OKI
PRINTING SOLUTIONS

ML620/ML621
Maintenance Manual

020711B

Oki Data CONFIDENTIAL

Please refer to the
"Illustrated Parts Manual"
for spare part information.

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1. CONFIGURATION

1.1 Standard Printer Configuration

This printer consists of the following assemblies:

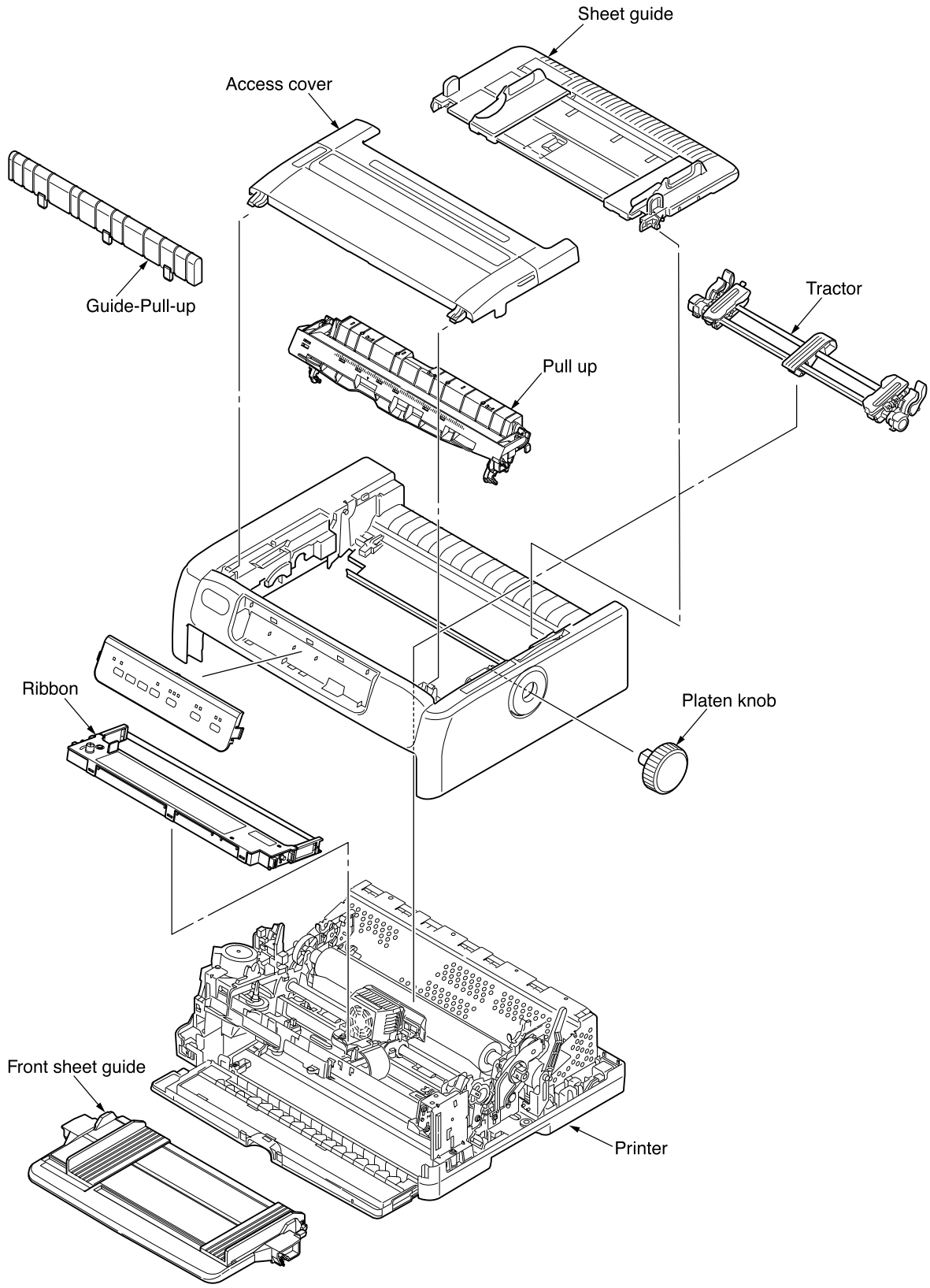


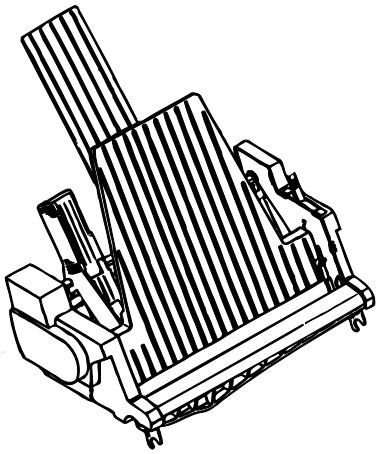
Figure 1-1 Configuration

1.2 Options

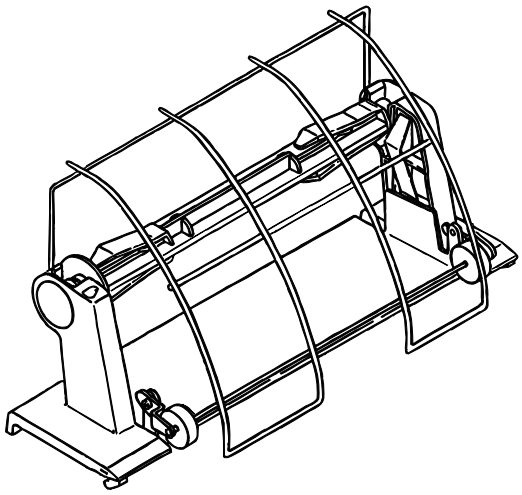
(1) Cut sheet feeder unit (CSF)

(Narrow and wide versions available)

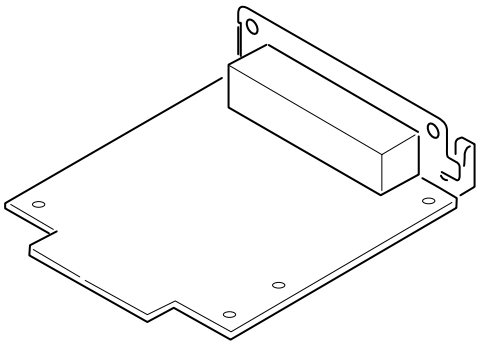
Single-bin CSF



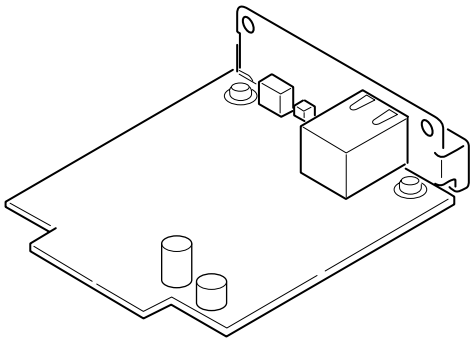
(2) Roll paper stand (Narrow only)



(3) RS232C Serial interface board



(4) OKI LAN board



2. THEORY OF OPERATION

2.1 Electrical Operation

The electrical operation of the printer circuit is described in this section.

2.1.1 Summary

Figure 2-1 shows the block diagram of the printer.

The control board is made up of the SOC (SYSTEM ON CHIP), peripheral circuits, drive circuits, sensors and interface connectors.

The power to the control board is supplied by the power supply unit through the connector cord.

The power to other electrical parts is also distributed through the connectors within the control board.

2.1.2 SOC and the Peripheral Circuit

(1) SOC

SOC to be CPU and past LSI function, building SRAM into, and the outline of use is as follows.

- 3.3V single power supply (1.2V in internal core voltage)
- Operation frequency 48MHz
- Built-in CPU core (ARM7TDMI)
- SPAM 4M bit
- With built-in USB controller
- With built-in UART function
- AD converter x 4ch DA converter x 2ch

OKI of other peripheral circuitry is original though CPU core uses ARM7TDMI.

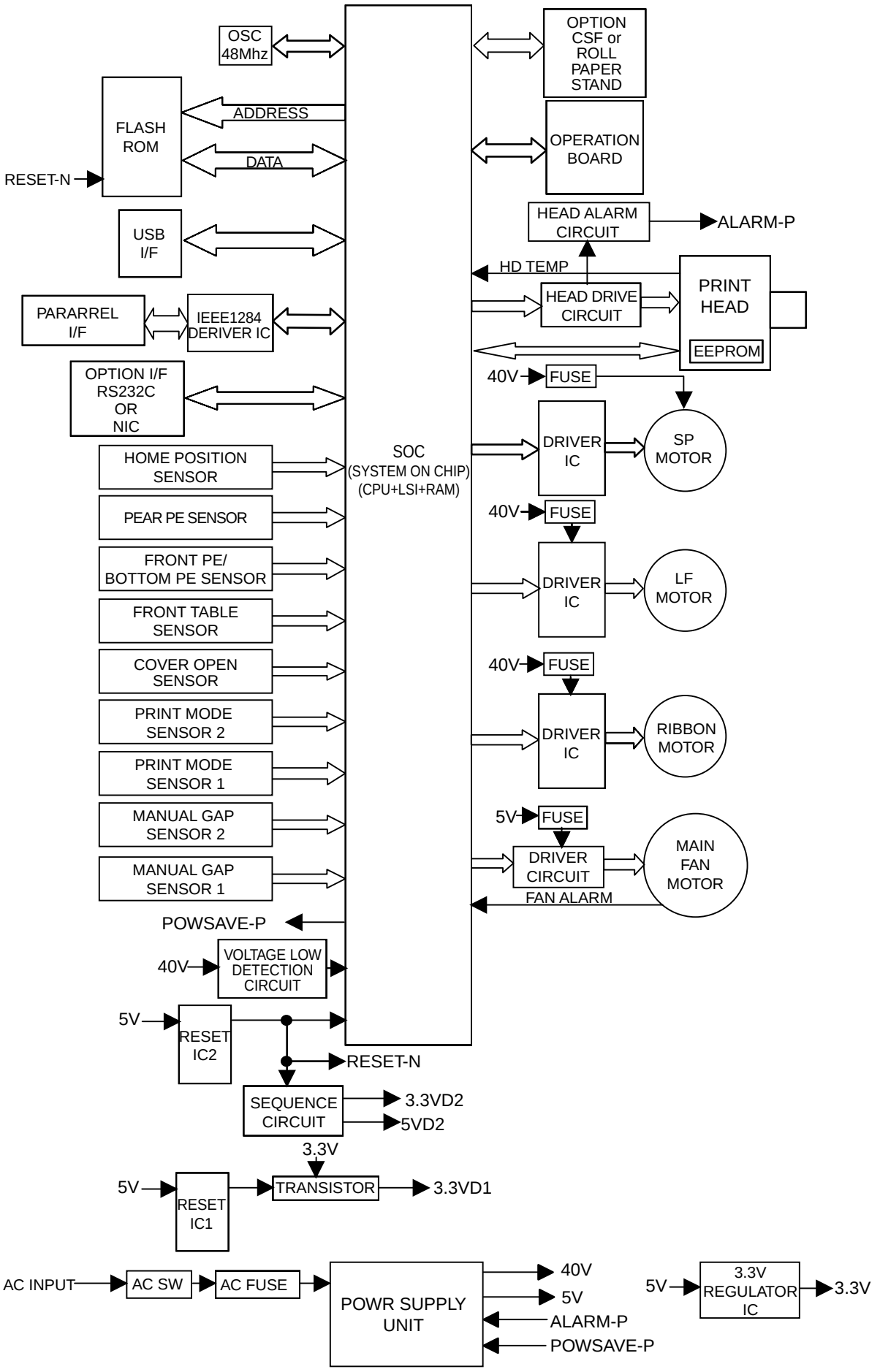
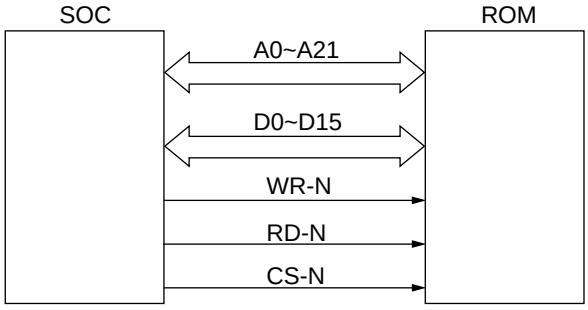

OSC
48Mhz
FLASH
ROM
ADDRESS
DATA
RESET-N
USB
I/F
PARARREL
I/F
IEEE1284
DERIVER IC
OPTION I/F
RS232C
OR
NIC
HOME POSITION
SENSOR
PEAR PE SENSOR
FRONT PE/
BOTTOM PE SENSOR
FRONT TABLE
SENSOR
COVER OPEN
SENSOR
PRINT MODE
SENSOR 2
PRINT MODE
SENSOR 1
MANUAL GAP
SENSOR 2
MANUAL GAP
SENSOR 1
SOC
(SYSTEM ON CHIP)
(CPU+LSI+RAM)
POWSAVE-P
40V
VOLTAGE LOW
DETECTION
CIRCUIT
5V
RESET
IC2
RESET-N
SEQUENCE
CIRCUIT
3.3VD2
5VD2
3.3V
5V
RESET
IC1
TRANSISTOR
3.3VD1
OPTION
CSF or
ROLL
PAPER
STAND
OPERATION
BOARD
HEAD ALARM
CIRCUIT
ALARM-P
HD TEMP
HEAD DRIVE
CIRCUIT
PRINT
HEAD
EEPROM
40V
FUSE
DRIVER
IC
SP
MOTOR
40V
FUSE
DRIVER
IC
LF
MOTOR
40V
FUSE
DRIVER
IC
RIBBON
MOTOR
5V
FUSE
DRIVER
CIRCUIT
MAIN
FAN
MOTOR
FAN ALARM
AC INPUT
AC SW
AC FUSE
POWR SUPPLY
UNIT
40V
5V
ALARM-P
POWSAVE-P
5V
3.3V
REGULATOR
IC
3.3V

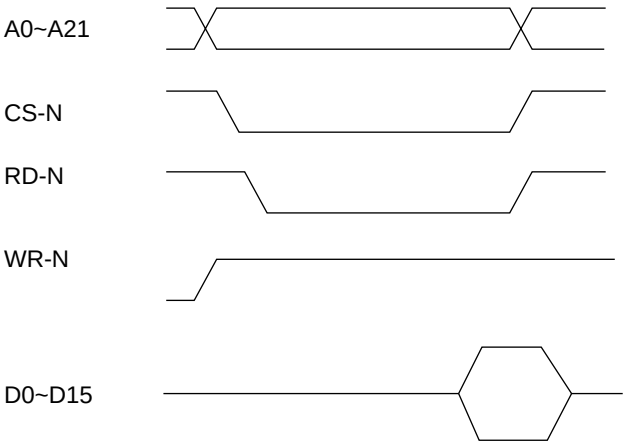
Figure 2-1

(2) Program ROM (external FLASH ROM)

The program to make the printer work is stored in FLASH ROM as external ROM.

FLASH ROM that can be installed is 64Mbit(16 x 4096k) or less. The access timing of the outline to FLASH ROM is shown in the following.





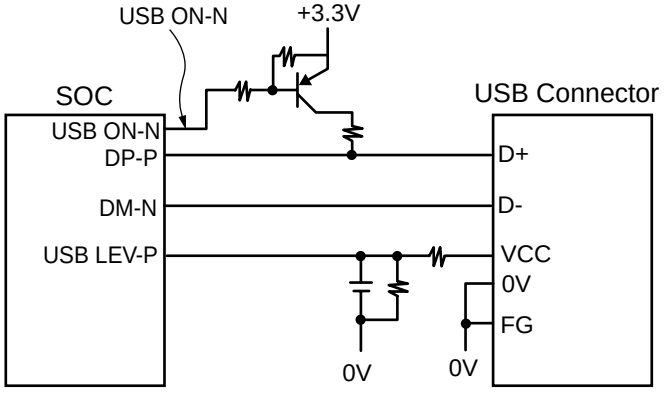
(3) RAM

In RAM, the memory capacity built into SOC is 256K x 16bit (4Mbit).

(4) USB Controller

The USB Controller detects and controls the USB interfacee.

The USB controller is built into SOC. The figure below shows the outline circuit.



2.1.3 Initialization

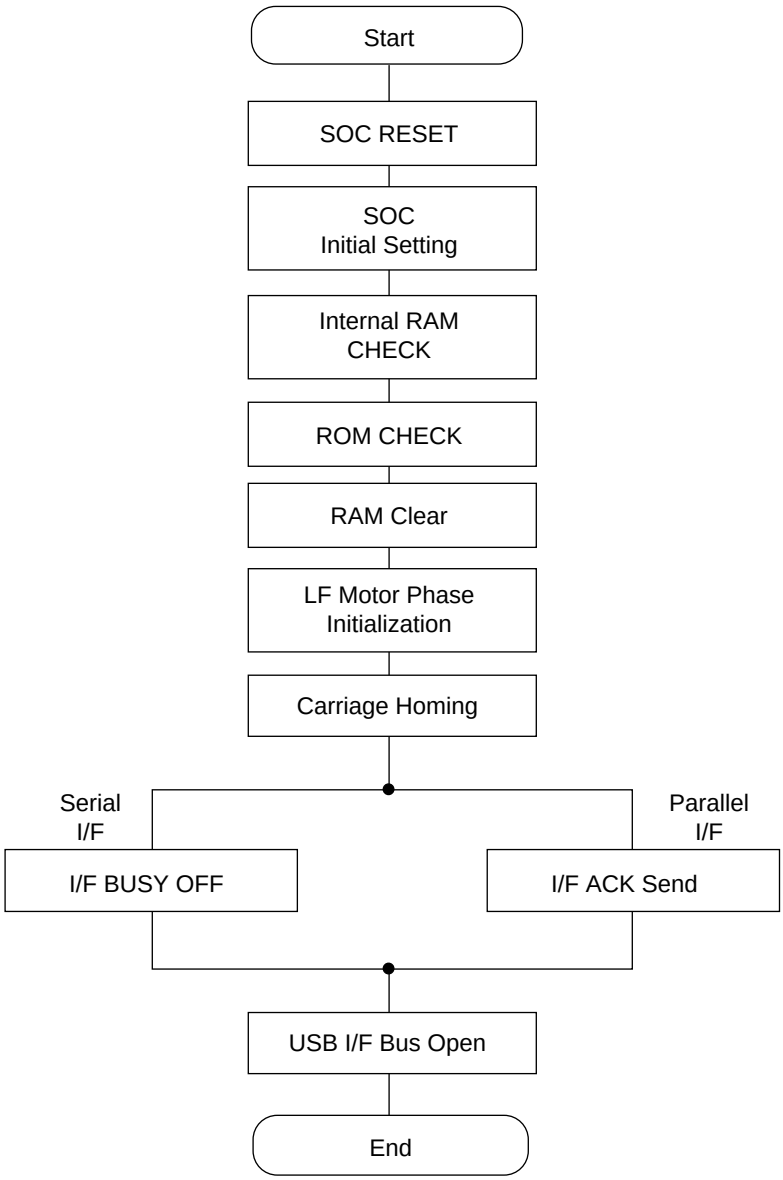
This printer is initialized when the power is turned on or when the I-PRIME-N signal is input from the host side via the parallel interface.

For the initialize operation, the RST-N signal is first output from the reset circuit to reset the SOC and Flash ROM. When resetting ends, the program starts. Reset operation by I-PRIME starts program to initialize, but does not reset the SOC.

The program here sets the mode of the SOC, checks the memories (ROMs and RAMs), then carries out carriage homing, and determines the LF motor phase.

Finally, the program establishes the interface signals (P-I/F: ACK-P signal sending, and S-I/F: BUSY-N signal off) and lights the SELECT lamp to inform the ready state for receiving to the host side and ends the initialize operation.

After USB I/F control I/O initialization and USB I/F bus opening.



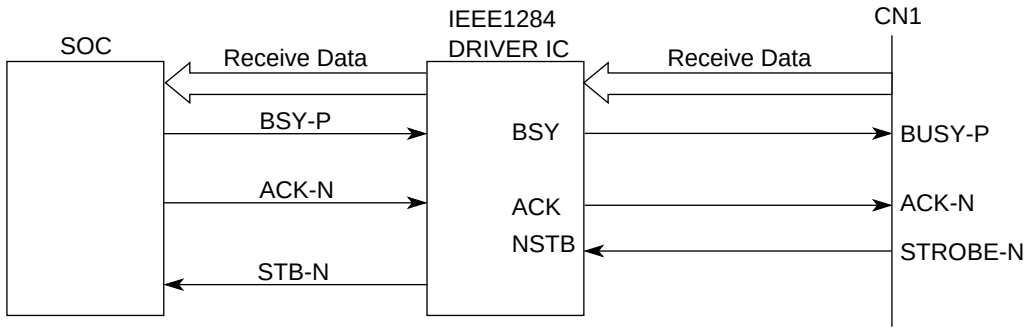
2.1.4 Interface Control

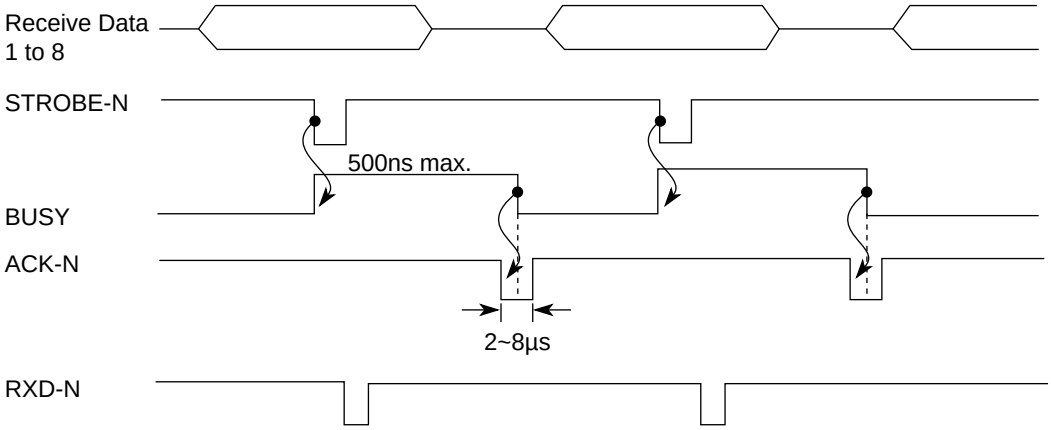
(1) Parallel Interface

The parallel data input from the host to the interfaced LSI is latched to its internal register at the falling edge of the STROBE-N signal.

At the same time, the LSI sets the BUSY signal to the high level to inform the host that the data is being processed, and outputs the RXD signal to inform the MPU of data reception. The data is read upon receiving the RD-N signal from the MPU.

When the data processing ends, the BUSY signal is set to off and the ACK-N signal in sent to request the next data. When reception is impossible because the buffer is full, the BUSY signal is sent to request stopping of data transmission.





* The $\overline{\text{STROBE}}$-based timing for the BUSY signal is adjustable from the Maintenance menu.

$\overline{\text{ACK}}$ signal timing and BUSY signal timing can be adjusted from the Maintenance menu.

(2) Universal Serial Bus (USB)

Universal Serial Bus Specification Revision 2.0 (Full speed) compliance.

1) Connector

- Printer Side : "B" Receptacle (Upstream Input to the USB Device)
- Cable Side : Series "B" Plug

2) Cable

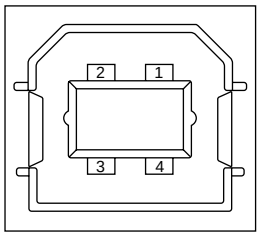
- Cable Length : Approx 1.8m (A cable must be met USB Spec Rev 1.1 for normal operation)

Note: Cable is not supplied.

3) Table of USB I / F signals

Contact Number	Signal Name	Typical Wiring Assignment
1	Vbus	Red
2	D -	White
3	D +	Green
4	GND	Black
Shell	Shield	Drain Wire

4) Connector pin arrangement



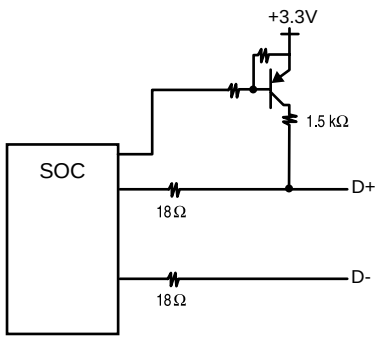
5) Mode & Class of Device

- Full - speed Driver
- Self - powered Device

6) Data Signaling Rate

- Full - speed function - 12Mb/s ± 0.25%(2500ppm)

7) Interface circuit



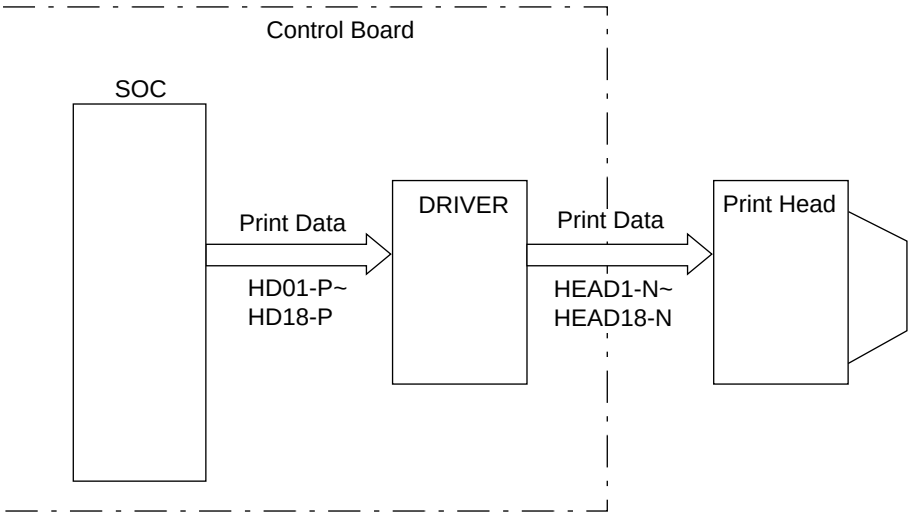
9) Signal Level

- Input / Output Level

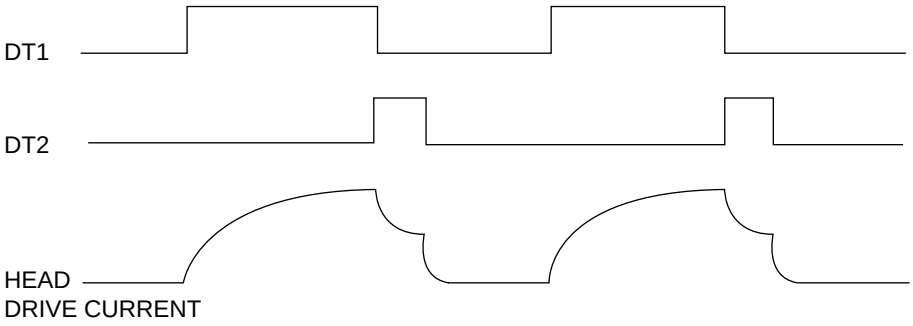
Parameter	Symbol	Min.	Max.	Units
Input Levels :				
High (driven)	V_{IH}	2.0		V
High (floating)	V_{IHZ}	2.7	3.6	V
Low	V_{IL}		0.8	V
Output Levels :				
Low	OL	0.0	0.3	V
High (driven)	OH	2.8	3.6	V
Output Signal Crossover Voltage	V_{CRS}	1.3	2.0	V

2.1.5 Print Control

Print data is transmitted as parallel data (HD01~HD18) from SOC to print head. SOC generates print timing and drive time.



HEAD DRIVE TIMING CHART



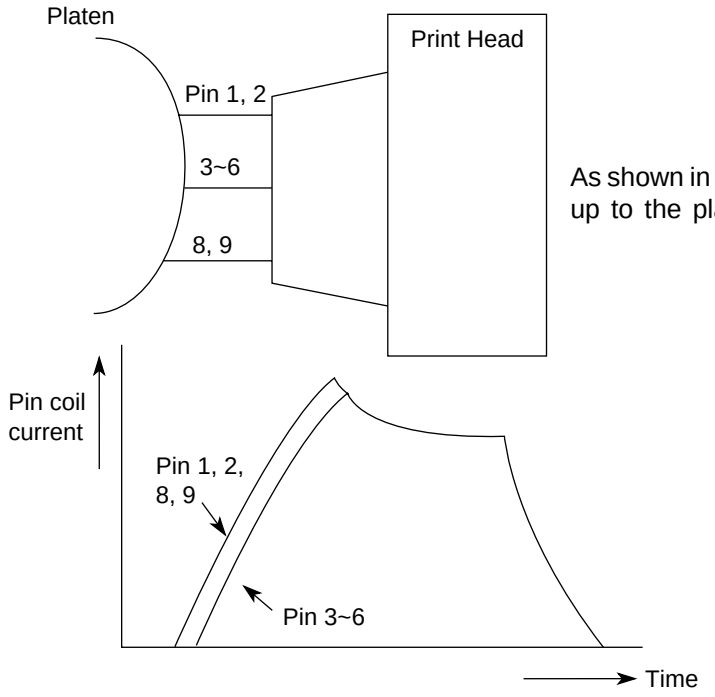
Print Compensation Control

The print compensation can be made as shown below:

(a) Voltage compensation (See 2.1.8 “Alarm Circuit.”)

(b) Temperature compensation (See 2.1.8 “Alarm Circuit.”)

(c) Pin stroke compensation



As shown in the drawing left, the stroke length up to the platen is different for each pin.

(d) Simultaneous Compensation of the number of impact pins

The MPU is provided with the compensation table for each pin to make necessary compensation.

Number of impact pins	Few ⟷ Many
Drive time	Short ⟷ Long

(e) Print mode compensation

According to the thickness of the printing medium, the print mode is compensated as shown in the table below:

Head Gap Range		1	2	3	4	5	6	7	8	9	10
Print speed	HSD/SSD	100%	100%	80%							
	Draft/NLQ	100%	100%	85.3%							
Drive time		Short ⟷ Long									

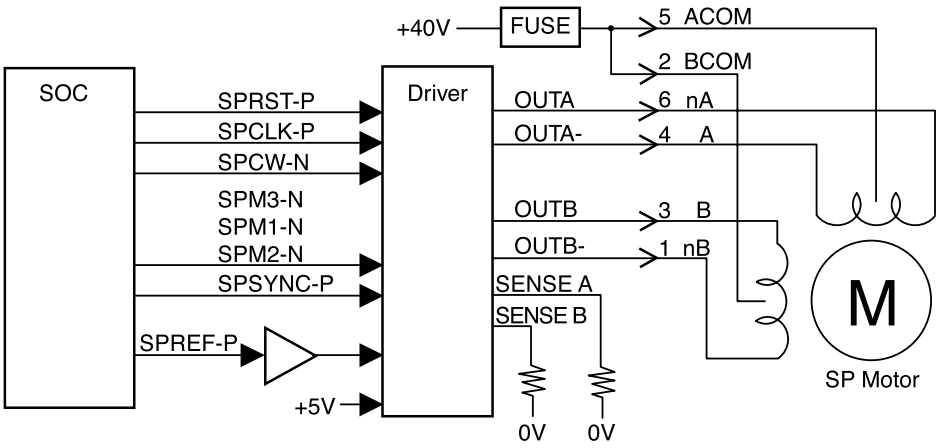
(Drive time lengthens at each step.)

2.1.6 SP/LF/RBN/MAIN FAN CONTROL

The driver of each motor is controlled according to the control signal from SOC and the motor is driven.

(1) SP MOTOR CONTROL

The motor that uses it is a hybrid type stepping motor.
The outline circuit composition : as shown in the following figures.



The drive system is an unipolar fixed current drive method.

Each output of OUTA, A-, OUTB, B- is turned on synchronizing with the SPCLK-P signal, driving current flows to the motor, and the motor rotates.

The method of exciting the aspect by combining signals of SPM3-N~SPM1-N is set.

Driving current value to the motor is set according to the SPREF-P signal.

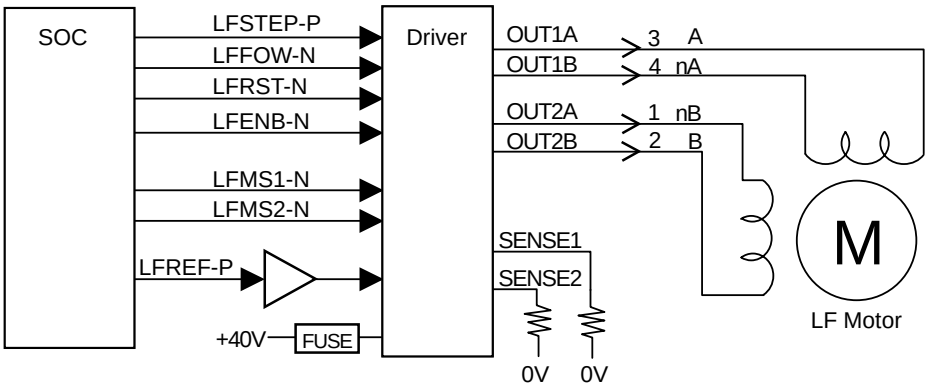
The direction where the motor is rotated is controlled by the SPCW-N signal.

The carriage rotates for one step 1/72 inches in case of two aspect excitation method and the motor rotates.

(2) LF MOTOR CONTROL

The motor that uses it is PM type stepping motor.

The outline circuit composition : as shown in the following figures.



The drive system is a bipolar fixed current drive method.

The LFSTEP-N signal is clock signals, OUT1A, 1B and OUT2A, 2B signals are turned on synchronizing with the signal, the current flows to the motor each aspect, and the motor rotates.

The method of exciting the aspect by combining signals of LFMS1-N and LFMS2-N is set.

The direction of the rotation is set by the LFFOW-N signal.

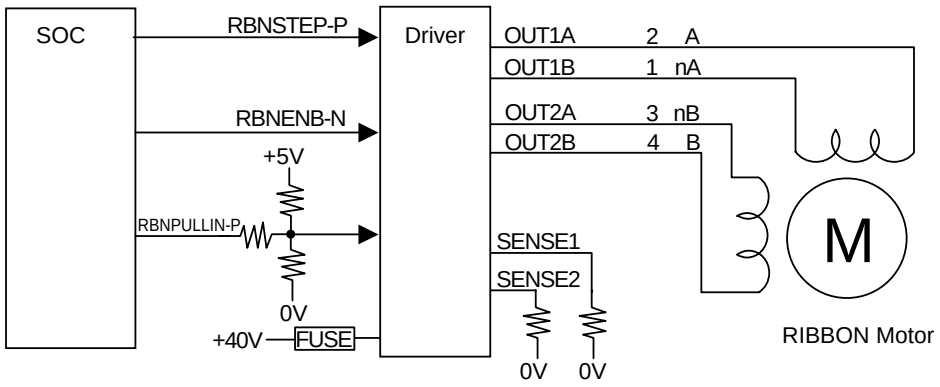
The motor drive current value is set by the LFREF-P signal.

The platen rotates for one step 1/432 inches in case of two aspect excitation method and the motor rotates.

(3) RIBBON MOTOR CONTROL

The motor that uses it is PM type stepping motor.

The outline circuit composition : as shown in the following figures.



The drive system is a bipolar fixed current drive method.

The RBNSTEP-N signal is clock signals, OUT1A, 1B and OUT2A and 2B signals are turned on synchronizing with the signal, the current flows to the motor each aspect, and the motor rotates.

The method of exciting the aspect is excitation 1-2 aspect fixation.

The direction of the rotation is fixation.

The motor drive current value switches by the RBNPULLIN-P signal and is about 0.5A when a fixed velocity rotates by about 0.6A when the motor starts.

PD436 (Narrow) : The rotational speed of the motor is 868PPS, and, as a result, 71.1mm/s is sent to the ribbon.

PD437 (Wide) : The rotational speed of the motor is 744PPS, and, as a result, 60.9mm/s is sent to the ribbon.

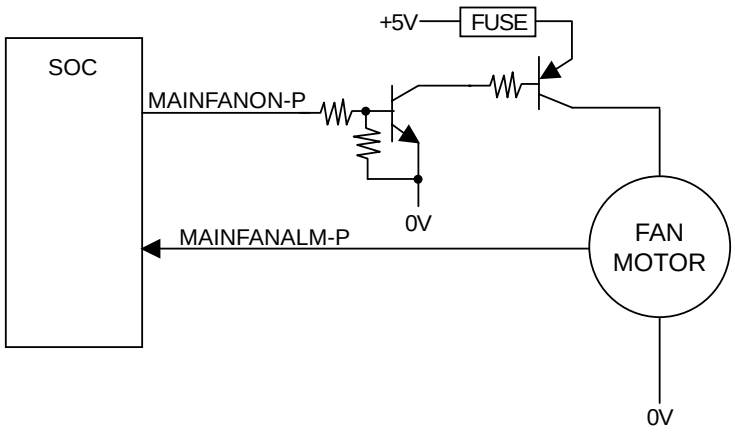
(4) MAIN FAN CONTROL

The motor that uses it is DC brushless FAN motor.

The outline circuit composition is as follows.

On/off is controlled by control signal MAINFANON-P from SOC.

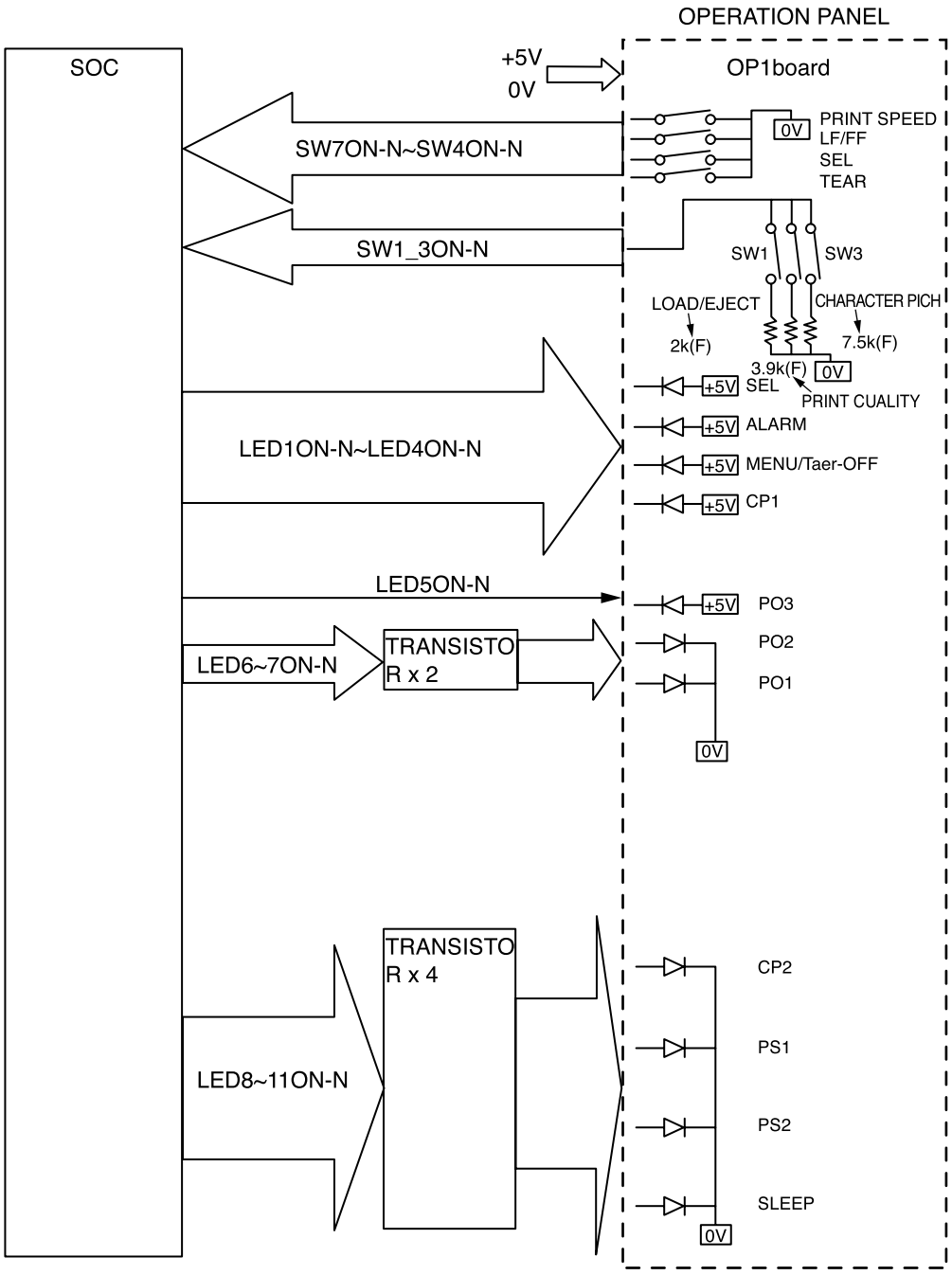
When the motor stops by some factors when the motor rotates, the MAINFANALM-P signal is sent from FAN, and this signal is recognized with SOC and it is assumed fan alarm.



2.1.7 OPERATION PANEL

OPERATION PANEL is controlled by each signal port of SOC.

An outline circuitry is as follows.



2.1.8 Alarm Circuit

(1) Head drive time alarm circuit

This circuit monitors the drive time using the DT1ALM1-N signal interlocked with the overdrive signal of each drive circuit.

If the drive time of any drive circuit exceeds the specified time, the drive fault alarm circuit sends an ALM-P signal to POWER SUPPLY UNIT.

This signal turns off +40V and +5V output. This state is maintained after the power switch is turned off until the power supply resumes about 30 seconds later. Until the cause of the output of the ALM-P signal is removed, even if the power supply is resumed this function operates so that no +40V and +5V output occurs.

(2) Alarm processing when DC power is low.

+40V is converted into the DC LOW-N signal (0V to about 3.3V) by resistors and input into the A/D port of the SOC to control the drive time and the print speed (pass number) of the head.

(a) Head drive time

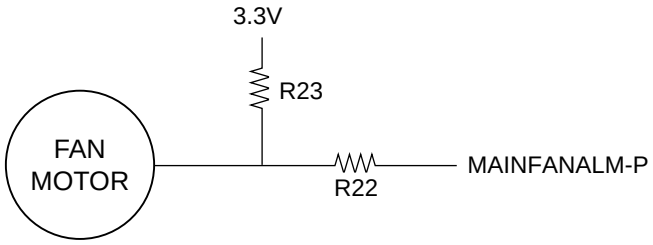
The head drive time is lengthened to compensate for the amount of voltage drop by monitoring the DC LOW-N signal once every 500 µ sec. to control and maintain the impact necessary for each printing pin at the fixed value.

(b) Print speed

Voltage, +40V	Pass number	Print speed
36V or more	1 Pass	100%
Less than 36V	2 Pass	50%

(3) MAIN FAN alarm

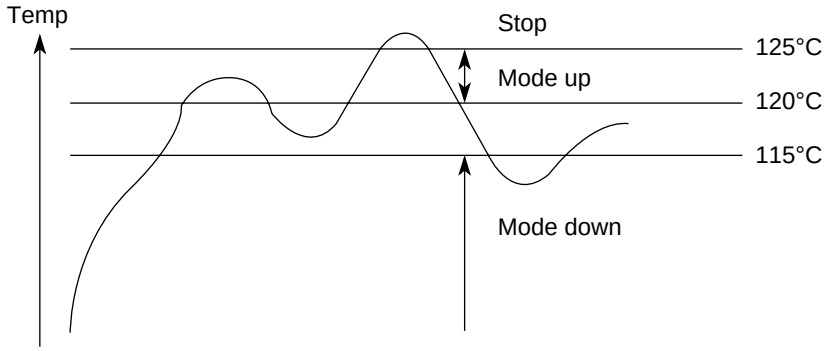
The SOC detects 3.3V on the signal even through the fan is driven.



