



対応文書 No. MH\* - DMG D180

# OPERATION MANUAL

MHQJ 2 Series

MODEL

MHQJ 2 - 10

MHQJ 2 - 16

MHQJ 2 - 20

MHQJ 2 - 25

SMC CORPORATION

初版

92.7.27

AIR GRIPPER Paralle type  
Series MHQJ2 / with Dust Cover

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AIR GRIPPER OF PARALLEL TYPE : DOUBLE ACTING, SINGLE ACTING

1. Specification

Action	Double Acting				Single Acting							
					Normally open type				Normally closed type			
Cylinder I.D.(mm)	10	16	20	25	10	16	20	26	10	16	20	25
*Holding Force (Effective value) at 0.5MPa {5.1kgf/cm <sup>2</sup> }	10.7	34.3	42.2	62.7	7.8	26.4	33.3	49.0	7.8	26.4	33.3	49.0
Open close stroke mm (Both Side)	4	6	10	14	4	6	10	14	4	6	10	14
Mass g(Except switch)	90	180	340	640	90	181	342	643	90	181	342	643
Port size	M3×0.5	M5×0.8			M3×0.5	M5×0.8			M3×0.5	M5×0.8		
Repeatability	±0.01 mm											
Fluid	Air											
Operating Pressure	0.1~0.6MPa {1~6.1kgf/cm <sup>2</sup> }				0.25~0.6MPa {2.5~6.1kgf/cm <sup>2</sup> }				0.25~0.6MPa {2.5~6.1kgf/cm <sup>2</sup> }			
Ambient and Fluid Temperature	-10~60°C											
Max.operating frequency	180 c. p. m											
Lubrication	Unnecessary											

\*Refer to "Effective holding force" data in catalog about holding force at each holding point.

The effective holding force is a value at mid-stroke position.

2. Instruction before operating

2-1. Air

- ①Use the air which was filtered by the air filter of AF series made by SMC and regulated at specified set pressure by the regulator of AR series.
- ②No need to lubricate.

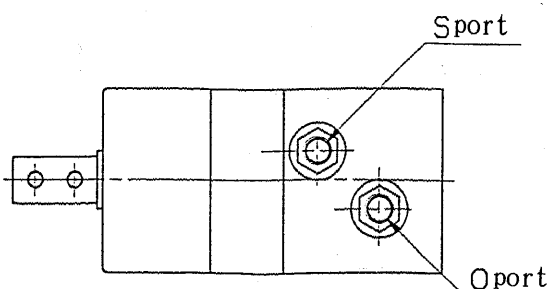
2-2. Adjustment of open-close finger speed

- ①Use the speed controller and adjust so that the open-close finger speed does not speed up too much.

Note: If the open-close speed of finger is unnecessarily fast, impact force on finger will become too much and repeatability at the time of workpiece holding and its life will be shortened.

2-3. Piping

Double Acting



·Piping port

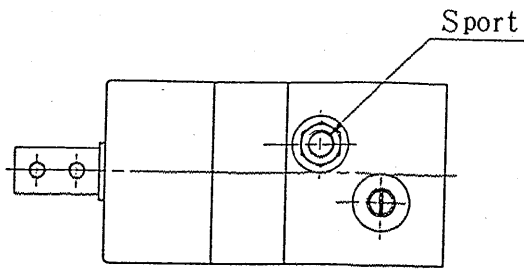
Sport : Finger close port

Oport : Finger open port

·Piping port size

Model	Piping port size
MHQJ2-10D	M3×0.5
MHQJ2-16D	M5×0.8
MHQJ2-20D	
MHQJ2-25D	

Single Acting / Normally open type



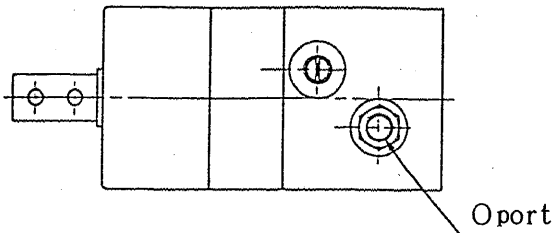
• Piping port

Sport Finger close port

• Piping port size

Model	Piping port size
MHQJ2-10S	M3 × 0.5
MHQJ2-16S	M5 × 0.8
MHQJ2-20S	
MHQJ2-25S	

Single Acting / Normally closed type



• Piping port

Oport Finger open port

Piping port size

Model	Piping port size
MHQJ2-10C	M3 × 0.5
MHQJ2-16C	M5 × 0.8
MHQJ2-20C	
MHQJ2-25C	

- Use miniature tube fitting (M3, M5 series) or one-touch tube fitting (M5 size).
- Flush the pipe completely so that particles and chip do not enter inside of air gripper

