

**PNEUMATIC CYLINDERS**  
Automation Technology



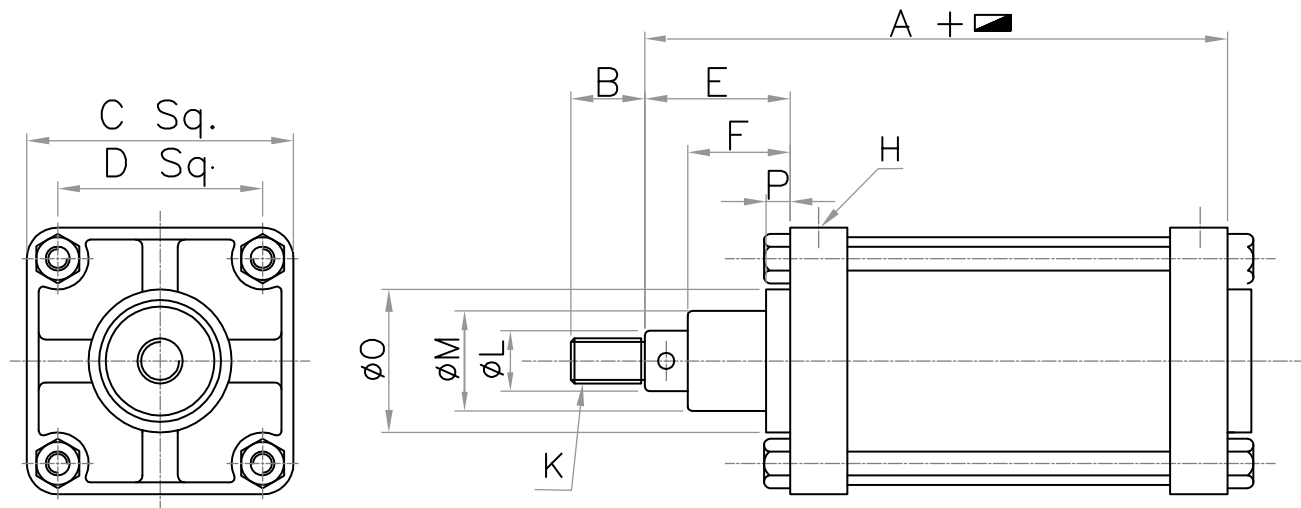
E:- [karmaautomationindustries@gmail.com](mailto:karmaautomationindustries@gmail.com)  
[karmaindustries7@gmail.com](mailto:karmaindustries7@gmail.com)

Contact Us: +91 9325 653 913  
+91 9112 468 769



## PNEUMATIC CYLINDERS - Series - SB

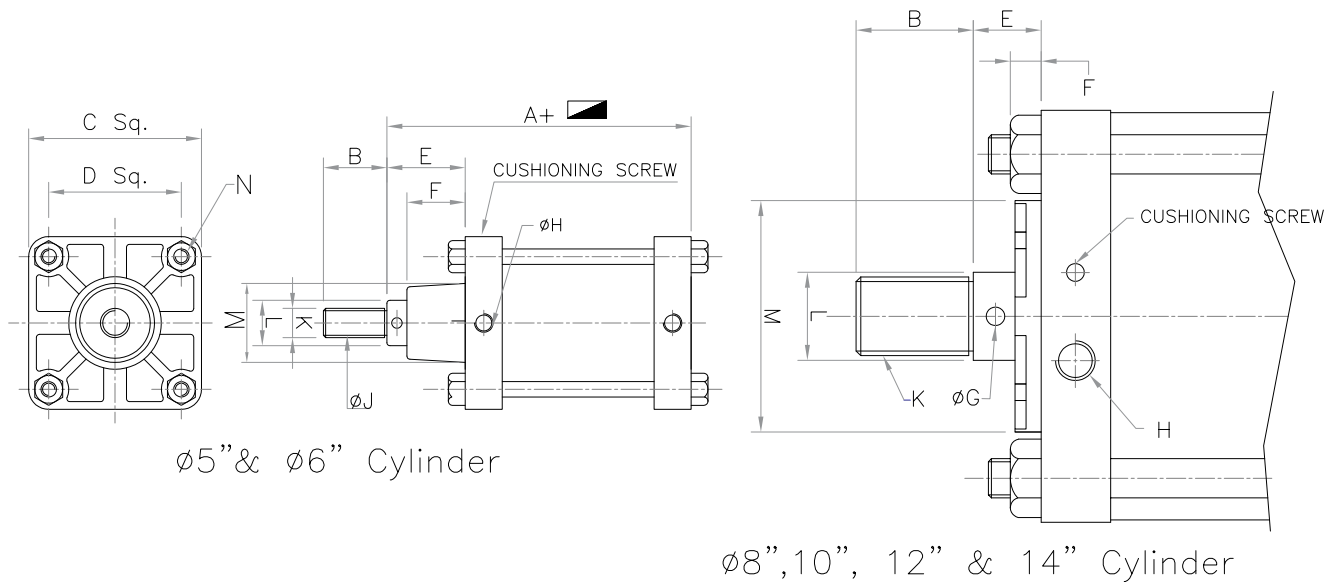
Double Acting and Single Acting Medium Bore Cylinder - Tie Rod Type Construction



