

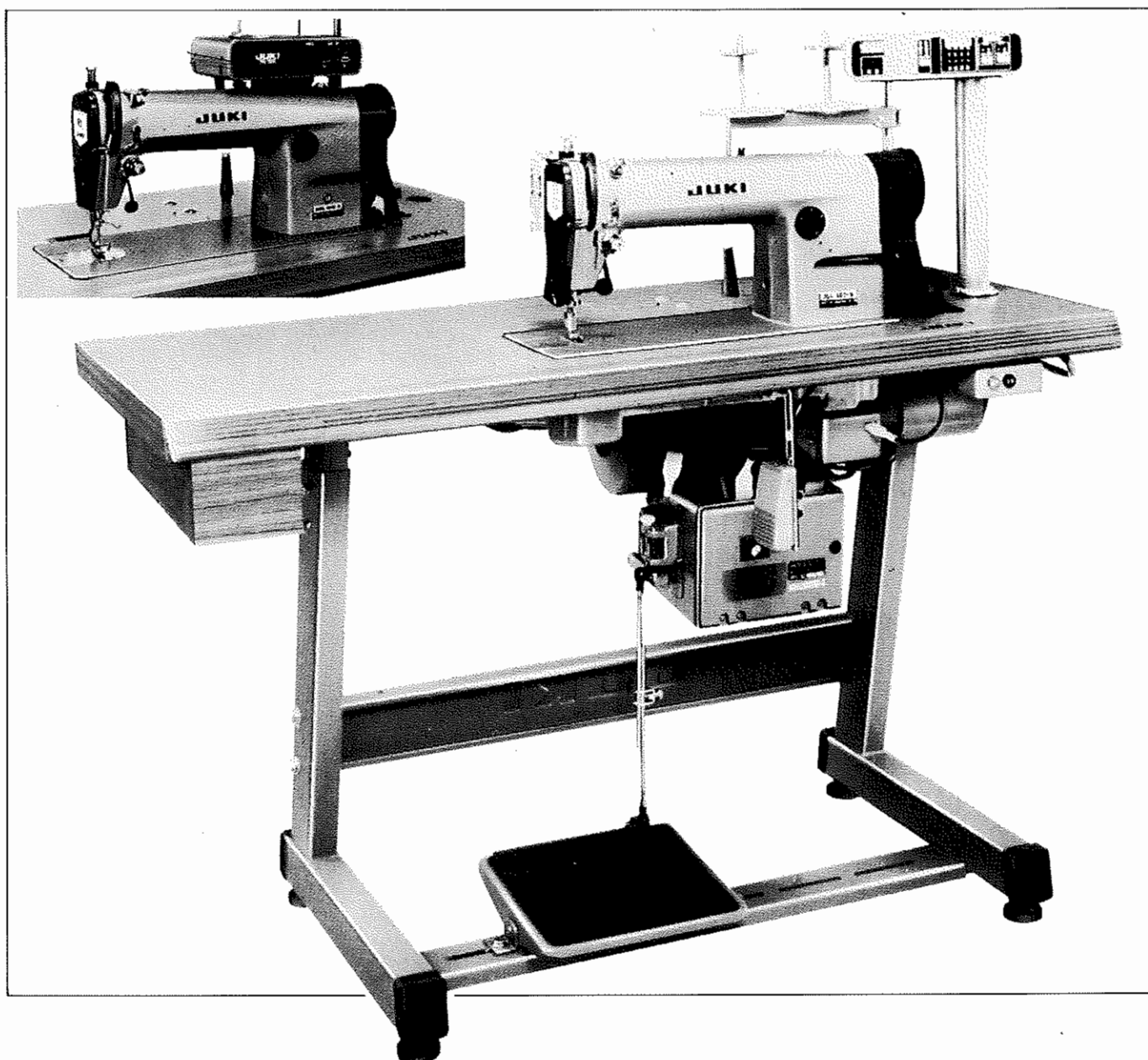
JUKI®

DDL-555-5/100

DDL-555-5/200

1- Needle Lockstitcher with
Automatic Thread Trimmer

ENGINEER'S MANUAL



TOKYO JUKI INDUSTRIAL CO., LTD.

PREFACE

This engineering manual is written for the technical personnel who are responsible for the service and maintenance of the sewing machines. This manual presents detailed explanation of the adjusting procedures, etc. which are not covered by the INSTRUCTION BOOK intended for the maintenance personnel and operators at a sewing factory.

It is advisable to use this engineering manual in combination with the pertinent INSTRUCTION BOOK and PARTS BOOK when servicing the sewing machines of these models.

CONTENTS

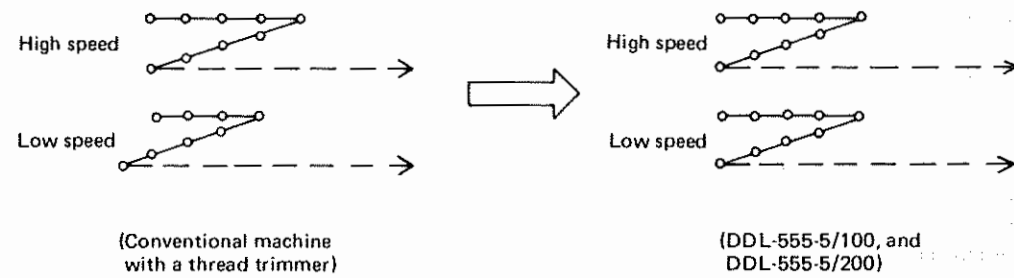
1. OVERVIEW	1
1-1 Features	1
1-2 Specifications	3
1-3 Applications	4
2. OPERATION	5
2-1 Name of each component	5
2-2 Test run	9
3. ADJUSTMENT OF EACH SECTION	15
3-1 Adjusting the belt tension	15
3-2 Checking and changing the rotational direction of the sewing machine	15
3-3 Adjusting the pedal	15
3-4 Adjusting the needle stop position	17
3-5 Adjusting the max. sewing speed	17
3-6 Adjustment of the minute rise of the presser foot	18
3-7 Adjusting the wiper (200-type)	19
3-8 Adjusting the Auto-lifter (AK-2 and AK-5)	20
3-9 Theory of thread trimming	22
3-10 Thread trimming sequence	22
3-11 Adjusting the timing of the thread trimmer cam	23
3-12 Positioning the moving knife	24
3-13 Installing the counter knife	25
3-14 Adjusting the floating amount of the tension disc No. 2	26
3-15 Sharpening the counter knife	26
3-16 Replacing the moving knife	27
3-17 Changing the thread guide for knife	28
3-18 Adjusting the thread take-up picker	28
3-19 Adjusting the slide shaft	29
3-20 Installing and removing the knife mounting base	29
3-21 Adjusting the position of the one touch reverse feed switch lever	30
3-22 Adjusting the reverse stitch length	30
4. OTHER PROVISIONS	31
4-1 Changing the power supply voltage of PSC box	31
4-2 Setting the number of reverse feed stitches	31
4-3 Setting for the soft starting	32
4-4 Setting for a machine (200-type) with Auto-lifter	33
4-5 Safety circuits	33
4-6 Stand-by circuitry	34
4-7 Adjusting the low sewing speed (LSL) and reverse feed stitching speeds (SBTL, ECTL, and BTH) (Test Program)	35
4-8 Function of the needle upper position stopping switch (S075)	37
5. MAINTENANCE AND INSPECTION	38
5-1 How to replace the fuse	38
5-2 How to replace the sensor control knob asm. (M8521-110-0A0)	38
5-3 How to replace the synchronizer	40
5-4 How to apply lubricant to the clutch and the brake ring	41
5-5 Constitution of the motor and the theory of changing the motor speed	43
5-6 Adjusting the clutch gap	43
5-7 Replacing the clutch ring and the brake ring	44
5-8 Replacing the clutch disc	45
5-9 Replacing the brake disc	45
5-10 Replacing the clutch shaft	46
6. TROUBLES AND CORRECTIVE MEASURES 1 (Mechanical components)	47
TROUBLES AND CORRECTIVE MEASURES 2 (Electrical components)	51

1. OVERVIEW

1-1. Features

○ The features available with 100-type and 200-type

- 1) The sewing speed can be changed continuously from the low to high speed by controlling the tread on the pedal, contributing to easier operation.
- 2) Automatic reverse feed stitching is provided at the start and end of a seam line.
Further, compared with the conventional machines, uniform stitch starting is ensured regardless of the sewing speed, leading to improved quality of workpieces.



- 3) The adjustable forward/backward pressures of the pedal provide pedal pressure best suited for each operator.
- 4) A CPU box provided on the machine head allows easy checking of ON/OFF of the power switch or the automatic reverse feed stitching at the start/end of a seam line to eliminate the chance for operational mistakes. (A pattern selection switch is added to the CPU box for 200-type.)
- 5) The pulley of the machine can be turned by hand when the machine is in halt. In addition, the pulley contains a synchronizer for ease of operation.
- 6) The maximum sewing speed can be changed by the adjusting control on the PSC box without the need for change of the motor pulley.
- 7) In case the machine is locked, the clutch coil will be automatically de-energized in 2 sec. to minimize the possible damages such as burning of the motor and failures in the machine.
- 8) A microcomputer will detect a failure of the upper or lower detector of the synchronizer, and cause the damaged synchronizer to continue to operate, in turn, as an ordinary clutch motor. (A detector failure would render a conventional sewing machine with a thread trimmer inoperative.)
- 9) If the CPU box has failed, the machine can be used as a sewing machine with needle-up/down stop feature by changing the connection of the connectors within the PSC box. (A CPU box failure would render a conventional sewing machine with a thread trimmer inoperative.)
- 10) In order to meet also the European standards, the magnet driving power has been reduced from 31 volt to 24 volt to ensure higher safety.

○ Features available only with 200-type

- 1) The number of the automatic reverse feed stitches (A to D: 0 to 9 stitches) can be easily set from the outside. (For Type 100, the number of the automatic reverse feed stitches is fixed as 4 for all A to D. However, 0 or 2 to 5 stitches can be set for A and D, and 2 to 5 stitches for B and C by changing the jumper connection on the CPU board.)
- 2) New features such as the Auto-lifter and a selector switch for stopping the machine with its needle up or down position have been added.
- 3) A variety of seam patterns are provided easily by the combination of a different number of stitches with the two basic seam patterns.

1-2. Specifications

Model		DDL-555-5-2B/100 for general materials		DDL-555A-5-2B/100 for light-weight materials	DDL-555H-5-2B/100 for heavy weight materials
		Cotton thread	Synthetic thread		
1	Sewing speed	5,000 s.p.m.	4,000 s.p.m.	4,000 s.p.m.	3,500 s.p.m.
2	Stitch length	4 mm		4 mm	4.5 mm
3	Needle bar stroke	30.5 mm		29 mm	35 mm
4	Needle	DB x 1 #14 (standard)	DB x 1 #9 #11 DB x 1 KN #9 #11	DA x 1 #9 #11 (standard)	DB x 1 #21 (standard)
5	Presser foot pressure	4 ~ 5 kg		2 ~ 4 kg	4 ~ 5 kg
6	Presser foot lift (by knee lifter) (by hand lifter)	10 mm 5.5 mm (Presser foot height finely adjustable)		10 mm 5.5 mm (Presser foot height finely adjustable)	12 mm 5.5 mm (Presser foot height finely adjustable)
7	Presser foot	Special hinging presser foot			
8	Feed dog teeth	3 rows (feed dog teeth tilt adjustable)		4 rows (feed dog teeth tilt adjustable)	3 rows
9	Height of feed dog teeth	0.8 mm		0.6 ~ 0.7 mm	0.8 mm
10	Feed system	Link-type			
11	Thread take-up	Link-type			
12	Thread take-up stroke	Max. 110.5 mm ~ Min 104 mm			
13	Lubrication	Fully automatic			
14	Oil return	By plunger pump			
15	Lubricant	NEW DEFRIX OIL No. 1			
16	Wiper	None			
17	Automatic reverse stitching (One touch type) (Number of stitch control type)	Standard equipment 4 stitches for both start/end of a seam line			
18	Motor	Electromotor			
19	Motor consumption power	400W (1/2 HP), 550W (3/4 HP)			
20	Power supply	3-phase 220 ~ 440V or single-phase 110 ~ 250V			
21	Magnet driving power	24VAC (rectified smooth power source)			
22	Speed control	500 s.p.m. to max. speed			

Note: Before shipping, the machines are adjusted for 3-phase or single-phase power supply according to the requirement of a destination.

Model		DDL-555-5- ^{2B} / _{4B} /200 for general materials		DDL-555A-5- ^{2B} / _{4B} /200 for light-weight materials	DDL555H-5- ^{2B} / _{4B} /200 for heavy weight materials
		Cotton thread	Synthetic thread		
1	Sewing speed	5,000 s.p.m.	4,000 s.p.m.	4,000 s.p.m.	3,500 s.p.m.
2	Stitch length	4 mm		4 mm	4.5 mm
3	Needle bar stroke	30.5 mm		29 mm	35 mm
4	Needle	DB x 1 #14 (Standard)	DB x 1 #9 #11 DB x 1 KN #9 #10	DA x 1 #9 #11 (standard)	DB x 1 #21 (standard)
5	Presser foot pressure	4 ~ 5 kg		2 ~ 4 kg	4 ~ 5 kg
6	Presser foot lift (by knee lifter) (by hand lifter)	10 mm 5.5 mm (Presser foot height finely adjustable)		10 mm 5.5 mm (Presser foot height finely adjustable)	12 mm 5.5 mm (Presser foot height finely adjustable)
7	Presser foot	Special hinging presser foot			
8	Feed dog teeth	3 rows (feed dog teeth tilt adjustable)		4 rows (feed dog teeth tilt adjustable)	3 rows
9	Height of feed dog teeth	0.8 mm		0.6 ~ 0.7 mm	0.8 mm
10	Feed system	Link-type			
11	Thread take-up	Link-type			
12	Thread take-up stroke	Max. 110.5 mm ~ Min. 104 mm			
13	Lubrication	Fully automatic			
14	Oil return	By plunger pump			
15	Lubricant	NEW DEFRIX OIL No. 1			
16	Wiper	Equipped (not equipped on DDL-555-5-2B & DDL-555A-5-2B)			Equipped (not equipped on DDL-555H-5-2B)
17	Automatic reverse stitching (One touch type) (Number of stitch control type)	Standard equipment 0 ~ 9 stitches for both start/end of seam line			
18	Motor	Electromotor			
19	Motor consumption power	400W (1/2 HP), 550W (3/4 HP)			
20	Power supply	3-phase 220 ~ 440V or single-phase 110 ~ 250V			
21	Magnet driving power	24VAC (rectified smooth power source)			
22	Speed control	500 s.p.m. to max. speed			
23	Auto-lifter	Option			
24	Needle upper position stopping switch	Option			

Note: Before shipping, the machines are adjusted for 3-phase or single-phase power supply according to the requirement of a destination.

1-3. Applications

1) Models for general materials

Extensively used for various types of materials from general materials to light- and medium-weight materials such as those used in men's suits, ladies' wear, working uniforms, students' uniforms, etc.
Cotton or synthetic thread of #80 to #30 is generally used for the machines of these models.

2) A-type models for light-weight materials

Suitably used for relatively light-weight materials such as tetoron broadcloth, and georgette used in men's shirts, blouses, etc.
Cotton or synthetic thread of #80 to #50 is mainly used for the machines of these models.

3) H-type models for heavy-weight materials

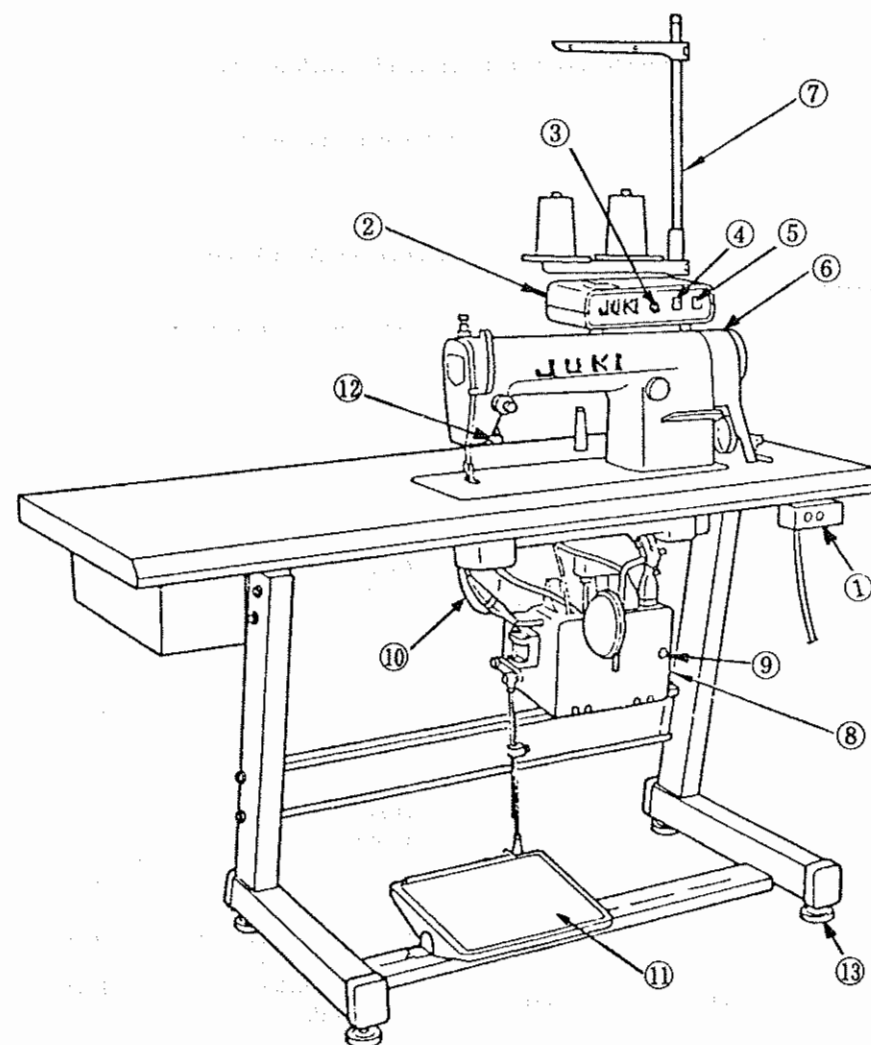
- Note (1) Machine head of DDL-555-5 (standard type) and DDL-555A-5 (A type) are different from that of DDL-555H-5 (H type).
(2) DDL-555-5 and DDL-555A-5 can not be converted into model DDL-555H-5.

Needle	Size	Thread		Materials	Applications
		Cotton thread	Synthetic thread		
DB x 1	#9	#80	#80	Georgette, nylon, T/C broadcloth	Extremely light-weight materials
	#11	#80 ~ #60	#80 ~ #60	Ordinary broadcloth, and light-weight knit	Light-weight materials
	#14	#60 ~ #50	#60 ~ #50	Wool, cotton gaberdine and drill	General materials
	#16	#50 ~ #30	#50 ~ #30	Coatings	Medium-weight materials
	#18	#30 ~ #20	#30 ~ #20	Denim (11 oz)	Heavy-weight materials
	#19 ~ #20	#30 ~ #20	#30 ~ #20	Denim (11 oz) Coatings	Heavy-weight materials
	#21 ~ #23	#20 ~ #8	#20 ~ #8	Heavy-weight denim (over 14 oz) Man-made leather	Denim jeans Heavy overcoats
DB x 1 KN	#9	#80	#80	Georgette, nylon, and T/C broadcloth	Extremely light-weight materials
	#10	#60	#60	Ordinary broadcloth and light-weight knit	Light-weight materials
	#12	#50	#50	Wool, cotton gaberdine, and drill	Ordinary materials
DA x 1	#8 ~ #9	#80	#80	Georgette, nylon, T/C broadcloth	Extremely light-weight materials
	#11	#60	#60	Ordinary broadcloth and light-weight knit	Light-weight materials
	#14	#50	#50	Wool, cotton gaberdine, and drill	General materials

2. OPERATION

2-1. Name of each component

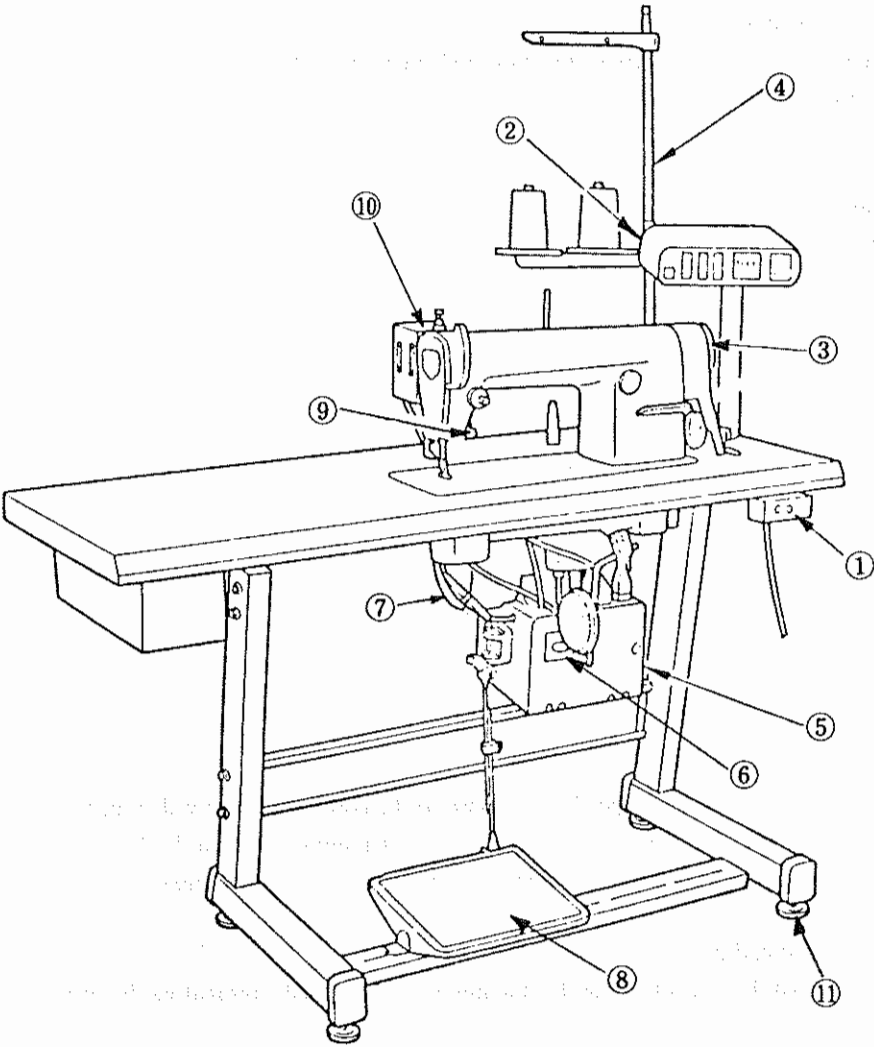
○ 100-type



- | | |
|--|---|
| ① Power switch | ⑦ Thread stand |
| ② CPU box | ⑧ PSC box |
| ③ Power indication lamp | ⑨ Max. speed control knob adjusting hole |
| ④ Automatic reverse stitching selection switch
(sewing start) | ⑩ Electromotor |
| ⑤ Automatic reverse stitching selection switch
(sewing end) | ⑪ Pedal |
| ⑥ Synchronizer | ⑫ One touch reverse feed switch lever |
| | ⑬ Adjusting screw for the flatness of the table |

- ① Power switch
A power switch of the motor, PSC box, and CPU box.
- ② CPU (Central Processing Unit) box
An electronic brain which controls the sewing machine and the motor. The CPU box contains a CPU board consisting of a microcomputer and IC and is provided with a power indication lamp and automatic reverse feed switches (sewing start and end, respectively).
- ③ Power indication lamp
Lights up with yellow light when the power switch is turned on.
- ④ Automatic reverse stitching selection switch (sewing start)
Controls the automatic reverse feed at the sewing start.
- ⑤ Automatic reverse stitching selection switch (sewing end)
Controls the automatic reverse feed at the sewing end.
- ⑥ Synchronizer
Incorporated in the machine pulley, the synchronizer detects the position (up or down) of the needle and the sewing speed, and then sends the resultant input signals to the PSC and CPU boards.
- ⑦ Thread stand
- ⑧ PSC (Power and Speed Controller) box
Comprises a circuit to control the sewing speed in response to the commands received from the microcomputer in the CPU box, an output circuit to operate each element (thread trimming solenoid, back solenoid, etc.), a pedal sensor to sense the operation of the pedal, and a power circuit to actuate each element.
- ⑨ Max. speed control knob adjusting hole
Allows adjustment of the knob for controlling the maximum sewing speed, eliminating the need for change of the motor pulley.
- ⑩ Electromotor
Operates the machine at high speed ↔ medium speed ↔ low speed in response to the clutch and brake signals sent from the PSC box.
- ⑪ Pedal
By treading on this pedal forward (toe down) or backward (heel down), the sewing speed control and thread trimming can be done.
- ⑫ One touch reverse feed switch lever
Used to perform reverse feed stitching.
- ⑬ Adjusting screw for the flatness of the table
Used to perform adjustment so that the table stands on the floor flatly to minimize vibration during operation.

○ 200-type



- | | | |
|----------------|---------------------------|---|
| ① Power switch | ⑤ PSC box | ⑨ One touch reverse feed switch lever |
| ② CPU box | ⑥ Max. speed control knob | ⑩ Wiper |
| ③ Synchronizer | ⑦ Electromotor | ⑪ Adjusting screw for the flatness of the table |
| ④ Thread stand | ⑧ Pedal | |

- ① Power switch
A power switch of the motor, PSC box, and CPU box.
- ② CPU (central Processing Unit) box
An electronic brain which controls the sewing machine and the motor. The CPU box incorporates a CPU board consisting of a microcomputer, IC and various control switches, and is provided with a CPU panel.
- ③ Synchronizer
Built in the machine pulley, the synchronizer detects the position (up or down) of the needle and the sewing speed, and then sends the resultant input signals to the PSC and CPU boards.
- ④ Thread stand
- ⑤ PSC (Power and Speed Controller) box
Comprises a circuit to control the sewing speed in response to the commands received from the microcomputer in the CPU box, an output circuit to operate each element (thread trimming solenoid, back solenoid, etc.), a pedal sensor to sense the operation of the pedal, and a power circuit to actuate each element.
- ⑥ Max. speed control knob
Allows control of the maximum sewing speed without the need for change of the motor pulley.
- ⑦ Electromotor
Operates the machine at high speed ↔ medium speed ↔ low speed in response to the clutch and brake signals sent from the PSC box.
- ⑧ Pedal
By treading on this pedal forward (toe down) or backward (heel down), the sewing speed control and thread trimming can be done.
- ⑨ One touch reverse feed switch lever
Used to perform reverse feed stitching.
- ⑩ Wiper
Wipe out needle thread after thread trimming in response to the wiper signals given by the PSC box.
- ⑪ Adjusting screw for the flatness of the table
Used to perform adjustment so that the table stands on the floor flatly to minimize vibration during operation.

