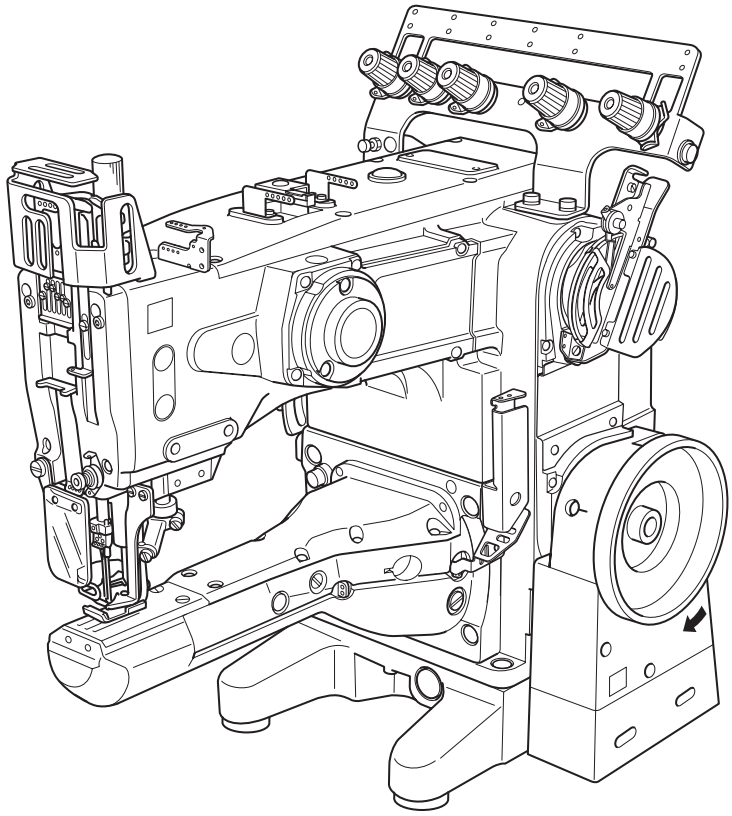
yamato®

Instruction Manual

3-Needle Cylinder Bed
Interlock Stitch Machine

VT2500 Class



Thank you for purchasing this product. This instruction manual contains information on how to handle this product and precautions in usage. Before using the product, read this instruction manual carefully and familiarize yourself with its content. Also, keep this manual in safe handy place so that others may use it as future reference.

YAMATO SEWING MACHINE MFG. CO.,LTD.

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Remarks

◇This manual has been prepared primarily for engineers, but information marked with  should be read by operators as well to ensure the machine is properly used.

◇Illustrations in this manual bear a number under the lower left-hand corner. These numbers also appear in the body of this manual, therefore, as necessary, refer to the indicated illustration.

Note

This product is subject to change without notice. Due to such event, the contents of this manual may not match the product in some regards. Every effort has gone into making this manual, nevertheless should you discover any mistakes or missing information, please note that it may not always be possible for Yamato to correct those errors immediately.

⚠Safety Instructions⚠

1. To ensure safe use

Always observe the following instructions to ensure the safe use of the industrial sewing machines and devices.

1.1 Application and purpose

The sewing machine is designed to improve productivity in the sewing industry and must not be used for other applications and purposes. Do not use this sewing machine until it can be confirmed that safety measures for the drive units have been taken.

1.2 Before use

Read all instruction manuals thoroughly before starting the use of this machine and follow them.
Also, read the instruction manual for the installed drive unit.

1.3 Working environment

DO NOT WORK IN THE FOLLOWING ENVIRONMENTS:

◇Place where atmosphere temperature and humidity give a bad influence the performance of sewing machines.
◇Outdoors and place where the sewing machines are exposed to sunlight directly.
◇Atmosphere containing dust, corrosive gases or flammable gases.
◇Place where voltage fluctuation exceeds ｱ10% of the rated voltage.
◇Place where power capacity necessary for the used motor specifications cannot be secured.
◇Place where strong electric or magnetic fields are generated such as near large-output high frequency transmitters or high frequency welding machines.

1.4 Unpacking and transportation

(1) Unpack from the top.
(2) Never hold the parts near the needle or threading parts when removing the sewing machine head from the buffer of box.
(3) When carrying the sewing machine head, have an assistant.
(4) Pay attention not to get excessive impact or shock when moving the sewing machine head with a pushcart.

2. Installation and preparation

Always observe the following instructions to ensure the safe use of the industrial sewing machines and devices.

2.1 Instruction and training

Operators and workers, who supervise, repair or maintain the machine head and machine unit, are required to have the adequate knowledge and operation skills to do the job safely. In order to establish such necessary conditions, it needs for the employer to plan and enforce the safety education and training to those workers.

2.2 Sewing table and motor

(1) Prepare a machine table that has enough strength to withstand the weight of the sewing head and any reaction while operating.
(2) Maintain a comfortable working environment with considering the lighting and the arrangement of sewing machine so that the operators can work smoothly.
(3) When installing the control box and the related parts on the sewing machine, take care about the posture of the worker.
(4) Install the drive unit correctly according to the instruction manual.

2.3 Wiring

(1) Never connect the plug for power supply until assembly is finished.
(2) Fix the connectors securely to the sewing machine head, motor, and electric apparatus.
(3) Do not apply excessive force to the connection cords.
(4) Connect the cords away from the driving parts.
(5) Place the ground wire securely to the designated position on the machine head.

2.4 Before operation

(1) Take care not to attach lubricant, silicone oil, and grease on the eyes or skin. Keep them away from children.
(2) Be sure to fill or drop lubrication oil before operating the sewing machine.
Use the Yamato SF oil as specified.
(3) Never put your hand under the needle or near the moving parts of the machine when turning on power supply switch.
(4) When operating a new sewing machine, make sure the rotating direction of pulley agrees with the rotating-direction mark.

2.5 During operation

(1) Be sure to operate the sewing machine with the safeguards such as belt cover, finger guard, and eye guard.
(2) Never place the finger, hair or objects under the needle or close to the moving parts while operating the sewing machine.
(3) Be sure to turn off the power supply switch when threading or replacing the needles.
(4) Never place your hands close to the knives when operating the sewing machine with the trimming devices.
(5) Be sure to turn off the power supply switch when terminating the sewing work or leaving the sewing machine.
(6) If the sewing machine malfunctions, abnormal sound or smell something unusual while operating, be sure to turn off the power supply switch.

2.6 Removal

(1) Turn off the power supply switch if removed or replaced any parts or during adjustment of sewing machine.
(2) Do not pull the cord when removing the plug. Be sure to hold the plug itself.
(3) A high voltage is applied inside the control box. Turn off the power supply switch and wait more than 5 minutes before opening the cover.

3. Maintenance, inspection, and repair

(1) Follow the instruction manuals for maintenance, inspection, and repair.
(2) Entrust the maintenance, inspection, and repair to specially trained personnel.
(3) Be sure to turn off the power supply switch and make sure that the sewing machine and motor completely stop before the maintenance, inspection, and repair. (If using a clutch motor, take care that the motor keeps turning for a while even after turning off the power supply switch.)
(4) Do not modify the sewing machine by the customer's judgment.
(5) Be sure to use original replacement parts for repairs or maintenance.

4. Caution signs and alert pictorial markings

This instruction manual contains the following caution signs and alert pictorial markings to prevent you from injuring yourself or the sewing machine from being damaged.
Please follow the instructions.

4.1 Meanings of caution signs

⚠ WARNING

indicates potentially hazardous situations which, if not heeded, could result in death or serious injury to you and others.

⚠ CAUTION

indicates hazardous situations which, if not heeded, may result in minor or moderate injury to you and others, or may result in machine damage.

4.2 Alert pictorial markings

This mark indicates the warning which, if not heeded, could result in death or serious injury.

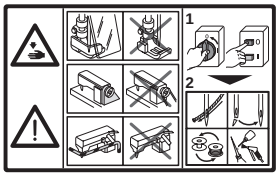
This mark indicates the caution for high temperature.

This mark indicates the warning which, if not heeded, could result in death or Serious injury. And also this mark is used to emphasize the important information.

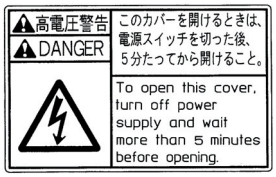
High-voltage applies in the control box. This label indicates that electric shock may be caused.

This mark indicates the caution which, if not grounded, the machine or device could malfunction and could result in personal injury.

5. Warning labels on sewing machines



This label indicates that removal of the safeguards and works except for sewing performance while the power supply switch is on are prohibited. (For details, see the next page.)

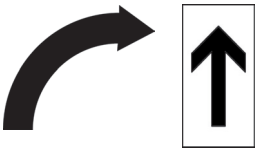


High-voltage applies in the control box. This label indicates that electric shock may be caused.

This label is affixed on the safeguards. Considering the operation, it is not affixed on the finger guard and eye guard. Be sure to operate with the finger guard and eye guard in position.

Stepping motor and solenoid may overheat if used continuously. To prevent a burn, take care not to touch.

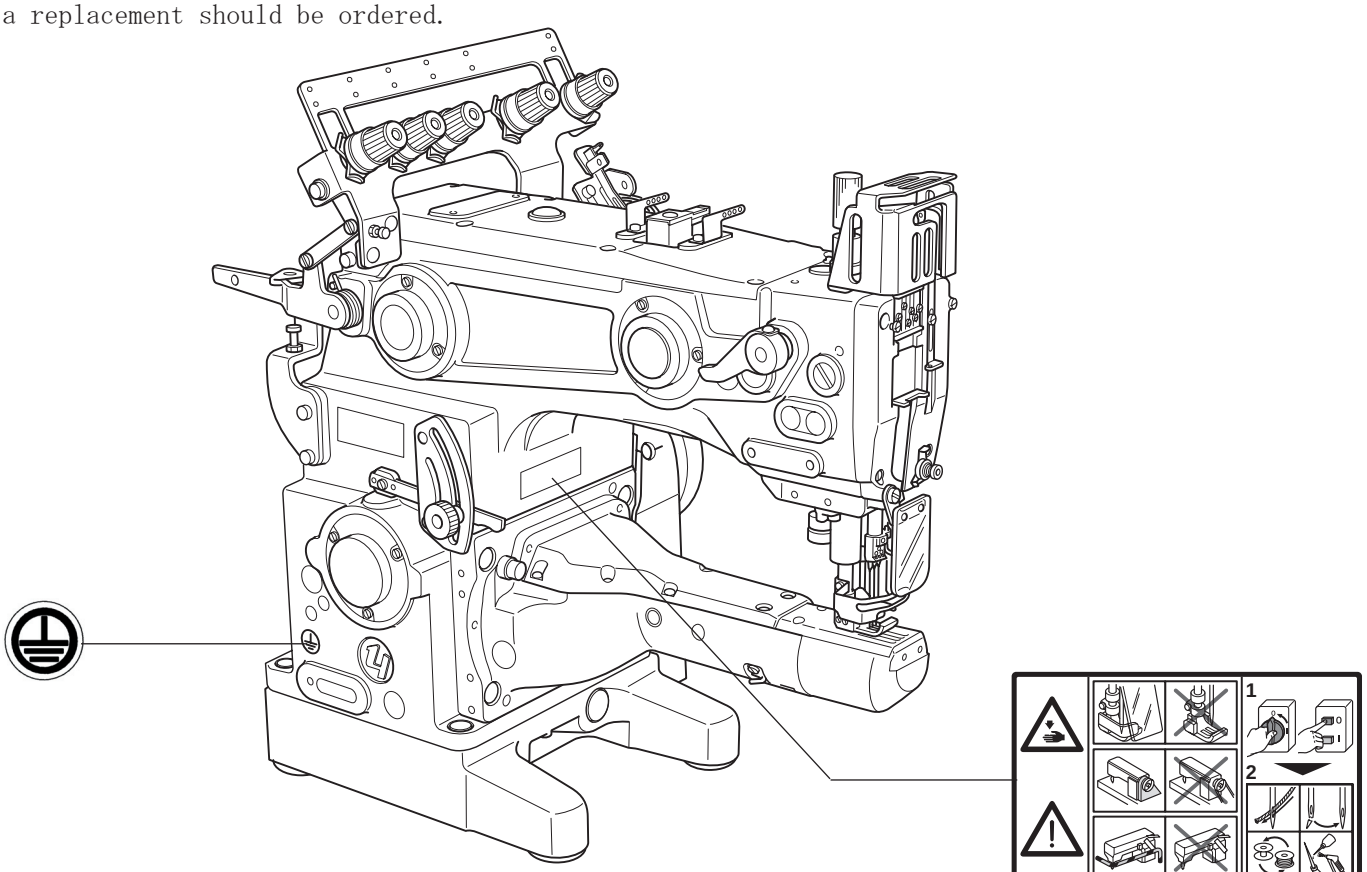
If not connected earth line, static electricity may be generated and inflict injury on person. In addition, the malfunction of electric system may cause injury to person.

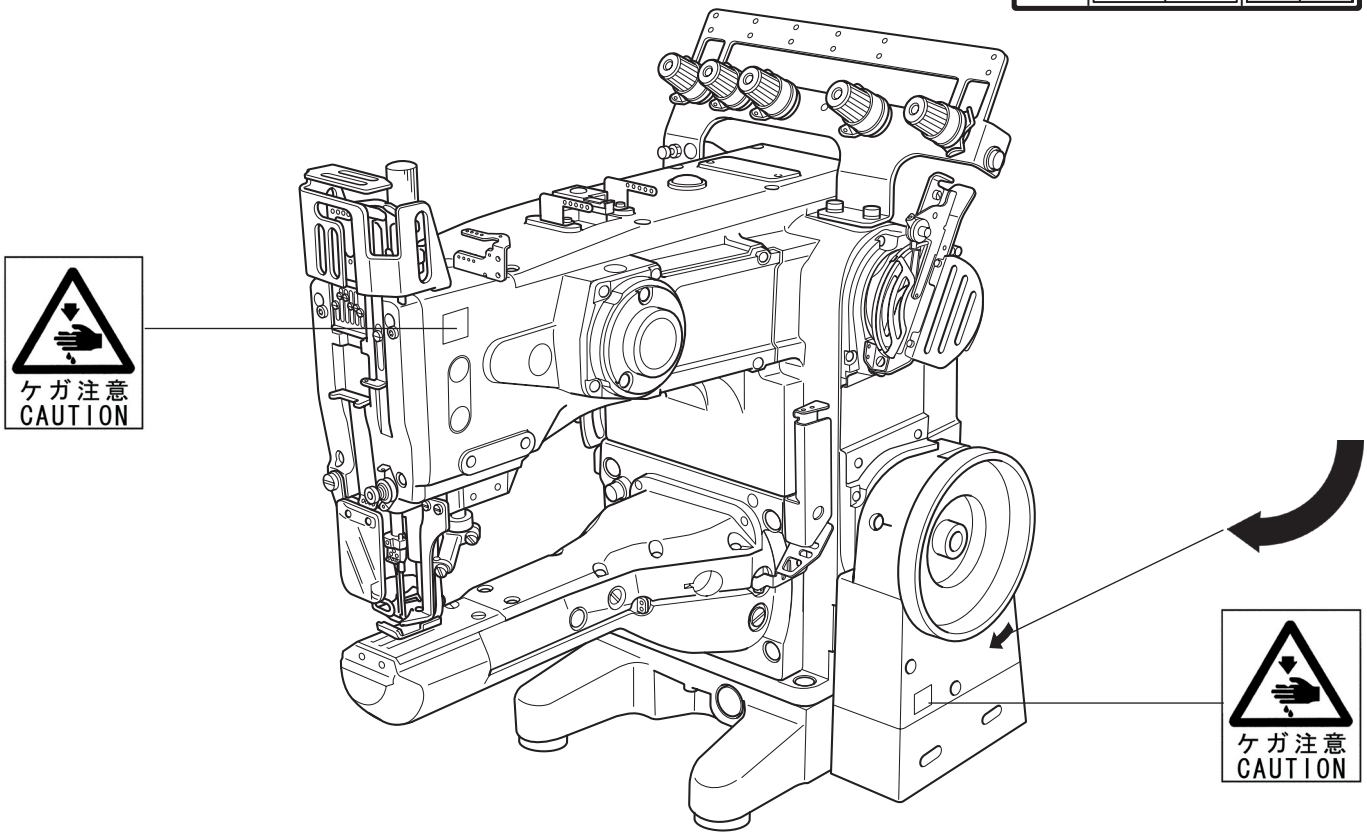


Check the rotating direction of machine pulley agrees with 'ROTATING-DIRECTION SYMBOL'.

