

OPERATION MANUAL

PRODUCT NAME: 180° OPENING GRIPPER

MODEL : M H Y 2 - 1 0 D

M H Y 2 - 1 6 D

M H Y 2 - 2 0 D

M H Y 2 - 2 5 D

- Read this operation manual carefully to understand before installation and operation.
- Pay extra attention on the clause concerning the safety.
- Keep this operation manual available whenever necessary.

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Notes to users

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by label of “Caution”, “Warning”, or “Danger”. To ensure safety, be sure to observe ISO 4414^{Note 1)}, JIS B 8370^{Note 2)} and other safety practices.

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|  Caution : Operator error could result in injury or equipment damage. |
|  Warning : Operator error could result in serious injury or loss of life. |
|  Danger : In extreme conditions, there is a possible result of serious injury or loss of life. |

(Note – 1) ISO 4414 : Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems.

(Note – 2) JIS B 8370 : Pneumatic systems axiom.

WARNING

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| <p>① <u>The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.</u></p> <p>Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analyses and/or tests to meet your specific requirements.</p> <p>② <u>Only trained personnel should operate pneumatically operated machinery and equipment.</u></p> <p>Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.</p> <p>③ <u>Do not service machinery/equipment or attempt to remove component until safety is confirmed.</u></p> <ol style="list-style-type: none">1. Inspection and maintenance of machinery / equipment should only be performed after confirmation of safe locked – out control positions.2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system. |
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compressed air in the system.

3. Before machinery/equipment is re-started, take measures to prevent shooting out of cylinder piston rod etc. (Bleed air into the system gradually to create back-pressure.)

④ Contact SMC if the product is to be used in any of the following conditions :

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

1. Specifications

Specifications

Model		MHY2-10D	MHY2-16D	MHY2-20D	MHY2-25D
Bore size (mm)		10	16	20	25
Fluid		Air			
Operating pressure		0. 1~0. 6MPa			
Ambient and fluid temperature		-10~60°C			
Repeatability		±0. 2mm			
Max. operating frequency		60 c. p. m.			
Lubrication		Not required			
Action		Double acting			
Effective holding force N · m At pressure 0. 5MPa		0. 16	0. 54	1. 10	2.28
Opening angle (Both sides)	Opening side	180°			
	Closing side	-3°			
Note 1) Weight (g)		70	150	320	560

Note 1) Not including auto switch.

2. Operation Guide for Air Gripper.

2-1 Precautions on design

⚠ Warning

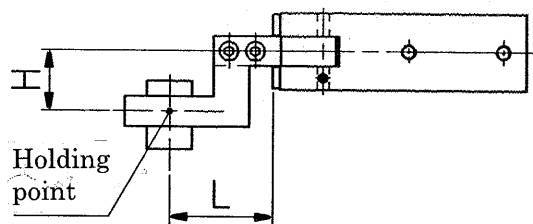
1. A protective cover is recommended to minimize the risk of personal injury due to accidental contact with moving parts of the gripper.
2. Measures should be taken to protect against unexpected drop of work due to loss of air pressure.
3. Contact SMC for other applications than work transfer. (i.e. Positioning, crimping)

2-2 Selection

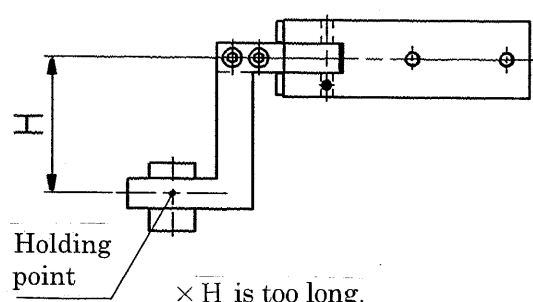
⚠ Warning

1. Keep the holding point within the specified range of the holding distance.

When the holding point distance becomes large, the finger attachment applies an excessively large load to the cross roller section, causing excessive play of the fingers and possibly leading to premature failure. Refer to catalog for details.

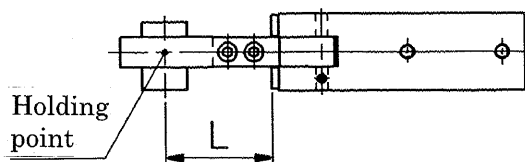


○ L and H are correct.



