CHAPTER 13: MASTER MAKING SECTION

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Mechanism

1. Master making & master loading

The master making & master loading mechanism is made up of the following components.

1) Scanner Table Set Detection Mechanism

The Flat bed set switch [A] confirms that the original is positioned on the scanner table.

The Master loading unit sensor [B] confirms that the master loading unit is set.

The Master end sensor [C] confirms that master roll has ran out of master.

2) Master Cutting Mechanism

The master cutting operation is performed by the Cutter motor [D], and the cutter motor stop position is confirmed by the Cutter home position switch [E].

3) Thermal Print Head Elevation Mechanism

The Thermal print head (TPH) [F] is raised and lowered by the Thermal pressure motor [G], and the position is confirmed by the TPH pressure sensor [H].

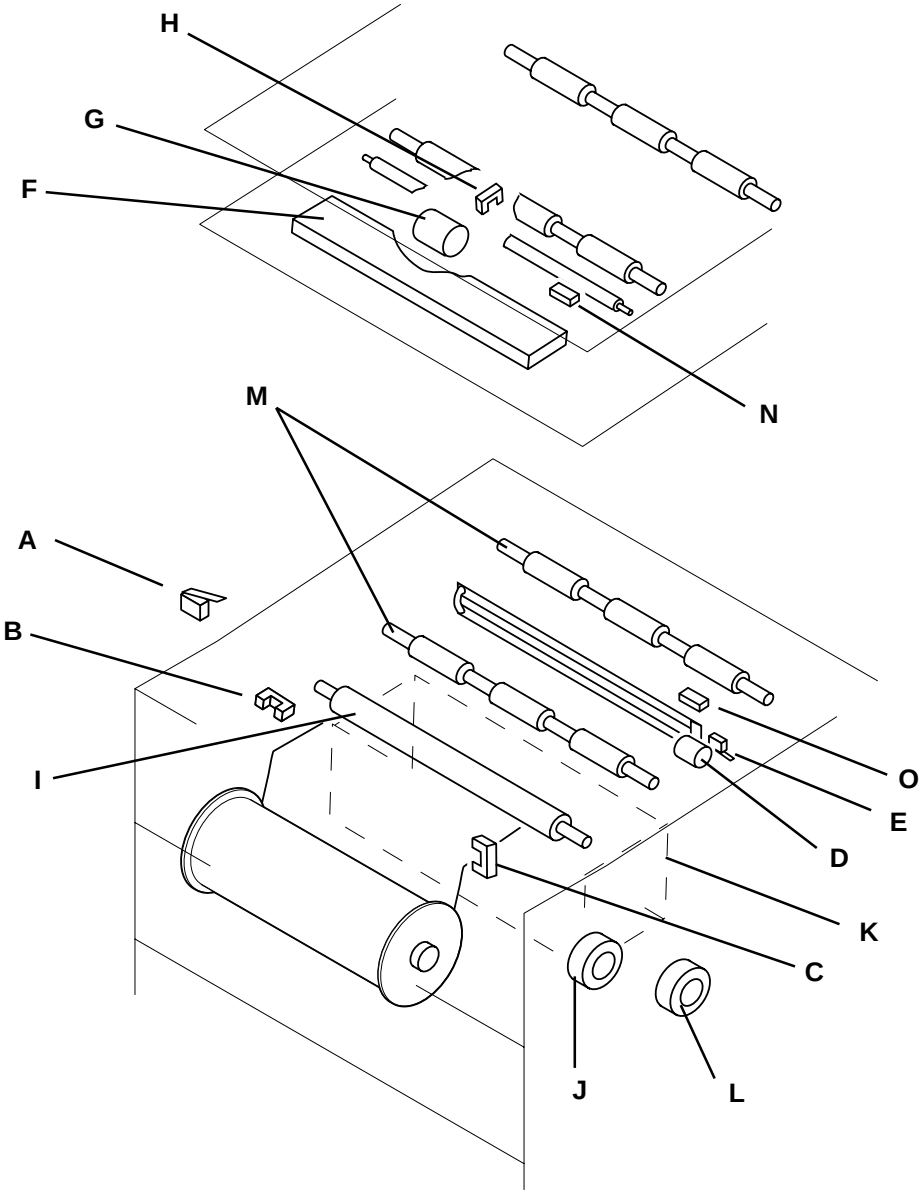
4) Master Making Section Mechanism

Master making is performed by lowering the Thermal print head [F] and transporting the master clamped between it and the Write roller [I]. The master is transported by the Write roller, which is driven by the Write pulse motor [J]. Created masters are stored inside the master stocker [K].

5) Master Loading Mechanism

Masters that have been created are fed to the print drum and clamped, and then loaded by rotating the print drum.

The master is transported by the Load roller [M], which is driven by the Load pulse motor [L].



A: Flat bed set switch
B: Master loading unit sensor
C: Master end sensor
D: Cutter motor
E: Cutter home position switch
F: Thermal print head
G: Thermal pressure motor
H: TPH pressure sensor
I: Write roller
J: Write pulse motor
K: Master stocker
L: Load pulse motor
M: Load roller
N: Master detection sensor
O: Master positioning sensor

2. Scanner Table Set Detection Mechanism

Scanner table and master loading set detection mechanism

The Flat bed set switch [A] confirms that the scanner table is closed.

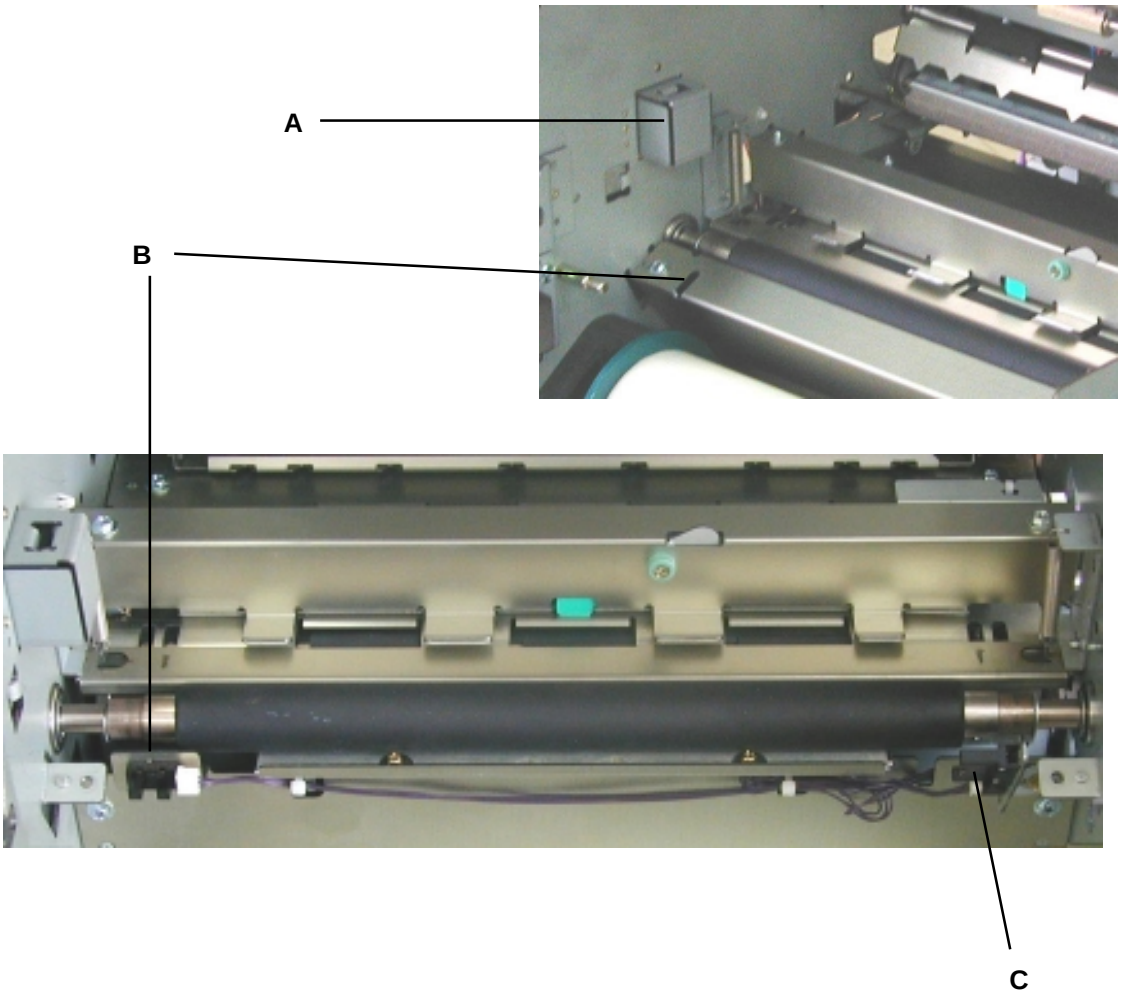
The Flat bed set switch [A] is the interlocking switch for the main motor, and this forces the Main motor, Clamp motor, and TPH power to an emergency stop if the Scanner table is opened while the system is operating.

