

# ..... And MCF ISO (5211 Type) Actuators

**Independently Tested Under Full Load For 200,000 Cycles - No Significant Wear!**

Reference Test No MA961101

Precision engineered pistons incorporate unique guide bars to prevent excess load on the drive teeth ensuring smooth, long life operation.

Namur standard slotted pinion provides self centering drive for indicators, positioners and switches.

Namur VDI/NDE 3845 standard mounting pad simplify the addition of top mounted accessories.

**A Patented Space-Saving DA & SR Design**

MCF actuators have springs encapsulated in the pistons making Double Acting or Spring Return type units dimensionally the same. A patented feature not found in competitive units with springs located outside the pistons.

**Standard Construction** - hard anodized aluminum body and end covers resist oxidation and abrasion involving both indoor and outdoor applications.

**CNI Construction** - for highly corrosive or hygienic applications. The aluminum body, end covers and pistons are Chemically Nickel Impregnated (C.N.I.) to a uniform deposit thickness of 25 microns on all surfaces.

**Stainless Steel travel stop** provides rotational adjustment for the actuator pinion. It allows precise (+/-5°) adjustment of the valve's closed position for optimum performance and seat life.

**Standard size "O" ring seals** in Buna N or optional Viton are quality controlled for long life.

**Long end cover bolts** allow full relaxation of springs on SR models ensuring field safety during maintenance or disassembly.

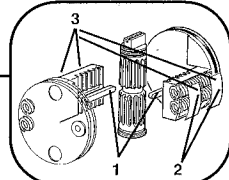
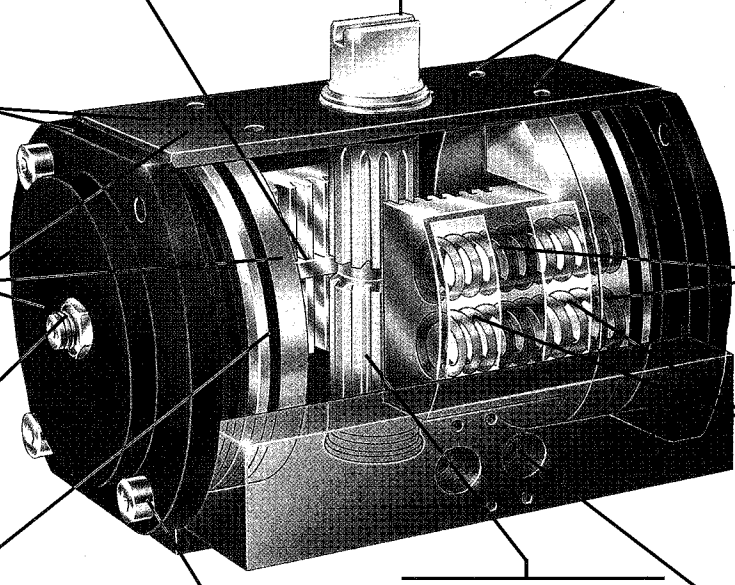
**One piece "blow out proof" shaft** is completely machined from solid bar including pinion (no multiple components) and is vertically "locked" in place by a unique horizontal guide bar system.

designed and built to never break, then protected against corrosion. **Guaranteed and backed by a free complete actuator replacement.**



**Dual function encapsulated (acetal) wear pads** absorb "side loading" and eliminate metal-to-metal contact of pistons to body ensuring smooth operation and long life.

**Namur solenoid mounting pad** (an international standard) permits a choice of various manufacturers' solenoid valves to be directly mounted to the actuator.



## Unique Three Point Load Bearing Piston Design.

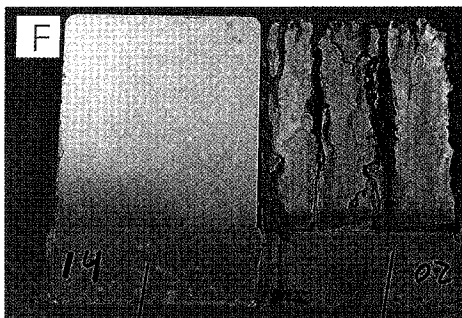
1. Twin guide bar feature absorb rack and pinion load and ensure optimum teeth engagement.
2. Dual encapsulated Acetal piston wear pads absorb adverse side loading at the start of each stroke.
3. The four encapsulated Acetal piston wear pads ensure no metal to metal contact thus providing low friction travel.