2-2. Test run

1) Operation at the time of turning on the power switch.

When the power switch is turned on, the machine rotates until its needle reaches the upper position, and then stops with its needle up. However, when the needle is at its upper position from the beginning, the machine does not rotate.

2) How to operate the pedal

As shown below, the pedal is operated in four stages.

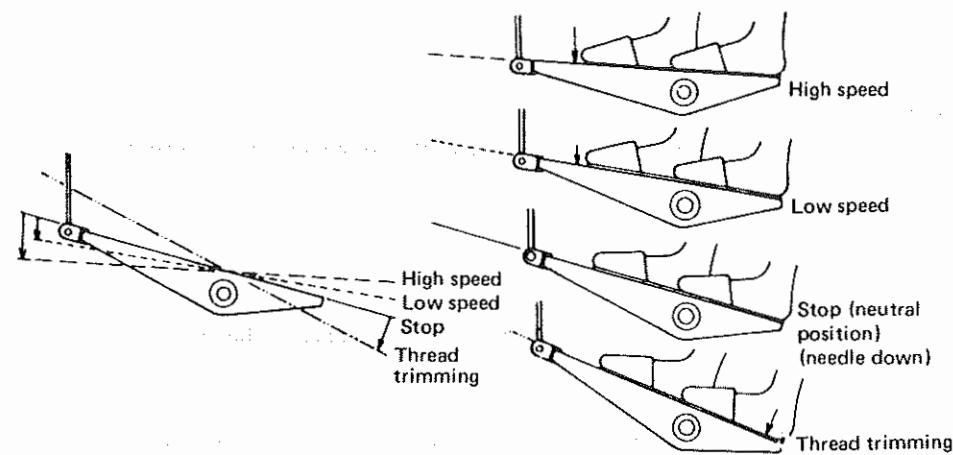


Fig. 1

- ① When the pedal is trodden lightly forward (toe down), the machine will start to run at a low speed.
- ② When the pedal is trodden further forward (toe down), the machine will increase its speed. (However, when the automatic reverse feed switch has been turned on, the machine will not run at a high speed until the reverse feed is completed.)
- ③ When the pedal is returned to the stop (neutral) position, the machine will stop with its needle up and down.
- ④ When the pedal is trodden on backward (heel down), thread trimming will be done, and the machine will stop with its needle at the upper position. (For the 200-type, the wiper will be actuated when the wiper switch has been turned on.)
 - The machine will run at a speed in response to the treading force. (The speed can be changed continuously.)
 - The proper thread trimming action will not be disturbed even when the pedal is returned to the neutral position immediately after the machine started thread trimming. When the pedal is trodden forward (toe down) immediately after the machine started thread trimming, the proper thread trimming action will not be prevented either. However, in this case, the safety circuit will operate to cause the machine not to run even after the thread trimming has been completed, and therefore, the pedal must be returned to the neutral position once.

3) Operation of the automatic reverse stitching selector switch (100-type)

Fig. 2

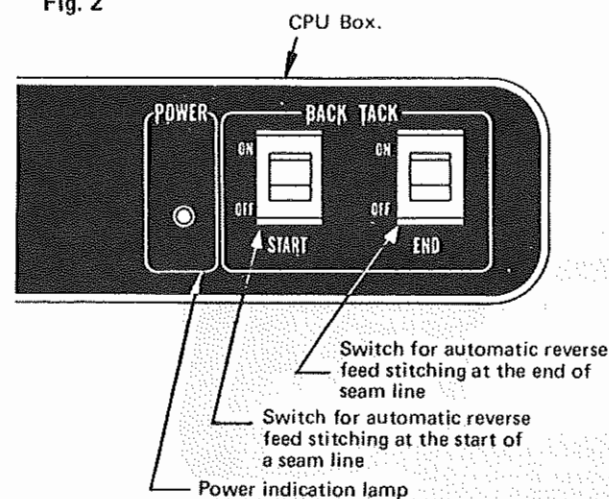


Fig. 3 "Switch setting vs. Reverse feed stitch"

Switch for reverse feed stitch at the start	ON	ON	OFF	OFF
Switch for reverse feed stitch at the end	ON	OFF	ON	OFF
Stitching pattern				

- The automatic reverse feed stitching at the start or end of a seam line can be selected by setting the switches on the CPU box panel to "ON" or "OFF".
- Refer to the following table "Switch setting vs. Reverse feed stitch" for the switch action and the resultant reverse feed stitches.
- During A stitching period of the reverse feed at the start, and D stitching period of the reverse feed at the end of a seam line, the one touch reverse feed switch is inoperative.
- During the A and B stitching periods of the reverse feed at the start of a seam line, the maximum sewing speed of the machine is limited. However, at a sewing speed lower than the limit, the priority is given to the pedal operation, and machine stop or thread trimming can be done as required through pedal action. When the pedal is trodden backward (heel down), during these stitching periods, thread trimming will be performed immediately.
- When the switch for reverse feed stitching at the start has been set to "OFF", and when the pedal is trodden backward (heel down) for thread trimming within 3 stitches from the start, the machine will proceed directly to thread trimming action without carrying out the reverse feed stitching at the end of the seam line even when the switch for reverse feed at the end has been set to "ON".
- The machine will run automatically at a predetermined speed during the reverse feed stitching period at the end of a seam line.

4) Function of each switch on the CPU panel (200-type)

CPU box panel

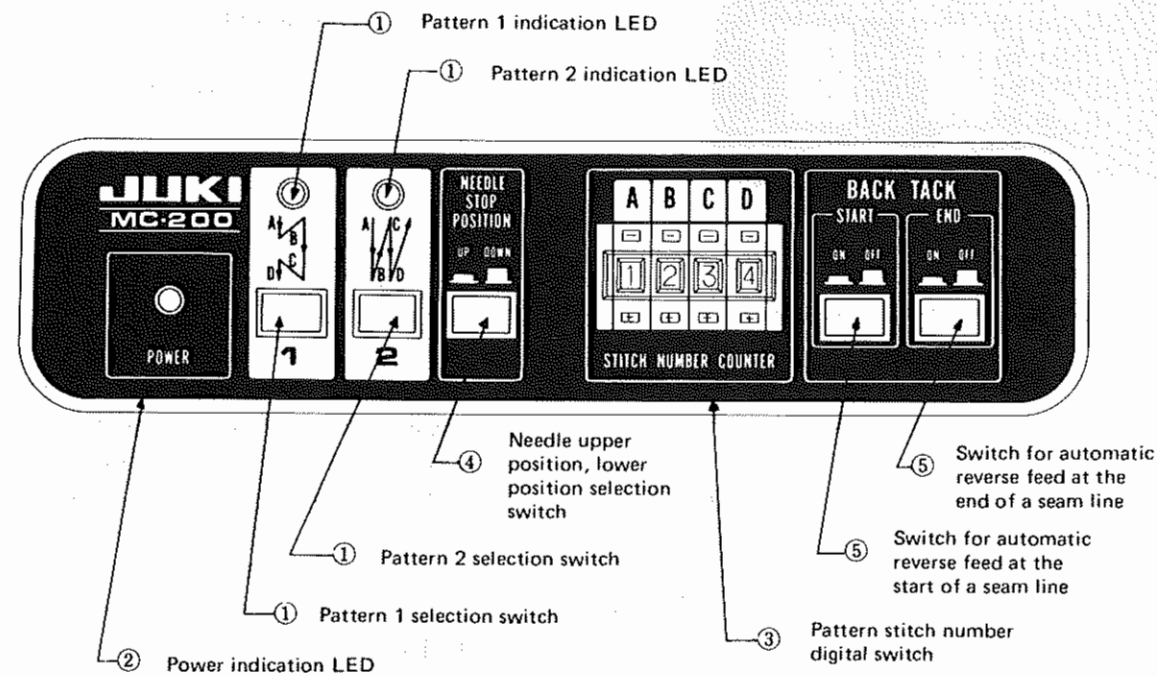


Fig. 4

① Pattern selection switches and Pattern indication LED

- There are two basic stitching patterns; automatic reverse feed stitching 1, and Z pattern 2.
- A stitching pattern can be set by the Pattern 1 selection switch or Pattern 2 selection switch, and the selected pattern is shown by the Pattern 1 indication LED or Pattern 2 indication LED.
- A stitching pattern can not be changed during a pattern stitching period. Accordingly, a stitching pattern change should be made only when the power switch is turned on, or while the machine is in halt after completion of thread trimming.
- When the power switch is turned on, the automatic reverse feed stitching 1 is automatically set. Therefore, when performing the Z pattern 2 stitching immediately after the power switch is turned on, depress the Pattern 2 selection switch without fail before starting the machine. If the Z pattern 2 is automatically set when the power switch is turned on, it may be due to the failure of the Pattern 2 selection switch. However, it is possible to switch to the automatic reverse feed stitching 1, and to run the machine.

② Power indication LED

- When the power switch is turned on, this LED gives an orange light to indicate that the power is on.

③ Pattern stitch number digital switch

- The number of stitches for the automatic reverse feed, and Z pattern can be set from 0 to 9 stitches for A, B, C, and D, respectively by these switches. Depress **+** and **-** buttons according to stitching specifications.

④ Needle upper position, lower position selection switch

- The needle position (up or down) when the pedal is set at the neutral position can be easily changed by these switches.
- When the machine has been set so that it stops with its needle at the upper position, thread trimming action can be performed by treading on the pedal backward. In this case, the needle bar goes down once before the thread trimming action takes place.
- Even when the machine has been set to the needle-up stop, the point of the needle at its upper position may slightly enter an extremely heavy-weight material. This, however, does not occur at the time of needle-up stop after thread trimming.

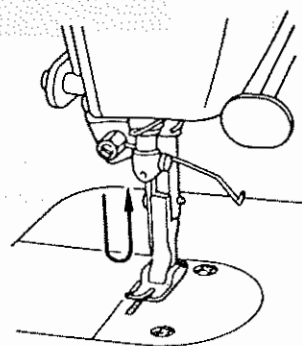


Fig. 5

⑤ Automatic reverse stitching switch

- The automatic reverse feed at the start or end of a seam line can be selected by operating the “ON” and “OFF” switches on the CPU box panel.
- During A stitching period of the reverse feed at the start, and D stitching period of the reverse feed at the end of a seam line, the one touch reverse feed switch is inoperative.

5) How to operate the switch (for 200-type)

[Automatic reverse feed stitching]

- ① The automatic reverse feed stitching is provided by depressing the Pattern 1 selection switch on the CPU box panel.
- ② The automatic reverse feed stitching at the start or end of a seam line can be set by operating the "ON" and "OFF" switches.
- ③ The number of stitches for each of A to D can be set by depressing $\boxed{+}$ and $\boxed{-}$ buttons. Refer to the table "Number of stitches vs. Stitching pattern".
- ④ The machine runs automatically at a fixed speed during the reverse feed period at the start or end of a seam line.

Note:

1. The one touch reverse feed switch is inoperative during A stitching period of the reverse feed at the start, and D stitching period of the reverse feed at the end of a seam line.
2. When the pedal is trodden backward (heel down) for thread trimming during A and B stitching periods of the reverse feed at the start, or within 2 stitches after completion of the reverse feed at the start of a seam line, the machine will proceed directly to thread trimming action without carrying out the reverse feed at the end of a seam line even when the switch for reverse feed at the end of a seam line has been set to "ON".
3. When the switch for reverse feed at the start has been set to "OFF", and when the pedal is trodden backward for thread trimming within 3 stitches from the start, the machine will proceed directly to thread trimming action without carrying out the reverse feed stitching at the end of the seam line even when the switch for reverse feed at the end has been set to "ON".
4. When the number of stitches has been set to B = 0, the machine will start normal stitching without any reverse feed stitching at the start. In case of C = 0, thread trimming action takes place without reverse feed stitching at the end of a seam line.

Fig. 6 "Automatic reverse feed stitching"

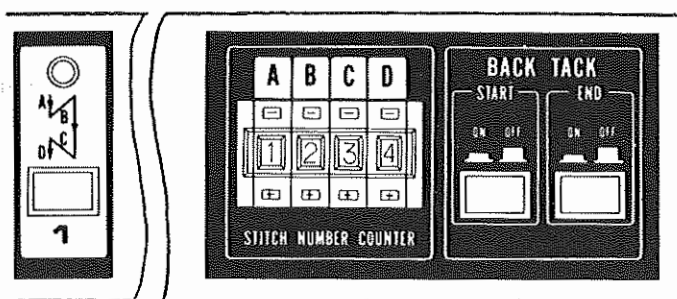


Fig. 7 "Number of stitches vs. Stitching pattern"

A	1 ~ 9	1 ~ 9	0	1 ~ 9
B	1 ~ 9	1 ~ 9	1 ~ 9	0
C	1 ~ 9	1 ~ 9	1 ~ 9	0
D	1 ~ 9	0	0	1 ~ 9
Stitching pattern				

[Z pattern]

- ① The Z pattern stitching is set by depressing the Pattern 2 selection switch on the CPU box panel.
- ② The number of stitches for each of A to D can be set by depressing \oplus and \ominus buttons. Refer to the table "Number of stitches vs. Stitching pattern".
- ③ During A to D stitching periods, the machine follows the stitching pattern automatically at a constant speed whether the pedal is trodden forward (toe down) or set to the neutral position, and stops after completion of thread trimming.
- ④ During A to D stitching periods, thread trimming can be done as required by treading on the pedal backward (heel down).

Fig. 8 "[Z pattern]"

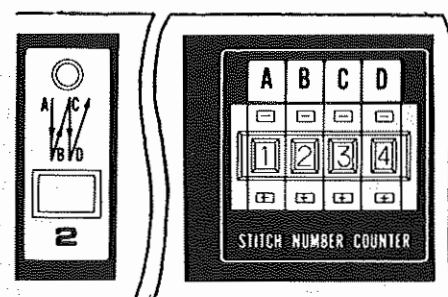


Fig. 9 "Number of stitches vs. Stitching pattern"

A	1 ~ 9	1 ~ 9	1 ~ 9	1 ~ 9
B	0	1 ~ 9	1 ~ 9	1 ~ 9
C	0	0	1 ~ 9	1 ~ 9
D	0	0	0	1 ~ 9
Stitching pattern				

3. ADJUSTMENT OF EACH SECTION

3-1. Adjusting the belt tension

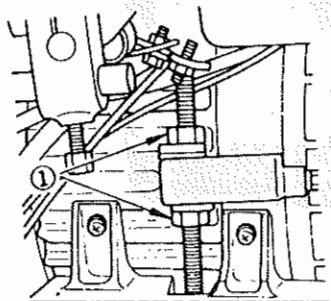


Fig. 10

An excessive belt tension would damage the main shaft bushing of the machine or the motor bearing, while an insufficient belt tension would cause the belt to slip with consequent shortened life of the belt, and also cause other faults such as overrun after thread trimming and machine stop with uneven needle stop height.

Accordingly, use a belt of an appropriate length as specified in INSTRUCTION BOOK. Adjust the belt tension by adjusting nut ① so that the belt gives a 10 ~ 15 mm slack when you push the middle of the belt.

3-2. Checking and changing the rotational direction of the sewing machine

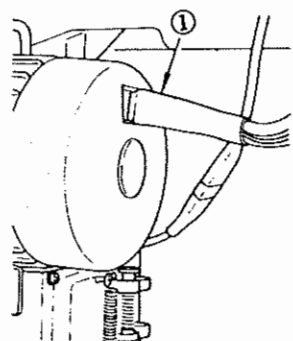


Fig. 11

Manually turn the hand wheel to lower the needle bar, and turn on the power switch with your feet away from the pedal. At this time, confirm that the hand wheel rotates counterclockwise as observed from the hand wheel side.

To change the rotational direction of the motor, remove connector ① on the rear of the motor (on the opposite side from the pulley), and give the motor a 180° turn (in the opposite direction) before reconnecting the connector.

Note: The connector may vary according to the destination or applicable standards (UL, VDE, etc.).

3-3. Adjusting the pedal

1) Adjusting the pedal pressure

① Forward (toe down) treading pressure

Hook pedal pressure adjusting spring (a) on the right side to increase the pressure (pedal becomes heavier), or on the left side to decrease the pressure (pedal becomes lighter).

② Backward (heel down) treading pressure

Screw in adjusting screw (b) to increase the pressure (pedal becomes heavier), or screw it out to decrease the pressure (pedal becomes lighter) within the adjusting range shown on the right.

Note: After adjustment, lightly retighten the stopper together with adjusting screw (b) by the fingers.

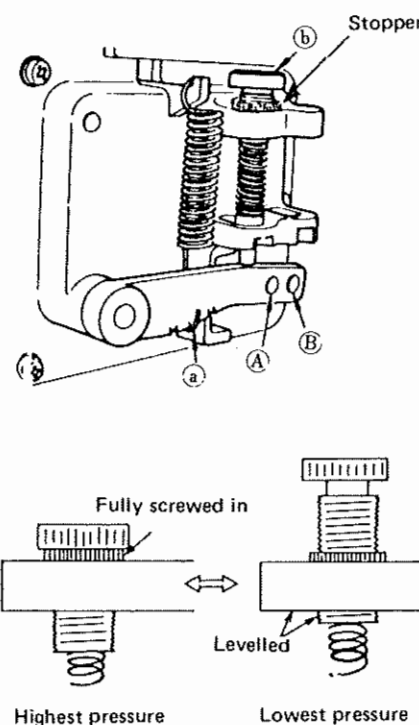


Fig. 12

2) Adjusting the pedal stroke

The pedal stroke varies depending upon whether the connecting rod is attached to ① or ② in Fig. 12. The pedal stroke becomes smaller when the connecting rod is attached to ① than when attached to ②, with resultant increase in the forward or backward treading pressure. Accordingly, when only the pedal stroke is required to be changed, perform adjustment of the pedal pressure after changing the installation position (① or ②) of the connecting rod.

3) Adjustment of the stroke play before the start of the machine or thread trimming

In the predecessor models, the point at which the machine is started when the pedal is trodden on forward (toe down) is adjusted by moving the switch in the pedal sensor. In these DDL-555-5/100 and DDL-555-5/200 models, the above-mentioned point can be adjusted electrically by means of a semi-fixed resistor on the PSC board.

① How to adjust the stroke before machine start.

The stroke before the machine starts can be adjusted by VR7 (LSW) shown in the figure right. Using a screwdriver, turn this knob clockwise to increase the stroke, or counter-clockwise to decrease the stroke. (Take care not to turn the knob excessively, or else the machine will keep on running and not stop or will not run even when the pedal is trodden on forward.)

- The standard value is 3 mm at the attaching point of the connecting rod.

② How to adjust the stroke before the thread trimmer is actuated

The stroke before the thread trimmer is actuated can be adjusted by VR8 (TSW) shown in the figure right. As the knob is turned clockwise, the stroke is increased, and vice versa.

(Be careful not to turn the knob excessively, or else thread trimming action will take place when the pedal is set to the neutral position or the thread trimmer will not be actuated even when the pedal is trodden on backward for thread trimming.)

- The standard value is 5 mm at the attaching point of the connecting rod.

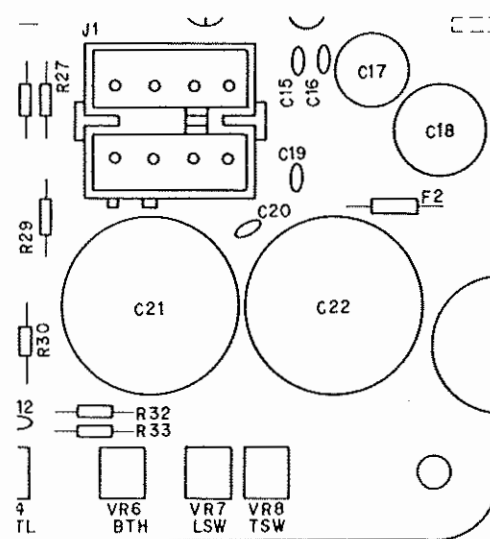


Fig. 13 100-type

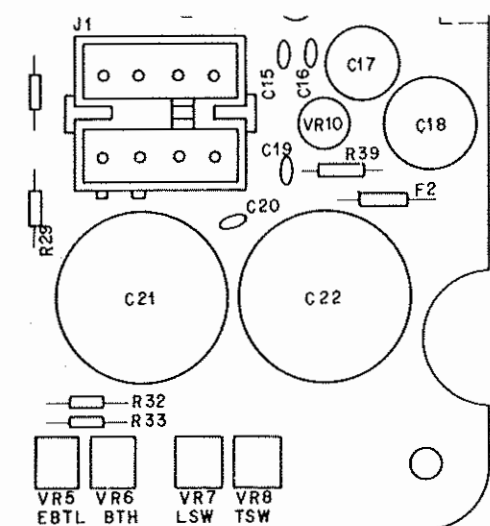


Fig. 14 200-type

3-4. Adjusting the needle stop position

1) How to adjust the upper stop position (after thread trimming)

The standard needle stop position is represented by the red engraved dot on the arm in alignment with the white engraved dot on the hand wheel at the time of needle stop after thread trimming.

With the needle stopped at its upper, loosen screw (A) shown in the figure right to perform adjustment within the slit.

- Move (A) to ① for a lower stop position.
- Move (A) to ② for a higher stop position.

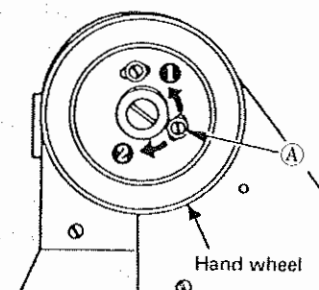


Fig. 15

2) How to adjust the lower stop position

To adjust the lower stop position of the needle at the time when the pedal is set to the neutral position through the preceding forward depressing, set the needle at its lower stop position, and loosen screw (B) (see figure on the right) to make adjustment within the slit.

- Move (B) to ① for a higher stop position.
- Move (B) to ② for a lower stop position.

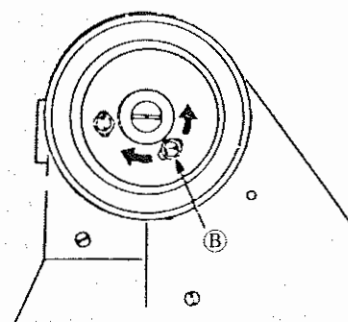


Fig. 16

Note: Do not run the machine with (A) and (B) loosened while making the above adjustment.

Screws (A) and (B) should be just loosened, and should not be removed.

3-5. Adjusting the max. sewing speed

In DDL-555-5/100 and DDL-555-5/200 machines, the sewing speed can be easily adjusted from a low speed of approx. 500 s.p.m. up to the maximum speed through the control knob on the PSC box, eliminating the need for changing the motor pulley.

Remove the rubber plug on the PSC box cover, and turn the control knob by a small screwdriver to make necessary adjustment. (For a 200-type machine, the control knob is provided on the cover surface of the PSC box.)

As the control knob is turned counterclockwise, the speed becomes lower.

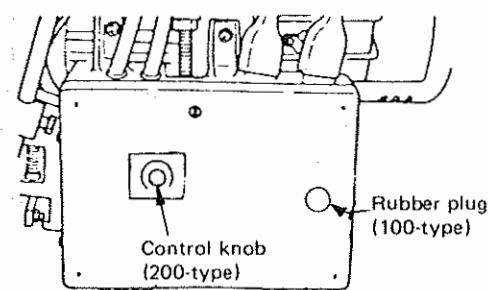


Fig. 17

(Pedal depression vs. Speed vs. Max. speed limit)

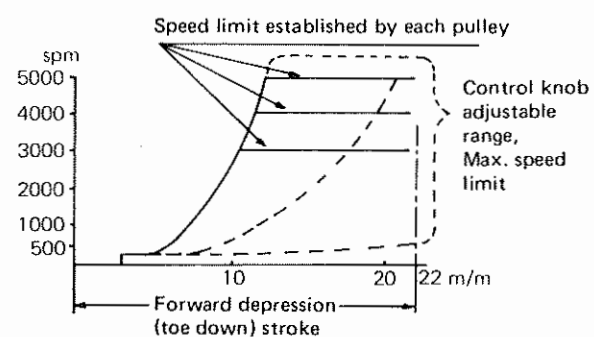
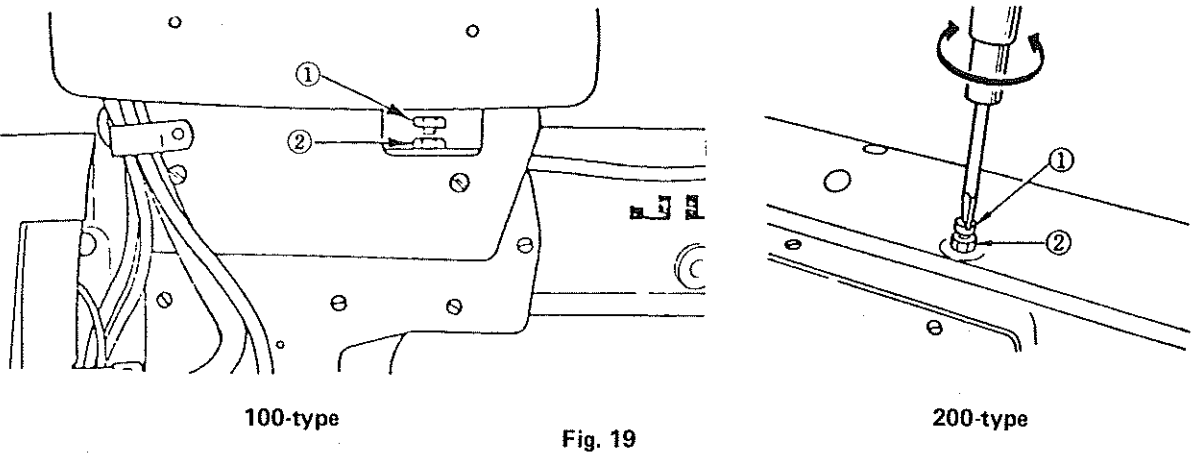


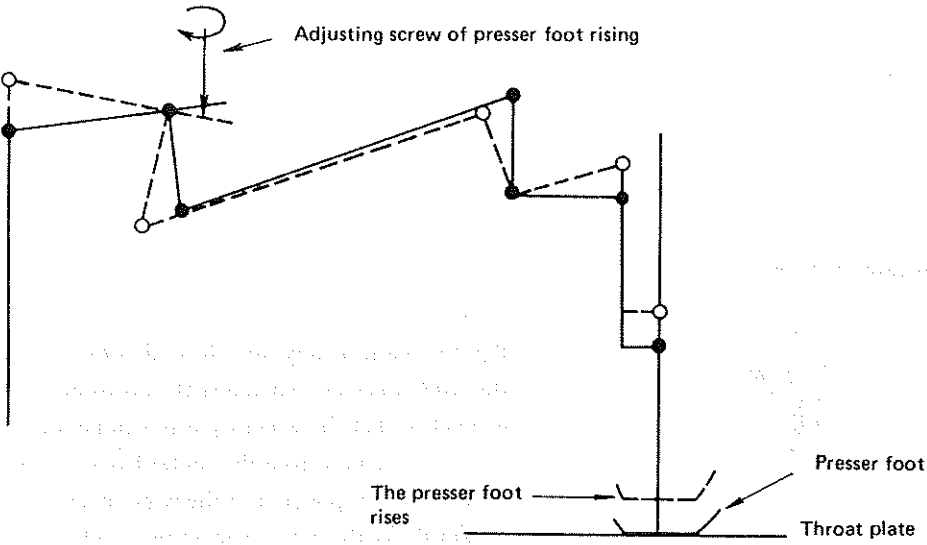
Fig. 18

3-6. Adjustment of the minute rise of the presser foot

When nut ② (Fig. 19) is loosened and adjusting screw ① (Fig. 19) on the top of the machine arm is turned in, the presser foot will rise gradually from the top surface of the throat plate.



