

# Technical manual

## Thermal line printer M-T530A/T540A Series

Issued Date	200      ,      ,
Issued by	

English

401134701

## CONFIDENTIALITY AGREEMENT

BY USING THIS DOCUMENT, YOU AGREE TO ABIDE BY THE TERMS OF THIS AGREEMENT. PLEASE RETURN THIS DOCUMENT IMMEDIATELY IF YOU DO NOT AGREE TO THESE TERMS.

- ☐ This document contains confidential, proprietary information of Seiko Epson Corporation or its affiliates. You must keep such information confidential. If the user is a business entity or organization, you must limit disclosure to those of your employees, agents and contractors who have a need to know and who are also bound by obligations of confidentiality.
- ☐ On the earlier of (a) termination of your relationship with Seiko Epson, or (b) Seiko Epson's request, you must stop using the confidential information. You must then return or destroy the information, as directed by Seiko Epson.
- ☐ If a court, arbitrator, government agency or the like orders you to disclose any confidential information, you must immediately notify Seiko Epson. You agree to give Seiko Epson reasonable cooperation and assistance in the negotiation.
- ☐ You may use confidential information only for the purpose of operating or servicing the products to which the document relates, unless you obtain the prior written consent of Seiko Epson for some other use.
- ☐ Seiko Epson warrants that it has the right to disclose the confidential information. SEIKO EPSON MAKES NO OTHER WARRANTIES CONCERNING THE CONFIDENTIAL INFORMATION OR ANY OTHER INFORMATION ON THE DOCUMENT, INCLUDING (WITHOUT LIMITATION) ANY WARRANTY OF TITLE OR NON-INFRINGEMENT. Seiko Epson has no liability for loss or damage arising from or relating to your use of or reliance on the information on the document.
- ☐ You may not reproduce, store or transmit the confidential information in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise) without the prior written permission of Seiko Epson.
- ☐ Your obligations under this Agreement are in addition to any other legal obligations. Seiko Epson does not waive any right under this Agreement by failing to exercise it. The laws of Japan apply to this Agreement.

## Cautions

- ☐ Should any discrepancy exist between the contents of this document and the provisions of the "Master Contract" or "Specifications," the latter shall take precedence over the former.
- ☐ We shall not be responsible for any trouble that might occur from the application of this document by customer either to a machine other than this product, or to a drive circuit or other device that is the industrial property of a third party.
- ☐ No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Seiko Epson Corporation.
- ☐ The contents of this document are subject to change without notice. Please contact us for the latest information.
- ☐ While every precaution has been taken in the preparation of this document, Seiko Epson Corporation assumes no responsibility for errors or omissions.
- ☐ Neither is any liability assumed for damages resulting from the use of the information contained herein.
- ☐ Neither Seiko Epson Corporation nor its affiliates shall be liable to the purchaser of this product or third parties for damages, losses, costs, or expenses incurred by the purchases or third parties as a result of: accident, misuse, or abuse of this product or unauthorized modifications, repairs, or alterations to this product, or (excluding the U. S.) failure to strictly comply with Seiko Epson Corporation's operating and maintenance instructions.

- ❑ Seiko Epson Corporation shall not be liable against any damages or problems arising from the use of any options or any consumable products other than those designated as Original EPSON Products or EPSON Approved Products by Seiko Epson Corporation.

## Trademarks

EPSON® is a registered trademark of Seiko Epson Corporation.

General Notice: Other product and company names used herein are for identification purposes only and may be trademarks of their respective companies.

## Points That Must Be Observed To Assure Product Safety

To assure the safe operation of this product, carefully observe the specifications as well as the notes provided below.

Seiko Epson Corporation will not bear any responsibility for any damage or injuries arising from use of this product that is not in accordance with the specifications and the notes provided below.

### Notes on Head Control

- ❑ The conditions setting forth the maximum time power can be applied (and the maximum voltage that can be applied) to electronic components such as the head, motor, and magnets must be observed.

*If the maximum time power can be applied (or the maximum voltage that can be applied) is exceeded, the components mentioned above could overheat and start a fire or begin to smoke.*

- ❑ Always include protective circuitry governing the length of time power is applied and the amount of current that is applied when designing the drive and control circuits for the head, motor, magnets, etc.

*If protective circuitry is not included, misoperation of the printer control circuits could cause the components mentioned above to overheat and begin to smoke or burn.*

### Notes on Handling

- ❑ The case must be designed so that movable parts such as gears, etc., are not exposed.

*Touching moving parts could cause a laceration or other injury.*

---

## **About This Manual**

This manual is consisted of the following chapters.

<b>Chapter 1</b> <b>Features and Specifications</b>	This chapter contains features, general specifications for the M-T530A/T540A series.
<b>Chapter 2</b> <b>Operation Principle</b>	This chapter contains the outline and principles of mechanisms.
<b>Chapter 3</b> <b>Handling</b>	This chapter contains precautions on handling, paper loading/unloading paper and removing jammed paper.
<b>Chapter 4</b> <b>Maintenance</b>	This chapter contains cleaning, inspection, lubrication and tools.
<b>Chapter 5</b> <b>Repair</b>	This chapter contains repair levels, repair procedure and troubleshooting.
<b>Chapter 6</b> <b>Disassembly, Assembly and Adjustment</b>	This chapter contains disassembly, assembly and adjustment.
<b>Appendix</b> <b>Exploded Diagram and Lubrication Diagram</b>	Appendix contains the exploded, and the lubrication diagrams of the M-T530A/T540A series (for both the straight path and the curved path types).

---

## **Symbols**

Notes in this manual are identified by their level of importance, as defined below.



### **CAUTION:**

*Observe cautions to avoid minor injury to yourself, damage to your equipment, or loss of data.*



### **Note:**

*Notes have important information and useful tips on the operation of your equipment.*

---

## Contents

About This Manual .....	iii
Symbols .....	iii
Contents .....	iv
 <i>Chapter 1 Features and Specifications</i>	
Features .....	1-1
Model Name Labeling and Specifications .....	1-1
Printer Specifications .....	1-2
 <i>Chapter 2 Operation Principles</i>	
Outline of Mechanism .....	2-1
Drive Force Transmission Mechanism .....	2-2
Paper Feed Mechanism .....	2-4
Paper Feed Mechanism .....	2-4
Paper Feed Operation During Printing .....	2-4
Platen-open Mechanism .....	2-5
Printing Mechanism .....	2-6
Printing Operation Principle .....	2-6
Data Input and Printing .....	2-7
Paper Guide Mechanism .....	2-8
Curved Path Type Specifications (M-T531A/T541A) .....	2-8
Straight Path Type Specifications (M-T532A/T542A) .....	2-8
Detector Mechanism .....	2-9
Paper-end Detector Mechanism .....	2-9
Platen-open Detector Mechanism .....	2-10
Head Temperature Detector Mechanism .....	2-10
Black Mark Detector Mechanism (Optional) .....	2-11
Autocutter Mechanism .....	2-12
Fixed Blade Mechanism .....	2-12
Movable Cutter Blade Mechanism .....	2-12
Auto Cutting Operation .....	2-14
Emergency Cutter Mechanism .....	2-15
 <i>Chapter 3 Handling</i>	
Precautions .....	3-1
Shipping Precautions .....	3-1
Storage Precautions .....	3-1
Usage Precautions .....	3-2
Installation Precautions .....	3-3
Opening/Closing the Platen Unit .....	3-3
Loading/Removing Paper .....	3-4
Loading Paper .....	3-4
Replacing Paper .....	3-8
Removing Jammed Paper .....	3-8
 <i>Chapter 4 Maintenance</i>	
Cleaning .....	4-1
Head Cleaning .....	4-1
Removing Foreign Matter When the Cutter Locks .....	4-2
Removing Stains (Except for the Thermal Head) .....	4-2
Removing Dirt and Dust .....	4-2

Inspection .....	4-3
Daily Checks .....	4-3
Periodic Checks .....	4-3
Lubrication .....	4-3
Lubricant .....	4-3
Lubrication Standard .....	4-4
Lubrication Point .....	4-4
Tool List .....	4-4

#### *Chapter 5 Repair*

Repair Levels .....	5-1
Repair Procedure .....	5-1
Troubleshooting .....	5-2

#### *Chapter 6 Disassembly, Assembly and Adjustment*

Disassembly .....	6-1
Assembly .....	6-1
Pre-assembly A: Paper guide, straight, back unit .....	6-2
Pre-assembly B: Paper guide, curl, bottom unit .....	6-3
Pre-assembly C: Frame, platen, straight unit .....	6-4
Pre-assembly D: Frame, platen, curl unit .....	6-7
Pre-assembly E: Cutter motor assembly .....	6-10
Pre-assembly F: Cutter, cover sub-unit .....	6-11
Pre-assembly G: Cutter unit .....	6-14
Pre-assembly H: Black mark detector sub-assembly (optional) .....	6-16
Main Assembly A: Motor, Paper feed, receipt, B and Platen detector .....	6-17
Main Assembly B: Paper guide, straight, front and Paper guide, straight, back unit .....	6-19
Main Assembly C: Paper guide, curl, bottom unit .....	6-21
Main Assembly D: Frame, platen, straight unit .....	6-22
Main Assembly E: Frame, platen, curl unit .....	6-24
Main Assembly F: Thermal print head assembly .....	6-26
Main Assembly G: Plate, pressure spring .....	6-27
Main Assembly H: Fixing plate, Gear, reduction and Gear, idler .....	6-29
Main Assembly I: Cutter unit .....	6-30
Main Assembly J: Lead Wire Arrangement .....	6-31
Adjustment .....	6-32
Adjustment: Black mark detector .....	6-32

#### *Appendix Exploded Diagram and Lubrication Diagram*

M-T532A/T542A Exploded Diagram (for Straight Path Type) .....	A-1
M-T531A/T541A Exploded Diagram (for Curved Path Type) .....	A-2
M-T532A/T542A Lubrication Diagram (for Straight Path Type) .....	A-3
M-T531A/T541A Lubrication Diagram (for Curved Path Type) .....	A-4

Chapter 1

Features and Specifications

Features

The M-T530A and T540A series printers are one-station printers, designed to be used for issuing tickets and receipts at banks, kiosks and other similar locations.

- ☐ High speed printing:

maximum 150 mm/s (5.9"/s)
- ☐ High reliability

Service life:15 million lines

MCBF:37 million lines
- ☐ Platen-open mechanism allows for easy head cleaning, paper feeding, and paper jam removing.
- ☐ 79.5 mm (3.13") or 82.5 mm (3.25") paper width can be selected.
- ☐ Scissors-type automatic cutter is standard.
- ☐ Thick papers are available. (Paper thickness: 56 to 150 μm)
- ☐ Optional black-mark sensor
- ☐ Straight path or curved path can be selected for paper inlet.

Model Name Labeling and Specifications

The descriptions for model names and specifications are shown below.

Example:

M-T532AF

①

②

③

④

⑤

- ①

M-T500 series printer
- ②

Paper width

3: 79.5 mm ± 0.5 mm (3.13" ± 0.02")

4: 82.5 mm ± 0.5 mm (3.25" ± 0.02")
- ③

Paper path type

1: Curved path

2: Straight path
- ④

Autocutter is equipped.
- ⑤

Cut type

F: Full cut

P: Partial cut

## Printer Specifications

Printer specifications are shown below. Refer to the “M-T530A/T540A Specification” issued by Seiko Epson Corporation for details.

