

mitsubishi

Industrial Sewing Machine

TECHNICAL INFORMATION

Automatic Undertrimmer, Single-Needle Lockstitch

Model LS2-1280



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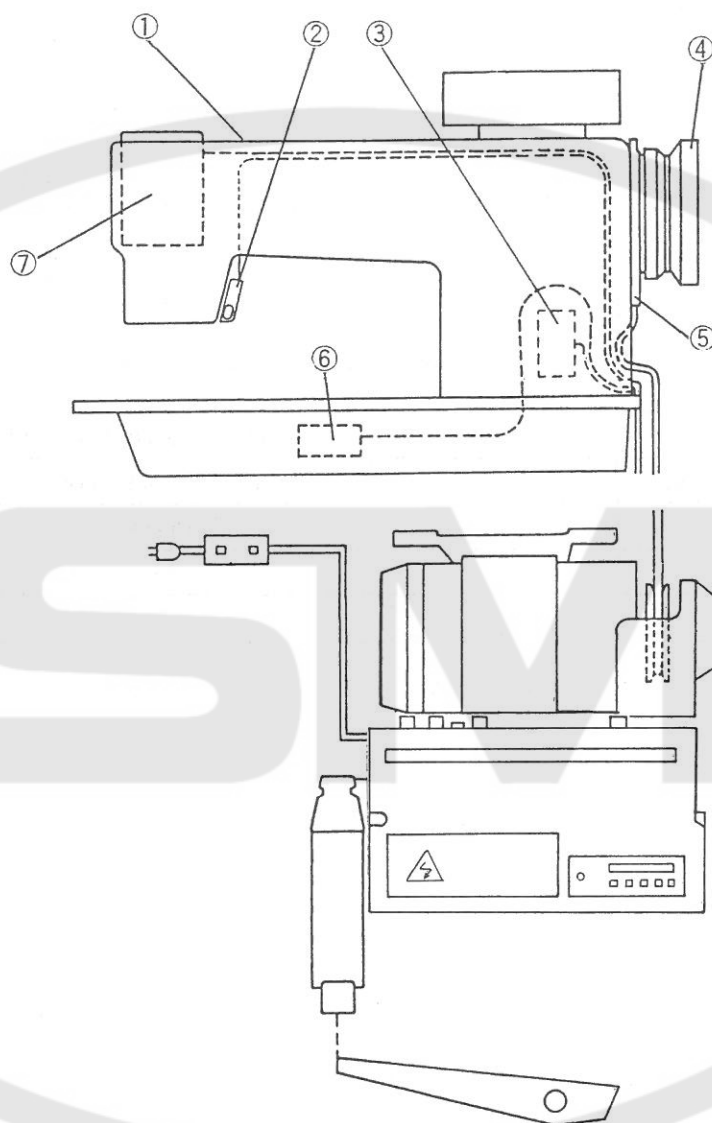
1. SPECIFICATIONS

Item \ Model	LS2-1280-M1T	LS2-1280-M1TW	LS2-1280-H1TW	LS2-1280-B1T
Material weight	Light to medium		Heavy	
Max. sewing speed, spm	5000		3500	3000
Stitch length, mm	0 to 4		0 to 7	
Needle bar stroke, mm	31.8		35.0	35.0
Presser foot stroke, mm (Knee lifter/Manual)	13/6			
Needle type* ¹	DB×1-2#14		DB×1#22	
Hook	Standard (for thread trimmer)		Heavy (for thread trimmer)	Heavy (Large) (for thread trimmer)
Bobbin case	Standard		Heavy	Large
Bobbin	Made of steel, for thread trimmer			Made of steel for thread trimmer, large
Thread trimmer	Rotary scissoring by left movable knife and right fixed blade			
Thread trimmer starting	Solenoid actuation			
Knife drive	Cam drive			
Touch-back	○			
Wiper	—	○	—	—

*¹ Needle type (Organ needles are standard.)

