



Operation Manual

PRODUCT NAME

AIR GRIPPER

MODEL / Series / Product Number

JMHZ2-8D
JMHZ2-12D
JMHZ2-16D
JMHZ2-20D

SMC Corporation

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Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots
etc.



Danger

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



Warning

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



Caution

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. SMC products cannot be used beyond their specifications. They are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not allowed.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, combustion equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.



Safety Instructions

Caution

SMC develops, designs, and manufactures products to be used for automatic control equipment, and provides them for peaceful use in manufacturing industries.

Use in non-manufacturing industries is not allowed.

Products SMC manufactures and sells cannot be used for the purpose of transactions or certification specified in the Measurement Act of each country.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

1. Product Specifications

1-1 Specifications

Specifications

Model		JMHZ2-8D	JMHZ2-12D	JMHZ2-16D	JMHZ2-20D
Bore size (mm)		8	12	16	20
Fluid		Air			
Operating pressure [MPa]		0.15 to 0.7	0.1 to 0.7		
Ambient and fluid temperature (°C)		- 10 to 60			
Repeatability (mm)		±0.01			
Maximum operating frequency (c.p.m.)		120			
Lubrication		Non-lube			
Action		Double acting			
Holding force Actual value per finger	O.D. holding force	7.8	17.5	32.7	54.2
	I.D. holding force	10.5	23.3	43.5	72.2
Opening/ closing stroke (both) (mm)		4.	6	10	14
Note 1) Weight [g]		31	65	128	240

Note 1) Excluding the auto switch weight.

2. Operating Method / Operation

2-1 Design

⚠ Warning

1. The product is designed for use only in compressed air systems. Do not operate at pressures or temperatures, etc., beyond the range of the specifications, as this can cause damage or malfunction of the cylinder and other equipment. (Refer to the specifications.) The product cannot be guaranteed if is used outside of the specification range.
2. Take safety measures (e.g. mounting protective covers) when there is a danger of fingers being caught in a gripper or workpieces causing damage, etc.
3. There is a danger of workpieces dropping if there is a decrease in gripping force due to a drop in circuit pressure caused by a power failure or trouble with the air source. It is necessary to take measures such as drop prevention so that injury and damage to machinery or equipment can be prevented.

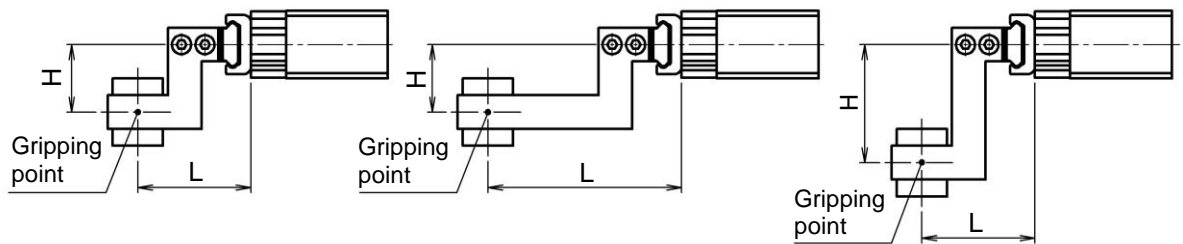
⚠ Caution

1. Finite orbit type guide is used in the actuator finger part. By using this, when there are inertial force which cause by movements or rotation to the actuator, steel ball will move to one side and this will cause a large resistance degrade the accuracy. When there are inertial force which cause by movements or rotation to the actuator, operate the finger to full stroke.

2-2 Selection

⚠ Warning

1. The gripping point should be set within the limited range.
When the gripping point distance becomes large, the gripper attachment applies an excessively large load to the gripper sliding section, and causes adverse affects on the life of the gripper. Refer to the catalog for details.



