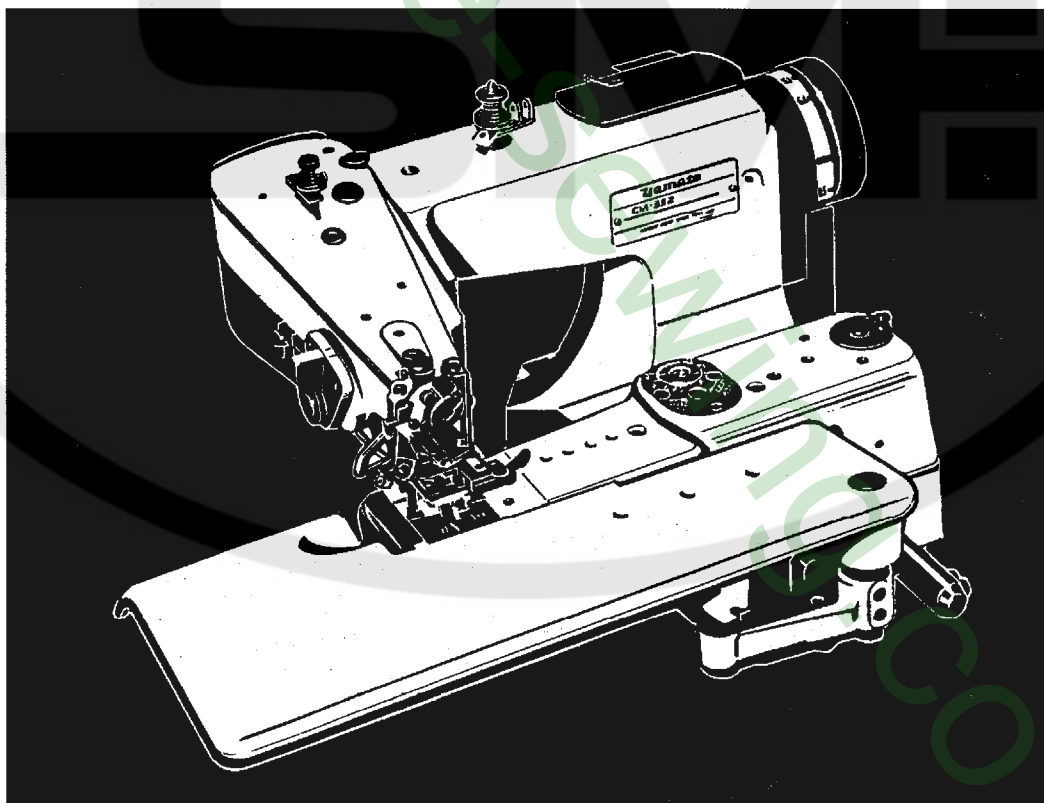


# ***Yamato***<sup>®</sup>

## INSTRUCTIONS FOR CLASS CM-351

(AT/TS2/TF, AT/AL5/TF and T Devices)

### Blind Stitch Felling Machine



## Introduction:

This Instruction manual is compiled to make best use of CM-351 Class machine for the operation, adjustment, maintenance and others.

We wish you to read this Instruction thoroughly and make the most of the features of this machine.

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## 1. Classification and application

CM-351	Standard Model of CM-351 Class for Felling Sewing on general fabric
CM-352	Blind Stitch Machine Available for felling sewing on bottoms, sleeves, blouses, underwear, ladies' coats, etc. (Skipstitch sewing is possible.)
CM-355	Exclusive for sewing bottom of trousers
CM-356	Exclusive for lapel and collar padding
CM-357	For blindstitching waist lining on trousers and other medium weight materials With automatic plunger
CM-359	For bookseaming on the coat's back Especially for the bookseaming to eliminate edge seaming of suit, coat, etc.
CM-360	Suitable for pin-tacking on slacks (Skipstitch sewing is possible.)
CM-364	Blind Stitch Machine with Differential Feed Mechanism(Rear) Available for hemming work on flare skirt which needs shirring (Skipstitch sewing is possible.)
CM-367	For staying furs and tacking inside of furs Irrespective of thickness, constant depth of Felling Sewing is obtained. In case of tacking, the machine can be adjusted to sew only upper ply of fabrics; for instance, tacking near a pocket, complete sewing shut is avoided even if sewn cross on.
CM-370	For felling sewing of the tacking 4-folded belt loop
CM-374	Same as CM364 Shirring while sewing operation is possible owing to Treadle Type Differential Feeding Mechanism (Skipstitch sewing is possible.)

## 2. Indication of Model Plate

[Example] CM-352/AT/TS2/TF

①      ②   ③      ④

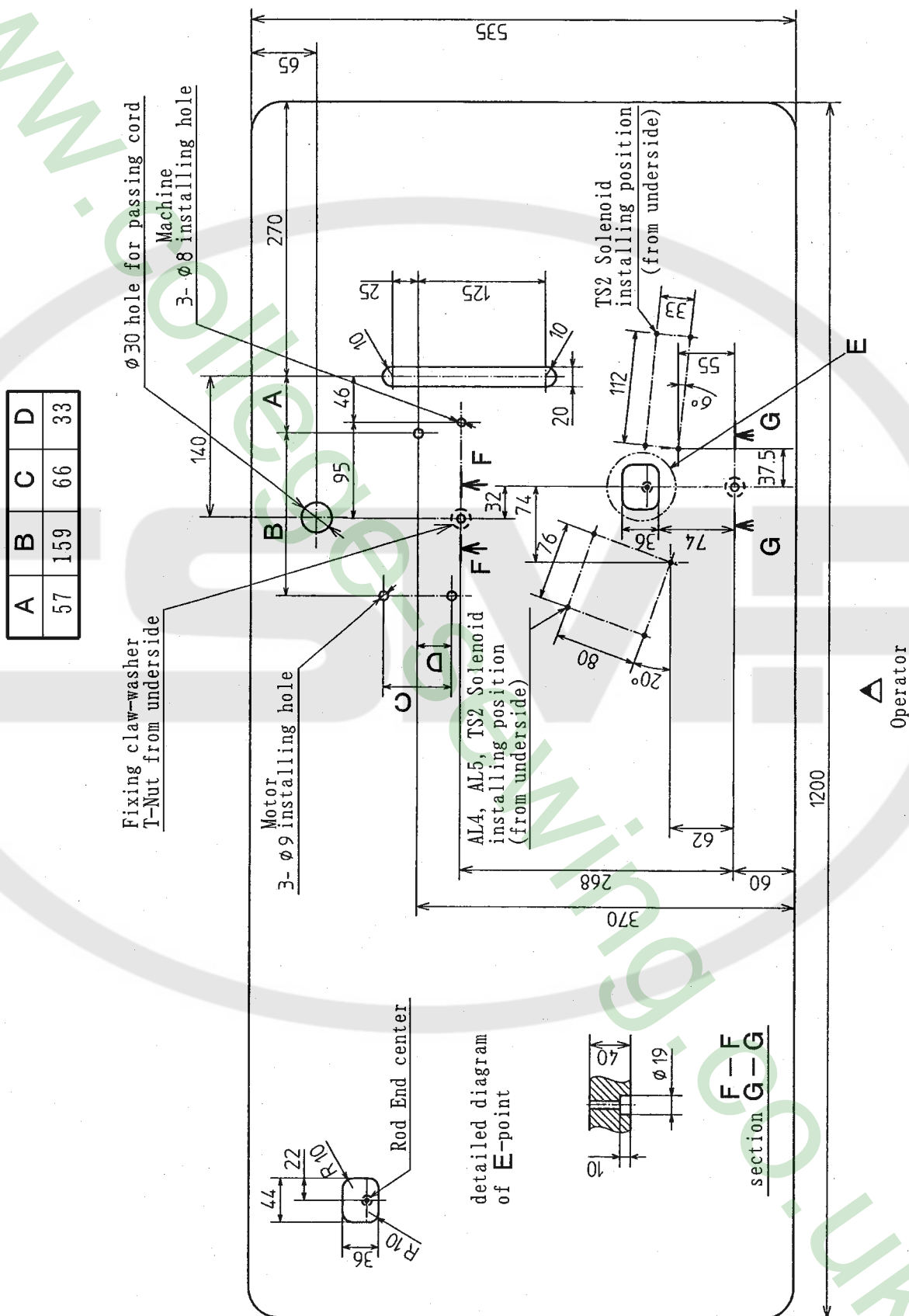
- ① Symbol of Series
- ② Number of Class
- ③ Submodel according to application
- ④ Attachments
  - AT . . . . Automatic Thread Trimming Device
  - TF . . . . Automatic Thread Fastening Device
  - TS2 . . . . Automatic Stitch Fastening Device
  - T . . . . Manual Thread Trimming Device
  - AL4 . . . . Automatic Presser Foot Lowering Device
  - AL5 . . . . Automatic Presser Foot Lowering Device including  
Knee Switch, Complete Set
  - DC3 . . . . Felling Depth Controller

### 3. Specifications

Description	Single Thread Blindstitch Machine
Dimensions	530 (L) × 400 (W) × 250 (H)
Weight	20.6 kg
Stitch type	103(ISO)
Application	Available for felling sewing on bottoms, sleeves, blouses, underwear, ladies' coats, etc.
Sewing speed	Max. 3000 s.p.m.
Stitch length	3.2~8.5mm stitch number: 3 - 8 stitch/inch (25.4 mm)
Needle system	Organ LW × 6T #3 (standard)
Differential ratio	1.1~1.5
Lubrication	Manual oiling
Installation	Table top installation

## 4. Installation

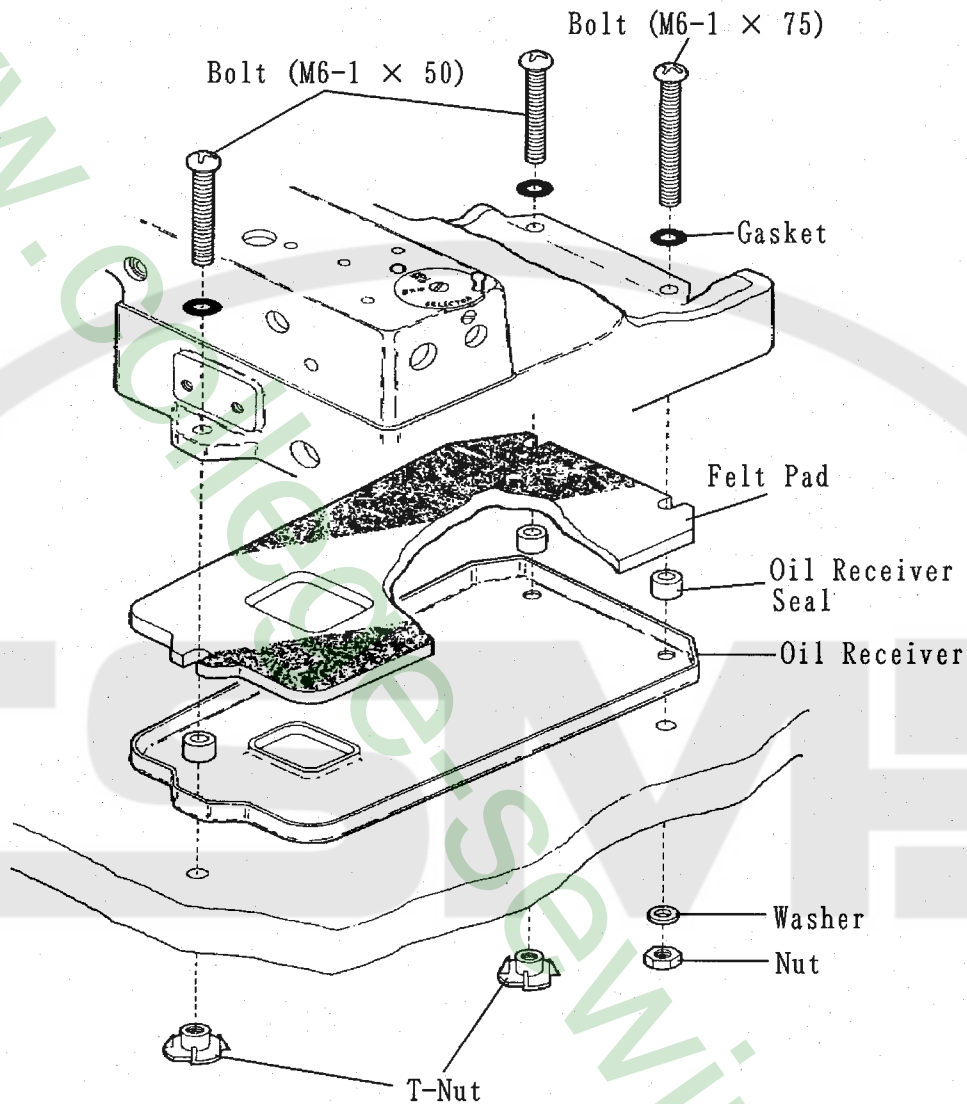
4-1 Drawing of table top cut out



#### 4-2 Installation of Sewing Machine

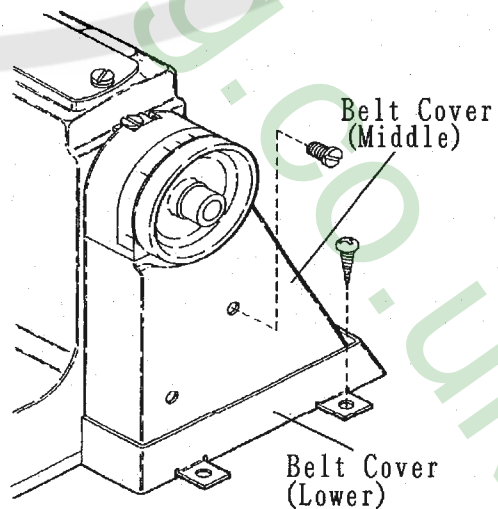
Place Felt Pad on Oil Receiver and mount the machine on the Pad.

