

INSTRUCTION MANUAL

SC-(F)N / JN-(T)N type

Scroll Chuck for Rotary Table



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.

Kitagawa Corporation

77-1, Motomachi, Fuchu-shi, Hiroshima, 726-8610, Japan

TEL +81-(0)847-40-0561

FAX +81-(0)847-45-8911

Preface

This manual provides detailed information about how to safely and correctly use the scroll chuck (SC-N, SC-FN, JN-N, JN-TN type) for a rotary table.

Before starting to use this scroll chuck, 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 a workpiece on the rotary tables. This product is equipped with the jaws to clamp the workpiece and they operate by the handle. 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.

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1. Structural Drawing and Parts List

1-1. Type display

Type display as shown below

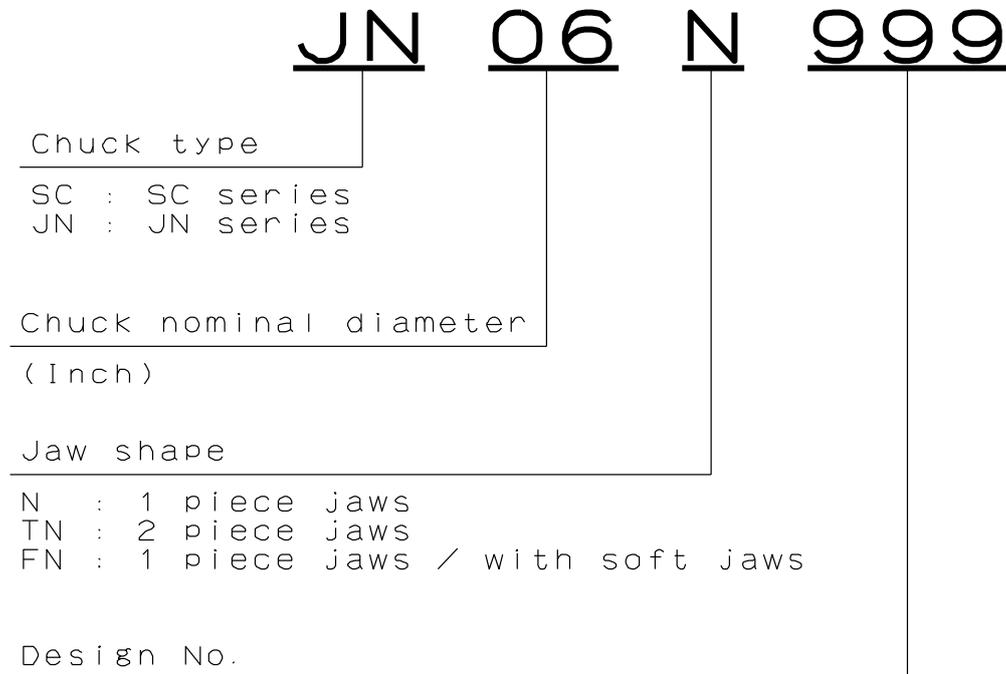


Fig.1

1-2. Structural drawing

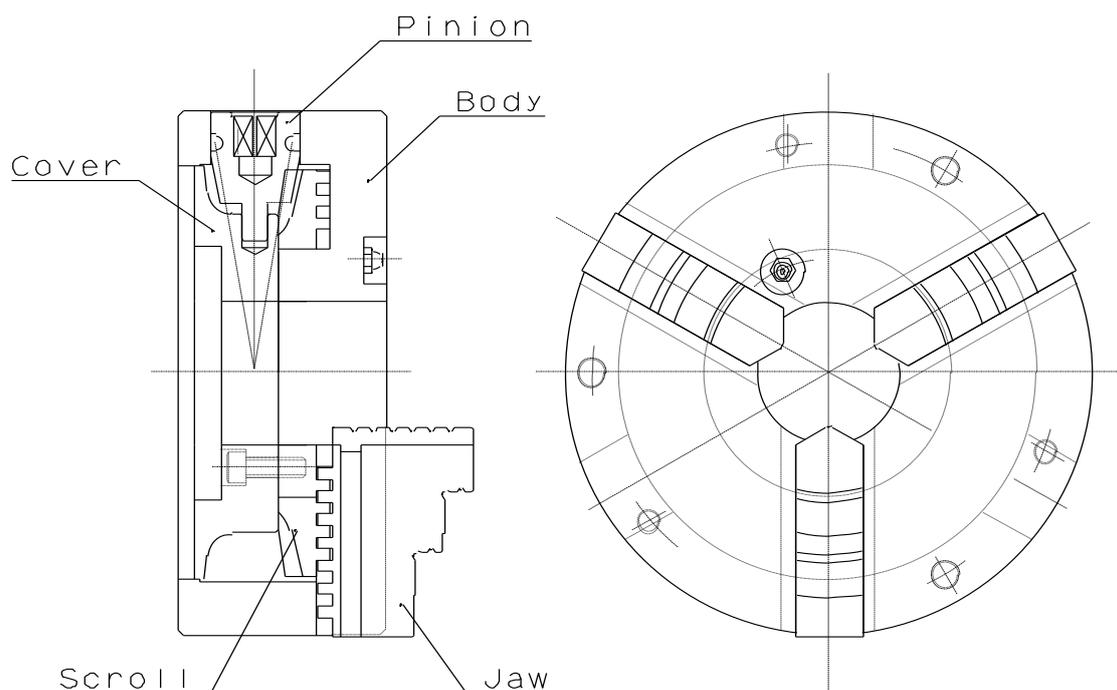


Fig.2

1-3. Parts list

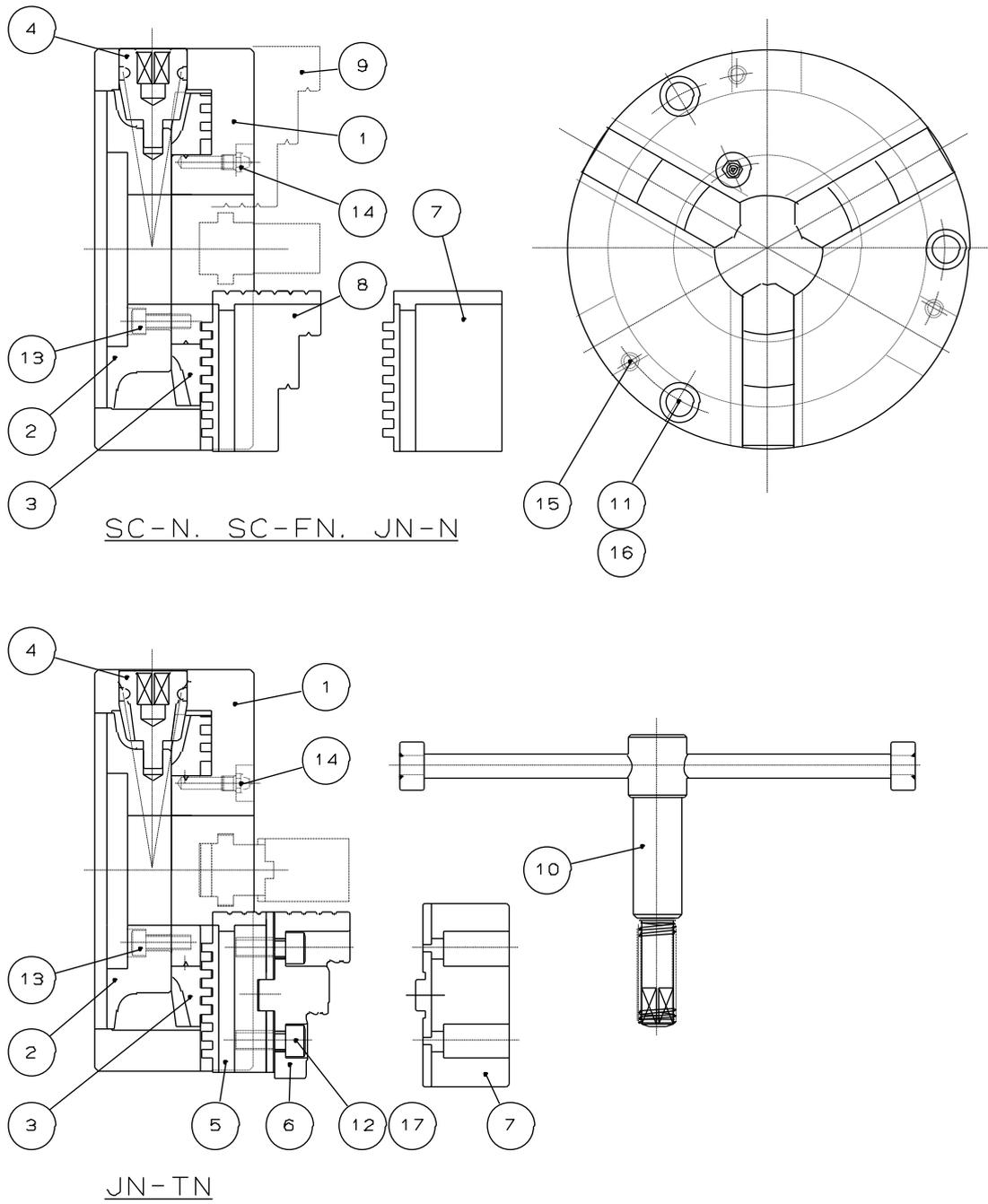


Fig.3

Table 1

No.	Name	Quantity			
		SC-N	SC-FN	JN-N	JN-TN
1	Body	1	1	1	1
2	Cover	1	1	1	1
3	Scroll	1	1	1	1
4	Pinion	3	3	3	3
5	Base jaw	-	-	-	3
6	Top jaw	-	-	-	3
7	Soft jaw	-	3	-	3
8	Internal jaw	3	3	3	-
9	External jaw	3	3	3	-
10	Handle	1	1	1	1
11	Chuck attaching bolt	3 / 6	3	3	3
12	Jaw attaching bolt	-	-	-	6
13	Cover attaching bolt	3	3	3	3
14	Grease nipple	-	-	1	1
14	Oil cup	1	1	-	-
15	Knock pin	3	3	3	3
16	Hex key	1	1	1	1
17	Hex key	-	-	-	1

2. Important Safety Precautions

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



DANGER

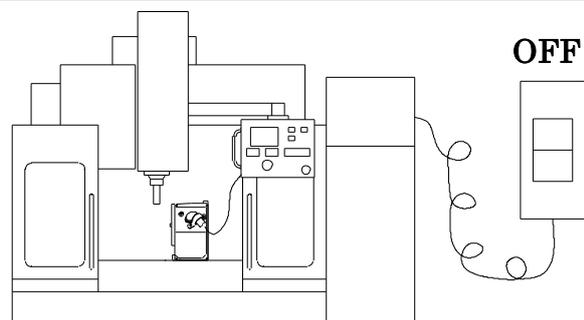
Failure to follow the safety precautions below will result in serious injury or death.



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

For All Users

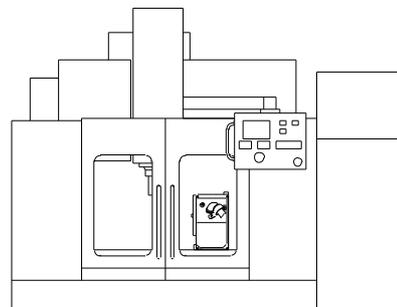
- The chuck may start rotation suddenly, and a part of the body or clothing may be caught.



Close door before rotating spindle.

For All Users

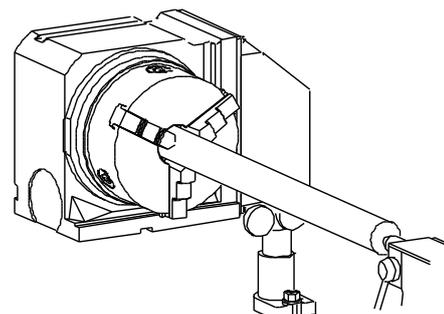