BORE	A	B	C SQ	DSQ	E	F	H	K-BSF	K-METRIC	Ø L	Ø M	N-BSF	Ø O	P
38	125	21	51	37	48	35	1/4"	1/2" - 16	M12 X 1.5	16	30	1/4"-26	35	10
51	125	21	63	45	48	35	1/4"	1/2" - 16	M12 X 1.5	16	30	5/8"	40	10
57	125	21	70	53	48	35	1/4"	1/2" - 16	M12 X 1.5	16	30	5/16"-26	45	10
63	125	21	76	57	48	35	1/4"	1/2" - 16	M12 X 1.5	16	30	5/16"-26	45	10
63	151	31	76	57	61	43	1/4"	3/4" - 12	M20 X 1.5	25	42	5/16"-26	50	10
76	151	31	89	67	61	43	3/8"	3/4" - 12	M20 X 1.5	25	42	3/8"-20	60	10
102	151	31	112	86	67	43	3/8"	3/4" - 12	M20 X 1.5	25	42	3/8"-20	60	10

## PNEUMATIC CYLINDERS - Series - LB

Double Acting and Single Acting Large Bore Cylinder - Tie Rod Type Construction



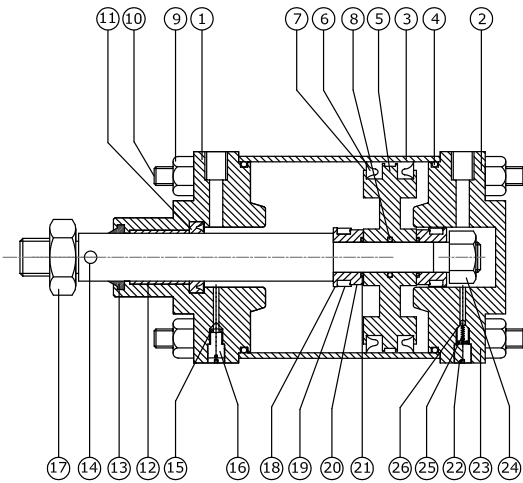
ø5" & ø6" Cylinder

ø8", 10", 12" & 14" Cylinder

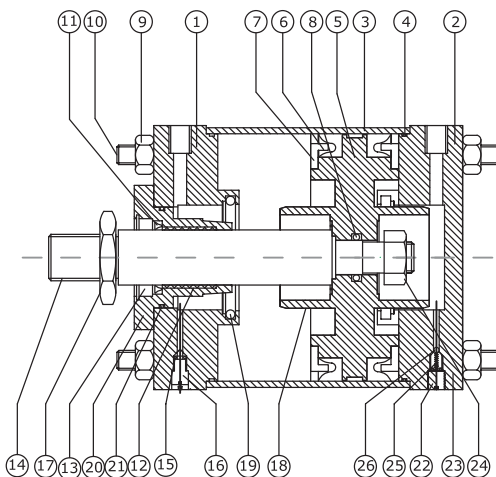
BORE	A	B	C	D	E	F	G	H BSP	K-BSF	K METRIC	L	M	N-BSF
127	179	45	140	108	70	45	8	G 3/8"	1" -10	M27 X 2	35	65	1/2" - 16
152	194	45	170	130	70	45	8	G 1/2"	1" -10	M27 X 2	35	70	5/8" - 14
203	205	57	216	168	29	16	8	G 3/4"	1.5" -8	M36 X 2	45	121	3/4" - 12
203	245	50	220	168	65	35	8	G 1/2"	1.5" -8	M36 X 2	45	65	5/8" - 14
254	240	76	267	210	43	17	9	G 3/4"	2" -7	M48 X 2	57	150	1" - 10
304	286	76	321	246	60	28	9	G 1"	2" -7	M48 X 2	57	177	1" - 10
354	286	76	375	292	60	28	9	G 1"	2" -7	M48 X 2	57	177	1.25" - 9