The machine must be fixed securely with 3 sets of Bolts and Nuts on table taking care the parallelism between Motor Pulley and Machine Pulley.



#### 4-3 Installation of Belt Cover

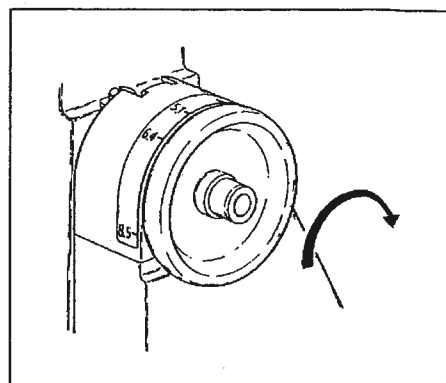
For safe operation, be sure to install Belt Cover (Middle) and Belt Cover (Lower) and operate Machine.



## 5. Sewing speed and rotating direction

The maximum sewing speed of this machine is 3,000 s.p.m. However, for the durability of the machine, it is recommended to operate at the speed of 2,500 s.p.m. for the initial one week and increase the speed gradually since then.

The rotating direction of Pulley is clockwise as shown in the illustration.



## 6. Motor and Belt

☆ For operating with AT, AL5, TS2, and TF Devices, the following electronic motors should be used.

Single phase, 200 ~ 240V: XL-554, XC-FY100  
manufactured by Mitubishi

3 phase, 200 ~ 240V: XL-554, XC-FY100E-45KA  
manufactured by Mitubishi

☆ For operating standard model and with "T" Device, the following clutch motor should be used.

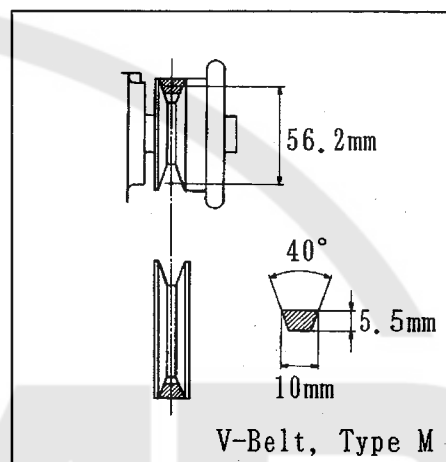
3-phase, 4-pole, 250 W (or 220W)

Note: When operating with "T" Device, the above electronic motors should be used. The sewing operation will be increased efficiency.

M-type V-Belt with circumference of 37 inches should be used.

Motor must be positioned so that the center line of Belt Pulley aligns with that of Motor Pulley, when Motor Pulley is shifted to the left side by treading Pedal.

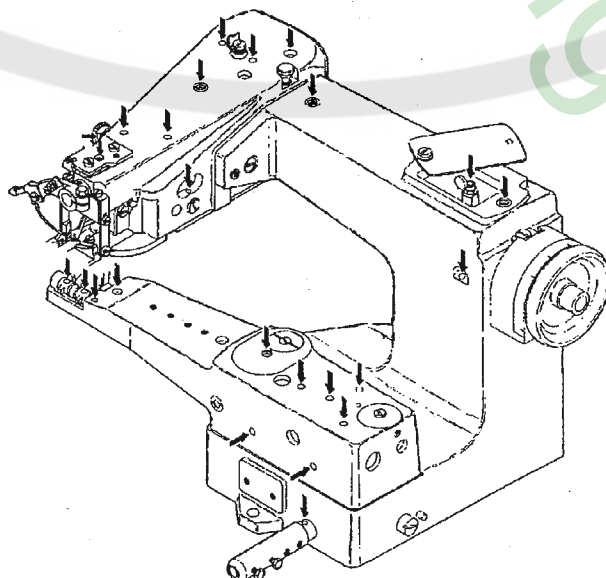
\* Diameters shown on the table are those nearest to the calculated value at intervals of 5mm.



Outside Diameter of Motor Pulley	s. p. m.	
	50Hz	60Hz
65mm		2,000
70mm		2,200
80mm	2,000	2,500
85mm	2,200	2,600
95mm	2,500	3,000
115mm	3,000	

## 7. Feeding of oil

Oil must be fed without fail to the points shown below prior to the operation every day.





## 8. Proper operation

### 8-1 Needle system

Use LW×6T of Organ or Schmetz.

There are many sizes of Needle, and most suited one for the sewing should be selected.

LW×6T #4 (No.16)

LW×6T #3 1/2 (No.14)

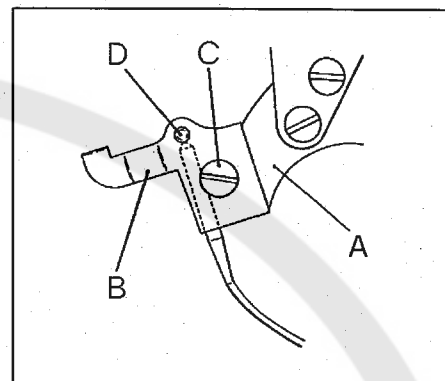
LW×6T #3 (No.11)

LW×6T #2 1/2 (No.9)

### 8-2 Setting of Needle

Turn Pulley by hand to move Needle Driving Lever(A) all the way to the left, then loosen Screw(C) to the extent that Needle Clamp(B) may not be disconnected.

Insert Needle securely up to Needle Stop Pin(D) on needle groove of the Driving Lever, then tighten Screw(C).



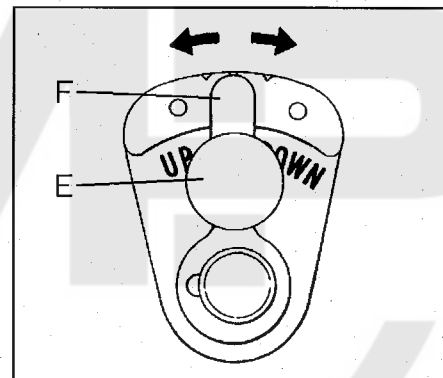
### 8-3 Change of Needle size

When Needle size is changed, select the most suited position to Loper Adjusting Eccentric for the Needle size.

When loosening Screw(E) for Loper Adjusting Eccentric (F) and set the mark to the graduation "DOWN" on Eccentric Bushing, there produces a clearance suitable for #2 1/2(No.9) between Needle and Loper.

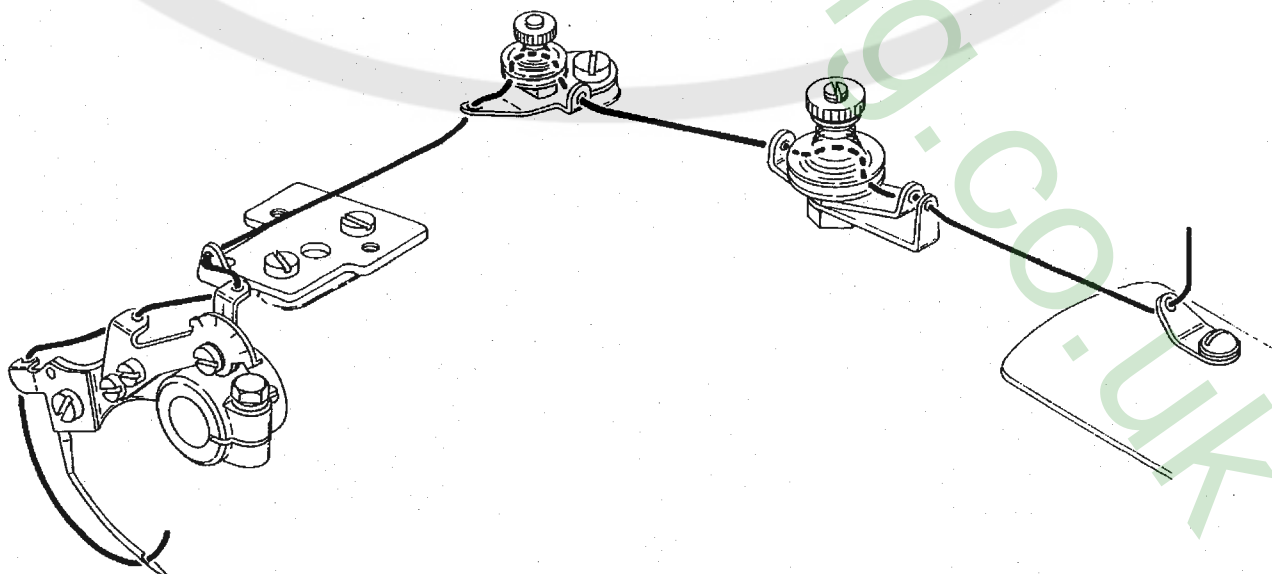
Mid position is suited for #3(No.11) and "UP" is suited for #3 1/2(No.14).

At the shipment, it is adjusted to #3(No.11).



### 8-4 Threading

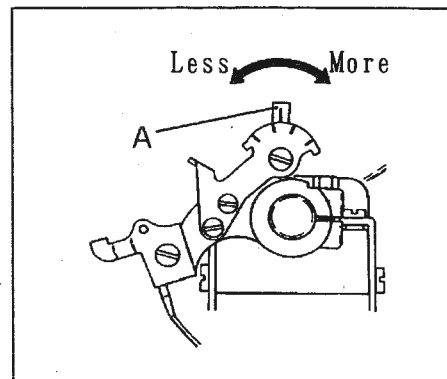
Threading must be done correctly referring to the illustration.



### 8-5 Thread tension

Thread tension should be adjusted as weak as possible without losing good balance of sewing. Turning Nut for Tension Post to the right, tension becomes strong and to the left, it becomes weak.

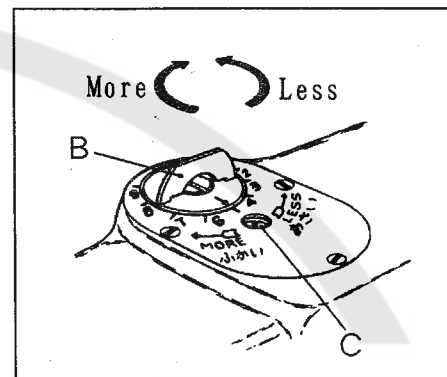
- \* The amount of thread pull-off will be decreased by moving Needle Thread Pull-off Eyelet(A) to the left and increased by moving to the right. Move Eyelet(A) to the right for thin fabrics and to the left for thick fabrics.



### 8-6 Adjustment of felling depth

Raise Knob(B) of dial style Ridge Forming Regulator and turn it to "MORE" to obtain more depth of felling stitch. Turn Knob(B) to "LESS" to obtain less depth of felling stitch. Set the mark to the desired extent.

- \* Adjustment of Ridge Forming Regulator  
If the sufficient felling depth cannot be obtained within the adjusting range of Ridge Forming Regulator, remove Lock Screw(C) and adjust the depth by another screw in the recess. Turn this Screw to the right to obtain the shallow felling, and turn to the left for deep felling. Set the arrow mark on Ridge Forming Regulator to 4~6 and adjust to obtain the suitable felling depth. Then tighten Screw(C) as before.



### 8-7 Adjustment of skipstitch sewing

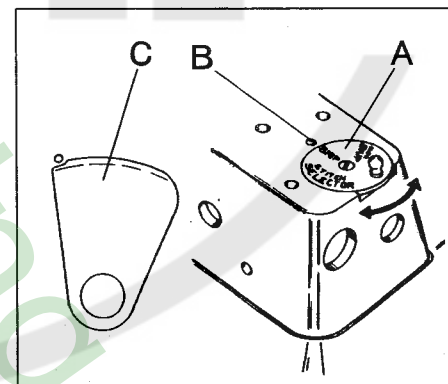
CM-352, 360, 364, 374 model machines have skipstitch mechanism as a standard.

Skipstitch sewing can be made by operating Skipstitch Selector(A).

The skipstitch sewing is possible every other time by aligning the letter "SKIP" with the Mark(B), while continuous felling sewing is possible by aligning it with the Mark "NON SKIP".

For aligning with the Mark "SKIP", the rise of Ridge Forming Plate(C) changes from the maximum to a little less. Adjust so that Needle passes the center of lower part of Ridge Forming Plate(C) when the Plate(C) rises a little less.

