

SINGER
569U2100A

SINGER
INDUSTRIAL PRODUCTS

569U

2100A SERIES

Operator's Guide

High Speed Single Needle Lockstitch Bar Tacking Machine

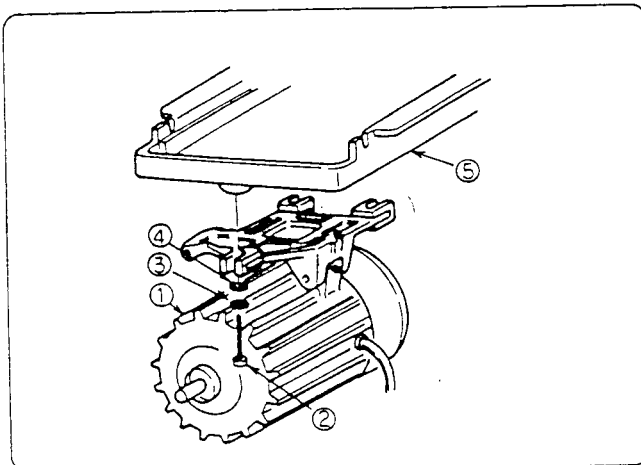
The SINGER 569U class machine is a high speed, single needle, lockstitch, bar tacking machine and designed for pleasant sewing with stable high quality.

For best sewing results, it is suggested a few moments be taken to read through this operator's guide as you sit at your new machine.

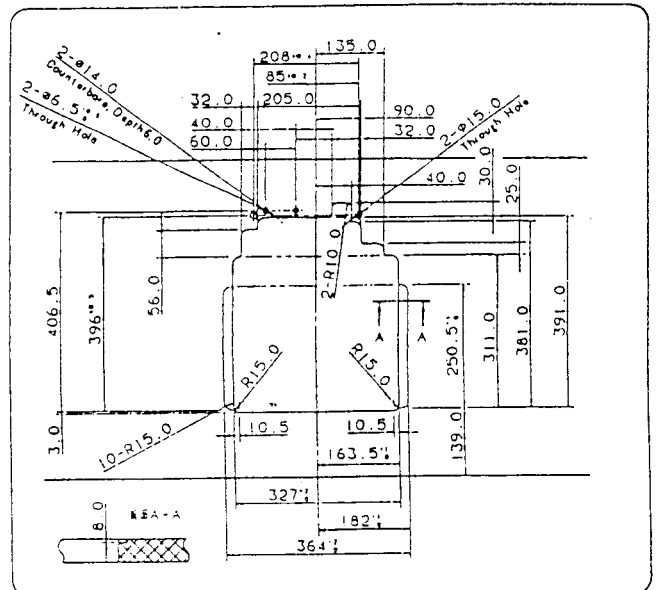
TABLE, STAND AND MOTOR

1. Table: part No. 505986-002 or equivalent
2. Stand: part No. 601001-H02 or equivalent
3. To mount motor

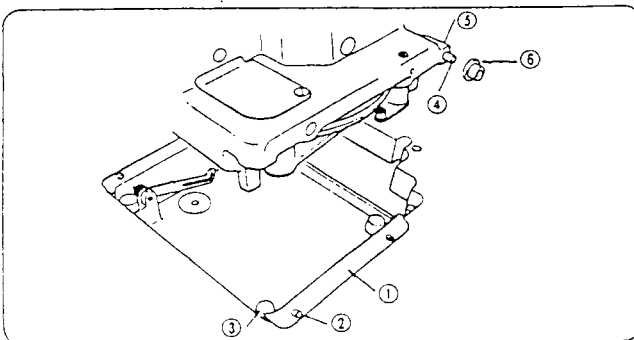
When using a commercial table, prepare in accordance with following chart.



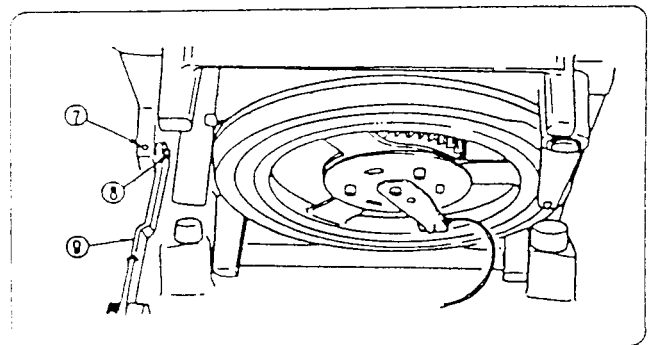
Mount motor ① to oil drip pan ⑤ with motor mounting bolts ②, spring washers ③, and washers ④.



MACHINE HEAD INSTALLATION

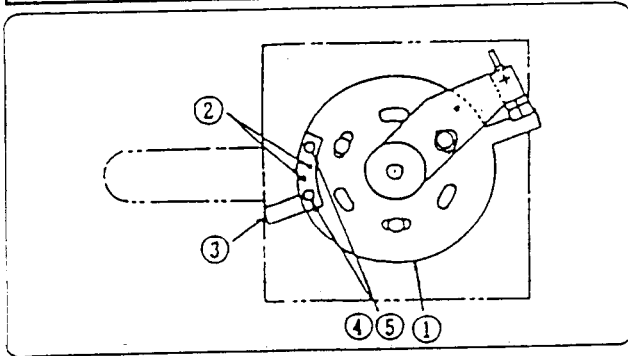


1. Assemble oil drip pan ① to table with four flat head wood screws ②.
2. Assemble cushions ③ to four corners of oil drip pan ①.
3. Insert machine hinges ④ into two places on the side of cylinder, tighten with set screws ⑤, assemble machine hinge collars ⑥ to machine hinges, and quietly place machine head on oil drip pan.



4. Tip machine back, loosen set screw ⑦, insert machine tilting latch lever hinge stud ⑧ into the long groove on latch lever ⑨ and tighten set screw ⑦.
5. To return machine in place, pull machine tilting latch lever ⑨ towards operator and raise machine quietly.

ASSEMBLY OF STOP SENSOR DETECTING BLADE



<569U2109A-21L, 569U2138A-21M>

Align position pin ② on stop sensor detecting plate ① to hole in stop sensor detecting blade ③ and fasten stop sensor detecting blade ③ to stop sensor detecting plate ① with screw ④ and washer ⑤.

MOTOR PULLEY AND BELT

Motor pulley
Belt

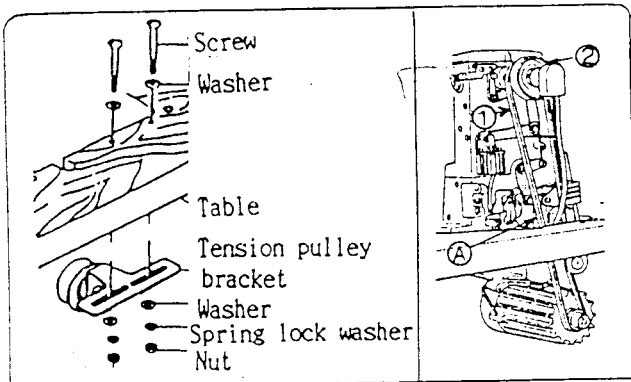
DIA 60 mm
M type V-belt (50")
M type V-belt (49")
M type V-belt (52")

P/N 373031-001

P/N 418487 (U 41 series motor)

P/N 418415 (U 43 series motor)

P/N 418484 (SYNCHRO 6040 series motor)



1. To install the tension pulley

Fasten tension pulley to underside of table as shown in the sketch.

2. To install the motor belt

<U41 and U43 series motor>

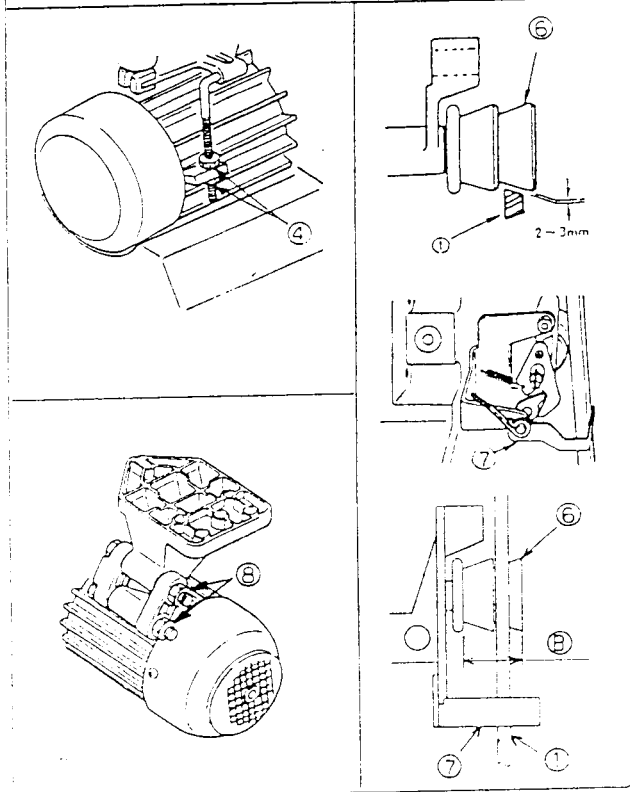
Slip V-belt ① on to pulley ② and motor pulley ③.