(4) Overheat alarm

(a) Head overheat alarm

The voltage of the output HTEMP signal of the thermistors, one of which is contained in the print head is monitored by the A/D port of the SOC to control the voltage.



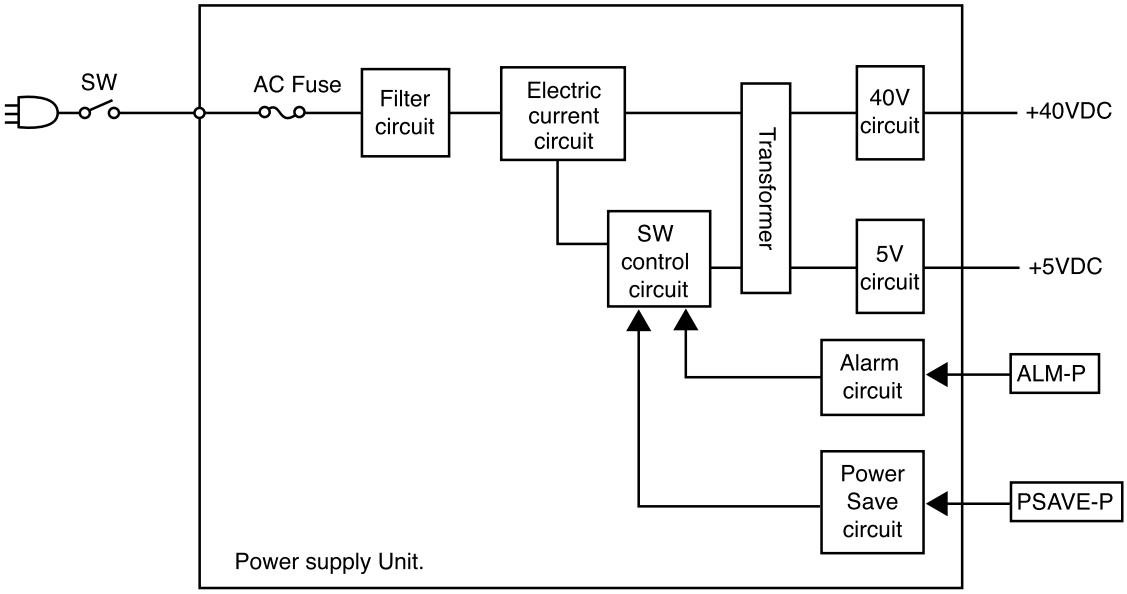
Mode and print control

Mode	Print Speed	Print Pass
1	100%	1
2	80%	1
3	80%	2
4	80%	3
5	80%	3
6	80%	3
7	Stop print	

- When the temperature is between 120°C and 125°C, the mode switches sequentially to higher level. When the temperature falls below 115°C, the mode switches to lower level.
- When the temperature exceeds 125°C, printing will stop.
- When temperature gradient is steep, higher mode shall be specified directly.

2.1.9 Power Supply Unit

This power supply unit is a switching power supply. This power supply unit supplies the +5VDC, +40VDC.



The uses of output voltages and signals are described below.

Voltage/signal	Use
+5V	Logic IC / LED drive / SENSOR drive / MAIN FAN drive
+40V	LF motor / SP motor drive / RIBBON Motor / Printhead.

Various protective functions in the power supply unit:

(1) +40V overcurrent detection function

When an overcurrent has been detected, this function suspends switching and cuts off all output.

This state in which all output is cut off is maintained.

Recovery takes place when the power supply is resumed about 30 seconds after turning off the power switch.

Until the cause of the overcurrent is removed, even if the power supply is resumed this function operates so that no +40V/+5V output occurs.

(2) +5V output overcurrent detection function

When an overcurrent has been detected, this function lowers the voltage for this output only.

Voltage is restored when the cause of the overcurrent is removed.

(3) +40V and +5V output overvoltage detection function

When voltage rises above the standard value of +40V or +5V, this function suspends switching and cuts off all output.

This state in which all output is cut off is maintained.

Recovery takes place when the power supply is resumed about 30 seconds after turning off the power switch.

Until the cause of the overvoltage is removed, even if the power supply is resumed this function operates so that no +40V/+5V output occurs.

(4) Alarm function (See 2.1.8)

When an ALM-P signal has been output from the control unit, this function suspends switching and cuts off all output.

This state is maintained after the power switch is turned off until the power supply resumes about 30 seconds later.

Until the cause of the output of the ALM-P signal is removed, even if the power supply is resumed this function operates so that no +40V/+5V output occurs.

(5) Protection against incorrect AC voltage input (See 3.3.21)

This power supply is a multi-input power supply. The power-supply voltage-setting pins can be used to set input at 100V or 200V. The power supply will not operate (i.e., no power will be supplied) when the power switch has been turned on with an incorrect setting for the AC input voltage used. In such a case, immediately turn off the power switch and change the settings to ones suited to the AC voltage used.

Operation during power saving

During power saving, a POWSAVE-P signal is output from the control unit to the power supply unit.

This signal decreases +40V voltage to approximately 20V to reduce power consumption.

When power saving is released, voltage is restored to +40V.

2.1.10 Motor/FAN/Aluminum electrolytic capacitors

There is a deteriorated possibility when motor/fan/aluminum electrolytic capacitor uses a long term exceeding five years of the life of equipment.

In that case, the exchange of motor/fan/power supply unit/control board might become necessary.

2.2 Mechanical Operation

2.1.1 Printhead Mechanism and Operation (See Figure 2-2.)

The printhead is a spring charged 9 double-pin driving head using a permanent magnet. It is attached to the carriage, which moves in parallel with the platen. Electrically, this unit is connected to the control circuits through the control board.

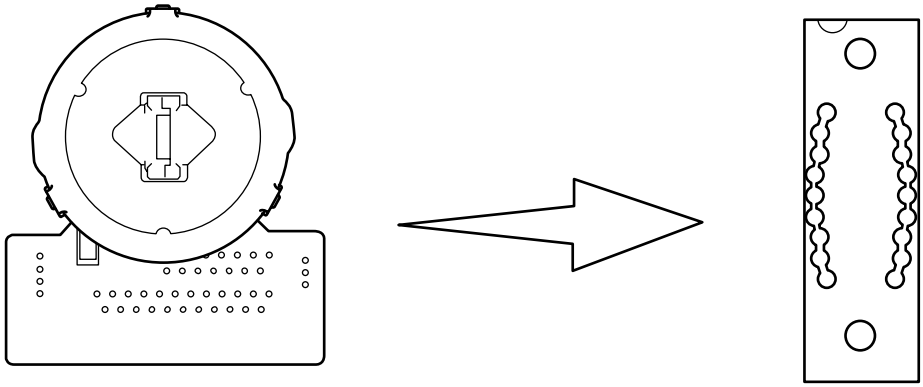


Figure 2-2 Arrangement of the Head Pins View from the Tip of the Printhead

(1) The printhead configuration:

The printhead is composed of the following parts:

(a) Wire guide

(b) Spring assembly (Wire, Armature, Spring, Yoke, Spacer)

(c) Magnet assembly (Magnet, core, coil, Yoke)

(d) Printed circuit board

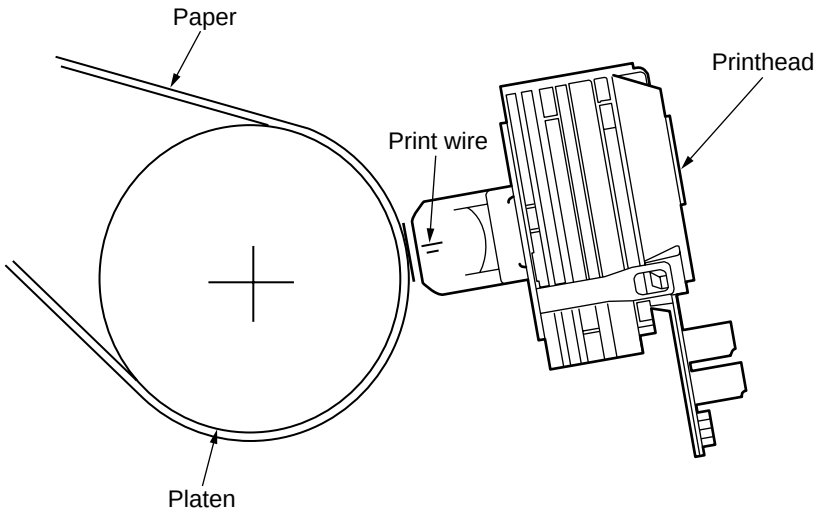
(2) Operation of printhead (See Figure 2-3.)

(a) When the printhead is idle, the armature is attracted by a permanent magnet and the spring fixing the armature is compressed. The print wires fixed to each armature are thus concealed under the wire guide.

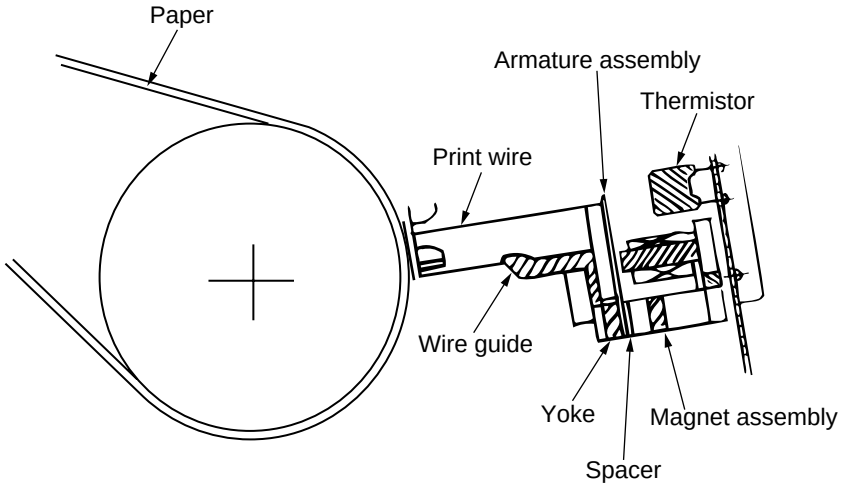
(b) When a signal for a character to be printed is detected, a current flows through the coil. When the coil is activated, the magnetic flux (caused by the permanent magnet between the armature and the core) is canceled to eliminate the attraction force. The armature is driven in the direction of the platen by the force of the armature spring. the paper through the ribbon and prints a dot on the paper.

(c) After the character has been printed, the armature is magnetically attracted again and the print wires are again concealed under the wire guide.

A thermistor in the printhead prevents burning caused by over-heating of the coil during extended continuous bi-directional printing. When the temperature of the coil exceeds a pre-determined limit (about 125°C) the control circuit detects a thermistor signal. Printing will then be intermittent or stop completely until the coil temperature falls below the limit value.



(1) When printing



(2) When not printing

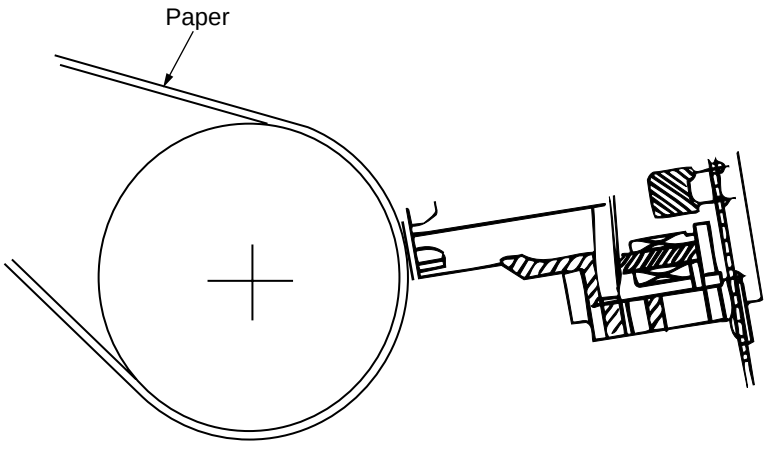


Figure 2-3

2.2.2 Spacing Operation (See Figure 2-4.)

The spacing mechanism consists of a carriage shaft mounted in parallel with the platen, and a carriage frame that moves along the shaft. Items included in the spacing mechanism are as follows: The space mechanism is driven by a stepping motor located behind the carriage frame.

(a) Stepping motor with motor gear

(b) Carriage frame

(c) Carriage shaft

(d) Beam guide

(e) Sensor

(1) Spacing operation

The carriage frame, on which the printhead moves along the carriage shaft in parallel with the platen. As a stepping motor revolves, the power of the stepping motor is transferred to a mini pitch belt.

The position of the carriage frame can be determined by counting the interrupts detected by the sensor.

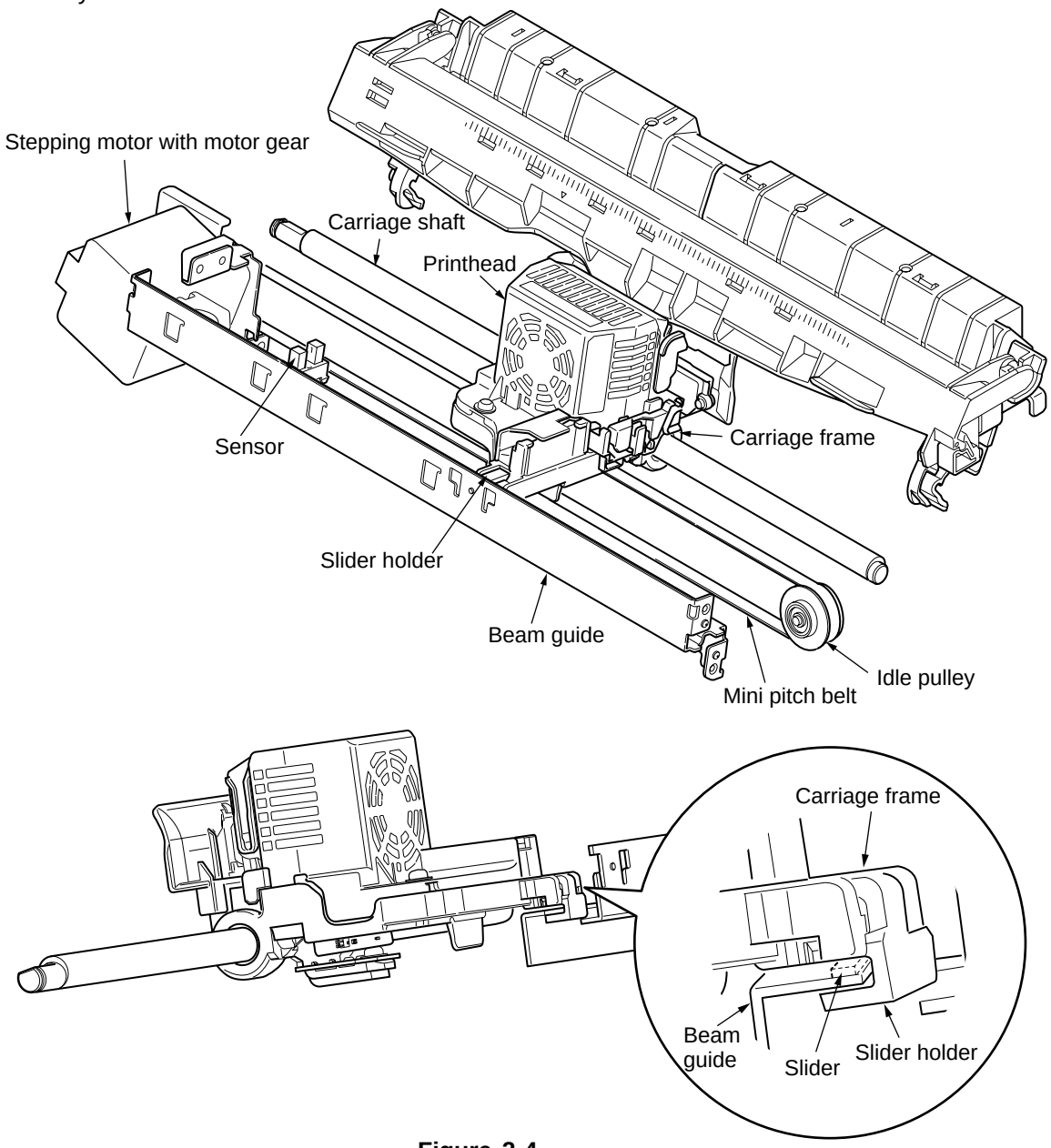


Figure 2-4

2.2.3 Head Gap Adjusting (See Figure 2-5.)

The head gap adjusting lever moves back and forth to tilt the carriage frame, altering the gap between the printhead and the platen.

Being rotated, both ends of the carriage shaft are eccentric, the shaft moving toward or away from tha platen.

The printer will reduce the printing speed automatically to ensure that adequate printing pressure is maintained for multipart paper.

The right and left adjustment knobs can be independently turned and used to adjust parallelism to the platen.

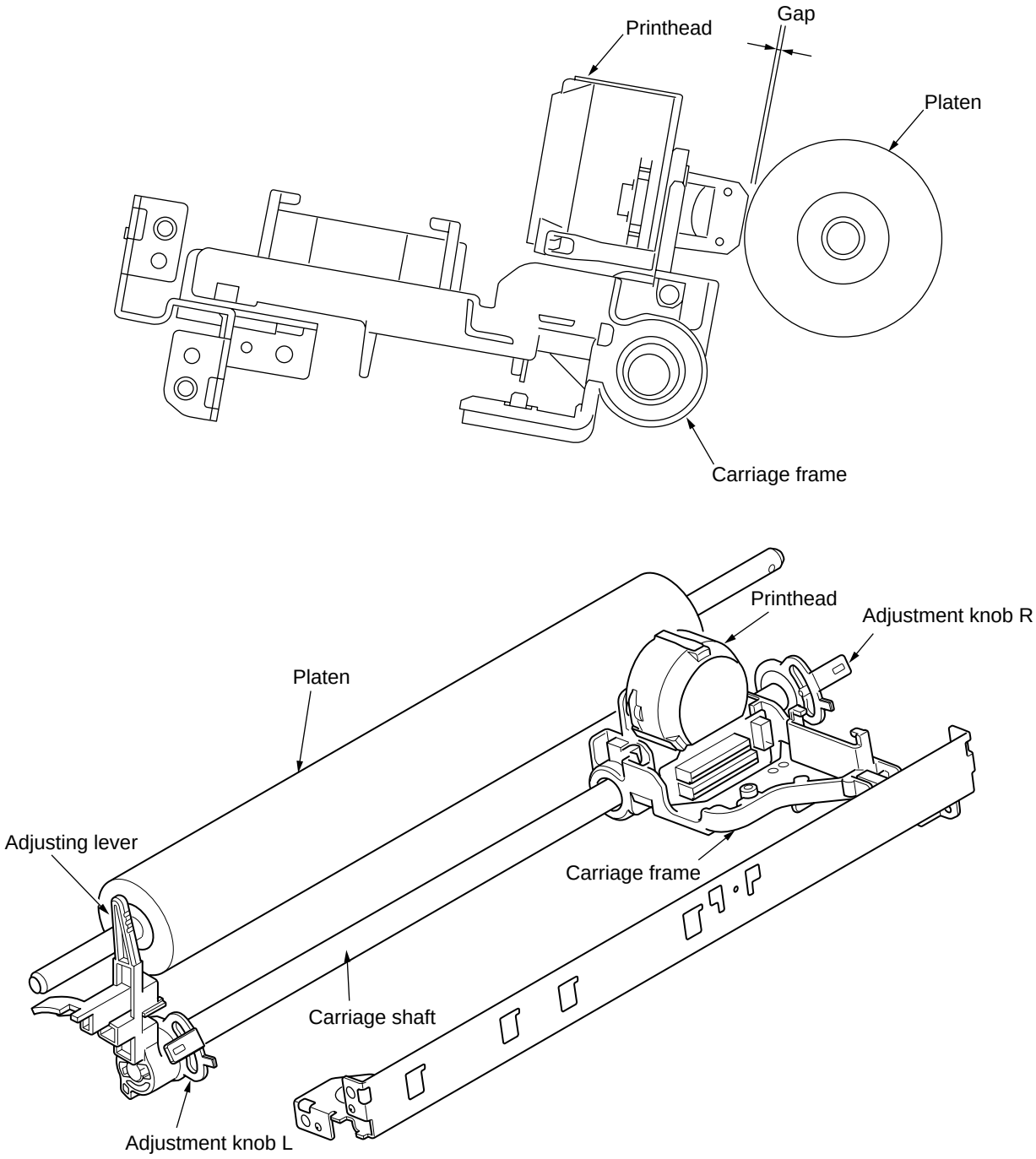


Figure 2-5

2.2.4 Ribbon Drive (See Figure 2-6.)

The ribbon driver mechanism moves the ribbon by the ribbon motor operation.

The ribbon drive mechanism consist of the following items:

(a) Ribbon feed gear assembly

(b) Ribbon cartridge

(1) Ribbon cartridge

An endless ribbon with a single direction feed is used. Ink is supplied from an ink tank, which is built in to the ribbon cartridge.

(2) Ribbon feed operation

The ribbon motor is used to drive the ribbon feed mechanism. The rotation is transmitted via the ribbon feed gear assembly to the drive roller in the ribbon cartridge, thus moving the ribbon.

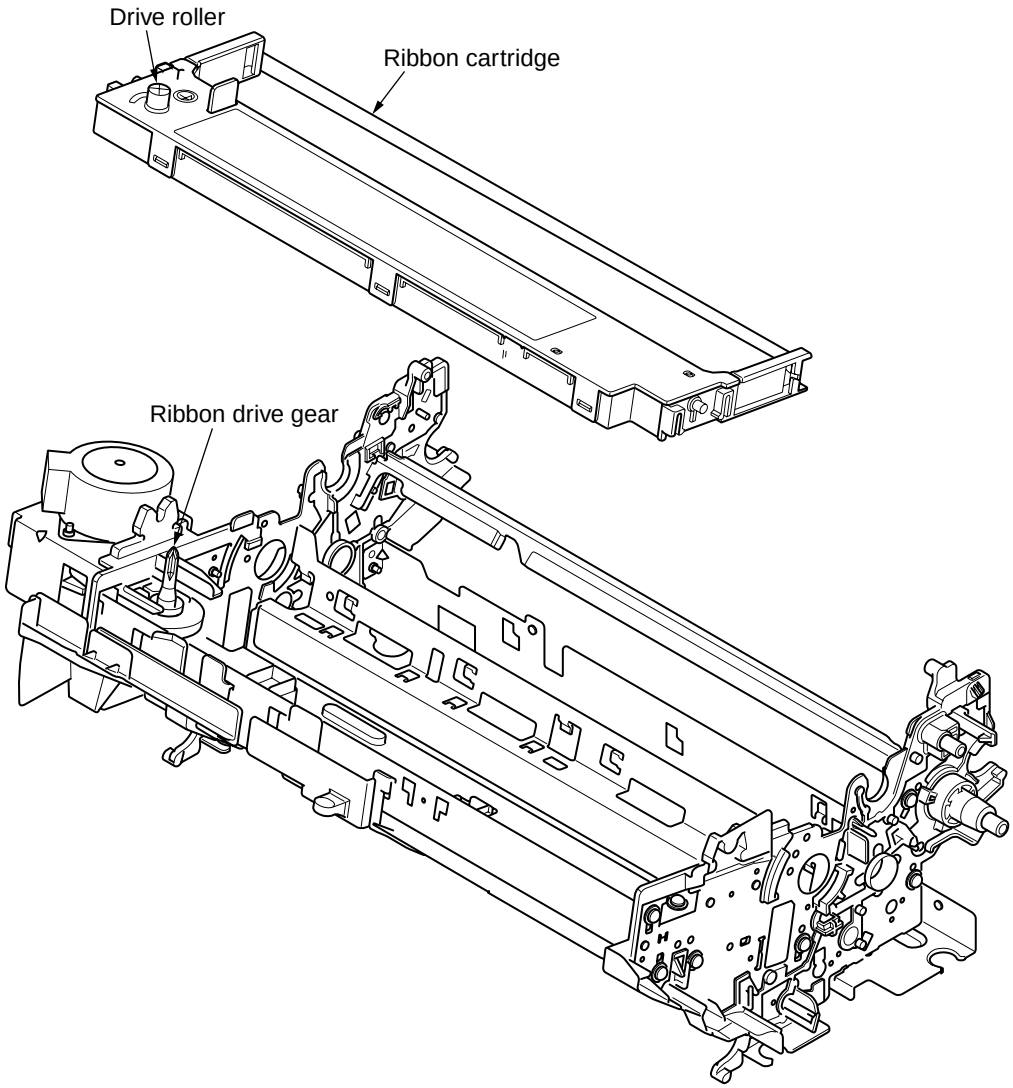


Figure 2-6

2.2.5 Paper Feed Operation

Feeding of the paper is performed by turning the platen and the pin tractor, which is driven by the LF pulse motor.

Item of the paper feed mechanism are as follows:

(a) Pulse motor with gears

(b) Decelerating gear

(c) Platen

(d) Tractor feed unit

(e) Pressure roller

(1) Cut sheet and continuous sheet switching mechanism (See Figure 2-7.)

Five (wide four) different paper paths can be selected and set by the change lever.

(a) (for cut sheet)

When the cut sheet is used in the manual mode or fed by the CSF (option), set the change lever at the position marked .

[Operation]

When the change lever is set to the position. This causes the Gear Idle A to be disengaged from the Gear Change A, leaving it free.

At this time, the pressure rollers (at the rear and the front) are pressed securely to the platen to feed the cut sheet. At the same time, the switch lever positions to confirm to the control board that you are in the cut sheet mode.

In the cut sheet mode, the control board automatically feeds the sheet up to the print start position after pausing for the wait time stored in the menu.

(b) RPS (Roll paper stand): Narrow only

When the change lever is set to RPS position, Gear Change A and Gear Change B is disengaged from the Gear idle.

At this time, the pressure rollers (at the rear and front) are pressed securely to the platen to roll paper.

Among three Front-Pressure-Rollers, two of them on sides are at the down position.

(c) REAR (Continuous sheet from push tractor)

When the change lever is set to REAR position, the Gear Change A is engaged with the Gear Idle A and the Gear Tractor to transmit the rotation of the Gear Idle A to the push tractor shaft, and the continuous sheet is fed from the push tractor.

At the same time, the switch lever turns on the rear switch, to confirm to the control board that you are in the rear continuous sheet mode.

(d) FRONT (Continuous sheet from push tractor)

When the change lever is set to FRONT position, the Gear Change A is disengaged , Gear Change B is engaged from the idle gear.

Gear Change B transmite the rotation of LF motor to push tractor shaft (front tractor).

At the same time, the switch lever turns on the front switch to confirm to the control board that you are in the front continuous mode.

(e) PULL (Continuous sheet)

When the change lever is set in the PULL position, the rotation of the platen is transmitted to the drive gear of the bottom tractor feed unit through the Gear Tractor to feed the sheet which has been set in the bottom, front and rear tractor feed.

At the same time, the switch lever turns on the pull switch, to confirm to the control board that you are in the pull continuous sheet mode.

Correlation in Mechanism

Lever Position \ Mechanism		Rear Switch	Bottom Switch	Front SW	Gear Idle A	Gear Change A	Gear Change B	Sheet Insertion
	Rear route	ON	OFF	OFF	Rotate	Stop	Stop	Manual/ automatic
	Bottom route	OFF	ON	ON				CSF: Operation SW or instruction
RPS only narrow		ON	OFF	OFF	Rotate	Stop	Stop	• Operation SW or • instruction
REAR		ON	OFF	OFF	Rotate	Rotate	Stop	• Operation SW or • instruction
FRONT		OFF	OFF	ON	Rotate	Stop	Rotate	• Operation SW or • instruction
PULL	Bottom route	OFF	ON	OFF	Rotate	Stop	Stop	• Operation SW or • instruction
	Rear route	ON	OFF	OFF				
	Front route	OFF	OFF	ON				

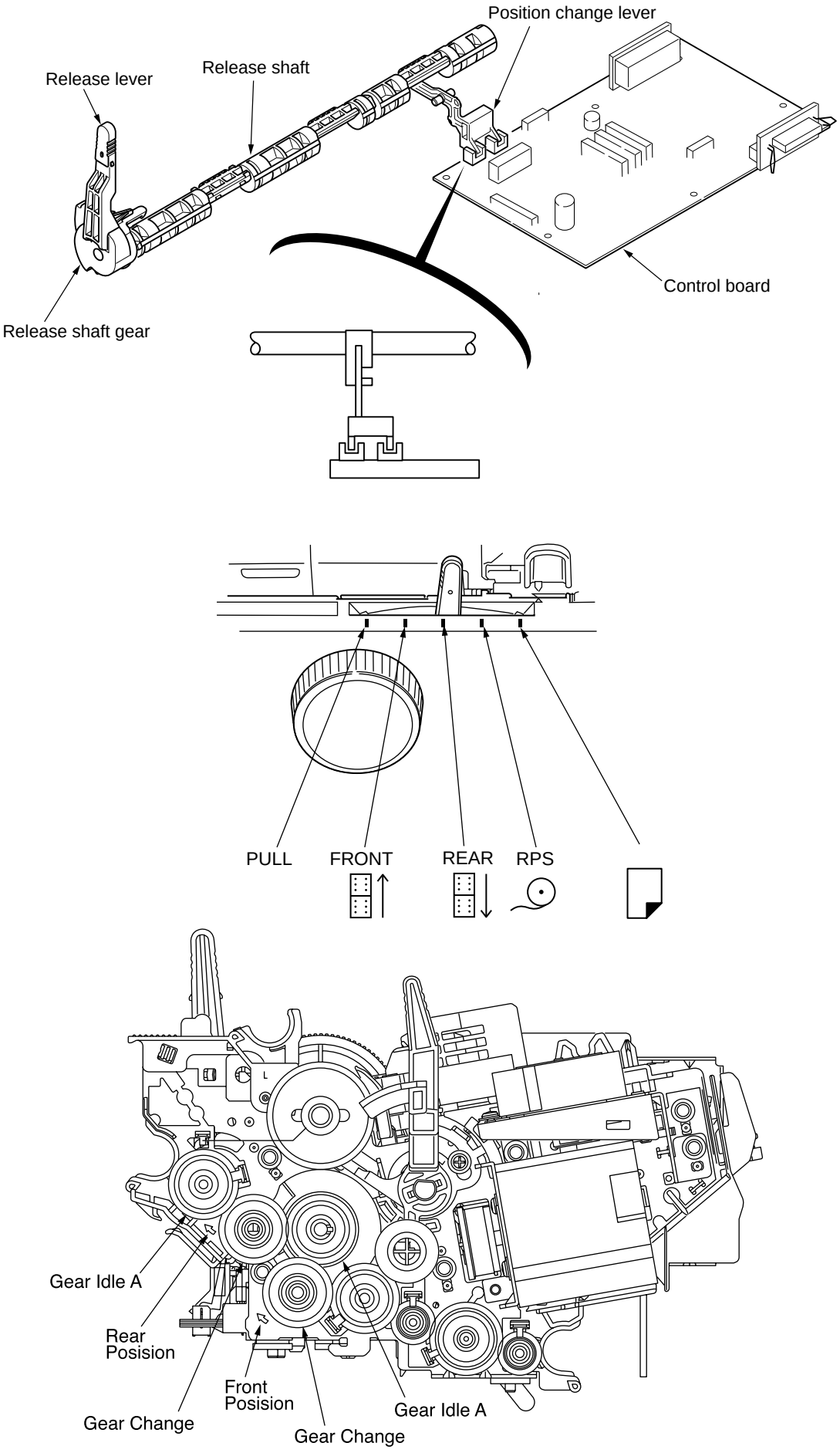

Position change lever
Release lever
Release shaft
Control board
Release shaft gear
PULL
FRONT
REAR
RPS
Gear Idle A
Rear
Posision
Front
Posision
Gear Idle A
Gear Change
Gear Change

Figure 2-7

(2) Cut-sheet feeder operation (See Figure 2-8.)

The pulse motor used for the paper feed mechanism is mounted on the left of the frame, and the rotation of the motor is transmitted through decelerating gears (Gear LF Idle, Gear Platen L) to the platen. When using cut-sheet paper, the change lever must be in the position to grab the paper, while disengaging the push tractor.

When the change lever is set to the position, the cut sheet is automatically fed in up to the print start position after pausing for the wait time stored in the menu.

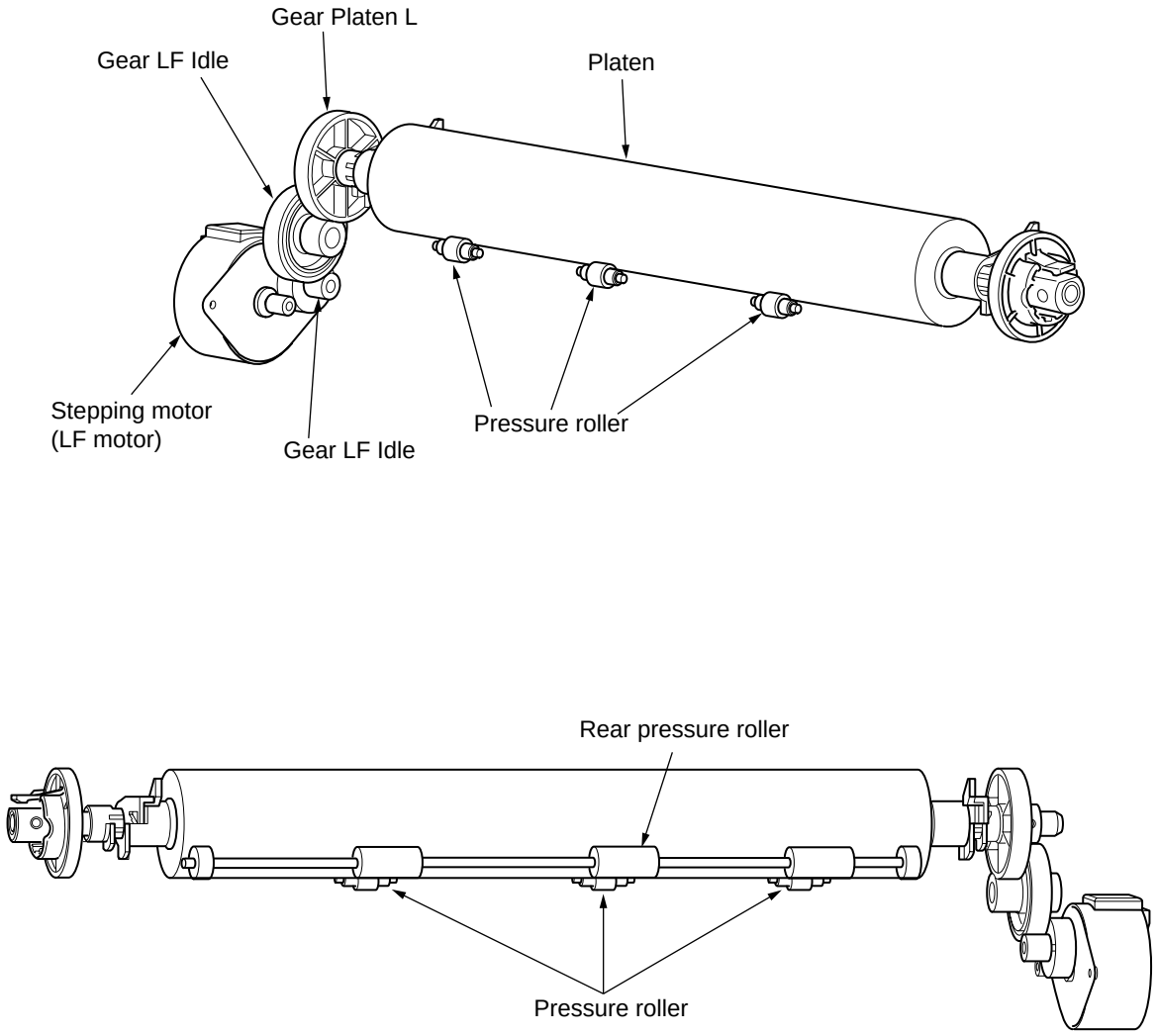


Figure 2-8

(3) Continuous paper feed operation (Rear) (See Figure 2-9.)

The force transmitted to Gear LF Idle, rotates the Gear Tractor through Gear Idle A and the Gear Change. The rotation of the Gear Tractor makes the pin tractor belt rotate through a sheet feeder shaft, feeding the continuous paper.

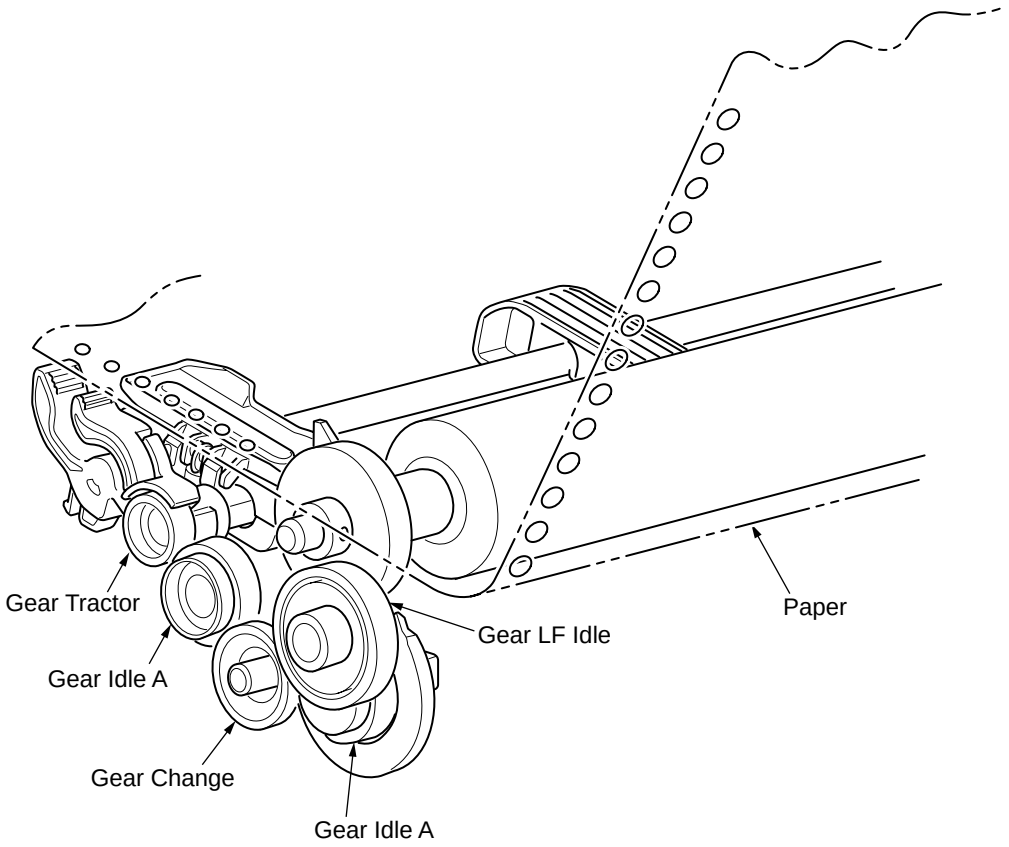


Figure 2-9

(4) Continuous paper feed operation (FRONT)(See Figure 2-10.)

The force that is transmitted to the Gear-LF-Idle rotates the Gear Tractor through the gears of Gear Idle A, Gear Change, Gear Idle A, Gear Idle C, Gear Idle B and Gear Idle C. The rotation of the Gear Tractor makes the pin tractor belt rotate through a sheet feeder shaft, feeding the continuous paper.

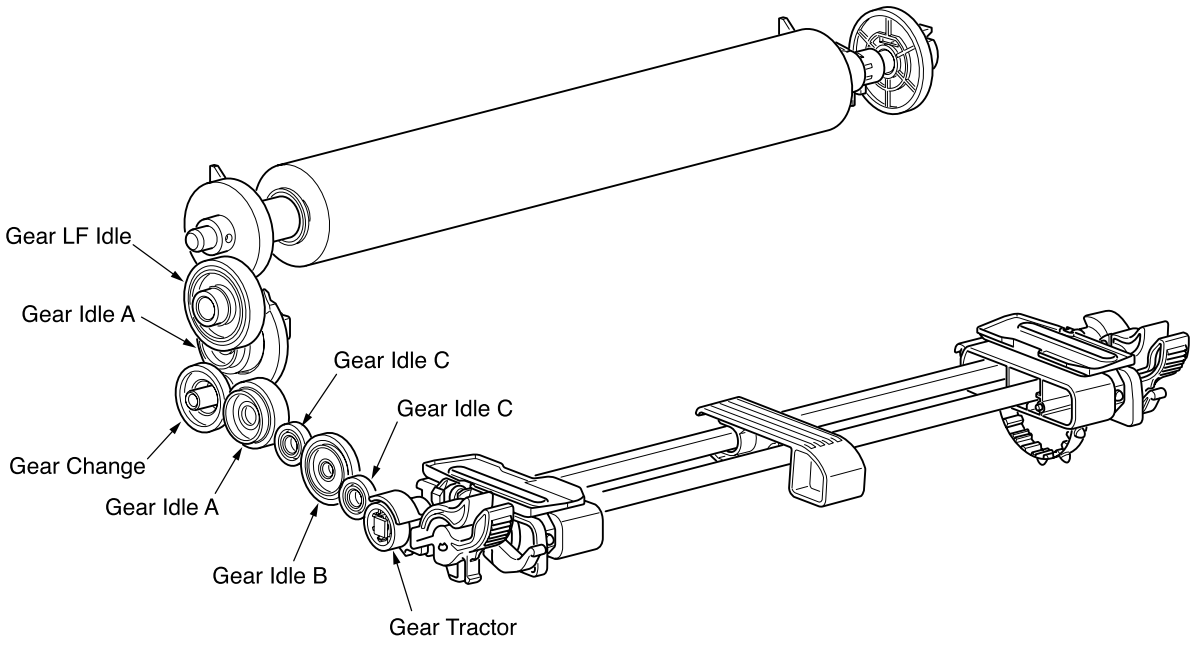


Figure 2-10

(5) Cut-sheet feeder operation (FRONT)(See Figure 2-11.)

The force that is transmitted to the Gear LF Idle rotates both the platen through the Gear Platen L and the Roller shaft through the Gear Idle B and the Gear Feed.

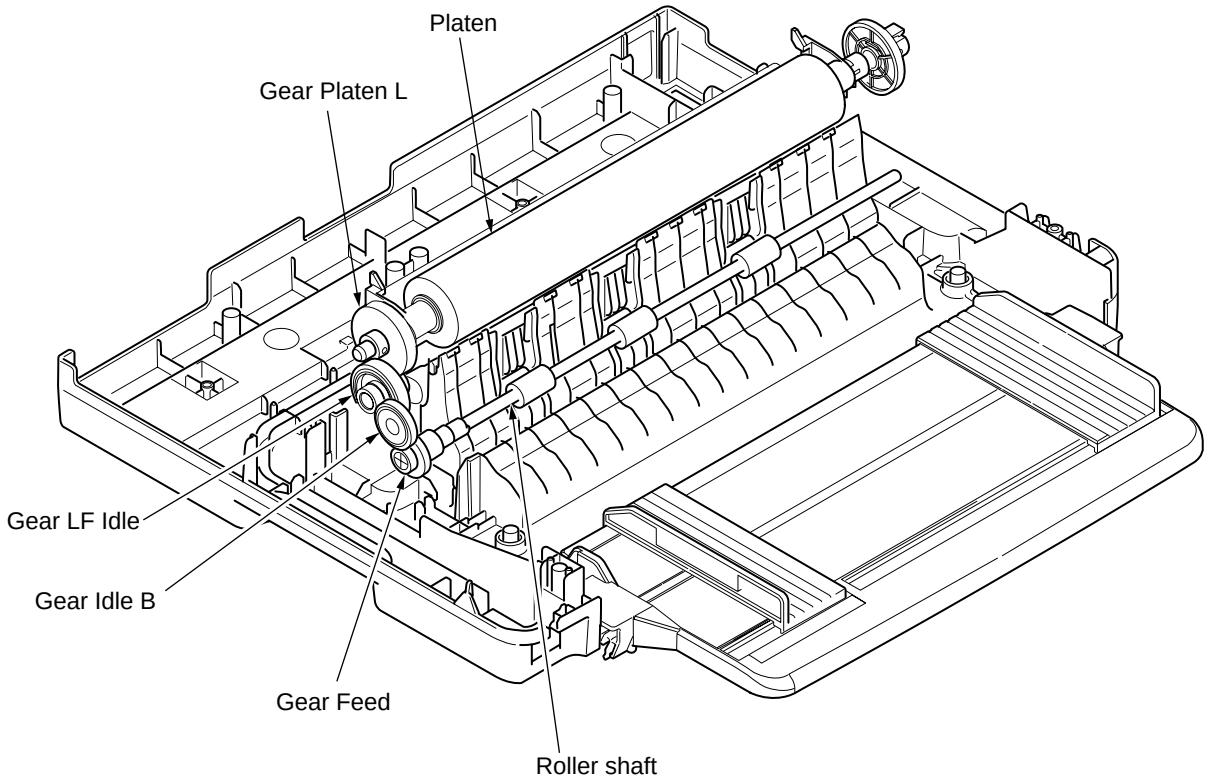


Figure 2-11

(6) Pull tractor mechanism (See Figure 2-12.)

