

TSC-461

INSTRUCTION MANUAL

NOTE : Read safety instructions carefully and understand them before using.
 Retain this Instruction Manual for future reference.

TO ENSURE SAFE USE OF YOUR SEWING MACHINE

For the sewing machine, automatic machine and ancillary devices (hereinafter collectively referred to as "machine"), it is inevitable to conduct sewing work near moving parts of the machine. This means that there is always a possibility of unintentionally coming in contact with the moving parts. Operators who actually operate the machine and maintenance personnel who are involved in maintenance and repair of the machine are strongly recommended to carefully read to fully understand the following **SAFETY PRECAUTIONS** before using/maintaining the machine. The content of the **SAFETY PRECAUTIONS** includes items which are not contained in the specifications of your product.

The risk indications are classified into the following three different categories to help understand the meaning of the labels. Be sure to fully understand the following description and strictly observe the instructions.

(I) Explanation of risk levels

	DANGER : This indication is given where there is an immediate danger of death or serious injury if the person in charge or any third party mishandles the machine or does not avoid the dangerous situation when operating or maintaining the machine.
	WARNING : This indication is given where there is a potentiality for death or serious injury if the person in charge or any third party mishandles the machine or does not avoid the dangerous situation when operating or maintaining the machine.
	CAUTION : This indication is given where there is a danger of medium to minor injury if the person in charge or any third party mishandles the machine or does not avoid the dangerous situation when operating or maintaining the machine.
	Items requiring special attention.

(II) Explanation of pictorial warning indications and warning labels

Pictorial warning indication		There is a risk of injury if contacting a moving section.	Pictorial warning indication		Be aware that holding the sewing machine during operation can hurt your hands.
		There is a risk of electrical shock if contacting a high-voltage section.			There is a risk of entanglement in the belt resulting in injury.
		There is a risk of a burn if contacting a high-temperature section.			There is a risk of injury if you touch the button carrier.
		Be aware that eye deficiency can be caused by looking directly at the laser beam.	Indication label		The correct direction is indicated.
		There is a risk of contact between your head and the sewing machine.			Connection of a earth cable is indicated.

Warning label	<div><div><div><div><div></div><div></div></div><div><div></div></div><div><div>1</div><div>2</div></div><div>3</div></div></div></div>		<div><div><div><div><div></div><div></div></div><div><div></div></div><div><div>1</div><div>2</div></div><div>3</div></div></div></div>
	<div><div>① • There is the possibility that slight to serious injury or death may be caused.</div><div>• There is the possibility that injury may be caused by touching moving part.</div><div>② • To perform sewing work with safety guard.</div><div>• To perform sewing work with safety cover.</div><div>• To perform sewing work with safety protection device.</div><div>③ • Be sure to turn the power OFF before carrying out "machine-head threading", "needle changing", "bobbin changing" or "oiling and cleaning".</div></div>		
Electrical-shock danger label	<div><div><div><div><div></div></div><div><div><div><div><div></div><div>危険</div></div><div><div><div><div><div></div><div>DANGER</div></div><div><div><div><div><div></div><div>高電圧部分に触れて、大けがをすることがある。</div></div><div><div><div><div><div></div><div>電源を切って、5分以上たってからカバーをはずすこと。</div></div><div><div><div><div><div></div><div>Hazardous voltage will cause injury.</div></div><div><div><div><div><div></div><div>Turn off main switch and unplug power cord and wait at least 5 minutes before opening this cover.</div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div></div>		

SAFETY PRECAUTIONS

Accident means "to cause personal injury or death or damage to property."



DANGER

1. When it is necessary to open the control box containing electrical parts, be sure to turn the power off and wait for five minutes or more before opening the cover in order to prevent accident leading to electrical shock.



CAUTION

Basic precaution

1. Be sure to read the instruction manual and other explanatory documents supplied with accessories of the machine before using the machine. Carefully keep the instruction manual and the explanatory documents at hand for quick reference.
2. The content of this section includes items which are not contained in the specifications of your product.
3. Be sure to wear safety goggles to protect against accident caused by needle breakage.
4. Those who use a heart pacer have to use the machine after consultation with a medical specialist.

Safety devices and warning labels

1. Be sure to operate the machine after verifying that safety device(s) is correctly installed in place and works normally in order to prevent accident caused by lack of the device(s).
2. If any of the safety devices is removed, be sure to replace it and verify that it works normally in order to prevent accident that can result in personal injury or death.
3. Be sure to keep the warning labels adhered on the machine clearly visible in order to prevent accident that can result in personal injury or death. If any of the labels has stained or come unstuck, be sure to change it with a new one.

Application and modification

1. Never use the machine for any application other than its intended one and in any manner other than that prescribed in the instruction manual in order to prevent accident that can result in personal injury or death. JUKI assumes no responsibility for damages or personal injury or death resulting from the use of the machine for any application other than the intended one.
2. Never modify and alter the machine in order to prevent accident that can result in personal injury or death. JUKI assumes no responsibility for damages or personal injury or death resulting from the machine which has been modified or altered.

Education and training

1. In order to prevent accident resulting from unfamiliarity with the machine, the machine has to be used only by the operator who has been trained/educated by the employer with respect to the machine operation and how to operate the machine with safety to acquire adequate knowledge and operation skill. To ensure the above, the employer has to establish an education/training plan for the operators and educate/train them beforehand.

Items for which the power to the machine has to be turned off

Turning the power off: Turning the power switch off, then removing the power plug from the outlet.
This applies to the following.

1. Be sure to immediately turn the power off if any abnormality or failure is found or in the case of power failure in order to protect against accident that can result in personal injury or death.
2. To protect against accident resulting from abrupt start of the machine, be sure to carry out the following operations after turning the power off. For the machine incorporating a clutch motor, in particular, be sure to carry out the following operations after turning the power off and verifying that the machine stops completely.
 - 2-1. For example, threading the parts such as the needle, looper, spreader etc. which have to be threaded, or changing the bobbin.
 - 2-2. For example, changing or adjusting all component parts of the machine.
 - 2-3. For example, when inspecting, repairing or cleaning the machine or leaving the machine.
3. Be sure to remove the power plug by holding the plug section instead of the cord section in order to prevent electrical-shock, earth-leakage or fire accident.
4. Be sure to turn the power off whenever the machine is left unattended between works.
5. Be sure to turn the power off in the case of power failure in order to prevent accident resulting of breakage of electrical components.

PRECAUTIONS TO BE TAKEN IN VARIOUS OPERATION STAGES

Transportation

1. Be sure to lift and move the machine in a safe manner taking the machine weight in consideration. Refer to the text of the instruction manual for the mass of the machine.
2. Be sure to take sufficient safety measures to prevent falling or dropping before lifting or moving the machine in order to protect against accident that can result in personal injury or death.
3. Once the machine has been unpacked, never re-pack it for transportation to protect the machine against breakage resulting from unexpected accident or dropping.

Unpacking

1. Be sure to unpack the machine in the prescribed order in order to prevent accident that can result in personal injury or death. In the case the machine is crated, in particular, be sure to carefully check nails. The nails have to be removed.
2. Be sure to check the machine for the position of its center of gravity and take it out from the package carefully in order to prevent accident that can result in personal injury or death.

Installation

(I) Table and table stand

1. Be sure to use JUKI genuine table and table stand in order to prevent accident that can result in personal injury or death. If it is inevitable to use a table and table stand which are not JUKI genuine ones, select the table and table stand which are able to support the machine weight and reaction force during operation.
2. If casters are fitted to the table stand, be sure to use the casters with a locking mechanism and lock them to secure the machine during the operation, maintenance, inspection and repair in order to prevent accident that can result in personal injury or death.

(II) Cable and wiring

1. Be sure to prevent an extra force from being applied to the cable during the use in order to prevent electrical-shock, earth-leakage or fire accident. In addition, if it is necessary to cable near the operating section such as the V-belt, be sure to provide a space of 30 mm or more between the operating section and the cable.
2. Be sure to avoid starburst connection in order to prevent electrical-shock, earth-leakage or fire accident.
3. Be sure to securely connect the connectors in order to prevent electrical-shock, earth-leakage or fire accident. In addition, be sure to remove the connector while holding its connector section.

(III) Grounding

1. Be sure to have an electrical expert install an appropriate power plug in order to prevent accident caused by earth-leakage or dielectric strength voltage fault. In addition, be sure to connect the power plug to the grounded outlet without exceptions.
2. Be sure to ground the earth cable in order to prevent accident caused by earth leakage.

(IV) Motor

1. Be sure to use the specified rated motor (JUKI genuine product) in order to prevent accident caused by burnout.
2. If a commercially available clutch motor is used with the machine, be sure to select one with an entanglement preventive pulley cover in order to protect against being entangled by the V-belt.

Before operation

1. Be sure to make sure that the connectors and cables are free from damage, dropout and looseness before turning the power on in order to prevent accident resulting in personal injury or death.
2. Never put your hand into the moving sections of the machine in order to prevent accident that can result in personal injury or death.
In addition, check to be sure that the direction of rotation of the pulley agrees with the arrow shown on pulley.
3. If the table stand with casters is used, be sure to secure the table stand by locking the casters or with adjusters, if provided, in order to protect against accident caused by abrupt start of the machine.

During operation

1. Be sure not to put your fingers, hair or clothing close to the moving sections such as the handwheel, hand pulley and motor or place something near those sections while the machine is in operation in order to prevent accident caused by entanglement that can result in personal injury or death.
2. Be sure not to place your fingers near the surround area of the needle or inside the thread take-up lever cover when turning the power on or while the machine is in operation in order to prevent accident that can result in personal injury or death.
3. The machine runs at a high speed. Never bring your hands near the moving sections such as looper, spreader, needle bar, hook and cloth trimming knife during operation in order to protect your hands against injury. In addition, be sure to turn the power off and check to be sure that the machine completely stops before changing the thread.
4. Be careful not to allow your fingers or any other parts of your body to be caught between the machine and table when removing the machine from or replacing it on the table in order to prevent accident that can result in personal injury or death.

5. Be sure to turn the power off and check to be sure that the machine and motor completely stop before removing the belt cover and V-belt in order to prevent accident caused by abrupt start of the machine or motor.
6. If a servomotor is used with the machine, the motor does not produce noise while the machine is at rest. Be sure not to forget to turn the power off in order to prevent accident caused by abrupt start of the motor.
7. Never use the machine with the cooling opening of the motor power box shielded in order to prevent fire accident by overheat.

Lubrication

1. Be sure to use JUKI genuine oil and JUKI genuine grease to the parts to be lubricated.
2. If the oil adheres on your eye or body, be sure to immediately wash it off in order to prevent inflammation or irritation.
3. If the oil is swallowed unintentionally, be sure to immediately consult a medical doctor in order to prevent diarrhea or vomiting.