1) By properly adjusting the rising of the presser foot in accordance with the thickness of a fabric, the fabric can be turned easily for sewing corners, etc.



2) The minute-rising feature of the presser foot permits easier use in combination with the sliding foot.

3-7. Adjusting the wiper (200-type)

1. Adjusting the position of the wiper

Adjust the position of the wiper according to the thickness of materials to be sewn as follows:

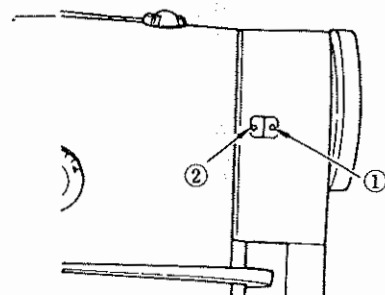


Fig. 21

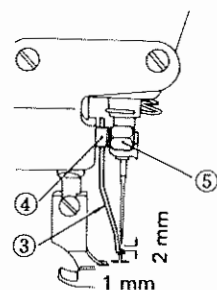


Fig. 22

- 1) Turn the hand wheel in the normal rotational direction to align white dot ① on the hand wheel with red dot ② on the machine arm.

- 2) Insert wiper ③ into wiper driving shaft ④ so that the vertical clearance between the wiper edge and the needle point becomes 2 mm, and also the parallel clearance between the needle center and the straight inside face of the wiper becomes 1 mm. Then retighten lock nut ⑤ to fix the wiper.

2. Adjusting the position of the wiper magnet

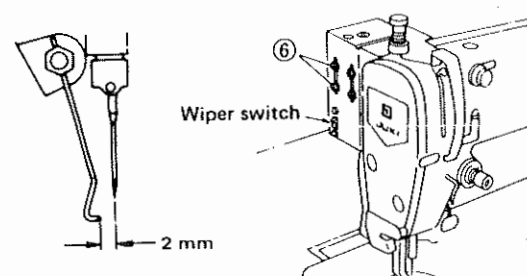


Fig. 23

Pull the plunger fully into the coil, loosen screws ⑥ of the wiper magnet, and adjust the position of the wiper magnet so that the wiper tip is positioned with a distance of 2 mm from the center line of the needle. After a correct position of the wiper magnet has been obtained, fix the wiper magnet by retightening the screw. When the wiper is not used, turn off the wiper switch.

3-8. Adjusting the Auto-lifter (AK-2 and AK-5)

The Auto-lifters (AK-2 and AK-5) are optional attachments. The Auto-lifters AK-2 and -5 are designed to automatically lift the presser foot and hold it at the highest position for 10 to 12 sec. after completion of thread trimming action. Both AK-2 and -5 use PSC boxes especially designed for them.

1. How to operate AK-2

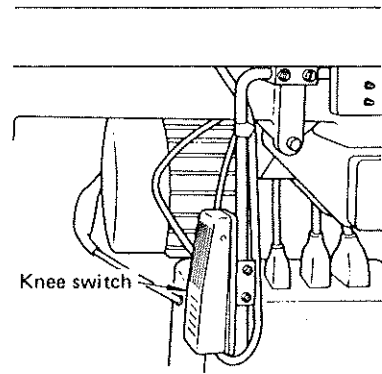


Fig. 24

If you want to raise the presser foot during sewing, press the knee switch. The raised presser foot will come down immediately after the knee switch is released. If you want to bring down the presser foot which has been raised automatically, treat on the pedal forward (toe down) or push and release the knee switch.

2. Adjusting the presser lifter stroke

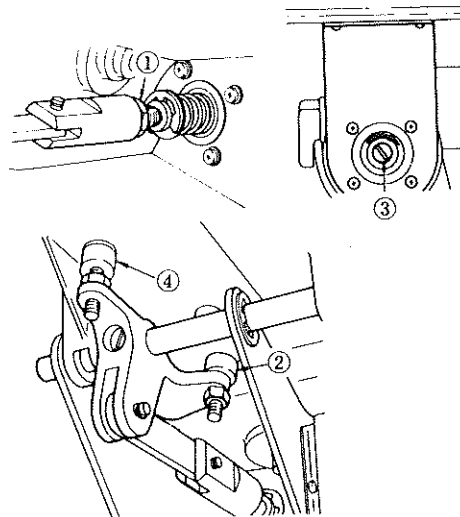


Fig. 25

1. Loosen lock nut ① of the coupler.
2. Lower presser lifter stopper (A) ② fully by loosening the lock nut.
3. Push the knee switch to drive the solenoid.
4. To increase the presser foot lift, turn plunger ③ on the far side of the solenoid clockwise, and turn the plunger counterclockwise to decrease the lift. (The maximum presser foot lift is about 8 mm.)
5. Raise stopper (A) until it comes in contact with the oil reservoir by activating the solenoid.
6. Further raise stopper (A) by giving it another half turn after releasing the knee switch.
7. Retighten the lock nuts of stopper (A) and the coupler, respectively.
8. Loosen the lock nut of stopper (B) ④, push the presser lifter lever toward the solenoid by hand, and adjust the height of stopper (B) ④ so that the playing gap between the top end of the knee lifter rod and the knee lifter connecting rod located on the machine head becomes about 1 mm. Then retighten each lock nut.

3. How to operate AK-5

The Auto-lifter AK-2 is operated by the knee switch, while AK-5 is actuated by the pedal action.

The Auto-lifter AK-5 is an optional attachment, and uses a PSC box especially designed for AK-5.

AK-5 is designed to lift automatically the presser foot and hold it at the highest position for 10 to 12 sec. after completion of thread trimming action. If you want to raise the presser foot after stopping the machine (pedal at the neutral position) during sewing, lightly tread on the pedal backward (heel down) by one step. Take care not to tread on the pedal excessively backward, or else the presser foot will come down and thread trimming action take place.

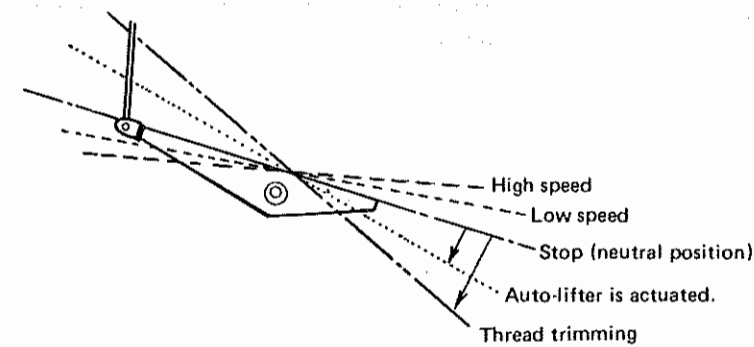


Fig. 26

3-9. Theory of thread trimming

The DDL-555-5/100 and DDL-555-5/200 machines will trim the needle and bobbin threads in the sequence illustrated below:

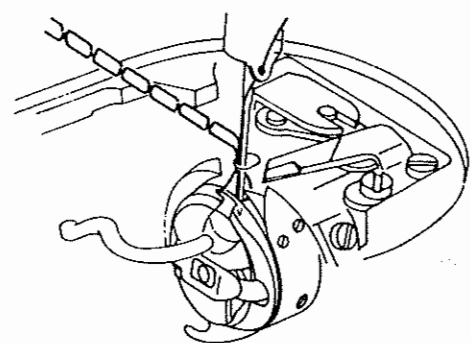


Fig. 27

1. The blade point of the sewing hook catches the needle thread.

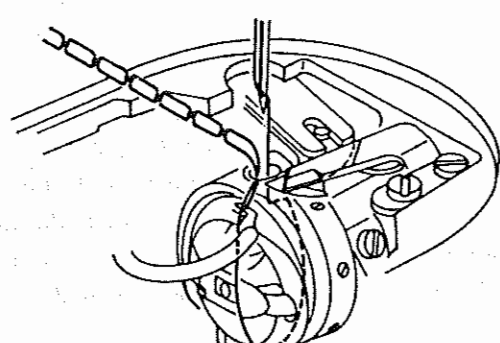


Fig. 28

2. The moving knife spreads the threads.
(goes back)

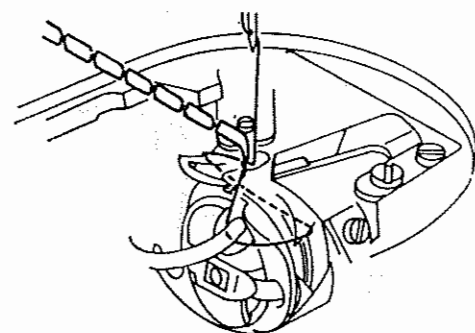


Fig. 29

3. The moving knife hooks the needle and bobbin threads (advances).

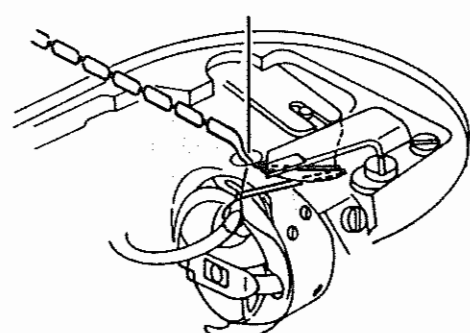


Fig. 30

4. The threads are trimmed.

3-10. Thread trimming sequence

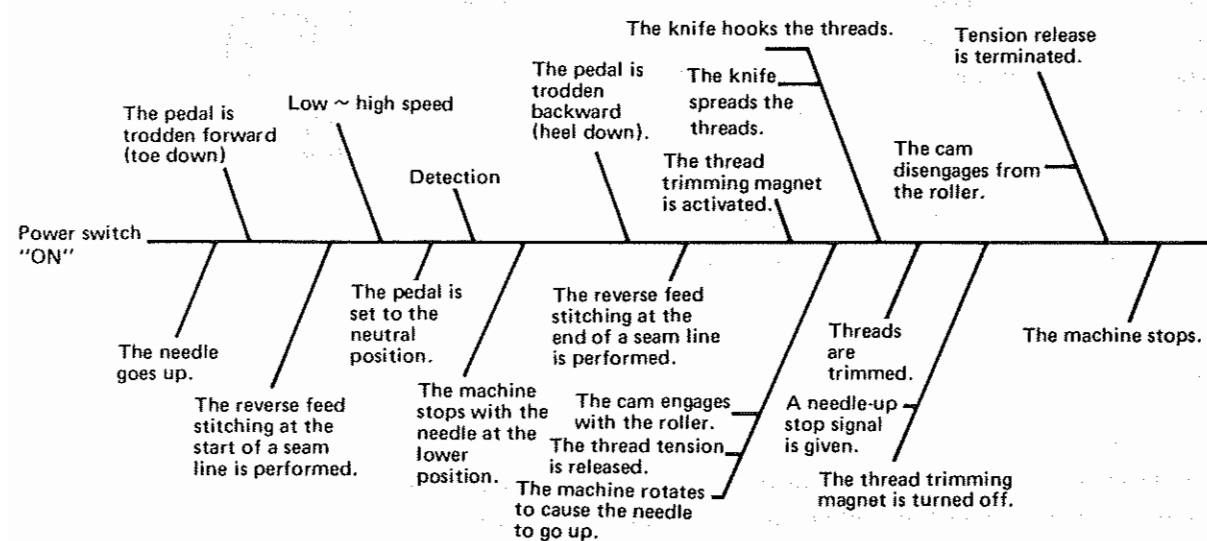


Fig. 31

Note: The above illustration shows the thread trimming sequence when both switches for automatic reverse feed stitching at the start and end of a seam line have been set to “ON”

3-11. Adjusting the timing of the thread trimmer cam

1) How to adjust the timing for cotton and synthetic threads

The timing of the thread trimmer cam is adjusted in order to change the length of the needle thread remaining on the needle after thread trimming. The proper timing of the thread trimmer cam for cotton or synthetic thread can be provided easily by making the engraved dots on the machine arm and hand wheel, respectively in alignment. Tilt the machine head, manually turn the hand wheel until the thread take-up lever comes a little before its highest position, and press thread take-up picker ③ in Fig. 32 to the right by your finger. This will cause the cam roller (Fig. 33) to fit in the groove of the thread trimmer cam (Fig. 33). With this condition maintained, turn the hand wheel in the direction opposite to the normal rotational direction of the machine, and you will find a position at which the hand wheel can turn no further. Then, adjust the cam timing so that engraved dot ① (Fig. 34) on the machine arm is aligned with dot ② (Fig. 34) on the hand wheel as shown in Fig. 34. This will provide the proper cam timing for cotton thread. Alignment of engraved dot ① (Fig. 34) gives the cam timing for synthetic thread.

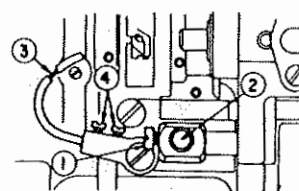


Fig. 32

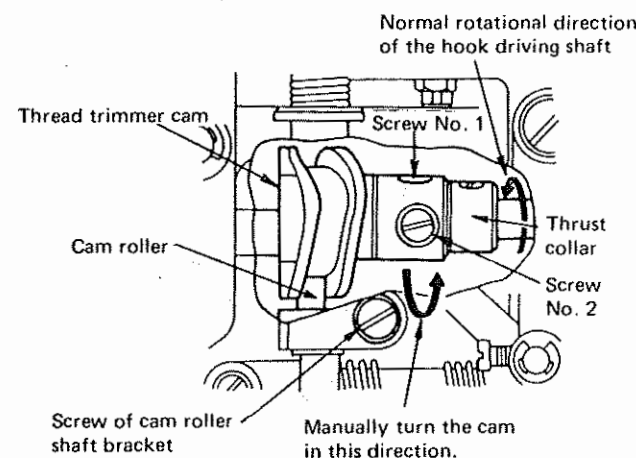


Fig. 33

2) How to adjust the timing of the thread trimmer cam

Loosen screw No. 1 first, and then screw No. 2 (Fig. 33), and align one of the engraved dots on the hand wheel with that on the machine arm as required (Align red dot 1 with red dot 2 for cotton thread, and red dot ① with green dot ③ for synthetic thread). Fit the cam roller in the groove of the cam while pressing thread take-up picker ③ (Fig. 32) to the right. Manually turn only the cam (do not turn the hook driving shaft) in the direction opposite from the normal rotational direction of the hook driving shaft (see arrow in Fig. 33) until a position at which the cam goes no further is reached. At this position, press the cam against the thrust collar of the thread trimmer cam (Fig. 33), and retighten the screw No. 2 first and then the screw No. 1.

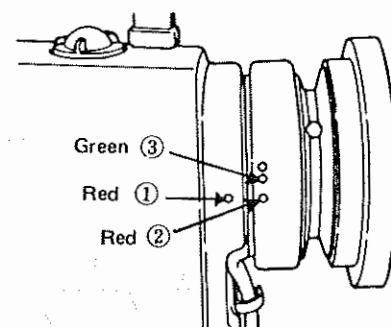


Fig. 34

Note: The engraved dots on the hand wheel provide the standard cam timings. It is possible to set a timing which is approx. 2° earlier than that for cotton thread, or a timing which is approx. 5° later than that for synthetic thread. In this case, however, confirm that the moving knife securely separate two needle threads at the bottom surface of the throat plate. If a cam timing is too early or late, the thread remaining on the needle may become too short, causing the needle thread to slip out of the needle immediately after thread trimming. Also, the cam roller may fail to fit in the groove of the thread trimmer cam.

3-12. Positioning the moving knife

1) Proper position of the moving knife

The correct position of the moving knife when the moving knife has gone back farthest is such that the tip of the moving knife is distanced 2 to 2.5 mm from the center of the needle. If the retreat of the moving knife is not enough, the knife would fail to catch the needle thread or bobbin thread at the time of thread trimming. On the other hand, excessive retreat may cause the moving knife to hit the feed dog.

2) How to perform positioning of the moving knife

The position of the moving knife is adjusted by changing the lateral position of knife driving shaft ① (Fig. 36) while the machine is at a stop. When the lateral position of the knife driving shaft is changed, the engagement of the cam with the cam roller is also changed, and therefore the axial position of the thread trimmer cam must be readjusted at the same time.

① Loosen screw ② (Fig. 36), and remove link driving magnet pin ③ (Fig. 36).

② Lower magnet driving link ④ (Fig. 36), and screw in or out adjusting nut ⑤ (Fig. 36) of the knife driving shaft to adjust the retreat of the moving knife.

As the nut is screwed in, the retreat of the knife increases, and vice versa.

③ Loosen the two screws of thread trimmer cam ⑦ (Fig. 36) and thrust collar ⑥ (Fig. 36), respectively.

④ Align the engraved dot on the machine arm with one of the engraved dots on the hand wheel (Align red dot ① with red dot ② for cotton thread, and red dot ① with green dot ③ for synthetic thread as shown in Fig. 34).

⑤ Manually turn the cam until screw No. 2 ⑧ is oriented toward you. Then press the thread take-up picker to the right.

⑥ Move the cam to the right or left to engage the cam with the cam roller.

⑦ With the cam engaged with the cam roller, turn the cam in the arrow direction until it stops while lightly pulling the cam to the right.

⑧ Tighten screw No. 2 ⑧ (fig.36) of the cam for preliminary installation.

⑨ Then confirm;

a) that the required dots on the machine arm and hand wheel are in alignment,

b) the roller smoothly fits in the cam groove, and

c) the retreat of the knife has been set to 2 to 2.5 mm.

⑩ Firmly tighten the two screws of the cam.

⑪ Press the thrust collar against the cam, and fix it by tightening the two screws.

⑫ Reinstall the link driving magnet pin.

(Ref.) The moving knife can be easily checked for correct positioning by checking whether the stepped part of the machine bed is in parallel to the forked base for knife. When they are in parallel, the moving knife may be generally considered to have been correctly positioned.

Note: ○ Note that a minute change in the lateral position of the knife driving shaft will greatly affect the retreat of the knife.

○ Confirm that the moving knife spreads the threads as shown in Fig. 37.

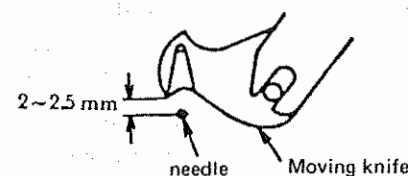


Fig. 35

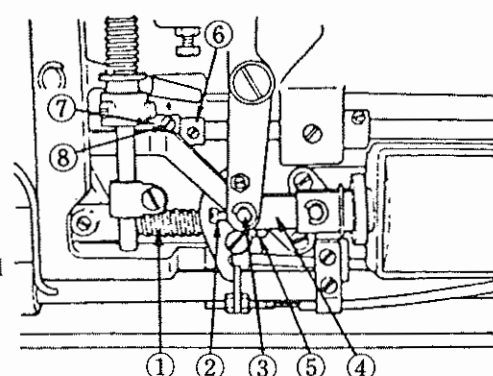


Fig. 36

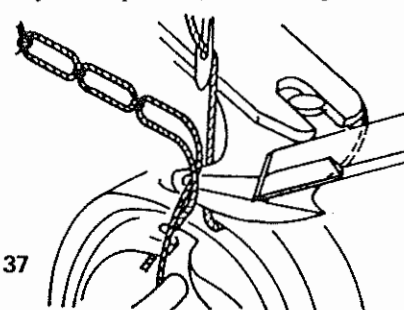


Fig. 37

3-13. Installing the counter knife

Refer to Fig. 38 for proper installation of the counter knife. The standard distance from the center of the needle to the blade point of the counter knife is 4.0 mm. The blade point of the counter knife is located 0.6 mm above the installing surface as shown in Fig. 39.

The sharpness of the counter knife depends upon the installing angle of the blade tip of the counter knife. The proper matching of the blade of the counter knife with that of the moving knife will provide the best sharpness of the counter knife. Check the sharpness of the counter knife, and adjust the installing angle (A in Fig. 38) of the counter knife whenever the counter knife has been readjusted or changed. The installing position of the counter knife can be moved to the right from the standard position. When the counter knife has been installed at such a position, the needle and bobbin threads to be pulled out become correspondingly longer, and also the timing of thread trimming is delayed, resulting in an increased length of the thread remaining on the needle after trimming (See Fig. 41).

When using synthetic thread, the timing of thread trimming can be delayed by moving the counter knife to the right.

In this case, timing of the thread trimmer cam must be adjusted.

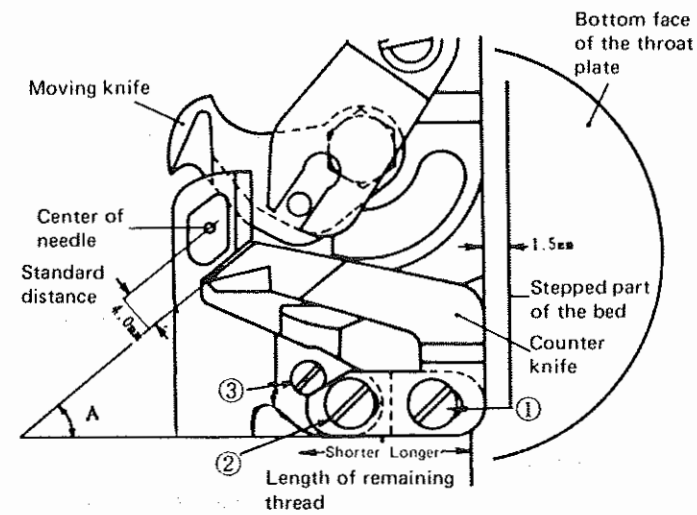


Fig. 38

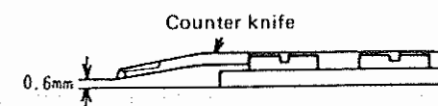


Fig. 39

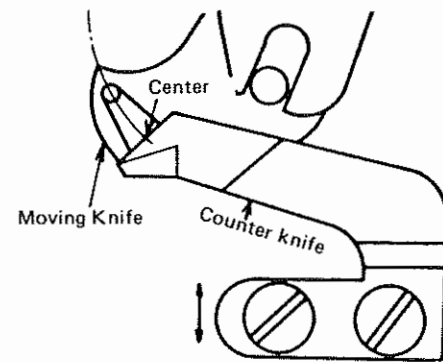


Fig. 40

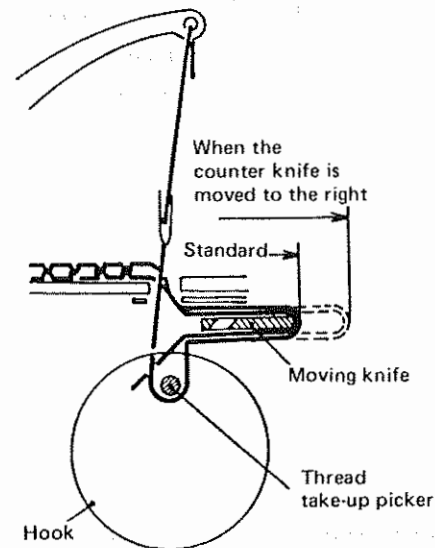


Fig. 41

3-14. Adjusting the floating amount of the tension disc No. 2

1) How to check the floating amount

Check whether the tension disc No. 2 floats 0.5 to 1 mm when thread take-up picker ③ in Fig. 42 is pressed to the right with the thread take-up lever located slightly below its highest position and the presser foot lifted.

2) How to adjust the floating amount (See Fig. 42)

① To increase the floating amount, loosen nut ②, and tighten nut ①.

② To decrease the floating amount, loosen nut ①, and tighten nut ②.

After adjustment, firmly tighten nuts ① and ②.

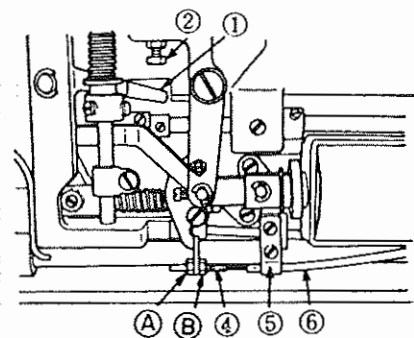


Fig. 42

3-15. Sharpening the counter knife

The most important factor of the sharpness of the thread trimmer is the shape of the blade tip of the counter knife. In most cases, the sharpness of the thread trimmer can be improved by merely sharpening the blade of the counter knife.

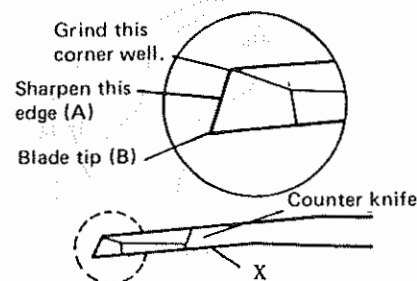


Fig. 43

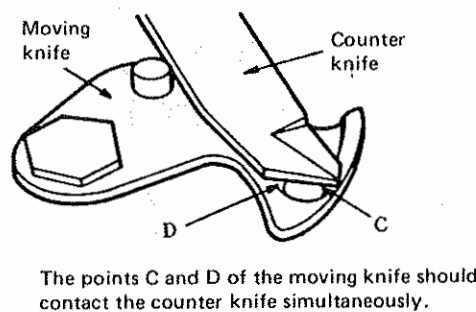


Fig. 44

It is important to make the blade of the counter knife contact with the blade of the moving knife.