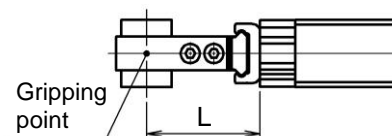
○ "L" and "H" are appropriate

× "L" is too long

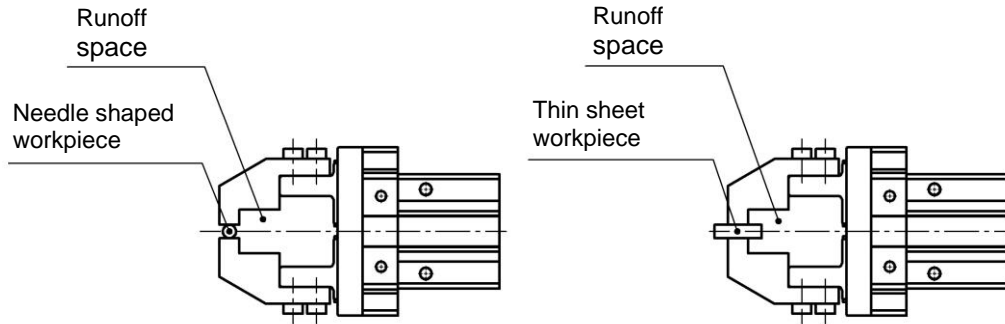
× "H" is too long

2. Attachments should be designed to be as light and short as possible

- (1) A long or heavy attachment increases the inertia force required to open or close the fingers. This may cause unsteady movement of fingers and have an adverse affect on the life of the gripper.
- (2) Design the attachment to be as short and light as possible even if the gripping point is within the limited range. Refer to the catalogue for details.



- (3) Select a larger size gripper or used two or more grippers for handling a long and/or large workpiece.
3. Provide a runoff space in the attachment when using with a small or thin workpiece.
If a runoff space is not provided, gripping becomes unsteady, and it may lead to gripping failure or slippage.



4. Select a model that provides a gripping force with margin in relation to the workpiece weight.
Incorrect selection may lead to dropping of the workpiece or other troubles. Refer to the model selection criteria of each series for the effective gripping force and the workpiece mass.
5. Do not use the product in applications where excessive external force or impact force is applied.
This can result in failure.
6. Select a model having a sufficient working finger opening/closing width.
< In case of insufficient width >
- (1) Gripping becomes unsteady due to variations in opening/closing width or workpiece diameter.
 - (2) When using an auto switch, the detection may not be reliable. Refer to the Auto Switch Hysteresis section and set the stroke including the hysteresis length for reliable switch function. When using the water resistant 2-color indicator auto switch, the gripper stroke may be limited by the setting of the indicator color during detection.

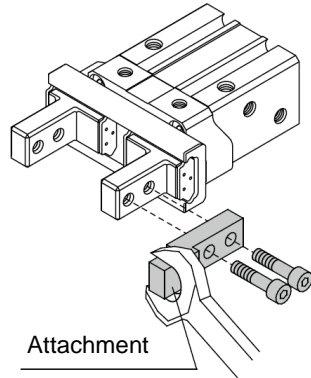
2-3. Installation

Warning

1. Install and operate the product only after reading the Operation Manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.
2. Allow sufficient space for maintenance and inspection.
3. Do not scratch or dent the air gripper by dropping or bumping it when mounting.
Slight deformation can cause inaccuracies or a malfunction.
4. Tighten the screw within the specified torque range when mounting the attachment.
Tightening with a torque above the limit can cause malfunction, while insufficient tightening can cause slippage and dropping.

How to mount attachment to the finger

Make sure to mount the attachments on fingers with the tightening torque in the table below by using bolts, etc., for the female threads on fingers.

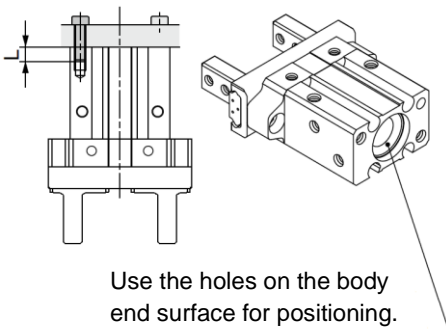


Model	Bolt	Max. tightening torque Nm
JMHZ2-8	M2.5x0.45	0.31
JMHZ2-12	M2.5x0.45	0.31
JMHZ2-16	M3x0.5	0.59
JMHZ2-20	M4x0.7	1.4

5. Tighten the screw within the specified torque range when mounting the air gripper. Tightening with a torque above the limit can cause malfunction, while insufficient tightening can cause slippage and dropping.

