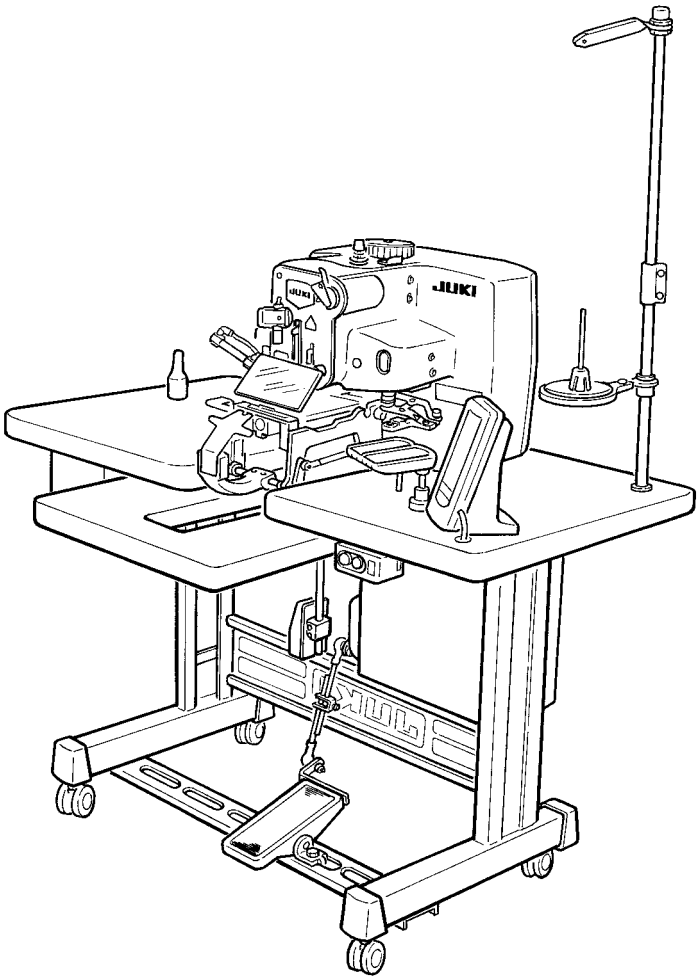
JUKI®

Computer-controlled, High-speed, Single thread,
Chainstitch, Button-neck-wrapping Machine

AMB-289

ENGINEER'S MANUAL



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PREFACE

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machine.

The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. And this manual describes "Standard Adjustment", "Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered by the Instruction Manual.

It is advisable to use the relevant Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these machines.

In addition, for the motor for the sewing machine with thread trimmer, refer to the separate Instruction Manual or Engineer's Manual for the motor. And for the control panel, refer to the Instruction Manual for the control panel.

This manual gives the "Standard Adjustment" on the former page under which the most basic adjustment value is described, and on the latter page "Results of Improper Adjustment" under which stitching errors and troubles arising from mechanical failures are described together with the "Adjustment Procedures".

CONTENTS

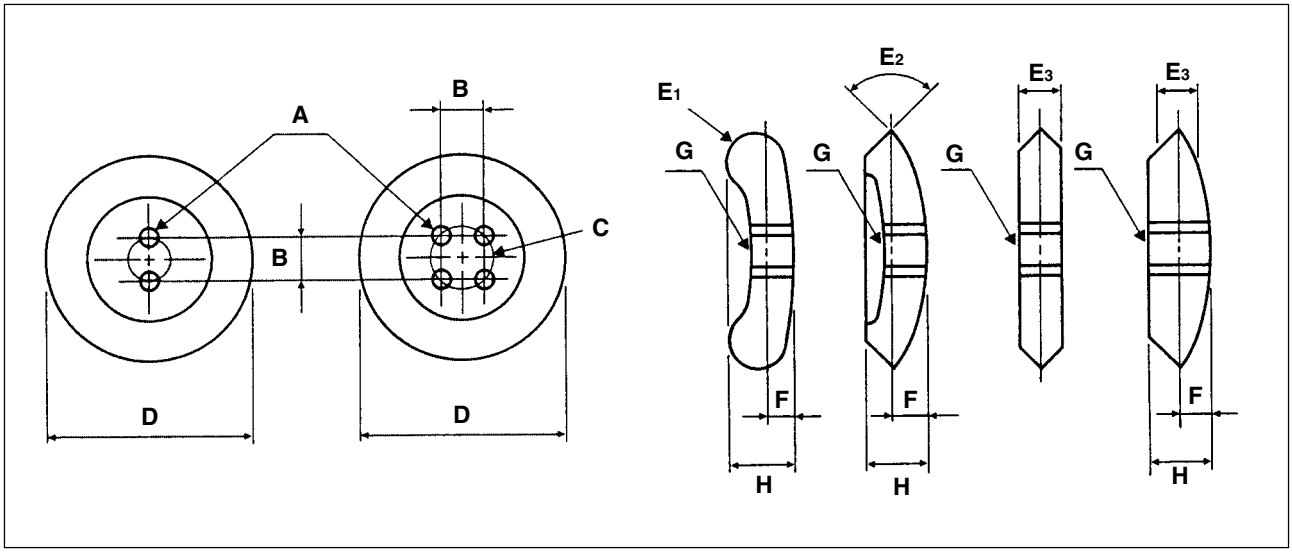
1. SPECIFICATIONS

(1) Specifications

No.	Item	Specifications
1	Model	AMB-289
2	Name of model	Computer-controlled, high-speed, single-thread, chainstitch, button-neck-wrapping machine
3	Application	Various buttons sewing (Buttons which can be sewn with the sewing machine)
4	Feature	The machine comes standard with plural sewing patterns by computer-controlled feed, needle throwing, thread tension and thread trimmer. It can perform efficiently high-quality button sewing and a multipurpose button sewing machine that can be used as the general machine.
5	Sewing speed	Max. 1,800 rpm (buttons with neck wraps), 1,200 rpm (button sewing) Normal speed 1,500 rpm (buttons with neck wraps), 1,000 rpm (button sewing)
6	Button size	Sewing buttons without button neck : 8 mm to 38 mm Sewing buttons with neck wraps : Max. 32 mm Counter button : 8 mm to 25 mm Counter button neck wrapping : Total of material and front button is up to 32 mm.
7	Button chuck	small : ø 8 to 16 mm (Accessory), medium : ø 14 to 25 mm (Installed on machine head), large : ø 25 to 38 mm (Accessory) (Part No.40020932) (Part No.40020931) (Part No.40020930)
8	Needle	SM332EXTLG-NY (Standard) #12 to #18
9	Thread used	Polyester spun thread #30 to #60, Cotton thread #30 to #60
10	Lubrication	Non-lubrication
11	Grease	1. Grease tube : 13525506 (containing 10g, green) for gear section of rack or the like and cam section 2. JUKI grease B tube : 40013640 (containing 10g, white) for worm section 3. JUKI grease A tube : 40006323 (containing 10g, white) for other rocking mechanism section to which lubrication is necessary
12	Thread take-up lever	Needle bar thread take-up lever : Stroke 60 mm
13	Needle throwing method	Stepping motor drive
14	Feed method	Stepping motor drive
15	Presser lifting method	Stepping motor drive
16	Cloth presser method	Air drive
17	Thread trimmer method	Air drive
18	Thread tension adjustment	Active tension (VCM) method
19	Dimensions	Width : 600 x Height : 400 x Length : 600 (mm)
20	Weight of head / Control box weight	Head : 65 kg / Control box : 13 kg
21	Number of data that can be stored in memory	Max. 99 patterns
22	Number of times of cycle sewing	Number of registered patterns : 20 patterns (1 cycle 30 patterns)
23	Basic shape setting range	Interval between buttonholes : 1.5 to 6.0 mm (in increments of 0.1 mm) Height of neck wraps : 0, 1.5 to 10.0 mm (in increments of 0.1 mm) Number of crossover threads : 2 to 64 threads (in increments of 2 threads)
24	Pattern selection	Pattern No. designation method (scroll 1 to 99 patterns)
25	Memory backup	Pattern data, sewing data, cycle sewing data
26	Sewing count	Number of times of sewing count method (0 to 9999) up/down Sewing counter is possible.
27	Power requirements	Single phase 200V, 220V, 230V and 240V, Three phase 200V, 220V and 240V 400VA
28	Control/operation panels	MC-640/IP200D
29	Button loader	Provided as standard
30	Optiona	Movable eye-guard
31	Air pressure	0.5 MPa

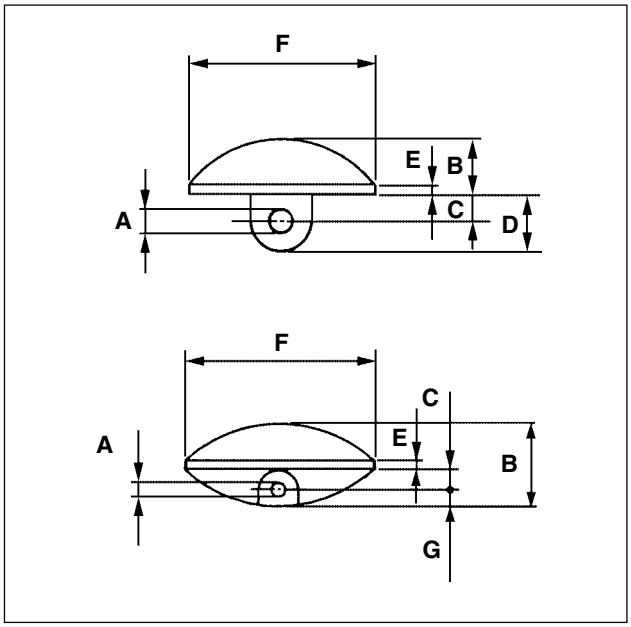
(2) Shapes of buttons

1) Specifications for 4-holed and 2-holed buttons



A : Buttonhole diameter	Needle used : ø 1.5 mm or more when using #12 to #16 Needle used : ø 2 mm or more when using #16 to #18
B : Distance between buttonholes	1.5 to 6.0 mm (in increments of 0.1 mm)
C : Location of buttonholes	All holes must be located equidistant from the center of each button.
D : Outside diameter	Min. outside diameter : ø 8 mm Max. outside diameter : ø 32 mm Line height : within ± 0.25 mm
E_1 : Button with a round edge	R (roundness) of button edge must be a 3 mm radius or less.
E_2 : Button with a V-shaped edge	Within 120˚ angle
E_3 : Button with an angular edge	The thickness must be 5 mm or less.
F : Bulge	5 mm or less
G : Area around buttonholes	Must be smooth
H : Thickness of button	8 mm or less

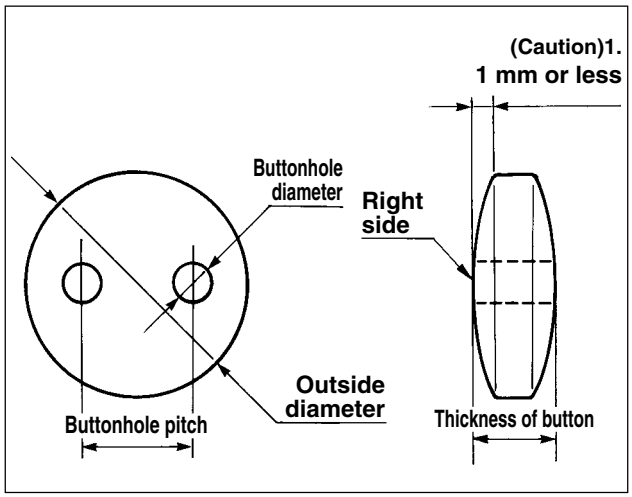
2) Specifications for shank button and marble button



A : Buttonhole diameter	ø 1.5 mm or more
B : Thickness of button	6.8 mm or less
C : Distance from the bottom of the button head to the center of the buttonhole	Shank button : 1 mm to 6 mm Marble button : 1.5 mm or more
D : Length of shank	8 mm or less
E : Height of the straight section on the000 side face of button	3.5 mm or less
F : Outside diameter	Min. outside diameter : ø 8 mm Max. outside diameter : ø 32 mm
G : Distance from the center of the hole to the button edge	2 mm or less

(Caution) When the button loader is used, there are cases where the buttons cannot be used due to the shape. So, be careful.

3) Specifications for stay button

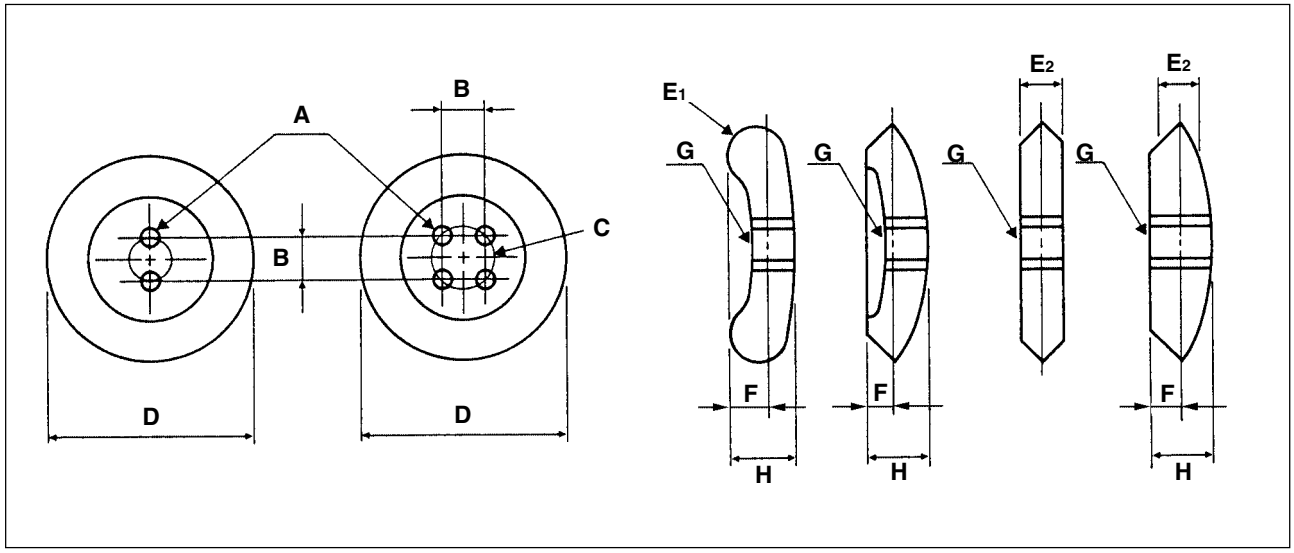


Commendable dimension

	Outside diameter	Buttonhole diameter	Buttonhole pitch	Thickness of button
Type A	8.5mm	2.5mm	3.1mm	2.0mm
Type B	10.2mm	3.2mm	4.0mm	2.0mm

(Caution)1. For the stay buttons, use those, the amount of convex on the right side of which is 1 mm or less.

4) Counter button specifications

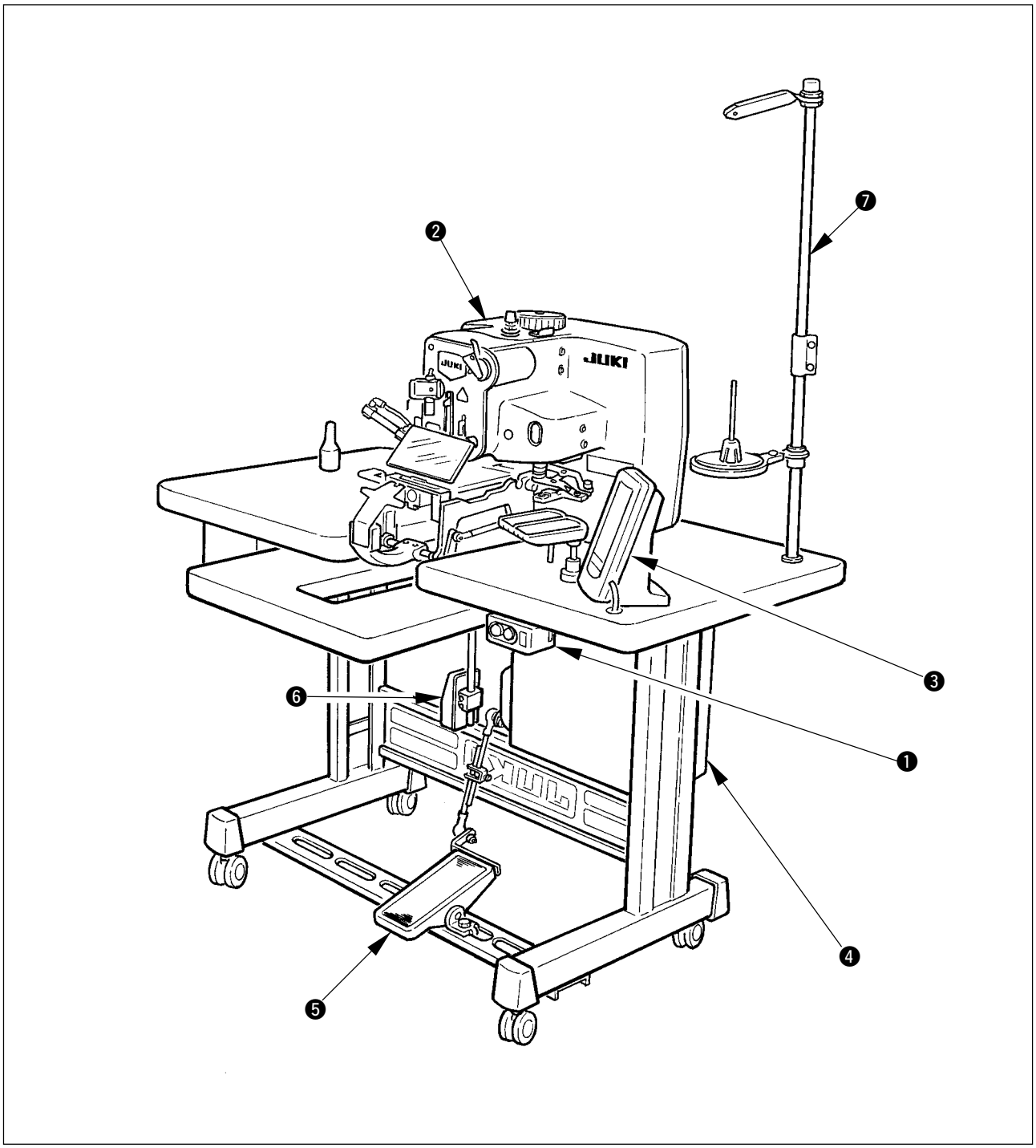


Commendable dimension

A : Buttonhole diameter	Needle used : ø 1.5 mm or more when using #12 to #16 Needle used : ø 2 mm or more when using #16 to #18
B : Distance between buttonholes	1.5 to 6.0 mm
C : Location of buttonholes	All holes must be located equidistant from the center of each button.
D : Outside diameter	Min. outside diameter : ø 8 mm Max. outside diameter : ø 25 mm
E_1 : Button with a round edge	R (roundness) of button edge must be a 2 mm radius or less.
E_2 : Button with an angular edge	The thickness must be 5 mm or less.
F : Height of button edge	2 mm or less
G : Area around buttonholes	Must be smooth
H : Thickness of button	5 mm or less

2. CONFIGURATION

(1) Sewing machine

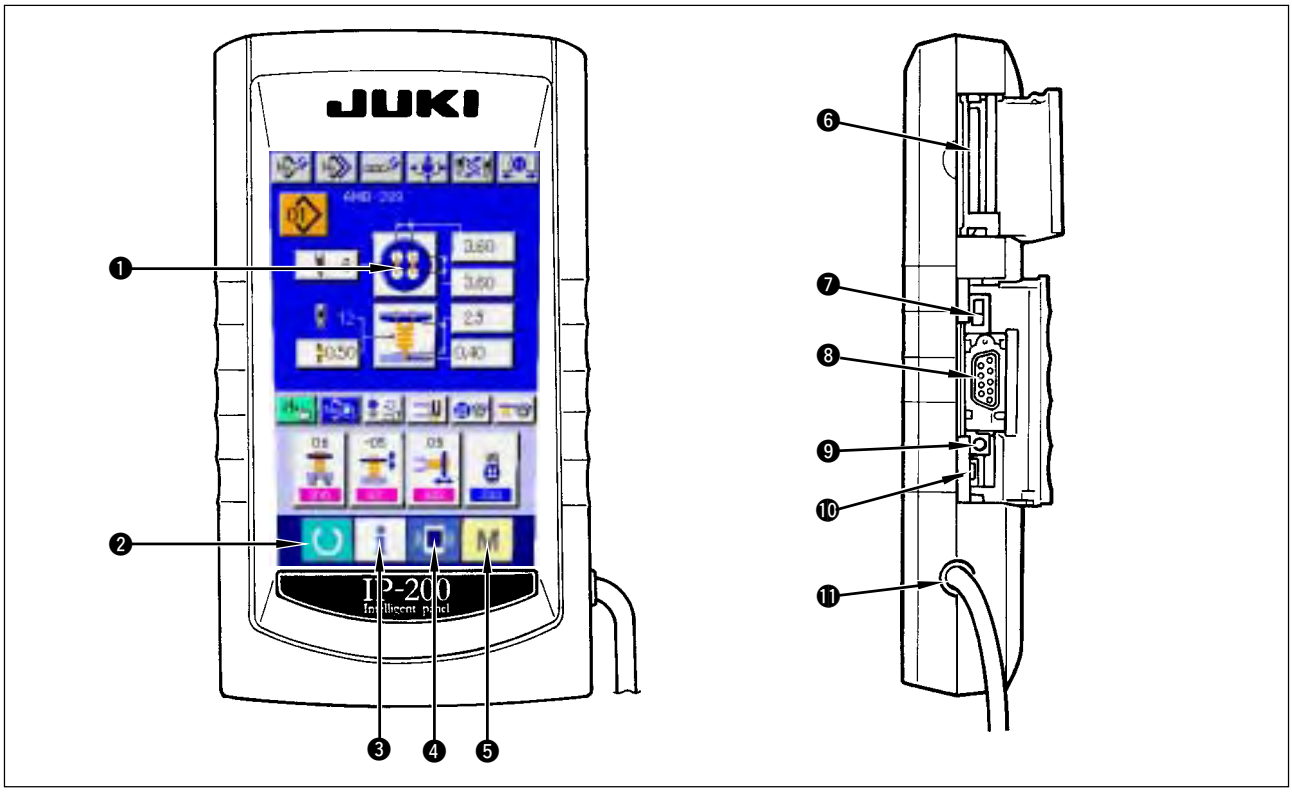


AMB-289 consists of the following components.

❶	Power ON/OFF switch
❷	Machine head(AMB-289)
❸	Operation panel(IP-200D)
❹	Control box(MC-640)
❺	Foot pedal
❻	Start switch
❼	Thread stand device

(2) Operation panel

1) Body



❶ Touch panel · LCD display section

❷ READY key → Changeover of the data input screen and the sewing screen can be performed.

❸ INFORMATION key → Changeover of the data input screen and the information screen can be performed.

❹ COMMUNICATION key → Changeover of the data input screen and the communication screen can be performed.

❺ MODE key → Changeover of the data input screen and the mode changeover screen which performs various detail settings can be performed.

❻ Smart media card slot (Close the cover for use.)
❼ Slide switch (Not used · OFF)
❽ Connector for RS-232C communication
❾ Variable resistor for color LCD → Screen contrast can be adjusted. Adjust it as you desire.
❿ Connector for external input
⓫ Cable

2) Buttons to be used in common

The buttons which perform common operations in each screen of IP-200 are as follows :

CANCEL button → This button closes the pop-up screen. In case of the data change screen, the data being changed can be cancelled.

ENTER button → This button determines the changed data.

UP SCROLL button → This button scrolls the button or the display in the upward direction.

DOWN SCROLL button → This button scrolls the button or the display in the downward direction.

RESET button → This button performs the release of error.

NUMERAL INPUT button → This button displays ten keys and input of numerals can be performed.

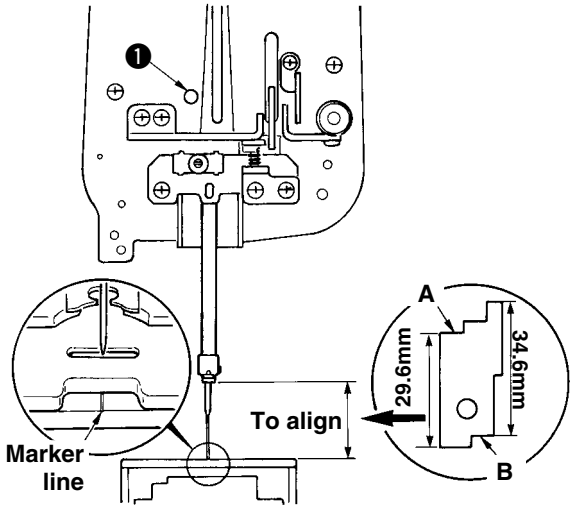
SEWING DATA DISPLAY button → This button displays the sewing data list corresponding to the pattern No. being selected.
→ Refer to **"20. CHANGING SEWING DATA"** of the Instruction Manual.

CHARACTER INPUT button → This button displays the character input screen.
→ Refer to **"5. NAMING THE PATTERN"**of the Instruction Manual.

3. STANDARD ADJUSTMENT

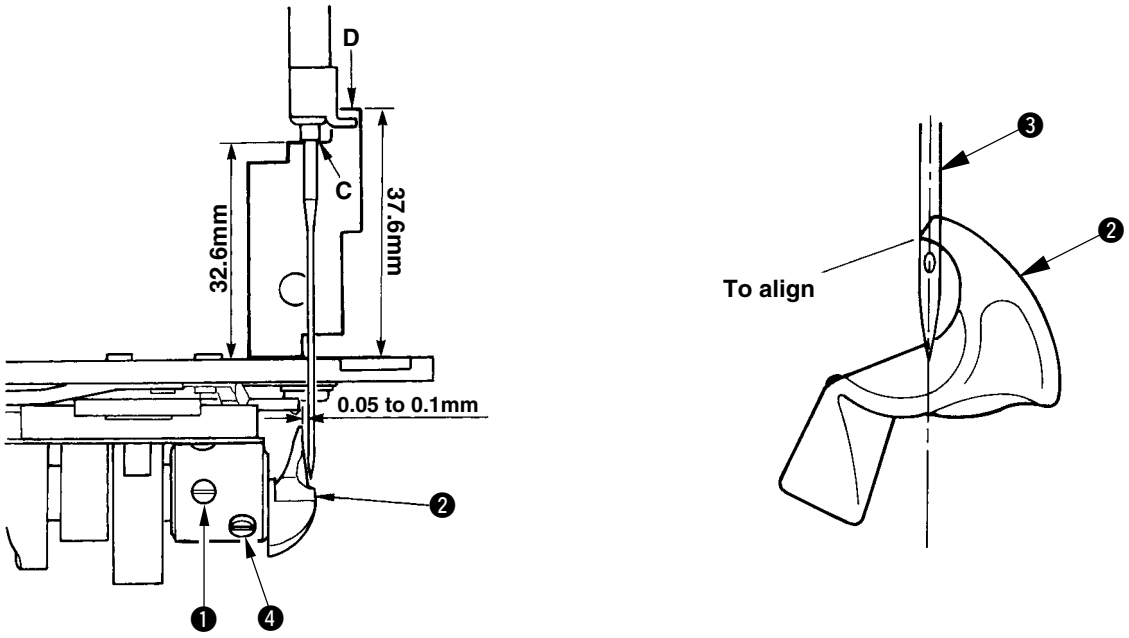
(1) Adjusting the height of the needle bar

Standard Adjustment



(2) Adjusting the clearance between the needle and the looper

Standard Adjustment



Adjustment Procedures	Results of improper Adjustment
1. Use the timing gauge supplied as accessories. Loosen screw ❶ and adjust in case of SM332EXTLG-NY (standard needle) so that when plane **A** is SM332SUPLG-NY, turn the timing gauge up side down, and plane **B** aligns with the height of throat plate when the needle bar comes down to the lowest position. **(Caution) Adjust the needle at the position of center (aligns with the engraved marker line on the machine bed).** **[Needle list]**	

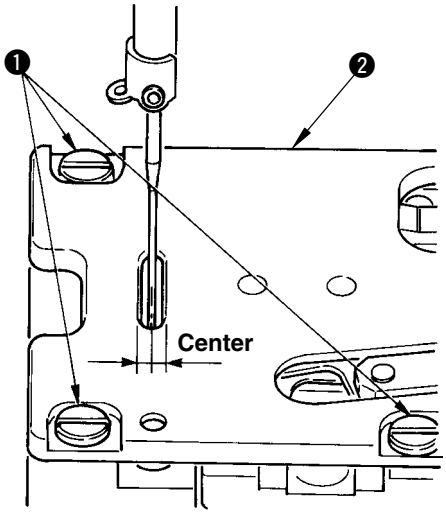
JUKI Part No.	Needle Part No.	Remarks
MSM3AAN1100	NEEDLE SM332EXTLG-NY #11	Standard needle
MSM3AAN1200	NEEDLE SM332EXTLG-NY #12	
MSM3AAN1400	NEEDLE SM332EXTLG-NY #14	
MSM3AAN1600	NEEDLE SM332EXTLG-NY #16	
MSM3AAN1800	NEEDLE SM332EXTLG-NY #18	
MSM3ABN1100	NEEDLE SM332SUPLG-NY #11	Long needle
MSM3ABN1200	NEEDLE SM332SUPLG-NY #12	
MSM3ABN1400	NEEDLE SM332SUPLG-NY #14	
MSM3ABN1600	NEEDLE SM332SUPLG-NY #16	
MSM3ABN1800	NEEDLE SM332SUPLG-NY #18	

Adjustment Procedures	Results of improper Adjustment
1. Use the timing gauge supplied as accessories. 2. Loosen two screws ❶, move looper ❷ and adjust by loosening screw ❹ so that the clearance between the needle and the blade tip of looper is 0.05 to 0.1 mm when plane **C** in case of SM332EXTLG-NY (standard needle) or plane **D** in case of SM332SUPLG-NY aligns with the height of the needle bar. In addition, adjust so that the left position of needle ❸ aligns with the top end of looper ❷ as observed from the front. **(Caution) Adjust the needle at the position of center (aligns with the engraved marker line on the machine bed).**	

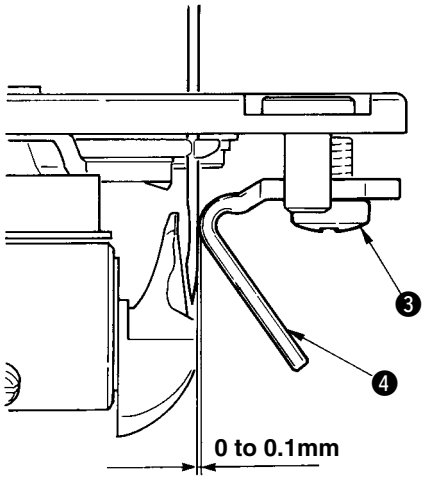
(3) Adjusting the needle and the needle guide

Standard Adjustment

[The position of the needle and the throat plate]

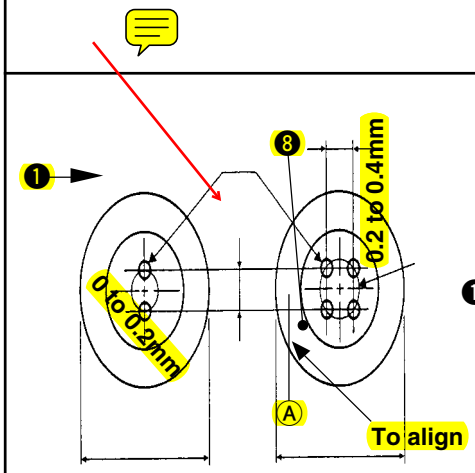


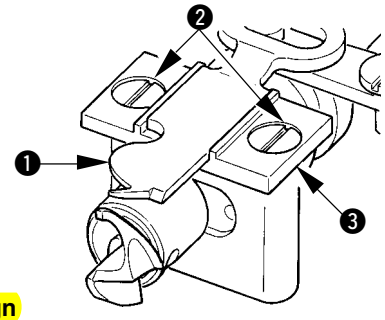
[The clearance between the needle and the needle guide]

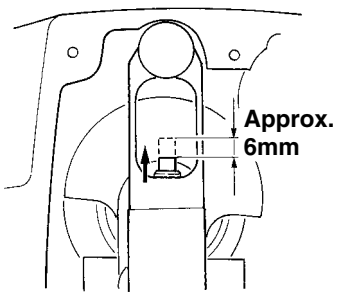


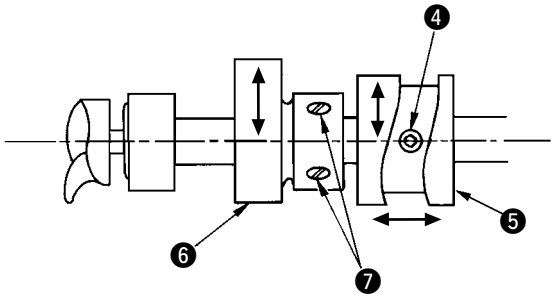
(4) Adjusting the position of the york slide

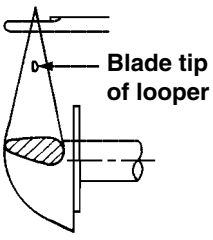
Standard Adjustment

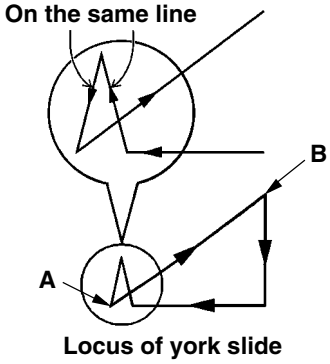












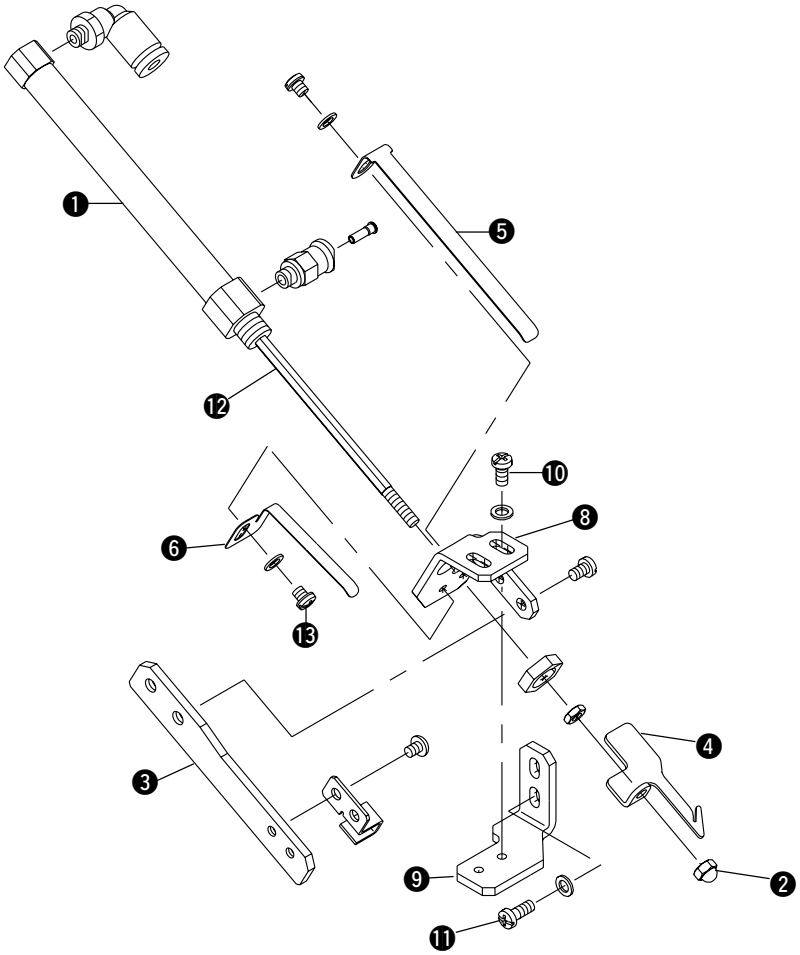
Adjustment Procedures	Results of improper Adjustment
Adjusting the position of the needle and the throat plate 1. Loosen screws ❶ and adjust the throat plate ❷ so that the needle enters the center of the needle hole. **Adjusting the clearance between the needle and the needle guide** 1. Loosen screw ❸ and adjust so that the clearance between needle guide ❹ and the needle is 0 to 0.1 mm at the lowest position of the needle bar. **(Caution) When the needle size is changed, perform re-adjustment.**	○ Stitch skipping or thread breakage will be caused.

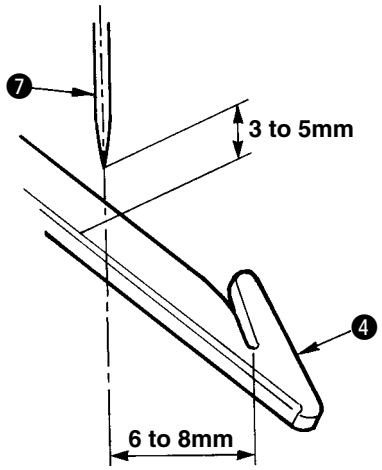
Adjustment Procedures	Results of improper Adjustment
1. Adjust the lateral position of needle ❽ and the looper shaft so that the left side of needle ❽ aligns with section Ⓐ of yoke slide ❶. 2. The position of york slide ❶ has been factory-assembled so that the clearance between york slide ❶ and the needle ❽ is longitudinally 0.2 to 0.4 mm and laterally 0 to 0.2 mm when the needle bar comes to the lowest position. 3. Adjust the lateral position of yoke slide ❶ by loosening setscrew ❷ and moving yoke slide support A ❸ to the right and left. 4. Adjust the longitudinal position of york slide ❶ by loosening setscrew ❹ and moving york slide cam ❺ longitudinally. The motion timing of york slide cam ❺ at this time is adjusted by making the engraved marker line on york slide cam ❺ directly below and tightening the cam with setscrew ❹ when the needle bar is at the lowest position. 5. Timing of the yoke slide motion is performed in the order that yoke slide ❶ starts moving from point A to point B immediately after the blade tip of looper has passed the triangle of the thread. (Position where the needle bar goes up approximately 6 mm from the lowest position) 6. Loosen setscrews ❼ in york slide triangle cam ❻ and turn the cam in the direction of rotation to perform this adjustment. **(Reference) Marks made by the electron pen have been put on york slide cam ❺ and york slide triangle cam ❻ at the time of delivery from factory. Make them as the standard of timing adjustment.** 7. Adjust the locus of york slide motion by loosening setscrew ❹ in york slide cam ❺ and turning the cam in the direction of rotation so that the locus becomes as shown in the figure. **(Caution) When the needle size is changed, perform re-adjustment.**	○ Stitch skipping or thread breakage will be caused.

(5) Wiper adjustment

Standard Adjustment

[Wiper components]

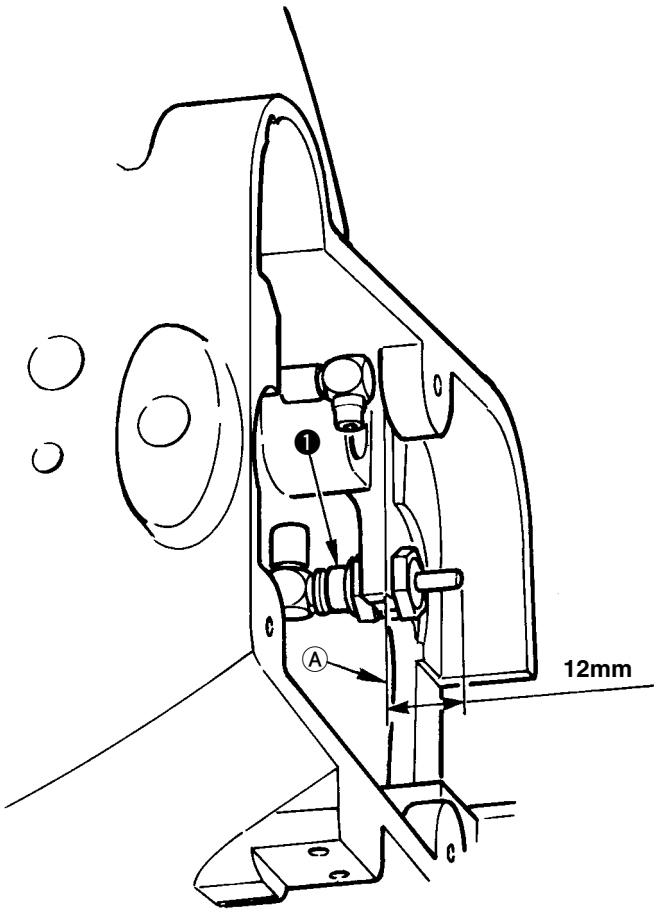


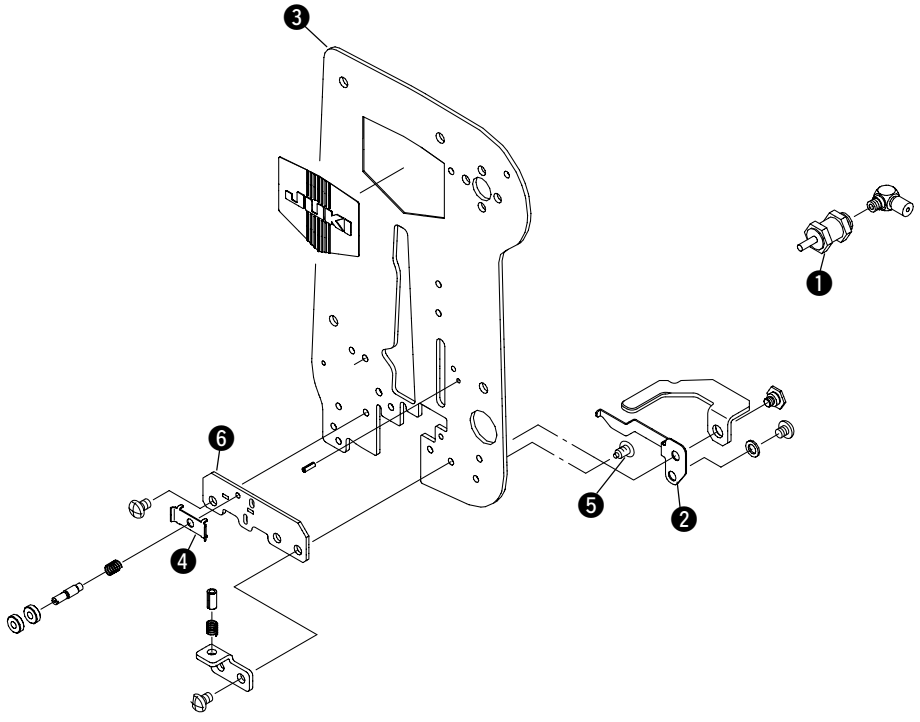


Adjustment Procedures	Results of improper Adjustment
Assembling adjustment 1. Temporarily tighten the wiper at the position where cap nut ❷ is tightened to wiper cylinder rod ⓬. 2. Fix wiper guide ❸ so that wiper guide ❸ and wiper ❹ equally come in contact with each other within the range of the stroke of cylinder ❶. 3. Securely tighten wiper ❹. 4. Fix spring A ❺ so that wiper ❹ and spring A ❺ equally come in contact with each other on the plane within the range of the stroke of cylinder ❶. 5. Adjust the holding force of thread with spring B ❻. 6. To adjust the holding force, loosen screw ⓭ and adjust so that thread slips off with the force of approximately 20 to 25g when polyester spun thread #50 is held. **Installing adjustment** 1. Turn OFF the air supply, and fully draw out wiper ❹. 2. Adjust wiper cylinder installing bases A ❽ and B ❾ with the respective setscrews ⓾ and ⓫ so that the vertical clearance between needle tip ❼ and the top surface of wiper ❹ is 3 to 5 mm and the lateral dimension between needle tip ❼ and the thread holding section of wiper ❹ is 6 to 8 mm at the sewing machine stop position (needle bar upper dead point).	

(6) Adjusting the face plate thread tension

Standard Adjustment

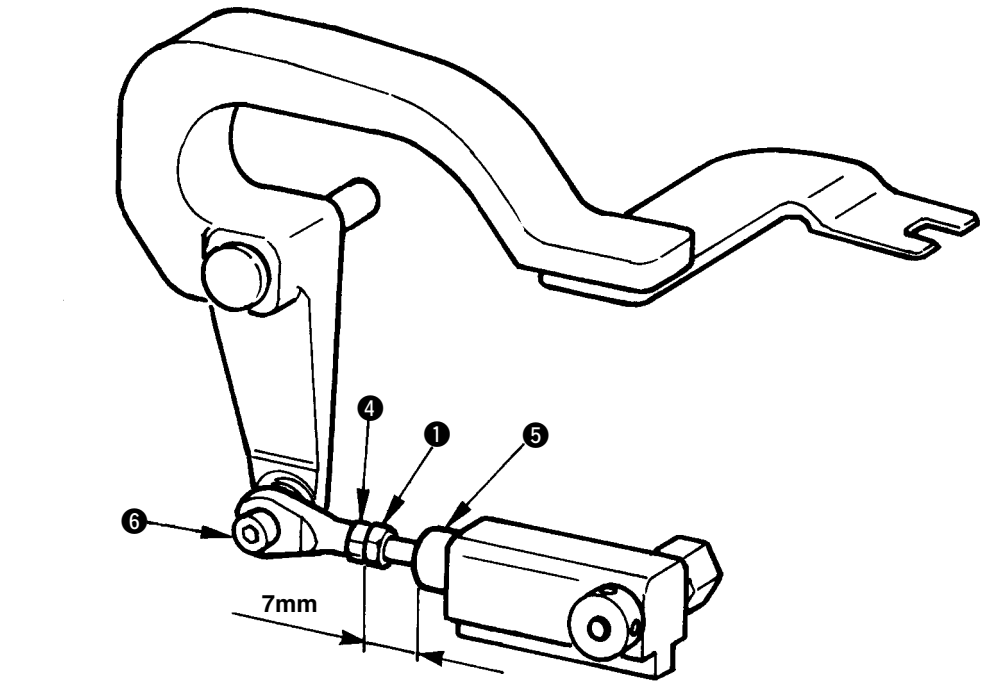


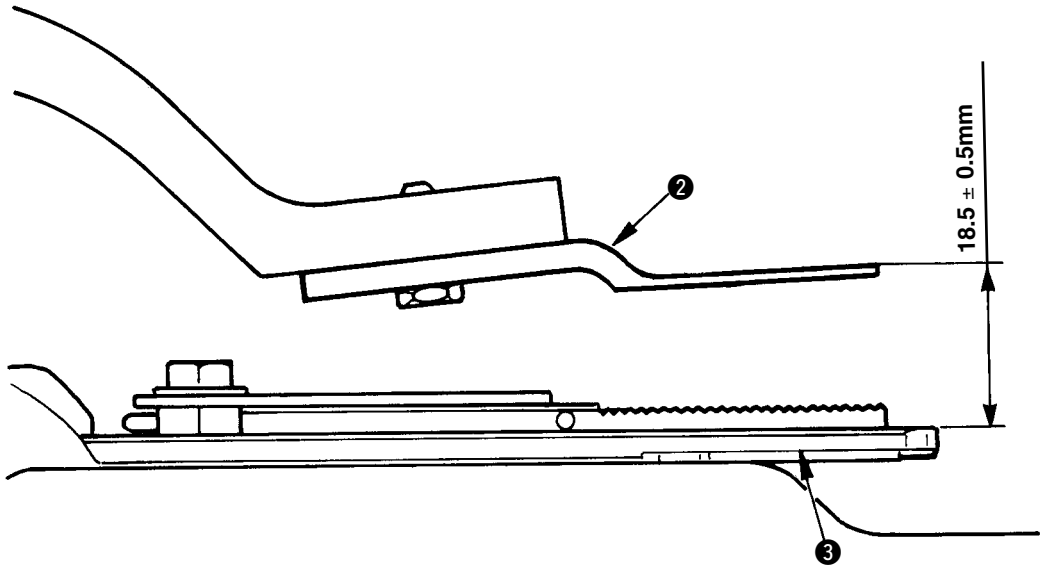


Adjustment Procedures	Results of improper Adjustment
1. Adjust face plate thread tension cylinder ❶ so that a clearance is opened between the face plate thread tension cylinder and tension release plate ❷ in the state that the air is drawn out. (For the standard, the distance from frame processed plane Ⓐ to the top end of cylinder shaft is 12 mm at the time of suction.) 2. When installing tension release plate ❷ to face plate ❸, make sure that needle thread pressing plate ❹ is not pressed up, there is a clearance between the plate and stopper pin ❺, and the top end of tension release plate ❷ is in the center of thread pressing base ❻.	○ Face plate thread tension fails to work unless there is a clearance.

(7) Adjusting the cloth presser cylinder for sewing flat button directly to cloth

Standard Adjustment

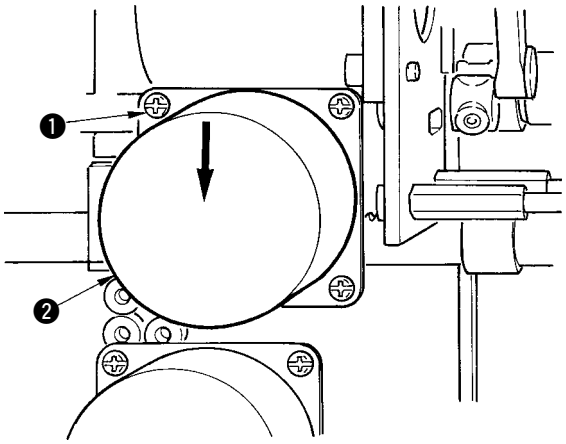


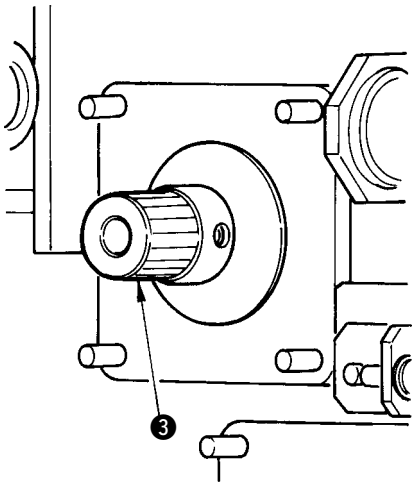


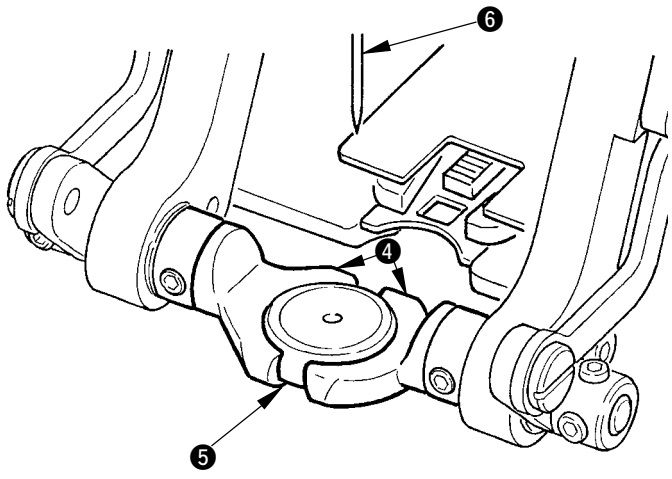
Adjustment Procedures	Results of improper Adjustment
1. Loosen cylinder nut ❶, turn cylinder knuckle ❹ and adjust so that the top surface of the top end of cloth presser ❷ for sewing flat button directly to cloth is 18.5 ± 0. 5mm from the top surface of counter button lower plate ❸ with the cylinder sucked. Then tighten cylinder nut ❶. (For the reference value : 7 mm from end of cylinder boss ❺ to end of knuckle ❻)	○ When the height of cloth presser ❷ for sewing flat button directly to cloth is higher than specified one, the presser interferes with chuck click and step-out of top feed will be caused, or damage of chuck click will be caused.

(8) Adjusting the position of Y top feed motor

Standard Adjustment



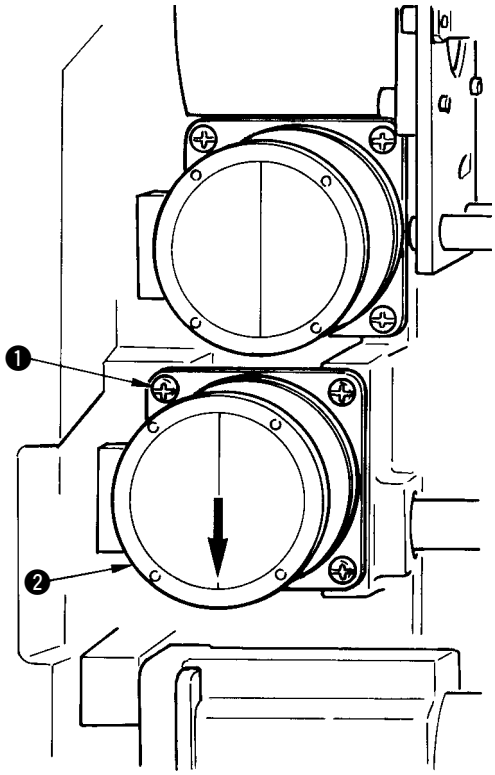


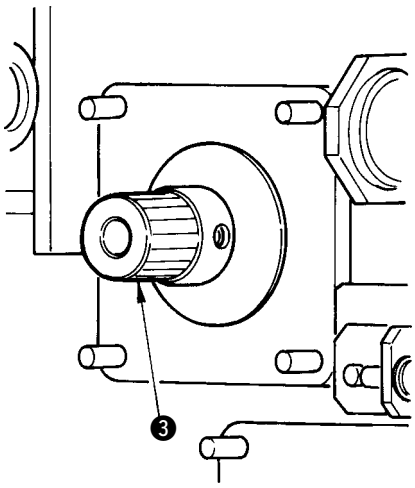


Adjustment Procedures	Results of improper Adjustment
1. Loosen four setscrews ❶, lightly press Y top feed motor ❷ in the direction of arrow mark, and tighten four setscrews ❶ again, while moving the top feed unit to and fro and confirming that it smoothly moves within the movable range. 2. Apply grease (green : grease tube) to lengthwise feed gear section ❸. 3. Place button gauge ❺ in button chuck ❹. Set button gauge ❺ to the position where the center of button gauge almost aligns with needle ❻. 4. Turn ON the power, and confirm whether there is any looseness after the origin retrieval. 5. For adjusting the origin position, refer to “3) Adjusting the top feed origin sensor” of “(16) Adjusting the respective sensors”.	○ When pressing is insufficient, backlash becomes large, and pressing is excessive, torque becomes large. Then step-out may be caused.

(9) Adjusting the position of Y bottom feed motor

Standard Adjustment

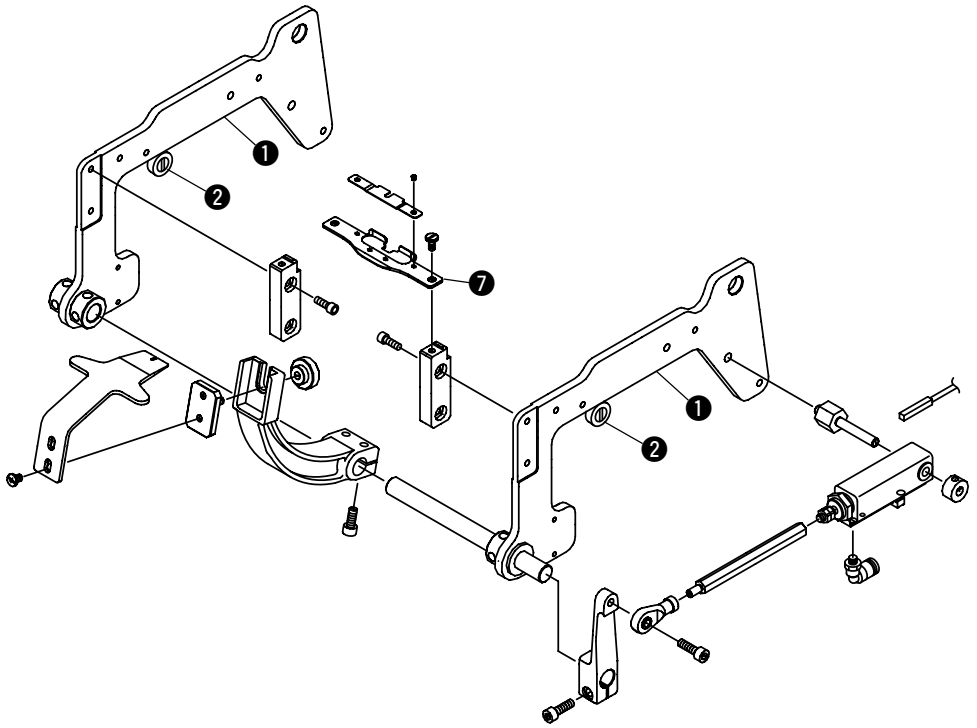


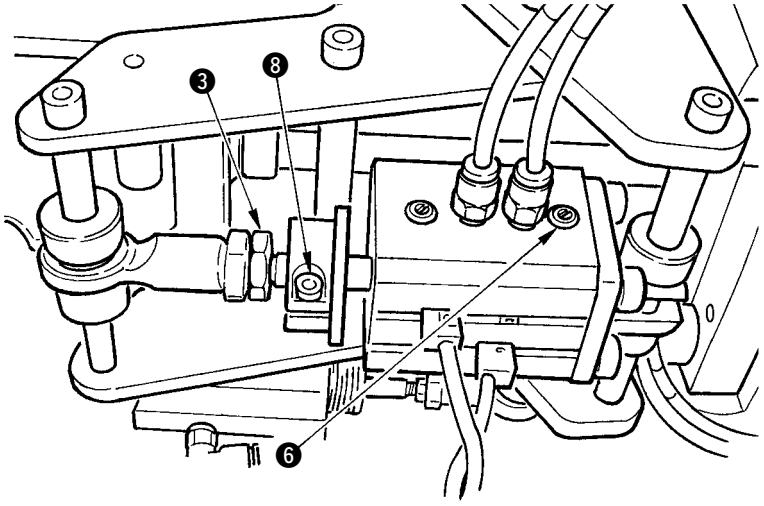


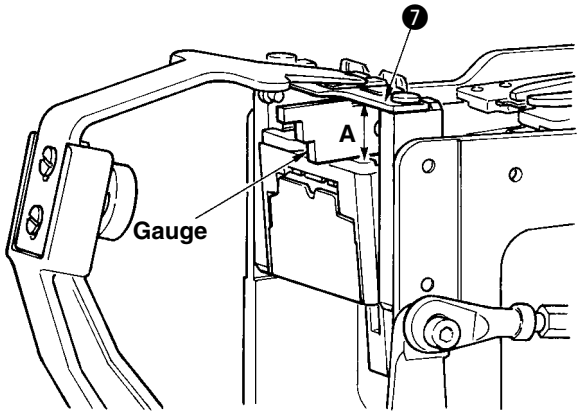
Adjustment Procedures	Results of improper Adjustment
1. Loosen four setscrews ❶, lightly press Y bottom feed motor ❷ in the direction of arrow mark, and tighten four setscrews ❶ again, while moving the top feed unit to and fro and confirming that it smoothly moves within the movable range. 2. Apply grease (green : grease tube) to lengthwise feed gear section ❸. 3. Turn ON the power, and confirm whether there is any looseness after the origin retrieval. 4. For adjusting the origin position, refer to "2) Adjusting the bottom feed origin sensor" of "(16) Adjusting the respective sensors".	○ When pressing is insufficient, backlash becomes large, and pressing is excessive, torque becomes large. Then step-out may be caused.