#### 2-4. Usage of extension fittings

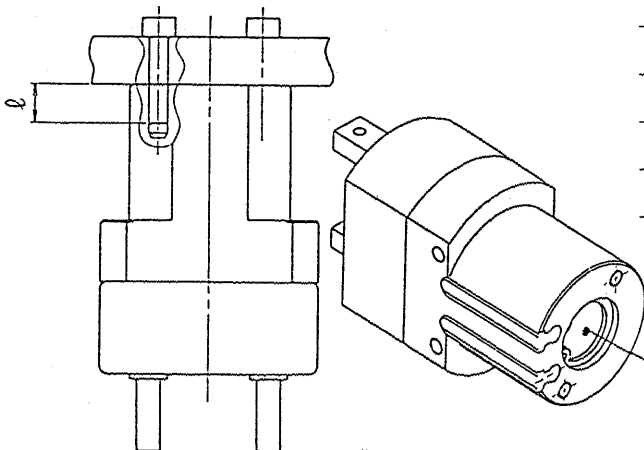
Use extension fittings when the speed controllers and fittings are interfered each other.

#### 2-5. Mounting method of Air Gripper

Air Gripper of MH series can be mounted from two directions.

Choose the direction according to the machine and workpiece.

##### ① Axial Mounting Type (Body Tapped)



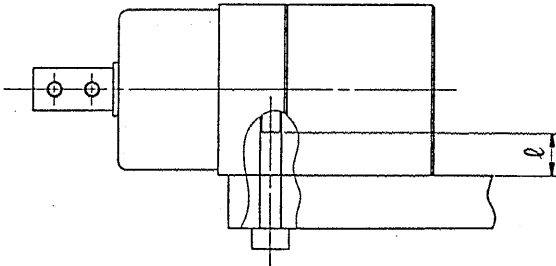
Model	fixing bolt	Max.tinghening Torque N·m(kgf·cm)	Max.thread depth ℓ mm
MHQJ2-10	M3×0.5	0.9( 9)	6
MHQJ2-16	M4×0.7	2.1(21)	8
MHQJ2-20	M5×0.8	4.3(44)	10
MHQJ2-25	M6×1	7.3(74)	12

● Use the Hold at the end of body for setting position

Model	Hole diameter(mm)	Hole depth(mm)
MHQJ2-10	$\phi 11H9^{+0.043}_0$	1.5
MHQJ2-16	$\phi 17H9^{+0.043}_0$	1.5
MHQJ2-20	$\phi 21H9^{+0.052}_0$	1.5
MHQJ2-25	$\phi 26H9^{+0.052}_0$	1.5

## ②Lateral Mounting Type(body Tapped · Body Trough Hole)

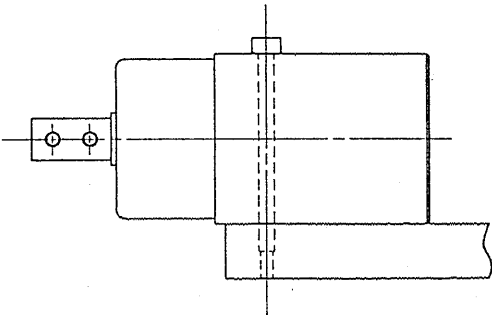
· Use of the body tap



In case of use of the body tap

Model	Fixing bolt	Max.tightening torque N·m(kgf·cm)	Max.thread depth ℓ mm
MHQJ2-10	M3×0.5	0.7(7)	5
MHQJ2-16	M4×0.7	2.1(21)	8
MHQJ2-20	M5×0.8	4.3(44)	10
MHQJ2-25	M6×1	7.3(74)	12

