Version 1.02 (2024.05.01)

INSTRUCTION MANUAL

SC-S type

Scroll Work Gripper

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 on the Scroll Work Gripper (SC-S type) to help understand its performance and functions and to use it safely and correctly.
Before using the Scroll Work Gripper, read this instruction manual carefully to understand how to use the gripper correctly. Be sure to follow the instructions and warnings given in **"Important Safety Precautions"** and **"Precautions for Use"** at beginning of this manual. Failure to follow these precautions may result in serious injury.

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.

⚠ DANGER	**Indicates a hazardous situation which, if you not avoided, will result in death or serious injury.**
⚠ WARNING	**Indicates a hazardous situation which, if you not avoided, could result in death or serious injury.**
⚠ CAUTION	**Indicates a hazardous situation which, if you not avoided, could result in minor or moderate injury.**
NOTICE	**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 workpieces on machining centers. This product is equipped with jaws for clamping workpieces, which are operated by turning the handle. It cannot be used for any other purpose (turning, etc.).
Our company will not assume responsibility for injury, death, damage, or loss resulting from failure to follow the instructions in this manual.

The contents of this manual do not cover all possible hazards during operation, control, inspection, and maintenance in all environments. There are countless things that cannot and 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 shall be 1 year after delivery.
Use the parts delivered by Kitagawa Corporation 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 Corporation. Additionally, if parts other than genuine parts manufactured by Kitagawa Corporation are used, this guarantee will be completely invalid.

Table of Contents

For Machine Tool Manufacturers (Chapter 8)

