



# Mini cylinder(Aluminum barrel)——MAL Series

## Compendium of MAL Series



### Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type	Pressure area(mm <sup>2</sup> )	Operating pressure(MPa)								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7		
20	8	Single acting	Push side	314.0	-	12.6	44.0	75.4	106.8	138.2	169.6	
			Pull side	263.8	-	2.6	28.9	55.3	81.7	108.1	134.4	
		Double acting	Push side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8	
			Pull side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7	
25	10	Single acting	Push side	490.6	-	29.2	78.3	127.4	176.4	225.5	274.5	
			Pull side	412.1	-	13.5	54.7	96.0	137.2	178.4	219.6	
		Double acting	Push side	490.6	49.1	98.1	147.2	196.2	245.3	294.4	343.4	
			Pull side	412.1	41.2	82.4	123.8	164.8	206.1	247.3	288.5	
32	12	Single acting	Push side	804.3	-	76.6	157.0	237.3	317.7	398.1	478.5	
			Pull side	691.2	-	54.0	123.0	192.1	261.2	330.3	399.4	
		Double acting	Push side	804.3	80.4	160.9	241.3	321.7	402.2	482.6	563.0	
			Pull side	691.2	69.1	138.2	207.4	278.5	345.6	414.7	483.8	
40	16	Single acting	Push side	1256.6	-	37.5	163.1	288.7	414.3	539.9	665.5	791.1
			Pull side	1055.6	-	17.4	122.9	228.4	333.9	439.4	544.9	650.4
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.6	628.3	754.0	879.6	
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.4	738.9	

### Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40 μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return;
- If the cylinder is dismantled and stored for a long time, please to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.



# Mini cylinder(Aluminum barrel)

## MAL Series

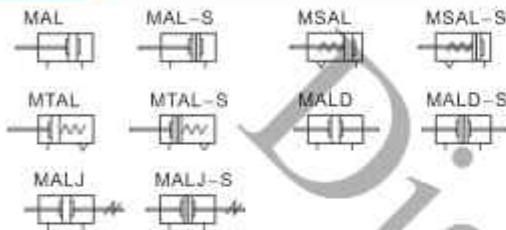


### Specification

Bore size(mm)	20	25	32	40
Acting type	MSAL/MTAL: Single acting Others: Double acting			
Fluid	Air(to be filtered by 40 μm filter element)			
Operating pressure	Double acting: 0.15~1.0MPa(22~145psi)(1.5~10.0bar) Single acting: 0.2~1.0MPa(28~145psi)(2.0~10.0bar)			
Proof pressure	1.5MPa(215psi)(15bar)			
Temperature °C	-20~70			
Speed range mm/s	Double acting: 30~800		Single acting: 50~800	
Stroke tolerance	0~150 <sup>+1.0</sup> / <sub>0</sub> >150 <sup>+1.5</sup> / <sub>0</sub>			
Cushion type	Bumper			
Port size [Note1]	1/8"		1/4"	

[Note1] PT thread, G thread and NPT thread are available.  
Add) Refer to P313 for detail of sensor switch.

### Symbol



### Stroke

Bore size (mm)	Standard stroke (mm)															Max. std. stroke	Max. stroke								
	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175			200	250	300	350	400	450	500	
MAL	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	1000
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	1000
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	1500
MALD	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	300	-
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	300	-
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MALJ	20	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	160	175	200	250	300	350	400	450	500	500	-
MSAL	20	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-	-	-	-	-	-	-	-	-
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-	-	-	-	-	-	-	-	-
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-	-	-	-	-	-	-	-	-
MTAL	20	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-	-	-	-	-	-	-	-	-
	25	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-	-	-	-	-	-	-	-	-
	32	10	15	20	25	30	40	50	60	75	80	100	125	150	-	-	-	-	-	-	-	-	-	-	-

[Note] Consult us for non-standard stroke.

### Product feature

1. Manufactured by our enterprise.
2. Front and back cover and cylinder tube are connected by threads.
3. Piston adopts heterogeneous two-way seal structure. It has compact size and has the function of grease reservation.
4. Front cover adopts self-lubrication bearing guide that has good performance of lubrication and guide.
5. There are several modes of back cover, which makes the installation of cylinder more convenient.
6. There are cylinders and mounting accessories with several specifications for your choice.