· Use of the body trough hole



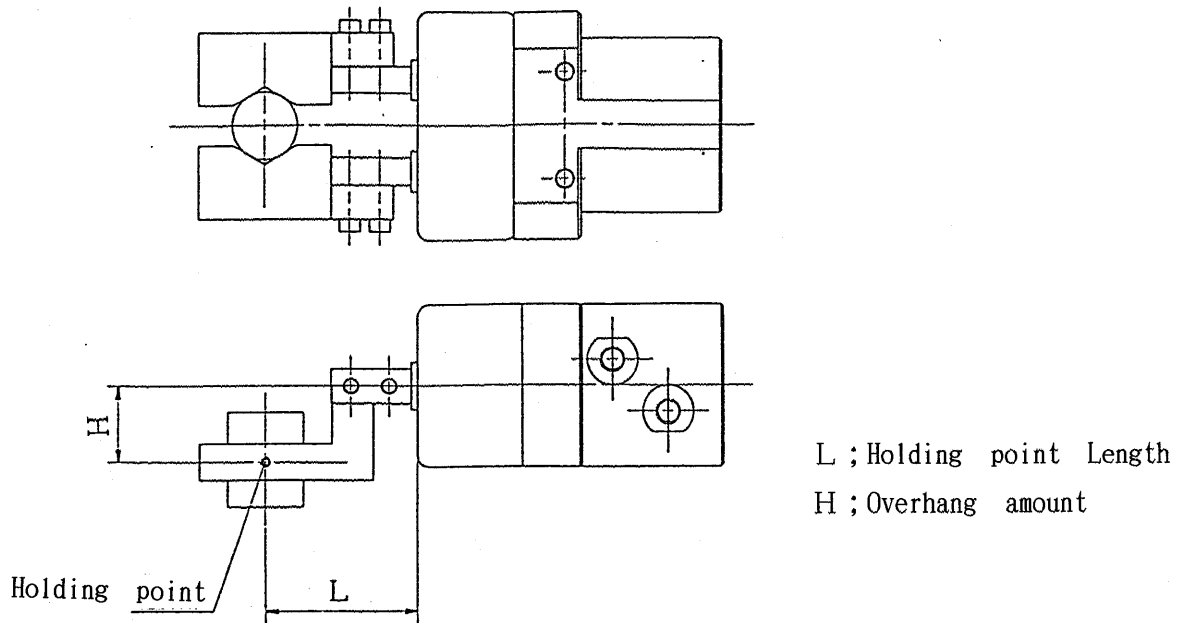
In case of use of the body through hole

Model	Fixing bolt	Max.tightening torque N·m(kgf·cm)
MHQJ2-10	M2.5×0.45	0.5(5)
MHQJ2-16	M3×0.5	0.9(9)
MHQJ2-20	M4×0.7	2.1(21)
MHQJ2-25	M5×0.8	4.3(44)

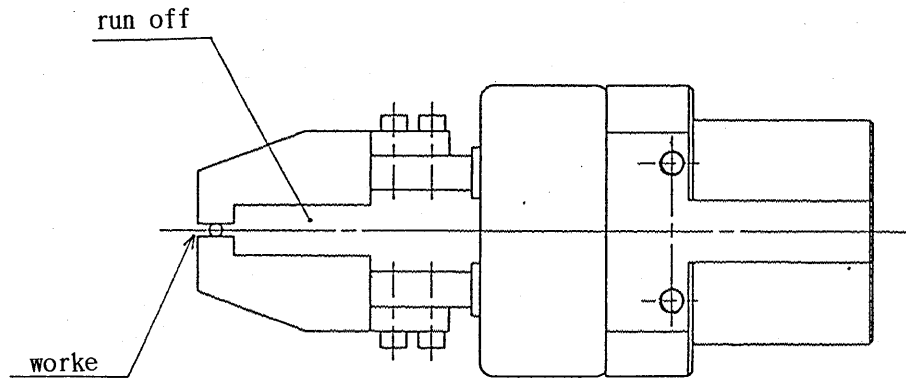
## 3. Caution in handling

### 3-1. Desing of attachment

- 1)When the overhang amount become bigger, an excessive moment load acts to cross roller and finger may be loosened and its life may be shortened, so a length of holding point L and an overhang amount H should be within the limited graph of catalog. Make the attachment as short and light as possible even if they stay within the limiting range.

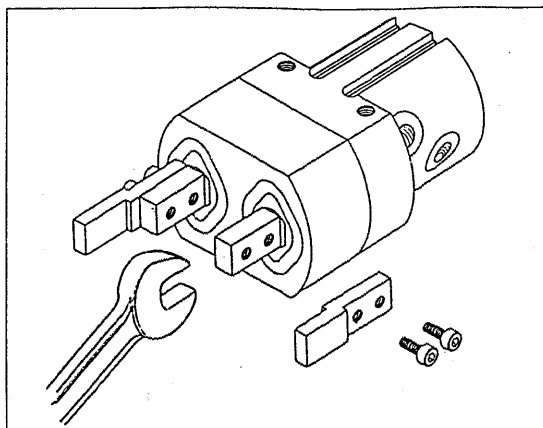


2) When shape of workpiece is like a needle or a thin board, the run off should be required at the attachment to stabilize the hold.



### 3-2. How to mount attachment

How to mount attachment to finger



When mounting attachment to finger, it should be carried out holding finger by spanner or other means so that the tightening force is not transmitted to the finger guide mechanism.

For tightening torque of bolts, refer to the following table.

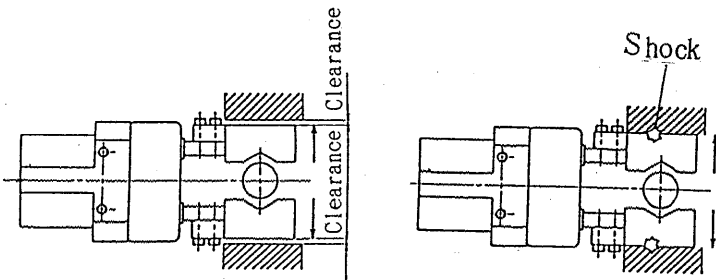
Model	Fixing bolt	Max. Tightening torque N·m(kgf·cm)
MHQJ2-10	M2.5×0.45	0.31 (3.2)
MHQJ2-16	M3×0.5	0.58 (6)
MHQJ2-20	M4×0.7	1.37 (14)
MHQJ2-25	M5×0.8	2.84 (29)

### 3-3. Adjustment of Air Gripper

Adjust and ensure that finger does not receive external force.