2. Attachment should be designed as light and short as possible.

- 1) Long and heavy attachment increases the inertia force to open or close the finger. It may cause unsteady movement of fingers and have an adverse effect on life.
- 2) Even if holding point remains within the limited range, make the attachment as light and short as possible. Refer to catalog for details.



- 3) Select the model whose holding force is sufficient against work weight.
Incorrect selection may lead to release of work etc. Refer to “Effective holding force” and information to select the model by weight of work.
- 4) Do not use in applications where excessive external force or impact force may be applied to gripper. It may cause malfunction. Consult SMC with regard to any other application.
- 5) Select a model to have allowance in opening/closing width to work.
<If no allowance is provided>
 1. Holding may be insecure due variations in air gripper opening/closing width or in work diameter.
 2. If auto-switch is used, detection failure may occur. Refer to hysteresis of auto-switch in each series to secure extra stroke for hysteresis. Especially when dual color advance waterproof auto-switch is used, stroke may be restricted depending on the setting of the lamp color at detection.

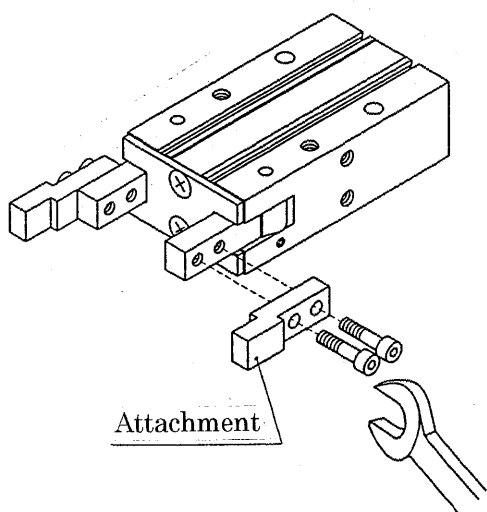
2-3 Mounting

Warning

1. Do not drop nor dent the gripper when mounting. Slight deformation can cause unaccuracy or malfunction.
2. Tighten the screw within the specified torque range to mount the attachment.
The tightening with larger torque than specified range may cause malfunction, while the tightening with smaller torque may allow movement of holding position and dropping of work.

How to mount the attachment on fingers

To mount attachment, screw bolts in finger mounting female threads with the tightening torque in the table below.



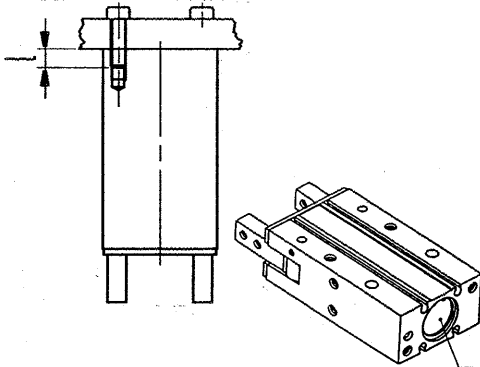
model	mounting bolt	Max.tightening torque N·m
MHY2-10D	M3×0.5	0.59
MHY2-16D		
MHY2-20D	M4×0.7	1.4
MHY2-25D	M5×0.8	2.8

3. Adjust the holding point so that excessive force will not be applied on fingers when inserting the work.

Confirm that the gripper can operate without receiving any shock by testing with manual operation or low-speed operation.

Mounting of gripper

Axial mounting type (Body tapped)

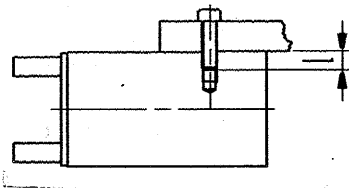


Model	mounting bolt	Max. tightening torque N · m	Max. screw-in depth l mm	hole dia mm	hole depth mm
MHY2-10D	M3 × 0.5	0.88	6	$\phi 11H9^{+0.043}_0$	1.5
MHY2-16D	M4 × 0.7	2.1	8	$\phi 17H9^{+0.043}_0$	1.5
MHY2-20D	M5 × 0.8	4.3	10	$\phi 21H9^{+0.052}_0$	1.5
MHY2-25D	M6 × 1	7.3	12	$\phi 26H9^{+0.052}_0$	1.5

Refer to a catalog for location pin hole dimensions.