2. THREAD TRIMMER SYSTEM

2.1 Electric Section

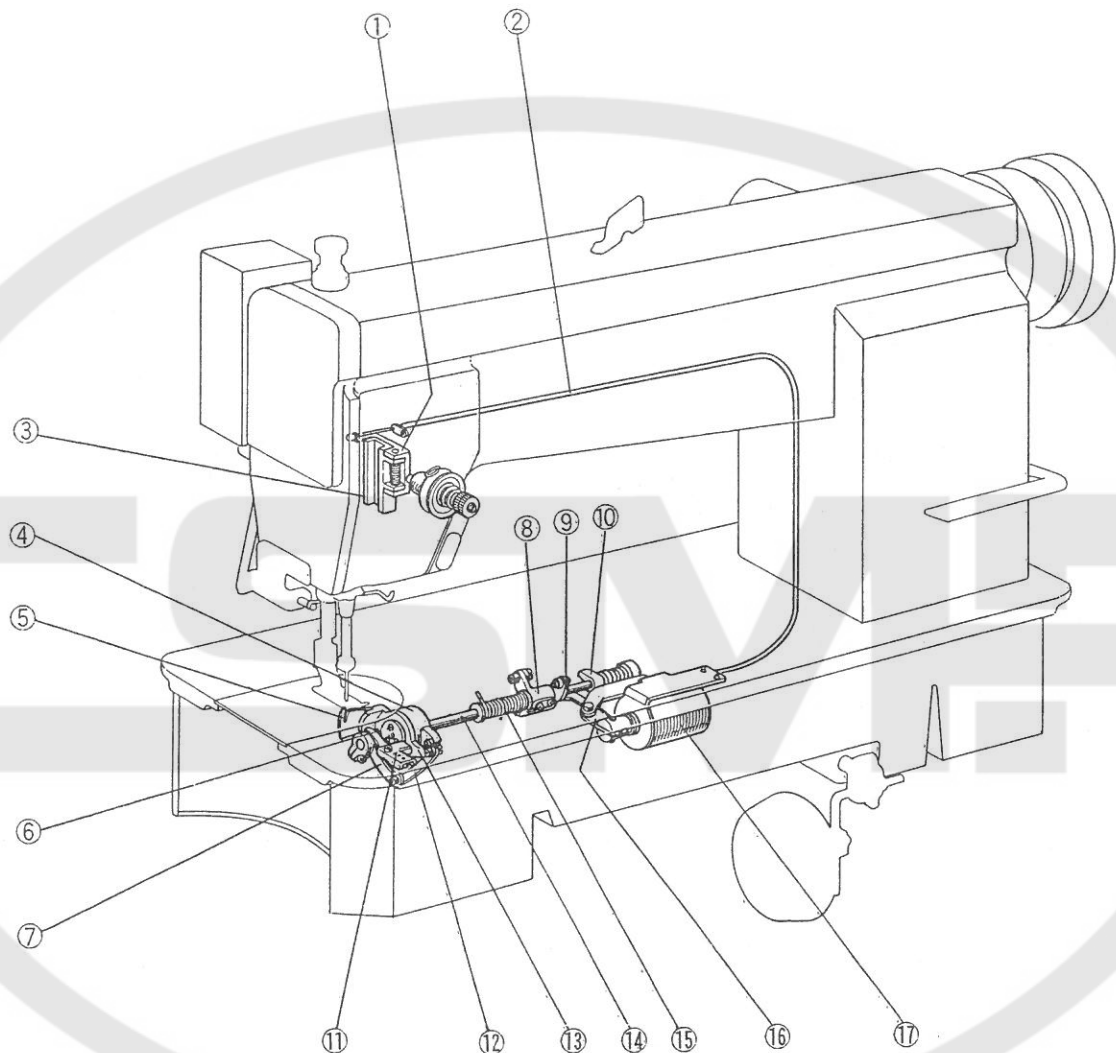


Part names

- | | | | |
|------------------|---------------------------|------------------|-----------------|
| ① Sewing machine | ② Touch switch | ③ Back solenoid | ④ Balance wheel |
| ⑤ Synchronizer | ⑥ Thread trimmer solenoid | ⑦ Wiper solenoid | |

2.2 Machine Head Section (1)

Thread trimming mechanism

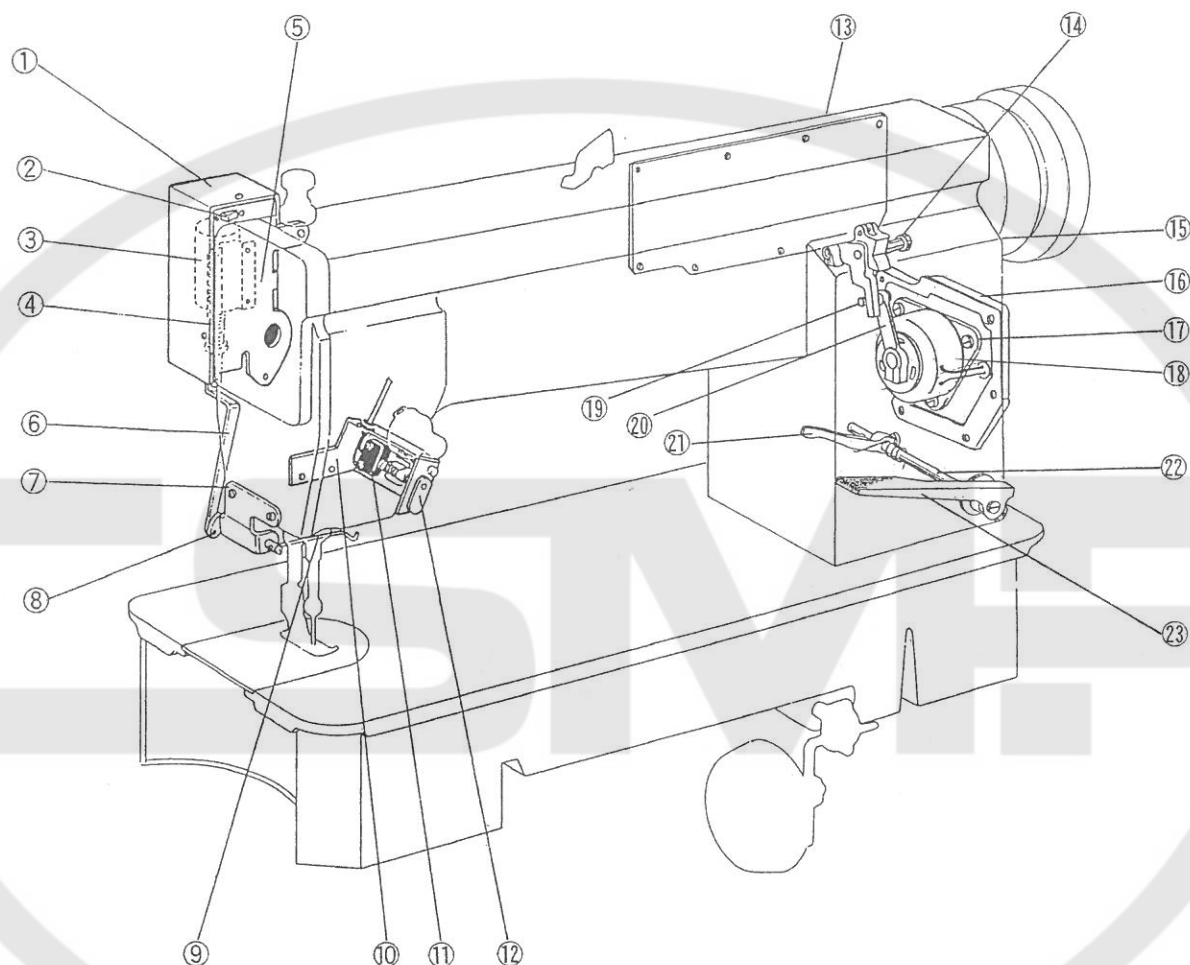


Part names

① Thread tension release	② Flexible wire	③ Needle bar connecting link guide
④ Pedestal	⑤ Movable knife (left)	⑥ Fixed blade
⑦ Knife driving crank	⑧ Cam follower crank (1)	⑨ Cam follower crank (2)
⑩ Stopper	⑪ Fixed blade bracket	⑫ Link
⑬ Knife base (left)	⑭ Knife driving shaft	⑮ Coil spring
⑯ Driving lever	⑰ Thread trimmer solenoid	

2.3 Machine Head Section (2)

Touch back mechanism

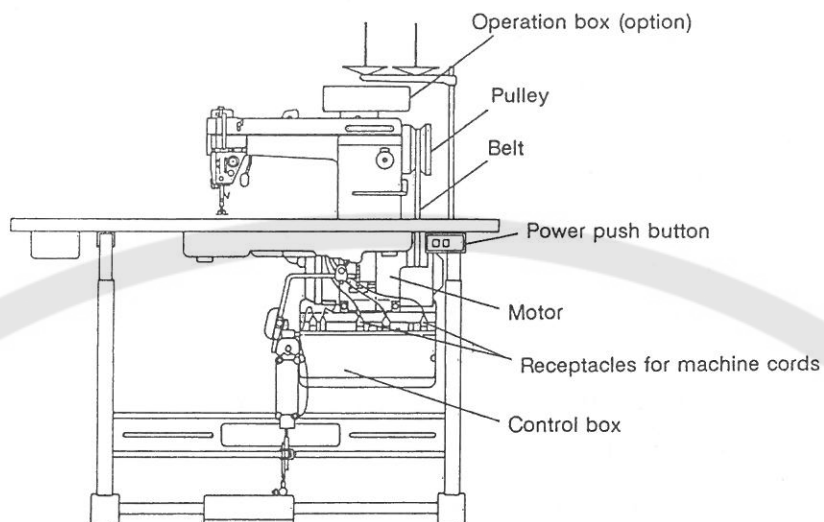


Part names

① Cover	② Switch	③ Wiper solenoid
④ Coil spring	⑤ Solenoid mounting bracket	⑥ Link
⑦ Wiper bracket	⑧ Pin	⑨ Wiper
⑩ Switch bracket	⑪ Micro switch	⑫ Pushbutton
⑬ Side cover	⑭ Set pin	⑮ Feed regulator
⑯ Arm side cover	⑰ Solenoid plate	⑱ Back solenoid
⑲ Pin	⑳ Drive crank	㉑ Reverse crank
㉒ Reverse lever shaft	㉓ Reverse lever	