1. Structural Drawing and Parts List

1-1. Type display

Type display as shown below

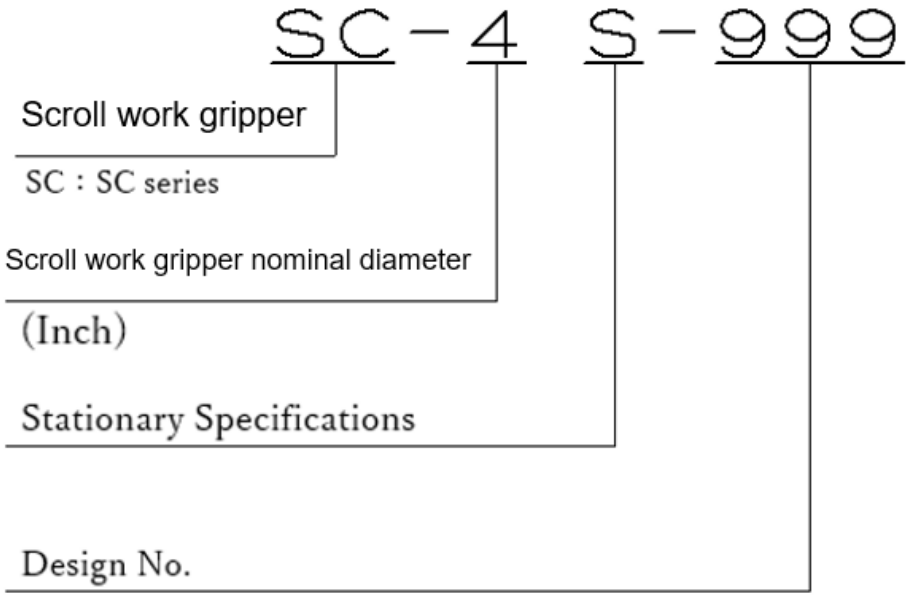


Fig.1

1-2. Structural drawing

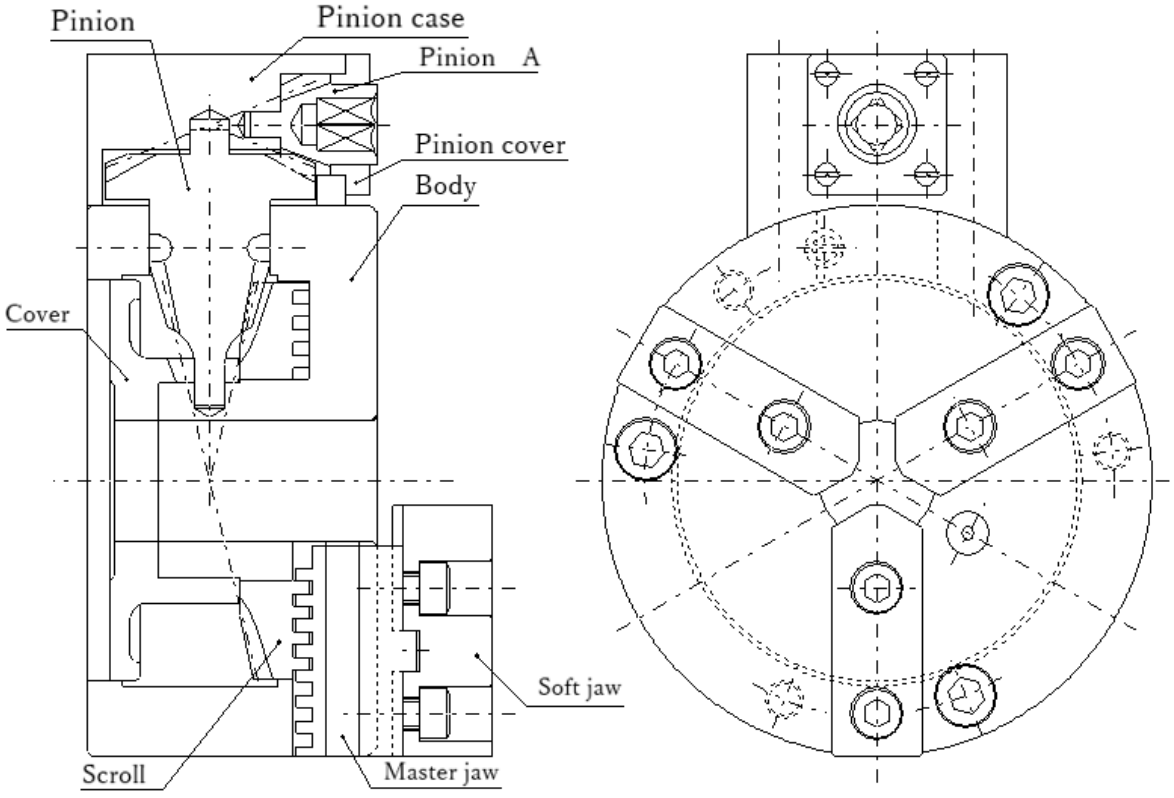


Fig.2

1-3. Parts list

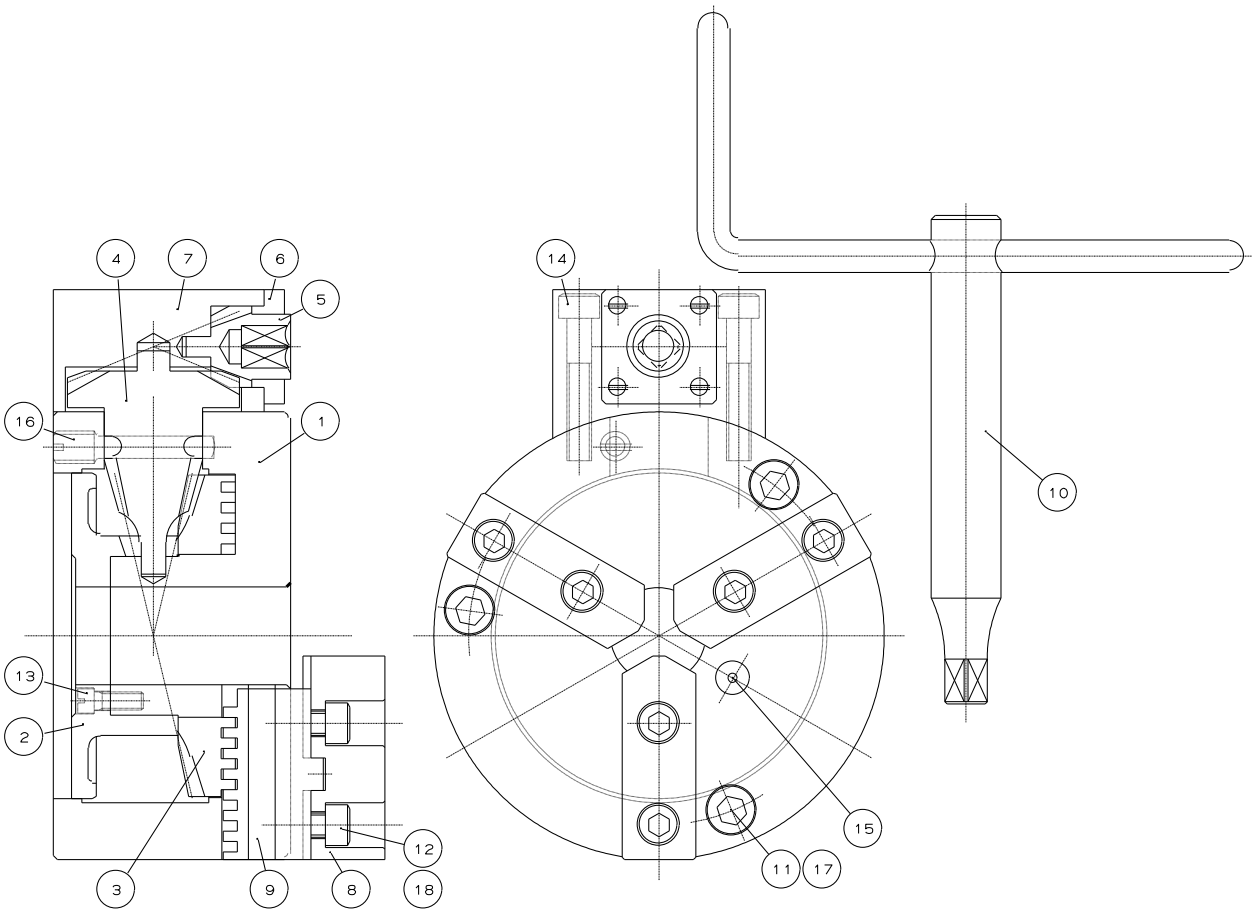


Fig.3

Table 1

No.	Part Name	Quantity
1	Body	1
2	Cover	1
3	Scroll	1
4	Pinion	1
5	Pinion A	1
6	Pinion cover	1
7	Pinion case	1
8	Soft jaw	3
9	Master jaw	3
10	Handle	1
11	Scroll work gripper mounting bolt	3
12	Jaw mounting bolt	6
13	Cover mounting bolt	3
14	Pinion case mounting bolt	4
15	Grease oil cup	1
16	Knock pin	1

2. Important Safety Precautions

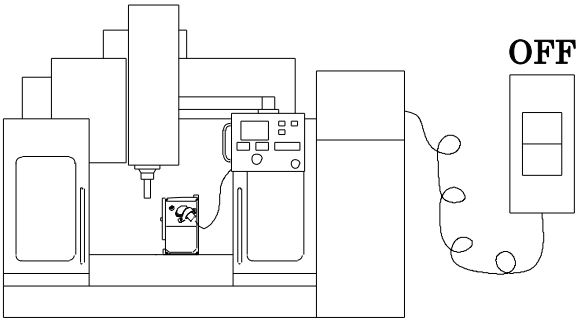
Important safety precautions are summarized below. Please read this section before first starting to use this product.

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 scroll work gripper, and before adding oil.

For All Users

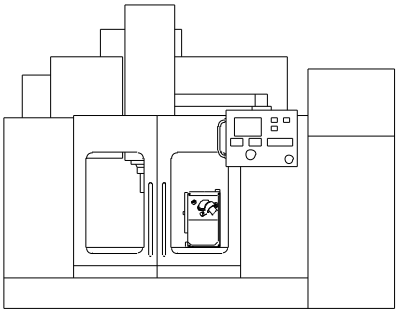
- The scroll work gripper may start rotation suddenly, and a part of the body or clothing may be caught.



Close door before rotating spindle.

For All Users

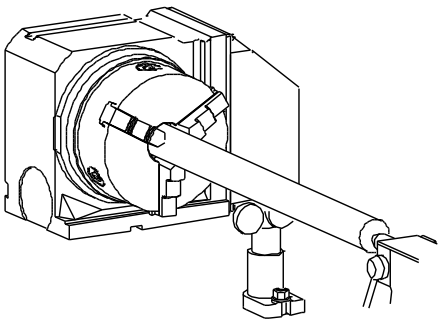
- If the door is not closed, you may touch the rotating scroll work gripper or the work may fly out, which is very dangerous. (In general, the safety interlock function which allows rotation only when the door is the manual mode or the test mode)



When the protrusion of the work is long, support it with the steady rest or center.

