

**Instruction Manual  
for  
VIDA CLAMP  
(Diaphragm Chuck)  
Edition for 2014**

**Important:**

**Prior to use of the product, be  
sure to read and understand this  
document.**

The product has been named VIDA (life) after its  
dynamic features like life.



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## Signal Words

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



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



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



Indicates information to prevent any trouble or damage, important messages for use, and tips.

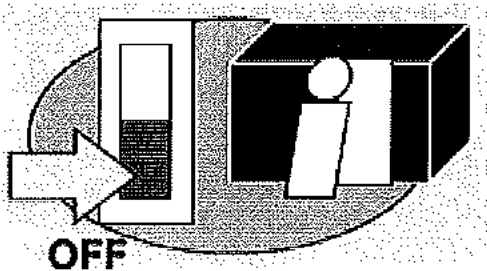


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## Precautions for Use

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To attach, replace, or lubricate VIDA CLAMP, previously turn OFF the power.



If the spindle, tool rest, grinding wheel, or the like moves, the operator is exposed to very hazardous risks.

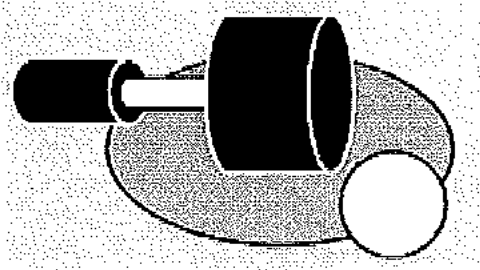
During machining, do not use the opening/closing valve.



This is very dangerous as the workpiece would be ejected.

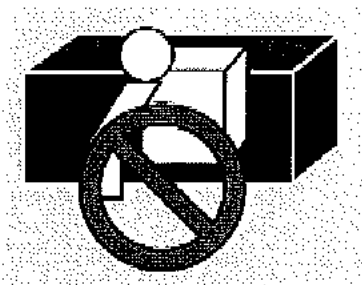


**The product cannot be used exceeding the upper limit of the supplied air pressure.**



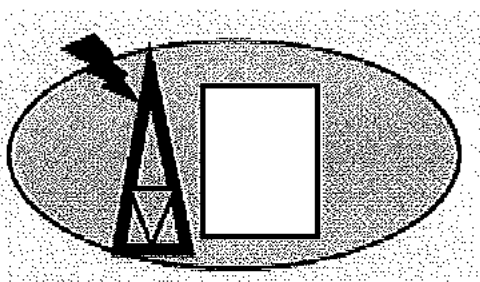
The parts for VIDA CLAMP may be damaged during machining, causing the workpiece and those parts to be scattered around.

**Do not open/close the door of the machine until machining is completely finished.**



VIDA CLAMP, the workpiece, machining chip, or the like might cause an accident resulting in injury or death.

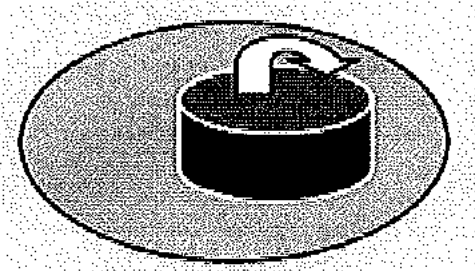
**Considering possible power interruption due to power failure or any other reason, use a check valve to maintain the air pressure.**



The workpiece might be ejected, causing an accident resulting in injury or death or damage to the machine or other equipment.

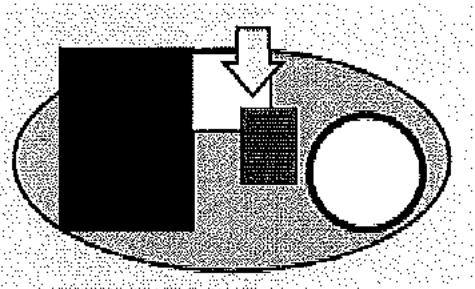


**To tighten attaching screws and other parts, use the specified torque.**



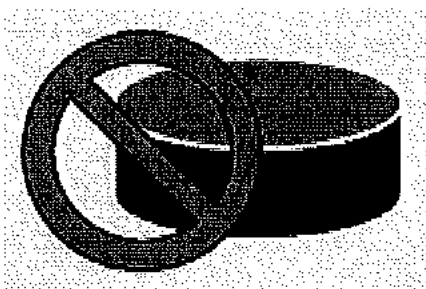
If VIDA CLAMP or its parts come off and are scattered around during rotation, the operator is exposed to very hazardous risks.

**When jaws higher than the standard height are used, the clamping torque decreases.**



Design and handle the jaws so that the proper state can be maintained within the operating air pressure for the chuck.

