

# **mitsubishi**

## **Industrial Sewing Machine**

**TECHNICAL INFORMATION**

**Single-Needle Lockstitch, Upper-& Lower-feed,  
Automatic Undertrimmer**

**Model DY-359**

**ET-024A**



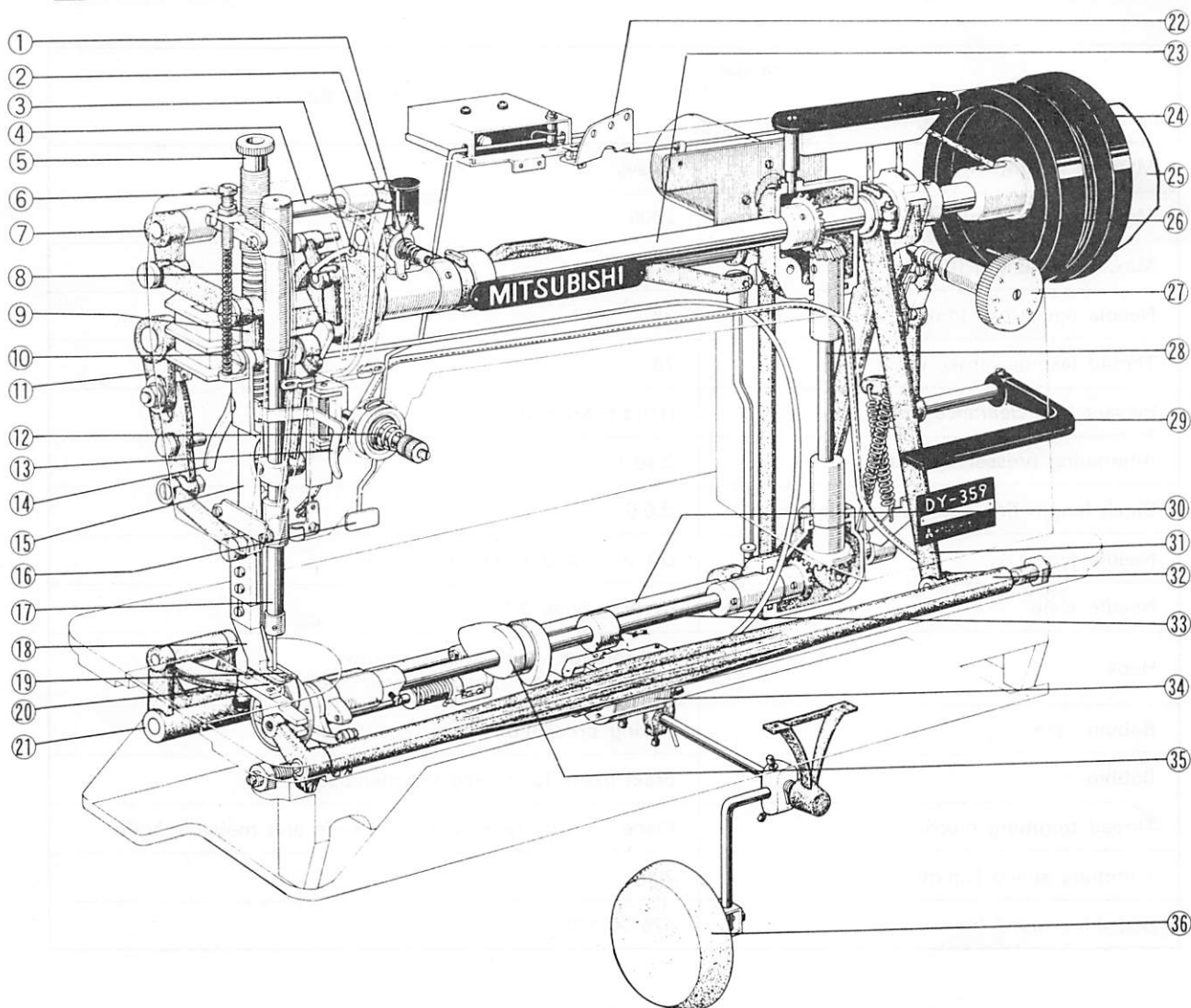
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This Technical Information mainly describes the thread trimming mechanism. For the motor and the control equipment, refer to the respective Manual or Information. The adjusting procedure for Single-needle Lockstitch Sewing Machine DY-350 may be correspondingly applied to other adjustments not covered in this Technical Information.

# 1 CONSTRUCTION



## Parts Name

① Pre-tension	② Feed lifting rock shaft crank, right	③ Take-up lever
④ Feed lifting rock shaft	⑤ Presser bar regulating thumb screw	⑥ Feed regulating screw
⑦ Upper feed lifting rock shaft crank	⑧ Presser bar spring	⑨ Bell crank
⑩ Presser bar spring	⑪ Feed driving rock shaft crank, left	⑫ Tension regulator
⑬ Thread guide	⑭ Presser bar lifter	⑮ Walking foot guide link
⑯ Pushbutton	⑰ Needle bar	⑱ Walking foot
⑲ Presser foot	⑳ Feed dog	㉑ Feed rock shaft crank
㉒ Thread guide	㉓ Arm shaft	㉔ Balance wheel
㉕ Detector	㉖ Feed forked connecting rod	㉗ Feed regulating dial
㉘ Vertical shaft	㉙ Reverse sewing lever	㉚ Feed rock shaft
㉛ Crank rod	㉜ Feed lifting shaft	㉝ Hook shaft
㉞ Thread trimmer solenoid	㉟ Thread trimmer	㊱ Knee lifter

