

**HIGHLEAD**

**HLK-1510**

**ELECTRONIC PATTERN SEWING MACHINE**

**Instruction Manual**  
**Parts Catalog**

**SHANGHAI HUIGONG NO.3 SEWING MACHINE FACTORY**

## FOR YOUR SAFETY!

If you operate the sewing machine first time, please make sure to read the following instructions for your safety and proper operation.

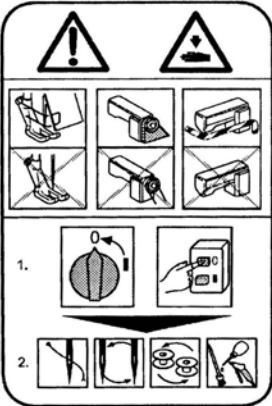


In this technical manual, the notice **CAUTION** is mentioned at some paragraph to attract your attention for the safety. Please keep it in mind whenever you work with the sewing machine.

**CAUTION** is used as the notice to warn a possible danger to cause a wound

This technical manual explains the instructions how to operate and maintain the sewing machine. All information in this technical Manual are subject to change without notice.

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### Explanations for the warning signs

NO	Warning sign	Meanings of warning sign
1		<p>Caution for sewing machine operation:</p> <p>Warning to operate the sewing machine without safety guards and to prohibit doing any operation except sewing while the power is turned on.</p> <p>&lt;Interpretation of sign&gt;</p> <ul style="list-style-type: none"> <li>·Do not operate without finger guard, eye guard, belt cover and other safety devices.</li> <li>·Before threading, changing needle and bobbin clearing, oiling etc. switch off main switch.</li> </ul>
2		<p>Caution for a wound on the fingers:</p> <p>Warning to a possible danger to cause a wound on the fingers under the specified operation.</p>
3		<p>Caution for the fingers:</p> <p>Warning to a possible danger to be caught the fingers in the machine under the specified operation.</p>

## Caution

- ★ For avoiding the sewing machine from the troubles, please do not operate the sewing machine under the following conditions.

### 1. Temperature and humidity

#### ➤ During operating:

The atmosphere temperature should not exceeded more 35°C (95°F) or less 5°C (41°F).

#### During transportation:

The atmosphere temperature should not exceeded more 55°C (131°F) or less -10°C (18°F).

#### ➤ The relative humidity in the atmosphere should not exceeded more 85% or less 45%.

### 2. Atmosphere for the machine operation

#### ➤ In the atmosphere filled with dust or corrosive gas.

#### ➤ In the atmosphere filled with flammable or explosive gas.

### 3. Power source voltage

#### ➤ In the place where the power fluctuation exceeds more or less 10% of the fixed power voltage.

#### ➤ In the place where the power source cannot supply enough voltage to keep the motor running.

### 4. Power source voltage

#### ➤ In the place where the power fluctuation exceeds more or less 10% of the fixed power voltage.

#### ➤ In the place where the power source cannot supply enough voltage to keep the motor running.

### 5. Noise

#### ➤ In the place near a high frequency transmitter or a high frequency welder.

#### ➤ In the place filled with strong electromagnetic radiation or magnetic field.

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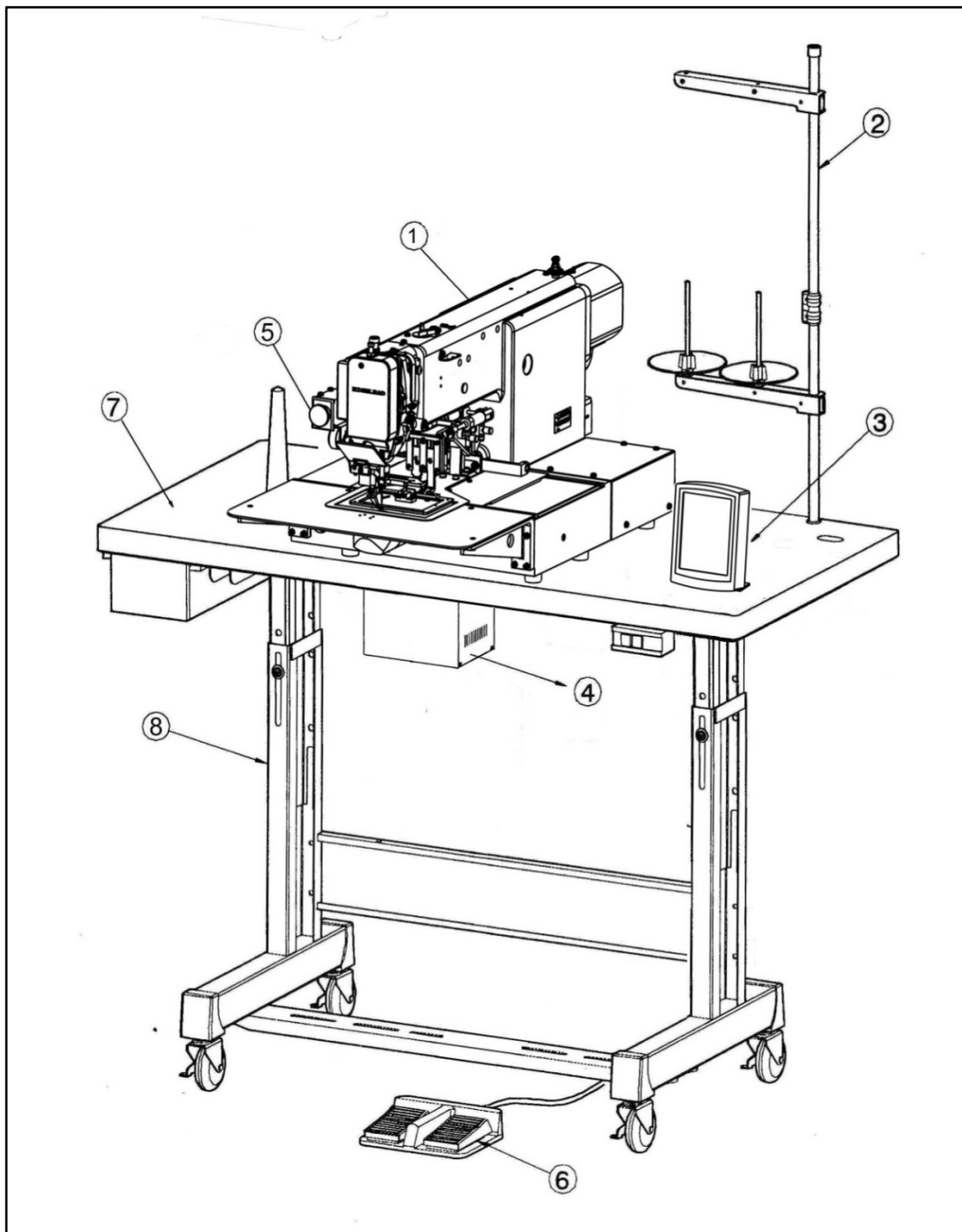
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# 1 STRUCTURE OF THE SEWING MACHINE



HLK-1510 electronic pattern sewing machine is constructed with the following main parts

- ① Sewing machine head    ② Thread stand    ③ Operation Panel    ④ Control Unit
- ⑤ Hand switch    ⑥ Work holder foot switch    ⑦ Wooden Table    ⑧ Steel stand

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## 2 SPECIFICATION

Sewing area:	X-Direction(left / right) 100mm Y-Direction(forward / backward) 100mm
Maximum sewing speed:	2500 rpm
Sewing speed:	10 steps variable from 200 to 2500 rpm
Stitch length:	0.1 to 12.7mm
Stitch type:	Single needle lock stitch
Needle bar stroke :	41.2 mm
Thread take up lever stroke:	68mm
Class of needle:	DP × 17#16(the standard specification)
Wiper system :	Back to forward wiping system(the standard specification)
Presser foot lift:	15 mm(18mm max)
Presser foot stroke:	Variable from 4mm to 10mm(4mm is standard)
Work holder lift:	25 mm
Hook:	Large size shuttle hook
Bobbin case:	With non racing spring
Bobbin:	Large size aluminum bobbin
Thread trimmer system:	Horizontal engagement with fixed knife and movable knife
Lubrication system:	Manual oiling and replenishment with the oil braids from the oil tanks
Lubrication oil:	White machining oil
X—Y drive system:	Stepping motor and X-Direction timing belt drive Y-Direction gear Intermittent or continuous feeding
Machine dimension:	1, 200mm (W)× 740mm (L)×1, 220mm (H)
main motor:	450W

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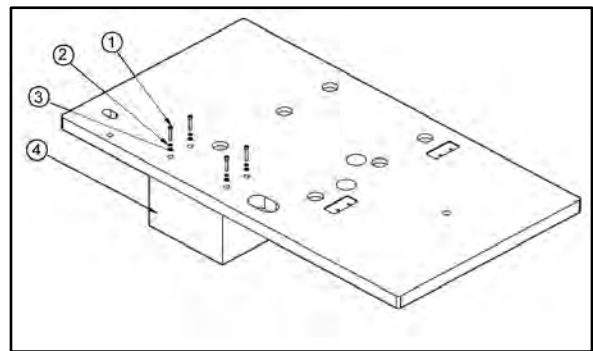
## 3 INSTALLATION

### Caution

- ★ The machine should be installed by the specialists who have enough experience for the sewing machine installations.
- ★ All the necessary electric wiring should be done by electric engineers who are qualified for the electric wiring.
- ★ If any damage or fault is found on the machine at the installation, please do not operate until it is repaired.
- ★ Please do not operate the sewing machine with excessive modifications from the standard specification.

### 3-1 Installation of the control box

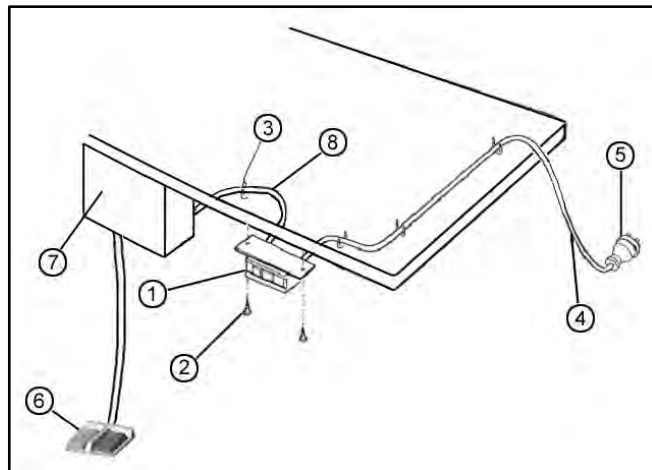
If the control box is purchased without assembling to the table, the control box has to be installed underneath the table. Please install the control box with the instruction in the paragraph



### 3-2 Installation of the power switch

If the power switch is purchased without assembling to the table, the power switch has to be attached with the following procedure.

- (1) Mount the power switch (1) with the wood screw (2) underneath the table as shown on the figure.
- (2) Fix the electric cords with the staples (3) underneath the table.
- (3) Hook up the connector (8) of the power switch (1) to the control box (7).
- (4) Attach the power plug (5) to another end of the power switch cord (4). Connect the foot switch (6) to the control box (7). The foot switch is enclosed in the accessory box.



### 3-3 Installation of the oil pan

- (1) Fix the oil pan (1) at its four corners on the table top with four.

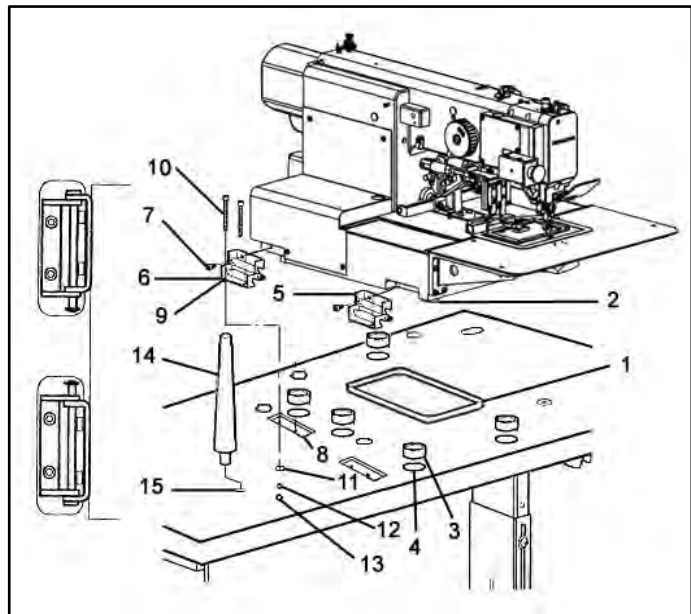


### 3-4 Installation of the sewing machine head

#### Caution

★ For the safety, please make sure to carry the sewing machine head by more than two people.

- (1) Make sure to hold the machine table with the caster stopper.
- (2) Fit the rubber cushion pads ③ into the each hole ④ on the tabletop. The rubber cushion pads are enclosed in the accessory box.
- (3) Put the sewing machine head on the table top and set the each leg ⑤ to the each rubber cushion pad ③

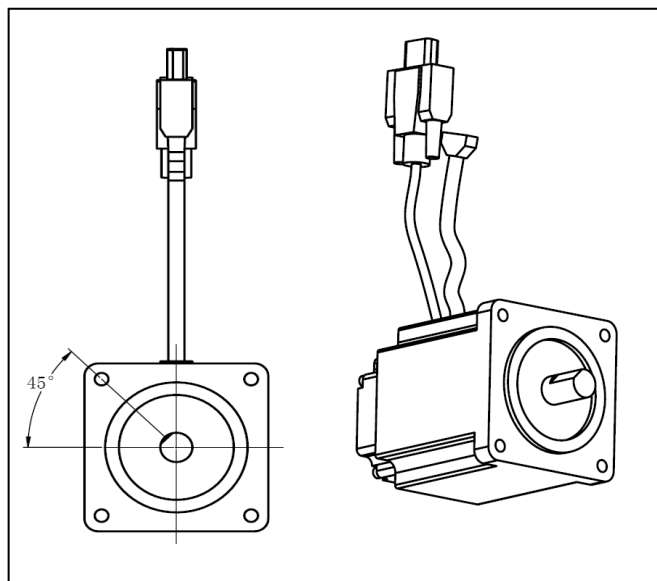


- (4) Attach two hinges ⑥ temporarily, make the setting screw ⑦ fastening on the left side surface of the machine bed .
- (5) At this time, take notice that the E-shaped snap ring on the front side hinge must be come to the backside, and E-shaped snap ring on the backside hinge must be come to the front.
- (6) These parts are all enclosed in the accessory box.
- (7) Fit the screw holes ⑨ of the hinges ⑥ to the bolt setting holes ⑧ on the table top then, pass the bolt ⑩ through these holes and fasten the bolt ⑩ to fix the hinges ⑥ with the flat washers ⑪, the spring washers ⑫ and the nuts ⑬ .
- (8) Fasten firmly hexagonal socket head set screws ⑦, which set the hinges ⑥ temporarily then, fix the hinges ⑥ perfectly.
- (9) Insert the headrest ⑭ into the hole ⑮ on the tabletop.

### 3-5 Installation of the spindle motor

If the spindle motor has been removed from the machine for the adjustment or the like, fix the spindle motor as the procedure described right.


- (1) Spindle motor according to right: put the signal cord upward.
- (2) Adjust the plane of the motor shaft alignment of the left on the motor mounting holes, 45 ° Angle adjustment.

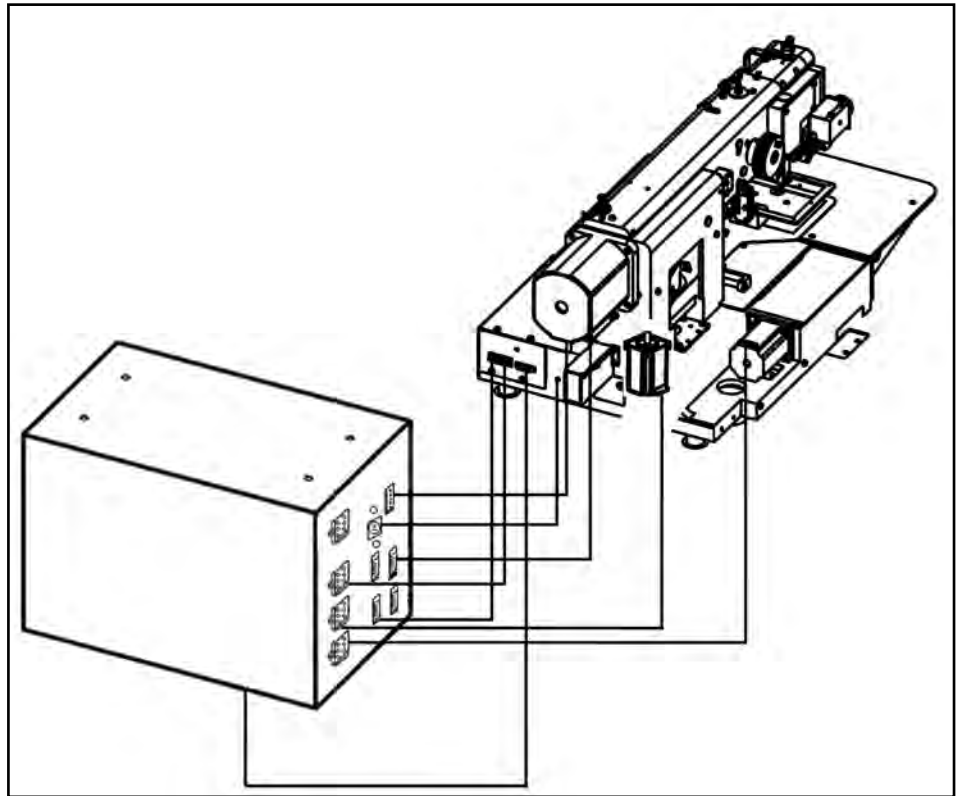


### 3-6 Connection of the operation panel

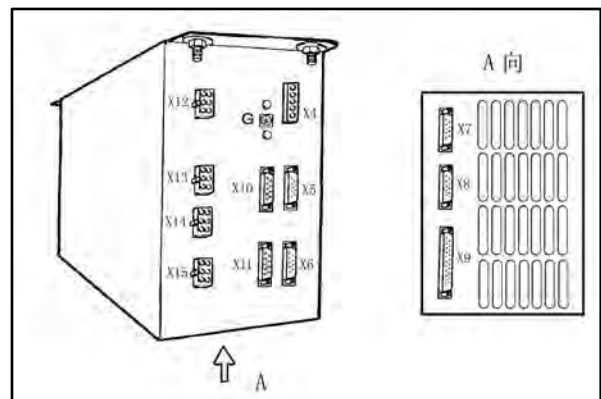
Please connect the operation panel with the instructions of operation panel manual enclosed in the packing.

### 3-7 Connection of the electric cables

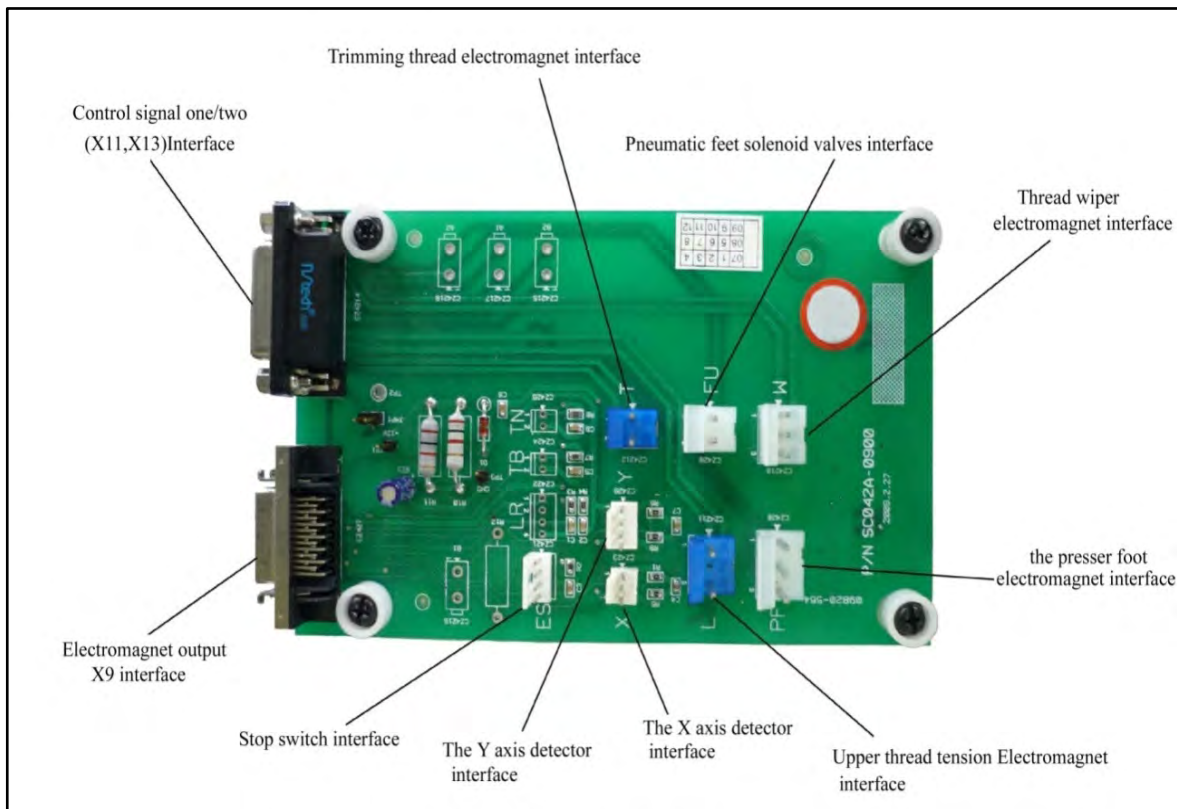
Please make sure to ground the place where there is  mark. Failure to do so may cause electric shock and/or malfunction.



