

Valve Actuators



MASTERGEAR® U.S.A.

Division of REGAL-BELOIT CORPORATION



BEVEL GEAR OPERATORS

Manual & Motorizable

FEATURING... MORE SIZES &
MSS-102 SPECIFICATIONS

Mastergear Bevel Gear Operators are used for multi-turn applications, gate, globe valves, and sluice gates. Designs are for either rising or non-rising stems.

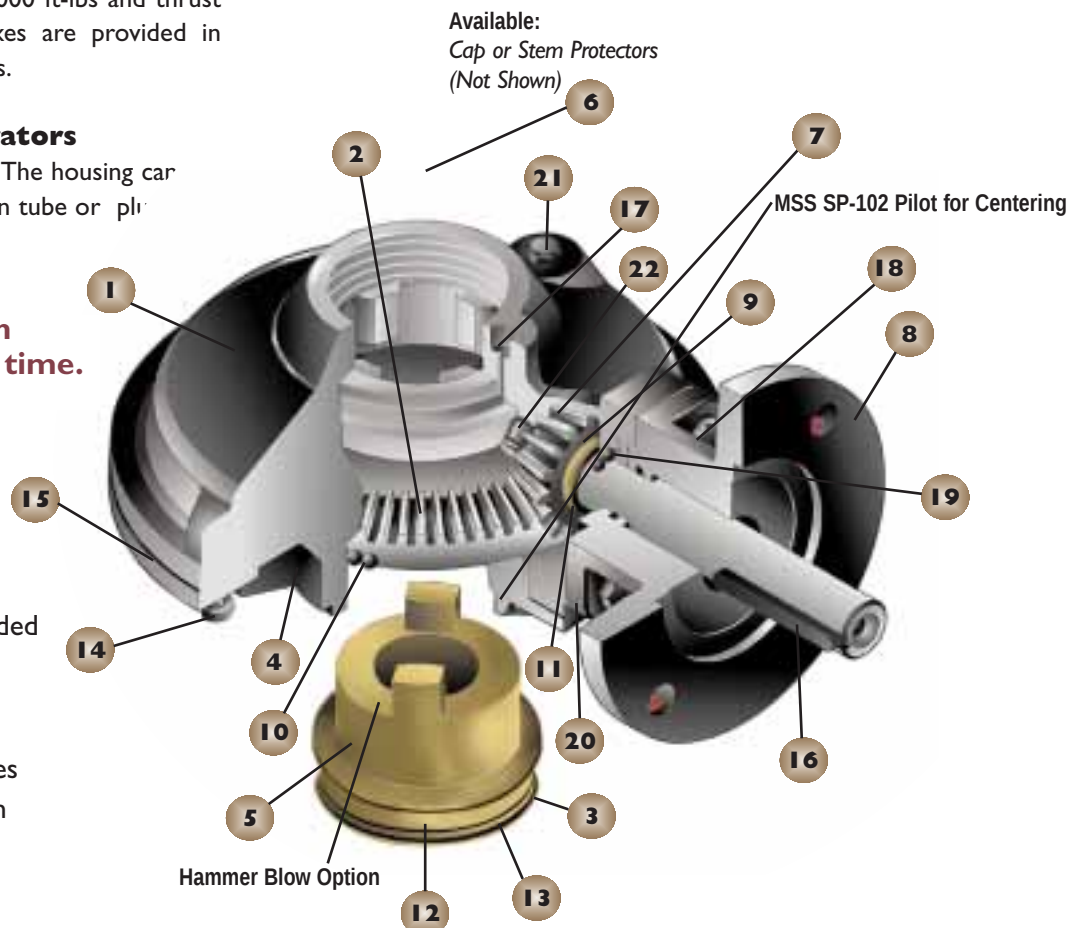
Torque ranges from 220 ft-lbs to 22,000 ft-lbs and thrust capabilities to 675,000 lbs. Gearboxes are provided in either manual or motorizable versions.

Mastergear Bevel Gear Operators are completely weatherproof to IP67. The housing can be sealed by the valve stem protection tube or plug.

IP67 - Can be submerged in water for a short period of time.