Table 1.1 Printer Specifications

Item		M-T530A series	M-T540A series
Printing method		Thermal line dot printing	
Dot density		8 dots/mm	
Paper feed method		Friction feed	
Print width	Maximum 80 mm (3.15")	72 mm (2.83") (Recommended)	74 mm (2.91") (Recommended)
Number of print columns	12 × 24 font	53 maximum (for 80 mm (3.15") print width)	
Printing speed	High speed mode	Maximum 150 mm/s (5.9"/s) at 24 V	
	Medium speed mode	100 mm/s (3.9"/s)	
	Low speed mode	50 mm/s (2"/s)	
Paper feeding speed		Maximum 150 mm/s (5.9"/s)	
Paper specifications	Paper type	Single-ply thermal paper roll	
	Recommended thermal paper	Original paper No.: P350 KSP Original paper No.: TF50KS-E Nippon paper industries Co., Ltd. Original paper No.: AF50KS-E JUJO THERMAL Original paper No.: PD160R Oji paper MFG. Co., Ltd. Original paper No.: AF50KS-E Nippon paper industries Co., Ltd. Paper quality will vary, depending on the paper type.	
	Paper dimensions	Width: 79.5 ± 0.5 mm (3.13 ± 0.02")	Width: 82.5 ± 0.5 mm (3.25 ± 0.02")  Outside diameter: 254 mm (10") maximum (The conditions for paper roll supply will differ depending of the outside diameter. For details, see “M-T530A/T540A Specification” issued by Seiko Epson Corporation.)
Power supply	Thermal head, Paper feeding motor and Autocutter	24 VDC ± 10%	
	Head control and detectors	5 VDC ± 5%	
Connectors	Thermal head and Head temperature detector	FFC connector	
	Paper feeding motor, Platen open detector, Autocutter, and Black mark detector (optional)	FFC connector	
Dimensions (W) × (D) × (H)		126.9 × 91.9 × 57.5 mm {5 × 3.62 × 2.26"} }	
Weight		Approximately 550 g	



*Table 1.1 Printer Specifications*

Item		M-T530A series	M-T540A series
Environmental conditions	Operating temperature	0 to 55 (32 to 131°F) [Reliable printing: 5 to 50 (41 to 122 °F)]	
	Operating humidity	10 to 80% (No condensation)	
Reliability	Printer service life	15 million lines	
	MCBF	37 million lines	
	Print head service life	100 km, one hundred million pulses	
	Autocutter service life	1,000,000 cuts	
Autocutter		Full cut or partial cut (one point (left side) left uncut) *Partial cut setting is not for The M-T540A.	
Paper path		Straight path or curved path	

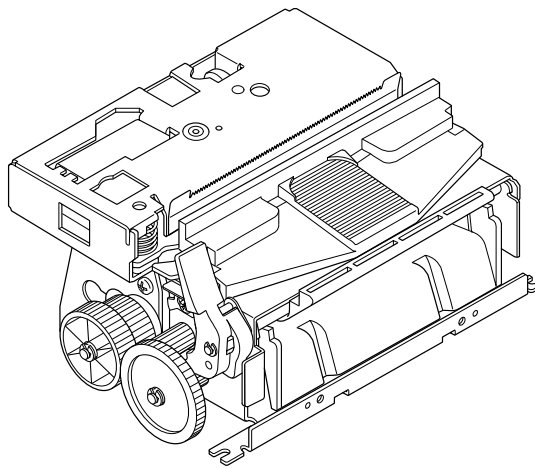
## *Chapter 2*

# **Operation Principles**

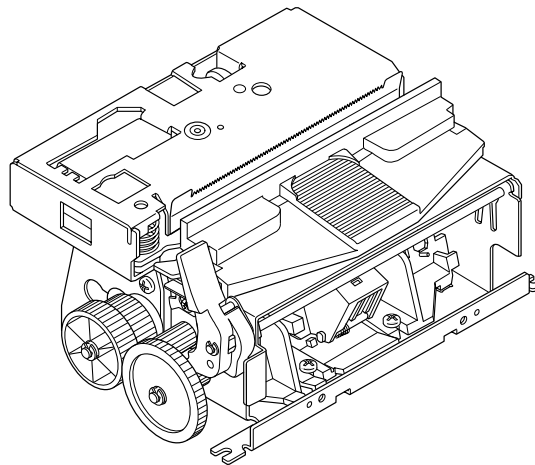
---

### **Outline of Mechanism**

The M-T530A/T540A series consist of the following six mechanisms: the drive force transmission mechanism, the paper feed mechanism, the printing mechanism, the paper guide mechanism, the detector mechanism, and the autocutter mechanism. The appearances of the M-T530A/T540A series for straight path and for curved path types are shown below.



*Figure 2-1 M-T531A/T541A appearance for curved path type*



*Figure 2-2 M-T532A/T542A appearance for straight path type*

## Drive Force Transmission Mechanism

This mechanism consists of the **Motor, paper feed, receipt, B** (fixed to pinion), the **Gear, reduction**, the **Gear, idler**, and the **Gear, platen**. The printer uses a stepping motor, the rotation force of which is reduced in sequence by the **Gear, reduction** and the **Gear, idler** before being transmitted to the **Gear, platen**. (The arrows in the figure below indicate the direction of the gear rotation.) The **Gear, platen** is mounted to the frame platen unit and separates from the **Gear, idler** when the **Platen** is open.

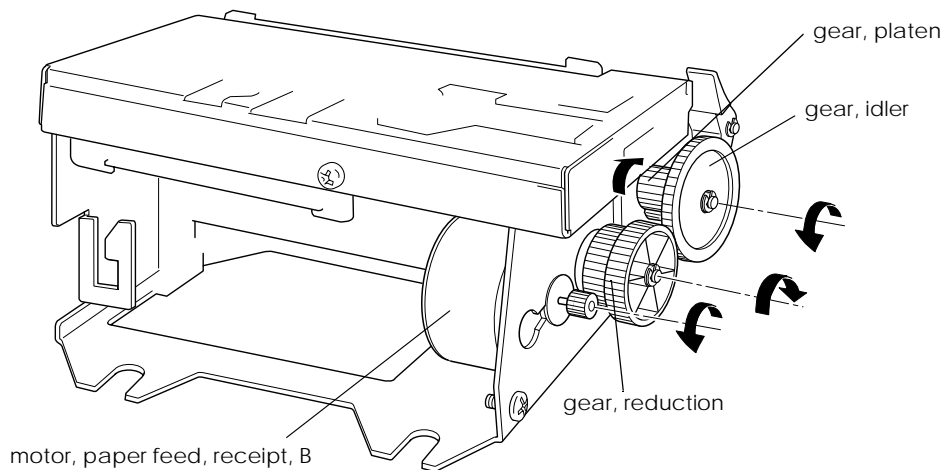


Figure 2-3 Drive force transmission mechanism

This printer uses a 4-phase bi-polar stepping motor driven by 24 V voltage controlled 2-2 phase excitation. The maximum drive frequency of 2-2 phase excitation is 1200 pps.

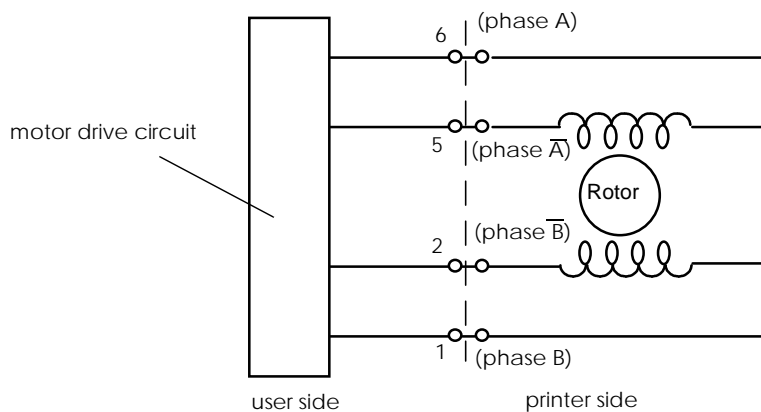


Figure 2-4 Motor wiring diagram

*Table 2-1 Motor Drive Sequence (2-2 phase excitation)*

<div>Step</div> <div>Pin No.</div>	1	2	3	4
6 (Red • Phase A)	H	H		
2 (Blue • Phase B)	H			H
5 (White • Phase $\overline{A}$ )			H	H
1 (Orange • Phase $\overline{B}$ )		H	H	

Note) Rotational direction: Counterclockwise rotation when viewed from the motor output shaft side.

*Table 2-2 Motor Drive Sequence (2-2 phase excitation)*

<div>Step</div> <div>Pin No.</div>	1	2	3	4
6 (Red • Phase A)			H	H
2 (Blue • Phase B)	H			H
5 (White • Phase $\overline{A}$ )	H	H		
1 (Orange • Phase $\overline{B}$ )		H	H	

Note) Rotational direction: Clockwise rotation when viewed from the motor output shaft side.

## Paper Feed Mechanism

This mechanism consists of the paper feed mechanism and the platen-open mechanism.

### Paper Feed Mechanism

The paper feed mechanism consists of the **Platen** ( paper feed roller) and the **Thermal head**. When the **Motor, paper feed, receipt, B** rotates counterclockwise as viewed from the shaft, the gear train transmits the motion to the **Platen** which rotates in direction A.

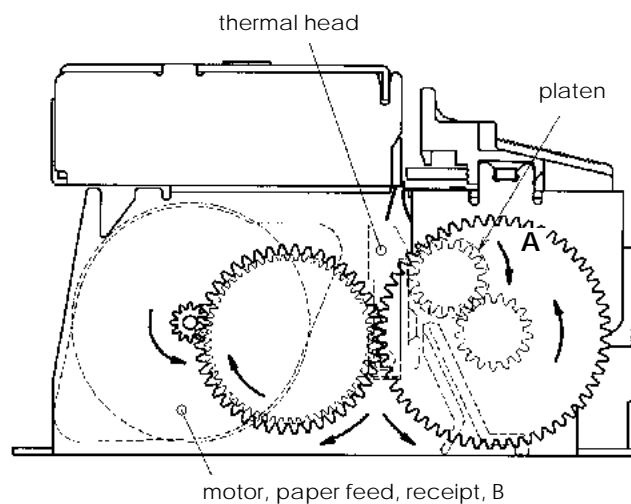


Figure 2-5 Paper feed mechanism

### Paper Feed Operation During Printing

The **Platen** presses the thermal paper against the **Thermal head** with a constant force. When the **Platen** rotates in direction A, the thermal paper advances in direction B.