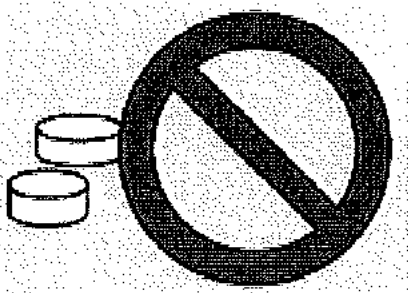
**Avoid any modification to VIDA CLAMP as it results in a hazardous situation.**



Never give any modification to DIDA CLAMP as it causes various hazards including decreased force and air leakage.

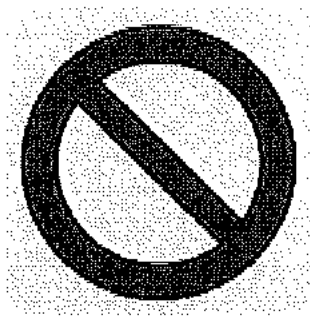


**Do not operate the machine after drinking or taking a medicine.**



Avoid drinking alcohol, taking any medicine that has a sleep-inducing effect, or using any cannabis, narcotic or stimulant drug, or the like.

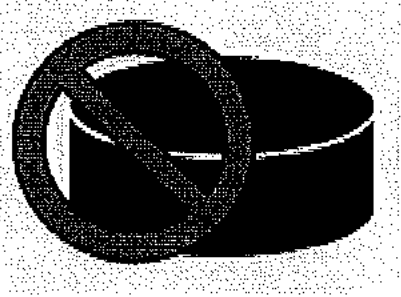
**During operation, do not use any wear that is easily caught by the machine.**



Avoid using any necktie, gloves, or low-bottom jacket, which is easily caught by the machine.

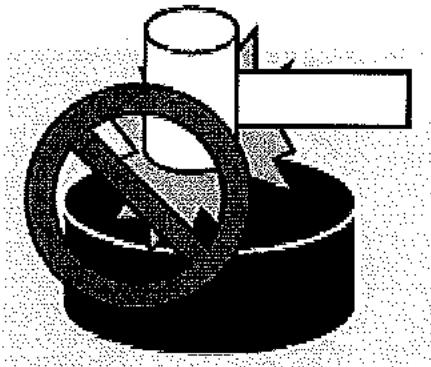


**In clamping a workpiece with VIDA CLAMP, take care not to get your finger or hand clamped.**



This may result in serious injury such as cutting off your finger or hand. Make the operator well aware of this potential hazard.

**Do not hit VIDA CLAMP or its part with a tool or the like.**



The chuck might be damaged or its precision might deteriorate.

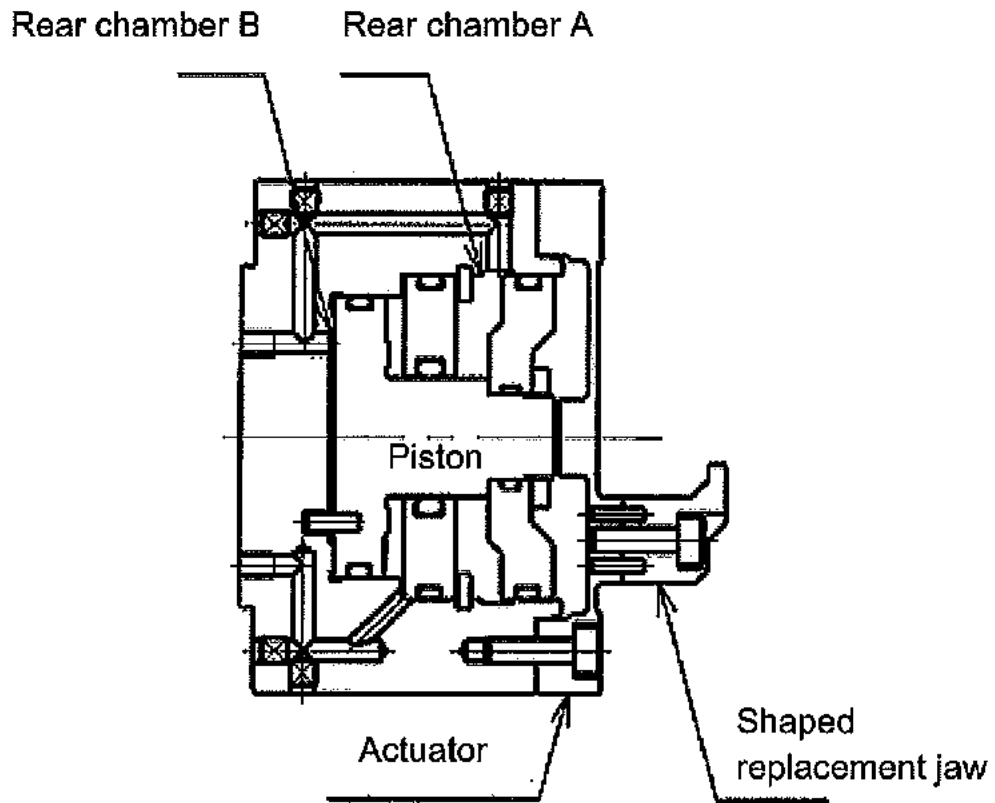
For centering, use a resin hammer or the like.