• Some clearance should be kept at stroke end of the finger.

① Stroke end when finger is opened.

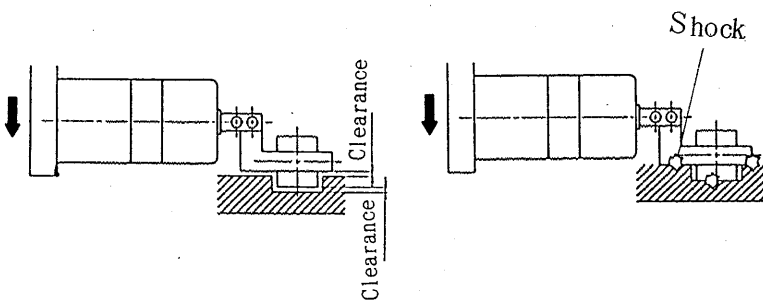


○With Clearanse

×Without Clearance

Appropriate clearance should be kept at finger not to receive force except holding workpiece, particularly when workpiece is hold, not to crash to other object at stroke end of Air Gripper movement. When lateral load or impact load comes on to finger repeatedly it may cause loosening or damage of finger.

② Stroke end of Air Chuck in movement.

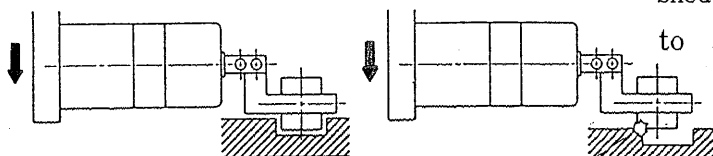
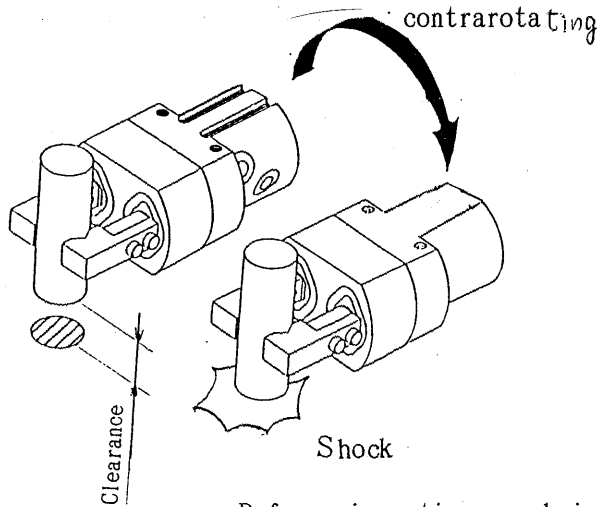


○With Clearanse

×Without Clearance

(In particular, in case of contrarotating Air Gripper, a little variation of length of workpiece may cause to crash at downward stroke end after contrarotaing, so it should be cared.

③ When contrarotating.



○Correct centering

×Incorret centering

Before inserting workpiece, centering should be carried out thoroughly not to add unnecessary force to finger.

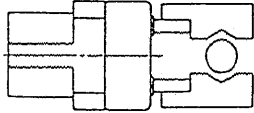
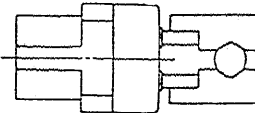
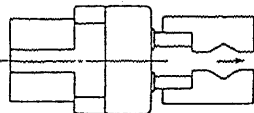
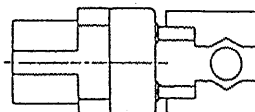
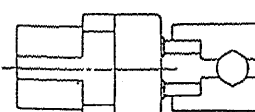
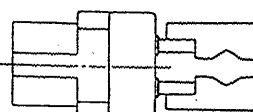
3-4. Confirmation

In test run, keep manual force or air cylinder pressure low to operate and made sure no existence of shock and safety.

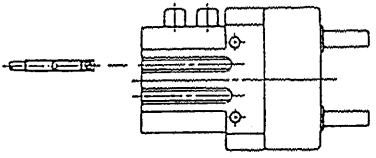
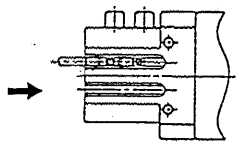
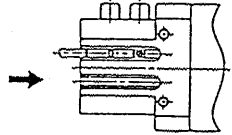
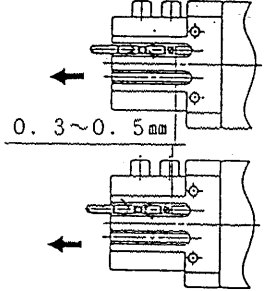
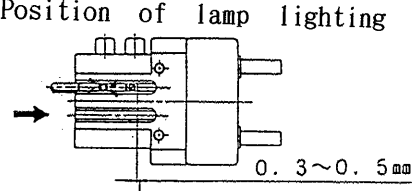
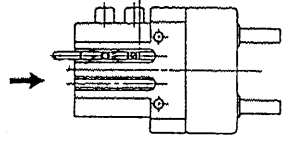
#### 4. Installation and Setting of Auto Switch

Auto Switch can be used variously according to combination of mounting quantity and detecting position.