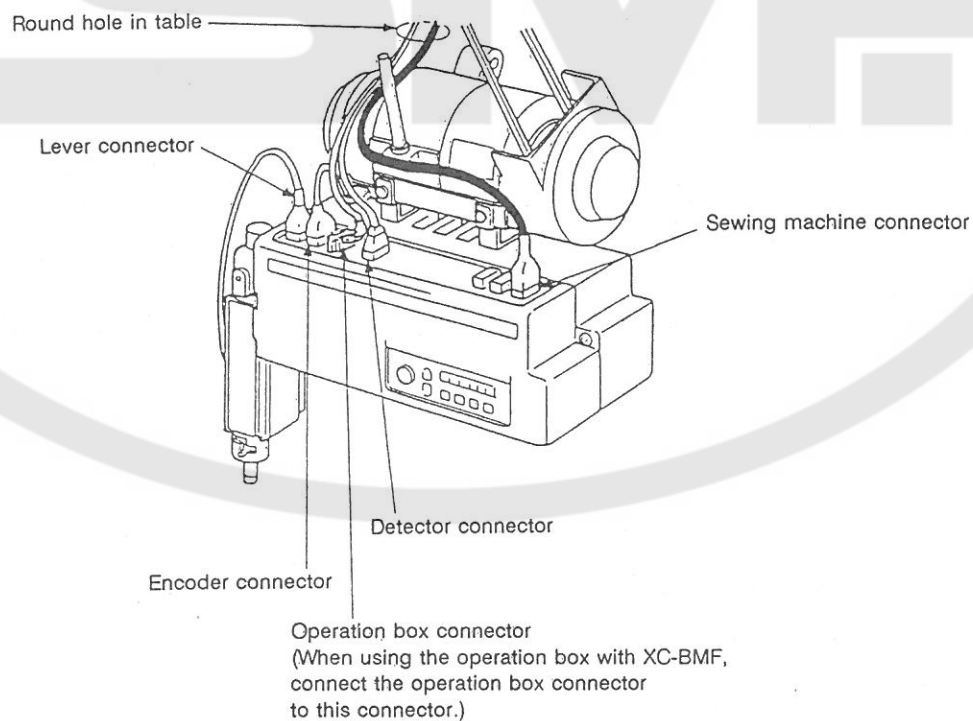
3. PREPARATIONS BEFORE OPERATION

3.1 Installation of Sewing Machine and Motor



Connection with sewing machine control box

Wire as shown below.



CAUTION

Before plugging or unplugging, always turn off the POWER ON/OFF push-button for safety purposes. Wait for the panel display [E0] (displayed for approx. 10 sec.) to go out before starting. Note that this [E0] display is not an error.

3.2 Adjustment of Machine Stop Position

3.2.1 Adjust of "UP" position

When the pedal is kicked down by heel, the machine stops at "UP" position. If the marks deviate larger than 3 mm adjust as follows.

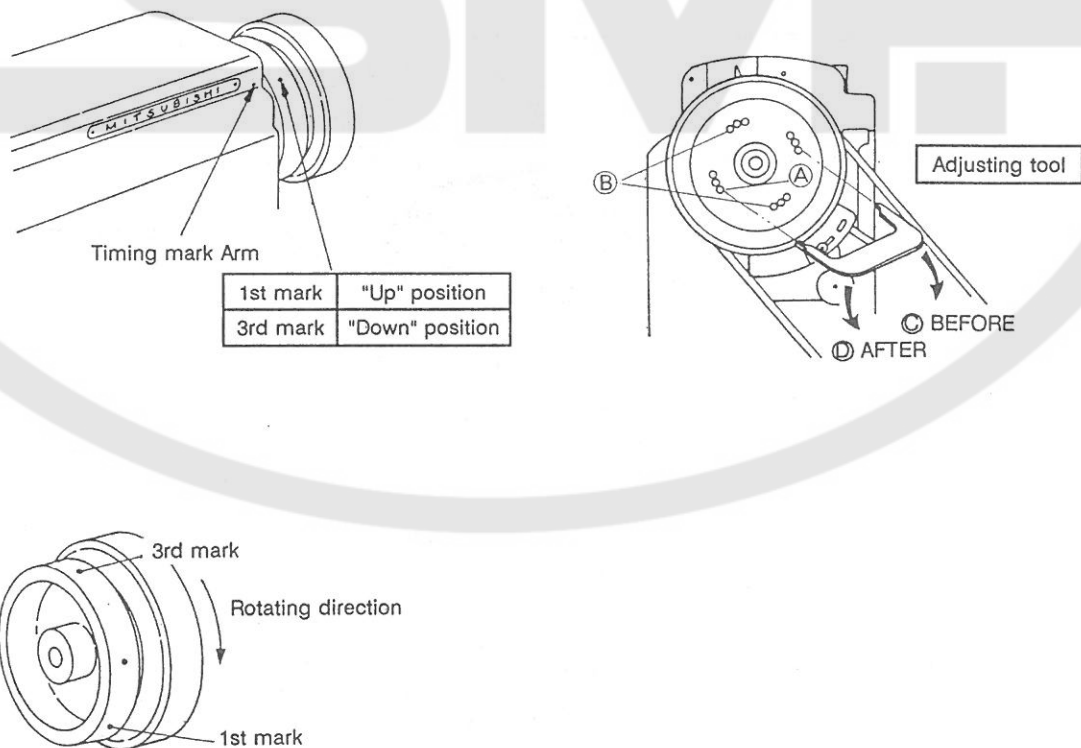
- (1) Disconnect the plug (12 pins) of cable from the machine head.
- (2) Run the machine and stop at "UP" position.
- (3) While holding the pulley insert the "adjusting tool" in the hole (A), then remove the tool.

3.2.2 Adjust of "DOWN" position

When the pedal is Neutral the machine stops at "DOWN" position. If the marks deviate larger than 3 mm adjust as follows.

- (1) Disconnect the plug (12 pins) of cable from the machine head.
- (2) Run the machine and stop at "DOWN" position.
- (3) While holding the pulley insert the "adjusting tool" in the hole (B), then remove the tool.

3.2.3 Confirm the stop operation then the plug (12 pins) coming from the machine head into the receptacle.



4. ADJUSTMENTS

4.1 How to Adjust the Timing between Needle and Hook

The standard timing between needle and hook is following the table.