Maintenance



1. In prevention of accident caused by unfamiliarity with the machine, repair and adjustment has to be carried out by a service technician who is thoroughly familiar with the machine within the scope defined in the instruction manual. Be sure to use JUKI genuine parts when replacing any of the machine parts. JUKI assumes no responsibility for any accident caused by improper repair or adjustment or the use of any part other than JUKI genuine one.
2. In prevention of accident caused by unfamiliarity with the machine or electrical-shock accident, be sure to ask an electrical technician of your company or JUKI or distributor in your area for repair and maintenance (including wiring) of electrical components.
3. When carrying out repair or maintenance of the machine which uses air-driven parts such as an air cylinder, be sure to remove the air supply pipe to expel air remaining in the machine beforehand, in order to prevent accident caused by abrupt start of the air-driven parts.
4. Be sure to check that screws and nuts are free from looseness after completion of repair, adjustment and part replacement.
5. Be sure to periodically clean up the machine during its duration of use. Be sure to turn the power off and verify that the machine and motor stop completely before cleaning the machine in order to prevent accident caused by abrupt start of the machine or motor.
6. Be sure to turn the power off and verify that the machine and motor stop completely before carrying out maintenance, inspection or repair of the machine. (For the machine with a clutch motor, the motor will keep running for a while by inertia even after turning the power off. So, be careful.)
7. If the machine cannot be normally operated after repair or adjustment, immediately stop operation and contact JUKI or the distributor in your area for repair in order to prevent accident that can result in personal injury or death.
8. If the fuse has blown, be sure to turn the power off and eliminate the cause of blowing of the fuse and replace the blown fuse with a new one in order to prevent accident that can result in personal injury or death.
9. Be sure to periodically clean up the air vent of the fan and inspect the area around the wiring in order to prevent fire accident of the motor.

Operating environment

1. Be sure to use the machine under the environment which is not affected by strong noise source (electromagnetic waves) such as a high-frequency welder in order to prevent accident caused by malfunction of the machine.
2. Never operate the machine in any place where the voltage fluctuates by more than "rated voltage $\pm 10\%$ " in order to prevent accident caused by malfunction of the machine.
3. Be sure to verify that the air-driven device such as an air cylinder operates at the specified air pressure before using it in order to prevent accident caused by malfunction of the machine.
4. To use the machine with safety, be sure to use it under the environment which satisfies the following conditions:

Ambient temperature during operation	5°C to 35°C
Relative humidity during operation	35 % to 85 %
5. Dew condensation can occur if bringing the machine suddenly from a cold environment to a warm one. So, be sure to turn the power on after having waited for a sufficient period of time until there is no sign of water droplet in order to prevent accident caused by breakage or malfunction of the electrical components.
6. Be sure to stop operation when lightning flashes for the sake of safety and remove the power plug in order to prevent accident caused by breakage or malfunction of the electrical components.
7. Depending on the radio wave signal condition, the machine may generate noise in the TV or radio. If this occurs, use the TV or radio with kept well away from the machine.
8. In order to ensure the work environment, local laws and regulations in the country where the sewing machine is installed shall be followed.
In the case the noise control is necessary, an ear protector or other protective gear should be worn according to the applicable laws and regulations.
9. Disposal of products and packages and treatment of used lubricating oil should be carried out properly according to the relevant laws of the country in which the sewing machine is used.

Precautions to be taken so as to use the TSC-461 more safely

	<ol style="list-style-type: none">1. Keep your hands away from needle when you turn ON the power switch or while the machine is in operation.2. Do not put your fingers into the thread take-up cover while the machine is operating.3. Turn OFF the power switch when removing the belt cover or the V belt.4. During operation, be careful not to allow your or any other person's head, hands or clothes to come close to the handwheel and the thread take-up. Also, do not place anything close to them.5. Do not operate your machine with the belt cover and finger guard removed.
	<ol style="list-style-type: none">1. To ensure safety, never operate the machine with the ground wire for the power supply removed.2. When inserting/removing the power plug, the power switch has to be turned OFF in advance.3. In time of thunder and lightening, stop your work and disconnect the power plug from the receptacle so as to ensure safety.4. If the machine is suddenly moved from a cold place to a warm place, dew condensation may be observed. In this case, turn ON the power to the machine after you have confirmed that there is no danger of water drops in the machine.5. To prevent fires, periodically draw out the power plug from the plug socket and clean the root of the pins and the space between pins.6. The hook rotates at a high speed while the machine is in operation. To prevent possible injury to hands, be sure to keep your hands away from the vicinity of the hook during operation. In addition, be sure to turn OFF the power to the machine when replacing the bobbin.7. To avoid possible accidents due to abrupt start of the machine, be sure to turn OFF the power to the machine.8. Be careful of handling this product so as not to pour water or oil, shock by dropping, and the like since this product is a precision instrument.

BEFORE OPERATION



CAUTION :

Check the following so as to prevent maloperation of and damage to the machine.

- Before you put the machine into operation for the first time after the set-up, clean it thoroughly. Remove all dust gathering during transportation and oil it well.
- Confirm that voltage has been correctly set.
Confirm that the power plug has been properly connected to the power supply.
- Never use the machine in the state where the voltage type is different from the designated one.
- The direction of normal rotation of the machine is counterclockwise as observed from the pulley side.
Take care not to allow the machine to rotate in the reverse direction.
- Never operate the machine unless the sewing machine have been filled with oil.
- For a test run, remove the bobbin and the needle thread.
- For the first month, decrease the sewing speed and run the sewing machine at a speed of 500 sti/min or less.
- Operate the handwheel after the machine has totally stopped.



CAUTION :

Note that safety devices such as “eye guard”, “finger guard”, etc. may be omitted from the illustrations in this Instruction Manual for easy explanation.

When operating the machine, be sure not to remove these safety devices.

DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY

We hereby declare that the sewing machine (sewing head) described below ;

1. Must not be put into service until the machinery to which it is incorporated has been declared in conformity with the provisions of the Directive 2006/42/EC, and
2. Conforms to the essential requirements of the Directive 2006/42/EC, described in the technical documentation, and
3. To be prepared with the above technical documentation compiled in accordance with part B of Annex VII, and
4. Also to conform to the RoHS Directive 2011/65/EU
5. Relevant information on which should be transmitted in response to a reasoned request by the national authorities, by the electronic method or other according to the request.

Model	TSC-461
Description	Industrial Sewing Machine
Function	make stitches and sew

Applied harmonized standards, in particular :
EN ISO12100, EN ISO10821, EN 50581

Manufacturer :
JUKI CORPORATION
2-11-1, Tsurumaki, Tama-shi, Tokyo, Japan

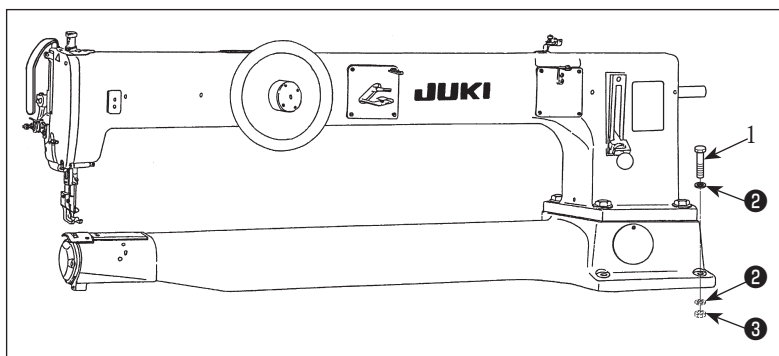
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SPECIFICATIONS

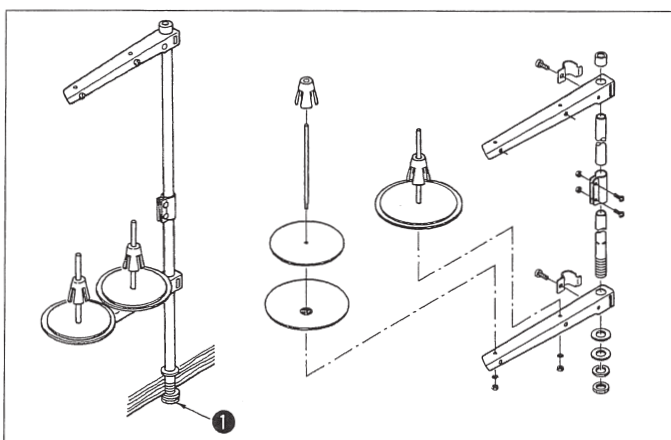
Stitch type	1-needle, unison feed, super long cylinder bed, lockstitch machine for extra heavy-weight materials	Needle bar stroke	56 mm
Usage	Large-sized tubular sewing products including golf bags	Needle to be used	Schmetz 794
		Needle system	Nm 130 to Nm 280 (standard: Nm 230)
Stitch length	Max. 11 mm	Thread	#00 to #8
Lift of presser foot	Hand lifter 12 mm, Knee lifter 20 mm	Stitch adjusting method	Lever nut type
Thread take-up lever	Cam-type thread take-up lever	Lubrication method	Hand oiling
Noise	- Equivalent continuous emission sound pressure level (L_{pA}) at the workstation: A-weighted value of 77.0 dB; (Includes $K_{pA} = 2.5$ dB); according to ISO 10821- C.6.2 -ISO 11204 GR2 at 650 sti/min.		
		Motor to be used	3-phase/single phase 400W clutch motor (4P)
		Oil to be used	JUKI New defrix oil No.1

1. INSTALLING THE MACHINE



1. Carry the sewing machine with two persons or more.
(Caution) Do not hold the main shaft.
2. Do not put protruding articles such as the screwdriver and the like at the location where the sewing machine is placed.
3. Place the sewing machine on the table aligning the mounting holes in the former with those in the latter.
4. Pass hexagonal head bolts 1 and washers 2 through four mounting holes in the sewing machine and fix them with washers 2 and nuts 3 from the underside of the table.

2. INSTALLING THE THREAD STAND



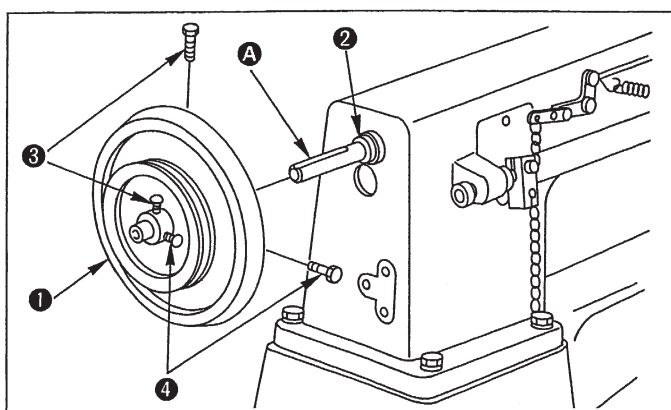
1. Assemble the thread stand unit, and insert it in the hole in the machine table.
2. Tighten locknut 1 to fix the thread stand.