- The sharpness of the thread trimmer is improved merely by sharpening "A" shown in Fig. 43 (Pay attention to the angle shown in Fig. 43).
- The thread trimmer becomes dull also when "B" has been worn out and rounded. Accordingly, take care not to change the angle while sharpening the blade edge.
- If the thread trimmer is still dull even after the blade of the counter knife has been sufficiently sharpened, it is due to failure of the points C and D of the moving knife to contact with the blade of the counter knife at the same time. In this case, correct the tilt of the counter knife.

Note: The contact of the moving knife with the counter knife can be also improved by changing the angle shown by the arrow in Fig. 45. When "D" side shown in Fig. 44 is dull, decrease this angle, and when "C" side is dull, increase the angle.

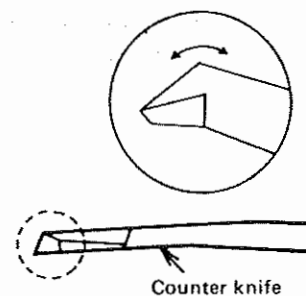


Fig. 45

3-16. Replacing the moving knife

Remove the moving knife in the following order:

- 1) Loosen screw ① (Fig. 50), and remove pin ② (Fig. 50) for knife forked base.
- 2) Remove hinge screw ① (Fig. 46), remove forked base for knife ② (Fig. 46) and the moving knife ③ (Fig. 46) to the position as shown in Fig. 47, and remove the moving knife pin from the forked base for knife.
- 3) Move the forked base for knife to the position shown in Fig. 48, and remove the hinge screw (Fig. 48).

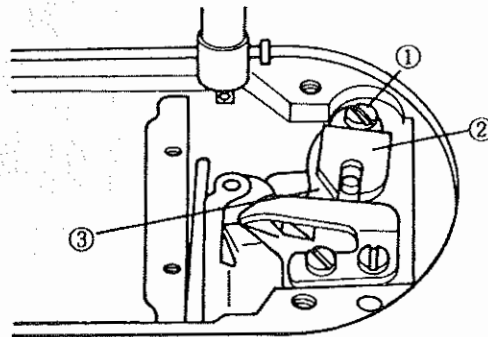


Fig. 46

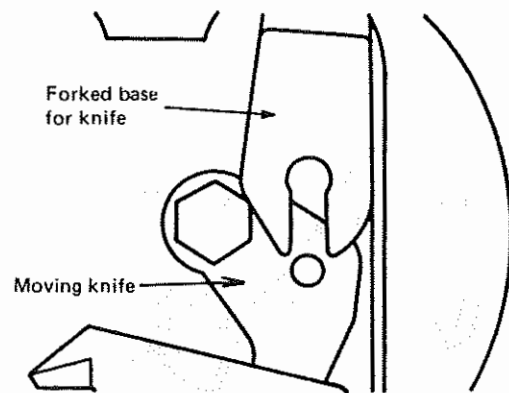


Fig. 47

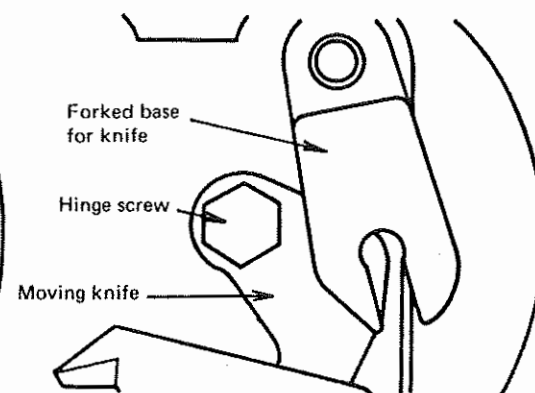


Fig. 48

Reverse the above sequence for installing the moving knife. After tightening the hinge screw of the moving knife, move the moving knife by hand to confirm that it moves smoothly without play.

Position the forked base for knife as shown in Fig. 49, and securely insert the pin for knife forked base into the forked base for knife (The pin can be fully inserted into the forked base for knife without fail by moving the knife driving shaft to the right and left).

Confirm that the knife is actuated when the knife driving shaft is moved to the right.

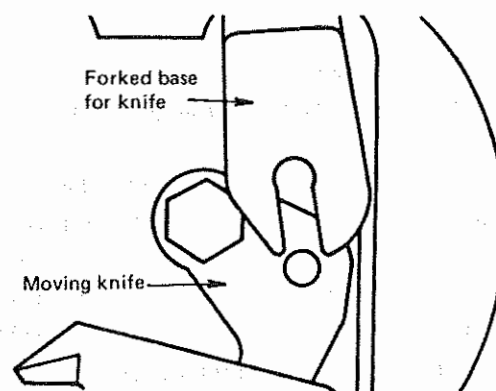


Fig. 49

3-17. Changing the thread guide for knife

Change the thread guide for knife by loosening screws ② and ③ with screw ① (Fig. 38) left tightened. If the installing angle of the counter knife has been disturbed, readjust it in accordance with 3-13 "Installing the counter knife".

3-18. Adjusting the thread take-up picker

If thread take-up picker ③ (Fig. 50) enters the bobbin case too deeply at the time of thread trimming, the bobbin does not turn, and the bobbin thread is cut too short, causing thread cast-off at the start of a seam line. On the contrary, if the entrance of the thread take-up picker into the bobbin case is not enough, the needle thread slips off the tip of the thread take-up picker at the time of thread trimming, and as a result, the thread remaining on the needle after trimming becomes too short, causing thread cast-off.

1) Positioning the thread take-up picker

With thread trimmer lever ① (Fig. 42) pressed against stopper ② (Fig. 42), make adjustment so that the bobbin thread can be pulled out smoothly.

At this time, perform the adjustment so that a clearance of 1.0 to 1.5 mm is provided between the tip of the thread take-up picker (bobbin winder trip latch) and the middle of the top recess of the bobbin case, and also the rear end of the bobbin winder trip latch is aligned with the engraved line of the thread take-up picker.

(Fig. 51)

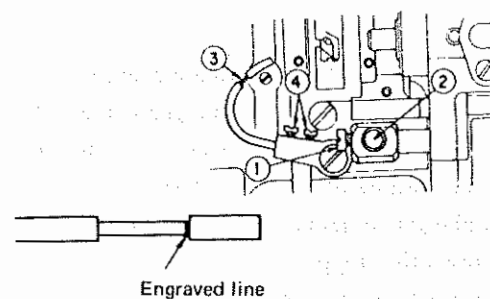


Fig. 50

2) How to adjust the position of the thread take-up picker

After loosening screws ④ (Fig. 50), perform adjustment so that the tip of the thread take-up picker (bobbin winder trip latch) is positioned as shown in Fig. 51. To adjust the entrance of the thread take-up picker into the bobbin case, move stopper ② (Fig. 42).

After completion of the above adjustment, retighten the nut of the stopper. When the stopper has been screwed in, check whether or not the end of the roller shaft comes in contact with the bottom of the cam groove, and if it does, readjust the position of the collar of the slide shaft in accordance with 3-19 "Adjusting the slide shaft".

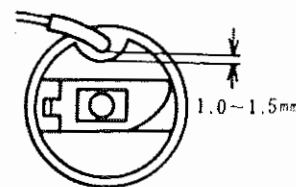


Fig. 51

3-19. Adjusting the slide shaft

Move thrust collar ② (Fig. 52) in the axial direction to obtain the 5.4 mm travel of slide shaft ① (Fig. 52). Position cam roller shaft bracket ③ as shown in Fig. 52 (13.5 mm).

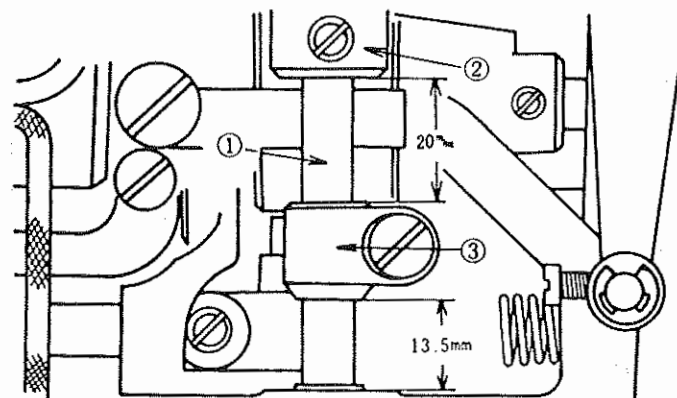


Fig. 52

Perform the adjustment in the following sequence:

- 1) Position the stopper of the thread trimmer lever based on the position of the thread take-up picker.
- 2) Adjust the position of thrust collar ② so that the travel of the slide shaft becomes 5.4 mm.
- 3) Adjust the position of the thread trimmer magnet (DC solenoid) so that the snap ring on the thread trimmer magnet plunger comes in contact with the rubber ring and stops when the thread trimmer lever has moved to almost reach the stopper, and that no clearance is produced on either end of the rubber ring when the thread trimmer magnet is energized.

3-20. Installing and removing the knife mounting base

Remove knife mounting base ① (Fig. 53) in the following sequence.

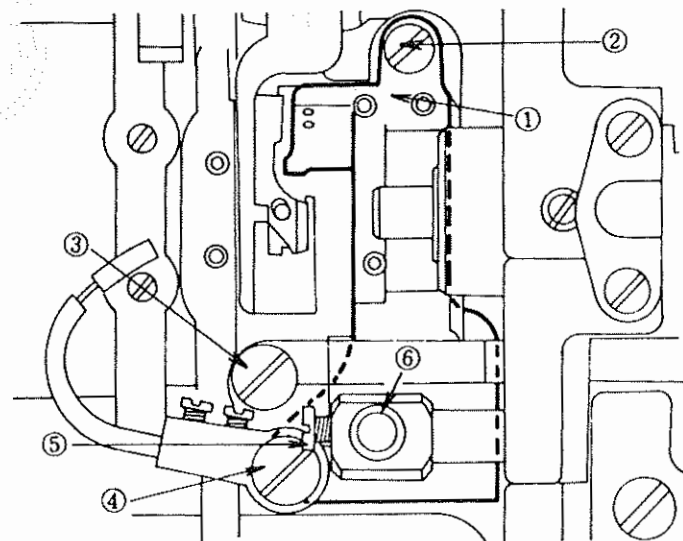


Fig. 53

- 1) Remove the hook.
 - 2) Loosen screw ⑤ (Fig. 53), and remove pin ⑥ (Fig. 53) for knife forked base.
 - 3) After removing hinge screw ③ (Fig. 53), remove hinge screw ④ (Fig. 53) and screw ② (Fig. 53), and the knife mounting base can be removed.
- Reverse the above sequence for installing the knife mounting base.

3-21. Adjusting the position of the one touch reverse feed switch lever

There is no specified height for one touch reverse feed switch lever ①, and therefore the one touch reverse feed switch lever may be positioned at any height suited for each operator.

Loosen screw ② (fig. 54), and move the switch lever up and down to obtain a suitable height.

Retighten the screw firmly after adjustment.

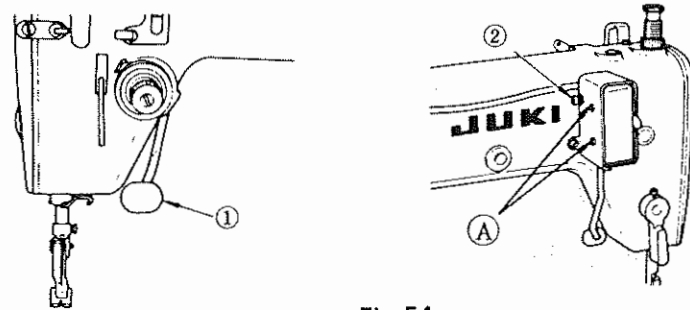


Fig. 54

3-22. Adjusting the reverse stitch length

An operator often makes a longer back feed seam line than required until he gets used to operating this one touch reverse feed switch. Accordingly, until he gets well used to this new device, it may be advisable to shorten the back feed seam by making the reverse feed stitch shorter than the normal feed stitch if possible. To do this, loosen screw ① from the bottom face of the bed, and push up stopper plate ② (in the arrow direction). When the stopper plate is pushed down to the bottom, the normal and reverse feed stitch lengths will become identical.

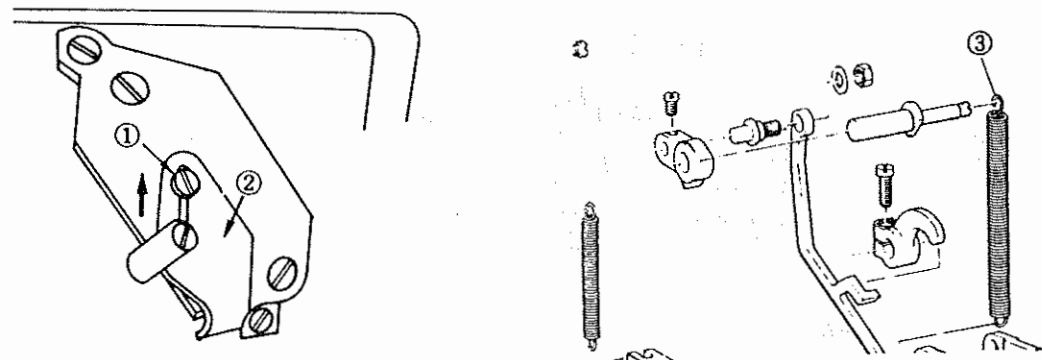


Fig. 55

- Caution:**
- Do not change the spring pressure of tension spring ③ (Fig. 55). The proper speed at the time of switching into the reverse feed or back to the normal feed is provided by the good balance between the spring tension and the attraction force of the solenoid. Accordingly, careless adjustment would disturb this balance, and if the spring tension is set too high, the machine may fail to switch to the reverse feed.
 - Be careful not to overtighten screws ① (Fig. 54), or else the switch cover may break.

4. OTHER PROVISIONS

4-1. Changing the power supply voltage of PSC box

There are two types of PSC box in the power supply voltage; one type of PSC box operates on 100 volt, and the other operates on 200 volt. Use a 100V PSC box for a single-phase 110V ~ 125V, and a 200V PSC box for other power supply voltage (single-phase 220V ~ 250V, 3-phase 220V ~ 250V, or 3-phase 380V ~ 440V).
The 100V PSC box has transformer taps for 100V, 105V, 110V, 115V, 120V, and 130V. The 200V PSC box has 190V, 200V, 230V, 240V, and 250V transformer taps. Use the most suitable tap in accordance with the power supply voltage. For a 3-phase 380V ~ 440V power supply voltage, calculate the tap voltage from the following formula to select a tap having the most approximate voltage:

The voltage of a tap to be selected = $\frac{\text{Power supply voltage}}{\sqrt{3}}$

Example: For a 400V power supply voltage

Tap voltage = $\frac{400}{1.732} = 230.9 \div 230 \text{ [V]}$

To make connection to a necessary tap, turn off the power, and remove the PSC board. Then you will find a terminal base. Perform connection in accordance with the label indicating the voltages for voltage switching.

Caution for replacing the motor or power switch:

When operating the PSC box on a 380V ~ 440V power supply voltage, confirm that the specified switch and motor are used without fail, or else the PSC box will be damaged.

4-2. Setting the number of reverse feed stitches

4-2-1. 100-type

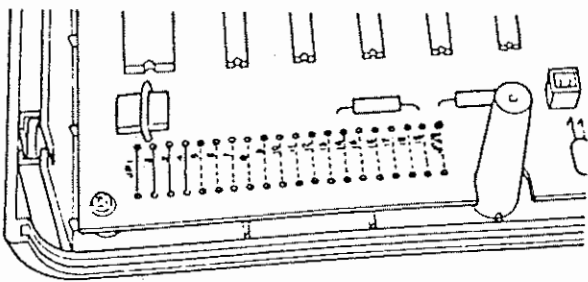
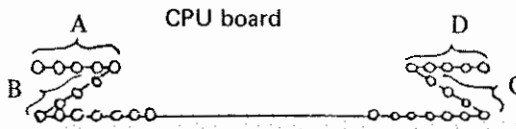


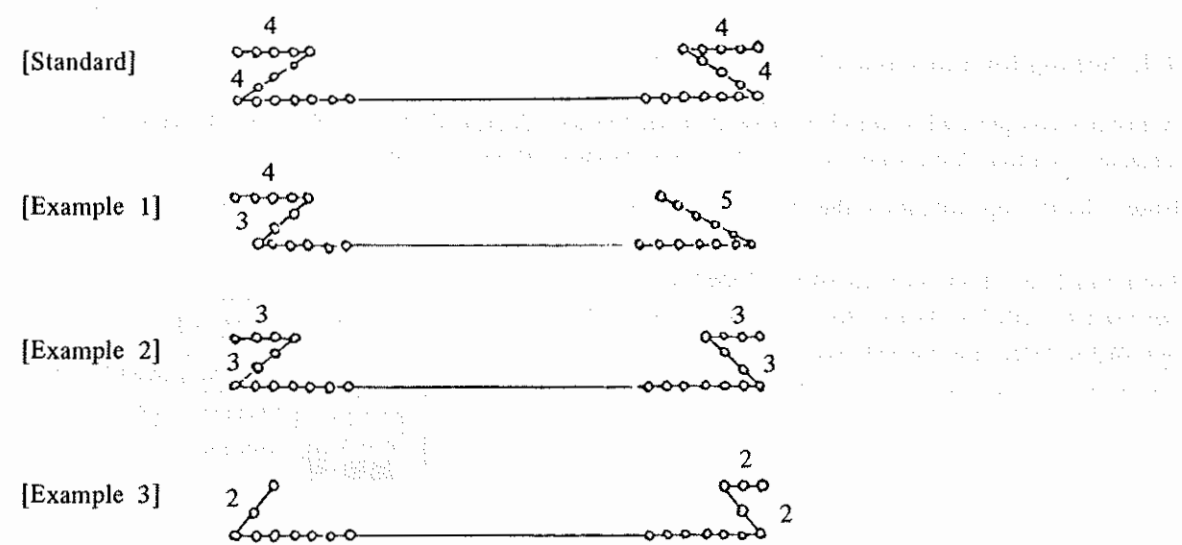
Fig. 56

The number of reverse feed stitches can be set to 2~5 by means of JP1 ~ JP8, JP18, and JP19 on the CPU board shown on the left (change of jumper connection is necessary).
The number of reverse feed stitches can be set to "0" in addition to 2 ~ 5 for only "A" and "D".



- Meanings of the symbols:
- : The jumpers are connected.
 - × : No connection of the jumpers
 - : Independent of jumper connection

	Setting for "A"	Setting for "B"	Setting for "C"	Setting for "D"	Number of stitches for "A" ~ "D"				
					(only for "A" and "D")	2	3	4	5
Jumper No.	JP5	JP6	JP7	JP8	—	×	○	×	○
	JP1	JP2	JP3	JP4	—	×	×	○	○
	JP19			JP18	○	×	×	×	×



	A	B	C	D	JP1	JP2	JP3	JP4	JP5	JP6	JP7	JP8	JP18	JP19
Standard	4	4	4	4	○	○	○	○	×	×	×	×	×	×
Example 1	4	3	5	0	○	×	○	—	×	○	○	—	○	×
Example 2	3	3	3	3	×	×	×	×	○	○	○	○	×	×
Example 3	0	2	2	2	—	×	×	×	—	×	×	×	×	○

Note: The machines are set for the standard number of stitches at the time of shipping.

4-2-2. 200-type

Refer to the previous clause 5) “How to operate the switches (for 200-type) in 2-2 “Test run” for setting the number of reverse feed stitches.

4-3. Setting for the soft starting

The DDL-555-5/100 and /200 machines are provided with a “soft” starting feature to ensure stitch formation at the start of a seam line for sewing heavy-weight materials. The “soft” starting is a feature to run the machine at a low speed for the beginning one stitch (1 to 2 stitches for 200-type). This soft starting feature works whether the switch for reverse feed stitching at the start of a seam line is set to “ON” of “OFF”.

The soft starting can be set by;

- Connecting JP20 jumper on CPU board for 100-type, and
- Setting DSWs 1 and 2 on CPU board to “ON” for 200-type.

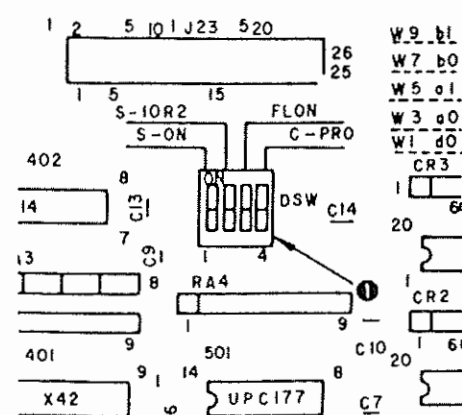


Fig. 57 200-type

DSW1 (S-ON)	DSW2 (S-10R2)	Number of stitches
OFF	—	-----> (No soft starting)
ON	OFF	-----> (One-stitch soft starting)
ON	ON	-----> (Two-stitch soft starting)

4-4. Setting for a machine (200-type) with Auto-lifter

A machine equipped with Auto-lifter (AK-2 or AK-5) uses a dedicated PSC box, but uses the same CPU box as that for a machine without Auto-lifter. Set the dip switch (D SW) 3 FLON to "ON" for a machine with Auto-lifter.

Note: Set the dip switches in the PSC box as follows according to the use of MC-200 or the type of machines head.

For normal operation, set both SW1 and SW2 to "OFF".

Set SW 1 to "ON" for DMN-530-5 or DMN-531-5.

Set SW2 to "ON" for 2-needle machines (LH-1152-5) or for sewing heavy-weight materials (for high load).

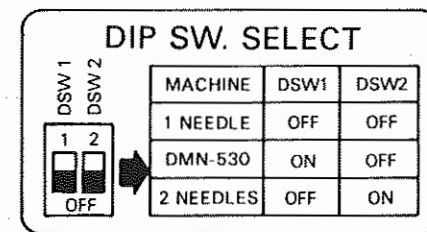


Fig. 58

4-5. Safety circuits

The DDL-555-5/100 or -555-5/200 machine is equipped with a safety circuit explained below:

1) Safety circuit against machine locking

< Function > If the machine stops for more than 2 sec. during operation due to some mechanical or electrical failure, the safety circuit causes the clutch coil to be de-energized, and also prohibit any pedal inputs, thereby protecting the motor from burning, and minimizing damage to the machine.

< Circuit operation > When the safety circuit has been put into operation, all inputs and outputs are prohibited, and therefore the machine will not run even when the pedal is trodden on. Also, the back solenoid will not work, since the manual reverse stitching switch is rendered inoperative.

< How to reset > Turn off the power switch. Remove the cause for the machine locking, and then turn on the power switch again.

2) Safety circuit against detector failure

< Function > If the detector for sensing the position (up or down) of the machine's needle fails, the needle stops at any position other than the uppermost or lowermost position, or the machine keeps on running and does not stop, or the thread trimmer is damaged.

To prevent these troubles, the microcomputer constantly checks the signals of the upper or lower detector. And if any trouble with the detector signals is found, the micro-computer will cause the machine to continue to operate as a machine without the thread trimming feature controlled by a clutch motor.

< Circuit operation > If any of the above troubles has been detected during machine operation, the machine is brought to a halt even when the pedal has been trodden on forward (toe down). After this halt, when the pedal is trodden on to the neutral position, and then depressed forward (toe down) again, the machine will be operated and controlled by a clutch motor without thread trimming and automatic reverse feed stitching features. (Reverse feed switching by means of the manual switch is possible.)

< How to reset > Turn off the power switch, and replace or repair the detector. Then turn on the power switch again.

3) Safety circuit for thread trimming

The machine will not run after thread trimming even when the pedal is trodden on forward (toe down) during the reverse feed stitching at the end of a seam line, or during thread trimming action, and therefore troubles such as needle or knife breakage are prevented.

< How to reset > Return the pedal to the neutral position once before treading it on forward again, and the normal operation will be restored.

4) Turning on the power switch with the pedal depressed forward

Even when the power switch is turned on with the pedal trodden on forward (toe down), the machine runs only to move up the needle and stops, or the machine does not run at all when the needle is at the upper position from the beginning. The machine operates in the same manner as when the pedal is set to the neutral position.

< How to reset > Return the pedal to the neutral position once before treading it on forward again, and the normal operation will be restored.

5) Safety circuit for the reverse feed solenoid

If the one touch reverse feed stitch stays "ON" for 12 sec. or more, the reverse feed solenoid will be de-energized. However, the automatic reverse feed stitching at the start/end of a seam line can be performed even when this safety circuit is in operation. When thread trimming action takes place with the above switch continuously on, the reverse feed solenoid will be de-energized at that point.

< How to reset > Turn off one touch reverse feed stitch once.

4-6. Stand-by circuitry

The PSC board is provided with a stand-by circuitry which is capable of controlling the sewing speed (through the pedal action) or stop of the machine in the absence of the CPU board.

In case of a CPU board failure, this stand-by circuitry functions to cause the machine to operate, without the CPU board, as a machine with needle-up/down stop feature, by changing the connection of the connectors.

< Function of the stand-by circuitry >

The stand-by circuitry controls the start, sewing speed, and stop of the machine through the pedal action. (The needle-up/down stop function works, but thread trimming, automatic or one touch reverse feed stitch features are inoperative.)

The control knob for maximum sewing speed is operative.

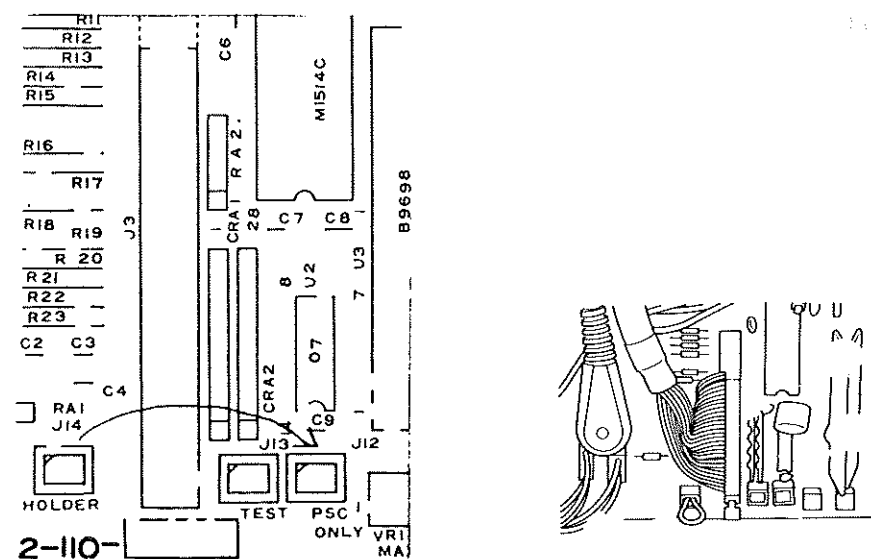


Fig. 59

< How to switch to the stand-by circuitry >

- ① Turn off the power switch, open the cover of the PSC box, and remove the J3 plug.
- ② Attach the connector at J14 (HOLDER) to H12 (PSC ONLY).
- ③ Close the cover of the PSC box with the J3 plug left disconnected.