- If the door is not closed, you may touch the rotating chuck or the work may fly out, which is very dangerous. (In general, the safety interlock function which allows rotation only when the door is the manual mode or the test mode)



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.



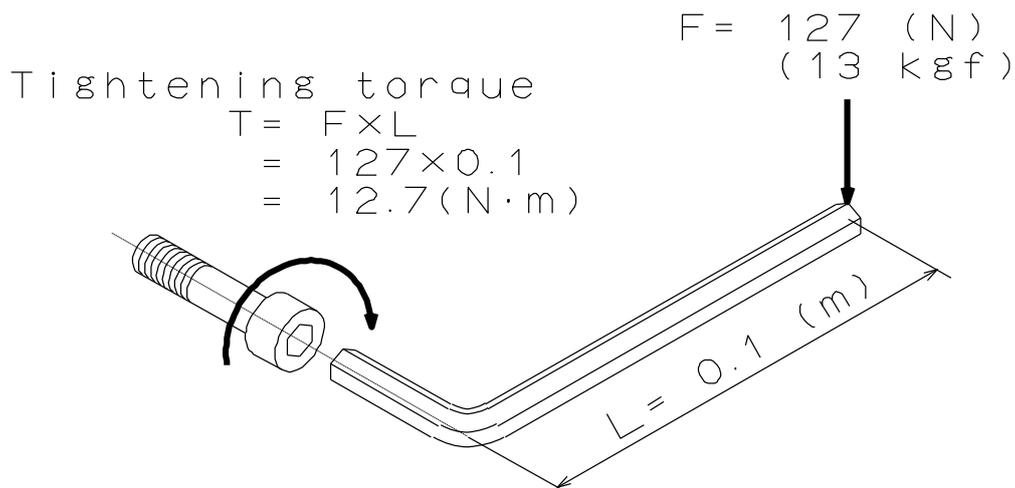
Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out. Use the bolts attached to the chuck, and do not use bolts other than these.

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 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	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 = $F \times L$.



Important Safety Precautions



WARNING

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



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

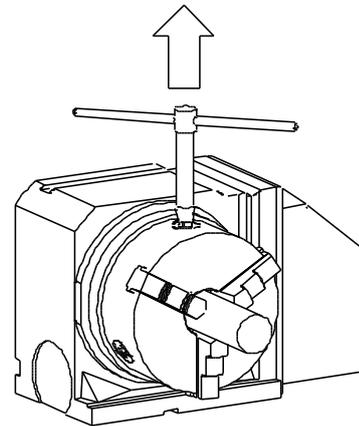
- If the gripping force is insufficient, this is dangerous as the work will fly out.



Use the handle attached to the product, and remove the handle after use.

For All Users

- The handle attached to the product comes to come off by a spring automatically. If you use other handle, the handle may scatter when you forget to remove it.
- Excessive handle torque can lead to breakage of the chuck, this is dangerous as the jaw and work will fly out.
- If the handle torque is insufficient, this is dangerous as the work will fly out.



Use neither jaw that is taller jaw than standard jaw.

For All Users

- The moment hanging to the chuck becomes large when you use taller jaw and this is dangerous as the chuck and work will fly out.



Be sure to use the chuck at the gripping range. (Refer to page 15)

Be sure to use the chuck at the permissible protruding range. (Refer to page 17)

For All Users

- If exceeded the gripping range, the engaged part strength between the jaw and scroll becomes insufficient, thus scattering the chuck jaw or work and resulting in danger.



Important Safety Precautions



WARNING

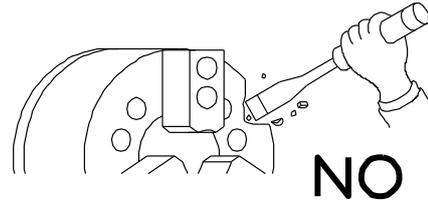
Failure to follow the safety precautions below could result in serious injury or death.



Do not modify the chuck in a way not permitted by the manufacturer.