**2 SPECIFICATIONS**

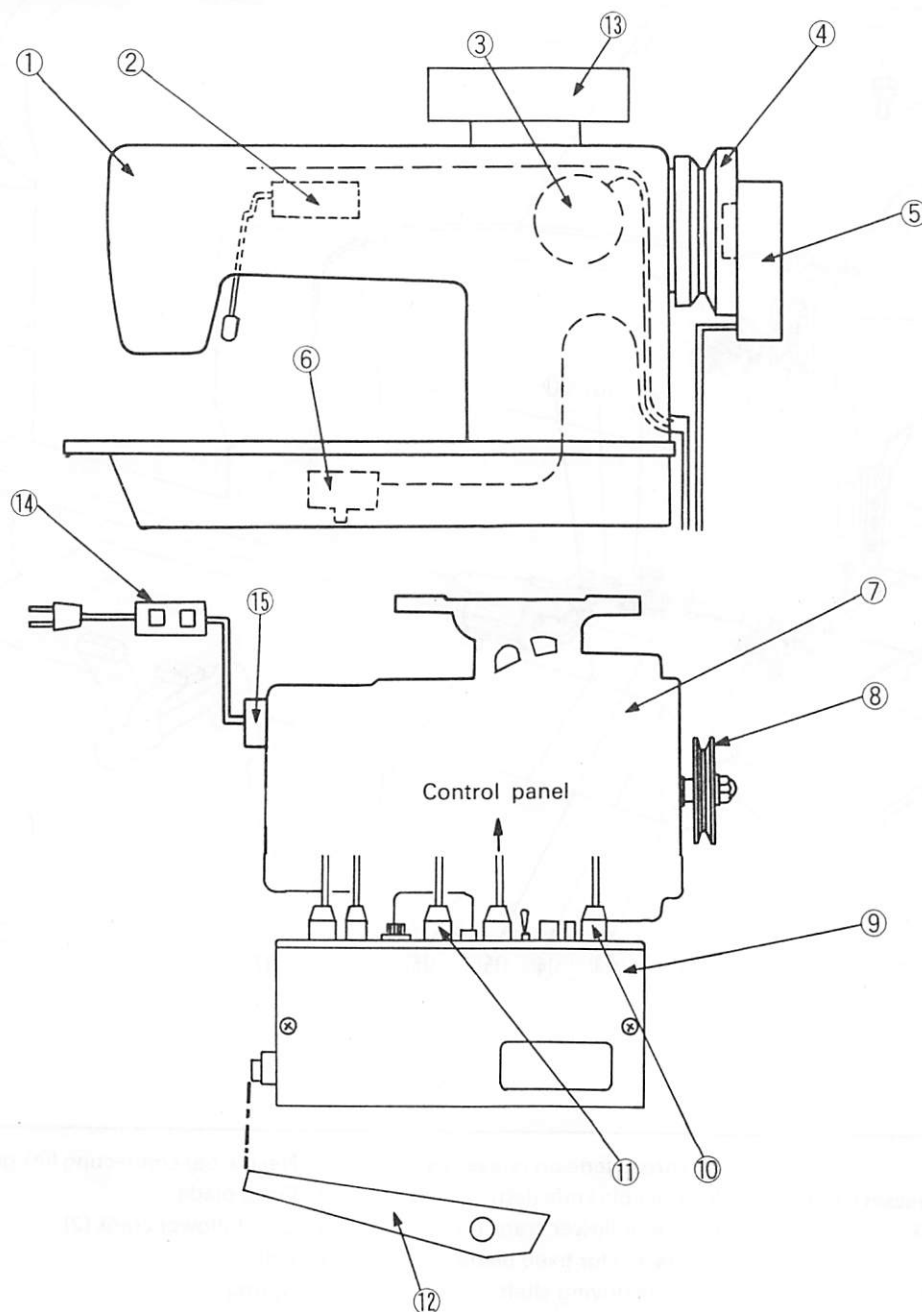
<div>Model</div> <div>Item</div>	DY-359-22-BZ
Material weight	Heavy
Max. speed (s.p.m)	2000
Max. stitch length (mm)	0 to 8
Needle bar stroke (mm)	38
Thread take-up stroke (mm)	73
Presser foot clearance (mm)	Hand:6 Knee:15
Alternating presser lift (mm)	2 to 5
Stitch length fine adjustable range (mm)	±0.5
Needle type	DB × 1 #22 or DP × 17 #22
Needle plate	(Needle hole) 2.5 φ
Hook	Full-rotation automatic lubrication (Large type for thread trimmer use)
Bobbin case	Racing prevention spring equipped
Bobbin	Steel made for thread trimmer use
Thread trimming mechanism	Plane scissors type with fixed knife and movable knife
Trimming speed (s.p.m)	200
Bed dimensions (mm)	475 × 178

