

INSTRUCTION MANUAL

FG-AC type

Finger Chuck for Automotive Wheels
(for Auto Chuck Changer)



DANGER

- This instruction manual is for production engineers and maintenance personnel in charge of operation of this product. When a beginner uses this product, receive instructions from experienced personnel, the distributor or our company.
- Before installing, operating or maintaining this equipment, carefully read this manual and the safety labels attached to the equipment. Failure to follow these instructions and safety precautions could result in serious injury, death, or property damage.
- Store this manual near equipment for future reference.
- If any questions related to safety arise about this manual, please confirm them with the distributor or our company.

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Preface

This manual provides detailed information about how to safely and correctly use the finger chuck for automotive wheels (FG-AC type) for a lathe.

Before starting to use this finger chuck for automotive wheels, read this manual carefully and always follow the instructions and warnings in "Important Safety Precautions" and "Precautions for Use" at beginning of the manual. Failure to follow these precautions could result in a serious accident.

Terms and Symbols Used for Safety Messages

In this manual, precautions for handling that are considered especially important are classified and displayed as shown below depending on the damage of risk including the seriousness of the harm that could result. Please sufficiently understand the meanings of these terms and follow the instructions for safe operation.



Safety Alert Symbol

The triangle is the safety alert symbol used to alert you to potential safety hazards that could result in injury or death.



Indicates a hazardous situation which, if you not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if you not avoided, could result in death or serious injury.



Indicates a hazardous situation which, if you not avoided, could result in minor or moderate injury.



Indicates instructions which, if not avoided, could result in damage to the equipment or a shortened work life.

Liability and How to Use this Manual

This product is suitable for gripping an automotive aluminum wheel on the lathes with auto chuck changer. This product is equipped with the levers to clamp the automotive aluminum wheel and they operate by means of a built-in cylinder. For any other applications, please contact us.

Our company will not assume responsibility for injury, death, damage, or loss resulting from not following the instructions in this manual.

There are countless things that cannot or should not be done, and it is impossible to cover all of them in this manual.

Therefore, do not perform any actions unless they are specifically allowed in this manual. If any questions related to safety arise about operation, control, inspection and maintenance which are not specified in this manual, please confirm them with our company or distributor before performing them.


Guarantee and Limitation of Liability

The guarantee period of this product is 1 year after delivery.

Use the parts delivered by Kitagawa Iron Works for all the parts including consumable parts. We will not assume responsibility for injury, death, damage, or loss caused by usage of parts not manufactured by Kitagawa Iron Works. Additionally, if parts other than genuine parts manufactured by Kitagawa Iron Works are used, this guarantee will be completely invalid.

The chuck and cylinder from Kitagawa Iron Works should be used together. If you must use a part not made by Kitagawa, check with us or our distributor to be sure it is safe to do so. We will not be responsible for injury, death, damage or loss caused by use of a chuck or cylinder made by another company unless this use has been approved by Kitagawa or its distributor.

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1. Structural Drawing and Parts List

1-1. Type display

Type display as shown below

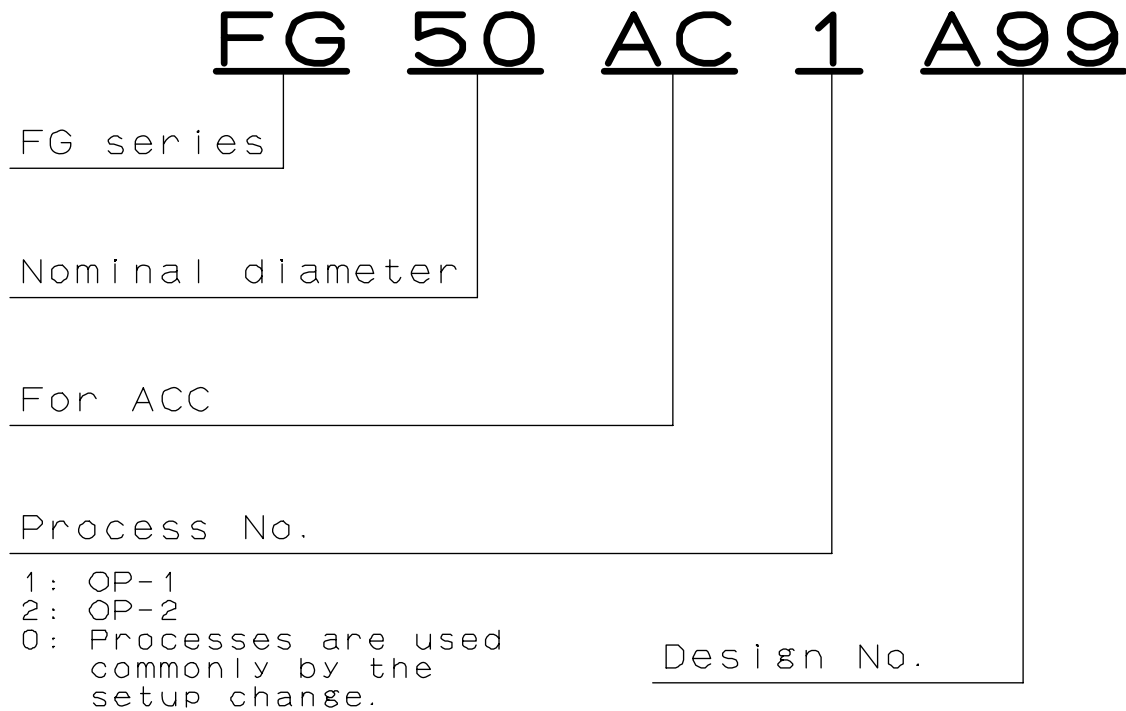


Fig.1

1-2. Structural drawing

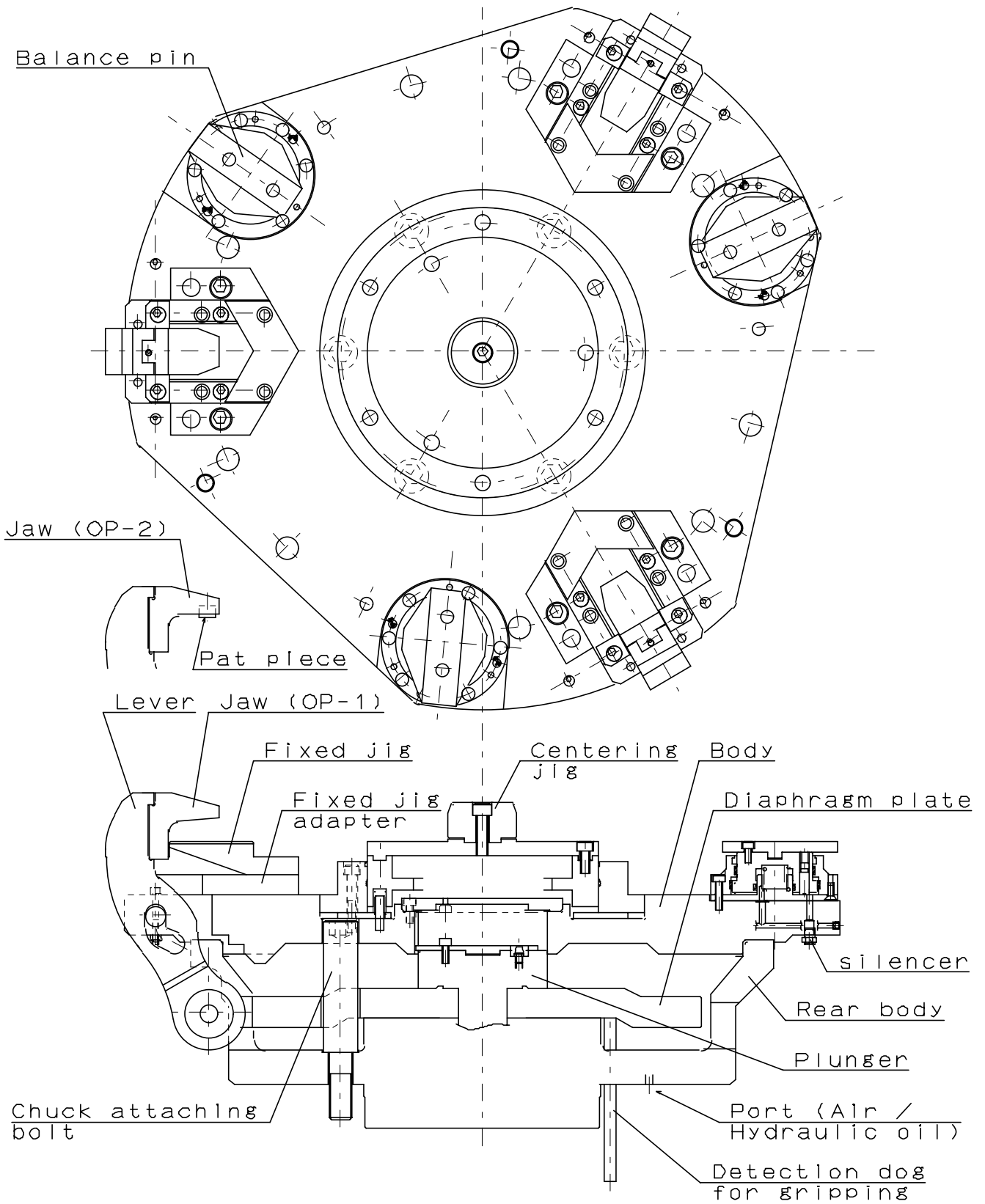


Fig.2

1-3. Scope of product

This instruction manual is for the chuck part.

