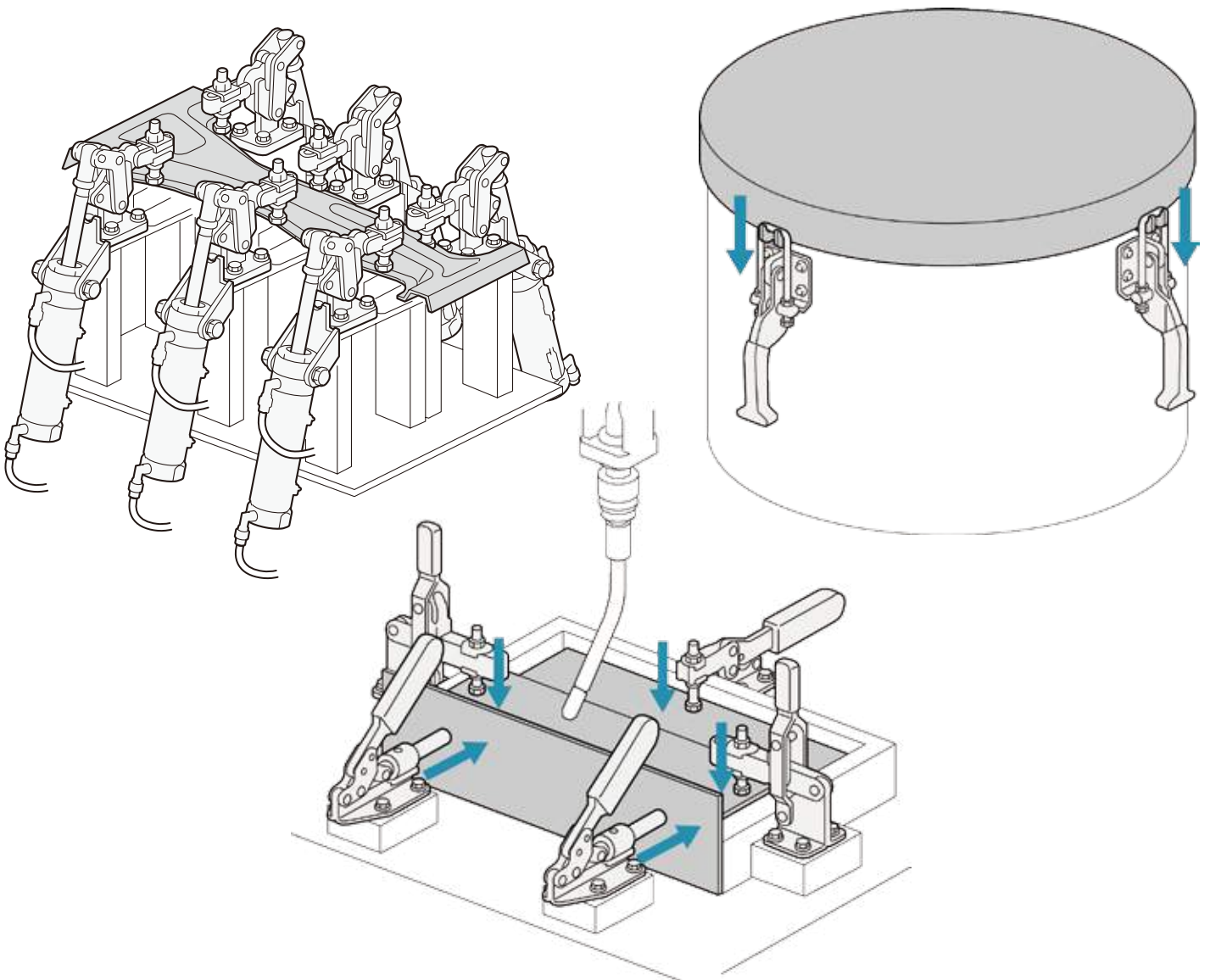


# Toggle Clamp Handbook

## Toggle Clamp Comprehention



**Kakuta Co.,Ltd.**

### ■What is Toggle Clamp

Toggle Clamp is work holding tool which can hold or press object at tens kgf to hundreds kgf by small force as hand by the effect of toggle & lever mechanism.

\*Holding or Pressing force by toggle mechanism is not different from torque of tighten bolt or pressing force of cylinder.

(Toggle mechanism, combination of solid, usually metallic links (bars), connected by pin (hinge) joints that are so arranged that a small force applied at one point can create a much larger force at another point.)

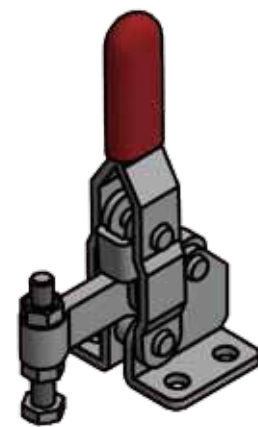
### ■Type of Toggle Clamp

#### ●Hold Down Toggle Clamp

Vertical Handle (Handle is vertical position against the holding or pressing surface at clamping.)

Horizontal Handle(Handle is horizontal position against the holding or pressing surface at clamping.)

Vertical Handle (Handle is vertical position against the holding or pressing surface at clamping.)



Mounting Base  
Flange



Lever  
T Type

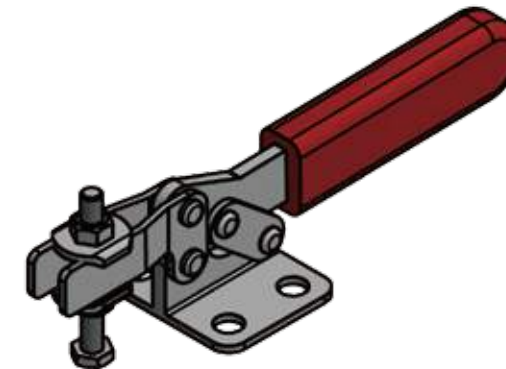


Lever  
Standard

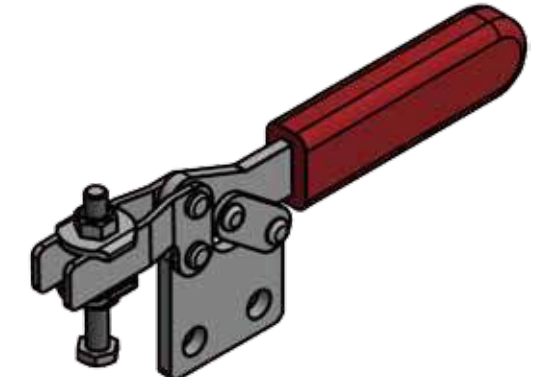
Mounting Base  
Straight



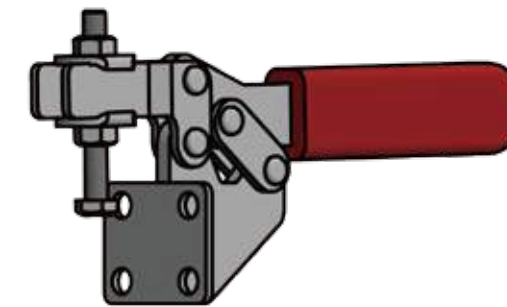
Horizontal Handle(Handle is horizontal position against the holding or pressing surface at clamping.)



Mounting Base  
Flange

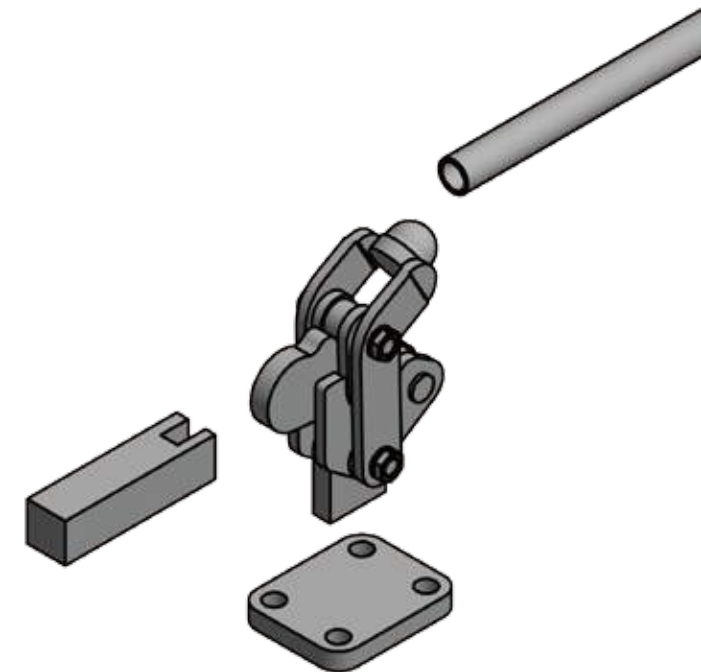


Mounting Base  
Straight

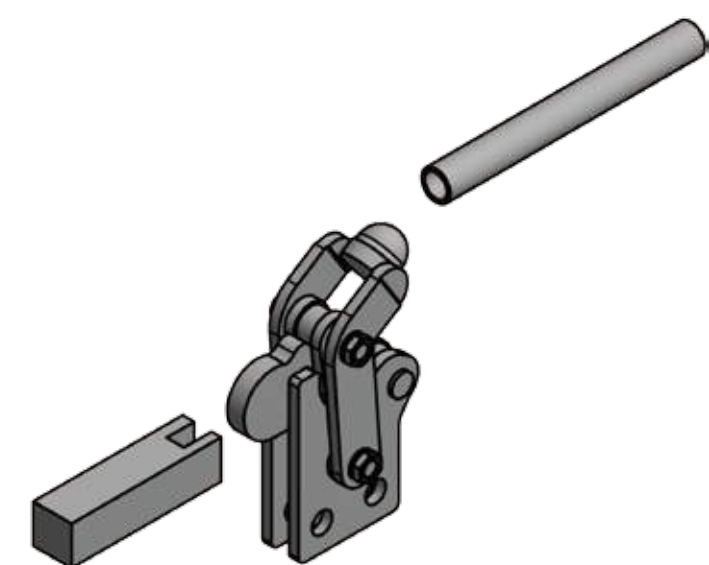


Mounting Base  
Side Flange

### Vari Clamp



Mounting Base  
Flange



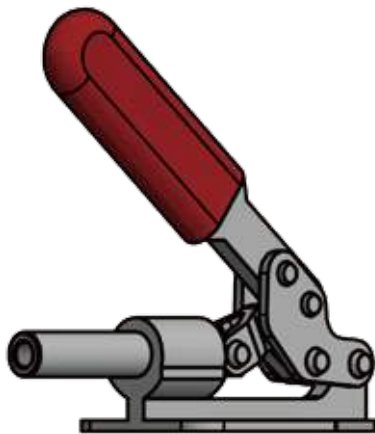
Mounting Base  
Straight

All rights reserved.