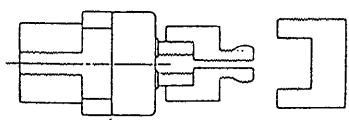
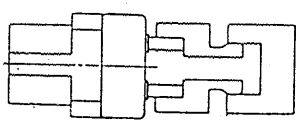
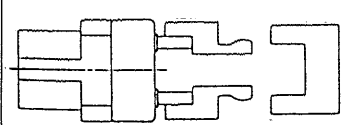
##### 4-1. Detection of workpiece (External holding)

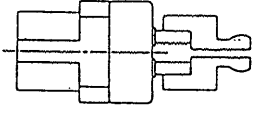
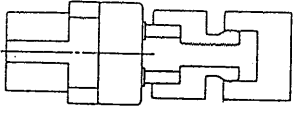
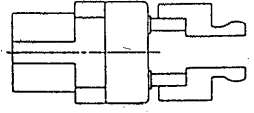
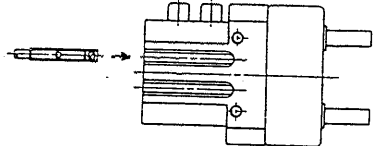
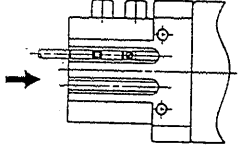
Detection Example	①Confirmation of finger reset position	②Confirmation of holding of the workpiece	③Confirmation of workpiece not held
<p>Detecting position</p> 	<p>Workpiece holding position</p> 	<p>Finger fully closed position</p> 	
Auto switch operation	<p>Switch to turn ON at finger reset position (Lamp : Operation)</p>	<p>Switch to turn ON at workpiece holding position. (Lamp : Operation)</p>	<p>At workpiece holding position. (Normal Operation) Turn OFF the switch (Lamp not lit) Workpiece not held condition (Abnormal operation) Turn ON the switch (Lamp : Operation)</p>
Auto switch	One	●	
	Two		●
	Three		●
Auto switch	One	●	
	Two	●	●
	Three	●	●
Auto switch installation position Setting procedure	<p>Procedure 1) Open fully the fingers.</p> 	<p>Procedure 1) Locate the fingers in the workpiece holding position.</p> 	<p>Procedure 1) Locate fingers in the full closed position.</p> 

