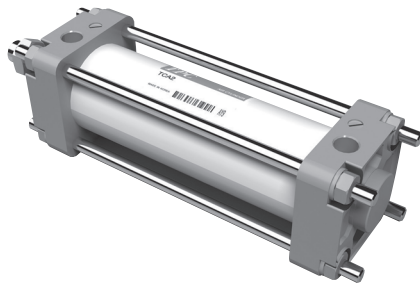


Series AM

Air Cylinder/Double Acting

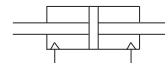
Non-lube · Air-hydro Type(mm) : Ø40, Ø50, Ø63, Ø80, Ø100



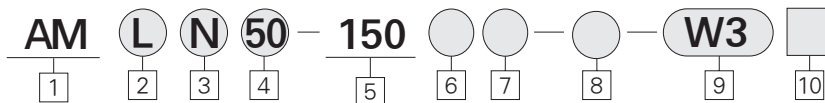
- BUILT-IN AIR CUSHION
- DESIGNED FOR LONG LIFE & HIGH SPEED
- AVAILABLE IN WIDE STROKE & BORE SIZES

Symbol

Double acting



How To Order



1 Air Cylinder
Standard
(Built-in magnet)

2 Mounting
B : Standard
L : Foot
F : Front flange
G : Rear flange
C : Single clevis
D : Double clevis
T : Center trunnion

3 Type
N : Non-lube
H : Air-hydro
F : Iron tube
(W/O Magnet)

4 Bore Size(mm)
40 : Ø40
50 : Ø50
63 : Ø63
80 : Ø80
100 : Ø100

5 Stroke/(mm)
Bore Size : standard stroke
40 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
63 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700
100 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700

6 Rod Boot
Blank : None
J : Nylon tarpaulin
K : Neoprene cloth

7 Cushion
Blank : Both end
N : None
H : Head end
R : Rod end

※ When knuckles are ordered,
I : Single knuckle attached
Y : Double knuckle attached

8 Special Option
Blank : Standard type
XC16 : Copper-free

9 Auto Switch
Blank : None
W3 : Reed switch type,
W3(AC100,200V,DC 24V)
Standard Auto Switch lead wire length is 0.5m.

※ Please suffix L at the end for lead wire of 3m(Optional)
(Example) W3 - W3L

10 Number of Auto Switches
Blank : 2 pcs
S : 1 pc
N : N pcs

Model

Model	Type	Action	Seal
AMON	Non-lube	Double	Special
AMOH	Air-hydro		Special

Series AM

Parts No. Of Mounting Bracket					
Bore size	φ 40	φ 50	φ 63	φ 80	φ 100
※ Foot	TCA2L40	TCA2L50	TCA2L63	TCA2L80	TCA2L100
Flange	TCA2F40	TCA2F50	TCA2F63	TCA2F80	TCA2F100
Single clevis	TCA2C40	TCA2C50	TCA2C63	TCA2C80	TCA2C100
Double clevis	TCA2D40	TCA2D50	TCA2D63	TCA2D80	TCA2D100

Specifications		
Type	Non-lube	Air-hydro
Fluid	Air	L.P.Oil
Proof pressure	1.5MPa(213psi)	
Max. operating pressure	1.0MPa(140psi)	
Min. operating pressure	0.05MPa(7psi)	0.1MPa(14psi)
Ambient and fluid temperature	5~60° C(41~140° F)	
Piston speed	50~500mm/s	0.5~300mm/s
Cushion	Air Cushion	Not Available
Stroke tolerance	~250 st : ^{+1.0} / ₀ , 251~1,000 st : ^{+1.4} / ₀ , 1,001~1,500 st : ^{+1.8} / ₀	
Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Center trunnion	

Weight/Aluminum Tube(Iron Tube)						(kgf)
Bore size		φ 40	φ 50	φ 63	φ 80	φ 100
Basic Weight	Basic	0.89 (0.94)	1.37 (1.40)	2.01 (2.04)	3.48 (3.63)	4.87 (5.07)
	Foot	1.08 (1.13)	1.58 (1.62)	2.34 (2.38)	4.15 (4.30)	5.86 (6.06)
	Flange	1.26 (1.30)	1.81 (1.86)	2.79 (2.84)	4.93 (5.08)	6.79 (6.99)
	Single clevis	1.12 (1.17)	1.71 (1.74)	2.63 (2.67)	4.59 (4.74)	6.65 (6.68)
	Double clevis	1.16 (1.21)	1.79 (1.83)	2.79 (2.83)	4.88 (5.03)	7.18 (7.38)
	Trunnion	1.25 (1.35)	1.85 (1.94)	2.80 (3.00)	5.03 (5.32)	7.15 (7.54)
Additional weight per 2" stroke	All mounting bracket (except trunnion iron tube)	0.22 (0.28)	0.28 (0.35)	0.37 (0.43)	0.52 (0.70)	0.65 (0.87)
	Trunnion of iron tube	(0.36)	(0.46)	(0.65)	(0.86)	(1.07)
Accessories	Single knuckle	0.23	0.27	0.27	0.60	0.83
	Double knuckle(with pin)	0.37	0.43	0.43	0.87	1.27

※ In parentheses are for Iron tube type.

Example

- AML 40-100(Foot, φ 40, 100st)
- Basic weight 1.08kgf
 - Additional weight 0.22/50st
 - Cylinder stroke 100st
- $$1.08 + 0.22 \times 100 / 50 = 1.52 \text{kgf}$$

- ACP
- APM
- AS
- AX
- AM2
- AM**
- AL
- ALX
- AQ
- ADQ
- AQ2
- ADQ2
- AJ
- AJM
- ABK
- ACK1
- NSK
- AG
- NGQ
- AGX
- GX
- NP
- ADR
- AMR
- NDM
- ARD
- NST
- AST
- ASTH
- NLCD
- NLCS

Series AM

Accessories

Description	Mounting	Basic	Foot	Front Flange	Rear Flange	Single Clevis	Double Clevis	Center Trunnion
Standard	Rod End Nut	○	○	○	○	○	○	○
	Clevis Pin	—	—	—	—	—	○	—
Option	Single Knuckle Joint	○	○	○	○	○	○	○
	Double Knuckle Joint(With Pin)	○	○	○	○	○	○	○
	Gaiter	○	○	○	○	○	○	○

Parts No. Of Auto Switch Mounting Band

Switch Model	Parts No.	Applicable Bore Size(mm)
W3	TBT-04	φ 40
	TBT-04	φ 50
	TBT-06	φ 63
	TBT-08	φ 80
	TBT-08	φ 100

Base Material And Surface Treatment

Description	Material	Note
Cover	Aluminum Alloy	Silver Paint
Cylinder Tube	Aluminum Alloy	Hard Alumite
	Carbon Steel Tube	Inside/Hard Chrome Plated Outside/Platinum Silver
Seals areal	Non-lube	NBR PDU, NLP, OPA
	Air-hydro	NBR SCB, SKY, SDA
Piston Rod	Carbon Steel	Hard Chrome Plated
Piston	Aluminum Alloy	Chromate

Gaiter/Material

Symbol	Material	Max.Ambient Temperature
J	Nylon Tarpaulin	60℃(140°F)
K	Neoprene Cloth	※110℃(230°F)

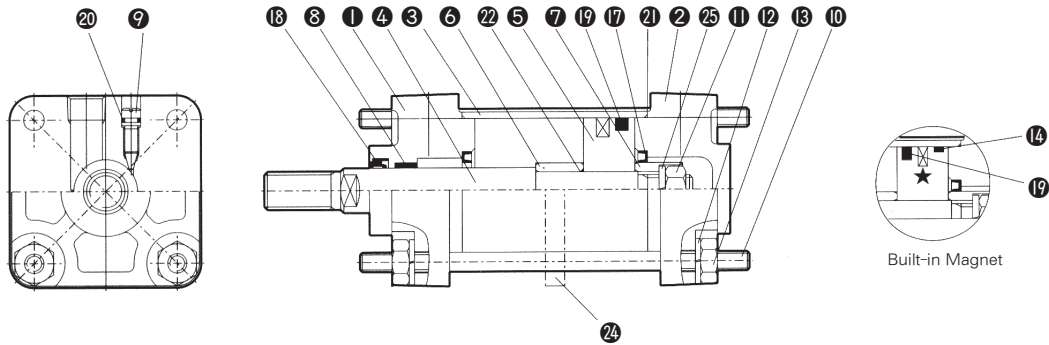
※ For gaiter itself

⚠ Precautions

- ① When mounting, completely flush the piping and be careful that dust and chips do not enter the cylinder.
- ② Load of piston rod should always be aligned parallel with the cylinder axis.
- ③ Avoid damaging (scratches, nicks) on the piston rod, which would lead to damage of rod seal, resulting in air leakage.
- ④ <Lubrication>
Use non-additive turbine oil ISO-VG32.
Never use machine oil or spindle oil.
- ⑤ <L. P. Oil>
Use ISO VG-22-46 or equivalent L. P. oil.
Never use machine oil or spindle oil.
- ⑥ Open air exhaust valve and completely let the inside air out before use.
- ⑦ In case you need cushion only on the air side, you don't have to specify the above. All you have to do is suffix R or H, and for others, follow "How to Order."