### Ordering code

MAL 20×50 S CM

MALD 20×50 S

MALJ 20×50-20 S

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

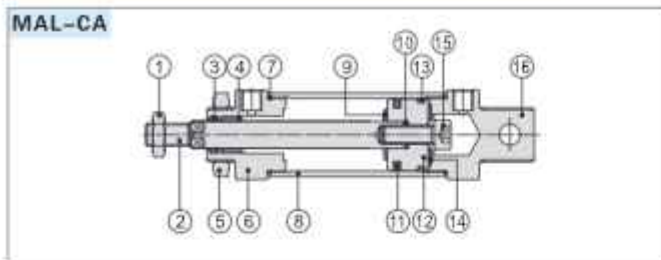
1. Model	2. Bore size	3. Stroke	4. Adjustable Stroke	5. Magnet	6. Back cover	7. Mounting type [Note 1]	8. Thread type
MAL: Mini cylinder(Double acting) MSAL: Mini cylinder (Single acting_push) MTAL: Mini cylinder (Single acting_pull)	20 25 32 40	Refer to stroke table for details	No this code	Blank: Without magnet S: With magnet	CA: Pivot type U: Flat-end type CM: Round-end type	Blank: No accessories FA: FA type SDB: SDB type LB: LB type	Blank: PT G: G T: NPT
MALD: Mini cylinder (Double rod)	No this code				Blank: No accessories FA: FA type LB: LB type		
MALJ: Mini cylinder (Adjustable stroke)	10 20 30 40 50 75 100				Blank: No accessories FA: FA type LB: LB type		

[Note 1] Please refer to page 99-100 for accessory parts.

# Mini cylinder(Aluminum barrel)

## MAL Series

### Inner structure and material of major parts

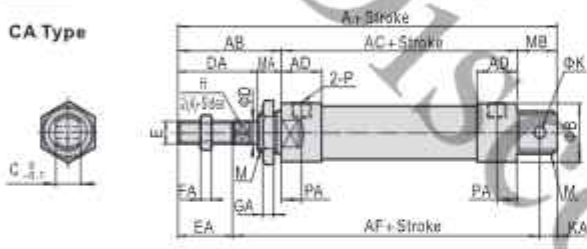


NO.	Item	Material
1	Rod nut	Carbon steel
2	Piston rod	Carbon steel with 20 μm chrome plated
3	Front cover packing	NBR
4	Bushing	Wear resistant material
5	Front cover nut	Carbon steel
6	Front cover	Aluminum alloy
7	O-ring	NBR
8	Barrel	Aluminum alloy
9	Bumper	NBR
10	O-ring	NBR
11	Piston seal	NBR
12	Piston	Aluminum alloy
13	Wear ring	Wear resistant material
14	Washer	Free cutting material
15	Bolt	Carbon steel
16	Back cover	Aluminum alloy

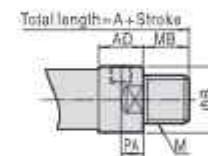
### Dimensions

#### MAL

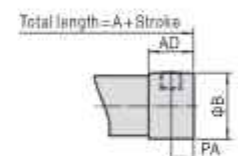
##### CA Type



##### CM Type



##### U Type

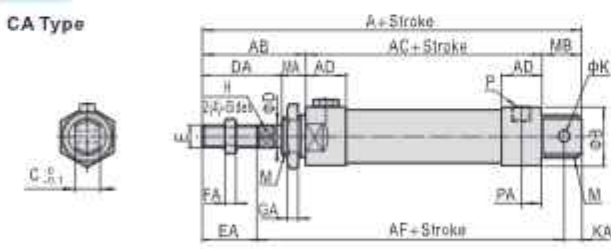


Bore size/Item Back cover	A			AB	AC	AD	AF	B	C	D	DA	E	EA	F	FA	G	GA	H	K	KA	M	MA	MB			P	PA
	CA	CM	U																				CA	CM	PA		
20	131	122	110	40	70	16	102	29	16	8	28	M8×1.25	20	12	6	29	7	6	8	9	M22×1.5	12	21	12	1/8"	8	
25	135	128	114	44	70	16	104	34	16	10	30	M10×1.25	22	17	8	29	7	8	8	9	M22×1.5	14	21	14	1/8"	8	
32	141	128	114	44	70	16	107	39.5	16	12	30	M10×1.25	22	17	6	32	8	10	10	12	M24×2.0	14	27	14	1/8"	8	
40	165	152	138	46	92	22	129	49.5	20	16	32	M12×1.25	24	17	7	41	9	14	12	12	M30×2.0	14	27	14	1/4"	11	