How to Mount Air Gripper

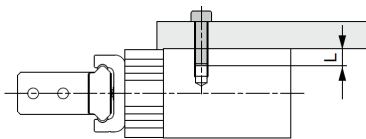
Axial mounting (Body tapped)



Model	Bolt	Max. tightening torque (N · m)	Max. thread depth L(mm)	Hole diameter (mm)	Hole depth (mm)
JMHZ2-8	M3 x 0.5	0.88	6	$\varnothing 9H9^{+0.036}_0$	2
JMHZ2-12	M3 x 0.5	0.88	6	$\varnothing 13H9^{+0.043}_0$	2
JMHZ2-16	M4x0.7	2.1	8	$\varnothing 17H9^{+0.043}_0$	2
JMHZ2-20	M5 x 0.8	4.3	10	$\varnothing 21H9^{+0.052}_0$	3

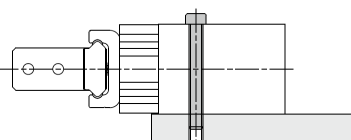
Refer to the catalogue for the dimension of the positioning pin.

Lateral mounting (Body tapped)



Model	Bolt	Max. tightening torque (N · m)	Maximum screw-in depth Depth [mm]
JMHZ2-8	M3 x 0.5	0.88	6
JMHZ2-12	M3 x 0.5	0.88	6
JMHZ2-16	M4x0.7	2.1	8
JMHZ2-20	M5 x 0.8	4.3	10

Lateral mounting (Body through-hole)

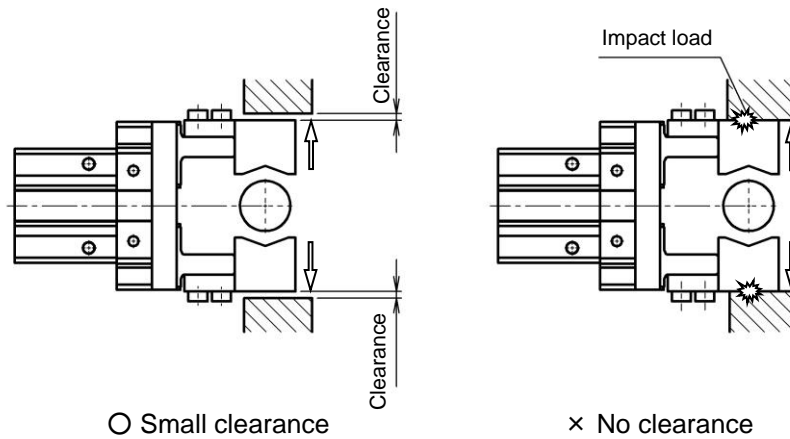


Model	Bolt	Max. tightening torque Nm
JMHZ2-8	M2.5x0.45	0.31
JMHZ2-12	M2.5x0.45	0.31
JMHZ2-16	M3 x 0.5	0.59
JMHZ2-20	M4x0.7	1.4

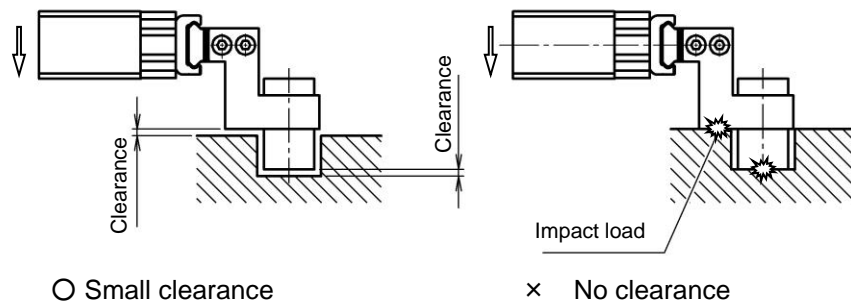
 **Caution**

1. To mount the attachment to the finger, make sure not to apply undue strain on the finger. Any damage to the gripper may cause malfunction and reduce the accuracy.
2. Avoid external force to the finger.
Fingers may be damaged by a continual lateral or impact load. Provide clearance to prevent the workpiece or the attachment from striking against any object at the stroke end.

