

HORIZON INTERNATIONAL, INC.
Kyoto, Japan

Horizon



SERVICE MANUAL **SPF-20/FC-20** **Stitcher & Folder** **Fore-edge Trimmer**

HORIZON INTERNATIONAL, INC.

510 Kuze Ooyabu-cho Minami-ku, Kyoto 601-8206, Japan
Phone:+81-75-934-6700, Fax:+81-75-934-6708, www.horizon.co.jp

FOREWORD



SPF-20 Stitcher & Folder FC-20 Fore-edge Trimmer

Important Information

This service manual is designed to help your repair and maintenance activity to keep the SPF-20 and FC-20 in good operating condition. Read and understand the instructions in this service manual and perform repair and maintenance.

- Horizon International Inc. shall not be liable for incidental consequential damages resulting from : improper or inadequate maintenance by customer; unauthorized modification or misuse; operation outside of the environmental specifications for the product.
- Horizon International Inc. pursues a policy of continuing improvement in design and performance of the product. Therefore, the product design and specifications are subject to change without prior notice and without our legal obligation.
- All rights are reserved. No part of the manual may be photocopied, reproduced or translated to another language without the prior written consent of Horizon International Inc.

Safety Precautions

- Read and understand all safety instructions with signal word such as  **WARNING**, and  **CAUTION**. If safety instructions are ignored, personal injury may result.
- The repair & maintenance and safety instructions in this manual are valid only when the repair and maintenance is performed according to the procedure in this manual.
- The signal word **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- The signal word **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in damage on machines. It may also be used to alert against unsafe practices.
- Horizon International Inc. cannot anticipate every possible situation that might involve a potential hazard. The instructions in this manual and warning labels on the machine are therefore not all inclusive.
- All equipment shall be locked out or tagged out to protect against accidental or inadvertent operation when such operation, repair or maintenance could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy isolating device where it is locked or tagged out.
- Some of the drawings in this manual show the machine uncovered for explaining the detail or inside of machine.

I. Necessary Tool for Maintenance and Repair

Use the following tools for maintenance and repair.

- | | |
|--------------------------|--------------------------------|
| 1. Phillips Screw Driver | No. 2 |
| 2. Screw Driver | 6 to 7 mm |
| 3. Allen Wrenches | 1.5, 2, 2.5, 3, 4, 5, and 6 mm |
| 4. Open-ended Wrench | 5.5 x 7, 8 x 10, 13 x 17 mm |
| 5. Box Wrench | 5.5 mm |
| 6. Snap-ring Expander | |

II. Signs and Abbreviations in This Manual

1. The following signs in this manual represent wire color.

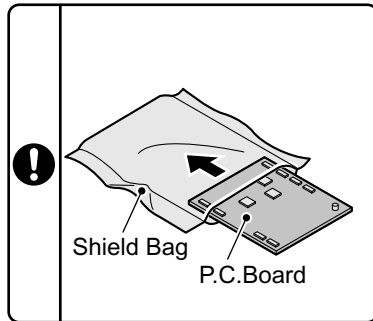
Sign	Color	Sign	Color
BRN	Brown	PNK	Pink
RED	Red	LBL/LBLU	Light Blue
ORN	Orange	YEG	Yellow Green
YEL	Yellow	YEO	Yellow Orange
GRN	Green	LYE	Light Yellow
BLU	Blue	LGRN	Light Green
VIO	Violet	GND	Ground
GRY	Gray		
W HT	White		
BLK	Black		

2. The following abbreviations in this manual represent electronic and electrical parts.

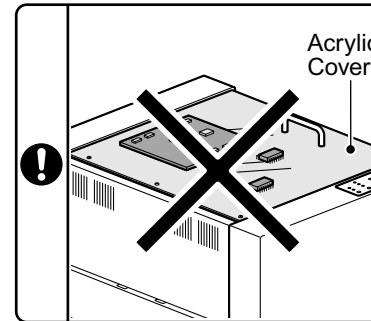
Abbreviation	Meaning
CL	Clutch
BK	Brake
SW	Switch
PS	Proximity Switch
mSW	Micro-switch
M	Motor
LED	Light Emitted Diode
VR	Potentiometer
RY	Relay
AS	Assembly
FA	Filter Array
SS	Set Screw
S/N	Sirial Number
VAC.	Vacant

III. Handling Precautions for P.C.Board and ROM

P.C.Board and ROM can be damaged by humanly imperceptible static electricity.
Handle P.C.Board and ROM with following care.



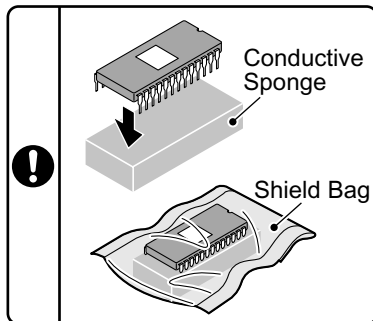
Keep P.C.Board in a shield bag.



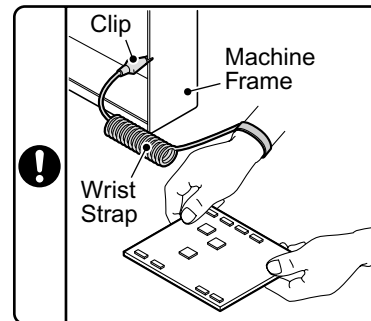
Do not put P.C.Board and ROM on the machine, especially on the acrylic cover.
(No problem on the conductive plate.)

And keep the P.C.Board and ROM away from the insulators.

Insulators: plastic, form polystyrene,
chemical fiber fabric, dry paper, etc.



Put the ROM on a conductive sponge
and keep in a shield bag.



When replacing the P.C.Board and ROM,
or setting the dip switches and volumes
on the P.C.Board, wear a wrist strap, and
connect the clip to the machine frame
(not painted surface).

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6. P.C.B. and Wiring / Circuit Diagram

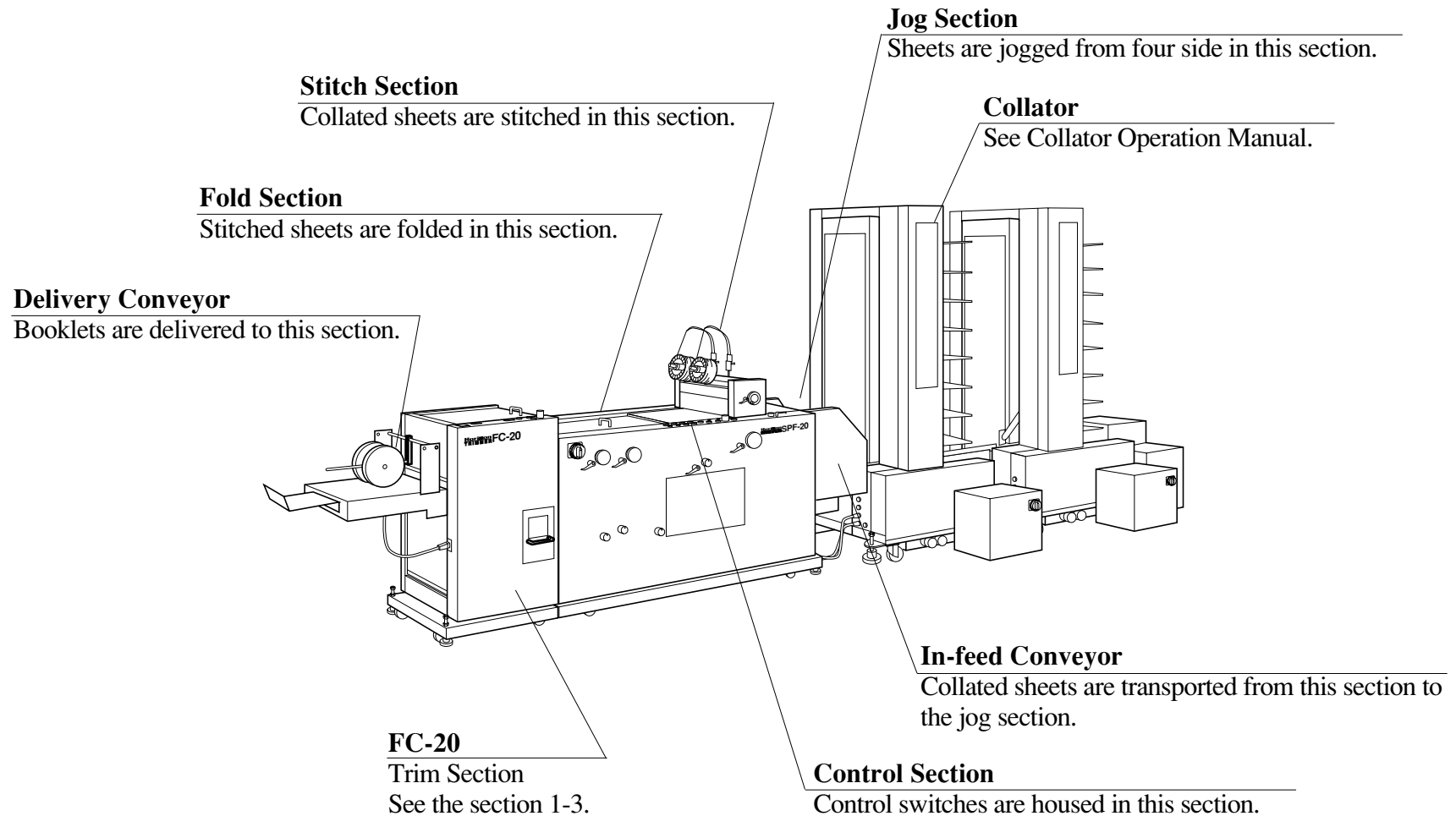
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1. Before You Begin

1-1 System Overview

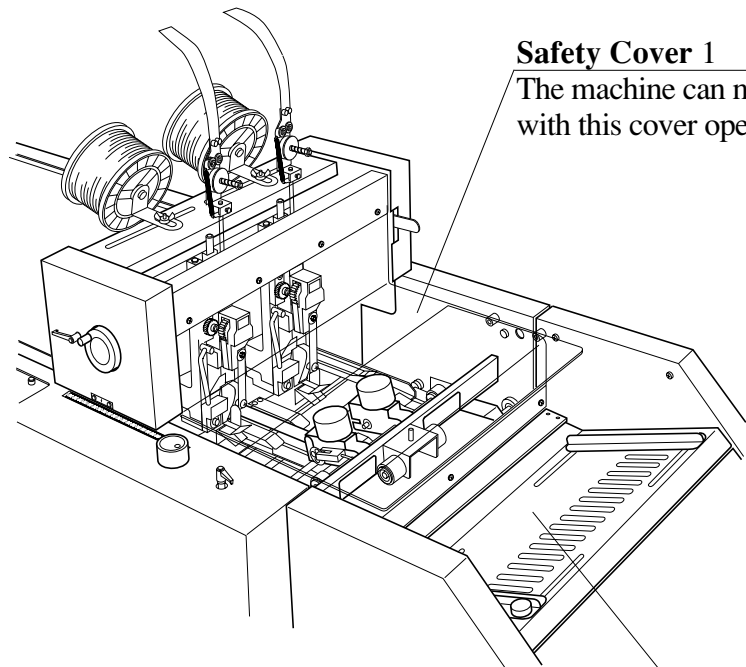
[SPF-20, FC-20]



1-2 SPF-20 Machine Descriptions

[SPF-20]

1-2-1 Safety Device and Safety Function

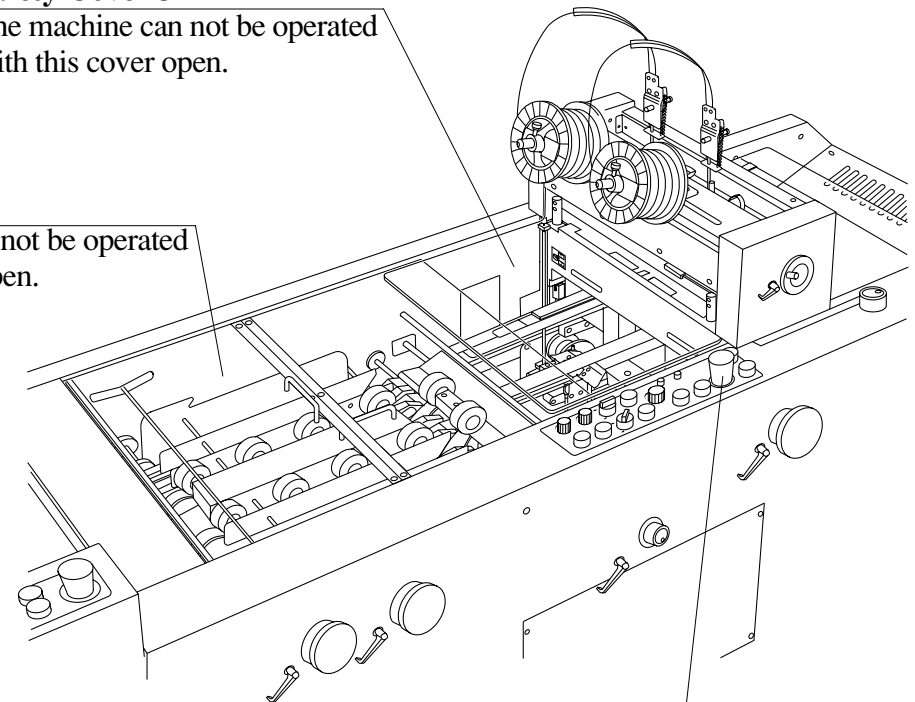


Safety Cover 1
The machine can not be operated with this cover open.

Safety Cover 2
The machine can not be operated with this cover open.

Safety Cover 3
The machine can not be operated with this cover open.

Safety Cover 4
The machine can not be operated with this cover open.



Emergency Stop Button
This button is used to stop all operation of the whole system.

1-2 SPF-20 Machine Descriptions

[SPF-20]

1-2-2 General View

Fold Position Adjust Knob

This knob is used to adjust the fold position. (The distance between the fold position and stopper.)

Transport Roller Lock Lever

Transport Roller Position Adjust Knob

This knob is used to adjust transport roller position according to the sheet size.

Stitch Position Adjust Knob

This knob is used to adjust the stitch position.

Fold Stopper Lock Lever

Power Switch

Stitch Position Lock Lever

Fold Plate Gap Adjust Knob

This knob is used to select fold plate gap according to the collated sheets' thickness.

Head Stopper Position Adjust Knob

This knob is used to adjust head stopper position according to sheet size.

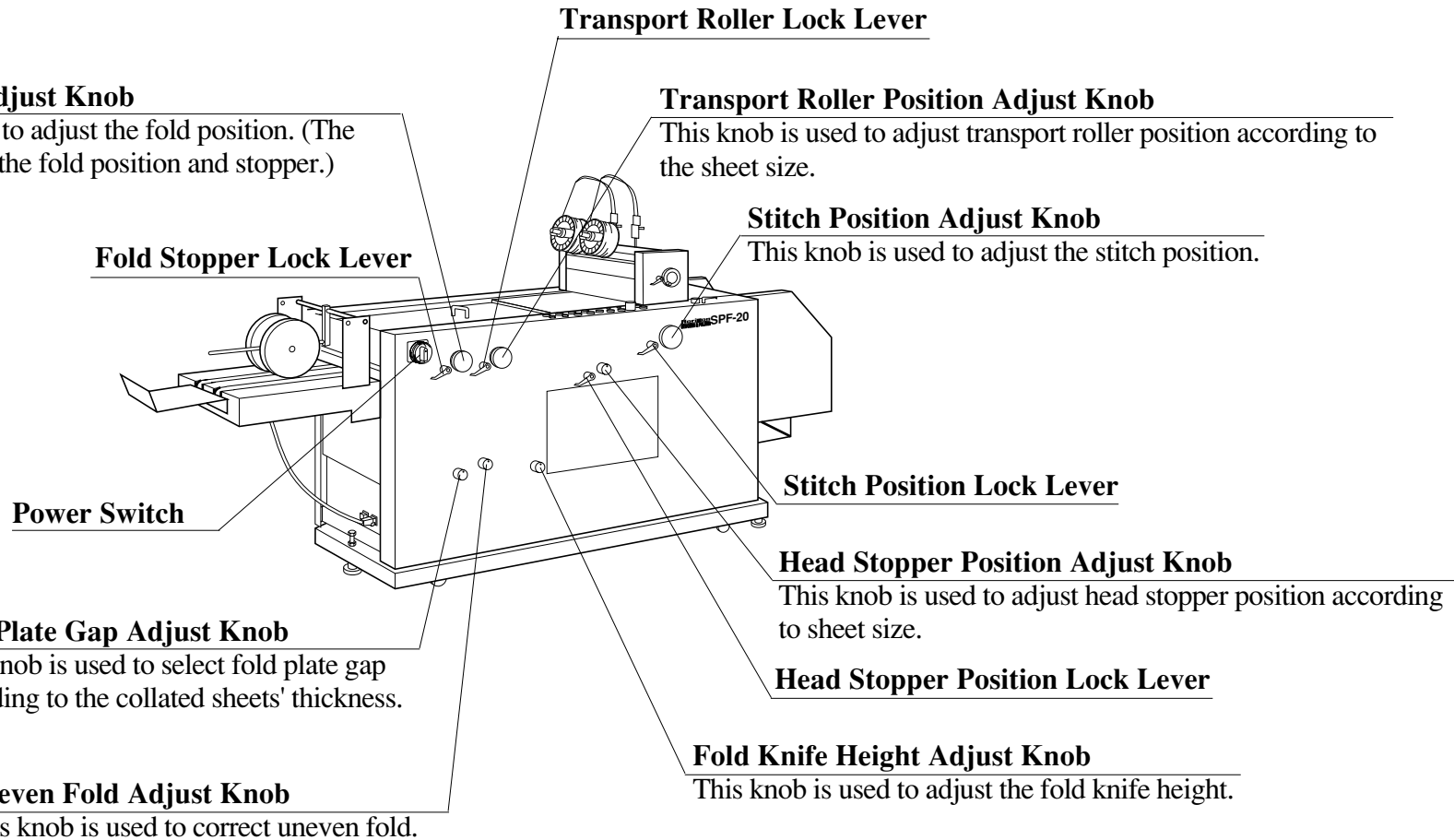
Head Stopper Position Lock Lever

Uneven Fold Adjust Knob

This knob is used to correct uneven fold.

Fold Knife Height Adjust Knob

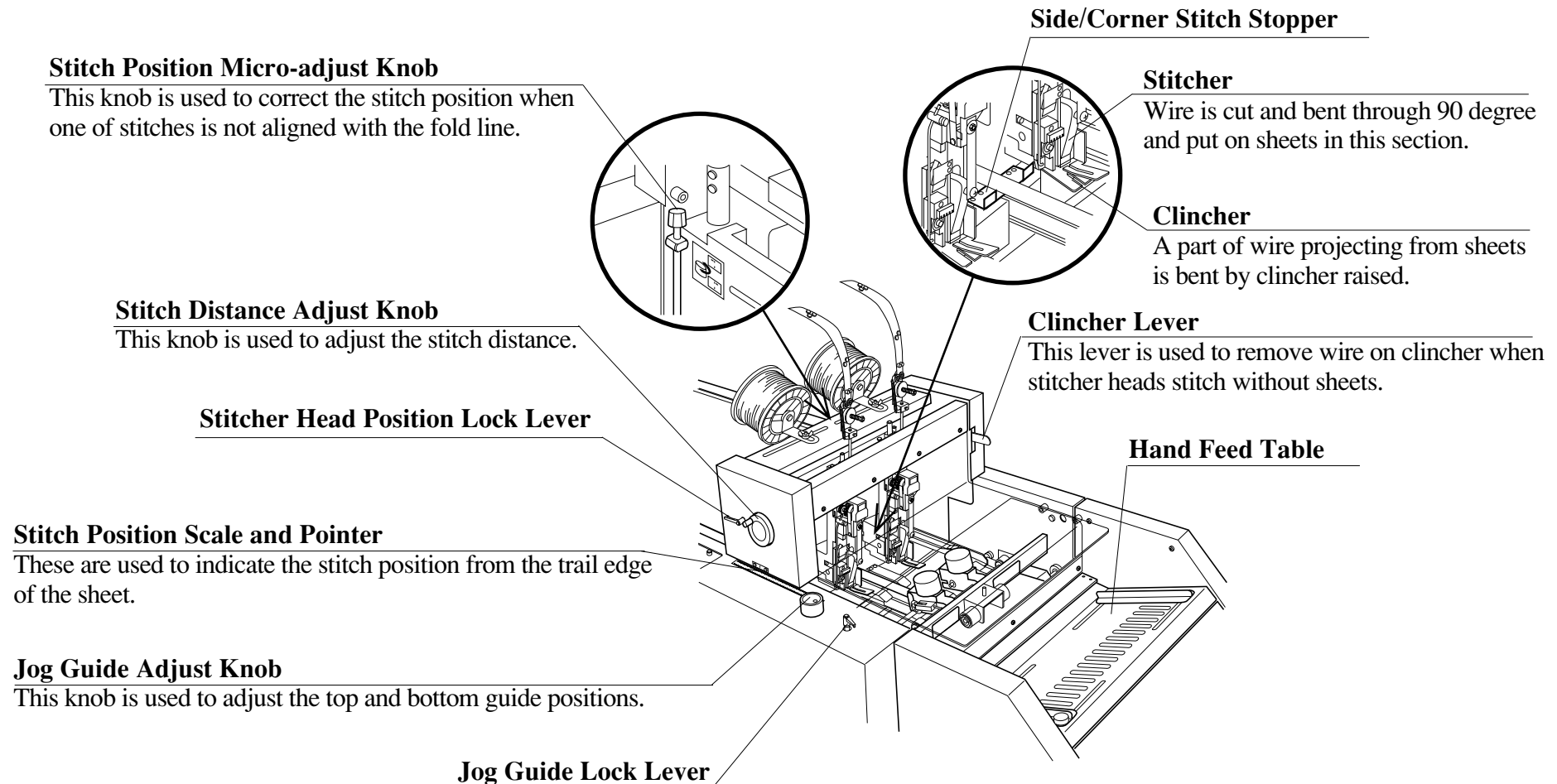
This knob is used to adjust the fold knife height.



1-2 SPF-20 Machine Descriptions

[SPF-20]

1-2-3 Stitch Section



1-2 SPF-20 Machine Descriptions

[SPF-20]

1-2-4 Jog Section

Weight Roller

This roller feeds sheets transported from the in-feed conveyor section into the jog section.

Weights

This weights are used to adjust feed roller compression.

Jog Guide

This guide jogs sheets from the top and bottom sides.

Tail Jog Plates

These plates jog sheets from the leading and tail sides.

Bulging Nose

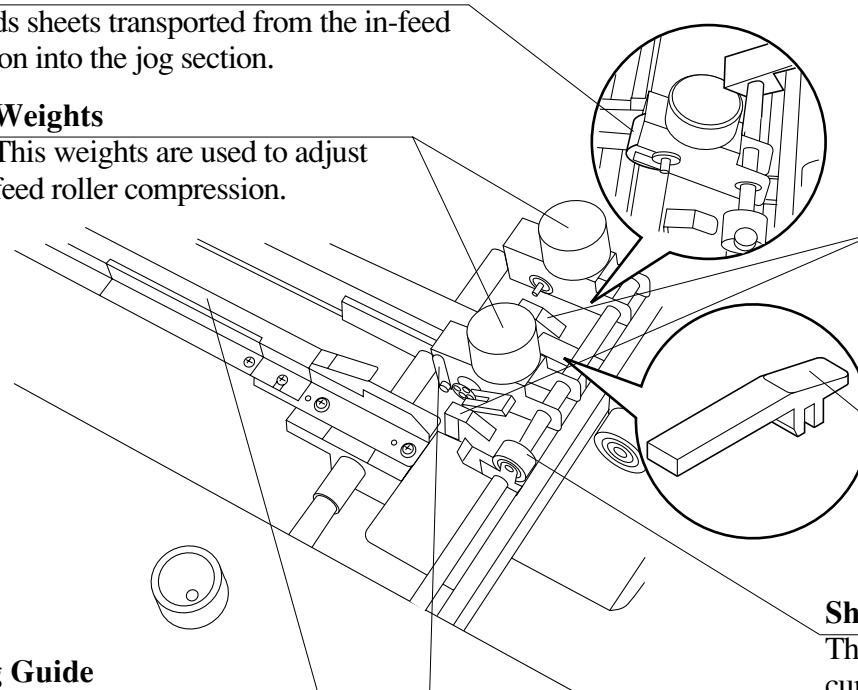
This bulging nose bends sheets slightly to feed them smoothly.

Sheet Holder

This holder holds sheets and prevents sheets from curling up.

Transport Angle Adjust Lever

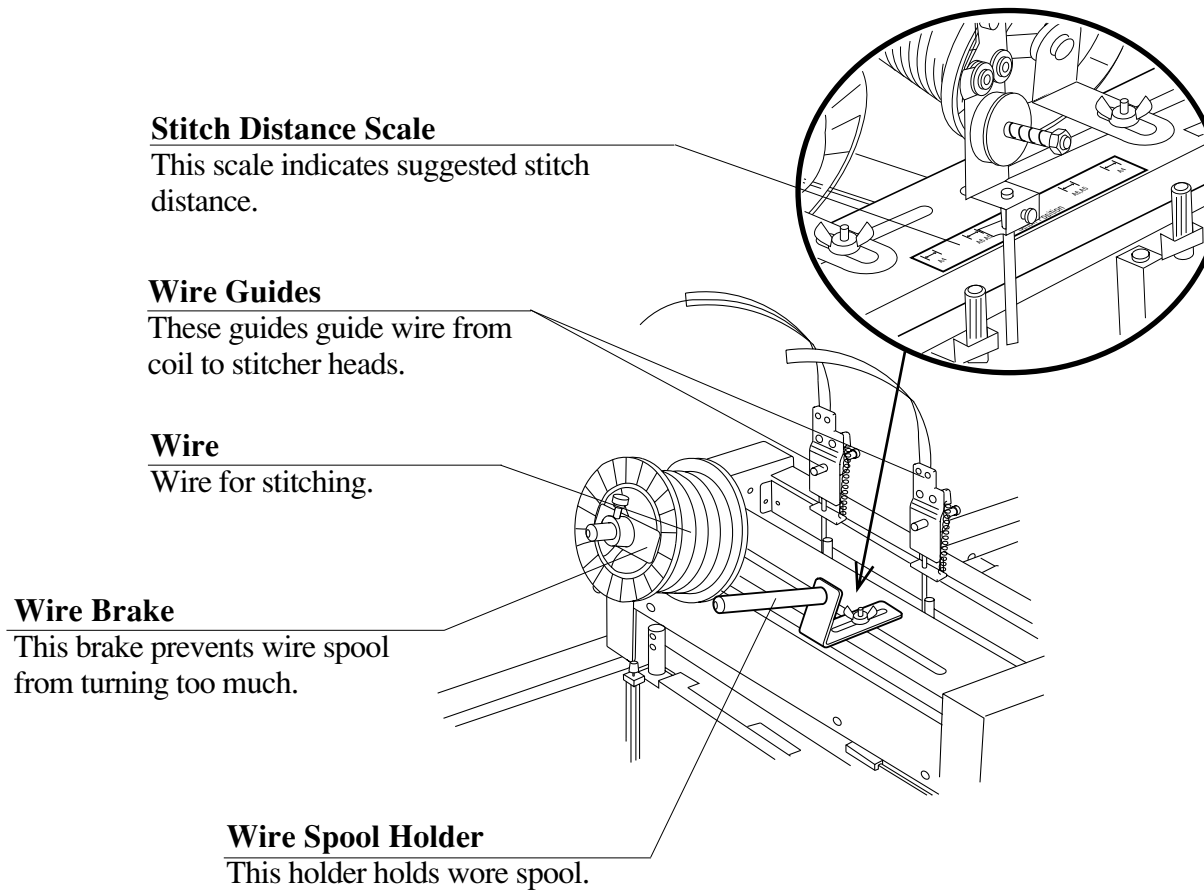
This lever is used to change the sheet transport direction downward.



1-2 SPF-20 Machine Descriptions

[SPF-20]

1-2-5 Stitch Wire Section



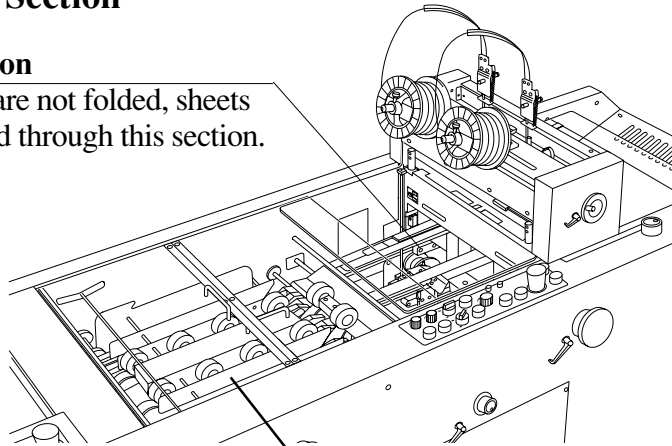
1-2 SPF-20 Machine Descriptions

[SPF-20]

1-2-6 Fold Section

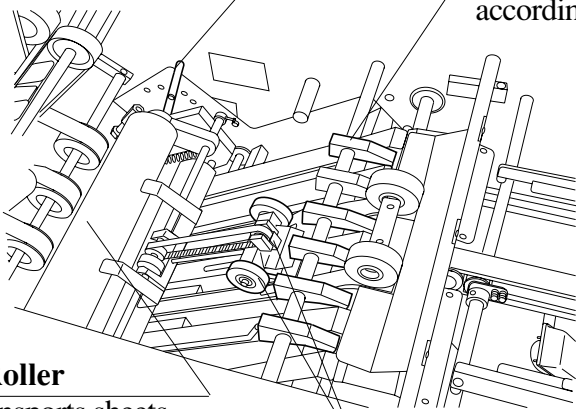
Bypass Section

When sheets are not folded, sheets are transported through this section.



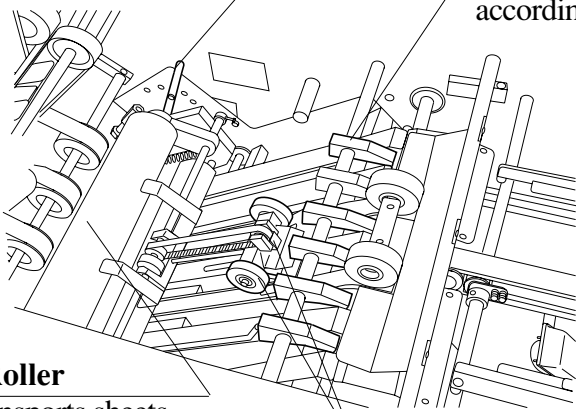
Fold Roller Gap Adjust Lever

This lever is used to adjust fold roller gap.



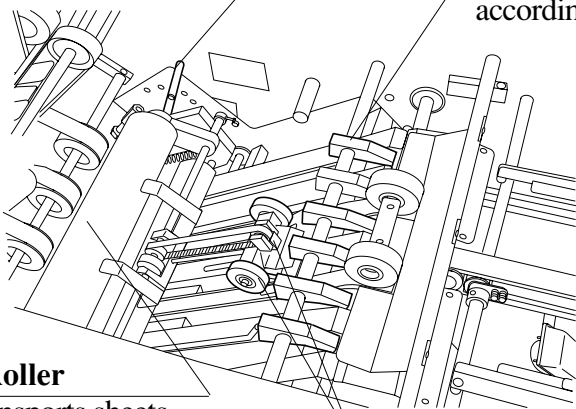
Transport Roller

This roller transports sheets into the fold plate and prevents sheets from backing up.



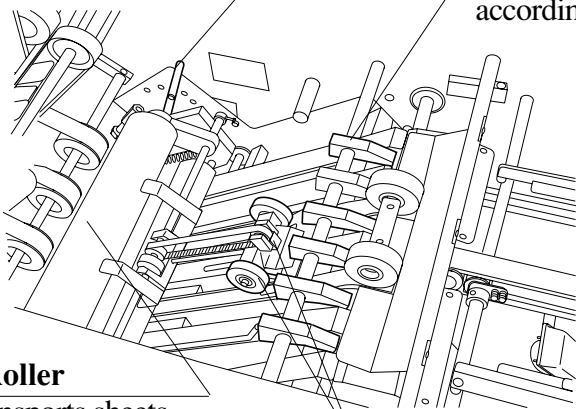
Jog Pushers

These jog pusher jogs sheets before sheets are folded.



Gate

This gate changes the sheet transport direction according to the operation mode.



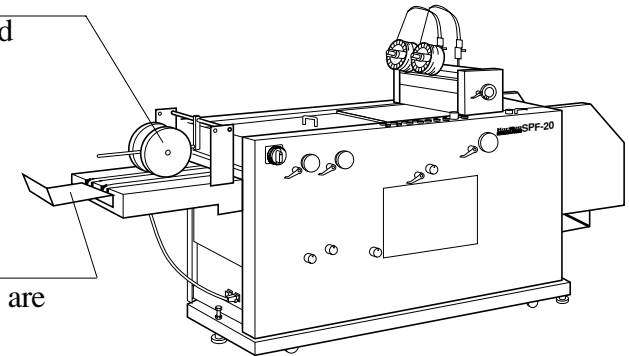
1-2-7 Delivery Conveyor Section

Conveyor Wheels

This wheel hold ejected sheets/booklets.

Stack Plate

Ejected sheets/booklets are stacked on this plate.



1-2 SPF-20 Machine Descriptions

[SPF-20]

1-2-8 SPF-20 Operation Panel

Stitch Delay Time Knob

This knob is used to adjust the stitch delay time to give enough time for jogging sheets.

Conveyor Operate Time Knob

This knob is used to adjust operating time of delivery conveyor according to the booklet size and thickness.

Single Fold Button

This button is used to fold sheet in the fold section.

Single Stitch Button

This knob is used to stitch sheets on the jog section and transport them to the bypass or fold section.

Stitch ON/OFF Switch

This switch is used to turn on/off stitching function.

Stitcher Inching Button

This knob is used to inch stitcher heads

Collating Start/Stop Button

This button is used to start/stop collating operation.

System ON/OFF Button

This button is used to turn on/off SPF-20 and FC-20.

Operation Mode Select Switch

This switch is used to select operation mode; side/corner stitching, stitching and folding and folding only.

Jog ON/OFF Button

This button is used to turn on/off jog pusher, head stopper and tail jog plate.

Belt Speed Button

This button is used to adjust the belt rotating speed.

Power Lamp

This lamp lights when power is turned on.

Jam Lamp

This lamp lights when sheet jam occurs at the entrance of the jog and fold sections.

System Backward Button

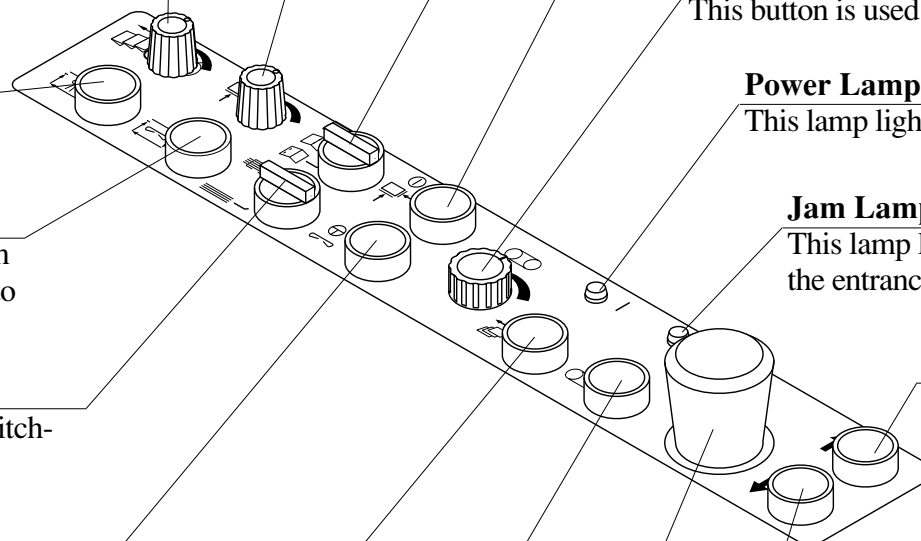
This button is used to move SPF-20 and FC-20 to the drive side.

System Forward Button

This button is used to move SPF-20 and FC-20 to the operation side.

Emergency Stop Button

This button is used to stop all operation of the whole system.



1-3 FC-20 Machine Descriptions

[FC-20]

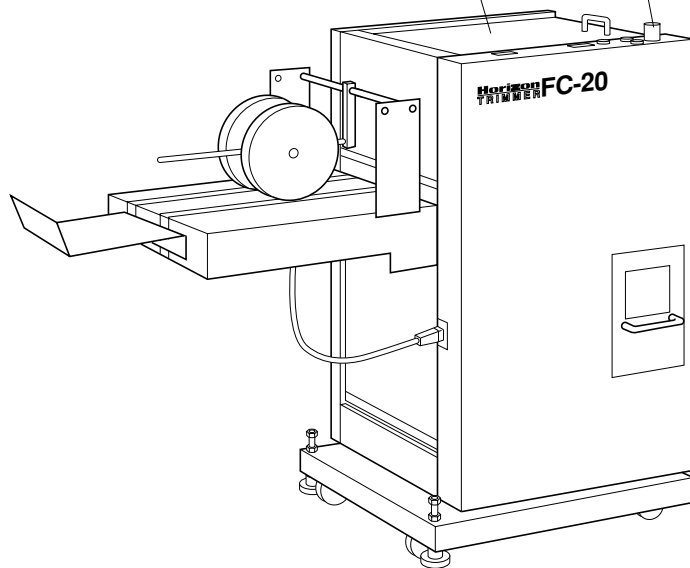
1-3-1 Safety Device and Safety Function

Emergency Stop Button

This button is used to stop all operation of the whole system.

Safety Cover 1

FC-20 can not be operated with this cover open.



1-3-2 General View

Delivery Conveyor

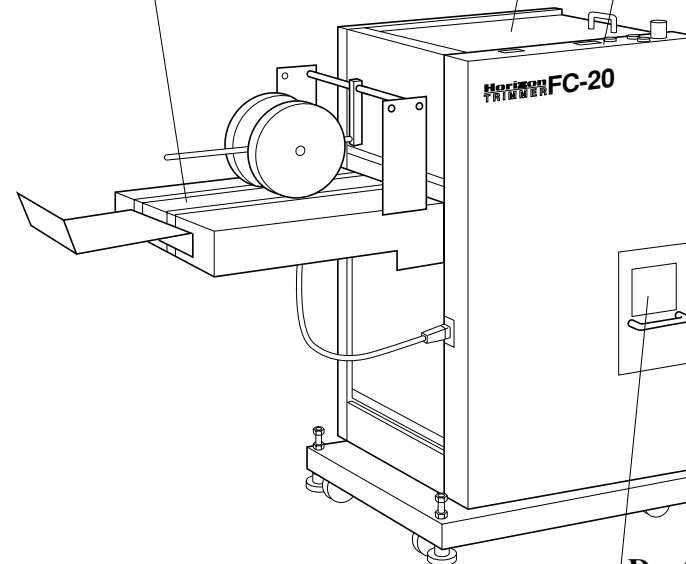
This delivery conveyor is an accessory of SPF-20.

Trim Section

Booklets are trimmed in this section.

Control Panel

Control switches are housed in this section.



Dust Box

Trimnings are collected in this section.

1-3 FC-20 Machine Descriptions

[FC-20]

1-3-3 Press Section

Transport Roller

This roller transports booklets before and after trimming.

Press Plate Height Lock Knob

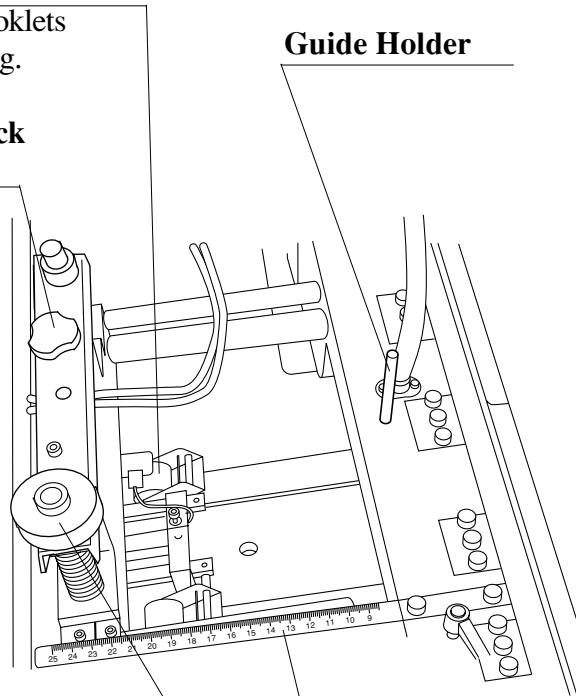
Press Plate Height Adjust Knob

This knob is used to adjust the press plate height according to the booklet thickness.

Guide Holder

Trimming Size Scale

This scale indicates the required trimming size.



1-3-4 In-feed Section

In-Feed Roller Pressure Adjust Bar

This bar is used to adjust the in-feed roller pressure. The pressure can be adjusted in three steps.

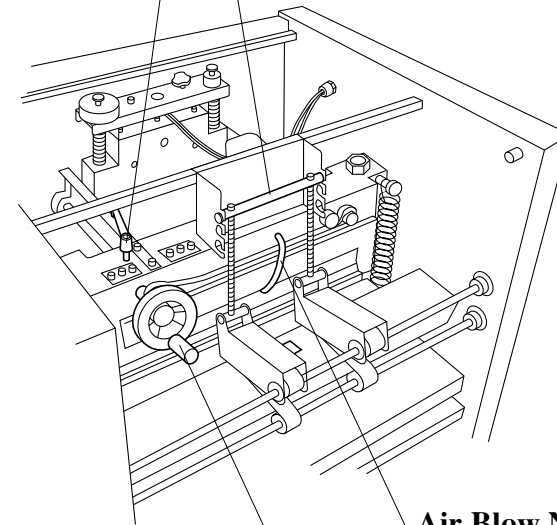
Adjust Handle Lock Knob

Trimming Size Adjust Handle

This handle is used to adjust the required trimming size.

Air Blow Nozzle

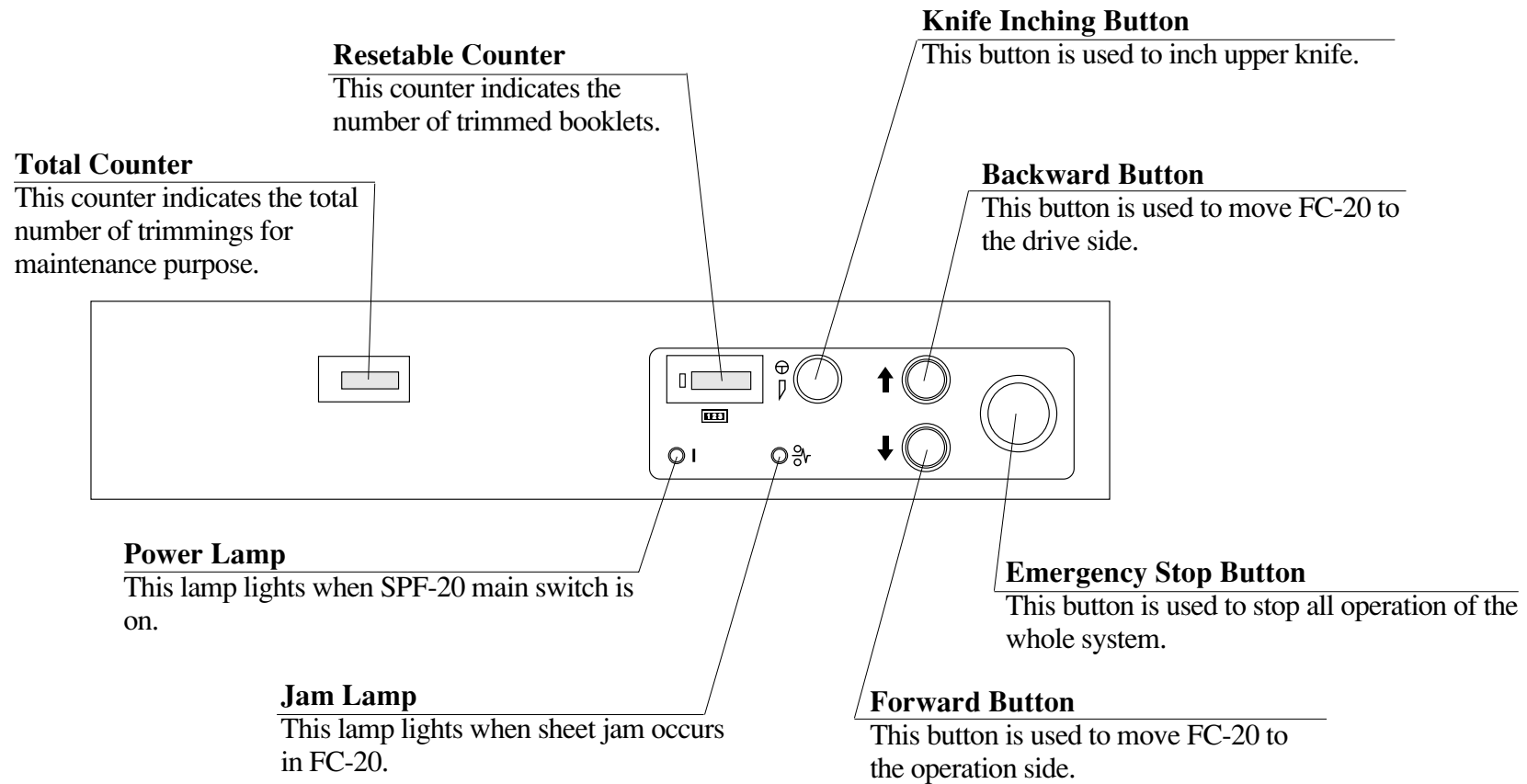
This nozzle blows air to expel trimmed paper into dust box.



1-3 FC-20 Machine Descriptions

[FC-20]

1-3-5 FC-20 Operation Panel



2. Troubleshooting

2-1 Sheet Jam Occurs

2-1-1 Sheet Jam In Stitch Section

Driving velocity of transport belt is too high.

When driving velocity of transport belt is too high, sheet jam may occur because of floating or bending of sheets during transporting of thin sheet or light sheet.

On the contrary, sheet jam may also occur because of bounce of sheets during transporting of thick sheet or heavy sheet.

2-1-2 Sheet Jam in Fold Section

A piece of paper is left in fold section.

- Check that a piece of paper is not left on the sheets transporting path.

Distance between jog guides is not appropriate.

- Check that the width between jog guides is appropriate and adjust if not appropriate.

When SPF-20 is supported by casters, sheets may not be transported straight to fold section because of frame distortion.

- Lift up main body by leveling bolt to remove frame distortion.

2-1-3 Sheet Jam In FC-20

Sheets are stuck on press table.

Sheets may not be transported smoothly on the press table because of dirt on the press table or wet ink on sheet.

- Remove the dirt on the press table.

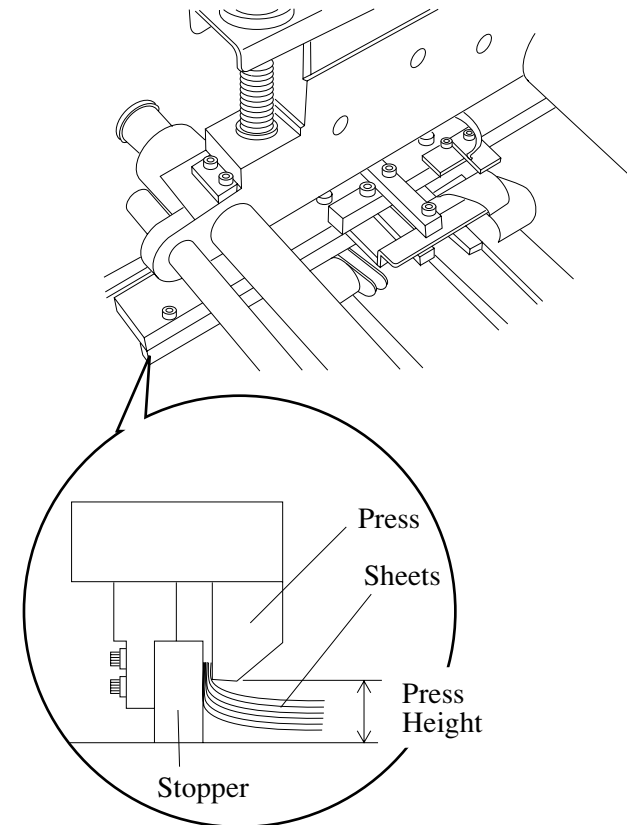
Transport belt slips.

- Refer to “3-4-7 Transport Belt Tension Adjustment” or “4-2-19 Transport Belt Replacement”

Sheets are caught between press and stopper.

Sheet jam may occur because transported sheets are caught between press and stopper.

- When a few sheets are transported, lower press to prevent catching sheets into gap between stopper and press.



2-1 Sheet Jam Occurs

2-1-4 First Transported Sheets Jam Belt drive motor does not drive.

Inverter may be stopped because of undervoltage of input voltage.

- Check error message “LU” appears on the display of inverter.

All Error Messages Indicated on Display of Inverter

Function	Causes	Error Message
Momentary Overcurrent Protection	Inverter stopped to prevent overcurrent caused by overload on output side.	OC1(in acceleration) OC2(in deceleration) OC3(at constant speed)
Overvoltage Protection	Inverter stopped with detection of overvoltage in internal circuit of inverter.	OU
Undervoltage of Input Voltage	Inverter stopped with detection of undervoltage in internal circuit of inverter.	LU
Cooler Overheating Protection	Inverter stopped with detection of overheating of cooler.	OH1
External Alarm Input	Inverter stopped by external input signal.	OH2
Motor Overloading Protection	Inverter stopped with detection of overloading of motor.	OL
Inverter Overloading Protection	Inverter stopped with detection of overloading of inverter.	OLU
Unusual Memory	Inverter stopped because of unusual memory.	Er1(Notes)
Unusual CPU	Inverter stopped because of unusual CPU.	Er3

(Note)

When inverter is stopped due to unusual memory (Er1), reset initial figure on function code F17 after pressing PRG/RESET button. Refer to “4-2-6 Inverter Replacement - Set Figure List”. (If initial figure is set up on F17, the figures on all function codes are returned to set up figure at shipment by manufacturer. Reset the figures.

2-2 Stitcher Malfunctions

Alarm lamp lights or power lamp does not light on stitch motor driver.

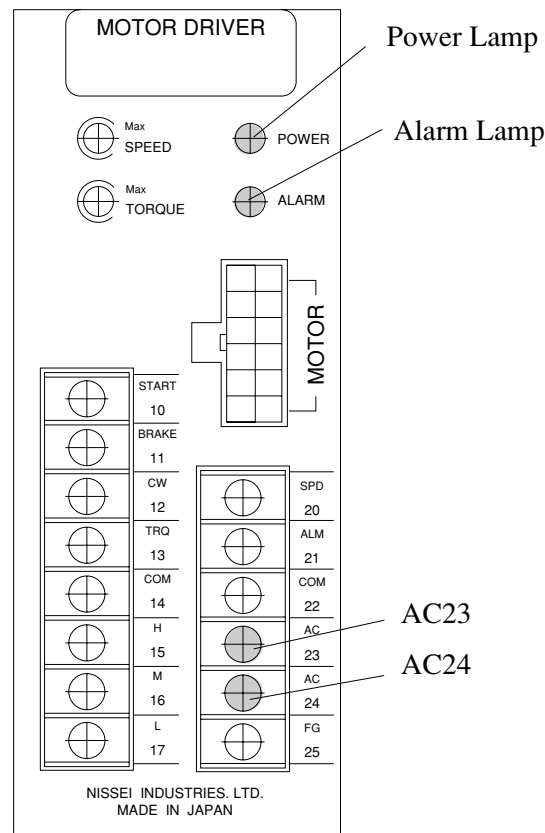
1. When torque over a rating is given continuously more than a period of 10 seconds or when driver is overheated (more than 80 degree inside driver), the alarm lamp lights.

- When alarm lamp lights due to overloading, turn off power switch and remove causes of overloading and turn on power switch.
- When alarm lamp lights without overloading, replace driver. When alarm lamp still lights after replacement of driver, replace motor.

2. When power lamp of driver does not light, even if power switch is turned on, the driver may be out of order or the breakers (Q06,Q07) are tripped.

NOTE

Voltage of 200 volts is applied between terminal AC23 and terminal AC24 on driver.



Start signal is not output to stitch motor.

- Check that stitch motor start signal from P.C.B. is output to driver by lightening of LED 11 on QPM-112/QPW-455 (Refer to “6-2-2”).

Set present proximity switch (B04) and actuator malfunction or the proximity switch is not positioned properly.

- Check that set present proximity switch (B04) and actuator function and the proximity switch is positioned properly. (Refer to “5-2-6 Set Present Proximity Switch (B04)”.

Parts delivered power from stitch motor malfunction.

- Check that components like sprocket, chain or connecting pin function.

2-3 Accuracy on Stitching

2-3-1 Wire Bending Is Lenient

The position of stitcher head against clincher is not appropriate in the sheet delivery direction.

If the position of stitcher head against clincher is not appropriate, clincher does not hit the wire accurately.