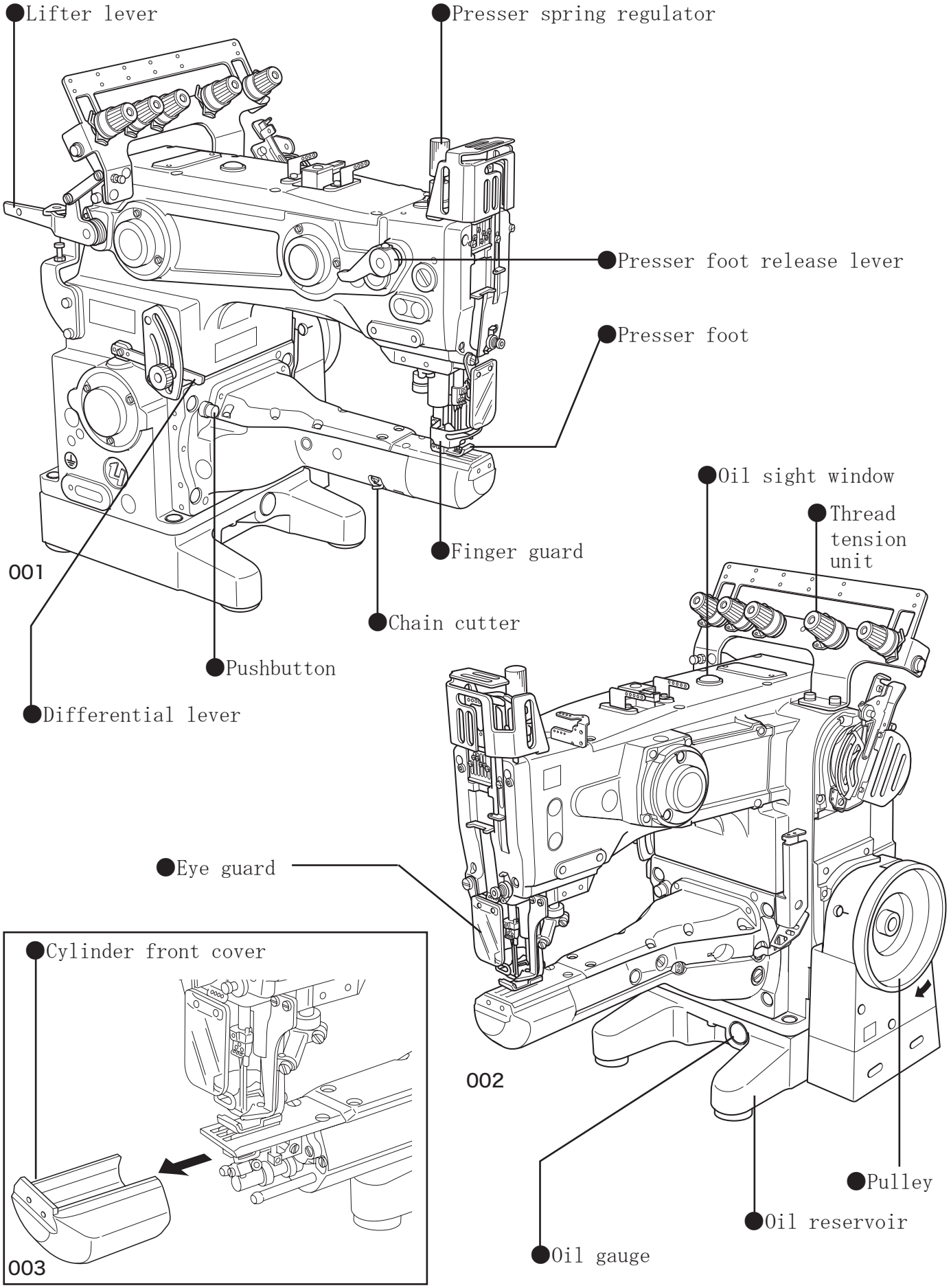
6. Location of Safety Labels

Safety labels are placed adjacent to potential hazards.
Keep these labels clean and easily readable at all times; should a label become damaged or lost, a replacement should be ordered.





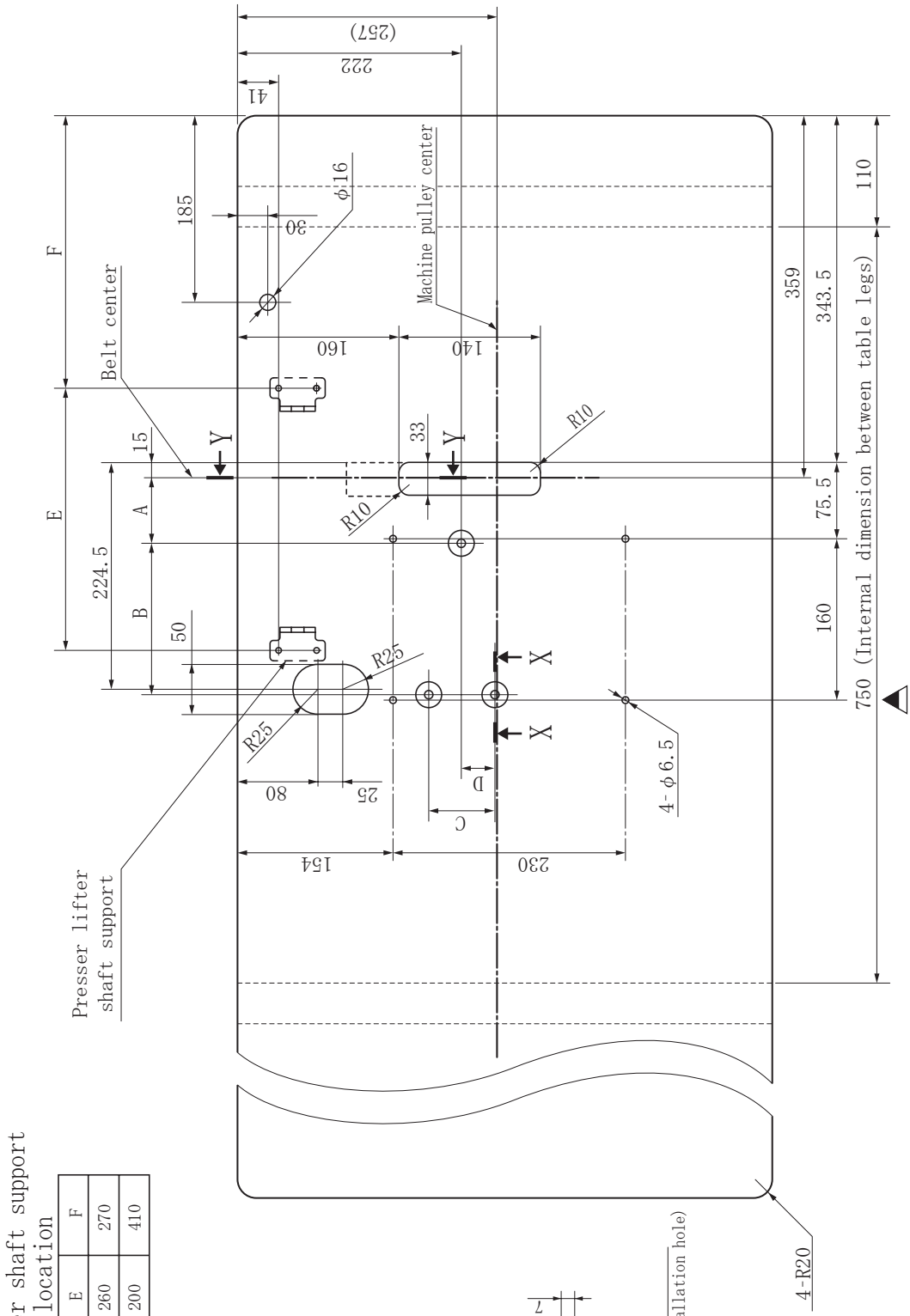
1. Name of each part



2. Installation

2.1 Table top type

2.1.1 Table cutting diagram



Presser lifter shaft support installation location

Pedal position	E	F
Right	260	270
Left	200	410

* For dimensions A, B, C and D, see the Instruction Manual of the motor.

004

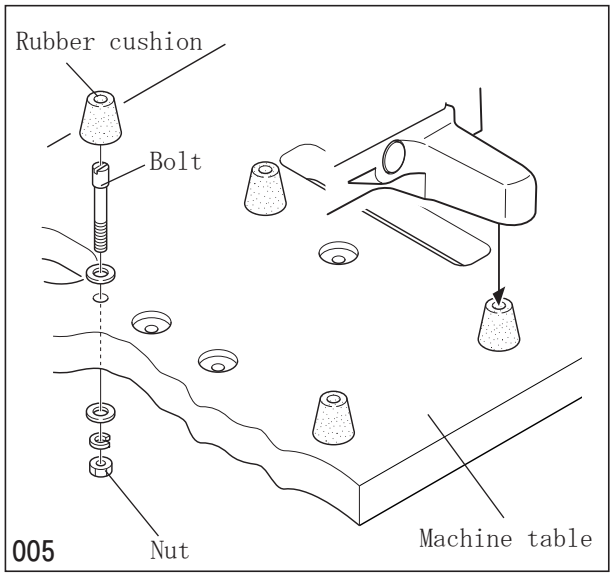
2.1.2 Installation onto table

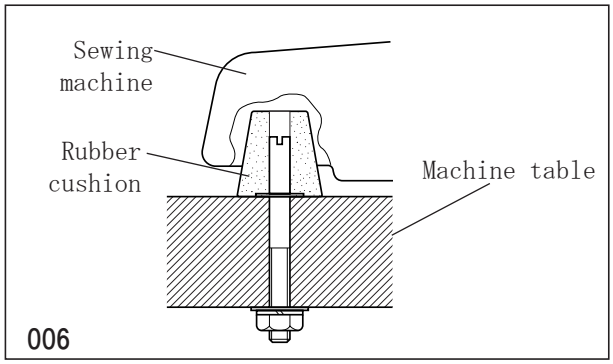
⚠ CAUTION

The sewing machine weighs 42 kg or more. Work in twos or more when unpacking, carrying and installing the machine.

Install the sewing machine correctly as shown in Fig. 004, 005 and 006.

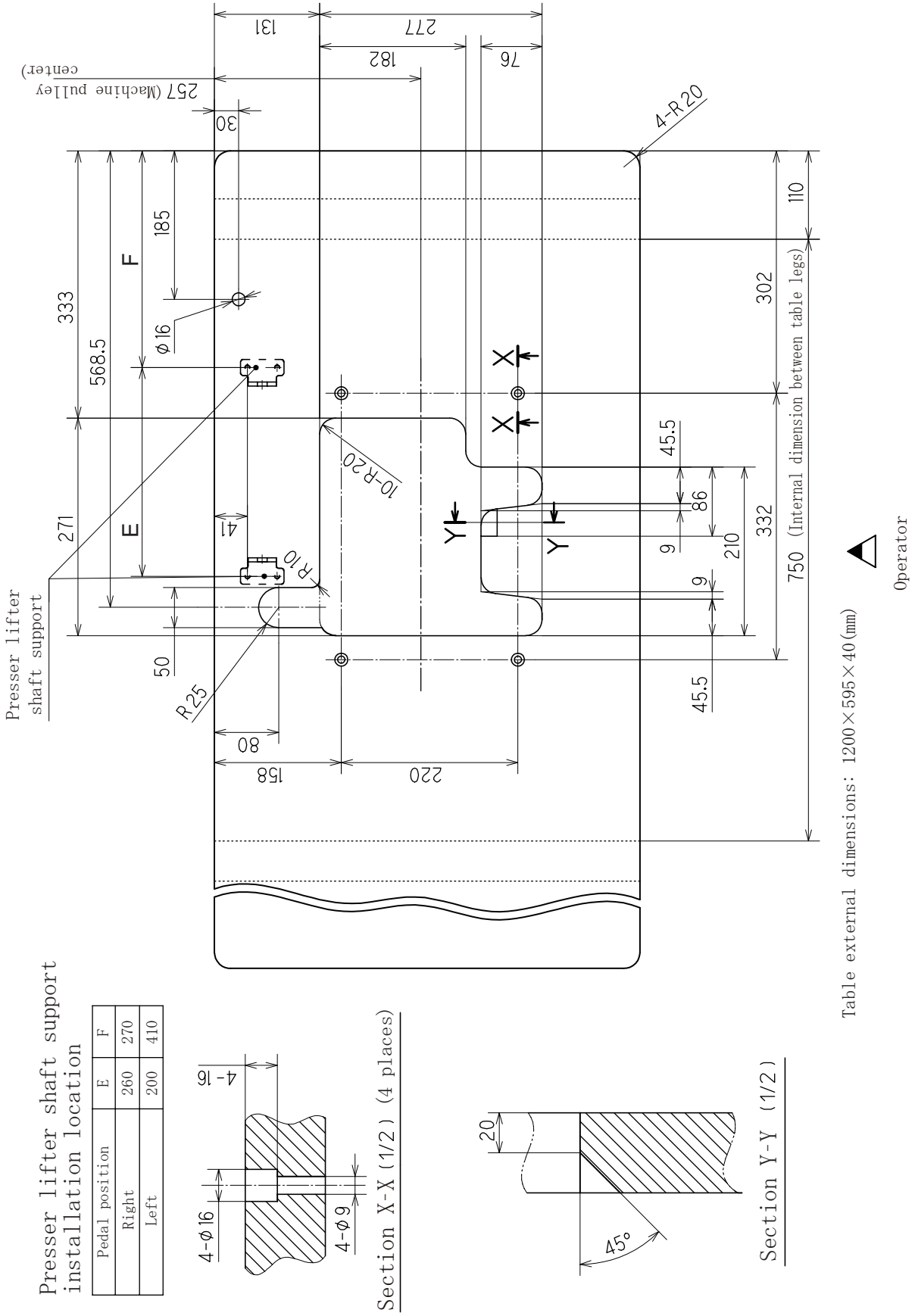
(1) Attach the bolts and nuts to the machine table.
(2) Cover the bolts with the rubber cushions.
(3) Set the sewing machine over the rubber cushions.