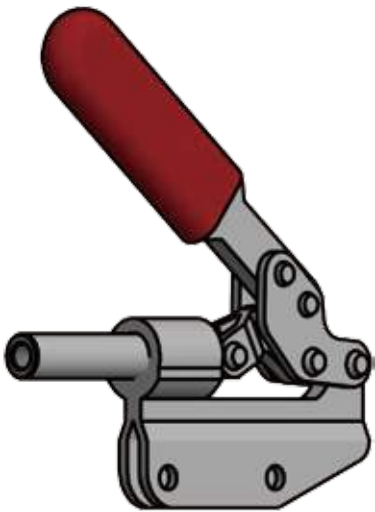
All rights reserved.

●Straight Line Toggle Clamp

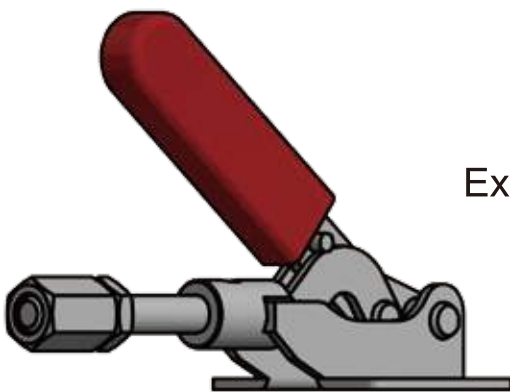
Push  
Push & Pull



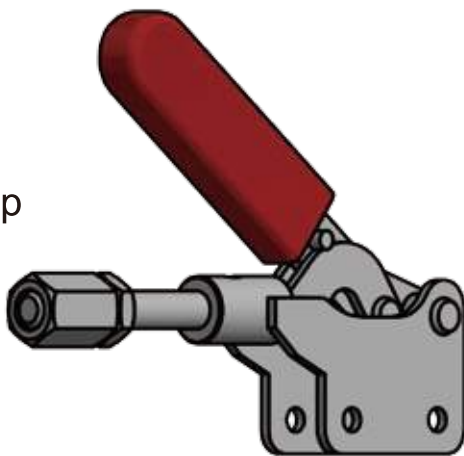
Internal Thread at Shaft Tip



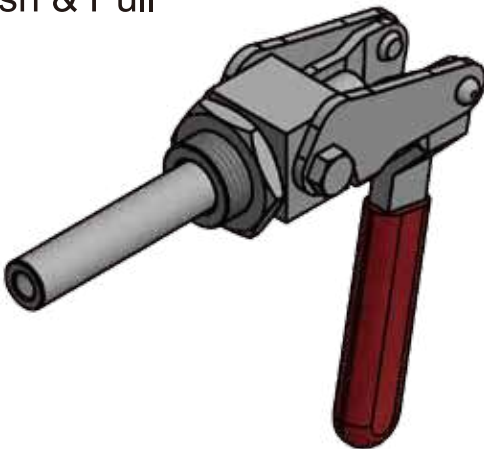
Mounting Base  
Straight



External Thread at Shaft Tip



Push & Pull



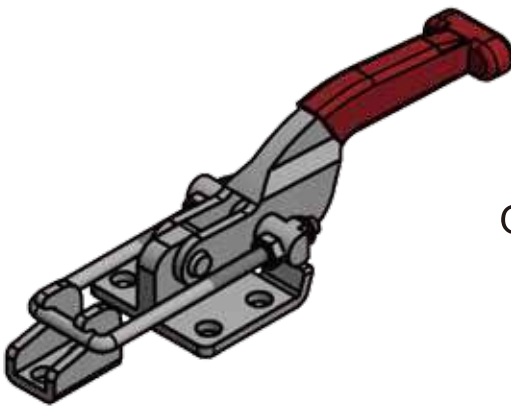
At Pushing  
Clamping  
At Pulling  
Unclamping



At Pushing  
Unclamping  
At Pulling  
Clamping

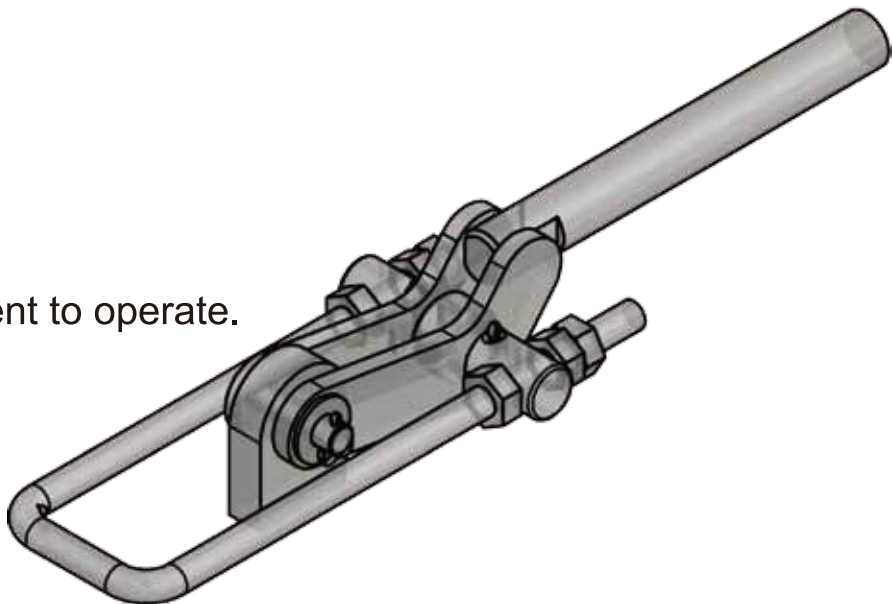
All rights reserved.

●Hook(Pull)Toggle Clamp



Only fixing and adjustment to operate.

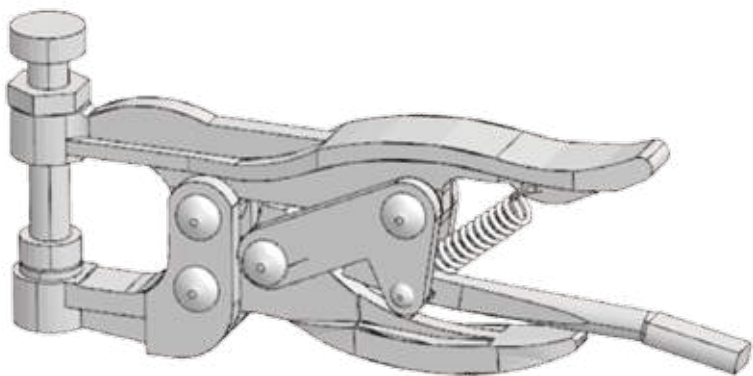
Need assembly, welding, adjustment to operate.



※Bracket is not attached. Prepare it at customer side.

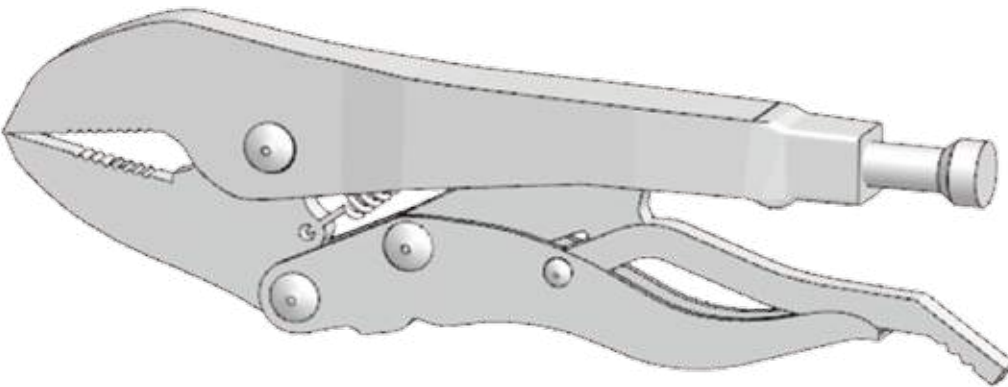
●Hand Vise Plier

Standard Hand Vise  
Hand Vise Plier



Standard Hand Vise

Hand Vise Plier



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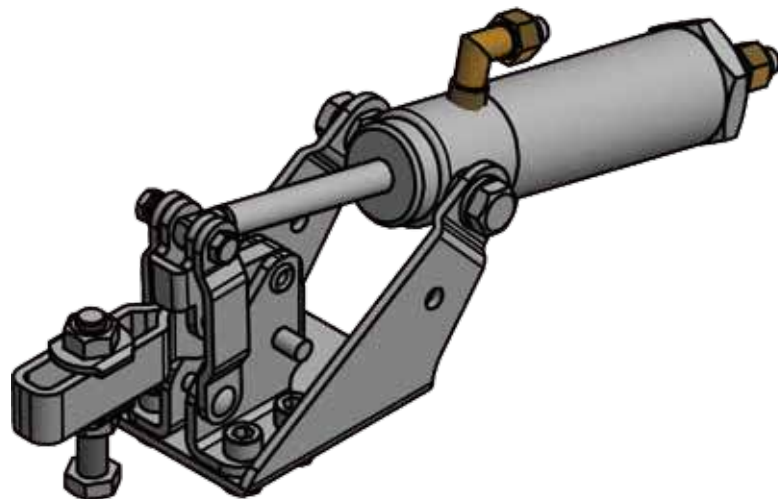


■Air Clamp

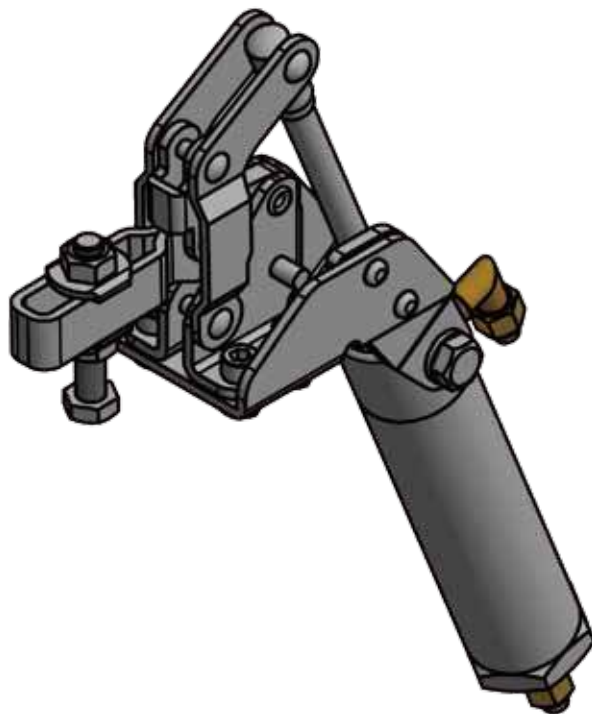
Activate Toggle Clamp by pneumatic and called Air Clamp.