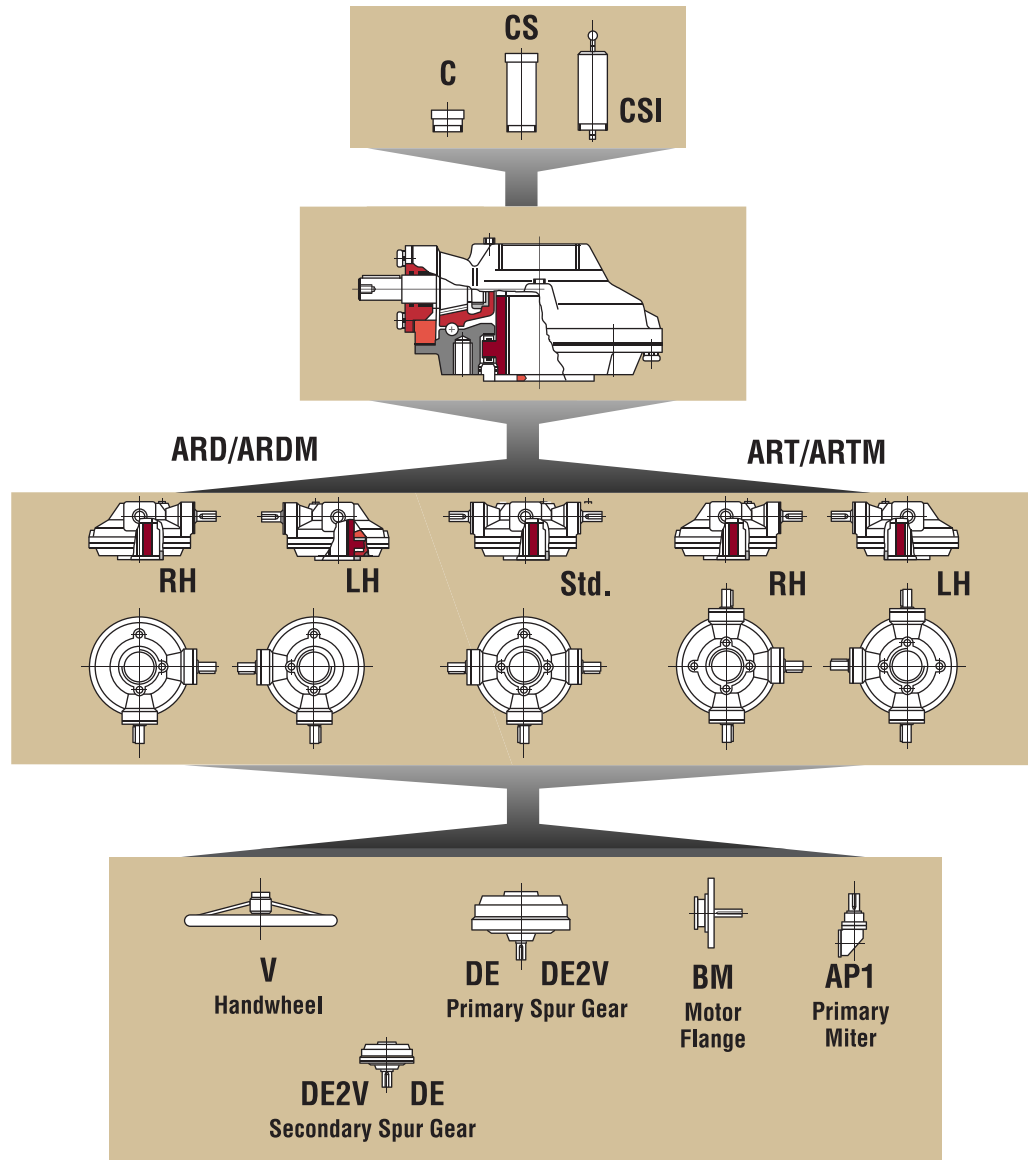
Features & General Specifications

- ◆ **AR** Thrust Unit includes Bronze Stem Nut, can be threaded or machined by customer
- ◆ Sealed to IP67
- ◆ Supplied with “Hammer Blow” feature to help loosen stiff valves
- ◆ Motor Drive Flanges available in MSS SP-102
- ◆ DE 2V Series has two ratios: **first** with higher reduction for locking
second for completing this operation quickly
- ◆ Miter Gear Operators available to align handwheel to threaded stem
- ◆ 220 to 22,000 ft-lbs torque range
- ◆ Thrust capabilities to 675,000 lbs
- ◆ Housing can be sealed by the valve stem protection tube or plug
- ◆ Ideal for multi-turn applications
- ◆ Rising or non-rising stem designs
- ◆ Optional Input Padlock Flange