The rotation of the Gear LF Idle is transmitted to the Gear Idle A of the pull tractor unit through the Gear Platen at the right end of the platen. The rotation of the Gear LF Idle is transmitted to the Gear Platen L through the Gear LF Idle and rotates the platen and continuous sheet forms are fed by the pull tractor being rotated through the sheet feeder shaft.

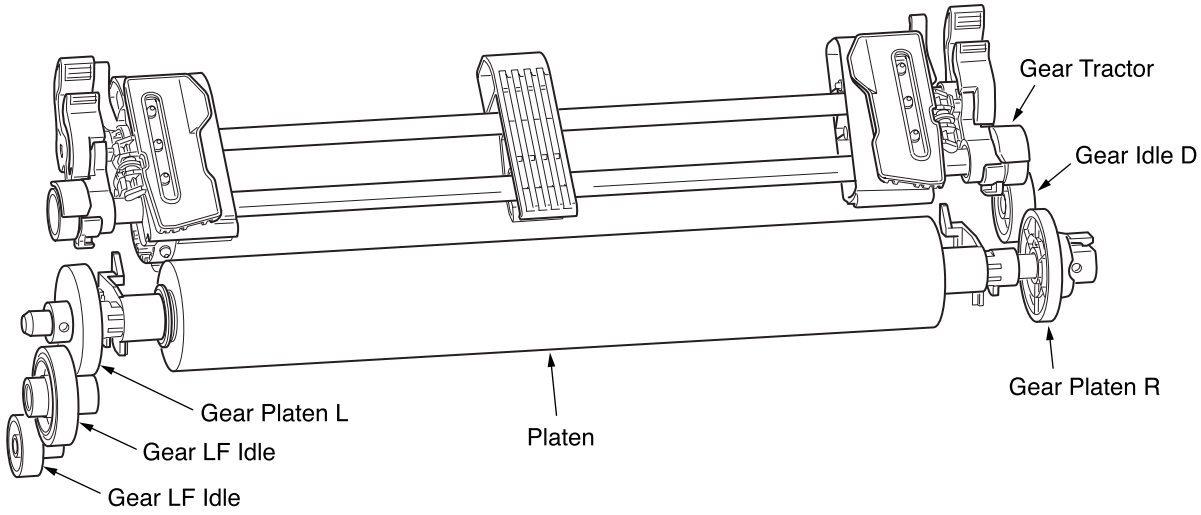


Figure 2-12

(7) Push and pull tractor mechanism (Option) (See Figure 2-13)

This mechanism consist of two pull tractor mechanism.
This mechanism can perform foward and reverse feed by setting continuous sheets to the push tractor and pull tractor.

The rotation of the Gear LF Idle A is transmitted to the push tractor and the pull tractor. Sheets are fed by these two tractors at the same time.

To remove slack from the sheets, set the sheets according to the following procedure when using the push and pull tractors.

① Set the change lever to the REAR position (setting the sheets to the push tractor to feed).

② Set the paper, which is fed in front of the platen, to the pull tractor.

③ Set the change lever to the position and feed paper using the platen knob.

④ If paper slack is removed, set the change lever to the REAR position.

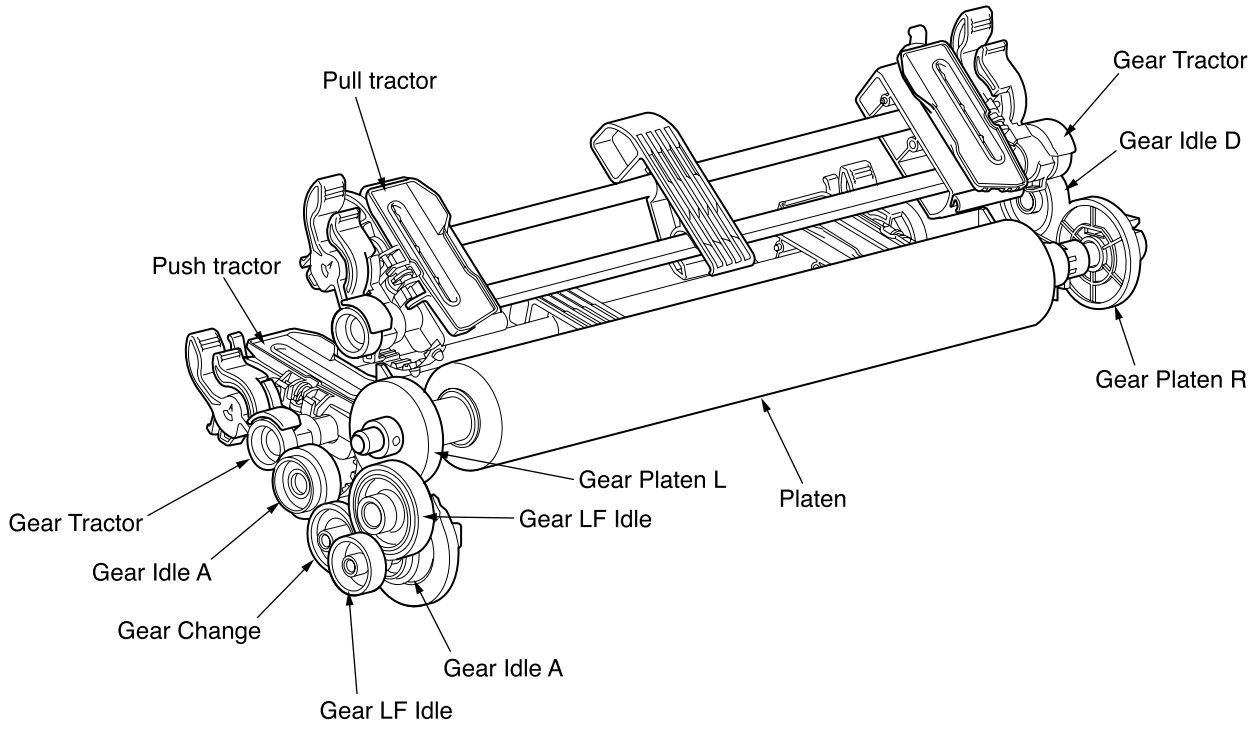


Figure 2-13

(8) Cut-sheet feeder unit operation (option)(See Figure 2-14.)

To install a CSF, remove the Pull-Tractor-Attachment-L and the Pull-Tractor-Attachment-R from the Frame-side-(L)-outsert and the Frame-size-(R)-outsert respectively.

The force of the Gear LF Idle is transmitted to the platen though the Gear LF Idle and the Gear Platen L.

The rotation of the Gear Platen L is transmitted to the CSF through the Coupling gear.

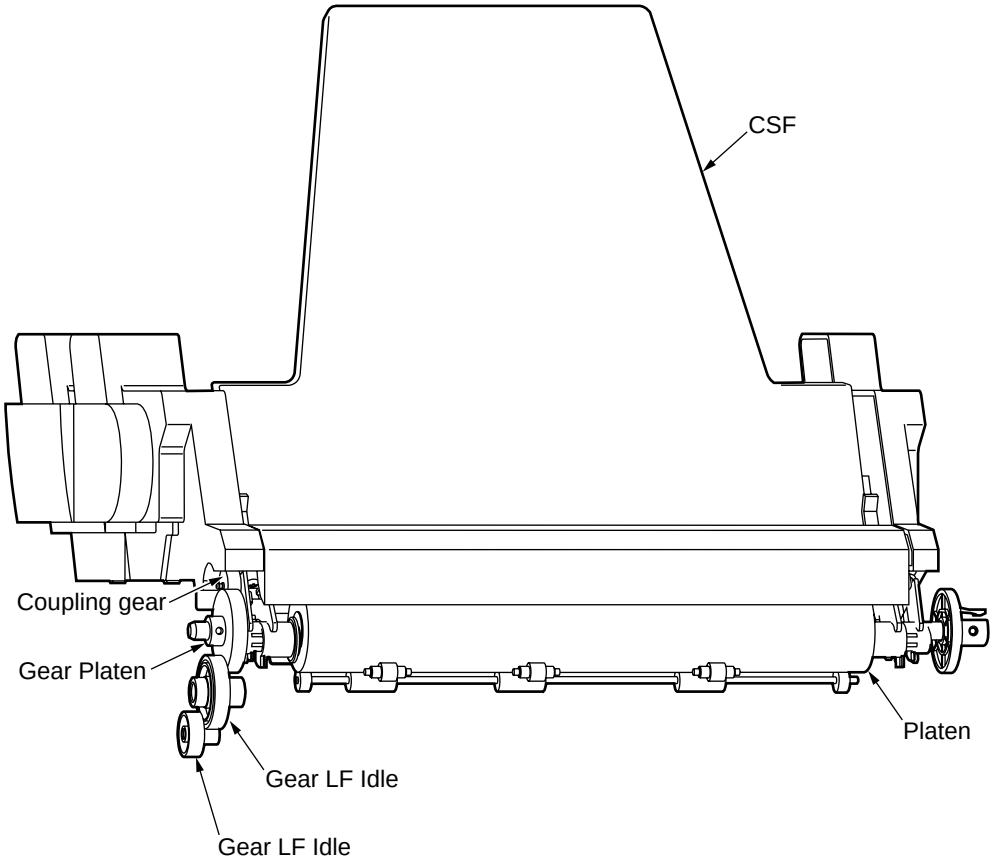


Figure 2-14

(9) Roll paper stand mechanism (option)(See Figure 2-15.)

The Roll paper stand is attached on the Sheet Guide Assy. Rear.

The force of the Gear LF Idle is transmitted to the Gear Platen L through the Gear LF Idle and rotates the platen.

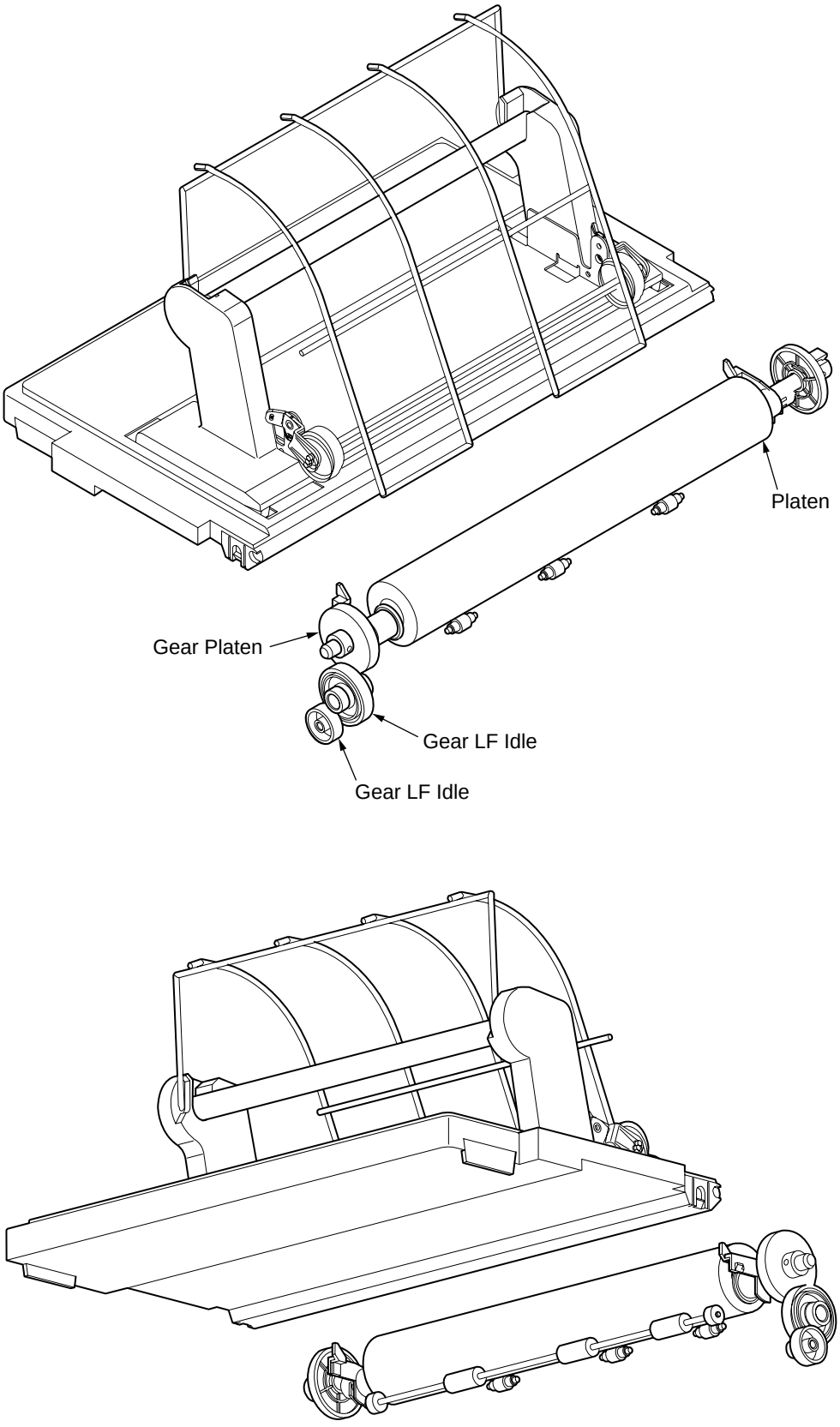


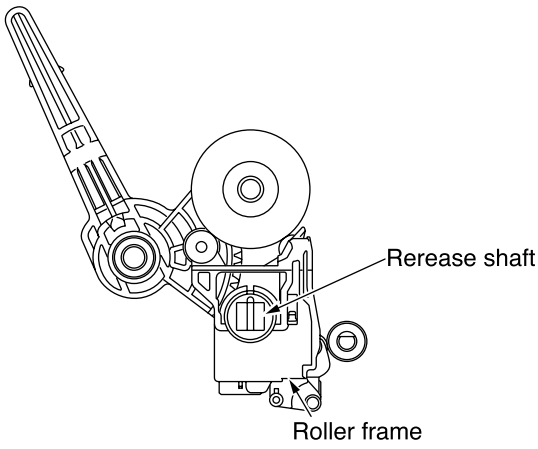
Figure 2-15

(10) Paper clamp mechanism (See Figure 2-16.)

When setting the change lever to the PULL, or REAR, RPS, FRONT position, the Shaft-Release rotates causing the Frame-Roller to move up/down to determine the position of the Roller-Pressure.

Position of change lever	Open or close of front pressure roller	Open or close of rear pressure roller	Open or close of roller shaft
Cut	CLOSE	CLOSE	CLOSE
RPS (Narrow only)	Only center CLOSE (Low tension on both side)	Only center CLOSE (Low tension on both side)	-
Rear push	CLOSE (However, tension is low)	OPEN	CLOSE (However, tension is low)
Front push	CLOSE (However, tension is low)	OPEN	CLOSE (However, tension is low)
Pull	OPEN	OPEN	OPEN

Cut (Rear) Position



RPS Position (Narrow only)

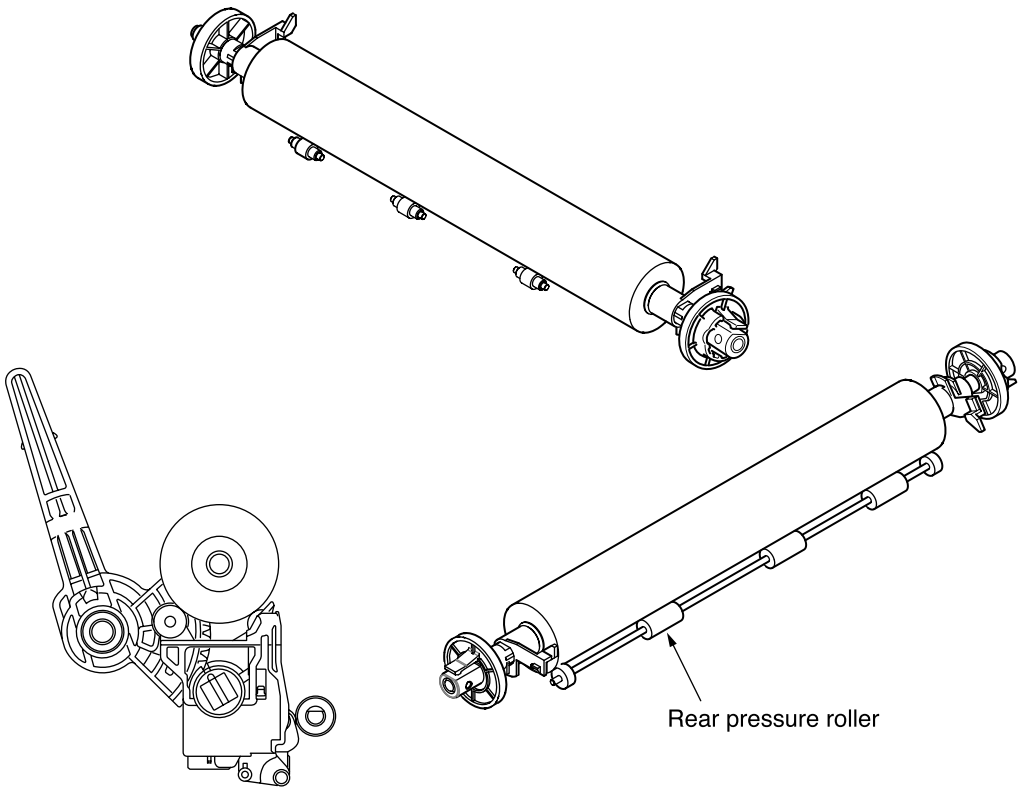
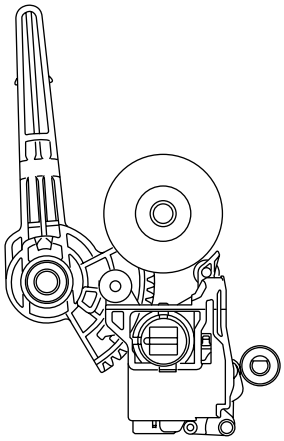
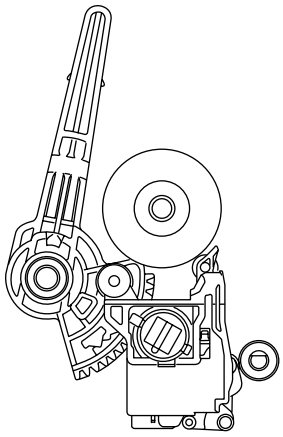


Figure 2-16-1

Rear Push Position



Front Push Position



Pull Position

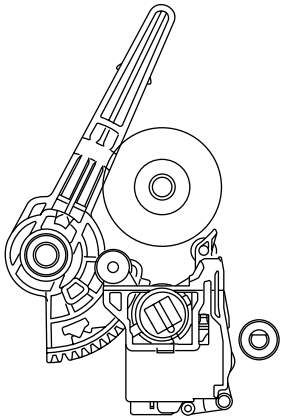


Figure 2-16-2

2.2.6 Paper Detection Mechanism (See Figure 2-17.)

(1) Cut sheet, rear sheet detection

When a cut sheet or continuous sheet is feed from the rear side between the platen and the Paper Pan Lower, the Lever paper end (Rear) Point A moves down, the lever moves out of the photo sensor's path, and then the rear feed is detected.

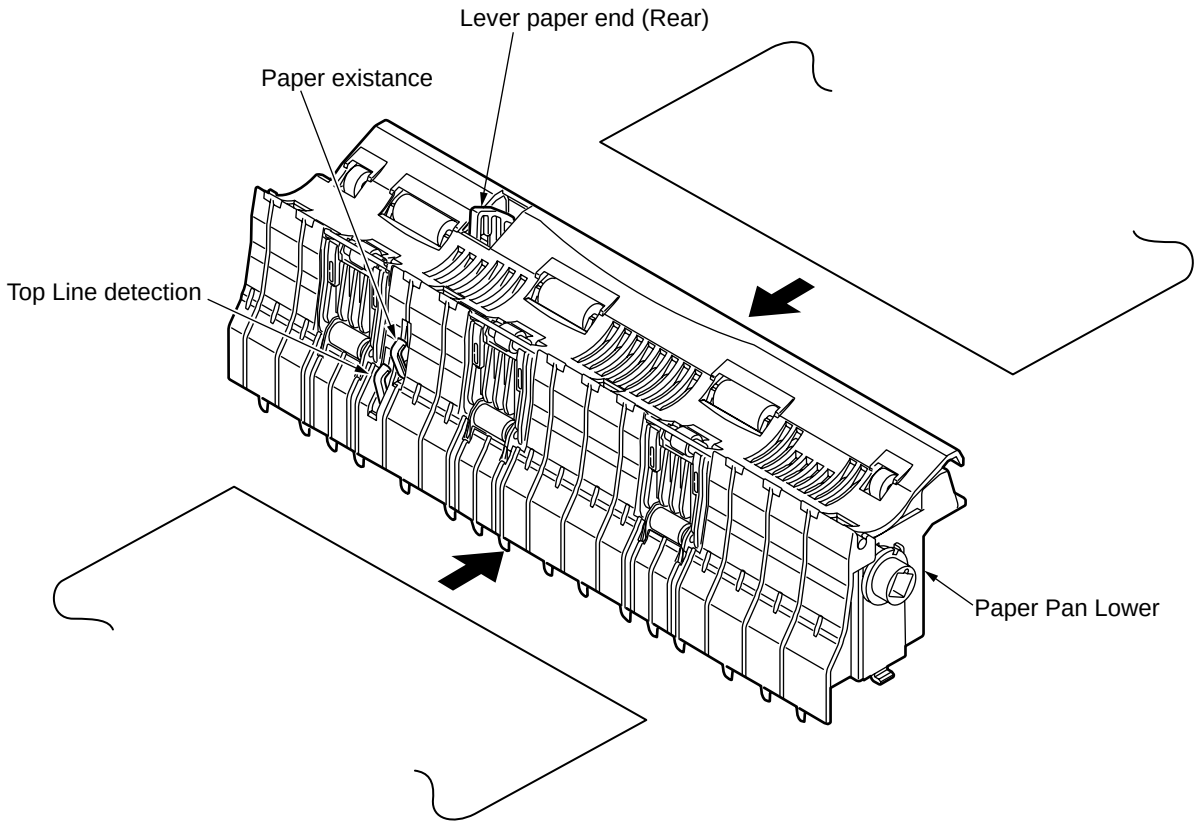


Figure 2-17

(2) Bottom; top line detection and paper existence detection(See Figure 2-18.)

The lever is pushed when the paper that is feed from the bottom or front of the printer reaches the microswitch, and the front end of the paper is detected as well as the presence of paper.

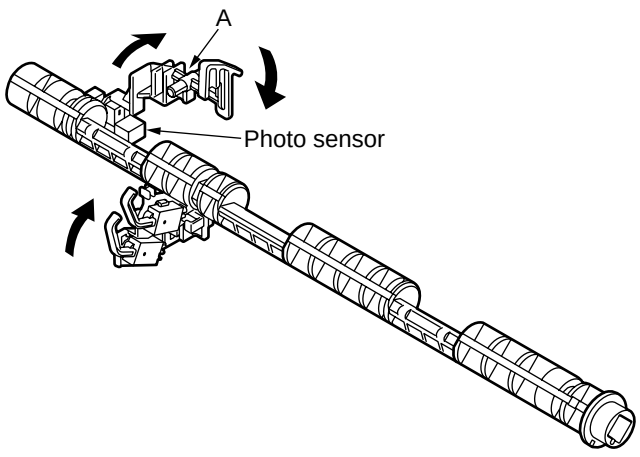


Figure 2-18

(3) Top line print mechanism (See Figure 2-19.)

The front edge of the sheet is protected by the ribbon protector so that it can stop at a position just near to the print head (0 tear off position) to start printing at the front end of the sheet, without causing the sheet to crumple or curl up.

The printing starts at the front end of the sheet, and continues uni-directionally until the front end of the sheet gets to the inside of the pull up roller cover.

After that, that printing continues bi-directionally.

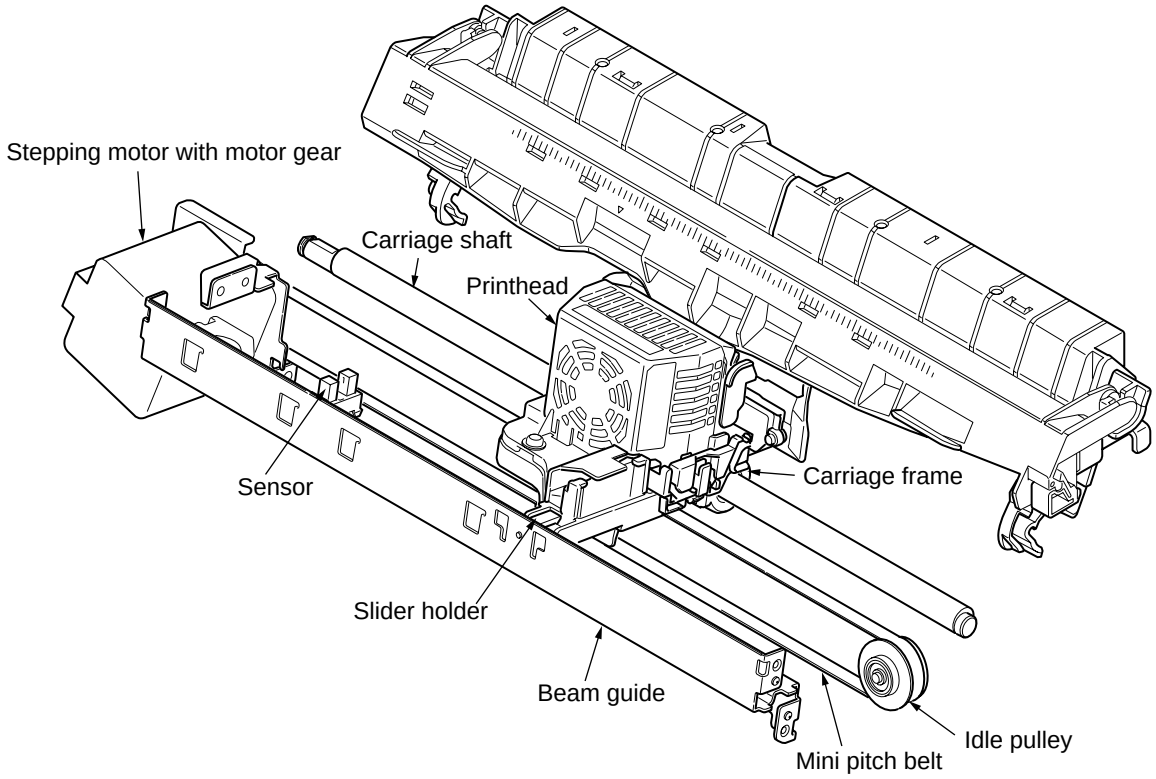


Figure 2-19

2.2.7 Automatic Sheet Feed

This function is used to feed in the sheet automatically up to the print start position when the cut sheet or the continuous sheet is used.

[Operational procedure]

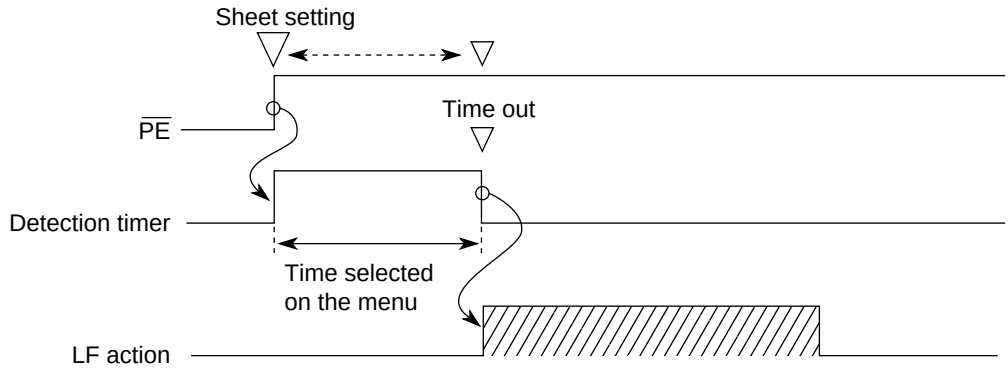
(1) When using the cut sheet

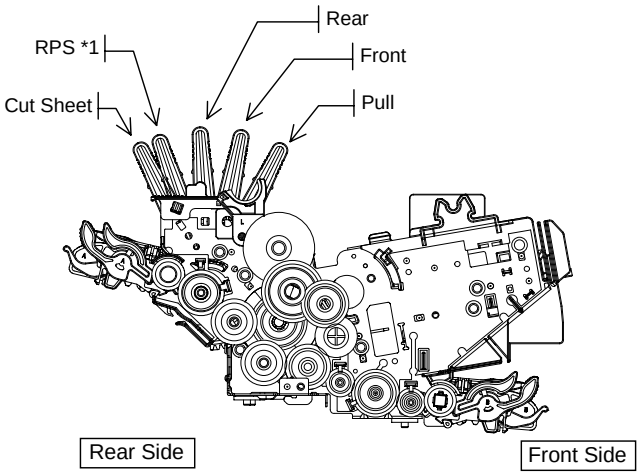
1) Set the change lever to the CUT SHEET position. (See Figure 2-20.)

2) Insert a sheet of paper between the platen and the paper shoot.

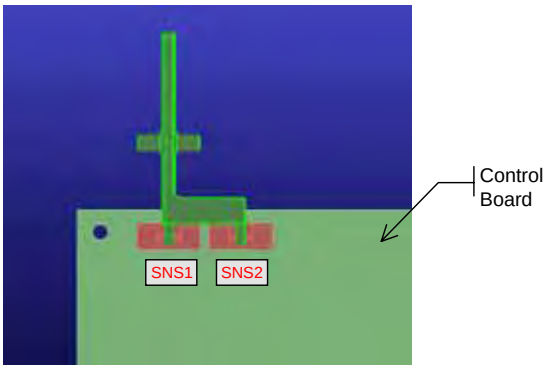
3) After the lapse of time selected by the “wait time” in the menu, the LF motor starts its operation to feed the sheet of paper up to the print position.

4) When the default is selected, the sheet of paper is feed in up to the position 0.85 inches (first dot position) from the upper end of the sheet. However, the 0 tear off mechanism allows the printing at the front end of the sheet by changing the TOF position.





*1 : RPS position exstence only in narrow printer.



Lever Position	SNS1	SNS2
Cut Sheet	ON	ON
Rear	OFF	ON
Front	ON	OFF
Pull	OFF	OFF

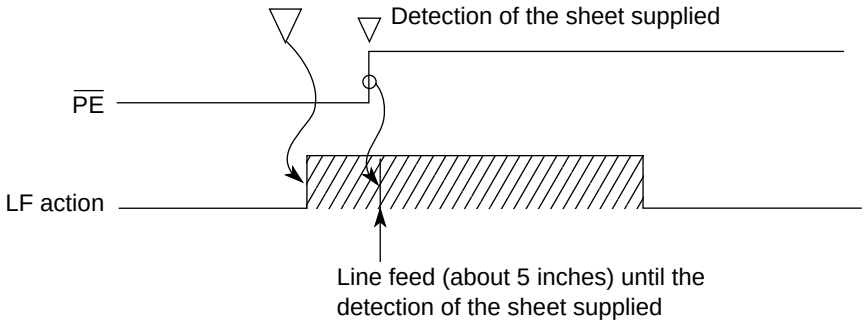
ON : intercept
OFF : open

Figure 2-20

(2) When using the continouos paper

1) Set the change lever either to the rear side, front side or the pull side position. (See Figure 2-20.)
2) Set a sheet of paper either to the push tractor.
3) Press the “LOAD/EJECT” switch.
4) The LF motor starts its operation to feed the paper up to the print start position.
5) The paper is fed in up to the TOF position (Factory default: 0.85 inches from the top).

Push down the “LOAD/EJECT” switch.



When the “LOAD/EJECT” switch is pushed down, the LF motor feeds in the sheet about 5 inches. When the LF motor completes the operation and the sheet has not been fed in, the feeding operating operation becomes, ineffective, thus resulting in the feeding jam.

2.2.8 Paper Park Function (Continuous paper)

Continuous sheets which have been inserted can be reversed automatically by using the “LOAD/EJECT” button on the operation panel.

1) Press the “LOAD/EJECT” button on the operation panel.

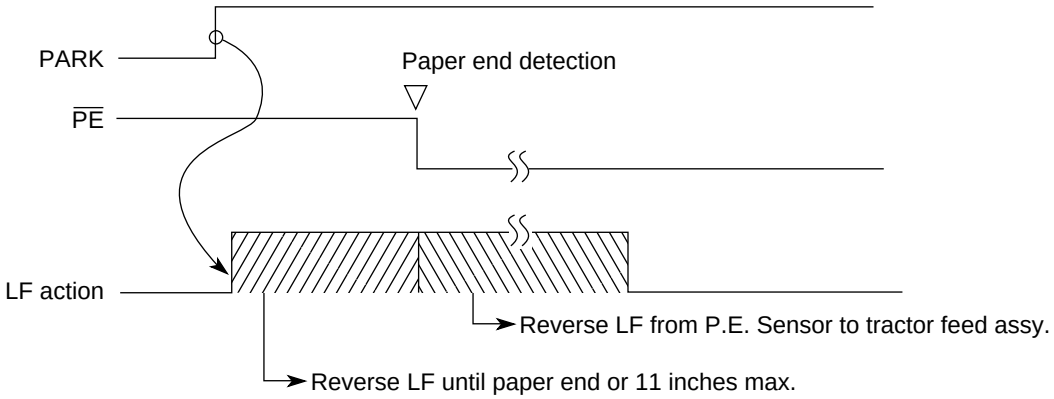
2) Reverse LF is started and paper is fed in reverse until paper end occurs or 14 inches maximum have been fed. When menu "Centering Position" is set to "MODE1", the amount of maximum reverse feed is assumed to be 7 inches.

3) The paper is fed in reverse, to leave the paper on the push-tractor.

   Alarm LED is blinked when the paper end cannot be detected even if a reverse feed by the form save is executed, and Print Quality LED lights. (Refer to Table 6-2.)

   Operator can press SEL key to turn off the ALARM LED then press PARK key to continue park function.

   This operation is required when the length of paper for parking is more than 11 inches.



* When menu "Centering Position" is set to "MODE1", the amount of maximum reverse feed is assumed to be 7 inches

3. ASSEMBLY/DISASSEMBLY

This section explains the procedures for removing and installing various assemblies and units in the field.

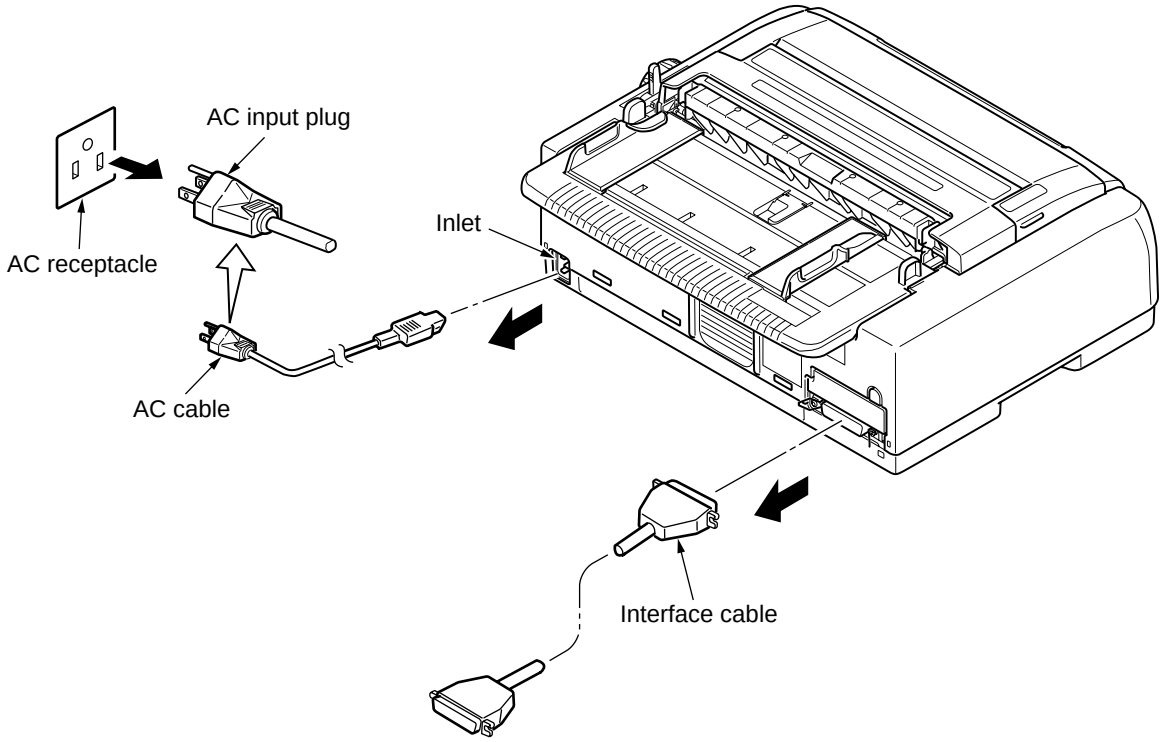
Description is mainly limited to the removal procedure; installation should basically be performed in the reverse sequence of the removal procedure.

3.1 Precaution for Parts Replacement

(1) Remove the AC cable and the interface cable before disassembling or assembling.

(a) Turn off the AC power switch. Remove the AC input plug of the AC cable from the receptacle. Remove the AC cable from the inlet on the printer.

(b) To connect the AC cable again, connect it to the inlet on the printer first, then insert the AC input plug into a receptacle.



(2) Do not disassemble the printer as long as it is operating normally.

(3) Do not remove unnecessary parts, and limit the disassembly area as much as possible.

(4) Use the designated service tools.

(5) Carry out disassembly in the prescribed sequence; otherwise, damage to the parts may result.

(6) It is advisable to temporarily install screws, snap rings and other small parts in their original positions to avoid losing them.

(7) Whenever handling the microprocessors, ROM, RAM IC chips and boards, do not use gloves which may cause static electricity.

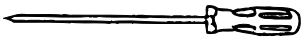
(8) Do not place the printed circuit board directly on the equipment or on the floor.

(9) If adjustment is specified in the middle of installation, follow the instructions.

3.2 Service Tools

Table 3.1 lists the tools necessary for replacing printed circuit boards and parts of units in the field.

Table 3.1 Service tools

No.	Service Tool		Q'ty	Use	Remarks
1		No. 2-200 Phillips screwdriver	1	Screws 3-5 mm	
2		No. 3-100 screwdriver	1		
3		Volt/ohmmeter	1		
4		Feeler gauge	1	Head gap adjustment	
5		Pliers	1		
6		No. 5 nippers	1		

3.3 Disassembly/Reassembly Procedure

This section explains the assembly replacement procedures according to the following disassembly system.

