

RACK & PINION PNEUMATIC ACTUATORS

Reliable, Compact, and Safe Valve Regulating Automation



IPC is an expert solution provider for High Performance Industrial Valves & Valve Automation Systems. In the last 21 years IPC has worked with many reputed companies in India and Overseas.





COMPREHENSIVE RANGE OF PNEUMATIC ACTUATORS

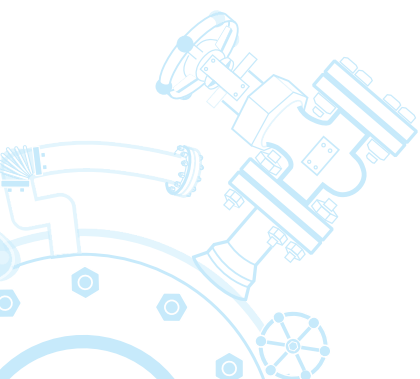
The IPC Rack & Pinion pneumatic actuators are designed for use in quarter-turn applications and are ideal for the on/off or continuous operation of plug, butterfly, and ball valves, as well as dampers and other 90° turn devices.

Engineered for reliability and built to last, our actuators' precision design and quality provide long and safe performance for valve control.



KEY BENEFITS AND DESIGN FEATURES

- Compact design allows extensive direct mounting orientations.
- Compliance with international interface standards ISO 5211/DIN 3337 and VDI/VDE 3845 (NAMUR).
- Pre-compressed encapsulated springs allow for easier assembly/disassembly and provide an extra layer of safety protection against spring energy release.
- Equipped with Seals and low friction bearing material for low maintenance and trouble-free cycle life.
- Multiple drive shaft options to suit valve requirements and direct mounting.
- Blowout resistant shaft design for improved safety.



GENERAL SPECIFICATIONS

TORQUE RANGE

- Double-Acting: 354.9 to 33446 lbf.in (40.1 to 3778.9 Nm) at 80 psig (5.5 barg)
- Spring Return: 77 to 14679.8 lbf.in (8.7 to 1658.6 Nm) spring end torque at maximum spring set

PRESSURE RANGE

- Double-Acting: 2.9 to 116 psig (0.2 to 8.0 barg)
- Spring-Return: 43.5 to 116 psig (3 to 8.0 barg)

PRESSURE MEDIA

- Air, dry or lubricated and inert gases

CYCLE LIFE

- Normal working life cycles are according to EN15714-3, where 1 cycle is 1 open stroke and 1 close

FINISH

- Body: Extruded and hard anodized aluminium.
PTFE / PVDF Coated.
PU Coated
- End caps: Powder Coated
- Pinion: Electrolyte Nickel Plating
- Fasteners: Stainless Steel

LUBRICATION

- Petro-Canada Lubricants PURITY™ FG2 Synthetic Grease

TEMPERATURE RANGE

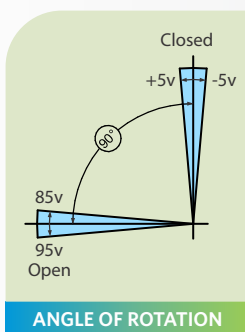
- Standard: -5 °F to 176 °F (-15 °C to +80 °C)
- Option:
Low temperature:
-40 °F to 176 °F (-40 °C to +80 °C)
High temperature:
-5 °F to 302 °F (-15 °C to +150 °C)

COMPLIANCE TO INTERNATIONAL STANDARDS

- Valve flange: ISO 5211/DIN3337
- Solenoid flange: VDE/VDI 3845 (NAMUR)
- Accessory flange: VDE/VDI 3845 (NAMUR)
- SIL 3 rated according to IEC 61508-1-7:2010
- European Directives: PED 2014/68/EU (PENDING)

ANGLE OF ROTATION

- Factory Set at 90°
- Adjustable Range: -5° to +5° and 85° to 95°



ANGLE OF ROTATION



FEATURED WALK THROUGH

5. Rack and Pinion Design

Precision die cast with larger cylinder bearings for higher efficiency and cycle life. Hardened electroless Nickel plated alloy steel pinion is blowout proof and corrosion resistant.

3. Spring Cartridges

Pre-compressed encapsulated springs for enhanced safety and modularity.

1. Actuator Design

Identical design for double acting and spring return models. This feature makes easier field conversion and saves on inventory cost.

8. Fasteners

Internal and external stainless-steel fasteners for long term corrosion resistance.