(For CM-360, see page 15.)



### 8-8 Adjustment of stitch length

Stitch length can be adjusted in 6 stages from 3.2mm to 8.5mm.

The right table shows stitch length and number of stitches per inch(25.4mm) or 30mm.

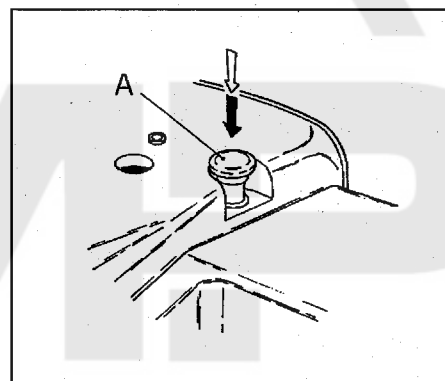
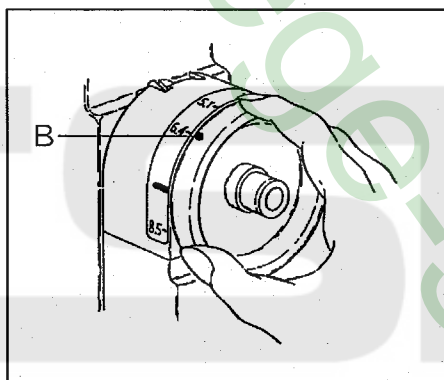
There may be a slight difference according to the kind of materials or other factors.

Stitch length	Stitches per	
	inch	30mm
8.5mm	3	3.5
6.4mm	4	4.7
5.1mm	5	5.9
4.2mm	6	7.1
3.6mm	7	8.3
3.2mm	8	9.4

#### \* Change of stitch length

The change should be made following the procedure below:

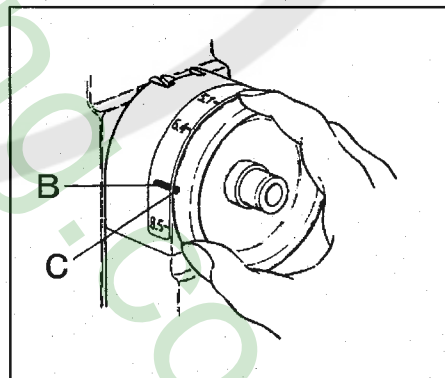
- ① Press in Push Button(A) lightly with left hand.
- ② Keeping pressing the Button, turn Pulley with right hand.
- ③ The tip of Push Button put in the groove of Feed Regulator.
- ④ Press in Push Button(A) strongly, and set the Mark(B) to desired graduation of stitch length by turning Pulley.
- ⑤ After adjustment is completed, release Push Button(A).



### 8-9 Stop position at the time of Thread Trimming

The position where the red Sticker(B) on the Graduations Plate of Belt Cover aligns with the mark (C) is the stop position of needle at the time of thread trimming when it comes to the extreme left. Trimming thread at the sewing finish must be made at this position without fail.

The above is the same in case of machines with Manual Thread Trimmer (T Device) and with Automatic Thread Trimmer (AT Device).

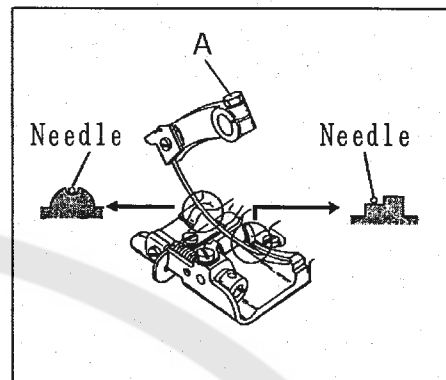


## 9. Appropriate adjustment

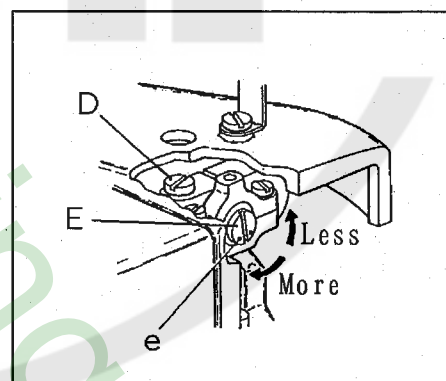
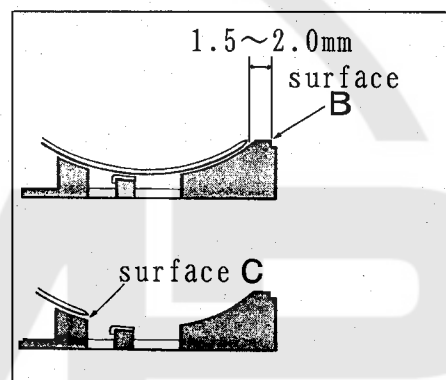
Machines are properly adjusted at the time of shipment, but if further adjustment is necessary because of the sewing conditions or other factors, it is advisable to refer to the following items.

### 9-1 Lateral relation between Needle and Presser Foot Plate

- ① Install Presser Foot Plate to the machine.
- ② For the Needle to pass the center of Needle Groove on Presser Foot Plate, loosen Screw(A) of Needle Driving Arm. Then tighten Screw(A) tentatively.
- ③ When Needle comes to the extreme right by turning Pulley, adjust the point of Needle to 1.5~2.0mm from the surface(B) of Presser Foot Plate.
- ④ When Needle comes to the extreme left, make sure whether the tip of Needle keeps even with the surface(C) of the Plate.



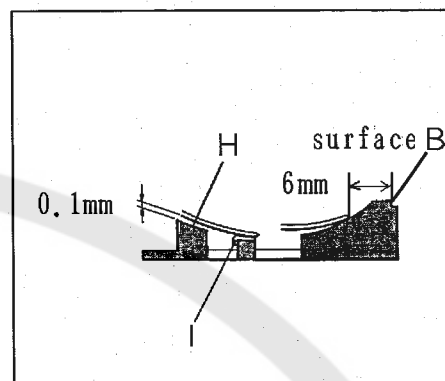
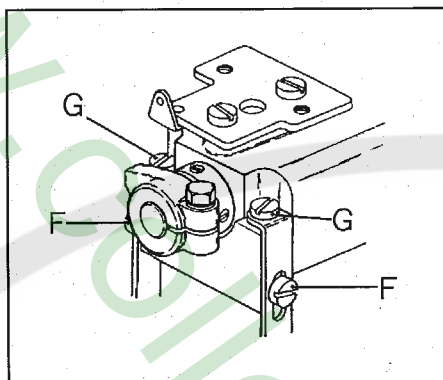
- \* If the tip of Needle is not in the position described above, loosen Screw(D) of Needle Driving Eccentric(E) to adjust the amount of strokes of Needle Driving Lever by turning Needle Driving Eccentric(E). Turning the Eccentric(E) to the clockwise the amount of stroke increases and to the counterclockwise, it decreases. At this time, the mark “.” of (e) on the Eccentric (E) must always face downward. Continue adjusting to obtain the position mentioned above. Tighten each Screws without fail after adjustment.



## 9-2 Vertical relation between Needle and Presser Foot Plate

After fixing lateral relation of Needle, loosen Screws(F) of Presser Foot Plate Support and turn Adjusting Screws(G) to adjust the vertical position of Presser Foot Plate.

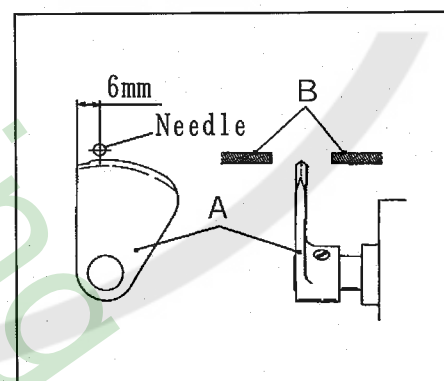
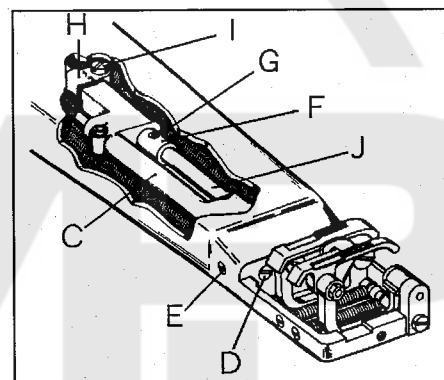
Adjust so that the space between Needle point and Needle Groove(H) of Presser Foot Plate is 0.1mm, Needle point lightly touches Needle Guard(I), and Needle point is slightly pressed by Presser Foot Plate at the position of 6mm away from the surface(B) on Presser Foot Plate.



## 9-3 Setting and adjustment of Ridge Forming Plate

Ridge Forming Plate(A) must be set correctly to come to the center of the groove on Presser Foot Plate(B) following the procedure below.

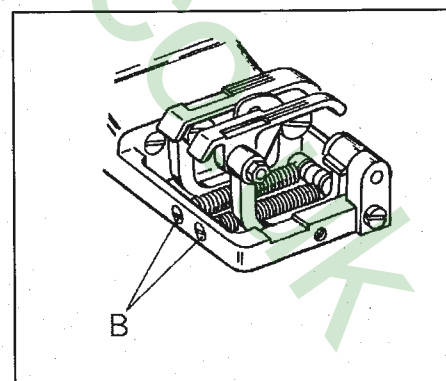
- ① Ridge Forming Plate Cradle(C) must be adjusted to move smoothly without play by Pivot Bearing Screw(D), after this, Screw(D) should be fixed by Screw(E).
- ② Loosen Screw(G) of Ridge Forming Plate Shaft Collar(F) and Screw(I) of Ridge Forming Plate Shaft Lever(H).
- ③ Move Ridge Forming Plate Shaft(J) so that Ridge Forming Plate(A) comes to the center of the groove on Presser Foot Plate(B), and apply the Shaft Collar(F) to the edge of Cradle(C), then tighten Screw(G).
- ④ Turn Pulley to the rotating direction. When needle point comes to the top of Ridge Forming Plate(A) give the distance of 6mm between the edge of the Plate and the center of Needle. Then tighten Screw(I) of Ridge Forming Plate Shaft Lever(J) with no play in the Shaft.



## 9-4 Pressure of Presser Foot and its adjustment

Presser Foot have two functions: one is to press down fabric by the pressure of 2 springs against the back side of Presser Foot Plate to prevent it from shifting at the time of felling by Needle, and the other is to keep feeding smoothly.

In case of uneven in stitches because of sewing speed, adjust to get proper pressure by turning Adjusting Screws(B).



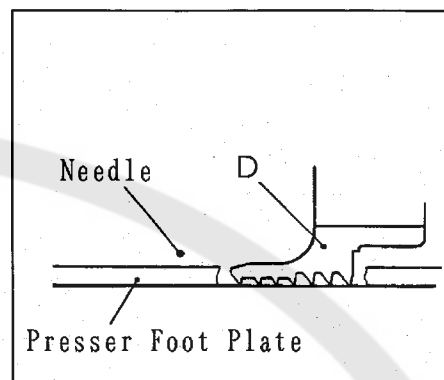
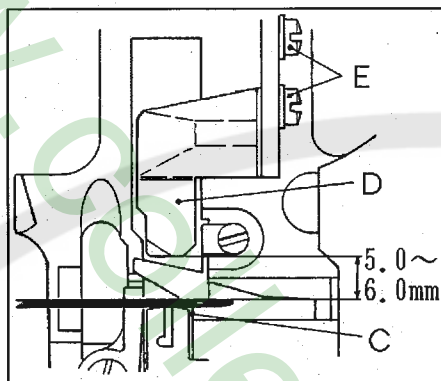
### 9-5 Adjustment of Feed Dog

Set stitch length at 8.5 on the graduations.

When Needle moves to the left from the extreme right and its eye comes to the point(C) of Presser Foot Plate, the distance between Needle and top of Feed Dog(D) must be 5.0~6.0mm.

To make this adjustment, loosen the Screw(E).

At this time, teeth of Feed Dog must be even with bottom face of Presser Foot Plate.



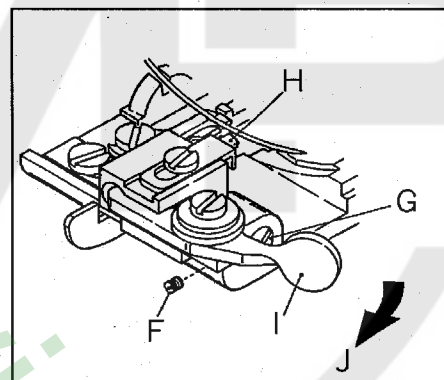
### 9-6 Adjustment of Cloth Retainer

Adjust so that the upper edge of Cloth Retainer is as close to the Needle as possible.

The adjustment is made by loosening Screw(F) and turning Cloth Retainer Adjusting Pin(G) left or right.

When the Needle fells fabrics, Retainer(H) must hold them tightly on Ridge Forming Plate.

