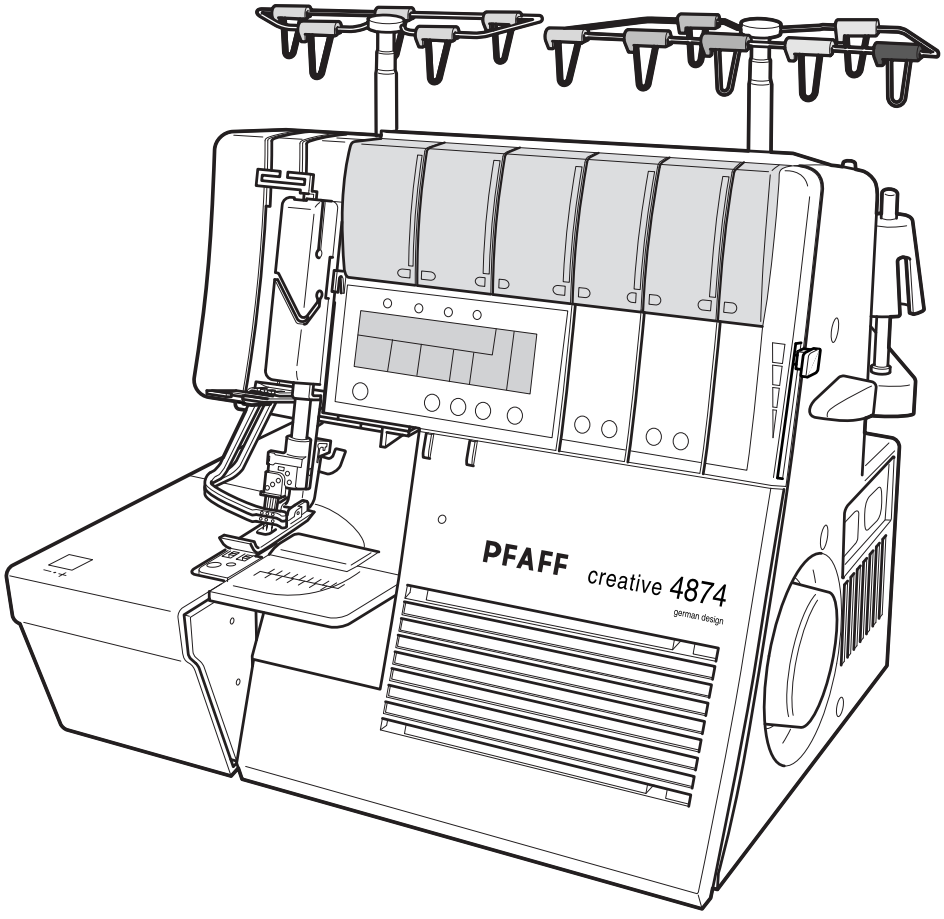


PFAFF

4874

SERVICE MANUAL

TABLE OF CONTENTS

Safety

For safety reasons, the sewing machine must be disconnected from the mains:
- Whenever the machine is left unattended
- Whenever preparing the machine for sewing
- Whenever servicing
- Whenever replacing mechanical or electrical parts or accessories

Needles

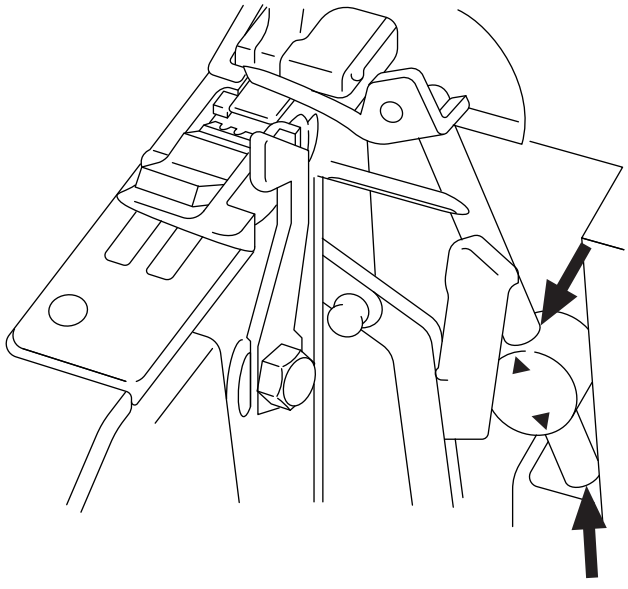
Usually needles of the system 130/705 H may be used. However, in certain cases stitch quality may be improved by using type ELX 705 needles.
Choose needle size Nm 80 for sheer materials and Nm 90 for normal or thick materials.

Threads

Choose a good quality polyester thread or blended thread.

Lubrication

Besides the 2 oiling points marked in red, the machine is equipped with self-lubrication bearings and parts. Lubricate the machine as follows: when using it for the first time - if it has not been used for some time - when it has been intensively during 7 to 8 hours.



RECOMMENDATIONS B

1. Never connect the machine to a different voltage than tha t marked on the specification plate.

2. For safety reasons, never perform any repairs on the powe r supply circuit without first removing the mains lead from the machine.

3. Before replacing the LCD display PCB unit, check by means of the test program.

4. Never plug in or run the machine unless all the connections are correctly set.

5. After replacing the main control PCB unit, it is necessar y to recheck the speeds. Use a small screwdriver with insulated blade to avoid short-circuits.

6. When changing the light bulb, it is neccessary to disconnect the mains lead.

First of all, please refer to the paragraph entitled **"maintenance"** in the instruction manual, especially when machine does not turn freely by turning the flywheel by hand. If necessary, check and adjust tightness of motor belt.
Given below are the most frequent disorders. In most cases, they can be remedied by checking the adjustments in the following order. However, before checking the adjustments, make sure that the threading is correct and that all the thread passages are okay.

1. Skipped overlock stitches

Check and adjust if necessary:
- Needle bent or with a dull point - replace needle
- Needle not set correctly - refer to **"changing the needle"** in the instruction manual
- Burrs on upper or lower looper - polish
- Burrs on stitch tongue - polish
- Excessive tension on the needle thread
- Height and orientation of needle bar
- Clearance between point of lower loopers and needle
- Clearance between upper and lower loopers
- Timing of upper and lower loopers against needle
- Feed timing

2. Skipped chainstitches - Cover hems

Check and adjust if necessary:
- Needle and chain looper thread tensions not balanced
- Needle bent or with a dull point - replace needle
- Needle not set correctly - refer to **"changing the needle"** in the instruction manual
- Burr on chain looper - replace or polish
- Dull blade edge on moving cutter - replace
- Chain looper needle clearance
- Chain needle guard clearance
- Angular position of chain looper
- Orbital timing of chain looper
- Chain thread take up lever timing
- Height and orientation of needle bar
- Needle plate spring plate bent
- Clearance and position between back of chain looper and needle L0

Note: For more information, see pages 28-31.

3. Thread breakage

Before checking the adjustment, make sure of the good quality of the thread and the needle, the correctness of threading and the smoothness of all the thread passages. Quite often, an injury to thread passage is the cause of thread breakage. If all these points are in order, check the following:

- Dull point of needle or bent needle - replace.
- Dull or burred point of looper - replace.
- Scratch or injury on stitch tongue of needle plate - replace.
- Too strong thread tension.
- Unsmooth or injured edge of needle hole on needle plate (thread breakage of chain stitches) - replace.

4. Irregular stitches

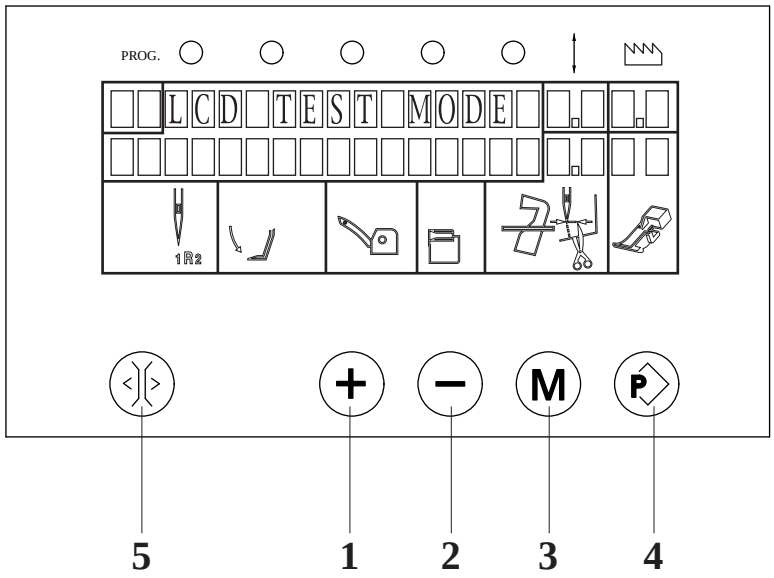
- Inadequate setting of thread tensions - re-adjust.
- Unsmooth thread passage - polish.
- Height of feed dog.
- Position of looper thread take up levers and thread guides.
- Dull blade edge of moving cutter - replace.
- Injury on needle plate face or presser foot sole - replace.
- Incorrect alignment of pulled-up thread antenna with spool pins - reset it at correct position to align to spool pins.

5. Breakage of needle

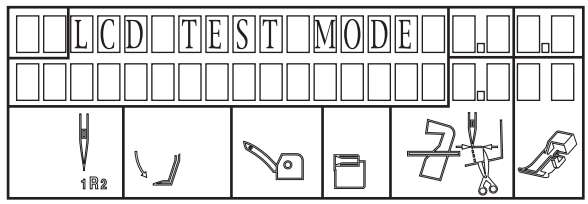
Check and adjust if necessary

- Dull point of needle or bent needle - replace.
- Incorrect placement of needle - refer to **"changing the needle"** in the instruction manual.
- Clearance of needle guard and (chain needle).
- Incorrect alignment of needle holes of presser foot and needle plate.
- Clearance from needle to lower looper.
- Clearance between the upper and lower loopers.
- Feed timing.
- Horizontal feed timing against chain-stitch needle.

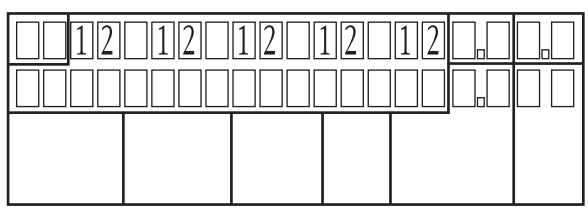
Access to the test program



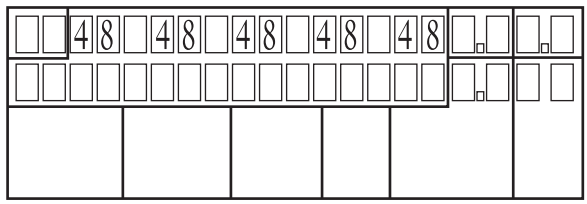
1. Switch off the machine.
2. While pressing key **"2"** and **"3"** simultaneously, switch on the machine.
3. The matrix pattern turns to **"LCD test mode"**.



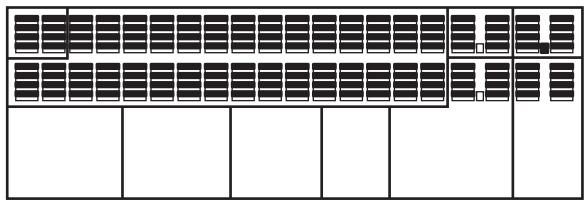
4. Press **"1"**, the step motors will rotate to their minimum position and the number **"12"** will appear on the display.
   Tension value can be checked and adjusted as a manner shown in the page E1.



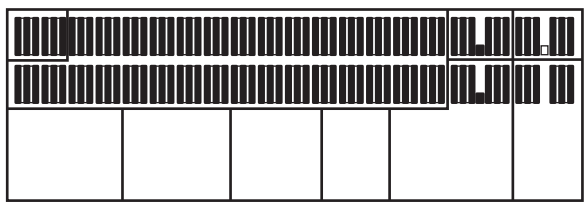
5. Press "**1**" again, the step motors will rotate to their maximum position and the number "48" will appear on the display.
   Tension value can be checked and adjusted as a manner shown in the page E1.



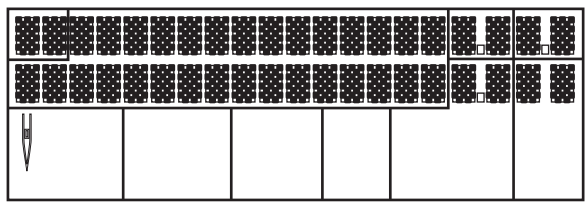
6. Press "**1**" again, the display becomes



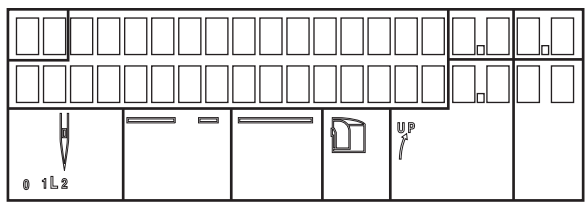
7. Press "**1**" again, the display becomes



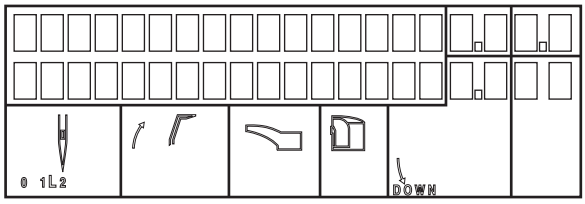
8. Press "**1**" again, the display becomes



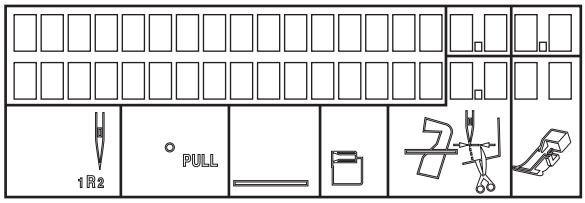
9. Press "**1**" again, the display becomes



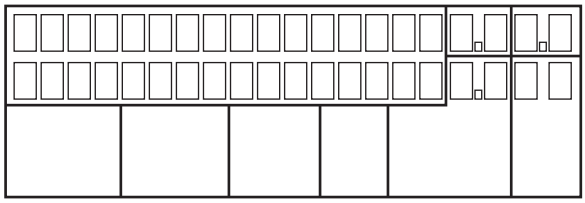
10. Press "**1**" again, the display becomes



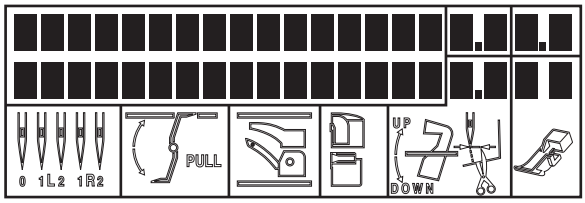
11. Press "**1**" again, the display becomes



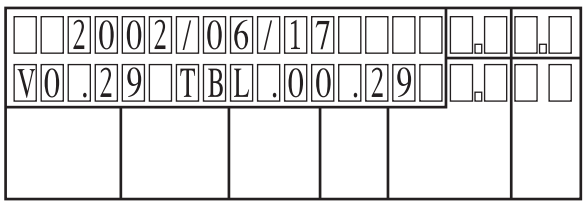
12.Press "**1**" again, nothing is displayed



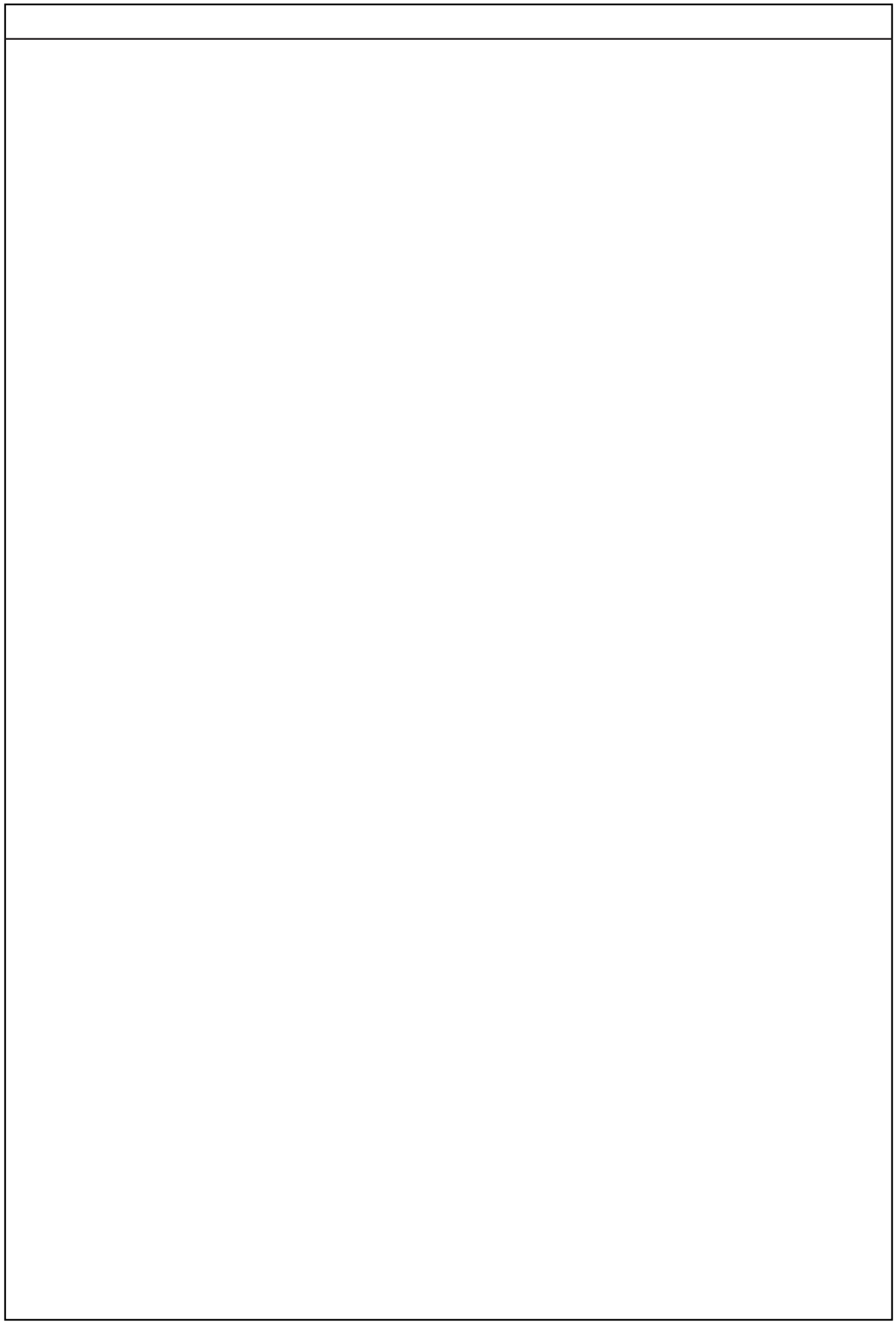
13. Press "**1**" again, all symbols are displayed



14. Press "**1**" again, Program version number is displayed



Note: It is also possible to proceed with above tests in reverse sequence by pressing key "**2**" instead of key "**1**".



TEST PROGRAM-THREAD TENSION SETTING-DIAL TENSION FINE TUNING E1

Test program for minimum dial tension (step 4 in page D1) and maximum dial tension (step 5 in page D2).

The following manners are used for the setting of step motors (dial tensions).

a) Step 4

The step motors will rotate to its minimum position. Check the tension value by pulling a polyeter thread #60/3 in the direction of "e" as drawing below. Make sure that each tension is set at 5 to 15 gr.

b) Step 5

The step motors will rotate to its maximum position. Check the tension value in the same manner as mentioned in the step 4. Make sure that each tension is set at 40 to 50 gr.

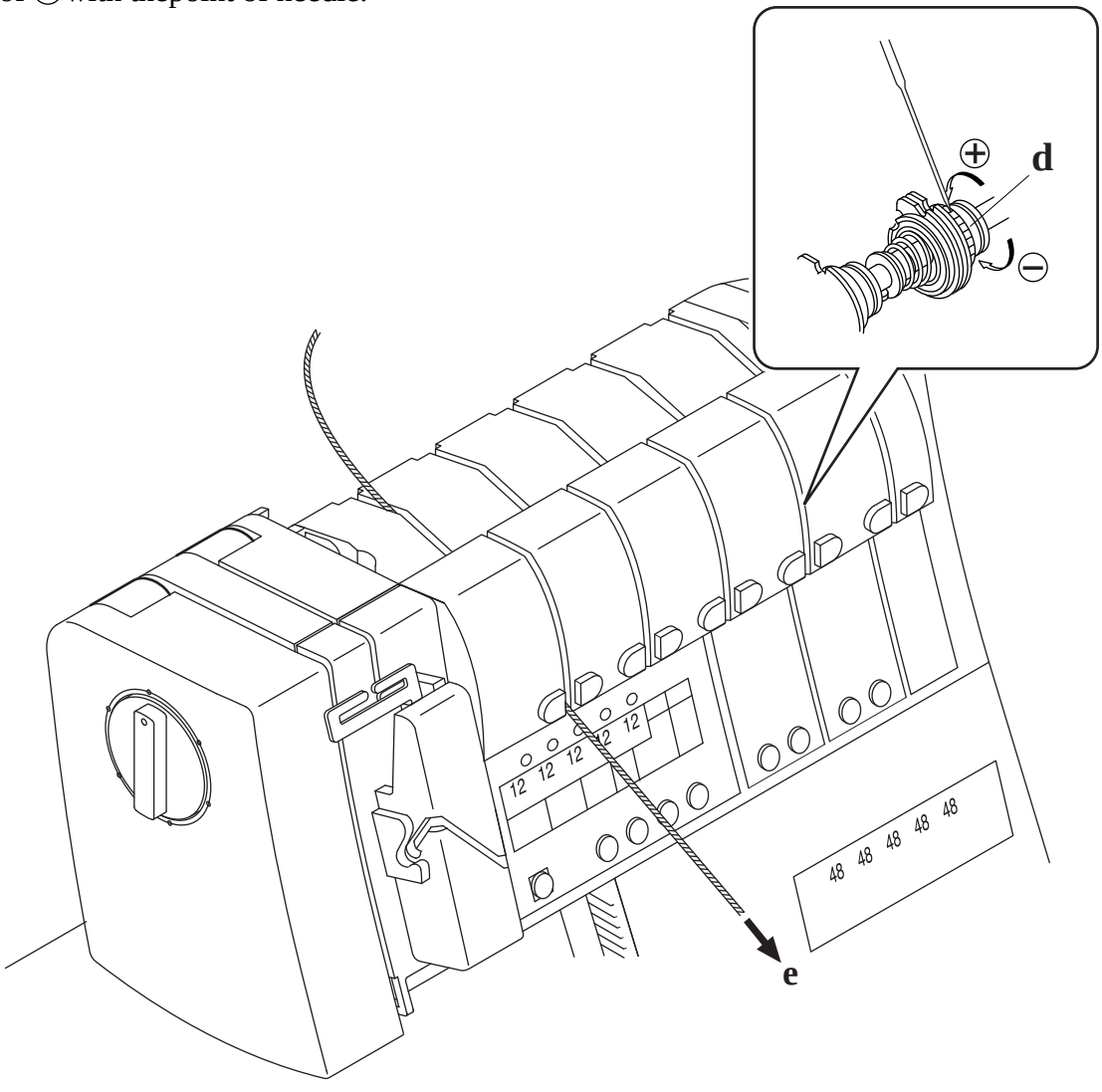
c) If not, adjust the tension(s) with the fine tuning dial "d".