Series AM

Construction



- ACP
- APM
- AS
- AX
- AM2
- AM**
- AL
- ALX
- AQ
- ADQ
- AQ2
- ADQ2
- AJ
- AJM
- ABK
- ACK1
- NSK
- AG
- NGQ
- AGX
- GX
- NP
- ADR
- AMR
- NDM
- ARD
- NST
- AST
- ASTH
- NLCD
- NLCS

Parts List

NO.	Description	Material	Note
1	Rod cover	Aluminum alloy	Silver paint
2	Head cover	Aluminum alloy	Silver paint
3	※Cylinder tube	Aluminum alloy	Hard alumite
4	Piston rod	Carbon steel	Hard chrome plated
5	Piston	Aluminum alloy	Chromate
6	Cushion ring A	Aluminum	Chromate
7	Cushion ring B	Aluminum	Chromate
8	Bush	Lead bronze casting	-
9	Cushion Valve	Rolled steel	Chromate
10	Tie rod	Carbon steel	Zinc chromate
11	Piston nut	Rolled steel	Chromate
12	Spring washer	Steel wire	Black Zinc chromate
13	Tie rod nut	Rolled steel	Black Zinc chromate
14	Wearing	Resin	-
24	※ Tie rod reinforcing ring	Cast iron	-
25	Spring washer	Steel wire	Zinc chromate

※ 24 Tie rod reinforcing ring : Available only for 1,000 stroke or more.
 ※ 3 In the case of Iron tube cylinder : Carbon steel tube, inside hard chrome plated.

Seals List

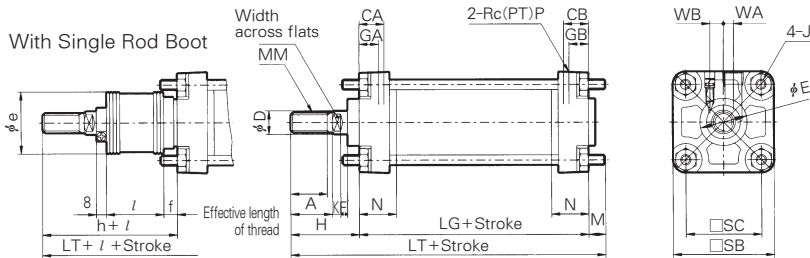
NO.	Description	Material	Parts. No.				
			40	50	63	80	100
Non-lube Type							
17	Cushion seal	NBR	DSM-20	DSM-25	DSM-25	DSM-30	DSM-35
18	Rod seal		PDU-16Z	PDU-20Z	PDU-20Z	PDU-25Z	PDU-30Z
19	Piston seal		TPSA-40A	TPSA-50A	TPSA-63A	TPSA-80A	TPSA-100A
			P34	P44	P53	P70	P90
20	Cushion Valve seal		TC2A040-16A1486-PL	TC2A063-16A1488-PL			
21	Cylinder tube gasket	TC2A03-16-1487	TC2A03-16-1488	TC2A03-16-1489	TC2A03-16-1490	TC2A03-16-1491	
22	Piston gasket	CA40-1609K-PL	CA63-1609K-PL	CA63-1609K-PL	CA80-1609K-PL	CA100-1610K-PL	
Air-hydro Type Same as lube type except 17, 19 and 22							
18	Rod seal	NBR	SKY-16	SKY-20	SKY-20	SKY-25	SKY-30
19	Piston seal		SDA-40	SDA-50	SDA-63	SDA-80	SDA-100
23	Scrapers		SCB-16	SCB-20	SCB-20	SCB-25	SCB-30

★ Magnet (Built-in Magnet)

Series AM

Basic Type/(B)

Non-Lube Type(AMBN), Air-Hydro Type(AMBH)

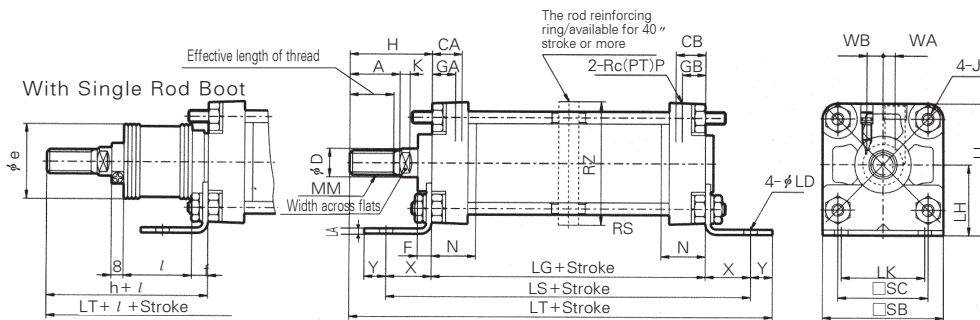


(unit:mm)

Bore size (mm)	Stroke range(mm)		Effective length of thread	Width across flats MM	A	□SB	□SC	CA	CB	φD	φE	F	GA	GB	J	K	M	MM	N	P	LG	WA	WB	Without Rod Boot		With Rod Boot				
	Without gaiter	With gaiter																						H	LT	φe	f	h	l	LT
φ 40	~500	20~500	27	14	30	60	44	18	18	16	32	10	15	15	M8×1.25	6	11	M14×1.5	27	1/4	84	5	10.5	51	146	43	11.2	59	1/4 Stroke	154
φ 50	~600	20~600	32	18	35	70	52	21	21	20	40	10	17	17	M8×1.25	7	11	M18×1.5	30	3/8	90	8	9.9	58	159	52	11.2	66		167
φ 63	~600	20~600	32	18	35	85	64	21	21	20	40	10	17	17	M10×1.25	7	14	M18×1.5	31	3/8	98	9	11.5	58	170	52	11.2	66		178
φ 80	~750	20~750	37	22	40	102	78	26	26	25	52	14	21	21	M12×1.75	11	17	M22×1.5	37	1/2	116	11	13	71	204	65	12.5	80		213
φ 100	~750	20~750	37	26	40	116	92	28	28	30	52	14	21	21	M12×1.75	11	17	M26×1.5	40	1/2	126	13	14	72	215	65	14	81		224

Foot Type/(L)

Non-Lube Type(AMLN), Air-Hydro type(AMLH)



(unit:mm)

Bore size (mm)	Stroke range(mm)		Effective length of thread	A	□SB	□SC	CA	CB	φD	φE	F	GA	GB	J	K	MM	N	P	LG	WA	WB
	Without Rod Boot	With Rod Boot																			
φ 40	~500	20~500	27	30	60	44	18	18	16	32	10	15	15	M8×1.25	6	M14×1.5	27	1/4	84	5	10.5
φ 50	~600	20~600	32	35	70	52	21	21	20	40	10	17	17	M8×1.25	7	M18×1.5	30	3/8	90	8	9.9
φ 63	~600	20~600	32	35	85	64	21	21	20	40	10	17	17	M10×1.25	7	M18×1.5	31	3/8	98	9	11.5
φ 80	~750	20~750	37	40	102	78	26	26	25	52	14	21	21	M12×1.75	11	M22×1.5	37	1/2	116	11	13
φ 100	~750	20~750	37	40	116	92	28	28	30	52	14	21	21	M12×1.75	11	M26×1.5	40	1/2	126	13	14

Bore size (mm)	X	Y	φLD	LH	LS	LA	LK	LL	Without Rod Boot		With Rod Boot					
									H	LT	φe	f	h	l	LT	
φ 40	27	13	9.0	40	138	3.2	42	70	51	175	43	11.2	59	1/4 Stroke	183	
φ 50	27	13	9.0	45	144	3.2	50	80	58	188	52	11.2	66		196	
φ 63	34	16	11.5	50	166	3.2	59	93	58	206	52	11.2	66		214	
φ 80	44	16	13.5	65	204	4.5	76	116	71	247	65	12.5	80		256	
φ 100	43	17	13.5	75	212	6.0	92	133	72	258	65	14.0	81		267	