If this holding is weak, the fabric moves, causing skipping stitch. In this case, move Cloth Retaining Adjusting Lever(I) to the direction(J) to get proper pressure.





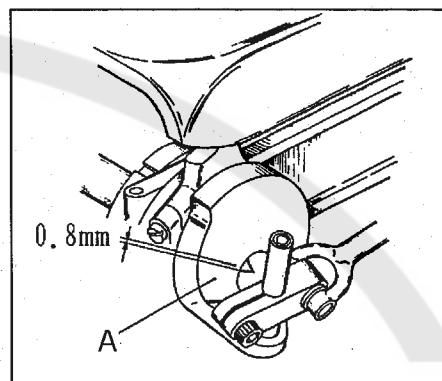
### 9-7 Adjustment of Looper

At the shipment, adjustment is made to cover needle size # 2 1/2 ~ # 3 1/2 by changing Looper Adjusting Eccentric, as mentioned in clause 8-3.

But at the time of readjustment, as the adjustment of Looper of this machine is very subtle because of their intricate movement, various kinds of adjustment must be made (example: adjustment of Looper Ball Joint Adjusting Eccentric change of timing for Looper Driving Crank, etc.) And these adjustments are related with those of other parts, adjust the machine carefully to get the best condition, taking these factors into consideration.

\* Adjustment of Looper should be made on the basis of Needle #3 by turning Pulley to the rotating direction as follows:

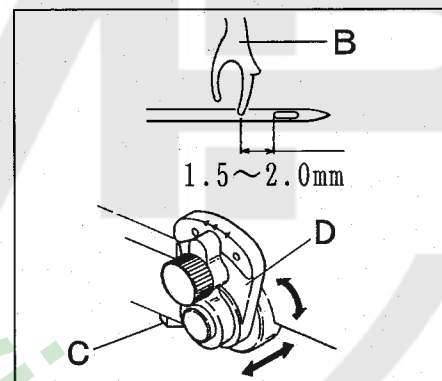
- ① Set the mark on Looper Driving Crank(A) at about 0.8mm inside from the left edge of V-groove of Main Shaft.



- ② When the top of longer finger of Looper(B) comes to the center of Needle, it must pass 1.5~2.0mm from Needle eye. Adjustment is made by loosening Screw(C) and moving Adjusting Eccentric Bushing(D) right or left.

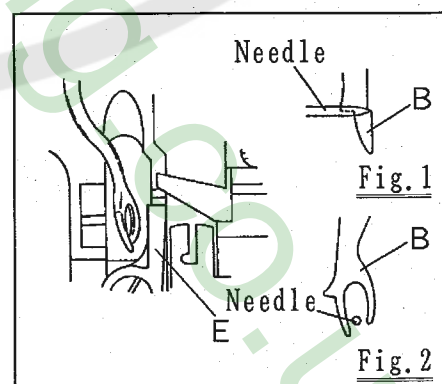
At the same time, the longer finger should be as close to the Needle as possible without touching the Needle.

This adjustment is made by turning Adjusting Eccentric Bushing(D).



- ③ Next, when Looper(B) turns over and comes to the left side of Presser Foot Plate, relation between Needle and Looper, as shown in Fig.1, must be adjusted in order that the point of Needle and the side of Looper is even, while Needle is on the stepped part of Looper(B) (as shown by dotted line in the figure.) Furthermore, when the shorter finger meets the center of Needle, Needle must be adjusted to pass the center of Looper Yoke or a bit lower part of it. (Fig.2)

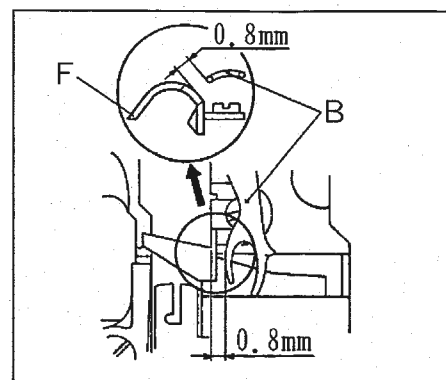
This adjustment is made by turning Adjusting Eccentric Bushing(D).



- ④ Bring the shorter finger of Looper(B) as close to Needle Guard(E) as possible without touching it.

And when Looper comes to the right side of Chaining Finger(F) of the Presser Foot Plate, the clearance between the shorter finger and the Chaining Finger must be less than 0.8mm.

The adjustment is made by moving Adjusting Eccentric Bushing(D) right or left.

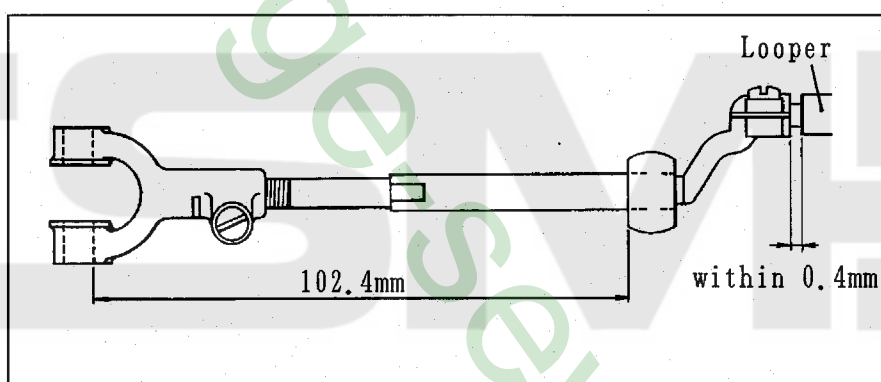


- \* After above adjustment, change #2 1/2 and #3 1/2 again and position Looper Adjusting Lever at "DOWN" and "UP" respectively then check the parallelism between Needle and Looper.
- \* If satisfactory result is not gained in spite of these adjustments mentioned above, change the position of the mark on Looper Pivot Crank(A) and readjust the timing of Looper.

The adjustment of the mark must be made in the range of 0.8mm left or right from the point 0.8mm inside of V-groove.

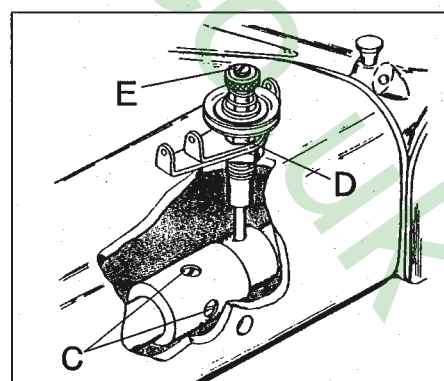
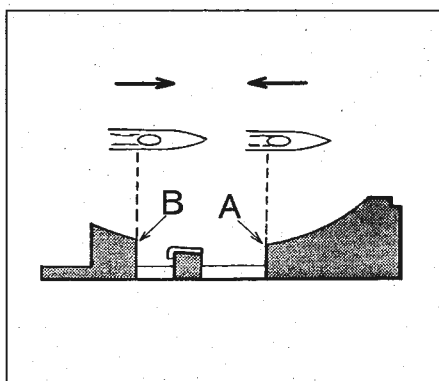
- \* Illustration of Looper Carrier is shown below.

Refer to it when reassembly of Looper or the like is necessary.



### 9-8 Adjustment of Automatic Thread Tension Mechanism

- ☆ When Needle moves to left and the left side of needle eye comes to the point (A) of Presser Foot Plate, Tension Disc(Upper) begins to open.  
When Needle moves to right and the left side of needle eye passes from the middle of Needle Groove on Presser Foot Plate to the right side [the point (B)], Tension Disc closes.
- ☆ For adjusting the opening amount of Tension Disc, loosen Nut (D) and turn Tension Post (E).  
To increase the amount, turn Tension Post (E) clockwise.  
To decrease the amount, turn Tension Post (E) counterclockwise.





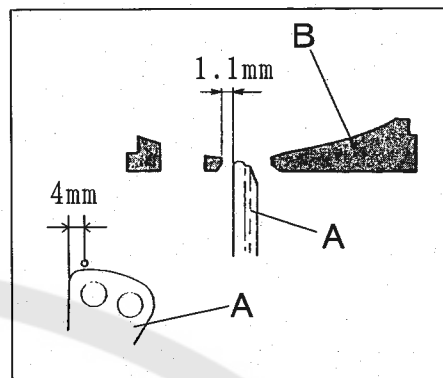
## 1 O. Handling of Sub-models

Explanations for each sub-model machine in this article are of the different points on operation and adjustments from those for CM-351 and CM-352.

### 10-1 CM-355

#### \* Adjustment of Ridge Forming Plate

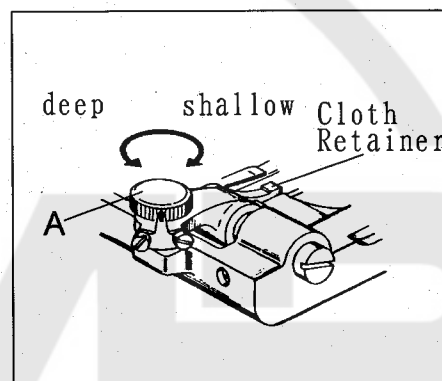
The lateral adjustment of Ridge Forming Plate(A) must be made with clearance of 1.1mm between the left side of the groove on Presser Foot Plate(B) and the left side of Ridge Forming Plate(A). When turning Pulley clockwise and the needle point comes to the center of Ridge Forming Plate(A), the distance between the center of the needle and the front of Ridge Forming Plate(A) must be 4mm.



### 10-2 CM-357

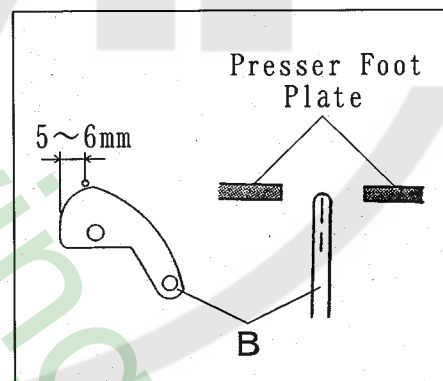
#### \* Adjustment of Felling Depth

The felling depth of Needle must be adjusted by Cloth Retainer Adjusting Screw(A). Deep felling by turning left and shallow felling by turning right.



#### \* Adjustment of Ridge Forming Plate

Position Ridge Forming Plate(B) so that it comes to the center of the groove of Presser Foot Plate. When turning Pulley clockwise and the needle point comes to the center of Ridge Forming Plate(B), the distance between the center of the needle and the front of Ridge Forming Plate(B) must be 5~6mm.

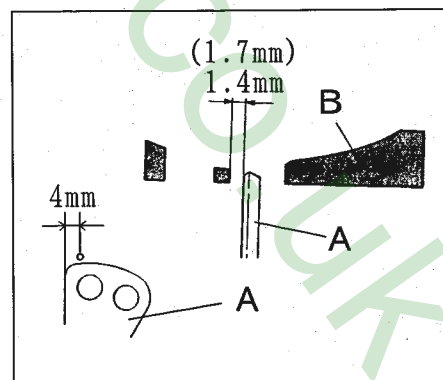


### 10-3 CM-359

#### \* Adjustment of Ridge Forming Plate

The lateral adjustment of Ridge Forming Plate(A) must be made with clearance of 1.4mm in case of using Folder of 1/4 inch (6.35mm) or 1.7mm representatively between left side of the groove on Presser Foot Plate(B) and left side of Ridge Forming Plate(A).

When turning Pulley clockwise and the needle point comes to the center of Ridge Forming Plate(A), the distance between the center of the needle and the front of Ridge Forming Plate(A) must be 4mm.

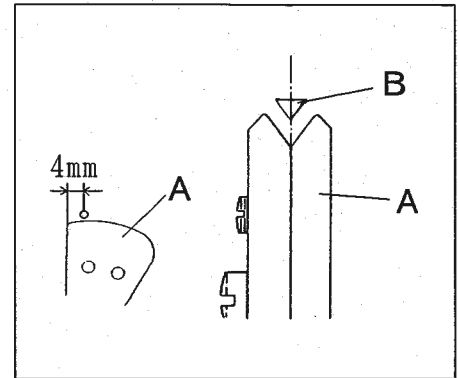


#### 10-4 CM-360

##### \* Adjustment of Ridge Forming Plate

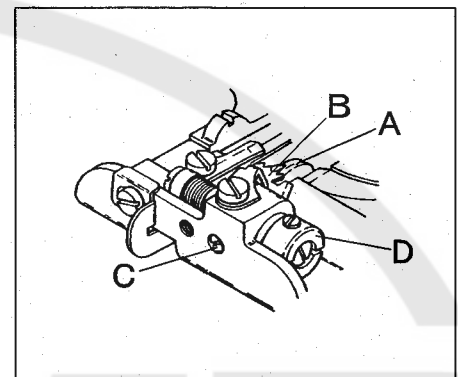
Set the Skipstitch Selector to "SKIP".

When turning Pulley clockwise and Ridge Forming Plate(A) rises too much or the needle point comes to the center of Ridge Forming Plate(A), the distance between the center of the needle and the front of Ridge Forming Plate(A) must be 4mm.



