

INSTRUCTION MANUAL

MODEL QG

Face Plate Exchanging Type Quick Change Gripper

DANGER

- This Instruction Manual has been prepared for intended use for production engineers and maintenance persons who operate this product. When the beginners use this product, be sure to receive the guidance from skilled persons, sales agents, or us in advance.
- Before installing, using, or maintaining this product, read carefully the safety precautions given in this manual so as to understand them completely. If you do not heed given instructions or safety precautions, serious human accidents, death, or physical damage may occur.
- Store this manual with care in the specified place at hand, and reread it as necessary for correct use of the product.
- Please contact the sales agent if you have any uncertainty or doubt about this manual.

Preface

This manual provides detailed information on the face plate exchanging type quick change gripper (model QG) so that you can understand its performance and functions and use it safely and correctly.

Before using this gripper, read this manual carefully to understand how to use the gripper correctly. Always follow the instructions and warnings given in **“Important Safety Precautions”** and **“Precautions for Use”**. Failure to follow these precautions could result in serious human accidents.

Terms and Symbols Used for Safety Messages

In this manual, handling precautions that are considered especially important are classified and displayed as shown below according to the degree of risk (seriousness of harm) that could result. Please completely understand the meaning of these terms and follow the instructions for safe operation.

Safety Alert Symbol

This triangle is a safety alert symbol used to alert you to potential safety hazards. To avoid death or injuries that could occur, follow the safety messages given with this safety alert symbol.



Failure to follow the safety precautions below will result in death or serious injuries.



Failure to follow the safety precautions below will result in death or serious injuries.



Failure to follow the safety precautions below may result in minor or moderate injuries.



Indicates instructions which, if you do not heed given instructions, could result in damage to the product or shortened service life, or damage to peripheral equipment.

Disclaimer and How to Use Instruction Manual

This product is suitable for gripping a conveyed workpiece by being installed on the robot or loader. The product is equipped with the jaws to grip the conveyed workpiece and they are operated by air pressure. For any other applications, please contact us.

Kitagawa Iron Works Co., Ltd. shall not be held liable for human accidents, death, damage, or loss that occurred due to a failure to follow the safety precautions given in this manual.

This manual does not predict all potential hazards in operation, inspection, and maintenance under all environmental conditions. There will be an infinite number of matters that cannot or must not be done, and it is impossible for the manual to cover all of them.

Therefore, the matters, unless otherwise mentioned clearly as “can be done” or “may be done” in this manual, should be considered as “cannot be done” or “must not be done”. Please contact us or our agents if you have an uncertainty about safety when you try to perform operation, inspection, or maintenance not mentioned in this manual.

Warranty and Disclaimer

The product is warranted for one year after the date of delivery.

All parts used shall be those delivered by Kitagawa Corporation. Kitagawa Corporation shall not be held liable for human accidents, death, damage, or loss that occurred due to the use of parts which are not genuine parts manufactured by Kitagawa. Also, the use of parts other than Kitagawa’s genuine parts will void the warranty.

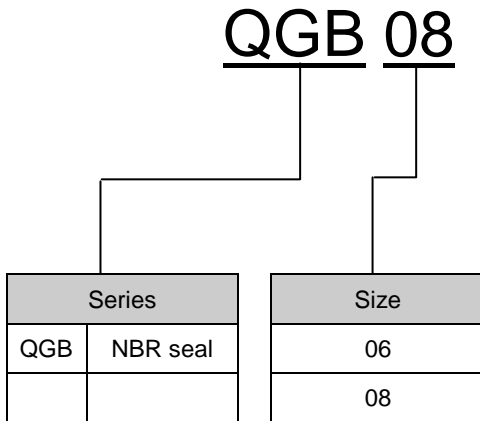
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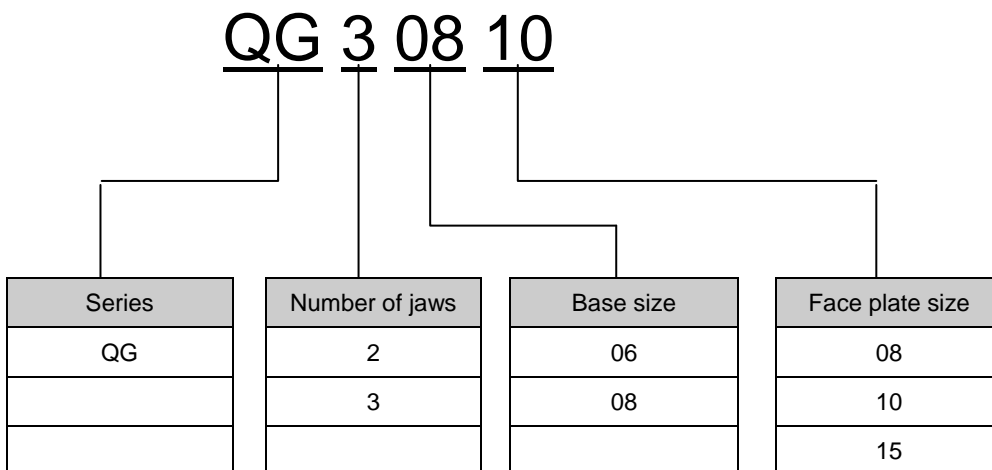
1. Structural Drawing and Parts List

