

# Milwaukee Controls C-Series

Pneumatic Rack & Pinion Actuator



**MILWAUKEE VALVE**

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Our Milwaukee Controls C-Series Pneumatic Actuator is an aluminum rack & pinion actuator available in doubling acting and spring return. This actuator features a top mount multifunction indicator and open-close stop adjustment as a standard. The features and characteristics of the actuator are equal to pneumatic actuators worldwide



## STRUCTURE



### 1. Indicator

Position indicator with NAMUR interface is convenient for mounting accessories such as limit switch box and positioners.

### 2. Pinion

The pinion is made from nickel alloy steel, to ASTM standards.

### 3. Actuator Body

The actuator body is extruded aluminum alloy 6005-T5. Body is treated with hard anodized and powder polyester painted.

### 4. End Caps

Die-cast and aluminum powder polyester coated.

### 5. Pistons

The twin rack pistons are made from die-cast aluminum and hard anodized. This provides long cycle life and smooth operation. Reverse rotation achieved by simply inverting the pistons.

### 6. Travel adjustment

The two independent external travel stop adjustment bolts can adjust +/- 5 degrees in open and close directions easily.

### 7. High performance springs

Preloaded coated springs are made from high quality material for resistant to corrosion and longer cycle life. They can be removed safely and conveniently to satisfy different requirements of torque by changing quantity of springs.

### 8. Bearings & guides

Made from low friction, long-life compound, to avoid the direct contact between metals. The maintenance and replacement are easy and convenient.

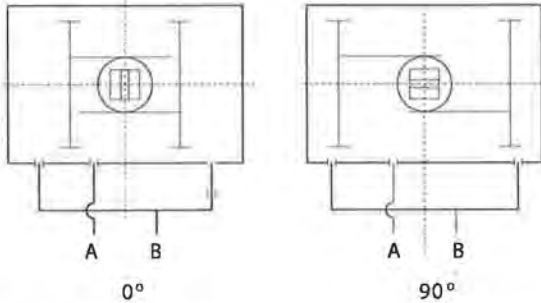
### 9. O-rings

Buna-N o-rings provide trouble-free operation at standard temperature ranges. For high and low temperature, viton or silicone is available.



## Double acting

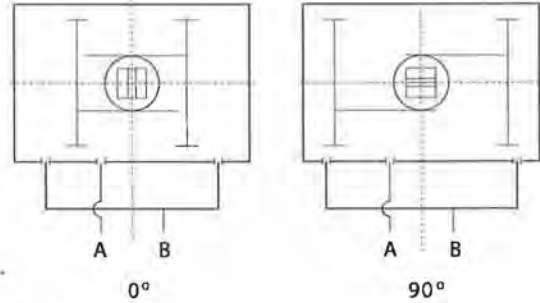
**Standard Rotation**  
CCW



**Standard Rotation:**

Air to port A forces the pistons outwards, causing the pinion to turn counterclockwise while the air is being exhausted from port B. Air to port B forces the pistons inwards, causing the pinion to turn clockwise while the air is being exhausted from port A.

**Reverse Rotation**  
CW

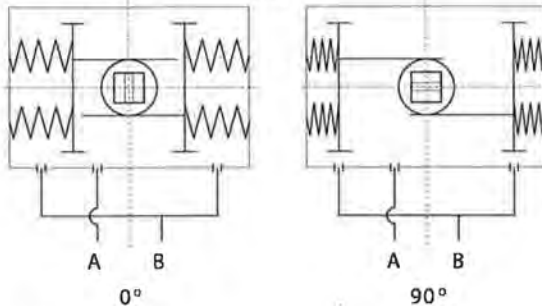


**Reverse Rotation:**

Air to port A forces the pistons outwards, causing the pinion to turn clockwise while the air is being exhausted from port B. Air to port B forces the pistons inwards, causing the pinion to turn counter clockwise while the air is being exhausted from port A.

## Spring return

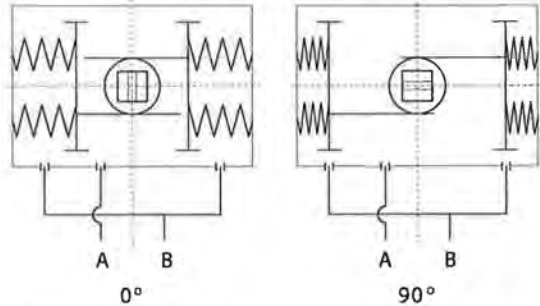
**Standard Rotation**  
CCW



**Standard Rotation:**

Air to port A forces the pistons outwards, causing the springs to compress, the pinion turns counterclockwise while air is being exhausted from port B. Loss of air pressure on port A, the stored energy in the springs forces the pistons inwards. The pinion turns clockwise while air is being exhausted from port A.