### Ø1½" - Ø14" Bore Air Cylinders

- Sizes available 1 ½", 2", 2¼", 2½, 3" and 4" bore diameter (Medium bore) and 5",6", 8",10", 12" and 14" bore diameter. (Large Bore)
- Suitable for a wide range of applications.
- Available in all types of mountings and attachments.
- Single, Double acting, Magnetic, Double Ended, Tandem, Telescopic.
- Max stroke lengths upto 2000 mm.



Ø1½" - 4" Medium Bore Cylinders



Ø5" - 14" Large Bore Cylinders

### Part List

No.	Description	Qty.
01	Front cover	1
02	Rear cover	1
03	Tube	1
04	'O' ring for cover	2
05	Wear ring	1
06	'U' cup seal for piston	2
07	Piston	2
08	'O' ring for piston	1
09	Tie rod nut	8
10	Tie rod	4
11	'U' cup for piston rod seal	1
12	Bush bearing	1
13	Wiper Seal	1
14	Piston rod	1
15	'O' ring for bleed screw	2
16	Bleed Screw	2
17	Lock nut	2
18	Cap (for Medium Bore cylinders)	2
19	Cushioning boss (for Large Bore cylinders)	2
20	Cushioning Seal	2
21	Sleeve (for Medium Bore cylinders)	2
22	bush (for Large Bore cylinders)	2
23	'O' ring for Sleeve (for Medium Bore cylinders)	2
24	'O' ring bush (for Large Bore cylinders)	2
25	Check Screw	2
26	'O' ring for check screw	2
27	Piston rod nut	1
28	Spring	2
29	Ball	2

### Technical Characteristics :

- Media : Air
- Mountings & Accessories
- Seals : Nitrile, Viton on request
- Temperature : 0°C to 80°C (for Nitrile Seals)
- Piston : Up to 4" Aluminium & from 5" to 14" cast iron.
- Pressure : 0.5 to 10.2 kgf/cm<sup>2</sup>, high pressure on request.
- Piston rod : En-8 (ground & Hard Chrome Plated), SS304 on request
- End Covers : Up to 4" Aluminium die Casted & powder coated.  
From 5" to 14" close grain cast iron & powder coated.
- Cylinder Barrel : Upto 4" Dia, Aluminium, M.S.  
(Honed & Hard Chrome Plated) From 5" dia. To 14" dia .  
MS (Honed & Hard Chrome Plated) Powder Coated on request.

## Piston Thrust Chart (Theoretical)

BORE SIZE		Air Pressure (BAR)										Free Air Consumption Liters / 25 mm stroke
		1	2	3	4	5	6	7	8	9	10	
<b>Thrust Available (KGF)</b>												
38 (1-1/2")	Push	11	23	34	45	57	68	79	91	102	114	0.22
	Pull	9	19	28	37	47	56	65	75	84	94	0.184
50.8 (2")	Push	19	39	58	78	98	117	137	156	176	196	0.205
	Pull	17	34	51	69	86	103	120	138	155	172	0.31
57 (2-1/4")	Push	25	51	76	102	128	153	179	204	230	256	0.504
	Pull	23	47	70	94	118	141	165	188	212	236	0.465
63 (2-1/4")	Push	31	63	95	126	158	190	221	253	285	317	0.625
	Pull	29	59	88	118	148	177	207	236	266	296	0.568
76 (3")	Push	45	91	136	182	228	273	319	364	410	456	0.9013
	Pull	40	81	121	162	203	243	284	324	365	406	0.804
102 (4")	Push	81	162	243	324	405	486	567	648	729	810	1.6
	Pull	76	152	228	304	380	456	532	608	684	761	1.53
127 (5")	Push	102	282	304	406	506	608	710	811	912	1014	2.53
	Pull	94	187	281	375	468	562	655	750	843	937	2.34
152 (6")	Push	149	298	447	596	745	894	1043	1192	1342	1497	3.73
	Pull	142	282	424	566	706	848	990	1131	1272	1414	3.53
203 (8")	Push	262	523	785	1046	1307	1569	1830	2092	2354	2615	6.54
	Pull	249	498	746	995	1244	1493	1742	1990	2239	2468	6.22
254 (10")	Push	406	811	1216	1622	2027	2433	2838	3243	3649	4045	10.14
	Pull	385	770	1155	1540	1925	2310	2695	3090	3465	3850	9.63
304 (12")	Push	581	1162	1742	2323	2904	3485	4065	4646	5226	5807	14/52
	Pull	560	1121	1681	2241	2801	3362	3922	4482	5043	5603	14.01
354(14")	Push	792	1568	2376	3168	3960	4752	5543	6335	7127	7919	19.8
	Pull	771	1544	2314	3068	3858	4629	5401	6172	6952	7715	19.29