For All Users

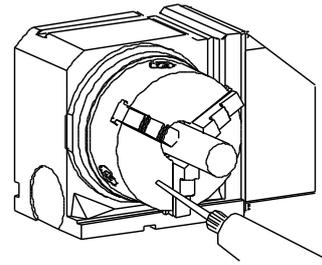
- It may not only break the chuck but the chuck and the work may fly out, which is dangerous.
- If you attach a locator or jig on the chuck body surface, only process work in an acceptable range (Refer to pages 24-25).



Periodically supply adequate grease (Refer to page 26). Turn off power before adding grease.

For All Users

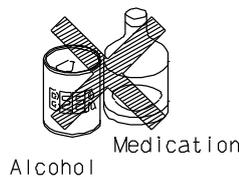
- Insufficient grease supply lowers the gripping force, causes operation failure due to lower hydraulic pressure, lowers the gripping precision, and causes abnormal wearing and seizing, etc.
- This is dangerous as the work could fly out from a drop in the gripping force.



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

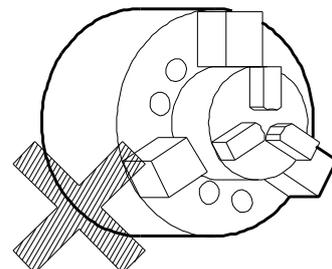
- Dangerous since it will be caught.



Do not grip a chuck with a chuck.

For All Users

- Because it is easy to confuse the specifications of each chuck and the protrusion become long, it is apt to exceed the specifications of the base chuck. The chuck may break and the chuck or work could fly out.



3. Specifications

3-1. Specifications

Table 2-1

Type		SC-3N	SC-4N	SC-5N
Maximum static gripping force	kN (kgf)	9.0 (918)	12.0 (1224)	15.0 (1530)
Thru-hole diameter	mm	16	24	32
Mass	kg	1.5	3.1	4.4
Moment of inertia	kg·m ²	0.001	0.004	0.009
Maximum permissible handle torque	N·m (kgf·m)	29.4 (3.0)	44.1 (4.5)	63.7 (6.5)
Balance quality		G6.3		
Storing temperature / Operating temperature		-20~+50°C / -10~+40°C		

Table 2-2

Type		SC-5FN Hard jaw	SC-5FN Soft jaw	JN06N	JN06TN
Maximum static gripping force	kN (kgf)	15.0 (1530)	12.0 (1224)	31.0 (3161)	31.0 (3161)
Thru-hole diameter	mm	32	32	45	45
Mass	kg	4.4	4.4	8.4	9.0
Moment of inertia	kg·m ²	0.009	0.009	0.030	0.033
Maximum permissible handle torque	N·m (kgf·m)	63.7 (6.5)	51.0 (5.2)	88.3 (9.0)	88.3 (9.0)
Balance quality		G6.3			
Storing temperature / Operating temperature		-20~+50°C / -10~+40°C			

Table 2-3

Type		JN07N	JN07TN	JN09N	JN09TN
Maximum static gripping force	kN (kgf)	31.0 (3161)	31.0 (3161)	37.0 (3773)	37.0 (3773)
Thru-hole diameter	mm	55	55	70	70
Mass	kg	12.2	13.0	21.2	22.0
Moment of inertia	kg·m ²	0.060	0.063	0.160	0.163
Maximum permissible handle torque	N·m (kgf·m)	107.9 (11.0)	107.9 (11.0)	147.0 (15.0)	147.0 (15.0)
Balance quality	G6.3				
Storing temperature / Operating temperature	-20~+50°C / -10~+40°C				

Table 2-4

Type		JN10N	JN10TN	JN12N	JN12TN
Maximum static gripping force	kN (kgf)	46.0 (4691)	46.0 (4691)	55.0 (5608)	55.0 (5608)
Thru-hole diameter	mm	85	85	96	96
Mass	kg	28.0	29.0	41.0	43.0
Moment of inertia	kg·m ²	0.253	0.265	0.588	0.600
Maximum permissible handle torque	N·m (kgf·m)	176.5 (18.0)	176.5 (18.0)	206.0 (21.0)	206.0 (21.0)
Balance quality	G6.3				
Storing temperature / Operating temperature	-20~+50°C / -10~+40°C				

Table 2-5

Type		SC-14N	SC-16N
Maximum static gripping force	kN (kgf)	40.5 (4130)	45.0 (4589)
Thru-hole diameter	mm	100	110
Mass	kg	54.0	74.0
Moment of inertia	kg·m ²	0.950	1.725
Maximum permissible handle torque	N·m (kgf·m)	225.6 (23.0)	245.0 (25.0)
Balance quality		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.

3-2. Gripping range

Table 3

Type	Gripping range							
	External gripping					Internal gripping		
	A1	A2	A3	A4	Soft jaw	B1	B2	Soft jaw
SC-3N	2~35	33~55	53~70	2~35	-	24~44	42~64	-
SC-4N	3~43	41~69	67~95	3~43	-	29~57	55~84	-
SC-5N	3~46	44~77	75~110	3~46	-	33~67	65~100	-
SC-5FN	3~46	44~77	75~110	3~46	3~110	33~67	65~100	33~100
JN06N	3~64	62~112	110~160	3~64	-	48~100	98~150	-
JN06TN	3~64	62~112	110~160	-	3~160	55~104	102~150	55~150
JN07N	4~72	70~126	124~180	4~72	-	56~114	112~170	-
JN07TN	4~68	66~124	122~180	-	4~180	62~117	115~170	62~170
JN09N	5~84	82~150	150~220	5~84	-	62~137	135~210	-
JN09TN	5~80	78~150	148~220	-	5~220	70~141	139~210	70~210
JN10N	5~96	94~178	176~260	5~96	-	70~161	159~250	-
JN10TN	5~94	92~177	176~260	-	5~260	80~166	164~250	80~250
JN12N	10~108	108~204	202~300	10~108	-	86~189	187~290	-
JN12TN	10~108	108~204	202~300	-	10~300	90~191	189~290	91~290
SC-14N	25~118	116~210	208~315	25~118	-	107~188	186~290	-
SC-16N	25~132	130~215	213~360	25~132	-	113~212	210~340	-

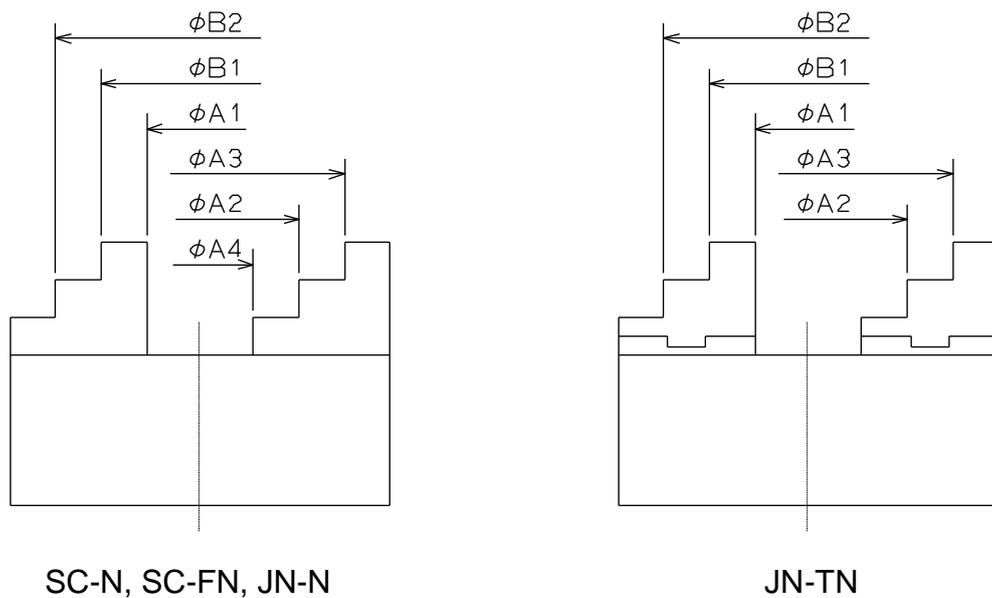


Fig.4



- Be sure to use the chuck at the gripping range. If exceeded the above range, the engaged part strength between the jaw and scroll becomes insufficient, thus scattering the chuck jaw or work and resulting in danger.
- Since there is a possibility that the jaw is protruded from chuck periphery by the size of gripping diameter, take extreme care so as not to interfere with tool, 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 chuck surface to the top surface of the jaw).
- Specified grease is used.