**Motor and Control Equipment**

Motor	CB-Z402E	CA-Z402E
Control box	LF-M-120	
Control panel	LF-C2, C4, C6, C8	

### 3 DETAIL SCHEMA OF THREAD TRIMMER SYSTEM

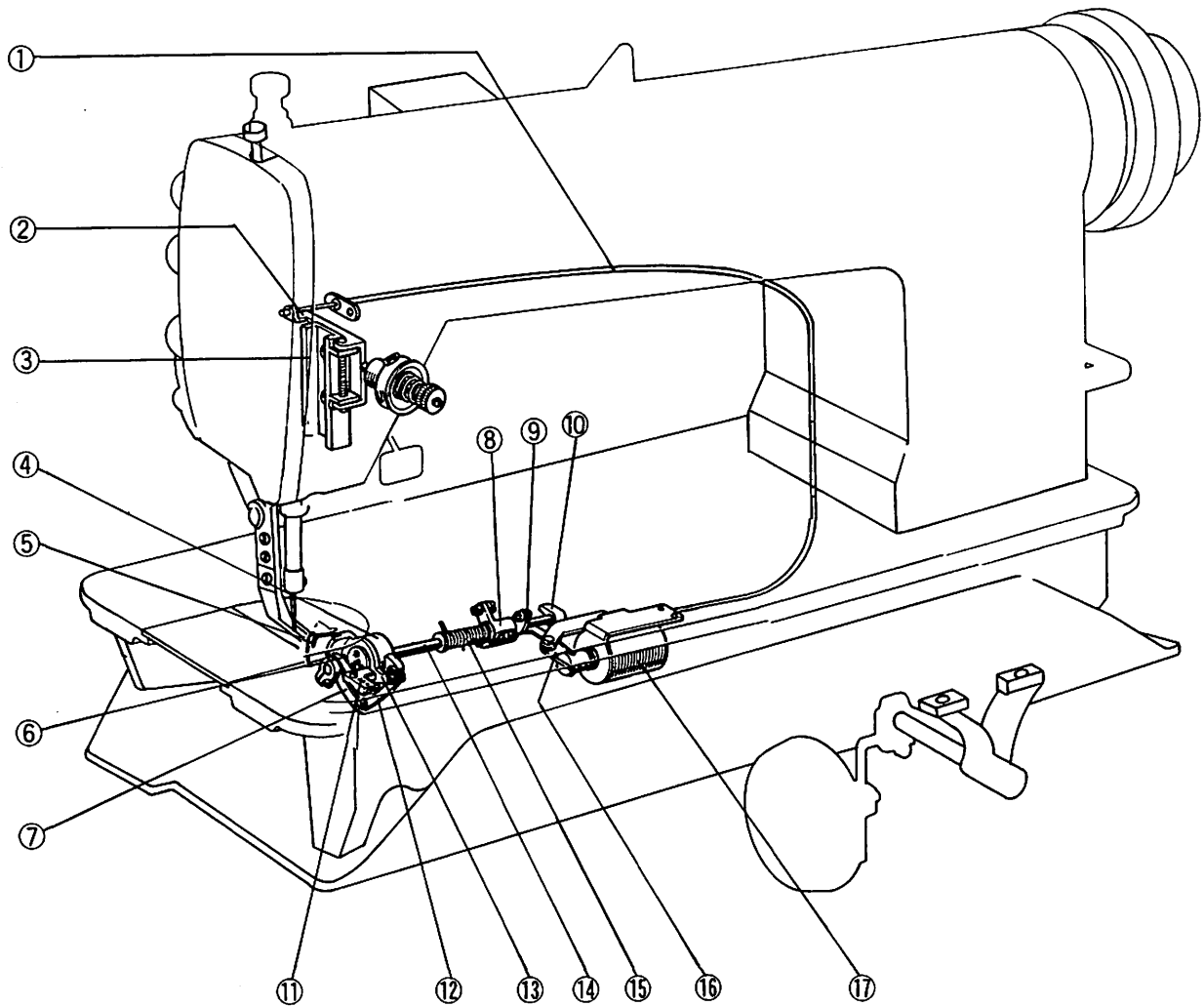
#### 3.1 Electric Section DY-359-BZ



#### Parts Name

- |                     |                           |                           |
|---------------------|---------------------------|---------------------------|
| ① Sewing machine    | ② Touch switch            | ③ Back solenoid           |
| ④ Balance wheel     | ⑤ Detector                | ⑥ Thread trimmer solenoid |
| ⑦ Motor             | ⑧ Drive pulley            | ⑨ Control box             |
| ⑩ Machine cord plug | ⑪ Detector cord plug      | ⑫ Pedal                   |
| ⑬ Control panel     | ⑭ Power ON/OFF pushbutton | ⑮ Phase reversing plug    |

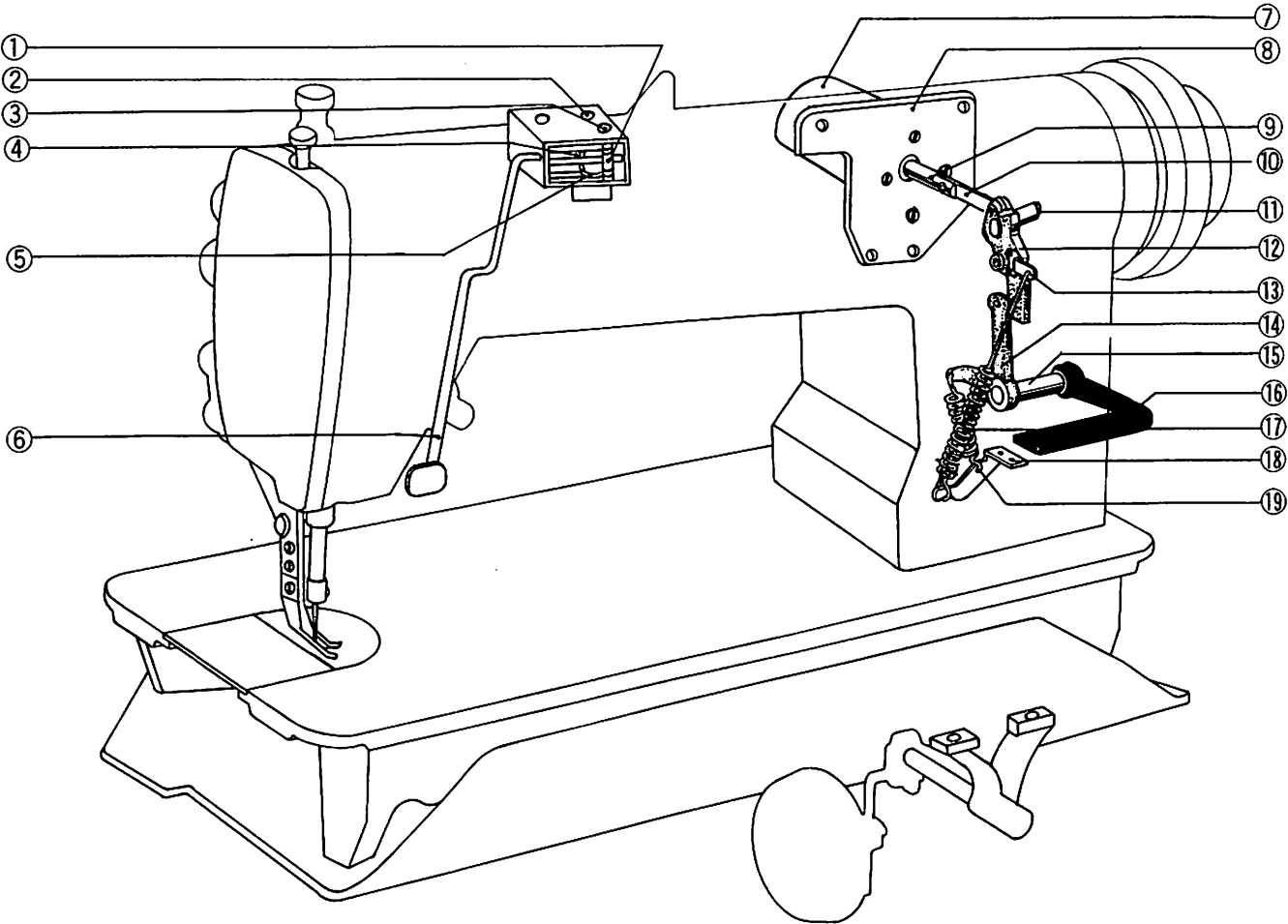
### 3.2 Machine Head Section (1)



