
1. PRECAUTIONS BEFORE STARTING OPERATION

1) Safety precautions

- (1) When turning the power on, keep your hands and fingers away from the area around/under the needle and the area around the pulley.
- (2) Power must be turned off when the machine is not used, or when the operator leaves his/her seat.
- (3) The power must be turned off before tilting the machine head, installing or adjusting the machine, or when replacing.
- (4) Avoid placing fingers, hairs, bars etc. nears the pulley, bobbin winder pulley, when the machine is operation. Injury could result.
- (5) Do not insert fingers into the thread take-up cover, under/round the needle, or pulley when the machine is in operation.
- (6) If a mini motor cover, finger guard, and/or eye guard are installed, do not operate the machine without these safety devices.

2) Precaution before starting operation

- (1) If the machine's oil pan has an oil sump, never operate the machine before filling it.
- (2) If the machine is lubricated by a drop oiler, never operate the machine before lubricating.
- (3) When a new sewing machine is first turned on, verify the rotational direction of the pulley with the power on. (The pulley should rotate counterclockwise when viewed from the pulley.)
- (4) Verify the voltage and (single or three) phase with those given on the machine nameplate.

3) Precaution for Operating Conditions

- (1) Avoid using the machine at abnormally high temperature (35°C or higher) or low temperatures (5°C or lower). Otherwise, machine failure may result.
- (2) Avoid using the machine in dusty conditions. Avoid using the machine in areas where too much electrical noise, resulted from the high-frequency welder and others, is generated

2. SPECIFICATIONS

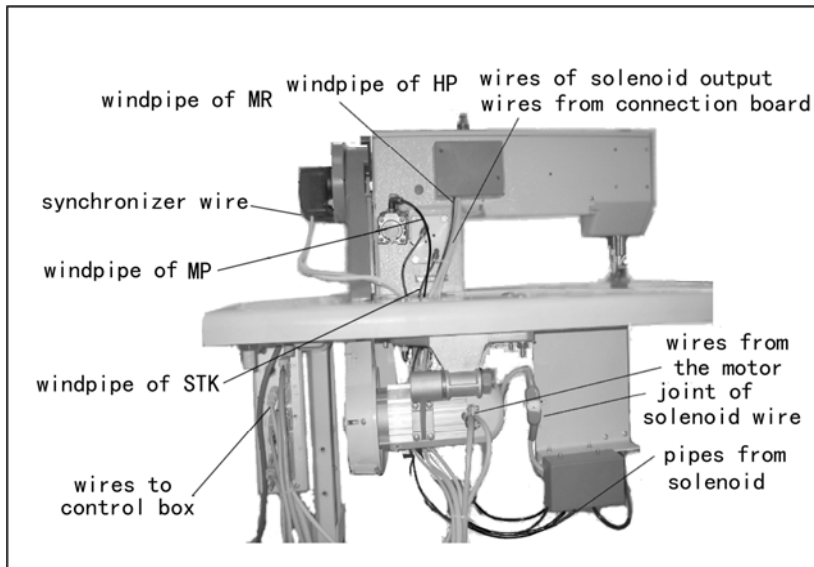
Item		GC20688-1-D	GC20688-2-D
Max. Speed		3500rpm	3200rpm
Stitch length		0 to 9mm	0 to 9mm
Needle bar stroke		34mm	34mm
Presser foot clearance	By hand	9 mm	9 mm
	By knee	16 mm	16 mm
Rotating hook		Large vertical hook (1.6 times)	Large vertical hook (1.6 times)
Needle		DP×17 #18-#25	DP×17 #18-#25
Presser foot alternation		1-7mm	1-7mm
Auto presser foot lifter		Pneumatic	Pneumatic
Oil lubrication method		Automatic lubrication	Automatic lubrication
Bed dimensions		300×120 mm	300×120 mm
Needle gauge (mm)			3.2 8 10 12 16

3. PREPARATION BEFORE STARTING TO OPERATE

1) Connection of control box

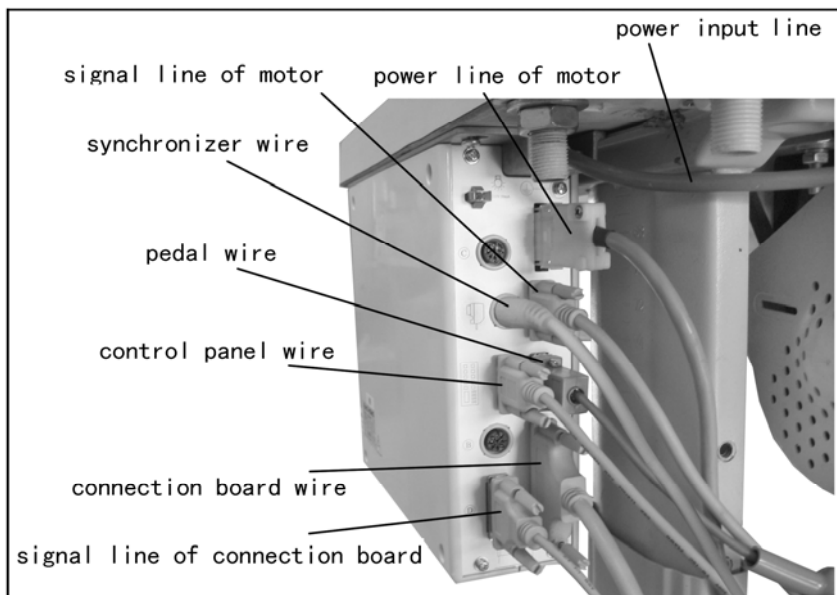
It shows the connection of the electrical wires of the whole machine on the right picture.

When the machine needs to be assembled, each line should be linked to the right joint according to the instruction of the picture.



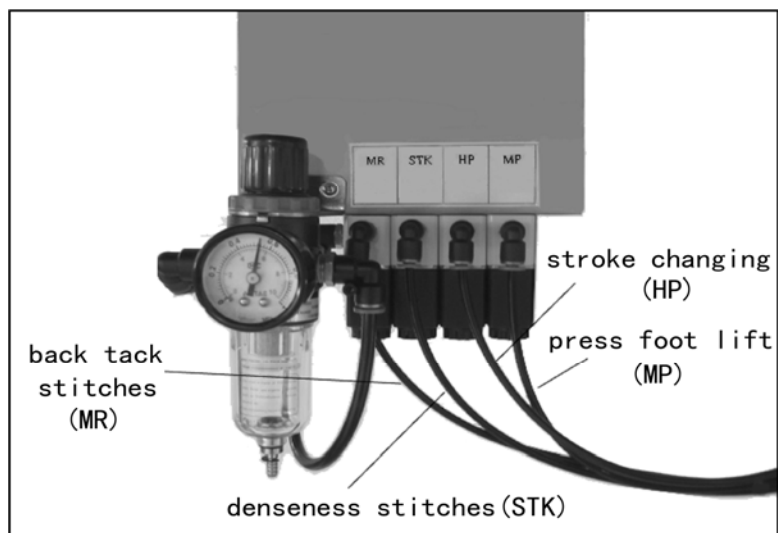
All the pins on the control box have signals of function showing, and usually, different wires have different kinds of joint.

Caution: the pin of synchronizer wire is the same with another two external pins and if there is a misconnection, the synchronizer might be burn.



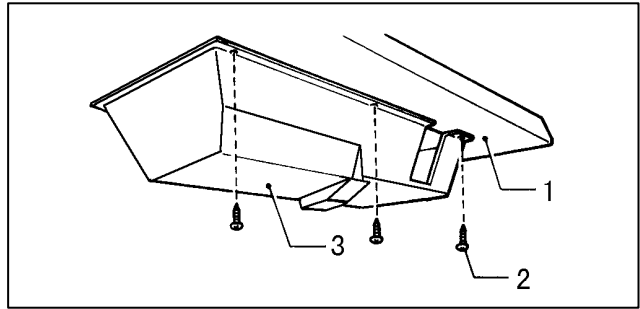
When connecting the pipes, please check the joint at the picture of the whole machine above as reference.

And also there have an instruction mark of each joint of the solenoid at the setting board.

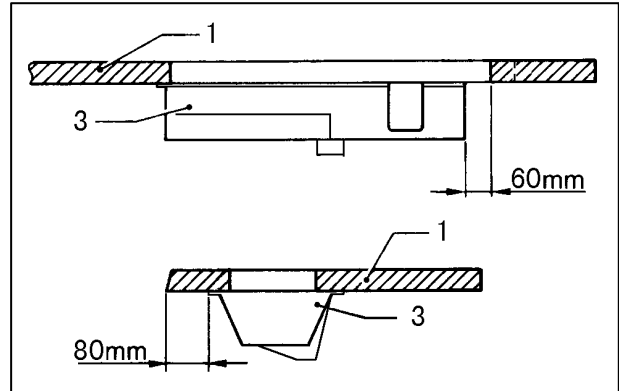


2) Oil pan

(1) Install the oil pan 3 to the underside of the worktable 1 in the place shown in the illustration using the nails 2.



