INSTRUCTION MANUAL

Thank you for choosing our MC Compact Mechanical / Hydraulic Vise, in order to obtain the best performance and durability of the equipment please read this manual thoroughly before operation.

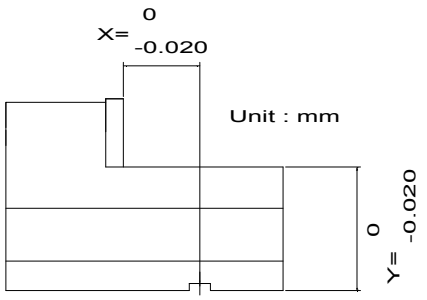
1. Selection and proper use of precision vise:

1-1 Design for V and S type:

1-1-1 For parallel use (V):The height and accuracy will always full controlled within the tolerance whenever you purchase additionally. Therefore number of vises of the same size can be used in parallel for clamping larger workpiece which can not be well clamped by single vise.

1-1-2 For stand-alone use (S):Only be used as single vise because its interchangeability is not controlled.

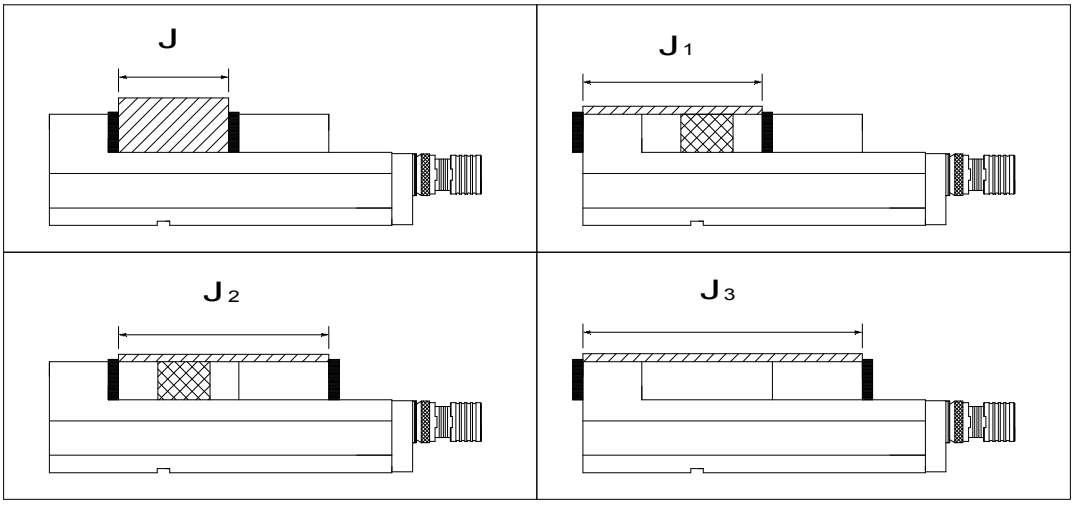
※Remarks：The quality and accuracy of "V" and "S" version are the same, the only difference is the interchangeability that ensures the parallel use of vise in terms of tolerance and the perpendicularity when position the vise by its side as below:



CHV-100V , 130V , 160V , 200V	CHV-100S , 130S , 160S , 200S
X= 0 -0.020 Y= 0 -0.020	X≠ 0 -0.020 Y≠ 0 -0.020
Vise side-lock square within 0.010/100mm	Vise side-lock square without 0.010/100mm

1-2 The 4 ways of clamping for your best choice:

There are 4 clamping positions provided by this series of vises as indicated below, also different jaws are available for special shaped workpiece(refer to 7. adequate workpiece clamping by the vise).



1-3 Vise Selection

In addition to above, the size and clamping force are also the important factors for vise selection:

1-3-1 Jaw width: select proper jaw width for the workpiece. The number designation in the type of vise stands for the jaw width. The available space on the machine should also be checked for maximum opening of the vise.

1-3-2 Clamping force: select proper clamping force for the work, the wider the jaw the higher the maximum clamping force. Refer to catalogue for the maximum clamping force that can be provided by different size of vises.

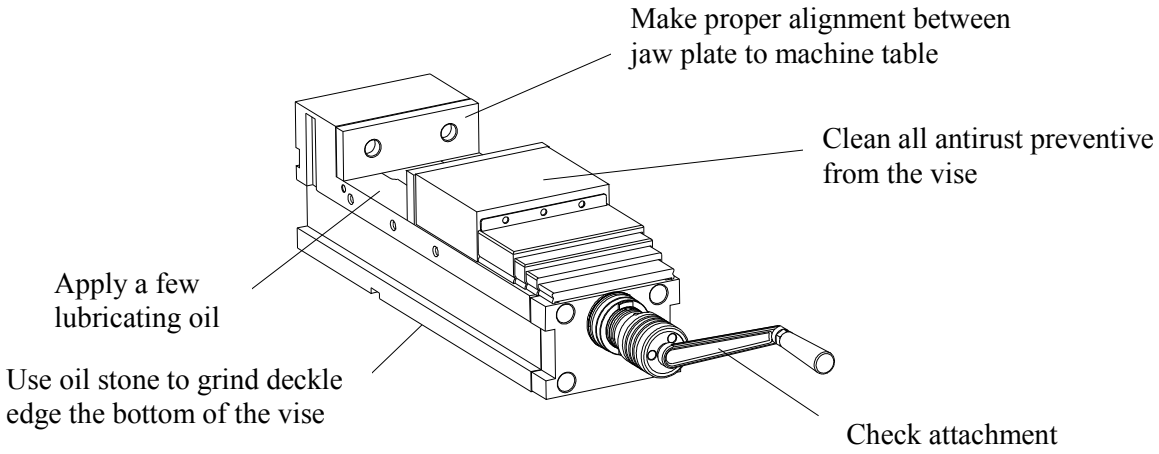
2. Notes before operating the vise：

2-1 Inspect the type, size and attachments of vise when opening the package of vise.

2-2 Thoroughly clean all antirust preventive from the vise and use oil stone to grind deckle edge the bottom of the vise before position it on the worktable.

2-2 Apply few lubricant onto the slide side of vise for protecting the slide side.

2-3 Adjust proper alignment between the fixed jaw of vise with the machine table before fixing the vise in position. Then begin to process after inspecting the accuracy of vise.

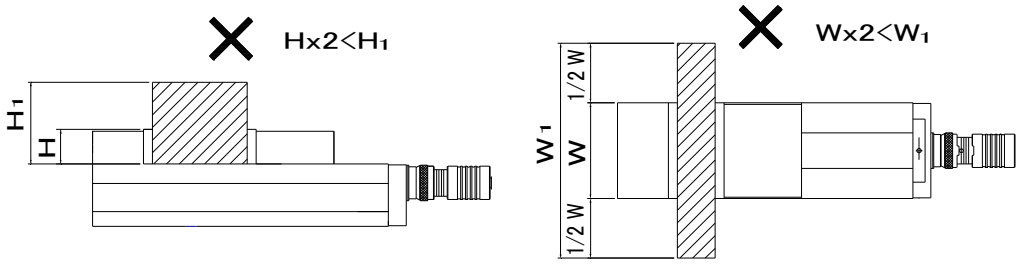


2-4 Clean down all iron chippings and oil residue after using the vise, then apply antirust preventive or lubricant to keep the vise in good condition.

2-5 Please operate and maintain the vise according to the instruction in this manual. Any damage or malfunction caused by mis-operation or insufficient maintenance will void the warranty.

2-6 The hydraulic components must be used in oil pressure enough condition, if clamping force is not enough or failure, please try to refill with oil (lubricating oil ex. R68) first. (please refer to 6-1 how to refill with oil). The warranty will be void and no responsibility will be taken by the manufacturer for any damage (vise, workpiece, tooling, machine or personal) resulted from such strained application of the vise.