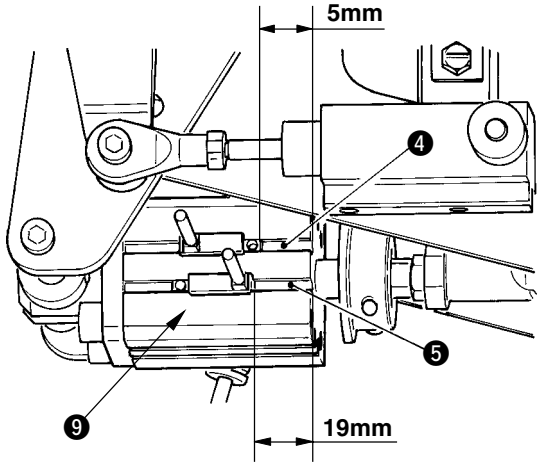
(10) Adjusting the tongue up/down cylinder

Standard Adjustment





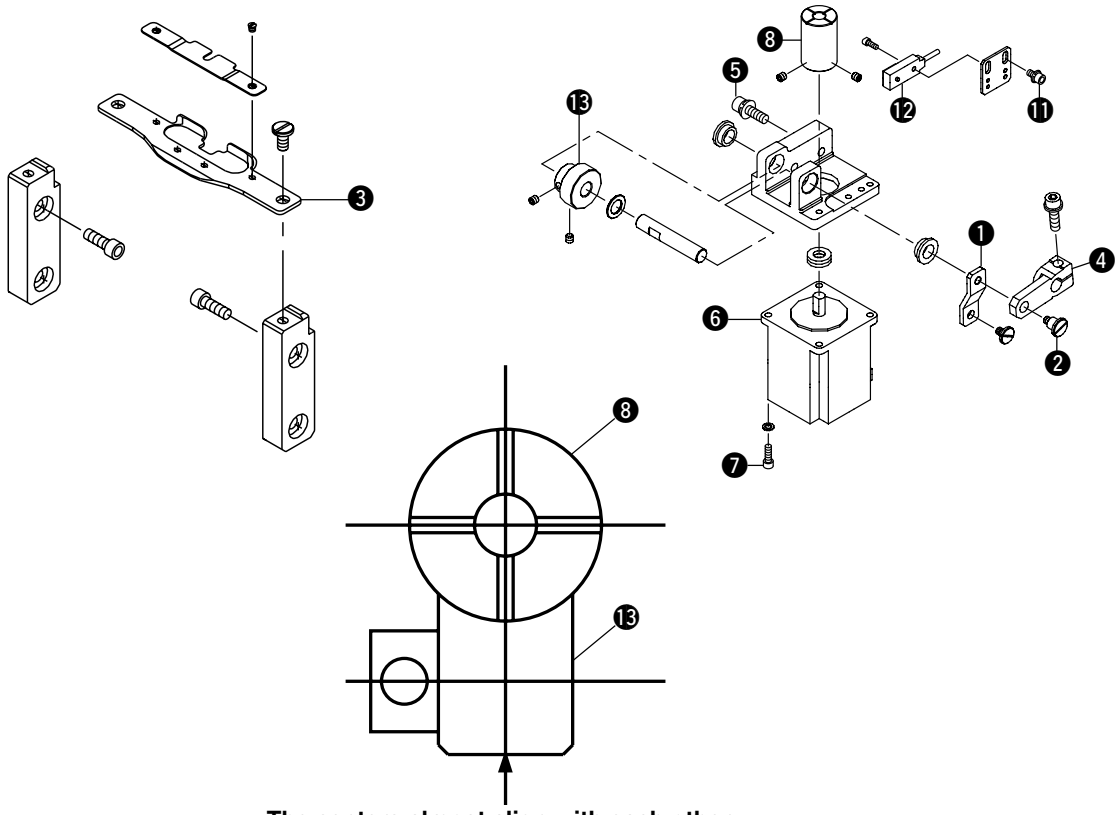




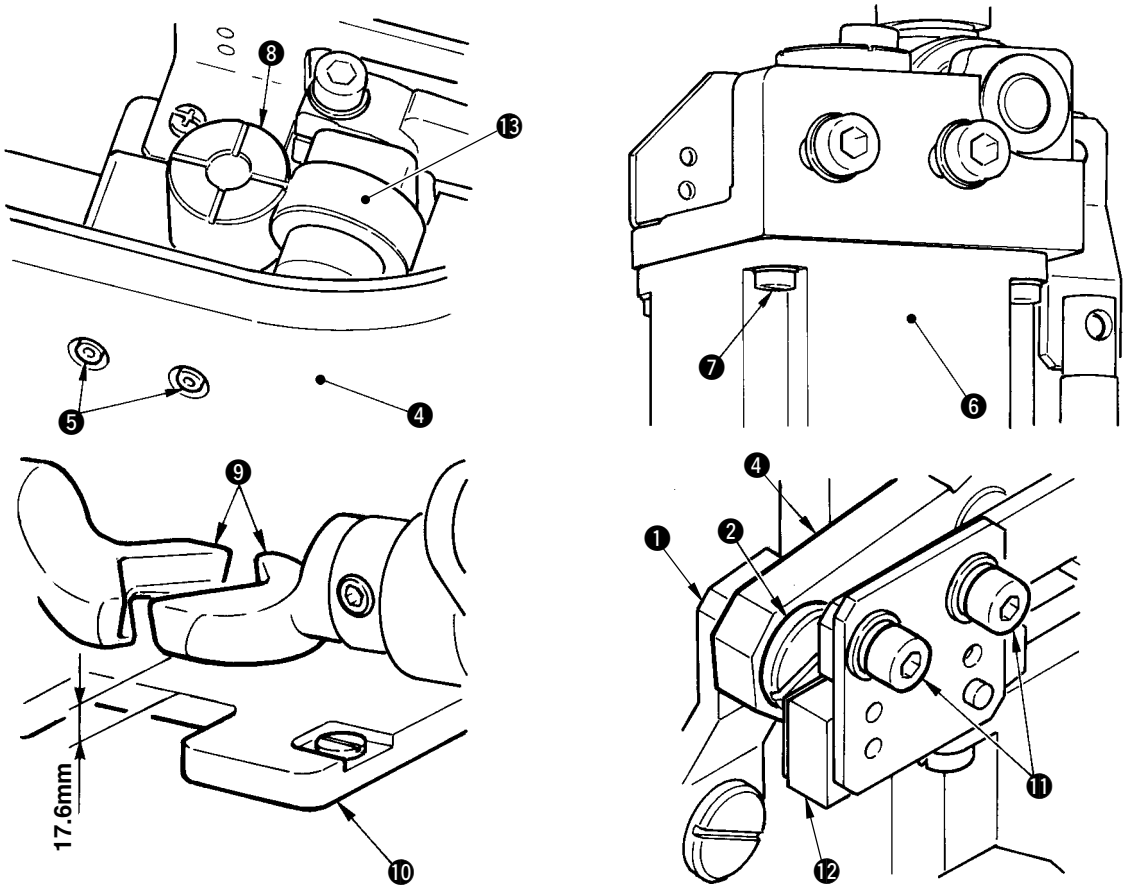
Adjustment Procedures	Results of improper Adjustment
1. Lower the tongue section, and tighten cylinder nut ❸ at the position where side face plates ❶ on both sides ride on rollers ❷ and rollers ❷ turn when tongue section is moved to and fro.	
2. Loosen stopper setscrew ❽ and adjust so that the clearance between the top surfacre of throat plate and tongue stopper ❼ is 14 ± 0.5 mm with the tongue section raised. Insert the gauge between the throat plate and tongue stopper ❼, and perform adjustment as shown in the figure since dimension A of the gauge supplied as accessories is 14 mm.	○ Button size is set up to 32 mm, and when using small sized buttons only, influence of needle bend is lessened by lowering this height.
3. Loosen sensor setscrew located on the side of cylinder, adjust the sensor to the position where it goes off and lights, and further moves by 0.5 to 1 mm, and tighten the setscrew. In the figure, adjust upper sensor ❹ at the time of going up and lower sensor ❺ at the time of coming down respectively.	○ When the position is improper, error occurs.
4. Supply air and adjust with the speed controller so that the motion is not shocked largely at the time of going up or coming down.	○ Do not adjust except when the motion is shocked largely since adjustment has been performed at the time of delivery.
5. There is adjustment screw ❻ of air damper on the side of this cylinder, and adjust it when there is a shock in motion even when adjustment is performed with speed controller.	○ Do not adjust except when the motion is shocked largely or the cylinder is replaced since adjustment has been performed at the time of delivery.
6. Adjust the installing dimension of upper sensor ❹ of tongue up/down cylinder ❾ to 5 mm from the edge of cylinder. (Reference dimension)	
7. Adjust the installing dimension of lower sensor ❺ of tongue up/down cylinder ❾ to 19 mm from the edge of cylinder. (Reference dimension)	

(11) Adjusting the chuck up/down motor

Standard Adjustment



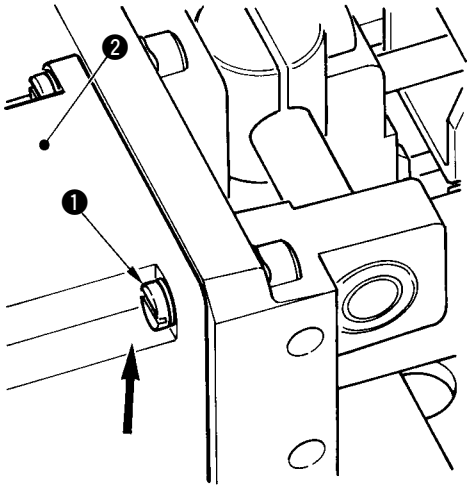
The centers almost align with each other.

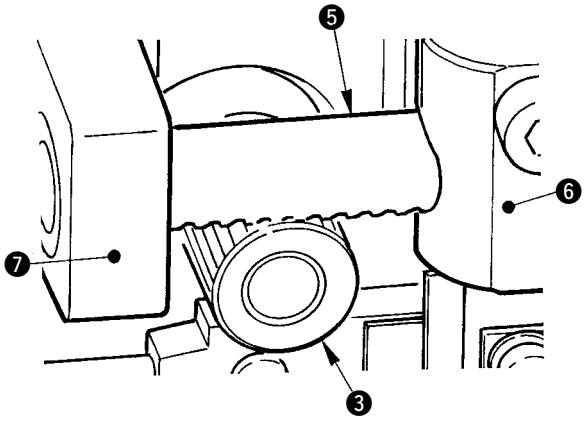


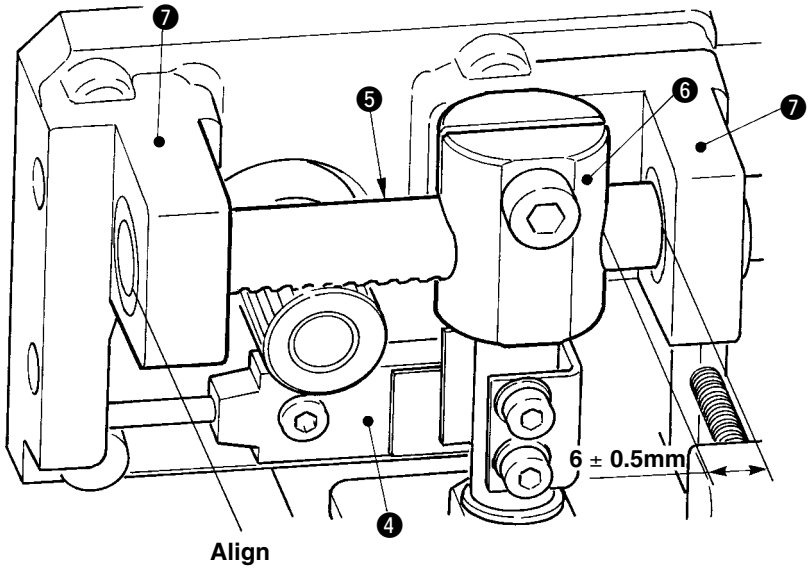
Adjustment Procedures	Results of improper Adjustment
1. Remove hinge screw ❷ of lever ❶ and two screws ❺ located on the side of arm ❹, and remove the unit. 2. Loosen four screws ❼ fixing presser motor ❻, and adjust the backlash of worm gear ❽. **(Caution) When adjusting the backlash, adjust at the position where the centers of worm gear ❽ and worm wheel ⓭ almost align with each other.** Set the amount of backlash to 0.1 to 0.3 mm. 3. Apply enough JUKI grease B tube (white grease) to the whole teeth section after cleanly wiping white grease gathered around teeth of worm gear ❽. 4. Turn the cross section attached to worm gear ❽ with a screwdriver, loosen upper/lower sensor plate setscrews ⓫ of sensor ⓬ when the clearance between the bottom face of chuck ❾ and the top surface of throat plate ❿ is 17.6 mm, adjust the sensor to the position where it goes off and lights, and tighten upper/lower sensor plate setscrews ⓫. 5. When the pedal is depressed at K57 Presser motor origin compensation, the chuck goes up to sensor origin position (17.6 mm), detects the sensor, and comes down to the top end of tongue stopper ❸. At this time, make sure of the clearance of within 0 to 0.5 mm between the top end of tongue stopper ❸ and the bottom end of the chuck, perform fine adjustment with the panel, and set the clearance to 0 mm.	○ When backlash is too close, worm gear ❽ is apt to be worn. ○ When the position is improper, error occurs.

(12) Adjusting the differential feed motor

Standard Adjustment





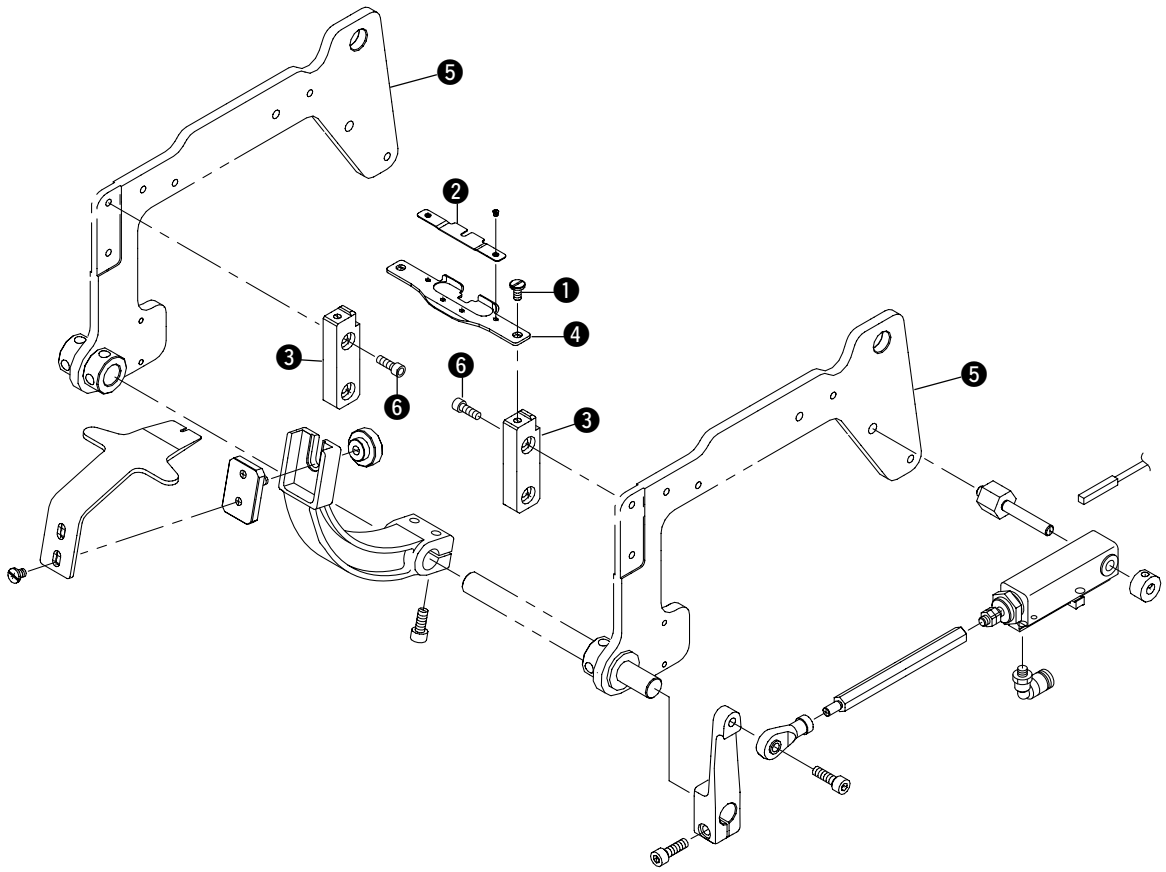


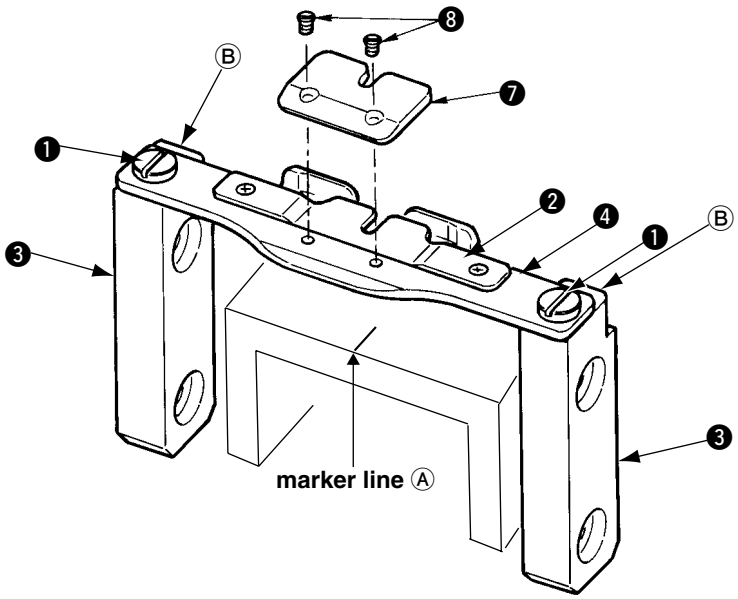
Adjustment Procedures	Results of improper Adjustment
1. Loosen four screws ❶, slightly press differential feed motor ❷ in the direction of arrow mark, and tighten four screws ❶ again, while moving rack gear shaft ❺ to the left and right and confirming that it smoothly moves within the movable range. 2. Apply grease (green : grease tube) to gear ❸ section. 3. This sensor ❹ is a fixed type and cannot be adjusted. 4. Perform adjustment with the operation panel. Refer to "(16) Adjusting the respective sensors 3)". 5. Set the position of rack gear shaft ❺ and roller base ❻ to the position where the clearance between roller base ❻ and base ❼ is 6 ± 0.5 mm when the left end of rack gear shaft ❺ is aligned with base ❼.	○ When pressing is insufficient, backlash becomes large, and pressing is excessive, torque becomes large, and step-out may be caused.

(13) Adjusting the tongue stopper

Standard Adjustment

[Tongue components]





Adjustment Procedures	Results of improper Adjustment

1. Adjust engraved marker line Ⓐ at the top end of machine bed to the center of tongue stopper guide ❷, and make the guide come in contact with step section Ⓑ in the rear of tongue stopper installing base ❸. Then fix it with setscrews ❶.
2. Adjust tongue stopper installing base ❸ so that the clearance between the bottom end of tongue stopper ❹ and the top surface of throat plate is 0.5 mm, and fix the tongue stopper with setscrew ❻ while pressing the tongue stopper to the edge in the rear of side face plate ❺.
3. Adjust the origin of Y bottom feed. "Refer to (9) Adjusting the position of Y bottom feed motor. "

(Caution) Correctly adjust the origin since it becomes the origin for all.

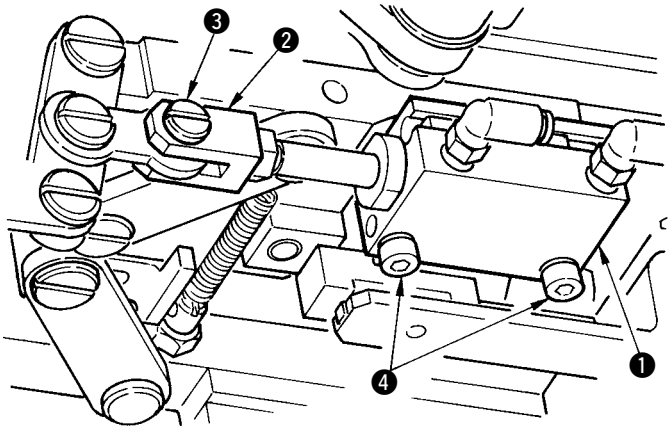
4. When performing sewing flat button with blindstitch, fix spacer A❼(Part No. : 40020764) supplied as accessories with setscrews ❽.

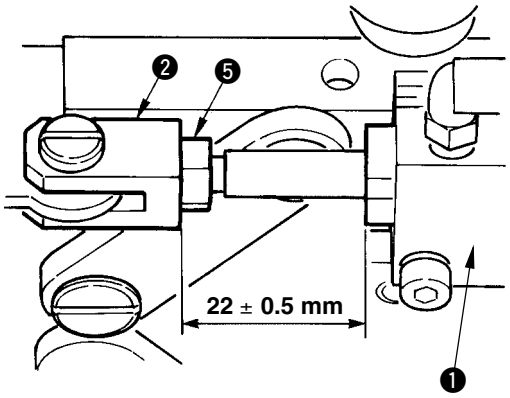
* Underplate spacer A ❼ : thickness of 1.6 mm, There are underplate spacer B : thickness of 2.0 mm and underplate spacer C : thickness of 2.6 mm as the other optionals. Select a proper one from among them for use.

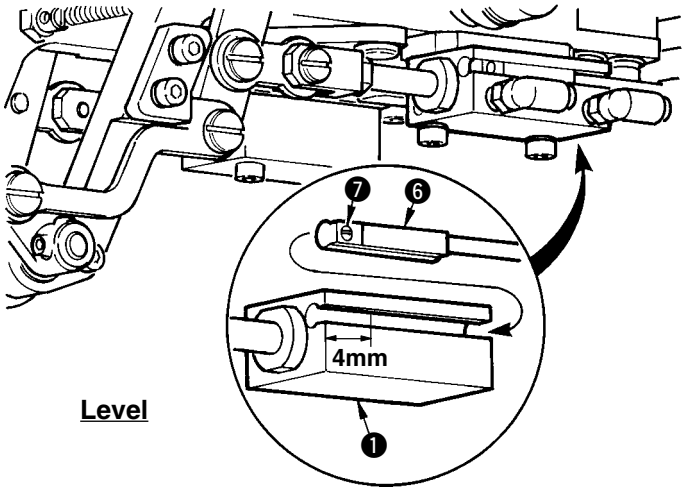
No.	Part No.	Discription	Thickness	Remarks
1	40020764	UNDER_PLATE_SPACER A	t=1.6mm	Accessory
2	40020769	UNDER_PLATE_SPACER B	t=2.0mm	Optional
3	40020770	UNDER_PLATE_SPACER C	t=2.6mm	Optional

(14) Adjusting the chuck inversion cylinder

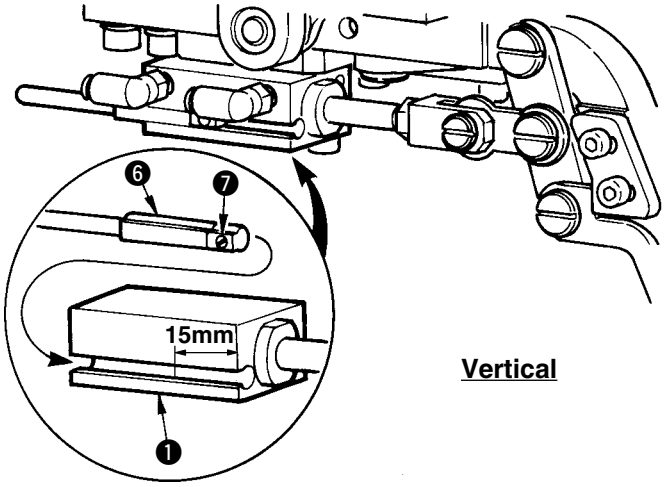
Standard Adjustment







Level

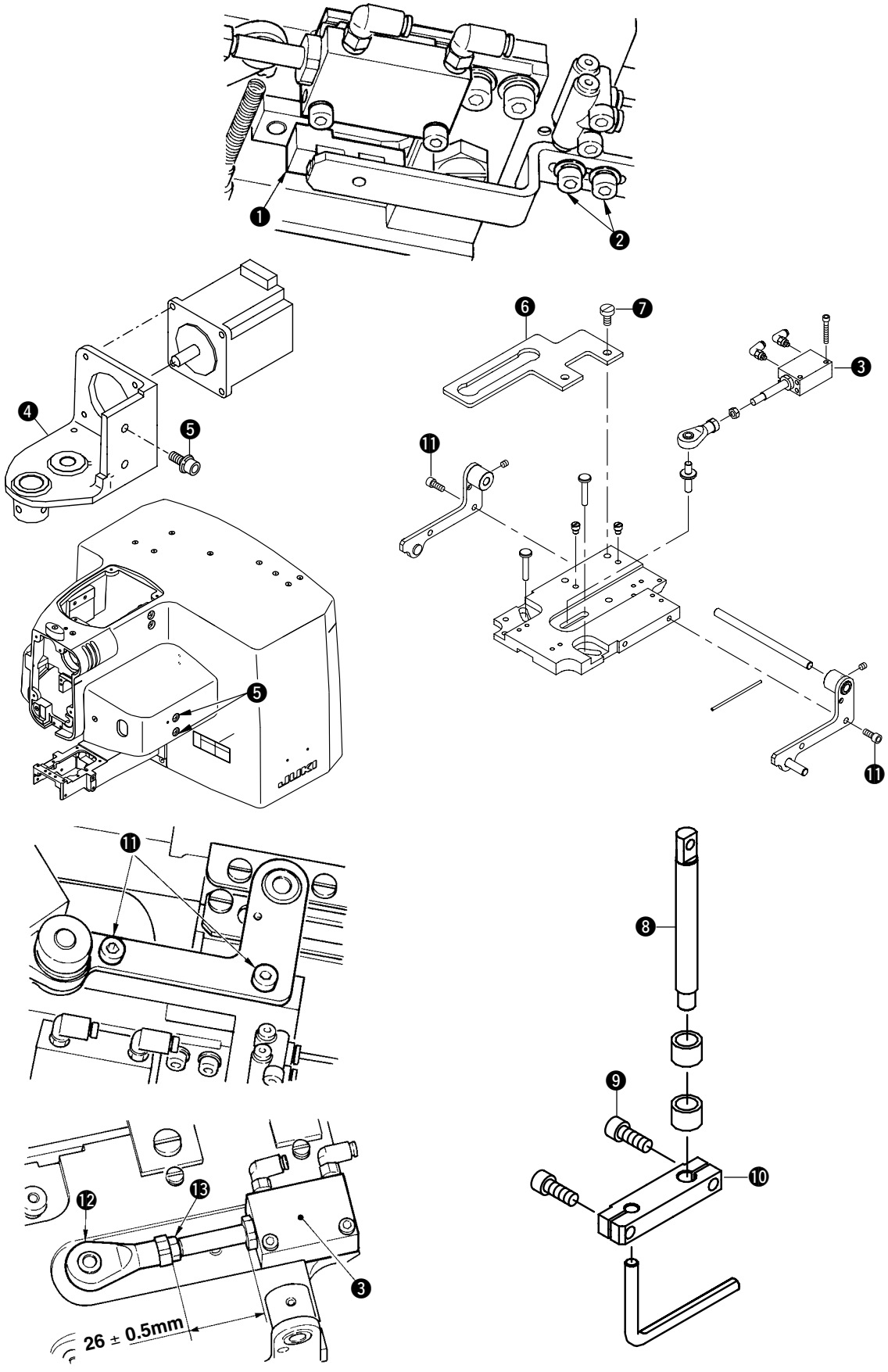


Vertical

Adjustment Procedures	Results of improper Adjustment
1. To remove chuck inversion cylinder ❶, remove hinge screw ❸ of knuckle ❷, cylinder ❶ and two setscrews ❹. 2. In the state that the button chuck is level, loosen nut ❺ and adjust so that the clearance between knuckle ❷ and cylinder ❶ is 22 ± 0.5 mm.	
3. Loosen setscrews ❼ in respective sensors ❻ located on the sides of respective cylinders ❶, adjust the sensors ❻ to the position where they go off and light, and further move by 0.5 to 1 mm, and tighten setscrews ❼. Adjust sensor ❻ attached to the arm on the right-hand side in the figure when the chuck is level, and sensor ❻ on the left-hand side when the chuck is vertical respectively.	○ When the position is improper, error occurs.
4. Supply air and adjust with the speed controller so that the motion is not shocked largely at the time of inversion. 5. Adjust the installing dimension of sensor ❻ of chuck inversion cylinder 1 ❶ (vertical) to 4 mm from the top end. (Reference dimension) 6. Adjust the installing position of sensor ❻ of chuck inversion cylinder 2 ❶ (level) to 15 mm from the top end. (Reference dimension)	○ Do not adjust except when the motion is shocked largely since adjustment has been performed at the time of delivery.

(15) Adjusting the chuck open/close cylinder

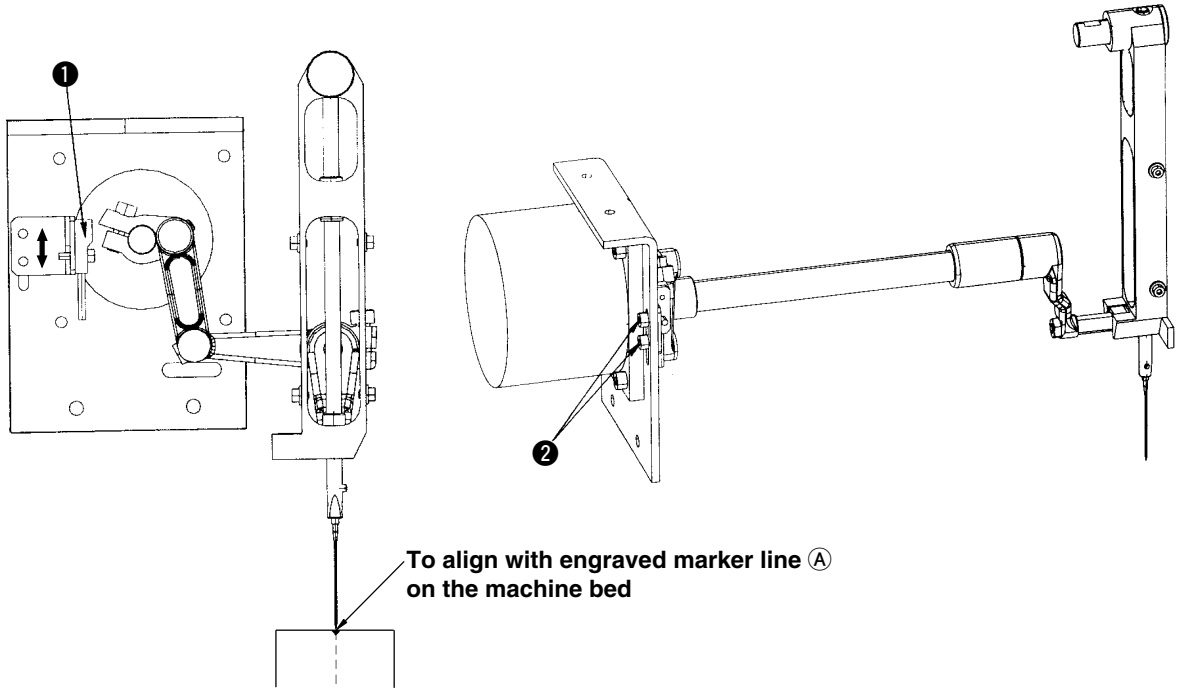
Standard Adjustment

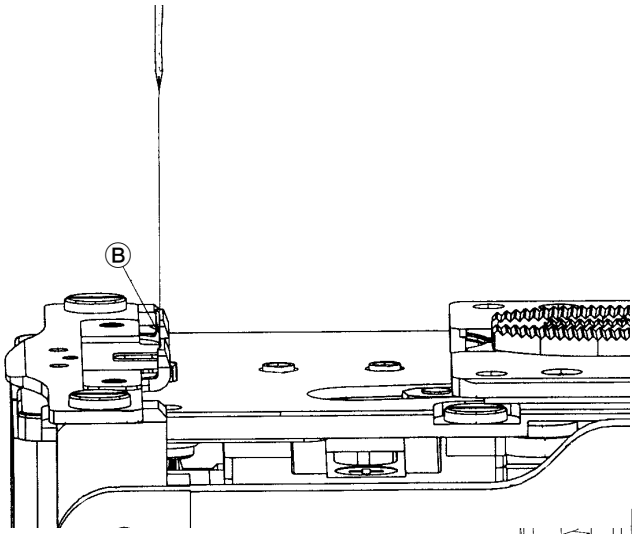


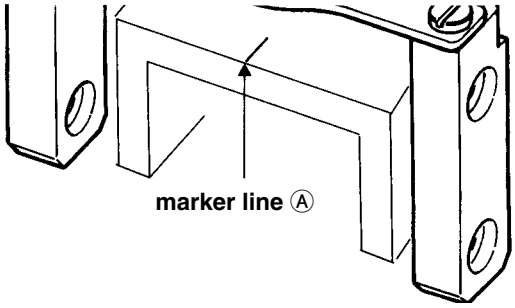
Adjustment Procedures	Results of improper Adjustment
1. To remove sensor ❶, remove two setscrews ❷. 2. Fix sensor ❶ with setscrew ❷ at the position where sensor ❶ is returned to the front by 0.5 to 1 mm from the position where sensor ❶ lights and goes off at the position where the chuck fully closes in the state that the button is not placed in the chuck. 3. To replace chuck open/close cylinder ❸, it is necessary to remove loader unit ❹ first. To facilitate this work, remove loader unit ❹ beforehand. 4. To remove loader unit ❹, remove the power cord and the sensor cord at the position of the relay cord. (The position is in the rear of the motor section.) 5. Loosen two setscrews ❺ and remove loader unit ❹. 6. Loosen setscrew ❼ and remove differential feed guide ❻. 7. Loosen fixing screw ❾ of presser lifter shaft ❽, and remove presser lifter bracket ❿. 8. Remove four screws ⓫ located on the both sides of the chuck unit, and remove the unit. 9. Loosen nut ⓭ and adjust so that the clearance between knuckle ⓬ and cylinder ❸ is 26 ± 0.5 mm. 10. Supply air and adjust with the speed controller so that the motion is not shocked largely at the time of open/close.	○ Do not adjust except when the motion is shocked largely since adjustment has been performed at the time of delivery.

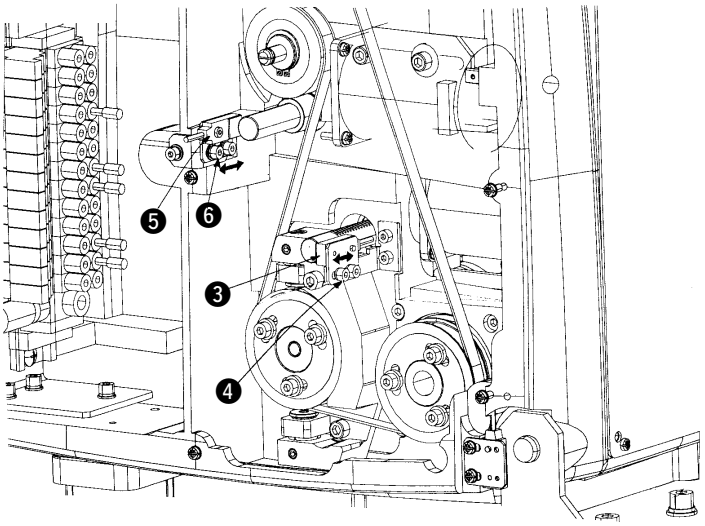
(16) Adjusting the respective sensors (1/2)

Standard Adjustment





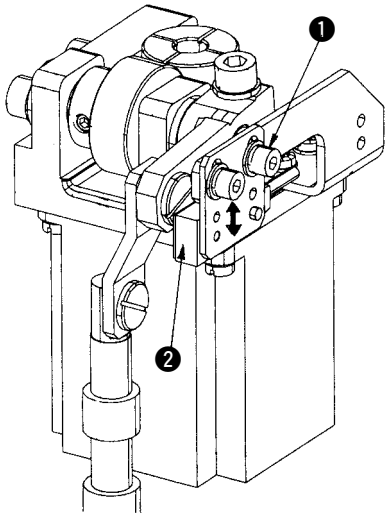


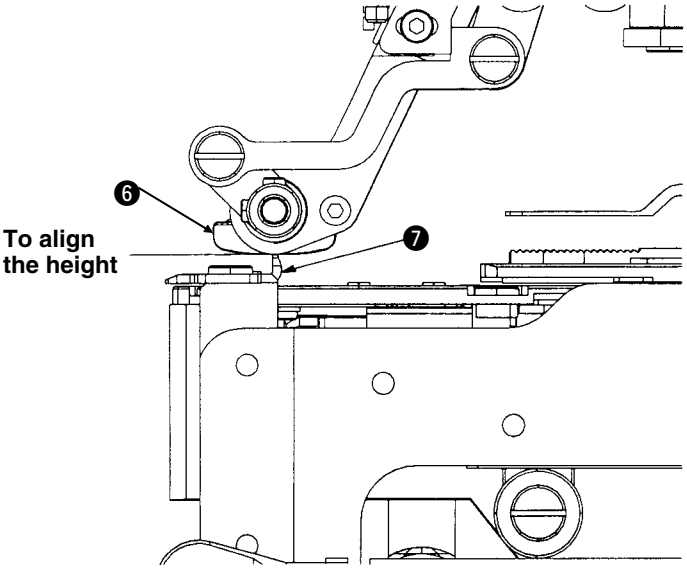


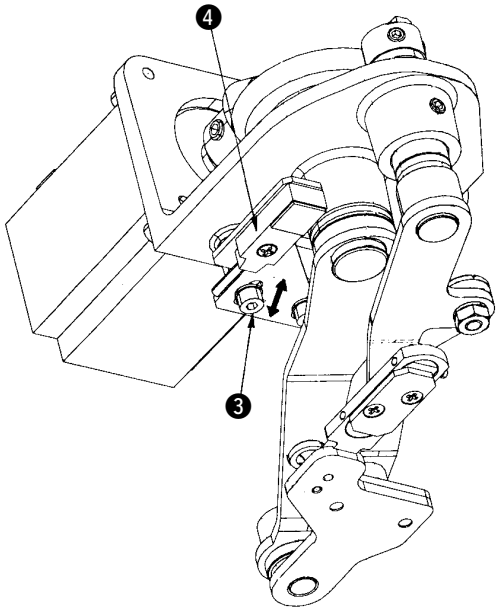
Adjustment Procedures	Results of improper Adjustment
1) Adjusting the needle throwing motor origin sensor 1. After assembling the needle throwing components, turn ON the power to display K51 of level 2 of the memory switch. (At this time, set the parameter display to "0".) 2. Move the position of sensor ❶ to the direction of arrow mark so that the needle is positioned to align with engraved marker line Ⓐ on the machine bed when depressing the pedal once and performing the origin retrieval. 3. To change the position of the sensor, loosen setscrews ❷, move sensor ❶ along the slit, and fix setscrews ❷. 4. Compensation of the needle throwing motor origin ○ After performing adjustment of the sensor, when the needle is out of the center, compensation of the position can be performed with the panel. ○ Display K51 of level 2. ○ By changing the parameter, compensation can be performed to the right and left sides up to 5 mm. 2) Adjusting the bottom feed origin sensor (Adjust after confirming that the needle throwing motor origin has been adjusted.) 1. Display K54 of level 2 of the mempry switch. (At this time, set the parameter display to "0".) 2. Move the position of sensor ❸ to the direction of arrow mark so that the needle aligns with position Ⓑ of tongue stopper in the longitudinal direction when depressing the pedal once and performing the origin retrieval. 3. To change the position of the sensor, loosen setscrews ❹, move sensor ❸ along the slit, and fix setscrews ❹. 4. Compensation of the bottom feed motor origin ○ After performing adjustment of the sensor, when the tongue stopper in terms of the needle is out of the position, compensation of the position can be performed by changing the parameter of K54. ○ By changing the paramer, compensation can be performed to the front and rear sides up to 5 mm. 3) Adjusting the top feed origin sensor (Adjust after confirming that the needle throwing motor origin has been adjusted.) 1. Set the button gauge supplied with the chuck as accessories. 2. Display K52 and K53 of level 2 of the memory switch. (At this time, set the parameter display to "0".) 3. Position where the needle aligns with the hole in the center of the gauge is the position of origin when depressing the pedal once and performing the origin retrieval. 4. Move the position of position sensor ❺ in the longitudinal direction to the direction of arrow msark. 5. To change the position of sensor, loosen setscrews ❻, move sensor ❺ along the slit, and fix setscrews ❻. 6. Perform the adjustment of the position in the differential direction (direction X) by changing the parameter of K52 of level 2 of the memory switch since the position of sensor is fixed. 7. By changing the parameter, adjustment can be performed to the right and left sides up to 2 mm. 8. For the adjustment of the position in the longitudinal direction, compensation of the position is performed by changing the parameter of K53 of level 2 of the memory switch. 9. By changing the parameter, compensation can be performed to the front and rear sides up to 5 mm.	

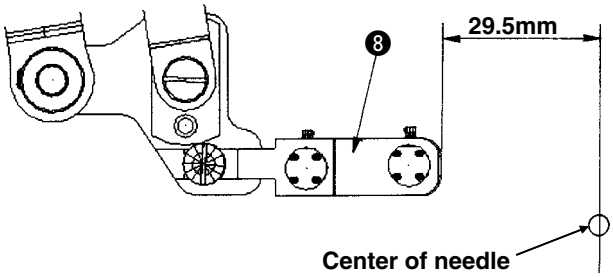
(16) Adjusting the respective sensors (2/2)

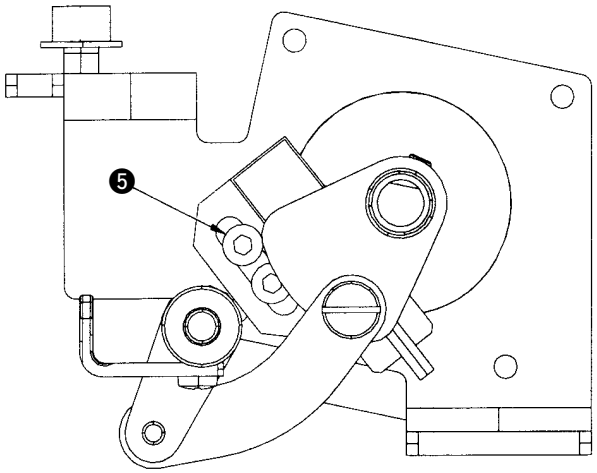
Standard Adjustment

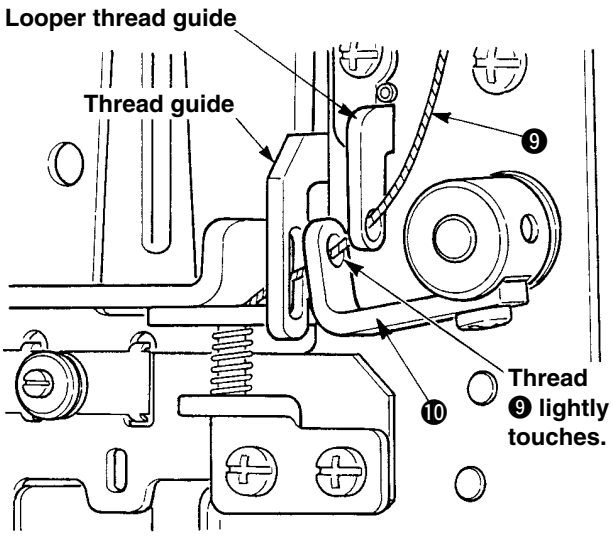










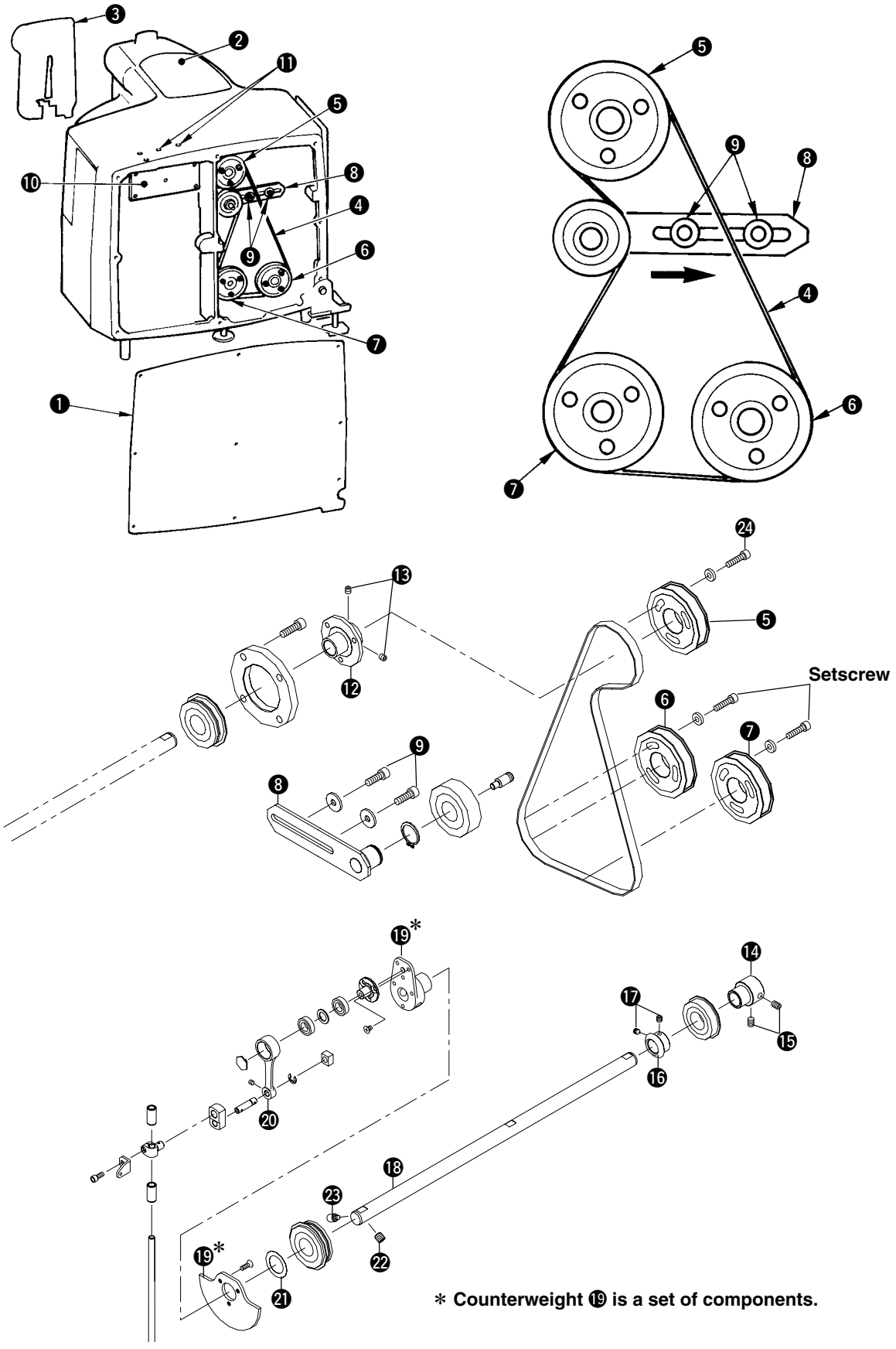


Adjustment Procedures	Results of improper Adjustment
4) Adjusting the top feed sensor in the vertical direction 1. Set the button gauge supplied with the chuck as accessories. 2. Display K57 of level 2 of the memory switch. (At this time, set the parameter display to "0".) 3. Move the position of sensor ❷ so that the bottom face of chuck ❻ is as high as the upper part of tongue stopper ❼ when depressing the pedal once and performing the origin retrieval. 4. To change the position of sensor, loosen setscrews ❶, move sensor ❷ along the slit, and fix setscrews ❶. 5. Compensation of the position of top feed origin ○ After performing the adjustment of sensor, when the tongue stopper in terms of the needle is out of the position, compensation of the position can be oerformed by changing the parameter of K57. 5) Adjusting the sensor of loader 1. Display K57 of level 2 of the memory switch. (At this time, set the parameter display to "0".) 2. Move the position of sensor ❹ so that the distance from the center of needle to the front edge of button set pin ❽ is 29.5 mm when depressing the pedal once and performing the origin retrieval. 3. To change the position of sensore, loosen setscrew ❸, move sensor ❹ along the slit, and fix setscrew ❸. 4. After performing the adjustment of sensor, when the tongue stopper in terms of the needle is out of the position, compensation of the position can be performed by changing the parameter of K59. 6) Adjusting the thread drawing motor sensor 1. Fix the position of sensor with setscrews ❺ which are symmetrically set from the center of the slit. 2. Display K58 of level 2 of the memory switch. 3. Adjust the parameter of K58 so that thread ❾ lightly touches the upper side of the thread ❾ drawing hole (thread guide No. 2 ❿).	

4. DISASSEMBLING, ASSEMBLING AND ADJUSTMENT

(1) Disassembling and assembling of the main shaft (1/2)

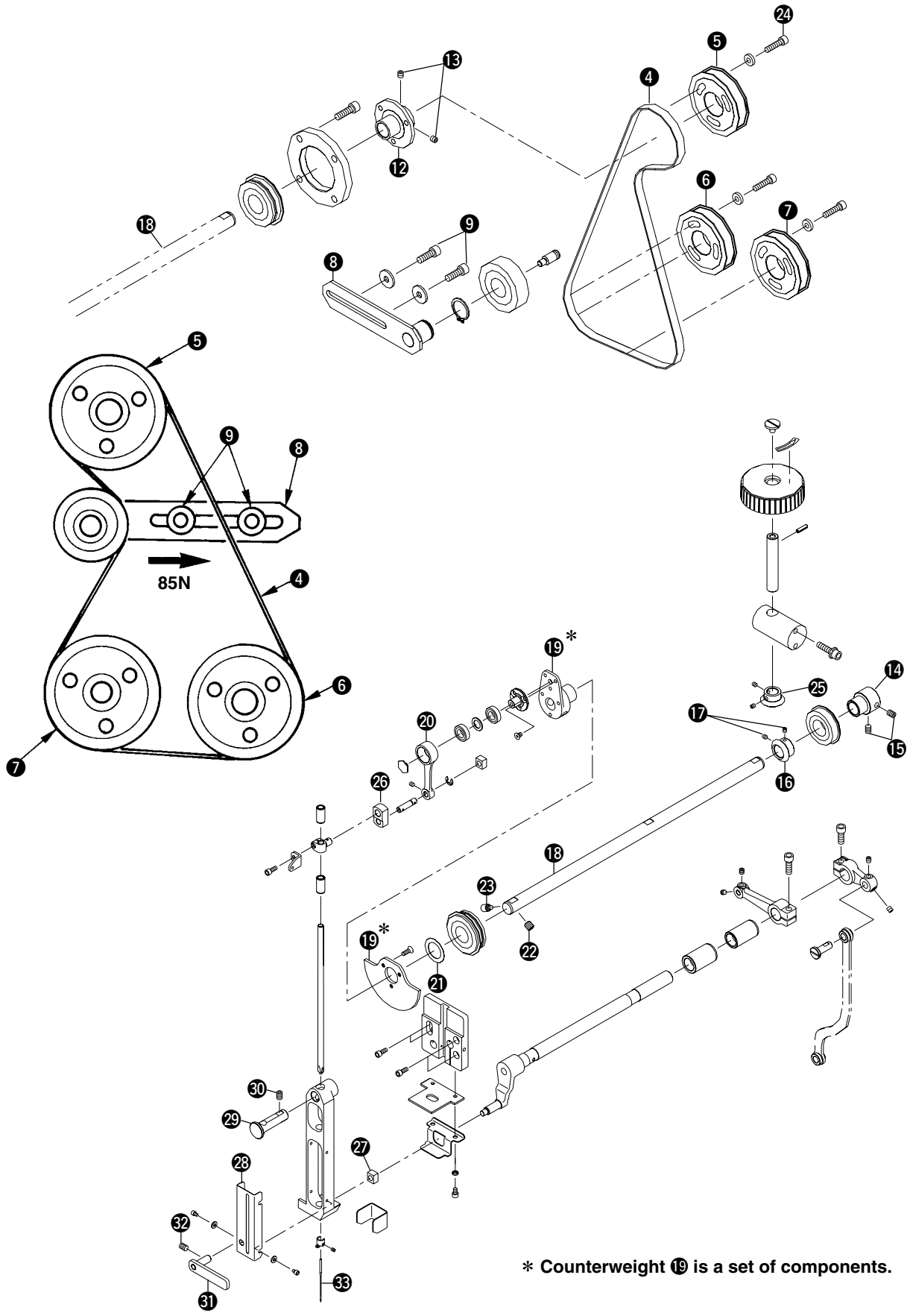
Procedures of disassembling / assembling



Procedures of disassembling / assembling	Caution in disassembling / assembling
Disassembling of the main shaft 1. Remove needle, rear cover ❶, arm cover ❷ and face plate ❸ "refer to (2) Disassembling and assembling of the face plate". 2. When timing belt ❹ is not replaced, put marking with white paint or the like on main shaft sprocket ❺, main motor shaft sprocket ❻, looper shaft sprocket ❼ and timing belt ❹. 3. Loosen two setscrews ❾ in idler pulley installing plate ❽, and remove timing belt ❹. 4. Remove with two setscrews ⓫ relay circuit board installing plate ⓾. Connector does not have to be removed. However, remove it if it is hard to perform the work.) 5. Remove frame support and needle bar rocking shaft, and remove needle bar rocking base. "Refer to (3) Disassembling and assembling of the needle bar rocking base and the needle bar crank rod." At this time, be careful not to lose the needle bar connecting rod and the square block. 6. When timing belt ❹ is not replaced, put marking with white paing or the like on main shaft sprocket ❺ and sprocket bush A ⓬. 7. Loosen setscrew ㉔ and remove main shaft sprocket ❺. 8. Loosen two setscrews ⓭ in sprocket bush A ⓬. (Screw No. 1 is set to the flat section of the shaft.) 9. Enter the hand from the section of relay circuit board installing plate ⓾ which has been removed, and loosen two setscrews ⓯ in main shaft bearing ⓮. (Screw No. 1 is set to the flat section of the shaft.) 10. Loosen two setscrews ⓱ in gear A ⓰ from the top surface of machine arm. 11. Make the lacked part of counter weight ⓳ below, and draw out main shaft ⓲ together with needle bar crank rod ⓴. Be careful not to lose main shaft spacer ㉑. 12. Loosen setscrew ㉒ in counter weight ⓳, remove taper screw ㉓ (screw No. 1), and draw out main shaft ⓲.	○ At the time of assembling, timing adjustment of main motor shaft, main shaft and looper shaft does not have to be performed if the components are adjusted to the positions where marking has been put. ○ At the time of assembling, timing adjustment of the main shaft does not have to be performed if the components are adjusted to the positions where marking has been put.