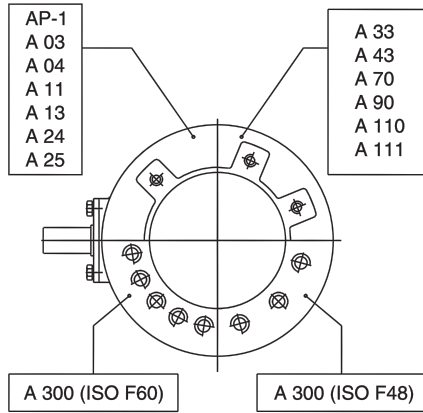
Item	Component	Material Description
1	Cover	Cast Iron
2	Bevel Wheel	Forged Steel *
3	Thrust Ring	Steel
4	Base “R”	Forged Steel *
5	Stem Nut	Bronze
6	Stem Protection	Steel Pipe
7	Pinion	Alloy Steel
8	Motor Flange	Ductile Iron
9	Spacer	Steel
10	Ball Bearings	Steel
11	O-Ring	Medium Nitrile
12	Thrust Bearings	Steel
13	O-Ring	Medium Nitrile
14	Screw & Washers	Hex Head
15	Gasket	Fiber Gasket
16	Key	Steel
17	O-Ring	Medium Nitrile
18	Screw & Washers	Hex Head
19	Ball Bearing	Steel
20	Gasket	Fiber Gasket
21	Grease Plug	Steel
22	Bearing	Bronze

* Ductile Iron on A90 and A110



- API** ◆ Primary miter
- AR** ◆ Thrust, bronze stem nut, can be threaded for rising stem or machined for non-rising
- ARD or ARDM** ◆ Two pinion shafts; one may be used for actuation, and second may transfer power to another actuator
- ARM** ◆ Motorizable, contains high quality ball bearings at the input shaft and hardened seats on the ring gear
- ART** ◆ Three pinion shafts; units permit transfer of power to two other actuators
- BM** ◆ Bevel motor flange
- C** ◆ Cover plug, non-rising stem
- CS** ◆ Stem cover for rising stems
- CSI** ◆ CS with mechanical position actuator
- DE/DEM** ◆ Spur gears available from sizes 24 to 110; motorizable versions also use higher grade ball bearings
- DE2V** ◆ Reducer units can be shifted to second ratio simply by pulling the handwheel toward you; permits high ratio for releasing or seating valve
- V** ◆ Handwheel

Mounting Options



Mounting Dimensions MSS - 102

Flange	Thread Size	No. of Holes	BCD
FA10	3/8 - 16	4	4.000
FA14	5/8 - 11	4	5.500
FA16	3/4 - 10	4	6.500
FA25	5/8 - 11	8	10.000
FA30	3/4 - 10	8	11.750
FA35	*1-1/8 - 7	8	14.000
FA40	*1-3/8 - 6	8	16.000
F48	*1-3/8 - 6	12	*19.016
F60	*1-3/8 - 6	20	*23.740

Note: All dimensions in inches

* Non Standard

Miter available for sizes A04, A13, A24, and all DE range, except DE110. Installation of miter requires FA10 flange.