For All Users

- If the protrusion is long, the tip of the work can turn and the work fly out.



Important Safety Precautions

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

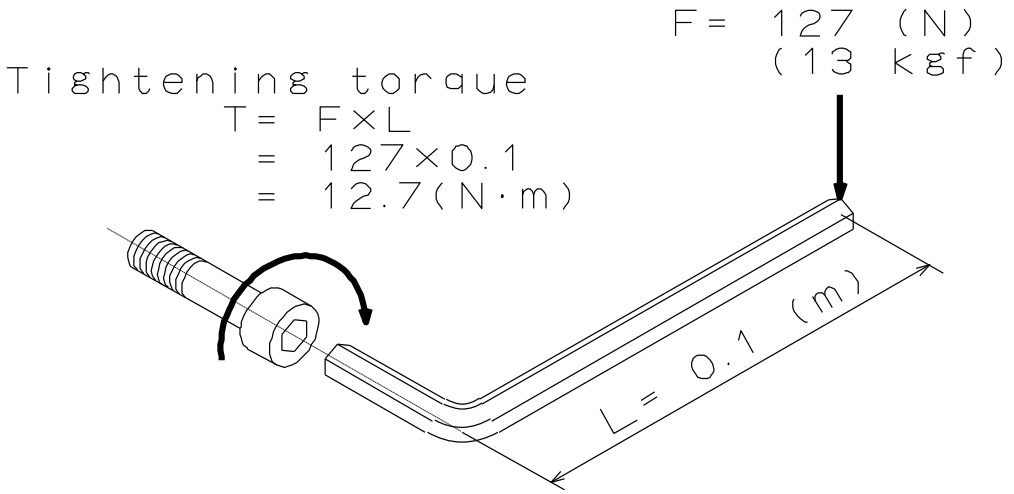
Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the scroll work gripper or workpiece will fly off. Use the bolts provided with the scroll work gripper, and do not use any other bolts.

For All Users

- If the number of bolts installed is insufficient or the tightening torque is insufficient or excessive, the bolt will break, and the scroll work gripper or workpiece will fly off, which is dangerous.
- When tightening bolts, either fix the spindle or prevent the scroll work gripper from rotating. Your hand could slip and get injury when you work without fixing the spindle.
- The provided hexagon key is used only for temporary tightening. For proper tightening a torque wrench is needed for torque control.

Specified torque for hex. socket head cap screw

Bolt size	Tightening torque	
M5	7.5	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 × L.

Important Safety Precautions

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

The gripping force required for machining must be determined by the machine manufacturer or user through trial cutting, and it must be confirmed that the necessary gripping force is obtained before machining.

For All Users

- If the gripping force is insufficient workpiece will fly off, which is dangerous.

Use the handle provided with the product, and remove the handle after use.

For All Users

- If a pipe or similar item is used instead of the provided handle and tighten with excessive handle torque, the scroll work gripper will be damaged and jaws and workpiece may also fly off, which is dangerous.
- If the handle torque is insufficient, the necessary gripping force will not be obtained and this may cause workpiece to fly off, which is dangerous.

Do not use jaws that is taller than the standard jaw.

For All Users

- Taller jaws are dangerous because larger moment will be applied to the scroll work gripper causing the scroll work gripper to break, resulting in damage and scattering of the scroll work gripper and workpiece.

Be sure to use the scroll work gripper at the gripping range. (Refer to page 12)
Be sure to use the scroll work gripper at the permissible protruding range. (Refer to page 14)

For All Users

- If use outside the gripping range, the engagement strength between the jaw and scroll becomes insufficient, thus scattering the scroll work gripper jaw or workpiece, which is dangerous.

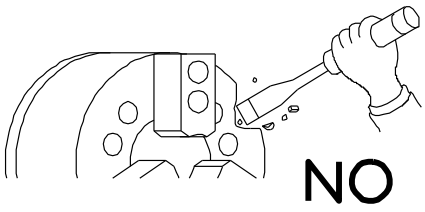
Important Safety Precautions

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

Do not modify the scroll work gripper in a way not permitted by the manufacturer.

For All Users

- It may not only break the scroll work gripper but the scroll work gripper jaw and workpiece may fly out, which is dangerous.
- If you want to attach a locator or jig on the scroll work gripper body surface, machining is only permitted within the range where additional machining is possible. (Refer to page 21)



Periodically lubricate with grease (Refer to page 22). When lubricating, turn off the power and make sure to use the specified grease.

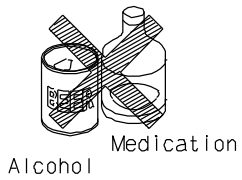
For All Users

- Insufficient grease supply may cause a loss of gripping force, malfunction due to low hydraulic pressure, decrease in gripping accuracy, abnormal wearing and seizure, etc.
- Danger of workpiece flying off due to loss of gripping force.

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

For All Users

- Dangerous since these lead to operation mistakes and misjudgment.



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

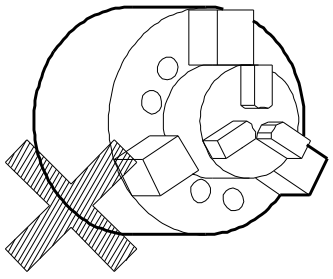
For All Users

- Dangerous since it can be caught in the machine.

Do not grip a scroll work gripper with a Chuck.

For All Users

・Both the chuck and the scroll work gripper have longer overhangs, that may exceed the allowable conditions. If used beyond the allowable conditions, the scroll work gripper and workpiece may be damaged or fly off, which is dangerous.



3. Specifications

3-1. Specifications

Table 2

Type		SC-3S	SC-4S	SC-5S
Maximum static gripping force	kN	7.2	9.6	12.0
Thru-hole diameter	mm	16	24	32
Mass	kg	1.9	4.0	5.3
Maximum permissible handle torque	N･m	18.1	27.5	39.2

Reference: 1kN = 101.97kgf

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

3-2. Gripping range

Table 3

Type	Gripping range	
	External gripping	Internal gripping
	Soft jaw	Soft jaw
SC-3S	ϕ2~70	ϕ24~64
SC-4S	ϕ3~95	ϕ29~84
SC-5S	ϕ3~110	ϕ33~100

DANGER

- **Be sure to use the scroll work gripper within the gripping range. If outside the gripping range, the engagement strength between the jaw and scroll becomes insufficient, thus scattering the scroll work gripper jaw or workpiece, which is dangerous.**
- **Since there is a possibility that the jaw may protrude from scroll work gripper periphery by the size of gripping diameter, be careful not to interfere with tools, etc.**

3-3. Relationship between handle torque and gripping force

Fig.5 shows relationship between handle torque and gripping force.
The gripping force is different depending on the state of grease lubrication, grease in use, height of the jaw, etc. The maximum static gripping force specified in the specification is the value under the following conditions:

- The Kitagawa standard jaw is used as the jaw.
- Tightened at the maximum permissible handle torque.
- The numerical values are obtained with the Kitagawa gripping force meter. The gripping position of the gripping force meter is at a position 1/2 of the height of the jaw top surface (height from the scroll work gripper surface to the top surface of the jaw).
- Specified grease is used.