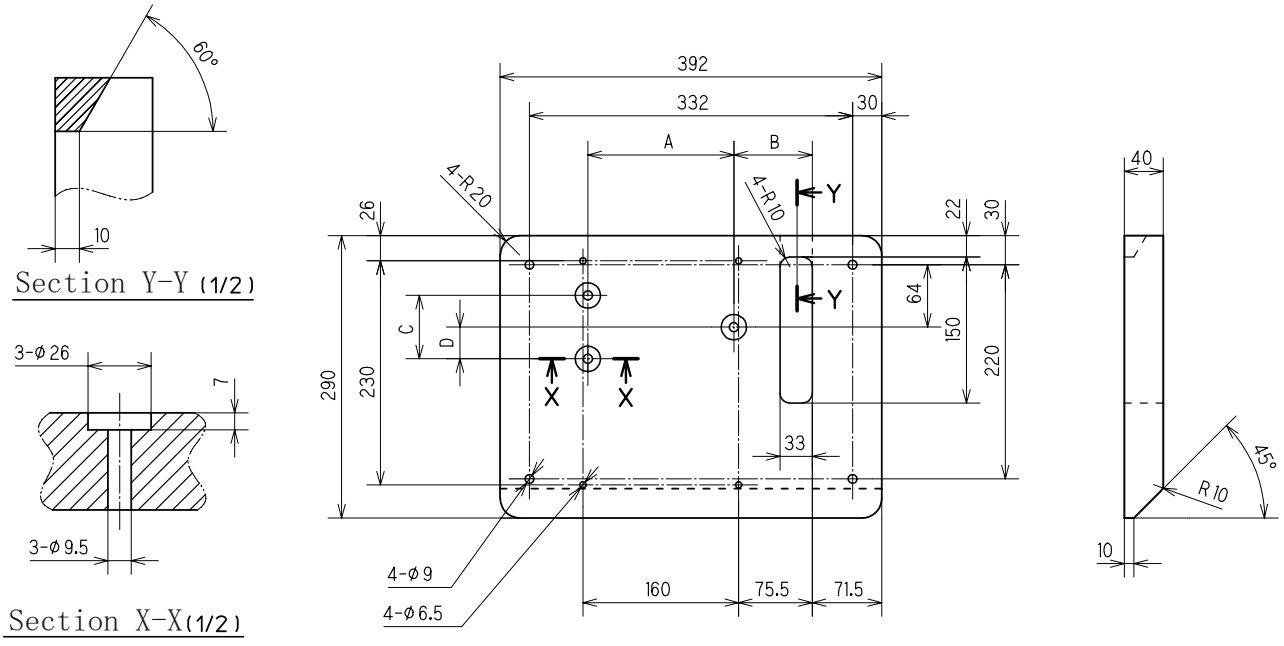
2.2 Semi-submerged type

2.2.1 Table cutting diagram



007

Supporting board



008

* For dimensions A, B, C and D, see the Instruction Manual of the motor.

2.2.2 Installation onto table

⚠ CAUTION

The sewing machine weighs 42 kg or more. Work in twos or more when unpacking, carrying and installing the machine.

Properly install the sewing machine referring to the figures 007, 008, 009 and 010.

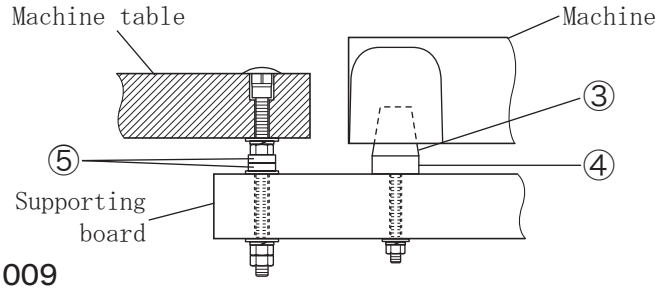
(1) Attach the bolt ② (4 in total) to the supporting board ①.

(2) Cover the bolt ② with the rubber cushion ③.

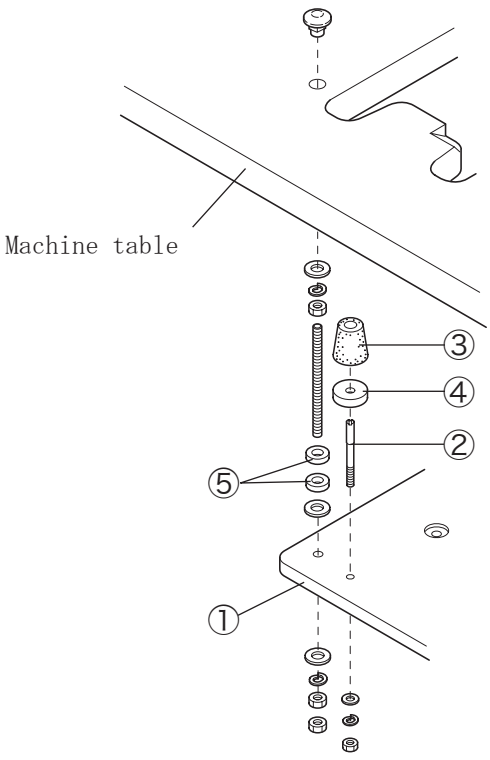
(3) Fix the supporting board ① to the machine table ② while inserting the two supporting board spacers ⑤ between the board and the table.

Notes

- **If the thickness of the table exceeds the standard (40 mm), use the rubber cushion spacer ④ or adjust the number of the supporting board spacers ⑤.**
- **The top surface of the stitch plate is typically approx. 100 mm high from the table.**



009



010

2.3 Motor, pulley and belt

Clutch motor

◇ See the instruction manual of the motor you are using.

◇ The clutch motor should be installed in a position where the center of the motor pulley ② and the center of the machine pulley ① align with one another when the pedal is depressed and the motor pulley ② moves to the left.

◇ Commercially available pulleys have outer diameters incremented every 5 mm, therefore pulleys are specified by commercial sizes.

⚠ CAUTION

Use of an inappropriate motor pulley may cause the sewing machine to exceed the maximum speed whereby resulting in breakdown.

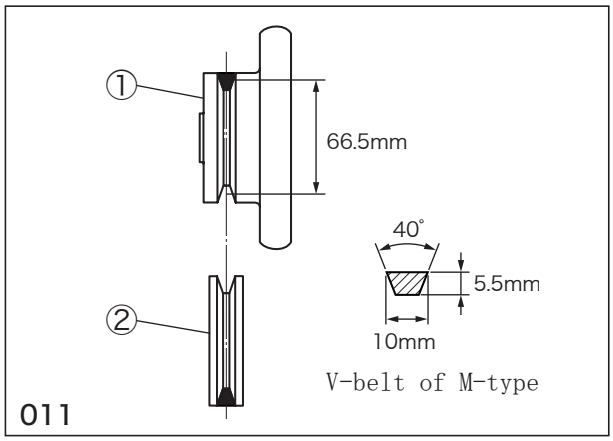


Table 1

Motor pulley O.D. (mm)	Sewing speed (rpm)		Belt size
	50Hz	60Hz	
75		3600	M36
80		3850	M36
85	3400	4100	M36
90	3600	4350	M37
95	3800		M37
100	4000		M37
105	4200		M38
110	4400		M38

◇ Numerical figures are given for a 3-phase, 2-pole, 550 W (3/4 HP) clutch motor.

Servomotor

See the instruction manual of the motor you are using.

Calculate motor pulley outer diameter from the below formula. Or select the best size of motor pulley from Table 2.

$$\text{Motor pulley O.D.} = \frac{\text{Sewing speed}}{\text{Servomotor speed}} \times 66.5 + 5\text{mm}$$

◇ Commercially available pulleys have outer diameters with every 5 mm increment, therefore select a pulley of an outer diameter that is near to the calculated outer diameter.

Table 2

Sewing speed (rpm)	Motor pulley O.D.	
	Servomotor speed (rpm)	
	3000	3600
3500	83	70
3800	89	75
4000	94	79
4300	100	84
4500	105	88

◇ Numerical figures are examples for servomotors of 3000 and 3600 rpm.

Belt

Use an M-type V-belt.

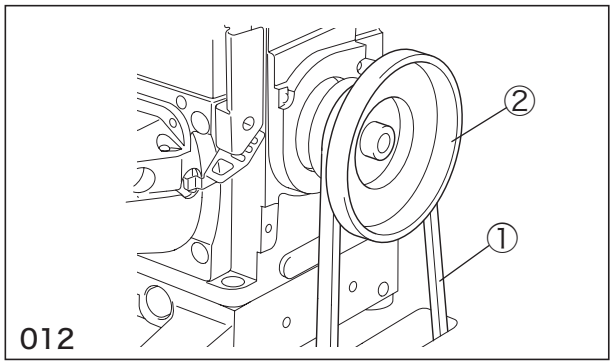
For sizes, see Table 1.

2.4 Hanging belt

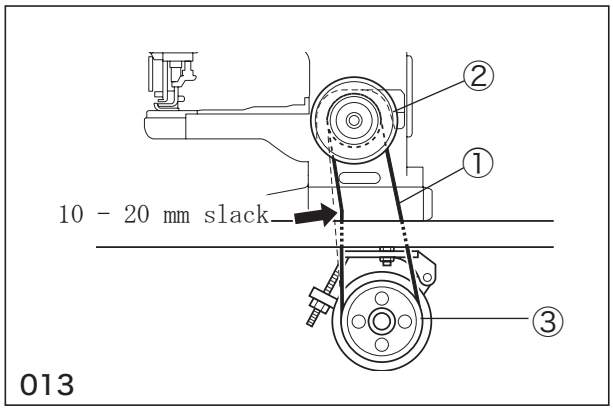
⚠ CAUTION

Turn off the power switch of the motor and check the motor has stopped before hanging or replacing the belt. If not, hands or clothing may become entangled whereby resulting in injury.

(1) Hang the belt ① around the machine pulley ②.
(2) While turning the machine pulley ②, hang the other end of belt ① around the motor pulley ③.
(3) Stretch the belt so that the belt has a 10 to 20 mm slack when a force of about 10 N (1.02 kgf) is applied to the center of the belt.
(4) Once the belt is sufficiently taut, securely lock the motor pulley.
    * How the motor is locked down differs depending on motor, therefore see the instruction manual of the motor.



012



013

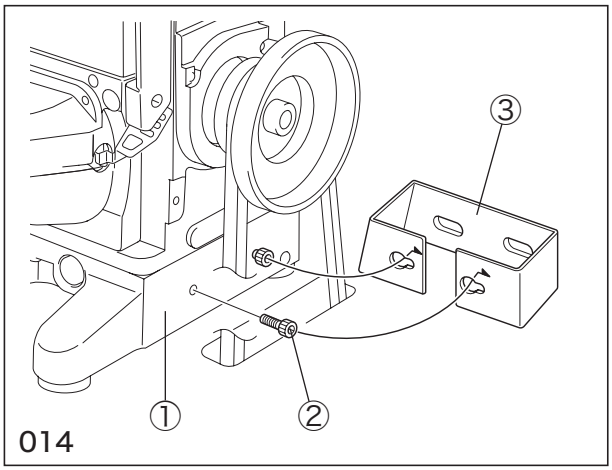
ⓘ SUPPLEMENT

Semi-submerged installation of the machine requires the supplementary belt cover to be installed before the machine is mounted on the table and the belt is hanged in place. **See page 8.**

2.5 Belt cover installation

⚠ CAUTION

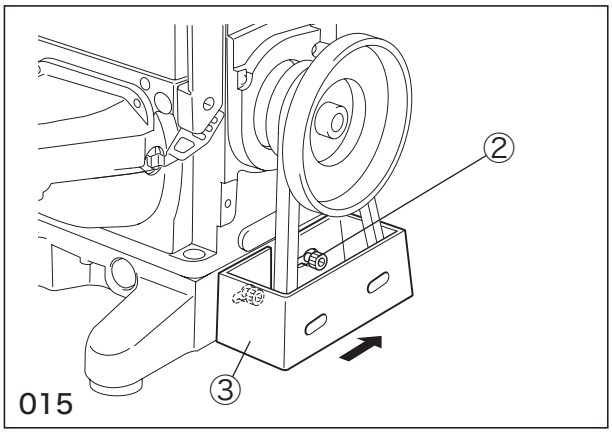
- Turn off the power switch of the motor and check the motor has stopped before installing the belt cover. Working with the power on can result in injury.
- Install the belt cover without fail.
  If the belt cover is not installed, hands, clothing or the stitched fabric may become entangled in the belt resulting in injury or damage.



014

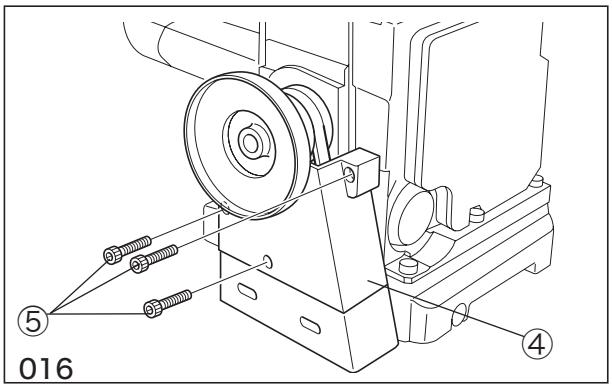
(1) Insert the screws ② halfway into the oil reservoir ①.

(2) Fit the holes on the supplementary belt cover ③ over the heads of the screws ②, slide the cover to the rear and tighten the screws ②.



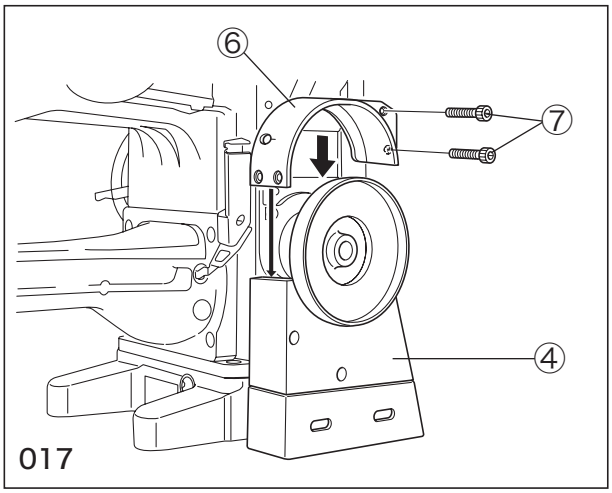
015

(3) Attach the belt cover(lower) ④ to the sewing machine with the screws ⑤.



016

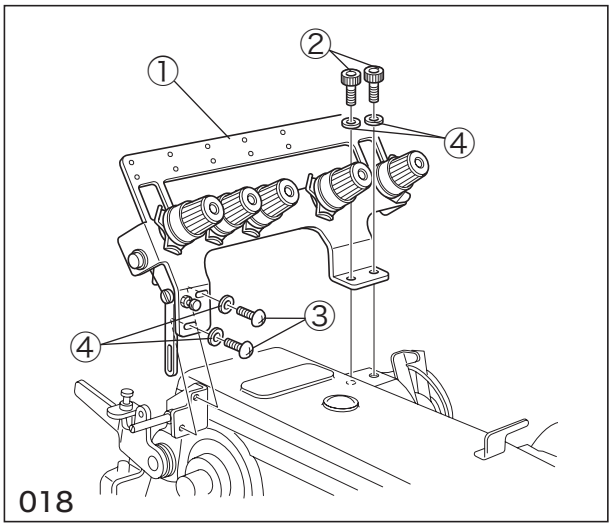
(4) Fit the belt cover(upper) ⑥ onto the belt cover(lower) ④ and lock in place with the screws ⑦.



017

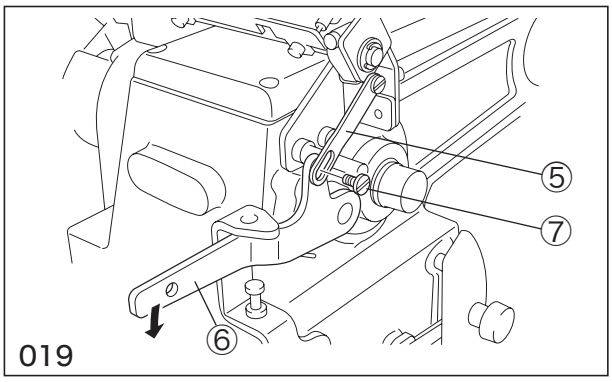
2.6 Thread tension unit installation

(1) Attach the thread tension unit to the sewing machine with the screws ② ③ and the washers ④ (2 on each left and right.)



(2) Attach the tension release lever connector ⑤ to the lifter lever ⑥ with the screw ⑦.