(When aberration of the position is wide)

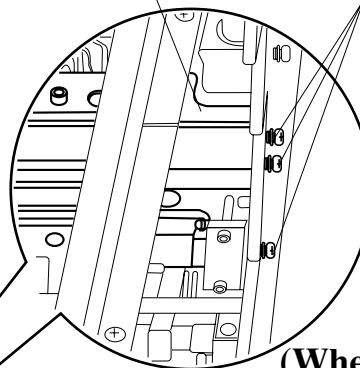
- Remove front and rear cover (refer to “4-1 How to Remove Cover”), and align stitcher head with clincher in the sheet delivery direction by positioning clincher base (6 fix screws).

(When aberration of the position is narrow)

- Adjust the clincher guide by positioning guide plate on clincher base.

(When aberration of the position is big)

Clincher Base
Fix Screws



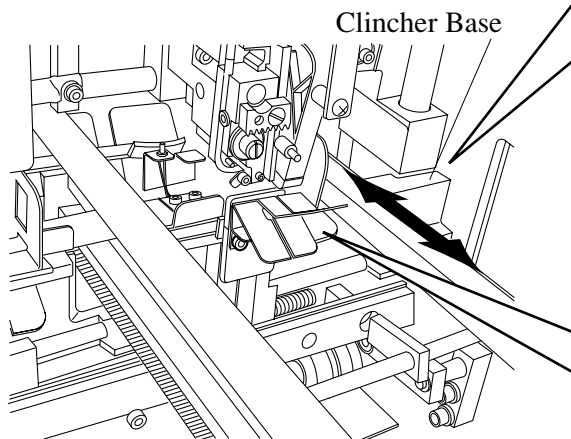
(When aberration of the position is small)

Guide Plate
Clincher Base

Guide Plate
Clincher Base

Clincher Slider

Distance between guide plate and clincher base can be adjusted 0.25 to 0.6 mm.



2-3-2 Two Sheets Are Not Stitched

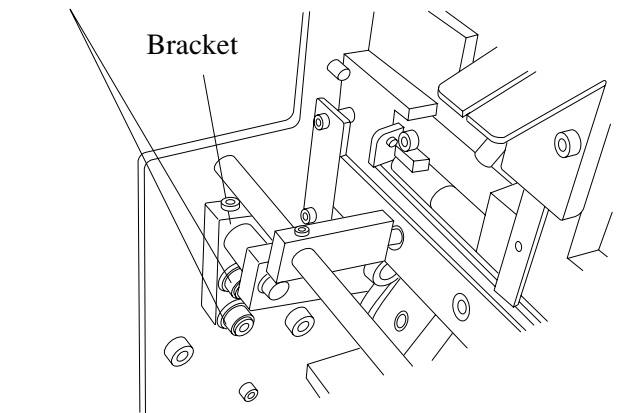
Accurately

The stroke of clincher is not appropriate.

- Adjust press up height of clincher. press up height of clincher increases with raising fixed position of bracket 2 fix screws).

Fix Screws

Bracket



The stroke of stitcher is not appropriate.

- Check the stitcher stroke referring to “3-2-5 Stitcher Stroke Adjustment”.

2-3 Accuracy on Stitching

2-3-3 Stitching Position Is Not Appropriate

Some guides are not set in position or malfunction.

- Jog guides (Refer to “3-1-2 Jog Guide Parallel Adjustment” and “3-1-3 Jog Guide Stroke Adjustment (SPF-20 Only)”.)
- Side/corner stitch end stopper (Refer to “3-1-4 Side/Corner Stitch End Stopper Solenoid Adjustment”.)
- Saddle stitch end stopper (Refer to “3-1-5 Saddle Stitch End Stopper Adjustment”.)

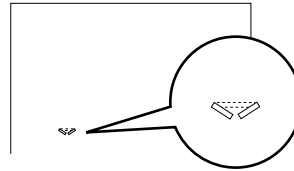
Stitcher unit is tilted against frame.

- Adjust the tilt of stitcher unit referring to “3-2-1 Stitcher Unit Tilt Adjustment”.

Set present proximity switch (B04) and actuator malfunction or the proximity switch is not positioned properly.

- Check that set present proximity switch (B04) and actuator function and the proximity switch is positioned properly. (Refer to “5-2-6 Set Present Proximity Switch (B04)”.)

2-3-4 Bent Wire Is Not Parallel



The position of stitcher head against clincher is not appropriate in the sheet delivery direction.

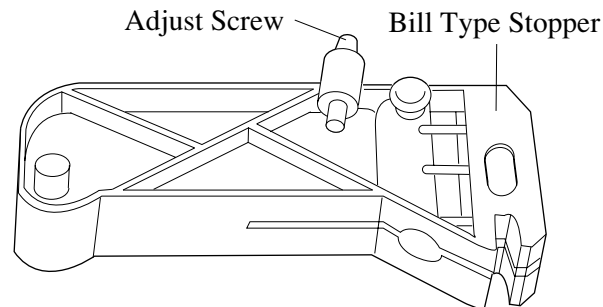
- Refer to “2-3-1 Wire Bending Is Lenient”.

2-3-5 Cut Wire Is Fallen Without Stitching and Bending

Bill type stopper in stitcher head is not positioned properly.

If bill type stopper in stitcher head is not positioned properly, wire may not be bended completely.

- Adjust bill type stopper fixing position with project of adjust screw.



2-3-6 A Stitch Is Not Dropped Though Stitcher Drives

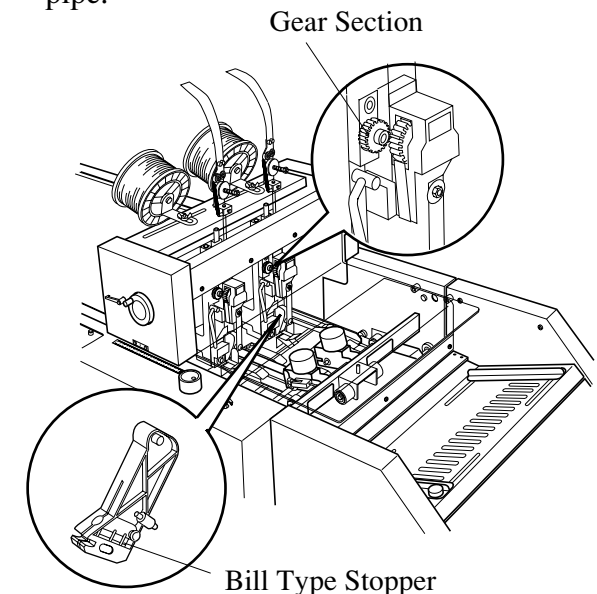
Wire is left in clincher.

- Remove wire left in clincher with clincher lever. (Refer to page 5 of operation manual)

Wire projects from gear section.

Wire misfeeding occurs in pipe.

- Remove the wire and clean up the choked pipe.



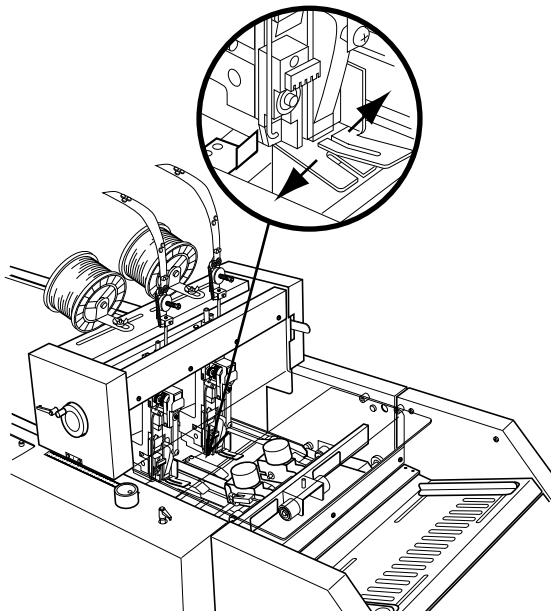
2-3 Accuracy on Stitching

2-3-7 Sheet Are Broken On Stitching

The position of stitcher head against clincher is not appropriate in the sheet delivery direction.

- Refer to “2-3-1 Wire Bending Is Lenient”.

The position of stitcher head against clincher is not appropriate in front/rear direction.



- Adjust stitcher and clincher in position referring to “3-2-2 Stitcher Head Distance Adjustment”.

2-3-8 Stitching Position Varies Widely

Driving velocity of transport belt is too high.

When driving velocity of transport belt is too high, stitching position may vary because of bounce or bending of sheets.

- Decrease the driving velocity of transport belt.

2-4 Sheets Are Not Jogged Neatly

2-4-1 Jog Guides Malfunction Jog guide belt malfunctions.

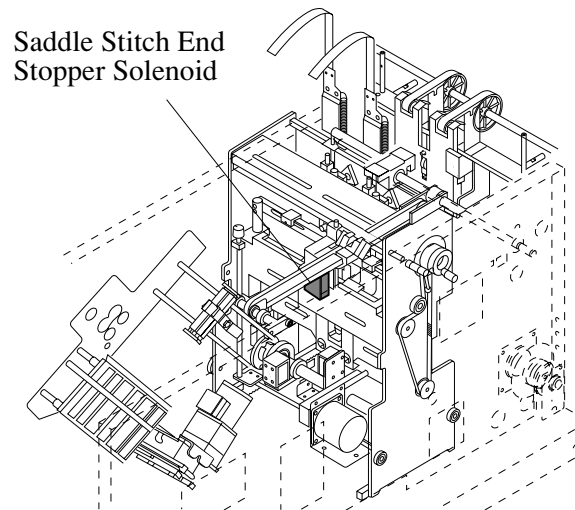
- Adjust tension of the belt referring to “3-1-10 Jog Guide Stroke Belt Tension Adjustment” or replace the belt referring to “4-2-12 Jog Guide Stroke Belt Replacement” if necessary.

Jog guide slide timing belt malfunctions.

- Adjust tension of the belt referring to “3-1-9 Jog Guide Move Timing Belt Tension Adjustment” or replace the belt referring to “4-2-11 Jog Guide Move Timing Belt Replacement” if necessary.

2-4-2 Sheet Are Not Jogged Neatly In Sheet Width Direction Saddle stitch end stopper solenoid is out of order.

- Stopper may raise incompletely because of malfunction of the solenoid or stopper may not raise at all because of removal of solenoid connecting pin.
Check function of the solenoid.



2-5 Sheets Are Not Folded at All

Fold knife motor malfunctions.

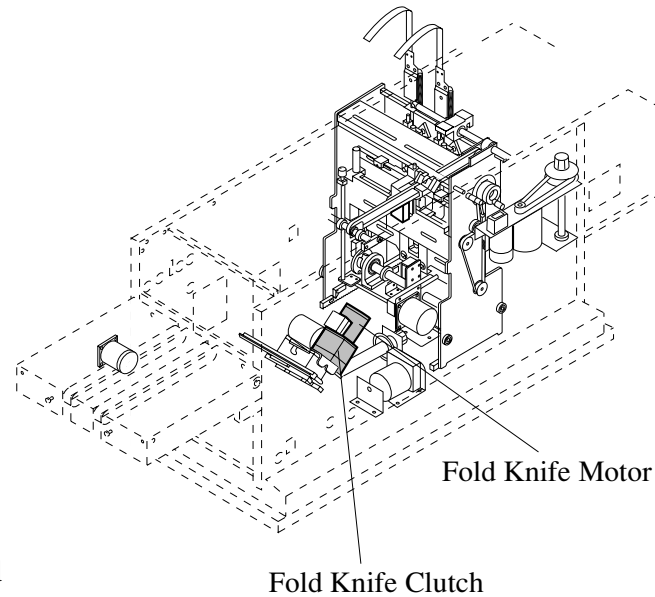
- Check that fan of fold knife motor (M02) rotates.

Start signal is not output from P.C.B..

- Check LED 19 on QPM-112/QPW-455 referring to “6-2-1 LED, FA,DSW,VR Layout”.

Fold knife clutch malfunctions.

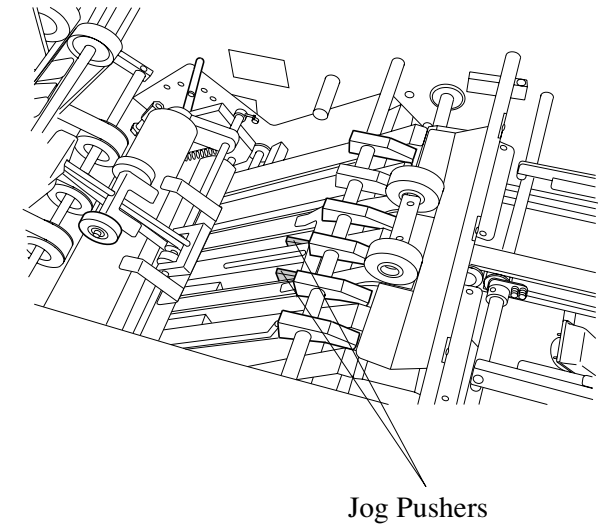
- Check that voltage of DC 24 V is applied to fold knife clutch. If the voltage is not applied, wire may be cut. Check the wire.



Jog pushers in fold section are not positioned properly.

When jog pushers are positioned too low, fold tail jog sensor (B10) in fold section may detect sheets and jam lamp may light.

- Adjust jog pushers in position.



2-6 Accuracy on Folding

2-6-1 Sheet Are Torn In Fold Section Fold knife height is too low.

- If frictional force between fold roller and outer sheet is stronger than that between outer sheet and inner sheet, the outer sheet only may be delivered and torn.

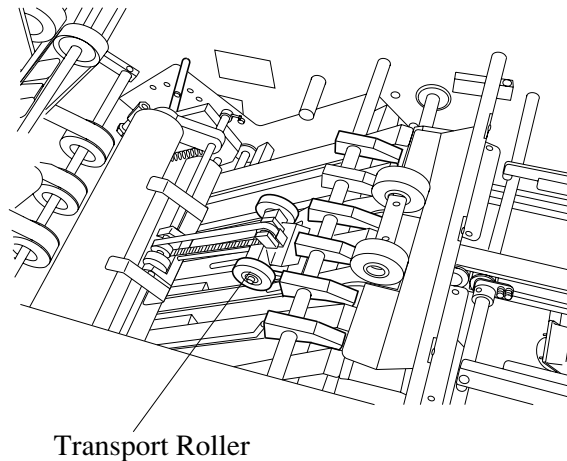
2-6-2 Trace Are Left On Sheet After Folding Fold knife height or distance between fold rollers is not appropriate.

Trace may be left on sheet after folding when fold knife height and distance between fold rollers is not appropriate against sheet thickness.

- Adjust fold knife height and distance between fold rollers according to sheet thickness. (Refer to page 34 and 27 of operation manual.)

2-6-3 Folding Position Varies Widely Transport roller is not positioned appropriately.

Transport roller can prevent from bounce of sheet by stopper and reduce scatter of folding position. Therefore this roller should be positioned in where roller just touches to edge of sheet.



2-6-4 Sheets Are Not Folded Correctly Stopper in fold section is not positioned appropriately.

- Adjust stopper in fold section (refer to page 24 of operation manual) in position and perform fold skew correction (refer to page 34 of operation manual).

Set present proximity switch (B04) and actuator malfunction or the proximity switch is not positioned properly.

- Check that set present proximity switch (B04) and actuator function and the proximity switch is positioned properly. (Refer to “5-2-6 Set Present Proximity Switch (B04)”.

2-7 Accuracy on Trimming

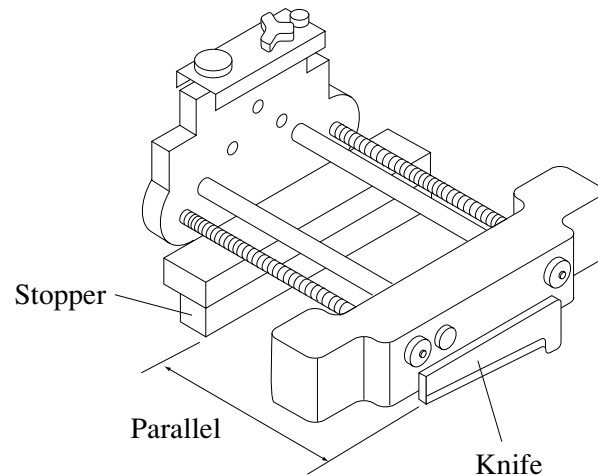
2-7-1 Sheets Are Trimmed Askew Either of transport belts in trim section slips.

Sheet are not transported because either of transport belts slips.

- Clean up belt and adjust tension. (Refer to 3-4-7 Transport Belt Tension Adjustment)

Stopper is tilted against knife.

- Position stopper parallel to knife. (Refer to “3-4-1 Trim Knife and Stopper Parallel Adjustment”.)

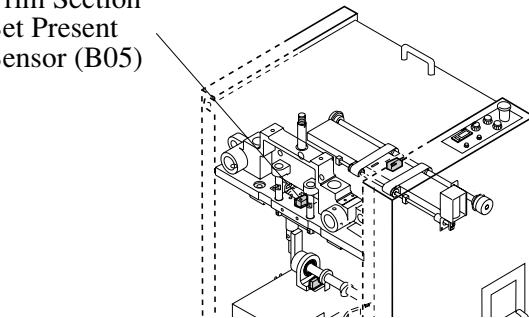


2-7-2 Knife Falls Down Twice

Continuously

Actuator of trim section set present sensor (B05) bounces at the moment that it falls down.

Trim Section
Set Present
Sensor (B05)



Trim Section Set Present Sensor (B05)

Actuator

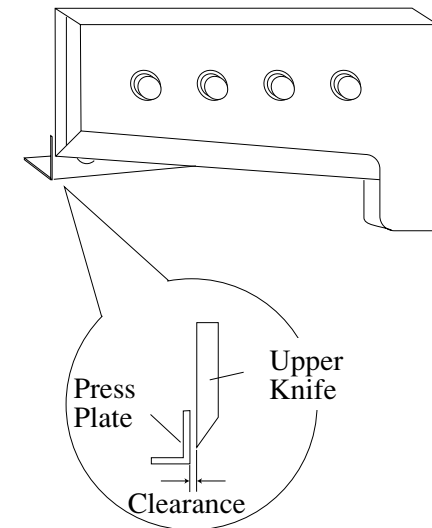
When thick sheets are transported or transporting velocity is too high, actuator bounces when falling down, therefore trim section set present sensor may detect actuator again.

2-7-3 Metal Powder is Attached to Sheets

Press plate is touched by upper knife.

Press plate may be deformed by hitting to upper knife.

- Replace the press plate if it is deformed.



2-8 Machine Is Not Operated

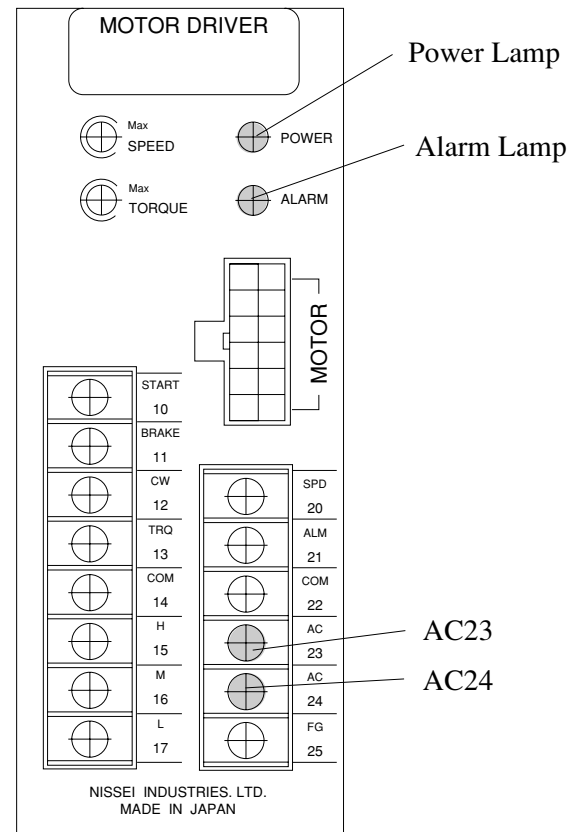
2-8-1 Machine Is Not Operated At All

Alarm lamp lights or power lamp does not light on stitcher motor driver.

1. *When torque over a rating is given continuously more than a period of 10 seconds or when driver is overheated (more than 80 degree inside driver), the alarm lamp lights.*
 - When alarm lamp lights due to overloading, turn off power switch and remove causes of overloading and turn on power switch.
 - When alarm lamp lights without overloading, replace driver. When alarm lamp still lights after replacement of driver, replace motor.
2. *When power lamp of driver does not light even if power switch is turned on, the driver may be out of order or the breakers (Q06,Q07) are tripped.*

NOTE

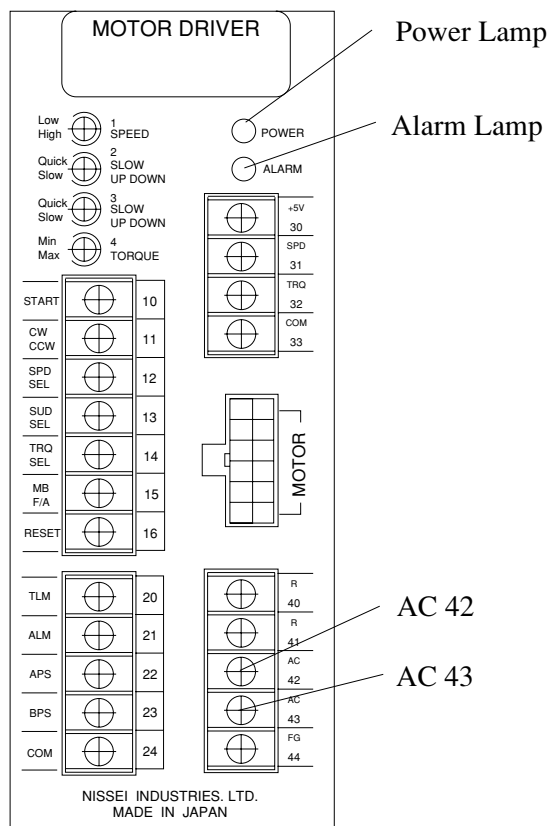
Voltage of 200 volts is applied between terminal AC23 and terminal AC24 on driver.



2-8 Machine Is Not Operated

Alarm lamp lights or power lamp does not light on trim knife motor driver in trim section.

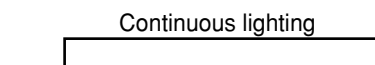
- When alarm lamp lights on driver, clarify the cause of trouble according to blinking cycle of power lamp and troubleshoot following the restart procedures.



CAUSE 1 : Operation in Overloading

Torque over a rating is given continuously more than a period of a couple of seconds.

(Blinking Cycle of Power Lamp on Driver)



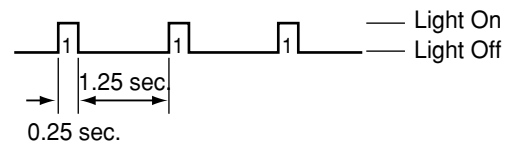
(Restoration)

1. Turn off power switch.
2. Remove causes of overloading.
3. Turn on power switch.

CAUSE 2 : Unusual Input Voltage

Voltage out of range from AC 170 V to 250 V is input because of multiple connection of power plug or using of small cord.

(Blinking Cycle of Power Lamp on Driver)



(Restoration)

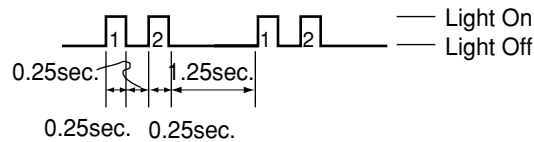
1. Turn off power switch and turn on it.
2. Measure voltage applied between terminal AC42 and AC43 during alarming.

2-8 Machine Is Not Operated

CAUSE 3 : Overvoltage by Regeneration

Overvoltage by regeneration is applied to internal circuit of the driver.

Blinking Cycle of Power Lamp on Driver



(Restoration)

1. Replace driver.
2. When not be restored yet, replace trim knife motor (M01) in trim section.

CAUSE 4 : Overheating of Driver

Driver is overheated more than 80 degree inside driver.

Blinking Cycle of Power Lamp on Driver



(Restoration)

1. Replace driver.
2. When not be restored yet, replace trim knife motor (M01) in trim section.

CAUSE 5 : Unusual Current

Unusual current is caused by short on power line. (Different from overcurrent caused by overloading)

Blinking Cycle of Power Lamp on Driver



(Restoration)

1. Replace driver.
2. When not be restored yet, replace trim knife motor (M01) in trim section.

CAUSE 6 : Encoder Error (A,B Phase)

Encoder is out of order or encoder signal is not input.

Blinking Cycle of Power Lamp on Driver



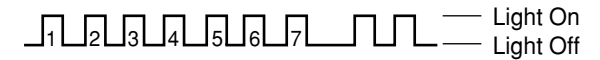
(Restoration)

1. Replace driver.
2. When not be restored yet, replace trim knife motor (M01) in trim section.

CAUSE 7 : Pole Sensor Error

Unusual output signal of hole IC for detection of magnetic pole of rotor.

Blinking Cycle of Power Lamp on Driver



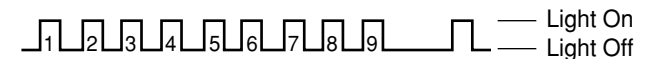
(Restoration)

1. Replace trim knife motor (M01) in trim section.
2. When not be restored yet, replace driver.

CAUSE 8 : Unusual CPU

CPU overruns.

Blinking Cycle of Power Lamp on Driver



(Restoration)

1. Replace trim knife motor (M01) in trim section.
2. When not be restored yet, replace driver.

2-8 Machine Is Not Operated

Circuit breakers (Q01, Q02, Q03) are tripped .

- Check the state of circuit breakers mentioned above. (Refer to “5-1-5 P.C.B., Power Supply and Other Electrical Parts Layout”.)

Inverter (U01) is tripped.

Inverter may be stopped because of undervoltage of input voltage.

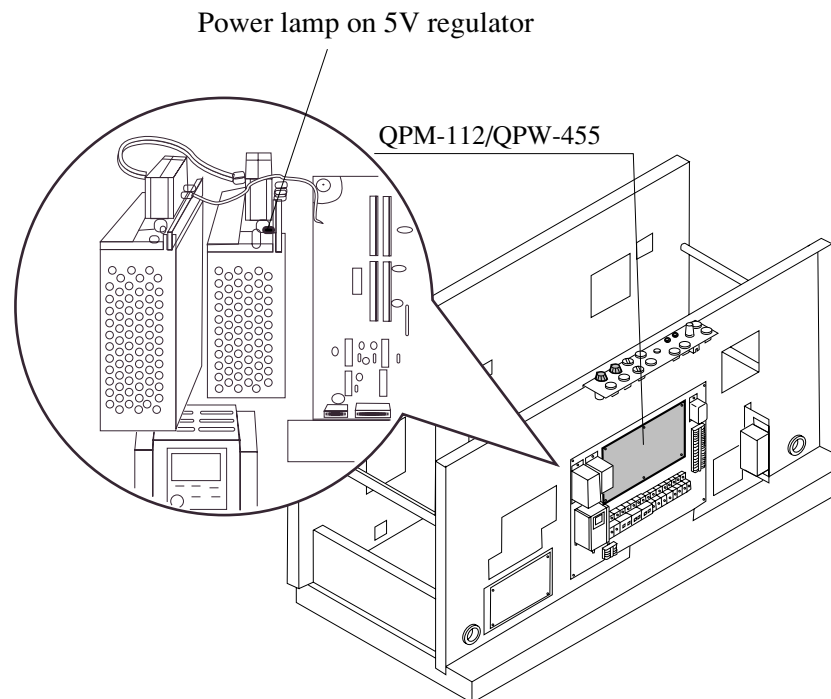
- Check error message “LU” on the display of inverter.
- For details of error messages, refer to “2-1-4 First Transported Sheets Jam”.

Power lamp on 5V regulator in SPF-20 does not light.

If the lamp on 5V regulator does not light, the regulator may be out of order, the line between power and regulator may be broken or breakers (Q04, 05, 08, 09) may be tripped.

The voltage of 5 volts from 5V regulator to P.C.B. is not output.

- Check that voltage of 5 volts is applied to control P.C.B. (QPM-112/QPW-455) referring to step 1 to 3 in “5-3-3 SPF-20 Regulator Voltage Adjustment”.



2-8 Machine Is Not Operated

2-8-2 Motor Stops during Operation Jam lamp lights.

- Check the items mentioned below.
 1. Jam lamp lights on operation panel.
 2. In-feed Jam Sensor (B08), fold tail jog sensor (B10), trim section entrance proximity switch (B03) and trim section set present sensor (B05) function properly. (Refer to “5-1-4 Sensor and Proximity Switch Layout and Functions”.)

Alarm lamp lights or power lamp does not light on stitcher motor driver.

- Refer to “2-8-1 Machine Is Not Operated At All”.

Alarm lamp lights or power lamp does not light on knife motor driver in trim section.

- Refer to “2-8-1 Machine Is Not Operated At All”.

Circuit breakers (Q01, Q02, Q03) are tripped .

- Refer to “2-8-1 Machine Is Not Operated At All”.

Inverter (U01) is tripped.

- Refer to “2-8-1 Machine Is Not Operated At All”.

2-8 Machine Is Not Operated

2-8-3 Motor Does Not Run Inverter has an error.

- Check that LU (Undervoltage of input voltage) is not indicated on the panel of the inverter. If LU is indicated, turn on the power switch again, or press RESET on the inverter and set the belt speed slow, then drive the belt for 5 minutes for warming up.
- * In winter, the belt becomes hard and this error can occur easily.

Electrical wiring of inverter is incorrect.

- Check that electrical wiring of inverter is correct. (Refer to “4-2-6 Inverter Replacement”.)

Control P.C.B. QPM-112/QPW-455 malfunctions.

- Replace the P.C.B. Refer to “6-2-1 LED, FA, DSW, VR Layout” and “6-2-2 Connector Layout”.

Relays (K01, K02) malfunction (Confined in SPF-20 only).

- Press system ON/OFF button on operation panel.
- Check the electrical continuity between 1 and 2 pin of connector 10 on QPM-112/QPW-455 by tester to check that electrical contact of relays K01, K02 is poor.

Signal from control P.C.B. to inverter (U01) is not output.

- Check the LED 9 on QPM-112/QPW-455. (Refer to “6-2-1 LED, FA,DSW, VR Layout.”)

2-8-4 Motor Does Not Run Leaving

Knife Down

Breakers (Q01, Q02) for knife motor in trim section are tripped.

- Check breakers (Q01, Q02) for knife motor in cut section. (Refer to “5-1-5 P.C.B., Power Supply and Other Electrical Parts Layout”.)

Alarm lamp lights or power lamp does not light on trim knife motor driver in trim section.

- Refer to “2-8-1 Machine Is Not Operated At All”.

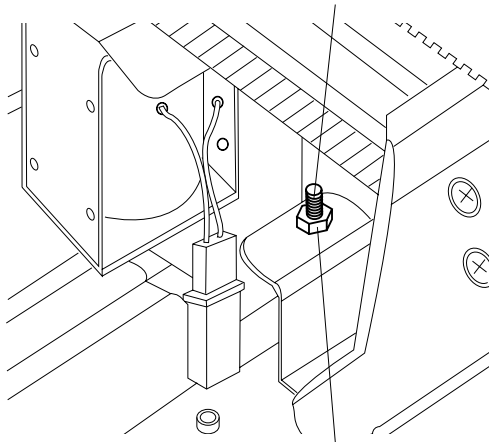
2-9 Other Troubles

2-9-1 Stopper Does Not Raise After Sheet Passage

Cords of end stopper photo sensor (B09, B12) are disconnected.

- Check sensor cord connecting part.

End Stopper Photo Sensor (B09)



Locked Nut

End stopper photo sensor (B09, B12) are positioned too low.

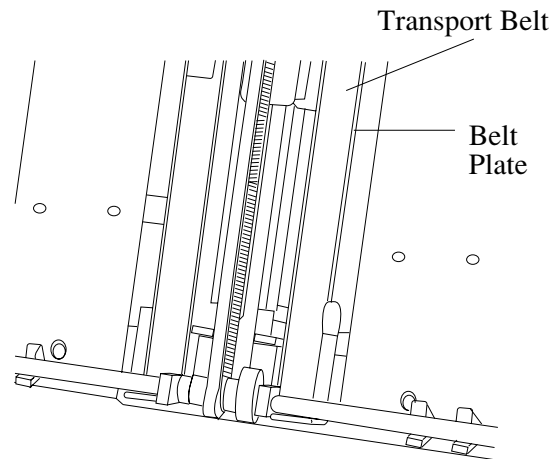
- Raise the sensor after loosening lock nuts so that sensor does not touch to transporting sheet.

2-9-2 Transport Belt Deviates

Transport belt is in contact with belt plate tightly.

When small size sheet is transported, belt is pushed against belt plate by transport roller because transport roller is positioning low. Therefore the transport belt may be come off by resistance.

- Bend belt plate slightly so that large friction is not produced.



2-9-3 Trim Knife Does Not Come

Down Automatically

Trim section set present sensor (B05) does not function properly.

- Check whether the line 10 from connector 2 on QPM-113/QPW-454 is broken or not. (Refer to “2-12 When Sensors and Actuator LEDs Indicate Malfunction”.)

Alarm lamp lights or power lamp does not light on trim knife motor driver in trim section.

- Refer to “2-8-1 Machine Is Not Operated At All”.

2-9-4 Saddle And Side Stitch End

Stopper Are Fallen Down In Advance of Sheets Arrival

Set present proximity switch (B04) and actuator malfunction or the proximity switch is not positioned properly.

- Check that set present proximity switch (B04) and actuator function and the proximity switch is positioned properly. (Refer to “5-2-6 Set Present Proximity Switch (B04)”.

2-10 SPF-20 Sensor and Actuator Check Points

[SPF-20]

	Item	Code	V	P.C.B. Name	P.C.B. Code	LED Layout (refer to)	LED Layout	Parts Book	Note
1	Cable from collator is connected.	X142		Control P.C.B.	QPM-112/QPW-455	LED 26	6-2-1	Fig.34-5	Lights when cable is connected.
2	Collating Start/Stop Button	S02	24V	Control P.C.B.	QPM-112/QPW-455	FA1	6-2-1	Fig.34	Lights when on collating.
3	System ON/OFF Button	S01	24V	Control P.C.B.	QPM-112/QPW-455	FA2	6-2-1	Fig.34	Lights when operating system.
4	Side/Corner Stitching Mode in Operation Mode Select Switch	S06	24V	Control P.C.B.	QPM-112/QPW-455	FA3	6-2-1	Fig.34-30	
5	Side Stitching and Folding Mode in Operation Mode Select Switch	S06	24V	Control P.C.B.	QPM-112/QPW-455	FA4	6-2-1	Fig.34-30	Corresponded to Folding Switch before S/N 002001.
6	Single Stitch Button	S07	24V	Control P.C.B.	QPM-112/QPW-455	FA5	6-2-1	Fig.34-49	
7	Stitcher Inching Button	S08	24V	Control P.C.B.	QPM-112/QPW-455	FA6	6-2-1	Fig.34-49	
8	Jog ON/OFF Button	S09	24V	Control P.C.B.	QPM-112/QPW-455	FA7	6-2-1	Fig.34-49	Lights when this switch is turned on.
9	Single Fold Button	S10	24V	Control P.C.B.	QPM-112/QPW-455	FA8	6-2-1	Fig.34-49	
10	Emergency stop signal from collator is input to P.C.B.			Control P.C.B.	QPM-112/QPW-455	FA9	6-2-1		
11	Transport motor in collator			Control P.C.B.	QPM-112/QPW-455	FA10	6-2-1		
12	Misfeed signal of collator is input to P.C.B.			Control P.C.B.	QPM-112/QPW-455	FA11	6-2-1		
13	Off-set signal of collator is input to P.C.B.			Control P.C.B.	QPM-112/QPW-455	FA12	6-2-1		
14	Emergency Stop Button	S03	24V	Control P.C.B.	QPM-112/QPW-455	FA13	6-2-1	Fig.34-29	
15	Stitching Delay Time ON/OFF Knob			Control P.C.B.	QPM-112/QPW-455	FA14	6-2-1		Lights when this knob is turned on.
16	System Backward Button	S04	24V	Control P.C.B.	QPM-112/QPW-455	FA15	6-2-1	Fig.34-28	
17	System Forward Button	S05	24V	Control P.C.B.	QPM-112/QPW-455	FA16	6-2-1	Fig.34-28	
18	Stitcher Stop Position Proximity Switch	B03	24V	Control P.C.B.	QPM-112/QPW-455	FA17	6-2-1	Fig.17-19	
19	Set Present Proximity Switch	B04	24V	Control P.C.B.	QPM-112/QPW-455	FA18	6-2-1	Fig.7-10	
20	FC-20 Emergency Stop Switch	S01	24V	Control P.C.B.	QPM-112/QPW-455	FA19	6-2-1	Fig.10-13	
21	Stitch ON/OFF Button	S16	24V	Control P.C.B.	QPM-112/QPW-455	FA20	6-2-1	Fig.34-31	Lights when this button is turned on.
22	Alarm of stitcher motor driver functions.	U02		Control P.C.B.	QPM-112/QPW-455	FA21	6-2-1	Fig.34-22	Lights when alarm malfunctions.
23	Saddle Stitch End Stopper Photo Sensor	B09	5V	Control P.C.B.	QPM-112/QPW-455	FA22	6-2-1	Fig.12-11	
24	Base Motor Forward Limit Proximity Switch	B02	24V	Control P.C.B.	QPM-112/QPW-455	FA23	6-2-1	Fig.3-22	
25	Base Motor Backward Limit Proximity Switch	B01	24V	Control P.C.B.	QPM-112/QPW-455	FA24	6-2-1	Fig.3-19	
26	Fold Delay Time Proximity Switch	B11	24V	Control P.C.B.	QPM-112/QPW-455	FA27	6-2-1	Fig.30-12	

2-10 SPF-20 Sensor and Actuator Check Points

[SPF-20]

	Item	Code	V	P.C.B. Name	P.C.B. Code	LED Layout (refer to)	LED Layout	Parts Book	Note
27	Breaker Alarm Contact and Emergency Stop Relay Contact	K02		Control P.C.B.	QPM-112/QPW-455	FA29	6-2-1	Fig.34-46	Lights in normal, lights-out in case of emergency.
28	Fold Tail Jog Sensor	B10	5V	Control P.C.B.	QPM-112/QPW-455	FA32	6-2-1	Fig.24-8	
29	Stitching Delay Time Up Function			Control P.C.B.	QPM-112/QPW-455	LED1	6-2-1		
30	Conveyor Motor Running Timer			Control P.C.B.	QPM-112/QPW-455	LED3	6-2-1		
31	Infeed Jam Sensor	B08	5V	Control P.C.B.	QPM-112/QPW-455	LED4	6-2-1	Fig.7-30	Blicks in normal operation.
32	System move backward signal from P.C.B. to FC-20 is output.			Control P.C.B.	QPM-112/QPW-455	LED5	6-2-1		
33	System move forward signal from P.C.B. to FC-20 is output.			Control P.C.B.	QPM-112/QPW-455	LED6	6-2-1		
34	Side stitch mode signal from P.C.B. to FC-20 is output.			Control P.C.B.	QPM-112/QPW-455	LED7	6-2-1		
35	Emergency stop signal from P.C.B. to FC-20 is output.			Control P.C.B.	QPM-112/QPW-455	LED8	6-2-1		
36	Motor start signal from P.C.B. to FC-20 is output.			Control P.C.B.	QPM-112/QPW-455	LED9	6-2-1		
37	Stitch motor start signal from P.C.B. is output.	U02		Control P.C.B.	QPM-112/QPW-455	LED11	6-2-1	Fig.34-22	
38	System move backward signal is output to system move motor.	M10	100V	Control P.C.B.	QPM-112/QPW-455	LED13	6-2-1	Fig.3-1	
39	System move forward signal is output to system move motor.	M10	100V	Control P.C.B.	QPM-112/QPW-455	LED14	6-2-1	Fig.3-1	
40	Close signal is output to side jog torque motor.	M11	100V	Control P.C.B.	QPM-112/QPW-455	LED15	6-2-1	Fig.10-32	
41	Open signal is output to side jog torque motor.	M11	100V	Control P.C.B.	QPM-112/QPW-455	LED16	6-2-1	Fig.10-32	
42	Signal is output to conveyor motor.	M12	100V	Control P.C.B.	QPM-112/QPW-455	LED17	6-2-1	Fig.33-24	
43	Carry belt start signal is output.	Y22	24V	Control P.C.B.	QPM-112/QPW-455	LED18	6-2-1	Fig.20-13	
44	Fold knife start signal is output.	Y23	24V	Control P.C.B.	QPM-112/QPW-455	LED19	6-2-1	Fig.29-31	
45	Signal is output to sheet end jog solenoid.	Y24	24V	Control P.C.B.	QPM-112/QPW-455	LED20	6-2-1	Fig.9-23	
46	Signal is output to side stitch stopper solenoid.	Y25	24V	Control P.C.B.	QPM-112/QPW-455	LED21	6-2-1	Fig.14-18	
47	Signal is output to saddle stitch stopper solenoid.	Y26	24V	Control P.C.B.	QPM-112/QPW-455	LED22	6-2-1	Fig.12-22	
48	Signal is output to fold/non-fold solenoid.	Y27	24V	Control P.C.B.	QPM-112/QPW-455	LED23	6-2-1	Fig.21-15	
49	Signal is output to folder jog finger solenoid.	Y28	24V	Control P.C.B.	QPM-112/QPW-455	LED24	6-2-1	Fig.24-18	
50	Collating start signal is output.			Control P.C.B.	QPM-112/QPW-455	LED28	6-2-1		
51	Collating stop signal is output.			Control P.C.B.	QPM-112/QPW-455	LED29	6-2-1		
52	Fold Knife Stop Position Proximity Switch	B05	12V	Driver P.C.B.	QPW-456	FA1	6-3-1	Fig.29-25	
53	Carry belt and fold knife emergency stop signal is input to P.C.B.			Driver P.C.B.	QPW-456	FA2	6-3-1		Lights when motor is running.

2-10 SPF-20 Sensor and Actuator Check Points

[SPF-20]

	Item	Code	V	P.C.B. Name	P.C.B. Code	LED Layout (refer to)	LED Layout	Parts Book	Note
54	Carry belt start signal is input.	Y22,Y21	24V	Driver P.C.B.	QPW-456	FA5	6-3-1	Fig.20-6,13	From Clutch Y22, Brake Y21
55	Fold Knife start signal is input.	Y23	24V	Driver P.C.B.	QPW-456	FA6	6-3-1	Fig.29-31	From Clutch and Brake Y23
56	Sheet end jog solenoid ON signal is input.	Y24	24V	Driver P.C.B.	QPW-456	FA7	6-3-1	Fig.9-23	
57	Side stitch stopper solenoid ON signal is input.	Y25	24V	Driver P.C.B.	QPW-456	FA8	6-3-1	Fig.14-18	
58	Saddle stitch stopper solenoid ON signal is input.	Y26	24V	Driver P.C.B.	QPW-456	FA9	6-3-1	Fig.12-22	
59	Fold/non-hold solenoid ON signal is input.	Y27	24V	Driver P.C.B.	QPW-456	FA10	6-3-1	Fig.21-15	
60	Folder jog finger solenoid ON signal is input.	Y28	24V	Driver P.C.B.	QPW-456	FA11	6-3-1	Fig.24-18	
61	Signal is output to pick belt position detector 1.	B06	12V	Driver P.C.B.	QPW-456	LED1	6-3-1	Fig.19-4	
62	Signal is output to pick belt position detector 2.	B07	12V	Driver P.C.B.	QPW-456	LED2	6-3-1	Fig.20-24	
63	Side stitch mode signal is input from SPF-20.			Control P.C.B.	QPM-113/QPW-454	FA1	6-4-1		
64	Emergency stop signal is input from SPF-20.			Control P.C.B.	QPM-113/QPW-454	FA2	6-4-1		
65	Motor ON signal is input from SPF-20.			Control P.C.B.	QPM-113/QPW-454	FA3	6-4-1		
66	Cut Section Entrance Proximity Switch	B03	24V	Control P.C.B.	QPM-113/QPW-454	FA5	6-4-1	Fig.5-18	Lights when no sheet.
67	Cut Section Set Present Sensor	B05	24V	Control P.C.B.	QPM-113/QPW-454	FA6	6-4-1	Fig.8-49	
68	Knife Stop Position Proximity Switch	B04	24V	Control P.C.B.	QPM-113/QPW-454	FA7	6-4-1	Fig.7-25	
69	Alarm of knife motor driver functions.	U01		Control P.C.B.	QPM-113/QPW-454	FA8	6-4-1	Fig.10-31	Lights when alarm malfunctions.
70	Output signal of preset counter for kicker is input to P.C.B.	P03	24V	Control P.C.B.	QPM-113/QPW-454	FA12	6-4-1	Fig.10-8	
71	Signal from FC-20 backward button and system backward signal from SPF-20 are input to P.C.B.	S02	24V	Control P.C.B.	QPM-113/QPW-454	FA13	6-4-1	Fig.10-12	
72	Signal from FC-20 forward button and system forward signal from SPF-20 are input to P.C.B.	S03	24V	Control P.C.B.	QPM-113/QPW-454	FA14	6-4-1	Fig.10-12	
73	System Backward Limit Proximity Switch	B02	24V	Control P.C.B.	QPM-113/QPW-454	FA15	6-4-1	Fig.3-19	

2-10 SPF-20 Sensor and Actuator Check Points

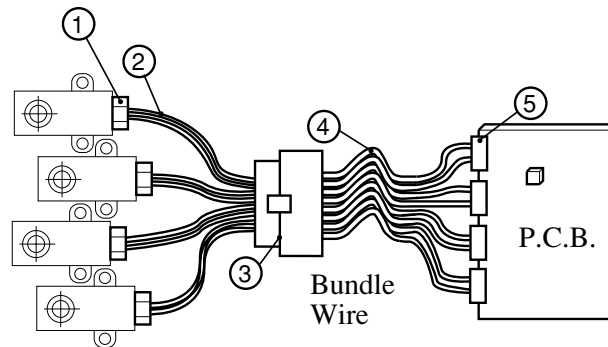
[SPF-20]

	Item	Code	V	P.C.B. Name	P.C.B. Code	LED Layout (refer to)	LED Layout	Parts Book
74	System Forward Limit Proximity Switch	B01	24V	Control P.C.B.	QPM-113/QPW-454	FA16	6-4-1	Fig.3-19
75	Knife Inching Button	S04	24V	Control P.C.B.	QPM-113/QPW-454	FA17	6-4-1	Fig.7-25
76	Knife Cover Switch	S10	24V	Control P.C.B.	QPM-113/QPW-454	FA18	6-4-1	Fig.1-4
77	Emergency stop signal is output to SPF-20.			Control P.C.B.	QPM-113/QPW-454	LED2	6-4-1	
78	Signal is output to jam lamp.	H01		Control P.C.B.	QPM-113/QPW-454	LED3	6-4-1	Fig.10-14
79	Signal is output to relay for total counter.			Control P.C.B.	QPM-113/QPW-454	LED5	6-4-1	
80	Signal is output to kicker solenoid.		24V	Control P.C.B.	QPM-113/QPW-454	LED6	6-4-1	
81	Signal is output to stopper solenoid.	Y21	24V	Control P.C.B.	QPM-113/QPW-454	LED7	6-4-1	Fig.8-9
82	Signal is output to transport belt clutch.	Y22	24V	Control P.C.B.	QPM-113/QPW-454	LED8	6-4-1	Fig.9-37
83	Knife motor driver start signal is output.	U01		Control P.C.B.	QPM-113/QPW-454	LED9	6-4-1	Fig.10-31
84	Knife motor driver VRSEL signal is output.	U01		Control P.C.B.	QPM-113/QPW-454	LED10	6-4-1	Fig.10-31
85	Transport Belt Clutch OFF Delay Timer Function			Control P.C.B.	QPM-113/QPW-454	LED12	6-4-1	
86	Signal is output to relay for preset counter.			Control P.C.B.	QPM-113/QPW-454	LED13	6-4-1	
87	Signal is output to SSR for air pump motor.	K02		Control P.C.B.	QPM-113/QPW-454	LED14	6-4-1	Fig.10-27
88	Signal is output to SSR for guide plate solenoid.	K03		Control P.C.B.	QPM-113/QPW-454	LED15	6-4-1	Fig.10-24
89	Signal is output to system move motor (backward).	M10	100V	Control P.C.B.	QPM-113/QPW-454	LED17	6-4-1	Fig.3-3
90	Signal is output to system move motor (forward).	M10	100V	Control P.C.B.	QPM-113/QPW-454	LED18	6-4-1	Fig.3-3

2-11 When Sensors and Actuator LEDs Indicate Malfunction

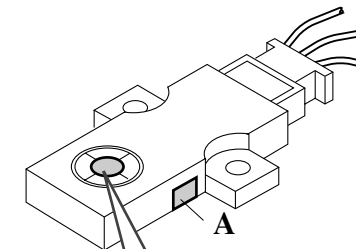
If LEDs on P.C.B. indicate parts malfunctions, these parts do not always malfunction. Check the following points.

- ① Sensor and actuator are firmly connected to connector.
- ② Wire from connector is caught or cut.
- ③ Connector is firmly connected to bundle wire.
- ④ Cables are caught or cut.
- ⑤ Connector is firmly connected to P.C.B.



Check sensor and actuator themselves.

1. Check correct voltage is loaded to each sensor and actuator. (In regard to the correct voltage, refer to “2-10 Sensor and Actuator Check Points”.)
2. In the case of sensor, check that detection plate which operates sensor is not removed.
3. In the case of photo sensor, check that optic axis of photoelectric sensor is properly positioned and paper dust does not stick to sensor.
4. Replace sensor. When new sensor malfunctions after replacement, check wire breaking.



If lamp A lights when metal is brought near hear, sensor functions correctly.
(The detecting range is within 5 mm.)

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3. Adjustment

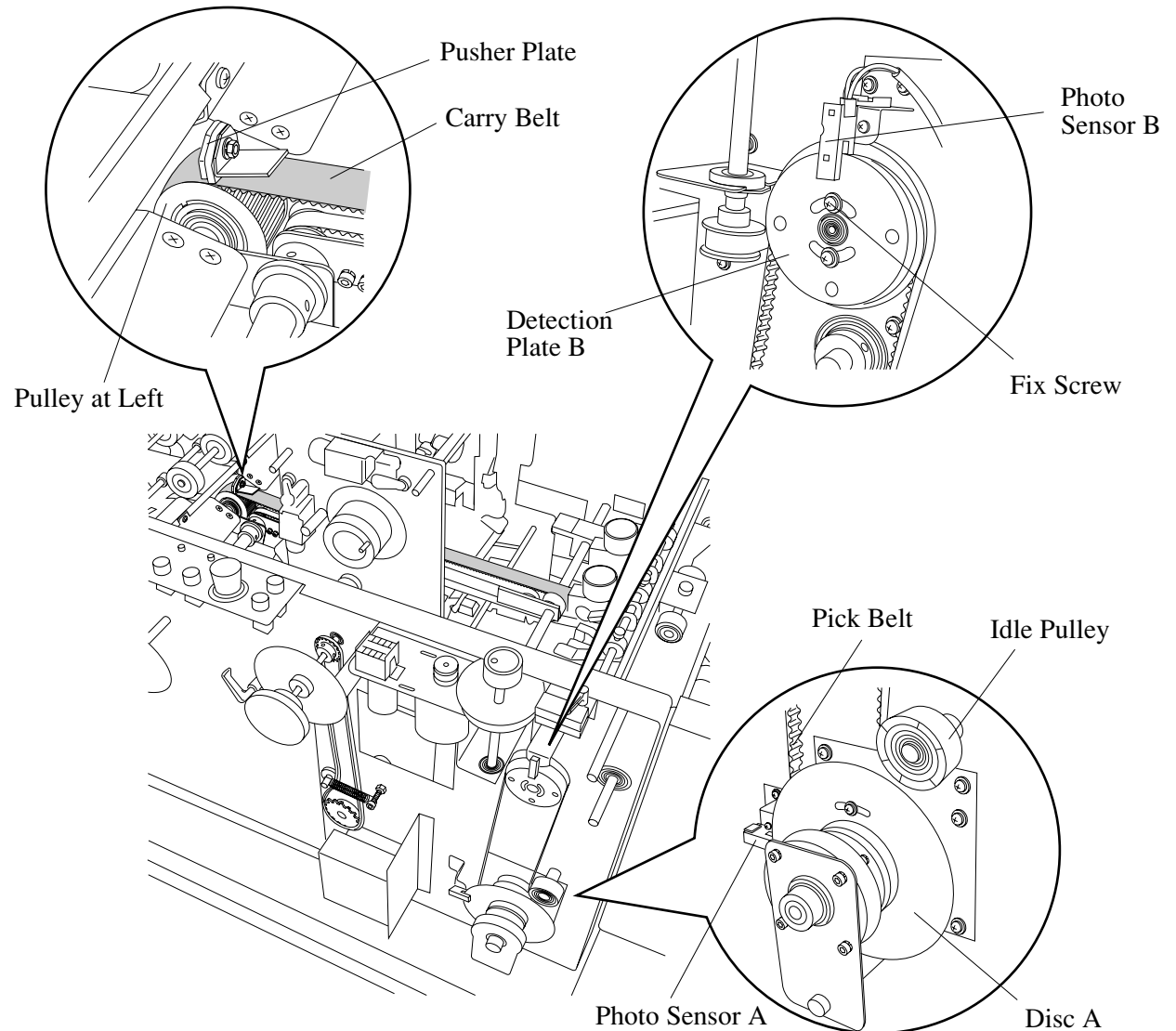
3-1 Adjustment In Jog Section

[SPF-20]

3-1-1 Carry Belt Timing Adjustment

When pusher plate of carry belt is positioned right above pulley at left, the middle of hole of detection plate is positioned in the optic axis of photoelectric sensor.