3. INSTALLING THE HANDWHEEL



WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



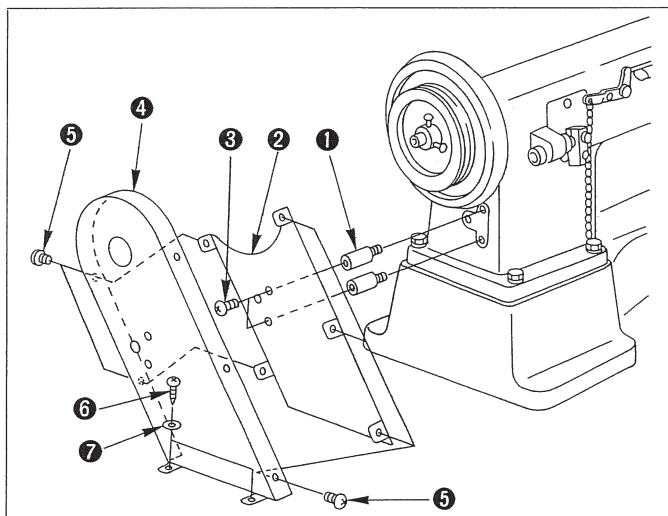
1. Fit handwheel 1 close to the main shaft bushing, rear 2.
2. Align two screws NO. 1 3 of the handwheel with slit A in the main shaft, and tighten them. Then tighten two screws 4.

4. INSTALLING THE BELT COVER



WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



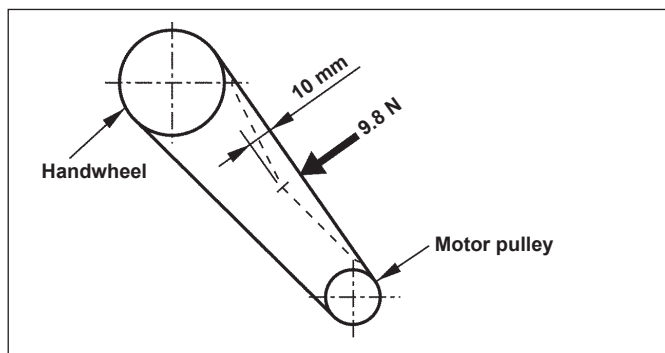
1. Install two belt cover supports 1 to the machine arm.
2. Install belt cover B 2 to belt cover supports 1 using screws 3.
3. Hook the V belt on the handwheel.
4. Attach belt cover A 4 to belt cover B 2 using screws 5.
5. Fix belt cover A 4 on the table using wooden screw 6 and washer 7.

5. ADJUSTING THE BELT TENSION



WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



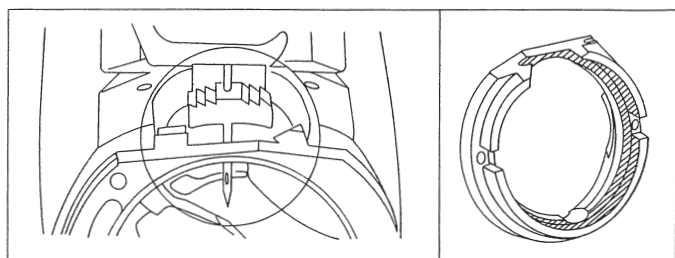
Adjust the belt tension with the height of the motor so that the belt sags 10 mm when the center of V belt is applied with a 9.8 N load.

6. CLEANING



WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



Waste thread, dust, dirt, etc., build-up around the feed dog or the shuttle may cause malfunction of the machine. Clean periodically according to your frequency of use.

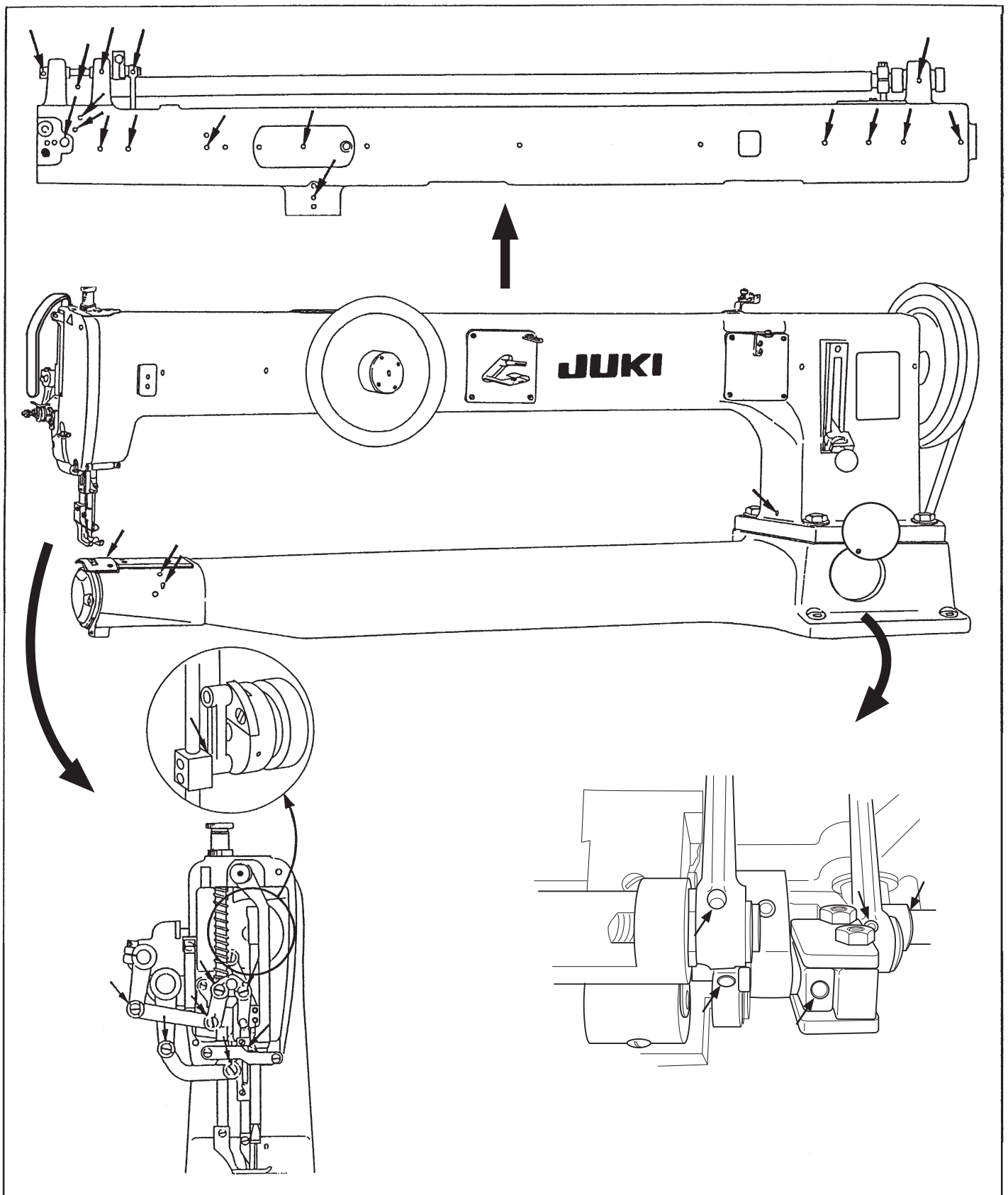
1. Remove the throat plate, and clean the area (circled area in the figure) around the feed dog.
2. Remove the shuttle race, and remove the hook. Then clean up the inside (the area filled with slant lines) of the shuttle race.

7. LUBRICATION



WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



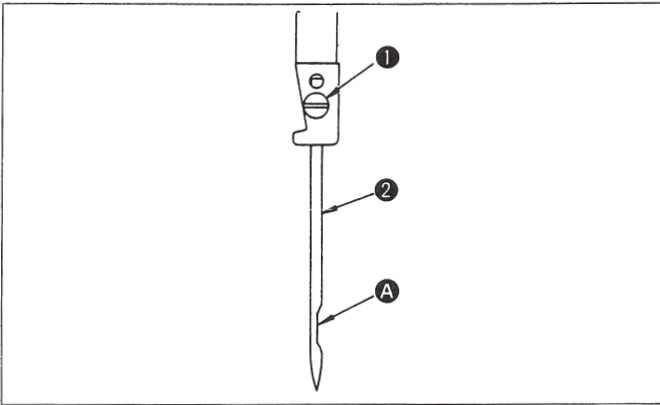
1. After uncrating, supply oil to the machine after cleaning it thoroughly.
 2. When oiling all the sections requiring lubrication, after installation of the machine has been completed, wait for a while (approximately 10 minutes) so that oil can penetrate each section sufficiently before starting continuous operation.
 3. If you use the sewing machine continuously, apply a few drops of oil to the points indicated with arrows and the hook in the morning and afternoon before starting the operation of the sewing machine.
- (Caution) Use JUKI New Defrix Oil No. 1.

8. HOW TO INSTALL THE NEEDLE



WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



The standard needle is a Schmetz 794, however an Organ DY x 3 can be used.

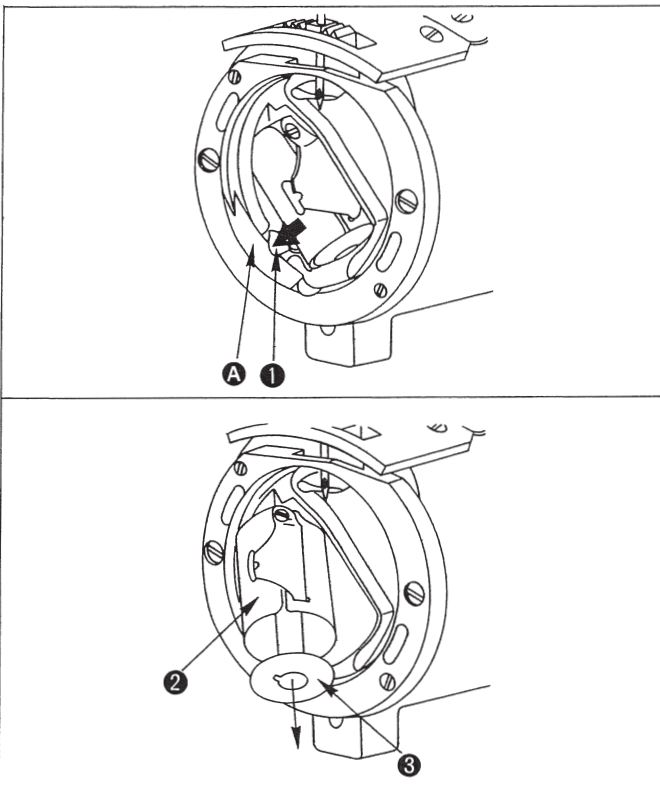
1. Turn the handwheel by hand and raise the needle bar to its top position.
2. Loosen screw ① and insert the needle ② into the hole until it will go no further.
(Insert the needle with its recess A facing directly to the right-hand side.)
3. Securely tighten the screw in the needle.