The Master loading unit switch [B] confirms that the Master loading unit is set, and the master setting operation is performed once the Master loading unit is set.

Master end detection

The end of the master roll is confirmed by the Master end sensor [C] detecting the black end mark attached to the end of the master on the master roll.

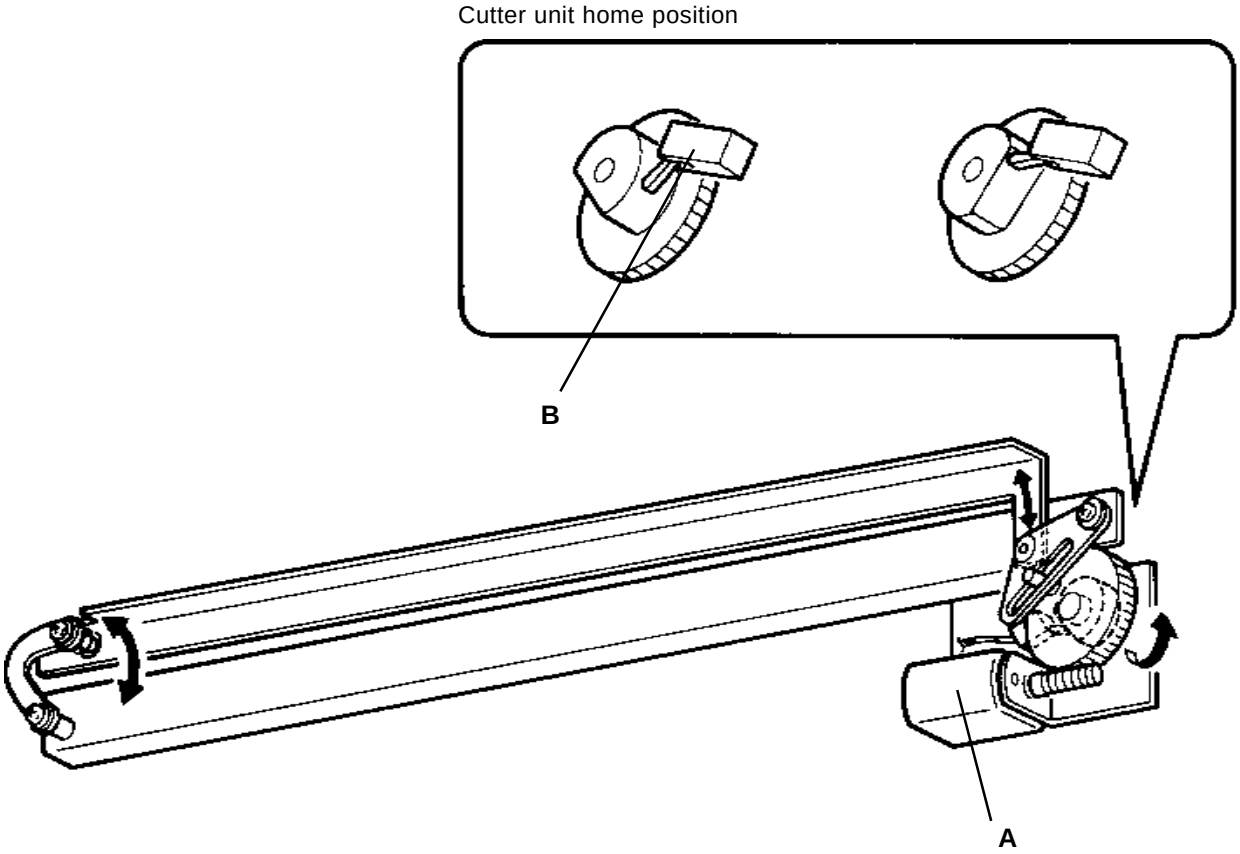
The Master end sensor [C] checks every 10 ms while the master is being transported, and gives an indication on the panel when the end mark is detected twice in succession.



A: Flat bed set switch
B: Master loading unit switch
C: Master end sensor

3. Master Cutting Mechanism

- The master is cut by the upper cutter of the Cutter unit being moved up and down by the Cutter motor [A].
- The Cutter motor rotates in a constant direction, and the Cutter home position switch [B] confirms the position of the upper cutter.
- The Cutter is at the home position when it is not pressing against the Cutter home position switch [B], and if the switch is depressed briefly after the Cutter motor starts, the motor stops when the switch is no longer depressed.



A: Cutter motor
B: Cutter home position switch

4. Thermal Print Head Elevation Mechanism

Thermal print head elevation

When the system is on standby or when winding the master onto the print drum after master making, the Thermal print head is raised from the Write roller. Conversely, for master making and during transport, the Thermal print head is lowered and pressed onto the Write roller.

The Thermal print head is raised and lowered by the Pressure release cam [B], which is driven by the Thermal pressure motor [A].

The Pressure release cam [B] is an eccentric cam, which raises and lowers the TPH pivot plate [C] as it rotates. The raised and lowered stop positions for the motor are detected by the TPH pressure sensor [E], which is blocked by the Pressure detection disc [D]. The Sliding plate [F] and Blade link [G] are also moved by the vertical action of the thermal head.

Thermal print head raised position

In the Thermal print head raised position, the Load roller No. 1 (top) [H] and Load roller (top) [I] also rise.

At the same time, the Blade cushion [J] descends, and applies back tension to the master while it is being wound onto the print drum to prevent creases in the master.

Thermal print head's lowered position

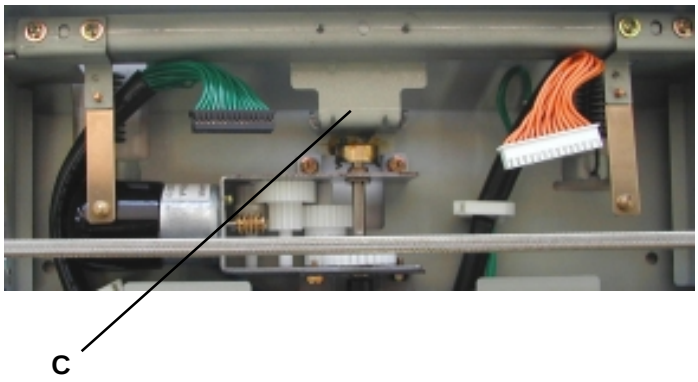
In the Thermal print head lowered position, the Load roller No. 1 (top) [H] and Load roller (top) [I] also descend to allow the master to be transported. At the same time, the Blade cushion [J] rises.