[Parts Layout]

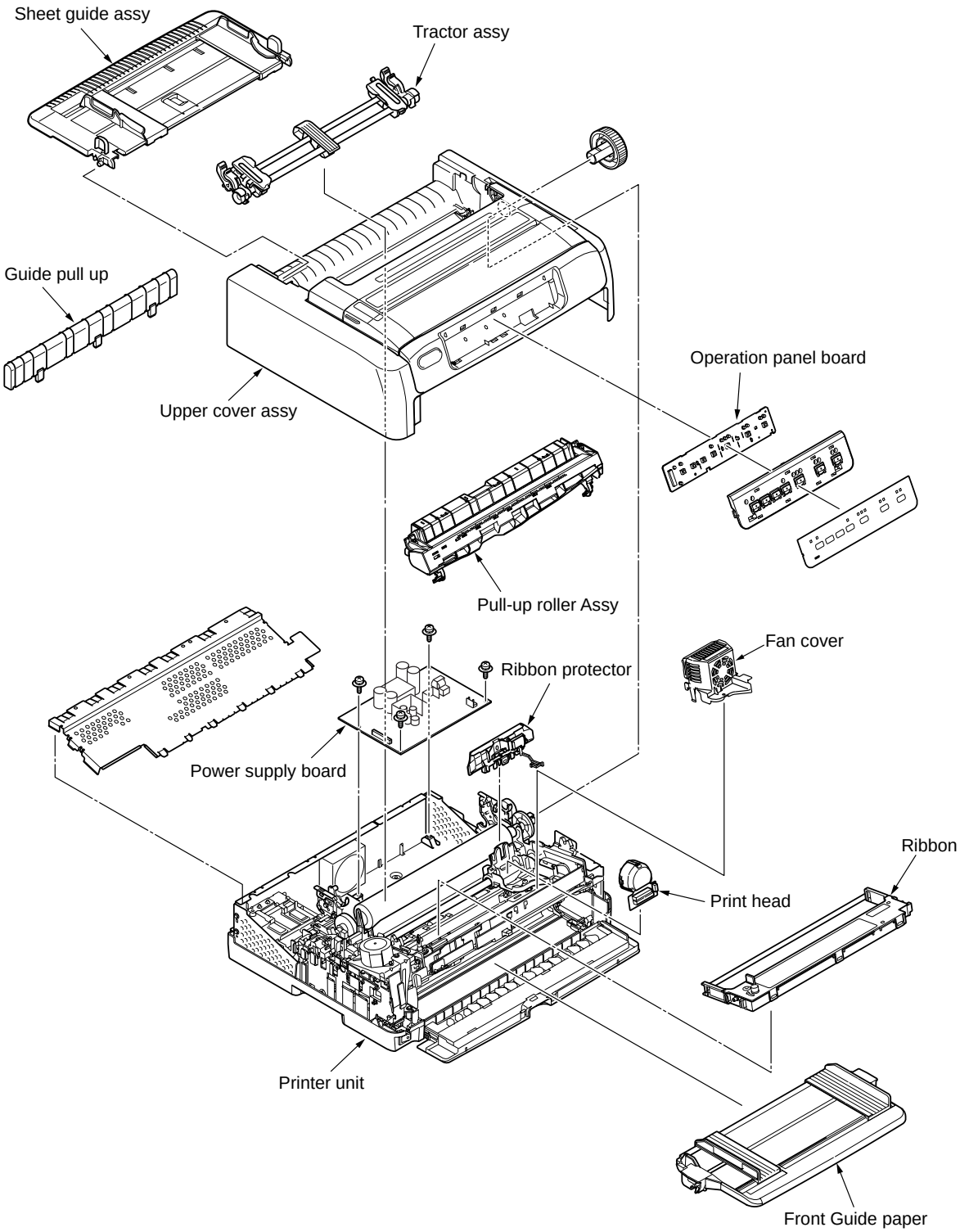
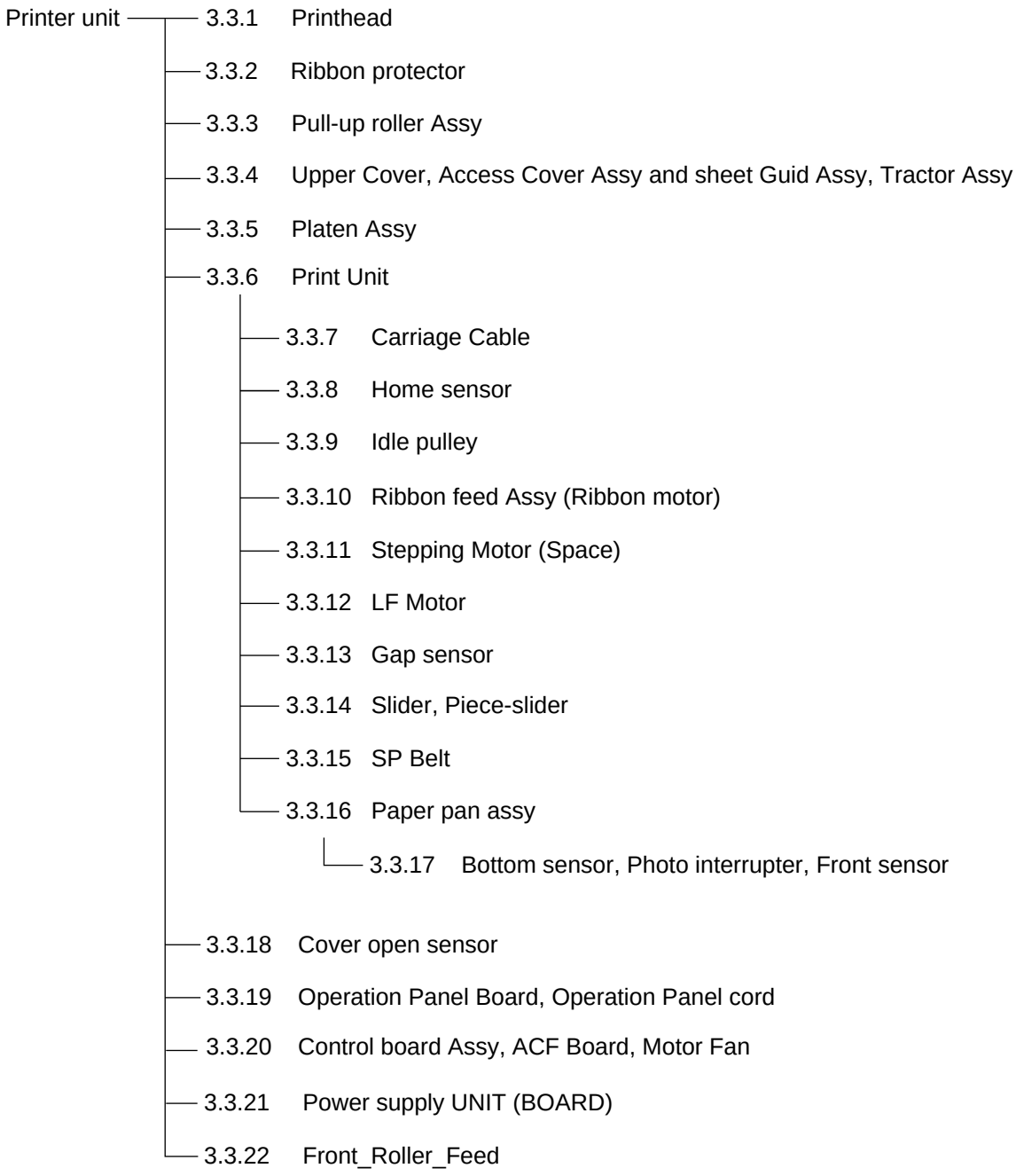


Figure 3-1 Printer unit

[How to Change Parts]

This section explains how to change parts and assemblies appearing in the disassembly diagram below.



3.3.1 Printhead

(1) Open the access cover ①.

(2) Move carriage frame to lack of a pull-up cover ②.

(3) Remove the one screw ③, and then the fan cover ④.

(4) Pull up and rotate the head clamp ⑤ to unclamp the printhead ⑥ as shown Figure 3.3.1.

(5) Lift the printhead ⑥ and, from the carriage frame ⑧, unlatch the head cable ⑦.

(6) Disconnect head cable ⑦ from the head.

(7) To install, follow the removal steps in the reverse order.

Notes on installation:

(1) Connect the head cable ⑦ securely to the printhead ⑥.

(2) The head clamp ⑤ must surely be sandwiched between printhead ④ and carriage frame ⑧ as shown Figure 3.3.2.

(3) Be sure to check the gap between platen and printhead (see 4).

(4) Be careful not to touch the print head while it is very hot.

(5) Make sure that there is not any dust or oil on the connector contact section A. If it is found, wipe it off by alcohol.

Cautions after replacement:

Be sure to turn on the printer with no paper fed into the printer.
(If there is paper in the printer at power on, 6-2 alarm [Edge sensor alarm] occurs. When an edge alarm occurs, remove the paper from the printer and turn on again.)

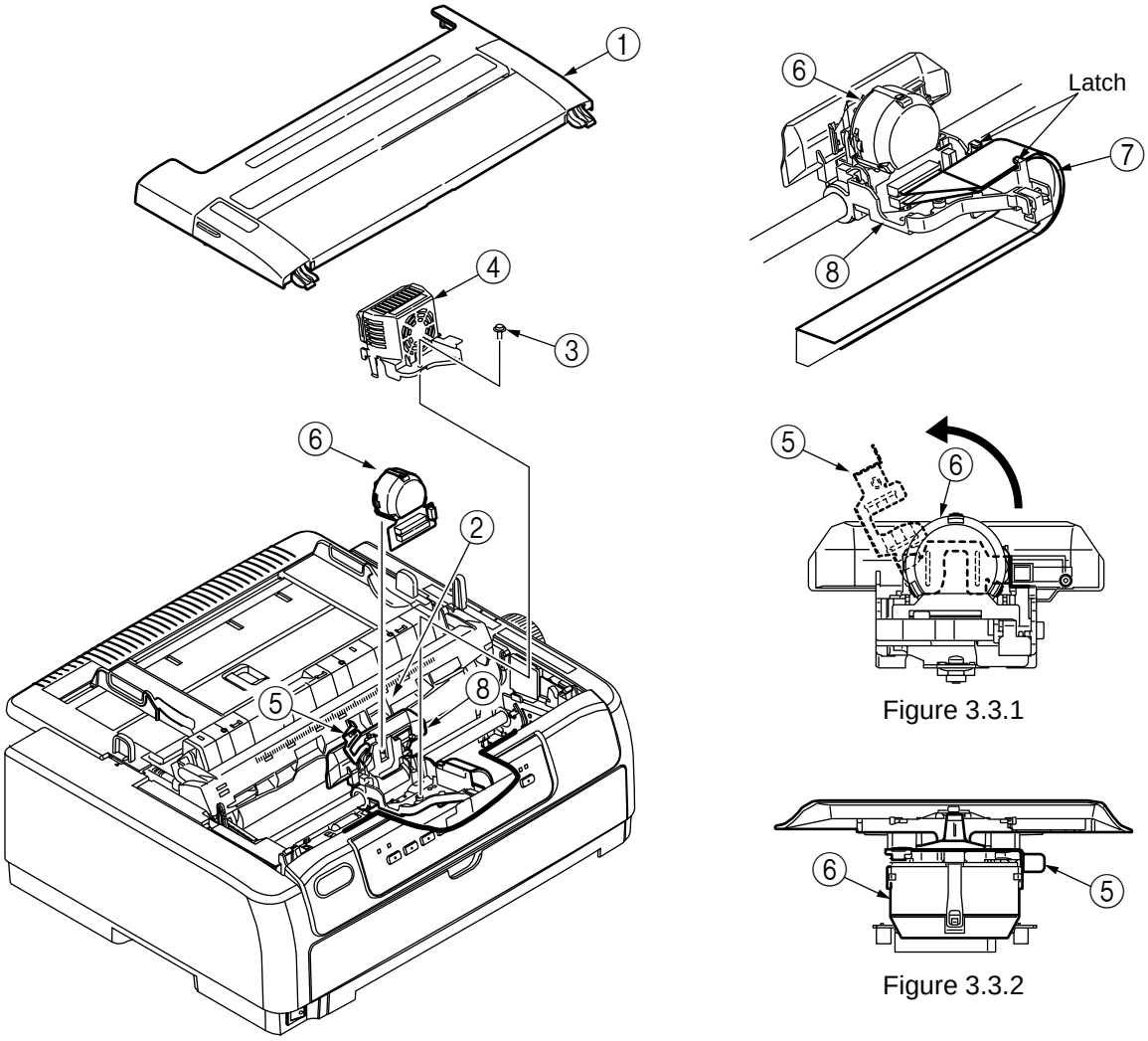


Figure 3.3.1

Figure 3.3.2

3.3.2 Ribbon Protector

(1) Remove the printhead. (See 3.3.1)

(2) Open the pull-up roller cover ①.

(3) Raise and remove the ribbon protector ②.

(4) To install, follow the removal steps in the reverse order.

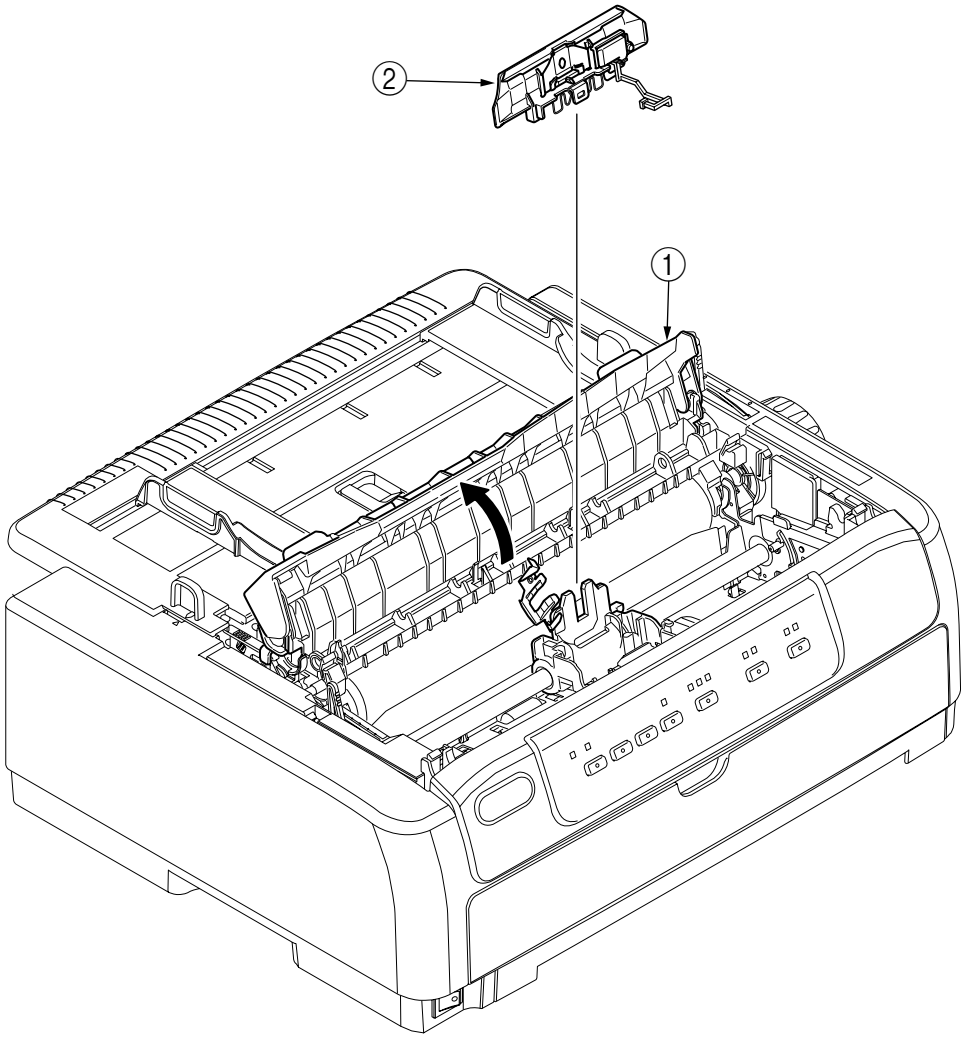
Notes :

(1) After installation, check the slice level. (See 4-6)

Cautions after replacement:

Set the slice level for the edge sensor, with no paper fed into the printer.

(If there is paper in the printer at power on, 6-2 alarm [Edge sensor alarm] occurs. When an edge alarm occurs, remove the paper from the printer and set the slice level for the edge sensor again.)



3.3.3 Pull-up Roller Assy

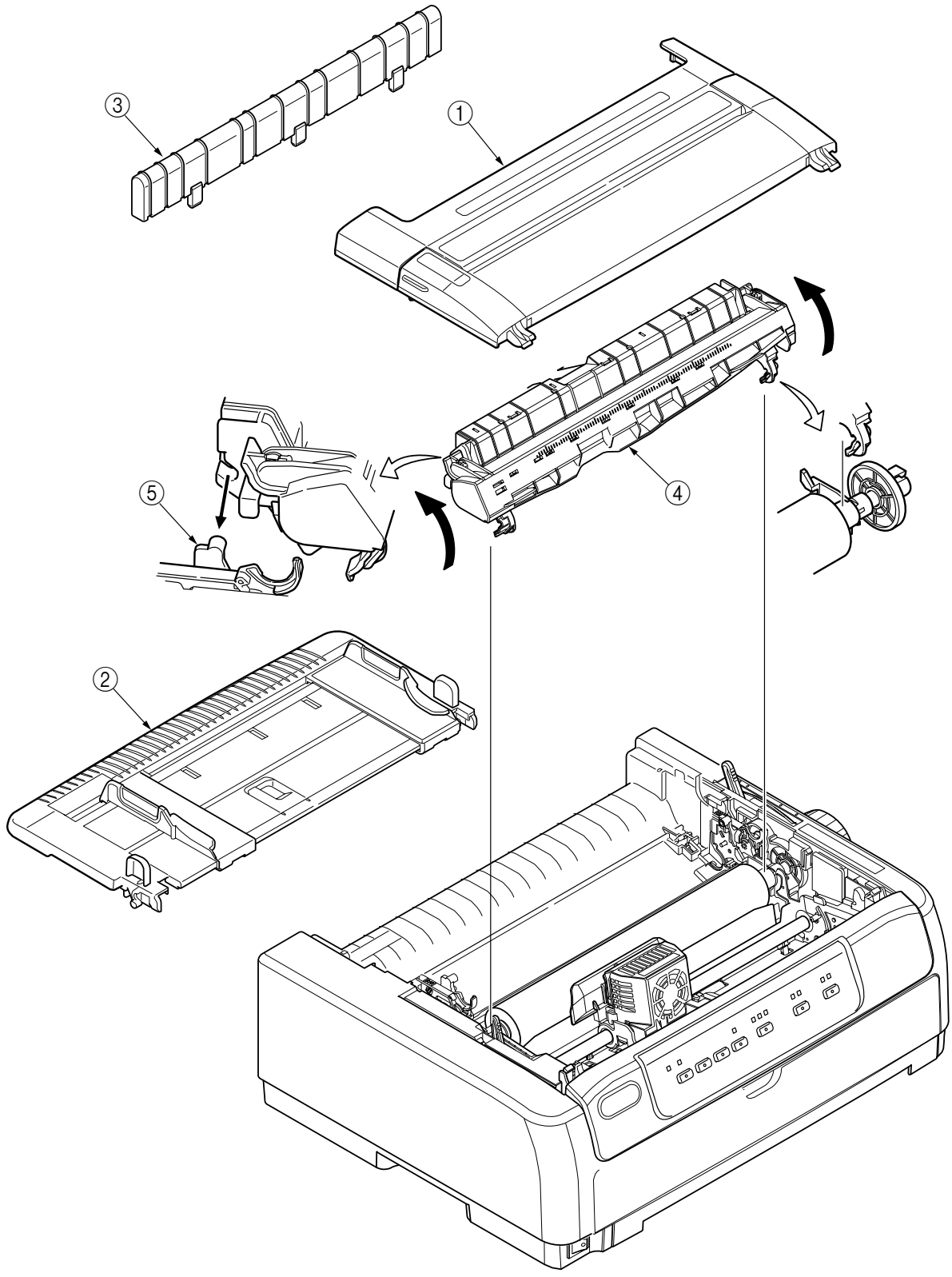
(1) Open the access cover ①.

(2) Lift up the sheet guide Assy ② to remove.

(3) Remove the Guide-Pull-Up ③.

(4) Tilting the pull-up roller Assy ④ toward the rear, remove from the shaft of frame ⑤.

(5) To install, follow the removal steps in the reverse order.



3.3.4 Upper Cover Assy, Access Cover Assy and Sheet Guide Assy, Tractor Assy

(1) Pull off the platen knob ①.

(2) Turn the change lever ② toward the rear position.

(3) Open the access cover Assy ③ toward the front to remove.

(4) Lift up the sheet guide Assy ④ to remove.

(5) Remove the tractor Assy ⑤.

(6) Remove the pull-up Assy ⑥ and remove the Guide-Pull-Up ⑦.(See 3.3.3)

(7) Open the front cover ⑧.

(8) Remove the operator panel Assy ⑨, and then the connection cable. (See 3.3.19)

(9) Remove the two screws ⑩.

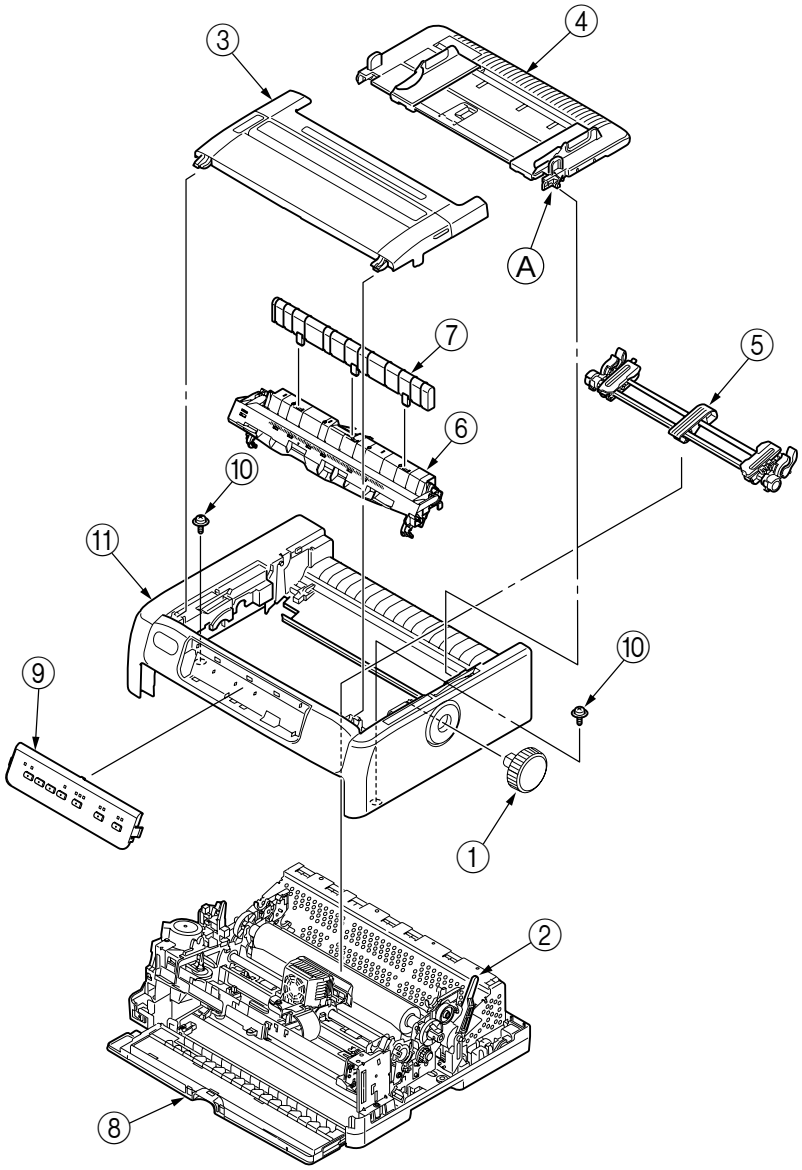
(10) Raise the front side of upper cover Assy ⑪ and shift toward the rear to disengage claws (6 places) (5 places for narrow type) of frame.

(11) Raise the upper cover Assy ⑪ to remove.

(12) To install, follow the removal steps in the reverse order.

Remark on assembly:

Match the posts Ⓐ at the both sides of the Sheet Guide ④ with the arrow marks on the upper cover. Push the Guide into the Cover.



3.3.5 Platen Assy

(1) Remove the printhead. (See 3.3.1)

(2) Remove the ribbon protector. (See 3.3.2)

(3) Remove the pull-up roller Assy. (See 3.3.3)

(4) Remove the upper cover. (See 3.3.1 (1) – (6))

(5) Turn the change lever ① to the cut position.

(6) Remove the two screws ② and remove the bracket-gear-idle-D-P ③.

(7) Remove the Gear-idle-D ④.

(8) Pull in the lock levers ⑤ on both sides to unlock from the frame, then rotate them upward by 90°.

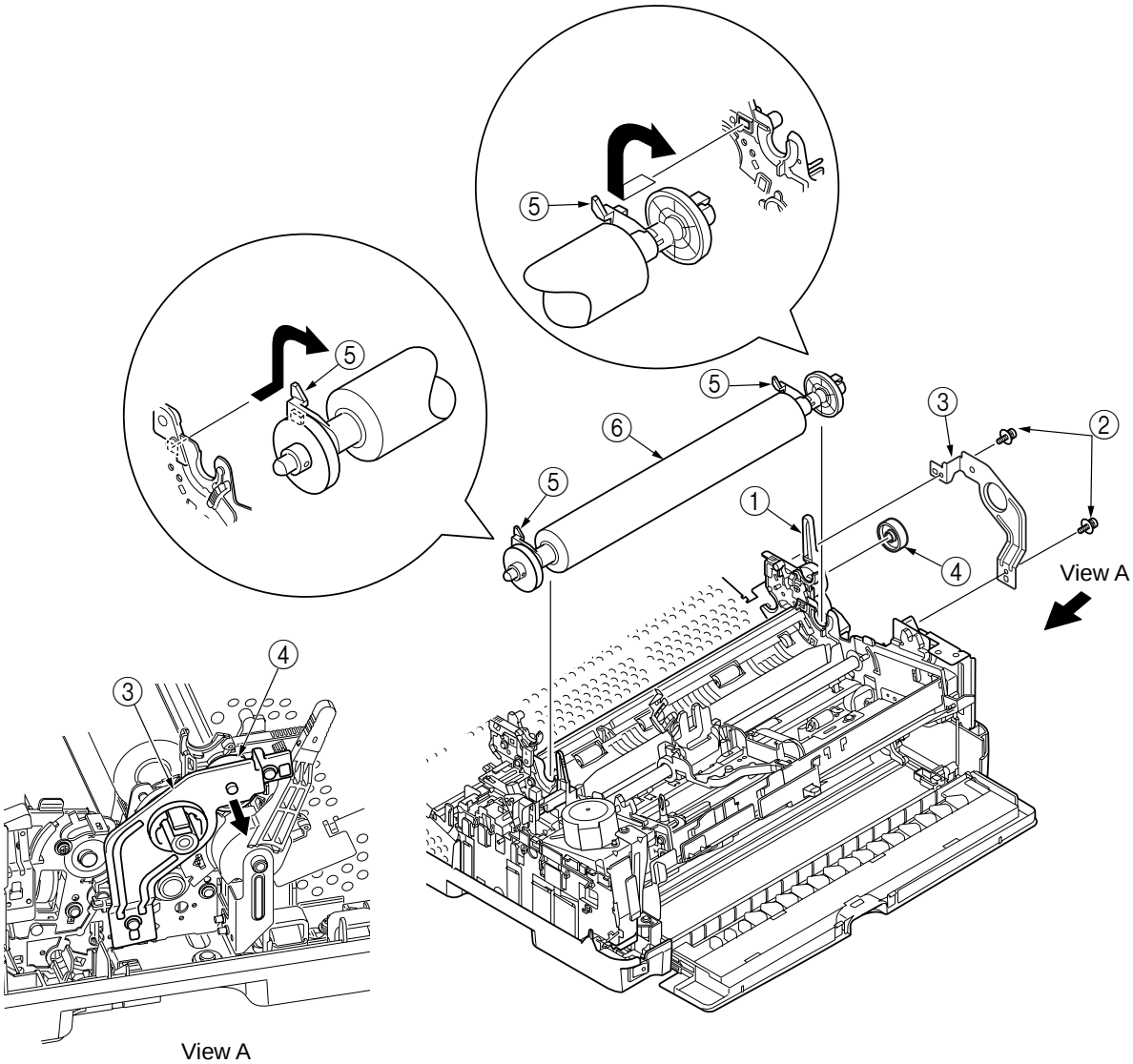
(9) Remove the platen Assy ⑥ from side frame.

(10) To install, follow the removal steps in the reverse order.

Notes :

(1) After installation, check and adjust the gap between platen and printhead. (See 4-1)

(2) After installation, check the slice level. (See 4-6)



3.3.6 Printer unit

(1) Remove the Pull-up Roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the four screws ① and remove the Plate-Shield-Upper ②.

(4) Remove the two screws ③ and remove the Bracket-Side-R ④, the Bracket-Side-L ⑤ from the Cover-Lower.

(5) Remove the four mechanical locking screws ⑥ and two screws ⑦.

(6) Remove the Film Harness ⑧.

(7) Disconnect the Motor-SP-cable, Head-cord, operation-panel-cable, Motor-LF-cable, Ribbon-Motor-cable, Gap-sensor-cable and top-line-detection-sensor-cable from the control board.

(8) Remove the two cores ⑨.

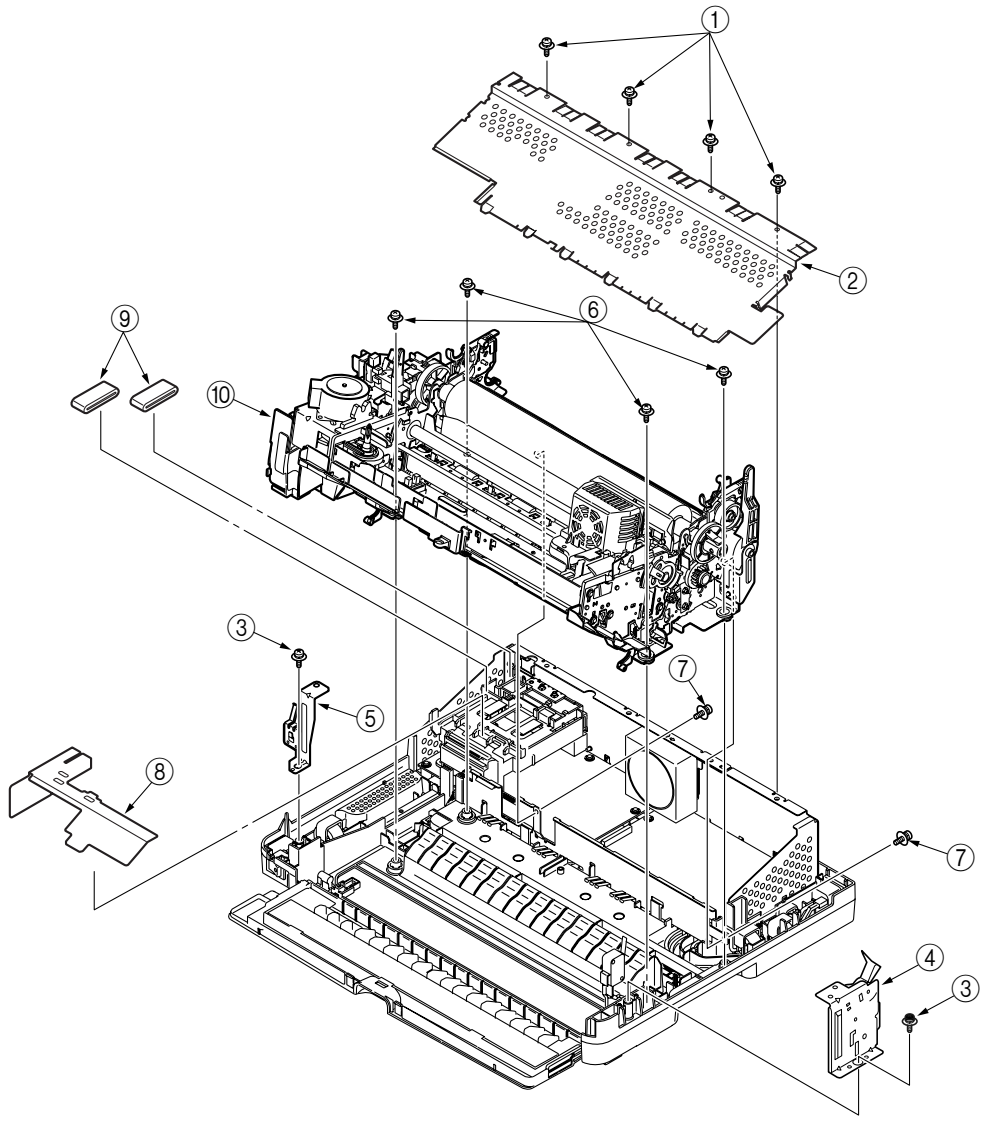
(9) Lift up and remove the printer unit ⑩.

(10) To install, follow the removal steps in the reverse order.

Notes :

(1) Take care not to fold the carriage cable during installation. Curre slightly the carriage cable when assembling into the fastenera.

(2) Make sure that there is not any dust or oil on the connector contact sectious A. If it is found,wipe it off by alcohol.



3.3.7 Carriage Cable

(1) Remove the Pull-up roller Assy. (See 3.3.1)

(2) Remove the Upper cover. (See 3.3.4)

(3) Remove the four screws ① and remove the Plate-Shield-Upper ②.

(4) Remove the Printehead. (See 3.3.1)

(5) Slide the Clamp-Head-Cable ③ to the left by pressing the round tab on it and pull the cable down to remove.

(6) Remove Flat cable ④ from the Clamp-Head-Cable ③.

(7) Remove the Film Harness ⑦ from Plate Shield PCB ⑤, and remove the two cores ⑥.

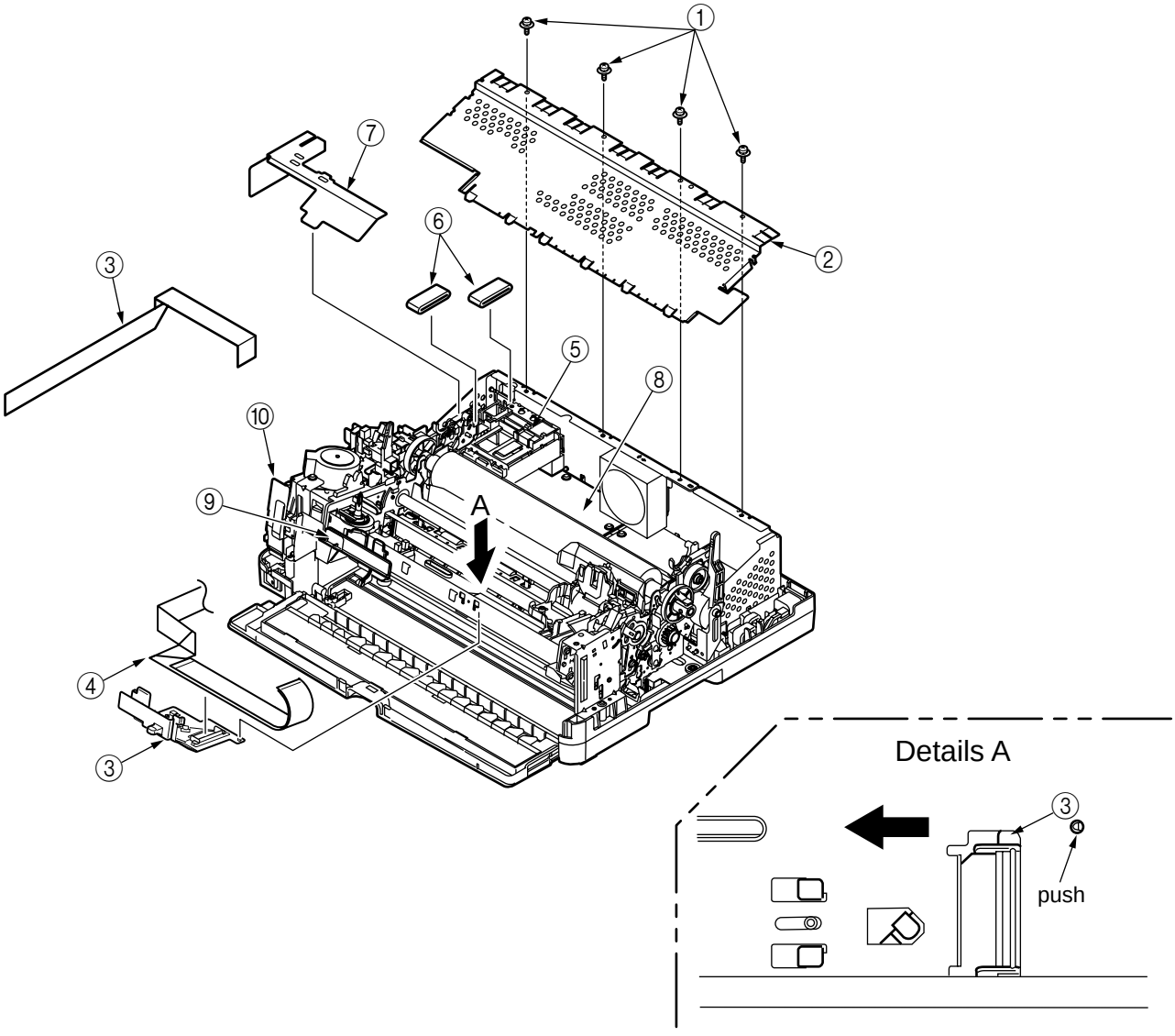
(8) Disconnect the Head-Cord ④ from the Control-Board ⑧ and remove it from the Clamp-Home-Sensor ⑨ and Motor Cover ⑩.

(9) To install, follow the removal steps in the reverse order.

Notes :

(1) Take care not to fold the head cable ④ during installation. Curve slightly the head cable ④ when assembling into the fasteners.

(2) Make sure that there is not any dust or oil on the connector contact sections A to D. If it is found, wipe it off by alcohol.



3.3.8 Homing sensor

(1) Remove the Pull-up roller Assy. (See 3.3.1)

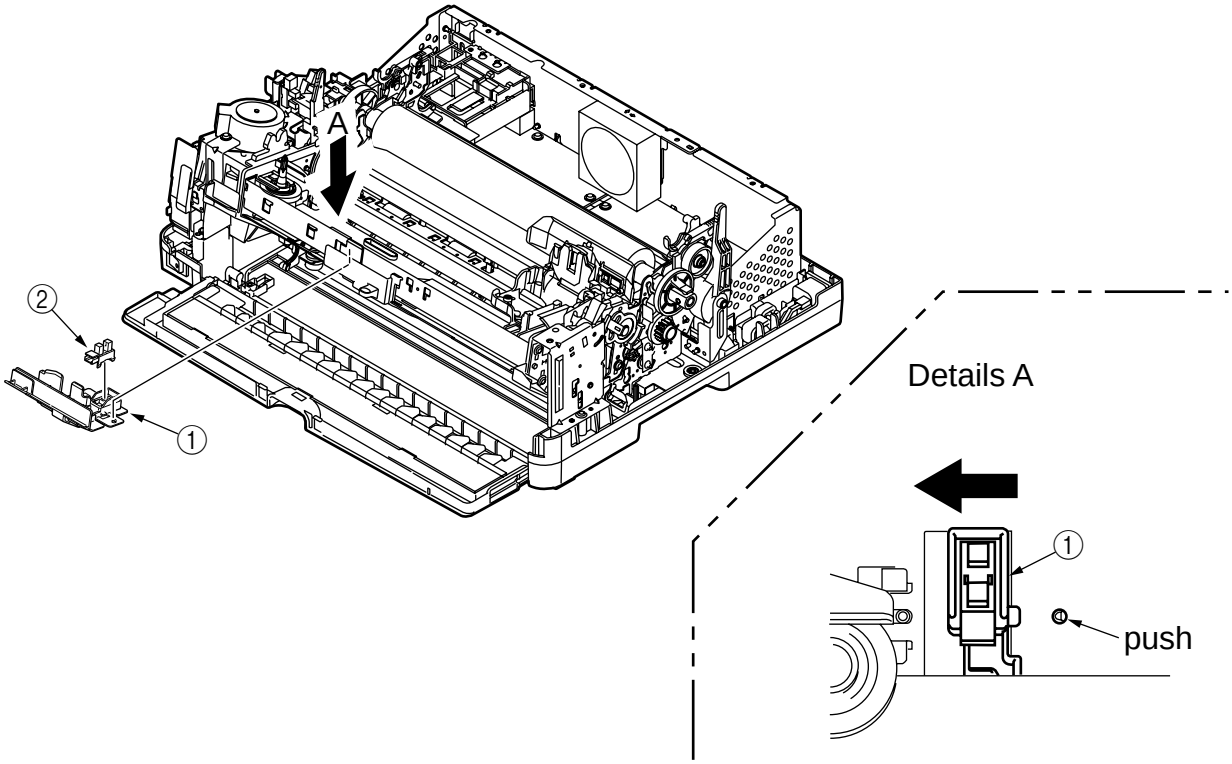
(2) Remove the Upper cover. (See 3.3.4)

(3) Remove the Plate-Shield-Upper. (four screws) (See 3.3.7)

(4) Slide the Clamp-Home-Sensor ① to the left by pressing the round tab on it and pull the clamp down to remove.

(5) Disconnect the cable, remove the homing sensor (photo interrupter) ② from the Clamp-Home-Sensor.

(6) To install, follow the removal steps in the reverse order.



3.3.9 Idle-pulley

(1) Remove the Pull-up Roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the locking screw ① of the idle pulley bracket ②.

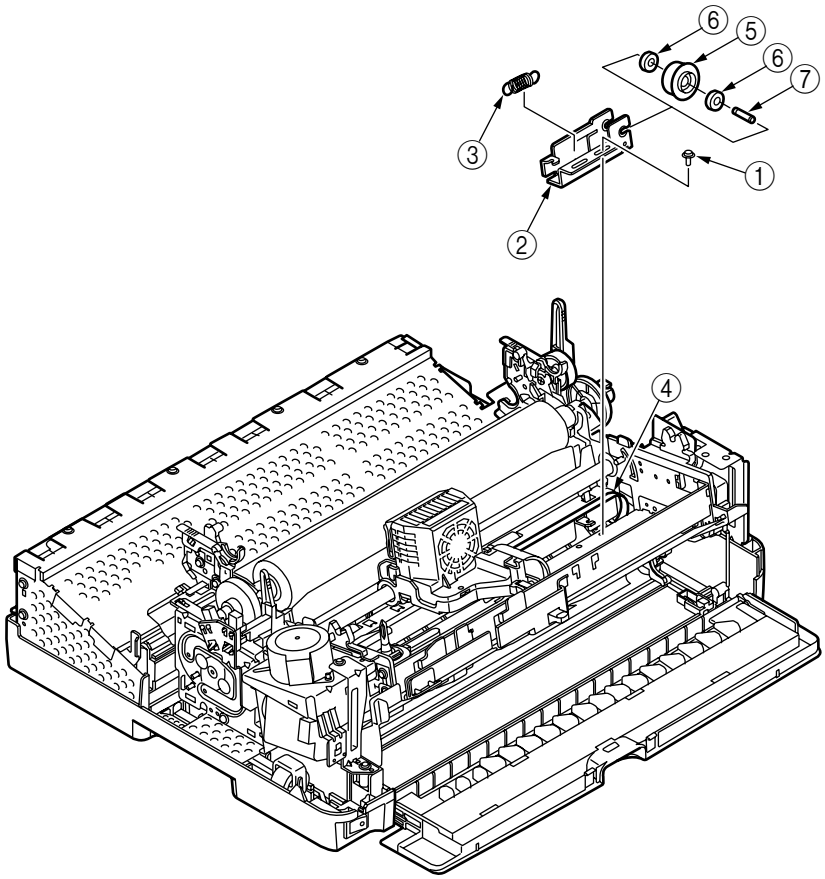
(4) Remove the plate tension spring ③.

(5) Remove the pitch belt ④ from the pulley on the space motor side.

(6) Remove the idle pulley ⑤ from the idle pulley bracket.

(7) Remove the two bearings ⑥ and the Pulley-Shaft-Idle ⑦ from the Pulley-Idle.

(8) To install, follow the removal steps in the reverse order.



3.3.10 Ribbon Feed Assy. (ribbon motor)

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the printer unit. (See 3.3.6)

(4) From the Cover-Motor ①, disconnect the Motor-SP-Cable, Head-Cord, Operation-Panel-Cable, Motor-LF-Cable, Ribbon-Motor-Cable and Gap-Sensor-Cable.

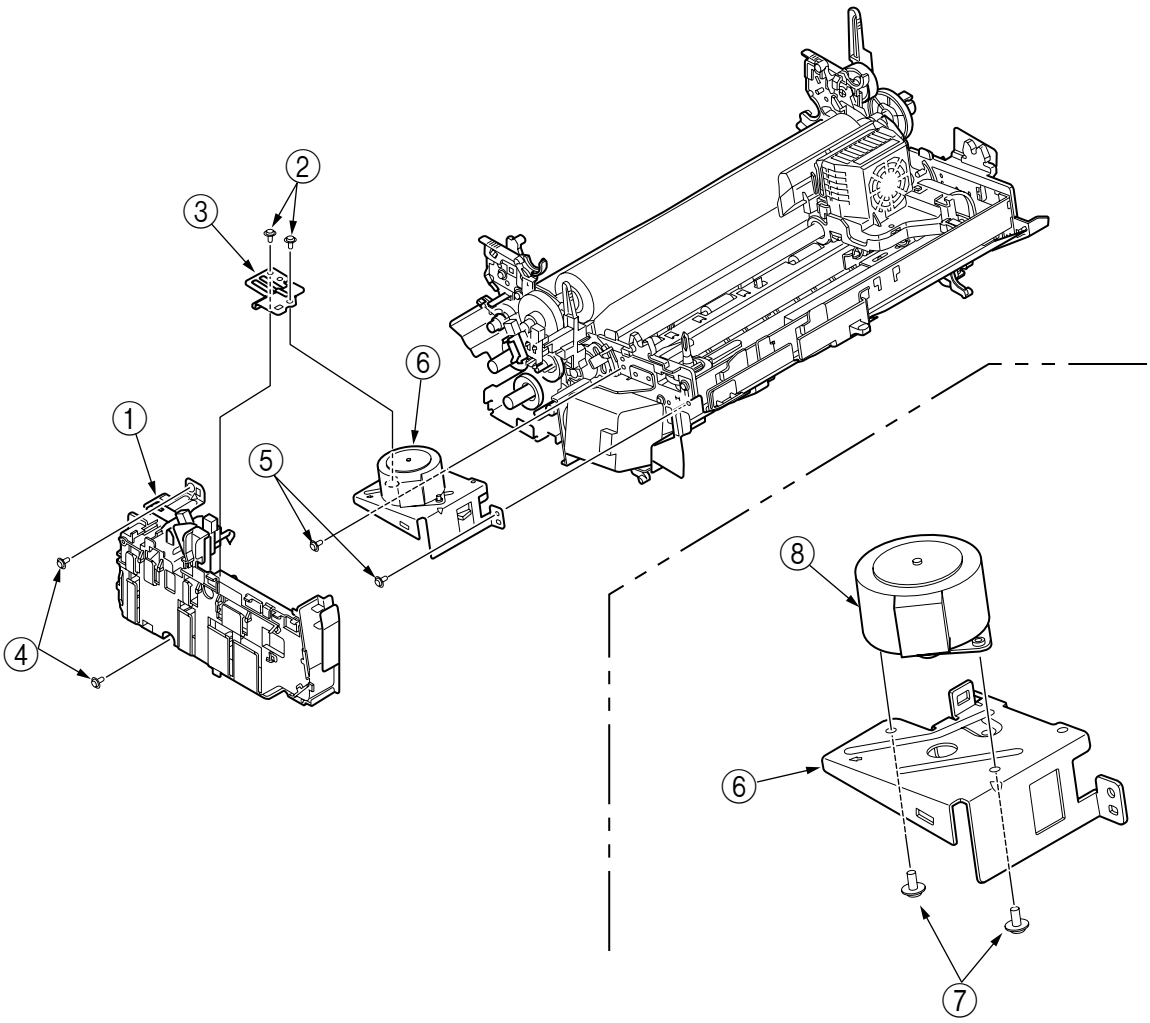
(5) Remove the two screws ② and remove the Bracket-LF-Ribbon-Feed ③.