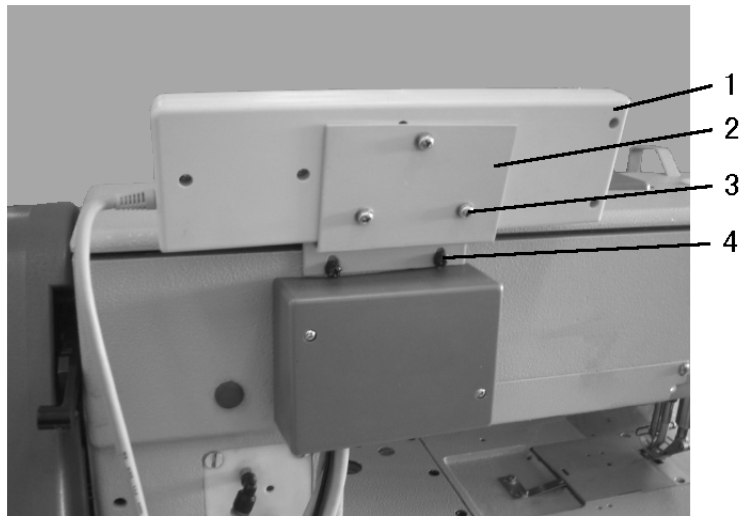
(2) From front view, the oil pan 3 to the side is 60mm; from right view, the oil pan 3 to the side is 80mm.



3) Operation panel

(1) Install the operation panel 1 to the set plate 2 with the three screws 3.

(2) Install the set plate 2 to the back of the machine arm with the two screws 4.



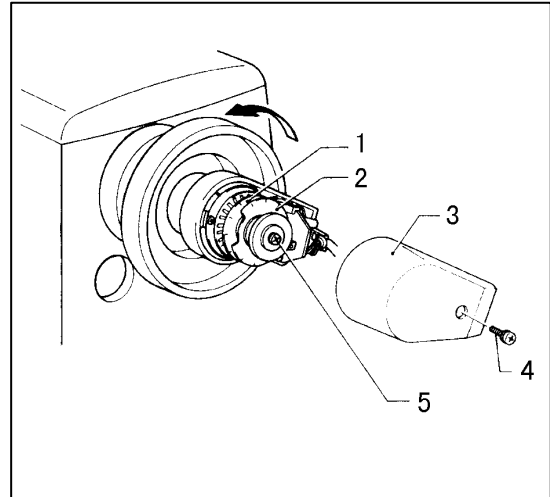
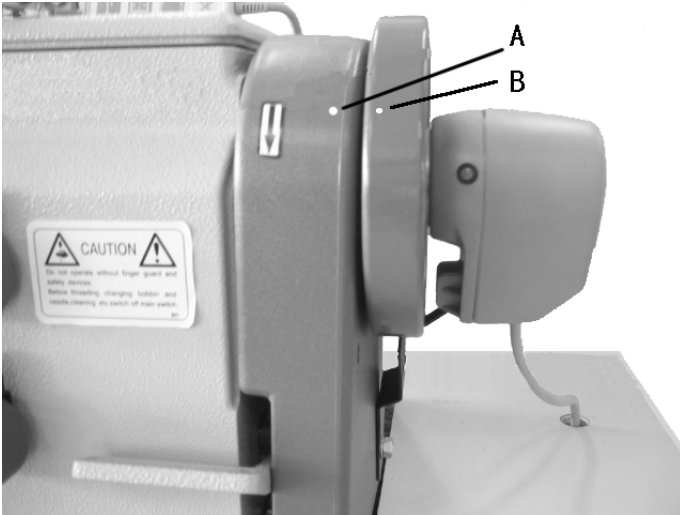
4) Adjusting the needle stop position

(1) Adjusting the needle up stop position

When the sewing machine stops in the needle up stop position (the stop position of trimming) and the treadle is pressed back, the red mark on the pulley should be consistent with the mark on the belt cover A. Adjust as follows:

- a. Turn off the power switch.
 - b. Loosen the screw 4, and then remove the cover 3.
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c. When the red mark stops in a position over the mark on the belt cover, the needle up stop position disc 1 should be turned in the opposite direction as the direction of machine pulley rotation. When the red mark stops in a position under the mark on the belt cover, Turn the disc 1 in the same direction as the pulley rotation direction.



(2) Adjusting the needle down stop position

When the sewing machine stops in the needle down stop position, the black mark on the pulley should be consistent with the mark on the belt cover A. Adjust as follows:

a. Turn off the power switch.

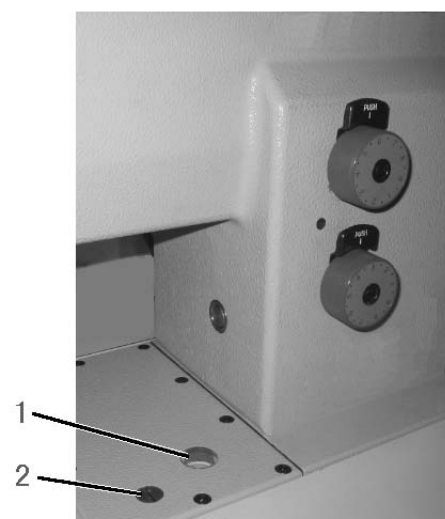
b. When the black mark stops in a position over the mark on the belt cover, the needle down stop position disc 2 should be turned in the opposite direction as the direction of machine pulley rotation. When the black mark stops in a position under the mark on the belt cover, Turn the disc 2 in the same direction as the pulley rotation direction.

c. After adjusting, install the cover 3, with screw 4.

Note: There is no need to loosen the screw 5, when turning the discs.

5) Lubrication

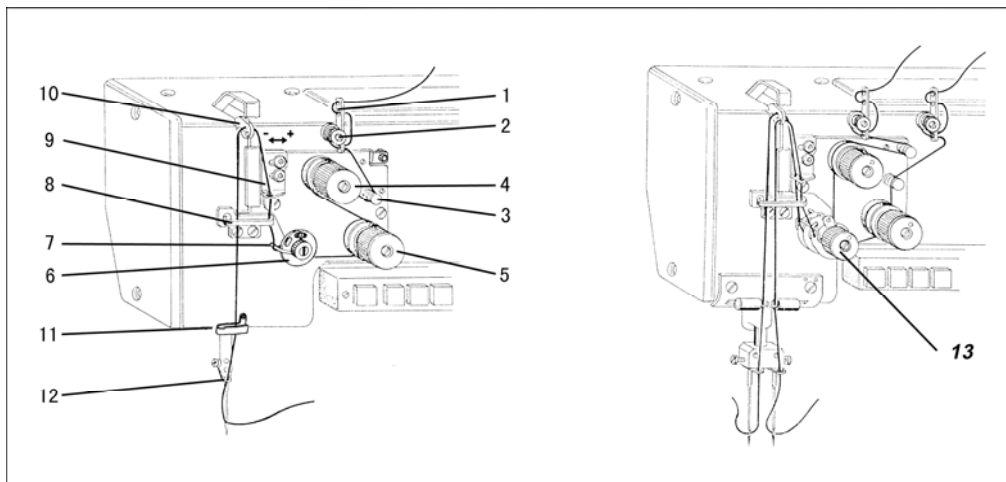
Before the new machine is used, please loosen the screw 2 and full the oil into the oil case. Set the oil level between “EMPTY” and “FULL”. Then replace oil-filling screw 2.



4. HOW TO USE THE MACHINE

1) Threading

Raise the thread take-up lever to its highest position and thread the upper thread in the following order.

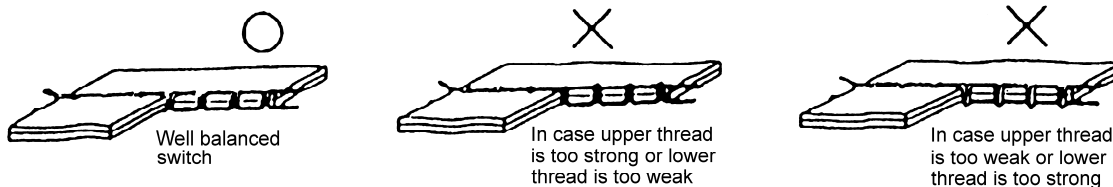


2) Adjusting of the thread regulator

The thread regulator 9 (see the right picture) regulates the amount of needle thread necessary for stitch formation. The setting depends on the following factors: material thickness, yarn characteristics and stitch length.

The thread regulator is fitted with slots for this purpose. Moving in the “+” direction increases the quantity of needle thread; Moving in the “-” direction reduces the quantity of needle thread.

3) Adjusting of upper thread tension



Tension should be as low as possible. The crossover point should be in the center of the material. Upper thread tension can be adjusted by thread tension nut 4 and 5 (see the picture of above). Turn the thread tension nut clockwise to increase the needle thread tension. Turn the thread tension nut counter-clockwise to decrease the needle thread tension.

