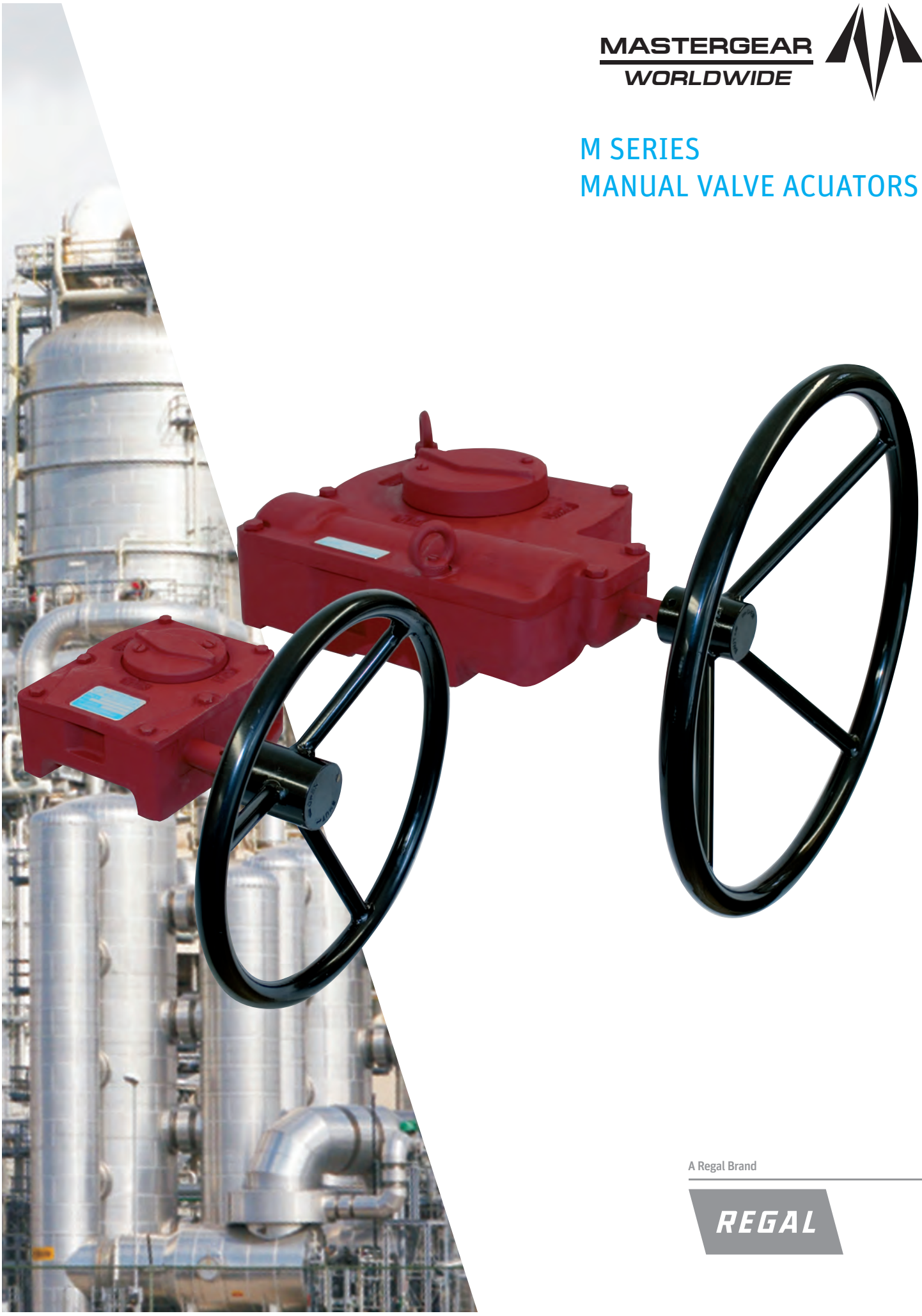
MASTERGEAR
WORLDWIDE

M SERIES
MANUAL VALVE ACUATORS

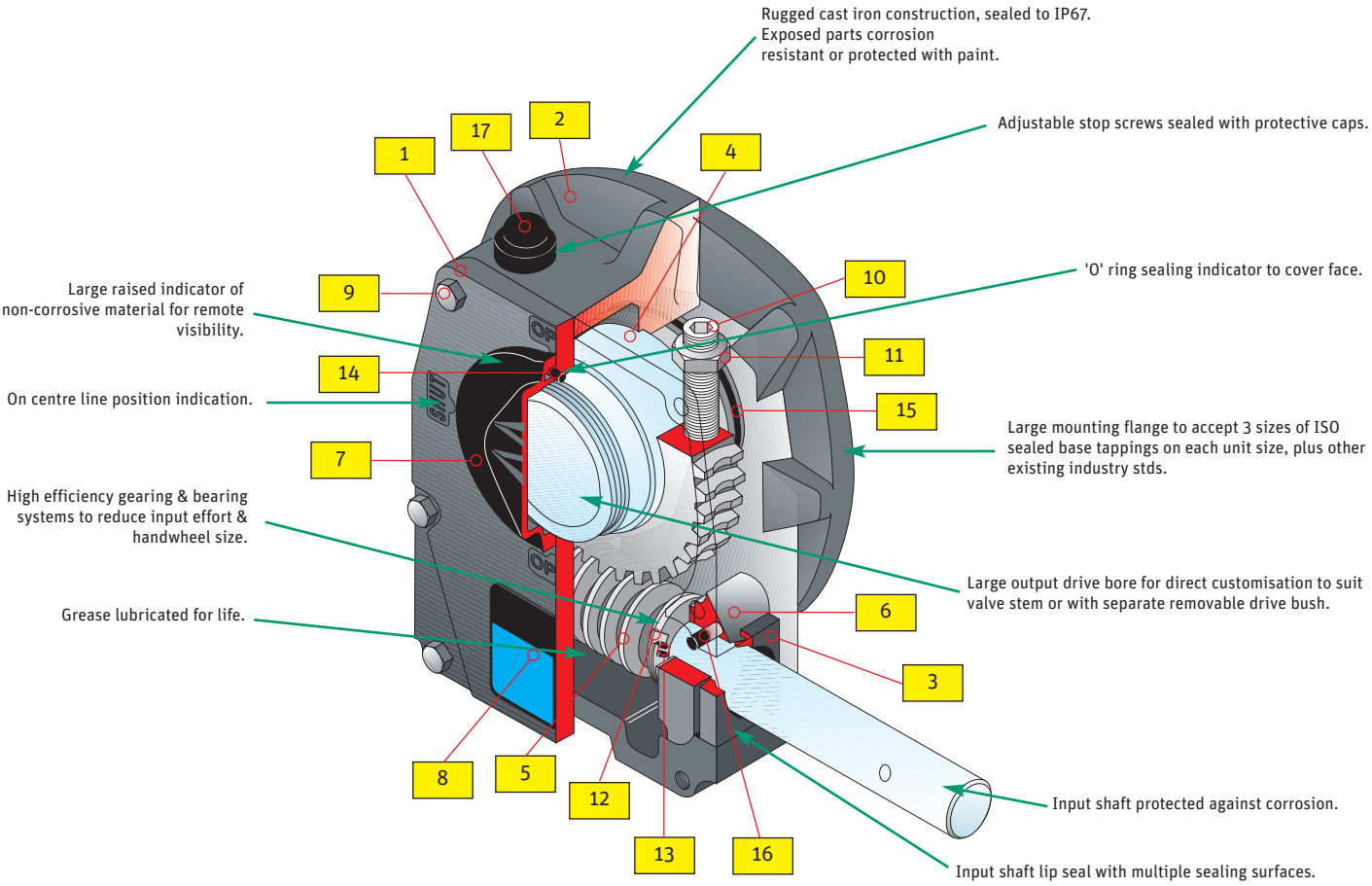


A Regal Brand

REGAL

General description

The cast iron construction and rugged design of the Mastergear 'M' series range of manual valve actuators has been engineered to meet the arduous requirements demanded of industrial environments. Through corrosion resistant treatment of bare metal surfaces, a paint finish and the use of lip seals with multiple sealing surfaces, the 'M' range is sealed to IP67 and achieves exceptional durability. All models use high performance axial needle roller bearings, which combined