ECI ENTECH CONTROLS

Entech RP Series

Rack & Pinion Pneumatic Actuators

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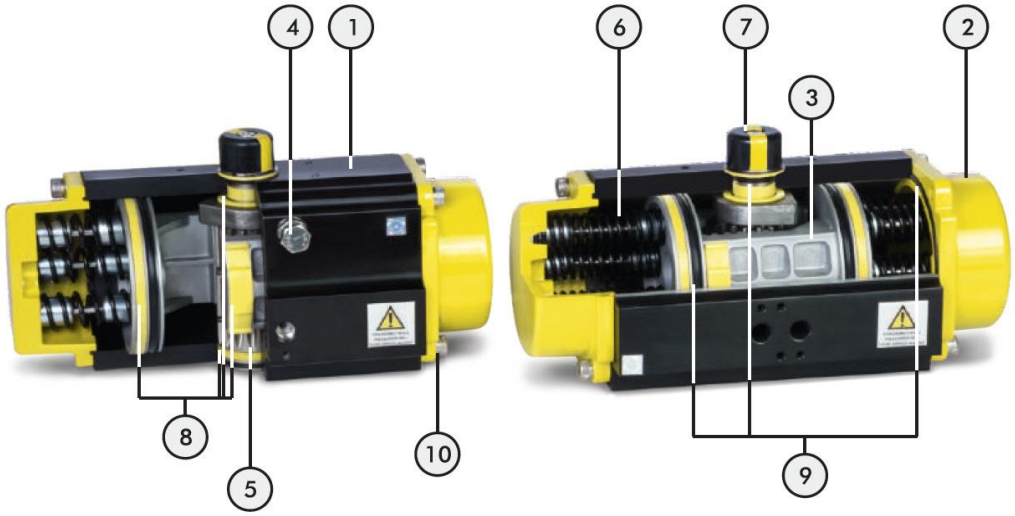
TÜV INDIA
TÜV NORD GROUP

CE

Rack & Pinion Actuators

Design

Dual Rack and pinion design with extra wide base manufactured in full compliance with the latest requirement of ISO 5211 with provision for mounting Solenoid Valves, Limit Switches & Accessories comply to NAMUR VDI/ VDE 3845



Features

1 Actuator Body

Extruded Aluminium Alloy body is hard anodised to protect the internal and external components against corrosion, Special Honed Internal Surface reduces the friction on moving pistons and extends the life cycle of the actuators. Alternative coatings are available such as ENP (Electroless Nickle Plating), Fiber Powder Coated, PFA, ECTFE for more aggressive environments.

2 End Caps

Diecasted aluminum end caps are primarily Alodine Chromatized coated which provides longer life cycles against corrosion and reduces wearing resistance.Secondary standard coating is powder polyester coating and also ENP, PFA, ECTFE etc coatings are offered alternatively for agressive environments.

3 Pistons

Diecasted aluminum twin rack pistons are equipped with slide guides and seals in high engineered plastic. Alodine Chromatized coated pistons ensure longer life cycles against corrosion and wearing resistance.Pistons that are identical on both sides allow reverse rotation simply by inverting the pistons.

4 Travel Adjustment

Bi-directional external travel stop adjustment bolts can adjust the position ± 5° between 85° to 95° at both opening and closing directions for accurate valve allignment. 0-90° full scale limit position adjustment can also be offered optionally.

5 Pinion (Drive Shaft)

Anti Blow Out proof alloy steel pinion is electroless nickel plated in order to reduce the friction, provide maximum wear resistance and protection against corrosion under severe conditions as it fully conforms to the latest standards of ISO5211, DIN3337,NAMUR. Double square, paralel or diagonal square or key way type shaft can be supplied in accordance with customer demands.

6 Preloaded Springs

Modular Pre Loaded Spring Cartridge design in high grade coated steel springs provide great safety and corrosion resistance in fail safe and emergency shut down operations. Also these springs can be used for both high & Low Temperature applications.

7 Position Indicator

All actuators are equipped with regular position indicator showing the current state of the actuators and valves. Top of Actuator has a NAMUR slot to engage with all popular sensors and positioners.