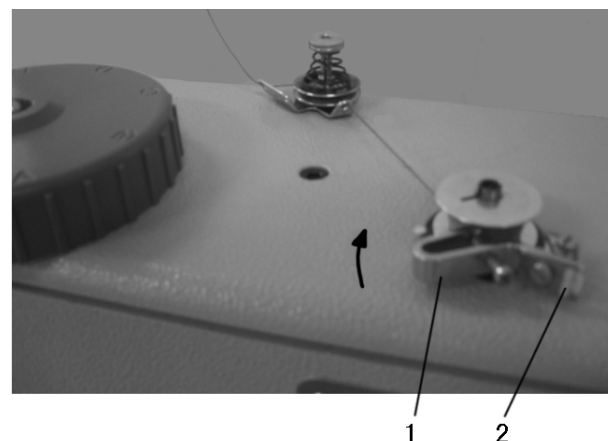
4) Winding the lower thread

(1) Place the bobbin onto the bobbin winder shaft.

(2) Pass the thread for winding thread as shown in the figure, and wind the end of the thread clockwise around the bobbin several times.

(3) Push the bobbin presser 1 toward the bobbin.

(4) The operation will automatically stop when winding is completed. The amount of thread wound onto the bobbin should be a maximum of 80% if the bobbin capacity.



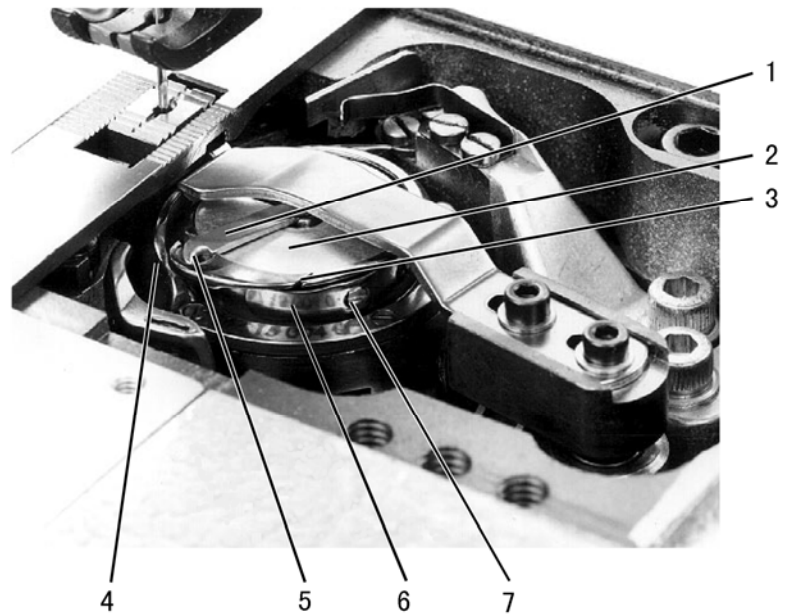
(5) After the thread has been wound on, remove the bobbin and cut the thread with the thread-trimming knife 2.

5) Threading the lower thread

(1) Raise flap 1 and remove the empty bobbin.

(2) Insert bobbin 2 in such a way that when the thread is unwound from it moves in the opposite direction to the gripper.

(3) Pass the thread through slit 3 and below spring 6, pass the thread through slit 4 and pull about 3 cm through.



(4) Close flap 1 and pass the thread through the flap's guide 5.

6) Adjusting the lower-thread tension

The lower-thread tension should be set in accordance with the type of seam required. Adjust the tension with screw 7. (See the picture of above)

7) Installing the needle

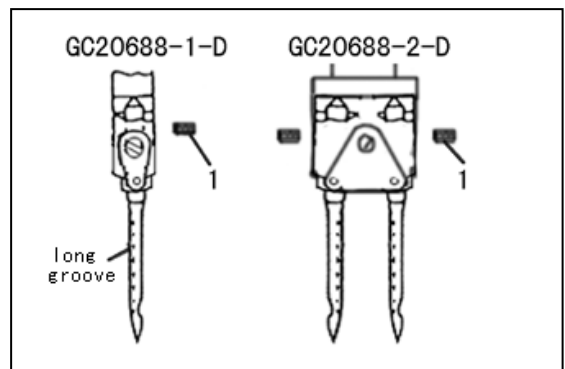
Note: Before attach needle, be sure to turn off the power.

1) Turn the balance wheel by hand to raise the needle bar to its highest position;

2) Loosen the needle clamping screw;

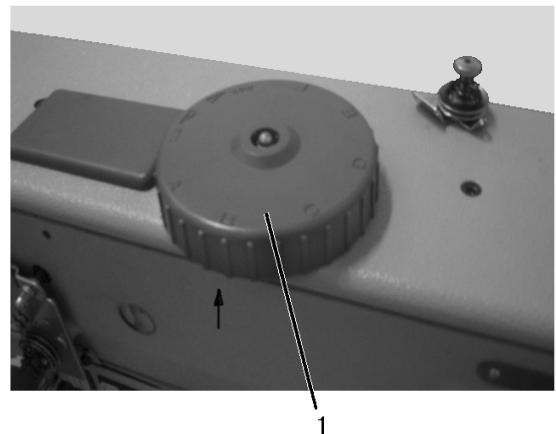
3) Hold the needles so that the two needles side with the long groove (faces each other), and insert it as deeply as it will go into the needle clamping holes(model GC20688-2-D);Hold the needle to its side with the long groove side(left),then insert the needle as deeply as it will go into the needle clamping hole(model GC20688-1-D).

4) Tighten the needle clamping screw.



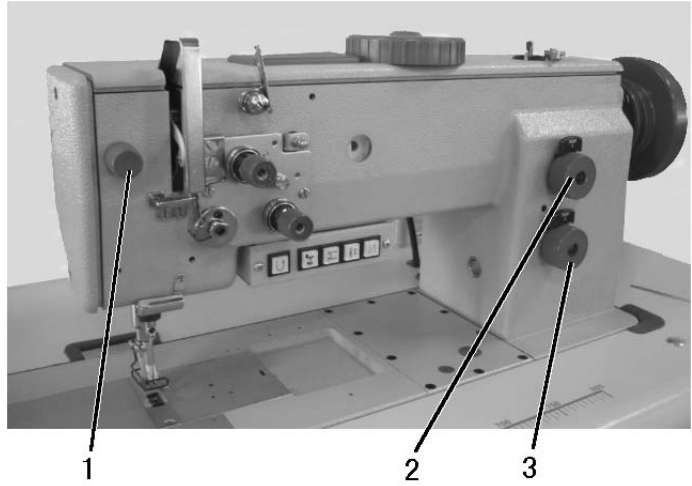
8) Alternating presser foot movement amount

The alternating movement amount for the inner presser foot and the outer presser foot can be adjusted within the range of 1-7 mm using the alternating presser foot movement dial 1. Turn the alternating presser foot movement dial 1 clockwise or counterclockwise to align the mark. (MIN. A, B, C, D, E, F MAX.)



9) Adjusting the presser foot pressure

The presser foot pressure should be set as weak as possible, but strong enough so that the material does not slip. If the presser-adjusting dial 1 is turned clockwise, the presser foot pressure will become stronger, and if it is turned counterclockwise, the pressure will become weaker.



10) Adjusting the stitch length

The feed adjustment dials 2 and 3 can be used to set two different types of stitch length. (See the picture of above) Use feed adjustment dial 2 to set the big stitch length. Use feed adjustment dial 3 to set the little stitch length. The sewing machine will switch between the two stitch lengths each time the stitch length change switch is pressed.

11) Using the manual switches

(1) Quick reverse switch

Back tacking is carried out during sewing only while the switch 1 is being pressed.

(2) Alternating presser foot movement change switch

The sewing machine can be switched between two different alternating presser foot movement amounts each time when the switch 2 is pressed.

(3) Auto back tacking select switch

If the switch 3 is pressed when either start back tacking or end back tacking has been set to ON at

the operation panel, back tacking is canceled for the first time only. Furthermore, if the switch 3 is pressed when neither starting nor end back tacking has been set, back tacking is carried out for the first time only.

(4) Needle up or down switch

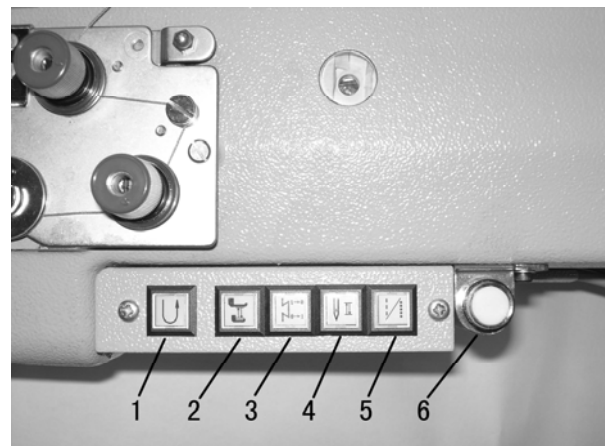
If the switch 4 is pressed, The needle will move up to the needle up stop position from down stop position or move down to the needle down stop position from up stop position.

(5) Stitch length change switch

The stitch length changes alternately between two different stitch length settings each time the switch 5 is pressed. OFF: Sewing is carried out using the big stitch length; ON: Sewing is carried out using the little stitch length.

(6) Stitch counter switch

The orange light on the switch will flash and the machine will stop when the bobbin thread is used up.