**Reverse Rotation**  
CW



**Reverse Rotation:**

Air to port A forces the pistons outwards, causing the springs to compress, the pinion turns clockwise while air is being exhausted from port B. Loss of air pressure on port A, the stored energy in the springs forces the pistons inwards. The pinion turns counterclockwise while air is being exhausted from port A.



Double Acting Actuators Output Torque (lbs-in)

MODEL	Air Pressure (PSI)								
	40	50	60	70	80	90	100	110	120
MC2C	97	122	146	171	195	219	244	268	292
MC3C	178	223	267	313	356	401	446	490	535
MC5C	245	306	368	430	490	551	613	674	735
MC7C	383	476	574	671	766	861	957	1053	1149
MC10C	551	689	827	967	1103	1240	1378	1516	1654
MC14C	808	1009	1211	1416	1615	1817	2019	2221	2423
MC29C	1225	1532	1833	2149	2450	2757	3063	3369	3676
MC47C	2088	2611	3133	3662	4177	4699	5221	5743	6265
MC58C	3249	4061	4873	5697	6497	7309	8122	8934	9746
MC90C	5198	6497	7797	9115	10396	11695	12995	14294	15594
MC121C	6497	8122	9746	11394	12995	14619	16243	17868	19492
MC236C	9398	11753	14097	16480	18796	21151	23495	25850	28194
MC295C	14282	17856	21430	25046	28565	32139	35712	39286	42859

Spring Return Actuators Output Torque (lbs-in)

Actuator Type	Spring No.	Output Air to Spring														Spring Return Output			
		40		50		60		70		80		90		100					
		0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	90° Start	0° End		
MC2S4C	5	55	37	77	58												55	38	
	6	48	24	70	46	94	78										66	45	
	7	39	13	61	34	90	67	120	89								77	52	
	8			53	20	84	55	113	78	140	114						87	60	
	9			44	8	76	44	105	67	133	104	160	132				98	67	
	10					68	33	98	57	126	94	153	122				109	75	
	11					60	21	91	46	119	84	146	113	172	140		120	82	
	12							83	36	112	74	139	95	166	130		131	90	
	MC3S4C	5	111	75	153	116	204	137										92	61
		6	98	55	138	95	191	152	242	205								111	72
		7	84	35	127	73	179	133	229	187								129	85
		8			111	52	167	114	218	169	267	220	315	269				148	97
9						154	95	206	151	255	203	304	253				166	109	
10						132	75	195	133	244	186	293	236	341	286		185	121	
11								184	115	234	169	283	220	330	270	203	133		
12								171	97	222	152	271	204	320	254	222	145		
MC5S4C		5	141	103	197	158	270	235										128	93
		6	121	74	176	128	251	208	321	280								154	112
		7	101	47	155	99	232	182	303	256								179	131
		8			133	69	211	155	284	231	352	301	418	369				205	149
	9					192	129	266	206	335	278	402	347				231	168	
	10					174	102	246	181	318	254	386	324	451	391	256	187		
	11							231	157	301	231	369	301	435	369	282	205		
	12							213	132	284	207	353	278	419	346	308	224		
	MC7S4C	5	227	157	317	244	428	364										204	140
		6	196	112	285	196	400	321	508	434								244	168
		7	166	67	252	151	371	279	481	395								285	196
		8			221	103	342	237	454	355	560	466	663	572				326	224
9						313	192	426	316	534	429	638	536				367	252	
10						284	152	400	276	508	391	613	500	715	605	407	280		
11								373	237	483	353	588	464	691	570	448	308		
12								345	198	456	316	563	428	667	536	489	336		
MC10S4C		5	322	214	450	338	612	511										304	207
		6	277	148	403	269	569	449	725	612								365	248
		7	231	80	355	197	526	385	685	553								426	289
		8			319	128	484	323	646	495	799	655	947	808				487	331
	9					441	260	606	436	761	599	911	755				548	372	
	10					399	197	566	377	723	543	874	700	1022	853	608	413		
	11							525	318	685	487	837	647	986	801	669	454		
	12							486	260	647	432	800	593	950	749	730	496		