## The Chemically Nickel Impregnated Process

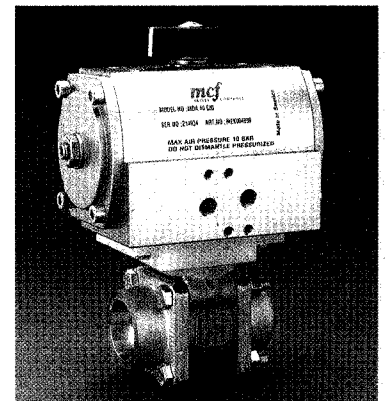
The autocatalytic nickel bath process does not require rectifiers, electrical currents or anodes as in electro plating. After etching, a controlled Nickel Bath allows a uniform 25 micron deposit to be layered on all exposed internal and external surfaces. In the deposit process, once a primary layer of nickel has formed on the substrate, that layer and each subsequent layer becomes the catalyst that causes the above reaction to continue until the uniform thickness is achieved. Unlike plastic and glass-filled epoxy composites, the surface will not crack or peel off and the aluminum base material ensures that rigidity, integrity and strength are maintained.

**NSS Test "ISO3768" Neutral Salt Spray (600 hrs.)**



MCF Valves' CNI Actuator Cupon

Actuator Electroless Nickel Plated Cupon



MCF Valves CNI actuator, close couple bracket and ISO valve package ready for immediate installation.



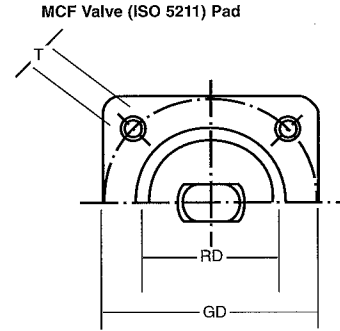
Valve/ISO Reference

MCF Valves Size (Inches)*	ISO** 5211
1/4 - 3/4	F 03
1 - 1 1/4	F 04
1 1/2 - 2	F 05
2 1/2 - 3	F 07
4 - 6	F 10
8	F 12
10	F 14

\* Standard Port  
 \*\* Valves use metric bolts on ISO flange.

ISO Flange Dimensions/Bolt Type (Inches)

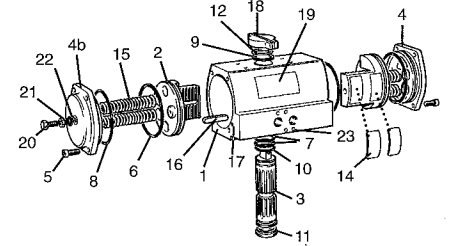
ISO 5211	GD Bolt Circle	RD Dia. Flange	Metric Bolt "T"	UNC Bolt "R"
F 03	1.42	0.98	M5	10 - 24
F 04	1.65	1.18	M5	10 - 24
F 05	1.97	1.38	M6	1/4 - 20
F 07	2.76	2.17	M8	5/16 - 18
F 10	4.02	2.76	M10	3/8 - 16
F 12	4.92	3.35	M12	1/2 - 13
F 14	5.51	3.94	M16	5/8 - 11
F 16	6.5	5.12	M20	3/4 - 10
F 25	10.0	5.12	M20	1/2 - 13



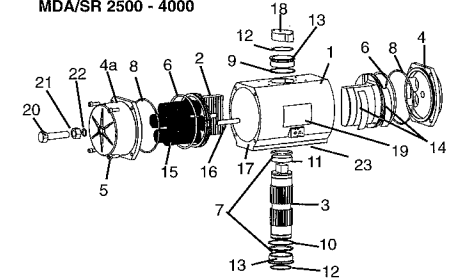
MCF Actuator Material, Double Acting & Spring Return (Standard/CNI)

