

MCP

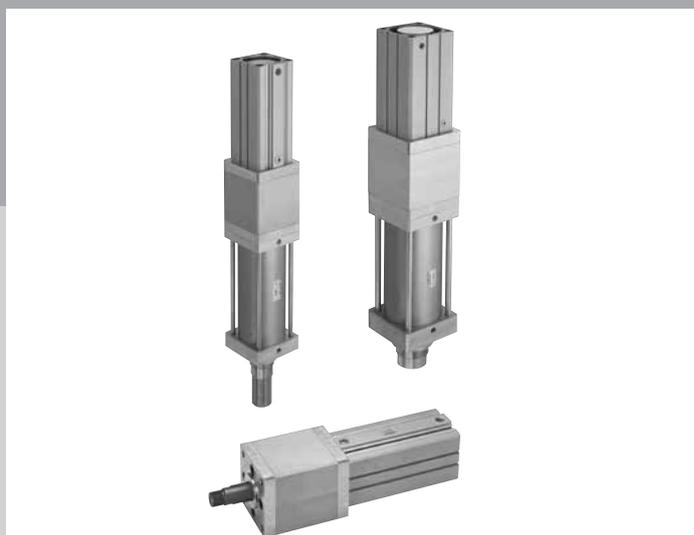
Mechanical power cylinder

Special

Actual thrust : 2t / 5t

Overview

An environmentally-friendly cylinder that allows 2t or 5t high thrust power at your desired position with a pneumatic source alone.



Description

Product introduction	1176
Series variation	1178
● Mechanical power cylinder (MCP)	1180
⚠ Safety precautions	1188

The cylinder switches T2YH, T2YV, T3YH, and T3YV are scheduled for end of production at the end of December 2023.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Realizes high thrust at any position using only a pneumatic source!

Incorporated flexibly into a multi-model production line

Mechanical power cylinder

MCP Series

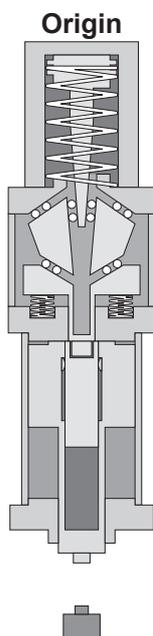
Only pneumatic units are used for driving.

Since no hydraulic devices such as pneumatic units or high-pressure hoses are used with this eco-friendly cylinder, no waste oil is generated.

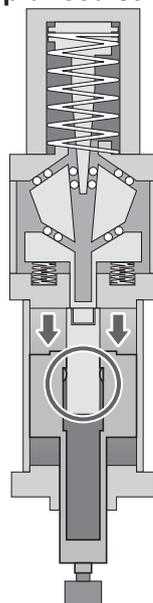
- Thrust eight times higher than a cylinder with the same bore size is achieved during boosting.
- Space saving design needs no dedicated units.
- No oil is used, eliminating the need for maintenance such as lubrication and oil replacement.
- Free installation

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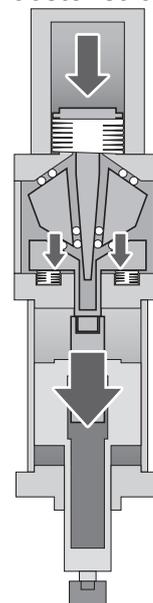
Operation principle



Rapid feed stroke



Booster stroke



When the rapid feed section of cylinder contacts the workpiece, the circled section is coupled due to the internal mechanism.

After coupling, force is conveyed to the rapid feed section by operating the booster section, generating high thrust.

LCM
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USSD
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UB
JSB3
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LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
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Ending

Boost power at an arbitrary position!

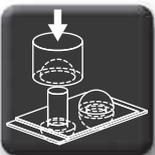
Automatic boosting even if the workpiece height is changed or there are variations in the workpiece.

Booster stroke 10 mm or more is possible!

You can hold down the workpiece at rapid speeds until the required booster stroke, and repeat the pressure and exhaust of the booster stroke unit.

x8

Applications



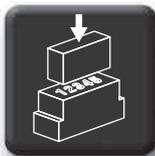
Swaging



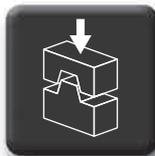
Press-fitting



Punching



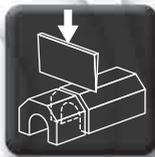
Stamping



Bending



Riveting



Cutting



POWER

Series variation



Mechanical power cylinder MCP Series

- LCM
- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP**
- GLC
- MFC
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
- Hand
- Chuk
- MecHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending

Variation	Model No.	Effective thrust (Thrust at 0.6 MPa)	Stroke (mm)
Rapid feed + booster	MCP-W	For 2t/5t	50/100/150/200/250/300/350/400/450/500
Booster section only	MCP-S	For 2t/5t	10

●: Standard ○:Option

	Min. stroke	Max. stroke	Mounting		Option	Page
			Basic	Rod side flange	Rod end male thread	
	(mm)	(mm)	00	FA	N	1180
	50	500	●	●	○	
	-	-	●	●	○	

- LCM
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SpdContr
Ending



Mechanical power cylinder

MCP Series

● Effective thrust: For 2t/5t



Specifications

1 MPa = 10 bar

Item	Effective thrust (Thrust at 0.6 MPa)		
	2 (for 2t)	5 (for 5t)	
Working fluid	Compressed air		
Actuation	Rapid feed : Double acting, Booster : Single acting push		
Min. working pressure	MPa Rapid feed : 0.3 (≈44 psi, 3 bar), Booster and MCP-S: 0.2 (≈29 psi, 2 bar)		
Max. working pressure	MPa 0.6 (≈87 psi, 6 bar)		
Proof pressure	MPa 1.0 (≈150 psi, 10 bar)		
Ambient temperature	°C -5 (23°F) to 60 (140°F) (no freezing)		
Rod end form	Female thread (male thread optional)		
Booster stroke	mm	10 ⁺⁵ ₀ *1	
Rapid feed port size	Rc1/4	Rc3/8	
Booster port size	Rc3/8		
Rapid feed working piston speed	mm/s	50 to 300	
Booster working piston speed	mm/s	10 to 50	
Lubrication	Not available		
Theoretical booster thrust (when the booster and rapid feed pressures are equal)	0.3 MPa (≈44 psi)	S=11.5 W=13.9	S=28.5 W=33.1
	0.4 MPa (≈58 psi)	S=15.7 W=18.9	S=38.7 W=44.9
	0.5 MPa (≈73 psi)	S=19.9 W=23.8	S=49.0 W=56.7
	0.6 MPa (≈87 psi)	S=24.1 W=28.8	S=59.2 W=68.4
*2	KN		
Theoretical rapid feed thrust	0.3 MPa (≈44 psi)	Forward 2.3, backward 1.6	Forward 4.6, backward 2.9
	0.4 MPa (≈58 psi)	Forward 3.1, backward 2.1	Forward 6.1, backward 3.8
	0.5 MPa (≈73 psi)	Forward 3.9, backward 2.7	Forward 7.6, backward 4.8
	0.6 MPa (≈87 psi)	Forward 4.7, backward 3.2	Forward 9.2, backward 5.8
	KN		

*1 : By repeating pressurizing and exhaust of the booster section only, a 10-mm boost per repeat can be obtained within the total stroke.