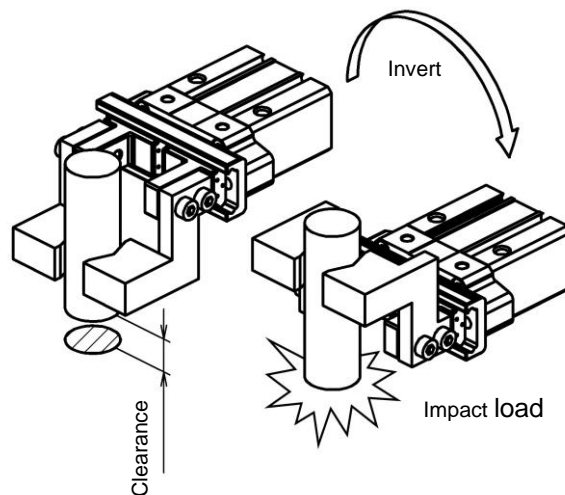
1. Stroke end when fingers are open



2. Stroke end when gripper is moving

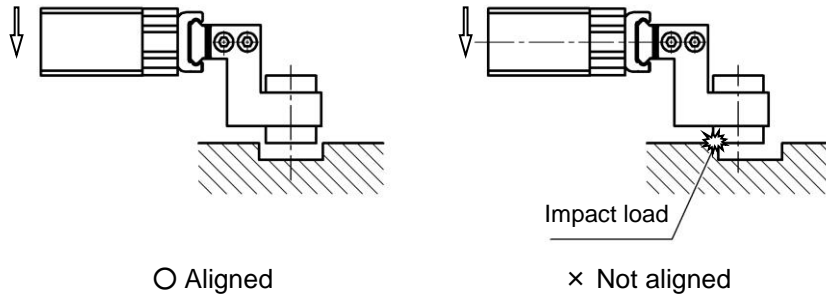


3. When turning over the gripper



3. Adjust the gripping point so that an excessive force will not be applied to the fingers when inserting a workpiece.

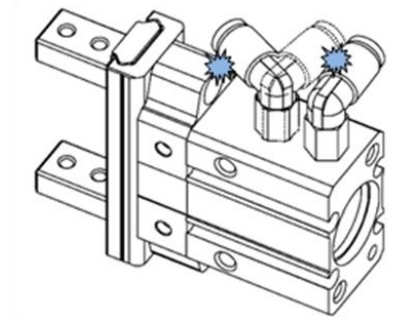
Confirm that the gripper can operate without receiving any shock by testing it in manual operation mode or by low speed operation.



4. Control the opening/closing speed with the speed controller to avoid excessive high speed operation.

If the finger opening/closing speed is greater than necessary, impact forces on the fingers and other parts will increase. This can cause a loss of repeatability when gripping a workpiece and have an adverse effect on the life of the gripper unit. It may be difficult to adjust the speed using meter-out control depending on the piping condition. In this case, adjust the speed using meter-in control or with dual speed controllers.

5. When elbow piping fittings are used, they may interfere each other or part of the air gripper, limiting the range for piping entry. Please use long elbow union: KQ2W or extension fitting to avoid this situation. Refer to the catalog for details.



2-4 Air supply

Warning

1. Use compressed air.
2. Compressed air containing a large amount of condensate can cause malfunction of pneumatic equipment. An air dryer or water separator should be installed upstream from filters.
3. If condensate in the drain bowl is not emptied on a regular basis, the condensate will overflow enter the compressed air lines. This will cause a malfunction of pneumatic equipment. If the drain bowl is difficult to check and remove, the installation of a drain bowl with an auto drain option is recommended.
4. Use clean air.
Do not use compressed air that contains chemicals, synthetic oils including organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction of equipment.

Refer to "SMC Air Preparation System" for further details on compressed air quality.