## Standard Cylinders Mode Selection Chart

KAI	Bore	Mounting	Stroke	Extra Mounting
1	2	3	4	5
KAI	1½" (15)	Rear Pivot (RP)	50	Single
	2¼" (20)	Front Pivot (FP)	:	Pivot (SP)
	2½" (22)	Front Flange (FF)	100	Rod End (RE)
	3" (25)	Rear Flange (RF)	:	Fork (F)
	4" (30)	Foot MTG (FM)	200	Double
	5" (40)	NECK MTG (NM)	:	Ended (DE)
	6" (50)	Centre Trunion (CT)	1000	Flexible Connector (F)
	8" (60)	Flexible Connector (S)	:	Basic (B)
	10" (80)	Basic (B)		
	12" (100)			
	14" (120)			
	(140)			

### Note :

#### To decide cylinder bore size :

- ◆ Establish force required and working pressure available.
- ◆ Select working pressure on top of the chart.
- ◆ Select force required by reading down from selected working pressure.
- ◆ Read Out Cylinder bore size on left of the chart.

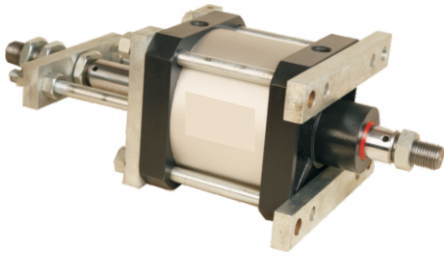
### Example :

If it is established that the force required is 150kg and working pressure available is 7 bar, above chart will lead you to select 2¼" bore cylinder.

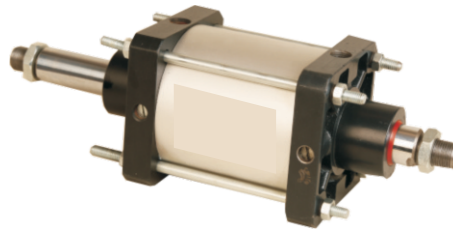
E.g. 1½" Bore x 400 mm Stroke Rear Pivot with Fork is represented as (15 RP 400 S)