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## Spring Return Actuators Output Torque (lbs-in)

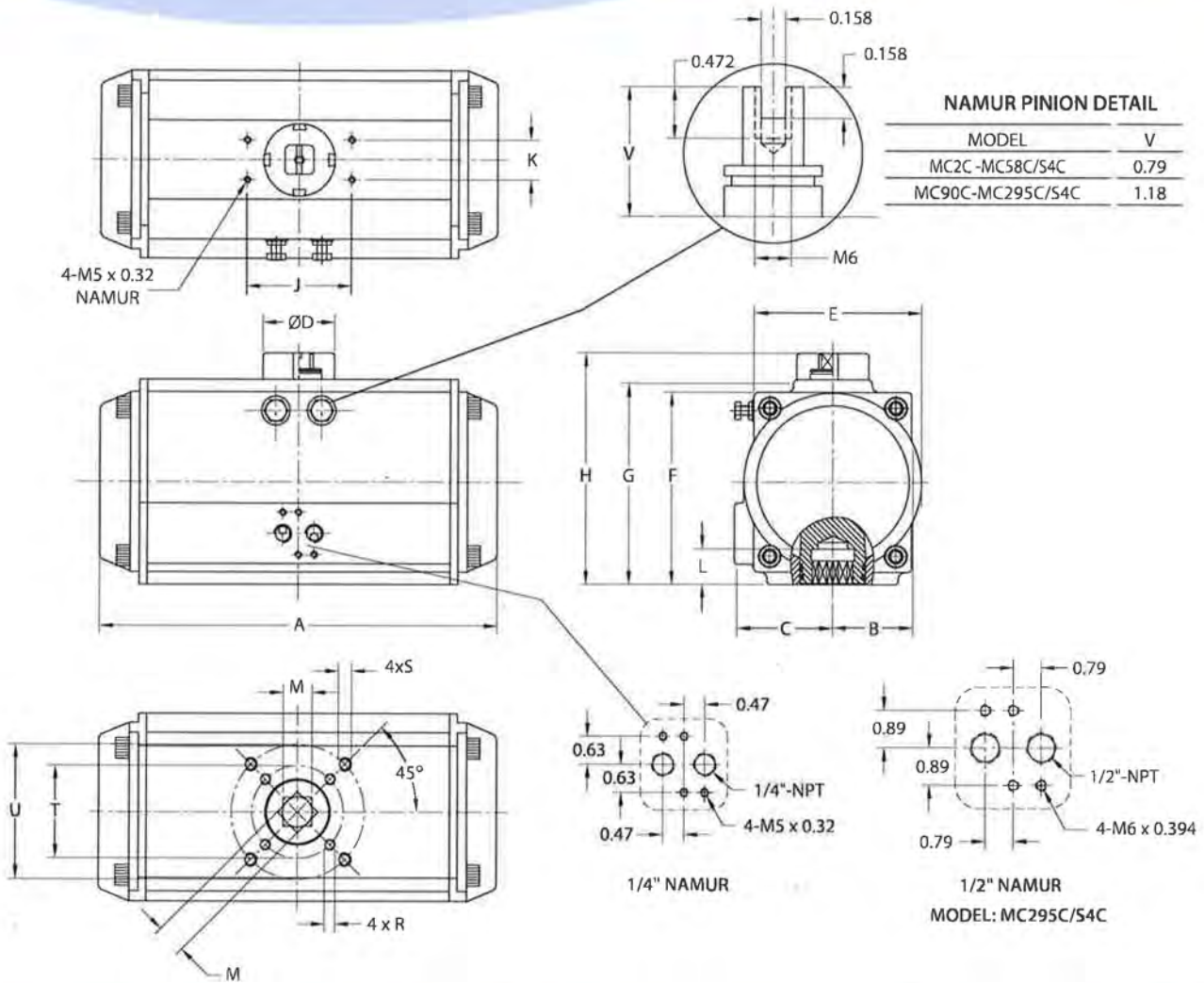
Air Pressure (PSI)		Output Air to Spring														Spring Return output			
		40		50		60		70		80		90		100					
Actuator Type	Spring No.	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End	0° Start	90° End		
MC14S4C	5	497	325	687	508	921	760										436	280	
	6	435	229	622	407	862	670	1088	908								523	336	
	7	374	133	559	308	805	580	1035	824								610	392	
	8			494	208	747	490	980	740	1203	974	1419	1198				697	448	
	9					689	400	927	656	1152	894	1370	1122				784	504	
	10					631	306	872	569	1100	811	1320	1041	1535	1264		871	560	
	11							818	487	1048	733	1270	966	1486	1191		958	616	
	12							764	406	997	656	1221	892	1439	1119		1045	672	
	MC29S4C	5	712	453	1000	729	1358	1115										698	462
		6	610	305	893	574	1263	976	1608	1340								832	555
		7	509	148	787	410	1167	828	1519	1202								971	647
		8			681	255	1071	689	1429	1072	1770	1429	2100	1772				1110	740
9						976	541	1340	934	1685	1298	2018	1645				1249	832	
10						880	402	1251	804	1600	1174	1936	1526	2264	1865		1387	925	
11								1161	666	1514	1043	1854	1399	2184	1742		1530	1017	
12								1072	536	1429	919	1772	1280	2105	1626		1665	1110	
MC47S4C		5	1246	823	1737	1296	2346	1948										1143	759
		6	1082	573	1566	1035	2192	1713	2778	2331								1370	908
		7	916	324	1392	773	2035	1478	2631	2112								1598	1059
		8			1218	512	1878	1244	2485	1892	3063	2498	3624	3080				1826	1211
	9					1713	1009	2331	1673	2916	2290	3483	2879				2054	1370	
	10					1557	765	2185	1446	2777	2073	3348	2670	3906	3247		2283	1522	
	11							2039	1226	2638	1864	3214	2468	3776	3051		2510	1673	
	12							1892	1007	2498	1655	3080	2267	3645	2855		2741	1824	
	MC58S4C	5	1877	1212	2640	1943	3592	2966										1844	1236
		6	1609	805	2359	1518	3340	2583	4256	3549								2212	1483
		7	1332	398	2069	1093	3079	2200	4012	3192								2581	1730
		8			1789	667	2826	1818	3777	2022	4680	3782	5556	4691				2949	1977
9						2566	1435	3533	2477	4448	3442	5332	4363				3321	2225	
10						2313	1052	3297	2120	4223	3102	5116	4034	5986	4935		3691	2472	
11								3062	1771	3999	2769	4900	3714	5776	4624		4056	2719	