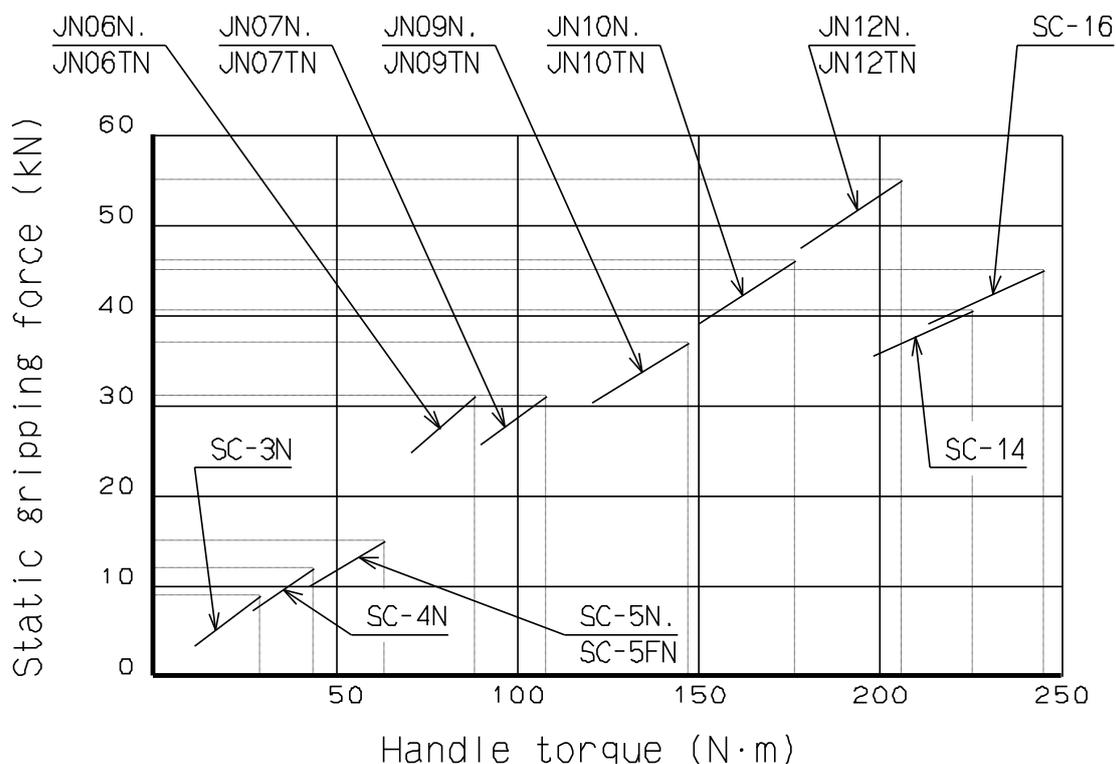


Fig.5

4. Forming Soft Jaw

4-1. Attachment of soft jaw

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



- Be sure to use the chuck 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 chuck jaw or work and resulting in danger.

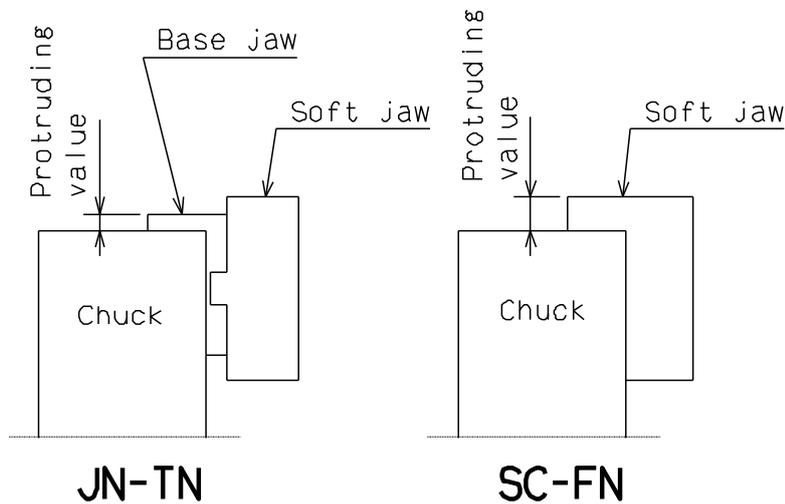


Fig.6

Table 4

Type	Permissible value of jaw protruded from chuck periphery (mm)
SC-5FN	5 mm or less
JN06TN	16 mm or less
JN07TN	16 mm or less
JN09TN	18 mm or less
JN10TN	21 mm or less
JN12TN	30 mm or less

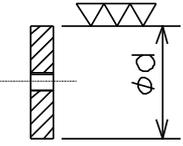
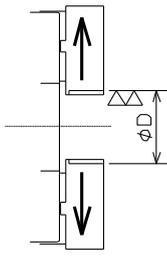
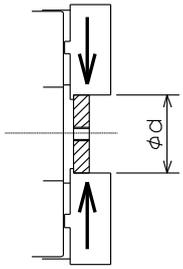
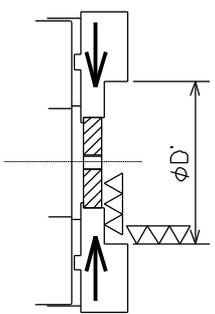
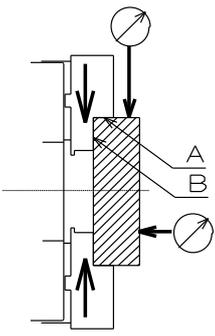


- Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out.

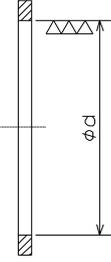
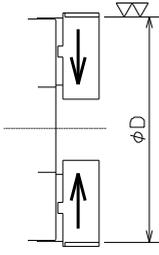
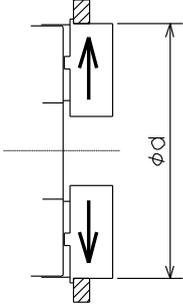
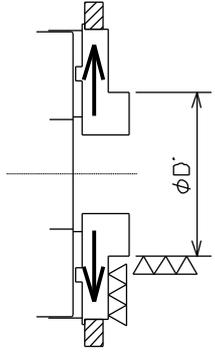
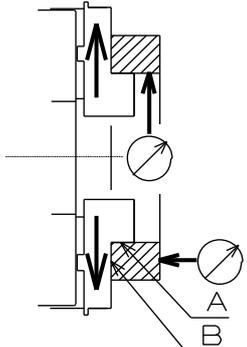
Table 5

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

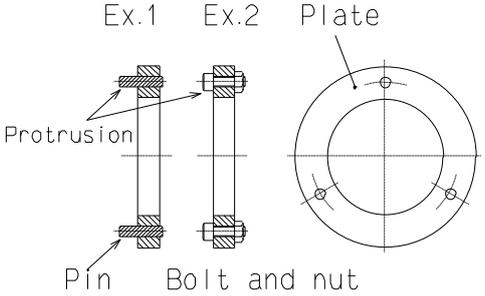
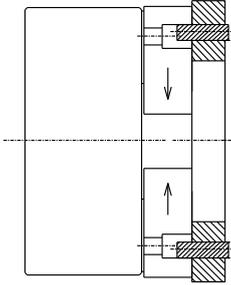
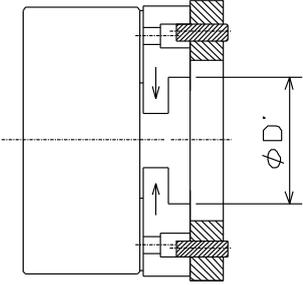
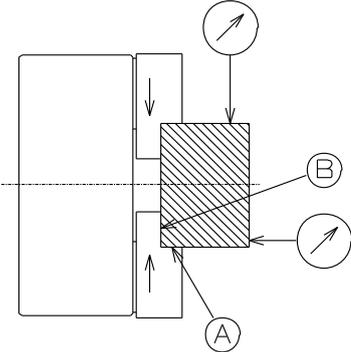
4-2. Forming soft jaw with outside diameter gripping