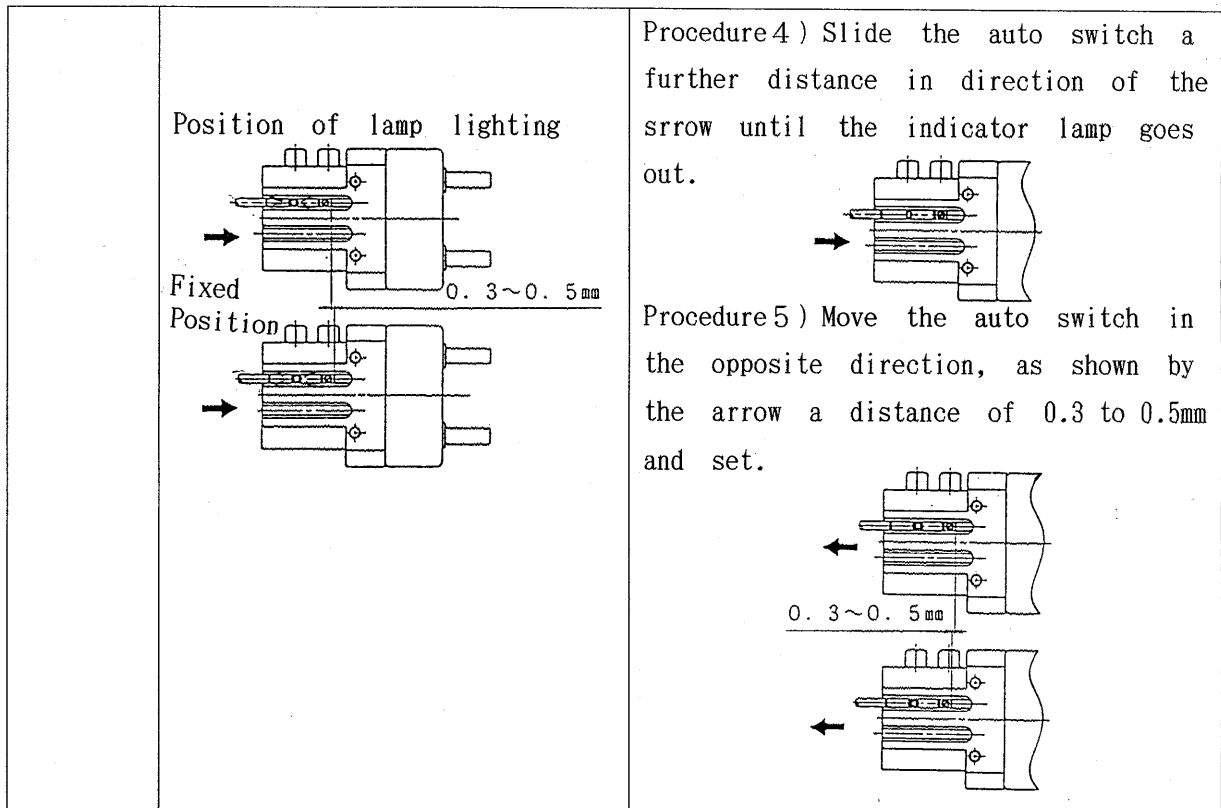


<p>&lt;Connect switch as per connection instructions with the power turned off. to order&gt;</p>	<p>Procedure 2) Insert the auto switch into the switch installation groove from the direction shown in the right drawing.</p> 	
	<p>① Procedure 3) Slide Auto-switch in the direction of the arrow until the lamp lights.</p>  <p>Procedure 4) Slide Auto-switch a further distance in the direction of the arrow until the indicating lamp goes out.</p>  <p>Procedure 5) Move Auto-switch in the opposite direction, as shown by the arrow, a distance of 0.3 to 0.5mm and set.</p> 	<p>② ③ Procedure 3) Slide Auto-switch in the direction of the arrow until the lamp lights. Move switch a further 0.3 to 0.5mm in the direction of the arrow and set.</p> <p>Position of lamp lighting</p>  <p>Fixed Position</p> 

4-2. Detection of workpiece (Internal holding)

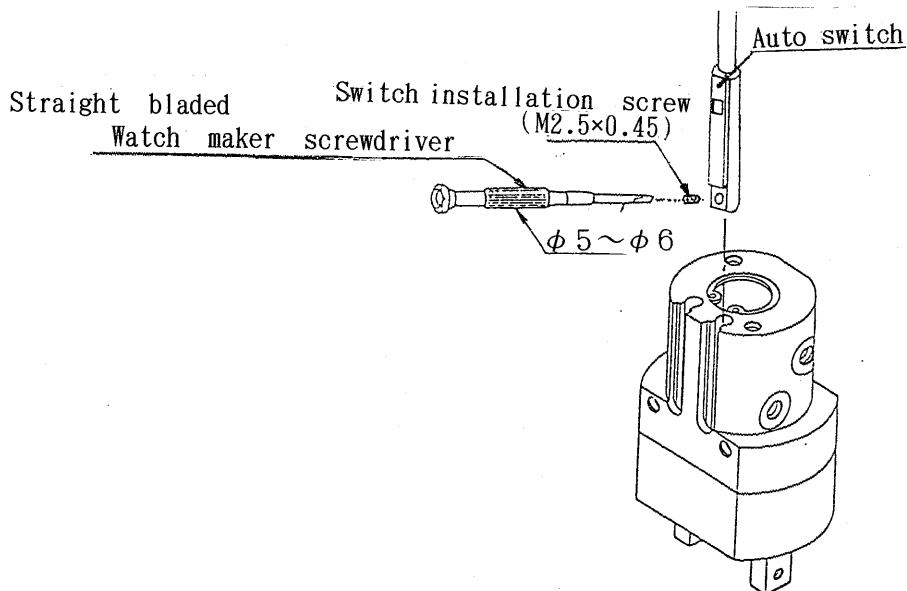
Detection example	①Confirmation of finger reset position	②Confirmation of holding of the workpiece	③Confirmation of workpiece not held
Detection position	Finger fully cloused position	Workpiece holding position	Finger fully open position
			

Auto-switch operation	Switch to turn ON at finger resetposition (Lamp : Operation)	Switch to turn ON at workpiece holding Position (Lamp : Operation)	At workpiece holding position (Normal operation): Turn OFF the switch (Lamp not light) Workpiece not held condition (Abnormal operation Turn ON the switch (Lamp : Operation)
One Auto Switch	●		
		●	
			●
Two Auto Switches	●	●	●
		●	●
	●		●
Auto-switch Installation position Setting procedure	<p>Procedure 1) Locate the finger in the full closed position.</p> 	<p>Procedure 1) Locate the fingers in the workpiece holding position.</p> 	<p>Procedure 1) Open fully the fingers.</p> 
	<p>Procedure 2) Insert the auto-switch into the switch installation groove from the direction shown in the right drawing.</p> 		
	<p>Procedure 3) Slide auto switch in the direction of the arrow until the lamp lights. Move switch a further 0.3 to 0.5mm in the direction of the arrow and set.</p>	<p>Procedure 3) Slide auto switch in the direction of the arrow until the lamp lights.</p> 	



#### 4-3. How to fix Auto-switch

Auto-Switch should be inserted into the switch installation groove of Air Gripper from the direction shown in the following drawing. After setting the installation position, tighten the attached switch mounting machine screw with a straight bladed watchmakers screwdriver.