12								2818	1413	3767	2429	4676	3386	5559	4305		4422	2966	
MC90S4C		5	3228	2164	4457	3345	5957	4957										2737	1774
		6	2839	1563	4051	2717	5592	4392	7041	5921								3287	2127
		7	2451	962	3645	2088	5227	3827	6700	5393								3834	2480
		8			3239	1460	4861	3261	6359	4865	7789	6366	9180	7808				4380	2833
	9					4496	2696	6018	4337	7464	5863	8867	7323				4927	3186	
	10					4131	2131	5677	3809	7139	5360	8554	6838	9936	8269		5473	3540	
	11							5336	3281	6814	4858	8240	6354	9632	7798		6020	3893	
	12							4995	2753	6490	4355	7927	5869	9327	7327		6566	4246	
	MC121S4C	5	3801	2774	5327	4254	7227	6262										3363	2430
		6	3265	2035	4767	3481	6723	5566	8552	7472								4036	2917
		7	2728	1295	4206	2707	6218	4870	8081	6822								4708	3405
		8			3645	1934	5714	4174	7610	6172	9413	8044	11164	9844				5381	3893
9						5209	3479	7139	5523	8965	7426	10731	9247				6053	4380	
10						4705	2783	6668	4873	8516	6807	10299	8651	12038	10436		6726	4868	
11								6197	4223	8068	6188	9866	8054	11617	9856		7399	5356	
12								5726	3574	7619	5569	9434	7457	11197	9276		8071	5843	
MC236S4C		5	5373	3977	7571	6111	10332	9018										4902	3632
		6	4578	2895	6739	4979	9584	8001	12239	10761								5885	4355
		7	3773	1822	5898	3858	8827	6992	11533	9819								6861	5087
		8			5066	2727	8079	5975	10834	8869	13451	11579	15989	14184				7844	5810
	9					7323	4957	10128	7919	12778	10674	15340	13312				8828	6541	
	10					6575	3948	9429	6976	12113	9777	14699	12446	17220	1503		9803	7264	
	11							8731	6026	11448	8872	14057	11574	16596	14183		10787	7987	
	12							8024	5076	10775	7967	13408	10701	15966	13335		11771	8719	
	MC295S4C	5	8786	6576	12163	9852	16289	14210										6961	4952
		6	7695	5050	11022	8257	15263	12775	19256	16934								8349	5944
		7	6612	3514	9891	6652	14245	11332	18306	15585								9744	6928
		8			8750	5057	13219	9897	17348	14245	21286	18332	25109					11132	7920
9						12193	8453	16389	12897	20374	17048	24229	21023				12527	8912	
10						11167	7018	15431	11557	19461	15771	23349	19792	27156	23699		13914	9904	
11								14473	10209	18548	14487	22469	18554	26300	22496		15310	10896	
12								13523	8869	17643	13211	21597	17324	25452	21300		16697	11880	