<p>1. Preparation of the plug for forming</p> <ul style="list-style-type: none"> 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. 	 <p>A cross-sectional diagram of a plug. The plug is a rectangular block with a diameter labeled as ϕd. The top surface of the plug is indicated with a roughness symbol (a triangle with a vertical line). The plug is shown partially inserted into a hole in a workpiece.</p>
<p>2. Process of the plug gripping part for forming</p> <ul style="list-style-type: none"> 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 chuck periphery. 	 <p>A cross-sectional diagram showing the initial setup. The upper jaw is moving upwards (indicated by an upward arrow) and the lower jaw is moving downwards (indicated by a downward arrow). The diameter of the gripping part is labeled as ϕD. The plug is positioned between the jaws.</p>
<p>3. Gripping of the plug for forming</p> <ul style="list-style-type: none"> Clamp the plug in the part of ϕD. At this time, grip by pressing the plug on the chuck front surface in order for the plug not to be tilted. 	 <p>A cross-sectional diagram showing the plug being gripped. The upper jaw is moving downwards (indicated by a downward arrow) and the lower jaw is moving upwards (indicated by an upward arrow). The plug is now firmly held between the jaws. The diameter of the gripping part is labeled as ϕd.</p>
<p>4. Forming</p> <ul style="list-style-type: none"> Process the gripping part (dimension $\phi D'$) of the work in the state that the plug is kept gripped. The $\phi D'$ 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. 	 <p>A cross-sectional diagram showing the forming process. The upper jaw is moving downwards (indicated by a downward arrow) and the lower jaw is moving upwards (indicated by an upward arrow). The plug is gripped between the jaws. The diameter of the gripping part is labeled as $\phi D'$. The plug is shown being pressed against the workpiece.</p>
<p>5. Trial cutting</p> <ul style="list-style-type: none"> 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. 	 <p>A cross-sectional diagram showing trial cutting. The upper jaw is moving downwards (indicated by a downward arrow) and the lower jaw is moving upwards (indicated by an upward arrow). The plug is gripped between the jaws. The diameter of the gripping part is labeled as $\phi D'$. The plug is shown being pressed against the workpiece. Two contact points, labeled A and B, are indicated on the gripping surface.</p>

4-3. Forming soft jaw with inside diameter gripping

<p>1. Preparation of the ring for forming</p> <ul style="list-style-type: none"> 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. 	
<p>2. Process of the ring gripping part for forming</p> <ul style="list-style-type: none"> 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 chuck periphery. 	
<p>3. Gripping of the ring for forming</p> <ul style="list-style-type: none"> Clamp the plug in the part of ϕD. At this time, grip by pressing the ring on the chuck front surface in order for the ring not to be tilted. 	
<p>4. Forming</p> <ul style="list-style-type: none"> Process the gripping part (dimension $\phi D'$) of the work in the state that the ring is kept gripped. The $\phi D'$ 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. 	
<p>5. Trial cutting</p> <ul style="list-style-type: none"> 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

<p>1. Preparation of the jig for forming</p> <ul style="list-style-type: none"> 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. 	 <p>Ex.1 Ex.2 Plate</p> <p>Protrusion</p> <p>Pin Bolt and nut</p>
<p>2. Gripping of the jig for forming</p> <ul style="list-style-type: none"> 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. 	
<p>3. Forming</p> <ul style="list-style-type: none"> Process the gripping part (dimension $\phi D'$) of the work in the state that the jig for forming is kept gripped. The $\phi D'$ 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. 	 <p>$\phi D'$</p>
<p>4. Trial cutting</p> <ul style="list-style-type: none"> 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. 	 <p>A B</p>

5. Usage

This product is a device to fix a work-piece when it is processed by the rotary table. The handle closes the jaw manually and fixes a work-piece so that it does not move during processing. The chuck opens the jaw after having processed it and remove a work-piece.

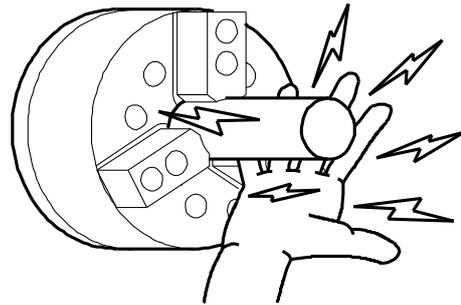
NOTICE

- When replacing the top jaw, carefully clean the top jaw and the cross-key (key and keyway) of base jaw. If not, it will cause an inadequate deflection accuracy.

5-1. Precautions during gripping work with chuck

DANGER

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



5-2. Precautions during gripping work in irregular shape

DANGER

- If a work in an irregular shape is gripped the jaw may be broken. Consult our company or the distributor if there is any concern.
- Cast metal, pitched shape or taper shape cannot be gripped.
- If the protrusion of the work is long, support it with a center or the steady rest. If the protrusion is long the tip of the work turns, and this is dangerous as the work will fly out.

5-3. Precautions related to usage of jaw



- If a soft jaw other than one made by Kitagawa Iron Works is used, the engagement will be inferior, and the gripping precision will worsen, and the work will fly out due to gripping failure, which is dangerous.
- Do not use the soft jaw by welding to join for extension. 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 related to processing



<1> Interference, contact, impact

- Before starting work, check that the top jaw, locator, 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, jaw, 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 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 chuck and gripping force drop may result. The work will fly out due to the gripping force drop and this is dangerous.

5-5. Attachment of locator and jig

- In the case of attaching the locator and the jig on the chuck body surface, tap or drill a hole in the additional process range specified in Fig. 7.

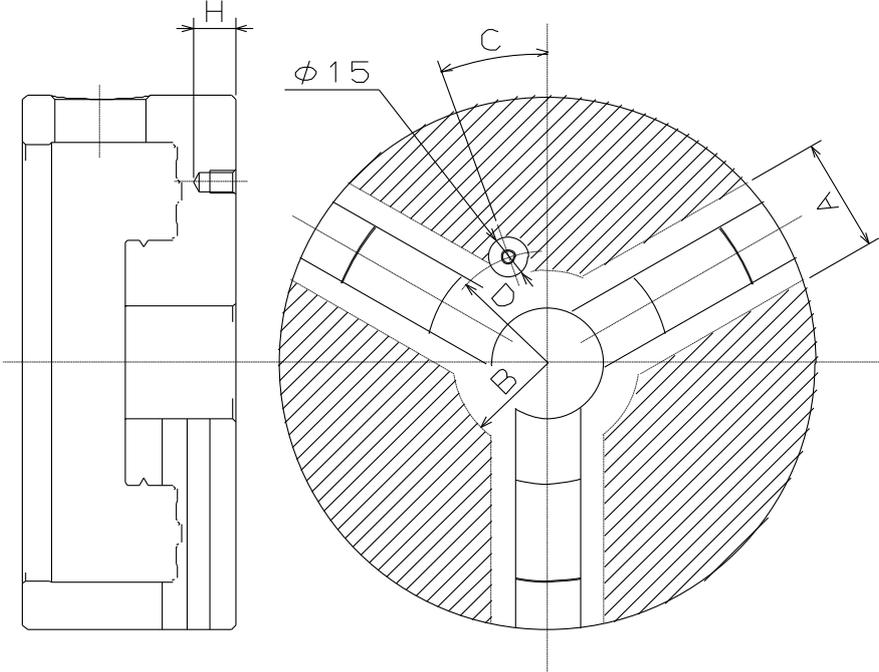


Fig.7

Table 6

Type	A mm	B mm	C °C	D mm	H (Max) mm
SC-3N	20	12	0	15	10
SC-4N	24	16	0	18	11.5
SC-5N	26	20	0	24.25	14.5
SC-5FN	26	20	0	24.25	14.5
JN06N	36	28	24	35.5	14
JN06TN	36	28	24	35.5	14
JN07N	40	33	20	40	17.5
JN07TN	40	33	20	40	17.5
JN09N	46	40.5	20	49	21.5
JN09TN	46	40.5	20	49	21.5
JN10N	46	48	20	64	21
JN10TN	46	48	20	64	21
JN12N	52	53.5	20	74	28
JN12TN	52	53.5	20	74	28
SC-14N	44	55	0	81	13
SC-16N	50	60	0	86	15

A, B: Additional process impossible dimension.