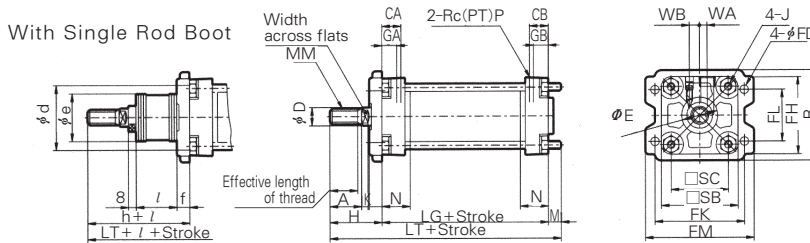
Long Stroke Type

Bore size (mm)	Stroke range (mm)	RS	RZ
φ 40	501~800	-	-
φ 50	601~1200	30	76
φ 63	601~1200	40	92
φ 80	751~1400	45	112
φ 100	751~1500	50	136

Series AM

Front Flange/(F)

Non-Lube Type(AMFN), Air-Hydro Type(AMFH)



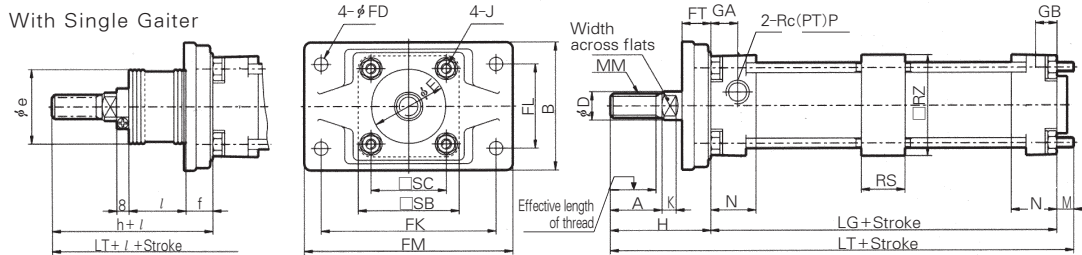
(unit:mm)

Bore size (mm)	Stroke range(mm)		Effective length of thread	A	B	SB	SC	CA	CB	ϕD	ϕE	GA	GB	J	K	M	MM	N	P	LG	WA	WB
	Without Rod Boot	With Rod Boot																				
$\phi 40$	~800	20~800	27	30	71	60	44	18	18	16	32	15	15	M8×1.25	6	11	M14×1.5	27	1/4	84	5	10.5
$\phi 50$	~1,000	20~1,000	32	35	81	70	52	21	21	20	40	17	17	M8×1.25	7	11	M18×1.5	30	3/8	90	8	9.9
$\phi 63$	~1,000	20~1,000	32	35	101	85	64	21	21	20	40	17	17	M10×1.25	7	14	M18×1.5	31	3/8	98	9	11.5
$\phi 80$	~1,000	20~1,000	37	40	119	102	78	26	26	25	52	21	21	M12×1.75	11	17	M22×1.5	37	1/2	116	11	13
$\phi 100$	~1,000	20~1,000	37	40	133	116	92	28	28	30	52	21	21	M12×1.75	11	17	M26×1.5	40	1/2	126	13	14

Bore size (mm)	FH	ϕFD	FT	FK	FL	FM	Without Rod Boot		With Rod Boot						
	H	LT	$\star \phi d$	ϕe	f	h	H	LT	$\star \phi d$	ϕe	f	h	l	LT	
$\phi 40$	60	9.0	12	80	42	100	51	146	52	43	15	59	1/4 Stroke	154	
$\phi 50$	70	9.0	12	90	50	110	58	159	58	52	15	66		167	
$\phi 63$	86	11.5	15	105	59	130	58	170	58	52	17.5	66		178	
$\phi 80$	102	13.5	18	130	76	160	71	204	80	65	21.5	80		213	
$\phi 100$	116	13.5	18	150	92	180	72	215	80	65	21.5	81		224	

★ Hole diameter of Rod Boot to mount Air-cylinder should be larger than the outside diameter of gaiter mounting bracket ϕd .

Long Stroke(1001 Stroke or more)



(unit:mm)

Bore size (mm)	Stroke range (mm)	Effective length of thread	A	B	SB	SC	ϕD	ϕE	GA	GB	J	K	M	MM	N	P	LG	WA	WB
			$\phi 50$	1,001~1,200	32	35	88	70	52	20	40	17	17	M8×1.25	7	6	M18×1.5	30	3/8
$\phi 63$	1,001~1,200	32	35	105	85	64	20	40	17	17	M10×1.25	7	10	M18×1.5	31	3/8	98	9	11.5
$\phi 80$	1,001~1,400	37	40	124	102	78	25	52	21	21	M12×1.75	11	12	M22×1.5	37	1/2	116	11	13
$\phi 100$	1,001~1,500	37	40	140	116	92	30	52	21	21	M12×1.75	11	12	M26×1.5	40	1/2	126	13	14

Bore size (mm)	ϕFD	FT	FK	FL	FM	RS	RZ	Without Rod Boot		With Rod Boot						
								H	LT	$\star \phi e$	f	h	l	LT		
$\phi 50$	9.0	20	120	58	144	30	76	67	163	52	19	66	1/4 Stroke	162		
$\phi 63$	11.5	23	140	64	170	40	92	71	179	52	19	66		174		
$\phi 80$	13.5	28	164	84	198	45	112	87	215	65	21	80		208		
$\phi 100$	13.5	29	180	100	220	50	136	89	227	65	21	81		219		

★ Hole diameter of rod boot to mount Air-cylinder should be larger than the outside diameter of rod boot mounting bracket ϕe .

ACP

APM

AS

AX

AM2

AM

AL

ALX

AQ

ADQ

AQ2

ADQ2

AJ

AJM

ABK

ACK1

NSK

AG

NGQ

AGX

GX

NP

ADR

AMR

NDM

ARD

NST

AST

ASTH

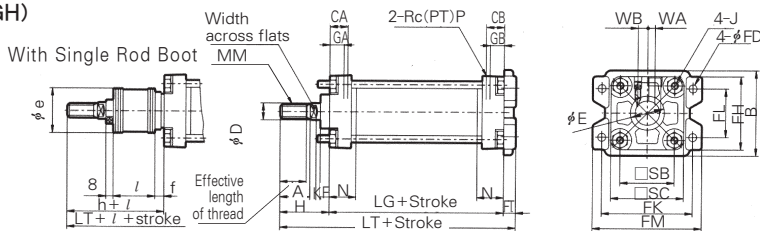
NLCD

NLCS

Series AM

Rear Flange/(G)

Non-Lube Type(AMGN),
Air-Hydro Type(AMGH)



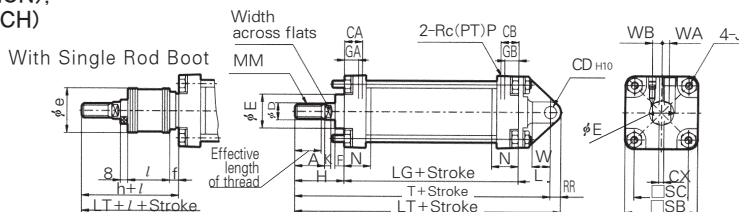
(unit:mm)

Bore size (mm)	Stroke range		Effective length of thread	A	B	SB	SC	CA	CB	φD	φE	F	GA	GB	J	K	MM	N	P	LG	WA	WB
	Without Rod Boot	With Rod Boot																				
φ40	~500	20~500	27	30	71	60	44	18	18	16	32	10	15	15	M8×1.25	6	M14×1.5	27	1/4	84	5	10.5
φ50	~600	20~600	32	35	81	70	52	21	21	20	40	10	17	17	M8×1.25	7	M18×1.5	30	3/8	90	8	9.9
φ63	~600	20~600	32	35	101	85	64	21	21	20	40	10	17	17	M10×1.25	7	M18×1.5	31	3/8	98	9	11.5
φ80	~750	20~750	37	40	119	102	78	26	26	25	52	14	21	21	M12×1.75	11	M22×1.5	37	1/2	116	11	13
φ100	~750	20~750	37	40	133	116	92	28	28	30	52	14	21	21	M12×1.75	11	M26×1.5	40	1/2	126	13	14