1-1. Model indication

Base unit



Jaw plate



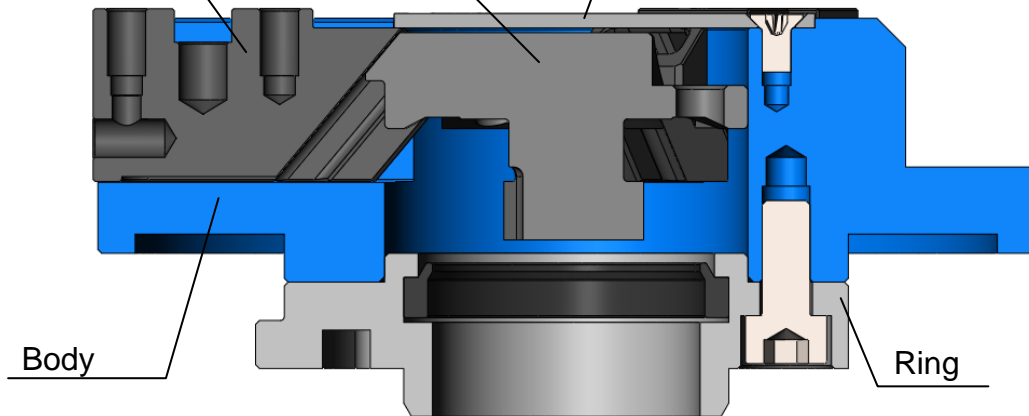
1-2. Structural drawing

Jaw plate

Wedge plunger

Cover

Master jaw



Body

Ring

Base unit

Piston head

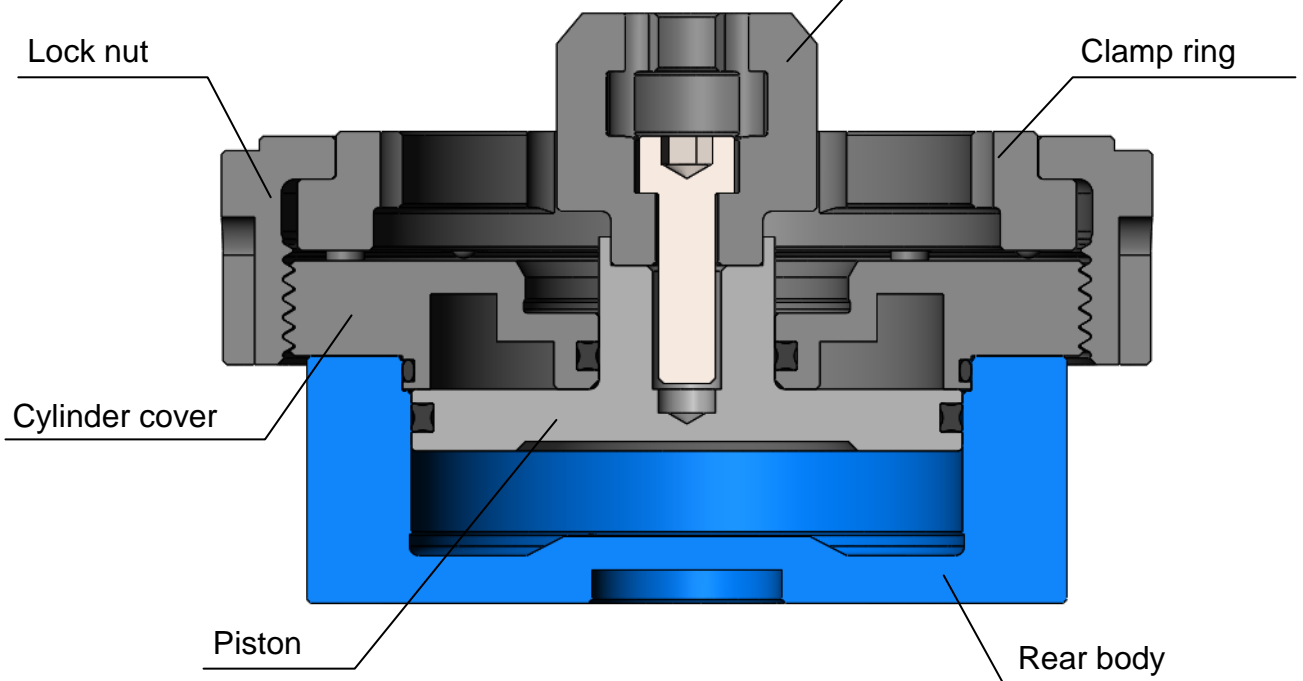
Lock nut

Clamp ring

Cylinder cover

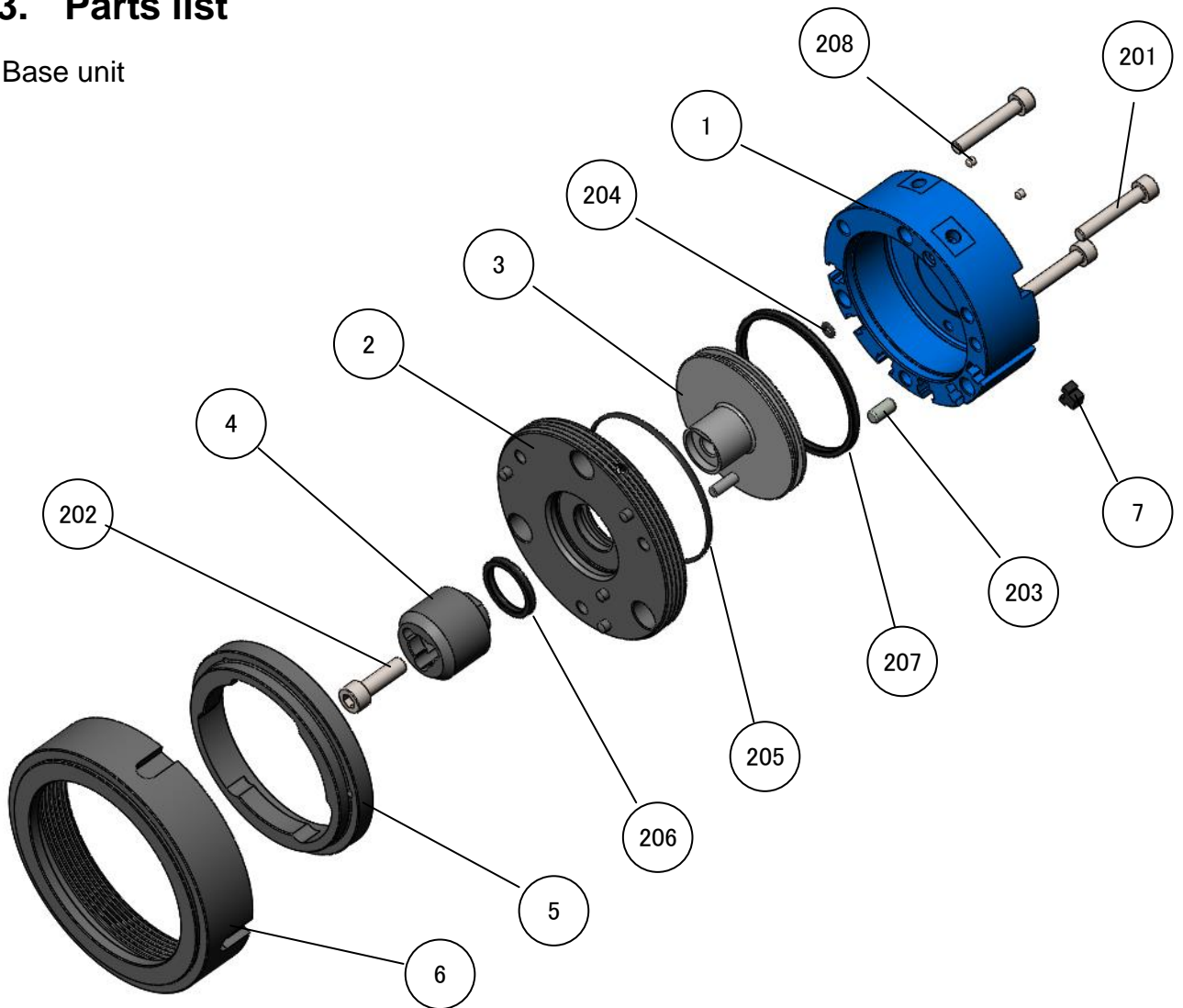
Piston

Rear body



1-3. Parts list

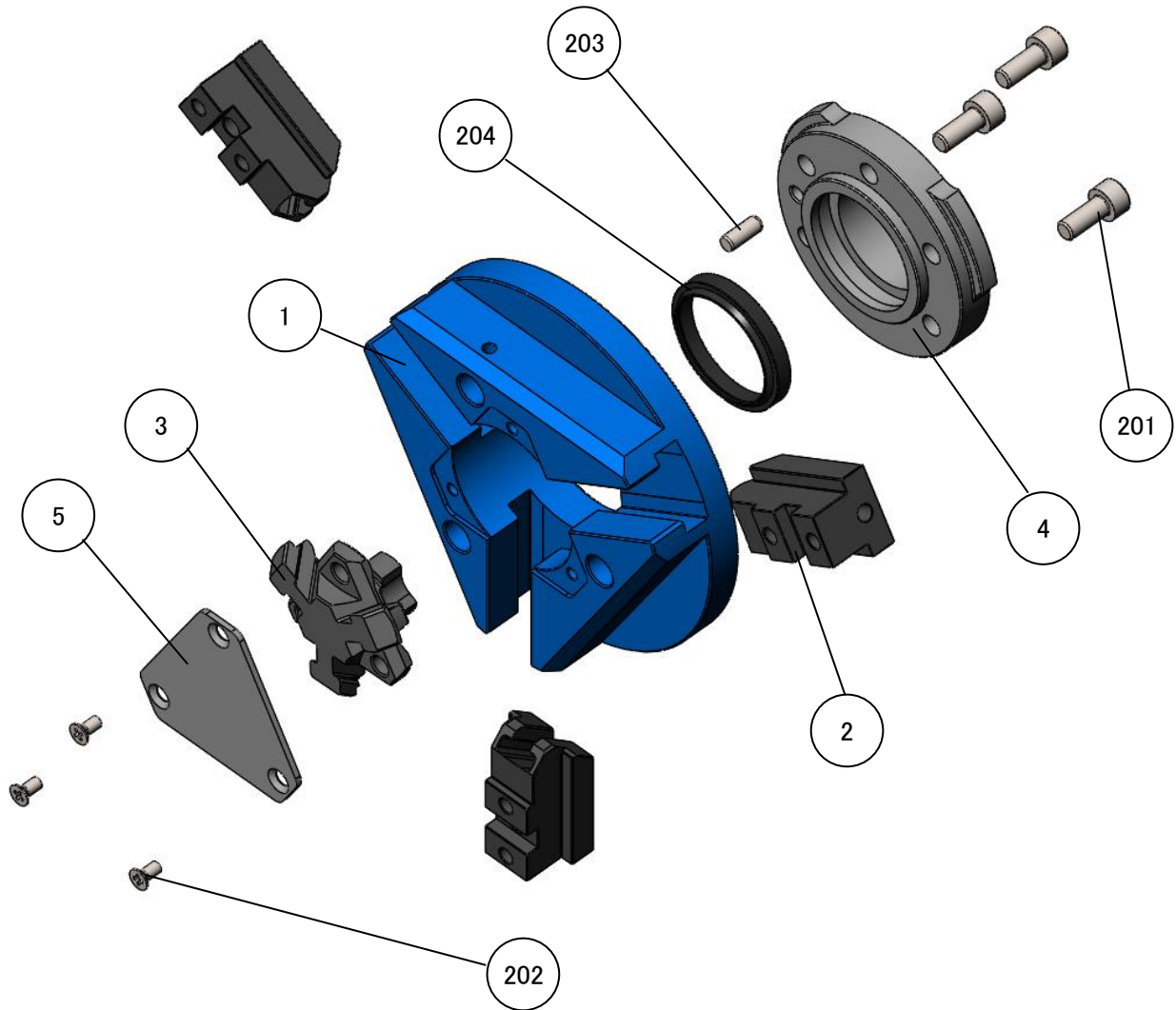
Base unit



No.	Parts name	Quantity	No.	Parts name	Quantity
1	Rear body	1	201	Rear body fixing bolt	3
2	Cylinder cover	1	202	Piston head fixing bolt	1
3	Piston	1	203	Parallel pin	1
4	Piston head	1	204	O-ring	1
5	Clamp ring	1	205	O-ring	1
6	Lock nut	1	206	Shaft packing	1
7	Sensor bracket (accessory)	6	207	Piston packing	1
			208	Setscrew(fixed with adhesive at the delivery)	2

Model	No.			
	204	205	206	207
QGB06	O-ring P3	O-ring AS568-30	X-ring X114	X-ring X130
QGB08	O-ring P3	O-ring AS568-34	X-ring X116	X-ring X137