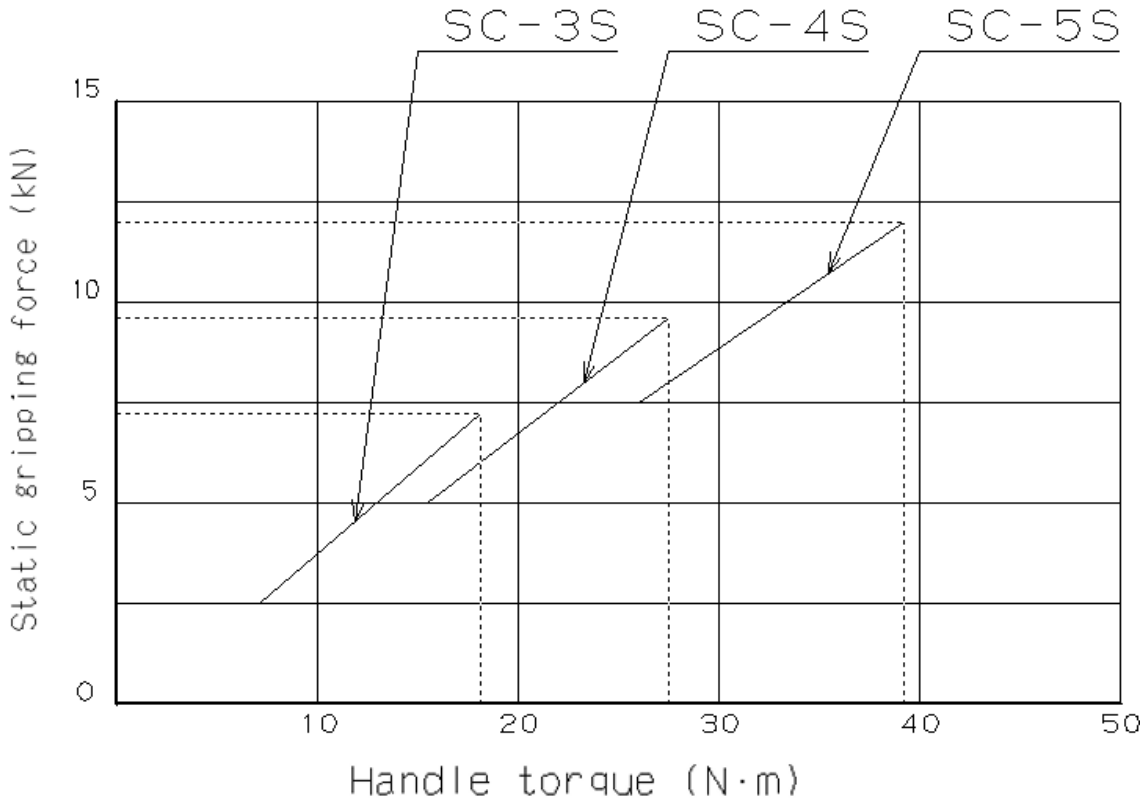


Fig.4

4. Forming Soft Jaw

4-1. Soft Jaw Installation

Use the most appropriate soft jaw considering the shape, dimension, material, and surface roughness of the work and the cutting conditions, etc.

DANGER

- **Be sure to use the scroll work gripper at the above permissible protruding range (Table 4). If exceeded the above range, the engaged part strength between the jaw and scroll becomes insufficient, thus scattering the scroll work gripper jaw or work and resulting in danger.**

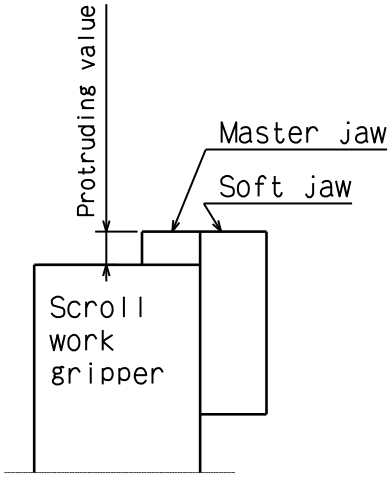


Fig.5

Table 4

Type	Permissible value of jaw protruded from scroll work gripper periphery (mm)
SC-3S	3.5 mm 以下
SC-4S	3 mm 以下
SC-5S	5 mm 以下

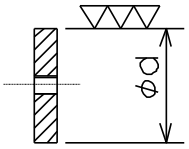
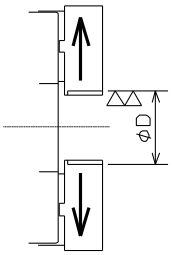
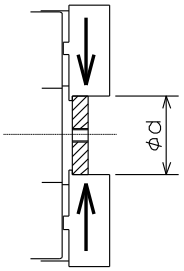
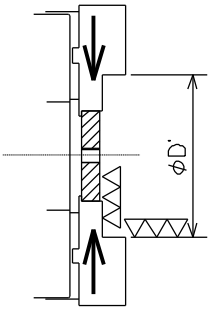
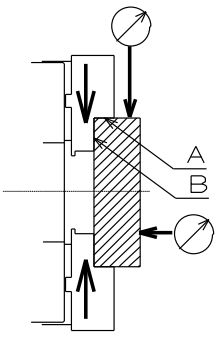
DANGER

- **Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the scroll work gripper or workpiece will fly off.**