with a one piece input wormshaft, maximises the available mechanical advantage and overall unit efficiency.



Features & general specifications:

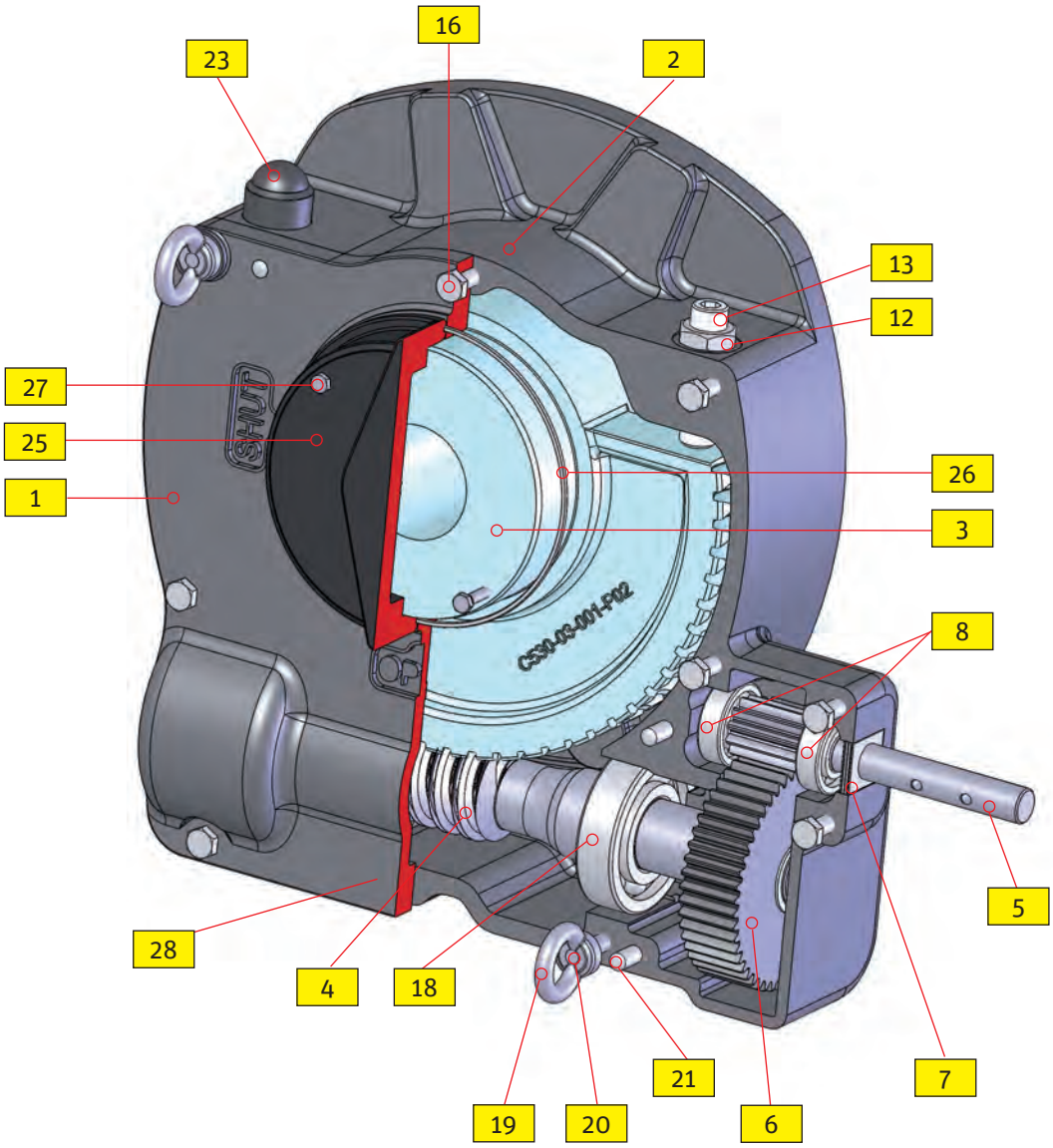
- Sealed to IP67
- Maintenance Free
- Optional Input Padlock Flange
- Optional output drivebushes*
- Self Locking/High Efficiency
- High Mechanical Advantage
- Cast Iron Enclosure
- 90° ± 5° (adjustable) travel
- To 4500 Nm output torque
- 6 frame sizes
- 50% grease filled for life
- Capability to withstand overload to twice maximum output torque rating
- -20°C to +80°C temperature range for continuous operation
- Unrivalled versatility for direct fixing to valve