●Hold down Air Clamp

Hold down Air Clamp (Hold or press object vertically)



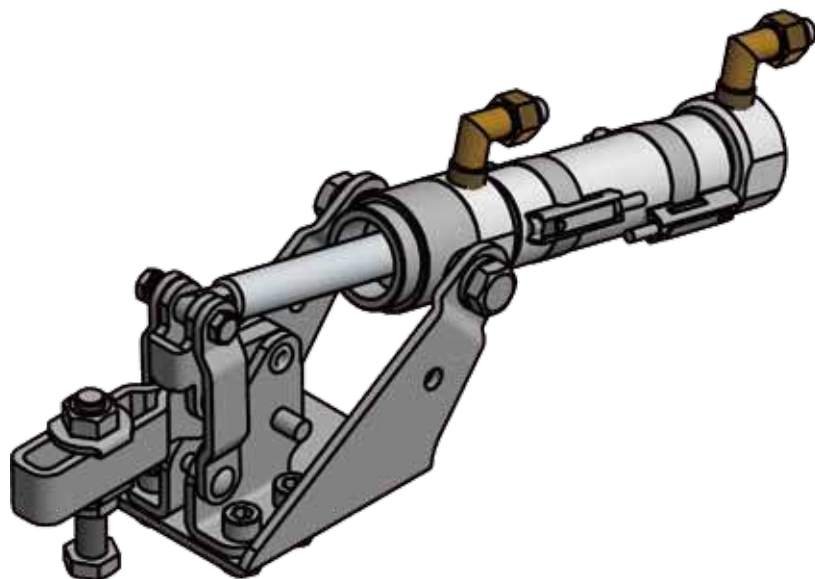
Air cylinder is horizontal at clamping.



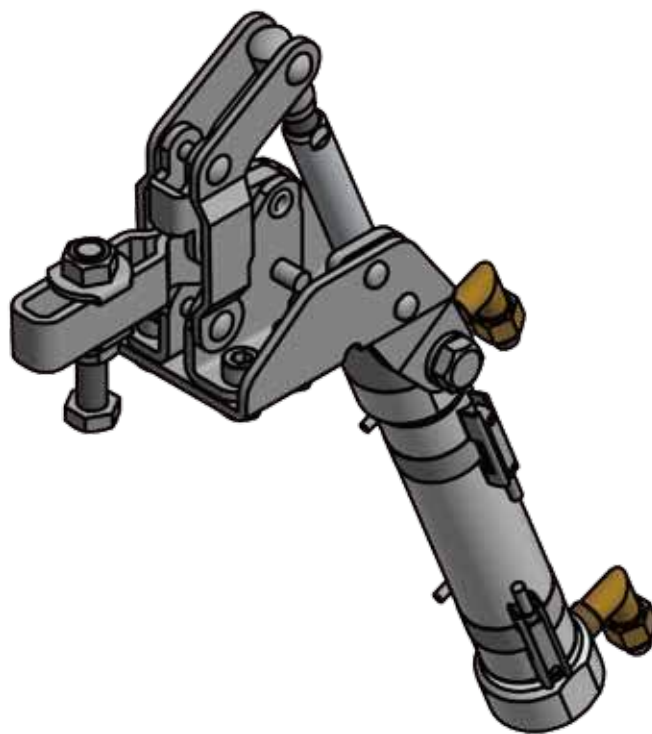
Air cylinder is vertical at clamping.

●Hold down Air Clamp S series

Hold down Air Clamp with Sensor



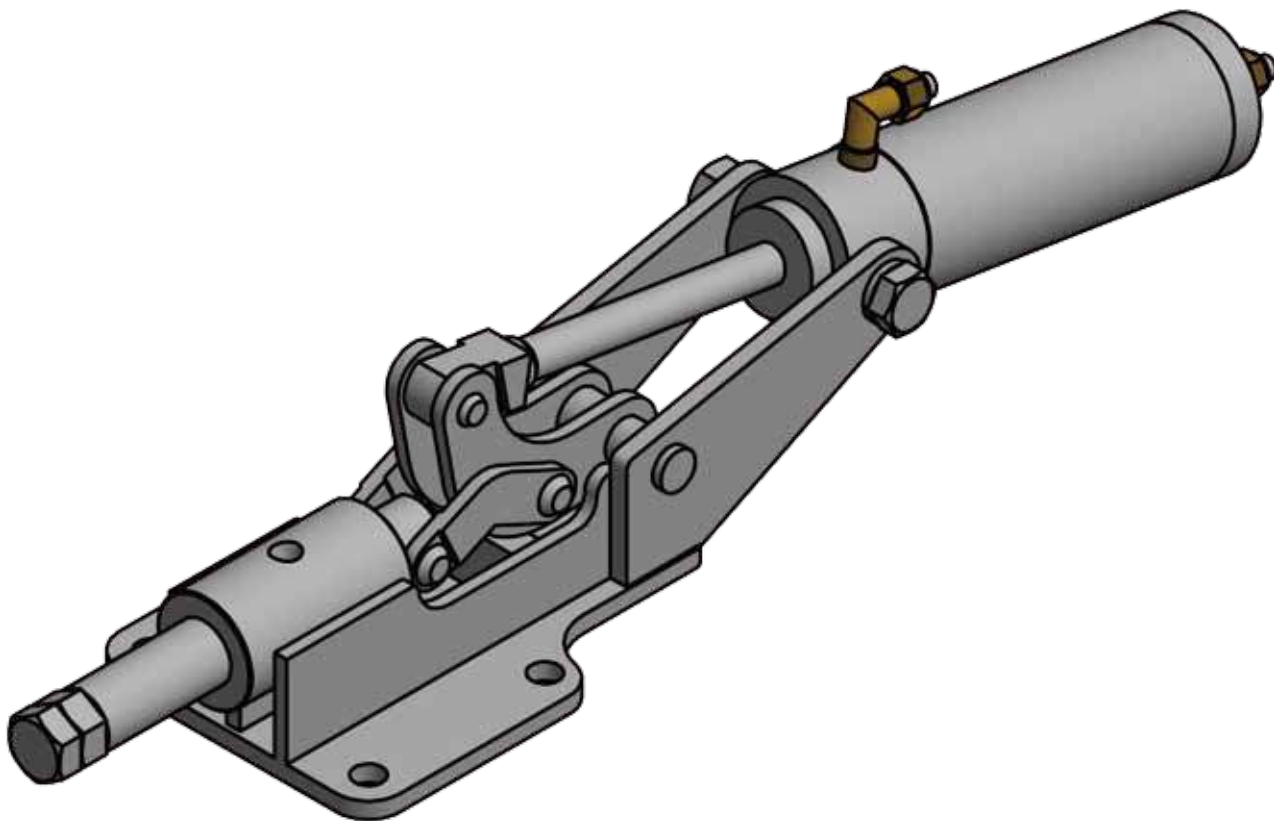
Air cylinder is horizontal at clamping.



Air cylinder is vertical at clamping.

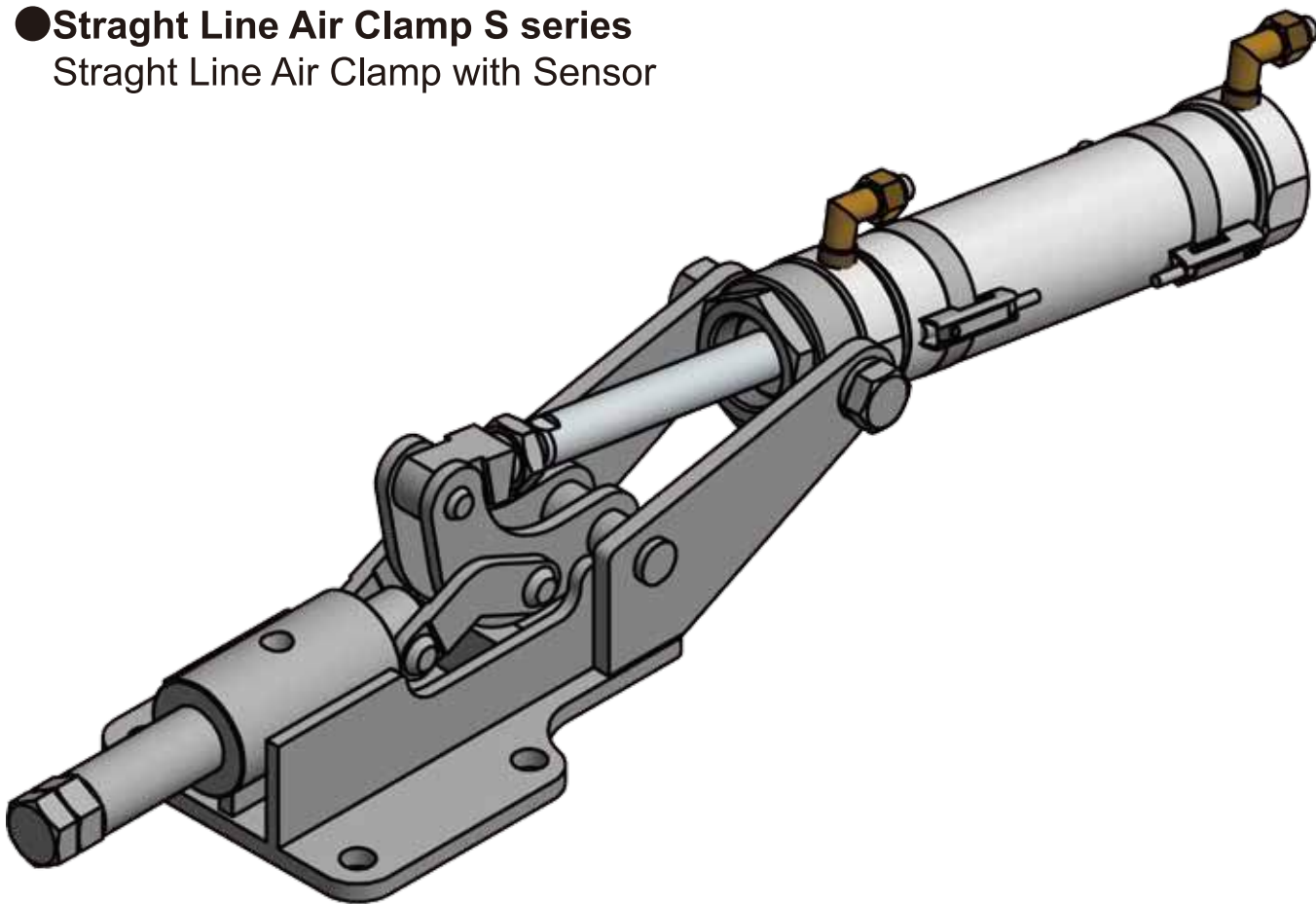
All rights reserved.