Note: The fine tuning can be executed without removing the covers by using a point of needle, as shown in the drawing below.

d) Fine tuning with dial **"d"**may be executed as follows:

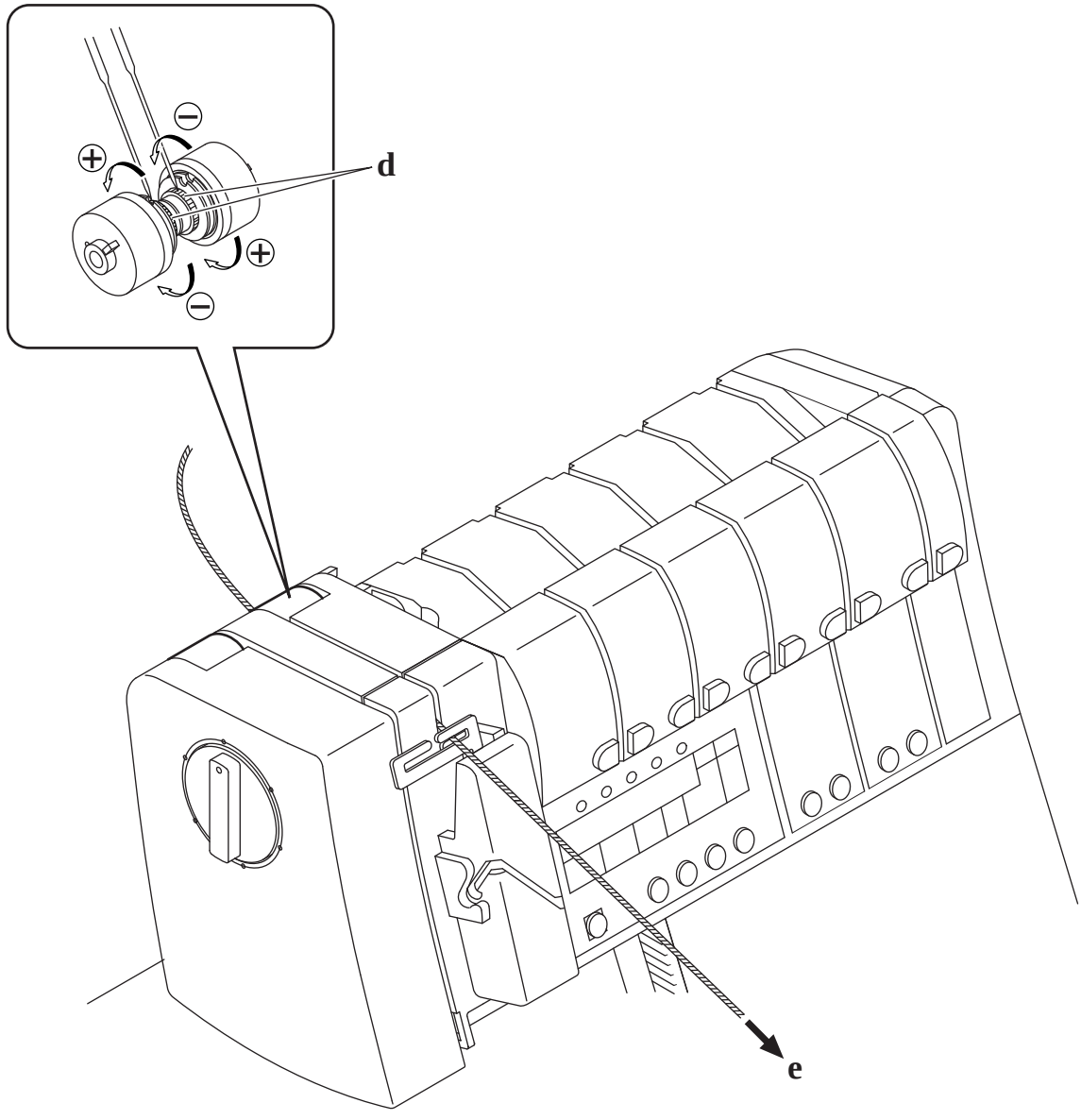
i) If thread tension appeared as strong (stitch becomes tight),dial **"d"** should turn to the direction of ⊖with the point of needle.

ii) To the contrary, if it appeared as not eough strong,dial **"d"** should turn to the direction of ⊕with thepoint of needle.



FINE TUNING OF DIAL TENSION FOR TOP-COVER & DECO-COVER E2

1. At the indication of Dial Tension Number **"4"**, secure the tension value of thread shouldbe 15 to 20 gr.(with polyester thread #30)
2. If the thread tension is higher than expected(stitch becomes tight.), adjust tensions with fine tuning dial **"d"** to turn it in the direction of ⊖ with the point of needle.
3. If it is lower than expected(stitch becomes loose), adjust tensions with the fine tuningDial **"d"** to turn it in the direction of ⊕ with the point of needle.



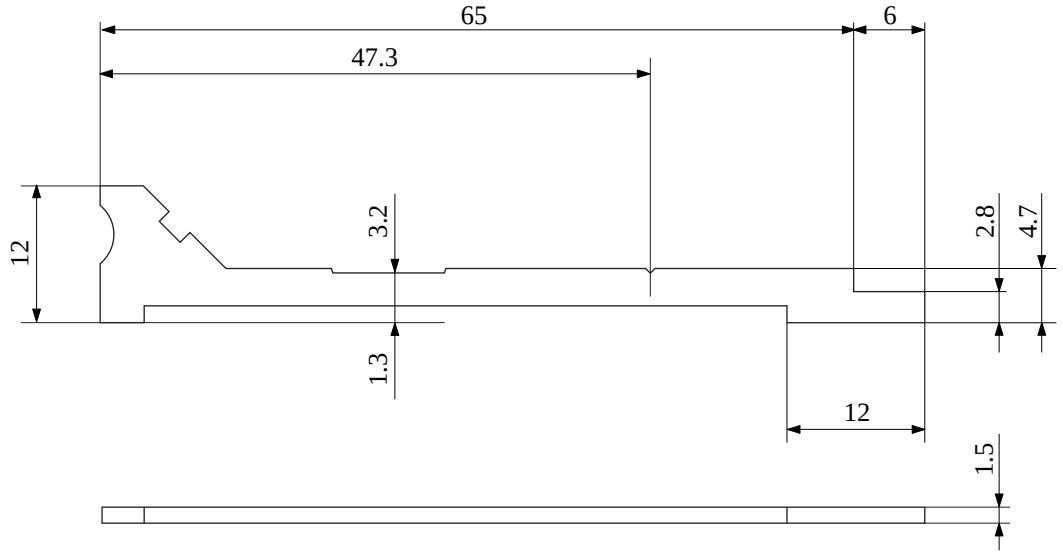
ERROR CODE F1

Error Code	Place in problem	Phenomenon
1 2 3 4 5	Step motor DT-1 Step motor DT-2 Step motor DT-3 Step motor DT-4 Step motor DT-5 Ref. to Page 3	Step motor with same number of Error code does not turn. (Example: Error No.3 showed on the display, DT-3 does not turn however DT-1 & DT-2 are normal.)
	Sensor of DT(DTS) Ref. to Page 3	Although a notch of the shelter disk crossed a sensor, the disk does not reverse its course and turn all the way.
6	Step motor for S.L.(SLM) Ref. to Page 3 and 23	Step motor does not turn.
	Step motor and the middle gear(idle) and Feed regulator gear. Ref. to Page 23	Step motor's pinion gear,middle gear and feed regulator's gear do not smoothly turn.
	S.L. sensor P.C.B(SLS) Ref. to Page 23	Although a shelter disk (driven by middle gear) crossed sensor, middle gear does not reverse its course and turn all the way.
7	Step motor for D.F.(DFM) Ref. to Page 3 and 17	Step motor for D.F. does not turn.
	Step motor,middle gear and D.F. gear for D.F. Ref. to Page 17 Fig. 1	All gears driven by Step motor do not smoothly turn.
	D.F. Sensor P.C.B (DFS) Ref. to Page 17 Fig. 1	Same as Phenomenon for S.L. Sensor P.C.B
8	DECO Step motor (DCM) Ref. to Page 3, 26 and 27	DECO Step motor does not turn.
	Miter gear Ref. to Page 27b Fig. 4	Step motor turns, Blue & Yellow Decorative Thread Guides does not move.
	DECO Sensor P.C.B (DCS) Ref. to Page 26 Fig. 1,27b Fig. 4	Blue & Yellow Decorative Thread Guides dose not return to initial point and turn all the way to left or right.

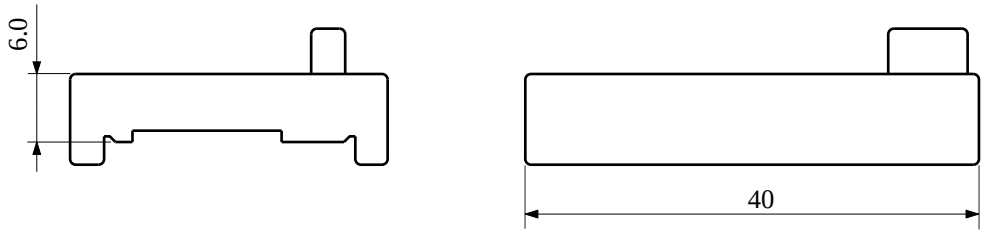
ERROR CODE F2

Cause of failure	Measure
Failure of DECO Step motor.	Replacing the Step motor.
Lead wire of Step motor for D.F. cut off. (burn out)	Replacing the lead wire and or the Step motor.
Defective connection at the connector on the LCD P.C.B. and at the connectors from other components.	Connect repeatedly with connectors.
Failure of sensor.	Replacing a P.C.B of sensor.
Lead wire cut off.	Replacing lead wire and or a P.C.B of sensor.
Defective connection at the connector on the LCD P.C.B	Connect repeatedly with connector.
Failure of Step motor.	Replacing the Step motor.
Lead wire of Step motor cut off. (burn out)	Replacing lead wire and or the Step motor.
Defective connection at the connector on the LCD P.C.B.	Connect repeatedly with connector.
Gearing between Step motor pinion gear and middle gear (Fig.1-C) is out of mesh. (may be tight)	Adjust its gearing properly with moving set position.
Gearing between middle gear(Fig 1-C) and Feed regulator gear (Fig.1-B) is out of mesh. (may be tight)	Adjust set position of S.L. regulating unit, so that it may secure proper gearing. (Two set screws for SL Unit must be loosen. Fig.2-D)
Failure of S.L. Sensor.	Replacing S.L. Sensor P.C.B
Lead wire cut off. (burn out)	Replacing S.L. Sensor P.C.B
Defective connection at the connector on the LCD P.C.B	Connect repeatedly with connector.
Failure of Step motor for D.F.	Replacing Step motor for D.F.
Lead wire of Step motor for D.F. cut off (burn out)	Replacing lead wire and or Step motor for D.F.
Defective connection at the connector on the LCD P.C.B.	Connect repeatedly with connectors.
Gearing between Step motor's pinion gear and middle gear is out of mesh.(tight)	Adjusting the setting position of Step motor.
Gearing between middle gear and D.F. gear is out of mesh. (tight)	Adjusting setting position of D.F. Unit.
Tension of D.F. spring is strong.(Page 17 Fig.1-S)	Decreasing the tension of D.F. spring.
Same as Cause of failure and Measure for S.L. Sensor P.C.B.	
Failure of DECO Step motor.	Replacing DECO Step motor.
Lead wire from Step motor.	Preplacing DECO Step motor and or lead wirte.
Defective connection at the connector on the LCD P.C.B	Connecting the connector properly.
Loosing of set screws for miter gear.	Refer. to Manual Part.1
Failure of DECO Step motor.	Replacing DECO Sensor.
Lead wire cut off. (burn out)	Replacing lead wire and or DECO Sensor.

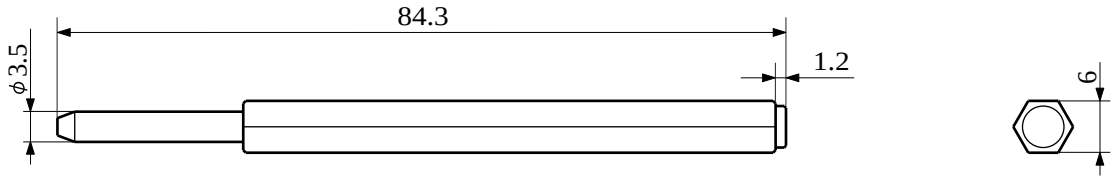
	Dimension	Use
Gauge No. 10989	4.7mm	Height of cloth presser bar
	12.0mm	Height of needle bar
	2.8mm	Angular position of lower looper to needle
	65.0mm	Height of lower looper
	6.0mm	Angular position of upper looper to needle
	1.5mm	Chain looper angular position
	47.3mm	Position of upper looper thread take up lever
	1.3mm	Height of feed dogs
	3.2mm	Position of feed dogs



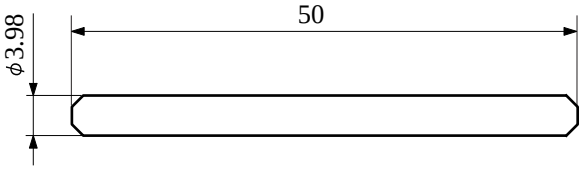
	Dimension	Use
Gauge No. 11687	6.0mm	For the adjustment of setting position of Yellow Decorative Thread Guide(height of the same from the surface of the needle plate and position of the point of the Blue and Yellow Decorative Thread Guides). (Page.26-Fig.2)



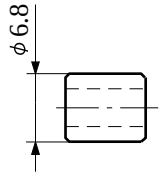
	Dimension	Use
Gauge No. 11684	84.3mm	For the adjustment of initial point for Blue & Yellow Decorative Thread Guides
	1.2mm	and for setting position of the DECO UNIT sensor (Page.23-Fig.1,Page.27b-Fig.6,7,9)
	3.5mm	For the setting of stitch length unit (setting the both gears(Page.23-Fig.1B&C))
	6mm	Height of Yellow Decorative Thread Guide from thesurface of needle plate



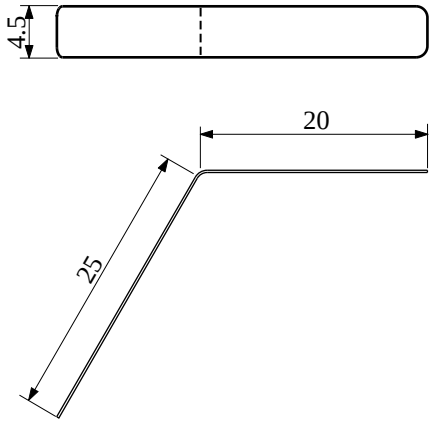
	Dimension	Use
Gauge No. 11685	3.98mm	For the setting of Differential Feed UNIT (setting the both gears) (Page.17-Fig.1-C&D)



	Dimension	Use
Gauge No. 11686	6.8mm	For the setting of Differential Feed UNIT (setting the position of feed rock lever,back and differential regulator slide block (Page.17-Fig.2-B))

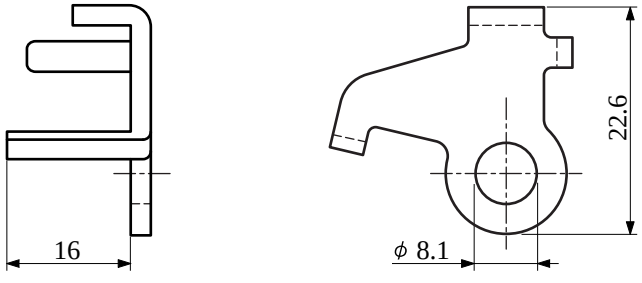


	Dimension	Use
Gauge No. 11691		For the adjustment of setting position of EN-Sensor (measuring the clearance between out side of a projected arc of slit-plate and the bottom of U shaped part of EN-Sensor) Ref.to Page 22a & b

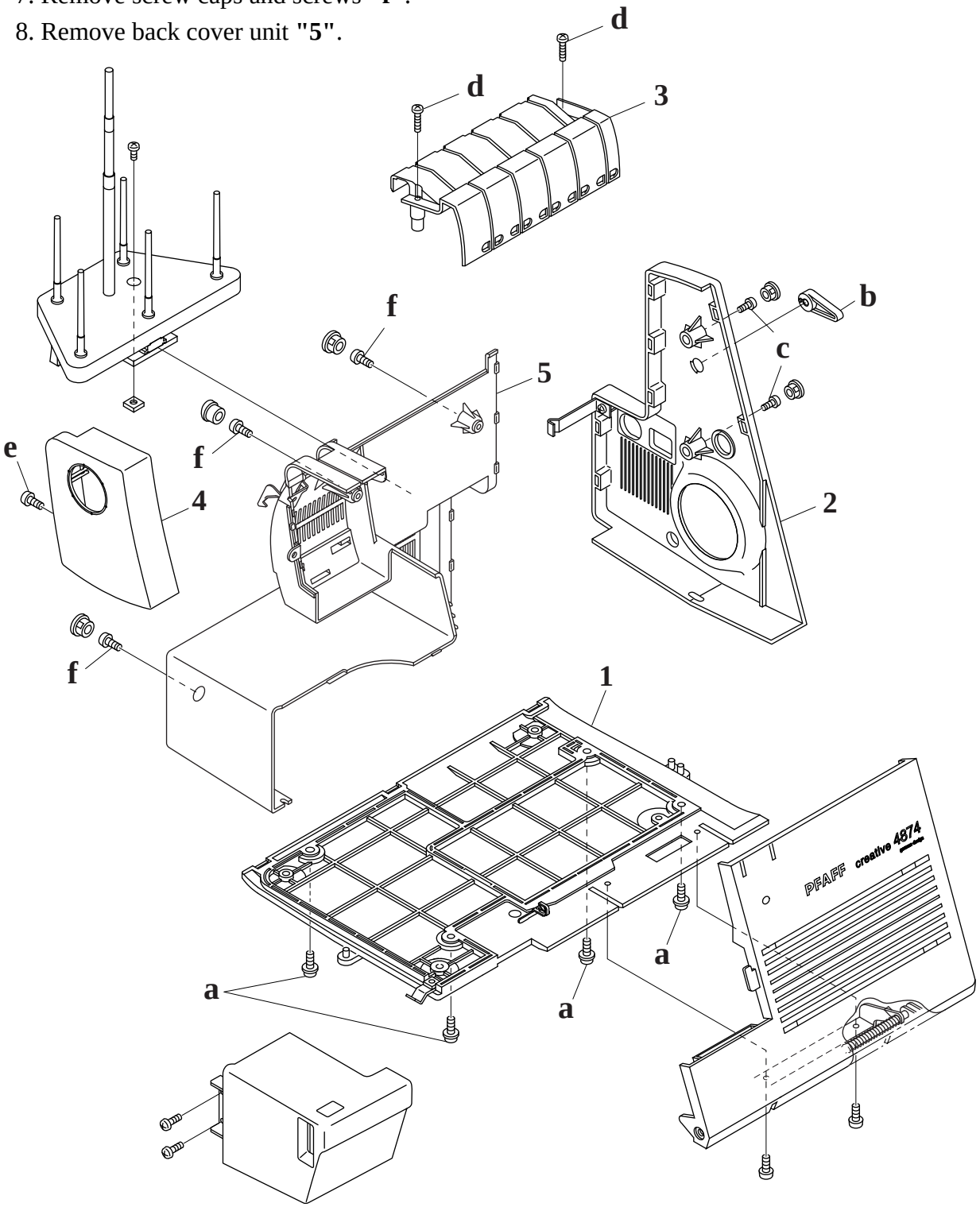


Thickness = 0.2mm

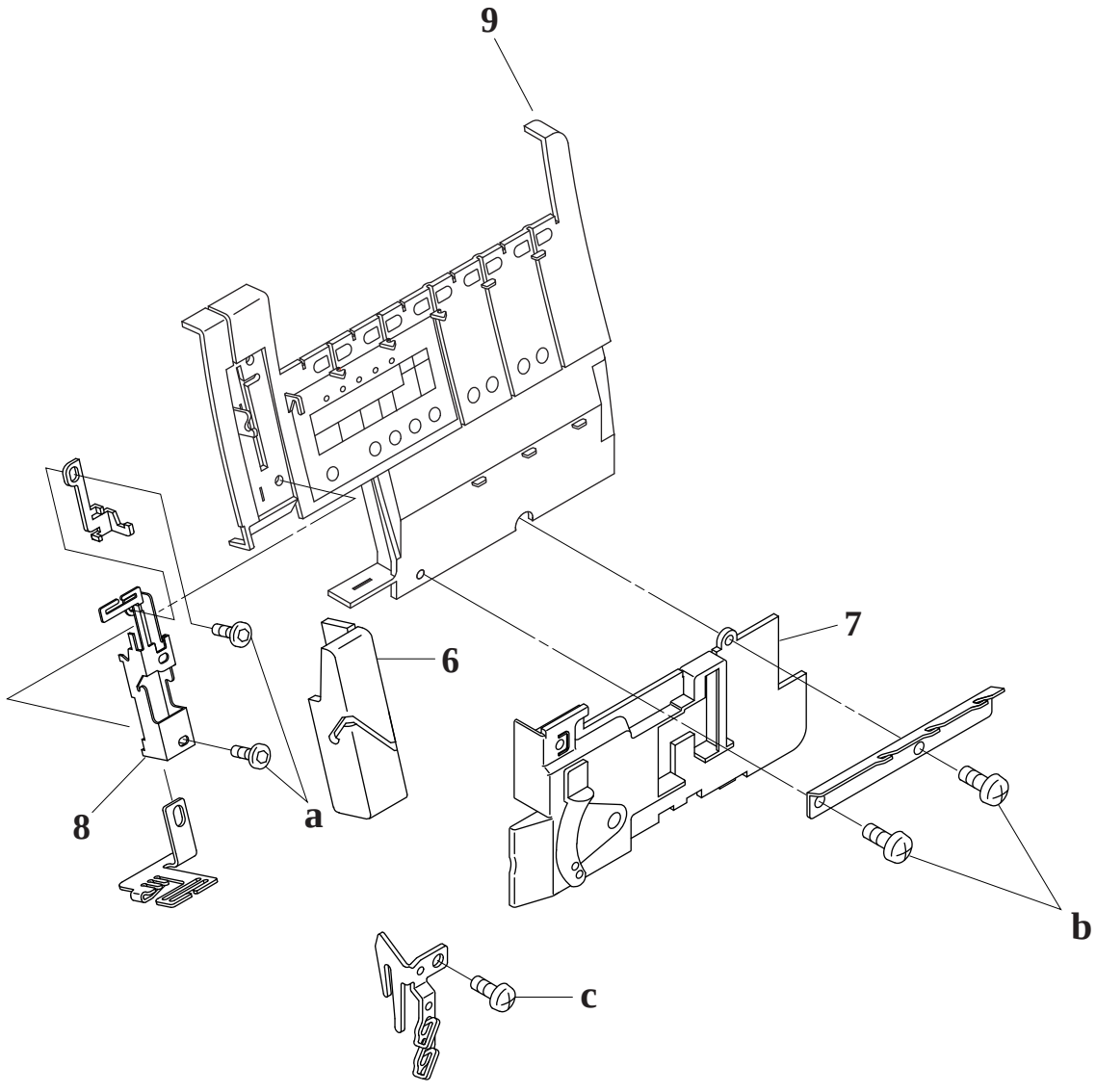
	Dimension	Use
Gauge No. 11692		For the adjustment of setting position of the slit-plate. Ref. to Page 22a & b.



1. Remove mains lead.
2. Remove base plate unit "**1**" (screws "**a**").
3. Remove knobs "**b**" and screw caps and screws "**c**".
4. Remove side cover "**2**".
5. Remove top cover "**3**" with screws "**d**".
6. Remove lamp cover "**4**" with screw "**e**".
7. Remove screw caps and screws "**f**".
8. Remove back cover unit "**5**".

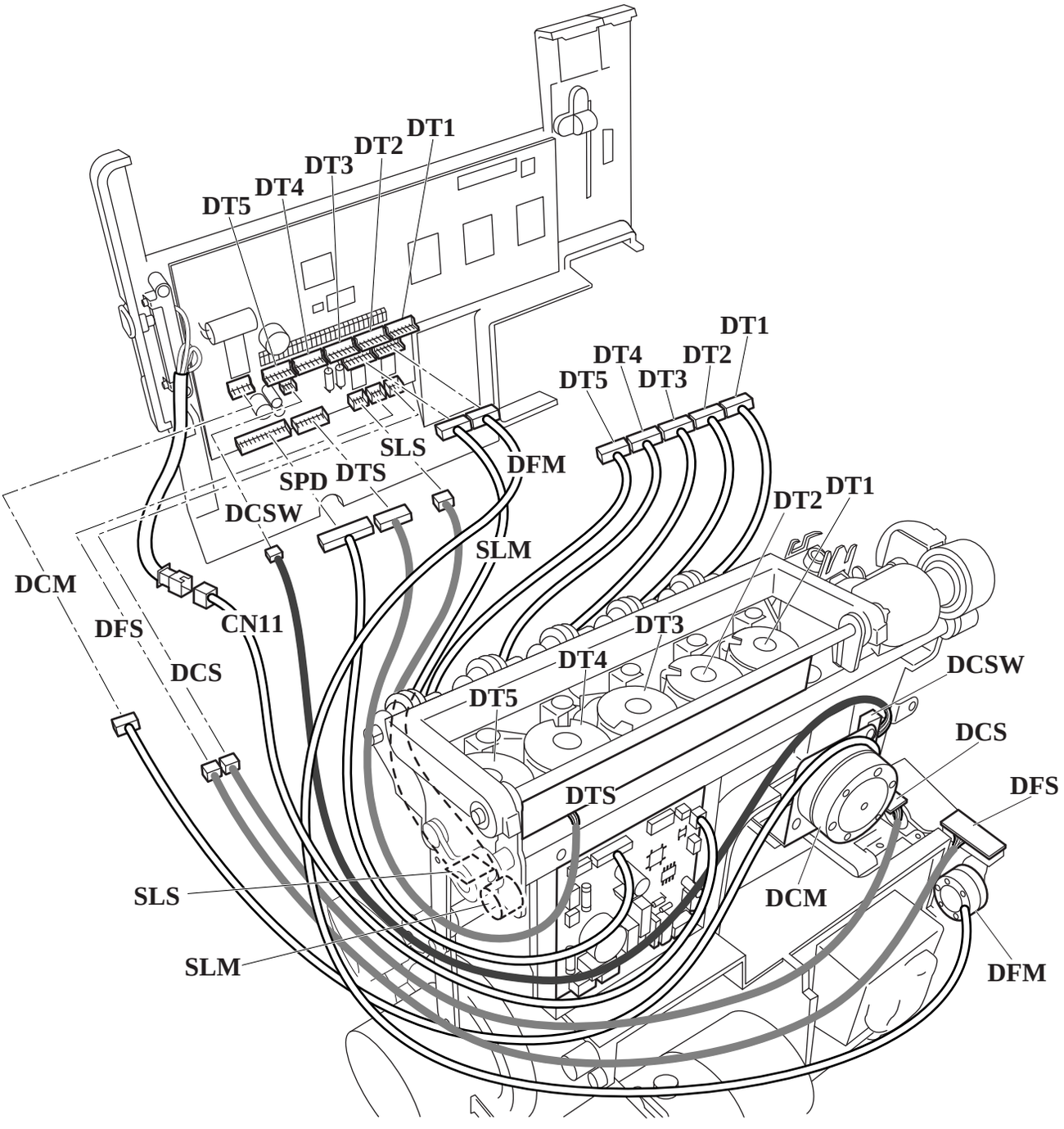


1. Remove mains lead.
2. Remove screws **"b"**, **"c"** and cover unit 7.
3. Remove snap-on noise cover unit 6. (Spread its sides.)
4. Remove screws **"a"** (allen screw 2.5mm) and take-up lever noise cover bracket 8.
5. Position needle thread take-up lever in the middle of the slot by turning handwheel.
6. Pull the front cover towards you, unplug variable speed wire located on the back (see page 3) and remove front cover unit 9.