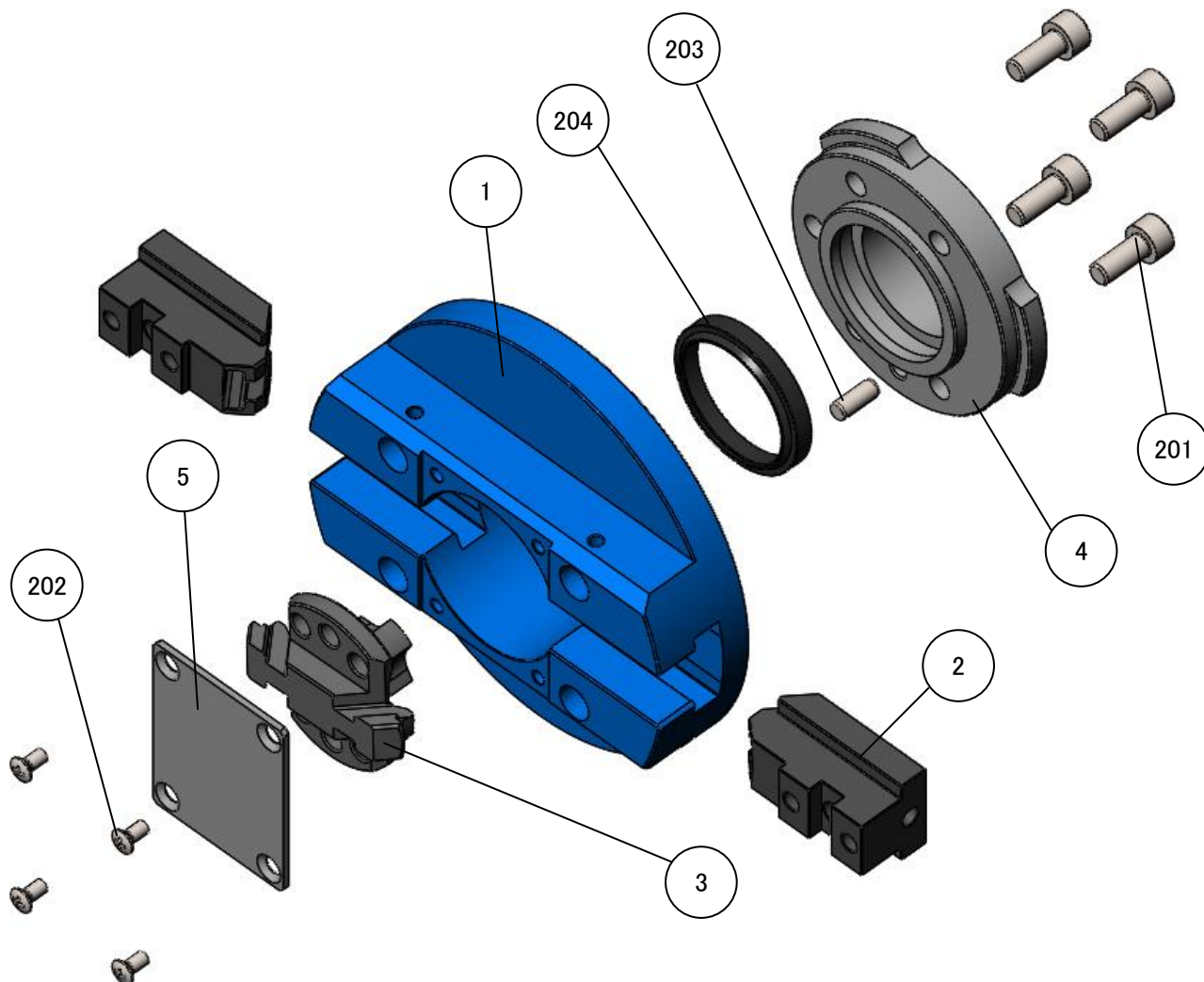
Jaw plate with 3 jaws <Replacement part>



No.	Parts name	Quantity	No.	Parts name	Quantity
1	Body	1	201	Ring fixing bolt	3
2	Master jaw	3	202	Cover fixing bolt	3
3	Plunger	1	203	Parallel pin	1
4	Ring	1	204	Dust seal	1
5	Cover	1			

No.	
Model	204
QG30608	Sakagami Seisakusyo SER22
QG30810	Sakagami Seisakusyo SER28
QG30815	Sakagami Seisakusyo SER28

Jaw plate with 2 jaws <Replacement part>



No.	Parts name	Quantity	No.	Parts name	Quantity
1	Body	1	201	Ring fixing bolt	4
2	Master jaw	2	202	Cover fixing bolt	4
3	Plunger	1	203	Parallel pin	1
4	Ring	1	204	Dust seal	1
5	Cover	1			

No.	
Model	204
QG20808	Sakagami Seisakusyo SER22
QG20810	Sakagami Seisakusyo SER28

2. Important Safety Precautions

Important safety precautions that particularly you should know or follow are summarized below. Please read them before starting to use the product.



DANGER

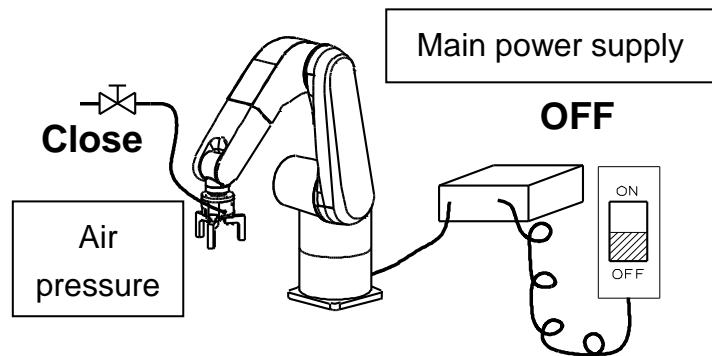
Failure to follow the safety precautions below will result in death or serious injuries.



Be sure to turn off the main power supply when installing, checking, oiling, or replacing the gripper.

Also, shut down the air pressure in the work area.

- During work, the robot or gripper could move abruptly and collide with your body.
- After shutting down the air pressure, release the air pressure remaining inside the gripper.



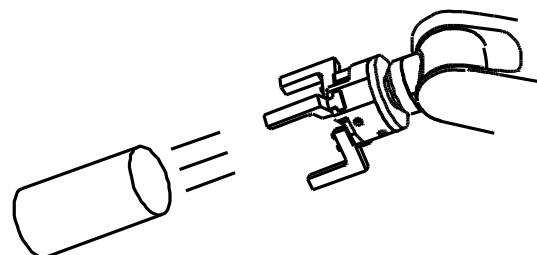
When installing, checking, oiling, or replacing the gripper, post a sign, or provide a notice, fence, and so on to notify people around the machine that work is in progress.

- Notify people around the machine that work is in progress and take measures to keep people other than the operator out of the work area.
Machine motion not predicted by a third party could cause serious danger.



Take safety measures so that the operator is not injured even if the conveyed workpiece flies out due to the reduced air pressure.

- Observe the legal safety standards defined by each country, such as installation of safeguards or fall prevention covers.





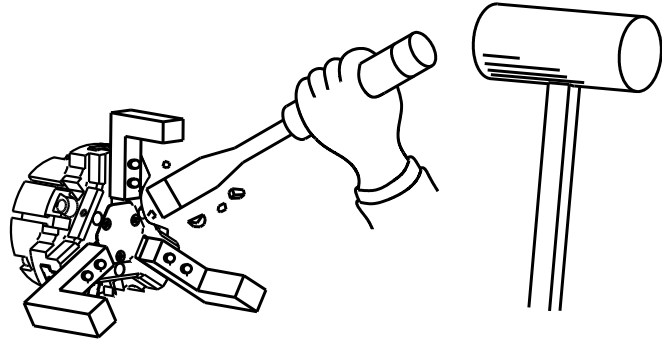
DANGER

Failure to follow the safety precautions below will result in death or serious injuries.



Do not modify the gripper.

- Not only the gripper is damaged but also the gripper and conveyed workpiece may fly out.



If using the gripper as a workpiece fixture when the workpiece is drilled, deburred, welded, or modified additionally, confirm the specifications.

- If the gripper is used out of the specifications, not only the gripper is damaged but also the fixed workpiece may fly out.



Be sure to tighten the bolts with the specified torque.

- Lack of bolt quantity or tightening torque, or excessive torque could damage the bolt, causing the gripper or conveyed workpiece to fly out.
- When tightening the bolts, fix the gripper so that it will not rotate. Failure to do so may result in injury by slipping your hands when tightening the bolts.

Other than piston fixing bolt		Piston fixing bolt	
Bolt Size	Tightening torque	Bolt Size	Tightening torque
M3	1.0 N·m	M6	12.7 N·m
M5	4.5 N·m		
M6	7.65 N·m		

Lock nut	Tightening torque
M70X2	12.0 N·m
M85X2	20.0 N·m



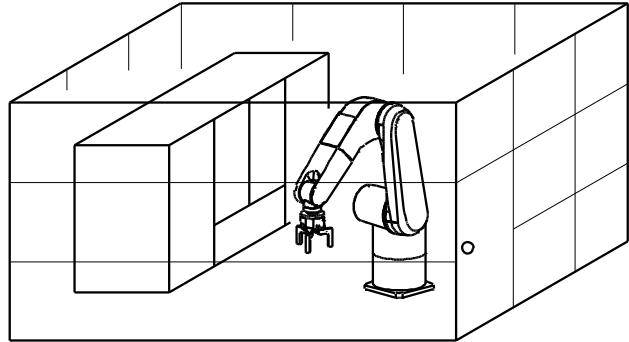
DANGER

Failure to follow the safety precautions below will result in death or serious injuries.



Use the gripper in accordance with the legal safety standards.

- Use the gripper in accordance with the legal safety standards defined by each country, such as installation of safeguards or safety covers.





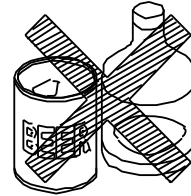
WARNING

Failure to follow the safety precautions below will result in death or serious injuries.



Do not operate the machine after drinking alcohol or taking medicine.

- Impaired judgment or operation mistake may cause serious hazards.



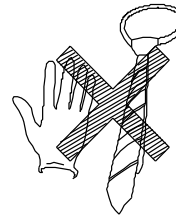
Alcohol

Medicine



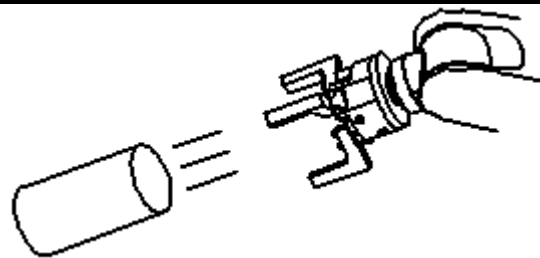
Do not wear clothing or accessories such as a necktie, necklace, etc. which are easy to be caught in.

- You may be caught in the gripper.



Use the gripper within the range of specification values.

- When selecting a gripper, select the model by referring to "Model selection" in page 11.
- Have the gripper grip the conveyed workpiece at the position of its center of gravity.
- If not, not only the gripper is damaged but also the conveyed workpiece may fly out.