●Straght Line Air Clamp



●Straght Line Air Clamp S series

Straght Line Air Clamp with Sensor

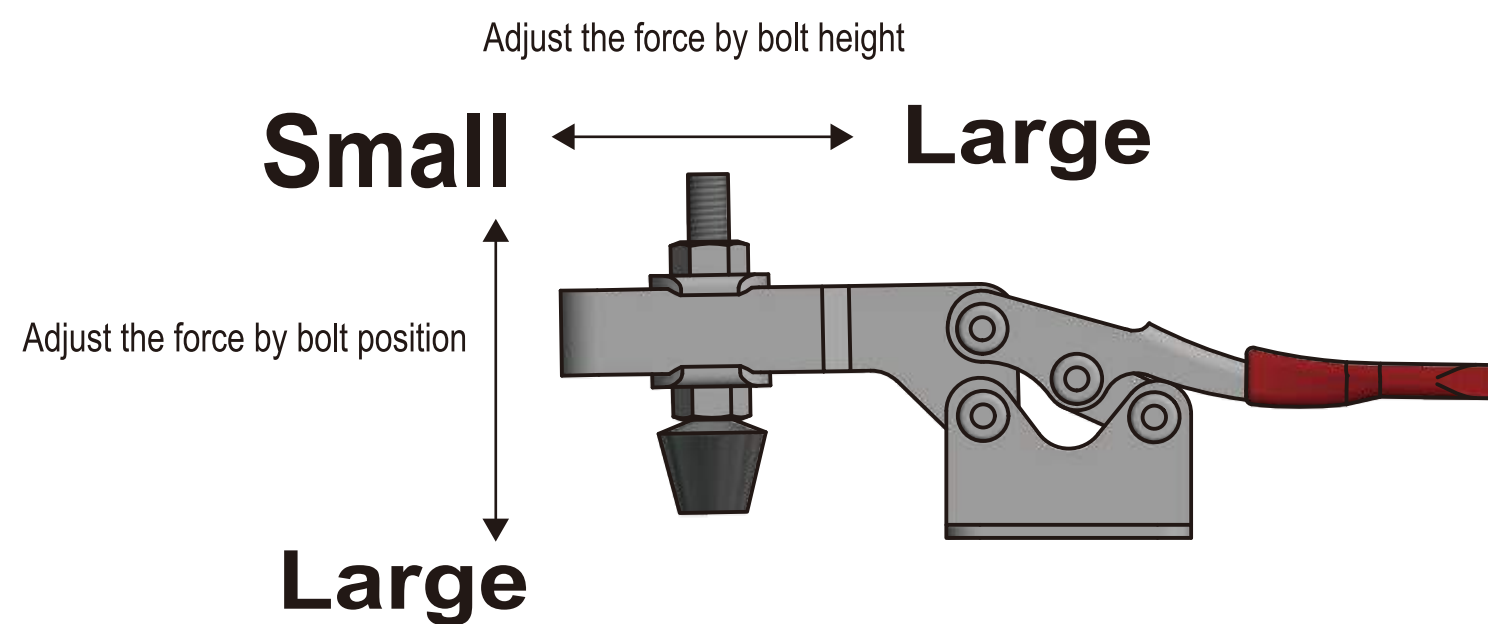


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The below explanation is basic of toggle clamp and is not included a condition of operation.  
The values of holding capacity, mentioned in our catalog, are maximum capability.  
The holding capacities in catalog, it is based on operation air pressure at 0.5MPa.  
Air Clamp is operated by air cylinder instead of manual operation of Toggle Clamp.  
Refer to Misumi website about Booster Mechanism (Toggle & Lever mechanism)

#### Relation between holding force and bolt height&position

Hold Down Toggle Clamp  
(Example of Hold Down Toggle Clamp (Horizontal Handle))



**Using rubber tip bolt, the force is decreased about 50%  
from using steel or stainless steel hex head bolt.**

\*The above explanation is for hold down toggle clamp (horizontal handle). It is same as hold down toggle clamp (vertical handle).

\*Some models of hold down toggle clamp cannot change the bolt position.

\*Adjusting the force by bolt position is same as Air Clamp.

\*Some models of hold down toggle clamp (vertical handle) cannot change the bolt location and change it by cut the arm and weld a boss.

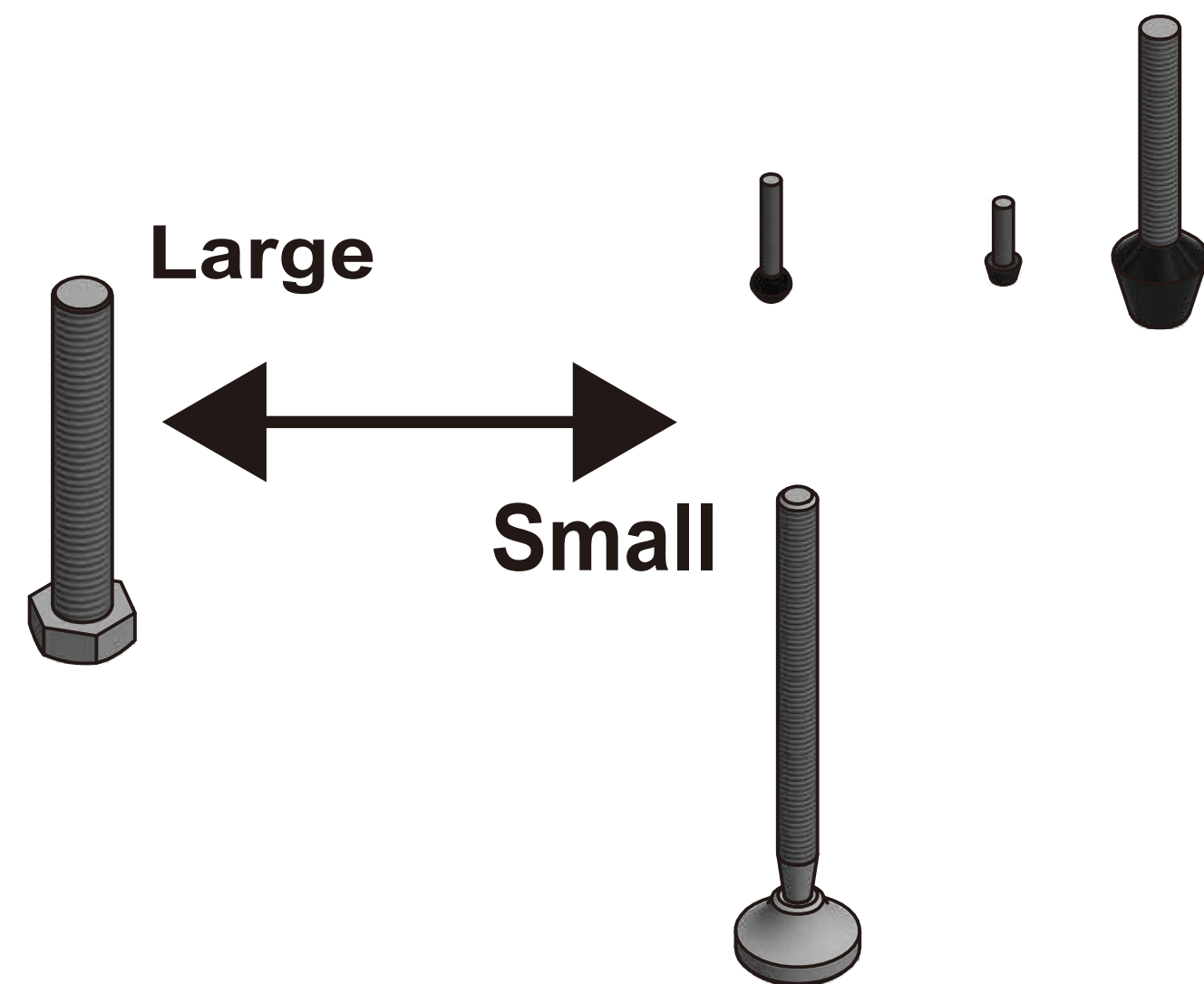
All rights reserved.

#### \*Relation between the force and type of bolt.

The force will be changed by using type of bolt.

Hex head bolt makes large and rubber or urethane are small.

The swivel head bolt is intermediate.



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## ■Toggle Clamp How to Adjust Holding Force・Hold Down Toggle Clamp

Adjust length and position of the bolt to change the force.

\*It is same adjusting the force both vertical handle and horizontal handle of Hold Down Toggle Clamp.  
See "Relation between holding force and bolt height&position" to know the relation between the force and the bolt position.

Refer to the right for adjusting the bolt length.

\*Some models of hold down toggle clamp (vertical handle) cannot change the bolt position and change it by cut off the arm and weld a boss.

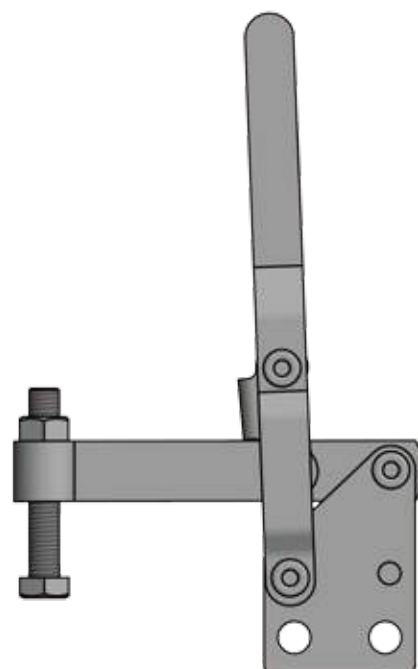
### ■Hold Down Toggle Clamp Vertical Handle

(Cut off the Arm and Weld a boss to decide the position of the bolt)

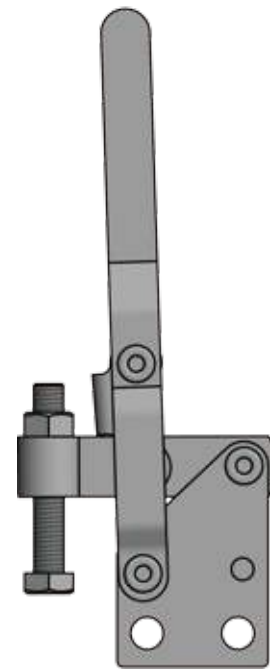
\*The maximum holding capacity of this type Toggle Clamp is performed by cutting off the arm shortest and using hex head bolt.