WARNING

- To prevent the work from flying, safe design, maintenance and erroneous action prevention of the hydraulic system to maintain the gripping force of the chuck is extremely important. Thoroughly read the “Important Safety Precautions” on and after page 9 in this manual.
- As for the cylinder, follow the instruction manual for the cylinder.

1-4. Parts list

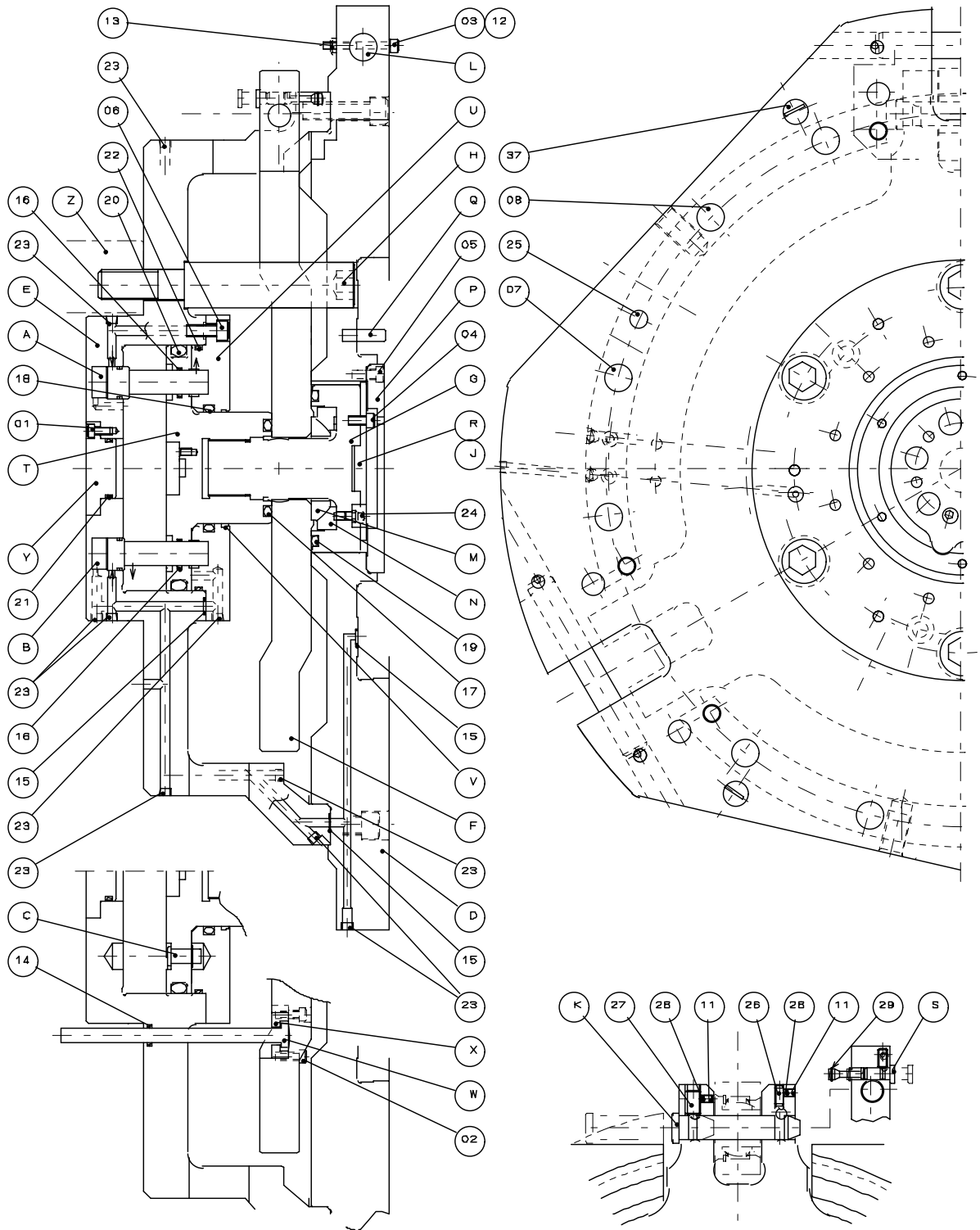


Fig.3

Table 1

No.	Part name	Quantity	No.	Part name	Quantity
A	Lock valve LV-124G2	1	08	Socket head cap screw	9
B	Lock valve LV-124H2	1	09	Eyebolt M10 (FG67: M12)	1
C	Relief valve RV-106	2	10	Eyebolt M16	3
D	Body	1	11	Set screw	-
E	Rear body	1	12	Spring washer	6
F	Diaphragm plate	1	13	Nut	6
G	Plunger	1	14	O-ring	3
H	Chuck attaching bolt	6	15	O-ring	10
J	Connection handle	1	16	O-ring	2
K	Pin	3	17	O-ring	1
L	Guide pin	3	18	O-ring	1
M	Spherical bushing A1	1	19	O-ring	1
N	Spherical bushing A2	1	20	O-ring	1
P	Plunger cover	1	21	O-ring	1
Q	Guide pin	12	22	O-ring	1
R	Key plate	1	23	Plug	-
S	Lock pin	3	24	Grease nipple A M6	1
T	Piston	1	25	Parallel pin	3
U	Cylinder cover	1	26	Mini ball plunger	3
V	Scraper	1	27	Small plunger	3
W	Detection dog for gripping	3	28	Fixed plate	6
X	Dog cover	3	29	Retaining ring	3
Y	Cylinder cover A	1	30	Hex key 3 (FG67: none)	1
Z	Plate for packing	1	31	Hex key 4	1
			32	Hex key 5	1
01	Socket head cap screw	6	33	Hex key 6	1
02	Socket head cap screw	6	34	Hex key 10	1
03	Socket head cap screw	6	35	Hex key 17	1
04	Socket head cap screw	2	36	-	-
05	Socket head cap screw	6	37	Plug THP16	3
06	Socket head cap screw	12			
07	Socket head cap screw	3			

※ Refer to the Spec. information for supply for the top tooling.

2. Important Safety Precautions

Important safety precautions are summarized below. Please read this section before first starting to use this product.



DANGER

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



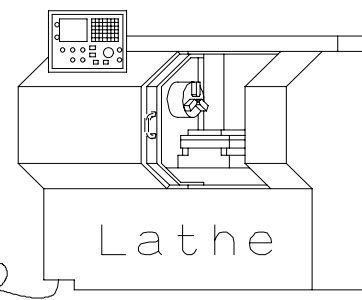
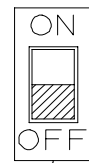
Turn off main power supply before attaching, inspecting or replacing chuck, and before adding oil.

For All Users

- The chuck may start rotation suddenly, and a part of the body or clothing may be caught.

Main power supply

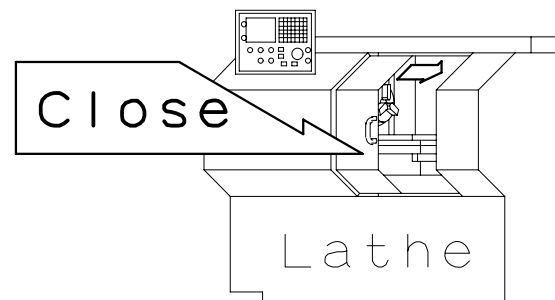
OFF



Close door before rotating spindle.

For All Users

- If the door is not closed, you may touch the rotating chuck or the work may fly out, which is very dangerous. (In general, the safety interlock function which allows rotation only when the door is the manual mode or the test mode)



During spindle rotation, do not turn off hydraulic pump power supply and do not operate switching valve.