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## Structure and Operating Principle

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## **Movement of Clamp and Operating Principle (Example of O.D. Clamping)**

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1. Air is sent to rear chambers A and B.
2. The piston moves to the right side in the above figure while pushing and inflating the actuator (a workpiece can be inserted by sending higher air pressure than the jaw finishing pressure).
3. The workpiece is inserted.
4. By releasing the air from rear chambers A and B, the actuator clamps the workpiece with its membrane still inflated due to the previously applied jaw finishing pressure. The actuator's clamping force depends on the amount of membrane inflation.
5. In order to ensure the sufficient clamping force, a back pressure (reduction pressure) mechanism is incorporated.

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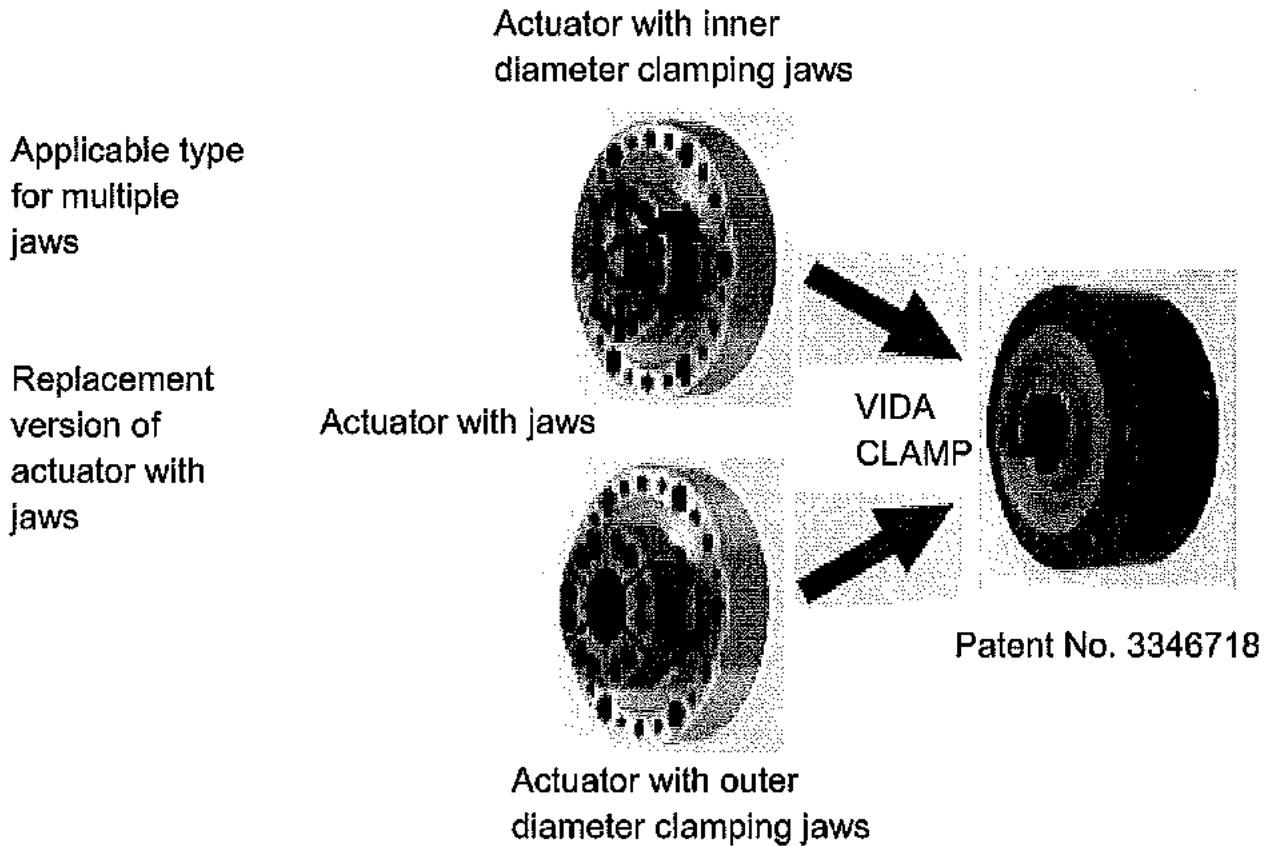
### **Back pressure (reduction force)**

In step 4, the air is released from rear chambers A and B. Subsequently, pressure is applied to these chambers at pressure lower than the jaw finishing pressure depending on the situation. (The jaws' clamping force decreases as this pressure becomes closer to the jaw finishing pressure.) This operation provides a solution for excessive clamping force without requiring remachining the workpiece at lower jaw finishing pressure.

