

Bettis GVO-M Series

Pneumatic Linear Actuator



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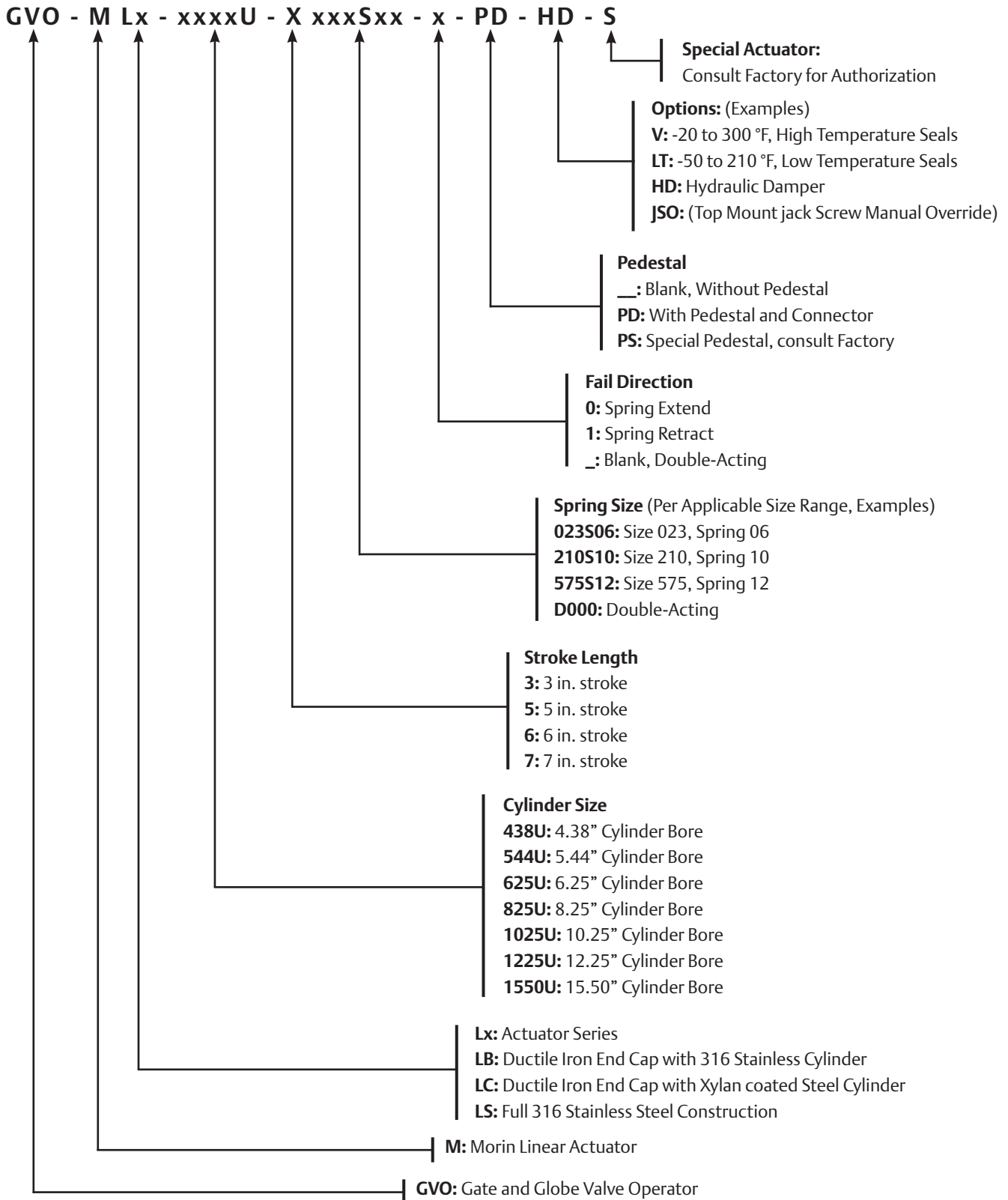
Introduction

GVO-M Series is a linear pneumatic actuator with high quality materials as Emerson's popular quarter-turn actuators. Ductile Iron with 316 stainless steel cylinders, ductile iron with Xylan protected steel cylinders, and all stainless steel construction. GVO-M Series are available both in double action and spring-return models. It has adjustable travel stop which provide accurate travel adjustment. Spring-return actuators are compact because spring is incorporated into same cylinder as the pneumatic power cylinder. It is suitable for automating most types of rising stem valves in safety shutdown and control applications. The GVO-M Series actuators are manufactured in accordance with strict-quality standards and assure reliability and safety in your specific service. The GVO-M Series actuators are backed by a five-year material and workmanship warranty, the best in the industry.

Types of Applications

On-Off, Emergency Shutdown Device (ESD), and Modulating Service for: Oil and gas, LNG terminal, power generation, water distribution, water and wastewater treatment, petrochemical, mining and minerals, industrial process.

Model Identification



Basic Features

Design

- Double-acting and spring-return models available
- Bores from 4.38 in. / 111 mm to 15.5 in. / 394 mm
- Adjustable travel stop provides accurate travel adjustment
- Designs available for water-hydraulic service
- Optional tandem cylinder for high thrust

Construction

- Available in all 316 Stainless steel provides unrivaled corrosion resistance.
- **Ductile Iron Endcaps with Xylan** - lined carbon steel cylinder provide long product life with durable, cost effective operation.
- **Sintered Bronze/PTFE Piston Rod Bushing**
 - Provides low-friction support and precise alignment of the piston rod to increase efficiency, reduce maintenance and extend actuator life.
- **Piston Rod**
 - Chrome-plated piston rod provides strength and corrosion resistance for enduring high cycle applications.
 - Optional stainless piston rod provides superior corrosion resistance.
- **Teflon Guide Band**
 - Ensures low-friction piston guidance during operation to protect cylinder walls from potential scoring and extend seal performance with a continuous cylinder wiping action.

Thrust Output

- Spring-Return: 190 lb to 23,606 lb / 845 N to 104,647 N
- Double-Acting: 542 lb to 28,667 lb / 2,625 N to 127,151 N

Supply Medium

- Pneumatic or water hydraulic services

Operating Pressure

- 40 to 160 psig / 3 to 11 bar

Temperature Rating

- Standard Range: -20 to 210 °F / -29 to 99 °C
- Optional Range: -65 to 300 °F / -54 °C to 149 °C

Standards and Certification

- ISO 9001 Certification by Lloyd's Register Quality

Warranty

- 5 Years

GVO-M Spring-Return - Fail Extend Performance Data (Imperial)

Table 1. GVO-M - Spring Fail Extend Linear Actuators Thrust Table

MODEL	Spring-Return Linear Actuators Spring Stroke						Air Stroke Thrust Output in lbf at Operating Pressure (psig)																CYLINDER DISPLACEMENT (cu. in.)	MINOP (psig)	MAWP (psig)		
	SET (lbf)	SST (lbf)	CYLINDER DIAMETER (in.)	STROKE (in.)	ROD DIAMETER (in.)	Fail Extend/Retract	40		50		60		70		80		90		100		110					120	
							AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET				AST	AET
LB-438U-3-023S040	190	353	4.38	3	1	Extend	353	190	488	326	624	461	760	597	895	733	1031	868	1167	1004	1303	1140	1438	1275	42.85	40	160
LB-438U-3-023S050	237	441	4.38	3	1	Extend	305	102	441	237	577	373	712	509	848	644	984	780	1119	916	1255	1052	1391	1187	42.85	40	160
LB-438U-3-023S060	285	529	4.38	3	1	Extend	-	-	393	149	529	285	665	421	801	556	936	692	1072	828	1208	963	1343	1099	42.85	50	160
LB-438U-3-023S070	332	617	4.38	3	1	Extend	-	-	-	-	482	197	617	332	753	468	889	604	1024	739	1160	875	1296	1011	42.85	55	160
LB-438U-3-023S080	380	706	4.38	3	1	Extend	-	-	-	-	434	109	570	244	706	380	841	516	977	651	1113	787	1248	923	42.85	60	160
LB-438U-3-023S090	438	813	4.38	3	1	Extend	-	-	-	-	-	-	512	137	648	272	783	408	919	544	1055	679	1190	815	42.85	70	160
LB-438U-3-023S100	485	901	4.38	3	1	Extend	-	-	-	-	-	-	-	-	600	184	736	320	871	455	1007	591	1143	727	42.85	79	160
LB-438U-3-023S120	586	1087	4.38	3	1	Extend	-	-	-	-	-	-	-	-	-	-	636	134	771	269	907	405	1043	541	42.85	90	160
LB-544U-3-036S040	294	546	5.44	3	1	Extend	559	307	773	520	986	734	1199	947	1413	1160	1626	1374	1839	1587	2053	1801	2266	2014	67.37	40	160
LB-544U-3-036S050	368	683	5.44	3	1	Extend	486	171	699	384	912	597	1126	811	1339	1024	1552	1237	1766	1451	1979	1664	2192	1877	67.37	40	160
LB-544U-3-036S060	441	819	5.44	3	1	Extend	-	-	625	247	839	461	1052	674	1266	887	1479	1101	1692	1314	1906	1527	2119	1741	67.37	43	160
LB-544U-3-036S070	515	956	5.44	3	1	Extend	-	-	552	111	765	324	979	537	1192	751	1405	964	1619	1177	1832	1391	2045	1604	67.37	50	160
LB-544U-3-036S080	588	1093	5.44	3	1	Extend	-	-	-	-	692	187	905	401	1118	614	1332	828	1545	1041	1758	1254	1972	1468	67.37	58	160
LB-544U-3-036S090	672	1249	5.44	3	1	Extend	-	-	-	-	-	-	821	245	1034	458	1248	672	1461	885	1675	1098	1888	1312	67.37	65	160
LB-544U-3-036S100	746	1385	5.44	3	1	Extend	-	-	-	-	-	-	748	108	961	322	1174	535	1388	748	1601	962	1814	1175	67.37	72	160
LB-544U-3-036S120	898	1668	5.44	3	1	Extend	-	-	-	-	-	-	-	-	-	-	1022	252	1235	465	1449	679	1662	892	67.37	85	160
LB-625U-3-050S040	398	738	6.25	3	1	Extend	738	398	1022	682	1306	966	1590	1250	1874	1534	2158	1818	2442	2102	2726	2386	3010	2670	89.68	40	160
LB-625U-3-050S050	497	923	6.25	3	1	Extend	639	213	923	497	1207	781	1491	1065	1775	1349	2059	1633	2343	1917	2627	2201	2911	2485	89.68	40	160
LB-625U-3-050S060	596	1108	6.25	3	1	Extend	-	-	824	312	1108	596	1392	880	1676	1164	1960	1448	2244	1732	2528	2016	2812	2300	89.68	50	160
LB-625U-3-050S070	696	1292	6.25	3	1	Extend	-	-	724	128	1008	412	1292	696	1576	980	1860	1264	2144	1548	2428	1832	2712	2116	89.68	50	160
LB-625U-3-050S080	795	1477	6.25	3	1	Extend	-	-	-	-	909	227	1193	511	1477	795	1761	1079	2045	1363	2329	1647	2613	1931	89.68	58	160
LB-625U-3-050S090	895	1661	6.25	3	1	Extend	-	-	-	-	-	-	1093	327	1377	611	1661	895	1945	1179	2229	1463	2513	1747	89.68	65	160
LB-625U-3-050S100	994	1846	6.25	3	1	Extend	-	-	-	-	-	-	994	142	1278	426	1562	710	1846	994	2130	1278	2414	1562	89.68	70	160
LC-825U-5-135S040	687	1277	8.25	5	1.5	Extend	1277	687	1768	1179	2259	1670	2750	2161	3241	2652	3732	3143	4223	3634	4714	4125	5205	4616	258.45	40	160
LC-825U-5-135S050	859	1596	8.25	5	1.5	Extend	1105	368	1596	859	2087	1350	2578	1841	3069	2332	3560	2824	4051	3315	4542	3806	5033	4297	258.45	40	160
LC-825U-5-135S060	1031	1915	8.25	5	1.5	Extend	-	-	1424	540	1915	1031	2406	1522	2897	2013	3388	2504	3879	2995	4370	3486	4861	3977	258.45	42	160
LC-825U-5-135S070	1203	2234	8.25	5	1.5	Extend	-	-	1252	221	1743	712	2234	1203	2725	1694	3216	2185	3707	2676	4198	3167	4689	3658	258.45	50	160