Caution

1. When low dew point air is used as the fluid, degradation of the lubrication properties inside the equipment may occur, resulting in reduced reliability (or reduced service life) of the equipment. Consider using products compatible with low dew points such as those from the 25A- series.
2. Install air filters.
Install an air filter at the upstream side of valve. A filtration degree of 5µm or less should be selected.
3. Install an aftercooler, air dryer or drain catch before the filter and take appropriate measures.
Compressed air that contains excessive foreign material may cause malfunction of valves and other pneumatic equipment.
Therefore, take appropriate measures to ensure air quality, such as by providing an aftercooler, air dryer or water separator.
4. Use the product within the specified fluid and ambient temperature range.
If the fluid temperature is 5°C or less, the moisture in the circuit could freeze, causing damage to the seals and leading to equipment malfunction. Therefore, take appropriate measures to prevent freezing.

Refer to "SMC Air Preparation System" for further details on compressed air quality.

2-5 Piping

Caution

1. Refer to the Fittings and Tubing Precautions (Best Pneumatics) for handling one touch fittings.
2. Before piping
Before piping, blow air (flush) or clean the piping to remove any cutting chips, cutting oil, dust, etc.

2-6. Operating environment

Warning

1. Do not use in an environment where corrosive gases, chemicals, sea water, water or steam are present.
2. Do not use in direct sunlight.
3. Do not operate in a location subject to vibration or impact.
4. Do not mount the product in locations where it is exposed to radiant heat.
5. Do not use this product in an area that is dusty, or in an environment in which water or oil splashes on the cylinder.

Caution

1. Martensitic stainless steel is used for the finger guide , so make sure that anti-corrosiveness is inferior to the austenitic stainless steel. Especially, rust may be generated in environments that allow water drops from condensation to stay on the surface.

2-7. Lubrication

Caution

1. The non-lube type air gripper is lubricated at the factory, and can be used without any further lubrication.

If a lubricant is used in the system, use turbine oil Class 1 (with no additive) ISO VG32.
Do not use machine oil or spindle oil.

Furthermore, once lubrication is applied, it must be continued.

If lubrication is later stopped, malfunction can occur due to loss of the original lubricant.
Refer to the Material Safety Data Sheet (SDS) of the hydraulic fluid when supplying the fluid.