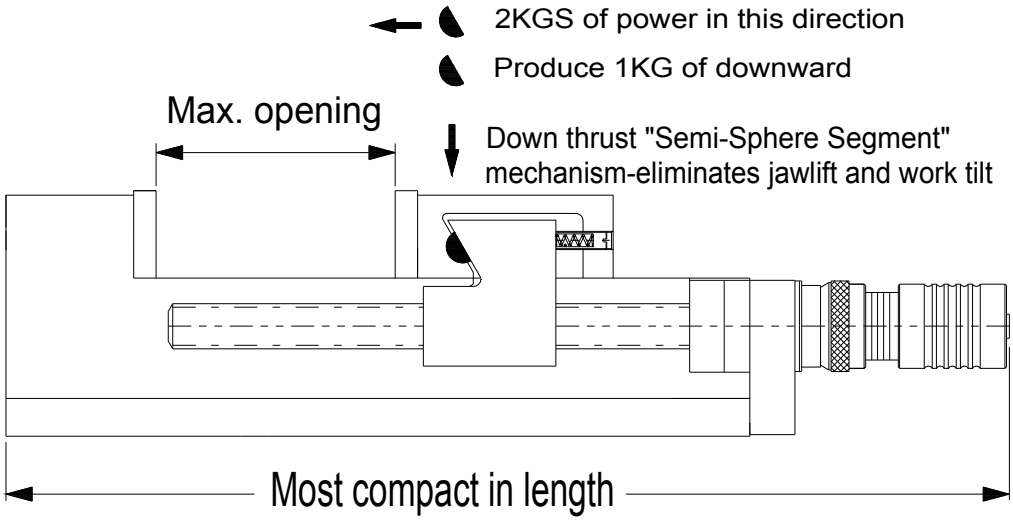
2-7 Cautioning for operating the vise under abnormal clamping conditions. (such as odd shape of workpiece or uneven workpiece surface that can not be clamped sufficiently or that the workpiece overhangs the same length as the vise jaw, or that the workpiece height is more than 2 times the height of vise jaw). Above conditions have overstepped in regular clamping situation, please don't proceed heavy cutting and operate the vise carefully. The warranty will be void and no responsibility will be taken by the manufacturer for any damage (vise, workpiece, tooling, machine or personal) resulted from such strained application of the vise.



3. Feature:

3-1 Compact mechanical / hydraulic vise most suitable for vertical machine center, milling machine for high precision and heavy cutting process.

3-2 "Semi-sphere segment" eliminates jaw lifting and work-piece tilting.



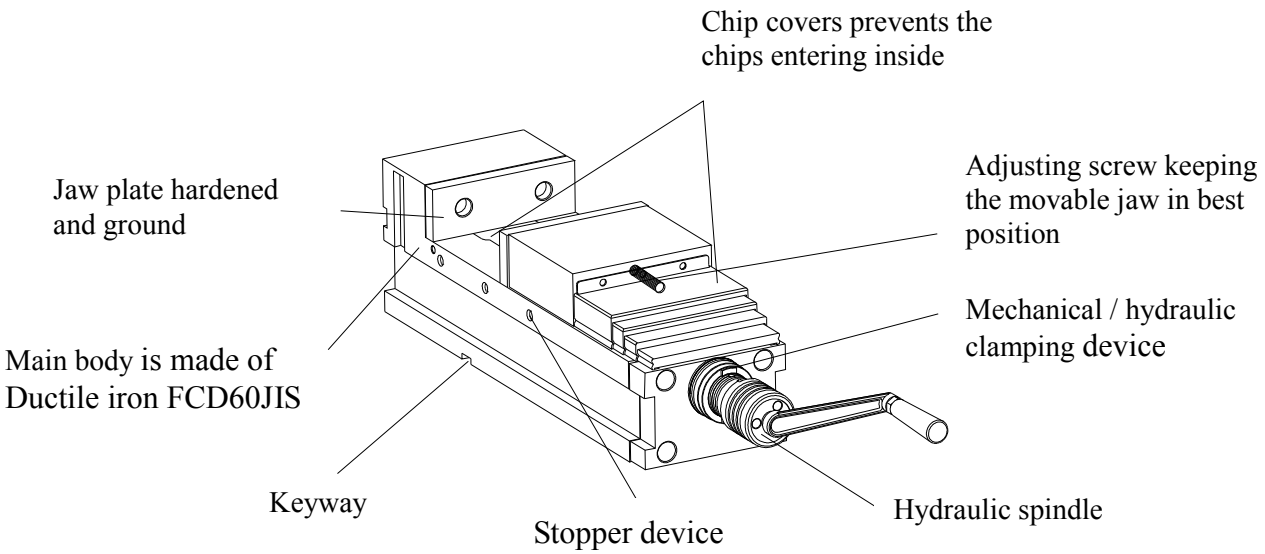
3-3 Rigid material-The vise body is made of Ductile iron FCD60JIS (Equal to GGG60) with 60kgs/mm^2 or 80,000psi tensile strength.

3-4 The vise bed flame hardened to HRC 45° and up takes up wear and maintain accuracy for long.

3-5 Adjusting screw for keeping the movable jaw in best position.

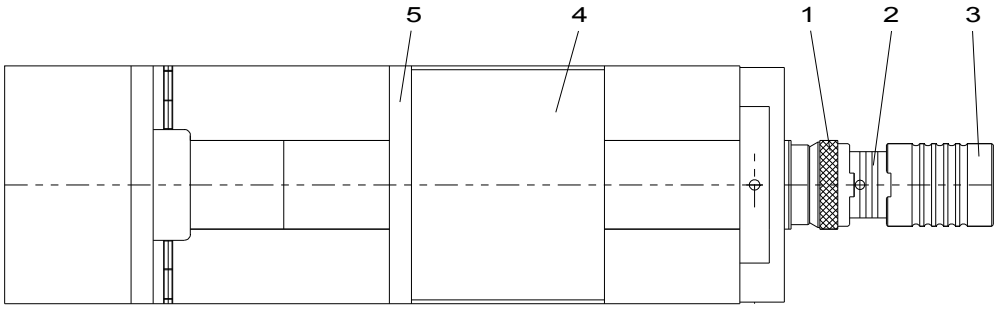
3-6 Mechanical/hydraulic spindle without original clutch mechanism.

3-7 Chip covers adopt on each vise for preventing chips falling into lead screw and inside of vise.

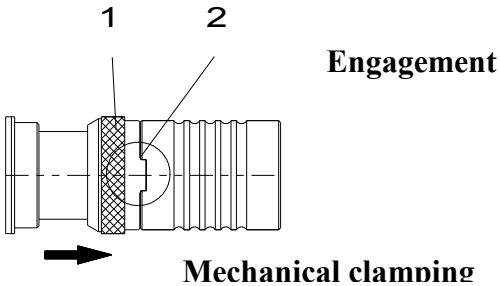


4 How to operate the vise：

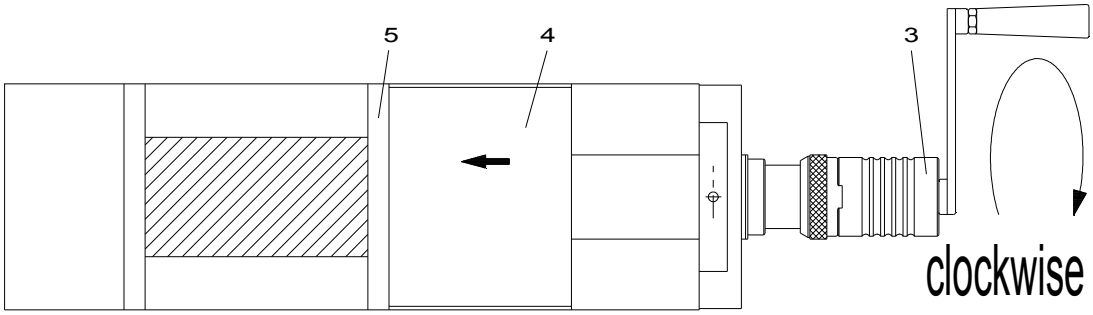
4-1 Mechanical clamping



4-1-1 Pull Collar① backward to engage with the notch of Clutch holder②.

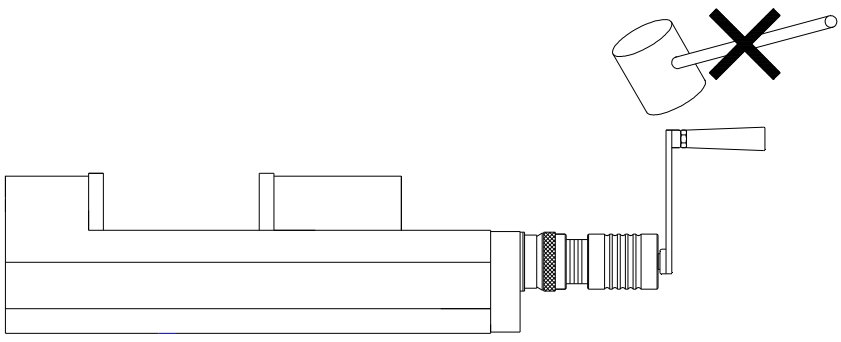


4-1-2 Put handle into Collar③. And it can drive Mavable④ to move forward while turning handle clockwise.