		(mm)		
Item	Sub-class	-M	-H	-B
Needle lift-up quantity from lowest position	Ⓐ	2.0	2.4	2.4
Distance between upper side of needle hole and hook point	Ⓑ	1.9	1.5	1.4
Distance between needle and hook point	Ⓒ	0.05	0.05	0.05
Distance between needle point and needle plate setting base, in highest position of needle bar		18.6	20.6	20.6

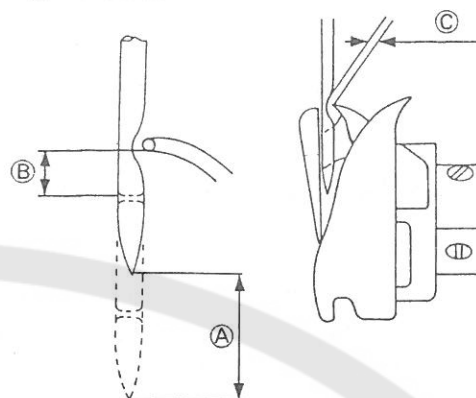


Fig. 1

4.2 Thread Trimmer Mechanism

4.2.1 Construction

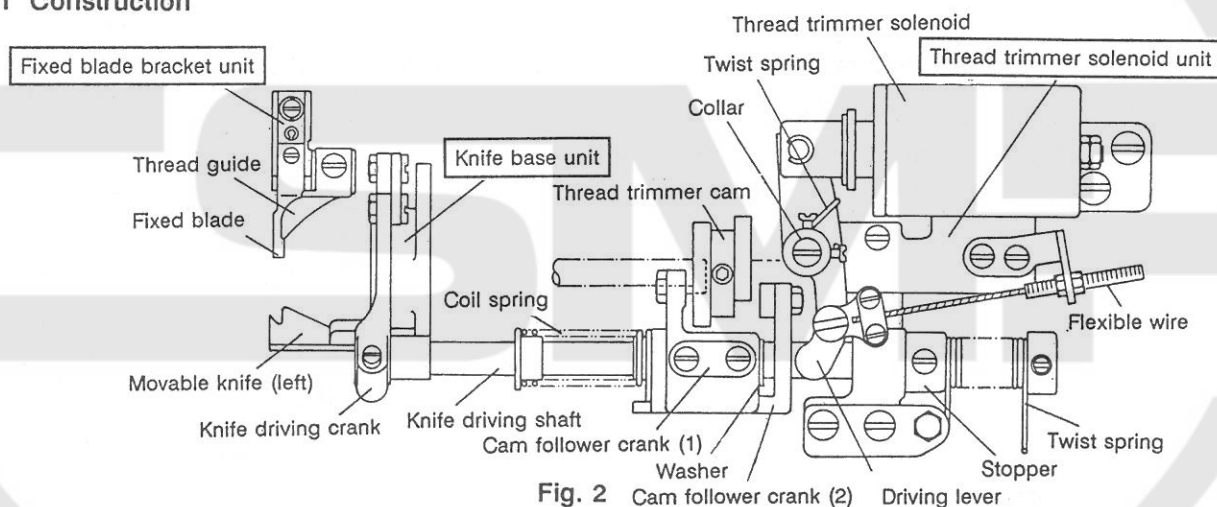


Fig. 2

4.2.2 Cautions on adjustment

A hook shaft cam system is utilized for the thread trimmer drive. Therefore, during the adjustment of sewing machine, if the sewing machine is rotated one turn with the thread trimmer solenoid in the operating state (the roller of cam follower crank (2) is engaged with the thread trimmer cam), the movable knife makes contact with the needle, resulting in damage. Be sure to bring the solenoid into the operating state only during a normal thread trimming cycle (Needle DOWN position to UP position).

4.2.3 Installation of knife base and fixed blade bracket unit

4.2.3.1 Knife base unit

- (1) As shown in Fig. 3, fit the knife base unit to the hook shaft bushing (left) and fix with the screws Ⓐ.

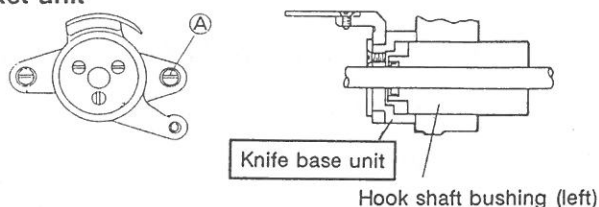


Fig. 3

4.2.3.2 Fixed blade bracket unit

- (1) As shown in Fig. 4, install the fixed blade bracket unit with the hook positioner dismounted, and then fix with the screws ①.

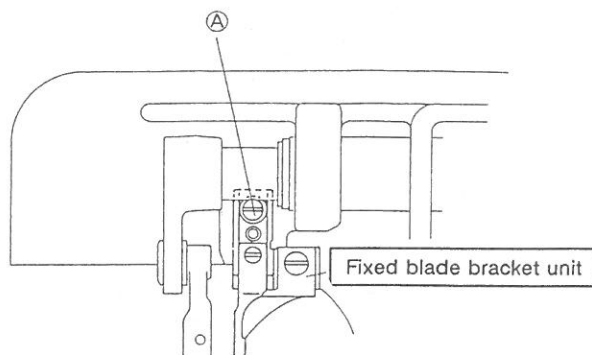


Fig. 4

4.2.3.3 Relation between fixed blade and movable knife (left) edge

- (1) Fig. 5 shows the standard state.
- (2) If the dimension indicated in Fig. 5 is too large, three-thread breakage will occur, leading to needle thread cast-off, etc. after the thread trimming. Reversely, if the dimension is too small, thread trimming error may result. Therefore, caution must be exercised.
- (3) Make the adjustment in (2) in the installation procedure of fixed blade bracket unit or in the installation procedure of fixed blade.

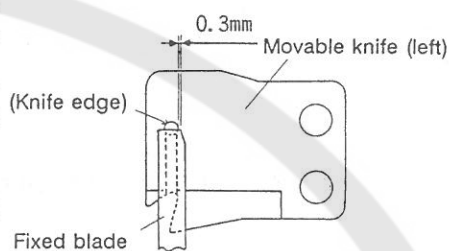


Fig. 5

4.2.4 Connection of knife base and knife driving crank

LS2-1280-M1T

LS2-1280-H1T

LS2-1280-B1T

- (1) Make connection as shown in Fig. 6. At this time, use care for the position of link depends on the sewing machine model.