- (1) Connect the machine head and the control box with cables as shown on the figure.
- (2) Hold the dangling cables under the table with accessory tie holders and cord ties.
- (3) At this time, please check whether the cables are not pulled when tilting the sewing machine.
- (4) Control box back and socket as shown on the below figure
- (5) Printed circuit board wiring as shown on the top of next page

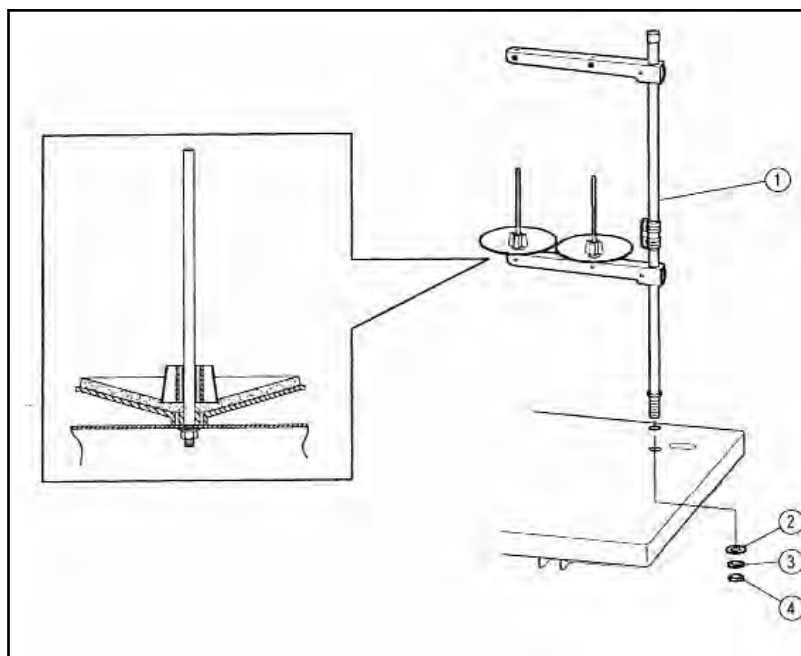


- |                          |                               |                               |
|--------------------------|-------------------------------|-------------------------------|
| X4: Spindle motor power  | X5: Spindle motor signal      | X6: RS-232C (selection)       |
| X7: Operation panel      | X8: Foot switch               | X9: Electromagnet output      |
| X10: RS-232C (selection) | X11: Control signal one       | X12: Expand I/O               |
| X13: Control signal two  | X14: X spindle stepping motor | X15: Y spindle stepping motor |
| G: Grounding wires       |                               |                               |



### 3-8 Installation of the thread stand

- (1) Assemble the thread stand with the instructions enclosed in the packing.
- (2) Fit the thread stand ① in the thread stand hole on the tabletop.
- (3) Fix the thread stand ① firmly from the rear side of the table with tightening the nut ④ and the washers ②, ③.



## 4 LUBRICATION

Caution

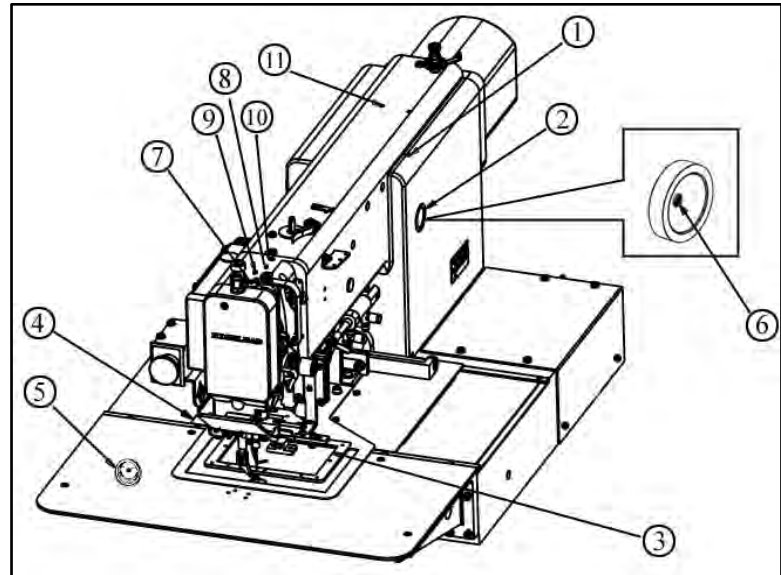
★Please make sure to turn power switch off before oiling.

★Please make sure to put some oil before starting the operation of the brand new machine or

NOTE : Please use high quality white machining oil.

### 4-1 Filling the oil tank

Pour the oil through the oil hole ① to the oil tank ② on the machine arm. Move the work holder by hand to the right end then, machine bed. Please Pour the oil through the oil hole ④ to the oil tank, fill with the oil over level mark ⑤ of the oil tank.



### 4-2 Oiling

Put some oil to red marked oil holes(NO. ⑦ ~ ⑩).

## 5 PROPER OPERATION

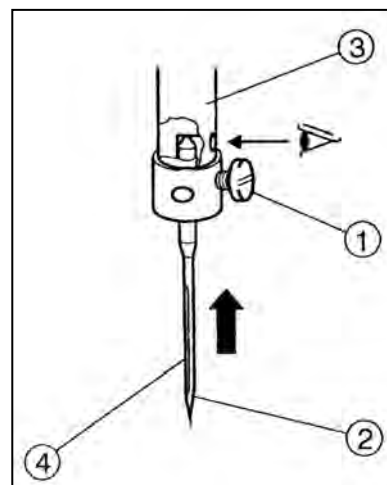
### 5-1 Installation of the needle

Caution

★Please make sure to turn the power switch OFF before installing or replacing the needle.

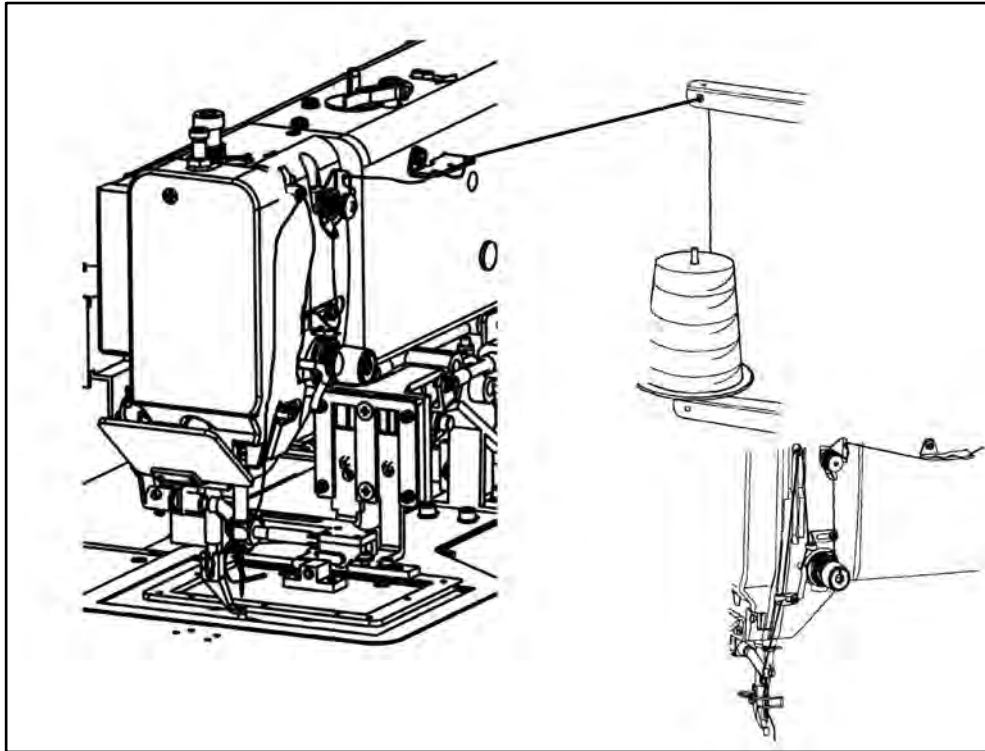
★Please pay attention for the fingers not to be wounded by the needlepoint.

- (1) Loosen the needle set screw ① then, Insert the new needle ② until the needle head is reached the end of the hole of the needle bar ③.
- (2) Fasten the setting screw ① with facing the needle groove ④ to the front







## 5-2 Threading the upper thread

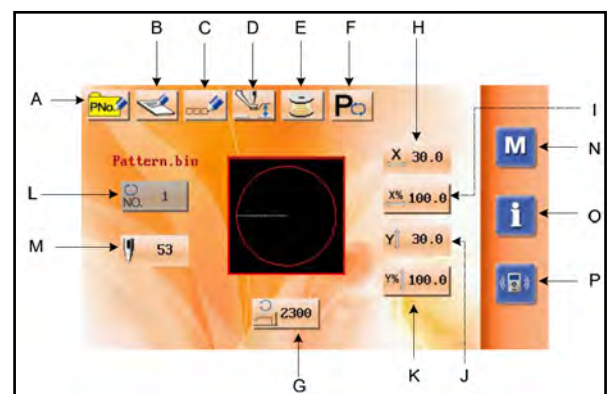
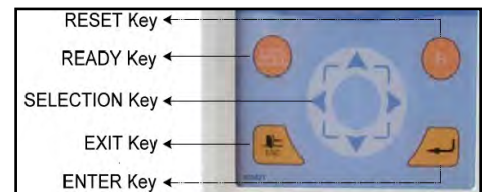
- ★ Please make sure to turn the power switch off before threading the upper thread.
- ★ Please thread the upper thread with referring to the below figures.



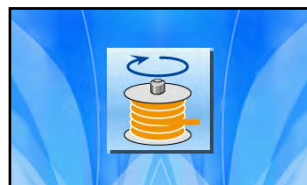
## 5-3 Winding the bobbin thread

- ★ Please make sure to pull the upper thread out of the needle before winding the bobbin thread

- (1) Turn the power switch ON.
- (2) Press the READY key  on the operation panel twice slowly. Firstly Press, the work holder moves to home position. Secondly, the interface for data input will be shown.
- (3) Press the SELECTION  key on the operation panel to select the BOBBIN-WIND key , then press the ENTER key , at this time, work holder goes down.
- (4) Then, Wind mode window will be appeared. (the background color is blue)

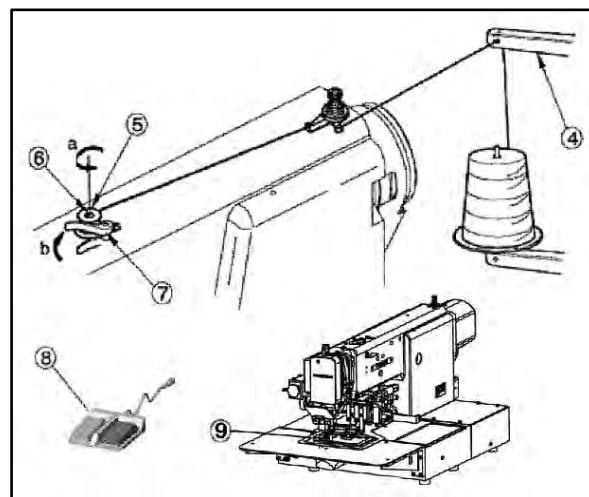


(5) Pass through the thread from the thread stand ④ as shown on the right figure . then , wind the thread to the empty bobbin ⑤ in the arrow mark “a” direction couple times and insert the bobbin ⑤ into the bobbin winder ⑥ .




(6) Push the adjust lever ⑦ in the arrow mark “b” direction.

(7) Step on the gray color start foot switch ⑧ . The thread is kept winding to the Bobbin ⑤ while the gray color start switch is stepping on.



(8) When the bobbin becomes full of the thread, the adjust lever ⑥ is returned to the original position.

(9) Step the gray foot switch to exit winding mode, and press the Escape key  to back to the standard operation interface.

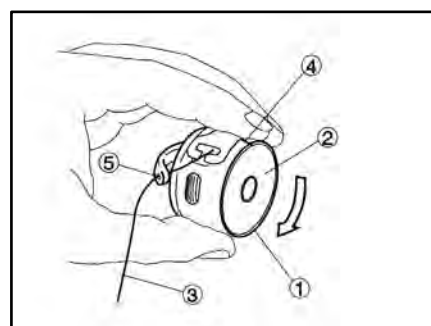
(10) To wind the bobbin thread during the sewing operation, carry out above (2) to (7) procedure, then, the bobbin winding is performed automatically.

#### 5-4 Settling the bobbin

(1) Set the bobbin ② into the bobbin case ① .

(2) Pull the bobbin thread ③ into the slit ④ and pass the thread through the thread hole ⑤ .

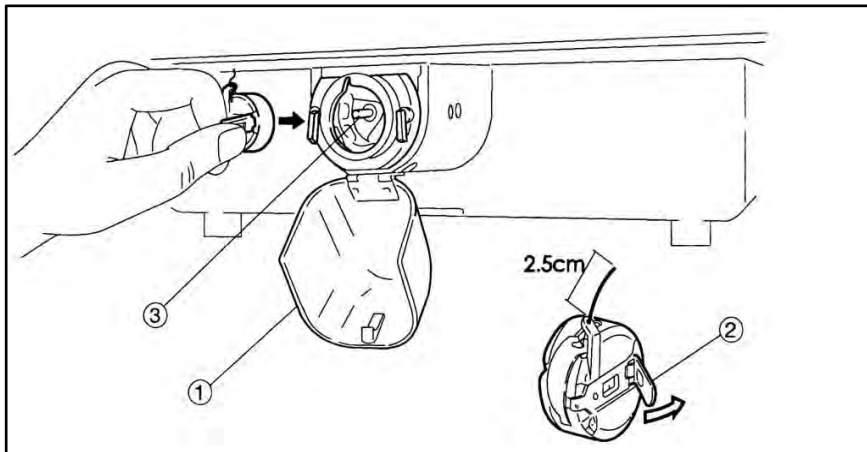
(3) At this time, pull the bobbin thread ③ then, check with the bobbin ② if it is rotated to the arrow direction. if it is not, set the bobbin ② into the bobbin case ① over again to get the proper rotation.



## 5-5 Setting the bobbin case

- (1) Set the needle bar to its highest position then, open the cylinder cover ①.
- (2) Open the bobbin case latch lever ② fully then, fit it securely in the inner hook ③.

[NOTE] Please pull the bobbin thread about 2.5mm out of the thread hole(NO.4) of the bobbin case.



## 6 PROPER SEWING

### 6-1 Operation of the halt switch

If an incident such as a thread breakage, needle breakage and any other incidents are happened during the sewing operation, please hit immediately the halt switch. The sewing machine running is stopped instantly.

Caution


- ★ Before start the sewing operation, please make sure the location of the halt switch and keep it in mind the function and how to use it.
- ★ Please keep away the hands and the face from the needle during the sewing operation.

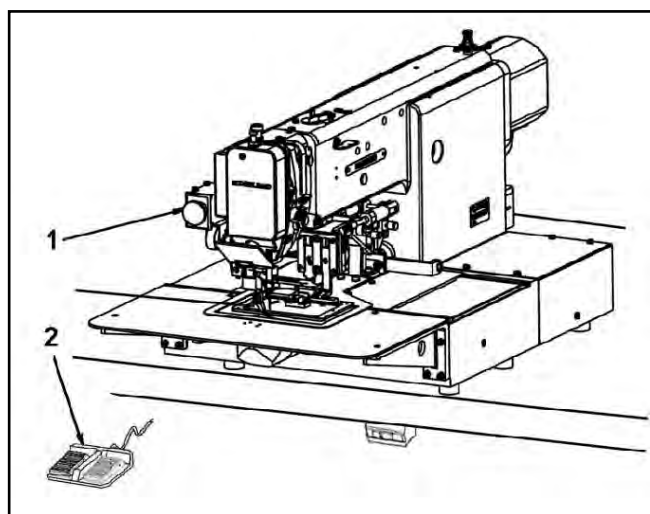
- (1) Press the HALT switch ①, All operations will stop, and the sewing machine will stop at the needle UP state without trimming the thread.

- (2) Remove the cause of the abnormality.
- (3) To continue sewing, turn the HALT switch to the right. The switch will be unlocked. Next, press the Escape key

 on the operation panel, then press

 key to select the  key or other

key. in the end, press  key, and work holder will go up and return to the



home position.

- (4) When the start switch ② (left) is pressed again, the operation will start .

#### Caution

- ★ Depending on the shape of the work holder, the collision may be happened with the work holder and the presser foot while the work holder is on the way back to the home position. For avoidance of this accident, before starting the sewing operation . program the work holder returning home with the operation panel of the control box to trace the sewing pattern.

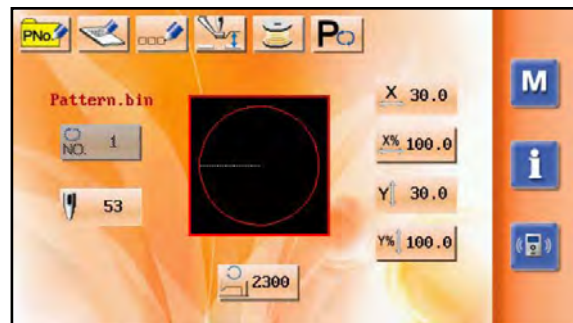
## 6-2 The sewing operation


#### Caution

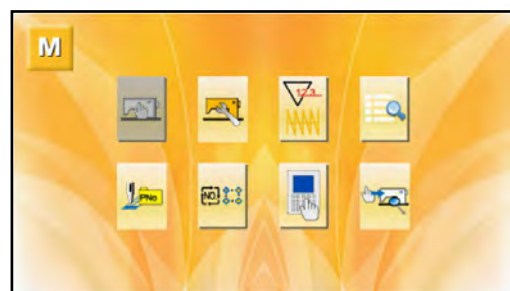
- ★ It is very dangerous to operate the sewing machine without the safety guards(Eye guard: belt cover, Link cover, Finger guard etc. ).
- ★ Please make sure to always operate the sewing machine with the safety guards.
- ★ Please do not put unnecessary articles except for the sewing operation on the tabletop.
- ★ Please keep the hands and the face away from the needle.




- (1) Turn the power switch ① ON.




The collision may be happened with the work holder and the presser foot depending on the work holder shape when the work holder is moved to original position.

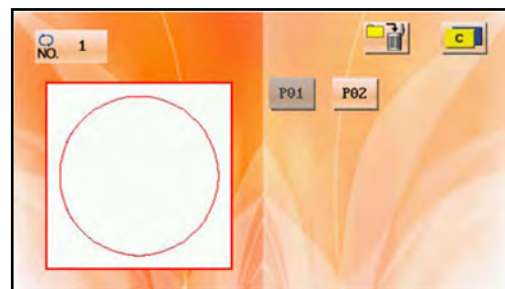


- (2) In sewing interface, press  to return to the interface of data input.




- (3) In the interface of data input, press  to select the , then press  to enter the interface for selecting the mode(as shown in the figure right)

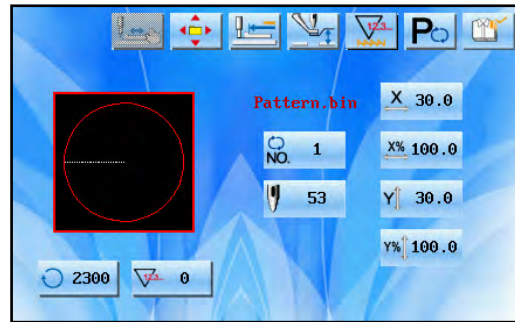
- (4) After  mode selecting end , back to the interface of data input, press  to select , then enter the the interface for selecting pattern number ,





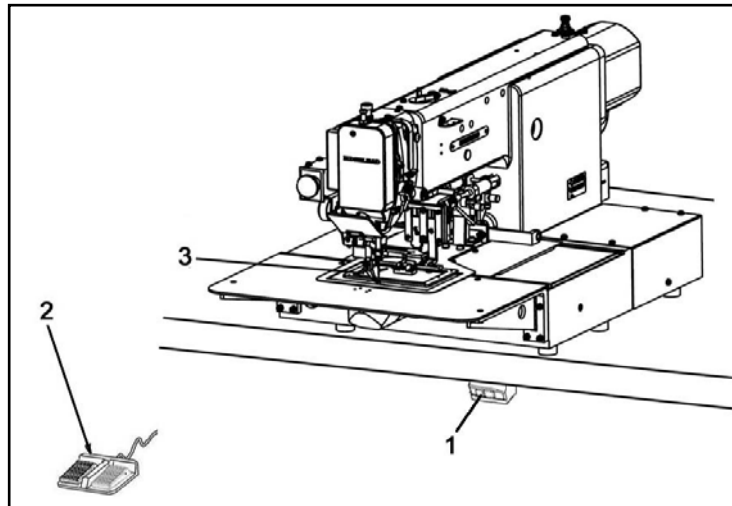
(5) Back to the interface of data input,

press , then enter the Sewing Interface (the background color is blue)



(6) When the start switch ② (left) is pressed, the work holder ③ will go down, the operation will start.

For the details, please refer to the instructions on the technical manual [Operation Panel].



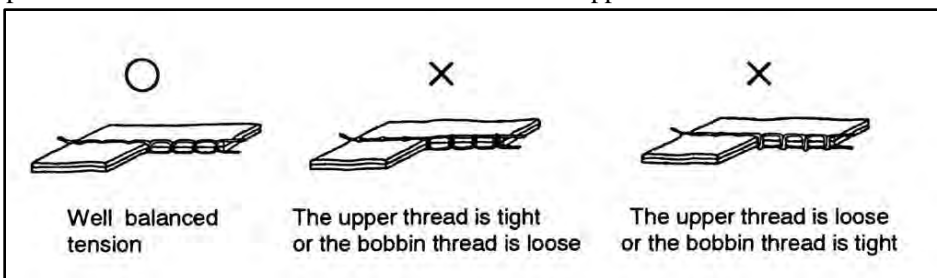
### 6-3 Adjustment of the thread tension

The thread tension between the upper and bobbin thread should be balanced in the best condition.

When the upper thread tension is well balanced with the bobbin thread tension, both threads are interlocked along the centerline of fabric layers as shown on the below figures.

**NOTE** Normally weaker bobbin thread tension brings better sewing quality.

So it is prefer to set bobbin thread tension first and then set upper thread tension.