#### Parts Name

- |                                |                               |                                    |
|--------------------------------|-------------------------------|------------------------------------|
| ① Flexible wire                | ② Thread tension release assy | ③ Needle bar connecting link guide |
| ④ Knife holding bracket saddle | ⑤ Movable knife (left)        | ⑥ Fixed blade                      |
| ⑦ Knife drive crank            | ⑧ Cam follower crank (1)      | ⑨ Cam follower crank (2)           |
| ⑩ Stopper                      | ⑪ Bracket for fixed blade     | ⑫ Link                             |
| ⑬ Knife base (left)            | ⑭ Knife driving shaft         | ⑮ Spring                           |
| ⑯ Flexible driving lever       | ⑰ Solenoid assy               |                                    |

Machine Head Section (2)



Parts Name

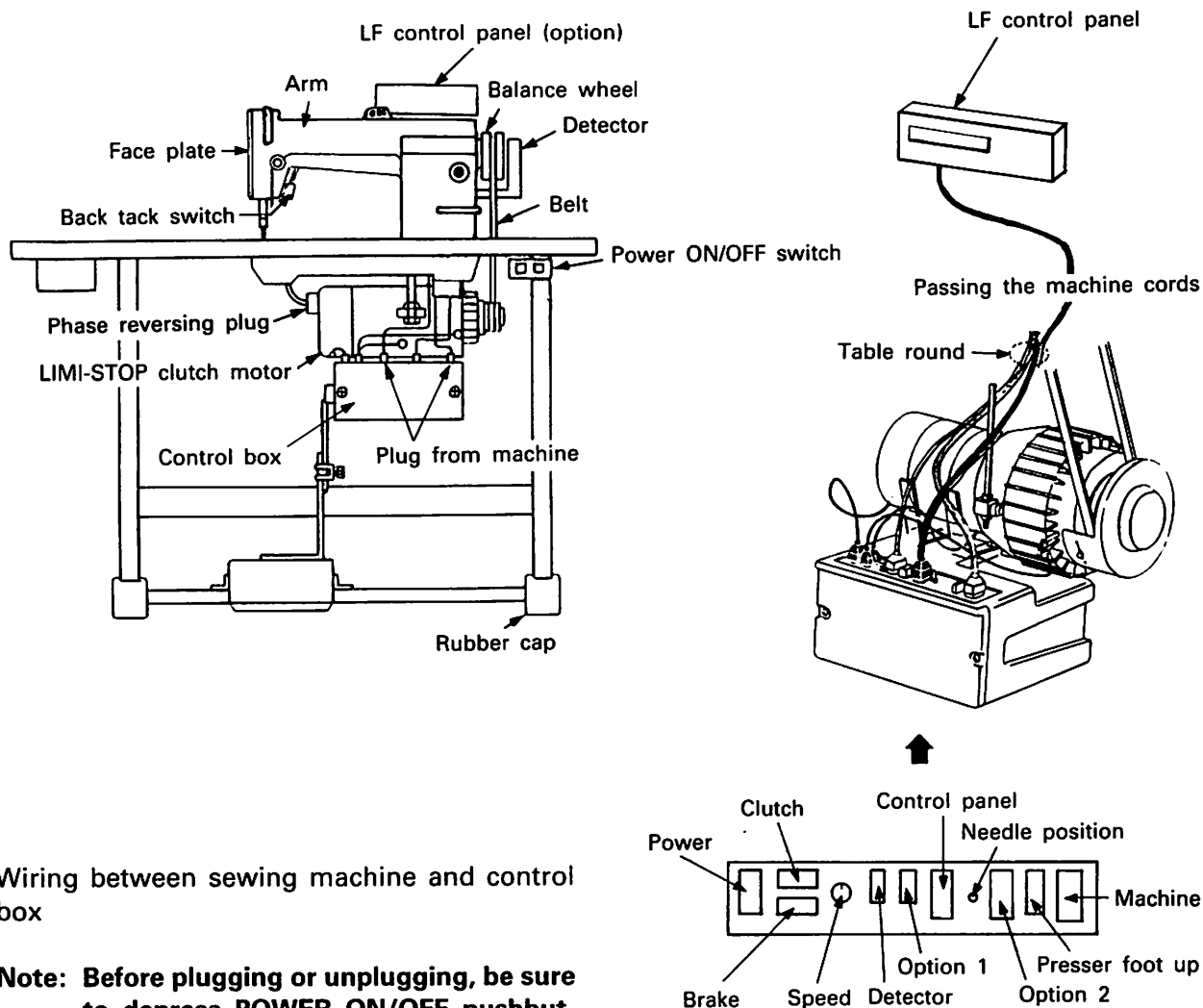
① Stepped shaft	② Cover	③ Screw
④ Switch	⑤ Spring	⑥ Switch lever
⑦ Solenoid	⑧ Arm side cover	⑨ Shaft
⑩ Link	⑪ Set pin	⑫ Feed regulator
⑬ Bracket	⑭ Reverse sewing clank assy	⑮ Shaft
⑯ Reverse sewing lever	⑰ Spring	⑱ Bracket
⑲ Spring		