(6) Remove the two screws ④ and remove the Cover Motor (LF Motor Assy are included) ①.

(7) Remove the two screws ⑤ and remove the Ribbon-Feed-Assy ⑥.

(8) Remove the two screws ⑦ and remove the Ribbon-Motor ⑧ from the Ribbon-Feed-Assy.

(9) To install, follow the removal steps in the reverse order.



3.3.11 Stepping Motor (Space)

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the printer unit. (See 3.3.6)

(4) Remove the Cover-Motor. (See 3.3.10)

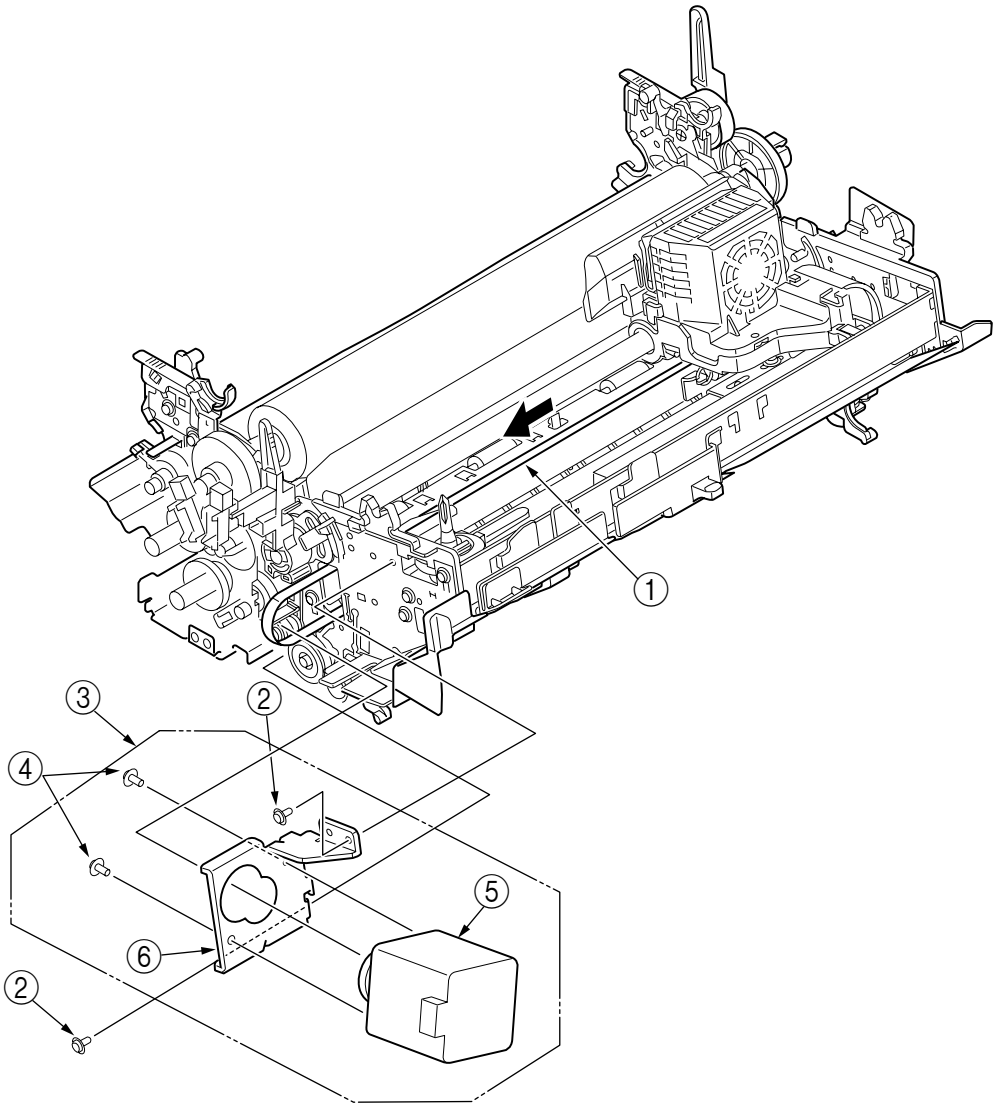
(5) Remove the Ribbon-Feed-Assy. (See 3.3.10)

(6) Push the mini pitch belt in the direction of the arrow and remove the mini pitch belt ① from the space motor pulley.

(7) Remove the two screws ② and remove the SP-Motor-Assy ③.

(8) Remove the two screws ④ and remove the Motor-SP ⑤ from the Bracket-SP-Motor ⑥.

(9) To install, follow the removal steps in the reverse order.



3.3.12 LF Motor

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

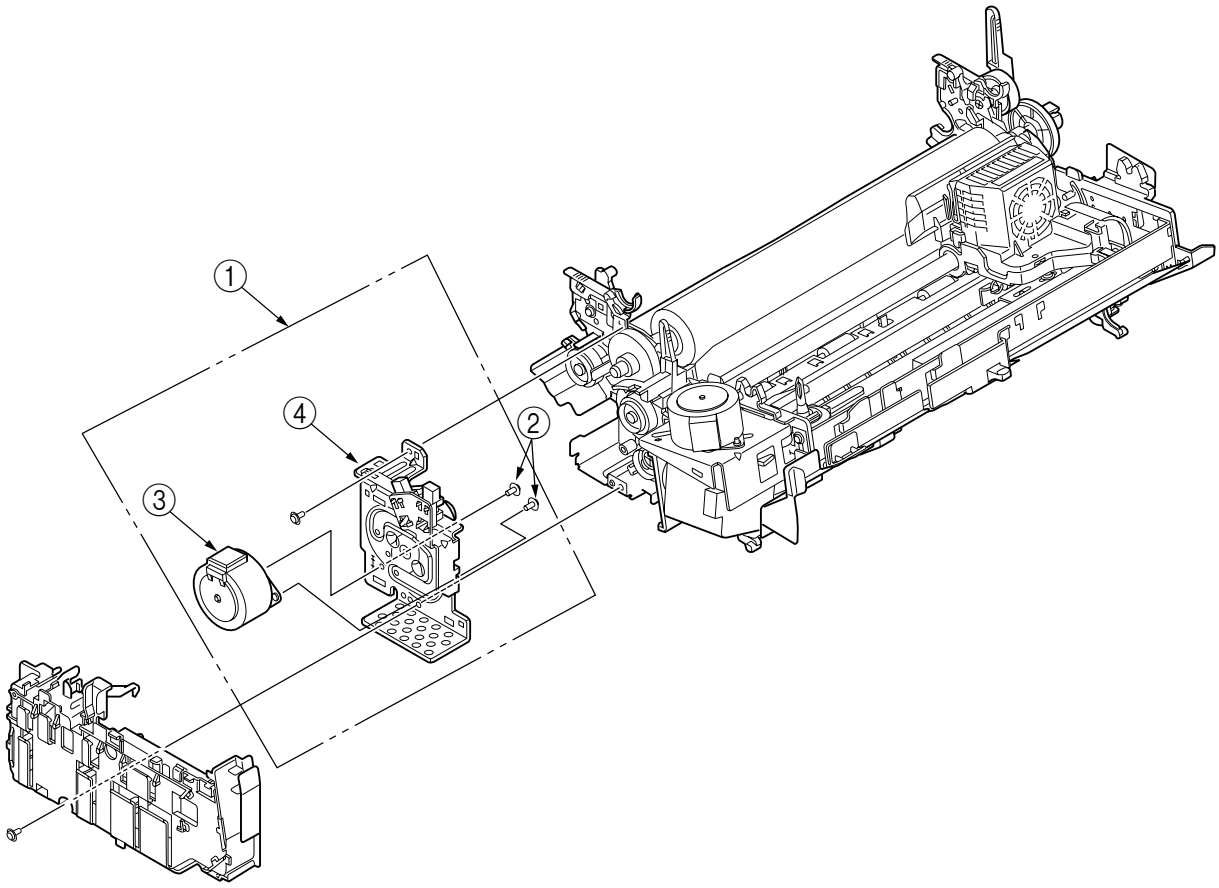
(3) Remove the printer unit. (See 3.3.6)

(4) Remove the Cover-Motor. (See 3.3.10)

(5) Remove the LF Motor Assy ①.

(6) Remove the two screws ② and remove the Motor-LF ③ from the Bracket-LF-Motor ④.

(7) To install, follow the removal steps in the reverse order.



3.3.13 Gap sensor

(1) Remove the pull-up roller Assy.(See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the printer unit. (See 3.3.6)

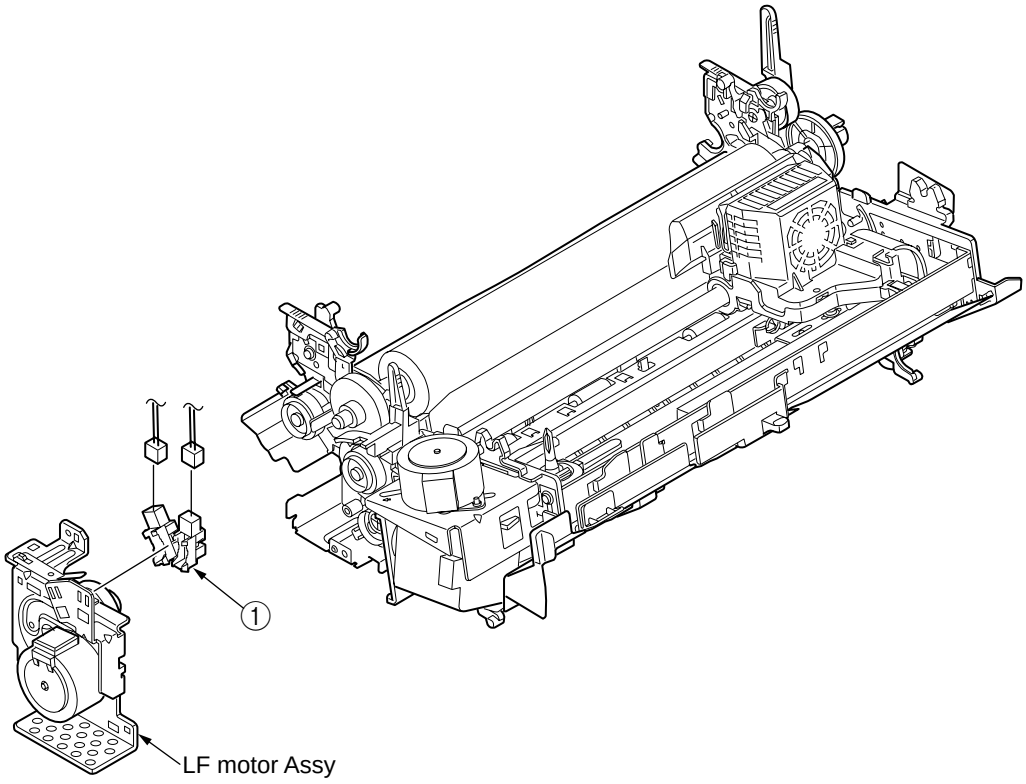
(4) Remove the Cover-Motor. (See 3.3.10)

(5) Remove the LF motor. (See 3.3.11)

(6) Disconnect the two Gap-Sensor-Cables from the Gap Sensor ①.

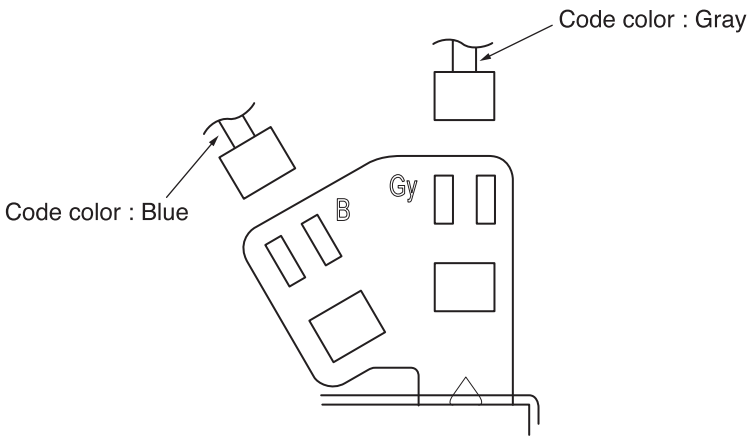
(7) Remove the Gap-Sensor from the Bracket-LF-Motor by bending the claw.

(8) To install, follow the removal steps in the reverse order.



Notes :

(1) Pay attention to the code colors during assembly.



3.3.14 Slider Pice-Slider

(1) Remove the pull up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the printer unit. (See 3.3.6)

(4) Remove the Cover-Motor. (See 3.3.10)

(5) Pull the Lever-Adjust ① out of the shaft ③.

(6) Remove the Knob-Adjust-L and the Knob-Adjust-R ② from the Frame-Side-(L)-outsert and Frame-Side-(R)-outsert respectively (one screw on each).

(7) Pull the shaft ③ out of the Frame-Carriage ④.

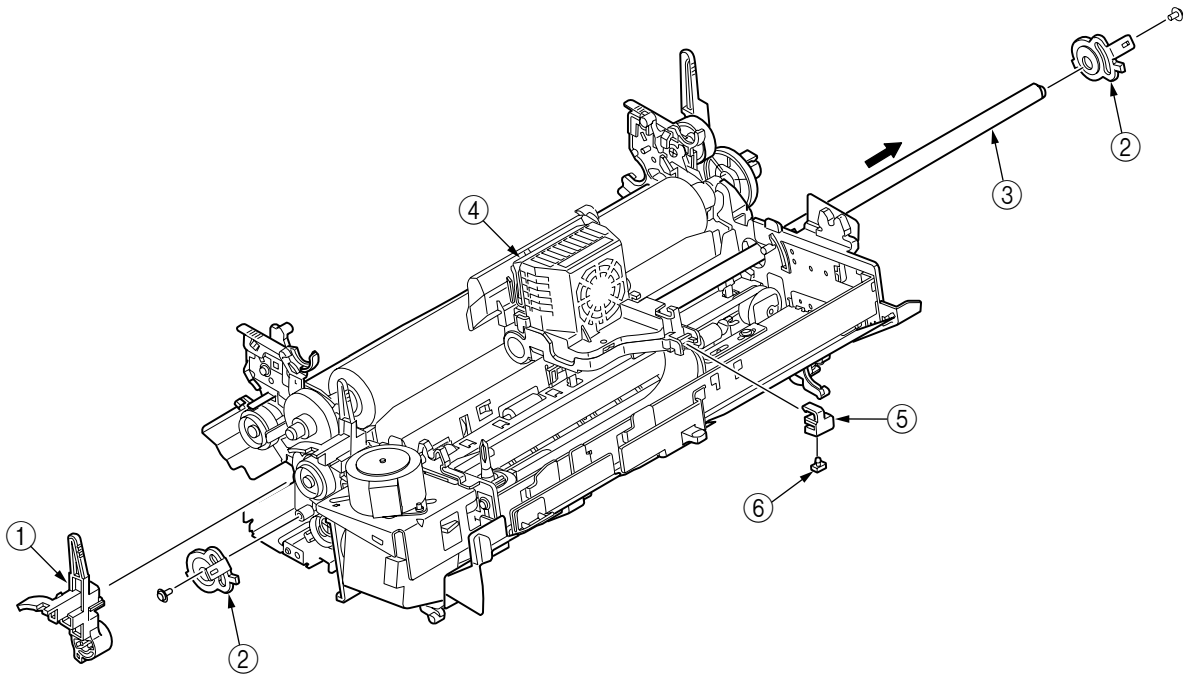
(8) Remove the Holder-Slider ⑥ and the Piece-Slider ⑤ from the Frame-Carriage ④.

(9) To install, follow the removal steps in the reverse order.

Notes :

(1) After installation, check and adjust the gap between platen and printhead (see 4-1).

(2) After installation, check the slice level. (See 4-6)



3.3.15 SP Belt

(1) Remove the printhead. (See 3.3.1)

(2) Remove the pull-up roller Assy. (See 3.3.3)

(3) Remove the upper cover. (See 3.3.4)

(4) Remove the idle pulley bracket. (See 3.3.9)

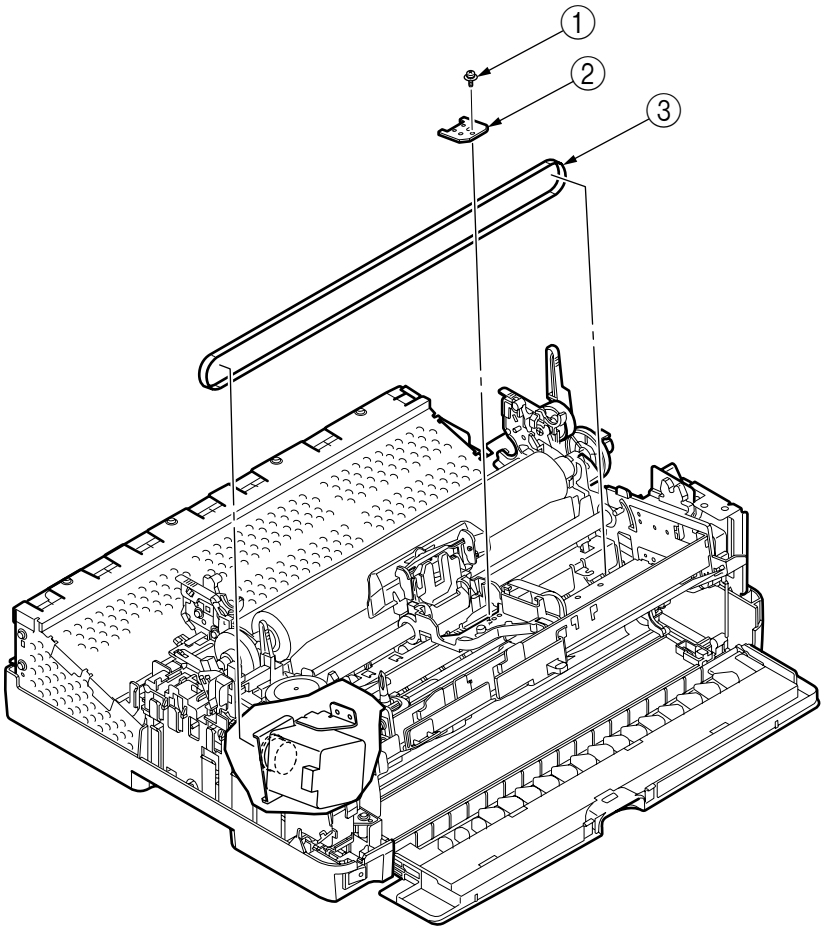
(5) Remove the one screws ① and remove the belt clamp ②.

(6) Remove the SP belt ③.

(7) To install, follow the removal steps in the reverse order.

Note:

(1) When fastening the belt with the belt clamp ②, make sure that the teeth are engaged with each other and that the belt ③ is not bent.



3.3.16 Paper Pan Assy

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the printer unit. (See 3.3.6)

(4) Remove the platen. (See 3.3.5)

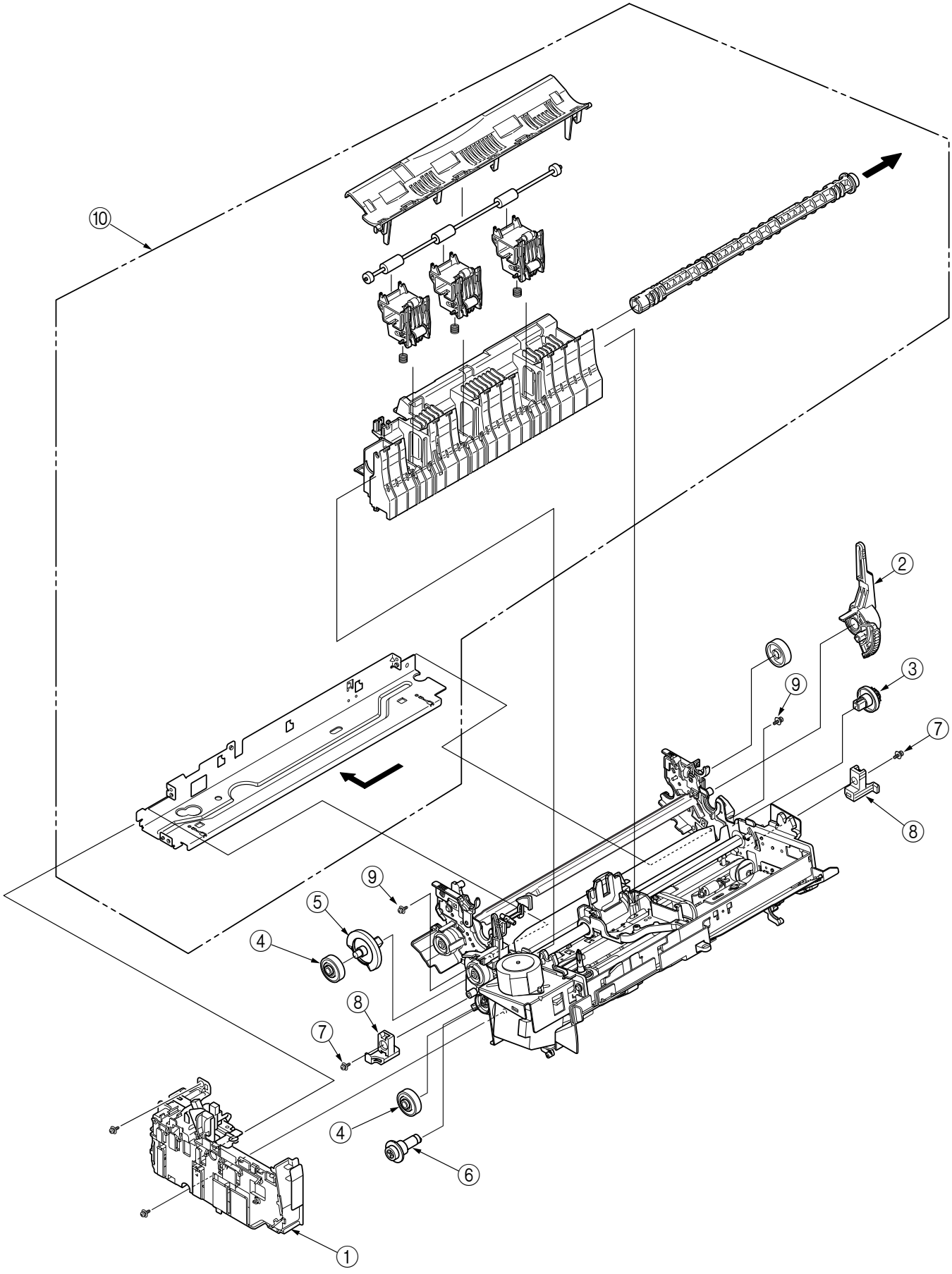
(5) Remove the Cover Motor ①.

(6) Remove the change lever ② and the Gear Change ③.

(7) Remove the two idle gears ④, the change plate ⑤ and the Gear Feed ⑥.

(8) Remove the screws ⑦ and remove the pieces ⑧. (Both left and right)

(9) Remove the two screws ⑨ and remove the paper pan Assy ⑩.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3.3.17 Bottom sensor, photo interrupter front sensor

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the printer unit. (See 3.3.6)

(4) Remove the platen. (See 3.3.5)

(5) Remove the paper pan Assy. (See 3.3.16)

(6) Slide the Beam-Lower ① in the direction of the arrow by pressing the tab to remove the Paper-Pan-Assy ②.

(7) Remove two micro switches ③ from the Paper-Pan-Lower.

(8) Remove the photo interrupter ④ from the Paper-Pan-Lower.

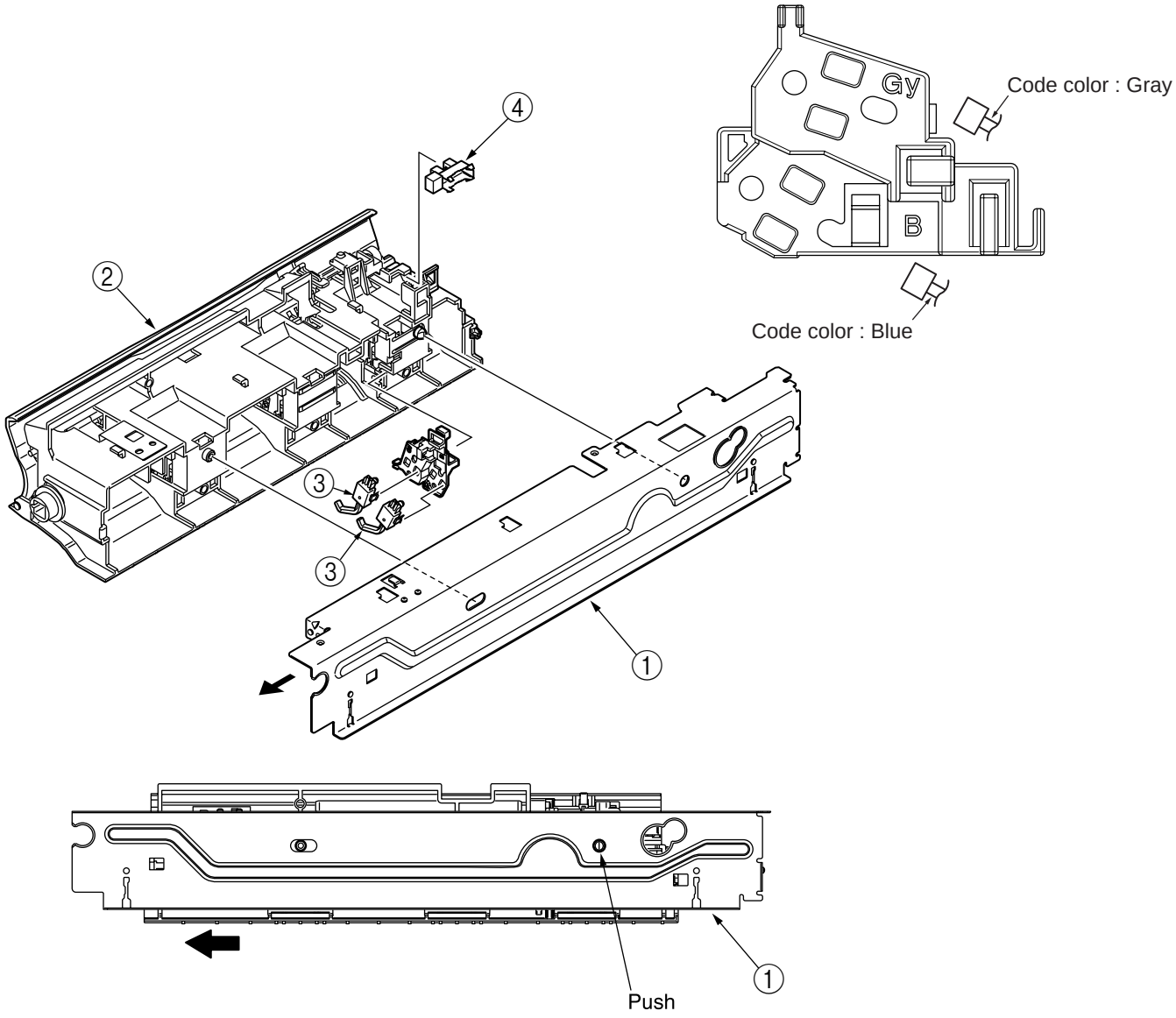
(9) To perform mounting, follow the reverse procedure of removal.

Remake on Assembly

(1) After assembling, make sure that the sensor arm moves smoothly.

Notes :

(1) Pay attention to the code colors during assembly.



3.3.18 Cover Open sensor

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

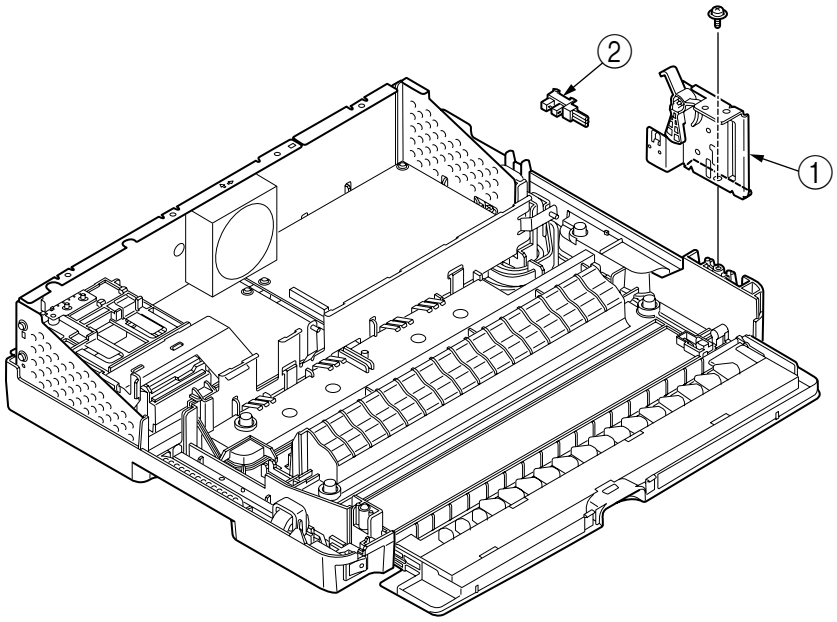
(3) Remove the Bracket-side-L-Assy ① (one screw).

(4) Remove the Cover-Open-Sensor ② from Bracket-side-L-Assy (one screw).

(5) Remove the printer unit. (See 3.3.6)

(6) Disconnect the connector of the Cover-Open-Sensor from the Control-Board-Assy.

(7) Disconnect the cable of the Cover-Open-Sensor from the Cover-Lower.



3.3.19 Operation Panel Board and Operation Panel cord

(1) Remove the access cover. (See 3.3.4)

(2) Pry the upper cover's latches open by using a flathead screwdriver from the back of the upper cover.

(3) Release the six claws of the operation panel frame ①, remove the board ②.

(4) Remove the operator panel cable.

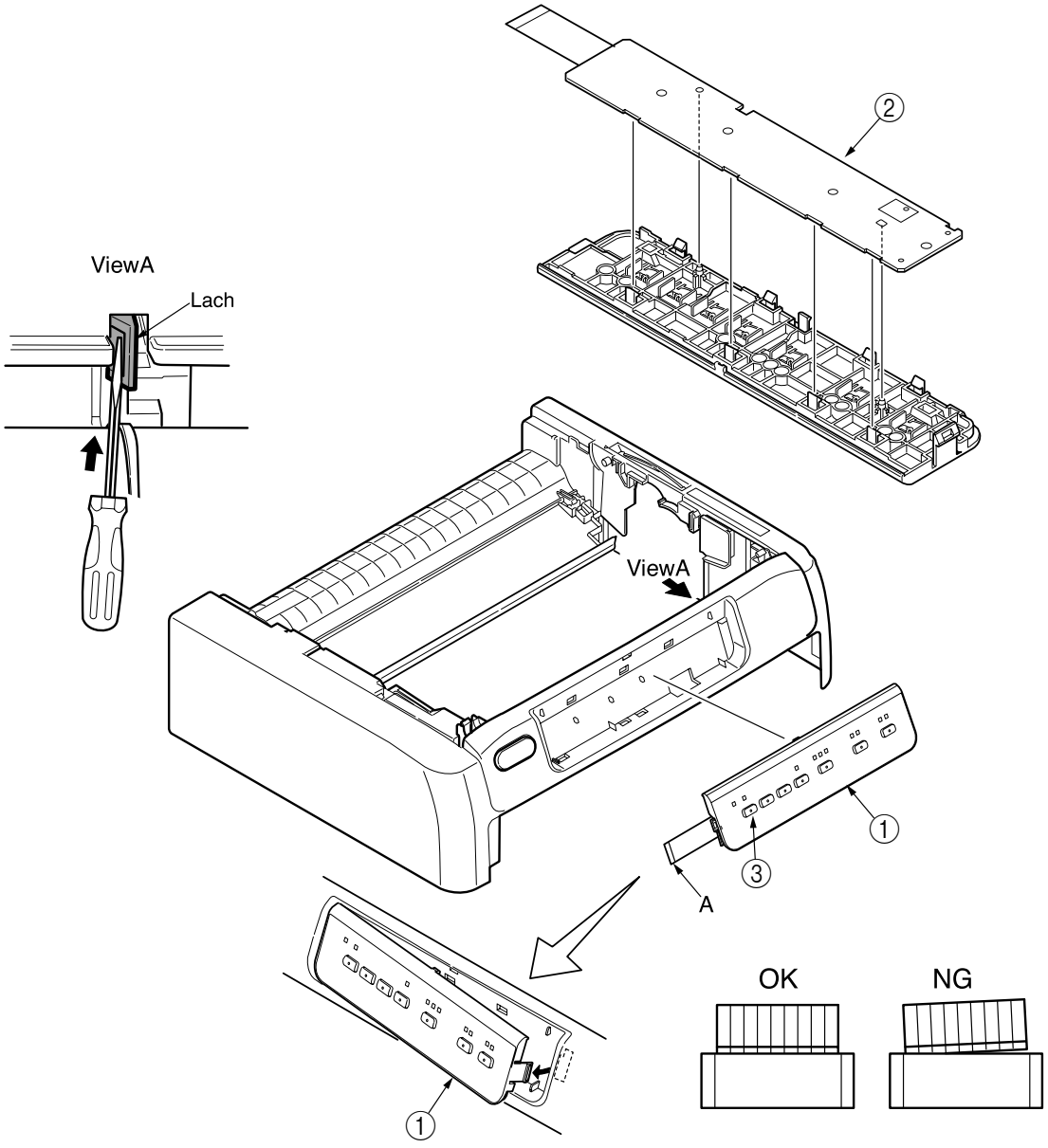
(5) To install, follow the removal steps in the reverse order.

Remark on assembly:

(1) Make sure that there is not any dust or oil on the connector contact section. If it is found, wipe it off by aicohol.

(2) When connecting the cable to the connector, make sure that they are securely locked, and not joined askew.

(3) When inserting the board, take care not press on the key ③ (Seven places).



3.3.20 Control Board, ACF Board, Motor Fan

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the Plate-shield-upper (four screws) ①.

(4) Disconnect the Motor-SP-Cable, Head-cord, Operation-panel-cable, Motor-LF-cable, Ribbon-Motor-cable, Gap-sensor-cable, top-line-detection-sensor-cable, Cover-open-sensor-cable and Power-supply-cable.

(5) Remove the Film Harness ② and the two cores ③.

(6) Remove the screw ④ and remove the ACF Board ⑤.

(7) Remove the two screws ⑥ and remove the Plate PCB ⑦.

(8) Remove the two screws ⑧ and the five screws ⑨ and remove the Shield PCB Assy ⑩.

(9) Remove the screw ⑪ and the two screws ⑫ and remove the Control Board ⑬.

(10) Remove the two screws ⑭ and remove the Motor Fan ⑮.

(11) To install, follow the removal steps in the reverse order.

Notes on replacement:

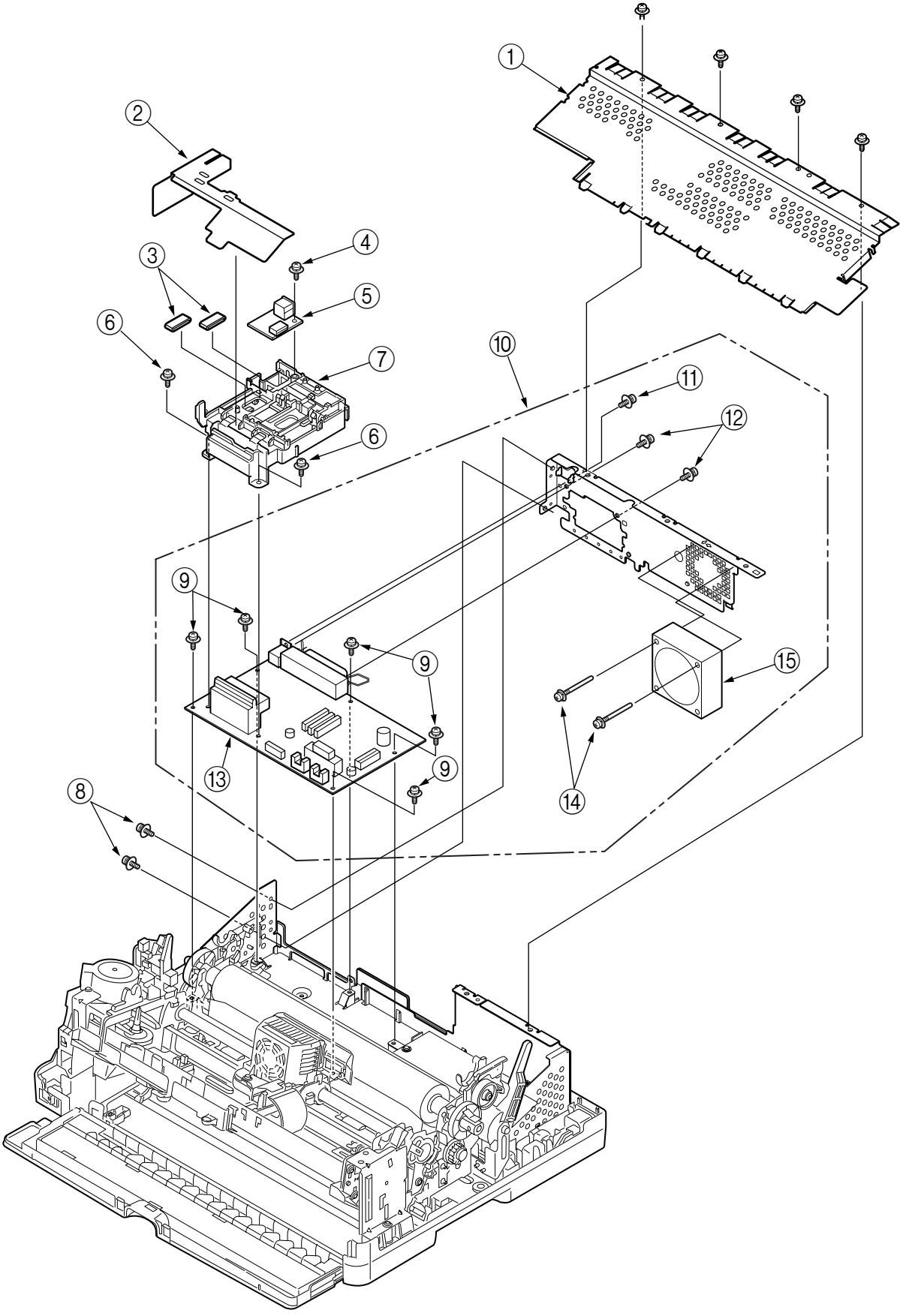
After replacing the Control Board, take the following steps to have the serial number of the printer unit written to the new Control Board.

1. Write the printer unit's serial number to the Control Board using a serial number registration utility. (For how to use the utility, see the operating manual of the utility.)
2. After writing is completed, run the printer menu, have the serial number printed, and check to make sure that it matches the serial number of the printer unit.

Running the printer menu: See 4.7.

Cautions after replacement:

Be sure to turn on the printer with no paper fed into the printer.
(If there is paper in the printer at power on, 6-2 alarm [Edge sensor alarm] occurs. When an edge alarm occurs, remove the paper from the printer and turn on again.)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3.3.21 Power supply UNIT (BOARD)

⚠Warning	Risk of Electric Shock	

There is a risk of electric shock during replacement of the power supply.

Use insulating gloves or avoid direct contact with any conducting part of the power supply, and caution should be exercised during replacement.

The capacitor may take one minute to complete discharge after the AC cable is unplugged. Also, there is a possibility that the capacitor doesn't discharge because of a breakage of the PCB, etc., so remember the possibility of electric shock to avoid electric shock.

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the Plate-shield-upper (four screws). (See 3.3.20)

(4) Remove the cord ② and the power cable ③ from the power supply ①.

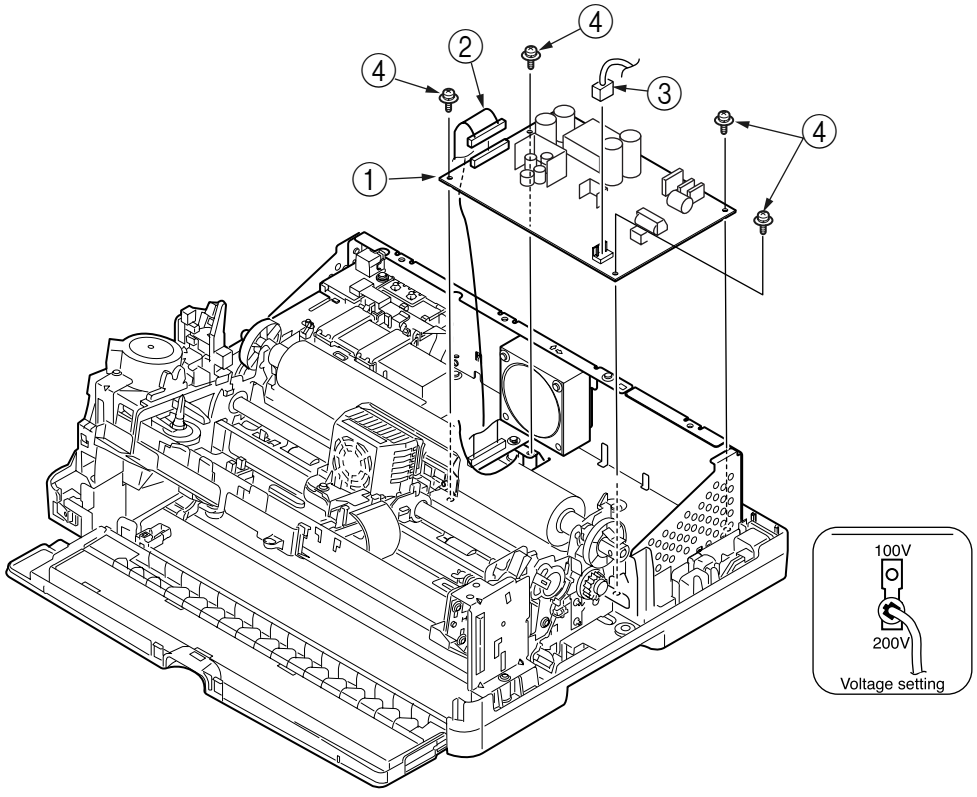
(5) Remove the four screws ④ and remove the power supply ①.

(6) To install, follow the removal steps in the reverse order.

Notes :

(1) Set the voltage setting pin as shown in the illustration.

(2) When AC voltage of 120V is input incorrectly under the 200V setting, or AC voltage of 200 V is input incorrectly under the 100V setting, the power supply unit will not operate (no power will be supplied).
If no power is supplied, immediately turn off the power and make the correct voltage settings.