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## Actuator Replacement

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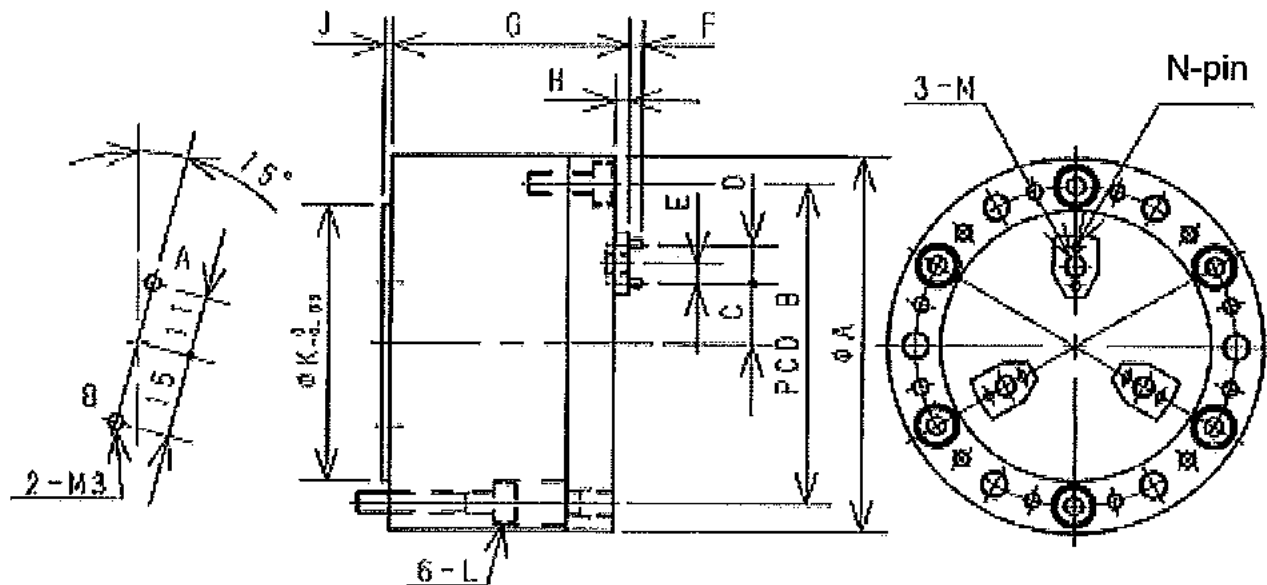
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## Actuator Replacement Principle

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The actuator and the cylinder have their respective alignment marks. The actuator has the ○ alignment mark, while the cylinder has the ■ alignment mark. Align these marks, insert the actuator's male and female spigot joints, and then mate the end faces with each other. This completes the engagement. Tighten the actuator attaching bolts to attach the actuator to the cylinder. To replace the actuator, reverse the above steps. This allows you to attach another actuator (with plus jaws) to the cylinder.

## Basic Specification



	A	B	C	D	E	F	G	H	J	K	L	M	N
NV-2	53	44.5	12	-	-	2.5	50	4	1.5	36	M3	M3	1.6
NV-2.4	60	50	9	8	3	2.5	43	2	1.5	40	M3	M3	1.6
NV-2.7	68	58	11	7	3.5	2.5	43	2.5	1.5	50	M4	M4	1.6

## Procedure for Shaping Jaws

1. Attach a soft jaw to the soft jaw shaping jig and then attach the jig to the general lathe's scroll chuck. Roughly shape the soft jaw while taking into consideration the finishing allowance of the clamping part including the jaw stroke.
2. Remove the soft jaw from the jig. Use hex socket head cap bolts to attach the soft jaw to VIDA CLAMP. Coat the mounting bolts with Loctite 242 (blue-white) and then tighten them with a torque wrench.