*2 : The actual thrust is about 80% of the theoretical value

*3 : Because MCP-S is a single acting cylinder, the applied load (jig weight) on the piston rod end should be 20 kg or less for the 2t and 50 kg or less for the 5t.

Air consumption

Air consumption per reciprocation of booster stroke ℓ (ANR)

Pressure (MPa)	0.3	0.4	0.5	0.6
Thrust				
2t	2.51	3.13	3.76	4.38
5t	6.13	7.65	9.18	10.70

Air consumption per 100 mm reciprocation of rapid feed stroke ℓ (ANR)

Pressure (MPa)	0.3	0.4	0.5	0.6
Thrust				
2t	5.28	6.60	7.91	9.23
5t	9.95	12.43	14.91	17.39

Total stroke *4

Standard stroke (mm)	Max. stroke (mm)	Min. stroke (mm)	Min. stroke with switch (mm)
50,100,150,200,250,300,350, 400,450,500	500	50	50

*4 : For "rapid feed stroke + booster stroke", set the stroke of "+5 mm and over" as total stroke.

Switch specifications (T-switch)

Item	Proximity 2-wire		Proximity 2-wire				Proximity 3-wire				Reed 2-wire					
	T1H/T1V	T2H/T2V/ T2JH/T2JV	T2YH/ T2YV	T2WH/ T2WV	T3H/ T3V	T3PH/ T3PV	T3YH/ T3YV	T3WH/ T3WV	T0H/T0V	T5H/T5V		T8H/T8V				
Applications	For programmable controller, relay, compact solenoid valve	Dedicated for programmable controller			For programmable controller, relay				For programmable controller, relay	For programmable controller, relay, IC circuit (no indicator lamp), serial connection		For programmable controller, relay				
Output method	-			NPN output	PNP output	NPN output	NPN output	-								
Pwr. supp. V.	-			10 to 28 VDC				-								
Load voltage	85 to 265 VAC	10 to 30 VDC		24 VDC ±10%	30 VDC or less				12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	12/24 VDC	110 VAC	220 VAC	
Load current	5 to 100 mA	5 to 20 mA (*3)			100 mA or less		50 mA or less		5 to 50 mA	7 to 20 mA	50 mA or less	20 mA or less	5 to 50 mA	7 to 20 mA	7 to 10 mA	
Indicator	LED (Lit when ON)	LED (Lit when ON)	Red/green LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)	Yellow LED (Lit when ON)	Red/green LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)		No indicator lamp		LED (Lit when ON)			
Leakage current	≤ 1 mA at 100 VAC, ≤ 2 mA at 200 VAC	1 mA or less			10 µA or less				0 mA							
Weight g	1 m:33	1 m:18	1 m:33	1 m:18	1 m:18		1 m:33	1 m:18	1 m:18		1 m:33		1 m:33			
	3 m:87	3 m:49	3 m:87	3 m:49	3 m:49		3 m:87	3 m:49	3 m:49		3 m:87		3 m:87			
	5 m:142	5 m:80	5 m:142	5 m:80	5 m:80		5 m:142	5 m:80	5 m:80		5 m:142		5 m:142			

*1 : Refer to Ending Page 1 for detailed switch specifications and dimensions.

*2 : Switches other than the above models, such as switches with connectors, are also available. Refer to Ending Page 1.

*3 : The max. load current is 20 mA at 25°C. The current is lower than 20 mA if the operating ambient temperature around the switch is higher than 25°C. (5 to 10 mA at 60°C)

Cylinder weight

● MCP-S (booster only)

Unit: kg

Item	Product weight for 10st stroke		Additional weight per 100 mm	Additional weight for male thread (N)	Switch weight
	Basic (00)	Rod side flange (FA)			
MCP-S-2-10	14.3	16.9	-	0.4	Refer to the weight in the switch specifications.
MCP-S-5-10	36.1	43.4	-	1.2	

● MCP-W (rapid feed + booster)

Unit: kg

Item	Product weight when at 0 mm stroke		Additional weight per 100 mm	Additional weight for male thread (N)	Switch weight	Mounting bracket weight
	Basic (00)	Rod side flange (FA)				
MCP-W-2	24.3	26.9	1.9	0.95	Refer to the weight in the switch specifications.	0.024
MCP-W-5	63.8	71.1	4.5	4.6		0.030

(Example) Product weight of MCP-W-00-2-100-T2H-D-N

- Product weight at 0 mm stroke24.3 kg
- Additional weight per 100 mm stroke1.9 x $\frac{100}{100}$ = 1.9 kg
- Male thread additional weight0.92 kg
- Weight of 2 T2H switches0.018 x 2 = 0.036 kg
- Weight of 2 mounting brackets0.024 x 2 = 0.048 kg
- Product weight24.3 + 1.9 + 0.92 + 0.036 + 0.048 = 27.204 kg

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Ending

How to order

Without switch (built-in magnet for switch)

MCP-W-00-2-100-N

With switch (built-in magnet for switch)

MCP-W-00-2-100-T2H-R-N

A Model No.

B Mounting
*1

C Effective thrust

D Total stroke
*2

E Switch model No.

* indicates the lead wire length.

⚠ Precautions for model No. selection

*1: Mounting bracket will be shipped assembled with the product.

*2: For MCP-S, it will be stroke = booster stroke = 10 mm fixed.
D Total stroke cannot be selected.

*3: A piston magnet is also built into the MCP-W booster, so a switch can be mounted. Purchase the switch body separately.