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Loosen fix screw of idle pulley to remove the tension.
4. Adjust detection plate A sliding pick belt so that the middle of hole of the detection plate A is positioned in the optic axis of photoelectric sensor A when pusher plate of carry belt is positioned right above pulley at left.
5. Adjust the pick belt tension by positioning idle pulley keeping the position set up in the step 4. The belt should be bent by 8 to 10 mm when the middle of belt is pushed with 500 gf strength.
6. Adjust detection plate B so that holes of both detection plate A and B positioned in the each optic axes simultaneously. (2 fix screws)
7. Attach front cover.
8. Turn on power switch.



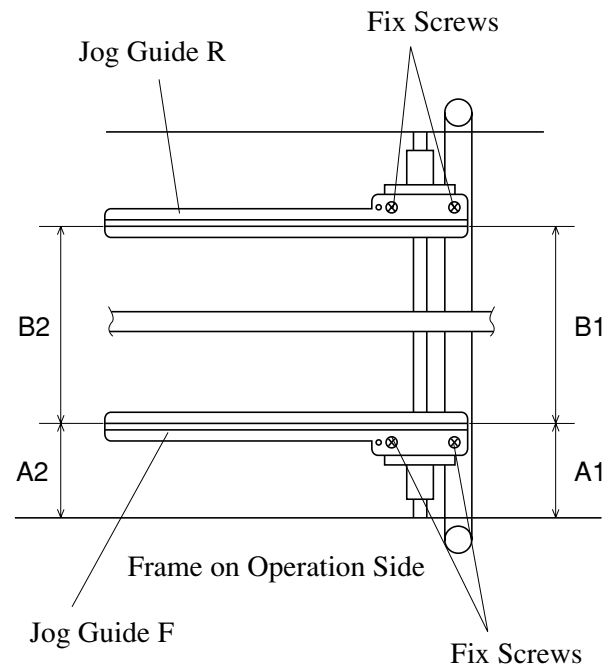
3-1 Adjustment In Jog Section

[SPF-20]

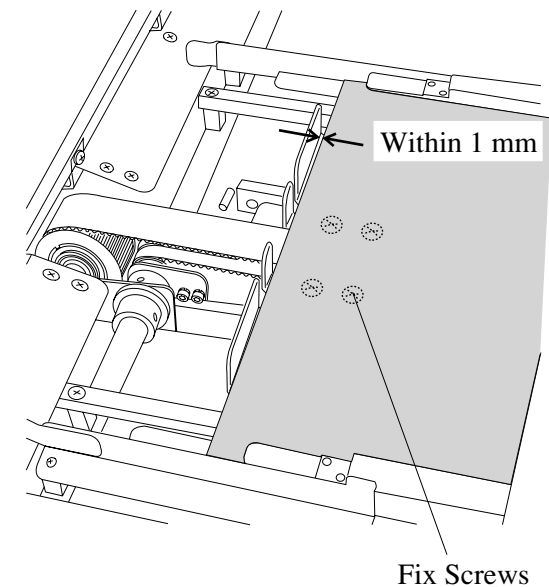
3-1-2 Jog Guide Parallel Adjustment

Adjust distance between jog guide F and R so that B1 is equal to B2 within the range of 0 to 0.5 mm as shown in the drawing at right.

1. Turn on power switch.
2. Raise saddle stitch end stopper with jog ON/OFF button.
3. Turn off power switch.
4. Lift safety cover (R).
5. Loosen screws of jog guide F, R.
6. Fix jog guide F so that A2 is equal to A1 within the range of 0 to 1 mm as shown in the drawing at right.
7. Fix jog guide R so that B2 is equal to B1 within the range of 0 to 0.5 mm as shown in the drawing at right. And put exact rectangular sheet of free size between jog guide F, R.



8. Adjust saddle stitch end stopper so that the gap between stopper and sheet is within 1 mm. (4 fix screws)



9. Lower safety cover (R).
10. Turn on power switch.

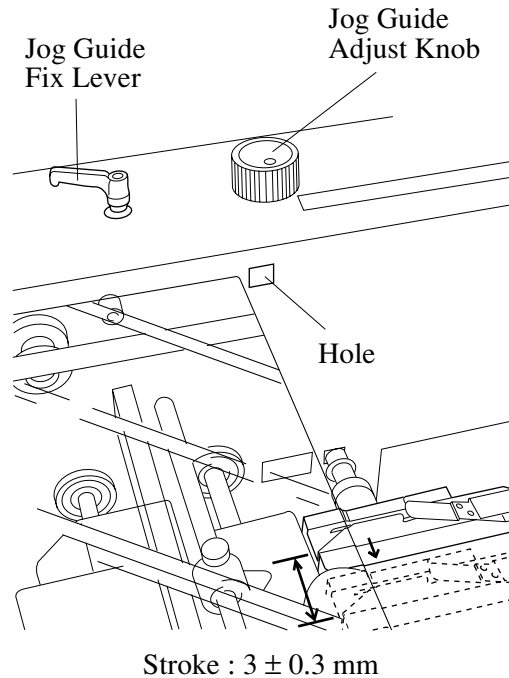
3-1 Adjustment In Jog Section

[SPF-20]

3-1-3 Jog Guide Stroke Adjustment

Check that jog guide stroke is 3 ± 0.3 mm.

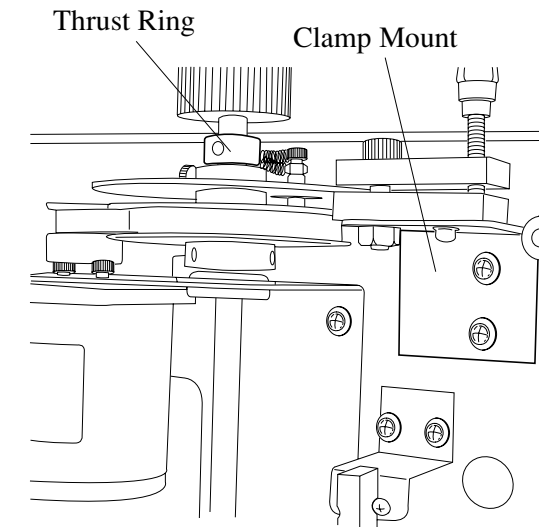
1. Turn off power switch.
2. Open safety cover (R).
3. Loosen jog guide fix lever.
4. Turn mark on jog guide adjust knob towards anti-operation side so that stroke adjust bolt can be turned through hole of frame. When it is impossible to access the bolt, perform following step after removing front cover. (Refer to “4-1 How to Remove Cover”.)
5. Adjust by turning stroke adjust bolt through the hole with allen wrench (5 mm) so that jog guide stroke is 3 ± 0.3 mm. Measure the stroke with scale after adjustment.



When jog guide adjust knob does not turn smoothly, perform following steps below.

- 1 to 3. Perform 1 to 3 steps mentioned at left.
4. Remove front cover.(Refer to “4-1 How to Remove Cover”.)
5. Loosen a fix screw of thrust ring (PB:Fig.10-16) and 2 fix screws of clamp mount.

6. Fix clamp mount so that jog guide adjust knob can be turned throughout smoothly.
7. Fasten a fix screw of thrust ring.
8. Attach front cover.
9. Fasten jog guide fix lever.
10. Close safety cover (R).
11. Turn on power switch.



3-1 Adjustment In Jog Section

[SPF-20]

3-1-4 Side Stitch End Stopper Solenoid Adjustment

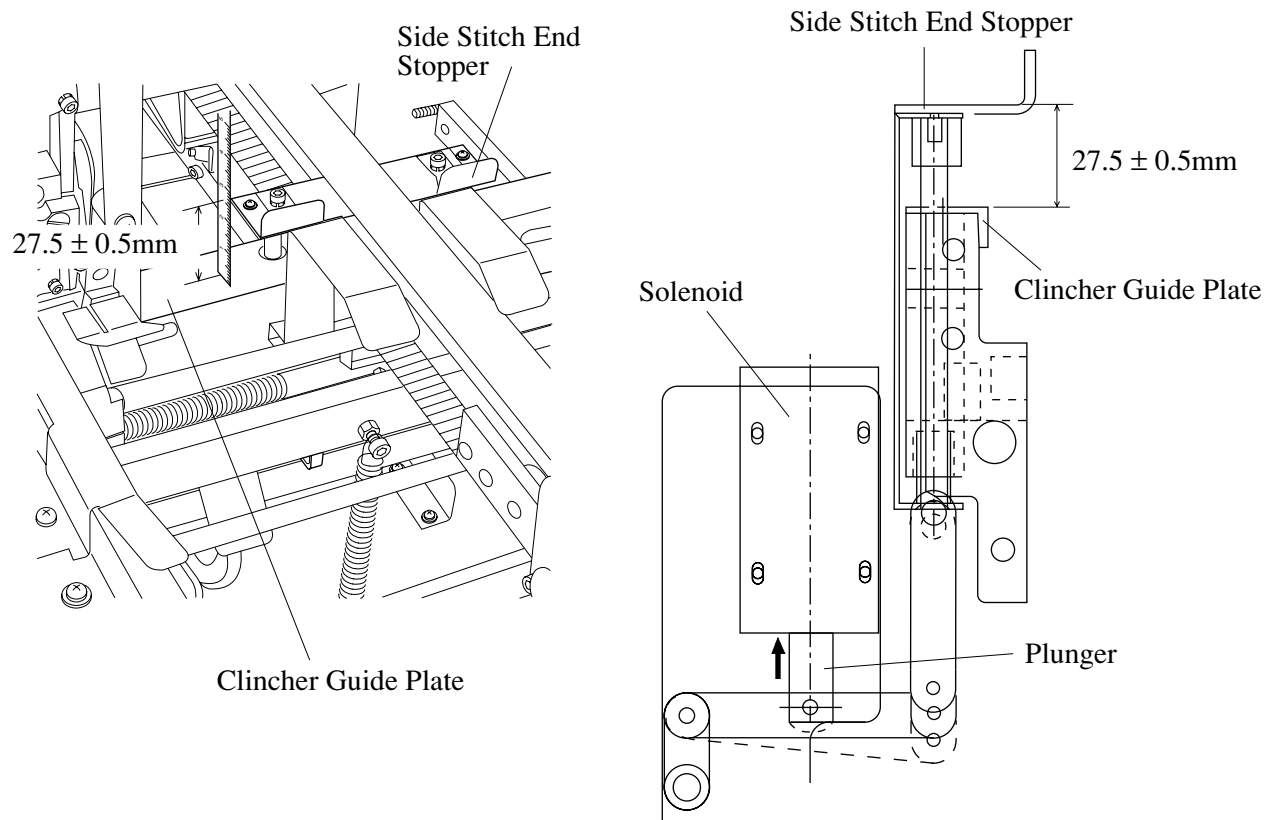
Check that distance between side stitch end stopper and clincher guide plate is 27.5 ± 0.5 mm when the stopper is raised by lifting up plunger.

1. Turn off power switch.
2. Open safety cover (R).
3. Adjust the side stitch end stopper solenoid so that distance between side stitch end stopper and clincher guide plate is 27.5 ± 0.5 mm when the stopper is raised by lifting up plunger.

NOTE

- The distance between side stitch end stopper and clincher guide plate becomes longer with raising the solenoid.

4. Close safety cover (R).
5. Turn on power switch.



3-1 Adjustment In Jog Section

[SPF-20]

3-1-5 Saddle Stitch End Stopper Solenoid Adjustment

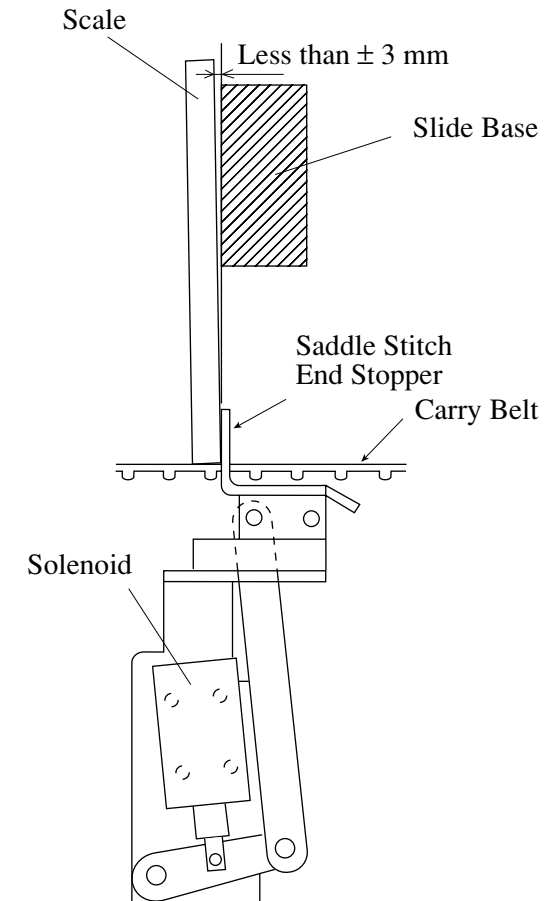
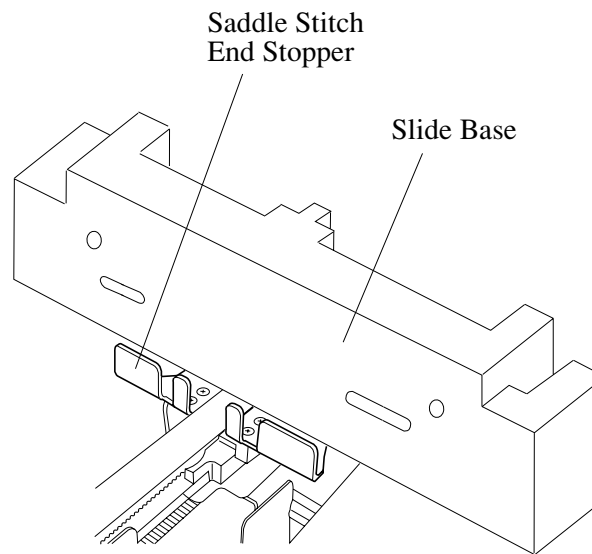
Check that vertical part of saddle stitch end stopper against slide base is tilted less than ± 3 mm.

1. Turn on power switch.
2. Raise saddle stitch end stopper by pressing jog ON/OFF button
3. Turn off power switch.
4. Open safety cover (L).
5. Slide stitcher unit so that slide base is positioned over saddle stitch end stopper as shown in the drawing at right.
6. Adjust saddle stitch end stopper solenoid so that vertical part of saddle stitch stopper is tilted less than ± 3 mm against slide base. (4 fix screws)

NOTE

- The saddle stitch end stopper is tilted forward with raising the solenoid.

7. Close safety cover (L).
8. Turn on power switch.



3-1 Adjustment In Jog Section

[SPF-20]

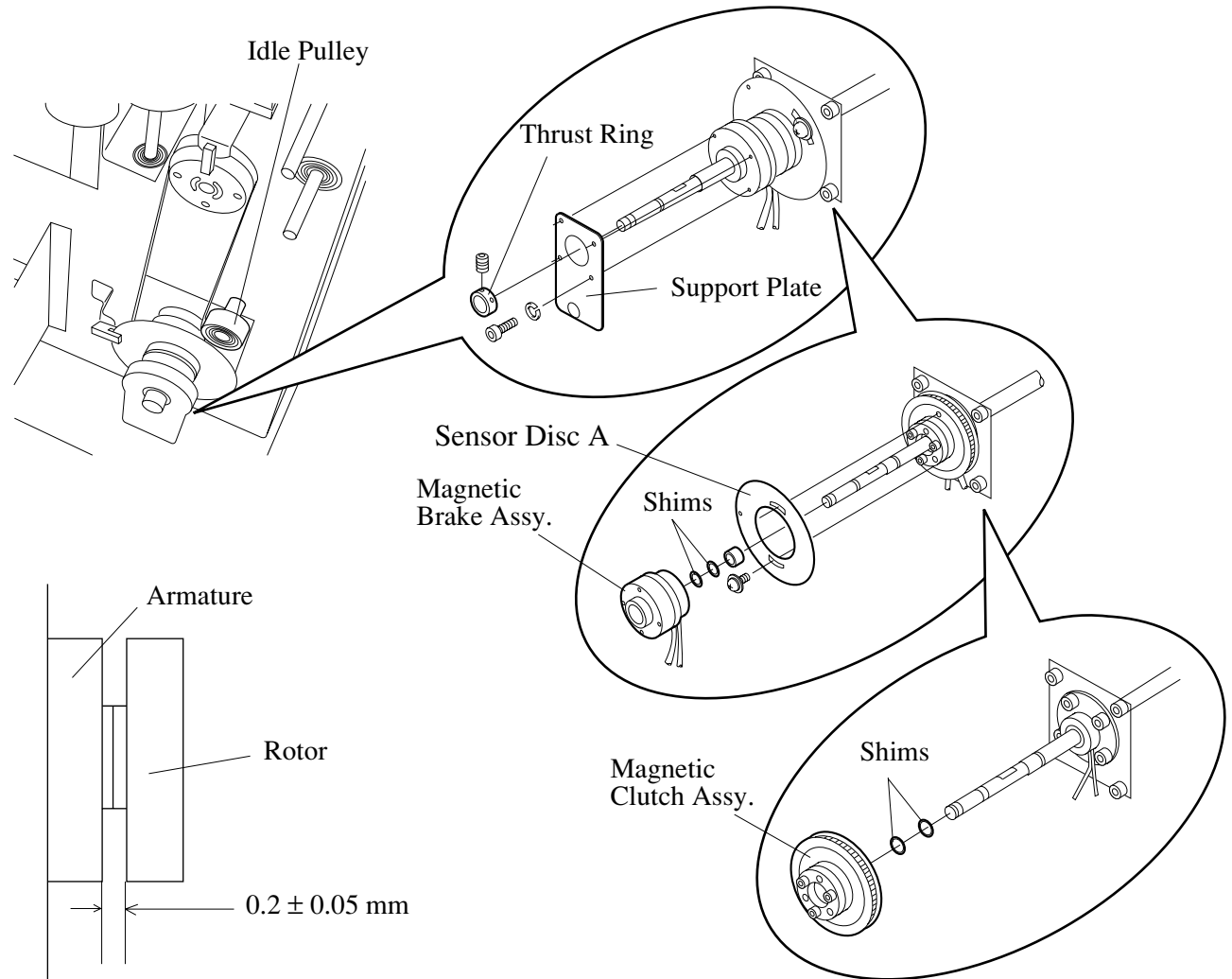
3-1-6 Belt Clutch (Y22) Gap Adjustment

Check that the gap between rotor and armature of clutch pulley assy. is 0.2 ± 0.05 mm.

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Release idle pulley to remove tension of belt.
4. Remove support plate and thrust ring.
5. Remove magnetic brake assy., shims and sensor disc A.
6. Adjust the gap with shims so that the gap between rotor and armature of clutch pulley assy. is 0.2 ± 0.05 mm.

NOTE

- Normally, insert a few shims which thickness is 0.1 mm to provide proper gap.



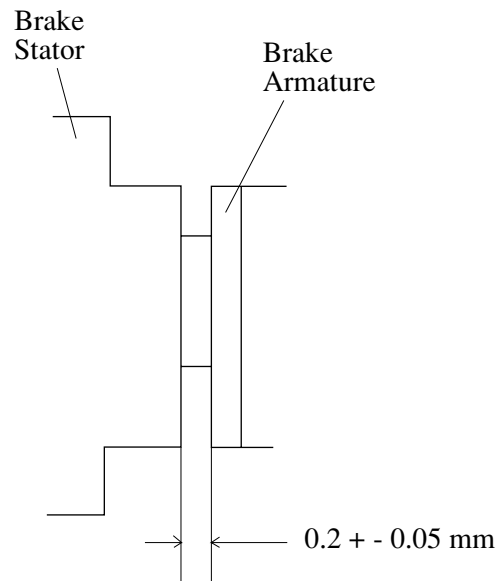
3-1 Adjustment In Jog Section

[SPF-20]

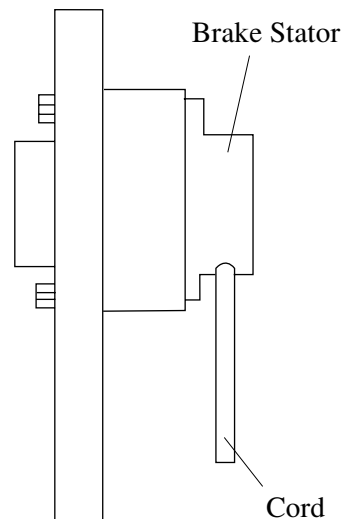
- 7.** Attach clutch and brake in the reverse order of removal.

NOTE

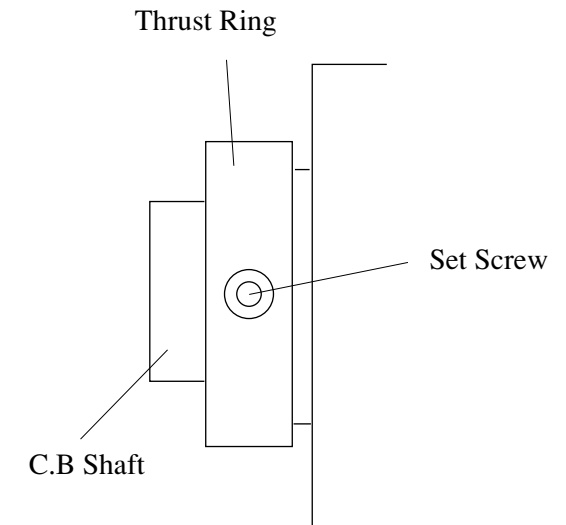
- When sensor disc A is attached, refer to “3-1-1 Carry Belt Timing Adjustment”.
- Adjust the gap with shims so that the gap between brake stator and brake armature of magnetic brake assy. is 0.2 ± 0.05 mm. Normally, insert a few shims (thickness 0.1 mm) to provide proper gap.



- Check that bar has a play in hole of support plate after inserting bar into the hole.
- Attach support plate to magnetic brake so that cord of brake stator is turned downward.



- Insert thrust ring into C.B. shaft considering direction and fix the ring by set screw without a play.



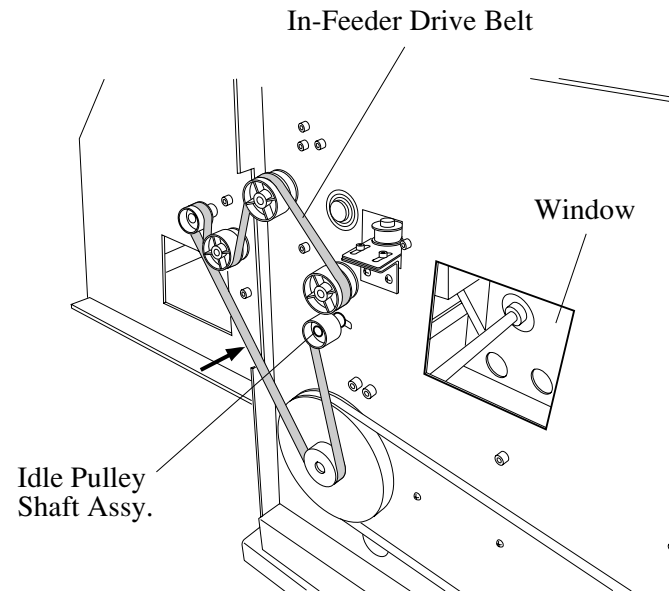
3-1 Adjustment In Jog Section

[SPF-20]

3-1-7 In-Feeder Drive Belt Tension Adjustment

Check that the belt is bent by 9 to 10 mm when the arrow part is pushed with 500 gf strength.

1. Position stitcher unit in left end.
2. Turn off power switch.
3. Remove IF-rear cover. (Refer to “4-1 How to Remove Cover”.)
4. Remove rear cover. (Refer to “4-1 How to Remove Cover”.)
5. Adjust tension by positioning idle pulley shaft assy. through window on rear frame so that the belt is bent by 9 to 10 mm when the arrow part is pushed with 500 gf strength.
6. Attach the belt in the reverse order of removal.



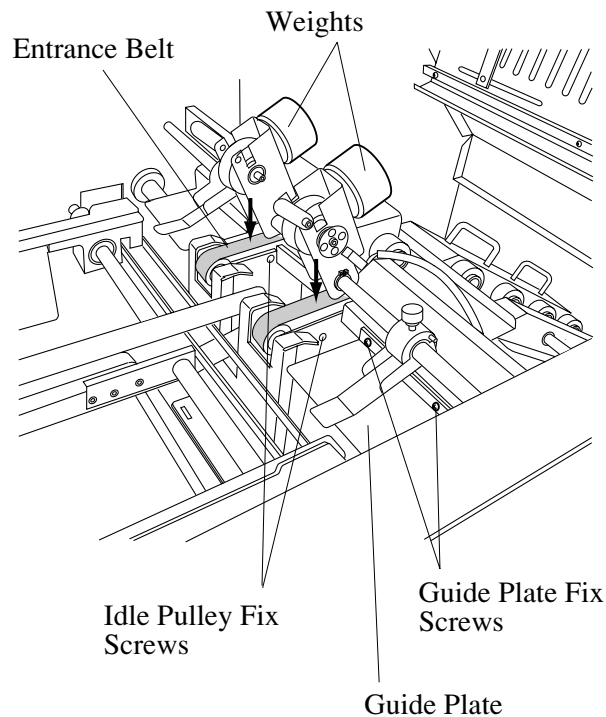
3-1 Adjustment In Jog Section

[SPF-20]

3-1-8 Entrance Belt Tension Adjustment

Check that the belt is bent by 6 to 8 mm when the arrow part is pushed with 500 gf strength.

- 1.** Turn off power switch.
- 2.** Lift up 2 weights.
- 3.** Remove guide plate. (2 fix screws)
- 4.** Adjust tension by positioning idle pulley so that the belt is bent by 6 to 8 mm when the arrow part is pushed with 500 gf strength.
- 5.** Attach the belt in the reverse order of removal.



3-1 Adjustment In Jog Section

[SPF-20]

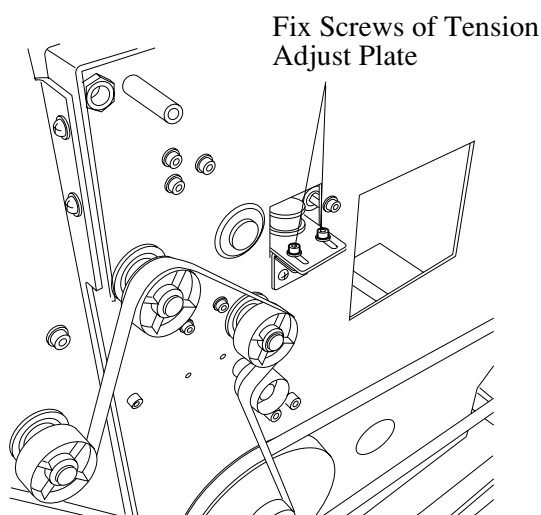
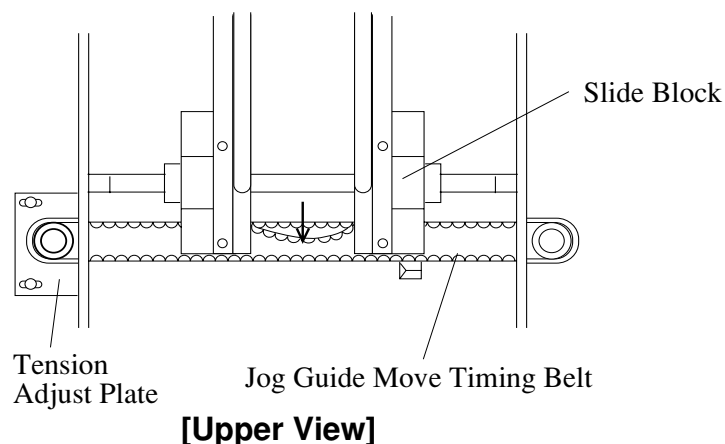
3-1-9 Jog Guide Move Timing Belt Tension Adjustment

Check that the timing belt is bent by 8 to 10 mm when the arrow part is pushed with 500 gf strength after width of jog guide is set up 350 mm of maximum on saddle stitch mode.

1. Set up width of jog guide 350 mm of maximum on saddle stitch mode.
2. Turn off power switch.
3. Remove rear cover. (Refer to “4-1 How to Remove Cover”.)
4. Adjust tension by positioning tension adjust plate. (2 fix screws)

NOTE

- Adjust so that the timing belt does not touch to slide blocks.
- Adjust tension so that the timing belt is bent by 8 to 10 mm when the arrow part is pushed with 500 gf strength.



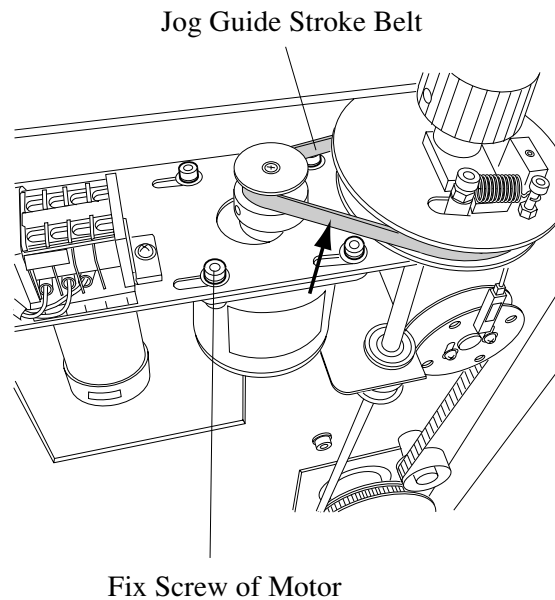
3-1 Adjustment In Jog Section

[SPF-20]

3-1-10 Jog Guide Stroke Belt Tension Adjustment

Check that the belt is bent by 4 to 6 mm when the arrow part is pushed with 500 gf strength.

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Adjust the belt tension by positioning motor so that the belt is bent by 4 to 6 mm when the arrow part is pushed with 500 gf strength.



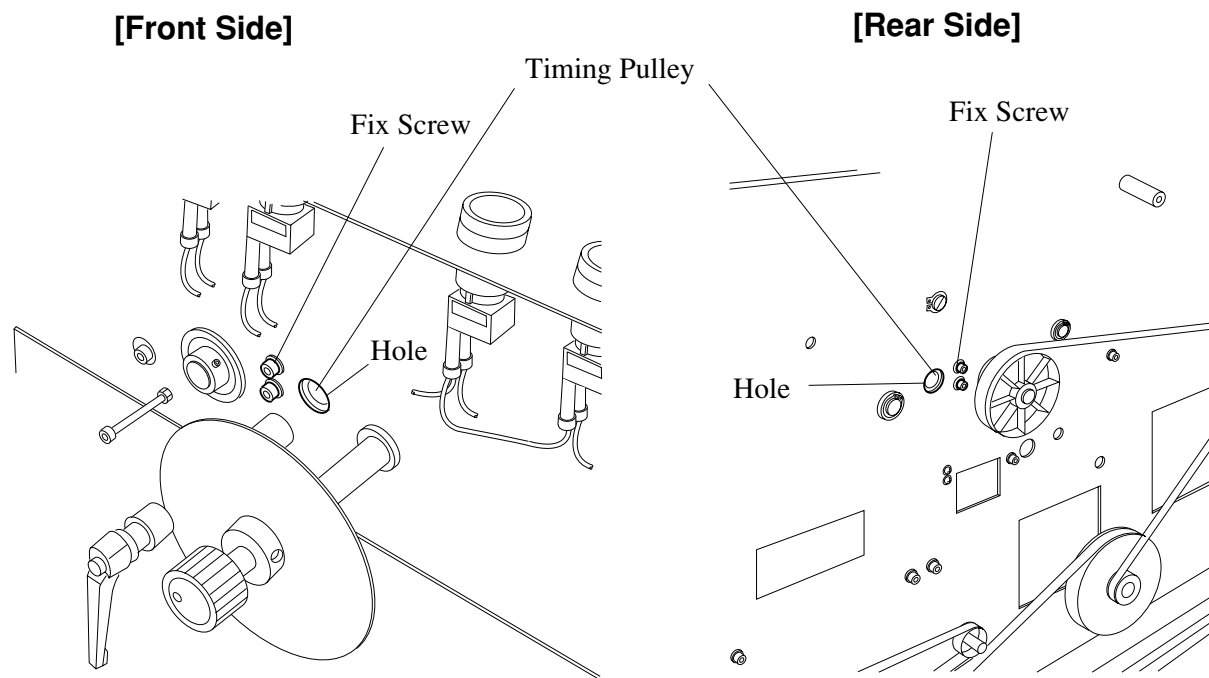
3-1 Adjustment In Jog Section

[SPF-20]

3-1-11 Carry Belt Tension Adjustment

Check that timing pulley shaft is positioned in the middle of the hole on the frame of both front side and rear side.

1. Turn off power switch.
2. Remove front and rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Adjust so that timing pulley shaft is positioned in the middle of the hole on the frame of both front side and rear side.



3-2 Adjustment In Stitch Section

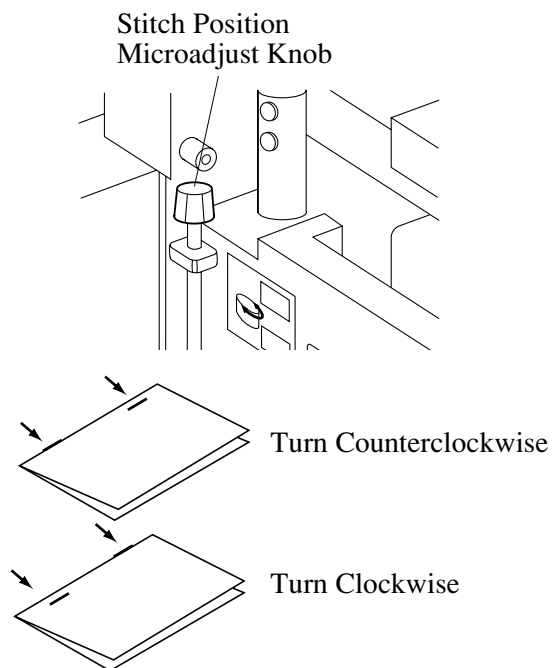
[SPF-20]

3-2-1 Sticher Unit Tilt Adjustment

Check stitch position on the booklet stitched actually.

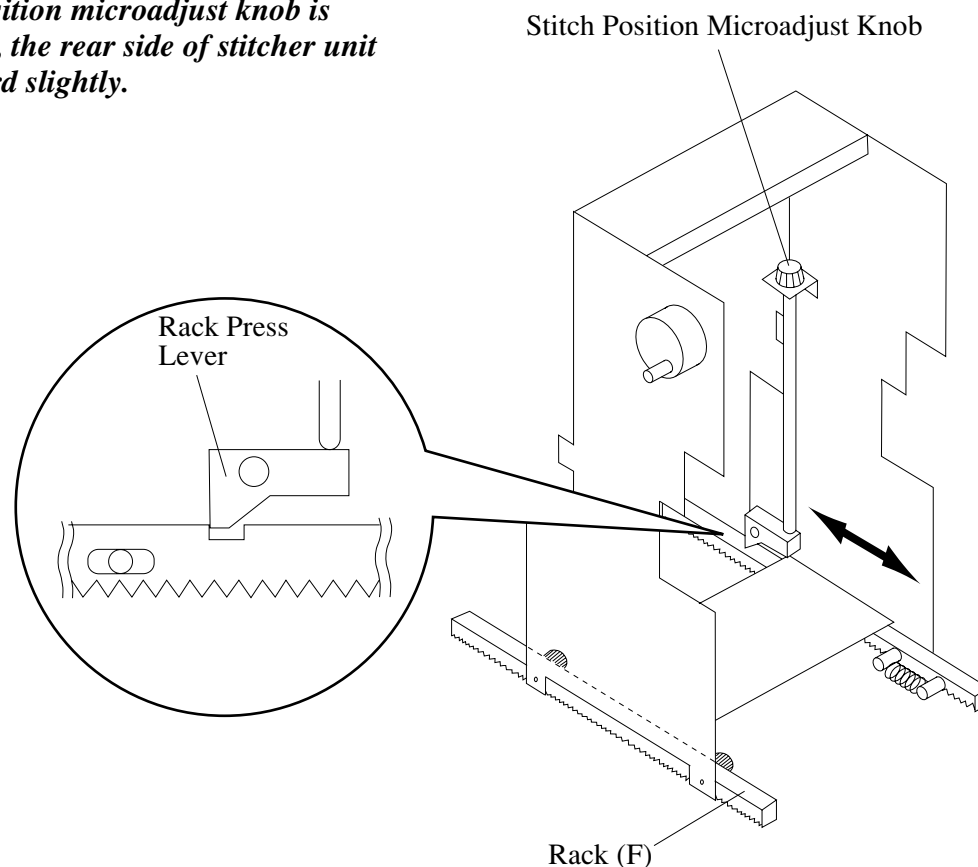
[Adjust with stitch position microadjust knob]

1. Open safety cover (F).
2. Modify tilt of sticher unit by turning stitch position microadjust knob.



NOTE

- After performing sticher unit tilt adjustment, adjust so that both staples are on folded line of sheet.
- When stitch position microadjust knob is turned clockwise, the rear side of sticher unit is slided rightward slightly.



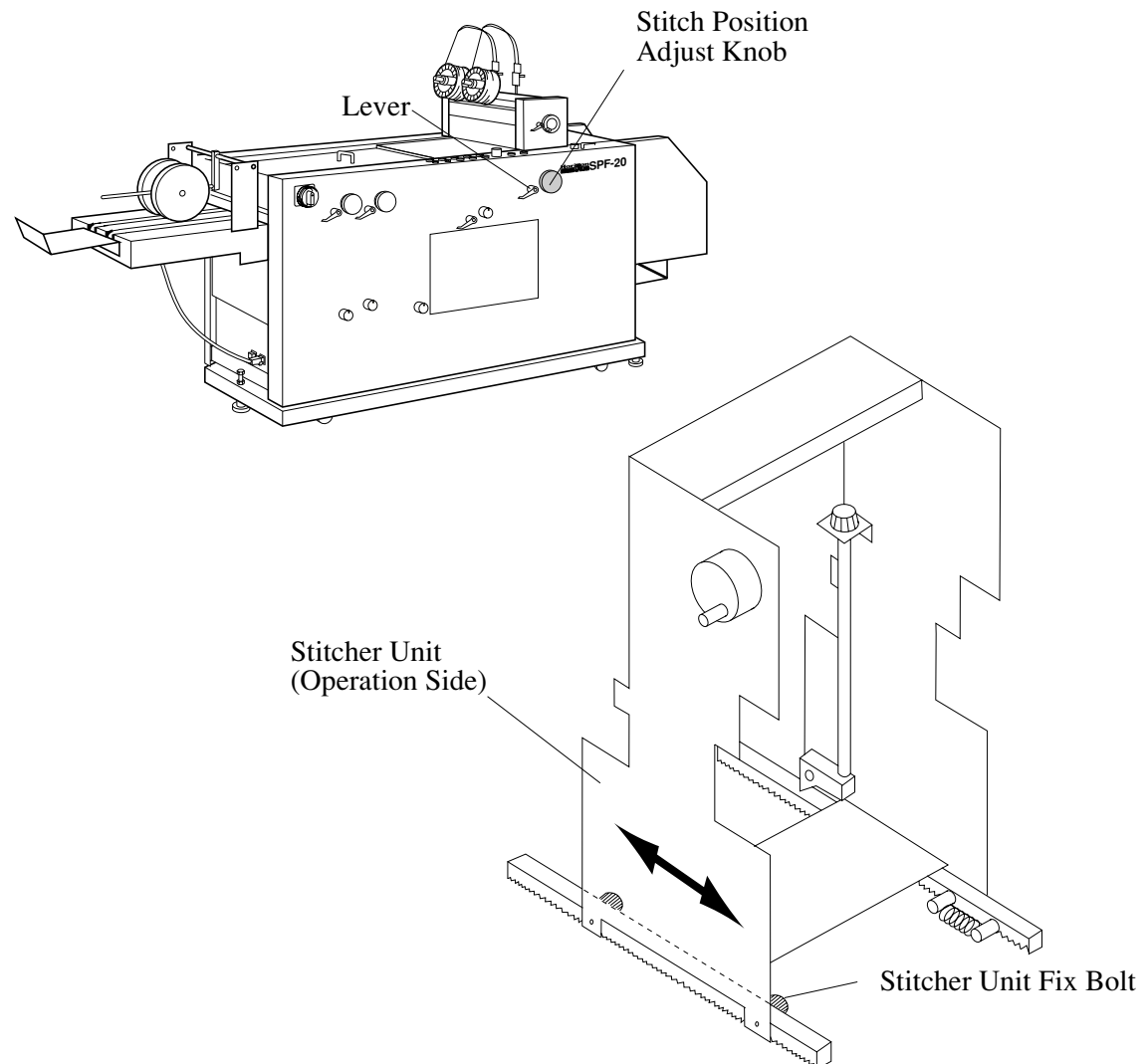
3-2 Adjustment In Stitch Section

[SPF-20]

3-2-1 Stitcher Unit Tilt Adjustment

[Adjust by sliding stitcher unit after loosening fix bolts]

1. Fix stitch position adjust knob with lever.
2. Remove 2 fix bolt of stitcher unit and position stitcher unit correctly by pressing operation side of stitcher unit.



3-2 Adjustment In Stitch Section

[SPF-20]

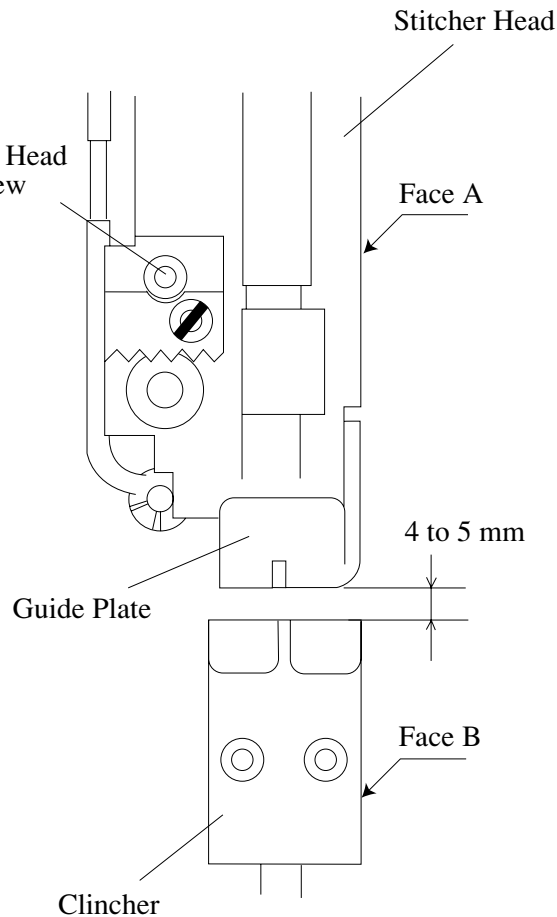
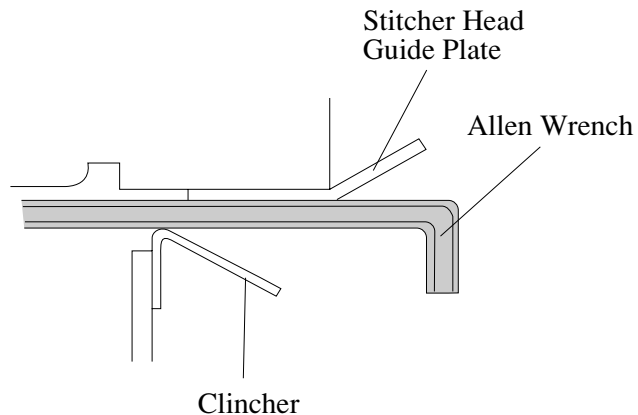
3-2-2 Stitcher Head Distance Adjustment

(Check)

1. Check alignment with scale that difference between face A of stitcher head and face B of clincher is less than 0.5 mm.
2. Check that distance between stitcher head guide plate and clincher is within a range of 4 to 5 mm.

(Example for how to check)

4 mm allen wrench can be pass through straightly, even if 5 mm allen wrench can not pass.



(Adjust)

1. Turn off power switch.
2. Open safety cover (R).
3. Loosen stitcher head fix screw and move stitcher head to correct position.

3-2 Adjustment In Stitch Section

[SPF-20]

3-2-3 Clincher Adjustment

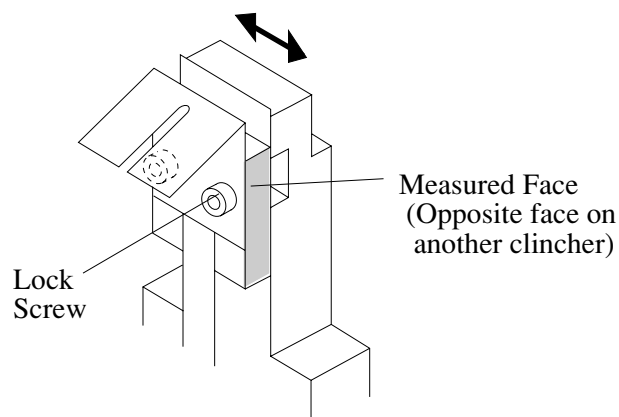
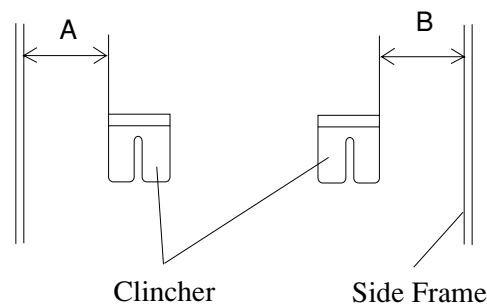
Check that difference between distance A and B is less than 1 mm as shown in the drawing at right.

1. Turn off power switch.
2. Open safety cover (F).
3. Loosen lock screws of either clincher or both and adjust clincher position.

NOTE

- Adjust clincher position so that difference between distance A and B is less than 1 mm as shown in the drawing at right.

4. Readjust stitcher head position referring to “3-2-2 Stitcher Head Distance Adjustment”.



3-2 Adjustment In Stitch Section

[SPF-20]

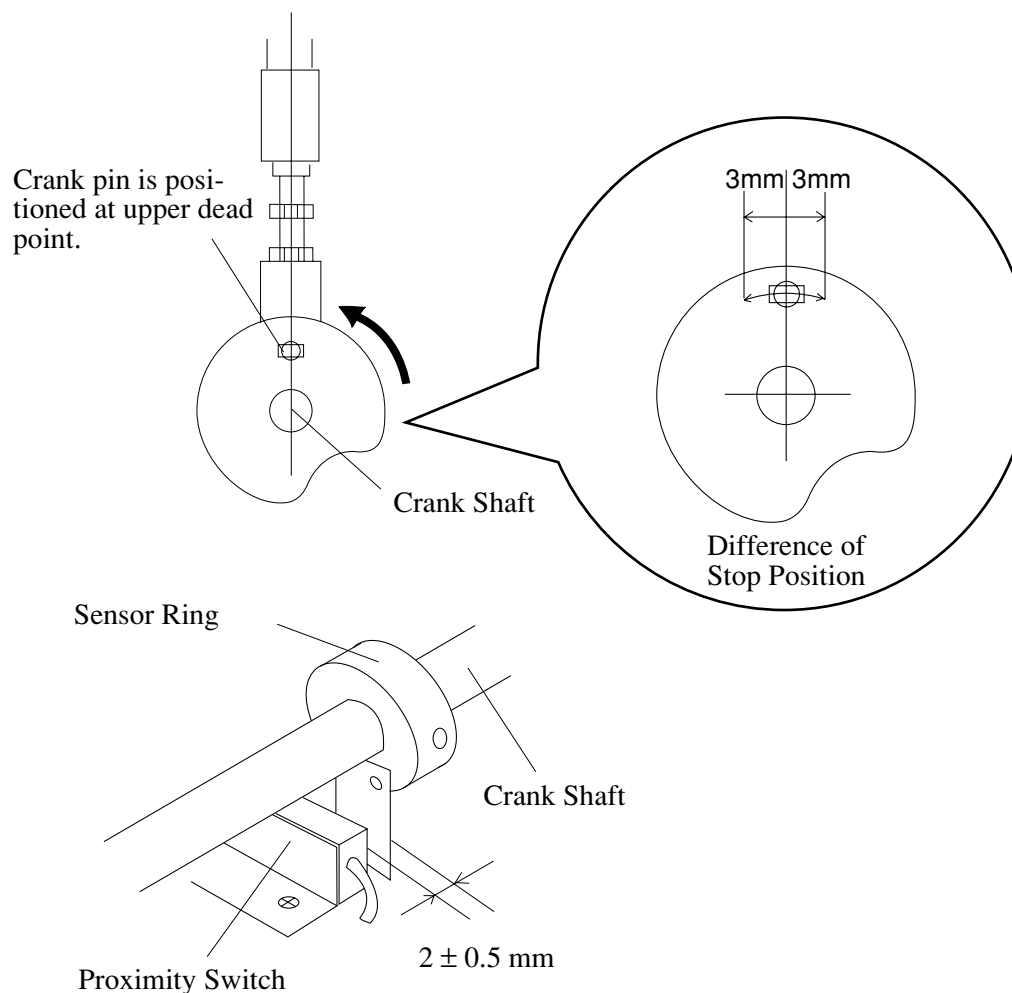
3-2-4 Stitcher Stop Position Adjustment

Press stitch inching button until stitcher stops and check that crank pin is positioned at upper dead point with difference in the range of ± 3 mm by measuring with the eye.

1. Turn off power switch.
2. Open safety cover (L).
3. Adjust fix position of sensor ring so that requirement mentioned above is met.

NOTE

- The gap sensor and sensor plate should be within a range of 2 ± 0.5 mm.
- In the case of performing this adjustment after threading wire, perform this adjustment after preventing wire feeding with wire feed ON/OFF knob.



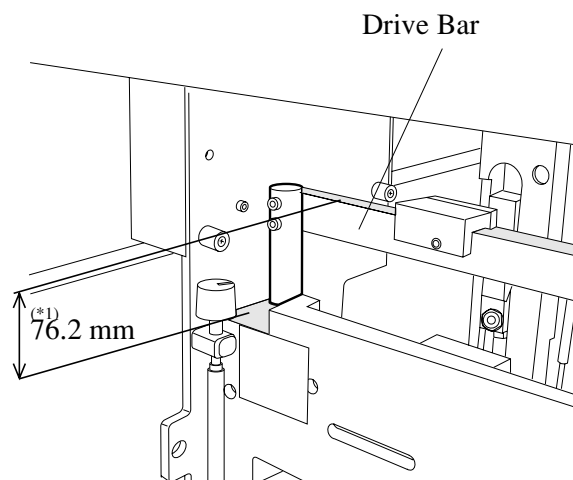
3-2 Adjustment In Stitch Section

[SPF-20]

3-2-5 Stitcher Stroke Adjustment

*Check that the length between the slide base and drive bar is 76.2 mm ^(*1) when the drive bar is at the upper limit position.*

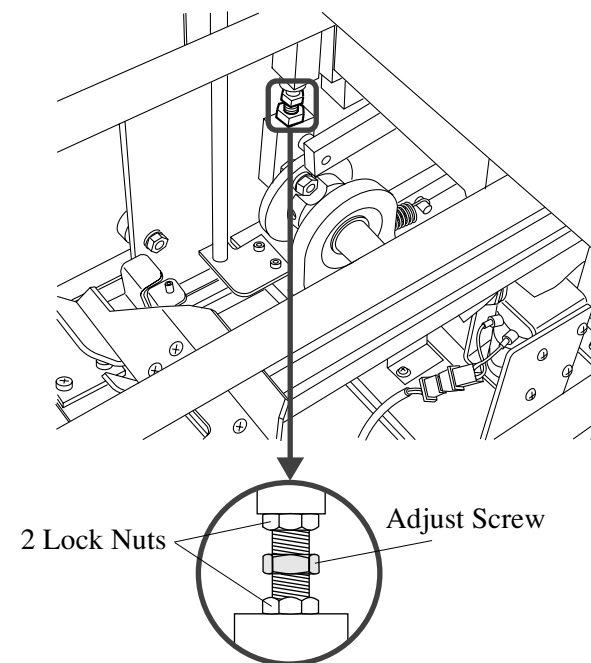
*(*1 When the stitcher head is 43/6, the length is 76.8 mm.)*



1. Press stitcher inching button to position the drive bar at the upper limit.
2. Turn off power switch.
3. Open safety cover (L).
4. Loosen 2 lock nuts and adjust with adjust screw so that the length between the slide base and drive bar is 76.2 mm ^(*1).
(*1 When the stitcher head is 43/6, the length is 76.8 mm.)

NOTE

- The length between the slide base and drive bar is increased with turning the adjust screw counterclockwise.