**Note :** Due to continuous developments dimensions are subject to change without notice.

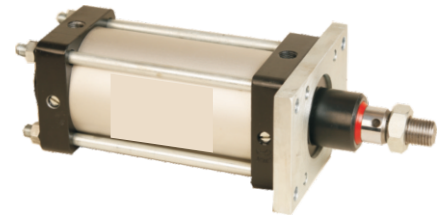




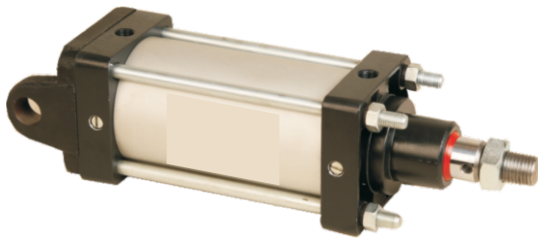
Stroke Adjustable Cylinders



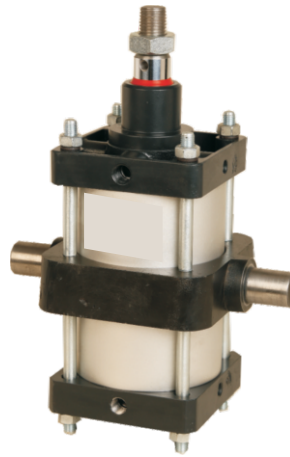
Double Ended Cylinders



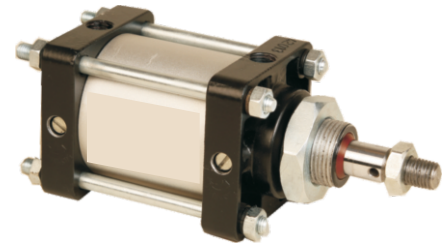
Flange Mounted Cylinders



Rear Trunion Mounted Cylinders

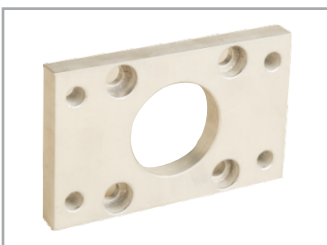


Central Trunion Mounted Cylinders

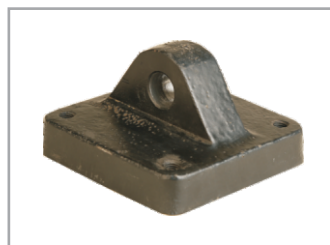


Neck Mounted Cylinders

## Mountings



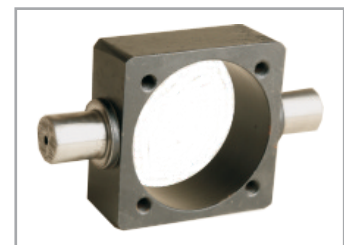
Flange (FF / RF)



Single Pivot (SP)



Rear Pivot (RP)



Centre Trunion (CT)



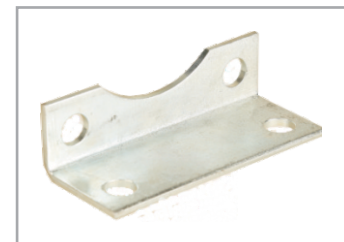
Rod End (RE)



Fork (F)



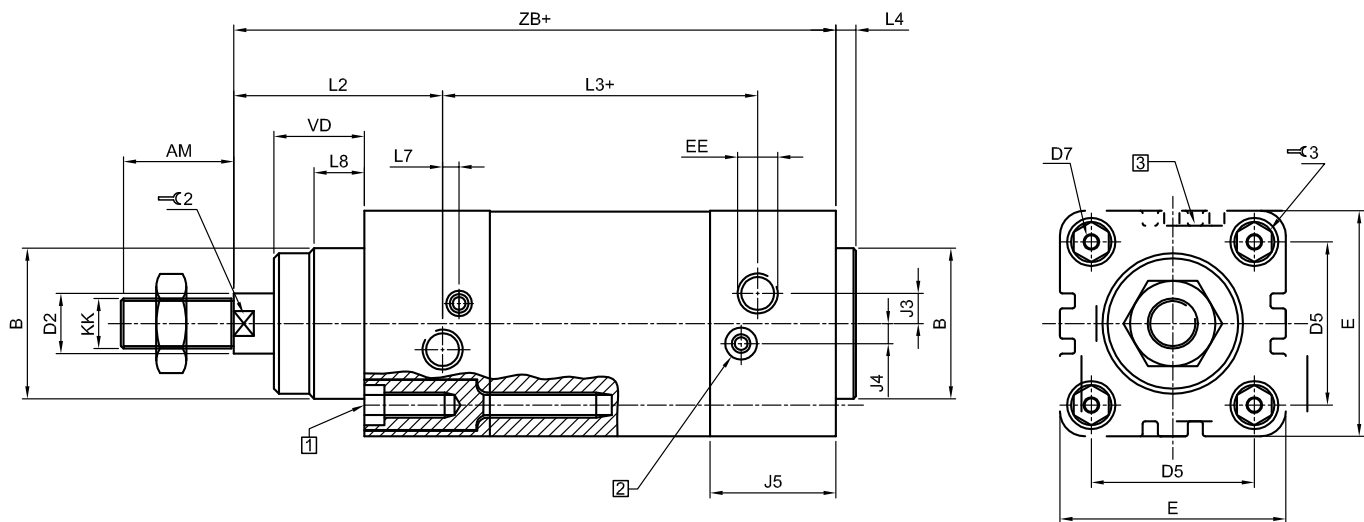
Flexible Connection (S)



Foot Mounting (FM)