* M07 has integral drivebush

Item	Component	Material description	Material specification
1	Cover	S.G. cast iron	BS1452 grade 260
2	Gearcase	S.G. cast iron	BS1452 grade 260
3	Wormshaft oilseal	Injection moulded plastic	Hytrel 5526
4	Quadrant	S.G. cast iron	BS2789 grade 500/7
5	Wormshaft	Nitempered steel	BS970 606M36
6	Wormshaft bearings	Sintered iron copper	FC025 40
7	Indicator cap	Cast iron	BS1452 grade 260
8	Nameplate	Inox	Aisi 316
9	Cover screws	Hex. head set screws	BS3692 grade 8.8
10	Stopscrews	Socket set screws	BS4168 part 2
11	Locknut	Hex. locknut	BS3692
12	Bearing thrust washers	Needle thrust washer	Type AS
13	Thrust bearings	Needle thrust bearing	Type AXK
14	Indicator O-ring	Medium Nitrile	60-80 Shore hardness
15	Quadrant O-ring	Medium Nitrile	60-80 Shore hardness
16	Dowels	Hardened & ground steel	BS7055 type A
17	Locknut protection caps	Injection moulded plastic	Low density polyethylene

General description

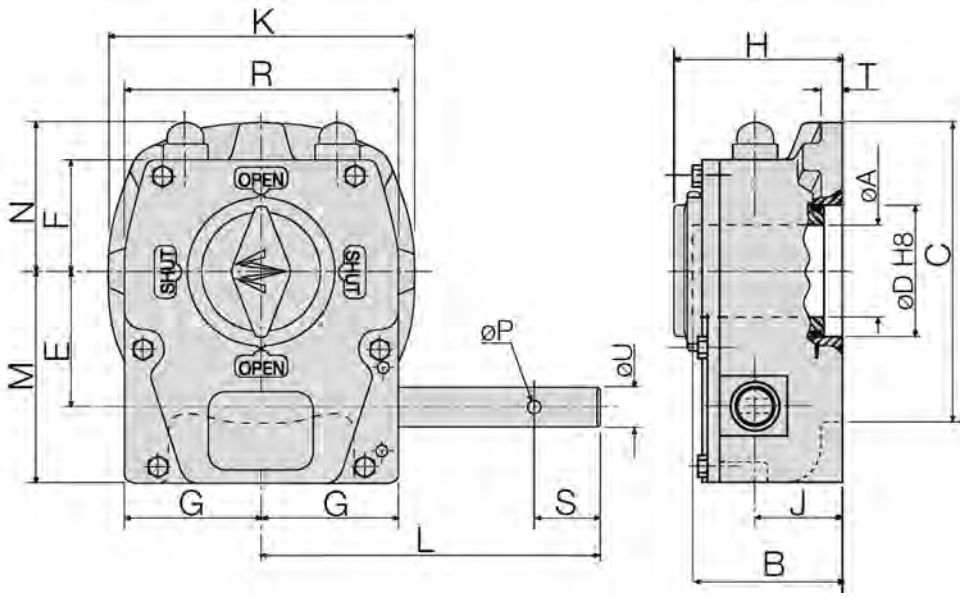
To extend the M-Serie to higher torques than 4.500 Nm, it was neccessary to design units with double reduction and more. The result are the M20 to M70 units, this line will be extended in the future to higher torques. The advantages of the smaller sizes have been incorporated in the bigger sizes too.