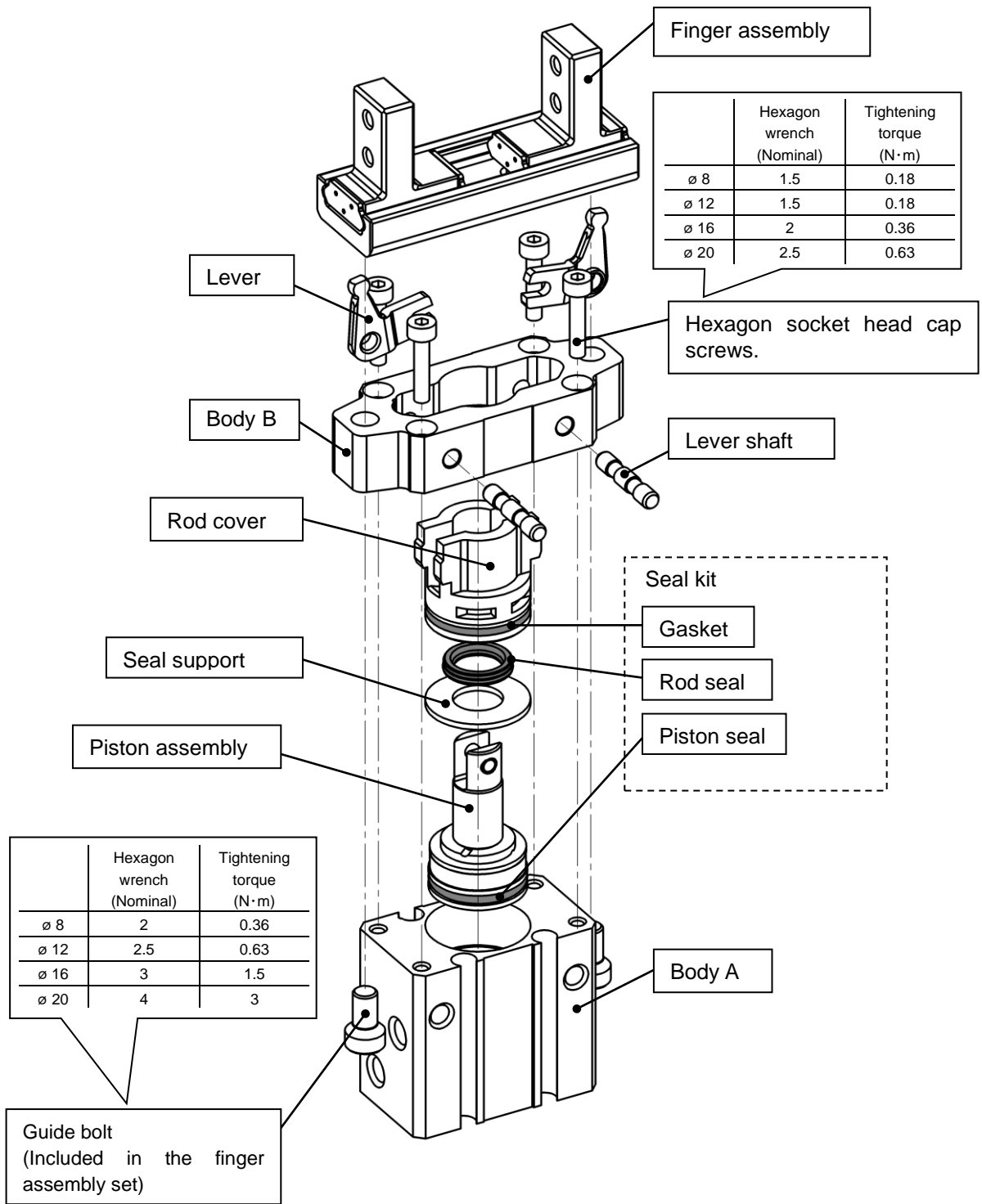
3. Maintenance

3-1. Precautions

Warning

1. Maintenance should be performed according to the procedure indicated in the Operation Manual.
If handled improperly, malfunction and damage of machinery of equipment may occur.
2. If handled improperly, compressed air can be dangerous. Assembly, handling, repair and element replacement of pneumatic systems should be performed by a knowledgeable and experienced person.
3. Remove drainage moisture from air filters regularly.
4. When air grippers are removed, first confirm that measures are in place to prevent any workpieces from dropping, run-away of equipment, etc. Then cut off the supply pressure and electric power and exhaust all compressed air from the system using the residual pressure release function.
When the equipment is restarted, proceed with caution after confirming that appropriate measures are in place to prevent cylinders from sudden movement.
5. Do not allow people to enter or place objects in the carrying path of the air gripper.
Otherwise, injury or an accident may occur.
6. Do not put hands, etc. in between the air gripper fingers or attachments.
7. When removing the air gripper, first confirm that no workpieces are being held and then release the compressed air before removing the air gripper.
If a workpiece is still being held, there is a danger of it being dropped.

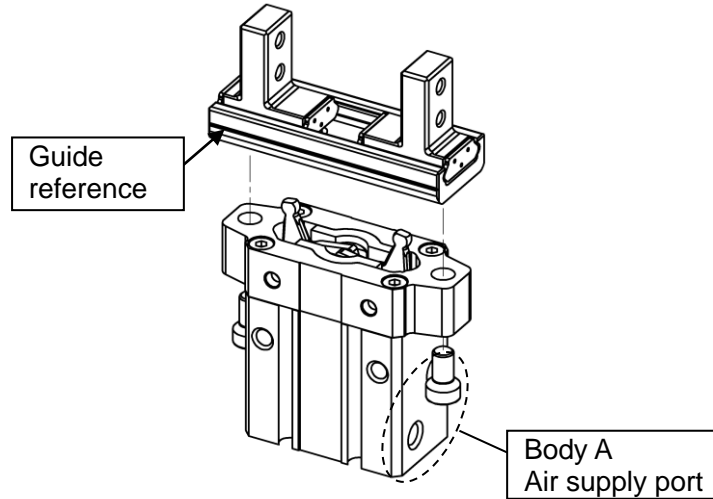
3-2 Disassembly drawing



3-3. Finger assembly set replacement procedure

- (1) Direction of the body of the drawing below is recommended for mounting the finger assembly to the body.