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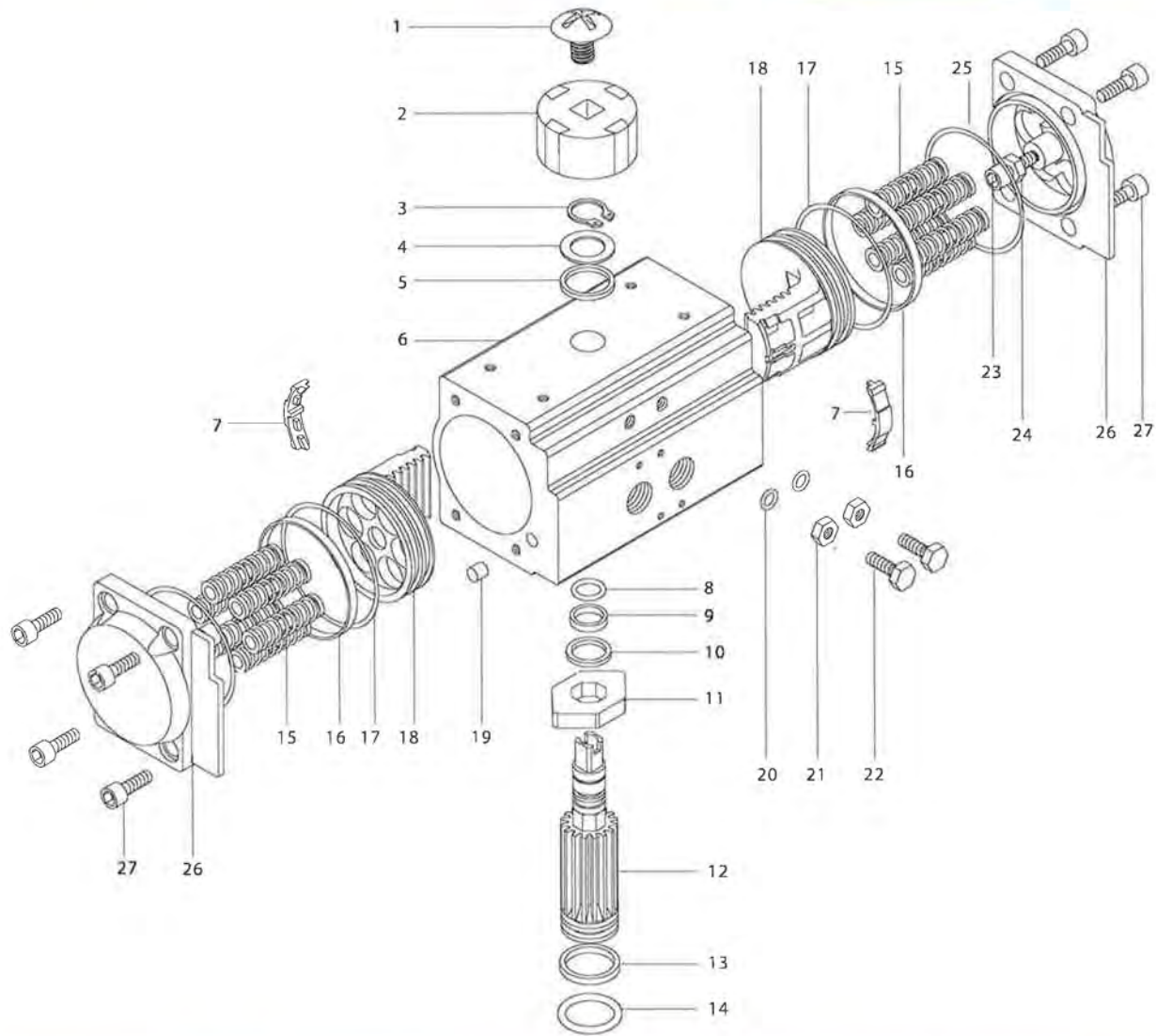