Item	Component	Material Description
1	Cover	S.G. cast iron
2	Gearcase	S.G. cast iron
3	Quadrant	S.G. cast iron
4	Wormshaft	Steel harden
5	Input pinion	Steel harden
6	Spur wheel	Steel harden
7	Oilseal	Injection moulded plastic
8	Ball Bearing	Steel
12	Hexagon nut	8.8
13	Socket set screw	8.8

Item	Component	Material Description
14	O-ring for quadrant	Nitril rubber
16	Hexagon screw	8.8
18	Ball Bearing	Steel
19	Eye nut	Steel
20	Socket set screw	8.8
21	Dowel	Steel harden
23	Protection cap	Injection moulded plastic
25	Indicator cap	Cast iron
26	O-ring for indicator cap	Nitril rubber
27	Pan head screw	8.8
28	Name plate	Inox aisi 316

Performance specification and dimensions

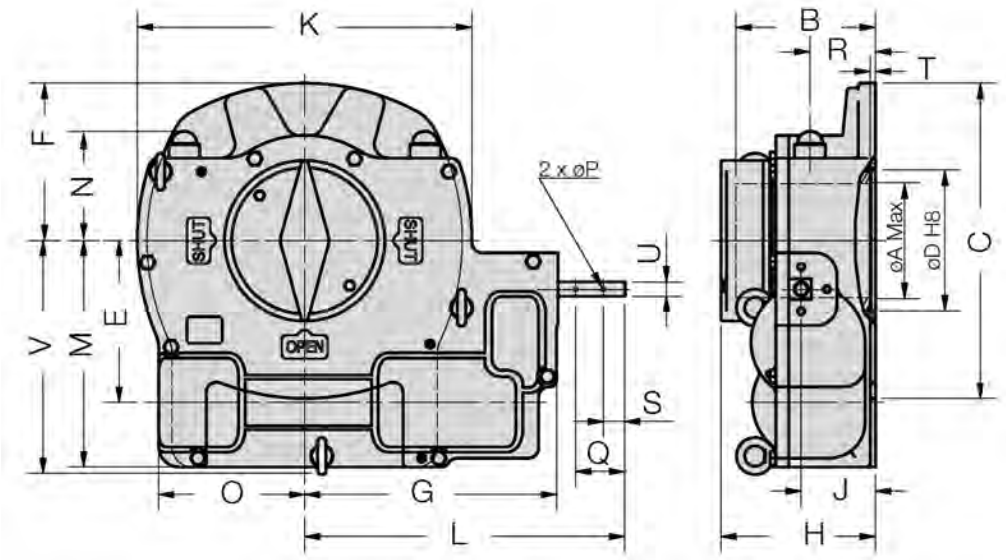


Unit Size	M07	M10	M12	M14	M15	M16
Max. Output Torque (Nm) II 2)	300	600	1200	2200	4100	5400
Mechanical Advantage	11.0	11.0	11.3	16.2	20.5	26.5
Input Torque (Nm)II	27.3	54.5	106.2	136	200	204
Ratio	40:1	40:1	42:1	60:1	68:1	88:1
Turns to Close	10	10	10.5	15	17	22
Valve Mounting Flange ISO 5211	F05, F07	F07, F10	F10, F12 F14	F12, F14 F16	F14, F16	F16, F25
A_1 Max. Bore in Quadrant (mm)	25	32	45	65	86	92
A_2 Max. Bore in Drivebush (mm)	25	25	32	45	65	70
B Max. Valve Shaft Height	51	57	72	81	92	113
C	88	112	150	192	235	290
D	N/A	50	65	90	115	120
E	38.5	52	66.7	89.5	123	154
F	32.5	44	56	66	87.5	116
G	42	53	66	82.5	111	125
H	58	67	81	93.5	105.5	126.5
J	26.5	35	42	50	50	50
K	88	116	150	198	252	315
L_1 Standard Shaft Length	120	135	168	185	250	275
L_2 Extended Shaft Length	N/A	205	240	260	325	350
M	62	83.5	105	131	178	209
N	45	58	75	86	114	117
P	4	5	6	6	8	8
R	84	107	136	184	248	312.5
S	20	25	32	32	45	45
T	N/A	4.5	7.5	7.5	9.5	9.5
U	11.98 11.94	14.98 14.94	19.98 19.94	19.98 19.94	29.98 29.94	29.98 29.94
Unit Weight (Kg)	2.6	4.2	8.2	14.5	27.2	41.2
Recommended Handwheel	SR5 125	R5, SR8 400	SR10, SR12 400	R18 500	R18, R24 700	R18, R2 700
Rim Pull (Kg/hand)1	22	27	26	27	28	29

