KITAGAWA
Machine Tool Accessories

Version 1.04 (2010.12.28)
Original instructions

INSTRUCTION MANUAL

PW/PWT type

Power Wing Chuck

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 power chuck (PW / PWT type) for a lathe.

Before starting to use this power 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.

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 a workpiece on the lathes or rotary tables. This product is equipped with the jaws to clamp the workpiece and they operate by means of a rotary 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.

Table of Contents

1 . Structural Drawing and Parts List

1-1 Type display

Type display as shown below.

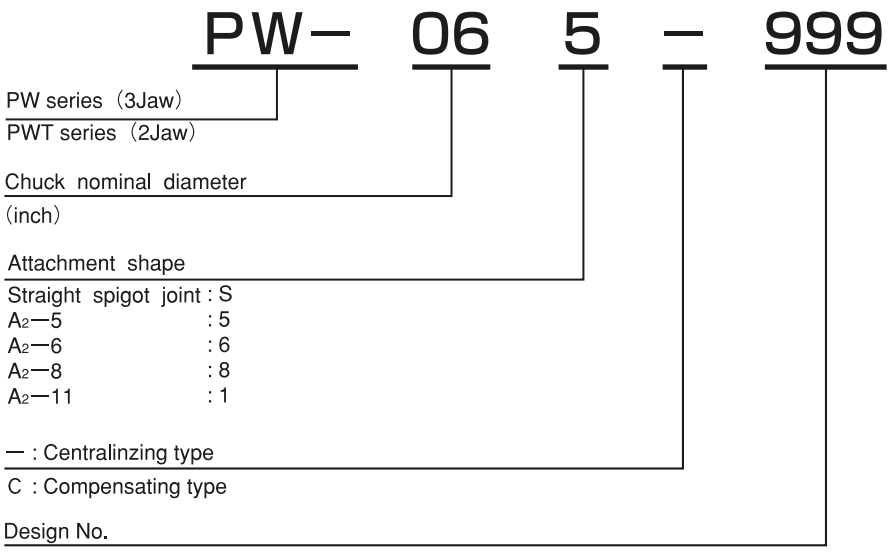


Fig. 1

1-2 Structural drawing

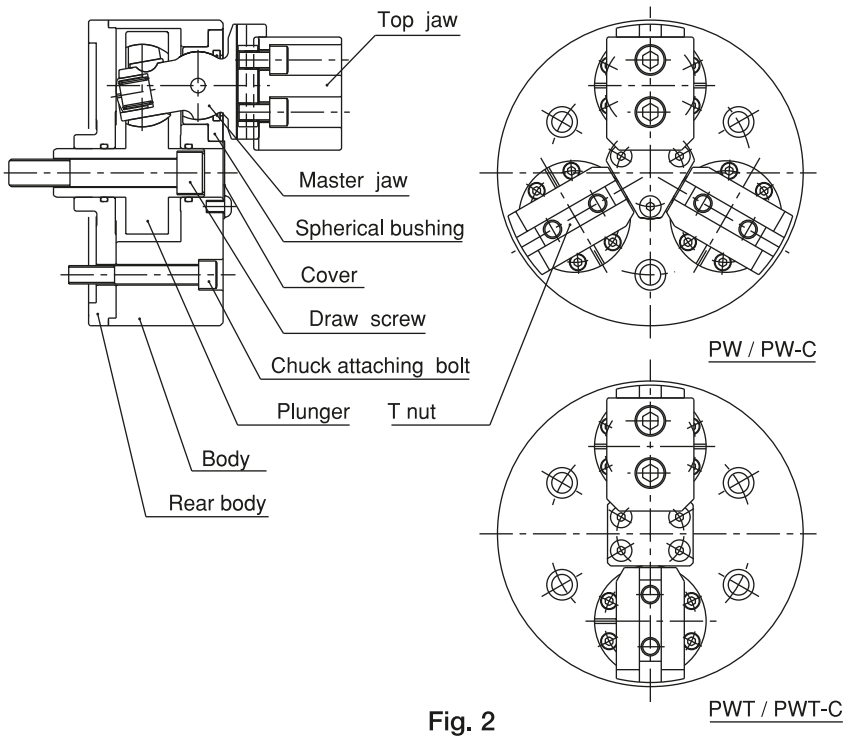


Fig. 2

1-3 Scope of product

This instruction manual is for the chuck part.

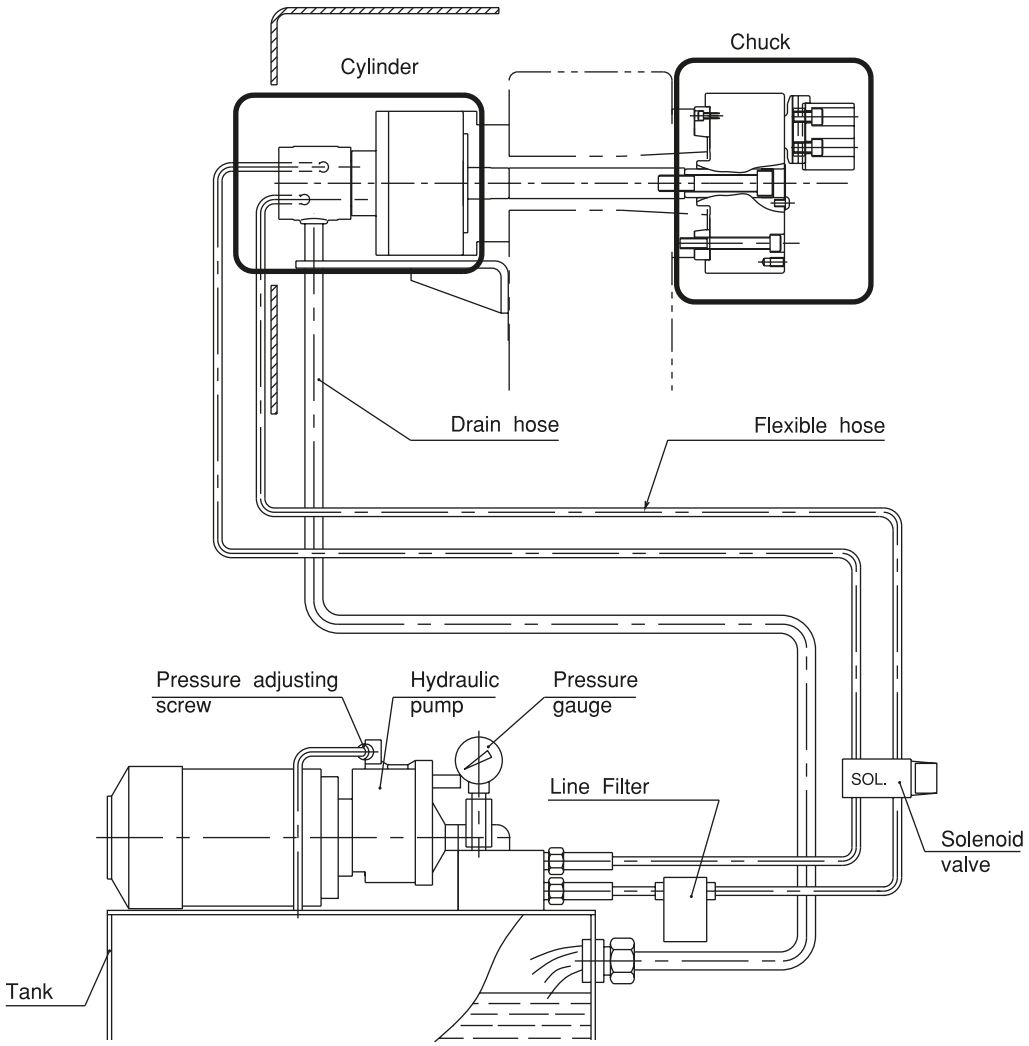
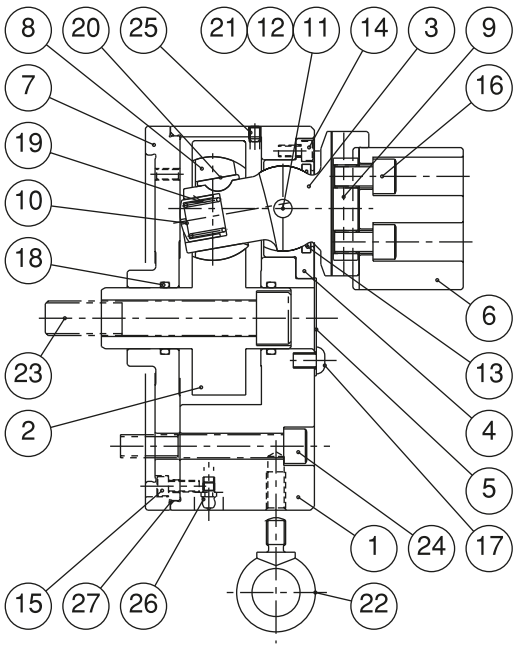


Fig.3

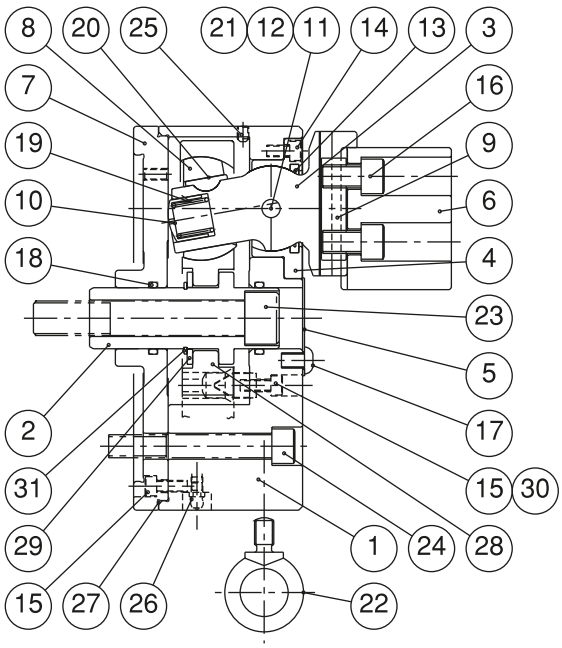
⚠ WARNING

- 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 7 in this manual.
- As for the cylinder, follow the instruction manual for the cylinder.