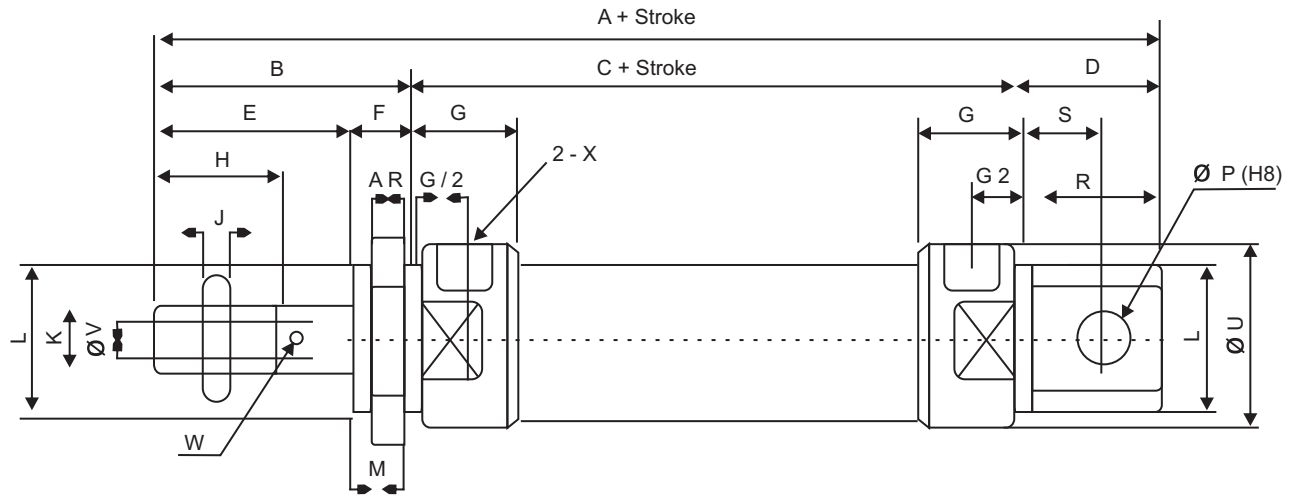
## PNEUMATIC CYLINDERS - Series - DNC

ISO Profile Cylinder Magnetic and Non-Magnetic  
Double Acting Profile Cylinder ISO-6431



BORE	AM	Bød	Døf	D5	D7	E	EE	J3	J4	KK	L2	L3	L4	L5	L6	L7	L8	2	3	VD	WH	ZB
32	22	30	12	32.5	M6	45	G1/8	6	5.2	M10x1.25	41.6	62.8	4	25.1	16	3.3	10	10	6	18	26	120
40	24	35	16	38	M6	54	G1/4	8	6	M12x1.25	44	77	4	29.6	16	3.6	10.5	13	6	21.5	30	135
50	32	40	20	46.5	M8	64	G1/14	10	8.5	M16x1.5	51	78	4	29.6	17	5.1	11.5	17	8	28	37	143
63	32	45	20	56.5	M8	75	G3/8	12.4	10	M16x1.5	54	87	4	35.6	17	6.6	15	17	8	28.5	37	158
80	40	45	25	72	M10	93	G3/8	12.5	8	M20x1.5	62.4	95.2	4	35.9	17	10.5	15.7	22	6	34.7	46	174
100	40	55	25	89	M10	93	G1/2	11.8	10	M20x1.5	69.8	100.4	4	38.8	17	8	19.2	22	6	38	51	

## PNEUMATIC CYLINDERS-Mini Cylinders Series-RB




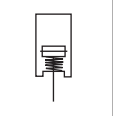
BORE	A	A1	A2	B	C	D	D1	E	F	G	H	I	J	K
16	114	114	98	38	60	15	15	22	16	10	16	10	5	M6 x 1
20	137	128	116	40	76	21	12	28	12	16	20	12	6	M8 X 1.25
25	141	134	120	44	76	21	14	30	14	16	22	17	6	M10 X 1.25
32	147	134	120	44	76	27	14	30	14	16	22	17	6	M10 X 1.25
40	149	1369	122	46	76	27	14	32	14	16.7	24	17	7	M12 X 1.25
BORE	L	M	P	Q	R	R1	S	U	V	W	X	AR	AX	AY
16	M16 X 1.5	14	6	12	14	14	9	21	6	5	M5	6	24	27.5
20	M22 X 1.5	10	8	16	19	12	12	27	8	6	G1/8"	7	33	29
25	M22 X 1.5	12	8	16	19	14	12	30	10	8	G1/8"	7	33	29
32	M24 X 2.0	12	10	16	25	14	15	35	12	10	G1/8"	8	37	32
40	M30 X 2.0	12	12	20	25	14	15	41.6	16	14	G1/8"	9	47	41