For All Users

- Cutting off hydraulic pressure causes a drop in the gripping force which could result in the work being released and flying out.
- Operating the manual switching valve or solenoid valve will lead to a drop of hydraulic pressure.



Important Safety Precautions



DANGER

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



Do not allow the rotation speed of the chuck to exceed the maximum allowable speed limit. (Refer to the Spec. information for supply and Pages 13) **For All Users**

- If the rotation speed of the chuck exceeds the rotation speed limit, this is very dangerous as the chuck and work will fly out. Be sure to refer to the specifications given in the Delivery Specification since the rotary speed may have to be reduced than standard value depending on the top tooling.



The hydraulic pressure of the chuck must not exceed the allowable maximum hydraulic pressure. (Refer to the Spec. information for supply and Pages 13) **For All Users**

- Hydraulic pressure must match the specification of the chuck.
- Excessive hydraulic pressure can lead to breakage of the jaw attaching bolt, which is very dangerous, as the work can be damaged and fly out. Particularly for long jaws, the moment applied to the bolts becomes large, requiring the hydraulic pressure to be reduced than standard value. Accordingly, be sure to refer to the specifications given in the Delivery Specification.



Determine the gripping force required for processing by the machine tool manufacturer or user, and check that the required gripping force is provided before processing. **For All Users**

- Adjust the hydraulic pressure to the cylinder to obtain the required gripping force. If the gripping force is insufficient, this is dangerous as the work will fly out.



Variations in height of workpiece gripping part must not exceed the fluctuations of diaphragm plate. Also, do not grip the workpiece at a burred portion or in the inclined state. **For All Users**

- If variations at three places in height of workpiece gripping part exceed the fluctuations of diaphragm plate, the workpiece cannot be gripped completely, causing the workpiece to fly out.
- If the burred part of workpiece or the inclined workpiece is gripped, a gripping failure will occur, causing the workpiece to fly out.



Important Safety Precautions



DANGER

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



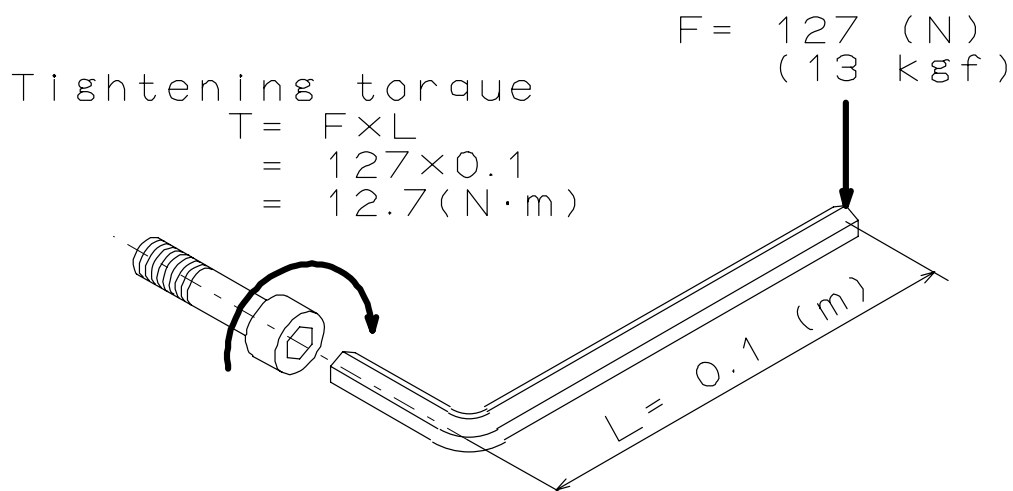
Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out. Use the bolts attached to the chuck, and do not use bolts other than these.

For All Users

- If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out.
- Fix the lathe spindle or the chuck when you tighten bolts. Your hand could slip and get injury when you work without fixing the spindle.
- You cannot control the torque by a hex key. You must use a torque wrench for torque control.

Specified torque for socket head cap screw

Bolt size	Tightening torque	
M5	8	N·m
M6	13	N·m
M8	33	N·m
M10	73	N·m
M12	107	N·m
M14	171	N·m
M16	250	N·m
M20	402	N·m



- Tightening torque is moment of force when you tighten a bolt. Tightening torque = $F \times L$.



Important Safety Precautions



WARNING

Failure to follow the safety precautions below could result in serious injury or death.



Do not modify the chuck.

For All Users

- Not only the chuck is damaged but also the chuck and workpiece may fly out.
- Do not install parts other than genuine parts made by Kitagawa by adding the tapping.
- Do not remove chuck parts from the chuck.



Periodically supply adequate grease (Refer to page 22). Turn off power before adding grease.

For All Users

- Insufficient grease supply lowers the gripping force, causes operation failure due to lower hydraulic pressure, lowers the gripping precision, and causes abnormal wearing and seizing, etc. This is dangerous as the work could fly out.



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

For All Users

- Dangerous since these lead to operation mistakes and misjudgment.



Alcohol

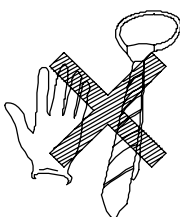
Medication



Do not operate the machine wearing gloves, a necktie, and other loose clothing or jewelry.

For All Users

- Dangerous since it will be caught.



3. Specifications

3-1. Specifications

Table 2

Type		FG50AC	FG56AC	FG62AC	FG67AC
Jaw stroke	mm	28.5	28.5	28.5	28.5
Gripping force per a jaw	kN (kgf)	9.2 (938)	9.2 (938)	9.2 (938)	9.2 (938)
Allowable maximum input force	kN (kgf)	29 (2957)	29 (2957)	29 (2957)	29 (2957)
Allowable maximum rotation speed	min ⁻¹	2500	2500	2200	1500
Mass	kg	117	170	200	200
Moment of inertia	kg·m ²	2.6	5.6	6.5	10.1
Maximum hydraulic pressure	MPa (kgf/cm ²)	2.0 (20.4)	2.0 (20.4)	2.0 (20.4)	2.0 (20.4)
Fluctuation of diaphragm plate	mm	3.3	3.8	4.3	4.7
Balance quality (standard soft jaw not included)		G6.3			
Storing temperature / Operating temperature		-20 ~ +50 °C / -10 ~ +40 °C			

Reference: 1kN = 101.97kgf 1MPa = 10.197kgf/cm²

When storing this product, the product should be subjected to the antirust treatment and stored in a place free from wetting, condensation, or freeze.



- Allowable maximum rotary speed and allowable maximum hydraulic pressure may be different depending on the size of top tooling and workpieces. Be sure to refer to the latest Delivery Specification to use the chuck within the given specifications. Excessive hydraulic pressure or rotary speed will damage the chuck, causing the chuck and workpiece to fly out.**

4. Top tooling

4-1. Exchange of jaw

Removing the jaws

1. Loosen the set screw [1].
2. Loosen the socket head cap screw [2] and remove the jaw [3]. Save the fixed plate [4] carefully.

Installing the jaws

1. Install the jaw [3] with the socket head cap screw [2]. At this time, the reference surfaces of jaws and lever must contact completely. Also, tighten the socket head cap screw with the specified torque.
2. Confirm that the fixed plate [4] is present, and then tighten the set screw [1].

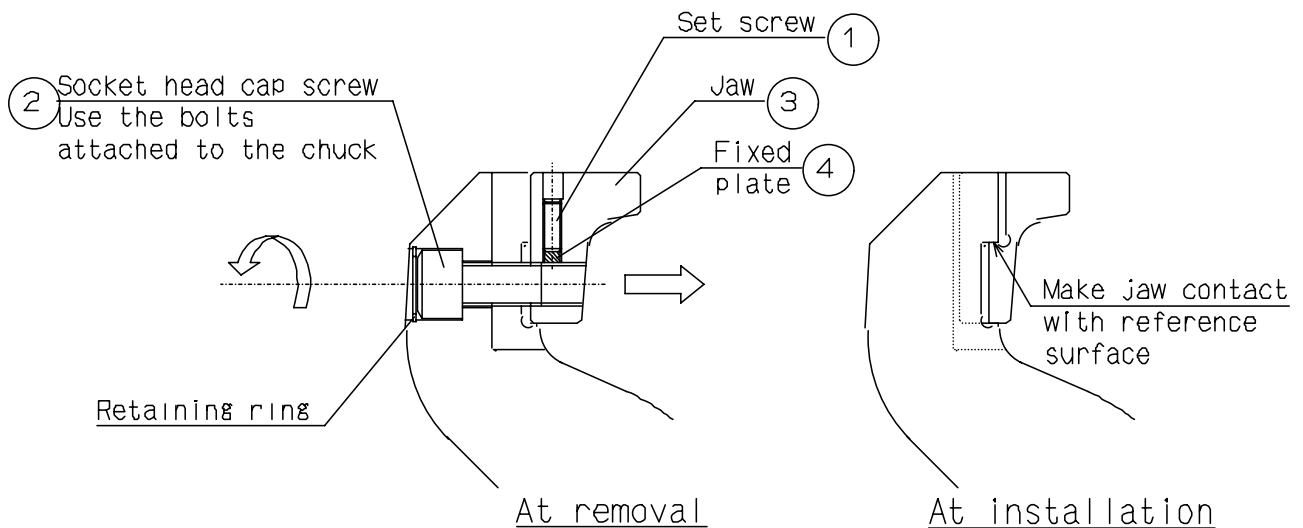


Fig.4

⚠ DANGER

- Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out.
- Use the bolts attached to the chuck, and do not use other bolts. However, if you must use other bolts not provided by Kitagawa, use bolts that have at least a strength classification of 12.9 (10.9 for M22 or more) and be sure they are long enough.