8 Bearings

Low friction Bearing & guides provide high life cycle to ensure trouble free operations and stability during operation of actuators.

9 Seals

NBR rubber O-rings provide trouble free operation at standard temperature ranges between -20 °C to +80 °C temperature ranges. For high and low temperature applications Viton (-20 °C ~ +150 °C) and Silicone (-50 °C ~ +180 °C) seals are available optionally

10 Fasteners

Stainless steel fasteners for long life corrosion resistant application.

11 Traceability

Each individual actuator is assigned an unique identification number allowing full traceability.

General Specifications

Torque Range

- Spring Return: 16 to 712Nm (for 5.5barg supply pressure)
- Double Acting: 16 to 1296Nm (for 5.5barg supply pressure)

Pressure Range

- Spring Return: 2.5 to 8 barg
- Double Acting: 2.5 to 8 barg

Pressure Media

Compressed air, dry or lubricated and inert gases

Temperature Range

- Standard: -20°C to 80°C (NBR seals)
- Low temperature: -40°C to 80°C (Silicon seals)
- High temperature: -20°C to 120°C (Viton seals)

Rotation Angle

- Factory set at 90°
- Adjustable: -10° to +10°

Parts & Material List

- Body: Hard anodized Aluminium
- End Caps & Piston: Die cast Aluminium/ Alodine Chromatized
- Pinion: Alloy steel / electroless nickel plated
- Fasteners: Stainless Steel

Compliance to Global Standards

- Valve flange: ISO 5211
- Solenoid flange: NAMUR VDI/ VDE 3845
- Acessory flange: NAMUR VDI/ VDE 3845
- European Norms: ATEX, CE

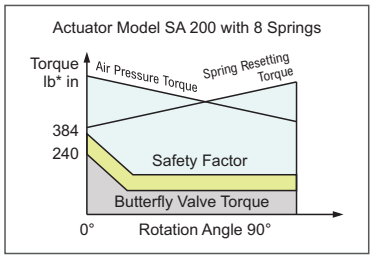
Actuator Selection

While selecting Actuator add adequate safe value to the defined Valve torque, for example Lubricants (Oil, Greese ETC) 20%, Clear Liquid, Dry Gas & Wet Gas 40%, Soft Slurry & Dry Steam 60 %, Abrasive Slurry 100%,

(The above are approx safe recommended values)

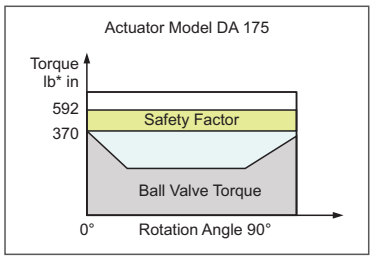
Selection of Single Acting Actuator

When controlling a Butterfly Valve with Torque of 240Nm, Air supply pressure of 4 Bar, process media non lubricating dry steam, considering safety factor of 60% value i.e Valve Torque shall be considered as 384Nm, Select Torque Value in a Single Acting Torque output table for the nearest Spring Torque of 384Nm. i.e 514Nm for start torque and 351Nm for end torque and then select the Air output torque, nearest to 384Nm for Air supply of 4 Bar, which is 550Nm for Start & 374 Nm for End. From the output Table the corresponding Actuator Size is 200 with 8 Nos. of Springs.



Selection of Double Acting Actuator

When controlling a Ball Valve with Torque requirement of 370Nm, Air supply pressure of 4 Bar process media of Non Lubricating dry steam considering safety Factor of 60% i.e Valve Torque shall be considered as 592Nm, select the air supply pressure of 4 Bar in the Double acting output torque table, and then search for equal or approximate Torque data in vertical line and select 613Nm band then search leftward in the line and select Act Model DA 175

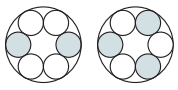
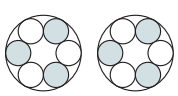
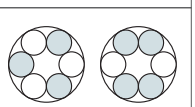
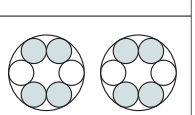