The correctly set V-belt should deflect approximately 10mm when pressed with a force of 200 ~ 300 grams at the mid-point A between the machine pulley and motor pulley.

To adjust, loosen two nuts ④ and move motor up or down as required.

When correct tension has been obtained, tighten the two nuts ④ and press tension pulley ⑤ lightly against the belt.

Adjust clearance between V-belt ① and bobbin winder pulley ⑥ from 2 to 3mm by moving pulley guide ⑦ back or forth.



<SYNCHRO 6040 series motor>

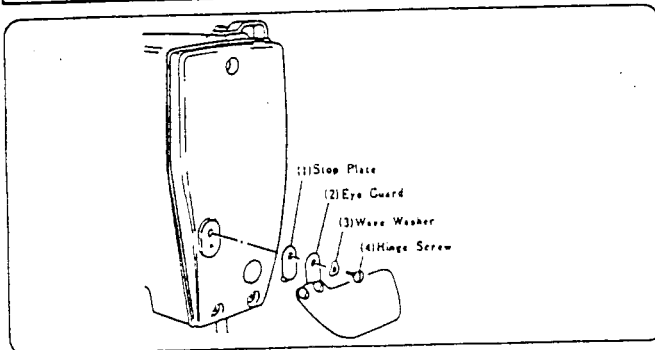
Slip V-belt ① on to pulley ② and motor pulley ③.

The correctly set V-belt should deflect approximately 10mm when mid-point A between machine pulley and motor pulley pressed with 200 ~ 300 grams force.

Also, the left side of the V-belt (looking at machine from rear end) should be located within length B of the bobbin winder pulley.

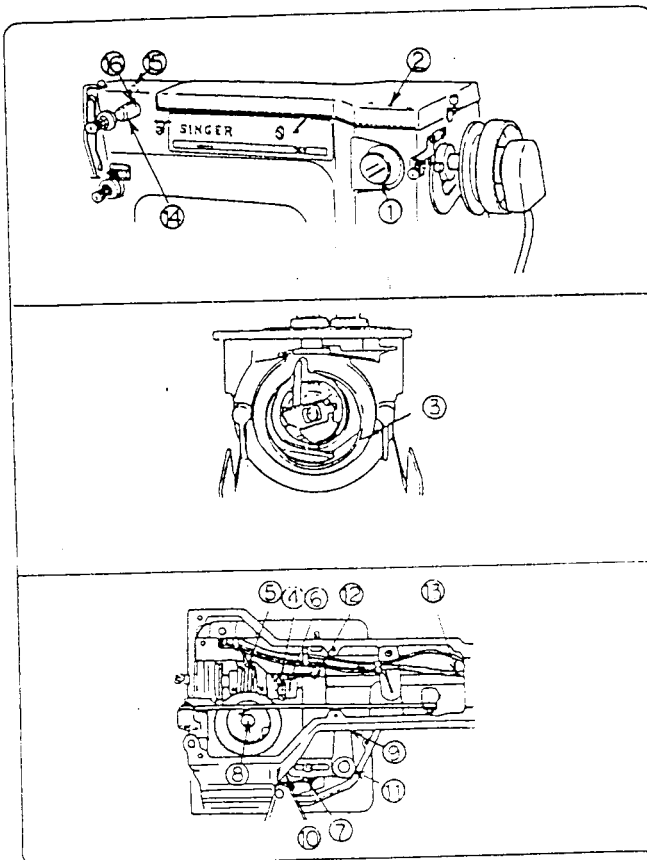
To adjust, loosen two nuts ⑧ and move motor up or down, or sidewise as required, and tighten the two nuts.

ASSEMBLY OF EYE GUARD



Assemble eye guard to face plate according to sequence shown in the sketch.

LUBRICATION



Use SINGER oil "TYPE C"

When oil in oil window ① is low, fill from oil hole ②.

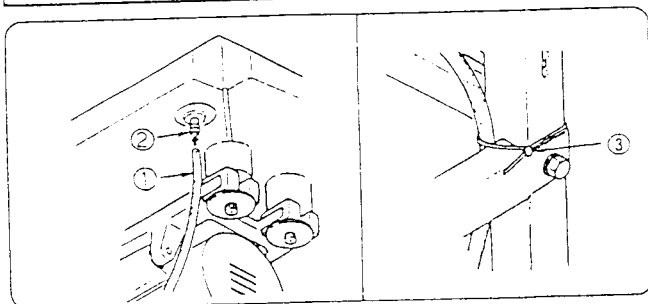
In new machines or those that have been idle for some time, adequately lubricate the raceway of shuttle ③, crank connecting rod oil felt ④, vertical drive shaft worm oil felt ⑤, oscillating rock shaft oil felt ⑥, cylinder oil felt ⑦, vertical drive shaft oil felt ⑧, lateral pivot driving arm oil felt ⑨, cylinder oil felt ⑩, longitudinal pivot driving arm oil wick ⑪, arm shaft bushing (center) oil wick ⑫, arm shaft bushing (front) oil wick ⑬, needle bar and thread take-up components and oil wicks in various places.

Remove shuttle bobbin case, shuttle race ring and shuttle body from shuttle race body and clean the parts once every day.

When thread lubricating reservoir ⑭ is used, fill with silicone oil from oil hole ⑮.

In this case, check to see silicone oil sticks to needle thread passed through thread guide ⑯

ATTACHING THE OIL TUBE

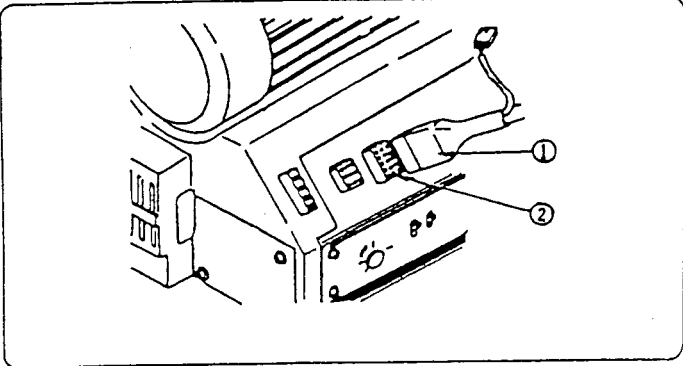


1. Fit oil drain tube ① to oil drain tube screw sleeve ② on underside of drip pan and push it on as far as it will go.
2. Fasten oil drain tube ① to stand lightly with tube retainer ③.

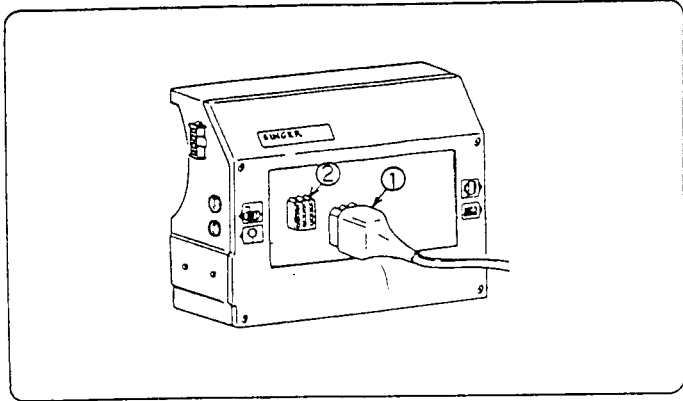
Note: Be sure the drain tube is not compressed by fastening it too tightly.