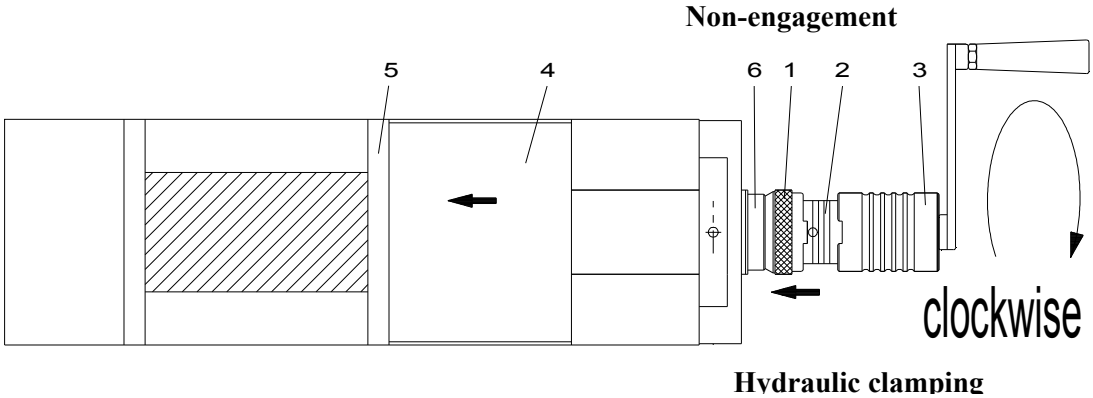


4-1-3 While jaw plate on movable⑤ touch the workpiece , keep on turning the handle clockwise, the workpiece can be clamped. How much clamping force be appeared depend on how much strength you turn. (Mechanical clamping performance only suitable for lightly cutting process.)

※ Remarks：Don't hammer the handle in order to increase clamping force when operate the vise, avoid damaging hydraulic components.



4-2 Clamping with Hydraulic power



Hydraulic clamping

4-2-1 Pull Collar① forward, then 4 scales showed of notch onto Clutch holder② can be appeared. Next, put the handle into Collar③,and it can drive Mavable④ to move forward while turning handle clockwise.

4-2-2 While jaw plate⑤ touch the workpiece, movable④ can stop moving forward, at the moment, knock the handle softly clockwise, the clutch of internal Main Cylinder⑥ will be apart and get into hydraulic clamping condition.

4-2-3 Continue to turn the handle by clockwise, simultaneously, hydraulic clamping force will increase progressively as Collar③ keep moving forward.

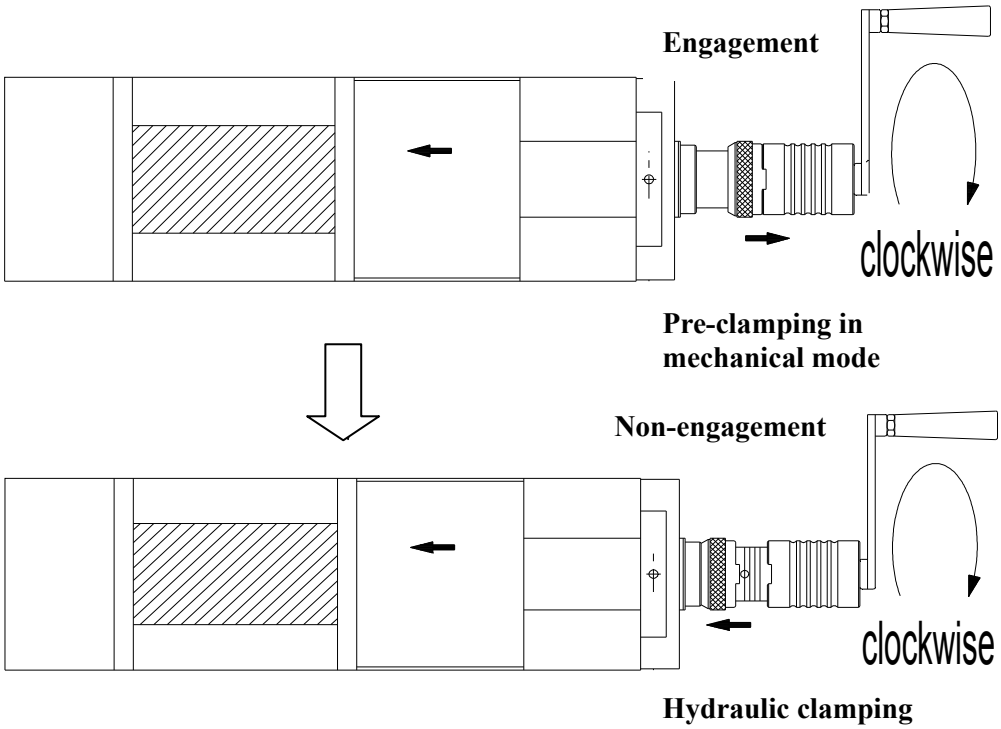
4-2-4 The 4 scales showed of notch onto Clutch holder② will indicate notch position according to the move forward of Collar③. The hydraulic clamping force indicated at each strip of notch onto Clutch holder② is approximately 1500kgs, the rest may be deduced by analogy.

4-3 Hydraulic / mechanical clamping

(Recommended for augmenting clamping pressure over maximum hydraulic force.)

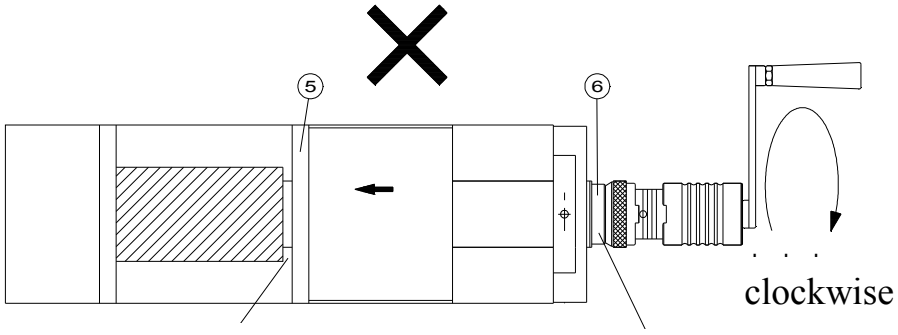
4-3-1 The normal hydraulic clamping pressure can be increased to the limit pressure(see the limit pressure value on catalogue) by pre-clamping in mechanical mode as stated above. After mechanical pre-clamping, put the Collar(1) notch to engagement position, then apart the Collar(1) notch to non-engagement position from Collar(3). This mode can increase hydraulic clamping pressure greatly, however, the power increased by the amount of mechanical pre-clamping pressure applied but should always not exceed the limit pressure. (Don't gauge the hydraulic clamping pressure depend on the 4scales showed of notch onto Clutch holder(2) while operating this mode.)

4-3-2 The clamping function can use for heavy cutting process. It can result utmost clamping force, but don't operate the function frequently, avoid reducing the life of hydraulic components of the vise.