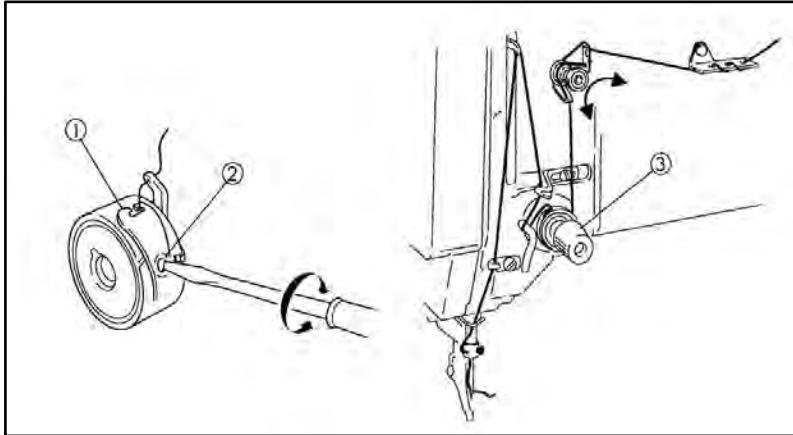
(1) Bobbin thread tension

Adjust the bobbin thread tension with the thread tension adjusting screw ② on the bobbin case ①. The thread tension becomes loose if turn the thread tension adjusting screw ② to the counter clockwise, and the

thread tension becomes tight if turn it to the clockwise.

## (2) Upper thread tension

Adjust the upper thread tension based on the bobbin thread tension. For this adjustment, turn the thread tension adjusting nut ③. The upper tread tension becomes tight if turn the thread tension adjusting nut ③ to the clockwise, and the upper thread tension becomes loose if turns it to the counter clock wise.



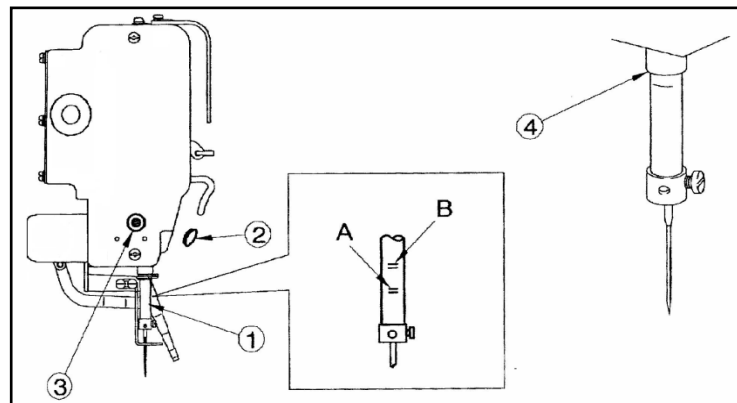
## 7 STANDARD ADJUSTMENT

### Caution

- ★Please make sure to turn the power switch OFF before adjust the sewing machine.
- ★If the adjustment is required under the power switch is ON, keep the start foot switch away from the foot.
- ★Be careful not to be wounded by the needle or the inner hook point.
- ★Please make sure to put the safety guards(Eye guard, Belt guard, Link cover and finger guard etc. )back on the original location after the sewing machine adjustment.

### 7-1 Adjustment of the needle bar position

- (1) Turn the power switch OFF.
- (2) Turn the sewing machine pulley by hand then, stop the needle bar ① at the lowest position.
- (3) Remove the rubber plug ② from the face plate then, loosen the needle bar holder setscrew ③.



- (4) Move the needle bar ① to the position where the needle bar timing mark A is matched to the needle bar bushing bottom line ④ then, tighten the needle bar holder setscrew ③.

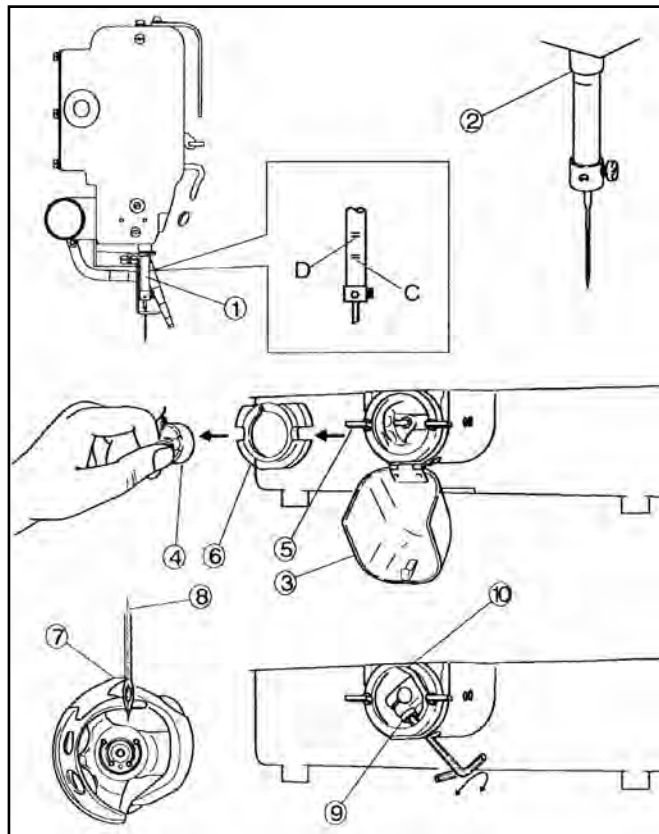
NOTE: If the needle class is DP×5, match the needle bar timing mark B to the needle bar bushing bottom line ④.

### 7-2 Adjustment of the position between the needle and the shuttle hook

- (1) Turn the power switch OFF.
- (2) Turn the sewing machine pulley by hand then, move up the needle bar ① from the lowest position and stop it at the position ② where the needle bar timing mark C is matched to the needle bar bushing bottom line.

NOTE: If the needle class is DP×5, match the needle bar timing mark D to the needle bar bushing bottom line ②.

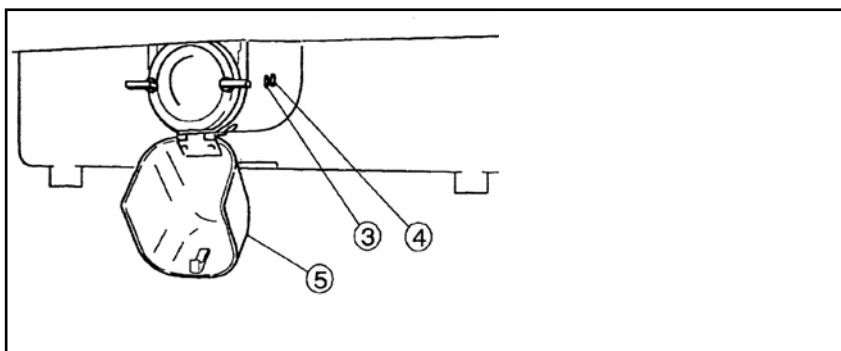
- (3) Open the cylinder cover ②.
- (4) Remove the bobbin case ③.
- (5) Turn the hook retainer lever ⑤ then, remove the hook retainer ⑥.
- (6) Loosen the driver setscrew ⑨ then, move the driver (No.10) and adjust the shuttle hook point ⑦ to be matched with the center line ⑧ of the needle.



- (7) After the adjustment, tighten the driver setscrew ⑨ and put the bobbin case ④, the hook retainer ⑥ and the hook retainer lever ⑤ back to the original location then close the cylinder cover ②.

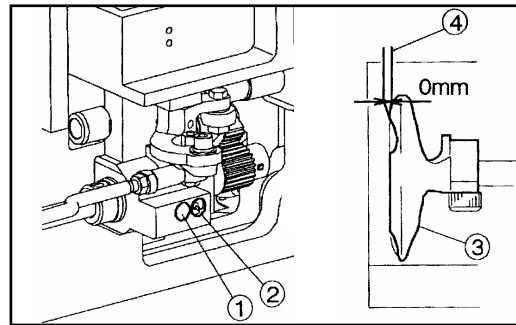
### 7-3 Adjustment of the clearance between the shuttle hook and the needle

- (1) Please take the same procedures as above paragraph 7-2. from (1) to (5).
- (2) Loosen the outer hook setscrew ③ and turn the eccentric pin ④ so that the clearance between the shuttle hook point and the needle becomes 0.05~0.1 mm.
- (3) After the adjustment, securely tighten the outer hook setscrew ③ and put the hook retainer and the bobbin case back to the original location then, close the cylinder cover ②.



#### 7-4 Adjustment of the clearance between the driver and the needle

- (1) Please take the same procedures as above paragraph 7-2. from(1)to(5).
- (2) Please make sure the clearance between the shuttle hook point and the needle has been adjusted 0.05~0.1 mm at above procedure 7-3 Adjustment of the clearance between the shuttle hook and the needle.

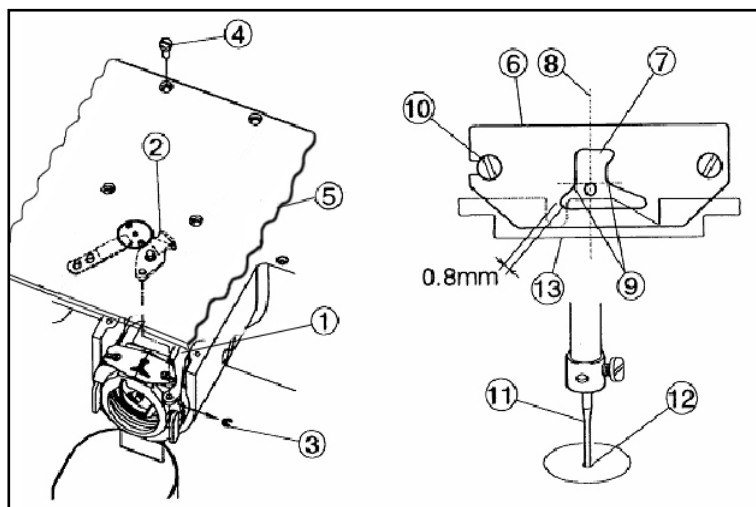


- (3) Loosen the driver setscrew ① and turn the eccentric pin ② so that the clearance between the driver ③ and the needle ④ can become 0.
- (4) After the adjustment, securely tighten the driver setscrew ① and put the hook retainer and the bobbin case back to the original location then, close the cylinder cover ⑤.

#### 7-5 Adjustment of the thread guide

- (1) Remove the E-shaped snap ring ③ which is engaging the movable knife ② and the link ① then, loosen the setscrews ④ and remove the sliding plate(S) ⑤.
- (2) Loosen the setscrews ⑩ and move the thread guide ⑥ to the position where the needle center line ⑧ divides the needle groove ⑦ evenly and the rear side line ⑨ of the needle is aligned with the shoulder ⑨ of the thread guide ⑥. At this time, make sure that there is some clearance between the hook retainer and the thread guide ⑥ at least the upper thread can be passed smoothly through it(standard clearance is 0.8mm). If this clearance is too wide, it causes the trimming failure and if this clearance is too narrow, it causes the sewing condition disturbance, the trimmed upper thread tail uneven and the locking up the hook with the upper thread.

- (3) After the adjustment, engage the link ① of the trimmer mechanism with the movable knife ② with the E shaped snap ring ③ and put the sliding plate(S) ⑤ back on the original location then, tighten the setscrews ④. At this time, set the sliding plate(S) ⑤ so that the needle ⑪ can come down to the center ⑫ of the needle hole of the needle plate.



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## 7-6 Adjustment of the presser foot

[NOTE]The presser foot is a very important part to form the fine stitches.

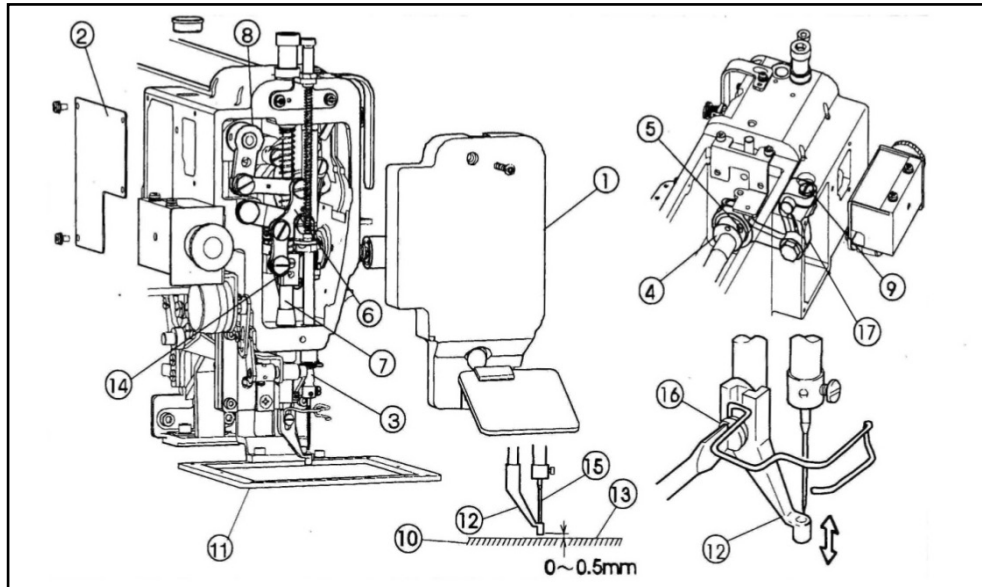
It moves simultaneously with the needle and stabilize the needle penetrating area of the sewing material with pressing down it, when the needle sticks into or pulls out the sewing material and prevent the skip stitch or the over penetration happening. Please adjust the presser foot properly to the sewing materials with the following instructions.

### 7.6.1 Adjustment of the presser foot position

[NOTE]Please always adjust the presser foot position when the thickness of the sewing material is changed.

- (1) Turn the power switch OFF.
- (2) Remove the face plate ① and the link cover ② .
- (3) Turn the sewing machine pulley by hand and stop the needle bar ③ at the lowest position. At this time, make sure the setscrew ⑤ of the eccentric cam ④ is positioned right beside the center line of the upper shaft. This is the standard position of the eccentric cam ④ . If the eccentric cam ④ is off from this position , set it back to the standard position with the instructions on the paragraph[7-6-3. Adjustment of the presser foot timing]in the following page.
- (4) Turn the sewing machine pulley by hand and stop the needle at the highest position(this is also the thread take up lever's highest position). At this time, loosen the setscrew ⑨ of the upper feed lock crank shaft ⑧ and adjust the center line of the bell crank ⑥ to be parallel with the presser foot bar ⑦ .
- (5) Insert the sewing material ⑩ under the work holder ⑪ and turn the sewing machine pulley by hand then, stop the presser foot ⑫ at the lowest position.
- (6) Loosen the presser foot bar setscrew ⑭ and move the presser foot bar ⑦ then, adjust the presser foot ⑫ position to be become the clearance between the bottom surface of the presser foot ⑫ and the surface of the sewing material 0~0.5mm. At the same time, rotate the presser foot bar ⑦ for the needle ⑮ to come down to the center of the needle hole of the presser foot ⑫ .
- (7) After the adjustment, put the face plate ① and the link cover ② back on the original location.

[NOTE]The lower position of the presser foot, the more effective for the skip stitches. However, if the presser foot becomes to Press the sewing material, the movement of the presser foot mechanism generates a slight noise. And also, the presser foot stays longer to hold the sewing material, so the upper thread tension becomes loose or the sewing pattern forming gets out of shape because the presser foot catches the surface of the sewing material. For avoiding these troubles, please lower the presser foot as small as possible.

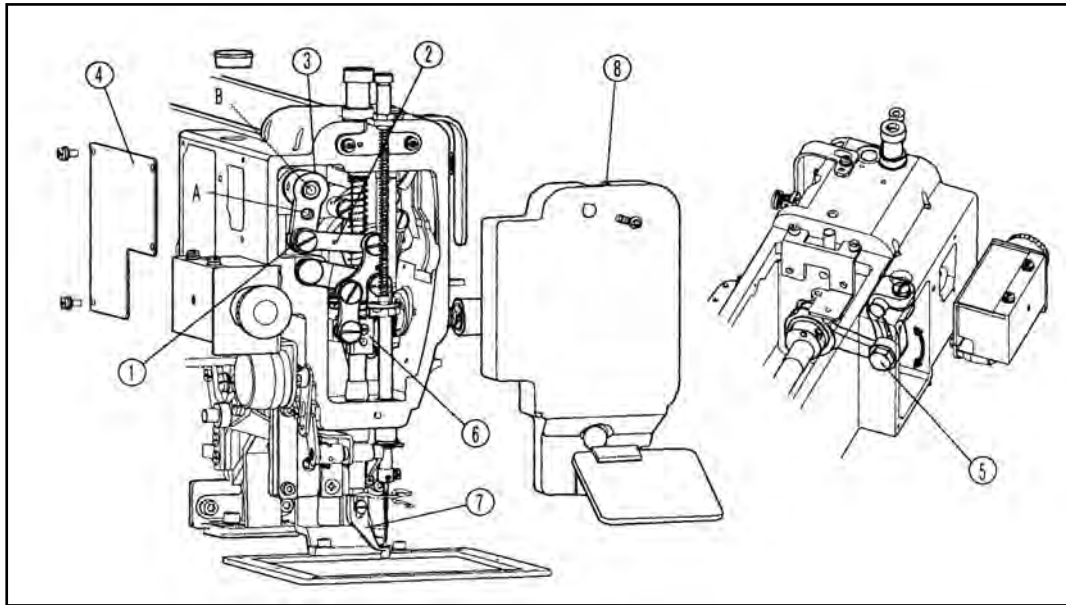


[NOTE]If the thickness of the sewing material changes very often, it is recommended to take the easy way for the adjustment of the presser foot position with the method that change only the fixed position of the presser foot after fixed the presser foot bar at higher position. For this adjustment, loosen the setscrew (16) then, move the presser foot (12) up and down.

### 7.6.2 Adjustment of the presser foot lift during the sewing

[NOTE]The presser foot lift during the sewing can be adjusted 0 and 2~10mm.

- (1) The presser foot lift during the sewing becomes 4~10mm at the condition which the connection of the link (2) and the lever (3) with the shoulder screw (1) is as shown on the figure and it becomes 2 to 4 mm if the connection is made with A hole, and it becomes 0 mm if the connection is made with B hole.
- (2) The stepping lift is adjusted 4mm when the sewing machine is shipped from the factory.
- (3) For the adjustment at the each range of the presser foot lift, remove the link cover (4) then, loosen and move the adjust bolt (5).
- (4) If the link (2) connection is changed to A or B hole, the presser foot position is also changed. So reset the presser foot position with adjusting the position of the presser foot bar or the presser foot itself with loosening their setscrews (6) or (7).
- (5) Regarding the running noise and the vibration, the higher lift effects worse. So adjust the presser foot lift during the sewing as small as possible.
- (6) After the adjustment, put the link cover (4) and the face plate (8) back on the original location.

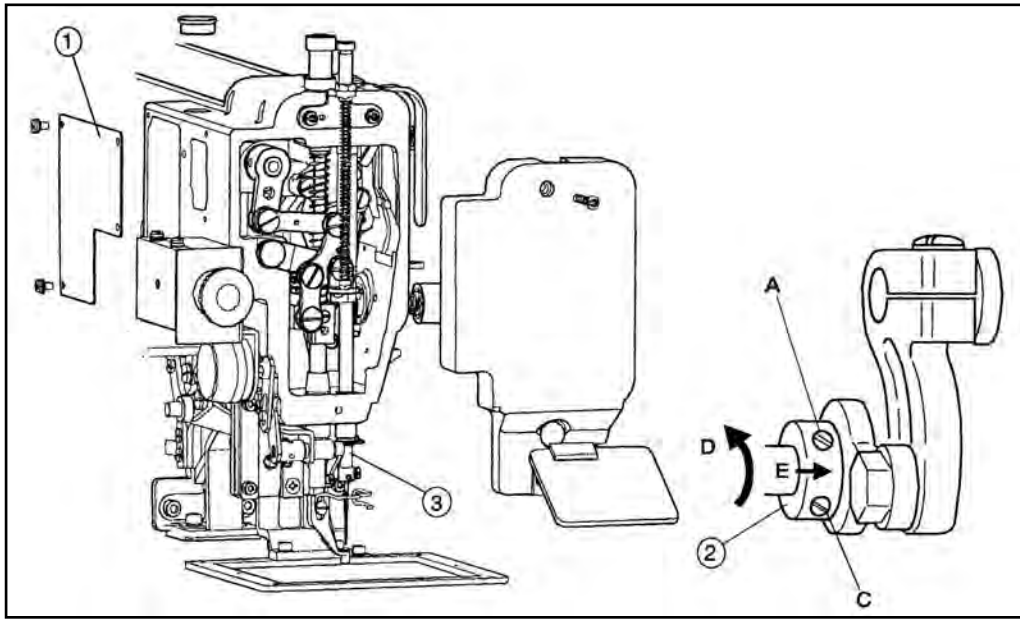


### 7.6.3 Adjustment of the presser foot timing

[NOTE] The presser foot up and down movement during the sewing synchronizes with the needle up and down movement. With changing this synchronized timing to the sewing materials, the skip stitches can be prevented or the seam tightness can be improved.

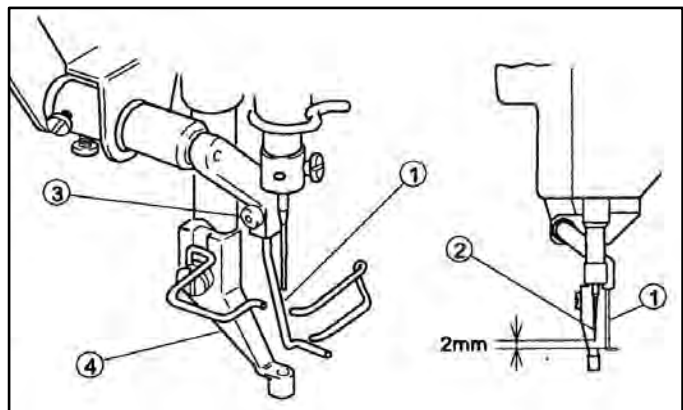
For example, the delay of the presser foot timing against the needle movement prevents the skip stitches especially to the thin materials, and the advance of the presser foot timing can improve the seam tightness especially to the thick materials.