This completes the switching to the stand-by circuitry.

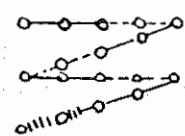
When the power switch is turned on, the power indication lamp on the CPU box will not light. However, this does not mean any failure.

When the pedal is depressed forward (toe down), the machine will start, and the speed can be controlled. When the pedal is returned to the neutral position, the machine will stop with the needle down. The machine will stop with the needle up, but thread trimming can not be performed even when the pedal is trodden on backward (heel down). Further, the automatic or one touch reverse feed stitch function does not work.

4-7. Adjusting the low sewing speed (LSL) and reverse feed stitching speeds (SBTL, EBTL, and BTH) (Test program)



Pattern 1



Pattern 2 (only for 200-type)

○—○—○ BTH (BACK TACK HIGH SPEED)	1700 ± 200 s.p.m.
○—○—○ SBTL (START BACK TACK LOW SPEED)	1500 ± 200 s.p.m.
○—○—○ EBTL (END BACK TACK LOW SPEED)	1500 ± 200 s.p.m.
○—○—○ LSL (LOW SPEED LIMIT)	200 ± 20 s.p.m.

The DDL-555-5/100 and /200 machines are designed to slow down before the reverse feed solenoid is energized or de-energized as shown above in order to ensure accurate reverse feed stitching.

The above sewing speeds are adjusted prior to shipping. Do not readjust these speeds if an accurate tachometer is not available.

The microcomputer stores a program for adjusting these sewing speeds. Perform adjustment as follows, if necessary.

Necessary tools for adjustment:

1. Tachometer
2. ⊖ screwdriver (small)
3. ⊖ screwdriver (large)

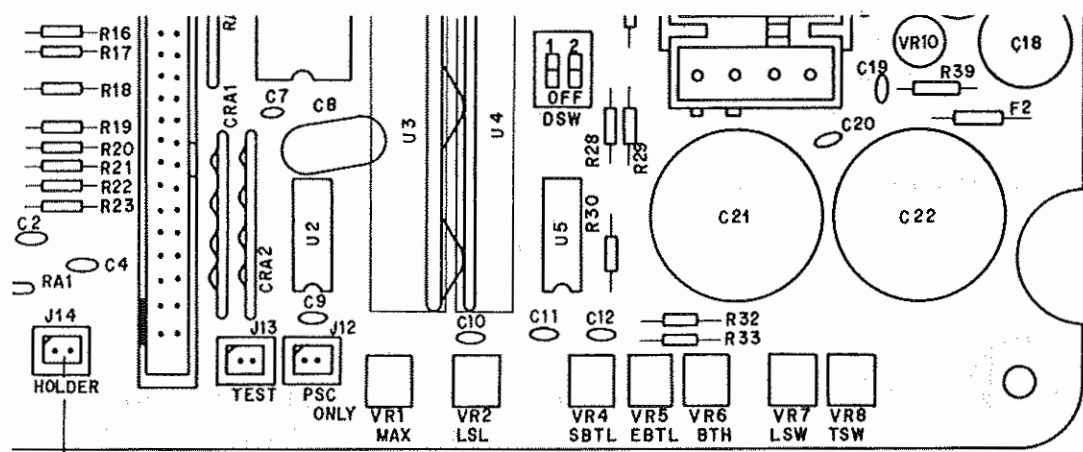


Fig. 60

< Adjusting procedure >

1. Turn off the power switch of the motor, and attach a reflection tape for measuring the sewing speed to the machine pulley.
2. Open the PSC box by removing the one setscrew of the PSC box cover by a large \ominus screwdriver.
3. Connect the short plug at J14 to J13 (TEST). (Do not remove the other connectors.)
4. Hold the presser foot of the machine head at the uppermost position by the presser lifting lever.
5. Turn on the power switch. (At this time, the machine will not run at all even when the needle is at other than the upper position. However, this does not mean any failure, but it indicates that the speed test program is ready for execution.)
6. Proceed as follows: Set the pedal to the neutral position \rightarrow Tread it on forward (toe down) \rightarrow Neutral position. This series of action will keep the machine running. Then from the neutral position \rightarrow Tread on the pedal backward (heel down) \rightarrow Set the pedal to the neutral position again. Thus, the machine will stop.
7. The sewing speed of the machine will vary as shown in the table below during the above pedal action cycle (neutral \rightarrow forward \rightarrow neutral \rightarrow backward \rightarrow neutral)

* Upon completion of the 6th cycle, the program returns to the 1st cycle.

	1st	2nd	3rd	4th	5th	6th
Output signal	LSI	LSL	SOFT	SBTL	EBTL	BTH
Sewing speed	200~ MAX	200 \pm 20	200	1500 \pm 200	1500 \pm 200	1700 \pm 200
Adjusting point 100-type	Depends on pedal position	Adjust by VR2	Fixed	Adjust by VR4	Adjust at the same time with SBTL.	Adjust by VR6
200-type	Depends on pedal position	Adjust by VR2	Fixed	Adjust by VR4	Adjust by VR5	Adjust by VR6

8. After completion of adjustment of each sewing speed, turn off the power.
9. Reconnect the short plug at J13 to the J14 connector.
10. Close the PSC box cover with care taken not to pinch the cord, and fix the cover by the setscrew. Remove the reflection tape from the pulley.
11. When the power switch is turned on again this time, the normal program is resumed. Check the machine for proper operation.

4-8. Function of the needle upper position stopping switch (S075)

The needle upper position stopping switch is an option, and it is designed to make the needle stop at its highest position without thread trimming action during a stitching cycle.

The needle upper position stopping switch S075 (Part No. MAS075010A0A)) can be installed on all the boxes.

1. How to connect the U switch relay cord asm.

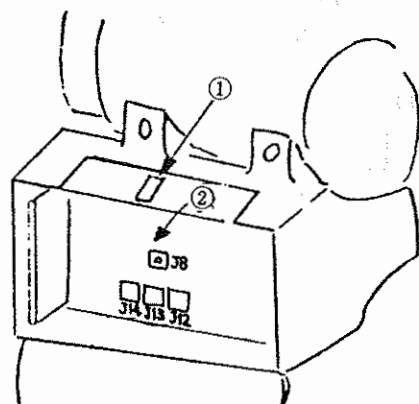


Fig. 61

- 1) Open the cover of the PSC box.
- 2) Remove the blind cap of hole ① for the U switch relay cord connector, and insert the nylon connector into the hole.
- 3) Attach the connector on the opposite side from the U switch relay cord to the connector J8 (USW) on the PSC board.
- 4) Fix the middle part of the U switch relay cord by a nylon band supplied with the cord.
- 5) Close the cover of the PSC box.

2. How to connect the U switch asm. (B)

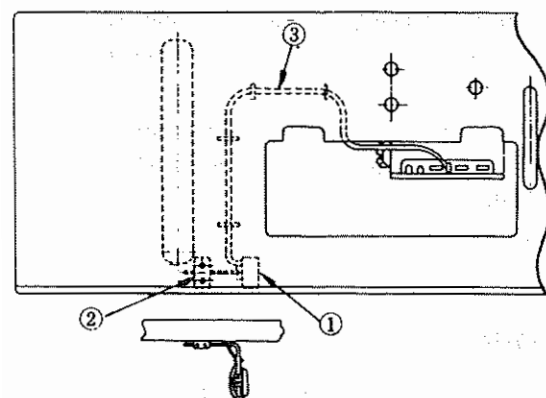
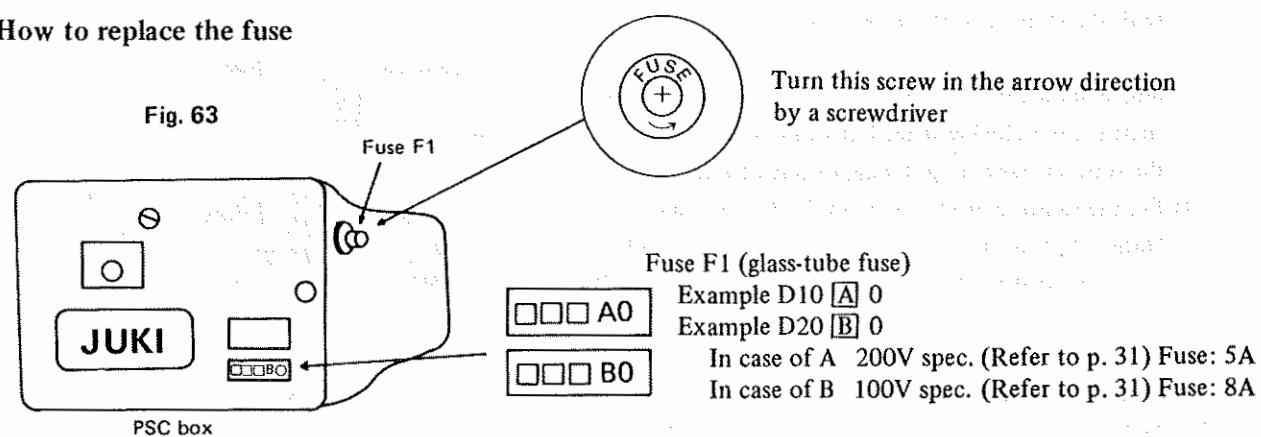


Fig. 62

- 1) Fix U switch asm (B) ① by wood screw ② supplied with the switch.
- 2) Fix the switch cord by four staples ③
- 3) Connect the switch connector to the nylon connector of the U switch relay cord asm.

5. MAINTENANCE AND INSPECTION

5-1. How to replace the fuse



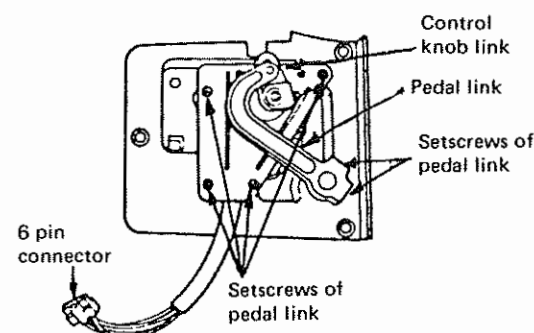
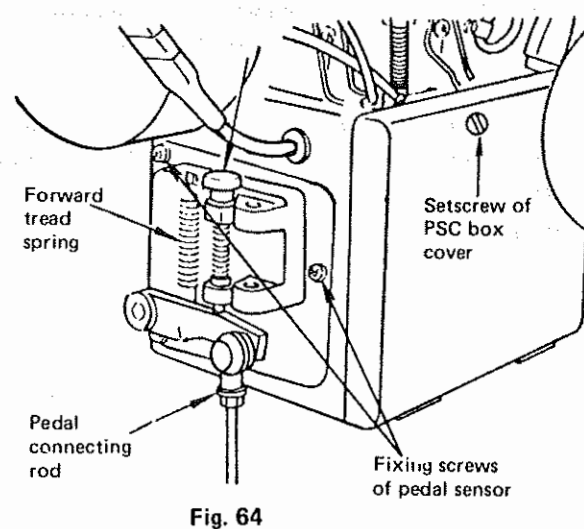
As shown above, the fuse is located on the right of the PSC box. Be sure to turn off the power before changing the fuse.

Using a \oplus or \ominus screwdriver, turn the cap of the fuse holder in the arrow direction, and the cap will be removed, making the fuse accessible. If a new fuse blows immediately, identify the cause. Do not replace a blown fuse by a new one with a larger capacity.

5-2. How to replace the sensor control knob asm (M85211100A0)

If the sewing speed drops suddenly or the machine stops suddenly while treading on the pedal forward, it is due the expiry of the service life of the sensor control knob asm M85211100A0. In this case, replace the sensor control knob asm in accordance with the following procedure:

- 1) At the pedal lever, remove the pedal connecting rod.
- 2) Open the PSC box cover by removing its setscrew.
- 3) Disconnect the 6P connector trailing from the sensor control knob from the PSC board. (The connector housing is provided with a lock. Depress this lock by finger to release the lock, and draw it out while depressing it.)
- 4) Remove the three fixing screws of the pedal sensor to remove the pedal sensor asm.
- 5) Loosen the two setscrews of the pedal link by an L-shaped hexagon wrench, and remove the pedal link. (Do not remove the pedal lever.)
- 6) Unscrew the four setscrews of the sensor control knob to remove the sensor control knob asm.
- 7) Remove the control knob from the sensor control knob asm.



- 8) Install the removed control knob link on the new sensor control knob asm as follows:
With the stopper of the sensor control knob in contact with the positioning pin of the control knob link as shown in the figure left, turn the control knob shaft counterclockwise until it stops, and retighten the setscrew with a tightening torque of 8 to 10 kg.cm.
- 9) Fix the sensor control knob asm by four screws.
Note: At this time, install the sensor control knob asm. so that the lead wire does not cause the installing plate to bulge.
- 10) Install the pedal link so that its pin is inserted to the slot of the control knob link.
- 11) Tighten the setscrews of the pedal link for preliminary installation, and remove the forward/backward tread springs.
- 12) Turn the pedal lever in the arrow direction to make it come in contact with the stopper. At this time, position the pedal lever to provide a 2 mm clearance between the pedal link and the control knob link as shown in the figure left, and an axial play of 0.05 to 0.1 mm. Then firmly tighten the setscrews of the pedal link.
Note: After this installation, the rotation torque of the pedal lever will be 0.5 kg.cm or less (equivalent to 67g or less downward at the outer holes of the pedal lever).
- 13) Install the pedal sensor asm with the 6 pin output cord drawn out to the left edge of the PSC board to prevent the cord from being pinched.
- 14) Reverse the removing order to proceed with further installation. On completion of the installation, adjust VR7 and VR8 shown in the previous clause 3-3 "Adjusting the pedal".

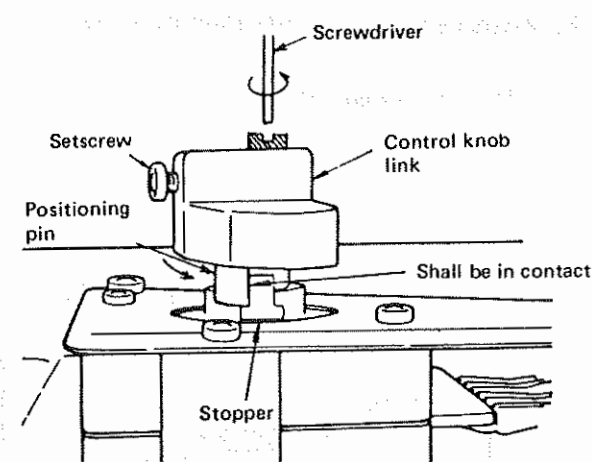


Fig. 66

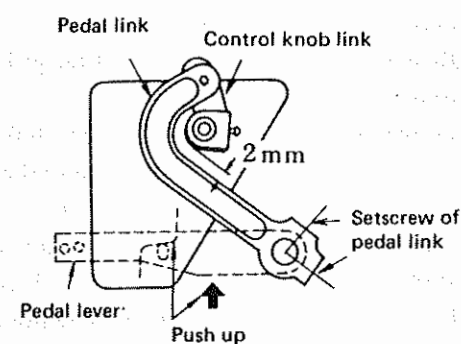
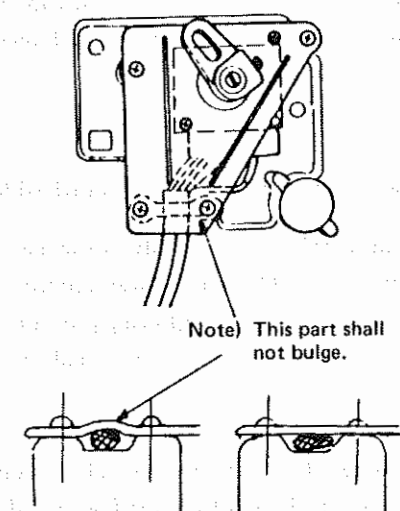


Fig. 67

5-3. How to replace the synchronizer

If the synchronizer fails, the needle of the machine will not stop at the upper or lower position when the machine stops, and the safety circuit will be put into operation, or the machine will keep on running at a high speed. Replace a faulty synchronizer in the following sequence. Note that the synchronizer is always changed together with the pulley.

- 1) Removing the belt cover, loosen the setscrews of the pulley to remove the pulley.
- 2) Unscrew the cord setscrew and two setscrews of the stator mounting base to remove the stator.
- 3) Fix a new stator by the setscrews so that the stator is pressed against the side of the rear bushing of the machine without any clearance left, and that one of the setscrews is positioned right above.
The stator mounting base is made of plastic.
Tighten the setscrews with approx. 6 kg.cm torque (it is advisable to use the 7 cm small screwdriver supplied with the machine).
- 4) Retighten the cord setscrew.
- 5) Install the pulley so that the screw No. 1 contacts the flat part of the main shaft, and a $1\text{ mm} \pm 0.5\text{ mm}$ clearance is provided between the stator mounting base and the position detector magnet as shown in the figure left.
- 6) Turn the pulley by hand to check it for freedom of rotation.
- 7) Install the cord, and attach the V belt to the pulley.
Then confirm that there is no contact between the V belt and the cord.
- 8) With the needle set at the lower position, turn on the power switch. The machine will then operate until the needle has gone up fully. If the needle stop position at that time is considerably out of position, check the position of the pulley setscrews.
- 9) Run the machine at a low speed to check for any frictional noise. After reinstalling the belt cover, check for frictional noise again.
- 10) Adjust the needle up/down stop positions by the setscrew of the magnet mounting base of the pulley.

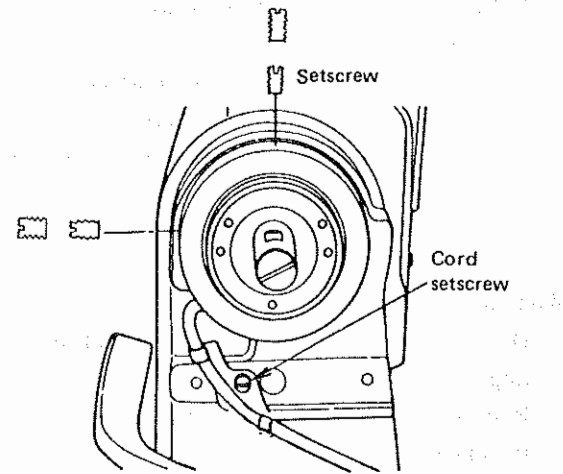


Fig. 68

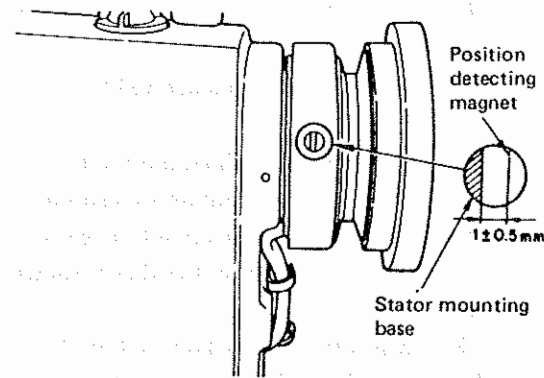


Fig. 69

5-4. How to apply lubricant to the clutch and the brake ring (for H-motor)

When the clutch or brake produces a noise, or the machine slightly runs after the needle stops, or the machine does not run smoothly, apply the lining lubricant to the linings (friction plates) of the brake ring and clutch.

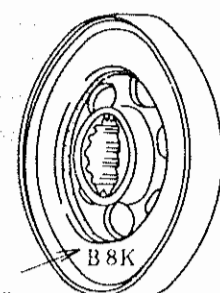
Note: a) Use only the specified lubricant.

b) The lining lubricant can be used only for "K-type" rings.

c) The lining lubricant in one container is for two applications (4 plates in total).

d) The spline grease in one tube is for four applications.

e) Lightly wipe off excessive lubricant by gauze.



* A K-type ring bears a 3-digit symbol ending with "K" (Example: F7K, L7K, and B8K).

Fig. 70

< Maintenance procedure >

① Disassembly of the motor, and removal of the clutch ring and brake ring.

Refer to the clause 5-7 "Replacing the clutch ring and the brake ring".

② Cleaning after disassembly

Remove cotton dust and thread wastes adhering to the ventilating paths of the clutch ring, clutch disc, brake disc, housing, etc. Also remove dust on the splines. Using a dry cloth, wipe off cotton dust, thread wastes, and powdered cork (produced by a wearing cork) adhering to the linings.

③ How to apply the lubricant

○ Apply drops of the lubricant (each drop as large as a soybean) to the three points on the lining of the clutch or brake ring as shown in the figure left.

○ Shake the lubricant container well before application.

○ Press the ring lining without lubricant drops against that with lubricant drops, and turn them in the opposite direction from each other while rubbing them together as shown in the figure.

Then, wipe off excessive lubricant on the linings, and leave them with their lining surfaces upward for 10 min. at a dust-free place.

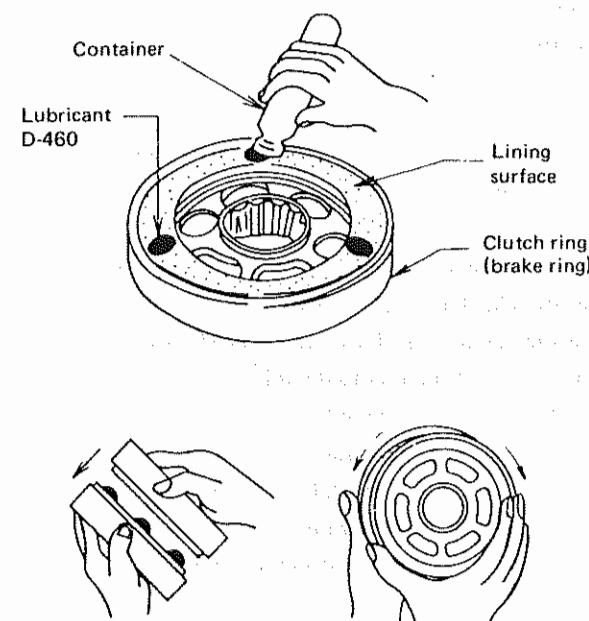


Fig. 71

④ Application of grease to the splines

○ Using a toothbrush or the like, apply the grease (MOLY-PS265) contained in the tube supplied with the machine to the splines uniformly.

⑤ Reassembly

For reassembly, reverse the disassembly sequence.

⑥ Running-in

Treat on the pedal forward (toe down) and back to the neutral position repeatedly for about 100 times without any workpiece.

Note: After application of the lubricant, the machine may keep on running at a low-speed when the power switch is turned on. However, this will be corrected by carrying out the running-in.

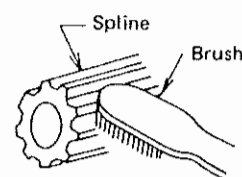
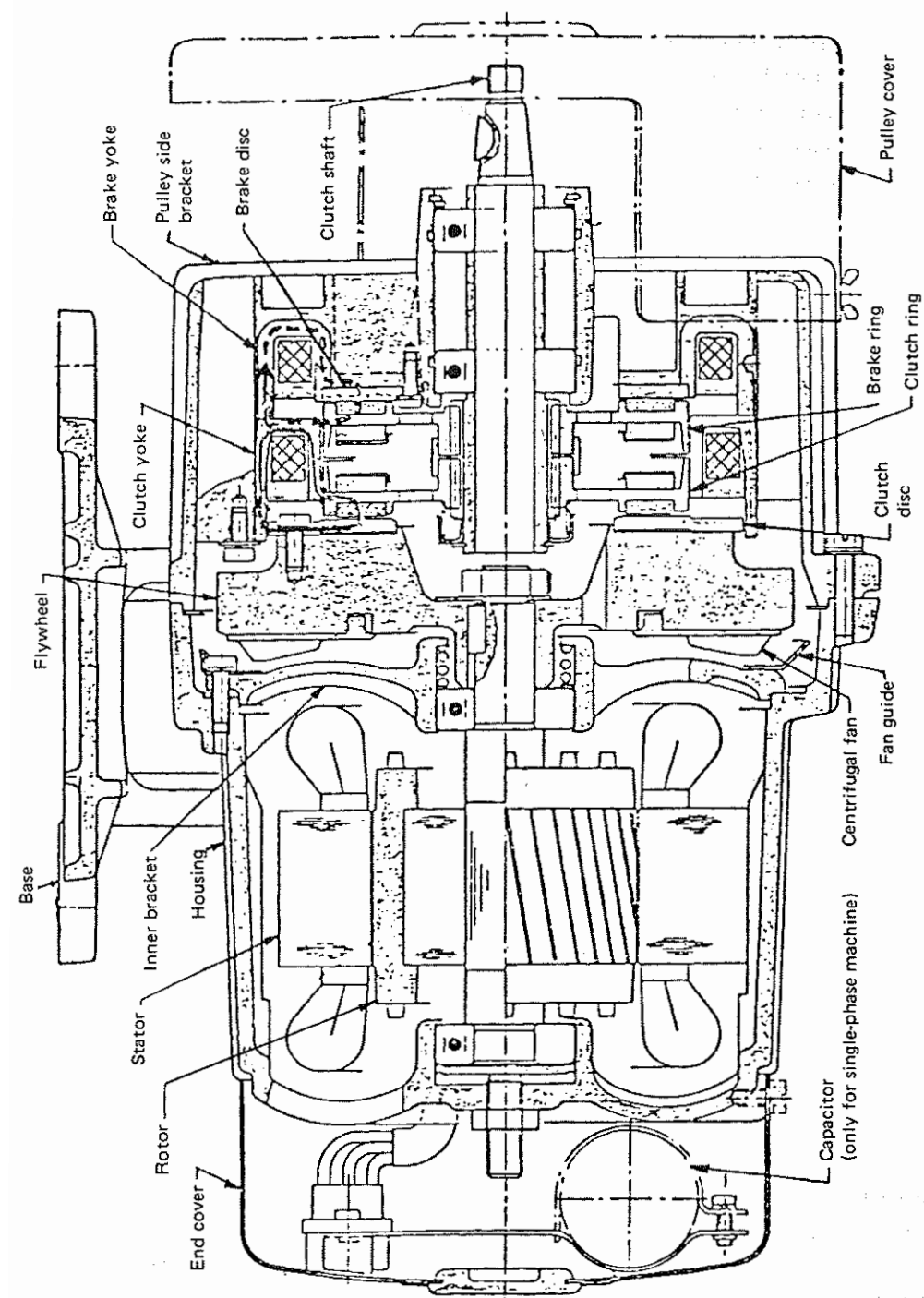


Fig. 72



Structure diagram of B-type ELNP

Fig. 73 Structure diagram of Electromotor

5-5. Constitution of the motor and the theory of changing the motor speed

Refer to the structure diagram of the motor. While the power of the machine stays on, the motor (rotor, fly wheel, and clutch disc) is constantly running. Since the clutch ring is connected with the output shaft through the splines, it rotates together with the output shaft, and can slide crosswise.