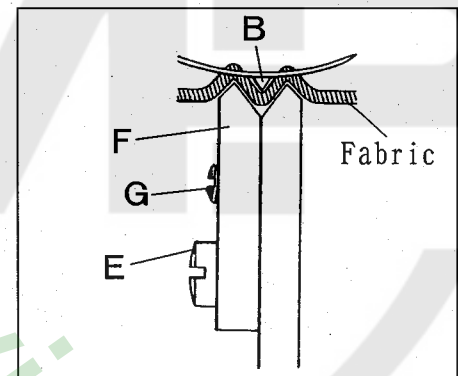
##### \* Adjustment of Cloth Retainer

Decide the normal position of Cloth Retainer(B) to be in the center of V-groove of Ridge Forming Plate(A) by loosening Screw(C) to move Cloth Retainer Adjusting Sleeve(D) laterally.



##### \* Adjustment of Felling Depth

To obtain the same felling depth on both right and left ridges of fabric, loosen Screw(E) and move Ridge Forming Plate(Small)(F) vertically. When felling thick fabric, if the sufficient pin-tacking can not be obtained, loosen Screw(E) and tighten Screw(G) gradually then the V-groove will be widened to increase the amount of pin-tacking.

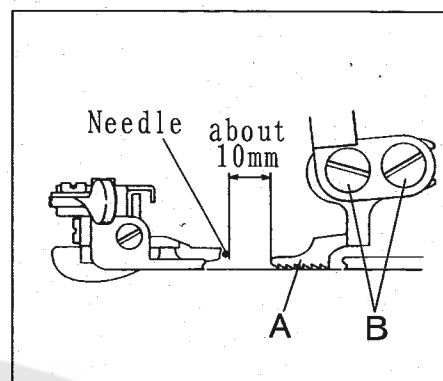


# 10-5 CM-364

Set the stitch length to "8.5" when making the following adjustment.

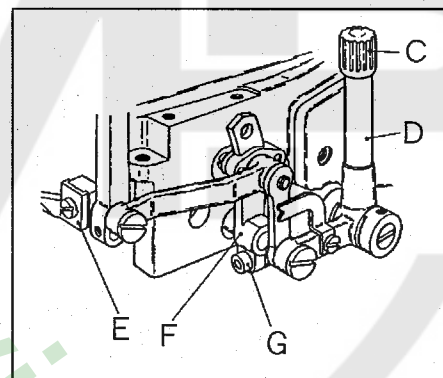
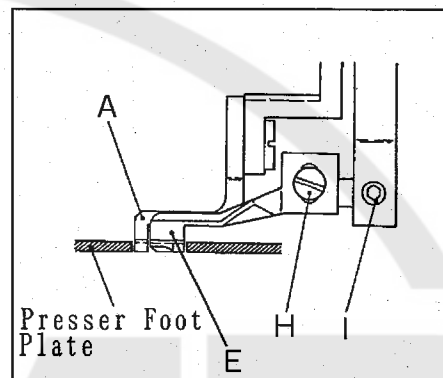
- ① When Main Feed Dog(A) comes to the foremost position, with the distance of 10mm between Needle and the tip of the Feed Dog, fix the Feed Dog with Screws(B).

Set the teeth surface flush with the bottom surface of Presser Foot Plate.



- ② When Main Feed Dog(A) comes to the foremost position, loosen Fixing Screw(C) and move Differential Feed Control Lever(D), and at the position where Differential Feed Dog(E) does not move, tighten Screw(G) of Differential Feed Regulator(F). Fix the height of Differential Feed Dog(E) to be same as that of Main Feed Dog (A) when the Main Feed Dog comes to the foremost position. The adjustment is made by loosening Screw(H).

Adjust the lateral position of Differential Feed Dog(E) so that left side of Differential Feed Dog(E) lightly contacts to the right side of Main Feed Dog(A). The adjustment is made by loosening Screw(I).



- ③ Fix the position of Differential Control Lever(D) so that the moving amount of Main Feed Dog(A) and Differential Feed Dog(E) become same (The center of Feed Link Pin aligns with the axis of Differential Feed Regulating Slider.) by loosening Fixing Screw and moving Differential Control Lever(D).

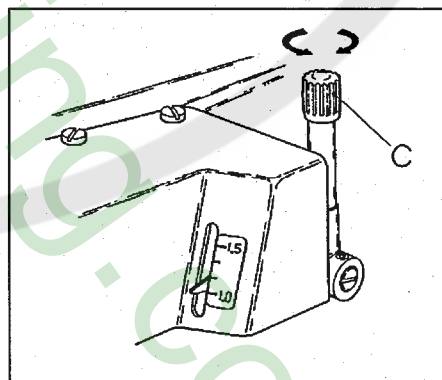
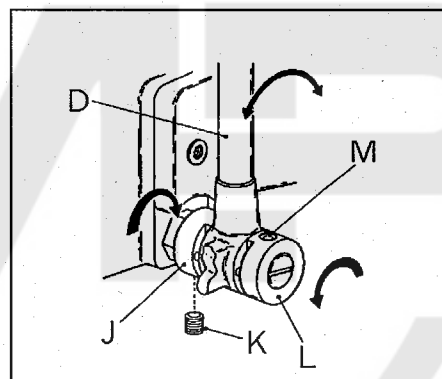
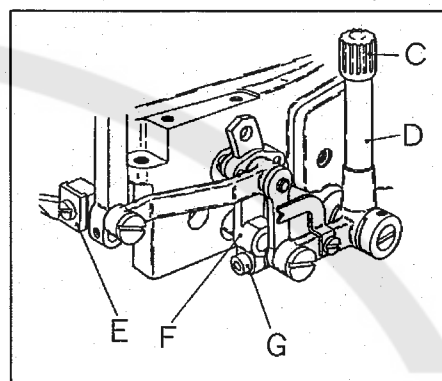
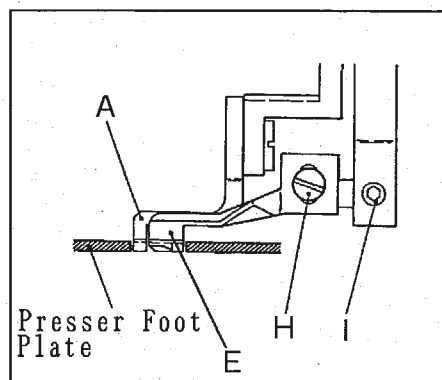
Turn Differential Feed Control Lever Stop(Left) (J) clockwise until it contacts the pin of Differential Control Lever then tighten Screw(K). At this position, the moving amount of Main Feed Dog(A) and Differential Feed Dog(E) are the same; and there is no differential.

Next, move Differential Control Lever(D) until the tip of Differential Feed Dog(E) goes to 3.5mm in the rear from the tip of Main Feed Dog(A) when the Feed Dog travels all the way rearward. There, fix the Lever.

Then turn Differential Feed Control Lever Stop (Right)(L) until it contacts the pin on Differential Control Lever, and tighten Screw(M). With this position, the ratio of movement of Main Feed Dog(A) against that of Differential Feed Dog(E) is 1:1.5.

- ④ With the graduation at 1.0, the differential ratio is 1:1 and at 1.5 it is 1:1.5. Set the suitable value on the basis of graduation on Cover and tighten Screw(C).

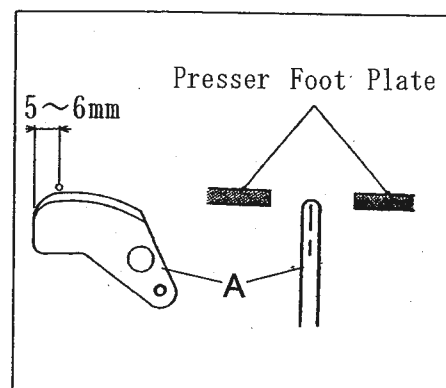
Note: In case of sewing using differential operation, make the sewing within the range of stitch length "3.2~6.4".



## 10-6 CM-367

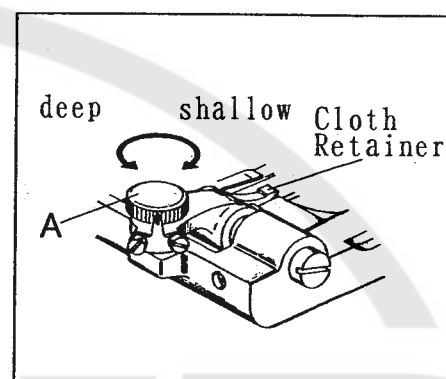
### \* Adjustment of Ridge Forming Plate

Ridge Forming Plate(A) must be set correctly to come to the center of the groove on Presser Foot Plate. When turning Pulley clockwise and the needle point comes to the center of Ridge Forming Plate(A), the distance between the center of the needle and the front of Ridge Forming Plate(A) must be 5 ~ 6mm.



### \* Adjustment of Felling Depth

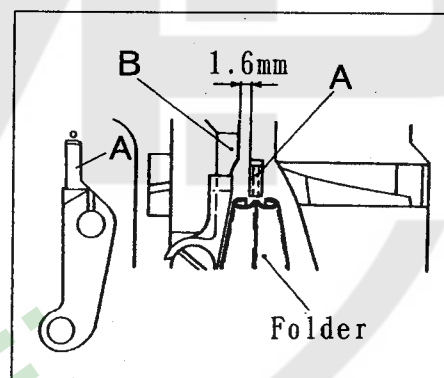
The felling depth of Needle must be adjusted by Cloth Retainer Adjusting Screw(A). Deep felling by turning left and shallow felling by turning right.



## 10-7 CM-370

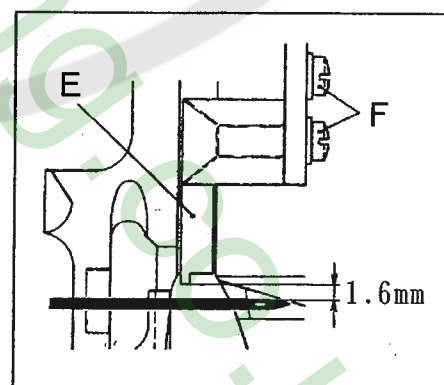
### \* Adjustment of Ridge Forming Plate

Ridge Forming Plate(A) must be set with a clearance of 1.6mm between its left side and the left side of the groove on Presser Foot Plate(B). And make the center of Plate correspond to that of the Folder.



### \* Adjustment of Feed Dog

Set the stitch length at 4.2 of Graduations. When Needle moves leftward from the extreme right and Feed Dog comes to the foremost position, clearance between Needle and the top of Feed Dog (E) must be 1.6mm, and this adjustment is made by loosening Screw(F) of Feed Dog.

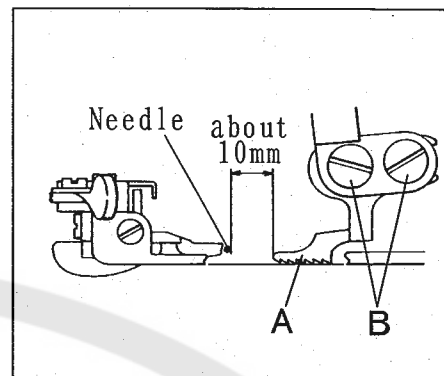


## 10-8 CM-374

### \* Adjustment of Feed Dog

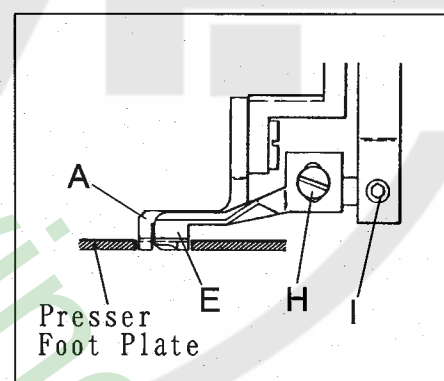
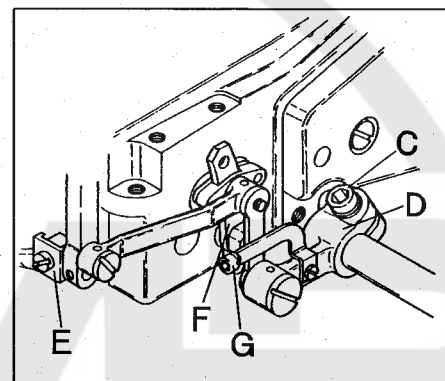
Set the stitch length at 8.5 on Graduations and make the following adjustment.

- ① When Feed Dog(A) comes to the foremost position, distance between Needle and the point of Feed Dog must be about 10mm and set the Dog by Screws(B). In this case, teeth of the Dog must be even with the bottom of Presser Foot Plate.



- ② When Feed Dog comes to the foremost position, loosen Fixing Screw(C) and move Differential Feed Control Lever(D), then tighten Screw(G) for Differential Feed Regulator(F) at the position where Differential Feed Dog(E) does not move. When Feed Dog(A) comes to the foremost position, adjust the height of Differential Feed Dog(E) to the same height of Feed Dog(A) by loosening Screw(H).