The position of the bolt is decided by the length of the arm.

After fixed the length of the arm, adjust the length of the bolt.



Welding the boss to the original length arm.  
In this case, the holding capacity is decreased from the value in catalog or website.

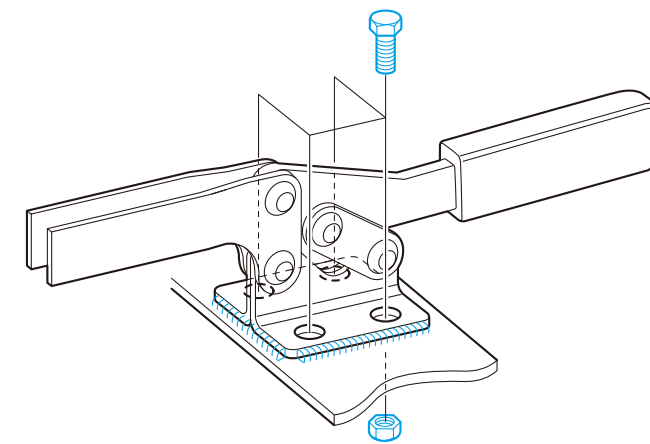


Welding the boss to cutted off arm.  
In this case, the holding capacity is closed to the value in catalog or website.

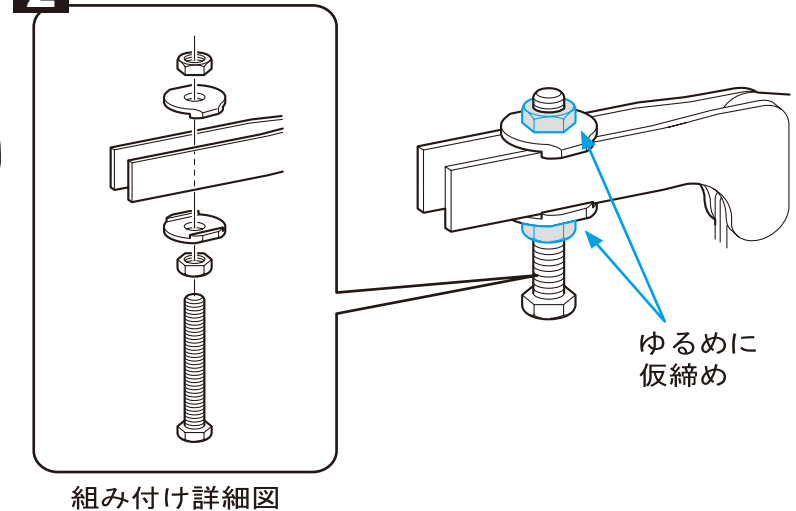
The above explanation is not included the length of bolt.  
The holding capacity will be changed by kinds of bolt.  
This explanation is based on using steel or stanless steel hex head bolt.

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**1** Fix the main body by bolts or welding.

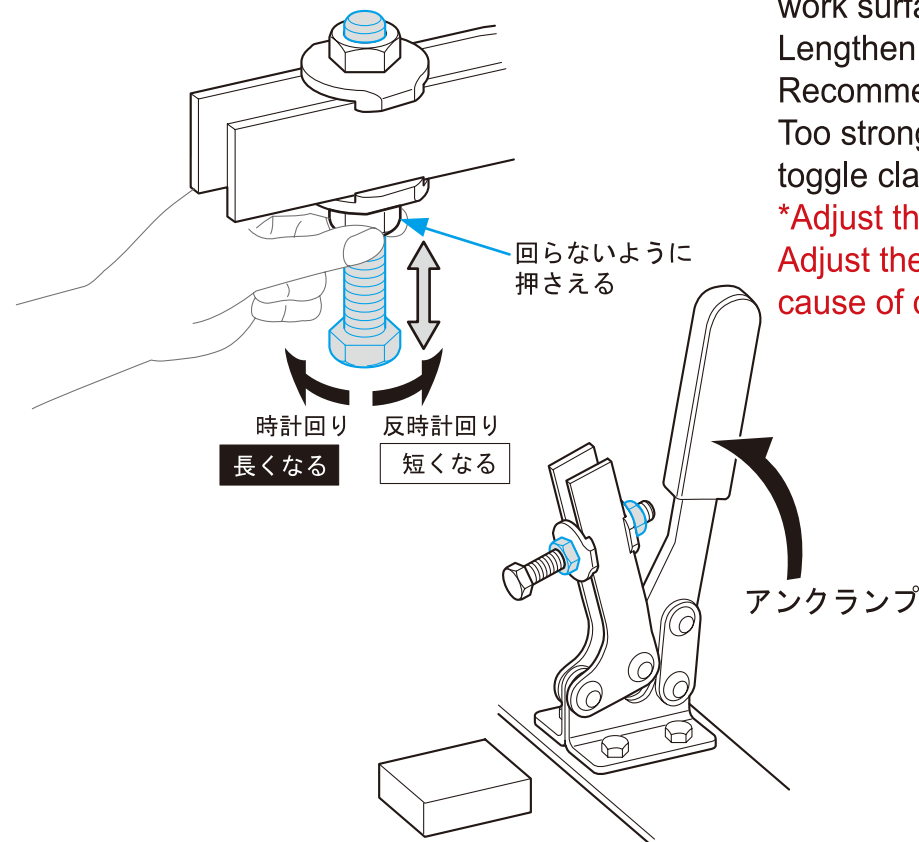


**2** Tighten the nut temporary.



組み付け詳細図

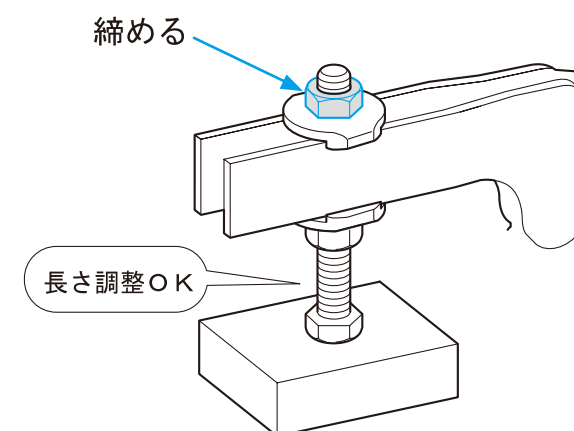
**3** Adjust the bolt length.



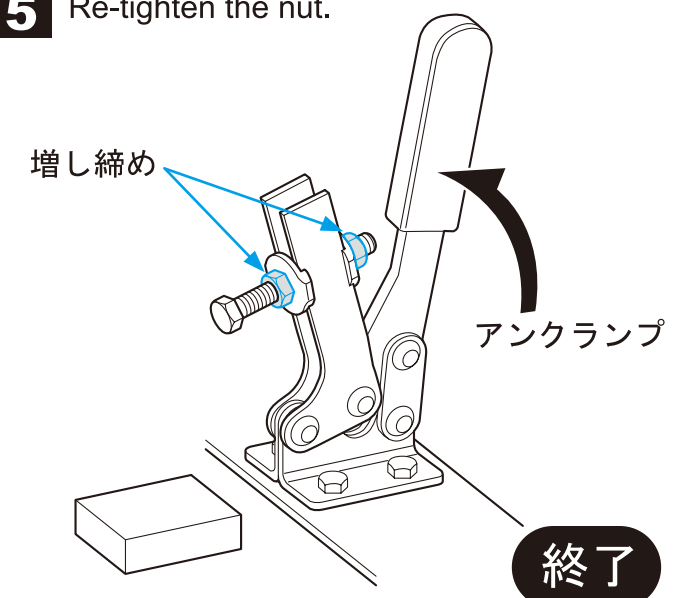
Adjust the bolt length to contact to the work surface at clamping.  
Lengthen bolt length increase the force.  
Recommend lengthening bolt length step by step.  
Too strong clamping will be the cause of damage of toggle clamp and work.

\*Adjust the bolt length at unclamp.  
Adjust the bolt length at clamping is the cause of damage of work.

**4** Tighten the nut.



**5** Re-tighten the nut.

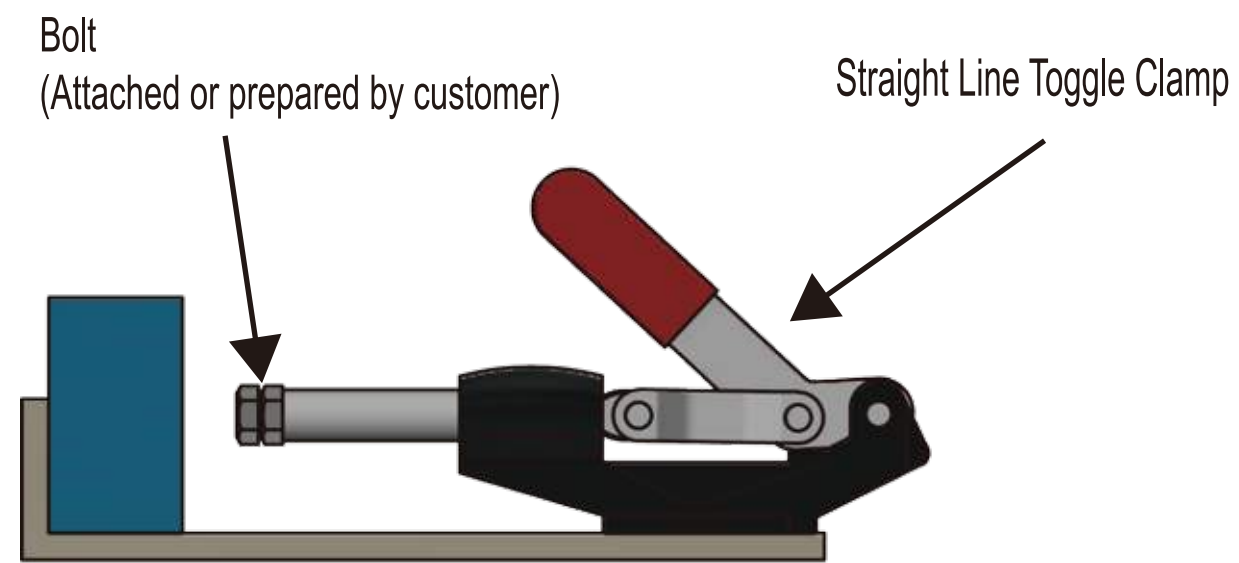


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## ●Straight Line Toggle Clamp

Only adjust the length of the bolt to change the force.