When the clutch coil is energized, lines of magnetic force are produced as shown by the solid line arrow, and the clutch ring is pressed against the clutch disc, thereby transmitting the motor rotation to the output shaft.

When the brake coil is energized, lines of magnetic force are produced as shown by the broken line arrow, and the brake ring is pressed against the brake disc (constructed integral with the pulley side bracket, and does not turn), thus stopping the rotation of the output shaft.

At a medium speed, the clutch coil and the brake coil are energized for a short period alternately for rotation.

5-6. Adjusting the clutch gap

The clutch gap is adjusted to 0.5 mm at the factory.

Readjust the clutch gap in the following cases:

- When the clutch ring or brake ring has been replaced.
- When the clutch gap is too small, causing constant friction between the clutch and brake with any of the following results:
 - a) The main motor is overheated.
 - b) The motor does not run smoothly.
 - c) A scorching smell of wood is produced (from an overheated cork).
 - d) Even when the needle is brought to a stop, it moves slowly by itself and does not remain stationary.

< Adjusting procedure > (see Fig. 74, 75)

- 1) Turn off the power, and remove end cover ② of the motor by loosening setscrew ① after the fly wheel of the motor has stopped.
- 2) Remove the pulley cover, and then the V belt.
- 3) Loosening lock nut ⑤ by a spanner, insert L-shaped hexagon wrench key ④ supplied with the motor to the hexagonal hole of setscrew ③.
- 4) Screw in the L-shaped wrench key in ④ direction shown in the figure left by turning the pulley by the finger until the inertia of the pulley can no longer drive the pulley (in other words, until a pulley's resistance is felt - - - 0 mm gap). Then return the L-shaped wrench key in ⑤ direction for eight cooling fins ⑥ of the motor (= 120°, 0.5 mm gap).
- 5) With the L-shaped wrench key held at the above position, tighten lock nut ⑤ by a spanner with care taken not to move setscrew ①.
- 6) Upon completion of the adjustment, manually turn the pulley to check it for smooth rotation. Turn on the power switch to check the motor for proper operation, and perform 20 to 30 times of test run.

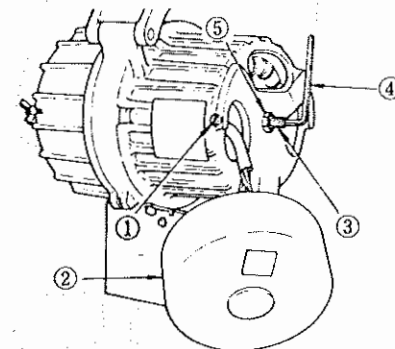


Fig. 74

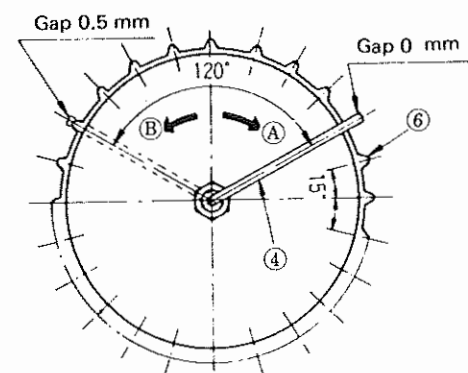


Fig. 75

5-7. Replacing the clutch ring and the brake ring

When the clutch noise or brake noise has come to change to a metallic noise after extended use, or when the clutch or brake has come to run unsmoothly, it is the sign of service life expiry of the friction parts. Replace the clutch ring or brake ring as follows:

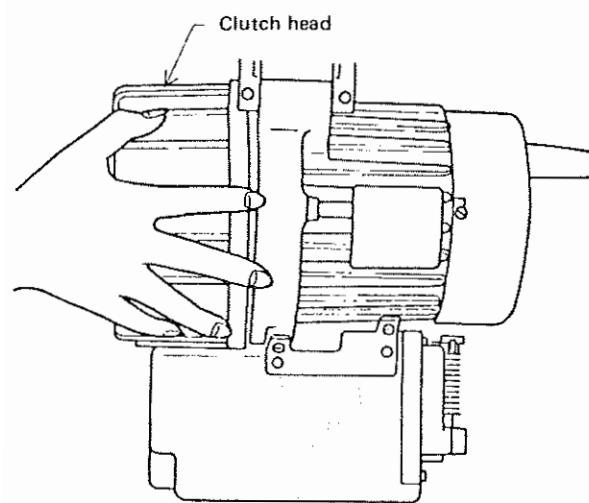


Fig. 76

Be sure to start the replacement work after the power has been turned off and the motor has completely stopped (Wait for 3 to 5 min. after turning off the power.)

How to remove the clutch head

- 1) Disconnect the 4-pole connector from the controller.
- 2) Remove the pulley cover, and then the V belt.
- 3) Unscrew the three mounting screws of the clutch head to remove the clutch head from the body (Take care not to drop the clutch head).

When the clutch head is removed, the clutch ring and brake ring can be replaced. The clutch ring and brake ring are shown in Fig. 77.

How to remove and clean the clutch ring and brake ring (see Fig. 77)

- 1) Remove C ring ⑦
- 2) Take out spring holder ⑧, clutch return spring ⑨, clutch ring ⑩, spline cap ⑪, and brake ring ⑫
- 3) Using a rag infiltrated with benzine, clean the surface of brake disk ⑬ and the clutch disk, and spline shaft ⑥

If the surfaces have been browned, burnish the surfaces using a commercially available metal cleaner, and then wipe them with a rag infiltrated with benzine. (Do not touch or clean with benzine the surface of the clutch ring or the brake ring.)

Cleaning the splines

Clean the splines with a rag if they are dirty. Apply the grease supplied with the motor to a new ring. Use only "MOLY PS265" grease, and never use any other grease.

At the time of reassembly, remember to reinstall the spline cap, and to attach the connector from the clutch head to the PSC box. Adjust the gap whenever the rings have been replaced.

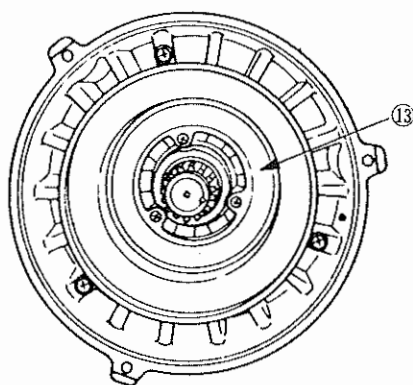
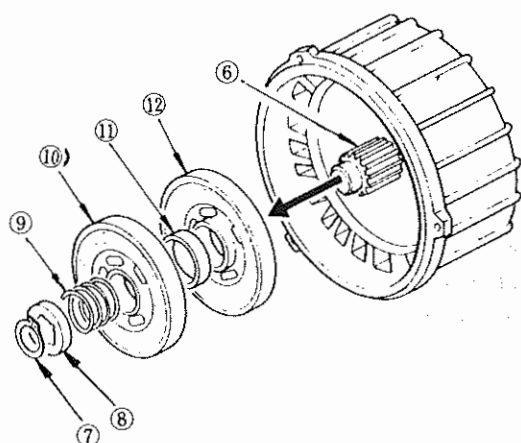


Fig. 77

5-8. Replacing the clutch disc

Replace the clutch disc in the following cases:

- When the lining of the clutch ring has worn out to such an extent that the clutch disc comes in contact with the metal part of the clutch ring, and burnishing with a commercially available metal cleaner can no longer correct it.
- When the clutch disc has worn out unevenly due to partial contact with the clutch ring.

< Replacement procedure >

- 1) Remove the clutch head according to the previous clause 5-7 "Replacing the clutch ring and brake ring".
- 2) Loosen the four screws M5×12 fixing the clutch disc, and remove the clutch disc.
- 3) Taking the faucet joint inside the vanes of the fly wheel as the reference, fix a new clutch disc by alternately tightening the four screws M5×12 gradually. At this time, be very careful not to scratch a clutch disc surface to be in contact with the friction plate.
- 4) Upon completion of the above, turn on the power switch to check motor vibration before reinstalling the clutch head. If the vibration is too high, remove the fixing screws again, turn the clutch disc 90° against the fly wheel, and reinstall the clutch disc so that the motor vibration is reduced to a minimum.
- 5) After the motor has stopped, reinstall the clutch head by the three screws.

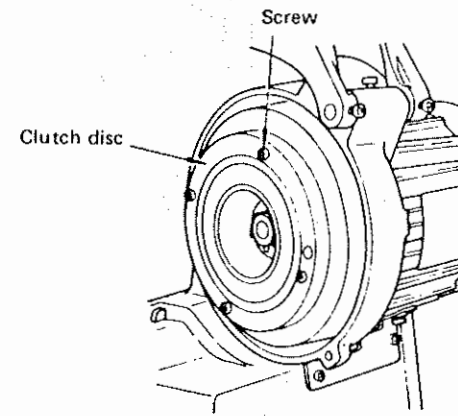


Fig. 78

5-9. Replacing the brake disc

Replace the brake disc in the following cases:

- When the lining of the brake ring has worn out to such an extent that the brake disc comes in contact with the metal part of the brake ring, and burnishing with a commercially available metal cleaner can no longer correct it.
- When the brake disc has worn out unevenly due to partial contact with brake ring.

< Replacement procedure >

- 1) Remove the clutch head according to the previous clause 5-7 "Replacing the clutch ring and brake ring".
- 2) Remove the ring also according to the clause 5-7.
- 3) Unscrew the three screws M4×12 fixing the brake disc to the pulley side bracket in order to remove the brake disc.
- 4) Install a new brake disc to the pulley side bracket by gradually tightening the three fixing screws alternately. At this time, be very careful not to scratch a brake disc surface to be in contact with the friction surface.
- 5) Then, reinstall the ring before attaching the brake disc to the body.

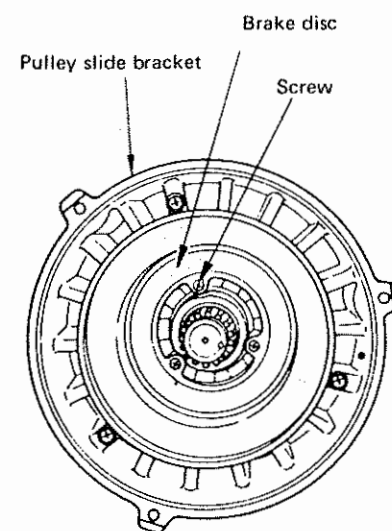


Fig. 79

5-10. Replacing the clutch shaft

Replace the clutch shaft (spline shaft) in the following cases:

- When the spline surfaces have gotten rough, preventing smooth axial slide of the clutch ring or brake ring.
- When an abnormal noise is produced, or smooth rotation is prevented due to damaged ball bearing which holds the clutch shaft.
- When the semi-circular key ways have been deformed.
- When the setscrews of the pulley have been damaged.

< Replacement procedure >

- 1) Remove the clutch head in accordance with the previous clause 5-7 "Replacing the clutch ring and brake ring".
- 2) Remove the ring also in accordance with the clause 5-7.
- 3) Using a C-ring remover, remove the C-ring shown in the figure left.
- 4) Remove the washer and thrust spring under the C-ring.
- 5) Using a wood or plastic hammer, strike the clutch shaft from the opposite side of the motor pulley (i.e. the side where the clutch ring is located) to take out the clutch shaft to the pulley side.
- 6) Push in a new clutch shaft asm. from the pulley side of the pulley side bracket inversely from the above item 5). At this time, confirm that the rubber BB-ring has been securely fitted in the groove of the pulley side bracket. To push in the new clutch shaft, lightly hit it by a wooden or plastic hammer to prevent the screw on the top of the clutch shaft from being damaged. Never use a metallic hammer.
- 7) Then, reinstall the thrust spring, washer, C-ring in the reverse order from the disassembly procedure.

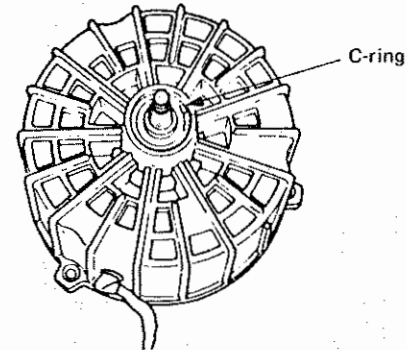
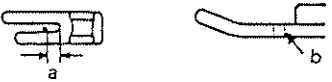
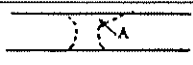


Fig. 80

6. TROUBLES AND CORRECTIVE MEASURES 1 (Mechanical components)

Trouble	Cause (1)	Cause (2)	Corrective measures
1. One or a few stitches are skipped at the start of a seam line.	1-1). The needle thread remaining on the needle after thread trimming is too short.	1)-A. The needle thread tension becomes too high at the time of thread trimming due to some trouble in the needle thread path.	Check the needle thread path. Remove thread entangled with the thread guide pin, or correct the position of the thread guide on the thread stand or other troubles.
		1)-B. The tension of the tension disc No. 1 is too high.	Reduce the tension by turning counterclockwise the tension nut of the tension disc No. 1.
		1)-C. The floating amount of the tension disc No. 2 at the time of thread trimming is insufficient.	Check whether a tension disc floats 0.5 to 1 mm when the thread take-up picker is pressed in to the right, and if not, correct it by the adjusting nuts (Fig. 42 (A) and (B)) on the bottom surface of the bed. Also check whether the discs are released in parallel, and if not, turn the tension spring 180°, or correct the tilt of the spring.
		1)-D. The cam timing is too early.	Check and correct the cam timing in accordance with 3-11.
		1)-E. The needle thread slips off the needle at the time of thread trimming due to improper position of the thread take-up picker.	Check for loosened setscrew of the thread take-up picker.
		1)-F. The counter knife is located too close to the needle, or the blade point is too sharp.	Removing the throat plate, check and correct the position of the counter knife, or check for any scratch on the moving knife (Refer to 3-13).
		1)-G. There are scratches on the knife thread guide, moving knife, or hook.	Check the hole of the knife thread guide and hook for scratches or burrs, and if a scratch or burr has been found, buff it. If buffing does not correct the trouble, replace the components.
	1-2). The needle, throat plate, or presser foot is not correct, or the presser foot pressure is too low.	2)-A. The presser foot can not hold the needle thread because "a" dimension of the relief at "b" of the presser foot is too large.	Check "a" and "b" of the presser foot, and "A" of the throat plate. <ul style="list-style-type: none">When synthetic thread is used for tricot; "a" < 0.8 mm, and r of "A" and "b" < 0.3 mm.When synthetic thread is used, "a" shall be smaller than 1.2 mm, and there shall be no relief at "b" and "A".For cotton thread, the relief at "a", "b" and "A" should desirably be small as far as good tightness of stitches is obtained.The smaller the relief at "a", "b", and "A", the better for lighter-weight or coarser fabrics, more slippery thread, or smaller stitch length.
			
			
		2)-B. The relief at "A" of the throat plate needle hole is too large.	
		2)-C. The needle is too thick.	A thinner needle is better as far as sufficient tightness of stitches is obtained.
		2)-D. The needle hole in the throat plate is too large.	Replace the throat plate by one with a smaller needle hole.
		2)-E. The presser foot pressure is insufficient.	Increase the pressure of the presser foot, provided the feed power is not weakened (or the stitches are jammed).

Trouble	Cause (1)	Cause (2)	Corrective measures
	1-3). The blade point of the hook does not catch the needle thread (stitch skipping).	3)-A. The timing between the needle and the hook is bad.	Check whether the height of the needle bar is correct, and if not, readjust it to the engraved line on the needle bar (1.8 mm). For knit and the like, delay the timing by slightly lowering the needle bar.
		3)-B. The tension and stroke of the take-up spring is too great.	Reduce the tension and the stroke (standard stroke: 5 to 7 mm).
		3)-C. The blade point of the hook has worn out.	Correct the blade point, or replace the hook.
		3)-D. The needle is improperly installed.	Correct the tilt of the needle. If the needle has been bent, replace it.
	1-4). The bobbin thread at the start of a seam line is too short.	4)-A. The free end of the bobbin thread is pulled into the bobbin due to idle running of the bobbin.	Increase the pressure of the bobbin case holder positioning finger. Increase the bobbin thread tension.
		4)-B. The pressure of the bobbin case holder positioning finger is too high.	Decrease the pressure of the bobbin case holder positioning finger, and check for idle running of the bobbin.
		4)-C. A scratch or burr on the hook cuts the bobbin thread short.	Eliminate the scratch or burr, or replace the hook.
2. The end of the needle thread of a starting stitch comes out on a material.	2-1). The needle thread remaining on the needle after thread trimming is too long.	1)-A. The thread tension No. 1 is not enough.	Increase the thread tension No. 1.
		1)-B. The timing of the thread trimmer cam is too late.	Check and correct the cam timing in accordance with 3-11.
		1)-C. The counter knife is improperly positioned.	Correct the position of the counter knife in accordance with 3-13.
3. The needle thread of the stitch trails long on the wrong side of a material.	3-1). The needle thread remaining on the needle after thread trimming is too long.	1)-A. Refer to the above 2-1).	Refer to the above 2-1).
	3-2). The needle thread remaining on the needle after thread trimming can not shortened because of an incorrect needle, throat plate, or presser foot.	2)-A. Refer to the above 1-2).	Refer to the above 1-2).
4. The needle thread slips off from the needle at the start of a seam line.	4-1). There is variation in the length of the needle thread remaining on the needle after thread trimming.	1)-A. A delayed cam timing causes the thread tension No. 1 to become too high, and thread is trimmed before the moving knife and counter knife engage each other.	Stopping the motor, push the thread take-up picker into the bobbin case by hand with the needle down, and slowly turn the hand wheel by hand toward you to perform thread trimming, and then stop the hand wheel when the thread take-up lever has reached its highest position. At this time, if the needle thread remaining on the needle is 10 mm or more shorter than that for thread trimming performed through pedal action, it means that the length of the remaining needle thread is not enough. Set the timing of the thread trimmer cam earlier, and decrease the thread tension No. 1.

Trouble	Cause (1)	Cause (2)	Corrective measures
		1)-B. The thread take-up picker does not enter the bobbin case sufficiently, causing the needle thread to come off the thread take-up picker from time to time.	Correct the position of the thread take-up picker according to 3-18.
		1)-C. The blade of the counter knife has been sharpened excessively, and thread is trimmed only by the counter knife.	Re-sharpen the blade of the knife according to 3-15, or replace the knife.
		1)-D. The knife thread guide, moving knife, or hook has scratches or burrs.	Remove the scratches or burrs, or replace the defective component.
		1)-E. The needle is too thick.	Change the needle.
	4-2). The needle thread slips off from the needle immediately after thread trimming.	2)-A. The cam timing is too early, and the needle thread on the needle is trimmed, too.	The needle thread slips off from the needle immediately after thread trimming because the moving knife spreads the threads improperly, and the needle thread to be left on the needle is also cut (Remove the throat plate, and you will find a remaining needle thread trimmed to about 20 mm). In this case delay the timing of the thread trimmer cam.
5. The beginning stitch is loose.	5-1). The needle thread tension at the start of a seam line is not enough.	1)-A. The thread take-up picker is positioned improperly.	Correct the position of the thread take-up picker in accordance with 3-18.
		1)-B. The bobbin thread tension is reduced at the start of a seam line because of idle running of the bobbin.	Readjust the thread take-up picker in accordance with 3-18 to prevent the bobbin from running idle. Use a spring-loaded bobbin case.
		1)-C. Both the needle and bobbin thread tensions are insufficient.	Increase the both needle and bobbin thread tensions.
		1)-D. The presser foot or throat plate is incorrect.	Refer to Cause (1) of 1-2).
6. The needle thread is not trimmed, while the bobbin thread is trimmed.	6-1). The final stitch is skipped.	1)-A. The needle has been attached to the needle bar improperly.	Correct the installation of the needle, and check the needle for bend.
		1)-B. The stroke of the take-up spring is too large.	Reduce the stroke of the take-up spring to 5 ~ 7 mm.
		1)-C. The hook timing is not correct.	Check for stitch skipping at a low sewing speed, and readjust the hook timing (Adjust the hook timing 1.8 mm which is earlier than that for the standard lockstitchers).

Trouble	Cause (1)	Cause (2)	Corrective measures
	6-2). Some part of the thread trimmer blades is dull.	2)-A. The blade of the moving knife does not closely meet that of the counter knife at the time of thread trimming (The installing angle, position, and the tilt of the blade tip of the counter knife are not correct with respect to the blade of the moving knife).	Remove the throat plate, and manually operate the thread trimmer to cut about three cotton threads #50. When all the three threads are cut evenly, no further corrective action is required. If not; <ul style="list-style-type: none"> Sharpen the counter knife. Correct the inclination of the blade tip of the counter knife. Correct the position of the counter knife.
7. The bobbin thread is not trimmed, while the needle thread is trimmed.	7-1). The moving knife does not go back far enough.	1)-A. The retreating amount of the moving knife is not correct (the lateral positioning of the knife driving shaft or the thread trimmer cam is not correct).	Check the treating amount of the moving knife, and readjust the lateral position of the thread trimmer cam so that the retreating amount of the moving knife becomes 2 to 2.5 mm.
	7-2). The position of the bobbin thread at the time of thread trimming varies.	2)-A. A hook other than specified is used.	Check whether the hook has a guide groove for bobbin thread, and if not replace the hook.

TROUBLE AND CORRECTIVE MEASURES 2 (Electrical components)

○ Take the following action in case of any failure.

1) Disconnect the plug from the connector of the controller once, and reconnect the plug to the same connector securely again.

2) Check the voltage and phase (single- or 3-phase) of the power source against the name plate of the machine.

3) Check the fuse in the controller. Replace a blown fuse with a new one supplied with the machine.

Fuse : □□□A0 (200V spe.c) glass-tube fuse $\phi 5.4 \times 30$

□□□B0 (100V spe.c) glass-tube fuse $\phi 5.4 \times 30$

4) The automatic thread trimmer operates in the following sequence:

In case of failure, check the operation after the point up to which the machine has operated properly. By doing so, fault isolation can be done quickly and easily.

1) When the power switch is turned on;

1-1) The power lamp lights up.

1-2) The motor starts to run.

1-3) The needle bar goes up and stops.

2) When the pedal is depress forward;

2-1) The machine runs (low speed → high speed).

3) When the pedal is set to the neutral position;

3-1) The needle bar goes down. (For a 555-5-2B/200 or 555-5-4B/200 machine, the needle bar stops at the upper or lower position preset.)

4) When the pedal is depressed backward (heel down);

4-1) Thread trimming action takes place.

4-2) The needle bar goes up and stops.

4-3) The wiper is put into operation.

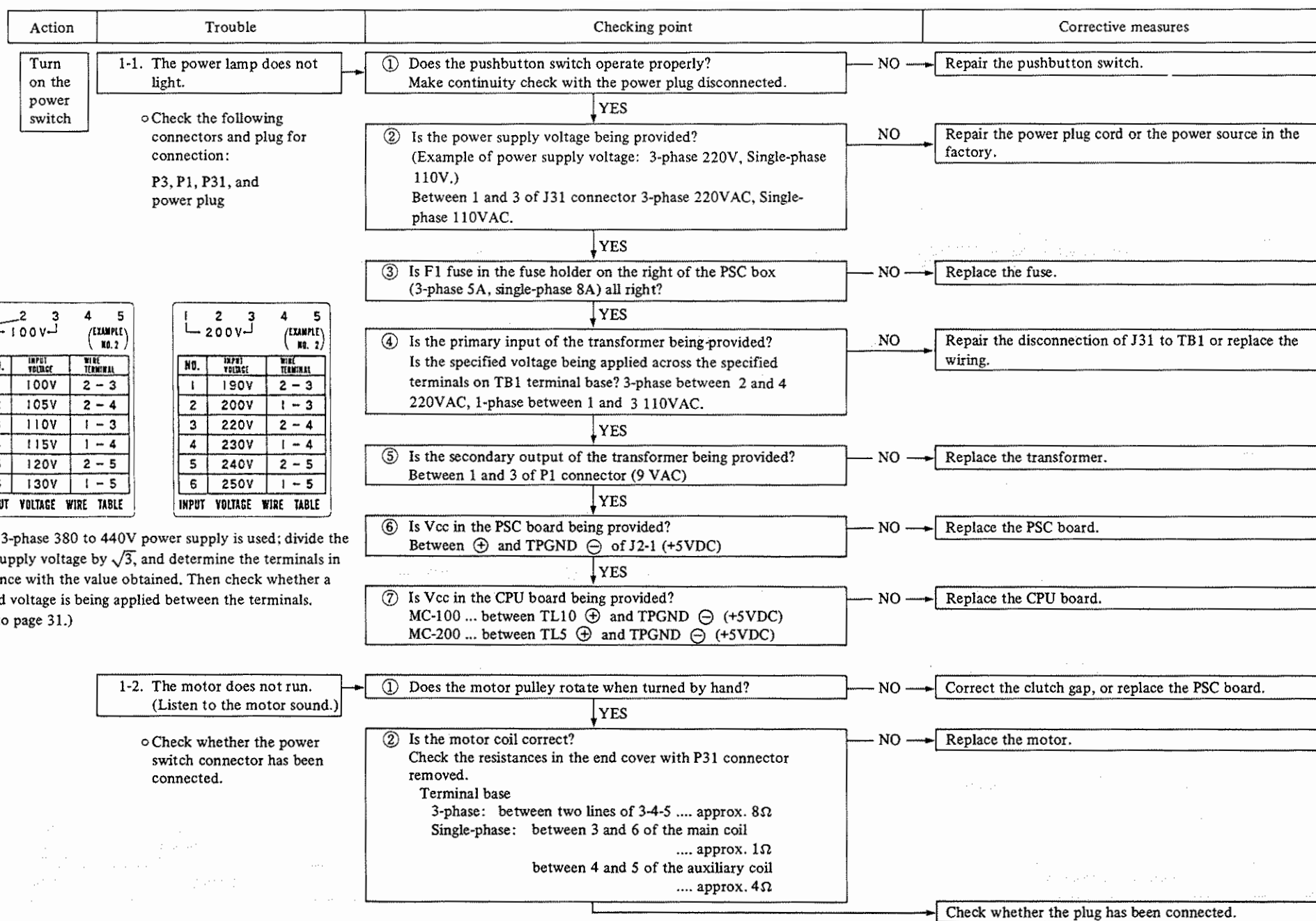
5) Reverse feed

5-1) Automatic reverse feed

5-2) One touch reverse feed

5) The operation of a DDL-555-5/100 or DDL-555-5/200 machine is controlled by a CPU board and a PSC board.