TO CONNECT THE FOOT SWITCH CABLE

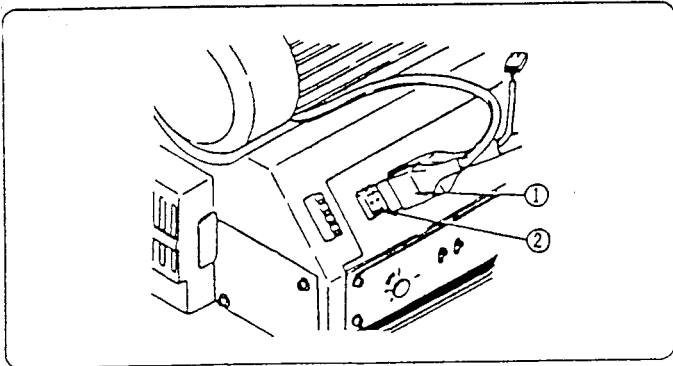


<U41 and U43 series motor>
Connect plug (15P) ① on foot switch cable to receptacle (15P) ② on motor control box as shown in the sketch.

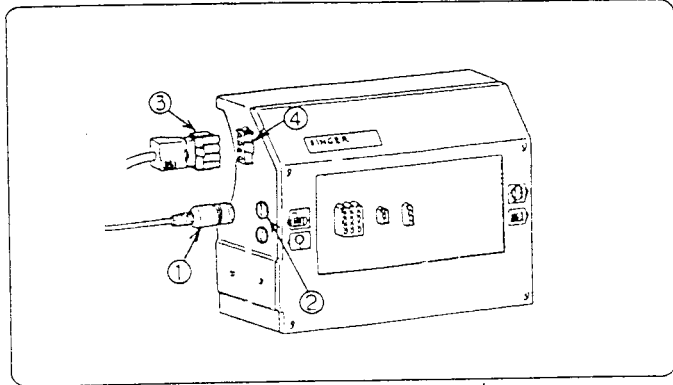


<SYNCHRO 6040 series motor>
Connect plug (15P) ① on foot switch cable to receptacle (15P) ② on motor control box as shown in the sketch.

TO CONNECT THE MOTOR ENCODER CABLE

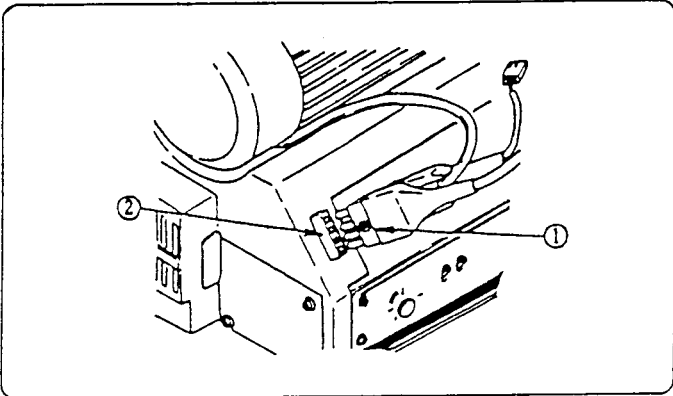


<U41 and U43 series motor>
Connect plug (9P) ① on encoder cable leading out from rear of motor to receptacle (9P) ② on motor control box as shown in the sketch.

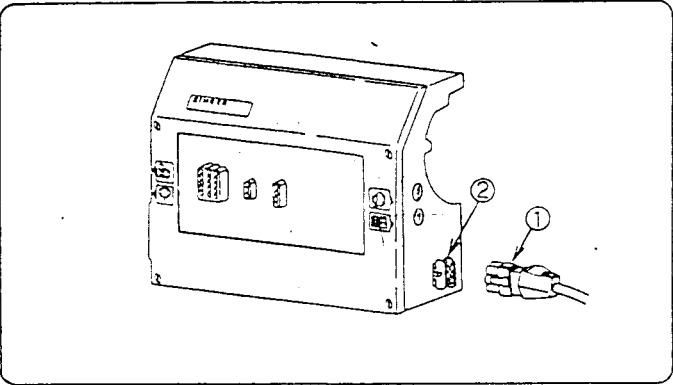


<SYNCHRO 6040 series motor>
Connect plug ① on encoder cable leading out from rear of motor to connector ② on motor control box as shown in the sketch.
Connect plug ③ on encoder cable leading out from rear of motor to connector ④ on motor control box as shown in the sketch.

TO CONNECT THE POWER SUPPLY CABLE

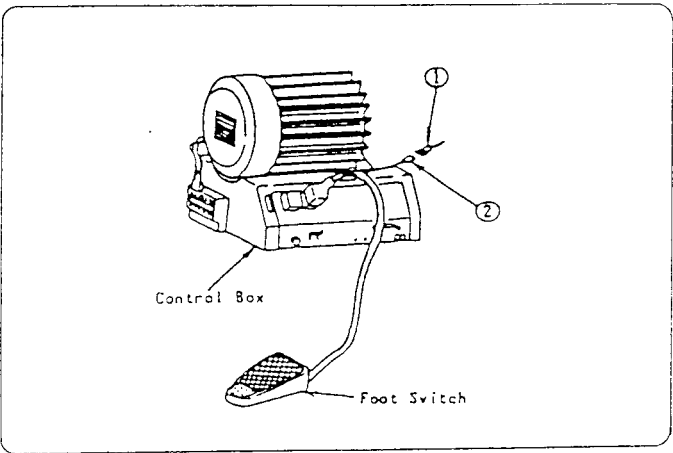


<U41 and U43 series motor>
Connect plug (4P, blue) ① on power supply cable to receptacle (4P, blue) ② on motor control box as shown in the sketch.



<SYNCHRO 6040 series motor>
Connect plug ① on power supply cable to connector ② on motor control box as shown in the sketch.

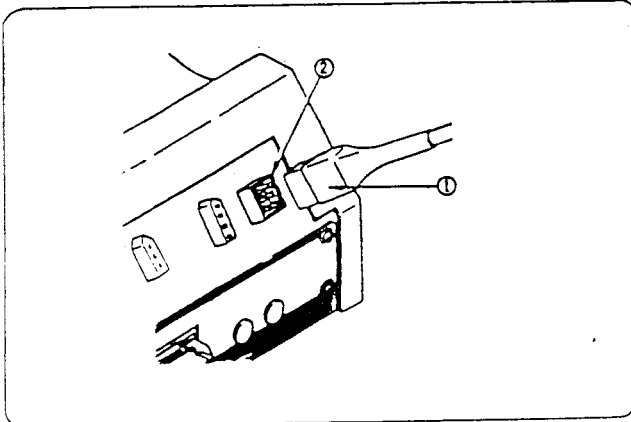
TO CONNECT THE SENSOR CABLE



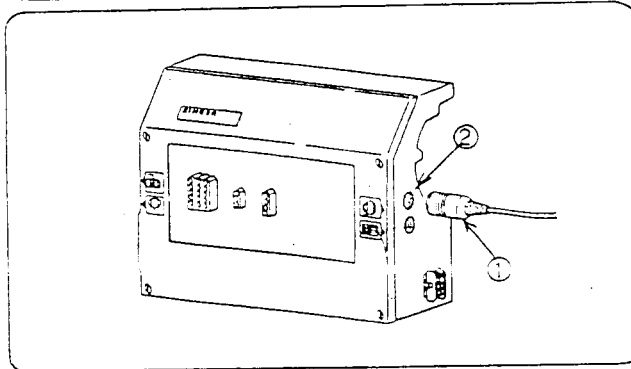
<U41 and U43 series motor>
Connect sensor plug (3P) ① to receptacle (3P) ② on cable branched off from foot switch cable as shown in the sketch.

<SYNCHRO 6040 series motor>
Connect sensor plug (3P) ① to receptacle (3P) ② on cable branched off from foot switch cable as shown in the sketch.

TO CONNECT THE SYNCHRONIZER CABLE

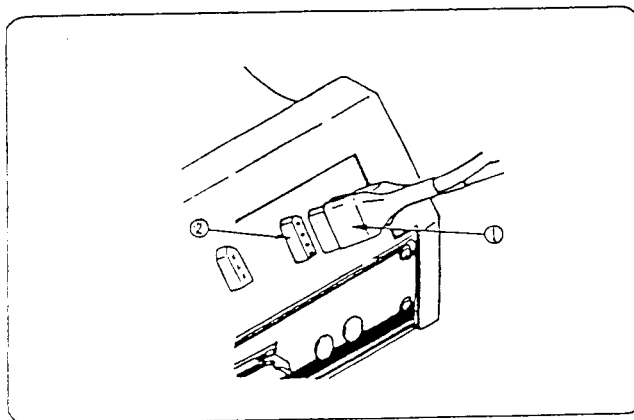


<U41 and U43 series motor>
Connect receptacle (6P) ① on synchronizer cable to plug (6P) ② on motor control box as shown in the sketch.