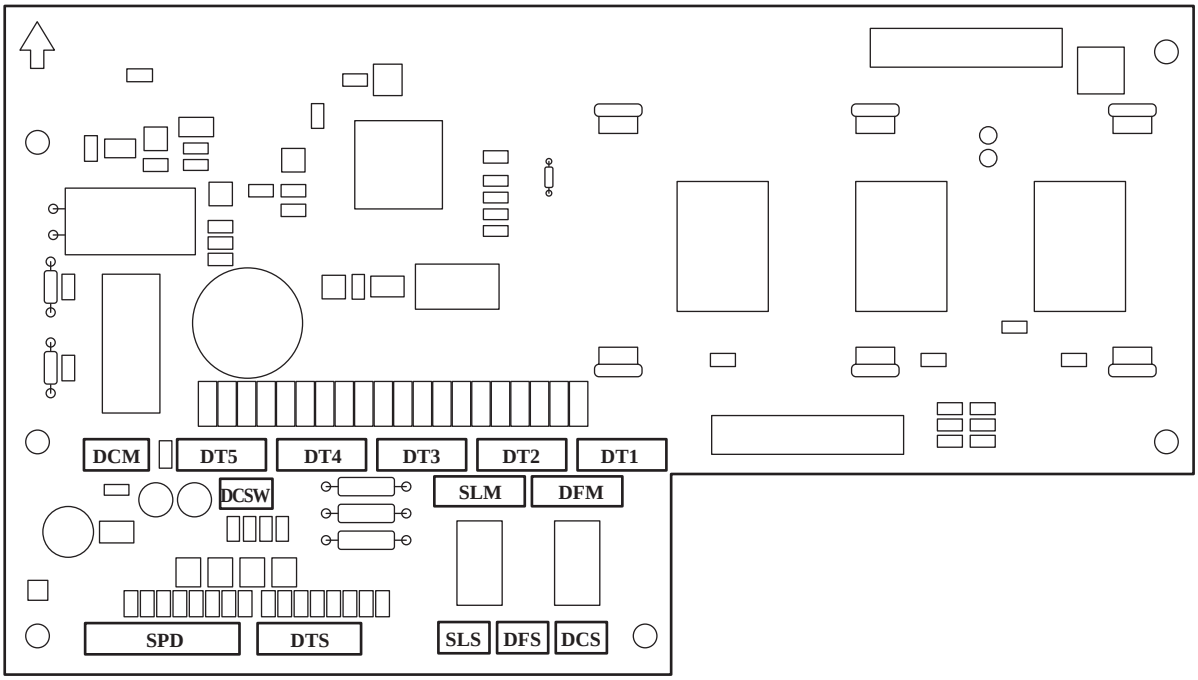


REMOVING LCD PRINTED CIRCUIT BOARD 3a

1. Remove: Mains lead
2. Disconnect all connectors from the LCD printed circuit board (connectors wired with 8 step motors, sensors, switches and speed reducer etc.)
3. The details of wiring are available from the page 3b and 3c.



Secure respective wiring between each connectors and related motors and sensors with wire-harness as shown in the following tables.

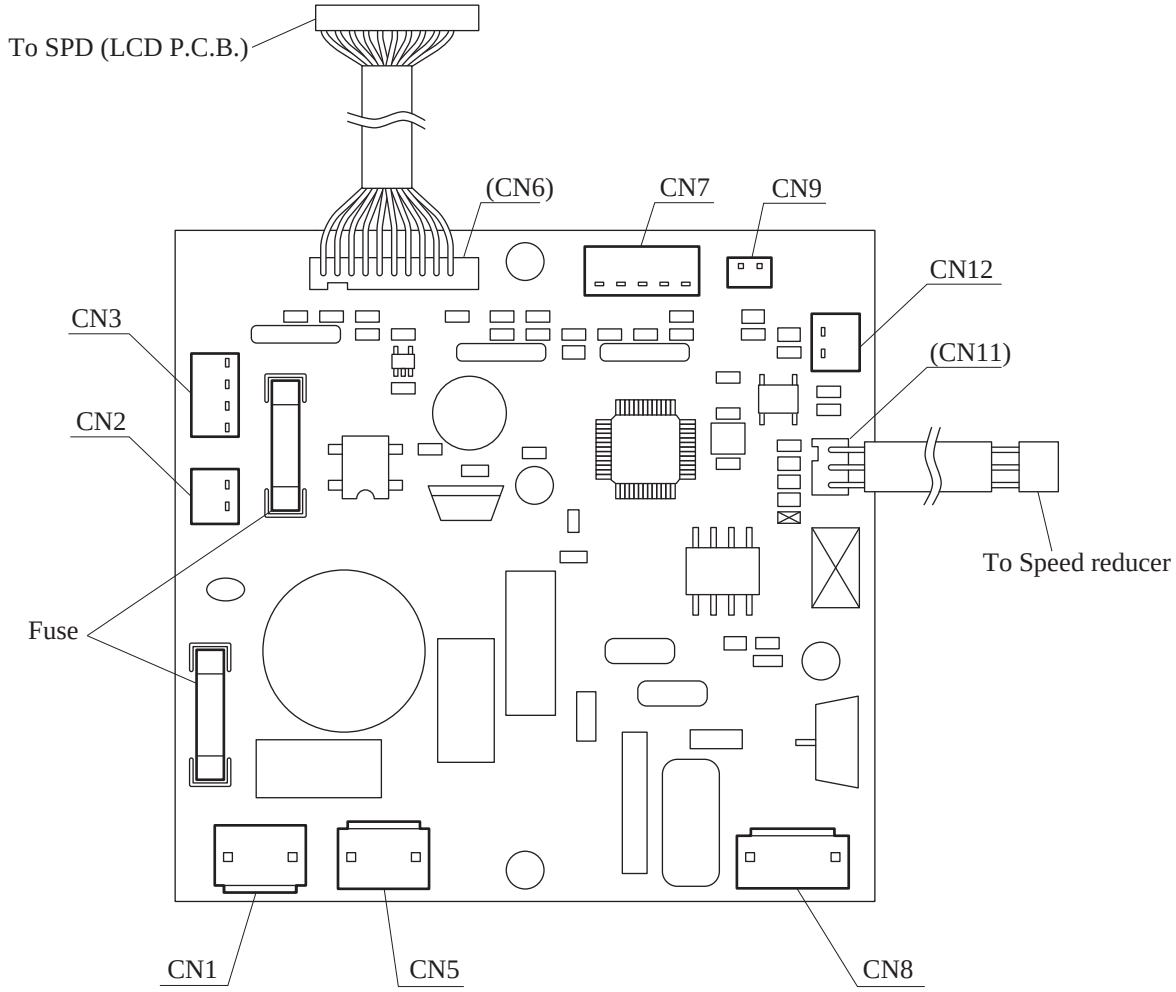


Wiring for Sensors

Connectors	Sensors	
DTS	From DT Sensor P.C.B.	Page.3a
SLS	From S.L. Sensor P.C.B.	Page.3a
DFS	From D.F. Sensor P.C.B.	Page.3a
DCS	From DECO Sensor P.C.B.	Page.3a
DCSW	From DECO Switch	Page.3a
SPD	From Main P.C.B.	Page.3a

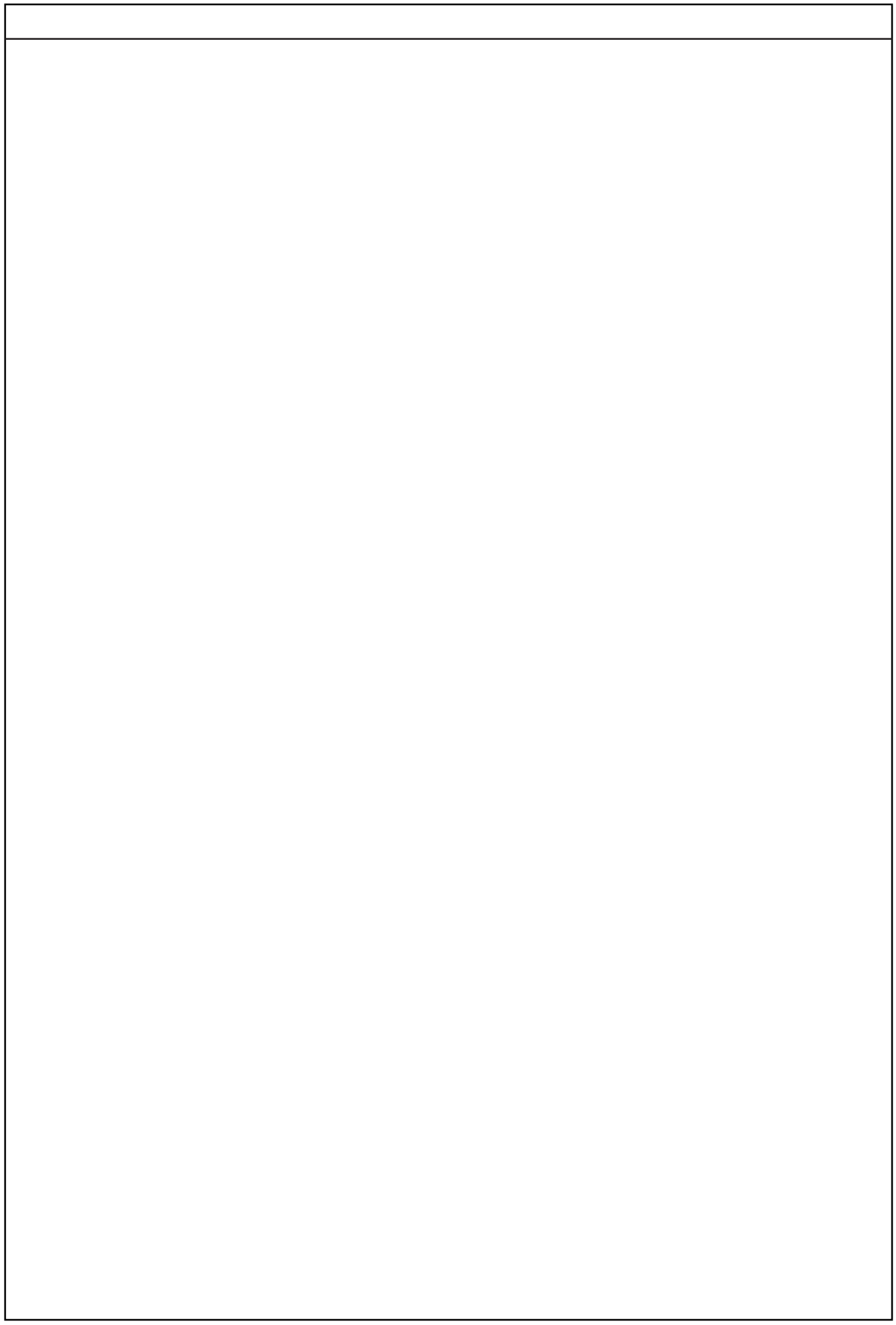
Wiring for Step Motors

Connectors	Step Motors	
DT1	From DT1 Step Motor	Page.3a
DT2	From DT2 Step Motor	Page.3a
DT3	From DT3 Step Motor	Page.3a
DT4	From DT4 Step Motor	Page.3a
DT5	From DT5 Step Motor	Page.3a
DCM	From DECO Step Motor	Page.3a
DFM	From D.F. Step Motor	Page.3a
SLM	From S.L. Step Motor	Page.3a

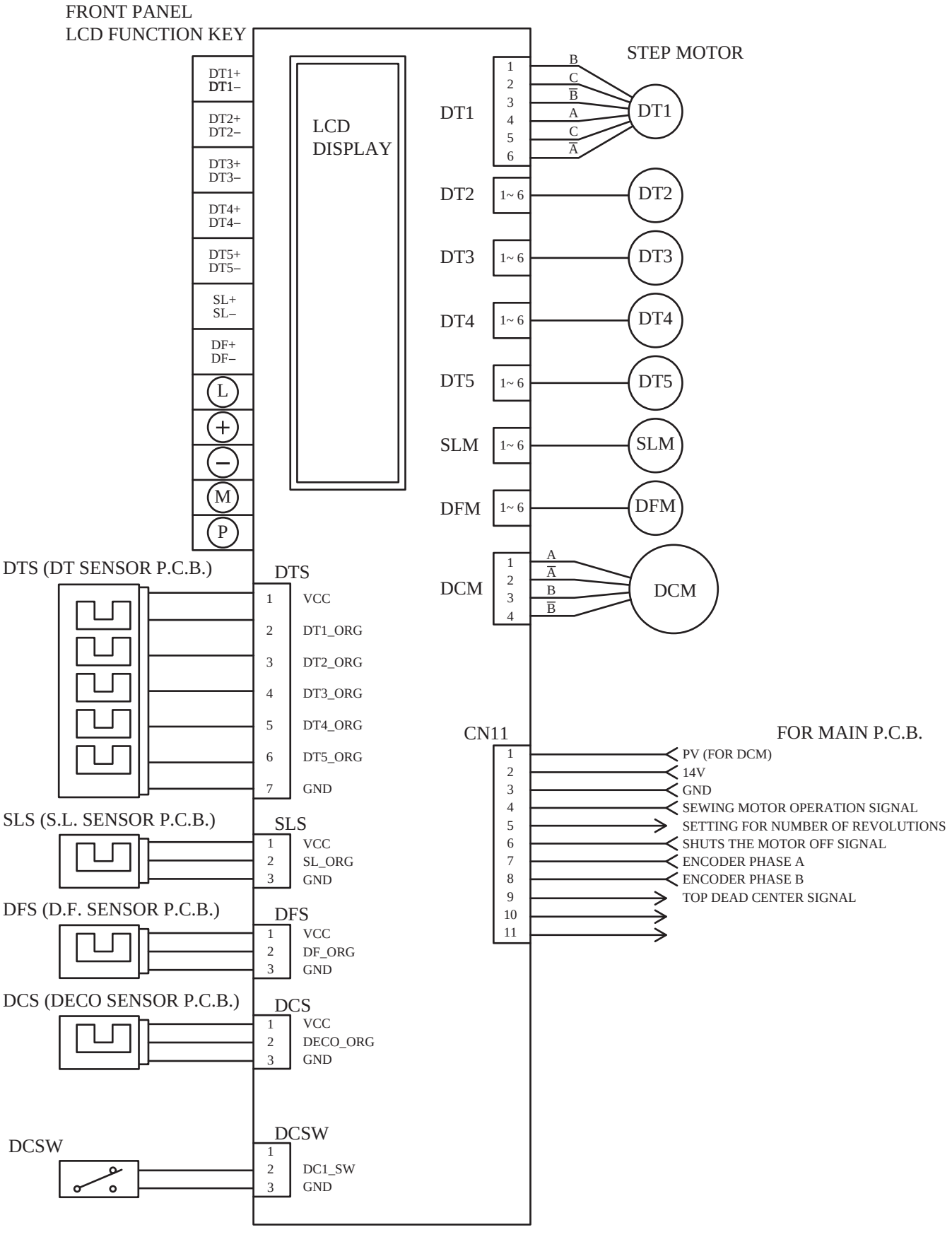


Wiring

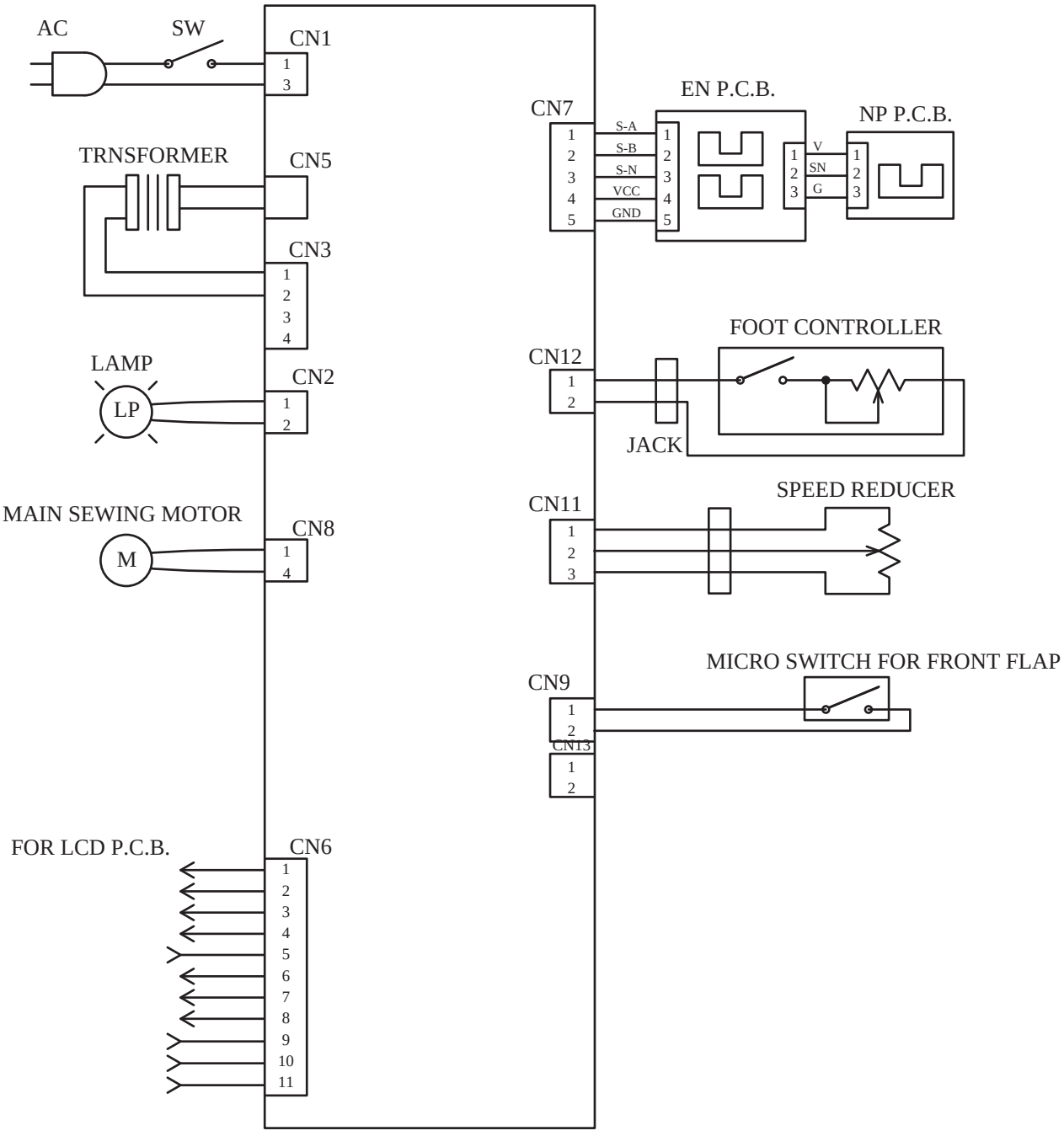
Connectors		
CN1	From Power Supply	
CN2	From Lighting (Lamp)	
CN3	From Transformer (Out-put Side)	
CN5	From Transformer (In-put Side)	
CN7	From Sensor of the EN P.C.B.	
CN8	From Sewing Motor	
CN9	From Micro Switch For Front Flap	
CN12	From Foot Controller	
FUSE	125V 5A 250V 3.15A	