Table 3

Bolt size	Tightening torque	
M10	73	N·m
M14	171	N·m

4-2. Exchange of lever

Removing the lever

1. Remove the socket head cap screw [1]. Save the spring washer [3] and the nut [4] carefully.
2. Pull out guide pin [2].
3. Push in the lock pin [5] and pull out the pin [6] and remove the lever [7].

Installing the lever

1. Install the lever [7] with the pin [6].
2. Push up the lock pin [5] so that the pin [6] is not removed.
3. Install the lever with the guide pin [2].
4. Attach the socket head cap screw [1] and spring washer [3], and lock them with the nut [4].

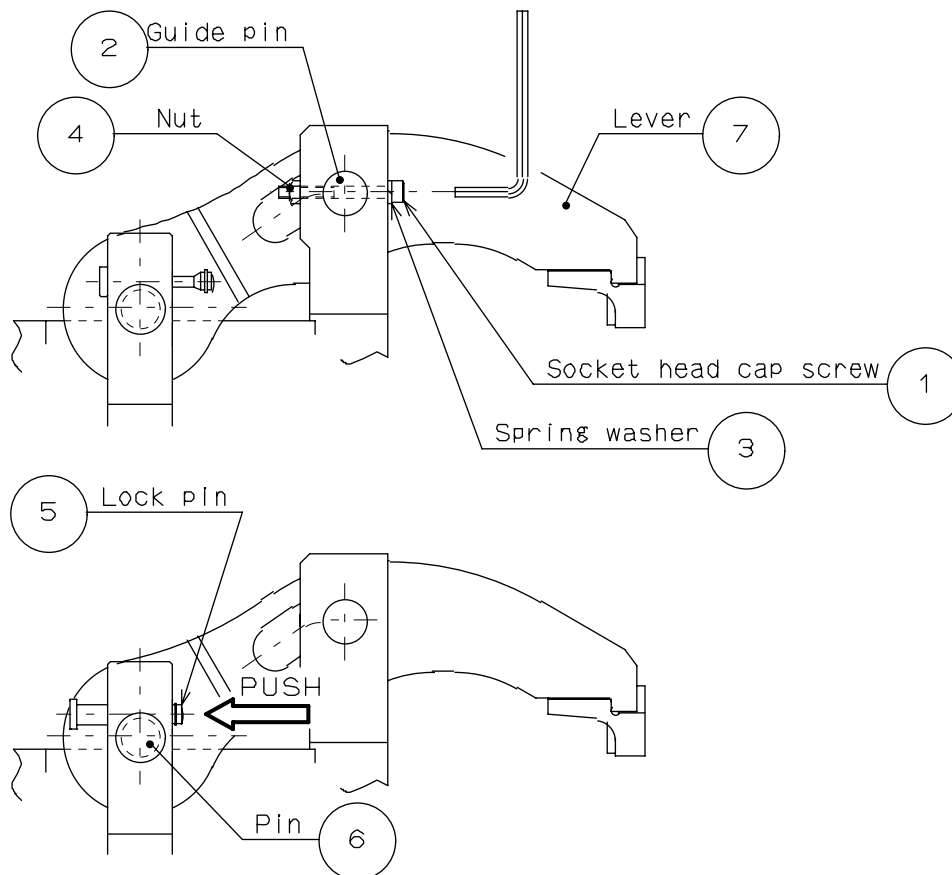


Fig.5

4-3. Centering jigs

Function of centering jigs

The centering jigs for workpiece is provided. They are the slide ring for process-1 or the centering rod or centering chuck / collet chuck for process-2 as shown in Fig.6. Refer to the Spec. information for supply for the shape and specifications.

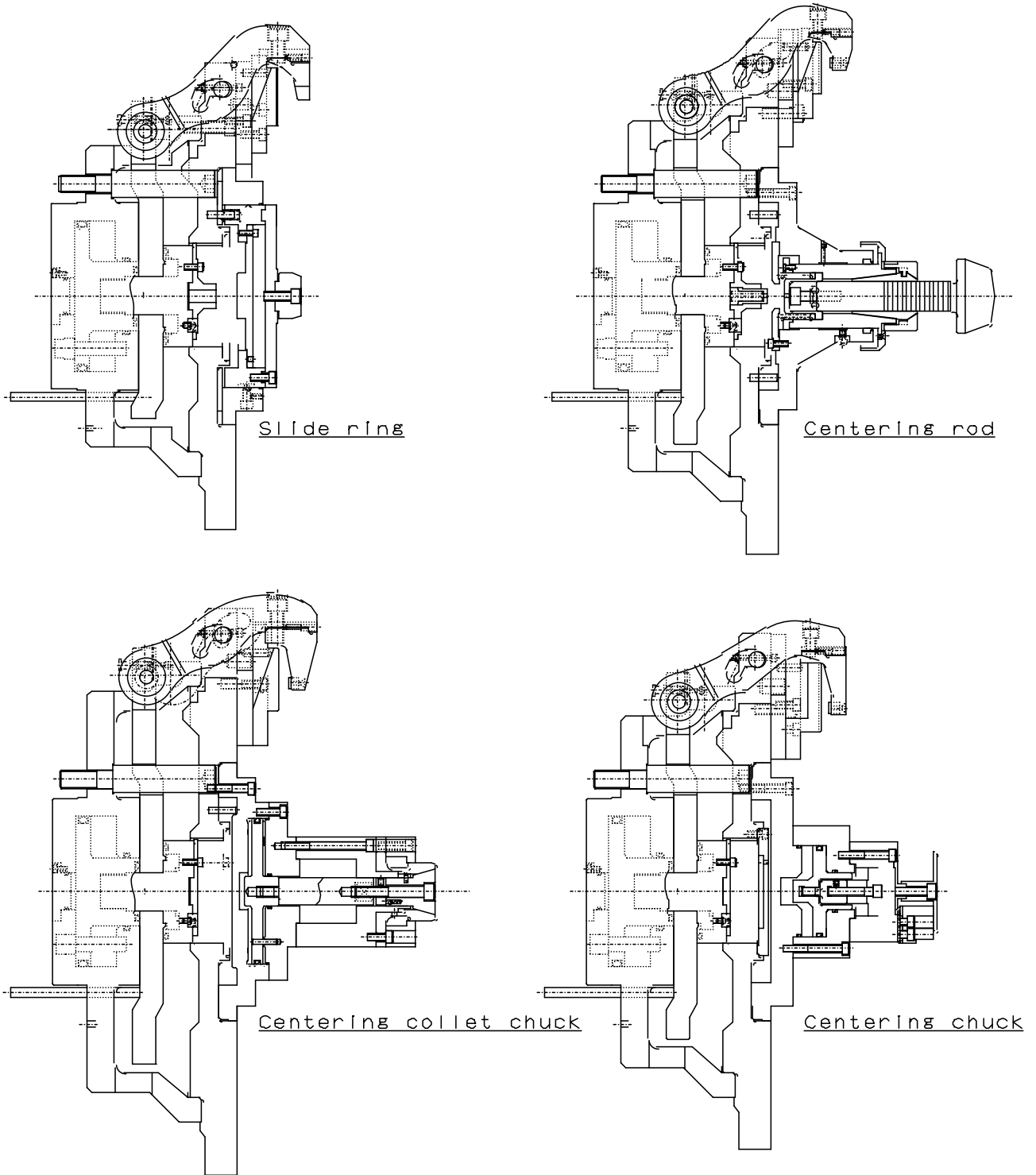


Fig.6

NOTICE

- Do not operate the collet chuck without the work-piece or the master ring. This may cause the collet to be damaged.