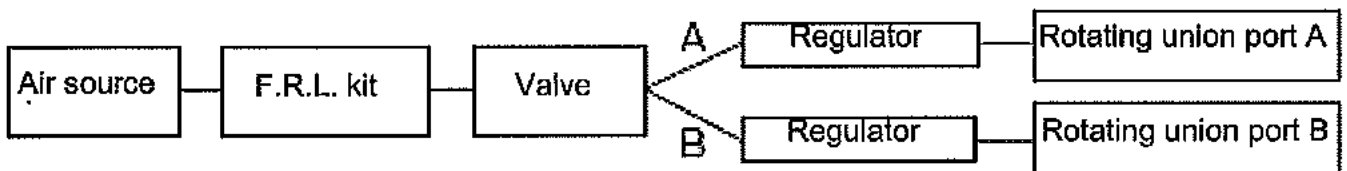
**For the tightening torque, see page 14.**

3. Attach VIDA CLAMP to a machine tool. (For attaching VIDA CLAMP, see Basic Attachment on page 15.)

### **Pneumatic piping**

Attach the rotating union securely to the chuck. (For using the rotating union, see page 7.)

Carry out piping with the precision regulator installed in the circuit to make the air pressure variable.



### **Setting the jaw finishing pressure and loader clearance**

For O.D. clamping, finish the jaws by gradually changing the difference between the air source and jaw finishing pressures in units of 0.05 MPa.

For I.D. clamping, gradually change the jaw finishing pressure in units of 0.05 MPa.

Example: For O.D. clamping, use 0.4 MPa (port B) as the standard setting.

Example: For I.D. clamping, use 0.1 MPa (port B) as the standard setting.

### **Finish the jaws.**

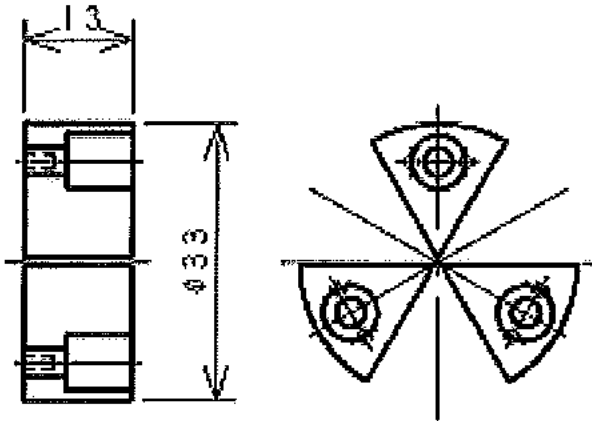
Considering the loader clearance, initially finish the jaws so that the clamping force increases as much as possible. If the clamping force is too strong, refinish the jaws to decrease the clamping force.

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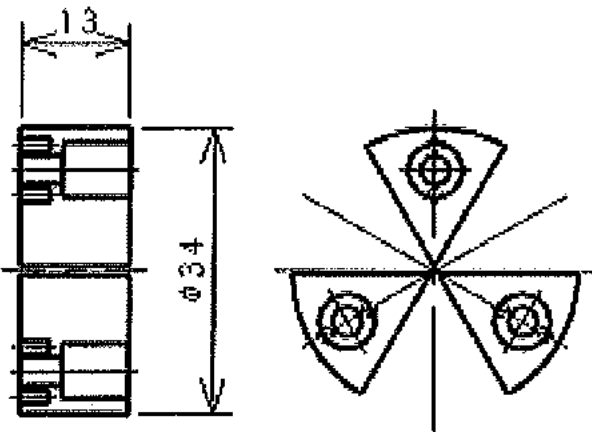
## Dimensions of Soft Jaw

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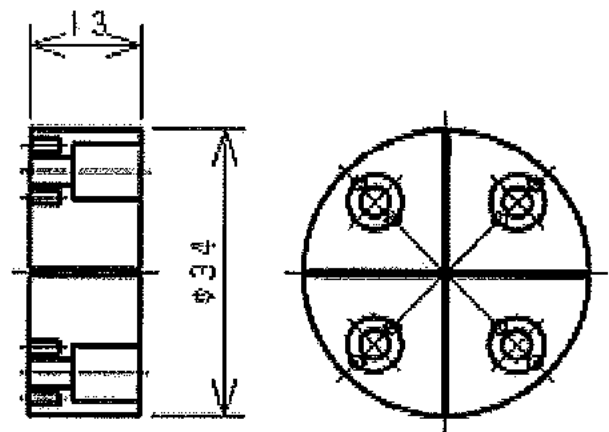
For NV-2-3-50H