## Force, AIR Consumption for Double Acting Cylinder

Double acting cylinder			Force (N)									
Ø			Pressure (bar)									
Bore	Piston Rod		1	2	3	4	5	6	7	8	9	10
32	12	←	80	160	240	320	400	480	560	640	720	800
		→	69	138	207	276	345	414	483	552	621	690
40	16	←	126	252	378	504	630	756	882	1008	1134	1260
		→	105	211	311	422	528	633	739	844	950	1055
50	20	←	196	392	588	788	980	1176	1372	1568	1764	1960
		→	165	330	495	660	825	990	1155	1320	1485	1650
63	20	←	312	624	936	1248	1560	1872	2184	2496	2808	3120
		→	281	562	843	1124	1405	1686	1967	2248	2529	2810
80	25	←	503	1006	1509	2012	2515	3018	3521	4024	4527	5030
		→	453	903	1359	1812	2265	2718	3171	3624	4077	4530
100	25	←	785	1570	2355	3140	3925	4710	5495	6280	7065	7850
		→	736	1473	2209	2946	3682	4419	5156	5892	6639	7365
125	32	>	1227	2453	3680	4906	6133	7359	8586	9812	11039	12265
		<	1146	2292	3439	4585	5731	6877	8023	9169	10316	11462
160	40	>	2010	4019	6029	8038	10048	12058	14067	16077	18086	20096
		<	1884	3768	5652	7536	9420	11304	13188	15072	16956	18840
200	40	>	3140	6280	9420	12560	15700	18840	21980	25150	28260	31400
		<	3015	6029	9043	12058	15072	18086	21101	24115	27130	30144

**Remark 1** Max. 1 bar is necessary to deal with the mechanical friction **Remark 2** To obtain a uniform speed, the load degree is not to be chosen over 60%

Single Acting Cylinder				
Spring Forces (N)			<b>Remark</b> The given spring forces are intended only for the return of the piston and piston rod.	Other spring forces can be provided, consult FT
Ø Bore				
32 / 40	30	80	For model E and EA spring forces remains same, cushioning not available on spring side, flow control not possible on spring side.	
50 / 63	75	130		
80 / 100	50	320		

Air consumption - dm <sup>3</sup> A.N.R./cm stroke A.N.R.= d <sub>m</sub> under Norm-conditions										
Ø	1 bar	2 bar	3 bar	4 bar	5 bar	6 bar	7 bar	8 bar	9 bar	10 bar
32	0.017	0.025	0.033	0.041	0.049	0.057	0.065	0.073	0.081	0.089
40	0.026	0.038	0.05	0.063	0.076	0.088	0.1	0.113	0.126	0.139
50	0.04	0.059	0.079	0.099	0.118	0.138	0.158	0.177	0.197	0.22
63	0.063	0.094	0.125	0.156	0.188	0.219	0.25	0.281	0.312	0.343
80	0.101	0.151	0.202	0.252	0.302	0.352	0.403	0.453	0.503	0.554
100	0.158	0.236	0.315	0.393	0.472	0.55	0.629	0.708	0.786	0.865
125	0.246	0.369	0.492	0.615	0.738	0.861	0.984	1.107	1.230	1.353
160	0.403	0.604	0.805	1.006	1.207	1.408	1.609	1.81	2.011	2.212
200	0.628	0.942	1.256	1.57	1.884	2.198	2.512	2.826	3.14	3.454

## AIR Cylinder as per ISO 6431

### Ordering Code

Type	Model	Piston Rod Connection	Special Model	Special Mounting	Bore	Stroke
1	2	3	4	5	6	7
1 Type	KAI					
2 Model	D	Double Acting				
	SAF	Single Acting, Spring at Rod Side				
	SAR	Single Acting, Spring at Rear Cover				
3 Piston Rod Conn.	O	Outer Thread				
	S	Flexible Connection Piece				
	F	Fork				
	LN	Extra Lock Nut				
	4 Sp. Model	OO	Standard			
	AV	Viton Seals				
	BG	Bellows				
	CL	Polyurethane Coating				
	DS	Double-ended Piston Rod				
	MAE	Piston with Permanent Magnet Ring				
	RS 1	One Reed Switch				
	RS 2	Two Reed Switches				
	ZR	304/ 316 Material Piston Rod 1.4305 (18/ 8)				
	SU	Other, to define special models				
5 Cylinder Mount.	O	4x Internal Thread Front and Rear				
	MS1	2 Pedestals				
	MF1	Front Flange				
	MF2	Rear Flange				
	GA	Rear Hinge Cardan				
	LG	Counter Hinge for GA				
	MP2	Rear Hinge				
	LB 2	Counter Hinge for MP2				
	MP 3	RearTrunion Cardan				
	MP 4	Rear Hinge				
	MT 4	Central Trunnion				
	MT 5	Front Trunnion				
	MT0	Bearing for MT4 and MT5 `				
	6	BORE	32 / 40 / 50 / 63 / 80 / 100 / 125 / 160 / 200			
	7	STROKE	3500mm	Max. D		
300mm			Max. E			
8		300	Max. EA			