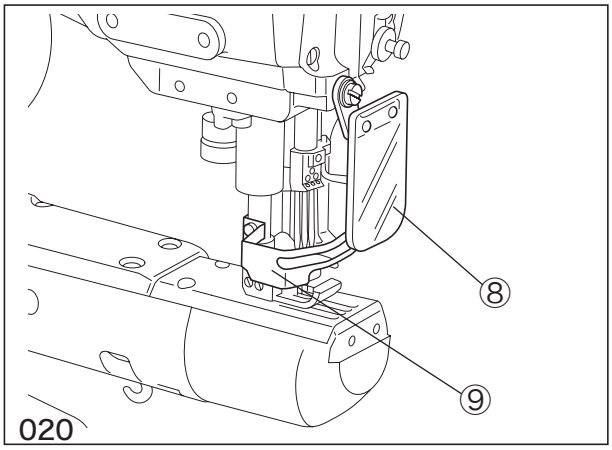
(3) Press the lifter lever ⑥ downward to check it moves smoothly.



2.7 Eye guard and finger guard installation

⚠ CAUTION

Use the sewing machine with the eye guard ⑧ and the finger guard ⑨ attached. Also, lower the eye guard ⑧ to the set position when working.



2.8 Presser lifter pedal installation

Attach the presser lifter shaft(lower) ③ on the underside of the table and then connect the presser lifter pedal and lifter lever ⑦ to the presser lifter shaft(lower) ③ by chain ⑧.

(1) Attach the presser lifter shaft support ① on the underside of the table with the screws ②.

(2) Pass the presser lifter shaft(lower) ③ through the collar ④, return spring ⑤, lifter shaft lever ⑥ and presser lifter shaft support ① as shown in the figure.

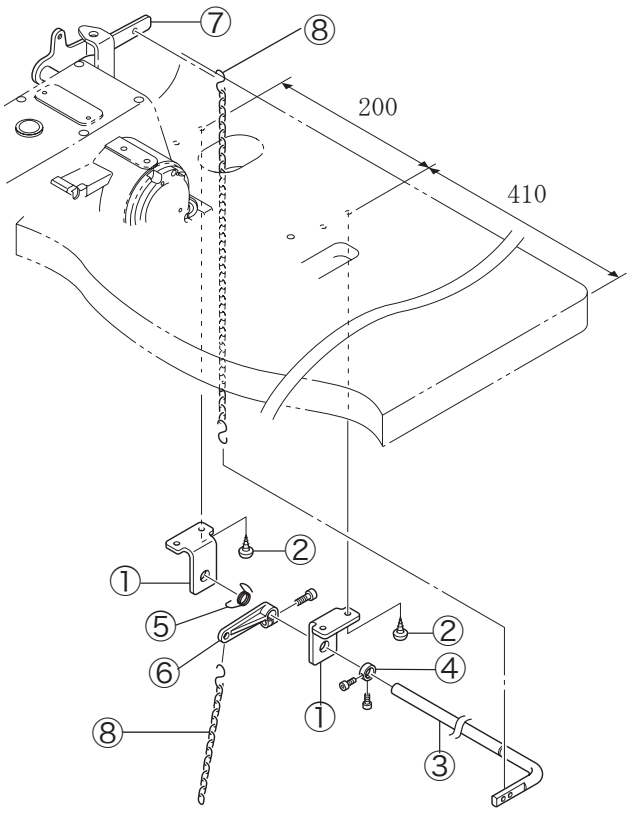
(3) Check that the presser lifter shaft(lower) ③ turns smoothly.

(4) Move the collar ④ to the left and right so that the arm of the presser lifter shaft(lower) ③ is directly beneath the lifter lever ⑦.

(5) Lock down the arm of the presser lifter shaft(lower) ③ so that it is parallel to the lifter shaft lever ⑥.

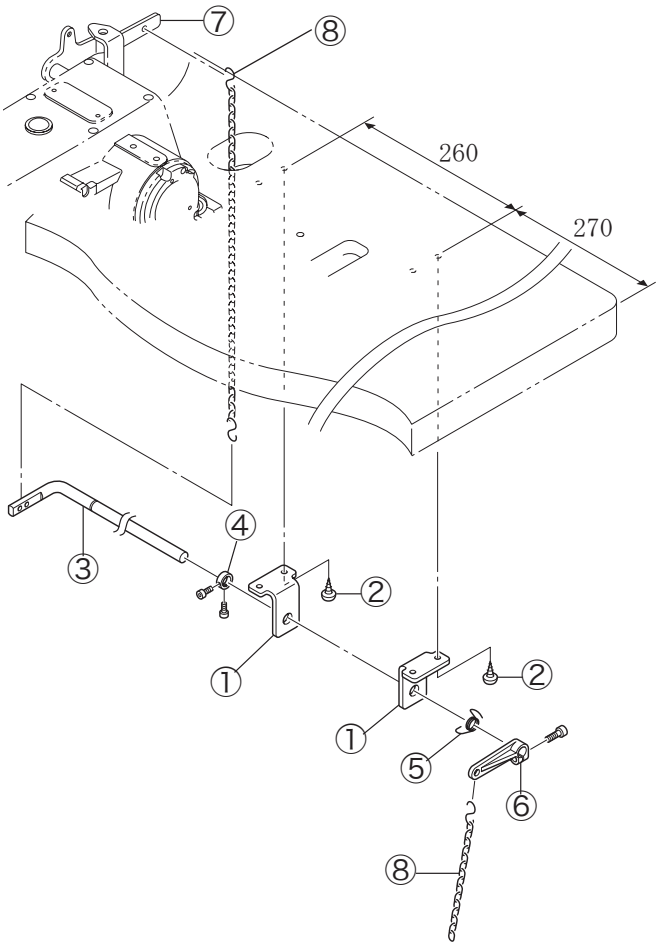
(6) Connect the arm of the presser lifter shaft(lower) ③ and the lifter lever ⑦, the lifter shaft lever ⑥ and the presser lifter pedal by chains ⑧.

When attaching pedal to the right side of table



021

When attaching pedal to the left side of table



022

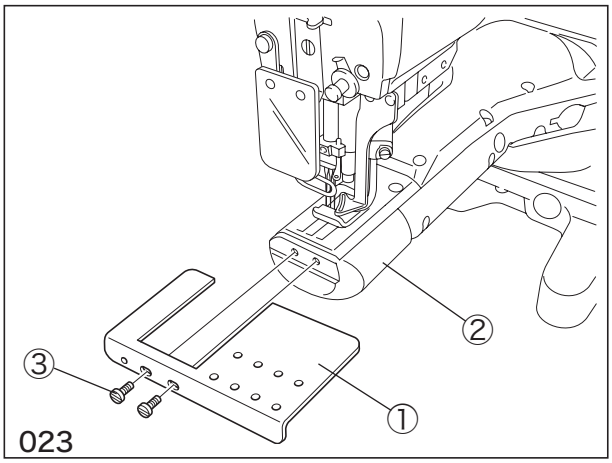
2.9 Supplementary cover installation

Attach the supplementary cover ① to the cylinder front cover ② with the screws ③.

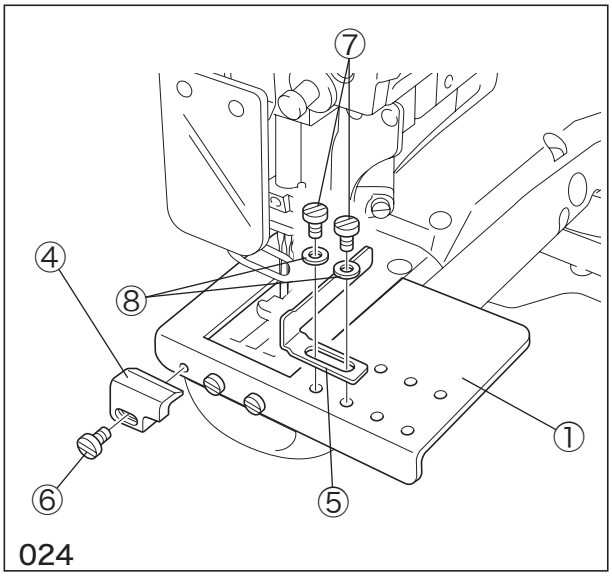
* The fabric edge guides ④ ⑤ can be attached to the supplementary cover ① with the screws ⑥ ⑦ and the washers ⑧.

⚠ CAUTION

Turn off the power switch of the motor and check the motor has stopped before installing the supplementary cover. Working with the power on can result in injury.



023

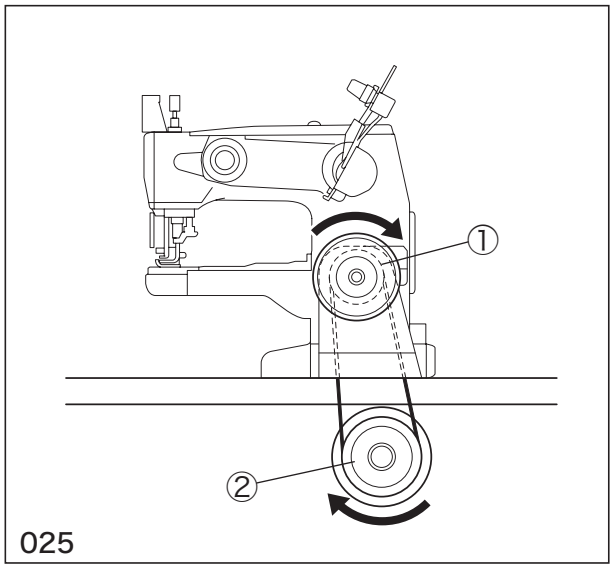


024

3. Sewing speed and pulley rotating direction

◇ The maximum speed of this sewing machine is 4500 rpm (intermittent operation). When using it for the first time, run the machine at 15% to 20% lower speed of its maximum sewing speed during the first 200 hours (approx. 1 month) so that it will offer a long service life in good condition.

◇ Both the motor pulley ② and the machine pulley ① rotate in the clockwise direction.



025

⚠ CAUTION

If the pulleys rotate in reverse direction, oil can not be properly supplied to parts resulting in sewing machine breakdown.

4. Lubrication

⚠ CAUTION

Turn off the power switch of the motor and check the motor has stopped before performing work. Working with the power on can result in injury.

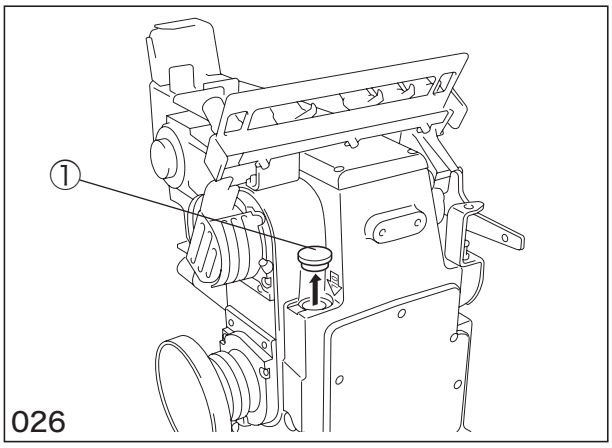
4.1 Lubricating oil

⚠ CAUTION

Do not use oil additives as they can deteriorate the oil resulting in sewing machine breakdown.

◇ Lubricating oil: YAMATO SF OIL No.28

◇ Capacity of oil reservoir: 600 mL

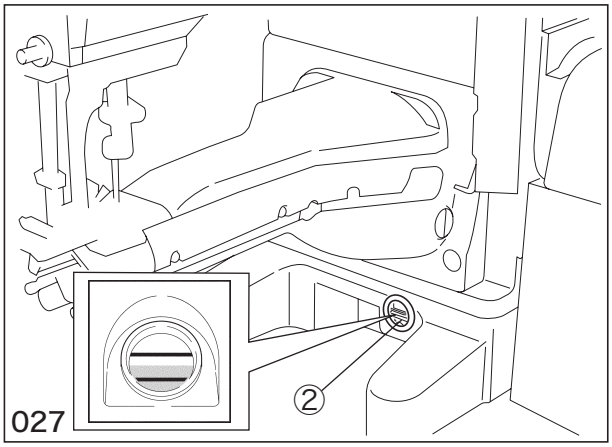


026

4.2 Lubricating

When using a sewing machine for the first time

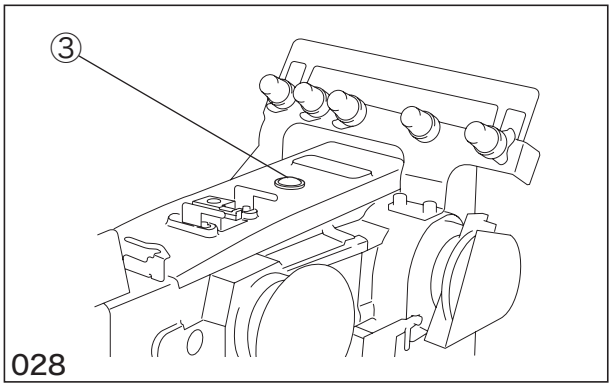
A sewing machine is shipped with the oil drained. Before using a sewing machine for the first time, charge with oil. To add oil, remove the rubber seal plug ① labeled "OIL" and add oil up to the top line on the oil gauge ②.



027

Checking point

After starting the sewing machine, check oil is coming from the nozzle when looking from the oil sight window ③. If oil is not coming out, check and replace the oil filter (see page 15).



028

⚠ CAUTION

If very little oil is sprayed out from the nozzle despite a sufficient charge of oil or if there are many bubbles in the oil, check and replace the oil filter.

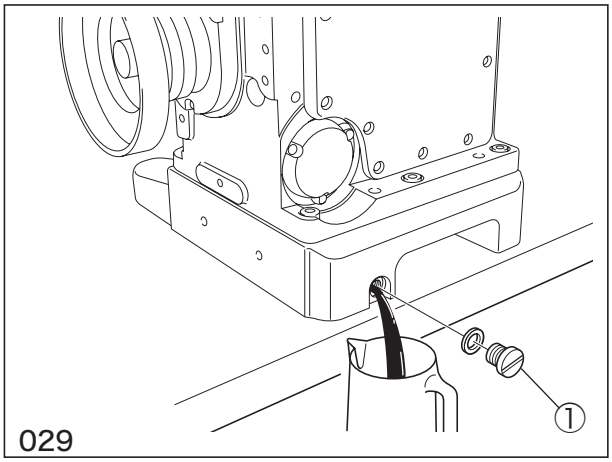
4.3 Changing oil

Oil changing interval

With a new sewing machine, change the lubricating oil after about 200 hours (approx. 1 month) of use. After that, change the oil once or twice a year.

How to change

(1) Remove the belt cover. (See page 8.)
(2) Remove the V-belt from the sewing machine. (See page 7.)
(3) Remove the sewing machine from the machine table.
(4) Set a container for collecting the oil underneath the drain hole.
(5) Remove the drain hole screw ①.
The oil is drained out.

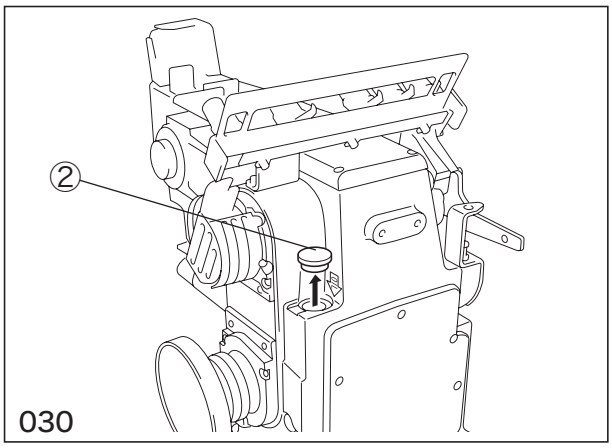


029

⚠ CAUTION

Be careful not to get oil on the V-belt or machine pulley.

(6) Screw back the drain hole screw ①.
(7) Remove the seal plug ② labeled "OIL".
(8) Change with new oil. (See page 13.)
(9) Set the sewing machine on the machine table.
(10) Hang the V-belt around the motor pulley and reinstall the belt cover. (See page 7 and 8.)