[Example of model No. 1]

MCP-W-00-2-100-T2H-D-N

Model : Mechanical Power Cylinder (MCP) Series

A Model No. : Rapid feed + booster

B Mounting : Basic

C Effective thrust : For 2t

D Total stroke : 100 mm

E Switch model No. : Proximity T2H switch, lead wire 1 m

F Switch quantity : 2

G Option : Rod end male thread

[Example of model No. 2]

MCP-S-00-2-T2H-D-N

Model: Mechanical Power Cylinder (MCP) Series

A Model No. : Booster section only

B Mounting : Basic

C Effective thrust : For 2t

E Switch model No. : Proximity T2H switch, lead wire 1 m

F Switch quantity : 2

G Option : Rod end male thread

How to order switch

● Switch body + mounting bracket set

MCP-T0H-2

Effective thrust
(Item **C** above)

Switch model No.
(Item **D** above)

● Switch body only

SW-T0H

Switch model No.
(Item **D** above)

● Switch mounting bracket set

MCP-T-2

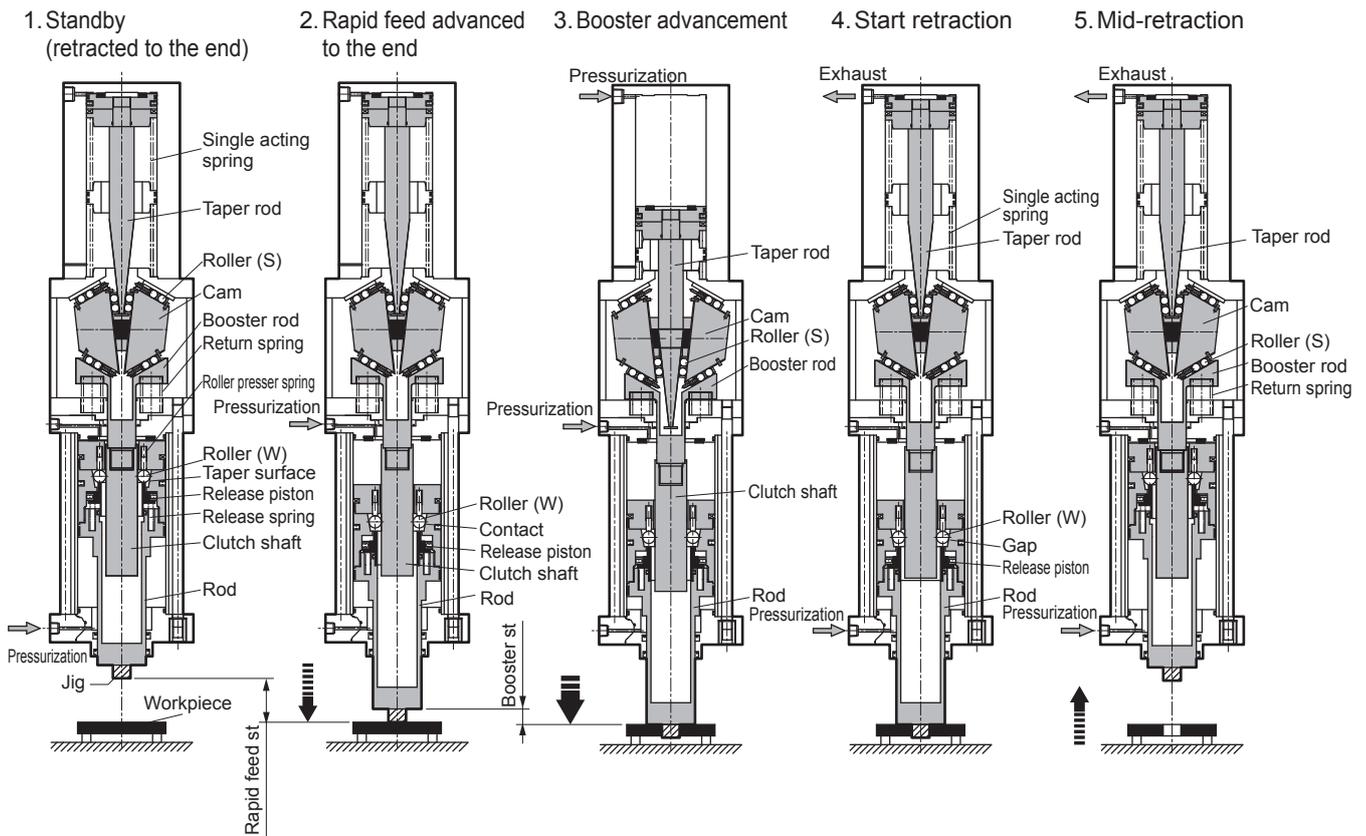
Effective thrust
(Item **C** above)

Mounting bracket

Note : A switch bracket is not required for MCP-S.

Code	Description					
A Model No.						
MCP-W	Rapid feed + booster					
MCP-S	Booster section only					
B Mounting						
00	Basic					
FA	Rod side flange					
C Effective thrust						
2	For 2t					
5	For 5t					
D Total stroke (mm)						
50, 100, 150, 200, 250, 300, 350, 400, 450, 500						
E Switch model No.						
Straight Lead wire	L-shaped Lead wire	Contact	Voltage		Indicator	Lead wire
			AC	DC		
T0H*	T0V*	Reed	●	●	1-color LED	2-wire
T5H*	T5V*		●	●	No indicator lamp	
T8H*	T8V*		●	●	1-color LED	
T1H*	T1V*	Proximity	●	●	1-color LED	2-wire
T2H*	T2V*		●	●		
T3H*	T3V*		●	●	1-color LED	3-wire
T3PH*	T3PV*		●	●		
T2YH*	T2YV*		●	●	2-color LED	2-wire
T2WH*	T2WV*		●	●		
T3YH*	T3YV*	●	●	2-color LED	3-wire	
T3WH*	T3WV*	●	●			
T2JH*	T2JV*	●	●	Off-delay	2-wire	
* Lead wire length						
Blank	1 m (standard)					
3	3 m (option)					
5	5 m (option)					
F Switch quantity						
R	1 on rod side					
H	1 on head side					
D	2					
T	3					
G Option						
Blank	Rod end female thread					
N	Rod end male thread					

Operational principle



The release spring creates a gap between the taper surface and 6 rollers (W), allowing the rapid feed head side to pressurize, advancing the rod. Advancing to strike the workpiece and then discharging causes the release piston to be pressed, contracting the release spring, which causes the rollers (W) to contact the clutch shaft and taper surface.

Pressurizing the booster head side provides the force to advance the taper rod which widens due to the wedge effect, spreading the cam out via the roller (S), in turn boosting the clutch shaft integrated into the boost rod vertically. The rod is linked with the clutch shaft through the wedge effect, boosting its effect to punch out the workpiece.

Exhausting the booster pressure causes the taper rod to push back via the single acting spring. Next, pressurizing the rapid feed rod side pushes the release piston back in, creating a gap between the rollers (W) and taper surface, releasing the connection and causing the rod to retract.

Pushing the taper rod back causes the booster rod to return via the return spring, returning the cam to its original position via roller (S).