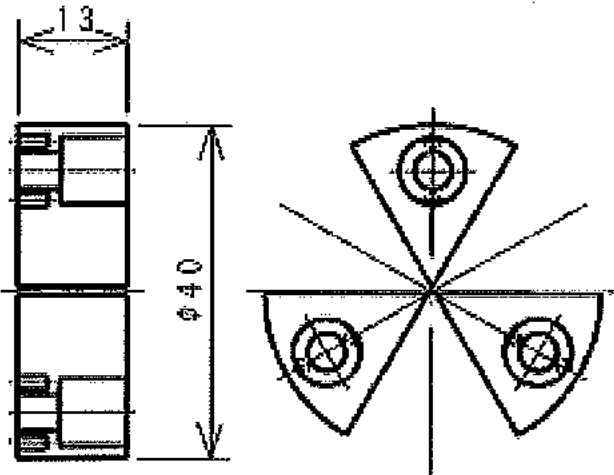
For NV-2.4-3-43H



For NV-2.4-4-43H



For NV-2.7-3-43H



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## Jaw Reshaping Procedure

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### ■ Attaching the jaws

Apply Loctite 242 (blue-white) to the attaching bolts and then tighten them with a torque wrench.

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**For the tightening torque, see page 16.**

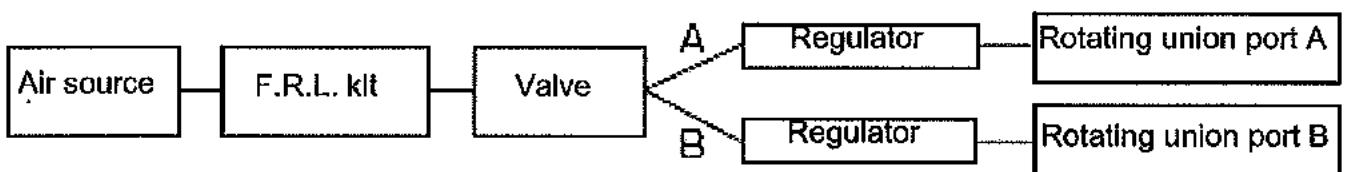
### ■ Centering

Check that the actuator is centered relative to its circumference. If not, center the actuator. (See page 15).

### ■ Air source

Attach the rotating union securely to the chuck. (See page 17.)

Set the precision regulator into the circuit to make the air pressure variable and perform piping,



### ■ Setting the air pressure

Set the air pressure to the value used for the previous finishing.

## ■ Cutting the jaws

### **For O.D. clamping:**

Cut the jaws to the specified diameter while reducing the air pressure. Continue to decrease the air pressure until the entire jaw surfaces are finished. (In this case, the clamping force decreases.)

### **For I.D. clamping:**

Cut the jaws to the specified diameter while increasing the air pressure. Continue to increase the air pressure until the entire jaw surfaces are finished. (In this case, the clamping force decreases.)

## ■ Record

Record the jaw finishing pressure and diameter.