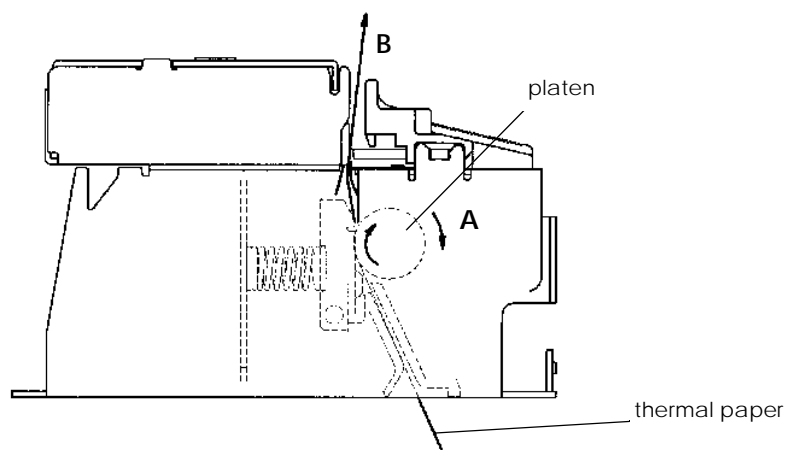


Figure 2-6 Paper feed operation during printing

### **Platen-open Mechanism**

The platen-open mechanism is used for the following purposes:

- Paper loading when using the printer with the curved path type. (Excluding when using semi-autoloading mode.)
- Removing a paper jam when the paper jam has occurred
- The Thermal head and the Platen cleaning

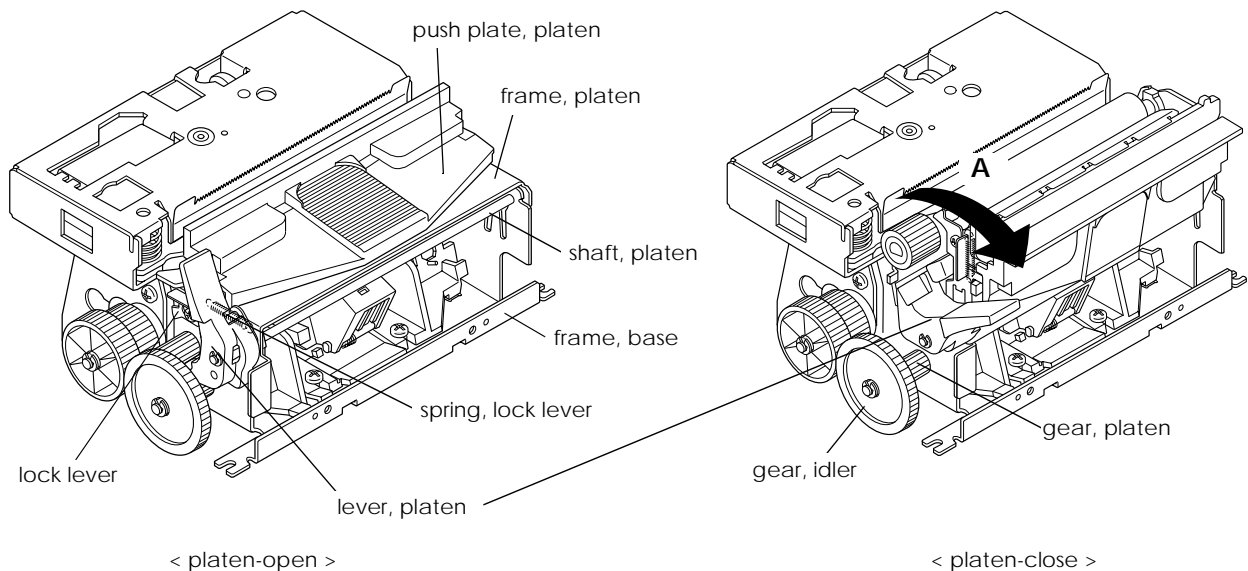
The mechanism consists of the Frame, platen, the Lever, platen, the Shaft, platen, the Lock lever, the Spring, lock lever, and the Pushplate, platen.

In the Frame, platen, the Platen is mounted. The Lever, platen is operated by hand to open the frame platen unit. The Shaft, platen connects the Lever, platen and the Frame, platen to the Frame, base in a manner which allows them to rotate. The Lock lever is located on the gear train side of the Frame, platen and locks the frame platen unit to the Frame, base. The Spring, lock lever (inside the Lock lever) pushes the Lock lever back and forth. The Pushplate, platen is secured on top of the Frame, platen and covers the Fixed blade.

When the frame platen unit is closed, the Platen is in the print-ready position where the Gear, platen and the Gear, idler are engaged and the power can be transmitted readily. Also, the Lock lever is locked at a part of the Frame, base to prevent the gears from disengaging.

To open the Platen, turn the Lever, platen in the arrow A direction as shown in Figure 2-7. Simultaneously, the Lock lever is released and the frame platen unit is opened.

To close the Platen, turn the Lever, platen in the opposite direction of the arrow A until the lever stops.



*Figure 2-7 Platen-open mechanism*

## Printing Mechanism

This mechanism consists of the **Thermal head** which has the head heating elements arranged in a series and has a driver IC for controlling voltage to the head heating elements, the **Platen** which is also used for the paper feed mechanism as well as this mechanism (the **Thermal head** is also used for both mechanisms), and the **Spring, press head**. The **Platen** presses the thermal paper wrapped around the **Platen** against the head heating elements pressed by the **Spring, press head**. When the elements are activated, the paper will be heated at the designated points, resulting in the printing action.

## Printing Operation Principles

The cross-sections of the **Thermal head** and the thermal paper are shown below. Printing is performed in the following steps:

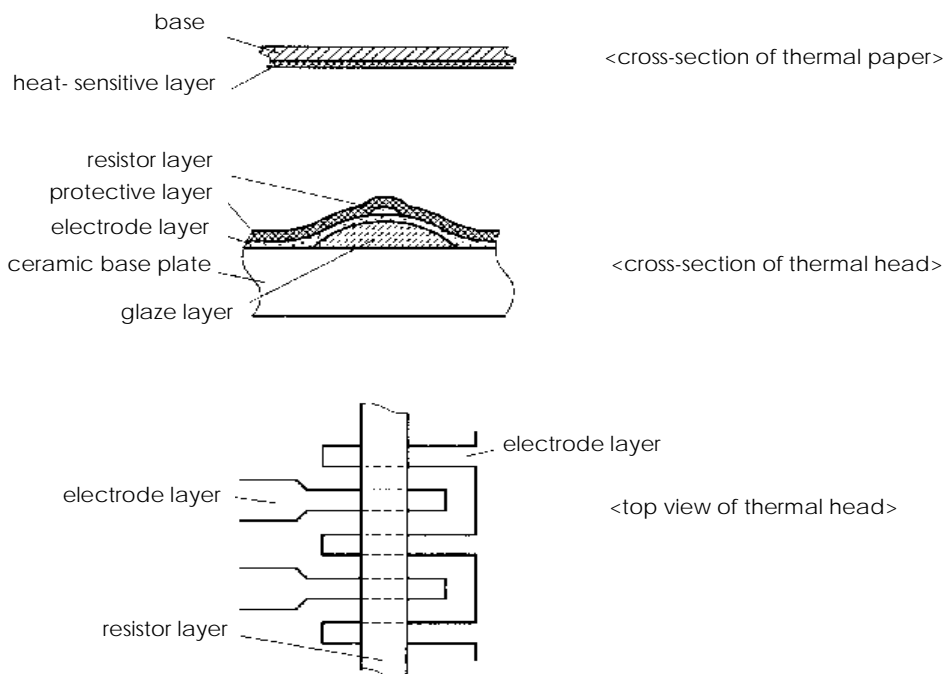


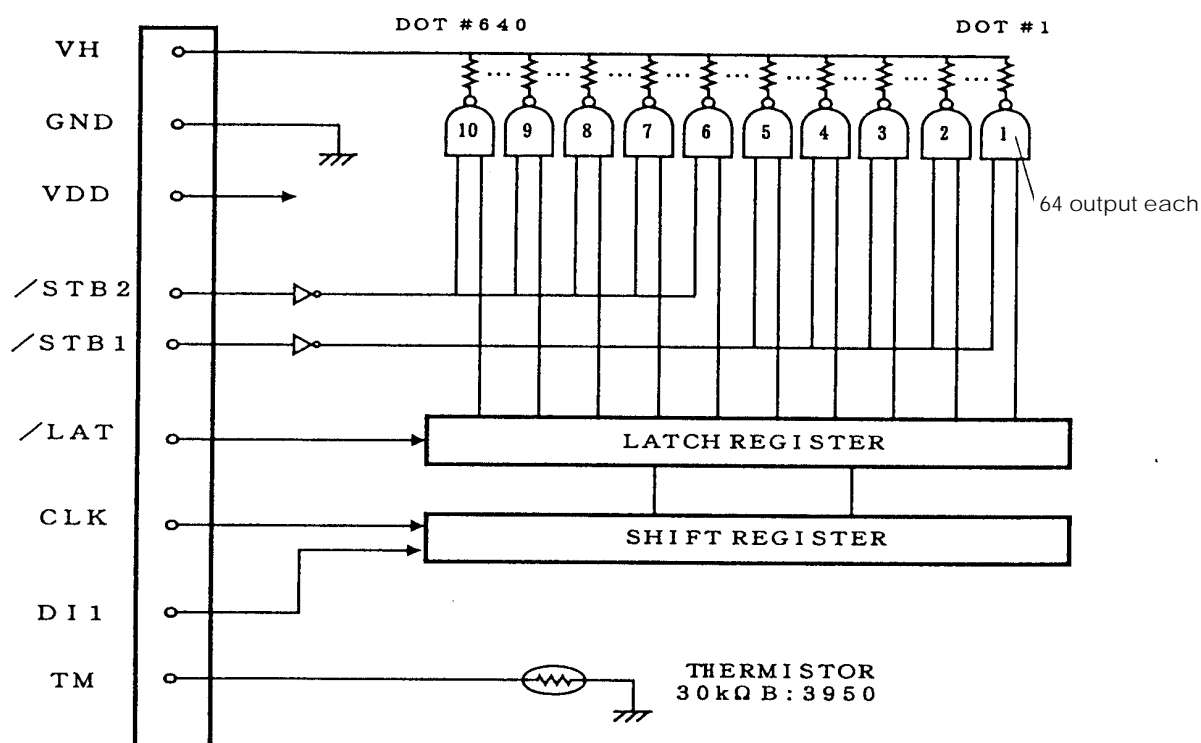
Figure 2-8 Cross -section of thermal head and thermal paper

1. Drive pulses are sent to the designated dot electrodes in accordance with the print signal.
2. Since the resistor layers are formed at the top of each electrode inside of the **Thermal head**, the resistor layers are heated up when the drive pulses are sent to the electrodes.
3. The thermal energy of the heated resistors is transferred via the protective layer of the **Thermal head** to the surface of the thermal paper, and the heat-sensitive layer of the paper changes color, thus forming the printed character.

## Data Input and Printing

The Thermal head consists of the head heating elements, the head driver, which controls or drives the head heating elements, and the Thermistor, which detects the temperature of the Thermal head. The serial print data input from Data In (DI1) is synchronized to the CLOCK (CLK) input, and temporarily placed in the SHIFT REGISTER. Using the LATCH (/LAT) signal timing, these data are then stored in the LATCH REGISTER. Activated by the STROBE signals (/STR1, /STR2), the stored print data is used to control the gate ON condition for the head heating element drive pulse.

This printer is equipped with two strobes, and can print using a maximum of two divisions. The drive pulse width is controlled in accordance with the temperature measured by a Thermistor integrated in the Thermal head, the head supply voltage, and user setting values. (For details, refer to the "M-T530A/T540A Specifications" issued by Seiko Epson Corporation.)



\*The STB terminals are pulled down in the control IC.

Figure 2-9 Thermal head block diagram

Table 2-3 Strobe and Dot Number

STROBE No.	Dot No.	Dots/STROBE
1	1 to 320	320
2	321 to 640	320

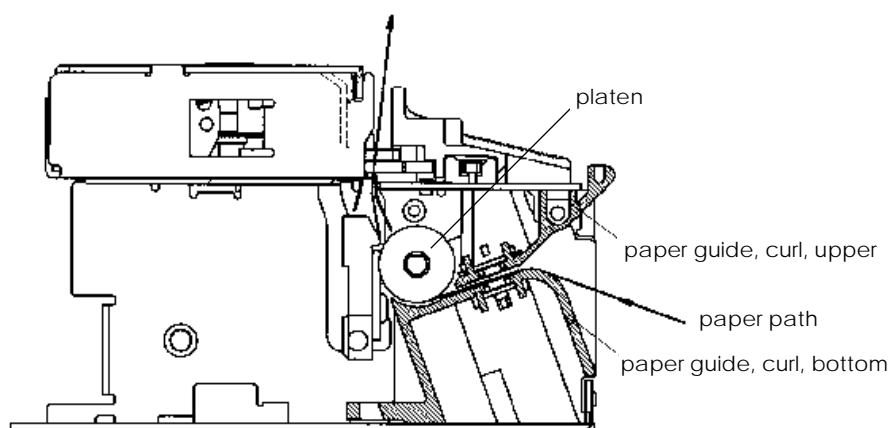


## ***Paper Guide Mechanism***

This mechanism consists of the paper guide mechanism. As shown in Figures 2-7 and 2-8 below, either the curved path or the straight path type can be selected to meet the user's needs.