Ref. No.	Item Description	Standard Component Material	Model/Quantity	
			20 - 1500	2500 - 4000
1	Cylinder	Hard Anodized Aluminum*	1	1
2	Piston	Aluminum*	1	1
3	Drive Shaft	Zinc Plated**	1	1
4	End Cap- DA	Hard Anodized Aluminum*	2	2
4a	End Cap- SR	Hard Anodized Aluminum*	—	2
4b	End Cap-C/W Stop Adj.	Hard Anodized Aluminum*	1 or 2	—
5	Bolt	SS 316	8	8 - 16
6	"O" Ring	Buna N	2	2
7	"O" Ring	Buna N	2	2
8	"O" Ring	Buna N	2	2
9	Washer	Polyethylene	1	1
10	Washer	Polyethylene	1	1
11	Bearing	Acetal	1	1
12	Circlip	Steel	2	2
13	Bushing	Bronze	—	2
14	Wear Pad	Acetal	4	4
15	Spring	Spring Steel (SiCr) <sup>1</sup>	1 to 4	2 to 16
16	Guide Bar	Steel	2	2
17	Ball Bearing	Composite	2	2
18	Position Indicator	Polyethylene	1	1
19	Product Label	Polyester	1	1
20	Stop Adj. Screw	SS 316	1 or 2	2
21	Stop Adj. Nut	SS 316	1 or 2	2
22	Stop Adj. "O" Ring	Buna N	1 or 2	2
23	ISO Centering Ring	Acetal	1	1

MDA/SR 20 - 1500



MDA/SR 2500 - 4000



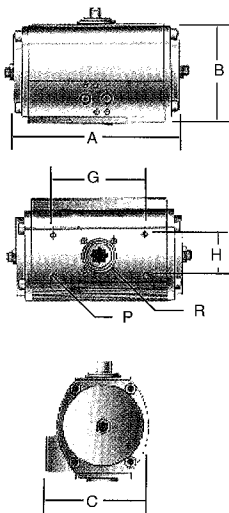
\* Available in CNI \*\* SS316 for CNI units  
<sup>1</sup> Life time warranty

MCF Actuator, Mounting Pad Dimensions/Air Consumption & Weights

Actuator Model No.	ISO 5211	Dimensions (Inches)						Air Consumption Per Stroke*		Wgts. (Lbs.)	
		A	B	C	G	H	(P)UNC	Port A (Open)	Port B (Closed)	DA	SR
MDA/SR 20	F 03	4.51	2.87	2.97	2.87	1.26	10 - 24	5.5 (90)	7.3 (120)	2	2
MDA/SR 40	F 04	5.24	3.56	3.44	2.87	1.26	10 - 24	11.0 (180)	14.6 (240)	4	4
MDA/SR 80	F 05	6.38	4.29	4.13	2.87	1.26	1/4 - 20	20.7 (340)	25.0 (410)	6	7
MDA/SR 120	F 07	7.64	4.67	4.76	4.21	1.93	1/4 - 20	29.9 (490)	39.0 (640)	9	10
MDA/SR 200	F 07	8.58	5.53	5.37	4.21	1.93	5/16 - 18	54.9 (900)	61.0 (1000)	14	15
MDA/SR 350	F 10	10.47	6.56	6.14	6.34	2.87	5/16 - 18	103.1 (1690)	115.9 (1900)	23	26
MDA/SR 550	F 12	12.28	8.17	7.52	6.34	2.87	5/16 - 18	170.8 (2800)	207.4 (3400)	40	45
MDA/SR 700	F 12	13.39	8.17	7.52	8.39	4.02	5/16 - 18	186.1 (3050)	225.7 (3700)	45	53
MDA/SR 1000	F 14	14.21	9.84	8.94	8.39	4.02	3/8 - 16	336.7 (5520)	359.9 (5900)	62	72
MDA/SR 1500	F 14	15.35	11.81	11.02	9.61	4.61	1/2 - 13	463.6 (7600)	585.6 (9600)	89	106
MDA 2500	F 16	19.6	11.81	11.02	9.61	4.61	1/2 - 13	519.0 (8500)	597.8 (9800)	130	—
MSR 2500	F 16	26.6	11.81	11.02	9.61	4.61	1/2 - 13	519.0 (8500)	597.8 (9800)	—	185
MDA 4000	F 25	22.6	15.16	14.2	9.61	4.61	1/2 - 13	829.6 (13600)	1067.5 (17500)	235	—
MSR 4000	F 25	29.2	15.16	14.2	9.61	4.61	1/2 - 13	829.6 (13600)	1067.5 (17500)	—	297

\* Cubic Inches ( xxx ) Cubic Centimeters

MDA/SR 20 - 1500



MCF Double Acting Actuator, Output Torque (Inch Lbs.)