MODEL	Spring-Return Linear Actuators Spring Stroke						Air Stroke Thrust Output in lbf at Operating Pressure (psig)																CYLINDER DISPLACEMENT (cu. in.)	MINOP (psig)	MAWP (psig)		
	SET (lbf)	SST (lbf)	CYLINDER DIAMETER (in.)	STROKE (in.)	ROD DIAMETER (in.)	Fail Extend/Retract	40		50		60		70		80		90		100		110					120	
							AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET				AST	AET
LC-825U-5-135S080	1375	2553	8.25	5	1.5	Extend	-	-	-	-	1571	393	2062	884	2553	1375	3044	1866	3536	2357	4027	2848	4518	3339	258.45	58	160
LC-825U-5-135S090	1570	2916	8.25	5	1.5	Extend	-	-	-	-	-	-	1867	521	2358	1012	2849	1503	3340	1994	3831	2485	4322	2976	258.45	65	160
LC-825U-5-135S100	1742	3235	8.25	5	1.5	Extend	-	-	-	-	-	-	1695	202	2186	693	2677	1184	3168	1675	3659	2166	4150	2657	258.45	70	160
LC-825U-5-135S120	2098	3896	8.25	5	1.5	Extend	-	-	-	-	-	-	-	-	-	-	2322	524	2813	1015	3304	1506	3795	1997	258.45	85	160
LC-1025U-5-210S040	1074	1994	10.25	5	1.5	Extend	1994	1074	2762	1841	3529	2608	4296	3375	5063	4142	5830	4910	6597	5677	7364	6444	8131	7211	403.74	40	160
LC-1025U-5-210S050	1342	2493	10.25	5	1.5	Extend	1726	575	2493	1342	3260	2110	4027	2877	4794	3644	5562	4411	6329	5178	7096	5945	7863	6712	403.74	40	160
LC-1025U-5-210S060	1611	2992	10.25	5	1.5	Extend	-	-	2225	844	2992	1611	3759	2378	4526	3145	5293	3912	6060	4679	6827	5446	7594	6214	403.74	42	160
LC-1025U-5-210S070	1879	3490	10.25	5	1.5	Extend	-	-	1956	345	2723	1112	3490	1879	4257	2647	5025	3414	5792	4181	6559	4948	7326	5715	403.74	50	160
LC-1025U-5-210S080	2148	3989	10.25	5	1.5	Extend	-	-	-	-	2455	614	3222	1381	3989	2148	4756	2915	5523	3682	6290	4449	7057	5216	403.74	58	160
LC-1025U-5-210S090	2440	4531	10.25	5	1.5	Extend	-	-	-	-	-	-	2930	839	3697	1606	4464	2373	5231	3140	5998	3907	6765	4674	403.74	65	160
LC-1025U-5-210S100	2708	5030	10.25	5	1.5	Extend	-	-	-	-	-	-	2661	340	3428	1107	4196	1874	4963	2641	5730	3408	6497	4175	403.74	70	160
LC-1025U-5-210S120	3257	6049	10.25	5	1.5	Extend	-	-	-	-	-	-	-	-	-	-	3647	855	4414	1622	5181	2389	5948	3156	403.74	85	160
LC-1225U-6-370S040	1526	2834	12.25	6	2	Extend	2834	1526	3923	2616	5013	3705	6103	4795	7193	5885	8283	6975	9372	8065	10462	9154	11552	10244	688.30	40	160
LC-1225U-6-370S050	2234	3215	12.25	6	2	Extend	2125	1144	3215	2234	4305	3324	5395	4414	6484	5504	7574	6593	8664	7683	9754	8773	10844	9863	688.30	40	160
LC-1225U-6-370S060	2289	4250	12.25	6	2	Extend	2071	109	3160	1199	4250	2289	5340	3378	6430	4468	7520	5558	8610	6648	9699	7738	10789	8827	688.30	40	160
LC-1225U-6-370S070	2997	4632	12.25	6	2	Extend	-	-	2452	817	3542	1907	4632	2997	5722	4087	6811	5177	7901	6266	8991	7356	10081	8446	688.30	50	160
LC-1225U-6-370S080	3051	5667	12.25	6	2	Extend	-	-	-	-	3487	872	4577	1962	5667	3051	6757	4141	7847	5231	8936	6321	10026	7411	688.30	55	160
LC-1225U-6-370S090	3802	6126	12.25	6	2	Extend	-	-	-	-	2737	413	3827	1503	4917	2592	6007	3682	7096	4772	8186	5862	9276	6952	688.30	58	160
LC-1225U-6-370S100	3856	7161	12.25	6	2	Extend	-	-	-	-	-	-	3773	467	4862	1557	5952	2647	7042	3737	8132	4827	9222	5916	688.30	70	160
LC-1225U-6-370S120	4640	8617	12.25	6	2	Extend	-	-	-	-	-	-	-	-	4079	102	5168	1191	6258	2281	7348	3371	8438	4461	688.30	80	160
LC-1550U-6-575S040	2468	4583	15.5	6	2	Extend	4583	2468	6346	4231	8109	5993	9871	7756	11634	9519	13397	11281	15159	13044	16922	14807	18685	16570	1113.30	40	160
LC-1550U-6-575S050	3085	5729	15.5	6	2	Extend	3966	1322	5729	3085	7492	4847	9254	6610	11017	8373	12780	10136	14542	11898	16305	13661	18068	15424	1113.30	40	160
LC-1550U-6-575S060	3702	6875	15.5	6	2	Extend	3349	176	5112	1939	6875	3702	8637	5464	10400	7227	12163	8990	13926	10753	15688	12515	17451	14278	1113.30	40	160
LC-1550U-6-575S070	4319	8020	15.5	6	2	Extend	-	-	4495	793	6258	2556	8020	4319	9783	6081	11546	7844	13309	9607	15071	11370	16834	13132	1113.30	47	160
LC-1550U-6-575S080	4936	9166	15.5	6	2	Extend	-	-	-	-	5641	1410	7403	3173	9166	4936	10929	6698	12692	8461	14454	10224	16217	11987	1113.30	55	160
LC-1550U-6-575S090	5594	10390	15.5	6	2	Extend	-	-	-	-	4982	187	6745	1950	8507	3712	10270	5475	12033	7238	13796	9000	15558	10763	1113.30	60	160
LC-1550U-6-575S100	6211	11535	15.5	6	2	Extend	-	-	-	-	-	-	6128	804	7890	2566	9653	4329	11416	6092	13179	7855	14941	9617	1113.30	70	160
LC-1550U-6-575S120	7466	13866	15.5	6	2	Extend	-	-	-	-	-	-	-	-	6636	236	8398	1999	10161	3762	11924	5524	13687	7287	1113.30	79	160

Notes:
 SET: Spring End Thrust
 SST: Spring Start Thrust
 AET: Air (Pressure) End Thrust
 AST: Air (Pressure) Start Thrust
 MinOP: Minimum Operating Pressure
 MAWP: Maximum Allowable Working Pressure

GVO-M Spring-Return - Fail Retract Performance Data (Imperial)