1) Output torque for a lifetime of 1000 cycels with twice overload capacity

for handwheel selection please refer to chart overleaf

Performance specification and dimensions



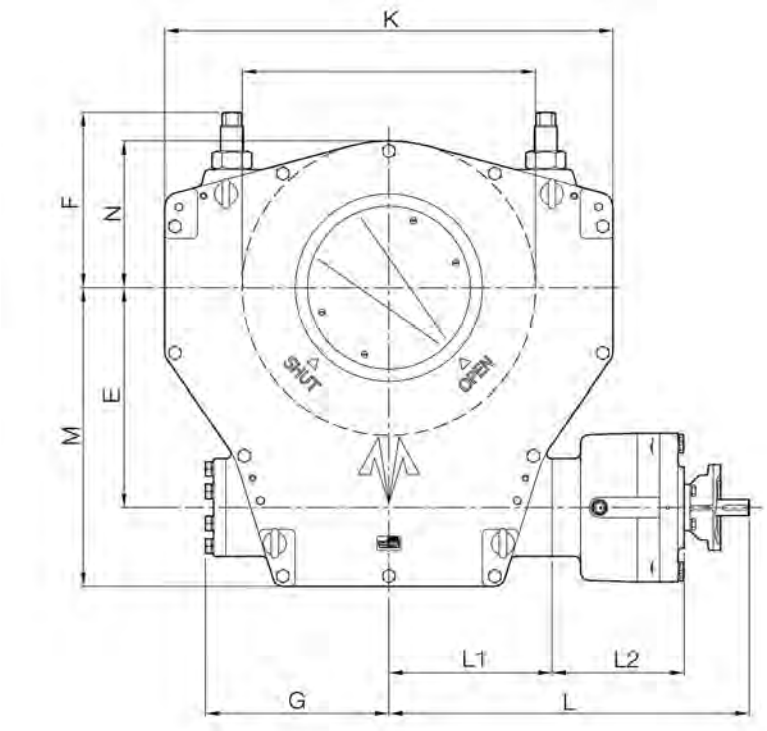
Unit Size	M20	M30	M40	M50	M55	M60	M70
Max. Output Torque (Nm) I 1)	8.000	13.000	24.000	50.000	95.000	135.000	203.000
Ratio 3)	183 : 1	309,1 : 1	615 : 1	1219,8 : 1	1219,8 : 1	3408 : 1	3408 : 1
Mechanical Advantage	57	99	188.7	384.6	346	1102,2	735,1
Input Torque (Nm) I	140	131	127	130	275	122	276
Turns to Close	45,76	77,3	153,75	304,95	304,95	852	852
Valve Mounting Flange ISO 5211	F16,F25	F25, F30	F25,F30,F40	F25,F30 F40,F48	F25,F30 F40,F48	F40,F48	F40,F48
A Max. Bore in Quadrant (mm)	92	124	165	180	180	241	241
B Max. Valve Shaft Height	116	144	203	250	250	342	342
C	300	370	458	540	540	557	557
D	120 H8	155 H8	205 H8	225 H8	225	309,372	309,372
E	146	185	235	305	305	364,95	361,95
F	150	185	229	270	270	269,24	269,24
G	228	262,5	366	422	422	282,702	282,702
H	129	162	224	271	271	765/-	765/-
J	60	85	108	135	135	373,126	373,126
K	300	370	486	614	614	223,52	223,52
L_1 = Standard / L_2 = Extended	328 / 379	362,5 / 413,5	466 / 517	523 / 573	523	700	700
M	211	257	329	423	423	817/-	817/-
N	123	132	159	187	187	476	476
O	133	159,5	212	270	270	222,504	222,504
P	6	6	6	6	6	6x6/8x7	6x6/8x7
Q	72	72	72	72	72	84	84
R	58	80	95	115	115	175	175
S	32	32	32	32	32	45	45
T	4	4	5	5	5	5	5
U	20 H8	20 H8	20 H8	20 H8	20	20/30	20/30
V	221	267	340	433	433	527	527
Unit Weight (Kg)	44,5	84	181,5	294,3	296	800	800
Recommended Handwheel	R18 600	R18 600	R18 600	R18 600	R18 900	R18 900	R18 900
Rim Pull (Kg/hand)1	23	22	21	21	30	20	30

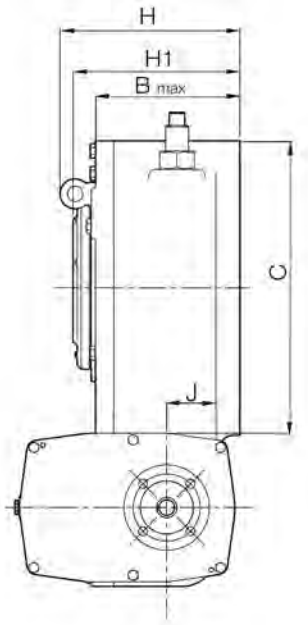
1) Output torque for a lifetime of 1000 cycels with twice overload capacity

2) Available different ratios

for handwheel selection please refer to chart overleaf

Performance specification and dimensions





Unit Size	M80	M90	M100
Max Output Torque (Nm) 1*	217.500	271,500	337,500
Mechanical advantage	956,6	1195,8	1485,9
Input torque (Nm) 1*	227	227	227
Rim pull (Kg/hand) 1*	18	18	18
Ratio	2479,7	3099,6	3852,4
Turns to close	619,9	774,9	963,1
Valve mounting flange ISO 5211	F48/60	F48/60	F60
A max valve shaft diam.	275	310	350
A max valve shaft square	195	220	248
B max valve shaft height	330	365	403
C	771,5	897	1052,7
D	350	400	450
E	441,5	537	652,7
F	420	430	430
G	400	450	530
H	406,75	442	481
H1	370	410	456
J	150	180	215
K	900	1,100	1,340
L	834	884	964
L_1	674,5	725	805
L_2	160	160	160
M	608	730	840
N	330	360	400
P			
R			
S_1			
S_2			
T	10	9	9
U	40	40	40/50
Unit Weight (Kg)	1.160	1.520	2.130
Recommended handwheel	800	800	800
Rim Pull (Kg/hand)1l	28	28	28

NOTES:

* max output/input torque 2 based on 500 life cycles and 100% overload capability