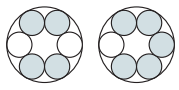
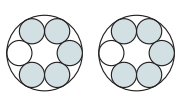
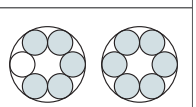
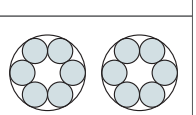
Double – Acting Actuators Torque Output

Actuator Size	Air Supply Pressure (Bar)										
	2.5	3	3.5	4	4.2	4.5	5	5.5	6	7	8
045	7	9	10	12	12	13	15	16	17	20	23
055	12	14	17	19	21	22	25	27	30	35	40
065	20	24	28	32	34	36	41	45	49	57	65
075	31	37	44	49	51	55	62	68	74	87	99
085	45	53	62	72	75	81	90	98	107	126	144
100	69	83	97	110	116	124	139	153	167	195	221
115	114	137	161	184	193	205	229	252	275	322	369
125	149	179	208	238	250	268	299	229	359	420	481
150	257	310	362	415	436	467	515	567	620	725	830
175	385	463	536	613	645	691	769	847	925	1081	1237
200	584	703	821	940	940	1059	1177	1296	1415	1653	1890

Actuator Data

Model	Min / Max Air Supply Pressure	Rotation Angle	Cylinder Diameter	Cylinder Volumes (Cm3) Opening	Cylinder Volumes (Cm3) Closing	Cycle Time (Sec.)	Weight (Kg) Double Acting	Weight (Kg) Single Spring
045	Dry or lubricant clean compressed Air 2.5 to 8 Bar	90° ±5° or the whole trip 0° to 90°	45	75	120	0.2	0.9	-
055			55	145	145	0.3	1.55	0.017
065			65	260	320	0.35	2.3	0.031
075			75	360	560	0.45	2.9	0.049
085			85	535	840	0.6	4.2	0.075
100			100	840	1220	0.8	5.6	0.107
115			115	1350	1955	1	9.2	0.154
125			125	1700	2700	1.3	11.5	0.233
150			150	2900	4465	1.5	22.0	0.374
175			175	4350	6800	2	29.0	0.559
200			200	6900	11000	3.5	48.0	1.008

Spring Quantity	Spring Installation Mode
5	
6	
7	
8	

Spring Quantity	Spring Installation Mode
9	
10	
11	
12	

Note – Actuator Cycle Time (Open Stroke/Close Stroke) are at 5.5bar & orifice dia of approx 4mm.
For Actuator spring return weight please multiply number of spring selected from table with single spring weight and add double acting actuator weight.
Operating Temperature : NBR (+20° C to 80° C) | Viton (-20° C to 150° C) | Silicon (-35° C to +80° C)