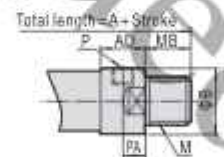
Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

#### MSAL

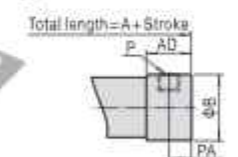
##### CA Type



##### CM Type



##### U Type



Item Back cover	A			AC			AF								
	CA	CM	U	-	-	-	-	-	-						
Bore size/Stroke	≤50	51-100	≥101	≤50	51-100	≥101	≤50	51-100	≥101	≤50	51-100	≥101	≤50	51-100	≥101
20	156	181	206	147	172	197	135	160	185	95	120	145	127	152	177
25	160	185	210	153	178	203	139	164	189	95	120	145	129	154	179
32	166	191	216	153	178	203	139	164	189	95	120	145	132	157	182
40	190	215	240	177	202	227	163	188	213	117	142	167	154	179	204

Bore size/Item	AB	AD	B	C	D	DA	E	EA	F	FA	G	GA	H	K	KA	M	MA	MB(CA)		MB(CM)		P	PA
																		CA	CM	CA	CM		
20	40	16	29	16	8	28	M8×1.25	20	12	6	29	7	6	8	9	M22×1.5	12	21	12	14	1/8"	8	
25	44	16	34	16	10	30	M10×1.25	22	17	6	29	7	8	8	9	M22×1.5	14	21	14	14	1/8"	8	
32	44	16	39.5	16	12	30	M10×1.25	22	17	6	32	8	10	10	12	M24×2.0	14	27	14	14	1/8"	8	
40	46	22	49.5	20	16	32	M12×1.25	24	17	7	41	9	14	12	12	M30×2.0	14	27	14	14	1/4"	11	

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

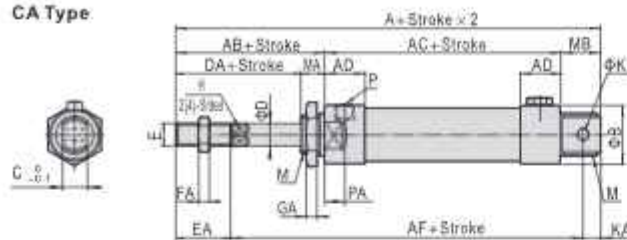


# Mini cylinder(Aluminum barrel)

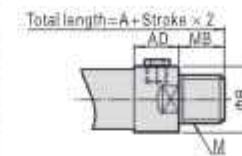
## MAL Series

### MTAL

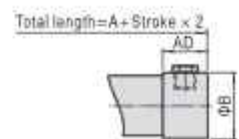
#### CA Type



#### CM Type



#### U Type

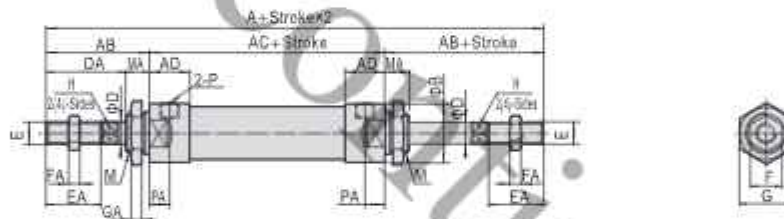


Item	CA				A				U				AC				AF			
	0~25	26~50	51~75	76~100	0~25	26~50	51~75	76~100	0~25	26~50	51~75	76~100	0~25	26~50	51~75	76~100	0~25	26~50	51~75	76~100
Back cover	CA				CM				U				AC				AF			
Bore size/Stroke	0~25	26~50	51~75	76~100	0~25	26~50	51~75	76~100	0~25	26~50	51~75	76~100	0~25	26~50	51~75	76~100	0~25	26~50	51~75	76~100
20	145	156	171	181	137	147	162	172	125	135	150	160	85	95	110	120	117	127	142	152
25	150	160	175	185	143	153	168	178	129	139	154	164	85	95	110	120	121	131	146	156
32	156	166	186	196	143	153	173	183	129	139	159	169	85	95	115	125	122	132	152	162
40	180	190	210	220	167	177	197	207	153	163	183	193	107	117	137	147	144	154	174	184