## 4 PREPARATION BEFORE OPERATION

### 4.1 Installation of Sewing Machine and Motor

DY-359-BZ





## 4.2 Adjustment of Machine Stop Position

When the pedal is kicked down by heel and thread trimming is completed, the machine stops with the timing mark ⑥ matching with the white timing mark ③. The needle bar stop position of all sewing machines are factory-adjusted. However, if the timing marks are out of alignment more than 3mm, adjust the setting position of light shielding disc in the following procedure:

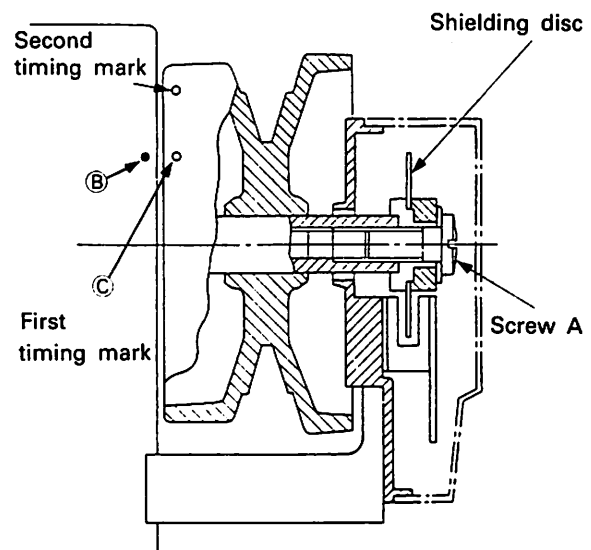
### [Preparation]

- 1) Disconnect the plug (12 pins) of cable, which comes out of the machine head, from the control box.
- 2) Remove the detector cover.
- 3) Run the machine and stop with the needle at UP position. After the completion of preparation, start the following adjustment.

### [Adjustment]

- 1) While holding the light shielding disc by hand, turn the balance wheel until the timing marks ⑥ and ③ are aligned.
- 2) Repeat pedal operation (toe down and heel down) several times to make sure the needle always stops exactly at the specified position.
- 3) Then, set the plug (12 pins), which comes from the machine head, into the receptacle.

DY-359-BZ



## 5 ADJUSTMENT

### 5.1 General

Since the sewing machine DY-359-BZ is a version of the standard single-needle lockstitch machine and equipped with thread trimmer, the construction does not differ from the standard one except for the thread trimmer system and therefore description in this Manual is mainly concerned with the thread trimmer.

### 5.2 Thread Trimmer Mechanism

#### 5.2.1 Construction

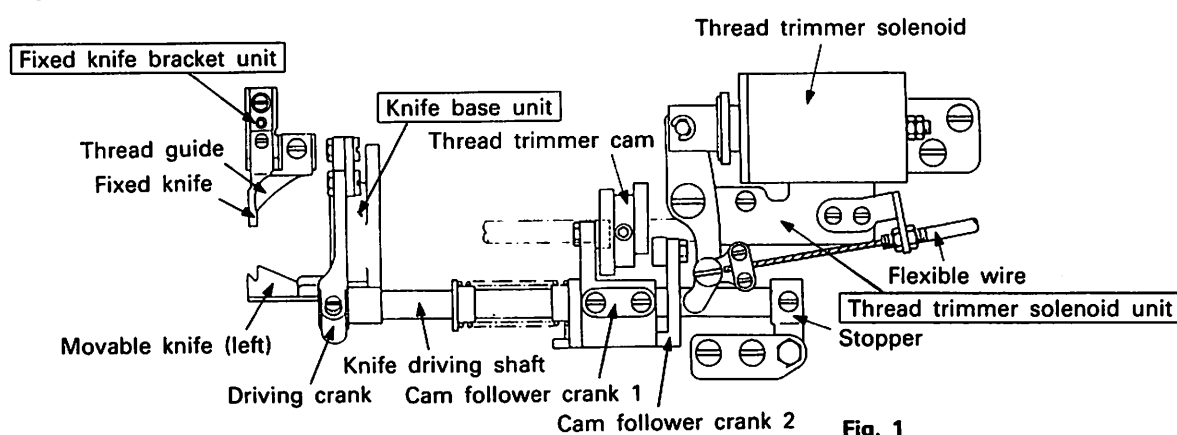


Fig. 1

#### 5.2.2 Instruction

The thread trimmer drive uses a hook shaft cam system. Therefore, the movable knife will be damaged by making contact with the needle if the sewing machine is rotated one turn during adjustment with the thread trimmer solenoid set to its operation state (the roller of the cam follower crank 2 engaged with the thread trimmer cam).