3. Specifications

3-1. Specification table

Base unit

Model	QGB	
	06	08
Fluid used	Air pressure	
Operating air pressure (MPa)	0.2 ~ 0.8	
Ambient temperature range (°C)	5 ~ 60	
Piston stroke (mm)	7.5	10
Piston thrust (pull) (N)	968	1506
Piston thrust (push) (N)	867	1353
Cylinder internal volume (reciprocation) (cm ³)	24.1	50.2
Body mass (kg)	0.75	1.15
Ambient humidity range (%)	30 ~ 95	
Storage temperature range (°C)	-10 ~ 60	
Waterproof protection grade	IP44	

* The piston thrust is when the air pressure is 0.6 MPa.

Jaw plate

Model	QG				
	20608	30608	20810	30810	30815
Applicable base model	QGB06		QGB08		
Number of jaws	2 jaws	3 jaws	2 jaws	3 jaws	3 jaws
Fluid used	Air pressure		Air pressure		
Operating air pressure (MPa)	0.2~0.6	0.2~0.8	0.2~0.6	0.2~0.8	
Ambient temperature range (°C)	5 ~ 60		5 ~ 60		
Jaw stroke in diameter (mm)	11.2		15.6		
Repeatability (mm)	±0.03		±0.03		
Body mass (kg)	0.30	0.33	0.40	0.55	0.90
Ambient humidity range (%)	30 ~ 95		30 ~ 95		
Storage temperature range (°C)	-10 ~ 60		-10 ~ 60		
Waterproof protection grade	IP44		IP44		
Noise level (dB)	79		79		

* The repeatability includes the accuracy by Jaw plate replacement.

* The body mass does not include the Base unit.

* Noise level is measured at a distance of 1m from the gripper in front, rear, left, and right four positions of the gripper when it is used in combination with the applicable base.

3-2. Gripping force

① Model selection

Perform the following calculation and select the model that provides a gripping force exceeding the calculation result, though a gripping force varies depending on the shapes of jaws created by the customer and conveyed workpiece or the friction coefficient.

$$F = m(g+a)/\mu$$

(Example)

When mass of conveyed workpiece = 8 kg, friction coefficient = 0.1, and robot acceleration = 10m/s²:
 $F = 8(9.8+10)/0.1 = 1584$ (N)

F = Gripping force (N)

m = Mass of conveyed workpiece (kg)

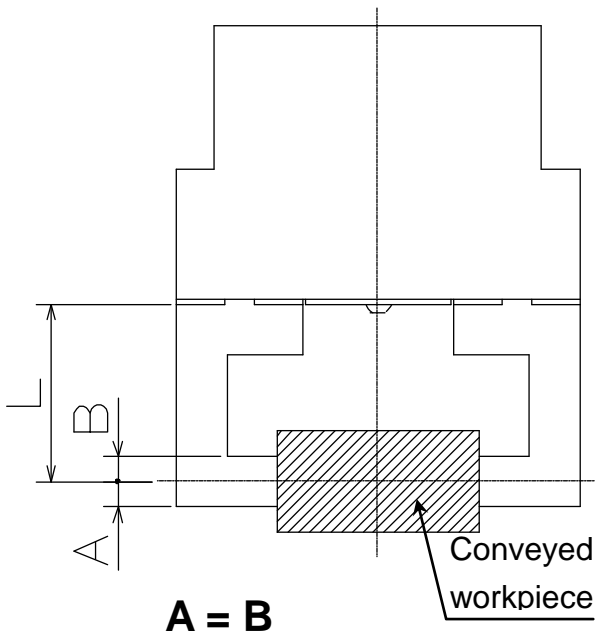
g = Gravitational acceleration (m/s²)

a = Acceleration of robot/loader (m/s²)

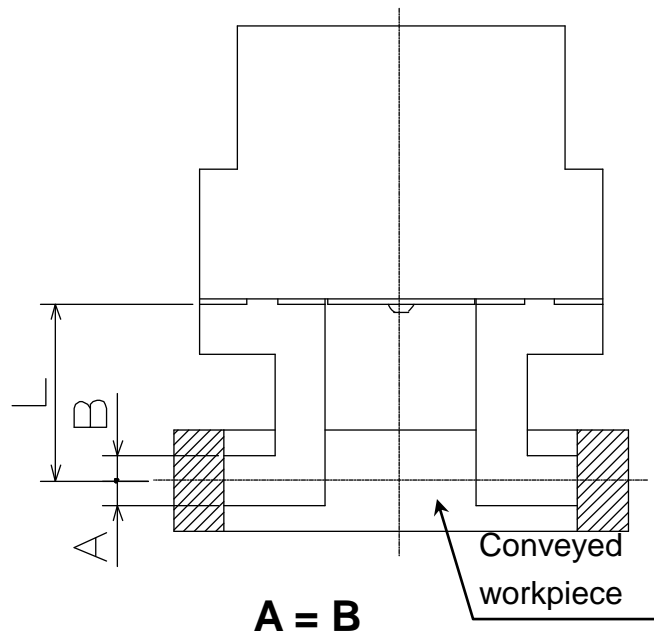
μ = Friction coefficient of gripping part

② Gripping force

● External gripping



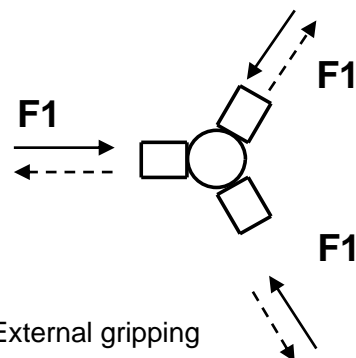
● Internal gripping



● Expression of gripping force

A gripping force F shown in graph is actually measured gripping force per jaw F1 x the number of jaws.

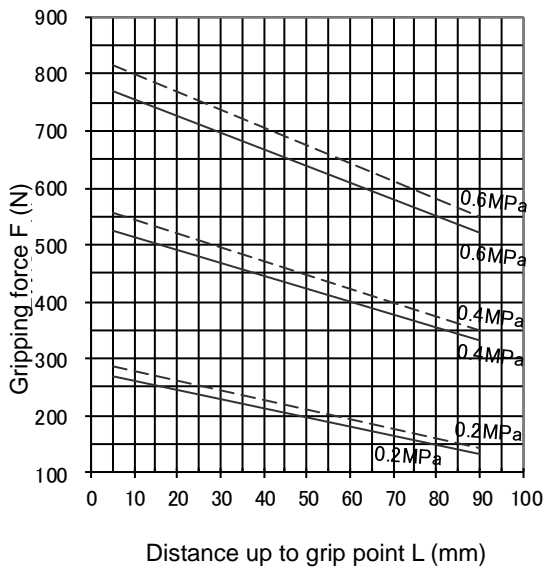
$$(F = F1 \times 3)$$



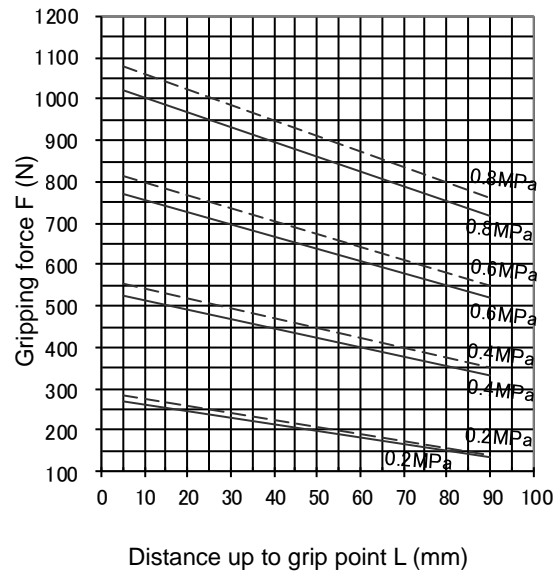
—— External gripping

- - - - Internal gripping

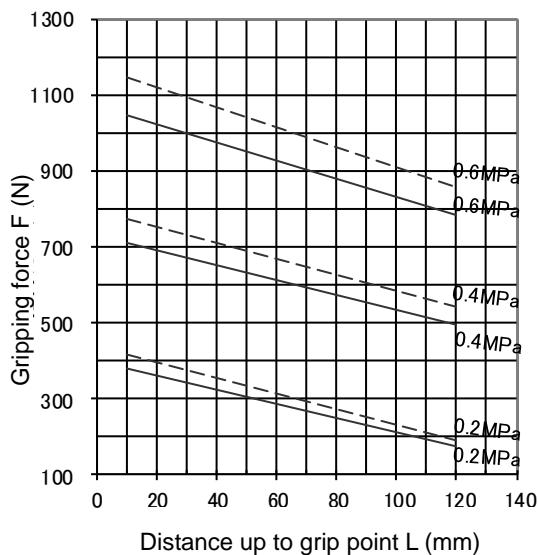
■ **QGB06 + QG20608**



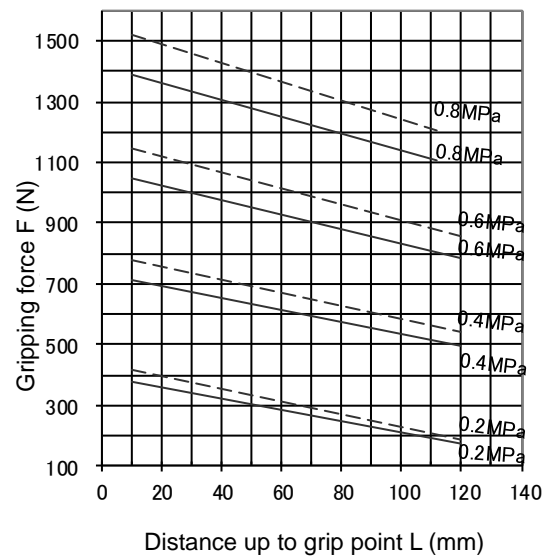
■ **QGB06 + QG30608**



■ **QGB08 + QG20810**



■ **QGB08 + QG30810, QB30815**



NOTICE

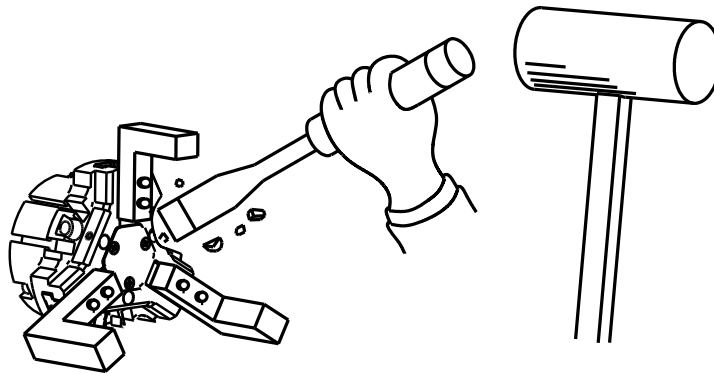
- Determine the distance up to a grip point L as short as possible when designing the jaws. Also, the distance up to a grip point L should be used within a range shown in graph. If it is used out of the range, not only the specified gripping force may not be obtained but also the wear of sliding parts may be increased.