Table 2. GVO-M - Spring Fail Retract Linear Actuators Thrust Table

MODEL	Spring-Return Linear Actuators Spring Stroke						Air Stroke Thrust Output in lbf at Operating Pressure (psig)																CYLINDER DISPLACEMENT (cu. in.)	MINOP (psig)	MAWP (psig)		
	SET (lbf)	SST (lbf)	CYLINDER DIAMETER (in.)	STROKE (in.)	ROD DIAMETER (in.)	Fail Extend/Retract	40		50		60		70		80		90		100		110					120	
							AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET				AST	AET
LB-438U-3-023S041	190	353	4.38	3	1	Retract	220	382	363	525	506	668	649	812	792	955	935	1098	1078	1241	1221	1384	1364	1527	42.85	40	160
LB-438U-3-023S051	237	441	4.38	3	1	Retract	131	335	274	478	417	621	561	764	704	907	847	1050	990	1193	1133	1336	1276	1479	42.85	40	160
LB-438U-3-023S061	285	529	4.38	3	1	Retract	-	-	186	430	329	573	472	717	615	860	758	1003	902	1146	1045	1289	1188	1432	42.85	50	160
LB-438U-3-023S071	332	617	4.38	3	1	Retract	-	-	98	383	241	526	384	669	527	812	670	955	813	1098	956	1241	1099	1384	42.85	50	160
LB-438U-3-023S081	380	706	4.38	3	1	Retract	-	-	-	-	153	479	296	622	439	765	582	908	725	1051	868	1194	1011	1337	42.85	58	160
LB-438U-3-023S091	438	813	4.38	3	1	Retract	-	-	-	-	-	-	188	564	331	707	474	850	618	993	761	1136	904	1279	42.85	65	160
LB-438U-3-023S101	485	901	4.38	3	1	Retract	-	-	-	-	-	-	100	516	243	659	386	802	529	945	672	1088	815	1231	42.85	71	160
LB-438U-3-023S121	586	1087	4.38	3	1	Retract	-	-	-	-	-	-	-	-	-	200	702	343	845	486	988	629	1131	42.85	85	160	
LB-544U-3-036S041	294	546	5.44	3	1	Retract	336	589	557	809	778	1030	999	1251	1219	1471	1440	1692	1661	1913	1881	2133	2102	2354	67.37	40	160
LB-544U-3-036S051	368	683	5.44	3	1	Retract	200	515	421	736	641	956	862	1177	1083	1398	1303	1619	1524	1839	1745	2060	1965	2281	67.37	40	160
LB-544U-3-036S061	441	819	5.44	3	1	Retract	-	-	284	662	505	883	725	1104	946	1324	1167	1545	1388	1766	1608	1986	1829	2207	67.37	43	160
LB-544U-3-036S071	515	956	5.44	3	1	Retract	-	-	147	589	368	809	589	1030	810	1251	1030	1471	1251	1692	1472	1913	1692	2134	67.37	50	160
LB-544U-3-036S081	588	1093	5.44	3	1	Retract	-	-	-	-	232	736	452	957	673	1177	894	1398	1114	1619	1335	1839	1556	2060	67.37	58	160
LB-544U-3-036S091	672	1249	5.44	3	1	Retract	-	-	-	-	-	-	296	873	517	1093	738	1314	958	1535	1179	1755	1400	1976	67.37	65	160
LB-544U-3-036S101	746	1385	5.44	3	1	Retract	-	-	-	-	-	-	160	799	380	1020	601	1240	822	1461	1043	1682	1263	1902	67.37	72	160
LB-544U-3-036S121	898	1668	5.44	3	1	Retract	-	-	-	-	-	-	-	-	-	318	1088	539	1309	760	1530	980	1750	67.37	85	160	
LB-625U-3-050S041	398	738	6.25	3	1	Retract	427	768	718	1059	1009	1350	1301	1642	1592	1933	1883	2224	2175	2515	2466	2807	2757	3098	89.68	40	160
LB-625U-3-050S051	497	923	6.25	3	1	Retract	242	668	534	960	825	1251	1116	1542	1407	1833	1699	2125	1990	2416	2281	2707	2573	2999	89.68	40	160
LB-625U-3-050S061	596	1108	6.25	3	1	Retract	-	-	349	860	640	1151	932	1443	1223	1734	1514	2025	1806	2317	2097	2608	2388	2899	89.68	43	160
LB-625U-3-050S071	696	1292	6.25	3	1	Retract	-	-	164	761	456	1052	747	1343	1038	1635	1330	1926	1621	2217	1912	2509	2204	2800	89.68	50	160
LB-625U-3-050S081	795	1477	6.25	3	1	Retract	-	-	-	-	271	953	562	1244	854	1535	1145	1827	1436	2118	1728	2409	2019	2701	89.68	58	160
LB-625U-3-050S091	895	1661	6.25	3	1	Retract	-	-	-	-	-	-	378	1145	669	1436	960	1727	1252	2018	1543	2310	1834	2601	89.68	65	160
LB-625U-3-050S101	994	1846	6.25	3	1	Retract	-	-	-	-	-	-	193	1045	484	1336	776	1628	1067	1919	1358	2210	1650	2502	89.68	70	160
LC-825U-5-135S041	687	1277	8.25	5	1.5	Retract	754	1343	1261	1850	1769	2358	2276	2866	2784	3373	3291	3881	3799	4388	4307	4896	4814	5403	258.45	40	160
LC-825U-5-135S051	859	1596	8.25	5	1.5	Retract	434	1171	942	1679	1450	2186	1957	2694	2465	3201	2972	3709	3480	4216	3987	4724	4495	5232	258.45	40	160
LC-825U-5-135S061	1031	1915	8.25	5	1.5	Retract	115	999	623	1507	1130	2014	1638	2522	2146	3029	2653	3537	3161	4045	3668	4552	4176	5060	258.45	42	160
LC-825U-5-135S071	1203	2234	8.25	5	1.5	Retract	-	-	-	-	811	1842	1319	2350	1826	2858	2334	3365	2841	3873	3349	4380	3857	4888	258.45	50	160
LC-825U-5-135S081	1375	2553	8.25	5	1.5	Retract	-	-	-	-	492	1671	1000	2178	1507	2686	2015	3193	2522	3701	3030	4208	3537	4716	258.45	58	160
LC-825U-5-135S091	1570	2916	8.25	5	1.5	Retract	-	-	-	-	129	1475	637	1983	1144	2490	1652	2998	2159	3505	2667	4013	3175	4521	258.45	65	160

MODEL	Spring-Return Linear Actuators Spring Stroke						Air Stroke Thrust Output in lbf at Operating Pressure (psig)																CYLINDER DISPLACEMENT (cu. in.)	MINOP (psig)	MAWP (psig)		
	SET (lbf)	SST (lbf)	CYLINDER DIAMETER (in.)	STROKE (in.)	ROD DIAMETER (in.)	Fail Extend/Retract	40		50		60		70		80		90		100		110					120	
							AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET				AST	AET
LC-825U-5-135S101	1742	3235	8.25	5	1.5	Retract	-	-	-	-	-	-	318	1811	825	2318	1333	2826	1840	3334	2348	3841	2855	4349	258.45	70	160
LC-825U-5-135S121	2098	3896	8.25	5	1.5	Retract	-	-	-	-	-	-	-	-	165	1963	673	2471	1180	2978	1688	3486	2195	3993	258.45	85	160
LC-1025U-5-210S041	1074	1994	10.25	5	1.5	Retract	1140	2060	1923	2844	2707	3627	3490	4411	4274	5194	5057	5978	5841	6761	6624	7545	7408	8328	403.74	40	160
LC-1025U-5-210S051	1342	2493	10.25	5	1.5	Retract	641	1792	1424	2575	2208	3359	2991	4142	3775	4926	4558	5709	5342	6493	6125	7276	6909	8060	403.74	40	160
LC-1025U-5-210S061	1611	2992	10.25	5	1.5	Retract	142	1523	926	2307	1709	3090	2493	3874	3276	4657	4060	5441	4843	6224	5627	7008	6410	7791	403.74	42	160
LC-1025U-5-210S071	1879	3490	10.25	5	1.5	Retract	-	-	427	2038	1211	2822	1994	3605	2778	4389	3561	5172	4345	5956	5128	6739	5912	7523	403.74	50	160
LC-1025U-5-210S081	2148	3989	10.25	5	1.5	Retract	-	-	-	-	712	2553	1496	3337	2279	4120	3063	4904	3846	5687	4630	6471	5413	7254	403.74	58	160
LC-1025U-5-210S091	2440	4531	10.25	5	1.5	Retract	-	-	-	-	170	2261	953	3045	1737	3828	2520	4612	3304	5395	4087	6179	4871	6962	403.74	65	160
LC-1025U-5-210S101	2708	5030	10.25	5	1.5	Retract	-	-	-	-	-	-	455	2776	1238	3560	2022	4343	2805	5127	3589	5910	4372	6694	403.74	70	160
LC-1025U-5-210S121	3257	6049	10.25	5	1.5	Retract	-	-	-	-	-	-	-	-	219	3011	1003	3794	1786	4578	2570	5361	3353	6145	403.74	79	160
LC-1225U-6-370S041	1526	2834	12.25	6	2	Retract	1643	2951	2762	4070	3881	5189	5000	6308	6119	7427	7238	8546	8357	9665	9476	10784	10596	11903	688.30	40	160
LC-1225U-6-370S051	2234	3215	12.25	6	2	Retract	1261	2242	2380	3361	3500	4480	4619	5600	5738	6719	6857	7838	7976	8957	9095	10076	10214	11195	688.30	40	160
LC-1225U-6-370S061	2289	4250	12.25	6	2	Retract	226	2188	1345	3307	2464	4426	3583	5545	4702	6664	5822	7783	6941	8902	8060	10021	9179	11140	688.30	40	160
LC-1225U-6-370S071	2997	4632	12.25	6	2	Retract	-	-	964	2598	2083	3718	3202	4837	4321	5956	5440	7075	6559	8194	7678	9313	8797	10432	688.30	43	160
LC-1225U-6-370S081	3051	5667	12.25	6	2	Retract	-	-	-	-	1048	3663	2167	4782	3286	5901	4405	7020	5524	8139	6643	9259	7762	10378	688.30	55	160
LC-1225U-6-370S091	3802	6126	12.25	6	2	Retract	-	-	-	-	588	2913	1708	4032	2827	5151	3946	6270	5065	7389	6184	8508	7303	9627	688.30	58	160
LC-1225U-6-370S101	3856	7161	12.25	6	2	Retract	-	-	-	-	-	-	672	3977	1791	5097	2910	6216	4030	7335	5149	8454	6268	9573	688.30	65	160
LC-1225U-6-370S121	4640	8617	12.25	6	2	Retract	-	-	-	-	-	-	-	-	336	4313	1455	5432	2574	6551	3693	7670	4812	8789	688.30	79	160
LC-1550U-6-575S041	2468	4583	15.5	6	2	Retract	2584	4699	4375	6490	6167	8282	7959	10074	9750	11865	11542	13657	13334	15449	15125	17240	16917	19032	1113.30	40	160
LC-1550U-6-575S051	3085	5729	15.5	6	2	Retract	1438	4082	3229	5874	5021	7665	6813	9457	8604	11249	10396	13040	12188	14832	13979	16624	15771	18415	1113.30	40	160
LC-1550U-6-575S061	3702	6875	15.5	6	2	Retract	292	3465	2084	5257	3875	7048	5667	8840	7459	10632	9250	12423	11042	14215	12834	16007	14625	17798	1113.30	40	160
LC-1550U-6-575S071	4319	8020	15.5	6	2	Retract	-	-	938	4640	2730	6431	4521	8223	6313	10015	8105	11806	9896	13598	11688	15390	13480	17181	1113.30	47	160
LC-1550U-6-575S081	4936	9166	15.5	6	2	Retract	-	-	-	-	1584	5814	3375	7606	5167	9398	6959	11189	8750	12981	10542	14773	12334	16564	1113.30	55	160
LC-1550U-6-575S091	5594	10390	15.5	6	2	Retract	-	-	-	-	360	5156	2152	6947	3944	8739	5735	10531	7527	12322	9319	14114	11110	15906	1113.30	60	160
LC-1550U-6-575S101	6211	11535	15.5	6	2	Retract	-	-	-	-	-	-	1006	6330	2798	8122	4590	9914	6381	11705	8173	13497	9965	15289	1113.30	70	160
LC-1550U-6-575S121	7466	13866	15.5	6	2	Retract	-	-	-	-	-	-	-	-	468	6867	2259	8659	4051	10450	5843	12242	7634	14034	1113.30	79	160