(1) Disassembling and assembling of the main shaft (2/2)

Procedures of disassembling / assembling

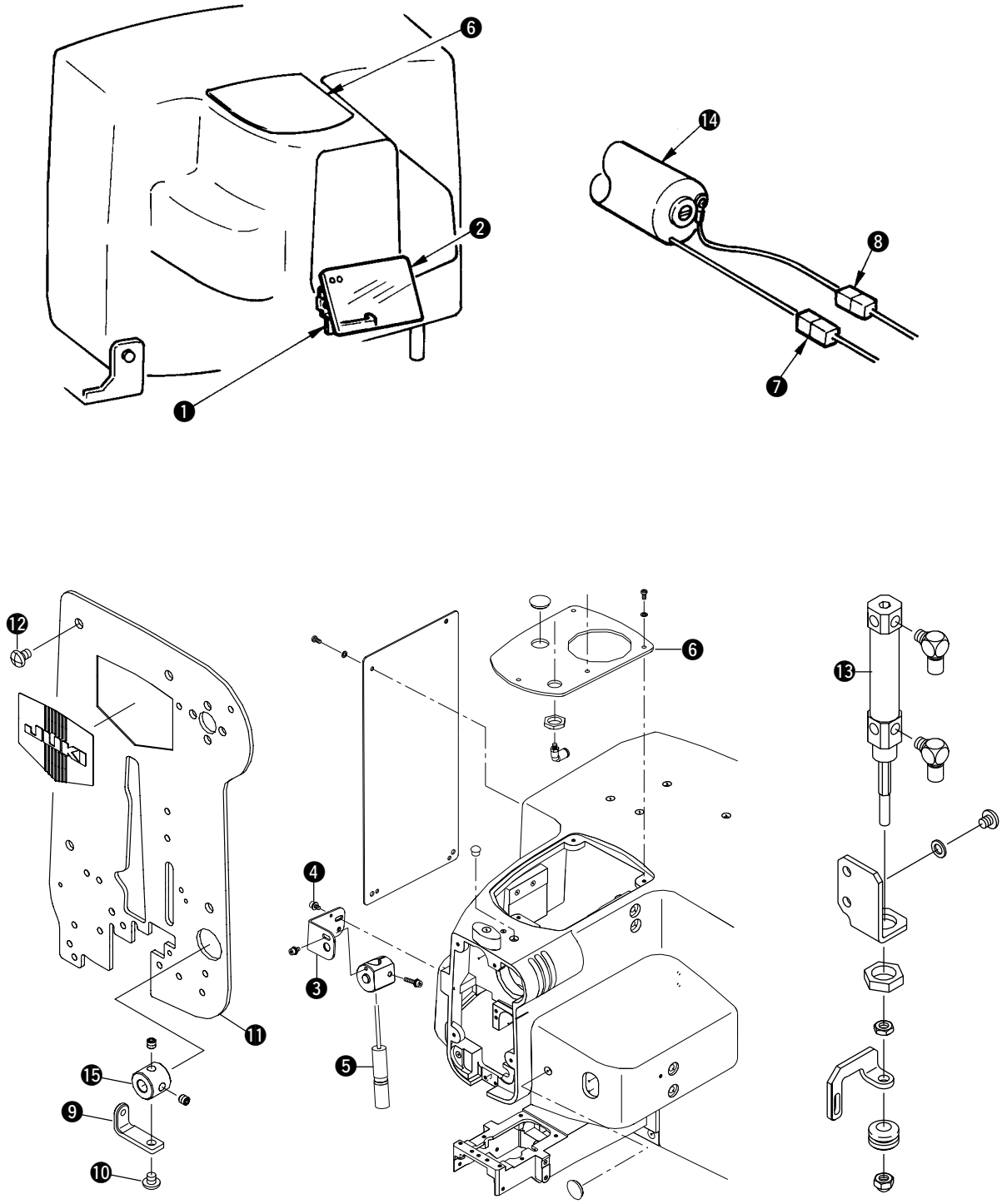


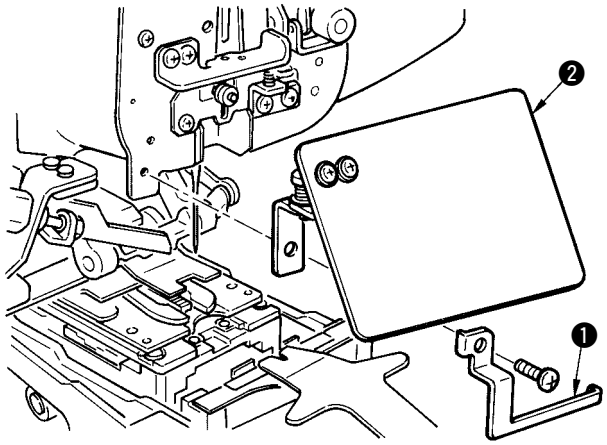
∗ Counterweight ⑲ is a set of components.

Procedures of disassembling / assembling	Caution in disassembling / assembling
Assembling of the main shaft 1. Enter main shaft ⓲ to counter weight ⓳, and tighten taper screw ㉓ and setscrew ㉒. 2. Enter main shaft ⓲ until it goes no further, tighten two setscrews ⓭ while taking thrust with sprocket bush A ⓬. 3. Tighten two setscrews ⓯ in main shaft bearing ⓮. 4. Adjust to the position of gear B ㉕, and tighten two setscrews ⓱ in gear A ⓰. **(Caution) When replacing timing belt ❹, proceed to step 5.** **If not, proceed to step 10.** 5. Temporarily tighten three setscrews ㉔ at the center of the slot of main shaft sprocket ❺. 6. Turn ON the power to display the needle bar angle of the sensor check screen. (Refer to "39. USING CHECK PROGRAM" in the Instruction Manual.) Angle of the main motor is displayed. Put timing belt ❹ to respective sprockets ❺, ❻ and ❼ at the position where the display of "0" degree almost aligns with the upper dead point of needle bar, and the looper is roughly adjusted. 7. Temporarily fix the idler pulley in the state that timing belt ❹ is slightly tense, loosen setscrew ㉔ in main shaft sprocket ❺, adjust it to the position where "0" degree of the panel aligns with the upper dead point of needle bar, and tighten setscrews ㉔. 8. Loosen setscrews ❾ in the idler pulley and tighten setscrews ❾ while applying tension to timing belt ❹. 9. Adjust the looper to the yoke slide. "Refer to (2) Adjusting the clearance between the needle and the looper, and (4) Adjusting the position of the yoke slide." Proceed to step 12. 10. Enter main shaft sprocket ❺ to sprocket bush A ⓬, adjust it to the position where marking has been performed, and tighten setscrews ㉔. 11. Adjust timing belt ❹ to the marking, put it to respective sprockets ❺, ❻ and ❼, and tighten two setscrews ❾ in idler pulley installing plate ❽ while applying tension to timing belt ❹. 12. Make sure of the direction of needle connecting rod ㉖, and simultaneously entering square block ㉗, assemble needle bar rocking base ㉘. Enter needle bar rocking shaft ㉙ and tighten setscrew ㉚ while taking the lengthwise thrust. "Refer to (3) Disassembling and assembling of the needle bar rocking base and the needle bar crank rod". 13. Assemble frame support plate ㉛, and tighten setscrew ㉜ while talking the lengthwise thrust at the lower section of needle bar rocking base ㉘. 14. Attach face plate ❸, rear cover ❶, arm cover ❷ and needle ㉝.	○ Assemble main shaft ⓲ so that screw No. 1 comes to the flat section. ○ Assemble main shaft ⓲ so that screw No. 1 comes to the flat section. ○ Press idler pulley ❽ with 85N load, and tighten two screws ❾. Make sure again that “0” degree of the panel aligns with the upper dead point of needle bar. If not, perform re-adjustment. ○ Press idler pulley ❽ to the right-hand side with 85N load, and tighten two screws ❾. **(Reference) There is a screw tapping of M5 in the bearing fulcrum shaft of idler pulley ❽. Attach screw or the like to this tapping to draw.**

(2) Disassembling and assembling of the face plate

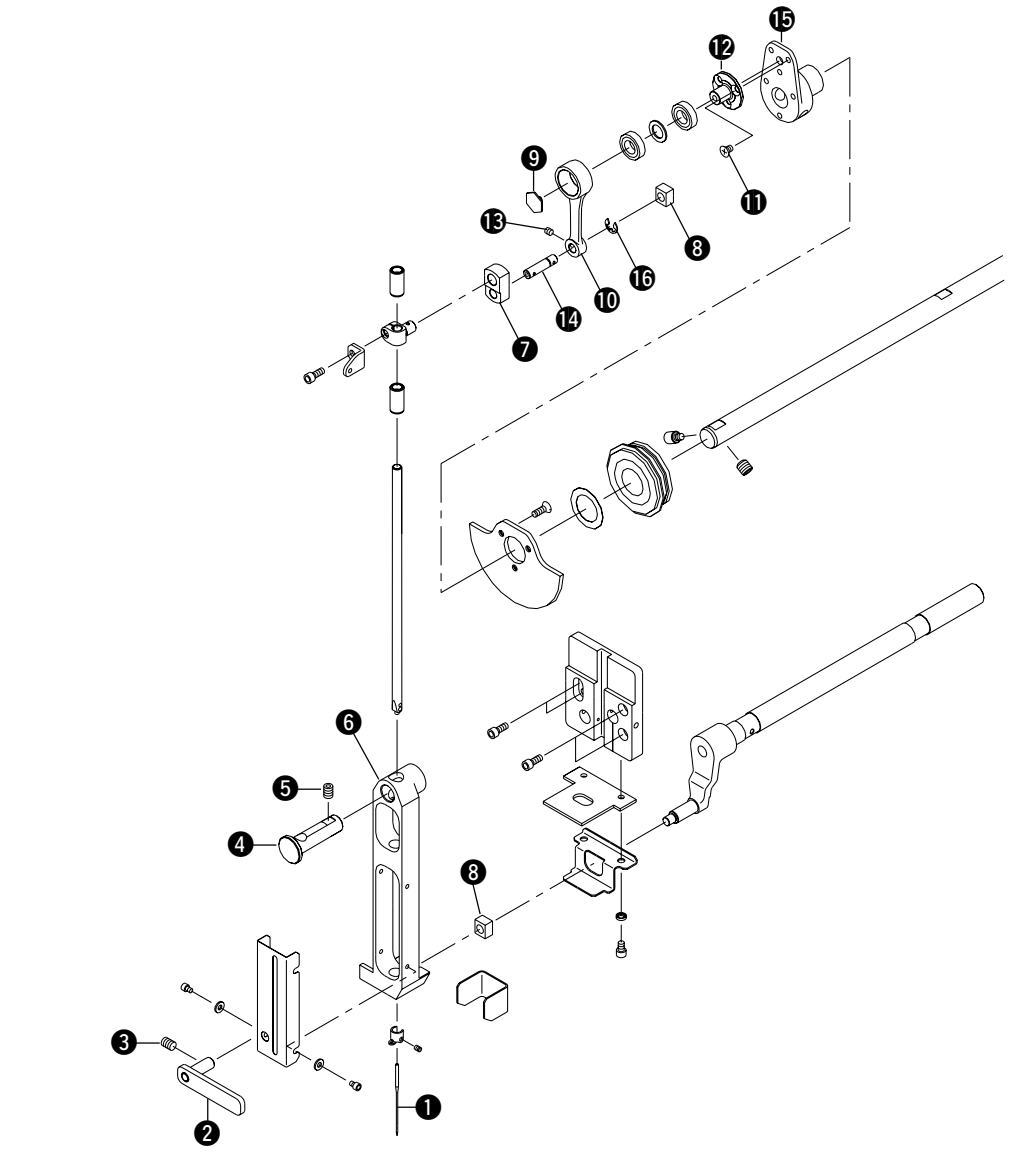
Procedures of disassembling / assembling

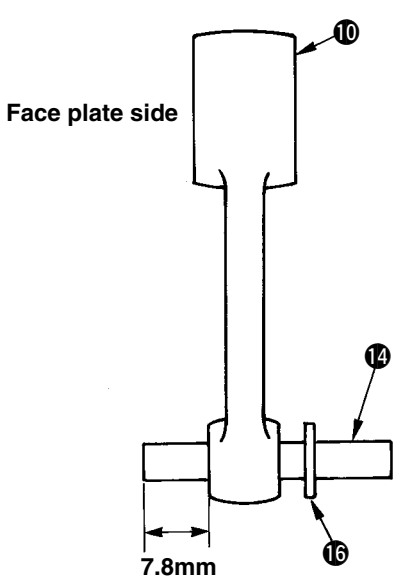


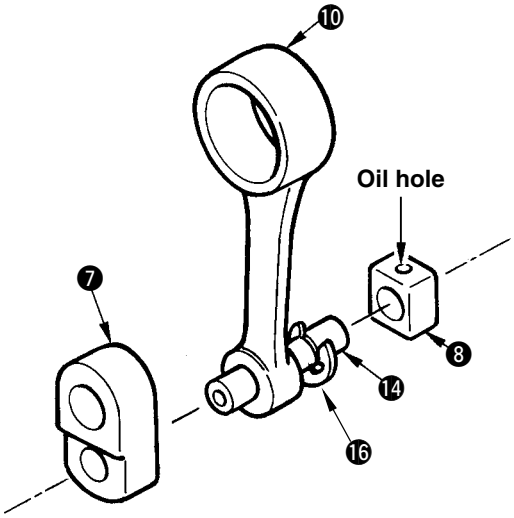
Procedures of disassembling / assembling	Caution in disassembling / assembling
Disassembling of the face plate 1. Remove finger guard ❶ and eye guard ❷. 2. Loosen setscrew ❹ of marking light stay ❸, and remove marking light ❺. 3. Remove top cover ❻, and remove the air tube of thread tension. "Refer to 15. AIR PIPING DIAGRAM." 4. Remove connector ❼ of active tension ⓮ and connector ❽ of temperature sensor. 5. Remove thread guide No. 2 ❾ . At this time, turn thread guide No. 2 ❾ so that setscrw ❿ can be easily removed. 6. Remove four setscrews ⓬ in face plate ⓫, slightly draw face plate ⓫ to the front, remove air tube of thread drawing cylinder ⓭, and remove face plate ⓫.	○ Marking light stay ❸ consists of U-groove, and can be removed when setscrew ❹ is loosened. ○ Lead wire of the temperature sensor is apt to be broken. Be careful not to apply the stress to the wire.
Assembling of the face plate 1. Entering connector ❼ of active tension ⓮ and connector ❽ of temperature sensor so that they are not caught in the frame, attach air tube of thread drawing cylinder ⓭, set face plate ⓫ until it goes no further, and tighten four setscrews ⓬. 2. Connect connector ❼ of active tension ⓮ with connector ❽ of temperature sensor. 3. Attach the air tube of thread tension, and install top cover ❻. 4. Adjust thread guide No. 2 ❾ to the groove of boss ⓯ and install it with setscrew ❿. 5. Install marking light ❺ and adjust the position. 6. Install finger guard ❶ and eye guard ❷.	○ Be careful that air tube of thread drawing cylinder ⓭ and wiring of active tension ⓮ temperature sensor do not come in contact with the moving parts such as main shaft or the like.
	

(3) Disassembling and assembling of the needle bar rocking base and the needle bar crank rod

Procedures of disassembling / assembling



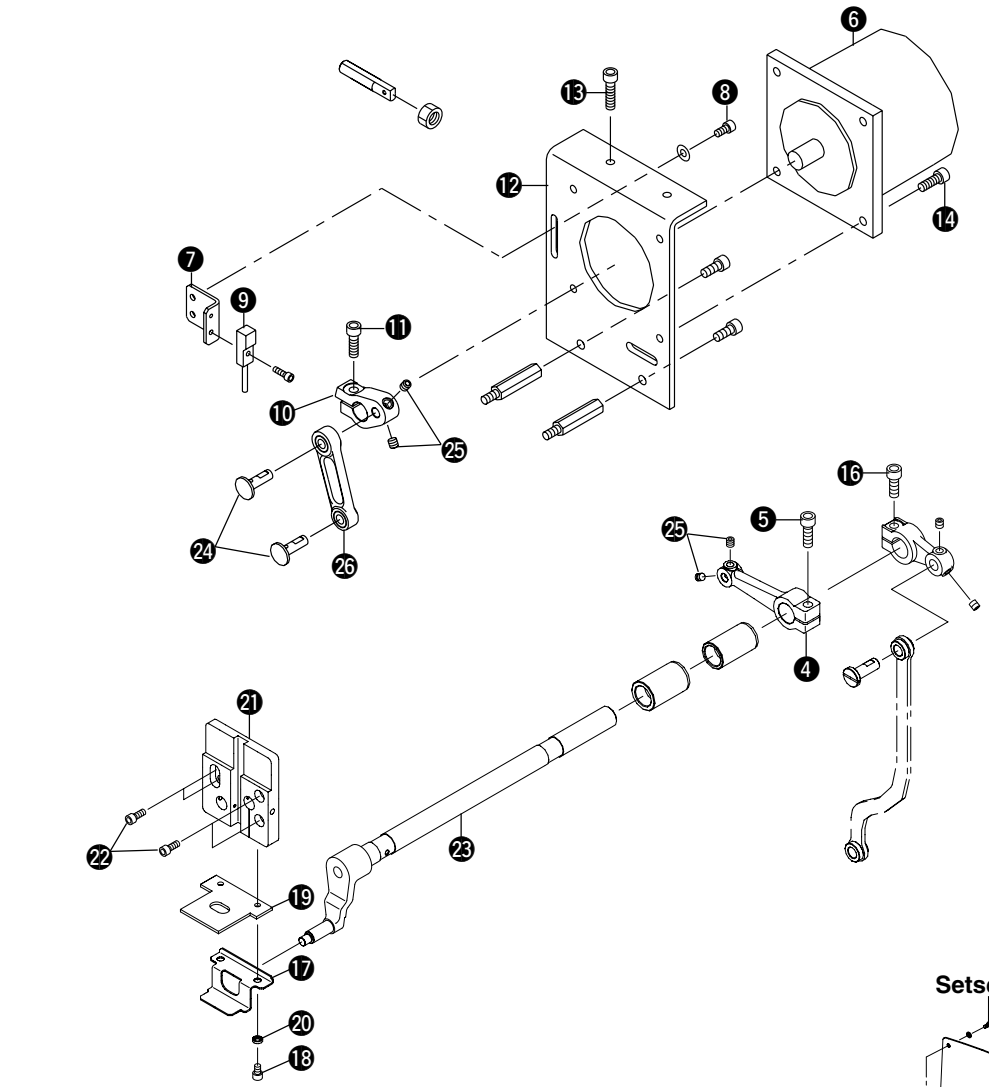


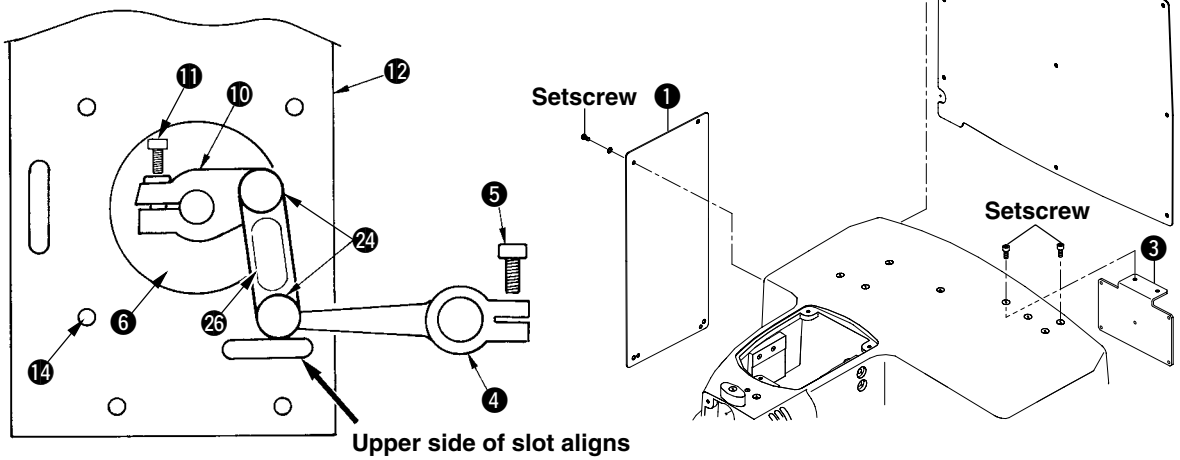


Procedures of disassembling / assembling	Caution in disassembling / assembling
Disassembling of the needle bar crank rod	
1. Remove needle ❶ and face plate. "Refer to (2) Disassembling and assembling of the face plate".	
2. Loosen setscrew ❸ in frame support ❷, and remove frame support ❷.	○ There is a flat section at setscrew section of frame support ❷.
3. Lower the needle bar, loosen setscrew ❺ in needle bar rocking shaft ❹, remove needle bar rocking shaft ❹, and remove needle bar rocking base ❻. At this time, be careful not to lose needle bar connecting rod ❼ and square block ❽.	○ There is a flat section at setscrew section of needle bar rocking shaft ❹.
4. Remove crank rod setscrew ❾, and remove crank rod ❿. At this time, be careful not to lose square block ❽.	
5. Remove needle bar crank setscrew ⓫, and remove needle bar crank ⓬.	
6. Loosen crank rod shaft setscrew ⓭, and remove crank rod shaft ⓮. Draw it out on the E-ring ⓰ side since E-ring ⓰ is attached.	○ There is a flat section at setscrew section of crank rod shaft ⓮.
Assembling of the needle bar crank rod	
1. Paying attention to the direction of crank rod ❿, enter crank rod shaft ⓮, adjust it to the flat position with the protruding amount of 7.8 mm, tighten setscrew ⓭, and install crank rod shaft ⓮.	
2. Install needle bar crank ⓬ to counter weight ⓯ with setscrew ⓫.	
3. Paying attention to the direction of crank rod ❿, enter square block ❽ to crank rod shaft ⓮, assemble them to needle bar crank ⓬, and tighten setscrew ⓫.	○ Set the oil hole of square block ❽ to the upside
4. Paying attention to the direction and entering procedure of needle bar connecting rod ❼, assemble needle bar rocking base ❻ while entering square block ❽.	
5. Enter needle bar rocking shaft ❹ with the flat section upward, and tighten setscrew ❺ while taking the lengthwise thrust.	○ Assemble so that the base smoothly rocks without looseness.
6. Enter frame support ❷, and tighten setscrew ❸ while taking the lengthwise thrust.	○ There is a flat section at setscrew section of frame support ❷.
7. Assemble the face plate "refer to (2) Disassembling and assembling of the face plate", and attach needle ❶.	Assemble so that needle bar rocking base ❻ smoothly rocks without looseness.

(4) Disassembling and assembling of the needle throwing motor and the needle bar rocking arm (1/2)

Procedures of disassembling / assembling



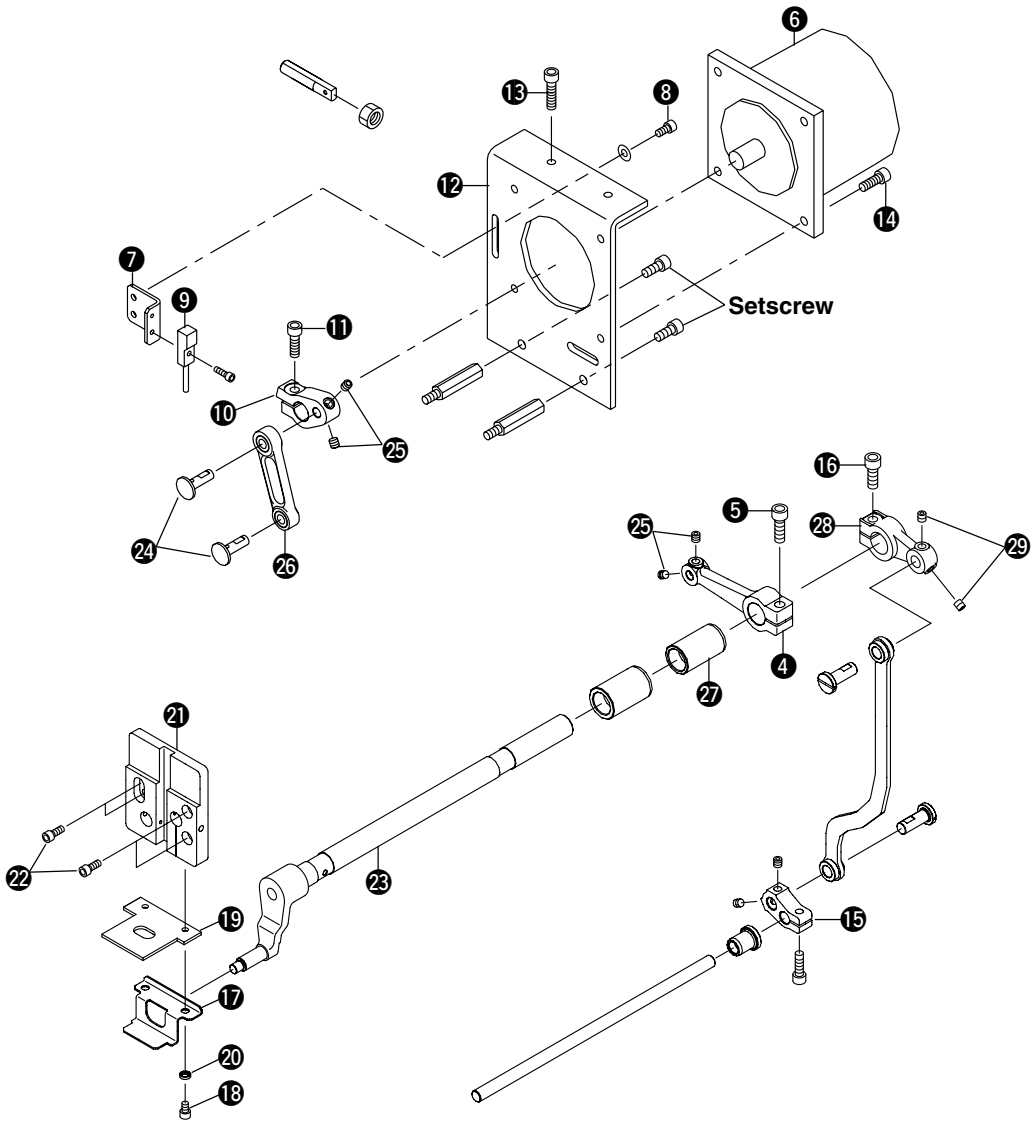


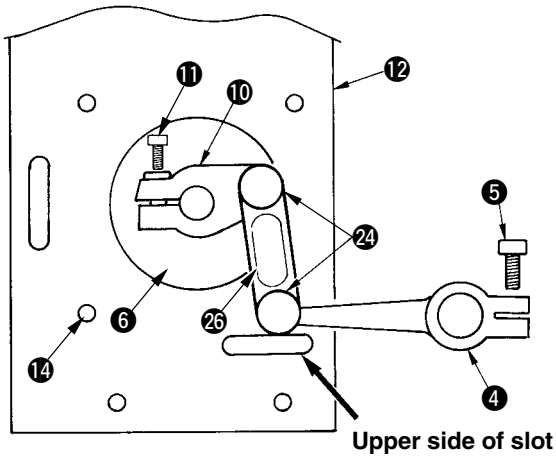
Procedures of disassembling / assembling	Caution in disassembling / assembling
Disassembling of the needle throwing motor and the needle bar rocking arm 1. Remove needle, remove face plate "refer to (2) Disassembling and assembling of the face plate.", and remove needle bar rocking base "refer to (3) Disassembling and assembling of the needle bar rocking base and the needle bar crank rod." 2. Remove side cover ❶ and rear cover ❷. 3. Remove relay circuit board installing plate ❸. (Connector may not be removed. However, remove it when it is hard to perform the work.) 4. Loosen setscrew ❺ in needle throwing lever, rear ❹. **(Caution) When removing needle throwing motor ❻, proceed to step 5. If not, proceed to step 9.** 5. Remove setscrew ❽ in needle throwing sensor installing plate ❼, and remove needle throwing sensor ❾. 6. Turn needle throwing motor drive arm ❿, and loosen setscrew ⓫ after setting it to the position where it is easily loosened. 7. Remove setscrew ⓭ in needle throwing motor installing base ⓬, and remove needle throwing motor ❻ (coupling). 8. Remove setscrew ⓮ in needle throwing motor ❻, and remove needle throwing motor ❻. 9. Loosen setscrew ⓰ in looper rocking lever ㉘. 10. Remove setscrew ⓲ in needle bar cover ⓱, and take out felt ⓳ and needle bar cover ⓱. 11. Remove setscrew ㉒ in needle bar square block base ㉑, and remove needle bar square block base ㉑. 12. Draw out needle bar rocking arm (asm.) ㉓. 13. Loosen setscrew ㉕ in needle throwing connecting shaft A ㉔, and remove needle throwing rod ㉖ and needle throwing connecting shaft A ㉔ from needle throwing lever, rear ❹. 14. Loosen setscrew ㉕ in needle throwing connecting shaft A ㉔, and remove needle throwing rod ㉖ and needle throwing connecting shaft A ㉔ from needle throwing motor drive arm ❿.	○ There is washer ⓴ in setscrew ⓲. Be careful not to lose it. ○ There is a flat section at setscrew section of needle throwing connecting shaft A ㉔. ○ There is a flat section at setscrew section of needle throwing connecting shaft A ㉔. ○ Needle throwing connecting shaft A ㉔ is the selective part. There are four kinds from A to D. Select an adaptable needle throwing connecting shaft from among them for use.

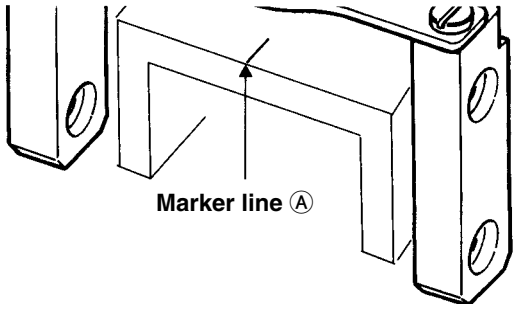
(4) Disassembling and assembling of the needle throwing motor and the needle bar rocking arm (2/2)

Procedures of disassembling / assembling

[Main shaft components]





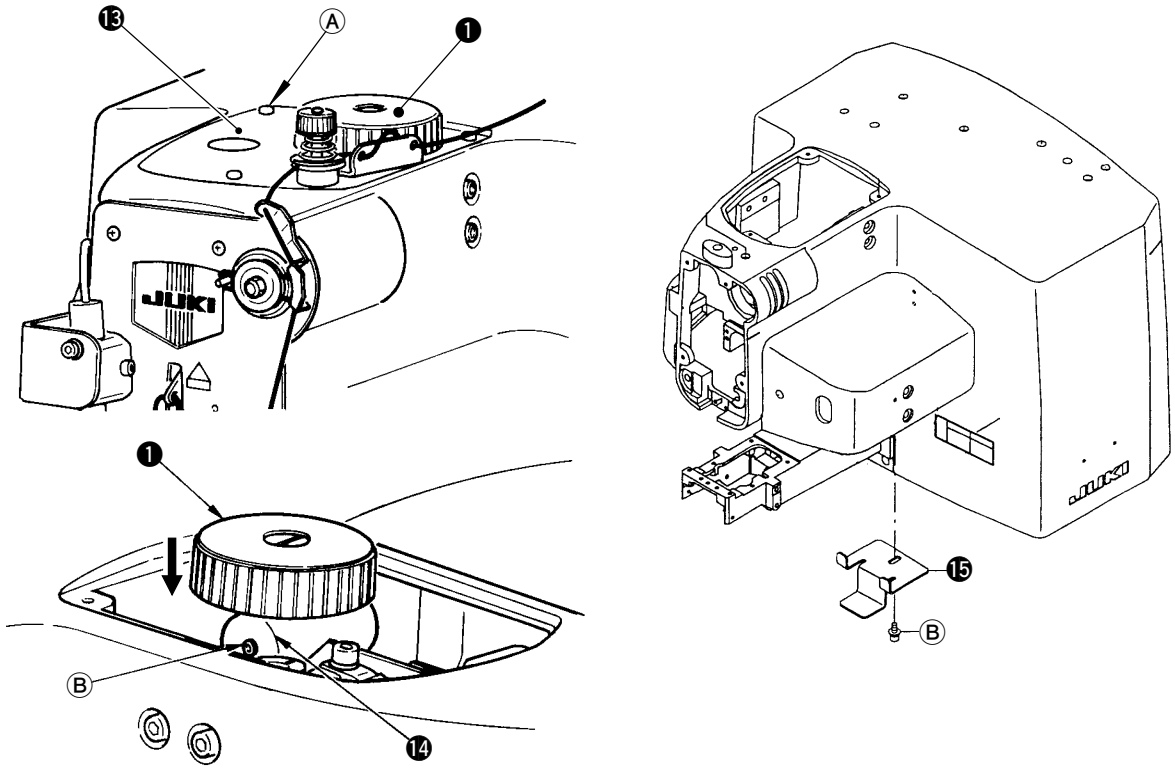


Upper side of slot aligns with bottom edge of needle throwing connecting shaft A ㉔.

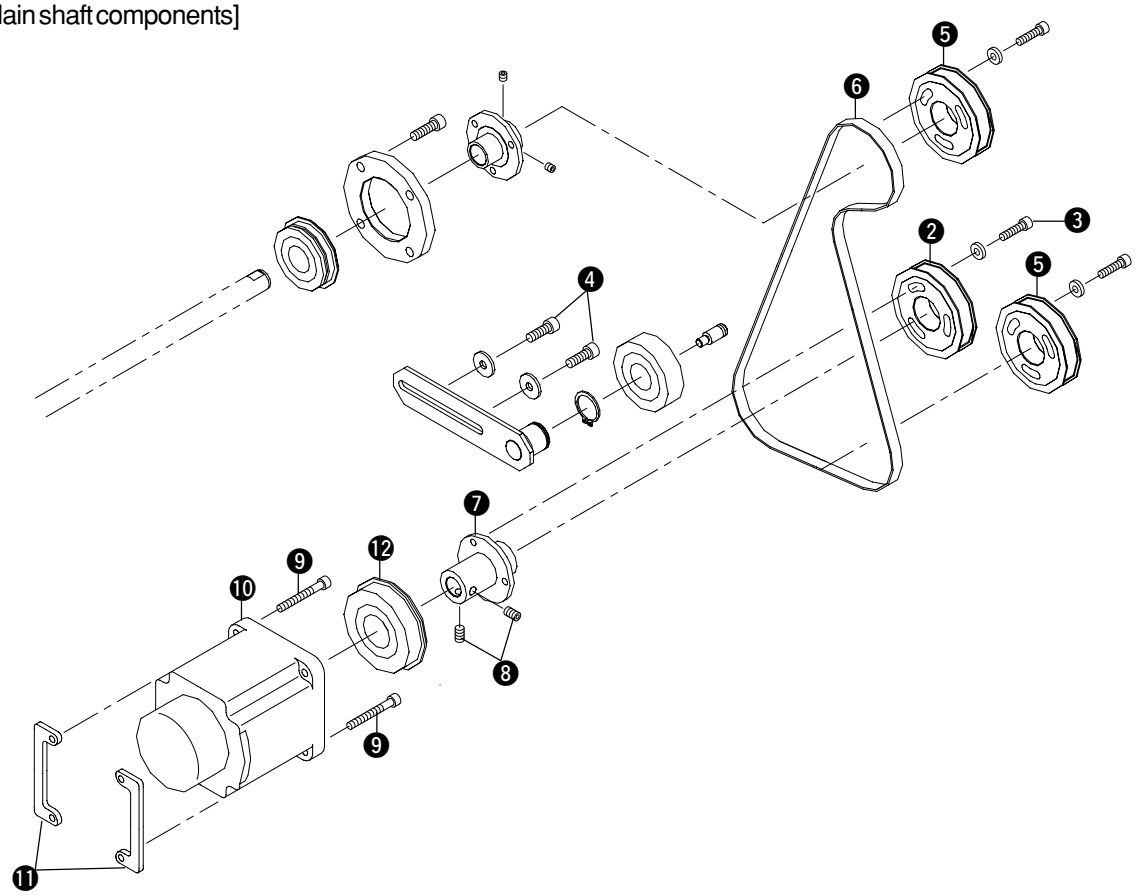
Procedures of disassembling / assembling	Caution in disassembling / assembling
Assembling of the needle throwing motor and the needle bar rocking arm **(Caution) When needle throwing motor ❻ is removed, proceed to step 1. If not, proceed to step 6.** 1. Install needle throwing motor ❻ on installing base ⓬ with setscrews ⓮. 2. Paying attention to the assembling direction, enter needle throwing connecting shaft A ㉔ to needle throwing rod ㉖ and needle throwing lever, rear ❹, adjust it to the flat section, and tighten with setscrews ㉕.	○ Assemble so that the components smoothly rock without looseness. ○ Needle throwing connecting shaft A ㉔ is the selective part. There are four kinds from A to D. Select an adaptable needle throwing connecting shaft from among them for use.
3. Paying attention to the assembling direction, enter needle throwing connecting shaft A ㉔ to needle throwing rod ㉖ and needle throwing motor drive arm ❿, adjust it to the flat section, and tighten setscrews ㉕. 4. Paying attention to the assembling direction, enter needle throwing motor drive arm ❿ to the shaft of needle throwing motor ❻, and temporarily tighten screw ⓫ at the position where both planes of the top end of shaft and needle throwing motor drive arm ❿ align with each other. 5. Install needle throwing motor installing base ⓬ with setscrews ⓭. 6. Entering needle bar rocking arm (asm.) ㉓ from the face plate section, pass it through needle throwing lever, rear ❹ and looper drive lever ㉘. **(Caution) When needle throwing motor ❻ is removed, proceed to step 7. If not, proceed to step 9.** 7. Loosen setscrew ⓫ in needle throwing motor drive arm ❿, make needle throwing lever, rear ❹ come in contact with metal ㉗, and tighten setscrew ⓫ in needle throwing motor drive arm ❿ at the position where it smoothly moves. 8. Temporarily tighten meedle throwing sensor installing plate ❼ at the center of the slot with setscrew ❽. 9. Temporarily tighten needle bar square block base ㉑ with setscrews ㉒. 10. Attach felt ⓳ together with needle bar cover ⓱ and washer ⓴ using setscrew ⓲. 11. Assemble the needle bar rocking base. "Refer to (3) Disassembling and assembling of the needle bar rocking base and the needle bar crank rod." 12. Loosen setscrews ㉒ in needle bar square block base ㉑, move the needle bar up and down to check whether there is any torque. Then tighten sertscrews ㉒. 13. Attach needle, and align the needle with engraved marker line Ⓐ on the machine bed when the needle bar is in the lowest position (lateral direction). "Refer to (13) Adjusting the tongue stopper." At this time, align the bottom edge of needle throwing connecting shaft A ㉔ with the upper side of the slot of motor installing base ⓬. Then taking the lengthwise thrust of needle bar rocking arm (asm.) ㉓ with needle throwing lever, rear ❹, tighten setscrew ❺ in needle throwing lever, rear ❹. 14. Align the needle with engraved marker line Ⓐ on the machine bed when the needle bar is in the lowest position. “Refer to (13) Adjusting the tongue stopper” (lateral direction). At this time,move looper rocking lever ㉘ to and fro at the position where the bottom end of engraved marker line Ⓐ on the machine bed is aligned with the edge on the lower side of the slot of looper rocking lever B ⓯. Then tighten setscrew ㉙ at the position where the looper rocking lever smoothly moves. 15. Make sure of the position of the needle and the yoke slide when the needle bar is in the lowest position. "Refer to (7) Disassembling and assembling of the looper rocking link and the looper rocking shaft and (4) Adjusting the position of the yoke slide."	○ Assemble so that the components smoothly rock without looseness. ○ Assemble so that the components smoothly rock without looseness. If the adjustment is improper, the lateral needle throwing fails to perform symmetrically. ○ Assemble so that the components smoothly rock without looseness. If the adjustment is improper, the lateral looper throwing fails to perform symmetrically.

(5) Replacing the main motor

Procedures of disassembling / assembling



[Main shaft components]

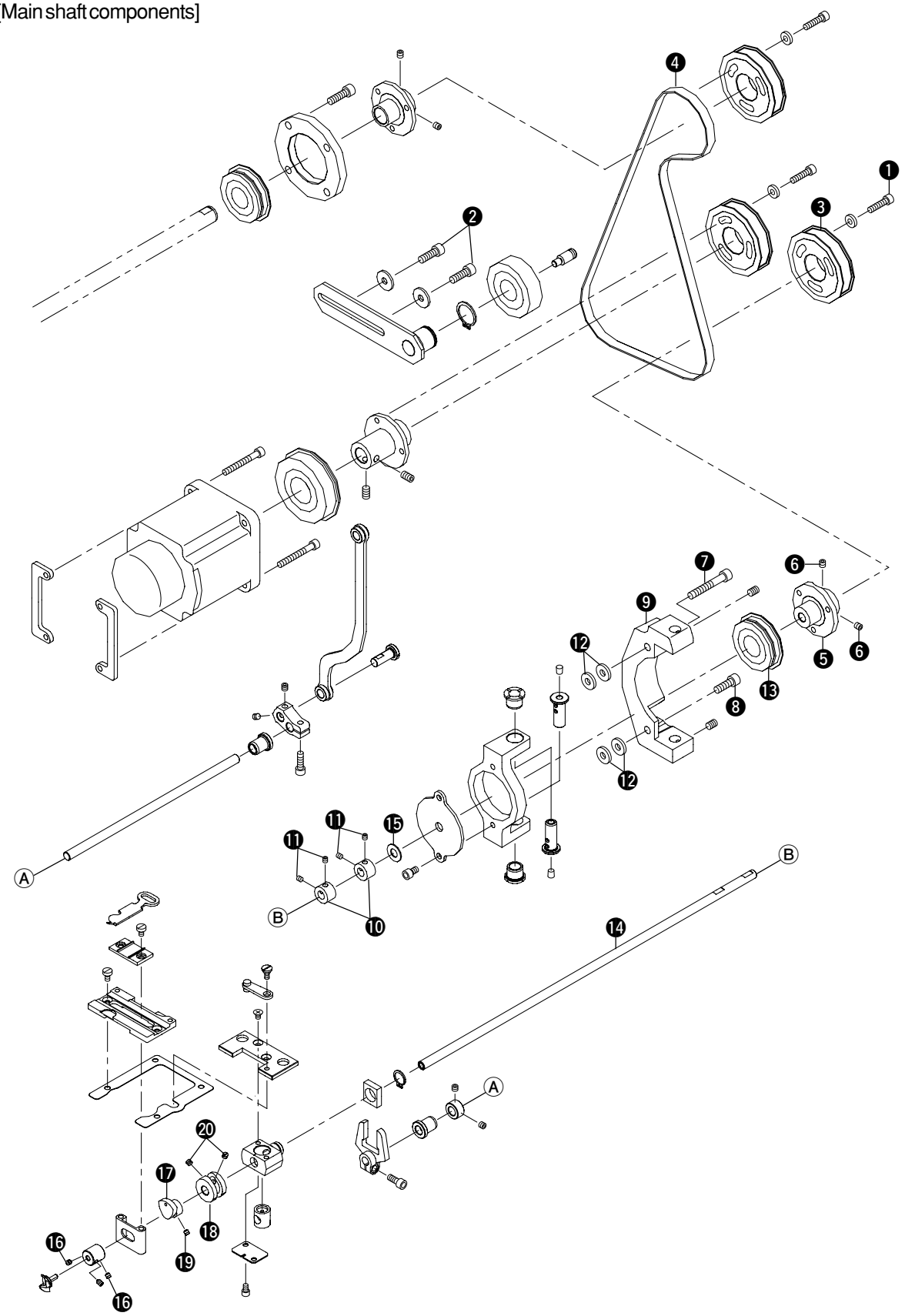


Procedures of disassembling / assembling	Caution in disassembling / assembling
Removing the main motor 1. Fix the main shaft with hand pulley ❶, and loosen three setscrews ❸ in main motor sprocket ❷. Loosen two idler setscrews ❹, and remove main motor sprocket ❷. At this time, fix timing belt ❻ with gum-tape or the like while holding timing belt ❻ with sprockets ❺ of main shaft and looper shaft so that timing between main shaft and looper shaft is not changed. 2. Loosen two main motor fixing screws ❽ of main motor bearing bush ❼, and remove main motor bearing bush ❼. 3. Loosen four motor setscrews ❾, remove main motor ❿, and draw out the connector. **Installing the main motor** 1. After adjusting the boss section of main motor ❿ to the hole and pressing it so that the main motor cord is on the front side, put the main motor between two main motor installing plates ⓫ and four main motor setscrews ❾, and temporarily tighten the motor. 2. Adjust the flat section of main motor shaft to screw No. 1 of main motor bearing bush ❼, put main motor bearing bush ❼ between main motor bearing ⓬ and the main motor shaft, and securely tighten four main motor setscrews ❾. 3. Pressing main motor bearing bush ❼ to main motor bearing ⓬, loosen main motor shaft fixing screws ❽. 4. Draw out the main motor cord from the slot located on the bottom face of frame, pass it through the hole of control box under the table, and insert the connector. 5. Assemble sprockets ❷ and ❺, put timing belt ❻, and perform timing adjustment of main shaft and main motor ❿. "Refer to (1) Disassembling and assembling of the main shaft." Adjust the timing with the adjustment of main motor sprocket ❷ since the timing between main shaft and looper shaft is adjusted. **Fixing procedure of the main shaft** 1. Remove three setscrews Ⓐ, and remove top cover ⓭. 2. Adjust the main shaft to the upper dead point. 3. Setscrew Ⓑ is used for fixing the main shaft using setscrew Ⓑ for fixing bottom feed unit (plate support ⓯). 4. This setscrew Ⓑ is the screw for fixing the bottom feed unit at the time of delivery from factory and transportation. It is the screw which is removed and not used at the time of sewing. 5. Press down hand pulley ❶, install setscrew Ⓑ to hand pulley installing base ⓮, and fix the hand pulley. 6. When releasing the fixing, remove setscrew Ⓑ.	

(6) Replacing the looper rocking base

Procedures of disassembling / assembling

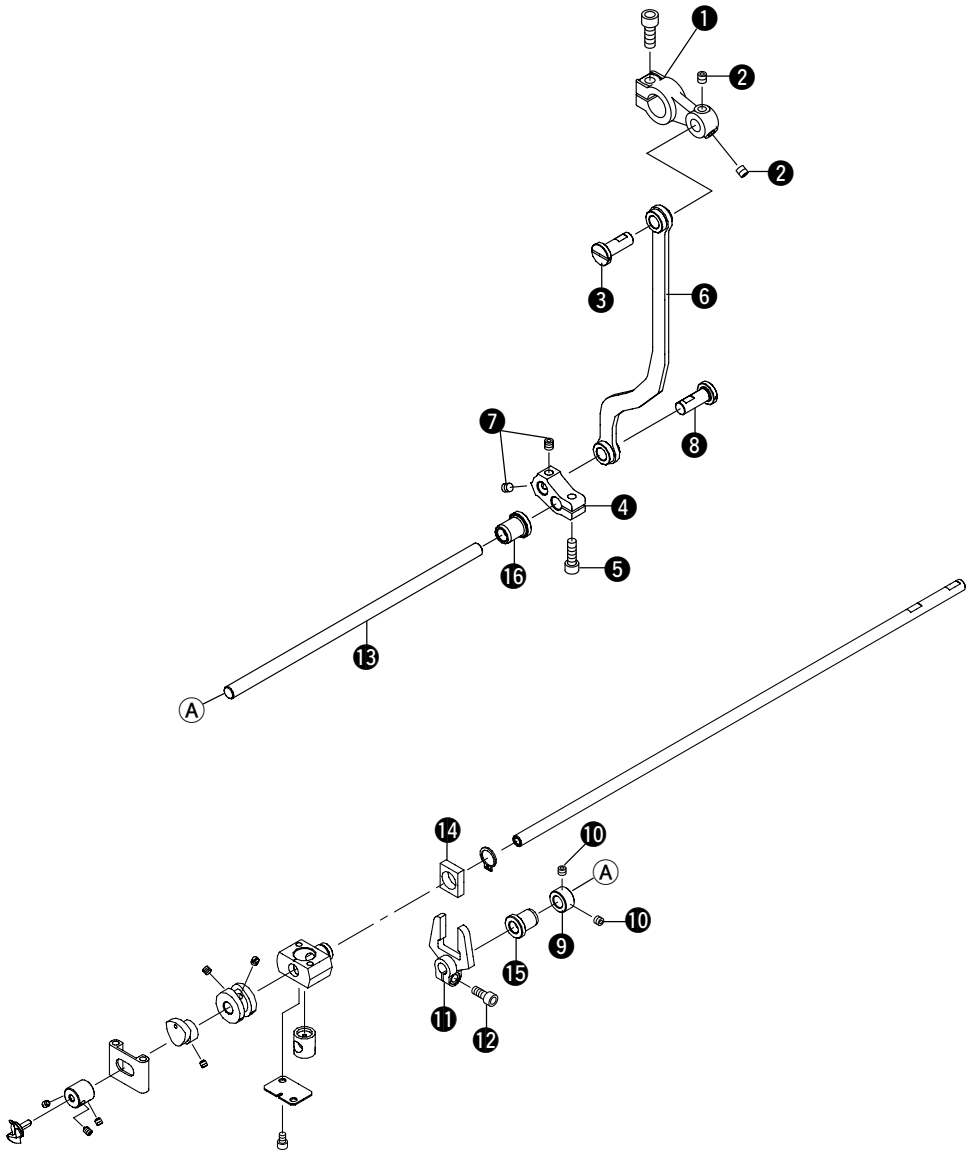
[Main shaft components]

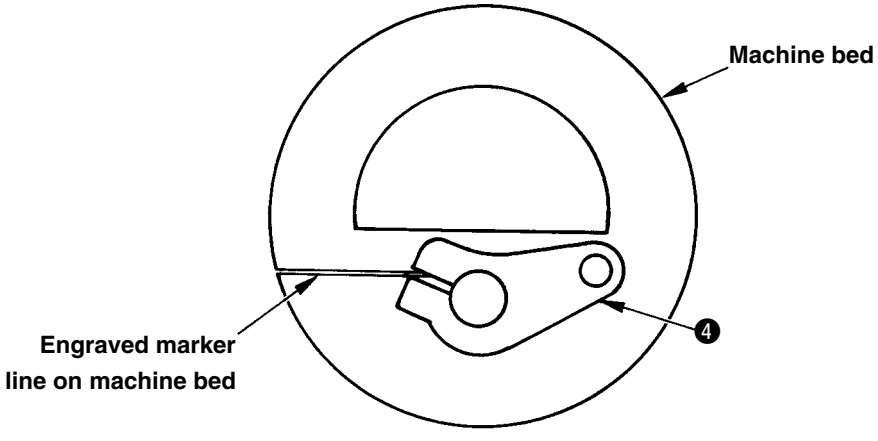


Procedures of disassembling / assembling	Caution in disassembling / assembling
Removing the looper rocking base 1. Fix the main shaft with hand pulley, and loosen three looper shaft sprocket setscrews ❶. 2. Loosen two idler setscrews ❷, and remove looper shaft sprocket ❸. At this time, fix timing belt ❹ with gum-tape or the like while holding timing belt ❹ with the sprockets of main shaft and main motor shaft so that the timing of main shaft and main motor shaft is not changed. 3. Loosen two looper shaft fixing screws ❻ of looper bearing bush ❺, and remove looper bearing bush ❺. 4. Loosen two looper rocking base fixing screws ❼ and ❽, and remove looper rocking base ❾. 5. Loosen four setscrews ⓫ of two looper shaft thrust collars ⓾. **Installing the looper rocking base** 1. Place four washers ⓬ to looper rocking base ❾, and aim at the center of screw holes of the washers to attach the base with two looper rocking base fixing screws ❼ and ❽. 2. Insert looper bearing bush ❺ to looper shaft bearing ⓭, adjust the flat section of looper shaft ⓮ to screw No. 1 of looper bearing bush ❺ in the state that the edge of looper bearing bush ❺ is aligned with the edge of looper shaft ⓮, and tighten looper shaft fixing screws ❻. 3. Insert thrust washer ⓯ to looper shaft thrust collar ⓾ in the rear, and take the thrust looseness of looper shaft ⓮. Then adjust the flat section of looper shaft ⓮ to screw No. 1, and fix the collars with four setscrews ⓫. 4. Put looper shaft thrust collar ⓾ on the front side to the edge of the other thrust collar ⓾ and fix it with four setscrews ⓫. 5. Insert looper shaft sprocket ❸ to looper bearing bush ❺, and tighten screws ❶ in the center of the slot of looper shaft sprocket ❸. 6. Loosen looper sleeve setscrew ⓰, and setscrews ⓳ and ⓴ of yoke slide triangle cam ⓱ and yoke slide lengthwise cam ⓲. 7. After performing looper adjustment "refer to (2) Adjusting the clearance between the needle and the looper.", and perform adjustment of the yoke slide triangle cam and the yoke slide lengthwise cam "refer to (4) Adjusting the position of the yoke slide.".	

(7) Disassembling and assembling the looper rocking link and the looper rocking shaft

Procedures of disassembling / assembling

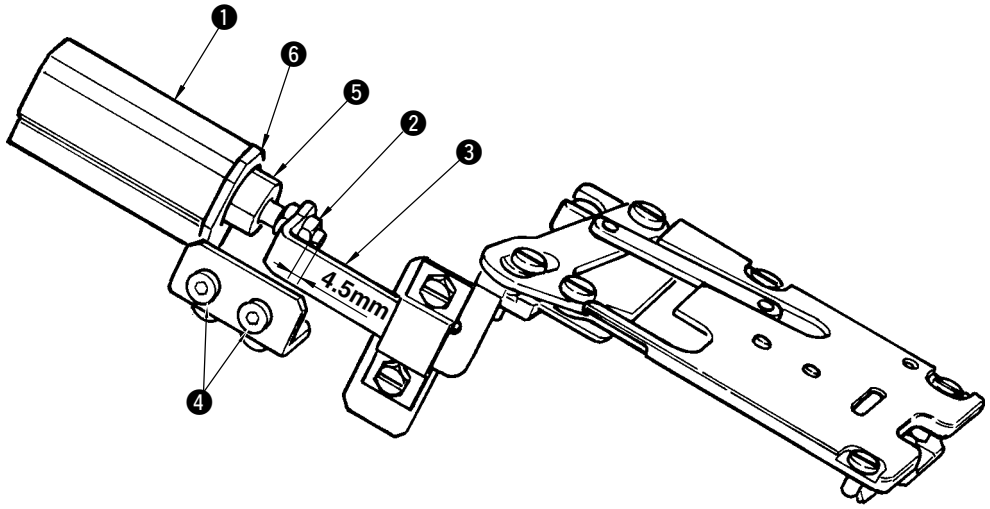




Procedures of disassembling / assembling	Caution in disassembling / assembling
Disassembling the looper rocking link and the looper rocking shaft 1. Remove the rear cover. 2. Remove the relay circuit board installing plate. (Connector may not be removed. However, remove it when it is hard to perform the work.) 3. Loosen pin setscrews ❷ of looper rocking lever ❶, and draw out pin ❸. 4. Tilt the machine head, loosen setscrew ❺ of looprer rocking lever B ❹, and remove looper rocking link (asm.) ❻. 5. Loosen pin setscrews ❼ of looper rocking lever B ❹, and draw out pin ❽. 6. Loosen setscrews ❿ of thrust collar ❾. 7. Loosen setscrew ⓬ of looper rocking arm ⓫, and draw out looper rocking shaft ⓭.	
Assembling the looper rocking link and the looper rocking shaft 1. Paying attention to the assembling direction of looper rocking arm ⓫, set the arm to square block ⓮, enter looper rocking shaft ⓭ to looper rocking arm ⓫, looper rocking metal ⓯ and thrust collar ❾, align the front end of looper rocking arm ⓫ with the front end of looper rocking shaft ⓭, and temporarily tighten setscrew ⓬ of looper rocking arm ⓫.	
2. Take the thrust of looper rocking shaft ⓭ with thrust collar ❾.	
3. Paying attention to the assembling direction, enter pin ❽ to looper rocking link ❻ and looper rocking lever B ❹, adjust it to the flat section, and tighten setscrews ❼.	○ Assemble so that the components smoothly rock without looseness.
4. Paying attention to the assembling direction, enter looper rocking lever B ❹ to looper rocking shaft ⓭, enter pin ❸ to looper rocking link (asm.) ❻ and looper rocking lever ❶, adjust it to the flat section, and tighten setscrews ❷.	○ Assemble so thart the components smoothly rock without looseness.
5. Attach the needle, and align the needle with the engraved marker line on the machine bed when the needle bar is in the lowest position (lateral direction).	○ Make sure that the bottom end of the engraved marker line on the machine bed aligns with the edge of the lower side of slot of looper rocking lever B ❹. "Refer to (4) Disassembling and assembling of the needle throwing motor and the needle bar rocking arm." Tilt the machine head, adjust the lateral position of the needle and the yoke slide. "Refer to (4) Adjusting the position of thge yoke slide." Press looper rocking lever B ❹ to looper rocking shaft metal ⓰, and tighten setscrew ❺.
6. Raise the machine head, and confirm again adjustment of step 5. When it is good, tighten setscrew ⓬ of looper rocking arm ⓫. When it is not good, loosen setscrew ⓬ of looper rocking arm ⓫, and perform adjustment.	○ When the lateral position is improper, sewing trouble will be caused.