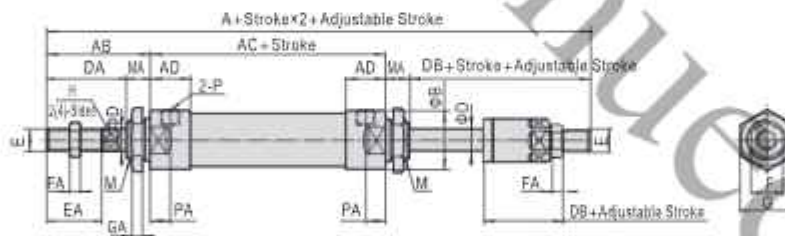
Bore size/Item	Back cover	AB	AD	B	C	D	DA	E	EA	F	FA	G	GA	H	K	KA	M	MA	MB		P	PA
		CA	CM	P	PA																	
20	40	16	29	16	8	28	M8 × 1.25	20	12	6	29	7	6	8	9	M22 × 1.5	12	21	12	1/8"	8	
25	44	16	34	16	10	30	M10 × 1.25	22	17	6	29	7	8	8	9	M22 × 1.5	14	21	14	1/8"	8	
32	44	16	39.5	16	12	30	M10 × 1.25	22	17	6	32	8	10	10	12	M24 × 2.0	14	27	14	1/8"	8	
40	46	22	49.5	20	16	32	M12 × 1.25	24	17	7	41	9	14	12	12	M30 × 2.0	14	27	14	1/4"	11	

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

### MALD



### MALJ



Bore size/Item	A		AB	AC	AD	B	D	DA	DB	E	EA	F	FA	G	GA	H	M	MA	P	PA
	MALD	MALJ																		
20	150	147	40	70	16	29	8	28	25	M8 × 1.25	20	12	6	29	7	6	M22 × 1.5	12	1/8"	8
25	158	155	44	70	16	34	10	30	27	M10 × 1.25	22	17	6	29	7	8	M22 × 1.5	14	1/8"	8
32	158	155	44	70	16	39.5	12	30	27	M10 × 1.25	22	17	6	32	8	10	M24 × 2.0	14	1/8"	8
40	184	180	46	92	22	49.5	16	32	28	M12 × 1.25	24	17	7	41	9	14	M30 × 2.0	14	1/4"	11

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

# Mini cylinder(Aluminum barrel)

## MAL Series—Accessories

### List for ordering code of accessories

Accessories Bore size	Mounting accessories			Knuckle				Sensor switch	
	LB	FA	SDB	I	Y	F	U	CS1-M□	DS1-M□
20	F-MA20LB	F-MA20FA	F-MA20SDB	F-MA20I	F-MA20Y	F-M8X125F	F-M8X125U	CS1-M-A20	DS1-M-A20
25				F-MA25I	F-MA25Y	F-M10X125F	F-M10X125U	CS1-M-A25	DS1-M-A25
32	F-MA32LB	F-MA32FA	F-MA32SDB	F-MA40I	F-MA40Y	F-M12X125F	F-M12X125U	CS1-M-A32	DS1-M-A32
40	F-MA40LB	F-MA40FA	F-MA40SDB					CS1-M-A40	DS1-M-A40

### Accessory selection

Cylinder model	Accessories	Mounting accessories			Knuckle[Note 1]				Sensor switch	
		LB	FA	SDB	I	Y	U	F	CS1-M	DS1-M
MAL	Standard	●	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●	●
MSAL	Standard	●	●	●	●	●	●	●	×	×
	With magnet	●	●	●	●	●	●	●	●	●
MTAL	Standard	●	●	●	●	●	●	●	●	●
MALD	Standard	●	●	×	●	●	●	●	×	×
MALJ	With magnet	●	●	×	●	●	●	●	●	●

### Material of accessories

Accessories Bore size	Mounting accessories			Knuckle			
	LB	FA	SDB	I	Y	F	U
20~40	○	○	○	□	□	□	□

○ Lower carbon steel; □ Carbon steel.