H: Processible depth of tapping or drilling a hole.



- **The chuck can be modified only in the manufacturer permissible range. This will not only break the chuck but the chuck and work may fly out, which is dangerous.**
- **Provide a countermeasure against flying out (dwell pin, etc.) due to centrifugal force to the locator or the jig, and attach with bolts which have sufficient strength. The locator or the jig may fly out, and this is dangerous.**

6. Maintenance and Inspection

6-1. Periodic Inspection

- Add grease at least once a day.
- Always clean the chuck body or the sliding surface using an air gun, etc., at the end of work.
- If swarf of foreign matter is caught inside chuck (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

6-2-1. JN-N, JN-TN type

1. Position to lubricate

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

2. Grease to use

- Use the designated grease specified in Table 7. If grease other than the designated grease is used, sufficient effect may not be obtained.

Table 7

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

- Add grease once every day.
- In the case of high rotation or in the case of using a large amount of water soluble coolant, increase the frequency of lubrication according to the usage conditions.



- To keep the chuck running in the best condition for a long time, adequate grease lubrication is necessary. Insufficient grease lubrication causes a drop in the gripping force, operation failure at low hydraulic pressure, drop in gripping precision, abnormal wearing, seizing, etc. The work will fly out due to a drop in the gripping force and this is dangerous.

6-2-2. SC-N, SN-FN type

1. Position to lubricate

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

2. Grease to use

- Lubrication oil equivalent to ISO VG32

3. Frequency of lubrication

- Add grease once every day.
- In the case of high rotation or in the case of using a large amount of water soluble coolant, increase the frequency of lubrication according to the usage conditions.

6-2-3. 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 6-7.

1. Turn off the main power of the machine before starting work.
2. Remove the jaws.
3. Loosen the chuck attaching bolt [11] and remove the chuck from the spindle.
4. Loosen the knock pin [15] and remove the pinion [4].
5. Loosen the cover attaching bolt [13] and remove the cover [2].
6. Remove the scroll [3].

Assembling procedures

Assemble again while sufficiently coating the recommended grease in the reverse procedures of disassembling. At this time, pay sufficient attention so as not to make a mistake in the numbers of the body [1], the jaw and the pinion [4].

Refer to page 36 about the installation procedure. (9-3. Attachment of chuck).



- **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.**

Table 8-1 Chuck mounting bolt and jaw mounting bolt

Socket head cap screw	Tightening torque
M8	33 N·m
M10	73 N·m
M12	107 N·m
M16	250 N·m

Table 8-2 Cover mounting bolt

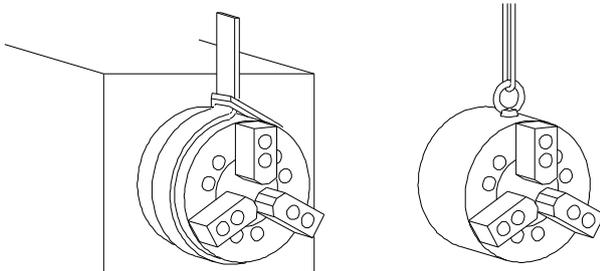
Slotted head cap screw	Tightening torque	Socket head cap screw	Tightening torque
M3.5	3.0 N·m	M6	15.7 N·m
M4.5	3.0 N·m	M8	29.4 N·m
M6	3.0 N·m	M10	49.0 N·m
		M12	49.0 N·m

Table 8-3 Knock pin

Knock pin	Tightening torque	Chuck model
M6, M8	3.0 N·m	3"~5"
M8	7.5 N·m	6"~10"
M10	7.5 N·m	12"~14"
M12	7.5 N·m	16"

CAUTION

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



Chuck size (inch)	Eyebolt
9, 10	M10
12, 14	M12
16	M16

WARNING

- Remove the eyebolt or the belt without fail after using. If the chuck is rotated with the eyebolt, etc., attached, they may fly out and this is dangerous.
- 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.
- After assembling, measure the gripping force according to the method on page 16, and check that the specified gripping force is obtained.
- 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 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 9

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.
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 chuck.
	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 chuck is running out.	Check the end surface run-out and the outer periphery, and retighten the chuck 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 chuck 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 chuck failed due to a seizure or breakage, remove the chuck from the machine, following the disassembly steps in page 28. 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.

8. Quality standard

8-1. Runout accuracy

Table 10

Type	Chuck runout (mm)		Test bar runout (mm)						
	a	b	Pinion position	l	c	d	e	f	g
SC-3	0.02	0.02	Master pinion (Master pinion other than)	38	0.03 (0.05)	0.05 (0.05)	0.02	0.05 (0.05)	0.02
SC-4						0.04 (0.05)		0.04 (0.05)	
JN06									
JN07				50		0.05 (0.05)	0.05 (0.05)		
JN09									
JN10				75		0.05 (0.05)	0.03 (0.05)	0.05 (0.05)	
JN12									
SC-14									0.03
SC-16				0.03					
Type	Size	Dia. of Test Round Bar				Test ring (mm)			
						SC·SA type		TC·TA type	
						Inner dia.	Outer dia.	Inner dia.	Outer dia.
SC-3N	85	8	10	15	-	40	60	-	-
SC-4N	110	8	15	20	-	50	80	-	-
SC-5	130	8	15	25	-	60	100	-	-
JN06	165	12	19	30	37	81	134	86	134
JN07	190	12	16	25	37	102	168	107	166
JN09	230	12	25	37	50	122	196	128	196
JN10	273	12	25	37	50	144	223	151	223
JN12	310	19	45	55	70	157	245	162	247
SC-14	355	30	70	90	-	188	290	188	290
SC-16	405	50	70	90	-	208	315	208	315

Reduce runout a amount of the main body if runout c amount is 0.03mm or more when gripping the test bar.

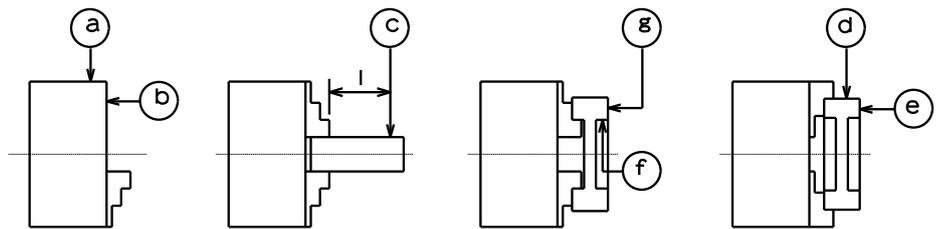


Fig.8

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.