Bevel Gears - Type AR Thrust

Size	Spur Gear	Ratio	Max. Output Torque		Max. Input Torque		Max. Thrust	Stem Diameter	Output Flange	Weight Lbs
			Ft-lbs	±10%	Ft-lbs	Ft-lbs				
A03		2.3:1	221	1.95	113	9000	1.57	FA10	18	
A04		4.5:1	221	3.83	57	9000	1.57	FA10	18	
A11		1.52:1	368	1.29	285	22480		FA14	33	
A13		4.5:1	442	3.83	115	30350	2.36	FA14	33	
A24		4.5:1	811	3.83	211	53950	2.76	FA16	60	
	DE24	15.75:1	811	12.08	67	53950		FA16	80	
A25		5.8:1	627	4.93	127	56200	2.76	FA16	60	
A33		4.5:1	1696	3.83	442	74200	3.35	FA25	128	
	DE43	20.25:1	1696	15.54	109	74200		FA25	157	
	DE43+DE24	70.9:1	1696	48.98	34	74200		FA25	177	
A43		4.5:1	2802	3.83	732	96650	4.02	FA30	168	
	DE43	20.25:1	2802	15.54	181	96650		FA30	196	
	DE43+DE24	70.9:1	2802	48.98	57	96650		FA30	218	
A70		4.5:1	4425	3.83	1156	157400	4.53	FA35	276	
	DE90	36:1	4425	27.60	160	157400		FA35	364	
	DE90+DE24	126:1	4425	88.23	50	157400		FA35	386	
A90		5:1	6638	4.25	1561	202300	4.80	FA35	353	
	DE90	40:1	6638	31.07	214	202300		FA35	452	
	DE90+DE24	140:1	6638	96.73	68	202300		FA35	474	
A110		5:1	11800	4.25	2773	247300	5.51	FA40	684	
	DE110	30:1	11800	23.02	512	247300		FA40	783	
	DE110+DE24	105:1	11800	72.73	162	247300		FA40	805	
A110S		5:1	11800	4.25	2773	359700	5.51	FA40	684	
	DE110	30:1	11800	23.02	512	359700		FA40	783	
	DE110+DE24	105:1	11800	72.73	162	359700		FA40	805	
A111		5.8:1	8850	4.93	1790	247300	5.51	FA40	684	
	DE110	34.8:1	8850	26.62	331	247300		FA40	783	
	DE110+DE24	121.8:1	8850	83.86	105	247300		FA40	805	
A111S		5.8:1	8850	4.93	1790	359700	5.51	FA40	684	
	DE110	34.8:1	8850	26.62	331	359700		FA40	783	
	DE110+DE24	121.8:1	8850	83.86	105	359700		FA40	805	
**A300		6:1	22127	5.1	4338	674430	7.87	F48/60	1610	
	DE450.v	36:1	22127	27.60	801	674430		F48/60	1874	
	DE450.x	60:1	22127	45.9	482	674430		F48/60	1874	
	DE450.x+DE24	210:1	22127	144.58	153	674430		F48/60	1896	

** Maximum thrust and torque accomplished with F60 flange.

Primary Miter

AP1	1762:1	229	1.5	152			FA10	18
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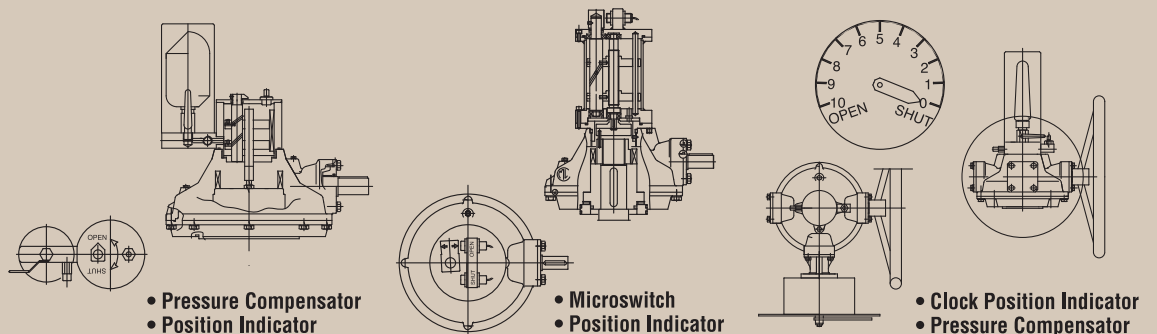
Note: All dimensions in inches, unless otherwise specified.