4-4 Notes when using hydraulic clamping system:

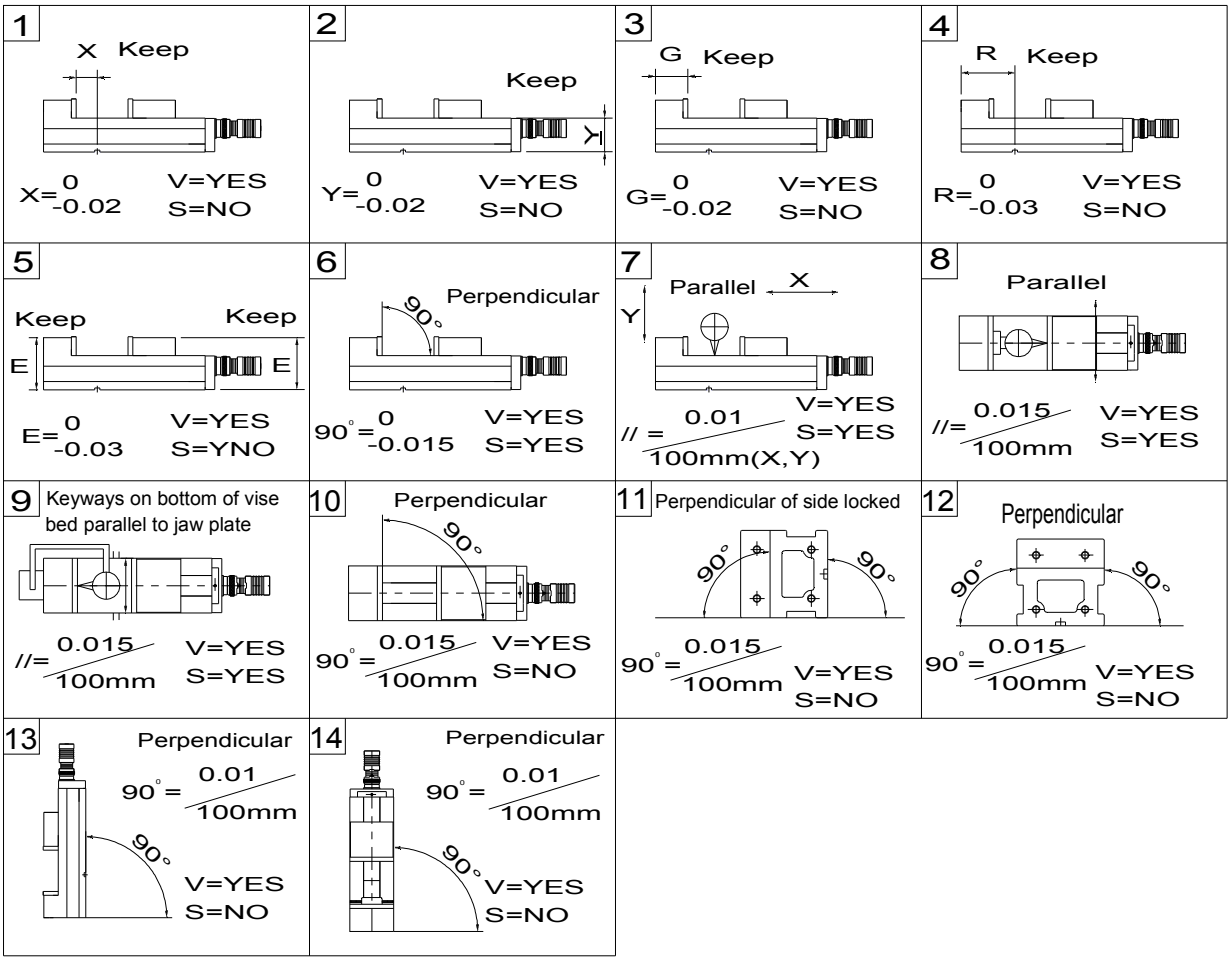
4-4-1 It is important to check Jaw plates(5) had already clamp tight workpiece before process hydraulic clamping function. If the clutch of internal Cylinder Body(6) be apart after Jaw plates(5) don't clamp workpiece yet, the hydraulic clamping performance is unable to result as continue turning handle clockwise.



Jaw plates(5) don't clamp tight workpiece yet. Hydraulic clamping pressure performance already.

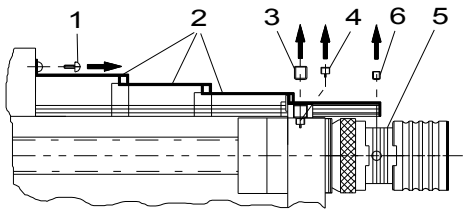
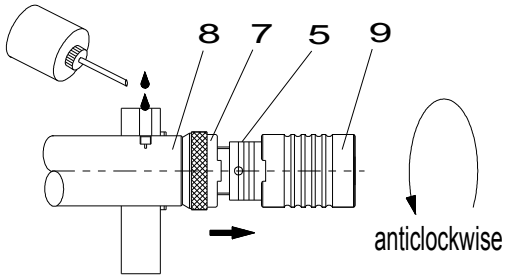
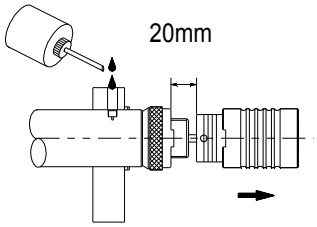
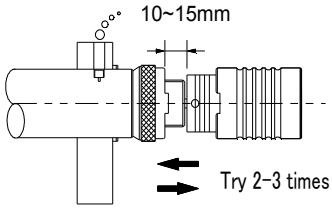
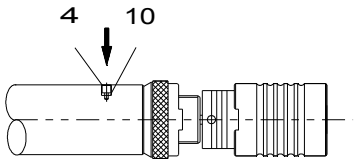
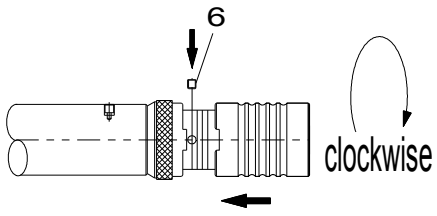
4-4-2 At first, must confirm Jaw Plates⑤ had already clamped the workpiece, then make clutch set apart from internal of Cylinder Body ⑥. If the hydraulic clamping function can't clamp the workpiece tightly, please refill with oil(refer to 6.1 How to refill with oil) in advance, and don't strained application of the vise, avoid resulting any dangers while working, ex. clamping force too lack to workpiece be dropped.

5 Accuracy：



6 Troubleshooting:

6-1 How to refill with oil when the pressure decreased

6-1-1 Take apart Chip cover set(2) after loosen Round head cap screw(1)x2pcs. Use 3m/m Hex. Wrench loosen Set Screw(3)x1pc. Use 4m/m Hex. Wrench loosen Oil plug(4)x1pc. 6-1-2 Loosen Set Screw(6)x2pcs.	
6-1-3 Left hand holding Collar(7)，Right hand turn handle by anti-clockwise. 6-1-4 Fill oil from plug hole on top of Cylinder Body(8). in the meantime, right hand turning Collar(9) by anti-clockwise until Cylinder Body(8) and Clutch holder(5) loosen to without screw.	
6-1-5 Pull Clutch holder(5) backward and continuted fill with oil. (max. 20mm backward.)	
6-1-6 Push Collar(9) forward to clear the air inside out leisurely. Repeat the same step as above till the air is completely out and full oil inside cylinder (try 2-3 times). At last time, retain the space about 10~15mm between Cylinder Body(8) and Clutch holder(5).	
6-1-7 Fix Oil plug(4).	
6-1-8 Push collar(9) forward and clockwise turning in position and fix Set Screw(6)x2pcs. Check convex of Collar(11) engaged with notch of Collar(9).	

6-2 Testing clamping force after refilled with oil

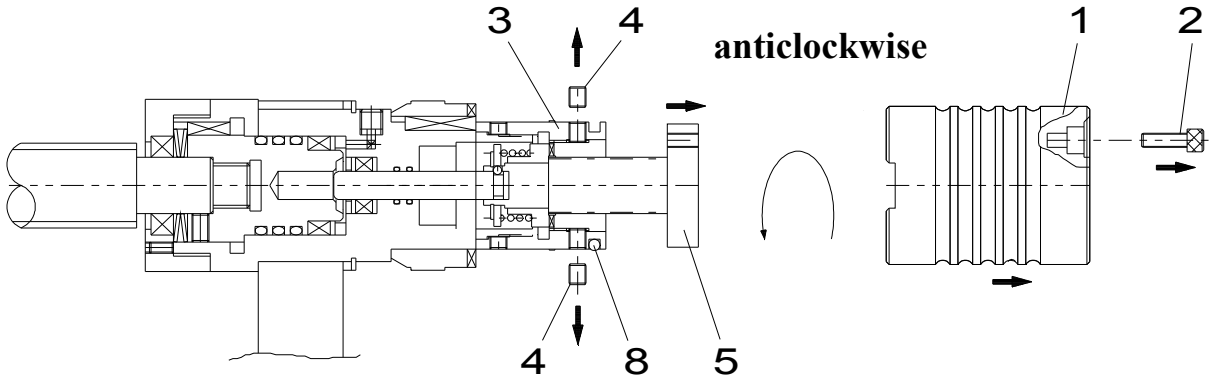
6-2-1 Too much oil refilled: testing clamping by turning handle clockwise, if turning was too tight, loosen Oil plug(4) little again. Until oil leak out a little , then fix Oil plug(4) quickly, and test clamping whether smooth again.