The solenoid must only be set to the operation state during normal thread trimming cycle (down position to up position).

#### 5.2.3 Installing the knife base and fixed knife bracket units

##### 5.2.3.1 Knife base unit

Fit the knife base unit to the hook shaft bushing (left) and tighten the screws (A) as shown in Fig. 2.

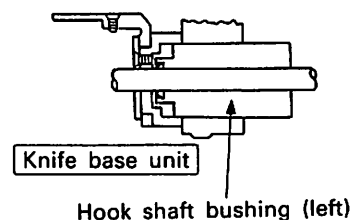
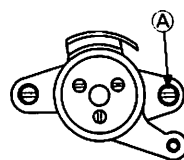


Fig. 2

##### 5.2.3.2 Fixed knife bracket unit

After removing the bobbin case holder, install the unit and tighten the screw (A) as shown in Fig. 3.

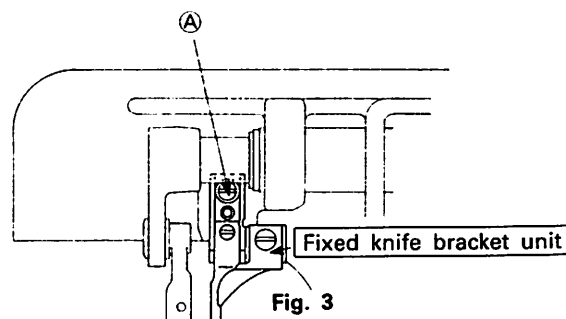
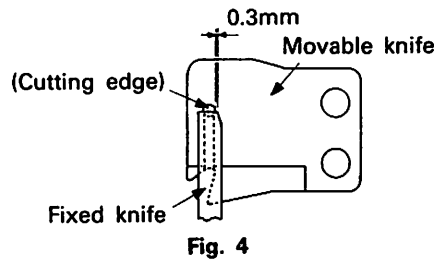


Fig. 3

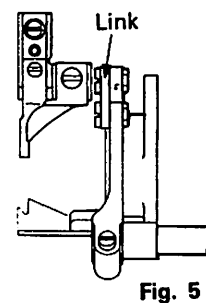
### 5.2.3.3 Relation between fixed knife and movable knife cutting edge

- (1) Fig. 4 shows the standard state.
- (2) If the dimension is greater than the specified (0.3mm) in Fig. 4, the thread may be broken into three pieces and pulled out of the needle after trimming. If the dimension is smaller, trimming fault may occur.
- (3) To make this adjustment, either the fixed knife bracket unit or the fixed knife position may be adjusted.

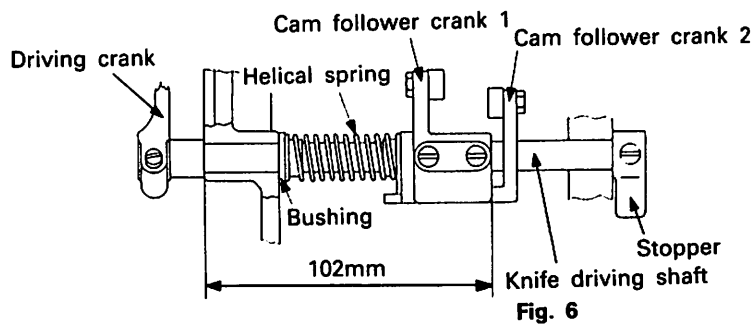


### 5.2.4 Connecting the knife base and driving crank

Connect the knife base and driving crank as shown in Fig. 5. At this time, the link must be located as shown.



### 5.2.5 Knife driving shaft



- (1) Fig. 6 shows the standard setting position.
- (2) First pass the knife driving shaft into the driving crank.
- (3) Fix the cam follower crank 1 to the fitting surface of the knife driving shaft at the location shown.
- (4) Fix the stopper to the fitting surface so that the knife driving shaft may be rotated smoothly in the axial direction without play.

## 5.2.6 Installing the thread trimmer solenoid unit

### (1) Operation stroke of thread trimmer solenoid

- 1) The standard operation stroke is 3.7mm.
- 2) Adjust the stroke using the nut ①.

### (2) Installing the unit

- 1) Install the unit using the screws ② and ③ shown in Fig. 7.
- 2) After installation, there should be about 1mm clearance between the driving lever and cam follower crank 2 with the stopper nut ① making contact with the solenoid.
- 3) When the solenoid is activated in this state, a clearance of 0.5mm is provided between the cam follower cranks 1 and 2 as shown in Fig. 8. This is the standard setting. To adjust, move the solenoid mounting plate in the direction of arrow in Fig. 7.