Fork (F)



Flexible Connection Piece (S)



Rear Hinge (MP2)



Pedestals (MS)



Rear Hinge (MP3)



Central Trunnion (MT 4)



Flange (MF)



Counter Hinge for MP2 (LB 2)



Rod End (RE)

**Ordering Example** KAI-D-00-0-63 / 150 Double acting Cylinder with 63 mm Bore and 150mm stroke

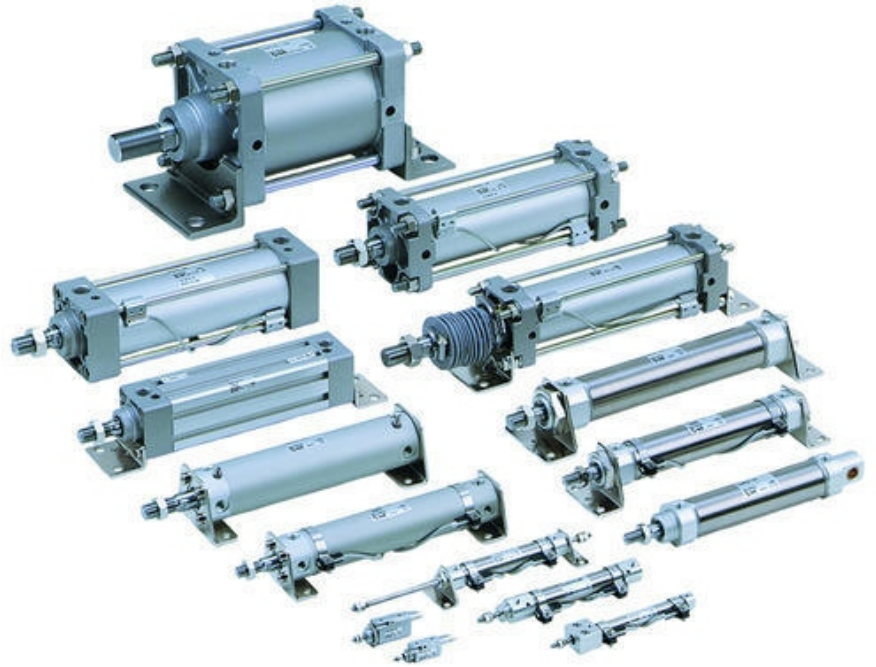
**Ordering Example Mountings :** MP2-50 Rear trunion for 50 dia cylinder

## Standard Spares and Accessories

### Solenoid Valves

KARMA offers complete range of solenoid valves for actuating double/single acting cylinders. Made from bar stock material, these solenoid valves offer matchless performance

- 3 Port Solenoid Valves
- 5 Port Solenoid Valves
- Direct Acting / Int or Ext Pilot operated
- High orifice valves
- Sub-base mounted valves
- Flameproof as per CIMFR, Gr I, IIA/IIB
- Body Material Aluminium anodized, Brass, SS, PP
- Coil Voltage 12V – 440V/ DC & AC, 50Hz and 60 Hz
- Ingress protection IP68



### Power Cylinder Setups

To cater to your unique and diverse requirements, KARMA offers complete range of accessories to power the pneumatic cylinder.

- Manual Override handwheel – de-clutch able
- Limit switch box – for local & remote position feedbacks.
- Positioner – for proportionate controlling
- Air Filter Regulator

### Air Line accessories

Flow control valve, Quick exhaust valves to regulate, enhance the performance of cylinders, Non return valves, Air lock relay, Handlever valves, Ball Valves, Fittings, tubings etc.

# KARMA AUTOMATION INDUSTRIES

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SHIRGAON WAJPE, BADLAPUR (E) PIN 421 503, DIST: THANE, (MH) - INDIA

Works:- Shop No 1042, Jambhivali Pada, Anand Nagar, MIDC, Ambarnath (E) 421 506 Dist. : Thane, State: Maharashtra - India

Ph.: +91-9325 653 913 / 9112 468 769 | E: karmaautomationindustries@gmail.com / karmaindustries7@gmail.com