- (1) Remove the link cover ①.
- (2) Loosen the setscrew “C” of the eccentric cam ②.
- (3) Turn the sewing machine pulley by hand and stop the needle bar ③ at the lowest position. At this stage, the setscrew “A” of the eccentric cam ② is positioned right beside the center line of the upper shaft. This is the standard position for the eccentric cam ②.
- (4) Loosen the setscrew “A” of the eccentric cam ②.
- (5) Hold the eccentric cam ② and turn the sewing machine pulley slowly by hand. If turn the sewing machine pulley to the arrow direction “D”, the presser foot timing against the needle movement is delayed, and if turn the pulley to the opposite direction, the timing of the presser foot is advanced.
- (6) After the adjustment, tighten the setscrew “A” and “C” in turn with slightly pushing the eccentric cam ② to the arrow direction “E”.
- (7) Put the link cover ① back on the original location.



### 7-7 Adjustment of the wiper

- (1) Loosen the wiper setscrew ③ and adjust the wiper ① to be positioned where the wiper ① passes under the needle point ② with about 2 mm clearances right after the sewing machine is stopped running at the needle upper position (the thread take up lever's highest position).



[NOTE] When the presser foot position or the presser foot lift is changed, the wiper ① may collide with the presser foot ④. In that case, please do not use the wiper ①. If do not use the wiper ①, cancel the wiper function with operation

### 7-8 Adjustment of the bobbin winder

- (1) Adjustment of the winding volume

Loosen the setscrew ② of the adjusting lever ① and adjust the position of the adjusting lever ①. If move the adjusting lever ① to the arrow direction “a” the Winding volume is reduced, and if move the adjusting lever ① to the arrow direction “b”, the winding volume is increased. The winding volume is adjusted 80% of the full volume when the sewing machine is shipped from the factory.

- (2) Adjustment of the proper position of the bobbin winder Firstly . loosen the setscrews ③ and ④ of

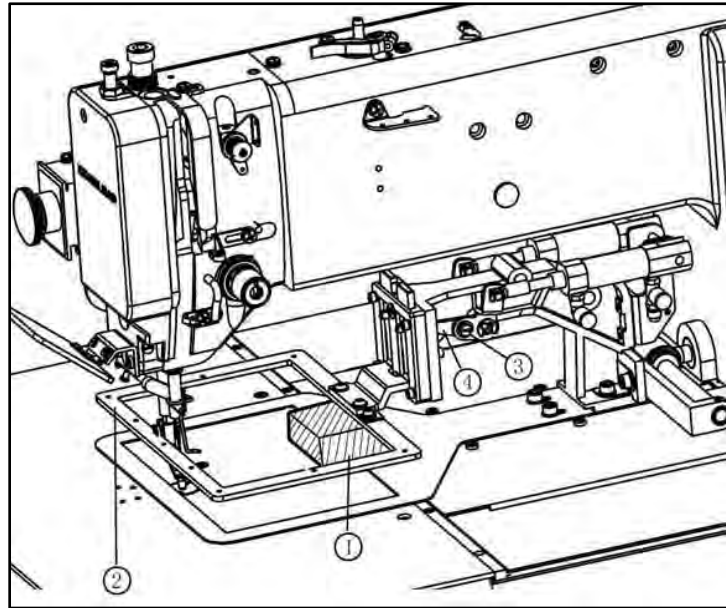


the bobbin winder and put the empty bobbin ⑤ on the rotating shaft ⑥ then, push the adjusting lever ① to the arrow direction “a”. Secondary. move the whole bobbin winder to the arrow direction “C” and stop it at the position where the empty bobbin is rotated then, tighten the setscrews ③ and ④ of the bobbin winder. This is the proper position of the bobbin winder.

### 7-9 Adjustment of the work holder

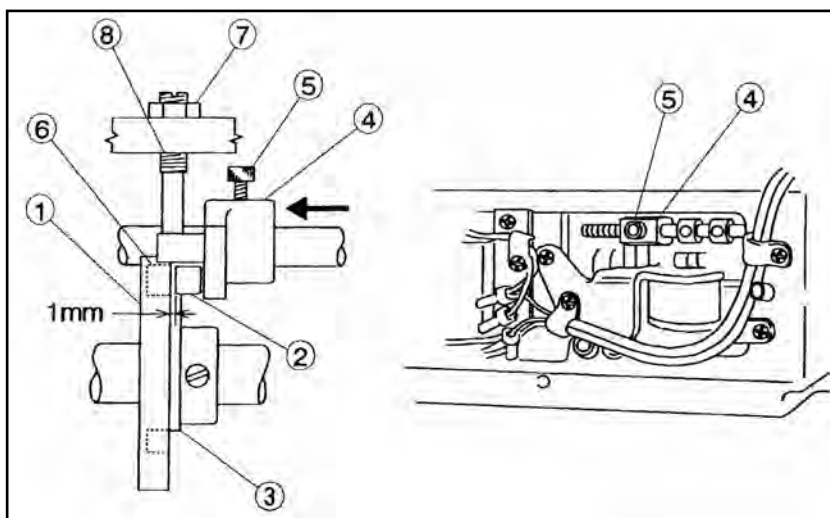
If the sewing material is thick and the work holder does not press it strong enough, adjust the work holder presser as follow.

- (1) Insert the sewing material ① under the work holder ②.
- (2) Turn the power switch ON and lower the work holder ② with the work holder foot switch
- (3) Loosen the 2 of the setscrews ③ and move adjusting plate ④ until it touches the material ① then, tighten the 2 of the setscrews ③.



### 7-10 Adjustment of the trimmer cam follower

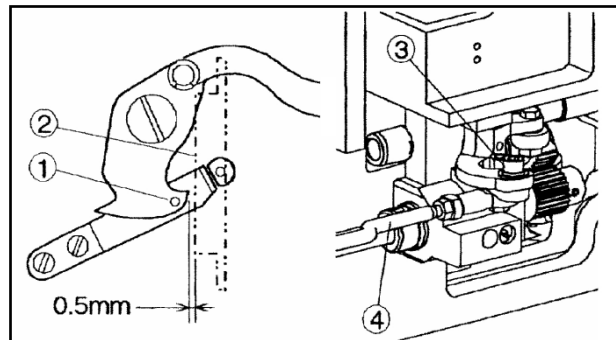
- (1) Turn the power switch OFF and remove the top cover.



- (2) Under the sewing machine regular stop condition (the needle stop position is upper and the take up lever stop position is highest), loosen the setscrew ⑤ of the cam follower lever ④ and adjust the cam follower ② to be positioned to contact with the shoulder portion ③ of the trimmer cam ① with having about 1 mm clearance between the cam follower ② and the trimmer cam ①. After this adjustment, tighten the setscrew ⑤ of the cam follower lever ④.
- (3) Push the cam follower lever ④ by hand to the arrow direction and make sure that the cam follower ② is engaged into the cam groove ③ smoothly.
- (4) If the cam follower ② is not engaged smoothly, under confirming with the condition which the cam follower ② contacts with the shoulder portion ③ of the trimmer cam ①, loosen the nut ⑦ and tighten the stopper screw ⑧ until it touches with the stopper ⑨ of the cam follower lever ④ then, loosen the stopper screw ⑧ back about 1/3 turn and fix the nut ⑦ firmly.

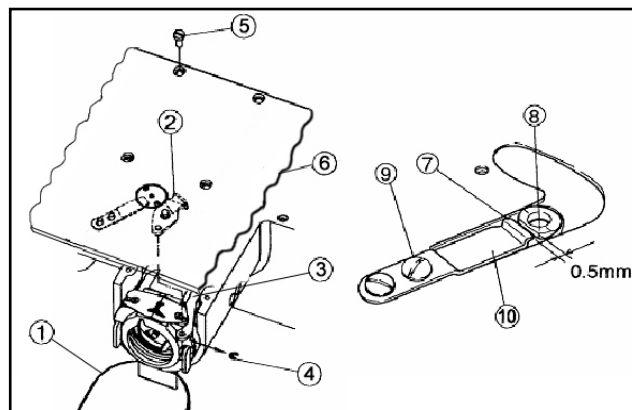
### 7-11 Adjustment of the position for the movable knife point

- (1) Tilt the sewing machine head to the left to be able to see the bottom component parts.
- (2) Open the cylinder cover
- (3) Check with the point ① of the movable knife whether it is located at the position apart 0.5mm from the front face of the hook retainer ②.
- (4) For the adjustment of the movable knife point ①, loosen the adjusting screw ③ and move the rod end ④ right and left then, adjust the position of the movable knife point.
- (5) After the adjustment, tighten the adjusting screw nut ③ securely.



### 7-12 Adjustment of the fixed knife position

- (1) Open the cylinder cover ①.
- (2) Remove the E-shaped snap ring ④, which engages the movable knife ② and the link ③.
- (3) Loosen the setscrews ⑤ then, remove the sliding plate ⑥.
- (4) Turn the sliding plate ⑥ upside down and loosen two setscrews ⑨ then, adjust the fixed knife ⑩ position to be positioned for the blade edge ⑦ to have the clearance 0.5mm from the edge of the needle



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plate ⑧.

(5) After the adjustment, tighten the setscrews ⑨ securely.

(6) Put all the parts for this adjustment back to the original locations.

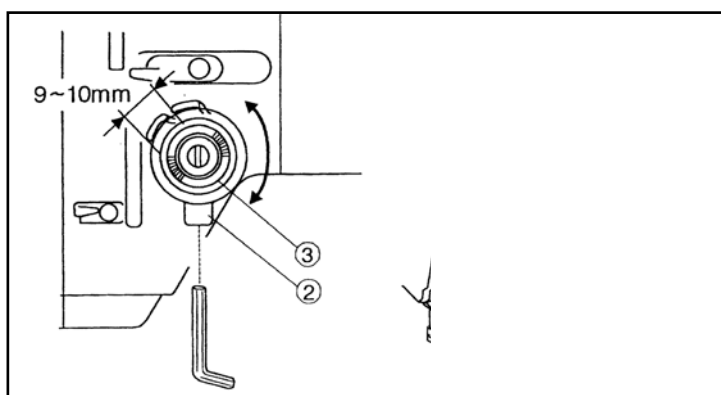
### 7-13 Adjustment of the thread take up spring swing stroke

Loosen the setscrew ② and turn the whole thread tension regulator ③ then, adjust the thread take up spring swing stroke to be become 9 to 10mm.

After the adjustment, tighten the setscrew ② securely.

### 7-14 Adjustment of the thread take up spring tension

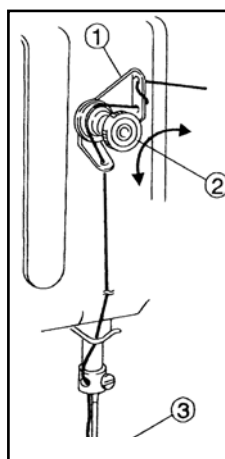
Insert the screw driver ⑤ into the slit ④ of the thread tension regulator ③ and adjust the thread take up spring ① tension. If turn the screw driver to the clockwise, the thread take up spring tension becomes tight. and if turn the screw driver to the counter clockwise, the thread take up spring tension becomes loose.



### 7-15 Adjustment of the thread tail after the trimming

Adjust the thread tail ③ from the needle after the trimming with turning the nut ② of the pre-tension ①.

If turn the nut ② to the clockwise, the thread tail becomes shorter and if turn the nut ② to the counter-clockwise, the tread tail becomes longer.



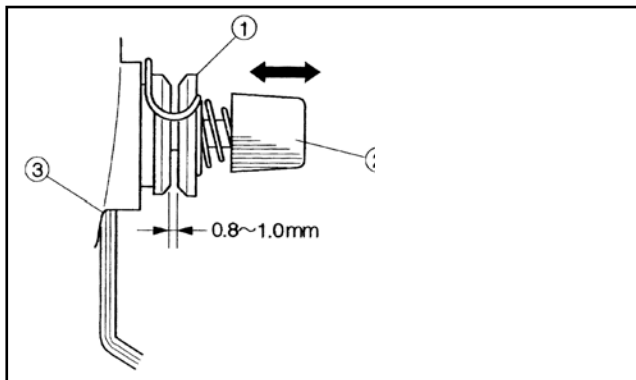
### 7-16 Cancellation of the trimming function

If the automatic trimming is not required during the sewing operation ,cancel the Trimming function with the setting panel of the control box .

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### 7-17 Adjustment of the upper thread tension release

- [NOTE] (a) The upper thread tension release works when the upper thread is trimmed automatically or the presser foot is lifted during the work holder feeding.
- (b) If the upper thread tension release does not work properly when the upper thread is trimmed automatically, the thread tail from the needle becomes shorter then, it induces the skip stitch happening or pulling the thread tail out of the needle at the start of the sewing.
- (c) During the sewing operation, the discs ① of the thread tension regulator is closed while the presser foot is moving up and down.
- If the discs ① of the thread tension regulator is not closed, the upper thread tension becomes loose and the proper stitch condition can not be obtained.
- (d) When the upper thread tension release is activated, the discs ① the upper thread tension regulator opens 0.8~1.0mm. This is the normal conduction of the discs ① opening. For this adjustment, take the following procedure.

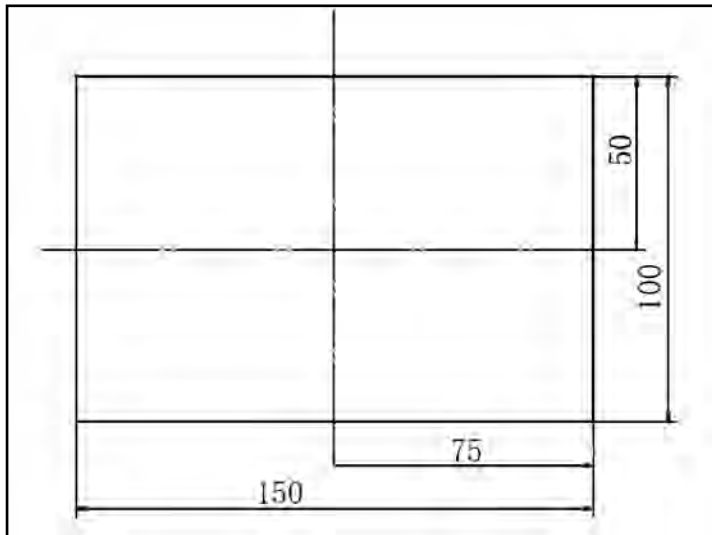


- (1) Remove the top motor cover.
- (2) Fully turn the crank ③ of the rotary solenoid ② in the arrow direction. At this time,
- (3) adjust the upper thread tension release for the discs to be opened 0.8 to 1.0 mm. For this adjustment, loosen the nut A then, if tighten the nut B, the discs opening becomes wider and if loosen the nut B, it becomes narrower.
- (4) If the normal opening of the discs can not be obtained with the nut adjustment, loosen the wire fix screws ⑤ and adjust the tension of the wire ⑥.
- (5) The wire ⑥ may be got longer over a long period machine operation. At that time, adjust the upper thread tension release again.

### 7-18 Adjustment of the mechanical home position

[NOTE]The mechanical home position is fixed at the center of the sewing area when the sewing machine is shipped from the factory. However, it can be moved within the area covered with diagonal lines.

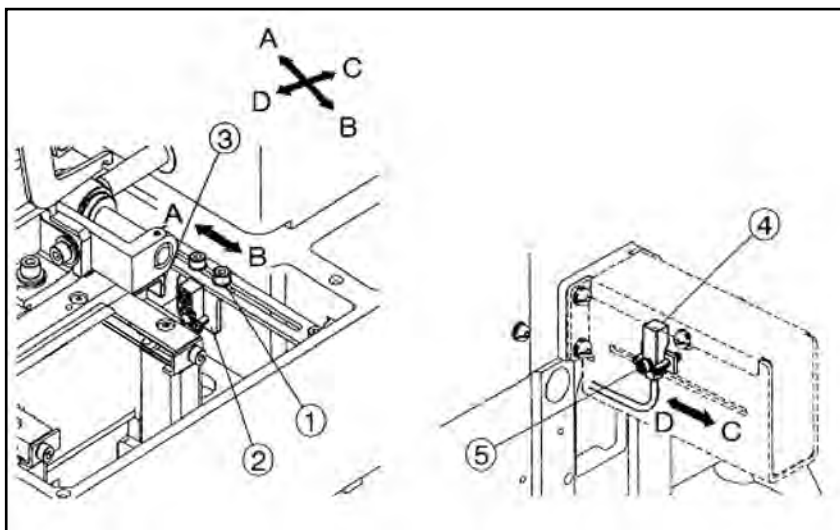
- (1) Turn the power switch ON and cancel the sewing area limit with the operation panel.
- (2) After the cancellation of the sewing area limit, once. Turn the power switch OFF.



#### 7-18-1. Shifting the mechanical home position to the X direction

- (1) Remove the X-Y cover (right),(left) and X cover.
- (2) Loosen the detector plate fix screws(2 pieces) ①. if move the detector plate ② to the right, the mechanical home position is shifted to the left and if it is moved to the left, the mechanical home position is shifted to the right.
- (3) After the mechanical home position setting, tighten the detector plate fix screws ① securely.

[NOTE] When the original mechanical home position is shifted. Please check the clearance between the X detector plate and the X detector. This clearance should be set within the range of 1.0—1.5 mm.



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### 7-18-2. Shifting the mechanical home position to the Y direction

- (1) Loosen the Y-detector setscrew ⑤ .
- (2) If move the Y-detector ④ to the front, the mechanical home position is shifted to the backward. If it is moved to the backward. the mechanical home position is shifted to the front.
- (3) After the mechanical home position setting, tighten the screw ⑤ securely.

### 7-19 Adjustment of the X-Y table contact pressure

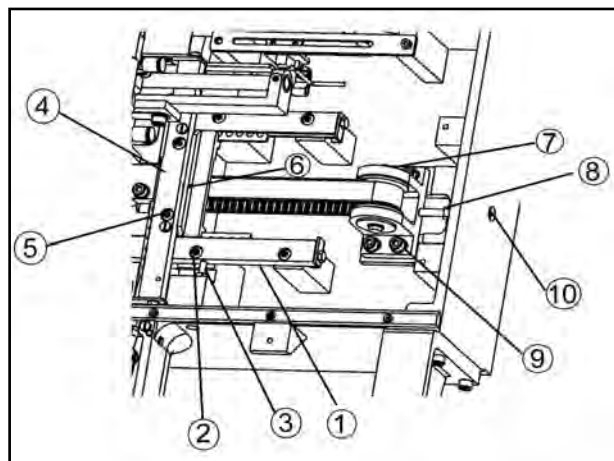
[NOTE] When take the X-Y table apart or the X-Y table became weak in the joints, adjust the X-Y table contact pressure. The adjustment should be made the X-Y table movement as smooth as possible without having play. If the X-Y table contact pressure is too tight , the over pressure induces the out of control on the X-Y table movement.

- (1) Remove the right and left X-Y cover and the right X cover plate.
- (2) Loosen the setscrew(2 pieces) ② so that the X fixed race ① can be moved slightly.
- (3) If tighten the both right and left contact presser adjusting screws ③ , the X table contact pressure is increased.
- (4) Loosen the setscrews(2 pieces) ⑤ so that the Y fixed race ④ can be moved slightly.
- (5) If tighten the contact pressure adjusting screws ⑥ , the Y table contact pressure is increased.
- (6) After adjustment, tighten the setscrews ② and ⑤ securely.

### 7-20 Adjustment of the X timing belt tension

[NOTE] The proper condition of the X timing belt tension is standing that they will not be got any yield even it is slightly pushed by hand.

- (1) Remove the right X cover and the right X cover plate.
- (2) Loosen the nut ⑧ and the setscrew ⑨ of the bracket ⑦ .
- (3) If the tighten the tension adjust screw ⑩ , the X timing belt tension will be increased.
- (4) After adjustment, tighten the nut ⑧ and the setscrew ⑨ .

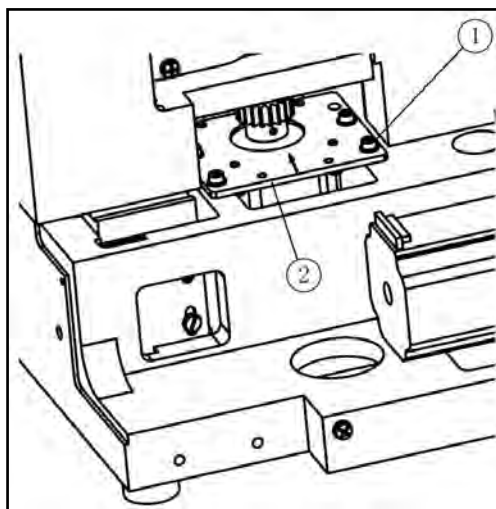


### 7-21 Adjustment of Y stepping motor position

- (1) Remove the motor cover.

- (2) Loosen four setscrews ① of the Y-stepping motor adapter ②.
- (3) Press the Y-motor adapter ② to arrow direction lightly.
- (4) Fasten the setscrews ① securely, and put the motor cover to original position.