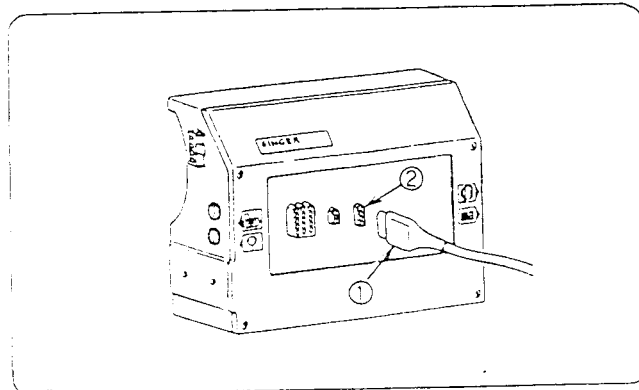


<SYNCHRO 6040 series motor>
Connect plug ① on synchronizer cable to connector ② on motor control box as shown in the sketch.

TO CONNECT SOLENOID VALVE CABLE (CLAMP LIFTING)

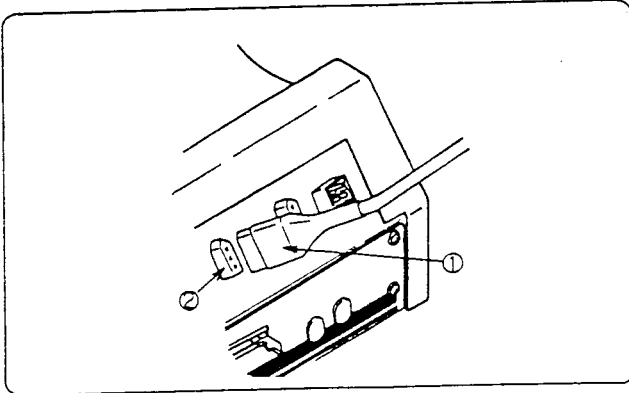


<U41 and U43 series motor>
Connect plug (4P) ① on solenoid valve cable (clamp lifting) to receptacle (4P) ② on motor control box as shown in the sketch.

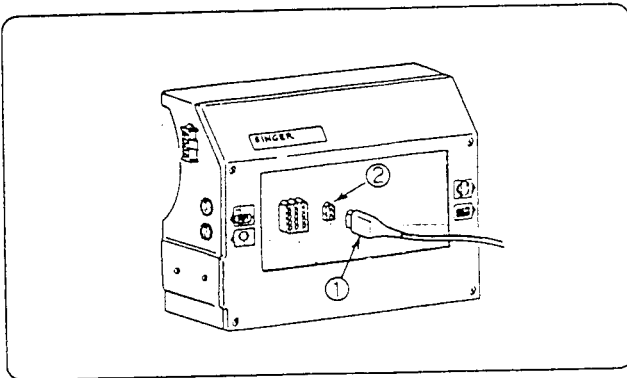


<SYNCHRO 6040 series motor>
Connect plug (4P) ① on solenoid valve cable (clamp lifting) to receptacle (4P) ② on motor control box as shown in the sketch.

TO CONNECT SOLENOID VALVE CABLE (THREAD TRIMMING)

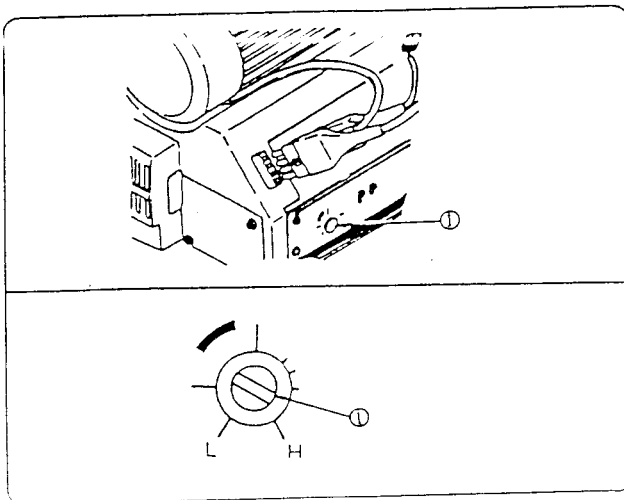


<U41 and U43 series motor>
Connect plug (3P) ① on solenoid valve cable (thread trimming) to receptacle (3P) ② on motor control box as shown in the sketch.



<SYNCHRO 6040 series motor>
Connect plug (3P) ① on solenoid valve cable (thread trimming) to receptacle (3P) ② on motor control box as shown in the sketch.

TO ADJUST THE MACHINE SPEED



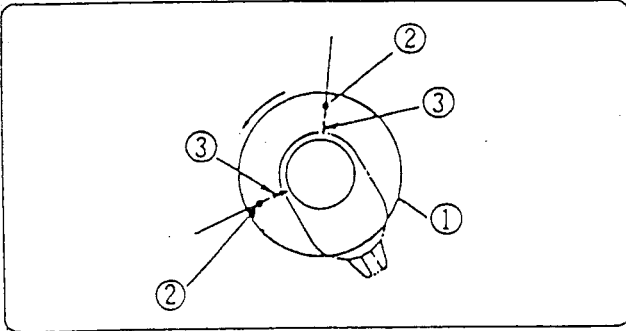
<U41 and U43 series motor>
Machine speed can be varied by means of a speed control volume (covered with rubber cap) ① provided on the motor control box.
Machine speed should be adjusted in accordance with the type of work being done.
Machine speed is set at 2000 s.p.m. when the mac

Note: The machine should be operated within the speed range of 1800 ~ 2300 s.p.m..
If the machine is run at speeds other than the above specified speed range, malfunction of the machine could result.

<SYNCHRO 6040 series motor>

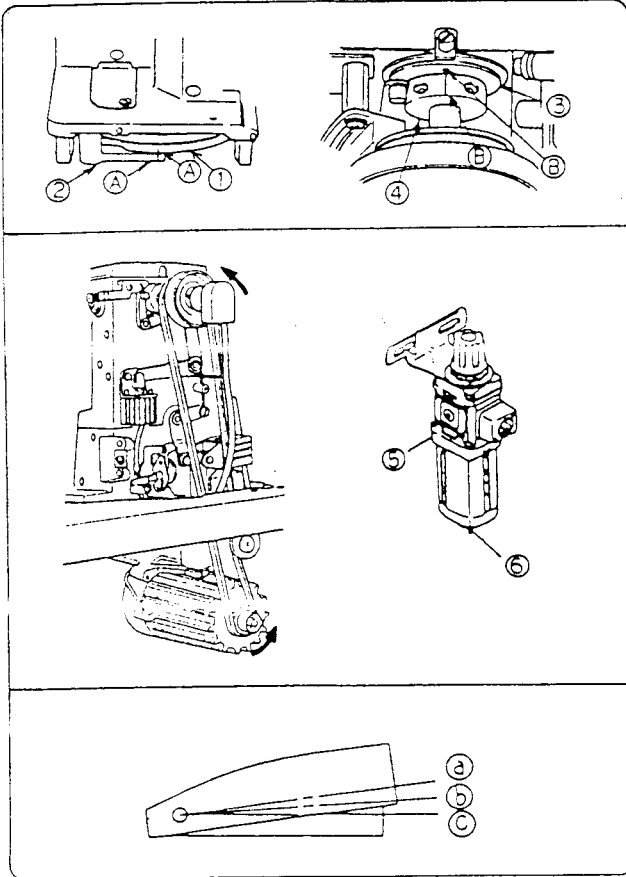
Machine speed is set at 2200 s.p.m. when the machine leaves the factory.
The machine speed can be varied by using a console available at additional charge.

TO MOUNT THE SYNCHRONIZER



Fasten synchronizer to machine pulley ① with set screw ③ located opposite to the timing mark ② on the machine pulley.

OPERATION OF MACHINE



1. Before turning the power switch on, tilt the machine back and make sure that the timing mark ④ on the feed cam ① is almost aligned with the timing mark ④ on lateral rock driving arm ②. Then return the machine in place and install the V-belt.

Align the timing mark ④ on arm shaft ball bearing (back) retaining plate ③ with the timing mark ④ on knife bar operating cam ④.

Check and make sure the air pressure is set at 0.5 Mpa (5kg/cm²) ~ 0.8 Mpa (8kg/cm²).

Note: Do not operate the machine when air pressure is low or no air at all as this may result in malfunction and damages to parts.