3.3.22 Front-Roller-Feed

(1) Remove the pull-up roller Assy. (See 3.3.3)

(2) Remove the upper cover. (See 3.3.4)

(3) Remove the printer unit. (See 3.3.6)

(4) From the Cover-Motor, disconnect the Motor-SP-Cable, Head-cord, operation-panel-cable, Motor-LF-Cable, Ribbon-Motor-Cable and Gap-Sensor-cable.

(5) Remove the Cover Motor. (See 3.3.10)

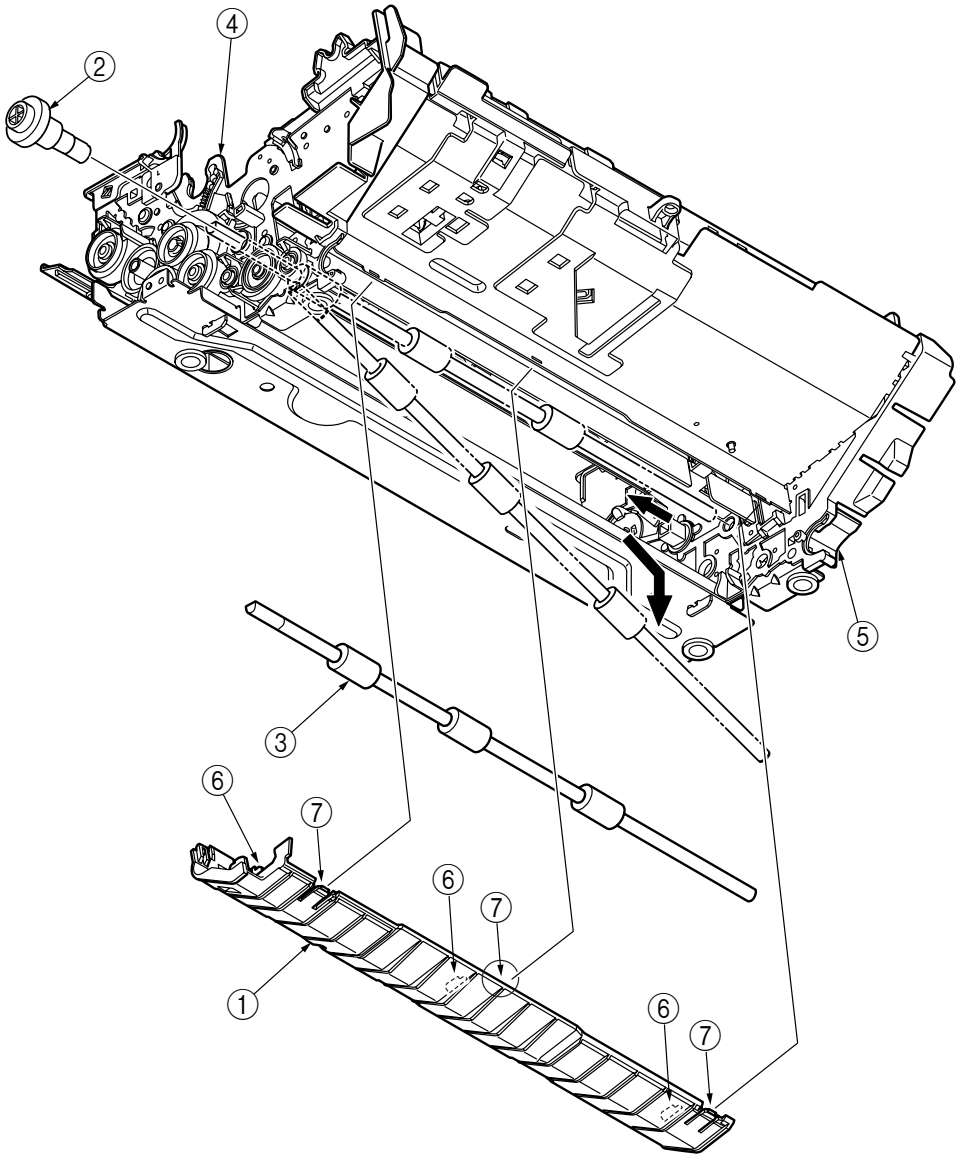
(6) Remove the Sheet-Guide-Front ①.

(7) Remove the Gear Feed ②.

(8) Slide the Roller-Feed-Front ③ leftward to disengage its end from the Side-Frame-Outside(R) ④, and then slide the rightward to disengage its end from the Side-Frame-Outside(L) ⑤

Notes :

(1) When assembling the front sheet guide, firmly insert the three latches ⑥ and the three latches ⑦ (four latches on a wide unit).



4. ADJUSTMENT

(1) Be sure to carry out this adjustment with the printer mechanism mounted on the lower cover.

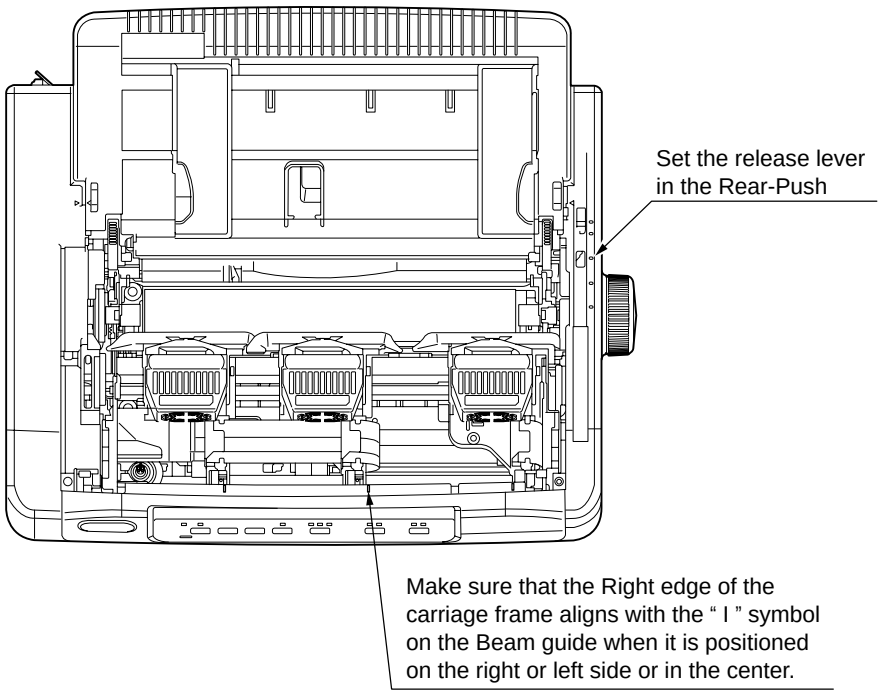
(2) Be sure to carry out this adjustment operation on a level and highly rigid work table (flatness: less than 0.039 inch or 1 mm) so as to minimize adjustment error.

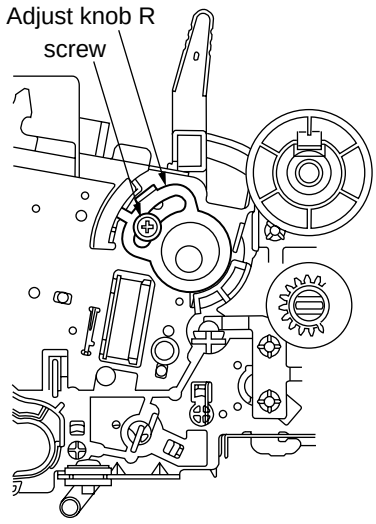
(3) Perform this adjustment at normal room temperature (20°C ± 5°C) and humidity.

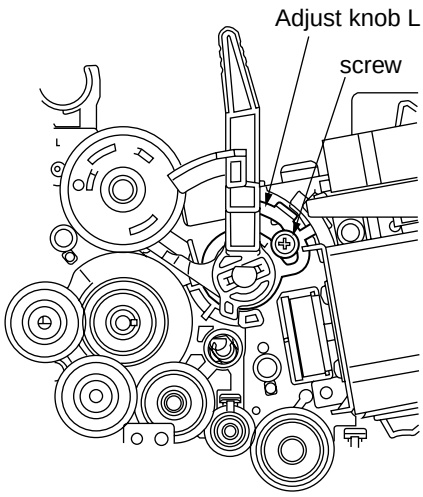
(4) Preparations

- Turn off the AC switch and disconnect the power cable.
- Remove the pull-up unit.
- Remove the tractor assy.
- Remove the sheet guide assy.
- Remove the upper cover.

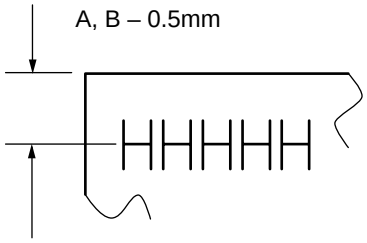
<table>
<tr><th>No.</th><th>Item</th><th>Specification</th><th>Drawing</th><th>Adjustment method</th></tr>
<tr><td>4.1-1</td><td>Gap between platen and print head</td><td></td><td></td><td><<Checking>>
Check the platen in three places: right and left ends and center.

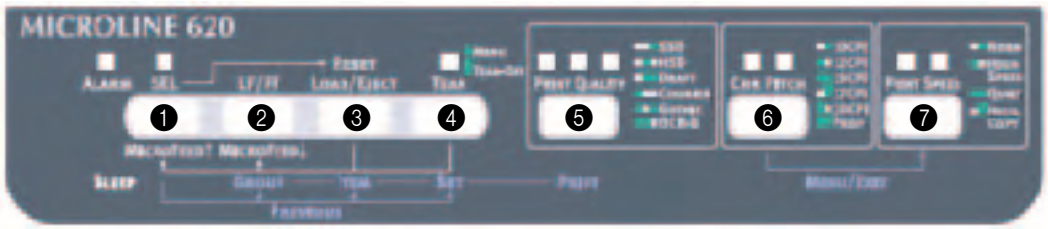
<<Adjustment procedure>>
(1) If the right and left platen gaps differ, unscrew, rotate the adjust knob on the right and left side of the printer forward or backward to adjust for the difference.
(2) Turn the adjustment lever into the range 1.
(3) Rotate the adjustment lever and unscrew the adjust knob forward or backward to adjust the right, left, and center gaps to the specified value.</td></tr>
<tr><td></td><td>Initial adjustment</td><td>0.36±0.03 mm</td><td></td><td></td></tr>
<tr><td></td><td colspan="3"> 



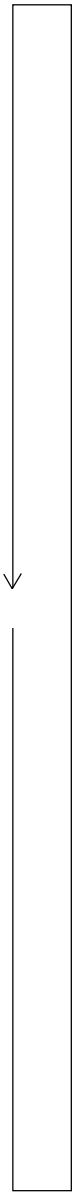
Side frame R


Side frame L</td><td></td></tr>
<tr><td>4.1-2</td><td>Measure variation of gap when range is changed.</td><td>Gap = 0.78±0.02 mm at the range 10.</td><td></td><td></td></tr>
</table>

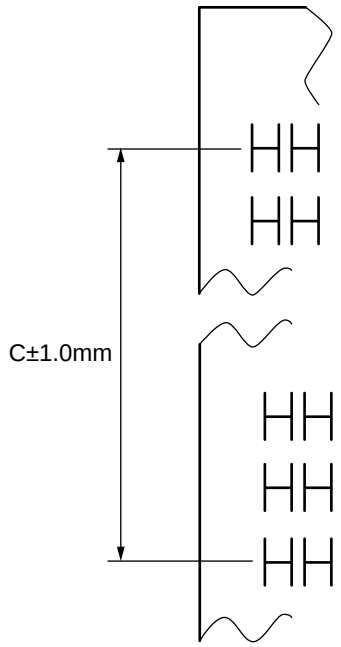
<table>
<tr><th>No.</th><th>Item</th><th>Specification</th><th>Drawing</th><th>Adjustment method</th></tr>
<tr><td>4.2</td><td>Paper top positioning distance check</td><td>Preset
± 0.5 mm</td><td>


<table>
<tr><th></th><th>Top position</th></tr>
<tr><td>Cut sheet (manual feed)</td><td>A±0.5mm</td></tr>
<tr><td>Continuous form (rear)</td><td>B±0.5mm</td></tr>
</table>
</td><td>(1) Set 1P-55 kg paper.
1. Set cut-sheet paper (manual feed) in the sheet guide.
2. Set continuous-form roll paper on the rear tractor or front tractor.
(2) Print the testing pattern.
While pushing ❷SW and ❸SW, power on.
While pushing ❷SW, push ❶SW (continu-ous-form)
While pushing ❷SW, push ❸SW (cut-sheet)
(3) Check to confirm that the top positioning distance is within the specified range.</td></tr>
<tr><td></td><td colspan="3"> 

ex) ML620 operation panel is shown.</td><td>(4) If this lies outside the specified range, correct as described below.</td></tr>
</table>

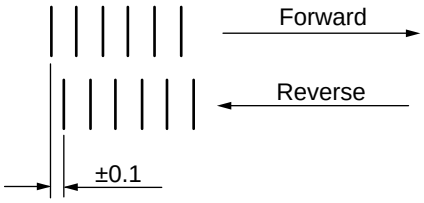
No.	Item	Specification	Drawing	Adjustment method
	Correcting the paper top positioning distance	Preset ± 0.5 mm		(1) Turn on power while holding down ❶SW and ❷SW. (2) While pushing ❶SW, push ❷SW. (3) Select a group Rear Feed (push) or Front Feed (push) or Cut sheet Top or Cut sheet Front while holding down ❷SW. (4) Select an item "TOF Adjust" while holding down ❸SW. (5) Pressing ❹SW will move the printing position 0.18 mm from the reference position. (When ❶SW and ❹SW are pressed simultaneously, the position will move -0.18mm.) (6) After making the corrections and while holding down ❻SW, press ❼SW simultaneously to register the correction value into printer memory.

Preset	Correction
+20	Move 20/144 inches (3.53 mm) down from the reference position.
+19	Move 19/144 inches (3.35 mm) down from the reference position.
+18	Move 18/144 inches (3.18 mm) down from the reference position.
+17	Move 17/144 inches (3.00 mm) down from the reference position.
+16	Move 16/144 inches (2.82 mm) down from the reference position.
+15	Move 15/144 inches (2.65 mm) down from the reference position.
+14	Move 14/144 inches (2.47 mm) down from the reference position.
+13	Move 13/144 inches (2.29 mm) down from the reference position.
+12	Move 12/144 inches (2.12 mm) down from the reference position.
+11	Move 11/144 inches (1.94 mm) down from the reference position.
+10	Move 10/144 inches (1.76 mm) down from the reference position.
+9	Move 9/144 inches (1.59 mm) down from the reference position.
+8	Move 8/144 inches (1.41 mm) down from the reference position.
+7	Move 7/144 inches (1.23 mm) down from the reference position.
+6	Move 6/144 inches (1.06 mm) down from the reference position.
+5	Move 5/144 inches (0.88 mm) down from the reference position.
+4	Move 4/144 inches (0.71 mm) down from the reference position.
+3	Move 3/144 inches (0.53 mm) down from the reference position.
+2	Move 2/144 inches (0.35 mm) down from the reference position.
+1	Move 1/144 inches (0.18 mm) down from the reference position.
0	Reference position
-1	Move 1/144 inches (0.18 mm) up from the reference position.
-2	Move 2/144 inches (0.35 mm) up from the reference position.
-3	Move 3/144 inches (0.53 mm) up from the reference position.
-4	Move 4/144 inches (0.71 mm) up from the reference position.
-5	Move 5/144 inches (0.88 mm) up from the reference position.
-6	Move 6/144 inches (1.06 mm) up from the reference position.
-7	Move 7/144 inches (1.23mm) up from the reference position.
-8	Move 8/144 inches (1.41 mm) up from the reference position.
-9	Move 9/144 inches (1.59 mm) up from the reference position.
-10	Move 10/144 inches (1.76 mm) up from the reference position.
-11	Move 11/144 inches (1.94 mm) up from the reference position.
-12	Move 12/144 inches (2.12 mm) up from the reference position.
-13	Move 13/144 inches (2.29 mm) up from the reference position.
-14	Move 14/144 inches (2.47 mm) up from the reference position.
-15	Move 15/144 inches (2.65 mm) up from the reference position.
-16	Move 16/144 inches (2.82 mm) up from the reference position.
-17	Move 17/144 inches (3.00 mm) up from the reference position.
-18	Move 18/144 inches (3.18 mm) up from the reference position.
-19	Move 19/144 inches (3.35 mm) up from the reference position.
-20	Move 20/144 inches (3.53 mm) up from the reference position.

No.	Item	Specification	Drawing	Adjustment method
4.3	Correcting cut-sheet 40-line feed height	C ± 0.5 mm	 C=4.233 × 39=165.09mm	(1) Set cut-sheet (manual feed) A4-55 kg paper in the sheet guide. (2) While pushing ❷SW and ❸SW, push power on. While pushing ❷SW, push ❸SW. (3) Check to confirm that the 40-line feed height is within the specified range. (4) If this lies outside the specified range, correct as described below.

Preset	Correction
+14	Move 1.22 mm forward from the reference position.
+13	Move 1.12 mm forward from the reference position.
+12	Move 1.06 mm forward from the reference position.
+11	Move 0.94 mm forward from the reference position.
+10	Move 0.88 mm forward from the reference position.
+9	Move 0.76 mm forward from the reference position.
+8	Move 0.71 mm forward from the reference position.
+7	Move 0.59 mm forward from the reference position.
+6	Move 0.53 mm forward from the reference position.
+5	Move 0.41 mm forward from the reference position.
+4	Move 0.35 mm forward from the reference position.
+3	Move 0.24 mm forward from the reference position.
+2	Move 0.18 mm forward from the reference position.
+1	Move 0.06 mm forward from the reference position.
0	Reference position
-1	Move 0.06 mm back from the reference position.
-2	Move 0.18 mm back from the reference position.
-3	Move 0.24 mm back from the reference position.
-4	Move 0.35 mm back from the reference position.
-5	Move 0.41 mm back from the reference position.
-6	Move 0.53 mm back from the reference position.
-7	Move 0.59 mm back from the reference position.
-8	Move 0.71 mm back from the reference position.
-9	Move 0.76 mm back from the reference position.
-10	Move 0.88 mm back from the reference position.
-11	Move 0.94 mm back from the reference position.
-12	Move 1.06 mm back from the reference position.
-13	Move 1.12 mm back from the reference position.
-14	Move 1.22 mm back from the reference position.

(1) Turn on power while holding down ❶SW and ❷SW.
(2) While pushing ❶SW, push ❷SW.
(3) Select a group Cut sheet Top or Cut sheet Front, while holding down ❷SW.
(4) Select an item LF Revise, while holding down ❸SW.
(5) Press ❹SW to move the printing position 1 pitch from the reference position. (When ❶SW and ❹SW are pressed simultaneously, the position will move -1 pitch.)
(6) After making the correction and while holding down ❻SW, press ❼SW simultaneously to register the correction value in printer memory.

No.	Item	Specification	Drawing	Adjustment method
4.4	Correcting both-direction print registration	Within ± 0.1 mm	 Correct print registration in the forward direction if the output is reversed. Check the registration both on a cut sheet and a continuous form.	(1) Set paper with 55 kg ream weight. (2) Turn on power while holding down ❷SW and ❸SW. (3) While pushing ❶SW, push ❹SW the regist pattern. Push ❸SW, and confirm Registration 1 to 4. Check to confirm that the horizontal registration error is within the specified range.

Preset	Correction
+10	Move 0.35 mm to the right from the reference position.
+9	Move 0.32 mm to the right from the reference position.
+8	Move 0.28 mm to the right from the reference position.
+7	Move 0.25 mm to the right from the reference position.
+6	Move 0.21 mm to the right from the reference position.
+5	Move 0.18 mm to the right from the reference position.
+4	Move 0.14 mm to the right from the reference position.
+3	Move 0.11 mm to the right from the reference position.
+2	Move 0.07 mm to the right from the reference position.
+1	Move 0.04 mm to the right from the reference position.
0	Reference position
-1	Move 0.04 mm to the left from the reference position.
-2	Move 0.07 mm to the left from the reference position.
-3	Move 0.11 mm to the left from the reference position.
-4	Move 0.14 mm to the left from the reference position.
-5	Move 0.18 mm to the left from the reference position.
-6	Move 0.21 mm to the left from the reference position.
-7	Move 0.25 mm to the left from the reference position.
-8	Move 0.28 mm to the left from the reference position.
-9	Move 0.32 mm to the left from the reference position.
-10	Move 0.35 mm to the left from the reference position.

If this lies outside the specified range;

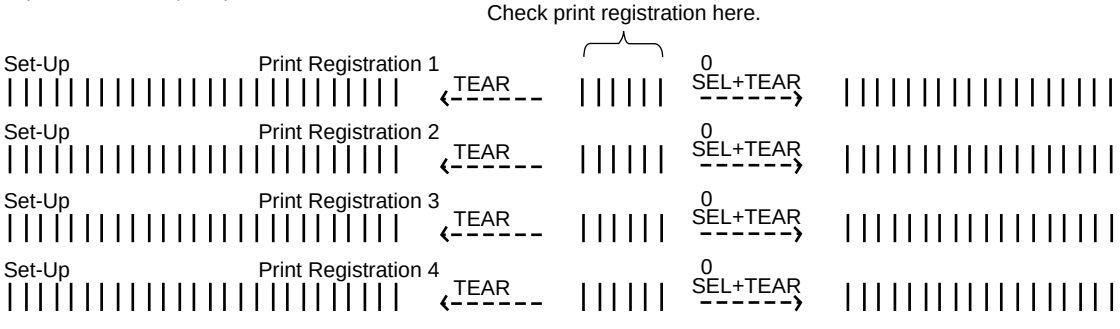
While pushing ❶SW, push ❷SW.

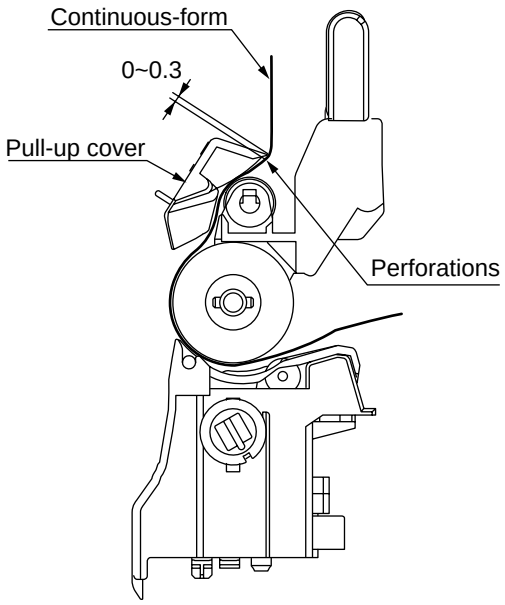
(1) Pressing ❹SW will move the printing position +0.035 mm from the reference position.

(Pressing ❶SW and ❹SW simultaneously will shift the position -0.035 mm.)

(2) After making the corrections and while holding down ❻SW, press ❼SW simultaneously to register the correction value into printer memory.

ex) ML 620 menu print pattern is shown.



No.	Item	Specification	Drawing	Adjustment method
4.5	Paper cut position check	0~0.3 mm		(1) Set a continuous-form roll (1P-55 kg, 10 inches) on the rear tractor or Front tractor. (2) Press Power SW. (3) Press ❸SW to feed paper into the printer. Continue pressing ❹SW to feed paper farther into the paper cut position. Check to confirm that the perforations are positioned within the specified range. If they lie outside the specified range, perform the correction below.

<table>
<tr><th>No.</th><th>Item</th><th>Specification</th><th>Drawing</th><th>Adjustment method</th></tr>
<tr>
<td>4.5</td>
<td>Correcting paper cut position
 </td>
<td>0~0.3 mm
<table>
<tr><th></th><th>Correction</th></tr>
<tr><td>+20</td><td>Move 20/144 inches (3.53 mm) down from the reference position.</td></tr>
<tr><td>+19</td><td>Move 19/144 inches (3.35 mm) down from the reference position.</td></tr>
<tr><td>+18</td><td>Move 18/144 inches (3.18 mm) down from the reference position.</td></tr>
<tr><td>+17</td><td>Move 17/144 inches (3.00 mm) down from the reference position.</td></tr>
<tr><td>+16</td><td>Move 16/144 inches (2.82 mm) down from the reference position.</td></tr>
<tr><td>+15</td><td>Move 15/144 inches (2.65 mm) down from the reference position.</td></tr>
<tr><td>+14</td><td>Move 14/144 inches (2.47 mm) down from the reference position.</td></tr>
<tr><td>+13</td><td>Move 13/144 inches (2.29 mm) down from the reference position.</td></tr>
<tr><td>+12</td><td>Move 12/144 inches (2.12 mm) down from the reference position.</td></tr>
<tr><td>+11</td><td>Move 11/144 inches (1.94 mm) down from the reference position.</td></tr>
<tr><td>+10</td><td>Move 10/144 inches (1.76 mm) down from the reference position.</td></tr>
<tr><td>+9</td><td>Move 9/144 inches (1.59 mm) down from the reference position.</td></tr>
<tr><td>+8</td><td>Move 8/144 inches (1.41 mm) down from the reference position.</td></tr>
<tr><td>+7</td><td>Move 7/144 inches (1.23 mm) down from the reference position.</td></tr>
<tr><td>+6</td><td>Move 6/144 inches (1.06 mm) down from the reference position.</td></tr>
<tr><td>+5</td><td>Move 5/144 inches (0.88 mm) down from the reference position.</td></tr>
<tr><td>+4</td><td>Move 4/144 inches (0.71 mm) down from the reference position.</td></tr>
<tr><td>+3</td><td>Move 3/144 inches (0.53 mm) down from the reference position.</td></tr>
<tr><td>+2</td><td>Move 2/144 inches (0.35 mm) down from the reference position.</td></tr>
<tr><td>+1</td><td>Move 1/144 inches (0.18 mm) down from the reference position.</td></tr>
<tr><td>0</td><td>Reference position</td></tr>
<tr><td>-1</td><td>Move 1/144 inches (0.18 mm) up from the reference position.</td></tr>
<tr><td>-2</td><td>Move 2/144 inches (0.35 mm) up from the reference position.</td></tr>
<tr><td>-3</td><td>Move 3/144 inches (0.53 mm) up from the reference position.</td></tr>
<tr><td>-4</td><td>Move 4/144 inches (0.71 mm) up from the reference position.</td></tr>
<tr><td>-5</td><td>Move 5/144 inches (0.88 mm) up from the reference position.</td></tr>
<tr><td>-6</td><td>Move 6/144 inches (1.06 mm) up from the reference position.</td></tr>
<tr><td>-7</td><td>Move 7/144 inches (1.23mm) up from the reference position.</td></tr>
<tr><td>-8</td><td>Move 8/144 inches (1.41 mm) up from the reference position.</td></tr>
<tr><td>-9</td><td>Move 9/144 inches (1.59 mm) up from the reference position.</td></tr>
<tr><td>-10</td><td>Move 10/144 inches (1.76 mm) up from the reference position.</td></tr>
<tr><td>-11</td><td>Move 11/144 inches (1.94 mm) up from the reference position.</td></tr>
<tr><td>-12</td><td>Move 12/144 inches (2.12 mm) up from the reference position.</td></tr>
<tr><td>-13</td><td>Move 13/144 inches (2.29 mm) up from the reference position.</td></tr>
<tr><td>-14</td><td>Move 14/144 inches (2.47 mm) up from the reference position.</td></tr>
<tr><td>-15</td><td>Move 15/144 inches (2.65 mm) up from the reference position.</td></tr>
<tr><td>-16</td><td>Move 16/144 inches (2.82 mm) up from the reference position.</td></tr>
<tr><td>-17</td><td>Move 17/144 inches (3.00 mm) up from the reference position.</td></tr>
<tr><td>-18</td><td>Move 18/144 inches (3.18 mm) up from the reference position.</td></tr>
<tr><td>-19</td><td>Move 19/144 inches (3.35 mm) up from the reference position.</td></tr>
<tr><td>-20</td><td>Move 20/144 inches (3.53 mm) up from the reference position.</td></tr>
</table>
</td>
<td>(1) Turn on power while holding down ❶SW and ❷SW.
(2) While pushing ❶SW, push ❷SW.
(3) Select a group Rear Feed (push) or Front Feed (push) or Cut sheet Top or Cut sheet Front while holding down ❷SW.
(4) Select on item "Cut Position Adjust" whild holding down ❸SW
(5) Pressing ❹SW will move the printing position 0.05 mm from the reference position.
(When ❶SW and ❹SW are pressed simultareously the position will move -0.14mm)
(6) After making the corrections and while holding down ❻SW, press ❼SW simultaneously to register the correction value into printer memory.</td>
</tr>
</table>

No.	Item	Specification	Adjustment method
4.6	Slice level check		(1) Set the following states · Set the adjust lever to 1 range. · Set the release lever to the cut position. · Remove the paper. · Remove the ribbon cassette. (2) Turn on power while holding down ❶SW, ❷SW and ❸SW. (3) While pushing ❸SW, push ❷SW. (4) Carriage operates and check the slice level. (5) Turn off the power, when the operation of carriage ends.
4.7	Check the Serial Number		Check the serial number of the printer unit written to the control board in 3.3.20. The procedure to check the serial number is described below. (1) Turn the printer off. (2) Press and hold down the ❶SW and ❷SW at the same time while turning the printer on. The SEL light will flash. (3) Press and hold down the ❶SW and then press the ❷SW. (4) Check the printed menu in the following format for the serial number of the printer unit written to the control board. <Print format> ML620 MEI A F/W 01.00 44203201YR-01 LD 01.00 S/N : AK0703202 ← Check the serial number here. Menu Print? (Configuration #1) : : : (5) Check to make sure that the serial number printed in (4) and the one labeled on the printer unit are the same. If the serial number is not printed or the serial numbers do not match, write the serial number to the control board again using a serial number writing tool.

5. CLEANING AND LUBRICATION

5.1 Cleaning

[Cautions]

1. Be sure to turn OFF the AC POWER switch before cleaning. Remove the AC power cord from the printer.
2. Avoid dust inside the printer mechanism when cleaning.
3. If a lubricated part has been cleaned, be sure to apply lubricating oil to that portion after cleaning.

   (1) Cleaning time

   When the equipment operating time has reached six months or 300 hours, whichever comes first.

   (2) Cleaning tools

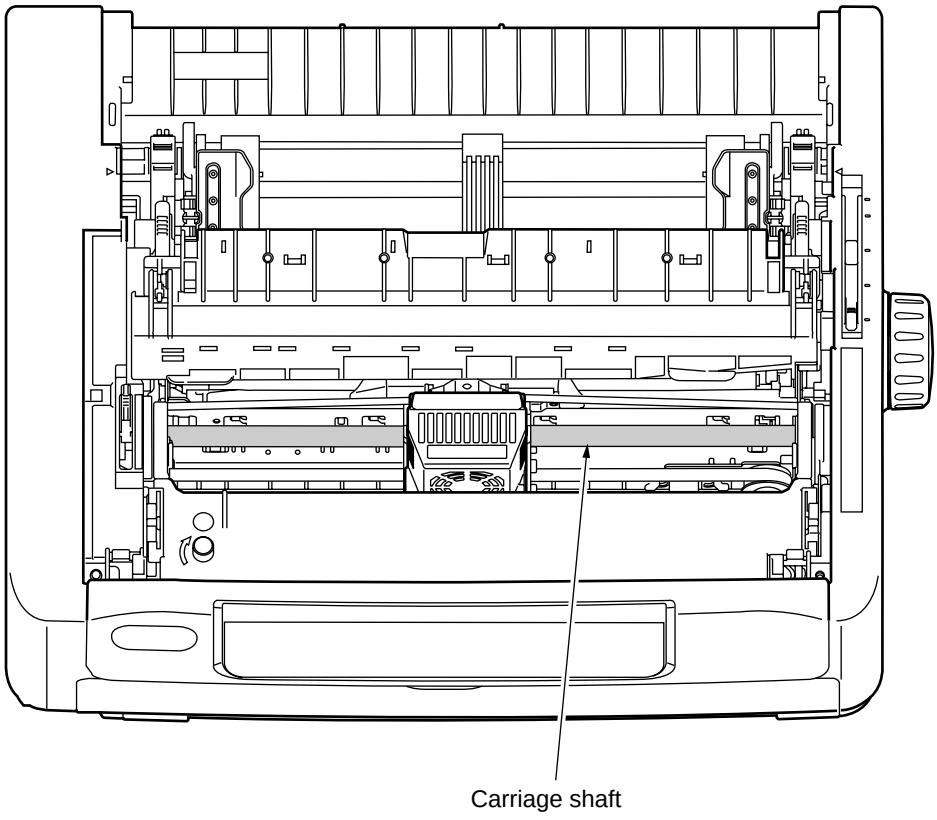
   Dry cloth (soft cloth such as gauze), vacuum cleaner

   (3) Places to be cleaned

   Table 5.1 lists the places to be cleaned:

Table 5.1

Place to be cleaned	Cleaning procedure
Carriage shaft and the vicinity Paper travel surface	Remove paper waste and wipe off stain, dust, ribbon waste. etc.



5.2 Lubrication

This printer is designed to be maintenance free and requires no lubrication during normal operation. However it is necessary to apply lubricant in case the printer is disassembled, reassembled, cleaned or parts have been changed.

(1) Cleaning time

Remarks:

1) Turn off the power before cleaning.

2) Make sure that paper dust will not fall inside of the machine.

- Cleaning period:

  6 months of operation or 300 hours of operation, whichever the earlier.

- Cleaning points:

  Carriage shaft and surroundings: → Remove paper and ribbon dust.

  Paper path: → Clean stains and dusts.

  Paper End Sensor: → Remove the dust on the Sensor.

(2) Lubricant

- Alvania grease or equivalent: GEP
- Pan motor oil (or equivalent): PM

(3) Amount of lubricant

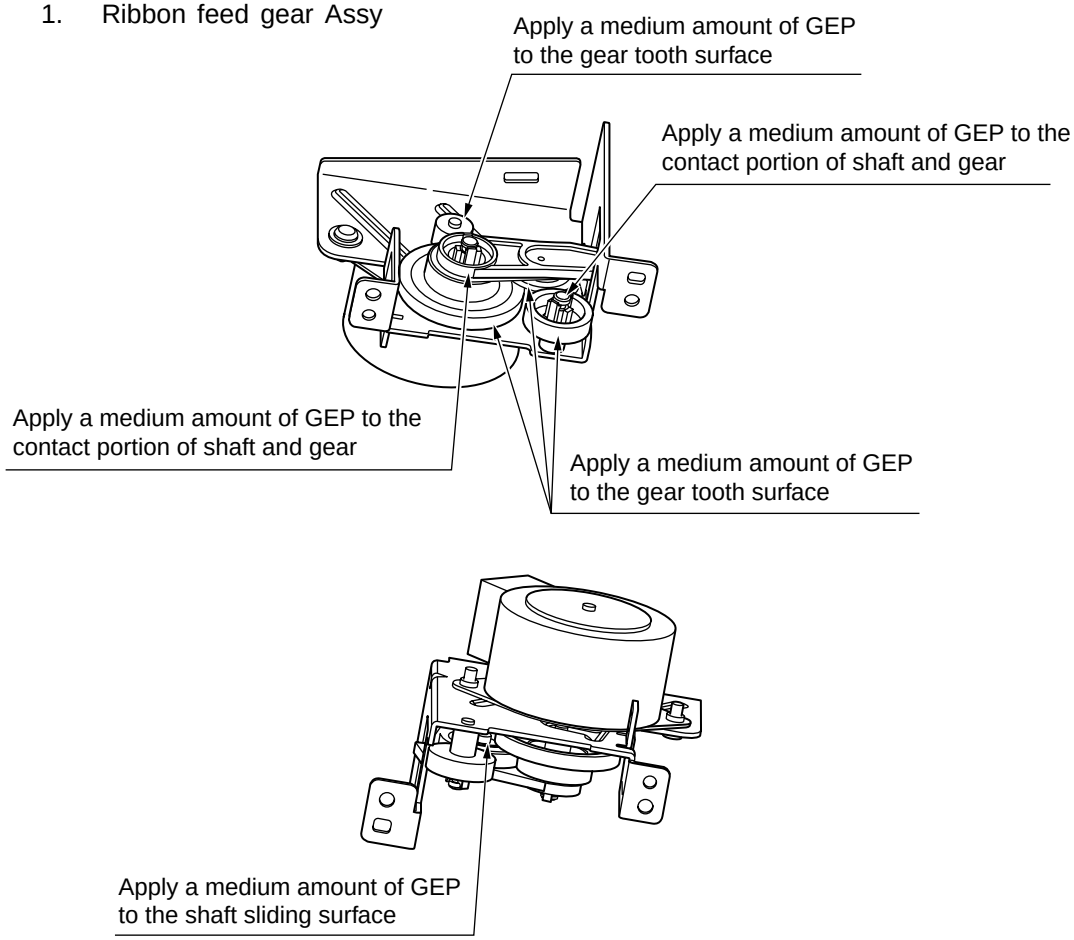
- Medium amount A : Apply three to four drops of oil, or 0.008 inch (0.2 mm) thick grease.
- Small amount B : Apply one drop of oil (0.006±0.002 g)

(4) Areas to Avoid

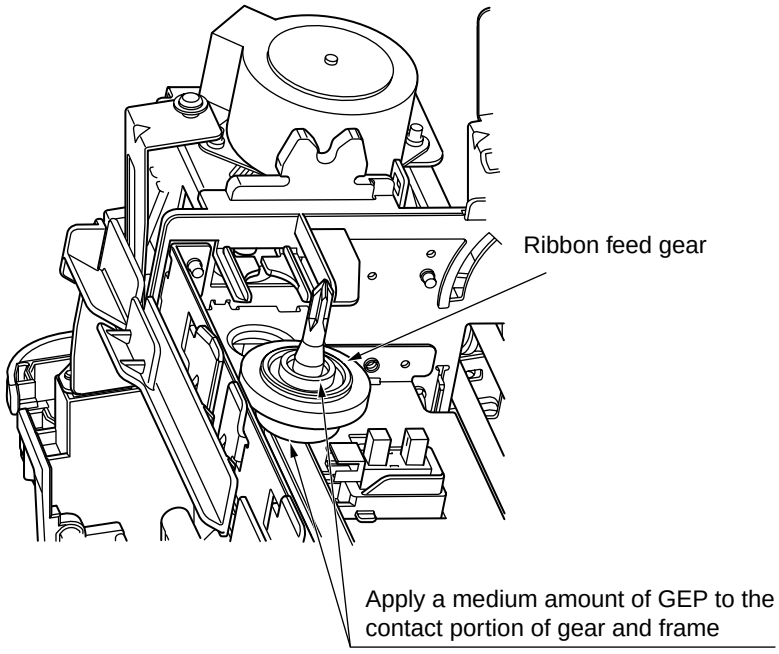
No.	Prohibited areas	Reason	Remarks
1	Platen surface	To keep paper clean	
2	Pull roller surface	To keep paper clean To prevent paper feed errors	Be careful to avoid applying lubricant to the roller surface when lubricating the fulcrum of the pressure roller.
3	Paper running surface of paper pan Paper running surface of tractor assy Paper running surface of pull roller unit Paper running surface of ribbon protector	To keep paper clean To prevent paper feed errors	
4	Ink ribbon	To prevent printing errors	
5	Pin tractor	To keep paper clean	
6	Flexible cable	To prevent cracks in the cable To prevent contact faillure	
7	Motor	To prevent contact faillure	
8	Connectors and terminals	To prevent contact faillure	
9	Micro switch	To prevent contact faillure	
10	Carriage shaft	To secure Carriage run load	
11	Sliding surface of piece slider	To prevent paper dust from attaching	
12	Sliding surface of guide beam	To prevent paper dust from attaching	