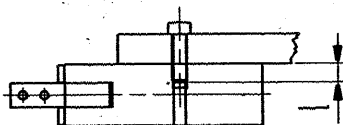
Use holes on the body for mounting.

Length side mounting (Body tapped)



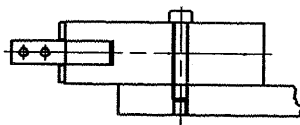
Model	mounting bolt	Max. tightening torque N · m	Max. screw-in depth l mm
MHY2-10D	M3 × 0.5	0.59	4
MHY2-16D	M4 × 0.7	1.3	5
MHY2-20D	M5 × 0.8	3.3	8
MHY2-25D	M6 × 1	5.9	10

Lateral side mounting (Body tapped)



Model	mounting bolt	Max. tightening torque N · m	Max. screw-in depth l mm
MHY2-10D	M3 × 0.5	0.88	6
MHY2-16D	M4 × 0.7	2.1	8
MHY2-20D	M5 × 0.8	4.3	10
MHY2-25D	M6 × 1	7.3	12

Lateral side mounting (Through-hole mounting)



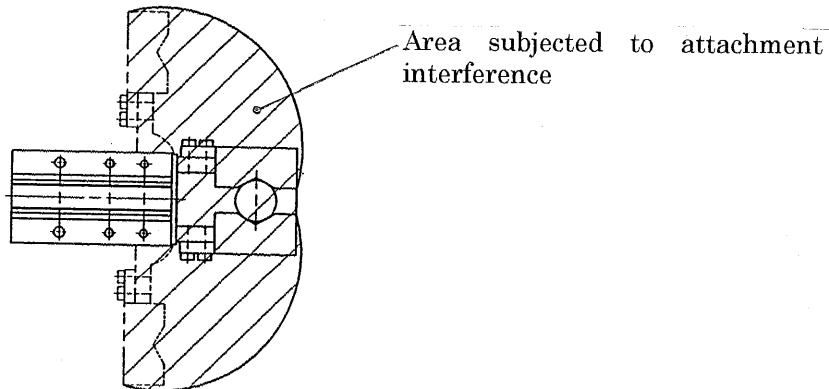
Model	mounting bolt	Max. tightening torque N · m
MHY2-10D	M3 × 0.5	0.88
MHY2-16D	M4 × 0.7	2.1
MHY2-20D	M5 × 0.8	4.3
MHY2-25D	M6 × 1	7.3

⚠ Caution

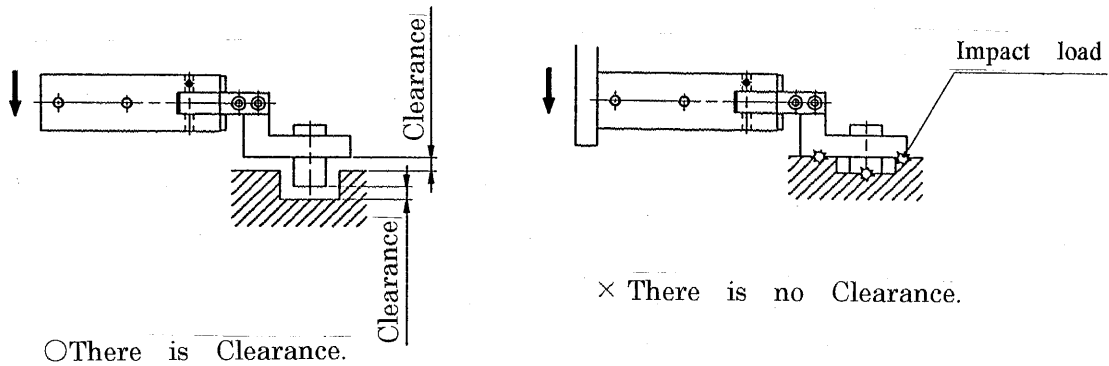
1. Avoid the excessive force on fingers when mounting the attachment.
Any change of fingers may cause the malfunction and deteriorate the accuracy.
2. Avoid external force to fingers. Fingers may be damaged by continual lateral or the impact load.

Provide clearance to prevent the work or the attachment from striking against any object at the stroke end.