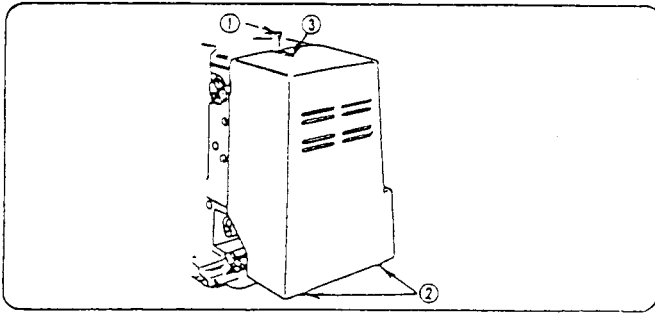
Also, check and make sure there is no water accumulated in the filter regulator ⑤. If there is water in the filter regulator ⑤, loosen drain screw ⑥ and drain the water.

2. Clamp foot will rise when power switch is turned on.
3. Clamp foot will descend when pedal is depressed to position ⑥. To raise the clamp foot, return pedal to neutral position ④.
4. The machine will start to run when pedal is depressed from position ⑥ to position ③. Return pedal to neutral position ④ immediately when machine starts to run.
5. When specified number of stitches have been sewn, the thread is trimming as the clamp foot rises and the machine will stop completing one cycle.

Note:

1. Do not depress pedal if clamp foot does not rise when power switch is turned on. Also, if clamp foot does not rise at completion of a cycle, check whether air pressure is set at 0.5 Mpa (5kg/cm²) ~ 0.8 Mpa (8kg/cm²) before depressing the pedal.
2. <When U41 series motor is used>
When pedal is depressed to, and held at either point ④ or ③ at completion of one cycle, the machine will sew the programmed number of stitches and trim the thread as the clamp foot rises and stop but the clamp foot will descend after reaching its highest point if the pedal is held at point ④ or ③ continuously. Therefore, to start the next cycle, return pedal to neutral position ④.
<When U43 or SYNCHRO 6040 series motor is used>
When pedal is depressed to, and held at either point ④ or ③ at completion of one cycle, the machine will sew the programmed number of stitches and trim the thread as the clamp foot rises and stop. To start the next cycle, return pedal to neutral position ④.
3. Be sure the stop sensor detecting blade attached to the inspection tag is fastened to the stop sensor detecting plate before operating the 569U2109A-21L and 569U2138A-21M machine.
4. Do not rotate the machine in reverse as it may cause breakdown.

ASSEMBLY OF BELT GUARD



To assemble belt guard, fit cushions ② into holes on table, assemble belt guard in place as illustrated and fix belt guard lock plate ③ with belt guard lock screw ①.

Caution: When assembling or removing belt guard, be sure to turn power switch off.

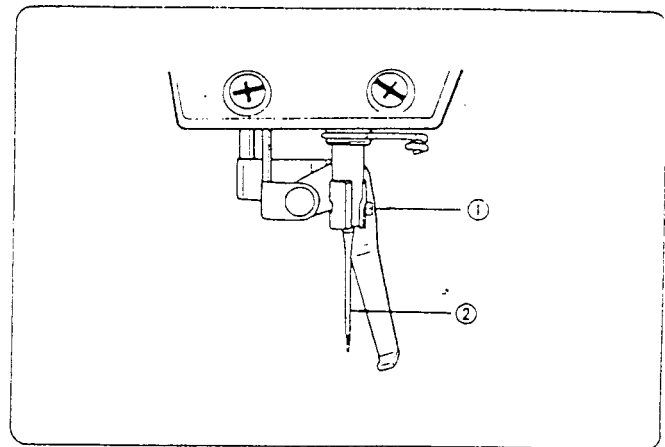
NEEDLES

Needle used has a direct affect on the quality of the stitches produced. Correct needle usage is very important for complete function of the machine and so always use singer needles indicated in chart to obtain best sewing finish.

Catalog No.	Size
1955-01	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25

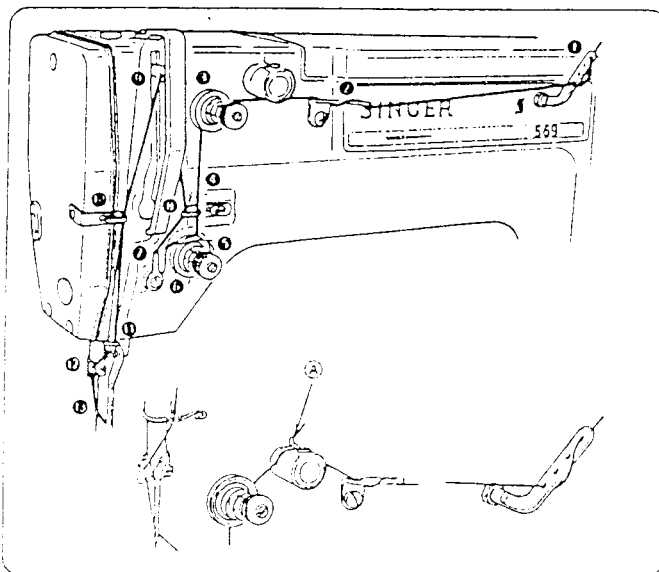
Needle size differs according to thread thickness and type of material, and so select a needle best suited for this. When proper needles are used, thread can be threaded freely through the needle eye and thread will not break during sewing. A bent needle can be cause of skip stitches. Also blunt or burred needle points may cause skip stitches and material damage.

INSERTING THE NEEDLE



Loosen needle clamping screw ① and insert needle ② fully into needle bar with long groove of needle ② facing operator. Securely tighten needle clamping screw ①.

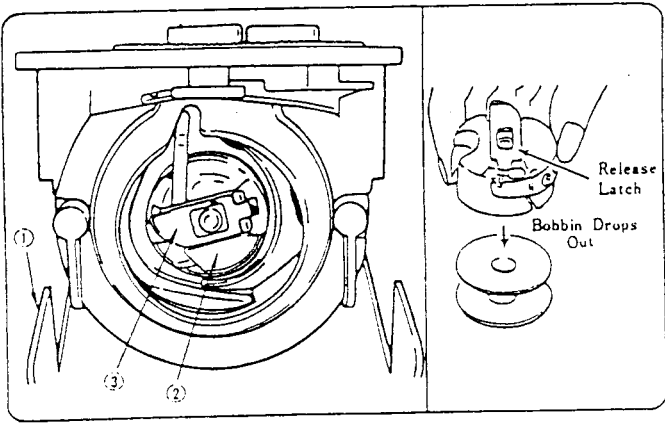
THREADING THE MACHINE



Thread machine in accordance with sequence illustrated at left. Draw about 3.5cm of thread through the eye of needle after threading.

Note: When using silicone oil, pass thread through thread guide ①

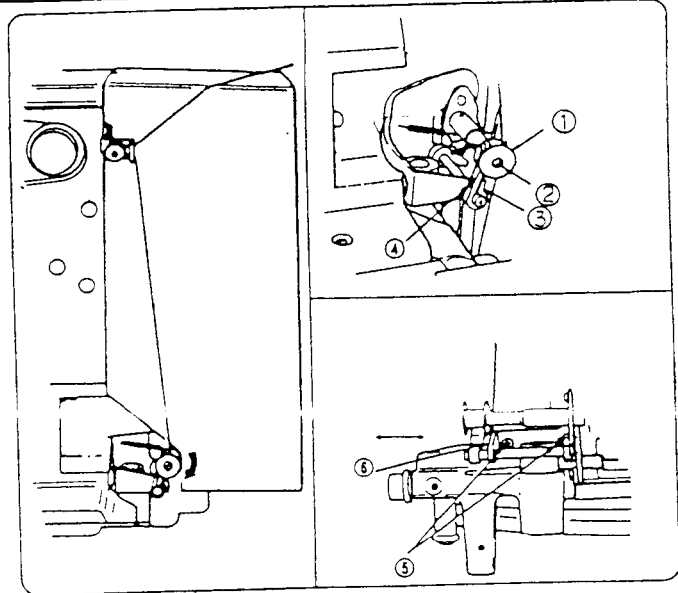
REMOVING AND REPLACING THE BOBBIN CASE



Pull cylinder cover ① toward operator and open, raise latch ③ on bobbin case ②, and remove bobbin case. While latch is raised, bobbin will not drop out of bobbin case. To replace, insert bobbin case fully into stud on shuttle and release latch.

To remove bobbin from bobbin case, release latch, face opening of bobbin case downwards and bobbin will drop out as shown.

WINDING THE BOBBIN



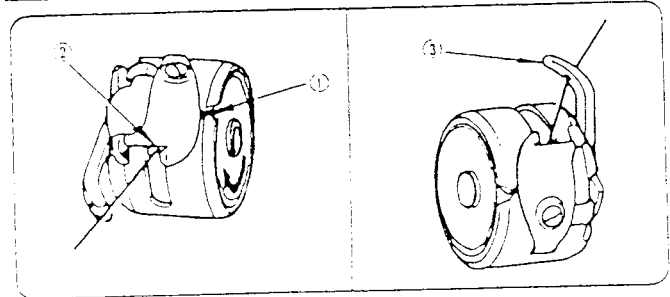
Insert bobbin ① fully into bobbin winder spindle ②. Pass thread as illustrated and wind thread end a few times in the arrow direction.