6. Actuator base design

Wider actuator base design to facilitate easy mounting of accessories that require wider drilling than specified in EN ISO 5211.

7. Bearing & Seal

Self-lubricating piston guide bands are positioned to negate side thrust while providing minimal sliding friction and higher actuator efficiencies.

9. Pinion Shaft

One piece pinion shaft with electrolytes nickel-plating. Blowout resistant design for improved safety and maximum cycle life.

11. Position Indicator

Multifunctional position indicator for visual position indication and for ease of retrofitting accessories.

2. Travel Stop Adjustments

External stainless steel stopper bolt for precise adjustment upto $\pm 5^\circ$ and also offers accurate valve alignment.

4. Body

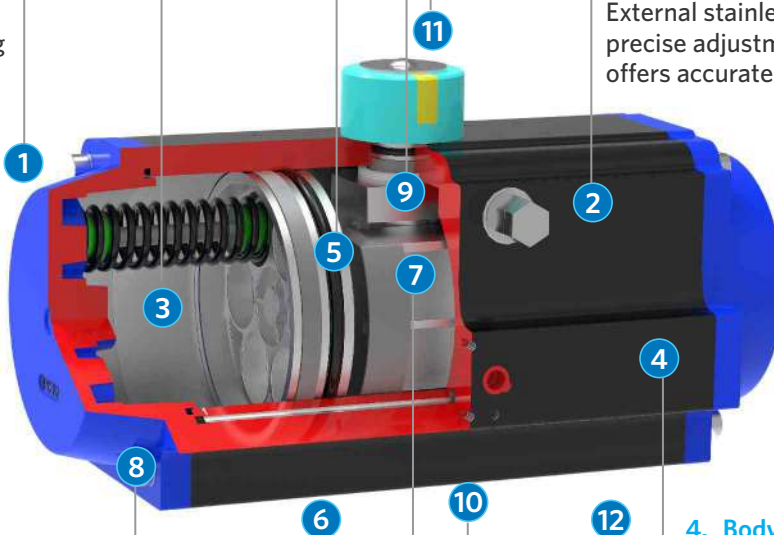
Extruded anodized aluminum body for corrosion protection. Honed cylinder surface for long service life.

12. Compliance

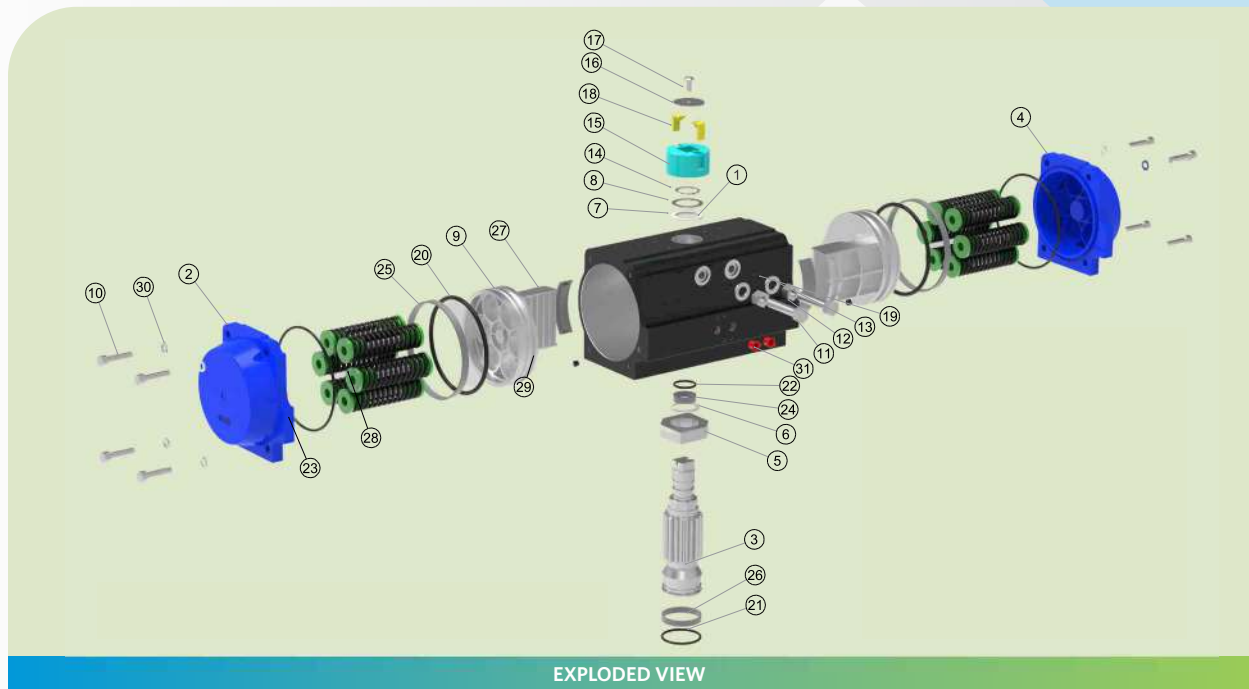
Design conforms with the latest requirements of EN ISO 5211. The provision for mounting solenoid valves and accessories complies with Namur VDI/VDE 3845.