4-4. Balance pins for seating confirmation

Function of balance pin

For the FG-AC chucks, the balance pins for seating confirmation can be provided at three places of chuck surface.

As shown in Fig.7, in no-load state, the balance pins are located in the upper position by the built-in springs and the air supplied into the balance pins is exhausted outside the chuck via the silencers. If a workpiece is gripped, the balance pins lower and the air circuit is closed and the air pressure rises. This pressure variation is detected by the pressure switch on the machine side.

If even one balance pin among three places is out of the workpiece, the air pressure does not rise.

Since general balance pins cover two or more workpiece sizes, the installation position can be changed. Refer to the Spec. information for supply for the shape and specifications.

The pressure switch will always become detected state if the balance pins remain in the lower position due to the spring damage or sticking of chips or if the air is not exhausted outside the chuck due to the clogged silencers. Check the balance pins periodically and repair or replace as necessary.

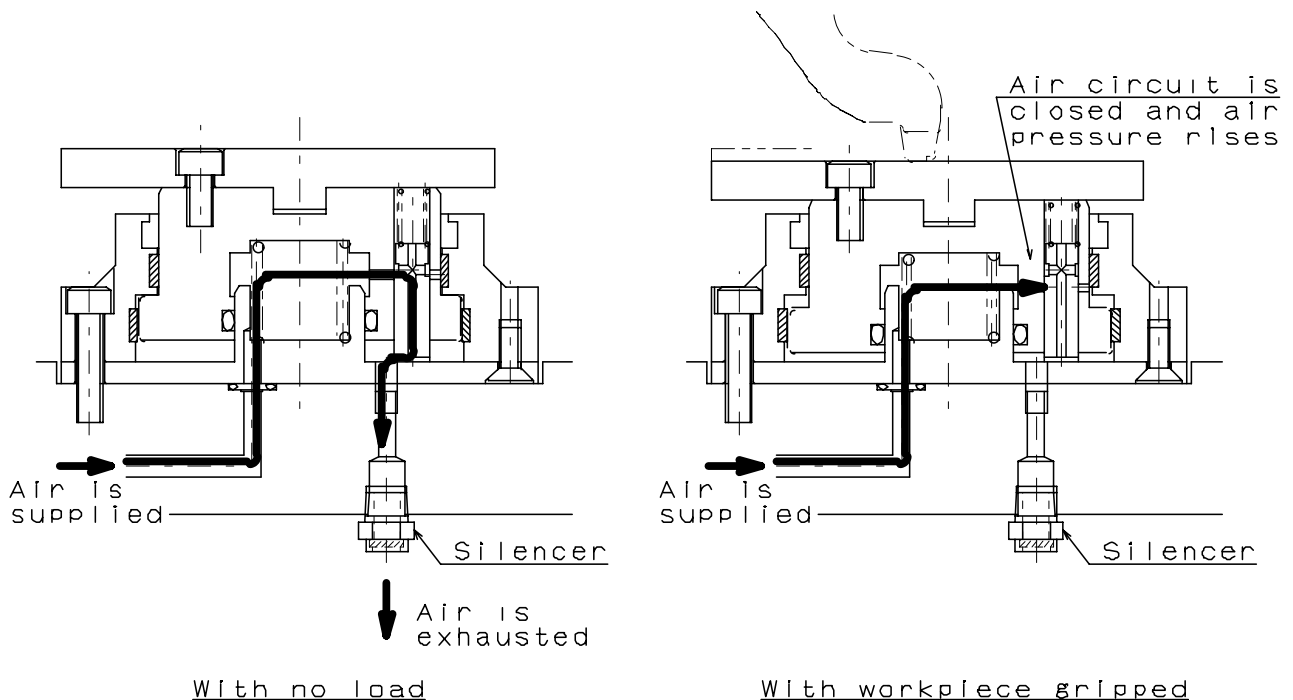


Fig.7

5. Usage

This product is a device to fix an automotive aluminum wheel when it is processed by the lathe with auto chuck changer.

The built-in cylinder closes the levers and fixes an automotive aluminum wheel so that it does not move during processing. The chuck opens the lever after having processed it and remove a wheel.

5-1. Precautions during gripping work with chuck



- This chuck is intended for automotive aluminum wheel machining, and it must not be used for workpieces other than automotive wheels. Otherwise, the workpiece may fly out.
- When gripping a work with the chuck, do not get fingers or hands become caught. This could cause crushed or cut fingers and hands.
- If variations at three places in height of workpiece gripping part exceed the fluctuations of diaphragm plate, the workpiece cannot be gripped completely, causing the workpiece to fly out. Also, if the burred part of workpiece or the inclined workpiece is gripped, a gripping failure will occur, causing the workpiece to fly out.

5-2. Precautions related to processing



<1> Unbalance

- In the case of processing largely unbalanced work, lower the rotation speed. The work will fly out and this is dangerous.
- Vibrations are generated if there is unbalance owing to the work or the jig, etc. Vibration not only will impart a negative influence on the process precision but also the endurance of the chuck being remarkably shortened, and the chuck may break. Correct the unbalance using balance weights, etc., or lower the rotation speed for use.
- Heavy cutting at high rotation speed easily generates vibration in the same manner as chuck unbalance, therefore, set cutting conditions appropriate for the dynamic gripping force and machine rigidity.

<2> Interference, contact, impact

- Before starting work, check that the levers, fixed jigs, work, etc., and the tool and the tool post, etc., do not interfere at low rotation and then start processing.
- Do not allow anything to impact the chuck, lever, and the work. The chuck will break and this is dangerous as the chuck and work will fly out.
- If the tool and the tool post contact the chuck or the work due to malfunction or tape mistake, etc., and impact is given, immediately stop the rotation, and check that there are no abnormalities in the body, lever, diaphragm plate and bolts of each part, etc.

<3> Coolant

- Unless coolant with a rust preventive effect is used, rust will occur inside the chuck and gripping force drop may result. The work will fly out due to the gripping force drop and this is dangerous.

6. Maintenance and Inspection

6-1. Periodic Inspection

Daily check

- Remove chips from the guide groove of the lever.
- Check that the balance pins and floating move over their stroke normally. If not smooth or if they do not move, disassemble and clean the chuck.
- Replace the pad pieces when worn out.
- If the slide ring (centering jig in process 1) is used, supply grease from the grease nipple.
- If the centering chuck (centering jig in process 2) is used, supply grease from the grease nipple on the side surface. Also, check that the specified stroke is obtained. In case of a short stroke, not smooth motion, or no movement at all, disassemble and clean the chuck.
- If the centering rod (centering jig in process 2) is used, supply grease from the grease nipple.
- Supply oil to the lubricator installed in the air piping system so as to maintain proper oil level range. Use the turbine oil type-1 additive free (ISO VG32).
- Check for water in the air filter of the air unit and drain it periodically, which otherwise causes rust.

Monthly check

- With a workpiece not gripped, check if the air is exhausted from the silencer for balance pin. If the seating pressure rises even though the workpiece is not gripped, the silencer may be clogged. Replace the silencer.

3-month check

- Check if the specified stroke is obtained when the chuck is moved over the stroke. Remove the centering jig in the center of chuck and check the stroke at the top surface of the plunger. If the stroke is short, chips may accumulate inside the lever or chuck, or chuck internal parts may be damaged. Disassemble and clean the chuck.
- Check if the chuck mounting bolts and jaw mounting bolts are loose.
- Supply grease from the grease nipple on the top surface of the plunger.

Check every 6 months or 100-thousand strokes

- Disassemble the chuck main body or balance pin assembly, floating assembly, etc. to check respective parts for a crack or damage using the color check, and repair or replace as necessary. Also, replace the O-rings and seals as necessary.

6-2. Grease lubrication

1. Position to lubricate

- Slide ring (Centering jig for process-1)
- Body periphery part of centering chuck (Centering jig for process-2)
- Centering rod (Centering jig for process-2)
- Plunger top surface

2. Grease to use

- Use the designated grease specified in Table 4. If grease other than the designated grease is used, sufficient effect may not be obtained.

Table 4

Genuine product	CHUCK GREASE PRO	Kitagawa genuine product (Kitagawa distributor of each country)
Conventional product	Kitagawa chuck grease	Conventional product
	Molykote EP Grease	TORAY Dow Corning (only inside Japan)
	Chuck EEZ grease	Kitagawa-Northtech Inc. (North American region)
	MOLYKOTE TP-42	Dow Corning (Europe, Asian region)
	Klüberpaste ME31-52	Klüber lubrication (worldwide)

3. Frequency of lubrication

Supply grease to the grease nipple on the top surface of the plunger every 3 months. For other grease nipples, supply grease every day.