Option Shown

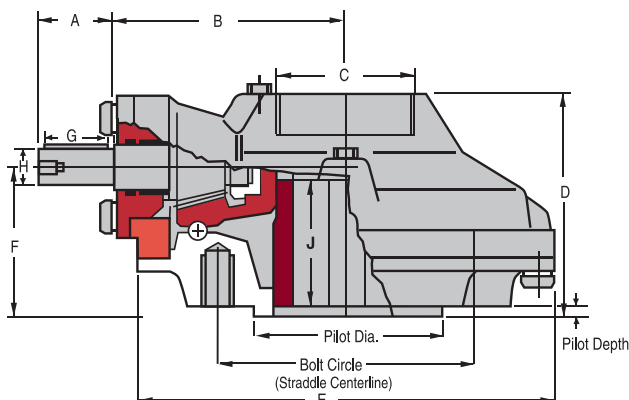
- ◆ Sub Sea

Other Options

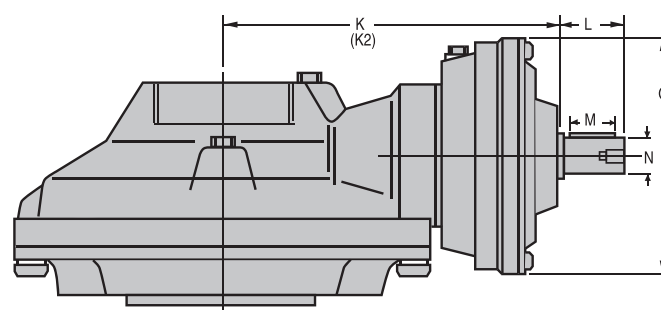
- ◆ Weatherproof
- ◆ Marine
- ◆ Tropical
- ◆ Buried Service
- ◆ Low/High Temperatures