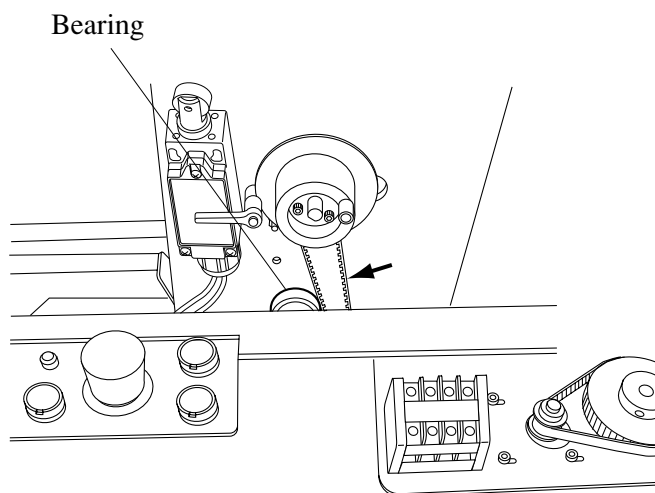
3-2 Adjustment In Stitch Section

[SPF-20]

3-2-6 Stitch Distance Timing Belt Tension Adjustment

Check that the belt is bent by 13 to 15 mm when the arrow part is pushed with 500 gf strength.

1. Turn off power switch.
2. Remove ST side cover (F). (Refer to “4-1 How to Remove Cover”.)
3. Adjust the belt tension by positioning bearing so that the belt is bent by 13 to 15 mm when the arrow part is pushed with 500 gf strength.



3-3 Adjustment In Fold Section

[SPF-20]

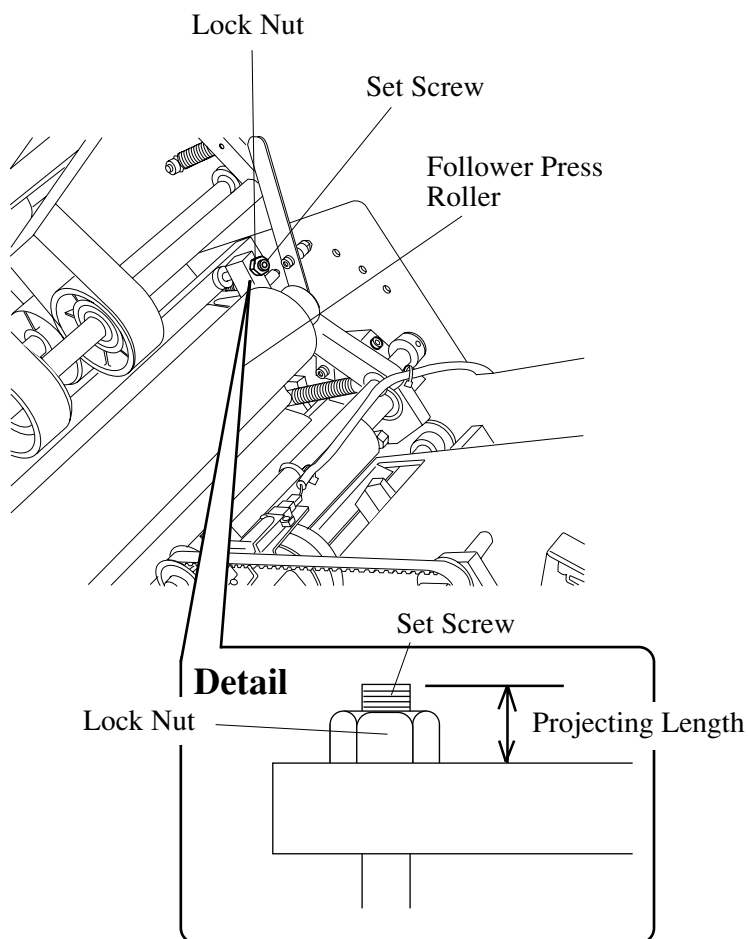
3-3-1 Press Roller Gap Adjustment

(Check)

1. Check projecting length of set screws are equal each other on both side.
2. Check that follower press roller is rotated when rotating drive press roller.

(Adjust)

1. Turn off power switch.
2. Lift up bypass section.
3. Adjust so that projecting length of set screws are equal each other on both side without raising of end.
4. Adjust the press rollers gap with set screw so that follower press roller is rotated with drive press roller.



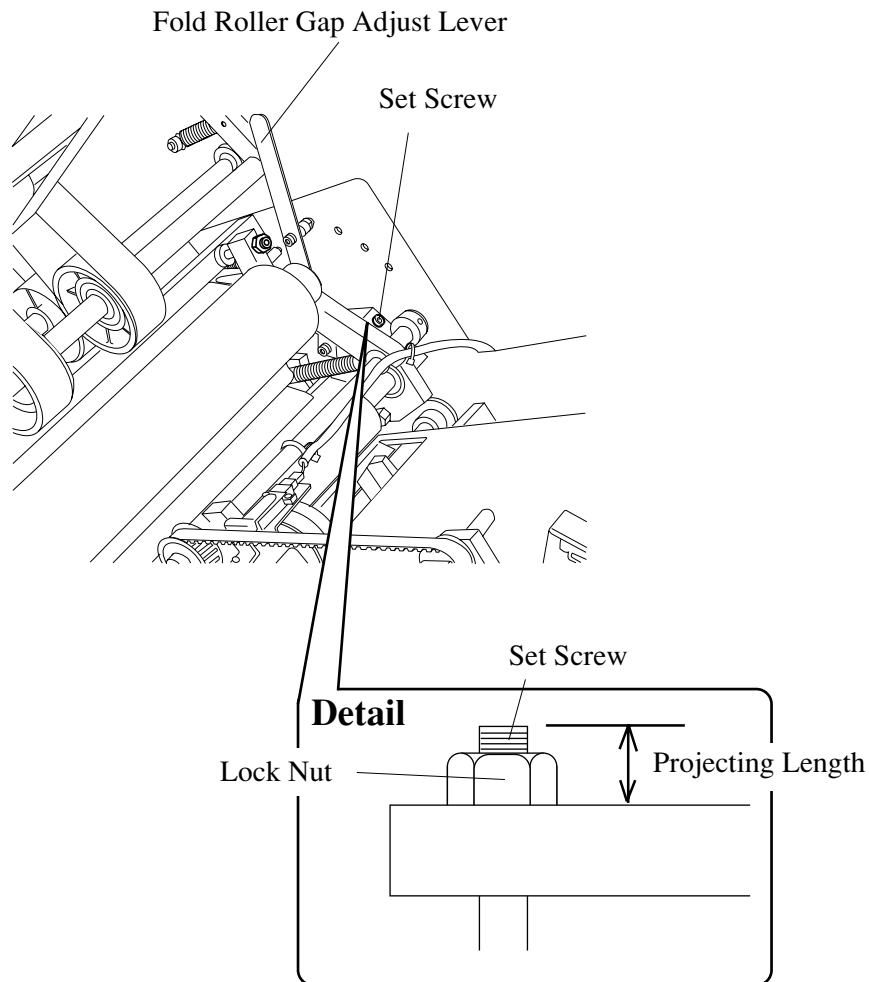
3-3 Adjustment In Fold Section

[SPF-20]

3-3-2 Fold Roller Gap Adjustment

Check that gap between fold rollers is equal on both side after adjusting the gap to minimum with fold roller gap adjust lever.

1. Turn off power switch.
2. Lift up bypass section.
3. Adjust the gap to minimum with fold roller gap adjust lever.
4. Adjust with set screw so that gap between fold rollers is equal on both side, moreover, a sheet (sheet weight : 81.4 gsm) can be passed through the gap, however a couple of same sheets can not be passed through the gap.



3-3 Adjustment In Fold Section

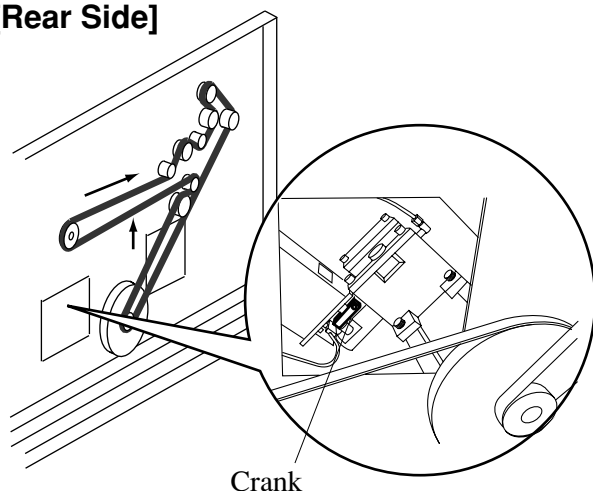
[SPF-20]

3-3-3 Fold Knife Upper Limit Adjustment

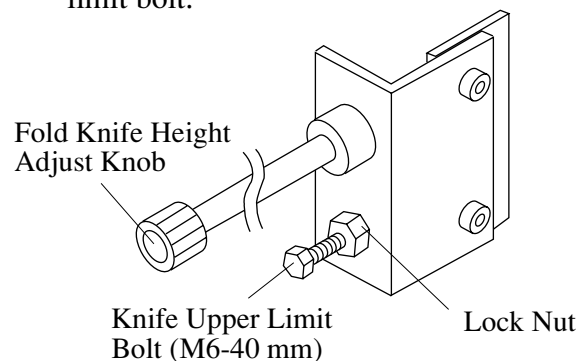
Check that gap A between fold rollers and fold knife is 2 mm when fold knife is positioned at upper limit after adjusting the gap to maximum.

1. Turn off power switch.
2. Lift up bypass section.
3. Adjust the gap to maximum with fold roller gap adjust lever.

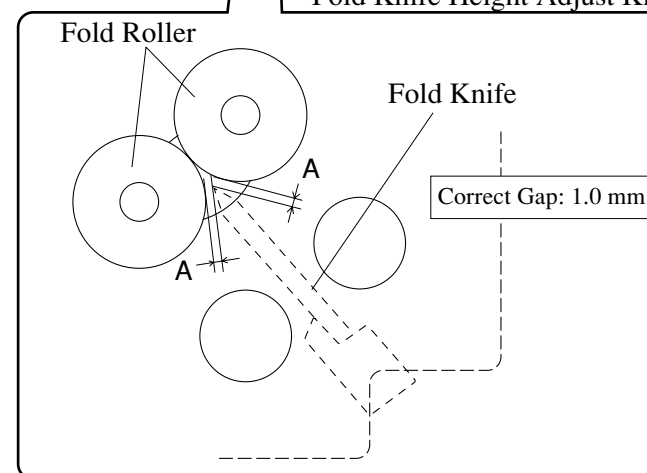
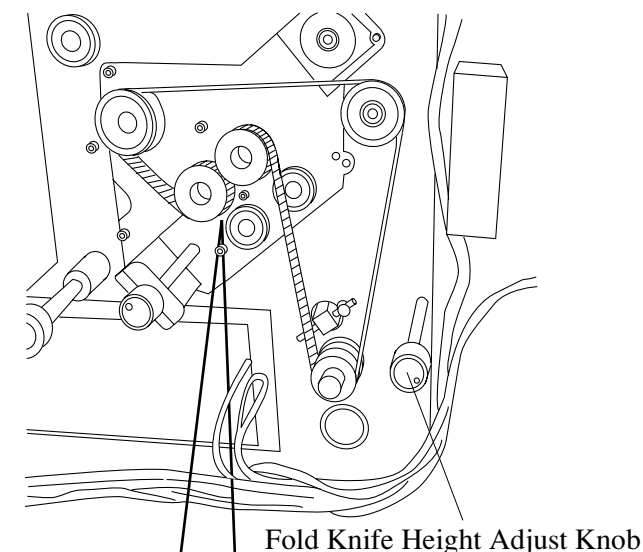
[Rear Side]



4. Remove rear cover and position fold knife in the upper limit by rotating crank of knife motor through window on frame.
5. Loosen lock nut and remove knife upper limit bolt.



6. Adjust so that gap A is 1.0 mm by turning fold knife height adjust knob.
7. Fasten knife upper limit bolt with lock nut.

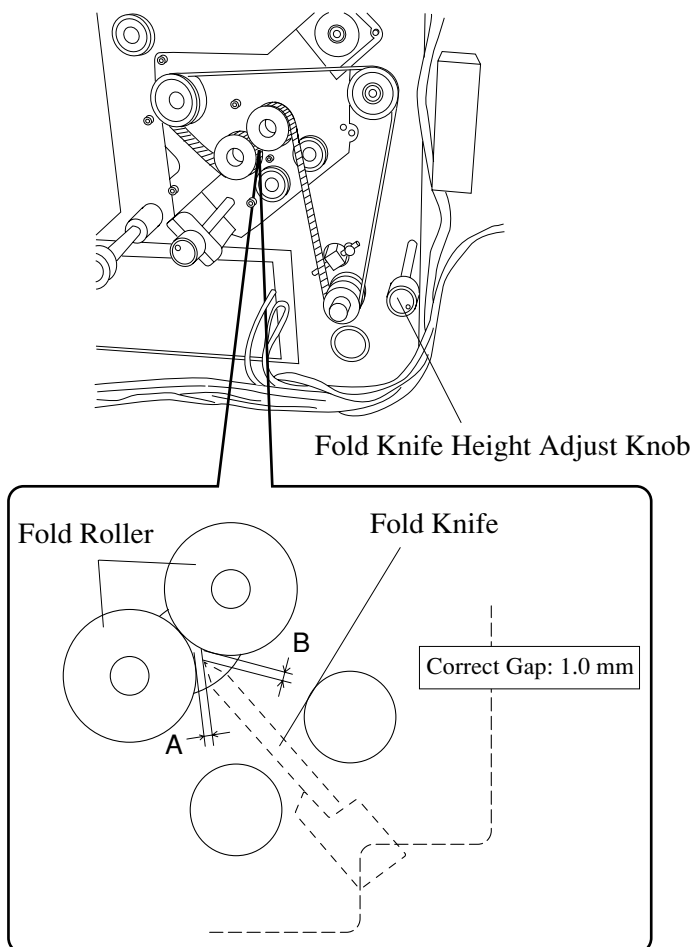


3-3 Adjustment In Fold Section

[SPF-20]

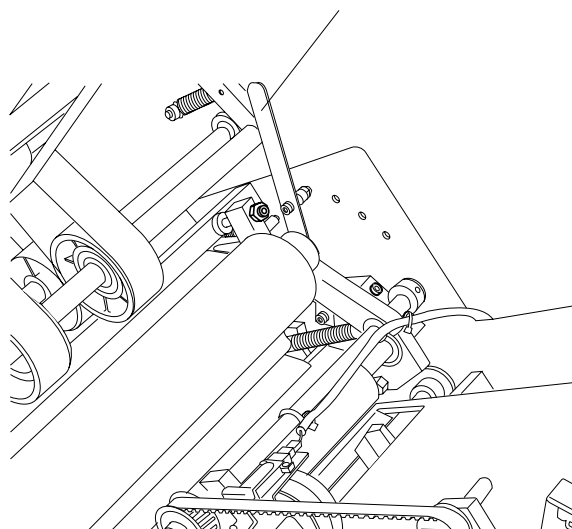
3-3-4 Fold Knife Against Roller Adjustment

Check that visible gaps A, B are provided between fold rollers and fold knife, moreover, A is equal to B.



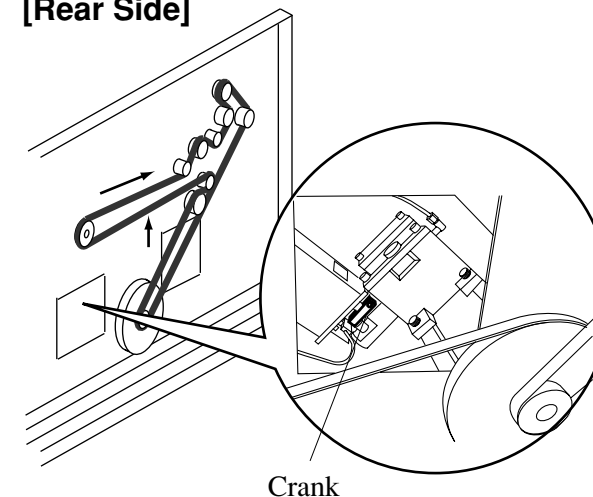
1. Turn off power switch.
2. Lift up bypass section.
3. Position fold roller gap adjust lever in second narrow position.

Fold Roller Gap Adjust Lever



4. Remove rear cover and position fold knife in the upper limit by rotating crank of knife motor through window on frame.

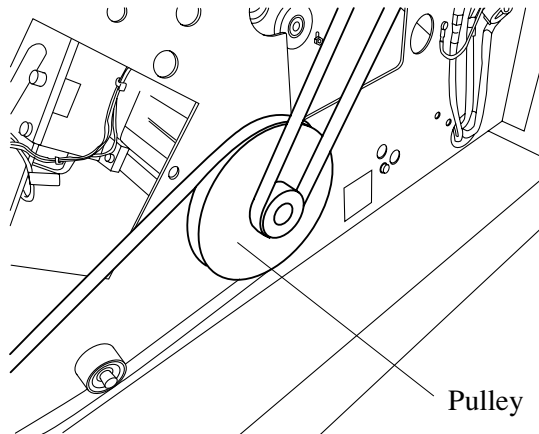
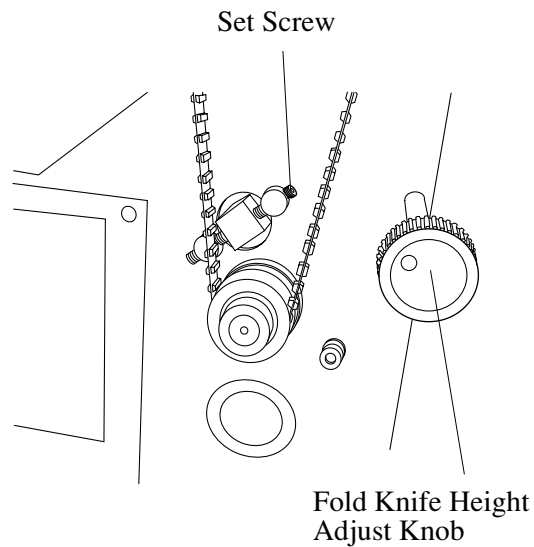
[Rear Side]



3-3 Adjustment In Fold Section

[SPF-20]

5. Check that visible gaps A, B are provided between fold rollers and fold knife, moreover, A is equal to B.
 - If adjustment is necessary, adjust projecting length of set screw so that gap A is equal to B.
 - Turn fold knife height adjust knob twice counterclockwise to lower fold knife by 1 mm.
6. Check that cycle of fold knife is repeated smoothly.



3-3 Adjustment In Fold Section

[SPF-20]

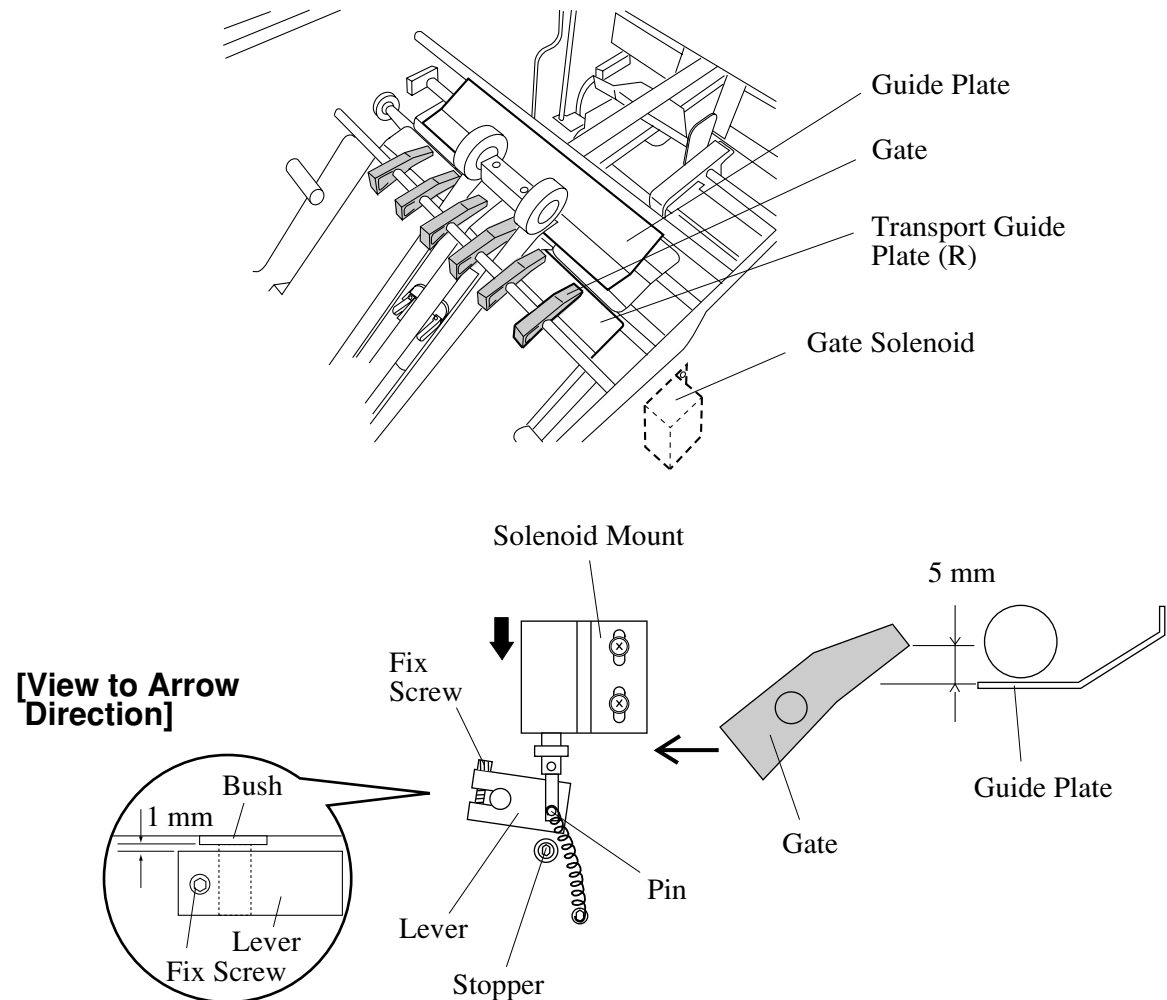
3-3-5 Fold / Non-Fold Solenoid Adjustment

Check that gap between gate and guide plate is about 5 mm.

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Loosen fix screw of solenoid lever and solenoid mount.
4. When lever is stopped by stopper, fix lever with fix screw so that gates are not in contact with transport guide plate (R).

NOTE

- Provide gap between lever and bush by about 1 mm to prevent sluggishness in movement of lever by frame distortion after attaching cover.
- Fix solenoid mount providing gap between gates and guide plate by about 5mm.



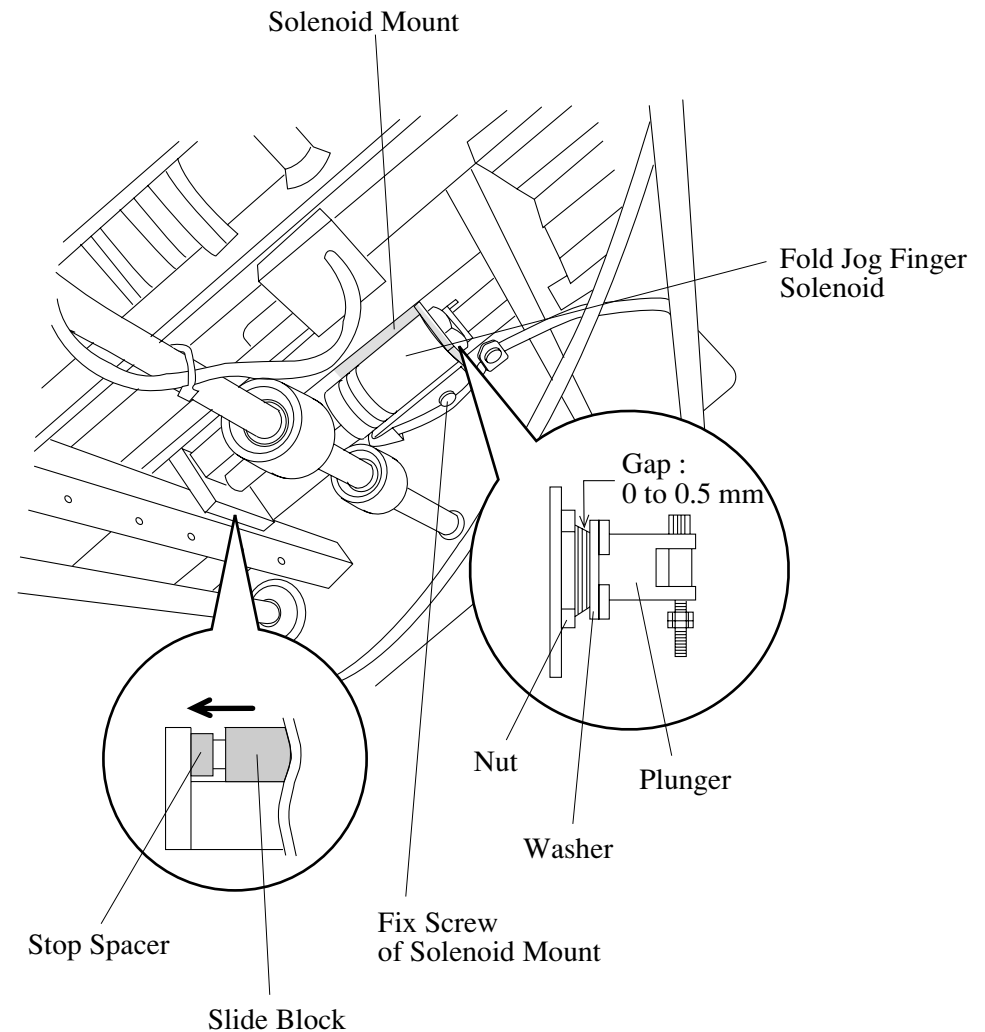
3-3 Adjustment In Fold Section

[SPF-20]

3-3-6 Fold Jog Finger Solenoid Adjustment

Check that a gap within a range of 0 to 0.5 mm is provided between nut and washer around plunger when touching slide block to stop spacer.

1. Turn off power switch.
2. Remove rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Loosen fix screws of solenoid mount.
4. Position solenoid mount so that a gap within a range of 0 to 0.5 mm is provided between nut and washer around plunger when touching slide block to stop spacer.



3-3 Adjustment In Fold Section

[SPF-20]

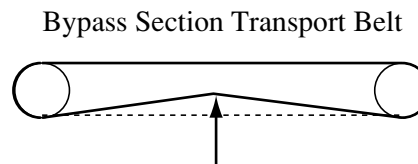
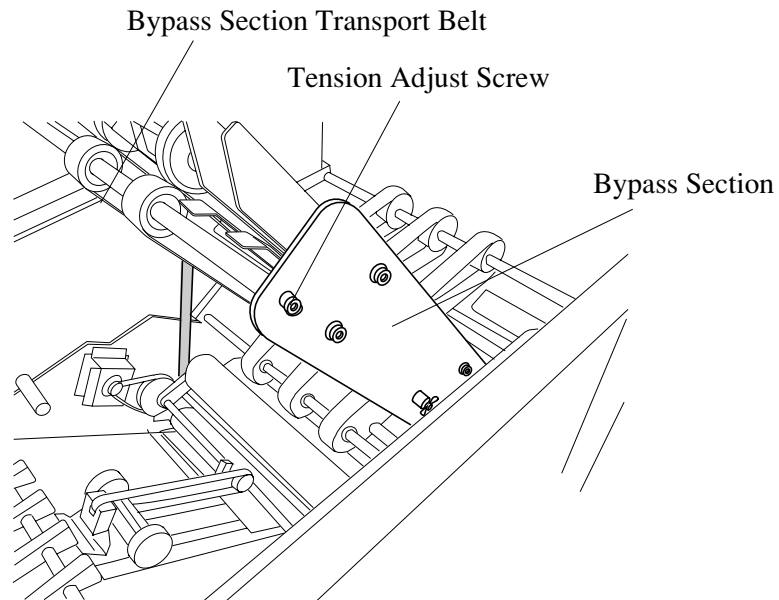
3-3-7 Bypass Section Transport Belt Tension Adjustment

Check that the belt is bent by 5 to 7 mm when the arrow part is pushed with 500 gf strength.

1. Turn off power switch.
2. Lift up bypass section.
3. Adjust belt tension with tension adjust screw so that the belt is bent by 5 to 7 mm when the arrow part is pushed with 500 gf strength.

NOTE

- Position tension adjust screw in the middle of slot to give proper tension when replacing with a new belt.



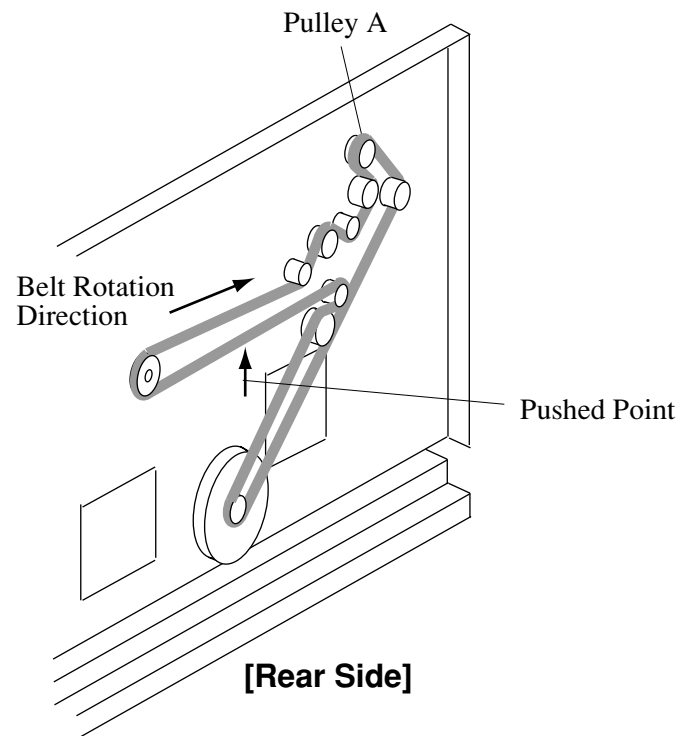
3-3 Adjustment In Fold Section

[SPF-20]

3-3-8 Fold Section Drive Belt Tension Adjustment

Check that the belt is bent by 7 to 9 mm when the arrow part is pushed with 500 gf strength.

1. Turn off power switch.
2. Remove rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Adjust the belt tension by positioning pulley A so that the belt is bent by 7 to 9 mm when the arrow part is pushed with 500 gf strength.



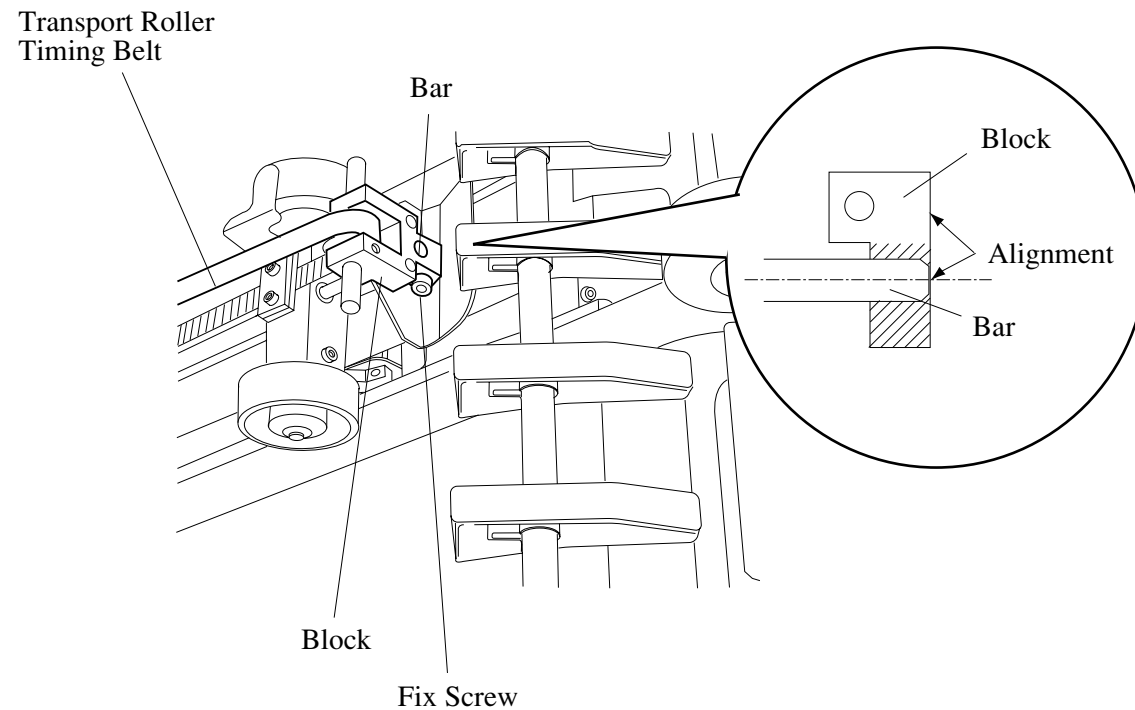
3-3 Adjustment In Fold Section

[SPF-20]

3-3-9 Transport Roller Timing Belt Tension Adjustment

Check that block is aligned with bar end.

- 1.** Turn off power switch.
- 2.** Lift up bypass section.
- 3.** Fix block with fix screw so that block is aligned with bar end.



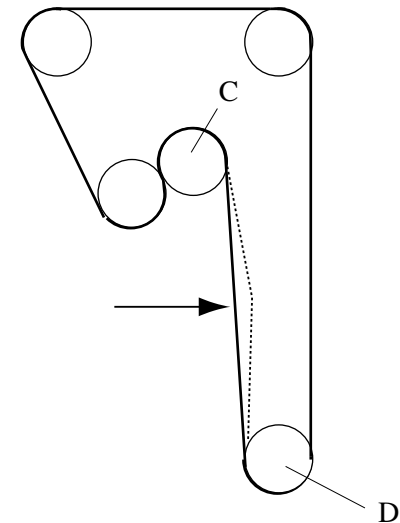
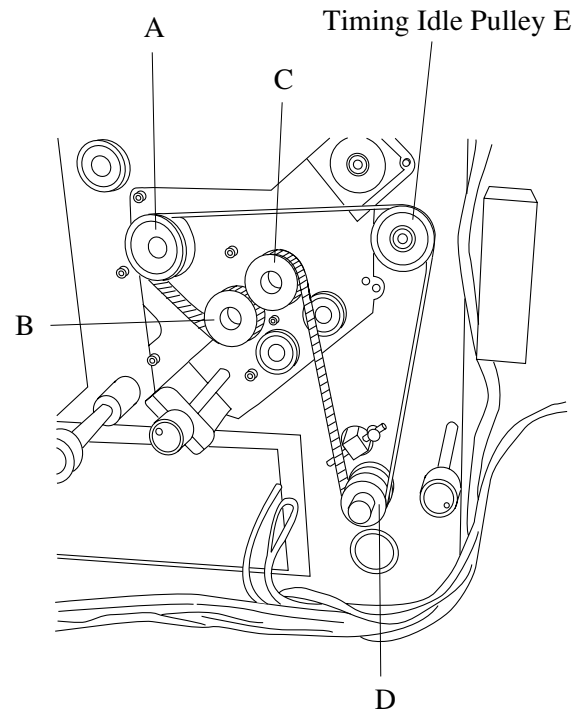
3-3 Adjustment In Fold Section

[SPF-20]

3-3-10 Fold Roller Timing Belt Tension Adjustment

Check that the belt is bent by 7 to 8 mm when the middle of belt between pulley C and pulley D is pushed with 500 gf strength after adjusting the fold roller gap to minimum with fold roller gap adjust lever.

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Adjust fold roller gap to minimum with fold roller gap adjust lever.
4. Adjust the belt tension by positioning timing idle pulley E so that the belt is bent by 7 to 8 mm when the middle of belt between pulley C and pulley D is pushed with 500 gf strength.



3-4 Adjustment In Trim Section

[FC-20]

3-4-1 Trim Knife and Stopper Parallel Adjustment

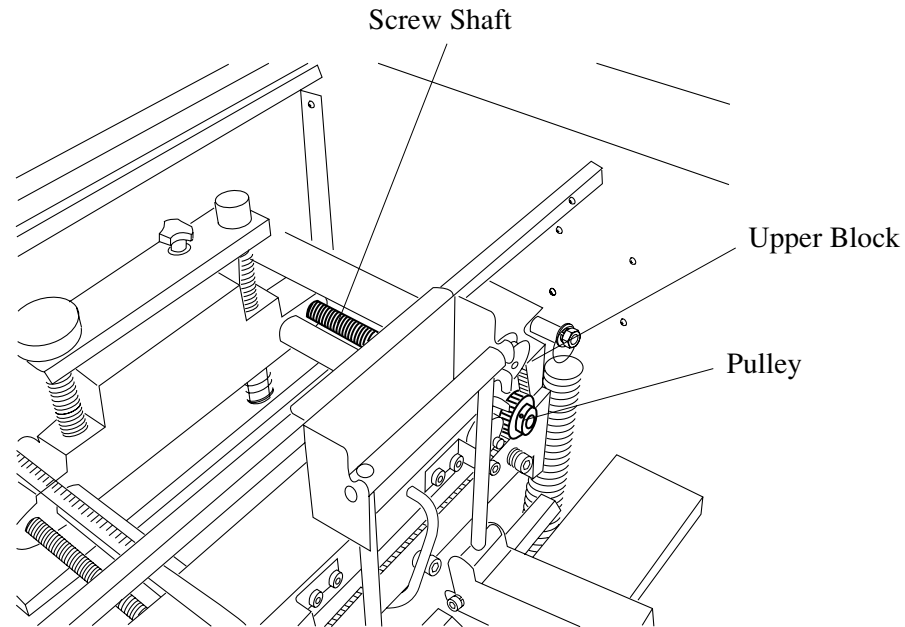
Check trimming accuracy on the booklet trimmed actually.

- 1.** Turn off power switch.
- 2.** Loosen a pulley. (1 fix screw)
- 3.** Adjust tilt of stopper by turning screw shaft with hand.
- 4.** Fix a pulley to shaft.

NOTE

- Fix the pulley so that it can be rotated smoothly without a play.

- 5.** Perform trimming performance once again and check the trimming accuracy.



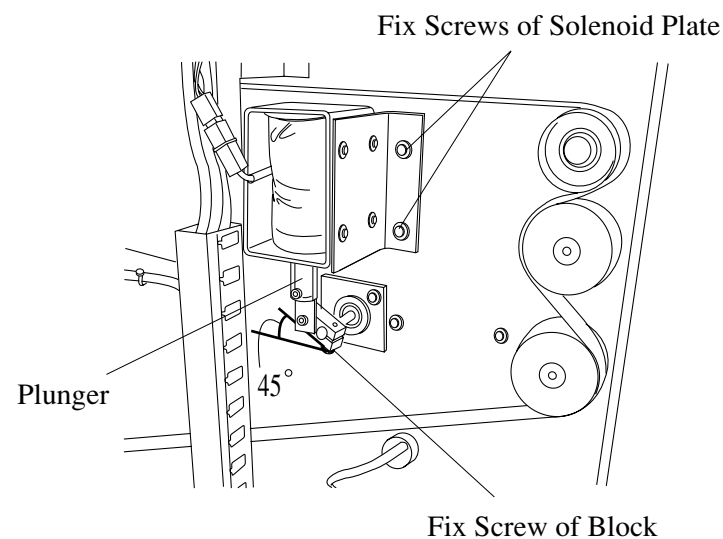
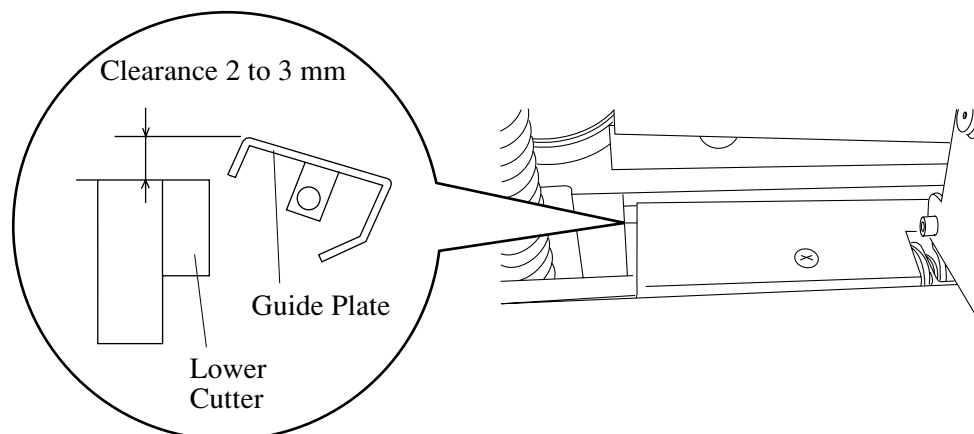
3-4 Adjustment In Trim Section

[FC-20]

3-4-2 Guide Plate Solenoid Adjustment

Check that clearance between guide plate and lower cutter is within a range of 2 to 3 mm when guide plate solenoid is activated.

1. Turn off power switch.
2. Remove rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Loosen fix screws of solenoid plate and block.
4. Fix block so that clearance between guide plate and lower cutter is within a range of 2 to 3 mm when guide plate solenoid is activated.
5. Attach front cover.



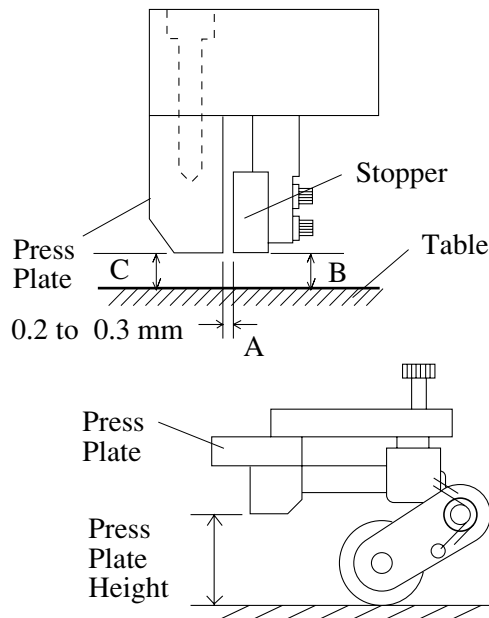
3-4 Adjustment In Trim Section

[FC-20]

3-4-3 Stopper Adjustment

Move upper block to upper dead point and lower press plate to bottom by turning press plate height adjust knob. And then check the following items below.

- 1. Clearance A is within a range of 0.2 to 0.3 mm.*
 - 2. Clearance B is less than 0.1 mm.*
 - 3. Clearance C is within a range of 6 to 8 mm.*
- And then raise press plate to upper limit, check the following items below.*
- 1. Clearance A is within a range of 0.2 to 0.3 mm.*
 - 2. Clearance C is within a range of 14 to 16 mm.*

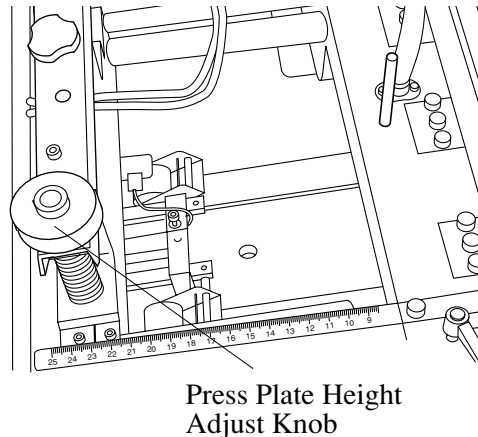


1. Turn off power switch.
2. Press system ON/OFF button in SPF-20.
3. Loosen fix screws of solenoid plate and block.

NOTE

- Upper block moves to upper dead point.

4. Lower press plate to bottom by turning press plate height adjust knob. And then



check the following items below.

1. Clearance A is within a range of 0.2 to 0.3 mm.
2. Clearance B is less than 0.1 mm.
3. Clearance C is within a range of 6 to 8 mm.

NOTE

- If stopper pushed by finger is touched to press plate, the gap of about 0.2 to 0.3 mm will be provided.

4. Stopper comes down under gravitation.

NOTE

- If items 1. and 2. mentioned above is not met, check that the fixing position of sensor ring which controls upper block stop position is correct referring to "3-4-4 Trim Knife Stop Position Adjustment".

5. Raise press plate to upper limit and check the following items below.

1. Clearance A is within a range of 0.2 to 0.3 mm.
2. Clearance C is within a range of 14 to 16 mm.
3. Stopper comes down under gravitation.
4. Press Plate Height Adjust Knob can be rotated smoothly.

3-4 Adjustment In Trim Section

[FC-20]

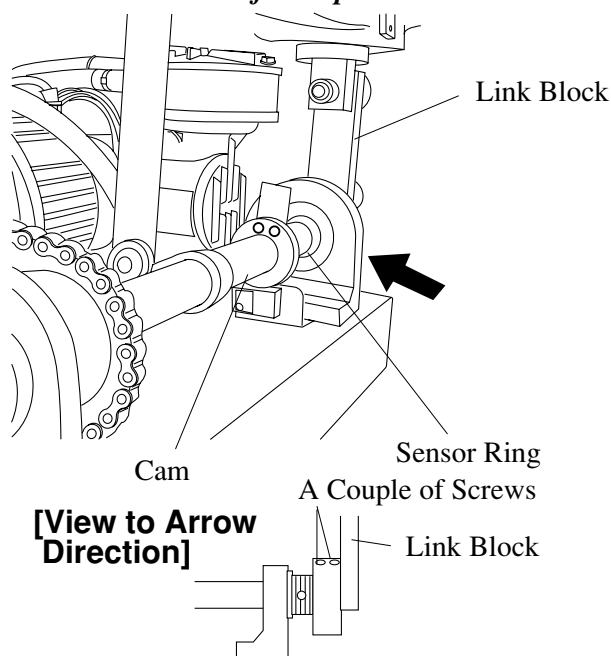
3-4-4 Trim Knife Stop Position Adjustment



WARNING

- Keep hands and fingers off trim knife and any moving parts. Otherwise personal injury may result.

When link block is stood vertically by pressing knife inching button, check that a couple of screws on crank face upward.



1. Turn on power switch.
2. Remove trimmings box.
3. Position upper block in upper dead point by pressing knife inching button.

NOTE

- When the link block is stood vertically, moreover, a couple of screws on crank face upward, upper block is positioned at upper dead point.

4. Turn off power switch.
5. Loosen fix screw of sensor ring and fix sensor ring so that sensor plate is over proximity switch.

NOTE

- Also, loosen cam at this time.

- Fix sensor ring being in contact with snap ring.

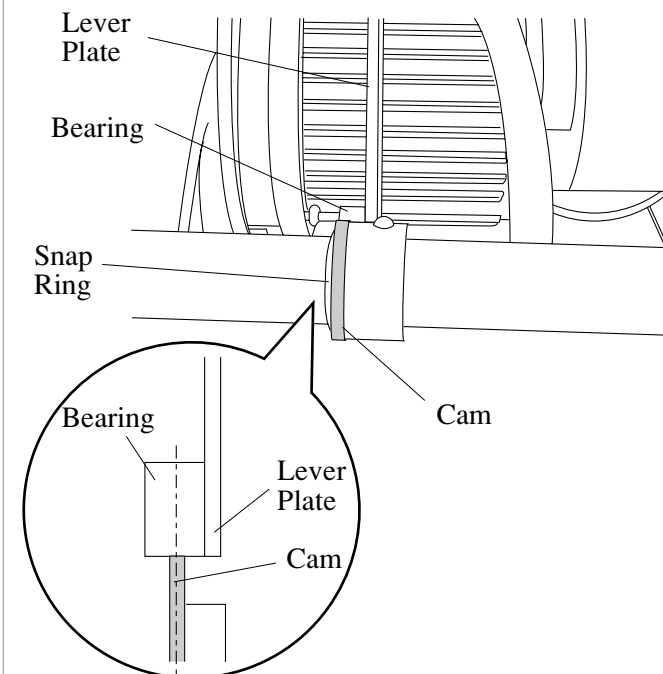
6. Turn on power switch.
7. Press system ON/OFF button in SPF-20.
- FC-20 belt motor stops and upper block stops in upper position.

8. Check that upper block is positioned in upper dead point.

NOTE

- Repeat step 4 to 8 mentioned above if readjustment is necessary.

9. Position cam in upper dead point.
- Fix cam contacting to snap ring.
- Fix cam in the middle of bearing.



3-4 Adjustment In Trim Section

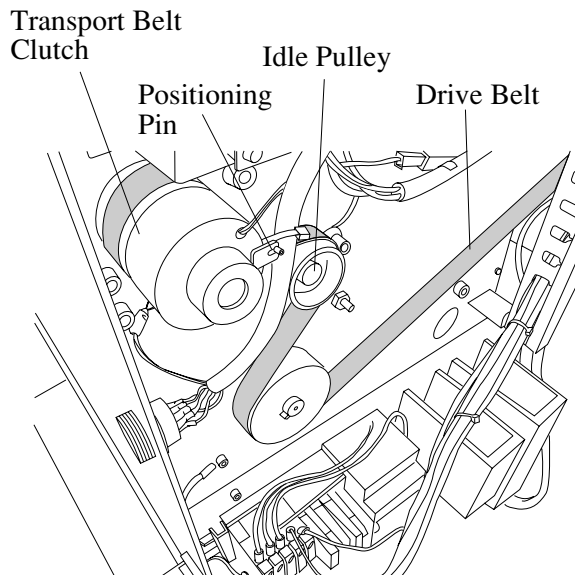
[FC-20]

3-4-5 Transport Belt Clutch Gap Adjustment

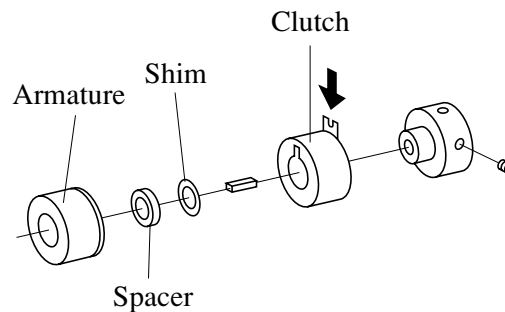
Measure a gap between spacer and clutch with thickness gauge.

- The correct gap is 0.2 ± 0.05 mm.

1. Turn off power switch.
2. Remove rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Loosen idle pulley to remove drive belt.



4. Measure a gap between spacer and clutch with thickness gauge. Adjust with shims so that the gap is 0.2 ± 0.05 mm.



NOTE

- When attaching the clutch, insert positioning pin to notch shown by arrow in the drawing above.

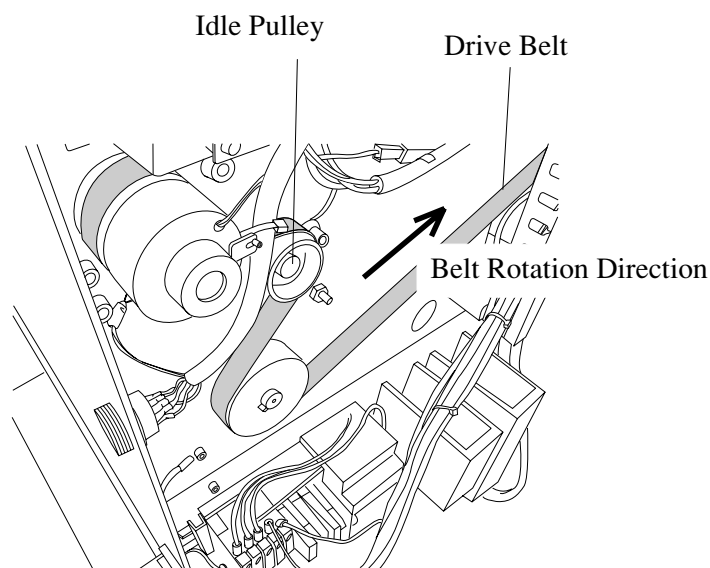
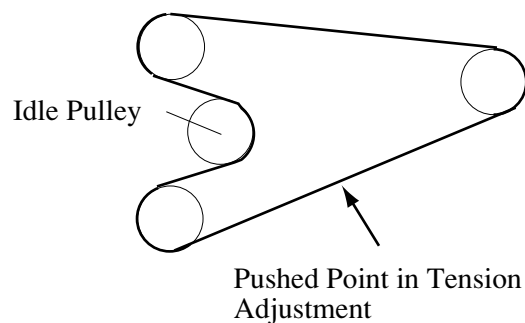
3-4 Adjustment In Trim Section

[FC-20]

3-4-6 Drive Belt Tension Adjustment

Check that the belt is bent by 9 to 11 mm when the arrow part is pushed with 500 gf strength.

1. Turn off power switch.
2. Remove rear, front and left cover. (Refer to “4-1 How to Remove Cover”.)
3. Adjust tension by positioning idle pulley so that the belt is bent by 9 to 11 mm when the arrow part is pushed with 500 gf strength.



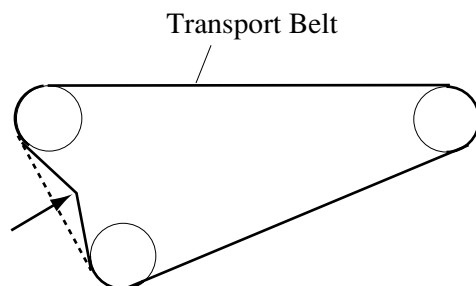
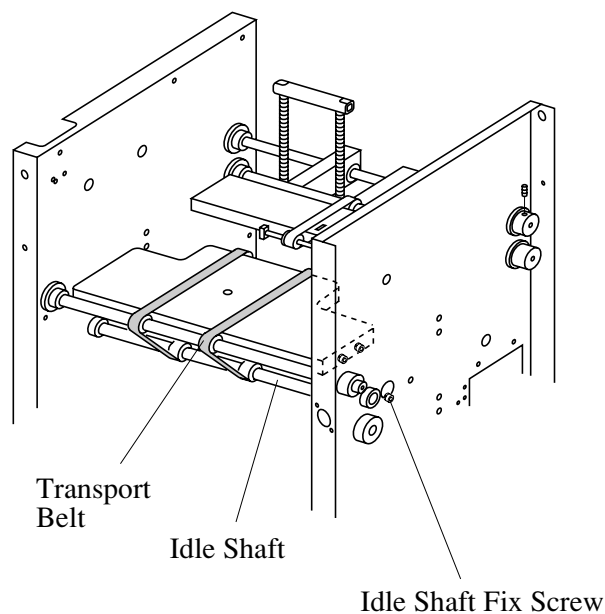
3-4 Adjustment In Trim Section

[FC-20]

3-4-7 Transport Belt Tension Adjustment

Check that the belt is bent by 2 to 4 mm when the arrow part is pushed with 500 gf strength.