(8) Replacing the thread trimmer cylinder

Procedures of disassembling / assembling

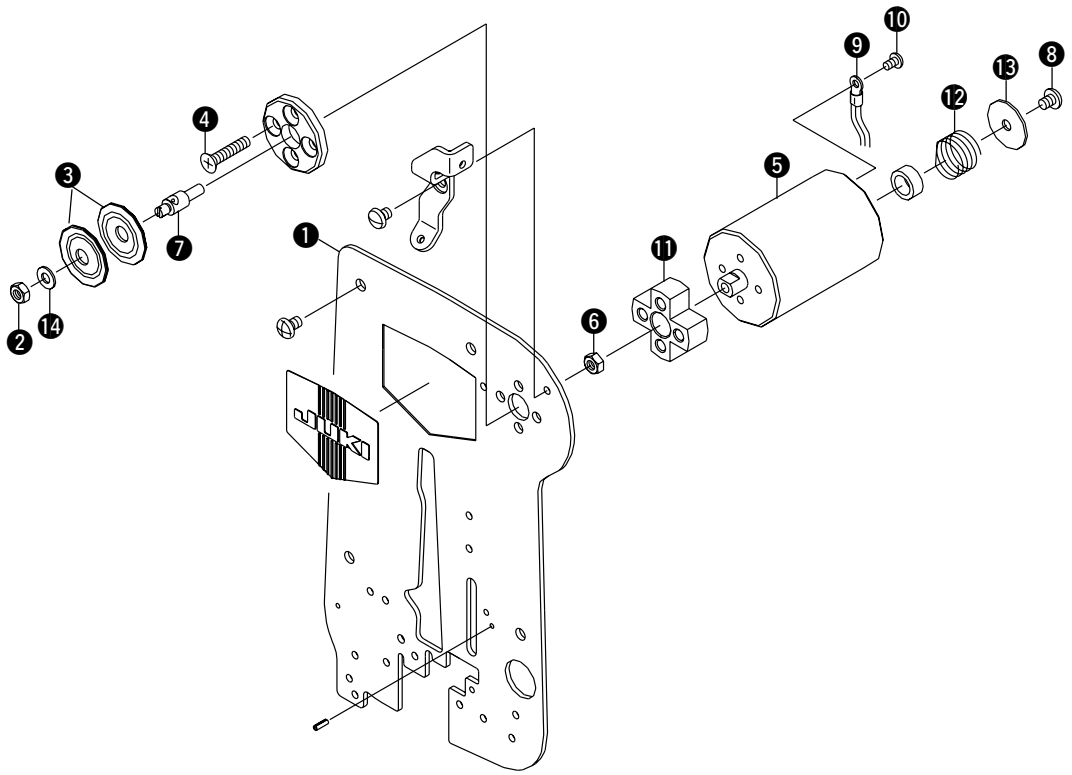


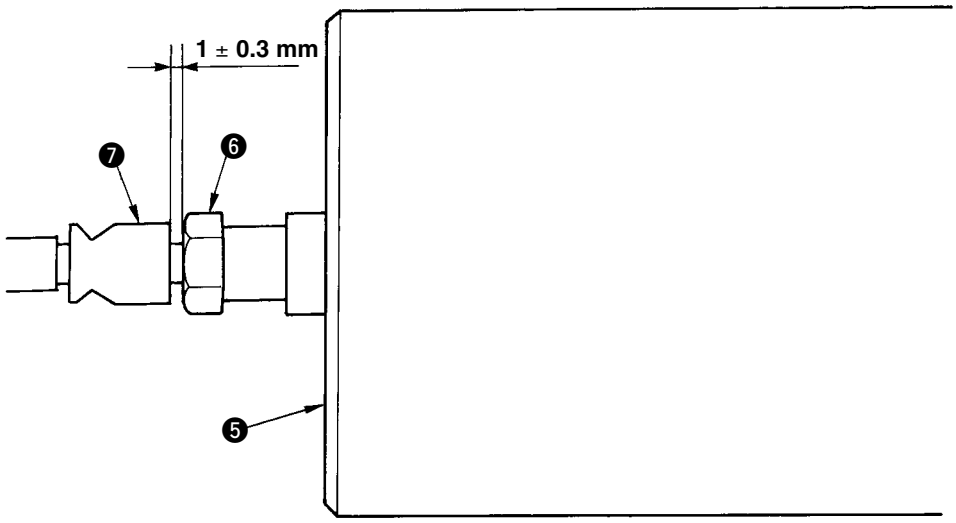
Procedures of disassembling / assembling	Caution in disassembling / assembling
Cylinder removing procedure 1. Remove nut ❷ from cylinder ❶, and remove link ❸. 2. Remove screw ❹, remove air tube, and take out cylinder ❶ from the machine. 3. Remove nut ❺, and replace cylinder ❶. **Cylinder assembling procedure** * Temporarily tighten the screw since the adjustment of position is performed after assembling, 1. Assemble cylinder ❶ to cylinder installing plate ❻, and connect air tube. 2. Assemble cylinder installing plate ❻ to the machine bed with screw ❹. 3. Assemble link ❸ to the cylinder rod. Fix the dimension between the top end of cylinder rod and nut ❷ to 4.5 mm.	

(9) Replacing and adjusting the active tension (VCM)

Procedures of disassembling / assembling

[Thread tension components]

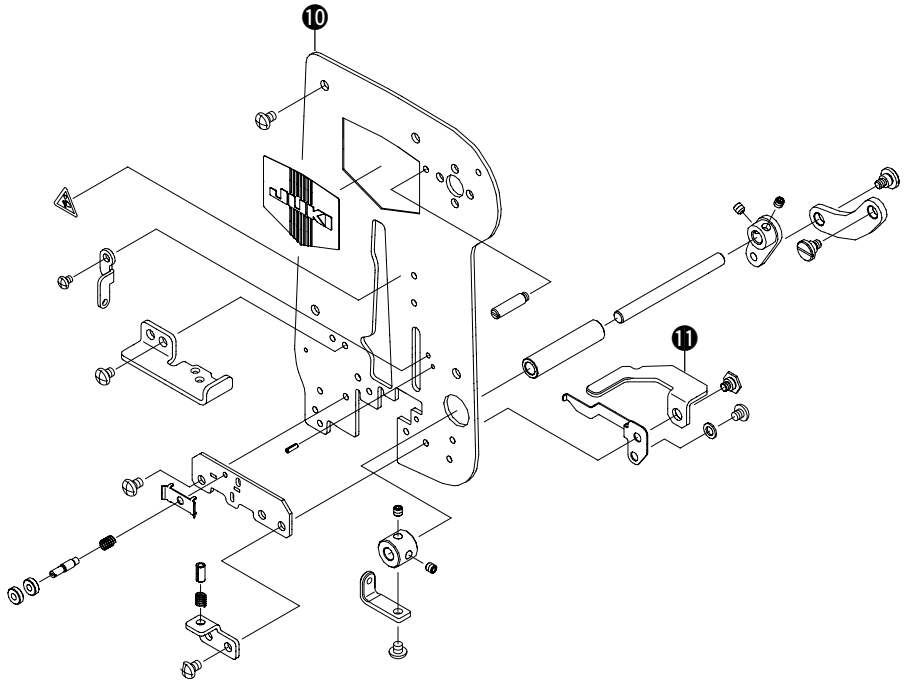


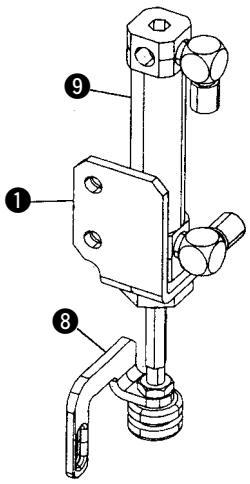


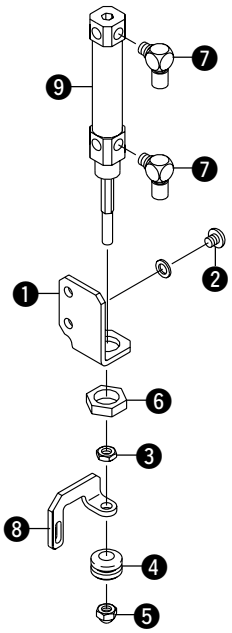
Procedures of disassembling / assembling	Caution in disassembling / assembling
Removing active tension 1. Rmove face plate ❶. "Refer to (2) Disassembling and assembling the face plate." 2. Remove thread tension disk lock nut ❷, and remove thread tension disk ❸. 3. Loosen active tension setscrew ❹, and remove active tension (VCM) ❺ from face plate ❶. 4. Fix the flat section of active tension shaft with a spanner or the like, loosen active tension stud adjustment nut ❻, remove active tension stud ❼, and remove spring setscrew ❽ on the opposite side as well. 5. Cut the cable clip band fixing temperature sensor ❾, and remove temperature sensor ❾ with setscrew ❿. **Assembling active tension** 1. Fix the flat section of active tension shaft with a apanner or the like, insert spacer ⓫, spring ⓬ and washer ⓭, and tighten it with spring setscrew ❽. 2. Screw in active tension stud ❼ with adjustmrent nut ❻ to active tension shaft. Adjust the end of active tension stud ❼ to the end of adjustment nut ❻ to 1 ± 0.3 mm, and tighten adjustment nut ❻. 3. Install temperature sensor ❾ with setscrew ❿, and fix the lead wire of temperature sensor ❾ to the lead wire of active tension ❺ with the cable clip band. 4. Adjust so that active tension shaft comes to the center of the hole of active tension spacer ⓫, and fix active tension ❺ to face plate ❶ with active tension setscrew ❹. 5. Insert two thread tension disks ❸ and one piece of washer ⓮ to active tension stud ❼, and tighten active tension stud ❼ with adjustment nut ❻. 6. Attach face plate ❶. "Refer to (2) Disassembling and assembling the face plate."	

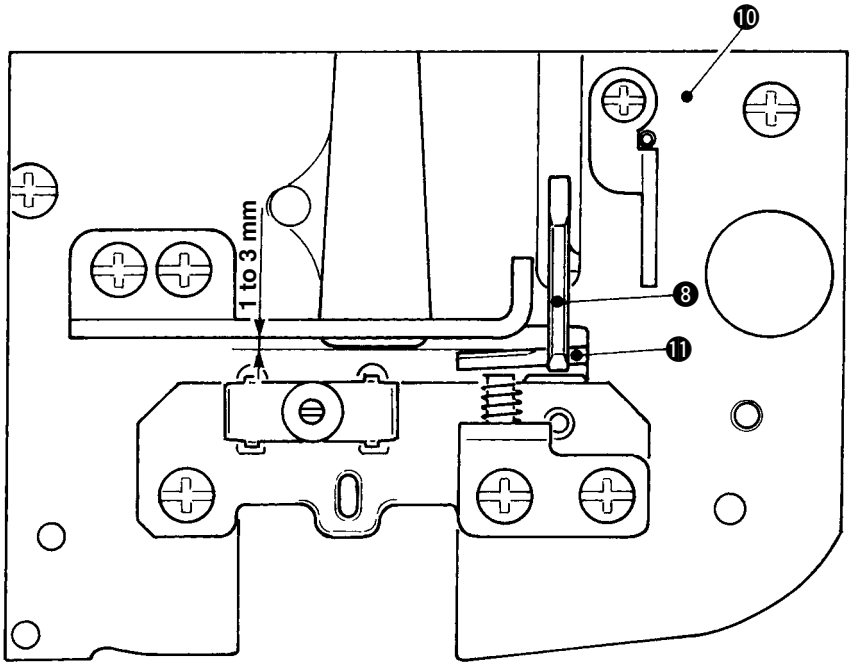
(10) Replacing and adjusting the thread drawing cylinder

Procedures of disassembling / assembling





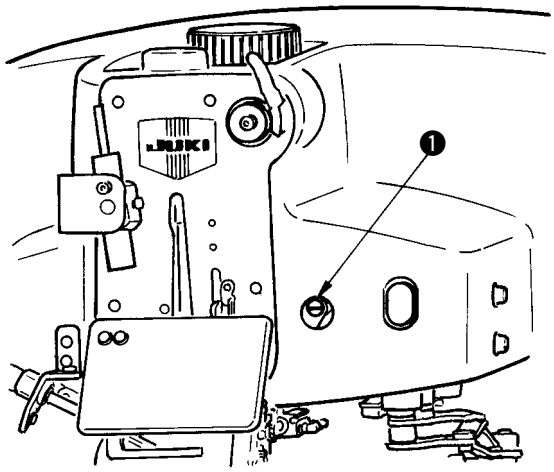


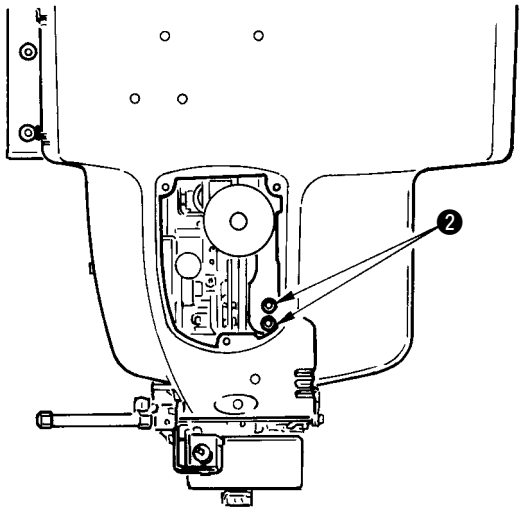


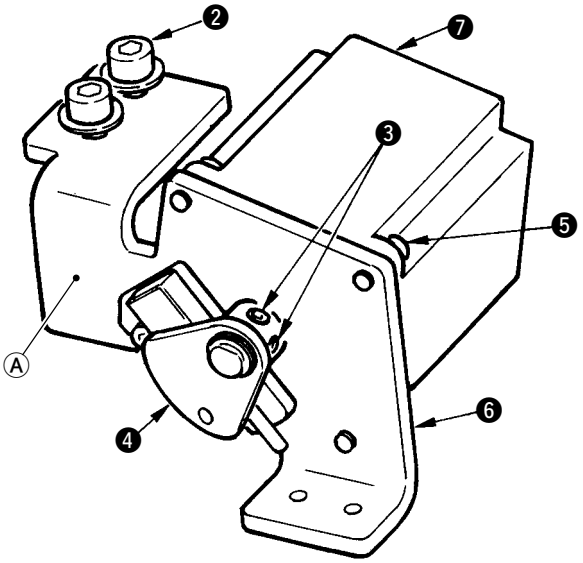
Procedures of disassembling / assembling	Caution in disassembling / assembling
Removing the thread drawing cylinder 1. Remove the face plate. "Refer to (2) Disassembling and assembling the face plate." 2. Remove screw ❷ of cylinder installing plate ❶. 3. Remove thread guide lock nut ❸,and remove rubber presser ❹ at the top end of shaft and cap nut ❺. 4. Remove cylinder nut ❻, and remove cylinder installing plate ❶. **Assembling the thread drawing cylinder** 1. Insert cylinder installing plate ❶, and tighten cylinder nut ❻. At this time, be careful of the direction of joint ❼. 2. Screw in thread guide lock nut ❸, insert thread guide ❽, and tighten cap nut ❺ until it goes no further. Then tighten thread guide lock nut ❸, and fix thread guide ❽. At this time, make the direction of thread guide ❽ vertical to the installing plane of cylinder installing plate ❶. 3. Install the cylinder unit to face plate ❿ with two screws ❷. Adjust so that thread guide ❽ passes the center of slot of face plate ❿ and the opening amount of nipper ⓫ is 1 to 3 mm when cylinder ❾ is expanded or contracted. 4. Attach rubber presser ❹ and cap nut ❺. 5. Connect the air tube, and install face plate ❿. "Refer to (2) Disassembling and assembling the face plate."	

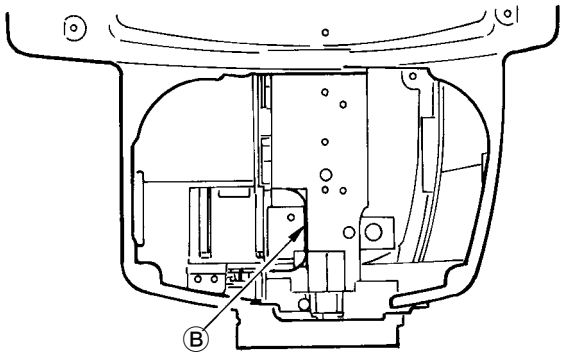
(11) Replacing the thread drawing motor

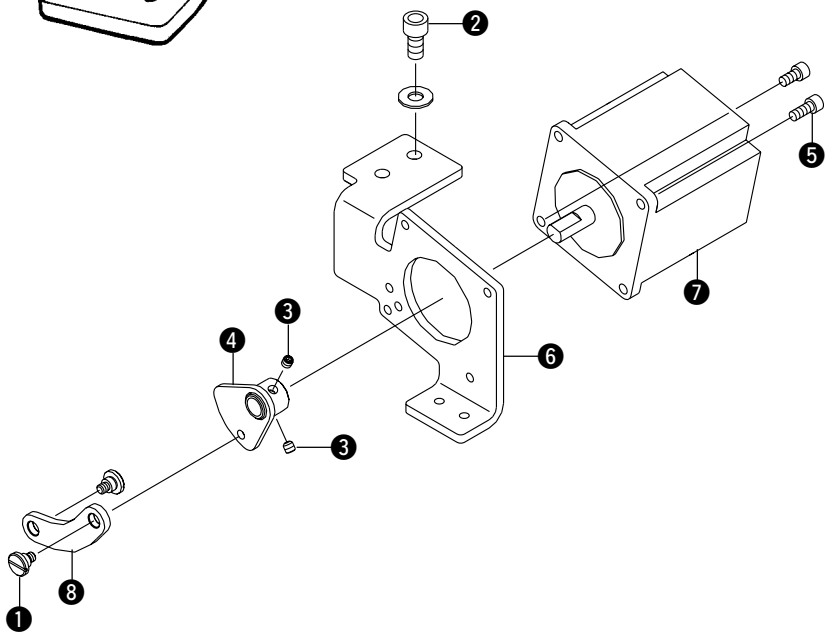
Procedures of disassembling / assembling







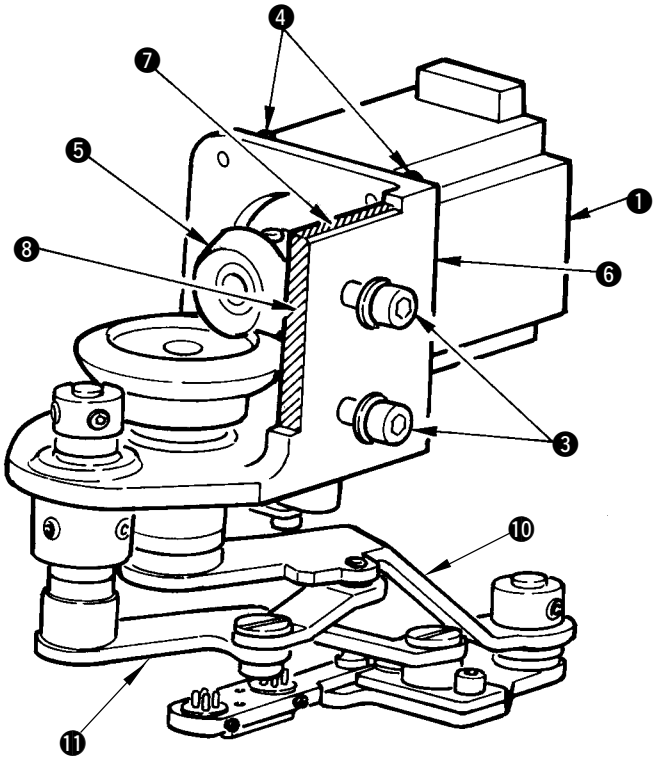


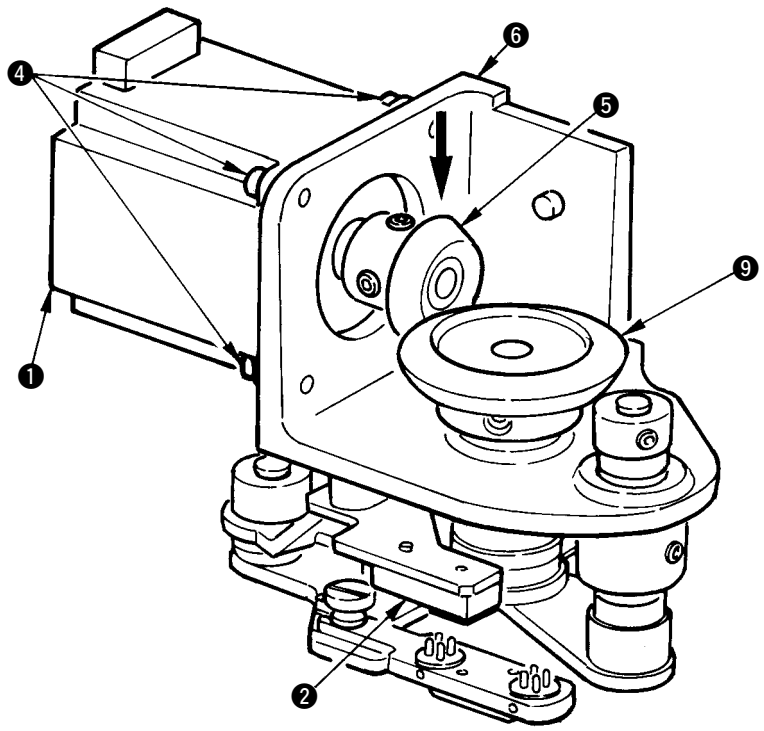


Procedures of disassembling / assembling	Caution in disassembling / assembling
Removing the thread drawing motor unit 1. Remove the loader unit. "Refer to (12) Replacing the loader motor." 2. Remove the top cover. "Refer to (2) Disassembling and assembling the face plate," 3. Remove the connector of thread drawing motor ❼. 4. Remove the stop plug of machine arm, and remove hinge screw ❶. 5. Remove screw ❷, and take out thread drawing motor unit from the main unit. 6. Loosen screws ❸, and remove motor arm ❹. 7. Remove screws ❺, and remove thread drawing motor ❼ from motor base ❻. **Installing the thread drawing motor unit** 1. Install thread drawing motor ❼ on motor base ❻, and fix it with screws ❺. (At this time, install the motor so that the outlet of motor cord faces downward.) 2. Adjust so that the clearance between plane Ⓐ of motor base ❻ and the rear of motor arm ❹ is 12 mm, and fix motor arm ❹ with screws ❸. 3. Temporarily tighten motor base ❻ with screw ❷. 4. Connect the motor connector. 5. Fix link ❽ and motor arm ❹ with hinge screw ❶. 6. Pressing section Ⓑ of motor base ❻ to the machine arm, move it to and fro, and fix screw ❷ at the position where thread drawing motor ❼ smoothly rotates. 7. Install the loader unit. "Refer to (12) Replacing the loader motor." 8. Attach the top cover. "Refer to (2) Disassembling and assembling the face plate." 9. Attach the stop plug of machine arm.	

(12) Replacing the loader motor

Procedures of disassembling / assembling

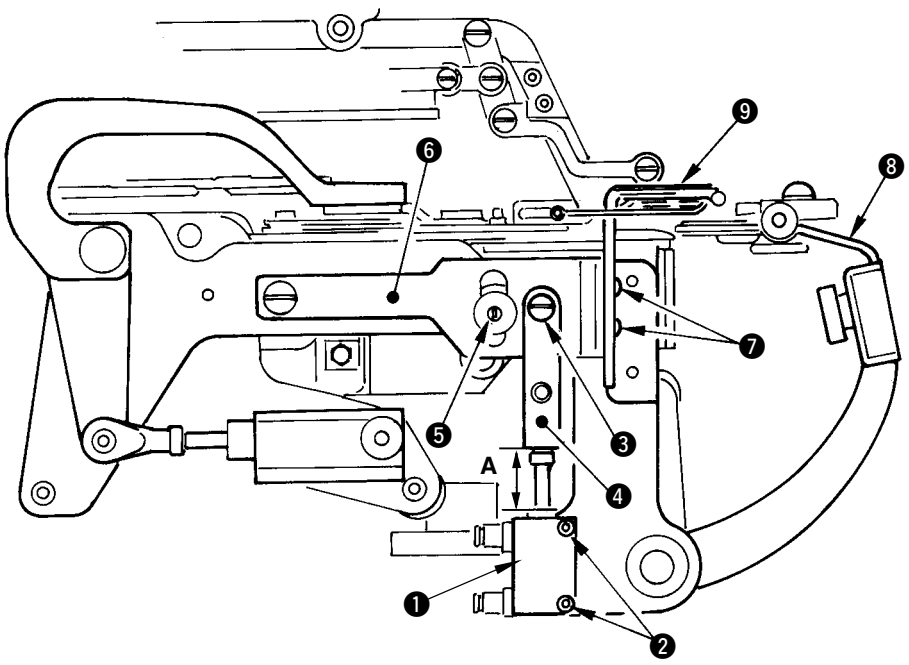


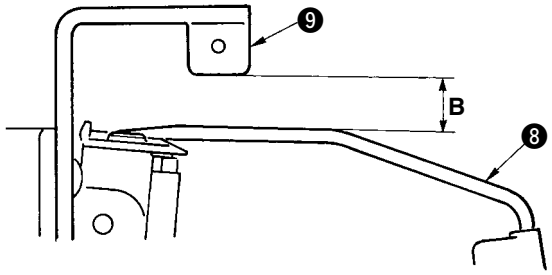


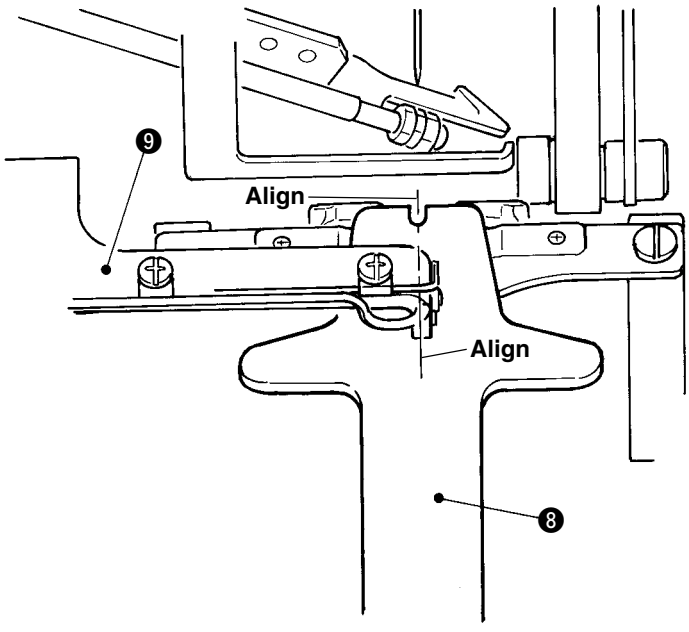
Procedures of disassembling / assembling	Caution in disassembling / assembling
Removing the loader motor 1. Draw out the connectors of loader motor ❶ and loader sensor ❷ from the relay cable connector. 2. Loosen two loader installing screws ❸, and remove the loader. 3. Loosen four loader motor setscrews ❹, and remove loader motor ❶. **Assembling the loader motor** 1. Insert loader motor ❶ to which gear A ❺ has been attached beforehand to loader base ❻ so that the cord comes upward. 2. Adjust the backlash (refer to adjusting procedure below.), and fix the motor with loader motor setscrews ❹. 3. Insert the connectors of loader motor ❶ and loader sensor ❷ to the relay cable connector. 4. Slip the loader to the frame, press top end ❼ of loader base to the processed plane of frame, and press front end ❽ to the hinge screw. Then fix the loader with loader installing screws ❸. **Adjusting the backlash of loader gear** 1. Loosen loader motor setscrews ❹. 2. Adjusting the center of gear A ❺ to that of gear B ❾, press gear A ❺ to gear B ❾ (direction of arrow mark), and make carrier arm A ❿ and carrier arm B ⓫ smoothly move on condition that the backlash is less than 0.1 mm. Then tighten loader motor setscrews ❹.	○ When the gear is excessively pressed in the direction of arrow mark, a load is applied to the motor, and step-out will be caused, or the button may come off from the pin during carrying since the carrier arm does not smoothly move. ○ When backlash is more than 0.1 mm, the trouble of delivery of button to chuck will be caused.

(13) Replacing and adjusting the cloth presser cylinder for sewing and wrapping flat button with blindstitch

Procedures of disassembling / assembling



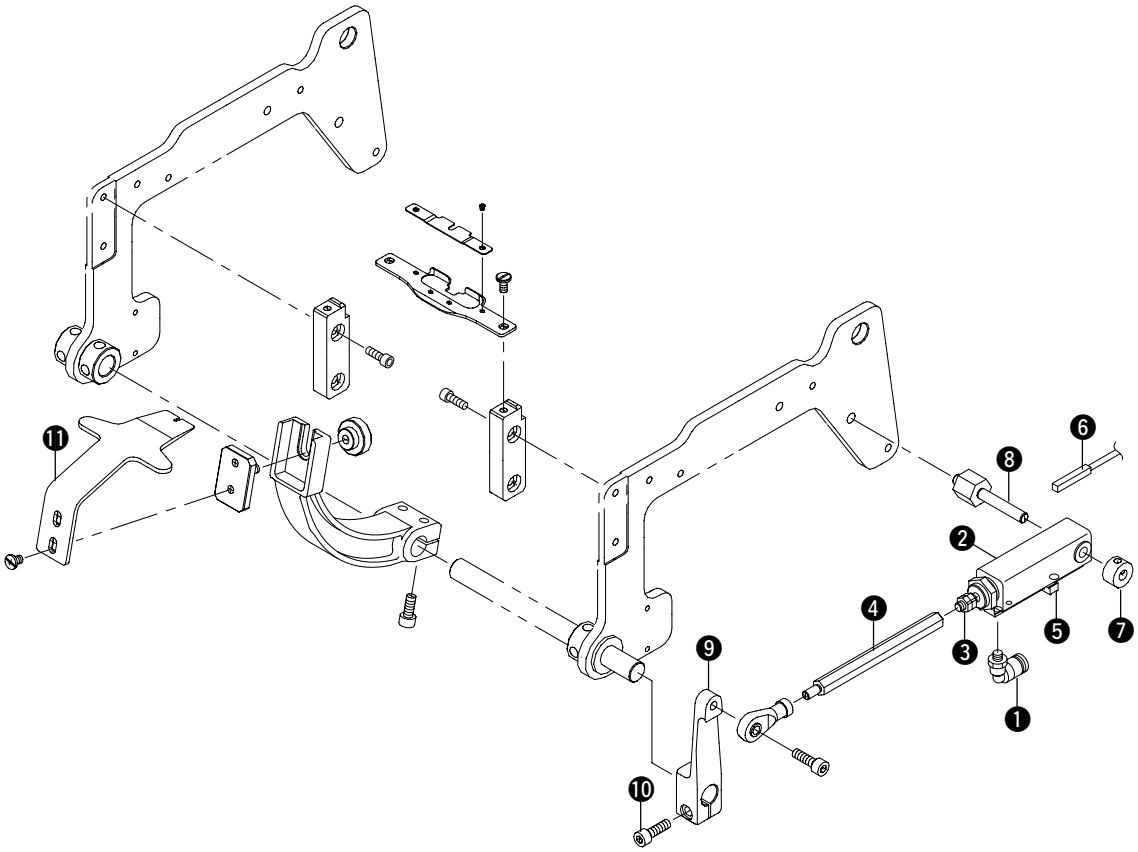


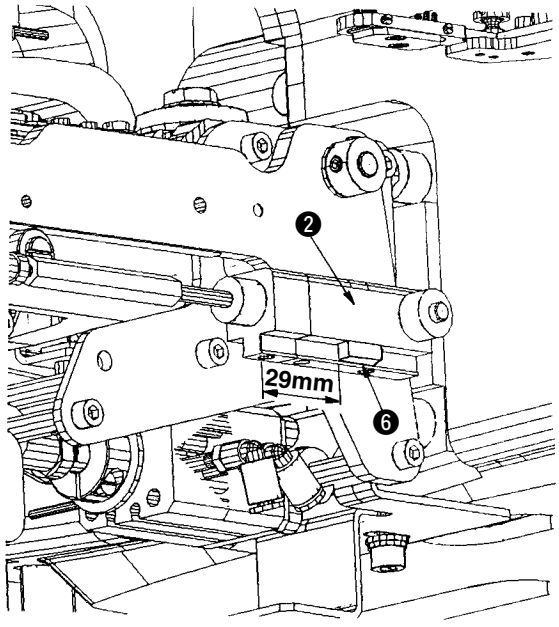


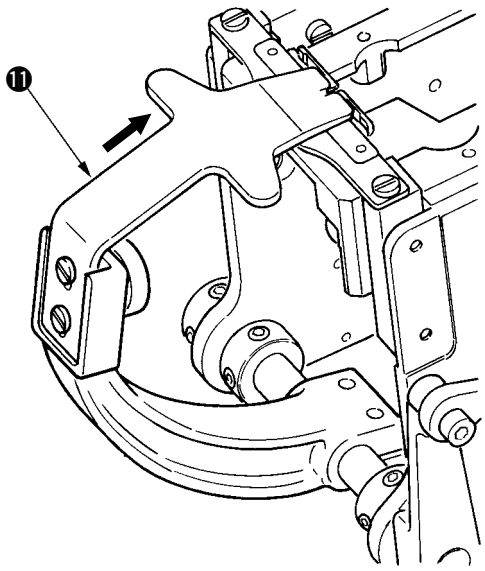
Procedures of disassembling / assembling	Caution in disassembling / assembling
(1) Replacing the cylinder 1. Remove the air tube of cylinder ❶. 2. Remove screw ❷ and hinge screw ❸, and remove cylinder ❶. 3. Remove the cylinder shaft from joint ❹. 4. Connect the rod of cylinder ❶ to be replaced with joint ❹. At this time, dimension A is 8 mm in the state that the rod is moved back. 5. Install cylinder ❶ with screw ❷ and hinge screw ❸. 6. Make sure that pin ❺ does not come in contact with the groove of presser lever ❻ when cylinder ❶ is moved up and down with the air. **(2) Adjusting the position of the cloth presser for sewing and wrapping flat button with blindstitch** * Positioning and fixing both in the height direction and the lateral direction are simultaneously performed with screw ❼. **(3) Adjusting the height of the cloth presser for sewing and wrapping flat button with blindstitch** 1. Adjust so that cloth presser for sewing and wrapping flat button with blindstitch ❾ enters the underside of tongue ❽ when tongue ❽ is released, cloth presser for sewing and wrapping flat button with blindstitch ❾ is lowered, and tongue ❽ is moved to the set position again. 2. Adjust so that dimension B between the top surface of tongue ❽ and cloth presser for sewing and wrapping flat button with blindstitch ❾ is 10 to 13 mm when in the state of step 1., tongue ❽ is released, cloth presser for sewing and wrapping flat button with blindstitch ❾ is moved to the upside of tongue ❽, and tongue ❽ is moved to the set position. **(4) Adjusting the lateral direction of the cloth presser for sewing and wrapping flat button with blindstitch** Adjust so that the center of the groove of tongue ❽ aligns with the center of cloth presser for sewing and wrapping flat button with blindstitch ❾ when cloth presser for sewing and wrapping flat button with blindstitch ❾ is lowered on tongue ❽ in the state of step 2. of **(3)**.	

(14) Replacing and adjusting the tongue release cylinder

Procedures of disassembling / assembling



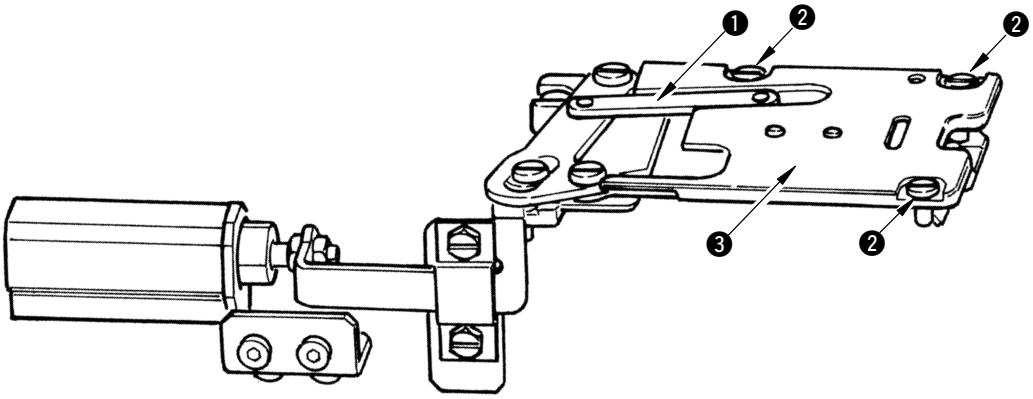


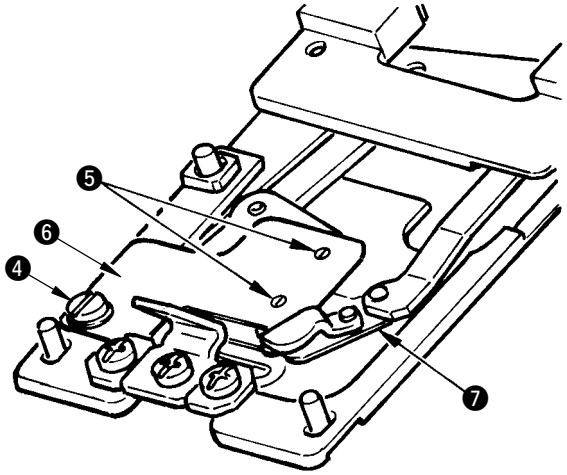


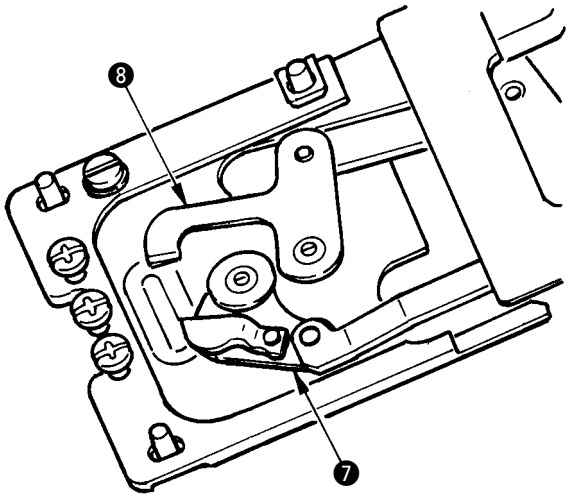
Procedures of disassembling / assembling	Caution in disassembling / assembling
Rmoving the tongue release cylinder 1. Turn OFF the power and the air. 2. Remove air tube from joint ❶. 3. Loosen nut ❸ of the shaft of cylinder ❷, and remove stud ❹. 4. Tilt the machine head, loosen the screw of sensor installing metal fitting ❺, and remove sensor ❻. 5. Remove thrust collar ❼, and remove cylinder ❷.	
Installing the tongue release cylinder 1. Paying attention to the direction of cylinder ❷, enter it to cylinder shaft ❽, and fix with thrust collar ❼. 2. Temporarily tighten sensor ❻. 3. Assemble stud ❹. 4. Insert the air tube. 5. Loosen setscrew ❿ of tongue open/close arm ❾, and tighten setscrew ❿ of tongue open/close arm ❾ at the position where cylinder is drawn by 1 mm from the place where it is fully moved back when tongue ⓫ is pressed to the end in the directon of arrow mark (➡). 6. Turn ON the power, and adjust so that sensor ❻ is turned ON when tongue ⓫ is pressed to the end in the direction of arrow mark (➡) while observing LED of sensor ❻. 7. Adjust the installing dimension of sensor ❻ of tongue open/close cylinder ❷ to 29 mm from the edge.(Reference dimension)	○ Assemble so that cylinder ❷ smoothly moves without looseness. ○ Insert the air tube without mistaking the direction of rear and front. ○ There is a detecting range of sensor ❻. Adjust the sensor so that it is turned ON early when tongue ⓫ is moved in the direction of arrow mark (➡), and still ON when tongue ⓫ is pressed to the end.

(15) Adjusting the moving knife and the fixed knife (1/2)

Procedures of disassembling / assembling







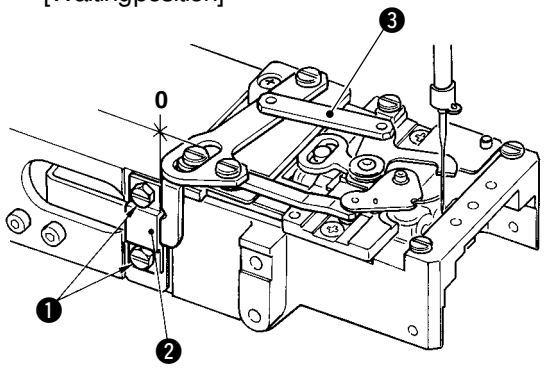
Procedures of disassembling / assembling	Caution in disassembling / assembling
Removing procedure of the knives 1. Remove fixed knife link ❶. 2. Remove three screws ❷, and remove throat plate unit ❸. 3. Remove two screws ❹ and ❺, and remove fixed plate ❻. 4. Remove moving knife ❼ and fixed knife ❽ respectively.	○ Washers attached with knives are different from each other. Be careful not to mistake when assembling.
Installing procedure of the knives Assemble them by reversing the removing order.	○ Be careful not to mistake the relations of positions between the washers and the knives.

(15) Adjusting the moving knife and the fixed knife (2/2)

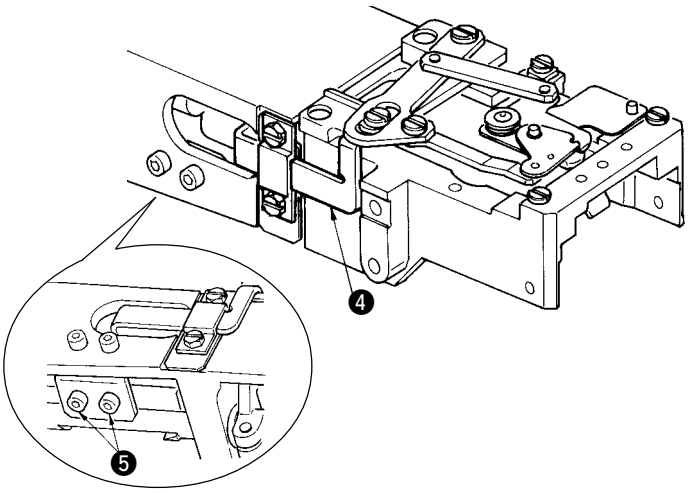
Standard Adjustment

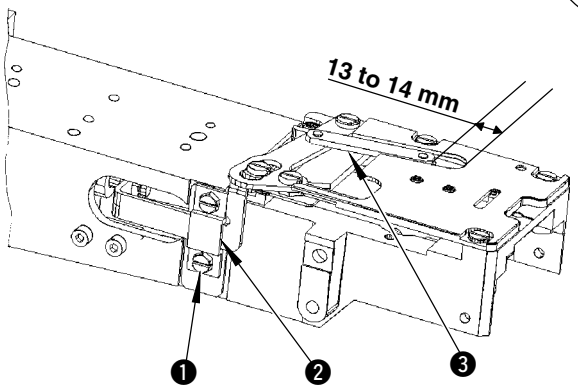
(1) Position of the moving knife and the fixed knife

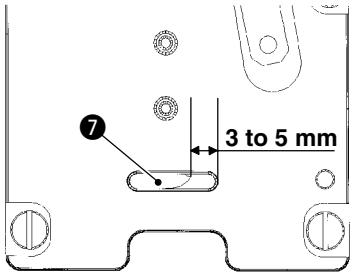
[Waitingposition]

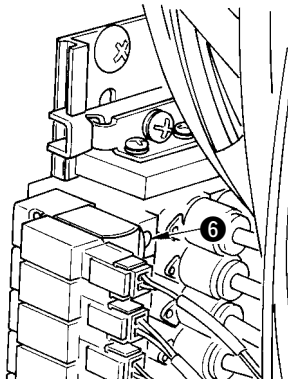


[Thread trimming position]

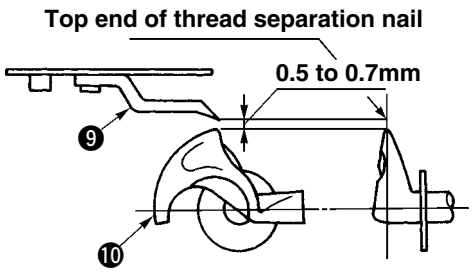








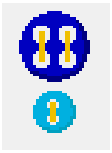
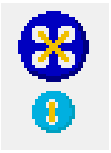
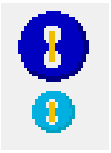
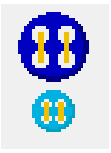
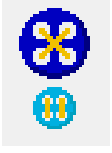
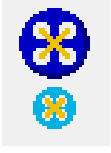
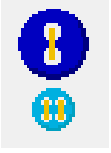
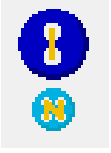
(2) Adjusting the moving knife thread separation nail



Adjustment Procedures	Results of improper Adjustment
[Waiting position] 1. Loosen screws ❶ and close the clearance with stopper ❷ so that the dimension between the edge of fixed knife link ❸ and the groove end of throat plate is 13 to 14 mm. Then fix screws ❶. [Thread trimming position] 1. Adjust the clearance between the blade point of moving knife ❼ and the right end of the slot of throat plate is 3 to 5 mm in the state that air only is ON (solenoid valve No. 14), loosen screws ❺, actuate the cylinder, and fix screws ❺ in the state that the clearance is closed. 2. After the adjustment, check that moving knife link ❹ smoothly moves. * When the work is completed, do not forget to perform the release of lock ❻ of the solenoid valve.	○ When dimension value is smaller than 13 mm, knife cannot wait and sewing trouble will be caused. ○ When dimension value is larger than 5 mm, knives do not engage with each other and thread trimming trouble will be caused.
1. Bend thread separation nail ❾ using a screwdriver or the like and adjust so that a clearance of 0.5 to 0.7 mm should be provided between thread separation nail ❾ and looper ❿.	

5. OPERATION PANEL

(1) Sewing method and sewing shape list

Sewing method	Sewing shape					
Sewing flat/wrapped-around button with blindstitch 						
						
Sewing flat button directly to cloth 						
						
Sewing flat button with blindstitch 						
Sewing counter/stay button 						
						
Sewing button with neck wraps	– – –					

(2) Data list

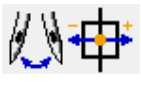
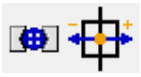
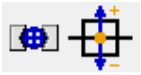
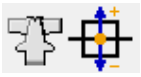
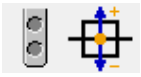
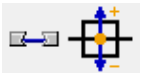
1. In case of point setting mode
2. In case of sewing motion step mode
3. Parameter which can be set depends on sewing method and sewing shape.

No.	Item	Setting range	Edit unit	Initial display	Remarks
S501	1st stitch hole position of upper button (longitudinal)	–2.00 to 4.00	0.05	1.80	
S502	1st stitch hole position of upper button (lateral)	–2.00 to 4.00	0.05	1.80	
S504	1st stitch hole position of lower button (longitudinal)	–13.00 to 4.00	0.05	1.60	
S505	1st stitch hole position of lower button (lateral)	–2.00 to 4.00	0.05	1.60	
S506	Whole compensation of button holding position (lateral)	–3.0 to 3.0	0.1	0	
S508	Compensation of shank/marble blindstitch position (left)	–2.0 to 2.0	0.1	0	
S509	Hole position of shank/marble button	–5.0 to 5.0	0.1	0.5	
S510	Tie stitch position of 1st stitch at the start of sewing of neck wrapping (longitudinal)	–4.0 to 4.0	0.1	0	
S511	Tie stitch position of 1st stitch at the start of sewing of neck wrapping (lateral)	–4.0 to 4.0	0.1	–0.3	
S512	Tie stitch position of 2nd stitch at the start of sewing of neck wrapping (longitudinal)	–4.0 to 4.0	0.1	1.0	
S513	Tie stitch position of 2nd stitch at the start of sewing of neck wrapping (lateral)	–4.0 to 4.0	0.1	0.3	
S516	Stitch width of neck wrapping (right side)	0 to 5.0	0.1	3.0	
S517	Stitch width of neck wrapping (left side)	0 to 5.0	0.1	3.0	
S518	Start position of neck wrapping	–1.0 to 3.0	0.1	1.0	
S519	Top position of neck wrapping	–1.0 to 5.0	0.1	0	
S520	1st stitch of first compensation of tie stitch position at the end of button sewing (longitudinal)	–1.0 to 1.0	0.1	0.3	

No.	Item	Setting range	Edit unit	Initial display	Remarks
S521	1st stitch of first compensation of tie stitch position at the end of button sewing (lateral)	–1.0 to 1.0	0.1	0	
S522	2nd stitch of first compensation of tie stitch position at the end of button sewing (longitudinal)	–1.0 to 1.0	0.1	0	
S523	2nd stitch of first compensation of tie stitch position at the end of button sewing (lateral)	–1.0 to 1.0	0.1	0	
S524	3rd stitch of first compensation of tie stitch position at the end of button sewing (longitudinal)	–1.0 to 1.0	0.1	0	
S525	3rd stitch of first compensation of tie stitch position at the end of button sewing (lateral)	–1.0 to 1.0	0.1	0	
S526	1st stitch of second compensation of tie stitch position at the end of button sewing (longitudinal)	–1.0 to 1.0	0.1	0.3	
S527	1st stitch of second compensation of tie stitch position at the end of button sewing (lateral)	–1.0 to 1.0	0.1	0	
S528	2nd stitch of second compensation of tie stitch position at the end of button sewing (longitudinal)	–1.0 to 1.0	0.1	0	
S529	2nd stitch of second compensation of tie stitch position at the end of button sewing (lateral)	–1.0 to 1.0	0.1	0	
S530	3rd stitch of second compensation of tie stitch position at the end of button sewing (longitudinal)	–1.0 to 1.0	0.1	0	
S531	3rd stitch of second compensation of tie stitch position at the end of button sewing (lateral)	–1.0 to 1.0	0.1	0	
S532	Tie stitch position at the end of sewing of neck wrapping (longitudinal)	–4.0 to 4.0	0.1	1.2	
S533	Tie stitch position at the end of sewing of neck wrapping (lateral)	–4.0 to 4.0	0.1	3.0	
S534	Longitudinal position of thread trimming of button sewing	–4.0 to 8.0	0.1	–1.0	
S535	Longitudinal position of thread trimming of neck wrapping sewing	–4.0 to 8.0	0.1	–0.2	
S536	Blindstitch width of shank/marble (right)	–2.0 to 5.0	0.1	0.3	
S537	Blindstitch width of shank/marble (left)	–2.0 to 5.0	0.1	0.3	

(3) Sensor list

20 kinds of sensors below are displayed.

No.	Pictograph	Description of sensor	No.	Pictograph	Description of sensor
01		Needle rocking motor origin	11		Air pressure sensor
02		Differential motor origin	12		Tongue open/close
03		Y feed upper motor origin	13		Feed plate up (rear side)
04		Y feed lower motor origin	14		Feed plate down (front side)
05		Button loader motor origin	15		Chuck inversion (left side)
06		Presser motor origin	16		Chuck level (right side)
07		Thread drawing motor origin	17		Chuck open/close
08		Temperature detection	18		Pedal start
09		Pause	19		Pedal input
10		Safety switch	20		Needle bar angle

(4) Comunication function

Communication function can download the sewing data created with other sewing machine, creation of sewing data and sewing data created by editing device PM-1 to the sewing machine. In addition, the function can upload the aforementioned data to the smart media or personal computer.
Smart media and RS-232C port are prepared as the vehicle to communicate.

* However, SU-1 (data server utility) is necessary to perform download/upload from the personal computer.

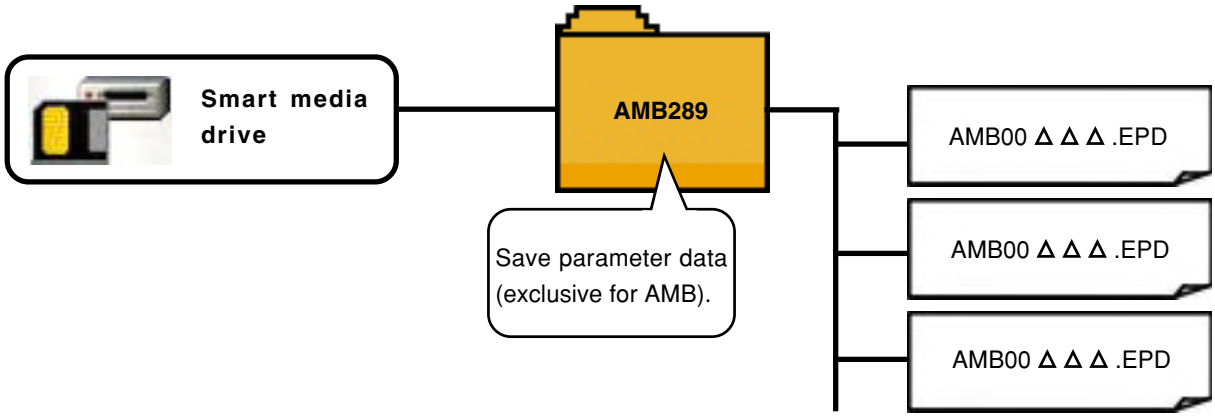
1. Normal use level

(1) Handling possible data
Handling possible sewing data is one kind below and the data format is as described below.

Data name	Pictograph	Extension	Description of data
Parameter data		AMB 00 Δ Δ Δ .EPD	Format of the data of sewing proper to AMB such as sewing shape, sewing method, interval of button holes, etc. created with the sewing machine

Δ Δ Δ : file No.

In case of saving the data in the smart media, save the data in the state of directory structure below.When the data are not saved in the correct folder, reading of file cannot be performed.



(Caution) There is beforehand the PROG folder in the Smart media purchased from our company. Do not delete it.

2. Maintenance personnel level

For the communication screen, the level which is normally used and the one which is used by the maintenance personnel are different in the kinds of data to be handled.

(1) Data which are possible to be handledIn case of the maintenance
In case of the personnel level, it is possible to use 5 different kinds of data in addition to the normal one kinds.The respective data formats are as below.

Data name	Pictograph	Extension	Description of data
Adjustment data		Model name+00Δ Δ Δ.MSW Example) AMB00001.MSW	Data of memory switches 1 and 2
All sewing machine data		Model name+00Δ Δ Δ.MSP Example) AMB00001.MSP	All data which are held by sewing machine
Panel program data (*)		IP+RVL(6 digits).PRG IM+RVL(6 digits).BHD	Program data and display data of panel
Main program data (*)		MA+RVL(6 digits).PRG	Program data of main
Servo program data (*)		MT+RVL(6 digits).PRG	Program data of servo

Δ Δ Δ : File No.

*** For panel program data, main program data and servo program data, refer to "6.-(2),-(3) and -(4)" of Engineer's Manual.**

(5) Information function

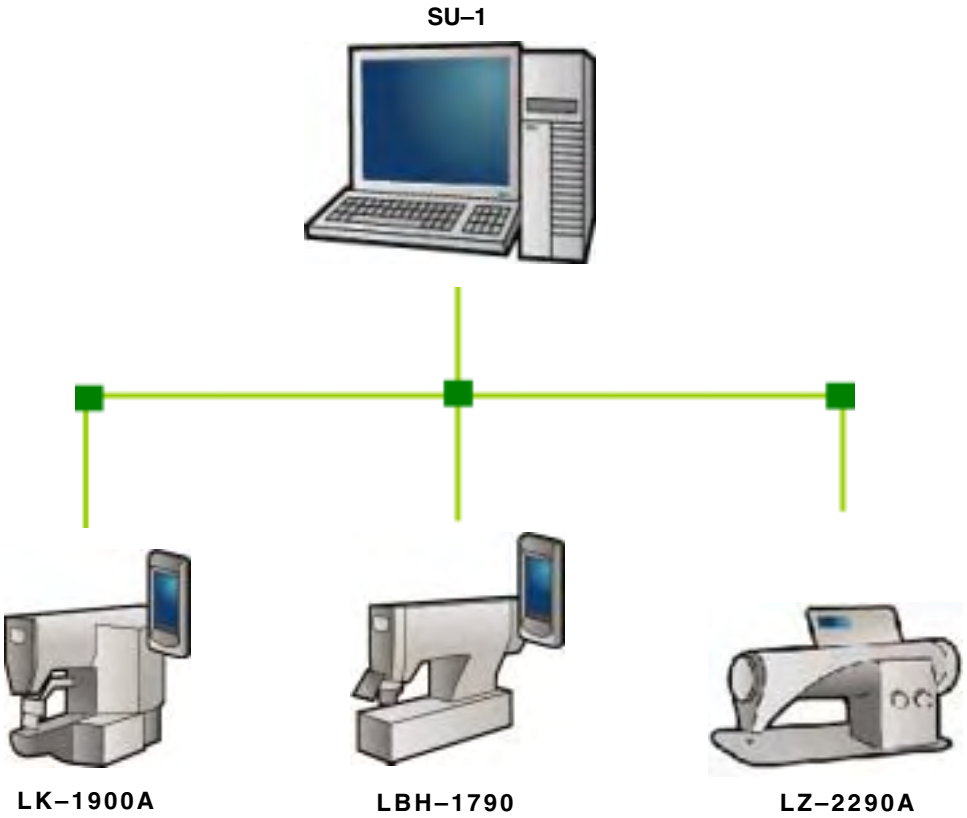
There are three functions below in the information function.

1) Oil replacement (grease-up) time, needle replacement time, cleaning time, etc. can be specified and the warning notice can be performed after the lapse of the specified time.
→ Refer to **"42. (1) Observing the maintenance and inspection information"** and **"42. (2) Inputting the maintenance and inspection time"** of the Instruction Manual for AMB-289.

2) Speed can be checked at a glance and the target achieving consciousness as a line or group is increased as well by the function to display the target output and the actual output.
→ Refer to **"42. (4) Observing the production control information"** and **"42. (5) Performing setting of the production control information"** of the Instruction Manual for AMB-289.

3) Information on machine working ratio, pitch time, machine time and machine speed can be displayed from the working state of the sewing machine.
Refer to **"42. (6) Observing the working measurement information"** of the Instruction Manual for AMB-289.

In addition, information on plural sewing machines can be controlled by the server when this function is used by connecting SU-1 (sewing machine data server utility) with the sewing machines.