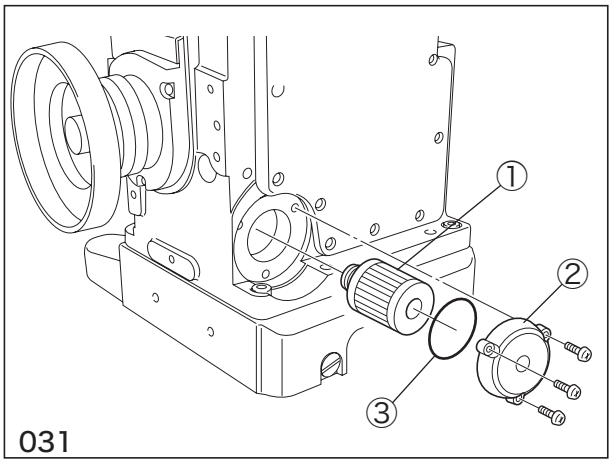


030

4.4 Oil filter check and replacement

◇Oil is not properly supplied if the oil filter ① becomes clogged with dirt. Check the filter for clogging and breakage every 6 months.

◇If very little oil is sprayed out from the nozzle despite a sufficient charge of oil or if there are many bubbles in the oil, check and replace the oil filter.



031

Check and replace

◇Remove the oil filter cap ②, pull out the O-ring ③ and the oil filter ①, and check the oil filter.

◇If the oil filter ① is clogged with dirt, clean or replace with a new filter.

◇If the oil filter ① is broken, replace with a new filter.

⚠ CAUTION

- **When removing the oil filter cap ②, oil in the oil filter ① may spill out.**
- **Insert the oil filter ① into the inmost to install it properly.**

5. Proper operation

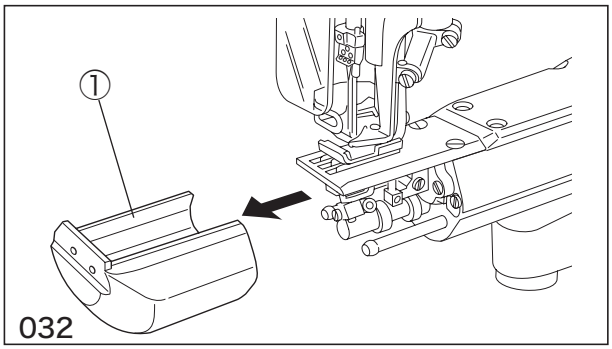
5.1 Detaching/reattaching cylinder front cover

Detaching

Slide out the cylinder front cover ① towards your side.

Reattaching

Align the cylinder front cover ① with the pins and slide it onto the sewing machine until hearing it clicks.



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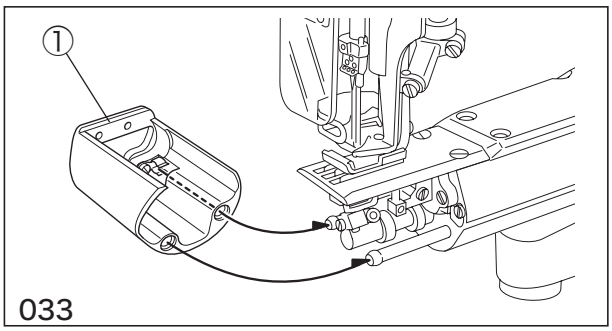

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⚠ CAUTION

Be sure to set the cylinder front cover ① during sewing procedure for safety use.

5.2 Needle system

Proper needle system for this sewing machine is UY x 128GAS needles.

Select a proper needle in size according to type and thickness of the fabric.

Table 3

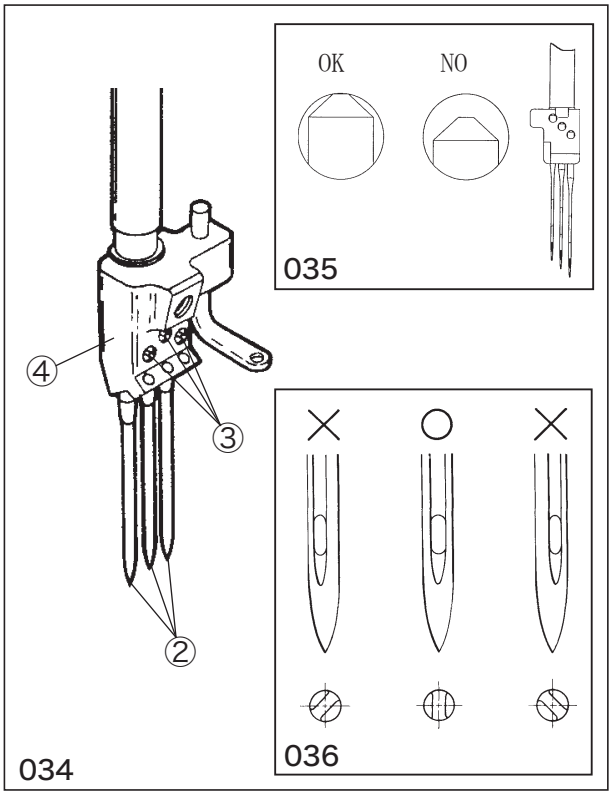
Japanese standard	8	9	10	11	12	13	14
Metric standard	60	65	70	75	80	85	90

5.3 Needle installation

⚠ CAUTION

Turn off the power switch of the motor and check the motor has stopped before installing needles. Working with the power on can result in injury.

(1) Loosen the screws ③ that lock the needles ② in place with a screwdriver. To replace a needle ②, use tweezers to pull the old needle out.
(2) Insert a new needle with facing its scarf to the right back to the end of the hole of the needle clamp ④, with tweezers.
(3) Tighten the screws ③ to lock the needles ② in place.



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036

Notes

- **Use 0.6 N･m (6 kgf･cm) of torque to tighten the screws ③.**
- **After replacing a needle, check the distance between the needle and looper, and between the needle and needle guards (See pages 27 and 29).**

5.4 Threading

⚠ CAUTION

- Turn off the power switch of the motor and check the motor has stopped before threading. Working with the power on can result in injury.
- Incorrect threading can cause skip stitch, thread breakage, and uneven stitch.

Thread as explained in Fig. 037.

ⓘ SUPPLEMENT

Raising the presser foot activates the tension release. This makes it easier to pull out the thread.

038

ⓘ SUPPLEMENT

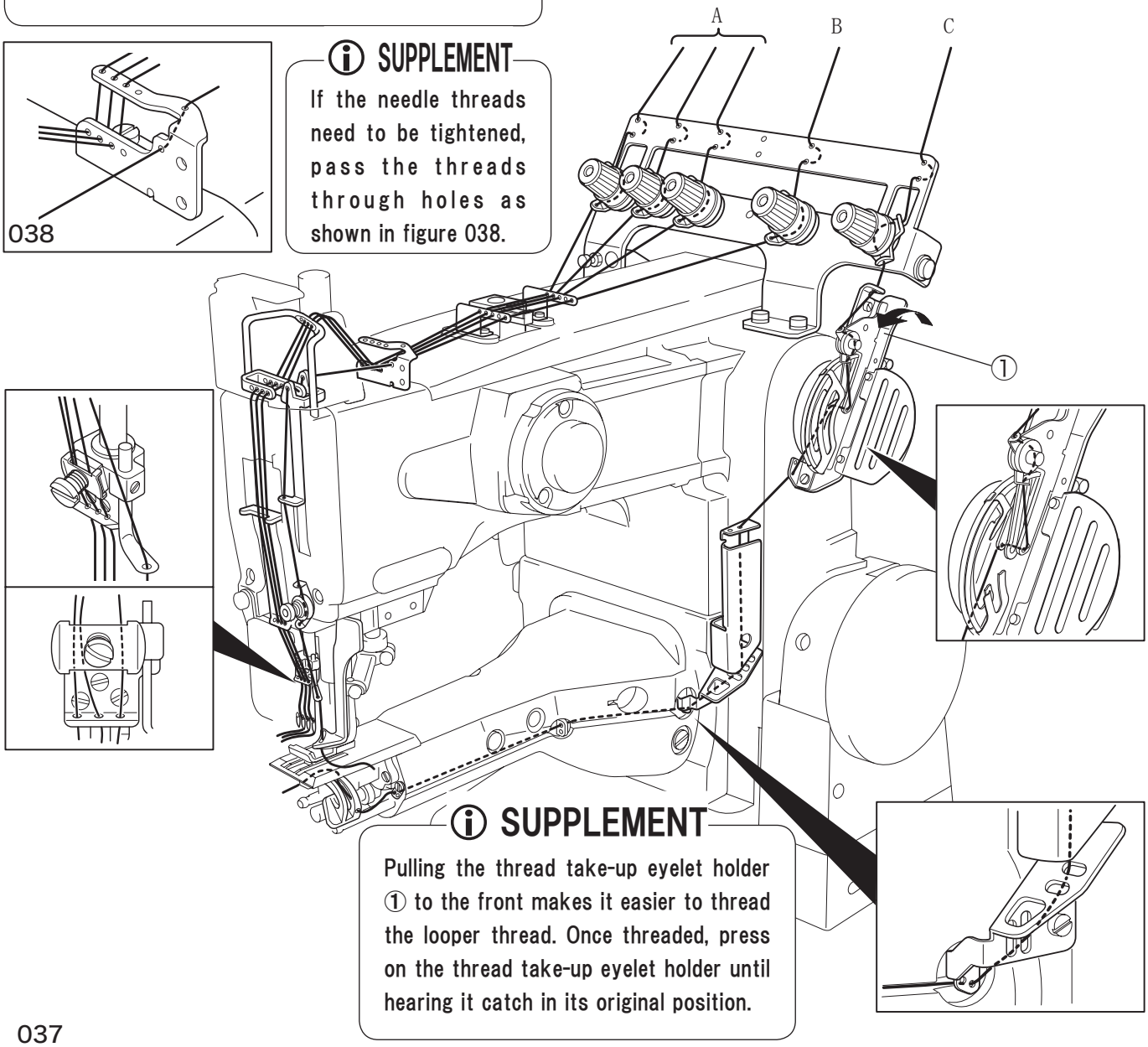
If the needle threads need to be tightened, pass the threads through holes as shown in figure 038.

If already threaded, tie them with new sewing threads.

<A: Needle threads>
Pull the thread knots to the front of needles, cut the knots off and rethread through the needles.

<B: Top cover thread>
Pull the thread until the knot comes out.

<C: Looper thread>
Pull the thread until the knot comes out, then cut the end with scissors.



ⓘ SUPPLEMENT

Pulling the thread take-up eyelet holder ① to the front makes it easier to thread the looper thread. Once threaded, press on the thread take-up eyelet holder until hearing it catch in its original position.

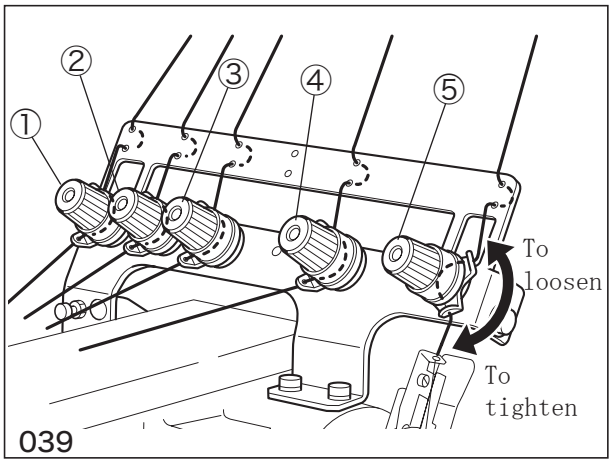
037

5.5 Adjusting thread tension unit

Thread tension varies depending on the type of fabric, type of thread, sewing width, stitch length and conditions of use. Adjust thread tension from the individual thread tension spring caps.

- To tighten the thread tension, turn the caps clockwise.
- To loosen the thread tension, turn the caps counterclockwise.

① Left needle thread
② Middle needle thread
③ Right needle thread
④ Top cover thread
⑤ Looper thread

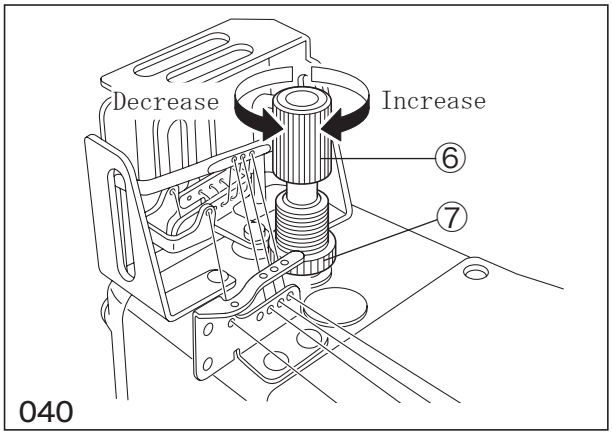


5.6 Presser foot pressure adjustment

Relieve presser foot pressure as much as possible within a range that keeps the stitch stable.

(1) Loosen the lock nut ⑦ and turn the presser spring regulator ⑥.
- To increase the pressure, turn the regulator clockwise.
- To decrease the pressure, turn the regulator counterclockwise.

(2) Once pressure has been adjusted, tighten the lock nut ⑦.



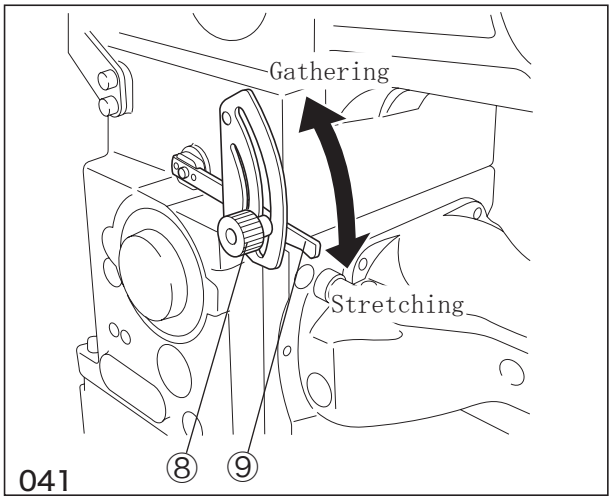
5.7 Differential feed adjustment

(1) Loosen the lock nut ⑧.

(2) Adjust differential feed with the differential lever ⑨.
- To make gathering, raise the lever.
- To make stretching, lower the lever.

* Position the lever as suggested by the relationship between graduations and differential ratio in Table 4.

(3) Once differential ratio has been adjusted, tighten the lock nut ⑧.



⚠ CAUTION

- **The differential ratio at the maximum stitch length of 4 mm is available up to 1:1.5**
- **At the maximum differential ratio of 1:2, the stitch length is 3 mm or less.**

Table 4

Graduation	Differential ratio	Remarks
S	1:0.8	Stretching
1	1:1	
	1:1.5	Stitch length: 4mm or less
2	1:2	Stitch length: 3mm or less

5.8 Stitch length adjustment

⚠ CAUTION

Turn off the power switch of the motor and check the motor has stopped before adjusting stitch length. Working with the power on can result in injury.

Stitch length can be adjusted infinitely from 1.2 mm to 4.0 mm.

Each graduation on the pulley indicates a stitch length (mm).

* The actual length of the stitch may vary depending on the type and thickness of fabric, and differential ratio.

Table 5

Stitch length (mm)	Number of stitches per inch	Number of stitches per 30mm
4.0	6	7.5
2.5	10	12
2.0	12.7	15
1.2	21	25

◇Tabel 5 shows the number of stitches per inch and 30 mm converted into stitch length.