Unit: inch

Model	A	B	C	D	E	F	G	H	J	K	L	M	R	S	T*	U
MC2C/S4C	5.79	1.18	1.63	1.58	2.56	2.58	2.83	3.62	3.15	1.18	0.55	0.43	M5 x 8	M6 x 10	F03/1.417	F05/1.969
MC3C/S4C	6.61	1.42	1.85	1.58	2.83	3.19	3.44	4.23	3.15	1.18	0.71	0.55	M6 x 10	M8 x 13	F05/1.969	F07/2.756
MC5C/S4C	7.24	1.65	2.09	1.58	3.19	3.70	3.92	4.70	3.15	1.18	0.71	0.55	M6 x 10	M8 x 13	F05/1.969	F07/2.756
MC7C/S4C	8.03	1.81	2.24	1.58	3.62	3.88	4.28	5.07	3.15	1.18	0.83	0.67	M6 x 10	M8 x 13	F05/1.969	F07/2.756
MC10C/S4C	10.31	1.97	2.30	1.58	3.86	4.37	4.60	5.39	3.15	1.18	1.02	0.67	M6 x 10	M8 x 13	F05/1.969	F07/2.756
MC14C/S4C	10.55	2.26	2.52	1.58	4.31	4.82	5.24	6.02	3.15	1.18	1.02	0.87	M8 x 13	M10 x 16	F07/2.756	F10/4.016
MC29C/S4C	11.65	2.66	2.93	2.17	5.02	5.73	6.10	6.89	3.15	1.18	1.38	0.87	M8 x 13	M10 x 16	F07/2.756	F10/4.016
MC47C/S4C	15.35	2.95	3.03	2.17	5.41	6.33	6.75	7.54	3.15	1.18	1.38	1.06	M10 x 16	M12 x 20	F10/4.016	F12/4.921
MC58C/S4C	18.03	3.43	3.43	2.17	6.22	7.24	7.76	8.54	3.15	1.18	1.77	1.06	M10 x 16	M12 x 20	F10/4.016	F12/4.921
MC90C/S4C	20.79	4.06	4.06	3.15	7.44	8.50	9.06	10.24	5.12	1.18	2.16	1.42		M16 x 25		F14/5.512
MC121C/S4C	22.20	4.45	4.45	3.15	8.27	9.27	10.04	11.22	5.12	1.18	2.16	1.42		M16 x 25		F14/5.512
MC236C/S4C	23.70	5.12	5.12	3.15	9.65	10.39	11.38	12.56	5.12	1.18	1.97	1.81		M20 x 25		F16/6.496
MC295C/S4C	27.80	5.79	5.79	3.15	10.75	11.77	12.83	14.01	5.12	1.18	1.97	1.81		M20 x 25		F16/6.496

\* T Dimension may be an ISO or rectangular metric pattern (in inch) as shown.





No.	Description	Qty.	Material	No.	Description	Qty.	Material
1	Indicator screw	1	Plastic(ABS)	15	Spring	0~12	Spring steel
2	Indicator	1	Plastic(ABS)	16	Bearing (piston)	2	polyoxymethylene
3	Circlip	1	Stainless steel(304)	17	O-ring(piston)	2	NBR
4	Thrust washer	1	Stainless steel(304)	18	Piston	2	Die-Cast aluminum(101A)
5	Outside washer	1	polyoxymethylene	19	Plug	2	NBR
6	Body	1	Extruded aluminum alloy(6005-T5)	20	O-ring(adjust screw)	2	NBR
7	Guide(piston)	2	polyoxymethylene	21	Nut (adjust screw)	2	Stainless steel(304)
8	O-ring(pinion top)	1	NBR	22	Adjust screw	2	Stainless steel(304)
9	Bearing(pinion top)	1	polyoxymethylene	23	Stop screw	2	Stainless steel(304)
10	Inside washer	1	polyoxymethylene	24	Nut (stop screw)	2	Stainless steel(304)
11	Cam	1	# 45	25	O-ring(end cap)	2	NBR
12	Pinion	1	# 45	26	End-cap	2	Die-Cast aluminum(ADC12)
13	Bearing (pinion bottom)	1	polyoxymethylene	27	End-cap screw	8	Stainless steel(304)
14	O-ring(pinion bottom)	1	NBR				

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