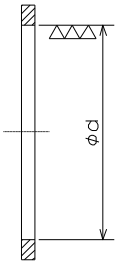
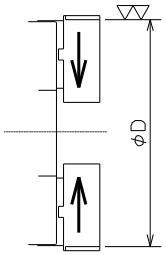
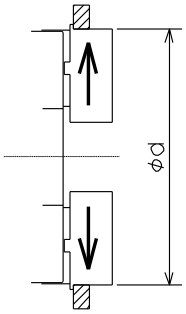
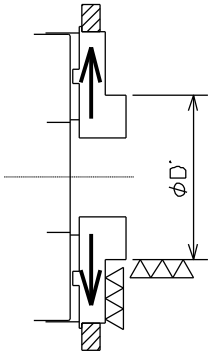
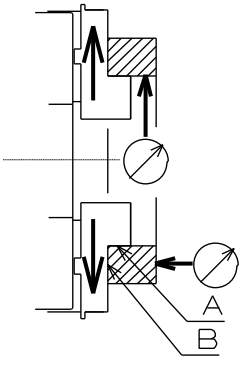
Table 5

Bolt size	Tightening torque	
M5	7.5	N･m
M6	13	N･m
M8	33	N･m

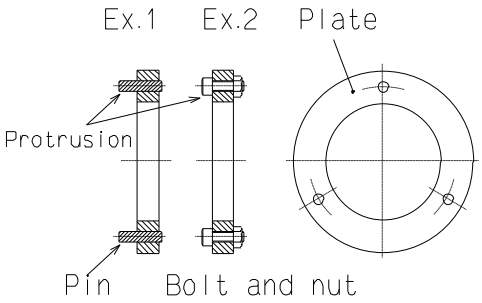
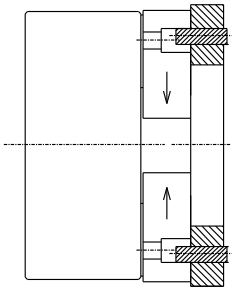
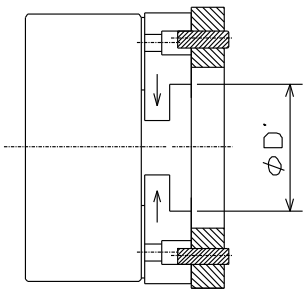
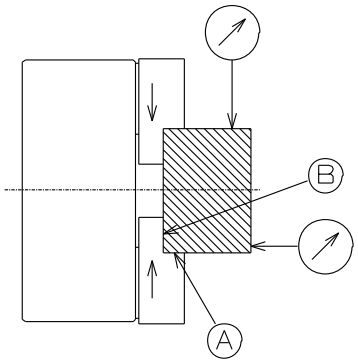
4-2. Forming soft jaw with outside diameter gripping

1. Preparation of the plug for forming ・ Prepare the plug for forming. The surface roughness of the plug outside diameter is to be approximately 25s, and make a shape with sufficient thickness which does not distort. ・ It is convenient to prepare various outside diameter dimensions for dimensions of forming parts. ・ It is convenient to process tapping in the center part of the plug and to guide with a bolt, etc.	
2. Process of the plug gripping part for forming ・ Unclamp the jaws by turning the handle. ・ Then, process the ϕD part (part to grip the plug for forming). Increase ϕD size more 0~some millimeter than ϕd. Arrange jaw positions so that they are not protruded from the scroll work gripper periphery.	
3. Gripping of the plug for forming ・ Clamp the plug in the part of ϕD. At this time, grip by pressing the plug on the scroll work gripper front surface in order for the plug not to be tilted.	
4. Forming ・ Process the gripping part (dimension ϕD') of the work in the state that the plug is kept gripped. The ϕD' part is to be approximately the same diameter (H7) as the diameter of the gripping part of the work, and process to be surface roughness at 6s or less. ・ Set the handle torque during forming the same as during processing of the work, or slightly higher. ・ When the plug distorts, lower the handle torque or change the plug into a shape which does not easily distort.	
5. Trial cutting ・ Remove the plug for forming and grip the work. ・ Implement trial cutting to check the process precision and that there is no slip, etc. ・ Contacting on the gripping surface is to be 2 points contact of the side A and the side B when gripping.	

4-3. Forming soft jaw with inside diameter gripping

1. Preparation of the ring for forming ・ Prepare the ring for forming. The surface roughness of the ring inside diameter is to be approximately 25s, and make a shape with a sufficient thickness which does not distort. ・ It is convenient to prepare various inside diameter dimensions for dimensions of forming parts.	
2. Process of the ring gripping part for forming ・ Unclamp the jaws by turning the handle. ・ Then, process the ϕD part (part to grip the ring for forming). Decrease ϕD size more 0~some millimeter than ϕd. Arrange jaw positions so that they are not protruded from the scroll work gripper periphery.	
3. Gripping of the ring for forming ・ Clamp the plug in the part of ϕD. At this time, grip by pressing the ring on the scroll work gripper front surface in order for the ring not to be tilted.	
4. Forming ・ Process the gripping part (dimension ϕD') of the work in the state that the ring is kept gripped. The ϕD' part is to be approximately the same diameter (H7) as the diameter of the gripping part of the work, and process to be surface roughness at 6s or less. ・ Set the handle torque when forming the same as when processing of the work, or slightly higher. ・ When the ring distorts, lower the handle torque or change the ring into a shape which does not easily distort.	
5. Trial cutting ・ Remove the ring for forming and grip the work. ・ Implement trial cutting to check the process precision and that there is no slip, etc. ・ Contacting on the gripping surface is to be 2 points contact of the side A and the side B when gripping.	

4-4. Forming method when you use forming jig

1. Preparation of the jig for forming ・ Prepare the jig for forming. (There is a commercially available product.) ・ Attach the pin (Example 1) or the bolt and nut (Example 2) by dividing equally into 3 portions onto the ring shape plate. Make the ring into a shape with sufficient thickness which does not distort.	
2. Gripping of the jig for forming ・ Insert the projection of forming jig into the upper face hole of soft jaw by turning the handle and clamp the ring with the plate end face pushed to the front soft jaw in order to eliminate the runout. (In the case of SC-FN, bore the upper face of soft jaw.) ・ Set the handle torque for forming rather lower than the torque when the work piece is machined.	
3. Forming ・ Process the gripping part (dimension ϕD') of the work in the state that the jig for forming is kept gripped. The ϕD' part is to be approximately the same diameter (H7) as the diameter of the gripping part of the work, and process to be surface roughness at 6s or less.	
4. Trial cutting ・ Remove the jig for forming and grip the work. ・ Implement trial cutting to check the process precision and that there is no slip, etc. ・ Contacting on the gripping surface is to be 2 points contact of the side A and the side B when gripping.	

5. Usage

This product is a device to fix a workpiece when it is processed on a machining center.
The manual handle allows the jaws to be moved toward the closing side, gripping the workpiece, and fixing the workpiece so that it does not move during machining. After processing, move the jaws to the open side and remove the workpiece.