Loosen Screw(I) and make the left face of Differential Feed Dog(E) touch softly with the right face of Feed Dog. This is the lateral position of Differential Feed Dog.

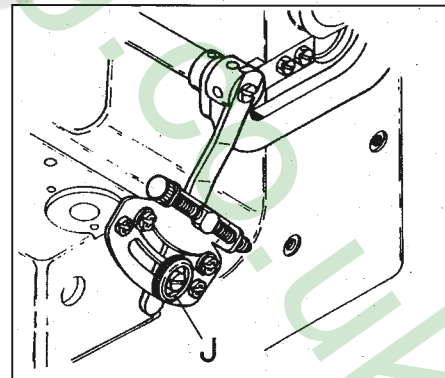


### \* Adjustment of Differential amount

The differential ratio can be changed in the range from 1:1 to 1:1.5 by treading pedal while running machine by loosening Nut(J).

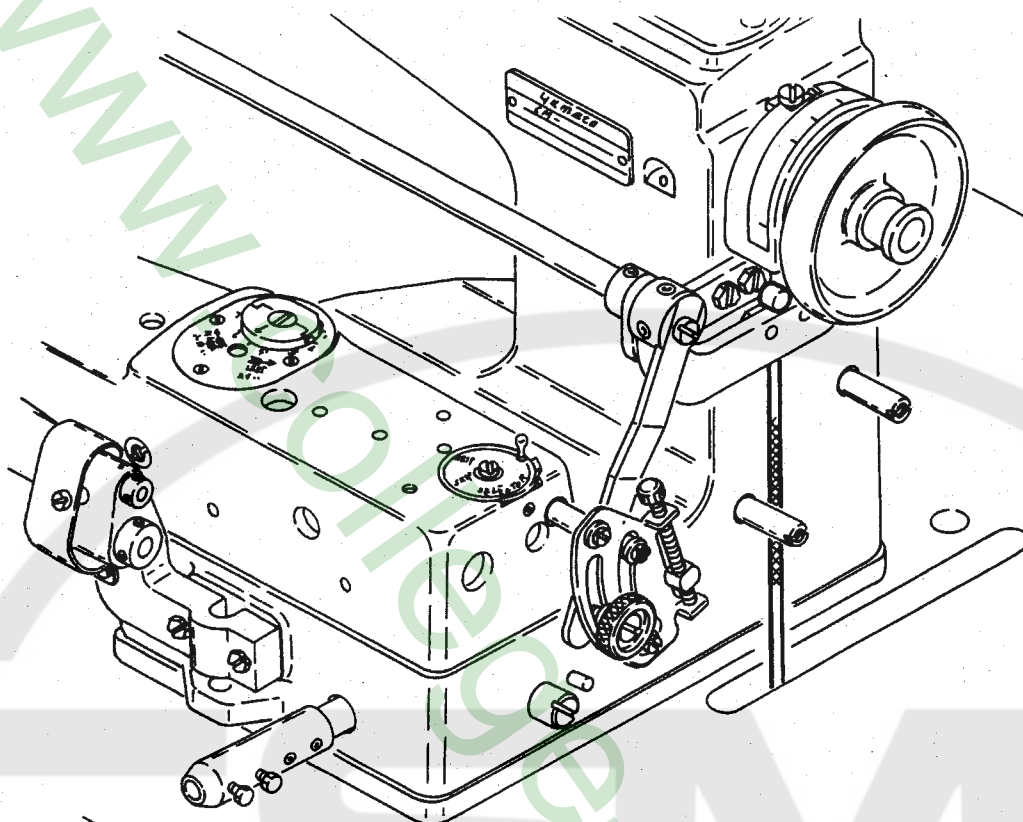
In case of sewing with a certain differential feeding, fix Differential Lever(Right) at a certain position to sew.

Note: Even if the pedal is treadled, Differential amount can not be changed.



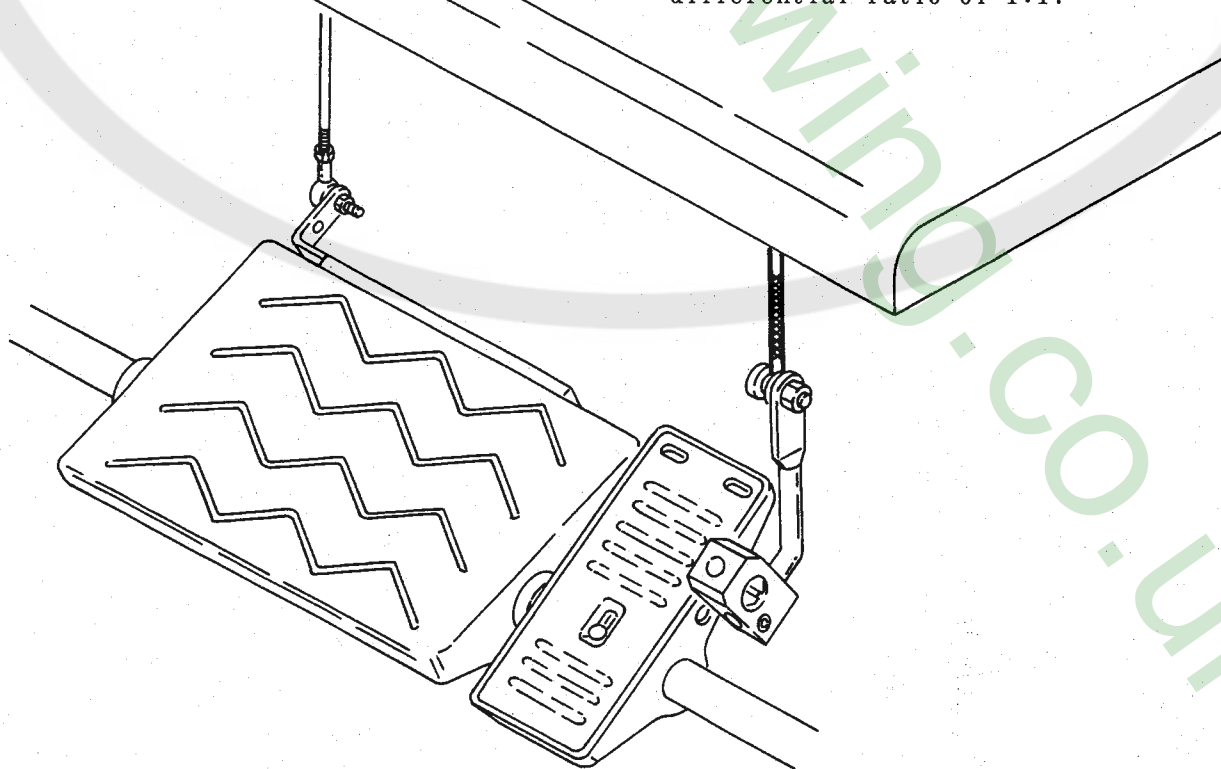


\* Installation of Flexible Wire

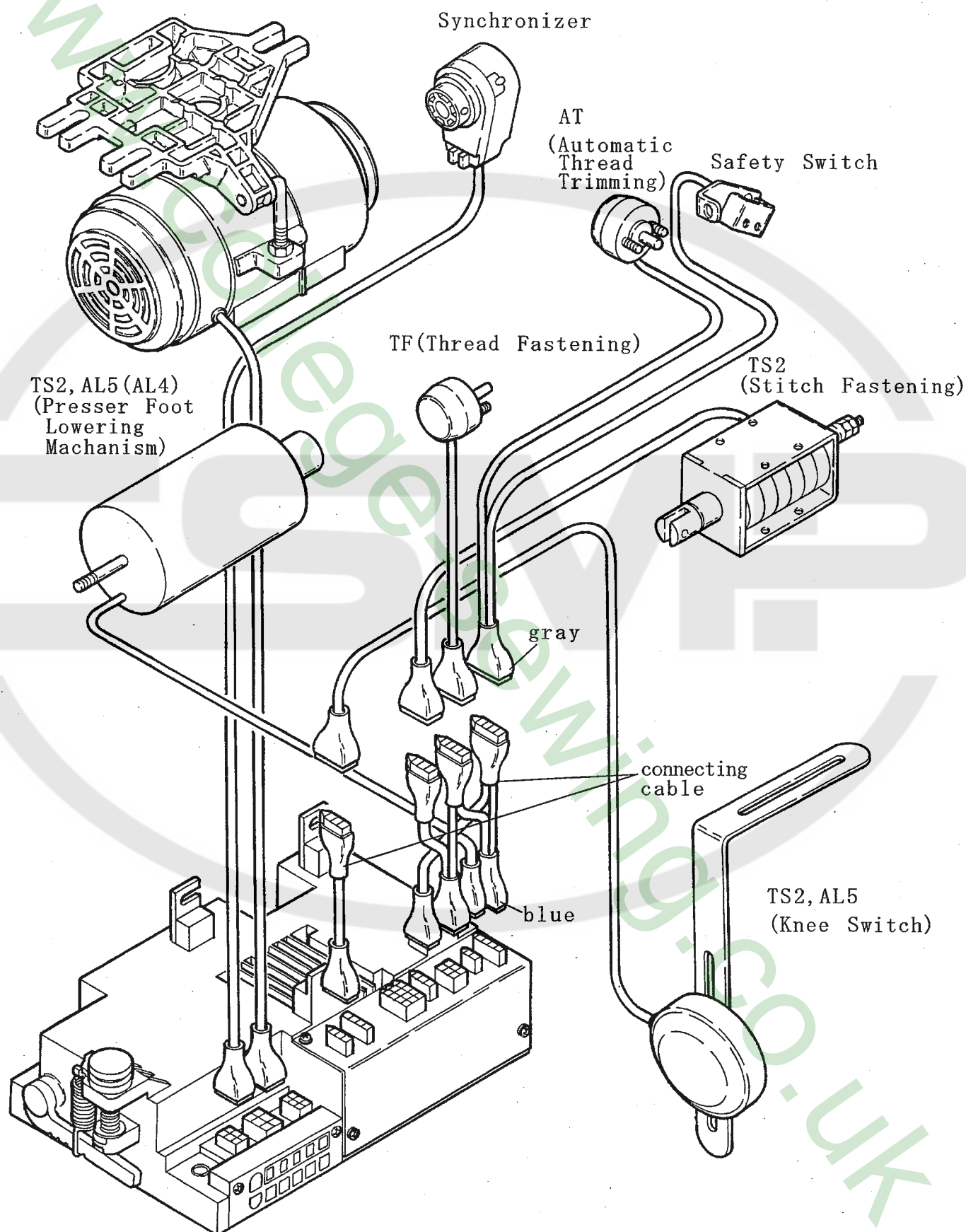


Install Wire Pulling Lever Block(A) and Flexible Wire Pulling Lever(B) on Differential Pedal.

Fix the Flexible Wire with Screw(C) and Nut(D) without loosening in the differential ratio of 1:1.