4. Use

This product supplies pneumatic pressure to the unit to move the jaws in the open or close direction for gripping the conveyed workpiece and transfers the conveyed workpiece up to any location. After transfer, the jaws are moved in the close or open direction for removing the conveyed workpiece.

DANGER

- Do not modify the gripper. Using the modified product could cause unexpected accidents. Kitagawa shall not be held liable for human accidents, death, damage, or loss that occurred due to the modification.



- If using the gripper as a workpiece fixture when the workpiece is drilled, deburred, welded, or modified additionally, confirm the specifications. If the gripper is used out of the specifications, not only the gripper is damaged but also the fixed workpiece may fly out.

WARNING

- Wear appropriate clothing suitable for the work and wear gloves, safety glasses, safety shoes, and helmet.
 - Wearing inappropriate clothing causes the clothing to be stuck, resulting in danger.
 - Appropriate clothing will be preventive measures to prevent hazards due to the carelessness or unexpected accidents during work.

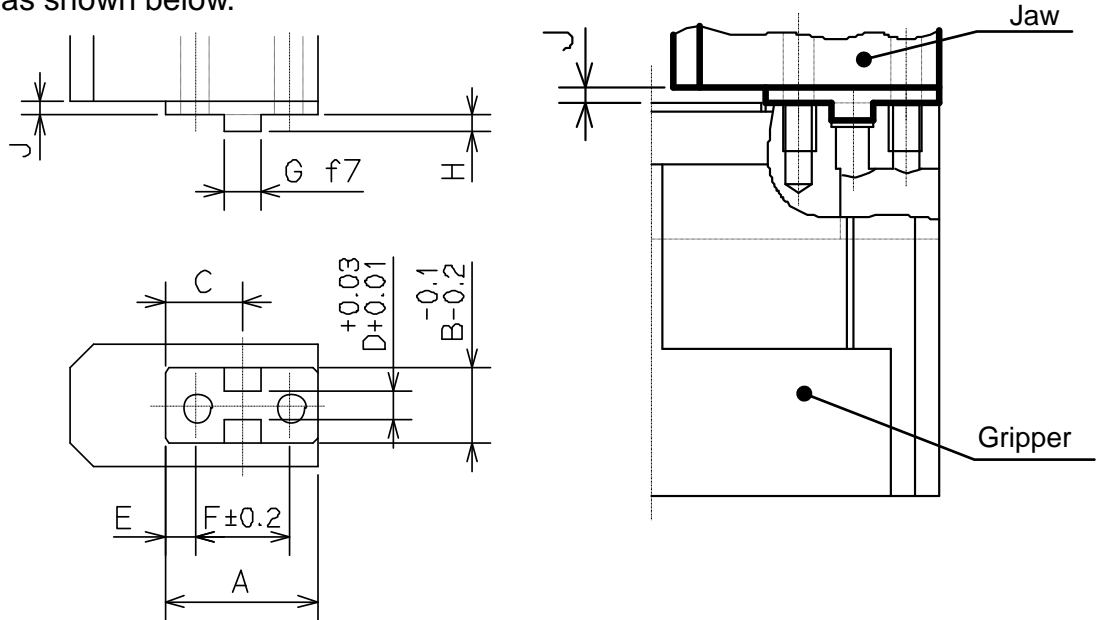
NOTICE

- Do not use the product in the environment of corrosive chemicals, corrosive gas, dust, and vibration, avoiding high temperature or direct sunlight.
- When storing the product, apply antirust treatment and then store it in a place free from water leakage, dew condensation, or freeze.

5. Design of Jaws

5-1. Designing jaws to be installed on the gripper

When designing jaws to be installed on the gripper, form the installation face to the master jaw as shown below.



Model	A	B	C	D ^(*)	E	F	G ^(*)	H ^(*)	J
QG20608	20	11	9.5	4	3	13	5	2.5	0.5
QG30608									
QG20810	23	13.5	11.5	5	3.5	16	6	3	0.5
QG30810									
QG30815									

* Dimensions D, G, and H in the table are used for positioning the jaws. Dimension D is used for positioning in the lateral direction, and dimensions G and H are used for positioning in the longitudinal direction.

6. Installation

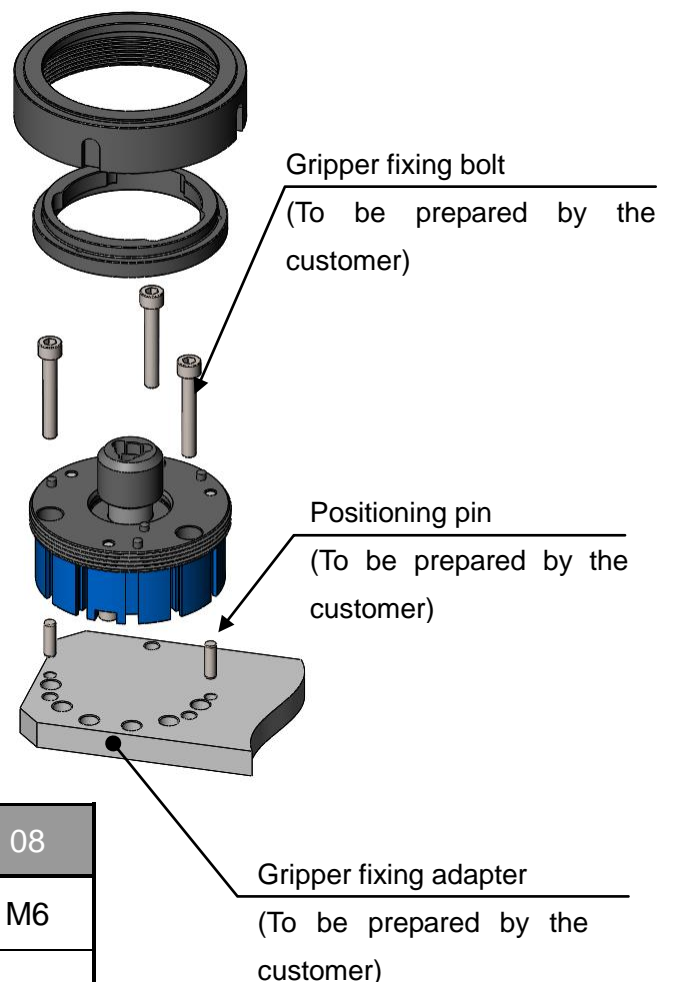
6-1. Installing the gripper

- * When using a reed switch, install it after inserting the attached sensor bracket into the reed switch installation groove. (See 6-5)
- * Workability may become better by assembling the air piping joint before installing the gripper to the adapter.

① Front face installation

- ① Loosen the lock nut and remove the lock nut and the clamp ring.
- ② Install the QGB body to the adapter using the two positioning pin holes or the center fitting portion.
- ③ Fix the body with the three mounting bolts.
- ④ Install the clamp ring with the lock nut while paying attention to the pin position of the clamp ring.

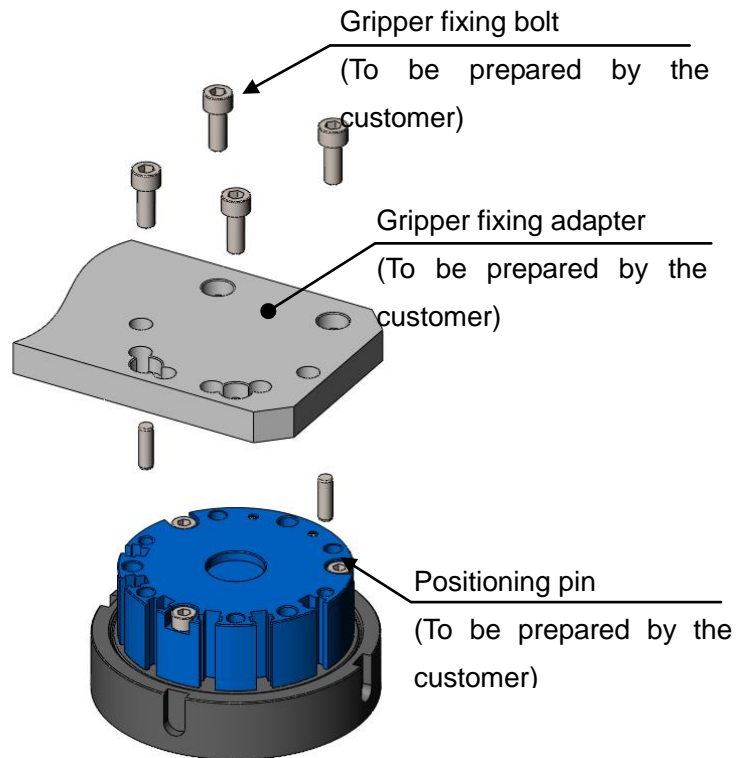
* The body fixing adapter, fixing bolts, and positioning pins are to be prepared by the customer.