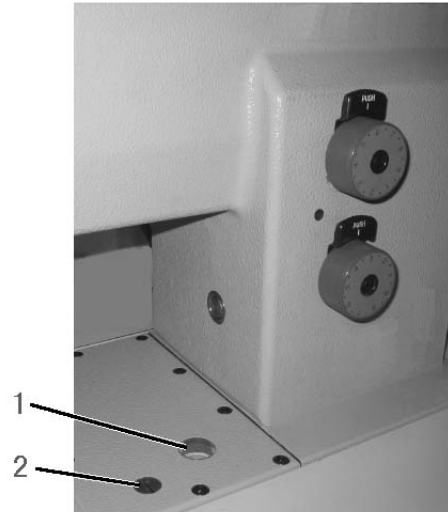
Push the switch one more time after change the bobbin. The sewing machine cannot run before the switch be pushed one more time. The stitch count should be set according to the stitch length and the count of the bobbin thread. **Notice:** the switch is not work until the correlative functions of the control box are set. The functions please read the parameter 42, 43, 44 in the servo motor user manual.

12) Cleaning

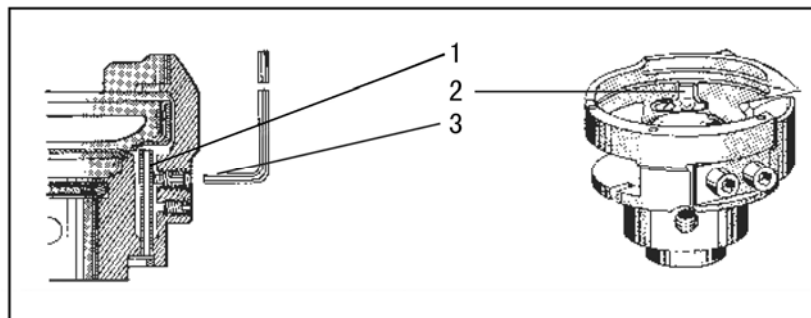
- (1) The area around the feed dog and the hook should be cleaned every day.
- (2) Remove any thread scraps from inside the rotary hook.
- (3) Keep the control box clean.

13) Lubrication

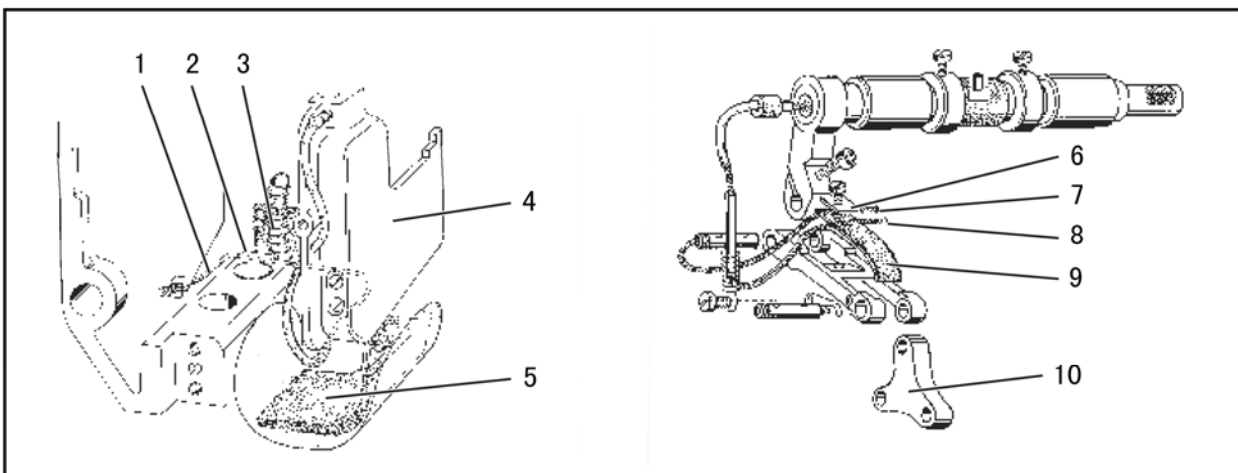
- (1) Check the oil level at the sight glass 1 every week. If the oil is not enough, remove oil-filling screw 2 and pour in oil. Check oil level at sight glass 2. The oil level must be between “EMPTY” and “FULL”. Replace oil-filling screw 2. After running for 500 hours since buying the new sewing machine, the oil must be changed. Then change the oil every two years.
- (2) The oil quantity is pre-set at a relatively high level in order to ensure adequate lubrication during running-in. This setting should be checked and corrected after running-in. (approx. 50 hours).



The hook is to have positive lubrication with the least possible amount of oil. Let the sewing machine run approx. 2 minutes. And run in intervals. Hold a piece of paper next to



the hook and check if sufficient oil is spun onto the paper. Remove cover plate 2. Loosen screw 3 until the tube 1 no longer moves. This is the case when the tube is in the center of the drilled hole. Turn screw 3



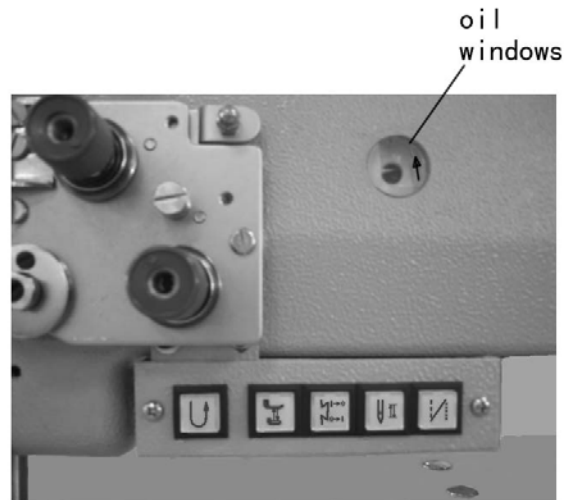
in until the tube movement just starts and then a 1/8 turn farther. The hook lubrication is preset. Attach cover plate 2 again. Setting the hook lubrication with screw 3.

(3) Lubricating wicks and felt (see the picture of above)

- a. The wick 1 leading from the oil sump to the oscillating crank 4 must be fixed between the groove 2 in the arm and the spring 3 of the recirculation wick.
- b. When the oil satchel is changed, the flock side should be faced to connecting plate 10. The oil wick 7 and 8 should be set between the oil satchel 9 and plate 8.

(4) Checking the lubrication oil.

Turn on the power switch. Depress the treadle gently and check that the oil level rises in the oil sight glass.



14) Adjusting the trailing length after thread trimming

Adjust by turning the pre-tensioner 1. If the tension of the pre-tension is increased, the lengths of the threads trailing from the needle tips will be reduced; if the tension is reduced, the lengths will be increased.



15) Back tacking

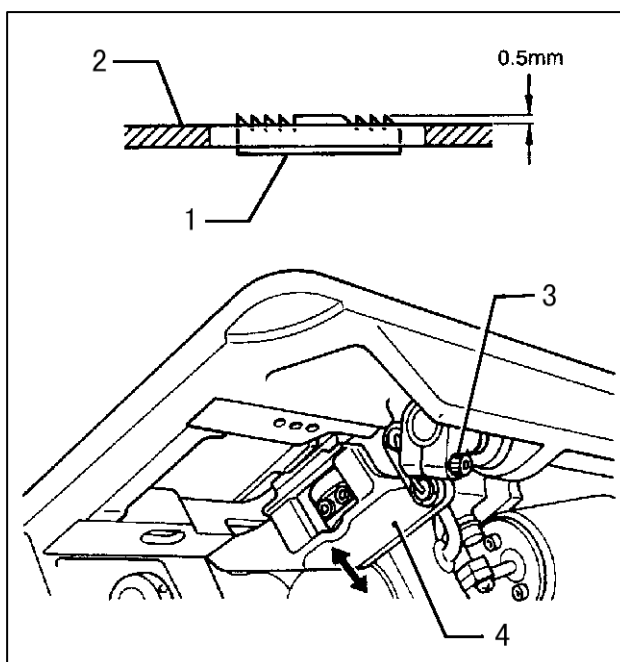
When the reverse lever 1 or the quick reverse switch is pressed during sewing, the feed direction will be reversed. When it is released, the feed direction will return to normal.



16) Adjusting the feed dog

Set the feed adjustment dials to the minimum settings. Then adjust as follows so that the feed dog 1 is at its highest position (0.5mm above the top of the needle plate 2) when the needle bar is at its lowest position.

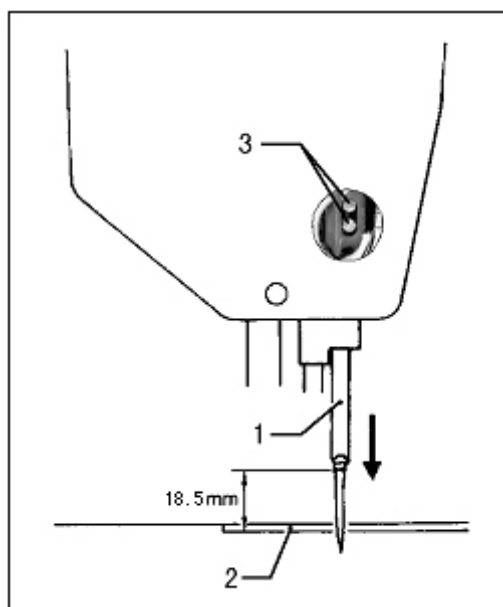
- (1) Turn the machine pulley to set the feed dog 1 is at its highest position.
- (2) Loosen the screw 3.
- (3) Adjust the feed dog's height.
- (4) Tighten the screw 3.