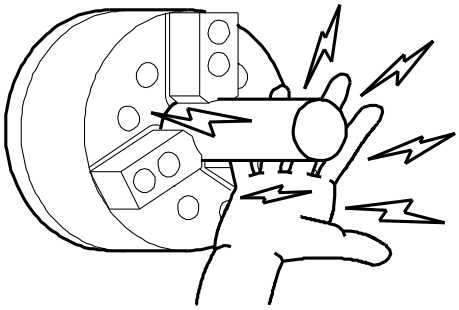
NOTICE

- When replacing the top jaw, carefully clean the cross-key part (key and keyway) of the top jaw and master jaw. If cross-key part is not clean, it may cause poor accuracy.

5-1. Precautions when gripping workpiece with scroll work gripper

DANGER

- **When gripping a work with the scroll work gripper, do not get fingers or hands become caught. This could cause crushed or cut fingers and hands.**



5-2. Precautions when gripping workpiece with irregular shape

DANGER

- **Gripping an irregular shape workpiece may damage the jaws. Consult our company or the distributor if there is any concern.**
- **It is not possible to grip sloped or tapered shapes such as castings.**
- **If the protrusion of the work is long, support it with a center or steady rest. If the protrusion is long the tip of the workpiece will rotate, and this is dangerous as the work will fly out.**

5-3. Precautions regarding use of jaws

DANGER

- **If a soft jaw other than one made by Kitagawa Corporation is used, the engagement will be inferior, and the gripping precision will worsen, and the work may fly out due to poor gripping, which is dangerous.**
- **Do not add soft jaw by welding. The jaw will break due to insufficient strength. As a result, the jaw will break, and this is dangerous as the work will fly out.**

5-4. Precautions regarding processing

DANGER

<1> Interference, contact, impact

- **Before starting work, check at low speed rotation that there is no interference between the top jaw, locator, workpiece, etc., and the cutter, tool post, etc. before starting the machining process.**
- **Do not allow anything to impact the scroll work gripper, jaw, or workpiece. The scroll work gripper will break and this is dangerous as the scroll work gripper and work will fly out.**
- **If the cutter and the tool post comes into contact with the scroll work gripper or the workpiece due to malfunction or tape error, etc., and causes an impact, immediately stop the rotation, and check that there are no abnormalities in the top jaw, base jaw and bolts of each part, etc.**

<2> Coolant

- **Unless coolant with a rust preventive effect is used, rust will occur inside the scroll work gripper resulting in a loss of gripping force. This may cause workpiece to fly off, which is dangerous.**

5-5. Installation of locator and jig

・ In the case of attaching locator and jig on the scroll work gripper body surface, tap or drill a hole in the allowable additional process range specified in Fig. 6.

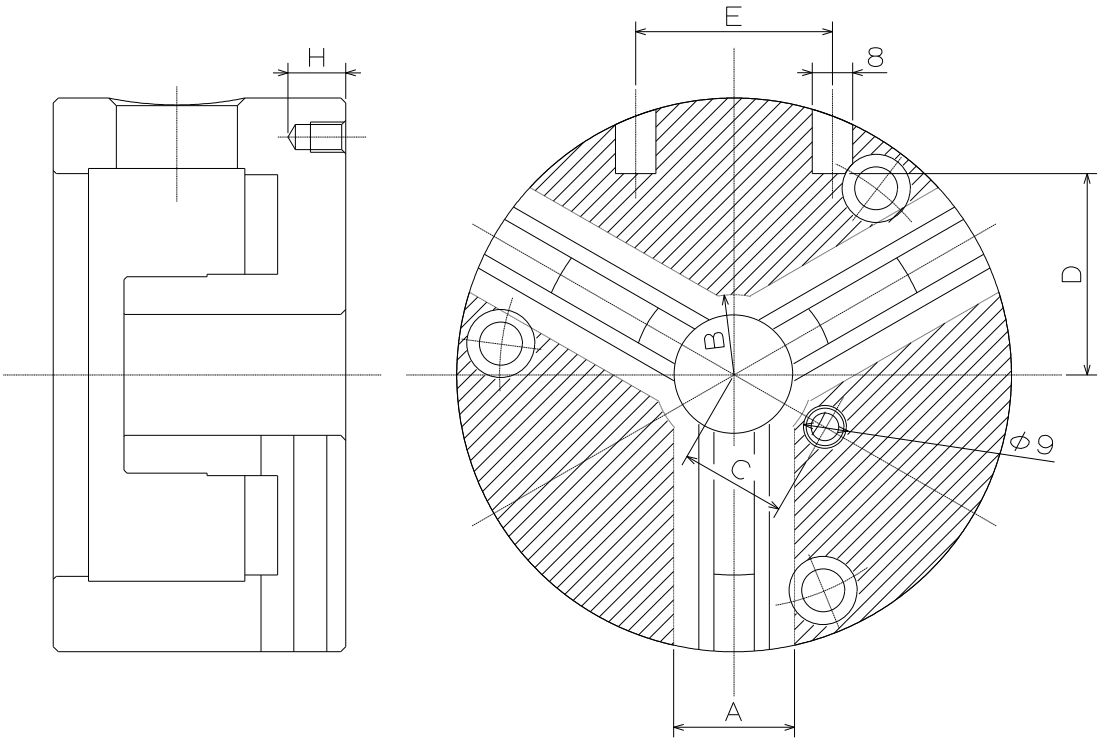


Fig.6

Table 6

形式	A mm	B mm	C mm	D mm	E mm	H (Max) mm
SC-3S	20	12	17	23	32	10
SC-4S	24	16	21	32	39	11.5
SC-5S	26	20	27	43	43	14.5

A, B, D, E: Dimensions that cannot be additionally machined

H: Allowable hole depth for tapping or drilling.

DANGER

- **The scroll work gripper can only be modified in the manufacturer permissible range. Modification beyond the allowable range may damage the scroll work gripper that can lead to scroll work gripper and workpiece flying off, which is dangerous.**
- **Provide countermeasure to prevent locator or jig from flying off (dwell pin, etc.) due to centrifugal force, and attach bolts which have sufficient strength. Without countermeasure locator or jig may fly off, which is dangerous.**

6. Maintenance and Inspection

6-1. Periodic Inspection

- Lubricate with grease at least once a day.
- Always clean the scroll work gripper body and the sliding surface with an air gun, etc., at the end of work.
- If chips of foreign matter is caught inside the scroll work gripper（scroll, gear part）, disassemble and clean it immediately.
- Check that the bolts of each part are not loosened at least once every 3 months.
- Disassemble and clean at least once every 6 months or every 100,000 strokes (once every 2 months or more for cutting cast metal).