4. Safety information about grease and anti-rust oil

Applicable range

- Designated grease
- Antirust agent applied to the product at the delivery.

First aid measures

After inhalation: Remove victim to fresh air. If symptoms persist, call a physician.

After contact with skin: Wash off with mild cleaners and plenty of water. If symptoms persist, call a physician.

After contact with eyes: Rinse with plenty of water. If symptoms persist, call a physician.

After ingestion: If large amounts are swallowed, do not induce vomiting. Obtain medical attention.

- Please refer to each MSDS about the grease and the anti-rust oil which you prepared.

6-3. Disassembling

Disassembling procedures

Read the following disassembling procedures with reference to pages 7-8.

1. Before start of work, be sure to turn off the main power of the machine. Also, start work with the pistons located in the forward end position.
2. Remove the levers, balance pins and centering jig in advance.
3. Loosen the socket head cap screw [05] and remove plunger cover [P].
4. Loosen the socket head cap screw [04] and remove the key plate [R].
5. Remove the socket head cap screw [07 and 08].
6. Lift up the body [D] with an eyebolt M16 [10] and remove it while hitting the back side with a plastic hammer.
7. Install the connecting handle [J] to the plunger [G] with the socket head cap screw [04].
8. Rotating the connecting handle [J], remove the diaphragm plate [F] together with the plunger [G].
9. Clean respective parts and check for a crack or damage.

**DANGER**

- Do not disassemble the cylinder part because hydraulic oil is enclosed in a built-in cylinder and it is high pressure. With internal pressure applied, disassembling the chuck causes the parts to fly out.
- If any malfunction occurs in the cylinder part, return chuck to our company for repair. If it is disassembled and reassembled at a place other than our company, it may not function correctly as well as cause precision failure.

**CAUTION**

- Use an eyebolt when attaching and detaching the chuck to and from the machine, as there is a danger of injury or damage if the chuck drops.

**WARNING**

- Remove the eyebolt without fail after using. If the chuck is rotated with the eyebolt, etc., attached, they may fly out and this is dangerous.

Assembling procedures

Read the following assembling procedures with reference to pages 7-8.

1. Before start of work, be sure to turn off the main power of the machine. Also, start work with the pistons located in the forward end position.
2. Install the connecting handle [J] to the plunger [G] with the socket head cap screw [04].
3. Install the spherical bushing A1 [M], the spherical bushing A2 [N] and the o-ring [19] between the diaphragm plate [F] and the plunger [G]. Then rotating the connecting handle [J], tighten the plunger [G] into the draw-pipe.
4. Install the body [D] with the socket head cap screws [07 and 08].
5. Using the connecting handle [J], as shown in Fig.8, adjust the position of plunger [G] to MIN 4.5 and install the key plate [R] with the socket head cap screws [04].
6. Install the plunger cover [P] with the socket head cap screws [05].
7. Install the lever, balance pins and centering jig.

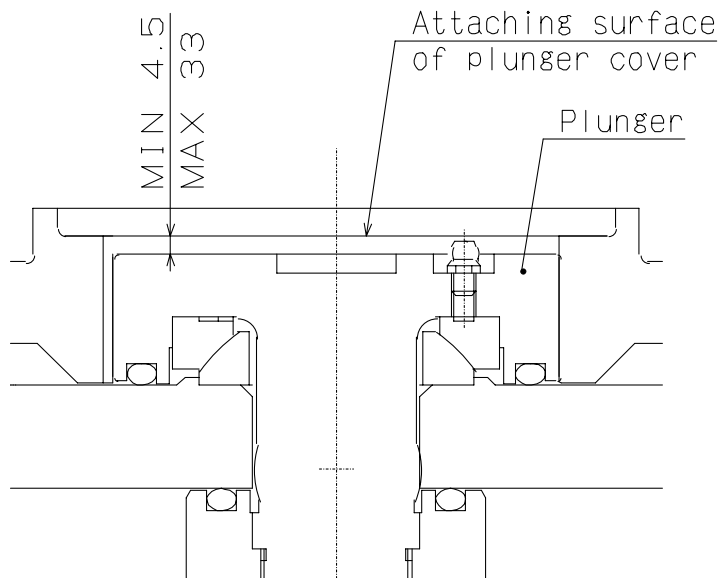


Fig.8

! DANGER

- Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out.
- Use the bolts attached to the chuck, and do not use other bolts. However, if you must use other bolts not provided by Kitagawa, use bolts that have at least a strength classification of 12.9 (10.9 for M22 or more) and be sure they are long enough.

Table 5

Bolt size	Tightening torque	
M5	8	N·m
M6	13	N·m
M8	33	N·m
M10	73	N·m
M12	107	N·m
M14	171	N·m
M16	250	N·m
M20	402	N·m

 **WARNING**

- **Disassemble and clean the chuck at least once every 6 months or every 100,000 strokes (once every 2 months or more for cutting cast metal). If cutting powder or other substances stagnate inside the chuck, it will lead to insufficient stroke and a drop in the gripping force, and this is dangerous as the work will fly out. Check each part carefully and replace any part that is worn or cracked.**
- **After inspection, apply sufficient grease in the designated areas and reassemble.**
- **If you stop the machine for a long period of time, remove the work from the machine. If you don't, the work can drop due to a drop in the hydraulic pressure or the cylinder can stop or malfunction.**
- **If you stop the machine or store the chuck for a long period of time, add grease to prevent rust.**

7. Malfunction and Countermeasures

7-1. In the case of malfunction

Check the points specified in the table below and take the appropriate countermeasure.

Table 6

Defective	Cause	Countermeasure
The chuck does not operate.	The chuck inside will break.	Disassemble and replace the broken part.
	The sliding surface is seized.	Disassemble, correct the seized part with oilstone, etc., or replace the part.
	The cylinder is not operating.	Check the piping and the electric system, and if there is no abnormality, disassemble and clean the cylinder.
Insufficient stroke of the lever.	Chips accumulate in guide groove of the lever.	Remove the lever and clean it.
The Work slips.	The stroke of the lever is insufficient.	Remove the lever and clean it.
	The gripping force is insufficient.	Check that the correct hydraulic pressure is obtained.
	The cutting force is too large.	Calculate the cutting force and check that it is suitable for the specification of the chuck.
	The rotation speed is too high.	Slow down to appropriate rotary speed.
Precision failure.	Centering jig or chuck body runs out.	Check respective parts for diameter runout and end face runout.
	Contact surface of centering jig to the workpiece has worn.	Correct the centering jig or replace the parts.
	The gripping force is too large leading to the work being deformed.	Lower the gripping force in the range possible to process to prevent deformation.

 **WARNING**

- If the chuck failed due to a seizure or breakage, remove the chuck from the machine, following the disassembly steps in page 23. When the chuck cannot be removed due to a blockage of workpiece, do not disassemble forcibly but please contact us or our agent.
- If these countermeasures do not correct the problem or improve the situation. Immediately stop using the machine. Continuous use of a broken product or a defective product may cause a serious accident by the chuck or the work flying out.
- Only experienced and trained personnel should do repairs and fix malfunctions. Repair of a malfunction by a person who has never received instruction from an experienced person, the distributor or our company may cause a serious accident.

7-2. Where to contact in the case of malfunction

In the case of malfunction, contact the distributor where you purchased the product or our branch office listed on the back cover.

For Machine Tool Manufactures

Following pages are described for machine tool manufacturers (personnel who attach a chuck to a machine). Please read following instruction carefully when you attach or detach a chuck to machine, and please sufficiently understand and follow the instructions for safe operation.