17) Adjusting the needle bar height

Set the feed adjustment dials to the minimum settings. Then adjust so that the distance from the setting surface of the needle plate 2 to the end of the needle bar 1 is 18.5mm when the needle bar 1 is at its lowest position.

- (1) Remove the face plate.
- (2) Set the feed adjustment dials to "0".
- (3) Turn the pulley to set the needle bar 1 to its lowest position.
- (4) Loosen the screw 3 and then move the needle bar 1 up or down to adjust so that the distance from the setting surface of the needle plate 2 to the end of the needle bar 1 is 18.5 mm.
- (5) Tighten the screw 3, install the face plate.

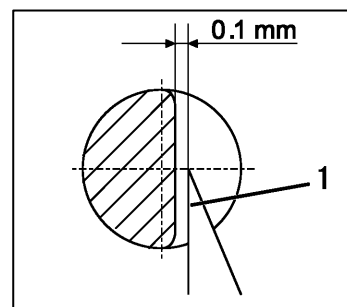


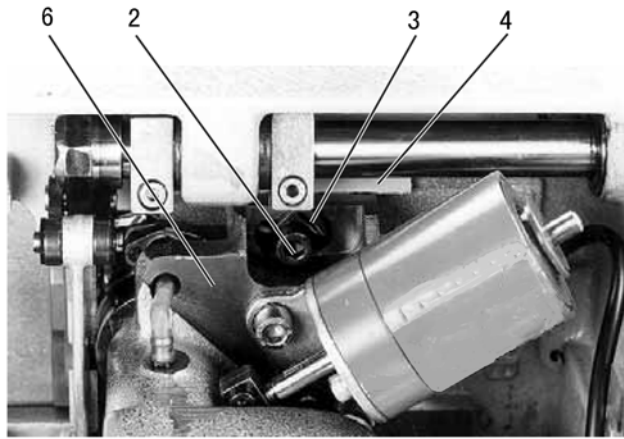
18) Adjusting the gap between the needle and the rotary hook tip

The gap between the needle and the rotary hook tip 1 is 0.1 mm.

Set the rotary hook tip at the level of the middle of the needle. Then adjusting the gap as follow:

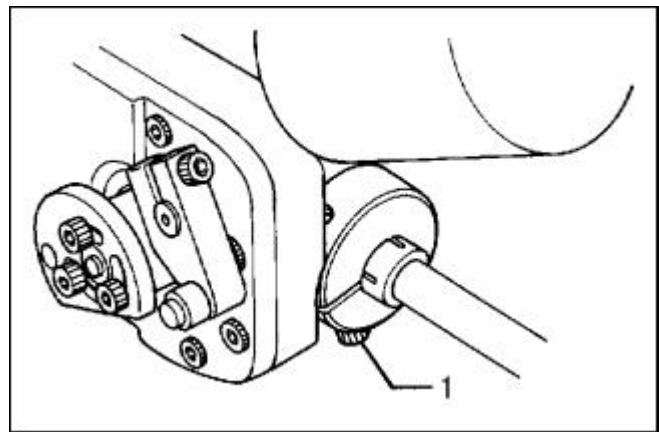
- (1) Loosen the screws 2 and 5 (see the picture of below).
- (2) Set the hook base 6 to the fit position.
- (3) Rotate the adjusting plate 3, let the hook base 6 depend on the bed plate 4.
- (4) Tighten the screws 2 and 5.





19) Adjusting of the needle and the hook timing

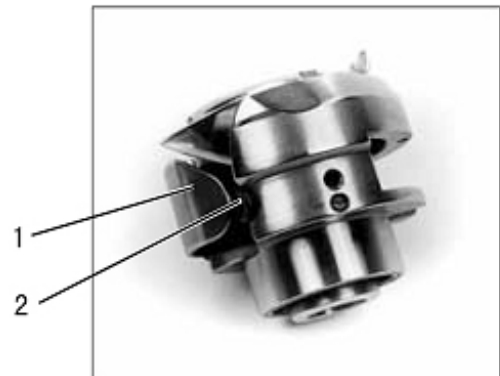
- (1) Set the stitch length to "0".
- (2) Remove the needle plate.
- (3) Overturn the arm.
- (4) Loosen the screw 1
- (5) Turn the machine pulley to raise the needle bar from its low position to the point that the needle rises 2.4 mm.
- (6) Turn the rotary hook to align the rotary hook tip with the center of the needle.
- (7) Tighten the screw 1.



20) Hook protection

In looping stroke position the needle must abut on the hook protection 1 without being displaced.

Move needle in looping stroke position by pulley. In looping stroke position the hook tip is at the level of the middle of the needle. Press needle against hook protection 1 manually. The needle should not touch the hook tip.

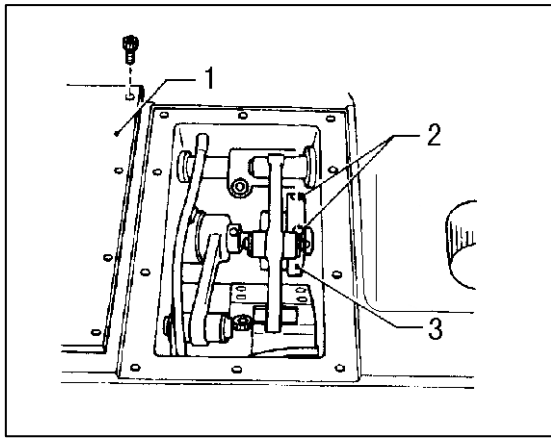


21) Adjusting the needle and feed mechanism timing

- (1) Horizontal feed direction

Set the feed adjustment dials to the maximum settings. Then turn the machine pulley until the needle bar is at its lowest position. Then adjust so that the needle and the feed dog do not move even when the reverse lever is moved up and down at this time.

- a. Remove the bed upper cover 1.
- b. Set the feed adjustment dial to the maximum settings.
- c. Loosen the two screws 2.



d. Turn the machine pulley until the needle bar is at its lowest position.

e. Turn the lower feed cam 3 gradually until it is at the position where the needle and the feed dog do not move even when the reverse lever is moved up and down.

f. Tighten the two screws 2.

(2) Vertical feed direction

Set the feed adjustment dials to the minimum

settings. Then adjust as follows so that the feed dog 1 is at its highest position (0.5mm above the top of the needle plate 2) when the needle bar is at its lowest position.

a. Loosen the two screws 3

b. Turn the machine pulley to set the needle bar to its lowest position.

c. Turn feed cam 4 to align the point 5 of feed cam 4 with the centerline of feed rod 6

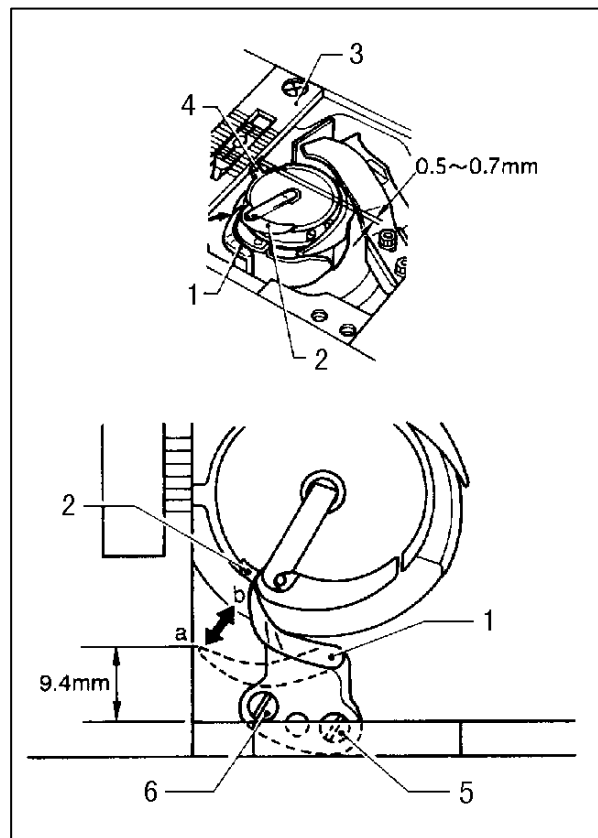
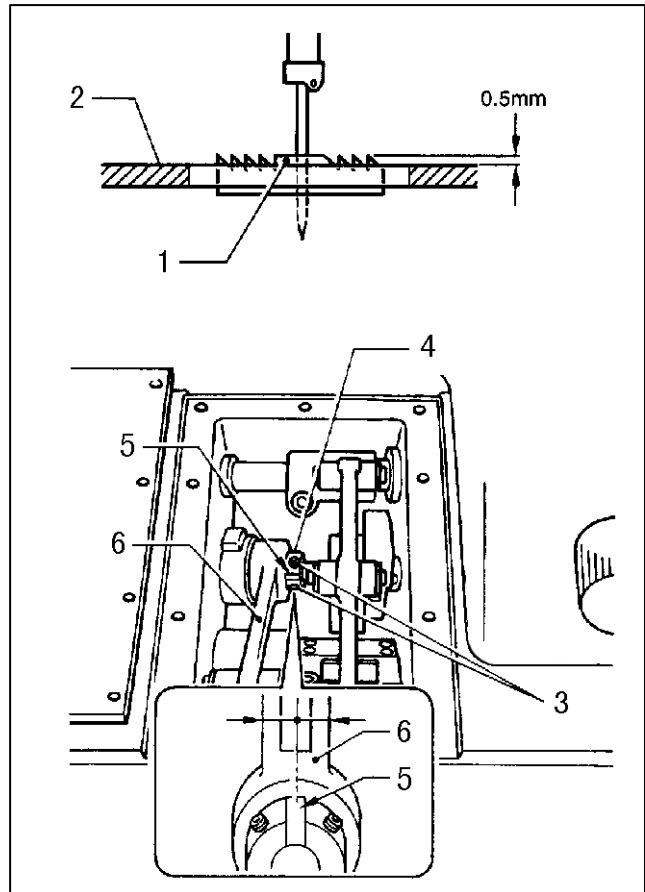
d. Tighten the screws 3

22) Adjusting the opener position

Adjust so that the clearance between the needle plate 3 and the stopper 4 of the inner rotary hook 2 is 0.5-0.7 mm when the opener 1 is at its closest position to the inner rotary hook 2.