### ***Curved Path Type Specifications (M-T531A/T541A)***

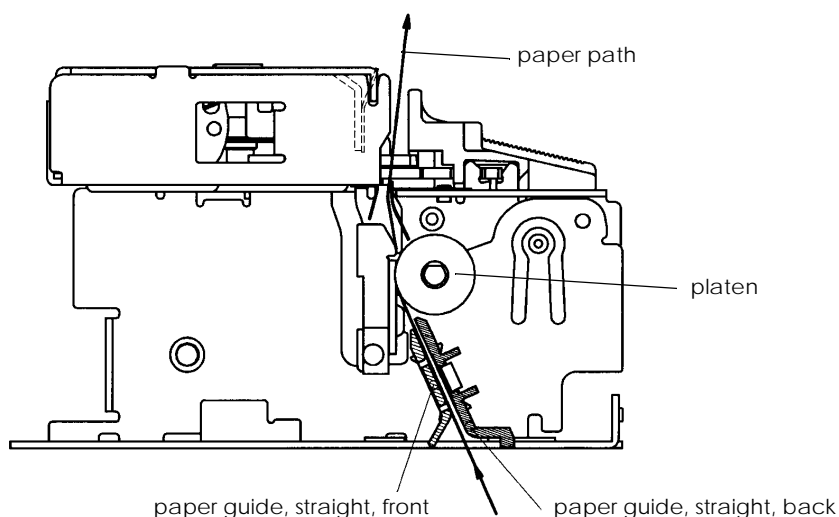
The paper path for the curved path type consists of the Paper guide, curl, upper and the Paper guide, curl, bottom. The paper path is shown below.



*Figure 2-10 Paper path for curved path type*

### ***Straight Path Type Specifications (M-T532A/T542A)***

The paper path for the straight path type consists of the Paper guide, straight, front and the Paper guide, straight, back. The paper path is shown below.



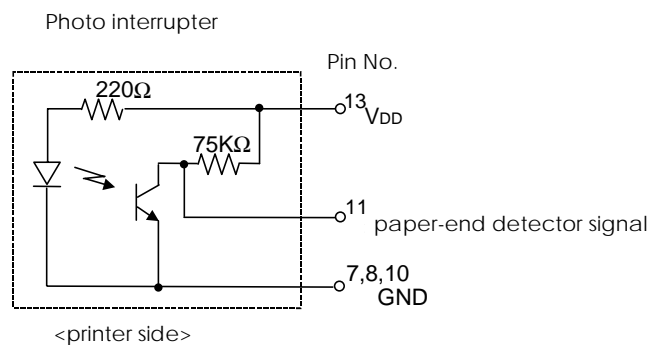
*Figure 2-11 Paper path for straight path type*

## ***Detector Mechanism***

This mechanism consists of the paper-end mechanism, the platen-open detector mechanism, the head temperature detector mechanism, and the black mark detector mechanism (optional).

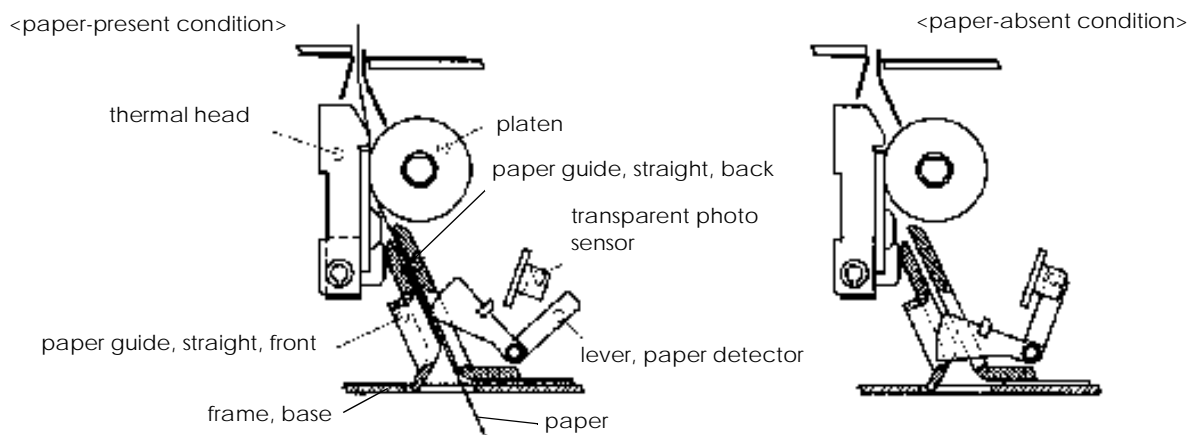
### ***Paper-end Detector Mechanism***

The paper-end detector mechanism is located inside the paper guide mechanism to detect the end of the thermal paper and the paper insertion state in the semi-autoloading mode. This mechanism consists of the **Transparent photo sensor**, the **Lever, paper detector** which presses against the thermal paper and the **Spring, paper detector** which pulls the **Lever, paper detector**.



*Figure 2-12 Paper -end detector circuit*

The **Transparent photo sensor** is in a high state (HI) when the paper is present, and in a low state (LOW) when the paper is not present because the **Lever, paper detector** blocks light to the sensor. When the end of the thermal paper passes through the paper guide, the **Lever, paper detector** operates as shown in Figure 2-13. At this time, the output level from the **Transparent photo sensor** varies as shown in Figure 2-14, then the absence of paper is detected. When the semi-autoloading function is used, the insertion of paper changes the status from “no paper” to “paper.” Since the output level changes from LOW to HI, the status changes to “paper”; then the semi-autoloading function is initiated.



*Figure 2-13 Paper-end detector mechanism for straight path type*



Figure 2-14 Paper-end detector operation

## Platen-open Detector Mechanism

The platen-open detector mechanism has a Microswitch which detects whether the Platen is open (printing impossible because the Thermal head is away from the Platen) or closed (printing possible). The Microswitch can be OFF only when the Frame, platen is perfectly closed, and at all other times is ON.

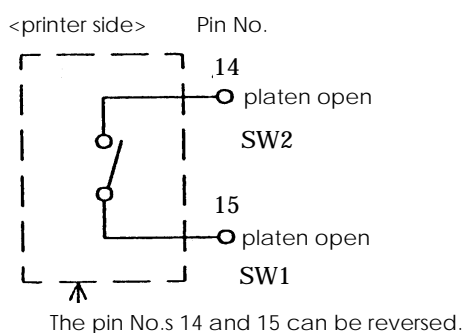


Figure 2-15 Platen-open detector circuit

## Head Temperature Detector Mechanism

The Thermal head has a Thermistor to detect the temperature of the Thermal head.

### Black Mark Detector Mechanism (Optional)

The black mark mechanism is a device which can be attached inside the paper guide mechanism to determine the printing position when using pre-printed thermal paper. This mechanism uses the reflective photo sensor.

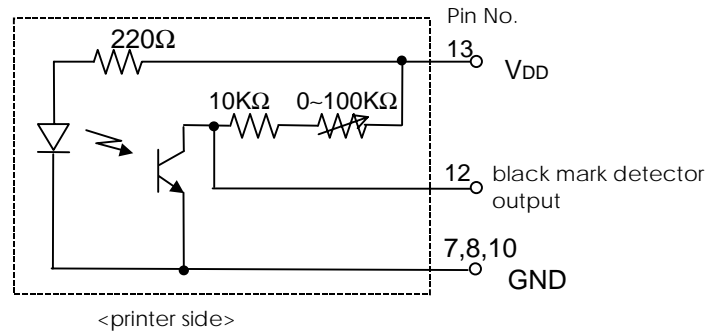


Figure 2-16 Black mark detector circuit

Black marks are detected through changes in output level from the reflective photo sensor. The changes in reflectivity between the pre-printed black marks and blank areas of the thermal paper cause the amount of light returning to the sensor to vary; then the sensor output level is also varied as shown in Figure 2-17. These variations are used to detect the black mark. Since the relationship between the black mark and the print position can be specified in the printer set up, detecting the black mark permits the correct positioning of the paper.

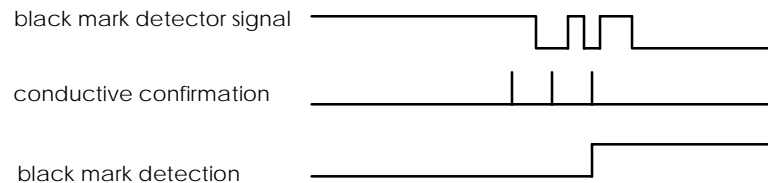


Figure 2-17 Black mark detecting operation



**Note:**

The reflective photo sensor used in the black mark detector mechanism must be properly adjusted the output power voltage during assembly. This adjustment is also required when the black mark detector sub-assembly is supplied as an after-service-part.

## Autocutter Mechanism

This mechanism consists of the fixed blade mechanism, the movable cutter blade mechanism and the emergency cutter mechanism.

The basic principle of the autocutter mechanism is an application of the scissors principle, where the paper is cut by two crossing blades. A configuration which allows the two blades to separate has been adopted so that the **Fixed blade** separates from the **Movable cutter blade** when the **Platen** is open.

### Fixed Blade Mechanism

This mechanism is mounted on the frame platen unit. This configuration consists of the **Fixed blade** which cuts the paper directly, the **Spring, fixed blade** which stabilizes the vertical positioning of the **Fixed blade**, and the **Cover, fixed blade** which covers the **Fixed blade** and is a paper guide as well as makes the operation to open the **Platen** safe.

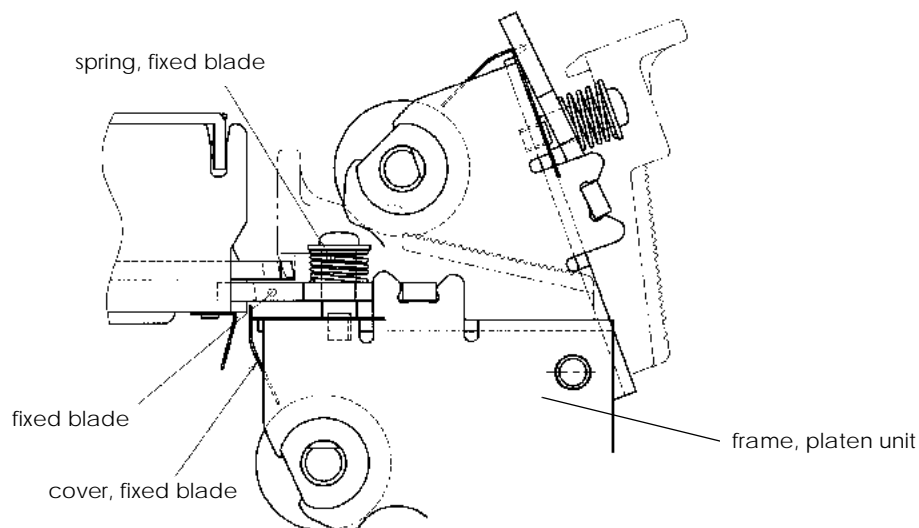


Figure 2-18 Fixed blade mechanism

### Movable Cutter Blade Mechanism

This mechanism is mounted on the **Frame, base**.