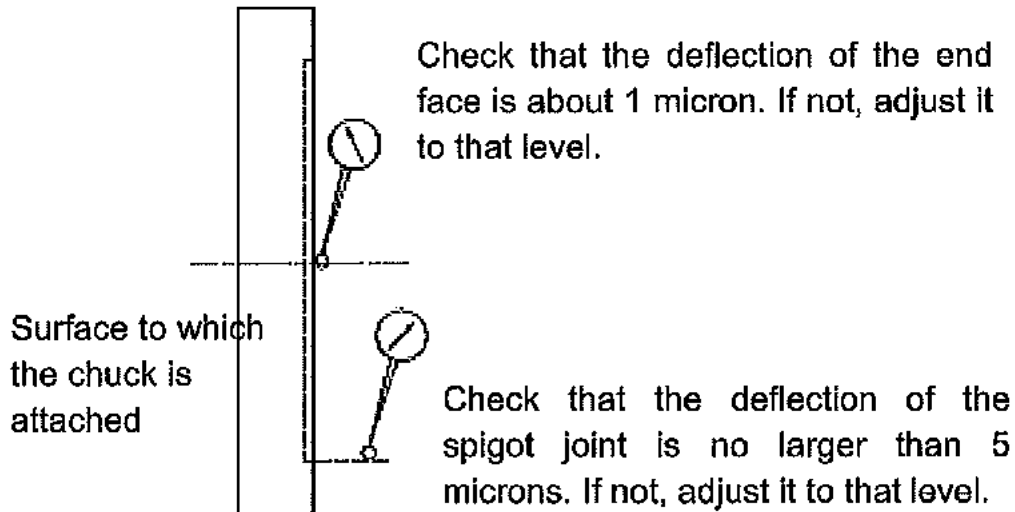


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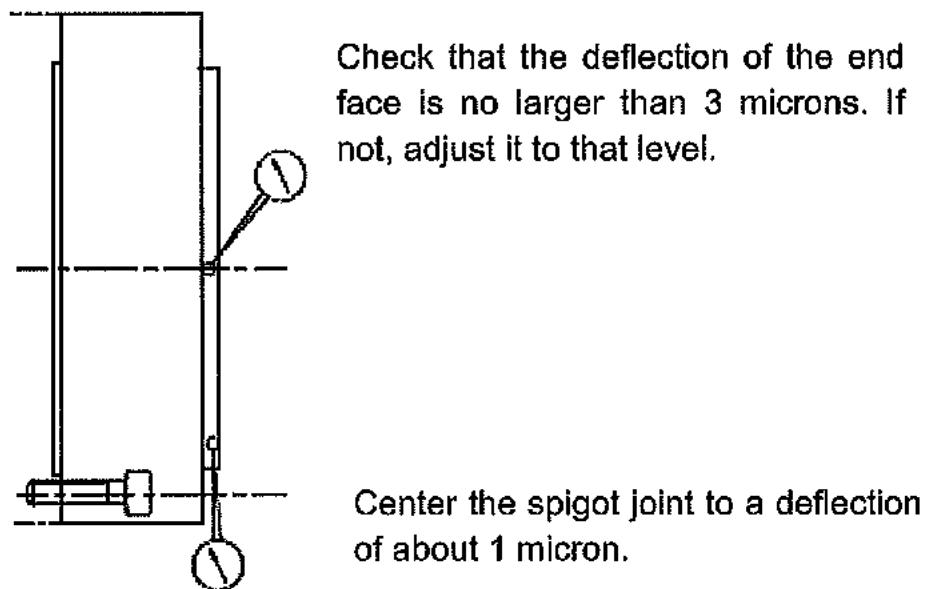
# Procedure for Attaching the Actuator and Cylinder

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## 1. Checking the attaching surface



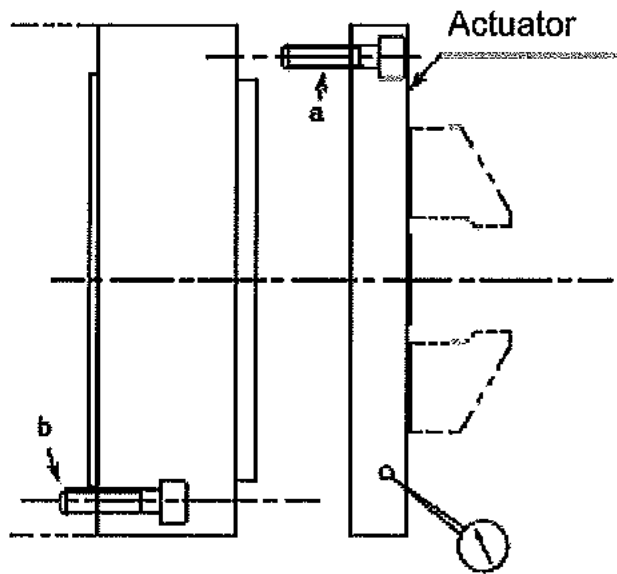
## 2. Attaching and centering the cylinder



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**Note: For centering, use a plastic hammer.**

### 3. Attaching the actuator



Attach the actuator and then check that it is centered to a deflection of no larger than about 5 microns. For higher accuracy or finishing the jaws, use the bolt "a" to center the actuator. Check that the actuator is centered to a deflection of no larger than 1 micron. If the actuator is not centered to that level, use the bolt "b" to perform centering.

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## Bolt Tightening Torque

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Attaching bolts for actuator and cylinder (Note)

### ■ Tightening torque

M3: 23 kgf · cm

M4: 53 kgf · cm

(For the bolt strength classification, see 12.9.)

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#### **Note:**

**The cylinder attaching bolt is incorporated in the cylinder.**

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## Procedure for Replacing the Actuator

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### ■ Removing the actuator

1. Shut off the air sent into the chuck.
2. Remove the actuator attaching bolts.
3. Remove the actuator from the cylinder.

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#### **Note:**

**Do not use a screwdriver for this purpose. The actuator and the attaching surface may be damaged, greatly affecting the restoration precision after replacement.**

### ■ Attaching a replacement actuator

1. Check that the piston is retracted.
2. Align the ○ mark on the actuator with the ■ mark on the cylinder.
3. Tighten the actuator attaching bolts using uniform force.
4. Check the deflection of the actuator's circumference. Center the actuator if necessary. If the actuator cannot be centered using the actuator attaching bolts, completely tighten the cylinder and the actuator and then use the cylinder mounting bolts.
5. Send air into the chuck and then check for the normal operation.