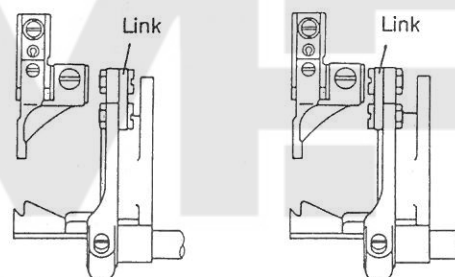


Fig. 6

4.2.5 Knife driving shaft and related parts

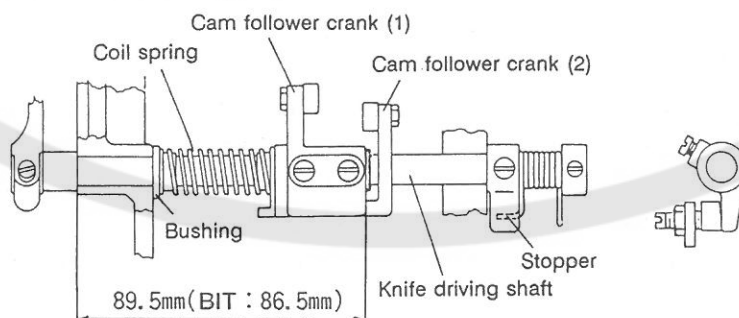


Fig. 7

- (1) Fig. 7 shows the standard setting position.
- (2) During assembling, be sure to pass the knife driving shaft through the knife driving crank first.
- (3) Fix the cam follower crank (1) to the recess of knife driving shaft at the position shown in Fig. 7.
- (4) Fix the stopper to the recess so that the knife driving shaft can rotate smoothly without play in the axial direction.

4.2.6 Installation of thread trimmer solenoid unit (Fig. 8)

(1) Operation stroke of thread trimmer solenoid

- ① Standard operation stroke is 6.0 mm.
- ② Adjust the operation stroke by use of the nut ①.

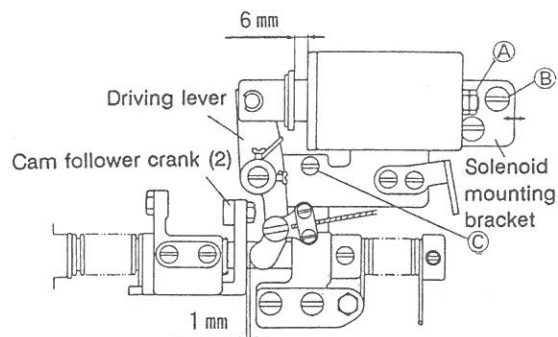


Fig. 8

(2) Installation of unit

- ① Install the unit with the screws ② and ③ shown in Fig. 8.
- ② Install the unit so that approximately 1 mm is provided between the driving lever and cam follower crank (2) with the stopper nut ① in contact with the solenoid.
- ③ When the solenoid is energized under this condition, clearance of 1.5 mm is provided between the cam follower cranks (1) and (2) as shown in Fig. 9. This is the standard installation status. Make adjustment by moving the solenoid mounting bracket in the arrow direction in Fig. 8.

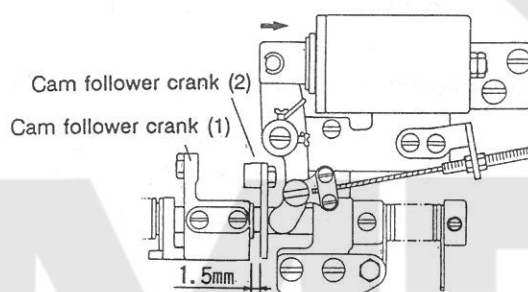


Fig. 9

4.2.7 Installation of thread trimmer cam (Fig. 10)

- (1) Align the second timing mark ① on the pulley with the matching mark on the arm.
- (2) Set the thread trimmer solenoid to the operation state and turn the thread trimmer cam forward. At the point where the cam makes contact with the roller, fix the cam.
- (3) When the operation of thread trimmer solenoid has been reset and the cam follower crank (2) has returned, the standard clearance between the cam and roller end is 0.5 to 1.0 mm.

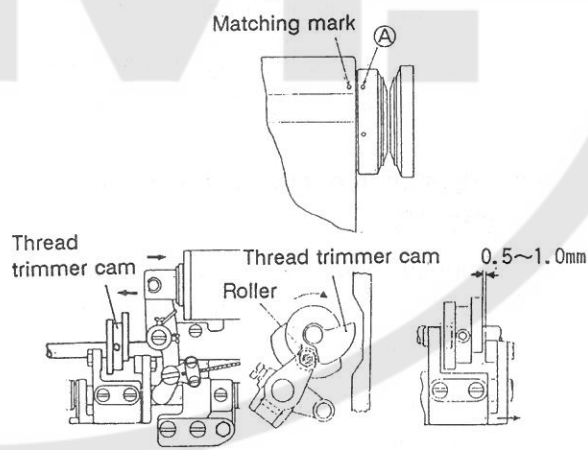


Fig. 10



CAUTION

The standard position of cam follower crank (2) prior to the operation is shown in Fig. 11. When this position has been changed, for example, by removing the stopper plate, make adjustment with the adjust screw (Fig. 7) and then make adjustment in (1) to (3).

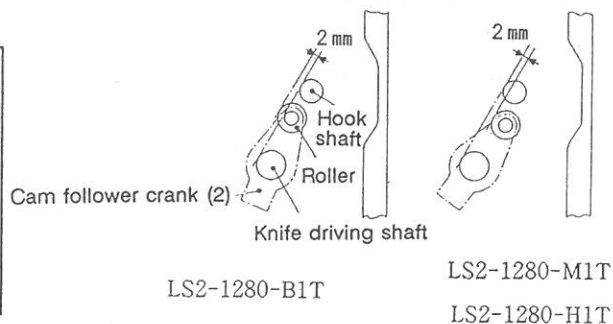


Fig. 11

4.2.8 Adjustment of knife engagement

- (1) Positions of movable knife (left) and fixed blade (Fig. 12)

① Fig. 12 shows the standard state.

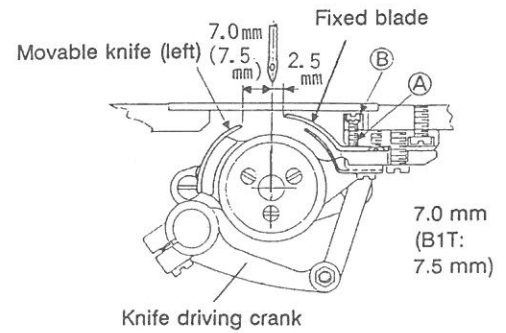


Fig. 12

- (2) Adjustment of knife engagement amount (Fig. 13)

① Set the solenoid to the operation state and rotate the sewing machine. Then, the movable knife (left) is rotated by the thread trimmer cam. When the movable knife (left) has moved to the maximum, the standard engagement amount is 1.5 to 2.0 mm. See Fig. 13.

② Make adjustment by the installation of knife driving crank.

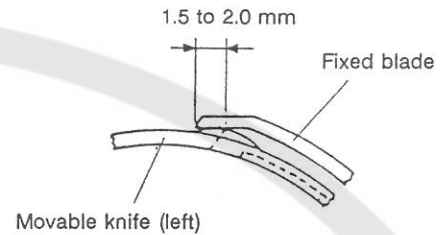


Fig. 13

- (3) Adjustment of knife engagement pressure

① The standard knife engaging pressure is obtained when the movable knife (left) and fixed blade start making contact with each other at the position shown in Fig. 14.