Notes:
 SET: Spring End Thrust
 SST: Spring Start Thrust
 AET: Air (Pressure) End Thrust
 AST: Air (Pressure) Start Thrust
 MinOP: Minimum Operating Pressure
 MAWP: Maximum Allowable Working Pressure

GVO-M Double-Acting Performance Data (Imperial)

Table 3. GVO-M - Double-Acting Linear Actuators Pressure Stroke

MODEL	CYLINDER DIAMETER (in.)	STROKE (in.)	ROD DIAMETER (in.)	Action	Air Stroke Thrust Output in lbf at Operating Pressure (psig)																												MINOP (psig)	MAWP (psig)
					40		50		60		70		80		90		100		110		120		130		140		150		160					
					Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract				
LB-438U	4.38	4	1	DA	572	542	715	678	858	814	1001	949	1145	1085	1288	1220	1431	1356	1574	1492	1717	1627	1860	1763	2003	1899	2146	2034	2289	2170	40	160		
LB-625U	6.25	4	1	DA	1165	1135	1457	1419	1748	1703	2039	1987	2330	2271	2622	2555	2913	2839	3204	3122	3496	3406	3787	3690	4078	3974	4370	4258	4661	4542	40	160		
LB-825U	8.25	6	1.5	DA	2030	1963	2538	2454	3045	2945	3553	3436	4061	3926	4568	4417	5076	4908	5583	5399	6091	5890	6598	6380	7106	6871	7614	7362	8121	7853	40	160		
LB-1025U	10.25	6	1.5	DA	3134	3067	3918	3834	4701	4600	5485	5367	6268	6134	7052	6901	7835	7667	8619	8434	9402	9201	10186	9967	10969	10734	11753	11501	12536	12268	40	160		
LB-1225U	12.25	7	2	DA	4476	4357	5595	5446	6715	6536	7834	7625	8953	8714	10072	9803	11191	10893	12310	11982	13429	13071	14548	14160	15667	15250	16786	16339	17905	17428	40	160		
LB-1550U	15.5	7	2	DA	7167	7047	8958	8809	10750	10571	12542	12333	14333	14095	16125	15857	17917	17618	19708	19380	21500	21142	23292	22904	25083	24666	26875	26428	28667	28189	40	160		

Notes:

MinOP: Minimum Operating Pressure
 MAWP: Maximum Allowable Working Pressure

GVO-M Spring-Return - Fail Extend Performance Data (Metric)

Table 4. GVO-M - Spring Fail Extend Linear Actuators Thrust Table

MODEL	Spring-Return Linear Actuators Spring Stroke						Air Stroke Thrust Output in Newton at Operating Pressure (bar)																CYLINDER DISPLACEMENT (L)	MINOP (bar)	MAWP (bar)				
	SET (N)	SST (N)	CYLINDER DIAMETER (mm)	STROKE (mm)	ROD DIAMETER (mm)	Fail Extend/Retract	3		3.5		4		4.5		5		5.5		6		6.5					7		8	
							AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET				AST	AET	AST	AET
LB-438U-3-023S040	845	1569	111.3	76.2	25.4	Extend	1780	1056	2217	1493	2655	1930	3092	2368	3530	2805	3967	3243	4404	3680	4842	4118	5279	4555	6154	5430	0.70	2.8	11
LB-438U-3-023S050	1056	1961	111.3	76.2	25.4	Extend	1569	663	2006	1101	2443	1538	2881	1976	3318	2413	3756	2850	4193	3288	4631	3725	5068	4163	5943	5038	0.70	2.8	11
LB-438U-3-023S060	1267	2354	111.3	76.2	25.4	Extend	-	-	1795	708	2232	1146	2670	1583	3107	2021	3545	2458	3982	2896	4419	3333	4857	3771	5732	4645	0.70	3.4	11
LB-438U-3-023S070	1479	2746	111.3	76.2	25.4	Extend	-	-	-	-	2021	754	2458	1191	2896	1628	3333	2066	3771	2503	4208	2941	4646	3378	5521	4253	0.70	3.8	11
LB-438U-3-023S080	1690	3138	111.3	76.2	25.4	Extend	-	-	-	-	-	-	2247	799	2685	1236	3122	1674	3560	2111	3997	2549	4434	2986	5309	3861	0.70	4.1	11
LB-438U-3-023S090	1948	3617	111.3	76.2	25.4	Extend	-	-	-	-	-	-	-	2427	758	2864	1195	3302	1632	3739	2070	4177	2507	5052	3382	0.70	4.8	11	
LB-438U-3-023S100	2159	4009	111.3	76.2	25.4	Extend	-	-	-	-	-	-	-	-	-	2653	803	3091	1240	3528	1678	3965	2115	4840	2990	0.70	5.4	11	
LB-438U-3-023S120	2605	4837	111.3	76.2	25.4	Extend	-	-	-	-	-	-	-	-	-	-	-	-	-	3082	850	3520	1287	4395	2162	0.70	6.2	11	
LB-544U-3-036S040	1308	2430	138.2	76.2	25.4	Extend	2819	1697	3507	2385	4194	3073	4882	3761	5570	4449	6258	5136	6946	5824	7634	6512	8322	7200	9697	8576	1.10	2.8	11
LB-544U-3-036S050	1636	3038	138.2	76.2	25.4	Extend	2492	1090	3179	1778	3867	2465	4555	3153	5243	3841	5931	4529	6619	5217	7307	5905	7994	6592	9370	7968	1.10	2.8	11
LB-544U-3-036S060	1963	3645	138.2	76.2	25.4	Extend	2164	482	2852	1170	3540	1858	4228	2546	4916	3234	5604	3921	6292	4609	6979	5297	7667	5985	9043	7361	1.10	3	11
LB-544U-3-036S070	2290	4253	138.2	76.2	25.4	Extend	-	-	2525	563	3213	1250	3901	1938	4589	2626	5277	3314	5964	4002	6652	4690	7340	5377	8716	6753	1.10	3.4	11
LB-544U-3-036S080	2617	4860	138.2	76.2	25.4	Extend	-	-	-	-	2886	643	3574	1331	4262	2019	4950	2706	5637	3394	6325	4082	7013	4770	8389	6146	1.10	4	11
LB-544U-3-036S090	2991	5554	138.2	76.2	25.4	Extend	-	-	-	-	-	-	3200	637	3888	1325	4576	2013	5264	2701	5952	3388	6639	4076	8015	5452	1.10	4.5	11
LB-544U-3-036S100	3318	6161	138.2	76.2	25.4	Extend	-	-	-	-	-	-	-	-	3561	717	4249	1405	4937	2093	5625	2781	6312	3469	7688	4844	1.10	5	11
LB-544U-3-036S120	3995	7419	138.2	76.2	25.4	Extend	-	-	-	-	-	-	-	-	-	-	-	-	4259	835	4947	1523	5635	2211	7011	3586	1.10	5.9	11
LB-625U-3-050S040	1769	3285	158.8	76.2	25.4	Extend	3725	2209	4641	3125	5557	4041	6472	4956	7388	5872	8304	6788	9219	7703	10135	8619	11050	9534	12882	11366	1.47	2.8	11
LB-625U-3-050S050	2211	4106	158.8	76.2	25.4	Extend	3283	1388	4199	2304	5114	3220	6030	4135	6946	5051	7861	5966	8777	6882	9693	7798	10608	8713	12440	10545	1.47	2.8	11
LB-625U-3-050S060	2653	4927	158.8	76.2	25.4	Extend	2841	567	3757	1483	4672	2398	5588	3314	6504	4230	7419	5145	8335	6061	9251	6977	10166	7892	11997	9724	1.47	3.4	11
LB-625U-3-050S070	3095	5748	158.8	76.2	25.4	Extend	-	-	3315	662	4230	1577	5146	2493	6061	3409	6977	4324	7893	5240	8808	6155	9724	7071	11555	8902	1.47	3.4	11
LB-625U-3-050S080	3537	6569	158.8	76.2	25.4	Extend	-	-	-	-	3788	756	4704	1672	5619	2587	6535	3503	7451	4419	8366	5334	9282	6250	11113	8081	1.47	4	11
LB-625U-3-050S090	3979	7390	158.8	76.2	25.4	Extend	-	-	-	-	-	-	4262	851	5177	1766	6093	2682	7008	3598	7924	4513	8840	5429	10671	7260	1.47	4.5	11
LB-625U-3-050S100	4421	8211	158.8	76.2	25.4	Extend	-	-	-	-	-	-	-	-	4735	945	5651	1861	6566	2776	7482	3692	8398	4608	10229	6439	1.47	4.8	11
LC-825U-5-135S040	3058	5679	209.6	127	38.1	Extend	6441	3820	8024	5403	9608	6987	11191	8570	12774	10153	14357	11736	15941	13319	17524	14903	19107	16486	22273	19652	4.24	2.8	11
LC-825U-5-135S050	3822	7099	209.6	127	38.1	Extend	5677	2400	7260	3984	8843	5567	10426	7150	12010	8733	13593	10316	15176	11900	16759	13483	18342	15066	21509	18232	4.24	2.8	11
LC-825U-5-135S060	4587	8519	209.6	127	38.1	Extend	4912	981	6495	2564	8079	4147	9662	5730	11245	7313	12828	8897	14412	10480	15995	12063	17578	13646	20744	16813	4.24	2.9	11
LC-825U-5-135S070	5351	9938	209.6	127	38.1	Extend	-	-	5731	1144	7314	2727	8897	4310	10481	5894	12064	7477	13647	9060	15230	10643	16813	12226	19980	15393	4.24	3.4	11