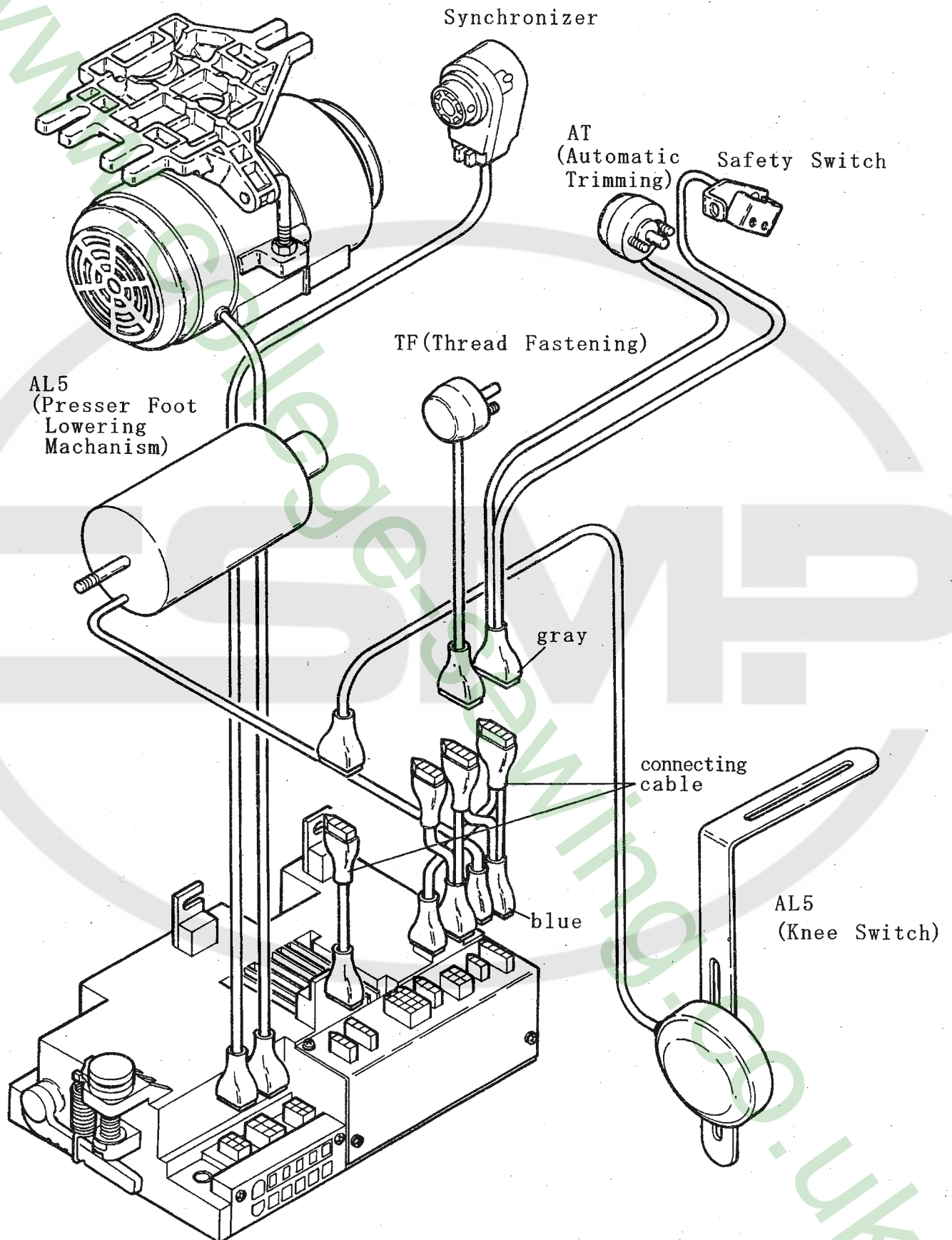


# 11. AT/TS2/TF and AT/AL5/TF Devices 11-1 Wiring diagram for AT/TS2/TF





11-2 Wiring diagram for AT/AL5/TF

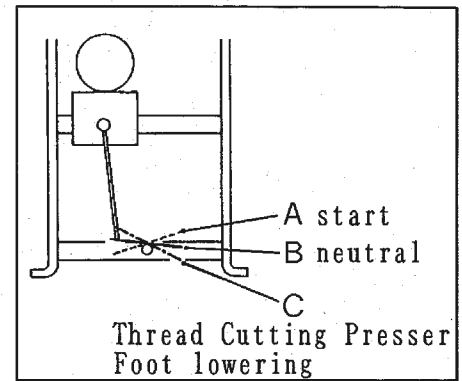


### 11-3 Operating instructions

- ① Turn Power Switch to "ON".
- ② When treadling back Pedal, Presser Foot will descend.
- ③ Load the fabric.
- ④ Set to "neutral". (Presser Foot rises.)
- ⑤ Sewing starts by treadling Pedal.
- ⑥ Sewing finishes.
- ⑦ Treadle back Pedal.

TS2  $\rightarrow$  TF  $\rightarrow$  AT  $\rightarrow$  Presser Foot descends.

- ⑧ Load next fabric.



## 11-4 Installation of Synchronizer

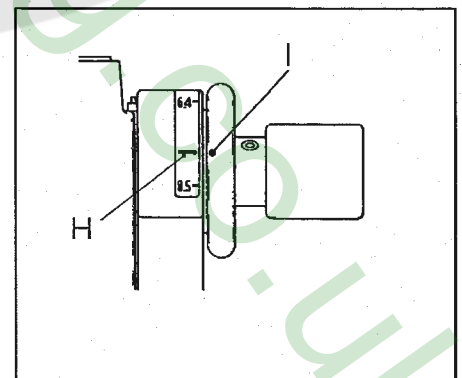
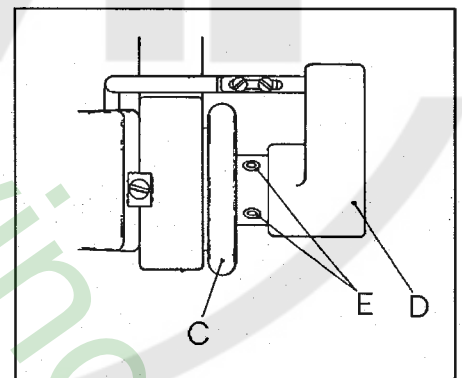
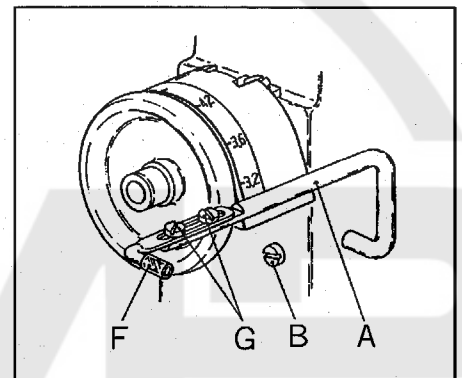
- ① Install Synchronizer Positioning Shaft(A) with Screw(B).
- ② Install Synchronizer(D) tentatively to Machine Pulley(C) with Screws(E).
- ③ Set Synchronizer Positioning Pin(F) to the guide groove of Synchronizer and tighten Screws(G).
- ④ Turn Motor Switch to "ON".

Note: Draw out Connector for Thread Trimmer Solenoid.

- ⑤ Treadle Pedal to sew 2 or 3 stitches, then release Pedal. Needle stops at a certain position.
- ⑥ Loosen Screws(E) for Synchronizer, turn Machine Pulley taking care not to shift the position of Screws(E), position Needle on the extreme left [align Mark(H) of sticker with Mark(I)], then tighten Screws(E).
- ⑦ Treadle Pedal again to sew 2~3 stitches then release Pedal, and make sure that Needle stops at the position described in ⑥.

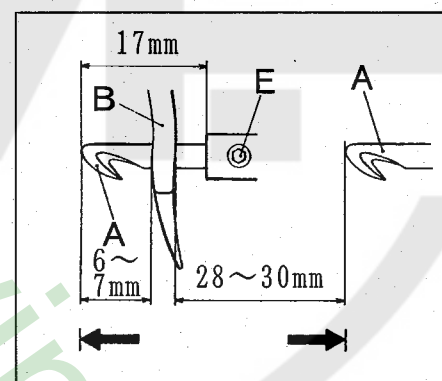
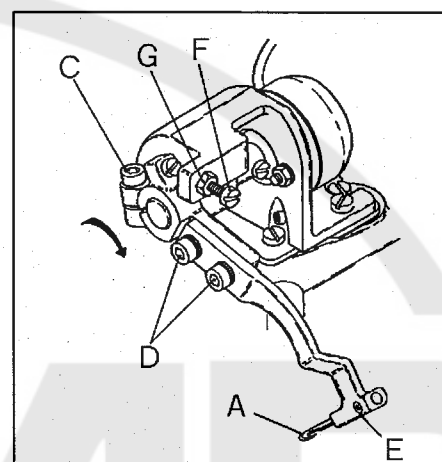
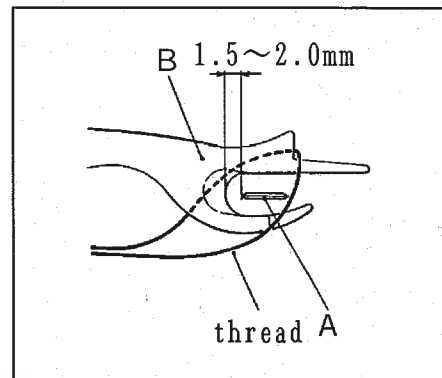
At this time, check the position of Knife again.

Note: Do not touch inside of Synchronizer unless unavoidable.



## 11-5 Adjustment of AT Device(Automatic Thread Trimming Device)

- ① Align the mark of Pulley and the mark on sticker of Pulley Graduation and bring Needle to the extreme left.
- ② Adjust so that Knife(A) pass the center of forked part of Loper(B) and also pass through the loop. The adjustment is made by loosening Screw(C) and (D) and pushing Cutting Knife Lever with finger. Adjustment of setting angle of Knife is made by loosening Screw(E).
- ③ Set Knife(A) so that the distance from the end of Cutting Knife Lever to the tip of Knife is 17mm.  
Adjust so that the distance from the tip of Knife(A) to the right surface of Loper(B) is 28~30mm when Knife moves foremost. The adjustment is made by loosening Screw(C). Adjust the clearance between Knife and Loper to be 1.5~2.0mm when Knife(A) comes to the forked part of Loper(B) by pushing Cutting Knife Lever with finger, then tighten Screw(C).
- ④ Adjust the distance from the tip of Knife(A) to left side of Loper(B) to be 6~7mm when the Knife moves to the extreme left. The adjustment is made by Adjusting Screw(F) and Lock Nut(G).



# 11-6 TS2 Device(Automatic Stitch Fastening Device) and AL5 Device(Automatic Presser Foot Lowering Device)

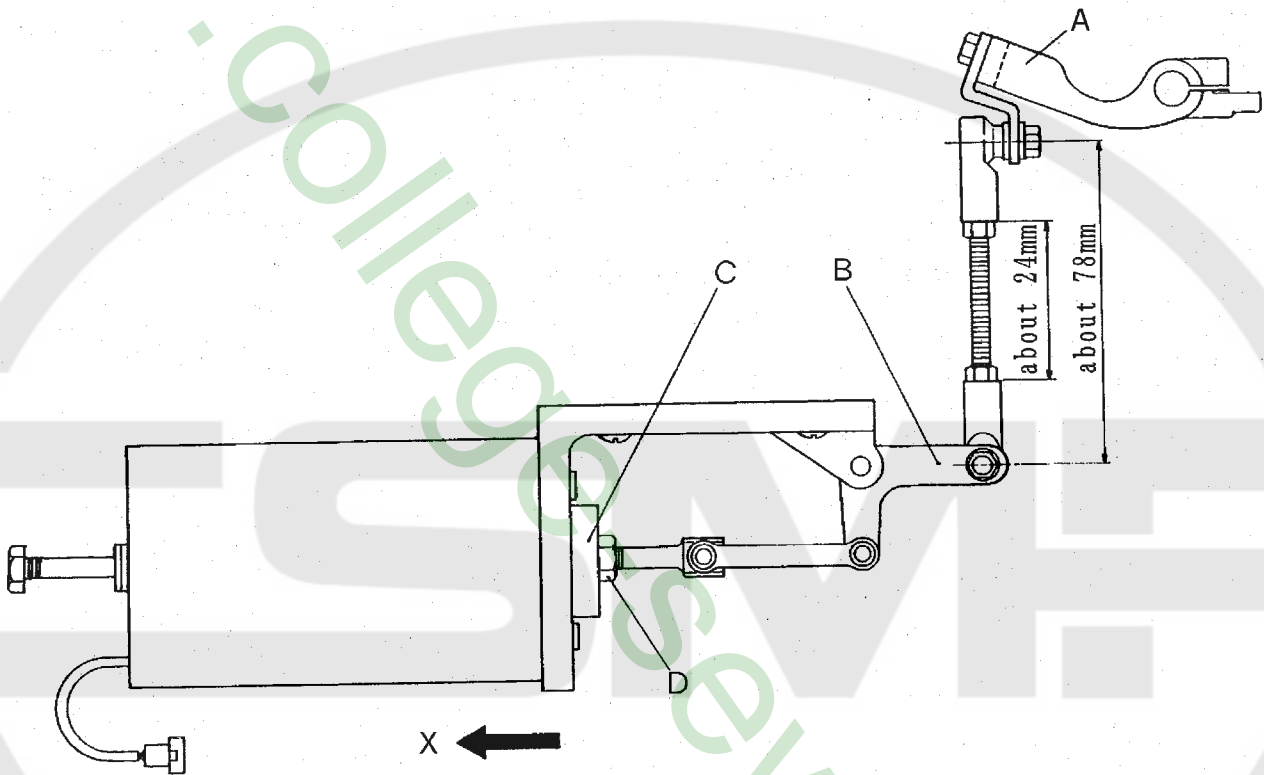
## \* Adjustment of TS2 and AL5

Install Presser Foot Lowering Solenoid Holder under Machine Table with Wood Screws referring to the drawing of table top cut-out.

Set Rod End according to the measure shown below (for the table thickness of 40mm) and connect to Knee Press Shaft Lever(A) and Lowering Lever(B).

Move Plunger(C) of Solenoid to the direction(X) and adjust so that Presser Foot descends 8~9mm.

The adjustment is made by loosening Nut(D) and turning Plunger(C).

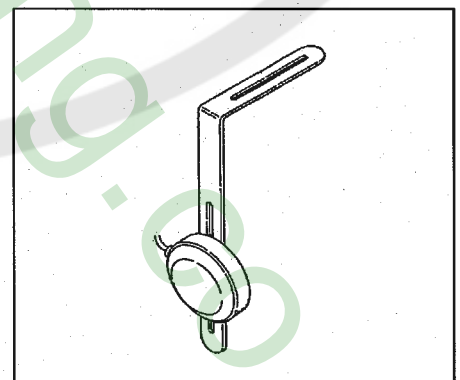


## \* Adjustment of TS2 and AL5

This Knee Switch is the standard equipment for AL5 and TS2 Devices.