(1) Turn the machine pulley to move the opener 1 in direction "a" (opening direction), and then loosen the screw 5

(2) Turn the machine pulley to move the opener 1 in direction "b" (closing direction), and then loosen the



screw 6.

(3) Turn the machine pulley to move the opener 1 as close to the inner rotary hook 2 as possible.

(4) While pressing the opener 1 against the inner rotary hook 2 with your finger, adjust so that the clearance between the needle plate 3 and the stopper 4 of the inner rotary hook 2 is 0.5-0.7 mm.

(5) Tighten the screw 6.

(6) Turn the machine pulley to move the opener 1 in direction “a” (opening direction), and then tighten the screw 5.

23) Adjusting the presser foot height

The standard height of the outer presser foot 7 is 9 mm when it is raised by the presser lifter bar 1.

(1) Remove the belt cover.

(2) Loosen the presser adjusting screw, to release the presser foot pressure.

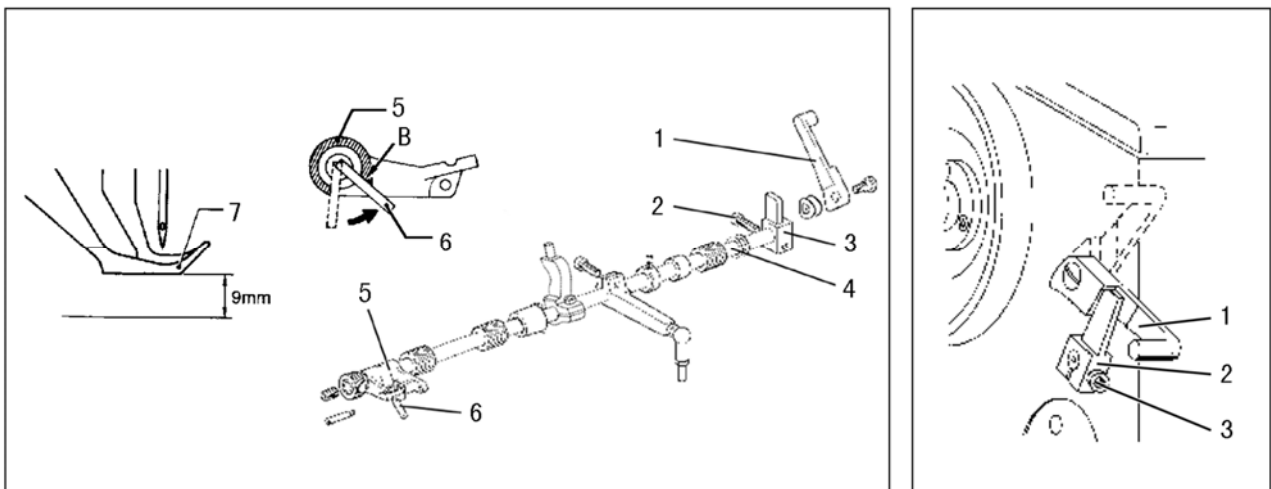
(3) Raise the presser lifters bar 1 and then loosen the screw 2.

(4) Move the outer presser bar up or down to adjust so that the height of the outer presser foot 7 is 9 mm.

(5) While the stopper pin 6 is touching against the notch B in the presser foot lifter connection 5 and while pushing the presser lifter shaft so that there is no play in the thrust direction, tighten the screw 2.

(6) Turn the presser adjusting screw to adjust the presser foot pressure.

(7) Install the belt guards.



24) Adjusting the alternating presser foot movement amount

(1) Maximum alternating presser foot movement amount. Carry out the following adjustment to set the maximum alternating movement amounts for the inner presser foot 1 and outer presser foot 2 to the maximum of 7 mm.

a. Remove the upper plate.

b. Remove the adjusting bracket 3.

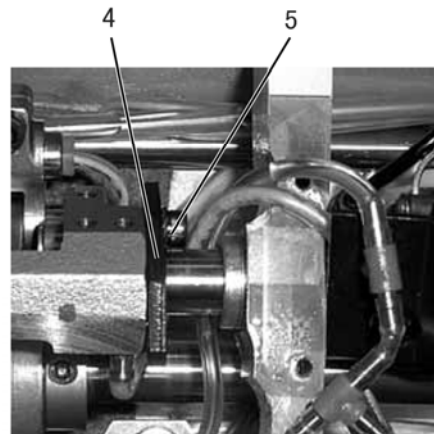
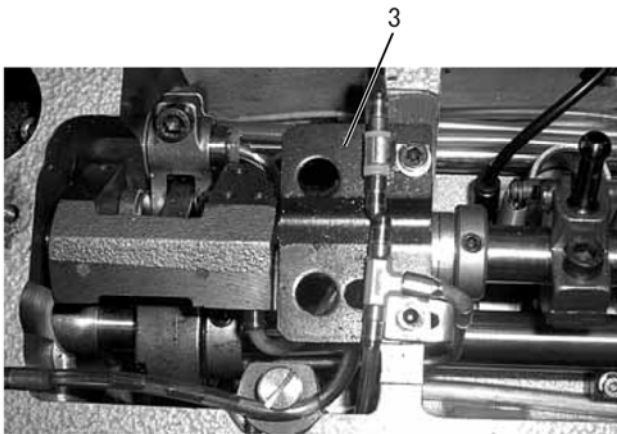
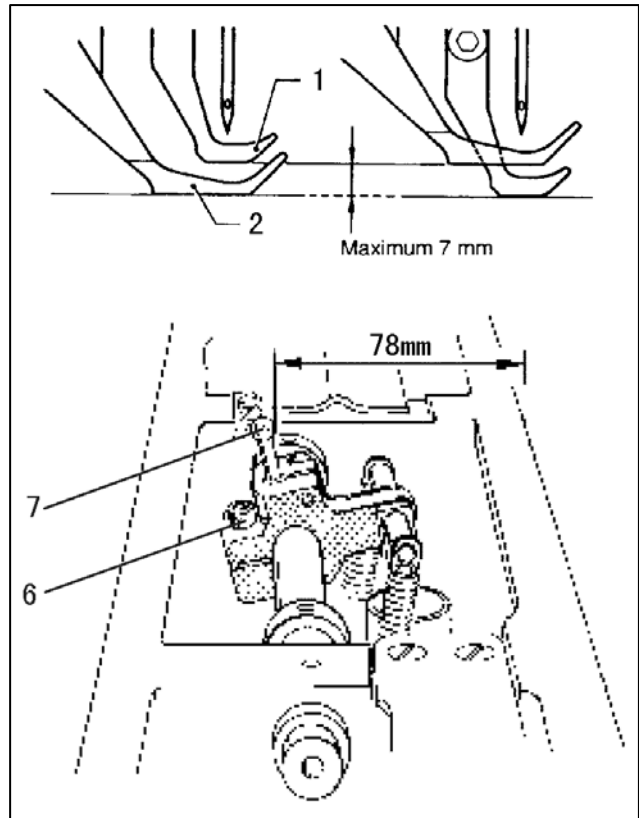
c. Loosen screw 5 of adjusting bracket collar 4.

d. Adjust the adjusting bracket collar 4. If the adjusting bracket collar 4 is be installed at the highest position, the alternating presser foot movement amount is 1-6mm. If it is at the lowest position, the alternating presser foot movement amount is 1.6-7mm.

e. Tighten the screw 5.

f. Install the adjusting bracket 3.

d. Loosen the bolt 6 and turn connecting lever 7 to adjust so that the distance from the outer edge of the arm to the outer edge of the pin 7 is 78 mm at this time. Then tighten the bolt 6. (When installing the upper plate, set the alternating presser foot movements dial to the “min.” position.)