6-2. Grease lubrication

1. Position to lubricate

- Lubricate using a grease gun from the grease oil cup on the body surface. After lubrication, repeat opening and closing the jaw several times without gripping any workpiece.

2. Grease to use

- Use ISO VG32 lubricant or its equivalent

3. Frequency of lubrication

- Lubricate with the designated lubricant once a day.
- The amount of lubrication is approximately 8~10cc.
- When using a large amount of water-soluble coolant, increase the frequency of lubrication according to the usage conditions.

6-3. Disassembling

Disassembling procedures

Read the following disassembling procedures with reference to pages 6-7.

1. Turn off the main power of the machine before disassembling.
2. Remove the jaws.
3. Loosen the scroll work gripper mounting bolt [11] and remove the scroll work gripper from the machine.
4. Loosen the pinion case mounting bolt [14] and remove the pinion case [6].
5. Loosen the knock pin [16] and remove the pinion [4].
6. Loosen the cover mounting bolt [13] and remove the cover [2].
7. Remove the scroll [3].

Assembly procedures

For reassembly, lubricate using the recommended grease sufficiently and perform the disassembly procedure in reverse order. Be careful to match the body [1] and master jaw [9] numbers. Also, tighten each bolt to the specified torque as shown in Table 7.

Refer to page 27 (8-3. Installation of scroll work gripper) for installation procedure of the scroll work gripper to the machine.

DANGER

- **Be sure to tighten the bolts to the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the scroll work gripper or workpiece will fly off.**

Table 7-1 Scroll work gripper mounting bolt, jaw mounting bolt, and pinion case mounting bolt

Socket head cap screw	Tightening torque	
M6	13	N･m
M8	33	N･m

Table 7-2 Cover mounting bolt

Slotted head cap screw	Tightening torque	
M3.5	3.0	N･m
M4.5	3.0	N･m
M6	3.0	N･m

Table 7-3 Knock pin

Knock pin	Tightening torque	
M6, M8	3.0	N･m

WARNING

- **Disassemble and clean the scroll work gripper at least once every 6 months or every 100,000 strokes (at least once every 2 months when cutting cast metal). If chips or other substances accumulate inside the scroll work gripper, it will lead to insufficient stroke and loss of gripping force and this may cause workpiece to fly off, which is dangerous. Check each part carefully and replace any part that is worn or cracked.**

- **After inspection, sufficiently lubricate with grease and reassemble.**
- **After assembly, measure the gripping force according to the method on page 13 and confirm that the specified gripping force is obtained.**
- **If the machine is stopped for a long period of time, remove the workpiece from the machine. Workpiece may fall due to malfunction if not removed.**
- **If the machine is to be stopped or stored for a long period of time, apply grease lubrication and anti-corrosion treatment in advance.**

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 8

Defective	Cause	Countermeasure
The scroll work gripper does not operate.	The scroll work gripper 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.
Handle rotation is hard.	A large amount of cutting powder is inside.	Disassemble and clean.
	Rust occurs at slide part and rotation part.	Disassemble and clean.
The Work slips.	The gripping force is insufficient.	Tighten at the specified handle torque.
	The forming diameter of the top jaw is not consistent with the work diameter.	Form again based on the correct forming method.
	The cutting force is too large.	Calculate the cutting force and check that it is suitable for the specification of the scroll work gripper.
	Insufficient grease lubrication	Supply grease from the grease nipple, and open and close the jaw several times without gripping a work.
Precision failure.	The outer periphery of the scroll work gripper is running out.	Check the end surface run-out and the outer periphery, and retighten the scroll work gripper attaching bolts.
	Foreign matter is caught in cross key part between base jaw and top jaws. jaw attaching bolts are inadequately tightened.	Remove top jaw and clean cross key part thoroughly and tighten bolts to specified torque.
	The forming method of the soft jaw is inappropriate.	Check that forming plug is parallel to scroll work gripper end face and plug is not deformed due to gripping force.
	The height of the top jaw is too high, the top jaw is deformed, the top jaw attaching bolt is elongated.	Do not use the jaw that is higher than a standard.

WARNING

- **If the scroll work gripper failed due to a seizure or breakage, remove the scroll work gripper from the machine, following the disassembly steps in page 22. When the scroll work gripper 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 scroll work gripper 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 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 scroll work gripper to a machine). Please read following instruction carefully when you attach or detach a scroll work gripper to machine, and please sufficiently understand and follow the instructions for safe operation.

8. Attachment

8-1. Outline drawing of attachment

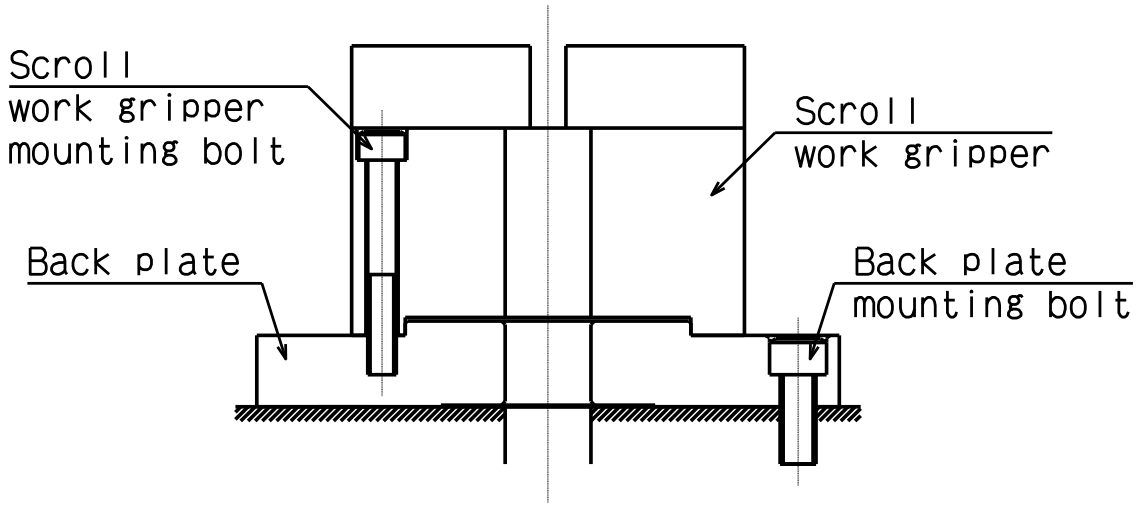


Fig.7

8-2. Manufacturing of back plate

NOTICE

- Runout of the back plate directly affects the machining accuracy. The end surface of the back plate runout should be kept to 0.005mm or less.
- The accuracy of machining the scroll work gripper mounting end surface of the back plate can be improved by machining it while it is mounted on the machine.