Bore size (mm)	FH	φFD	FT	FK	FL	FM	Without Rod Boot		With Rod Boot				
							H	LT	φe	f	h	l	LT
φ40	60	9.0	12	80	42	100	51	147	43	11.2	59	1/4 Stroke	155
φ50	70	9.0	12	90	50	110	58	160	52	11.2	66		168
φ63	86	11.5	15	105	59	130	58	171	52	11.2	66		179
φ80	102	13.5	18	130	76	160	71	205	65	12.5	80		214
φ100	116	13.5	18	150	92	180	72	216	65	14.0	81		225

Single Clevis/(C)

Non-Lube Type(AMCN),
Air-Hydro Type(AMCH)



(unit:mm)

Bore size (mm)	Stroke range		Effective length of thread	A	SB	SC	CA	CB	φD	φE	F	GA	GB	J	K	L	MM	N	P	LG	WA	WB
	Without Rod Boot	With Rod Boot																				
φ40	~500	20~500	27	30	60	44	18	18	16	32	10	15	15	M8×1.25	6	30	M14×1.5	27	1/4	84	5	10.5
φ50	~600	20~600	32	35	70	52	21	21	20	40	10	17	17	M8×1.25	7	35	M18×1.5	30	3/8	90	8	9.9
φ63	~600	20~600	32	35	85	64	21	21	20	40	10	17	17	M10×1.25	7	40	M18×1.5	31	3/8	98	9	11.5
φ80	~750	20~750	37	40	102	78	26	26	25	52	14	21	21	M12×1.75	11	48	M22×1.5	37	1/2	116	11	13
φ100	~750	20~750	37	40	116	92	28	28	30	52	14	21	21	M12×1.75	11	58	M26×1.5	40	1/2	126	13	14

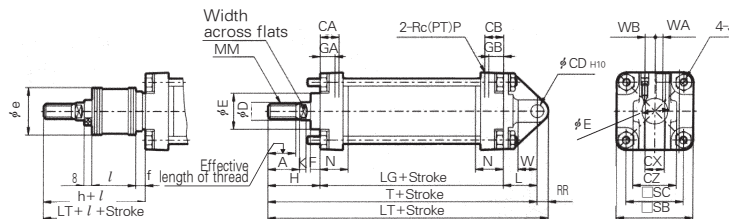
Bore size (mm)	RR	W	φCD _{H10}	CX	Without Rod Boot		With Rod Boot								
					H	T	LT	φe	f	h	l	T	LT		
φ40	10	16	10	^{+0.058} ₀	15.0	^{-0.1} _{-0.3}	51	165	175	43	11.2	59	1/4 Stroke	173	183
φ50	12	19	12	^{+0.070} ₀	18.0	^{-0.1} _{-0.3}	58	183	195	52	11.2	66		191	203
φ63	16	23	16	^{+0.070} ₀	25.0	^{-0.1} _{-0.3}	58	196	212	52	11.2	66		204	220
φ80	20	28	20	^{+0.084} ₀	31.5	^{-0.1} _{-0.3}	71	235	255	65	12.5	80		244	264
φ100	25	36	25	^{+0.084} ₀	35.5	^{-0.1} _{-0.3}	72	256	281	65	14.0	81		265	290

Series AM

Double Clevis Type/(D)

Non-Lube Type(AMDN),
Air-Hydro Type(AMDH)

With Single Rod Boot



(unit:mm)

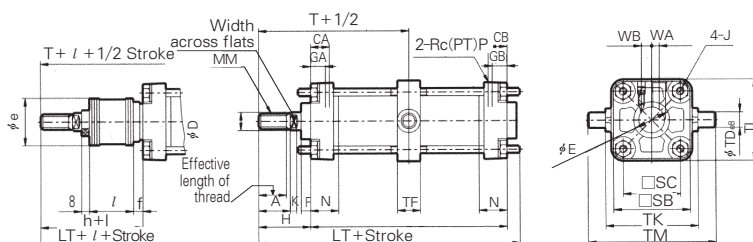
Bore size (mm)	Stroke range		Effective length of thread	A	SB	SC	CA	CB	φD	φE	F	GA	GB	J	K	L	MM	N	P	LG	WA	WB
	Without Rod Boot	With Rod Boot																				
φ40	~500	20~500	27	30	60	44	18	18	16	32	10	15	15	M8×1.25	6	30	M14×1.5	27	1/4	84	5	10.5
φ50	~600	20~600	32	35	70	52	21	21	20	40	10	17	17	M8×1.25	7	35	M18×1.5	30	3/8	90	8	9.9
φ63	~600	20~600	32	35	85	64	21	21	20	40	10	17	17	M10×1.25	7	40	M18×1.5	31	3/8	98	9	11.5
φ80	~750	20~750	37	40	102	78	26	26	25	52	14	21	21	M12×1.75	11	48	M22×1.5	37	1/2	116	11	13
φ100	~750	20~750	37	40	116	92	28	28	30	52	14	21	21	M12×1.75	11	58	M26×1.5	40	1/2	126	13	14

Bore size (mm)	RR	W	φCD _{H10}	CX	CZ	Without Rod Boot			With Rod Boot							
						H	T	LT	φe	f	h	l	T	LT		
φ40	10	16	10	+0.058 0	15.0	+0.3 +0.1	29.5	51	165	175	43	11.2	59	1/4 Stroke	173	183
φ50	12	19	12	+0.070 0	18.0	+0.3 +0.1	38	58	183	195	52	11.2	66		191	203
φ63	16	23	16	+0.070 0	25.0	+0.3 +0.1	49	58	196	212	52	11.2	66		204	220
φ80	20	28	20	+0.084 0	31.5	+0.3 +0.1	61	71	235	255	65	12.5	80		244	264
φ100	25	36	25	+0.084 0	35.5	+0.3 +0.1	64	72	256	281	65	14.0	81		265	290

Center Trunnion Type/(T)

Non-lube Type(AMTN),
Air-hydro type(AMTH)

With Single Rod Boot



(unit:mm)

Bore size (mm)	Stroke range		Effective length of thread	A	SB	SC	CA	CB	φD	φE	F	GA	GB	J	K	MM	N	P	LG	WA	WB
	Without Rod Boot	With Rod Boot																			
φ40	~500	20~500	27	30	60	44	18	18	16	32	10	15	15	M8×1.25	6	M14×1.5	27	1/4	84	5	10.5
φ50	~600	20~600	32	35	70	52	21	21	20	40	10	17	17	M8×1.25	7	M18×1.5	30	3/8	90	8	9.9
φ63	~600	20~600	32	35	85	64	21	21	20	40	10	17	17	M10×1.25	7	M18×1.5	31	3/8	98	9	11.5
φ80	~750	20~750	37	40	102	78	26	26	25	52	14	21	21	M12×1.75	11	M22×1.5	37	1/2	116	11	13
φ100	~750	20~750	37	40	116	92	28	28	30	52	14	21	21	M12×1.75	11	M26×1.5	40	1/2	126	13	14

Bore size (mm)	φTDe8	TF	TK	TL	TM	Without Rod Boot			With Rod Boot						
						H	T	LT	φe	f	h	l	T	LT	
φ40	15	-0.032 -0.059	22	85	62	117	51	93	140	43	11.2	59	1/4 Stroke	101	148
φ50	15	-0.032 -0.059	22	95	74	127	58	103	154	52	11.2	66		111	162
φ63	18	-0.032 -0.059	28	110	90	148	58	107	162	52	11.2	66		115	170
φ80	25	-0.040 -0.073	34	140	110	192	71	129	194	65	12.5	80		138	203
φ100	25	-0.040 -0.073	40	162	130	214	72	135	206	65	14.0	81		144	215

- ACP
- APM
- AS
- AX
- AM2
- AM**
- AL
ALX
- AQ
ADQ
- AQ2
ADQ2
- AJ
AJM
- ABK
- ACK1
- NSK
- AG
- NGQ
- AGX
GX
- NP
- ADR
- AMR
- NDM
- ARD
- NST
- AST
- ASTH
- NLCD
- NLCS

Series AM

Rod End Nut(Standard Accessories) (mm)