10. Mounting Customization

Valve mounting end of Pinion can be customized to Parallel or diagonal square to accommodate various valve mounting options.



EXPLODED VIEW



Item Number	Part Description	Material Quality	QTY	Item Number	Part Description	Material Quality	QTY	Item Number	Part Description	Material Quality	QTY
1	Body	Aluminium alloy	1	12	Nut (stop screw)	Stainless steel	2	23	"o" ring (end cap)	NBR	2
2	Left End cap	Aluminium alloy	1	13	Washer (stop screw)	Stainless steel	2	24	Bearing (pinion top)	POM+PTFE	1
3	Drive shaft	Alloy Steel	1	14	Spring clip	Spring steel	1	25	Bearing (piston head)	POM+PTFE	2
4	Right end cap	Aluminium alloy	1	15	Position indicator	Nylon	1	26	Bearing (pinion bottom)	POM+PTFE	1
5	OCTI-CAM	Alloy Steel	1	16	Indicator thrust bearing	Stainless steel	1	27	Wear band	Nylon	2
6	Thrust bearing (pinion top)	POM+PTFE	1	17	Cap screw	Stainless steel	1	28	Spring	Stainless steel	12
7	Thrust bearing	POM+PTFE	1	18	Color code	Nylon	2	29	End Plug	NBR	2
8	Thrust washer	Stainless steel	1	19	"o" ring (stop screw)	NBR	2	30	Washer (end cap)	Stainless steel	8
9	Piston	Aluminium alloy	2	20	"o" ring (piston)	NBR	2	31	Port Bush	Nylon	2
10	Cap screw (end cap)	Stainless steel	8	21	"o" ring (pinion bottom)	NBR	1				
11	Stop top screw	Stainless steel	2	22	"o" ring (pinion top)	NBR	1				

TECHNICAL DATA (METRIC UNIT)

Model TypeA	A6		A7		A8		A9		B1		B2		B5		B7		C0		C2		C5		D0	
	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S
Air Volume Opening (L)	0.19		0.3		0.44		0.88		0.83		1.41		2.31		3.8		5.68		9		13.6		19.09	
Air Volume Closing (L)	0.32		0.5		0.66		1.17		1.27		2.13		3.4		5.64		8.75		12.7		16.95		28.23	
Opening Time (sec)	0.4	0.9	0.4	0.9	0.9	1	0.9	1.4	0.9	1.4	1.3	2.4	1.65	3.8	2.1	3.6	2.55	2.9	3.05	3.6	3.8	4.4	5	6
Closing Time (sec)	0.4	0.8	0.4	0.9	0.9	1.2	1	1.4	1	1.6	1.4	2.4	1.9	3.95	2.5	3.95	3.2	3.55	3.75	4.05	4.3	4.75	6	6.8
Weight (Kg)	1.97	2.21	2.93	3.29	3.78	4.26	5.14	5.86	6.09	7.17	10.86	12.54	16.96	19.84	24.28	28.78	34.22	41.12	41.12	63.1	63.12	84.18	108	135.6

1. For model A6-B5

(1) Room temperature (2) Actuator stroke 90° (3) Solenoid valve with orifice of 4 mm and a flow capacity Qn400L/min (4) Inside pipe diameter 6 mm (5) Medium clean air (6) Air supply pressure 5.5 bar (7) Actuator without external resistance load

2. For model B7-C0

(1) Room temperature (2) Actuator stroke 90° (3) Solenoid valve with orifice of 12 mm and a flow capacity Qn5100L/min (4) Inside pipe diameter 8 mm (5) Medium clean air (6) Air supply pressure 5.5 bar (7) Actuator without external resistance load

Cautions: obviously on the field applications when one or more of the above parameter are different, the moving time will be different