LCD PRINTED CIRCUIT BOARO 3d



MAIN PRINTED CIRCUIT BOARD (SPEED ADJUST) 3e



ANGULAR POSITION OF BALANCE WEIGHTS AND POSITION OF ECCENTRICS

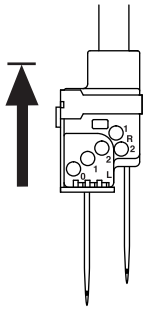


Fig.1

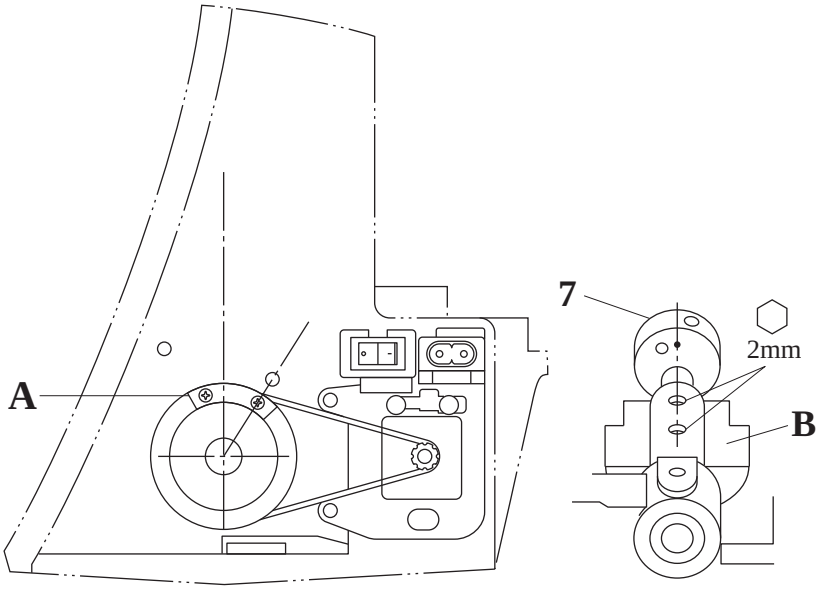


Fig.2

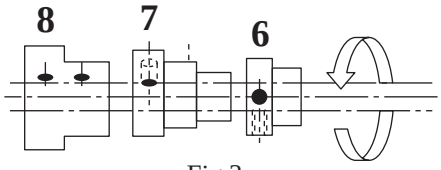


Fig.3

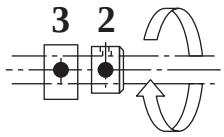


Fig.4

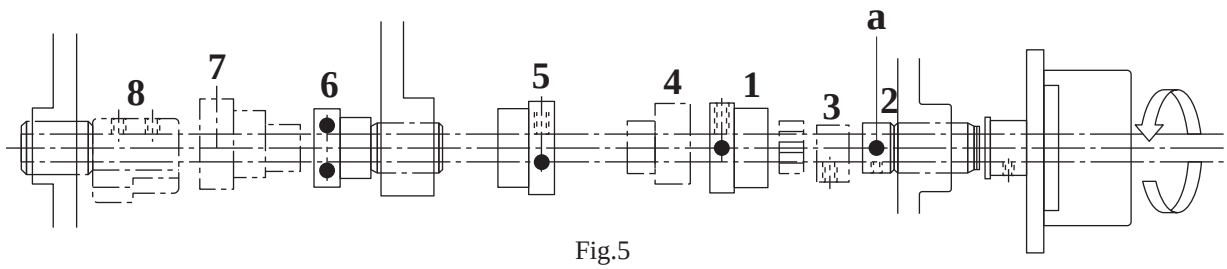


Fig.5

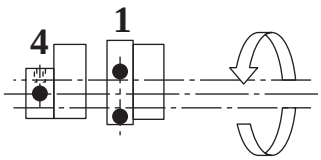


Fig.6

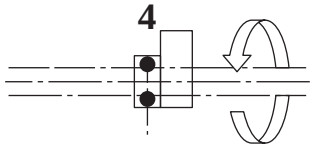


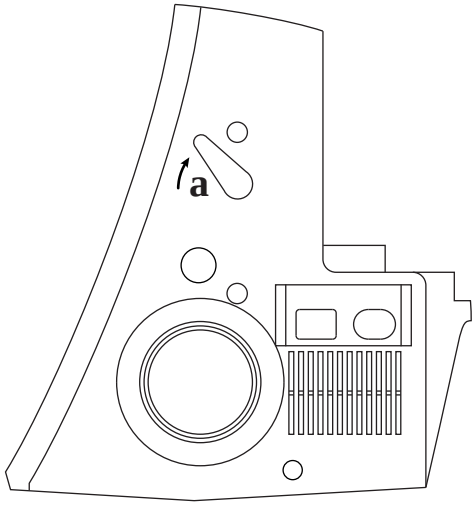
Fig.7

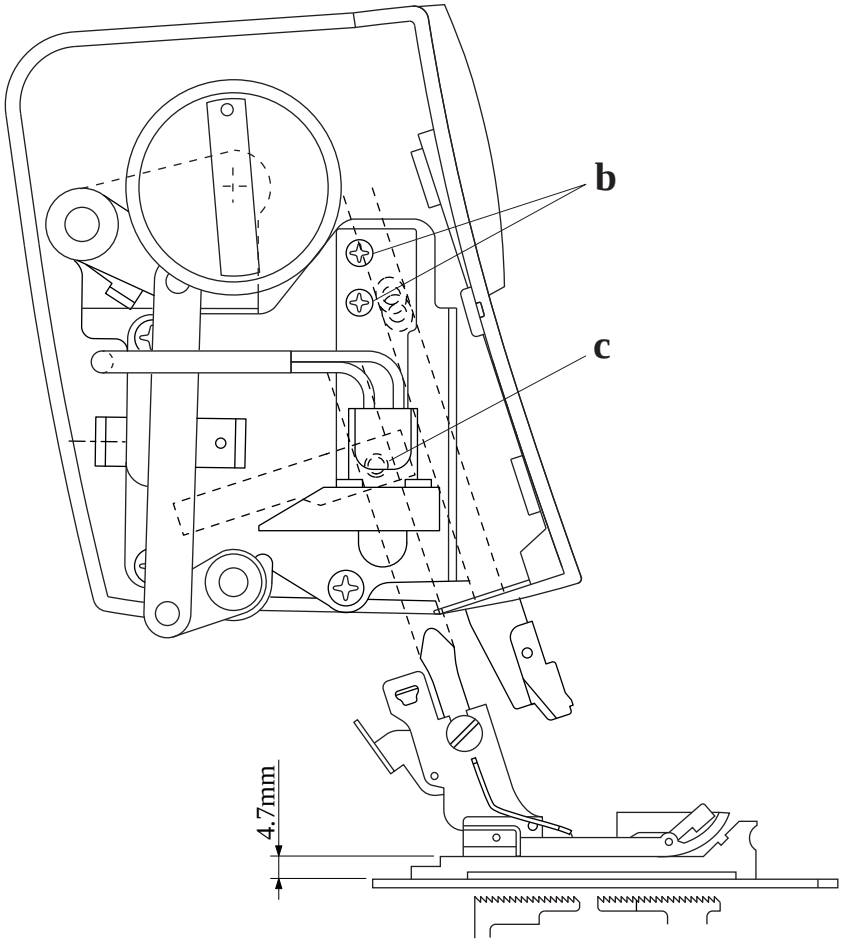
ANGULAR POSITION OF BALANCE WEIGHTS AND POSITION OF ECCENTRICS

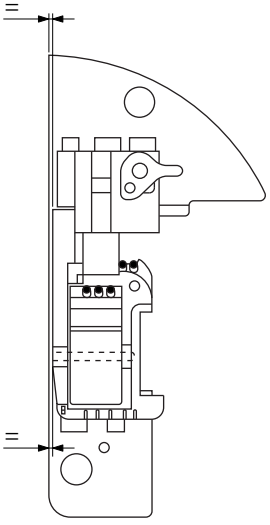
1. Remove: Mains lead - Back - front cover - Machine base.
2. In case of dismantling the lower shaft or if one of the eccentrics is damaged or badly fixed, the positions shown in page 4a, allow resetting the eccentrics approximately. These should be adjusted correctly with each relative adjustment. Each angular position of eccentrics as shown is based primarily on the angular positions of screw **"a"** of main shaft collar. It is useful to turn handwheel by (90˚) to check the correct position of the eccentrics. See procedure shown below.
3. Check and set screw **"a"** of collar **"2"** at the same level of the screw of needle bar timing eccentric **"1"**.(Fig.5) Turn the handwheel toward you and check if the screw on collar **"2"** is set at the same level of eccentrc **"3"**.(Fig.4)
4. Turn handwheel toward you and bring needle bar to its highest position.(Fig.1)
5. Check position of balance weight **"A** and **B"**.(Fig.2)
   Note: If position of eccentric **"3"** is correctly set, it is possible to see the screw of eccentric **"3"** from the opening on the thread take up Rotary Cam when needle bar is set in its highest position.
6. Turn handwheel (180˚) counterclockwise and check position of balance weight **"8"** and eccentric screws **"6-7"**.(Fig.3)
7. Turn handwheel (90˚) clockwise and check position of screw on collar **"2"** and eccentric screw **"3"**.(Fig.4)
8. Turn handwheel (90˚) counterclockwise and check position of screw **"a"** of collar **"2"** with eccentric **"1-5-6"**.(Fig.5)
9. Turn handwheel (90˚) counterclockwise and check position of eccentric screws **"1-4"**. (Fig.6)
10. Turn handwheel (90˚) counterclockwise and check position of eccentric screws**"4"**.(Fig.7)

Position and function of the eccentrics:

1) Needle bar timing
2) Main shaft collar
3) Horizontal feed eccentric
4) Upper looper timing
5) Lower looper and chain looper timing
6) Orbital motion of chain looper
7) Moving cutter and vertical feed timing
8) Balance weight


a


b
c
4.7mm



HEIGHT AND ALIGNMENT OF CLOTH PRESSER BAR 5b

1. Remove: Mains lead.

2. Lift up lever **"a"** and remove lamp cover.

3. Unscrew screws **"b"** to remove bracket with lamp holder.

4. Make sure that the shank holder of presser foot is in its highest position.

5. Turn handwheel and bring feed dog below needle plate.

6. Loosen screw **"c"**.

7. With lever **"a"** in its lowered position, push cloth presser bar down from the top so that foot touches gauge.(No.10989)

8. Align the needle opening(s) of foot with those of the needle plate, and tighten screw **"c"**.

9. Refit bracket with lamp holder.

HEIGHT AND ORIENTATION OF NEEDLE BAR IN RELATION TO THE NEEDLE PLATE HOLES

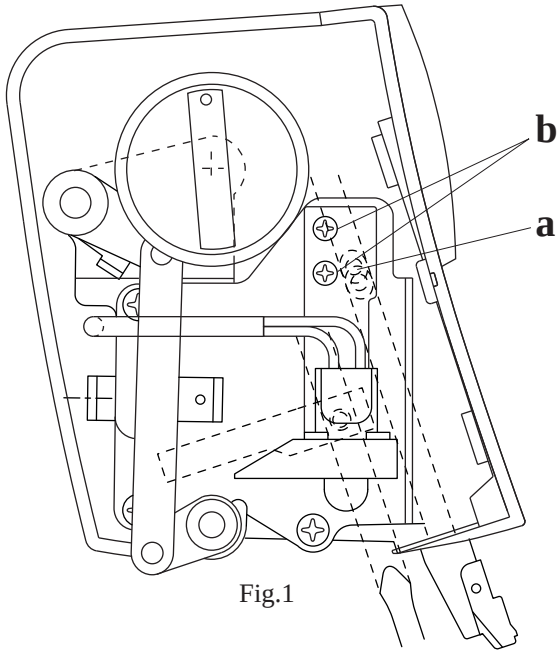


Fig.1

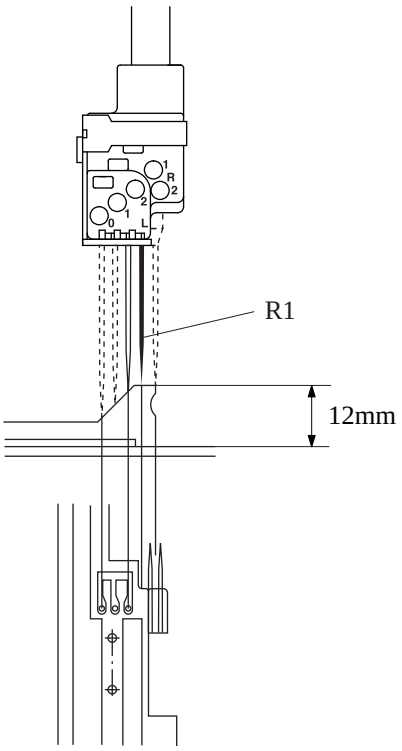
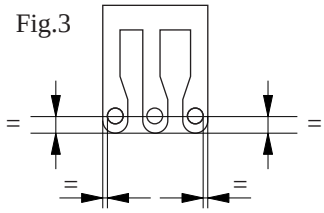


Fig.2

Fig.3



HEIGHT AND ORIENTATION OF NEEDLE BAR IN RELATION TO THE NEEDLE PLATE HOLES

1. Remove: Mains lead - Sewing foot.

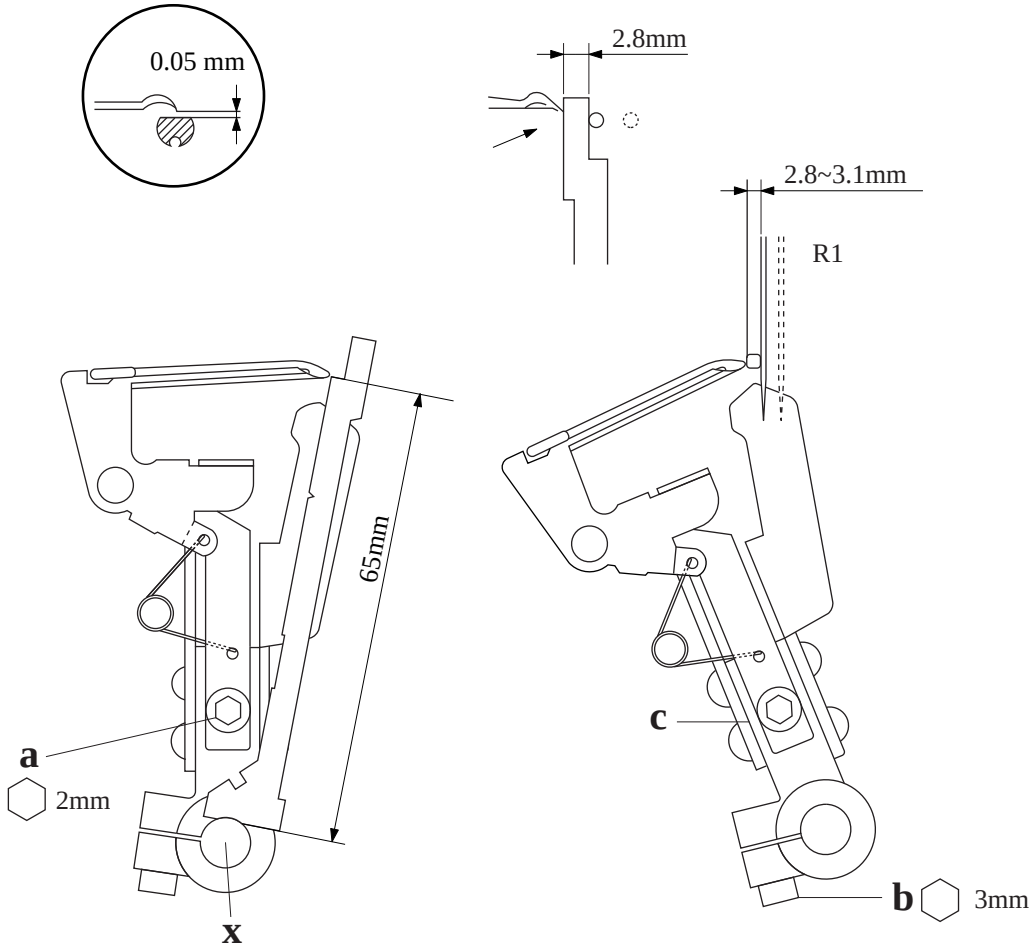
2. Insert a new needle (Nm 90) in **"R1"**.

3. With needle bar at its highest position, loosen screw **"a"** just enough so that needle bar slides with friction.(Fig.1)

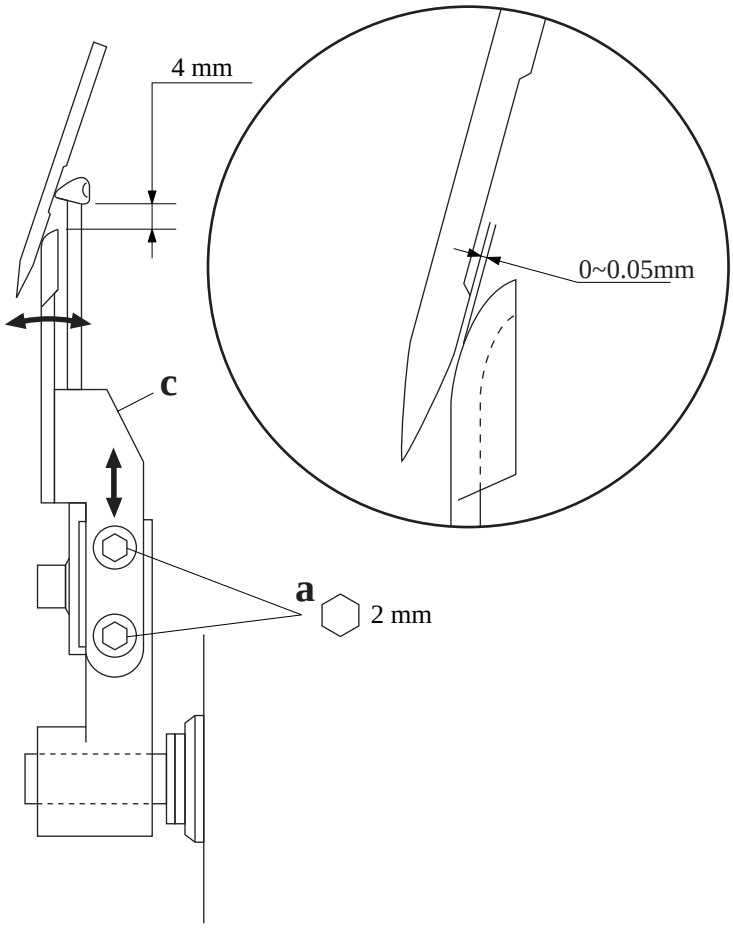
4. Place gauge on needle plate and adjust height of needle bar so that needle **"R1"** grazes the gauge.(Fig.2)

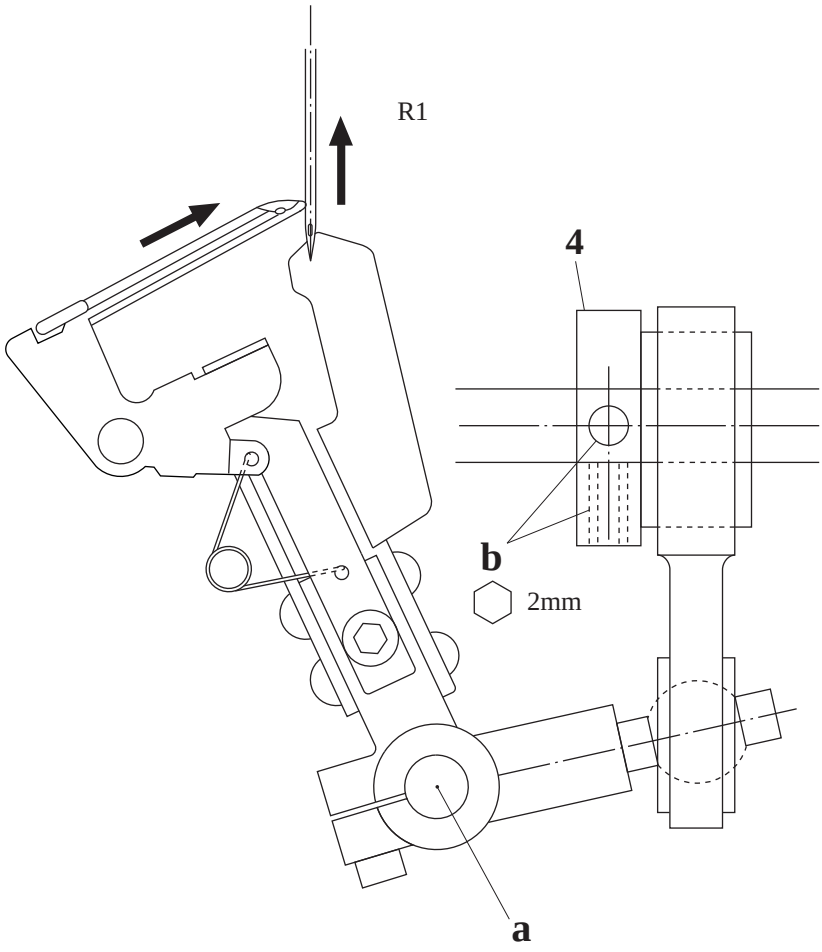
5. For the orientation of needle bar or needle holder, insert new needles in **"L0 , L1** and **L2"**, orientate needle bar so that the needles are centered in the needle plate holes. Make sure that neither needle **"L0 , L1** nor **L2"** is touching the inside of the needle plate holes. Tighten screw **"a"** and recheck the height.(Fig.3)
6. Remove needle plate and check the clearance between the chain and lower looper and needle(s). If necessary, adjust clearance of chain looper, (see page 12b) and clearnace of lower looper, (see page 7).

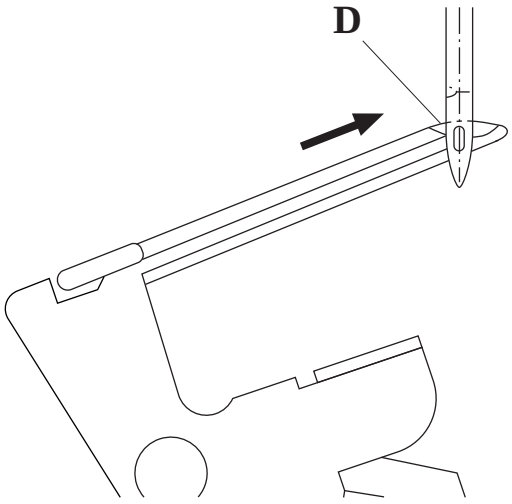
1. Remove: Mains lead. - Sewing foot
2. Make sure that there is no axial play on looper shaft **"x"**.
3. Loosen screw **"a"**, adjust height of lower looper as shown and tighten screw **"a"**.
4. Adjust clearance of overlock needle guard.
5. Insert a new needle (**Nm 90**) in R1 and check height and orientation of needle bar.
6. Remove needle plate and machine base.
7. Loosen screw **"b"** just enough to be able to shift lever **"c"**.
8. Adjust lever **"c"** axially to obtain a clearance of less than **0.05mm** between point of looper and needle; see below.
9. Turn the handwheel and bring lower looper to its extreme left swing position and adjust lever **"c"** angularly to obtain **2.8** to **3.1**mm between point of looper and the left side of the ovelock needle.
10. Recheck clearance and carefully tighten screw **"b"**.

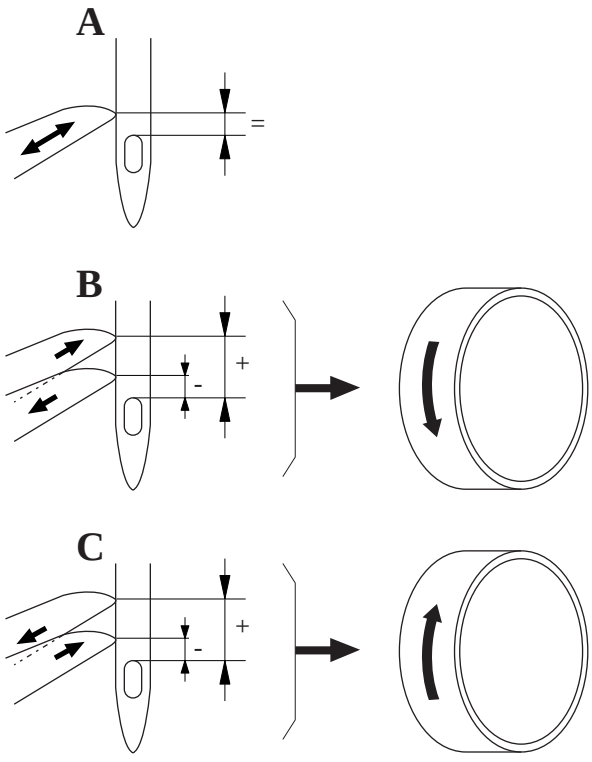


1. Remove: Mains lead - Needle plate.
2. Insert 2 new needles (**Nm 90**) in **"R1"** and **"R2"** positions.
3. Check height - clearance - angular position of lower looper.
4. Turn the handwheel and bring needle bar in its lowest position.
5. Loosen screws **"a"**.
6. Shift needle guard **"c"** back and forth to obtain a clearance of **0.05mm** between needle guard **"c"** and needles, tighten both screws **"a"**.




R1
4
b
2mm
a


D


A
=
B
+
-
C
+
-

TIMING OF LOWER LOOPER 9b

1. Remove: Mains lead - Sewing foot.

2. Make sure that there is no axial play on lower looper shaft **"a"**.

3. Insert a new needle (**Nm 90**) in **"R1"** and check height and orientation of needle bar (page 6), height and angular position of lower looper (page 7).

4. Remove needle plate and machine base.

5. Bring needle bar to its lowest position and check whether lower looper starts its left to right motion simultaneusly with up motion of needle bar.
   - Turn the handwheel towards you and bring point of looper from left - to - right against the left side of the ovelock needle **"R1"**. Observe the vertical distance between point of looper and upper edge of needle eye.
   - Turn the handwheel towards you and bring point of looper from right - to - left against the left side of the ovelock needle **"R1"**. The distances between point of looper and upper edge of needle eye must be identical as per sketch **"A"**.

6. If necessary, loosen both screws **"b"** of lower looper eccentric. By means of one screw, hold eccentric carefully.
   If, in relation to the upper edge of the needle eye, the point of the lower looper is higher in the left - to - right motion than in the right - to - left motion, see sketch **"B"**, turn handwheel very slightly towards you or inreverse. If the result is opposed, see sketch **"C"**.

7. Tighten both screws **"b"** of eccentric.

8. Check timing of upper looper to lower looper (see page 11).

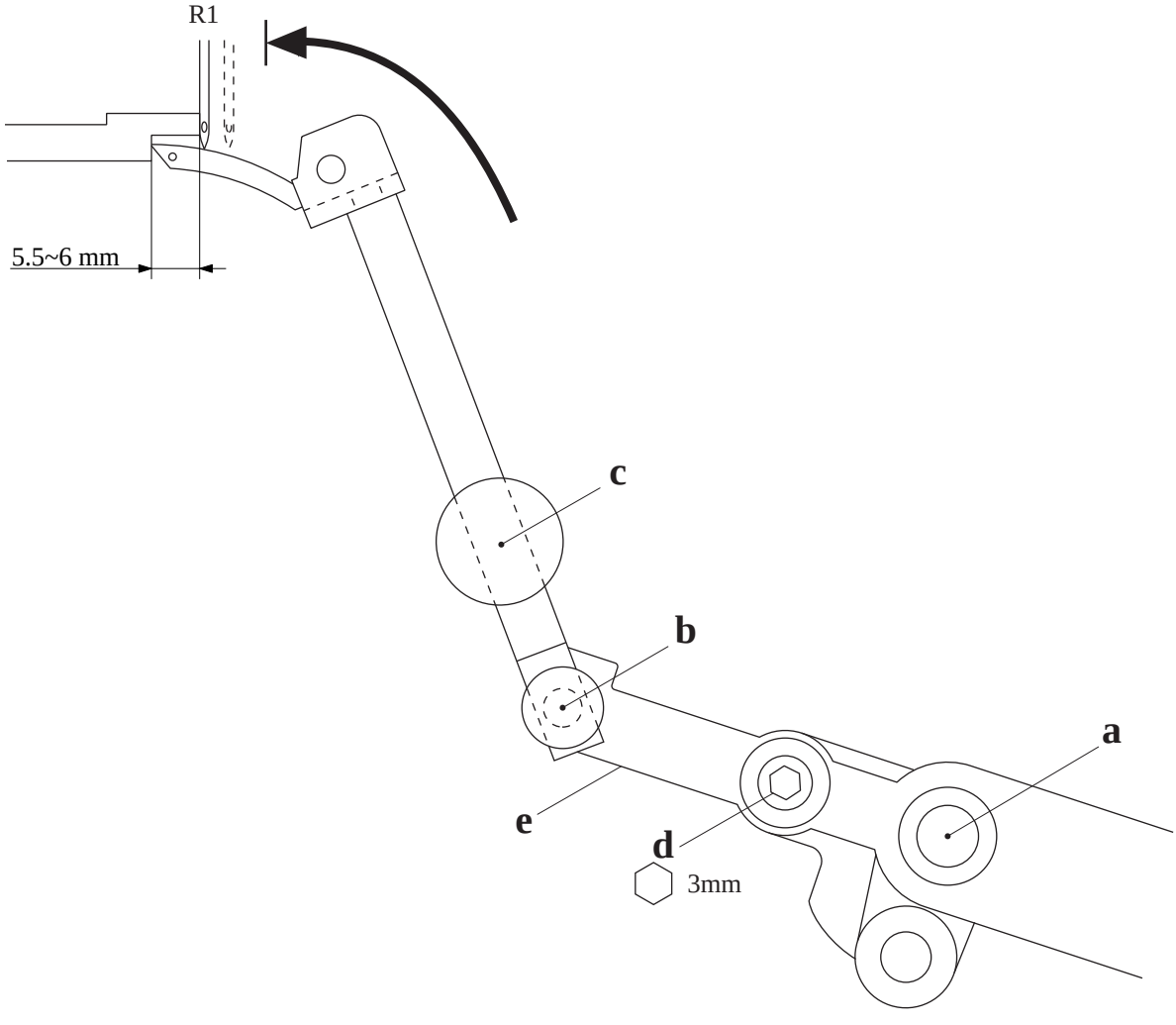
9. Refit machine base and needle plate.