To descend Presser Foot during sewing, turn Pedal to neutral and press this Switch, then Solenoid operates and Presser Foot descends.

Note: If this Switch only is pressed during sewing, Presser Foot does not descend.



\* Adjustment of TS2

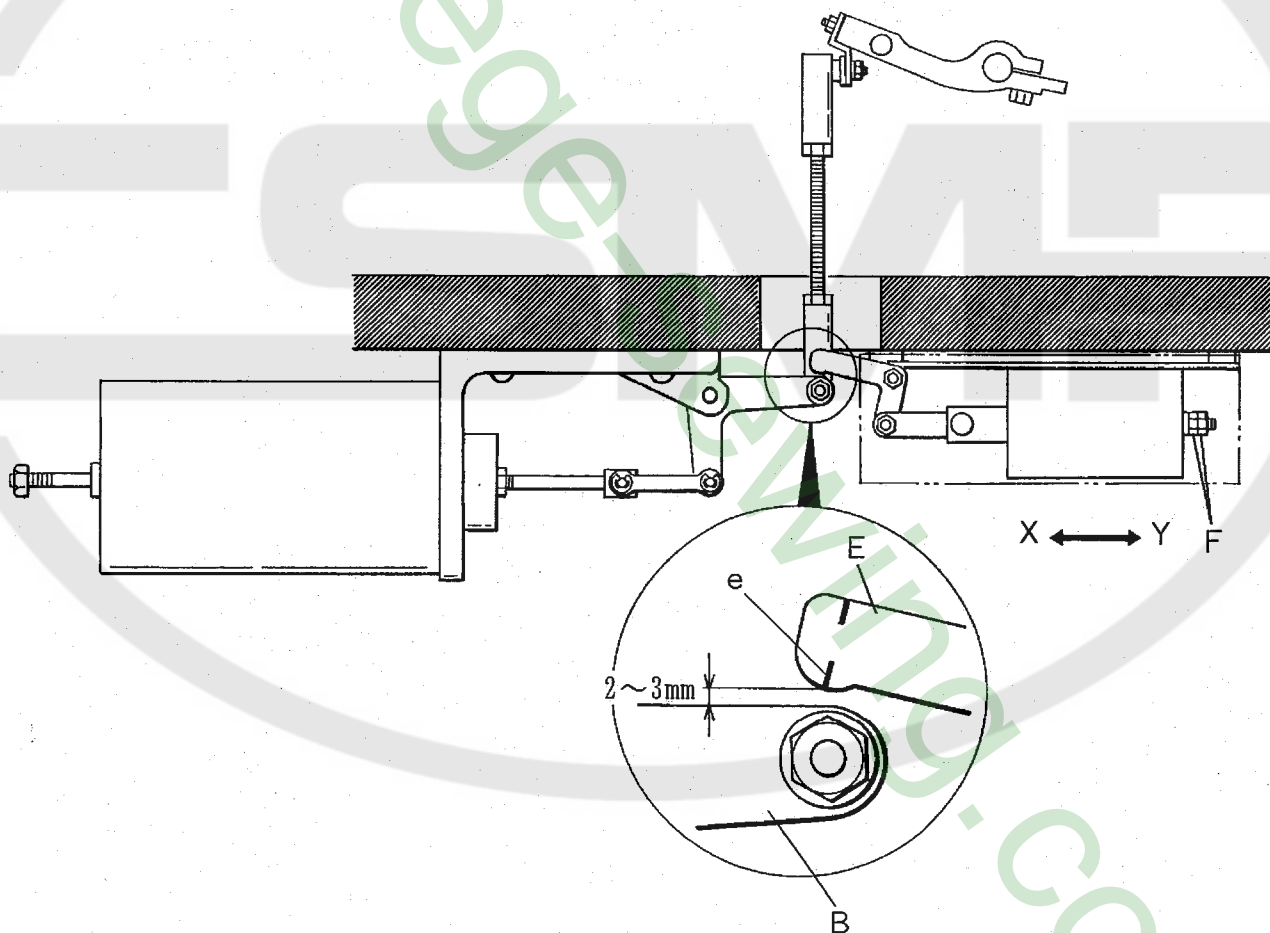
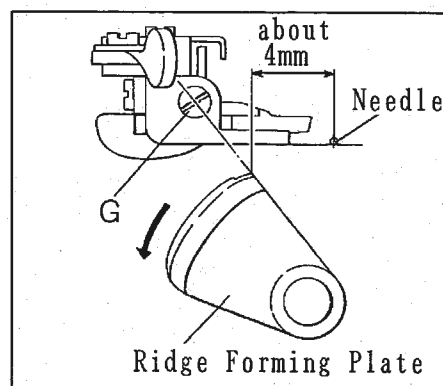
When Ridge Forming Solenoid, Complete Set is installed, make sure that Mark(e) of Solenoid Lever (E) matches the center of Lowering Lever (B).

Adjust so that the clearance between Lowering Lever (B) and Solenoid Lever (E) is 2~3mm when Solenoid Plunger is moved to the direction(X).

The adjustment is made by loosening Nut (F).

When the plunger is moved to the direction(Y), the standard amount of movement to operator side is 4mm before from Needle when Ridge Forming Plate moves foremost. (Extension of end surface of Ridge Forming Plate comes to the center of Cloth Retainer Adjusting Pin(G)).

At this time, the stroke of plunger of Ridge Forming Solenoid is 9~11mm.

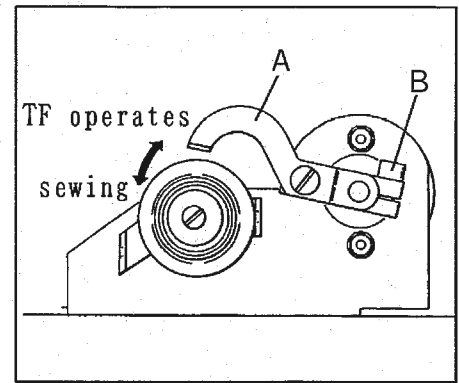


### 11-7 TF Device(Thread Fastening Device)

During sewing, Thread Tension Lever(A) gets in between Tension Discs and keep thread in the state of no-load.

When actuating (Solenoid operates) TF Device, set Thread Fasten Lever(A) to the position not to hit Tension Disc.

The adjustment is made by loosening Screw(B) of Thread Fasten Lever Holder.



### 1 2. T Device(Manual Thread Trimming Device)

(1) Set the countermark of Pulley to that on Pulley Graduations Plate and make Needle be at its extreme left position (Stop position).

(2) Operate Cutting Knife(A) by snapping Knife Driving Lever with fingers, and loosen Screw(C) of T Device Basement and Screw(D) of Knife Holder Guide Support, then adjust the Device so that the Knife(A) will pass under Looper(B) and also through the loop of thread.

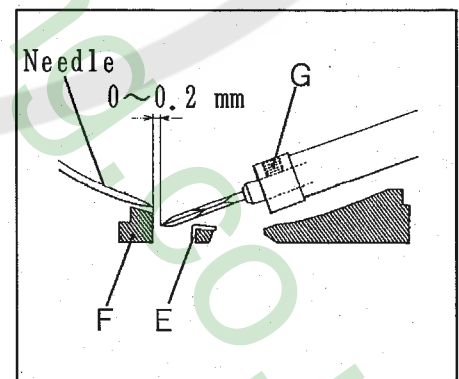
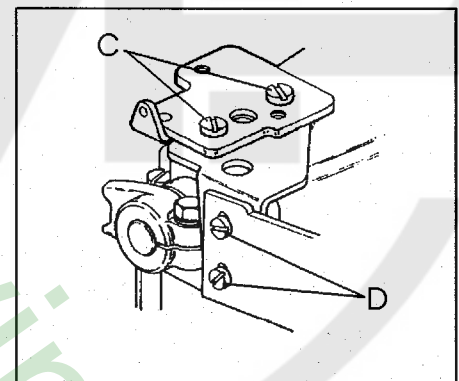
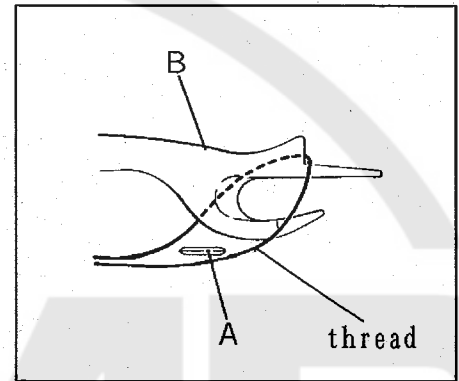
At this time, the Knife(A) should be made carefully not to touch Needle Guard(E).

(3) When the Knife(A) protrudes itself utmost, its point should be made to approach Presser Foot Plate(F) as near as possible without touching it (0~0.2 mm).

The adjustment is made by loosening Screw(G).

Note: The Device can be operated by Clutch Motor, but Positioner Motor is recommendable because of its greater efficiency for the operational feasibility.

As for installation of Synchronizer, refer to the item at page 16.





### 13. Motor and Control Box (XC-FY100 for CM series)

#### 13-1 Caution

Confirm whether or not it agrees with the type of the using sewing machine, which the mentioned type on the control box (FY100) and package.

	VC
O	CM
	VX

When the CM type

When the connecting cable is installed, the connector of blue cover must be connected to motor side and the connector of gray cover must be connected to sewing machine side.

Do not select the simple setting of other sewing machine.  
If selecting it, it might be broken.

Simple setting	Digital display	Model name of sewing machine
Y 6	$\mu$ 6	CM series Manual feed roller device tacking invalid
Y 7	$\mu$ 7	CM series Automatic feed roller device tacking invalid
Y 8	$\mu$ 8	CM series Manual feed roller device tacking valid <i>[CM type Factory setting]</i>
Y 9	$\mu$ 9	CM series Automatic feed roller device tacking valid

It is not related to the sewing machine(CM series) though  
[Y2] [Y3] [Y4] [Y5] [Y10] [Y11] [Y12]  
[Y13] are displayed.

### 13-2 Method of confirming simple setting

- (1)   
 \* Program mode [E] will be entered.  
 ([↓]+[↑]+[A])

- (2)   
 \* Changes into the display of [E].

- (3)   
 \* Set function to [T].

- (4)   
 \* Simple setting [Y8] is displayed.

- (5)   
 \* Return to the normal mode.

### 13-3 Method of changing simple setting

Example: To set the non-stitch fastening

- (1)   
 \* Program mode [2] will be entered.  
 ([↓]+[C]+[D])

- (2)   
 \* Changes into the display of [2].

- (3)   
 \* Set function to [Y6].

- (4)   
 \* [Y6] will flicker when the [D] key is pressed.

- (5)   
 \* Press the [D] key for 2 seconds or more and return to the normal mode.



#### 1 4. Against Troubles! (Causes and Countermeasures)

Causes	Countermeasures	Page
<b>A Stitch-skipping</b>		
Incorrect Threading	Refer to "Threading"	6
Improper Setting of Needle	Refer to "Setting of Needle"	6
Poor quality of Needle	Change for new one	
Improper Relation between Needle and Presser Foot Plate	Refer to "Lateral relation between Needle and Presser Foot Plate" and "Vertical relation between Needle and Presser Foot Plate"	9 10
Improper Strength of Thread Tension	Refer to "Thread tension"	7
Improper Relation between Needle and Looper	Refer to "Adjustment of Looper"	12
Wearing at point of Looper	Change for new one	
Excessive weakness of Pressure of Presser Foot Spring	Refer to "Pressure of Presser Foot and its adjustment"	10
<b>B Thread Breakage</b>		
Incorrect Threading	Refer to "Threading"	6
Improper Setting of Needle	Refer to "Setting of Needle"	6
Poor Quality of Needle	Change for new one	
Improper Relation between Needle and Presser Foot Plate	Refer to "Lateral relation between Needle and Presser Foot Plate" and "Vertical relation between Needle and Presser Foot Plate"	9 10
Improper Strength of Thread Tension	Refer to "Thread tension"	7
Improper Relation between Needle and Looper	Refer to "Adjustment of Looper"	12
Thread Breakage by Feed Dog	Deminish the sharpness of Dog Teeth by Oil Stone	
<b>C Unevenness of Felling Depth</b>		
Poor Quality of Needle	Change for new one	
Improper relation between Needle and Presser Foot Plate	Refer to "Lateral relation between Needle and Presser Foot Plate" and "Vertical relation between Needle and Presser Foot Plate"	9 10
Improper Adjustment of Cloth Retainer	Refer to "Adjustment of Cloth Retainer"	11
Wearing of Ridge Forming Plate	Change for new one	10
Incorrect Setting of Ridge Forming Plate	Refer to "Setting and adjustment of Ridge Forming Plate"	10
<b>D Needle Breakage</b>		
Improper Relation between Needle and Presser Foot Plate	Refer to "Lateral relation between Needle and Presser Foot Plate" and "Vertical relation between Needle and Presser Foot Plate"	9 10
Improper Relation between Needle and Looper	Refer to "Adjustment of Looper"	12
Incorrect Setting of Ridge Forming Plate	Refer to "Adjustment of felling depth"	7

***yamato***

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