Model	QGB	06	08
Gripper fixing bolt size		M5	M6
Positioning pin hole	Diameter ($\begin{smallmatrix} +0.025 \\ 0 \end{smallmatrix}$) (mm)	$\phi 4$	$\phi 5$
	Depth (mm)	6	10
Fitting portion	Diameter (H8) (mm)	$\phi 20$	
	Depth (mm)	3.5	

② Rear face installation

1. Install the QGB body to the adapter using the two positioning pin holes or the center fitting portion.
 2. Fix the body with the three mounting bolts from the rear.
- * The body fixing adapter, fixing bolts, and positioning pins are to be prepared by the customer.



Model		QGB	06	08
Gripper fixing screw	Size		M5	M6
	Thread depth (mm)		9	11
Positioning pin hole	Diameter $\left(\begin{smallmatrix} +0.025 \\ 0 \end{smallmatrix} \right)$ (mm)		$\phi 4$	$\phi 5$
	Depth (mm)		6	10
Fitting portion	Diameter (H8) (mm)		$\phi 20$	
	Depth (mm)		3.5	

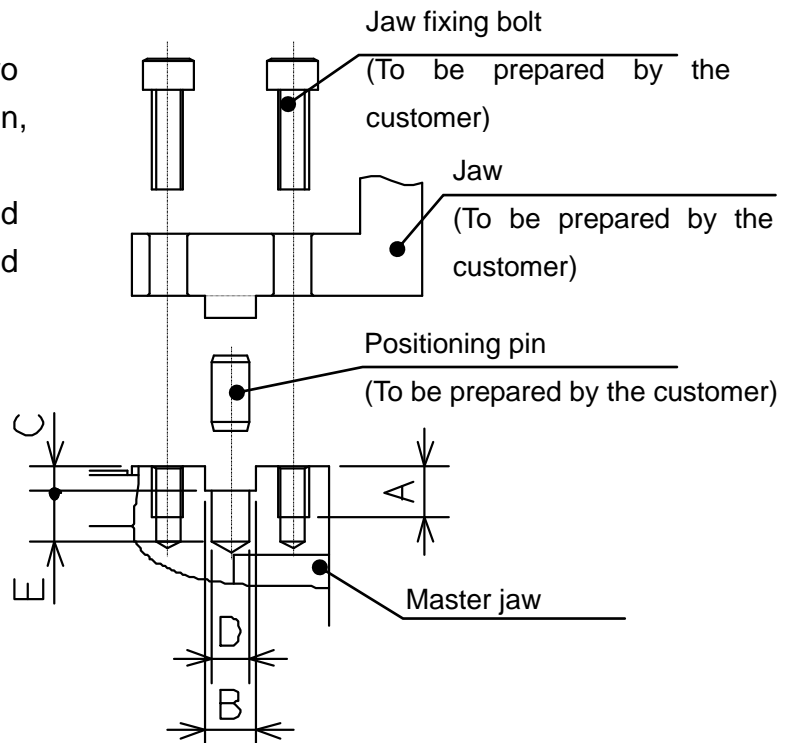
DANGER

- Be sure to tighten the bolts with the specified torque. Lack or tightening torque or excessive torque could break the bolts, causing the gripper or conveyed workpiece to fly out.

6-2. Installing the jaws

Install the jaws using two mounting bolt holes, fitting portion, and positioning pin hole.

The jaws, jaw fixing bolts, and positioning pin are to be prepared by the customer.



Model		QG	20608 30608	20810 30810 30815
Mounting bolt	Size		M4	M4
	Thread depth A (mm)		6	7
Fitting portion	Width (H8) B (mm)		5	6
	Depth C (mm)		3	3.5
Positioning pin hole	Diameter (H8) D (mm)		$\phi 4$	$\phi 5$
	Depth E (mm)		5	6

DANGER

- Be sure to tighten the bolts with the specified torque. Lack of tightening torque or excessive torque could break the bolts, causing the jaws or conveyed workpiece to fly out.
- Before installing the jaws, disconnect the air piping.

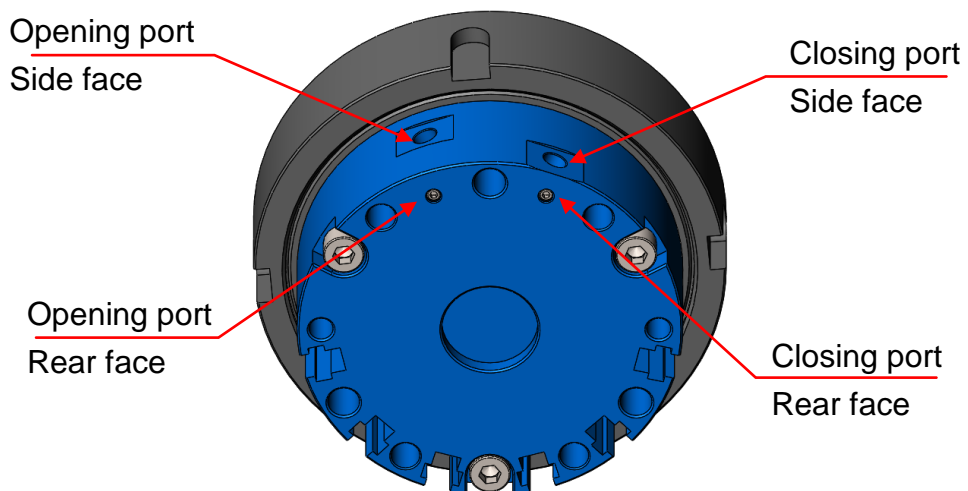
6-3. Connecting the air piping

The air pressure supply ports to open and close the gripper jaws are provided on the side face and rear face of the body.

When using the supply port on the side face of the body, connect the air piping directly.

When using the supply port on the rear face of the body, remove the setscrew, which is attached at the delivery to prevent air leakage, and supply air from the adapter to fix the gripper. Note that the opening/closing ports on the side face of the body must be closed when supplying air from the rear face. Close the ports using the screws prepared by the customer together with a seal, adhesive, and so on to prevent air leakage.

After connecting the piping, check that the gripper operates normally without air leakage.



Model	QGB	06	08
Port size of body side face		M5	M5
Port size of body rear face		M3	M3

NOTICE

- The setscrews in the air pressure supply ports on the body rear face are mounted with adhesive applied to them to prevent air leakage, so it is very difficult to remove them. Therefore, when removing the setscrews, be careful not to damage them.
- After removing the setscrews, take away adhesive fixed to the body screw hole clearly. Be careful not to drip the adhesive into the cylinder.

WARNING

- Be sure to shut off the air pressure before connecting the air piping.

6-4. Installing and replacing the Jaw plate

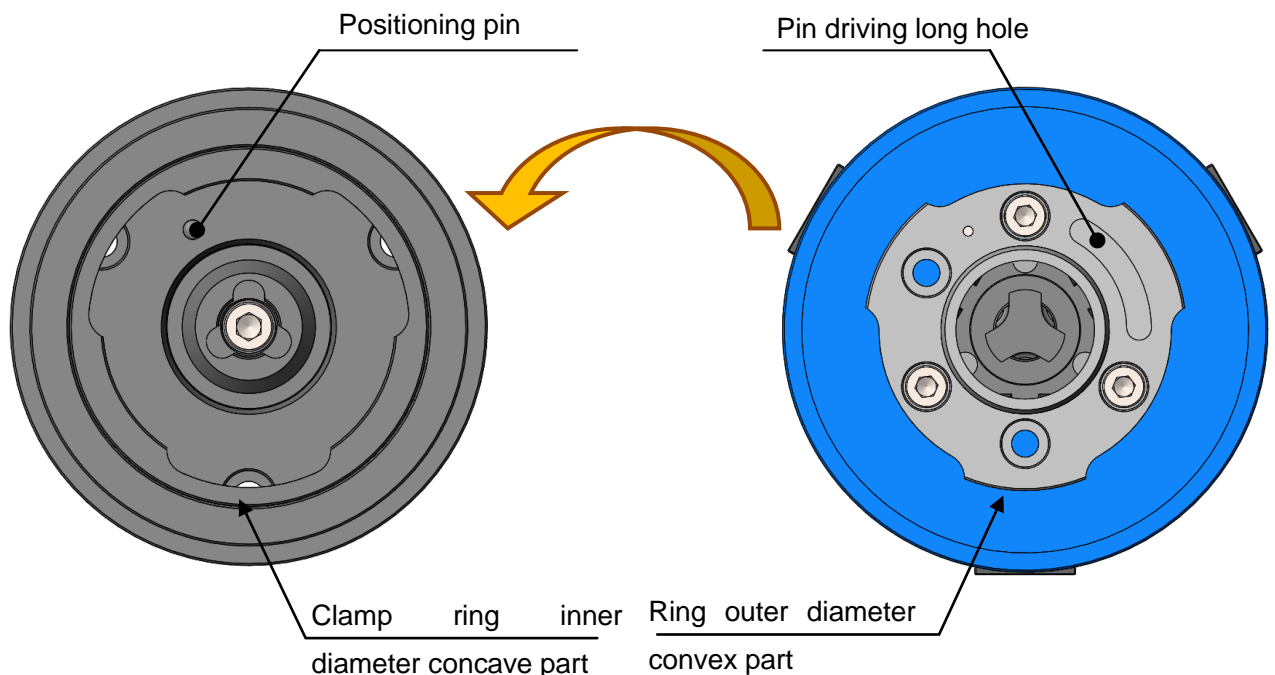
Installation procedure

1. Clean the base and the Jaw plate installation parts.
2. Lightly rotate the lock nut by hand as far as it will go, and then reversely loosen it by about a half rotation.
3. Move QGB06 or QGB08 to the forward end position.
4. Align the pin attached to the cylinder cover <base> with the long hole on the ring <Jaw plate>, and insert the Jaw plate in the base so that the concave parts on the clamp ring inner diameter fit the convex parts on the ring outer diameter. The assembling part of the base and the Jaw plate has sealing resistance because a dust seal is incorporated there.
5. Rotate the base clockwise by about 60° with the Jaw plate completely pressed against the base. When the base rotates by 60°, the internal parts come into contact with each other and it cannot rotate further.