1. Turn off power switch.
2. Remove rear, front and left cover. (Refer to “4-1 How to Remove Cover”.)
3. Adjust tension by positioning idle shaft so that the belt is bent by 2 to 4 mm when the arrow part is pushed with 500 gf strength.



4. Parts Replacement

4-1 How to Remove Cover

[SPF-20]

4-1-1 In-Feed Conveyor Cover

IF Front Cover

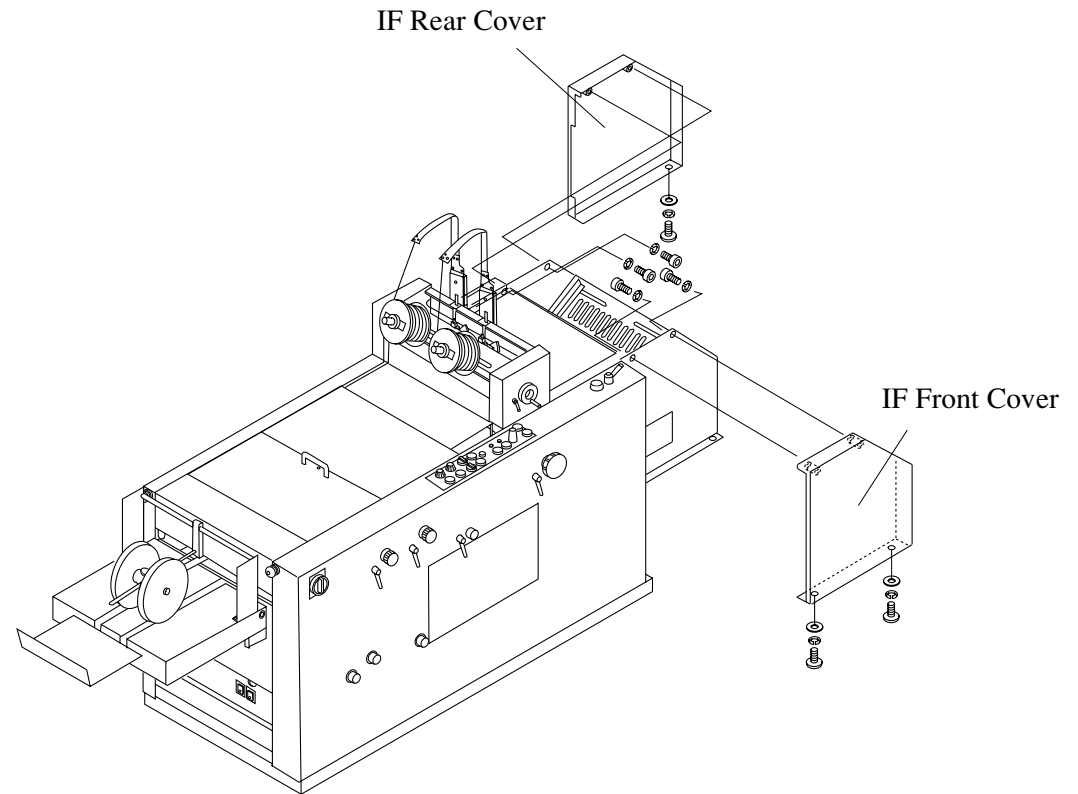
4 Fix Screws

NOTE

- When IF front cover can not be removed because SPF-20 front cover is in contact with IF cover, loosen fix screws of SPF-20 front cover (Refer to next page).

IF Rear Cover

4 Fix Screws



4-1 How to Remove Cover

[SPF-20]

4-1-2 SPF-20 Main Unit Cover

Front Cover

1. Remove adjust knobs B, C, E, G and I.

NOTE

- When removing adjust knob G and I, memorize the present points. And fix those knobs in same position when attaching.

2. Remove lock levers A, D, F, H and J.
3. Remove side cover (F) in stitch section.
(Refer to next page.)

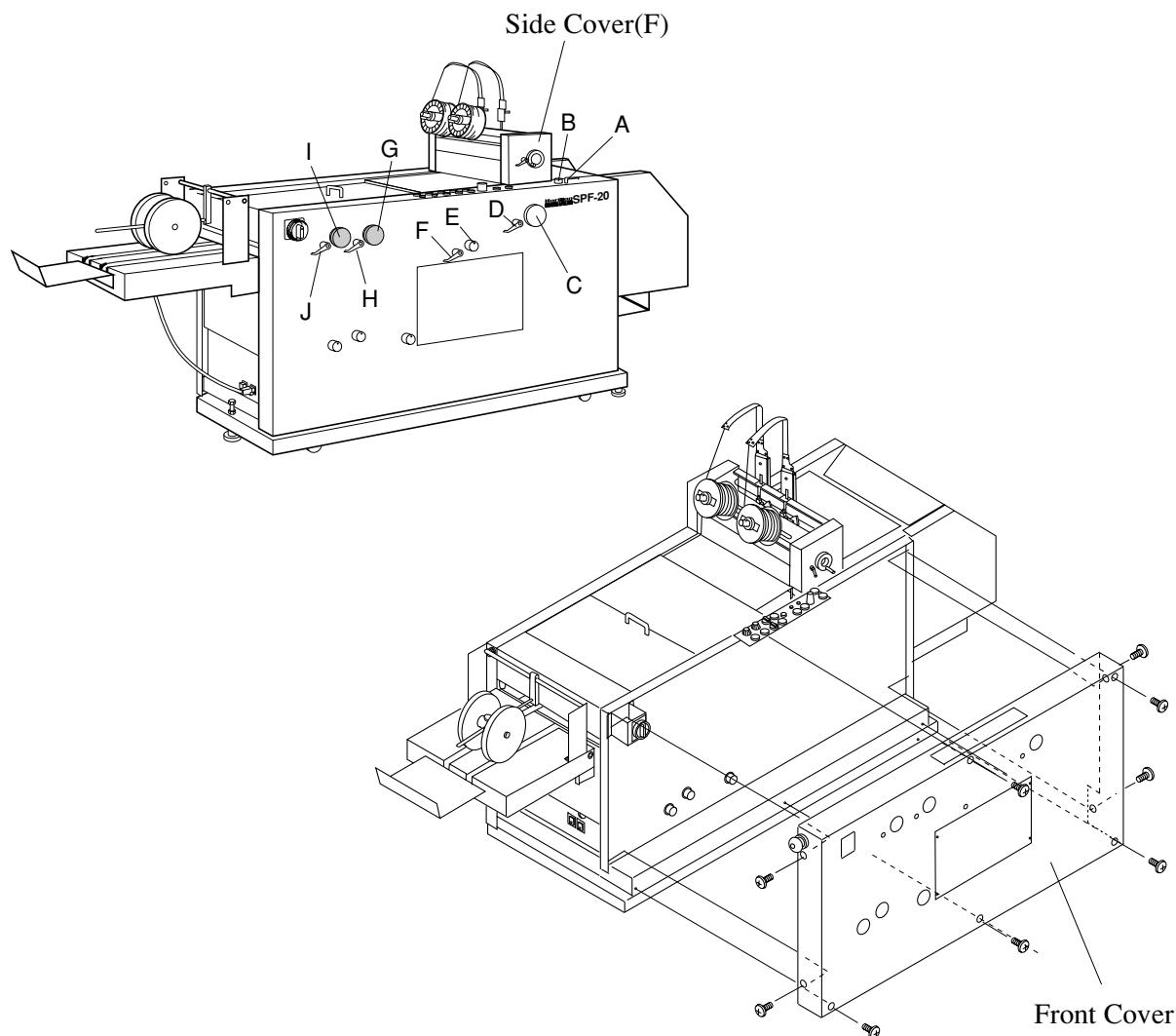
NOTE

- When front cover can not be removed because IF cover is in contact with the front cover, loosen fix screws of IF cover.

4. Remove the front cover.(8 fix screws)
5. Attach lock levers H and J.

NOTE

- Fix disc with lock levers to keep disc in present position during working.



4-1 How to Remove Cover

[SPF-20]

Rear Cover

8 Fix Screws

Left Cover

4 Fix Screws

Left Chassis Plate

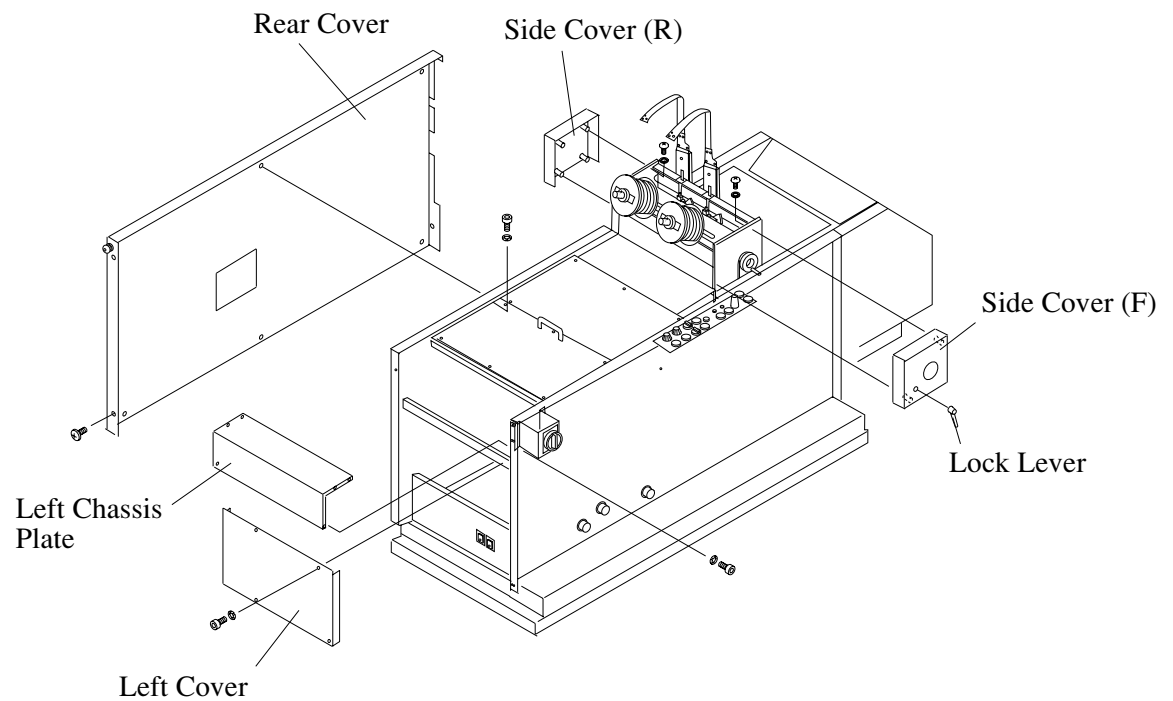
1. Remove front and rear cover.
2. Remove left chassis plate.(6 Fix Screws)

Side Cover (F)

1 Lock Lever and 2 Fix Screws

Side Cover (R)

2 Fix Screws



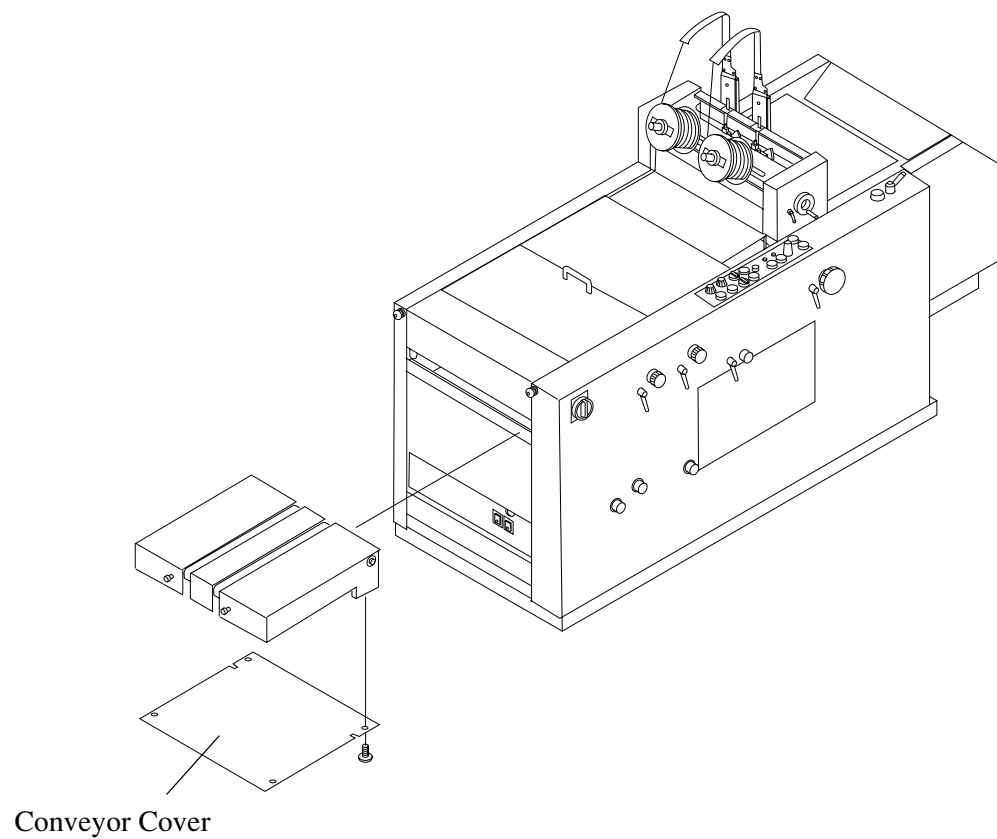
4-1 How to Remove Cover

[SPF-20]

4-1-3 Conveyor Cover

Conveyor Cover

4 Fix Screws



4-1 How to Remove Cover

[FC-20]

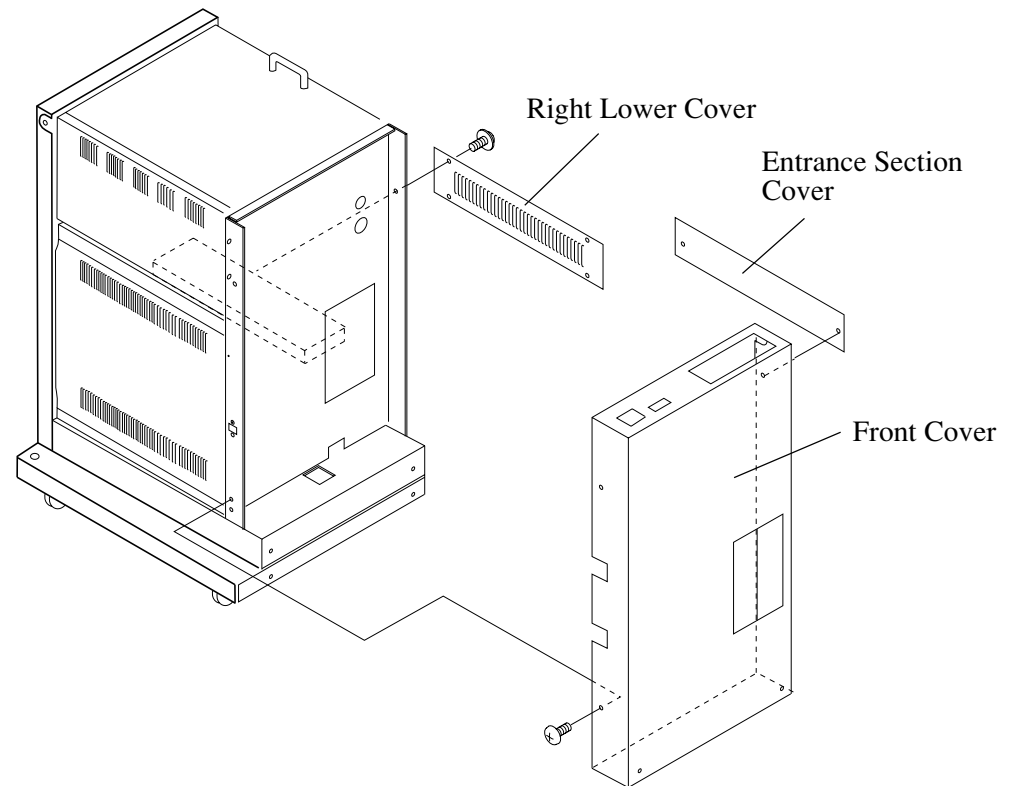
4-1-4 Trim Section (FC-20) Cover

Front Cover

1. Remove entrance section cover. (2 Fix Screws)
2. Remove front cover. (6 Fix Screws)

Right Lower Cover

1. Remove trimmings box.
2. Remove right lower cover. (4 Fix Screws)



4-1 How to Remove Cover

[FC-20]

Rear Cover

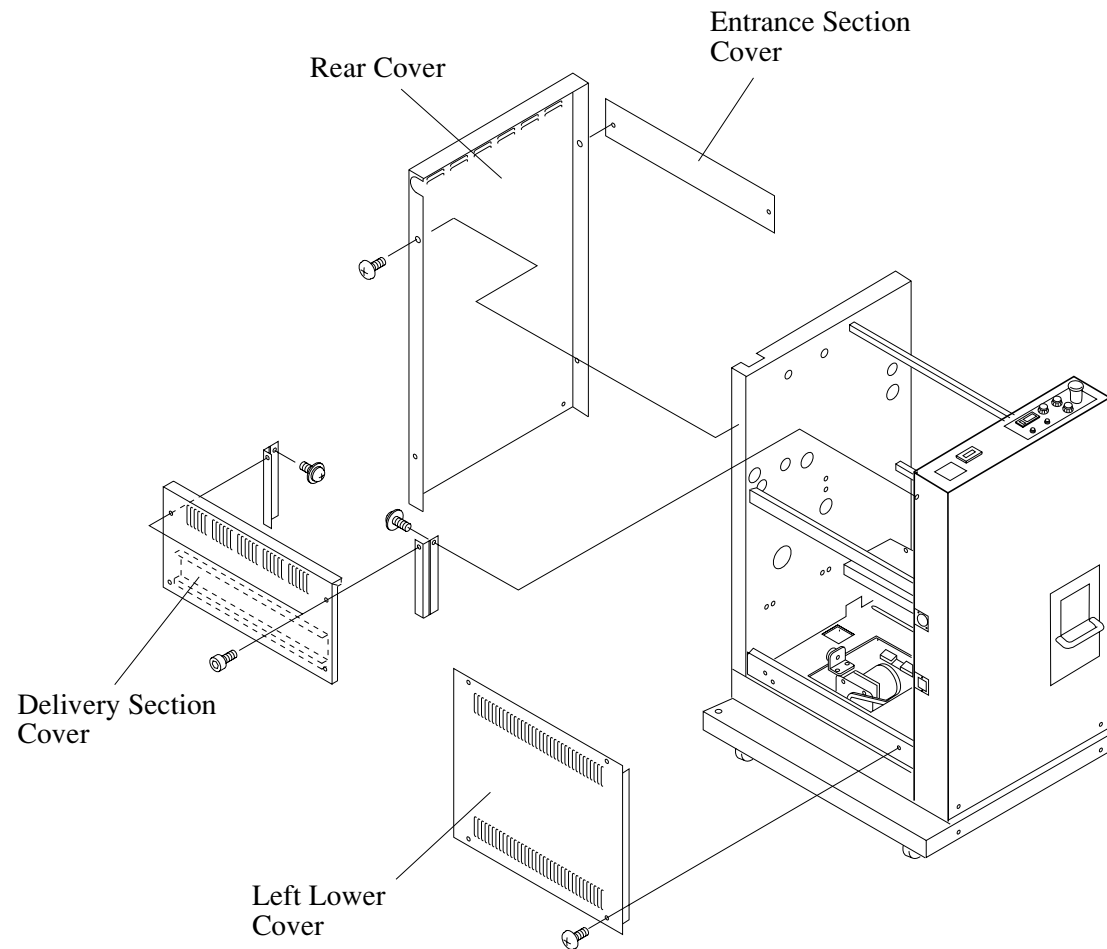
1. Remove entrance section cover. (2 Fix Screws)
2. Remove rear cover. (5 Fix Screws)

Left Lower Cover

4 Fix Screws

Delivery Section Cover

4 Fix Screws



4-2 Parts Replacement

[SPF-20]

4-2-1 Carry Belt Replacement

(Removal)

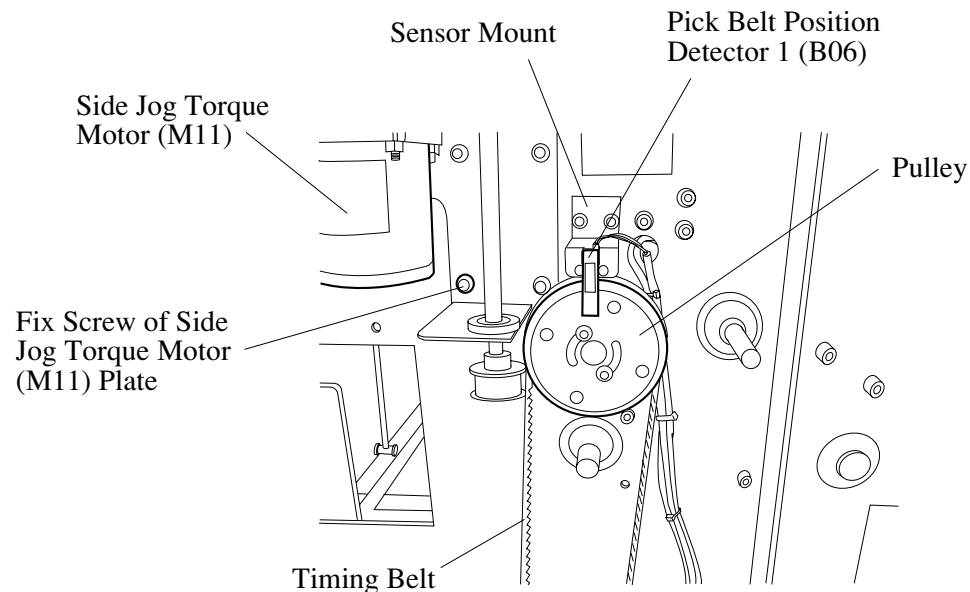
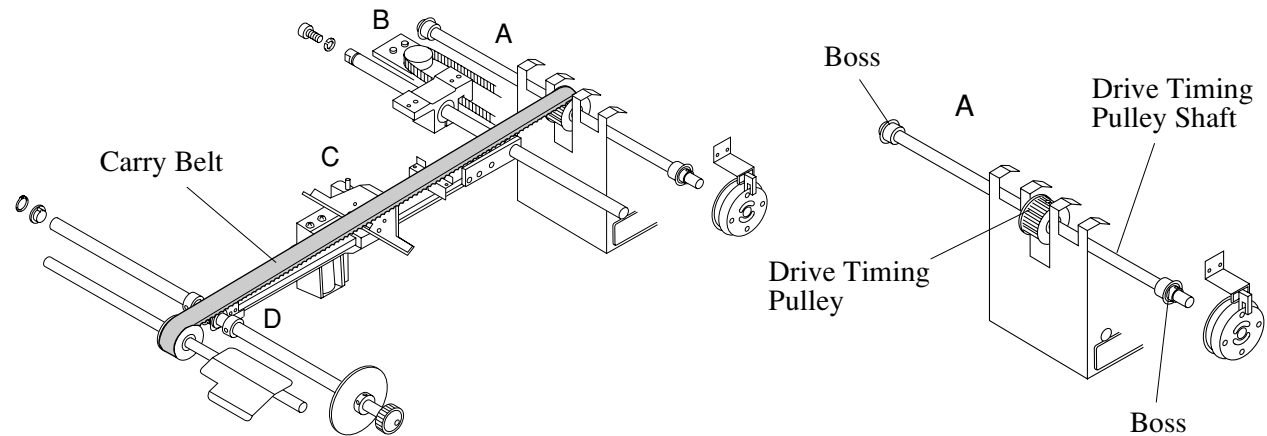
1. Remove carry belt after cutting the belt.

(Attachment)

1. Turn off power switch.
2. Remove front and rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Remove jog guide.

(Apply carry belt to the section A, B, C and D in order following the procedures below.)

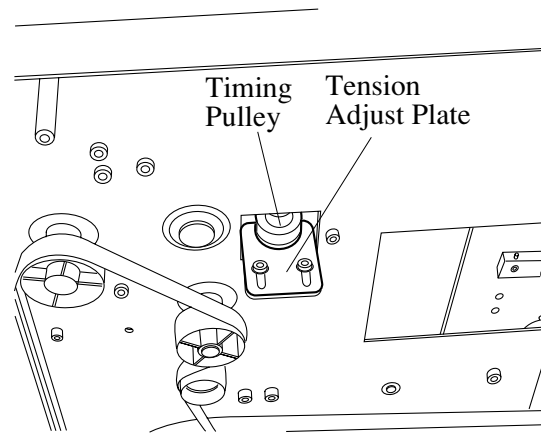
4. Attach carry belt to drive timing pulley shaft in section A.
 - a. Remove sensor mount with pick belt position detector 1 (B06).
 - b. Remove timing belt and loosen fix screw of drive timing pulley.
 - c. Loosen fix screw of bosses on both side.
 - d. Move side jog torque motor (M11) plate (4 fix screws) to keep a space to slide pulley towards operation side.
 - e. Pass carry belt through clearance produced by sliding drive timing pulley shaft towards operation side. And apply the carry belt to drive timing pulley in the middle of shaft.



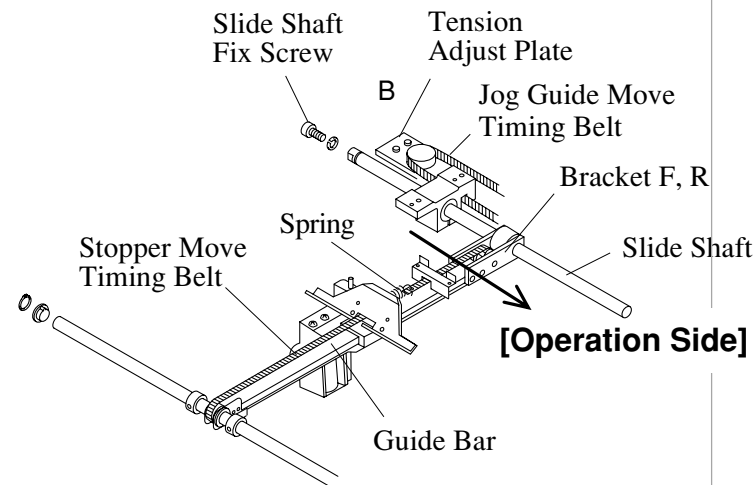
4-2 Parts Replacement

[SPF-20]

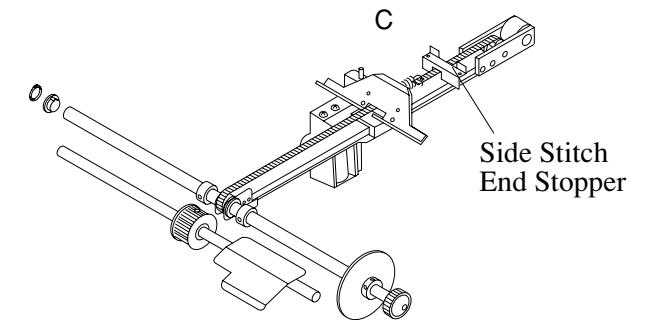
- 5.** Apply carry belt to jog guide move timing belt and slide shaft in section B.
- Remove jog guide move timing belt by loosening fix screws of tension adjust plate. And cross carry belt to jog guide move timing belt.
 - Remove fix screws of bracket F and R.
 - Remove slide shaft fix screw on anti-operation side.
 - Pass carry belt to clearance between slide shaft and frame.



NOTE
- Remove spring of stopper move timing belt, and take carry belt to operation side across guide bar and stopper move timing belt.



- 6.** Apply carry belt to side stitch end stopper in section C.
- Remove side stitch end stopper.
 - Apply carry belt and attach side stitch end stopper.

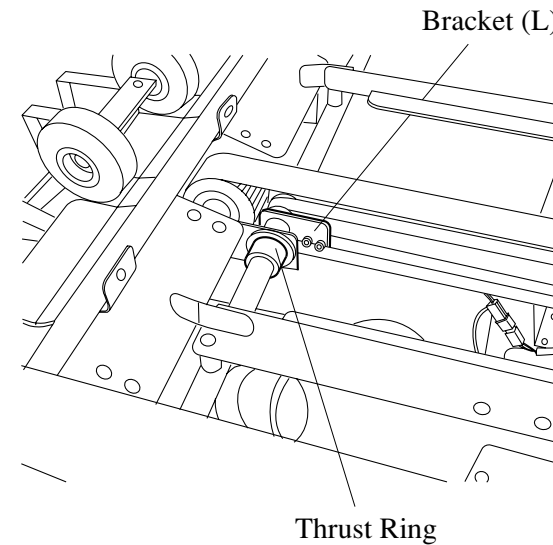
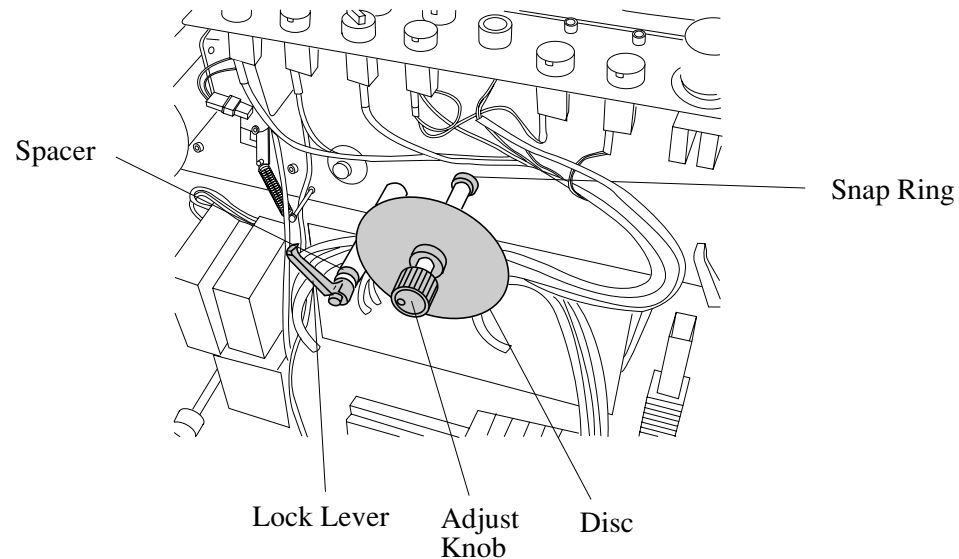
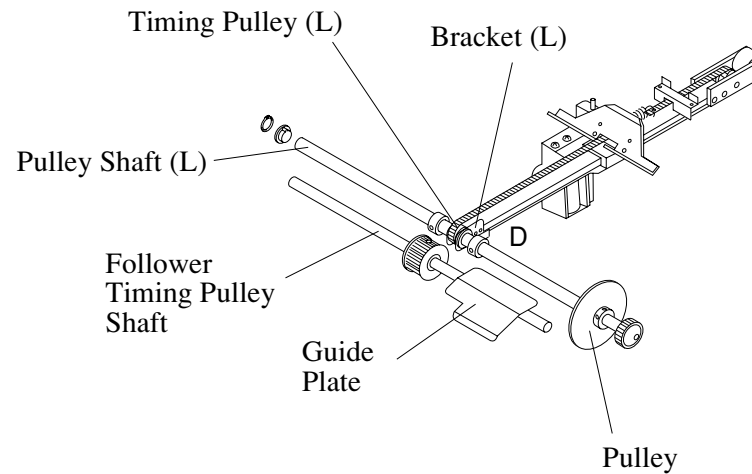


4-2 Parts Replacement

[SPF-20]

7. Cross carry belt over pulley shaft(L) and follower timing pulley shaft in section D.

- a. Remove lock lever and spacer.
- b. Remove adjust knob, disc and snap ring.
- c. Remove fix screw of bracket(L).
- d. Loosen thrust rings.
- e. Loosen timing pulley (L).



4-2 Parts Replacement

[SPF-20]

- f. Remove connector of saddle stitch end stopper home position proximity switch and pass carry belt through clearance provided by sliding pulley shaft (L) to anti-operation side.
 - g. Remove guide plate and guide block on operation side.
 - h. Remove blocks on both side.
 - i. Pass carry belt through clearance provided by sliding pulley shaft (L) to anti-operation side.
- 8.** Attach carry belt to both timing pulleys and restore all parts removed.

NOTE

- Attach each component so that carry belt is positioned in the middle of the machine.
- Perform carry belt timing adjustment.
(Refer to “3-1-1 Carry Belt Timing Adjustment”).

4-2 Parts Replacement

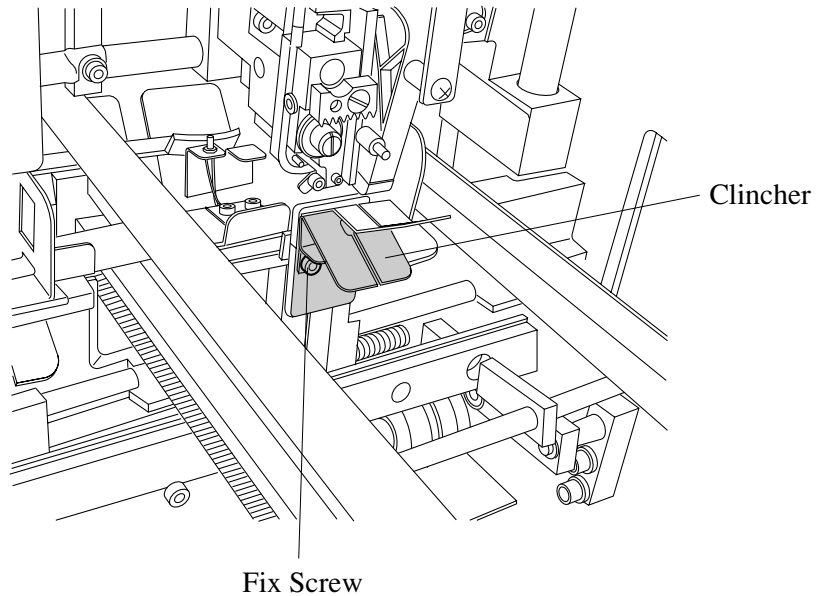
[SPF-20]

4-2-2 Clincher Replacement

1. Turn off power switch.
2. Open safety cover (R).
3. Replace clincher (2 fix screws).

NOTE

- Refer to “3-2-3 Clincher Adjustment” for regarding clincher fix position.



4-2 Parts Replacement

[SPF-20]

4-2-3 Fold Knife Replacement



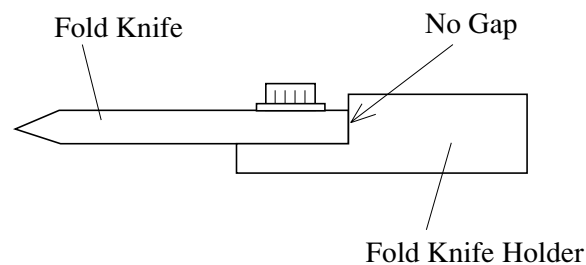
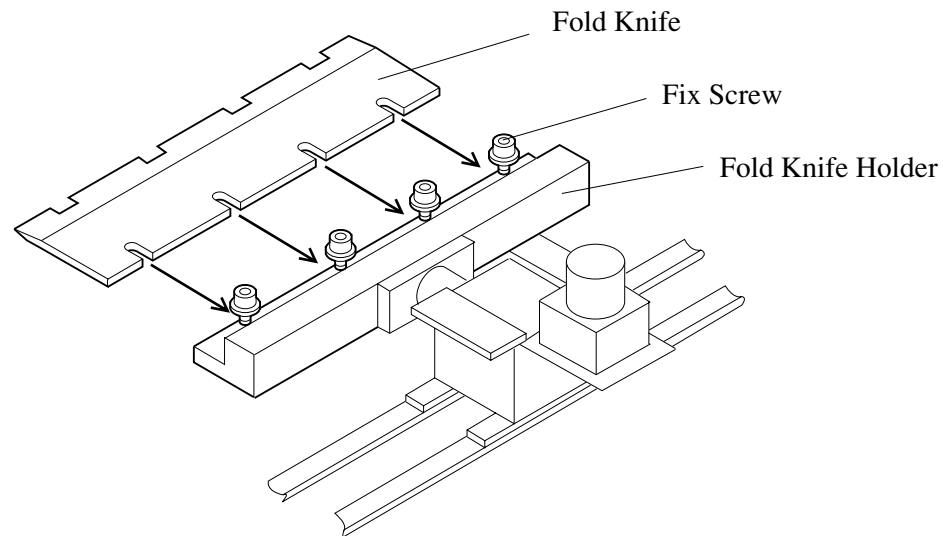
WARNING

- Wear leather grooves on your hands when handling knife. Otherwise sharp knife can cause severe personal injury.

1. Turn off power switch.
2. Remove rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Position fold knife in the lower limit.
4. Remove fold knife by loosening 4 fix screws.
5. Attach new fold knife with fix screws. (Standard torque : 30 kg/cm)

NOTE

- Attach fold knife so that no gap is provided between the bottom of fold knife and knife holder.



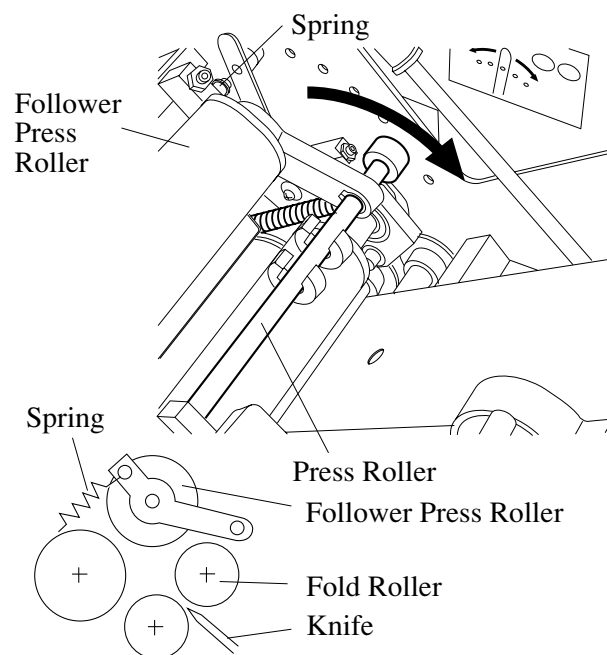
4-2 Parts Replacement

[SPF-20]

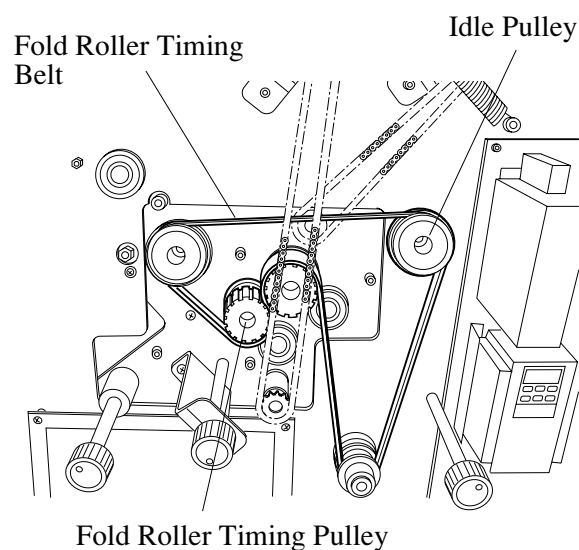
4-2-4 Fold Roller Replacement

(Replacement of Both Fold Rollers)

1. Turn off power switch.
2. Remove front and rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Remove spring (one provided on each side) of follower press roller and fall to the arrow direction shown in the drawing below.



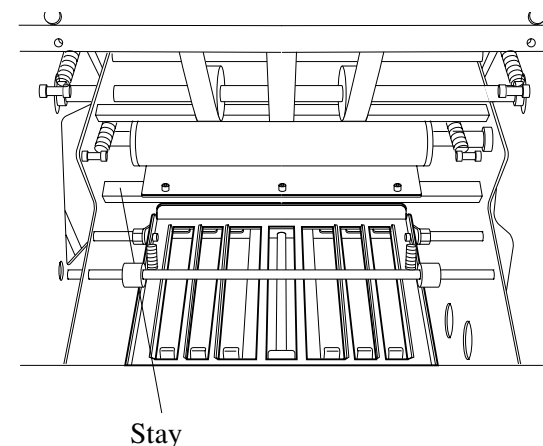
4. Remove fold roller timing belt by loosening idle pulley.



5. Remove fold roller timing pulley.
6. Remove bearing for fold roller (Parts Book : Fig.25-13).
7. Remove upper fold roller.
8. Remove lower fold roller in same procedure.
9. Attach new fold rollers in the reverse order of removal.

(Replacement of Both Fold Rollers)

1. Turn off power switch.
2. Remove front, rear and left cover. (Refer to “4-1 How to Remove Cover”.)
3. Remove a stay.



- 4 to 9. Follow the procedures from step 4 in replacement of both fold rollers.

4-2 Parts Replacement

[FC-20]

4-2-5 Cut Knife Replacement

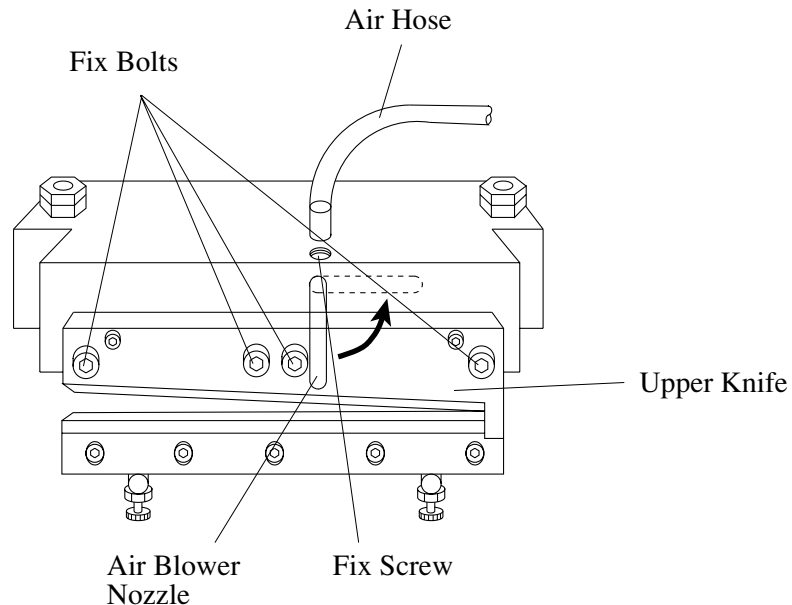


WARNING

- *Wear leather gloves on your hands when handling knife. Otherwise sharp knife can cause severe personal injury.*
- *Turn off power switch of SPF-20 before replacing knife.*

(Upper Knife)

- 1.** Turn off power switch.
- 2.** Loosen fix screw and turn air blower nozzle to the arrow direction in the drawing at right.
- 3.** Remove four set of fix bolts and springs and then remove upper knife.
- 4.** Attach upper knife in the reverse order of removal.



4-2 Parts Replacement

[FC-20]

(Lower Knife)

WARNING

- Wear leather groves on your hands when handling knife. Otherwise sharp knife can cause severe personal injury.
- Turn off power switch of SPF-20 before replacing knife.

1. Remove upper knife referring to “4-2-5 Fold Knife Replacement - Upper Knife.
2. Remove guide plate (2 fix screws).

NOTE

- Remove fix screws of guide plate supporting the plate horizontally.

3. Hold lower knife and remove 5 fix bolts and then remove lower knife.
4. Attach lower knife in the reverse order of removal.

NOTE

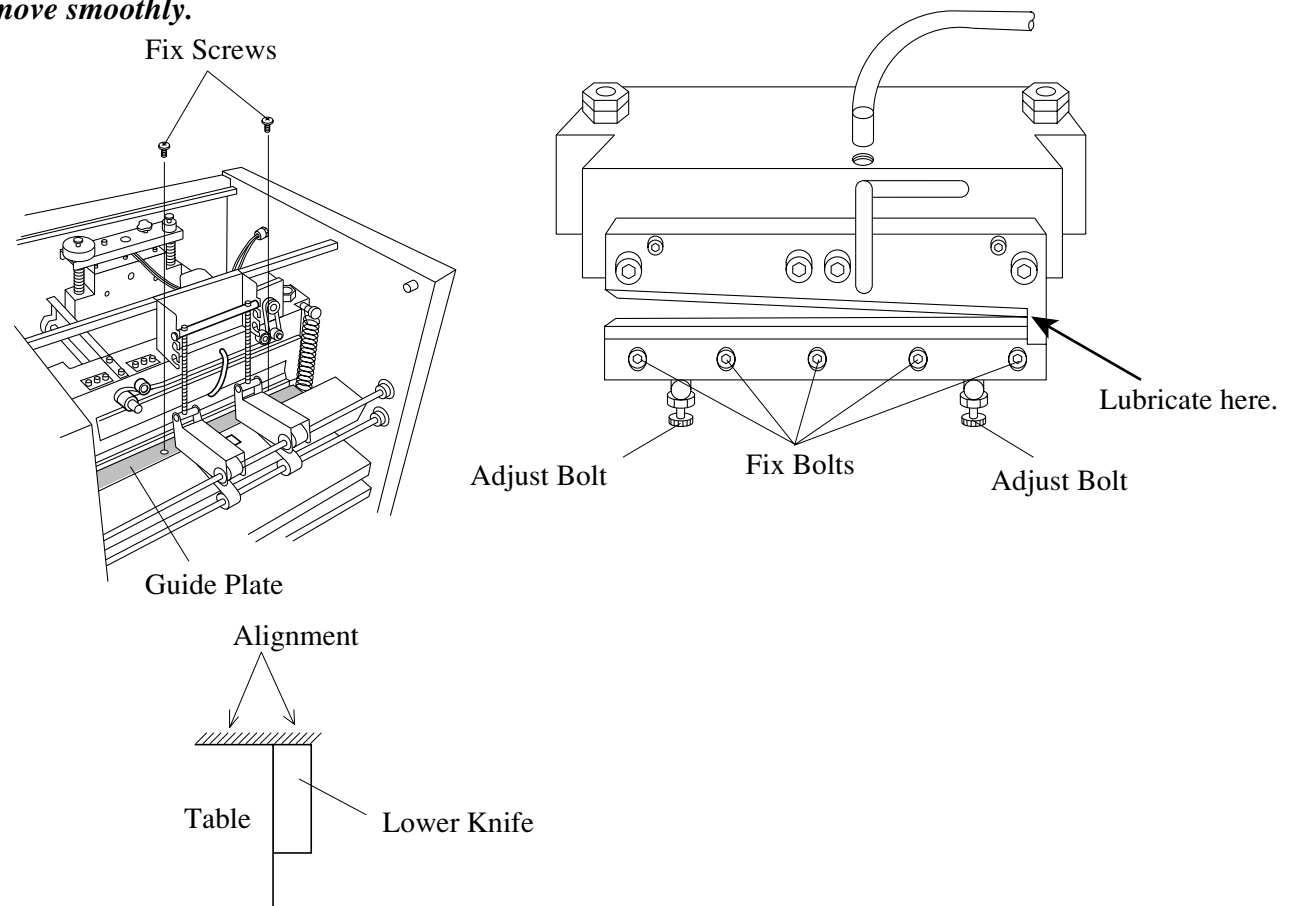
- After lower knife is resharpened, adjust the lower knife height using adjust bolts so that it is aligned with table.

5. Attach guide plate.
6. Lubricate the part where the arrow mark indicates in the drawing at right.

7. Attach upper knife.

NOTE

- Before starting operation, press knife inching button several times and check that knives move smoothly.

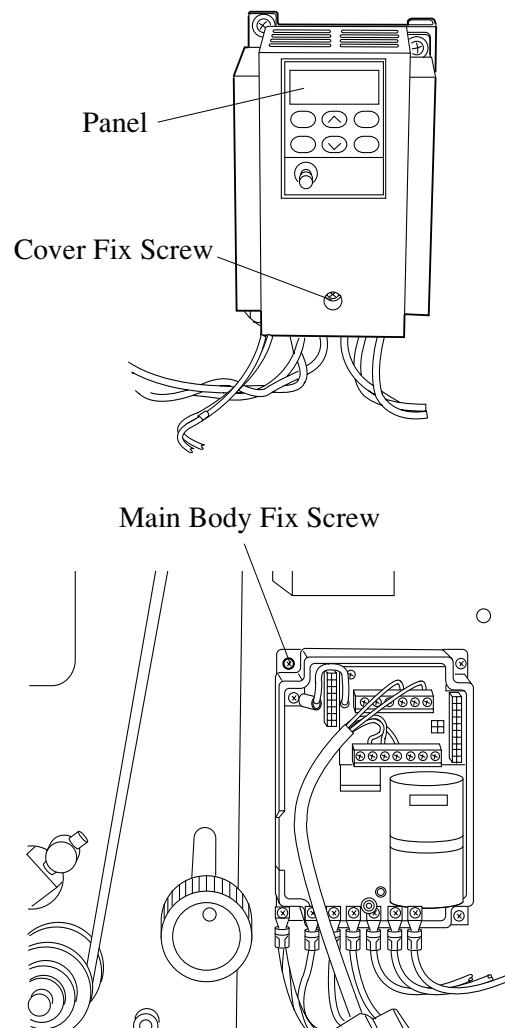


4-2 Parts Replacement

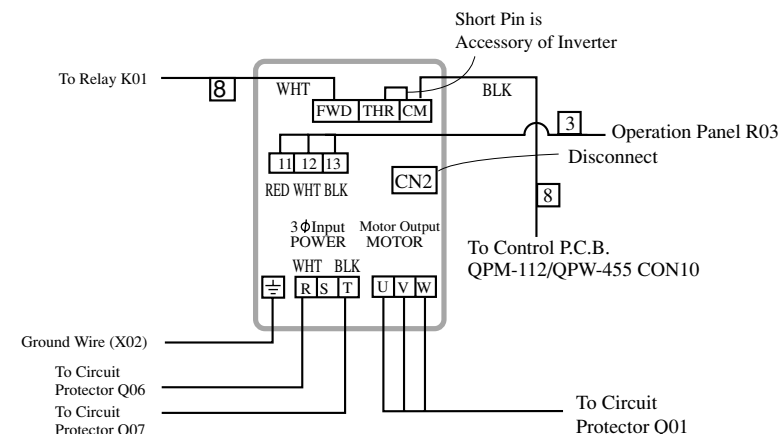
[SPF-20]

4-2-6 Inverter Replacement

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Remove cover of inverter. (Refer to “5-1-5 P.C.B., Power Supply and Other Electrical Parts Layout”)
4. Remove main body of inverter (2 fix screws) after removing panel and wire.
5. Remove cover of new inverter and install new inverter main body to chassis.
6. Wire referring to the drawing at right. Refer to the next page for the wiring of the inverter installed on the SPF-20 S/N 026001 or above.
7. Set up inverter after turning on power switch. (Refer to following page.)



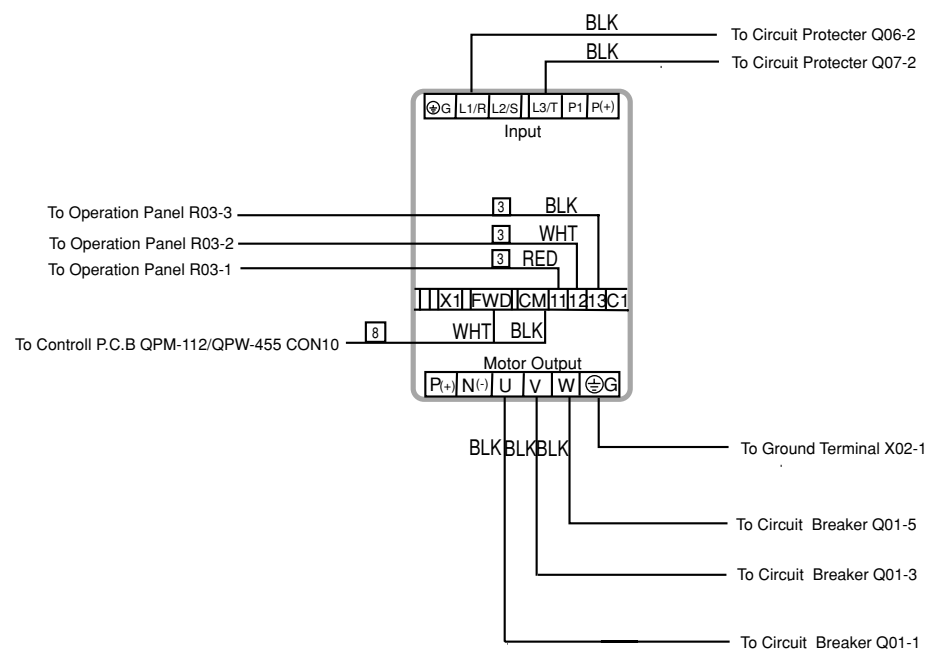
Wiring for SPF-20 is applicable to S/N025999 or below



4-2 Parts Replacement

[SPF-20]

Wiring for SPF-20 is applicable to S/N026001 or above






4-2 Parts Replacement

[SPF-20]


4-2-6 Inverter Replacement

(Inverter Initial Set Up) Indication on Monitor



1. Turn on power switch and check that the figure indicated on display blinks. — **60.0 (Blink)**
2. Check that indication on monitor is varied from 0 to 60 with turning belt speed knob on operation panel. And set up 60 Hz. — **60.0 (Blink)**
3. Press  key once. — **F00**
4. Press  key or  key several time to indicate F02 on display. — **F02**




NOTE

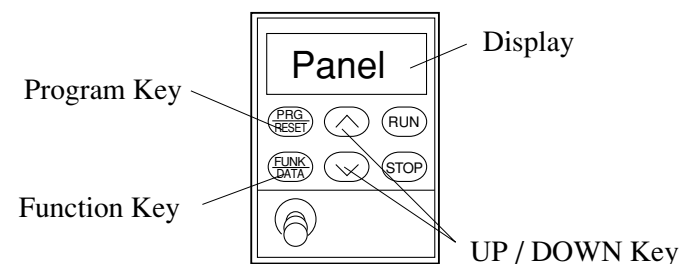
- The indication on display varies from F01 to F33.