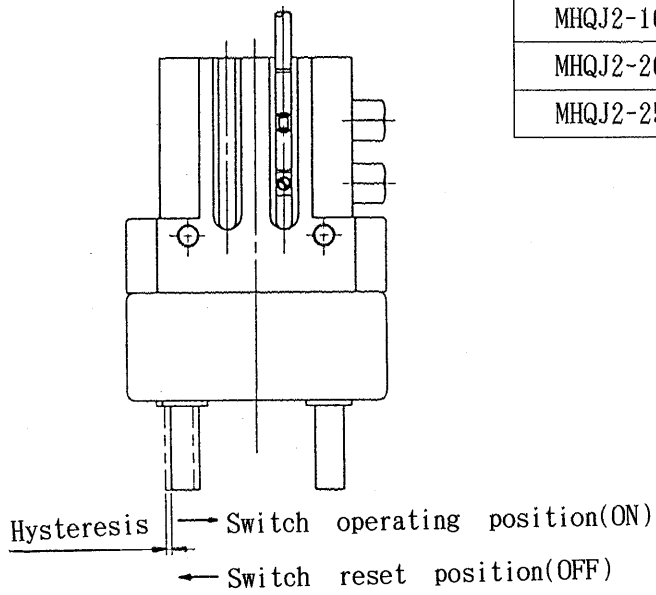


Note) Use a watchmaker screwdriver with a grip diameter of 5 to 6mm to tighten the auto switch installation screw. Use tightening torque of 0.5 to 1N·m. As a rough guide, tighten the screw through a further 90° after feeling a tight resistance.

## 5. Hysteresis of Auto Switch

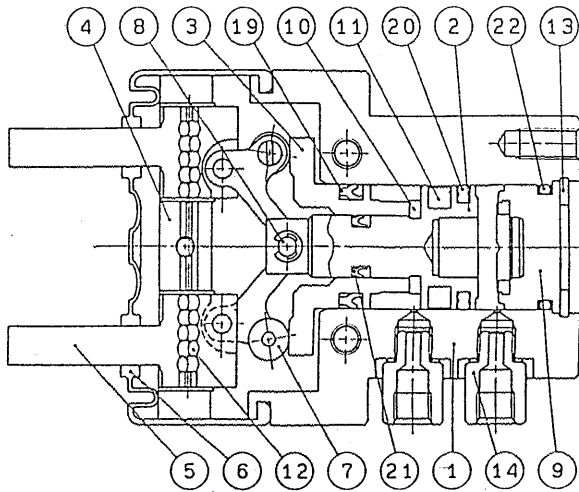
Hysteresis of Auto Switch is shown as right table.