NOTE After the adjustment, please make sure that there is no gap in the gear mechanism. Please grease gear periodically for reduction of noise or abrasion



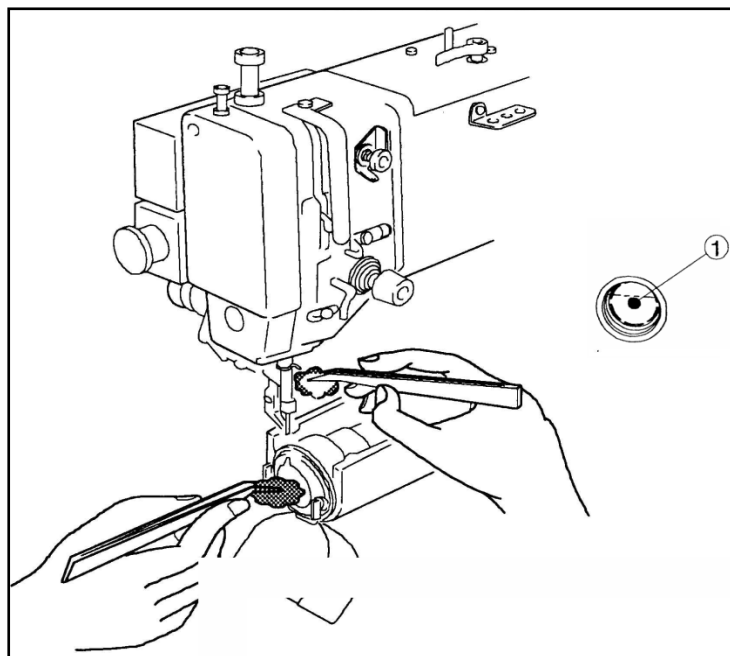
## 8 MAINTENANCE

### Caution

- ★Please make sure to turn the power switch always OFF when clean up the sewing machine.
- ★Before or after the sewing operation, clean up the sewing machine and check the Oil level in the oil tank.

### 8-1 Cleaning

- (1) Turn the power switch OFF.
- (2) Remove the dust and the thread waste sticking around the threading parts or the shuttle hook area.
- (3) Check the oil level in the oil tank. If the oil is under the red mark level supply the oil to be over the red mark level.



### 8-2 Disposing of oil waste

7. If the waste oil is full, please remove the oil .

## 9 BAD SEWING CONDITION & ITS CAUSE AND REMEDY

[NOTE] Please fix the troubles during the sewing machine operation with referring to the following instructions. Beside, if the trouble conditions are not coming under these classification, please contact the sewing machine dealers nearby.

Bad condition	Cause	Remedy	Ref. page & item
1. Upper thread breakage after happens	Poor thread tension	Use better quality thread	—
	Tight upper thread tension	Adjust thread tension	6-3
	Strong thread take up spring	Adjust thread take up spring properly	7-14
	Upper thread is thicker than needle size	Change needle to suitable size	—
	Damages on shuttle hook or drive	Change them new ones or grind them with buffing wheel or grind stone	—
	Damages inside presser foot needle hole	Change it new one or grind it with buffing wheel	—
	Needle touches with presser foot needle hole	Move presser foot position	7-6-1(6)
	Needle and shuttle hook are not in proper timing	Adjust the timing	7-2
	Thread melts with needle heat	Slow down sewing speed	—
		Use silicon oil	—
Use needle cooler		—	
2. Upper thread is pilled out from needle	Thread tension discs are not opened at trimming	Adjust thread tension release	7-17
	Thread take up spring swings too much	Adjust thread take up spring's swing stroke	7-14
	Upper thread is broken before regular trimming	Adjust fixed knife and needle plate position	7-12
	Needle size is bigger than thread size	Change needle to suitable size	—
	Pre-tension is too tight	Adjust pre-tension	7-16
	Thread guide is in wrong position	Adjust thread guide position properly	7-5
	Needle and shuttle hook are in bad timing	Adjust the timing properly	7-2
	Trimmer timing is not correct	Adjust trimmer cam position	7-10
		Adjust movable knife position	7-11
Adjust synchronizer position		—	



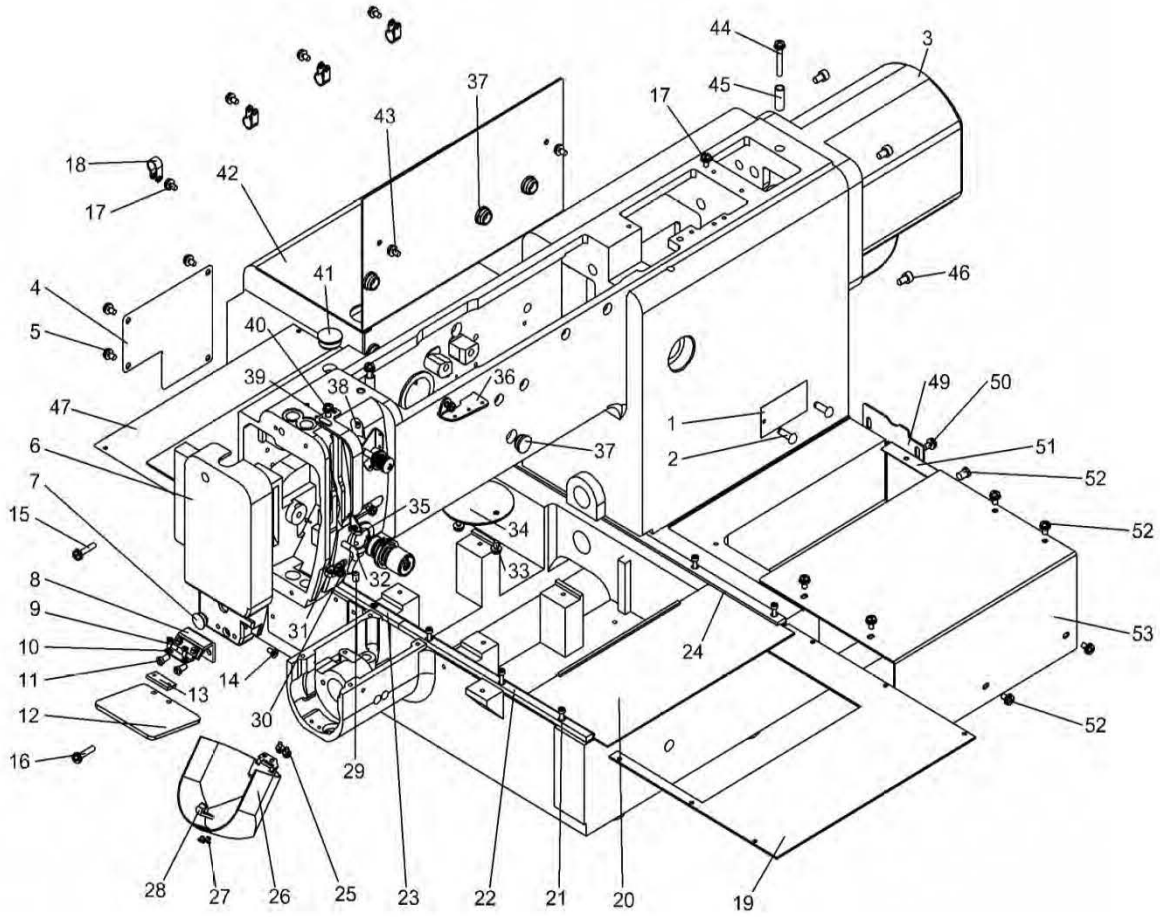
Bad condition	Cause	Remedy	Ref. page & item
3. Skip stitch happens at start sewing	Too short bobbin thread by bobbin spinning after trimming	Use non racing spring with bobbin	—
	Bobbin thread tension is too tight	Loosen bobbin thread tension spring	6-3
	Thread tail from needle is very short after trimming	Decrease pre-tension	7-16
		Adjust trimmer cam position	7-10
		Adjust synchronizer position	—
		Make thread take up swing stroke smaller	7-13
		Advance thread tension release timing	Control unit
Adjust thread guide position properly	7-5		
4. Thread tail from needle is too long after trimming	Pre-tension is too loose	Make pre-tension tighter	7-14
	Trimmer timing is delayed	Adjust trimmer cam position	7-10
		Adjust synchronizer position	—
	Upper thread tension release timing is too fast	Delay tension release timing	Control unit
Tread guide is in wrong position	Adjust thread guide position properly	7-5	
5. Trimming is not functioned	Trimmer function is canceled	Resume trimmer function	Control unit
	Fixed knife is dull	Change it new knife	7-11
	Movable Knife is in wrong position	Adjust movable knife position properly	7-11
	Skip stitching happens at trimming	Fix skip stitching	7-6
	Trimmer timing is wrong	Adjust trimmer cam position	7-10
Adjust synchronizer position		—	
6. Skip stitching often happens	Needle and shuttle hook clearance is too big	Adjust needle and shuttle hook timing properly	7-2
	Needle and shuttle hook timing is not correct	Adjust needle and shuttle hook timing properly	7-2
	Needle is bent	Change it new needle	—
	Needle is bent by driver	Adjust needle and diver clearance properly	7-4
	Needle is in wrong position	Amend needle position	7-2
	Presser foot position is not correct	Adjust presser foot position properly	7-6

Bad condition	Cause	Remedy	Ref.page & item
7. Stitch forming is loose	Upper thread tension is not tight enough	Increase upper thread tension	6-3
	Thread tension regulator's discs are opened during sewing	Adjust tension regulator position properly	7-17
		Adjust upper tension release position properly	7-17
	Presser foot position is not correct	Adjust presser foot position properly	7-6
	Driver and shuttle hook clearance is very small	Change shuttle hook	—
	Presser foot up and down timing is not proper	Adjust presser foot timing properly	7-6
8. Sewing machine does not work even start switch is turned ON	Cables wiring is disconnected	Connect all cables precisely	3
	System software is not loaded	Load system software to control box	5-1
	Emergency stop switch is kept ON	Release emergency stop switch lock	6-1
9. Sewing machine runs idle at high speed when power switch is turned ON	Synchronizer cable is disconnected	Connect synchronizer cable precisely	control unit
	Synchronizer is out of order	Change it new synchronizer	—
10. Work holder does not work	Work holder activate cable is disconnected	Connect the cable precisely	control unit
	Work holder activate cable is not strong enough	Increase work holder pressure	7-9
	Work holder switch is out of order	Change it new work holder switch	—
11. Sewing pattern is distorted	Work holder switch is not strong enough	Increase work holder pressure	7-9
	sewing material weight is very heavy	Slow down sewing speed	6-2
		Slow down feeding speed	control unit
		Select sewing material weight level at feeding	control unit
X timing belt is loose	Adjust X timing belt tension properly	7-21	

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Bad condition	Cause	Remedy	Ref. page & item
12. Work holder does no stop at home position	X-Y detectors cable are disconnected	Connect X-Y cables precisely	—
	X-Y detectors cable are out of order	Change them new detectors	—
	Detector and detector plate clearance is too big	Adjust the clearance properly	7-19
13. Work holder stops at not original home position	Detector and detector plate mounting is loose	Check setscrews and tighten them securely	7-19
	Detector and detector plate clearance is bigger than standard	Adjust detector and detector plate clearance properly	7-19

# A. ARM BED & IT'S ACCESSORIES (一)



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## A. ARM BED & IT'S ACCESSORIES (一)

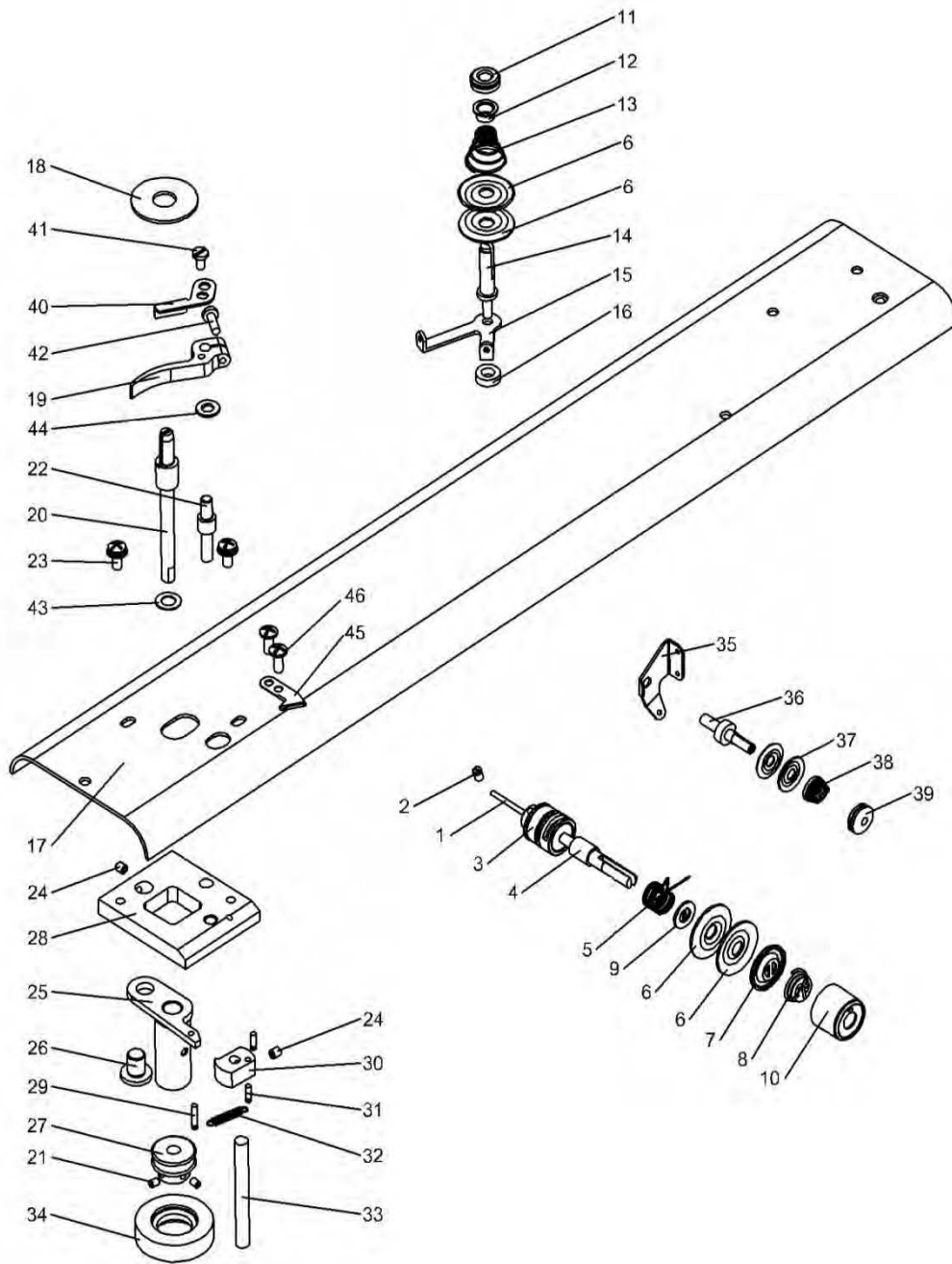
Fig. No.	Part No.	Description	Pcs.	Remarks
A01	HK41B88001	Type plate	1	
A02	H924025050	Pin	2	$\Phi 2.5 \times 5$
A03	HK42C58001	Motor cover	1	
A04	HK41B98001	Plate	1	
A05	H6642B8001	Screw	4	M4×8
A06	HM019B8001	Arm plate	1	
A07	HA307B0674	Rubber plug	1	
A08	HM015B8001	Bracket	1	
A09	HA104G0654	Screw	4	1/8(44)×6
A10	H6671B8001	Hinge	2	
A11	HA100C2190	Screw	2	11/64(40)×8
A12	HM014B8001	Plate	1	
A13	H6675B8001	Plate	1	
A14	HA106B0676	Screw	2	9/64(40)×6
A15	HZ11040250	Screw	1	M4×25
A16	H6609I8001	Screw	1	M4×20
A17	H6642B8001	Screw	5	M4×8
A18	H6648I8001	Nylon clip	5	AB-6N
A19	HK42B48001	Bed cover	1	
A20	HK42B68001	Middle cover	2	
A21	H415030120	Screw	10	M3×12
A23	HK42B88001	Front guide	2	
A24	HK43B08001	Back guide	2	
A25	H6698B8001	Screw	2	M3×6
A26	HK43B27101	Cylinder cover	1	
A26	H663FB7101	Cylinder cover	1	
A27	H6692B8001	Screw	2	9/64(40)×3.2
A28	H6691B8001	Spring	1	
A29	H431050080	Screw	1	M5×8
A30	H661EB8001	Screw	3	M4×6
A31	HA106B0675	Thread guide	1	
A32	H3000B2130	Thread guide	1	
A33	H415040080	Screw	2	M4×8
A34	HK44B88001	Plate	1	
A35	HA600B2050	Thread guide	1	
A36	HA700B2050	Thread guide	1	
A37	H4715B8001	Rubber	5	
A38	H431040060	Screw	1	M4×6
A39	H6689B8001	Thread take-up lever guard	1	
A40	H6642B8001	Screw	1	M4×8
A41	HA307B0673	Rubber plug	1	
A42	HK44B68001	Bed cover	1	
A43	H6642B8001	Screw	4	M4×8

## A. ARM BED & IT'S ACCESSORIES (一)

Fig. No.	Part No.	Description	Pcs.	Remarks
A44	H6665B8001	Screw	2	M4×30
A45	H6664B8001	Ball bushing	2	
A46	H415050180	Screw	4	M5×18
A47	HK42B58001	Cover	1	
A49	HK45B18001	Cover	1	
A50	H661EB8001	Screw	2	M4×6
A51	H6613I7102	Connector panel	1	
A52	H6642B8001	Screw	8	M4×8
A53	HK44B38001	Cover	1	

## B. ARM BED & IT'S ACCESSORIES (二)

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## B. ARM BED & IT' S ACCESSORIES (二)

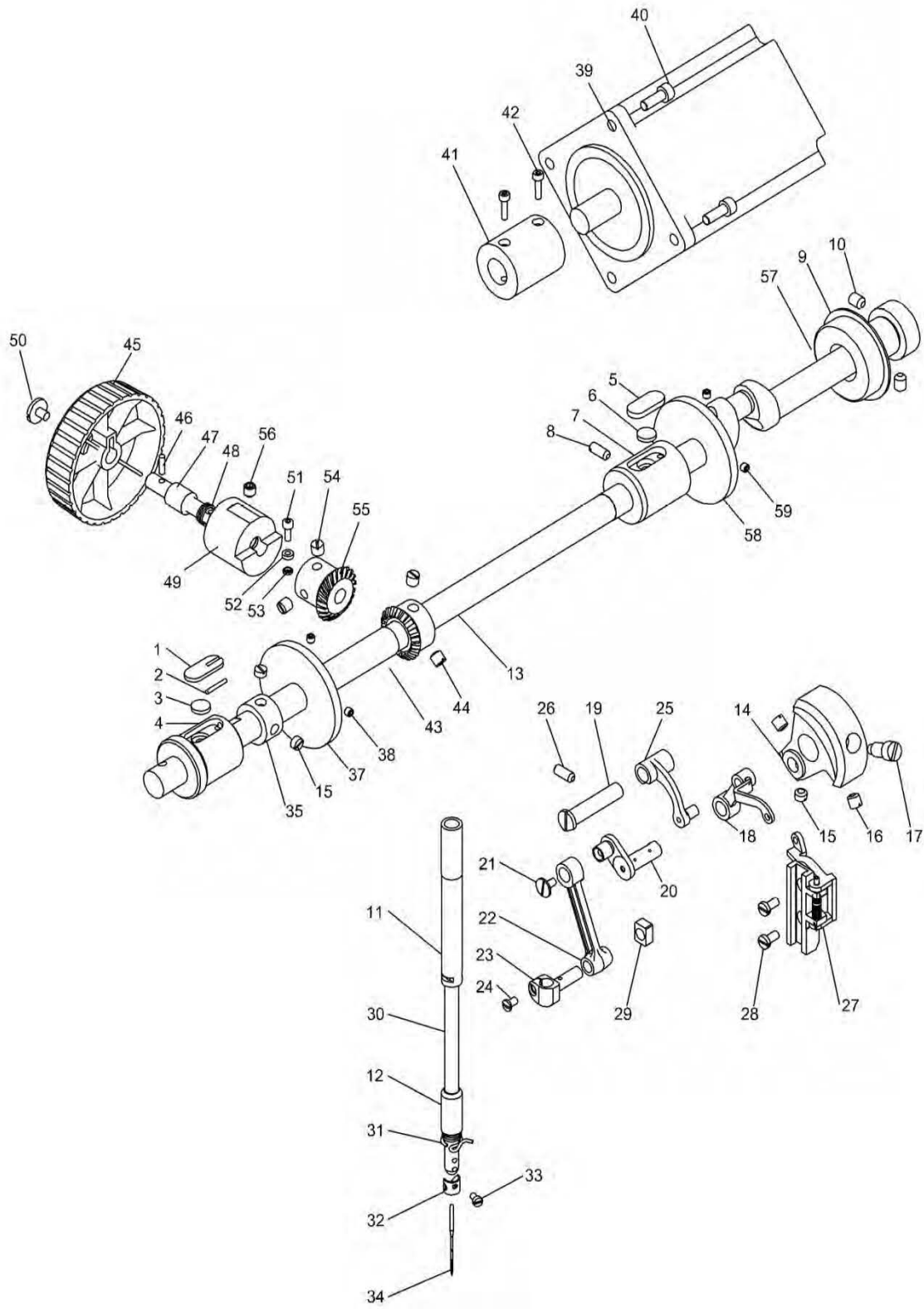
Fig. No.	Part No.	Description	Pcs.	Remarks
B01	HA115B0709	Pin	1	
B02	HA115B0708	Screw	1	
B03	HA310B0703	Regulator casing	1	
B04	HA115B0701	Screw	1	
B05	HA115B0706	Thread take-up spring	1	
B06	HA310B0705	Thread tension discs	2	
B07	HA310B0702	Disc retaining plate	1	
B08	H6675C8001	Thread tension spring	1	
B09	HA115B7010	Thumb nut revolution stopper	1	
B10	HA310B0701	Thumb nut	1	
B11	H660GB8001	Thumb nut	1	
B12	H660FB8001	Spring guide	1	
B13	H660EB8001	Thread tension spring	1	
B14	H660HB8001	Thread tension stud	1	
B15	H6662B8001	Thread guide	1	
B16	H6663B8001	Spacer	1	
B17	HK45B08001	Top cover	1	
B18	H6656B8001	Spacer	1	
B19	H6651B8001	Lever	1	
B20	H6648B8001	Driven shaft	1	
B21	H431030040	Screw M3×4	2	M3×4
B22	H6649B8001	shaft	1	
B23	H6682D8001	Screw M4×10	2	M4×10
B24	H431040040	Screw M4×4	2	M4×4
B25	H6645B7101	Lever	1	
B26	H6650B8001	Pin	1	
B27	H6657B8001	Wheel	1	
B28	H6644B8001	Bracket	1	
B29	H4921K8001	Pin $\phi 2.5 \times 8$	1	
B30	H6652B8001	Cam	1	
B31	H4917K8001	Pin $\phi 2.5 \times 12$	2	
B32	H6653B8001	Spring	1	
B33	H6655B8001	Pin $\phi 5 \times 56$	1	
B34	H6658B8001	Tire	1	
B35	HA710B0674	Thread guide	1	
B36	HA710B0673	Thread tension stud	1	
B37	HA112B0693	Thread tension discs	2	
B38	HA710B0672	Thread tension spring	1	
B39	HA710B0671	Thumb nut	1	
B40	H662EB8001	Plate	1	
B41	H3200B2100	Screw	1	9/64(40)×6.5
B42	HA100H2150	Screw	1	9/64(40)×11
B43	H662IB8001	Spacer	1	