1-4 Parts list



P W・P W T



P W—C・P W T—C

Fig. 4

Table 1
Parts list (PW / PW-C)

No.	Part name	Quantity	No.	Part name	Quantity
1	Body	1	17	Socket head button screw	3
2	Plunger	1	18	O ring	2
3	Master jaw	3	19	Spring	3
4	Spherical bushing	3	20	Woodruff key	3
5	Cover	1	21	Parallel pin	3
6	Soft jaw	3	22	Eye bolt	1
7	Rear body	1	23	Draw screw	1
8	Bearing	3	24	Chuck attaching bolt	3 or 6
9	T-nut	3	25	Set screw	1
10	Spring cap	3	26	Grease nipple	1
11	Pin	6	27	O ring	1
12	Spring B	3	28	Diaphragm plate	1
13	Seal	3	29	Ring	1
14	Socket head cap screw	12	30	Guide pin	3
15	Socket head cap screw	6 or 9	31	Retaining ring	1
16	Jaw attaching bolt	6			

Table 2
Parts list (PWT / PWT-C)

No.	Part name	Quantity	No.	Part name	Quantity
1	Body	1	17	Socket head button screw	4
2	Plunger	1	18	O ring	2
3	Master jaw	2	19	Spring	2
4	Spherical bushing	2	20	Woodruff key	2
5	Cover	1	21	Parallel pin	2
6	Soft jaw	2	22	Eye bolt	1
7	Rear body	1	23	Draw screw	1
8	Bearing	2	24	Chuck attaching bolt	4 or 6
9	T-nut	2	25	Set screw	1
10	Spring cap	2	26	Grease nipple	1
11	Pin	4	27	O ring	1
12	Spring B	2	28	Diaphragm plate	1
13	Seal	2	29	Ring	1
14	Socket head cap screw	8	30	Guide pin	2
15	Socket head cap screw	6 or 8	31	Retaining ring	1
16	Jaw attaching bolt	4			

Note: Eye bolt is the standard attached in case of 10 inch or more.

Table 3
Consumable parts

No.	Name	6″	8″	10″	12″	15″
13	Seal	61P422017	61P420340	61P420197	61P420197	61P422880
18	O ring	JIS B2401 P30	JIS B2401 P31.5	JIS B2401 P41	JIS B2401 P41	AN6230-6
27	O ring	NOK S150	185×2	242×2	272×2	360×2

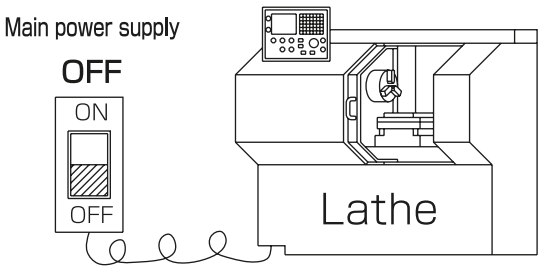
2 . ⚠ Important Safety Precautions

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.

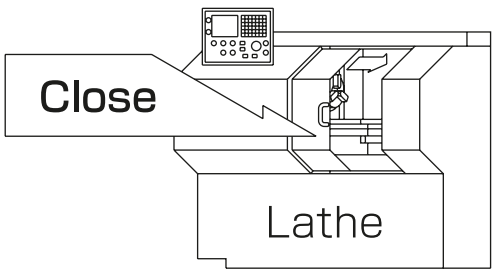
Turn off main power supply before attaching, inspecting or replacing chuck, and before adding oil. For All Users

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



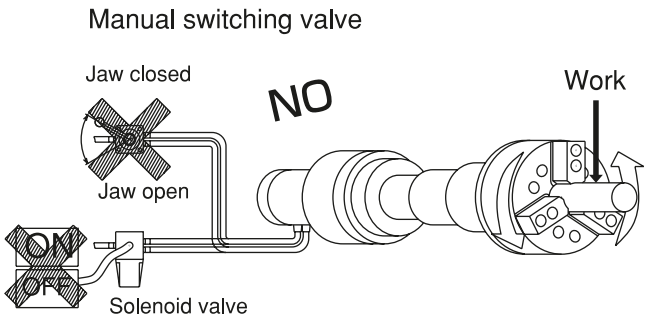
Close door before rotating spindle. For All Users

- 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)



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.



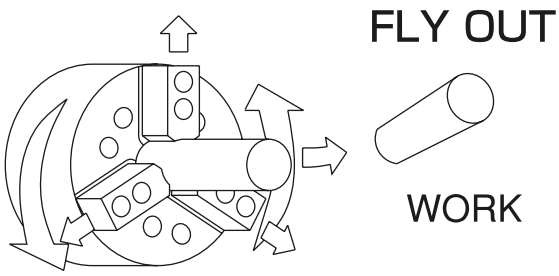
DANGER

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 pages 13-15)

For All Users

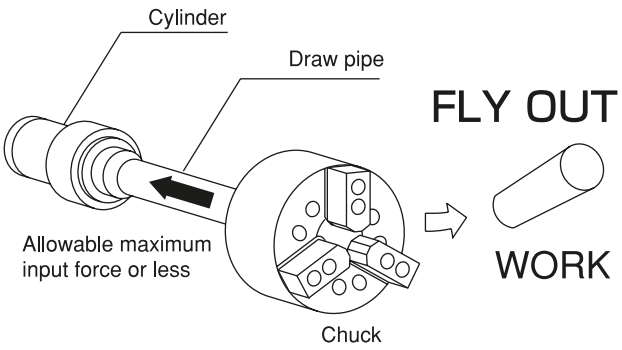
- If the rotation speed of the chuck exceeds the rotation speed limit, this is very dangerous as the chuck and work will fly out.



The input force of the chuck (piston thrust, pulling force of the draw bar) must not exceed the allowable maximum input force. (Refer to pages 13-15)

For All Users

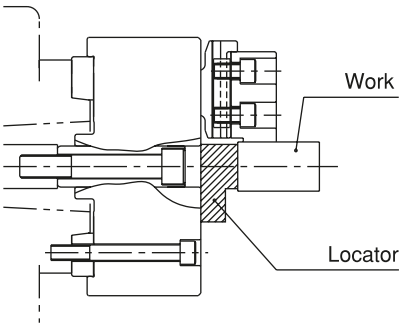
- Input must match the specification of the chuck.
- Adjust the hydraulic pressure to the cylinder so that the input force, which determines the gripping force of the chuck, does not exceed.
- Excessive input force can lead to breakage of the chuck, which is very dangerous, as the chuck can work can be damaged and fly out.



Grip the work-piece after having pushed it to the locator.

For All Users

- Grip the work-piece after having pushed it to the locator. You can't grip the work-piece stably when you use without locator, this is dangerous as the work will fly out.



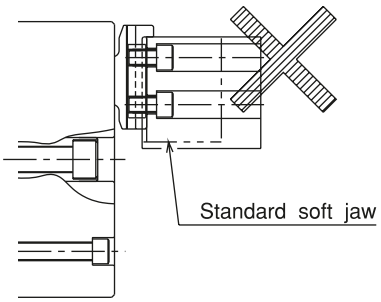
DANGER

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

Use neither jaw that is taller nor heavier jaw than standard jaw.

For All Users

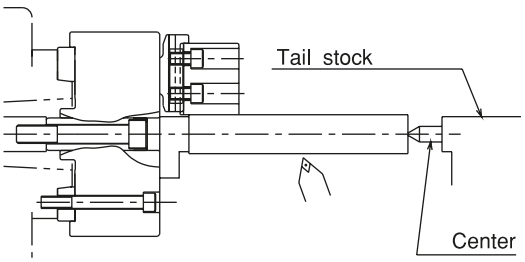
- The moment hanging to the chuck becomes large when you use taller jaw and this is dangerous as the chuck and work will fly out.
- The centrifugal force becomes large when you use heavy jaw and this is dangerous as the chuck and work will fly out.



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

For All Users

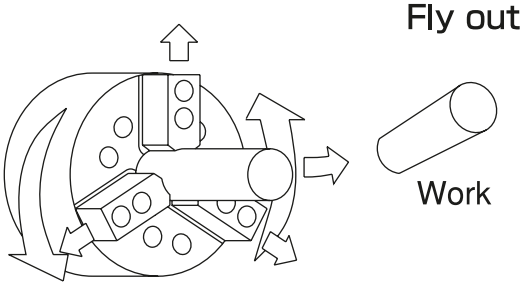
- If the protrusion is long, the tip of the work can turn and the work fly out.



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. (Refer to pages 14-15 and cylinder manual)

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.



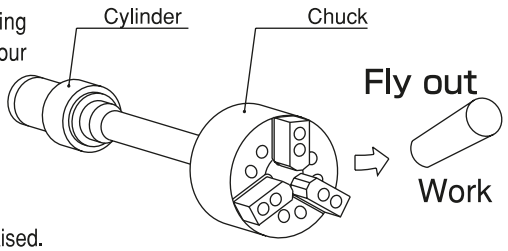
DANGER

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

Use of a chuck and cylinder that cannot be used together safely may cause the cylinder to break at high pressure resulting in the chuck and work flying out.

For All Users

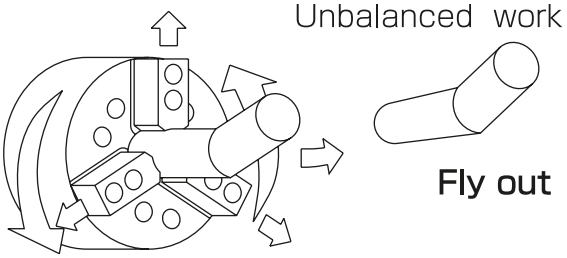
- Check that the chuck and the cylinder are in the "Safe combination" when using at high pressure with our company or the distributor. Especially when the cylinder of our company and a high pressure chuck of other company are combined, confirmation is necessary.
- If one of the abnormal events shown below occurs during operation, immediately stop the machine and consult with our company or the distributor.
  - The work slips.
  - Loss of accuracy.
  - The work begins to chatter.
  - The machine's vibration significantly increases.
  - The griping force does not rise even if hydraulic pressure is raised.



In the case of processing a significant unbalanced work, lower the rotation speed.

For All Users

- Unbalanced work generates dangerous centrifugal forces and the work could fly out.