9. HOW TO TAKE OUT THE BOBBIN



WARNING :

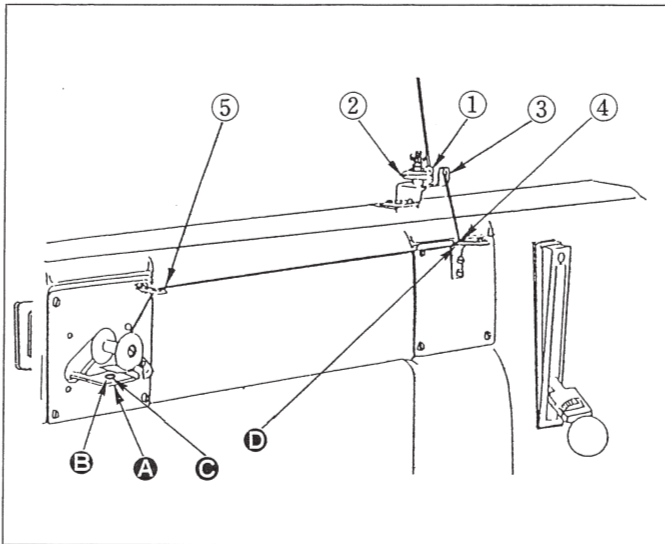
To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



Turn the handwheel by hand until the lowest position of the needle bar is reached so that spring ① in the bobbin case stopper comes to indented section A of the shuttle race.

When the case retaining spring is pressed, the bobbin case ② will be opened and the bobbin ③ will pop out of the case.

10. HOW TO WIND A BOBBIN THREAD



1. Raise the presser foot by the hand lifter lever.
2. Insert the bobbin into the bobbin winder spindle.
3. Thread the winder in the order illustrated and wind the thread onto the bobbin four or five turns.
4. Raise bobbin presser **A**, then the sewing machine will run to make the bobbin turn to wind itself.
5. When winding of bobbin thread has been completed, the bobbin winder trip latch will be disengaged and the bobbin will stop automatically.

★ Adjusting the amount of thread wound round the bobbin

That amount of thread has already been adjusted so that thread can be wound round approximately nine-tenths of the bobbin. If the amount is excessive or insufficient, adjust:

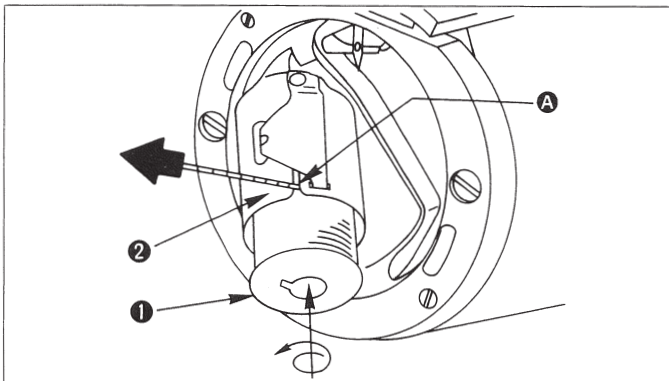
1. by loosening the adjusting screw and nut **B**.
 2. by turning the adjusting screw **C**.
To decrease the amount, turn clockwise.
To increase the amount, turn counterclockwise.
 3. After adjusting the amount, of thread has been completed, tighten the nut to secure firmly.
- ★ If bobbin thread is wound unevenly, move the bobbin winder thread guide **D** forward and backward so that thread can be wound evenly.

11. HOW TO INSTALL THE BOBBIN



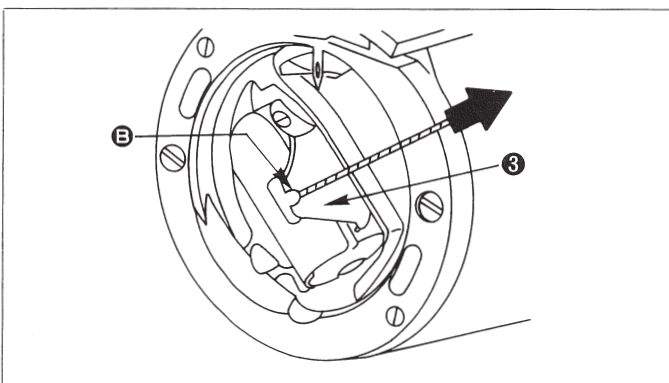
WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



1. After pulling out thread approximately 10 cm from bobbin **1**, put the bobbin into bobbin case **2**.
2. Pass the thread through the threading groove **A** in the bobbin case.

(Caution) Fit the bobbin in the bobbin case so that the bobbin turns in the direction of the arrow when the bobbin thread is pulled.



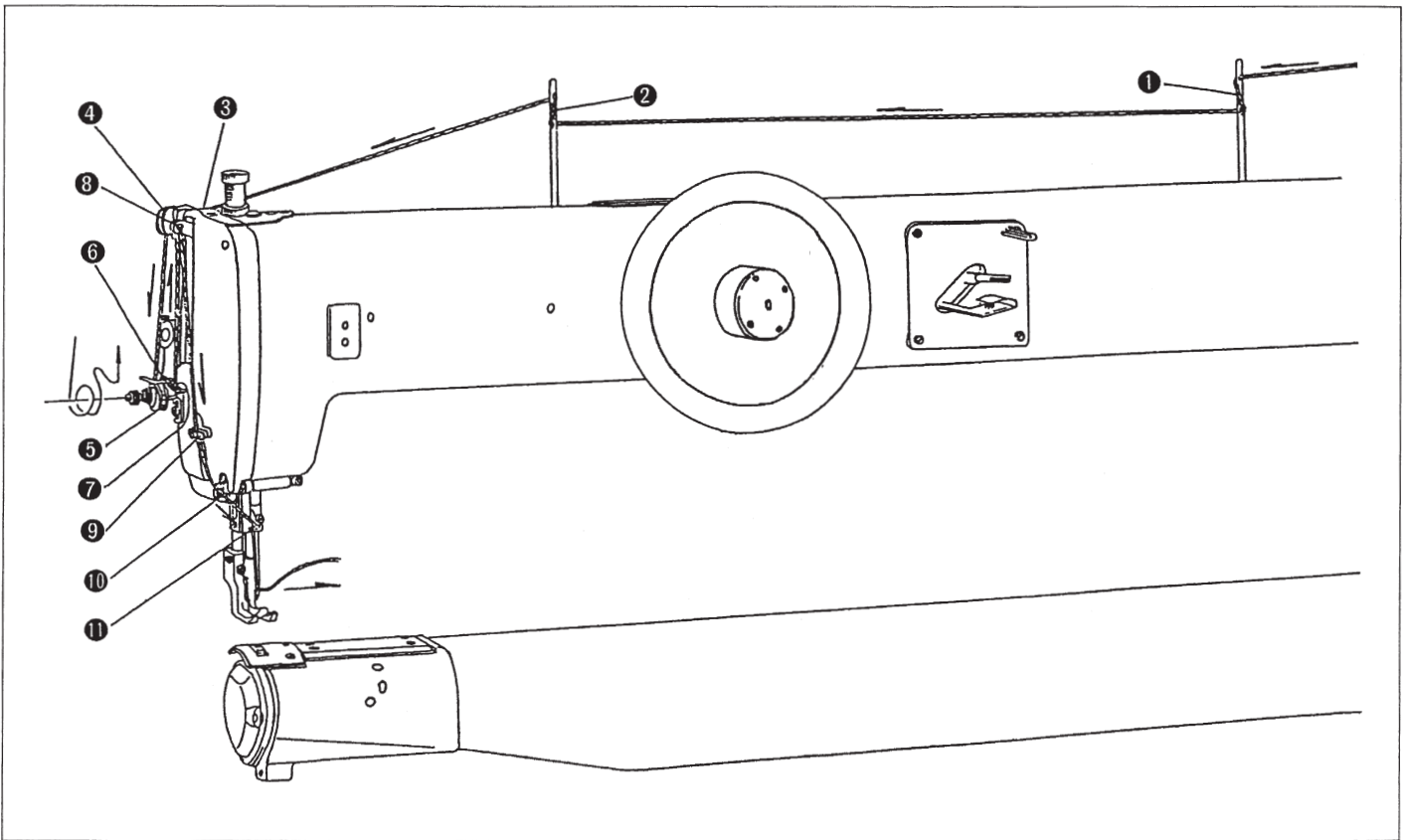
3. Pass the thread through thread slit **B** and pull it up. Then the thread can be passed under the thread tension spring **3** and pulled out.
4. Push the bobbin case into the original position of holding the bobbin.

12. HOW TO THREAD THE MACHINE HEAD



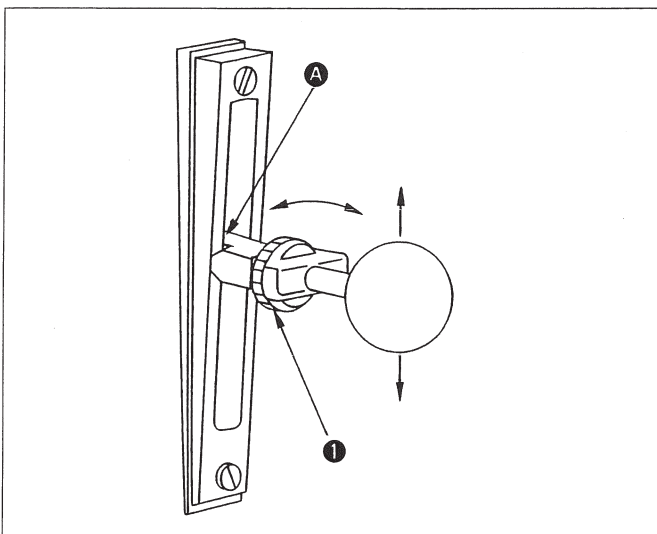
WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



1. Turn the handwheel by hand to move the thread take-up lever to its top position.
2. Thread in the order illustrated and thread the needle from the left to the right.
3. Pull out the thread, which has been threaded in the needle, approximately 10 cm.
(Caution) Thread the right-hand side of section ⑨ when viewed from the face plate.

13. ADJUSTING THE STITCH LENGTH AND REVERSE STITCHING



★ Adjusting the stitch length

To adjust the stitch length, use the feed regulator nut ①. Align the upper end A of the feed lever to the scale indicating the desired amount.

To increase the pitch, turn the nut counterclockwise.

To decrease the pitch, turn the nut clockwise.

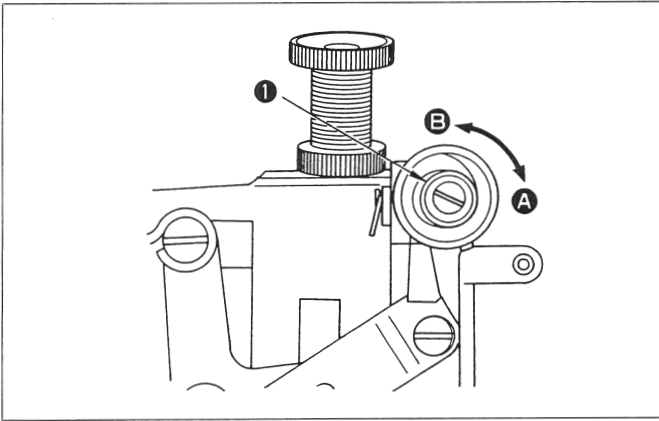
(To decrease the stitch length, turn the nut while slightly pushing the feed lever down.)