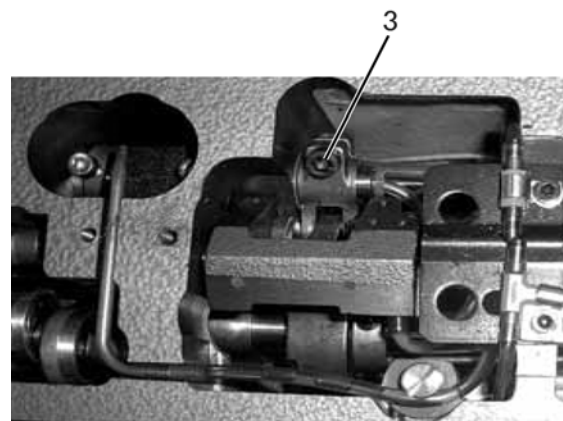
(2) Inner presser foot 1 and outer presser foot 2 movement amounts. Carry out the following adjustment to make the movement amounts for the inner presser foot 1 and outer presser foot 2 equal when the presser feet are lowered and the machine pulley is turned.

a. Set the feed adjustment dials to the maximum settings.

b. Open the cover 4

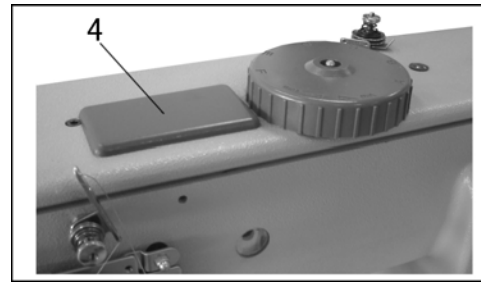
c. Turn the alternating presser foot movement dial to the “B” position.

d. Loosen the screw 3



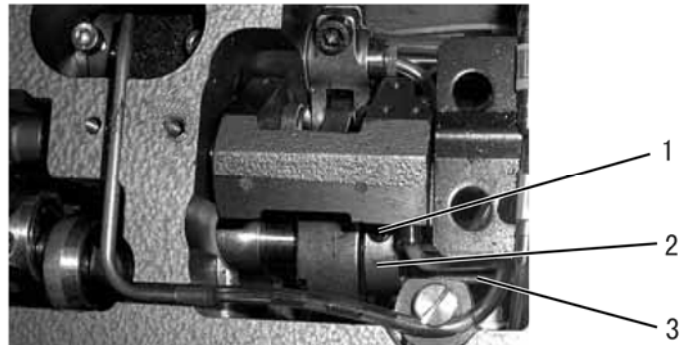
e. Turn the machine pulley toward you to align the tip of the needle and the top of the feed dog with the top of the needle plate.

f. Move the connecting lever to adjust so that both the inner presser foot 2 and outer presser foot 1 are in contact with the top of the needle plate at this time. Then tighten the screw 3.



25) Adjusting the presser foot timing

When the presser feet are lowered and the machine pulley is turned toward you. The inner presser foot should touch the feed dog before the needle arrives at the feed dog. Then when the needle lifts up, the tip of the needle should move away from the feed dog before the inner presser foot moves away.

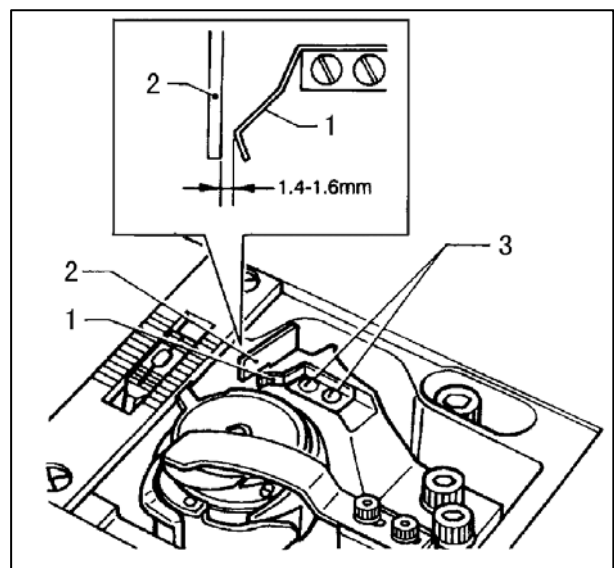
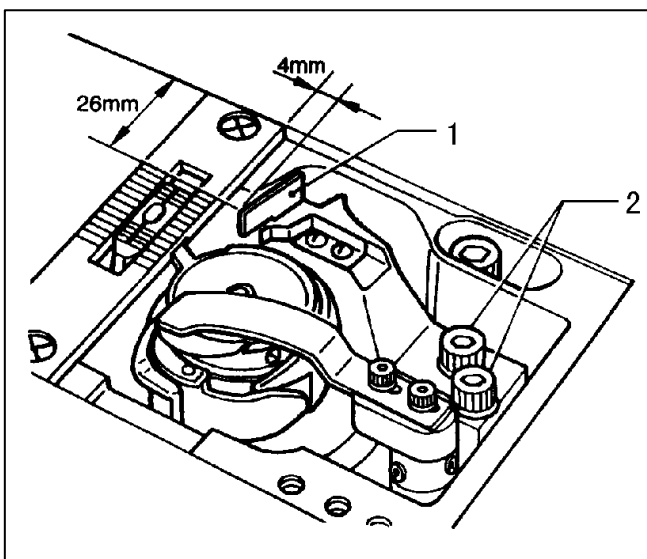


- (1) Remove the upper cover 4.
- (2) Loosen the two screws 1.
- (3) Turn the machine pulley until the needle tip and the feed dog's up face is the same plane.
- (4) Turn inner presser cam to adjust so that the point of inner presser cam is facing straight up.
- (5) Tighten the screws 2.
- (6) When installing the upper plate, set the alternating presser foot movement dial to the "MIN." position.

26) Adjusting the fixed knife position

The distance from the groove of slide plate to the fixed knife 1 should be 26 mm. Furthermore, the distance from the edge of the needle plate to the left edge of the tip of the fixed knife 1 should be 4 mm.

- (1) Loosen the two bolts 2.
- (2) Adjust the position of the fixed knife 1, and then tighten the bolts 2.



27) Adjusting the thread holding spring position (see the picture of above)

The thread holding spring 1 holds the lower thread after thread trimming to prepare it for the next sewing operation. The clearance between the thread holding spring 1 and the side of the fixed knife 2 should be 1.4-1.6 mm.

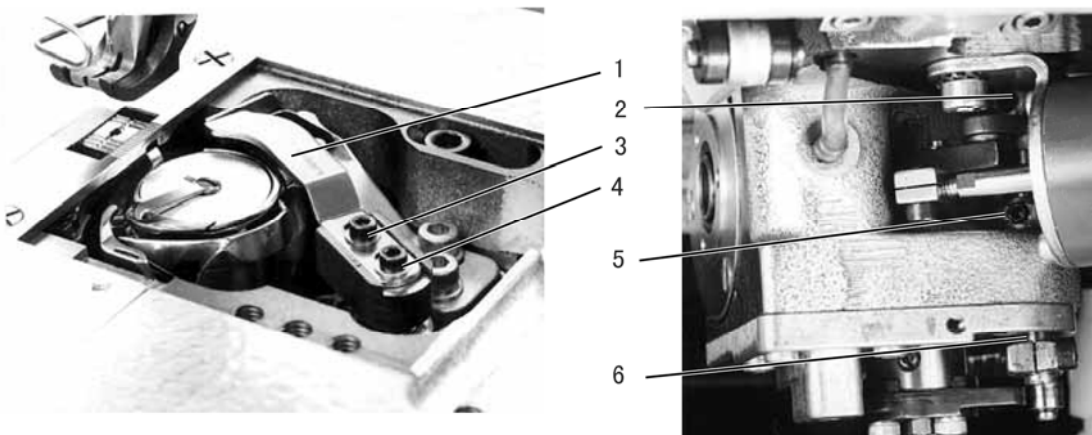
- (1) Loosen the two screws 3.
- (2) Move the thread holding spring 1 to adjust its position, and then tighten the screws 3.

28) Adjusting the knife timing position

After adjusting the position of the fixed knife 1, adjust the knife timing position.

Adjust so that the driving knife 1 starts touching the fixed knife at a position 5.5 mm along the front edge of the driving knife 1.

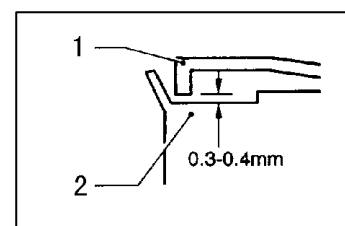
- (1) Loosen the two bolts 3 and 4.
- (2) Move the driving knife 1 to the left or right to adjust its position.
- (3) Then tighten the bolts 3 and 4.



29) Adjusting the driving knife height

The clearance between the lower blade edge of the driving knife 1 and the lower surface of the inner rotary hook should be 0.3-0.4mm.

- (1) Loosen the two screws 2 and 5.
- (2) Move the driving knife shaft 6 up or down to adjust the position of the driving knife 1.
- (6) Tighten the screws 2 and 5 on the setting collars again.