② When cutting action is poor especially because of thick thread, a slight increase of the engagement pressure produces an effect.

③ To adjust the engagement pressure, loosen the lock nut (B) in Fig. 12 and adjust with the adjust screw (A).

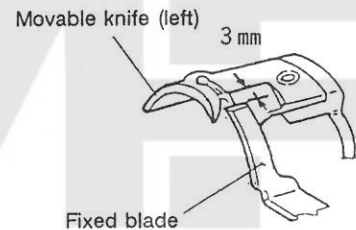


Fig. 14

4.2.9 Adjustment of needle thread tension releasing amount (Fig. 15)

- (1) Make adjustment so that when the thread trimmer solenoid is operated, the tension discs of thread tension regulator open approximately 1 mm.

- (2) To make adjustment, loosen the nuts (A) and move the flexible wire.

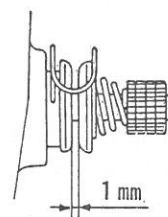
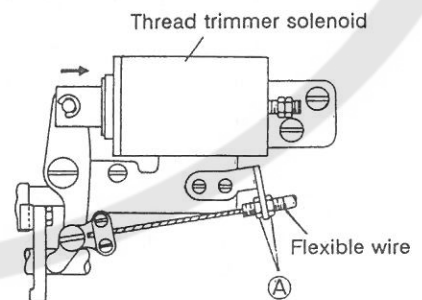


Fig. 15

CAUTION

If the opening of tension discs is too small, the needle thread will be trimmed at short length, leading to needle thread cast-off. Reversely, if the opening of tension discs is too large, the tension discs are left opened continuously, leading to loose stitches.

4.3 Adjustment of Needle Thread Remaining Length

- (1) Adjust the remaining length of needle thread by use of the pretension adjust nut (A). (Fig. 16)
Clockwise turn reduces the remaining length.
Counterclockwise turn increases the length.

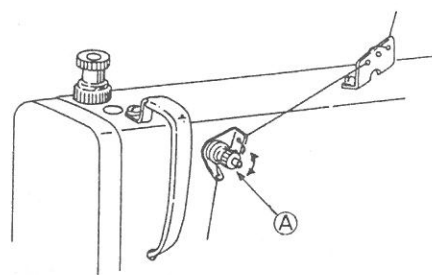


Fig. 16

4.4 Installation of Reverse Lever Crank (Fig. 17)

- (1) With the presser foot raised, set the feed to the maximum setting.
- (2) Insert spacer A (approx. 1.5mm) between the rubber bushing and reverse lever.
- (3) Turn the driver groove of the reverse lever shaft in the counterclockwise direction and fix it to be stationary where it starts to feel heavy.
- (4) Turn the reverse lever crank in the clockwise direction, and press the spacer A against the rubber bushing via the reverse lever.
- (5) Tighten set screw B in the state of (3) and (4).
- (6) Remove spacer A.

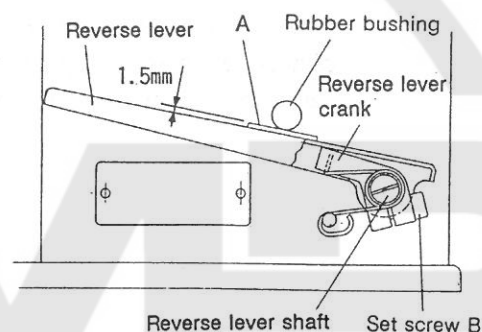


Fig. 17

4.5 Touch-Back Pushbutton (Fig. 18)

The function of pushbutton can be eliminated as required.

- (1) Normally, this pushbutton is used at the position shown in Fig. 18. When the sewing machine is operated after the pushbutton is pressed, reverse stitching is performed.
- (2) When the pushbutton is moved to the position indicated by the broken line in Fig. 18, the switch does not function even if it is pressed.

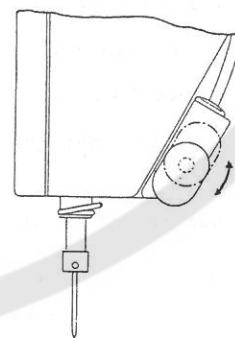


Fig. 18

4.6 Installation of Drive Crank for Touch-Back (Fig. 19)

- (1) Remove the side cover and rubber plug B.
- (2) With the presser foot raised, set the feed to the maximum setting.
- (3) Adjust the drive crank angle so that the clearance A between the feed adjusting cam and pin is approx. 1.5 mm, and then tighten the set screw.
- (4) Install the side cover and rubber plug B.

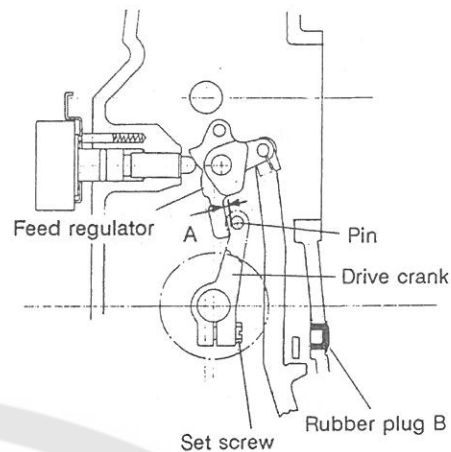


Fig. 19

Adjustment of drive crank angle (Fig. 20)

When rotating the drive crank in the counterclockwise direction to adjust is as shown in Fig. 19, the adjustment can be done easily by removing the rubber plug C and fixing the solenoid's right-direction axis.

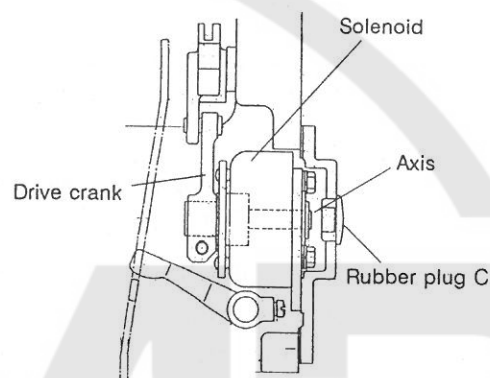


Fig. 20

4.7 Wiper (Fig. 21)

4.7.1 Height of wiper

- (1) The standard height of wiper is 2 mm below the tip of needle which is stopped at the UP position.
- (2) Make adjustment after loosening the screw (A).

4.7.2 Wiper operation position

- (1) The standard operation position of wiper is 0 to 2 mm from the center of needle when the plunger of wiper solenoid is fully pushed (when the solenoid is energized).
- (2) To make adjustment, loosen the screws (B) and (C) and then adjust the mounting position of solenoid unit.