[Note 1] Please refer to P302-305 for knuckle detail.

### Dimensions

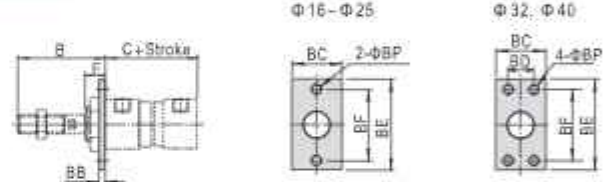
#### LB



Bore size/Item Stroke	AA		AA(MSAL)			AC		AC(MSAL)		
	(MAL)	0-50	51-100	101-150	(MAL)	0-50	51-100	101-150		
20	116	141	166	191	100	125	150	175		
25	116	141	166	191	100	125	150	175		
32	136	161	186	211	120	145	170	195		
40	158	183	208	233	142	167	192	217		

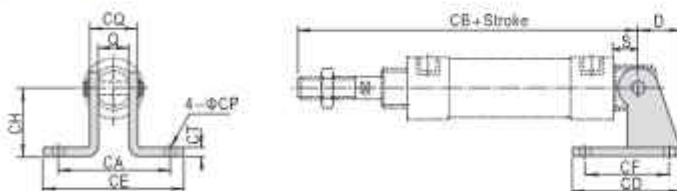
Bore size/Item Stroke	B	F	AB	AE	AF	AL	AQ	AP	AT	AH
	20	40	12	25	54	40	15	8	6.5	3
25	44	14	29	54	40	15	8	6.5	3	25
32	44	14	19	59	45	25	8	7	3.5	32
40	46	14	21	64	50	25	8	7	3.5	36

#### FA



Bore size/Item Stroke	B	C	C(MSAL)			BB	BC	BD	BE	BF	BP	F
			(MAL)	0-50	51-100							
20	40	70	95	120	145	3.5	38	-	64	50	7	12
25	44	70	95	120	145	3.5	38	-	64	50	7	14
32	44	70	95	120	145	4	47	33	72	58	6.5	14
40	46	92	117	142	167	4	50	36	84	70	6.5	14

#### SDB

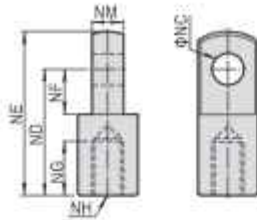


Bore size/Item Stroke	D	S	Q	CA	CB	CB(MSAL)			CD	CE	CF	CH	CT	CP	CQ
						(MAL)	0-50	51-100							
20	21	12	16	51	122	147	172	197	48	67	32	32	2.5	7	22
25	21	12	16	51	126	151	176	201	48	67	32	32	2.5	7	22
32	27	15	16	51	129	154	179	204	52	67	36	36	3	7	24
40	27	15	20	55	153	178	203	228	56	71	40	40	3	7	28

[Note] SDB is attached with relevant PIN.

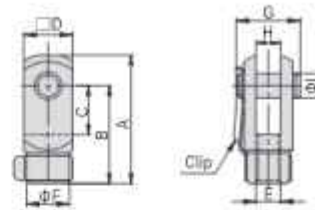


### I Knuckle

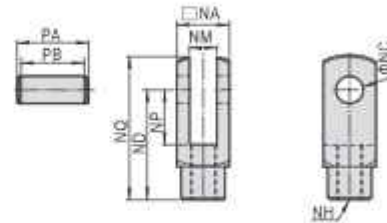


Type/Item	NC	ND	NE	NF	NG	NH	NM
F-MA20I	8	30	40	11	15	M8×1.25	8
F-MA25I	10	40	50	15	20	M10×1.25	10
F-MA40I	10	45	57	16	23	M12×1.25	14

### Y Knuckle



Type/Item	A	B	C	D	E	F	G	H	I
F-MA20Y	42	32	16	16	M8×1.25	14	21	8	8
F-MA25Y	52	40	20	19	M10×1.2	18	25	10	10



Type/Item	NA	NC	ND	NH	NP	NQ	NM	PA	PB
F-MA40Y	25.4	10	45	M12×1.25	20	57	14	32	26.2

Discontinued