(5) Lubrication point

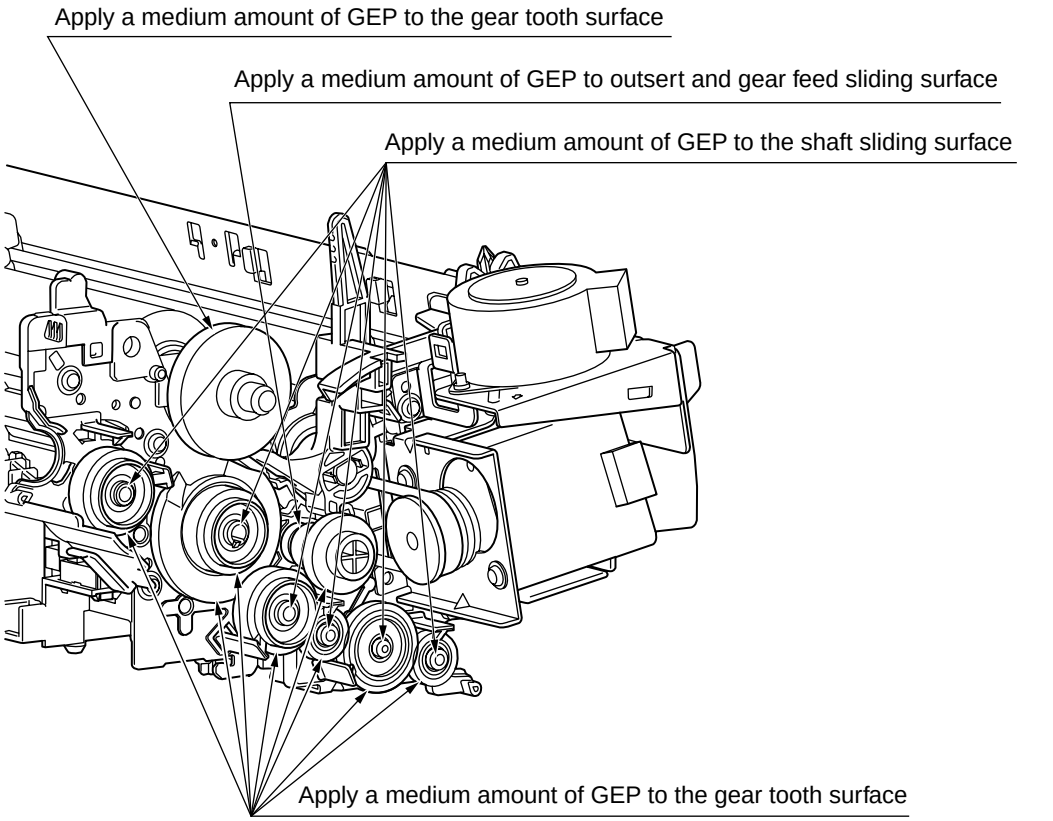
1. Ribbon feed gear Assy

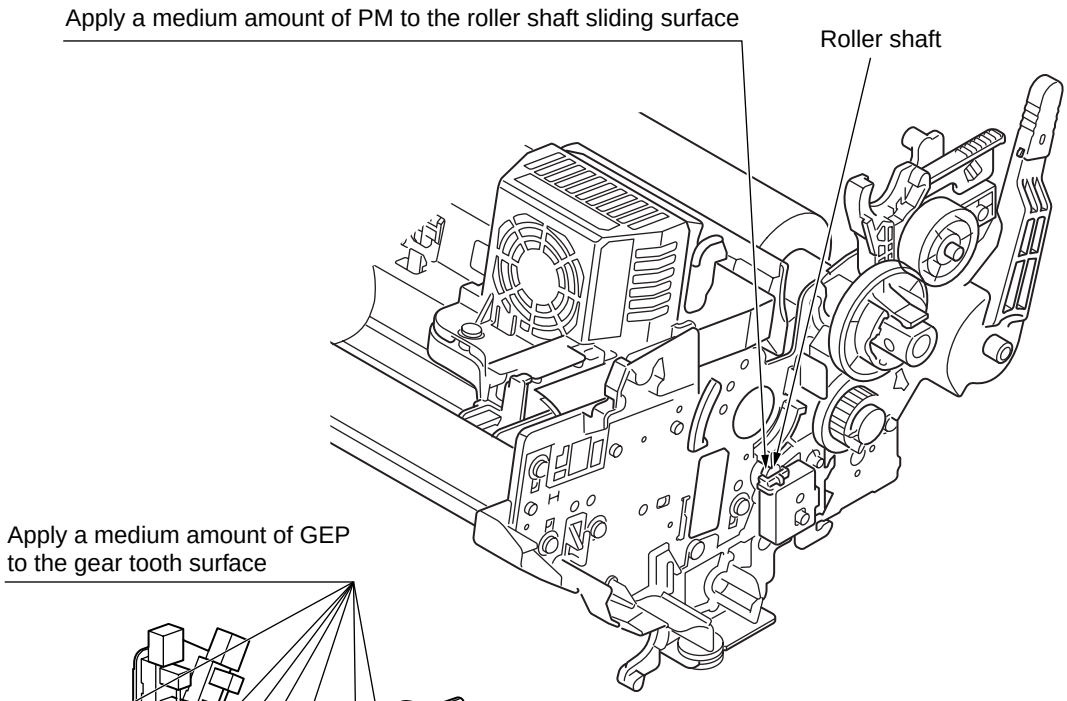


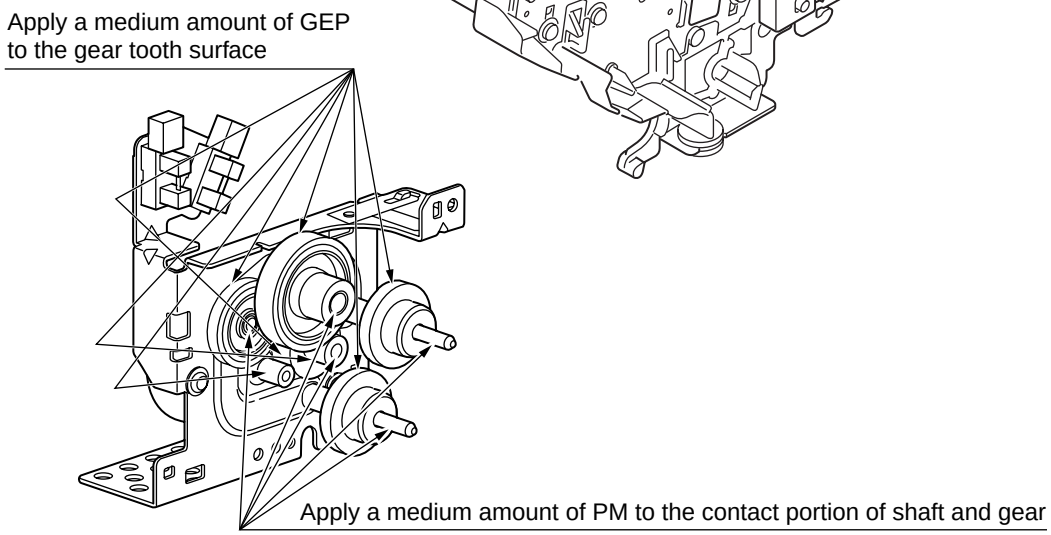
2. Ribbon feed gear



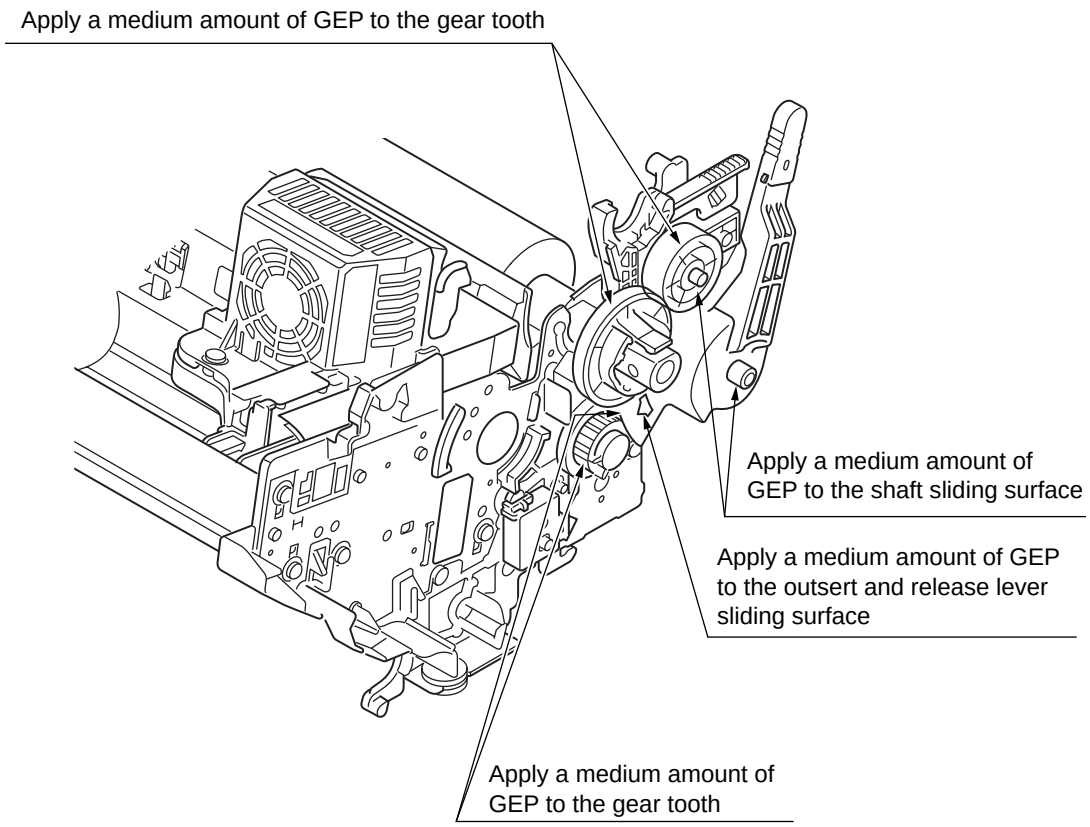
3. LF drive system and Gear Platen

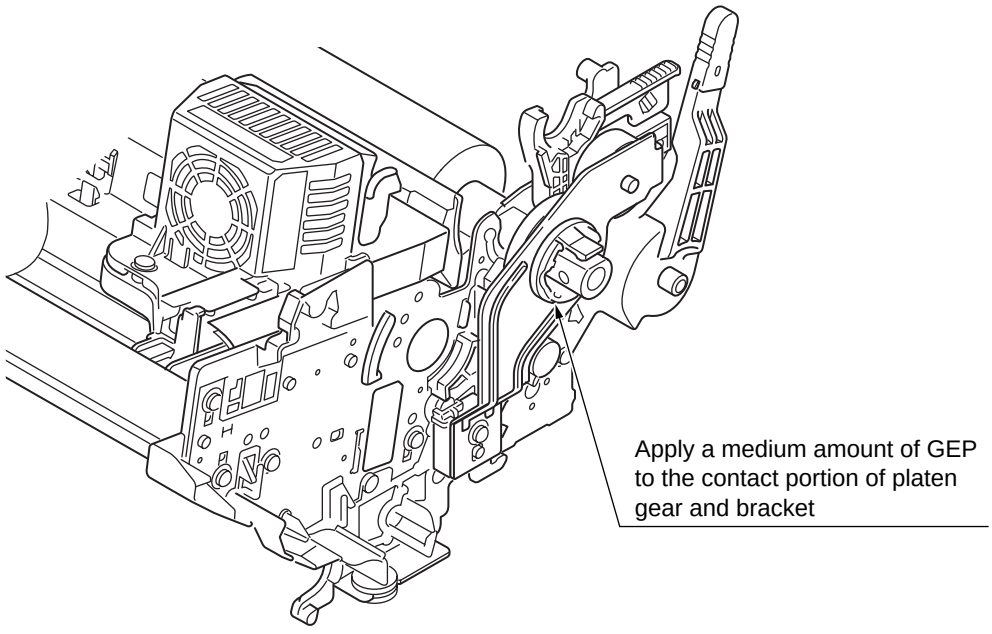


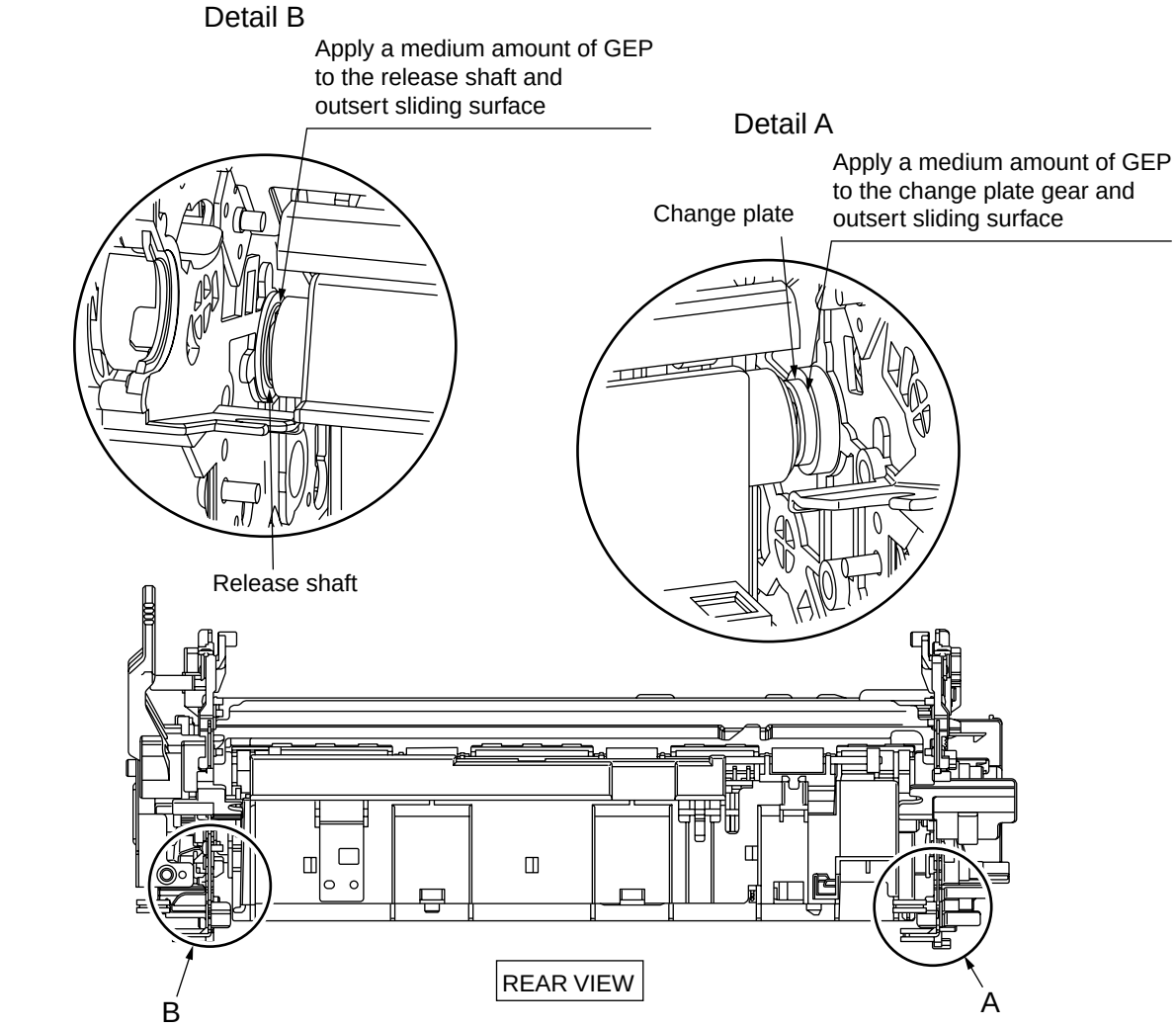




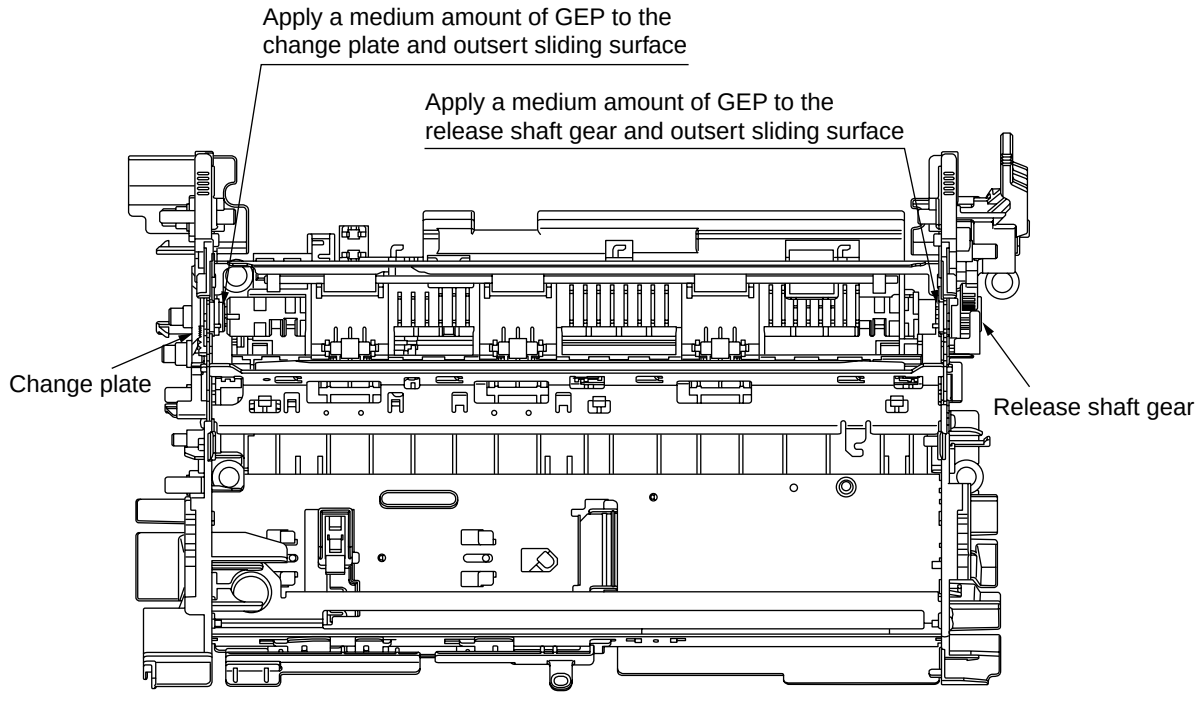
4. Mode change Assy and Gear Platen



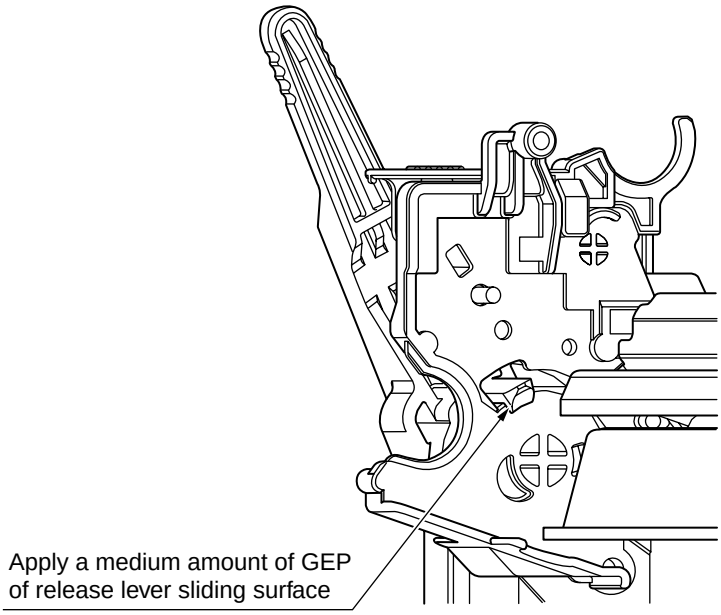




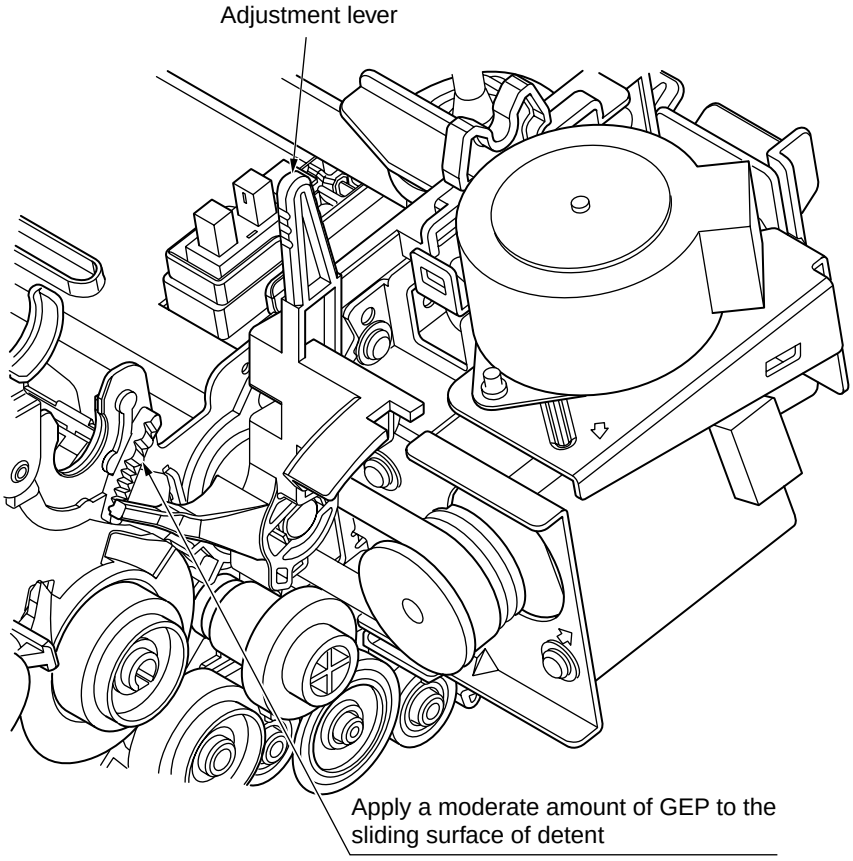
REAR VIEW



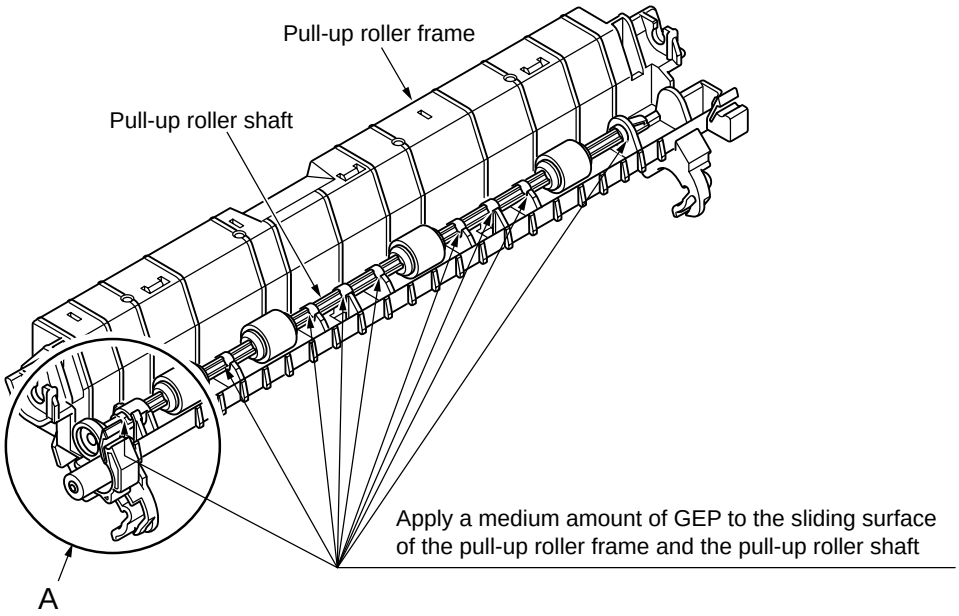
TOP VIEW



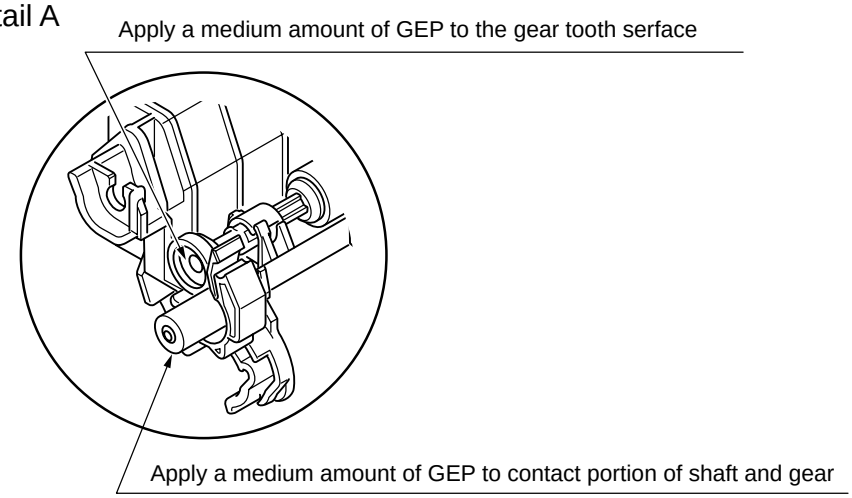
5. Adjustment lever

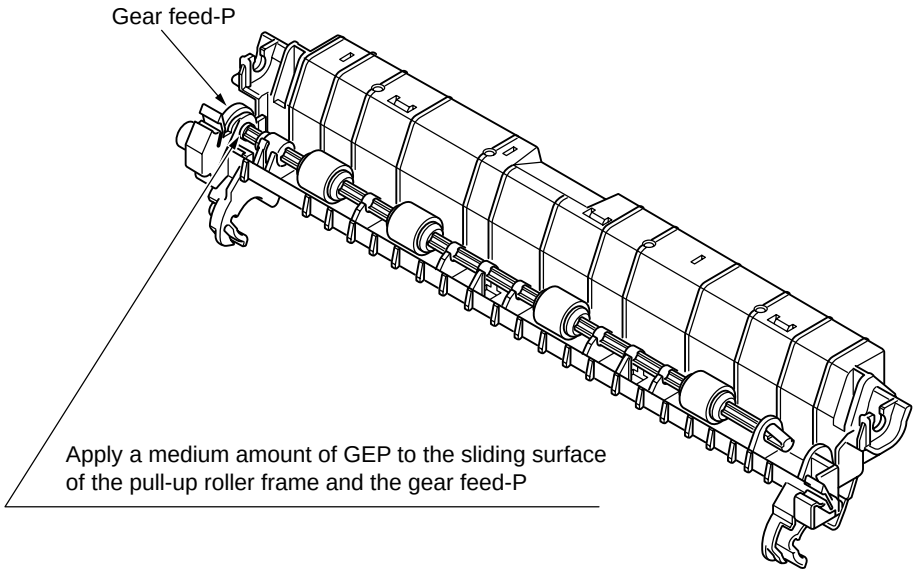


6. Pull-up-Roller-Assy



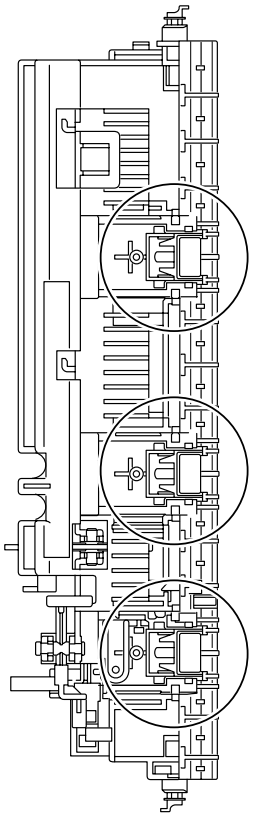
Detail A



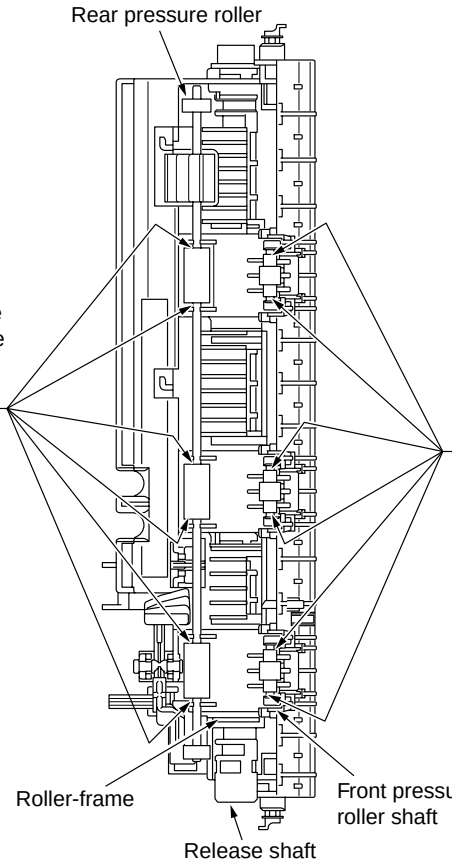


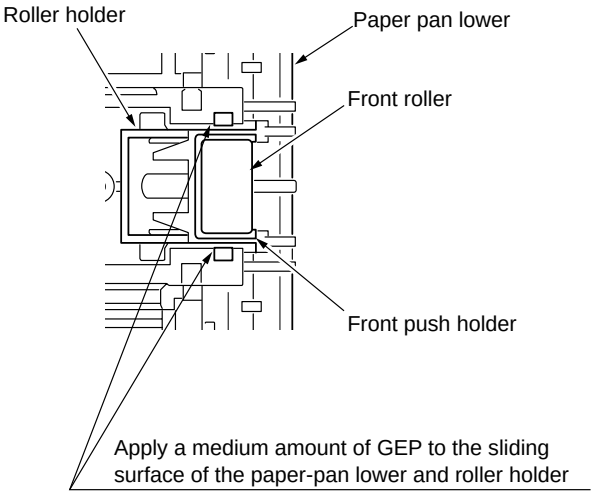
7. Paper-Pan-Assy

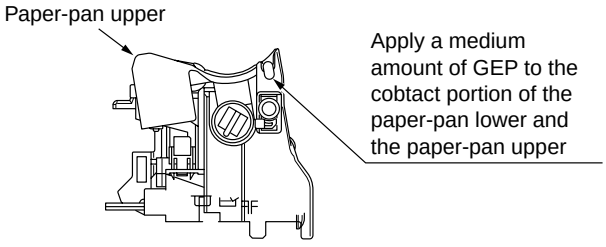
TOP VIEW
(without roller frame, pressure roller rear and release shaft)

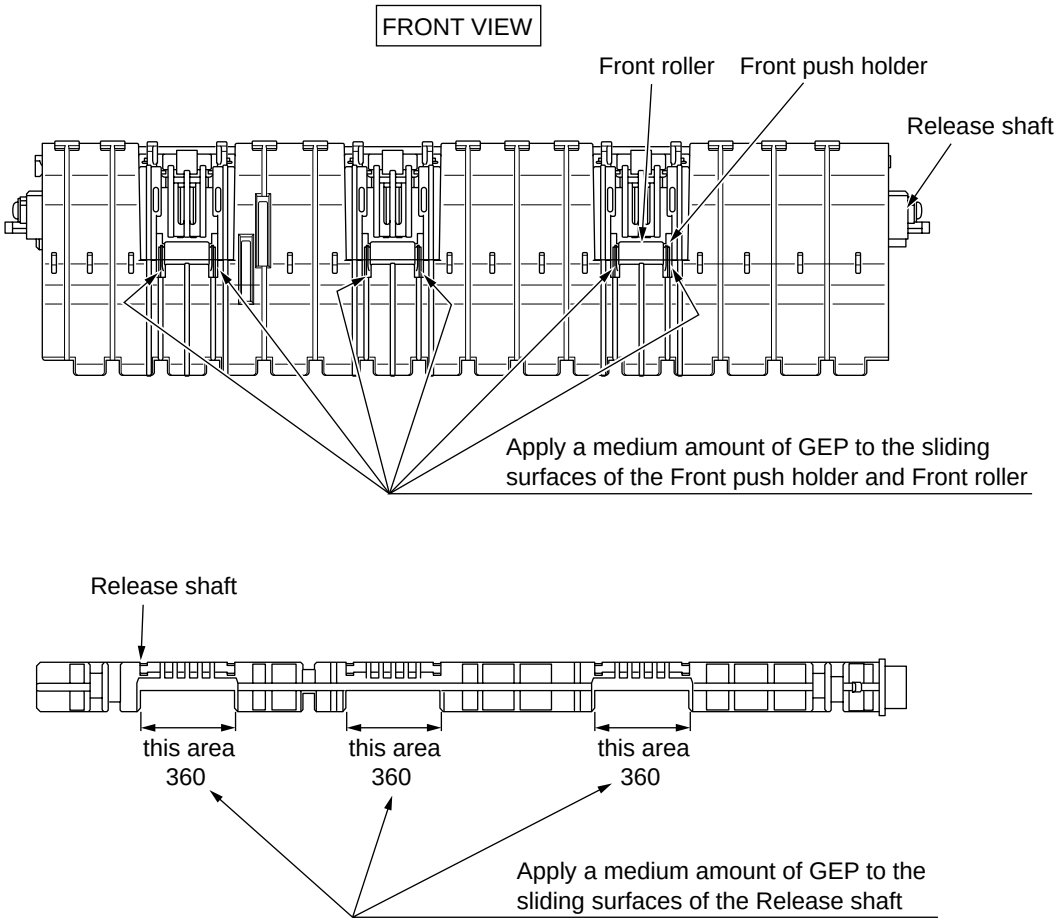


TOP VIEW
(with roller frame, pressure roller rear and release shaft)

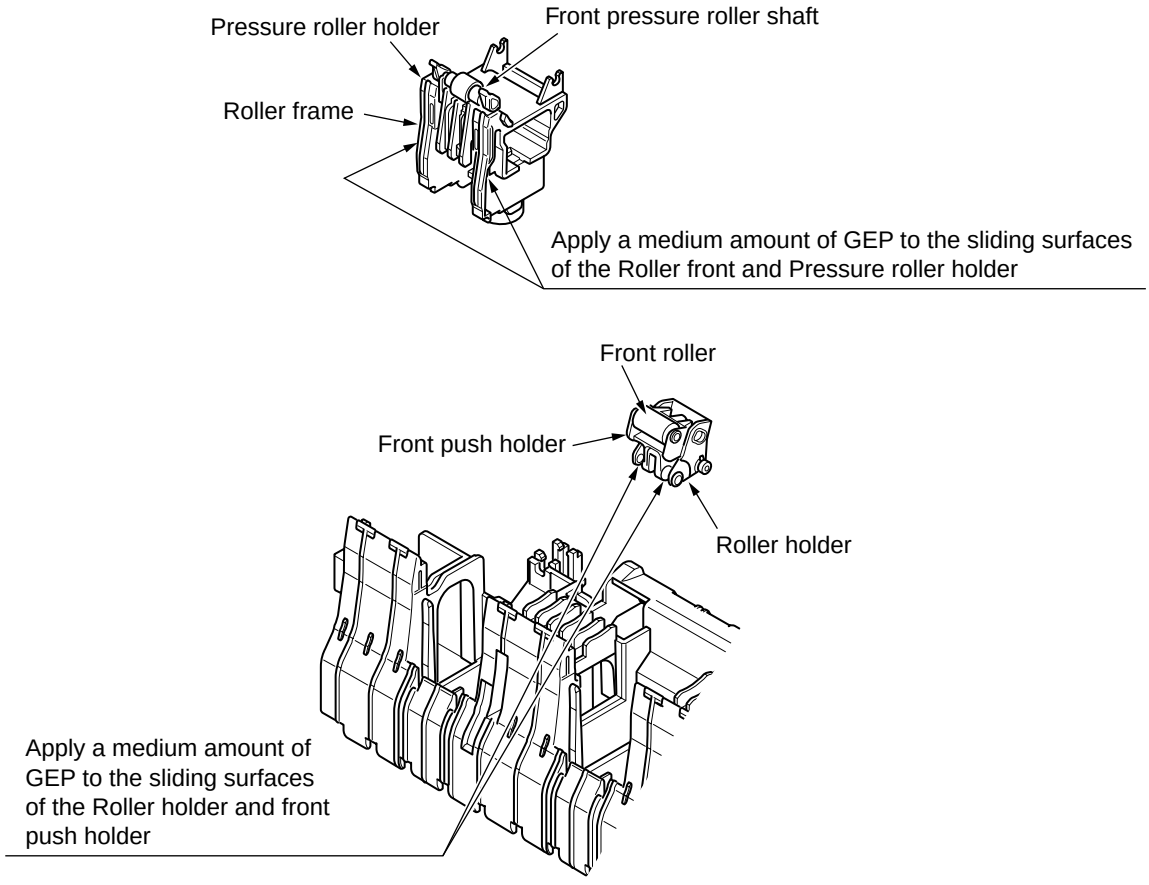


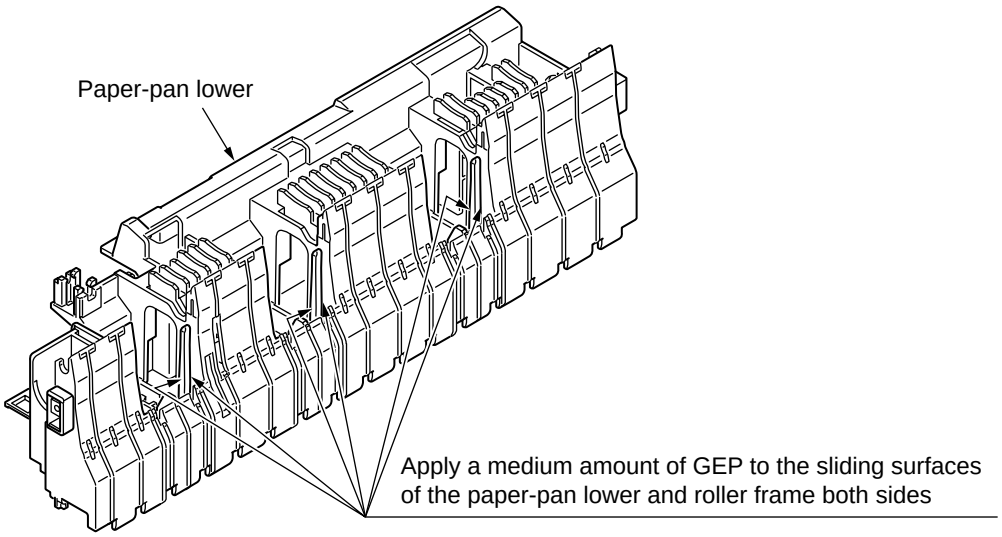


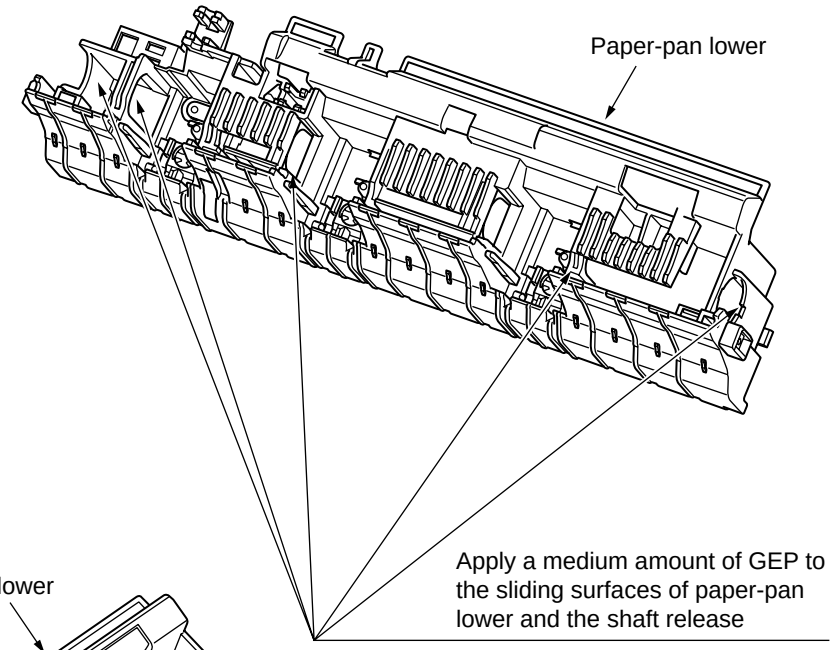


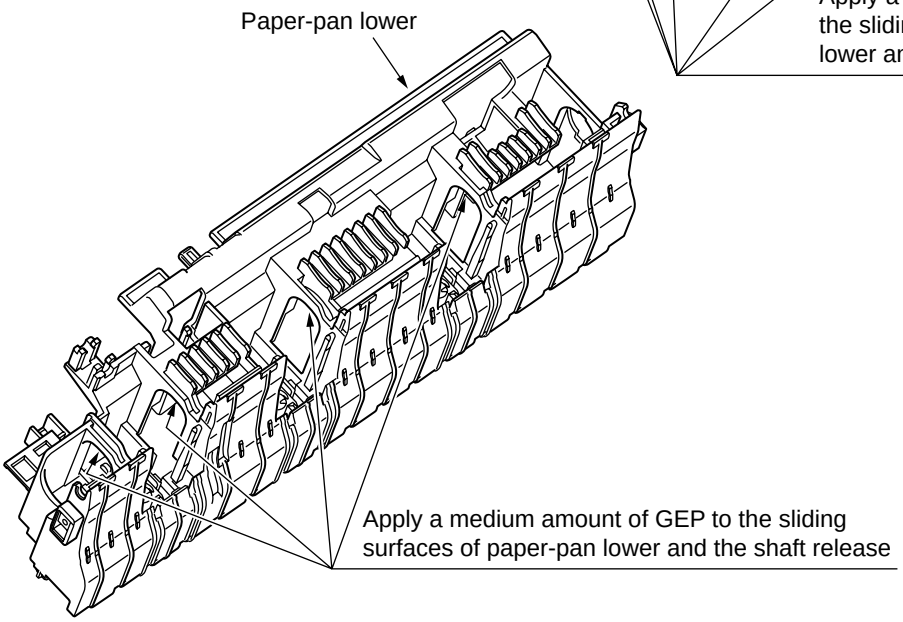


Roller frame (Narrow version: 3, Wide version: 5)

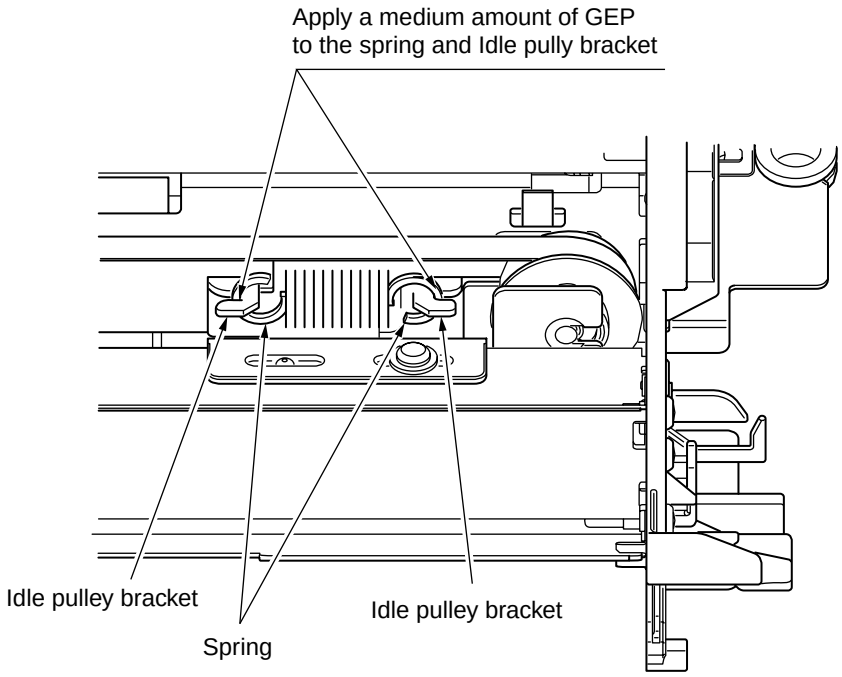



Paper-pan lower
Apply a medium amount of GEP to the sliding surfaces of the paper-pan lower and roller frame both sides


Paper-pan lower
Apply a medium amount of GEP to the sliding surfaces of paper-pan lower and the shaft release


Paper-pan lower
Apply a medium amount of GEP to the sliding surfaces of paper-pan lower and the shaft release

8. Idle pulley bracket



6. TROUBLESHOOTING AND REPAIR

6.1 Items to Check Before Repair

(1) Check the inspection items specified in the instruction manual.

(2) Find out as many details of the trouble as possible from the customer.

(3) Inspect in the conditions as close as possible to those at the time the trouble occurred.

(4) Proceed with the repair as follows:

Check the trouble status according to Table 6.1 for the details of the trouble. Then, locate the trouble position according to the detailed flowchart.

(5) Carry out a thorough test after the repair to check for correct functioning.

6.2 Troubleshooting Table

Table 6.1

Status	Trouble Contents	Troubleshooting Flowchart No.	Surmise of Trouble
Trouble upon power on	• Power is not supplied.	①	Power Supply Board, Control Board.
	• No spacing operation	②	
	• Homing does not end normally.	③	Space Motor, Carriage Cable, Power Supply unit, Control Board, Spacing Mechanism
Trouble during printing	• Paper jam while paper insertion	④	Pressure Roller Mechanism, Pull Up Roller Cover.
	• Smearing/Missing dots	⑤	Printhead, Control Board, Space Motor, Carriage Cable
	• Faint or dark print	⑥	Printhead, Ribbon Feed Assembly, Control Board
	• Ribbon feed trouble	⑦	Ribbon Feed Assembly, Ribbon Motor, Control Board
	• Line feed trouble	⑧	LF Motor, Platen Assy, LF Mechanism, Control Board
	• Malfunction of switch on operation panel	⑨	Operation Panel Board, Control Board
	• Data receiving failure	⑩	Control Board, (RS232C I/F Board), I/F Cable, Menu Setting

6.3 Lamp Display

(1) Printer mode display

Table 6.2

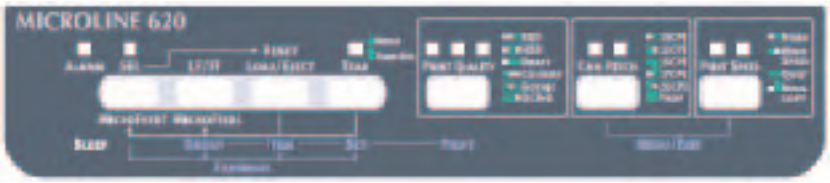
ALARM CATEGORY	ALARM	LED CONDITION				TEAR	CONTENTS	TROUBLE SHOOTING
		ALARM	SEL	PRINT QUALITY				
				2	3			
OPERATOR ALARM	Paper end alarm	ON	OFF	-	-	OFF	Continuous paper or cut sheet paper end.	Set new paper.
	Paper change lever alarm	BLINK	OFF	OFF	BLINK	OFF	• Change lever is set to TOP position while paper is already inserted from rear, front or bottom. • Change lever is set to REAR, FRONT or PULL position while paper already inserted from top or front.	• Set the lever to speci ed position. • Check sensor lever. • Replace Control board.
	Paper loading alarm	BLINK	OFF	OFF	ON	OFF	• Cut sheet could not be loaded.	• Remove the paper or check feed mechanism. • Press SEL switch.
	Paper eject/park alarm	BLINK	OFF	ON	OFF	OFF	• Cut sheet could not be ejected.	• Remove the paper or check feed mechanism. • Press SEL switch.
	Print Head thermal alarm	BLINK	-	-	-	BLINK	Print head temperature exceed 125 digree.	• Wait until it is cooled. • Replace Print head or control boad.
	Cover open	-	BLINK	-	-	BLINK	Printer top cover opend.	Close printer top cover.
FATAL ALARM		BLINK	BLINK	OFF	OFF	OFF	Hardware alarm has occurred.	See Table 6.3.