8. Attachment

8-1. Outline drawing of attachment

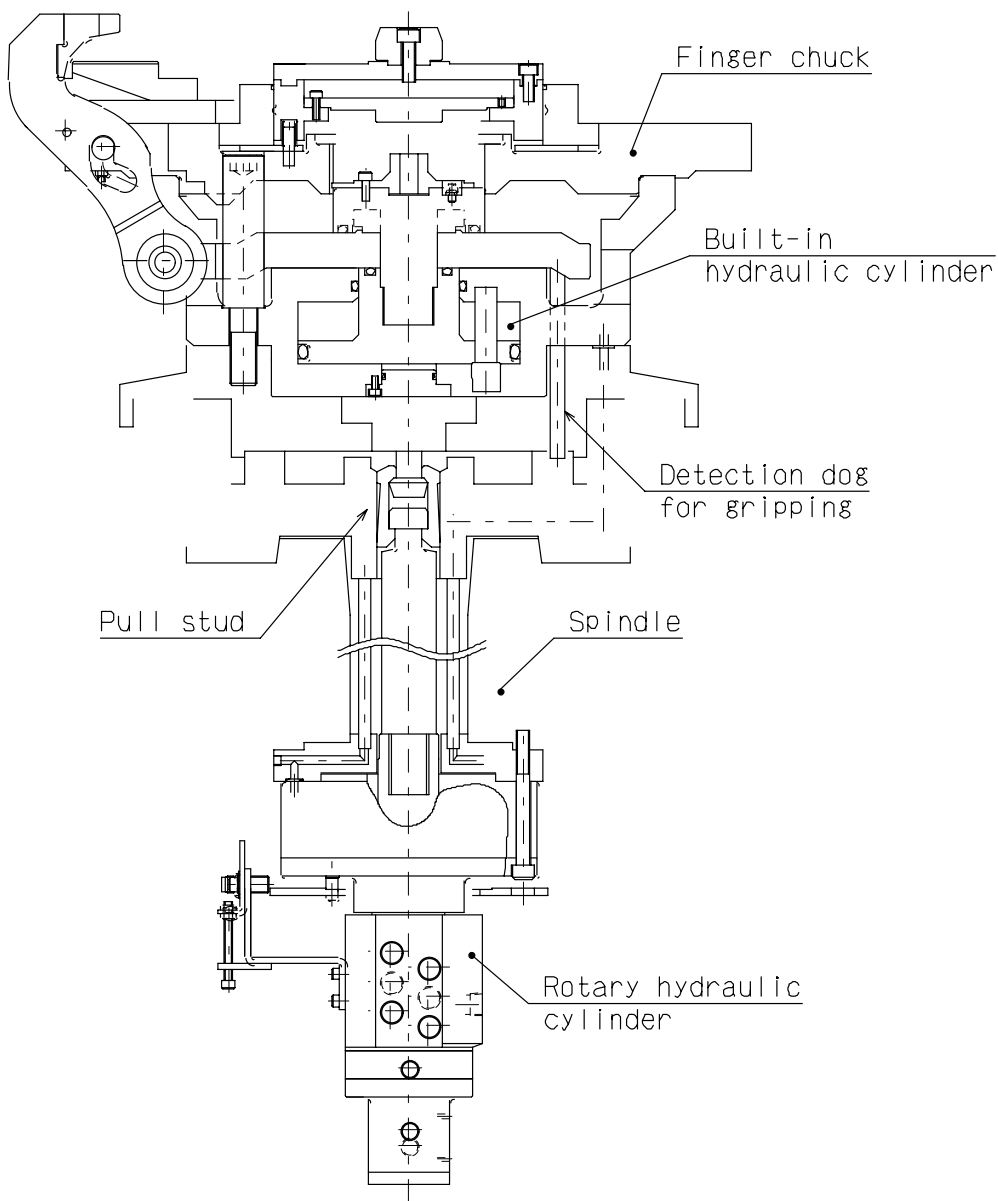


Fig.9

- Attach the manual switching valve at a position where it is easy to operate for the attaching equipment.
- Install the hydraulic unit at a position where the drain hose is not kinked and the needle of the pressure gauge is easily read.

DANGER

- **When other actuators are operated by the same hydraulic pressure source as the cylinder for chuck, be sure that a pressure drop of the cylinder does not occur during use. A hydraulic pressure drop leads to a drop in the gripping force which could allow the work to fly out.**
- **As to the drain hose**
 - **Use a transparent vinyl hose for visualization.**
 - **Provide a stream slope, without air pocket. This will ensure no back pressure.**
 - **The end of the hose is physically above the oil level.**
- **If the hydraulic oil stagnates inside the cylinder, oil leakage occurs, which may cause a fire.**

WARNING

- **Install after removing the dust inside the pipe completely.**
- **Add a filter to the pressure supply line. If foreign matters gets inside the cylinder, this is dangerous since the rotation valve of the cylinder will seize, the hose will tear off, and the cylinder will rotate. This is also dangerous as the work will fly out.**
- **Always use a flexible hose for the hydraulic piping to the cylinder, and the bending force or tensile force of the pipe must not be applied to the cylinder. Use a pipe inside diameter as large as possible and keep the piping length as short as possible.**

NOTICE

- Especially, when a large sized hydraulic unit is used, excessive surge pressure is generated and the gripping force becomes large, therefore, it may result in breakage of the chuck or the lowering of endurance. Restrain the surge pressure by adopting a throttle valve, etc.

8-2. Design of chuck open/close hydraulic circuit

- Fig.10 shows an example of chuck open/close hydraulic circuit.
- Use the solenoid valve having 4 ports, 2 positions, and the circuit must hold the gripping port position when current is not applied.
- Use the hydraulic pipes having the inside diameter over $\phi 9$ mm.

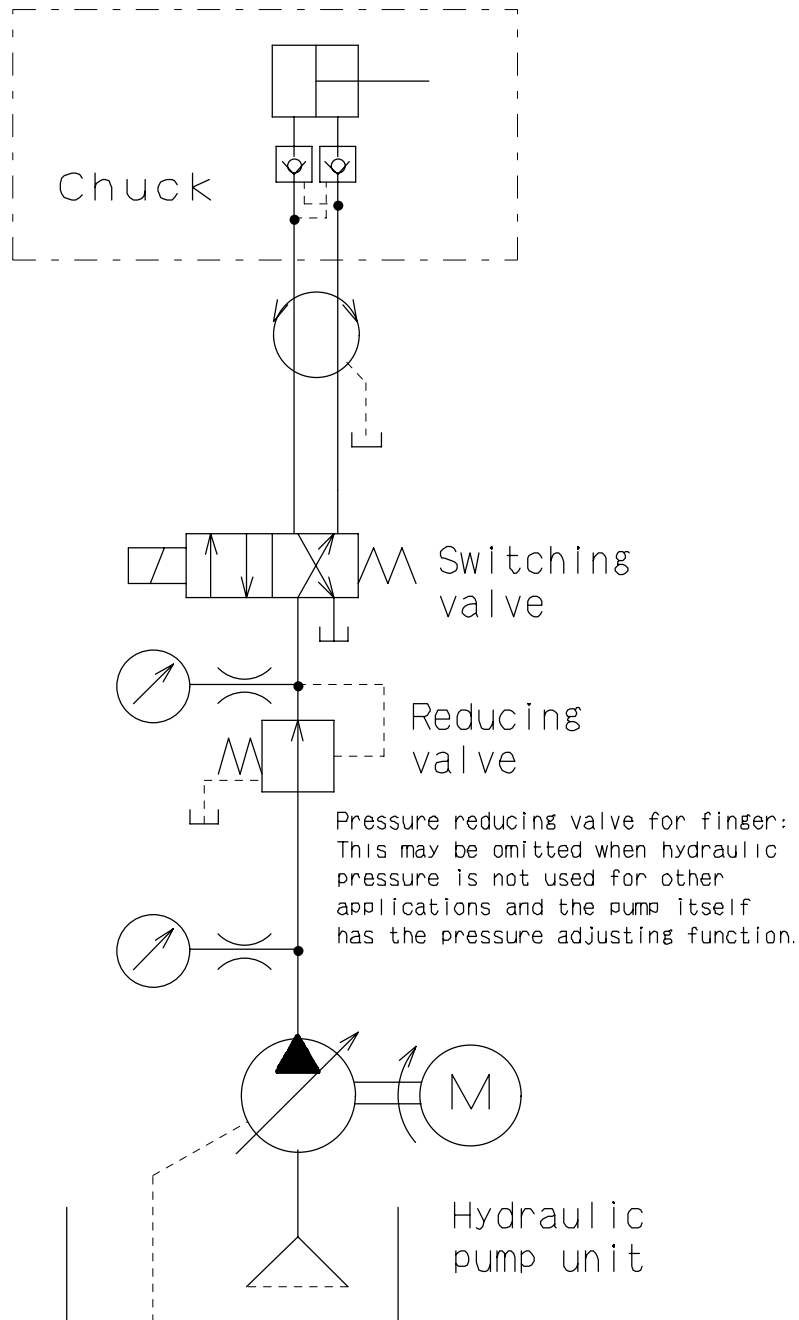


Fig.10

8-3. Design of seating confirmation air circuit

Fig.11 shows an example of seating confirmation air circuit.