Note:
For an easy check of the lower looper timing, check and make sure that height of needle bar, height of lower looper and angular position of lower looper are correctly set.

Turn the handwheel towards you, bring eye of lower looper from left to right behind the eye of needle **"R1"**. If not, adjust timing stroke with cam **"4"** (see page 4 position of eccentrics and sketch **"D"**).

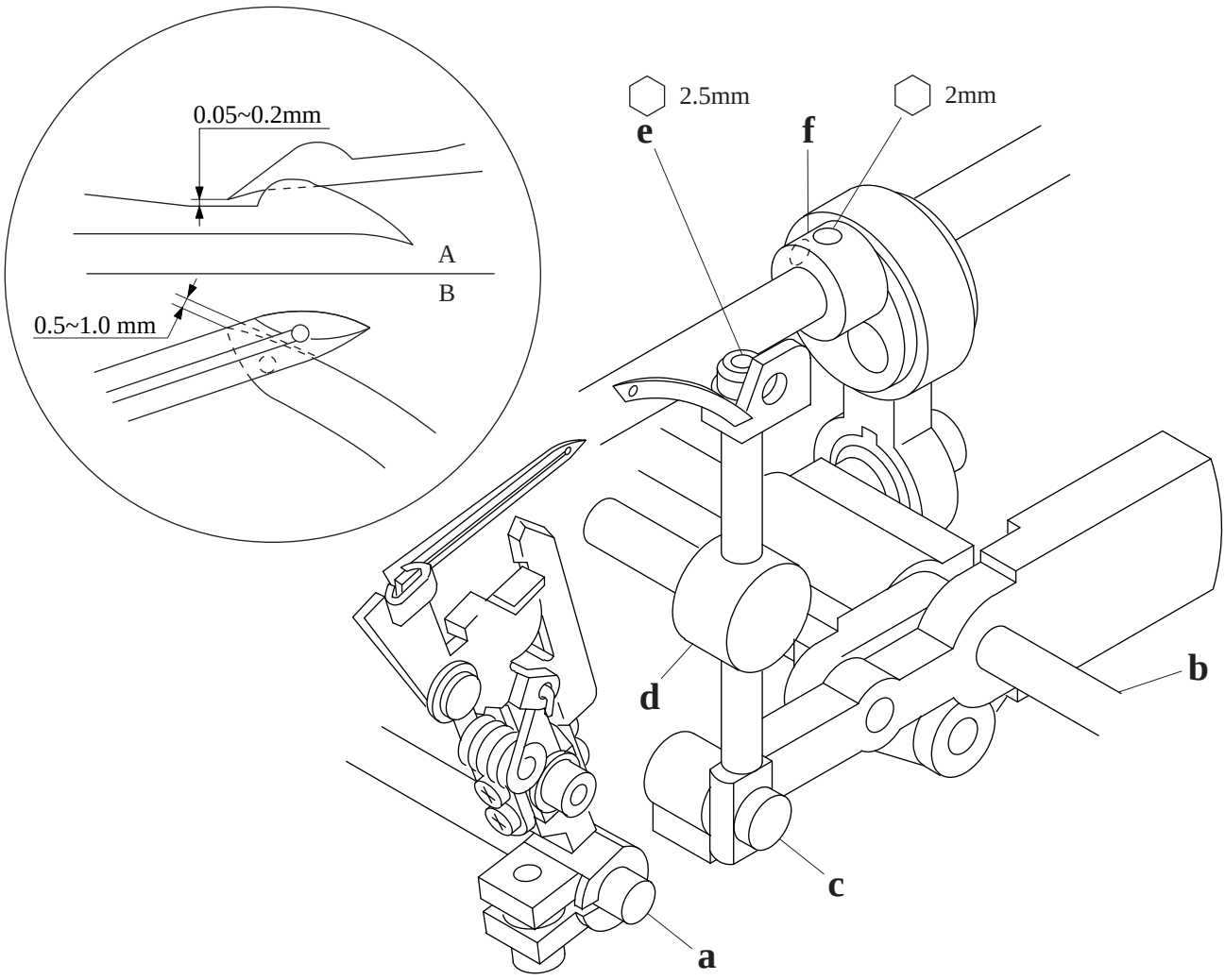
F.Y.I. Cam **"4"** is used for both chain and lower looper stroke. When checking this adjustment make sure that you also check adjustment of chain looper stroke (see page12).

1. Remove: Mains lead - Machine base.
2. Make sure that there is no axial play neither on the upper looper shaft **"a"** nor on the 2 pivoting axles **"b"** and **"c"**.
3. Bring upper looper to its extreme left swing position.
4. Loosen screw **"d"** just enough so that lever **"e"** articulates with friction and adjust lever **"e"** angularly to obtain a **6.0mm** gap between point of looper and the left side of the overlock needle.
5. Tighten screw **"d"**. It is very important that the machine turns quite freely without any biding effect caused by an axial shifting from lever **"e"**.
6. Check clearance and timing of upper looper to lower looper.



CLEARANCE AND TIMING OF UPPER LOOPER TO LOWER LOOPER 11

1. Remove: Mains lead - Sewing foot.
2. Check adjustments:
   - Height and orientation of needle bar (see page 6).
   - Height - clearnce - angular position of lower looper (see page 7).
   - Timing of lower looper (see page 9).
3. Remove machine base.
4. Make sure that there is no axial play, neither on the lower looper shaft **"a"**, the upper looper shaft **"b"**, nor on the 2 pivoting axles **"c"** and **"d"**.
5. Clearance: Loosen screw **"e"** slightly and adjust upper looper to lower looper to obtain a clearance of 0.1mm between them when they pass each other; see detailed drawing **"A"**.
6. Tighten screw **"e"** securely and recheck clearance.
7. Timing: Adjust timing of upper looper so that its point passes 0.5 to 1.0mm below the hump of lower looper; see detailed drawing **"B"**. If necessary, loosen both screws of upper looper eccentric **"f"** (No. 4 on page 4, then, by means of one screw, hold eccentric **"f"** and turn slightly handwheel, either forward to advance or backward to retard, upper looper in relation to lower looper.
8. Tighten both screw of eccentric **"f"**.
9. Refit machine base.



CHAIN LOOPER : ANGULAR POSITION - CLEARANCE - ORBITAL TIMING - CLEARANCE OF CHAIN NEEDLES GUARD 12a

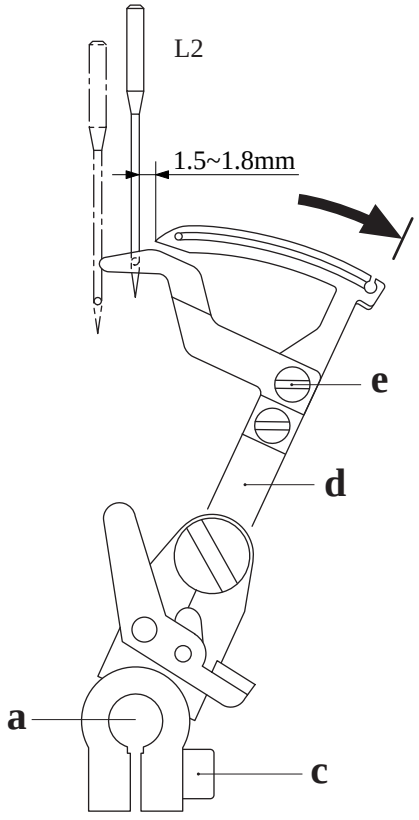


Fig.1

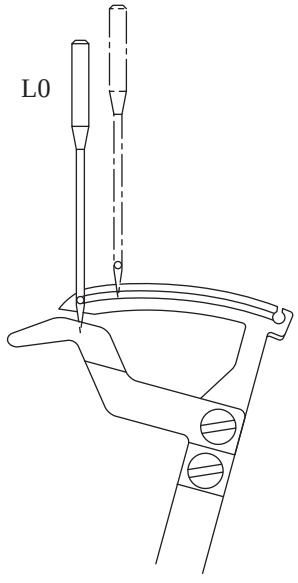
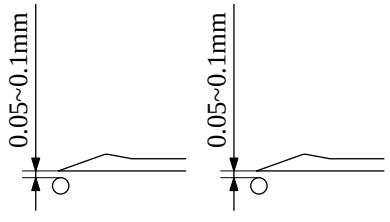


Fig.2



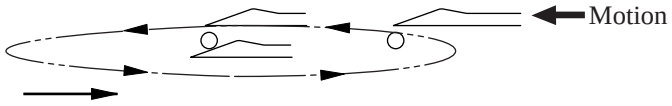


Fig.3

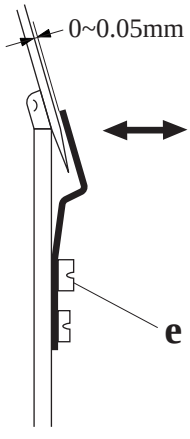


Fig.4

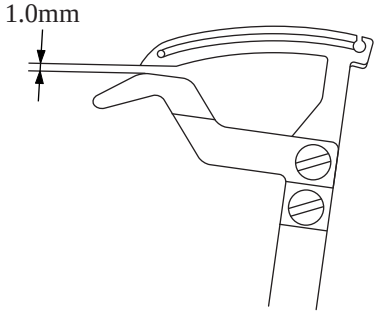


Fig.5

CHAIN LOOPER : ANGULAR POSITION - CLEARANCE - ORBITAL TIMING - CLEARANCE OF CHAIN NEEDLES GUARD 12b

1. Remove: Mains lead - Sewing foot - Machine base - Needle plate.

2. Make sure that there is no axial play on chain looper shaft **"a"**. If necessary, adjust with stop collar inside shaft **"g"** in Fig.7 on page 12c.

3. Angular position of chain looper: Insert a new needle (Nm 90) in **"L2"**. Check height and orientation of needle bar on page 6. Bring chain looper to its extreme right swing position. Check distance from point of chain looper to chain needle with thickness of gauge. If necessary, loosen screw **"c"** just enough to adjust the chain looper arm **"d"** angularly to obtain a clearnace of **1.5 to 1.8mm**. Then tighten screw **"c"**.(Fig.1)

Note: At this step, an easy check of the chain looper timing can be done as follows:
Chain looper motion right to left and the needle bar stroke should start at the same time. Turn the handwheel towards you, bring the chain looper eye from right to left motion behind the cover hem needle eye **"L0"**. Check if eye of chain looper matches with eye of needle (eye to eye).(Fig.2) If not, recheck all the above adjustments and adjust timing stroke with eccentric **"5"**. See page 4a & 4b for the position of eccentric. The eccentric **"5"** is used for both chain and lower looper timing. When adjusting this timing, make sure that you also check the adjustment of lower looper stroke. See page 9.

4. Clearance of chain looper: Bring point of looper - from right to left - behind the cover hem needle **"L2"**, and check if clearance is less than **0.05~0.1mm**. Then bring tip of looper behind the cover hem needle **"L0"**, and check if clearance is less than **0.05~0.1mm**.(Fig.3)

5. Clearance of chain needle(s) guard: Bring needle bar to its lowest position, turn the handwheel toward you and make sure that the clearance between both chain needle guard and needles is less than **0.05mm**. If necessary, adjust clearance with screw **"e"**.(Fig.4) Make sure that the gap between chain needle guard and chain looper is set at **1.0mm**. (Fig.5)

Note: Make sure that the chain needle **"L0"** is correctly positioned behind the chain looper in its motion left to right. The **(L0)** needle tip (motion down) should be positioned at the beginning of the chain looper hump (back of chain looper). See chain looper orbital motion on Fig.3.

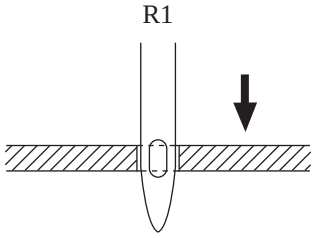


Fig.6

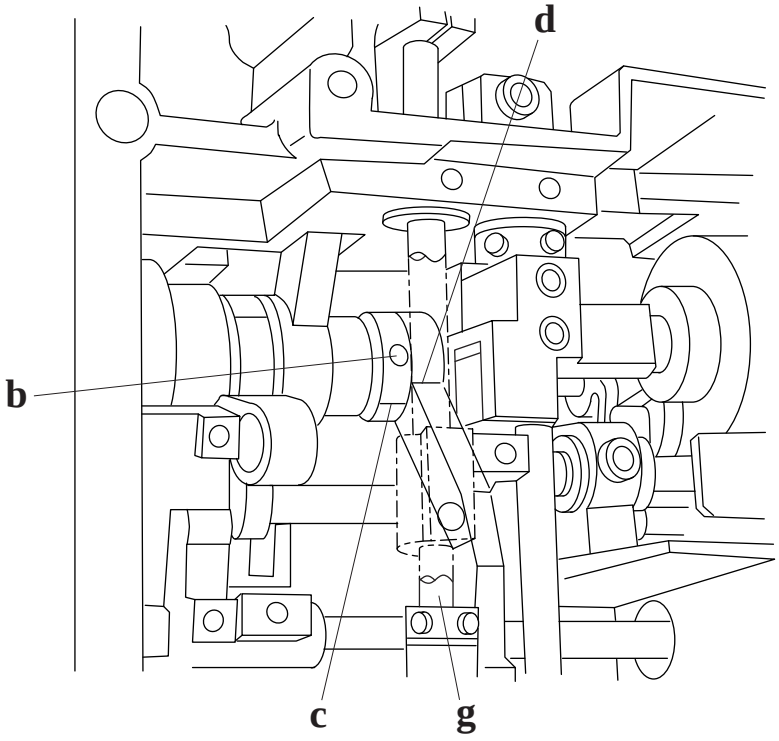


Fig.7

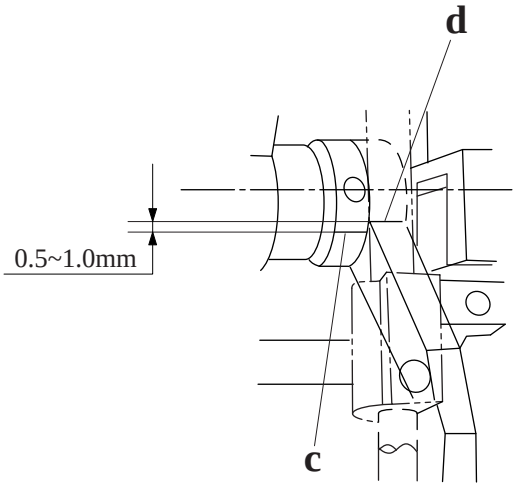


Fig.8

6. Chain looper: Eccentric - Orbital timing.
   Make sure that there is no axial play on chain looper shaft.

   If necessary, adjust with stop collar inside shaft **"g"**. Check angular position of chain looper and height and orientation of needle bar.

   Turn the handwheel to bring the needle bar to the lower edge of **"R1"** needle eye in its downward stroke flush with the needle plate.(Fig.6)

   If necessary, loosen screws **"b"** of eccentric, align eccentric mark **"c"** with mark **"d"** and tighten both screws **"b"**. Recheck the adjustment.(Fig.7)

   If formation of needle thread loop is incorrect, lower position of eccentric mark **"c"** by **0.5 to 1.0mm** from mark **"d"**.(Fig.8)

   Check to make sure that the orbital motion of chain looper right to left is as per sketch shown Fig.3 on page 12a.

1. Timing adjustment for chain looper thread take up rotary Cam **"C"**:
   When the small hole **"D"** on **"C"**adjoins at the surface of chain looper thread guide plate **"A"**, the needle **"L2"** in its downward movement must be positioned as shown in Fig. 1.

2. Setting for the timing adjustment:
   Loosen the screws **"E"**, then turn **"C"**, either in the direction of **"F"** or **"R"** depend on the requirement, until **"C"** is set as shown in Fig.2. Tighten the screws **"E"**.
   Screw driver can insert out of left side opening between left side **"C"** and **"A"** near by set screws on the setting stud of **"C"**.

3. When chain looper stitch formation shows either too tight (Fig.3) or too loose (Fig.4), this can be corrected with the following manner:
   In case of too tight (stitch formation), loosen the screws **"E"** and turn (adjust) **"C"**, slightly (may be about for a small hole) in the **"F"** direction. At the contrary, in case of too loose, turn (adjust) **"C"**, slightly (may be about for a small hole) in the **"R"** direction. After correcting properly, tighten the screws **"E"**.

4. Beside above adjustment, if chain looper thread holder **"B"** placed upper, stitch formation becomes tight and placed lower, stitch formation becomes loose.
   In connection with above adjustment (correction), if **"A"** adjusted toward upper position, Chain looper thread stitch formation becomes loose and if adjusted to the lower, Chain looper thread stitch formation becomes tight. It is required to make sure that **"C"** takes up chain looper thread properly when **"A"** adjusted its set position at the highest of adjustable long hole of **"A"**.

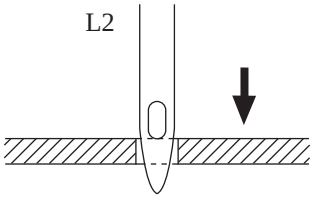


Fig.1

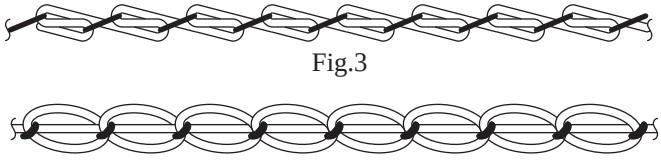


Fig.3

Fig.4

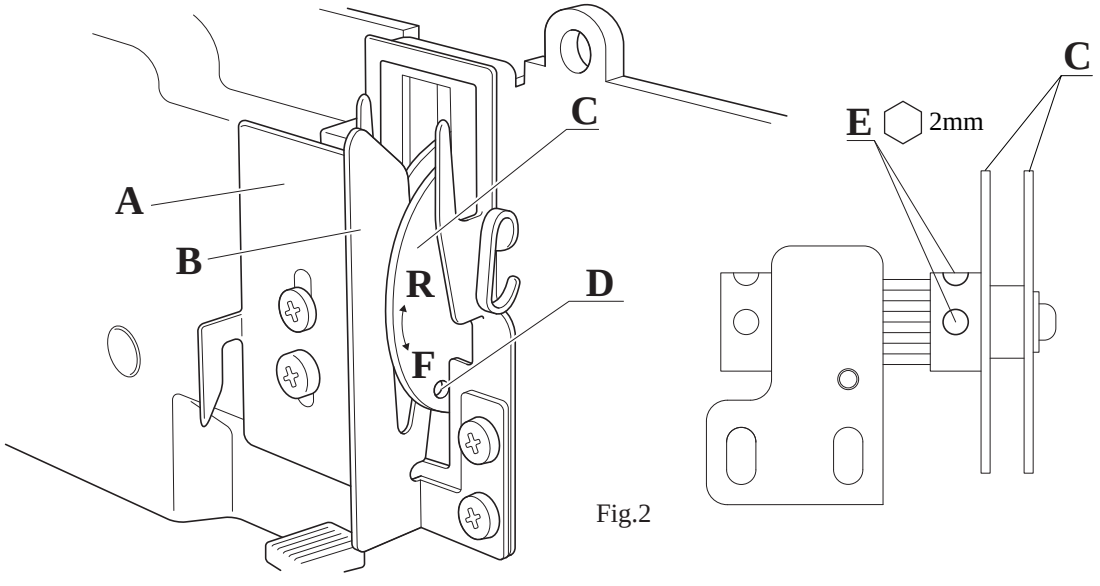
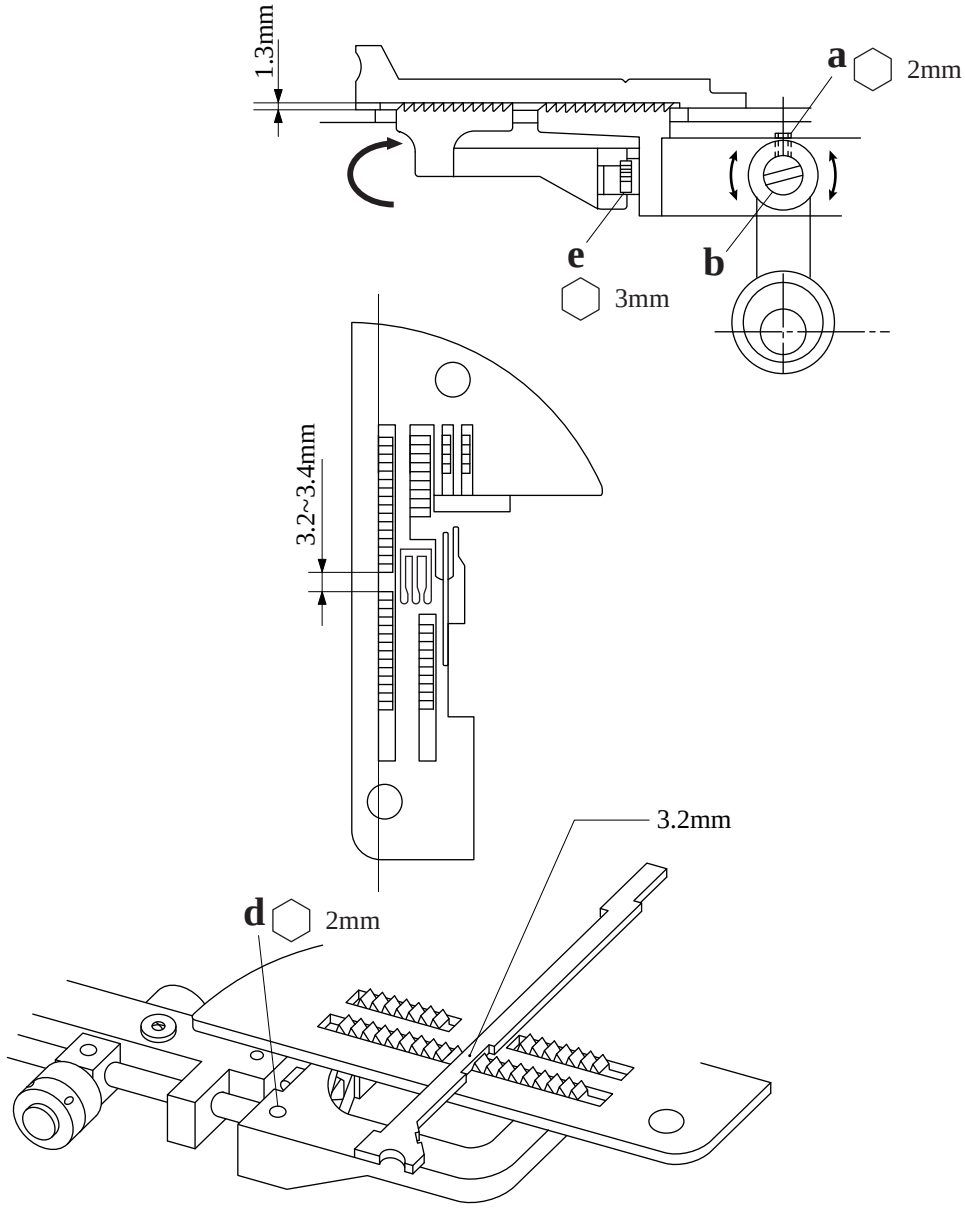


Fig.2

1. Remove: Mains lead - Sewing foot - Needles and rear cover
2. Set stitch length at **"0.6"** and differential feed at **"1"**.
3. Turn the handwheel and bring feed dogs to their highest position.
4. Loosen screw **"a"**.
5. Refit sewing foot, lower cloth presser bar to press gauge against needle plate.
6. Adjust feed dogs height with eccentric **"b"** to touch gauge and tighten screw **"a"**.
7. Turn the handwheel towards you at least 3 complete turns and recheck adjustments.
8. Check gap between front and back feed dog (3.2 to 3.4mm).
9. If necessary, loosen screw **"d"**, position gauge as per above sketch, push front feed dog against gauge and tighten screw **"d"**.

Note: Feed dogs should be both at the same level. If necessary, loosen screw **"e"** and adjust rear feed dog level to front feed dog.