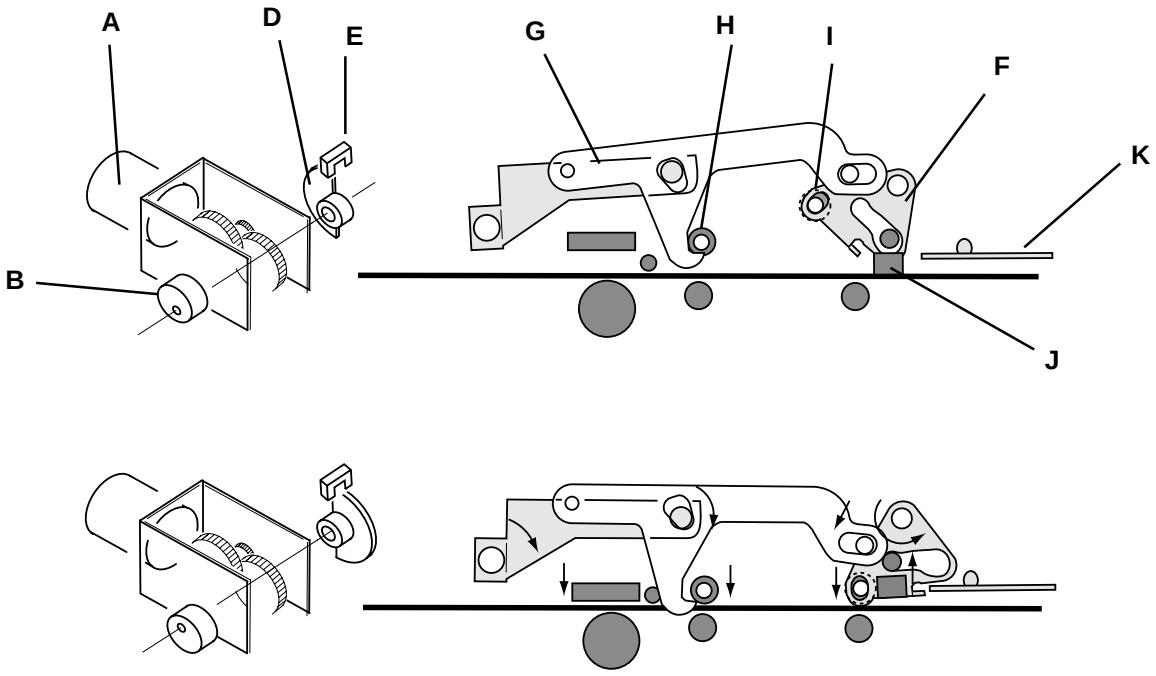
Initialization

This moves the Thermal print head to the pressure release (raised) position when power is switched on, or when everything is reset.

Loading guide plate operation

- In the clamp plate master release operation at the start of master ejection, the front edge of the Loading guide plate is raised by the Master release bar to prevent it from obstructing the leading edge of the freed master on the drum.
- In the clamp plate master clamping operation at the start of master loading, only the front edge sheet of the Loading guide plate is raised by the Clamp plate, so as to prevent it from obstructing the master loading operation.
- During master loading, the master being loaded is back-tensioned by the sponge fitted to the bottom of the front edge sheet of the Loading guide plate.





A: Thermal pressure motor
B: Pressure release cam
C: TPH pivot plate
D: Pressure detection disc
E: TPH pressure sensor
F: Sliding plate
G: Blade link
H: Load roller No. 1 (top)
I: Load roller (top)
J: Blade cushion
K: Loading guide plate

5. Master Positioning Mechanism

The master positioning operation is performed to bring the master to the Master positioning sensor when opening or closing the Master loading unit or during master making.

For master roll replacement

(1) • Insert the leading edge of the new master roll to the Master stopper gate [A], and close the master loading unit.

• Closing the Master loading unit raises the Master stopper gate.

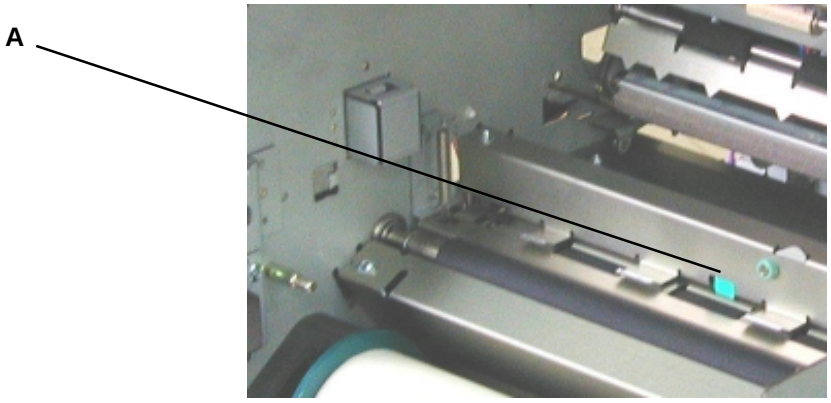
• The Master loading unit switch monitors operations every 10 ms and determines that the Master loading unit is closed when the light path is blocked twice in succession. The master is then checked by the Master detection sensor [B].

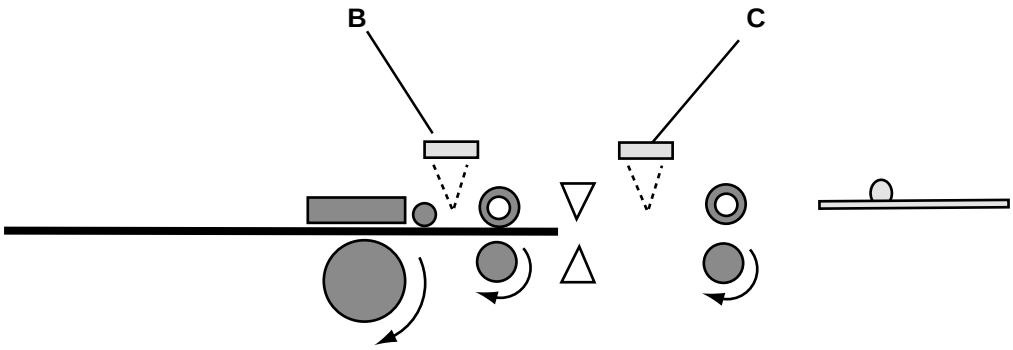
(2) • The Thermal print head is lowered by the Thermal pressure motor, and the Write pulse motor and Load pulse motor operate to transport the master to the Master positioning sensor [C].

(3) • Once the light path to the Master positioning sensor [C] is blocked by the master, the Write pulse motor alone operates in reverse to return the master 2 mm. The motor then stops and the Thermal print head is raised.

For master cutting

Steps (2) to (3) above are performed following master cutting.

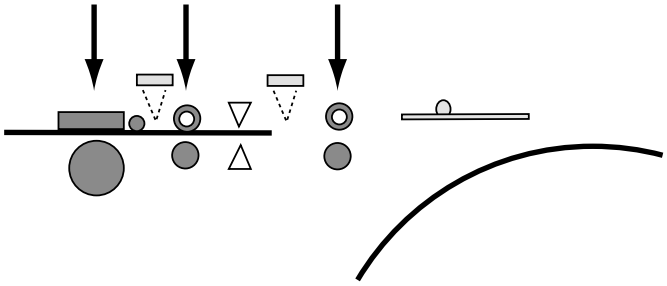




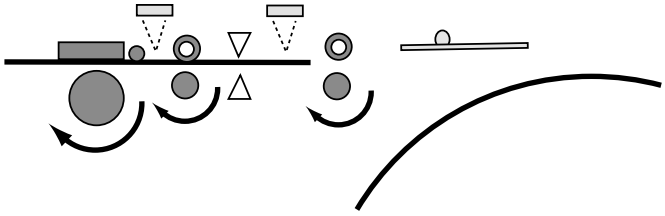
A: Master stopper gate
B: Master detection sensor
C: Master positioning sensor

6. Master Making

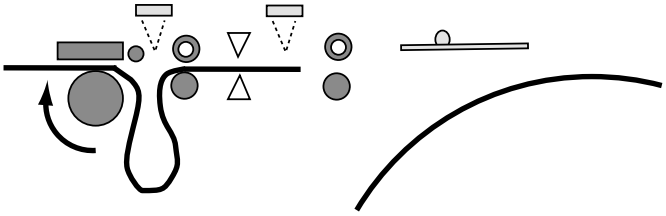
The sequence of operations from master making to master mounting is as described below.



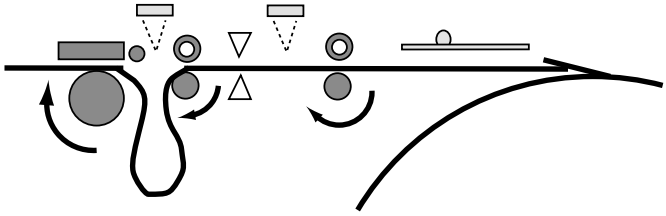
(1) At the start of master making, the Thermal print head is lowered to clamp the master between it and the Write roller.



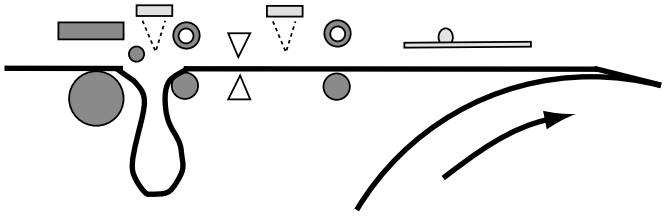
(2) The write pulse motor and Load pulse motor operate to transport the master to the Master positioning sensor, where it waits for scanning system preparations to be completed.