* available different ratios

Available ratios

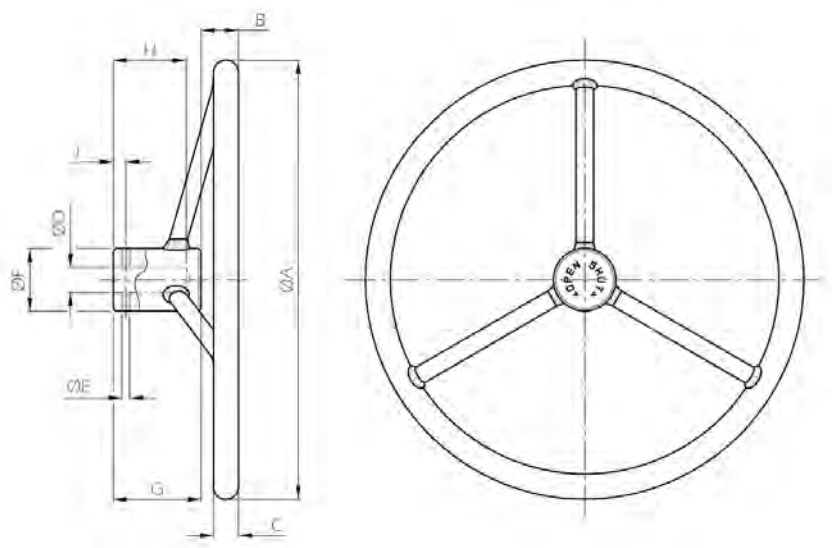
Unit size				Motorizable					Manual				
				Imperial		Metric			Imperial		Metric		
	Overall ratio : 1	Number of input turns to close	MA of actuator	Input torque in-lbs	Output torque in-lbs	Input torque Nm	Output torque Nm	Cycle Life (Motorizable)	Input torque in-lbs	Output torque in-lbs	Input torque Nm	Output torque Nm	Cycle Life (Manual)
M20.1	96.9	24.2	30.2	1,941	58,650	219.3	6,627	5,000 Cycles	2,353	71,100	265.9	8,034	1,000 Cycles
M20	183.0	45.8	57.1	1,028	58,650	116.1	6,627		1,246	71,100	140.8	8,034	
M30.1	191.3	47.8	60.8	1,578	96,000	178.3	10,848		1,899	115,500	214.6	13,052	
M30.2	228.3	57.1	72.6	1,322	96,000	149.4	10,848		1,591	115,500	179.7	13,052	
M30	309.1	77.3	98.3	976	96,000	110.3	10,848		1,175	115,500	132.8	13,052	
M40.1	270.8	67.7	83.1	2,139	177,702	241.7	20,080	2,500 Cycles	2,567	213,240	290.1	24,096	750 Cycles
M40.2	299.2	74.8	96.7	1,838	177,702	207.7	20,080		2,206	213,240	249.2	24,096	
M40.3	369.0	92.2	119.3	1,490	177,702	168.4	20,080		1,788	213,240	202.1	24,096	
M40.4	556.8	139.2	170.8	1,040	177,702	117.6	20,080		1,248	213,240	141.1	24,096	
M40	615.2	153.8	188.7	942	177,702	106.4	20,080		1,130	213,240	127.7	24,096	
M40.5	758.7	189.7	232.8	763	177,702	86.3	20,080		916	213,240	103.5	24,096	
M50.1	327.7	81.9	132.9	2,786	370,242	314.9	41,837		3,343	444,250	377.8	50,200	
M50.2	593.2	148.3	196.8	1,882	370,242	212.6	41,837		2,258	444,250	255.1	50,200	
M50.3	673.8	168.4	229.0	1,617	370,242	182.7	41,837		1,940	444,250	219.2	50,200	
M50	1219.8	305.0	384.6	963	370,242	108.8	41,837		1,155	444,250	130.5	50,200	
M55.1	327.7	81.9	119.6	5,853	700,000	661.4	79,100		7,024	840,000	793.7	94,920	
M55.2	593.2	148.3	177.1	3,953	700,000	446.6	79,100		4,743	840,000	536.0	94,920	
M55.3	673.8	168.4	206.1	3,396	700,000	383.7	79,100		4,075	840,000	460.5	94,920	
M55	1219.8	305.0	346.2	2,022	700,000	228.5	79,100		2,427	840,000	274.2	94,920	
M60.1 / F16	523.8	131.0	174.6	5,704	996,000	644.6	112,548	1,000 Cycles	6,844	1,195,000	773.3	135,035	500 Cycles
M60.2 / F16	681.6	170.4	227.2	4,384	996,000	495.4	112,548		5,260	1,195,000	594.3	135,035	
M60.3 / F14	1047.6	261.9	338.8	2,940	996,000	332.2	112,548		3,527	1,195,000	398.5	135,035	
M60.4 / F14	1363.1	340.8	440.9	2,259	996,000	255.3	112,548		2,711	1,195,000	306.3	135,035	
M60.5 / F14	1571.4	392.9	508.2	1,960	996,000	221.5	112,548		2,351	1,195,000	265.7	135,035	
M60.6 / F14	2044.7	511.2	661.3	1,506	996,000	170.2	112,548		1,807	1,195,000	204.2	135,035	
M60.7	2726.3	681.6	881.7	1,130	996,000	127.6	112,548		1,355	1,195,000	153.1	135,035	
M60	3407.8	852.0	1102.2	904	996,000	102.1	112,548		1,084	1,195,000	122.5	135,035	
M70.1 / F16	523.8	131.0	116.5	12,879	1,500,000	1455.3	169,500		15,455	1,800,000	1746.4	203,400	
M70.2 / F16	681.6	170.4	151.5	9,898	1,500,000	1118.4	169,500		11,877	1,800,000	1342.1	203,400	
M70.3 / F14	1047.6	261.9	226.0	6,637	1,500,000	750.0	169,500		7,965	1,800,000	900.0	203,400	
M70.4 / F14	1363.1	340.8	294.1	5,101	1,500,000	576.4	169,500		6,121	1,800,000	691.7	203,400	
M70.5 / F14	1571.4	392.9	339.0	4,425	1,500,000	500.0	169,500		5,310	1,800,000	600.0	203,400	
M70.6 / F14	2044.7	511.2	441.1	3,401	1,500,000	384.3	169,500		4,081	1,800,000	461.1	203,400	
M70.7	2726.3	681.6	588.1	2,550	1,500,000	288.2	169,500		3,061	1,800,000	345.8	203,400	
M70	3407.8	852.0	735.2	2,040	1,500,000	230.6	169,500		2,448	1,800,000	276.7	203,400	

1) The worm gear with this ratio, open the valve with clockwise rotation.