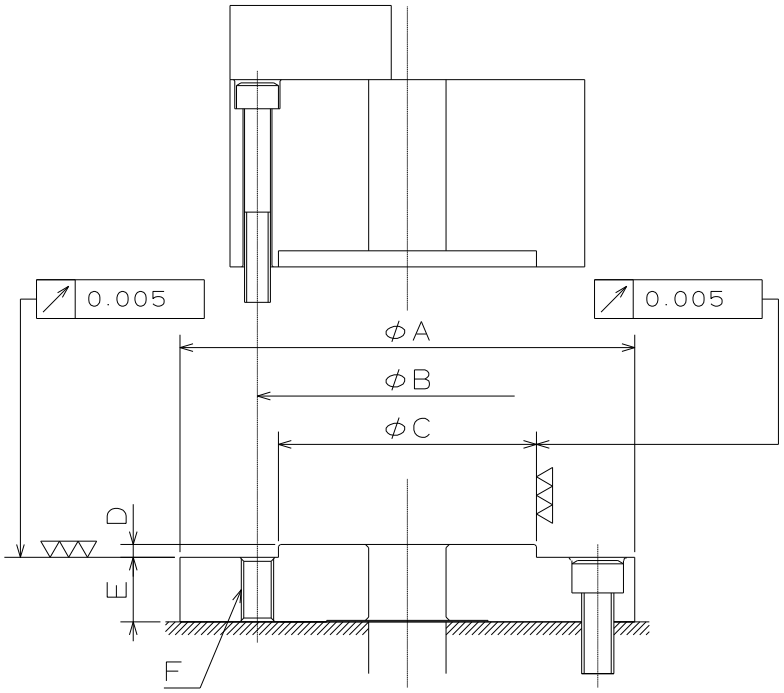


Fig.8

Table 9

Type	A mm	B mm	C (g6) mm	D mm	E mm	F
SC-3S	88	72	60	3	12	3-M6
SC-4S	115	93	80	4	12	3-M8
SC-5S	135	113	100	4	15	3-M8

8-3. Installation of scroll work gripper

1. Back plate installation

- Tighten the back plate mounting bolts evenly. Make sure that the bolts are tighten to the specified torque.

2. Scroll work gripper installation

- Attach the scroll work gripper to the back plate then adjust the end face runout to 0.02 T.I.R. or less. Make sure that the bolts are tighten evenly to the specified torque.
- Set the machine origin point using the chuck`s body side surface as reference.
- When using multiple scroll work grippers if it is necessary to center the chuck, tap the side of the body lightly with a plastic hammer to adjust the center.

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 scroll work gripper or work will fly out.**
- **Use the bolts attached to the scroll work gripper, and do not use other bolts. However, if you must use other bolts not provided by Kitagawa, use bolts that have at least the strength classification of 12.9 (10.9 for M22 or more) and be sure that it have sufficient length.**

Table 10

Bolt size	Tightening torque	
M5	7.5	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

9. Other information

9-1. Information about markings of product

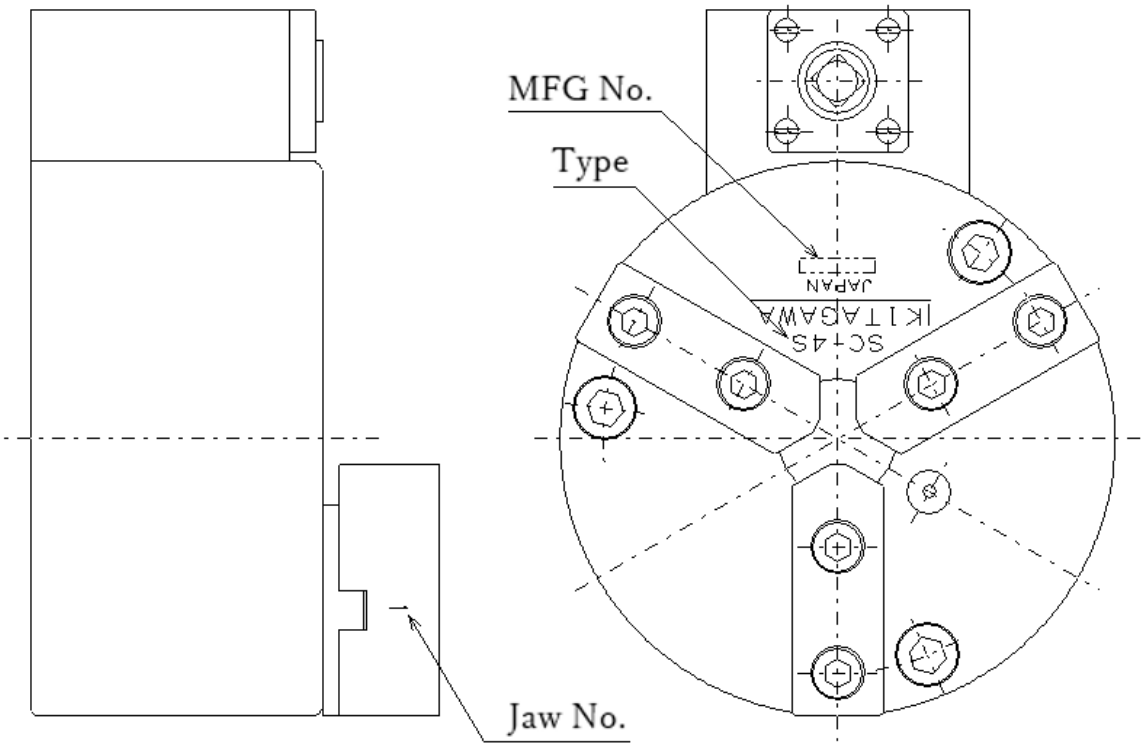


Fig.11

9-2. About disposal

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

kitagawa

https://www.kiw.co.jp
https://www.kitagawa.com

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