MODEL	Spring-Return Linear Actuators Spring Stroke						Air Stroke Thrust Output in Newton at Operating Pressure (bar)																		CYLINDER DISPLACEMENT (L)	MINOP (bar)	MAWP (bar)		
	SET (N)	SST (N)	CYLINDER DIAMETER (mm)	STROKE (mm)	ROD DIAMETER (mm)	Fail Extend/Retract	3		3.5		4		4.5		5		5.5		6		6.5		7					8	
							AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET				AST	AET
LC-825U-5-135S080	6116	11358	209.6	127	38.1	Extend	-	-	-	-	6550	1307	8133	2891	9716	4474	11299	6057	12883	7640	14466	9223	16049	10807	19215	13973	4.24	4	11
LC-825U-5-135S090	6985	12972	209.6	127	38.1	Extend	-	-	-	-	-	-	7264	1277	8847	2860	10430	4443	12013	6026	13597	7610	15180	9193	18346	12359	4.24	4.5	11
LC-825U-5-135S100	7750	14392	209.6	127	38.1	Extend	-	-	-	-	-	-	-	8083	1440	9666	3023	11249	4607	12832	6190	14415	7773	17582	10939	4.24	4.8	11	
LC-825U-5-135S120	9331	17329	209.6	127	38.1	Extend	-	-	-	-	-	-	-	-	-	-	-	9668	1670	11251	3253	12834	4836	16001	8003	4.24	5.9	11	
LC-1025U-5-210S040	4777	8872	260.4	127	38.1	Extend	10063	5968	12536	8441	15009	10914	17482	13388	19956	15861	22429	18334	24902	20808	27376	23281	29849	25754	34796	30701	6.62	2.8	11
LC-1025U-5-210S050	5972	11090	260.4	127	38.1	Extend	8868	3750	11342	6223	13815	8696	16288	11170	18761	13643	21235	16116	23708	18590	26181	21063	28655	23536	33601	28483	6.62	2.8	11
LC-1025U-5-210S060	7166	13308	260.4	127	38.1	Extend	7674	1532	10147	4005	12621	6478	15094	8952	17567	11425	20040	13898	22514	16372	24987	18845	27460	21318	32407	26265	6.62	2.9	11
LC-1025U-5-210S070	8360	15526	260.4	127	38.1	Extend	-	-	8953	1787	11426	4260	13900	6734	16373	9207	18846	11680	21319	14154	23793	16627	26266	19100	31213	24047	6.62	3.4	11
LC-1025U-5-210S080	9554	17744	260.4	127	38.1	Extend	-	-	-	-	10232	2042	12705	4516	15179	6989	17652	9462	20125	11936	22598	14409	25072	16882	30018	21829	6.62	4	11
LC-1025U-5-210S090	10853	20156	260.4	127	38.1	Extend	-	-	-	-	-	-	11406	2104	13880	4577	16353	7050	18826	9523	21300	11997	23773	14470	28719	19417	6.62	4.5	11
LC-1025U-5-210S100	12048	22374	260.4	127	38.1	Extend	-	-	-	-	-	-	-	-	12685	2359	15159	4832	17632	7305	20105	9779	22578	12252	27525	17199	6.62	4.8	11
LC-1025U-5-210S120	14488	26907	260.4	127	38.1	Extend	-	-	-	-	-	-	-	-	-	-	-	15191	2772	17664	5246	20138	7719	25084	12666	6.62	5.9	11	
LC-1225U-6-370S040	6787	12604	311.2	152.4	50.8	Extend	14296	8478	17809	11992	21323	15506	24837	19020	28351	22533	31864	26047	35378	29561	38892	33074	42405	36588	49433	43616	11.28	2.8	11
LC-1225U-6-370S050	9938	14301	311.2	152.4	50.8	Extend	11145	6782	14658	10295	18172	13809	21686	17323	25200	20837	28713	24350	32227	27864	35741	31378	39254	34891	46282	41919	11.28	2.8	11
LC-1225U-6-370S060	10180	18906	311.2	152.4	50.8	Extend	10902	2176	14416	5690	17930	9204	21443	12717	24957	16231	28471	19745	31985	23259	35498	26772	39012	30286	46039	37314	11.28	2.8	11
LC-1225U-6-370S070	13331	20603	311.2	152.4	50.8	Extend	-	-	11265	3993	14779	7507	18292	11021	21806	14534	25320	18048	28834	21562	32347	25076	35861	28589	42888	35617	11.28	3.4	11
LC-1225U-6-370S080	13574	25208	311.2	152.4	50.8	Extend	-	-	-	-	14536	2902	18050	6415	21564	9929	25077	13443	28591	16957	32105	20470	35618	23984	42646	31011	11.28	3.8	11
LC-1225U-6-370S090	16911	27250	311.2	152.4	50.8	Extend	-	-	-	-	11199	860	14713	4374	18227	7887	21741	11401	25254	14915	28768	18428	32282	21942	39309	28970	11.28	4	11
LC-1225U-6-370S100	17153	31856	311.2	152.4	50.8	Extend	-	-	-	-	-	-	-	-	17984	3282	21498	6796	25012	10309	28526	13823	32039	17337	39067	24364	11.28	4.8	11
LC-1225U-6-370S120	20639	38330	311.2	152.4	50.8	Extend	-	-	-	-	-	-	-	-	-	-	-	21526	3835	25039	7348	28553	10862	35580	17890	11.28	5.5	11	
LC-1550U-6-575S040	10977	20387	393.7	152.4	50.8	Extend	23123	13713	28806	19397	34489	25080	40173	30763	45856	36447	51539	42130	57222	47813	62906	53497	68589	59180	79956	70546	18.24	2.8	11
LC-1550U-6-575S050	13722	25483	393.7	152.4	50.8	Extend	20378	8617	26061	14300	31745	19983	37428	25667	43111	31350	48795	37033	54478	42717	60161	48400	65844	54083	77211	65450	18.24	2.8	11
LC-1550U-6-575S060	16466	30580	393.7	152.4	50.8	Extend	17634	3520	23317	9203	29000	14887	34684	20570	40367	26253	46050	31937	51734	37620	57417	43303	63100	48986	74467	60353	18.24	2.8	11
LC-1550U-6-575S070	19211	35677	393.7	152.4	50.8	Extend	-	-	20573	4107	26256	9790	31939	15473	37623	21157	43306	26840	48989	32523	54673	38207	60356	43890	71723	55256	18.24	3.2	11
LC-1550U-6-575S080	21955	40773	393.7	152.4	50.8	Extend	-	-	-	-	23512	4693	29195	10377	34878	16060	40562	21743	46245	27427	51928	33110	57611	38793	68978	50160	18.24	3.8	11
LC-1550U-6-575S090	24885	46215	393.7	152.4	50.8	Extend	-	-	-	-	-	-	26265	4935	31948	10618	37632	16301	43315	21985	48998	27668	54681	33351	66048	44718	18.24	4.1	11
LC-1550U-6-575S100	27629	51312	393.7	152.4	50.8	Extend	-	-	-	-	-	-	-	-	29204	5521	34887	11205	40570	16888	46254	22571	51937	28254	63304	39621	18.24	4.8	11
LC-1550U-6-575S120	33211	61678	393.7	152.4	50.8	Extend	-	-	-	-	-	-	-	-	-	-	29306	839	34989	6522	40672	12205	46355	17888	57722	29255	18.24	5.4	11

Notes:
SET: Spring End Thrust
SST: Spring Start Thrust
AET: Air (Pressure) End Thrust
AST: Air (Pressure) Start Thrust
MinOP: Minimum Operating Pressure
MAWP: Maximum Allowable Working Pressure

GVO-M Spring-Return - Fail Retract Performance Data (Metric)