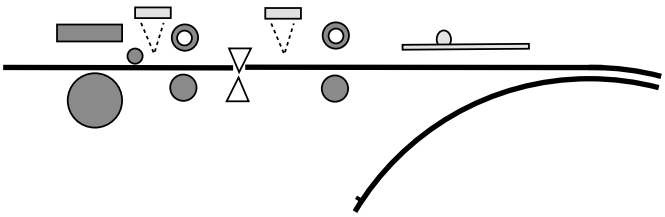
(3) Once master making can be started, the Write pulse motor operates to transport the master to the writing start position before master making commences. The master created is then stored in the master stocker.



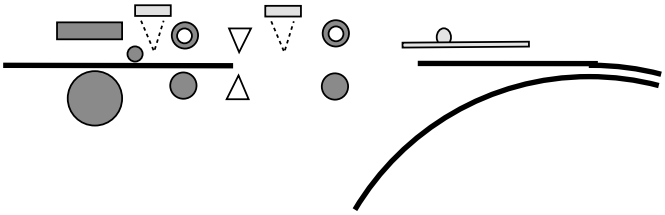
(4) Once the master making in step (3) starts, the Load pulse motor operates to transport the leading edge of the master to the clamp plate, where it is clamped.



(5) Once master making is finished, the Thermal print head is raised, and the print drum rotates as the master is wound onto it.



(6) The print drum pauses at the 220° position, where the master is cut.



(7) After the print drum has rotated a further 15°, the Master positioning sensor confirms that the master has been cut. Cutting has been performed correctly if the light path to the sensor is blocked (no master).
If the light path to the sensor is open, it is determined that an error has occurred. In this case, the cutting operation is repeated, the Master positioning sensor confirms whether the master has been cut after the print drum has rotated a further 15°. If it is cut, “A03 Cutting error” is displayed, and if it is not cut, “T13 Cutter motor lock” is displayed.

(8) The master setting operation is performed.

Rmoval and Assembly

1. Removing the Write Roller

(1) Switch off the power, and remove the rear cover.

(2) Loosen the mounting bracket screws (M4 x 8: 2 pcs) on the Write pulse motor [B], and remove the Belt [C].

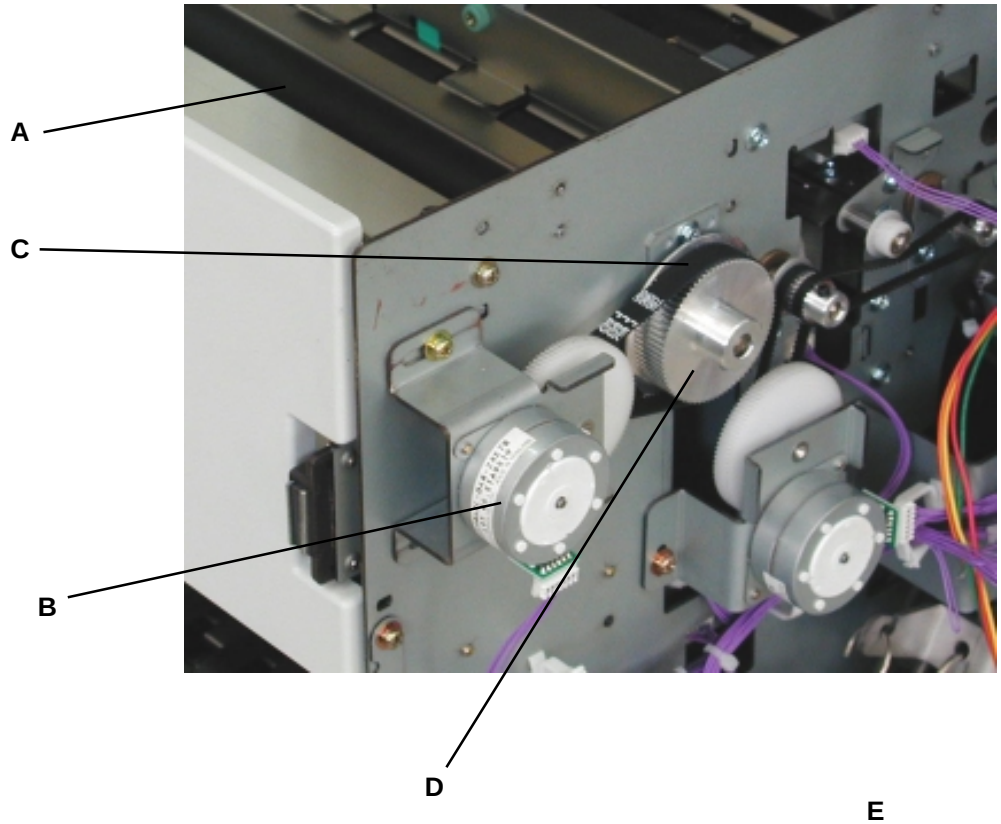
(3) Remove the Pulley [D]. (M2 x 6: 1 pc)

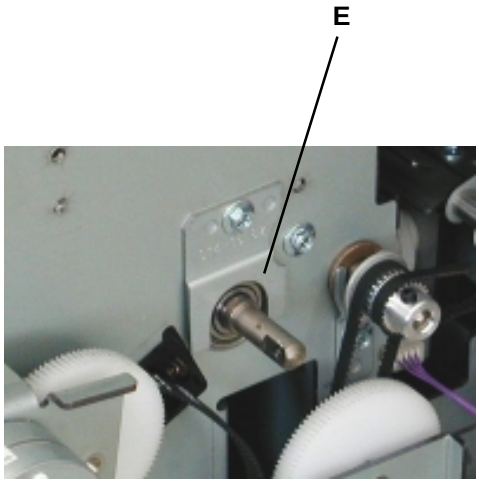
(4) Remove the Bearing stopper [E] and pull out the bearing. (M4 x 6: 1 pc)

(5) Pull out the Write roller [A].

[Precautions on Reassembly]

- Take care not to drop the bearing when mounting the Write roller (particularly the front).





A: Write roller
B: Write pulse motor
C: Belt
D: Pulley
E: Bearing stopper

2. Removing the Load Roller (bottom)

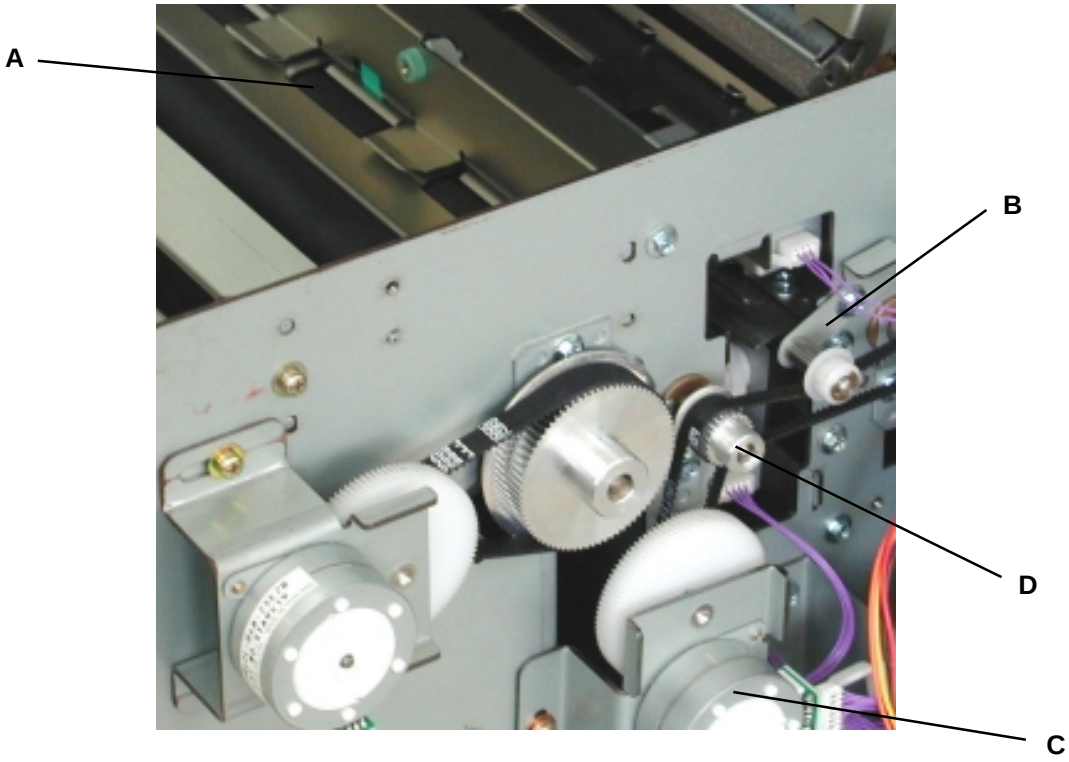
(1) Switch off the power, and remove the rear cover.