★ Reverse stitching

To carry out reverse stitching, push the feed lever up by hand as far as it will go.

Reverse stitching can be done only when the feed lever is pushed up.

14. THREAD TENSION



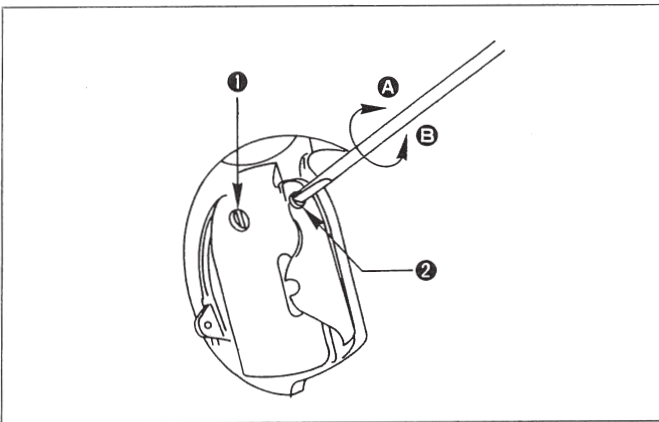
★ Adjusting the needle thread tension

Adjust the needle thread tension by thread tension nut ① .
To increase the needle thread tension, turn the nut to the clockwise ② .
To decrease the needle thread tension, turn the nut to the counterclockwise ③ .



WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.

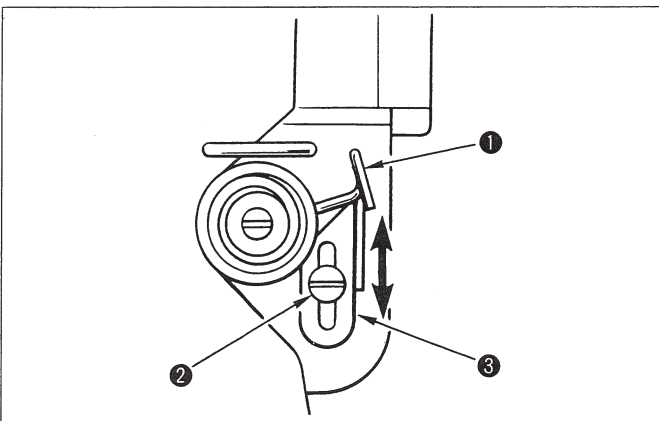


★ Adjusting the bobbin thread tension

To adjust the bobbin thread tension

1. Loosen screw ① .
2. Adjust the bobbin thread tension by turning screw ② .
To increase the bobbin thread tension, turn the screw to the clockwise ③ .
To decrease the bobbin thread tension, turn the screw to the counterclockwise ④ .
3. After the bobbin thread tension has been adjusted, tighten screw ① firmly.

15. THREAD TAKE-UP SPRING

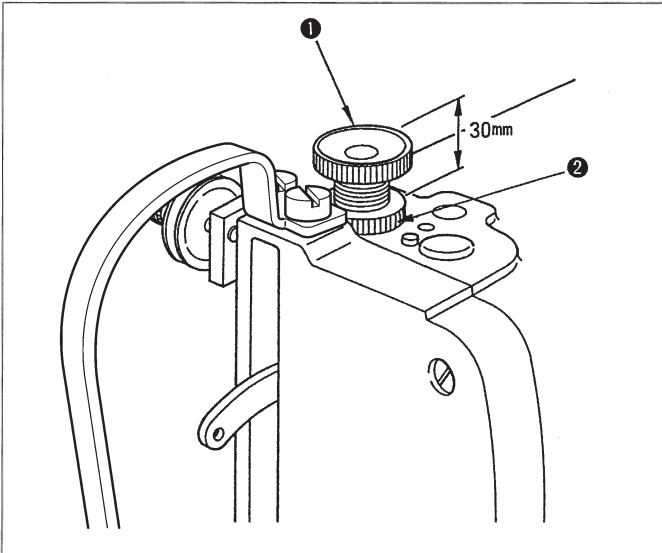


The standard stroke of thread take-up spring ① is 8 to 15 mm.

To adjust the operating range;

1. Loosen screw ② .
2. Adjust the operating range by moving the thread take-up spring adjusting plate ③ up and down.
3. After adjustment has been completed, tighten screw ② firmly.

16. ADJUSTING THE PRESSER FOOT PRESSURE



The standard height of presser spring regulator ① 30 mm above the main unit surface.

The presser foot pressure can be adjusted according to the material to be sewn.

To adjust the presser foot pressure

1. Loosen the presser spring regulator nut ②.
2. Turn the presser spring regulator ① clockwise to increase the pressure of the presser foot, or counterclockwise to decrease it.
3. After adjustment has been completed, turn the nut ② firmly, making sure to keep it securely in place.

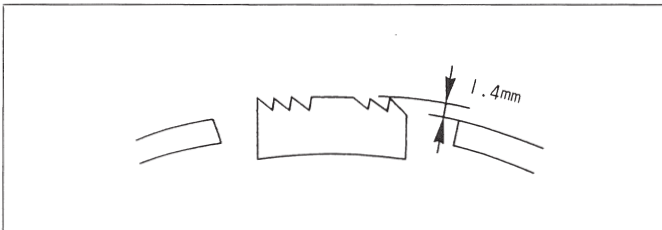
* Use a minimum amount of required pressure.

17. ADJUSTING THE HEIGHT OF THE FEED DOG

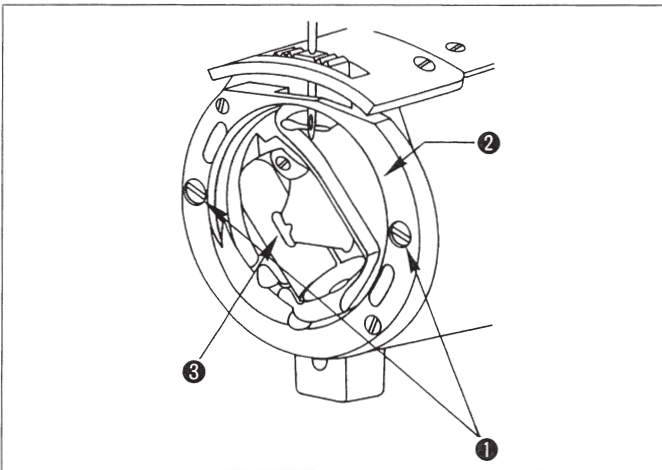


WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.

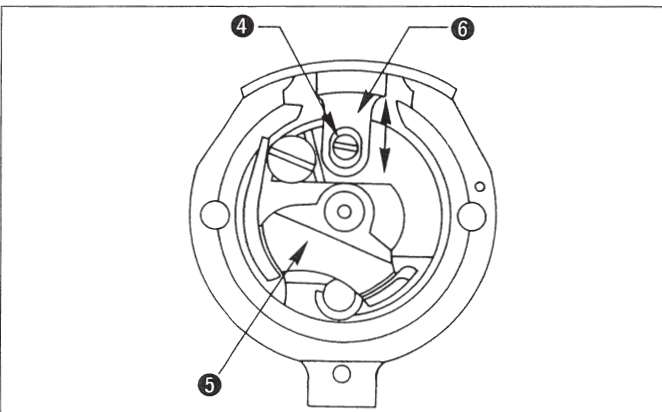


The advance amount of the feed dog from throat plate has already been adjusted to 1.4 mm.



To adjust the height of the feed dog according to the sewing condition given,

1. Remove two screws ① in the shuttle race, and remove shuttle race ② . Then remove shuttle ③ .



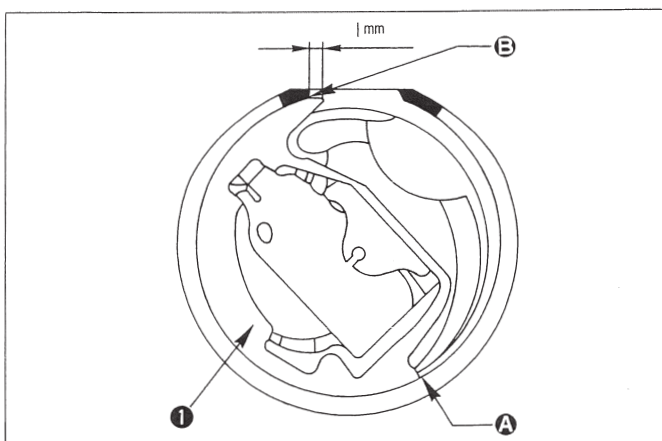
2. Turn the handwheel to move shuttle driver ⑤ until screw ④ in the feed dog appears.
3. Loosen screw ④ in the feed dog, and adjust the height of the feed dog by moving feed dog ⑥ up or down.
4. After the adjustment, firmly tighten screw ④ in the feed dog.

18. ADJUSTING THE NEEDLE-TO-SHUTTLE RELATIONSHIP



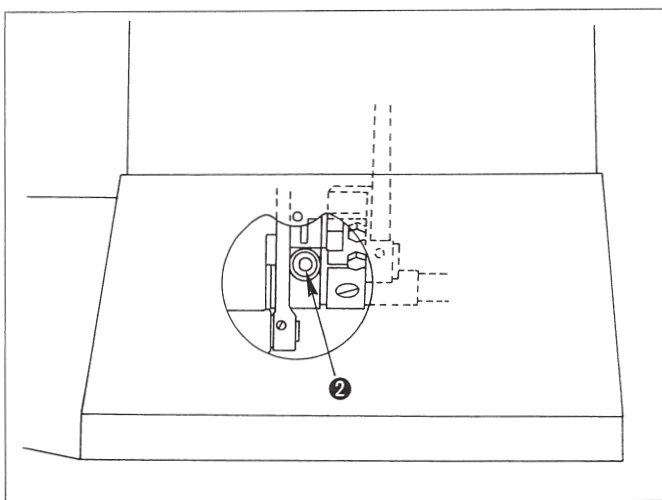
WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



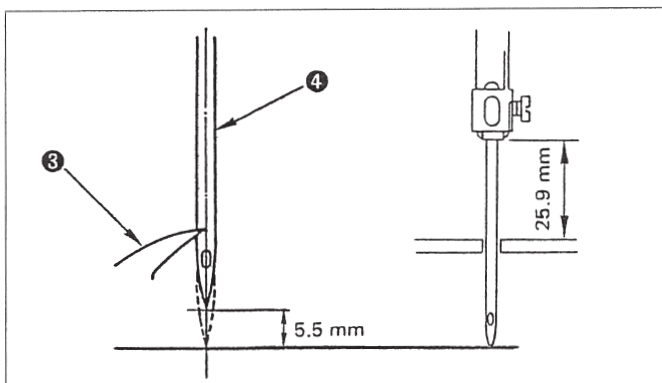
★ The position of the shuttle when it is recessed most.