Available ratios

Unit size				Motorizable					Manual				
				Imperial		Metric			Imperial		Metric		
	Overall ratio : 1	Number of input turns to close	MA of actuator	Input torque in-lbs	Output torque in-lbs	Input torque Nm	Output torque Nm	Cycle Life (Motorizable)	Input torque in-lbs	Output torque in-lbs	Input torque Nm	Output torque Nm	Cycle Life (Manual)
M80.1 / F25	286.2	71.5	110.4	17,436	1,925,000	1970.1	217,500	1,000 Cycles	17,436	1,925,000	1970.1	217,500	1,000 Cycles
M80.2 / F25	322.7	80.7	124.5	15,465	1,925,000	1747.3	217,500		15,465	1,925,000	1747.3	217,500	
M80.3 / F25	381.0	95.2	147.0	13,098	1,925,000	1479.9	217,500		13,098	1,925,000	1479.9	217,500	
M80.4 / F25	429.6	107.4	165.7	11,617	1,925,000	1312.5	217,500		11,617	1,925,000	1312.5	217,500	
M80.5 / F25	521.3	130.3	201.1	9,572	1,925,000	1081.6	217,500		9,572	1,925,000	1081.6	217,500	
M80.6 / F25	587.8	146.9	226.7	8,490	1,925,000	959.2	217,500		8,490	1,925,000	959.2	217,500	
M80.7 / F16	699.4	174.9	269.8	7,134	1,925,000	806.1	217,500		7,134	1,925,000	806.1	217,500	
M80.8 / F16	788.6	197.2	304.2	6,328	1,925,000	714.9	217,500		6,328	1,925,000	714.9	217,500	
M80.9 / F16	1094.5	273.6	422.2	4,559	1,925,000	515.1	217,500		4,559	1,925,000	515.1	217,500	
M80.10 / F16	1234.1	308.5	476.1	4,044	1,925,000	456.9	217,500		4,044	1,925,000	456.9	217,500	
M80.11 / F16	1527.3	381.8	589.2	3,267	1,925,000	369.2	217,500		3,267	1,925,000	369.2	217,500	
M80.12 / F16	1722.0	430.5	664.3	2,898	1,925,000	327.4	217,500		2,898	1,925,000	327.4	217,500	
M80.13	2199.3	549.8	848.4	2,269	1,925,000	256.4	217,500		2,269	1,925,000	256.4	217,500	
M80.14	2479.7	619.9	956.6	2,012	1,925,000	227.4	217,500		2,012	1,925,000	227.4	217,500	
M90.1 / F25	357.7	89.4	138.0	17,412	2,403,000	1967.2	271,500		17,412	2,403,000	1967.2	271,500	
M90.2 / F25	403.4	100.8	155.6	15,443	2,403,000	1744.8	271,500		15,443	2,403,000	1744.8	271,500	
M90.3 / F25	476.2	119.1	183.7	13,079	2,403,000	1477.7	271,500		13,079	2,403,000	1477.7	271,500	
M90.4 / F25	537.0	134.2	207.2	11,600	2,403,000	1310.6	271,500		11,600	2,403,000	1310.6	271,500	
M90.5 / F25	651.6	162.9	251.4	9,559	2,403,000	1080.0	271,500		9,559	2,403,000	1080.0	271,500	
M90.6 / F25	734.7	183.7	283.4	8,478	2,403,000	957.9	271,500		8,478	2,403,000	957.9	271,500	
M90.7 / F16	874.3	218.6	337.3	7,124	2,403,000	804.9	271,500		7,124	2,403,000	804.9	271,500	
M90.8 / F16	985.8	246.4	380.3	6,319	2,403,000	713.9	271,500		6,319	2,403,000	713.9	271,500	
M90.9 / F16	1368.2	342.0	527.8	4,553	2,403,000	514.4	271,500		4,553	2,403,000	514.4	271,500	
M90.10 / F16	1542.6	385.7	595.1	4,038	2,403,000	456.2	271,500		4,038	2,403,000	456.2	271,500	
M90.11 / F16	1909.1	477.3	736.5	3,263	2,403,000	368.6	271,500		3,263	2,403,000	368.6	271,500	
M90.12 / F16	2152.5	538.1	830.4	2,894	2,403,000	326.9	271,500		2,894	2,403,000	326.9	271,500	
M90.13	2749.1	687.3	1060.6	2,266	2,403,000	256.0	271,500		2,266	2,403,000	256.0	271,500	
M90.14	3099.6	774.9	1195.8	2,010	2,403,000	227.0	271,500		2,010	2,403,000	227.0	271,500	
M100.1 / F25	444.6	111.2	171.5	17,417	2,987,000	1968.0	337,500		17,417	2,987,000	1968.0	337,500	
M100.2 / F25	501.3	125.3	193.4	15,448	2,987,000	1745.4	337,500		15,448	2,987,000	1745.4	337,500	
M100.3 / F25	591.9	148.0	228.3	13,083	2,987,000	1478.3	337,500		13,083	2,987,000	1478.3	337,500	
M100.4 / F25	667.4	166.8	257.4	11,604	2,987,000	1311.1	337,500		11,604	2,987,000	1311.1	337,500	
M100.5 / F25	809.9	202.5	312.4	9,562	2,987,000	1080.4	337,500		9,562	2,987,000	1080.4	337,500	
M100.6 / F25	913.2	228.3	352.2	8,481	2,987,000	958.2	337,500		8,481	2,987,000	958.2	337,500	
M100.7 / F16	1086.6	271.7	419.1	7,127	2,987,000	805.2	337,500		7,127	2,987,000	805.2	337,500	
M100.8 / F16	1225.2	306.3	472.6	6,321	2,987,000	714.2	337,500		6,321	2,987,000	714.2	337,500	
M100.9 / F16	1700.5	425.1	655.9	4,554	2,987,000	514.6	337,500		4,554	2,987,000	514.6	337,500	
M100.10 / F16	1917.3	479.3	739.5	4,039	2,987,000	456.4	337,500		4,039	2,987,000	456.4	337,500	
M100.11 / F16	2372.7	593.2	915.2	3,264	2,987,000	368.8	337,500		3,264	2,987,000	368.8	337,500	
M100.12 / F16	2675.3	668.8	1031.9	2,895	2,987,000	327.1	337,500		2,895	2,987,000	327.1	337,500	
M100.13	3416.7	854.2	1317.9	2,267	2,987,000	256.1	337,500		2,267	2,987,000	256.1	337,500	
M100.14	3852.4	963.1	1485.9	2,010	2,987,000	227.1	337,500		2,010	2,987,000	227.1	337,500	