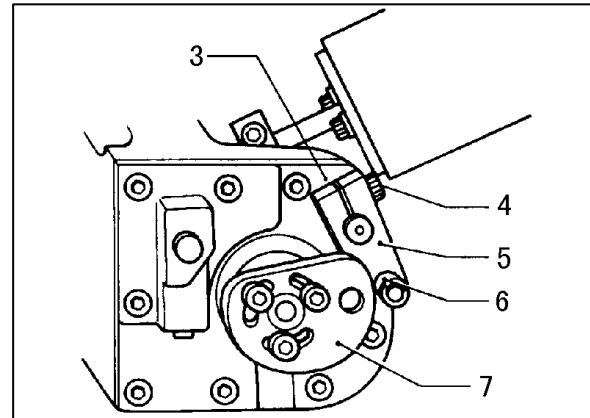
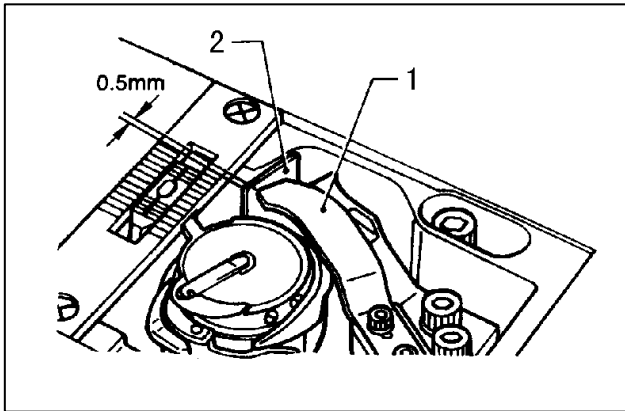
30) Adjusting the driving knife stop position

The distance from the blade of the fixed knife 2 to the end of the driving knife 1 should be 0.5 mm when the driving knife 1 has moved as far as possible toward the fixed knife 2.

- (1) Tilt back the machine head.
- (2) Turn the machine pulley to move the roller 4 of the driving knife arm 3 to the outermost side (right side) of the thread trimmer cam 5.

(3) Loosen the bolt 6.

(4) Move the driving knife 1 so that the distance between the blade of the fixed knife 2 to the end of the driving knife 1 is 0.5 mm, and then tighten the bolt 6.



31) Adjusting the driving knife operating position

The standard distance from the left side of driving knife arm 1 to the screw tip on the plunger 2 of the thread trimming solenoid is 1 mm. The clearance between the outermost side (right side) of the thread trimmer cam 5 and the roller 6 of the driving knife arm should be 0.1 mm.

(1) Overturn the arm.

(2) Loosen the bolt 3

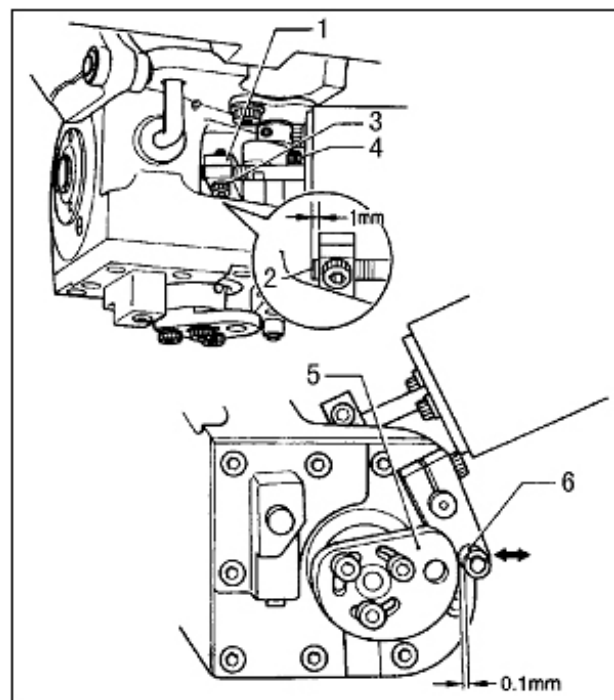
(3) Turn the plunger 2 of the thread trimming solenoid so that the distance from the left side of driving knife arm 1 to the screw tip on the plunger 2 of the thread trimming solenoid is 1 mm, and then tighten the bolt 3.

(4) Loosen the bolt 4.

(5) Set the plunger 2 to the position where it projects as far as possible to the left.

(6) Turn the machine pulley to move the roller 6 of the driving knife arm to the outermost side (right side) of the thread trimmer cam 5.

(7) Move the roller 6 so that the clearance between the outermost side (right side) of the thread trimmer cam 5 and the roller 6 is 0.1mm, and then tighten the bolt 4.



32) Adjusting the thread trimming timing

The center of the pin 1, the center of the reference hole 3 and the center of the roller 4 of the driving knife arm should be in a straight line when the thread take-up lever is at the highest position. (The white point on the pulley and the point on the belt cover are in a straight line.)

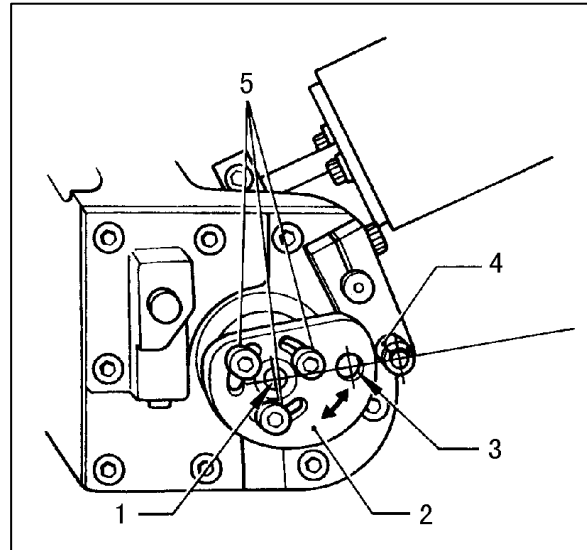
(1) Turn the machine pulley until the white point on the pulley and the point on the belt cover are in a straight line.

(2) Overturn the arm.

(3) Loosen the three bolts 5

(4) Turn the thread trimmer cam 2 to adjust the position of the thread trimmer cam 2 so that the center of the pin 1, the center of the reference hole 3 and the center of the roller 4 of the driving knife arm are in a straight line.

(5) Tighten the bolts 5.



33) Safety clutch

The standard safety clutch 2 in the lower toothed belt wheel protects the hook from being displaced or damaged in case of thread jamming in the hook path. When the hook is blocked, the safety clutch 2 must come out.

(1) Set free blocked hook.

(2) Stick a pin in drill-hole 1 of the outer clutch disc.

(3) Turn the pulley until the pin can be stuck in the drill-holes of both clutch parts.

(4) Turn the pulley forwards and backwards until the hook is freely movable again.

(5) Pull out pin.

(6) Hold down hook and turn the pulley until safety clutch 2 engages.

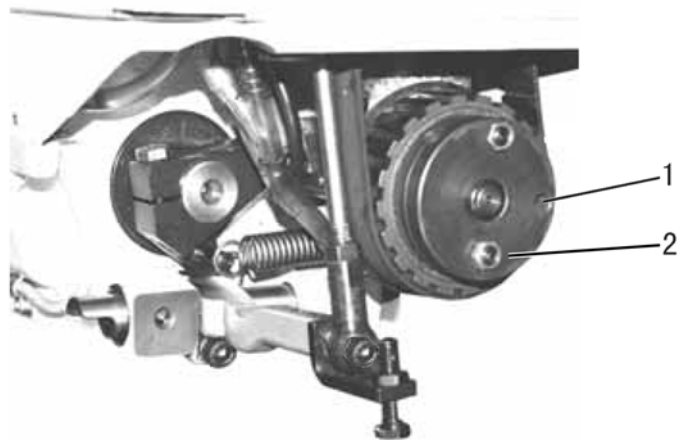
Adjust transmittable torque

Standard checking

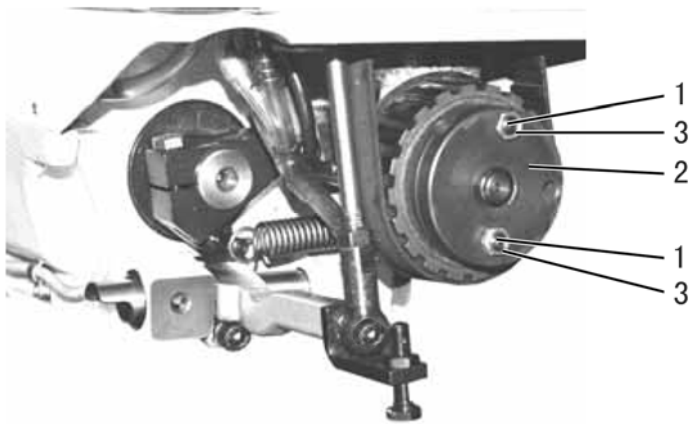
The supplier by means of a torque spanner should adjust the torque transmittable from safety clutch 4.

(1) Loosen counter-nuts 3.

(2) Adjust torque



(3) Tighten counter-nuts 3 again.



34) Regulate the atmospheric pressure

When the air cylinder works normally, the necessary atmospheric pressure is 5.5~6bar. Can find out through the dial plate of the filtering .

- (1) Lifting knob 1, clockwise rotation , the pressure increases.
- (2)Lifting knob 1, anticlockwise rotation, the pressure is reduced