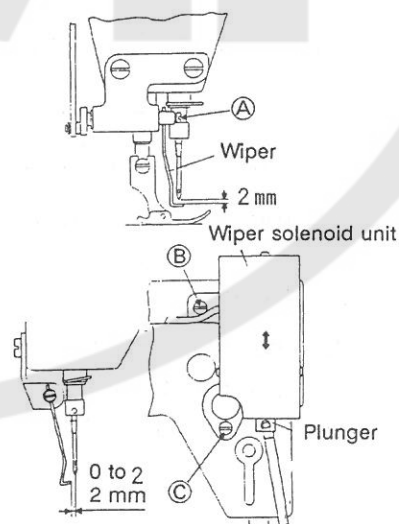


Fig. 21

4.8 Adjustment of Forward and Reverse Stitch Lengths (Fig. 22)

- (1) Loosen the screw (A) and make adjustment by turning the eccentric shaft (B). Clockwise turn reduces the forward stitch length and increases the reverse stitch length. Counterclockwise turn increases the forward stitch length and decreases the reverse stitch length.

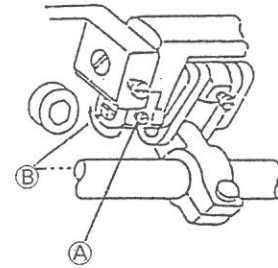


Fig. 22

4.9 Adjustment of Feed Dog Inclination (Fig. 23)

- (1) To adjust the inclination of feed dog, loosen the screw (A) and turn the eccentric pin (B). Clockwise turn sets to downward tilt. Counterclockwise turn sets to upward tilt.

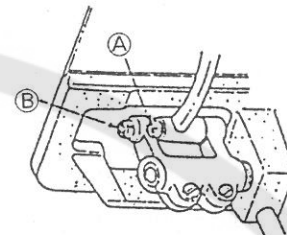


Fig. 23

4.10 Timing of Feed

- (1) The position for the standard feed timing is where the needle tip is located approximately 3 mm below the top surface of needle plate when the feed dog is sunk by turning the pulley and the teeth of feed dog align with the upper surface of needle plate. See Fig. 24.
- (2) Make adjustment by the mounting positions of feed cam. To install, timing mark on a feed cam is according with oiling hole on a upper shaft, by set screw as shown in Fig. 25.

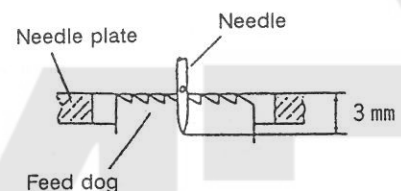


Fig. 24

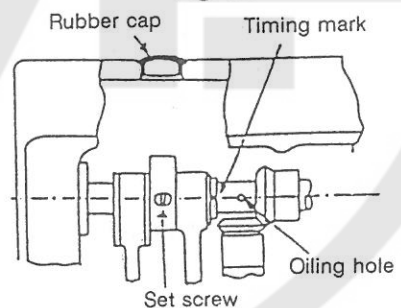


Fig. 25

4.11 Hook, Bobbin Case, and Bobbin

- (1) Use the undertrimmer hook which has the bobbin thread guide slit (A) as shown in Fig. 26.
- (2) Use the bobbin case which has idle running prevention spring (A) at the bottom as shown in Fig. 27.
- (3) For the bobbin, use the attached bobbin.

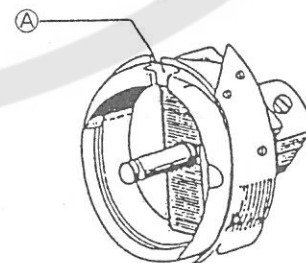


Fig. 26

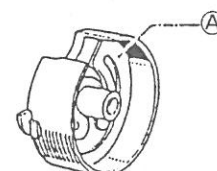
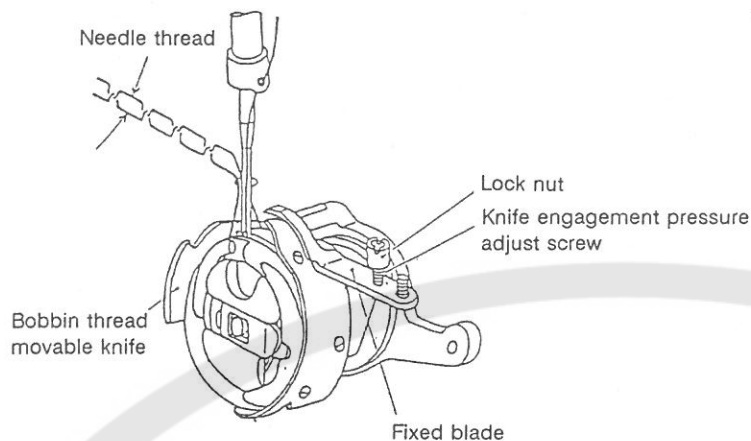


Fig. 27

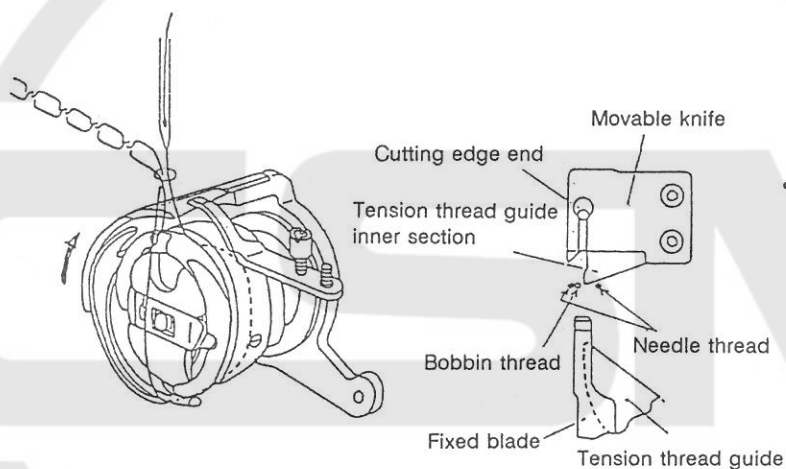
5. THREAD TRIMMER MECHANISM AND PRINCIPLE OF THREAD TRIMMING

1. Stop at needle DOWN position



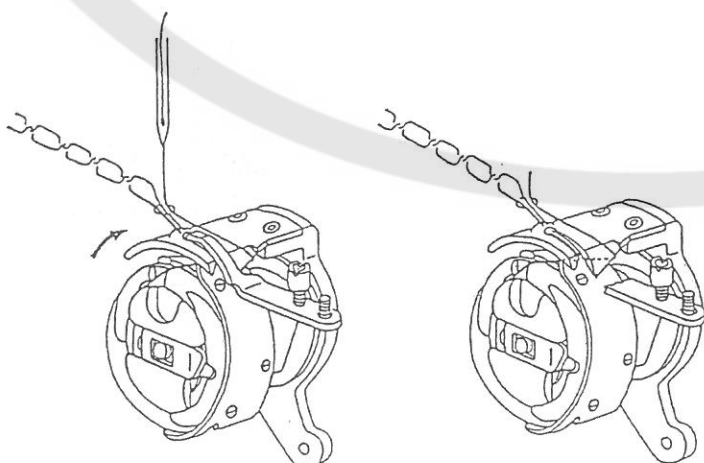
- If the pedal is set to the neutral position during stitching, the needle will rise slightly from the lowest position, and the sewing machine will stop after the needle thread loop has been caught by the end of the hook.