By repeating pressurizing and exhaust of the booster section only, a 10-mm boost per repeat can be obtained within the total stroke.

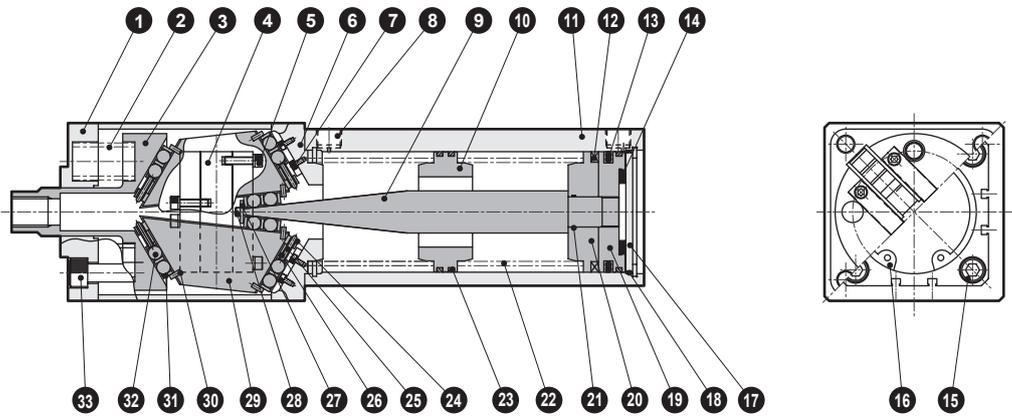
CAUTION

Set the total stroke with some margin over the sum of the rapid feed stroke and booster stroke. Refer to the precautions on page 1189 for details about total stroke settings.

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Internal structure and parts list

● MCP-S (booster only)



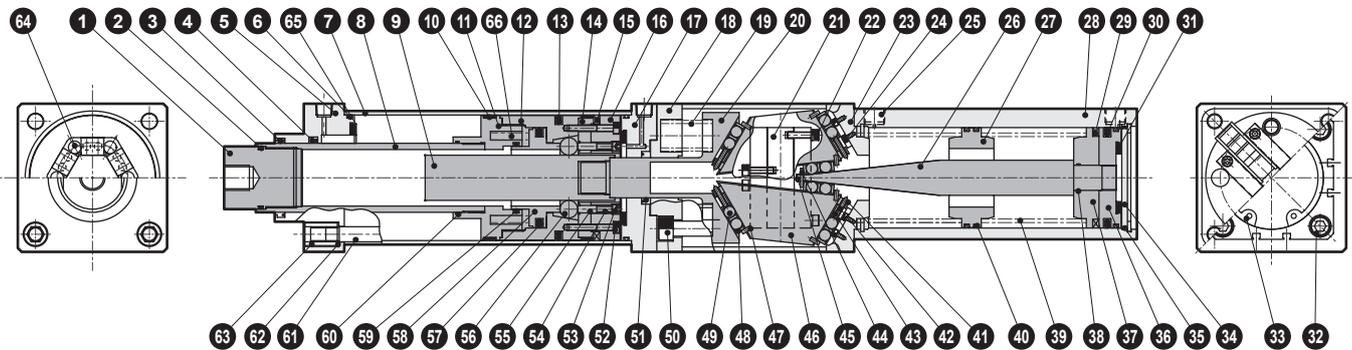
Cannot be disassembled

No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Rod cover (S)	Cast iron	Trivalent chromate	18	Gasket	Nitrile rubber	
2	Return spring	Steel	Black finish	19	Piston	Aluminum alloy	Alumite treatment
3	Booster rod	Alloy steel	Electroless nickel plating	20	Spacer	Aluminum alloy	Alumite treatment
4	Slide bar	Steel		21	Gasket	Nitrile rubber	
5	Hexagon socket head cap screw	Alloy steel	Black finish	22	Single acting spring	Steel	Black finish
6	Intermediate cover	Steel	Trivalent chromate	23	Wear ring (S)	Polyacetal resin	
7	Hexagon socket head cap screw	Alloy steel	Black finish	24	Spring holder	Steel	Trivalent chromate
8	Plug silencer	Steel + sintered alloy	Zinc plated	25	Spring holder pin	Stainless steel	
9	Taper rod	Alloy steel		26	Retainer spring	Steel	Black finish
10	Single acting spring holder	Steel	Trivalent chromate	27	Front plate	Steel	Trivalent chromate
11	Booster cylinder tube	Aluminum alloy	Hard alumite	28	Hexagon socket head cap screw	Alloy steel	Black finish
12	Magnet (S)	Plastic		29	Cam	Alloy steel	
13	Piston packing (S)	Nitrile rubber		30	Pin	Steel	
14	Cushion rubber	Urethane rubber		31	Retainer	Steel	Trivalent chromate
15	Hexagon socket head cap screw	Alloy steel	Black finish	32	Roller (S)	Alloy steel	
16	C-snap ring (for hole)	Steel	Black finish	33	Hexagon socket head cap screw	Alloy steel	Black finish
17	Cover	Aluminum alloy					

Note : This product cannot be disassembled.

Internal structure and parts list

● MCP-W (rapid feed + booster)