Changing Stitch Length

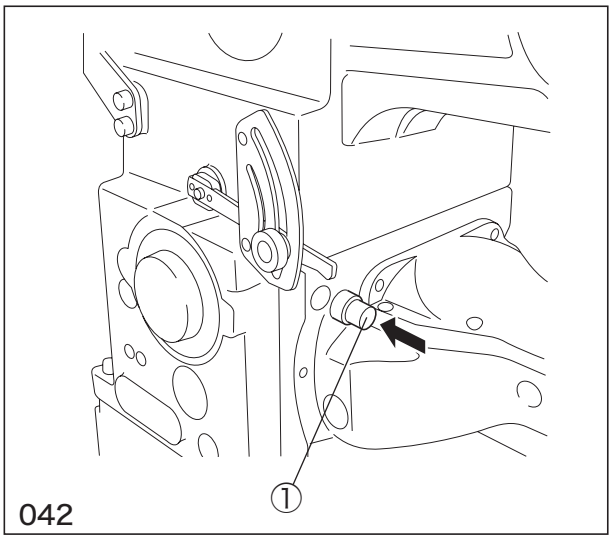
(1) Press the pushbutton ① with your left hand until feeling the button tip contact the internal part.

(2) With the pushbutton ① still depressed, turn the machine pulley to the front with your right hand. The pushbutton ① draws inward, therefore press the pushbutton ① forcefully.

(3) With the pushbutton ① still depressed, align the scale marked on the machine pulley ③ with the mark ② on the hole of the belt cover.

- ●To make the stitch length larger, turn the pulley clockwise.
- ●To make the stitch length smaller, turn the pulley counterclockwise.

(4) Once the marks are aligned, release the pushbutton ①.



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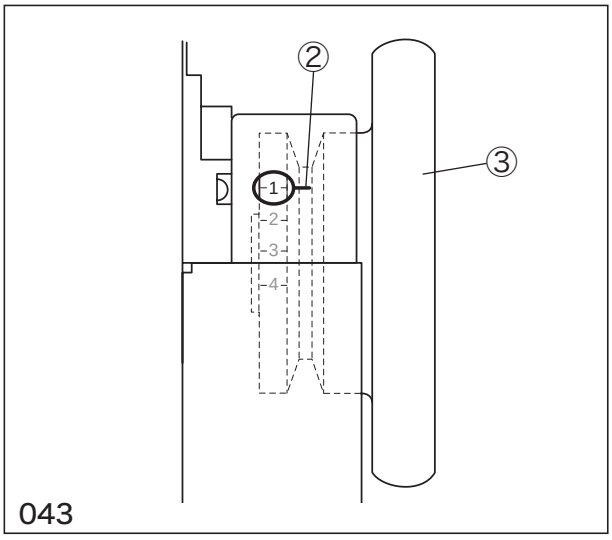


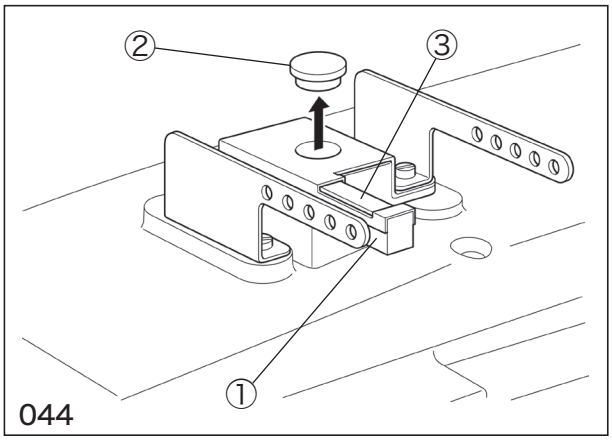
043

⚠ CAUTION

Check that the pushbutton ① has returned to it's original position and that the machine pulley ③ rotates smoothly.

5.9 SP device

To prevent thread breakage and skip stitch in high speed sewing or when using synthetic thread or fabric, be sure to use the SP device.
The device uses (dimethyl) silicon oil.



Checking points before use

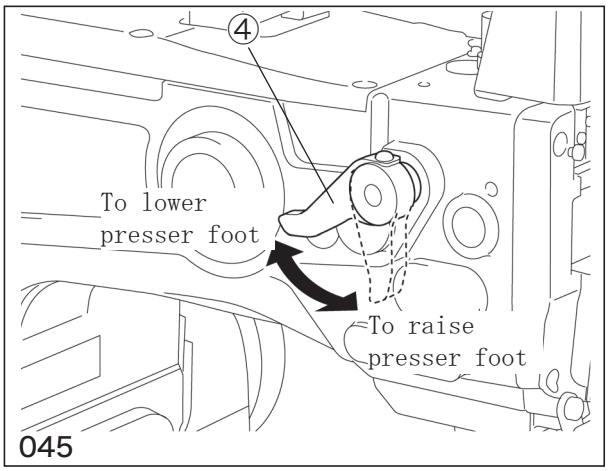
Remove the seal plug ② from the SP container ① and check the amount of (dimethyl) silicon oil. If oil level is low, add (dimethyl) silicon oil.

⚠ CAUTION

- **If not using the SP device, remove the felt ③ from the device. If left inside, it may adversely affect sewing condition.**
- **If (dimethyl) silicon oil is adhered to other than the SP device, be sure to wipe it off. Adhering (dimethyl) silicon oil can result in sewing machine breakdown.**

5.10 Using Presser Foot Release Lever

To remove sewn pre-closed materials, perform maintenance or clean the machine while keeping the presser foot up, move the presser foot release lever ④, The presser foot can be locked at the highest position.
This is also useful for reducing fatigue.



- To lock the presser foot at the highest point, push down the presser foot release lever ④ fully.
- To unlock and lower the presser foot, raise up the presser foot release lever ④ fully.

ⓘ SUPPLEMENT

Turning the presser foot release lever ④ while toeing down the presser lifter pedal makes it easier to move the presser foot.

5.11 Fabric edge guide adjustment

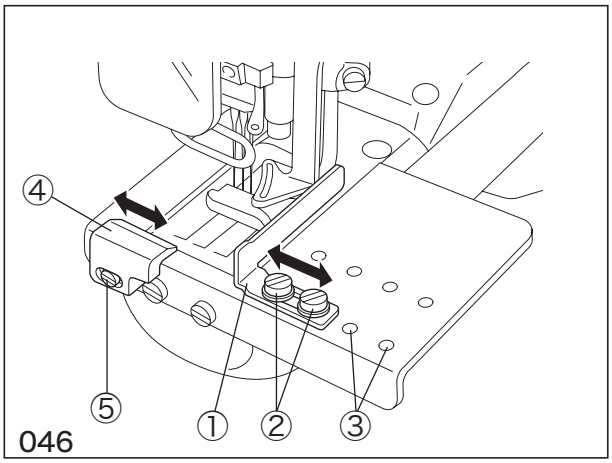
For hemming

The fabric edge guide(right) ① adjusts the fold width of the fabric.

(1) Loosen the screws ② and slide the fabric edge guide(right) ① to the left and right until properly positioned.
   * To greatly reposition the guide, use other screw holes ③.
(2) Tighten the screws ②.

The fabric edge guide(left) ④ adjusts the left edge of the folded fabric.

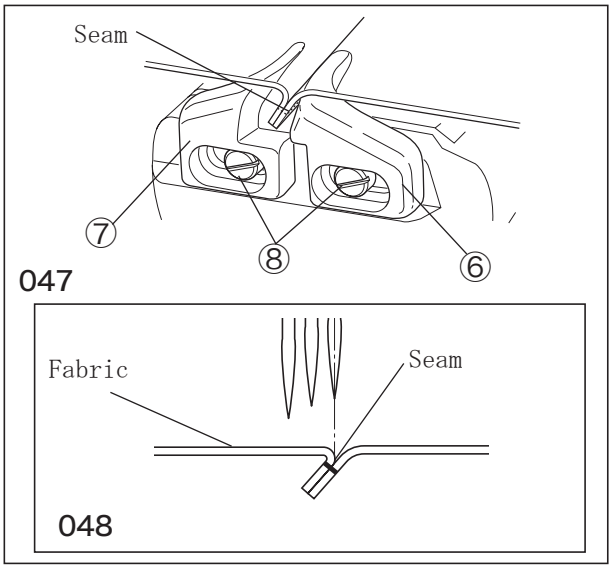
(1) Loosen the screw ⑤ and slide the fabric edge guide(left) ④ to the left and right until properly positioned.
(2) Tighten the screw ⑤.



046

For tip over covering seam

(1) Loosen the screws ⑧ of the fabric guide.
(2) Insert the seam between the fabric guide(right) ⑥ and fabric guide(left) ⑦.
(3) Position the seam at the center of the right needle and adjust the clearance between the fabric guide(right) ⑥ and fabric guide(left) ⑦ to feed the fabric smoothly.
(4) Once the clearance has been adjusted, tighten the screws ⑧.



047

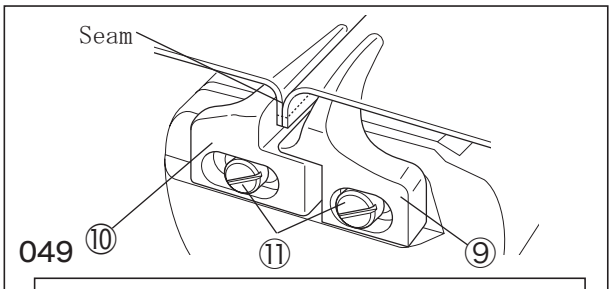
048

ⓘ SUPPLEMENT

The positional relationship between the aligned fabric edges and the right needle varies depending on the design of the garment.

For covering seam

(1) Loosen the screws ⑪ of the fabric guide.
(2) Spread open the fabric seam, position the seam at the center of the needle distance and adjust the clearance between the fabric guide(right) ⑨ and fabric guide(left) ⑩ to feed the fabric smoothly.
(3) Once the clearance has been adjusted, tighten the screws ⑪.



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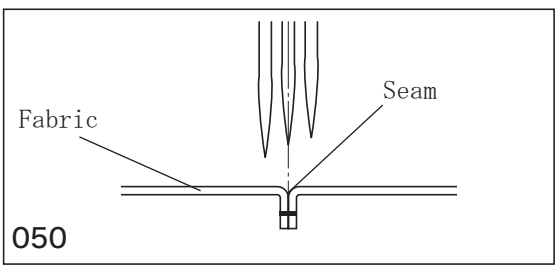

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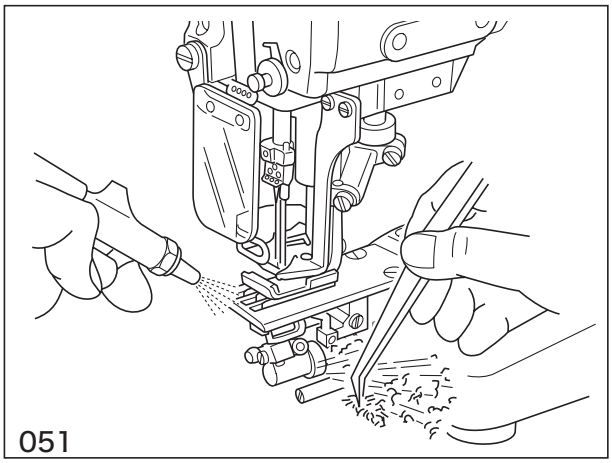
5.12 Cleaning

⚠ CAUTION

Shut off power to the motor and check motor rotation has stopped before cleaning. If power is on, hands or clothing may become entangled whereby resulting in injury.

◇At the end of work everyday, remove the cylinder front cover and clean away dust and lint accumulated in the sewing machine.

◇Once a week, remove the cylinder front cover and the presser foot to clean the grooves in the stitch plate and the feed dog area.



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6. Machine adjustment

⚠ CAUTION

Turn off the power switch of the motor and check the motor has stopped before making adjustment.

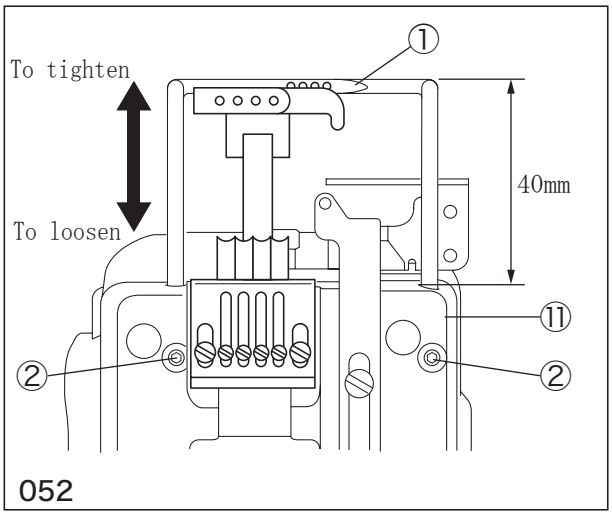
6.1 Needle thread tension adjustment

Needle thread eyelet (front) adjustment

The tension of the needle threads can be adjusted with the needle thread eyelet(front) ①. In the standard position, the distance between the top surface of the arm ⑪ and the top surface of the needle thread eyelet(front) ① is 40 mm.

Loosen the screws ② to adjust the needle thread eyelet(front) ①. Once the eyelet has been positioned, tighten the screws ②.

- To loosen the needle thread, lower the needle thread eyelet(front).
- To tighten the needle thread, raise the needle thread eyelet(front).

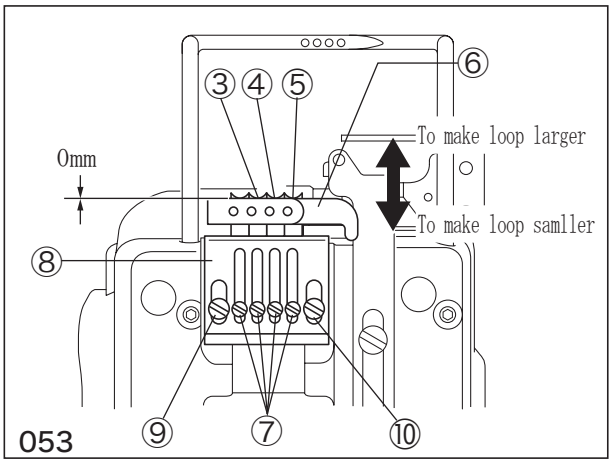


Needle thread strike-off pin adjustment

The size of the needle thread loops can be adjusted with the needle thread strike-off pins ③ ④ ⑤. While the needle thread strike-off pins ③ ④ ⑤ are in the standard positions, the top of the needle bar thread eyelet ⑥ becomes flush with the bottom of the recess of the pins when the needle bar reaches the lowermost position. (See Fig. 053.)

Loosen the screws ⑦ to adjust the needle thread strike-off pins ③ ④ ⑤. Once the pins have been positioned, tighten the screws ⑦.

- To make loop smaller, lower the needle thread strike-off pin.
- To make loop larger, raise the needle thread strike-off pin.



Holder adjustment

After changing the type of thread, the position of the holder ⑧ needs to be moved and the size of the loops of the all needle threads needs to be adjusted.

Loosen the screws ⑨ ⑩ to adjust the holder⑧. Once the holder has been positioned, tighten the screws ⑨ ⑩.

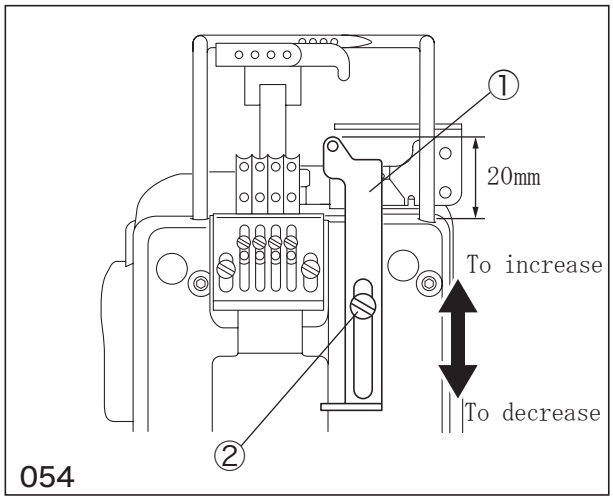
- To make loop smaller, lower the holder.
- To make loop larger, raise the holder.

6.2 Top cover thread tension adjustment

In the standard position of the top cover thread take-up eyelet, the distance between the top surface of the arm and the top surface of the top cover thread take-up eyelet ① is 20 mm.
Loosen the screw ② to adjust the top cover thread take-up eyelet ①. Once the eyelet has been positioned, tighten the screw ②.