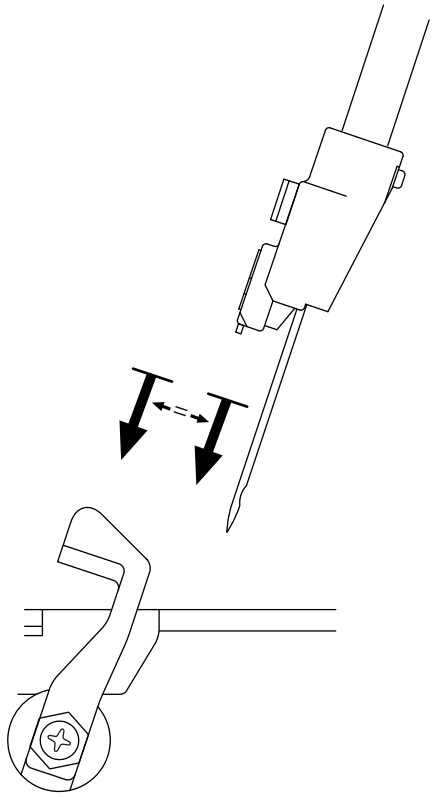


Fig.1

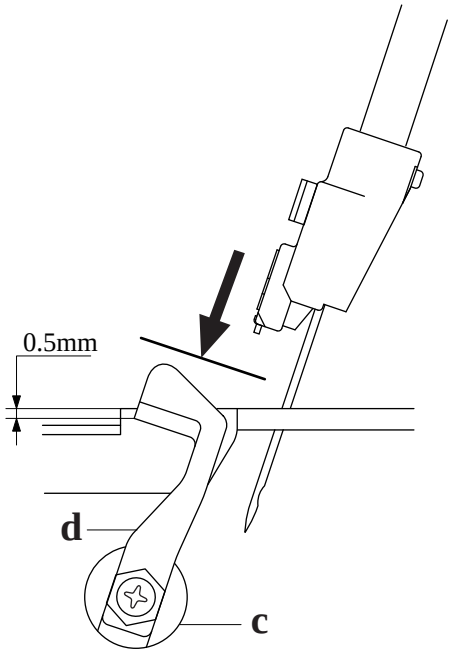


Fig.2

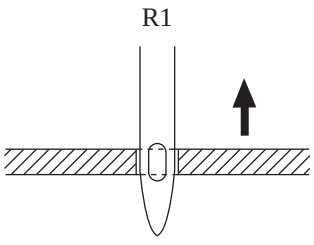


Fig.3

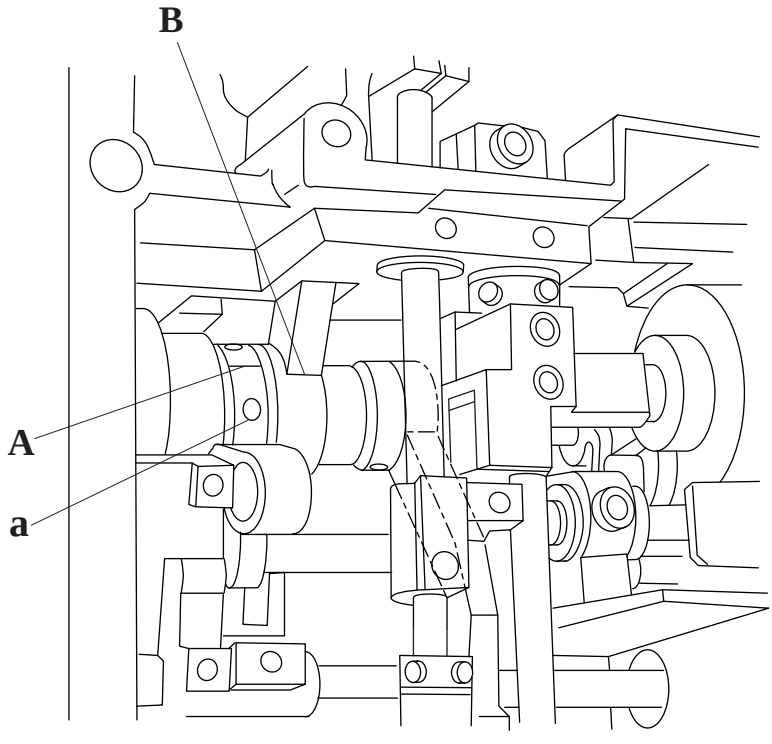


Fig.4

Caution: The eccentric **"7"** is used for feed and moving cutter timing. See page 4.

1. Remove: Mains lead - Sewing foot - Machine base.

2. Check height and orientation of needle bar - height of feed dog. See page 6&14.

3. Turn the handwheel and bring the needle bar to its highest position. Check and make sure if moving cutter and needle bar start simultaneously from their highest position.(Fig.1)

4. If necessary, turn the handwheel and bring needle bar to its lowest position. Then bring up the needle bar to the lower edge of **"R1"** needle eye flush with the needle plate.(Fig.3) Loosen both screws **"a"**, align eccentric mark **"A"** with mark **"B"** and tighten both screws. Recheck the above adjustments.(Fig.4)
   Note: Make sure that the machine turns freely without any biding effect.

5. Height of moving cutter: Turn the handwheel to bring moving cutter to its lowest position. Check to make sure that the tip of moving cutter blade is at **0.5mm** below the fixed cutter. (Fig.2) If necessary, loosen screw **"c"** and adjust height by sliding moving cutter **"d"** up or down. Tighten screw **"c"** firmly and recheck its height.

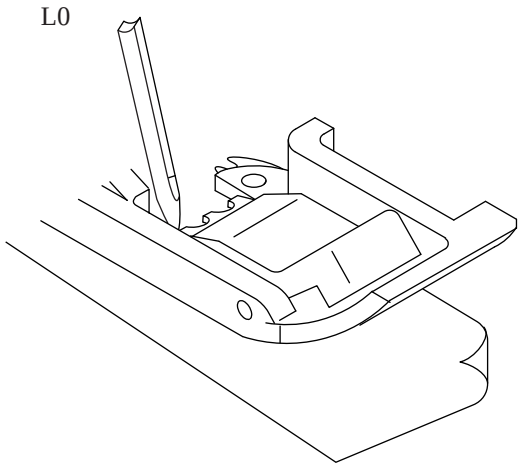


Fig.1

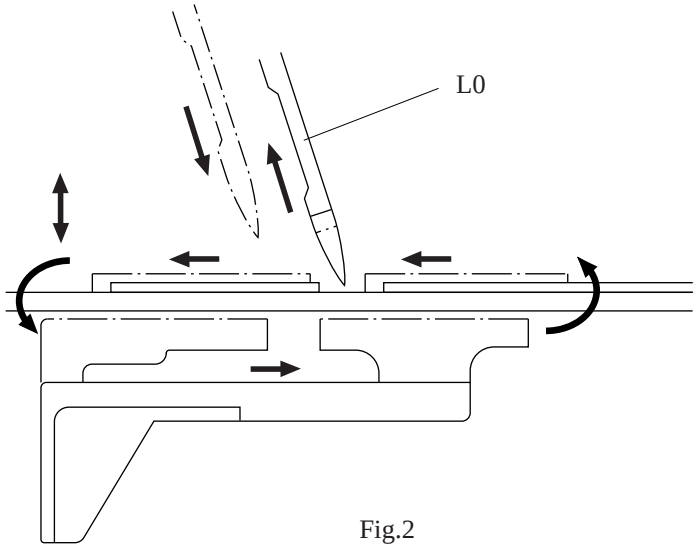


Fig.2

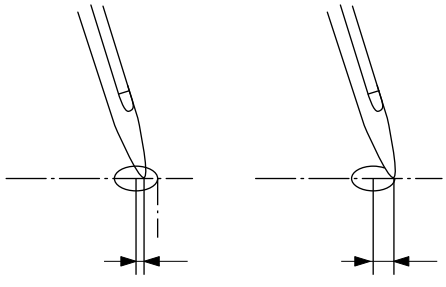


Fig.3

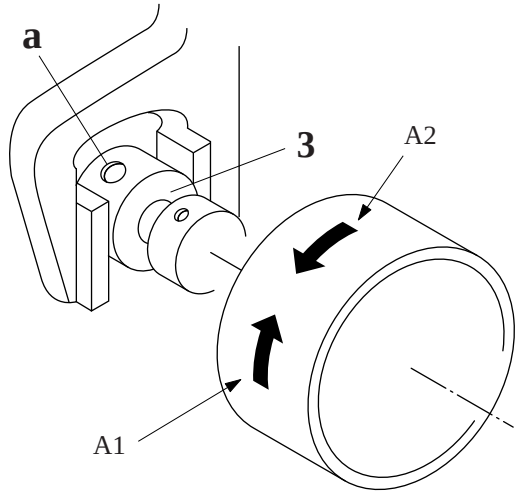


Fig.4

HORIZONTAL FEED TIMING AGAINST CHAINSTITCH NEEDLE 16b

Note: It is essential to precisely check and adjust this timing.
This adjustment avoids bending the chain needle(s) when sewing through maximum thickness of materials.

1. Remove: Mains lead - Machine base

2. Check adjustment height of feed dog and vertical feed timing. (See page 14 and 15a,b)

3. Set stitch length at **"4"** and differential feed dial at the neutral position **"1"**.

4. Bring needle bar to its heighest position.

5. Place a sheet of paper underneath the presser foot. Lower presser foot. (Fig.1)

6. Turn the handwheel clockwise and bring tip of **"L0"** needle into the paper, then turn the handwheel counterclockwise all the way and bring tip of **"L0"** needle flush or into the paper.(Fig.2)

7. Check if the needle point is set in the middle or in the front edge of the open hole on the paper. See figure 3 for correct setting **"A1-A2"**.

8. If not, loosen screw **"a"** and hold the feed eccentric **"3"** in position. Then turn the handwheel clockwise or counterclockwise as shown in figure 4 in order to get the correct setting and tighten screw **"a"**.

9. Recheck the adjustment and if necessary re-adjust the position of feed eccentric **"3"**.

ADJUSTMENT FOR DIFFERENTIAL FEED UNIT OPERATED WITH STEPPING MOTOR

1. Loosen set screws **"1"** and **"2"** for D.F. step motor gear **"C"** .(Fig.1)

2. Insert Gauge pin **"A"** (No.11685) into two holes on the both gears **"C "** and **"D"**of D.F. stepping motor. (Fig.1)

3. Set a gauge roller **"B"** (No.11686) into the guide of feed rock lever,back **"E"**and keep in touch with a D.F. regulator slide block **"G"** certainly onto the guage roller **"B"**.(Fig.2)

4. Tighten set screws **"1"** and **"2"** of the gear **"C"**. (Fig.1)

5. Secure the indication of stitch length number as **"4"** and D.F. as **"1"** on the LCD-display and perform its work test. If the feed length of front feed dog is larger than the same of the rear feed dog, loosen screw **"3"** and adjust the set position of the sensor in the direction of **"R"** , so that the both feed dogs have a equal feed length. (Fig.1)

6. On the contrary, if the feed length of the front feed dog is shorter, loosen the screw **"3"** and adjust the set position of the sensor in the direction of **"F"**. (Fig.1)

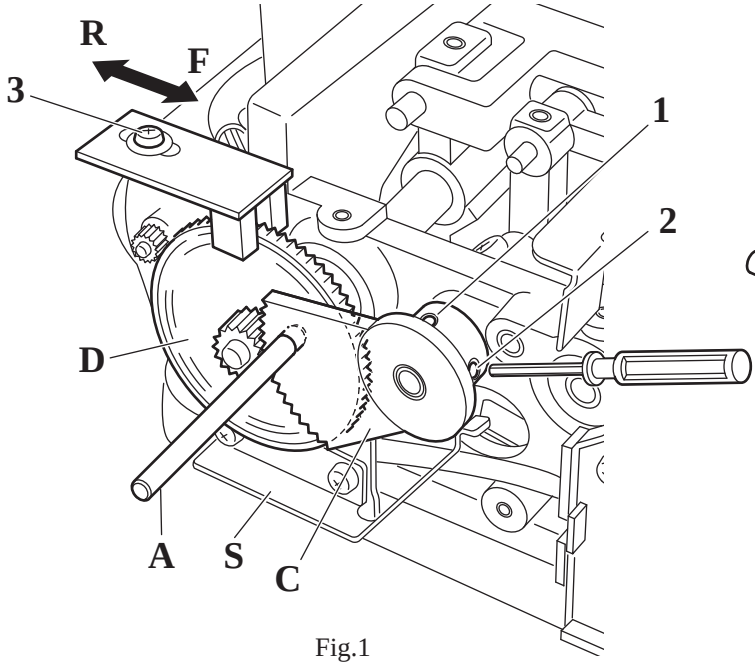


Fig.1

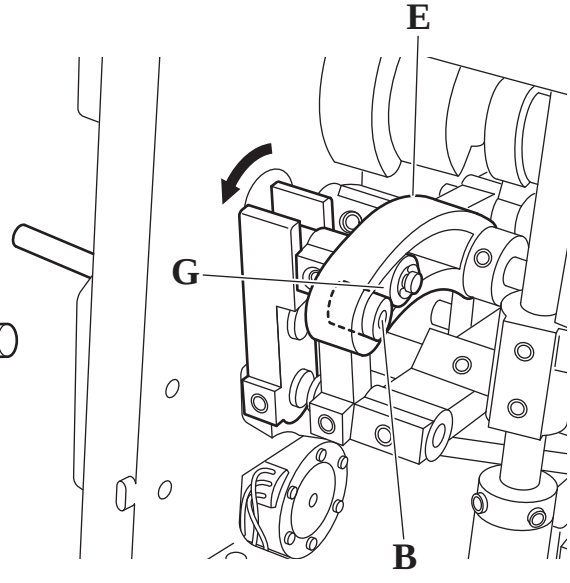
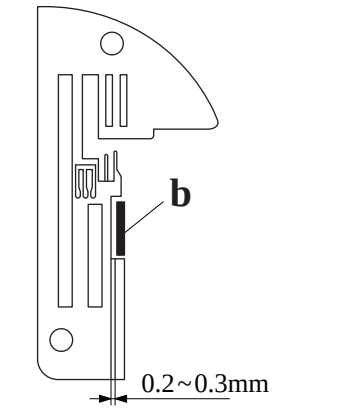


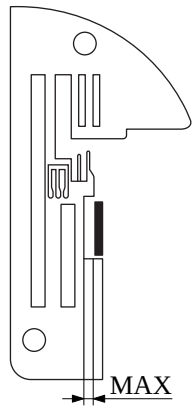
Fig.2

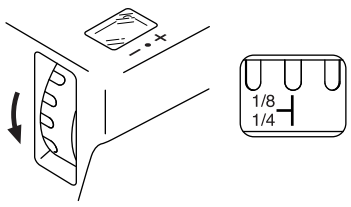
POSITION OF FIXED CUTTER AND CUTTING WIDTH DIAL SETTING 18

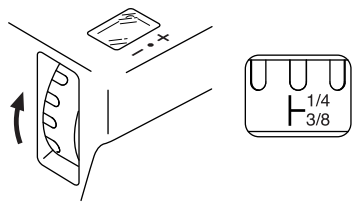
1. Remove: Mains lead - Sewing foot - Needles.
2. Disengage moving cutter.
3. Basic position: Turn dial **"a"** to bring indicator to position mark **"1/4~1/8"** and check if clearance of **0.2~0.3mm** is obtained between fixed blade **"b"** and needle plate edge.
4. Make sure that there is no play between cutting width cam unit **"d"**, lever **"e"** and shaft **"f"**.
5. If necessary, loosen screws **"c"**.
6. Push unit dial to the right to obtain a clearance of **0.2~0.3mm**.
7. Tighten screws **"c"** and check the clearance between fixed blade and needle plate edge.

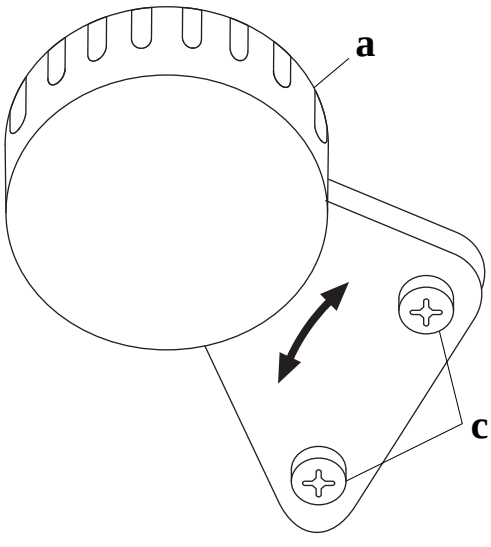
Note: Re-engage moving cutter and make sure that the moving blade release knob **"g"** is not touching the shaft support **"h"** (the gap between **"g"** and **"h"** is **0.1~0.2mm**).

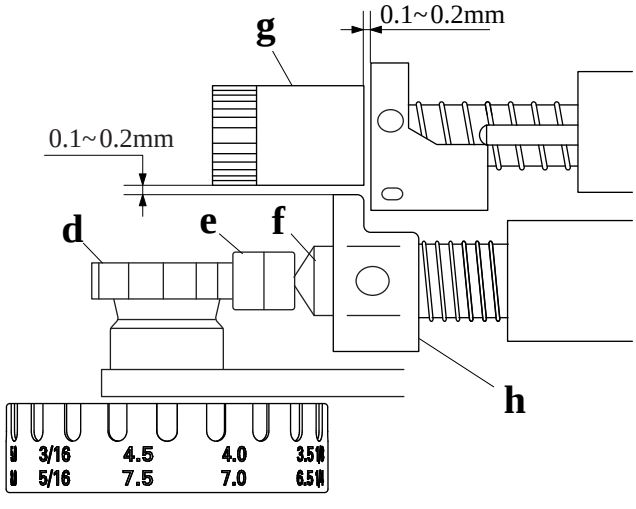






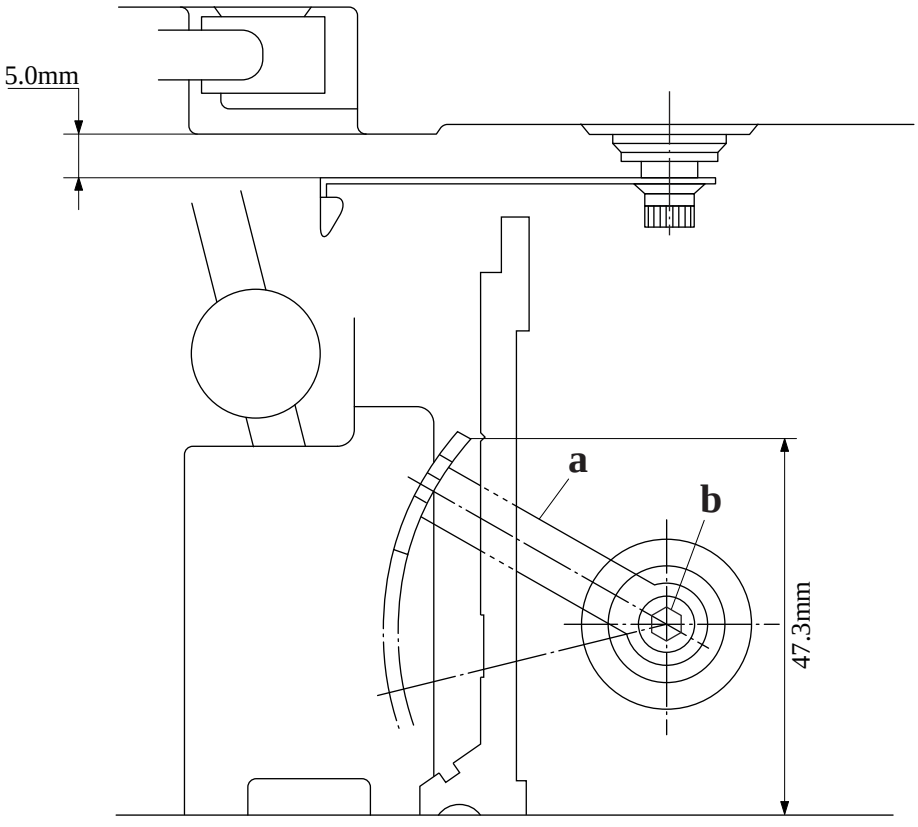






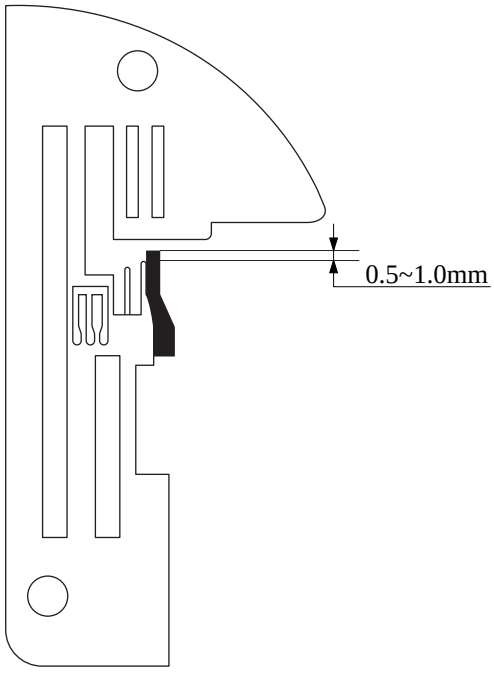
1. Remove: Mains lead and loopers threads take up lever cover unit **"6"**on page 2.
2. Turn the handwheel and bring upper looper thread take up lever **"a"** in its highest position.
3. Check and make sure that the distance between thread take up lever guide and inside of the machine base is at **47.3 mm**.
4. If not, loosen allen screw **"b"** and adjust position.

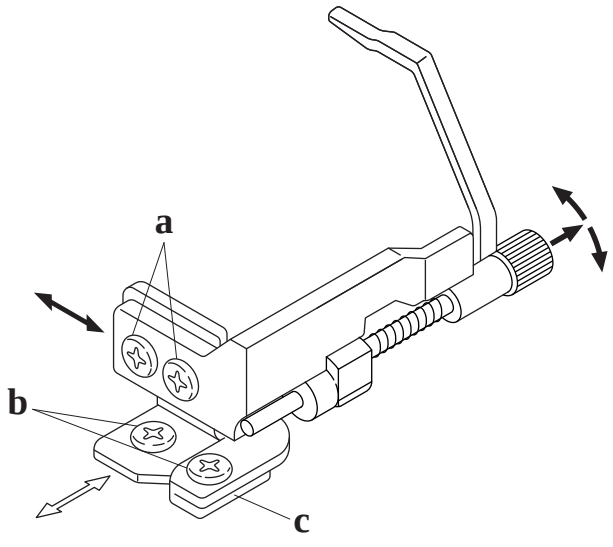
Note: Check and make sure that the space between back of thread take up lever and casing is at **5mm**.



1. Remove: Mains lead.
2. Check and make sure that the stitch width finger (=instant rolled hem device) is flush with the needle plate, that the distance between the needle plate tongue and front section of stitch width finger is at **0.5 to 1mm**.
3. If not, loosen screw **"a"** to adjust the back forward position and height.
4. If angular position of stitch width finger against needle plate is not positioned correctly, loosen screws **"b"** and adjust angular position so that stitch width finger touches the needle plate.

Note: One of the screws **"b"** fastens the plate **"c"** which allows the automatical return back of chain looper after its threading. Make sure the coming back is still working. Make sure also that there is a little gap between stitch width finger and cutters.