Material : Rolled steel

Part No.	Applicable bore	d	J	A	C	D
TNT-04	φ 40	M14×1.5	8	22	25.4	21
TNT-05	φ 50 · φ 63	M18×1.5	11	27	31.2	26
TNT-08	φ 80	M22×1.5	13	32	37.0	31
TNT-10	φ 100	M26×1.5	16	41	47.3	39

Knuckle Joint Pin/Clevis Pin (mm)

Material : Carbon steel

Part No	Bore Size		φ Dd9	L	l	m	φ d	Applicable split pin φ × l
	CLEVIS	KNUCKLE						
TCDP-2	φ 40	—	10 ^{-0.040/-0.076}	45.2	37.2	4	φ 3	φ 3×18l
TCDP-3	φ 50	φ 40 · φ 55	12 ^{-0.050/-0.093}	54.3	46.3	4	φ 3	φ 3×18l
TCDP-4	φ 63	—	16 ^{-0.050/-0.093}	70	60	5	φ 4	φ 4×24l
TCDP-5	—	φ 80	18 ^{-0.040/-0.076}	76	66	5	φ 4	φ 4×25l
TCDP-6	φ 80	φ 100	20 ^{-0.065/-0.117}	82	72	5	φ 4	φ 4×36l
TCDP-7	φ 100	—	25 ^{-0.065/-0.117}	87.5	77.5	5	φ 4	φ 4×36l

I Type Single Knuckle Joint (mm)

Material : Free cutting sulfur steel

Part No.	Applicable bore	A	A1	φ E1	L1	MM	R1	W1	φ ND _{H10}	NX
TI-04	φ 40	69	22	24	55	M14×1.5	15.5	20	12 ^{-0.070/-0}	16 ^{-0.1/-0.3}
TI-05	φ 50 · φ 63	74	27	28	60	M18×1.5	15.5	20	12 ^{-0.070/-0}	16 ^{-0.1/-0.3}
TI-08	φ 80	91	37	36	71	M22×1.5	22.5	26	18 ^{-0.070/-0}	28 ^{-0.1/-0.3}
TI-10	φ 100	105	37	40	83	M26×1.5	24.5	28	20 ^{-0.084/-0}	30 ^{-0.1/-0.3}

Y Type Double Knuckle Joint (mm)

Cast iron

Part No.	Applicable bore	A1	φ E1	L1	MM	R1	W1	φ ND _{H10}	NX	NZ
TY-04A	φ 40	22	24	55	M14×1.5	13	25	12 ^{+0.070/+0}	16 ^{+0.3/+0.1}	38
TY-05A	φ 50 · φ 63	27	28	60	M18×1.5	15	27	12 ^{+0.070/+0}	16 ^{+0.3/+0.1}	38
TY-08A	φ 80	37	36	71	M22×1.5	19	28	18 ^{+0.070/+0}	28 ^{+0.3/+0.1}	55
TY-10A	φ 100	37	40	83	M26×1.5	21	38	20 ^{+0.084/+0}	30 ^{+0.3/+0.1}	61

Trunnion Bracket

※ The order makes special for trunnion type bracket.

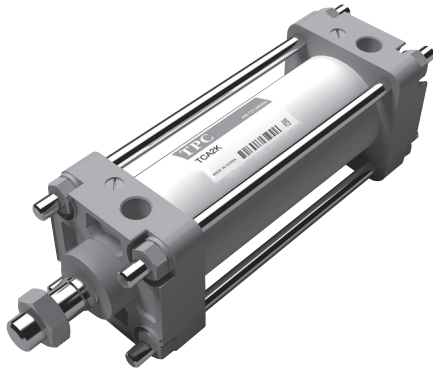
(mm)

Part No.	Applicable bore	TZ	TM	TU	TG	TV	TN	TO	φ TR	φ TK	TS	TH	TF	TY	W1	T	φ TD-H10
TCA1-S04	φ 40	80	60	10	102	85	119	17	9	17	12	45	60	62	10	93	15 ^{+0.070/0}
	φ 50	80	60	10	112	95	129	17	9	17	12	45	60	74	10	103	15 ^{+0.070/0}
TCA1-S06	φ 63	100	70	15	130	110	150	20	11	22	14	55	73	90	10	107	18 ^{+0.070/0}
TCA1-S08	φ 80	120	90	15	166	140	192	26	13.5	24	17	75	100	110	12	129	25 ^{+0.084/0}
	φ 100	120	90	15	188	162	214	26	13.5	24	17	75	100	130	12	135	25 ^{+0.084/0}

Series **AMK**

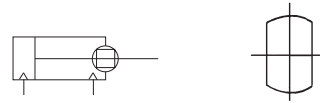
Non-Rotating Piston Rod Type

Non-lube Type : Ø40, Ø50, Ø63



- HIGH NON-ROTATING ACCURACY/±0.5°
- SAME MOUNTING DIMENSION AS OUR STANDARD TYPE
- AUTO SWITCH CAN BE MOUNTED (TIE ROD MOUNT TYPE)
- NON-LUBRICATED OPERATION POSSIBLE

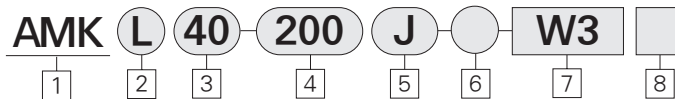
Symbol



Piston Rod cross section

- ACP
- APM
- AS
- AX
- AM2
- AM**
- AL
ALX
- AQ
ADQ
- AQ2
ADQ2
- AJ
AJM
- ABK
- ACK1
- NSK
- AG
- NGQ
- AGX
GX
- NP
- ADR
- AMR
- NDM
- ARD
- NST
- AST
- ASTH
- NLCD
- NLCS

How to Order



- 1 Non-Rotating Piston-Rod Type Series (Built-in Magnet)
- 2 Mounting
- 3 Bore Size
- 4 Stroke
- 5 With Rod Boot
- 6 Order Made Option
- 7 Auto Switch
- 8 Number of Auto Switches

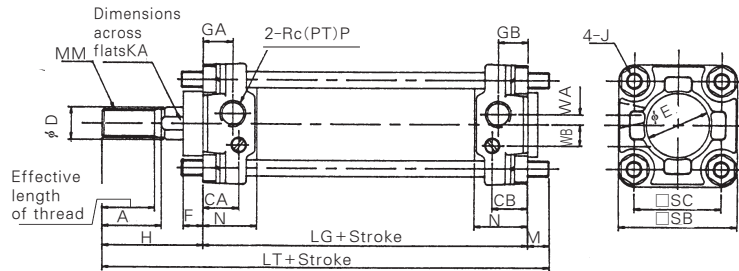
※ For details, please refer to page 186

Specification

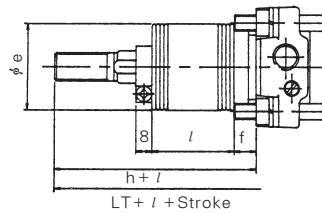
Fluid	Air
Proof pressure	1.5MPa(213psi)
Max.operating pressure	1.0MPa(140psi)
Min.operating pressure	0.5MPa(7psi)
Ambient and fluid temperature	5~60℃(41~140°F)
Piston speed	50~500mm/s
Cushion	Air Cushion
Stroke tolerance	φ 40:25~500 ^{mm} : ^{+1.4} ₀ , φ 50, φ 63:25~600 ^{mm} :
Allowable rotational torque	±0.5°
Lubrication	Not required
Bore size(mm)	φ 40, φ 50, φ 63,
Basic, Foot, front flange Mounting	Basic, Foot, Front flange, Rear flange, Single clevis, Double clevis, Center trunnion

Series AMK

Basic Type(B)



With Single Rod Boot



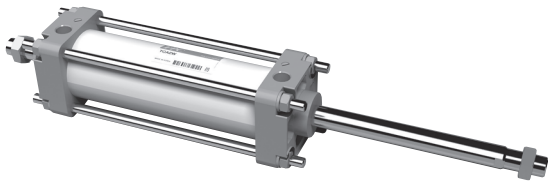
Bore size (mm)	Stroke range		Effective length of thread	A	SB	SC	CA	CB	ϕD	ϕE	F	GA	GB	J	KA	MM	N	P	LG	WA	WB
	Without Rod Boot	With Rod Boot																			
$\phi 40$	~500	20~500	27	30	60	44	18	18	16	32	10	15	15	M8×1.25	14	M14×1.5	27	1/4	84	5	10.5
$\phi 50$	~600	20~600	32	35	70	52	21	21	20	40	10	17	17	M8×1.25	18	M18×1.5	30	3/8	90	8	9.9
$\phi 63$	~600	20~600	32	35	85	64	21	21	20	40	10	17	17	M10×1.25	18	M18×1.5	31	3/8	98	9	11.5