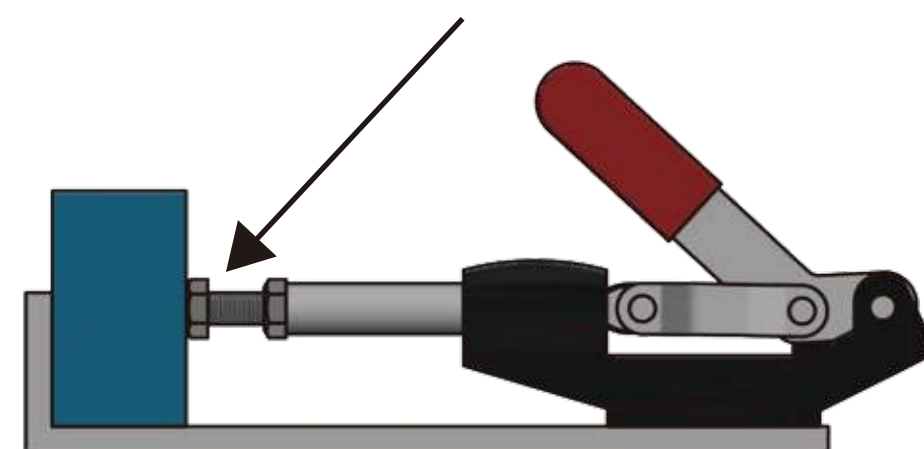


Adjust the bolt length.

Adjust the bolt length to contact to the work surface at clamping.

\*Adjust the bolt length at unclamp.

Adjust the bolt length at clamping is the cause of damage of work.



Force change by bolt length.

Long Short  
**Large Small**

Using Rubber tip bolt, the force is decreased about 50% from using steel or stainless steel hex head bolt.

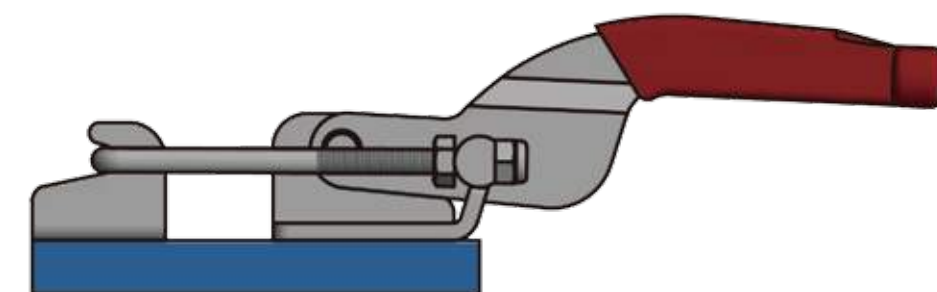
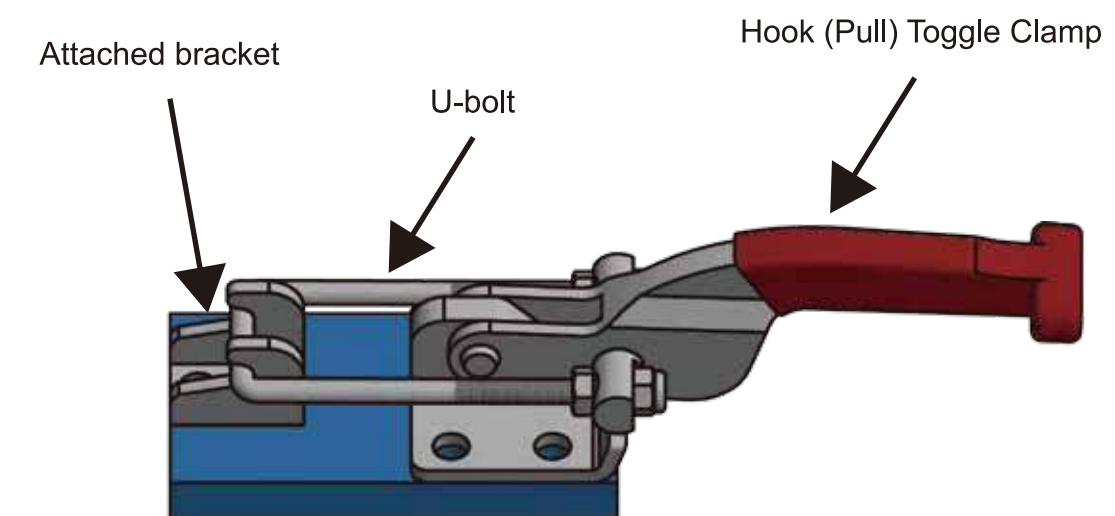
Adjusting the force by bolt position is same as Air Clamp.

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## Hook (Pull) Toggle Clamp

There are some types as hook, U-bolt and Hex head bolt.

The attached bracket are also some types and some are not attached.



U-bolt  
Adjust the pulling force.

Long Short  
**Small Large**

The position of the bracket should be decided by the length of U-bolt.

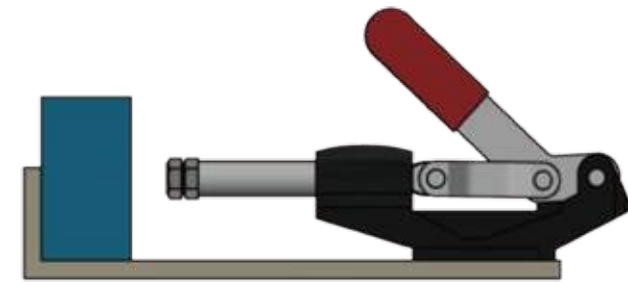
There is a possibility of impossible to adjust hook bolt length when fix the toggle clamp and bracket at improper position.

Hook bolt and bracket type are depend on the model of clamp.

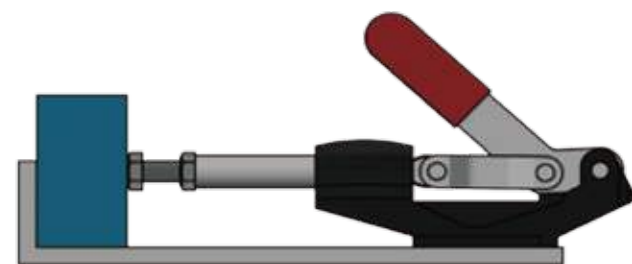
All rights reserved.

### ■Toggle Clamp - How to adjust holding force - Straight Line Toggle Clamp

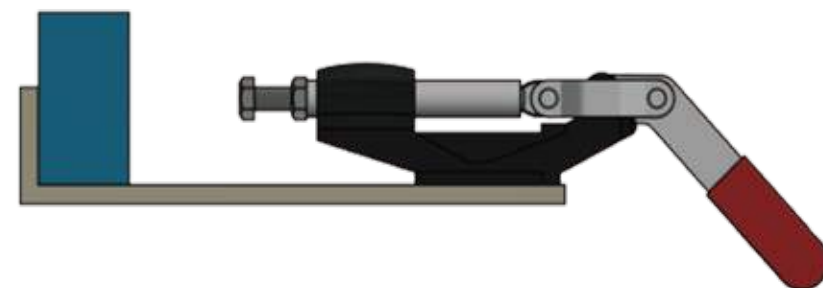
Only adjust the length of the bolt to change the force.  
Refer to the below for adjusting the force.



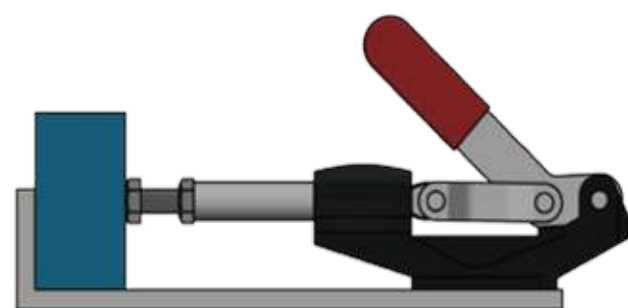
①Fix the main body and install a bolt at the tip of shaft.



②Adjust the bolt length 1.  
Adjust the bolt length to contact to the work surface at clamping.  
*\*Must adjust the bolt length at unclamp.  
Adjusting the bolt length at clamping is the cause of damage of work.*



③Adjust the bolt length 2.  
Adjust the bolt length at unclamp.



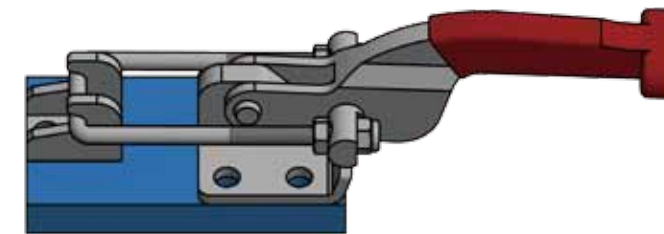
④Adjust the bolt length 3.  
Tighten the nut temporary then clamp.  
*\*Weak force, adjust the bolt length.  
\*Strong force, adjust the bolt length.  
Re-tighten the nut to finish the adjusting.  
\*Recommend lengthening bolt length step by step.*

Using Rubber tip bolt, the force is decreased about 50%  
from using steel or stainless steel hex head bolt.

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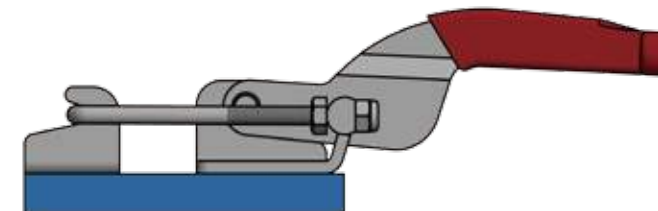
### ■Toggle Clamp - How to Adjust Holding Force - Hook Toggle Clamp

Only adjust the length of the bolt to change the force.  
Refer to the below for adjusting the force.