5. Press  key once. — **0**

NOTE

- When  key is pressed on wrong number, setup can be performed from step 3 again by pressing  key.

6. Press  key or  key to set up 1. — **1**
7. Press  key once to memorize the data, and the indication is F03. — **F03**



8. Set up 0.5 , 0.5 and 66 on F05, F06 and F26 respectively by repeating from step 4 to 7. — **0.5, 0.5, 66**
9. Press  key once to indicate F27 on display. — **F27**
10. Press  key once to finish the setup . — **60.0 (Blink)**

NOTE

- When input incorrect data on the setup, re-input initial set figure discribed in next page referring to step 2 to 7 and 11.

4-2 Parts Replacement

[SPF-20]

Set Figure List () shows the value of the inverter setting on SPF-20 S/N 026001 or above.

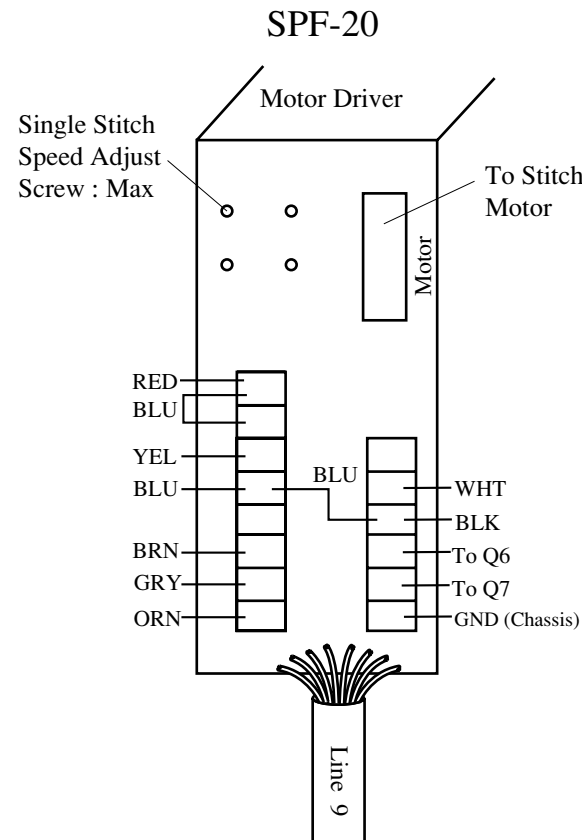
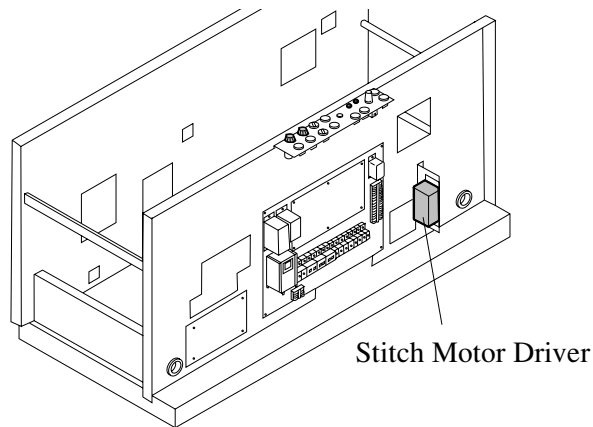
Code	Initial Figure	Set Figure	Code	Initial Figure	Set Figure	Code	Initial Figure	Set Figure
F 00	0	0	F 12	50(5)	50(5)	F 24	100(0)	100(0)
F 01	1	1(4)	F 13	0.1(-)	0.1(-)	F 25	0(1)	0(1)
F 02	0(1)	1(2)	F 14	1	1	F 26	0(2)	66(2)
F 03	60	60	F 15	5(70)	5(70)	F 27	0	0
F 04	60	60	F 16	- (0)	- (0)	F 28	0(-)	0(-)
F 05	6.0(0)	0.5(0)	F 17	0	0	F 29	10(-)	10(-)
F 06	6.0(0)	0.5(0)	F 18	0(40)	0(0)	F 30	20(100)	20(100)
F 07	13(0.5)	13(6.0)	F 19	4(-)	4(-)	F 31	30(0)	30(0)
F 08	0(0.5)	0(6.0)	F 20	3	3	F 32	85(-)	85(-)
F 09	100(13)	100(13)	F 21	0	0	F 33	0(-)	0(-)
F 10	0(1)	0(1)	F 22	0	0	F 36	(0)	(0)
F 11	0 (Motor rated current)	0 (Motor rated current)	F 23	0(1)	0(1)			

4-2 Parts Replacement

[SPF-20]

4-2-7 Stitch Motor Driver Replacement

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Remove wiring and driver main body. (Main body 2 fix screws)
4. Attach new driver and wire.



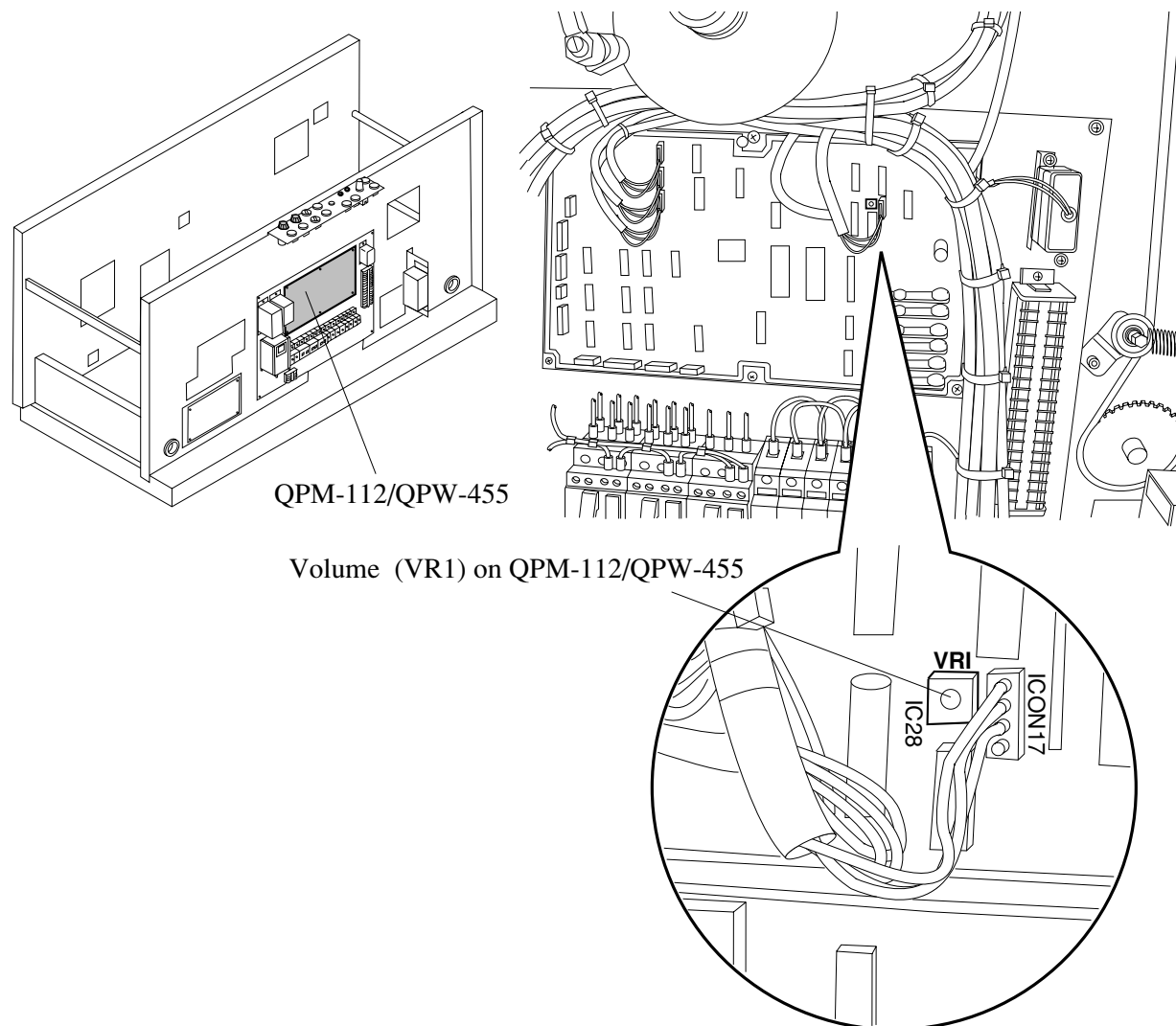
4-2 Parts Replacement

[SPF-20]

5. Turn on power switch.
6. Measure stitch cycle time by pressing stitcher inching button and adjust with VR1 on QPM-112/QPW-455 so that the stitch cycle time is 1.4 to 1.6 sec.

NOTE

- *Stitch cycle time is reduced with turning the volume (VR1) clockwise.*



4-2 Parts Replacement

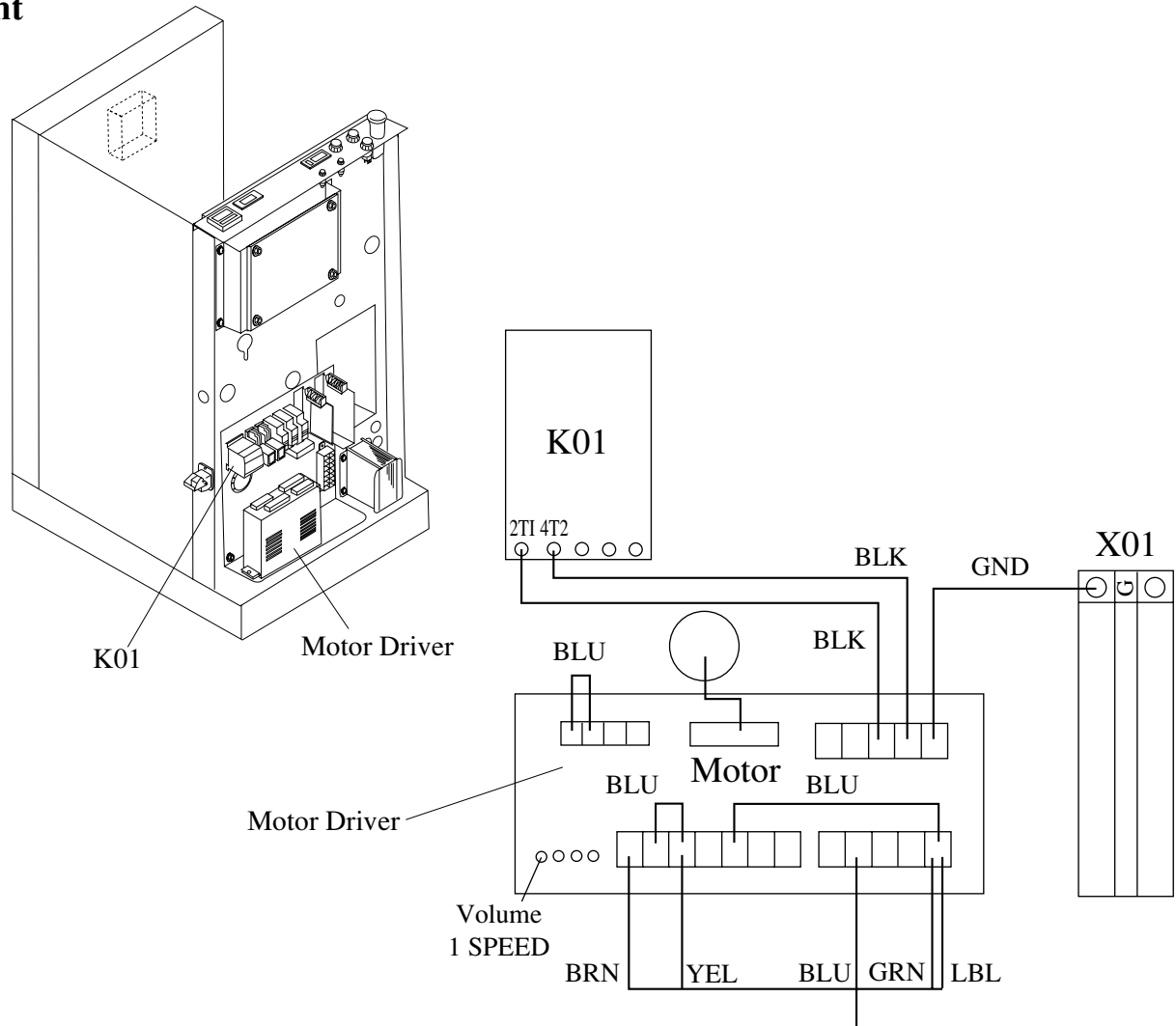
[FC-20]

4-2-8 Trim Knife Motor Driver Replacement

1. Turn off power switch.
2. Remove front cover of FC-20. (Refer to “4-1 How to Remove Cover”.)
3. Remove wire and driver main body.
4. Attach new driver main body and wire as shown in the drawing at right.
5. Turn on power switch.
6. Measure trim knife cycle time by pressing knife inching button and adjust with speed adjust volume (1 SPEED) on driver so that the knife cycle time is 2.7 to 3.3 sec.

NOTE

- Trim knife cycle time is reduced with turning the volume (1 SPEED) clockwise.

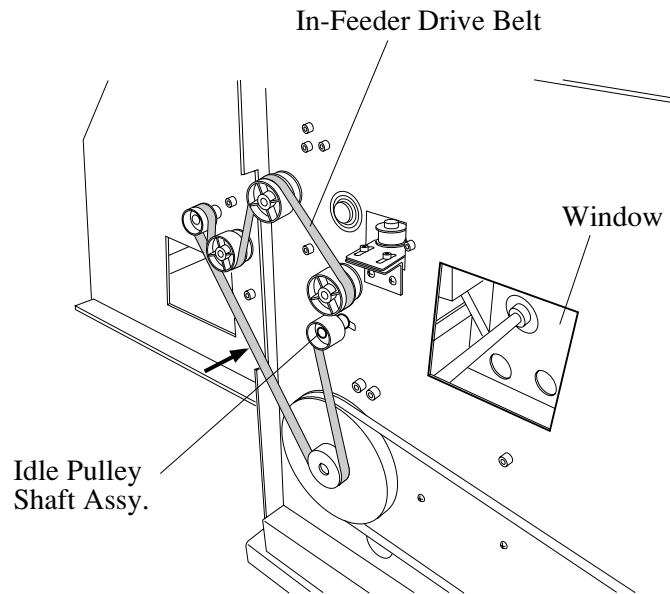


4-2 Parts Replacement

[SPF-20]

4-2-9 In-Feed Drive Belt Replacement

1. Move stitcher unit to the left end.
2. Turn off power switch.
3. Remove IF-rear cover of FC-20. (Refer to “4-1 How to Remove Cover”.)
4. Remove rear cover of SPF-20. (Refer to “4-1 How to Remove Cover”.)
5. Loosen idle pulley shaft assy. through window on rear frame and replace belt.
6. Adjust tension referring to “3-1-7 In-Feeder Drive Belt Tension Adjustment”.
7. Attach the covers in the reverse order of removal.



4-2 Parts Replacement

[SPF-20]

4-2-10 Entrance Belt Replacement

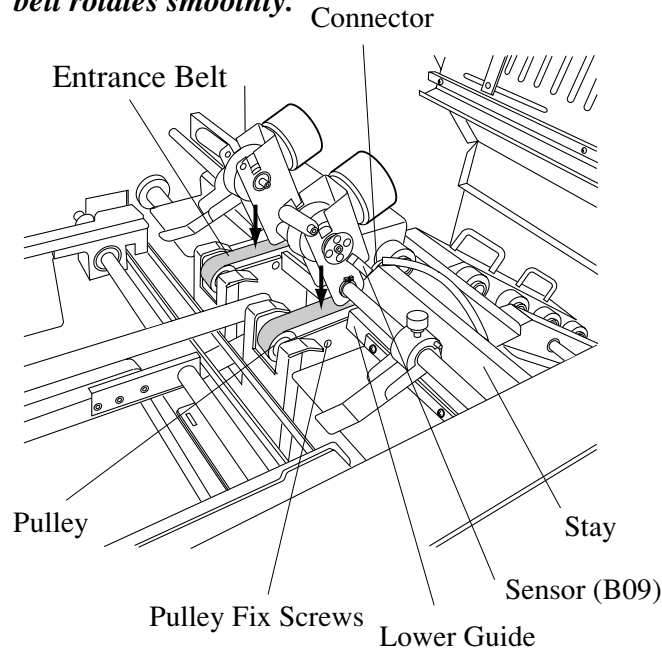
1. Turn off power switch.
2. Remove front and rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Remove In-feeder drive belt. (Refer to “4-2-9 In-Feed Drive Belt Tension Adjustment.”)
4. Remove connectors of sensors (B04, B08). (Refer to “5-1-4 Sensor and Proximity Switch Layout and Functions”.)
5. Remove stay. (2 fix screws each side)
6. Remove lower guide.
7. Loosen pulley fix screws to release tension.
8. Remove transport shaft (Parts Book : Fig.8-15).
9. Remove pulleys (2 fix screws each) and replace belt.
10. Attach transport shaft.

11. Adjust tension of entrance belt. (Refer to “3-1-8 Entrance Belt Tension Adjustment”.)

12. Attach the parts in the reverse order of removal.

NOTE

- When attaching the stay, check that entrance belt rotates smoothly.

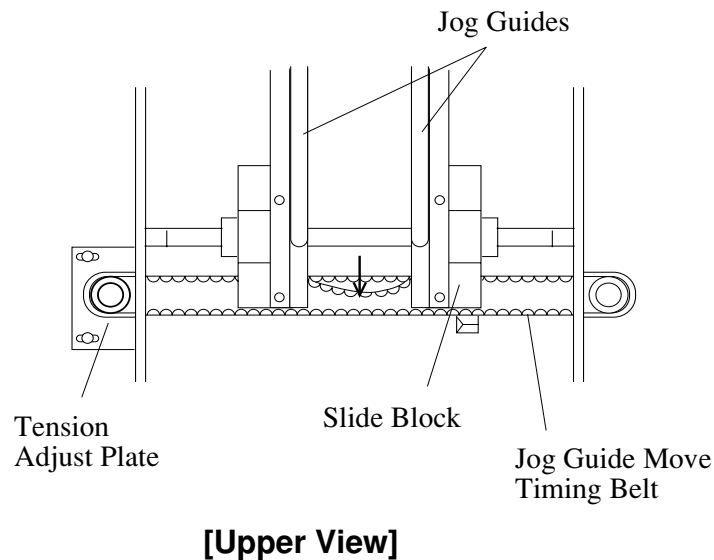


4-2 Parts Replacement

[SPF-20]

4-2-11 Jog Guide Move Timing Belt Replacement

1. Turn off power switch.
2. Remove front and rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Loosen 2 fix screws of tension adjust plate to release tension.
4. Remove fix screws of jog guide move timing belt from slide block and replace belt.
5. Adjust tension referring to “3-1-9 Jog Guide Move Timing Belt Tension Adjustment”.
6. Attach the covers in the reverse order of removal.

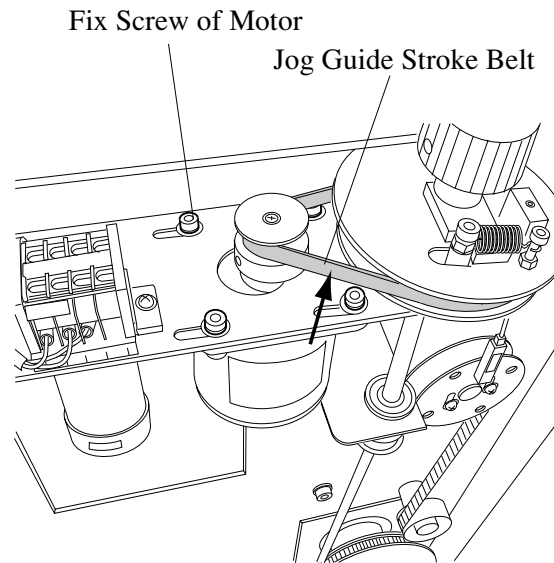


4-2 Parts Replacement

[SPF-20]

4-2-12 Jog Guide Stroke Belt Replacement

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Loosen 4 fix screws of motor and replace belt.
4. Adjust tension referring to “3-1-10 Jog Guide Stroke Belt Tension Adjustment”.
5. Attach the covers in the reverse order of removal.

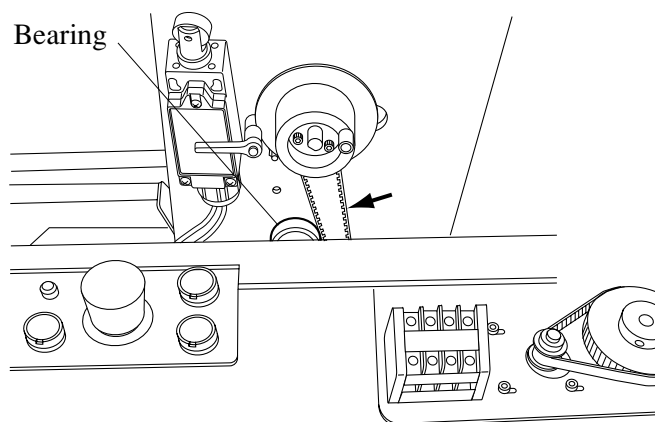
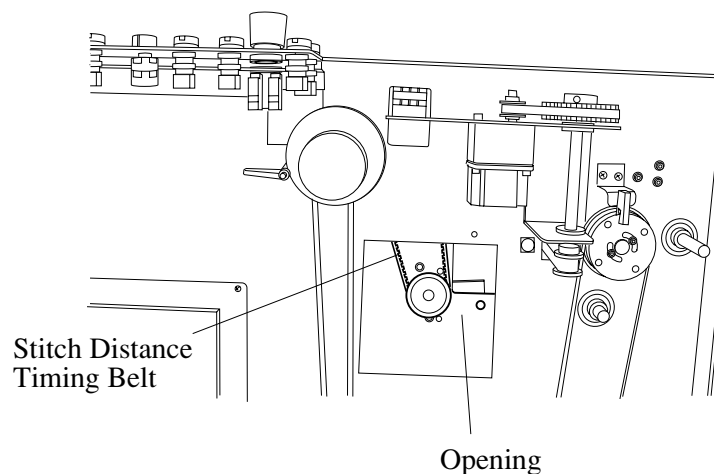


4-2 Parts Replacement

[SPF-20]

4-2-13 Stitch Distance Timing Belt Replacement

1. Turn off power switch.
2. Remove front cover and ST side cover (F). (Refer to “4-1 How to Remove Cover”.)
3. Move stitcher unit to position that stitch distance timing belt can be accessed through opening on front frame.
4. Adjust tension referring to “3-2-6 Stitch Distance Timing Belt Tension Adjustment”.
5. Attach the covers in the reverse order of removal.

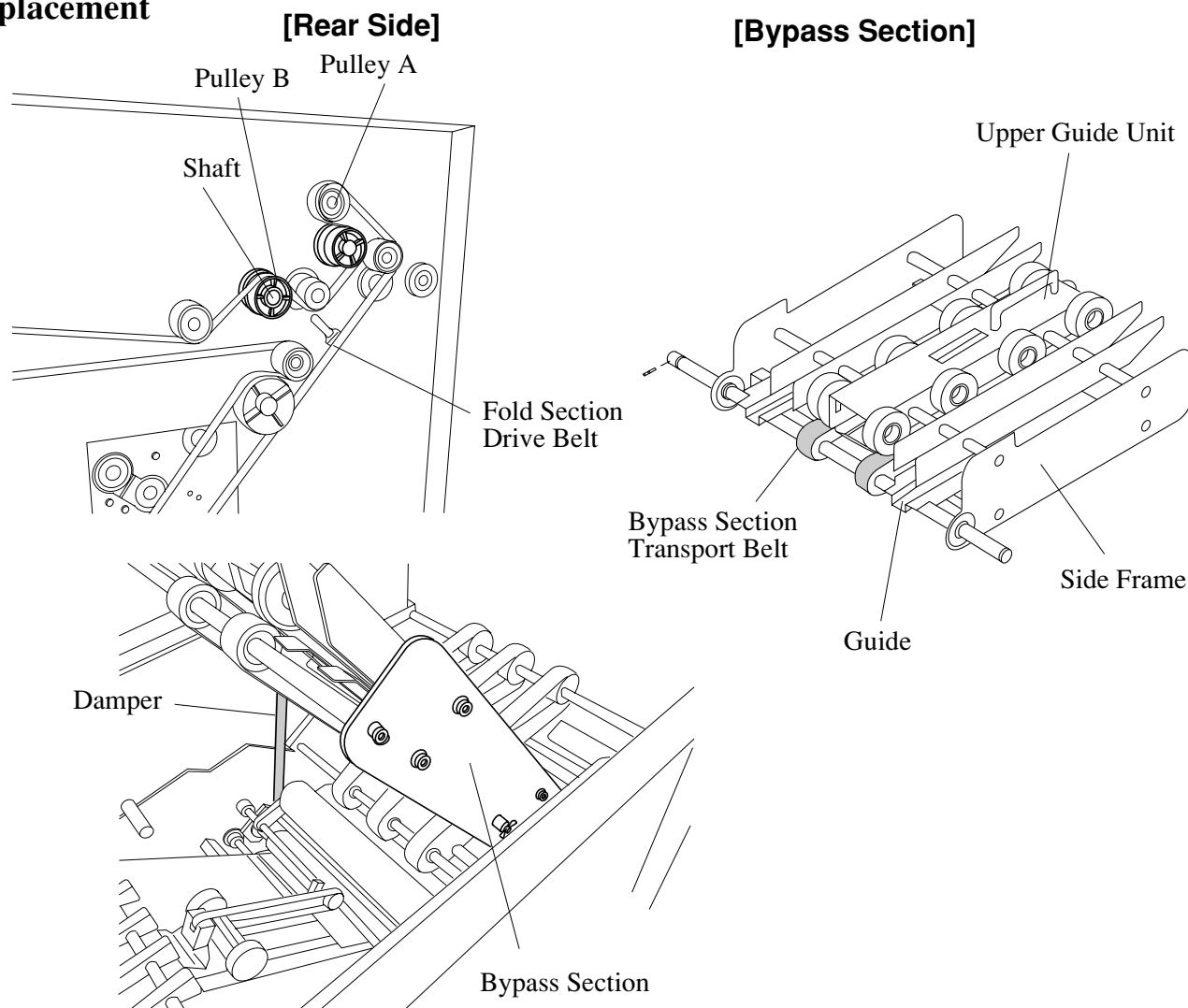


4-2 Parts Replacement

[SPF-20]

4-2-14 Bypass Section Transport Belt Replacement

1. Turn off power switch.
2. Remove front and rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Release tension of fold section drive belt by loosening fix screw of pulley A.
4. Remove snap ring and pulley B.
5. Remove damper.
6. Remove bypass section (Parts book : Fig.22). (2 bearing : Parts book Fig.21-12)
7. Remove either of side frames only. (5 fix screws and 2 bearing : Parts book Fig.22 20,21)
8. Remove upper guide unit (Parts book Fig.22-2).
9. Remove transport guide.
10. Replace bypass section transport belt.
11. Attach removed parts in the reverse order of removal.
12. Adjust tension referring to “3-3-7 Bypass Section Transport Belt Tension Adjustment”.

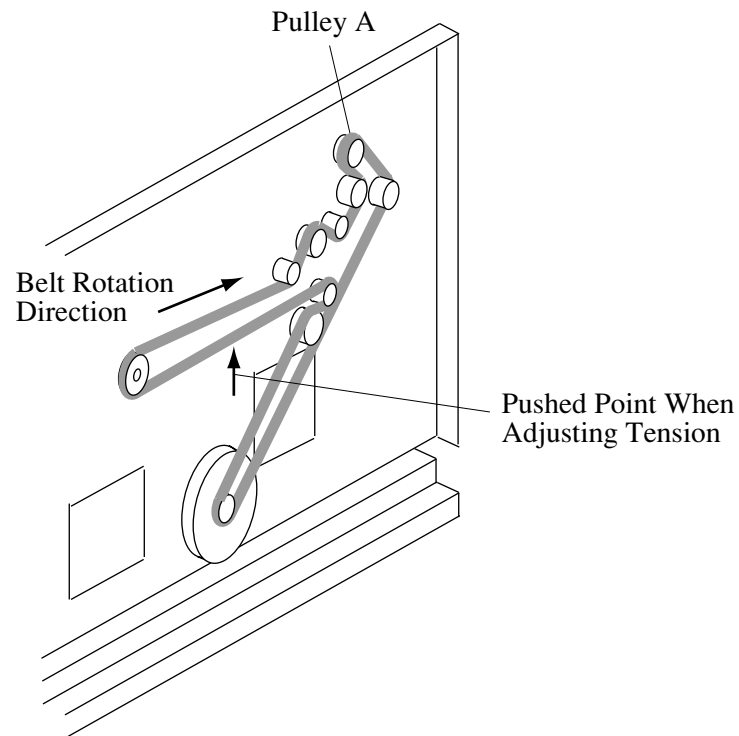


4-2 Parts Replacement

[SPF-20]

4-2-15 Fold Section Drive Belt Replacement

1. Turn off power switch.
2. Remove rear cover. (Refer to “4-1 How to Remove Cover”.)
3. Release tension of fold section drive belt by loosening fix screw of pulley A.
4. Replace fold section drive belt.
5. Adjust tension referring to “3-3-8 Fold Section Drive Belt Tension Adjustment”.
6. Attach covers in the reverse order of removal.

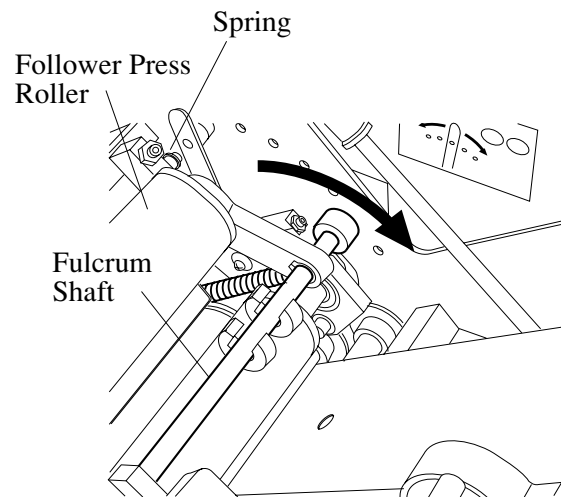


4-2 Parts Replacement

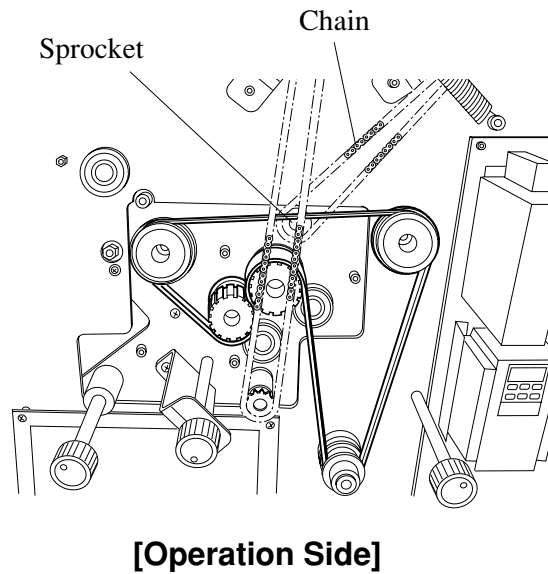
[SPF-20]

4-2-16 Transport Roller Timing Belt Replacement

1. Turn off power switch.
2. Remove springs of follower press roller.



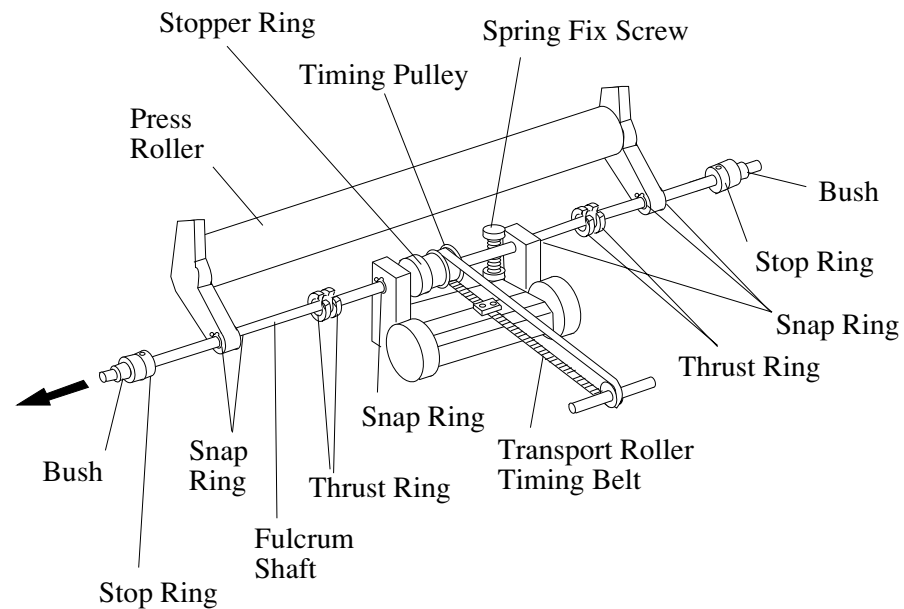
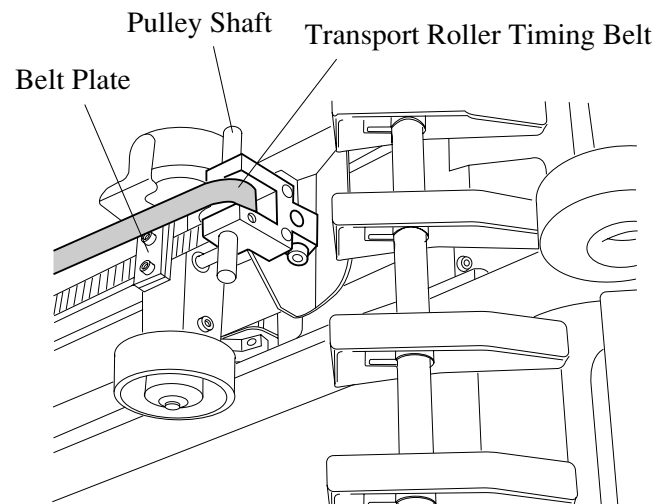
3. Remove front and rear cover. (Refer to “4-1 How to Remove Cover”.)
4. Remove chain and sprocket on operation side.



4-2 Parts Replacement

[SPF-20]

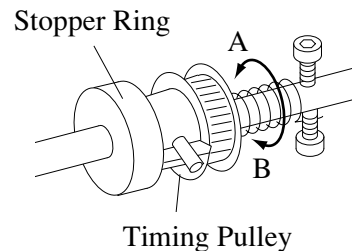
5. Loosen stop ring and remove bush.
6. Remove fulcrum shaft with press roller and transport roller.
7. Remove 6 snap rings and 4 thrust rings.
8. Remove 2 spring fix screws.
9. Remove pulley shaft (1 set screw), belt plate and 2 set screws of stopper ring.
10. Pull out fulcrum shaft as far as timing pulley to arrow direction.
11. Replace timing belt.



4-2 Parts Replacement

[SPF-20]

- 12.** Restore the fulcrum shaft.
- 13.** Attach pulley shaft and belt plate to original position.
- 14.** Attach spring so that timing pulley is returned to arrow direction B and stopped by stopper ring when the pulley is turned to arrow direction A.



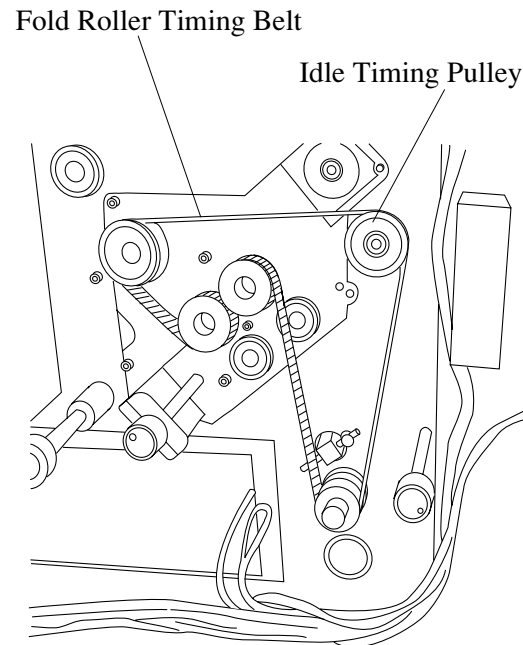
- 15.** Attach fulcrum shaft with press roller and transport roller.
- 16.** Attach 6 snap rings and 4 thrust rings.
- 17.** Attach bush and fix it with stop ring.
- 18.** Attach chain and sprocket.
- 19.** Attach springs of follower press roller.
- 20.** Adjust timing belt tension referring to “3-3-9 Transport Roller Timing Belt Tension Adjustment”.

4-2 Parts Replacement

[SPF-20]

4-2-17 Fold Roller Timing Belt Replacement

1. Turn off power switch.
2. Remove front cover. (Refer to “4-1 How to Remove Cover”.)
3. Loosen idle timing pulley and replace fold roller timing belt.
4. Adjust tension referring to “3-3-10 Fold Roller Timing Belt Tension Adjustment”.
5. Attach covers in the reverse order of removal.

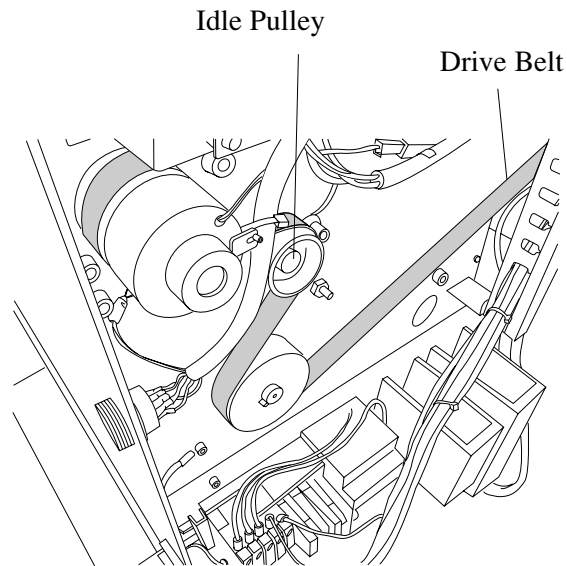


4-2 Parts Replacement

[FC-20]

4-2-18 FC-20 Drive Belt Replacement

1. Turn off power switch.
2. Remove FC-20 front, rear and left cover.
(Refer to “4-1 How to Remove Cover”.)
3. Loosen idle pulley and replace drive belt.
4. Adjust tension referring to “3-4-6 Drive Belt Tension Adjustment”.
5. Attach covers in the reverse order of removal.



4-2 Parts Replacement

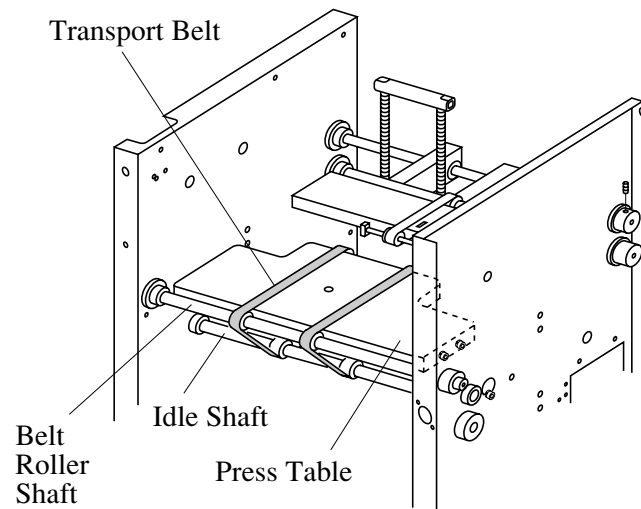
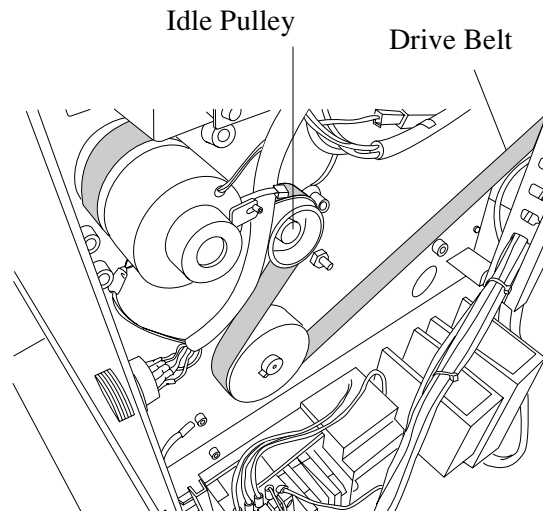
[FC-20]

4-2-19 Transport Belt Replacement

1. Turn off power switch.
2. Remove FC-20 front, rear and left cover.
(Refer to “4-1 How to Remove Cover”.)
3. Loosen idle pulley and remove drive belt.
4. Remove belt roller shaft, idle shaft and press table and replace transport belt.
5. Attach belt roller shaft, idle shaft and press table.

NOTE

- When attaching transport belt clutch, adjust clutch gap referring to “3-4-5 Transport Belt Clutch Gap Adjustment”.



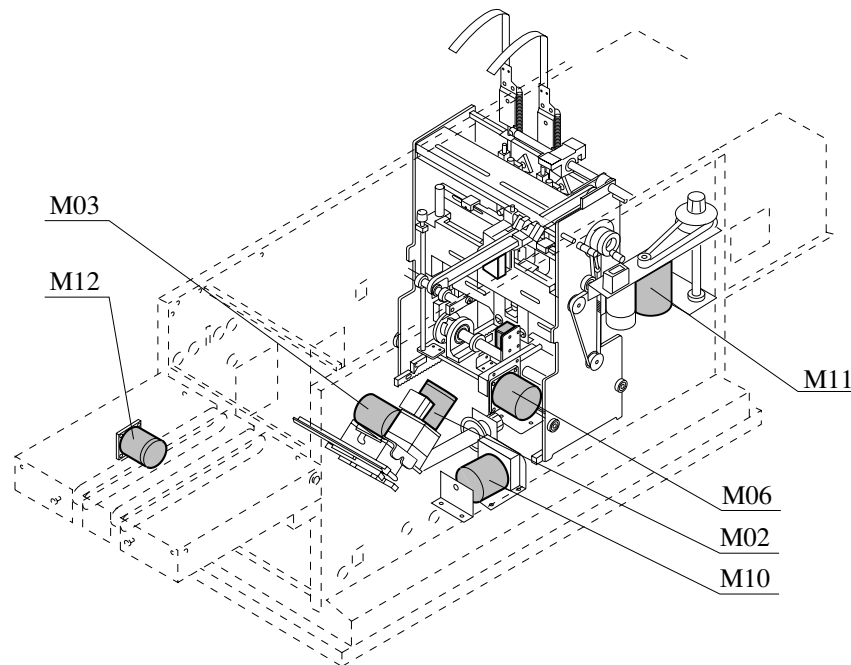
5. Electrical Parts Description

5-1 Electrical Parts Layout and Functions

[SPF-20]

5-1-1 Motor Layout and Functions

SPF-20

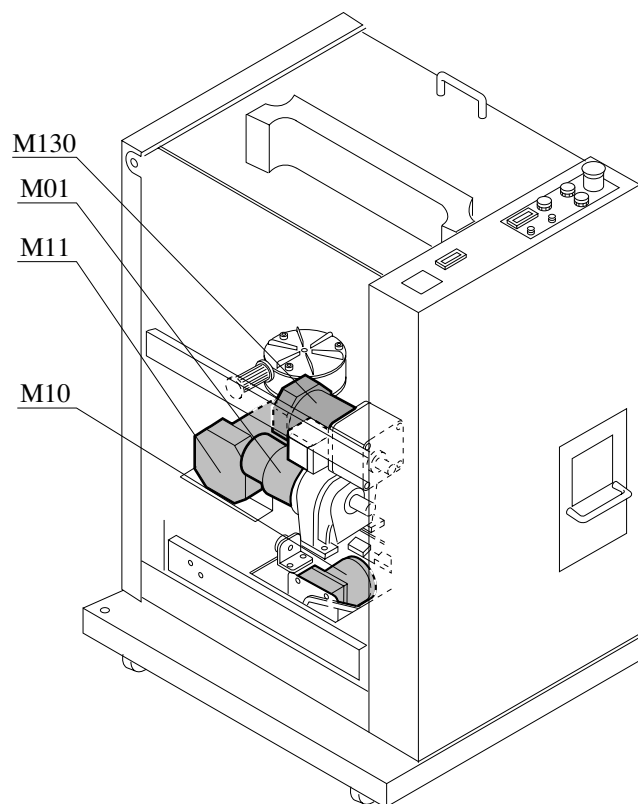


Code	Name	Parts Book
M02	Fold Knife Motor	Fig.29-32
M03	Main Motor	Fig.4-12
M06	Stitch Motor	Fig.15-28
M10	System Move Motor	Fig.3-1
M11	Side Jog Torque Motor	Fig.10-32
M12	Conveyor Motor	Fig.33-24

5-1 Electrical Parts Layout and Functions

[FC-20]

FC-20



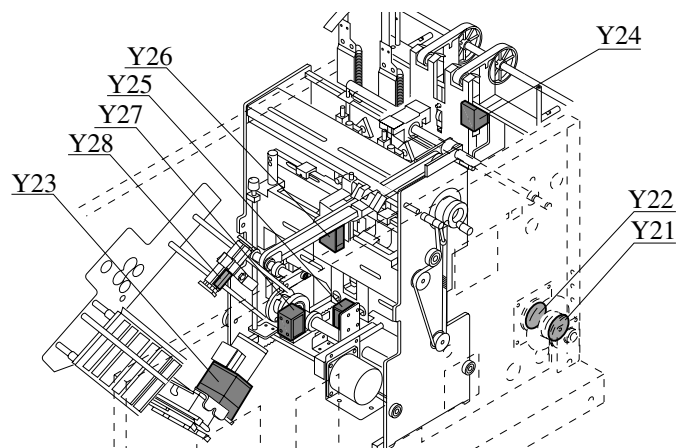
Code	Name	Parts Book	Remarks
M01	Trim Knife Motor	Fig.7-1	
M10	Base Motor	Fig.3-3	
M11	Blower Motor	Fig.10-3	S/N 018899 or below
		Fig.10-37	S/N 019001 or above
M130	Belt Motor	Fig.9-5	

5-1 Electrical Parts Layout and Functions

[SPF-20, FC-20]

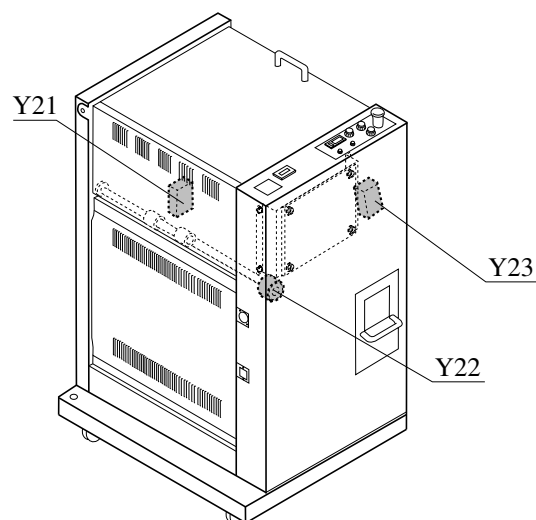
5-1-2 Solenoid Layout and Functions

SPF-20



Code	Name	Parts Book
Y21	Carry Belt Brake	Fig.20-6
Y22	Belt Clutch	Fig.20-13
Y23	Fold Knife Motor Gear Head	Fig.29-31
Y24	Sheet End Jog Solenoid	Fig.-9-23
Y25	Side Stitch End Stopper Solenoid	Fig.14-18
Y26	Saddle Stitch End Stopper Solenoid	Fig.12-22
Y27	Fold/Non-Fold Solenoid	Fig.21-15
Y28	Folder Jog Finger Solenoid	Fig.24-18

FC-20



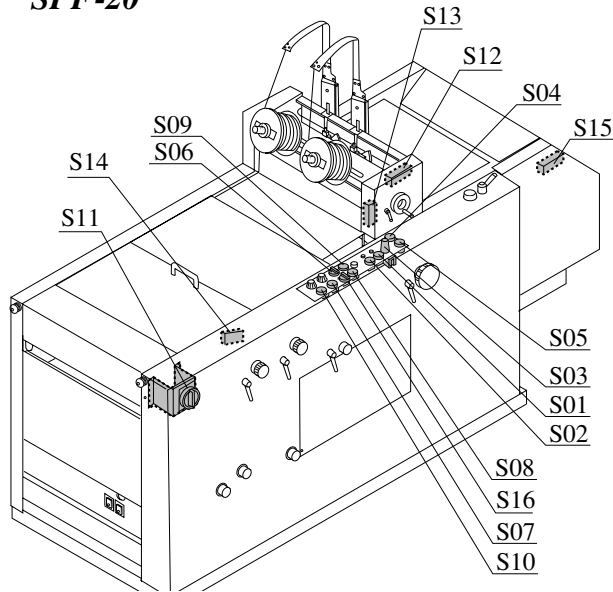
Code	Name	Parts Book
Y21	Stopper Solenoid	Fig.8-9
Y22	Transport Belt Clutch	Fig.9-37
Y23	Guide Plate Solenoid	Fig.5-32

5-1 Electrical Parts Layout and Functions

[SPF-20, FC-20]

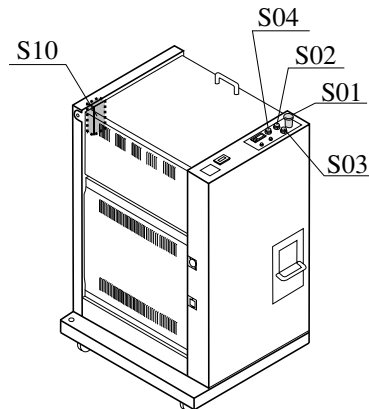
5-1-3 Switch Layout and Functions

SPF-20



Code	Nmae	Parts Book
S01	System ON/OFF Button	Fig.34-28
S02	Collating Start/Stop Button	Fig.34-28
S03	Emergency Stop Button	Fig.34-29
S04	System Backward Button	Fig.34-28
S05	System Forward Button	Fig.34-28
S06	Operation Mode Select Switch	Fig.34-30
S07	Single Stitch Button	Fig.34-49
S08	Stitcher Inching Button	Fig.34-49
S09	Jog ON/OFF Button	Fig.34-49
S10	Single Fold Button	Fig.34-49
S11	Power Switch	Fig.34-13
S12	Stitch Section Cover Switch(R)	Fig.13-6
S13	Stitch Section Cover Switch(L)	Fig.13-6
S14	Fold Section Cover Switch	Fig.1-18
S15	In-feed Cover Switch	Fig.5-15
S16	Stitch ON/OFF Switch	Fig.34-31

FC-20



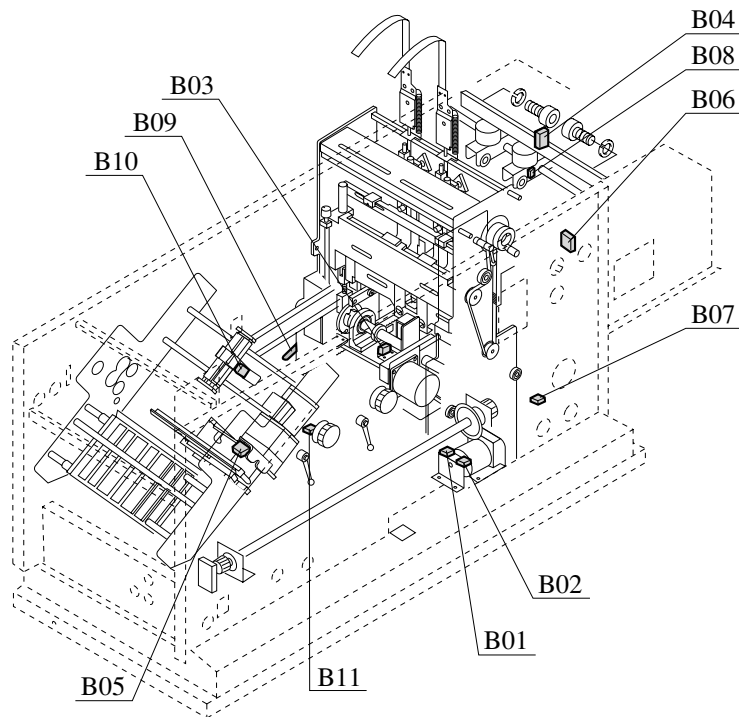
Code	Name	Parts Book
S01	FC-20 Emergency Stop Button	Fig.10-13
S02	FC-20 Forward Button	Fig.10-12
S03	FC-20 Backward Button	Fig.10-12
S04	Knife Inching Button	Fig.10-18
S10	Knife Cover Switch	Fig.1-4