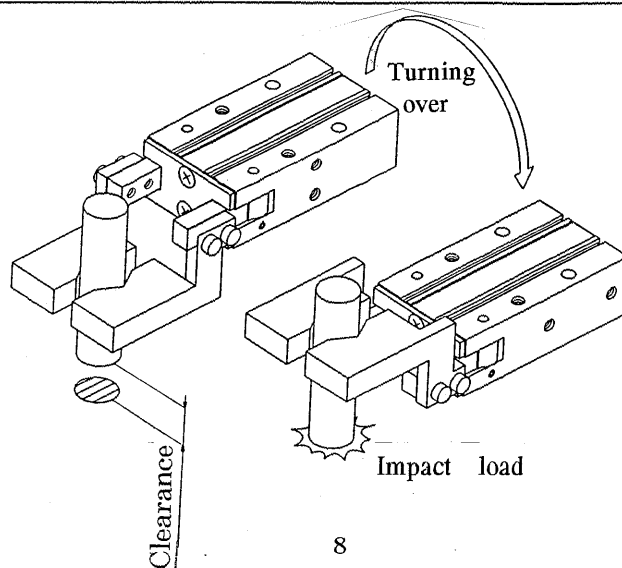
1. Finger opening / closing stroke



2. Air gripper traveling stroke end

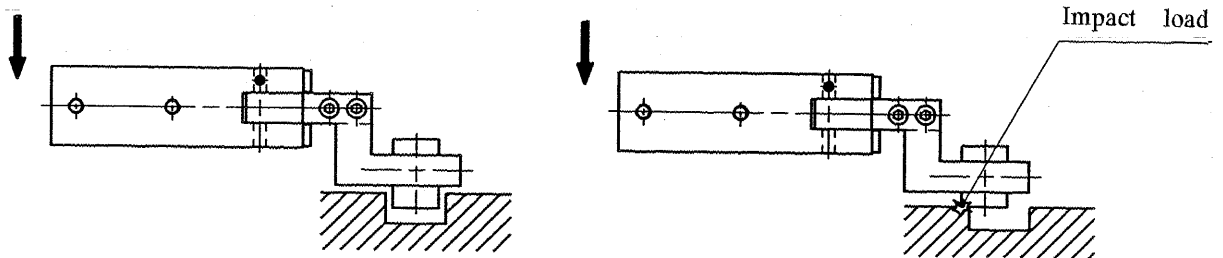


3. At opposite movement



- Adjust the holding point so that excessive force will not be applied on fingers when inserting the work.

Confirm that the gripper can operate without receiving any shock by testing with manual operation or low-speed operation.



○ Holding point impact is adjusted × Holding point impact is not adjusted

- Excessive finger opening/closing speed may cause play or damage of air gripper due to inertia of fingers or attachment. Mount speed controller to avoid impact.

Applicable speed controller

- Air gripper mounted type — AS1200-M5
- Piping type — AS1000series AS1001F

2-4 Air source

⚠ Warning

- Use clean air.

Do not use compressed air contains chemicals, salinity, corrosive gas or synthetic oil with organic solvent. Using it may cause malfunction or damage of air gripper.

⚠ Caution

- Mount air filter.

Mount air filter near valve and before air gripper. Select filtration rating of $5\ \mu\text{m}$ or less.

- Install after-cooler, air dryer and drain catch.

Compressed air contains a large amount of drain may cause malfunction of valve and other pneumatic equipment.

- Use air gripper within the specified fluid and ambient temperature range.

If air gripper is used below 5°C , moisture inside the circuit is frozen and may cause damage of packings or malfunction. Take preventative measures for freezing.

Refer to SMC "Compressed Air Cleaning System" for the details of compressed air quality described above.

2-5 Piping

Caution

1. Preparation before piping.

Thoroughly flush the fittings to prevent dust or chips from entering the gripper.

2-6 Environment

Warning

1. Do not use in environment of corrosive grass, salt water, water, nor vapor.
2. Do not use in direct sun light.
3. Do not subject to excessive vibration.
4. Do not use close to flame.
5. Use a cover when gripper must be used in an environment where dust or cutting oil will come in contact with gripper.
6. Consult SMC for the use in any other special environment.

2-7 Lubrication

Caution

1. Non-labe type is lubricated already. Therefore, it is not necessary to lubricate before using. When lubricating the gripper, use the turbibe oil class 1 (ISO VG32) and refuel continually. When lubrication has been started, it must be continued throughout the life of the gripper or malfunction may result.