6. SETUP OF IP-200

(1) Connecting procedure of operation panel with external vehicle

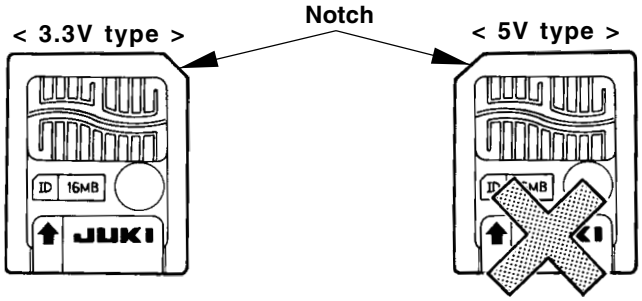
It is possible for this operation panel to perform communication with the external vehicle other than the control box. Connecting procedure is given below.

1. Communication by means of smart media card (3.3V voltage type only)
2. Communication by means of RS-232C
3. Input of signal by means of the connector for external input

1. Smart media card

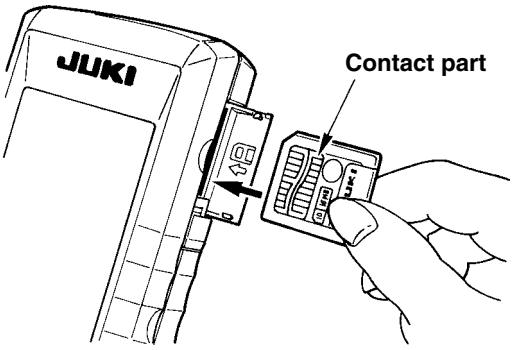
It is possible to give and take data by using the smart media card.

For the smart media card, it is recommended to use SmartMedia of 3.3V voltage type which is prescribed by SSFDC forum. The card is different in the position of notch as shown in the figure below. Judge it by the position of notch.



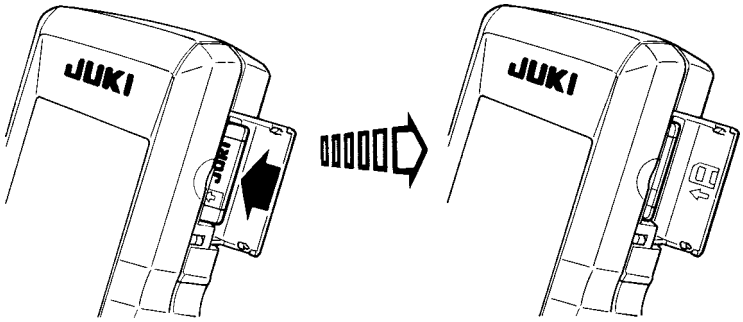
(Caution) When the contact part becomes dirty, contact failure will be caused. Control so that the contact part is not touched by hand, or that dust, oil or other foreign material does not adhere to the contact part. Besides, be very careful of handling the card since the internal data is broken by the static electricity or the like.

(Setting procedure)



① When the upper side cover located on the side of operation panel is opened, there is the inserting opening of the smart media card. Insert the card there while facing the contact part to the front.

② When continuing inserting the smart media card, the card stops once in the state that it protrudes by approximately 10 mm. When some force is applied to it, it is further inserted and goes to the end. When it goes no further, reduce the force and it returns by approximately 1 mm. This work completes the setting of the card.

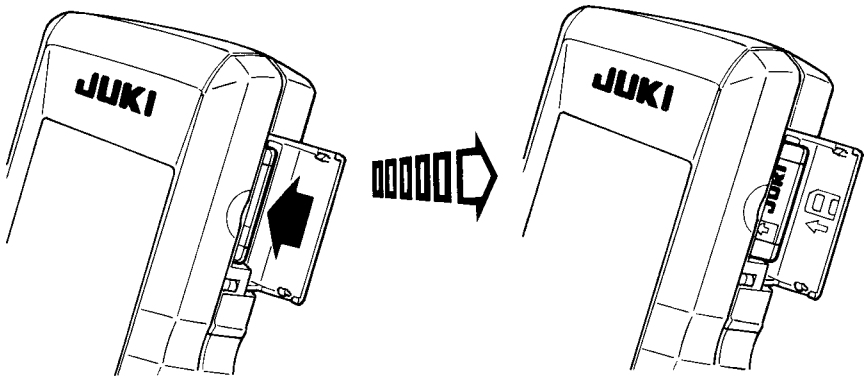


③ When the setting of the card is completed, close the smart media card cover. By closing the cover, it is possible to perform communication. For the communication procedure, refer to the Instruction Manual for this operation panel.
If the smart media card comes in contact with the cover and the cover is not closed, check the following matters.

- Check that inserting is stopped in the state that the card protrudes by approximately 10 mm.
- Check that the coantact part is faced downward and inserted.
- Check that the smart media card other than 3.3V voltage type is used.

(Removing procedure)

① Open the smart media cover, press the card until it goes no further and reduce the force. The card returns by approximately 10 mm by reversing order at the time of setting.
② Then drawing up the card completes removing.



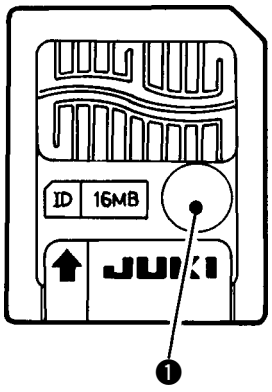
< Handling the smart media card >

1) Smart media is a precision instrument. Do not bend or shock it.
2) It is recommended to periodically save the data saved in the smart media into the other vehicle for the accident.
3) When initializing data, perform it after checking that there is no necessary data in the card. When the data is initialized, the internal data is deleted.
4) Avoid using or keeping the card in a high temperature or high humidity place.
5) Avoid using the card near heating or combustible articles.
6) When the contact part becomes dirty, contact failure will be caused. Control so that the card is not touched by hand, or that dust, oil or other foreign material does not adhere to the card. Besides, be careful of handling the card since the internal data is broken by the static electricity or the like.
7) Smart media has the life, and writing and deletion cannot be performed after an extended period of use. In this case, replace the smart media with a new one.

< Prevention of memory error >

1) When write protect seal ❶ is pasted, the card becomes exclusive for reading and writing cannot be performed.
2) Strip off the seal when you desire to record again.
3) Do not use again the seal which was pasted once and stripped off. The trouble of the main unit will be caused.

< 3.3V type >



2. Communication by means of RS-232C

Operation panel can give and take the data with the personal computer by using communication by means of RS-232C.

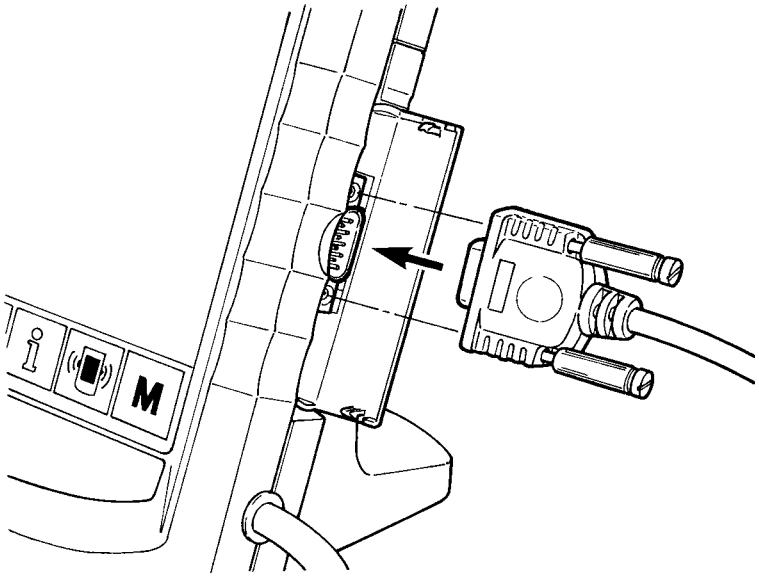
For the cable to be connected, connect the straight type 9-pin (female) to the operation panel side. Signal names of the operation panel are as follows.

Pin No.	Signal name	Function	Signal direction
1	N.C.	Not connected	
2	RXD	Receive data	To panel
3	TXD	Transmit data	From panel
4	DTR	Data terminal ready	From panel
5	GND	Earth	
6	DSR	Data set ready	To panel
7	RTS	Transmission request	From panel
8	CTS	Transmission approved	To panel
9	N.C.	Not connected	

(Caution) When the contact part becomes dirty, contact failure will be caused. Control so that the contact part is not touched by hand, or that dust, oil or other foreign material does not adhere to the contact part. Besides, be careful of handling the contact part since the internal element is broken by the static electricity or the like.

(Setting procedure)

① When the lower side cover located on the side of operation panel is opened, there is a 9-pin connector for RS-232C. Insert the cable there. When the screw for lock is attached to the connector, tighten the screw to prevent the screw from falling.

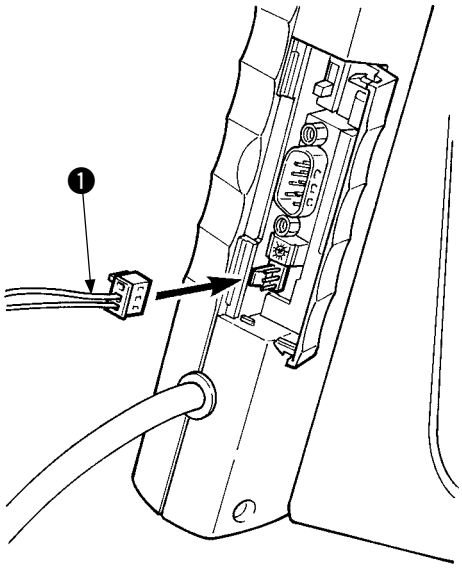


3. Input of signal by means of the connector for external input

It is possible to input the signal from the outside.

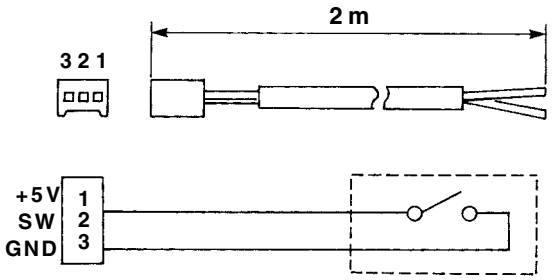
When the switch is connected, it is possible to use as the input of the production control information.

For the details, refer to "Observing the production control information" of the Instruction Manual.



Cable (separately-sold) as shown in the figure below can be connected.

❶ Relay cable A (asm.) (40008168)



Connector housing : KYOCERA ELCO CO. 60-8263-3038-15-000
Pin contact : KYOCERA ELCO CO. 60-8263-0513-00-808

(Note) The switch main unit is not installed to the relay cable A (asm.).

(Caution) When the contact part becomes dirty, contact failure will be caused. Control so that the contact part is not touched by hand, or that dust, oil or other foreign material does not adhere to the contact part. Besides, be careful of handling the contact part since the internal element is broken by the static electricity or the like.

(2) Setup of operation panel

When the case is as below, it is necessary to perform re-setup of the program of the operation panel.

○ When the operation panel is used as that for other model.

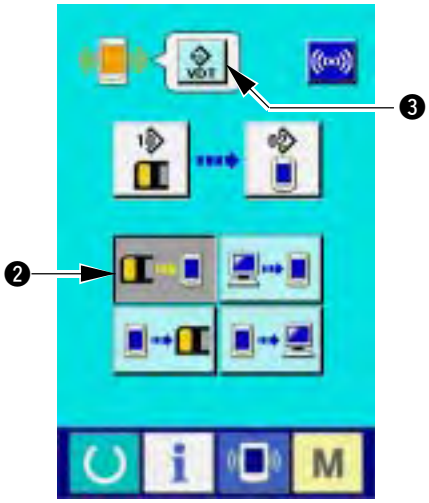
○ When version-up of the program is performed.

The way of performing setup of the program from the smart media is shown below. Besides, it is regarded that the program to perform setup has already entered the smart media card.

1) First, turn ON the power. Normally, the sewing ready screen is displayed.
2) Insert the smart media card into the operation panel.
3) Perform operation by the procedure below.

Data edit screen

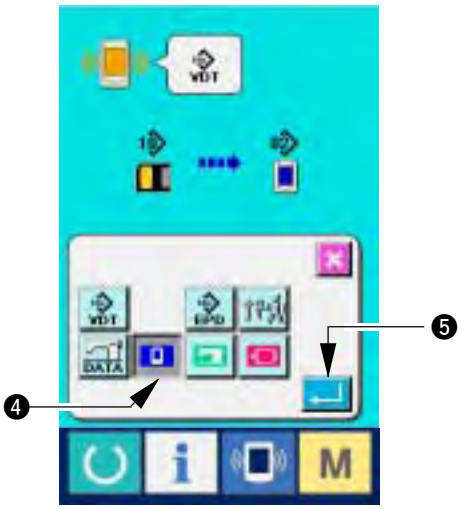
1) Press key ❶ for three seconds.



Communication screen 1

2) Press key ❷.

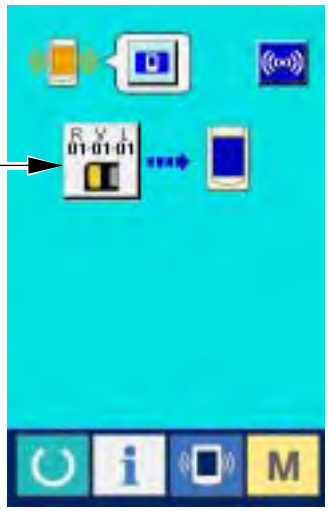
3) Press key ❸ VDT .



Data selection screen

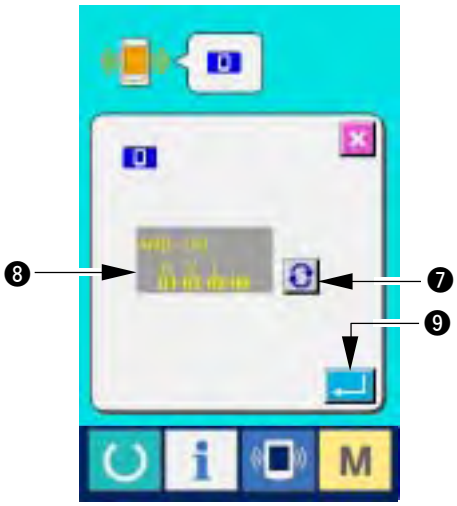
4) Press key ❹ .

5) Press key ❺ .



Communication screen 2

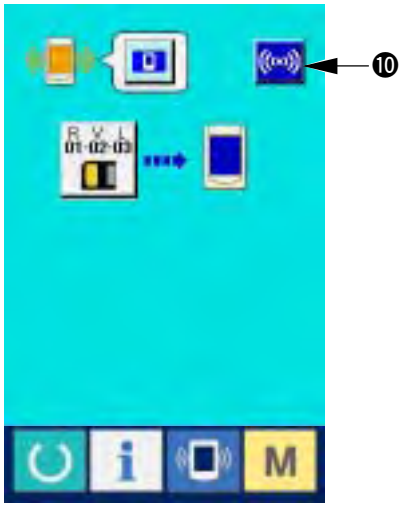
6) Press key ❻ .



File selection screen

7) Press key ❼ and select the download program at display ❽ .

8) Press key ❾ .



Communication screen 3

9) Press key ❿ .

<-<- Start of communication ->->

Screen during data deletion

Screen 1 during data writing

Screen 2 during data writing

If the screen below is displayed, quickly turn OFF the power and perform the set-up again after checking [Checking items] below.

Data writing abnormal screen

End screen

The procedure above completes the replacing work of application software.

Checking items

① Smart media cover is opened during the data communication from the smart media.
② Data of the smart media is not correct. Or, there is no data file.
③ Contact of the smart media is dirty. Contact is defective.

(Caution) Do not turn OFF the power and close/open the smart media cover during the work. The main unit may be broken.

(3) Setup of main program

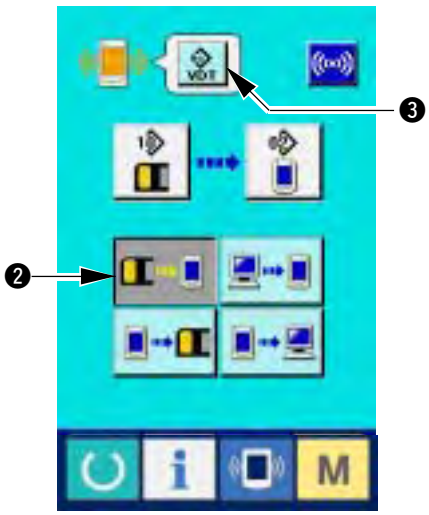
When you have purchased the single unit of IP-200 operation panel, the smart media card is packed together. You can perform re-setup of the main program of MAIN circuit board on the control box side by using this smart media card.
It is necessary that the main program and panel program have to match with each other.
If not, there is a possibility that trouble such as Error "E703 or E704" occurs. Be sure to perform setup by using the smart media card which is packed together.

1. When panel program matches with main program

Perform the work by the procedure below when performing version-up of the main program by using the smart media card.
1) First, turn ON the power.
2) Insert the smart media card into the operation panel.
3) Perform operation by the procedure displayed in the screen below.

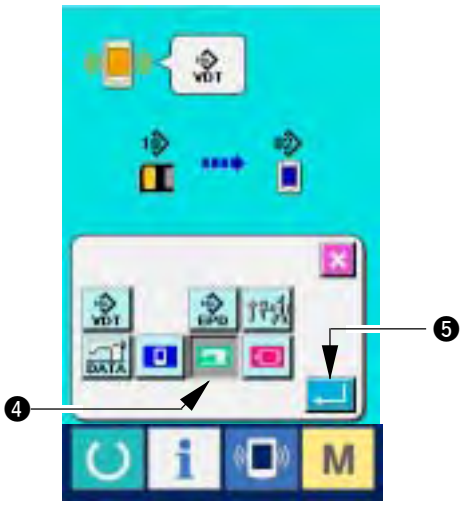
Data edit screen

1) Press key ❶ for three seconds.



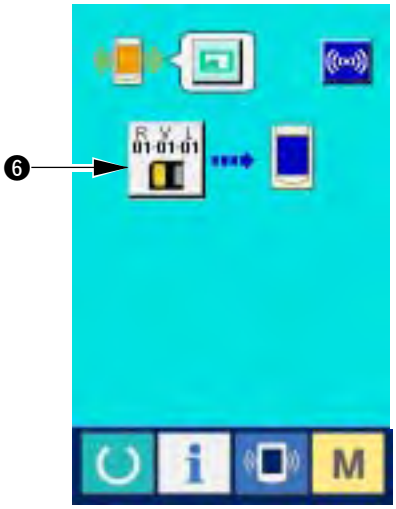
Communication screen 1

2) Press key ❷ .
3) Press key ❸ .



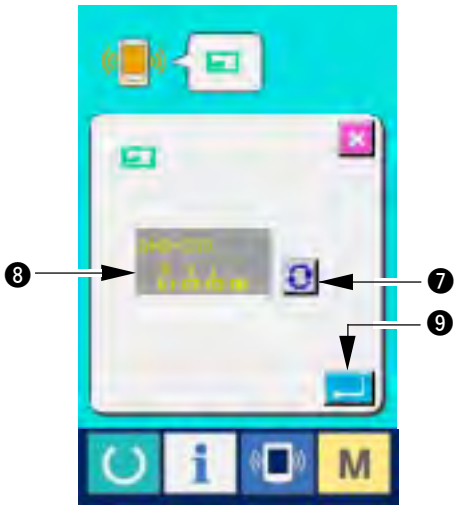
Data selection screen

4) Press key ❹ .
5) Press key ❺ .



Communication screen 2

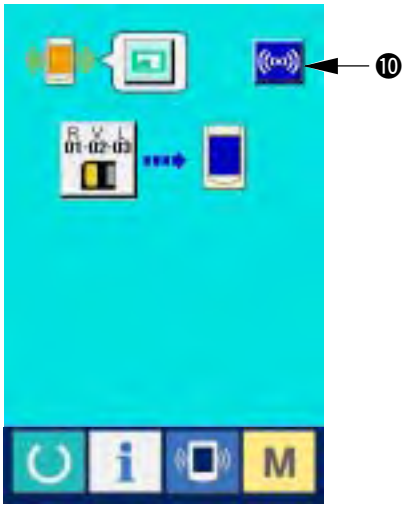
6) Press key ❻ .



File selection screen

7) Press key ❼ and select download program at display ❽ .

8) Press key ❾ .



Communication screen 3

9) Press key ❿ .

<-<- Start of communication ->->

Screen during data writing

Screen of end of data writing

The procedure above completes the replacing work of application software.

If the screen below is displayed, quickly turn OFF the power and perform the set-up again after checking [Checking items] below.

Data writing abnormal screen

Checking items

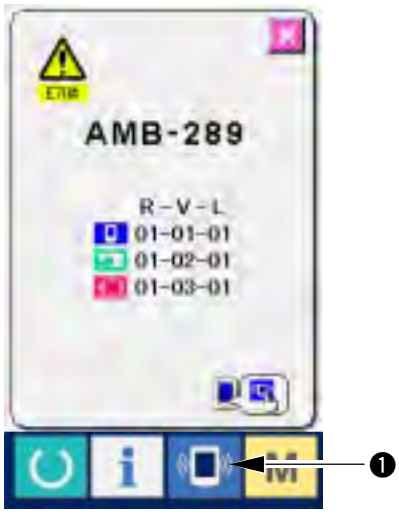
① Smart media cover is opened during the data communication from the smart media.
② Data of the smart media is not correct. Or, there is no data file.
③ Contact of the smart media is dirty. Contact is defective.

(Caution) Do not turn OFF the power and close/open the smart media cover during the work. The main unit may be broken.

2. When panel program does not match with main program and an error occurs

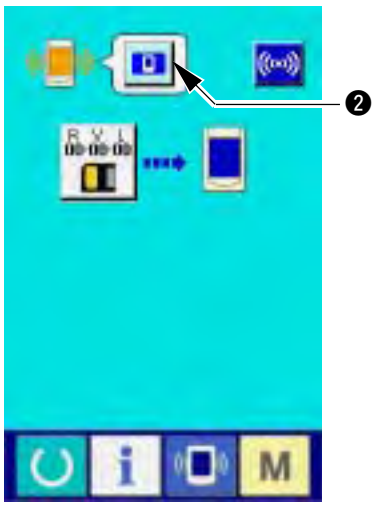
Perform the work by the procedure below when replacing the main program in case trouble such as Error "E703", "E704", etc. occurs.

1) First, turn ON the power. Error screen (E703 or E704) is displayed after turning ON the power.
2) Insert the smart media card into the operation panel.
3) Perform operation by the procedure displayed in the screen below.



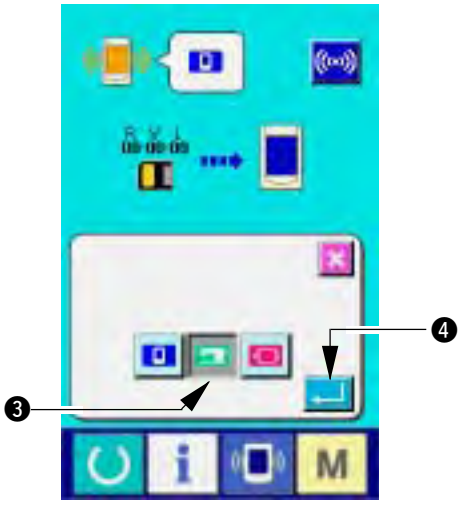
Error screen

1) Press key ❶ for three seconds.



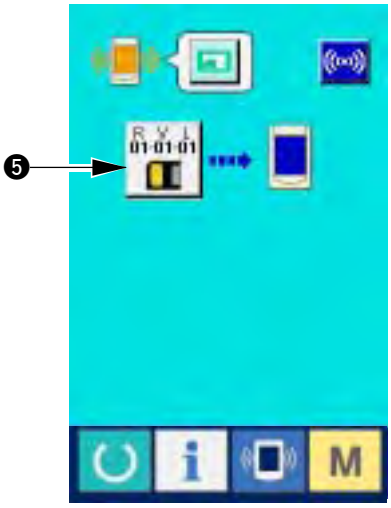
Communication screen 1

2) Press key ❷ .



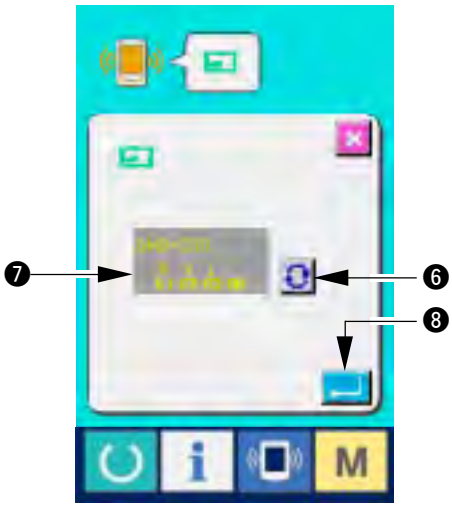
Data selection screen

3) Press key ❸ .
4) Press key ❹ .



Communication screen 2

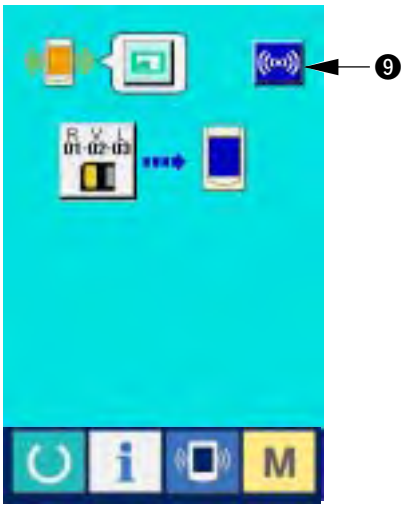
5) Press key ❺ .



File selection screen

6) Prees key ❻ and select the download program at display ❼ .

7) Press key ❽ .



Communication screen 3

8) Press key ❾ .

<-<- Start of communication ->->

Screen during data writing

Screen of end of data writing

The procedure above completes the replacing work of application software.

If the screen below is displayed, quickly turn OFF the power and perform the set-up again after checking [Checking items] below.

Data writing abnormal screen

Checking items

① Smart media cover is opened during the data communication from the smart media.
② Data of the smart media is not correct. Or, there is no data file.
③ Contact of the smart media is dirty. Contact is defective.

(Caution) Do not turn OFF the power and close/open the smart media cover during the work. The main unit may be broken.

(4) Setup of servo program

Perform the work by the procedure below when rewriting the servo program in the same way of "(3) Setup of main program".

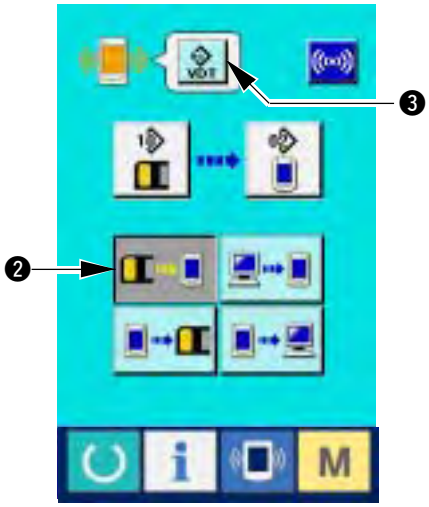
1. When main program matches with servo program

Perform the work by the procedure below when making the servo program version-up by using the smart media card.

1) First, turn ON the power. Normally, the sewing ready screen is displayed.
2) Insert the smart media card into the operation panel.
3) Perform operation by the procedure displayed in the screen below.

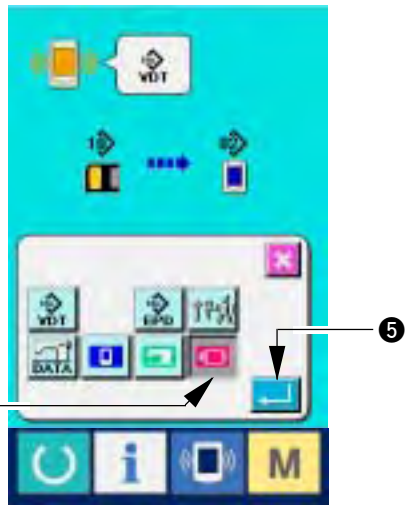
Data edit screen

1) Press key ❶ for three seconds.



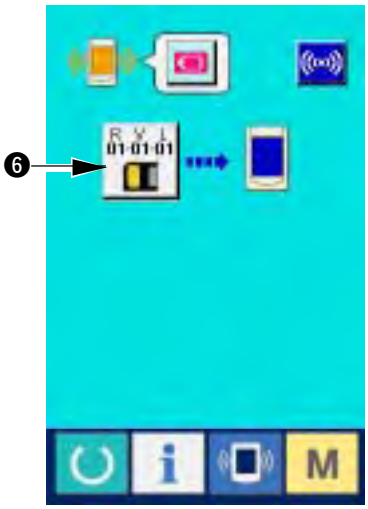
Communication screen 1

2) Press key ❷ .
3) Press key ❸ VDT .



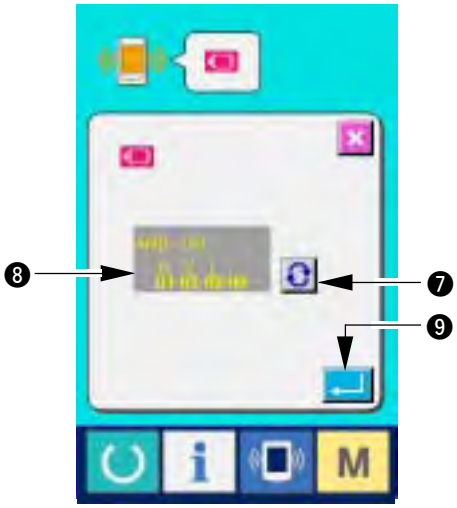
Data selection screen

4) Press key ❹ .
5) Press key ❺ .



Communication screen 2

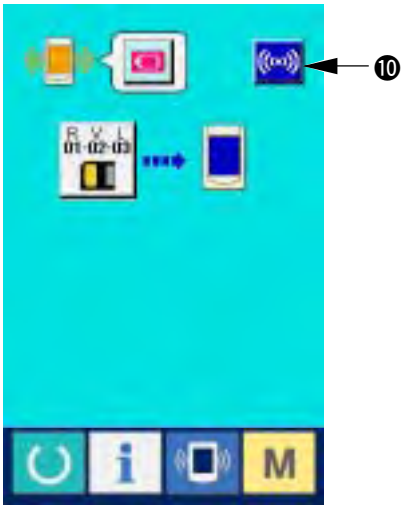
6) Press key ❻ .



File selection screen

7) Press key ❼ and select the download program at display ❽ .

8) Press key ❾ .



Communication screen 3

9) Press key ❿ .

<-<- Start of communication ->->

Screen during data writing

Screen of end of data writing

The procedure above completes the replacing work of application software.

If the screen below is displayed, quickly turn OFF the power and perform the set-up again after checking [Checking items] below.

Data writing abnormal screen

Checking items

① Smart media cover is opened during the data communication from the smart media.
② Data of the smart media is not correct. Or, there is no data file.
③ Contact of the smart media is dirty. Contact is defective.

(Caution) Do not turn OFF the power and close/open the smart media cover during the work. The main unit may be broken.

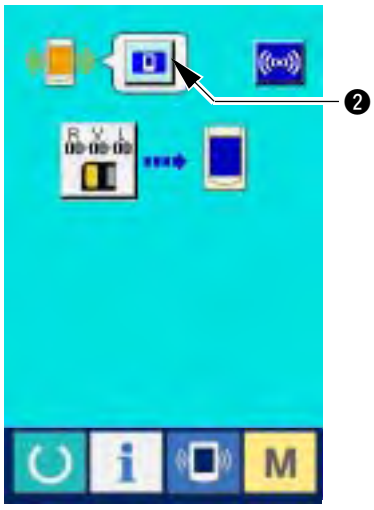
2. When main program does not match with servo program and an error occurs

Perform the work by the procedure below when replacing servo program in case trouble such as "E703", "E704", etc. occurs.

1) First, turn ON the power. Error screen (E703 or E704) is displayed after turning ON the power.
2) Insert the smart media card into the operation panel.
3) Perform operation by the procedure displayed in the screen below.

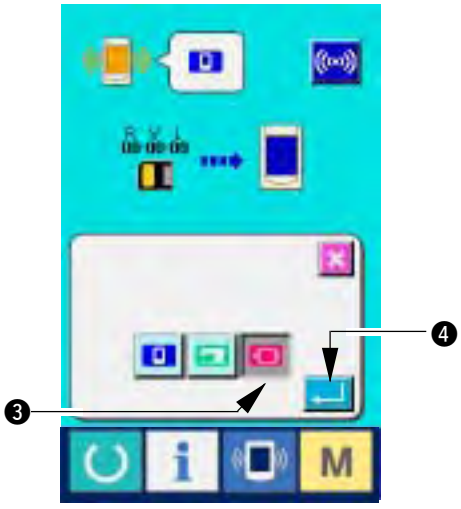
Error screen

1) Press key ❶ for three seconds.



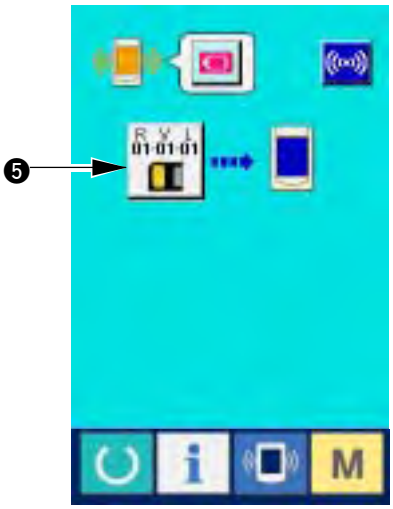
Communication screen 1

2) Press key ❷ .



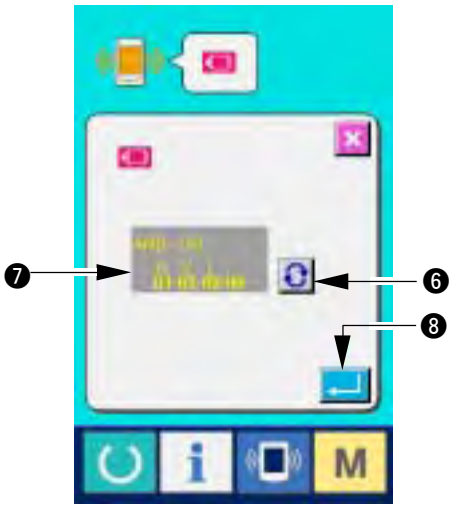
Data selection screen

3) Press key ❸ .
4) Press key ❹ .



Communication screen 2

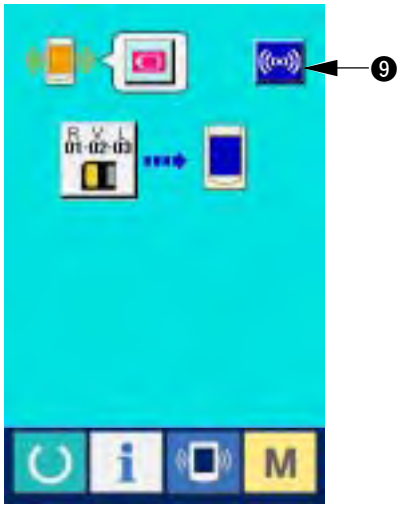
5) Press key ❺ .



File selection screen

6) Press key ❻ and select the download program at display ❼ .

7) Press key ❽ .



Communication screen 3

8) Press key ❾ .

<-<- Start of communication ->->

Screen during data writing

Screen of end of data writing

The procedure above completes the replacing work of application software.

If the screen below is displayed, quickly turn OFF the power and perform the set-up again after checking [Checking items] below.

Data writing abnormal screen

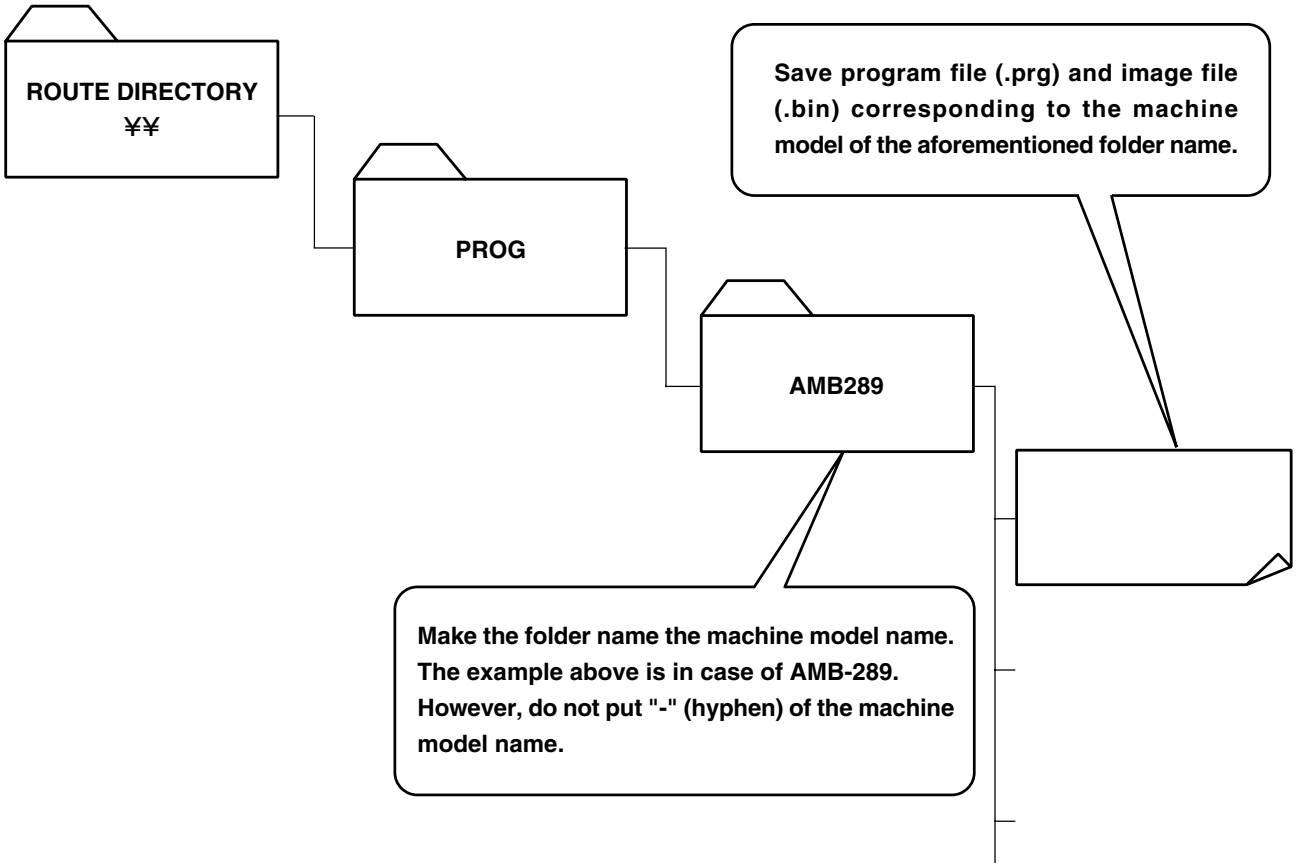
Checking items

① Smart media cover is opened during the data communication from the smart media.
② Data of the smart media is not correct. Or, there is no data file.
③ Contact of the smart media is dirty. Contact is defective.

(Caution) Do not turn OFF the power and close/open the smart media cover during the work. The main unit may be broken.

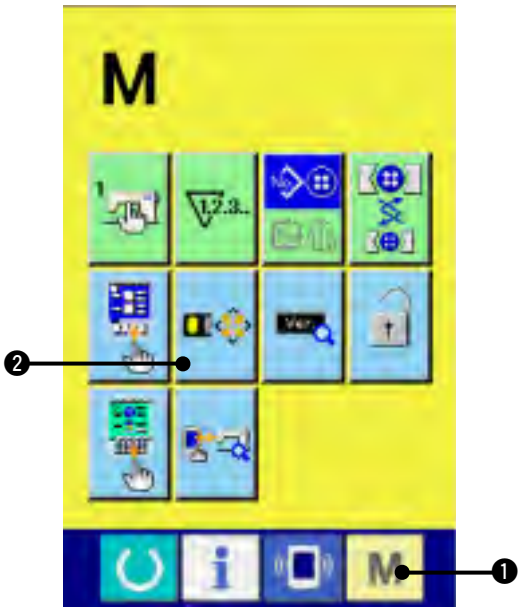
(5) When using smart media other than that which has been packed together

When copying the contents of the smart media card which is packed together to the other smart media, create the directory structure mentioned below with the personal computer after formatting the smart media to be the copy destination with IP-200.
For the formating procedure of the smart media, see (6) Formatting.



(6) Formating

In case of re-formating the smart media, be sure to perform it with IP-200. The smart media formated with the personal computer cannot be read with IP-200.



1) Display the smart media format screen.

When MODE key M ❶ is held pressed for three seconds, smart media format button ❷ is displayed on the screen. When this button is pressed, the smart media format screen is displayed.

2) Start formating of the smart media.

Set the smart media you desire to format to the smart media slot, close the cover, press ENTER button ❸ and formating starts.

(Caution) Save necessary data in the smart media to the other vehicle before formating. When formating is performed, the inside data are deleted.

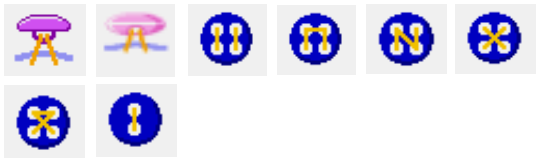
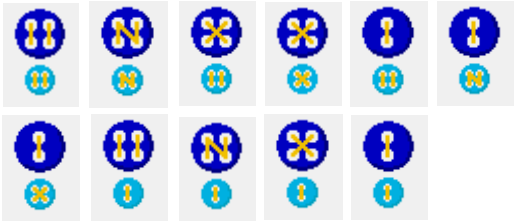
[Prohibition items in handling the smart media]

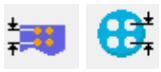
① Smart media is a precision electronic instrument. Do not bend it or apply shock to it.
② It is recommended to periodically save the data saved in the smart media to the other vehicle to prepare for accidents.
③ When initializing the data, perform it after checking that necessary data do not exist in the card.
④ Avoid using or storing the smart media in a place of high temperature and high humidity.
⑤ Avoid using the smart media near exothermic and combustible articles.
⑥ If the contact part of the card becomes dirty, failure of contact will be caused. Do not touch by hand, and control so that dust, oil, or other foreign material does not adhere to it. In addition, the inside element is damaged by static electricity or the like. So, be very careful when handling.
⑦ Smart media has a span of life. Writing and deletion cannot be performed after an extended period of use. In this case, replace it with a new one.

7. SEWING DATA

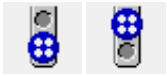
(1) Sewing data list

Sewing data are those that can be inputted to 99 patterns from pattern 1 to 99 and can be inputted to each pattern.However, the sewing data that can be inputted differ according to the selected sewing method or sewing shape.

No.	Item	Setting range	Edit unit	Initial display	Remarks
S01	**Sewing method** This item sets the sewing method.  : Sewing flat/wrapped-around button with blindstitch  : Sewing flat button directly to cloth  : Sewing flat button with blindstitch  : Neck wrapping  : Counter/stay button sewing	– – –	– – –	 Sewing flat/ wrapped-around button with blindstitch	
S02	**Stitch shape (sewing flat/wrapped-around button with blindstitch)** This item sets the stitch shape of sewing flat/wrapped-around button with blindstitch. 	– – –	– – –	 4-holed button without cross-over stitches (longitudinal)	
S03	**Stitch shape (sewing flat button directly to cloth)** This item sets the stitch shape of sewing flat button directly to cloth. 	– – –	– – –	 4-holed button without cross-over stitches (longitudinal)	
S04	**Stitch shape (sewing flat button with blindstitch)** This item sets the stitch shape of sewing flat button with blindstitch. 	– – –	– – –	 4-holed button without cross-over stitches (longitudinal)	
S05	**Stitch shape (counter/stay button sewing)** This item sets the stitch shape of counter/stay button sewing. * Selection of the shape of lower button is performed with  . 	– – –	– – –	 Front : 4-holed button without cross-over stitches (longitudinal) Rear : 4-holed button without cross-over stitches (longitudinal)	
S08	**Upper buttonhole interval (longitudinal)** This item sets the needle entry interval of top feed. 	0.10 to 6.00	0.05mm	3.60	

No.	Item	Setting range	Edit unit	Initial display	Remarks
S09	**Upper buttonhole interval (lateral)** This item sets the needle entry interval of top feed. 	0.10 to 6.00	0.05mm	3.60	
S10	**Needle entry interval of bottom feed (longitudinal)** This item sets the needle entry interval of bottom feed. 	0.10 to 6.00	0.05mm	3.20	
S11	**Needle entry interval of bottom feed (lateral)** This item sets the needle entry interval of bottom feed. 	0.10 to 6.00	0.05mm	3.20	
S12	**Number of stitches for button sewing** This item sets the number of stitches for button sewing. 	2 to 32	2 stitchs	6	
S13	**Number of stitches at the start of button sewing (1 to 3 stitches)** This item sets the number of stitches at the start of button sewing. 	1 to 3	1 stitch	1	
S14	**Compensation of lower left position of upper button** This item is set when cloth is pulled and the amount of blindstitch on the left side is different from that on the right side. 	–1.00 to 1.00	0.05mm	0	
S15	**Compensation of 3rd stitch at the start of sewing** This item compensates the position of 3rd stitch at the start of sewing to prevent thread from slipping off at the start of button sewing 	0 to 0.5	0.05mm	0	
S16	**Blindstitch width** This item has to be set within the range where needle and tongue do not come in contact with each other. 	0.0 to K05	0.2mm	0.6	* 1
S17	**Blindstitch amount** This item sets the blindstitch amount to cloth. 	–1.00 to 5.00	0.05mm	0.40	
S18	**Buttonhole height of shank/marble button sewing (Height from the feed plate)** This item is set to prevent the contact of needle and buttonhole. 	0.0 to 10.0	0.1mm	3.0	
S21	**Thinning level of the stay button** This item decreases the number of cross-over stitches of the lower side button at the time of stay button sewing.  : Without thinning  : Thinning level 1  : Thinning level 2  : Thinning level 3	– – –	– – –	 Without thinning	
S22	**Lateral compensation of needle entry of lower button at the time of sewing counter button (front : 4 holes, rear : 2 holes)** Perform compensation to such an extent that needle does not come in contact with buttonhole within the range of lower buttonhole. 	0 to 0.30	0.05mm	0.30	

* 1 The maximum value of the range of data editing depends on the setting of K05.

No.	Item	Setting range	Edit unit	Initial display	Remarks
S24	**Number of stitches of tie stitch at the end of sewing flat button directly to cloth.** This item sets the number of stitches of tie stitch at the end of sewing flat button directly to cloth. 	2 to 3	1 stitch	2	
S25	**Number of stitches of tie stitch at the end of counter sewing** This item sets the number of stitches of tie stitch at the end of counter sewing. 	1 to 3	1 stitch	2	
S26	**Button height (sewing flat/wrapped-around button with blindstitch)** This item sets the button holding height (finished height) in the neck wrapping process. 	0.5 to 15.0	0.1mm	2.5	
S27	**Button height (shank/marble)** This item sets the button holding height (finished height) in the neck wrapping process. 	0 to 15.0	0.1mm	3.4	
S28	**Button height (counter button)** This item sets the button holding height (finished height) in the button sewing process. 	0 to 20.0	0.1mm	4.5	
S29	**Number of stitches at the start of sewing of neck wrapping** This item sets the number of stitches at the start of sewing of neck wrapping. 	1 to 3	1 stitch	2	
S30	**Number of stitches of tie stitch at the end of sewing of neck wrapping** This item sets the number of stitches of tie stitch at the end of sewing in the neck wrapping process. 	2 to 3	1 stitch	2	
S31	**Compensation of the button holding height at the time of sewing flat/wrapped-around button with blindstitch** This item sets when compensating the button holding height in the button sewing process and desiring to give slackness between button and neck wrapping section. 	–5.0 to 5.0	0.1mm	–0.5	
S32	**Thread release compensation** This item is the compensation value of the button holding height in the button sewing process. Sewing is performed in the neck wrapping process by gradually returning the compensation value to the former one. This item is set when desiring to tightly wrap up to the root of the button. 	–5.0 to 5.0	0.1mm	0.5	
S33	**Button loader selection** <In case of shank/marble button>  : Loader OFF  : Loader ON <In case of normal button>  : Loader OFF  : Loader ON	– – –	– – –	 Loader used (Front side)	
S34	**Number of times of wrapping** This item sets the number of times of thread wrapping sewing in the neck wrapping process. 	0 to 5	1 time	0	

No.	Item	Setting range	Edit unit	Initial display	Remarks
S35	**Number of stitches of thread air-blow** This item sets the number of stitches of thread air-blow in the neck wrapping process. 	0 to 20	1 stitch	6	
S36	**Compensation of button height in the neck wrapping process** This item compensates the button holding height in the neck wrapping process and adjusts the wrapped condition. 	–5.0 to 5.0	0.1mm	0	
S37	**Button positioning motion With/without**  : With  : Without This item sets whether the compensation motion of button positioning is performed at the time of operation by operator before driving the sewing machine. It is convenient to use this item when sewing buttons which are uneven in shape. * Compensation value which has been set here is applied to one button sewing only and the compensation value returns to 0 after completion of sewing.	– – –	– – –	 Without	
S38	**Needle height at the time of button positioning** This item sets the angle which automatically lowers needle at the time of button positioning motion. Set the angle which is easy to perform positioning according to kinds of buttons, neck wrapping height, etc. 	0 to 130	1˚	80	
S39	**Thread drawing motor start position in the button sewing process** This item sets the thread slack amount at the start of sewing to stabilize thread remaining amount at the start of sewing. 	0 to 100	1 pulse	30	
S40	**Number of stitches to start thread drawing motor operation in the button sewing process** This item sets number of stitches to hold the thread slack amount set in No. S39. 	1 to 2	1 stitch	1	
S41	**Compensation of tension timing on cloth side and rear side in the button sewing process** This item changes the tension changeover timing at the needle entry on cloth side and rear side, and shifts the knotting position. 	–90 to 90	1˚	0	

(2) Initial sewing data

Patterns from 1 to 8 have been already registered at the time of your purchase and the data which are different in sewing method and sewing shape are inputted in the sewing data as the initial value.

Pattern No.	S01 Sewing method	S02 Sewing shape	Data changed from initial value	Changed value
1	 Sewing flat/wrapped-around button with blindstitch		Without	
2	 Sewing flat/wrapped-around button with blindstitch		S32 Thread release compensation S519 Top position of neck wrapping	0.5 → 0.0mm 0.5 → 2.7mm
3	 Sewing flat/wrapped-around button with blindstitch		S27 Button height (shank/marble) S32 Thread release compensation S509 Hole position of shank/marble button	4.0 → 2.5mm 0.5 → 0.0mm 0.3 → 2.5mm
4	 Sewing counter/stay button		Without	
5	 Sewing counter/stay button		S10 Needle entry interval of bottom feed (longitudinal) S504 1st stitch hole position of lower button (longitudinal) S505 1st stitch hole position of lower button (lateral)	3.6 → 3.2mm 1.8 → 1.6mm 1.8 → 0.0mm
6	 Sewing button with neck wraps	– – –	S510 Tie stitch position of 1st stitch at the start of sewing of neck wrapping (longitudinal) S512 Tie stitch position of 2nd stitch at the start of sewing of neck wrapping (longitudinal)	0.0 → 0.5mm 1.0 → 1.5mm
7	 Sewing flat button with blindstitch		Without	
8	 Sewing flat button directly to cloth		Without	

8. MEMORY SWITCH

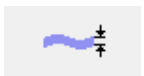
(1) Memory switch data list

1) Level 1

Memory switch data (level 1) are the motion data that the sewing machine has in common and the data that operate on all sewing patterns in common.

<table>
<tr><th>No.</th><th>Item</th><th>Setting range</th><th>Edit unit</th><th>Initial display</th><th>Remarks</th></tr>
<tr><td>U01</td><td>Pedal motion mode
Motion mode of the pedal is set. 
1 : Lower the button by depressing the front part of the pedal. Lower the cloth presser with the tongue sensor.
2 : Lower the button and the cloth presser by depressing the front part of the pedal.
3 : Lower the button and the cloth presser with the tongue sensor.</td><td>1 to 3</td><td>1</td><td>1</td><td></td></tr>
<tr><td>U02</td><td>Button loader motion mode
Motion mode of the button loader is set.
  : Unused
  : Automatic inserting mode
  : Pedal inserting mode</td><td>– – –</td><td>– – –</td><td> 
Automatic inserting mode</td><td></td></tr>
<tr><td>U03</td><td>Cloth take-out time
Waiting time for operator to take out cloth is set in case of sewing flat button directly to cloth and counter sewing.  </td><td>0 to 20.0</td><td>0.1s</td><td>2.0s</td><td></td></tr>
<tr><td>U04</td><td>Button loader setting position setting  </td><td>0 to 90</td><td>1˚</td><td>20˚</td><td></td></tr>
<tr><td>U05</td><td>Soft start mode (button sewing)
<table>
<tr><th>Display</th><th>1st stitch</th><th>2nd stitch</th><th>3rd stitch</th><th>4th stitch</th><th>5th stitch</th></tr>
<tr><td> 
: Slow</td><td>300</td><td>400</td><td>700</td><td>900</td><td>1100</td></tr>
<tr><td> 
: Rather fast</td><td>400</td><td>600</td><td>800</td><td>1000</td><td>1200</td></tr>
<tr><td> 
: Fast</td><td>800</td><td>1000</td><td>1200</td><td>1200</td><td>1200</td></tr>
<tr><td>  </td><td colspan="5">Optional setting</td></tr>
</table>
(Unit : rpm)</td><td>– – –</td><td>– – –</td><td> 
Rather fast</td><td></td></tr>
<tr><td>U06</td><td>Soft start 1st stitch (button sewing)  </td><td>200 to 1200</td><td>100rpm</td><td>400rpm</td><td>*1</td></tr>
<tr><td>U07</td><td>Soft start 2nd stitch (button sewing)  </td><td>200 to 1200</td><td>100rpm</td><td>600rpm</td><td>*1</td></tr>
</table>

*1 Displayed only when U05 is set optionally.

<table>
<tr><th>No.</th><th>Item</th><th>Setting range</th><th>Edit unit</th><th>Initial display</th><th>Remarks</th></tr>
<tr><td>U08</td><td>Soft start 3rd stitch (button sewing)
  </td><td>200 to 1200</td><td>100rpm</td><td>800rpm</td><td>*1</td></tr>
<tr><td>U09</td><td>Soft start 4th stitch (button sewing)
  </td><td>200 to 1200</td><td>100rpm</td><td>1000rpm</td><td>*1</td></tr>
<tr><td>U10</td><td>Soft start 5th stitch (button sewing)
  </td><td>200 to 1200</td><td>100rpm</td><td>1200rpm</td><td>*1</td></tr>
<tr><td>U11</td><td>Soft start mode (neck wrapping)
<table>
<tr><th>Display</th><th>1st stitch</th><th>2nd stitch</th><th>3rd stitch</th><th>4th stitch</th><th>5th stitch</th></tr>
<tr><td> 
: Slow</td><td>300</td><td>400</td><td>600</td><td>900</td><td>1200</td></tr>
<tr><td> 
: Rather fast</td><td>400</td><td>500</td><td>700</td><td>1000</td><td>1600</td></tr>
<tr><td> 
: Fast</td><td>600</td><td>900</td><td>1200</td><td>1600</td><td>1800</td></tr>
<tr><td>  </td><td colspan="5">Optional setting</td></tr>
</table>
(Unit : rpm)</td><td>– – –</td><td>– – –</td><td> 
Rather fast</td><td></td></tr>
<tr><td>U12</td><td>Soft start 1st stitch (neck wrapping)
  </td><td>200 to 1800</td><td>100rpm</td><td>400rpm</td><td>*2</td></tr>
<tr><td>U13</td><td>Soft start 2nd stitch (neck wrapping)
  </td><td>200 to 1800</td><td>100rpm</td><td>500rpm</td><td>*2</td></tr>
<tr><td>U14</td><td>Soft start 3rd stitch (neck wrapping)
  </td><td>200 to 1800</td><td>100rpm</td><td>700rpm</td><td>*2</td></tr>
<tr><td>U15</td><td>Soft start 4th stitch (neck wrapping)
  </td><td>200 to 1800</td><td>100rpm</td><td>1000rpm</td><td>*2</td></tr>
<tr><td>U16</td><td>Soft start 5th stitch (neck wrapping)
  </td><td>200 to 1800</td><td>100rpm</td><td>1500rpm</td><td>*2</td></tr>
<tr><td>U17</td><td>Cloth thickness
Height of the chuck motor is compensated in case of sewing flat button directly to cloth and counter sewing.
  </td><td>0 to 10.0</td><td>0.1mm</td><td>2.0mm</td><td></td></tr>
<tr><td>U18</td><td>Tongue cloth presser ON timing
Waiting time from working of tongue sensor to cloth presser ON is set.
  </td><td>0 to 500</td><td>5ms</td><td>100</td><td></td></tr>
</table>

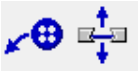
*1 Displayed only when U05 is set optionally.

*2 Displayed only when U11 is set optionally.

No.	Item	Setting range	Edit unit	Initial display	Remarks
U19	**Operation speed setting** Motion speed of the feed motor by means of pedal operation is set. 1 : Slow 10 : Fast 	1 to 10	1	10.0	
U20	**Bottom feed move amount at the time of manual mode** As much as the move amount of the bottom feed motor to which cloth setting position is set is advanced. 	0 to 25.0	0.1mm	10.0	
U21	**Position of the cloth presser at the time of manual mode**  : Up  : Down	– – –	– – –	 Up	

2) Level 2

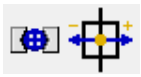
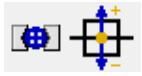
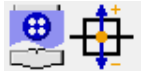
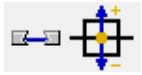
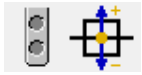
Memory switch data (level 2) can be edited when pressing MODE switch for as long as 6 seconds.