6-2-2 Too little oil refilled: testing clamping by turning handle clockwise, if turning was too softly, please repeat the same step as above till the clamp is completely smooth.

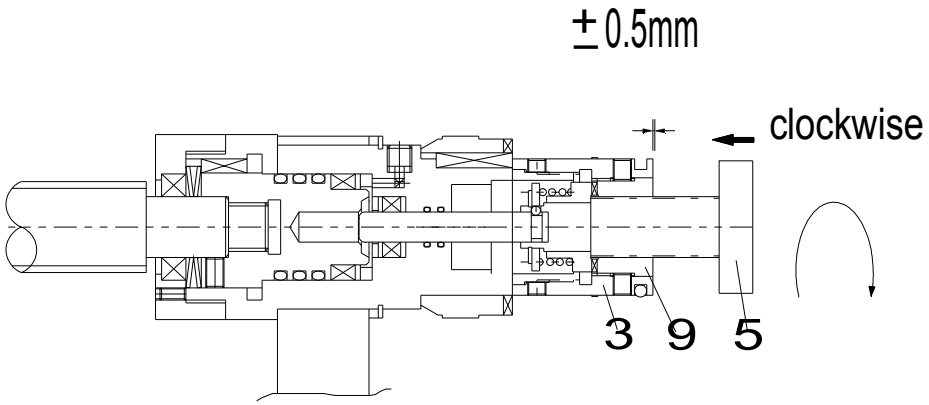
6-3 How to replace the clutch(if clutch damaged and operated irregular)

6-3-1 Take out Screw②x3 in turn back off the Collar①,and take out Collar①,Steel ball and roller⑧ over the Clutch holder③.

6-3-2 Take apart Set screw④x2 in turn over the Clutch holder③,then rotate the Clutch ⑤ anticlockwise and let Minor screw rod separately,then take out the Clutch set⑤.

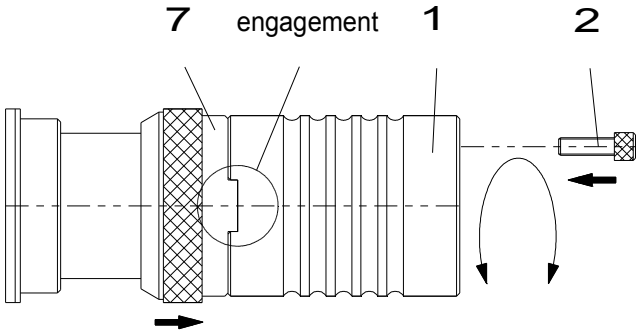


6-3-3 Take new Clutch set⑤ and rotate clockwise into Clutch holder③ until the Clutch holder③ and Clutch⑨ uniform.



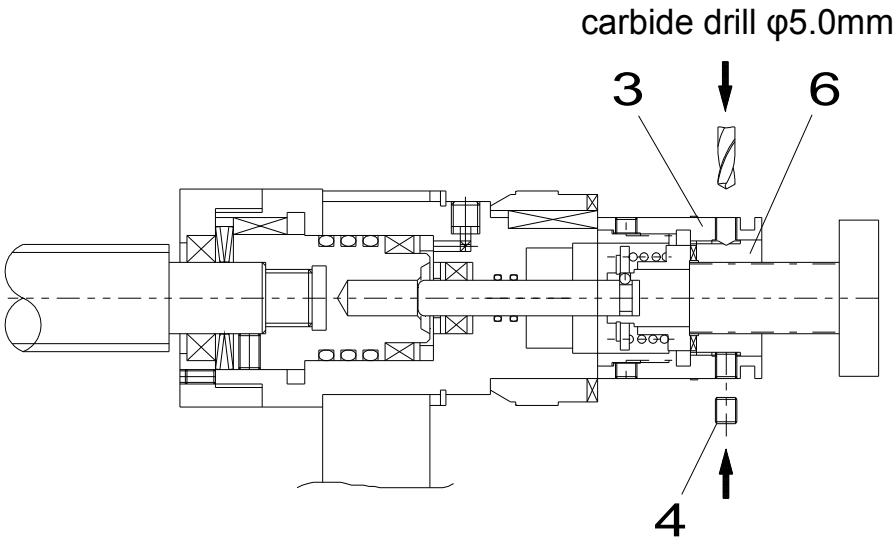
6-3-4 Put Collar① into Clutch⑤, and lock Screw②x3pcs lightly, don't lock tight.

6-3-5 Turn the indentation of Collar① and the protruding of Collar⑦ to be tie in, then take out the Screw ②over the Collar①, and take out the Collar(①.



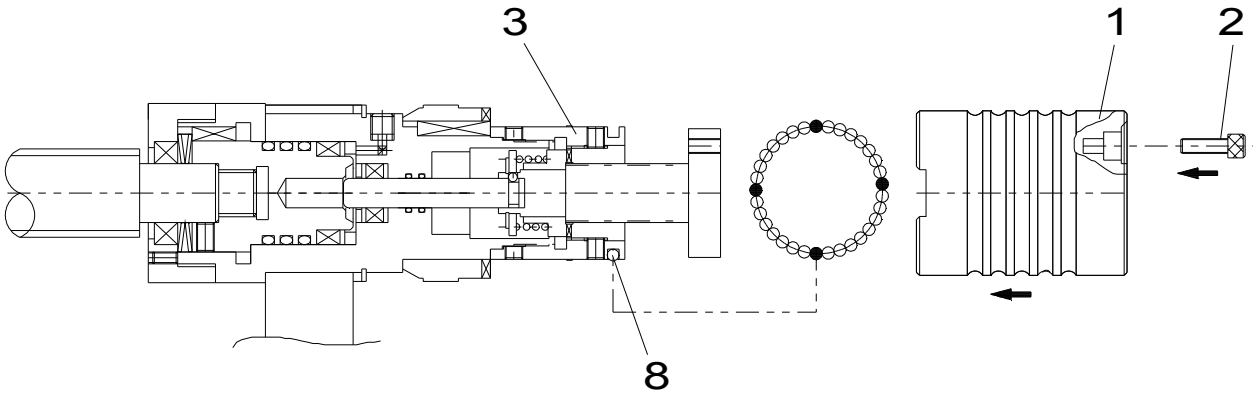
6-3-6 Fix one side Set screw④M6x6L over the Clutch holder③.

6-3-7 Drill a hole (1.0mm-2.0mm deep) into another side over the clutch holder by auger with carbide drill dia. 5mm, and drill indentation in the minor screw rod⑥, also clean chip, lock tight by Set screw④, then take out another screw that have not been drilled, drill indentation on it by auger, and clean chip, then lock tight by Set screw④.



6-3-8 Smear oil on groove of Clutch holder③, and put 4mm Steel ball and Roller⑧ in turn (7pcs Steel ball+1pcs Roller).

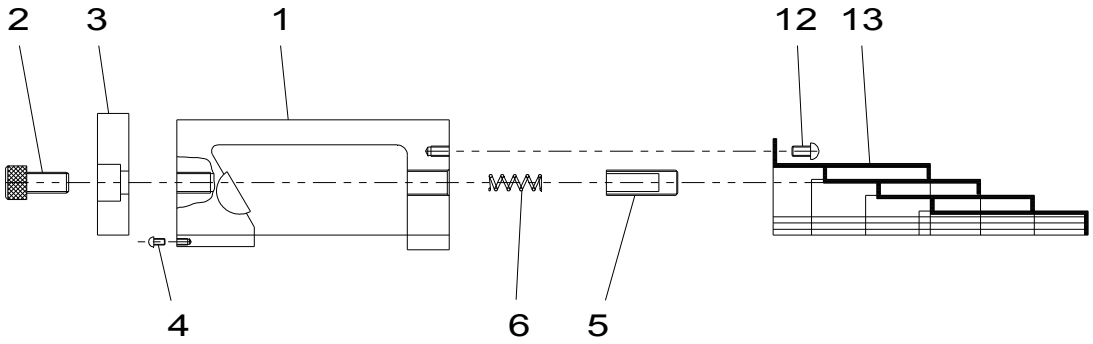
6-3-9 Put Collar①, and lock tight the Screw② in turn.