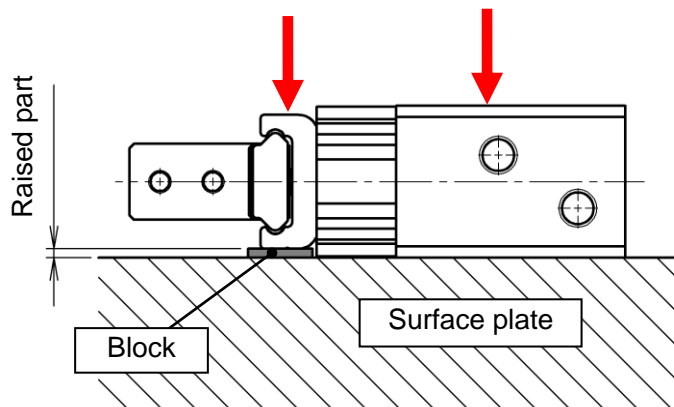
Note) For $\varnothing 8$, use a hexagon wrench with a ball end. Mount the finger assembly and the Body A with care so that the guide bolts do not interfere with the Body A.



- (2) The guide may be displaced during tightening of the guide bolts. In order to avoid this displacement, place the guide and Body A on a flat surface and insert a spacer to fill the gap between the surface and guide (with reference line face down).

With across flat of the guide bolt and tightening torque

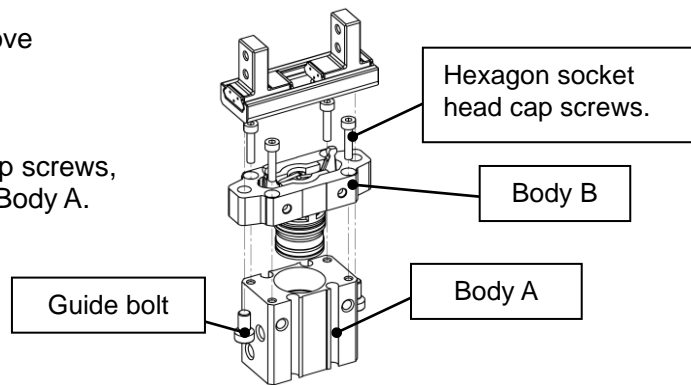
	Width across flats (Nominal)	Tightening torque (N · m)	Spacer size required (mm)
$\varnothing 8$	2	0.36	1.7
$\varnothing 12$	2.5	0.63	1.2
$\varnothing 16$	3	1.5	1.2
$\varnothing 25$	4	3	2.4



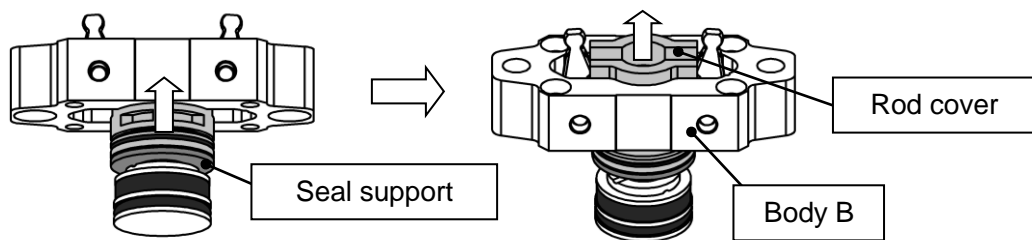
3-4. Seal replacement procedure

(1) Loosen the guide bolts and remove the finger assembly.