9. Attachment

9-1. Outline drawing of attachment

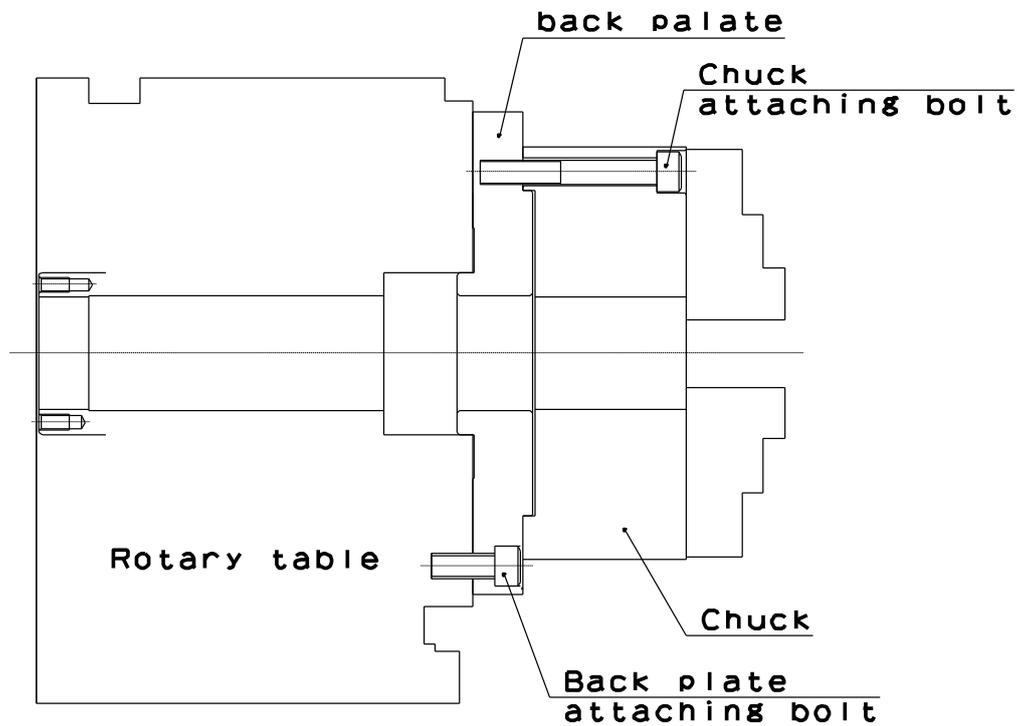


Fig.9

Table 11

Type	A mm	B mm	C (js6) mm	D mm	E mm	F
SC-3N	88	71	60	3	10	3-M6
SC-4N	115	93	80	4	12	3-M8
SC-5N	135	113	100	4	12	3-M8
SC-5FN	135	113	100	4	12	3-M8
JN06N	170	145	130	4.5	15	3-M10
JN06TN	170	145	130	4.5	15	3-M10
JN07N	195	170	155	4.5	18	3-M10
JN07TN	195	170	155	4.5	18	3-M10
JN09N	235	208	190	5.5	20	3-M12
JN09TN	235	208	190	5.5	20	3-M12
JN10N	275	248	230	5.5	20	3-M12
JN10TN	275	248	230	5.5	20	3-M12
JN12N	310	282	260	6.5	22	3-M12
JN12TN	310	282	260	6.5	22	3-M12
SC-14N	355	328	300	6.5	26	6-M14
SC-16N	405	375	345	7.5	26	6-M14

9-3. Attachment of chuck

1. Attach the back plate

- Tighten the back plate attaching bolts evenly. At this time, tighten the bolts at the specified torque.

2. Attach the chuck

- In the case of adjusting the centering of the chuck, lightly hit the body side face with a plastic hammer.
- Tighten the chuck attaching bolts evenly. At this time, tighten the bolts at the specified torque.
- Keep the periphery run-out and the end surface run-out of the chuck at 0.02mm T.I.R or less.



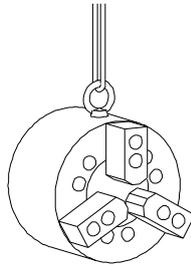
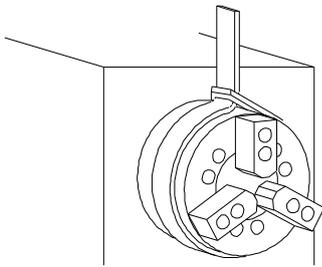
- **Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out.**
- **Use the bolts attached to the chuck, and do not use other bolts. However, if you must use other bolts not provided by Kitagawa, 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 12

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

CAUTION

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



Chuck size (inch)	Eyebolt
9, 10	M10
12, 14	M12
16	M16

WARNING

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

10. Other information

10-1. About standards and orders

This product is based on the following standards or orders.

- Machinery directive:2006/42/EC Annex I
- EN ISO 12100:2010
- EN1550:1997+A1:2008

10-2. Information about markings of product

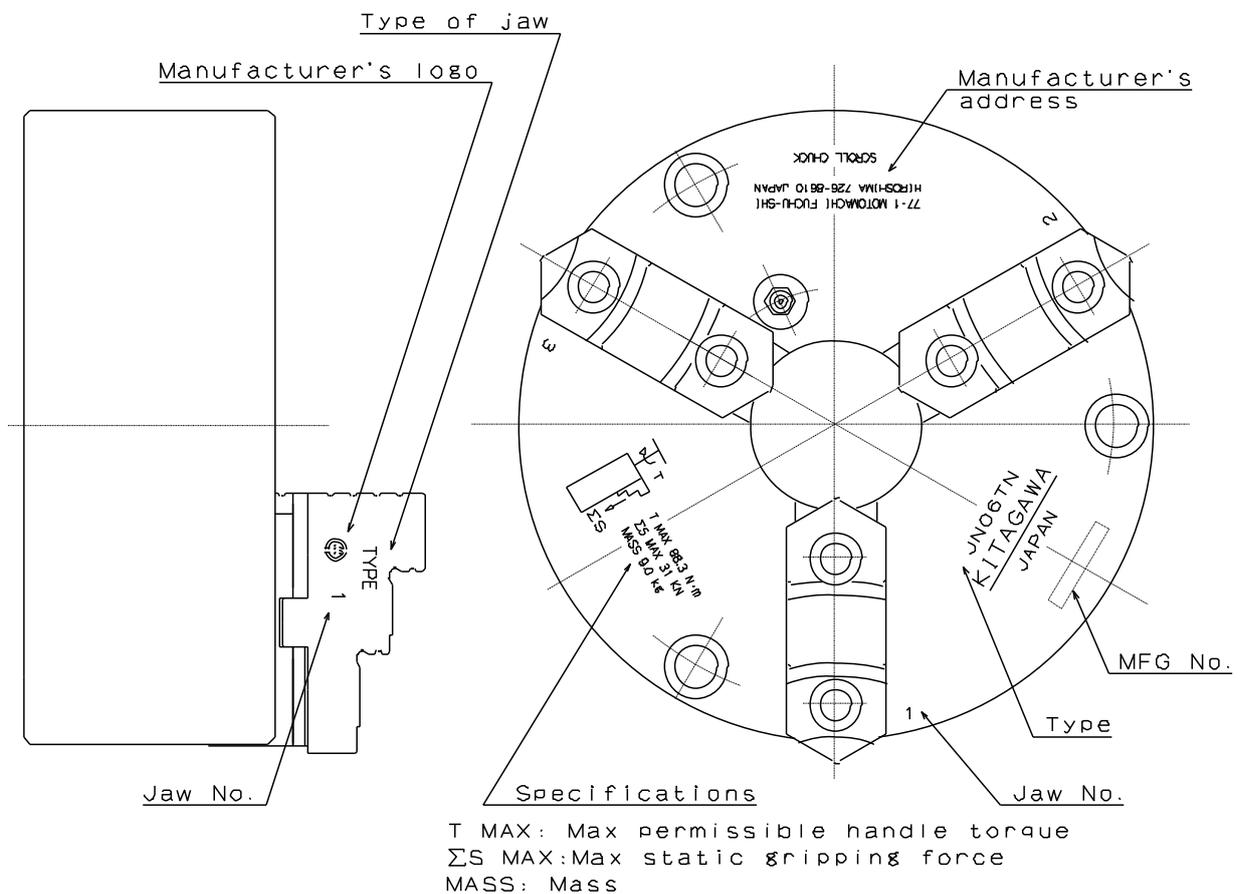


Fig.11

10-3. About disposal

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

DECLARATION OF INCORPORATION
of partly completed machinery
Original

We hereby declare that the following our product conform with the essential health and safety requirements of the EC Machinery Directive so that the product is to be incorporated into end-machinery. The product must not be put into service until end-machinery has been declared in conformity with the provisions of the EC Machinery Directive 2006/42/EC Annex II part 1.A.

We also declare that the specific technical documentation for this partly completed machinery was drawn up according to the EC Machinery Directive 2006/42/EC Annex VII part B.