When shuttle ① turns counterclockwise until it will go no further and the shuttle and the shuttle race come in contact with each other at point A, a distance of 1 mm should be provided between the blade point of the shuttle and end face B of the shuttle race.



To adjust the position of the shuttle being pulled:

1. Turn the handwheel and stop turning when the shuttle turns counterclockwise until it will go no further.
2. Loosen screw ②.
3. Align the blade point of the shuttle by turning the shuttle by hand.
4. After adjustment has been completed, tighten screw ② firmly.



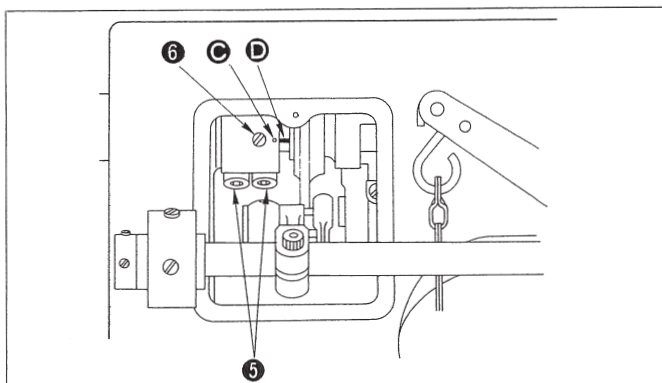
★ Positioning the needle and shuttle

Set the stitch length dial at "0".

Adjust the needle-to-hook relation so that blade point ③ of the hook is aligned with the center of needle ④ when the handwheel is turned toward you until the needle bar ascends from its lowest point by 5.5 mm.

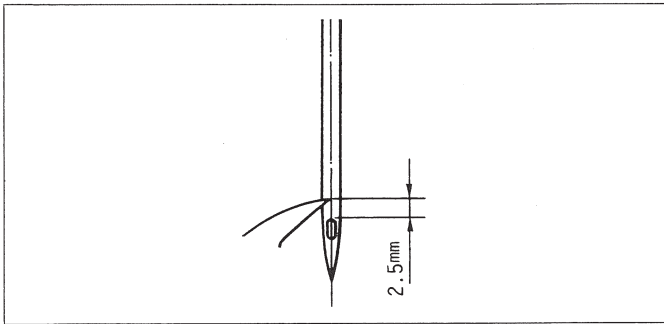
(Reference value of the lowest position of the needle bar stroke)

The distance from the upper surface of the throat plate to the lower end of the needle bar should be 25.9 mm with the feed pitch set to 0 mm.



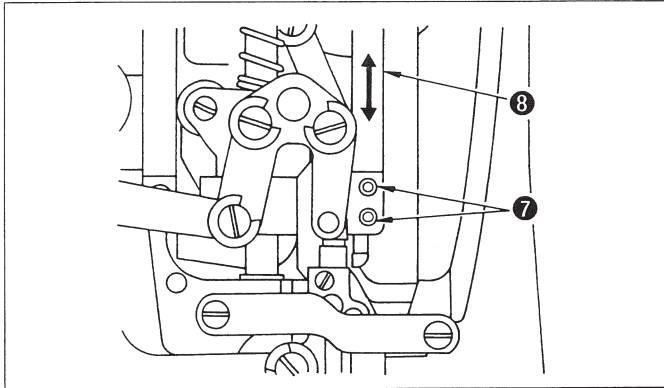
To adjust the position of the needle and shuttle

1. Loosen screw (B) ⑤.
2. Loosen screw (A) ⑥, and adjust so that marker dot C engraved on the eccentric cam of the vertical rod is aligned with marker line D engraved on the main shaft. Then, tighten screw ⑥.
3. Turn the handwheel toward you, and check the lifting amount of the needle bar.
4. After the adjustment, securely tighten screws ⑤ and ⑥.



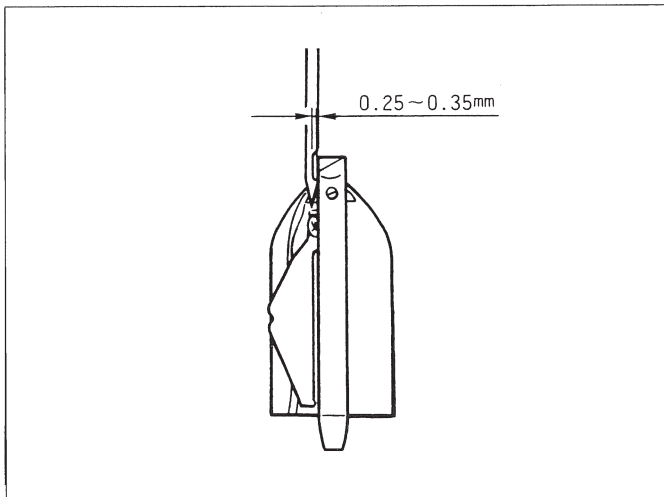
★ The height of the needle bar

The correct height is that the distance from the blade point of the shuttle to the upper end of the needle eyelet is 2.5 mm when the blade point of the shuttle is aligned with the center of the needle.



To adjust the height of the needle bar:

1. Set the stitch length dial at 0 mm.
2. Turn the handwheel and stop turning it when the blade point of the shuttle is aligned with the center of needle.
3. Loosen screws (7) .
4. Adjust the height by moving needle bar (8) up and down.
5. After adjustment has been completed, firmly tighten screws (7) .



★ The needle-to-shuttle clearance

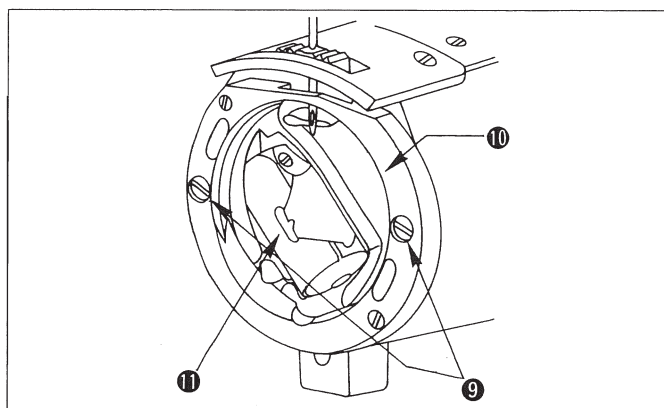
The clearance between the recess in the needle and the blade point of the shuttle has already been adjusted to 0.25 ~ 0.35 mm.

Point of the shuttle has already been adjusted to 0.35 mm.

Adjust the clearance between the needle and the shuttle by replacing the shuttle race back.

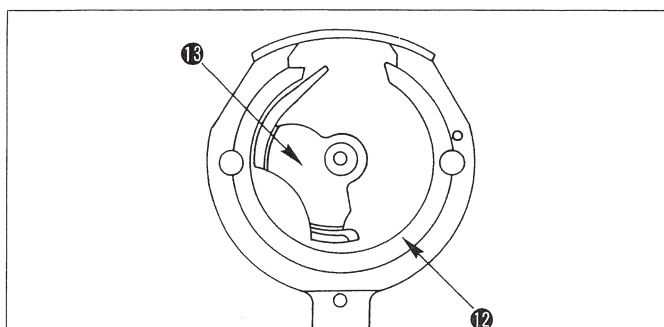
(The shuttle race back comes in six different thickness in addition to the standard thickness.)

Thickness (mm)	Part name	Part No.	Remarks
2.9	Shuttle race (1)	21155106	
3.1	Shuttle race (2)	21155205	
3.3	Shuttle race (3)	21155304	
3.5	Shuttle race (4)	21155403	Standard
3.7	Shuttle race (5)	21155502	
3.9	Shuttle race (6)	21155601	
4.1	Shuttle race (7)	21155700	

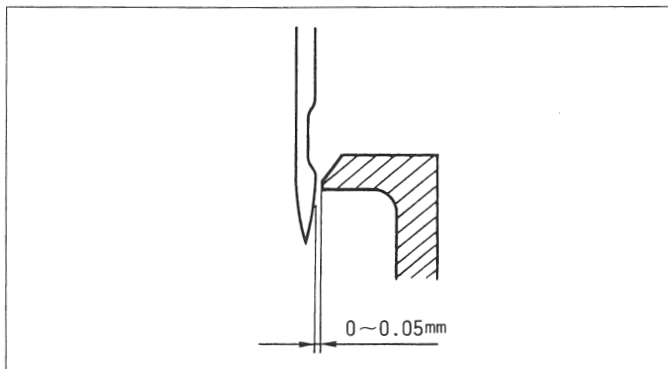


To replace the shuttle race back,

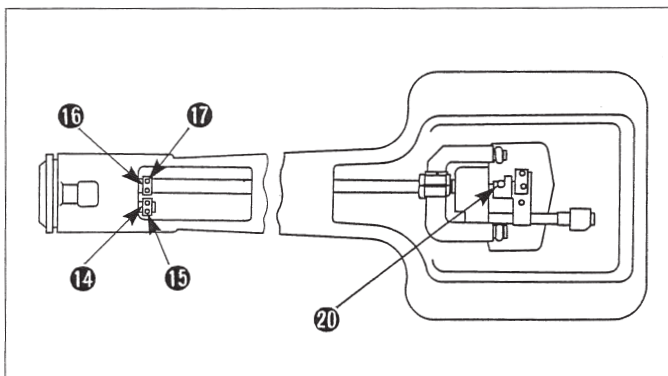
1. Remove two screws (9) in the shuttle race, remove shuttle race (10) , and remove shuttle (11) .



2. Turn the handwheel until shuttle driver (13) is brought to the position where shuttle race back (12) comes off. Then replace the shuttle race back.

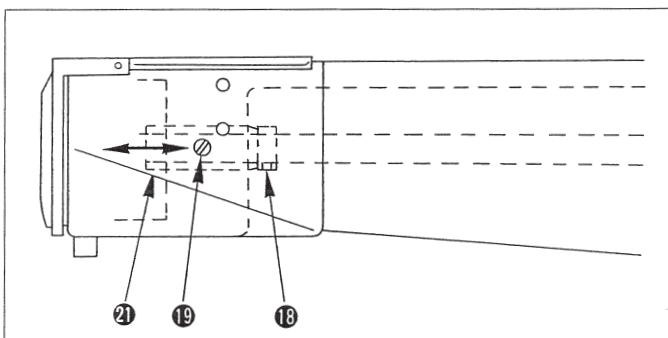


★ **Clearance between the needle and the shuttle driver**
The clearance between the needle and the needle guide of the shuttle driver has already been adjusted to the range of 0 through 0.05 mm.