[Note]

- If the base cannot be rotated even when the Jaw plate is pressed against it, the position of the lock nut may be incorrect. Slightly tighten or loosen the lock nut, and the base can be rotated.
- Rotating the base by more than 60° will damage the internal parts. So, do not apply torque after it comes into contact with the pin.

6. Tighten the lock nut with the specified torque to fix the Jaw plate. Tighten the lock nut so as to receive the reaction force so that excessive torque is not applied to the installed device side such as the robot.



Model	QGB	06	08
Lock nut screw size		M70X2.0	M85X2.0
Lock nut tightening torque	(N·m)	12.0	20.0
Tool to be used		φ 80 pin spanner	φ 98 pin spanner



- **Be sure to tighten the bolts with the specified torque. Lack of tightening torque or excessive torque could break the bolt, causing the jaws or conveyed workpiece to fly out.**

Removing procedure

1. Clean the periphery of the gripper. If dust adheres, remove it.
2. Move QGB06 or QGB08 to the forward end position.
3. Loosen the lock nut by about a half rotation. Loosen the lock nut so as to receive the reaction force so that excessive torque is not applied to the installed device side such as the robot.
4. Rotate the Jaw plate counterclockwise by 60°. When the Jaw plate rotates 60°, the internal parts come into contact with each other and it cannot rotate further.

[Note]

- If the face plate cannot be rotated even after loosening the lock nut, the lock nut may be loosened excessively. Slightly tighten the lock nut, and the face plate can be rotated.
 - Rotating the face plate by more than 60° will damage the internal parts. So, do not apply torque after it comes into contact with the pin.
5. Pull out the Jaw plate upward to remove it. The assembling part of the base and the Jaw plate has sealing resistance because a dust seal is incorporated there.

6-5. Installing the switches

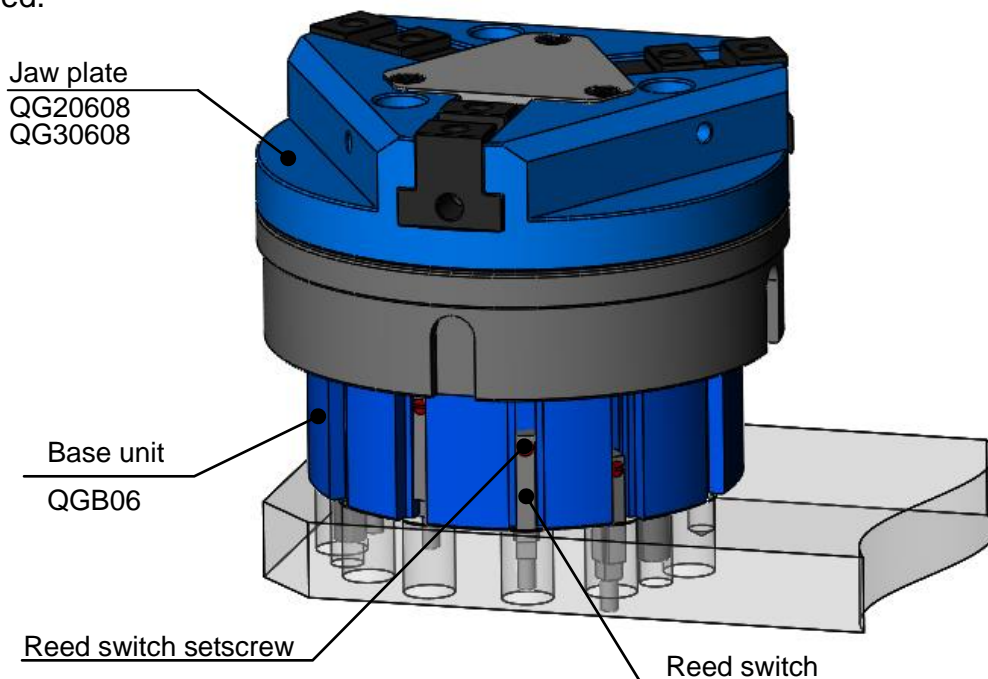
QGB06

- * It is recommended to design the adapter so that the reed switch can be pulled out from the rear face or the side face without removing the gripper to prepare for replacement of the reed switch for maintenance.

6-5-1. Installing the reed switch

Install the reed switch in the reed switch installation groove on the side face of the rear body.

There are six reed switch installation grooves, and up to six reed switches can be installed.



Installation procedure

- ① Install the Jaw plate to be used and fix it with the lock nut.
- ② Set the face plate in a state to be detected. (To detect the open end or the close end, apply air pressure to move the jaws to the stroke end. To detect the gripping position, have the jaws to grip a workpiece.)
- ③ Move up and down the reed switch slowly to confirm the position where it detects.
- ④ Tighten the setscrew provided on the side face at the position where the reed switch detected and fix it.
- ⑤ Repeat the opening/closing operation of the master jaws to confirm that the reed switch can detect.

6-5-2. Installing the proximity switch

For this model, the proximity switch cannot perform gripping confirmation.

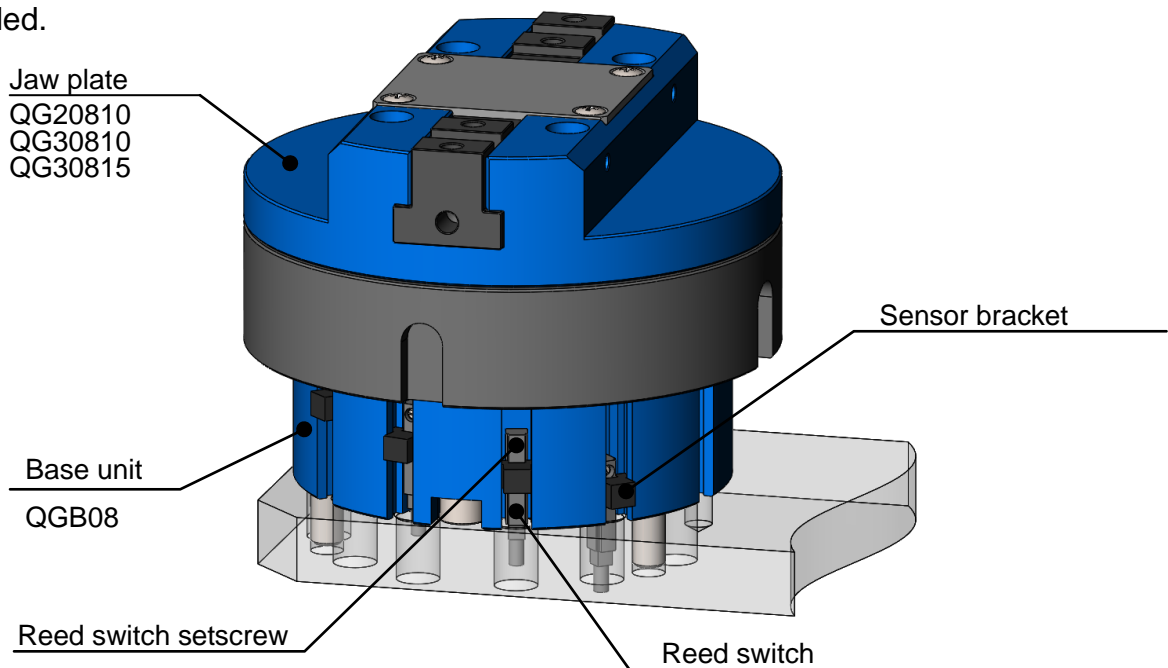
QGB08

- * Install the gripper after inserting the sensor bracket attached to the reed switch installation groove in the installation place.
- * It is recommended to design the adapter so that the reed switch can be pulled out from the rear face or the side face without removing the gripper to prepare for replacement of the reed switch for maintenance.

6-5-3. Installing the reed switch

Install the reed switch in the reed switch installation groove on the side face of the rear body.

There are six reed switch installation grooves, and up to six reed switches can be installed.



Installation procedure

- ⑥ Install the Jaw plate to be used and fix it with the lock nut.
- ⑦ Set the face plate in a state to be detected. (To detect the open end or the close end, apply air pressure to move the jaws to the stroke end. To detect the gripping position, have the jaws to grip a workpiece.)
- ⑧ Move up and down the reed switch slowly to confirm the position where it detects.
- ⑨ Move the sensor bracket to the vicinity of the reed switch setscrew.
- ⑩ Tighten the setscrew provided on the side face at the position where the reed switch detected and fix it together with the sensor bracket.
- ⑪ Repeat the opening/closing operation of the master jaws to confirm that the reed switch can detect.

6-5-4. Installing the proximity switch

For this model, the proximity switch cannot perform gripping confirmation.

7. Maintenance and Checking

7-1. Periodic checking

- Before work or at the grease supply, move the jaws over full stroke to check that the stroke mentioned in the specification table is obtained.
- At the end of work, be sure to clean the gripper body using an air gun.
- At least every three months, check that respective bolts have been tightened.

7-2. Maintenance interval

- The maintenance interval is 1 million cycles, and disassemble the gripper, and clean, replace the seals, apply grease, and reassemble the gripper.