The drive force transmission mechanism is on the **Cover, cutter side**. The **Motor, cutter**, which is a DC brush motor attached the **Gear, cutter motor**. It supplies the power and is attached on the **Cover, cutter** with screws. The **Gear, reduction A/C** and the **Gear, cutter worm** are supported by the **Shaft, reduction A/C**, and the **Gear, cutter drive** is attached with push nuts to the **Shaft, cutter drive gear** fixed on the **Cover, cutter**.

After being transmitted through the **Gear, reduction A/C** and the **Gear, cutter worm**, the power is transmitted to the **Gear, cutter drive**. The **Gear, reduction A/C** is pushed against the **Gear, cutter worm** by the **Spring, cutter clutch** and the **Washer, Clutch**, forming a one-way clutch which is used to cut off the transmission of power when the transmitted load exceeds a prescribed level during paper cutting.

The rotational movement of the Gear, Cutter Drive is translated to the back and forth movement of the Movable Cutter Blade by being engaged the Shaft, movable cutter blade drive with the oval hole of the Movable blade on the Frame, cutter. Also, the Microswitch attached to the Cover, Cutter is connected to the Gear, Cutter Drive, enabling it to detect the position of the Movable Cutter Blade. The lead wires of the Motor, Cutter and the Microswitch are bound together and connect to the Circuit board.

The Shaft, movable cutter blade is on the Frame, cutter side. The Receiver, movable cutter blade, the Spacer, movable cutter blade, the Spring, movable cutter blade and the Washer, movable cutter blade spring are mounted on the Shaft, movable cutter blade in a group with a push nut.

When putting the Cover, cutter and the Frame, cutter together, engage the Shaft, movable cutter blade drive with the oval hole of the Movable cutter blade, and secure the Cover, cutter and the Frame, cutter with screws.

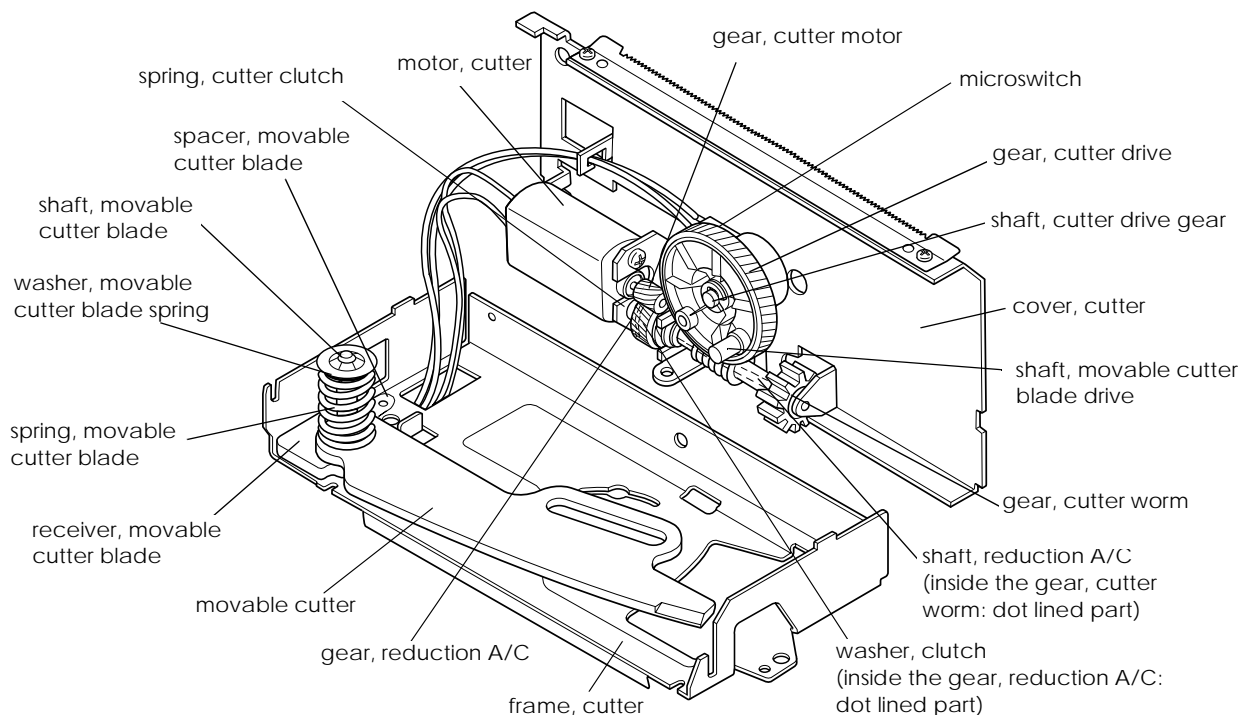


Figure 2-19 Movable cutter blade mechanism

## Auto Cutting Operation

The Autocutter will operate when the frame platen unit is closed and a paper is loaded. (The frame platen unit can be closed when the Movable cutter blade is in the standby position. The auto cutting operation is performed in the following steps:

1. Drive the Motor, cutter in the forward rotation.
2. The Microswitch is switched from OFF (open) to ON (closed), while the Motor continues to rotate in the forward rotation. The Movable cutter blade intersects with the Fixed cutter blade and cuts the paper from the right to the left, to the direction of the first column.
3. After cutting the paper, the Movable cutter blade starts to return to the home position.
4. As the Movable cutter blade approaches the home position, the Microswitch is switched from ON (close) to OFF (open); then the Motor, cutter stops rotating and the brake is applied.

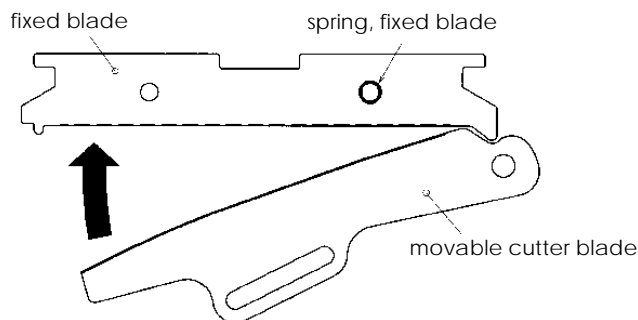


Figure 2-20 Auto cutting operation

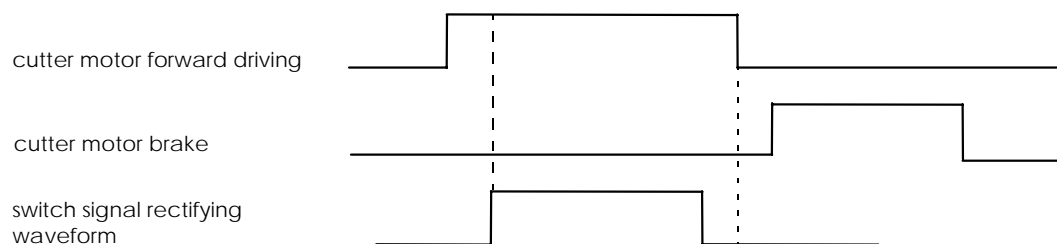
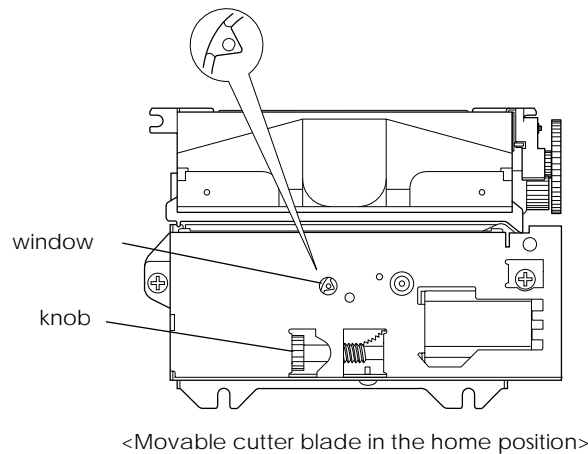


Figure 2-21 Auto cutting control example

**Note:**

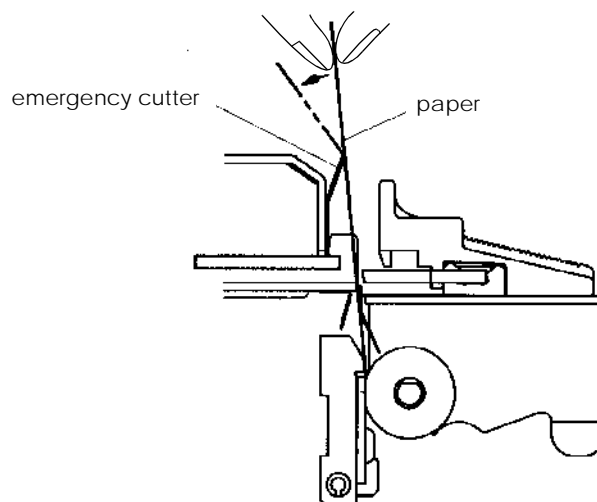
*If the Movable cutter blade can not be returned to the home position because of a foreign matter locking the blade when powered by the Motor, rotate the knob on the Gear, cutter worm with a tool such as a ball-point pen or tweezers to move the Movable cutter blade to the home position. The window on the Cover, cutter can be used to check if the Movable cutter blade has returned to the home position.*



*Figure 2-22 Home position check*

**Emergency Cutter Mechanism**

The Emergency cutter is attached to the Cover, frame with screws near the paper exit. If the autocutter mechanism fails to operate properly because of some trouble, the Emergency cutter can be used to cut the paper manually.



*Figure 2-23 Emergency cutter mechanism*



## *Chapter 3*

---

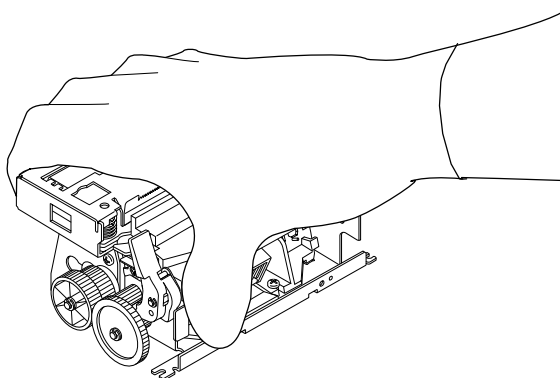
# **Handling**

---

### **Precautions**

#### **Shipping Precautions**

- ☐ When shipping the unit, do not hold it by the motor lead wires or the FFC (especially the FFC terminal).
- ☐ Avoid severe impact to the printer, such as dropping or collisions.
- ☐ Hold both sides of the printer as shown below.



*Figure 3-1 Correct way of holding the printer*

- ☐ To avoid static electricity damage to the **Thermal head**, do not touch the FFC terminal with bare hands. Use proper anti-static procedures such as using anti-static mats and body grounding before handling the printer.
- ☐ Ship the printer with the platen unit closed.
- ☐ Use anti-static packing materials when shipping.

#### **Storage Precautions**

##### **Printer**

- ☐ Do not store the printer in locations which are subject to excessive dust or dirt, direct sunlight, high temperature, or high humidity.
- ☐ Before storing the printer for an extended period, remove the printer paper, clean the **Platen** and the **Thermal head**, and close the platen unit after the alcohol evaporates. (For the cleaning method, see “Head cleaning procedure” on page 4-1.)

**Note:**

*If you leave the printer with the paper installed, discoloration of the paper and stickiness between the paper and the Platen may occur. In this case, replace the paper.*

- ❑ Storing the printer for an extended period with the **Platen** closed could cause the platen rubber to deform and result in defective printing. If the platen rubber is deformed, it can be restored to its proper shape by feeding paper through the printer. Just feed paper through the printer until the **Platen** works properly; then resume printing.