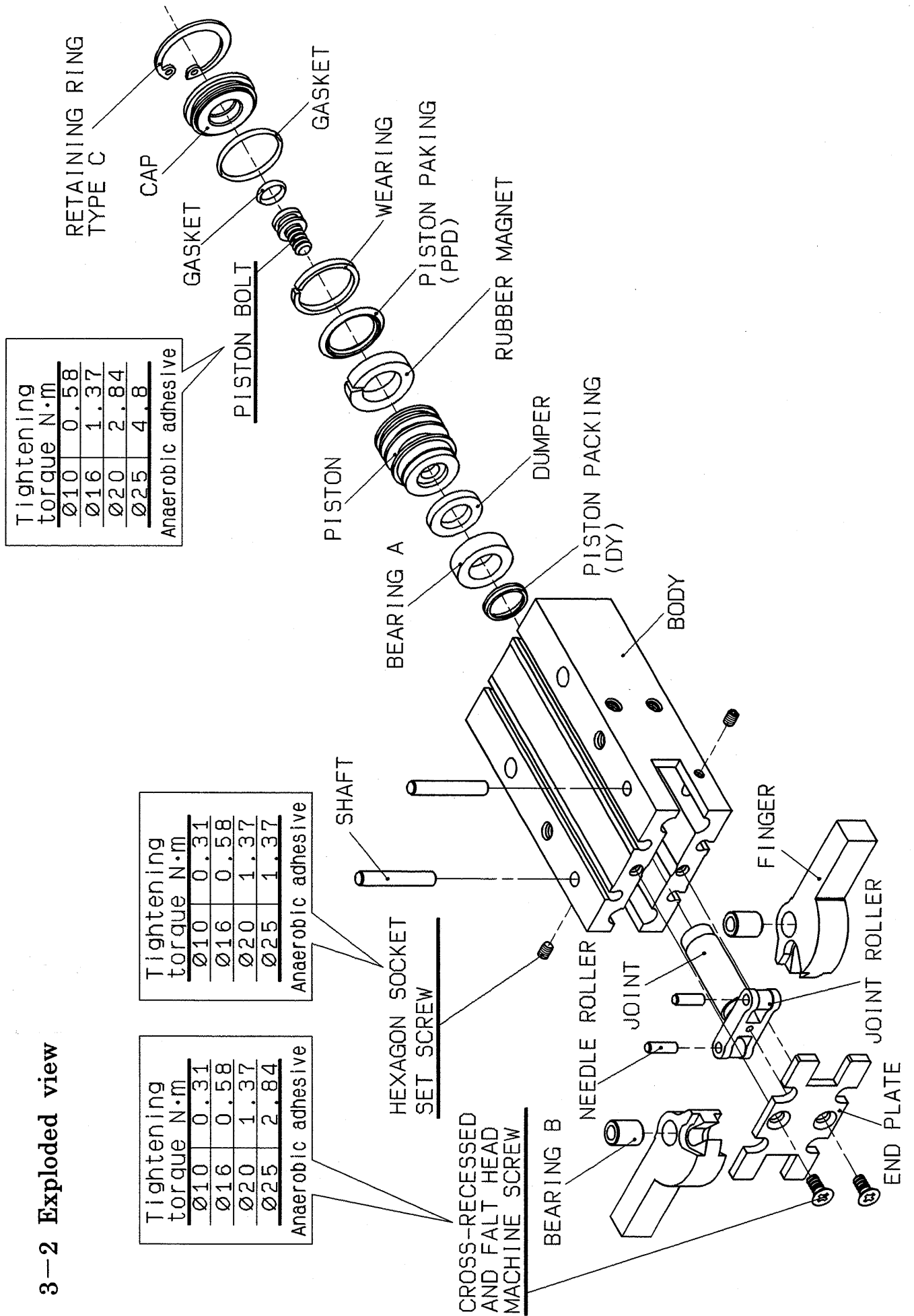
3. Maintenance

3-1 Notes

Warning

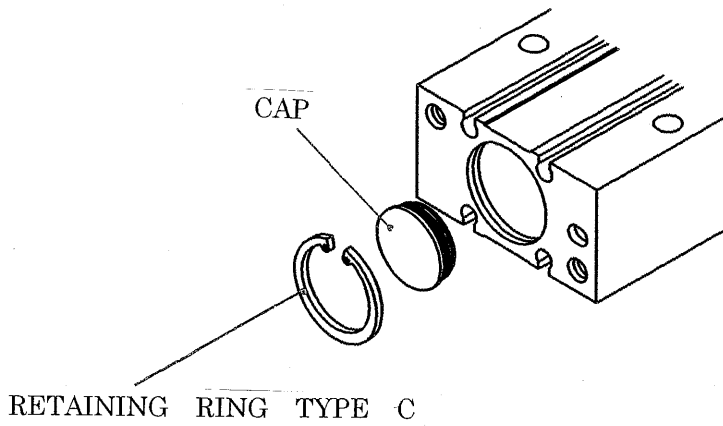
1. Do not enter the transfer line nor put the object. It may cause unexpected accidents.
2. Do not enter your hands between finger and attachment. It may cause unexpected accidents.
3. Confirm that no work is held by fingers before releasing the compressed air to remove the gripper from the line. Dropping of work can be dangerous.