Bore size (mm)	Without Rod Boot		With Rod Boot				
	H	LT	ϕe	f	h	l	LT
$\phi 40$	51	146	43	11.2	59		154
$\phi 50$	58	159	52	11.2	66	1/4 Stroke	167
$\phi 63$	58	170	52	11.2	66		178

Series **AMW**

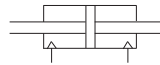
Double Rod End Type

Bore Size(mm) : Ø40, Ø50, Ø63, Ø80, Ø100



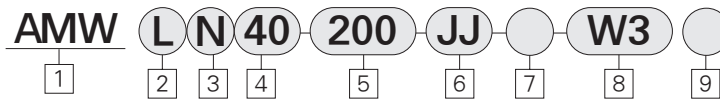
- DOUBLE ROD END TYPE CYLINDER
- LONG LIFE, HIGH SPEED OPERATION POSSIBLE
- NON-LUBRICATED OPERATION POSSIBLE
- AUTO SWITCH CAN BE MOUNTED (TIE ROD MOUNT TYPE)

Symbol



ACP
APM
AS
AX
AM2
AM
AL ALX
AQ ADQ
AQ2 ADQ2
AJ AJM
ABK
ACK1
NSK
AG
NGQ
AGX GX
NP
ADR
AMR
NDM
ARD
NST
AST
ASTH
NLCD
NLCS

How to Order



1 Double Rod End Cylinder
Built-in Magnet

2 Mounting

3 Type

N : Non-lube
H : Air-hydro

4 Bore Size

5 Stroke

φ40 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
 φ50 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
 φ63 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500

φ80 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500

φ100 : 25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500

6 Rod Boot

J : Nylon tarpaulin(Single gaiter)
 JJ : Nylon tarpaulin(Double gaiter)
 K : Neoprene cloth(Single gaiter)
 KK : Neoprene cloth(Double gaiter)

7 Order Made Option

8 Auto Switch

9 Number of Auto Switches

* For details, please refer to page 186

Series AMW

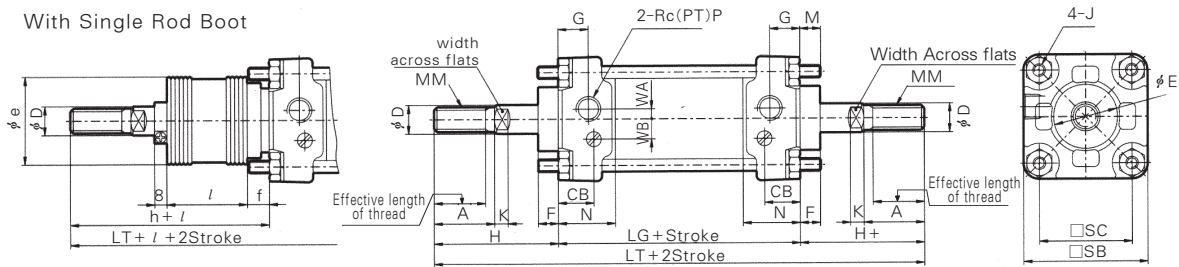
Specifications

Type	Non-lube	Air-hydro
Fluid	Air	L.P.Oil
Proof pressure	1.5Mpa(213psi)	
Max.operating pressure	1.0Mpa(140psi)	
Min.operating pressure	0.08MPa(1psi)	0.16MPa(22psi)
Piston speed	50~500mm/s	0.5~300mm/s
Ambient and fluid temperature	5~60°C(41~140°F)	
Cushion	Both side	None
Stroke tolerance	~250 st : ^{+1.0} / ₀ , 251~750 st : ^{+1.4} / ₀	
Mounting	Basic, Foot, Flange, Center trunnion	

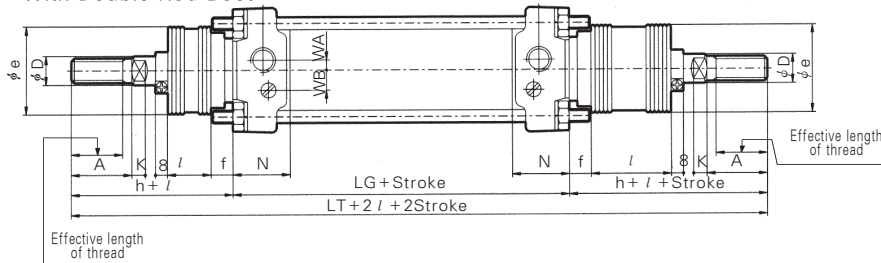
Basic Type/(B)

Non-Lube Type(AMWBN), Air-Hydro Type(AMWBH)

With Single Rod Boot



With Double Rod Boot



Bore size (mm)	Stroke range(mm)		Effective length of thread	A	SB	SC	CA	CB	φD	φE	F	G	J	K	M	MM	N	P	LG	WA	WB
	Without Rod Boot	With Rod Boot																			
φ40	~500	20~500	27	30	60	44	18	18	16	32	10	15	M8×1.25	6	11	M14×1.5	27	1/4	84	5	10.5
φ50	~600	20~600	32	35	70	52	21	21	20	40	10	17	M8×1.25	7	11	M18×1.5	30	3/8	90	8	9.9
φ63	~600	20~600	32	35	85	64	21	21	20	40	10	17	M10×1.25	7	14	M18×1.5	31	3/8	98	9	11.5
φ80	~750	20~750	37	40	102	78	26	26	25	52	14	21	M12×1.75	11	17	M22×1.5	37	1/2	116	11	13
φ100	~750	20~750	37	40	116	92	28	28	30	52	14	21	M12×1.75	11	17	M26×1.5	40	1/2	126	13	14

Bore size (mm)	Without Rod Boot		With Rod Boot(Single)				(Double)	
	H	LT	φe	f	h	l	LT	LT
φ40	51	186	43	11.2	59	1/4 Stroke	194	202
φ50	58	206	52	11.2	66		214	222
φ63	58	214	52	11.2	66		222	230
φ80	71	258	65	12.5	80		267	276
φ100	72	270	65	14.0	81		279	288

Order Made Option

Adjustable Stroke Cylinder/Extension adjustable Type

AM (Mounting) (Type) (Bore size) (Stroke) (Rod Boot) (Stroke Additional symbol) — XC8

ROD BOOT ●

Blank — Without Rod Boot
 J — With Rod Boot (Nylon tarpaulin)
 K — With Rod Boot (Neoprene cloth)

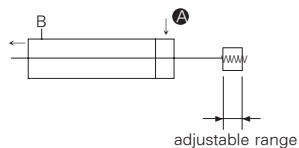
● Stroke Additional symbol

A — Stroke adjusting range 0~25mm
 B — Stroke adjusting range 0~50mm

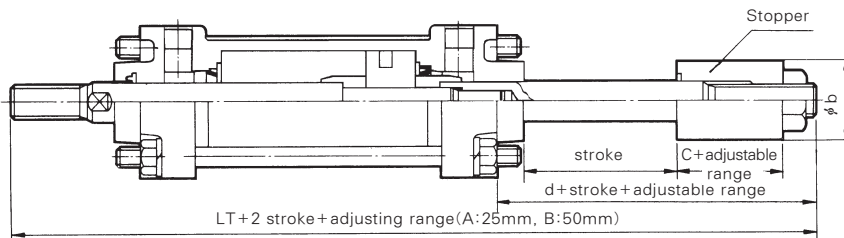
The stroke at the extended end of the cylinder can be adjusted by the stopper in the head side from full stroke 0~25mm or 0~50mm

※ If you want lubrication types, inquire with us.