Cannot be disassembled

No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Plug	Steel	Trivalent chromate	34	Gasket	Nitrile rubber	
2	Gasket	Nitrile rubber		35	Cover	Aluminum alloy	
3	Dust wiper	Nitrile rubber		36	Piston	Aluminum alloy	Alumite treatment
4	Rod packing (W)	Nitrile rubber		37	Spacer	Aluminum alloy	Alumite treatment
5	Rod cover (W)	Cast iron	Trivalent chromate	38	Gasket	Nitrile rubber	
6	Gasket	Nitrile rubber		39	Single acting spring	Steel	Black finish
7	Moving cylinder tube	Aluminum alloy	Alumite treatment	40	Wear ring (S)	Polyacetal resin	
8	Piston rod	Steel	Hard chrome plating	41	Spring holder	Steel	Trivalent chromate
9	Clutch shaft	Steel		42	Spring holder pin	Stainless steel	
10	Wear ring (W)	Fiber-reinforced phenolic resin		43	Retainer spring	Steel	Black finish
11	Connection piston B	Steel	Trivalent chromate	44	Front plate	Steel	Trivalent chromate
12	Connection piston A	Alloy steel		45	Hexagon socket head cap screw	Alloy steel	Black finish
13	Piston packing (W)	Nitrile rubber		46	Cam	Alloy steel	
14	Magnet spacer A	Stainless steel		47	Pin	Steel	
15	Magnet (W)	Plastic		48	Retainer	Steel	Trivalent chromate
16	Magnet spacer B	Aluminum alloy	Alumite treatment	49	Roller (S)	Alloy steel	
17	Head cover (W)	Aluminum alloy	Alumite treatment	50	Hexagon socket head cap screw	Alloy steel	Black finish
18	Rod cover (S)	Cast iron	Trivalent chromate	51	Rod packing (S)	Nitrile rubber	
19	Return spring	Steel	Black finish	52	Hexagon socket head cap screw	Stainless steel	
20	Booster rod	Alloy steel		53	Hexagon socket set screw	Alloy steel	Black finish
21	Slide bar	Steel		54	Roller presser spring	Steel	Black finish
22	Hexagon socket head cap screw	Alloy steel	Black finish	55	Roller presser	Alloy steel	
23	Intermediate cover	Steel	Trivalent chromate	56	Roller (W)	Alloy steel	
24	Hexagon socket head cap screw	Alloy steel	Black finish	57	Release piston packing	Nitrile rubber	
25	Plug silencer	Steel + sintered alloy	Zinc plated	58	Release piston	Steel	Trivalent chromate
26	Taper rod	Alloy steel		59	Gasket	Nitrile rubber	
27	Single acting spring holder	Steel	Trivalent chromate	60	Gasket	Nitrile rubber	
28	Booster cylinder tube	Aluminum alloy	Hard alumite	61	Tie rod	Steel	Trivalent chromate
29	Magnet (S)	Plastic		62	Conical spring washer	Steel	Black finish
30	Piston packing (S)	Nitrile rubber		63	Round nut	Steel	Trivalent chromate
31	Cushion rubber (S)	Urethane rubber		64	Guide rubber	Urethane rubber	
32	Hexagon socket head cap screw	Alloy steel	Black finish	65	Cushion rubber (W)	Urethane rubber	
33	C-snap ring (for hole)	Steel	Black finish	66	Release spring	Steel	Black finish

Note : This product cannot be disassembled.

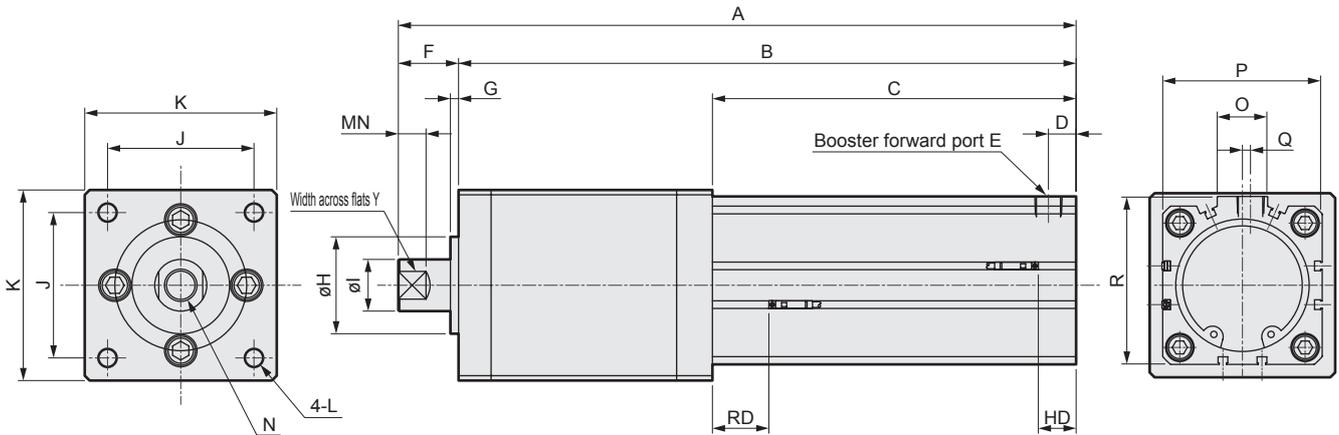
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr

Ending

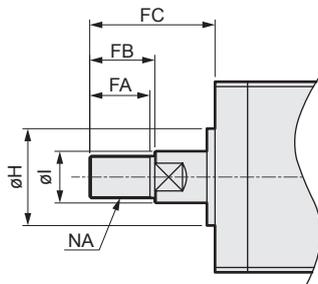


Dimensions (MCP-S)

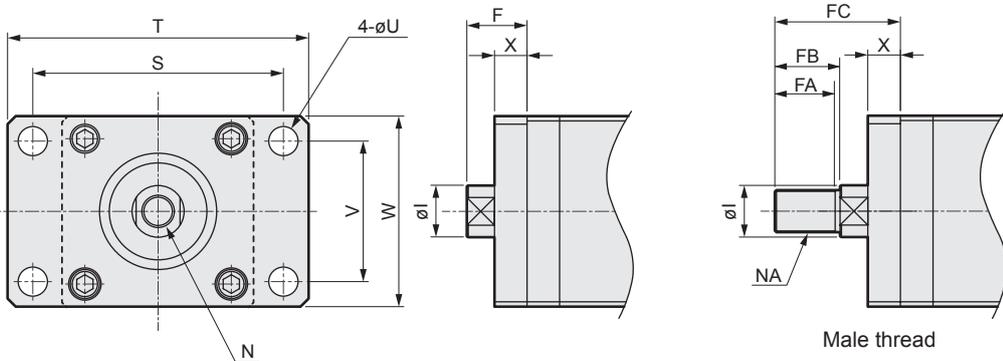
● Basic (00)



● Rod end male thread (N)



● Rod side flange (FA)



Code	Basic dimensions											
Thrust	A	B	C	D	E	F	G	H	I	J	K	L
2 (for 2t)	416.5	379.5	223.5	17	Rc3/8	37	5	60	32	90	118	M12 depth 20
5 (for 5t)	501	447	252	23.5	Rc3/8	54	12	100	45	128	167	M16 depth 25

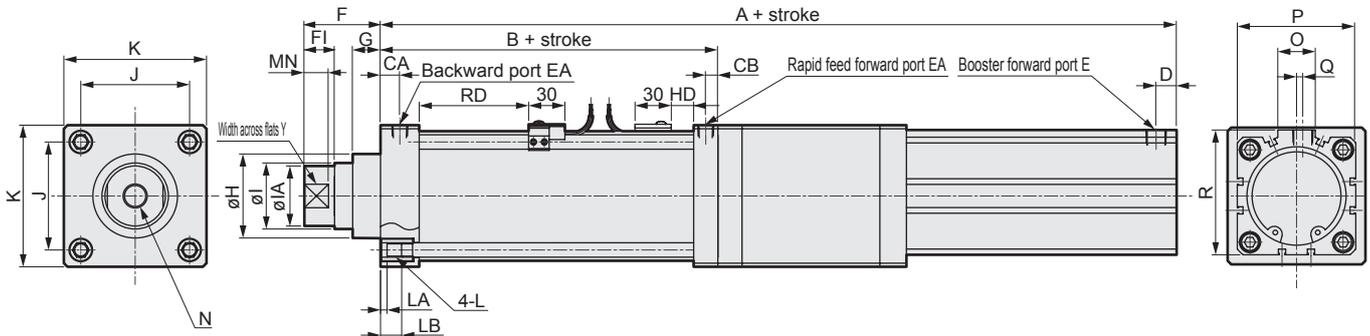
Code	Basic dimensions						
Thrust	MN	N	O	P	Q	R	Y
2 (for 2t)	17	M20 depth 24	31	98	-	104	27
5 (for 5t)	24	M30 depth 36	-	142	36	142	41