Product : Scroll chuck for Rotary table

Model : SC-4N, JN06TN, JN07TN
JN09TN, JN10TN, JN12TN

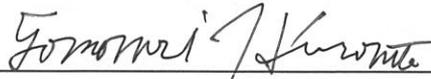
Serial number : A0000 ... Z9999 or 1A0000 ... 9Z9999

Manufacturer : Kitagawa Corporation
77-1, Motomachi, Fuchu-shi,
Hiroshima 726-8610, Japan

Authorized compiler : Peter Soetebier / Prokurist
in the community : Kitagawa Europe GmbH
Borsigstr.3 D-40880 Ratingen, GERMANY

The essential health and safety requirements in accordance with the EC Machinery Directive 2006/42/EC Annex I were applied and fulfilled:
1.1.2, 1.1.3, 1.1.5, 1.1.6, 1.3.1, 1.3.2, 1.3.4, 1.5.4, 1.5.8, 1.5.9, 1.5.13, 1.6.1, 1.7.1, 1.7.2, 1.7.3, 1.7.4, 1.7.4.1, 1.7.4.2

The following harmonized standards were applied:
EN ISO 12100:2010, EN 1550:1997+A1: 2008

Signature : 

Place / Date : Fuchu-shi / 28th Nov 2020

Name / Title : Tomonari Hiromoto / Manager, Technical section 1
Technical department
Kitagawa Global hand Company

Being the responsible person appointed and employed the manufacturer.

UK DECLARATION OF INCORPORATION

of partly completed machinery

Copy of original

We hereby declare that the following our product conform with the essential health and safety requirements of the Supply of Machinery (Safety) Regulations 2008 so that the product is to be incorporated into end-machinery. The product must not be put into service until end-machinery has been declared in conformity with the provisions of the Supply of Machinery (Safety) Regulations 2008 Annex II part 1.A.

We also declare that the specific technical documentation for this partly completed machinery was drawn up according to the Supply of Machinery (Safety) Regulations 2008 Annex VII part B.

Product	: Scroll chuck for Rotary table
Model	: SC-4N, JN06TN, JN07TN JN09TN, JN10TN, JN12TN
Serial number	: See original declaration
Manufacturer	: Kitagawa Corporation 77-1, Motomachi, Fuchu-shi, Hiroshima 726-8610, Japan
Authorized complier in the community	: Mark Jones / Financial Director UNIT 1 THE HEADLANS, DOWNTON, SALISBURY, WILTSHIRE, SP5 3JJ, UNITED KINGDOM

The essential health and safety requirements in accordance with the Supply of Machinery (Safety) Regulations 2008 Annex I were applied and fulfilled:
1.1.2, 1.1.3, 1.1.5, 1.1.6, 1.3.1, 1.3.2, 1.3.4, 1.5.4, 1.5.8, 1.5.9, 1.5.13, 1.6.1, 1.7.1, 1.7.2, 1.7.3, 1.7.4, 1.7.4.1, 1.7.4.2

The following harmonized standards were applied:
EN ISO 12100:2010, EN 1550:1997+A1: 2008

Signature : See original declaration

Place / Date : See original declaration

Name / Title : Tomonari Hiromoto / Manager, Technical section 1
Technical department
Kitagawa Global hand Company

Being the responsible person appointed and employed the manufacturer.

Kitagawa Corporation Kitagawa Global hand Company
 77-1, Motomachi, Fuchu-shi, Hiroshima, 726-8610, Japan

Tel. +81-847-40-0561 Fax. +81-847-45-8911

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Tokyo office	1-405-1, Kita-ku, Yosino-cho, Saitama-shi, Saitama, 331-9634, JAPAN Tel. +81-48-667-3469 Fax. +81-48-663-4678
Sendai office	4-15-13, Yamatomachi, Wakabayashi-ku, Sendai-shi, Miyagi, 984-0042, Japan Tel. +81-22-232-6732 Fax. +81-22-232-6739
Nagoya office	2-62, Kamitakabata, Nakagawa-ku, Nagoya-shi, Aichi, 454-0873, Japan Tel. +81-52-363-0371 Fax. +81-52-362-0690
Osaka office	3-2-9, Kitakagaya, Suminoe-ku, Osaka-shi, Osaka, 559-0011, Japan Tel. +81-6-6685-9065 Fax. +81-6-6684-2025
Hiroshima office	77-1, Motomachi, Fuchu-shi, Hiroshima, 726-8610, Japan Tel. +81-847-40-0541 Fax. +81-847-46-1721
Kyushu office	7-6-39, Itazuke, Hakata-ku, Fukuoka-shi, Fukuoka, 812-0888, Japan Tel. +81-92-501-2102 Fax. +81-92-501-2103
Overseas office	77-1, Motomachi, Fuchu-shi, Hiroshima, 726-8610, Japan Tel. +81-847-40-0526 Fax. +81-847-45-8911

■ OVERSEAS

America Contact	KITAGAWA-NORTHTECH INC. https://www.kitagawa.us 301 E. Commerce Dr, Schaumburg, IL. 60173 USA Tel. +1 847-310-8787 Fax. +1 847-310-9484
Europe Contact	KITAGAWA EUROPE LTD. https://www.kitagawa.global/en Unit 1 The Headlands, Downton, Salisbury, Wiltshire SP5 3JJ, United Kingdom Tel. +44 1725-514000 Fax. +44 1725-514001
	KITAGAWA EUROPE GmbH https://www.kitagawa.global/de Borsigstrasse 3, 40880, Ratingen Germany Tel. +49 2102-123-78-00 Fax. +49 2102-123-78-69
	KITAGAWA EUROPE GmbH Poland Office https://www.kitagawa.global/pl 44-240 Zory, ul. Niepodleglosci 3 Poland Tel. +48 607-39-8855
	KITAGAWA EUROPE GmbH Czech Office https://www.kitagawa.global/cz Purkynova 125, 612 00 Brno, Czech Republic Tel. +420 603-856-122 Fax. +420 549-273-246
	KITAGAWA EUROPE GmbH Romania Office https://www.kitagawa.global/ro Strada Heliului 15, Bucharest 1, 013991, Romania Tel. +40 727-770-329
	KITAGAWA EUROPE GmbH Hungary Office https://www.kitagawa.global/hu Dery T.u.5, H-9024 Győr, Hungary Tel. +36 30-510-3550
Asia Contact	KITAGAWA INDIA PVT LTD. https://www.kitagawa.global/in Plot No 42, 2nd Phase Jigani Industrial Area, Jigani, Bangalore – 560105, Karnataka, India Tel. +91-80-2976-5200 Fax. +91-80-2976-5205
	KITAGAWA (THAILAND) CO., LTD. Bangkok Branch https://www.smri.asia/jp/kitagawa 9th FL., Home Place Office Building, 283/43 Sukhumvit 55 Rd. (Thonglor 13), Klongton-Nua, Wattana, Bangkok 10110, Thailand Tel. +66 2-712-7479 Fax. +66 2-712-7481
	Kitagawa Corporation (Shanghai) https://www.kitagawa.com.cn Room 308 3F Building B. Far East International Plaza, No. 317 Xian Xia Road, Chang Ning, Shanghai, 200051, China Tel. +86 21-6295-5772 Fax. +86 21-6295-5792
	Kitagawa Corporation (Shanghai) Guangzhou Office B07, 25/F, West Tower, Yangcheng International Trading Centre, No. 122 East Tiyu Road, Tianhe District, Guangzhou, China Tel. +86 20-2885-5276
	DEAMARK LIMITED https://www.deamark.com.tw No. 6, Lane 5, Lin Sen North Road, Taipei, Taiwan Tel. +886 2-2393-1221 Fax. +886 2-2395-1231
KITAGAWA KOREA AGENT CO., LTD. http://www.kitagawa.co.kr 803 Ho, B-Dong, Woolim Lion's Valley, 371-28 Gasan-Dong, Gumcheon-Gu, Seoul, Korea Tel. +82 2-2026-2222 Fax. +82 2-2026-2113	
Oceania Contact	DIMAC TOOLING PTY. LTD. https://www.dimac.com.au 69-71 Williams Rd, Dandenong South, Victoria, 3175 Australia Tel. +61 3-9561-6155 Fax. +61 3-9561-6705

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