Output Torques

of Single Acting Actuator Springs in Nm

Actuator Size	No. of Springs	2.5		3		3.5		4		4.2		4.5		5		5.5		6		7		8		Spring Torque	
		0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	0	90°	90°	0
		START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END	START	END
055	05	8	5	10	8	12	10	15	12	16	13	17	15	20	17	23	20							7	4
	06	7	4	10	6	11	9	14	10	15	11	16	13	19	16	22	18	24	21					8	5
	07			9	5	10	7	13	10	14	10	16	12	18	14	20	17	23	19	28	24			10	6
	08					10	6	12	9	13	9	15	10	17	13	20	15	22	18	27	23	33	28	11	7
	09							11	7	12	8	14	9	16	11	19	14	21	16	26	21	32	26	12	8
	10											13	8	15	10	18	12	20	15	26	20	31	25	14	8
	11													14	9	17	11	19	13	25	18	30	23	15	9
	12															16	10	19	12	24	17	29	22	16	10
065	05	13	9	17	12	21	16	25	21	27	22	29	25	33	29									11	7
	06	11	7	15	10	19	14	24	18	25	20	28	22	32	27	36	31							13	8
	07			14	8	18	12	22	16	24	17	26	20	31	24	35	28	39	33					15	9
	08					17	10	21	13	22	15	25	18	29	22	33	26	37	30	46	38			17	11
	09							19	11	21	13	23	15	28	19	32	24	36	28	44	36	52	44	19	12
	10											22	13	26	17	30	21	34	25	43	34	50	42	21	13
	11													25	15	29	19	33	23	41	31	49	40	24	15
	12															27	16	32	21	40	29	48	37	26	16
075	05	17	10	24	16	30	23	36	29	39	32	43	35	49	42									19	12
	06	14	7	21	12	27	19	34	25	36	27	40	31	46	38	52	44							22	15
	07			18	9	24	14	31	21	33	23	37	27	44	33	49	40	55	46					26	17
	08					22	10	28	17	31	19	34	23	41	29	47	36	53	42	65	54			30	20
	09							25	12	28	15	32	19	38	25	44	32	50	38	63	50	75	62	34	22
	10											29	15	35	21	42	27	48	34	60	46	73	58	37	24
	11													33	17	39	23	45	30	57	42	70	54	41	27
	12															36	19	43	25	54	38	67	50	45	29
085	05	27	16	36	25	45	35	53	44	57	47	62	52	71	61									26	17
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	07			28	14	38	23	47	32	49	36	55	41	64	50	73	59	82	68					36	23
	08					34	17	43	26	47	30	51	36	60	45	70	53	79	62	97	81			41	27
	09							39	21	43	24	49	30	57	39	66	48	75	56	93	75	112	93	47	30
	10											45	24	53	33	62	43	71	51	90	69	108	87	52	33
	11													49	28	59	37	68	46	86	63	104	82	57	37
	12															55	31	64	40	82	58	101	76	62	40
100	05	42	25	55	39	69	52	83	66	89	72	97	80	110	94									41	25
	06	36	16	49	30	63	44	77	57	83	63	92	71	105	85	119	99							49	30
	07			45	21	58	35	72	49	78	54	86	62	99	76	113	91	127	104					57	35
	08					52	26	66	40	72	46	80	53	95	67	108	82	122	96	150	123			65	40
	09							61	31	66	37	75	45	89	58	102	73	116	87	145	114	173	142	73	45
	10											69	36	83	49	98	64	111	78	139	105	167	133	81	50
	11													78	41	92	55	105	69	133	97	162	124	89	55
	12															86	47	99	60	128	88	156	115	97	60
115	05	70	45	93	67	116	90	139	113	148	122	162	136	186	159									64	41