Table 5. GVO-M - Spring Fail Retract Linear Actuators Thrust Table

MODEL	Spring-Return Linear Actuators Spring Stroke						Air Stroke Thrust Output in Newton at Operating Pressure (bar)																CYLINDER DISPLACEMENT (L)	MINOP (bar)	MAWP (bar)				
	SET (N)	SST (N)	CYLINDER DIAMETER (mm)	STROKE (mm)	ROD DIAMETER (mm)	Fail Extend/Retract	3		3.5		4		4.5		5		5.5		6		6.5					7		8	
							AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET				AST	AET	AST	AET
LB-438U-3-023S041	845	1569	111.3	76.2	25.4	Retract	1200	1924	1661	2386	2123	2847	2584	3309	3046	3770	3507	4232	3969	4693	4430	5155	4892	5616	5815	6539	0.70	2.8	11
LB-438U-3-023S051	1056	1961	111.3	76.2	25.4	Retract	808	1713	1269	2174	1731	2636	2192	3097	2654	3559	3115	4020	3577	4482	4038	4943	4500	5405	5423	6328	0.70	2.8	11
LB-438U-3-023S061	1267	2354	111.3	76.2	25.4	Retract	-	-	877	1963	1338	2425	1800	2886	2261	3348	2723	3809	3184	4271	3646	4732	4107	5194	5030	6117	0.70	3.4	11
LB-438U-3-023S071	1479	2746	111.3	76.2	25.4	Retract	-	-	484	1752	946	2213	1408	2675	1869	3136	2331	3598	2792	4059	3254	4521	3715	4982	4638	5905	0.70	3.8	11
LB-438U-3-023S081	1690	3138	111.3	76.2	25.4	Retract	-	-	-	554	2002	1015	2464	1477	2925	1938	3387	2400	3848	2861	4310	3323	4771	4246	5694	0.70	4.1	11	
LB-438U-3-023S091	1948	3617	111.3	76.2	25.4	Retract	-	-	-	-	-	537	2206	998	2667	1460	3129	1921	3590	2383	4052	2844	4513	3767	5437	0.70	4.8	11	
LB-438U-3-023S101	2159	4009	111.3	76.2	25.4	Retract	-	-	-	-	-	-	-	606	2456	1067	2918	1529	3379	1990	3841	2452	4302	3375	5225	0.70	5.4	11	
LB-438U-3-023S121	2605	4837	111.3	76.2	25.4	Retract	-	-	-	-	-	-	-	-	-	-	-	701	2934	1163	3395	1624	3857	2547	4780	0.70	6.2	11	
LB-544U-3-036S041	1308	2430	138.2	76.2	25.4	Retract	1841	2963	2553	3675	3265	4387	3977	5099	4689	5811	5401	6523	6113	7235	6825	7946	7537	8658	8961	10082	1.10	2.8	11
LB-544U-3-036S051	1636	3038	138.2	76.2	25.4	Retract	1234	2636	1946	3348	2658	4060	3370	4772	4082	5484	4794	6195	5505	6907	6217	7619	6929	8331	8353	9755	1.10	2.8	11
LB-544U-3-036S061	1963	3645	138.2	76.2	25.4	Retract	626	2309	1338	3021	2050	3733	2762	4445	3474	5156	4186	5868	4898	6580	5610	7292	6322	8004	7746	9428	1.10	3	11
LB-544U-3-036S071	2290	4253	138.2	76.2	25.4	Retract	-	-	731	2694	1443	3406	2155	4117	2867	4829	3579	5541	4290	6253	5002	6965	5714	7677	7138	9101	1.10	3.4	11
LB-544U-3-036S081	2617	4860	138.2	76.2	25.4	Retract	-	-	-	835	3078	1547	3790	2259	4502	2971	5214	3683	5926	4395	6638	5107	7350	6531	8774	1.10	4	11	
LB-544U-3-036S091	2991	5554	138.2	76.2	25.4	Retract	-	-	-	-	-	853	3417	1565	4129	2277	4841	2989	5552	3701	6264	4413	6976	5837	8400	1.10	4.5	11	
LB-544U-3-036S101	3318	6161	138.2	76.2	25.4	Retract	-	-	-	-	-	-	-	958	3802	1670	4513	2382	5225	3094	5937	3805	6649	5229	8073	1.10	5	11	
LB-544U-3-036S121	3995	7419	138.2	76.2	25.4	Retract	-	-	-	-	-	-	-	-	-	-	-	1124	4548	1835	5260	2547	5972	3971	7396	1.10	5.9	11	
LB-625U-3-050S041	1769	3285	158.8	76.2	25.4	Retract	2354	3870	3293	4809	4233	5749	5173	6689	6113	7628	7052	8568	7992	9508	8932	10448	9871	11387	11751	13267	1.47	2.8	11
LB-625U-3-050S051	2211	4106	158.8	76.2	25.4	Retract	1533	3427	2472	4367	3412	5307	4352	6247	5291	7186	6231	8126	7171	9066	8110	10005	9050	10945	10930	12824	1.47	2.8	11
LB-625U-3-050S061	2653	4927	158.8	76.2	25.4	Retract	711	2985	1651	3925	2591	4865	3531	5804	4470	6744	5410	7684	6350	8624	7289	9563	8229	10503	10108	12382	1.47	3.4	11
LB-625U-3-050S071	3095	5748	158.8	76.2	25.4	Retract	-	-	830	3483	1770	4423	2709	5362	3649	6302	4589	7242	5529	8181	6468	9121	7408	10061	9287	11940	1.47	3.4	11
LB-625U-3-050S081	3537	6569	158.8	76.2	25.4	Retract	-	-	-	949	3980	1888	4920	2828	5860	3768	6800	4707	7739	5647	8679	6587	9619	8466	11498	1.47	4	11	
LB-625U-3-050S091	3979	7390	158.8	76.2	25.4	Retract	-	-	-	-	-	1067	4478	2007	5418	2947	6357	3886	7297	4826	8237	5766	9176	7645	11056	1.47	4.5	11	
LB-625U-3-050S101	4421	8211	158.8	76.2	25.4	Retract	-	-	-	-	-	-	-	1186	4976	2125	5915	3065	6855	4005	7795	4944	8734	6824	10614	1.47	4.8	11	
LC-825U-5-135S041	3058	5679	209.6	127	38.1	Retract	4145	6766	5782	8403	7420	10041	9057	11678	10694	13315	12332	14953	13969	16590	15606	18227	17244	19865	20518	23139	4.24	2.8	11
LC-825U-5-135S051	3822	7099	209.6	127	38.1	Retract	2725	6002	4362	7639	6000	9276	7637	10914	9274	12551	10912	14188	12549	15826	14186	17463	15824	19100	19098	22375	4.24	2.8	11
LC-825U-5-135S061	4587	8519	209.6	127	38.1	Retract	1305	5237	2943	6874	4580	8512	6217	10149	7855	11786	9492	13424	11129	15061	12767	16698	14404	18336	17679	21610	4.24	2.9	11
LC-825U-5-135S071	5351	9938	209.6	127	38.1	Retract	-	-	1523	6110	3160	7747	4798	9385	6435	11022	8072	12659	9710	14297	11347	15934	12984	17571	16259	20846	4.24	3.4	11
LC-825U-5-135S081	6116	11358	209.6	127	38.1	Retract	-	-	-	1740	6983	3378	8620	5015	10257	6652	11895	8290	13532	9927	15169	11564	16807	14839	20081	4.24	4	11	

MODEL	Spring-Return Linear Actuators Spring Stroke						Air Stroke Thrust Output in Newton at Operating Pressure (bar)																		CYLINDER DISPLACEMENT (L)	MINOP (bar)	MAWP (bar)		
	SET (N)	SST (N)	CYLINDER DIAMETER (mm)	STROKE (mm)	ROD DIAMETER (mm)	Fail Extend/Retract	3		3.5		4		4.5		5		5.5		6		6.5		7					8	
							AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET	AST	AET				AST	AET
LC-825U-5-135S091	6985	12972	209.6	127	38.1	Retract	-	-	-	-	-	-	1764	7751	3401	9388	5039	11026	6676	12663	8313	14300	9950	15938	13225	19212	4.24	4.5	11
LC-825U-5-135S101	7750	14392	209.6	127	38.1	Retract	-	-	-	-	-	-	-	-	1981	8624	3619	10261	5256	11899	6893	13536	8531	15173	11805	18448	4.24	4.8	11
LC-825U-5-135S121	9331	17329	209.6	127	38.1	Retract	-	-	-	-	-	-	-	-	-	-	682	8680	2319	10317	3957	11955	5594	13592	8869	16867	4.24	5.9	11
LC-1025U-5-210S041	4777	8872	260.4	127	38.1	Retract	6293	10387	8820	12915	11347	15442	13875	17970	16402	20497	18930	23024	21457	25552	23985	28079	26512	30607	31567	35662	6.62	2.8	11
LC-1025U-5-210S051	5972	11090	260.4	127	38.1	Retract	4075	9193	6602	11720	9129	14248	11657	16775	14184	19303	16712	21830	19239	24358	21767	26885	24294	29412	29349	34467	6.62	2.8	11
LC-1025U-5-210S061	7166	13308	260.4	127	38.1	Retract	1857	7999	4384	10526	6911	13054	9439	15581	11966	18108	14494	20636	17021	23163	19549	25691	22076	28218	27131	33273	6.62	2.9	11
LC-1025U-5-210S071	8360	15526	260.4	127	38.1	Retract	-	-	2166	9332	4693	11859	7221	14387	9748	16914	12276	19442	14803	21969	17331	24496	19858	27024	24913	32079	6.62	3.4	11
LC-1025U-5-210S081	9554	17744	260.4	127	38.1	Retract	-	-	-	-	2475	10665	5003	13192	7530	15720	10058	18247	12585	20775	15113	23302	17640	25829	22695	30884	6.62	4	11
LC-1025U-5-210S091	10853	20156	260.4	127	38.1	Retract	-	-	-	-	-	-	2591	11894	5118	14421	7646	16948	10173	19476	12700	22003	15228	24531	20283	29585	6.62	4.5	11
LC-1025U-5-210S101	12048	22374	260.4	127	38.1	Retract	-	-	-	-	-	-	-	-	2900	13227	5428	15754	7955	18282	10482	20809	13010	23336	18065	28391	6.62	4.8	11
LC-1025U-5-210S121	14488	26907	260.4	127	38.1	Retract	-	-	-	-	-	-	-	-	-	-	895	13313	3422	15841	5949	18368	8477	20895	13532	25950	6.62	5.9	11
LC-1225U-6-370S041	6787	12604	311.2	152.4	50.8	Retract	9056	14873	12666	18483	16276	22093	19886	25703	23496	29313	27105	32923	30715	36533	34325	40143	37935	43752	45155	50972	11.28	2.8	11
LC-1225U-6-370S051	9938	14301	311.2	152.4	50.8	Retract	7359	11722	10969	15332	14579	18942	18189	22552	21799	26162	25409	29772	29019	33382	32629	36992	36238	40601	43458	47821	11.28	2.8	11
LC-1225U-6-370S061	10180	18906	311.2	152.4	50.8	Retract	2754	11480	6364	15089	9974	18699	13583	22309	17193	25919	20803	29529	24413	33139	28023	36749	31633	40359	38853	47579	11.28	2.8	11
LC-1225U-6-370S071	13331	20603	311.2	152.4	50.8	Retract	1057	8328	4667	11938	8277	15548	11887	19158	15497	22768	19107	26378	22717	29988	26327	33598	29936	37208	37156	44428	11.28	3.4	11
LC-1225U-6-370S081	13574	25208	311.2	152.4	50.8	Retract	-	-	-	-	3671	15306	7281	18916	10891	22526	14501	26136	18111	29746	21721	33356	25331	36966	32551	44186	11.28	3.8	11
LC-1225U-6-370S091	16911	27250	311.2	152.4	50.8	Retract	-	-	-	-	1630	11969	5240	15579	8850	19189	12459	22799	16069	26409	19679	30019	23289	33629	30509	40849	11.28	4	11
LC-1225U-6-370S101	17153	31856	311.2	152.4	50.8	Retract	-	-	-	-	-	-	634	15337	4244	18947	7854	22557	11464	26167	15074	29777	18684	33386	25904	40606	11.28	4.8	11
LC-1225U-6-370S121	20639	38330	311.2	152.4	50.8	Retract	-	-	-	-	-	-	-	-	-	-	1379	19070	4989	22680	8599	26290	12209	29900	19429	37120	11.28	5.5	11
LC-1550U-6-575S041	10977	20387	393.7	152.4	50.8	Retract	14291	23700	20070	29479	25850	35259	31629	41039	37409	46818	43188	52598	48968	58377	54747	64157	60527	69936	72086	81495	18.24	2.8	11
LC-1550U-6-575S051	13722	25483	393.7	152.4	50.8	Retract	9194	20955	14974	26735	20753	32515	26533	38294	32312	44074	38092	49853	43871	55633	49651	61412	55430	67192	66989	78751	18.24	2.8	11
LC-1550U-6-575S061	16466	30580	393.7	152.4	50.8	Retract	4097	18211	9877	23991	15656	29770	21436	35550	27216	41329	32995	47109	38775	52888	44554	58668	50333	64447	61893	76007	18.24	2.8	11
LC-1550U-6-575S071	19211	35677	393.7	152.4	50.8	Retract	-	-	4780	21246	10560	27026	16339	32805	22119	38585	27898	44365	33678	50144	39457	55924	45237	61703	56796	73262	18.24	3.2	11
LC-1550U-6-575S081	21955	40773	393.7	152.4	50.8	Retract	-	-	-	-	5463	24282	11243	30061	17022	35841	22802	41620	28581	47400	34361	53179	40140	58959	51699	70518	18.24	3.8	11
LC-1550U-6-575S091	24885	46215	393.7	152.4	50.8	Retract	-	-	-	-	-	-	5801	27131	11580	32910	17360	38690	23139	44469	28919	50249	34698	56028	46258	67588	18.24	4.1	11
LC-1550U-6-575S101	27629	51312	393.7	152.4	50.8	Retract	-	-	-	-	-	-	-	-	6484	30166	12263	35946	18043	41725	23822	47505	29602	53284	41161	64843	18.24	4.8	11
LC-1550U-6-575S121	33211	61678	393.7	152.4	50.8	Retract	-	-	-	-	-	-	-	-	-	-	1897	30364	7677	36143	13456	41923	19236	47702	30795	59262	18.24	5.4	11