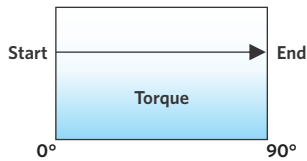
Air consumption rest with air supply, air volume and action cycle times. Expressions:

$$L/\text{min} = \text{Air volume (opening air volume + closing air volume)} \times \left[\frac{\text{Air Supply (Kpa)} + 101.3}{101.3} \right] \times \text{Action times (/min)}$$

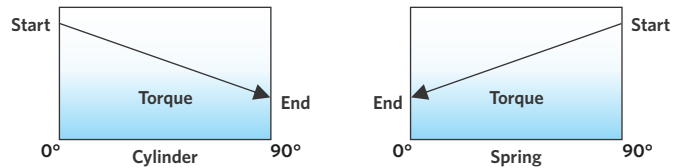


TORQUE DETAILS

Torque diagram double acting actuators



Torque diagram single acting actuators



DOUBLE ACTING TORQUE DATA IN Nm

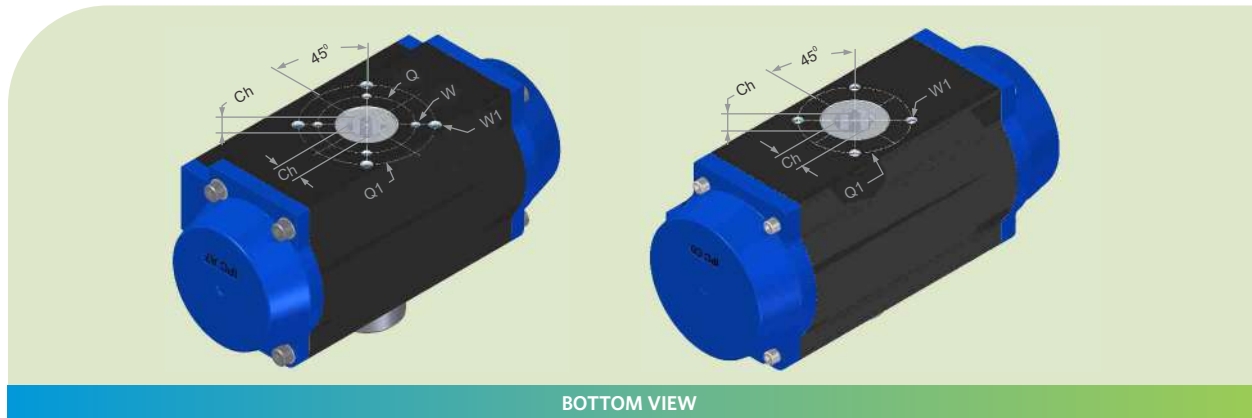
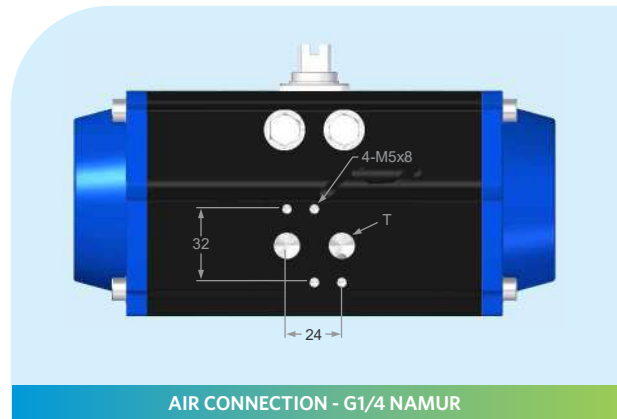
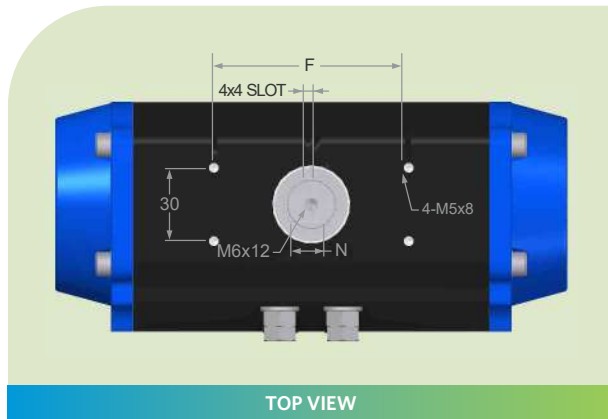
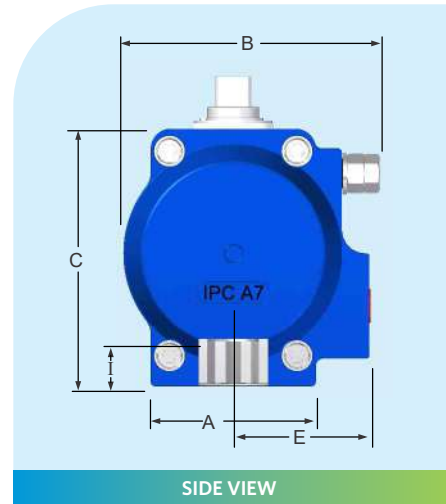
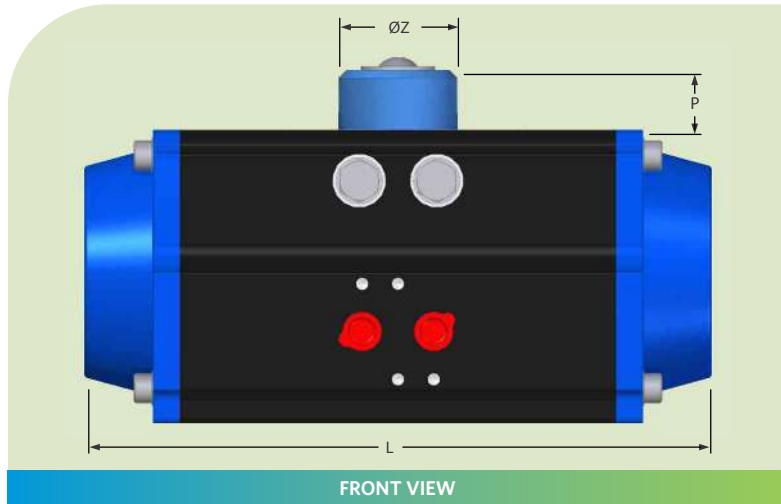
Models	Air Supply Pressure (Unit - bar)									
	2.5	3	3.5	4	4.5	5	5.5	6	7	8