## B. ARM BED & IT' S ACCESSORIES (二)

Fig. No.	Part No.	Description	Pcs.	Remarks
B44	HE121B8001	Spacer	1	
B45	H6756B8001	Knife	1	
B46	H6698B8001	Screw	2	M3×6
B47	HA310B0705	Thread tension discs	2	

# C. SEWING MECHANISM (一)



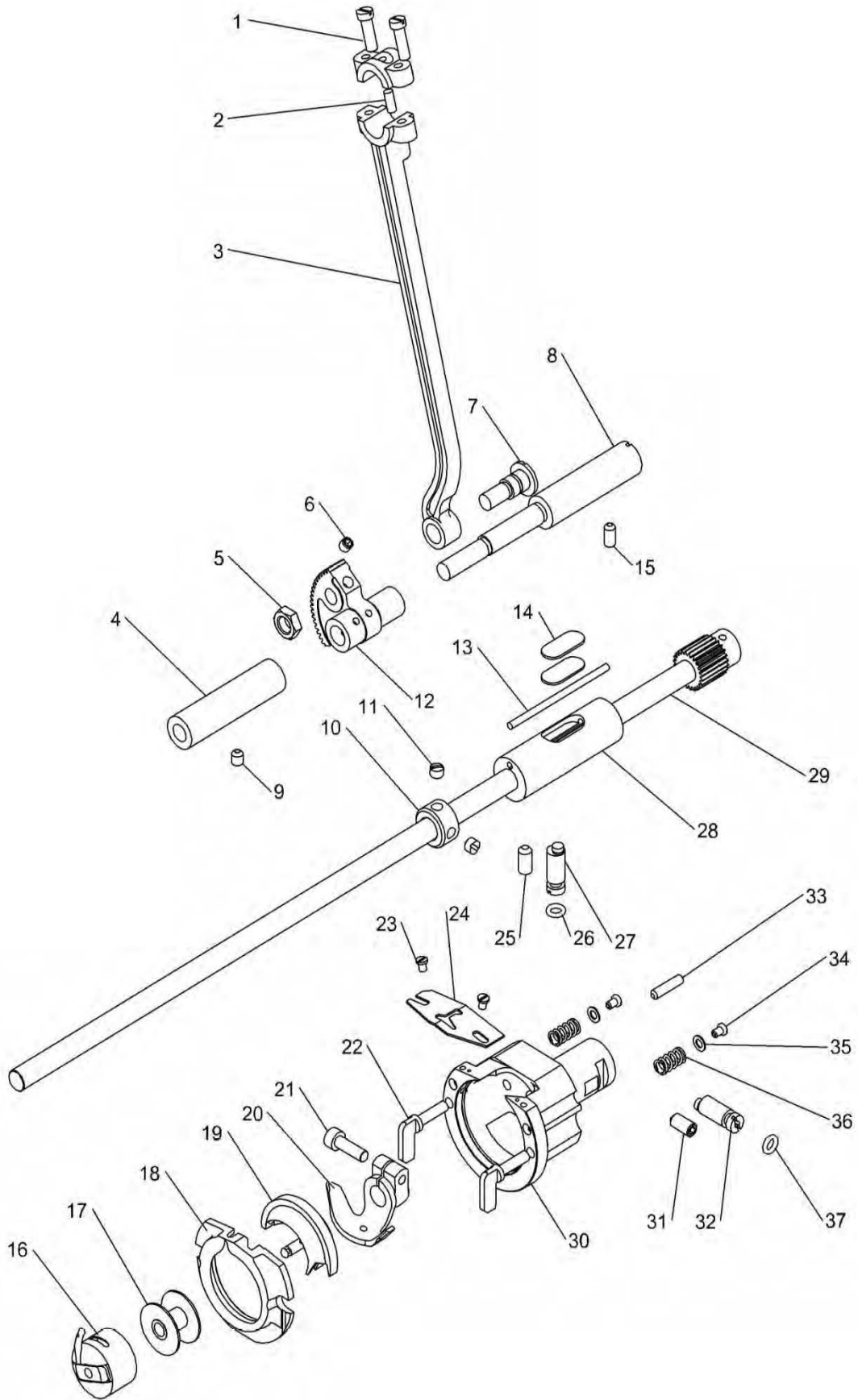
### C. SEWING MECHANISM (一)

Fig. No.	Part No.	Description	Pcs.	Remarks
C01	H2009B0743	Felt	3	
C02	H2009B0742	Felt	1	
C03	H6616B8001	Felt	1	
C04	H6617B8001	Bushing	1	
C05	H2009B0731	Felt	1	
C06	H6616B8001	Felt	1	
C07	H6620B8001	Bushing	1	
C08	H431050100	Screw	1	M5×10
C09	H3208H0661	Ball bearing	1	
C10	H3416D0692	Screw	2	15/64 (28) × 8
C11	H6612B8001	Needle bar bushing(upper)	1	
C12	H6613B8001	Needle bar bushing(lower)	1	
C13	HK40C58001	Drive shaft	1	
C14	H6607C8001	Crank	1	
C15	HA105D0662	Screw	1	1/4 (40) × 4
C16	HA307C0662	Screw	2	1/4 (40) × 6
C17	HA100C2070	Screw	1	9/32 (28)
C18	H6612C7101	Thread take-up lever assy	1	
C19	H6613C8001	shaft	1	
C20	H6614C8001	Crank	1	
C21	H2004H0067	Screw	1	
C22	H6616C8001	Crank	1	
C23	HA104C0658	Needle bar joint	1	
C24	HA104C0659	Screw	1	
C25	H6619C8001	Crank	1	
C26	H431050120	Screw	1	M5×12
C27	HM005C7101	Guide bracket assy	1	
C28	H6623C8001	Screw	2	M4×8
C29	HA100C2200	Square block	1	
C30	H6624C8001	Needle bar	1	
C31	HA300C2070	Thread guide	1	
C32	H6625C8001	Thread guide	1	
C33	HA100C2170	Screw	1	1/8 (44) × 4.5
C34	HM010C8001	needle	1	DP×17-18
C35	HA108G0661	Collar	1	
C36	HA105D0662	Screw	2	1/4 (40) × 4
C37	H6608C8001	Pulley	1	
C38	H431040060	Screw	2	M4×6
C39	HK42C38001	Main shaft motor	1	
C40	H415050140	Screw	4	M5×14
C41	H882708001	Coupling	1	
C42	H415030120	Screw	2	M3×12
C43	HA113D2112	Gear	1	

### C. SEWING MECHANISM (一)

Fig. No.	Part No.	Description	Pcs.	Remarks
C44	HA108C0663	Screw	2	SM1/4(40) × 7
C45	HK42C98001	Hand wheel	1	
C46	H609030120	Pin	1	
C47	HK43C18001	Shaft	1	
C48	H4767E8001	Spring	1	
C49	HK43C08001	Bushing	1	
C50	H5311F8001	Screw	1	11/64(40) × 6.1
C51	H415030100	Screw	1	M3 × 10
C52	HF15401014	Bearing	1	
C53	HF15401012	Washer	1	
C54	HA108C0662	Screw	2	1/4(40) × 5
C55	HA113D2122	Gear	1	
C56	H431050080	Screw	1	M5 × 8
C57	H3205J0661	Bushing	1	
C58	H6606F8001	Thread trimmer cam	1	
C59	HA105D0662	Screw	2	1/4(40) × 4

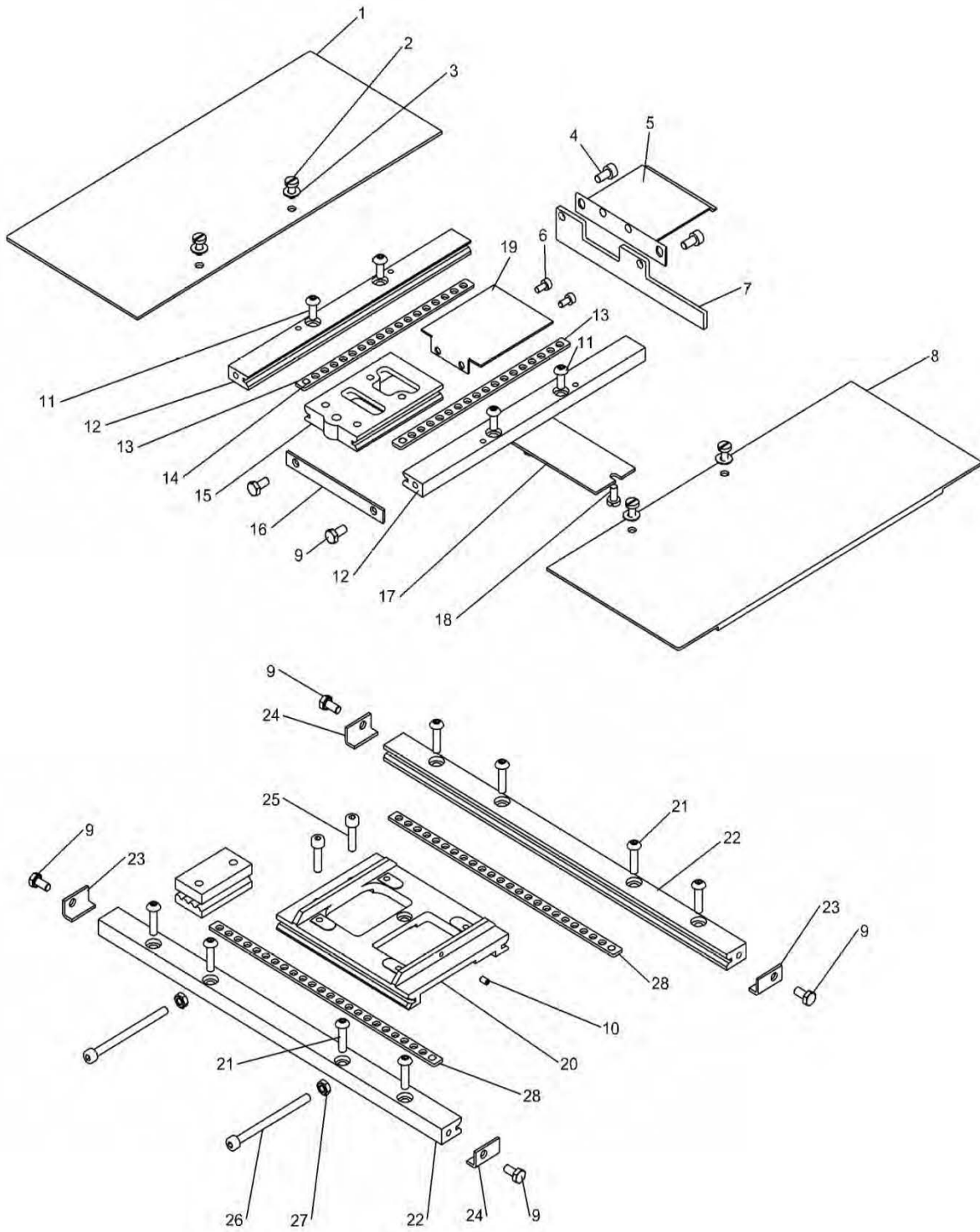
## D. SEWING MECHANISM (二)



## D. SEWING MECHANISM (二)

Fig. No.	Part No.	Description	Pcs.	Remarks
D01	HA304G0656	Screw	2	3/16 (28) × 15
D02	H6634C8001	Felt	1	
D03	H6628C7101	Connecting rod assy	1	
D04	H6628B8001	Bushing	1	
D05	H2010J0066	Nut	1	9/32 (28)
D06	H431050050	Screw	1	
D07	H6630C8001	Screw	1	9/32 (28)
D08	H6635C8001	Rock shaft	1	
D09	H431050080	Screw	1	M5 × 8
D10	H6670C8001	Collor	1	
D11	HA305E0662	Screw	2	SM15/64 (28) × 4.5
D12	H6631C8001	Sector gear	1	
D13	H6627B8001	Oil braid	1	
D14	H2009B0743	Felt	2	
D15	H431060100	Screw	2	
D16	H6684C8001	Bobbin case	1	
D17	H6685C8001	Bobbin	1	
D18	H6674C8001	Hook retaine	1	
D19	H6683C8001	Inner hook	1	
D20	H6654C8001	Hook driver	1	
D21	H415050160	Bolt M5 × 16	1	M5 × 16
D22	H6646C8001	Hook clamp	2	
D23	H6658C8001	Screw	2	1/8 (40) × 4
D24	H6657C8001	Thread guide	1	
D25	H431060120	Screw	1	M6 × 12
D26	HC01048019	O ring	1	
D27	H6648C8001	Eccentric shaft	1	
D28	H6625B8001	Bushing	1	
D29	HK44C87101	Hook shaft assy	1	
D30	H6642C8001	Outer hook	1	
D31	H6648C8001	Eccentric shaft	1	
D32	H431060120	Screw	1	M6 × 12
D33	H6651C8001	Pin	1	
D34	H6643C8001	Screw	2	1/8 (44) × 4.5
D35	H6644C8001	Washer	2	
D36	H6645C8001	Spring	2	
D37	HC01048019	O ring	1	

# E. X-Y TABLE MECHANISM (一)

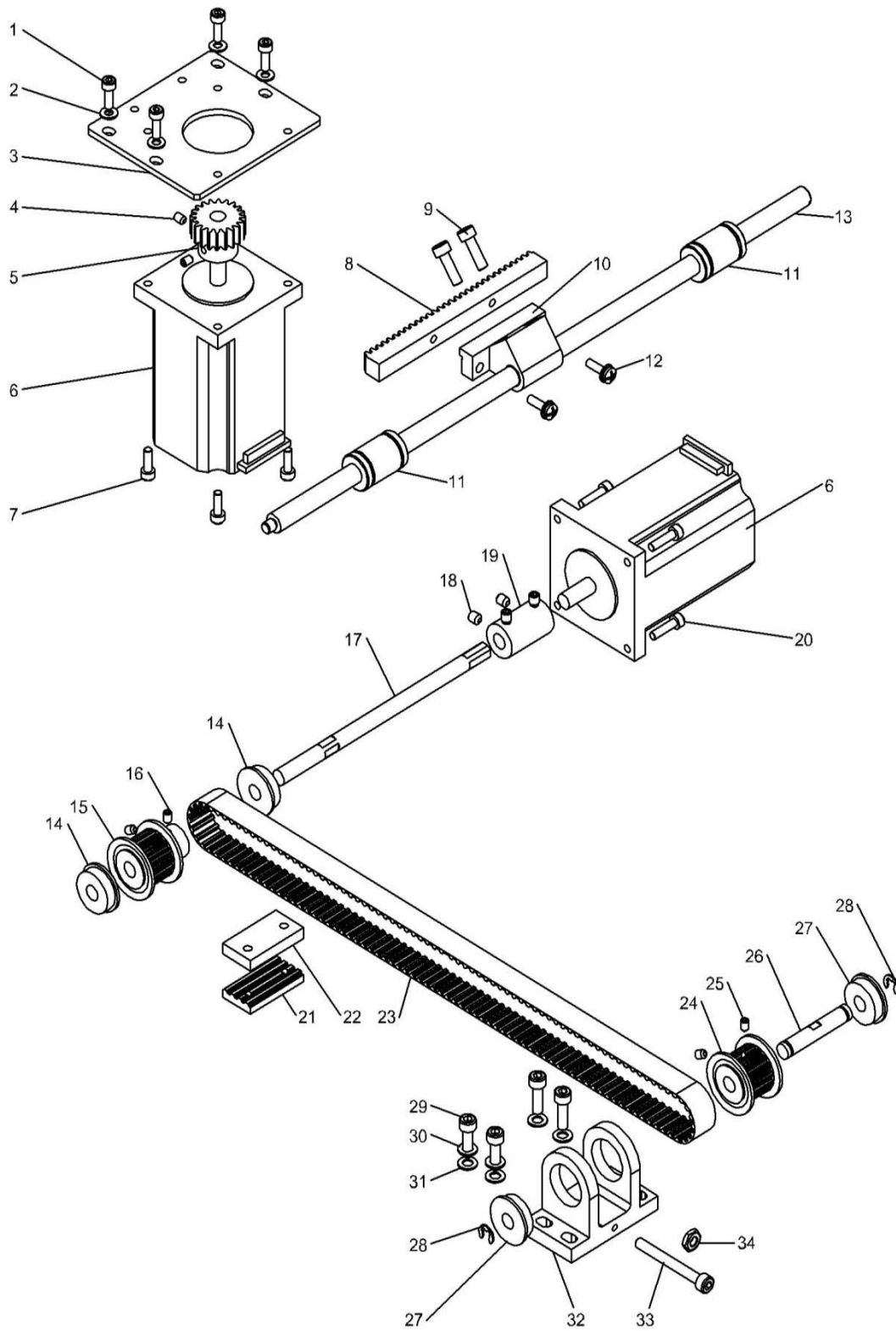


### E. X-Y TABLE MECHANISM (一)

Fig. No.	Part No.	Description	Pcs.	Remarks
E01	HK42D38001	Cover	1	
E02	HA70264C06	Screw	4	9/64(40)×8
E03	H7351C8001	Washer	4	
E04	H415040080	Screw	2	M4×8
E05	HK42D18001	Cover	1	
E06	HK42D08001	Screw	2	M3×6
E07	HK41D78001	Rear stopper Y	1	
E08	HK42D48001	Cover	1	
E09	H103040080	Bolt	6	M4×8
E10	H431030060	Screw	1	M3×6
E11	H416040100	Screw	4	M4×10
E12	HK41D18001	Fixed race Y	2	
E13	HK41D08001	Retainer Y	2	
E14	H6618D8001	Ball	80	
E15	HK41D58001	Movable race Y	1	
E16	HK41D38001	Front stopper Y	1	
E17	HK41D98001	Conncting plate	1	
E18	HA70264C06	Screw	2	9/64(40)×8
E19	H6623D8001	Cover	1	
E20	HK40D68001	Movable race X	2	
E21	H416040160	Screw	8	M4×16
E22	HK40D98001	Fixed race X	2	
E23	H6610D8001	Stopper	2	
E24	H6611D8001	Stopper	2	
E25	H415040140	Screw	2	M4×14
E26	H415040400	Screw	2	M4×40
E27	H003002040	Nut	2	M4
E28	HK40D88001	Retainer X	2	



# F. X-Y TABLE MECHANISM (二)



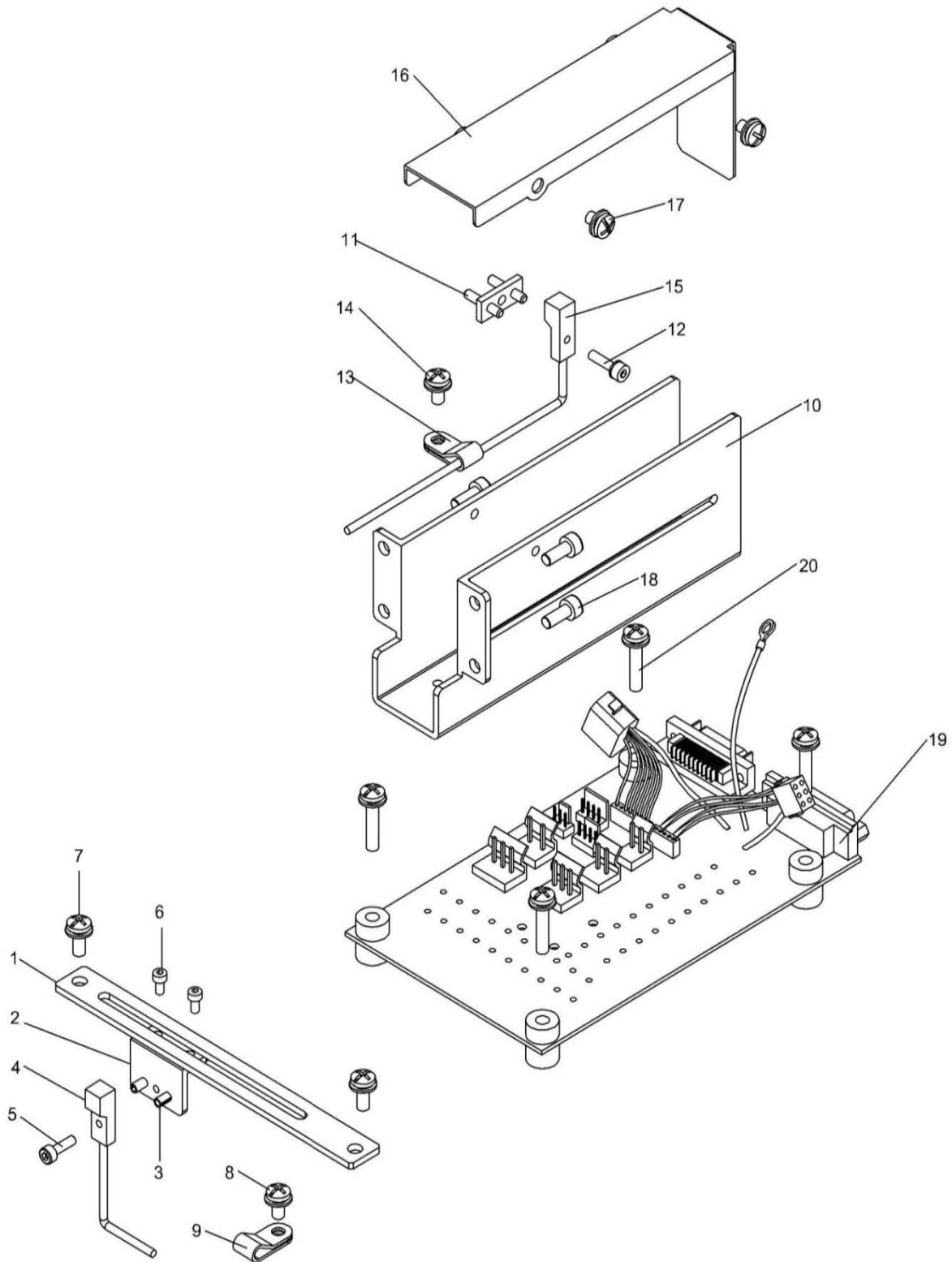
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## F. X-Y TABLE MECHANISM (二)