Bevel Gear



Bevel with Spur Gears



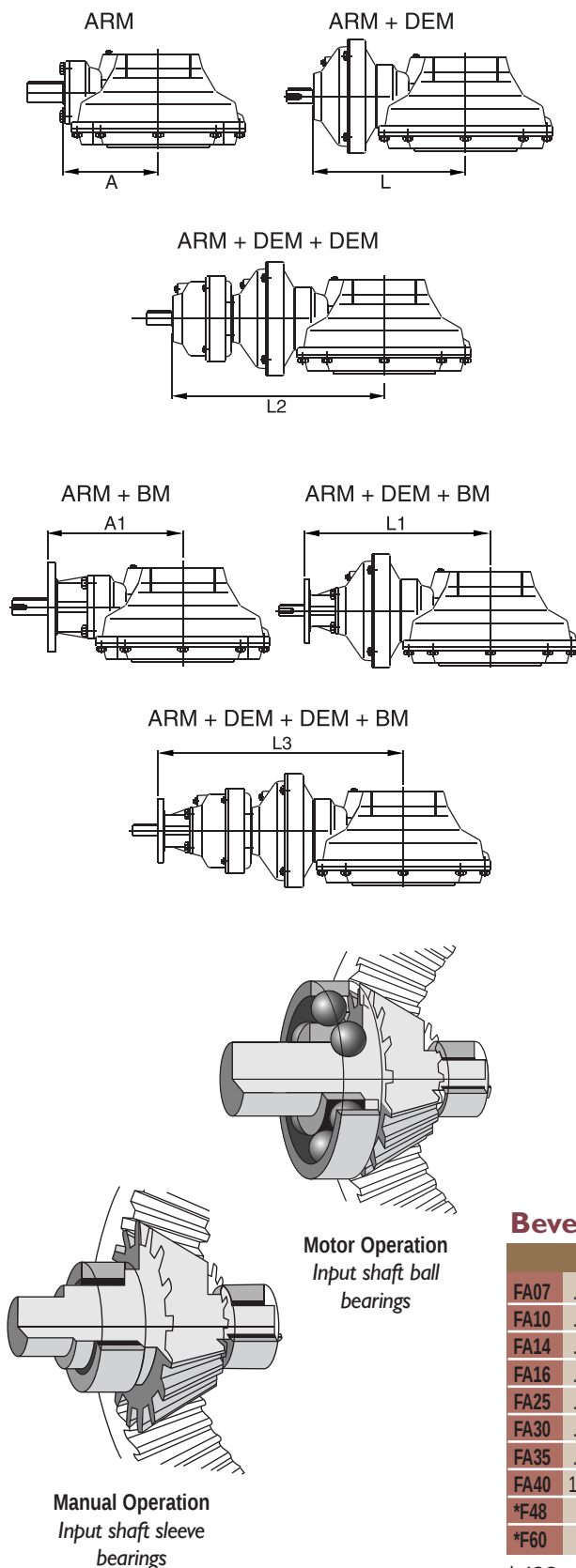
	Bevel Gears										Spur Gears									
	A	B	C NPT Thd.	D	E	F	G	H	J	Bolt Circle	Pilot Dia.	Max. Pilot Depth	Ratio K2**	K	L	M	N	O		
A03	1.97	4.60	2	4.29	7.09	2.83	1.77	.98	1.89	FA10	2.312	.120	N/A							
A04	1.57	3.94	2	4.09	7.09	2.32	1.38	.71	1.89	FA10	2.312	.120	N/A							
A11	1.97	4.76	3	6.22	7.09	3.90	1.77	.98	2.44	FA14	3.750	.160								
A13	1.57	4.84	3	5.31	8.90	3.11	1.38	.71	2.68	FA14	3.750	.160	N/A							
A24	1.97	5.67	3	6.37	10.12	3.82	1.77	.98	3.46	FA16	5.000	.190	DE24	15.75:1	10.0	1.97	1.77	.98	6.54	
A25	1.97	5.67	3	6.37	10.51	3.62	1.77	.98	3.46	FA16	5.000	.190	N/A							
A33	2.76	7.32	5	7.20	13.39	4.21	2.56	1.50	3.94	FA25	6.000	.190	DE43	20.25:1	11.81	1.97	1.77	.98	8.74	
													DE43+24	70.9:1	16.02				6.54	
A43	2.76	8.03	5	8.07	14.96	4.74	2.56	1.50	4.33	FA30	7.000	.190	DE43	20.25:1	12.48	1.97	1.77	.98	8.74	
													DE43+24	70.9:1	17.01				6.54	
A70	4.13	9.49	5	9.49	17.05	6.10	3.94	1.97	5.71	FA35	8.500	.190	DE90	36:1	14.33	1.97	1.77	.98	12.20	
													DE90+24	126:1	18.66				6.54	
A90	6.10	11.30	6	10.51	20.67	6.30	5.91	1.97	6.10	FA35	8.500	.190	DE90	40:1	16.10	1.97	1.77	.98	12.20	
													DE90+24	140:1	20.47				6.54	
A110	6.10	12.80	6	12.80	23.70	8.78	5.91	1.97	8.07	FA40	9.000	.320	DE110	30:1	17.76	2.76	2.56	1.50	13.07	
													DE110+24	105:1	22.24	1.97	1.77	.98	6.54	
A110S	6.10	12.80	6	12.80	23.70	8.78	5.91	1.97	8.07	FA40	9.000	.320	DE110	30:1	17.76	2.76	2.56	1.50	13.07	
													DE110+24	105:1	22.24	1.97	1.77	.98	6.54	
A111	6.10	12.80	6	12.80	23.70	8.78	5.91	1.97	8.07	FA40	9.000	.320	DE110	30:1	17.76	2.76	2.56	1.50	13.07	
													DE110+24	105:1	22.24	1.97	1.77	.98	6.54	
A111S	6.10	12.80	6	12.80	23.70	8.78	5.91	1.97	8.07	FA40	9.000	.320	DE110	30:1	17.76	2.76	2.56	1.50	13.07	
													DE110+24	105:1	22.24	1.97	1.77	.98	6.54	
A300	6.69	17.68	10	18.82	33.07	13.31	6.30	3.15	12.05	*F48	*14.567	*.315	DE300+450.v	36:1	25.94	2.76	2.56	1.50	19.29	
													DE300+450.x	60:1	25.94	2.76	2.56	1.50	19.29	
													DE300+450.x+DE24	210:1	30.39	1.97	1.77	.98	6.54	
Primary Miter — Miter available for sizes A04, A13, A24, and all DE range, except DE110. Installation of miter requires FA10 flange.																				
AP1	2	3.94	N/A	4	6.77	3.07	1.77	.98	2.52	FA10	2.312	1.20	N/A							

Note: All dimensions in inches, unless otherwise specified.