2. Spreading of thread with movable knife



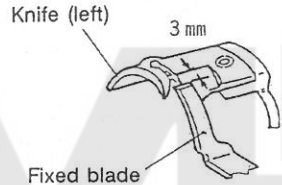
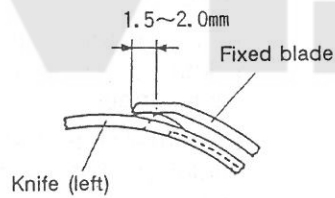
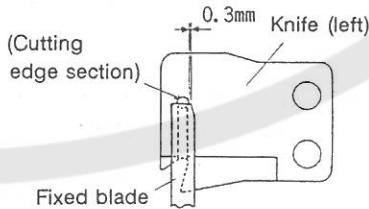
- If the pedal is heeled in the state given in one above (with needle at DOWN position), the sewing machine will start rotating simultaneously with the starting of the thread trimmer solenoid.
- The needle thread picked up by the end of the hook is spread to the left or right as shown in the drawing when the hook rotates further. At this time, the movable knife rotates and separates the needle thread and bobbin thread on the cloth side to the left and the needle thread on the needle side to the right at the tension thread guide section.

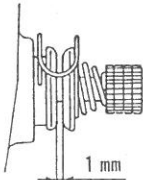
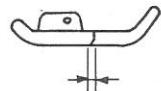
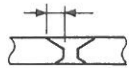
3. Thread trimming



- When the sewing machine rotates some more, the bobbin thread having a length required for the next stitch and the needle thread on the needle side are pulled out at the tension thread guide inner section of the movable knife. The movable knife rotates further, engages with the fixed blade and trims the thread.
- After this, the thread trimmer solenoid is released, the movable knife returns to the original position and the sewing machine stops at the needle UP position.

6. TROUBLESHOOTING

Trouble	Cause	Corrective action	Reference section
The thread cannot be trimmed.	When trimming the thread, the needle stops at the UP position too early.	Adjust the stop position. • Align the crank match mark and the pulley's No. 1 timing mark.	3.-2.1
	The thread trimmer solenoid operates but the knife does not move. • The relation of the cam follower crank and thread trimmer cam is incorrect.	Adjust the cam follower crank and thread trimmer cam installation position.	4.-2.5 4.-2.7
	The sewing machine skips a stitch.	Adjust the needle and hook timing.	4.-1
	The knife sharpness is poor. • There is a scratch on the cutting edge. • The cutting edge is worn.	Replace the knife.	
	The knife engagement is poor. • The engagement pressure is too low.	Adjust the engagement pressure	4.-2.8
	• The engagement amount is insufficient.	Adjust the engagement amount.	4.-2.8
			
			
	• The fixed blade position is poor.	Adjust the position of the fixed blade.	4.-2.3.3
			
	The knife (left) operates too early so the thread loop cannot be spread by the knife.	Adjust the installation position of the thread trimmer cam.	4.-2.7 4.-2.8

Trouble	Cause	Corrective action	Reference section
The needle thread comes out of the needle at the start of stitching.	<The needle thread (needle side) remaining length is too short.> When the thread is trimmed, the thread tension regulator discs do not open.	Adjust the needle thread tension releasing for thread trimming.	4.-2.9
	The thread trimming timing is too early.	 Adjust the installation position of the thread trimmer cam.	4.-2.7
	The thread is trimmed by the fixed blade before the cutting edge of the movable knife (left) engages with the fixed blade.	Adjust the position of the fixed blade. * Refer to the section, "The thread cannot be trimmed" on the previous page.	4.-2.3.3
	The pretension is too strong.	Adjust the pretension.	4.-3.1
	The sliding of the thread in the thread path related parts is poor.	Inspect the thread path related parts and correctly any abnormalities.	
	The take-up spring action is too large.	Adjust to the standard setting.	
	The hook position is abnormally large.	Adjust the needle and hook timing.	4.-1
	There is a scratch in the knife (left) thread sliding section.	Correct the thread sliding section.	
	The sewing machine speed is too fast when trimming the thread.	Adjust the speed.	1.
	<The needle, needle plate or cloth holding device being used is incorrect.> The rear side relief of the cloth holding device being used is too large.	Use a device with a smaller rear side relief.	
	 The needle hole on the needle plate is too large.	Select a needle plate with an appropriate needle hole. • Standard	
	The chamfer of the needle hole on the needle plate is too large.	Use a needle plate with less chamfering.	
			

Needle	Needle plate needle hole
#14	ø1.8
#22	ø2.6

Trouble	Cause	Corrective action	Reference section
The stitch skips at the start of stitching.	<p><The bobbin thread (bobbin case side) remaining thread length is too short after thread trimming.></p> <p>The bobbin thread is short due to idle running of the bobbin during thread trimming.</p> <p>The bobbin thread tension is too high.</p> <p>The bobbin is improper.</p> <ul style="list-style-type: none"> • The deviation of the side is large. • The side is scratched. <p>The bobbin case is improper.</p> <ul style="list-style-type: none"> • The bobbin idle running prevention spring is too strong. • There is dirt stuck in the bobbin case. <p>The sewing machine speed is too fast when trimming the thread.</p> <p><The needle thread (needle side) remaining length is short.></p> <p>* Refer to the section "The needle thread comes out of the needle at the start of stitching".</p> <p><Others></p> <p>The cloth is too thin.</p> <p>The stitching length is short.</p> <p>Idle stitching starts at the start of stitching.</p> <p>The rear side relief of the cloth holding device is large.</p> <p>The chamfer of the needle hole on the needle plate is large.</p> <p>The presser foot pressure is weak.</p> <p>Adjust the presser foot pressure.</p>	<p>Use a bobbin case with an idle running prevention spring.</p> <p>Adjust the bobbin thread tension.</p> <p>Use a thread trimmer bobbin with smaller deviation.</p> <p>Replace the bobbin with one that is not scratched.</p> <p>Repair or replace.</p> <p>Periodically inspect and clean.</p> <p>Adjust the speed.</p> <p>Turn ON the slow start switch on the control box.</p> <p>Adjust the presser foot pressure.</p>	<p>4.-11.2</p> <p>4.-11.3</p> <p>1.</p> <p>4.-7</p>
<p><Wiper></p> <p>The thread is not wiped.</p>	<p>The wiper operation position is incorrect.</p> <p>The installation of the wiper is incorrect.</p>	<p>Adjust the operation position.</p> <p>Correct the installation position.</p>	4.-7



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