(2) Loosen the screw (M4 x 8: 1 pc) on the Tension assembly [B], loosen the mounting bracket screws (M4 x 8: 2 pcs) on the Load pulse motor [C], and then remove the belt.

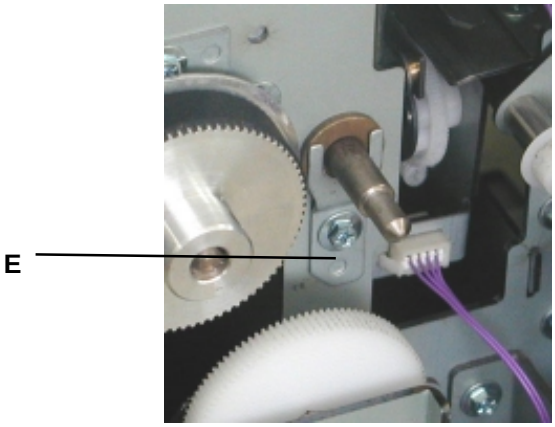
(3) Remove the Pulley [D]. (M2 x 6: 1 pc)

(4) Remove the Bearing fixing plate [E] and pull out the bearing. (M4 x 8: 1 pc)

* Removing the rear bearing here simplifies subsequent disassembly or reassembly work.



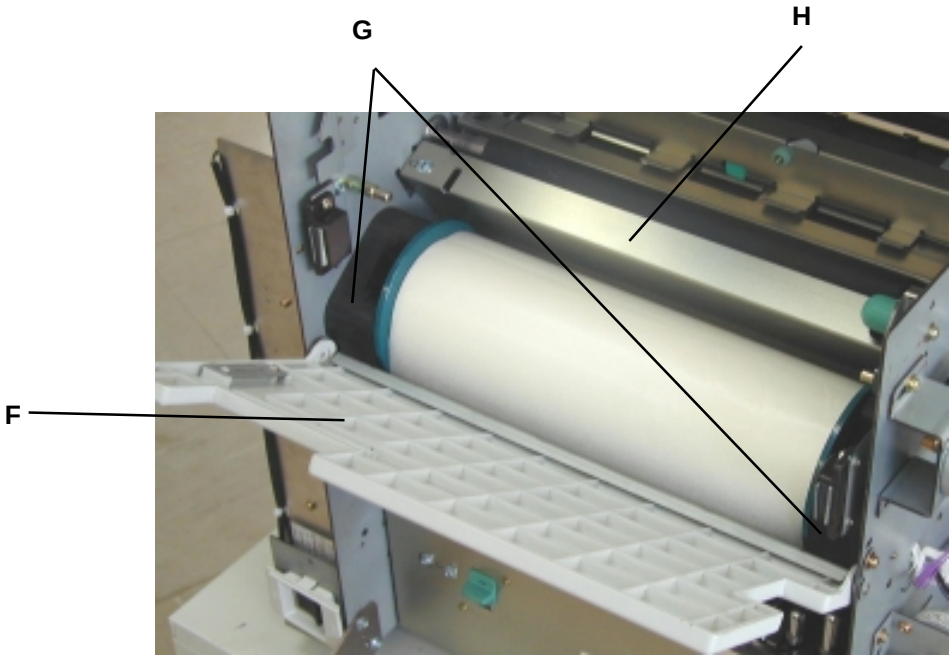
A: Load roller (bottom)
B: Tension assembly
C: Load pulse motor
D: Pulley
E: Bearing fixing plate



(5) Remove the master roll, and remove the Master cover [F]. (M4 x 6: 1 pc)

(6) Remove the Master holders [G] on both sides. (M3 x 6: 2 pcs each)

(7) Remove the Master set guide [H]. (M4 x 8: 2 pcs)

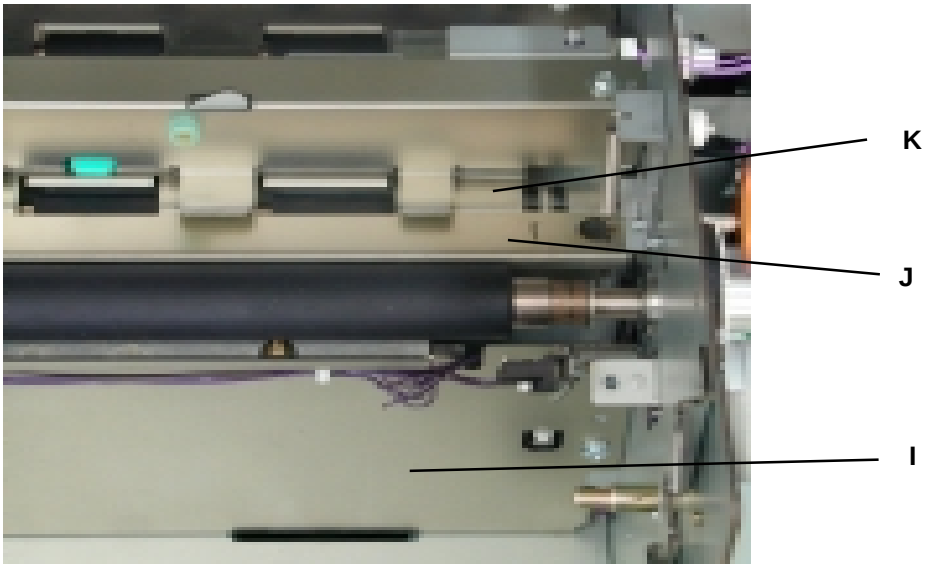


F: Master cover
G: Master holder
H: Master set guide

(8) Unplug the rear connector, and remove the Stocker cover [I]. (M4 x 8: 2 pcs)

(9) Remove the springs on both sides, and then remove the Master guide [J].

(10) Remove the Load roller guide [K] (M4 x 8: 2 pcs), and then remove the Load roller (bottom).

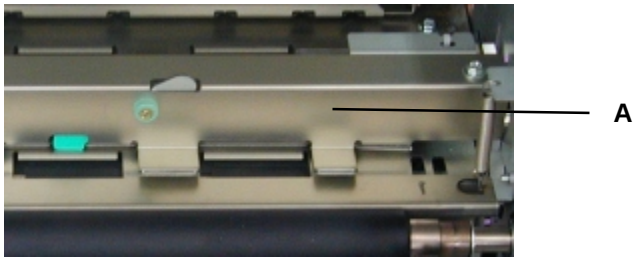


I: Stocker cover
J: Master guide
K: Load roller guide

3. Removing the Cutter Unit

(1) Switch off the power, remove the rear cover, and pull out the print drum.

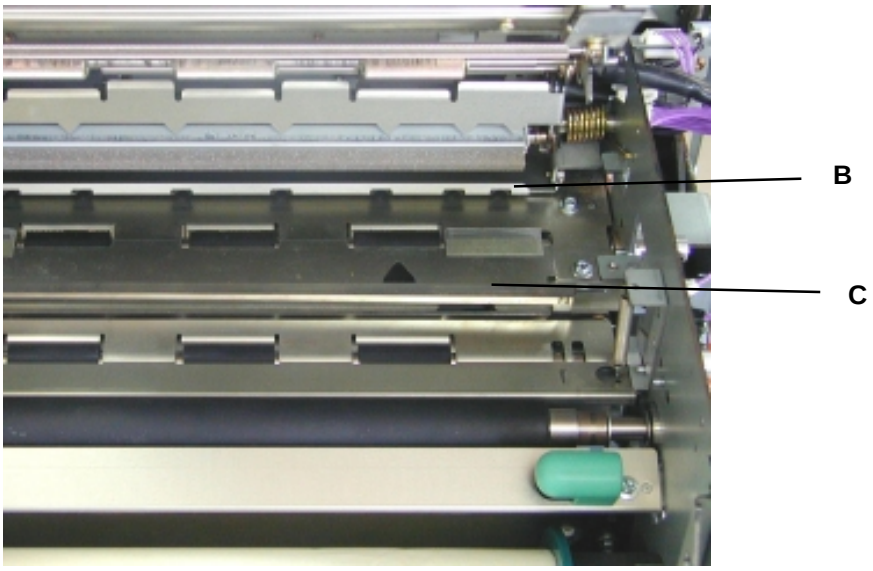
(2) Unplug the rear connector, and remove the Cutter cover [A]. (M4 x 8: 2 pcs)