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	08					90	49	112	71	121	80	135	94	159	117	182	140	203	163	250	208			103	65
	09							103	57	112	66	126	80	150	102	173	126	196	149	241	196	288	241	115	73
	10											117	66	141	89	164	112	187	135	232	182	279	226	128	81
	11													132	75	155	98	178	121	223	167	270	212	141	89
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125	05	92	59	121	89	152	119	182	149	194	161	213	180	241	208									82	52
	06	81	42	110	71	140	101	171	131	183	143	201	161	229	192	260	220							98	62
	07			98	53	129	84	159	113	171	125	190	143	218	174	248	202	279	232					114	73
	08					117	65	148	96	160	107	178	125	206	156	237	186	267	214	328	275			131	83
	09							136	78	148	90	166	107	197	137	225	168	256	196	316	257	377	318	147	94
	10											155	90	185	119	214	150	244	180	305	239	365	299	163	104
	11													174	101	202	131	232	162	293	221	354	282	180	114
	12															193	113	221	144	282	202	342	262	196	125
150	05	146	92	196	144	249	197	301	247	322	268	354	299	406	352									151	102
	06	123	58	175	110	226	162	278	213	299	234	331	265	383	318	437	370							182	123
	07			153	77	203	129	255	181	276	200	308	232	360	284	413	337	465	389					212	143
	08					182	96	233	148	254	169	285	198	338	251	390	330	443	356	543	460			242	164
	09							210	114	231	135	262	166	315	217	367	269	420	322	520	427	625	527	273	184
	10											240	133	292	183	345	236	397	288	497	393	602	493	303	205
	11													269	150	322	202	374	255	479	360	579	464	333	225
	12															299	170	352	221	457	326	557	431	364	246
175	05	225	148	303	224	381	302	459	380	490	411	532	458	610	531									215	143
	06	195	100	271	176	349	254	427	332	458	363	500	410	578	488	656	561							258	172
	07			240	129	317	207	395	285	427	316	473	362	546	440	624	513	702	591					301	201
	08					286	161	364	237	395	268	442	315	514	392	592	471	670	544	826	699			343	229
	09							332	191	363	220	410	266	488	345	561	423	638	496	794	652	950	808	386	258
	10											378	219	457	297	529	375	607	453	762	604	918	760	429	287
	11													424	250	497	328	575	405	731	556	886	712	472	315
	12															470	280	543	358	699	509	855	664	515	344
200	05	345	232	464	351	578	469	696	583	744	631	815	702	934	821									321	219
	06	296	162	415	279	529	398	648	512	695	559	766	630	885	749	1004	868							386	263
	07			366	208	485	326	599	445	646	493	718	559	836	678	955	796	1074	915					450	307
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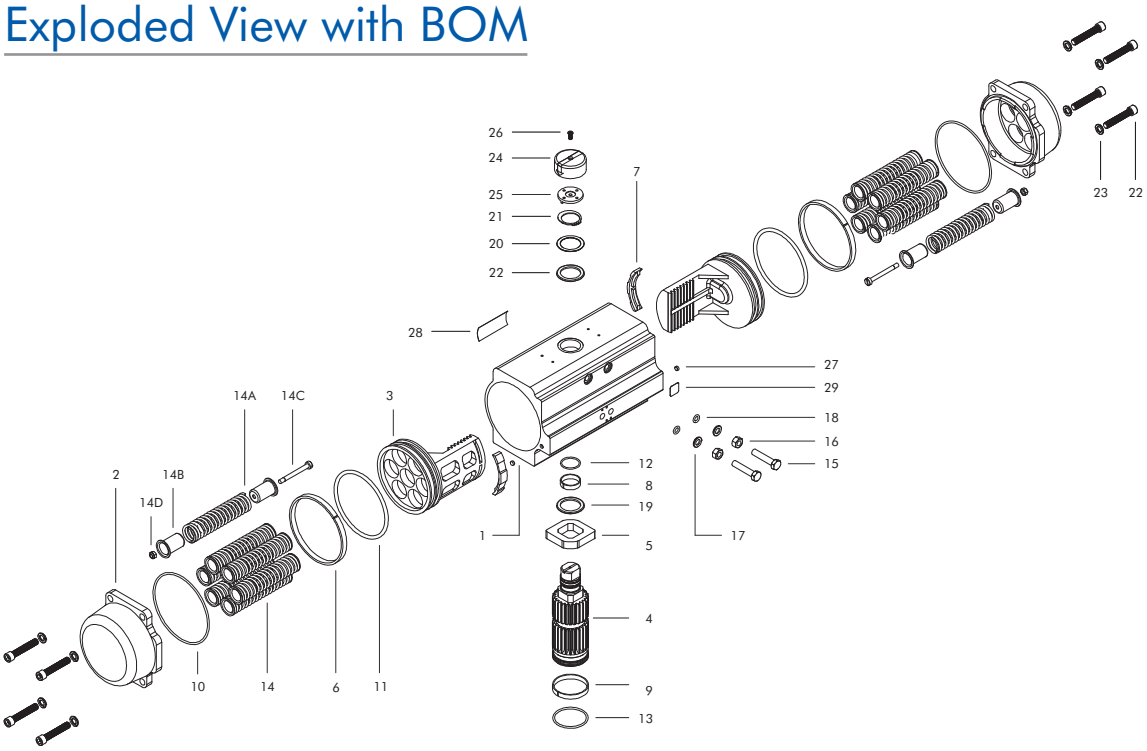
	10											572	350	690	469	809	582	928	701	1165	939	1403	1176	643	438
	11													642	397	760	511	879	630	1117	867	1354	1105	707	482
	12															712	444	830	558	1068	796	1305	1033	771	526