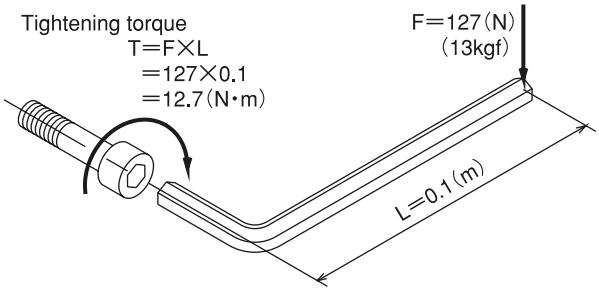
Always tighten the bolts at the specified torque. If the torque is insufficient or excessive, the bolt will break, which is dangerous as the chuck or work will fly out. Use the bolts attached to the chuck, and do not use bolts other than these.

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	Bolt size	Tightening torque
M 5	8 N·m	M12	107 N·m
M 6	13 N·m	M14	171 N·m
M 8	33 N·m	M16	250 N·m
M10	73 N·m	M20	402N·m



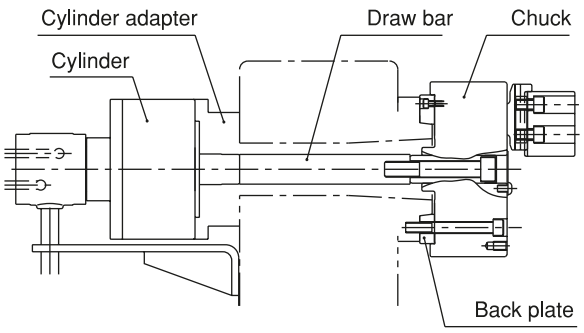
- Tightening torque is moment of force when you tighten a bolt. Tightening torque= F×L.

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

Provide sufficient strength for the draw bar (Refer to pages 32-33).
Provide sufficient screw depth for the draw bar.
Firmly tighten the draw bar.

For Machine Tool Manufactures

- If the draw bar break, the gripping force is instantly lost and this is dangerous as work will fly out.
- If the screw depth of the draw bar is insufficient, the screw will break and the gripping force will be lost instantly, and this is dangerous as work will fly out.
- If the engagement of the screw of the draw bar is loose, vibration may occur resulting in breakage of the screw. If the screw breaks, the gripping force will be lost instantly, which is dangerous as the work will fly out.
- If the draw bar is unbalanced, vibration occurs, the screw is broken and the gripping force will be lost instantly, which is dangerous as the work will fly out.

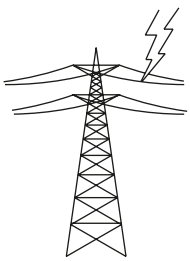


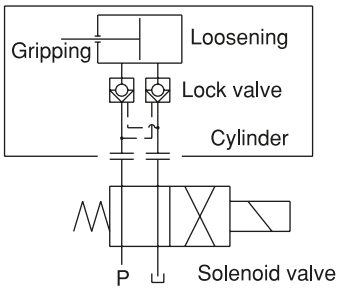
Use a cylinder with a lock valve (safety valve, check valve) incorporated in case of sudden hydraulic pressure drop due to blackout, malfunction of the hydraulic pump, etc. Further, use a solenoid valve with a circuit that retains the gripping position when no current is carried.

For Machine Tool Manufactures

- If the hydraulic pressure suddenly drops due to blackout or malfunction of the hydraulic pump, etc., this is dangerous as work will fly out.
- Lock valve retains the hydraulic pressure inside the cylinder temporarily, when the hydraulic pressure suddenly drops due to blackout or malfunction of the hydraulic pump, etc.

Lightning
=Blackout





The gripping position must be retained.

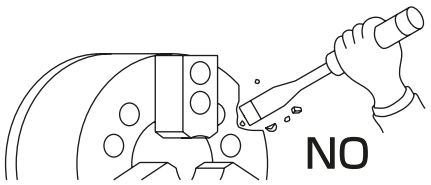
WARNING

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

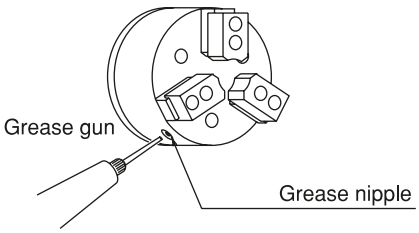
- It may not only break the chuck but the chuck and the work may fly out, which is dangerous.
- If you attach a locator or jig on the chuck body surface, only process work in an acceptable range (Refer to pages 24-25).



Periodically supply adequate grease (Refer to pages 26-27). Turn off power before adding grease.

For All Users

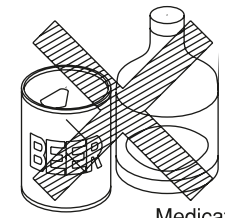
- Insufficient grease supply lowers the gripping force, causes operation failure due to lower hydraulic pressure, lowers the gripping precision, and causes abnormal wearing and seizing, etc.
- This is dangerous as the work could fly out from a drop in the gripping force.



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

For All Users

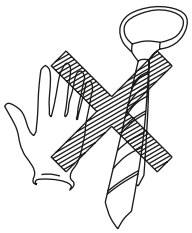
- Dangerous since these lead to operation mistakes and misjudgment.



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

For All Users

- Dangerous since it will be caught.



3 . Specifications

3-1 Specifications

Table 4

Type		3 jaw				
		PW-06 PW-06C	PW-08 PW-08C	PW-10 PW-10C	PW-12 PW-12C	PW-15 PW-15C
Plunger stroke	mm	11.4	14.2	17.5	17.5	23.3
Jaw stroke（in diameter）	mm	7.9	9.5	12.7	12.7	15.8
Allowable maximum input force	kN (kgf)	23.3 (2376)	32 (3263)	41 (4180)	41 (4180)	55 (5607)
Maximum static gripping force	kN (kgf)	70 (7138)	96 (9788)	123 (12540)	123 (12540)	165 (16800)
Allowable maximum rotation speed	min^{-1}	4200	3700	3400	2800	2000
Gripping range	mm	ϕ 12.7～120	ϕ 16～152	ϕ 50～203	ϕ 63～241	ϕ 76～317
Mass (standard soft jaw included)	kg	14.7	23.5	39.3	58.3	95
Moment of inertia	$kg \cdot m^2$	0.050	0.110	0.265	0.523	1.943
Matching cylinder		Y1225R	Y1225R	Y1530R	Y1530R	Y2035R
Maximum hydraulic pressure (with matching cylinder)	MPa (kgf/cm^2)	2.3 (23.5)	3.09 (31.5)	2.8 (28.5)	2.8 (28.5)	2.14 (21.8)
Balance quality (standard soft jaw not included)		G6.3				
Storing temperature / Operating temperature		−20～+50℃ / −10～+40℃				

Table 5

Type		2 jaw				
		PWT06 PWT06C	PWT08 PWT08C	PWT10 PWT10C	PWT12 PWT12C	PWT15 PWT15C
Plunger stroke	mm	11.4	14.2	17.5	17.5	23.3
Jaw stroke（in diameter）	mm	7.9	9.5	12.7	12.7	15.8
Allowable maximum input force	kN (kgf)	15.5 (1581)	21.3 (2172)	27.3 (2784)	27.3 (2784)	36.7 (3742)
Maximum static gripping force	kN (kgf)	46.6 (4752)	64 (6526)	82 (8362)	82 (8362)	110 (11217)
Allowable maximum rotation speed	min^{-1}	4200	3700	3400	2800	2000
Gripping range	mm	ϕ 12.7～120	ϕ 16～152	ϕ 50～203	ϕ 63～241	ϕ 76～317
Mass (standard soft jaw included)	kg	14	24	46	63	112
Moment of inertia	$kg \cdot m^2$	0.047	0.120	0.378	0.720	2.130
Matching cylinder		Y1225R	Y1225R	Y1530R	Y1530R	Y2035R
Maximum hydraulic pressure (with matching cylinder)	MPa (kgf/cm^2)	1.6 (16.3)	2.1 (21.4)	1.85 (18.9)	1.82 (18.6)	1.4 (14.3)
Balance quality (standard soft jaw not included)		G6.3				
Storing temperature / Operating temperature		−20～+50℃ / −10～+40℃				

Reference: 1kN = 101.97kgf　1MPa = 10.197kgf/cm^2

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 Relationship between gripping force and rotation speed

1. Maximum static gripping force

The static gripping force is the gripping force when the chuck is at a stop.

The power chuck has a mechanism to convert input force (piston thrust force, draw bar drawing force) from the cylinder to gripping force. Therefore, the gripping force when the allowable maximum input force becomes the maximum static gripping force.

However, 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 soft jaw is used as the jaw.
- The attaching bolts of the soft jaw are tightened at the specified torque. (Refer to page 10)
- The gripping force meter is gripped where the chuck surface is in parallel with the jaw attaching face of master jaw.
- The numerical values are obtained with the Kitagawa gripping force meter .
- CHUCK GREASE PRO is used.
- A variable displacement pump with the discharge volume of 20 liters/min or more is used as the hydraulic source. The pressure is set by the pressure control equipment of the pump itself, or the pressure reduction valve equipped separately.

2. Allowable maximum rotation speed

In the case of outside diameter gripping, when the chuck is rotated, the gripping force lowers due to the centrifugal force of the top jaw. Therefore, the rotation speed when the dynamic gripping force (gripping force during rotation) becomes approximately 1/3 of the maximum static gripping force is set as the allowable maximum rotation speed. The centrifugal force is different depending on the mass of the top jaw and the barycentric position as well as the rotation speed. The allowable maximum rotation speed specified in the specification is the value under the following conditions:

- The Kitagawa standard soft jaw is used.
- The gripping force meter is gripped where the chuck surface is in parallel with the jaw attaching face of master jaw.
- The numerical values are obtained with the Kitagawa gripping force meter.

DANGER

To avoid serious accidents caused by the chuck or work flying out:

- 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. The gripping force of the chuck must not exceed the maximum static gripping force.
- Determine the rotation speed required for processing by the machine tool manufacturer or user based on the gripping force required for the processing. The rotation speed at this point must not exceed the allowable maximum rotation speed.

NOTICE

- When determining the cutting conditions, refer to pages 14-15.
- Pay attention since the gripping force is different depending on the state of the oil supply, grease in use, height of the jaw, performance of the pump and the pressure reducing valve, piping state, etc.