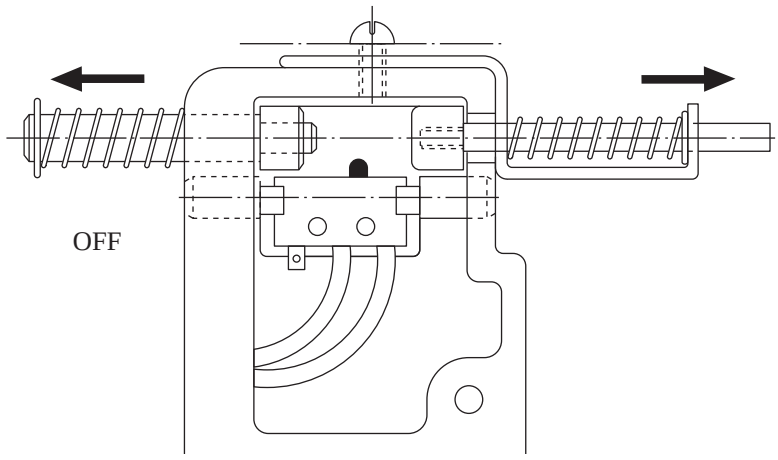


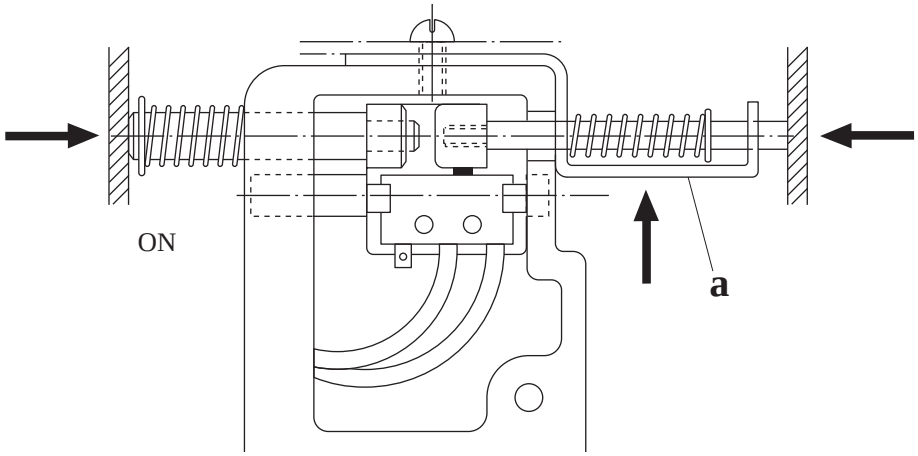


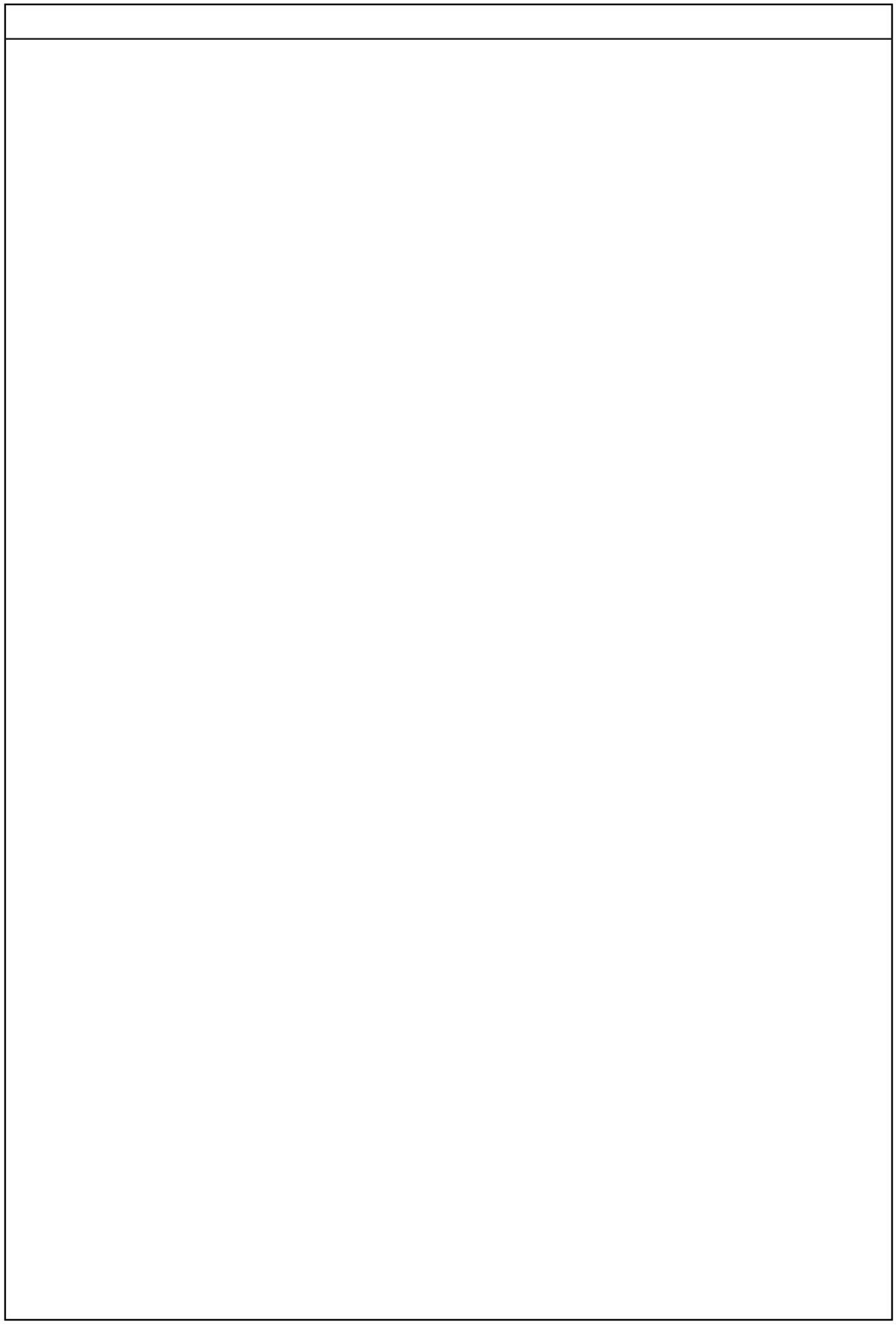
The device is built in order to switch off the machine as soon as one (or both) of the covers is opened.

In case that machine is still switch off by the device with both covers closed: check if switch clicks ON and OFF when opening / closing covers.

If necessary, push the support **"a"** upward to bend it until the switch clicks ON and OFF.







ADJUSTMENT OF SETTING POSITION FOR EN-SENSOR & SLIT-PLATE

In order to secure the proper position of EN-Sensor (Fig.2, **"f"**,Page22b) and the related Slit-plate (Fig.2, **"d"**, Page22b), take a following manner for this adjustment :

1. Adjustment of setting position for EN-Sensor

   1-1. Remove Main lead, lateral cover and a hand wheel.
   1-2. Loosen the set screw (Fig.2, **"a"**) for EN-Sensor (Fig.2, **"f"**) and Needle positioning sensor.(Fig.2, **"g"**)
   1-3. Measure the clearance 0.2mm at **"c"** with thickness gauge **No.11691**. Please refer to drawing in the balloon, Page22b.
   1-4. After making sure the clearance, tighten the set screw **"a"**.

2. Adjustment of setting position of Slit-plate(Fig.2, **"d"**)

   2-1. Loosen the set screw **"e"** of Slit-plate(Fig.2) and set the hand-wheel temporarily.
   2-2. Turn the hand-wheel in the normal direction until the needle eye is positioned in accordance with Fig.3.
   2-3. Remove hand wheel again and put Gauge **No.11692** on to Main shaft until touching with Roll pin(Part **No.800703**) on the Main shaft as shown in Fig.2.(drawing is located at the center of Page 22b) and the Gauge **No.11692** should be applied as follows:
      a) Right side of the Gauge formed a right angle should touch, its inner side, with outside of right part of EN-Sensor.(Fig.2, **"h"**)
      b) Turn the slit-plate in the normal direction until the slit plate stops after left end of projected part of slit-plate touches with left side(inner side) of the gauge formed a right angle as shown in the drawing Fig.2. **"i"**.
   2-4. Adjust the position of slit-plate in the parallel direction with the Main shaft, as slit-plate should lightly push and touch to the tip marked **"j"** of the gauge.
   2-5. Hold the above position and tighten the set screw **"e"** for the slit-plate. Remove the gauge **No.11692** from the Main shaft.

Note: Do not tighten the screw **"e"** too tightly, because the plastic disc (slit-plate) could break.

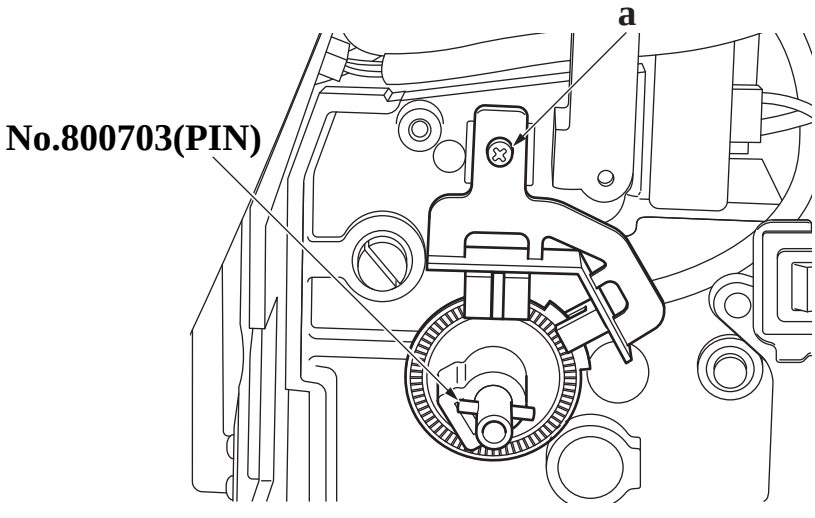


Fig.1

ADJUSTMENT OF SETTING POSITION FOR EN-SENSOR & SLIT-PLATE

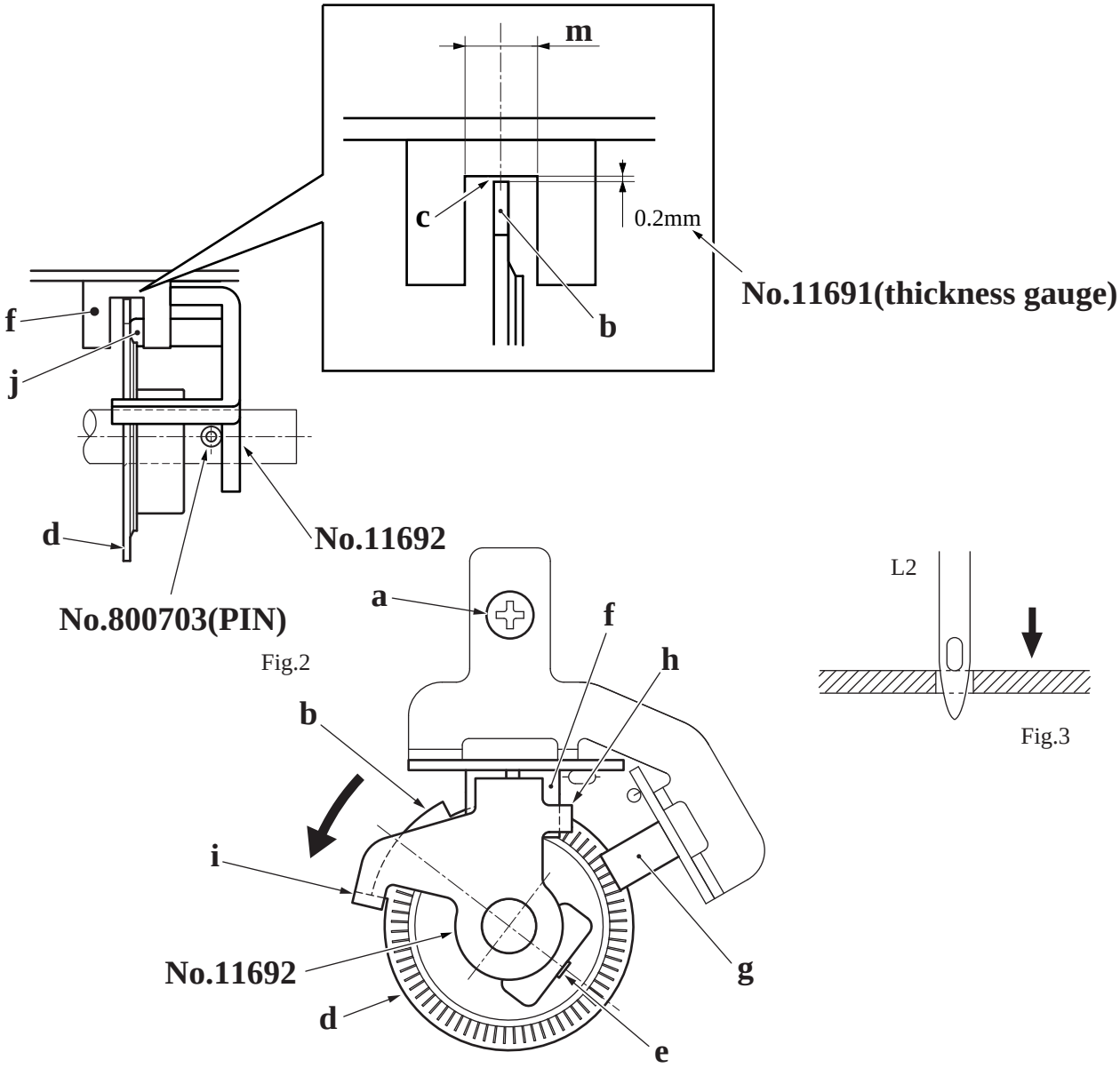


Fig.2

Fig.3

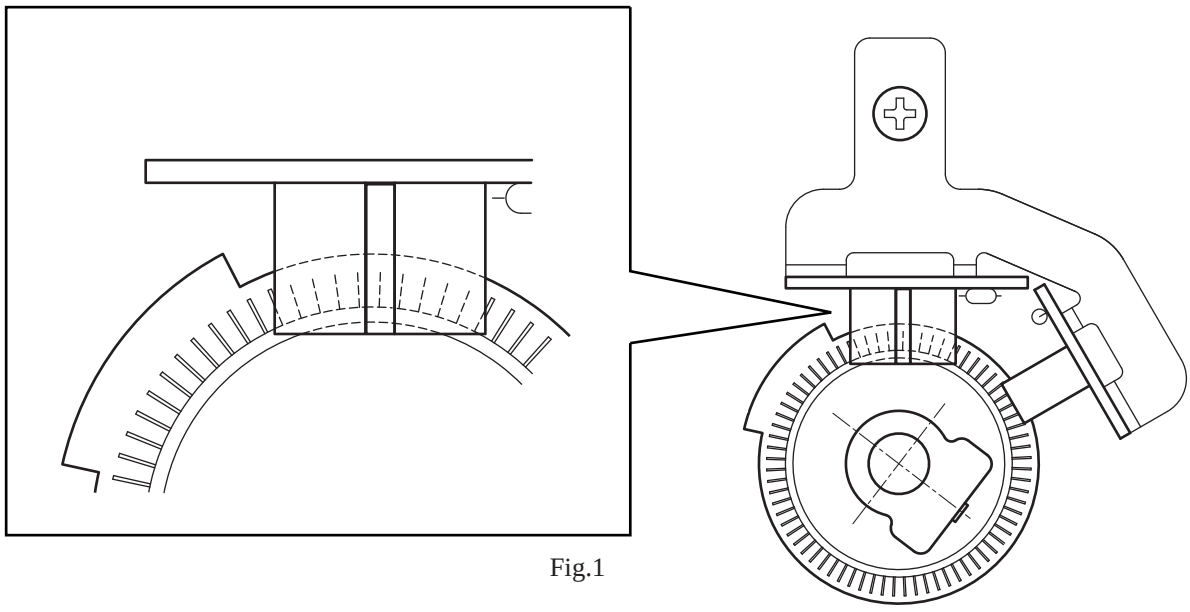


Fig.1

ADJUSTMENT FOR STITCH LENGTH UNIT OPERATED WITH STEP MOTOR

1. Loosen the two set screws **"D"** (Fig.2). One of the set screw located behind a drawing (Fig.2)and lower position.

2. Insert guage pin **"A"** (Fig.1 N0.11684) into the both hole on the gear **"B"** and **"C"** (Fig.1) for the step motor.

3. Tighten the set screws **"D"** (Fig.2) and pull out the Guage pin **"A"**, after securing proper instllingof Stitch length unit. At the working test, if st itch length appears as shorter while LCD display shows stitch length **"4"** and DF **"1"**, loosen the screw **"E"** (Fig.2) and adjust the position of sensor in the **"R"** direction, so that it may appear larger stitch length. Tighten the screw **"E"** after obtaining proper position.

4. On the contrary, if stitch length becomes larger than required length, sensor's position should be adjusted in the **"F"** direction (Fig.2) and tighten the screws **"D"** after securing right position.

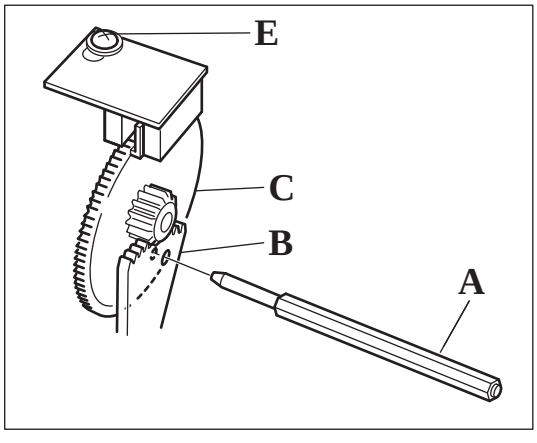


Fig.1

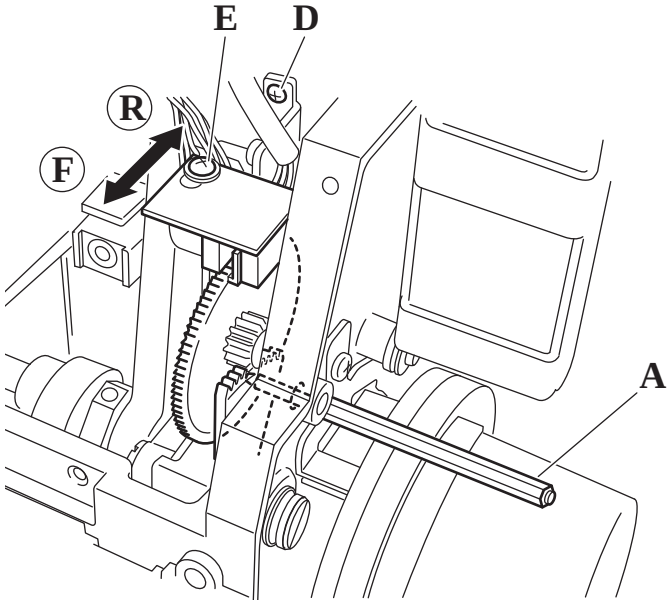


Fig.2

TIMING ADJUSTMENT FOR TOP COVER TRIANGLE THREAD GUIDE AND TOP COVER HOOK

1. Set the program any one of No. 21-23 and power supply should be turned off.

2. Turn the hand wheel, so that the both Top Cover Hook **"B"** and Top Cover Triangle Thread Guide**"C"** may locate at the position shown as Fig.1 and secure the distance for **0-0.5mm** as also shown in the Fig.1.

3. Adjustment of this distance may be executed to move a Top Cover Triangle Thread Guide **"C"** a little bit the front and the rear after loosing set screws **"A"**.

4. After obtaining proper distance, tighten the set screws **"A"**.

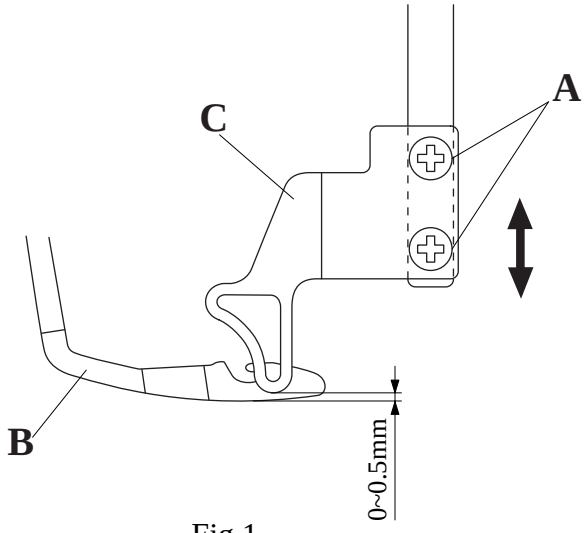
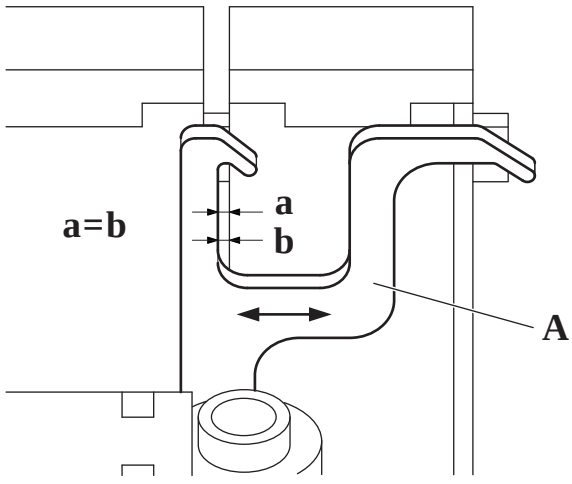


Fig.1

ADJUSTMENT OF THREAD TAKE UP LEVER FOR TOP COVER AND DECO-COVER. 25

In order to obtain good stitching result especially for the Top-Cover and DECO-Cover, maintain well Thread take up lever **"A"**.

For this purpose, check the distance of both **"a"** and **"b"** and if both are not equal, adjust the shape of Thread take up lever(A) by hand work with bending it in the directionof arrow (◄——►) upto resulting to have equal distance at the **"a"** and **"b"**.



INSTALLING OF DECO UNIT 26

Install DECO UNIT on to the position as shown Fig.1, with following manner:

1) Prepare preassembled DECO UNIT with Blue and Yellow Decorative Thread Guide and Gauge **No.11687**.
2) Before putting the guage on the needle plate, turn the handwheel in the normal direction until the **"L2"** needle point enter into the needle hole of needle plate and feed dog must be down under the needle plate surface. Then put the gauge on the Needle plate shown in the Fig.2 and adjust the position of DECO UNIT as follows.

1. Make the points of Blue and Yellow Decorative Thread Guide touch slightly with specified face **"e"**of the gauge and at the same time, make the bottom face of Yellow Decorative Thread Guide touch slightly on the another specified face **"f"**.

   Note: This work, with the gauge, must be performed without any force, in order to have a proper result in which Yellow Decorative Thread Guide has **6mm** height from the surface of needle plate and center of three thread holes of Blue and Yellow Decorative Thread Guide coincide each other as well as center of three corresponding needles uprightly. (Fig.2)

2. After recognizing necessary conditions, fit the DECO UNIT on to the position as shown in Fig.1 and tighten the screws **"a"**.

3. An alignment of DECO UNIT is stating in the page of **"Adjustment for DECO UNIT"**.

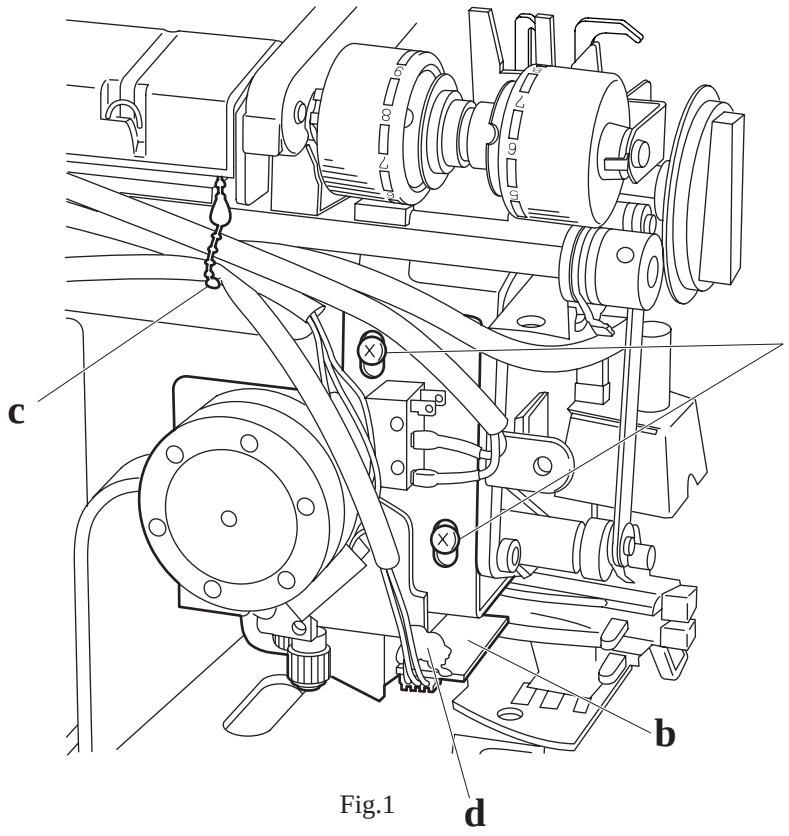


Fig.1

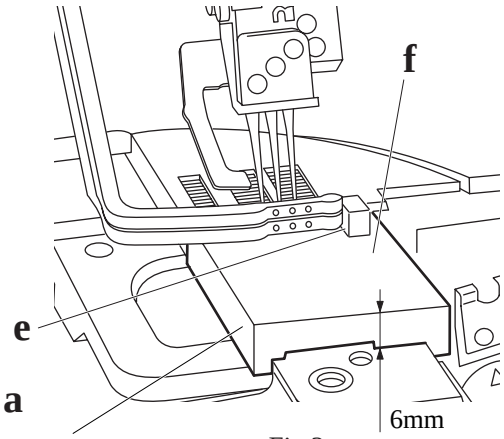


Fig.2

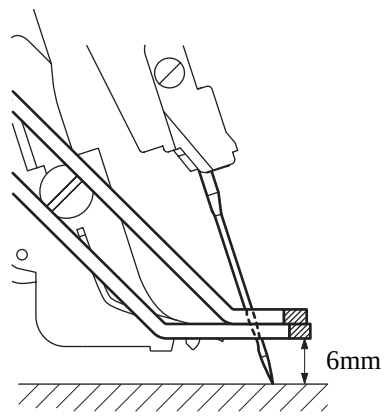


Fig.3

ADJUSTMENT FOR DECO-UNIT(ADJUSTMENT OF INITIAL POINT FOR BLUE & YELLOW DECORATIVE THREAD GUIDES)

When the undermentioned parts of DECO unit replaced and or the initial point of both (Blue and Yellow) Decorative Thread Guides shows incorrect position, it is required to make an adjustment of the initial point for the both Decorative Thread Guides with following manner:

Name of parts 1. DECO step motor,
2. Gears (miter gears, idling gear, pinion gears and DECO gears(upper and lower))
3. Sensor

1. Power source should be turned off.

2. Remove back cover and DECO unit after loosing the set screw for DECO unit. (Fig.1-a) Do not remove 3 sets of wire harness from LCD Printed Circuit Board. Wire fastening band can be cut off. See page 26-c.