5-1 Electrical Parts Layout and Functions

[SPF-20]

5-1-4 Sensor and Proximity Switch Layout and Functions

SPF-20

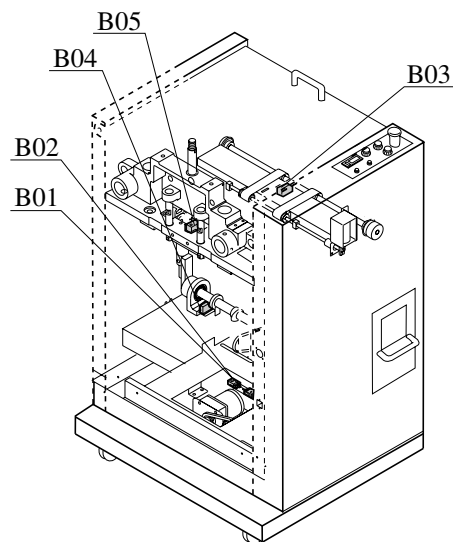


Code	Name	Parts Book
B01	Base Motor Forward Proximity Switch	Fig.3-22
B02	Base Motor Backward Proximity Switch	Fig.3-19
B03	Stitcher Stop Position Proximity Switch	Fig.17-19
B04	Set Present Proximity Switch	Fig.7-10
B05	Fold Knife Stop Position Detector	Fig.29-25
B06	Pick Belt Position Detector 1	Fig.19-4
B07	Pick Belt Position Detector 2	Fig.20-24
B08	In-feed Jam Sensor	Fig.7-30
B09	Saddle Stitch End Stopper Photo Sensor	Fig.12-11
B10	Fold Tail Jog Sensor	Fig.24-8
B11	Fold Delay Time Proximity Switch	Fig.30-12

5-1 Electrical Parts Layout and Functions

[FC-20]

FC-20



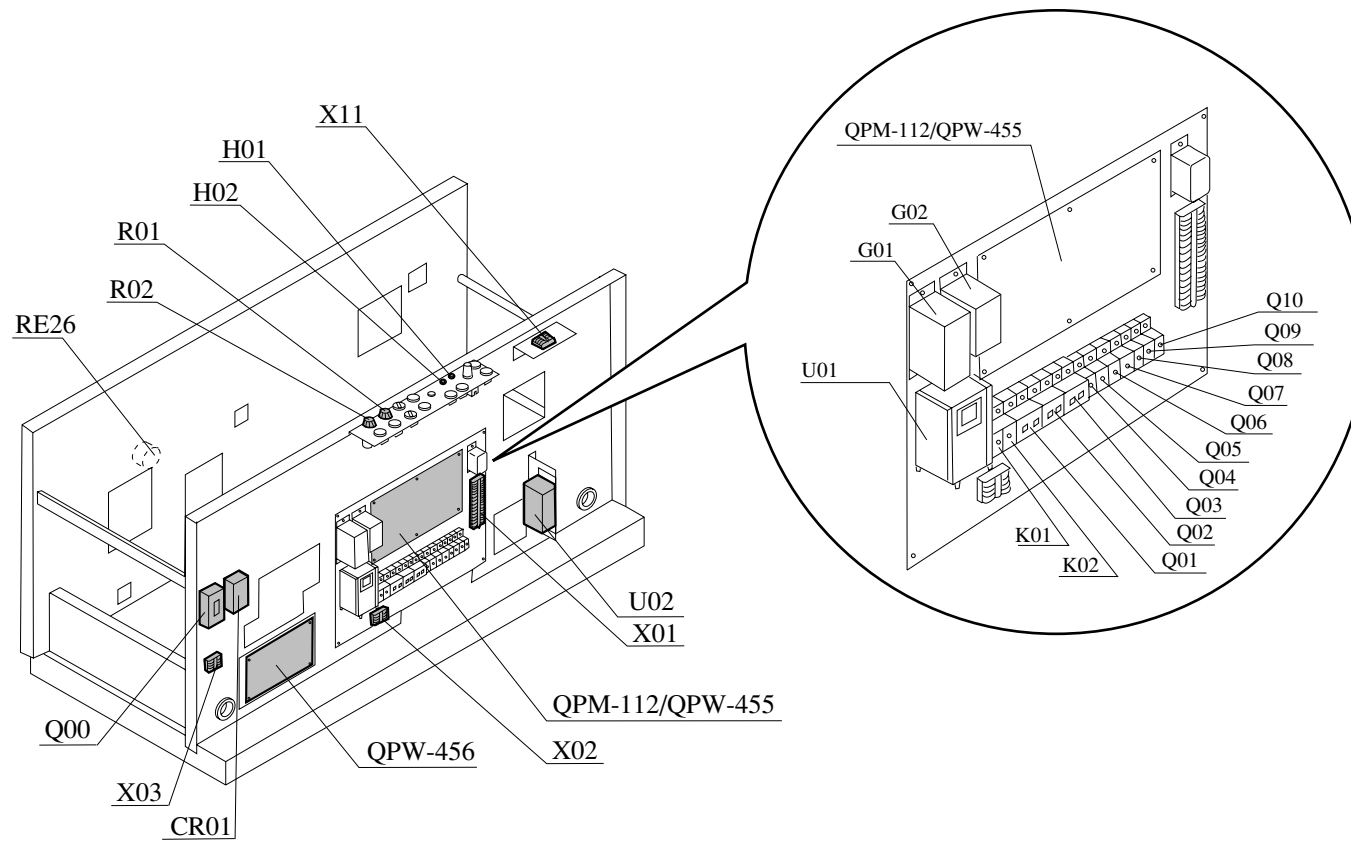
Code	Name	Parts Book
B01	System Forward Limit Proximity Switch	Fig.3-19
B02	System Backward Limit Proximity Switch	Fig.3-19
B03	Trim Section Entrance Proximity Switch	Fig.5-18
B04	Knife Stop Position Proximity Switch	Fig.7-25
B05	Trim Section Set Present Sensor	Fig.8-49

5-1 Electrical Parts Layout and Functions

[SPF-20]

5-1-5 P.C.B. Power Supply and Other Electrical Parts Layout

SPF-20



5-1 Electrical Parts Layout and Functions

[SPF-20]

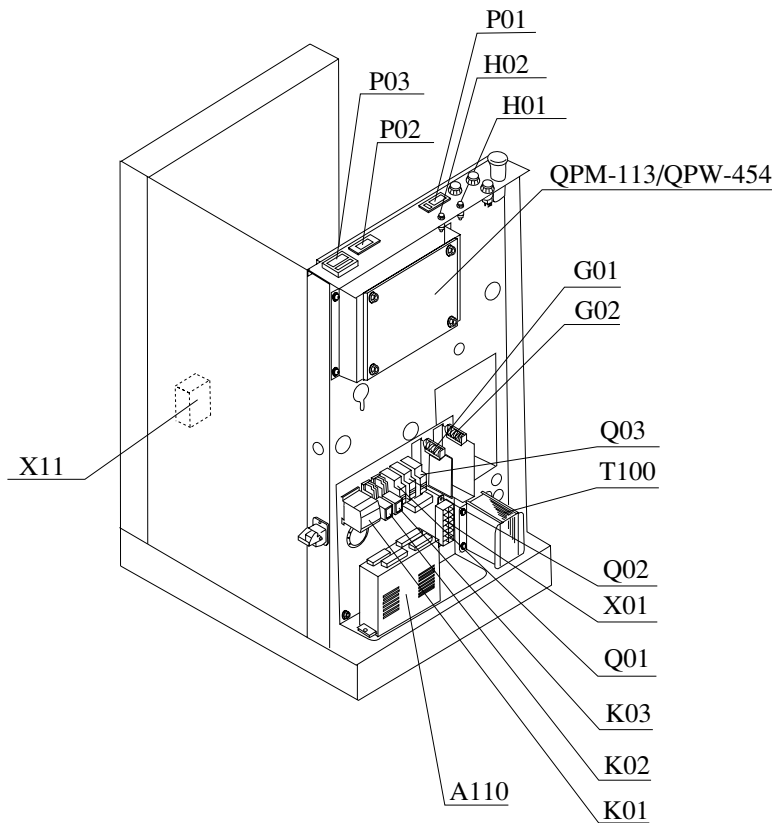
SPF-20

Code	Name	Parts Book	Remarks
Q01	FC-20 Belt Motor Breaker	Fig.34-45	
Q02	Fold Knife Motor Breaker	Fig.34-45	
Q03	Main Motor Breaker	Fig.34-44	
Q04	Inverter and Circuit Protector	Fig.34-43	
Q05	Inverter and Circuit Protector	Fig.34-43	
Q06	Stitch Motor Driver and FC-20 Circuit Protector	Fig.34-43	
Q07	Stitch Motor Driver and FC-20 Circuit Protector	Fig.34-43	
Q08	Transformer Primary Side and Power Supply Circuit Protector	Fig.34-42	
Q09	Transformer Primary Side and Power Supply Circuit Protector	Fig.34-42	
Q10	Motor Circuit Protector	Fig.34-41	
G01	Power Supply 24V	Fig.34-35	
G02	Power Supply 5V	Fig.34-36	
K01	Inverter and Stitch Motor Emergency Stop Relay	Fig.34-51	
K02	100V Motor Emergency Stop Relay	Fig.34-51	
U01	Inverter	Fig.34-47	Refer to "4-2-6 Inverter Replacement"
U02	Stitch Motor Driver	Fig.34-22	Refer to "4-2-7 Stitch Motor Driver Replacement"
H01	Jam LED	Fig.34-26	
H02	Power LED	Fig.34-26	
R01	Stitch Delay Time Volume	Fig.34-32	
R02	Conveyor Time Volume	Fig.34-33	
QPM-112/QPW-455	Control P.C.Board	Fig.34-21	
QPW-456	Driver P.C.Board	Fig.34-20	
X01	Terminal Board	Fig.34-38	
X02	Terminal Board	Fig.34-48	
X03	Terminal Board	Fig.34-12	
X11	Terminal Board	Fig.10-28	

5-1 Electrical Parts Layout and Functions

[FC-20]

FC-20



Code	Name	Parts Book	Remarks
H01	Jam LED	Fig.10-14	
H02	Power LED	Fig.10-14	
P01	Resetable Total Counter	Fig.10-11	
P02	Non-Resetable Total Counter	Fig.10-10	
P03	Preset Counter	Fig.10-8	Optional Part
Q01	Knife Motor Driver	Fig.10-25	
Q02	Power Supply		
	Transformer Primary Side		
	Circuit Protector		
Q02	Blower, Base Motor Protector	Fig.10-25	
Q03	Blower, Base Motor Protector	Fig.10-26	
G01	Power Supply 5V	Fig.10-19	
G02	Power Supply 24V	Fig.10-20	
K01	Emergency Stop Contactor	Fig.10-23	
K02	Blower Motor SSR	Fig.10-27	
K03	Guide Plate Solenoid SSR	Fig.10-24	
A110	Knife Motor Driver	Fig.10-31	Refer to "4-2-8 Knife Motor Driver Replacement"
QPM-113/QPW-454	P.C.B.	Fig.10-7	
X01	Terminal Board	Fig.10-32	
X11	Terminal Board	Fig.1-32	
T100	200V→100V Transformer	Fig.10-30	

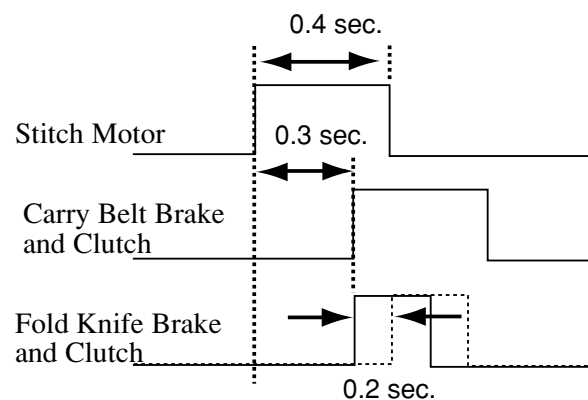
5-2 Sensor Description and Function Check

[SPF-20]

5-2-1 Fold Delay Time Proximity Switch (B11)

Function

Interval between transported sheets is selected according to sheet size by this sensor.



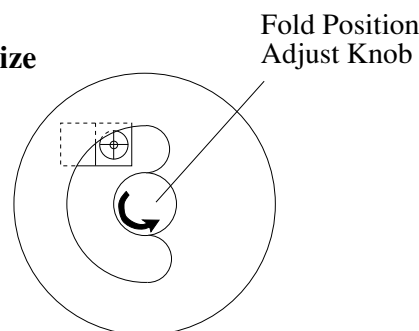
When fold position adjust knob is set up for large sheet, proximity switch (B11) is positioned under opening of disc. In this case, fold knife raises at same time that carry belt starts to run.

On the other hand, when fold position adjust knob is set up for small sheet, proximity switch (B11) detects in disc. In this case, the timing of fold knife raising is delayed by 0.2 sec. from time that carry belt starts to run. Therefore the interval between transported sheets is shortened.

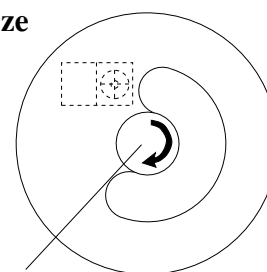
Proximity Switch Position Adjustment

1. Set up fold position adjust knob to largest sheet size referring to the drawings below.

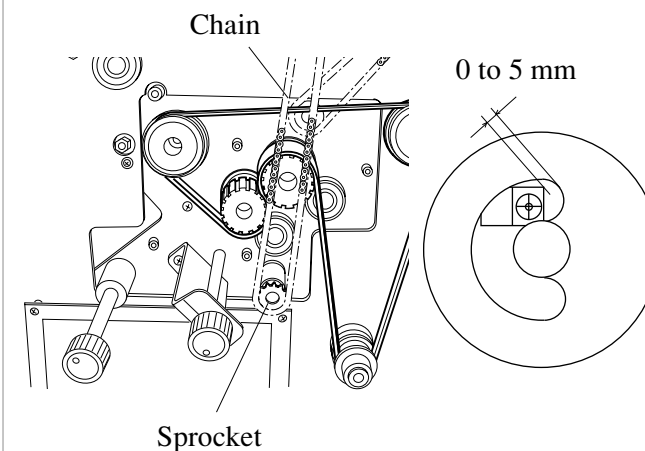
Large Size



Small Size

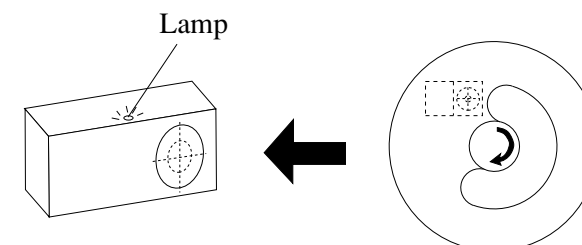


2. Position disc with slipping chain from sprocket so that distance between corner of proximity switch and end of opening is 0 to 5 mm.



Function Check

Check that lamp lights when disc is positioned over proximity switch.



5-2 Sensor Description and Function Check

[SPF-20]

5-2-2 In-feed Jam Sensor (B08)

Function

This sensor recognizes sheet jam when sensor plate is stopped rotating under roller due to sheet jam.

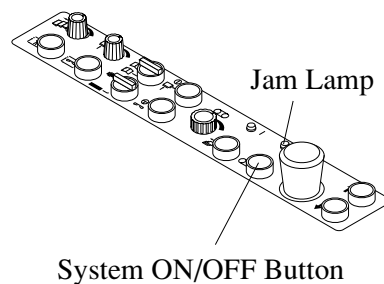
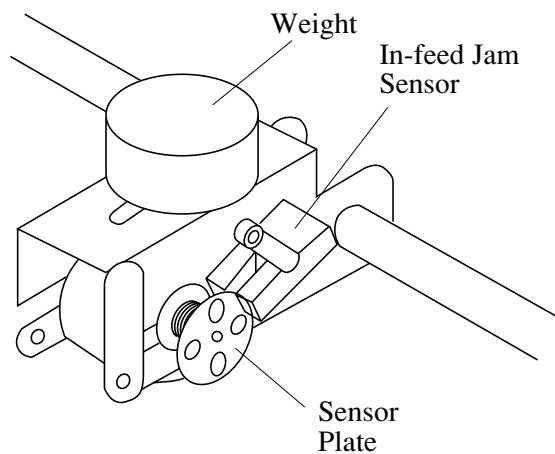
Function Check

Check that system stops and jam lamp lights when sensor plate is stopped by lifting weight with in-feed jam sensor.

NOTE

- (How to reset jam error)

Lower weight and press system ON/OFF button on operation panel.



5-2 Sensor Description and Function Check

[SPF-20]

5-2-3 Base Motor FWD, BWD Proximity Switch (B01, B02)

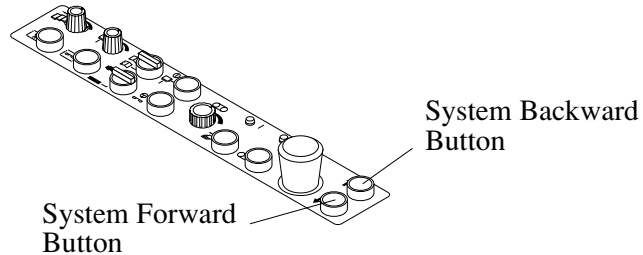
Function

This sensor is used to detect sheets jam in entrance of trim section.

Function Check

1. Press system forward button on operation panel of SPF-20.

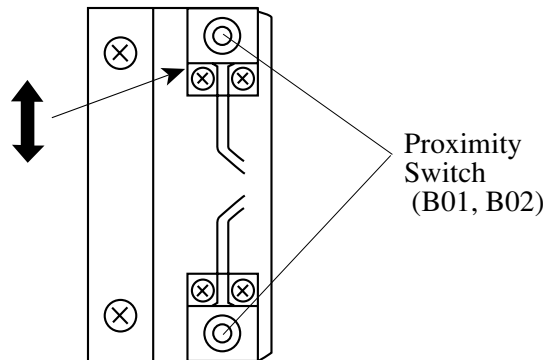
(SPF-20 Operation Panel)



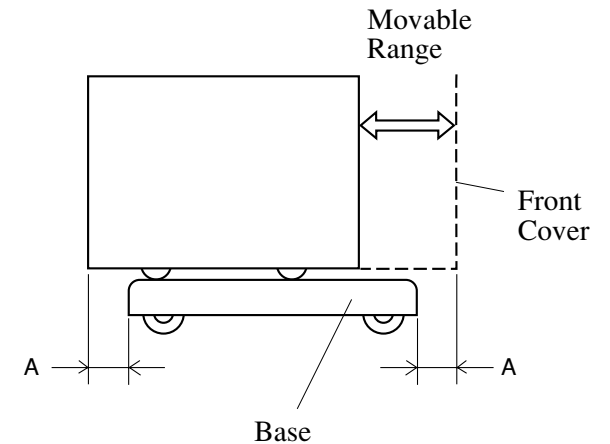
2. Check that main body is stopped moving by detection of proximity switch (B01, B02) even if system forward button is pressed.

NOTE

- Motor may be locked because of malfunction of proximity switch or mechanical limitation. Therefore, move main body little by little.



3. Check that distance A between front cover and base is within a range of 57 mm to 58 mm when system is positioned in fore-limit. If out of range, adjust proximity switch position.



4. Repeat procedures from step 1 to step 3 mentioned above in hind-limit checking.

5-2 Sensor Description and Function Check

[FC-20]

5-2-4 Trim Section Entrance Proximity Switch (B03)

Function

This sensor is used to detect sheets jam in entrance of trim section.

Function Check

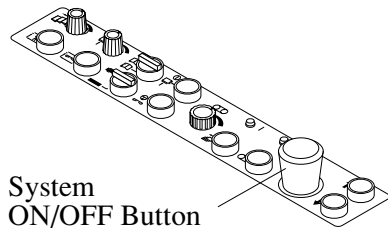


WARNING

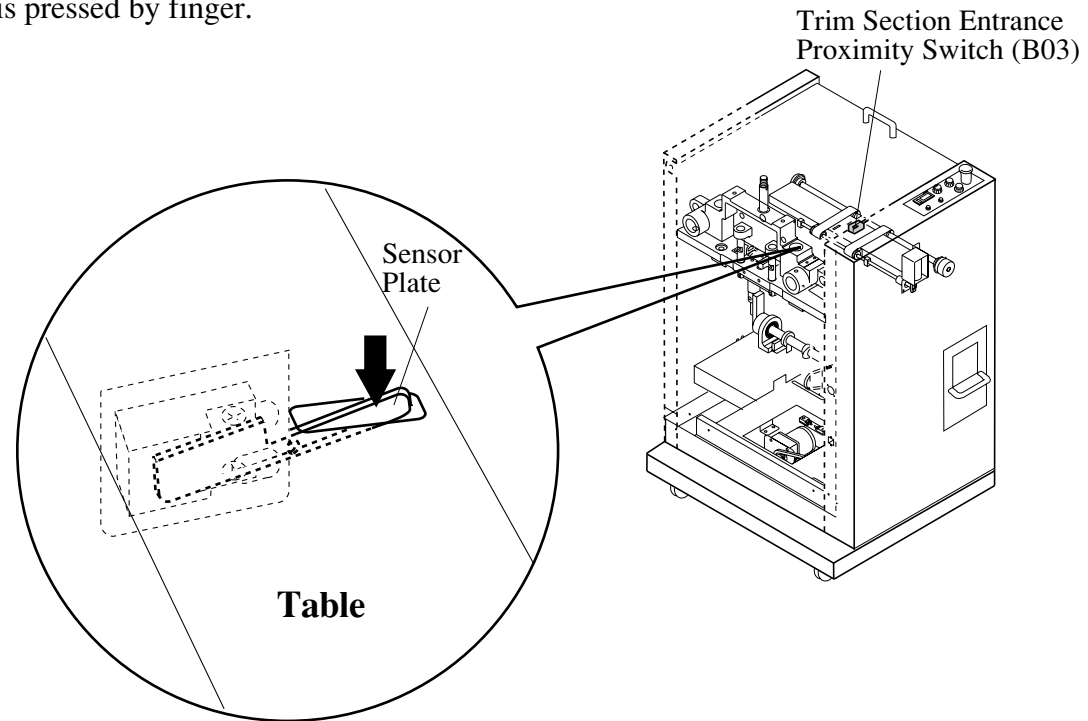
- Keep hands and fingers off any moving parts like belt. Otherwise personal injury may result.

1. Press system ON/OFF button on operation panel of SPF-20 to run transport section of FC-20.

(SPF-20
Operation Panel)



2. Check that whole system stops after about 0.4 sec. from the moment that sensor plate is pressed by finger.



5-2 Sensor Description and Function Check

[FC-20]

5-2-5 Trim Section Set Present Sensor (B05)

Function

This sensor is used to detect a set of sheets in stopper section of trim section.

Function Check

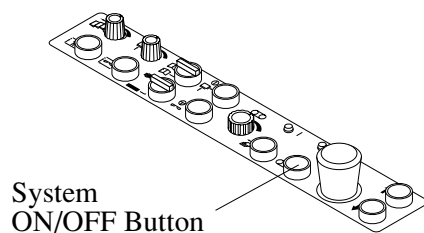


WARNING

- Keep hands and fingers off any moving parts like belt. Otherwise personal injury may result.

1. Press system ON/OFF button on operation panel of SPF-20 to run transport section of FC-20.

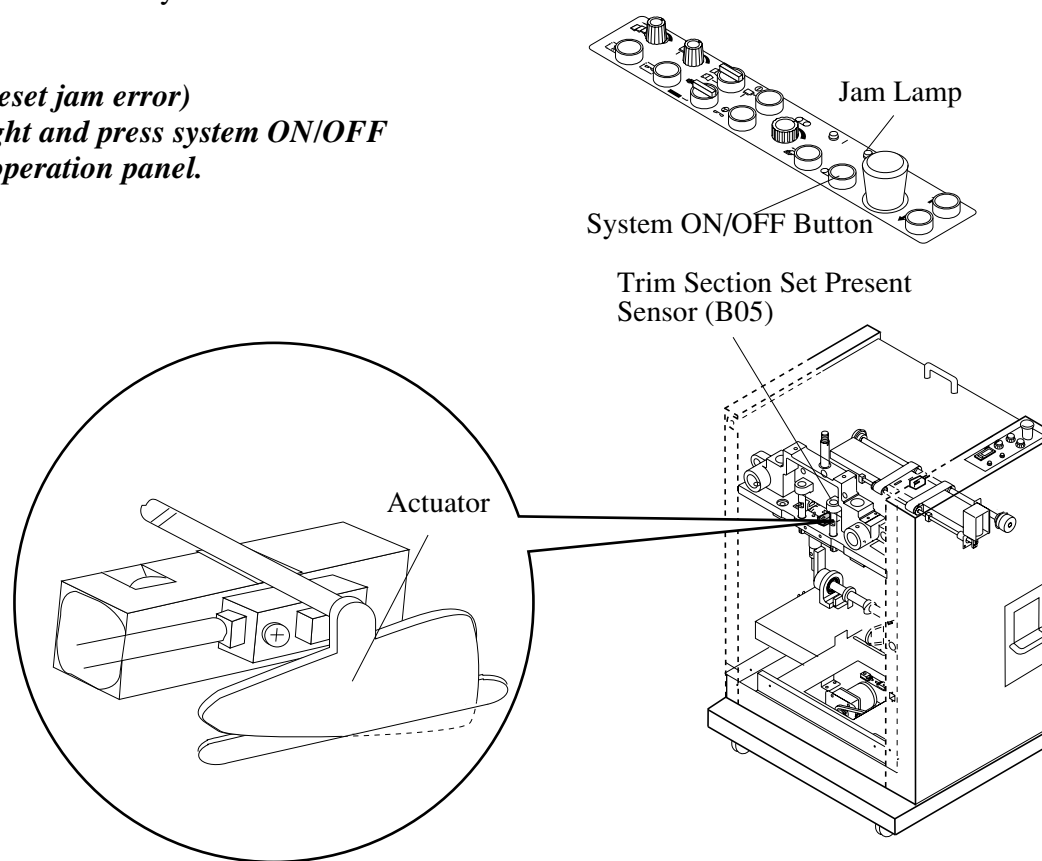
(SPF-20
Operation Panel)



2. Check that whole system stops with lighting of jam lamp and stopper lowers after about 2 sec. from the moment that actuator is lifted by scale.

NOTE

**- (How to reset jam error)
Lower weight and press system ON/OFF button on operation panel.**



5-2 Sensor Description and Function Check

[FC-20]

5-2-6 Set Present Proximity Switch (B04)

Function

This Proximity switch is used to detect the delivery of collated sheets into stitch section. And stitching and folding also as to SPF-20 are performed according to detection of sheets by this proximity switch.

Function Check

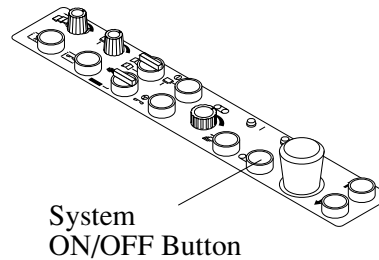
WARNING

- Keep hands and fingers off any moving parts like belt and roller. Otherwise personal injury may result.

1. Check that actuator of set present proximity switch (B04) can be raised up by finger and fallen down smoothly. If actuator is not in condition mentioned above, check whether actuator is in contact with proximity switch or not, moreover, lamp provided on the switch lights when the switch actuates.

2. Press system ON/OFF button on operation panel of SPF-20 to run transport belt.

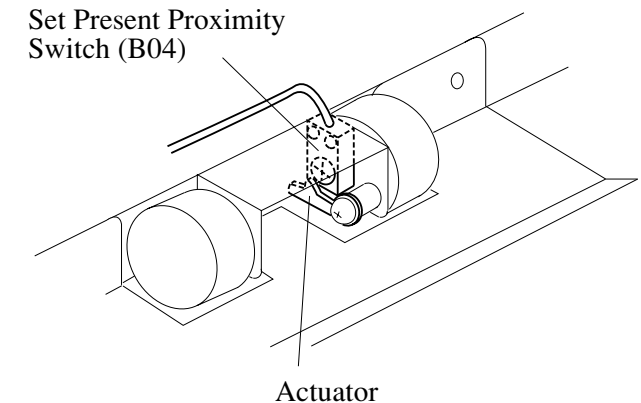
(SPF-20
Operation Panel)



3. Check that stitching is performed after about 0.2 second from when actuator is raised up by finger and fallen down and folding as to SPF-20 is also performed after about 0.5 second.

NOTE

- If the timing is not proper, check whether proximity switch detects actuator twice due to chattering or not. If proximity switch detects actuator twice, put the proximity switch to upper position slightly. However the proximity switch can not detect pass of thin sheets when positioned too high.



5-3 Other Electrical Parts Adjustment

[SPF-20]

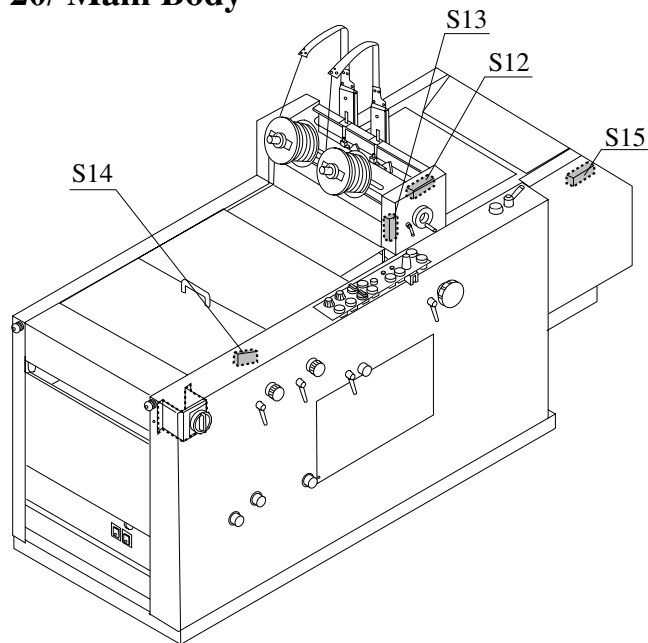
5-3-1 Each Cover Switch Position Adjustment



WARNING

- Disconnect power cord before check and adjustment of limit switch position.

SPF-20/ Main Body



Stitch Section Cover Switch (R) (S12)

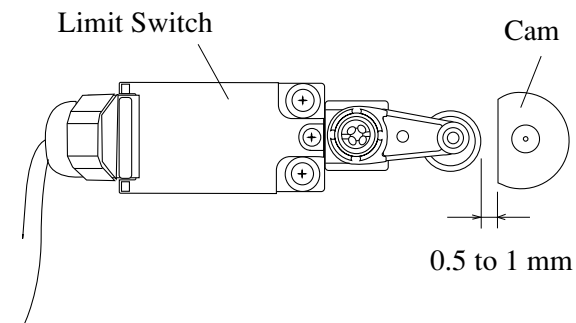
Check

Check that limit switch is vertical against plane of cam, moreover, the clearance between cam and limit switch is within a range of 0.5 to 1 mm as shown in the drawing below.

In-feed Cover Switch (S15)

Check

Check that limit switch is vertical against plane of cam, moreover, the clearance between cam and limit switch is within a range of 0.5 to 1 mm as shown in the drawing below.



5-3 Other Electrical Parts Adjustment

[SPF-20]

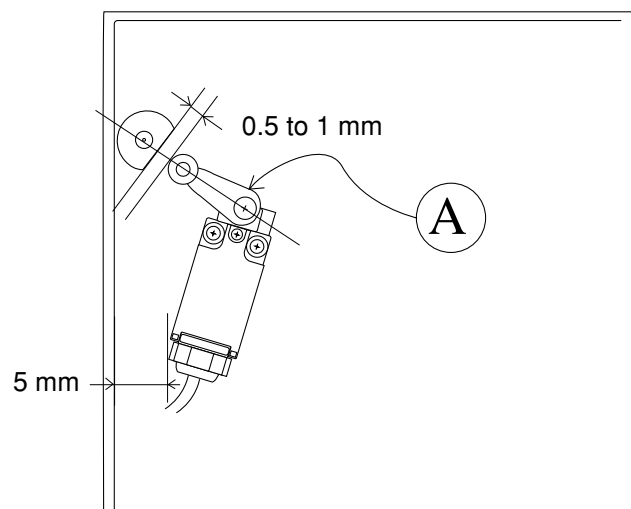
Stitch Section Cover Switch (L) (S13)

Check

Check that a clearance between left side frame and limit switch is provided by 5 mm, moreover, the limit switch is vertical against plane of cam, furthermore, the clearance between cam and limit switch is within a range of 0.5 to 1 mm.

NOTE

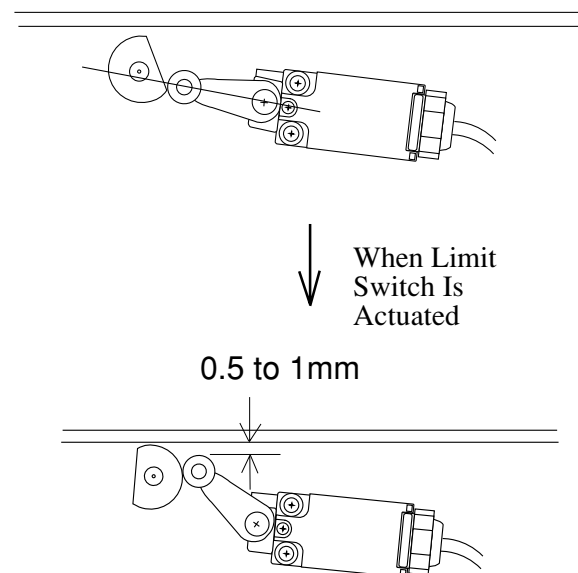
- Preform adjustment after loosening screw A to position limit switch vertical against cam.



Fold Section Cover Switch (S14)

Check

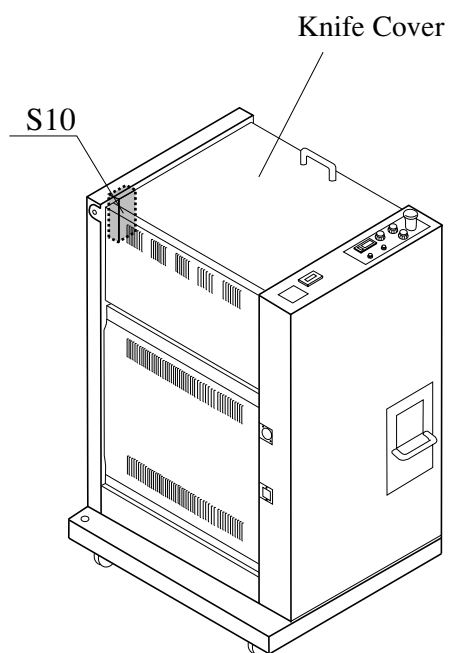
Check that the limit switch is positioned under cam shaft, moreover, the clearance between upper frame and limit switch is within a range of 0.5 to 1 mm when limit switch is actuated.



5-3 Other Electrical Parts Adjustment

[FC-20]

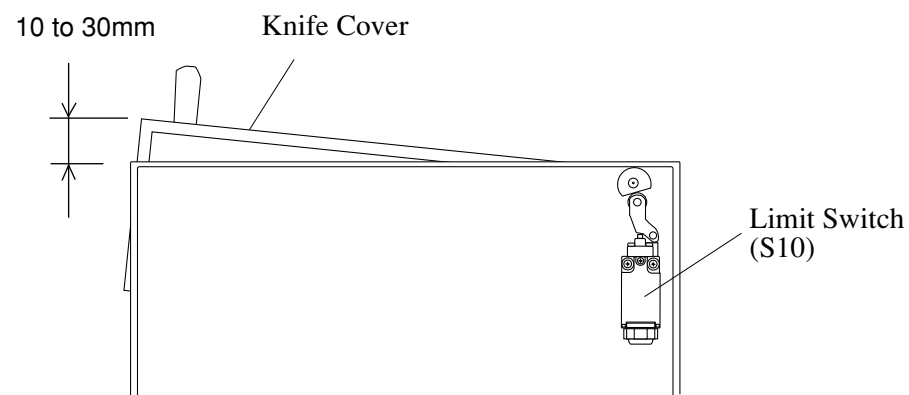
FC-20 Main Body



Knife Cover Switch (S10)

Check

Check that limit switch is switched off when a clearance between upper frame and knife cover is provided within a range of 10 to 30 mm.



5-3 Other Electrical Parts Adjustment

[FC-20]

5-3-2 FC-20 Regulator Voltage Adjustment



WARNING

- Keep hands and fingers off other electrical parts. Otherwise high voltage can cause personal injury.

Check

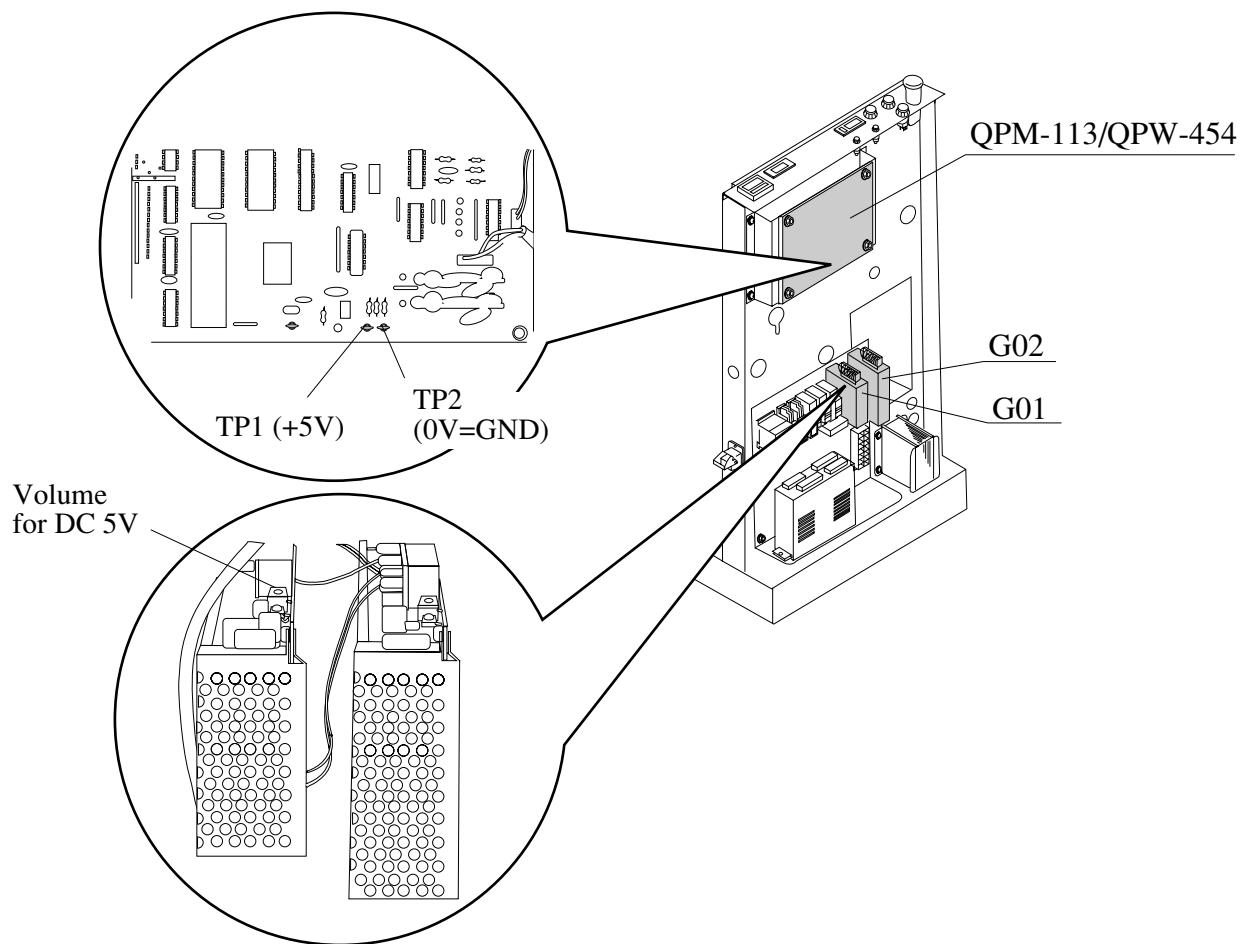
Check that voltage between TP1 (+5V) and TP2 (0V=GND) on FC-20 control P.C.B. QPM-113/QPW-454 is within a range of DC 5.15 volts to 5.20 volts when turning on power switch.

Adjustment

1. Turn on power switch.
2. Select mode for DC voltage measurement.
3. Contact red and black terminal bars of tester with TP1 (+5V) and TP2 (0V=GND) on QPM-113/QPW-454 respectively.
4. Adjust so that voltage is within a range of DC 5.15 volts to 5.20 volts by turning volume of 5V switching regulator (G02).

NOTE

- Turn the volume slowly to prevent rapid increase of voltage.



5-3 Other Electrical Parts Adjustment

[SPF-20]

5-3-3 SPF-20 Regulator Voltage Adjustment



WARNING

- Keep hands and fingers off other electrical parts. Otherwise high voltage can cause personal injury.

Check

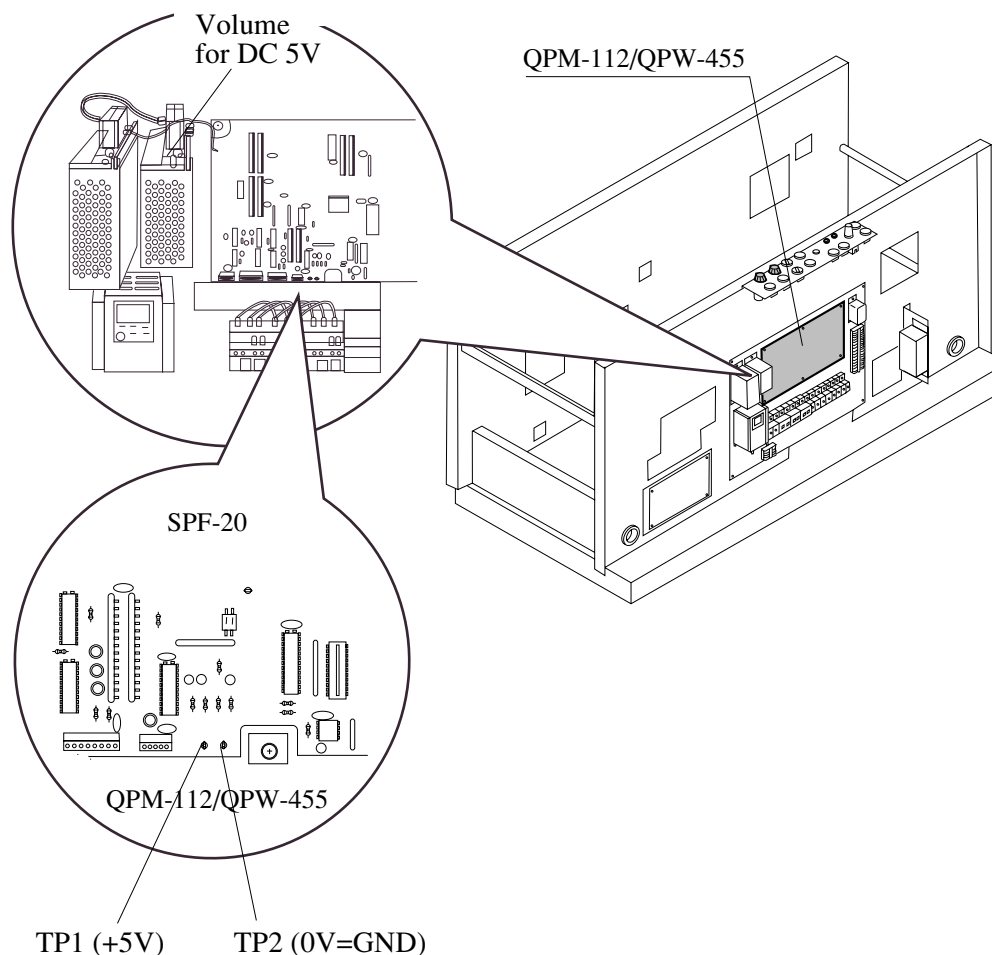
Check that voltage between TP1 (+5V) and TP2 (0V=GND) on SPF-20 control P.C.B. QPM-112/QPW-455 is within a range of DC 5.15 volts to 5.20 volts when turning on power switch.

Adjustment

1. Turn on power switch.
2. Select mode for DC voltage measurement.
3. Contact red and black terminal bars of tester with TP1 (+5V) and TP2 (0V=GND) on QPM-112/QPW-455 respectively.
4. Adjust so that voltage is within a range of DC 5.15 volts to 5.20 volts by turning volume of 5V switching regulator (G01).

NOTE

- Turn the volume slowly to prevent rapid increase of voltage.

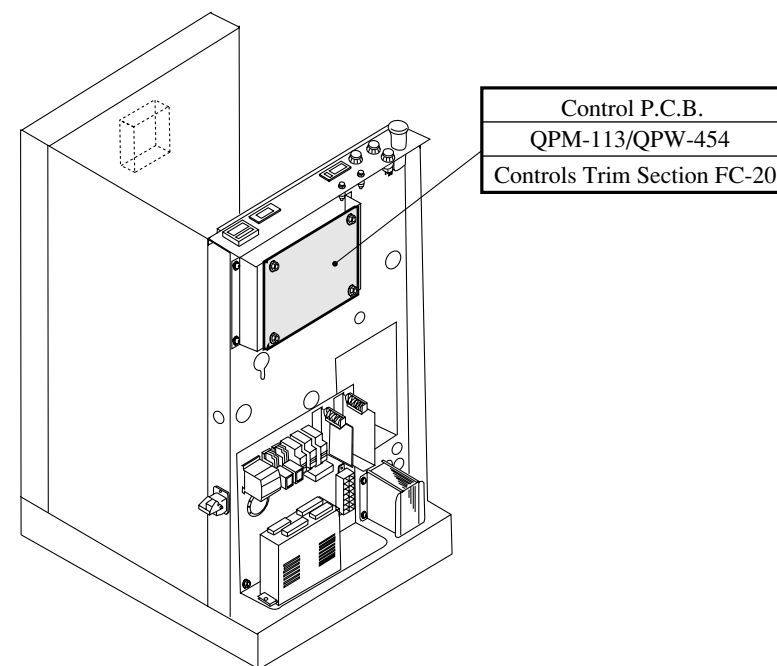
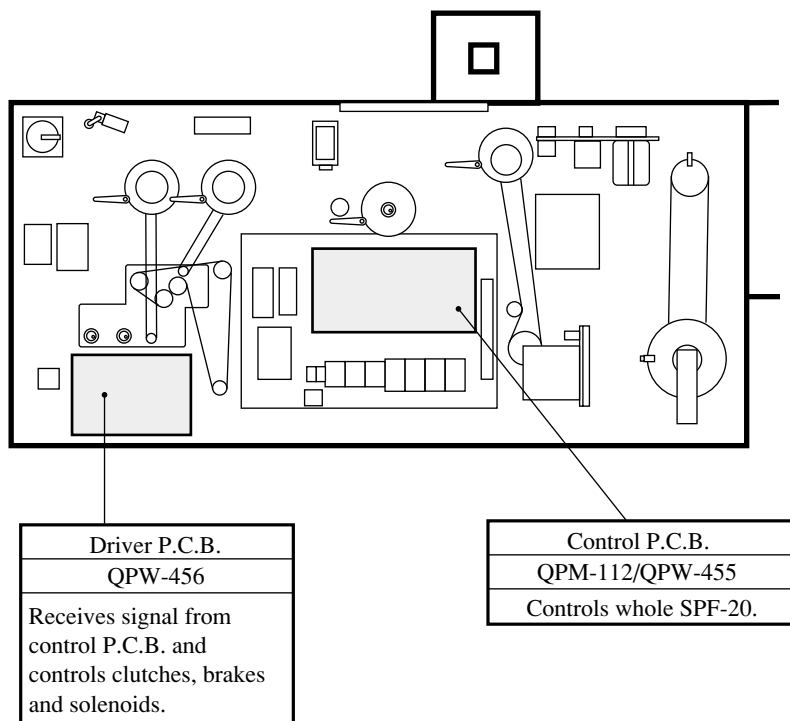


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6. P.C.B. and Wiring / Circuit Diagram

6-1 P.C.B. Layout and Functions

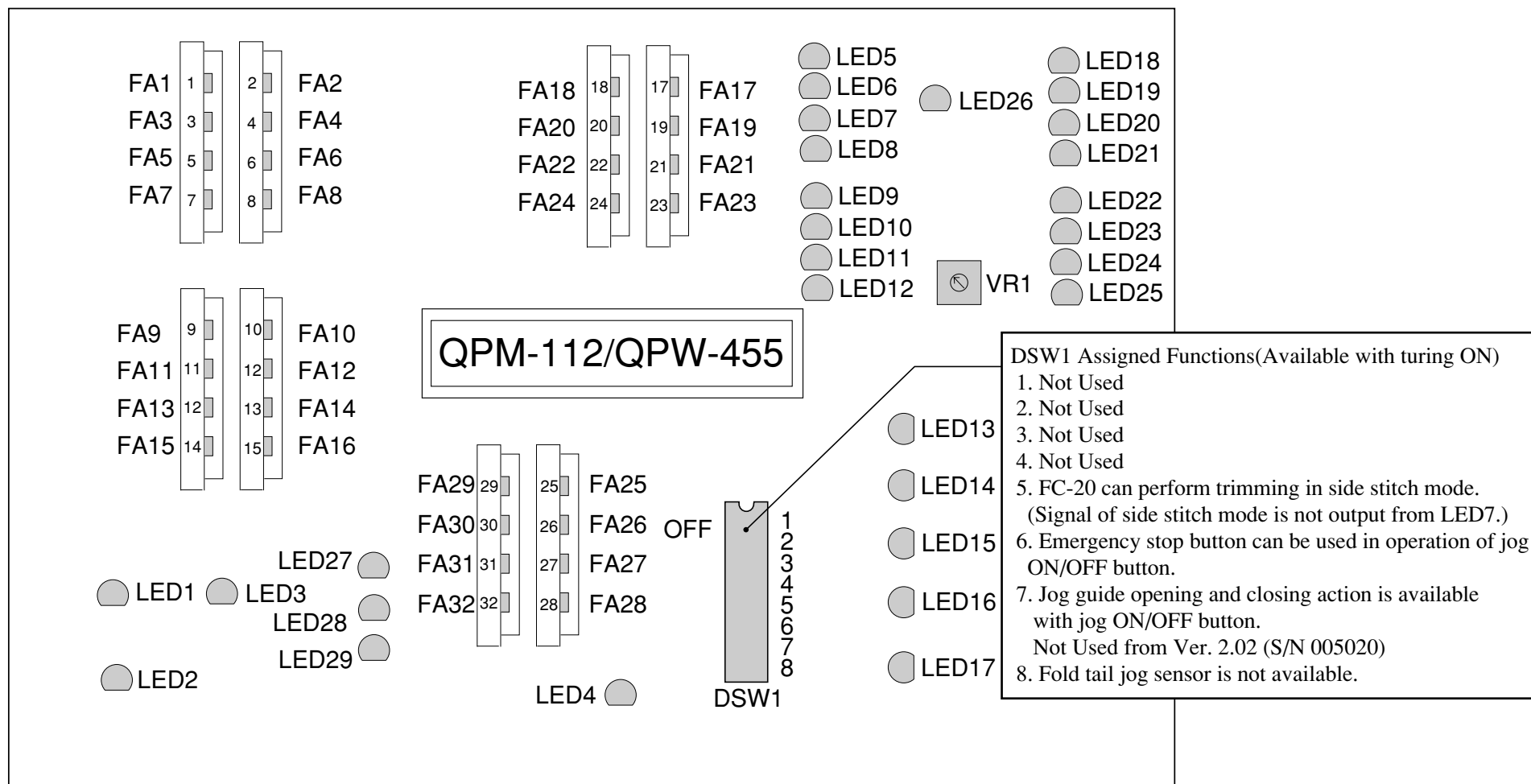
[SPF-20, FC-20]



6-2 SPF-20 Control P.C.B. QPM-112/QPW-455

[SPF-20]
[Control P.C.B.]

6-2-1 LED, FA, DSW, VR Layout



6-2 SPF-20 Control P.C.B. QPM-112/QPW-455

[SPF-20]
[Control P.C.B.]