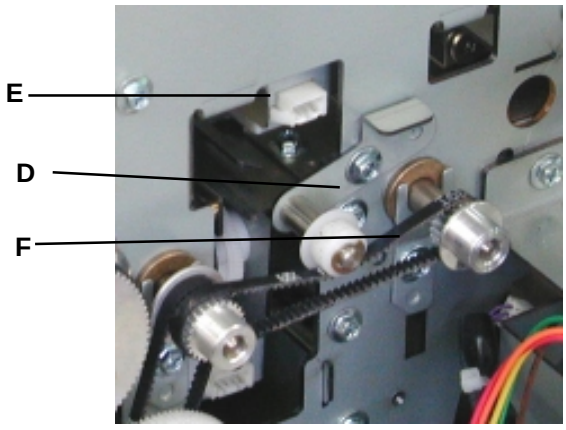


(3) Remove the Cutter guide plate [C]. (M4 x 8: 2 pcs)

(4) Remove the cutter unit mounting screws. (2 pcs)

(5) Loosen the Tension assembly [D] screw, detach the Belt [F], unplug the cutter unit connector [E], and then remove the Cutter unit.





A: Cutter cover
B: Load guide (tip)
C: Cutter guide plate
D: Tension assembly
E: Cutter unit connector
F: Belt

4. Removing the Load Roller

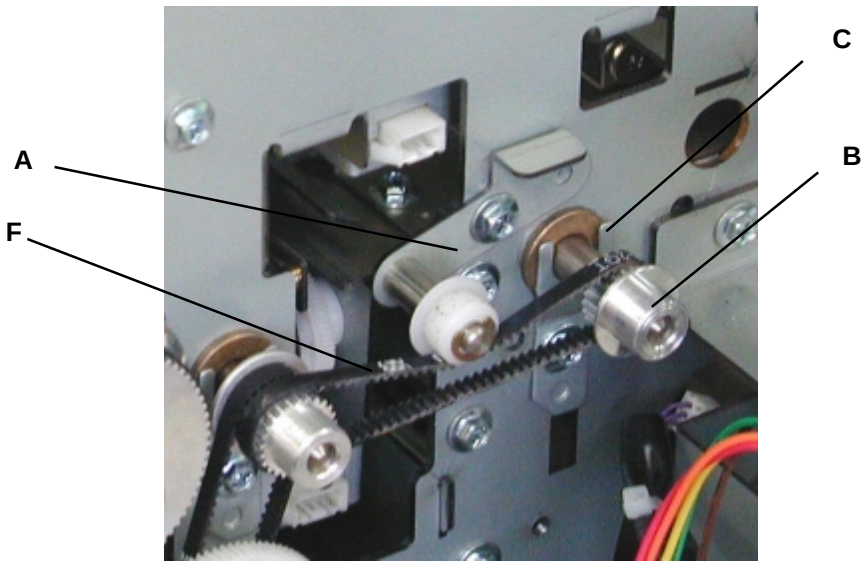
(1) Perform steps (1) to (4) to remove the cutter unit.

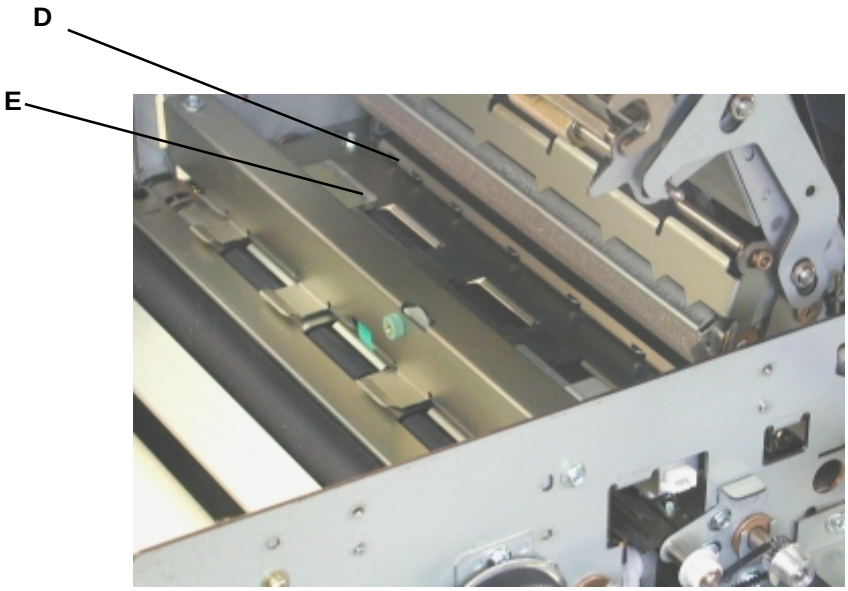
(2) Remove the Loading guide (bottom) [E]. (M4 x 8: 2 pcs)

(3) Loosen the screw (M4 x 8: 1 pc) on the Tension assembly [A], and remove the Belt [F].

(4) Remove the Pulley [B] (M2 x 6: 1 pc) and Bearing fixing plate [C] (M4 x 8: 1 pc).

(5) Remove the Load roller [D].





A: Tension assembly
B: Pulley
C: Bearing fixing plate
D: Load roller
E: Loading guide (bottom)
F: Belt

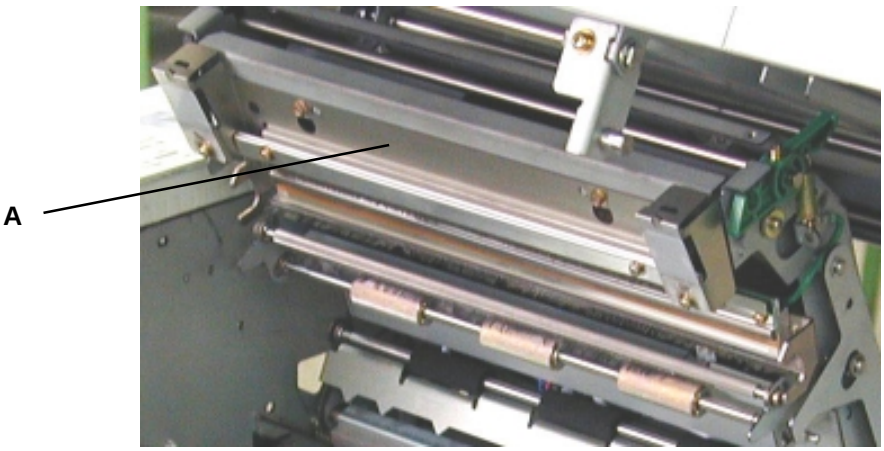
5. Removing the Thermal Print Head

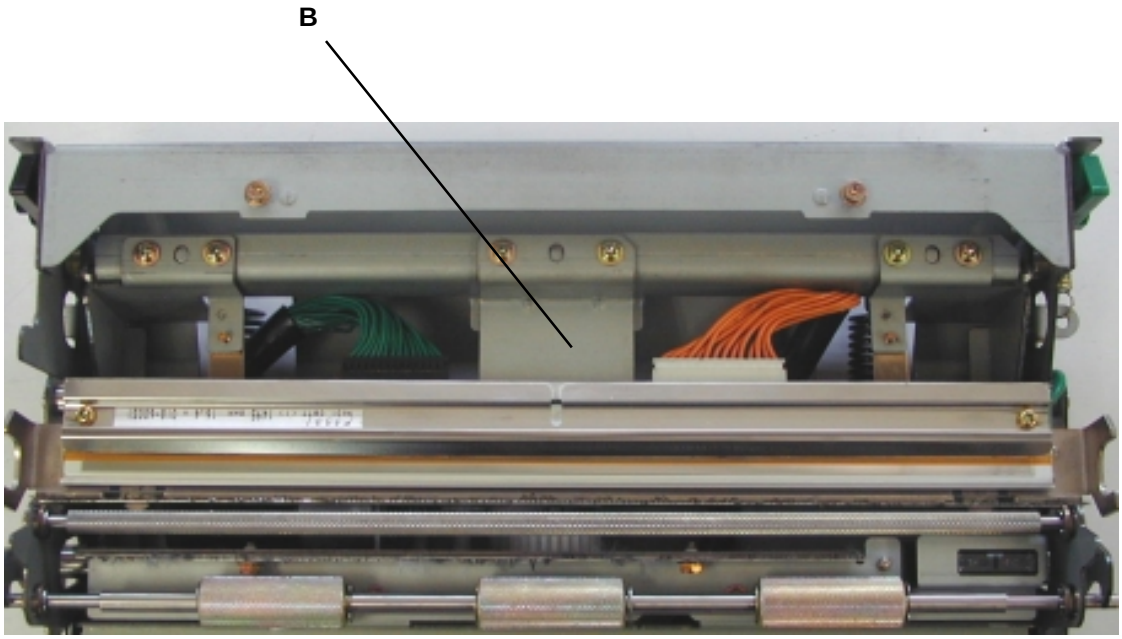
(1) Lift up the Master loading unit, and remove the Master loading unit bottom cover [A]. (Screws only need be loosened.)