3. Relationship between gripping force and rotation speed

As the rotation speed becomes higher, the centrifugal force of the jaw increases and the gripping force lowers. The curves displayed in Fig. 5 shows relationships between the rotation speed and the centrifugal force when using the standard soft jaw. The centrifugal force differs significantly depending on the size and shape of the top jaw and the attaching position, therefore, when the rotation speed is high, actual measurement using a Kitagawa gripping force meter is required.

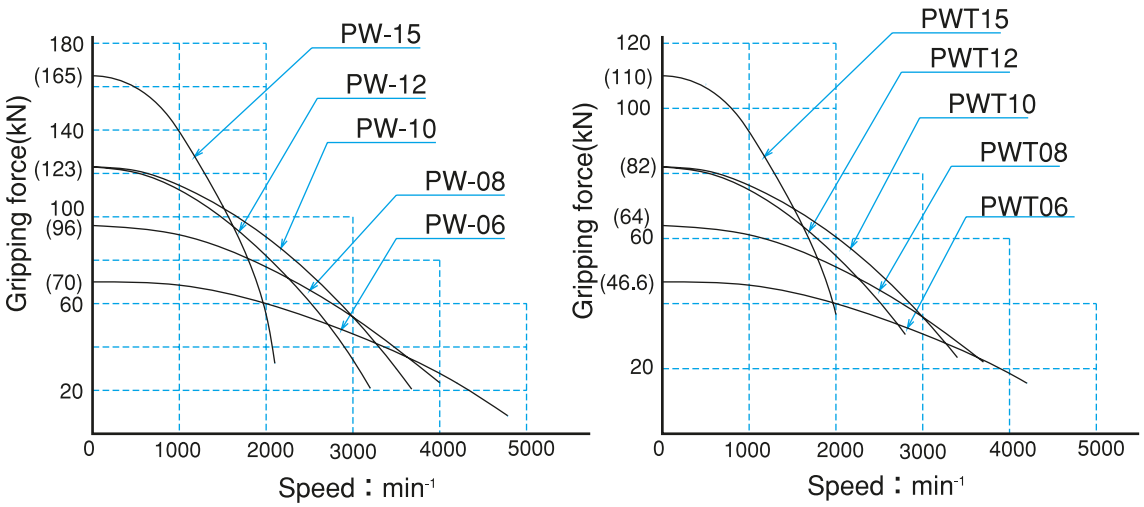


Fig. 5

DANGER

- Use neither jaw that is taller nor heavier jaw than standard jaw.
  - 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.
  - The centrifugal force becomes large when you use heavy jaw and this is dangerous as the chuck and work will fly out.
- In the case of processing a considerably unbalanced work, lower the rotation speed. The work will fly out and this is dangerous.
- Vibration is generated if there is unbalance due to the work and the jig, etc. Vibration decreases process precision and shortens the working life of the chuck, even possibly breaking it. Correct the unbalance by using a balance weight, etc., or lower the rotation speed for use.
- In the case of heavy cutting at high rotation speed, vibration is easily generated in the same manner as the unbalance of the chuck, therefore, set the cutting conditions appropriate for the dynamic gripping force and machine rigidity.

4 . Forming and attachment of jaw

Prepare the jaw that has the shape, dimensions, accuracy, plane roughness and quenching suitable for processing the work-piece. We recommend following the following method for manufacturing the jaws.

- Forming standard soft jaw on the machine and using a raw material as is. Although it is inferior in durability on gripping face, you can manufacture product immediately.
- Forming standard soft jaw roughly and quenching their gripping face, then finishing on the machine. This is suitable for a mass production, because it excels in durability of the gripping face.
- We recommend you request KITAGAWA for manufacturing, if you manufacture a special shape jaw from scratch without using soft jaw.

4-1 Change of inner/outer diameter gripping

The input force to the plunger cannot be used at the pushing side when the work piece is gripped with the PW chuck. Since the master jaws are faced reversely at the inner diameter gripping, it is necessary to change the master jaws. Because the attaching jig for the spherical bushing which looks page 18 and sealing compound 1212 (Three bond co.,ltd) are need for work, prepare beforehand.

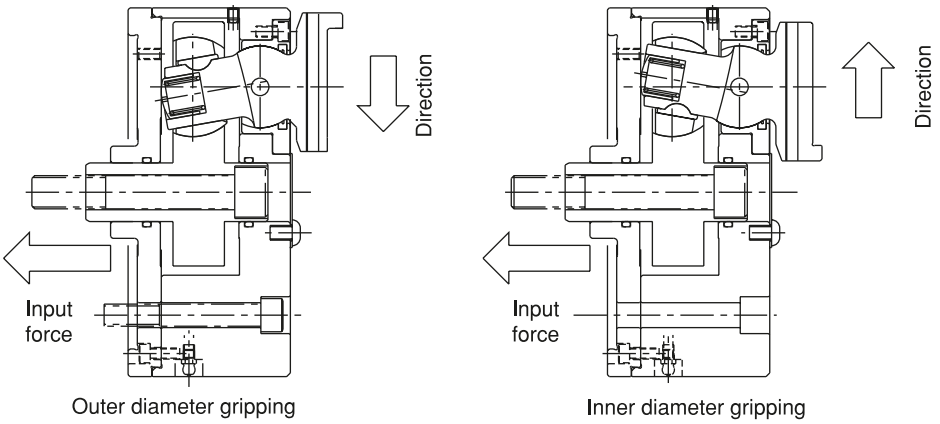


Fig. 6

DANGER

- When the work piece is gripped with the input force to the plunger set to the push side, there is a danger because the inside of the chuck is damaged, the gripping force is low and the work piece will scatter.

Perform the change in the following procedure.

1. Turn off the main power of the machine before starting work.
2. Remove the jaw and T nut.
3. Remove all locators or jigs on the chuck surface.
4. Loosen the attaching bolt. (Refer to Fig.7)

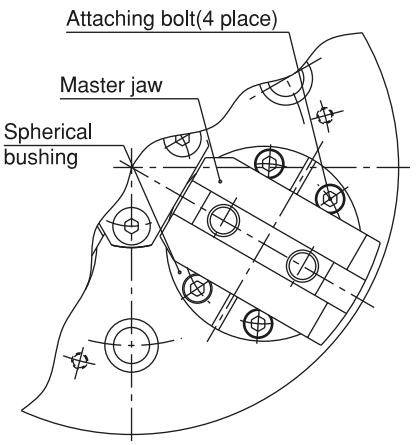


Fig. 7

5. Pull up the spherical bushing together with the master jaw to the extent that the side of spherical bushing appears a little.
6. Remove to set the spherical bushing in the attaching jig for spherical bushing. (Refer to page 18) Then check to see that no woodruff key falls. If spherical bushing separated into two parts, apply the new sealing compound 1212 (Three bond co.,ltd.) to the separated surface after remove the old sealing compound, moisture, oil stain, and others. Then set the spherical bushing in the attaching jig.
7. Turn the bearing to 180 degree horizontally to aim the flute of bearing. (Refer to Fig.8)

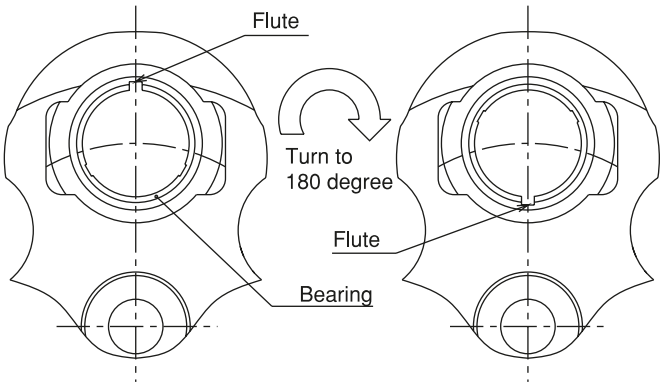


Fig. 8

8. Remove the old sealing compound, moisture, oil stain and others. Then apply the new sealing compound 1212 (Three bond co.,ltd.) to the body and the fitting surface of spherical bushing. (Refer to Fig.9)

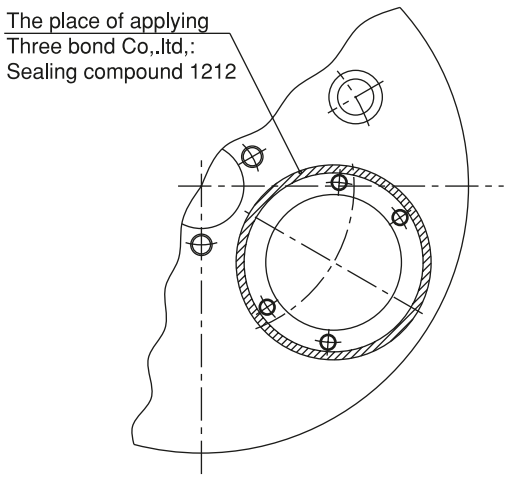


Fig. 9

9. Fix the spherical bushing set in the jig. With the key flute, set the spherical bushing in the body-engaged hole and insert it, striking the front of jig. When the back of jig comes in contact with the front body, put together the bolt holes of spherical bushing before temporarily tightening the bolts. At this time, remove the jig from the spherical bushing, and tighten the bolts.
10. If the grease is short, supply adequate grease according to procedure of pages 26-27.

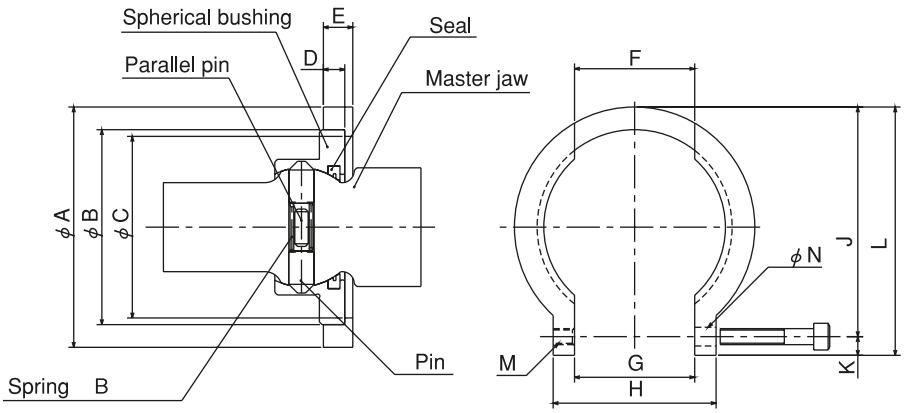


Fig. 10 Attaching jig for spherical bushing

Table 6

Chuck size	A	B	C	D	E	F	G	H	J	K	L	M	N
6"	75	62	59	7.5	10	39	39	55	72	6	78	M5	5.5
8"	90	73	68	8	11	45	45	61	86	7	93	M6	7
10"	115	94	87	10	13	60	60	78	110	8	118	M6	7
12"	115	94	87	10	13	60	60	78	110	8	118	M6	7
15"	140	105	98	11	14	68	68	88	133	9	142	M6	7

4-2 Attachment of jaw

DANGER

- Use the T nut and the attaching bolts attached to the chuck and do not use bolts other than these. If commercially available bolts are used for an unavoidable reason, use bolts at the strength classification 12.9 (strength classification 10.9 for M22 or more) or more, and pay sufficient attention to the length.
- Do not rotate the chuck so that the T nut is loosened causing the jaw to fly out.
- Never use the chuck when the work-piece is clamped near the stroke end more than 75% of the stroke.
  - When the work-piece is clamped near the stroke end, because the work-piece is not completely gripped or the gripping force is insufficient, this is dangerous as the work will fly out.
  - When gripping near the stroke end, the chuck may break and the chuck or work could fly out.
- 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.