- To decrease take-up amount, lower the top cover thread take-up eyelet.
- To increase take-up amount, raise the top cover thread take-up eyelet.

* When using wooly thread or other stretchable thread as the top cover thread, lower the top cover thread take-up eyelet ①.

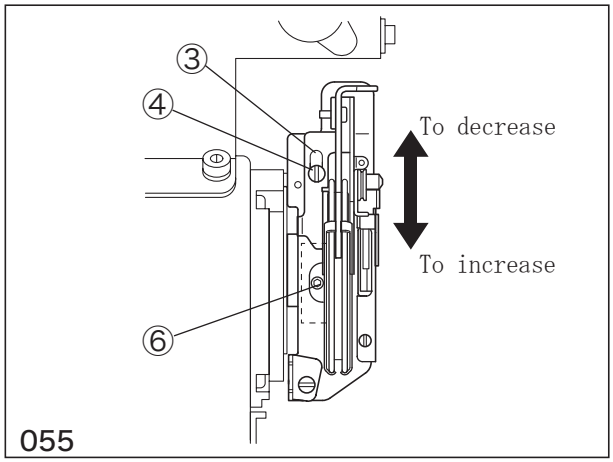


6.3 Looper thread tension adjustment

Thread Take-up Eyelet Adjustment

The thread take-up eyelet ③ is at the standard position when the screw ④ is at the lowermost position of the slot.
Loosen the screw ④ to adjust the thread take-up eyelet ③. Once the eyelet has been positioned, tighten the screw ④.

- To decrease take-up amount, raise the thread take-up eyelet.
- To increase take-up amount, lower the thread take-up eyelet.

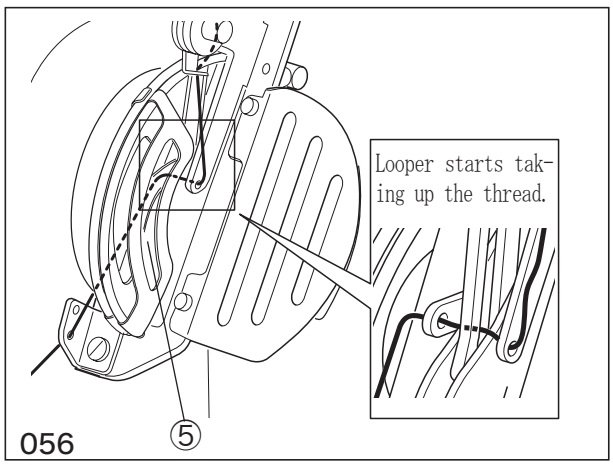


⚠ SUPPLEMENT

Too much take-up of looper thread can cause skip stitch.

Looper Thread Take-up Adjustment

When the needle bar is at the highest point (top dead center), adjust the looper thread take-up ⑤ to the position where the looper starts taking up the thread. To adjust the position, loosen the set screw ⑥ of the looper thread take-up ⑤



6.4 Needle and spreader adjustment

6.4.1 Spreader adjustment

(1) Loosen the screw ③ of the spreader and the screw ④ of the spring holder. (See Fig. 057.)

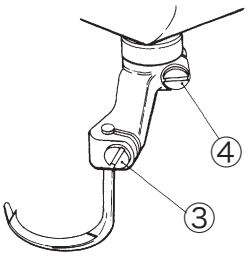
(2) Adjust the spreader ① so that the clearance between the left needle and the hook ② of the spreader ① is 0.5 - 0.8 mm. (See Fig. 058.)

(3) Make adjustment so that the distance from the center of the left needle to the hook ② is 4.5 - 5.5 mm when the spreader ① is at the extreme left. Then, tighten the screw ④. (See Fig. 057 and 058.)

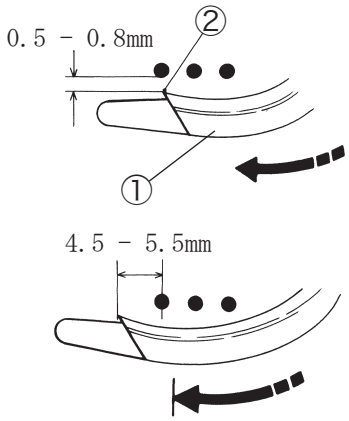
(4) Make adjustment so that the distance from the top surface of the stitch plate to the bottom surface of the spreader ① is 11 - 12 mm. Then, tighten the screw ③. (See Fig. 057 and 059.)

ⓘ SUPPLEMENT

Match the height of the spreader ① according to the needle distance within the adjustment range, so that the top cover thread can pass behind the right needle and be caught by the left needle.



057



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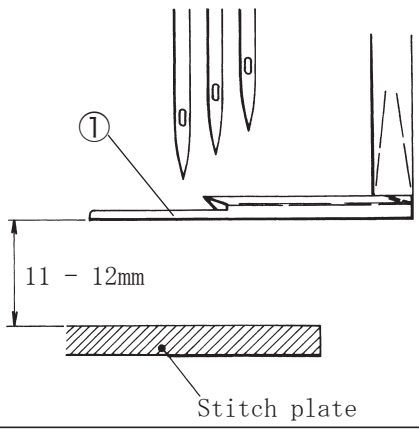
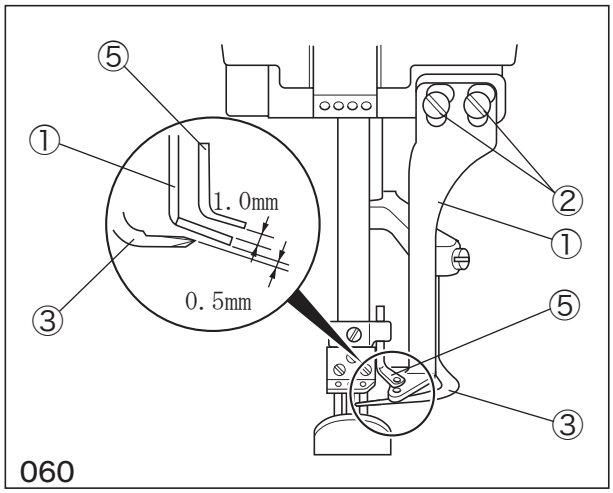


059

6.4.2 Top cover thread guide adjustment

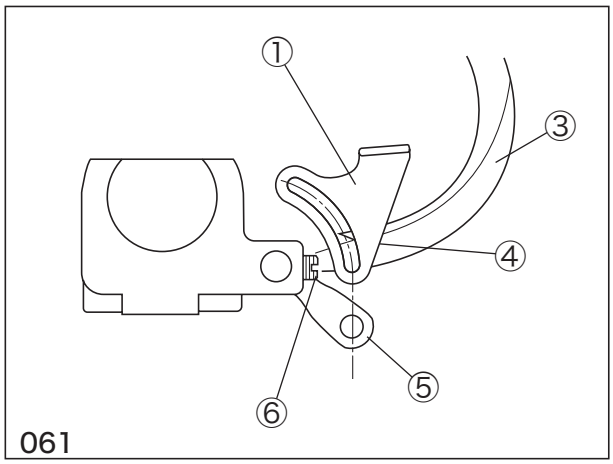
(1) Loosen the screws ② of the top cover thread guide ①. (See Fig. 060.)
(2) Adjust the top cover thread guide ① so that the clearance between the top surface of the spreader ③ and the bottom surface of the top cover thread guide ① is 0.5 mm. (See Fig. 060.)
(3) Adjust the spreader ③ so that the hook ④ is at the center of the slot on the top cover thread guide ① when the spreader ③ comes to the extreme right. Then, tighten the screws ②. (See Fig. 060 and 061.)



060

6.4.3 Top cover thread eyelet adjustment

(1) Loosen the screw ⑥ of the top cover thread eyelet ⑤. (See Fig. 061.)
(2) Adjust the top cover thread eyelet ⑤ so that the clearance between the top surface of the top cover thread guide ① and the top cover thread eyelet ⑤ is 1.0 mm when the needle bar is at the lowest point. (See Fig. 060.)
(2) Align the hole of the top cover thread eyelet ⑤ to the extension from the slot on the top cover thread guide ①. (See Fig. 061.)
(4) Tighten the screw ⑥. (See Fig. 061.)



061

6.5 Needle and looper adjustment

6.5.1 Looper and needle distance

The distance (L) from the tip of the looper ① to the center of the right needle when the needle is at the lowest point and the looper ① is at the extreme right varies depending on needle distance. Adjust the distance as shown in Table 6.

Loosen the screw ③ on the looper holder ② and the screw ⑤ on the looper holder collar ④ to adjust the position of the lopper ①.

Once the looper has been positioned, tighten the screws ③ and ⑤.

ⓘ SUPPLEMENT

Even though the needle distance is different, the distance from the center of the needle bar to the tip of the looper ① is 6.3 mm(6.2 - 6.4 mm.) (See Fig. 064.)

6.5.2 Looper angle and height

Insert the looper ① to the end of the looper holder ② and tighten the screw ⑥. Looper height and looper installation angle (2°) will be fixed.

6.5.3 Looper front-and-rear position

(1) Turn the machine pulley until the tip of the looper ① comes to the center of the left needle ⑦.

(2) Loosen the screws ③ ⑤ to adjust the looper holder ② together with the looper holder collar ④ so that the clearance between the backside of the left needle ⑦ and the tip of the looper ① is 0.2 - 0.3 mm.

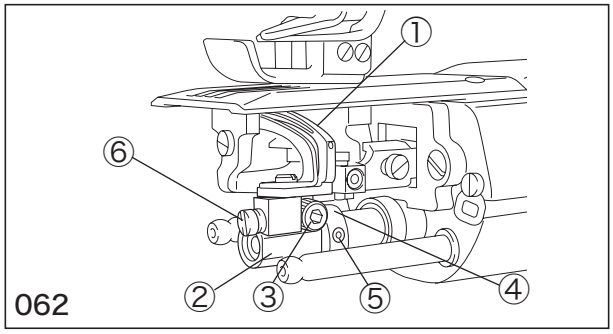
(3) Tighten the screws ③ ⑤.

ⓘ SUPPLEMENT

Even though the set of the looper ① and the looper holder ② is removed, they can be reinstalled easily.
Fit the pin of the looper holder collar ④ into the hole of the looper holder ②, press the parts together and tighten the screw ③ on the looper holder ②. Then, check the clearance between the needle and the looper ①.

⚠ CAUTION

- **Make the looper holder ② touch the looper holder collar ④ securely. If not, parts around the looper holder may be damaged.**
- **When tightening the screw ③, the looper ① may move in the front-and-rear position. After tightening the screw ③, recheck the front-and-rear position of the looper ①.**



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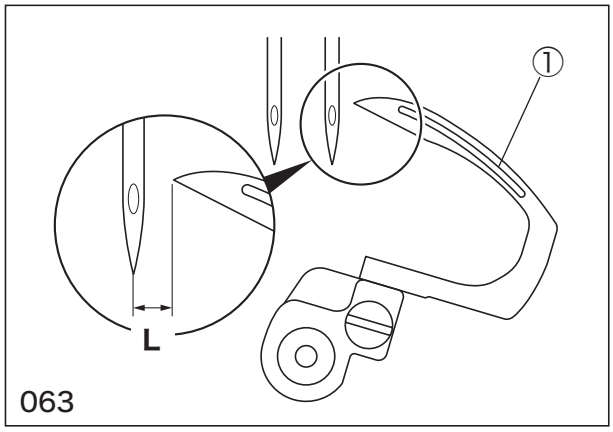
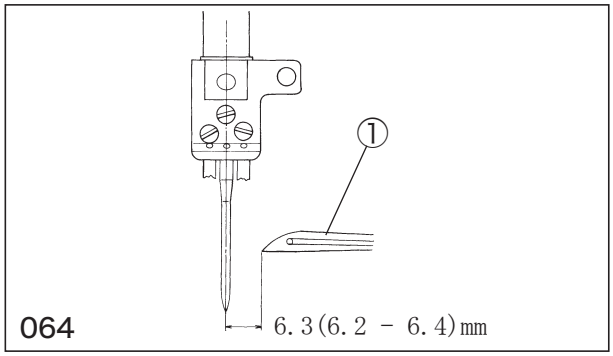


063

Table 6

Needle distance (code)	Looper and needle distance (L)
3.2 mm(32)	4.7(4.6 - 4.8)mm
4.0 mm(40)	4.3(4.2 - 4.4)mm
4.8 mm(48)	3.9(3.8 - 4.0)mm
5.6 mm(56)	3.5(3.4 - 3.6)mm
6.4 mm(64)	3.1(3.0 - 3.2)mm



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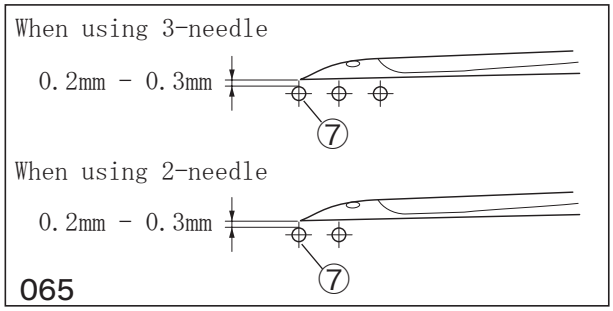


065

6.6 Needle height

(1) Set the needle into the left needle installation hole of the needle clamp.
(2) Remove the screw ①.
(3) Loosen the screw ② of the needle bar bracket and adjust the needle bar in the vertical direction so that the tip of the left needle is the height (N) given in Table 7 from the stitch plate top surface.
This height varies depending on needle distance.
(4) Check the needle drops in the center of the needle hole on the stitch plate, then tighten the screw ② of the needle bar bracket.
(5) Retighten the screw ①.

⚠ CAUTION

Before retightening the screw ①, wipe the old gasket clean and coat with liquid gasket. Dirt can cause oil leakage.