Note – Actual values are in range of ±10% of above values

Exploded View with BOM

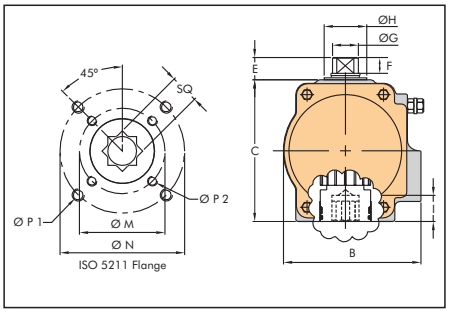


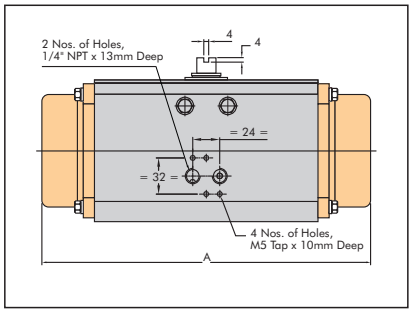
SR. No.	PART NAME	PART REF. No	STANDARD MATERIAL	TOTAL QUANTITY
01	BODY	01	EXTRUDED ALUMINIUM ALLOY	1
02	END CAP	02	ALUMINIUM	2
03	RACK PISTON	03	ALUMINIUM	2
04	PINION	04	CARBON STEEL	1
05	PINION CAM	05	STAINLESS STEEL	1
06	PISTON GUIDE	06	ENGINEERING PLASTIC	2
07	PISTON PAD	07	ENGINEERING PLASTIC	2
08	TOP GUIDE FOR PINION	08	ENGINEERING PLASTIC	1
09	BOTTOM GUIDE FOR PINION	09	ENGINEERING PLASTIC	1
10	`O' RING FOR END CAP	10	NBR	2
11	`O' RING FOR PISTON	11	NBR	2
12	`O' RING FOR PINION TOP	12	NBR	1
13	`O' RING FOR PINION BOTTOM	13	NBR	1
14	SPRING ASSEMBLY	14		5-12
14A	SPRING	14A	II D	5-12
14B	RETAINER FOR SPRING	14B	MS-ZINC PLATING	10-24
14C	STUD FOR RETAINER	14C	STAINLESS STEEL	5-12
14D	NYLOCK NUT	14D	STAINLESS STEEL + NYLON	5-12
15	HEX BOLT FOR STROKE ADJUSTING	15	STAINLESS STEEL	2
16	NUT FOR STROKE ADJUSTING	16	STAINLESS STEEL	2
17	FLAT WASHER FOR STROKE ADJUSTING	17	STAINLESS STEEL	2
18	`O' RING FOR STROKE ADJUSTING	18	NBR	2
19	WASHER FOR PINION	19	ENGINEERING PLASTIC	2
20	PINION WASHER	20	STAINLESS STEEL	1
21	CIRCLIP	21	SPRING STEEL	1
22	ALLEN CAP BOLT FOR END CAP	22	STAINLESS STEEL	8
23	SPRING WASHER	23	STAINLESS STEEL	8
24	INDICATOR	24	ENGINEERING PLASTIC	1
25	INDICATOR GUIDE	25	ENGINEERING PLASTIC	1
26	INDICATOR COUNTER BOLT	26	STAINLESS STEEL	1
27	VENT PLUG	27	NBR	2
28	NAME PLATE	28	STICKER	1
29	CAUTION LOGO	29	DOME STICKER	1