(2) Remove the mounting screws on the TPH bracket [B]. (M3 x 6: 2 pcs)

(3) Remove the ground lead mounting screw. (M3 x 6: 1 pc)

(4) Unplug the two connectors, and remove the Thermal print head together with the TPH bracket.





A: Master loading unit bottom cover
B: TPH bracket

6. Removing the Master Loading Unit

(1) Move the Scanner table unit to the servicing position [A].

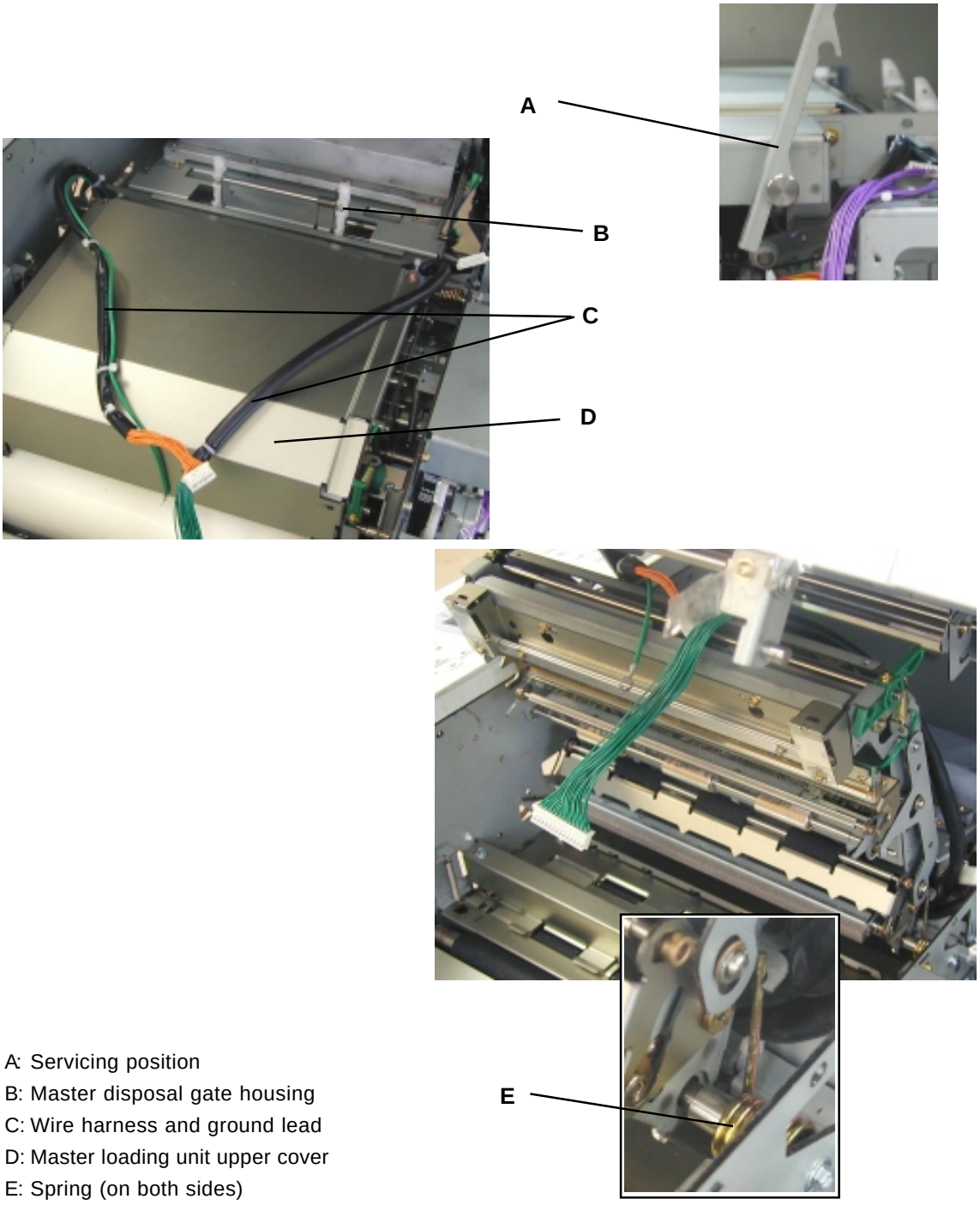
(2) Remove the Master loading unit upper cover [D]. (M3 x 6: 4 pcs)

(3) Remove the wire harness and ground wire [C], and place them on the Master loading unit.

(4) Open the Master disposal gate housing [B] as wide as possible. (Secure with a piece of cord or something similar.)

(5) With the Master loading unit opened as wide as possible, unhook the Springs [E] on both sides.

(6) Lift up the Master loading unit and remove.



A: Servicing position
B: Master disposal gate housing
C: Wire harness and ground lead
D: Master loading unit upper cover
E: Spring (on both sides)

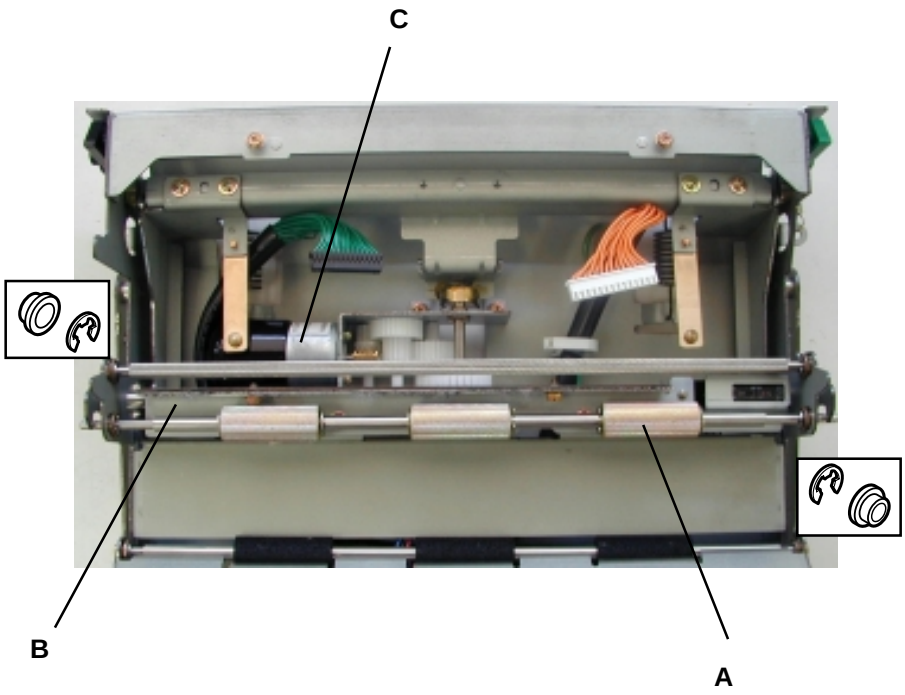
7. Removing the Thermal Pressure Motor

(1) Remove the Master loading unit.

(2) Remove the E-rings and bearings, and then remove the Load roller No. 1 (top) [A].

(3) Remove the De-electricity brush plate [B]. (M3 x 6: 2 pcs)

(4) Remove the Thermal pressure motor [C] as a unit. (M3 x 6: 4 pcs)



A: Load roller No. 1 (top)
B: De-electricity brush plate
C: Thermal pressure motor

Adjustment

1. Thermal power of thermal print head

The thermal power must always be set before making masters after the Thermal print head has been replaced.