If the CPU board has failed, the machine will continue to operate as a lockstitcher without thread trimmer and CPU board (provided with a needle-up/down stop feature and speed control through pedal action). Refer to the clause "Function of the stand-by circuitry" and "How to switch to the stand-by circuitry" of 4-6.



Action	Trouble	Checking point	Corrective measures					
Turn on the power switch	1-3. The needle bar does not go up and stop.	A) The machine does not run. ○ Check whether the connectors P6 and P1 are connected.	① Does the motor pulley rotate when turned by hand?	NO	Replace the PSC or CPU board, or replace the motor.			
			YES	② Does the machine pulley rotate when turned by hand?	NO	Repair the seizure at the machine head, or replace the machine head.		
			YES	③ Is CL. Sol. (clutch solenoid) correct? Between 1 and 3 of P6 connector approx. 12Ω	NO	Replace the clutch head or motor.		
			YES	④ Is a CL signal being produced? Between 3 ⊕ and GND ⊖ of P6 connector: 34VDC when the machine is not in operation. 0VDC when the machine is in operation.	NO	Replace the PSC or CPU board.		
			NO	The signal voltage does not become 0VDC when the machine is in operation.	Readjust VR7 (LSW). Replace the PSC, CPU, or detector.			
			NO	The signal voltage does not become 34VDC when the machine is not in operation.	Is the secondary output of the transformer being supplied? Between 2 and 5 of P1 connector 24VDC	NO	Replace the transformer.	
			YES	Replace the PSC or CPU board.				
			B) The machine keeps on running. ○ Check whether the connector P4 is connected.	① At high or low speed?	At low speed	Replace the PSC or CPU board.		
				At high speed	② Is the motor clutch gap correct? (0.5 mm)	NO Too small	Correct the clutch gap according to 5-6 "Adjusting the clutch gap". Replace the detector, PSC, or CPU.	
				C) The machine stops with its needle at other position than the highest.	① Is reverse stitching engaged by the one-touch type switch lever?	NO	Replace PSC or CPU board.	
					YES	② Does the thread trimmer work?	YES	
					NO			

③ Does the machine perform the number of stitches control type reverse stitching?

YES

NO

Replace the defective upper or lower detector while the safety circuit against a failure of the upper or lower detector is in operation.

Thread on the pedal forward (toe down)

2-1. The machine does not run.

① Does the machine start when the pedal is depressed backward (heel down) once?

NO

Replace the PSC board, CPU board, or pedal sensor.

Correct the forward pedaling (toe down) spring pressure or the angle of the pedal sensor, or readjust VR7 (LSW).

2-2. The machine does not reach high speed.

① Has the max. speed limit control knob on the PSC box been set correctly?

NO

Turn the control knob clockwise.

Replace the pedal sensor or PSC board.

○ Check whether PS connector is connected.

Set the pedal to the neutral position

3-1. The machine does not stop with the needle down.

A) The machine keeps on running at low speed.

① Does the machine stop when the pedal is depressed backward (heel down) once?

NO

Replace the PSC or CPU board.

Reduce the backward pedaling (heel down) spring pressure, or readjust the angle of the pedal sensor or VR7 (LSW).

B) The machine stops with its needle at other position than the lowest position.

① Is reverse stitching engaged by the one-touch type switch lever?

NO

Replace PSC or CPU board.

YES

② Does the thread trimmer work?

YES

NO

③ Does the machine perform the number of stitches control type reverse stitching?

YES

Replace the defective upper or lower detector while the safety circuit against a failure of the upper or lower detector is in operation.

NO

C) Thread trimming action takes place when the pedal is at the neutral position.

① Is the backward (heel down) pedaling spring pressure of the pedal sensor insufficient?

YES

Increase the spring pressure.

NO

Readjust VR8 (TSW).

Action	Trouble	Checking point	Corrective measures
	D) The automatic reverse feed is engaged, while the one-touch type reverse feed is not engaged.	① Is BT. SW correct? Between 1 and 2 of P7 connector: 0Ω while the switch is depressed	NO → Replace the BT. SW. → Replace the CPU board.
	4-1. Threads are not trimmed. ○ Check whether P7 and P5 connectors are connected.	① Does the thread trimmer solenoid work? NO Is the resistance of the thread trimmer solenoid correct? Between 10 and 11 of P7 connector approx. 11Ω YES Is a thread trimming signal being produced? Between 11 ⊕ and GND ⊖ of P7 connector: 38VDC when the thread trimmer is not in operation. 0VDC when the thread trimmer is in operation.	NO → Replace the solenoid. NO → Replace the PSC board, CPU board, or pedal sensor. → Reconnect the connectors securely. → Correct or replace the moving knife and/or counter knife.
	4-2. The machine does not stop with the needle up. A) The machine keeps on running at low speed.		→ Replace the CPU board.
	(Only for DDL-555-5-4B/200) 4-3. The wiper does not work. ○ Check whether P7 connector is connected.	① Is the wiper switch "on"? YES ② Is the resistance of WP. Sol. (wiper solenoid) correct? Between 6 and 9 of P7 connector approx. 12Ω YES ③ Is a wiper signal being produced? Between 9 ⊕ and GND ⊖ of P7 connector: 34VDC when the wiper is not in operation. 0VDC when the wiper is in operation.	NO → Turn on the wiper switch. NO → Replace the wiper switch or wiper solenoid. NO → Replace the PSC or CPU board. → Reconnect the connector securely.

(Only for a machine provided with AK-2 or AK-5)

(Only for a machine equipped with AK-2)

4-4. The presser foot does not go up.

○ Check whether P9 connector is connected.

AK-2

AK-5

① Is FL. SW (knee switch) correct?
Between 1 and 2 of P9 connector:
When the switch is depressed 0Ω
When the switch is released $\infty\Omega$

NO

Replace FL. SW.

YES

② Is FL. Sol. (Auto-lifter solenoid) correct?
Between 3 and 4 of P9 connector approx. 6Ω

NO

Replace the solenoid.

YES

③ Is an FL signal being produced?
Between 3 \oplus and GND \ominus of P9 connector:
34VDC when Auto-lifter is not in operation
0VDC when Auto-lifter is in operation

NO

Replace the PSC or CPU board.

Reconnect the connector securely.

Reverse feed

5-1. The reverse feed is not engaged.

A) The automatic reverse feed and the one-touch type reverse feed are not engaged.

① Is BT. Sol. (reverse feed solenoid) correct?
Between 7 and 8 of P7 connector approx. 5Ω

NO

Replace the solenoid.

YES

② Is a BT. signal being produced?
Between 8 \oplus and GND \ominus of P7 connector:
34VDC when the reverse feed is not engaged
0VDC when the reverse feed is engaged

NO

Replace the PSC or CPU board.

YES

Reconnect the connector securely.

B) The automatic reverse feed is not engaged, while the one-touch type reverse feed is engaged.

Only for MC-100

① Do S-BT. SW and E-BT. SW (pushbutton switches) work properly?
Between 1 and 2 of P22 connector:
 0Ω when the switches are depressed
Between 1 and 2 of P23 connector:
 0Ω when the switches are depressed

NO

Replace the switches.

Replace the CPU board.

5-2. The reverse feed is not disengaged.

Replace the CPU or PSC board.

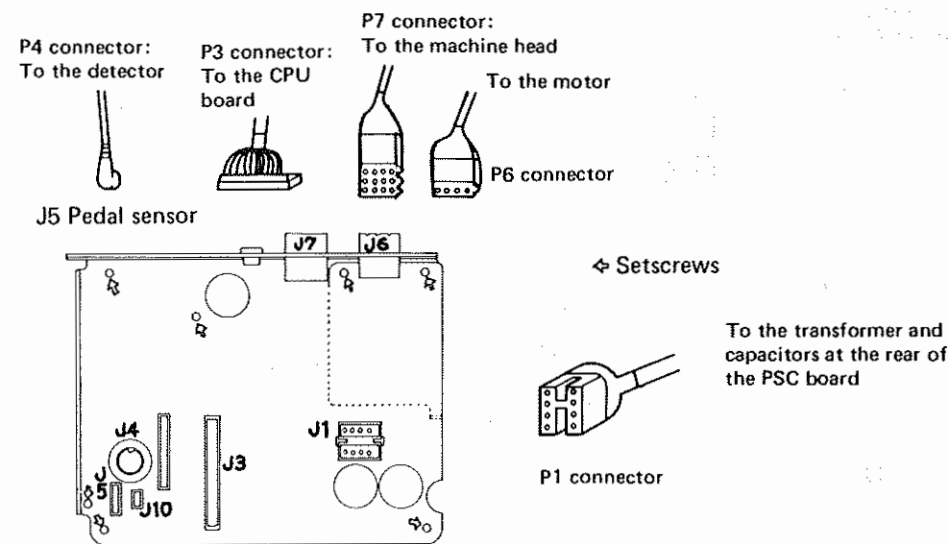
○ Safety circuits

The DDL-555-5/100 and -555-5/200 machines incorporate circuits for protection of the machines.
The following table shows the machine operations when the safety circuits are put into operation.
Refer to the table in case of failure. (Refer to 3. item 4-5 safety circuits (page 33) for the details.)

○ . . . Operated
× . . . Not operated

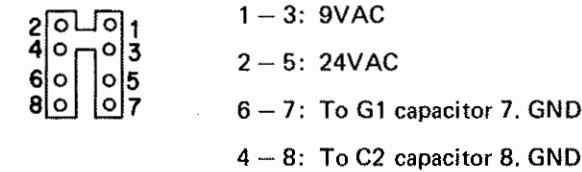
<div>Safety circuit</div> <div>Operation sequence</div>	The power switch is turned on. The power lamp lights up, and the motor starts.	The machine stops with the needle up.	The pedal is depressed forward (toe down). The machine starts.	The pedal is returned to the neutral position. The machine stops with the needle down.	The pedal if depressed backward (heel down). Thread trimming action takes place.	One-touch type reverse feed is engaged.	Number of stitch control type reverse feed is engaged
Safety circuit against machine locking	○	×	×	×	×	×	×
Safety circuit against failure of the upper or lower detector	○	×	○	×	×	○	×
Safety circuit for the reverse feed solenoid	○	○	○	○	○	×	○

Connection Diagram of DDL-555-5/100 connectors

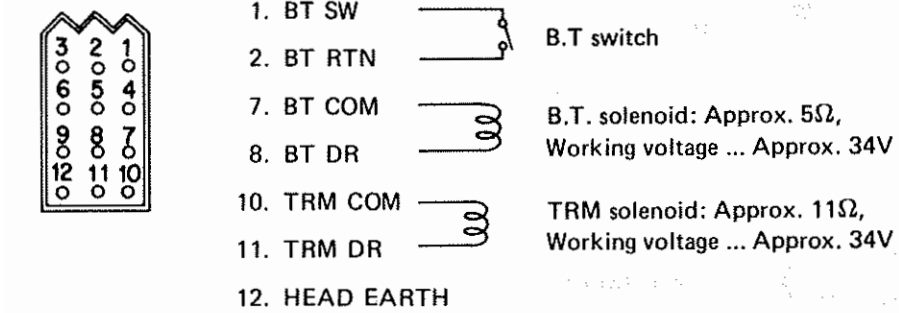


PSC board (can be removed by unscrewing the arrowed six setscrews)

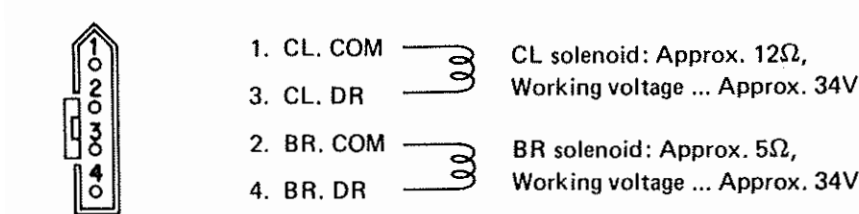
(P1 connector)



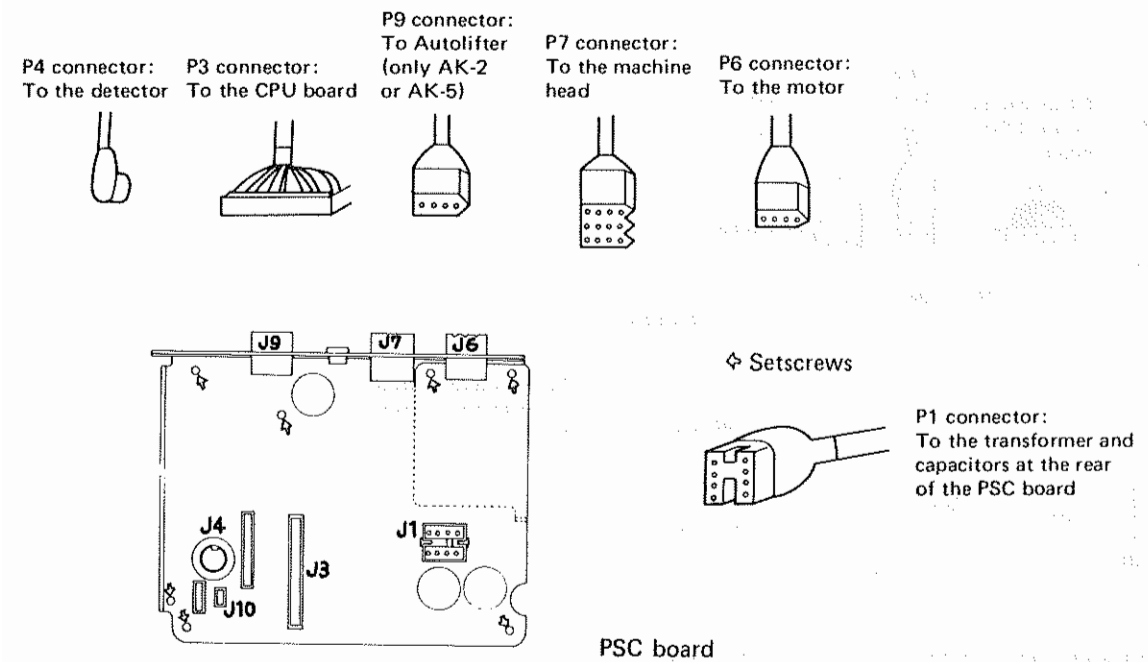
(P7 connector)



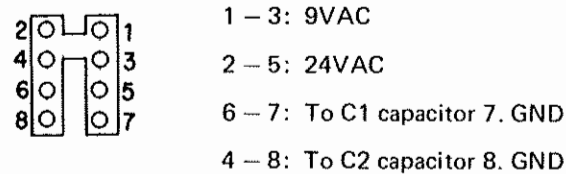
(P6 connector)



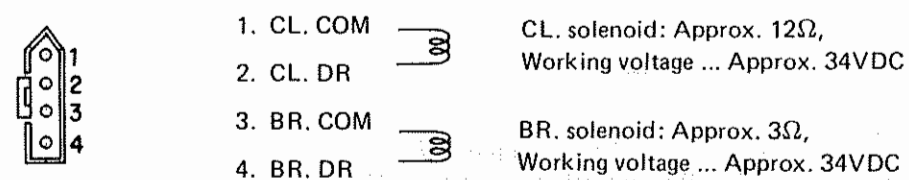
Connector Connection Diagram of DDL-555-5/200 and AK-2 (AK-5)



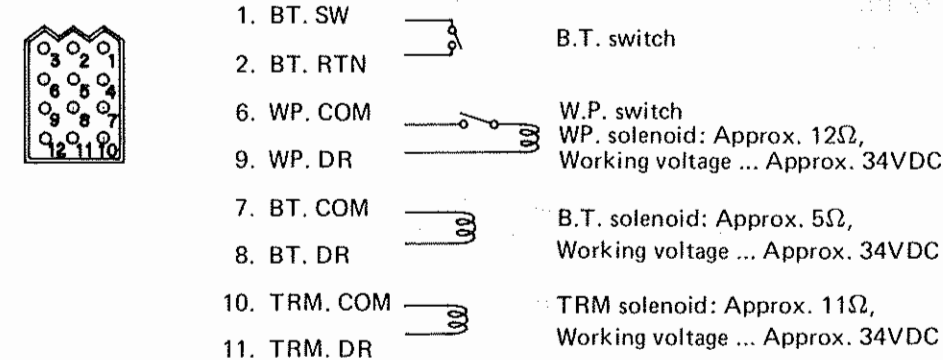
(P1 connector)



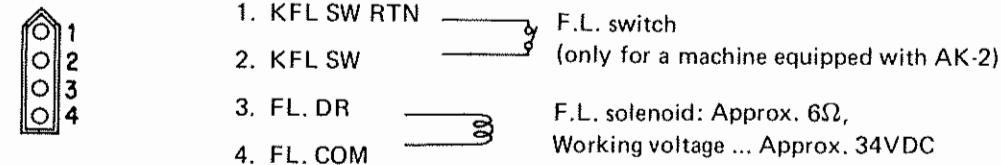
(P6 connector)



(P7 connector)

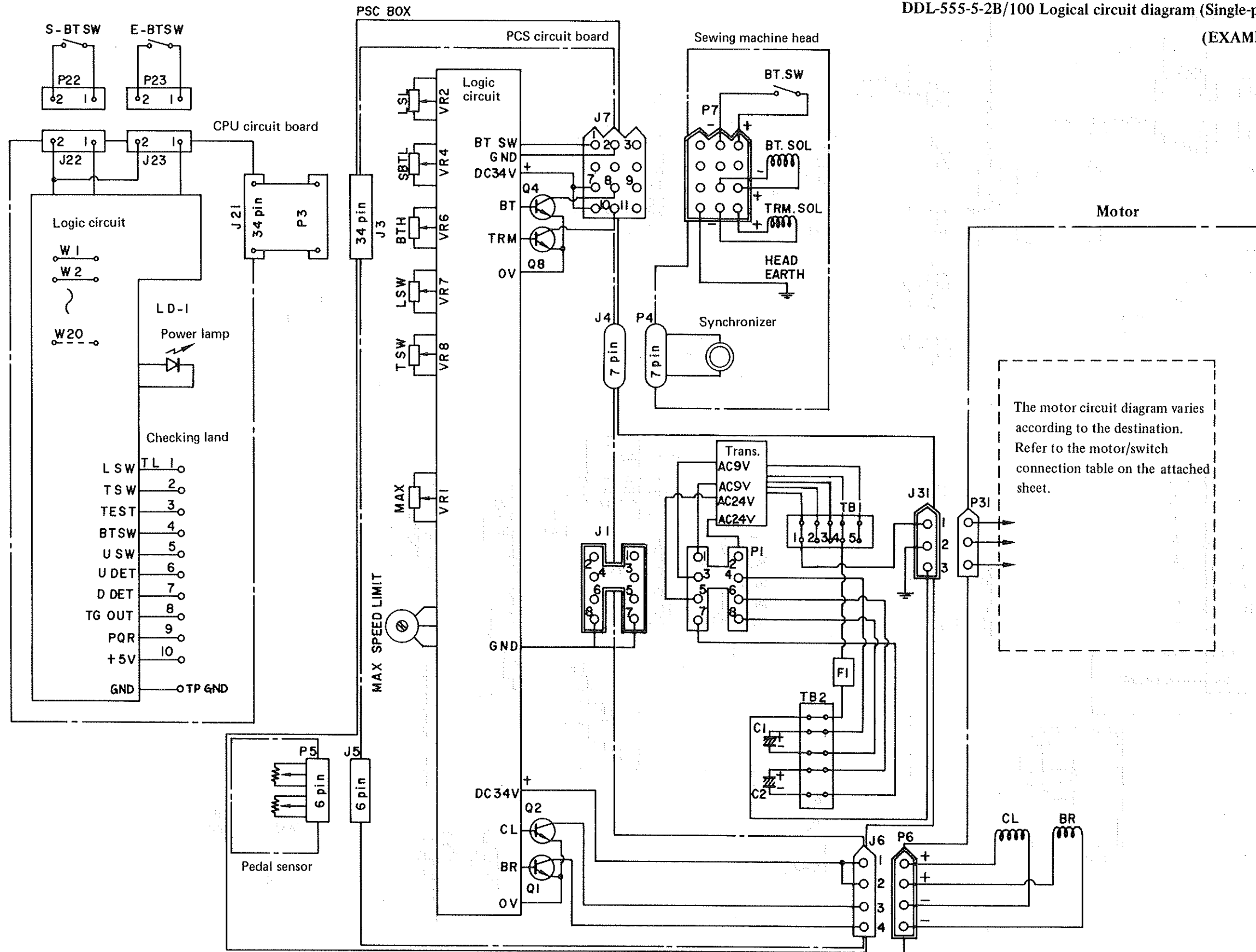


(P9 connector) (Only for a machine provided with AK-2 or AK-5)

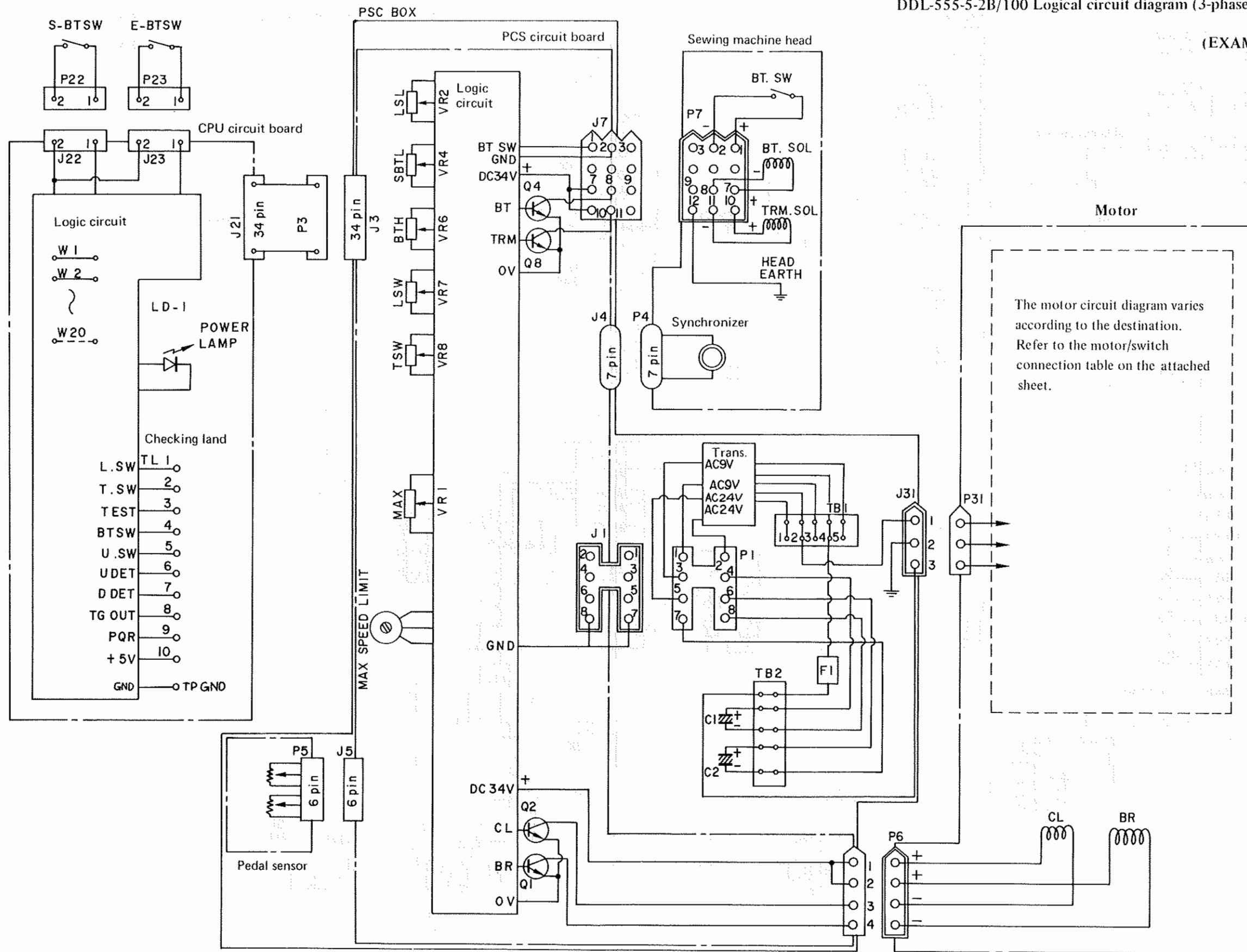


DDL-555-5-2B/100 Logical circuit diagram (Single-phase 115V)

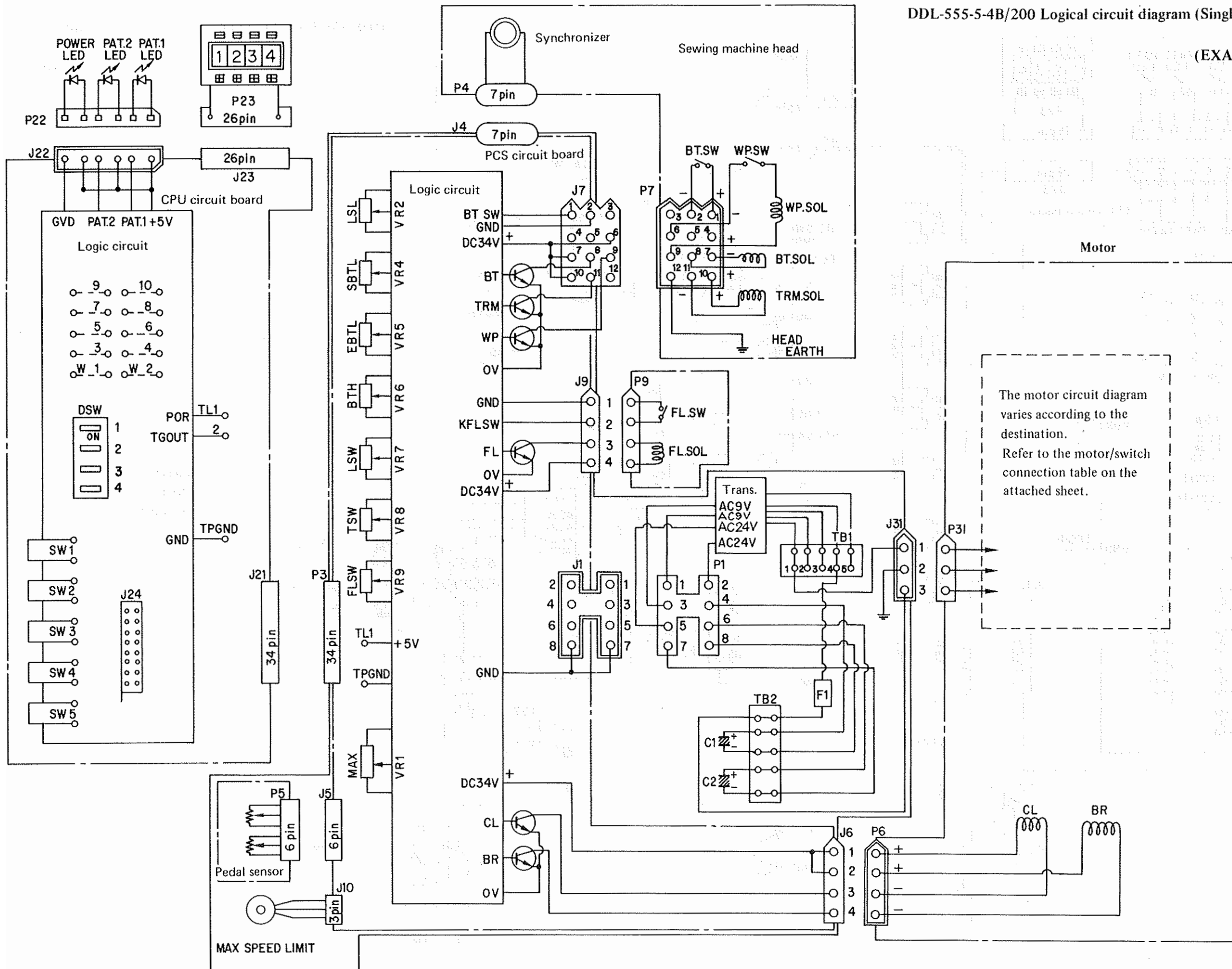
(EXAMPLE)