Fig. No.	Part No.	Description	Pcs.	Remarks
F01	H415050100	Screw	4	M5×10
F02	H6686D8001	Washer	4	
F03	H6646D8001	Motor mounting plate Y	1	
F04	H6632D8001	Screw	2	M4×6
F05	H6631D8001	Gear	1	
F06	HK43D08001	Stepping motor	1	
F06	HK43D08001	Stepping motor	1	
F07	H415040120	Screw	4	M4×12
F08	HK46D68001	Rack Y	1	
F09	H415050160	Screw	2	
F10	H6649D8001	Rack adapter Y	1	
F11	H6623B8001	Ball bushing 10	2	
F12	H6693D8001	Screw	2	M4×14
F13	HK47E18001	Linear shaft Y	1	
F14	HK41B58001	Bearing	2	
F15	HK44D68001	Driving pulley B	1	
F16	H6632D8001	Screw	2	M4×6
F17	HK43D48001	Shaft	1	
F18	HK43D38001	Screw	4	M5×6
F19	HK43D28001	Coupling	1	
F20	H415040160	Screw	4	M4×16
F21	HK42D58001	Pulley shaft	1	
F22	HK42D68001	Pulley shaft	1	
F23	HK45D58001	Cog belt	1	
F24	HK45D38001	Driving pulley A	1	
F25	H6632D8001	Screw	2	M4×6
F26	HK45D48001	Shaft	1	
F27	HK41B58001	Bearing	2	
F28	H007013060	E-type retaining ring	2	
F29	H415050160	Screw	4	M5×16
F30	H6686D8001	Washer	4	
F31	H005008050	Spring washing	4	
F32	HK45D08001	Bracket	1	
F33	HK42D88001	Screw	1	
F34	H3100E2180	Nut	1	M4

## G. CABLE COMPONENT & DETECTOR MECHANISM

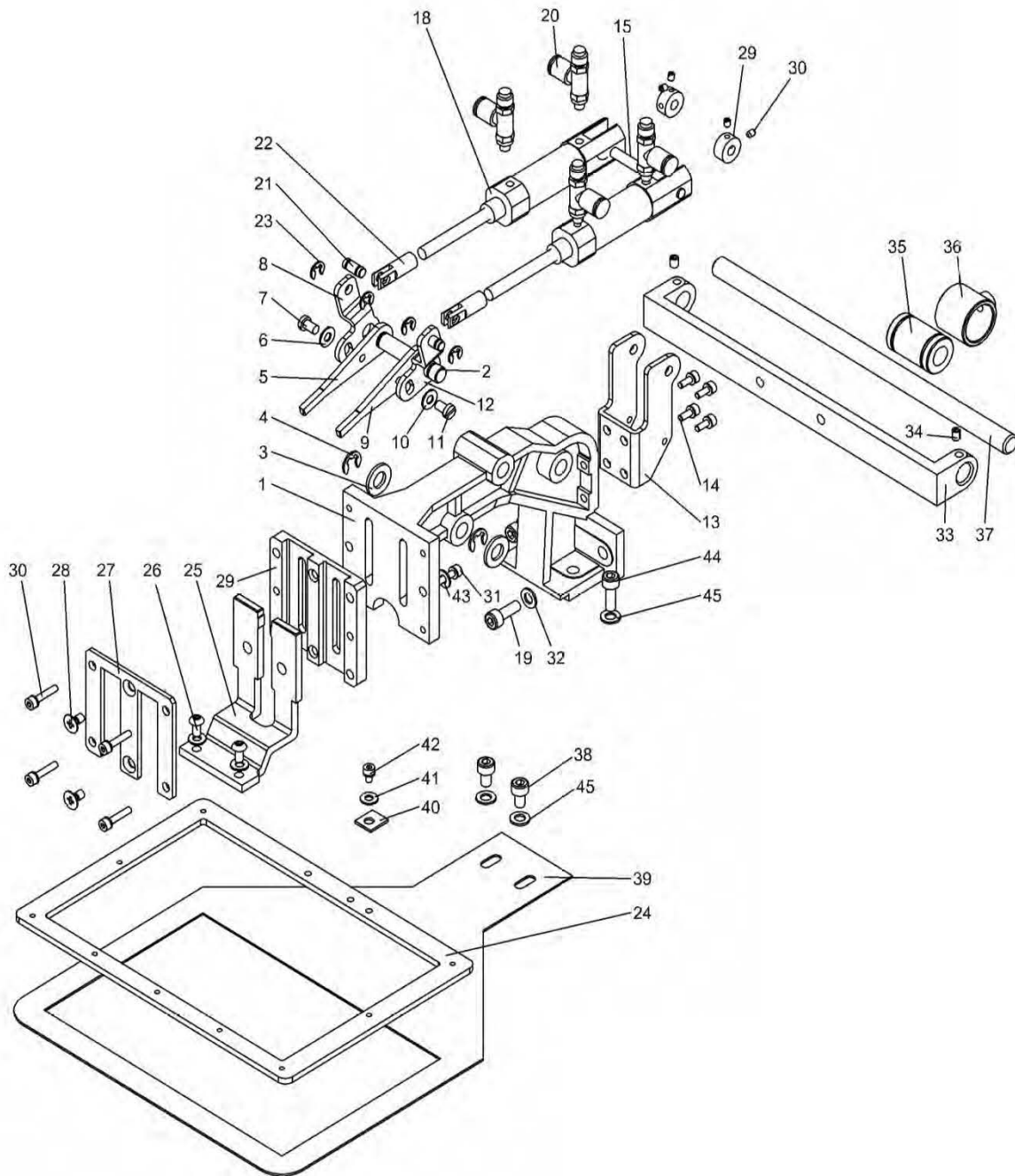
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## G. CABLE COMPONENT & DETECTOR MECHANISM

Fig. No.	Part No.	Description	Pcs.	Remarks
G01	H6656D8001	Detector X mounting plate	1	
G02	H6657D8001	Bracket	1	
G03	H6677D8001	Pin	2	
G04	H6694D8001	Detector X	1	
G05	H6695D8001	Screw	2	
G06	H415040080	Screw	2	M4×8
G07	H415040080	Screw	2	M4×8
G08	H6642B8001	Screw	1	M4×8
G09	H6679D8001	Nylon clip	1	AB-3N
G10	H6665D8001	Detector bracket Y	1	
G11	H6676D7101	Holder plate assy	1	
G12	H415030100	Screw	1	M3×10
G13	H6679D8001	Nylon clip	1	AB-3N
G14	H6642B8001	Screw	1	M4×8
G15	H6670D8001	Detector Y	1	
G16	H6666D8001	Detector cover Y	1	
G17	H661AB8001	Screw	2	M4×6
G18	H415040100	Screw	4	M4×10
G19		Print circuit board	1	
G20	H6609I8001	Screw	4	M4×20

# H. WORK HOLDER MECHANISM (AIR OPERATED)



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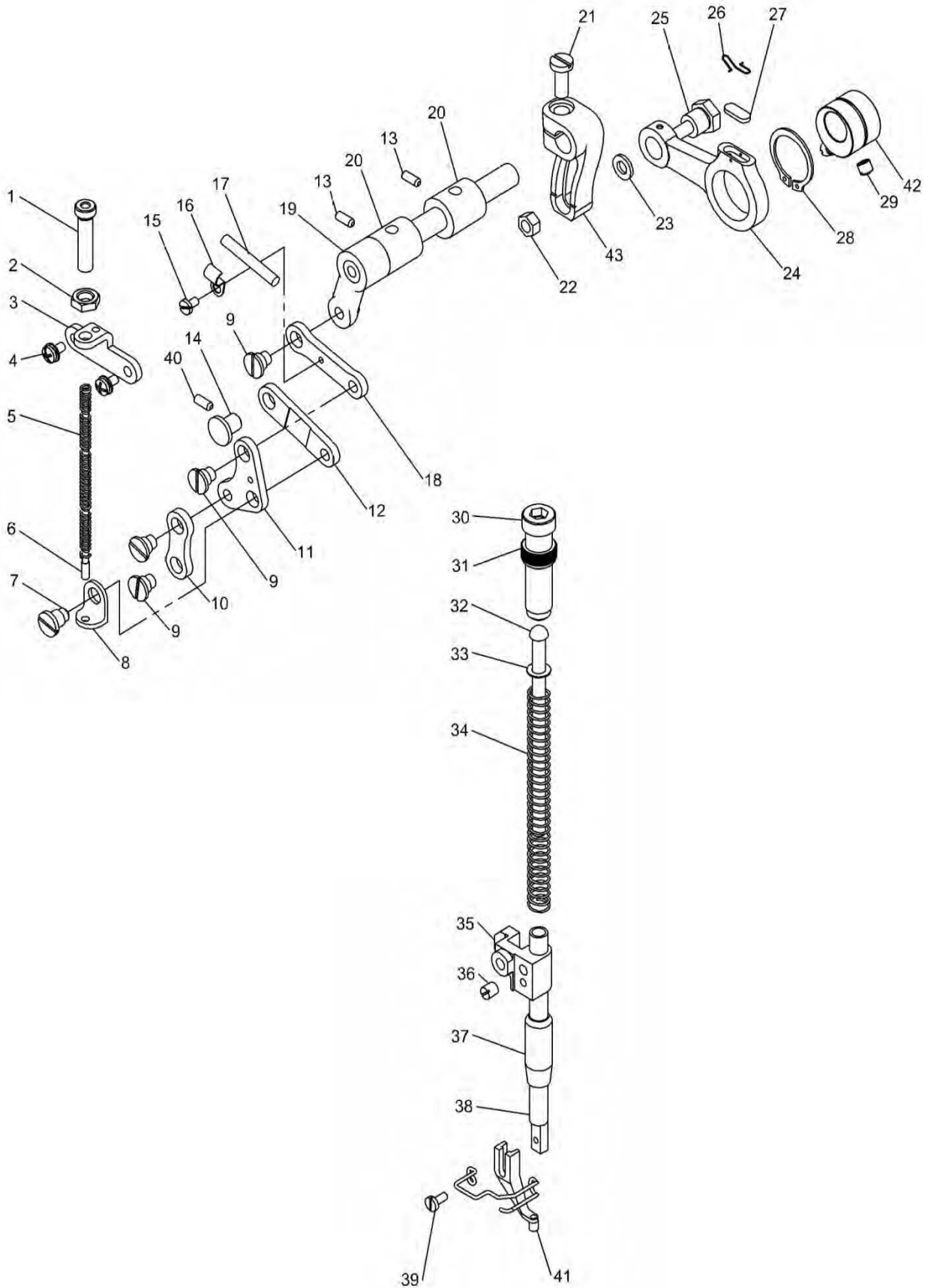
## H. WORK HOLDER MECHANISM(AIR OPERATED)

Fig. No.	Part No.	Description	Pcs.	Remarks
H01	HM012E8001	Work holder guide base	1	
H02		Pin	1	
H03	H005001080	Washer	2	
H04	H007013060	E-type retaining ring	2	
H05		Link	1	
H06	HA719B7010	Washer	1	
H07	HA700F2100	Screw	1	SM11/64 (40) × 7
H08		Link	1	
H09		Link	1	
H10	HA719B7010	Washer	1	
H11	HA700F2100	Screw	1	SM11/64 (40) × 7
H12		Link	1	
H13	HF15404017	Bracket	1	
H14	H415040080	Screw	4	M4 × 8
H15	HF15404016	Pin	1	
H16		retaining ring	2	
H17	HF997J8001	Screw	4	M3 × 4
H18	HEE4108001	air cylinder	2	
H19	H415050140	Screw	2	M5 × 14
H20	HEE4218001	Joint	4	
H21	HEE4708001	Bolt	2	
H22	HF15404014	Bracket	2	
H23	H007013040	E-type retaining ring	4	
H24	HK40E68001	Clamp foot	1	
H25	HM007E8001	Bracket	1	
H26	H416040080	Screw	2	M4 × 8
H27	HM008E8001	Guide bracket	1	
H28	H660JB8001	Screw	2	M4 × 8
H29	HM011E8001	Bracket	1	
H30	H415040160	Screw	4	M4 × 16
H31	H415040120	Screw	2	M4 × 12
H32	H6686D8001	Washer	4	
H33	HK42E78001	Bracket	1	
H34	H431040060	Screw	2	M4 × 6
H35	H6623B8001	Bearing	1	
H36	H6682E8001	Bearing housing	1	
H37	HK46E88001	Shaft	1	
H38	H415050080	Screw	2	M5 × 8
H39	HK46E98001	Feed plate	1	
H40	H666GE8001	Positioning block	1	
H41	H415040050	Screw	1	M4 × 5
H42	H6685D8001	Washer	3	
H43	H6684D8001	Washer	2	

## H. WORK HOLDER MECHANISM (AIR OPERATED)

Fig. No.	Part No.	Description	Pcs.	Remarks
H44	H415050140	Screw	2	M5×14
H45	H6686D8001	Washer	4	

# J. PRESSER FOOT MECHANISM



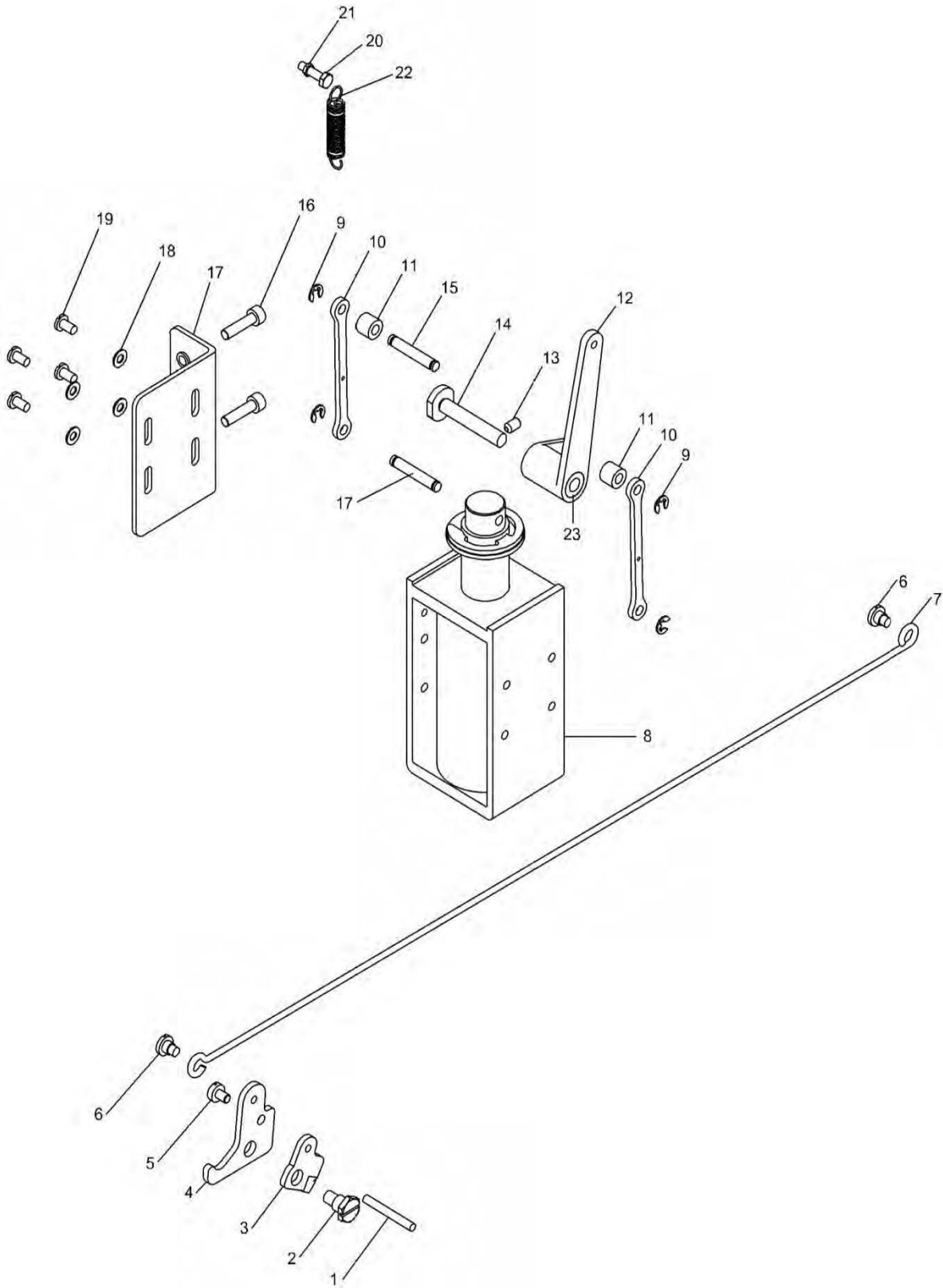


## J. PRESSER FOOT MECHANISM

Fig. No.	Part No.	Description	Pcs.	Remarks
J01	H2010J0065	Screw	1	9/32 (28) × 35
J02	H2010J0066	Nut	1	9/32 (28)
J03	HM018F8001	Bracket	1	
J04	H6682D8001	Screw	2	M4 × 10
J05	HM022F8001	Presser spring	1	
J06	H2000J2040	Presser bar	1	
J07	HM016F8002	Screw	1	1/4 (40)
J08	HM015F8001	Positioning block	1	
J09	HM016F8001	Screw	4	1/4 (40)
J10	HM014F8001	Link	1	
J11	HM011F8001	Link	1	
J12	HM013F8001	Link	1	
J13	H431040100	Screw	2	M4 × 10
J14	H6650B8001	Pin	1	
J15	HA106B0676	Screw	1	9/64 (40) × 6
J16	H3200K0190	Holder	1	
J17	H2000M0080	Felt	1	
J18	HM012F8001	Link	1	
J19	HM007F7101	Shaft	1	
J20	HM006B8001	Bushing	2	
J21	H2012N0652	Screw	1	1/4 (40) × 16
J22		Nut	1	M6
J23	H005001060	Washer	1	
J24	HM005F8001	Link	1	
J25	H2000J2100	Screw	1	M6
J26	H20111C106	Holder	1	
J27	H2014J0068	Felt	1	
J28	H007009250	retaining ring	1	
J29	HA307C0662	Screw	2	1/4 (40) × 6
J30	HA309H0681	Screw	1	1/2 (28) × 43
J31	HA117H0692	Nut	1	1/2 (28)
J32	HM025F8001	Presser bar guide	1	
J33	H6621B8001	Washer	1	
J34	HM026F8001	Presser spring	1	
J35	H6027H8001	Presser bar holder	1	
J36	HA3411D308	Screw	1	15/64 (28) × 7
J37	HA100H2090	Bushing	1	
J38	HM029F8001	Presser bar	1	
J39	H2000I2050	Screw	1	9/64 (40) × 8
J40	H431040100	Screw	1	M4 × 10
J41	HM027F8001	Presser foot	1	
J42	H2014J0652	Eccentric cam	1	
J43	H2100I2010	Link	1	

# K. PRESSER BAR LIFTING MECHANISM

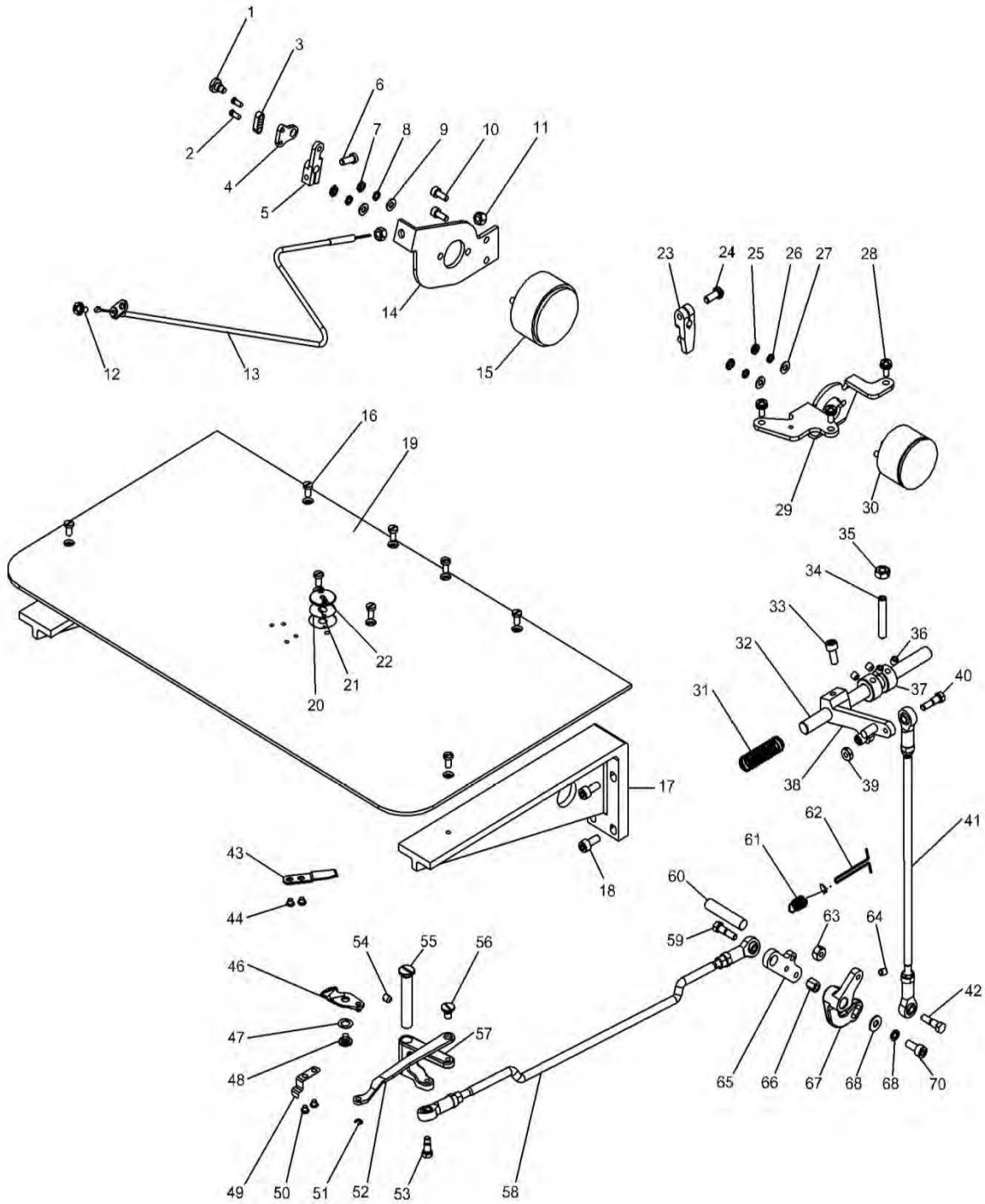
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## K. PRESSER BAR LIFTING MECHANISM