Procedure

(1) Switch off the power to the system.

(2) Connect a multimeter across pin 1 (+) and pin 3 (-) of CN108 on the Power supply unit.

(3) Run test mode No. 238. (Switch the thermal print head voltage on/off using the START/STOP keys.)

(4) Check that the voltage reading on the voltmeter corresponds to the thermal print head resistances shown in the setting table.

(5) If different, adjust using VR301 (coarse adjustment) and VR302 (fine adjustment) on the Power supply unit.

Precautions During Setting

- Adjustments must be made after the Thermal print head has been installed.
- A voltage will not be applied across the Thermal print head unless the Scanner table is positioned and test mode No. 238 is run.

Setting table

Thermal print head resistance (Ohm)	Voltage (V)
1403--1413	15.9
1414--1431	16.0
1432--1449	16.1
1450--1467	16.2
1468--1485	16.3
1486--1503	16.4
1504--1522	16.5
1523--1540	16.6
1541--1559	16.7
1560--1577	16.8
1578--1596	16.9
1597--1615	17.0
1616--1634	17.1
1635--1653	17.2
1654--1672	17.3
1673--1692	17.4
1693--1711	17.5
1712--1731	17.6
1732--1750	17.7
1751--1770	17.8
1771--1790	17.9
1791--1810	18.0
1811--1830	18.1
1831--1850	18.2
1851--1871	18.3
1872--1891	18.4
1892--1898	18.5

2. Master Feeding Adjustments

1) Master cut position adjustment

This adjustment sets the master cutting timing (print drum stop position for cutting).

Checks and procedure

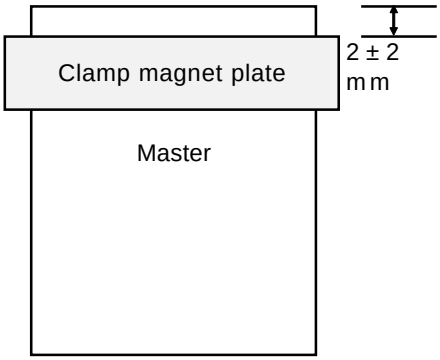
(1) Adjust if the tail end of the master mounted on the print drum is either too long or too short.

(2) Run test mode No. 284 to adjust.
Setting range: -100 to +100 (-10.0° to +10.0°)
Setting units: 1 (0.1°)
Default: 0 (±0°)

Increasing the settings increases the length of each master.

2) Master clamp range adjustment

Adjust the master clamp range when it is mounted.



Checks and procedure

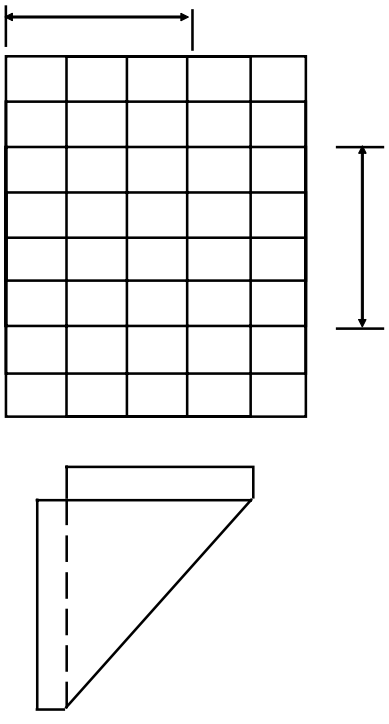
(1) Make a normal and confidential master, and then check the length of the master protruding from the Clamp magnet plate.
If the amount protruding is within 2 mm ±2 mm, it is normal. If it is outside this range, adjust as shown below.

(2) Run test mode No. 283 and adjust.
Setting range: -100 to +100 (-10.0 mm to +10.0 mm)
Setting units: 1 (0.1 mm)
Default: 0 (±0 mm)
Increasing the settings increases the amount of protrusion.

Note:
The relative positioning of already-made masters wound onto the print drum will change if the clamp range is adjusted. The master scanning start position must therefore be readjusted, and it must also be confirmed that the Vertical printing position adjustment is correct.

3) Master making image elongation/ shrinkage adjustment

Adjust the Write pulse motor speed for master making.



Checks and procedure

(1) Run test mode No. 051 Test print (mesh), and produce an actual print.
Printing is correct if the length of three blocks horizontally is the same as that for four blocks vertically. (Check by folding paper and illuminating from behind.) If it is not correct, adjust as shown below.

(2) Run test mode No. 287 and adjust.
Setting range: -50 to +50 (-5.0% to +5.0%)
Setting units: 1 (0.1%)
Default: 0 (±0%)
Increasing the settings elongates the image.

Note:
The vertical printing position must be readjusted after adjusting the elongation/shrinkage.

4) Write start position adjustment

Adjust the write start position (distance from master positioning sensor ON to read/write signal ON).

Adjustment for a leading edge margin of 5 mm assuming that the master clamp range has been correctly adjusted.

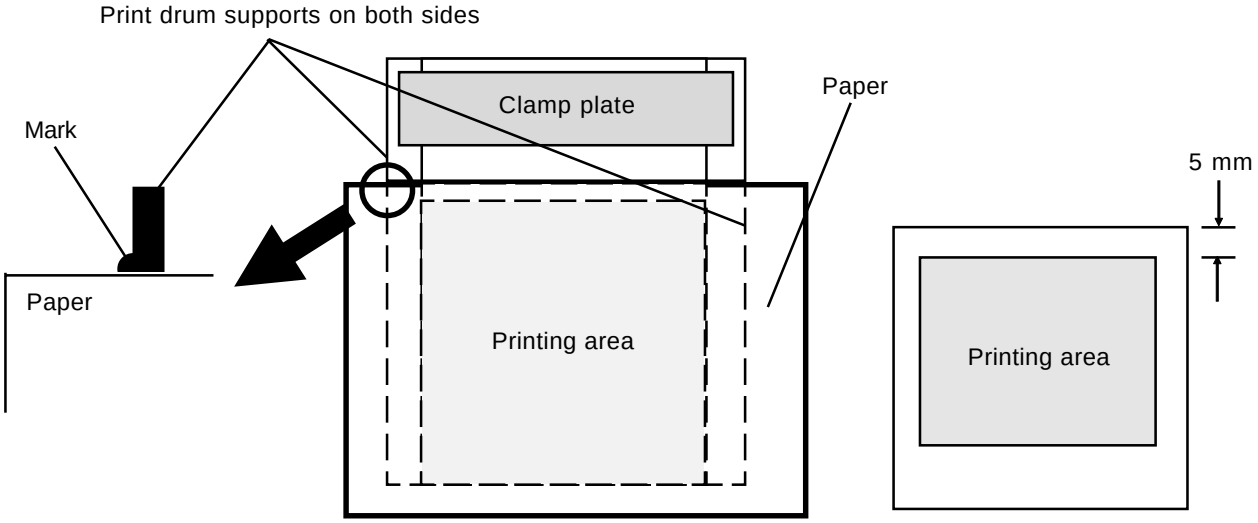
Checks and procedure

(1) Run test mode No. 050 Test print (check pattern), to confirm that the master clamp range is correctly adjusted.

(2) Cover the print drum surface, aligning the leading edge of the paper with the print drum support marks on either side as shown in the diagram, and then transfer the ink to the paper by rubbing from above.
The position is correct if the leading edge margin is 5 mm. If it is not correct, adjust as shown below.

(3) Run test mode No. 281 and adjust.
Setting range: -30 to + 50 (-3.0 mm to +5.0 mm)
Setting units: 1 (0.1 mm)
Default: 0 (±0 mm)

Increasing the settings lowers the write start position and increases the size of the paper leading-edge margin, moving the printing area downward.



5) Master making length adjustment

Adjust the master making area (scanning length)

Adjustment for a bottom edge margin of 2 mm assuming that the master clamp range has been correctly adjusted.

Checks and procedure

(1) Run test mode No. 050 Test print (Check pattern), remove the master created from the print drum, and measure the length.
The master is correct if the length is 357 mm. If it is not correct, adjust as shown below.

(2) Run test mode No. 282 and adjust.
Setting range: -100 to +100 (-10.0 mm to +10.0 mm)
Setting units: 1 (0.1 mm)
Default: 0 (±0 mm)

Increasing the settings increases the length of the master making area.