**Printer Paper (Thermal paper)**

- ❑ Avoid heat, humidity, sunlight and solvents, regardless of whether or not the paper has been used. (Thermal paper gradually darkens at about 70°C {158°F})
- ❑ Avoid locations which have high temperature and humidity (for example, in winter near a heater, or in summer in a hot room or in direct sunlight). If the paper is stored in direct sunlight, both the paper and the printed characters may be discolored.

**Usage Precaution****Printer**

- ❑ Since the printer contains permanent magnets (in the motor) as well as electromagnets, it should not be used in locations which are subject to excessive dirt, dust or metallic dust.
- ❑ Never print without paper installed and with the head away from the **Platen**, because the life of the **Thermal head** may be shortened.
- ❑ Never pull out the paper (forward or backward) with the head down (against the **Platen**).
- ❑ Since the head heating elements and the driver IC are very delicate, avoid touching them with any metal objects, such as tweezers or screwdrivers.
- ❑ Since the head area and the **Motor** surface are hot right after printing, never touch them with your bare hands; wait about 15 minutes for them to cool.
- ❑ Operate the **Head-up** lever only when required.
- ❑ Never touch the surface of the head heating elements or the driver IC. You could cause damage from static electricity or your fingers could cause dirt to stick to the head heating elements, possibly making them fail.
- ❑ Before handling the **Thermal head**, use proper body grounding procedures to avoid static electricity.
- ❑ Make sure no dust collects on the thermal paper.
- ❑ Since the printer uses a line thermal print head, condensation must be avoided. If condensation occurs, do not turn on the printer until it has disappeared.
- ❑ Do not apply excessive pressure to the **Thermal head** connectors. The FFC can be replaced up to ten times.

- ❑ Do not apply excessive pressure to the **Lever, platen** when opening or closing the platen unit with the lever.

### *Paper (Thermal paper)*

Use only the recommended thermal paper because thermal paper made with a high ion content, such as Na, K and Cl may damage the head heating elements.

### *Installation Precaution*

When installing the printer in your device, avoid areas containing dust, dirt and metallic powder.

---

### *Opening/Closing the Platen Unit*

The platen unit can be opened or closed using the **Lever, platen** (green lever) located on the left side of the printer. When the platen unit is open, the head separates from the **Platen**, allowing paper to be set in the unit. It is also possible to close the unit by pushing down on the **Push plate, platen** directly. Press down on it until it clicks into place on the frame.

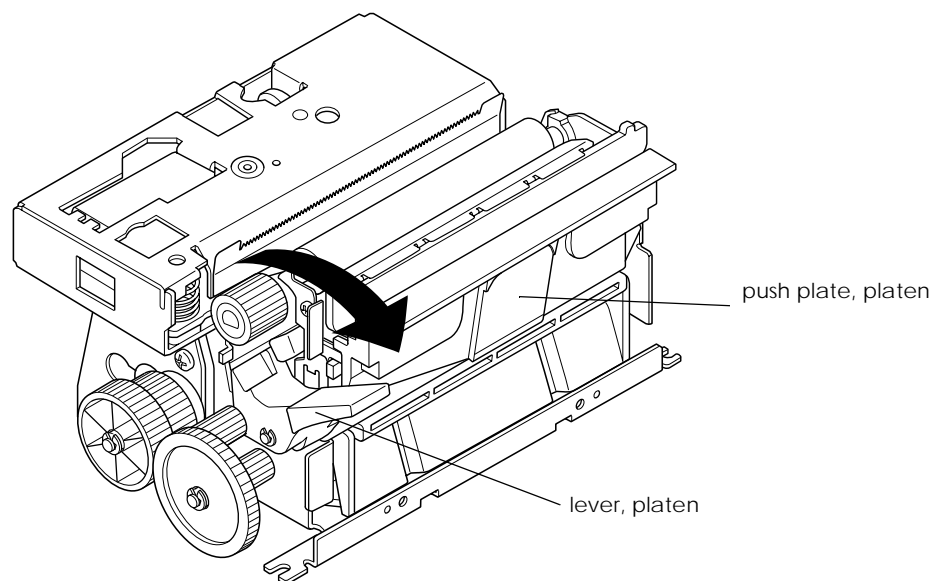


Figure 3-2 Opening/closing the platen unit

## Loading/Removing Paper



### Note:

- ❑ Use only the specified paper in the “M-T530A/T540A Specification” issued by Seiko Epson Corporation.
- ❑ Performing operation other than the procedures and the notes described in the following can cause improper paper feeding and jamming.

## Loading Paper

Follow the steps below to load the paper.

### Paper insertion for curved path type (M-T531A/541A)

#### Platen-close paper insertion

1. Cut the edge of the paper as shown below.

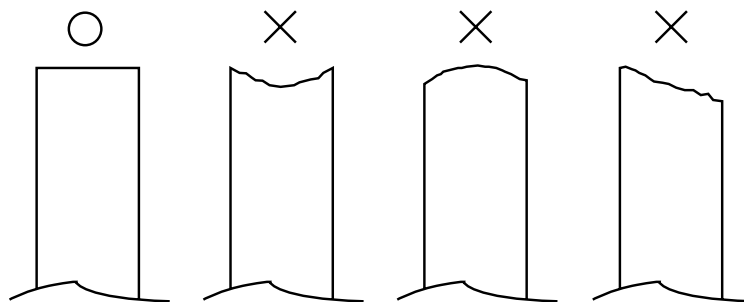


Figure 3-3 Shape of paper edge

2. Make sure that the correct side for the paper to insert, then insert the paper into the paper entrance at a right angle.

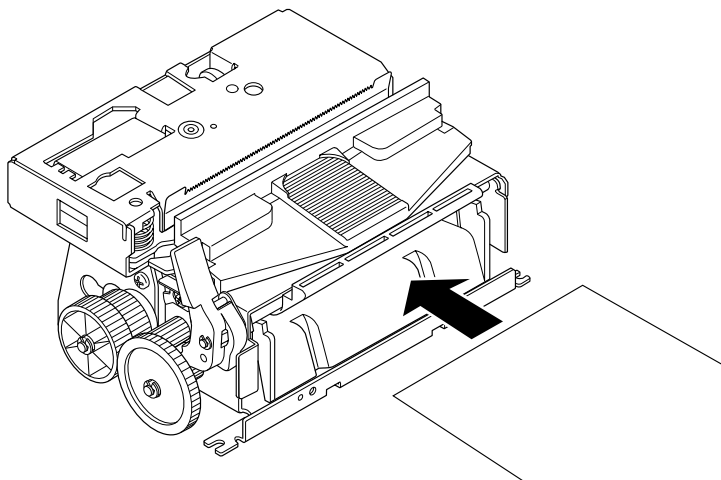


Figure 3-4 Platen-close paper insertion for curved path type



**Note:**

- Make sure that the paper is not wrinkled or torn.
  - To avoid paper jams, do not fold the edge of the paper.
  - Paper curled in the opposite direction from the paper entrance might be difficult to insert.
3. When the paper is detected by the paper-end detector at the paper entrance, the paper feed motor enters the semi auto-loading mode.  
(See the “M-T530A/T540A Specification” issued by Seiko Epson Corporation for the setting of the semi auto-loading mode.)
  4. Push the paper further into the paper entrance; then the paper is fed automatically.



**Note:**

*If the paper is not inserted at a right angle, paper jams may occur. In this case, raise the Lever, platen to open the platen unit, and load the paper properly after removing a paper jam.*

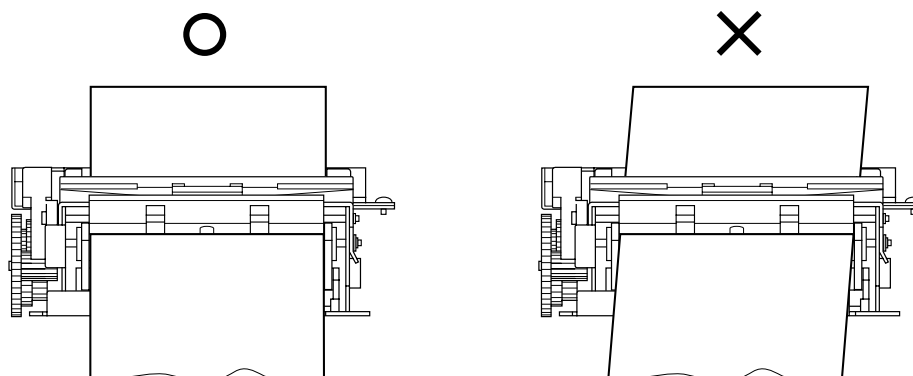
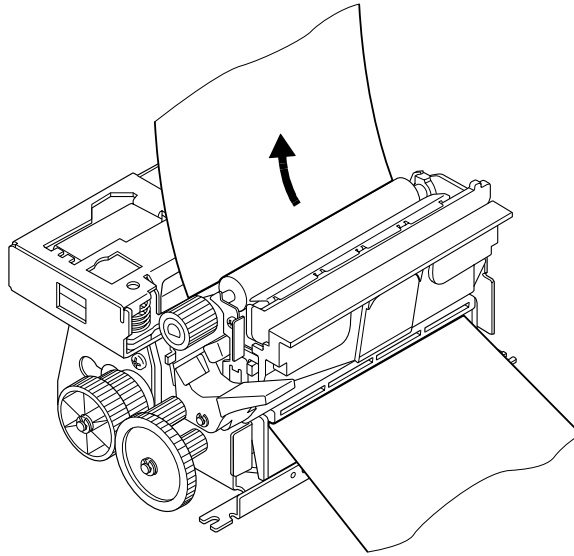


Figure 3-5 Correct way of loading paper

## *Platen-open paper insertion*

1. Cut the edge of the paper as shown in Figure 3-3.
2. Turn the Lever, platen to open the platen unit.
3. Make sure to note the correct side for the paper to insert, then insert the paper into the paper entrance at a right angle with your hands.



*Figure 3-6 Platen-close paper insertion for curved path type*

4. Pull out the edge of the paper from the paper exit.
5. After confirming that the paper is inserted straight, turn the Lever, platen or push the Push plate, platen down to close the platen unit. At this time, make sure that platen unit is closed securely.



### **Note:**

*If the paper is not inserted at a right angle, paper jams may occur. In this case, raise the Lever, platen to open the platen unit, and load the paper properly after removing a paper jam. (See Figure 3-5 for the proper paper loading.)*

6. Tear off the extra paper with the Emergency cutter.

**Paper insertion for straight path type (M-T532/T542)***Platen-close paper insertion*

1. Cut the edge of the paper as shown in Figure 3-3.
2. Make sure that the correct side for the paper to insert; then insert the paper into the paper entrance at a right angle.

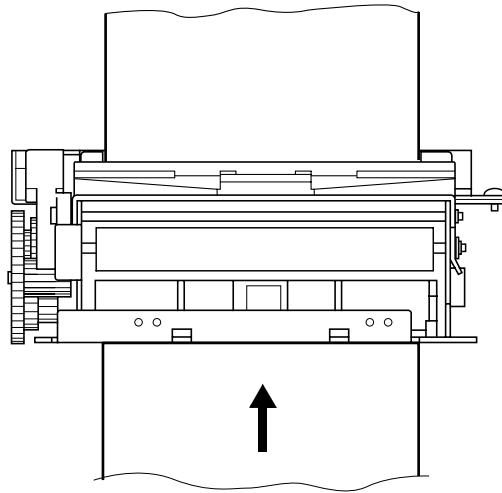


Figure 3-7 Platen-close paper insertion for straight path type

**Note:**

- Make sure that the paper is not wrinkled or torn.
  - To avoid paper jams, do not fold the edge of the paper.
  - Paper curled in the opposite direction from the curved path might be difficult to insert.
3. When the paper is detected by the **Paper-end detector** at the paper entrance, the paper feed motor enters the semi-auto-loading mode.  
(See the “M-T530A/T540A Specification” issued by Seiko Epson Corporation for the setting of the semi auto-loading mode.)
  4. Push the paper further into the paper entrance; then the paper is fed automatically.