A6	17.4	21.2	25.0	28.7	32.5	36.3	40.1	43.9	51.4	59.0
A7	27.0	32.9	38.8	44.7	50.5	56.4	62.3	68.2	79.9	91.7
A8	39.7	48.3	56.9	65.6	74.2	82.8	91.4	100.1	117.3	134.6
A9	55.7	67.9	80.0	92.1	104.2	116.4	128.5	140.6	164.8	189.1
B1	72.0	89.3	105.0	120.6	136.3	152.0	167.6	183.3	214.6	245.9
B2	128.7	159.5	187.5	215.4	243.4	271.4	299.4	327.4	383.3	439.3
B5	229.8	281.8	331.0	380.1	429.3	478.4	527.6	576.7	675.0	773.4
B7	346.0	422.3	495.6	568.9	642.2	715.6	788.9	862.2	1008.8	1155.4
C0	513.4	620.6	727.6	834.6	941.6	1048.7	1155.6	1262.6	1476.6	1690.6
C2	763.3	922.6	1081.5	1240.3	1399.7	1558.5	1717.8	1876.7	2194.9	2513.1
C5	1116.7	1349.5	1582.0	1814.5	2047.5	2280.0	2513.0	2745.5	3211.0	3676.5
D0	1678.6	2029.4	2379.3	2729.2	3079.1	3429.0	3778.9	4128.8	4828.5	5528.3