Code	Rod side flange (FA)						Rod end male thread (N)				With switch							
	S	T	U	V	W	X	FA	FB	FC	NA	T0, T5, T2, T3		T1, T2Y, T3Y, T2J		T2W, T3W		T8	
											RD	HD	RD	HD	RD	HD	RD	HD
2 (for 2t)	154	185	18	87	118	20	37	40	77	M26x1.5	55.5	23	54.5	22	57.5	25	49.5	17
5 (for 5t)	208	250	22	126	171	30	60	63	117	M40x1.5	80.5	26	80	25	83	28	74.5	20

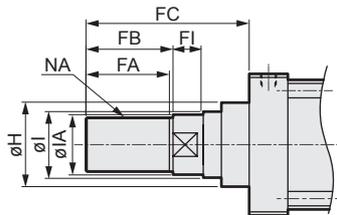
Dimensions (MCP-W)



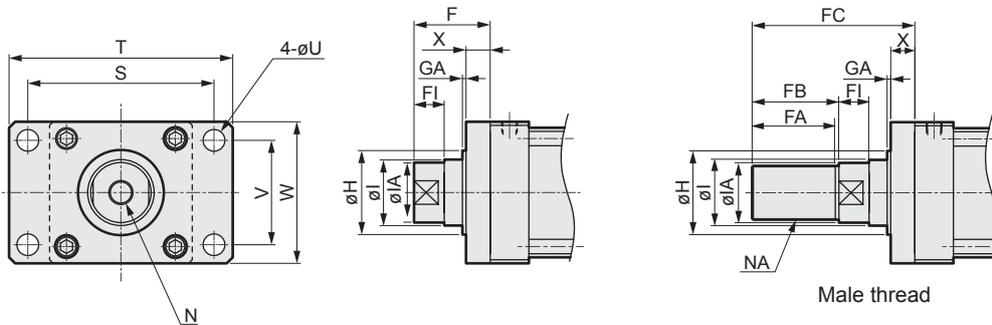
● Basic (00)



● Rod end male thread (N)



● Rod side flange (FA)



LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Code	Basic dimensions																
Thrust	A	B	CA	CB	D	E	EA	F	FI	G	H	I	IA	J	K	L	LA
2 (for 2t)	559.5	180	16	10	17	Rc3/8	Rc1/4	63	25	23	70	55	50	90	118	M12	(5.4)
5 (for 5t)	692	245	24	15	23.5	Rc3/8	Rc3/8	73	30	33	110	85	80	128	167	M16	(6.5)

Code	Basic dimensions							
Thrust	LB	MN	N	O	P	Q	R	Y
2 (for 2t)	16	20	M20 depth 24	31	98	-	104	46
5 (for 5t)	25	25	M30 depth 36	-	142	36	142	75

Code	Rod side flange (FA)						Rod end male thread (N)				With switch								
	S	T	U	V	W	GA	X	FA	FB	FC	NA	T0, T5, T2, T3		T1, T2Y, T3Y, T2J		T2W, T3W		T8	
												RD	HD	RD	HD	RD	HD	RD	HD
2 (for 2t)	154	185	18	87	118	3	20	69	72	135	M45x1.5	105	18	104	17	107	20	99	12
5 (for 5t)	208	250	22	126	171	3	30	135	140	213	M72x2.0	140	21.5	139	21	142	24	134	16

*1 : Rapid feed section RD dimension is 15 mm short of the rod side stroke end. (Refer to page 1189.)

*2 : For RD/HD booster dimensions, refer to page 1186 (MCP-S outline drawing).



Safety Precautions

Be sure to read this section before use.

Refer to Intro Page 73 for general information of the cylinder, and to Intro Page 80 for general information of the cylinder switch.

Product-specific cautions: Mechanical Power Cylinder MCP Series

Design/selection

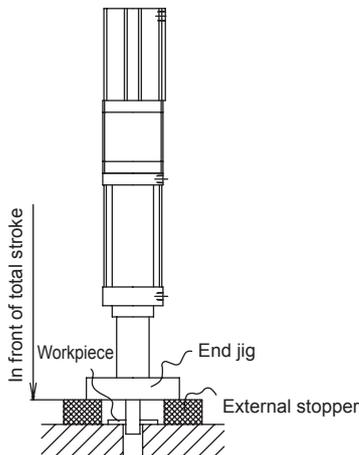
⚠ DANGER

- Before starting, be sure to supply air to the travel section's retract side to apply back pressure. The piston rod may pop out, which is extremely dangerous.

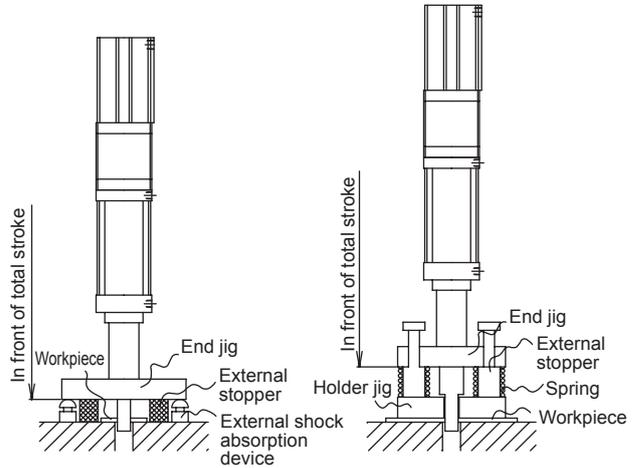
⚠ CAUTION

- If an external force in the direction of cylinder retraction is applied to the piston rod when the cylinder retracts after the boost, operate within the following value limits (maximum) to prevent the risk of coupling release failure or booster failure.
 - MCP-W-2: 1000N or less
 - MCP-W-5: 3000N or less

- When using the product for punching out or cutting workpieces, the piston rod may pop out. When the piston rod pops out, it can contact the rod cover (W) for the rapid feed section cylinder and cause impact sound or damage to the cylinder from the impact. Always use an external stopper or shock absorber within the total stroke.