**Note:**

*If the paper is not inserted at a right angle, paper jams may occur. In this case, raise the Lever, platen to open the platen unit, and load the paper properly after removing a paper jam.  
(See Figure 3-5 for the proper paper loading.)*

*Platen-open paper insertion*

The paper is normally inserted with the **Platen** closed, but can also be inserted while the **Platen** is open. Refer to “Platen-open paper insertion for curved path type” when you insert the paper with the **Platen** open.

---

## Replacing Paper

### **CAUTION:**

- ❑ *Never pull the paper out with the **Lever, platen** down.*
- ❑ *Never perform operations other than those described above since such operations can cause improper paper feeding and jamming, and damage the head heating elements.*

Follow the steps below to replace the paper.

1. Open the platen unit using the **Lever, platen** and pull the paper out. The paper can also be removed by feeding the paper until it is unloaded from the **Platen** after cutting the paper at the paper entrance side.
2. Load a new paper. (See previous section for loading the paper.)

---

## Removing Jammed Paper

### **CAUTION:**

- ❑ *Since the head area and the **Motor** surface are hot right after printing, wait about 15 minutes for it to cool.*
- ❑ *When using a tool such as tweezers to remove paper chips, take care not to touch the head heating elements with the tool.*

If a paper jam occurs, follow the steps below.

1. Cut the paper at the paper entrance.
2. Turn the **Lever, platen** to open the platen unit and remove the jammed paper.



## Chapter 4

# Maintenance

---

To keep the printer in peak working condition, extend its life for a long term and prevent operational failures, follow the maintenance procedures below.

### Cleaning

#### Head Cleaning

### CAUTION:

- Never clean the **Thermal head** with solvents other than the specified ones, since other solvents may damage the **Thermal head**.
- Since the head area and the **Motor** surface are hot right after printing, wait about 15 minutes for them to cool.

Follow the steps below for the head cleaning.

1. Turn off the printer.
2. Turn the **Lever, platen** to open the **Platen unit**, and remove the paper from between the **Platen** and the **Thermal head**.
3. Wipe off the dust on the head heating elements using a cotton swab dampened with alcohol solvent, such as ethanol, methanol, or IPA.

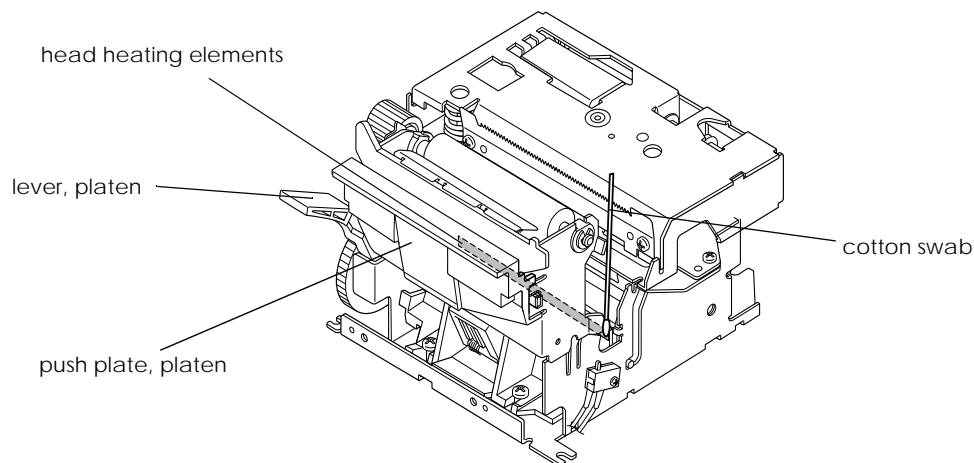


Figure 4-1 Head cleaning

4. After the alcohol evaporates completely, turn the **Lever, platen** or push the **Push plate, platen** to close the platen unit.

## ***Removing foreign matter when the cutter locks***

Follow the procedure below to remove foreign matter when the cutter locks.

After rotating the **Motor** in reverse so that the **Movable cutter blade** returns to the home position, shut off the current to the **Motor**; then remove any foreign matter. (See Figure 2-22 in Chapter 2 for checking the home position.)

If the **Movable cutter blade** fails to return to the home position even after executing the above procedure, follow the steps below.

1. Shut off the current to the **Motor**.
2. Rotate the knob on the **Gear, cutter worm** with a tool, such as tweezers, so that the **Movable cutter blade** returns to the home position; then remove the foreign matter.

## ***Removing Stains (Except for the Thermal Head)***

Wipe off stains with alcohol.

### **CAUTION:**

*Never use thinner, benzine, trichloroethylene, or ketone group solvents, since they may damage rubber and plastic parts or cause them to deteriorate.*

## ***Removing dirt and dust***

Use a vacuum cleaner to remove dirt and dust. After cleaning, check the required lubrication point, and lubricate when necessary. See “Lubrication” on page 4-3 for lubrication instructions.

---

## **Inspection**

The maintenance and inspection procedures for the printer fall into two categories. One is “Daily checks” for the printer user, and the other is “Periodic checks” for someone with more technical knowledge. Maintenance and inspection procedures should be carried out by properly qualified personnel.

### **Daily Checks**

Every day, check whether the condition and operation of the printer is proper. If any problems are found, correct them. The check items are as follows:

#### **Daily check items**

- ☐ The specified paper has been loaded.
- ☐ The paper is not discolored.

### **Periodic Checks**

Every six months, check the items listed in the table below. If any problems are found, use the procedures in the table below to correct them.

*Table 4-1 Periodic Checks*

Check item	Standard	Procedure
Dust, fuzz or dirt sticking to various parts	<ul style="list-style-type: none"><li>• The mechanism should not have a lot of dirt or fuzz on its surface.</li><li>• The paper path, gear and cutter areas are not jammed.</li></ul>	<ul style="list-style-type: none"><li>• Use a vacuum cleaner to remove dust, fuzz, or dirt attached to the parts.</li><li>• Clean the <b>Platen</b> and the head with alcohol. (See “Cleaning” on page 4-1.)</li></ul>
Operation check	<ul style="list-style-type: none"><li>• Printing and paper feeding operations perform properly.</li><li>• All other functions perform properly and parts are not deformed or worn.</li></ul>	See “Lubrication” on page 4-3 and “Troubleshooting table” on page 5-2 in Chapter 5.
Lubrication	See “Lubrication ” on page 4-3.	See “Lubrication” for lubrication instructions.

---

## **Lubrication**

Lubrication is particularly important in keeping the printer operating properly as long as possible. Therefore, lubricate at prescribed intervals, using the correct lubricants.

### **Lubricant**

The performance and durability of the printer are greatly affected by the lubricant applied. Therefore, pay careful attention to lubricant specifications, especially for the low temperature characteristics. The lubricants for the printer are chosen based on technical information analysis and tests on various lubricants by EPSON. The lubricants are available in 40 cc (gr.) plastic containers (the minimum supply unit). Both G-36 and G-15 are used on this printer.

## Lubrication Standards

Lubricate the printer under the following situation:

- ☐ Lubricant is wiped off during cleaning.
- ☐ Lubricant is wiped off when disassembly or assembly is performed.

When lubricating parts during assembly of the printer, clean parts before lubricating them.

Refer to the next section and on page A-2, “Lubrication Diagram” for the lubricants and the lubrication points.

## Lubrication Point

The lubrication points are as follows:

Table 4-2 Lubrication Point

Number	Lubrication point	Lubrication type	Amount of lubricant
1	Two points where the screw on the <b>Lock lever</b> is secured	G-15	1 mm-diameter lubricant
2 to 9	The nine points where the gears on the <b>Autocutter</b> are engaged with other parts.	G-36	appropriate quantity
10	The oval hole on the <b>Movable cutter blade</b> (Two points)	G-15	1 mm-diameter lubricant
11	The two points where the <b>Cutter frame</b> contacts with the <b>Fixed blade</b> .	G-15	1 mm-diameter lubricant
12	The two points where the shaft of the <b>Movable cutter blade</b> rotates.	G-15	appropriate quantity
13	The dowels where the platen unit rotates.	G-36	Until the dowels are covered.
14	The points where the <b>Frame assembly</b> contacts with the <b>Lock lever assembly</b> .	G-15	1 mm-diameter lubricant

Note: The lubrication point numbers in the table are the same as those in the lubrication diagrams for both the straight path and the curled path types at the end of this manual.

## Tool List

Table 4-3 Tool List

Tool name	Commercial availability
Brush (for lubrication)	Yes
Cotton swab	Yes
Cleaning brush (for cleaning)	Yes
crosshead screw driver No.1, 2 and 0	Yes
Tweezers	Yes
ET holder No. 1.5, 2 and 2.5	Yes

## *Chapter 5*

---

### **Repair**

Repairs are divided into two levels (A and B) in consideration of the degree of difficulty of repair. The person who repairs the printer should perform the proper repair procedures, depending on the individual technical knowledge and skills.

---

#### **Repair Levels**

<b>Level A:</b>	Requires general knowledge of the printer's operation principles and structure but does not require specialized experience.
<b>Level B:</b>	Requires a certain degree of knowledge of the printer's operating principles and structure as well as skills and experience using special tools for disassembly and assembly of the printer.

---

#### **Repair Procedure**

When problems occur, check the condition of the printer and locate the cause of the problem as outlined in "Troubleshooting Table." Then repair the unit properly. The table consists of the following five sections.

<b>Phenomenon</b>	Find the type of problem in this column.
<b>Condition</b>	Check the condition of malfunction by referring to this column.
<b>Cause</b>	Locate the cause of the problem by referring to this column. Also, the repair level is indicated for each cause; use this indication to determine the method of repair.
<b>Where/ how to check</b>	The mechanisms that may cause problems as well as checkpoints are listed in this column. Check the unit as outlined in this column to locate the malfunctioning section.
<b>Procedure</b>	Repair malfunctioning sections as indicated in this column. If the same problem or phenomenon recurs after the specified repair is performed, check other items in the "Cause" column and repair the unit again.

## Troubleshooting

Use troubleshooting procedures in the table below when problems occur.

Table 5-1 Troubleshooting Table

Phenomenon	Condition	Cause	Level	Where/how to check	Procedure
1. Printing is not performed.	Nothing is printed.	(1)The head's FFC is disconnected.	A	Check if the FFC is properly connected.	If the FFC is not properly connected, connect it firmly.
		(2)A common or signal line of the FFC is broken.	B	See if the FFC is not broken.	If it is broken, replace the FFC.
		(3)The Platen does not contact the head.	A	<ul style="list-style-type: none"> <li>•Check if the platen unit is in the proper position.</li> <li>•If the Platen is not set to the proper position, a platen-open error is detected.</li> </ul>	Set the platen unit to the printing position. See "Loading Paper" on page 3-4.
		(4)The input pulse is defective.	B	Check with an oscilloscope if the input pulse is within the specified range.	If the input pulse is not generated or is not within the specified range, adjust the drive control circuit.
2. Dots are missing continuously.	A specific dot is not printed.	(1)Foreign matter is on the head heating elements.	A	See if nothing is wrong with the head heating elements	Clean the head heating elements. See "Head Cleaning" on page 4-1.
		(2)The head heating elements are damaged.	B		If the head heating elements are damaged, replace the head.
		(3)The signal line of the FFC is broken.	B	See Cause (2) of Phenomenon 1.	
		(4)The input pulse is defective.	B	See Cause (4) of Phenomenon 1.	
3. Dots are missing occasionally.	Dots are missing occasionally or the color of some dots becomes light.	(1)Foreign matter is on the Platen surface.	A	Check the Platen surface.	Clean the Platen surface.
		(2)The Platen surface is deformed.	A		If deformation is found, replace the Platen.
		(3)Foreign matter is on the head heating elements.	A	See Cause (1) of Phenomenon 2.	
		(4)The head heating elements are damaged	B	See Cause (2) of Phenomenon 2.	