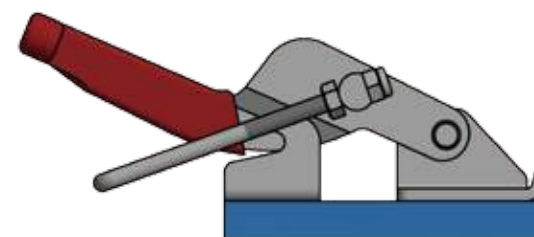


①Fix the main body and bracket.

*There is a possibility of impossible to adjust hook bolt length when fix the toggle clamp and bracket at improper position.*



②Adjust the pulling force.  
Shorten the bolt length, increase the force.  
Adjust the bolt length at unclamp.



③Adjust the pulling force.  
Adjust the bolt length and tighten the nut temporary then try to clamp.  
*\*Weak force, adjust the bolt length.  
\*Strong force, adjust the bolt length.  
Re-tighten the nut to finish the adjusting.*

*\*Recommend lengthening bolt length step by step.*

*\*Must adjust the bolt length at unclamp.*

*Adjusting the bolt length at clamping is the cause of damage of work.*

All rights reserved.



The below explanation is basic of toggle clamp and is not included a condition of operation.  
The values of holding capacity, mentioned in our catalog, are maximum capability.  
The holding capacity in catalog, it is based on operation air pressure at 0.5MPa.

## ■Air Clamp - How to Adjust Holding Force - Hold Down Type

Adjust length and position of the bolt to change the force.

\*The holding force of Air Clamp depends on the bolt adjustment and air pressure.

Air Clamp is operated by air pressure instead of manual operation of Toggle Clamp.  
Bolt adjustment is same as Hold Down Toggle Clamp.

## ■Air Clamp - How to Adjust Holding Force - Hold Down Type

Adjust length of the bolt to change the force.

\*The holding force of Air Clamp depends on the bolt adjustment and air pressure.

Air Clamp is operated by air pressure instead of manual operation of Toggle Clamp.  
Bolt adjustment is same as Straight Line Toggle Clamp.

## Toggle Clamp Instruction

### Read before use

<Check before use>

The holding capacity noted in catalogue is maximum value.

The value cannot be guaranteed as it depends on the condition of use.

Use caution as the holding force will drop due to depending on the holding position,  
bolt adjustment and type of bolt uses.

When selecting and using clamps, allow enough margin for the holding capacity.

<Precaution>

(Mounting Method)

Mount by fixing bolts or by welding securely.

(Test)

Before mount, test the action.

(Extension Handle)

Using with an extension handle or arm will have a negative effect on durability.

(Holding Position)

It does not hold or clamp on the way of actuating.

It only can hold at holding position.

(Toggle and cam mechanism at work)

(Lubrication)

Apply oil to the slides and friction parts on a regular basis.

Chip removing:When using in place where there are chips, remove chips around the  
main unit, especially the rivets and rotating parts by using an airgun  
before clamping & unclamping.

(Inspection)

Inspect regularly for bolts and nuts that secures the body and clamp arm,  
damage and transform.

(Operating environment)

Using in the corrosive or inappropriate environment causes malfunction,  
damage and transform.

(Precaution)

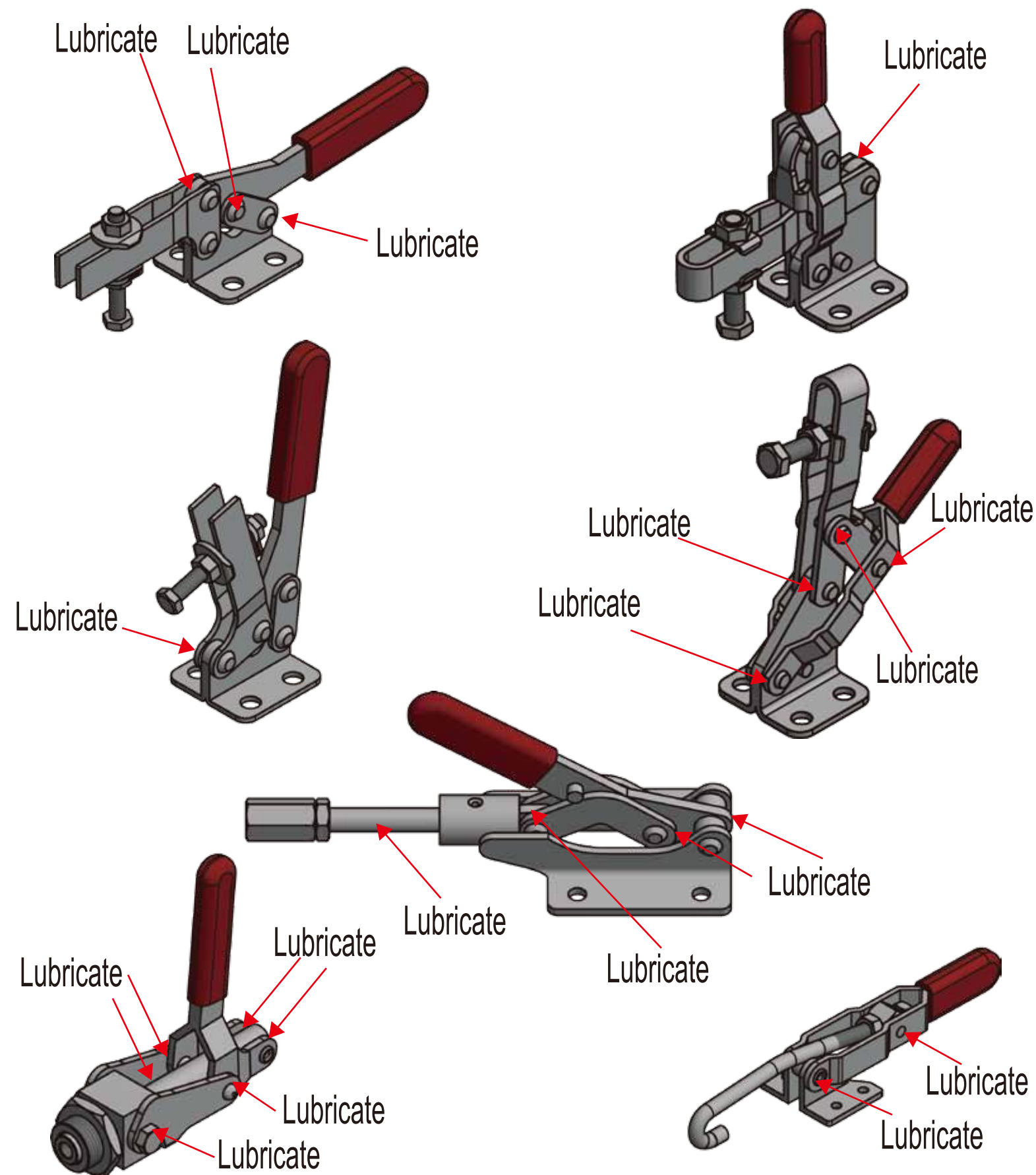
Do not insert your hands and fingers in range of the action and wear  
protective gloves for safety when mounting or operation.

Do not use at exceed the holding capacity.

Refer to the next page to maintenance.

The below explanation is basic of toggle clamp and is not included a condition of operation.

Lubrication: Apply oil to the slides and friction parts on a regular basis.



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## Air Toggle Clamp Instruction

<Check before use>

Air clamp designed to use in air. Do not use in hydraulic.

Operation air pressure range is 0.4 - 0.6MPa.

Be sure a safety for workers during operation.

The holding capacity noted in catalog is maximum values at supply air pressure 0.5MPa.

The value cannot be guaranteed as it depends on the condition of use.

Use caution as the holding force will drop due to depending on the holding position, bolt adjustment, type of bolt uses and supply air pressure.

When selecting and using air clamps, allow enough margin for the holding capacity.

<Precaution>

Mounting Method:

Mount by fixing bolts or by welding securely.

Clean plumbing:

Before connecting a tube to an air clamp, flow air at 0.3MPa min. to clean the inside of tube.

Air supply: Use clean and dry air.

Operating temperature:

5 - 60 deg. C Do not use in higher than 60 deg.C

Operation exceed the temperature range cause of damage.

Operation in high temperature must measure a thermal insulation and shield.

Insufficient measure, it will occur the damage of air cylinder O-ring and air leak.

We do not warrant the failure due to use in high temperature.

\*There is a possibility of oil leaking, due to a condition as above 40 deg.C,

keep supplying air pressure and low operation rate.

Note to use at the place where requested cleanness.

Operating environment:

Do not use in the corrosive environment.

Plumbing: Set up air circuit.

Lubrication:

Apply oil to the slides and friction parts on a regular basis

Operating Test:

Check the operation before and after mounting and connecting tubes.

Holding position:

It does not hold or clamp on the way of actuating. Be sure to finish the actuation.

Chip removing:

When using in place where there are chips, remove chips around the unit, especially the rivets and rotating parts by using an airgun before unclamping.

Precaution:

Do not insert your hands and fingers in range of the action and wear protective gloves for safety when mounting or using.

Inspection:

Inspect regularly for any loose bolts that mounts the air cylinder. Also inspect bolts, nuts that secures the clamp shaft, clamp bolt and body.

<Instruction>

Clamp:

To supply air pressure to the end of air cylinder. The cylinder rod push the clamp arm to downward then clamp.

Switch the air supply and the rod makes the clamp arm move to upward then unclamp.

Adjust speed:

Use a speed controller valve and adjust the speed.