Handwheels



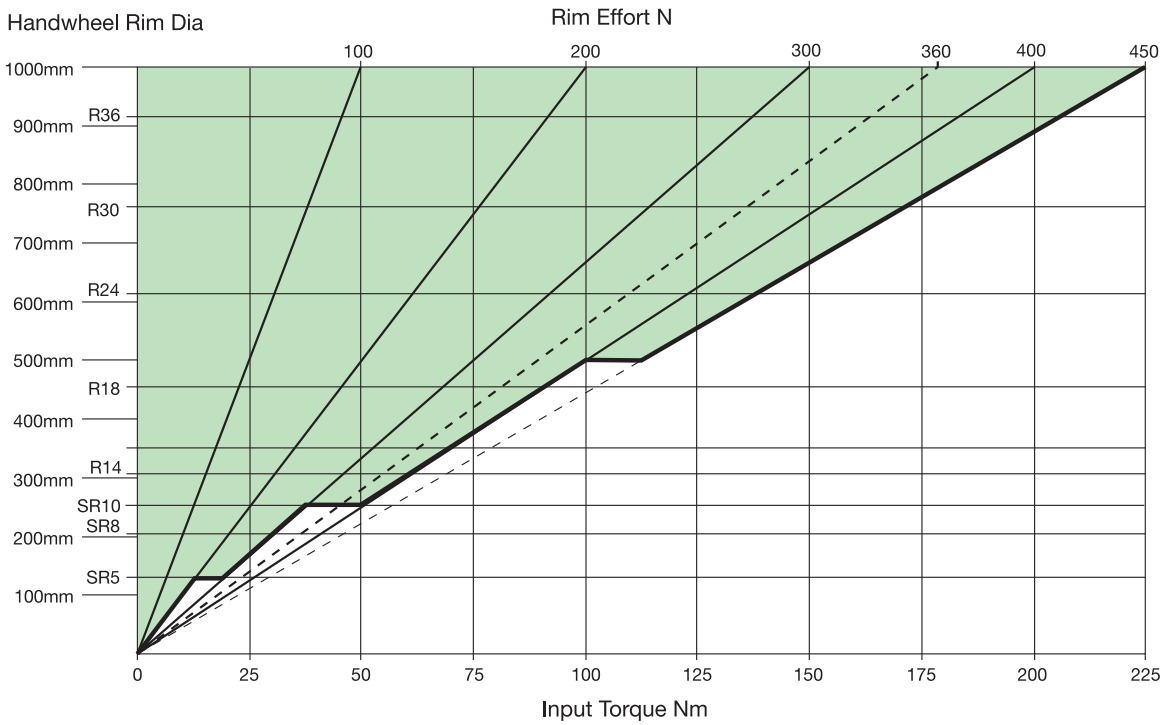
HANDWHEEL - DATA				
ØA ±10	B ±15	ØC	No.OF SPOKES	WEIGHT (Kg)
200	8	16	3	1.0
300	21	20	3	2.0
400	34	25	4	3.0
500	48	25	4	4.0
600	64	25	4	4.5
700	79	25	4	5.0
800	92	25	6	6.5
900	101	25	6	8.0
1000	115	25	6	10.0

HANDWHEEL - DATA					
ØD +0.05/+0.1	ØE +0.05/+0.1	ØF ±2	G ±0.5	H 0/+0.5	J ±2
12.00	4	40	70	30	8
15.00	5	40	70	42	8
20.00	6	50	80	58	10
25.40	8	50	80	58	10
30.00	8	50	80	58	10
31.70	8	50	100	76	12

Handwheel selection procedure

1. For optimum performance handwheels should be selected from the green shaded area.
2. Determine the required input torque from 3 below.
3. Input torque = $\frac{\text{required output torque}}{\text{mechanical advantage*}}$.
4. Determine the maximum allowable handwheel rim effort for your application.
5. Select handwheel rim diameter.

*For mechanical advantage refer to table on page 3.



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