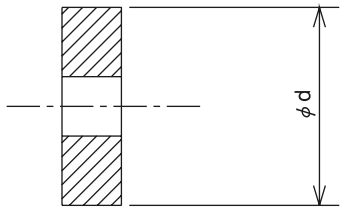
Table 7

Bolt size	Tightening torque
M 5	8 N·m
M 6	13 N·m
M 8	33 N·m
M10	73 N·m
M12	107 N·m
M14	171 N·m
M16	250 N·m
M20	402 N·m

4-3 Forming soft jaw with outside diameter gripping

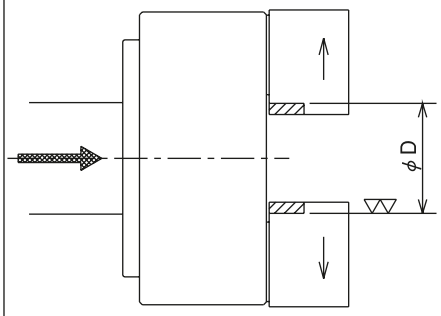
1. Preparation of the plug for forming

- 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.



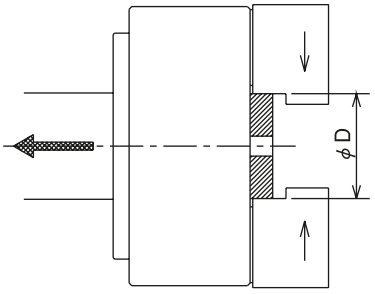
2. Process of the plug gripping part for forming

- Operate the switch valve and maximize the opening of the jaw.
- Then, process the φD part (part to grip the plug for forming). Set the dimension φD so that gripping near the center of the jaw maximum stroke (diameter) is possible.
- φD = φd + (jaw maximum stroke/2)



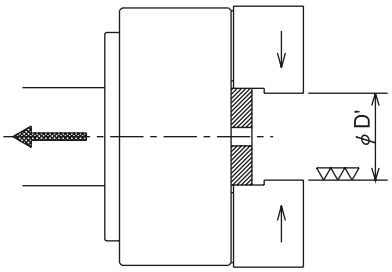
3. Gripping of the plug for forming

- By operating the switch valve, grip the plug for forming in the φD part. At this time, grip by pressing the plug on the chuck front surface in order for the plug not to be tilted. Repeat chucking several times to stabilize the plug.



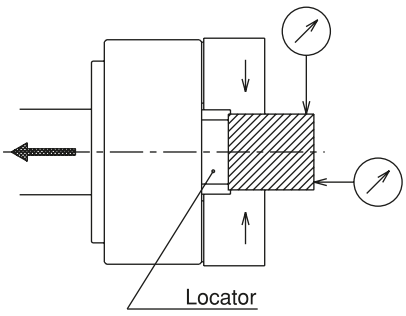
4. Forming

- 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 hydraulic pressure during forming the same as during processing of the work, or slightly higher.
- When the plug distorts, lower the hydraulic pressure or change the plug into a shape which does not easily distort.



5. Trial cutting

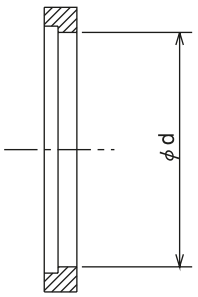
- Remove the plug for forming and grip the work to check the jaw stroke.
- Implement trial cutting to check the process precision and that there is no slip, etc.



4-4 Forming soft jaw with inside diameter gripping

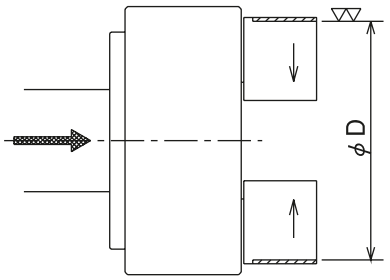
1. Preparation of the ring for forming

- 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.



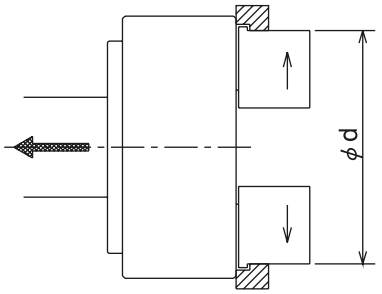
2. Process of the ring gripping part for forming

- Operate the switch valve and minimize the jaw to close.
- Then, process the ϕD part (part to grip the ring for forming). Set the dimension ϕD so that gripping near the center of the jaw maximum stroke (diameter) is possible.
- ϕD = ϕd - (jaw maximum stroke/2)



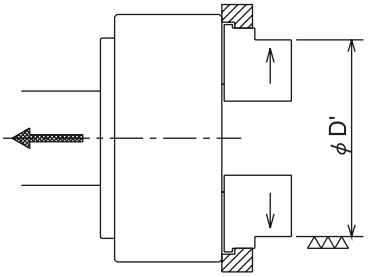
3. Gripping of the ring for forming

- By operating the switch valve, grip the ring for forming in the ϕD part. At this time, grip by pressing the ring on the jaw in order for the ring not to be tilted. Repeat chucking several times to stabilize the ring.



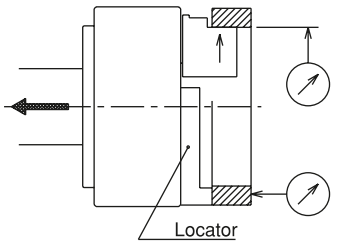
4. Forming

- 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 hydraulic pressure when forming the same as when processing of the work, or slightly higher. Additionally, in the case of inside diameter gripping, it is necessary to use the input at 1/2 of the allowable maximum input or less.
- When the ring distorts, lower the hydraulic pressure or change the ring into a shape which does not easily distort.



5. Trial cutting

- Remove the ring for forming and grip the work to check the jaw stroke.
- Implement trial cutting to check the process precision and that there is no slip, etc.

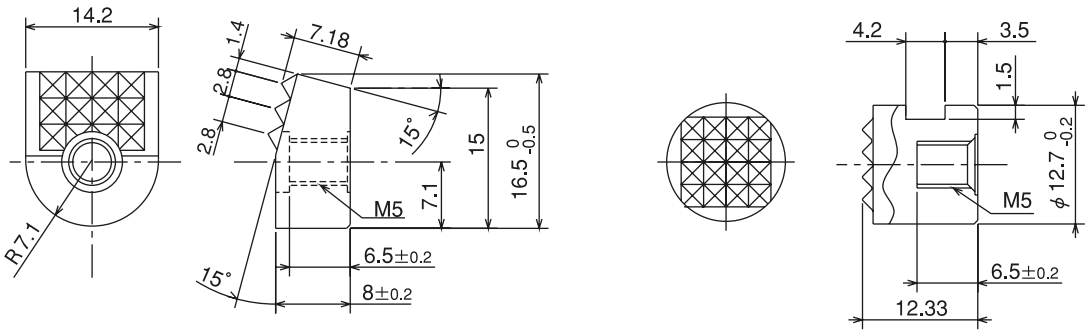


NOTICE

- The gripping force, retracting motion and accuracy become stable when the gripping center height becomes as low as possible.
- When the jaw is not finished on the machine or it is finished on another machine, the contact for the work-piece becomes worse, thus resulting in an unstable retracting motion or reducing the gripping accuracy.
- When finishing the jaw without touching the plug for forming to the chuck surface or locator datum end face, the gripping accuracy may be impaired.
- When the gripping position of the plug for forming is near the gripping face of work-piece as much as possible, the gripping accuracy becomes stable.
- When the jaw finished on the machine is removed from the chuck once, the gripping accuracy becomes low as compare with when it is attached as is.
- Do not mistake the numbers marked on jaw.
- If the rigidity of the plug for forming is insufficient, the gripping accuracy becomes low or stroke position becomes out of order.

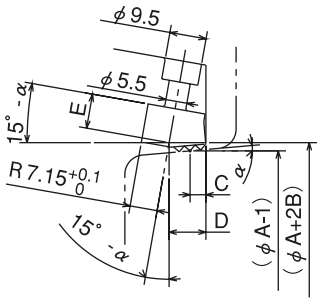
4-5 Jaw with grip piece

- When using the grip pieces, the gripping face increases frictional force. As a result, it becomes hard to slip the work piece in machining. However, the work piece will be damaged.
- The grip piece U-1 is especially effective when short-gripping area of work is chucked because the gripping area is arranged near the front edge of jaw.
- The grip piece R-1 is easy to mount the different work s of intricate shape. The following explains forming steps for jaw, which uses the grip piece U-1.



Grip piece U-1 Fig. 11 Grip piece R-1

1. First, deciding the gripping area of work piece. It is necessary to select the position on which there is high stiffness, the standard edge face near gripping area and all processes are concluded with reverse revolution as few as possible.
2. After deciding the gripping area of work piece, decide the jaw shape so that the area except the grip piece does not interfere with the work piece. The face for mounting the grip piece is a cylindrical face that in inner dia. (A+2B), thus adding the twotime values of B to the gripping diameter A. When the gripping force tapered, the outer diameter at distance C from the front edge of jaw is decided as the gripping diameter A, thus positioning the medium of grip piece crest.