- Do not apply lateral load or eccentric load to the piston rod. If the cylinder is operating in a direction other than the vertical direction, the tip load will be applied to the cylinder. In this case, use a guide that prevents the load from being applied to the cylinder.
- Use the cylinder in a mechanism in which the piston rod does not rotate so that no torque is applied to the rod. Otherwise, there is a risk of coupling release failure or booster failure.
- Do not use multiple synchronized cylinders.



If external force is applied in the direction of the cylinder retraction due to the spring or external shock buffer when the cylinder retracts, the external force should be within the following values:

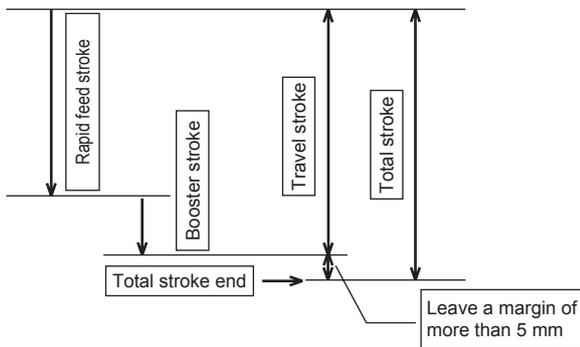
- MCP-W-2: 1000N or less
- MCP-W-5: 3000N or less

- After boosting, provide a time lag of 0.5 seconds or more between booster section retraction and rapid feed section retraction. If the rapid feed section retracts before the booster, the cylinder could be damaged if the booster pops out when the coupling is released. Also, do not use the booster while in the meter-out position. The cylinder could be damaged if the booster pops out when the coupling is released.
- Use discrete solenoid valves for booster and rapid feed sections. When using embedded into a manifold, be sure to take countermeasures such as using a single exhaust spacer.
- Do not advance the booster at the same time that the rapid feed section reaches the end of its travel. Coupling faults could result. Provide a time lag of one second or longer from after the rapid feed section moves forward and contacts the workpiece to when the booster section starts traveling.
- Using the product near a welder, etc., can magnetize the product, which may cause the cylinder switch to malfunction. Avoid use in an environment that may have magnetic fields.
- Because MCP-S is a single acting cylinder, the applied load (jig weight) on the piston rod end should be 20 kg or less for the 2t and 50 kg or less for the 5t.

- LCM
- LCR
- LCC
- LCW
- LCC
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP**
- GLC
- MFC
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
- Hand
- Chuk
- MechHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending

- When using the booster stroke, the total stroke should be well within the stroke end.

(1) If there is no external stopper
(When using the booster stroke up to the full stroke)



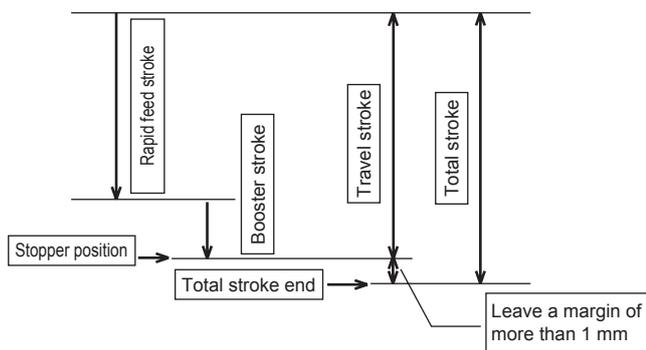
Set the total stroke so that it is greater than the sum of the travel stroke and 5 mm.

However, the travel stroke is equal to the sum of the rapid feed stroke and the booster stroke.

Applications

· Press-fitting, bending (pressing), etc.

(2) If there is an external stopper
(When not using the booster stroke up to the full stroke)



Set the external stopper so that the total stroke is greater than the sum of travel stroke and 1 mm.

However, the travel stroke is equal to the sum of the rapid feed stroke and the pressing length.

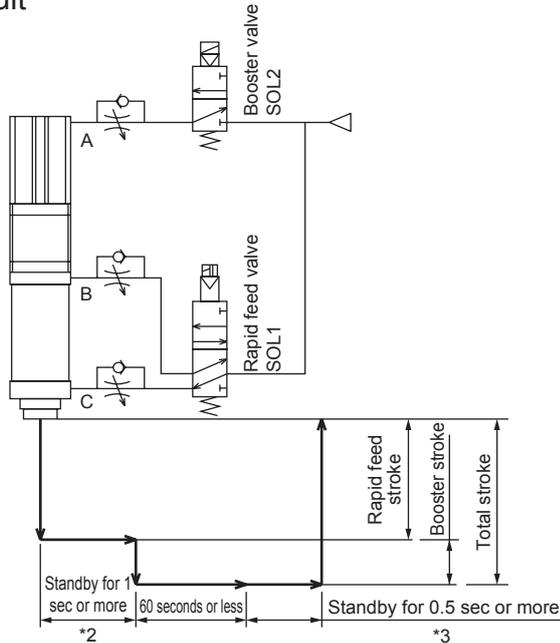
Applications

· Punching, cutting, etc.

- The retraction end of the booster section can be detected by installing a cylinder switch on the booster section.
To install a cylinder switch, purchase only the switch body.
- In the state where the booster section has not been allowed to completely return, if the booster is made to move forward repeatedly, damage to the booster section cylinder could result. In the case where the cycle time is short, use the cylinder switch to detect if the booster section cylinder is moving back to the end of the stroke.
- Because there is a possibility of a failed release of connection or a run-out of the piston rod, do not use the quick exhaust valve on the head side of the rapid feed section.
- MCP-W cannot be held in the booster state for a long period of time. Retract within roughly 60 seconds after boosting has commenced.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Circuit



Operation status	Solenoid valve	Travel stroke	Booster stroke
		SOL1	SOL2
Rapid feed advancement		ON	OFF
Rapid feed stroke end		ON	OFF
Standby for 1 sec or more *2		ON	OFF
Booster advancement		ON	ON
Booster retraction *1		ON	OFF
Standby for 0.5 sec or more *3		ON	OFF
Rapid feed return		OFF	OFF