7-3. Grease supply

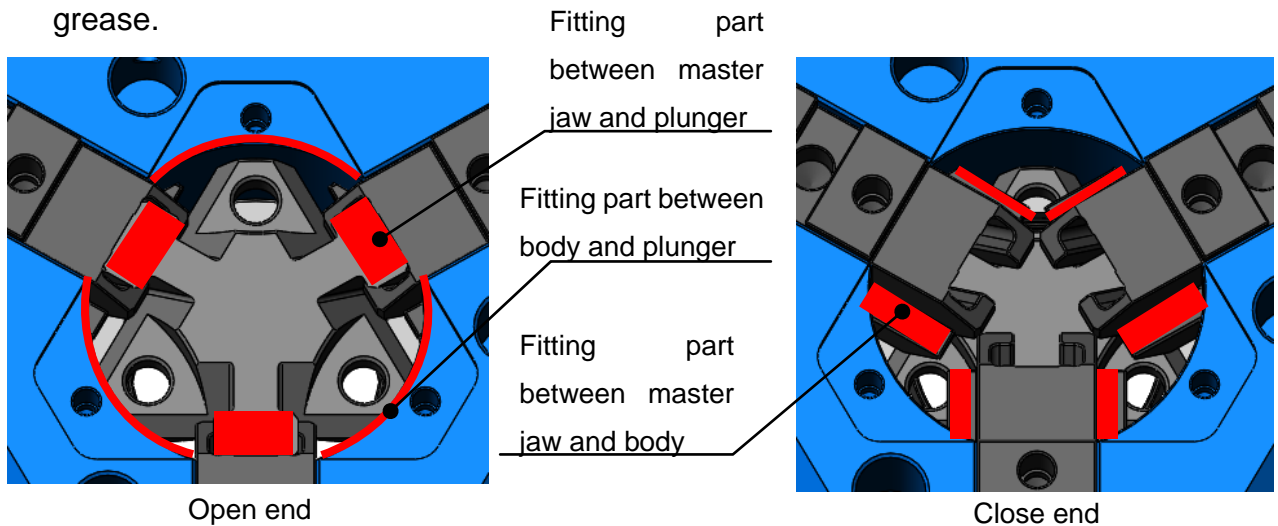
① Grease used

- Be sure to use the specified grease listed below. If unspecified grease is used, adequate effect may not be obtained.

Brand	Manufacturer
Klüberpaste 46 MR 401	Klueber Lubrication: Whole world
CHUCK GREASE PRO	Kitagawa genuine grease (Kitagawa sales agents in each country)

② Supplying method

- ① Remove the Jaw plate from the base unit.
- ② Remove the cover (No.5).
- ③ Apply grease to the fitting parts between the body (No.1), master jaw (No.2), and plunger (No.3).
- ④ Move the master jaws several strokes without gripping anything to spread the grease.



③ Safety information on grease and antitrust oil

Applicable range

- Specified grease
- Antirust agent applied to the product at the delivery

First-aid treatment

- Aspiration: In case of much aspiration, go to a place where there is fresh air, and cover your body with a blanket to keep your body warm. Consult a doctor if necessary.
- Sticking to your skin: Wipe off the oil, and wash your skin with water and soap. If you feel itchy or you get inflamed, consult a doctor immediately.
- Entering your eye: Wash your eye with fresh water for at least 15 minutes, and then consult a doctor.
- Accidental drinking: Consult a doctor immediately without vomiting forcibly.
- For the grease other than the specified one and antirust oil prepared by the customer, refer to the safety information prepared for respective oils.

7-4. Disassembly and assembly procedure

Disassembly procedure

Disassemble the Jaw plate after removing it from the base Unit.

Base unit

By referring to the parts list on page 6, disassemble the product through the procedure below:

- ① Stop the air pressure supplied to the base and disconnect the air piping.
- ② Remove the base from the robot or the loader. Remove the base unit in the procedure reverse to the installation procedure mentioned on page 20 to 23.
- ③ If the lock nut (No.6) and the clamp ring (No.5) are not removed, remove them.
- ④ Loosen the piston head fixing bolt (No.202) and remove the piston head (No.4).
- ⑤ Loosen the rear body fixing bolt (No.201) and remove the cylinder cover (No.2). At this time, be careful not to drop the phase determining parallel pin (No.203) and the O-ring (No.204).
- ⑥ Pull out the piston (No.3) from the rear body (No.1).

Jaw plate

By referring to the parts list on page 7 to 8, disassemble the product through the procedure below:

- ① Loosen the cover fixing bolt (No.202) and remove the cover (No.5).
- ② Loosen the ring fixing bolt (No.201) and remove the ring. At this time, be careful not to drop the phase determining parallel pin (No.203).
- ③ Push up the plunger (No.3) to the cover side and pull out the master jaws (No.2) completely from the body (No.1).

To reduce the error of the gripping center position before and after reassembly, it is recommended to provide a matching mark to the master jaw and the body so as to assemble them in the same position. Also, it is recommended to perform the same work for the plunger and the master jaw.

Assembly procedure

Base unit

- By referring to the parts list on page 6, assemble the product through the procedure below:
- Before assembly, check the sealing parts for flaws and apply the oil treatment shown below to the sealing parts and the seal sliding parts. Also, check that the seals do not protrude or fall when incorporating them.

Oil treatment used

Be sure to use the specified oil treatment shown below.

Brand	Manufacturer
S-10 Oil treatment	Napolex: Japan

- ① Incorporate the X-ring (No.207) into the piston (No.3).
- ② Incorporate the O-ring (No.205) and X-ring (No.206) into the cylinder cover (No.2).
- ③ Insert the piston in the rear body (No.1). At this time, match the phases of the hole on the rear body and the phase determining pin attached to the piston.
- ④ Attach the parallel pin (No.203) and the O-ring (No.204) to the rear body.
- ⑤ Install the cylinder cover (No.2) to the rear body and fix it with the rear body fixing bolt (No.201). At this time, pay attention to the phase of the cylinder cover.
- ⑥ Attach the piston head (No.4) to the end of the piston and fix it with the piston head fixing bolt (No.202). Match the phase of the piston head flat surface to the flat surface on the piston installation face when installing the piston head.
- ⑦ Tighten the lock nut (No.6) with the clamp ring (No.5) matched to the piston cover in phase.
- ⑧ Install the base to the robot or the loader by referring to page 20 to 23.
- ⑨ Conduct a test run to confirm that it operates normally.



- **Be sure to tighten the bolts with the specified torque. Lack of tightening torque or excessive torque could break the bolt, causing the jaws or conveyed workpiece to fly out.**

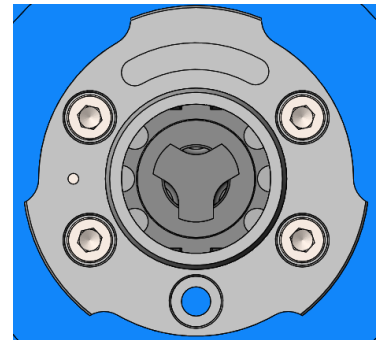
Jaw plate

- By referring to the parts list on page 7 to 8, assemble the product through the procedure below.
- When assembling the product, apply the specified grease (refer to page 27) to the sliding parts.
- When assembling the dust seal, check for flaws and apply the oil treatment mentioned above to it.

- ① Incorporate the dust seal (No.204) into the ring (No.4).
- ② Attach the parallel pin (No.203) to the body (No.1) and then attach the ring. After that, fix it with the ring fixing bolt (No.201).
- ③ Insert the master jaws (No.2) from the circumference of the body.
- ④ Insert the plunger (No.3) in the body while aligning it to the master jaw fitting parts.

[Note] When face plate is 2-jaw model

•Install the plunger so that the phases of the plunger and the ring are as shown in the right figure. If the plunger is installed rotating by 180°, the face plate cannot be installed to the base unit.



- ⑤ Install the cover (No.5) and fix it with the cover fixing bolt (No.202).
- ⑥ Move the face plate by hand to confirm that it operates smoothly.

DANGER

- **Be sure to tighten the bolts with the specified torque. Lack of tightening torque or excessive torque could break the bolts, causing the jaws or conveyed workpiece to fly out.**

8. Troubleshooting

8-1. Gripper is faulty

Check the following, and take corrective actions.

Symptom	Cause	Corrective actions
Gripper does not operate	Gripper internal part is broken	Replace the gripper with a new one
	Slideways get seized	Disassemble, and correct the seized part with an oilstone, or replace the gripper with a new one
	The piston does not operate	Check that the air pressure is within the operating pressure range
		Check for air leakage
		Check the piping and solenoid valve, and if normal, disassemble and clean the cylinder
The switch is faulty or installed incorrectly	Check that the switch can detect normally	
Lack of master jaw stroke	Much dust exists in master jaws	Disassemble the gripper, clean it, replace the seals, and apply grease
Low gripping force	Low air pressure	Check that the air pressure is within the operating pressure range
	Air leaks from the seal	Disassemble the gripper, clean it, replace the seals, and apply grease
	Master jaw movements are not smooth	Remove the cover and supply grease, and open and close the master jaws several times without gripping any conveyed workpiece
		Disassemble the gripper, clean it, and apply grease

WARNING

- If the gripper failed due to a seizure or damage, disassemble the gripper following the disassembly procedure. If the gripper is in the state that you cannot disassemble, do not disassemble it forcibly but please contact us or our agents.
- Stop using the gripper immediately if the situations are not improved though corrective actions given in above table were taken. Continuous use of faulty product or part could cause serious human accidents due to flying gripper or conveyed workpiece.
- The gripper must be repaired only by skilled persons who have received the training course. Repair by unskilled persons or persons other than us or our agents could cause serious human accidents.

8-2. Contact address in case of trouble

Please get in touch with our sales agent from which you purchased the gripper or our office of the address given on the back cover when the gripper troubled.

•9.Othres

9-1. Standards and directives to which the gripper conforms

This product conforms to the following standards and directives:

- Machinery directive:2006/42/EC Annex I
- EN ISO 12100-1:2003+A1:2009
- EN ISO 12100-2:2003+A2:2009

9-2. Disposal of gripper

Dispose of this unit in accordance with the laws and regulations of your country.