ISO and other bolt circle and pilot diameters available upon request

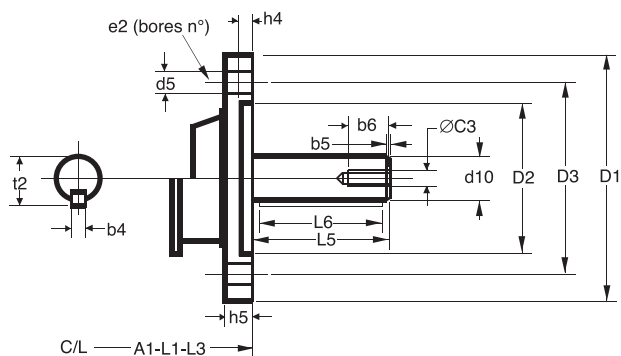
* Non Standard

** K2 dimension includes double reduction spur gears.



		With Flange MSS-102									
		FA07 FA10 FA14 FA16 FA25 FA30 FA35 FA40									
Size	Without Flange										
AP1M	A	3.937	A1	6.181	6.496						
A03M	A	4.606	A1	6.850	6.850						
A04M	A	3.937	A1	5.630	5.433						
A11M	A	4.763	A1	6.850	6.929						
A13M	A	4.842	A1	6.811	6.889	5.708					
A24M	A	5.669	A1	7.952	8.267	7.086					
A25M	L	10.000	L1	12.480	12.795						
A33M	A	5.669	A1	7.952	8.267	7.086					
A33M	L	7.322	A1		10.393	10.944	8.740				
	L2	11.614	L1	14.291	14.606	13.385					
A43M	L2	16.023	L3	18.425	18.740						
	A	8.031	A1		11.102	11.653	9.448				
A43M	L	12.322	L1	15.000	15.315	14.094					
	L2	16.732	L3	19.133	19.448						
A70M	A	9.488	A1			13.425	10.708	10.708			
	L	14.291	L1	16.771	17.086	15.705					
A90M	L2	18.661	L3	21.141	21.456						
	A	11.299	A1			15.196	12.480	12.480			
A90M	L	16.102	L1	18.543	18.858	17.677					
	L2	20.472	L3	22.913	23.228						
A110M-A111M	A	12.795	A1			16.692	13.976	13.976	13.976		
	L	17.755	L1	20.196	20.511	19.330					
A110SM-A111SM	L2	22.204	L3	24.645	24.960						
A300M	A	17.677	A1						20.314	20.629	
	L	25.944	L1			27.480					
A300M	L2	30.393	L3	32.952	33.267						

Note: All flange dimensions in inches.
L2/L3 dimension includes double reduction spur gears.



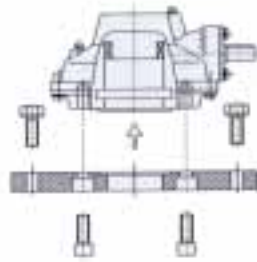
Bevel Motor Flange Sizes According to MSS - 102

	b4	b5	b6	c3	D1	D2	D3	d5	d10	e2	h4	h5	L5	L6	t2
FA07	.1968	.098	.826	M8	3.54	2.166	2.750	.3937	.630	4	.120	.3937	1.574	1.378	.7086
FA10	.2362	.098	.826	M8	4.92	2.312	4.000	.4724	.787	4	.120	.3937	1.968	1.771	.8858
FA14	.3149	.098	.945	M10	6.89	3.750	5.500	.7086	1.181	4	.160	.5905	2.756	2.560	1.2992
FA16	.4724	.098	.945	M10	8.25	5.000	6.500	.8661	1.575	4	.190	.5905	3.543	3.346	1.6929
FA25	.5511	.196	1.062	M12	11.81	6.000	10.000	.7086	1.968	8	.190	.7086	4.330	3.937	2.1062
FA30	.0786	.196	1.062	M12	13.78	7.000	11.750	.8661	2.362	8	.190	.7874	4.724	4.330	2.5196
FA35	.8661	.196	1.062	M12	16.33	8.500	14.000	1.2598	3.150	8	.190	.9842	5.313	4.921	3.3464
FA40	1.1023	.196	1.062	M12	18.70	9.000	16.000	1.4960	3.937	8	.320	1.1023	7.086	6.693	4.1732
*F48					22.04	14.566	19.016	1.4960		12					
*F60						18.504	23.740	1.4960		20					