3. Loosen slightly set screws (Fig.4-a) for the miter gear set on the shaft of DECO step motor and make the miter gear idle on the shaft.

4. Insert Blue & Yellow Decorative Thread Guides into setting hole of DECO gear and tighten slightly with set screws located inner part of small hole. (Fig.5-k and 6-k)

5. Turn power switch on. All step motor (from DT-1 motor to D.F. motor) perform, one after another, its movement of return to the initial point and only DECO step motor stops after free running.

6. At the same condition of Artcle 5, put the unit on the surface plate (Fig.7) and measure the height at the part of **"l"** and **"m"** of the both Decorative Thread Guides. After finding same height at the both part as **84.3mm**, then set a miter gear loosened in the article 3, with set screws (Fig.4-a) while slightly touching with the another miter gear. If there is a differ ent height at the **"l"** and **"m"**, adjust the height with only Blue Decorative Thread Guide (Fig.8-d) and then fix miter gear. After that , remove Yellow Decprative Thread Guide (Fig.8-e) from DECO unit and set it again after securing the same height at the **"l"** and **"m"**.

7. Adjust the position of sensor Printed Circuit Board (Fig.6-r), so that the end of shelter plate (Fig.6-t) on the lower DECO gear may locate at the position shown as (Fig.9-v) and fix the P.C.B. with set screw (Fig.6-s). The proper position of end of shelter plate may be secured with gauge **No.11684**.(Fig.9)

8. Power switch should be turned off and again turn power switch on. Although motor performs its movement of returning to the initial point, usually Blue & Yellow Decorative Thread Guides stop with some discrepancy of the position.

9. While power switch on, loosen the set screws (Fig.4-a) for a miter gear on the output- shaft of DECO step motor.

10. Adjust the position of DECO gears for the Blue & Yellow Decorative Thread Guides, so that it may secure the proper position (Fig.2) and be in mesh. Then tighten set screws (Fig.4-a) for miter gear.

11. Make sure the position of both Blue & Yellow Decorative Thread Guides , and if the position is not proper, it is required to repeat the man ner of Article 7 through 10.

12. Glue together bottom side of Sensor Printed Circuit Board and a protrusion of the chassis to prevent change of necessary position (Page26 Fig.1-d).

13. DECO unit should be positioned and installed on the Sewing Machine as shown in the page 26 (Installing of DECO UNIT).

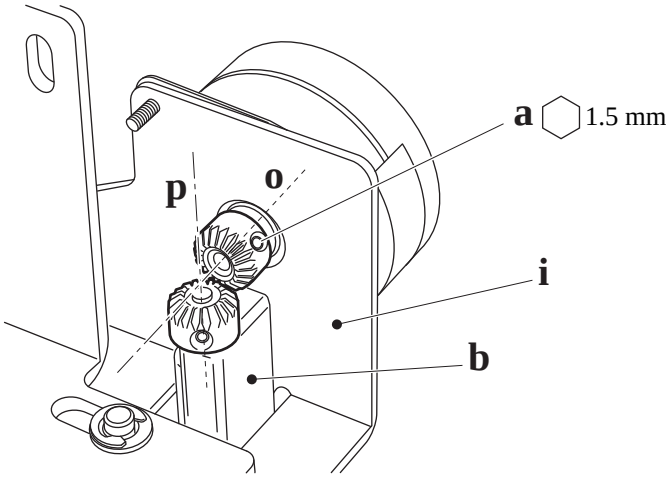


Fig.4

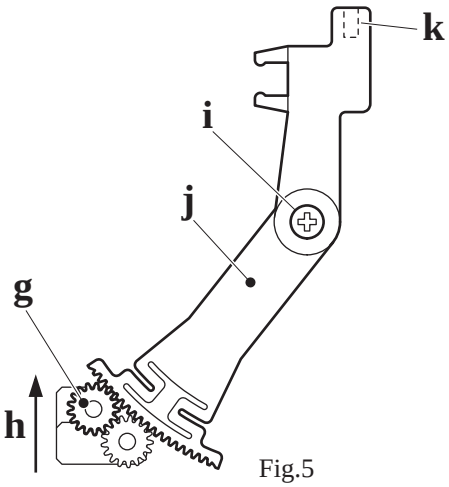


Fig.5

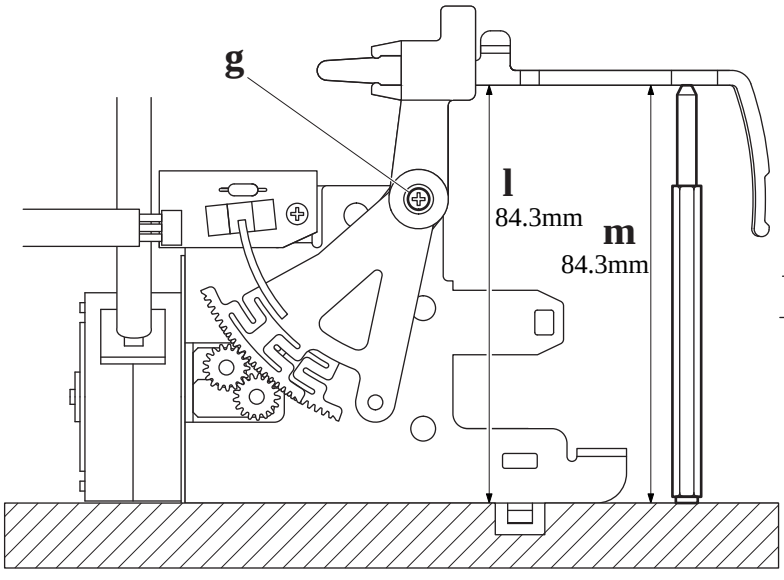


Fig.7

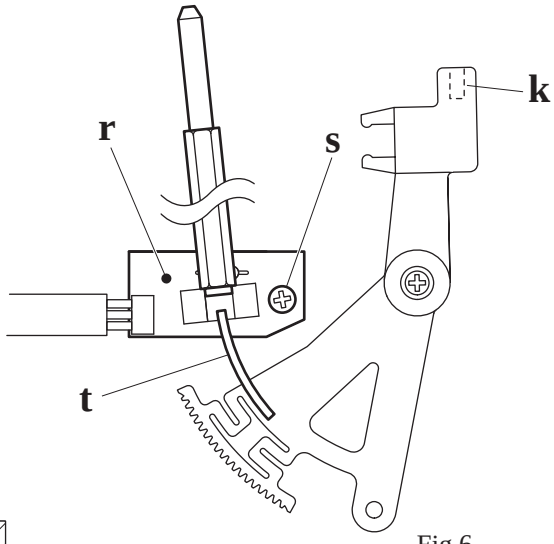


Fig.6

No.11684

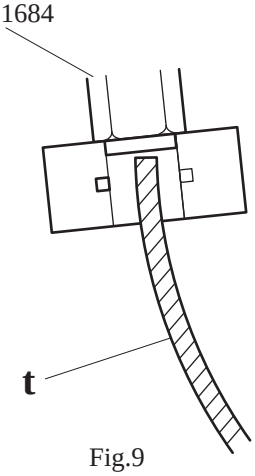


Fig.9

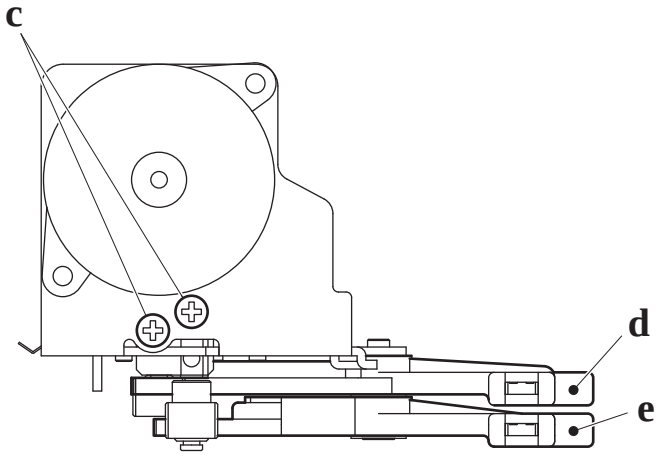


Fig.8

1. If **"L0** or **L1"** needle thread is being pulled to the right (Fig.1), then check the following points:
2. Insert new needles (Nm 90) .
3. Check and make sure that needles are correctly inserted into the needle clamp.
4. Check and make sure that the needle (**L0** or **L1**) is not touching the needle plate holes. If necessary, check adjustment on page 6, **"Height and orientaion of needle bar in relation to the needle plate holes"**.

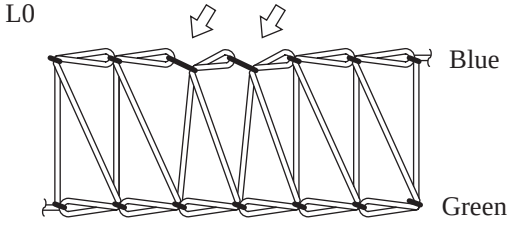
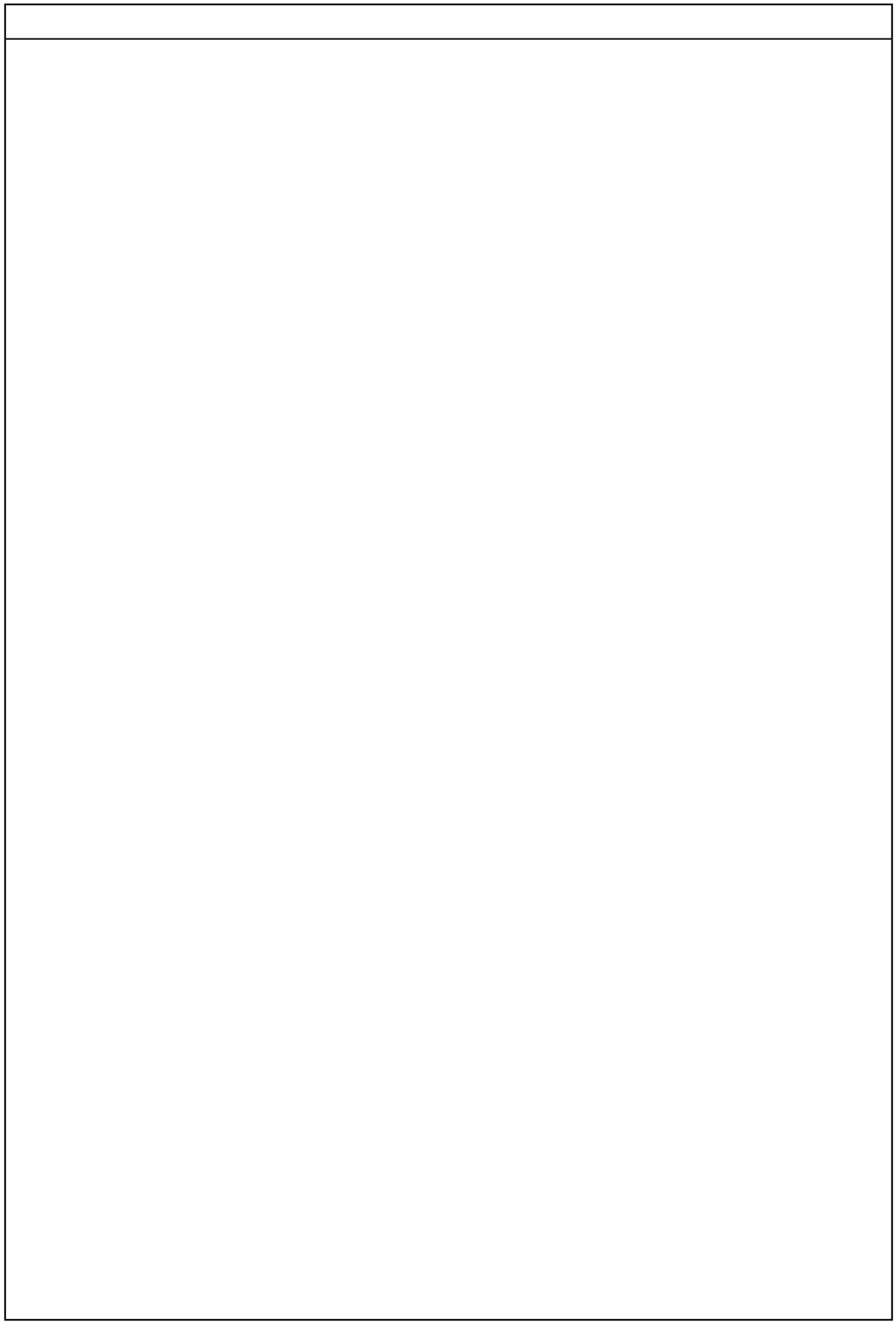


Fig.1



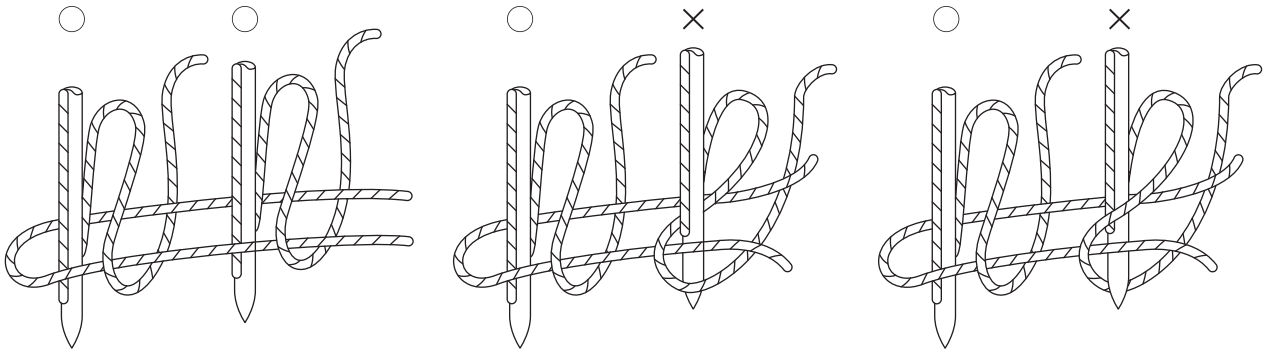


Fig.1

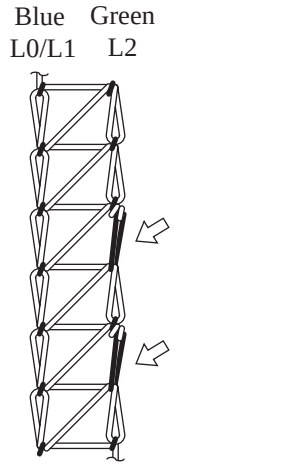


Fig.2

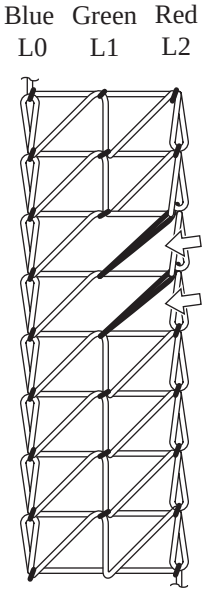


Fig.3

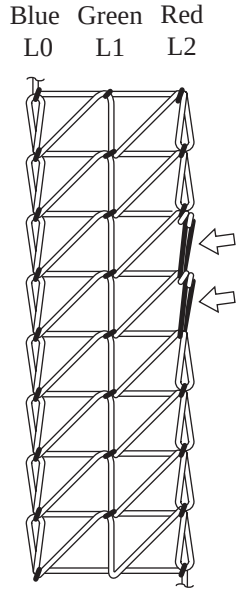


Fig.4

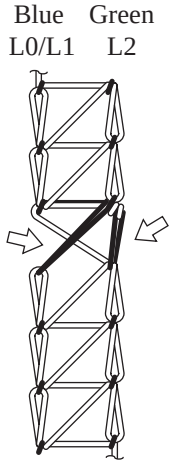


Fig.5

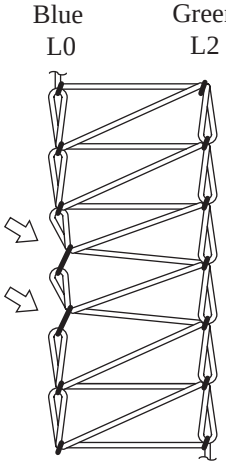


Fig.6

IRREGULAR LOOP FORMATION ON THE CHAIN NEEDLES (COVER HEMS) 29b

When the chain needles are in down position and going upstroke, the needles should pass behind the loops. See cover hem stitch formation on page 30 and 31. However, it is possible that some irregular loops will appear on the chain needle threads. In that case, the chain needle threads will not be positioned correctly and will fall down to the right or left (Fig.1).
As result of the above, the following problems may happen.

1. **Cover Hem (Narrow & Wide)**

If **"L2"** needle falls into the needle thread loop (Fig.1-2). Check position of chainstitch eccentric (0.5-1.0mm). See page 12 for adjustment. Check clearance between chain looper and **"L0 / L1"** needle. If sewing result is the same, replace chain looper.

2. **Triple Cover Hem**

If **"L2"** needle falls into the Green needle thread loop (Fig.3). Check if the tension is correctly set. Check the chain looper clearance and orbital timing **"L0-L2"**. See page 12 for adjustment. If sewing result is the same, replace chain looper.

3. **Triple Cover Hem**

If **"L2"** neelde falls into its neelde thread loop (Fig.4). Replace chain looper.

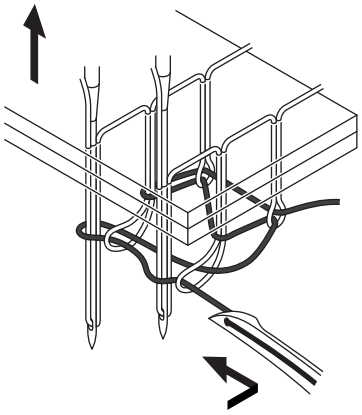
4. **Cover Hem (Narrow & Wide)**

If **"L2"** needle falls into both of the **"L2"** and **"L1"** neeldle thread loops (Fig.5).
Replace chain looper.

5. **Cover Hems**

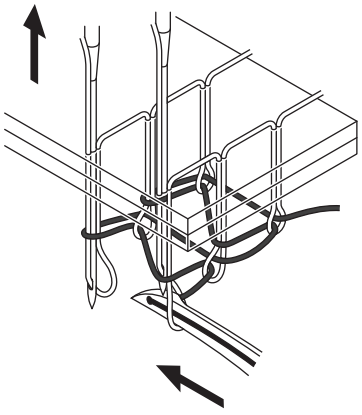
If **"L0"** or **"L1"** needle thread is pulled to the right (Fig.6). Check and make sure that the **"L0"** or **"L1"** needle is not touching the needle plate hole. When checking the above, use new needle.

1



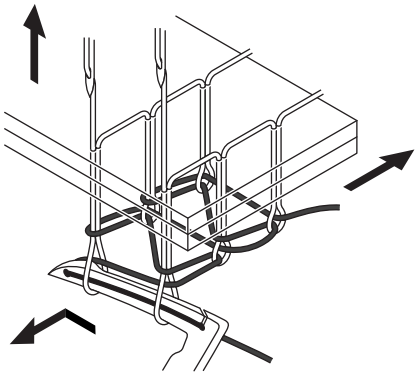
Needles rise to form loops. Chain looper start its motion from right to left.

2



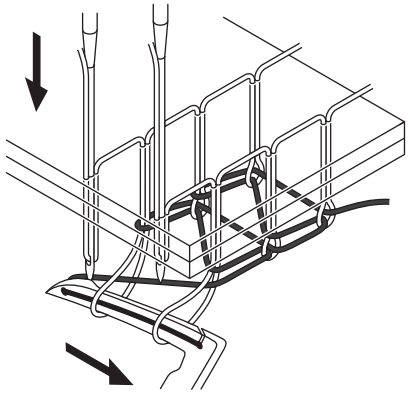
Chain looper pass into neelde thread loops.

3



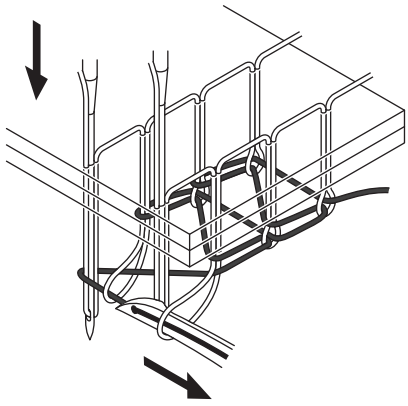
Fabric move forward to the next stitch and chain looper move to the front of the needles.

4



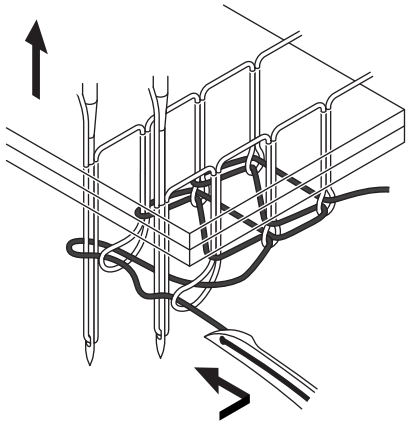
Needles go down into the thread triangle, and chain looper is moving to the right.

5



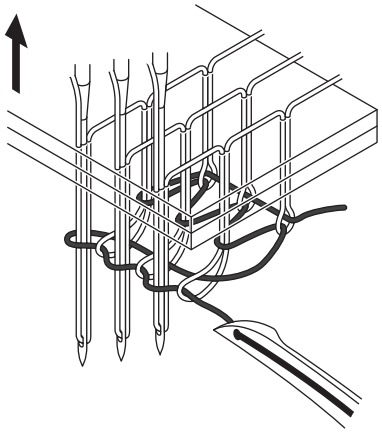
Chain looper is releasing needle thread loops.

6



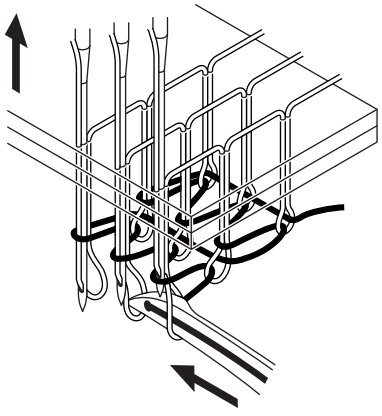
Needles are in the lowest position and chain looper is set at the extreme right position.

1



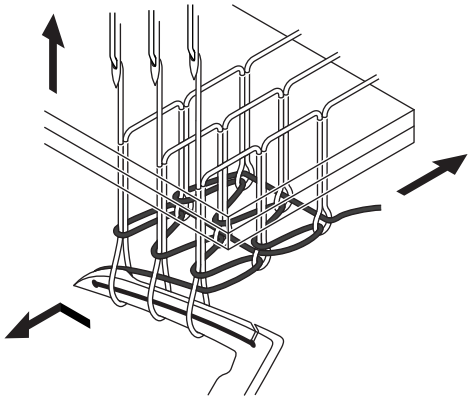
Needles rise to form loops. Chain looper start its motion from right to left.

2



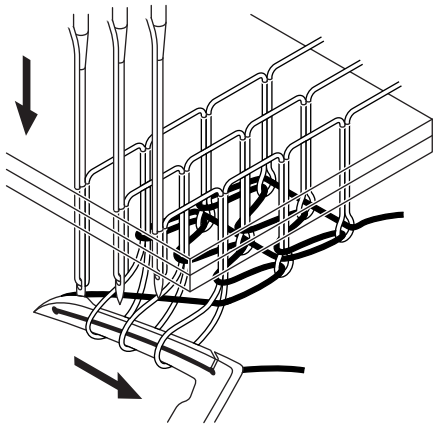
Chain looper pass into neelde thread loops.

3



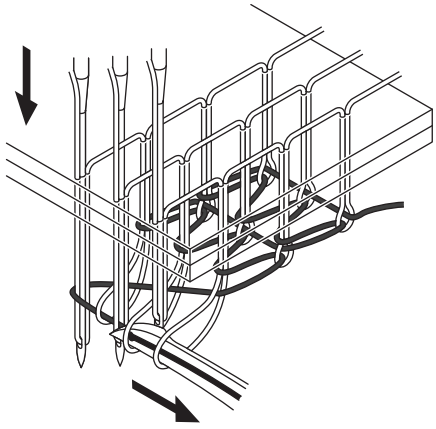
Fabric move forward to the next stitch and chain looper move to the front of the needles.

4



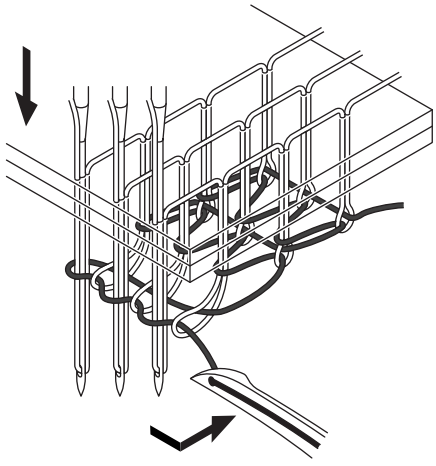
Needles go down into the thread triangle, and chain looper is moving to the right.

5



Chain looper is releasing needle thread loops.

6



Needles are in the lowest position and chain looper is set at the extreme right position.