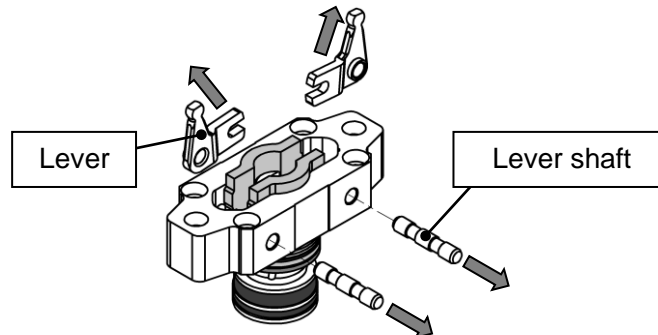
(2) Loosen hexagon socket head cap screws, and then remove them from the Body A.



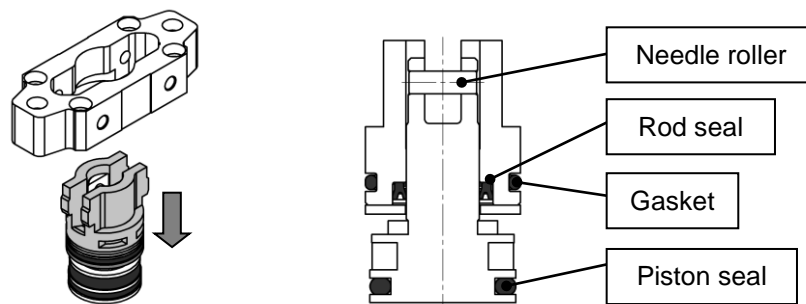
(3) Push the seal support so that the rod cover comes out of the Body B end surface.



(4) Remove the lever shaft and lever.

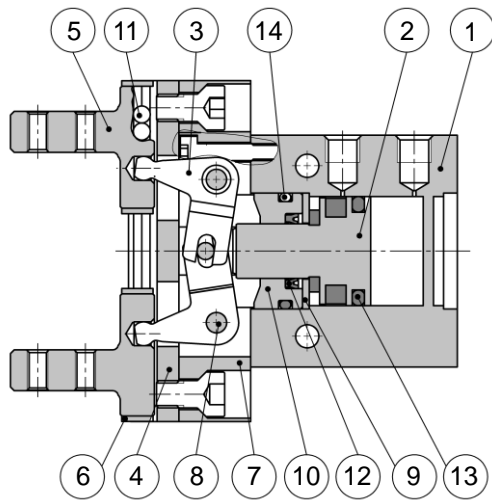


(5) Pull out the rod cover and piston assembly and replace the seal.



Assembly should be performed by following the removal procedure in reverse. Refer to the disassembly drawing for the tightening torque for the bolt. Use a specified grease. Specified grease pack part number: GR-S-010(10g)

3-5. Construction / Parts list, seal list



Components

No.	Parts description
1	Body A
2	Piston assembly
3	Lever
4	Guide
5	Finger
6	Roller stopper
7	Body B

No.	Description
8	Lever shaft
9	Seal support
10	Rod cover
11	Steel ball
12	Rod seal
13	Piston seal
14	Gasket

Replacement parts

Description	JMHZ2-8	JMHZ2-12	JMHZ2-16	JMHZ2-20	Main part	
Seal kit	JMHZ8-PS	JMHZ12-PS	JMHZ16-PS	JMHZ20-PS	12,13,14	
Finger assembly	JMHZ2-□□□	JMHZ-A0802	JMHZ-A1202	JMHZ-A1602	JMHZ-A2002	4,5,6,11
	JMHZ2-□□□1	JMHZ-A0802-1	JMHZ-A1202-1	JMHZ-A1602-1	JMHZ-A2002-1	Mounting screw
	JMHZ2-□□□2	JMHZ-A0802-2	JMHZ-A1202-2	JMHZ-A1602-2	JMHZ-A2002-2	
Piston assembly	JMHZ-A0803	JMHZ-A1203	JMHZ-A1603	JMHZ-A2003	2	
Lever assembly	JMHZ-A0804	JMHZ-A1204	JMHZ-A1604	JMHZ-A2004	3	

□ Finger option: 1= Side tapped 2=Through hole

Replacement part/ grease package part no: number: GR-S-010 (10g)

Revision history
Revision 1: Correction of $\phi 20$ finger assembly part number on page 16 Change to the latest format

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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