Pressing bobbin winder stop latch thumb lever ③ in the arrow direction, thread will automatically wind and automatically stop when specific amount of thread is wound.

To decrease thread-amount on bobbin, loosen screw ④ and move lever ③ in the arrow direction.

If thread winds unevenly on bobbin, loosen screw ⑤ and adjust by moving bobbin winder bracket ⑥ in the arrow direction.

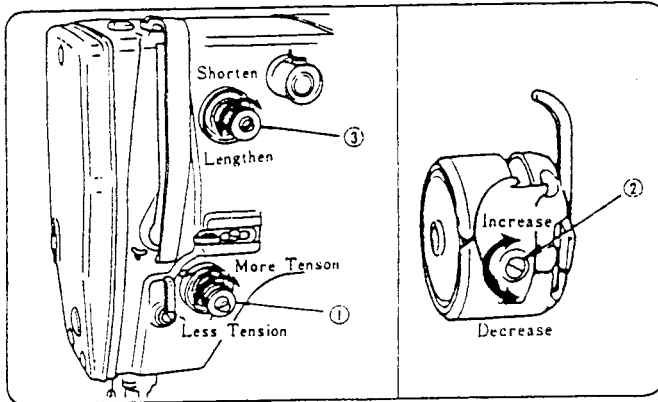
THREADING THE BOBBIN CASE



Place bobbin into bobbin case, pass thread through slot ① and draw from hole ②. At this time, check to see bobbin rotates in the arrow direction.

Pass thread through hole ③ on tip of finger and draw about 4cm of thread from the hole.

ADJUSTMENT OF THREAD TENSION



Needle thread tension

To increase needle thread tension, turn tension regulating thumb nut ① to the right, and to decrease, turn to the left.

Bobbin thread tension

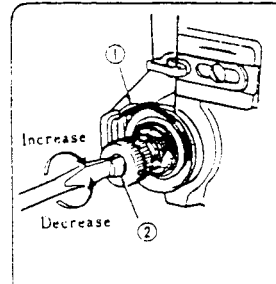
To increase bobbin thread tension, turn fulcrum tension regulating screw ② to the right, and to decrease, turn to the left.

Needle thread end length after trimming

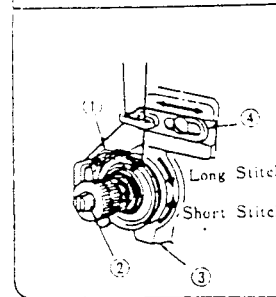
To shorten needle thread end after trimming, turn pre-tension regulating thumb nut ③ to the right, and to lengthen, turn to the left.

Thread end length should be as short as possible but should not pull out of needle eye.

ADJUSTMENT OF THREAD TAKE-UP SPRING & THREAD RETAINER



Tension and operating range of thread take-up spring ① may require different settings depending upon the size of thread and material used. Heavier thread or material requires stronger tension, thin material requires less tension and longer operating range.

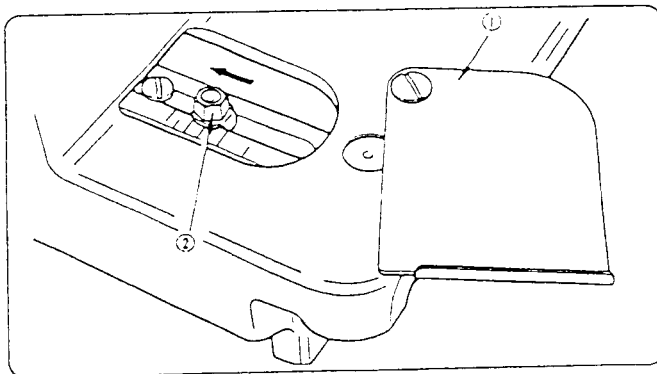


To adjust spring tension, insert a large screwdriver into slot of stud ② and turn left to decrease or right to increase.

To adjust spring operating range, loosen screw ③ and turn entire assembly to left to decrease or right to increase.

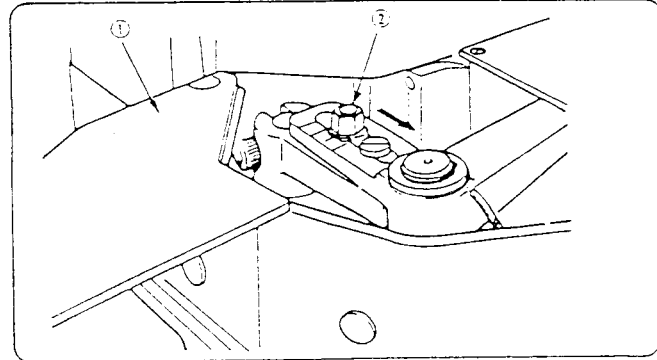
To obtain good stitch tightness depending on the thickness of material or length of stitch, it may be necessary to adjust the thread guard ④ to the left or right. For heavy material or long stitches, move thread guard to the right and for light material or short stitches, move thread guard to left.

ADJUSTMENT OF BAR TACKING LENGTH



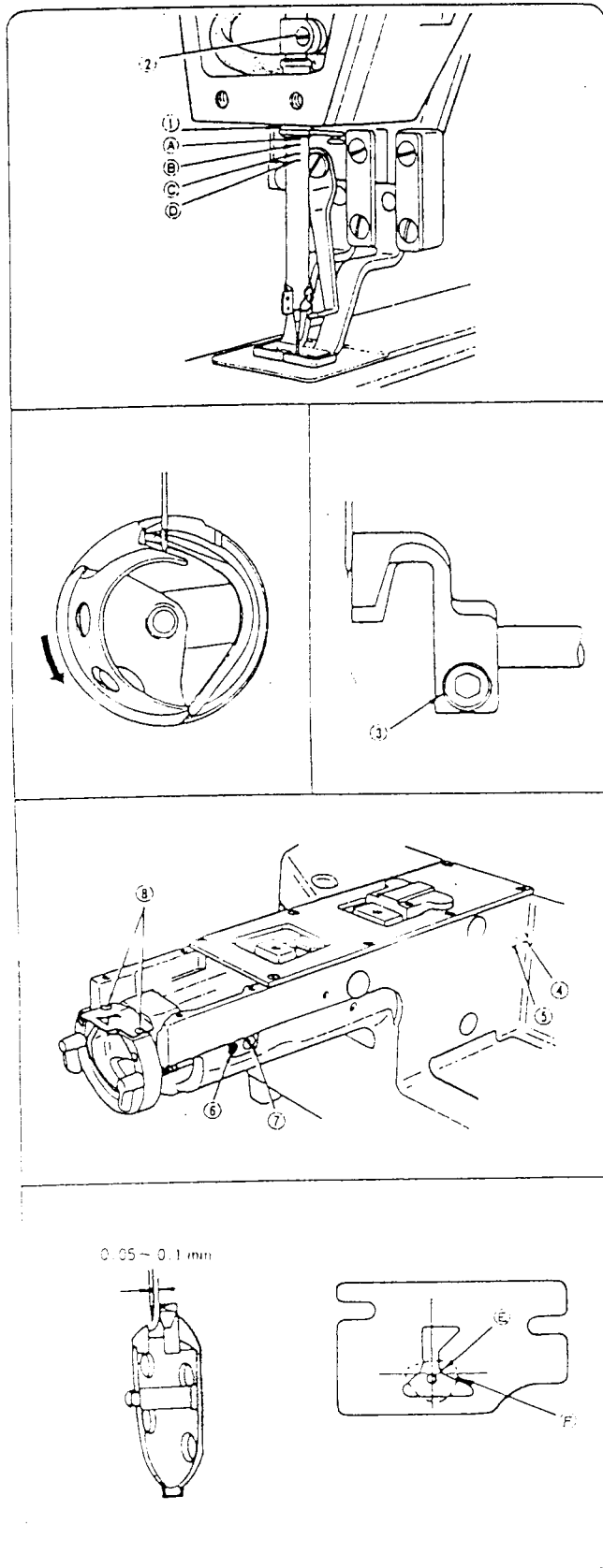
Open cover ① and loosen nut ②. To lengthen bar tacking length, move nut ② in the arrow direction, and to shorten, move in the opposite direction.