No.	Item	Setting range	Edit unit	Initial display	Remarks
K01	**VCM control starting angle offset** 	– 20 to 20.0	1°	0	*1
K02	**Tongue lifting amount** 	10.0 to 24.0	0.1mm	16.5mm	*1
K03	**Thread trimming control mode**  : Thread trimming priority mode  : Cycle time priority mode	– – –	– – –	 Thread trimming priority mode	
K04	**Button loader inserting height compensation** 	10.0 to 25.0	0.1mm	17.0	
K05	**Max. value of blindstitch width setting** 	0.0 to 6.0	0.2mm	1.6	
K06	**Bottom feed position of rear hole of blindstitch** Bottom feed position from origin at the rear hole of blindstitch is set. 	0.0 to 2.0	0.1mm	1.5	
K07	**Head tilt sensor detection ON/OFF**  : OFF  : ON	– – –	– – –	 ON	

*1 Data that have been memorized in the machine head EEP-ROM, and the adjustment value has been written at the time of delivery.

No.	Item	Setting range	Edit unit	Initial display	Remarks
K08	**Head type** 1 : Standard 2 to 9 : Unused 	1 to 9	1	1	*1
K09	**Each time origin retrieval** 1 : Bottom feed only 2 : Bottom feed + needle rocking 3 : Bottom feed + thread drawing 4 : Bottom feed + needle rocking + thread drawing  * Origin retrieval of bottom feed is performed only at the time of sewing flat/wrapped-around button with blindstitch.	1 to 4	1	1	
K10	**Button loader lifting amount** Lifting amount after grasping button is set. 	5.0 to 10.0	0.1mm	6.5	
K11	**Height from tongue stopper lower plate** Set this item when tongue stopper parts are changed. 	0 to 8.0	0.1mm	5.6	*1
K12	**Tongue change display mode** When READY key is pressed, whether AMB-189 type tongue or AMB-289 type one is judged, and displays below are shown. * Judge value is determined with K13 .  : Without display  : When tongue change is necessary  : When AMB-189 type tongue (wide gauge) is used  : When AMB-289 type tongue (narrow gauge) is used  : Tongue type used is displayed each time.	– – –	– – –	 When tongue change is necessary	
K13	**Tongue change blindstitch width** Blindstich width which is the standard to make the check screen display. 	1.0 to 20.0	0.1mm	1.6	
K14	**Pedal type** Kind of pedal to be used is set.  : Standerd pedal  : PK-47	– – –	– – –	 Standerd pedal	

*1 Data that have been memorized in the machine head EEP-ROM, and the adjustment value has been written at the time of delivery.

No.	Item	Setting range	Edit unit	Initial display	Remarks
K51	**Needle rocking motor origin compensation** 	– 5.00 to 5.00	0.05mm	0	*1
K52	**Differential motor origin compensation** 	– 2.0 to 2.0	0.1mm	0	*1
K53	**Y feed upper motor origin compensation** 	–5.00 to 5.00	0.05mm	0	*1
K54	**Y feed lower motor origin compensation (blindstitch origin)** 	–5.00 to 5.00	0.05mm	0	*1
K55	**Y feed lower motor origin compensation (neck wrapping compensation)** 	–5.00 to 5.00	0.05mm	0	*1
K56	**Y feed lower motor origin compensation (origin of button sewn directly to cloth)** 	–5.00 to 5.00	0.05mm	0	*1
K57	**Presser motor origin compensation** 	–50 to 50	1pulse	0	*1
K58	**Thread drawing motor origin compensation** 	–10 to 10	1pulse	0	*1
K59	**Loader motor origin compensation** 	–50 to 50	1pulse	0	*1

*1 Data that have been memorized in the machine head EEP-ROM, and the adjustment value has been written at the time of delivery.

9. OPTION

(1) Optional parts list

1) Marking light asm.
2) Counter button B asm.
3) Button carrier pin
4) Button set pin
5) Under plate spacer
6) Movable eye-guard

1) Marking light asm. (Part No.40021446)

No.	Part No.	Description	Qty
1	40021018	LIGHT_STAY _OPTION	1
2	SL6040892TN	BOLT	2
3	40020995	LIGHT_BUSH	1
4	SL6040892TN	BOLT	1
5	40019209	LIGHT MARKING PROJECTOR	1
6	SL6042092TN	SCREW M4 L=20	1

* Refer to Optional components (2) of Parts List.

2) Counter button B asm. (Part No.40021447)

No.	Part No.	Description	Qty
1	40020809	COUNTER_BUTTON_FEED_PLATE	1
2	40020815	COUNTER_BUTTON_PLATE_B	1
3	40020816	COUNTER_BUTTON_CLAMP_L	1
4	40020817	COUNTER_BUTTON_CLAMP_R	1

* Refer to Optional components (2) of Parts List.

4) Button set pin

No.	Part No.	Description	Qty
1	17974056	BUTTON SET PIN A (marble button)	1
2	17974254	BUTTON SET PIN B (shank button ø 1.5 to ø 2.0)	1
3	17974452	BUTTON SET PIN C (shank button ø 2.0 or more)	1
4	40023428	ASSY_BUTTON_SET_PIN D (metallic button)	1

* Refer to (1) Replacing the attachments of 10. MAINTENANCE.

5) Under plate spacer

No.	Part No.	Description	Qty
1	40020769	UNDER_PLATE_SPACER B t=2.0	1
2	40020770	UNDER_PLATE_SPACER C t=2.6	1

* Refer to (13) Adjusting the tongue stopper of 3. STANDARD ADJUSTMENT.

3) Button carrier pin

No.	Part No.	Description	Stamp	Qty	Remarks
1	17856600	BUTTON CARRIER	A	1	for 4-holed button
2	17856709	BUTTON CARRIER	B	1	
3	17856808	BUTTON CARRIER	C	1	
4	17856907	BUTTON CARRIER	D	1	
5	17857004	BUTTON CARRIER	E	1	
6	17857103	BUTTON CARRIER	F	1	
7	17857202	BUTTON CARRIER	F1	1	
8	17857301	BUTTON CARRIER	G	1	
9	17857400	BUTTON CARRIER (Standard spec)	H	1	
10	17857509	BUTTON CARRIER	J	1	
11	17857608	BUTTON CARRIER	K	1	
12	17857707	BUTTON CARRIER	K1	1	
13	17857806	BUTTON CARRIER	L	1	
14	17858002	BUTTON CARRIER	M	1	for 2-holed button
15	17858101	BUTTON CARRIER	N	1	
16	17858200	BUTTON CARRIER	P	1	
17	17858309	BUTTON CARRIER	Q	1	
18	17858408	BUTTON CARRIER	R	1	
19	17858507	BUTTON CARRIER	S	1	
20	17858606	BUTTON CARRIER (Standard spec)	T	1	
21	17858705	BUTTON CARRIER	U	1	
22	17858804	BUTTON CARRIER	V	1	
23	17858903	BUTTON CARRIER	W	1	
24	17859000	BUTTON CARRIER	X	1	
25	17859109	BUTTON CARRIER	Y	1	
26	17859208	BUTTON CARRIER	Z	1	

* Refer to (1) Replacing the attachments of 10. MAINTENANCE.

6) Movable eye-guard

No.	Part No.	Description	Qty
1	40024087	MOVING SAFETY PLATE OPTION	1

* Refer to (2) Movable eye-guard of 9. OPTION.

(2) Movable eye-guard

1. Assemble the movable eye-guard to face plate ❶ with setscrews ❷ and ❸ as shown in the figure. (Refer to Parts List.)
2. Structure is as shown in figure C. Loosen setscrew ❺ of stopper block ❹ in figure B, and assemble 5-port solenoid valve ❻ supplied as accessories.
3. Perform the piping of air hoses ❼ so that the hoses follow the same route of the wiper and go to 5-port solenoid valve ❻.

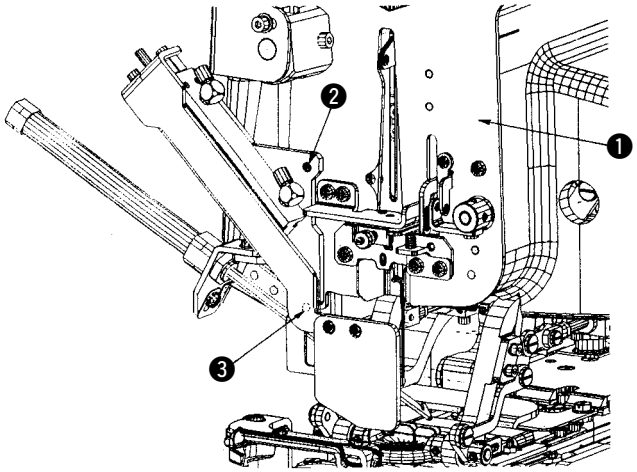


Fig.A

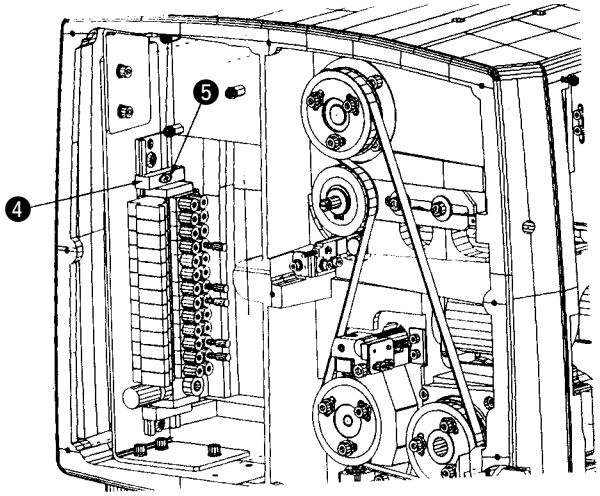


Fig.B

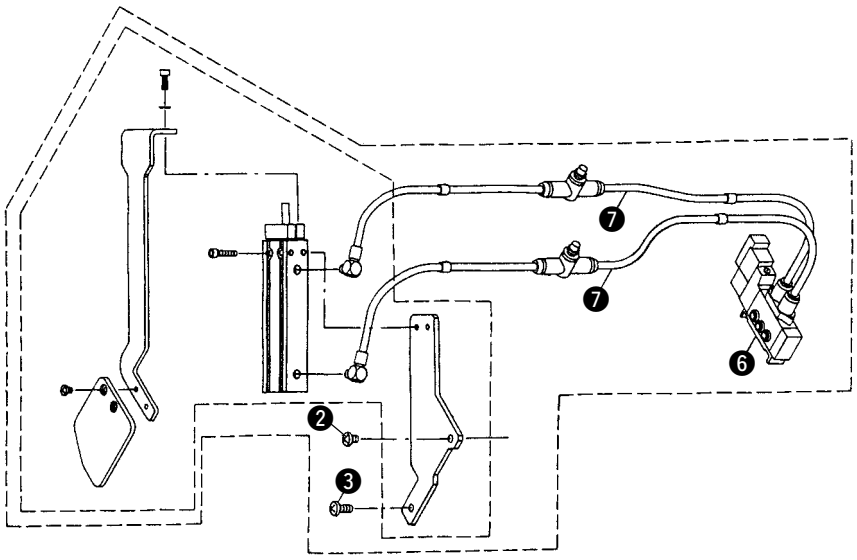
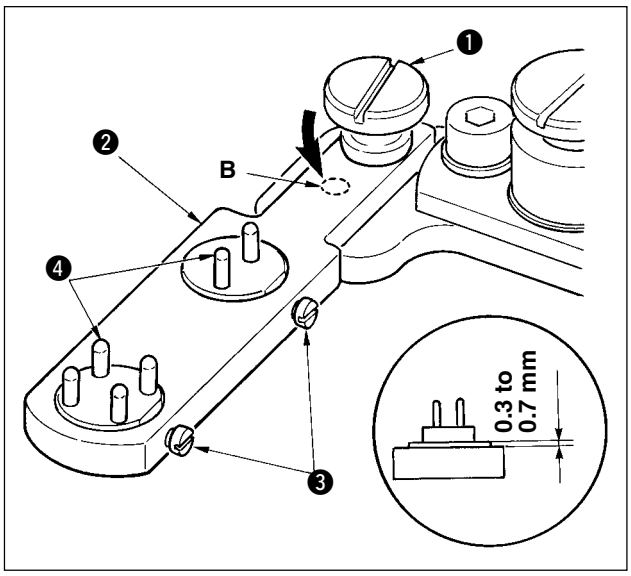


Fig.C

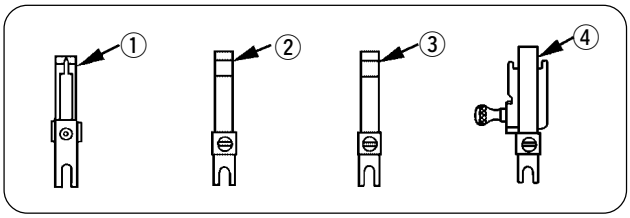
10. MAINTENANCE

(1) Replacing the attachments

1) Replacing the button set pin (optional)



When replacing button set pin ❷, loosen knob ❶ and replace it. However, when replacing the set pin with those below, remove knob ❶ and install it in the screw hole on side B.

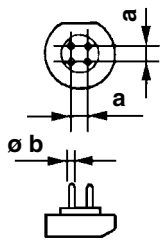
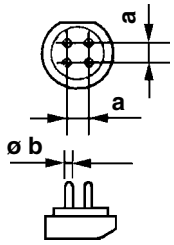
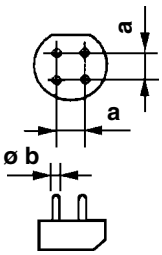
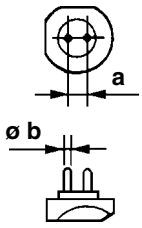
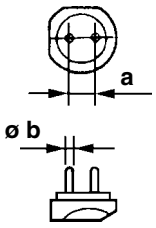


No.	Part No.	Description
①	17974056	Set pin for marble button
②	17974254	Set pin for shank button (ø 1.5 to ø 2.0)
③	17974452	Set pin for shank button (ø 2.0 or more)
④	40023428	Set pin for metallic button

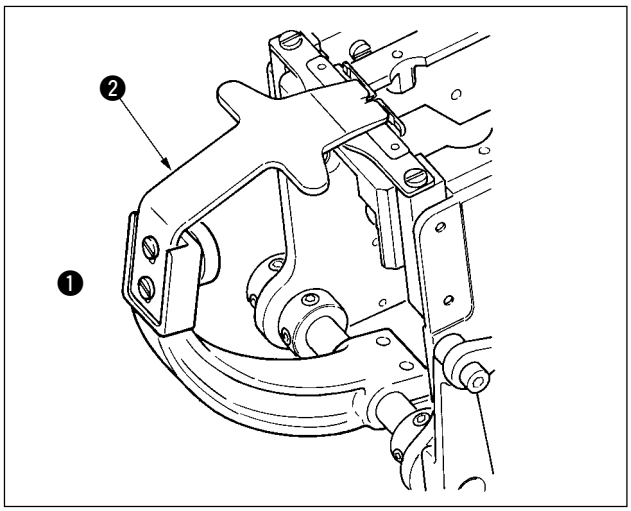
2) Replacing the carrier pin

When replacing button carrier ❹, loosen screw ❸ and replace it. At this time, adjust the height of carrier pin to 0.3 to 0.7 mm from the top surface of button set pin ❷.

<Carrier pin list>

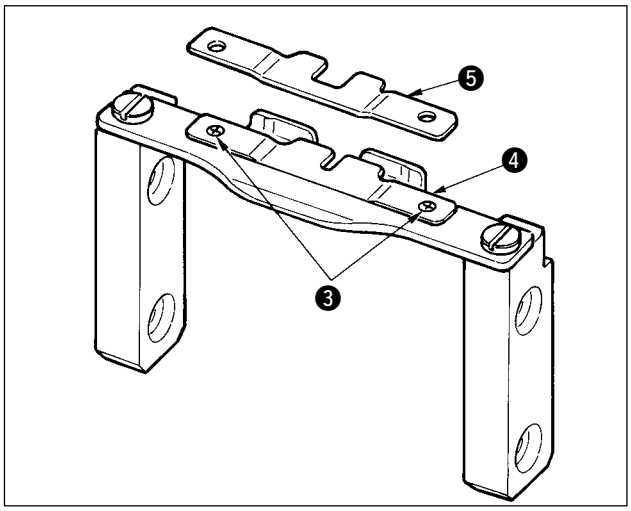
Button carrier (for 4-holed button)									Button carrier (for 2-holed button)								
1			2			3			4			5					
																	
Stamp	Part No.	Dimensions	Stamp	Part No.	Dimensions	Stamp	Part No.	Dimensions	Stamp	Part No.	Dimensions	Stamp	Part No.	Dimensions			
A	17856600	a 2.0 b 1.0	D	17856907	a 2.8 b 1.2	K	17857608	a 4.0 b 1.4	M	17858002	a 2.0 b 1.0	U	17858705	a 4.0 b 1.4			
B	17856709	a 2.4 b 1.2	E	17857004	a 2.8 b 1.4	K1	17857707	a 4.0 b 1.8	N	17858101	a 2.4 b 1.2	V	17858804	a 4.2 b 1.4			
C	17856808	a 2.6 b 1.2	F	17857103	a 3.0 b 1.2	L	17857806	a 5.0 b 1.8	P	17858200	a 2.6 b 1.2	W	17858903	a 4.4 b 1.4			
			F1	17857202	a 3.0 b 1.4				Q	17858309	a 2.8 b 1.2	X	17859000	a 4.6 b 1.4			
			G	17857301	a 3.2 b 1.4				R	17858408	a 3.0 b 1.2	Y	17859109	a 4.8 b 1.4			
			H	Standard spec 17857400	a 3.4 b 1.4				S	17858507	a 3.2 b 1.4	Z	17859208	a 5.0 b 1.4			
			J	17857509	a 3.6 b 1.4				T	Standard spec 17858606	a 3.4 b 1.4						

3) Replacing the tongue stopper



When using the standard 4-holed tongue (Part No. 25006602) of the former AMB-189N, replace the tongue stopper guide together.

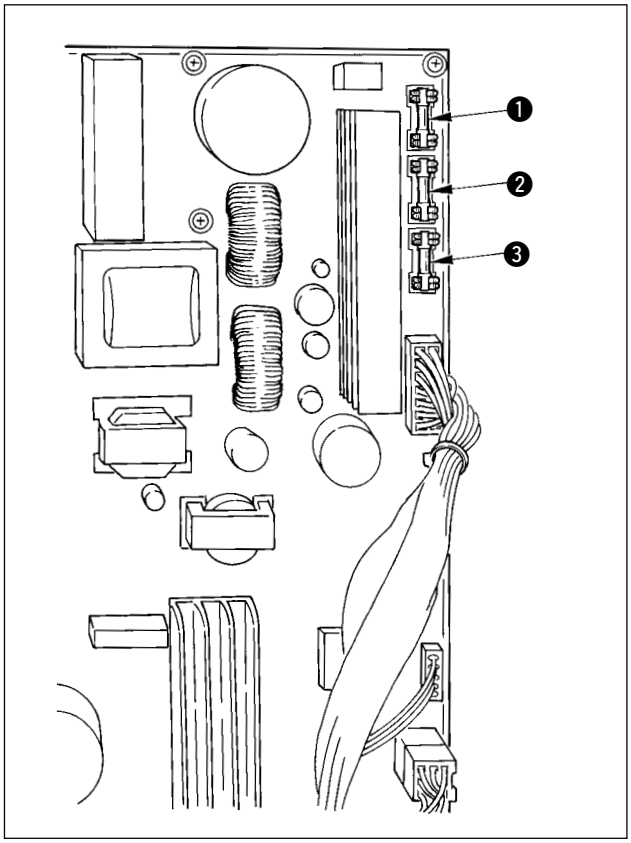
1) Replacing the tongue
   Remove screws ❶ and replace tongue ❷.



2) Replacing the tongue stopper guide
   Remove screws ❸ and replace tongue stopper guide ❹ with tongue stopper guide B (Part No. : 40020763) ❺ supplied as accessories.

3) Finally, perform the change of memory switch level K12.

(2) Replacing the fuse



The machine uses the following three fuses :

❶ For pulse motor power supply protection
5A (time-lag fuse)

❷ For solenoid and pulse motor power supply protection
3.15A (time-lag fuse)

❸ For control power supply protection
2A (fast-blow type fuse)

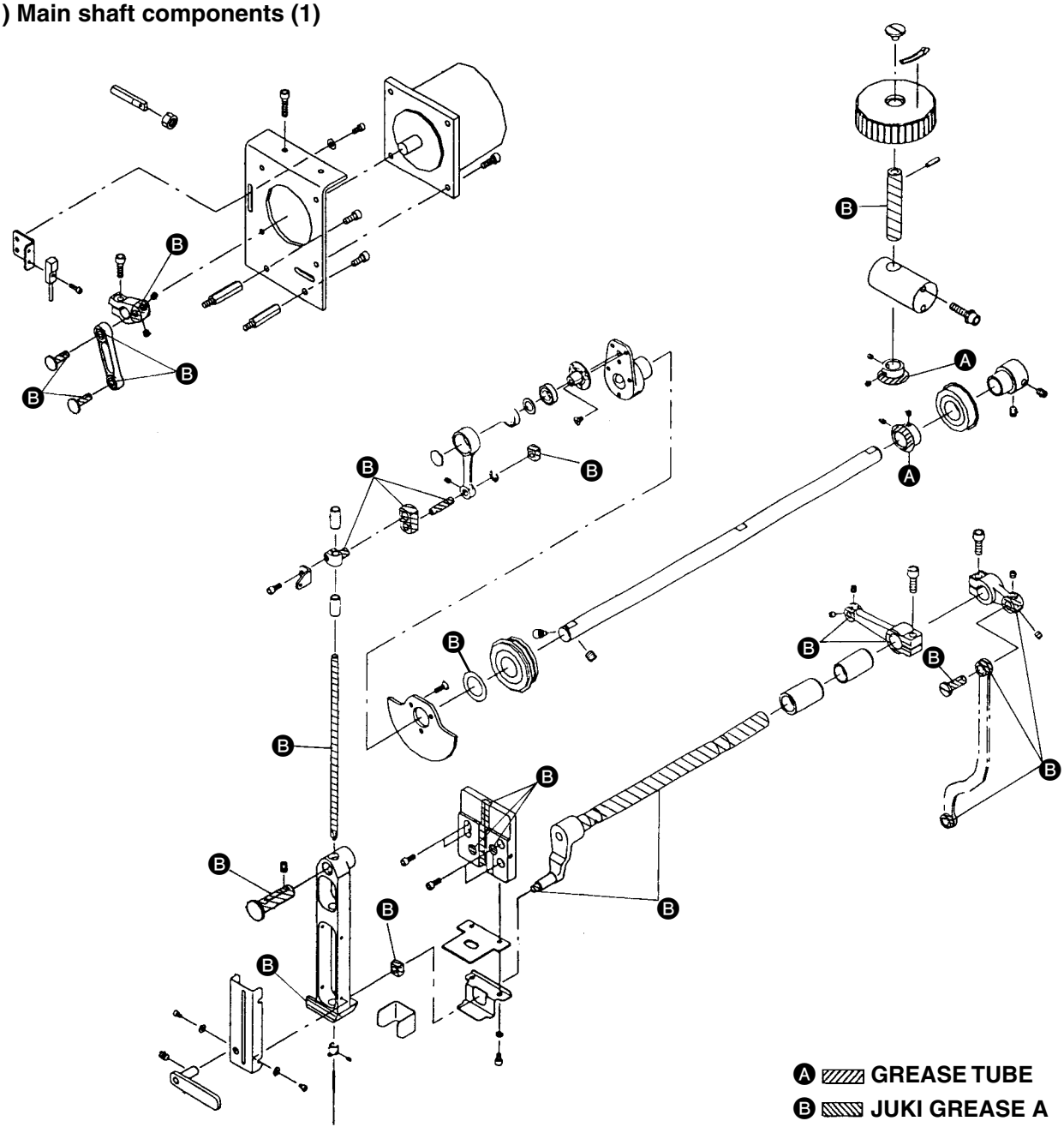
(3) Greasing parts

Periodically perform grease-up every 6 months as a standard.
There are three kinds of the exclusive greases supplied as accessories.
Grease in GREASE TUBE (green, Part No. 13525506) is applied to the gear section such as rack, etc. and the cam section.
Grease in JUKI GREASE B TUBE (white, Part No. 40013640) is applied to the worm section.
Grease in JUKI GREASE A TUBE (white, Part No. 40006323) is applied to the parts other than the aforementioned ones.

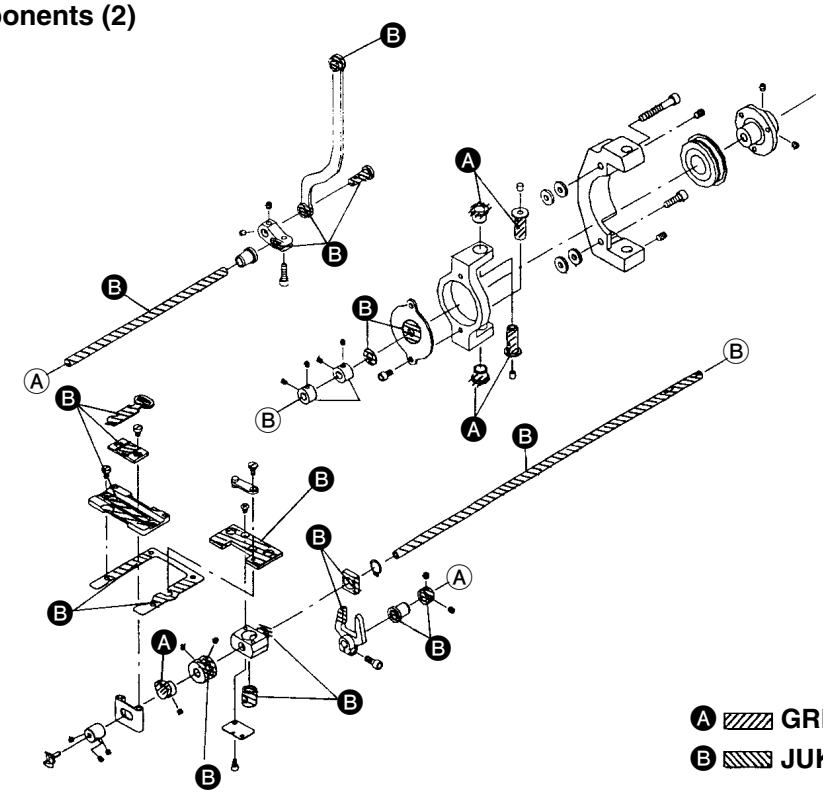
(Caution) 1. When applying grease, apply new grease after carefully wiping old grease with a piece of cloth or the like.
2. When the air gun or the like is blown to the greasing parts and the grease is scattered, perform grease-up again.

Ⓐ GREASE TUBE (green) Part No. : 13525506
Ⓑ JUKI GREASE A (white) Part No. : 40006323
Ⓒ JUKI GREASE B (white) Part No. : 40013640

1) Main shaft components (1)

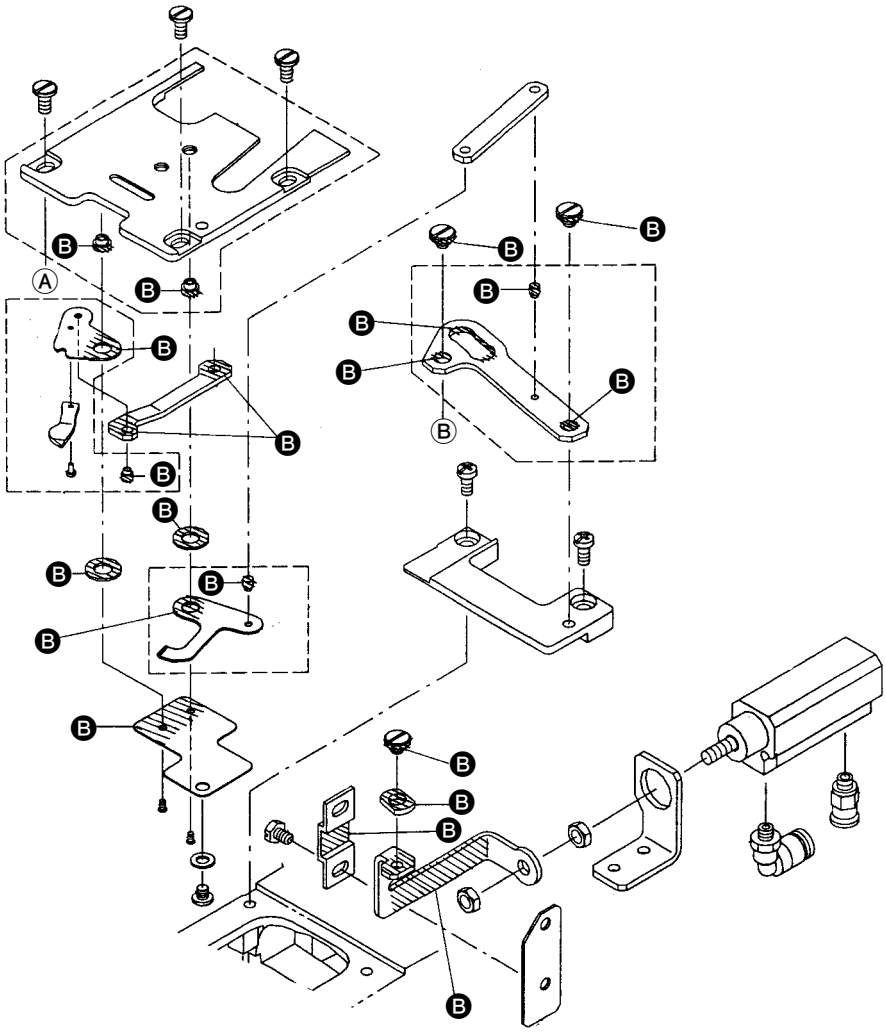


2) Main shaft components (2)



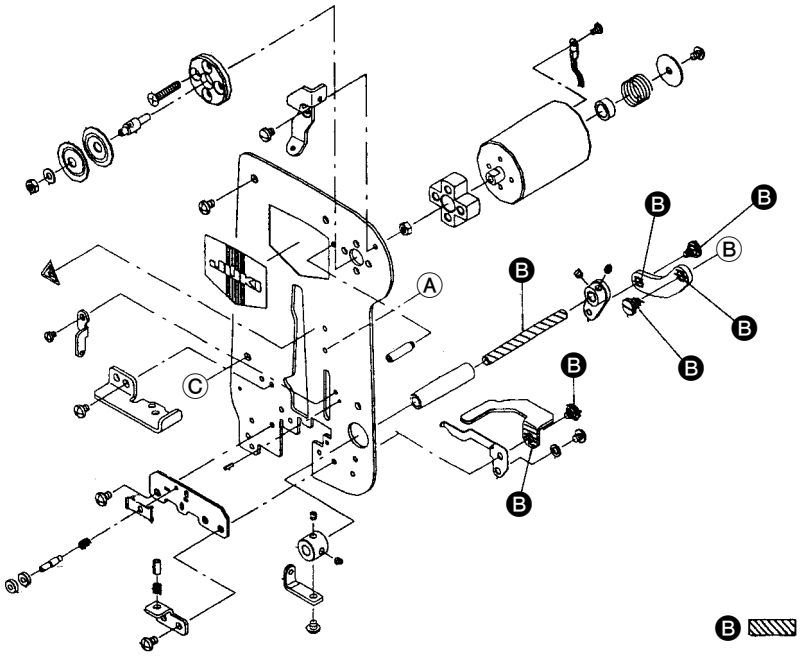
Ⓐ GREASE TUBE
Ⓑ JUKI GREASE A

3) Thread trimmer componets



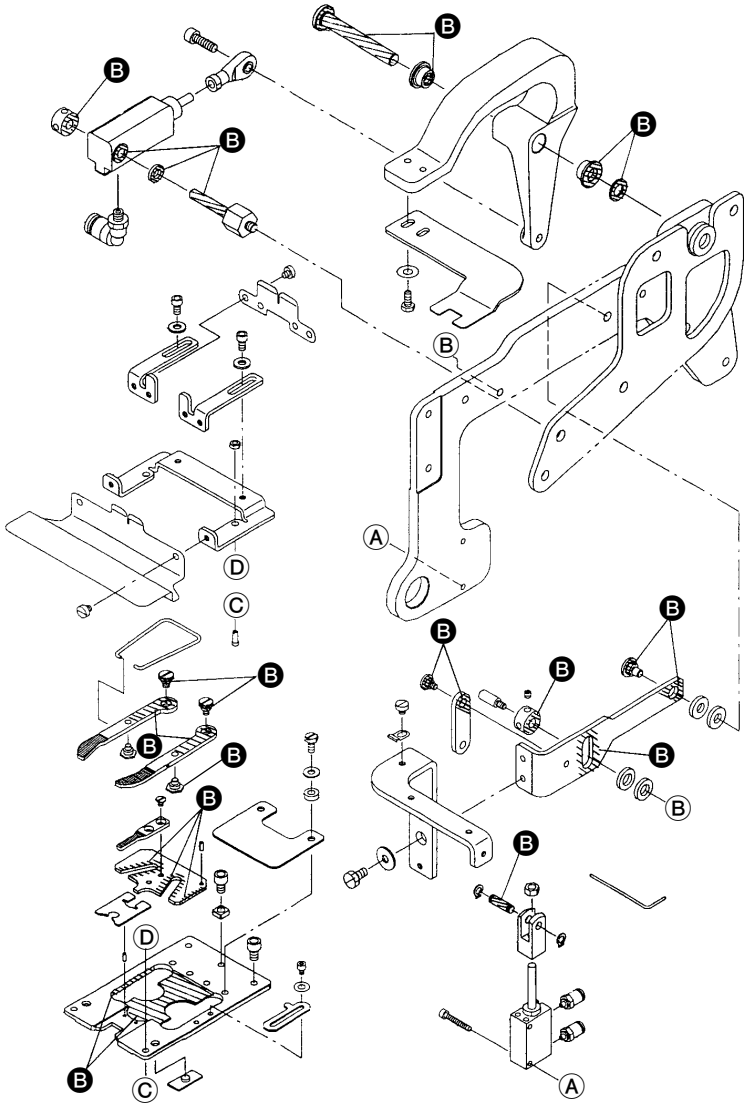
Ⓑ JUKI GREASE A

4) Thread hook and thread tension components



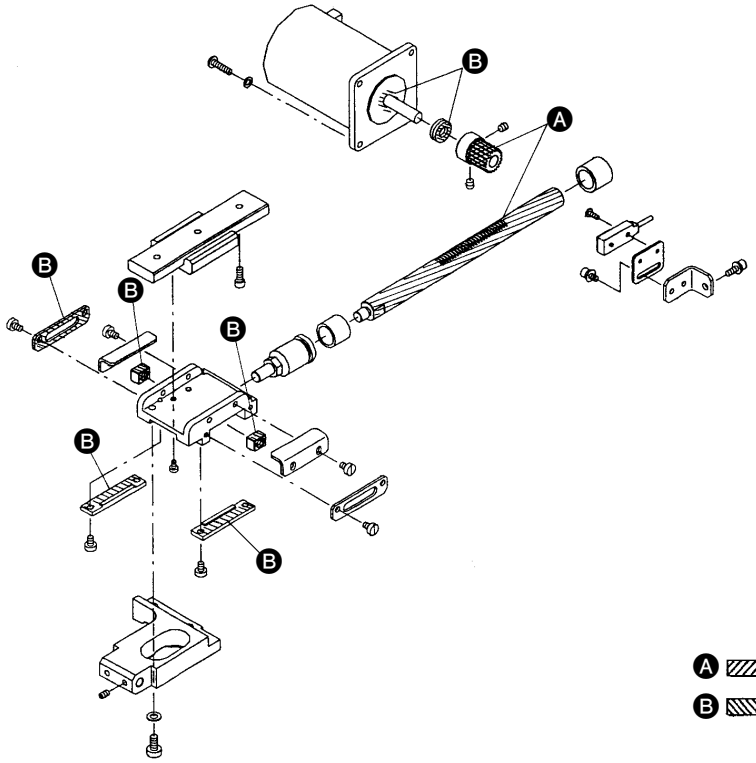
Ⓑ JUKI GREASE A

5) Counter button clamp and cloth presser, second process components



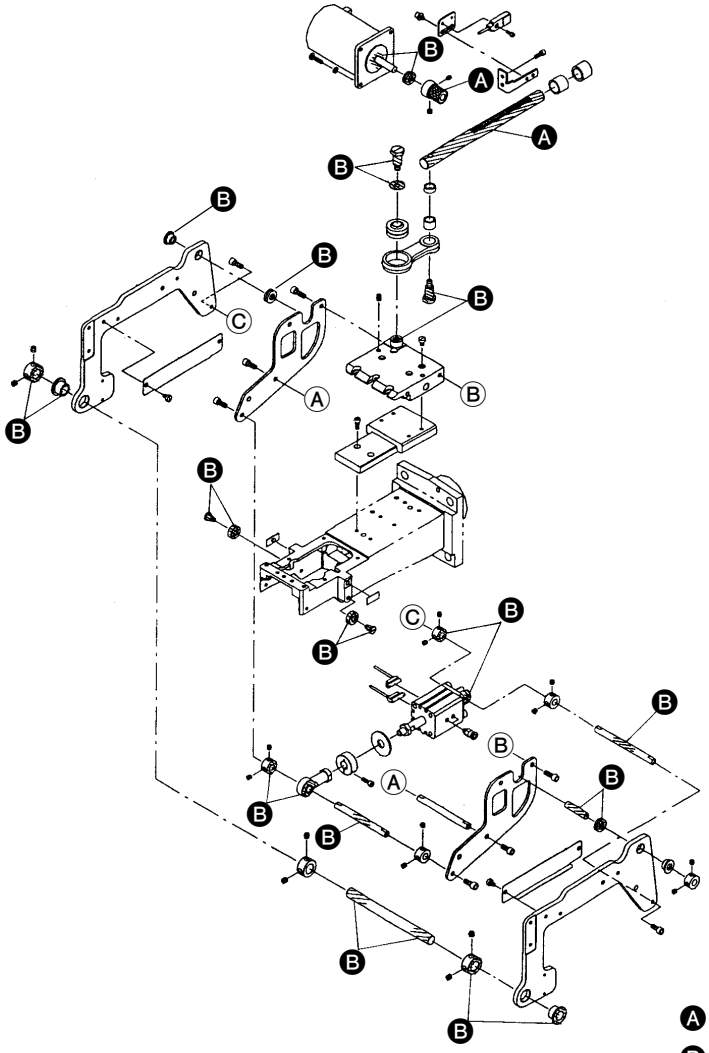
Ⓑ JUKI GREASE A

6) Upper feed components



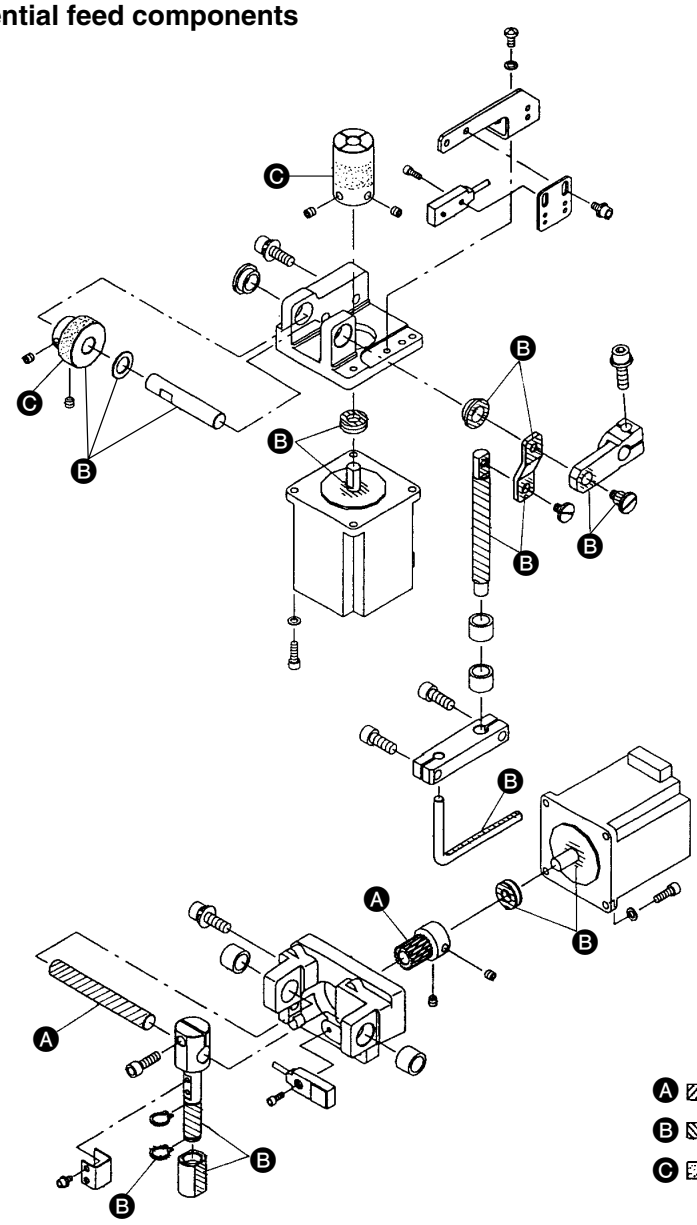
Ⓐ GREASE TUBE
Ⓑ JUKI GREASE A

7) Under feed components

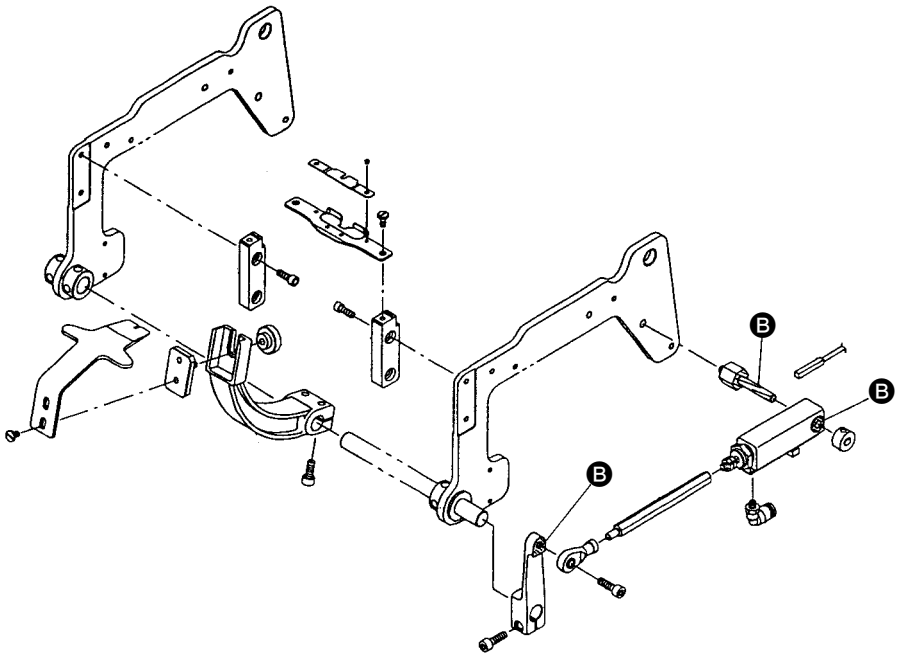


Ⓐ GREASE TUBE
Ⓑ JUKI GREASE A

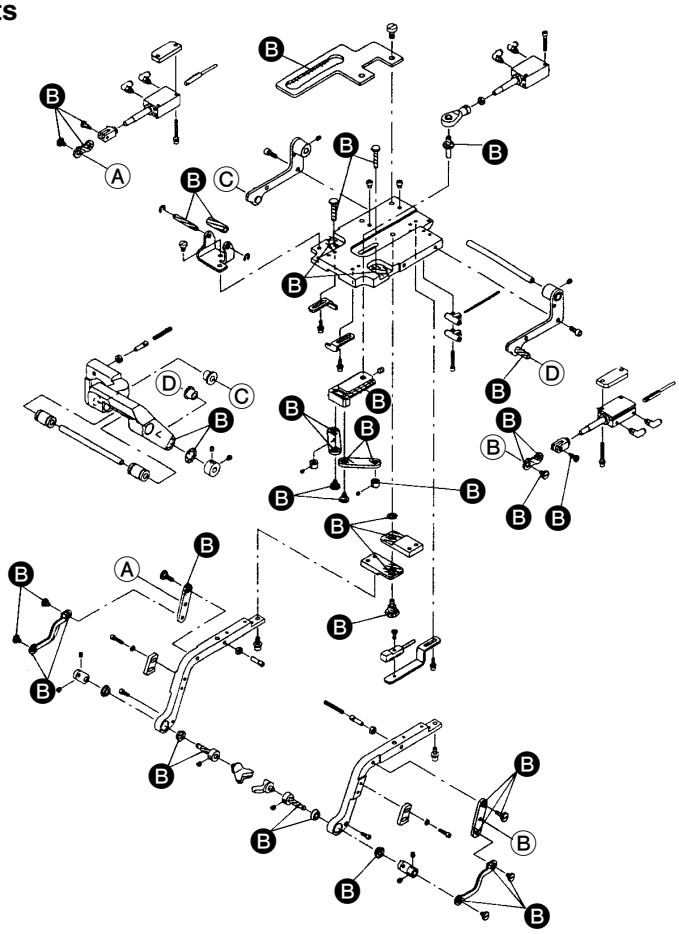
8) Vertical and differential feed components



9) Tongue components

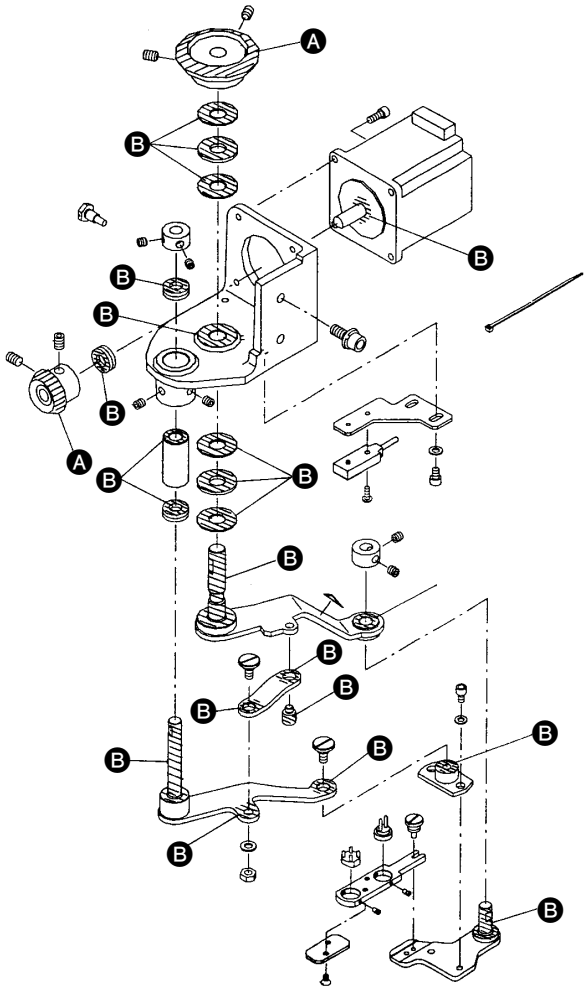


10) Chuck components



Ⓑ JUKI GREASE A

11) Loader components

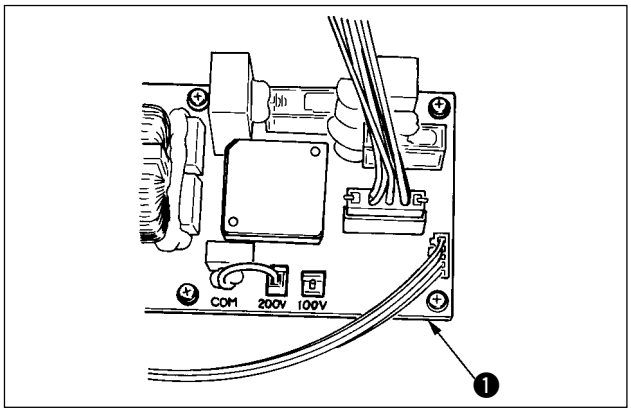


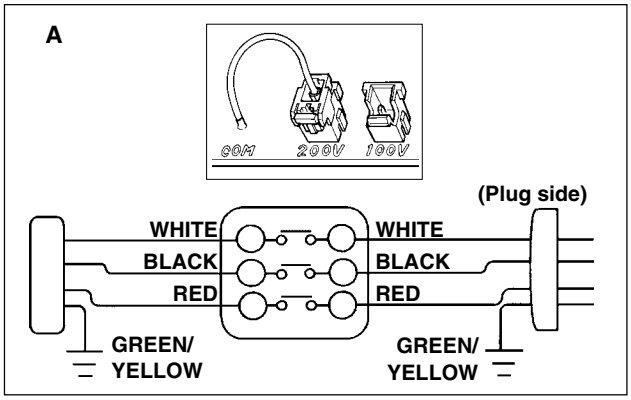
Ⓐ GREASE TUBE
Ⓑ JUKI GREASE A

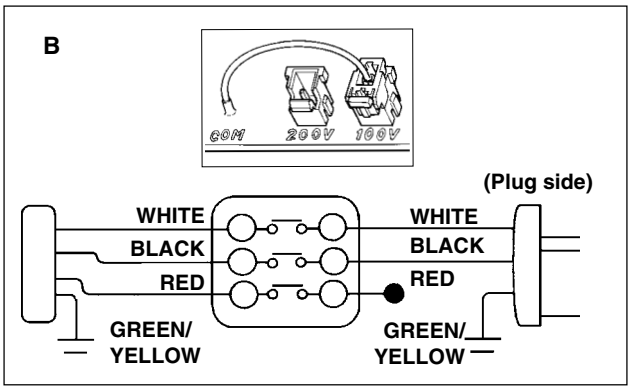
(4) Changing the voltage of 100 / 200V

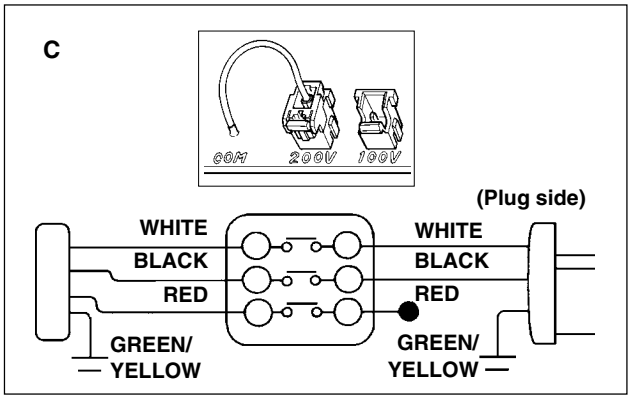
It is adaptable to the voltage of single phase 100V to 120V/3-phase 200V to 240V by changing the voltage changeover connector mounted on FLT p.c.b.

(Caution) When the changing procedure is wrong, the control box will be broken. So, be very careful.









Changing procedure of the changeover connector

1. Turn OFF the power source with the power switch after confirming that the sewing machine has stopped.
2. Draw out the power cord from the power plug socket after confirming that the power switch is turned OFF. Then wait for five minutes or more.
3. Remove the front cover.
4. Remove four screws fixing the rear cover of the control box and slowly open the rear cover.

A. In case of using with 3-phase 200V to 240V

- Changing the changeover connector
  Connect to 200V the 100/200V changeover connector of FLT p.c.b. ❶ located on the side of the Box Side of the control box.
- Connect the crimp style terminal of AC input cord to the power plug as shown in the figure.

B. In case of using with single phase 100V to 120V

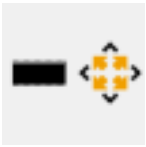
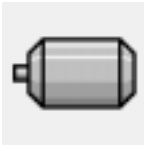
- Changing the changeover connector
  Connect to 100V the 100/200V changeover connector of FLT p.c.b. ❶ located on the side of the Box Side of the control box.
- Connect the crimp style terminal of AC input cord to the power plug as shown in the figure.
  (Caution) Securely perform the insulation treatment to the red terminal which is not used with insulation tape or the like. (When the insulation is insufficient, there is a danger of electric shock or leakage current.)

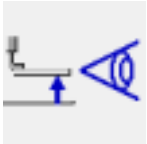
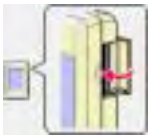
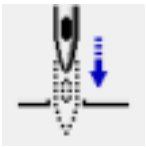
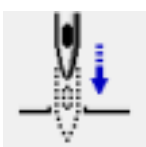
C. In case of using with single phase 200V to 240V

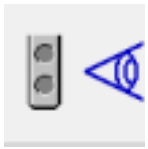
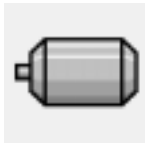
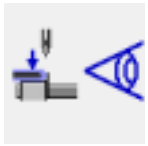
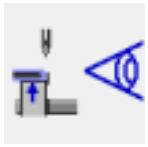
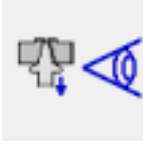
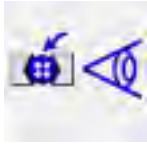
- Changing the changeover connector
  Connect to 200V the 100/200V changeover connector of FLT p.c.b. ❶ located on the side of the Box Side of the control box.
- Connect the crimp style terminal of AC input cord to the power plug as shown in the figure.
  (Caution) Securely perform the insulation treatment to the red terminal which is not used with insulation tape or the like. (When the insulation is insufficient, there is a danger of electric shock or leakage current.)

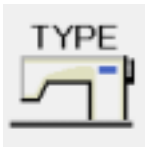
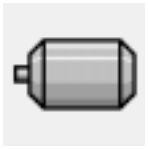
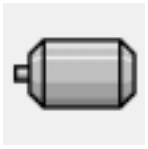
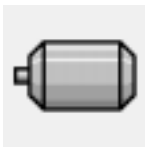
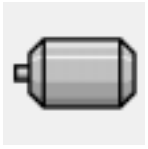
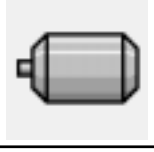
5. Check that the change has been performed without fail before closing the rear cover.
6. Be careful that the cord is not pinched between the rear cover and the control box main unit. Close the rear cover while pressing the lower side of rear cover, and tighten four screws.

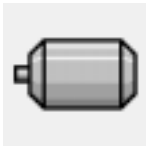
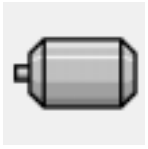
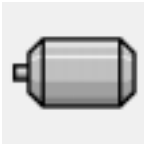
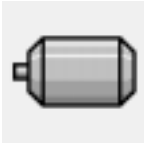
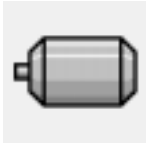
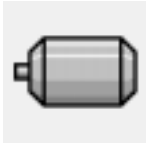
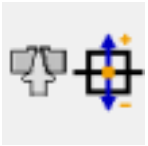
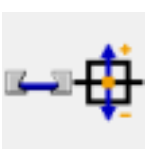
11. ERROR CODE LIST

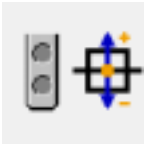
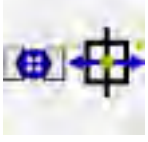
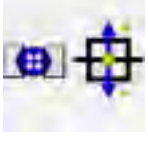
Error code	Pictograph	Description of error	How to recover	Place of recovery
E001		**Contact of EEP-ROM initialization of MAIN CONTROL p.c.b.** When data is not written in EEP-ROM or data is broken, data is automatically initialized and the initialization is informed.	Turn OFF the power.	
E007		**Main shaft motor-lock** When large needle resistance sewing product is sewn	Turn OFF the power.	
E011		**External media not inserted** External media is not inserted.	Possible to recover by reset.	
E012		**Read error** Data read from external media cannot be performed.	Possible to recover by reset.	Previous screen
E013		**Write error** Data write from external media cannot be performed.	Possible to recover by reset.	Previous screen
E014		**Write protect** External media is in the write prohibition state	Possible to recover by reset.	Previous screen
E015		**Format error** Formatting of external media cannot be performed.	Possible to recover by reset.	Previous screen
E016		**External media capacity over** Capacity of external media is short.	Possible to recover by reset.	Previous screen
E017		**EEP-ROM capacity over** Capacity of EEP-ROM is short.	Possible to recover by reset.	Previous screen
E018		**Type of EER-ROM is different** When the mounted EEP-ROM is different in type.	Turn OFF the power.	Previous screen
E019		**File size over** File size to be read in is too large.	Possible to recover by reset.	Previous screen

Error code	Pictograph	Description of error	How to recover	Place of recovery
E022		**File No. error** There is no designated file in the server or external media.	Possible to recover by reset.	Previous screen
E023		**Detection of step-out of presser lifting motor error** When step-out of motor is detected at the time when presser lifting motor passes the origin sensor.	Possible to recover by reset.	Data input screen
E024		**Pattern data size over** When sewing cannot be performed since the size of downloaded sewing data is too large.	Possible to recover by reset.	Data input screen
E027		**Read error** Data read from server cannot be performed.	Possible to recover by reset.	Previous screen
E028		**Write error** Data write to the server cannot be performed.	Possible to recover by reset.	Previous screen
E029		**Smart media slot release error** Lid of smart media slot is open.	Possible to recover by reset.	Previous screen
E030		**Needle bar upper position failure** When needle does not stop at UP position at the time of needle UP operation.	Possible to recover by reset.	Data input screen
E031		**Air pressure drop** When air pressure dropped.	Possible to recover by reset.	Data input screen
E042		**Operation error** Operation of sewing data cannot be performed.	Possible to recover by reset.	Data input screen
E050		**Stop switch** When stop switch is pressed during machine running.	Possible to recover by reset.	Data input screen
E098		**Needle bar down error** When needle bar cannot be lowered.	Possible to recover by reset.	Step screen

Error code	Pictograph	Description of error	How to recover	Place of recovery
E099		**Loader motor step-out detection error** When step-out of motor is detected at the time when loader motor passes origin sensor.	Possible to recover by reset.	Step screen
E302		**Confirmation of tilt of machine head** When tilt of machine head sensor is OFF.	Possible to recover by reset.	Data input screen
E303		**Main shaft semilunar plate sensor error** Semilunar plate of sewing machine motor is abnormal.	Turn OFF thepower.	
E394		**Feed plate lowering sensor can not detect.** When feed plate lowering sensor fails to work.	Possible to recover by reset.	Data input screen
E395		**Feed plate lifting sensor can not detect.** When feed plate lifting sensor fails to work.	Possible to recover by reset.	Data input screen
E396		**Tongue close/open sensor can not detect.** When the sensor fails to work, or the tongue is not drawn out at the time of tongue close/open operation.	Possible to recover by reset.	Data input screen
E397		**Chuck close/open sensor can not detect.** When the button is not in the chuck at the start of sewing machine operation.	Possible to recover by reset.	Data input screen
E398		**Chuck level sensor can not detect.** When the sensor fails to work at the time of chuck level operation.	Possible to recover by reset.	Data input screen
E399		**Chuck inversion sensor can not detect.** When the sensor fails to work at the time of chuck inversion operation.	Possible to recover by reset.	Data input screen
E401		**Copy disapproval error** When trying to perform copying to the pattern No. which has been registered. In case of cycle stitching : 	Possible to re-start after pressing cancel button.	Pattern list screen
E402		**Pattern deletion error** When the registered pattern No. is registered to cycle stitching, or trying to delete the pattern No. when there is only one pattern No. In case of cycle stitching : 	Possible to re-start after pressing cancel button.	Pattern list screen

Error code	Pictograph	Description of error	How to recover	Place of recovery
E497		**Tongue type error** When AMB-289 type tongue and AMB-189 type one are mixedly used in the cycle data.	Possible to recover by reset.	Data input screen
E498		**Button holding height over at the time of sewing** Button holding height is too high and sewing cannot be performed at the time of button sewing.	Possible to recover by reset.	Data input screen
E499		**Y feed motor move limit value over** When input data of shank/marble sewing exceed the maximum of Y feed move amount (max. operating amount : 15 mm).	Possible to recover by reset.	Data input screen
E702		**Abnormality of display data** When there is no display data of panel.	Turn OFF the power. Rewriting of program.	
E703		**Panel is connected to the machine other than supposed. (Machine type error)** When machine type code of system is improper in case of initial communication.	Possible to rewrite program after pressing down communication switch.	Communication screen
E704		**Nonagreement of system version** When version of system software is improper in case of initial communication.	Possible to rewrite program after pressing down communication switch.	Communication screen
E730		**Main shaft motor encoder defectiveness or phase-out** When encoder of sewing machine motor is abnormal.	Turn OFF the power.	
E731		**Main motor hole sensor defectiveness or position sensor defectiveness** When hole sensor or position sensor of sewing machine is defective.	Turn OFF the power.	
E733		**Reverse rotation of main shaft motor** When sewing machine motor rotates in reversedirection.	Turn OFF the power.	
E801		**Phase-lack of power** When phase-lack of input power occurs.	Turn OFF the power.	
E802		**Power instantaneous cut detection** When input power is instantaneously OFF.	Turn OFF the power.	