(EXAMPLE)



(EXAMPLE)



DDL-555-5-4B/200 Logical circuit diagram (3-phase 220V)

(EXAMPLE)

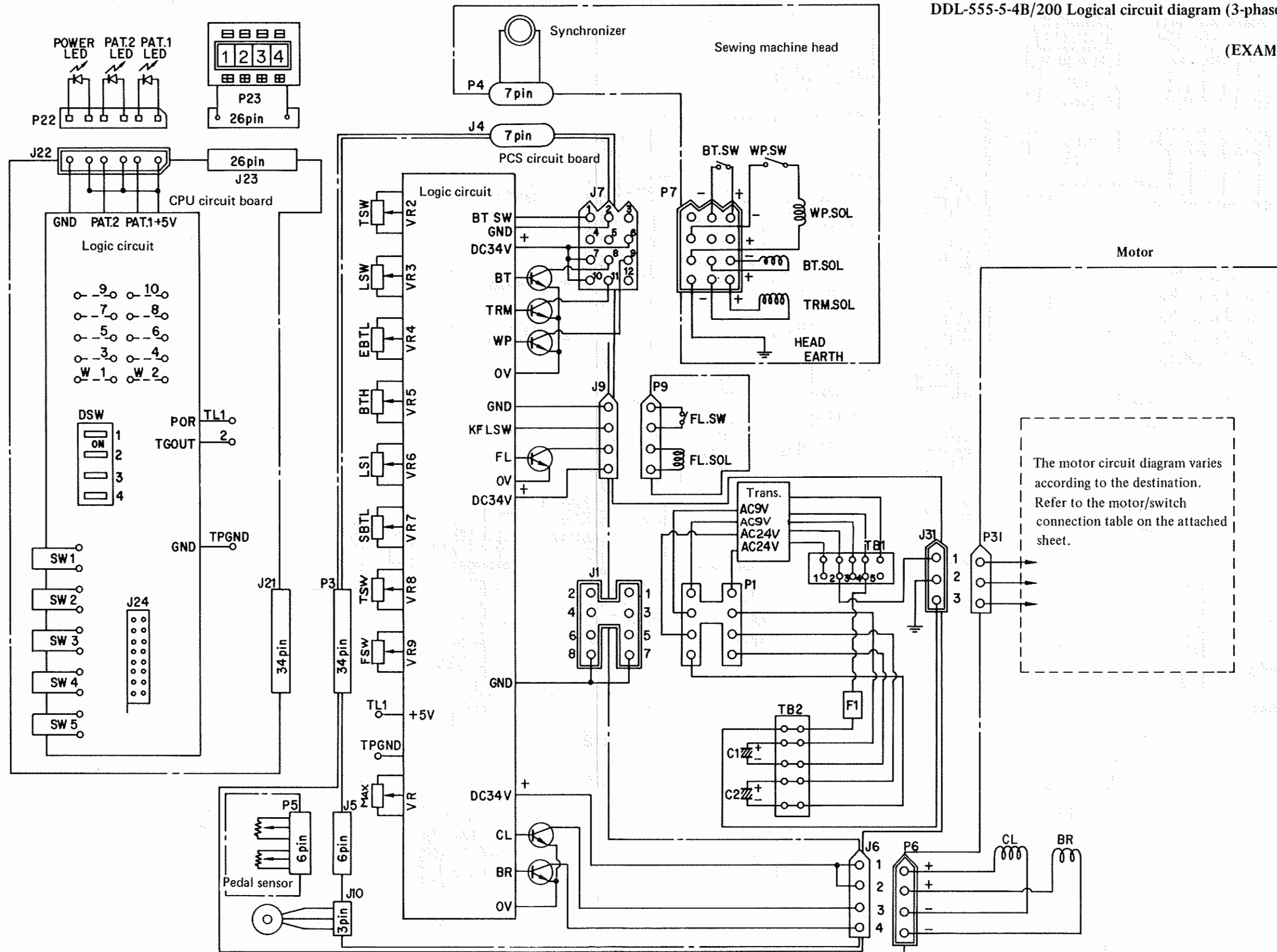
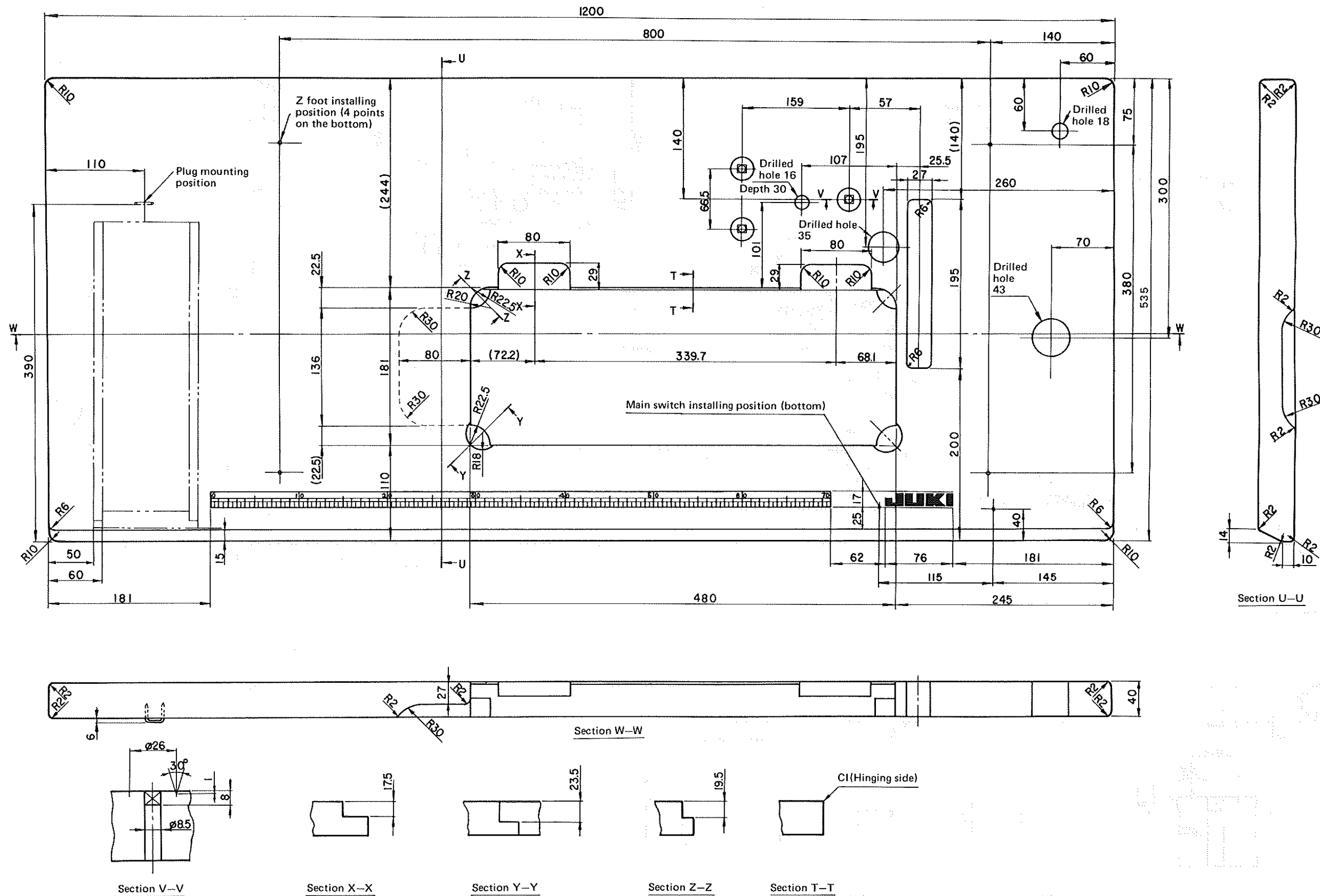
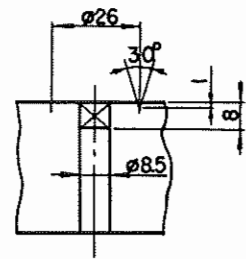
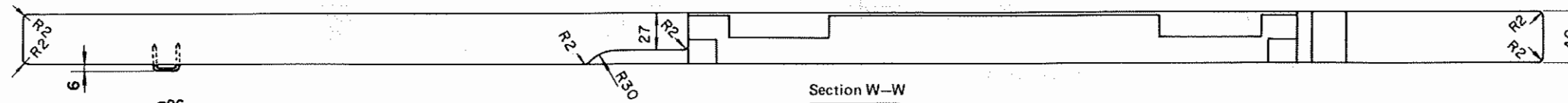
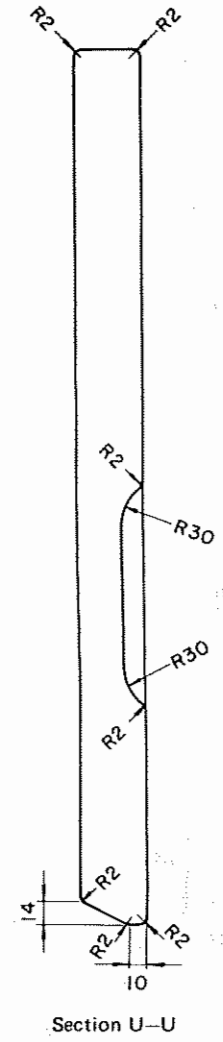


Table dimensional view of DDL-555-5/200

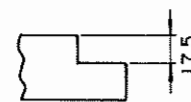
Table part No. B8201506000A



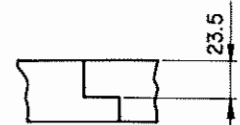
1200



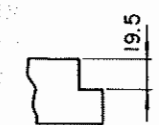
Section V—V



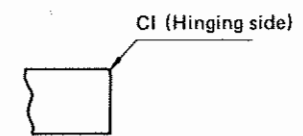
Section X—X



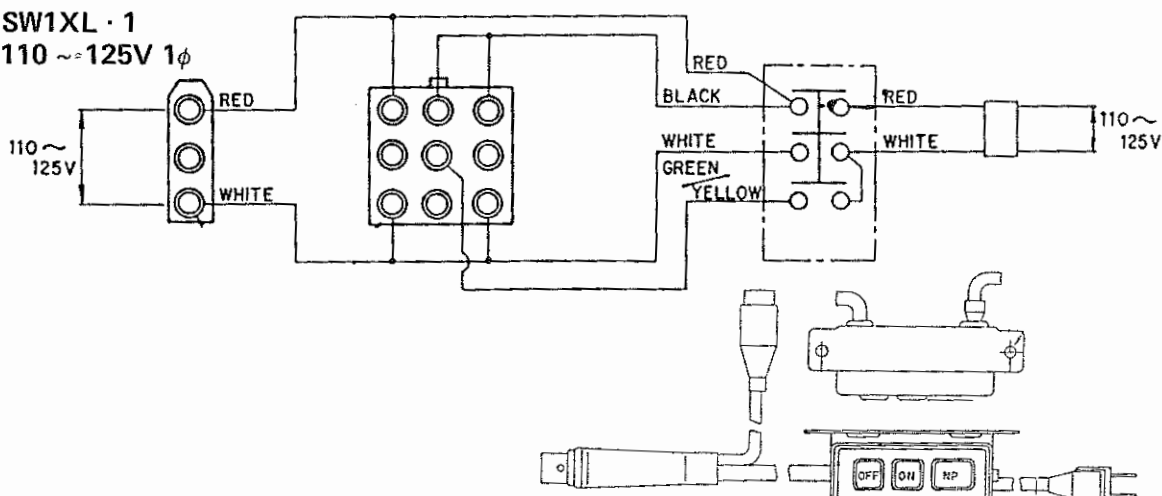
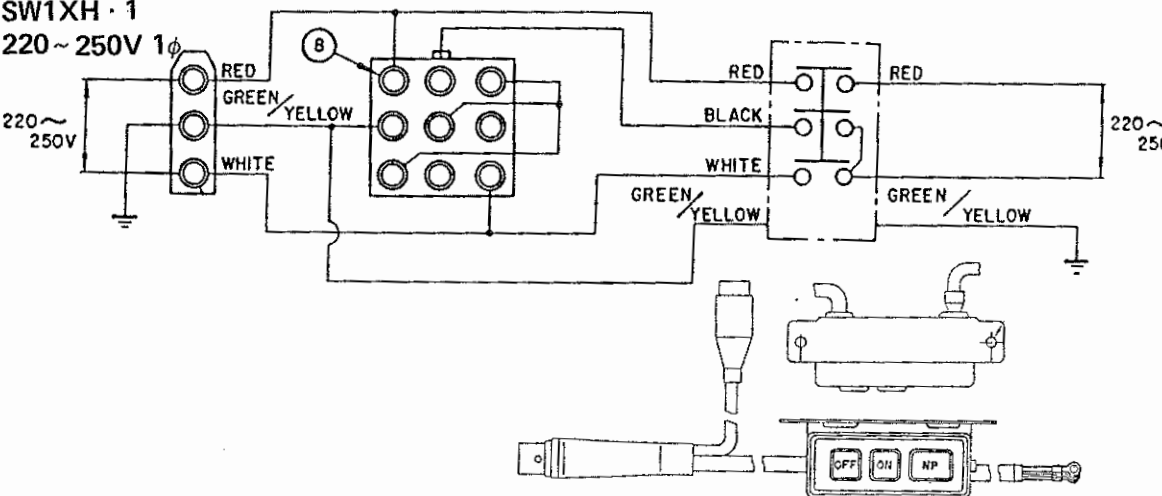
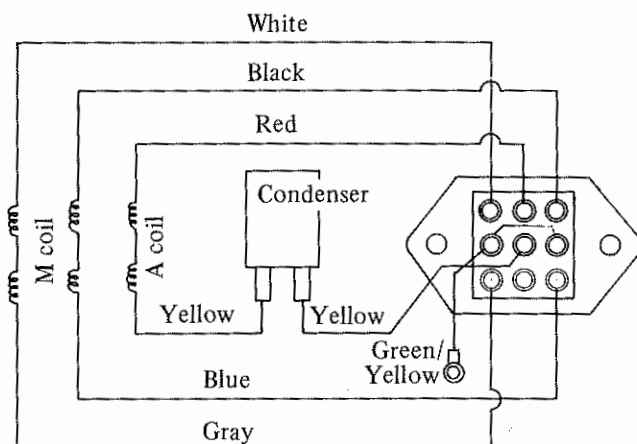

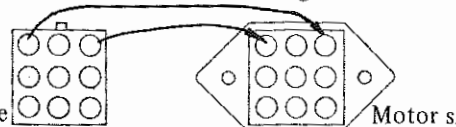
Section Y—Y



Section Z--Z

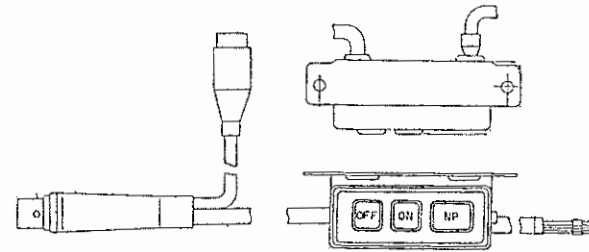
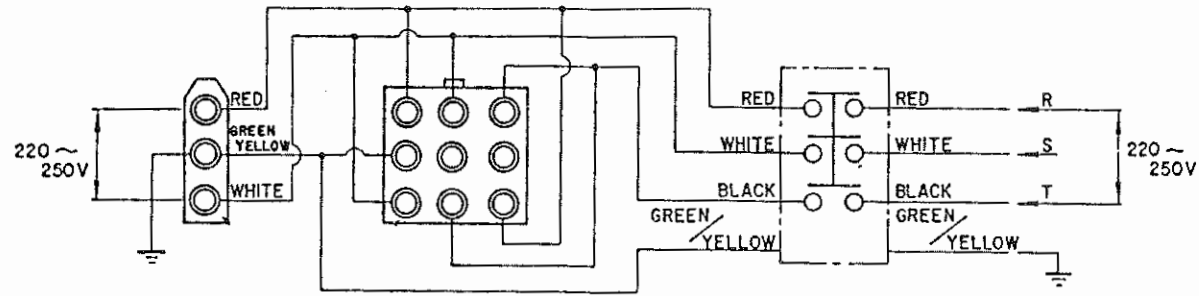


Section T—T

	Connection diagram	<p>SW1XL · 1 110 ~ 125V 1ϕ</p>  <p>For 110 ~ 125V power supply voltage</p>
	Connection diagram	<p>SW1XH · 1 220 ~ 250V 1ϕ</p>  <p>For 220 ~ 250V power supply voltage</p>
		 <p>(Note) The same motor connection is used for the both switch types, SW1XL · 1 and SW1XH · 1.</p> <p>1D402-E 1D402-E2 (1ϕXL/XH)</p>
Remarks		<p>Switch side Motor side</p>  <p>The pin layout of the 9P connector is to be observed from P.</p> <p>(Note) Fit in the above connectors as shown on the right.</p> 

For 220 ~ 250V power supply voltage

SW3XL · 1 220 ~ 250V 3 ϕ

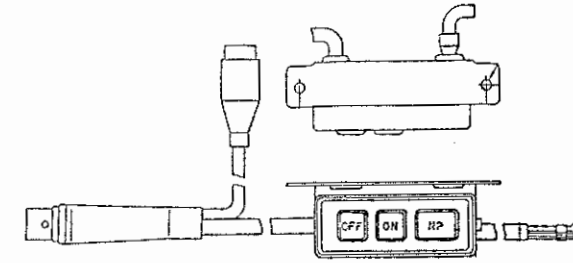
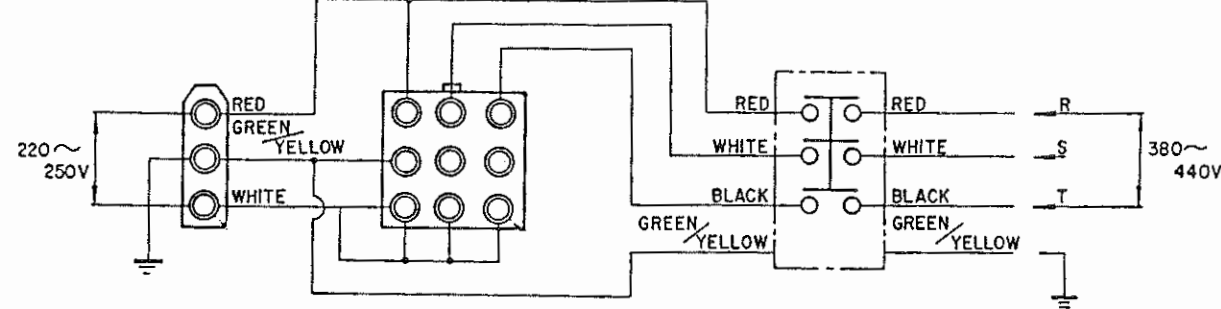


Motor side

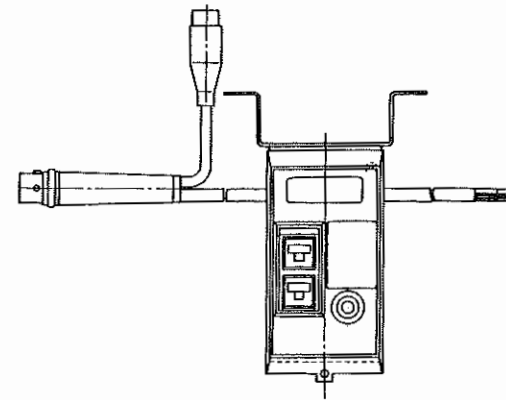
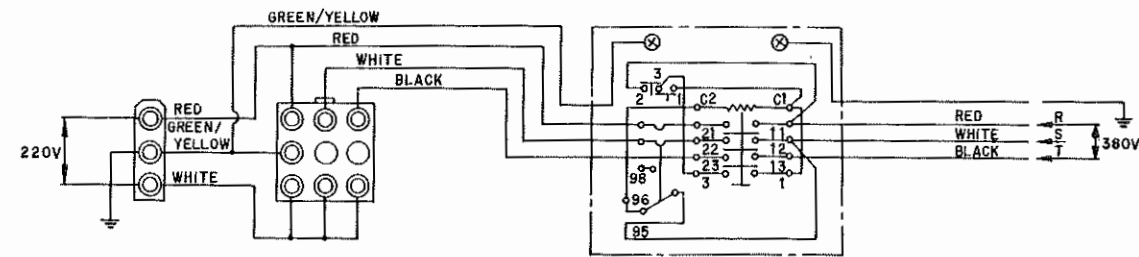
Remarks

For 380 ~ 440V power supply voltage

SW3XH · 1 380 ~ 440V 3 ϕ

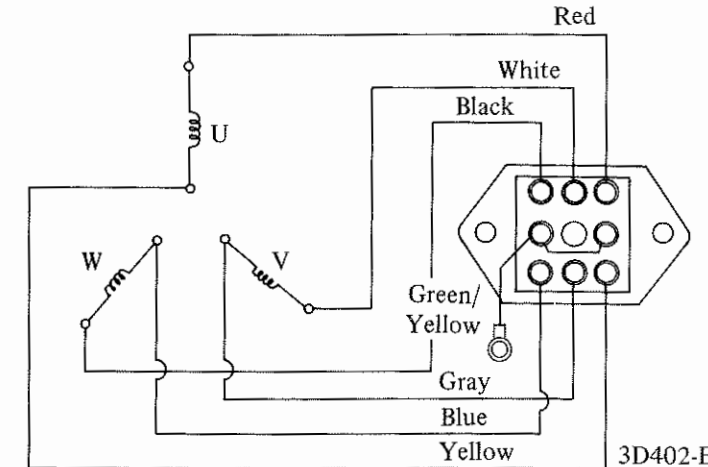
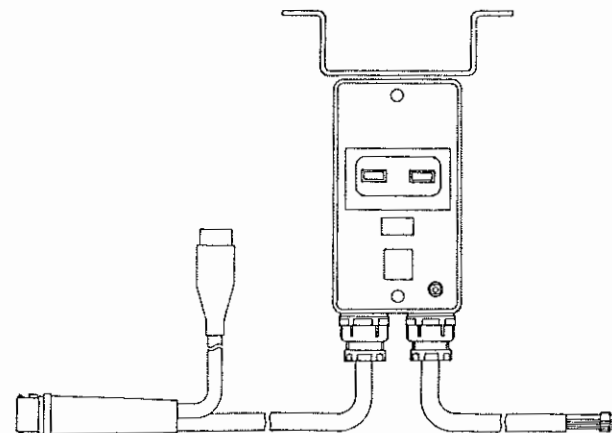
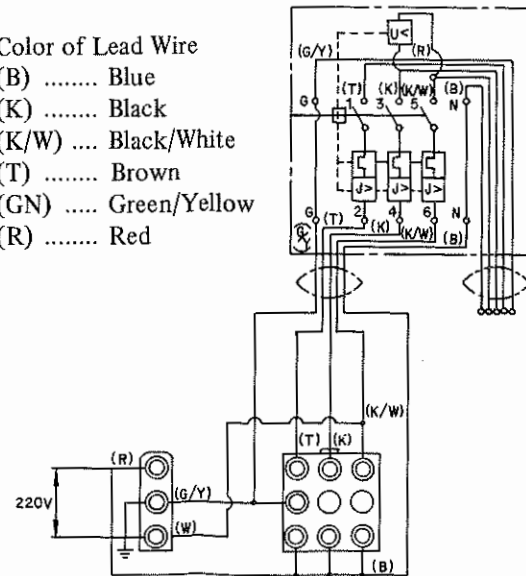


SW38N · 1



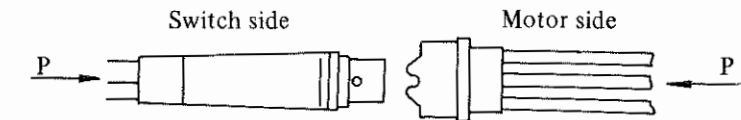
SW38K · 1

Color of Lead Wire
 (B) Blue
 (K) Black
 (K/W) Black/White
 (T) Brown
 (GN) Green/Yellow
 (R) Red



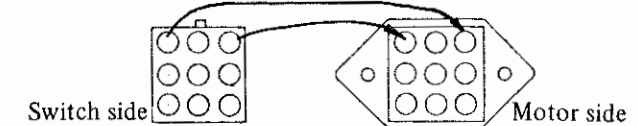
(Note) The same motor connection is used for the switch types, SW3XL · 1, SW3XH · 1, SW38N · 1 and SW38K · 1.

3D402-E
 3D402-E2
 (3 ϕ XL/XH)



The pin layout of the 9P connector is to be observed from P.

(Note) Fit in the above connectors as shown on the right.



JUKI 

TOKYO JUKI INDUSTRIAL CO., LTD.

Address : 23-3, Kabuki-cho 1-chome, Shinjuku-ku,
Tokyo 160, Japan
Cable : JUKI TOKYO
Telex : 22967, 232-2301
Phone : 03 (205) 1188, 1189, 1190