Notes:
 SET: Spring End Thrust
 SST: Spring Start Thrust
 AET: Air (Pressure) End Thrust
 AST: Air (Pressure) Start Thrust
 MinOP: Minimum Operating Pressure
 MAWP: Maximum Allowable Working Pressure

GVO-M Double-Acting Performance Data (Metric)

Table 6. GVO-M - Double-Acting Linear Actuators Pressure Stroke

MODEL	CYLINDER DIAMETER (mm)	STROKE (mm)	ROD DIAMETER (mm)	Action	Air Stroke Thrust Output in Newton at Operating Pressure (bar)																								MINOP (bar)	MAWP (bar)		
					3		3.5		4		4.5		5		5.5		6		6.5		7		8		9		10				11	
					Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract	Extend	Retract			Extend	Retract
LB-438U	111.2	101.6	25.4	DA	2769	2625	3231	3062	3692	3500	4154	3937	4615	4375	5077	4812	5538	5249	6000	5687	6461	6124	7384	6999	8307	7874	9230	8749	10153	9624	2.8	11
LB-625U	158.7	101.6	25.4	DA	5638	5494	6578	6410	7518	7325	8457	8241	9397	9156	10337	10072	11276	10988	12216	11903	13156	12819	15035	14650	16915	16482	18794	18313	20674	20144	2.8	11
LB-825U	209.5	152.4	38.1	DA	9824	9499	11461	11082	13099	12666	14736	14249	16373	15832	18011	17415	19648	18999	21285	20582	22923	22165	26197	25331	29472	28498	32747	31664	36022	34831	2.8	11
LB-1025U	260.3	152.4	38.1	DA	15165	14840	17692	17313	20219	19786	22747	22260	25274	24733	27802	27206	30329	29680	32857	32153	35384	34626	40439	39573	45494	44519	50549	49466	55604	54413	2.8	11
LB-1225U	311.1	177.8	50.8	DA	21660	21082	25270	24596	28880	28110	32490	31624	36100	35137	39710	38651	43320	42165	46930	45679	50539	49192	57759	56220	64979	63247	72199	70275	79419	77302	2.8	11
LB-1550U	393.7	177.8	50.8	DA	34677	34100	40457	39783	46236	45467	52016	51150	57796	56833	63575	62517	69355	68200	75134	73883	80913	79566	92473	90933	104032	102300	115591	113667	127151	125034	2.8	11

Notes:
MinOP: Minimum Operating Pressure
MAWP: Maximum Allowable Working Pressure

Dimensions

Figure 1. GVO-M Double-Acting Linear Actuator

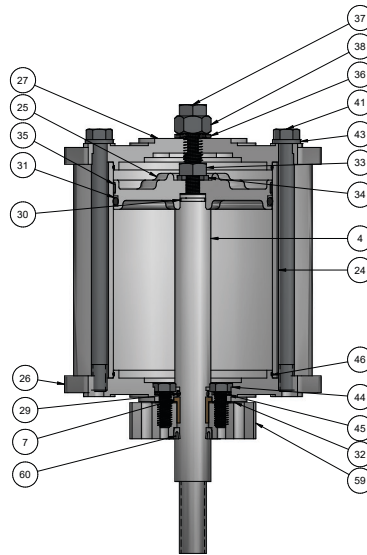


Table 7. Material List for GVO-M-LS / LB / LC Double-Acting Actuator

Item	Description	LS Material		LB Material		LC Material
		438 - 625	825 - 1550	438 - 625	825 - 1550	825 - 1550
37	Travel Stop Bolt	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
38	Jam Nut	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
36	Thread Seal	SS/EPDM	SS/EPDM	Steel/NBR	Steel/NBR	Steel/NBR
41	Tie Rod	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
43	Lock washer	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
27	End Cap	316 SS	316 SS	Ductile Iron	Ductile Iron	Ductile Iron
33	Piston bolt	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
34	Lock washer	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
25	Piston	316 SS	316 SS	Ductile Iron	Ductile Iron	Ductile Iron
35	Piston Bearing	PTFE	PTFE	PTFE	PTFE	PTFE
31	Seal - piston	NBR	NBR	NBR	NBR	NBR
4	Piston Rod	316 SS	316 SS	CPO	CPO	CPO
30	Seal - piston bolt	NBR	NBR	NBR	NBR	NBR
24	Cylinder	316 SS	316 SS	316 SS	316 SS	Steel/XYLAN
46	Cylinder seal	NBR	NBR	NBR	NBR	NBR
26	Adaptor	316 SS	316 SS	Ductile Iron	Ductile Iron	Ductile Iron
44	Hex Head Bolt	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
45	Stat-O-Seal	NBR	NBR	NBR	NBR	NBR
32	Gasket	Fiber	Fiber	Fiber	Fiber	Fiber
59	Mounting Plate	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
29	Seal - Piston Rod	NBR	NBR	NBR	NBR	NBR
7	Bushing - Piston Rod	Teflon	Teflon	Bronze	Bronze	Bronze
60	Rod Wiper	Polyurethane	Polyurethane	Polyurethane	Polyurethane	Polyurethane

Figure 2. GVO-M Spring-Return Linear Actuator

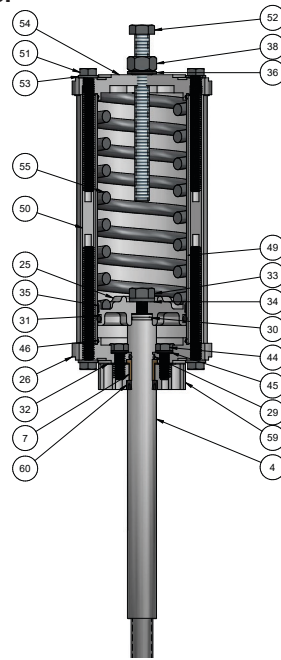


Table 8. Material List for GVO-M-LS / LB / LC Spring-Return Actuator

Item	Description	LS Material		LB Material		LC Material
		438 - 625	825 - 1550	438 - 625	825 - 1550	825 - 1550
52	Travel Stop Bolt	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
38	Jam Nut	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
36	Thread Seal	SS/EPDM	SS/EPDM	Steel/NBR	Steel/NBR	Steel/NBR
51	Hex Head Bolt	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
50	Tie Rod - spring side	316 SS	316 SS	316 SS	Steel	Steel
53	Flat Washer	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
54	Endcap - spring side	316 SS	316 SS	Ductile Iron	Ductile Iron	Ductile Iron
33	Piston bolt	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
34	Lock washer	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
25	Piston	316 SS	316 SS	Ductile Iron	Ductile Iron	Ductile Iron
35	Piston Bearing	PTFE	PTFE	PTFE	PTFE	PTFE
4	Piston Rod	316 SS	316 SS	CPO	CPO	CPO
30	Seal - piston bolt	NBR	NBR	NBR	NBR	NBR
31	Seal - piston	NBR	NBR	NBR	NBR	NBR
49	Cylinder - spring side	316 SS	316 SS	316 SS	316 SS	Steel/XYLAN
46	Cylinder seal	NBR	NBR	NBR	NBR	NBR
26	Adaptor	316 SS	316 SS	Ductile Iron	Ductile Iron	Ductile Iron
44	Hex Head Bolt	18-8 SS	18-8 SS	18-8 SS	Steel	Steel
45	Stat-O-Seal	NBR	NBR	NBR	NBR	NBR
32	Gasket	Fiber	Fiber	Fiber	Fiber	Fiber
59	Mounting Plate	316 SS	316 SS	Steel	Steel	Steel
29	Seal - Piston Rod	NBR	NBR	NBR	NBR	NBR
7	Bushing - Piston Rod	Teflon	Teflon	Bronze	Bronze	Bronze
60	Rod Wiper	Polyurethane	Polyurethane	Polyurethane	Polyurethane	Polyurethane
55	Spring	Steel	Steel	Steel	Steel	Steel