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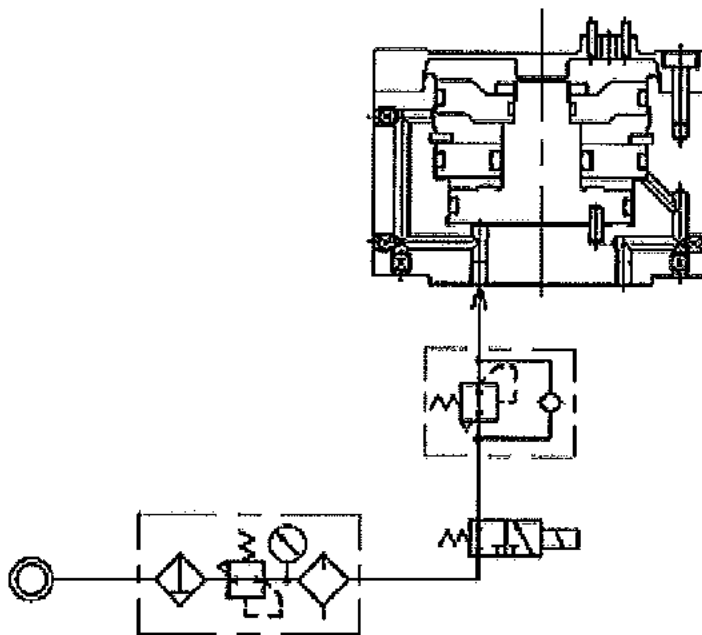
#### **Note:**

**Check that the actuator and the actuator attaching surface of the cylinder are free from any foreign matter. Take care not to get your finger or hand caught between the two. For centering, be sure to use a plastic hammer.**

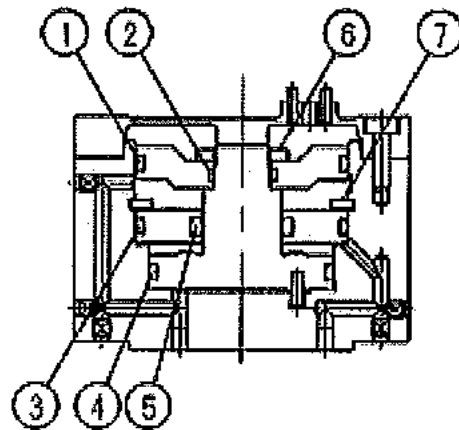
**For the bolting tightening torque, see page 14.**

Replace the actuator as describe above.

# Operation System Diagram



# Consumables and Parts



No.	NV-2	NM-2.4	NV2.7
①		S35	S44
②		S10	S12
③		S35	S42
④		P14	P16
⑤		S30	S38
⑥		STMTR10-7.5-2	STMTR12-1.0-3
⑦		C-type retaining ring for hole; nominal 38	C-type retaining ring for hole; nominal 45

# Troubleshooting

<b>Symptom</b>	<b>Cause</b>	<b>Action</b>
VIDA CLAMP malfunction	Air supply is insufficient.	Increase the pressure to 0.02 Mpa minimum.
	A VIDA CLAMP part is damaged.	The part must be repaired.
	The actuator is damage.	Replace the actuator.
	The solenoid valve is damaged.	Replace the solenoid valve.
	The internal seal is worn out.	Replace the part.
	Foreign matter is included.	Overhaul VIDA CLAMP.
Insufficient jaw stroke	A VIDA CLAMP part is damaged.	Replace the part.
	The internal seal is worn out.	Overhaul VIDA CLAMP.
Slipping of workpiece	VIDA CLAMP malfunction items	Take action for each item.
	The shaped jaws are worn out.	Refinish or replace the jaws.
Low machining precisio	Check all the items.	Take action for each item.
	Workpiece elements (material and process)	Check the work elements to take the appropriate action.

If the above troubleshooting does not settle your problem, contact us.

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## **Warranty of VIDA CLAMP**

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The warranty period is one (1) year subject to the normal use.

The air supply pressure is 0.8 MPa maximum (or 0.6 MPa maximum for additional air supply).

The use of 1,000,000 workpieces is warranted.

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## Data Sheet for VIDA CLAMP

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### ■ Main body

User:

Product name:

Product drawing:

Model:

VIDA CLAMP serial No.:

Actuator serial No.:

### ■ Jaw shaping

Supply pressure: [MPa]

Clamping diameter: [mm]

Finished dimensions: [mm]

Finishing pressure: [MPa]

Coaxial degree of jaws: [ $\mu$  m]

For further details, refer to the specifications and product drawings.

This Instruction Manual is subject to change without notice.



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