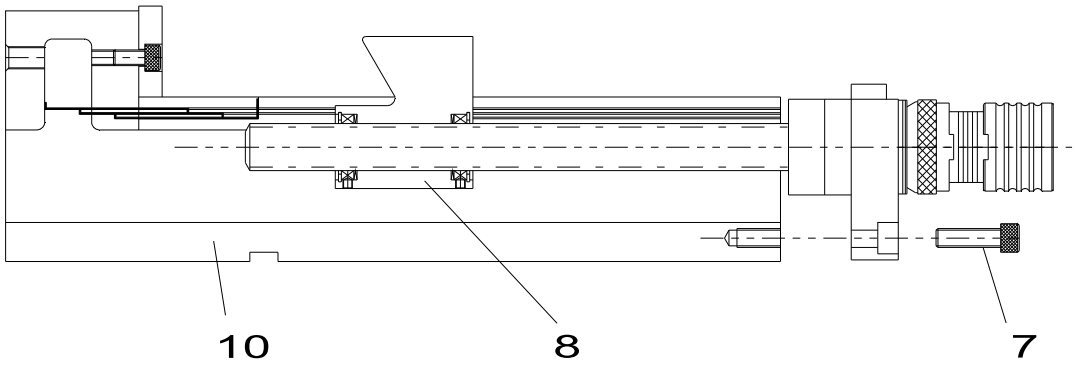
6-3-10 Try to oil again according to instruction 6-1 (how to refill with oil when the pressure was decreased) .

6-4 Replace Main cylinder set(include Main screw support and Main screw).

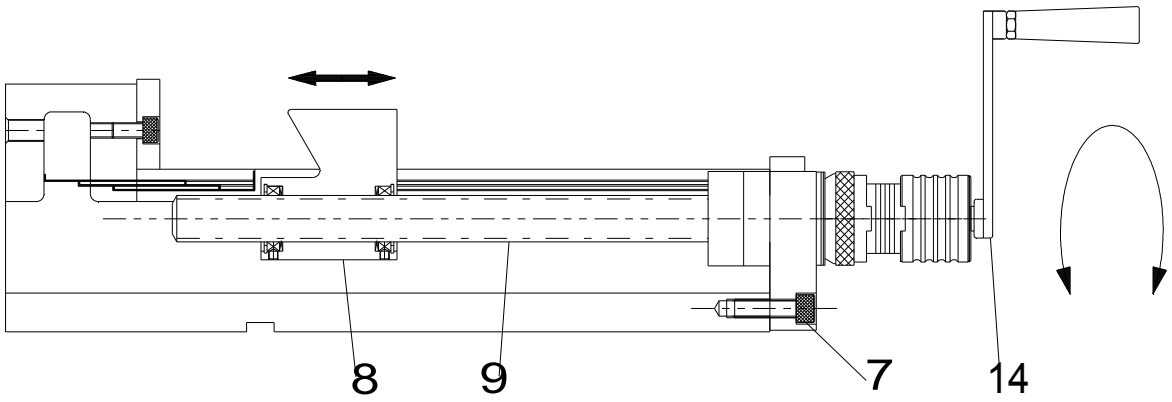
6-4-1 First, take apart Movable ①and Round socket cap screw⑫x2pcs. Next,take apart Chip cover (back1 to back 4)⑬. And take apart Screw②x2pcs,also take out Jaws③. Then take apart Round socket cap screw④x2pcs and Adjusting screw⑤ and Spring⑥,so that the completed Movable ③ can be take out.



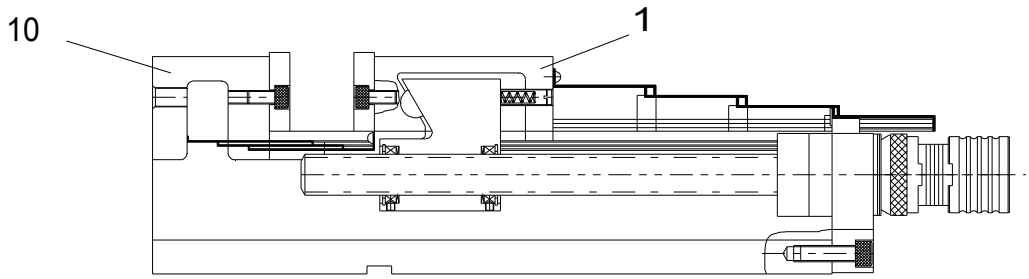
6-4-2 Take apart the Screw⑦x4pcs,and take out the old Main cylinder set,then rotate anticlockwise the Lock down body ⑧out,and take it to put into new Main cylinder set to fabricate new one into Main body⑩.



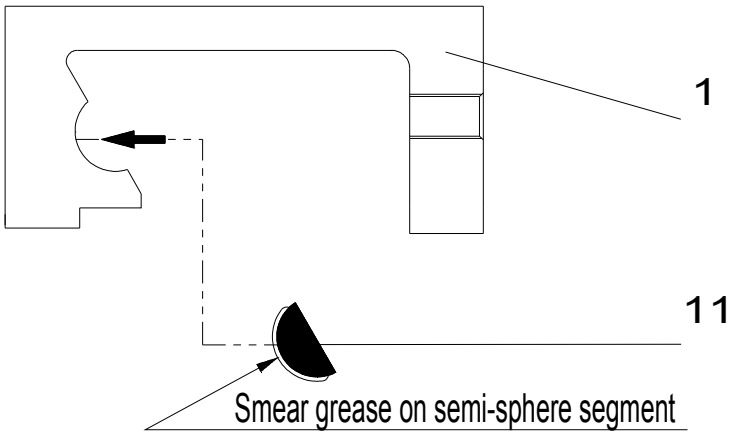
6-4-3 Lock Screw⑦x4pcs light(don't lock tight),and try to rotate Main screw⑭ by handle,you must make Lock down body⑧ and Main screw⑨ slip smooth altogether,then lock tight the Screw⑦x4pcs.



6-4-4 Fabricate Movable① into vise bed of Main body⑩ ,and according to instruction 6-4-1,do again by opposite steps,so that you will succeed in replace Main cylinder set.



※ Note: If you fabricate the Movable①,you must smear oil on Semi-sphere segment⑪ and let Semi-sphere segment stick together with Movable① to protect Semi-sphere segment⑪ from fall.



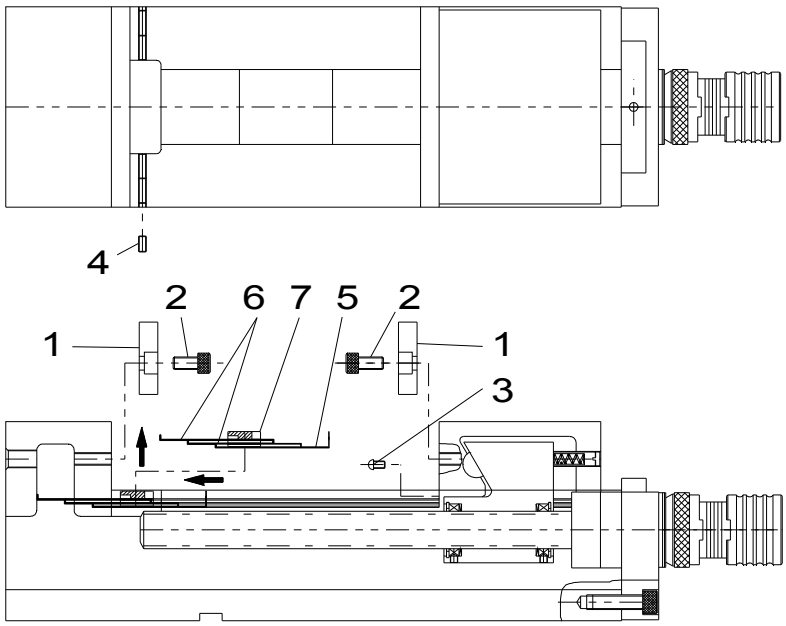
6-5 Replace Chip Cover(Forward):

6-5-1 First, you must take apart screw ② x4pcs in both sides of Jaw①,and take out the Jaw ①.