Error code	Pictograph	Description of error	How to recover	Place of recovery
E811		**Overvoltage** When input voltage is 280V or more.	Turn OFF the power.	
E813		**Low voltage** When input voltage is 150V or less.	Turn OFF the power.	
E901		**Abnormality of main shaft motor IPM** When IPM of servo control p.c.b. is abnormal.	Turn OFF the power.	
E902		**Overcurrent of main shaft motor** When current flows excessively to sewing machine motor.	Turn OFF the power.	
E903		**Abnormality of stepping motor power** When stepping motor power of servo control p.c.b. fluctuates ±15% or more.	Turn OFF the power.	
E904		**Abnormality of solenoid power** When solenoid power of servo control p.c.b. fluctuates ±15% or more.	Turn OFF the power.	
E905		**Abnormality of temperature of heat sink for servo control p.c.b.** When temperature of heat sink of servo control p.c.b. is 85 ˚C or more.	Turn OFF the power.	
E907		**Needle rocking width motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Turn OFF the power.	
E908		**Y-feed motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Turn OFF the power.	
E910		**Presser motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Turn OFF the power.	
E915		**Abnormality of communication between operation panel and main CPU** When abnormality occurs in data communication.	Turn OFF the power.	

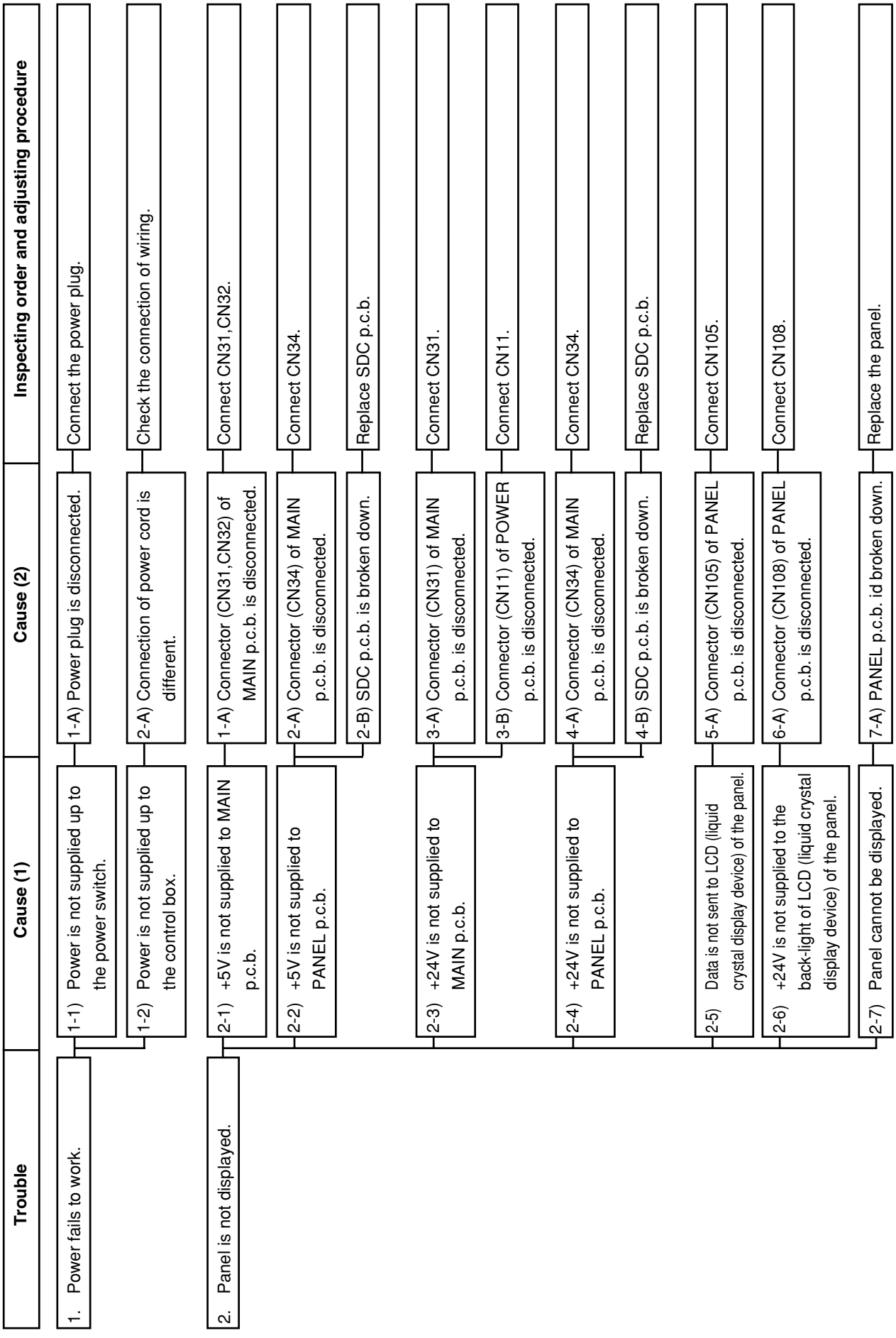
Error code	Pictograph	Description of error	How to recover	Place of recovery
E916		**Abnormality of communication between main CPU and main shaft CPU** When abnormality occurs in data communication.	Turn OFF the power.	
E917		**Failure of communication between operation panel and personal computer** When abnormality occurs in data communication.	Turn OFF the power.	
E918		**Abnormality of heat sink temperature for MAIN p.c.b.** When temperature of heat sink for MAIN p.c.b. is 85˚C or more.	Turn OFF the power.	
E923		**Abnormality of VCM temperature** When temperature of VCM has risen to 70˚C or more.	Turn OFF the power.	
E943		**Main EEP-ROM trouble** When data writing to EEP-ROM cannot be performed.	Turn OFF the power.	
E946		**Head EEP-ROM trouble** When data writing to EEP-ROM cannot be performed.	Turn OFF the power.	
E948		**Abnormality of F ROM.** When deletion or writing of F ROM is not performed at the time of downloading program.	Turn OFF the power.	
E996		**Thread drawing motor origin retrieval error** Origin sensor signal is not inputted at the time of operation of origin retrieval.	Turn OFF the power.	
E997		**Button loader motor origin retrieval error** Origin sensor signal is not inputted at the time of operation of origin retrieval.	Turn OFF the power.	
E998		**Differential motor origin retrieval error** Origin sensor signal is not inputted at the time of operation of origin retrieval.	Turn OFF the power.	
E999		**Y feed upper motor origin retrieval error** Origin sensor signal is not inputted at the time of operation of origin retrieval.	Turn OFF the power.	

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
1. Button neck-wrapped with blindstitch fails to properly stand.	1-1) Setting of neck wrapping is not proper.	1-A) Number of stitches of neck wrapping is insufficient.	Perform change of detailed setting of neck wrapping since value to be neatly finished at such height of neck wrapping as low as about 2.5 mm is input in initial setting of pattern. Display neck wrapping data detailed screen, and change setting of item below. S121 [Neck wrapping height (lower section of 2nd)] : 0.2 → 0.4 S123 [Neck wrapping pitch (center of 2nd)] : 1.0 → 0.5 S124 [Neck wrapping height (upper section of 2nd)] 0 → 0.5 S102 [Number of stitches at top of neck wrapping] : 2 → 4 S111 [Neck wrapping going height (lower section of 2nd top)] : 0.1 → 0.2 S113 [Neck wrapping going pitch (center of 1st top)] : 0.5 → 0.3 S114 [Neck wrapping going height (upper section of 1st top)] : 0 → 0.3 Re-adjust the values according to stitches since the changed values are for reference only.
2. Number of stitches of neck wrapping fails to increase.	2-1) Pitch of neck wrapping is not proper.	1-A) Pitch of neck wrapping is too large.	Decrease S123 Neck wrapping pitch and S113 Neck wrapping going pitch respectively. Even when number of stitches is not increased, make S518 small (draw cloth) or S519 (draw button) small to increase the range since the range put between S518 Neck wrapping start position and S519 Neck wrapping top position in terms of S26 Button height is small.
3. Blindstitch amount of tie stitch fails to decrease. (It does not disappear.)	3-1) Needle entry position of 1st stitch of neck wrapping is improper.	1-A) Needle entry position of 1st stitch of neck wrapping excessively scoops cloth.	Stitch becomes as tie stitch when 1st stitch of neck wrapping excessively scoops cloth. Increase value of S510 [Tie stitch position of 1st stitch of neck wrapping (longitudinal).
	3-2) Origin position of blindstitch is improper.		Check K54 Y feed lower motor origin compensation of level 2 of memory switch (blindstitch origin). Adjust so that plane to which tongue is pressed of tongue stopper aligns with center of needle.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
4. Thread at the start of sewing fails to interlace.	4-1) Thread path components are improper.	1-A) Threading is improper.	Check threading.
5. Thread after thread trimming fails to interlace at the start of sewing.	5-1) Thread trimming failure	1-A) Thread trimming position is improper.	Adjust thread trimming position with point setting mode of step motion since two threads on looper may be cut (thread trimming failure). ○ Thread is not cut at the end of sewing. → Adjust S535 [Longitudinal position of thread trimming of neck wrapping sewing] in the plus direction. Standard is 0.3 unit. ○ Thread is not cut at button sewing. → Adjust S534 [Longitudinal position of thread trimming of button sewing] in the plus direction. Standard is 0.3 unit.
6. Thread is not trimmed. Wiper trims thread.	6-1) Thread trimming failure	1-A) Thread trimming position is improper.	Adjust thread trimming position with point setting mode of step motion since there is the possibility of thread trimming failure. ○ Thread is not trimmed at the end of sewing. → Adjust S535 [Longitudinal position of thread trimming of neck wrapping sewing] in the plus direction. Standard is 0.3 unit. ○ Thread is not trimmed at button sewing. → Adjust S534 [Longitudinal position of thread trimming of button sewing] in the plus direction. Standard is 0.3 unit.

(2) Electrical parts

1) Turning ON the power

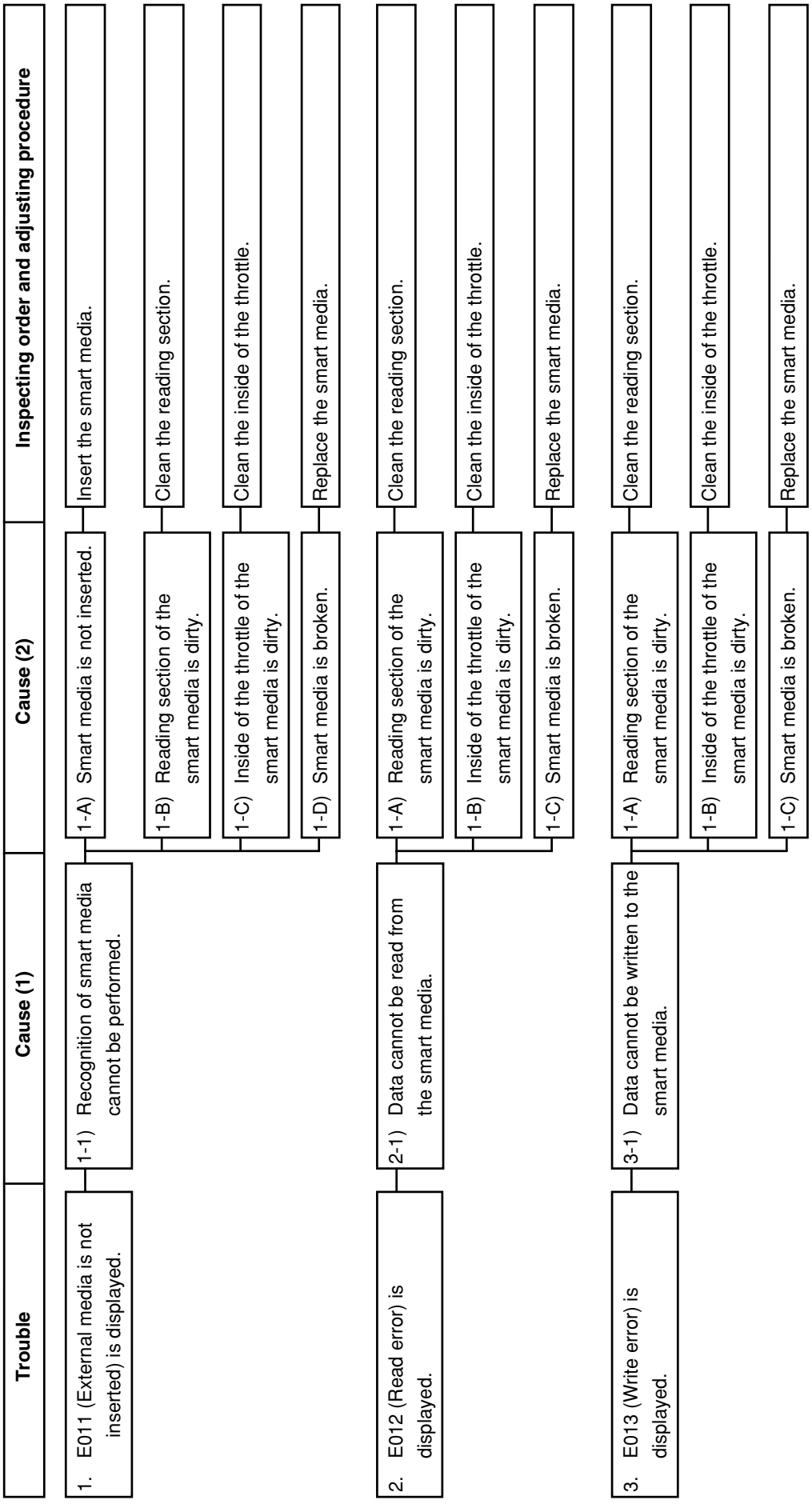


Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
3. E001 (Contact of EEP-ROM initialization of MAIN p.c.b.) is displayed.	3-1) Perform initialization since EEP-ROM data is broken or data is not written.	1-A) Contents of EEP-ROM are broken or a new EEP-ROM is mounted.	It is normal when E001 is not displayed when power is turned ON again. When it is displayed again, EEP-ROM is broken.
		1-B) EEP-ROM is not securely inserted or broken.	Check insertion of EEP-ROM. Or, replace it.
4. E018 (EEP-ROM type abnormality) is displayed.	4-1) Type of EEP-ROM mounted on MAIN p.c.b. is improper.	1-A) Type of EEP-ROM mounted on MAIN p.c.b. is improper.	Check type and replace EEP-ROM.
		1-B) EEP-ROM is not securely inserted or broken.	Check insertion of EEP-ROM. Or, replace it.
5. E031 (Air pressure drop) is displayed.	5-1) Air pressure drop is detected.	1-A) Air is not supplied.	Check air piping, or check open/close of air valve.
		1-B) Signal from pressure gauge does not come.	Check connection or breaking of wire of pressure gauge relay cord asm.
		1-C) Setting of pressure gauge is too high.	Adjust setting of pressure gauge (0.5 MPa).
6. E302 (Confirmation of tilt of machine head) is displayed.	6-1) Safety switch for confirmation of tilt of machine head is OFF.	1-A) Installation of safety switch is improper.	Adjust installation of safety switch.
		1-B) Safety switch is broken.	Replace safety switch.
7. E703 (Panel is connected to machine other than supposed.	7-1) Machine type code of system is improper in initial communication between panel and MAIN.	1-A) Panel which is different in machine type setting is connected.	Connect panel of the same machine type.
			Press communication switch, and write same program of machine type code in panel.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
8. E704 (Nonagreement of system version) is displayed.	8-1) Versions of panel, MAIN and main shaft are improper in initial communication of system.	1-A) Version of panel is improper.	Press communication switch, and re-write program of panel.
		1-B) Version of MAIN is improper.	Press communication switch, and re-write program of MAIN.
		1-C) Version of main shaft is improper.	Press communication switch, and re-write program of main shaft.
9. E801 (Phase-lack of power) is displayed.	9-1) 1 phase is lacking when input power is of 3-phase.	1-A) 1 phase among 3 phases of input power is lacking.	Check breaking of wire or connection of control box power cord 3P asm. and CN1 of FLT-T p.c.b.
		1-B) FLT-SDC cord S (asm.) is in trouble.	Check breaking of wire or connection of FLT-SDC cord S asm.
		1-C) SDC p.c.b. is broken down.	Replace SDC p.c.b.
		1-D) FLT-T p.c.b. is broken.	Replace FLT-T p.c.b.
10. E811 (Overvoltage) is displayed.	10-1) Input voltage is 280V or higher and power overvoltage signal (OVL) is detected.	1-A) Input power is high.	Check the input power.
		1-B) SDC p.c.b. is broken down.	Replace SDC p.c.b.
11. E813 (Low voltage) is displayed.	11-1) Input voltage is 150V or lower and low voltage signal (LVL) is detected.	1-A) Input power is low.	Check the input power.
		1-B) SDC p.c.b. is broken down.	Replace SDC p.c.b.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
12. E915 (Abnormal communication between operation panel and MAIN CPU) is displayed.	12-1) Communication cannot be performed between operation panel and MAIN CPU.	1-A) Contact of connector (CN34) of MAIN p.c.b. is improper.	Check the connection of CN34.
		1-B) Program of MAIN is broken.	Perform rewriting of the program of MAIN.
		1-C) Data of MAIN p.c.b. is broken.	Initialize the data on the side of MAIN of MAIN p.c.b.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
13. E916 (Abnormal communication between MAIN CPU and main shaft CPU) is displayed.	13-1) Communication cannot be performed between MAIN CPU and main shaft CPU.	1-A) Contact failure of connector (CN32) of MAIN p.c.b. or connector (CN15) of SDC p.c.b.	Check the connection of CN34, CN15.
		1-B) Program of main shaft is broken.	Perform rewriting of the program of main shaft.
		1-C) Data of SDC p.c.b. is broken.	Initialize data of SDC p.c.b.
		1-D) SDC p.c.b. is broken down.	Replace SDC p.c.b.

2) Panel operation



Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
4. E014 (Write protect) is displayed.	4-1) Smart media is in the writing prohibited state.	1-A) Write prohibition seal is pasted on the smart media.	Strip off the seal.
		1-B) Reading section of the smart media is dirty.	Clean the reading section.
		1-C) Inside of the throttle of the smart media is dirty.	Clean the inside of the throttle.
		1-D) Smart media is broken.	Replace the smart media.
5. E015 (Format error) is displayed.	5-1) Smart media is in the writing prohibited state.	1-A) Write prohibition seal is pasted on the smart media.	Strip off the seal.
		1-B) Reading section of the smart media is dirty.	Clean the reading section.
		1-C) Inside of the throttle of the smart media is dirty.	Clean the inside of the throttle.
		1-D) Smart media is broken.	Replace the smart media.
6. E016 (External media capacity over) is displayed.	6-1) Capacity of smart media is lacking.	1-A) Space region is not in the smart media.	Delete the inside data of the smart media and secure the space region.
	6-2) Recognition of the smart media cannot be performed.	2-A) Reading section of the smart media is dirty.	Clean the reading section.
		2-B) Inside of the throttle of the smart media is dirty.	Clean the inside of the throttle.
		2-C) Smart media is broken.	Replace the smart media.

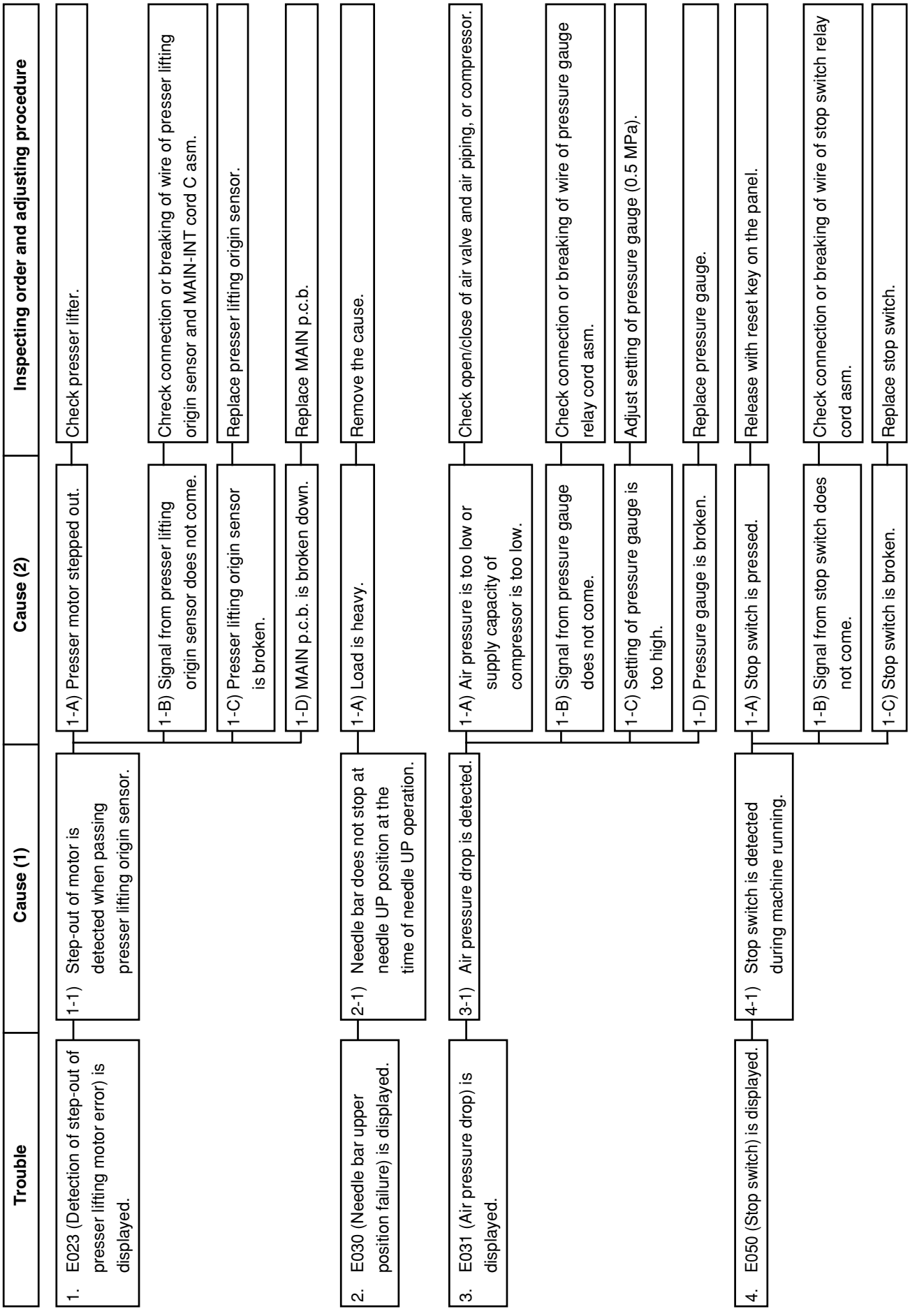
Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
7. E017 (EEP-ROM capacity over) is displayed.	7-1) Capacity of MAIN EEP-ROM is lacking.	1-A) EEP-ROM of 256K is mounted.	Replace it with EEP-ROM of 1M.
		1-B) MAIN p.c.b. is broken.	Replace MAIN p.c.b.
		1-C) MAIN EEP-ROM is broken.	Replace EEP-ROM
8. E019 (File size over) is displayed.	8-1) File size to be read is too large.		Check size of file.
		1-A) File is broken.	Check the file.
9. E022 (File No. error) is displayed.	9-1) The designated file is not in the smart media.		Designate the existing file.
	9-2) Recognition of the smart media cannot be performed.	2-A) Reading section of the smart media is dirty.	Clean the reading section.
		2-B) Inside of the throttle of the smart media is dirty	Clean the inside of the throttle.
		2-C) Smart media is broken.	Replace the smart media.
10. E024 (Pattern data size over) is displayed.	10-1) When the size of sewing data downloaded is too large and sewing cannot be performed.		Check the size of file.
		1-A) File is broken.	Check the file.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
11. E027 (read error) is displayed.	11-1) Data read from server cannot be performed.	1-A) Contact failure of RS232C connector (CN102) of panel	Check connection of CN102.
		1-B) Contact failure of RS232C connector of server	Check connection of RS232C connector of server.
12. E028 (write error) is displayed.	12-1) Data write to server cannot be performed.	1-A) Contact failure of RS232C connector (CN102) of panel	Check connection of CN102.
		1-B) Contact failure of RS232C connector of server	Check connection of RS232C connector of server.
13. E029 (Smart media slot release error) is displayed.	13-1) Cover of the smart media is open.		Close the cover.
	13-2) Close/open detection switch of the cover is broken.		Replace the close/open switch (SW2).
14. E042 (Operation error) is displayed.	14-1) Operation of sewing data cannot be performed.	1-A) Range of sewing data is improper.	Re-enter sewing data.
		1-B) Sewing data is broken.	Re-enter sewing data.
		1-C) MAIN p.c.b. is broken.	Replace MAIN p.c.b.
15. E401 (Copy disapproval error) is displayed.	15-1) Copying is tried to registered pattern No.		Perform copying to pattern No. which is not registered.
16. E402 (Pattern deletion error) is displayed.	16-1) when registered pattern No. is registered to cycle stitching, or trying to delete the pattern No. when there is only one pattern No.		In case of deletion, change register of cycle stitching. Deletion is impossible when there is only one pattern No.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
17. E497 (Tongue type error) is displayed.	17-1) AMB289 type tongue and AMB189 type tongue are mixedly used in the cycle data.		Unite tongue type to either one and create cycle data.
18. E498 (Button holding height over at the time of sewing) is displayed.	18-1) Button holding height is too high and sewing cannot be performed at the time of button sewing.		Change input data so that button holding height is not too high.
19. E499 (Y feed motor move limit value over) is displayed.	19-1) Input data of shank/marble sewing exceeded maximum of Y feed move amount.	1-A) Y feed move amount is larger than maximum move amount of 15 mm.	Change input data so that Y feed move amount is smaller than maximum move amount of 15 mm.
20. E702 (Abnormality of display data) is displayed.	20-1) Display data of panel does not exist.	1-A) Panel p.c.b. is broken.	Replace panel p.c.b.
		1-B) Display data of panel is broken.	Rewrite program of panel.
		1-C) Writing of program of panel is not properly performed.	Rewrite program of panel.
21. E917 (Failure of communication between operation panel and personal computer) is isplayed.	21-1) Communication cannot be performed between operation panel and personal computer.	1-A) Contact of RS232C connector (CN102) of the panel is improper.	Check the connection of CN102.
		1-B) Contact of RS232C connector of personal computer is improper.	Check the connection of RS232C connector of the personal computer.
		1-C) PANEL p.c.b. is broken down.	1-C) PANEL p.c.b. is broken down.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
22. E943 (EEP-ROM of MAIN control p.c.b. trouble) is displayed.	22-1) Data writing to EEP-ROM cannot be performed.	1-A) EEP-ROM is not securely inserted or broken.	Check insertion of EEP-ROM or replace it.
		1-B) MAIN p.c.b. is broken.	Replace MAIN p.c.b.
23. E946 (EEP-ROM of head relay p.c.b. trouble) is displayed.	23-1) Data writing to EEP-ROM cannot be performed.	1-A) Connector of MAIN-INT cord D asm. is disconnected or broken.	Check connection or breaking of wire of MAIN-INT cord D asm.
		1-B) MAIN p.c.b or INT p.c.b. is broken down.	Replace MAIN p.c.b. or INT p.c.b.
24. E948 (Abnormality of F ROM) is displayed.	24-1) Deletion or witting of F ROM cannot be performed at the time of downloading program.	1-A) MAIN p.c.b. is broken.	Replace MAIN p.c.b.
25. Key is not accepted even when pressing the touch panel.	25-1) Signal does not come to PANEL p.c.b.	1-A) Connector (CN109) of PANEL p.c.b. is disconnected.	Connect CN109.
	25-2) PANEL p.c.b. dos not accept the signal.	2-A) PANEL p.c.b. is broken down.	Replace the panel.

3) Sewing


Trouble
Cause (1)
Cause (2)
Inspecting order and adjusting procedure
1. E023 (Detection of step-out of presser lifting motor error) is displayed.
1-1) Step-out of motor is detected when passing presser lifting origin sensor.
1-A) Presser motor stepped out.
Check presser lifter.
1-B) Signal from presser lifting origin sensor does not come.
Chreck connection or breaking of wire of presser lifting origin sensor and MAIN-INT cord C asm.
1-C) Presser lifting origin sensor is broken.
Replace presser lifting origin sensor.
1-D) MAIN p.c.b. is broken down.
Replace MAIN p.c.b.
2. E030 (Needle bar upper position failure) is displayed.
2-1) Needle bar does not stop at needle UP position at the time of needle UP operation.
1-A) Load is heavy.
Remove the cause.
3. E031 (Air pressure drop) is displayed.
3-1) Air pressure drop is detected.
1-A) Air pressure is too low or supply capacity of compressor is too low.
Check open/close of air valve and air piping, or compressor.
1-B) Signal from pressure gauge does not come.
Check connection or breaking of wire of pressure gauge relay cord asm.
1-C) Setting of pressure gauge is too high.
Adjust setting of pressure gauge (0.5 MPa).
1-D) Pressure gauge is broken.
Replace pressure gauge.
4. E050 (Stop switch) is displayed.
4-1) Stop switch is detected during machine running.
1-A) Stop switch is pressed.
Release with reset key on the panel.
1-B) Signal from stop switch does not come.
Check connection or breaking of wire of stop switch relay cord asm.
1-C) Stop switch is broken.
Replace stop switch.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
5. E098 (Needle bar down error) is displayed.	5-1) Needle bar cannot be lowered.	1-A) Load of the machine is too heavy.	Check the sewing machine.
		1-B) SDC p.c.b. is broken down.	Replace SDC p.c.b.
6. E099 (Loader motor step-out detection error) is displayed.	6-1) Step-out of motor is detected when loader motor passes origin sensor.	1-A) Loader motor stepped out.	Check the loader.
		1-B) Signal from loader motor origin sensor does not come.	Check connection or breaking of wire of loader origin senbsor relay cord asm., loader origin sensor and MAIN-INT cord C asm.
		1-C) Loader origin sensor is broken.	Replace the loader origin sensor.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
7. E303 (Main shaft semilunar plate sensor error) is displayed.	7-1) Semilunar plate sensor of main shaft motor is abnormal.	1-A) Encoder of main shaft motor is broken.	Replace the main shaft motor.
	7-2) Encoder signal (semilunar plate) is not inputted.	2-A) Connection of connector (CN14) of SDC p.c.b. is improper.	Check connection of CN14.
		2-B) Connection of connector (CN15) of SDC p.c.b. is improper.	Check connection of CN15.
		2-C) Connection of connector (CN32) of MAIN p.c.b. is improper.	Check connection of CN32.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
8. E394 (Feed plate lowering sensor cannot be detected) is displayed.	8-1) Feed plate lowering sensor is not detected even when feed plate lifting solenoid valve is turned OFF.	1-A) Feed plate lifting cylinder fails to work.	Check lifting of the feed plate.
		1-B) Signal from feed plate lowering sensor does not come.	Check connection or breaking of wire of feed plate lowering sensor and MAIN-INT cord C asm.
		1-C) Feed plate lowering sensor is broken.	Replace the feed plate lowering sensor.
9. E395 (Feed plate lifting sensor cannot be detected) is displayed.	9-1) Feed plate lifting sensor is not detected even whenfeed plate lifting solenoid valve is turned ON.	1-A) Feed plate lifting cylinder fails to work.	Check lifting of the feed plate.
		1-B) Signal from feed plate lifting sensor does not come.	Check connection or breaking of wire of feed plate lifting sensor and MAIN-INT cord C asm.
		1-C) Feed plate lifting sensor is broken.	Replace the feed plate lifting sensor.
10. E396 (Tongue close/open sensor cannot detect) is displayed.	10-1) Sensor cannot be detected or turned OFF when tongue close/open operation ie performed.	1-A) Tongue close/open operation fails to work.	Check close/open of the tongue.
		1-B) Signal from tongue close/ open sensor does not come.	Check connection or breaking of wire of tongue close/ open sensor and MAIN-INT cord C asm.
		1-C) Tongue close/open sensor is broken.	Replace the tongue close/open sensor.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
11. E397 (Chuck close/open sensor cannot detect) is displayed.	11-1) Chuck close/open sensor cannot be detected when sewing machine starts operation.	1-A) Button is not set to chuck.	Set a buuton to the chuck.
		1-B) Adjustment of chuck close/ open sensor is improper.	Adjust the chuck close/open sensor.
		1-C) Signal from chuck close/ open sensor does not come.	Check connection or breaking of wire of chuck close/open sensor and NAIN-INT cord C asm.
		1-D) Chuck close/open sensor is broken.	Replace the chuck close/open sensor.
12. E398 (Chuck level sensor cannot detect) is displayed.	12-1) Sensor cannot be detected at the time of chuck level operation.	1-A) Adjustment of chuck level sensor is improper.	Adjust the chuck level sensor.
		1-B) Signal from chuck level sensor does not come.	Check connection or breaking of wire of chuck level sensor and MAIN-INT cord C asm.
		1-C) Chuck level sensor is broken.	Replace the chuck level sensor.
13. E399 (Chuck inversion sensor cannot detect) is displayed.	13-1) Sensor cannot be detected at the time of chuck inversion operation.	1-A) Adjustment of chuck inversion sensor is improper.	Adjust the chuck inversion sensor.
		1-B) Signal from chuck inversion sensor does not come.	Check connection or breaking of wire of chuck inversion sensor and MAIN-INT cord C asm.
		1-C) Chuck inversion sensor is broken.	Replace the chuck inversion sensor.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
14. E802 (Power instantaneous cut detection) is displayed.	14-1) Input power is momentarily turned OFF.	1-A) Input power is momentarily turned OFF.	Re-turn ON the power.
		1-B) Breaking of wire or improper connection of input power	Check breaking of wire or connection of control box power cord and CN1 of FLT-T p.c.b.
		1-C) FLT-SDC cord S (asm.) is in trouble.	Check breaking of wire or connection of FLT-SDC cord S asm.
		1-D) SDC p.c.b. is broken down.	Replace SDC p.c.b.
		1-E) FLT p.c.b. is broken.	Replace FLT p.c.b.
15. E903 (Abnormality of stepping motor power) is displayed.	15-1) +48V power of SDC p.c.b. fluctuated more than ±15%.	1-A) Load of +48V is too large.	5-phase stepping motor is broken down or wiring is shortcircuited somewhere.
		1-B) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
		1-C) SDC p.c.b. is broken down.	Replace SDC p.c.b.
16. E904 (Abnormality of solenoid power) is displayed.	16-1) +30V power of SDC p.c.b. fluctuated more than ±15%.	1-A) Load of +30V is too large.	Stepping motor, VCM, solenoid valve, light or sensor is broken down, or wiring is shortcircuited somewhere.
		1-B) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
		1-C) SDC p.c.b. is broken down.	Replace SDC p.c.b.
17. E905 (Abnormality of temperature of heat sink for SDC p.c.b) is displayed.	17-1) Heat sink of SDC p.c.b. has become more than 85 ℃.	1-A) Fan in the inside of box is not rotating.	Check connection of fan or the fan.
		1-B) Ventilator of control box is clogged.	Clean the ventilator of control box.
		1-C) SDC p.c.b. is broken down.	Replace SDC p.c.b.

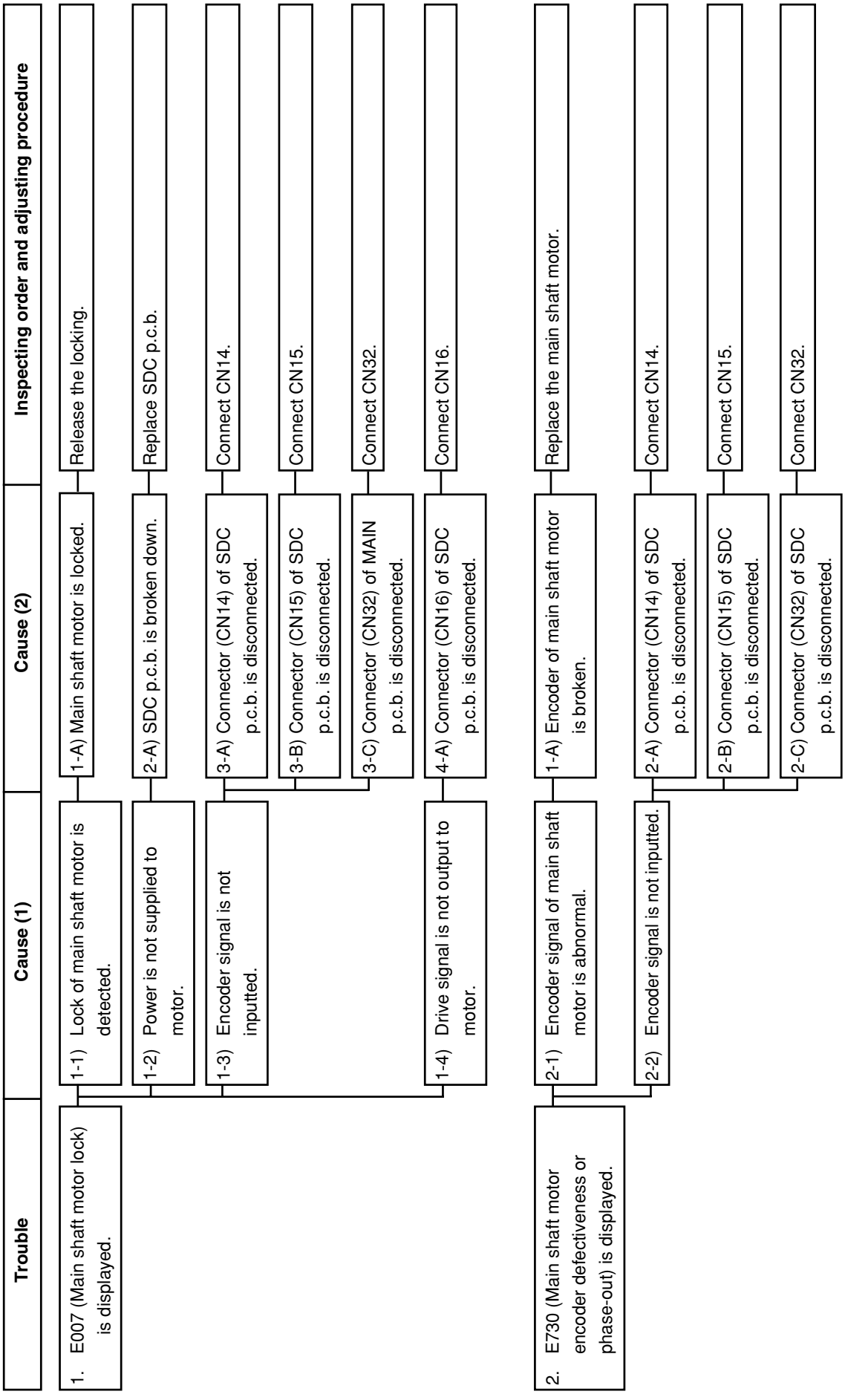
Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
18. E907 (Needle throwing motor origin retrival error) is displayed.	18-1) Origin sensor signal is not inputted at the time of needle throwing motor origin retrieval motion.	1-A) Needle throwing motor fails to properly work.	Check the needle throwing.
		1-B) Signal from needle throwing motor origin sensor does not come.	Check connection or breaking of wire of needle throwing origin sensor asm. and MAIN-INT cord C asm.
		1-C) Needle throwing origin sensor is broken.	Replace the needle throwing origin sensor.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
19. E908 (Y feed motor origin retrieval error) is displayed.	19-1) Origin sensor signal is not inputted at the time of Y feed motor origin retrieval motion.	1-A) Y feed motor fails to properly work.	Check Y feed.
		1-B) Signal from Y feed motor origin sensor does not come.	Check connection or breaking of wire of Y feed origin sensor asm. and MAIN-INT cord C asm.
		1-C) Y feed origin sensor is broken.	Replace the Y feed origin sensor.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
20. E910 (Presser motor origin retrieval error) is displayed.	20-1) Origin sensor signal is not inputted at the time of presser motor origin retrieval motion.	1-A) Presser motor fails to properly work.	Check the presser.
		1-B) Signal from presser motor origin sensor does not come.	Check connection or breaking of wire of presser origin sensor asm. and MAIN-INT cord C asm.
		1-C) Presser origin sensor is broken.	Replace the presser origin sensor.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
21. E918 (Abnormality of heat sink temperature for MAIN p.c.b.) is displayed.	21-1) Temperature of heat sink for MAIN p.c.b. has become more than 85 ℃.	1-A) Fan in the inside of box is not rotating.	Check the connection of fan or the fan.
		1-B) Ventilator of control box is clogged.	Clean the ventilator of control box.
		1-C) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
22. E923 (Abnormality of VCM temperature) is displayed.	22-1) VCM temperature sensor detected that VCM temperature is more than 70 ℃ .	1-A) VCM temperature has risen to 70 ℃ or more.	Check setting of VCM.
		1-B) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
23. E996 (Thread drawing motor origin retrieval error) is displayed.	23-1) Origin sensor signal is not inputted at the time of thread drawing motor origin retrieval motion.	1-A) Thread drawing motor fails to properly work.	Check thread drawing.
		1-B) Signal from thread drawing motor origin sensor does not come.	Check connection or breaking of wire of thread drawing origin sensor asm. and MAIN-INT cord C asm.
		1-C) Thread drawing origin sensor is broken.	Replace the thread drawing origin sensor.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
24. E997 (Button loader motor origin retrieval error) is displayed.	24-1) Origin sensor signal is not inputted at the time of button loader motor origin retrieval motion.	1-A) Button loader origin sensor is broken.	Check the button loader.
		1-B) Differential motor fails to properly work.	Check connection or breaking of wire of button loader origin sensor asm. and MAIN-INT cord C asm.
		1-C) Button loader origin sensor is broken.	Replace the button loader origin sensor.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.

Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
25. E998 (Differential motor origin retrieval error) is displayed.	25-1) Origin sensor signal is not inputted at the time of differential motor origin retrieval motion.	1-A) Differential motor fails to properly work.	Check differential motion.
		1-B) Signal from differential motor origin sensor does not come.	Check connection or breaking of wire of differential origin sensor asm. and MAIN-INT cord C asm.
		1-C) Differentisl origin sensor is broken.	Replace the differential origin sensor.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
26. E999 (Y feed upper motor origin retrieval error) is displayed.	26-1) Origin sensor signal is not inputted at the time of Y feed upper motor origin retrieval motion.	1-A) Y feed upper motor fails to properly work.	Check the Y feed upper.
		1-B) Signal from Y feed upper motor origin sensor does not come.	Check connection or breaking of wire of Y feed upper origin sensor asm. and MAIN-INT cord C asm.
		1-C) Y feed upper origin sensor is broken.	Rplace the Y feed upper origin sensor.
		1-D) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.

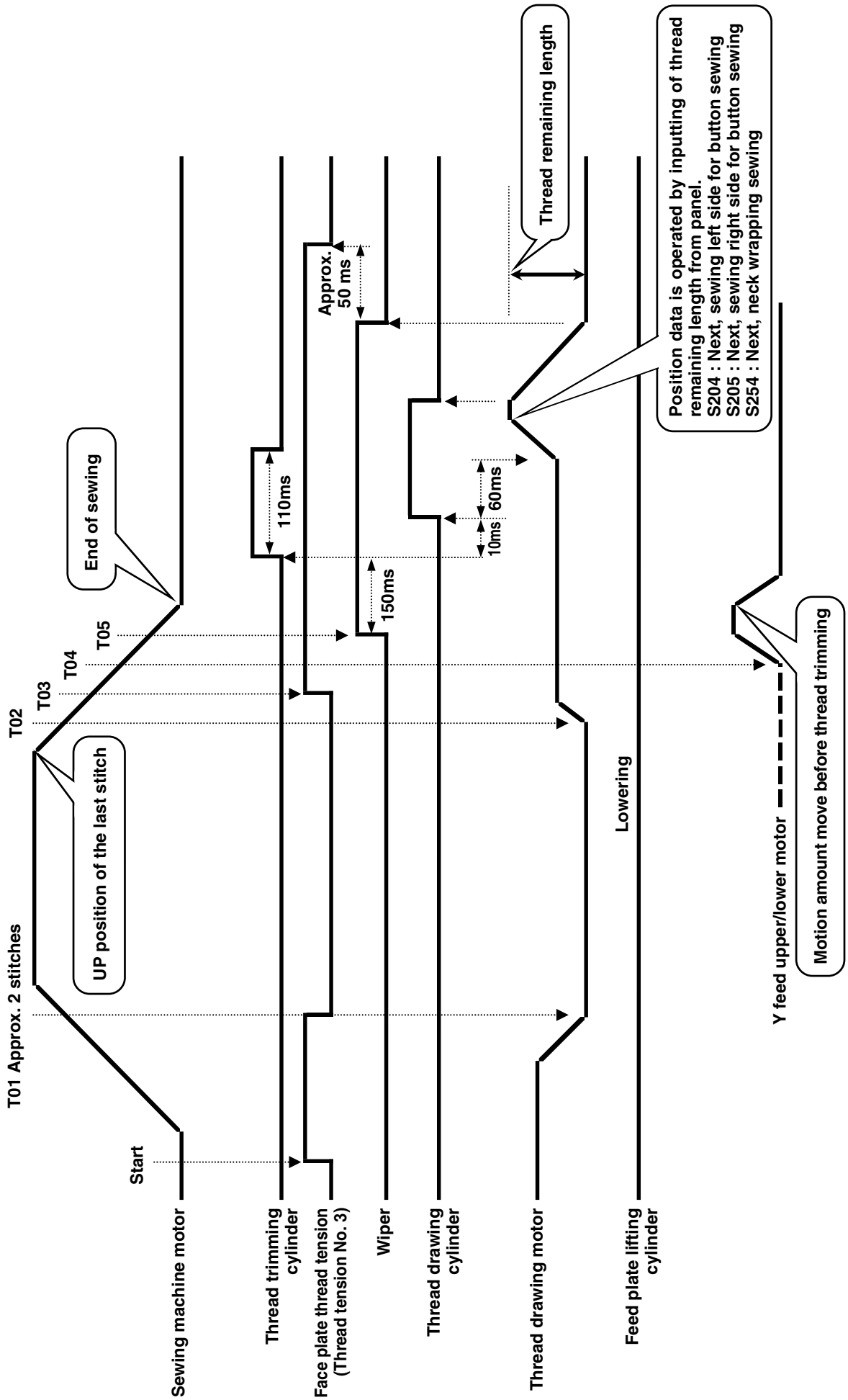
4) Starting of the sewing machine



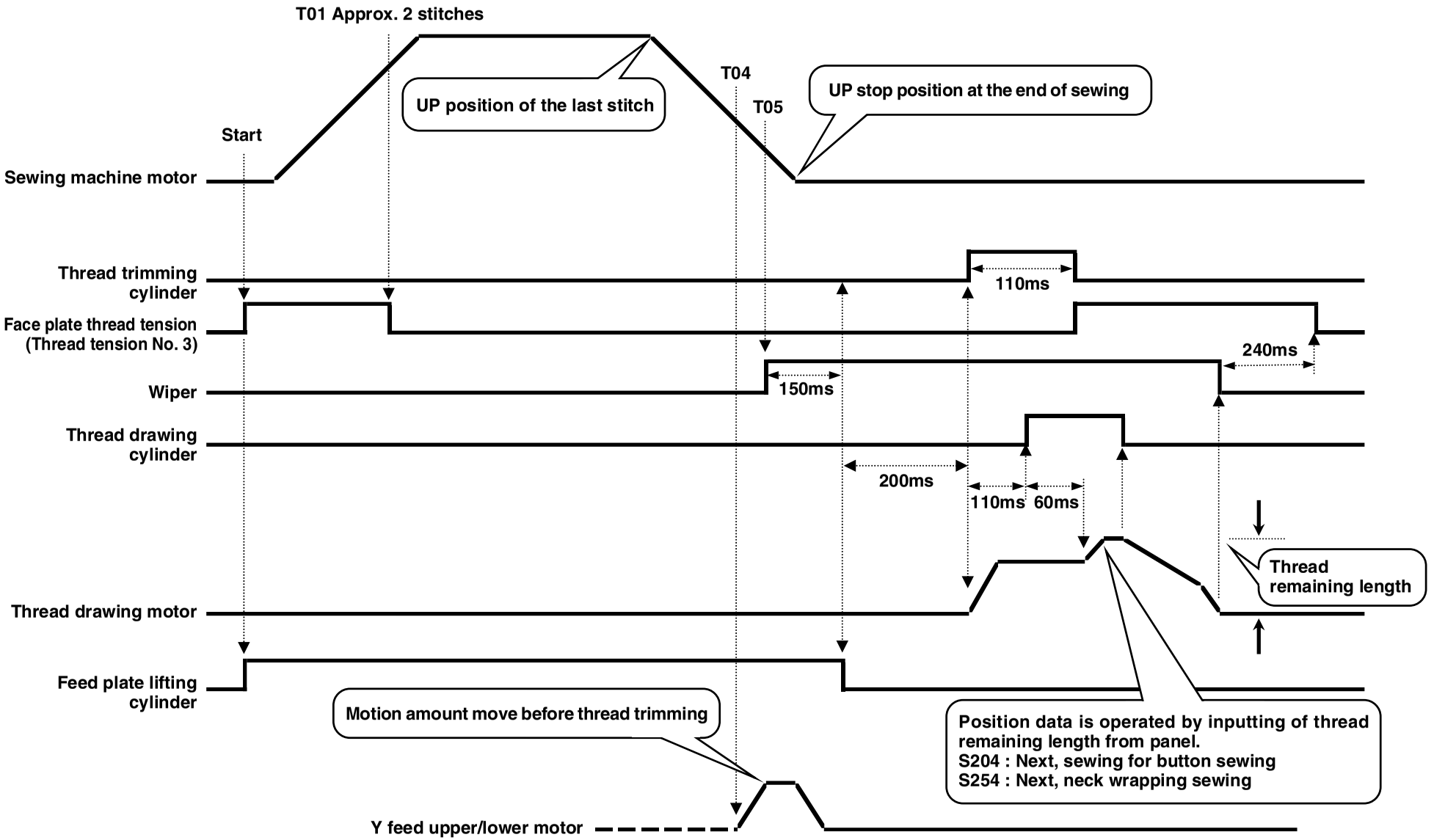
Trouble	Cause (1)	Cause (2)	Inspecting order and adjusting procedure
3. E731 (Main motor hole sensor defectiveness or position sensor defectiveness) is displayed.	3-1) Main motor hole sensor or position sensor is improper.	1-A) Encoder of main shaft motor is broken.	Replace the main shaft motor.
		1-B) Connector (CN14) of SDC p.c.b. is disconnected.	Connect CN14.
		1-C) Connector (CN15) of SDC p.c.b. is disconnected.	Connect CN15.
		1-D) Connector (CN32) of MAIN p.c.b. is disconnected.	Connect CN32.
4. E733 (Main shaft motor reverse rotation) is displayed.	4-1) Main shaft motor rotates in the reverse direction.	1-A) Main shaft motor is locked.	Replace the main shaft motor.
		1-B) SDC p.c.b. is broken down.	Replace SDC p.c.b.
		1-C) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
5. E901 (Abnormal IPM) is displayed.	5-1) IPM of SDC p.c.b. is abnormal.	1-A) SDC p.c.b. is broken down.	Replace SDC p.c.b.
		1-B) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.
6. E902 (Overcurrent of main shaft motor) is displayed.	6-1) Current more than max. rated current has flowed to main shaft motor.	1-A) Main shaft motor is locked.	Replace the main shaft motor.
		1-B) SDC p.c.b. is broken down.	Replace SDC p.c.b.
		1-C) MAIN p.c.b. is broken down.	Replace MAIN p.c.b.