- The solenoid valve for seating confirmation must be in detected state when current is applied.
- Use the air pipes having the inside diameter over $\phi 4$ mm.

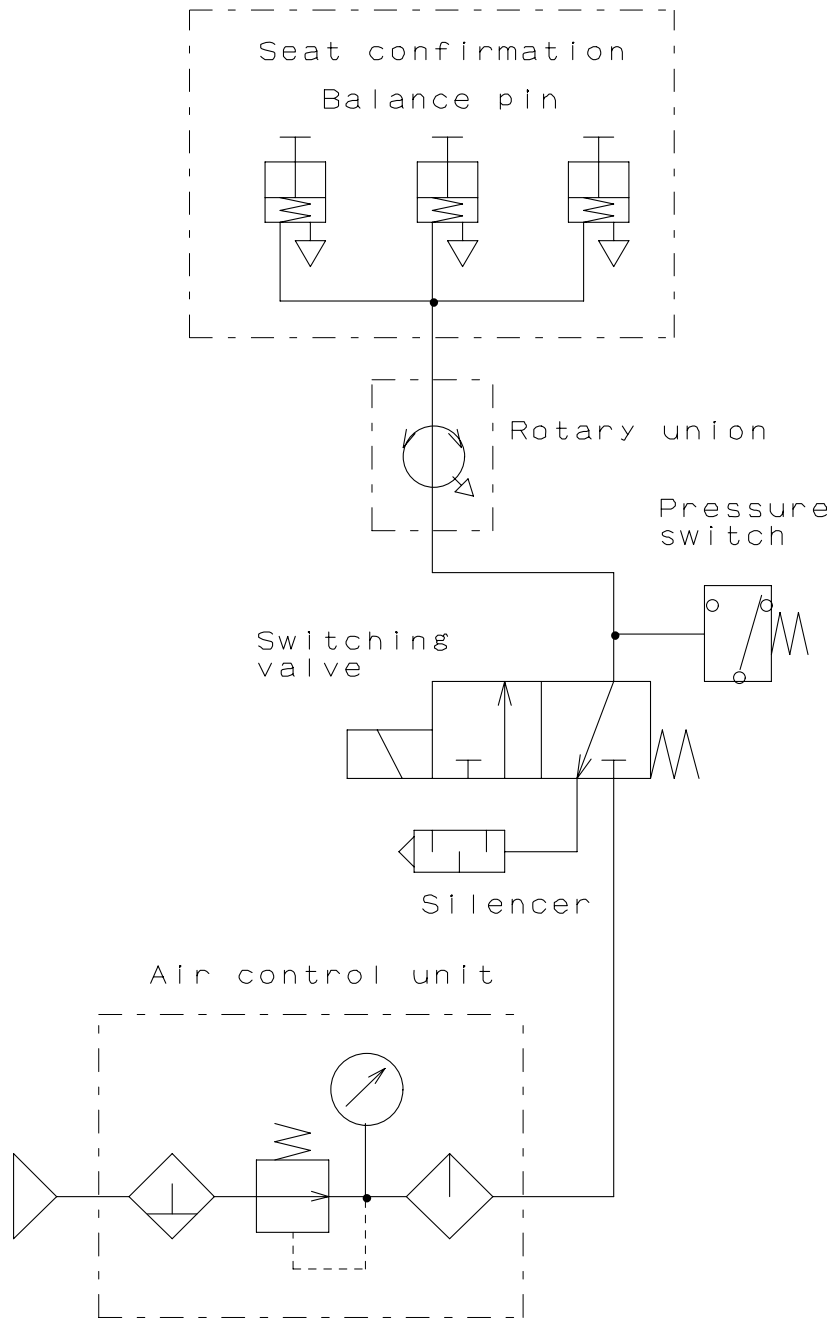


Fig.11

8-4. Detection dog for gripping

- This chuck has the three detection dogs for gripping on the chuck attaching surface. Refer to the Spec. information for supply for the detail.
- Prepare the proximity switches and the bracket by customer.

8-5. Attachment of chuck

1. Before start of work, be sure to turn off the main power of the machine.
2. Remove the centering jigs in advance.
3. Confirm that there are the o-rings in the hydraulic / air ports on the spindle.
4. Lift the chuck by the eyebolt and attach it matching to the attaching surface of the spindle. Then tighten the chuck attaching bolts. In the case of adjusting the centering of the chuck, lightly hit the body side face with a plastic hammer.
5. Tighten the chuck attaching bolts evenly. At this time, tighten the bolts at the specified torque.
6. Install the centering jigs again.

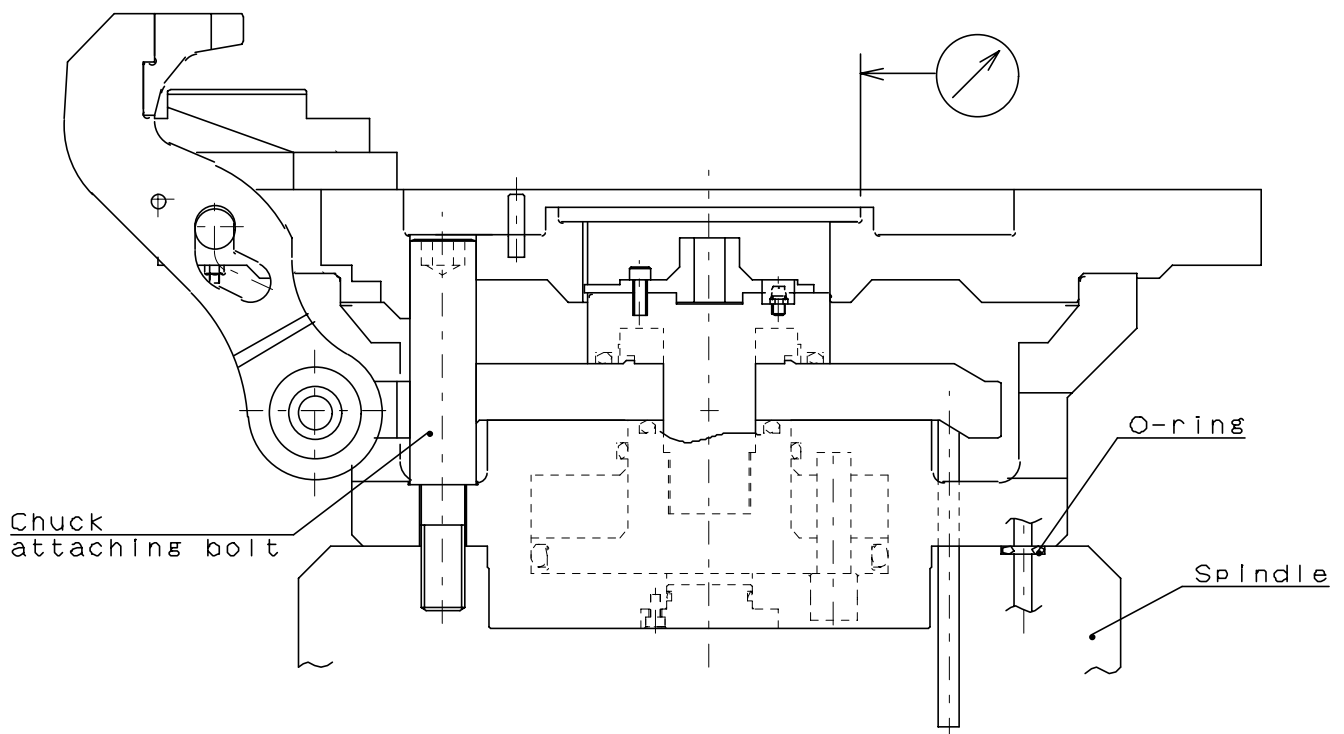


Fig.12

 **DANGER**

- Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out.
- Use the bolts attached to the chuck, and do not use other bolts. However, if you must use other bolts not provided by Kitagawa, use bolts that have at least a strength classification of 12.9 (10.9 for M22 or more) and be sure they are long enough.

Table 7

Bolt size	Tightening torque	
M5	8	N·m
M6	13	N·m
M8	33	N·m
M10	73	N·m
M12	107	N·m
M14	171	N·m
M16	250	N·m
M20	402	N·m

 **CAUTION**

- Use an eyebolt when attaching and detaching the chuck to and from the machine, as there is a danger of injury or damage if the chuck drops.

 **WARNING**

- Remove the eyebolt without fail after using. If the chuck is rotated with the eyebolt, etc., attached, they may fly out and this is dangerous.

9. Other information

9-1.About disposal

Ultimate disposal of this product should be handled according to all national laws and regulations.

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