6-5-2 Take apart Round socket cap screw ③x2pcs in the chip cover.

6-5-3 Take apart both sides of Set screw ④x2pcs.

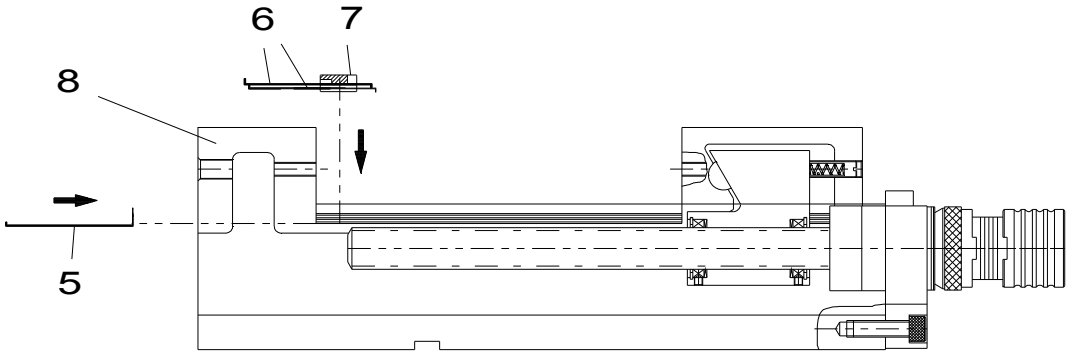
6-5-4 Put Chip Cover ⑤ forward(to vise immovable),also take out Chip Cover⑤x1pcs, ⑥x2pcs and Chip Cover guide⑦.



6-5-5 First, take Chip cover⑤x1pcs to put into bottom groove of Main body,and input Chip cover⑥x2pcs in turn to groove of Chip cover guide⑦.

※ Note: Input Chip cover⑥x2pcs to Chip cover guide⑦ outside the main body in advance,don't make a mistake in direction.

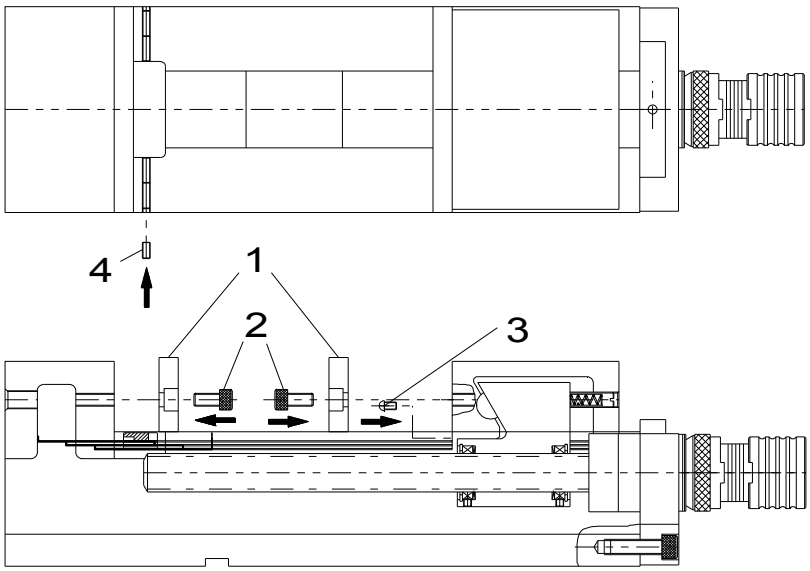
6-5-6 Take Chip cover⑤ and Chip cover guide⑦ put into Main body⑧,and pull Chip cover⑤ along the groove of Main body,then Chip cover ⑤x2pcs will be put into groove of Main body⑧.



6-5-7 Lock Set screw④x2pcs,and fasten Chip cover guide⑦.

6-5-8 Fix Round socket cap screw③x2pcs.

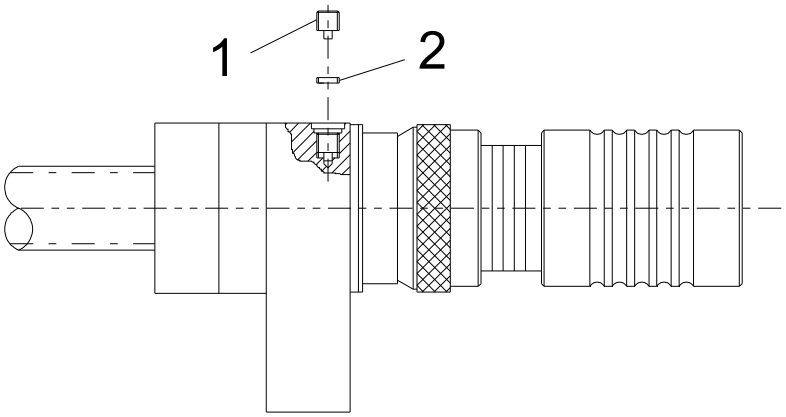
6-5-9 Put Jaw plates①,and lock Screw②x4pcs,above mentioned, it's completed to fabricate forward chip cover.



6-6 Change Oil plug seal:

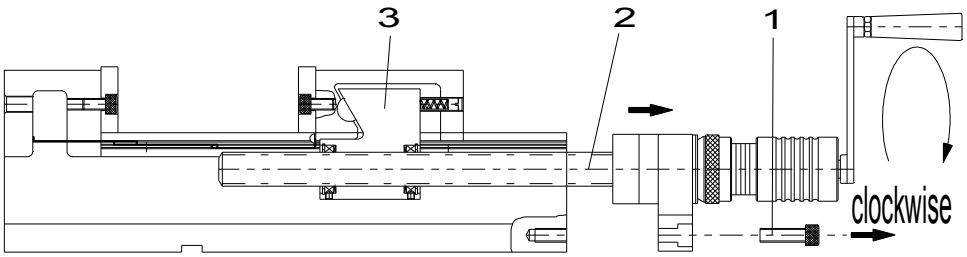
6-6-1 Take apart Oil plug① by handle,and take out Oil plug seal②.

6-6-2 Input new oil plug seal②,and according to instruction 6-1(How to fill with oil) to oil again.



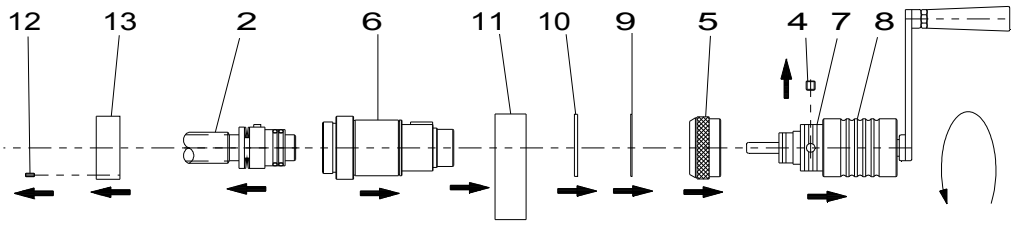
6-7 Replace oil seal :

6-7-1 First, take apart Socket cap screw(1)x4pcs,and rotate anticlockwise by handle,rotate out Main screw (2)from Lock down body(3),then take out Main cylinder set.



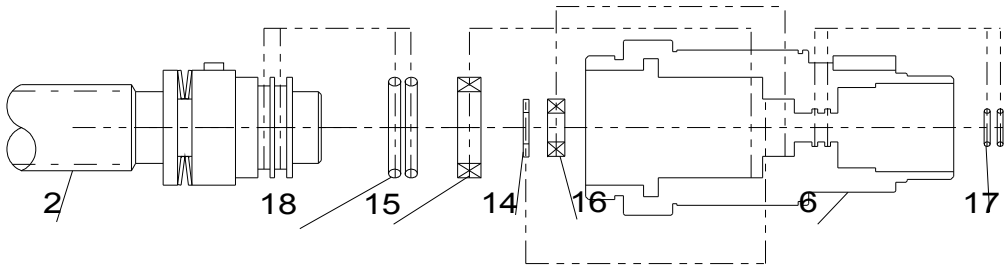
6-7-2 Take apart Set screw(4)x2pcs,then hold collar(5) by left hand,knock at handle by right hand to make Main cylinder(6) and Clutch holder(7) separate,and take out Collar set(8) in anticlockwise direction,then take out Collar(5).