ADJUSTMENT OF BAR TACKING WIDTH



Open cover ① and loosen nut ②. To widen bar tacking width, move nut ② in the arrow direction, and to reduce, move in opposite direction.

ADJUSTMENT OF NEEDLE AND SHUTTLE



1. To adjust needle bar height
Turn driving wheel by hand (See page 7) until needle bar is at its lowest point. Loosen needle bar connecting link screw ② and move needle bar up or down until the highest mark ④ on needle bar aligns with lower end of needle bar lower bushing ①. If catalog No. 3355-01 needle is used, align mark ③ on needle bar with lower end of needle bar lower bushing.

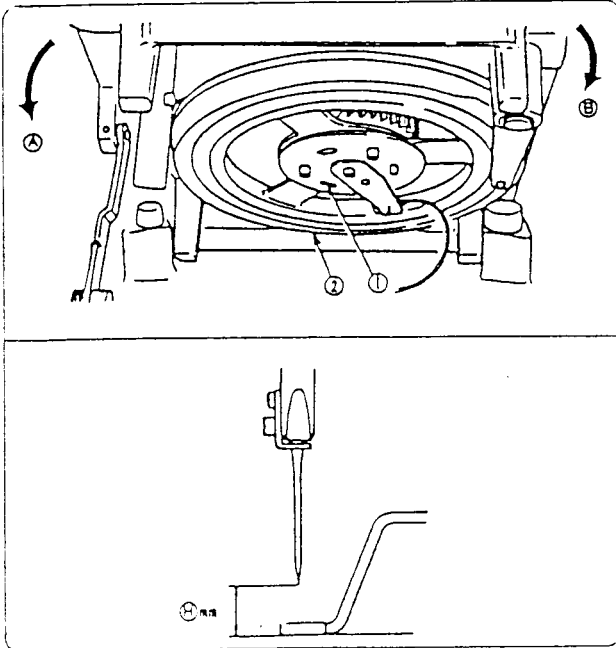
2. To adjust timing of needle and shuttle
Raise needle bar from its lowest point by turning driving wheel with hand and align the second mark ⑤ on needle bar with end of needle bar lower bushing ①. Loosen screw ③ and turn shuttle body in the arrow direction so that the center of needle aligns with shuttle point. If catalog No. 3355-01 needle is used, align mark ① on needle bar with lower end of needle bar lower bushing.

3. To adjust needle and shuttle driver
Turn driving wheel by hand and align shuttle point with the center of needle. Loosen screw ④ and turn oscillating shaft bushing adjusting stud ⑤ so that needle contacts with shuttle driver. If shuttle driver does not properly contact needle, needle and shuttle point will interfere causing damage to the parts. If the contact is too heavy, it will cause skip stitching.

4. To adjust clearance between needle and shuttle point
Turn driving wheel by hand and align shuttle point with the center of needle. Loosen set screw ⑥ and turn shuttle race body adjusting stud ⑦ so that clearance between needle and shuttle point is 0.05 to 0.1mm.

5. To adjust shuttle bobbin cap location
Loosen two screws ⑧, move and adjust shuttle bobbin cap so that needle location at penetration is equal in the left and right direction, and back of needle is even with corner ⑨ in the back and forth direction. Care must be taken as when shuttle bobbin cap is out of position either in left and right or back and forth direction, needle thread will be caught in shuttle.
If there should be any bruises at location ⑩, this will be causes for bobbin thread breakage and so remove bruises with emery cloth and polish with green rouge.

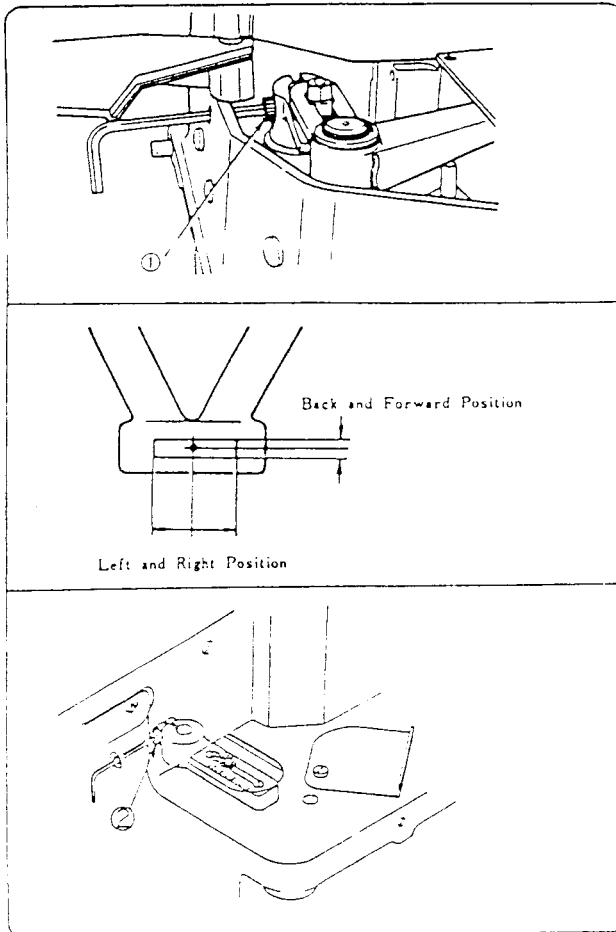
ADJUSTMENT OF FEED TIMING



Loosen three socket head bolts ① and adjust timing by turning feed cam ② so that when needle point is lowered to the height of H mm from throat plate upper surface, feed dog stops. For earlier feeding, turn feed cam to direction ④, and for later feeding, turn to direction ⑤. Height H differs according to models as shown in the following chart.

Model	2108A-42L 2108A-42H 2108A-42H 2109A-21L	2111A-42L 2138A-21M	2109A-28L 2138A-29M 2139A-29M 2141A-28L	2141A-29M 2141A-29H 2149A-28L 2149A-29M	2105A-22 2117A-15	2138A-36M 2142A-36L 2142A-36H 2142A-36H
Ⓜ Height (mm)	6		10		7	

ADJUSTMENT OF CLAMP FOOT POSITION



1. To adjust back and forward position of clamp foot

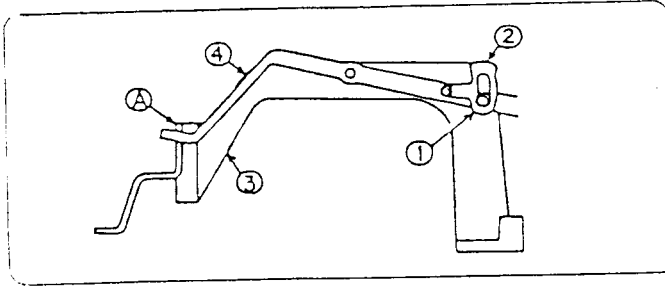
Turning driving wheel by hand, lower needle into needle hole the specified times shown in the chart below and with needle in the hole, loosen Socket head bolt ① and move clamp foot back or forward.

2. To adjust left and right position of clamp foot

Lower needle into needle hole in the same way as item 1. With needle in hole, loosen screw ② and move clamp foot left or right so that clearance between needle and clamp foot is even left and right.

Model	2108A-42L 2108A-42H	2108A-42H	2109A-21L 2109A-28L	2138A-21M 2138A-29M	2139A-29M
Stitch	6		4		1
Model	2138A-36M 2142A-36L	2142A-36M 2142A-36H	2149A-28L 2149A-29M	2111A-42L 2141A-28L	2111A-29M 2141A-29H
Stitch	7		2		5

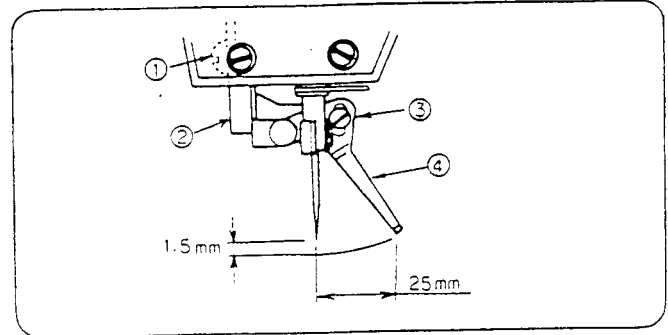
ADJUSTMENT OF CLAMP FOOT HEIGHT



Loosen socket head bolt ① and adjust clamp foot height by moving arch clamp foot lifting lever adjusting plate ② up or down. Maximum clamp foot lift amounts is 17mm from throat plate upper surface. Check and make sure there is no interference between arch clamp frame ③ and arch clamp foot lifting lever ④ at point A.