α	A	B	C	D	E
0	The value is varied by work piece. (Note)	2.50	4.5	9.52	7.29
2		2.65	4.4	9.46	6.96
4		2.80	4.3	9.40	6.63
6		2.95	4.2	9.34	6.30
8		3.10	4.1	9.28	5.97
10		3.25	4.0	9.22	5.64

Note) The serration penetration should be about 1mm on diameter.

Fig. 12

3. The cylindrical part ϕ (A+2B) of grip piece mounting face is formed with forming jig gripped. (Refer to page 19)
4. If the slope of work piece is less than 5 degree, it may be usual cylindrical face, while if it is more than 5 degree, provide the taper at the front side of jaw as shown in Fig.13 to prevent the work from interference.

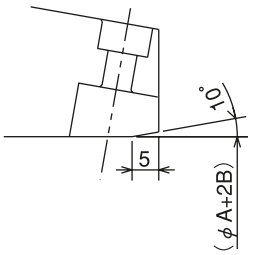


Fig. 13

5. Next, provide the grip piece mounting seat of depth E sloped only (15 - α) degrees at position D from jaw front edge. When adjusting the height of grip piece with a washer, add the washer thickness to the depth E.
6. Number of grip piece used is 6-piece per chuck. If the work piece is liable to be distorted, it is necessary to arrange to 6 equal parts as near as possible.

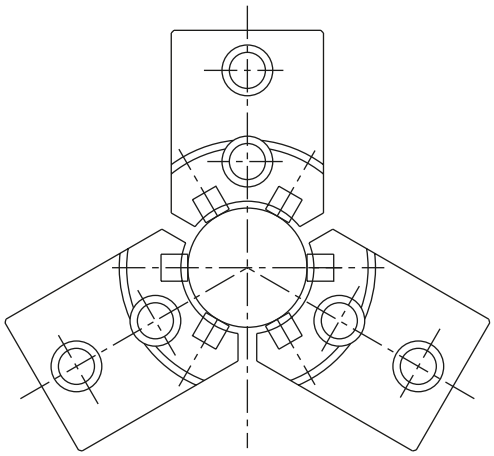


Fig. 14

7. Clamp the plug for forming, then read respective differences of grip piece with a dial gauge and adjust the grip piece. In this case, it is possible to adjust the grip piece height by regulating the washer thickness.

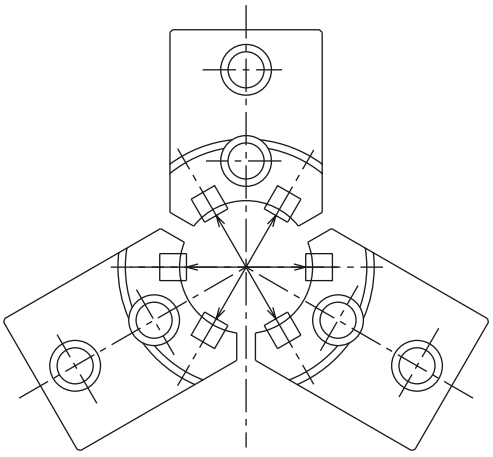


Fig. 15

5 . Usage

This product is a device to fix a work-piece when it is processed by the lathe machine or the rotary table.
The rotary cylinder closes the jaw 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.

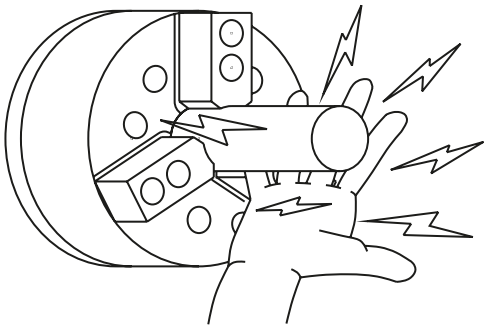
NOTICE

- When replacing the top jaw, carefully clean the jaw attaching face with the master jaw, and the engagement part of the T nut. Failure to do this may cause a precision failure.
- Set the hydraulic pressure according to the shape of the work and the cutting conditions. Pipe shape work, etc., may be distorted if they are tightened at a high gripping force.

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

- Do not grip the sloping part more than 20 degrees. This is dangerous as the work will fly out.
- 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

⚠ DANGER

- If a soft jaw other than one made by Kitagawa Iron Works is used, the engagement will be inferior, and the master jaw will be deformed, 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, and this is dangerous as the work will fly out.

5-4 Precautions related to processing

DANGER

<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 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, master jaw, T nut 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.

5-5 Attachment of locator and jig

The locator is required for the PW chuck. The PW chuck grips the work-piece in the radial direction and presses the work-piece to the locator simultaneously. Prepare the locator that has the dimensions, accuracy, materials and quenching suitable for processing the work-piece.

DANGER

- Grip the work-piece after having pushed it to the locator. You can't grip the work-piece stably when you use without locator, this is dangerous as the work will fly out. (The black thin cover for the center of the chuck is not a locator. This is temporary protection for the hole.)

- Since the runout of the locator datum end face remarkably influences the finishing accuracy of the work-piece, the datum end face requires that it has sufficient hardness and accuracy. To improve the accuracy of the datum end face, we recommend that the locator is finished with it attached to the chuck after quenching.
- 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. 16

DANGER

- 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.

Shaded part additional process possible range

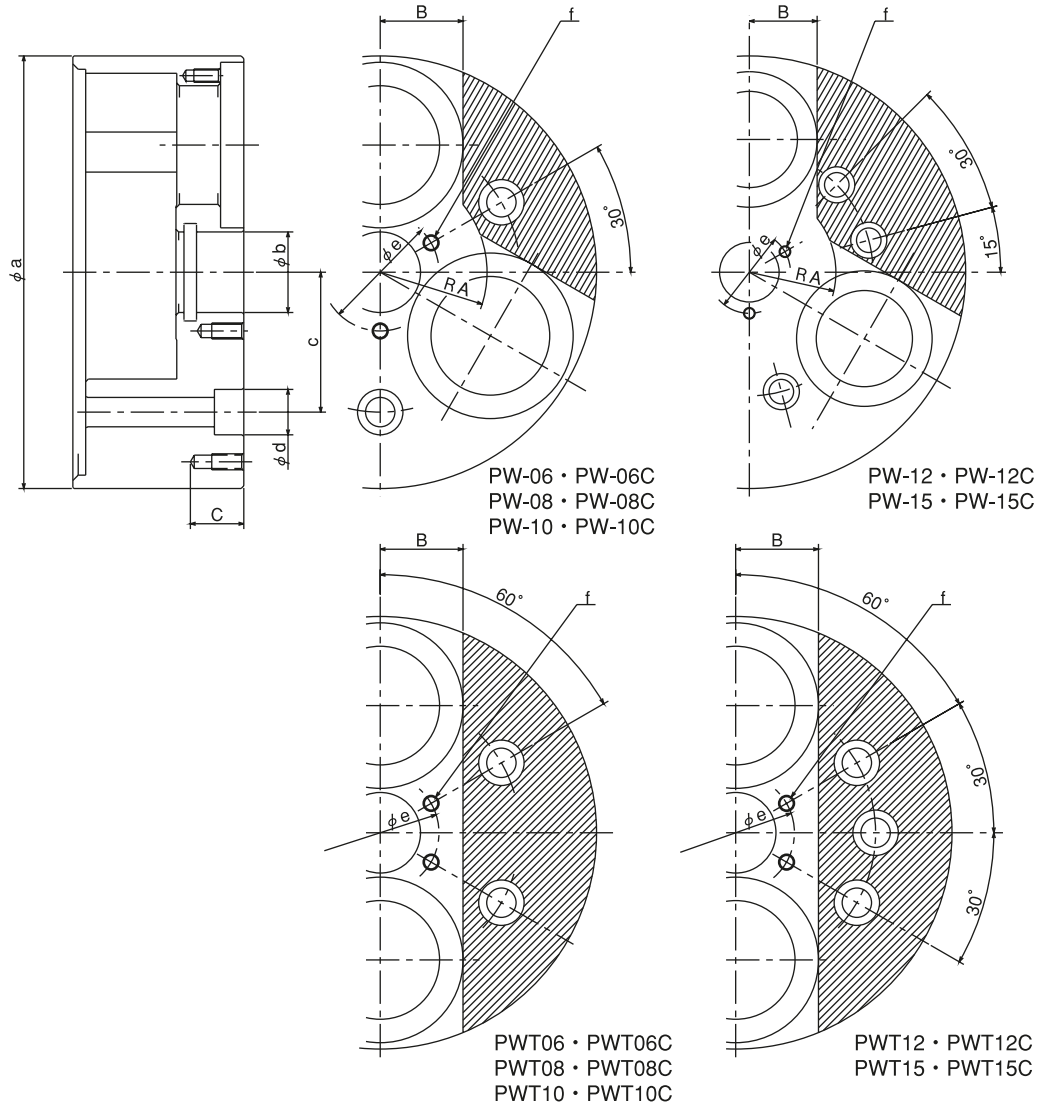


Fig. 16

Table 8

Chuck	A	B	C	a	b	c	d	e	f
6″	40	31	20 or less	162	30.17	52.39	17	44	M6
8″	50	36.5	25 or less	200	31.8	66.68	30	44	M8
10″	60	47	30 or less	254	41.3	85.73	25	57	M8
12″	60	47	30 or less	300	41.3	85.73	25	57	M8
15″	70	52.5	30 or less	381	57.16	117.5	32	95	M8

A: Additional process impossible dimension.
B: Processible depth of tapping or drilling a hole.

6 . Maintenance and Inspection

6-1 Periodic Inspection

- PW / PWT: Add grease at least once three months. PW-C / PWT-C: Add grease at least once two months.
- Fully stroke the jaw before starting work and check the specified stroke.
- Always clean the chuck body or the sliding surface using an air gun, etc., at the end of work.
- 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 nipple on the body periphery part.
- Read the following lubricating procedures with reference to pages 5-6.

1. Turn off the main power of the machine before starting work.
2. Remove the set screw [25] on the body periphery part.
3. Rotate the chuck so that the hole with the set screw may become it downward. (For the horizontal lathe.)
4. Move the jaws several times without work-piece to exhaust old grease. At this time, if the coolant or cutting chips are in the chuck, disassemble and clean it. It is necessary to doubt the damage of the seal.
5. Lubricate using a grease gun from the grease nipple [26] on the body periphery part until grease is exhausted from the hole.
6. Install the set screw [25], then move 2 or 3 times without work-piece, then remove the set screw again and lubricate.
7. Install the set screw [25] certainly.