13. TIMING CHART

Actuator control at the time of sewing (Button sewing process)

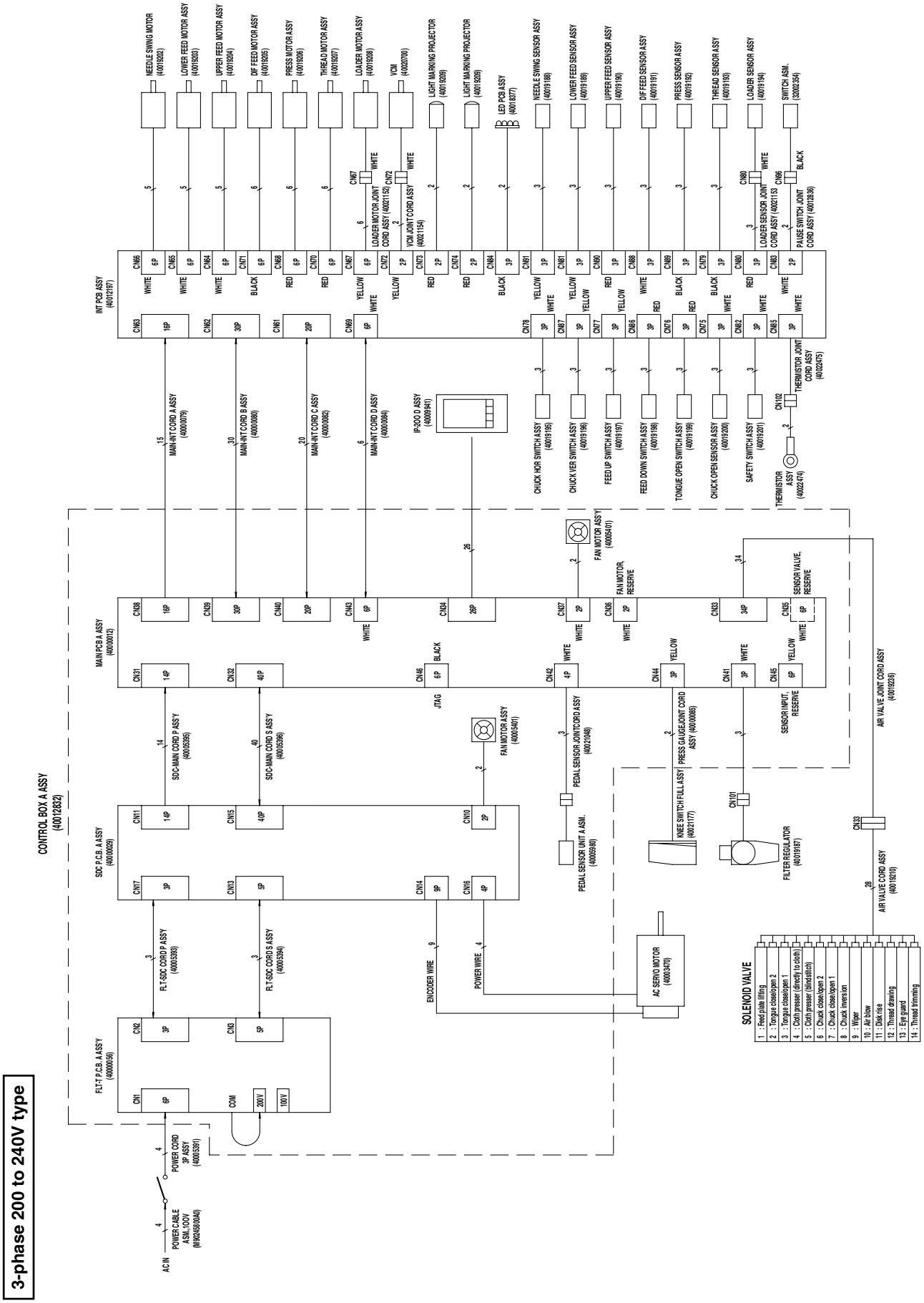


Actuator control at the time of sewing (Neck wrapping standard thread trimming mode)



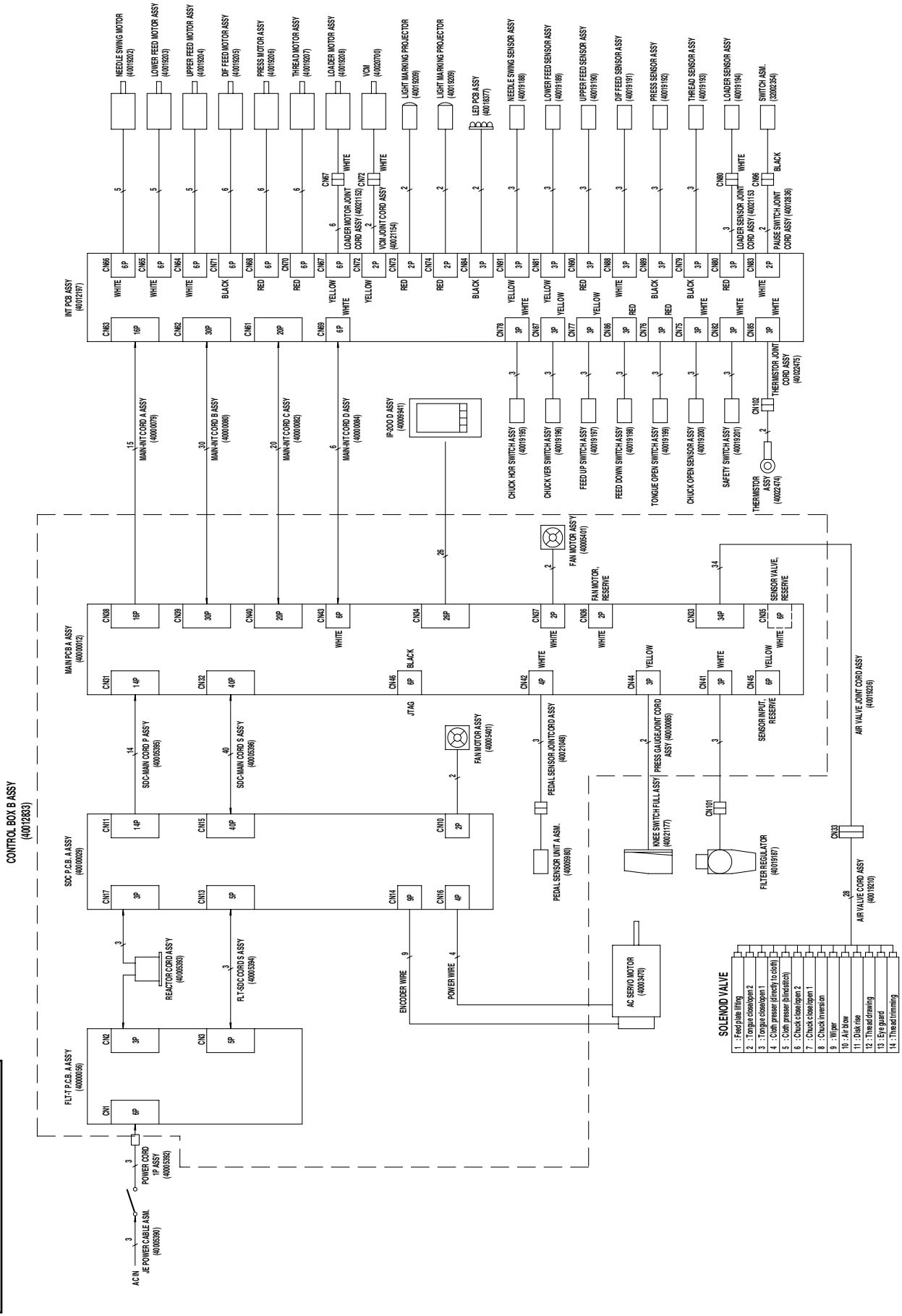
14. CIRCUIT DIAGRAM

(1) Block diagram A



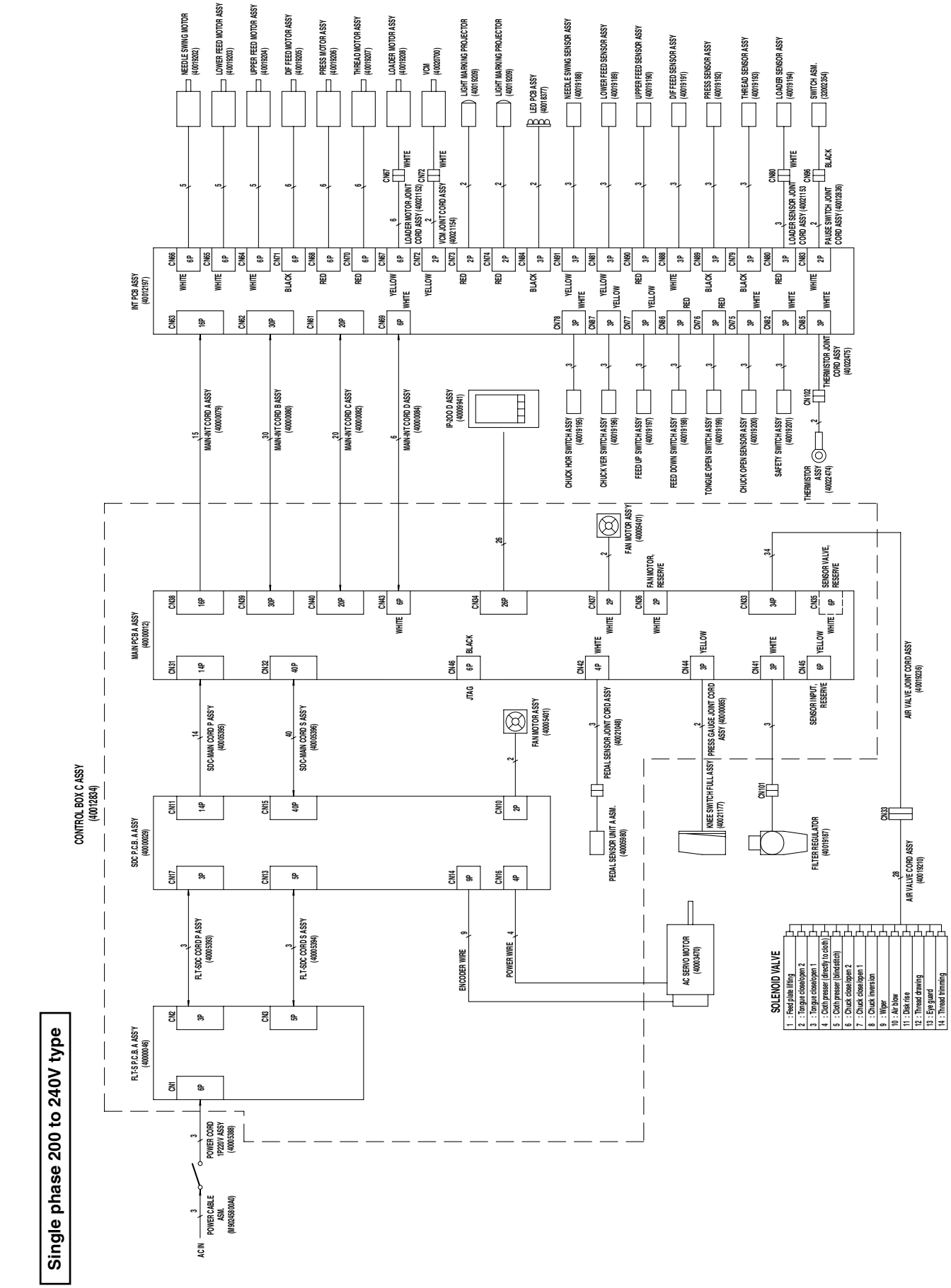
(2) Block diagram B

Single phase 230V (CE) type



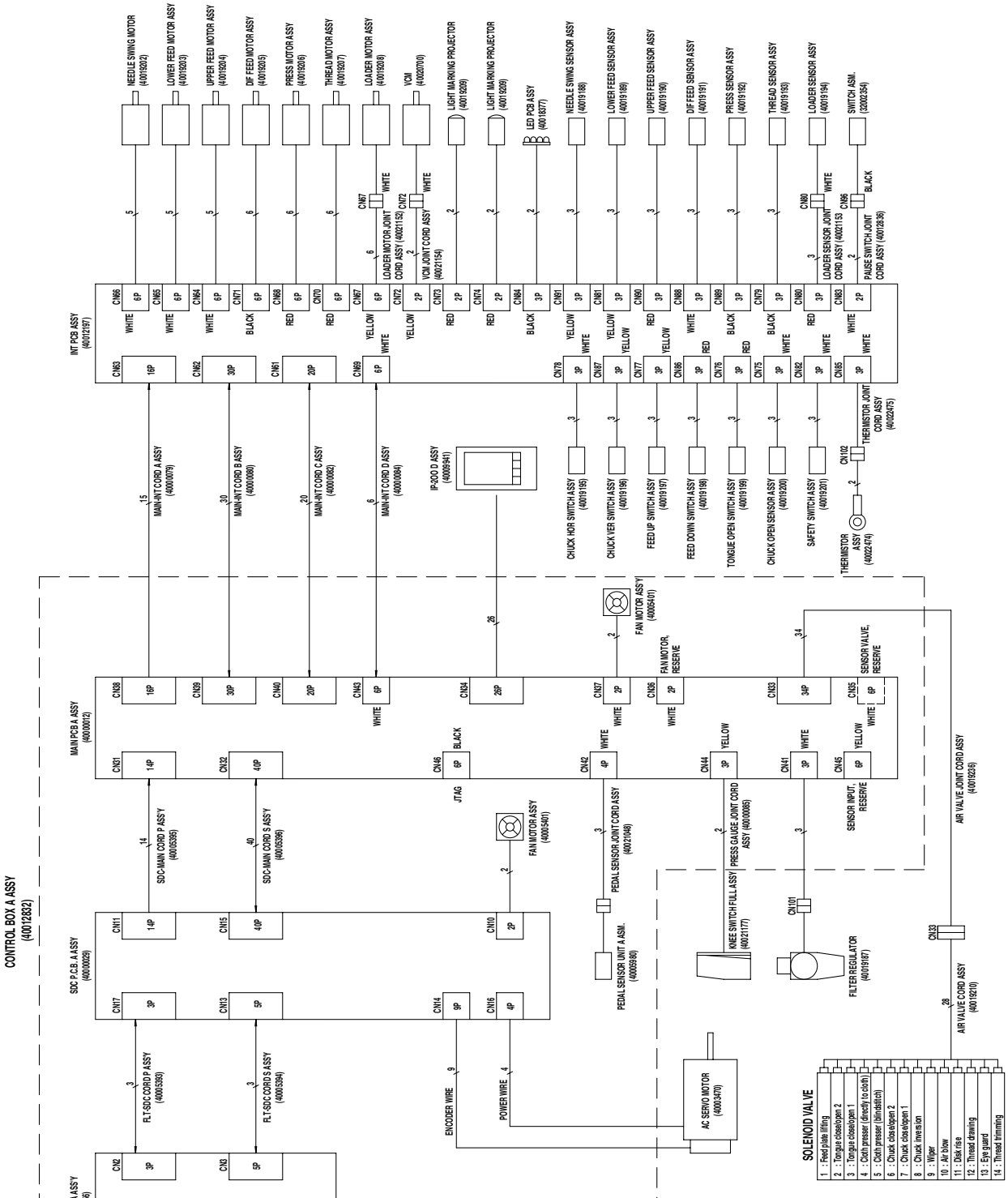
(3) Block diagram C

Single phase 200 to 240V type

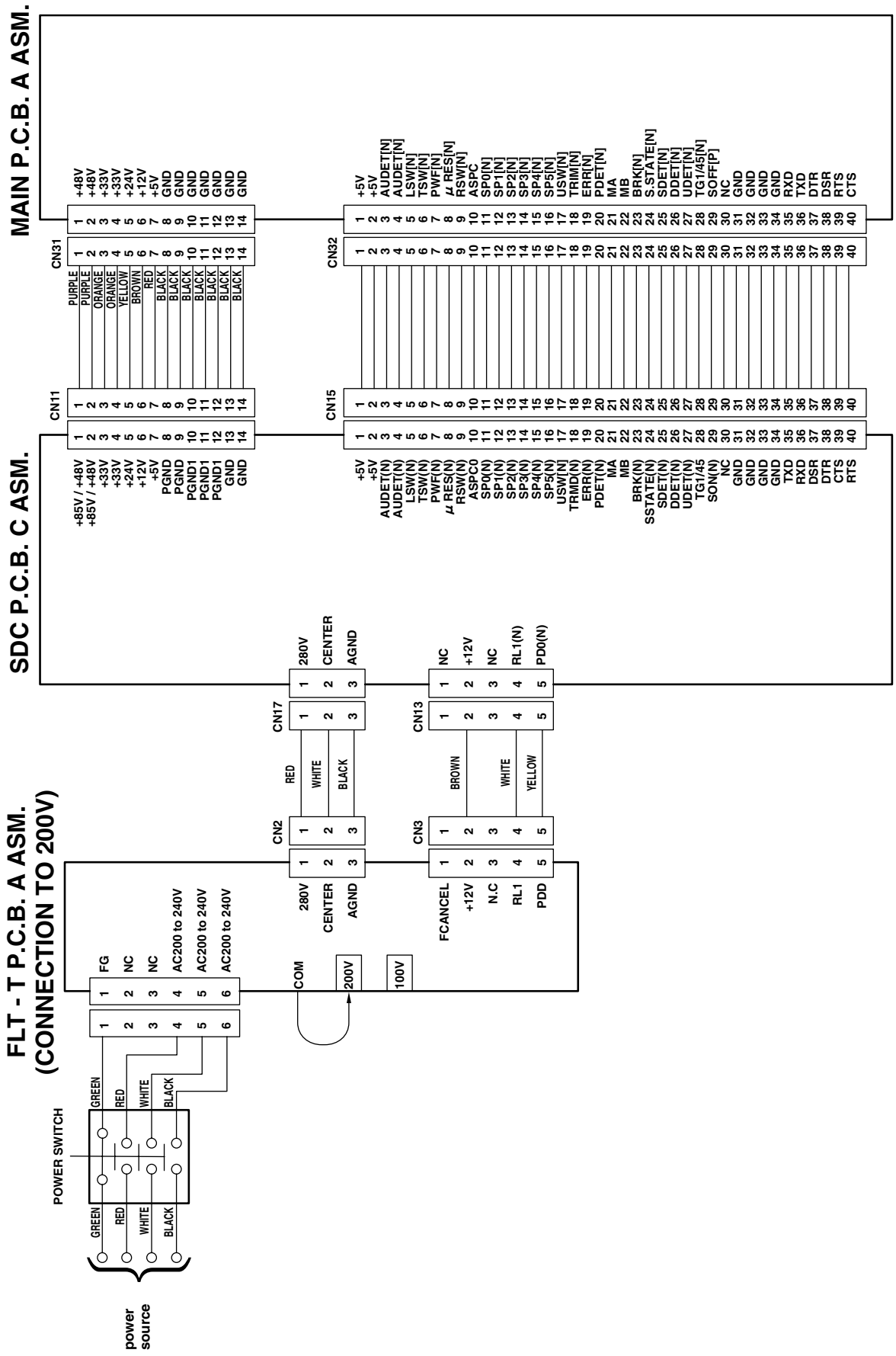


(4) Block diagram D

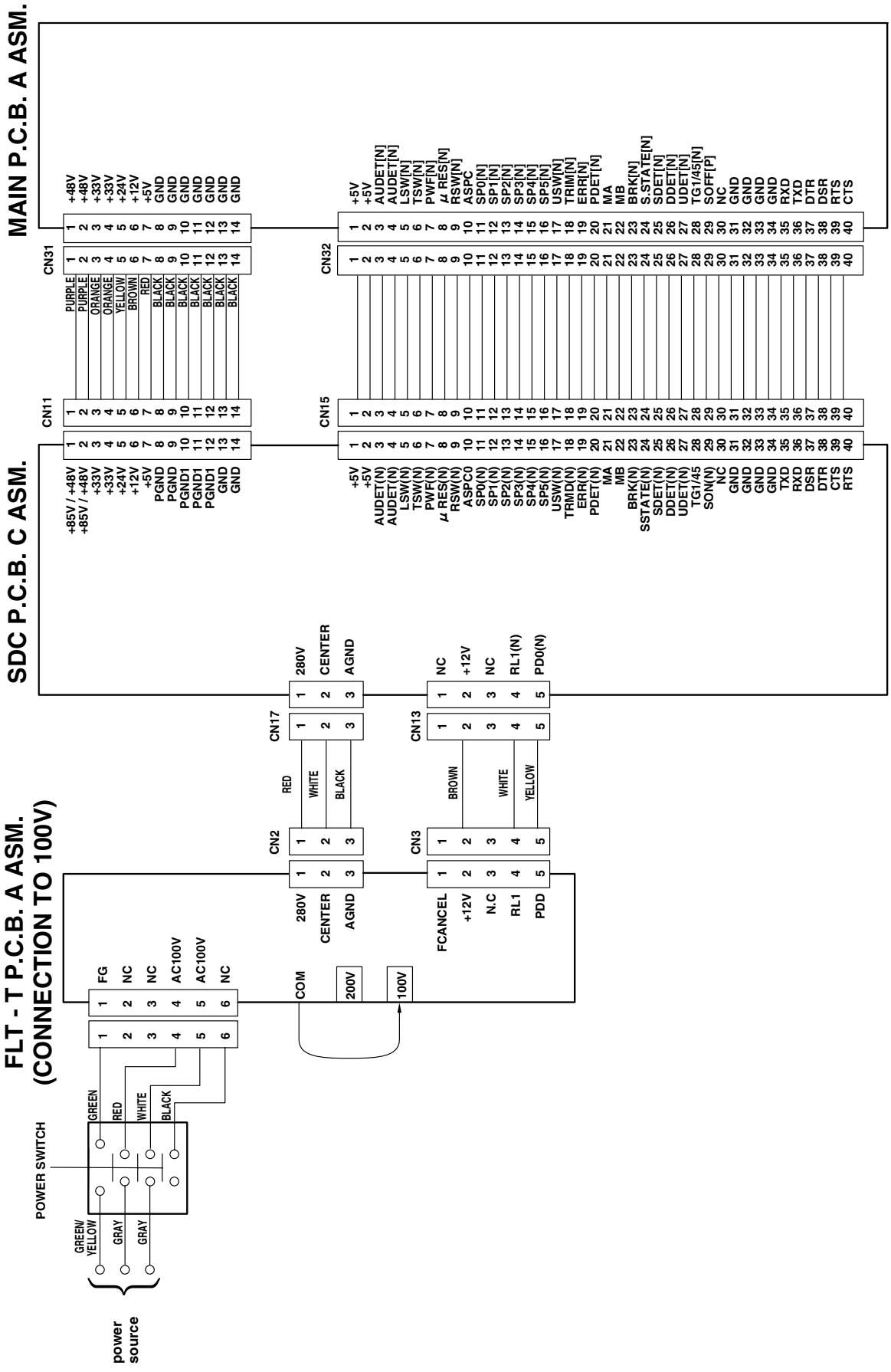
Single phase 100V type



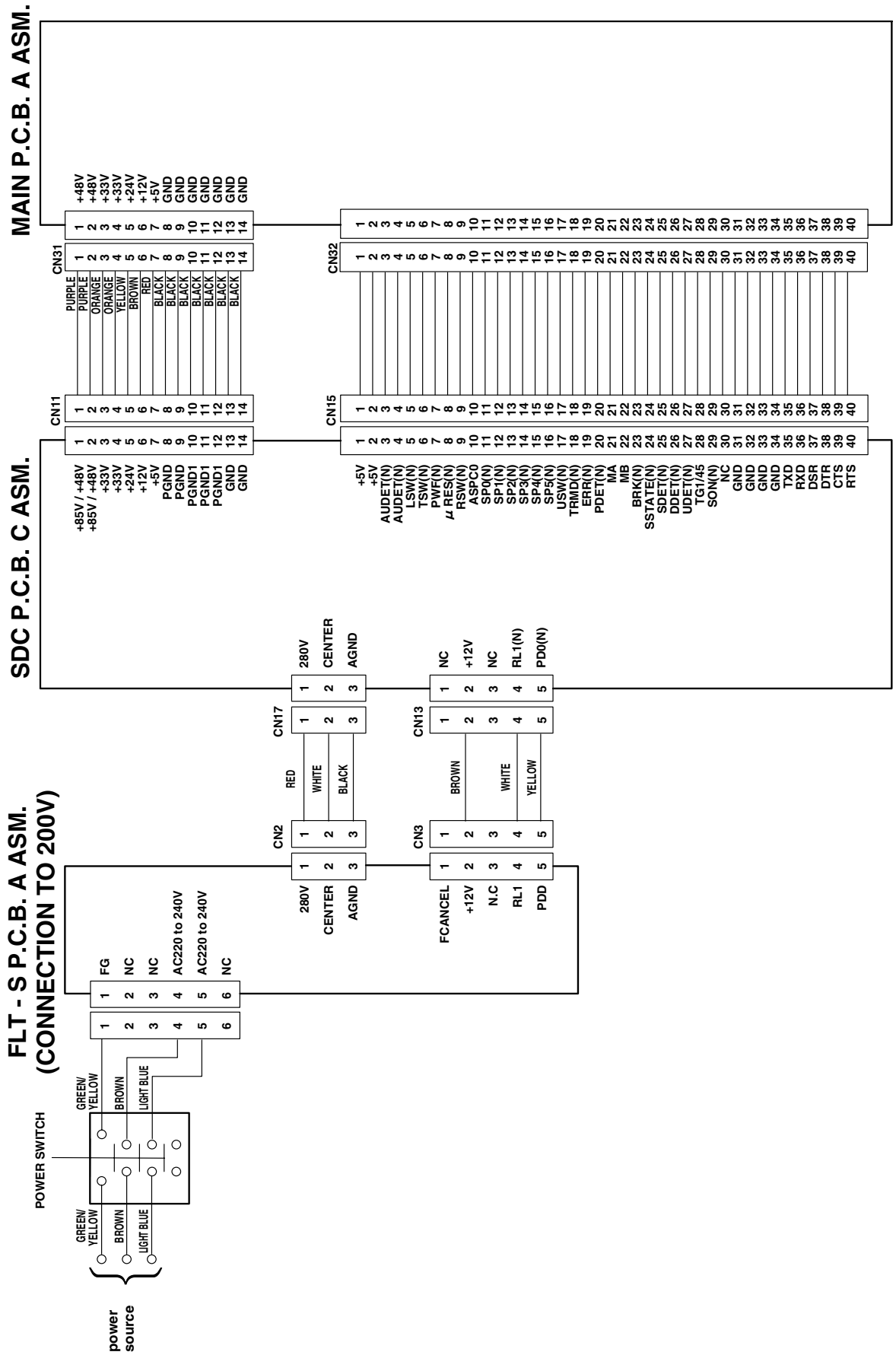
(5) Power circuit diagram (3-phase 200 to 240V type)



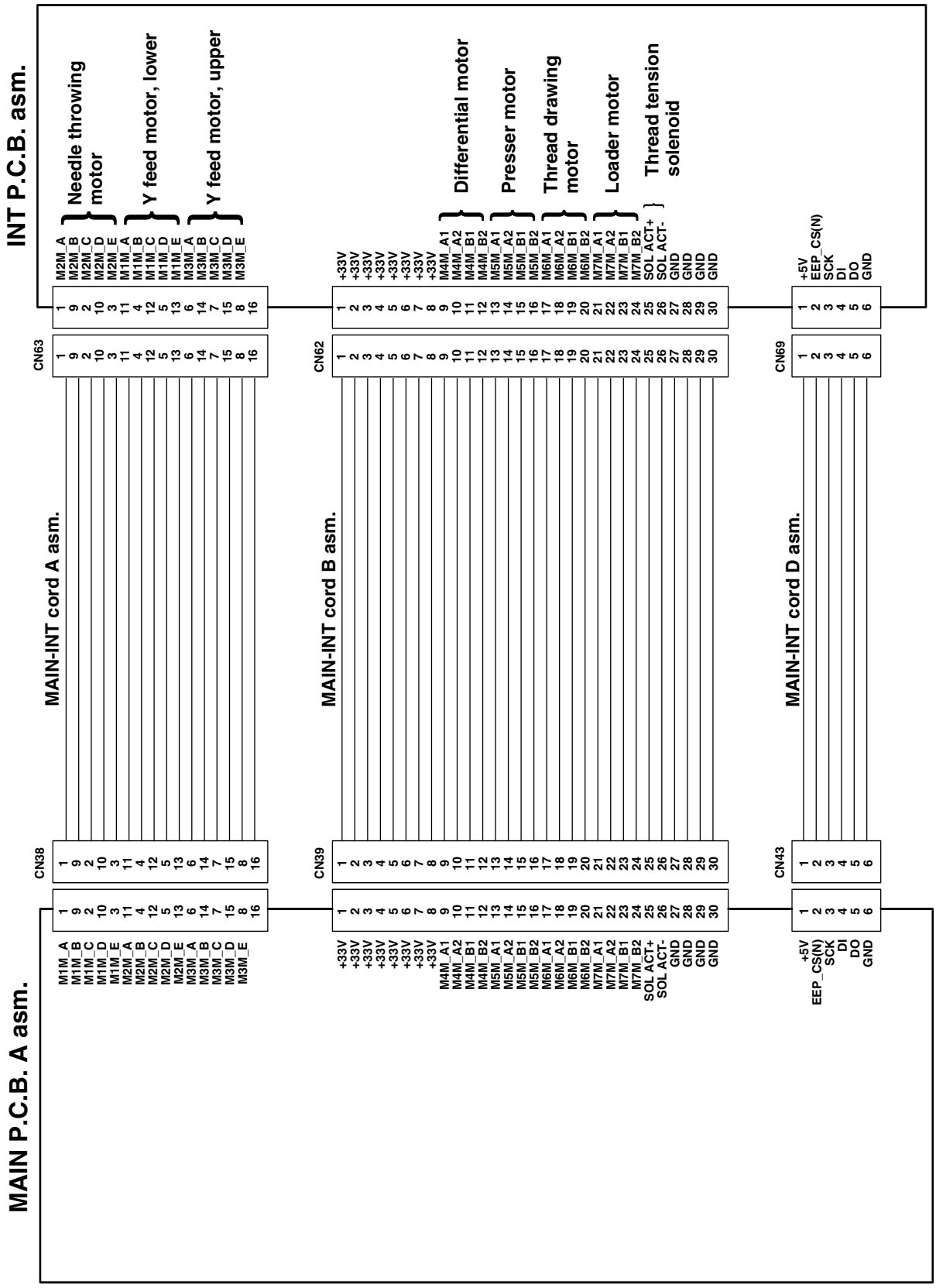
(6) Power circuit diagram (Single phase 100V type)



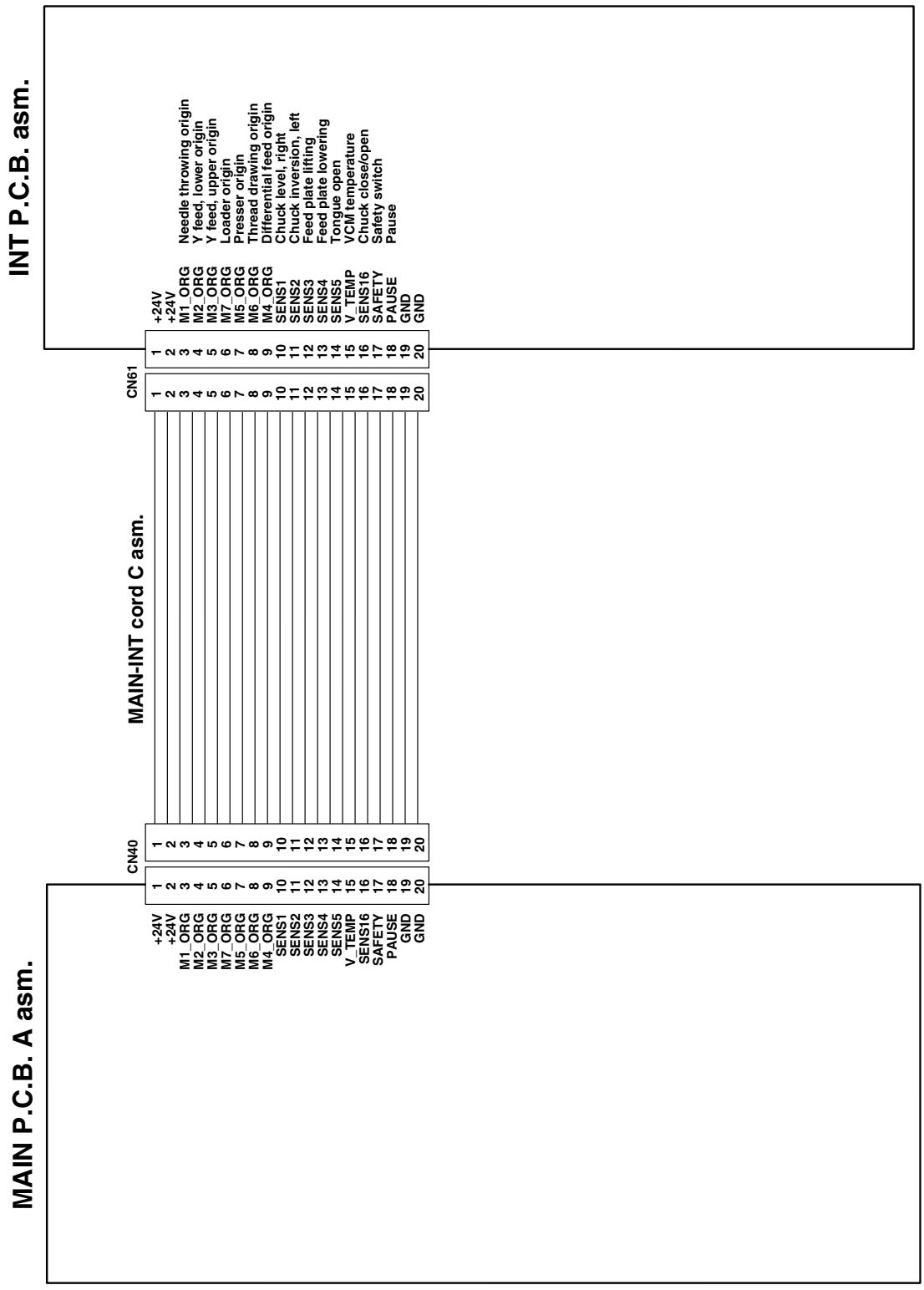
(7) Power circuit diagram (Single phase 220 to 240V type)



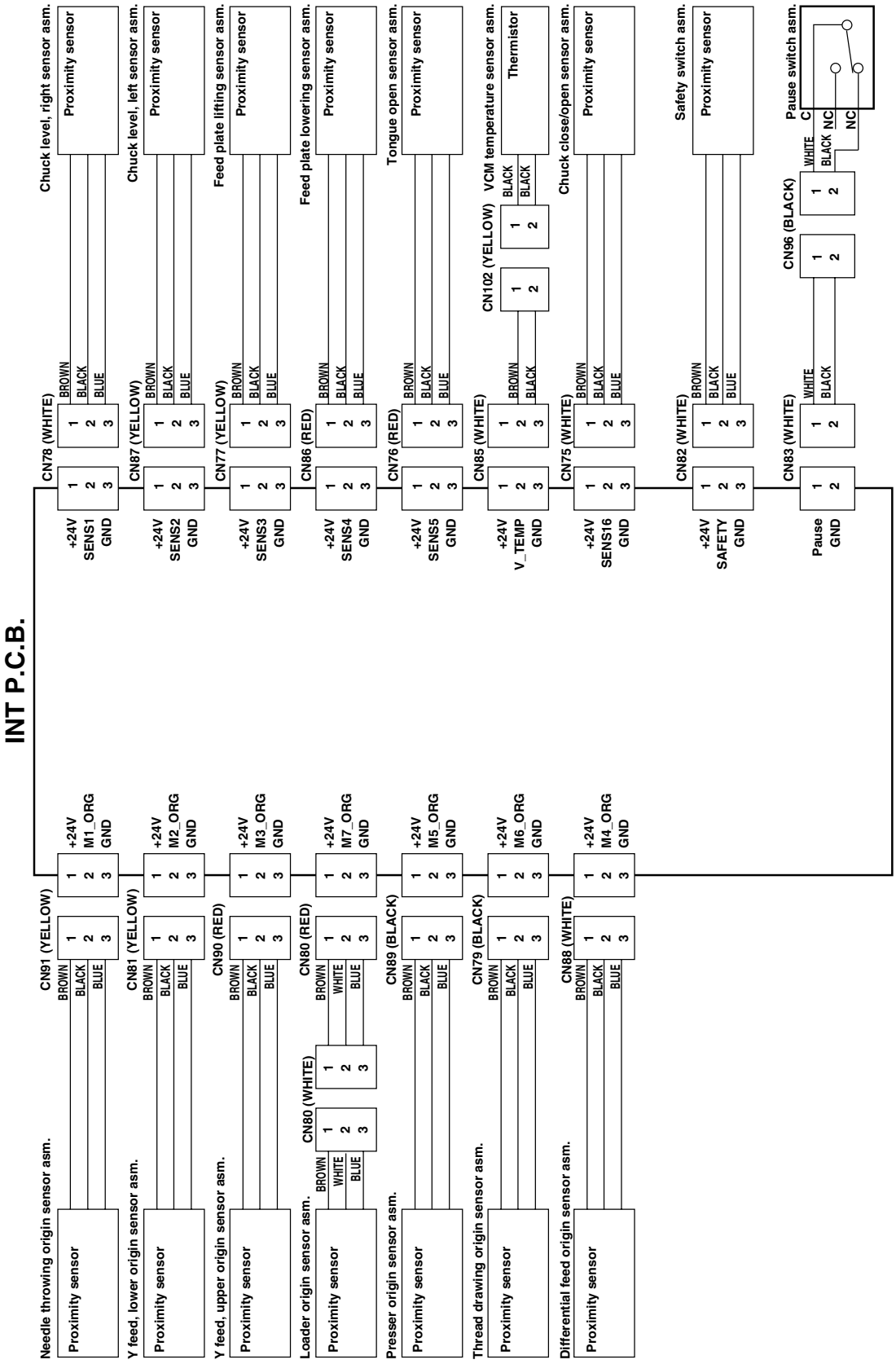
(8) Control box and machine head circuit diagram 1



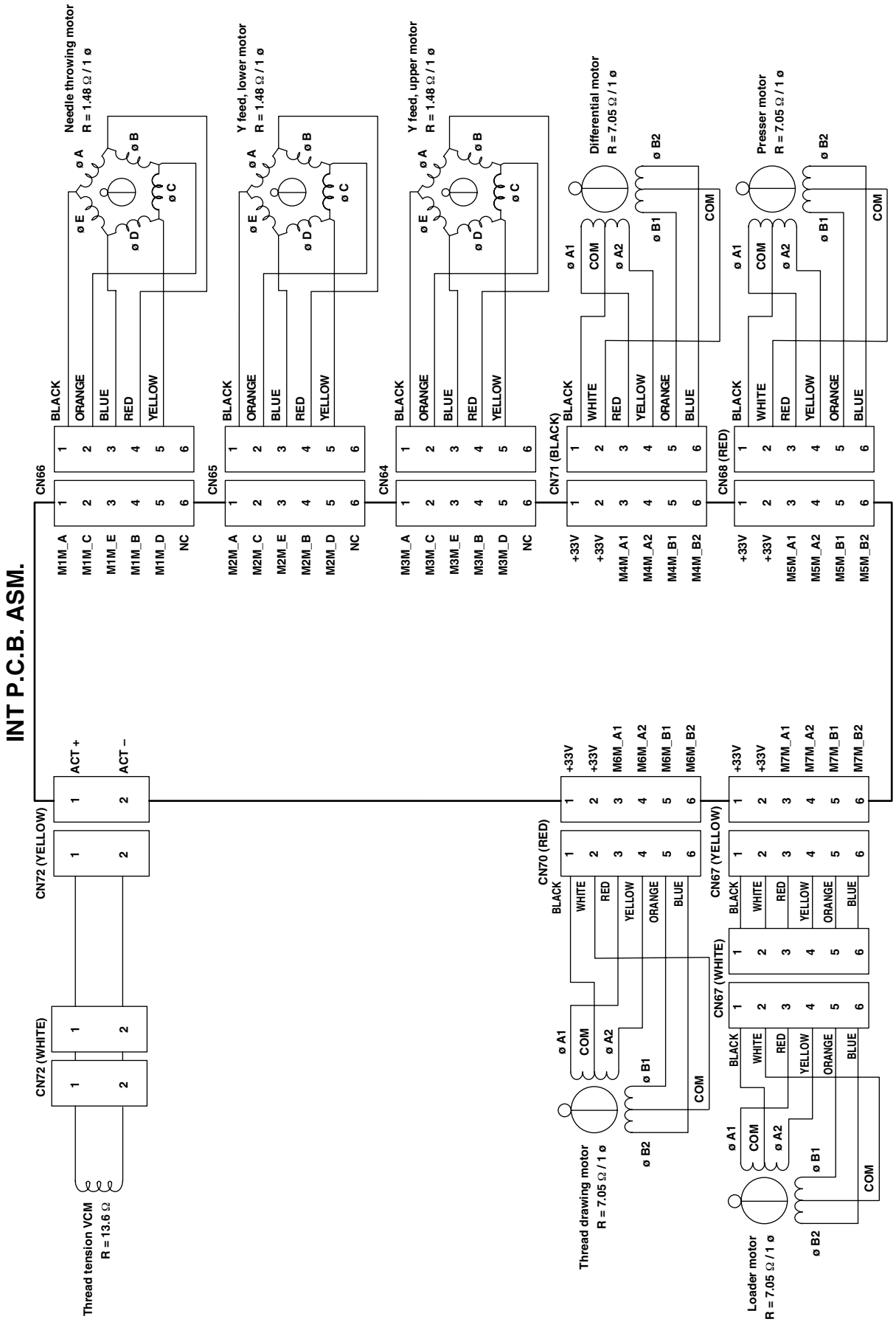
(9) Control box and machine head circuit diagram 2



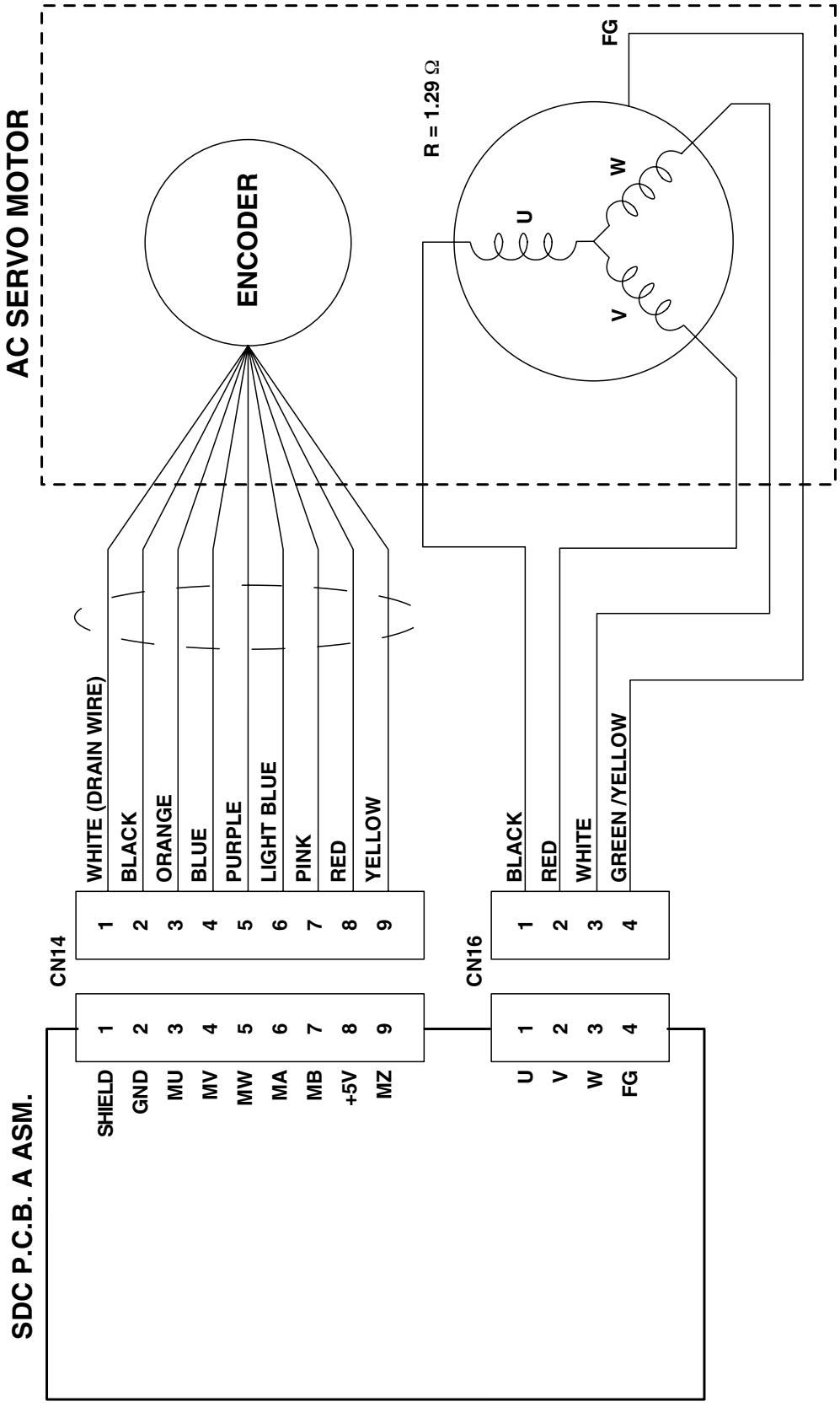
(10) Head sensor circuit diagram



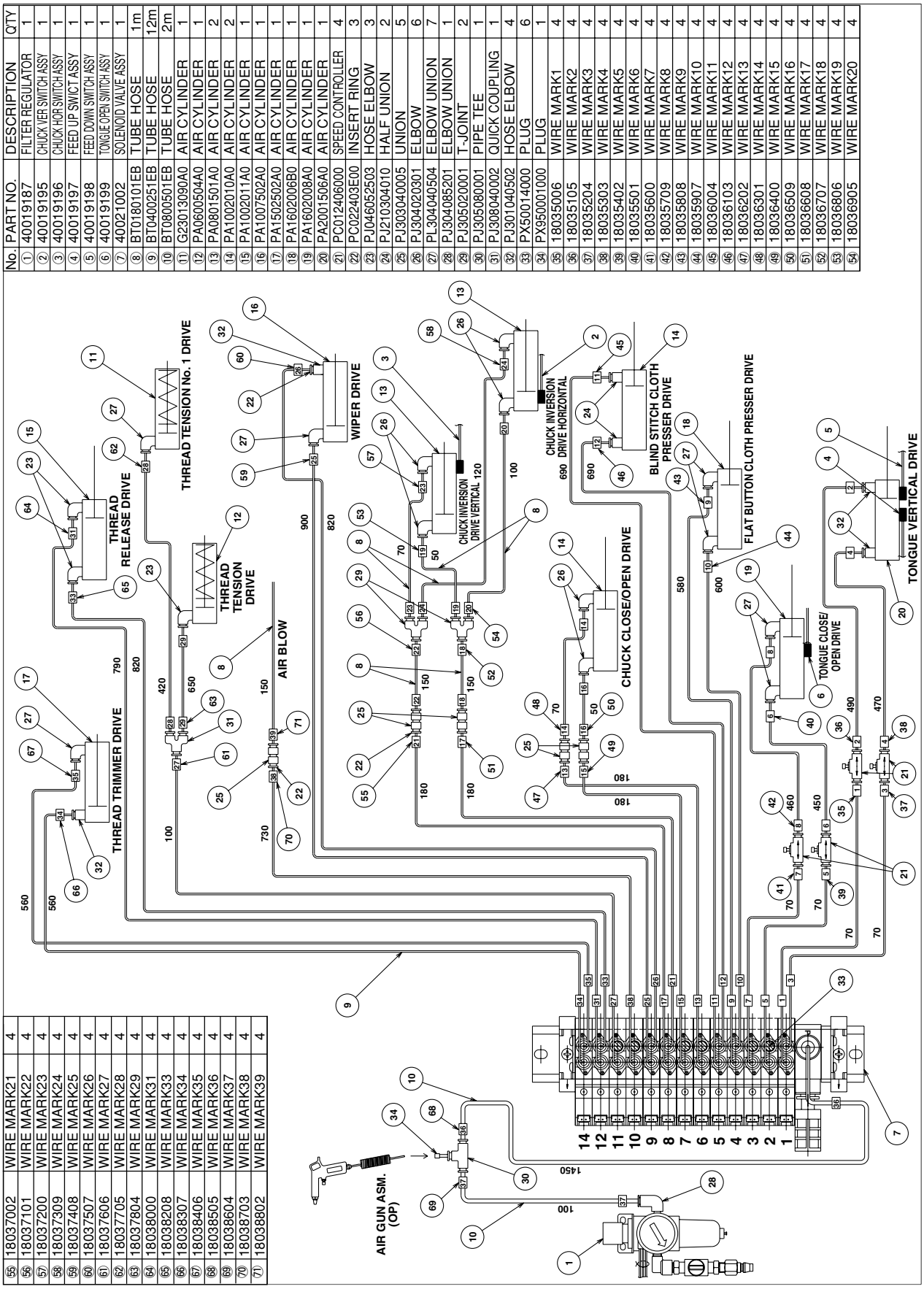
(11) Motor circuit diagram



(12) Servo motor circuit diagram



15. AIR CIRCUIT DIAGRAM



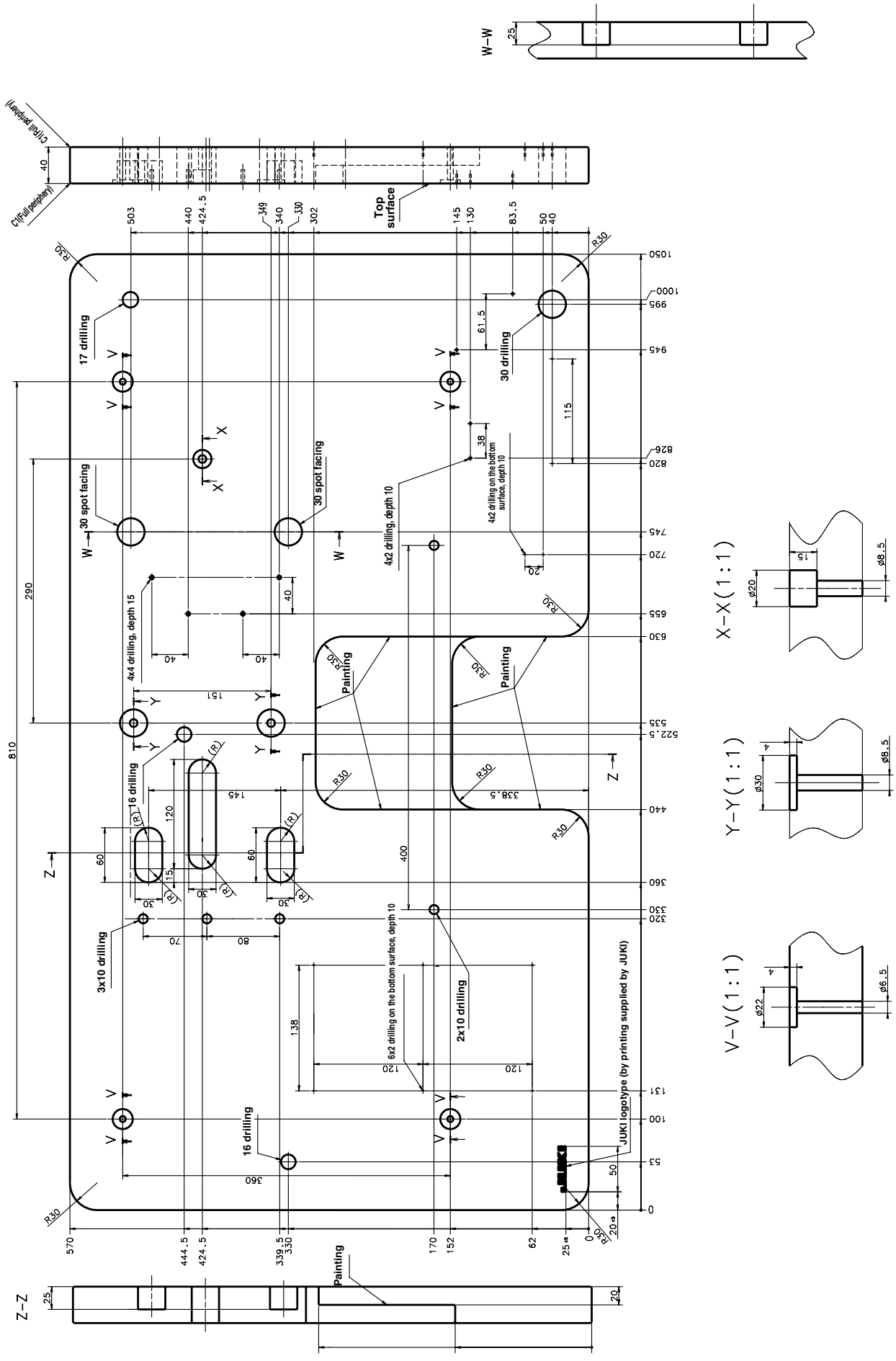
No.	PART NO.	DESCRIPTION	QTY
①	40019187	FILTER REGULATOR	1
②	40019195	CHUCK VER SWITCH ASSY	1
③	40019196	CHUCK HOR SWITCH ASSY	1
④	40019197	FEED UP SWICT ASSY	1
⑤	40019198	FEED DOWN SWITCH ASSY	1
⑥	40019199	TONGUE OPEN SWITCH ASSY	1
⑦	40021002	SOLENOID VALVE ASSY	1
⑧	BT0180101EB	TUBE HOSE	1m
⑨	BT0400251EB	TUBE HOSE	12m
⑩	BT0800501EB	TUBE HOSE	2m
⑪	G230130090A0	AIR CYLINDER	1
⑫	PA0600504A0	AIR CYLINDER	1
⑬	PA0801501A0	AIR CYLINDER	2
⑭	PA1002010A0	AIR CYLINDER	2
⑮	PA1002011A0	AIR CYLINDER	1
⑯	PA1007502A0	AIR CYLINDER	1
⑰	PA1502502A0	AIR CYLINDER	1
⑱	PA1602006B0	AIR CYLINDER	1
⑲	PA1602008A0	AIR CYLINDER	1
⑳	PA2001506A0	AIR CYLINDER	1
㉑	PC012406000	SPEED CONTROLLER	4
㉒	PC022403E00	INSERT RING	3
㉓	PJ046052503	HOSE ELBOW	3
㉔	PJ210304010	HALF UNION	2
㉕	PJ303040005	UNION	5
㉖	PJ304020301	ELBOW	6
㉗	PL304040504	ELBOW UNION	7
㉘	PJ304085201	ELBOW UNION	1
㉙	PJ305020001	T-JOINT	2
㉚	PJ305080001	PIPE TEE	1
㉛	PJ308040002	QUICK COUPLING	1
㉜	PJ301040502	HOSE ELBOW	4
㉝	PX50014000	PLUG	6
㉞	PX95001000	PLUG	1
㉟	18035006	WIRE MARK1	4
㊱	18035105	WIRE MARK2	4
㊲	18035204	WIRE MARK3	4
㊳	18035303	WIRE MARK4	4
㊴	18035402	WIRE MARK5	4
㊵	18035501	WIRE MARK6	4
㊶	18035600	WIRE MARK7	4
㊷	18035709	WIRE MARK8	4
㊸	18035808	WIRE MARK9	4
㊹	18035907	WIRE MARK10	4
㊺	18036004	WIRE MARK11	4
㊻	18036103	WIRE MARK12	4
㊼	18036202	WIRE MARK13	4
㊽	18036301	WIRE MARK14	4
㊾	18036400	WIRE MARK15	4
㊿	18036509	WIRE MARK16	4
(51)	18036608	WIRE MARK17	4
(52)	18036707	WIRE MARK18	4
(53)	18036806	WIRE MARK19	4
(54)	18036905	WIRE MARK20	4

㊺	18037002	WIRE MARK21	4
㊻	18037101	WIRE MARK22	4
㊼	18037200	WIRE MARK23	4
㊽	18037309	WIRE MARK24	4
㊾	18037408	WIRE MARK25	4
㊿	18037507	WIRE MARK26	4
(61)	18037606	WIRE MARK27	4
(62)	18037705	WIRE MARK28	4
(63)	18037804	WIRE MARK29	4
(64)	18038000	WIRE MARK31	4
(65)	18038208	WIRE MARK33	4
(66)	18038307	WIRE MARK34	4
(67)	18038406	WIRE MARK35	4
(68)	18038505	WIRE MARK36	4
(69)	18038604	WIRE MARK37	4
(70)	18038703	WIRE MARK38	4
(71)	18038802	WIRE MARK39	4

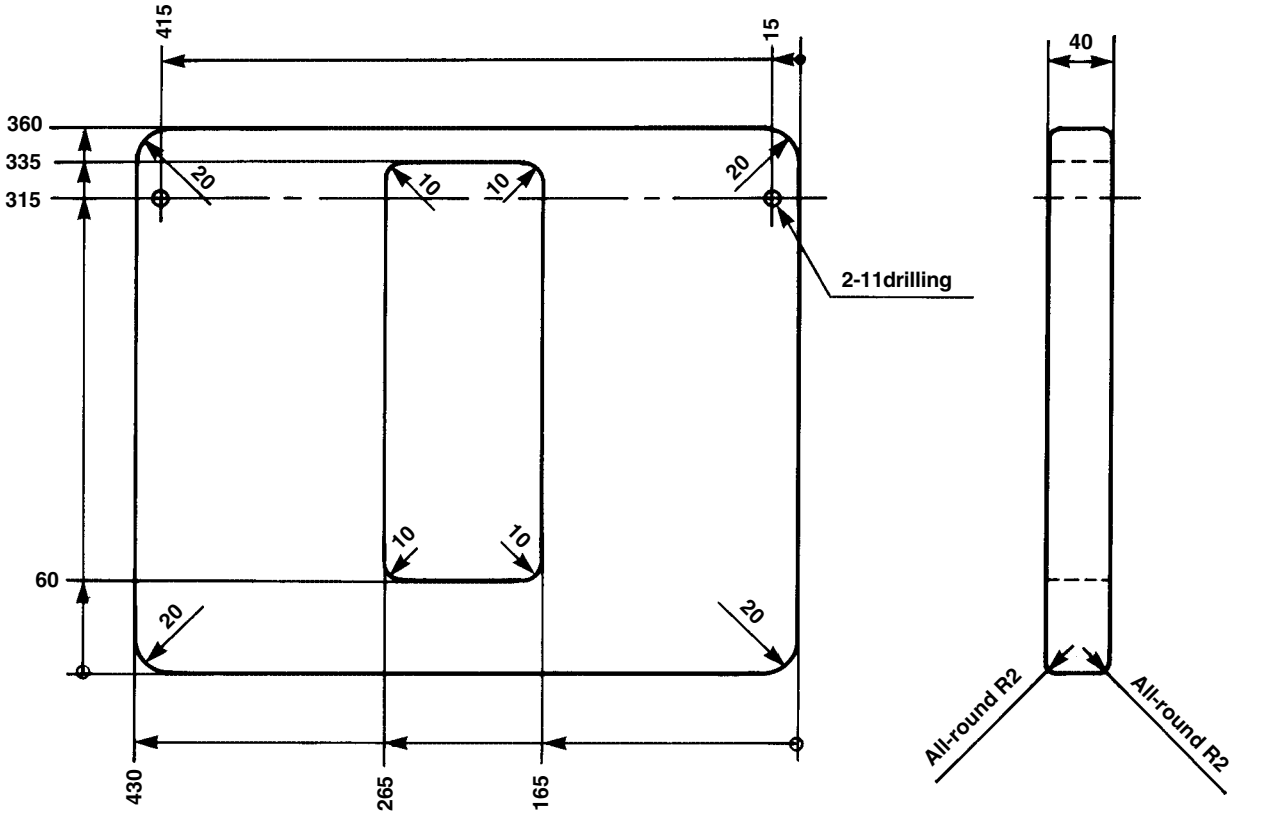
16. DRAWING OF THE TABLE

(1) Table

Part No. : 40020990



(2) Auxiliary table



Part No. : 17971805

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Please do not hesitate to contact our distributors or agents in your area for further information when necessary.

* **The description covered in this engineer's manual is subject to change for improvement of the commodity without notice.**

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