3-2 Exploded view

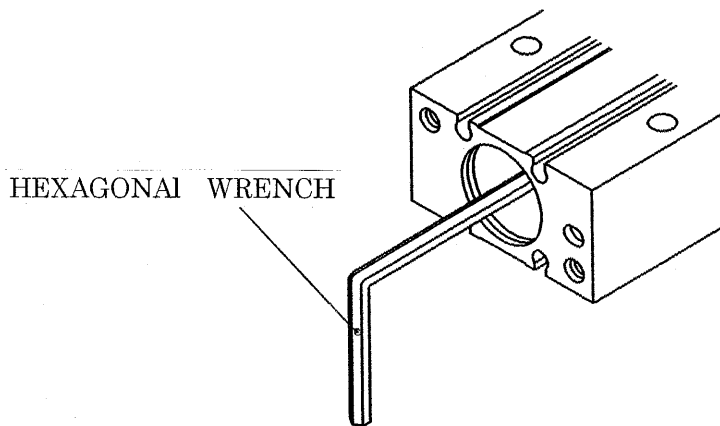


3-3 Replacing Procedure of Packing

1. Remove C-shaped snap ring and cap using special jig.

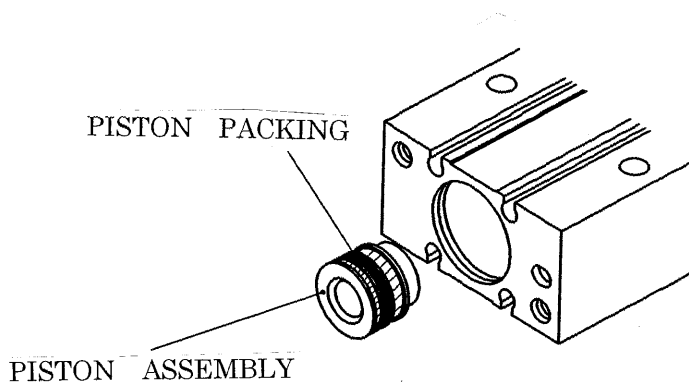


2. Untighten piston bolt with hexagonal wrench.



Size of hexagonal wrench	
	Width across flat
ϕ 10	2
ϕ 16	3
ϕ 20	4
ϕ 25	5

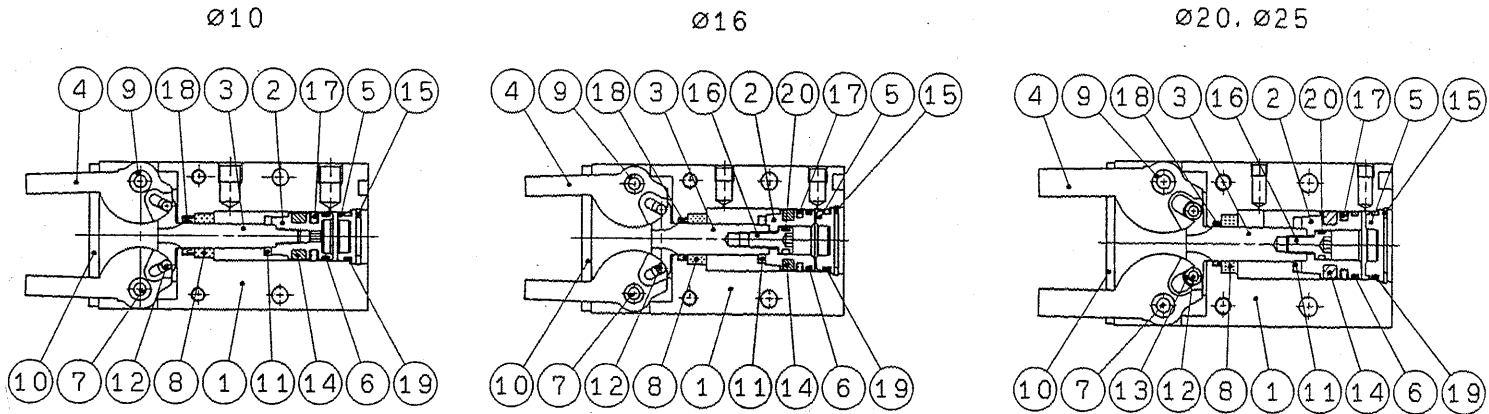
3. Take out piston assembly and then replace packing.



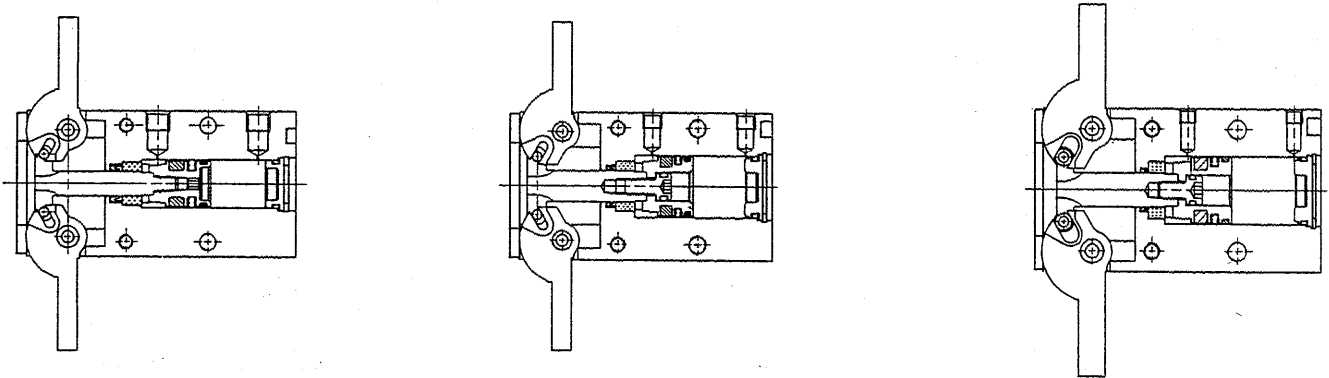
- Follow this procedure backward for assembly.
- Refer to the disassembly drawing for piston bolt tightening torque.
- Contact SMC for grease. Special grease is available.

3-4 Structural drawing / Parts List · Seal List

Finger closed condition



Finger open condition



Parts List

No.	Description	Material	Note	No.	Description	Material	Note
①	Body	Aluminum alloy	Hard anodized	⑨	Bearing B	Sintered alloy steel	
②	Piston	φ 10:Stainless steel φ 16~25:Aluminum alloy	φ 16~25 : Chromated	⑩	End plate	Stainless steel	
③	Joint	Stainless steel	Heat treatment	⑪	Dumper	Polyurethane	
④	Finger	Stainless steel	Heat treatment	⑫	Needle roller	High carbon chrome bearing steel	
⑤	Cap	Synthetic resin		⑬	Joint roller	Carbon Steel	Nitrided
⑥	Wearing	Synthetic resin		⑭	Rubber magnet	Synthetic rubber	
⑦	Shaft	Stainless steel	Nitrided	⑮	Retaining ring C	Carbon Steel	Nickel plated
⑧	Bearing A	Sintered alloy steel		⑯	Piston bolt	Stainless steel	

Parts List · Seal List

No.	Description	Material	Part No.			
			MHY2-10D□	MHY2-16D□	MHY2-20D□	MHY2-25D□
⑰	Packing set	NBR	MHY10-PS	MHY16-PS	MHY20-PS	MHY25-PS
⑱						
⑲						
⑳						