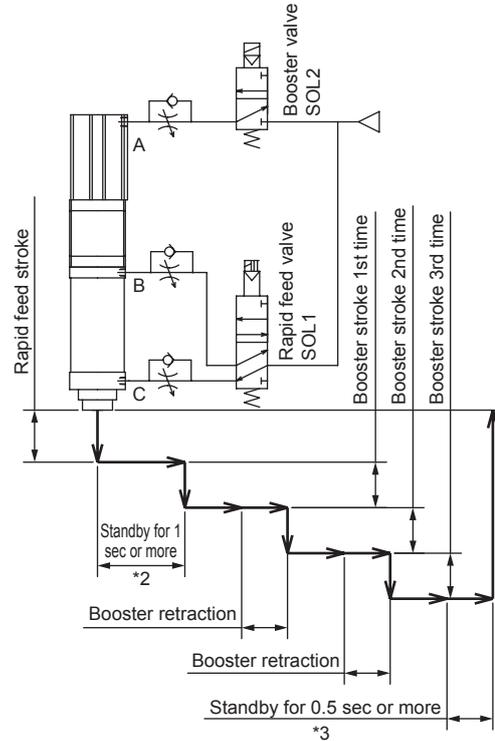
- *1 : Piston rod cannot be retracted while the booster section is returning.
- *2 : Time required for the air to be exhausted from the rapid feed rod side and the rapid feed and booster sections to connect.
- *3 : Time required for the air to be exhausted from the booster head side and the rapid feed and booster sections to release.

- Due to the time required to couple the rapid feed section and booster section, a 1-second wait is necessary before the booster cylinder starts to advance from the rapid feed stroke end (after the rapid feed cylinder advances and stops). If the exhaust from the rapid feed rod side is restricted as in the following cases, the wait may have to be longer than 1 second. Set the standby time with a margin of safety.
 - When the solenoid valve flow volume is minimal
 - When speed controller at rod side of the rapid feed cylinder is restricting flow (Fig. C above)
 - When the piping for the rapid feed section is long
 - When the piping diameter for the rapid feed section is narrow

- Because the booster section is retracted before the rapid feed section, a 0.3 to 0.5-second wait is necessary from the start of booster cylinder retraction to the start of rapid feed cylinder retraction. If the exhaust from the booster section is restricted as in the following cases, the wait may have to be longer than 0.5 seconds. Set the standby time with a margin of safety.
 - When the solenoid valve flow volume is minimal
 - When the piping for the booster section is long
 - When the piping diameter for the booster section is narrow

- By repeating pressurizing and exhaust of only the booster section after rapid feed, a 10 mm boost can be obtained per repeat. (Repeat boosting 3 times when 30 mm boosting is required)

[Circuit example when press-fitting 30 mm]

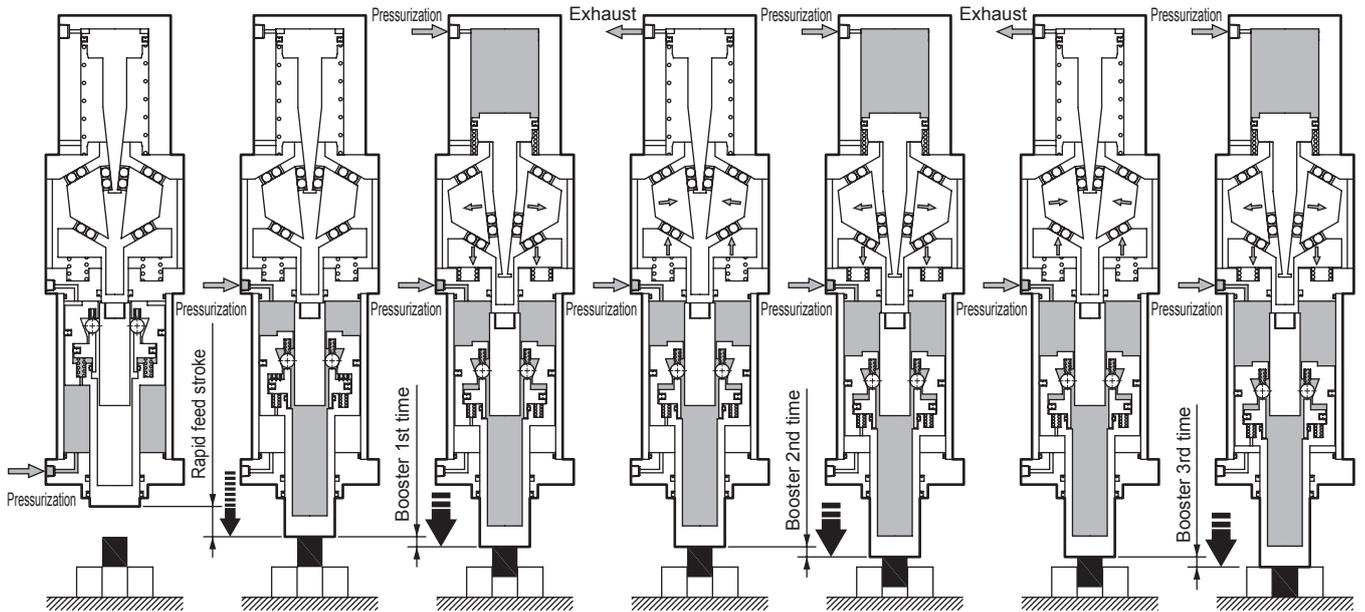


Operation status	Solenoid valve	Rapid feed stroke	Booster stroke
		SOL1	SOL2
Rapid feed advancement		ON	OFF
Rapid feed stroke end		ON	OFF
Standby for 1 sec or more *2		ON	OFF
Booster advancement 1st time		ON	ON
Booster retraction *1		ON	OFF
Booster advancement 2nd time		ON	ON
Booster retraction *1		ON	OFF
Booster advancement 3rd time		ON	ON
Booster retraction *1		ON	OFF
Standby for 0.5 sec or more *3		ON	OFF
Rapid feed return		OFF	OFF

- *1 : Piston rod cannot be retracted while the booster section is returning.
- *2 : Time required for the air to be exhausted from the rapid feed rod side and the rapid feed and booster sections to connect.
- *3 : Time required for the air to be exhausted from the booster head side and the rapid feed and booster sections to release.

[Operation diagram when press-fitting 30 mm]

1. Standby (retracted to the end)
2. Rapid feed advanced to the end
3. Booster advancement (1st time)
4. Booster retraction
5. Booster advancement (2nd time)
6. Booster retraction
7. Booster advancement (3rd time)



LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Mounting, installation and adjustment

⚠ CAUTION

- Do not disassemble the product.
- Do not lubricate the cylinder, as this may cause malfunction.
- While the mounting direction is unrestricted, if the cylinder is operating in a direction other than the vertical direction, the end load will be applied to the cylinder. In this case, use a guide that prevents the load from being applied to the cylinder.

- Tighten so that torque is not applied to the cylinder. When fixing the workpiece to the end of the piston rod, use a wrench to tighten for mounting.