Figure 3. GVO-M Mounting Pattern - Spring-Return

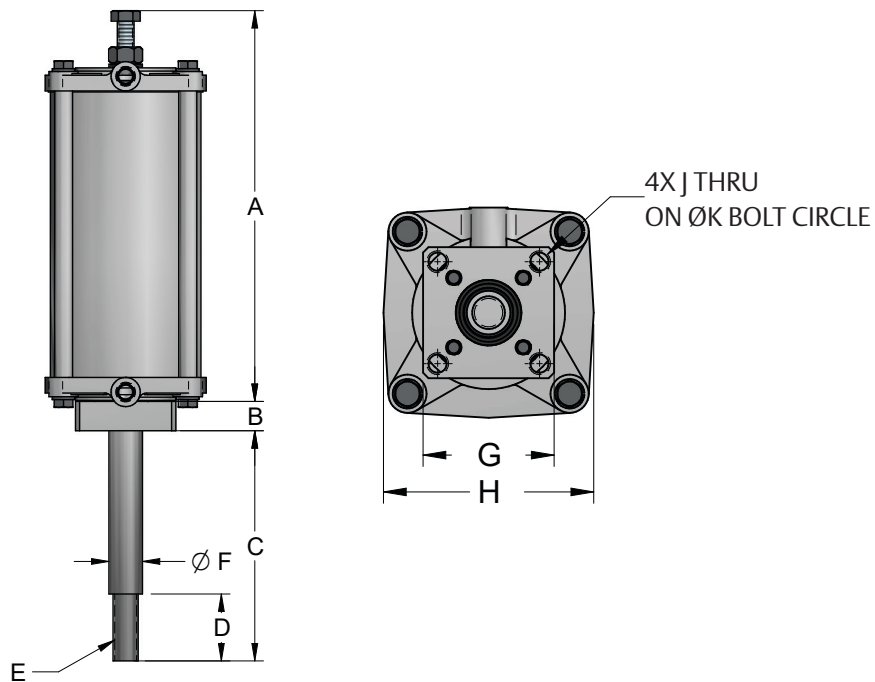


Table 9. Fail Direction Spring Extended Actuators

MODEL	LB/LC SIZES	CYLINDER SIZE	ROD DIAMETER	STROKE	A REF.	B	C		D	E	F	G	H	J	K
							Fail Extended	Fail Retracted							
LB-438U-3-023SXX0	438	4.38	1.0	3	11.68	0.88	9.88	6.88	2.0	3/4-10UNC-2A	1.0	3.00	4.81	1/2-13UNC-2B	3.625
LB-544U-3-036SXX0	544	4.38	1.0	3	14.15	1.00	7.02	4.02	2.0	3/4-10UNC-2A	1.0	3.50	5.81	1/2-13UNC-2B	3.625
LB-625U-3-050SXX0	625	6.25	1.0	3	17.16	1.00	7.44	4.44	2.0	3/4-10UNC-2A	1.0	3.50	7.13	1/2-13UNC-2B	3.625
LC-825U-5-135SXX0	825	8.25	1.5	5	19.59	2.19	8.20	3.20	2.0	1-1/2-8UN-2A	1.5	5.50	9.50	7/8-9UNC-2B	5.312
LC-1025U-5-210SXX0	1025	10.25	1.5	5	27.28	2.19	9.31	4.31	2.0	1-1/2-8UN-2A	1.5	5.50	11.50	7/8-9UNC-2B	5.312
LC-1225U-6-370SXX0	1225	12.25	2.0	6	30.02	2.92	12.37	6.37	4.0	1-7/8-8UN-2A	2.0	9.00	13.50	1-1/4-7UNC-2B	9.250
LC-1550U-6-575SXX0	1550	15.50	2.0	6	31.53	2.88	13.55	7.55	4.0	1-7/8-8UN-2A	2.0	10.63	17.00	1-3/8-6UNC-2B	11.375

Table 10. Fail Direction Spring Retracted Actuators

MODEL	LB/LC SIZES	CYLINDER SIZE	ROD DIAMETER	STROKE	A REF.	B	C		D	E	F	G	H	J	K
							Fail Extended	Fail Retracted							
LB-438U-3-023SXX1	438	4.38	1.0	3	11.35	0.88	6.84	3.84	2.0	3/4-10UNC-2A	1.0	3.00	4.81	1/2-13UNC-2B	3.625
LB-544U-3-036SXX1	544	4.38	1.0	3	12.95	1.00	8.00	5.00	2.0	3/4-10UNC-2A	1.0	3.50	5.81	1/2-13UNC-2B	3.625
LB-625U-3-050SXX1	625	6.25	1.0	3	13.00	1.00	8.56	5.56	2.0	3/4-10UNC-2A	1.0	3.50	7.13	1/2-13UNC-2B	3.625
LC-825U-5-135SXX1	825	8.25	1.5	5	20.41	2.19	13.78	8.78	2.0	1-1/2-8UN-2A	1.5	5.50	9.50	7/8-9UNC-2B	5.312
LC-1025U-5-210SXX1	1025	10.25	1.5	5	26.29	2.19	17.37	12.37	2.0	1-1/2-8UN-2A	1.5	5.50	11.50	7/8-9UNC-2B	5.312
LC-1225U-6-370SXX1	1225	12.25	2.0	6	30.34	2.88	19.81	13.81	4.0	1-7/8-8UN-2A	2.0	9.00	13.50	1-1/4-7UNC-2B	9.250
LC-1550U-6-575SXX1	1550	15.50	2.0	6	33.40	2.88	17.82	11.82	4.0	1-7/8-8UN-2A	2.0	10.63	17.00	1-3/8-6UNC-2B	11.375

Notes:

1. All dimensions are in inches.
2. Dimensions "A" and "C" may vary during actual assembly as per stop bolt adjustment.

Figure 4. GVO-M Mounting Pattern - Double-Acting

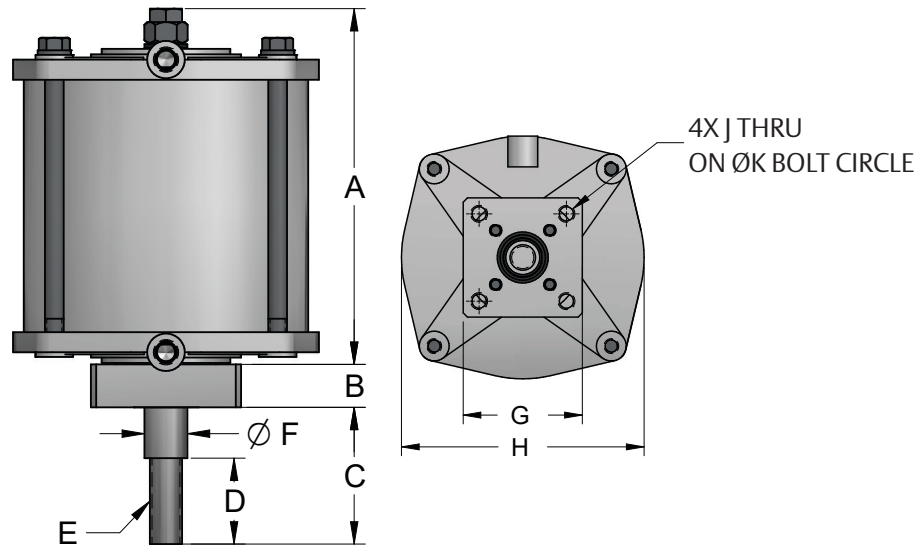


Table 11. Double-Acting Actuators

MODEL	LB/LC SIZES	CYLINDER SIZE	ROD DIAMETER	STROKE	A REF.	B	C		D	E	F	G	H	J	K
							Fail Extended	Fail Retracted							
LB-438U-4-D000	438	4.38	1.0	4	9.27	0.88	7.02	3.02	2.0	3/4-10UNC-2A	1.0	3.00	4.81	1/2-13UNC-2B	3.625
LB-625U-4-D000	625	6.25	1.0	4	8.28	1.00	7.19	3.19	2.0	3/4-10UNC-2A	1.0	3.50	7.13	1/2-13UNC-2B	3.625
LB-825U-6-D000	825	8.25	1.5	6	13.74	2.19	10.93	4.93	2.0	1-1/2-8UN-2A	1.5	5.50	9.50	7/8-9UNC-2B	5.312
LB-1025U-6-D000	1025	10.25	1.5	6	14.01	2.19	11.08	5.08	2.0	1-1/2-8UN-2A	1.5	5.50	11.50	7/8-9UNC-2B	5.312
LB-1225U-7-D000	1225	12.25	2.0	7	17.05	2.88	13.81	6.81	4.0	1-7/8-8UN-2A	2.0	9.00	13.50	1-1/4-7UNC-2B	9.250
LB-1550U-7-D000	1550	15.50	2.0	7	17.88	2.88	15.65	8.65	4.0	1-7/8-8UN-2A	2.0	10.63	17.00	1-3/8-6UNC-2B	11.375

Notes:

1. All dimensions are in inches.
2. Dimensions "A" and "C" may vary during actual assembly as per stop bolt adjustment.

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