SINGLE ACTING TORQUE DATA IN Nm

Models	Air Supply Pressure (Unit - bar)																				Spring Stroke	
	2.5		3		3.5		4		4.5		5		5.5		6		7		8			
	PB	PE	PB	PE	PB	PE	PB	PE	PB	PE	PB	PE	PB	PE	PB	PE	PB	PE	PB	PE	SB	SE
A6 S05	8.7	4.3	12.5	8.1	16.3	11.9	20	15.6	23.8	19.4	27.6	23.2	31.4	27	35.2	30.8	42.7	38.3	50.3	45.9	13.1	8.7
A6 S06	7	1.7	10.7	5.5	14.5	9.2	18.3	13	22.1	16.8	25.9	20.6	29.7	24.4	33.4	28.2	41	35.7	48.6	43.3	15.7	10.4
A6 S07			9	2.8	12.8	6.6	16.6	10.4	20.4	14.2	24.1	18	27.9	21.8	31.7	25.5	39.3	33.1	46.8	40.7	18.3	12.2
A6 S08					11	4	14.8	7.8	18.6	11.6	22.4	15.4	26.2	19.1	30	22.9	37.5	30.5	45.1	38.1	21	13.9
A6 S09							13.1	5.2	16.9	9	20.7	12.7	24.4	16.5	28.2	20.3	35.8	27.9	43.4	35.4	23.6	15.7
A6 S10									15.1	6.3	18.9	10.1	22.7	13.9	26.5	17.7	34	25.2	41.6	32.8	26.2	17.4
A6 S11											17.2	7.5	21	11.3	24.7	15.1	32.3	22.6	39.9	30.2	28.8	19.1
A6 S12													19.2	8.7	23	12.4	30.6	20	38.1	27.6	31.4	20.9
A7 S05	16.3	10.2	22.2	16	28.1	21.9	34	27.8	39.8	33.7	45.7	39.6	51.6	45.4	57.5	51.3	69.2	63.1	81	74.8	16.9	10.7
A7 S06	14.2	6.8	20.1	12.7	25.9	18.6	31.8	24.4	37.7	30.3	43.6	36.2	49.4	42.1	55.3	47.9	67.1	59.7	78.8	71.4	20.2	12.8
A7 S07			17.9	9.3	23.8	15.2	29.7	21.1	35.6	26.9	41.4	32.8	47.3	38.7	53.2	44.6	64.9	56.3	76.7	68.1	23.6	15
A7 S08					21.7	11.8	27.5	17.7	33.4	23.6	39.3	29.4	45.2	35.3	51	41.2	62.8	53	74.5	64.7	27	19
A7 S09							25.4	14.3	31.3	20.2	37.1	26.1	43	32	48.9	37.8	60.7	49.6	72.4	61.3	30.3	19.3
A7 S10									29.1	16.8	35	22.7	40.9	28.6	46.8	34.5	58.5	46.2	70.3	58	33.7	21.4
A7 S11											32.9	19.3	38.7	25.2	44.6	31.1	56.4	42.8	68.1	54.6	37.1	23.5
A7 S12													36.6	21.8	42.5	27.7	54.2	39.5	66	51.2	40.4	25.7
A8 S05	23.2	13.7	31.8	22.3	40.4	30.9	49	39.5	57.6	48.1	66.3	56.8	74.9	65.4	83.5	74	100.8	91.3	118	108.5	26.1	16.6
A8 S06	19.8	8.4	28.4	17	37.1	25.7	45.7	34.3	54.3	42.9	62.9	51.5	71.6	60.2	80.2	68.8	97.4	86	114.7	103.3	31.3	19.9
A8 S07			25.1	11.8	33.8	20.5	42.4	29.1	51	37.7	59.6	46.3	68.3	55	76.9	63.6	94.1	80.8	111.4	98.1	36.5	23.2
A8 S08					30.4	15.2	39.1	23.9	47.7	32.5	56.3	41.1	64.9	49.7	73.6	58.4	90.8	75.6	108.1	92.9	41.7	26.5
A8 S09							35.8	18.7	44.4	27.3	53	35.9	61.6	44.5	70.3	53.2	87.5	70.4	104.8	87.7	46.9	29.8
A8 S10									41.1	22.1	49.7	30.7	58.3	39.3	67	48	84.2	65.2	101.5	82.5	52.1	33.1
A8 S11											46.4	25.5	55	34.1	63.6	42.7	80.9	60	98.1	77.2	57.3	36.4
A8 S12													51.7	28.9	60.3	37.5	77.6	54.8	94.8	72	62.5	39.7
A9 S05	33.6	20.9	45.8	33	57.9	45.1	70	57.3	82.1	69.4	94.3	81.5	106.4	93.6	118.5	105.8	142.7	130	167	154.2	34.9	22.1
A9 S06	29.2	13.9	41.4	26.1	53.5	38.2	65.6	50.3	77.7	62.4	89.8	74.5	102	86.7	114.1	98.8	138.3	123	162.6	147.3	41.8	26.5
A9 S07			36.9	19.1	49.1	31.2	61.2	43.3	73.3	55.4	85.4	67.6	97.5	79.7	109.7	91.8	133.9	116.1	158.1	140.3	48.8	30.9
A9 S08					44.6	24.2	56.8	36.4	68.9	48.5	81	60.6	93.1	72.7	105.2	84.8	129.5	109.1	153.7	133.3	55.8	35.4
A9 S09							52.3	29.4	64.5	41.5	76.6	53.6	88.7	65.8	100.8	77.9	125.1	102.1	149.3	126.4	62.7	39.8
A9 S10									60	34.5	72.2	46.7	84.3	58.8	96.4	70.9	120.6	95.1	144.9	119.4	69.7	44.2
A9 S11											67.7	39.7	79.9	51.8	92	63.9	116.2	88.2	140.5	112.4	76.7	48.6
A9 S12													75.4	44.8	87.6	57	111.8	81.2	136	105.4	83.6	53
B1 S05	43.4	26.2	60.7	43.4	76.4	59.1	92	74.8	107.7	90.4	123.4	106.1	139	121.8	154.7	137.4	186	168.8	217.3	200.1	45.9	28.6
B1 S06	37.7	17	55	34.3	70.6	49.9	86.3	65.6	102	81.3	117.6	96.9	133.3	112.6	149	128.3	180.3	159.6	211.6	190.9	55	34.3
B1 S07			49.3	25.1	64.9	40.8	80.6	56.4	96.2	72.1	111.9	87.8	127.6	103.4	143.2	119.1	174.6	150.4	205.9	181.8	64.2	40
B1 S08					59.2	31.6	74.9	47.3	90.5	62.9	106.2	78.6	121.9	94.3	137.5	109.9	168.9	141.3	200.2	172.6	73.4	45.8
B1 S09							69.1	38.1	84.8	53.8	100.5	69.4	116.1	85.1	131.8	100.8	163.1	132.1	194.5	163.4	82.5	51.5
B1 S10									79.1	44.6	94.8	60.3	110.4	75.9	126.1	91.6	157.4	122.9	188.7	154.2	91.7	57.2
B1 S11											89	51.1	104.7	66.7	120.4	82.4	151.7	113.7	183	145.1	100.9	62.9
B1 S12													99	57.6	114.6	73.2	146	104.6	177.3	135.9	110	68.6