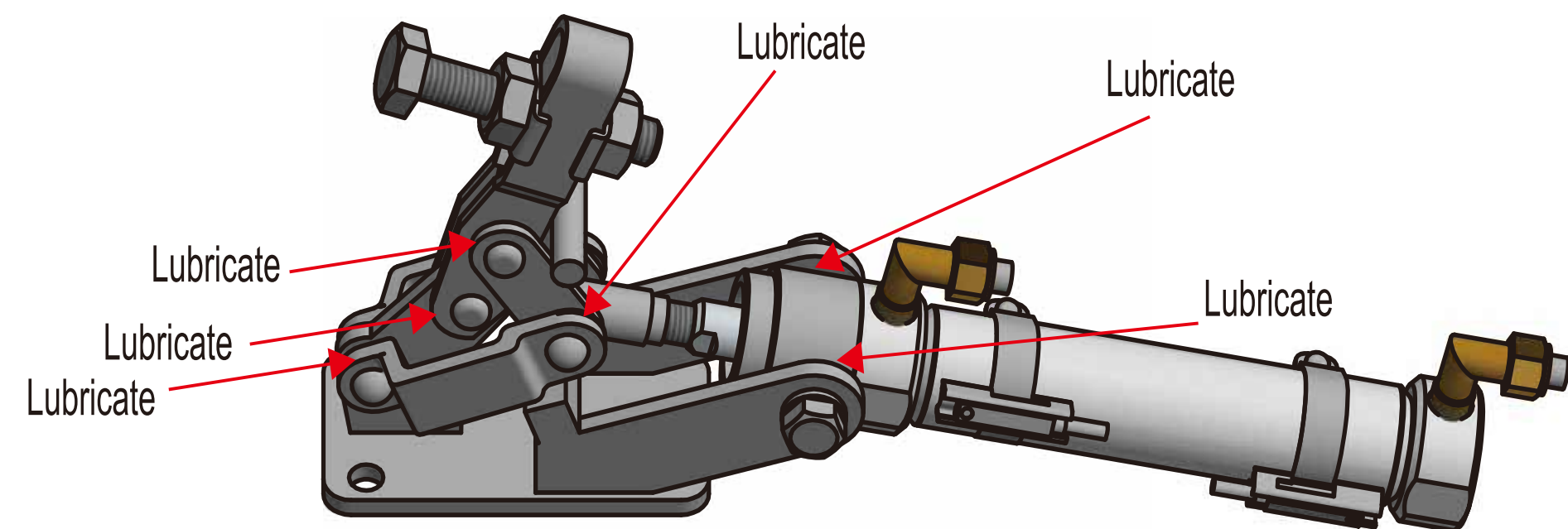
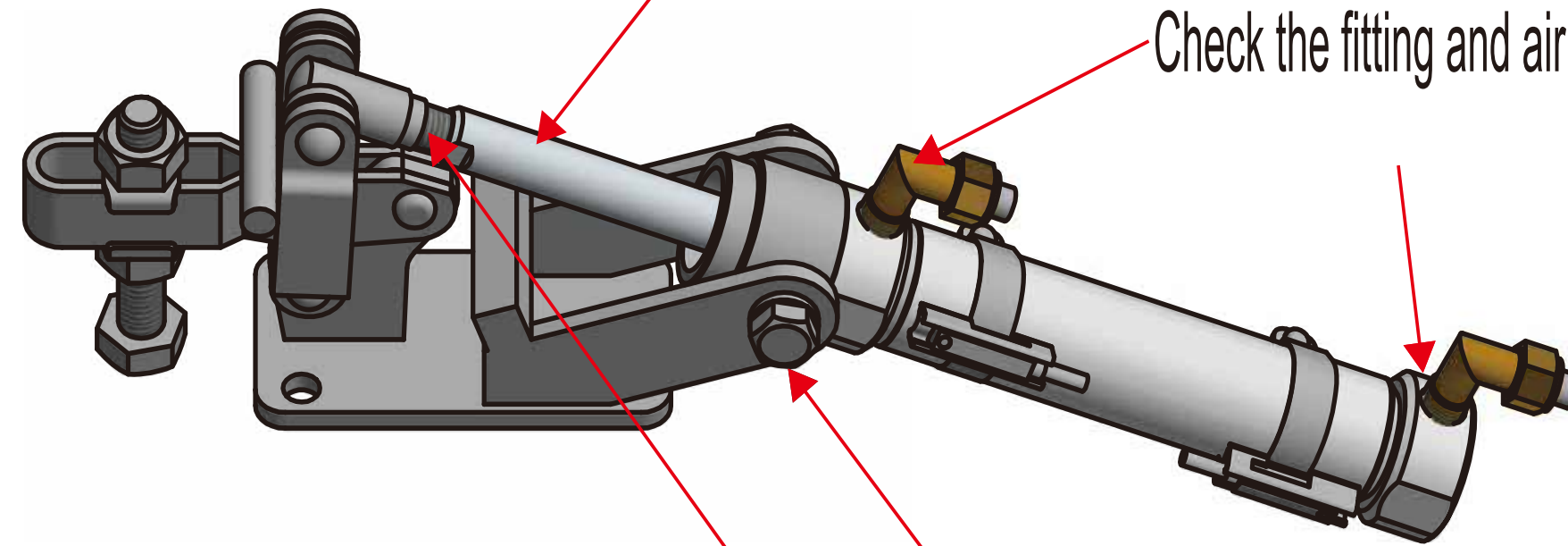
**DANGER !!** Do not insert your hands/fingers in range of the action during operation.

Check damages

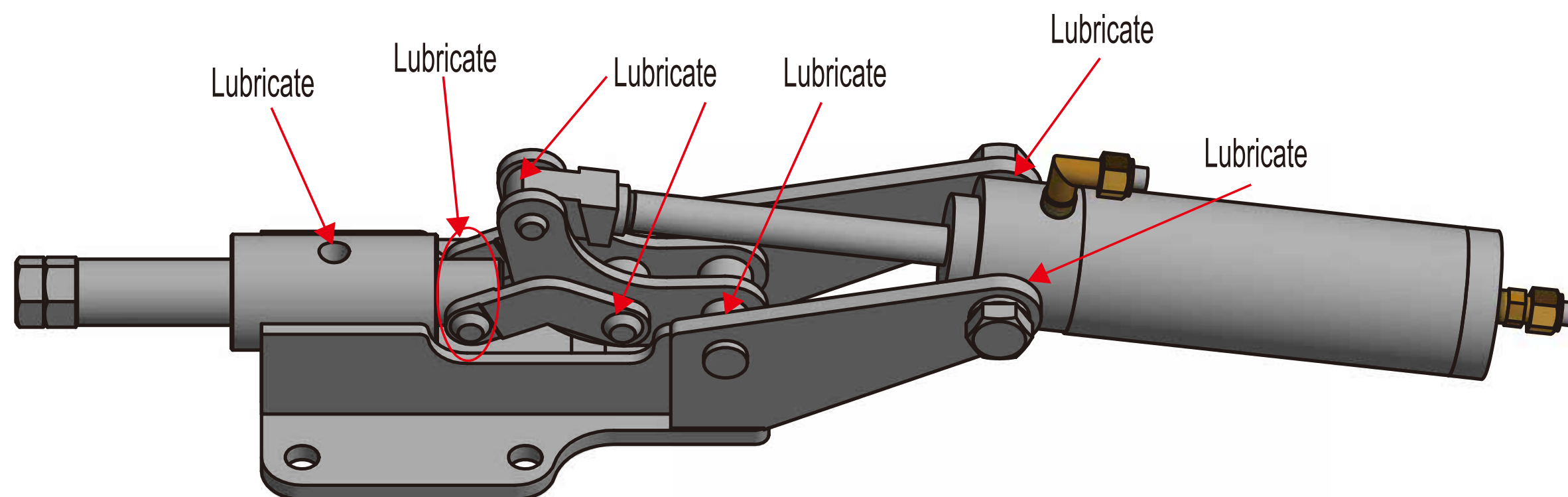
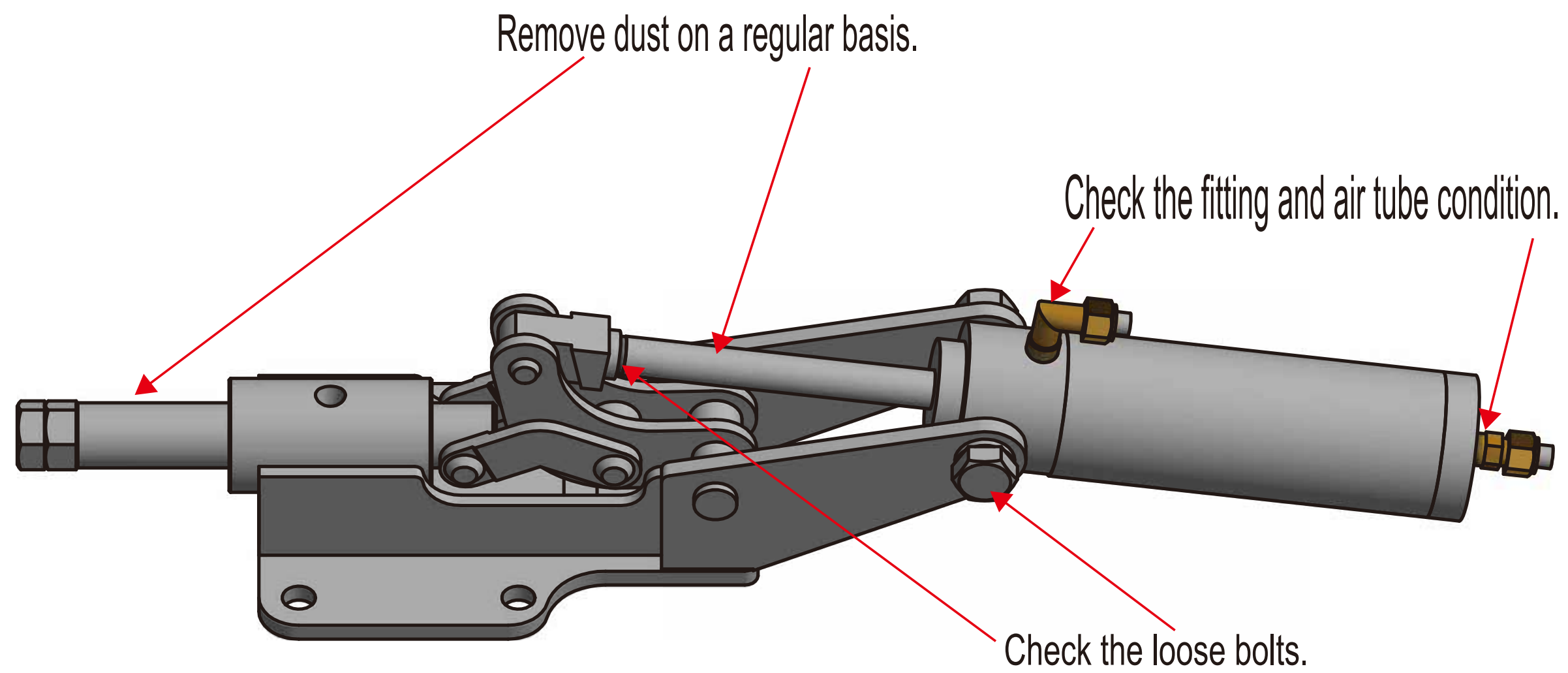
Remove dust on a regular basis.

Check the fitting and air tube condition.

Check the loose bolts.









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<http://www.kakuta-clamp.com>