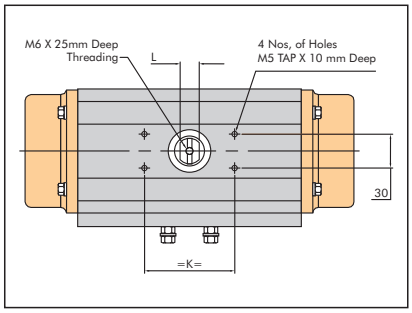
- Recommended as spare kit

- Recommended as service kit

Dimensions







SR NO.	SIZE	A	B	C	E	F	ØG	ØH	I	K	L	ØM	ØN	P1	P2	SQUARE
1	45	162.2	62	66.2	19.5	16	22	33	11	80	Ø22	50	70	M8 X 12	M6 X 9	09 X 09
2	55	169	73	76	20	14	15	23	18	80	12	50	70	M8 X 12	M6 X 9	11 x 11
3	65	216	84.5	87.8	20	14	18	29	18	80	14	50	70	M8 X 15	M6 X 12	14 x 14
4	75	232	93.5	98	20	14	18	30	18	80	14	50	70	M8 X 15	M6 X 15	17 X 17
5	85	271	105.5	108.7	20	14	21	34	18	80	17	50	70	M8 X 15	M6 X 15	17 X 17
6	100	293	122	125.7	20	12	23	38	23	80/130	17	70	102	M10 X 20	M8 X 15	22 X 22
7	115	346	139.5	140.5	20	12	30	47	23	80/130	20	70	102	M10 X 20	M8 X 15	22 X 22
8	125	405	149	152.5	20	12	30	47	30	80/130	20	102	125	M12 X 25	M10 X 20	22 X 22
9	150	475	183	186.5	30	20	38	55	30	80/130	30	102	125	M12 X 25	M10 X 20	27 X 27
10	175	521	210	215	30	18	43	62	30	80/130	32	102	125	M12 X 25	M10 X 20	27 X 27
11	200	641	237.5	248	30	19	50	72	45	80/130	36	125	164	M18 X 35	M12 X 25	36 X 36

Note – Reducer Square Sleeve can be provided on special request.

Actuator Model Number

1 ACTUATOR TYPE	2 SIZE	3 NO OF SPRINGS	4 PINION SQUARE	5 SEALS	6 BODY PROTECTION	7 PINION MATERIAL	8 ROTATION	9 SPECIAL REQUIREMENT
SA	045	05	09	N*	HA*	M*	1*	TO BE SPECIFIED
DA	055	06	11	V	EN	B	2	
	065	07	14	S	EP	C	3	
	075	08	17	O	FP	O	4	
	085	09	22		OO			
	100	10*	27					
	115	11	36					
	125	12	00					
	150	00						
	175							
	200							

1 ACTUATOR TYPE
SA - SINGLE ACTING
DA - DOUBLE ACTING

2 SIZE
045 | 055 | 065 | 075
085 | 100 | 115 | 125
150 | 175 | 200

3 NO OF SPRINGS
05 | 06 | 07 | 08 | 09
10* | 11 | 12 | 00

4 PINION SQUARE
09 - 09 X 09 FOR SA/DA 045
11 - 11 X 11 FOR SA/DA 055
14 - 14 X 14 FOR SA/DA 065
17 - 17 X 17 FOR SA/DA 075 & 085
22 - 22 X 22 FOR SA/DA 100, 115 & 125
27 - 27 X 27 FOR SA/DA 150 & 175
36 - 36 X 36 FOR SA/DA 200
00 - OTHER THAN ABOVE

5 SEALS
N - NITRILE*
V - VITON
S - SILICON
O - OTHER THAN ABOVE

6 BODY PROTECTION
HA - HARD ANODIZED*
EN - ELECTROLESS NICKLE PLATING
EP - EPOXY COATED
FP - FIBER POWDER COATED
00 - OTHER THAN ABOVE

7 PINION MATERIAL
M - EN 8*
B - SS304
C - SS316
O - OTHER THAN ABOVE

8 ROTATION
1 - 90° CCW* (ANTI CLOCKWISE)
2 - 90° CW
3 - 180° CCW
4 - 180° CW

9 SPECIAL REQUIREMENT
SPECIAL REQUIREMENT
TO BE SPECIFIED

EXAMPLE

SA — 055 — 10 — 11 — N — HA — M — 1 — -

Above stands SA - Single Acting, 055 Size with 10 Nos Springs, Pinion Square 11 X 11, Nitrile Seal, Hard Anodized Body with Pinion Material EN8 & Body Rotation 90°C CCW

Note - i) Above marked with "" is default for Actuator if not specified.*
ii) for Double Acting Actuator no of spring will be 00

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