Note:
BLINK : 500ms ON, 500ms OFF
— : LED is kept in Current Condition (no change)

(2) Fault alram display

When the printer detects any of the various alarm states, the information is displayed as shown below on the operation panel. (See Table 6.3 for details.)

For ODA



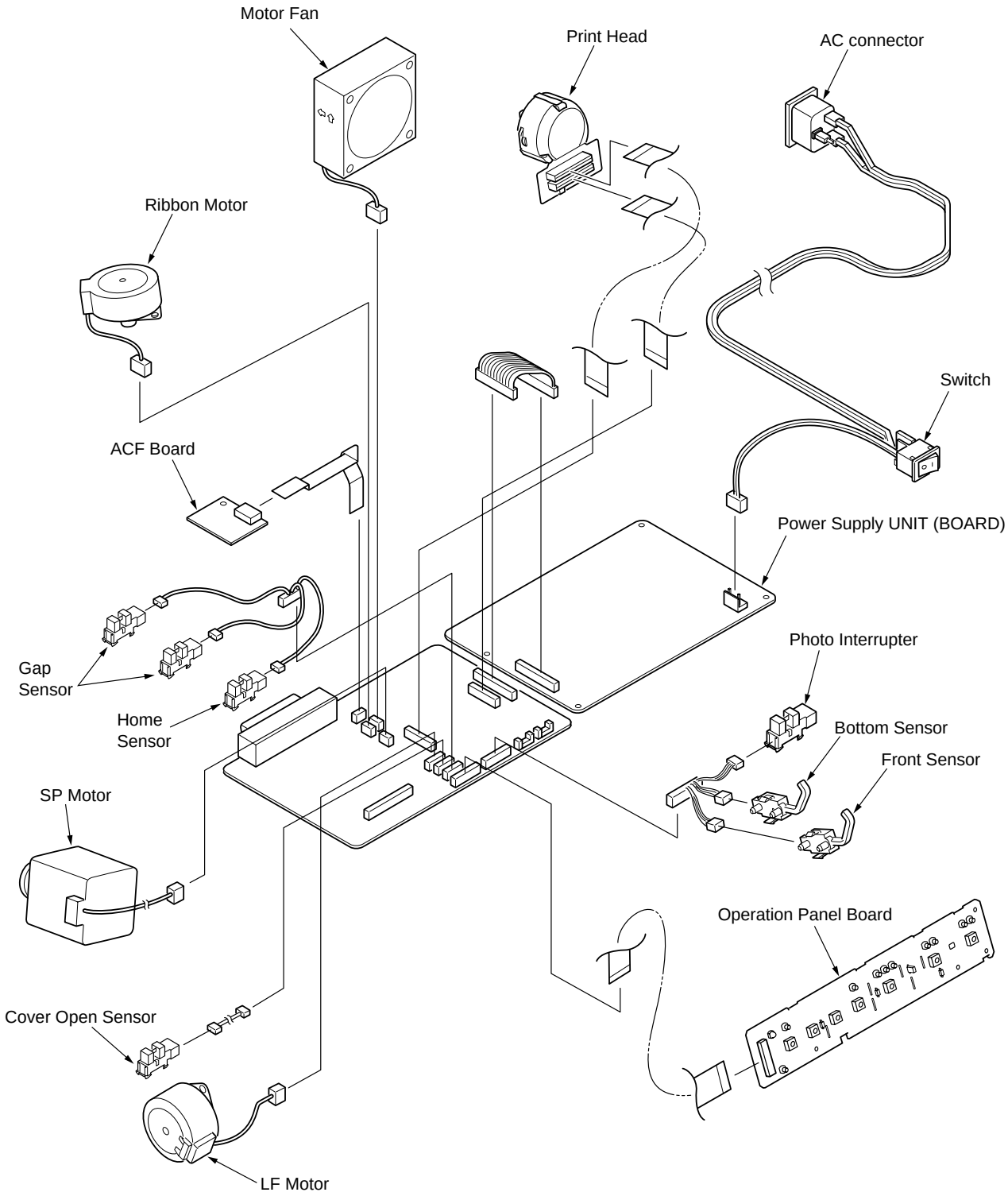
For AOS/OEL

(3) Fatal Alarm

Table 6.3

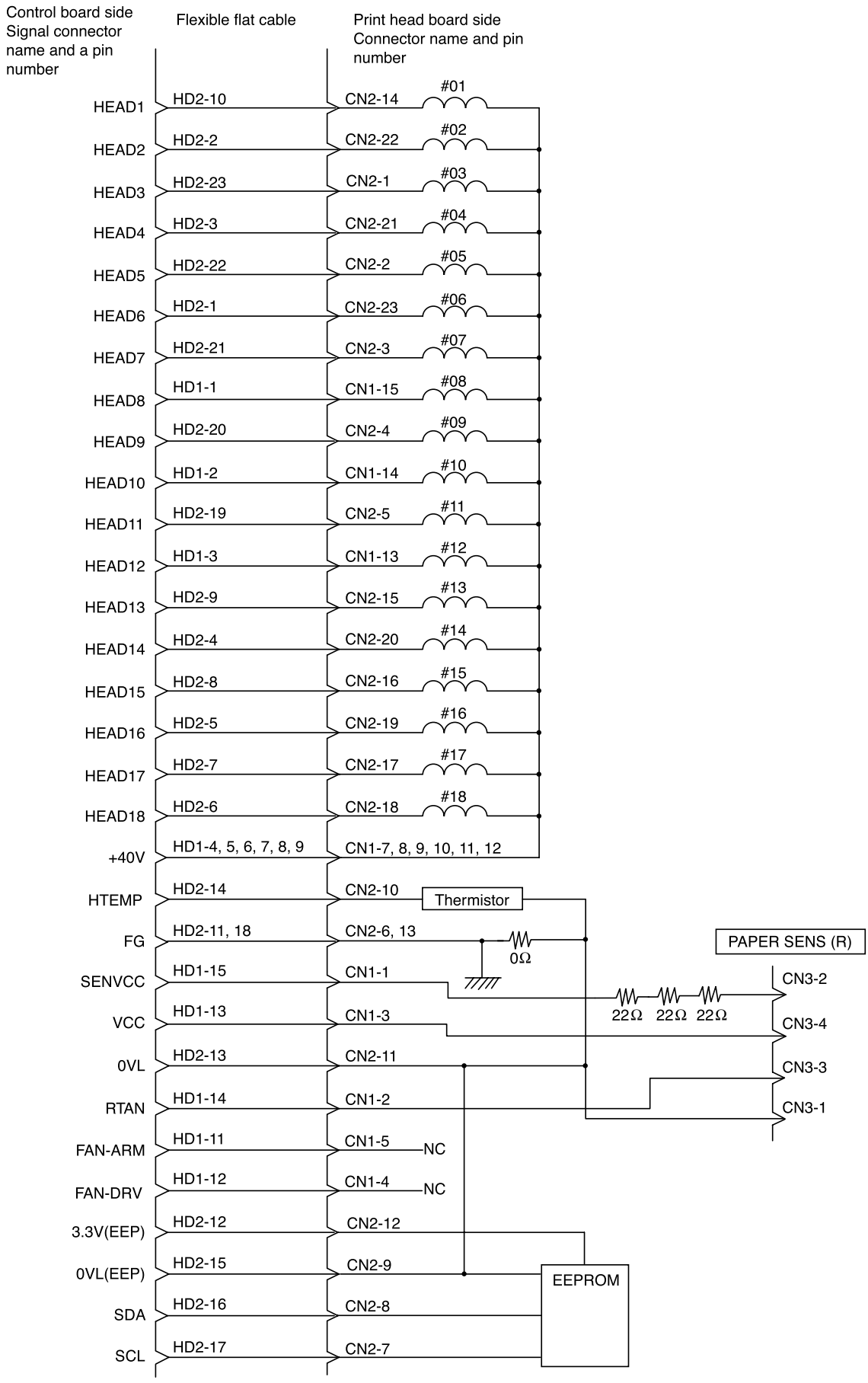
ALARM CATEGORY	ALARM	Main blinking	Sub blinking	CONTENTS	TROUBLE SHOOTING
MAIN CONTROL ALARM	Program ROM alarm	2	1	Check sum error	Replace Control Board.
	CPU internal RAM	4	1	Read/Write error	Replace Control Board.
	CPU alarm (Pre-fetch alarm)	4	2	Read/Write error	Replace Control Board.
	CPU alarm (Data abort alarm)	4	3	Read/Write error	Replace Control Board.
	LSI alarm (Bus control alarm)	4	4	Read/Write error	Replace Control Board.
	LSI alarm (DMA transfer alarm)	4	5	Read/Write error	Replace Control Board.
FIRMWARE DETECTION ALARM	CPU alarm (Undefined alarm)	4	6	Read/Write error	Replace Control Board.
	WDT (Watch Dog Timer) alarm	4	7	MPU is locked up and it is reset after about 50ms.	Turn-off,on the power or replace Control Board. New Firmware install in Control Board.
	Interrupt control alarm (Happened illegal interrupt)	4	8	Happened undefined interrupt.	Turn-off,on the power or replace Control Board. New Firmware install in Control Board.
SPACING ALARM	Print head homing alarm	1	1	Space interrupt not occurred within in specified timing.	Replace space motor. Replace Control Board. Check the mechanism if load too much.
	Spacing alarm	1	2	Print head does not reach to the home position.	
PRINT HEAD ALARM	Head thermistor alarm (Open status)	9	1	Print head thermister is open status.	Check print head connection. Replace print head. Replace print head cable. Replace Control Board.
	Head thermistor alarm (Short status)	9	4	Print head thermister is short status.	
FAN ALARM	FAN alarm (Main)	1	7	FAN motor does not rotate.	Check FAN connection. Replace FAN. Replace Control Board.
SENSOR ALARM	Edge sensor alarm	6	1	Slice level setting failure	Check edge sensor. Replace edge sensor.
		6	2	Paper exists at slice level setting.	

Oki Data CONFIDENTIAL


Motor Fan
Print Head
AC connector
Ribbon Motor
Switch
ACF Board
Power Supply UNIT (BOARD)
Photo Interrupter
Gap
Sensor
Home
Sensor
Bottom Sensor
Front Sensor
SP Motor
Operation Panel Board
Cover Open Sensor
LF Motor

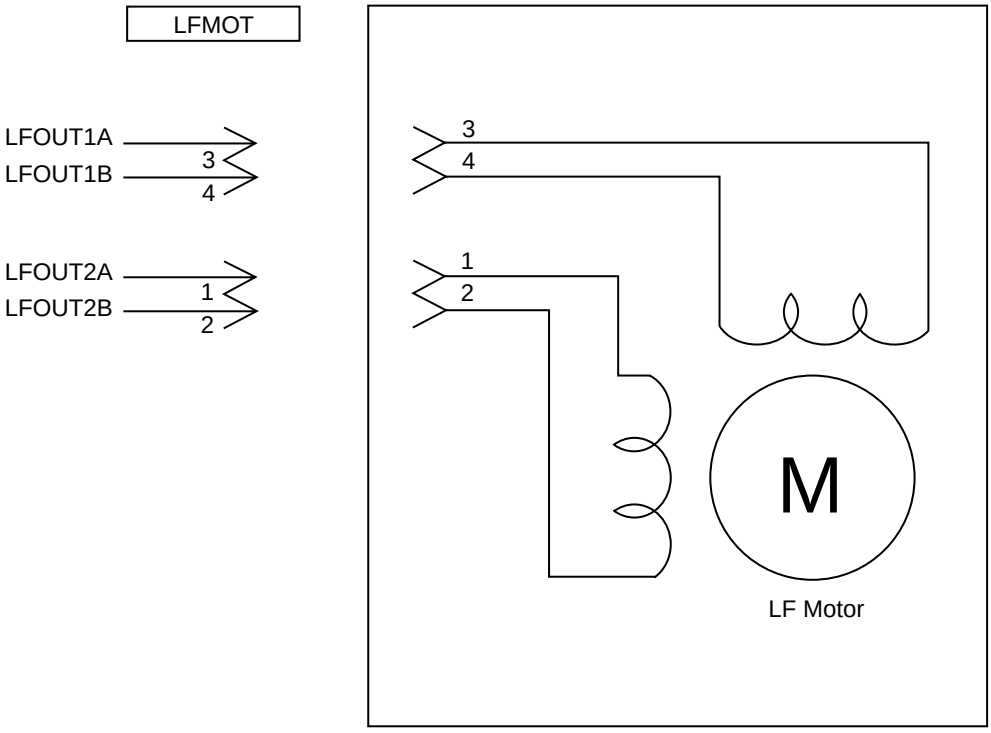
6.4 Connection Circuit Check for Printhead and SP/LF/RBN Motor

(1) Printhead



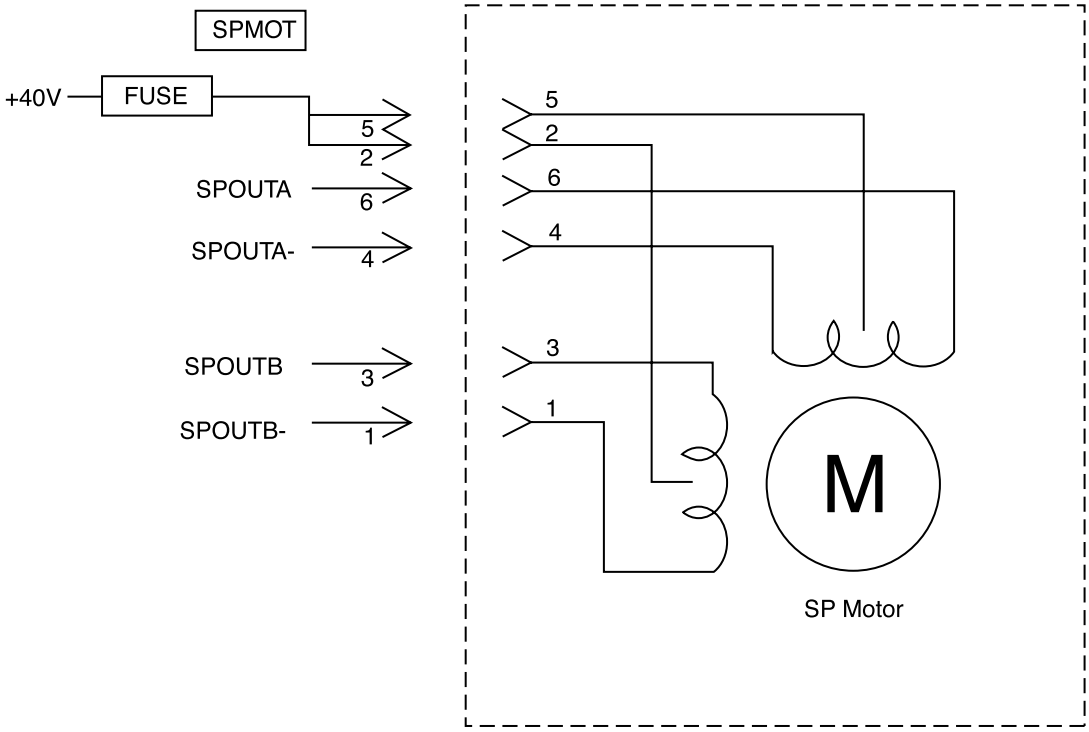
(2) Line Feed Motor

Resistance of each coil should be about 5.8Ω.



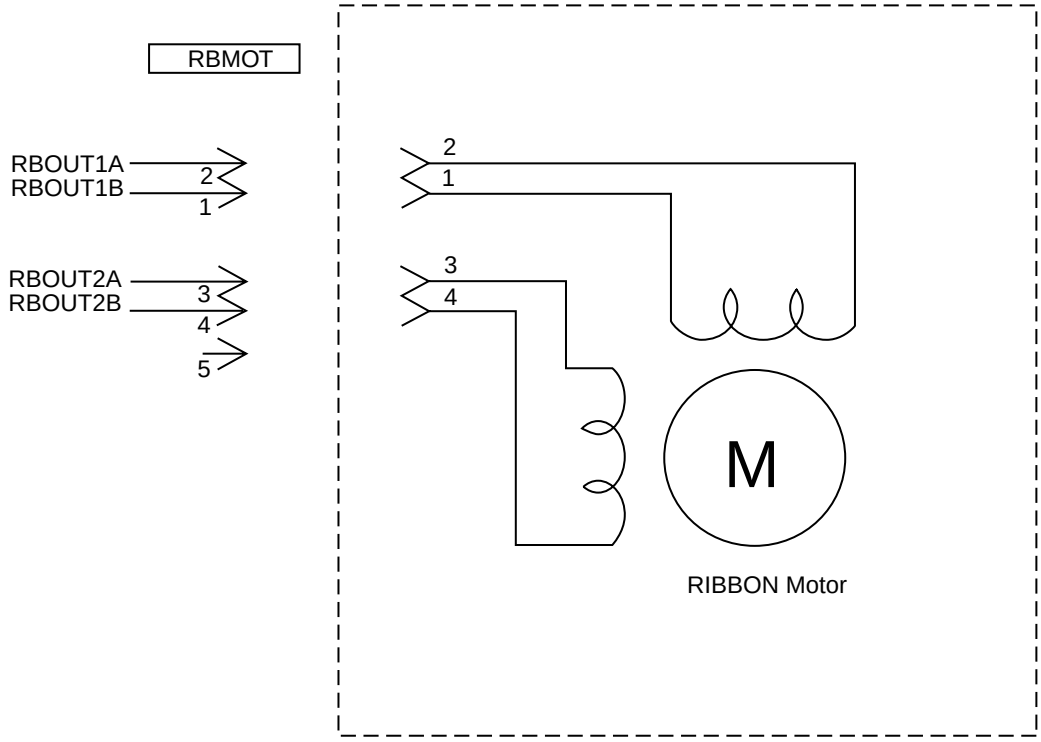
(3) SP Motor

Resistance of each coil should be about 4Ω.



(4) Ribbon Motor

Resistance of each coil should be about 7.6Ω.



6.5 Troubleshooting flow chart

① Power is not supplied.

- Is the AC cable connected correctly?

Yes No

- Connect the AC cable correctly.

- Are the voltage setting pins on the power supply unit configured correctly?

No Yes

- ① to next step

- Does the device operate when restoring power supply after turning the power switch off and changing the settings to ones suited to the AC voltage used?

No Yes

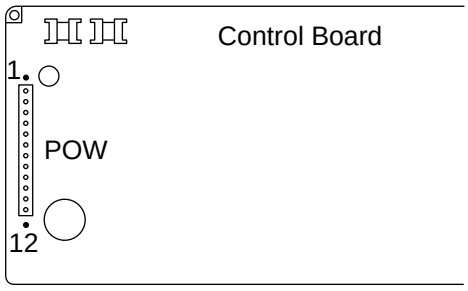
- End

- ① Remove CN101 on power supply unit.
- Measure for any short circuits between + 5V, + 40V, 0V in POW of Control Board.
- Any short circuit?

No Yes

- Replace Control Board.

- Replace power supply unit.



Pin No.	12	11	10	9	8	7	6	5	4	3	2	1
Signal	POWSAVE-P	ALM-P	+5V	+5V	0VL	0VL	0VP	0VP	0VP	+40V	+40V	+40V

② No spacing operation (The alarm LED Blinks)

- Is carriage assembly binding or jammed?

No Yes

- Check around space motor to repair the mechanism of space belt, idle pulley, ribbon feed mechanism, and carriage frame etc.

- Replace Space motor assy.
- Remedied?

No Yes

- End

- Replace Control Board.

③ Homing does not end normally

Yes No

- Check around space motor to repair the mechanism.
  (Space belt, idle pulley, ribbon feed mechanism, carriage frame and ribbon protector.)
- Remedied?

No Yes

- End
- Replace Space motor assy.

- Replace Space motor assy.
- Remedied?

No Yes

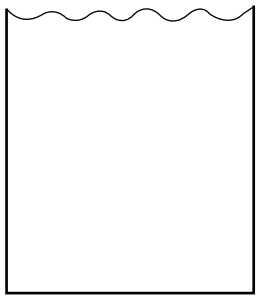
- End
- Replace Control Board.
- Remedied?

No Yes

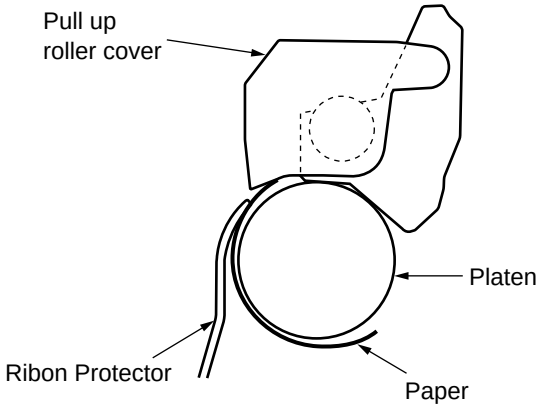
- End
- Replace Power Supply Board.

④ Paper jam while paper insertion

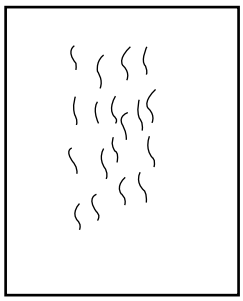
Jam 1



- Check the ribbon protector.
- Check the pull up roller cover is closed properly.



Jam 2 (wrinkled paper)



- Check around pressure roller mechanism.
  - Front pressure springs are narrow: 3 pcs; wide: 5 pcs) mounted properly or not.
  - Tension of all of front pressure rollers is properly.
  - Make sure of the fitting position of change lever and release shaft are correct.

⑤ Smearing/missing dots

- Does ALARM LED blink and display alarm?

No Yes

- See Tables 6.2 and 6.3 for troubleshooting information.

- Replace Printhead.
- Remedied?

No Yes

- End

- Replace Control Board.
- Remedied?

No Yes

- End

- Replace Carriage cable or Space motor assy.

⑥ Faint or dark print

- Is the print head gap set properly?

Yes No

- Adjust the printhead gap (see section 4).
- Remedied?

No Yes

- End

- Replace Printhead.
- Remedied?

No Yes

- End

- Replace Control Board.
- Remedied?

No Yes

- End

- Replace Ribbon feed mechanism.

⑦ Ribbon feed trouble

- Remove the ribbon cartridge.
- Does the ribbon drive shaft rotate?

No Yes

- Change Ribbon cartridge.

- Remove Ribbon feed mechanism.
- Does the ribbon drive shaft rotate?

No Yes

- Replace Ribbon feed mechanism.

- Replace Ribbon motor assy.

⑧ Line feed trouble

- Turn the power off, and rotate the platen manually.
- Does the platen rotate smoothly?

Yes No

- Is the Gear Platen (L) broken?

No Yes

- Replace Platen assembly.
- Is the gear line on the left side broken?

No Yes

- Replace the LF motor assembly or gear on the frame side.
- Is the Gear Platen (R), Gear Idle (D) broken?

No Yes

- Replace the gear.
- Set change lever to the rear position.
- Remove Tractor feed assembly on rear position.
- Does the platen rotate smoothly?

No Yes

- Replace Tractor feed assembly.
- Set change lever front position.
- Remove Tractor feed assembly on front position.
- Does the platen rotate smoothly?

No Yes

- Replace Tractor feed assembly.
- Replace LF motor assembly.

- Replace LF motor assembly.
- Remedied?

No Yes

- End
- Replace Control Board.

⑨ Malfunction of switch on operation panel

- Is the CN1 of Operation panel connected to the OP on the Control Board?

Yes No

- Connect the cable properly.

- Replace Operation panel board.
- Remedied?

No Yes

- End

- Replace Control Board.

⑩ Data receiving failure

- Is the SEL LED blinking?

No Yes

- Printer went into the print suppress mode.
  Wait until printer to receives DC1 code, or change the menu item “Print suppress-Ineffective” when the function is not required.

- Is the I/F RS232C?

No Yes

- To step 10-2

- Does the SEL LED light up?

Yes No

- Press SEL key.
- Remedied?

No Yes

- Does the printer receive data properly?

No Yes

- To step 10-1
- End

10-1

- Disconnect I/F cable.
- Does the SEL LED light up?

No Yes

- Change menu item I-prime to invalid, or check for defective cable.

- Replace Control Board.
- Remedied?

No Yes

- End

- Replace I/F cable.

10-2 (RS232C I/F)

Printer I/F pin assignment.

TXD 2 pin,
RXD 3 pin,
SSD 11 pin,
DTR 20 pin,
DSR 6 pin.

- Is the correct cable used?

Yes — No

- Change I/F cable.

- Is ALARM LED blinking?

No — Yes

- See tables 6.2 and 6.3 for the troubleshooting.

- Make sure of the parameters for RS232C in the menu are correct.

  - Baud rate
  - Bit length
  - Parity
  - Protocol
  - Busy signal and its polarity

- Remedied?

No — Yes

- End

- Replace RS232C I/F board.

- Remedied?

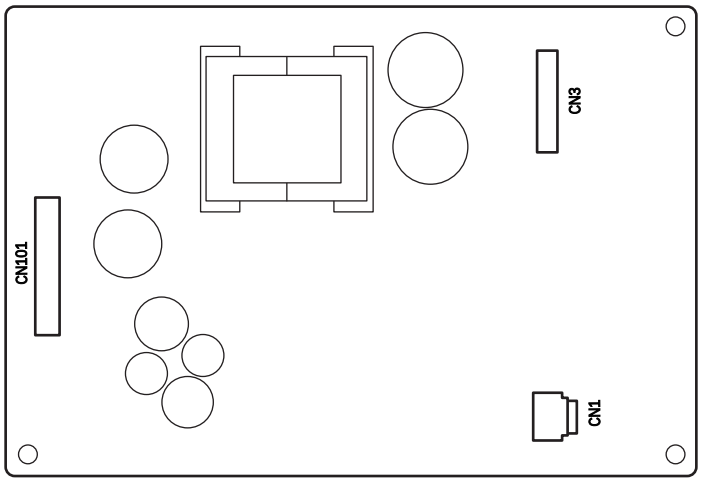
No — Yes

- End

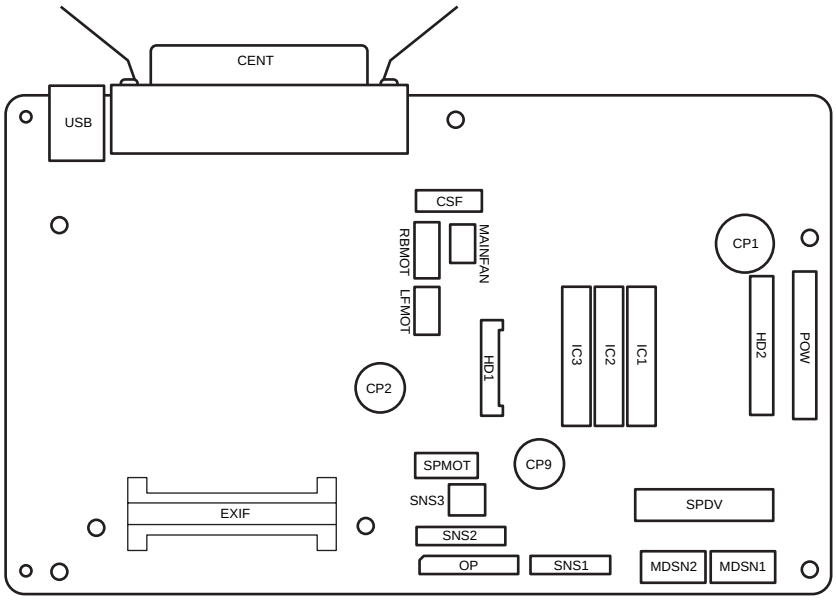
- Replace Control Board.

Appendix A PCB LAYOUT

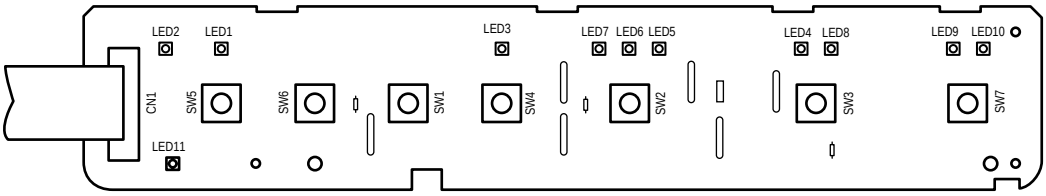
(1) Power Supply Board



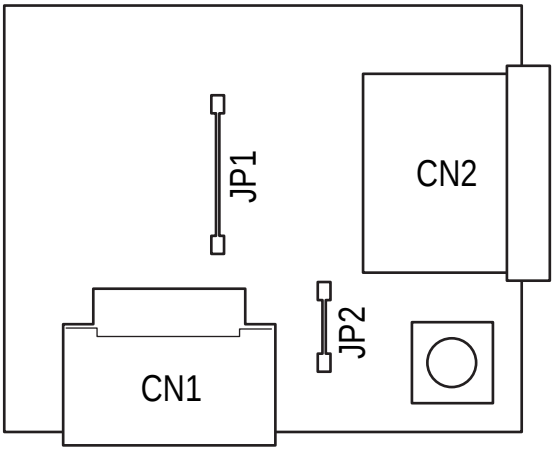
(2) Control Board



(3) Operation Panel Board



(4) CSF Connector Board



Appendix B RS-232C SERIAL INTERFACE BOARD (OPTION)

1. GENERAL

This section describes the operation of the RS-232C Serial Interface board installed in the Printer as an option using a start-stop synchronization and serial communications circuit. This serial interface board is capable of transmitting and receiving simultaneously at speeds up to 19,200 bits per second. Two protocols are available: printer Ready/Busy and X-ON/X-OFF modes.

ROM/RAM/CPU is not installed in this option board. Driver and receiver IC are controlled according to the control signal from the control board.

2. OPERATION DESCRIPTION

2.1 Element Description

The driver and the receiver for RS232C of 5V signal power supply are installed on this optional board.

(1) HIN202E

It is driver, and receiver IC for RS232C that operates by 5V single power supply.

2.2 Circuit Description

A block diagram is shown in Figure B-1.

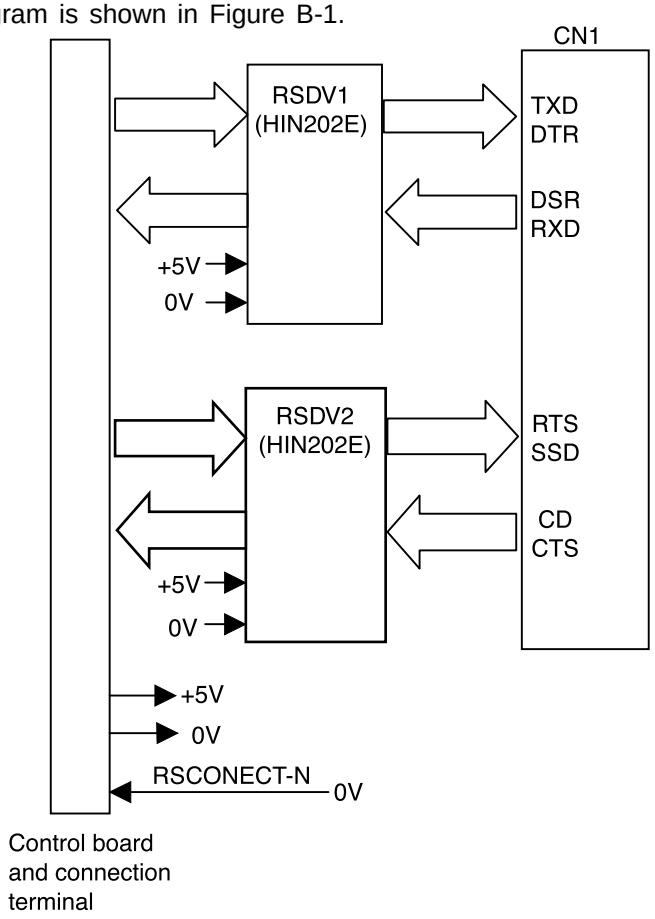


Figure B-1 Block Diagram

2.2.1 Operation at power on

It becomes possible to use the RS232C board because SOC of the control board recognizes that the RSCONECT-N signal is connected with OV when the power supply is turned on.

2.2.2 RS-232C interface

The DTR, SSD, TXD and RTS signals output by the SOC are converted to RS-232C signals by line driver receiver HIN202E (RSDV1, RSDV2) and sent to the interface.

In addition, signals DSR, CTS, CD, and RXD on the RS232C interface are converted to TTL level by line driver receiver HIN202E (RSDV1, RSDV2) and input to the SOC.

2.3 Communication Procedure Flowchart

2.3.1 Mode ⓐ

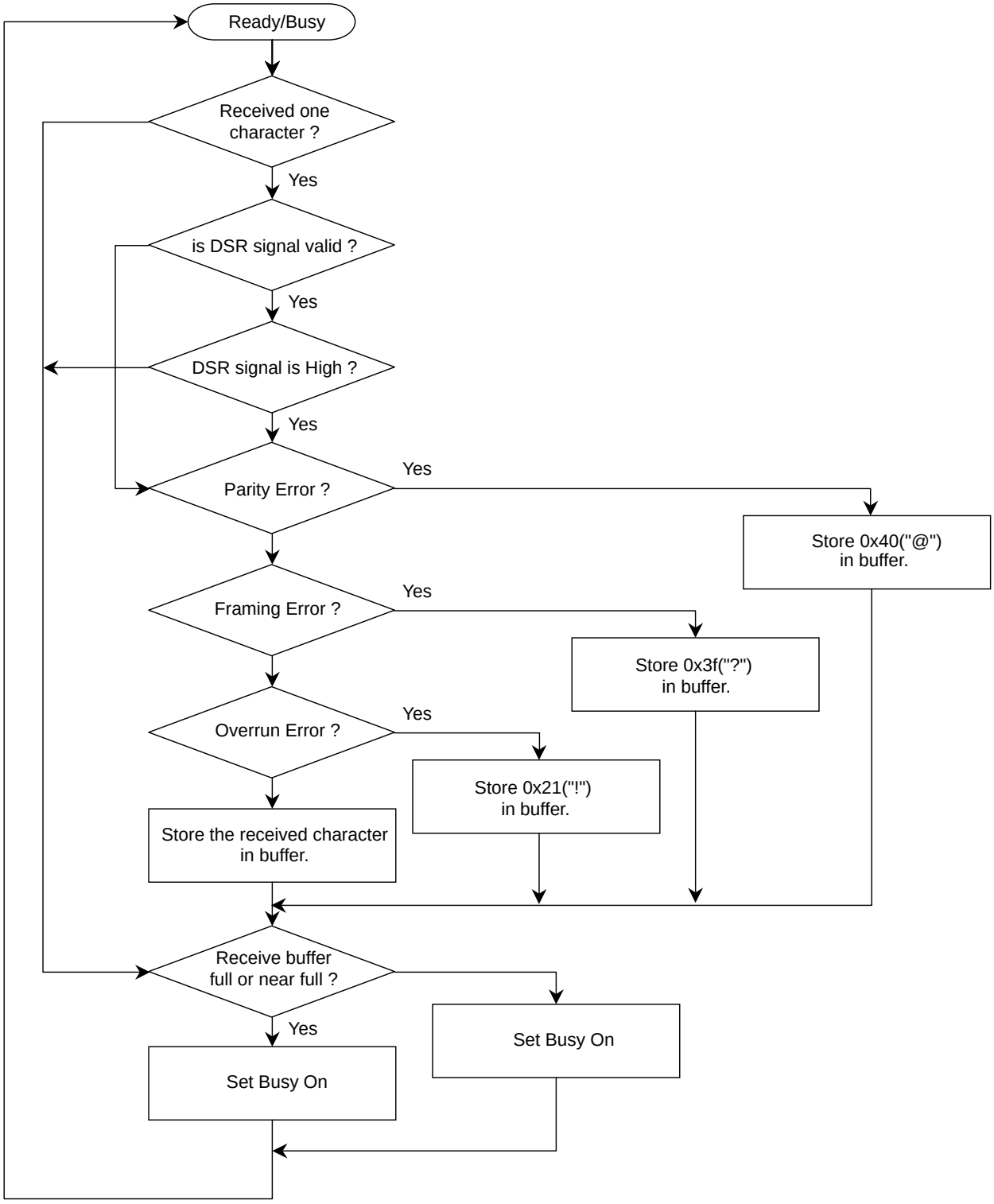


Figure B-2

2.3.2 Mode ⓑ

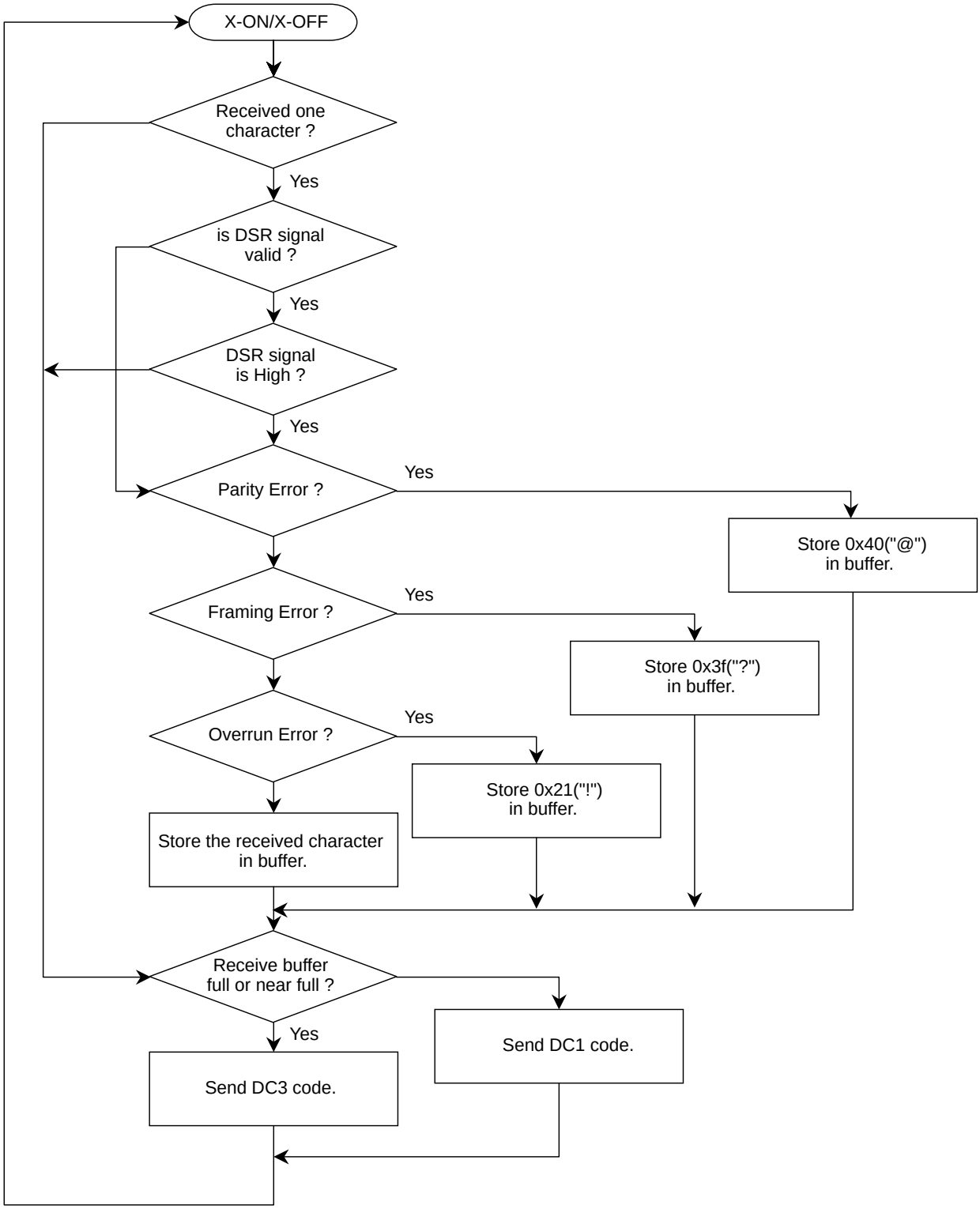


Figure B-3

3. TROUBLESHOOTING FLOWCHART

3.1 Before Repairing a Fault

Before servicing the printer, ask the customer in what situation the trouble occurred and record the response.

Before starting troubleshooting, operate the printer in the same situation as that at the time of trouble occurrence to see if the same trouble occurs again. If not, perform the printers self test and thoroughly test the printers functionality. If the trouble is reproducible proceed to the troubleshooting section.

3.2 Troubleshooting

(1) The data is not received using a serial interface.

(2) Using a serial interface, the print data is omitted or the print operation is not performed.

① The data is not received using a serial interface.

(A protocol is set to READY/BUSY state, and BUSY LINE is in SSD + state.)

- The RxD of RSDV1 as specified in Figure B-1?

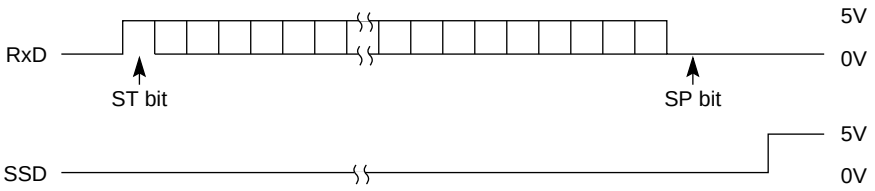


Figure B-1

- No Replace the RS232C optional board.

Yes Replace the control board.

② In receiving by serial interface, printing data is omitted or printing operation is not performed.

- Are RxD and SSD of RSDV1, RSDV2 as specified in Figure B-1?

- No Replace the RS232C optional board.

Yes Replace the control board.

3.3 Local Test

3.3.1 Circuit test mode

3.3.1.1 Setting

(1) Diagnostic test (set by menu)

(2) Test connector

Connect the test connector shown in Figure B-9 to the interface connector

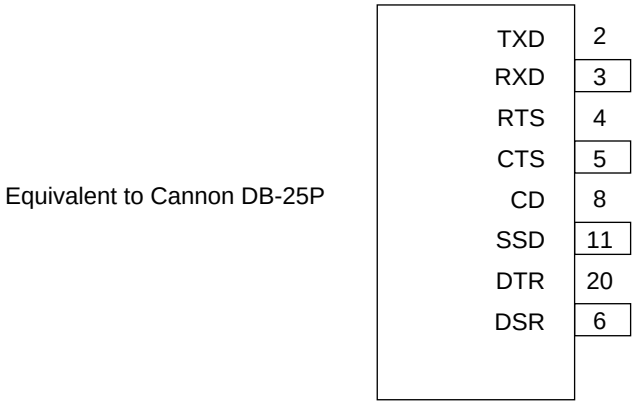


Figure B-9 Test Connector Connection Diagram

3.3.1.2 Function

After the settings outlined in Section 3.3.1.1 are completed and power is turned on, the serial interface checks the message buffer memory and interface driver/receiver circuit. It then prints characters.

To start and stop this test, push the SEL switch on the front of the printer.

Details of this test are explained on below.

(1) The program revision using two numerical characters is printed.

(2) “LOOP TEST” is printed.

(3) Memory is checked for the message buffer.

(4) Prints “OK” is printed if the memory check is OK and “BAD” is printed if the memory check fails.

(5) Output level to DTR, RTS, and SSD signals is dropped low. If DSR, CTS, or CD signals is High, “IF BAD” is printed. If DSR, CTS, and CD signals are all Low, “IF OK” is printed.

(6) Output level to DTR, RTS, and SSD signals is raised high. If DSR, CTS, or CD signals is Low, “IF BAD” is printed. If DSR, CTS, and CD signals are all High, “IF OK” is printed.

(7) Transmits characters codes from 20H to 7EH is transmitted by TXD signal. At the same time, characters are received by the RXD signal and stored in the message buffer.

(8) The characters that were stored in the message buffer as indicated in (7) are printed.

(9) Steps (1) through (8) are repeated until test is interrrupted.