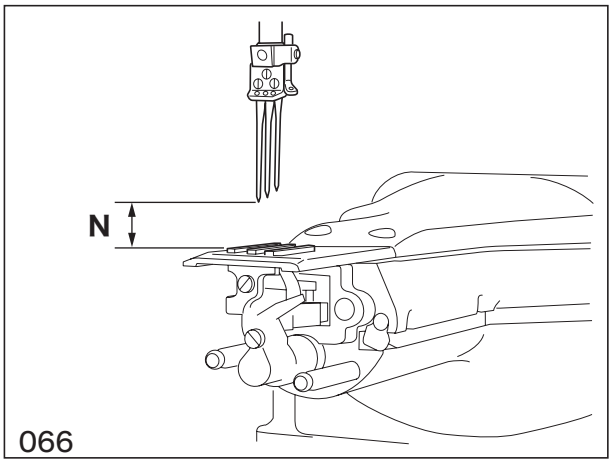
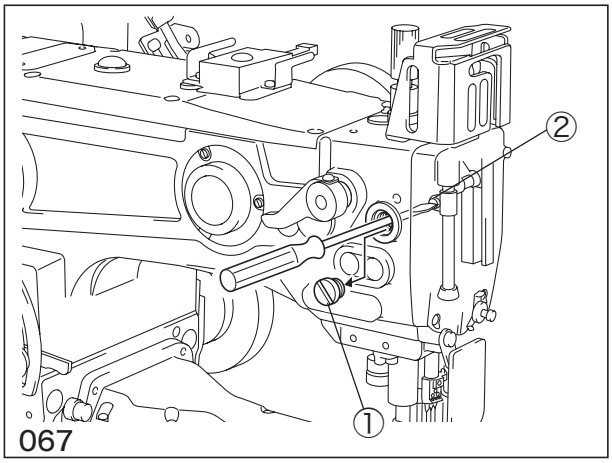
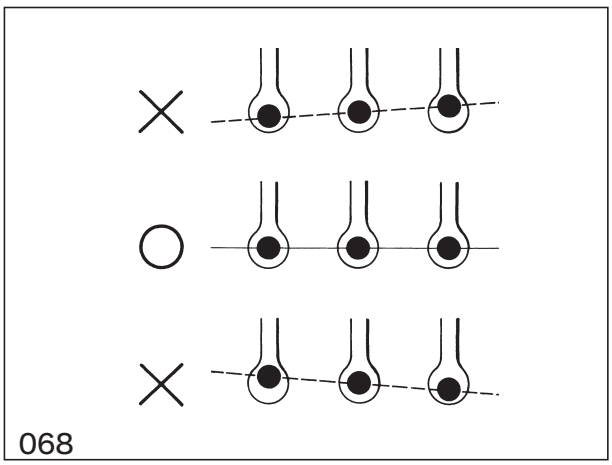


Table 7

Needle distance	Code	Left needle height (N)
3.2 mm	32	11.5(11.5 - 11.7)mm
4.0 mm	40	11.5(11.5 - 11.7)mm
4.8 mm	48	11.0(11.0 - 11.2)mm
5.6 mm	56	11.0(10.9 - 11.1)mm
6.4 mm	64	11.0(10.8 - 11.0)mm

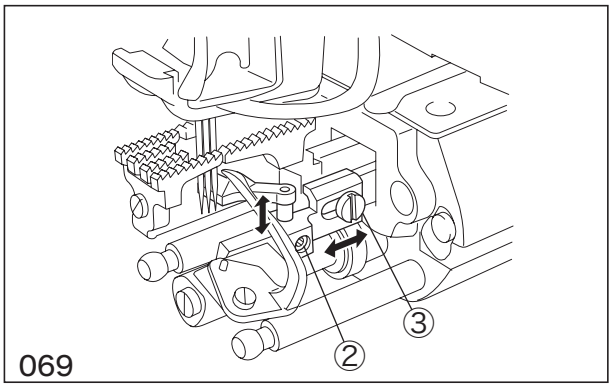




6.7 Needle guard (rear) adjustment

Needle guard (rear) height

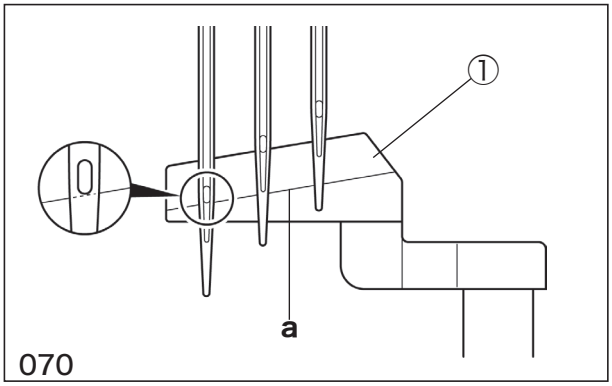
(1) Loose the screw ②.
(2) Set the ridge line "a" of the needle guard(rear) ① to the same height as the bottom of the left needle eye when the looper is at the center of the right needle.
(3) Tighten the screw ②.



069

Needle guard (rear) front-and-rear position adjustment

(1) Loosen the screws ② ③.
(2) When the looper tip is at the center of the right needle, the looper pushes the right needle, therefore the right needle will be pushed by the needle guard(rear) ①, and the clearance between the needle and the looper will be 0 - 0.05 mm. Also at this time, adjust the angle and front-and-rear position of the needle guard(rear) so that the clearance between the left needle and the needle guard(rear) ① is 0 - 0.05 mm.
(3) Check that the middle and left needles start contacting the needle guard(rear) at a point below the needle eye.
(4) Tighten the screws ② ③.



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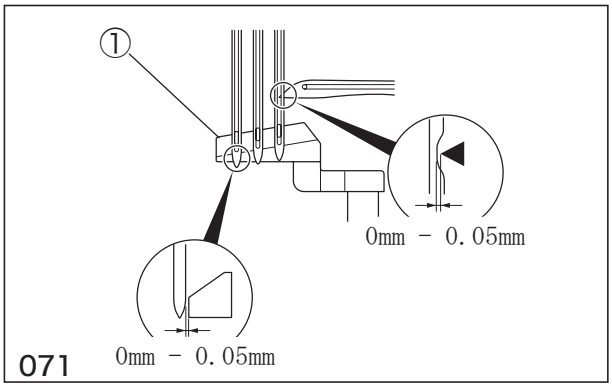
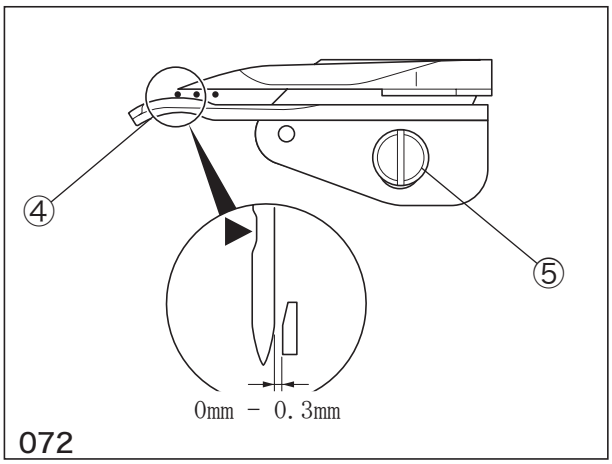


071

6.8 Needle guard (front) adjustment

(1) Loosen the screw ⑤ and position the needle guard(front) ④ so that the clearance between it and each needle is 0 - 0.3 mm when the looper tip comes to the center of the left needle.
(2) Tighten the screw ⑤.

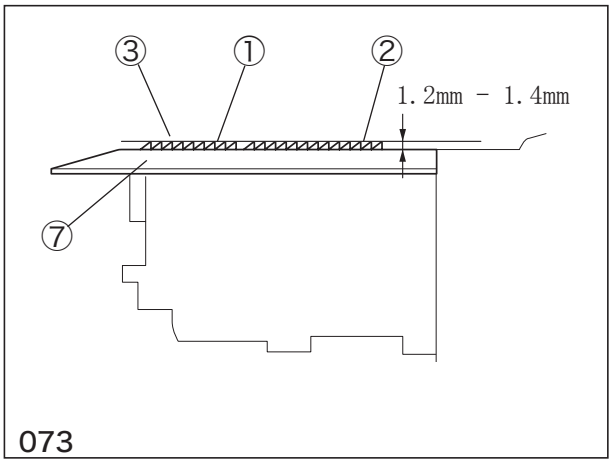


072

6.9 Feed dog height adjustment

Standard position

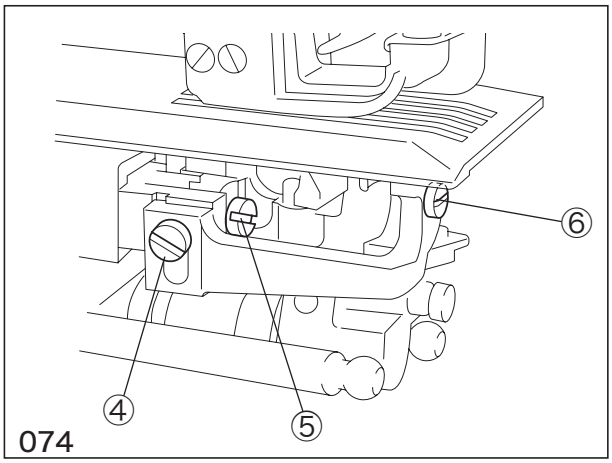
When the feed dog is at the highest point, the tail end of the main feed dog ② is 1.2 - 1.4 mm from the top surface of the stitch plate. When the feed dog rises to the same height as the top surface of the stitch plate ⑦, the differential feed dog ① and the main feed dog ② are parallel to the stitch plate ⑦. Set the differential feed dog ①, middle feed dog ③ and main feed dog ② to the same height.



073

Adjustment

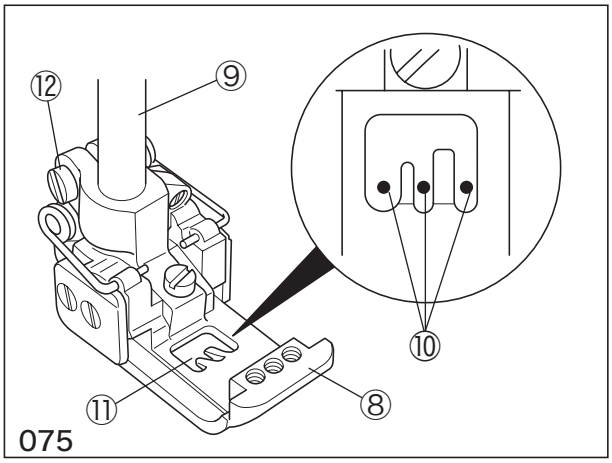
Loosen the screw ④ of the differential feed dog ①, the screw ⑤ of the main feed dog ② and the screw ⑥ of the middle feed dog ③, and position the feed dogs. Once the feed dogs have been positioned, tighten the screws ④ ⑤ ⑥.



074

6.10 Presser foot position adjustment

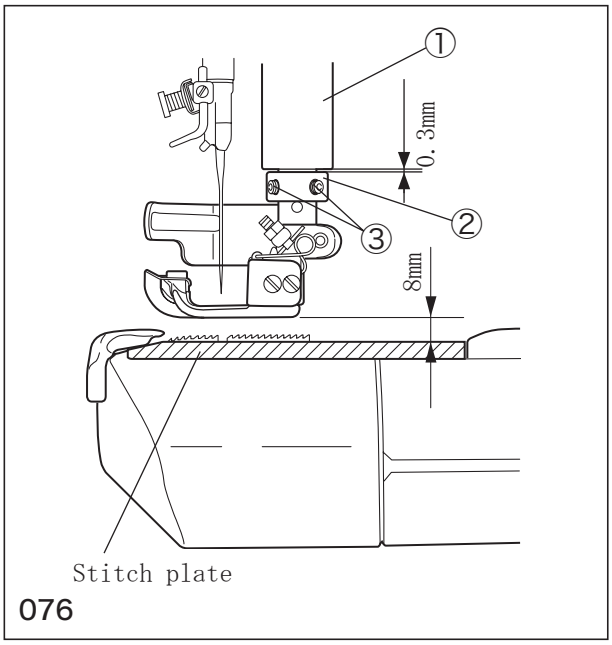
Correctly set the presser foot ⑧ on the presser bar ⑨ and position the presser foot so that the needles ⑩ drop in the center of the needle hole ⑪. Loosen the screw ⑫ on the presser foot ⑧ and turn the presser foot ⑧ to the left and right until the needles ⑩ drop in the center of the needle hole ⑪ on the presser foot ⑧.



075

6.11 Presser foot stopper collar adjustment

Loosen the screws ③ and adjust the height of the presser foot stopper collar ② so that the gap between the presser bar bushing ① and the collar ② is 0.3 mm when the presser foot is at the topmost position.

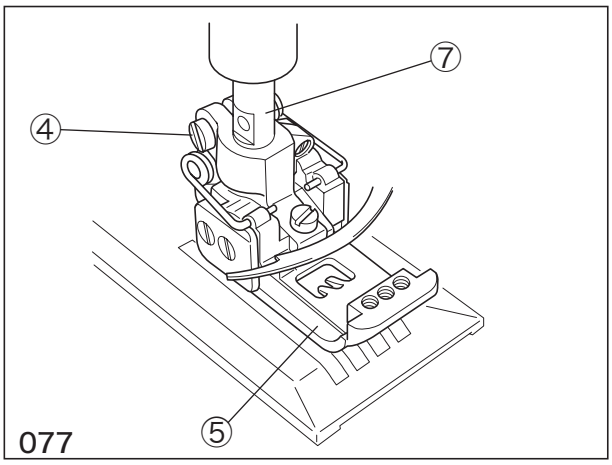


076

6.12 Detaching/reattaching presser foot

Detaching

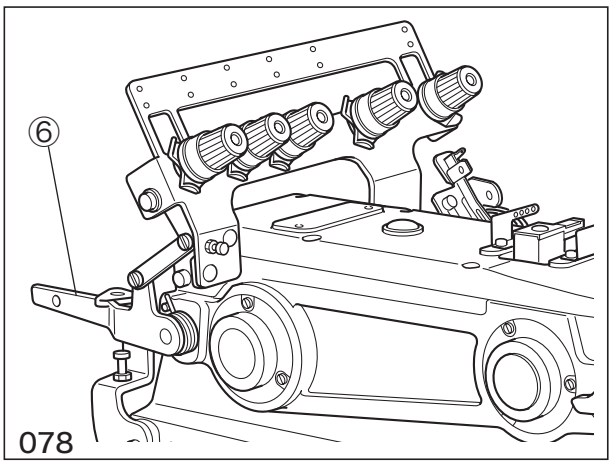
(1) Loosen the screw ④.
(2) Press the lifter lever ⑥ downward and detach the presser foot ⑤.



077

Reattaching

(1) Press the lifter lever ⑥ downward, and insert the presser foot ⑤ into the presser bar ⑦.
(2) Position the presser foot ② as explained in "6.10 Presser Foot Position Adjustment" (page 30), and tighten the screw ④.



078

7. Troubleshooting

Trouble	Check item	Remedial action	Ref. page
Skip stitch	Is the thread wrongly threaded?	String the thread properly.	17
	Is the needle bent or the tip broken?	Replace the needle.	16
	Is the thread too much tightened?	Loosen the thread by the tension unit.	18
	Are the timing and clearances of the needles, looper and needle guards correct?	Correct the timing and clearances of the needles, looper and needle guards.	27 ～ 29
	Is the needle too thin for the thread?	Either replace the needle or the thread with the proper size.	16
	Is the needle wrongly attached (direction or insertion depth)?	Attach the needle correctly.	16
Thread breakage	Is the thread caught on the eyelet?	Remove the caught thread.	
	Is the thread wrongly threaded?	String the thread properly.	17
	Is the thread too much tightened?	Loosen the thread at the tension unit.	18
	Is the needle too thick for the thread?	Either replace the needle or the thread with the proper size.	16
	Is the thread good quality?	Use a good quality thread.	
	Did the thread break under heat?	Use the SP device.	20
	Is there damage on eyelet, looper thread take-up, etc?	Either repair the damage or replace with a new part.	
Needle breakage	Did the needle contact the looper?	Correct the clearances of the needles, looper and needle guards.	27・29
Improper thread tension	Is the thread wrongly threaded?	String the thread properly.	17
	Are the needle threads and looper thread properly balanced?	Correct the balance at the tension unit.	
Uneven tension	Is the thread wrongly threaded?	String the thread properly.	17
	Are the needle threads and looper thread properly balanced?	Correct the balance at the tension unit.	
Oil does not come from nozzle	Is oil level below the line on the oil gauge?	Add oil.	13・14
	Is the oil filter clogged?	Replace the oil filter.	15

8. Specifications

Description	3-Needle Cylinder Bed Interlock Stitch Machine
Dimensions	430mm(L)×284mm(W)×360mm(H)
Cylinder circumference	160mm
Weight	42kg
Stitch type	ISO 406, 407, 602, 605
Application	Plain stitch, overlapped seam, hemming and welt seam for knitted fabrics
Sewing speed	Max. 4500rpm (during intermittent operation)
Stitch length	Number of stitches (1.2 - 4mm) 6 - 21 stitches/inch (25.4mm) 7.5 - 25 stitches/30mm
Needle system	UY×128GAS #9 - #14 (Standard #10) (65 - 90)
Needle distance	3-needle : 4.8mm, 5.6mm, 6.4mm (2-needle : 3.2mm, 4.0mm)
Needle stroke	31.5mm
Presser foot lift	8mm (with spreader)
Feed regulation	Pushbutton system
Differential ratio	Max. normal differential 1:2, Max. reverse differential 1:0.8
Differential feed regulation	External lever
Lubrication	Automatic lubrication by trochoid-shaped pump
Lubricating oil	YAMATO SF OIL No.28
Capacity of oil reservoir	600mL
Installation	"Table top installation" or "Semi-submerged installation"

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