INSTALLATION



MODEL	A	B	C	L	E	F	P	ØZ	N	I	FLANGE	Q	Q1	W	W1	Ch	T
A6	63	86	88	188	48	80	20	40	10	16	F05/07	50	70	M6x9	M8x12	14x14	G1/4"
A7	63	98	98	210	52	80	20	40	14	16	F05/07	50	70	M6x9	M8x12	14x14	G1/4"
A8	75	106	109	229	58	80	20	40	14	19	F05/07	50	70	M6x9	M8x12	17x17	G1/4"
A9	88	117	121	263	65	80	20	40	14	19	F05/07	50	70	M6x9	M8x12	17x17	G1/4"
B1	108	144	134	266	74	80	20	40	14	19	F07/10	70	102	M8x12	M10x15	17x17	G1/4"
B2	110	160	152	339	81	80	30	56	22	25	F07/10	70	102	M8x12	M10x15	22x22	G1/4"
B5	117	183	187	397	101	80	30	56	22	31	F10/12	102	125	M10x15	M12x18	27x27	G1/4"
B7	132	210	215	454	115	130	30	56	22	31	F10/14	102	140	M10x15	M16x24	36x36	G1/4"
C0	160	238	248	522	129	130	30	80	32	40	F14	-	140	-	M16x24	36x36	G1/4"
C2	150	249	274	576	126	130	30	80	32	50	F16	-	165	-	M20x28	46x46	G1/2"
C5	159	279	312	637	140	130	30	80	32	50	F16	-	165	-	M20x28	46x46	G1/2"
D0	180	335	354	784	173	130	30	80	32	50	F16	-	165	-	M20x28	46x46	G1/2"

PRODUCT CONFIGURATOR

1	2	3	4	5	6	7	8	9	10
PRODUCT SERIES	MODEL NUMBER	FUNCTION	SPRING SET	BODY	END CAP	TEMP CONDITION	END CONNECTION	CONNECTION SIZE	SPECIAL REQUIREMENTS
RPA	A6	D	00	A	D	S	S	14	A00

1 PRODUCT SERIES

RPA	Rack and Pinion
-----	-----------------

2 MODEL NUMBER

A6
A7
A8
A9
B1
B2
B5
B7
C0
C2
C5
D0

3 FUNCTION

D	Double Acting
C	Spring to Close (CW)
A	Spring to Open (CCW)

4 SPRING SET

00	Double Acting
05	03/02 Springs
06	03/03 Springs
07	04/03 Springs
08	04/04 Springs
09	05/04 Springs
10	05/05 Springs
11	06/05 Springs
12	06/06 Springs