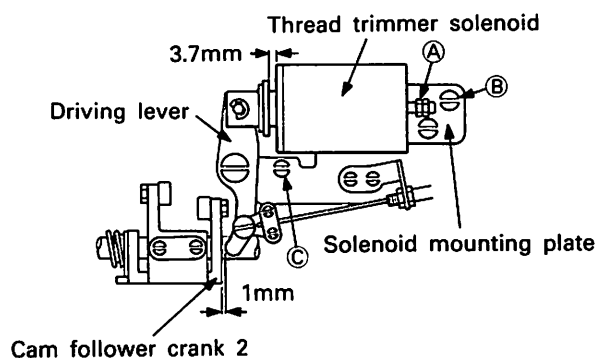


Fig. 7

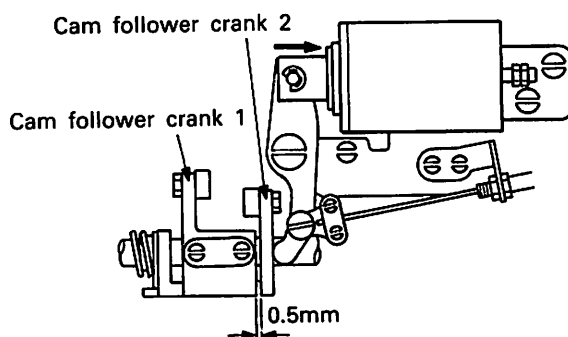


Fig. 8

## 5.2.7 Installing the thread trimmer cam

- (1) Align the second timing mark A on the pulley with the match mark on the arm.
- (2) Activate the thread trimmer solenoid, rotate the thread trimmer cam clockwise, and fix the cam when the cam makes contact with the roller.
- (3) The standard clearance between the cam and roller end is 0.5 to 1.0mm after the thread trimmer solenoid is deactivated and the cam follower crank 2 returns to the original position.

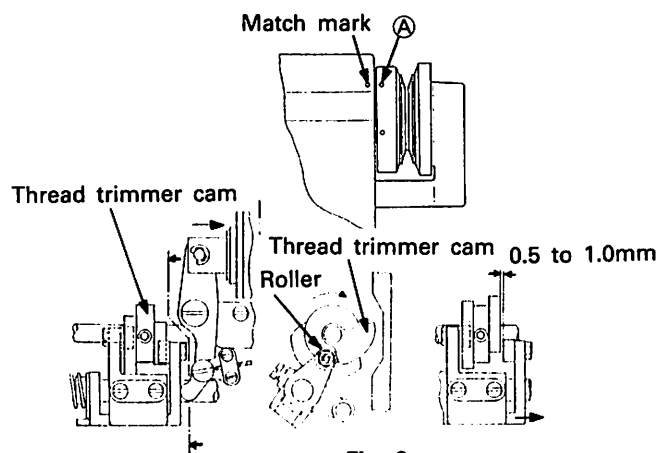


Fig. 9

### Caution

Before operation, the standard position of the cam follower crank 2 is shown in Fig. 10. If this position has changed, e.g. after removing the stopper plate, adjust the position with the adjust bolt (Fig. 6) before taking the above adjustment steps (1) to (3).

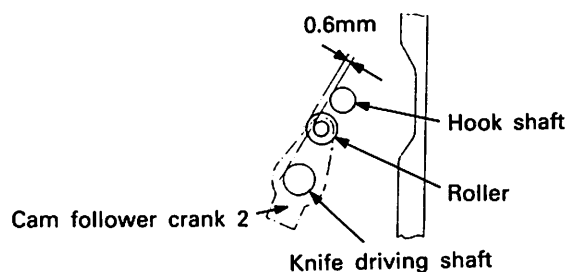


Fig. 10

### 5.2.8 Adjusting knife engagement

#### (1) Movable and fixed knife positions

Fig. 11 shows the standard state.

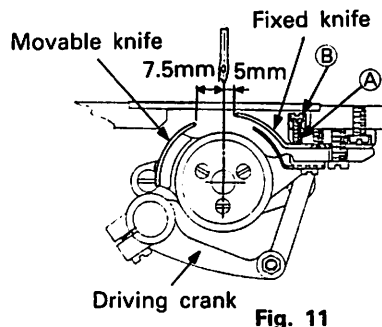


Fig. 11

#### (2) Adjusting the knife engagement stroke

- 1) Activate the solenoid and rotate the sewing machine to turn the movable knife by the thread trimmer cam. The standard engagement stroke is 1.5 to 2.0mm when the movable knife has moved the longest distance.

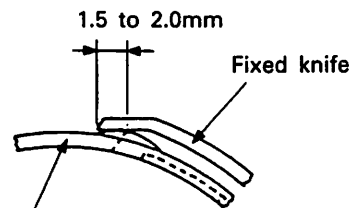


Fig. 12

#### (3) Adjusting the knife engagement pressure

- 1) The knife engagement pressure is standard if the movable knife begins to make contact with the fixed knife at the position shown in Fig. 13.
  - 2) It is recommended to increase the engagement pressure a little if a thick thread, etc. dulls the cutting edges of the knives.
- 3) To adjust the pressure, loosen the lock nut ② and turn the adjust screw ①.

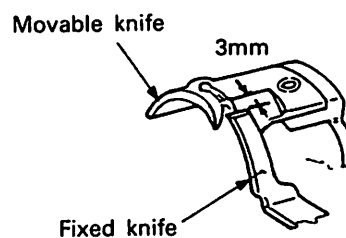


Fig. 13

### 5.2.9 Adjusting the needle thread loosening length

- 1) Make adjustment so that the tension disc of the tension complete opens about 1mm when the thread trimmer solenoid is activated.
- 2) To adjust, loosen the nut ① and move the flexible wire.

#### Caution

If the tension disc is not opened enough, the needle thread is cut short and the thread may be pulled out of the needle. If the disc is opened too wide, it remains opened and the tightness of stitches will be inappropriate.

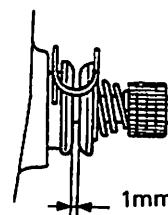
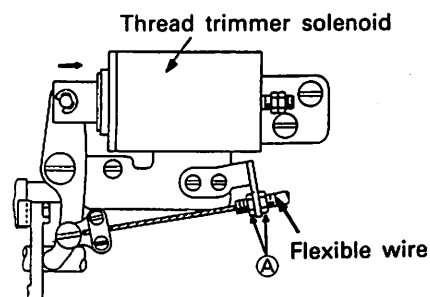


Fig. 14

### 5.3. Adjusting the Needle Thread Remaining Length

#### 5.3.1 Adjust the remaining length of the needle thread using the tension adjust nut ① for pretension.

Clockwise turn reduces the remaining length. Counterclockwise turn increase the remaining length.