2 . Grease to use

- Use the designated grease specified in Table 9. If grease other than the designated grease is used, sufficient effect may not be obtained.

Table 9

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)
	Kluberpaste ME31-52	Kluber lubrication (worldwide)

3 . Frequency of lubrication

- PW / PWT: Add grease at least once three months.
  PW-C / PWT-C: Add grease at least once two months.
- 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.

⚠ WARNING

- 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.

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

About the exchange of seal

- The seals of each part are consumable parts. In particular, the seal [13] in the spherical bushing is worn intensely because it is exposed to the harsh environment of chips and coolant. When grease leaks out in large quantities, when air breath sound is heard, or when coolant and chips entered the chuck inside, exchange the seals.

Disassembling procedures

Read the following disassembling procedures with reference to pages 5-6.

1. Turn off the main power of the machine before starting work.
2. Remove the soft jaw [6] and T nut [9].
3. Remove all locators or jigs on the chuck surface.
4. Loosen the draw screw [23], then loosen the chuck attaching bolt [24] and remove the chuck from the spindle.
5. Loosen the socket head cap screw [15] gradually. It can be easily removed because the rear body [7] rises on the surface by the spring [19] operated mode.
6. Remove the socket head cap screw [14] and turn the master jaw [3] in the right and left direction before removing the spherical bushing [4] together with the master jaw. Check to see that no woodruff key [20] falls.
7. Remove the plunger by inserting a wooden bar out of the center hole of body.
8. The bearing [8] is spherically engaged on the plunger [2]. With the bearing turned up against the plunger spherical surface, align bearing width position to a notch of spherical surface inner diameter and turn the bearing in order to search a removing position. If a bearing direction is opposite, the bearing won't remove. Therefore, change the bearing to correct direction.

Assembling procedures

- Assemble again in the reverse procedures of disassembling. Refer to pages 5-6.
- Assemble again while sufficiently coating the recommended grease.
- Lubricate grease after assembling. (Refer to page 26)
- Because the attaching jig for the spherical bushing which looks page 18 and sealing compound 1212 (Three bond co.,ltd) are need for work, prepare beforehand.

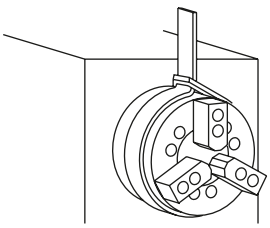
1. Remove the old sealing compound, moisture, oil stain and others. Then apply the new sealing compound 1212 (Three bond co.,ltd.) to the separate surface of spherical bushing.
2. Incorporate a parallel pin [21], coil spring B [12] and pin [11] into the master jaw [3] before sealing [13] the spherical bushings [4] and set the spherical bushings with the master jaw placed between both bushings. At this time, check the seal is thoroughly inserted into seal flute. Also, with the lower spherical bushing gripped by vise, tighten the vise until the half-separated rings of spherical bushing are corresponded each other completely. Also, repeat the tightening and loosening of vise two or three times, thereby eliminating the deviation of bushing.
3. With the spherical bushing [4] chucked with the vise, and set the attaching jig before tightening the bolts, As a result, the spherical bushing remains set on the master jaw [3] even if it is removed from the vise. (Refer to page 18)
4. Set the plunger [2] in which the bearing [8] is incorporated to the body [1]. Pay attention to arrangement.
5. Remove the old sealing compound, moisture, oil stain and others. Then apply the new sealing compound 1212 (Three bond co.,ltd.) to the body [1] and the fitting surface of spherical bushing. (Refer to Page 17, Fig.9)
6. The spherical bushing [4] and the master jaw [3] install to the body [1]. In this time, align the key flute position in

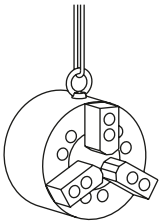
advance. With the key of master jaw aligned to the bearing key flute, set the spherical bushing in the body-engaged hole and insert it, striking the front jig. When the back of jig comes in contact with the body surface, put together the bolt holes of spherical bushing before temporarily tightening the bolts. At this time, remove the jig from the spherical bushing and tighten the bolts at the specified torque.

7. Check that the spring [19] and spring cap [10] is set to the tip of master jaw [3], then install the rear body [7].
8. Supply grease. (Refer to pages 26-27)

⚠ 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	Eyebolt
6″	none
8″	M10
10″	M10
12″	M12
15″	M12

⚠ 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 14, 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 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 10

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 jaw.	A large amount of cutting powder is inside.	Disassemble and clean.
	The draw bar loosened.	Remove the draw bar and retighten it again.
The Work slips.	The stroke of the jaw is insufficient.	Adjust so that the jaw is near the center of the stroke when gripping the work.
	The gripping force is insufficient.	Check that the correct hydraulic pressure is obtained.
	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.
	The rotation speed is too high. Swinging occurs due to incorrect alignment of cores of work feeder, steady rest, tail stock, etc.	Lower the rotation speed to a speed at which the required gripping force can be obtained. Align the cores sufficiently to eliminate such swinging.
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.
	Dust is attached on the attaching part of the master jaw and the top jaw.	Remove the top jaw, and clean the attaching part thoroughly.
	The attaching bolt of the top jaw is not tightened sufficiently.	Tighten the top jaw attaching bolt at the specified torque. (Refer to page 18)
	The forming method of the soft jaw is inappropriate.	Is the plug for forming parallel to the chuck end surface? Is the plug for forming not deformed due to the gripping force?
	The height of the top jaw is too high, the top jaw is deformed, the top jaw attaching bolt is elongated.	Lower the height of the top jaw. (Replace it with the standard size) or check the gripping contact surface and make it uniform.
	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 27. When the jaws and covers 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

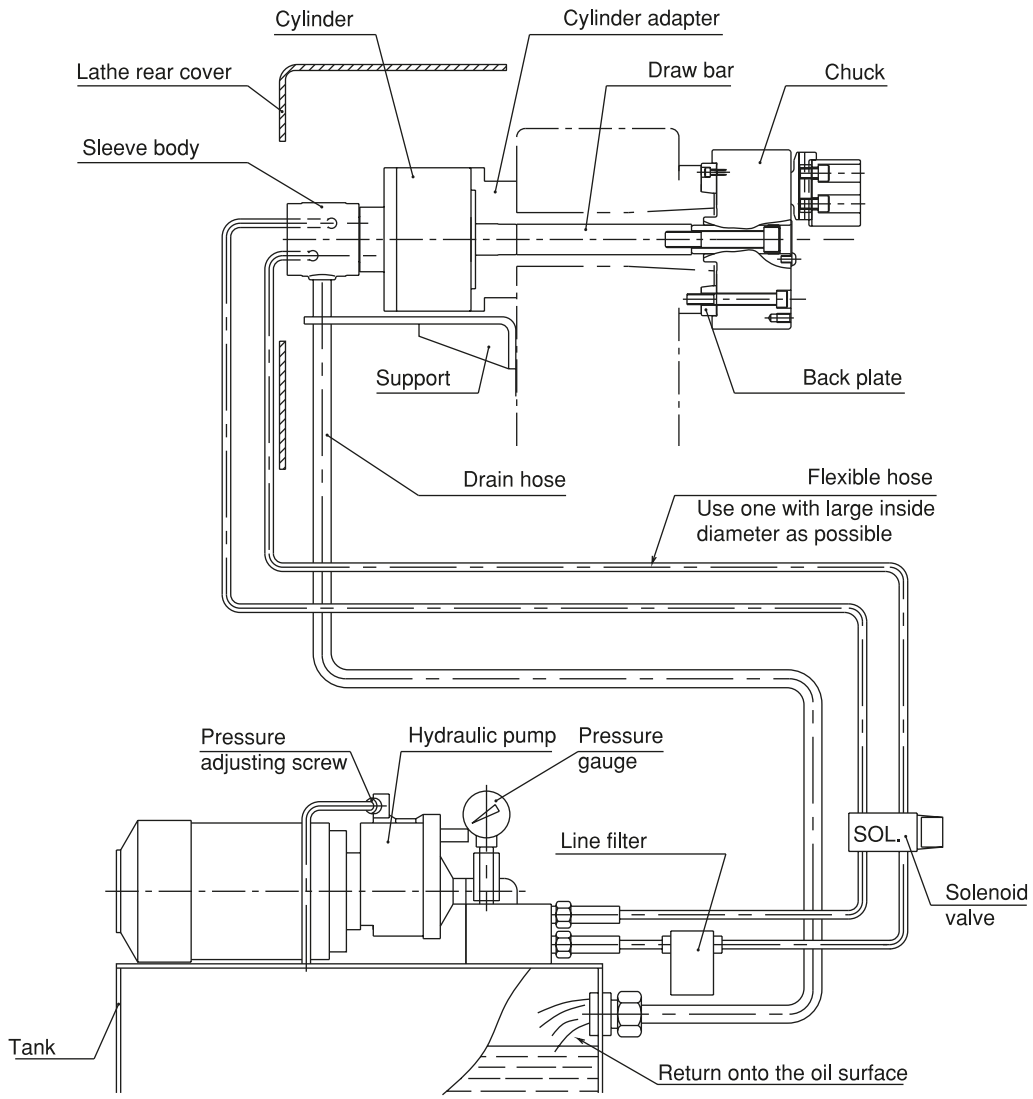


Fig. 17

- 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. (Refer to Fig.17)
- 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 Manufacturing and attachment of back plate

NOTICE

- Process the engagement diameter of the back plate after measuring the actual spindle.
- Run-out of the back plate directly affects the process precision. The end surface run-out of the back plate, spigot joint diameter run-out must be 0.005 mm or less.
- The precision of the processing of the chuck attachment end surface of the back plate and the spigot joint diameter can be raised by processing them after mounting to the installed machine.
- Fig.18 shows the case of the JIS short taper standard.