5 BODY

A	Anodised (std)
E	PU Painted
P	PTFE Coated

6 END CAP

D	Silver Gray (Std)
R	Red
G	Green
Y	Yellow
B	Blue

7 TEMP CONDITION

S	Standard - 15 °C to + 80 °C
L	Low Temperature - 40 °C to + 80 °C
H	High Temperature - 15 °C to + 150 °C

8 END CONNECTION

A	Square (std)
B	Double D
C	Diamond
D	Keyway
S	Star

9 CONNECTION SIZE

14
17
22
27
36
46
55

10 SPECIAL REQUIREMENTS

A00	Standard
A01	SS316 Spindle

EXAMPLE

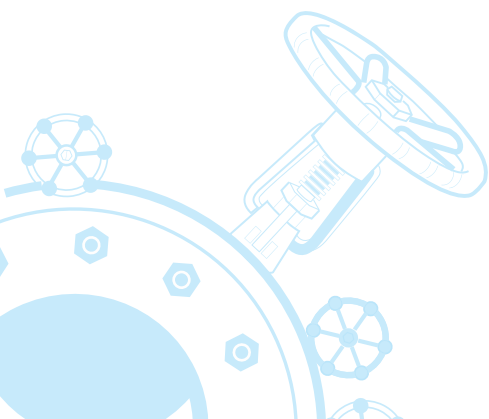
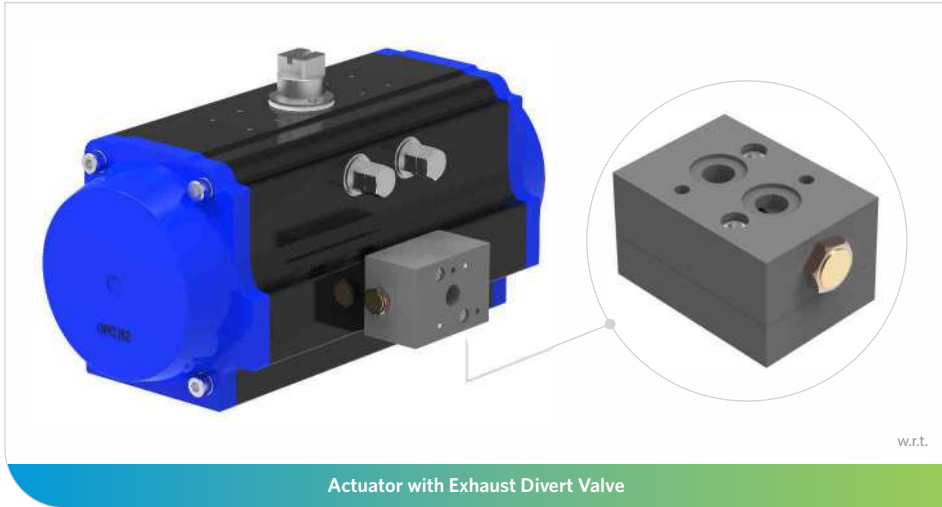
RPA	A6	D	00	A	D	S	S	14	A00
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IPC RACK & PINION ACTUATOR; MODEL: A6, DOUBLE ACTING; MOC: ALUMINIUM ANODISED; END CAP COLOR: GREY; TEMP. CONDITION: STANDARD (-18°C to 80°C); END CONNECTION: STAR (SQ. 14), STANDARD.





ACCESSORIES



TRUSTED BY THE LEADERS



QUICK RESPONSE, EFFICIENT DELIVERY AND QUALITY PRODUCTS!

Integral Process Controls was founded in 2001 with an objective to solve two key pain points for the customers. First, was to reduce the valve delivery time significantly to meet the aggressive demand timelines of the clients. Secondly, we sensed a need to meet the huge and largely unmet need for assured supply of quality valve and valve automation solutions of the customers. We set out to serve this very gap.

Solving the customer's challenges is the very reason we came into existence. Over the last two decades, we have been just scaling up this vision – solving new, bigger challenges for our customers while trying to set new benchmarks in quality. In last 21 years, IPC has worked with some of the reputed companies in India as well as overseas.

WHY US



QUALITY

Highest benchmark and an uncompromising attitude



EXPERTISE

Extensive experience and an 'ownership' approach



SOLUTIONING

Simplified, Standardized, Sustainable



Integral Process Controls India Pvt. Ltd.

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