Model	Hysteresis(Max)mm
MHQJ2-10	0.4
MHQJ2-16	0.5
MHQJ2-20	0.5
MHQJ2-25	1.1

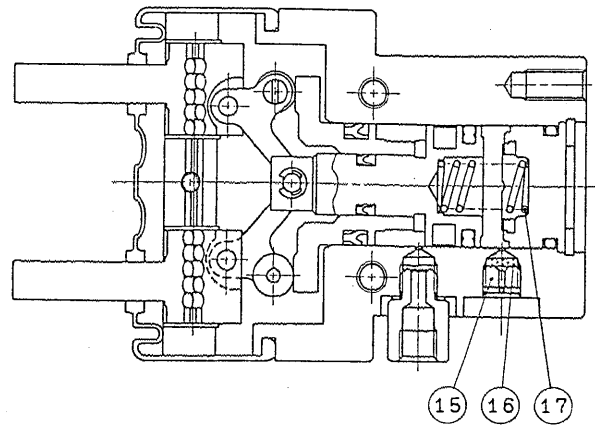


## 6. Structural Drawing/Parts List

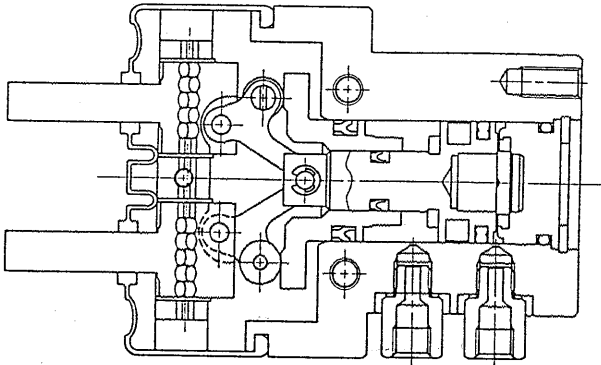
Double Acting/Finger Close Condition



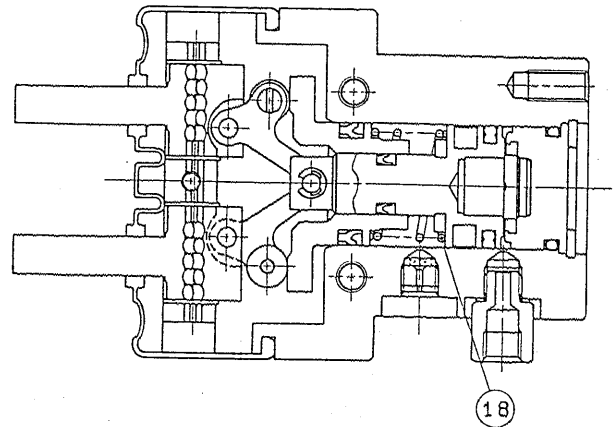
Single Acting/Normaly Open Type



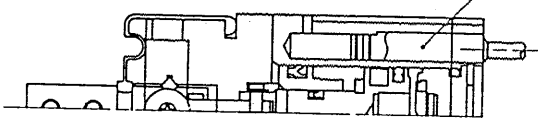
Double Acting/Finger Close Condition



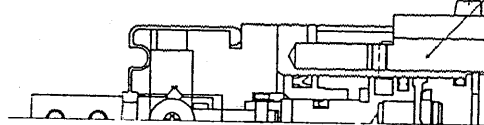
Single Acting/Normaly Close Type



With Auto-switch



Auto-switch  
D-F9N·F9P·F9B



Auto-switch  
D-F9NV·F9PV·F9BV

### Parts List

NO	Part Name	Material	Remark	NO	Part Name	Material	Remark
1	Body	Aluminim Alloy	Hard Alumite Trtmt.	11	Ruber Magnet	Synthetic Rubber	
2	Piston A	Aluminim Alloy	Hard Alumite Trtmt.	12	Cylindrical Roller	High Carbon Chrome Bearing Steel	
3	Piston B	Aluminim Alloy	Hard Alumite Trtmt.	13	C-shape Washer	Carbon steel	Nickel Plating
4	Guide	Carbon Tool Steel	Heat Treatment	14	Extension fittings	Brass	Electroless nickel plating
5	Finger Ass'y	Chrome Molybdinum Steel	Heat Treatment	15	Exhaust Plug	Brass	Electroless nickel plating
6	Dust Cover	Chloroprene rubber		16	Exhaust Filter A	Sponge	Electroless nickel plating
7	Roller	Carbon Steel	Nitriding	17	Spring	Stainless Steel Wire	
8	Center Pin	Carbon Steel		18	NC Spring	Stainless Steel Wire	
9	Cap Ass'y	Heat Treatment	Hard Alumite Trtmt.				
10	Dumper	Urethane					

### Packing List

NO	Part Name	Material				
			MHQJ2-10	MHQJ2-16	MHQJ2-20	MHQJ2-25
19	Piston Packing	NBR	DYP10	DYP16	DYP20	DYP25
20	Piston Packing	NBR	PSD-10	PSD-16	NLP-20A	NLP-25A
21	Piston Packing	NBR	DYP6	DYP8	DYP12	DYP15

## 7. How to replace dust cover

### How to remove dust cover

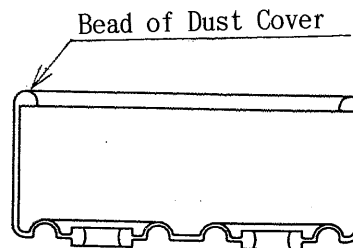
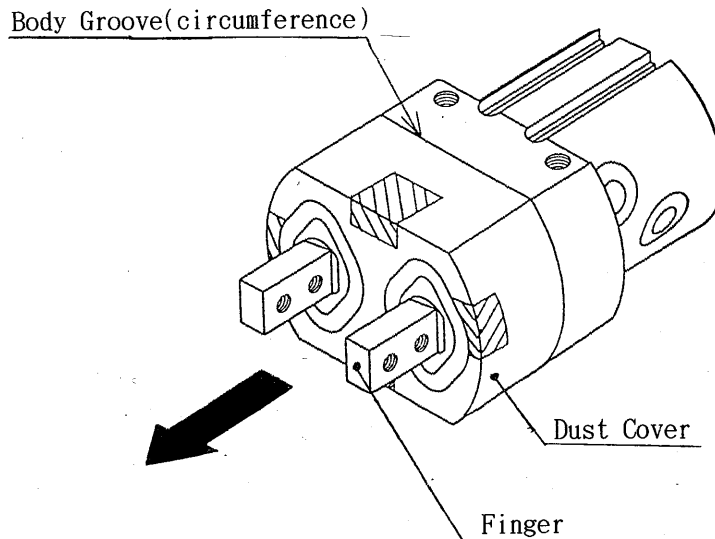
1. Hold the ▨ part of dust cover and pull to take it out from body groove.
2. After bead part of dust cover comes out of body groove, pull the ▨ part to the fingers direction.
3. When all parts of bead comes out of body groove, pull it to the arrow direction to take dust cover out of air gripper

### How to mount dust cover

1. Put the dust cover on fingers.
2. Fit it into the fingers' groove.
3. Push the bead part of the dust cover into the body groove completely.

Note) Care should be taken not to break dust cover when removing/mounting.

Also, be careful not to give deflection to fingers.



Cross Sectional Drawing of Dust Cover