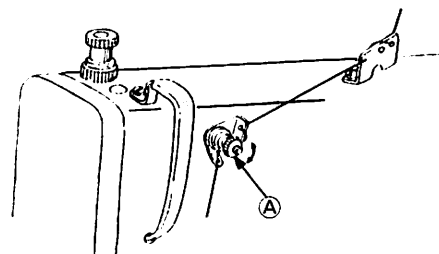


Fig. 15

### 5.4. Precaution for Solenoid Installation

Adjust the solenoid position side to side so that the solenoid plunger and link may not be twisted. Tighten the installation screws after checking that the stitch control lever moves smoothly up and down.

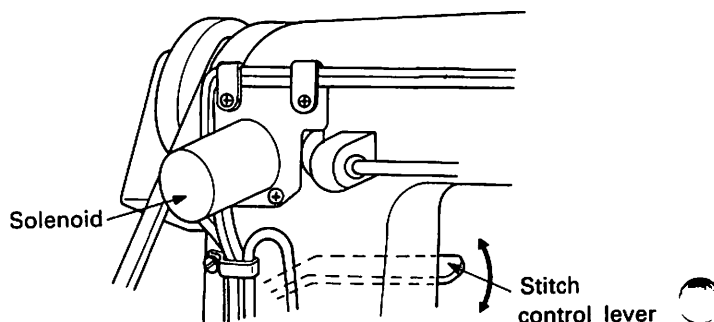


Fig. 16

### 5.5. Aligning the Needle and Hook

- (1) Make adjustment until the needle socket center is aligned with the inner face of the bobbin case holder when the needle ① is lowered to the bottom position.
- (2) Make adjustment until the bayonet point ② of the hook is located at the needle center when the needle ① rises 2.4mm from the bottom position. (Standard)

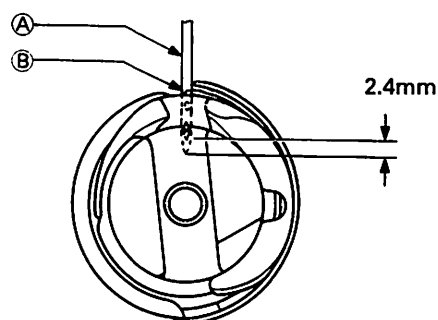


Fig. 17

### 5.6. Hook, Bobbin Case

- (1) Use the thread trimmer sewing machine hook which has a bobbin thread guide groove ① in the bobbin case holder.
- (2) Use the bobbin case which has a spring ① at the bottom to prevent the bobbin from idling.

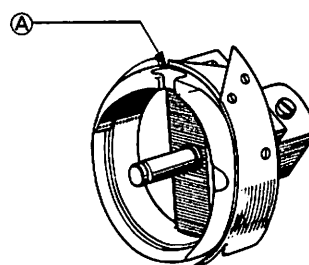


Fig. 18

When adjusting the bobbin thread tension without a bobbin, set the tension a little lower than that for the normal single-needle lock stitch sewing machine because the pressure of the idling prevention spring should be considered.

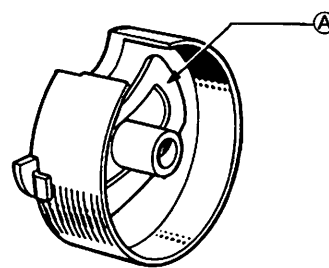


Fig. 19

## 6 TROUBLESHOOTING

Fault	Cause	Measures	Corresponding Section
Thread is not trimmed.	Knife engagement is improper.	Adjust engagement stroke.	5.2.2.8
	Knife engagement pressure is too low.	Adjust engagement pressure.	5.2.2.8
	Movable and/or fixed knife edge is damaged or worn.	Change the corresponding knife (knives).	
	Sewing machine stops ahead of the required position.	Adjust stop position.	4.3
	Sewing machine stop position varies greatly.	1. Check the needle thread release at thread cutting. 2. Check table specifications (motor pulley diameter, control box G switch ON).	5.2.2.9
	Fixed knife position is improper.	Adjust fixed knife position.	5.2.2.3
	Movable knife moves too quickly to allow loop spreading.	Adjust thread trimmer cam installation.	5.2.2.7
Needle thread is pulled out of the needle at start of sewing.	Needle thread tension disc does not open at thread trimming.	Adjust needle thread release.	5.2.2.9
	Thread is trimmed too early.	Adjust thread trimmer cam installation position.	5.2.2.7
	Thread is trimmed by the fixed knife before the movable knife edge engages with the fixed knife.	Adjust fixed knife position.	5.2.2.3
	Needle is too thick as compared to the thread.	Select appropriate needle.	
	Pretension is too high.	Adjust pretention	5.3
Stitches skip at start of sewing.	Bobbin thread is too short due to the bobbin idling at thread trimming.	Use bobbin case which has an idling prevention spring.	5.6
	Bobbin thread tension is too high.	Adjust bobbin thread tension.	
	Length of needle thread remaining at the needle is too short after thread trimming.	1. Adjust pretension. 2. Check thread trimmer cam installation. 3. Check thread handling area.	5.3 5.2.2.7
Needle thread is too long after trimming.	Pretension is too low.	Adjust pretension.	5.3
	Thread is trimmed late.	Adjust thread trimmer cam installation position.	5.2.2.7
	Thread is not pulled appropriately out of the bobbin case holder position bracket in the hook.		





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