NOTE: When clamp foot height is set higher than 17mm, there is a possibility that interference may occur between arch clamp frame ③ and arch clamp foot lifting lever ④.

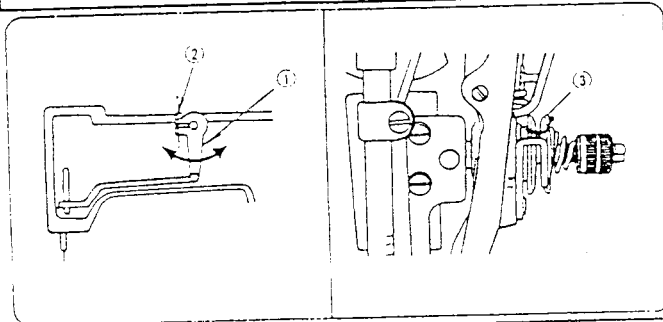
ADJUSTMENT OF WIPER SETTING



Loosen screw ① and move wiper bracket ② up or down, as required, so that clearance between wiper and needle point is 1.5 mm when wiper passes the needle point. Tighten screw ①.

Loosen screw ③ and move wiper ④ to the left or right, as required, so that the distance between wiper point and needle point is 25mm. Tighten screw ③.

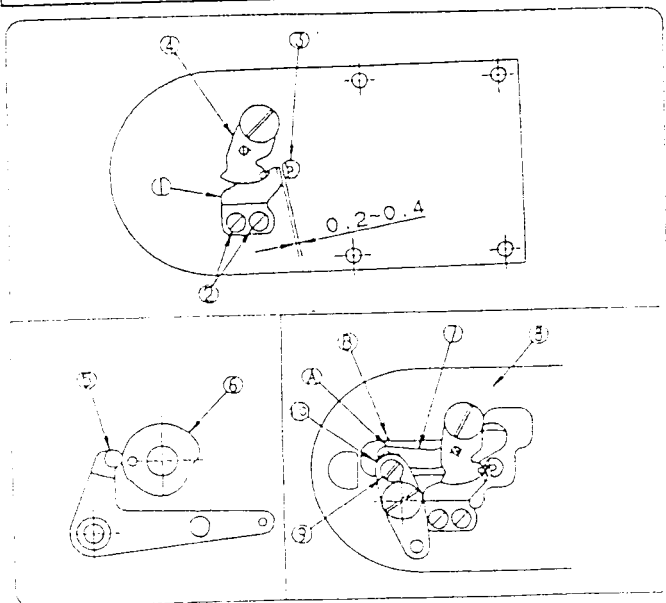
ADJUSTMENT OF TENSION RELEASING BAR



Loosen tension releasing bar operating arm screw ② and adjust tension releasing bar operating arm ① so that the tension discs ③ will begin to release when movable knife starts to move as the clamp foot is raised.

Note: Be sure the tension discs are not open when clamp foot is in its down position.

ADJUSTMENT OF KNIVES



1. To adjust stationary knife position

Loosen screw ② and adjust setting of stationary knife ① so that the clearance between its edge and edge of throat plate needle hole bushing ③ is 0.2 ~ 0.4mm.

2. To adjust movable knife position

Loosen screw ⑨ and move knife (movable) lever ⑧ backward or forward, as required, so that timing mark A on knife (movable) link ⑦ is aligned with timing mark B on throat plate ⑧ when knife bar operating cam connecting crank roller (upper) ⑤ comes in contact with knife bar operating cam ⑥ at the last stitch.

SPECIFICATION

Model	569U2108A-42M	569U2141A-28M	569U2142A-36M	569U2108A-42H	569U2141A-28H	569U2142A-36H
Application	General Clothing	General Clothing	General Clothing	Denim	Denim	Denim
Stitch Pattern						
No. of Stitches	42	28	36	42	28	36
Bar Tack Length	3.2 ~ 16.0 mm	3.2 ~ 16.0	3.2 ~ 16.0	3.2 ~ 16.0	3.2 ~ 16.0	3.2 ~ 16.0
Bar Tack Width	1.0 ~ 3.0 mm	1.0 ~ 3.0	1.0 ~ 3.0	1.0 ~ 3.0	1.0 ~ 3.0	1.0 ~ 3.0
Needle (Catalog No.)	1955-01	1955-01	1955-01	1955-01	1955-01	1955-01
Max. Clamp Foot Lift	17 mm	17	17	17	17	17
Max. Speed	2,300 s.p.m.	2,300	2,300	2,300	2,300	2,300

Model	569U2108A-42L	569U2109A-21L	569U2109A-28L	569U2111A-42L	569U2141A-28L	569U2142A-36L
Application	Light Material	Light Material	Light Material	Light Material	Light Material	Light Material
Stitch Pattern						
No. of Stitches	42	21	28	42	28	36
Bar Tack Length	3.2 ~ 16.0 mm	3.2 ~ 8.0	3.2 ~ 8.0	9.6 ~ 22.2	3.2 ~ 16.0	3.2 ~ 16.0
Bar Tack Width	1.0 ~ 3.0 mm	1.0 ~ 3.0	1.0 ~ 3.0	1.0 ~ 3.0	1.0 ~ 3.0	1.0 ~ 3.0
Needle (Catalog No.)	1955-01	1955-01	1955-01	1955-01	1955-01	1955-01
Max. Clamp Foot Lift	17 mm	17	17	17	17	17
Max. Speed	2,300 s.p.m.	2,300	2,300	2,300	2,300	2,300

Model	569U2149A-28L	569U2139A-28M	569U2149A-28M	569U2138A-21M	569U2138A-23M	569U2138A-36M
Application	Light Material	Belt Loops	Belt Loops	Buttonholing	Buttonholing	Buttonholing
Stitch Pattern						
No. of Stitches	28	28	28	21	23	36
Bar Tack Length	4.8 ~ 12.7 mm	3.2 ~ 12.7	4.8 ~ 25.4	3.2 ~ 8.0	3.2 ~ 8.0	3.2 ~ 8.0
Bar Tack Width	—	—	—	1.0 ~ 3.0	1.0 ~ 3.0	1.0 ~ 3.0
Needle (Catalog No.)	1955-01	1955-01	1955-01	1955-01	1955-01	1955-01
Max. Clamp Foot Lift	17 mm	17	17	17	17	17
Max. Speed	2,000 s.p.m.	2,000	2,000	2,000	2,000	2,000

Model	569U2105A-22			569U2117A-16			
Application	Button Sewing			Button Sewing			
Stitch Pattern							
No. of Stitches	22	11+11	11	16	8+8	8	
Across Arm Length	2.5 ~ 6.5 mm			2.5 ~ 6.5			
Up Arm Length	0 ~ 6.5 mm			0 ~ 6.5			
Diameter of Button	8.7 ~ 31.8 mm			8.7 ~ 31.8			
Needle (Catalog No.)	3355-01			3355-01			
Max. Button Clamp Lift	13 mm			13			
Max. Speed	2,000 s.p.m.			2,000			

TROUBLE-SHOOTING GUIDE

Trouble	Cause	Remedy	Ref. Page
1. Skipped stitches	Needle and shuttle body timing improper	Adjust to proper timing.	13
	Clearance between needle and shuttle body too big	Adjust to proper clearance.	13
	Needle bent	Replace needle.	10
	Needle setting improper	Set needle with long groove facing operator.	10
	Feed timing improper	Adjust to proper timing.	14
	Shuttle driver interferes with needle	Adjust shuttle driver position.	13
2. Needle breakage	Shuttle body interferes with needle	Adjust clearance between needle and shuttle body.	13
	Needle bent	Replace needle.	10
	Needle size too small	Replace with needle size suited to sewing material.	10
	Clamp foot interferes with needle	Adjust clamp foot position.	14
	Shuttle driver interferes with needle	Adjust shuttle driver position.	13
	Feed timing improper	Adjust to proper timing.	14
3. Thread breakage and frays	Bruises on throat plate needle hole	Remove and buff, or replace.	
	Bruises on shuttle body or shuttle driver	Remove and buff, or replace.	
	Clamp foot interferes with needle	Adjust clamp foot position.	14
	Needle thread tension too tight	Decrease tension.	12
	Thread take-up spring too strong	Decrease spring tension.	12
	Thread fuses by heat	Use silicone oil.	3, 10
4. Thread pulling out of needle eye at start of sewing	Stitches skip at start of sewing	See "Skipped stitches".	
	Needle thread end after trimming too short	Adjust tension releasing bar timing.	15
	Bobbin thread end too short	Decrease bobbin thread tension, or widen clearance between needle hole and stationary knife.	11 15
	Feed timing improper	Adjust to proper timing.	14