Fig. No.	Part No.	Description	Pcs.	Remarks
K01	HA700I2070	Pin	1	
K02	HA100H2050	Screw	1	15/64 (28)
K03	HA107H1012	Cam	1	
K04	HM036F8001	Link	1	
K05	HA107H1013	Screw	1	
K06	HA107H0662	Screw	2	3/16(28)
K07	HK43F48001	Lever	1	
K08	HK44F17101	Solenoid	1	
K09	H007013040	E-type retaining ring	4	
K10	HK44F68001	Link	2	
K11	HM048F8001	Bushing	2	
K12	HK44F88001	Link	1	
K13	H431050080	Screw	1	M5×8
K14	HK45F38001	Pin	1	
K15	HM037F8001	Pin	2	
K16	H415050200	Screw	2	M5×20
K17	H6608E8001	Bracket	1	
K18	H663FE8001	Washer	4	
K19	HA700B2060	Screw	4	11/64(40)×8
K20	H104040160	Bolt	1	M4×16
K21	H003002040	Nut	1	M4
K22	HD412J8001	Spring	1	
K23	HK44F98001	Bearing	2	

# L. THREAD TRIMMING MECHANISM



## L. THREAD TRIMMING MECHANISM

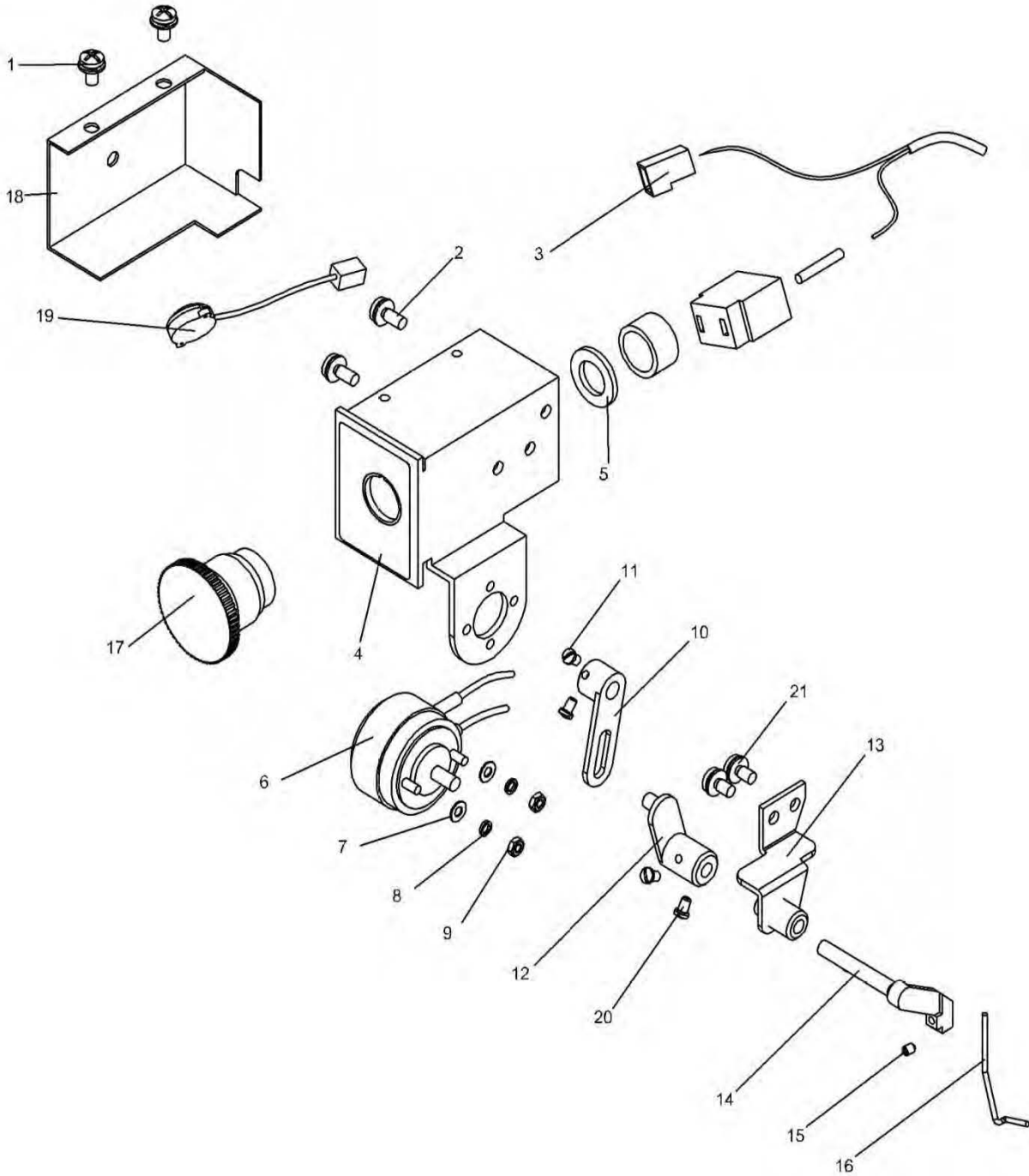
Fig. No.	Part No.	Description	Pcs.	Remarks
L01	HM038E8001	Screw	1	11/64 (40)
L02	HA712N6912	Screw	2	1/8 (44) × 7
L03	HA712N6911	Plate	1	
L04	HM010G8001	Plate	1	
L05	HM011G8001	Link	1	
L06	HA111G0683	Screw	1	11/64 (40) × 12
L07	H6683D8001	Nut	2	M4
L08	H6613F8001	Spring washer	2	
L09	H6685D8001	Washer	2	
L10	H415040100	Screw	2	M4 × 10
L11	H003002050	Nut	2	M5
L12	HZ11040080	Screw	1	M4 × 8
L13	HK43G57101	Soft cord	1	
L14	HK43G38001	Bracket	1	
L15	HM012G7101	Solenoid assy	1	
L16	H6623C8001	Screw	8	M4 × 8
L17	HK43G08001	Support	2	
L18	H415050200	Screw	8	M5 × 20
L19	HK42G68001	Slide plate	1	
L20	H6677F8001	Washer	1	
L21	H6676F8001	needle plate	1	
L22	H6675F8001	Screw	2	3/32 (56) × 2.8
L23	H6611F8001	Crank	1	
L24	H416050120	Screw	1	
L25	H6683D8001	Nut	2	M4
L26	H6613F8001	Spring washer	2	
L27	H6685D8001	Washer	2	
L28	H6682D8001	Screw	3	M4 × 10
L29	H6609F8001	mounting plate	1	
L30	H6616F8001	Solenoid assy	1	
L31	H6623F8001	Spring	1	
L32	H6622F8001	Camshaft	1	
L33	H415050120	Screw	1	M5 × 12
L34	H431060350	Screw	1	M6 × 35
L35	H003002060	Nut	1	M6
L36	H431050050	Screw	4	M5 × 5
L37	H6625F8001	Washer	2	
L38	H6635F7101	Thread crank assy	1	
L39	H6642F8001	Nut	1	11/64 (40)
L40	H6644F8001	Bolt	1	11/64 (40) × 5
L41	H6631F7101	Link	1	
L42	H6644F8001	Bolt	1	11/64 (40) × 5
L43	H6673F8001	Fixed knife	1	

## L. THREAD TRIMMING MECHANISM

Fig. No.	Part No.	Description	Pcs.	Remarks
L44	H6692B8001	Screw	2	9/64(40) × 3.2
L45	H3405D0663	Knuckle joint	2	
L46	H6671F8001	Movable knife	1	
L47	H6679F8001	Washer	1	
L48	H6678F8001	Screw	1	11/64(40)
L49	H6692B8001	Screw	2	9/64(40) × 3.2
L50	H6680F8001	Spring	1	
L51	H007013025	E-type retaining ring	1	2.5
L52	H6667F8001	Tension rod	1	
L53	H6659F8001	Screw	1	11/64 (40) × 10
L54	H431050060	Screw	1	M5 × 6
L55	H6664F8001	Shaft	1	
L56	H6666F8001	Screw	1	3/16(28)
L57	H6658F8001	Crank	1	
L58	HK41G37101	Link	1	
L59	H6644F8001	Bolt	1	11/64 (40) × 5
L60	H6654F8001	Shaft	1	
L61	H6645F8001	Spring	1	
L62	HK43G88001	Hook	1	
L63	H6641F8001	Nut	1	11/64 (40)
L64	HA100B2110	Screw	1	SM11/64(40) × 5.5
L65	H6653F8001	Crank	1	
L66	H6643F8001	Nut	1	11/64 (40)
L67	H6651F8001	Crank	1	
L68	HA300J2230	Washer	1	
L69	H005008050	Spring washer	1	
L70	H415050120	Screw	1	

# M. WIPER MECHANISM

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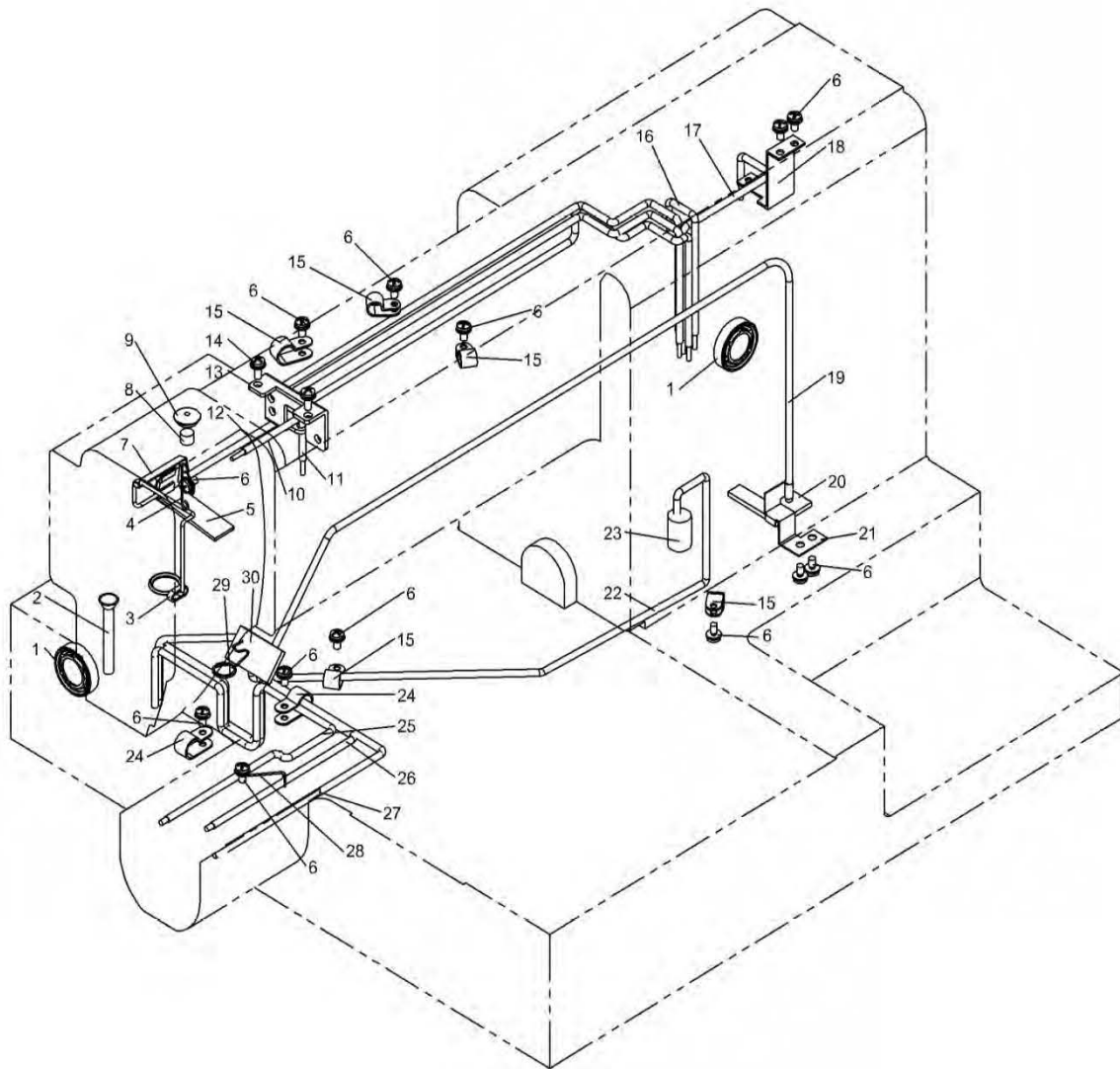
## M. WIPER MECHANISM

Fig. No.	Part No.	Description	Pcs.	Remarks
M01	H6642B8001	Screw	2	M4×8
M02	H6682D8001	Screw	1	M4×10
M03	HM019H7101	Wire assy	1	
M04	HM013H8001	Frame	1	
M05	H6642I8001	Washer	1	
M06	HK41H57101	Frame assy	1	
M07	H668CE8001	Washer	2	
M08	H668BE8001	Spring washing	2	
M09	H003002030	Nut	2	M3
M10	HM009H8001	Link	1	
M11	H6643C8001	Screw	2	1/8(44)×4.5
M12	HM031H8001	Link	1	
M13	HM024H7101	Frame	1	
M14	HM028H8001	Shaft	1	
M15	H431030040	Screw	1	M3×4
M16	HM029H8001	Wiper	1	
M17	H6636I8001	Switch assy	1	
M18	HM006H8001	Cover	1	
M19	HM007H7101	Buzzer assy	1	
M20	H6643C8001	Screw	2	1/8(44)×4.5
M21	H6642B8001	Screw	4	M4×8



# N. OIL LUBRICATION MECHANISM

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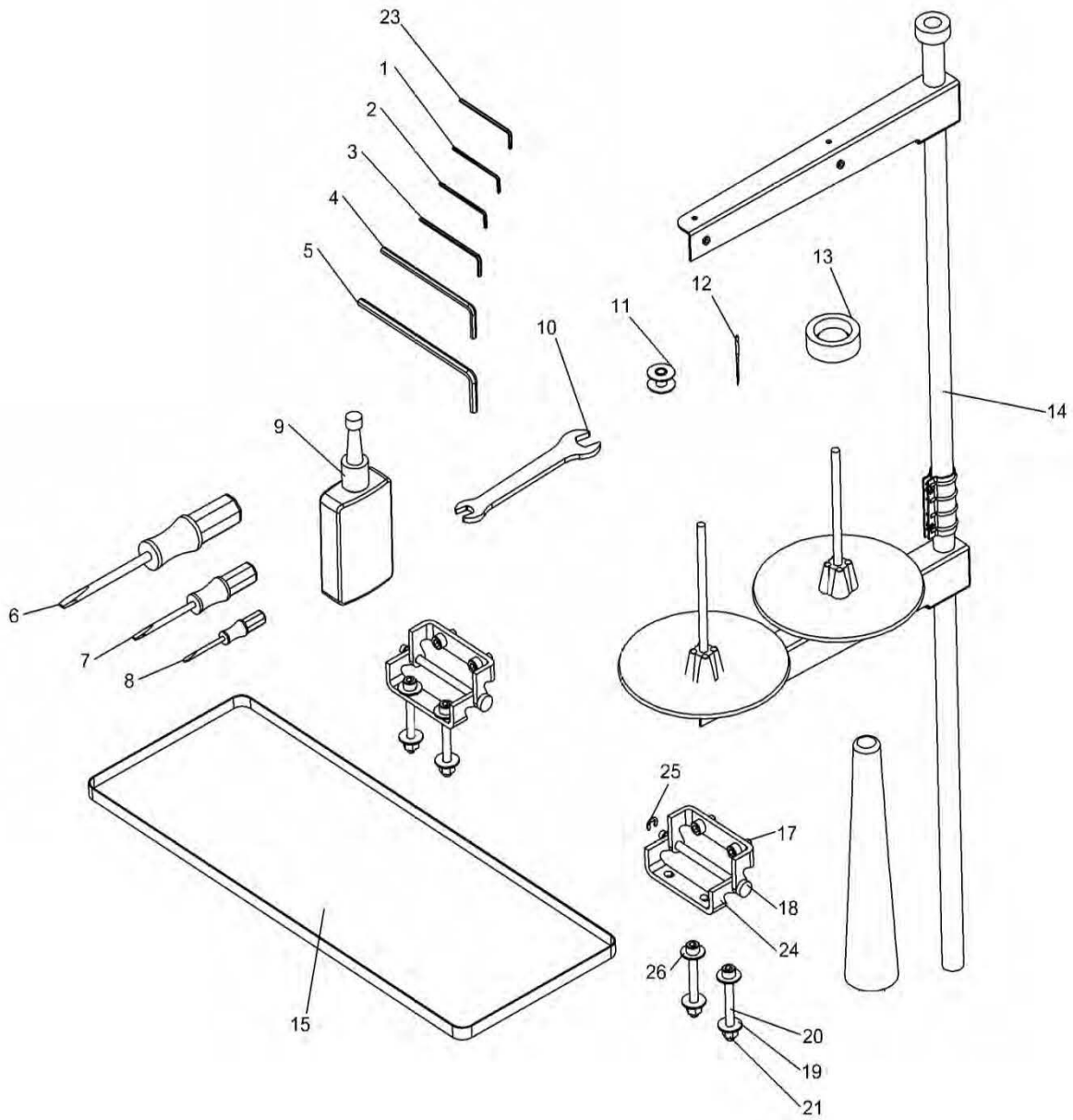
From the library of: Diamond Needle Corp

## N. OIL LUBRICATION MECHANISM

Fig. No.	Part No.	Description	Pcs.	Remarks
N01	H6614H8001	Oil gauge	2	
N02	H6613H8001	Pipe	1	
N03	H3200G2030	Holder	1	
N04	HM008I8001	Holder	1	
N05	H6634H8001	Felt	1	
N06	H6642B8001	Screw	8	M4×8
N07	H6611H8001	Holder	1	
N08	H6646H8001	Felt	1	
N09	H2000M0090	Cap	1	
N10	HK40I97101	Oil pipe assy	1	
N11	HK41I37101	Oil pipe assy	1	
N12	HM005I7101	Oil pipe assy	1	
N13	HM062E8001	Frame	1	
N14	H6682D8001	Screw	2	M4×10
N15	H6679D8001	Nylon clip	4	AB-3N
N16	H6638H7101	Oil pipe assy	1	
N17	H6635H7101	Oil pipe assy	1	
N18	H6609H8001	Holder	1	
N19	HK41I87101	Oil pipe assy	1	
N20	H6606H8001	Felt	1	
N21	H6605H8001	Holder	1	
N22	HK43I37101	Oil pipe assy	1	
N23	H6608H8001	Felt	1	
N24	H6648I8001	Nylon clip	2	AB-6N
N25	HK45C27101	Oil pipe assy	1	
N26	HK45C57101	Oil pipe assy	1	
N27	HK45C87101	Oil pipe assy	1	
N28	H6612H8001	Holder	1	
N29	HA300I2060	Holder	1	
N30	H6641H8001	Felt	1	

# R. ACCESSORIES

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## R. ACCESSORIES

Fig. No.	Part No.	Description	Pcs.	Remarks
R01	H3200L0070	Hexagonal wrench 1/16"	1	1/16"
R02	HB01001015	Hexagonal wrench 1.5	1	1.5
R03	HB01001025	Hexagonal wrench 2.5	1	2.5
R04	HB01001030	Hexagonal wrench 3	1	3
R05	HB01001040	Hexagonal wrench 4	1	4
R06	HA300J2070	Screw driver (large)	1	
R07	HA300J2200	Screw driver (middle)	1	
R08	HA300J2210	Screw driver (small)	1	
R09	H200400069	Oiler with oil	1	
R10	HA300J2220	Spanner 10-14	1	
R11	H6685C8001	Bobbin	3	
R12	HM010C8001	Needle	4	DP×17-18
R13	H6637J8001	Rubber cushion	6	
R14	HA200J2030	Cotton stand assy	1	
R15	HK42K18001	Oil pan	1	
R17	H415060120	Screw	4	M6×12
R18	H6685J8001	Hinge pin	2	
R19	H6642J8001	Washer	8	
R20	H415060550	Screw	4	M6×55
R21	H003002060	Nut	4	M6
R22	H6620J8001	Strut bar	1	
R23	HB01001020	Hexagonal wrench 2	1	2
R24	H6639J8001	Hinge	4	
R25	H007013050	E-type retaining ring	2	
R26	H005008060	Spring washing	4	6

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