Symbol



Construction/Dimensions



(mm)				
Bore size	φb	c	d	LT
φ40	φ32	22	46	181
φ50	φ42	28	58.5	206.5
φ63		28	54	210
φ80	φ55	35	70	257
φ100		35	70	268

※ Other dimensions are the same for standard type

- ACP
- APM
- AS
- AX
- AM2
- AM**
- AL
- ALX
- AQ
- ADQ
- AQ2
- ADQ2
- AJ
- AJM
- ABK
- ACK1
- NSK
- AG
- NGQ
- AGX
- GX
- NP
- ADR
- AMR
- NDM
- ARD
- NST
- AST
- ASTH
- NLCD
- NLCS

Order Made Option

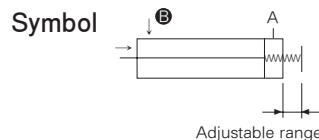
Adjustable Stroke Cylinder/Retraction adjustable Type

AM **Mounting** **Type** **Bore size** **Stroke** **Rod Boot** **Stroke Additional symbol** - XC9

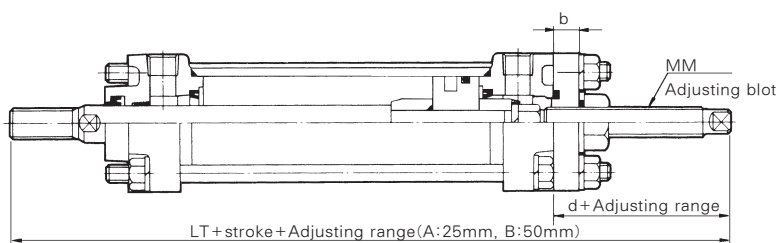
Additional symbol ●
 Blank - Without Rod Boot
 J - With Rod Boot (Nylon tarpaulin)
 K - With Rod Boot (Neoprene cloth)

● Stroke Additional symbol
 A - Stroke adjusting range 0~25mm
 B - Stroke adjusting range 0~50mm

The stroke at retraction of the cylinder can be adjusted from 0~25mm or 0~50mm by the adjusting bolt.



Construction/Dimensions



Bore Size	MM	b	d	LT
φ 40	M16×1.5	9	43	178
φ 50	M16×1.5	11	44	192
φ 63	M20×1.5	11	48	204
φ 80	M24×1.5	15	59	246
φ 100	M24×1.5	15	57	255

(mm)

※ Other dimensions are the same for standard type

Dual Stroke Cylinder/Double Rod Type

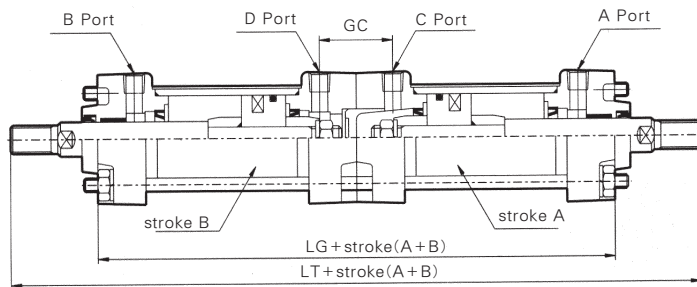
AM **Mounting** **Type** **Bore size** **Stroke A** **Rod Boot** + **Stroke B** **Rod Boot** - XC10

Two cylinders are constructed as one cylinder in a back-to-back configuration allowing the cylinder stroke to be controlled in three steps.

※ If you want lubrication types, inquire with us

● Additional symbol
 Blank - Without Rod Boot
 J - With Rod Boot (Nylon tarpaulin)
 K - With Rod Boot (Neoprene cloth)

Construction/Dimensions



Bore size	GC	LG	LT
φ 40	29	167	269
φ 50	33	179	295
φ 63	33	195	311
φ 80	41	231	373
φ 100	41	251	395

(mm)

※ Other dimensions are the same for standard type.

Order Made Option

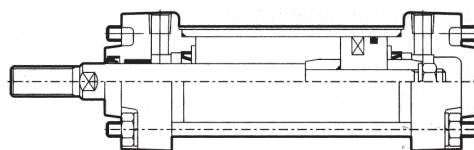
With Scraper

AM (Mounting) (Type) (Bore size) (Stroke) XC4

Specifications

Type	Lube, Non-Lube
Applicable cylinder bore size	φ 40, φ 50, φ 63, φ 80, φ 100
Max.operating pressure	1.0MPa(140psi)
Min.operating pressure	0.05MPa(7psi)
Cushion	Air cushion(Standard)
Wiper ring	Material:SCB
Mounting	Basic type, Axial foot type, Rod side flange type, head side flange type, Single clevis type, Double clevis type, center trunnion

Construction



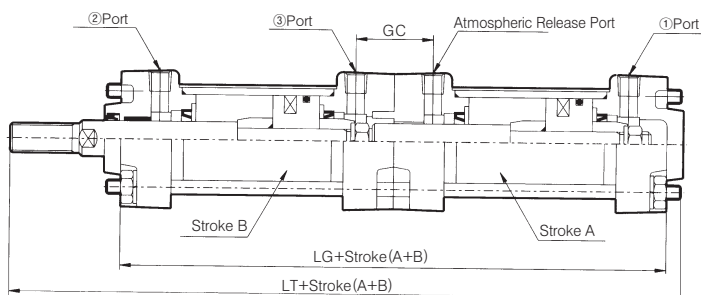
※ Dimensions are the same for standard type.

Dual Stroke Cylinder/Single Rod Type

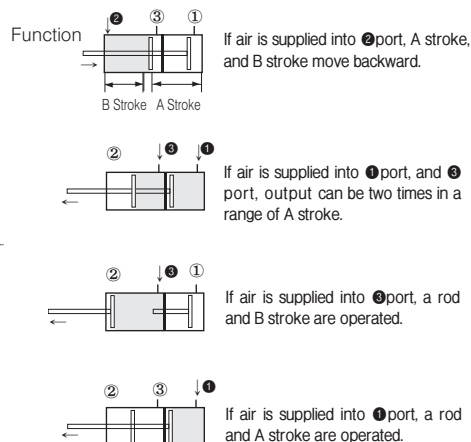
AM (Mounting) (Type) (Bore Size) (Stroke A) (Additional Symbol) + (Stroke B-A) (Additional Symbol) XC11

Two cylinders are unificated into one cylinder in series.
 Cylinder stroke can be controlled not only back and forth, but also 2 steps.
 Also, output can be two times.
 ex) AMB50-50+50-XC11 : S₁=50mm, S₂=100mm

Construction/Dimensions



Symbol



(Unit : mm)

Bore Size(mm)	GC	LG	LT
40	29	168	230
50	33	180	249
63	33	196	268
80	41	232	320
100	41	252	341

- ACP
- APM
- AS
- AX
- AM2
- AM**
- AL
- ALX
- AQ
- ADQ
- AQ2
- ADQ2
- AJ
- AJM
- ABK
- ACK1
- NSK
- AG
- NGQ
- AGX
- GX
- NP
- ADR
- AMR
- NDM
- ARD
- NST
- AST
- ASTH
- NLCD
- NLCS

Order Made Option

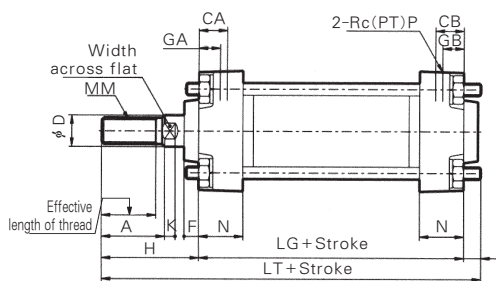
Over Sized Rod

AM (Mounting Type) (Bore size) (Stroke) (Suffix) XB5

The Piston Rod for the cylinder has larger diameter and increased intensity. In addition the stroke is long and this cylinder can be used in the cases of existing applications for bent Piston Rods.

Type	Lube, Non-lube				
Bore size(mm)	φ 40	φ 50	φ 63	φ 80	φ 100
Piston rod diameter(mm)	φ 20	φ 25	φ 25	φ 30	φ 36

Construction/Dimensions



(mm)

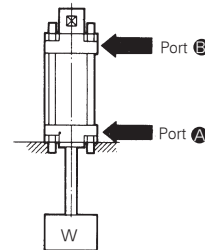
Bore size(mm)	A	φ D	K	MM	P	H	LT
40	35	20	7	M18×1.5	1/4	58	153
50	40	25	11	M22×1.5	3/8	71	172
63	40	25	11	M22×1.5	3/8	71	183
80	40	30	11	M26×1.5	1/2	72	205
100	50	36	15	M30×1.5	1/2	85	228

※ Other dimensions are the same for Series AM standard type.

End Lock Cylinder

AM (Mounting Type) (Bore size) (Stroke) (Suffix) X105

※ If you want lubrication types, inquire with us

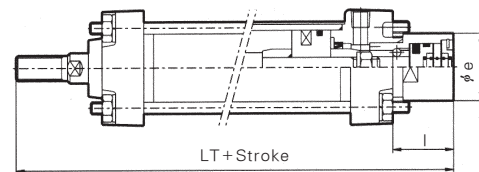


When the port B is the status of evacuation, the lock will be unlocked automatically if the piston rod reach the end of the head side stroke. Moreover the lock will be unlocked automatically if the air goes into the port B.