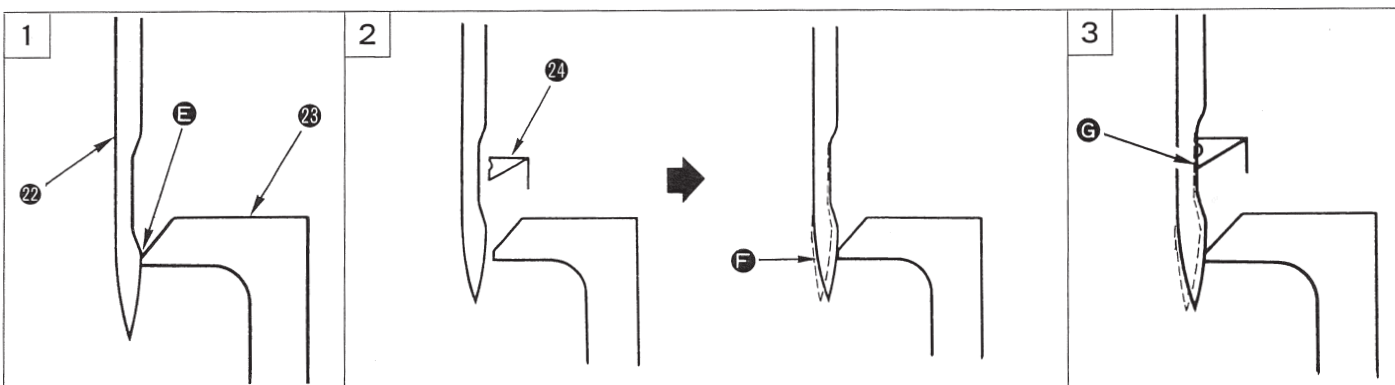


To adjust the clearance between the needle and the shuttle driver:

1. Loosen two screws 15, and remove thrust collar 14 of the feed rock driving shaft on the feed bracket.
2. Loosen two screws 17, and move thrust collar 16 of the feed rock shaft.
3. Loosen two screws 18 in the shuttle driving shaft thrust collar, screw 19 in the shuttle driving shaft front bushing and small pendulum clamping screw 20.



4. Adjust the clearance by moving shuttle driving shaft front bushing 21 to the left and right.
5. After the adjustment, fix the thrust collar of the hook driving shaft elimination an axial play in the hook driving shaft. Then fix the small pendulum in place.
6. Finally, secure the respective thrust collars, making sure there is no play in the feed driving shaft and the feed rock shaft.



[The standard for adjusting the clearance between the needle and the blade point of the shuttle]

Use a standard Schmetz 794-Nm230 needle.

1. Adjust the clearance E between the convex section of needle 22 and shuttle driver 23 to 0.
2. Align the needle center with the blade point of shuttle 24 and press the F section of the needle against the shuttle driver.
3. Adjust the clearance G to a minimum, with the needle pressed against the shuttle driver, making sure that the needle does not contact the blade point of the shuttle.

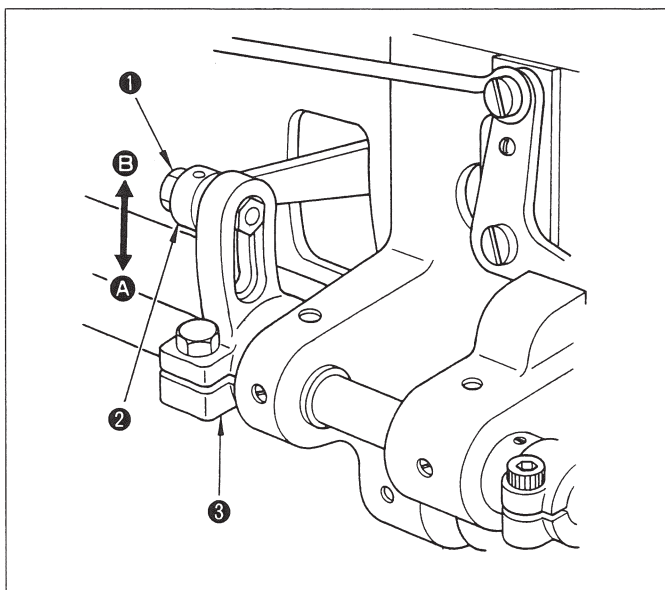
* By this adjustment the needle-to-shuttle blade point clearance will be 0.25 ~ 0.35 mm.

19. ADJUSTING THE WALKING FOOT AND THE PRESSER FOOT



WARNING :

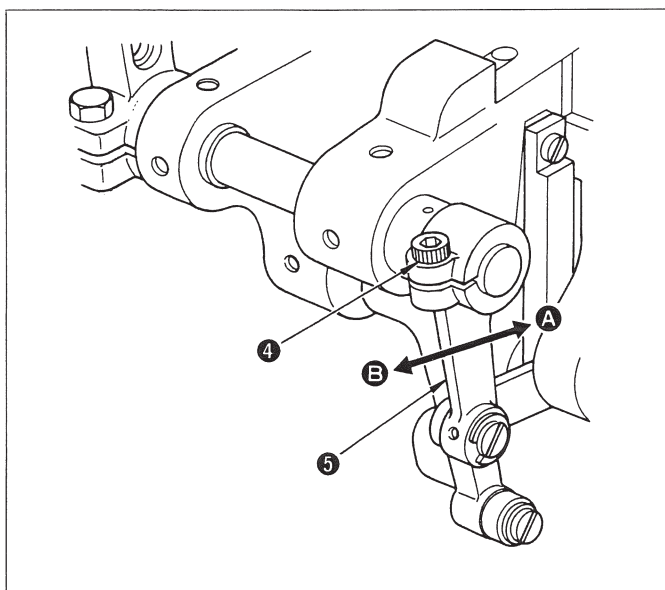
To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



★ Operating height of the walking foot and the presser foot

The standard operating height has been minimized. The operating height may be changed for better finish according to the sewing product.

1. Loosen hinged screw ① in the walking foot rod.
2. Secure walking foot rod ② to lower area A of the slot in the walking foot arm (rear) ③ to maximize the operating height (8 mm), or to upper area B to minimize the operating height (4 mm).
3. After the adjustment, firmly tighten hinge screw ① in the walking foot rod.



★ The amount of alternating vertical movement of the walking foot and the presser foot

Vertical movement of the walking foot and that of the presser foot are actuated alternately. For standard adjustment, the amount of vertical movement of the walking foot should be equal with that of the presser foot. However, the amount vertical movement of the walking foot is desired to be slightly decreased in accordance with the type of material to be sewn. This may result in better-finished products.

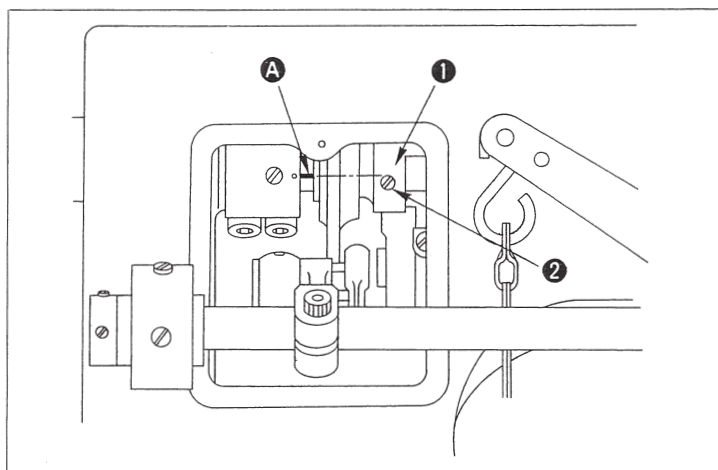
1. Bring the thread take-up to the lowest position of its stroke, and lower the presser foot.
2. Loosen screw ④.
3. Move walking foot arm (front) ⑤ to right A to increase the moving amount of the walking foot. Move the walking foot arm (front) ⑤ to the left B and movements will be equal.
4. After the adjustment, firmly tighten clamping screw ④ in the walking foot arm (front).

20. THE FEED DOG-TO-NEEDLE RELATIONSHIP



WARNING :

To avoid possible personal injury due to abrupt start of the machine, turn off the power to the machine and check to be sure that the motor has totally stopped rotating in prior.



As standard timing of the feed dog, when the center of the needle aligns with the blade point of the shuttle with the feed pitch set to "0", the feed dog should move from right to left by 1 mm when observed from the face plate by moving the feed lever from the position to set the normal feed pitch to the maximum value to the position to set the reverse feed pitch to the maximum value.

★ To adjust the timing:

1. Loosen the two screws for the feed eccentric cam ① .
2. Adjust the timing to the standard one by aligning the top end of screw No. 1 ② in the feed eccentric cam with marker line A engraved on the main shaft.
3. After adjusting the timing has been completed, firmly tighten the two screws for the feed eccentric cam.

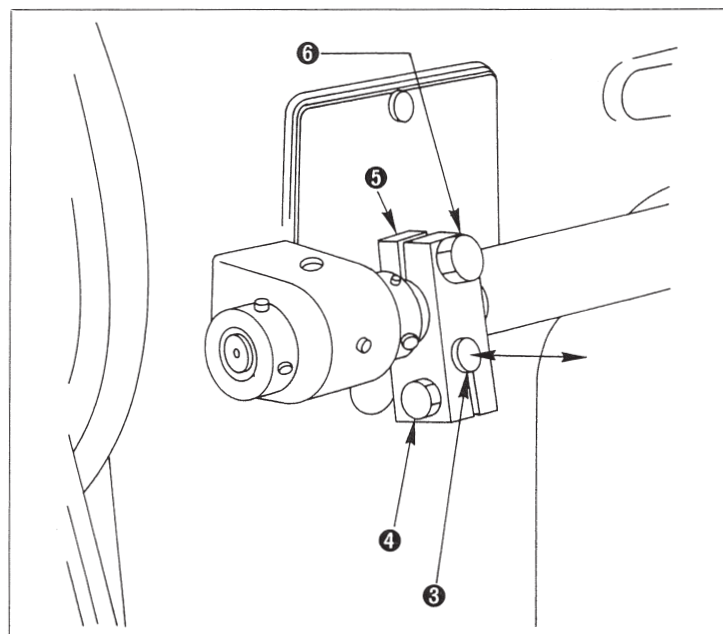
★ The motion of the feed dog and needle

The center of the needle hole in the feed dog must move with synchronized completely with the needle.

< How to adjust the needle sway >

If there is any lag in the motion of the feed dog and that of the needle, and the needle entry at the sewing end is not same as that at the sewing start, perform the following adjustment.