* ISO



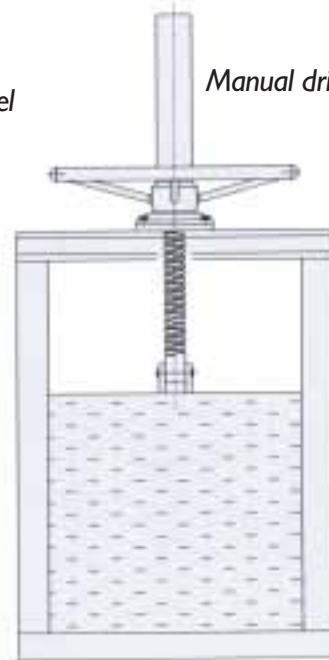
Plates



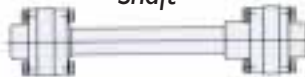
Handwheel

*Handle
(option)*

Manual drive



Shaft



Columns



Stems



*Cover tube
type C*



*Cover tube
type CS*



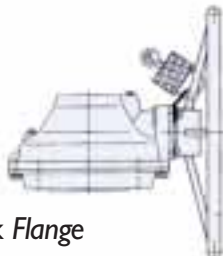
*Cover tube with
position indicator
type CSI*



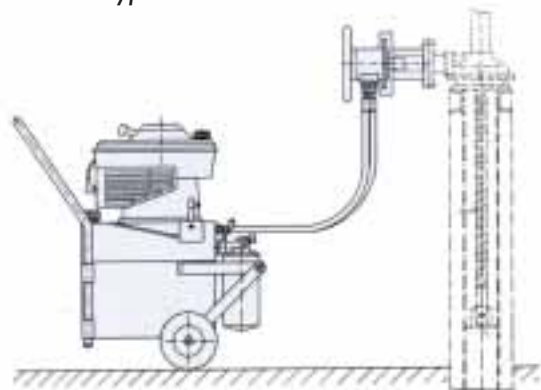
*Position indicator for
non-rising stem*



Padlock Flange



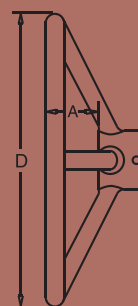
Portable powered drive



Information in this brochure is believed to be accurate. Mastergear reserves the right to alter specifications without notice. Please contact factory for certified drawings or specifications.

Handwheel Bore Diameter		mm	D inches	mm	A inches	Weight Lbs
25	18	200	7.87	9	.354	4
25	18	300	11.81	24	.944	6
25	18	400	15.74	38	1.496	6
25	18	500	19.68	51	2.007	7
25	18	600	23.62	67	2.637	11
25	18	700	27.55	80	3.149	13
38	25	800	31.49	94	3.700	15
38	25	900	35.43	110	4.330	18

Note: All dimensions in metric, unless otherwise specified.



The World's Largest Manufacturer of Valve Actuators for Manual & Motorizable Input Applications

High Strength Aluminum



- High Strength Aluminum Alloy
- 4 Frame Sizes
- Up to 9000 in.-lbs. of Output Torque

High Performance Cast Iron



- High Performance Series
- 21 Frame Sizes
- Up to 2.5 million in.-lbs. of Output Torque

Economy Cast Iron



- Economy Cast Iron
- Stamped Steel
- 3 Frame Sizes Up to 9000 in.-lbs. of Output Torque



MASTERGEAR® U.S.A.

Division of REGAL-BELOIT CORPORATION

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