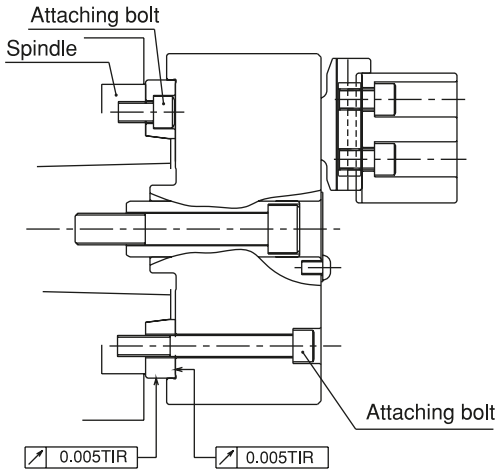


Fig. 18

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 11

Bolt size	Tightening torque	Bolt size	Tightening torque
M 5	8 N·m	M12	107 N·m
M 6	13 N·m	M14	171 N·m
M 8	33 N·m	M16	250 N·m
M10	73 N·m	M20	402 N·m

8-3 Manufacturing and attachment of draw bar

Determine the length of the draw bar as shown below.

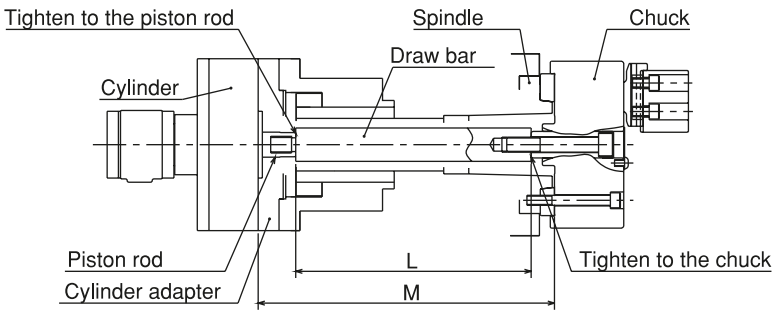


Fig. 19

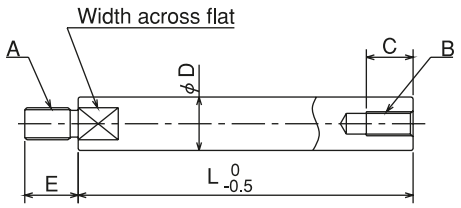


Fig. 20

Table 12

Chuck size	Cylinder	A	B	C	D	E	L
6″	Y1225R	M24	M16	35	35	40	M-68.6
8″	Y1225R	M24	M18	40	35	40	M-71.1
10″	Y1530R	M30	M22	45	45	40	M-78.4
12″	Y1530R	M30	M22	45	45	40	M-78.4
15″	Y2035R	M36	M27	50	55	55	M-100.4

The dimension L in Fig.19 is determined from the distance M between the cylinder adapter and the back plate.
(Example) In the combination of PW-08, Y1225R, and when M=600mm, the draw bar length L is to be
L = 600 — 71.1 = 528.9mm.
At the time of the screw process of the dimension A, the precision is to be JIS 6H and 6h, 6g matching the screw of the piston of the cylinder. Pay attention so that the thread parts on both ends and the outer periphery do not swing or become unbalanced.

⚠ DANGER

- Provide sufficient strength for the draw bar. If the draw bar is broken due to insufficiency of the strength, the gripping force will be lost instantly, which is dangerous as the work will fly out.
  - Keep the dimension D in Fig. 20 for the draw bar and a material with the tensile strength 380MPa (38kgf/mm^2) or more must be used.
  - The personnel who designed draw pipe must judge whether the strength of the draw pipe is sufficient for the usage conditions.
  - The dimensions and materials specified in this manual do not guarantee that the draw pipe will not break under every usage condition.
- If the screw-in depth of the draw bar to the draw screw is insufficient, the screw will break and the gripping force will be lost instantly, which is dangerous as the work will fly out.
- If the engagement of the screw of the draw bar is loose, vibration may occur resulting in breakage of the screw. If the screw breaks, the gripping force will be lost instantly, which is dangerous as the work will fly out.
- If the draw bar is unbalanced, vibration occurs, the screw is broken and the gripping force will be lost instantly, which is dangerous as the work will fly out.

8-4 Attachment of chuck

1. Attaching the draw bar to the cylinder

- Apply adhesive onto the screw part of the draw bar, and screw it into the piston rod of cylinder. At this time, refer to the instruction manual for the cylinder for tightening torque.

NOTICE

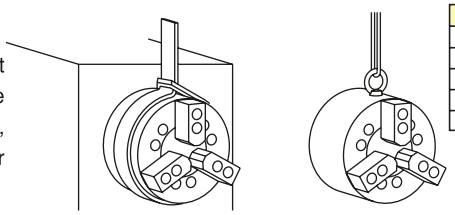
- When attaching the draw bar to the cylinder, the stopper pin of the piston may break if tightened at the stroke middle position of the piston. In the case of a Y type cylinder, screw it in so that the piston rod is fully in. Follow the explanation of the instruction manual for the cylinder for other items about the cylinder.

2. Attach the cylinder to the spindle (or the cylinder adapter)

- Check the run-out of the cylinder, and if it is normal, attach the hydraulic pipe.
- Move 2 to 3 times at low pressure (0.4 MPa-0.5 MPa, 4 - 5 kgf/cm^2) and set the piston at the forward end and turn off the power supply.

⚠ 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	Eyebolt
6″	none
8″	M10
10″	M10
12″	M12
15″	M12

⚠ 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.

3. Connect the chuck to the draw bar

- Remove the soft jaw and the cover of the chuck, and connect to the draw bar while turning the draw screw. Completely tighten the screw then.
- When connecting the draw screw and the draw bar, do not forcibly screw them in if they cannot be screwed smoothly, but check the inclination of the core of the screw, etc.

⚠ DANGER

- If the screw-in depth of the draw bar to the draw screw is insufficient, the screw will break and the gripping force will be lost instantly, which will the work to fly out.
- If the engagement of the screw of the draw bar is loose, vibration may occur resulting in breakage of the screw, loss of gripping force and the work flying out.

4. Attach the chuck matching to the attaching surface of the spindle (or the back plate).

- Make a state that the chuck closely contacts the spindle attaching surface of the lathe.
- 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.

⚠ 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 13

Bolt size	Tightening torque	Bolt size	Tightening torque
M 5	8 N·m	M12	107 N·m
M 6	13 N·m	M14	171 N·m
M 8	33 N·m	M16	250 N·m
M10	73 N·m	M20	402 N·m

5. Check the run-out of the chuck

- Keep the periphery run-out and the end surface run-out of the chuck at 0.02mm T.I.R or less.
- The appropriate position of the wedge plunger at the cylinder forward end is the position when the dimension A in Fig.21 becomes as shown in the table below.
- Stroke the jaw fully and confirm whether to obtain a regulated stroke.

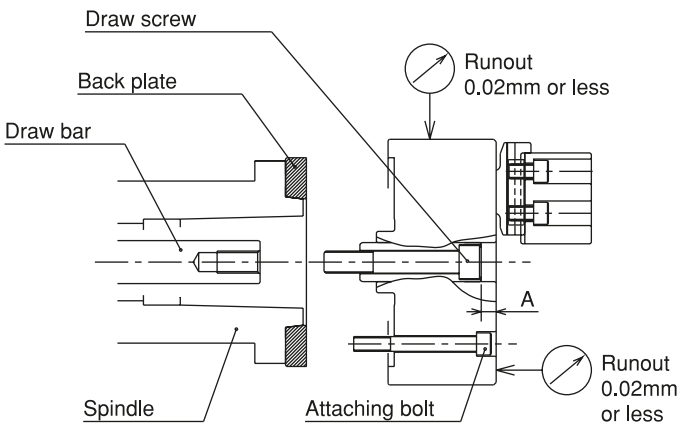


Fig. 21

Table 14

Chuck size	A (mm)
6″	3.3～5
8″	4.4～6
10″	2.2～4
12″	2.2～4
15″	2.6～4

9 . Other information

9-1 About standards and orders

This product is based on the following standards or orders.

- Machinery directive : 2006/42/EC Annex I
- EN ISO 12100-1 : 2003+A1 : 2009
- EN ISO12100-2+A1 : 2009
- EN ISO14121-1 : 2007
- EN1550 : 1997+A1 : 2008

9-2 Information about markings of product

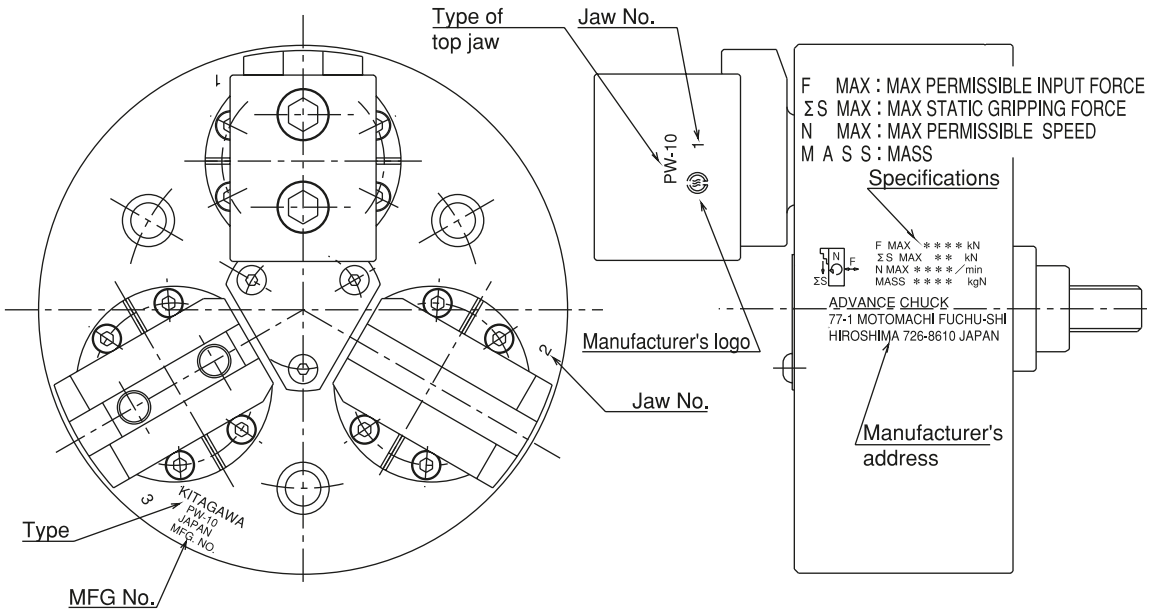


Fig. 22

9-3 About disposal

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

MEMO

MEMO

MEMO

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Machine Tool Accessories http://www.mta.kiw.co.jp/

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