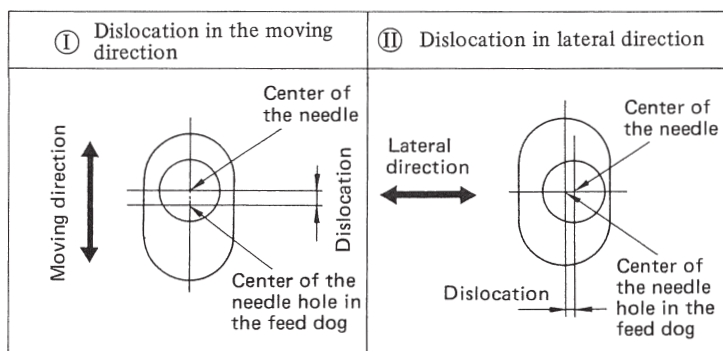
1. Loosen clamping screw ④ in center shaft rear arm (B) ③ .
2. Move center shaft rear arm (B) ③ toward/away from you and temporarily tighten the screw. At this time, move center shaft rear arm (B) ③ away from you to decrease the oscillating width of the needle bar frame, or pull the arm (B) toward you to increase it.
3. Slowly turn the handwheel by hand to confirm that there is no lag between the motion of the feed dog and that of the needle.
4. Repeat the above stated steps until the feed dog and the needle move with completely synchronized.
5. After the adjustment, firmly tighten screw ④ .

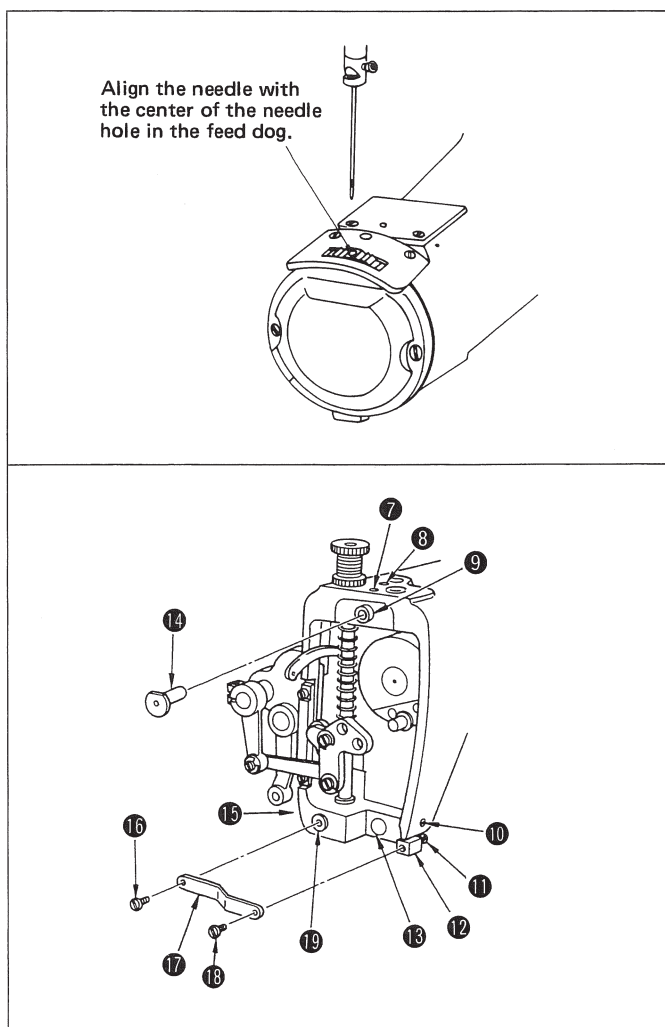


★ Needle entry point with respect to the needle hole in the feed dog

If the needle fails to enter just the center of the needle hole in the feed dog even when the motions of the feed dog and the needle are completely synchronized.

1. Check whether the needle is bent.
2. Check the direction of the dislocation either ① or ② as illustrated in the figure.





★ Adjusting the needle entry point

- ① When the needle entry point dislocates in the moving direction.
 1. Loosen clamping screw ⑥ in center shaft rear A ⑤ .
 2. Align the needle with the center of the needle hole in the feed dog.
 3. After the adjustment, firmly tighten the screw.
- ② When the needle entry points dislocates in the lateral direction.
 1. Remove the screw in the face plate, and remove the face plate.
 2. Remove screws ⑬ and ⑮ , and remove needle bar frame presser plate ⑯ .
 3. Loosen screw ⑩ to allow needle bar frame guide ⑬ to move freely.
 4. Loosen screws ⑦ and ⑧ , and move needle bar frame shaft bushing ⑨ until the needle is aligned with the center of the needle hole in the feed dog.
 5. Loosen screw ⑦ , and retain needle bar frame shaft bushing ⑨ so that it does not move.
Tighten screw ⑧ when the play in the needle bar frame is minimized so that needle bar frame shaft ⑭ is secured at that position.
 6. Make needle bar frame guide ⑬ come in slight contact with the needle bar frame, and fix the guide at that position by tightening screw ⑩ .
 7. Loosen screws ⑪ and ⑮ , and position needle bar frame presser retaining shaft ⑰ and needle bar frame presser retaining plate ⑫ to the position where the needle bar frame moves smoothly without play when needle bar frame presser plate ⑯ is attached to the needle bar frame. Then tighten the screws.

(Caution) After the needle entry point has been adjusted, be sure to confirm the clearance between the needle and the blade point of the shuttle as well as the clearance between the needle and the finger. (Refer to pages 11 for how to adjust these clearances.)

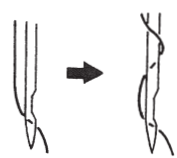
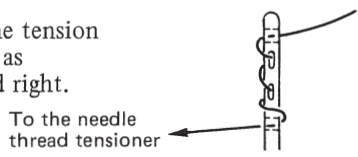

21. MOTOR PULLEY AND SEWING SPEED

- 1) Use an M type V belt.
- 2) The following table shows the relationship among the motor pulley and the sewing speed.

Model	Sewing speed	Effective diameter of handwheel	Number of poles	Frequency	Rotational speed of motor	Effective diameter of motor pulley
TSC-461	500 sti/min	ø 154	4	50 Hz	1,430 rpm	ø 50
				60 Hz	1,715 rpm	ø 45
	650 sti/min			50 Hz	1,430 rpm	ø 70
				60 Hz	1,715 rpm	ø 55

(Caution) The effective diameter of the motor pulley is obtained by subtracting 5 mm from the outside diameter.

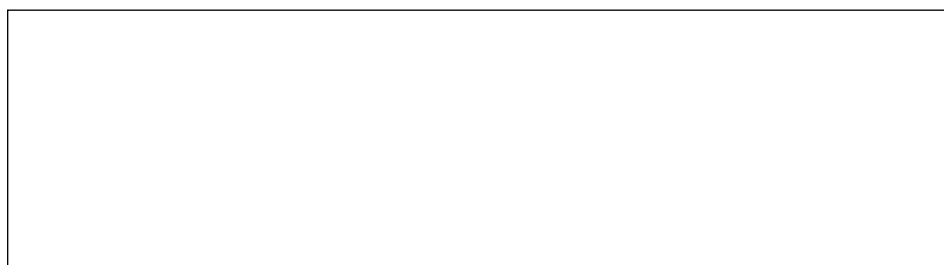
22. TROUBLES AND CORRECTIVE MEASURES

Problem	Cause	Corrective measures
1. Thread often breaks or thread splits finely, correct stitch cannot be formed (half-finished stitch)	<ol style="list-style-type: none"> ① Flaw is found out at thread path, needle point, shuttle blade point, or needle eyelet. ② Improper finish around the recess in the needle. ③ Excessively tightened needle thread tension ④ The needle interferes with the blade point of the shuttle. ⑤ The timing of the needle and the shuttle is too early or too slow. ⑥ Due to heat generated by the needle. ⑦ Excessive height difference at stepped section. 	<ul style="list-style-type: none"> ○ Remove flaw by smoothing flaw with fine paper file. ○ Replace the needle with a new one. ○ Adjust the needle thread tension. ○ Refer to “18. Adjusting the needle-to-shuttle relationship”. ○ Refer to “18. Adjusting the needle-to-shuttle relationship”. ○ Decrease the sewing speed of the machine. Use silicone oil. ○ Increase the amount of movement of the thread thread take-up spring.
2. Stitches are frequently skipped	<ol style="list-style-type: none"> 1. The needle-to-shuttle blade point clearance is excessive. 2. The timing of the needle and the shuttle is too early or too slow. 3. The presser bar pressure is insufficient. 4. The distance from the upper end of the needle eyelet to the blade point of the shuttle is not proper. 5. The needle is improperly selected. 6. The amount of movement of the thread take-up spring is excessive. 7. Overheated needle or shuttle. Thread is not pulled smoothly. 8. Reverse stitching is made at low speed on light weight material using nylon thread. 	<ul style="list-style-type: none"> ○ Refer to “18. Adjusting the needle-to-shuttle relationship”. ○ Refer to “18. Adjusting the needle-to-shuttle relationship”. ○ Tighten the presser adjuster screw. ○ Refer to “18. Adjusting the needle-to-shuttle relationship”. ○ Replace the needle with a one-count lower needle. ○ Decrease the amount of movement of the thread take-up spring. ○ Use silicone oil. ○ Wind the needle thread around the needle. 
3. Improper thread tension, irregular stitch, excessive bobbin thread tension	<ol style="list-style-type: none"> ① The needle hole in the walking foot, needle hole in the feed dog or thread path in the thread guides has scratches. ② The bobbin slides unsmoothly. ③ Weak bobbin thread tension. ④ Bobbin thread is wound too tightly. ⑤ Needle thread flaps. (Needle thread flaps and comes out of the thread tension disc due to excessive needle thread tension or is caught in other parts.) ⑥ Too thin bobbin thread is used to combine with needle thread. 	<ul style="list-style-type: none"> ○ Smooth the surface with a fine paper file or using a buff. ○ Replace the bobbin or the shuttle. ○ Adjust the bobbin thread tension. ○ Decrease the tension of the bobbin thread winder. ○ Thread the tension guide bar as illustrated right. ○ Use silicone oil. 
4. Poor gloss of the needle thread	<ul style="list-style-type: none"> ○ Excessive height difference at stepped section. 	<ul style="list-style-type: none"> ○ Use silicone oil.
5. Inconsistently finished seam (stitches are not made straight but made such as “≡”)	<ul style="list-style-type: none"> ○ Needle is too thick. 	<ul style="list-style-type: none"> ○ Replace the needle with a thinner one. ○ Use cutting point needle 
6. Bobbin thread tension cannot be increased.	<ul style="list-style-type: none"> ○ The bobbin thread tension spring of the shuttle has become dusty or dirty. 	<ul style="list-style-type: none"> ○ Clean by removing the bobbin thread tension spring.
7. The belt slips (Motor stoppage occurs, if an electronic-stop motor is used.)	<ol style="list-style-type: none"> ① The V belt is degraded. ② The V belt tension is not enough. 	<ul style="list-style-type: none"> ○ When degradation is found out to the V belt, such as wear, cracking, etc., replace with a new one. ○ Refer to “5. Adjusting the belt tension”.





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Please do not hesitate to contact our distributors or agents in your area for further information when necessary.
* **The description covered in this instruction manual is subject to change for improvement of the commodity without notice.**