Specifications

Type	Lube, Non-lube
Bore size	φ 40, φ 50, φ 63, φ 80, φ 100
Cushion	Air Cushion
Action	Double Acting
Retaining force	φ 40:20kgf, φ 50~φ 100:150kgf
Lock start pressure	0.05MPa(7psi)
Lock release pressure	0.2MPa(28psi)
Mounting	Basic, Foot, Flange, Center trunnion

Construction/Dimensions



(mm)

Bore size	φ e	l	LT
φ 40	34	31	166.0
φ 50	48	47.5	195.5
φ 63	48	47.5	203.5
φ 80	50	47.0	234.0
φ 100	50	49.0	247.0

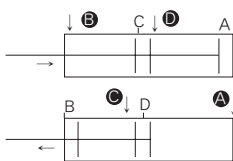
Order Made Option

Tandem Type Air Cylinder

AM (Mounting) Type Bore size Stroke Suffix XC12

This cylinder is produced with two air cylinders in line allowing double the output force.

Symbol



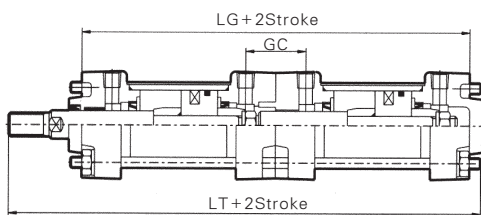
When air pressure is supplied to ports B and D, the output force is doubled in the return stroke.

When air pressure is supplied to ports A and C, the output force is doubled in the extend stroke.

Specifications

Type	Lube, Non-lube
Bore size	φ 40, φ 50, φ 63, φ 80, φ 100
Max.operating pressure	1.0MPa(140psi)
Min.operating pressure	0.1MPa(14psi)
Cushion	Air cushion(Standard)
Action	Double Acting
Mounting	Basic type, Foot type, Rod side flange type, Head side flange type, Single clevis type, Double clevis type

Construction



Bore size	GC	LG	LT
φ 40	29	169	231
φ 50	33	181	250
φ 63	33	197	269
φ 80	41	233	321
φ 100	41	253	342

(mm)

High Temperature Cylinder

AM (Mounting) N Bore size Stroke Suffix XB6

Can be used at high temperature up to 150°C

Specifications

Type	Non-lube
Bore size	φ 40, φ 50, φ 63, φ 80, φ 100
Ambient and media temperature	-20~+150°C (-4~302°F)
Seal material	FPM

* Auto-switch is not available

Stainless Steel Rod

AM (Mounting) Type Bore size Stroke Suffix XC6

Suffix-Cushion ●
 Blank - Both End Cushion
 R - Rod End Cushion
 H - Rod Head Cushion
 N - Non-Cushion

Stainless steel piston rod is used to protect in harsh or wet environment.
 Auto-switch mounting available

Specifications

Type	Lube, Non-lube, Air-hydro
Bore size	φ 40, φ 50, φ 63, φ 80, φ 100
Piston rod nut material	Stainless steel(SUS 304)

With Coil Scraper

AM (Mounting) Type Bore size Stroke Suffix X104

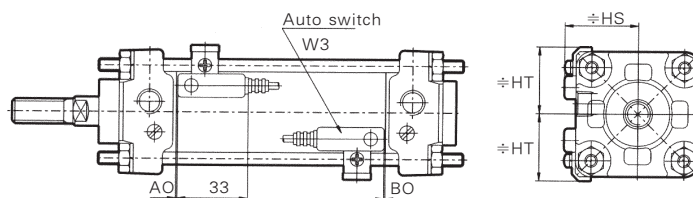
Cushion ●
 Blank - Both End
 R - Rod End
 H - Head End
 N - Without cushion

- ACP
- APM
- AS
- AX
- AM2
- AM**
- AL
ALX
- AQ
ADQ
- AQ2
ADQ2
- AJ
AJM
- ABK
- ACK1
- NSK
- AG
- NGQ
- AGX
GX
- NP
- ADR
- AMR
- NDM
- ARD
- NST
- AST
- ASTH
- NLCD
- NLCS

Series W3

Auto Switch Mounting Position (At stroke End)

W3



Auto s/w model	Auto s/w mounting position	Auto s/w placement dimensions(mm)				
		φ 40	φ 50	φ 63	φ 80	φ 100
W3	AO	0(0)	0(0)	0(2.5)	2(6)	4(7.5)
	BO	1(0)	1(0)	5(1.5)	8(4)	10(6.5)
	HS	40	43.5	49	55.5	63
	HT	31	35	42	50	57.5

※ () in parenthesis are for long stroke, non-lube type and air-hydro type, but long stroke is available only for foot type and front flange type in the series AM

Minimum Auto Switch Mountable Stroke

Minimum auto switch mountable stroke is as follows.

Auto switch model	No. of Auto switch	Mounting bracket except trunnion	Center trunnion			
			φ 40, φ 50	φ 63	φ 80	φ 100
W3	With 2 switch (different, same surface) with 1 switch	15	90	100	110	120
	With n switches (same surface)	$15 + 55 \left(\frac{n-2}{2} \right)$ n=1, 2, 3, 4, ...	$90 + 100 \left(\frac{n-4}{2} \right)$ n=4, 8, 12, 16, ...	$100 + 55 \left(\frac{n-4}{2} \right)$ n=4, 8, 12, 16, ...	$110 + 55 \left(\frac{n-4}{2} \right)$ n=4, 8, 12, 16, ...	$120 + 55 \left(\frac{n-4}{2} \right)$ n=4, 8, 12, 16, ...

Series W3

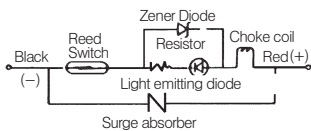


Auto Switch Specifications

Auto Switch Model	W3		
Application	Relay, Sequence Control		
Load Voltage	DC24V	AC100V	AC200V
Max. Load Current / Range of Load Current	5~50mA	5~25mA	5~12.5mA
Protection Circuit Contact Breaker Point	Built-in		
Internal Voltage Drop	2.4V		
Indicator Lamp	ON:Red Light Emitting Diode		

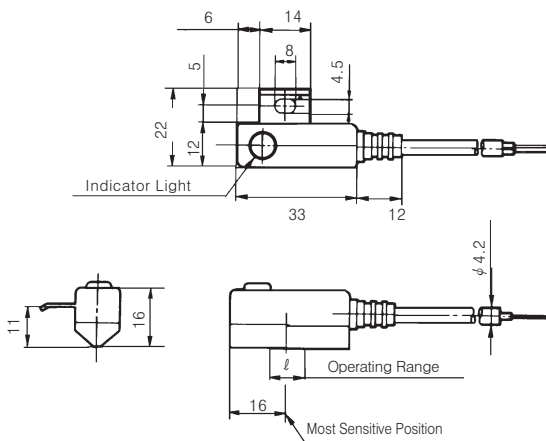
- Leakage current - None
 - Response time - 1.2ms
 - Lead Wire - Oil proof vinyl. ϕ 4, (0.3)mm², 2 wire(red, black), 0.5m
 - Impact Resistance - 30G
 - Insulation Resistance - 50M Ω or more under the test voltage 500VDC (Between case and cable)
 - Withstand Voltage - 1500VAC 1min(between case and cable)
 - Ambient Temperature - -10~60 $^{\circ}$ C
 - Protection Structure - IEC spec IP67, Water-proof(JISCO920), oil-proof.
- ※ If 3m lead wire is required, L is put at end of model numbers.
(Example) W3L

Auto Switch/Internal Circuit



Auto Switch Dimensions

(mm)



Operating Range (ℓ Dimensions)

(mm)

Series	Bore Size(mm)				
	ϕ 40	ϕ 50	ϕ 63	ϕ 80	ϕ 100
AM	9	10	11	11	11

ACP

APM

AS

AX

AM2

AM

AL

ALX

AQ

ADQ

AQ2

ADQ2

AJ

AJM

ABK

ACK1

NSK

AG

NGQ

AGX

GX

NP

ADR

AMR

NDM

ARD

NST

AST

ASTH

NLCD

NLCS