Actuator Model No.	ISO* 5211	Air Supply (PSI)		Max. Oper. Time (Sec.)**	
		60	80	Open	Close
MDA 20	F 03	125	167	< 1	< 1
MDA 40	F 04	247	329	< 1	< 1
MDA 80	F 05	449	598	< 1	< 1
MDA 120	F 07	729	972	1.5	1.5
MDA 200	F 07	1231	1641	2	2
MDA 350	F 10	2240	2987	2.5	2.5
MDA 550	F 12	3554	4739	3.5	3.5
MDA 700	F 12	5017	6689	4	4
MDA 1000	F 14	6811	9081	4.5	4.5
MDA 1500	F 14	10037	13383	5	5
MDA 2500	F 16	16113	21484	7	7
MDA 4000	F 25	18096	36192	12	12

\* MCF Actuators use UNC bolts on ISO flange.

\*\* Seconds (5.5 Bar/80 PSI)

MCF Spring Return Actuator, Output Torque (Inch Lbs.)

Actuator Model No.	No. Of Springs	Spring Stroke		60 PSI		80 PSI		Max. Oper. Time*	
		Start	End	Start	End	Start	End	Open	Close
MSR 20 F 03	1	23	12	113	102	155	144	< 1	< 1
	2	46	24	101	79	143	121		
	3	69	36	89	56	131	98		
	4	92	48	77	33	119	75		
MSR 40 F 04	1	51	28	219	196	301	278	< 1	< 1
	2	102	56	191	145	273	227		
	3	153	84	163	94	245	176		
	4	204	112	135	43	217	125		
MSR 80 F 05	1	96	52	397	353	546	502	< 1	< 1
	2	191	204	345	258	494	407		
	3	287	157	292	162	441	311		
	4	382	209	—	—	389	216		
MSR 120 F 07	1	172	76	669	573	918	822	1.5	1
	2	343	152	593	402	842	651		
	3	515	228	517	230	766	479		
	4	687	304	—	—	689	307		
MSR 200 F 07	1	273	136	1092	955	1502	1365	2	1.5
	2	547	273	955	681	1365	1091		
	3	820	409	819	403	1229	818		
	4	1094	545	—	—	1093	544		
MSR 350 F 07	1	414	250	1990	1826	2737	2573	2.5	2
	2	826	500	1740	1412	2487	2159		
	3	1242	750	1490	998	2237	1745		
	4	1656	1000	1240	584	1987	1331		
MSR 550 F 10	1	761	387	3167	2793	4352	3978	3.5	3
	2	1522	774	2780	2032	3965	3217		
	3	2283	1161	2393	1271	3578	2456		
	4	3044	1548	2006	510	3191	1695		
MSR 700 F 12	1	1115	531	4485	3901	6158	5573	4	3
	2	2230	1062	3954	2786	5627	4458		
	3	3346	1593	3423	1671	5096	3343		
	4	4461	2124	2892	556	4564	2228		
MSR 1000 F 14	1	1185	772	6039	5626	8309	7896	5.5	3
	2	2370	1544	5267	4441	7537	6711		
	3	3555	2316	4495	3256	6765	5526		
	4	4740	3088	3723	2071	5993	4341		
MSR 1500 F 14	1	2055	1486	8551	7982	11897	11328	7	4
	2	4110	2972	7065	5927	10411	9273		
	3	6165	4458	5579	3872	8925	7218		
	4	8220	5944	4093	1817	7439	5163		
MSR 2500 F 16	2	2764	1788	14325	13349	19696	18720	8	5
	4	5528	3576	12537	10585	17908	15956		
	6	8292	5364	10746	7821	16120	13182		
	8	11056	7152	8961	5057	14332	10428		
MSR 4000 F 25	10	13820	8940	—	—	12544	7664	13	10
	12	16584	10728	—	—	10756	4900		
	3	4487	2894	24250	22656	33297	31704		
	6	8975	5789	21355	18169	30403	27217		
MSR 4000 F 25	9	13462	8683	18461	13681	27509	22729	13	10
	12	17950	11577	—	—	24615	18242		
	14	20941	13507	—	—	22685	15250		
	16	23933	15436	—	—	—	—		

\* Seconds (5.5 Bar/80 PSI)