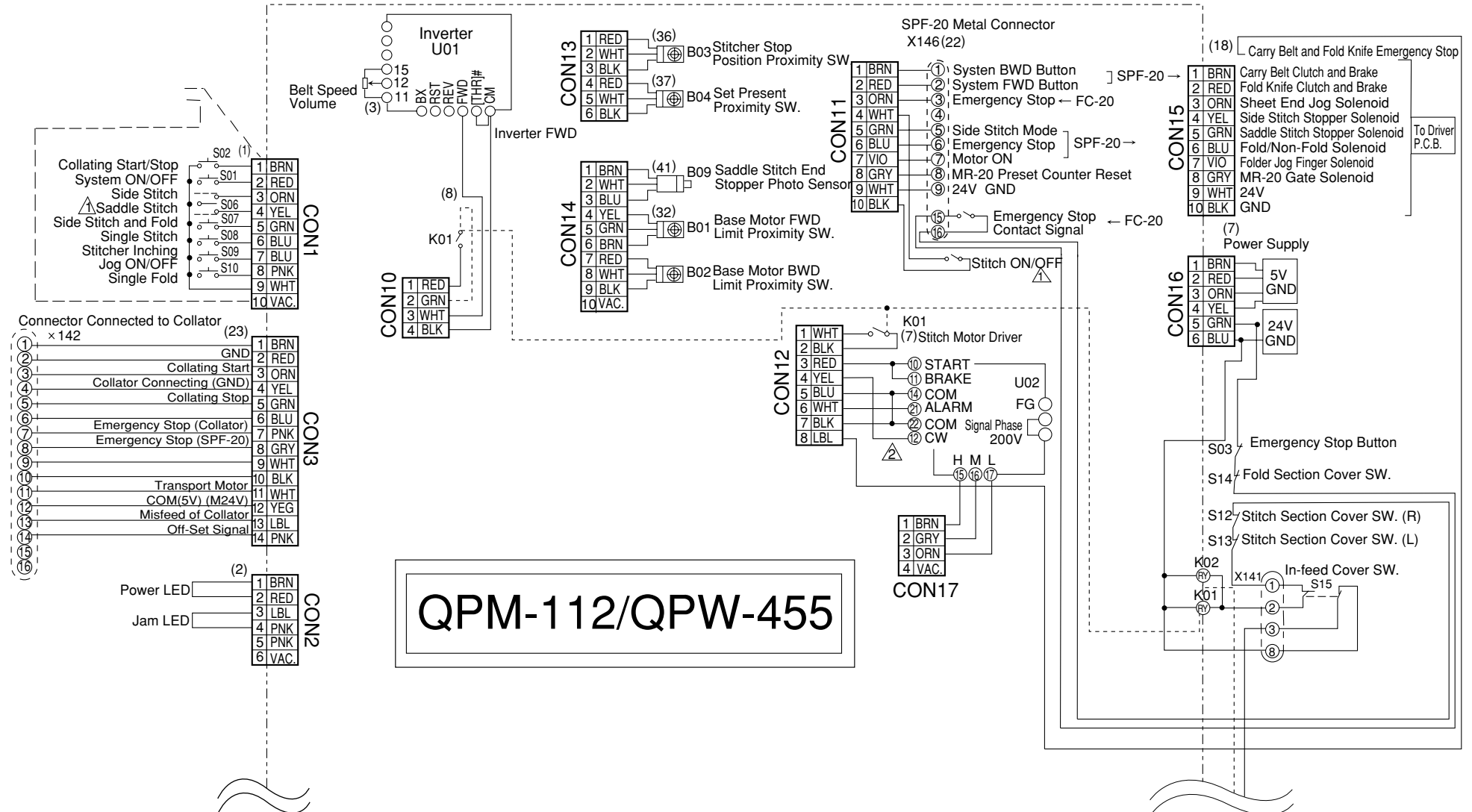
Element No.	Code.	Input	Element No.	Code.	Output
<input type="checkbox"/> LED 26 <input type="checkbox"/> FA 1 <input type="checkbox"/> FA 2 <input type="checkbox"/> FA 3 <input type="checkbox"/> FA 4 <input type="checkbox"/> FA 5 <input type="checkbox"/> FA 6 <input type="checkbox"/> FA 7	X142 S02 S01 S06 S06 S07 S08 S09	Cable from collator is connected. Collating Start/Stop Button System ON/OFF Button Side/Corner Stitching Mode in Operation Mode Select Switch Folding Mode (Side Stitching Mode from S/N 002001) in Operation Mode Select Switch Single Stitch Button Stitcher Inching Button Jog ON/OFF Button	<input type="checkbox"/> LED 1 <input type="checkbox"/> LED 2 <input type="checkbox"/> LED 3 <input type="checkbox"/> LED 4 <input type="checkbox"/> LED 5 <input type="checkbox"/> LED 6 <input type="checkbox"/> LED 7 <input type="checkbox"/> LED 8	B08	Stitching Delay Time Up Function Not Used Conveyor Motor Running Timer Infeed Jam Sensor System move backward signal from P.C.B. is output to FC-20. System move forward signal from P.C.B. is output to FC-20. Side Stitch mode signal from P.C.B. is output to FC-20. Emergency stop signal from P.C.B. is output to FC-20.
<input type="checkbox"/> FA 8 <input type="checkbox"/> FA 9 <input type="checkbox"/> FA 10 <input type="checkbox"/> FA 11 <input type="checkbox"/> FA 12 <input type="checkbox"/> FA 13 <input type="checkbox"/> FA 14	S10 S03	Single Fold Button Emergency stop signal from collator is input to P.C.B. Transport motor in collator Misfeed signal of collator is input to P.C.B. Off-set signal of collator is input to P.C.B. Emergency Stop Button Stitching Delay Time ON/OFF Knob (Lights when turning off)	<input type="checkbox"/> LED 9 <input type="checkbox"/> LED 10 <input type="checkbox"/> LED 11 <input type="checkbox"/> LED 12 <input type="checkbox"/> LED 13 <input type="checkbox"/> LED 14 <input type="checkbox"/> LED 15 <input type="checkbox"/> LED 16	U02 M10 M10 M11 M11	Motor start signal from P.C.B. is output to FC-20. Preliminary output signal to FC-20. Stitch motor start signal from P.C.B. is output. Preliminary output signal System move backward signal is output to system move motor. System move forward signal is output to system move motor. Close signal is output to side jog torque motor. Open signal is output to side jog torque motor.
<input type="checkbox"/> FA 15 <input type="checkbox"/> FA 16 <input type="checkbox"/> FA 17 <input type="checkbox"/> FA 18 <input type="checkbox"/> FA 19 <input type="checkbox"/> FA 20	S04 S05 B03 B04 S01 S16	System Backward Button System Forward Button Stitcher Stop Position Proximity Switch Set Present Proximity Switch FC-20 Emergency Stop Switch Stitch ON/OFF Button from S/N 002001	<input type="checkbox"/> LED 17 <input type="checkbox"/> LED 18 <input type="checkbox"/> LED 19 <input type="checkbox"/> LED 20 <input type="checkbox"/> LED 21 <input type="checkbox"/> LED 22 <input type="checkbox"/> LED 23 <input type="checkbox"/> LED 24	M12 Y22 Y23 Y24 Y25 Y26 Y27 Y28	Signal is output to conveyor motor. Carry belt start is output. Fold knife start signal is output. Signal is output to sheet end jog solenoid. Signal is output to side stitch stopper solenoid. Signal is putput to saddle stitch stopper solenoid. Signal is output to fold / non-fold solenoid. Signal is output to folder jog finger solenoid.
<input type="checkbox"/> FA 21 <input type="checkbox"/> FA 22 <input type="checkbox"/> FA 23 <input type="checkbox"/> FA 24 <input type="checkbox"/> FA 27 <input type="checkbox"/> FA 29	U02 B09 B02 B01 B11 K02	Alarm of stitcher motor driver functions. (Lights when alarm malfunctions) Saddle Stitch End Stopper Photo Sensor Base Motor Forward Limit Proximity Switch Base Motor Backward Limit Proximity Switch Fold Delay Time Proximity Switch Breaker Alarm Contact and Emergency Stop Relay Contact (Lights in normal, lights-out in case of emergency.)	<input type="checkbox"/> LED 25 <input type="checkbox"/> LED 27 <input type="checkbox"/> LED 28 <input type="checkbox"/> LED 29		Preliminary output Not Used Collating start signal is output. Collating stopt signal is output.
<input type="checkbox"/> FA 32	B10	Fold Tail Jog Sensor	VR1		Stitcher Inching Speed Adjustment. (Normally, 1.5s/one stitching cycle)

6-2 SPF-20 Control P.C.B. QPM-112/QPW-455

[SPF-20]
[Control P.C.B.]

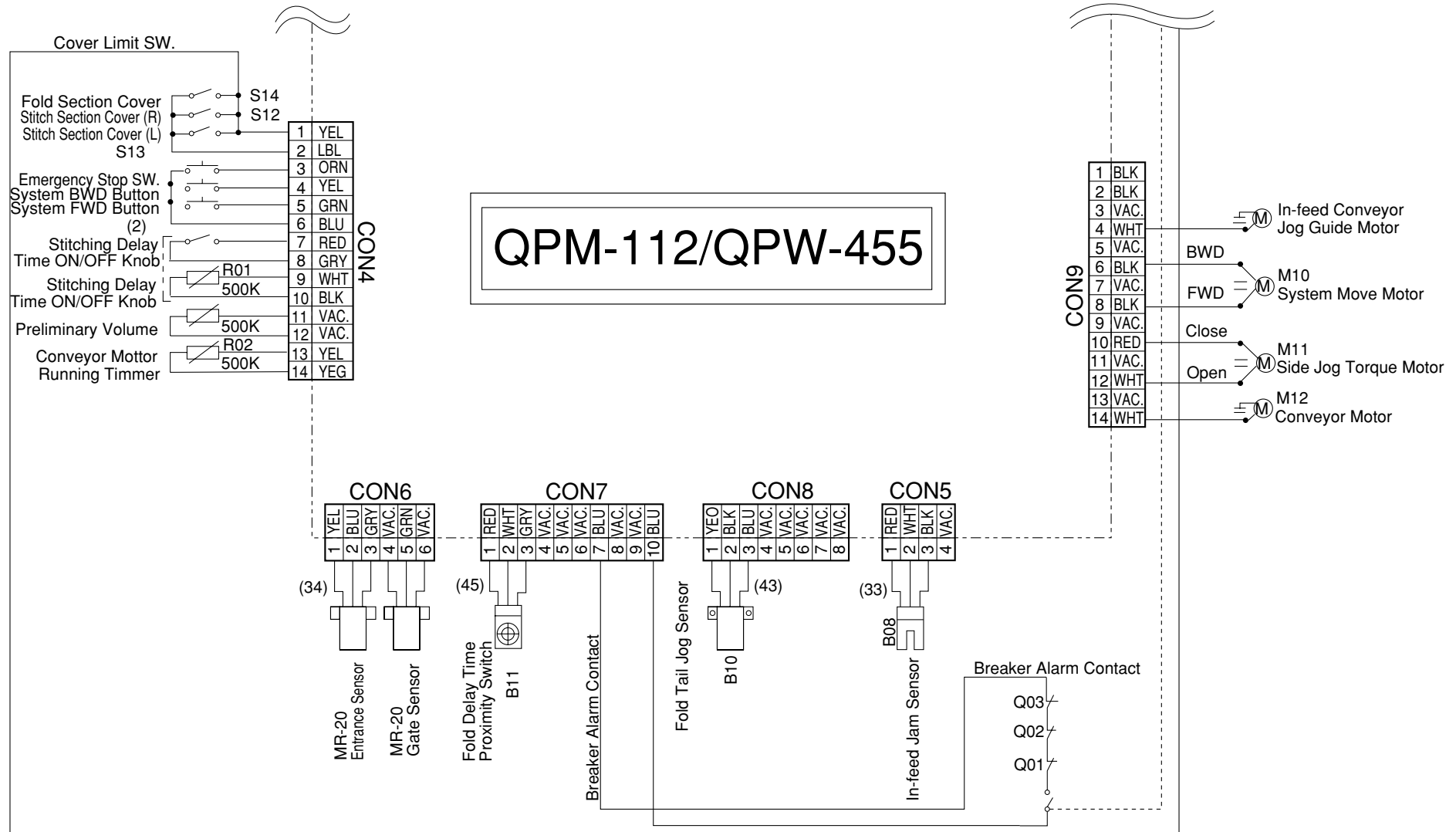
6-2-2 Connector Layout

[] shows the terminal of the inverter setting on the SPF-20 (from S/N 025999)



6-2 SPF-20 Control P.C.B. QPM-112/QPW-455

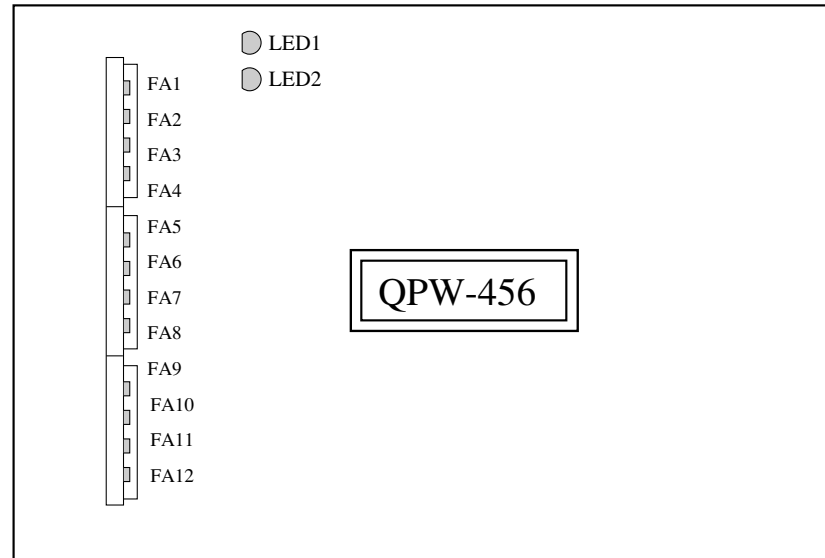
[SPF-20]
[Control P.C.B.]



6-3 SPF-20 Driver P.C.B. QPW-456

[SPF-20]
[Driver P.C.B.]

6-3-1 LED, FA Layout

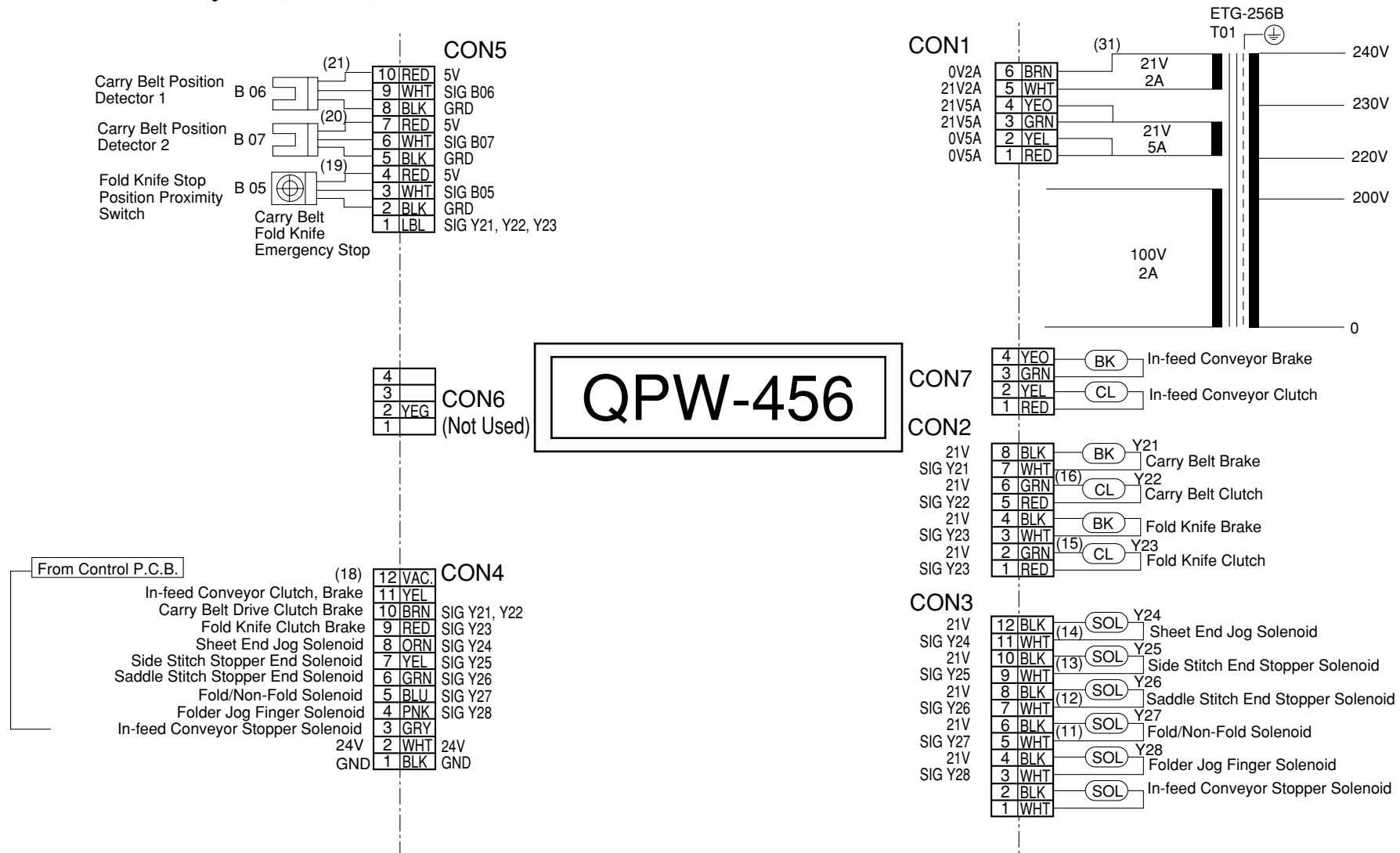


Element No.	Code	Input	Element No.	Code	Outout
<input type="checkbox"/> FA 1 <input type="checkbox"/> FA 2 <input type="checkbox"/> FA 3 <input type="checkbox"/> FA 4 <input type="checkbox"/> FA 5	B05 Y22, 21	Fold Knife Stop Position Proximity Switch Carry belt and fold knife emergency stop signal is input to P.C.B. (Lights when motor runs) Not Used Not Used Carry Belt Start Signal Input.(Clutch Y22, Brake Y21 Control Input)	<input type="checkbox"/> LED 1 <input type="checkbox"/> LED 2	B06 B07	Pick Belt Position Detector 1. Pick Belt Position Detector 2.
<input type="checkbox"/> FA 6 <input type="checkbox"/> FA 7 <input type="checkbox"/> FA 8 <input type="checkbox"/> FA 9 <input type="checkbox"/> FA 10 <input type="checkbox"/> FA 11 <input type="checkbox"/> FA 12	Y23 Y24 Y25 Y26 Y27 Y28	Fold Knife Start Signal Input. (Clutch Braker Y23 Control Input) Sheet End Jog Solenoid ON Signal Input. Side Stitch Stopper Solenoid ON Signal Input. Saddle Stitch Stopper Solenoid ON Signal Input. Fold/Non-hold Solenoid ON Signal Input. Folder Jog Finger Solenoid ON Signal Input. Preliminary Input			

6-3 SPF-20 Driver P.C.B. QPW-456

[SPF-20]
[Driver P.C.B.]

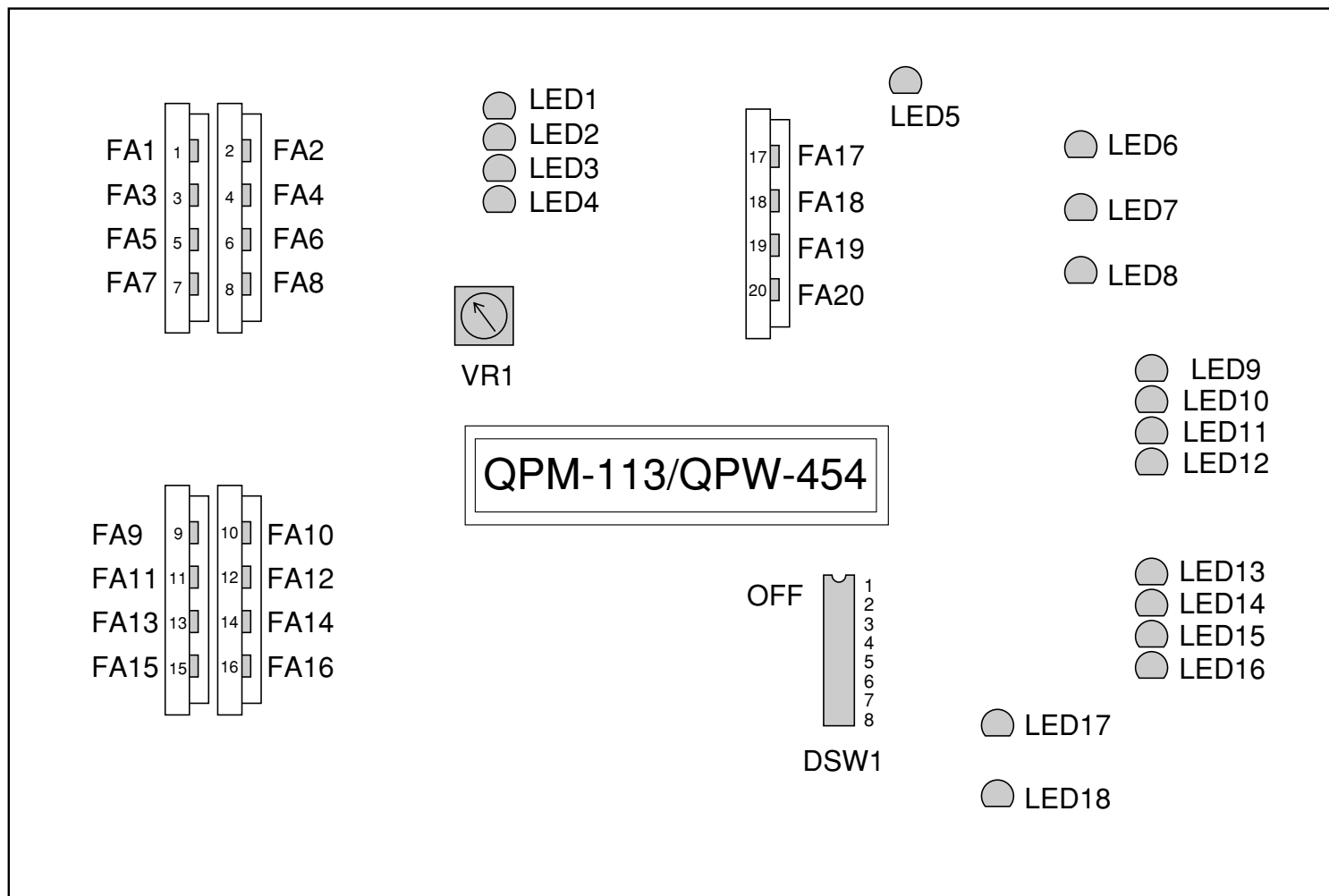
6-3-2 Connector Layout (SPF-20)



6-4 FC-20 Control P.C.B. QPM-113/QPW-454

[FC-20]
[Trim Section Control P.C.B.]

6-4-1 LED, FA, DSW, VR Layout



6-4 FC-20 Control P.C.B. QPM-113/QPW-454

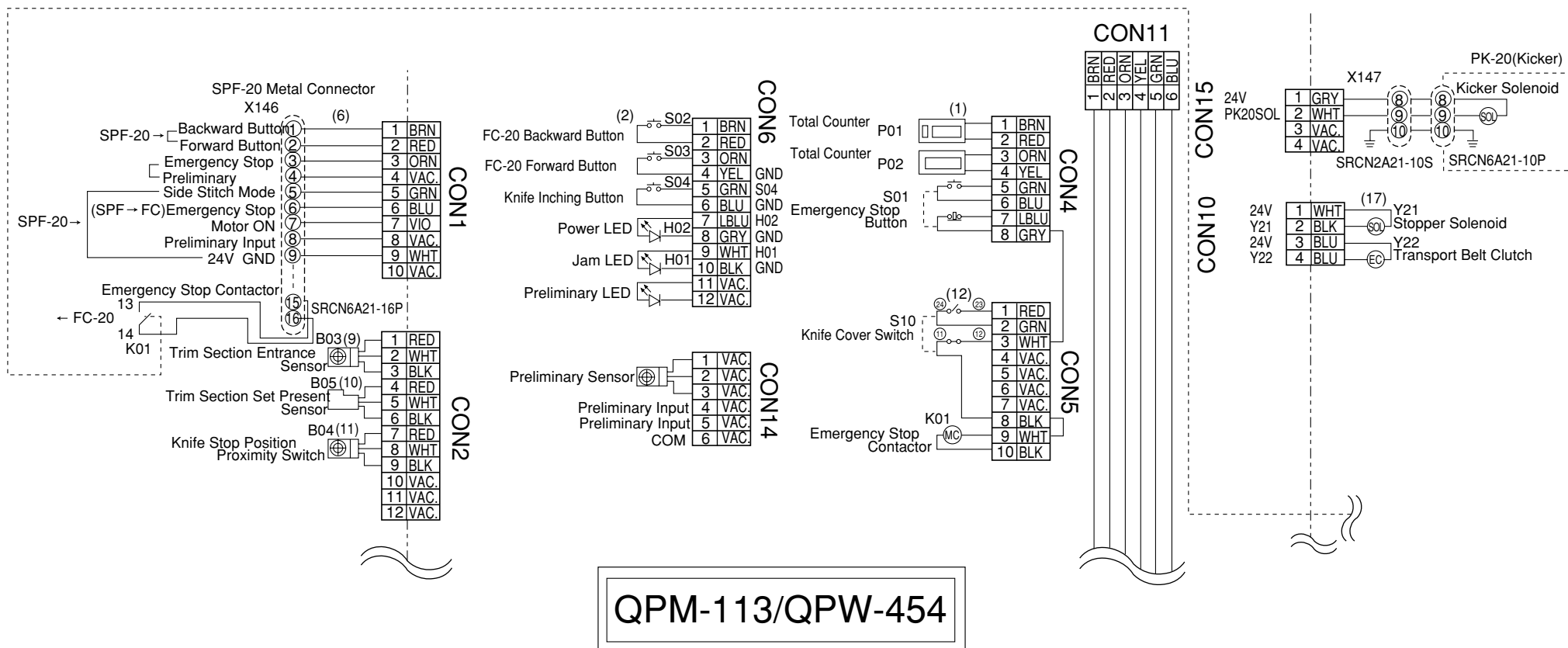
[FC-20]
[Trim Section Control P.C.B.]

Element No.	Code	Input	Element No.	Code	Output
<input type="checkbox"/> FA 1 <input type="checkbox"/> FA 2 <input type="checkbox"/> FA 3 <input type="checkbox"/> FA 4 <input type="checkbox"/> FA 5 <input type="checkbox"/> FA 6 <input type="checkbox"/> FA 7	 B03 B05 B04	Side Stitch Mode Signal from SPF-20 Emergency Stop Signal from SPF-20 Motor ON Signal from SPF-20 Preliminary Output Signal from SPF-20 Trim Section Entrance Sensor (Lights when no sheet) Trim Section Set Present Sensor Knife Stop Position Proximity Switch	<input type="checkbox"/> LED 1 <input type="checkbox"/> LED 2 <input type="checkbox"/> LED 3 <input type="checkbox"/> LED 4 <input type="checkbox"/> LED 5 <input type="checkbox"/> LED 6 <input type="checkbox"/> LED 7 <input type="checkbox"/> LED 8	 H01 Y21 Y22	Preliminary Output Emergency Stop Output Signal Jam Lamp Preliminary Output Relay for Total Counter Kicker Solenoid Stopper Solenoid Transport Belt Clutch
<input type="checkbox"/> FA 8 <input type="checkbox"/> FA 9 <input type="checkbox"/> FA 10 <input type="checkbox"/> FA 11 <input type="checkbox"/> FA 12 <input type="checkbox"/> FA 13 <input type="checkbox"/> FA 14	 P03 S02 S03	Knife Motor Driver Alarm (Lights when alarm malfunctions.) Not Used Not Used Not Used Preset Counter Output Signal for Kicker FC-20 Backward Button and System Backward Signal from SPF-20 FC-20 Forward Button and System Forward Signal from SPF-20	<input type="checkbox"/> LED 9 <input type="checkbox"/> LED 10 <input type="checkbox"/> LED 11 <input type="checkbox"/> LED 12 <input type="checkbox"/> LED 13 <input type="checkbox"/> LED 14 <input type="checkbox"/> LED 15 <input type="checkbox"/> LED 16	 U01 U01 K02 K03	Knife Motor Driver Start Signal Knife Motor Driver VRSEL Signal Preliminary Output Transport Belt Clutch OFF Delay Timer Function Relay for Preset Counter SSR for Air Pump Motor SSR for Guide Plate Solenoid Preliminary Output
<input type="checkbox"/> FA 15 <input type="checkbox"/> FA 16 <input type="checkbox"/> FA 17 <input type="checkbox"/> FA 18 <input type="checkbox"/> FA 19 <input type="checkbox"/> FA 20	 B02 B01 S04 S10/S01	System Backward Limit Proximity Switch System Forward Limit Proximity Switch Knife Inching Button Knife Cover Switch/Emergency Stop Button Preliminary Input Not Used	<input type="checkbox"/> LED 17 <input type="checkbox"/> LED 18	 M10 M10	System Move Motor (Backward) System Move Motor (Forward)
DSW1 Assigned Functions (Available with turning ON) 1. Emergency stop due to knife motor driver alarm is not available. 2. Motor ON signal is available even if not connected to SPF-20. 3. Trim section entrance sensor is not available. 4. Trim section set present sensor is not available. 5. Transport belt clutch OFF delay timer function is not available. 6. Transport belt clutch is turned ON when knife reaches to upper dead point after trimming. (The timing of clutch ON becomes earlier 0.1sec. with turning this switch.) 7. Stopper solenoid is turned off after 3 sec. of the timing that trim knife reaches to upper dead point. 8. Not Used			VR1 Transport Belt Clutch OFF Delay Time Adjustment • The interval from sheet detection by cut section set present sensor to transport belt stop can be adjusted with this volume. • The adjustable range is 0.1 to 0.6 sec. Initial setting value is 0.1sec. with turned counterclockwise up to the end.		

6-4 FC-20 Control P.C.B. QPM-113/QPW-454

[FC-20]
[Trim Section Control P.C.B.]

6-4-2 Connector Layout

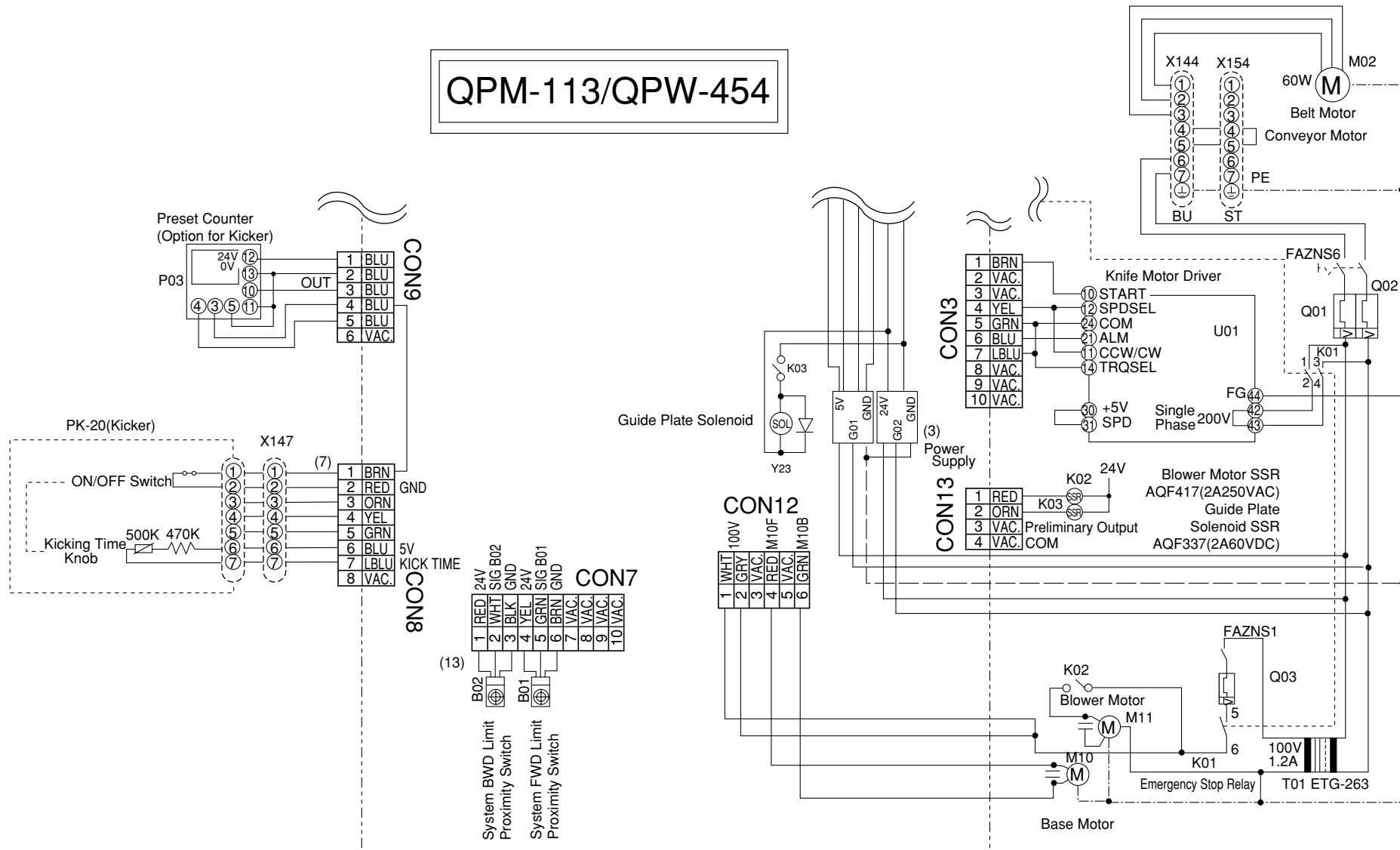


6-4 FC-20 Control P.C.B. QPM-113/QPW-454

[FC-20]

[Trim Section Control P.C.B.]

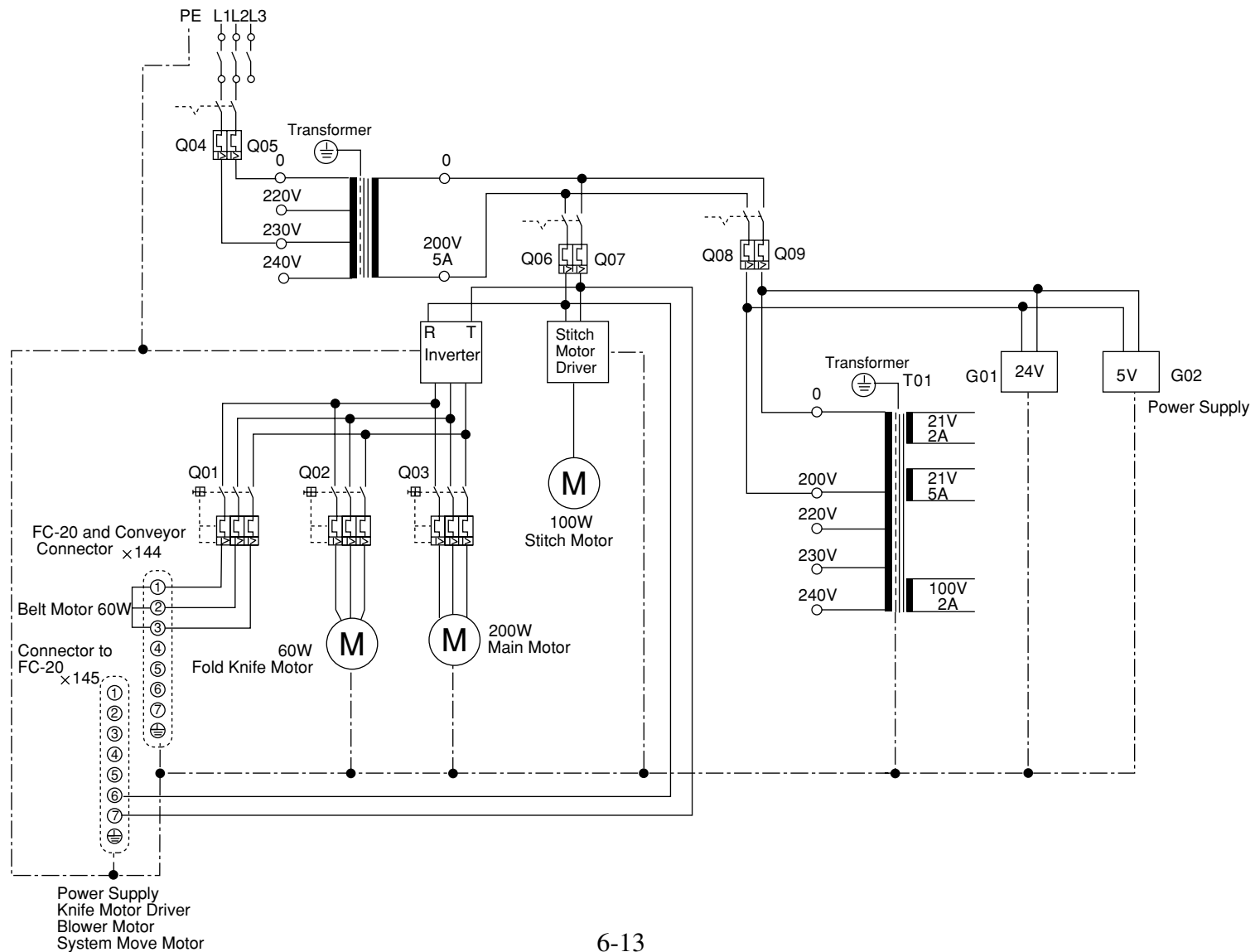
QPM-113/QPW-454



6-5 200V Drive Section Wiring Diagram

[SPF-20]

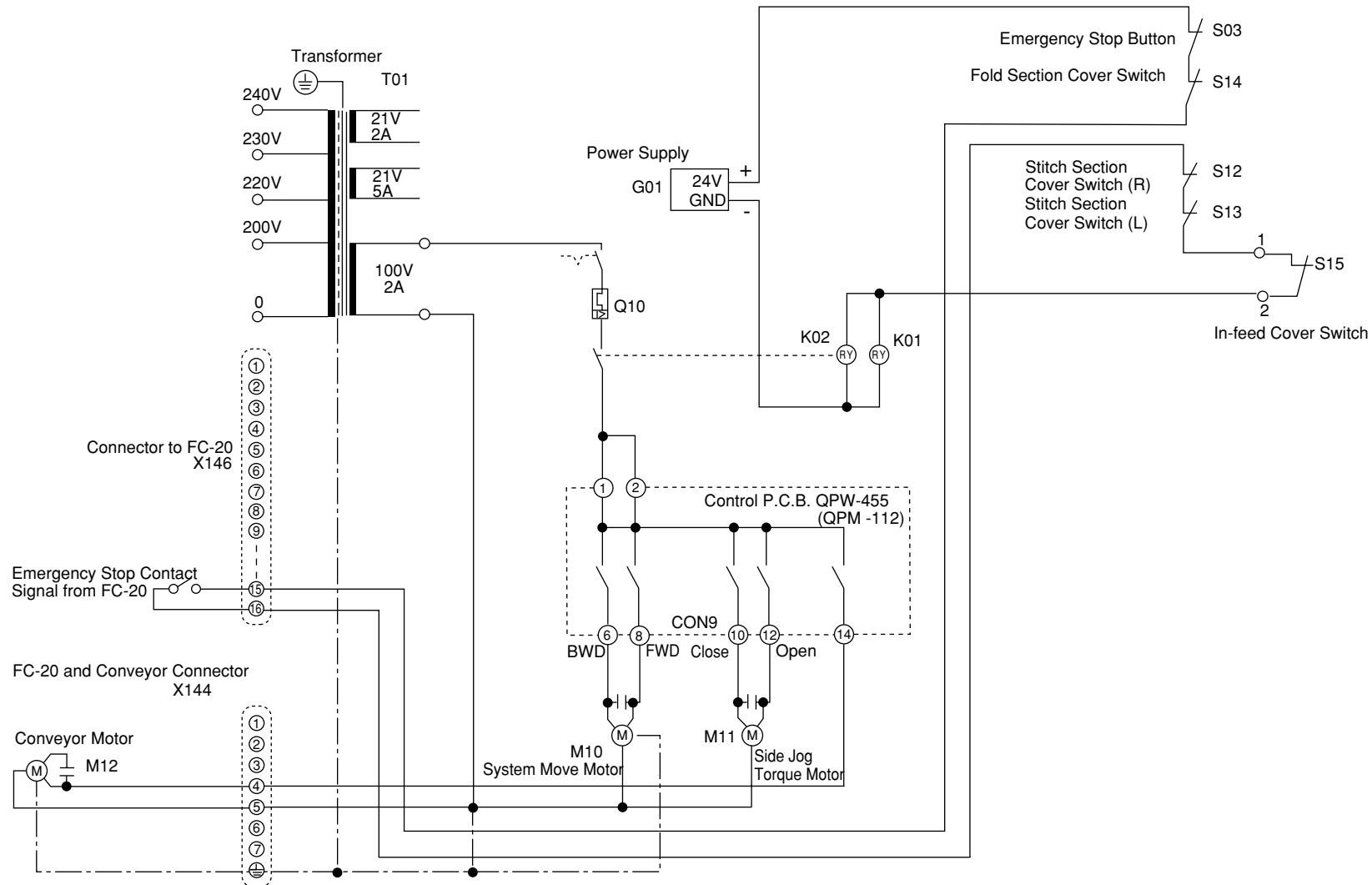
6-5-1 SPF-20



6-6 100V Drive Section Wiring Diagram

[SPF-20]

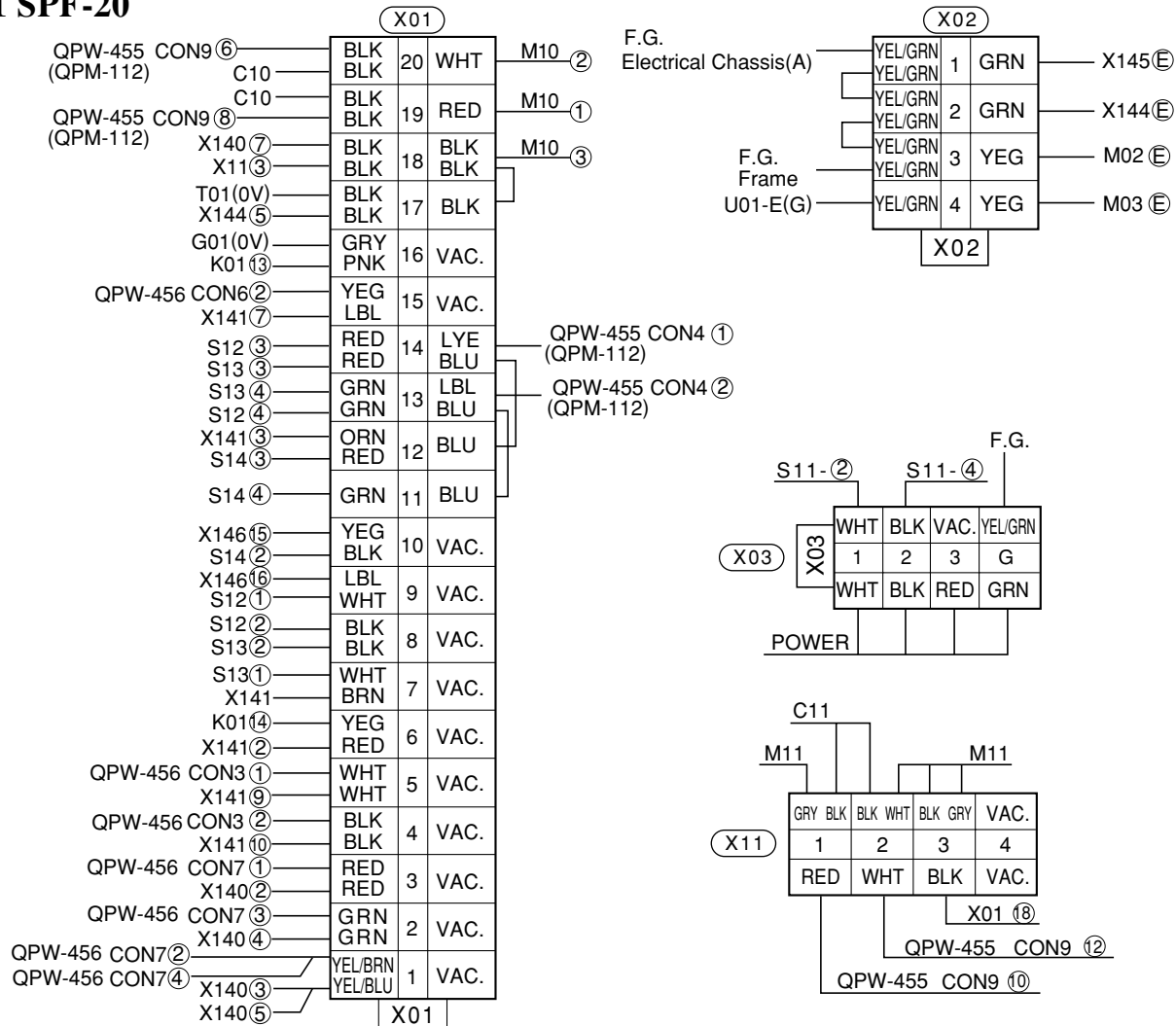
6-6-1 SPF-20



6-7 Terminal Block Circuit Diagram

[SPF-20]

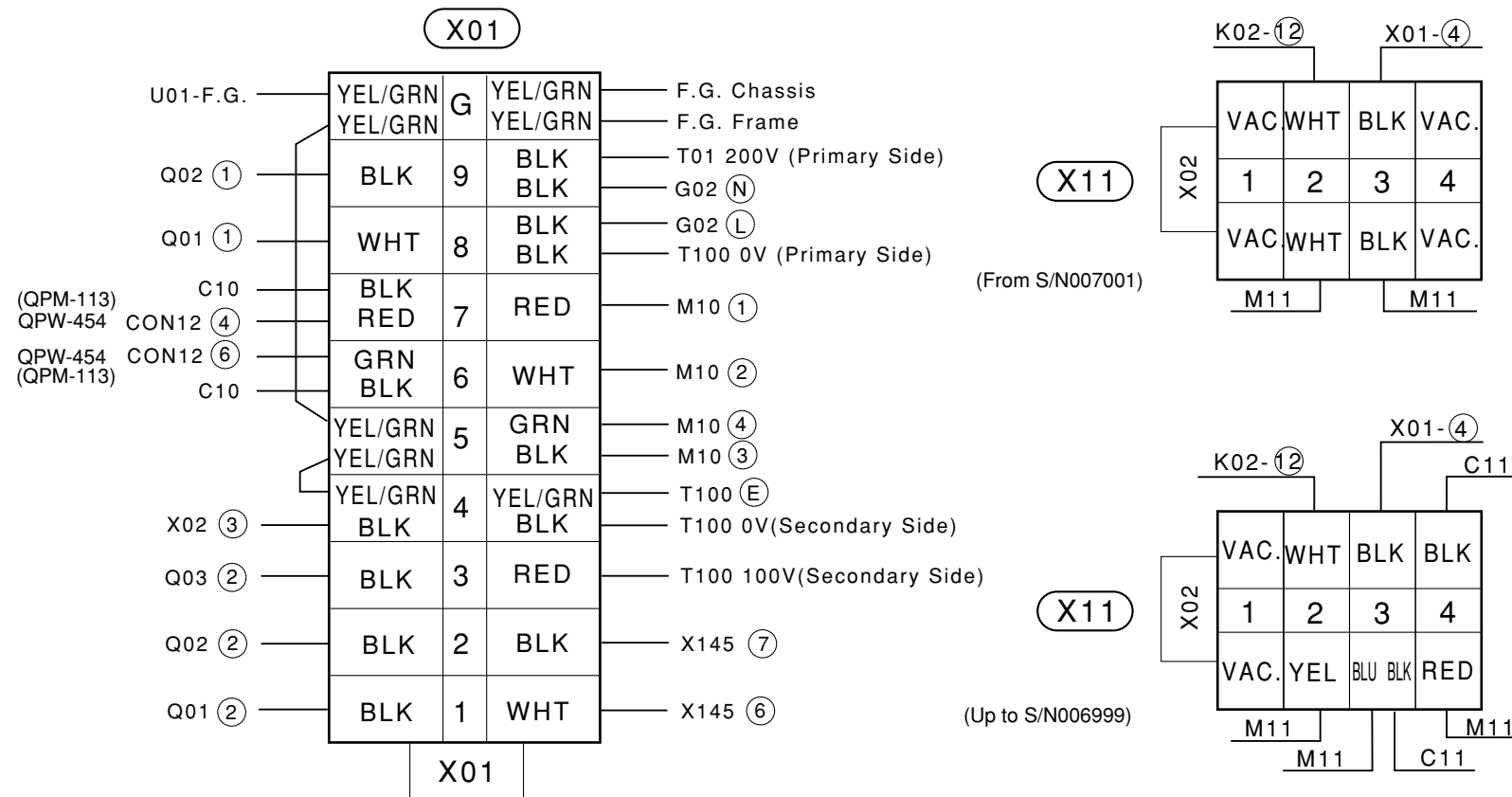
6-7-1 SPF-20



6-7 Terminal Block Circuit Diagram

[FC-20]

6-7-2 FC-20

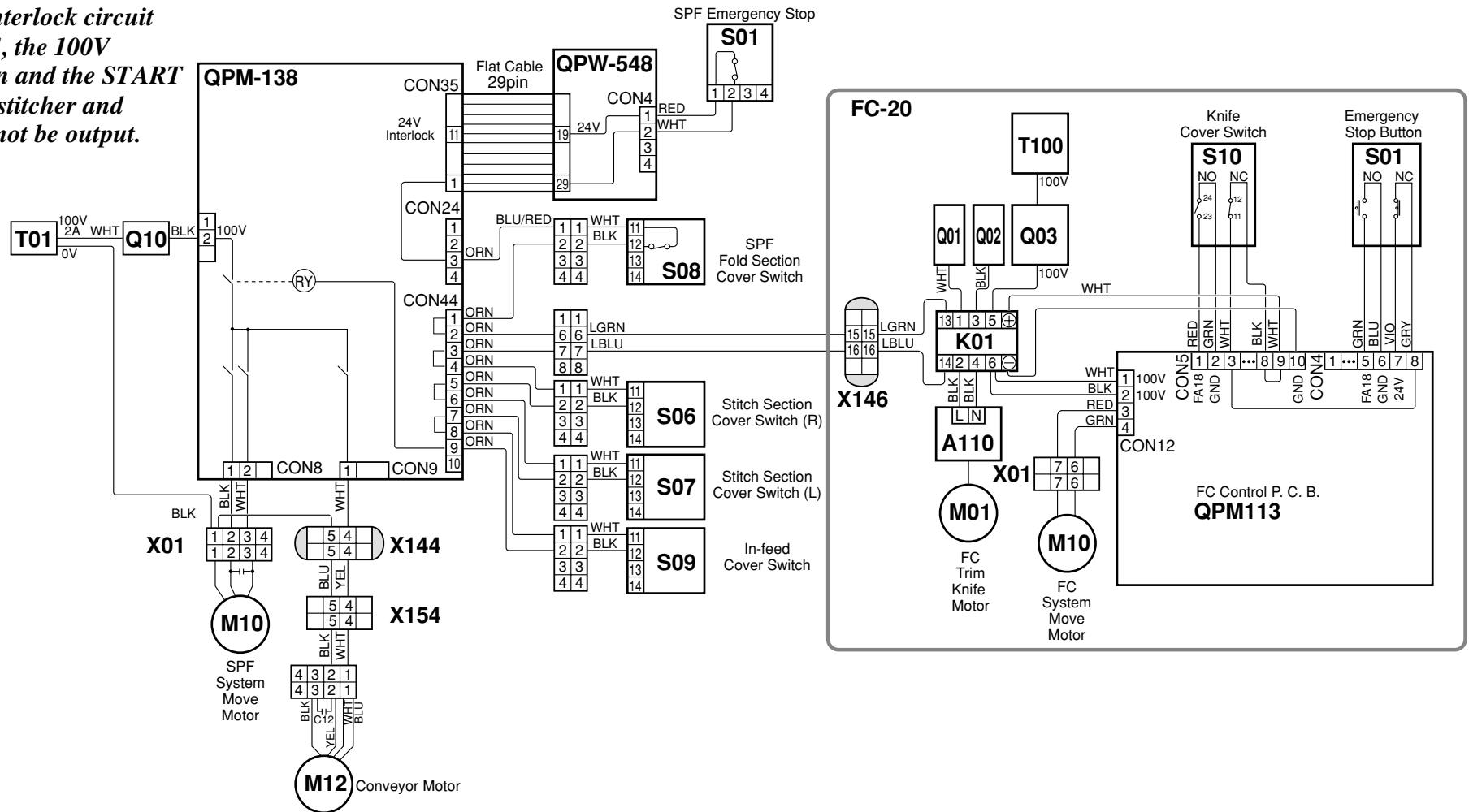


6-8 Interlock Circuit Diagram

[SPF-20, FC-20]

ADDITIONAL INFORMATION

- When the interlock circuit opens in SPF, the 100V circuit is open and the **START** signal of the stitcher and inverter can not be output.



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