6-7-3 Take out Snap ring(9) and Snap ring washer(10),and take apart Main screw support(11) and Set screw(12)x1pcs,and take apart seal collar (13) by anticlockwise,then take out Main screw(2) to separate from Main cylinder(6).



anticlockwise

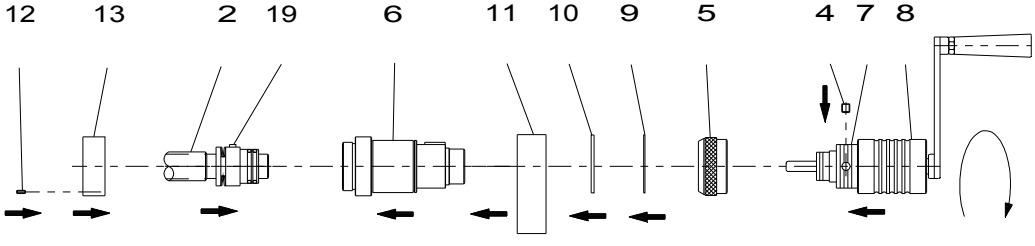
6-7-4 Take apart Packing ring(14),then replace oil seal(15)35x25x08x1pcs,(16)20x10x06x1pcs,O ring(17) P-10x2pcs,(18)P-28x2pcs and input Packing ring(14) tightly.



6-7-5 Fabricate Main screw(2) into Main cylinder(6),and lock Seal collar (13)tight by anticlockwise,and fasten Set screw(12).

6-7-6 According to instruction 6-6-1.2.3 to fabricate by opposite process.

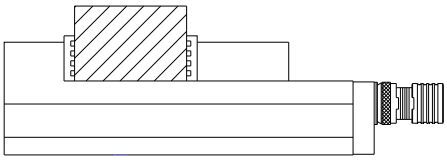
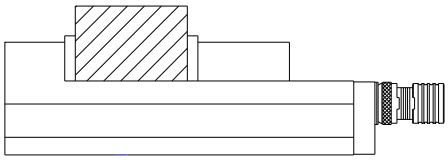
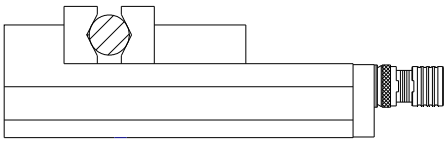
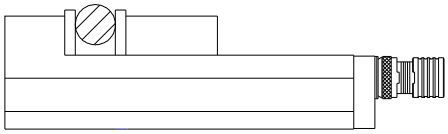
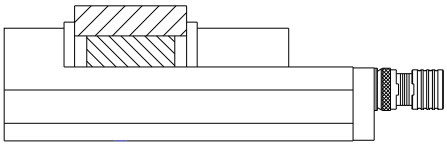
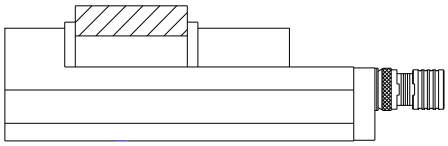
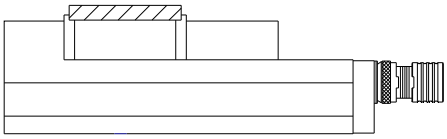
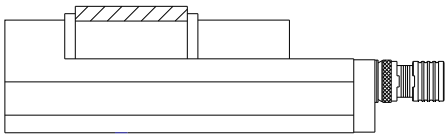
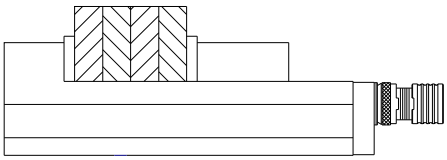
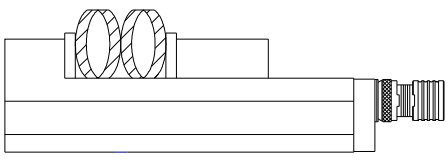
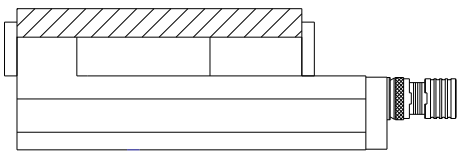
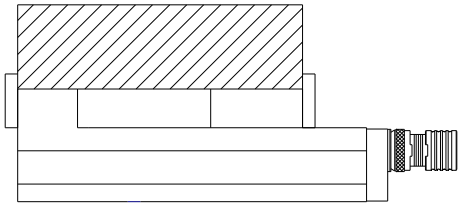
6-7-7 Refer to instruction 6-1(How to refill with oil) to oil again.



clockwise

7. Adequate workpiece clamping by the vise

The figures on the below left show the adequate application of the vise for workpiece clamping, while the figures on the below right show the opposite. Please note the principle of using vise, the clamping force must be larger than cutting force. If clamping force on the workpiece is less than the cutting force applied on it, unexpected result or even damage may occur. Adjust by yourself for optimal cutting performance about the cutting conditions such as depth of cut, feed rate, etc.

Adequate application	Inadequate application	Remark
		**Rough surface workpiece** Use type RJ jaws for casting or rough surface workpiece.
		**Round bar workpiece** Use type CJ jaws for round bar workpiece.
		**Surface to be machined is lower than the jaw top** A riser block must be placed under the workpiece as support.
		**Thin plate workpiece** Use type SJ jaws for thin plate workpiece.
		**Flexible workpiece** Flexible workpiece will deform if clamped by vise.
		**Oversized workpiece** Heavy cutting must not be applied on overhang or over-height workpiece.

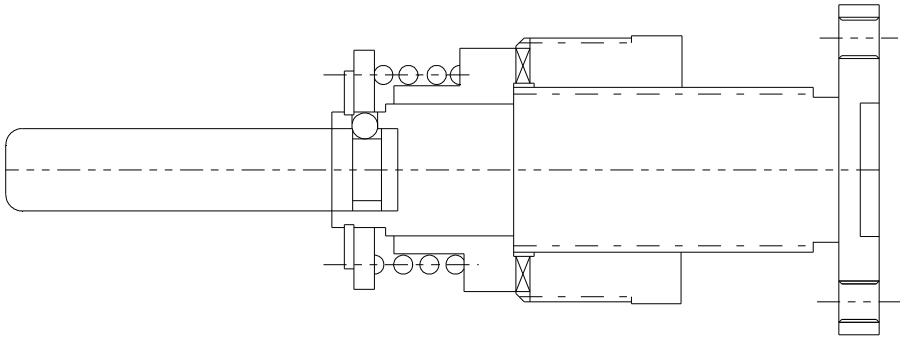
8. Part list:

Following part list is basis for CHV-160V,as long as you explain the model and specification of vise,no matter CHV-100、130、160、200 (S/V),you can refer to following part list to indicate what you need.

If you want to order spare parts, please refer to assembly drawing no. indicated below, and quote computer no. , part no. ,quantity requirement.

8-1 Part list for clutch set:

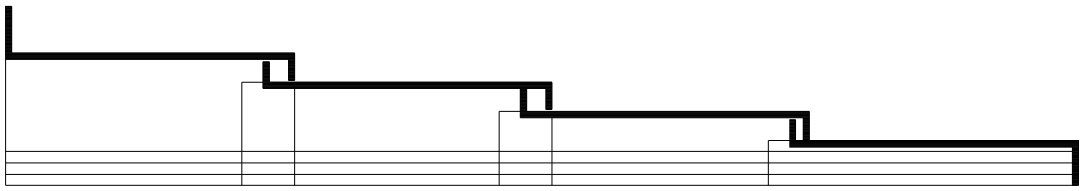
If the clutch set inside main cylinder damaged,the clutch function would be disappeared, you must replace clutch set according to following figure.



Computer No.	Part No.	Specification	Quantity	Remark
07990160	CHV-160-S	Clutch set	One set for one vise	Same the others vise

※ Please refer to instruction 6-3 (How to replace clutch set).

8-2 Part list for expansion chip cover(back1 to back 4):



Computer No.	Part No.	Specification	Quantity	Remark
07960100	C-100x065	CHV-100 chip cover	1set / 3pcs	
07962130	C-130x078	CHV-130 chip cover	1set / 3pcs	
07966160	C-160x075	CHV-160 chip cover	1set / 4pcs	
07970200	C-200x070	CHV-200 chip cover	1set / 5pcs	