Table 5-1 Troubleshooting Table

Phenomenon	Condition	Cause	Level	Where/how to check	Procedure
4. Printing is faint.	All printing color is light.	(1)The Platen does not contact to the head properly.	A	Check if the Platen is in the proper position.	Set the platen unit to the printing position. See "Opening/Closing the Platen Unit" on page 3-3.
		(2)The Platen surface is deformed.	A	See Cause (2) of Phenomenon 3.	
		(3)Foreign matter or dirt is on the head heating elements.	A	See Cause (1) of Phenomenon 2.	
		(4)The head heating elements have deteriorated.	B	Check the head heating element.	Replace the head.
		(5)The input pulse is defective.	B	See Cause (4) of Phenomenon 1.	
		(6)The thermal paper has deteriorated.	A	<ul style="list-style-type: none"> <li>•Check if the specified paper has been used.</li> <li>•Check if the paper is not old.</li> </ul>	Use the specified paper. (If the paper is discolored, replace it.)
5. Paper can not be loaded.	The end of the paper cannot be inserted into the paper guide.	Paper pieces or foreign matter is blocking the paper guide path or the paper-end detector mechanism.	A	<ul style="list-style-type: none"> <li>•See if any paper pieces or foreign matter is blocking any parts.</li> <li>•Check if the paper-end detector works properly.</li> </ul>	Remove paper pieces or foreign matter. <b>Note:</b> Make sure not to touch the head with any tools when removing the paper or foreign matter.
6. Paper is not fed.	The paper is not fed and the printing is repeated on the same line.	(1)The paper supply is defective.	B	<ul style="list-style-type: none"> <li>•Check if the specified paper has been used. (Check the width, thickness and diameter.)</li> <li>•Check if the paper is placed in the paper supply device to supply properly.</li> </ul>	<ul style="list-style-type: none"> <li>•Use the specified paper.</li> <li>•Load the paper correctly.</li> <li>•Paper pulling tension: 0.49N or less.</li> </ul>
		(2)The drive force transmission mechanism is jammed with foreign matter or paper pieces, or a gear is damaged.	B	Check the drive force transmission mechanism.	<ul style="list-style-type: none"> <li>•Remove foreign matter, if any.</li> <li>•If any of the gears are damaged, replace them.</li> </ul>

Table 5-1 Troubleshooting Table

Phenomenon	Condition	Cause	Level	Where/how to check	Procedure
6. Paper is not fed.	The paper is not fed and the printing is repeated on the same line.	(3)Paper feeding motor is damaged.	B	Check the resistance at each coil of the motor. See Figure 2-2 on page 2-2. Resistance: approx. 11.5 $\Omega$ per phase	Replace the Motor.
7. The paper feed pitch is not uniform.	The line spacing is not uniform.	(1)The paper is not supplied properly.	A	See Cause (1) of Phenomenon 6.	
		(2)The drive force transmission mechanism is jammed with foreign matter or paper pieces, or a gear is damaged.	B	See Cause (2) of Phenomenon 6.	
		(3)Paper feeding motor is damaged.	B	See Cause (3) of Phenomenon 6.	
		(4)Paper dust is on the Platen surface.	A	Check if the Platen has collected paper dust.	Clean the Platen with alcohol.
		(5)Input signal is defective.	B	Check with an oscilloscope if the input signal meets standard.	If the input signal is not input or does not meet the standard, modify the drive control circuit.
8. The Autocutter does not operate.	The Autocutter does not operate even when the power is turned on.	(1)Foreign matter is on the Autocutter area.	B	Check the Autocutter area.	Remove foreign matter. See "Removing foreign matter when the cutter locks" on page 4-2.
		(2)The inner mechanism of the Autocutter is damaged.	B	Check the power supply voltage.	Replace the Autocutter.
9. Paper-end is not detected.	The paper-end detector does not detect the paper even after the paper is removed from the paper path.	(1)Lever, paper detector does not return because of foreign matter.	B	See if nothing is blocking the paper path.	Remove foreign matter or paper pieces.
		(2)Paper-end detector is defective or disconnected.	B	<ul style="list-style-type: none"> <li>•See if the Paper-end detector is connected.</li> <li>•Check with an oscilloscope or tester if the signal is output properly.</li> </ul>	Replace the Paper-end detector.



*Table 5-1 Troubleshooting Table*

Phenomenon	Condition	Cause	Level	Where/how to check	Procedure
10. Black mark is not detected. (When optional black mark is installed.)		(1) Paper pieces are blocking the Black mark detector area in the paper path.	B	See if nothing is blocking the paper path.	Remove paper pieces.
		(2) The Black mark detector is defective or disconnected.	B	<ul style="list-style-type: none"><li>• See if the Black mark detector is connected.</li><li>• Check with an oscilloscope if the signal is output properly.</li></ul>	Replace the Black mark detector.
11. The platen unit does not open/close.	The platen unit does not open.	(1) The cutter blade is not in the home position.	B	See "Removing foreign matter when the cutter blocks" on page 4-2.	
		(2) The Lever, platen is damaged.	B	Check the Lever, platen.	Replace the Lever, platen.
	The platen unit does not close.	Foreign matter attaches between the Frame, platen and the Platen.	A	Check the area between the Frame, platen and the Platen.	Remove foreign matter.

## Chapter 6

# Disassembly, Assembly and Adjustment

### Disassembly

- ❑ For disassembly, follow the assembly procedures described in “Assembly” in reverse sequence.
- ❑ Disassembly of printer components beyond the exploded diagrams (A-1 and 2) may result in damage to the printer and its functions.

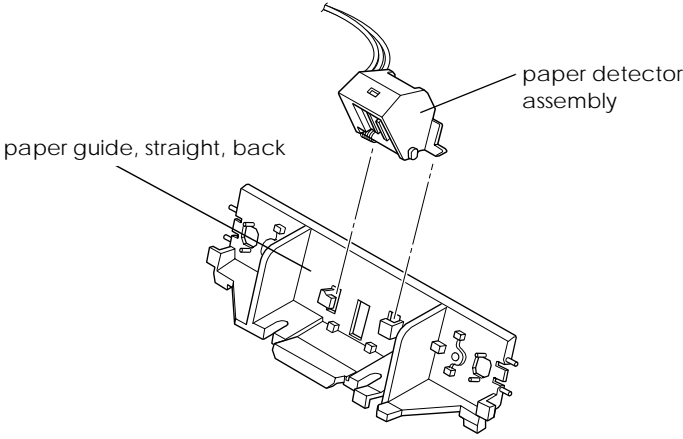
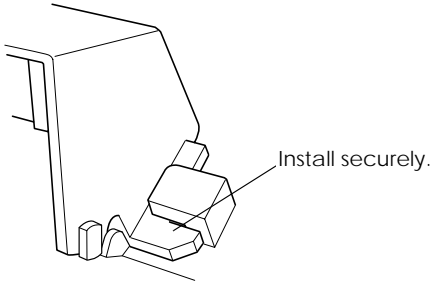
### Assembly

- ❑ The assembly process is divided into pre-assembly and main assembly. First perform the pre-assembly; then proceed to the main assembly after the components have been assembled into units.
- ❑ Perform assembly while referring to the component shapes and mounting positions shown in the “M-T530A/T540A Exploded Diagram” at the end of this manual.
- ❑ The ★ symbol and the ☆ symbol in the “Reassembly step” indicate places where a check or adjustment is required. Make sure to follow the instructions given in these places.
- ❑ Circled numbers in the “Reassembly step” indicate that lubrication is required during the reassembly of that component and that such lubrication will be difficult unless performed during reassembly.
- ❑ Refer to “Lubrication” in Chapter 4 for lubrication details. Also, refer to the lubrication diagrams (A-3 and 4) at the end of this manual for the places to lubricate.
- ❑ All small parts are represented by the abbreviations listed below.

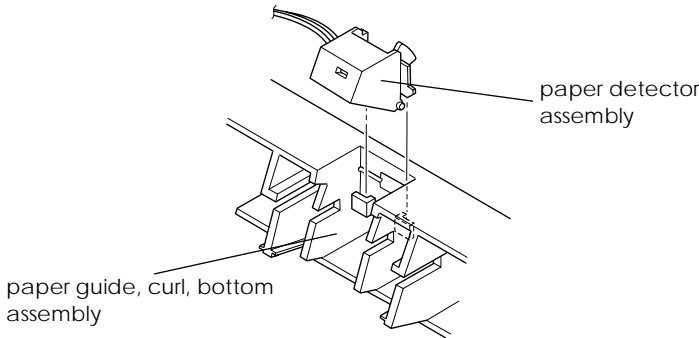
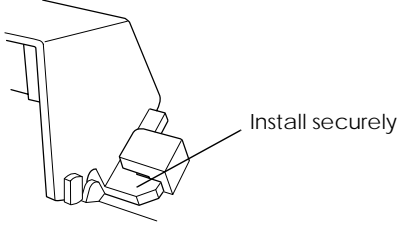
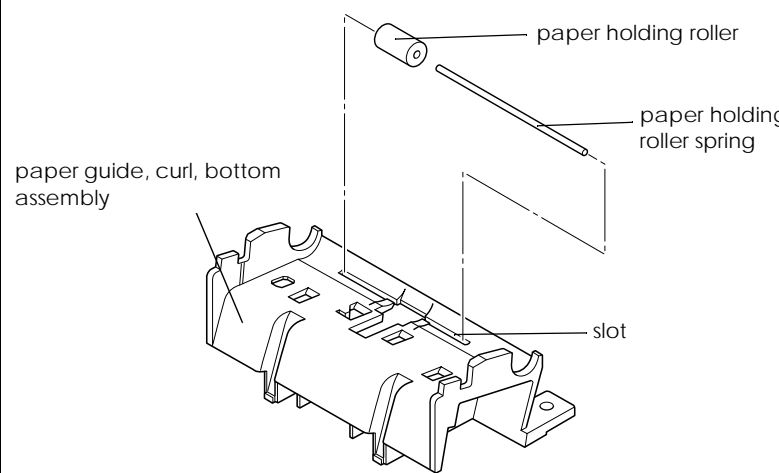
Table 6-1 Small Parts Abbreviations

Abbreviation	Part name
R.E	Retaining ring E-type
C.B.B-tite (M2 × 6)	Cross-recessed binding head B-tite self tapping screw, 2 × 6, F/Zn
C.C.P-tite (M2.5 × 6)	Cross-recessed cup head P-tite self tapping screw, 2.5 × 6, F/Zn
C.B. (M2 × 2.5)	Cross-recessed binding head screw, 2 × 2.5, F/Zn
C.B.S-tite (M3 × 5)	Cross-recessed binding head S-tite, 3 × 5, F/Zn
C.P. (M2 × 2)	Cross-recessed pan head screw, 2 × 2, F/Zn
C.P. (M1.6 × 5)	Cross-recessed pan head screw, 1.6 × 5, F/Zn
C.B. (M2.5 × 4)	Cross-recessed binding head screw, 2.5 × 4, F/Zn
C.B.S-tite (M2.5 × 4)	Cross-recessed binding head S-tite self tapping screw, 2.5 × 4, F/Zn
C. P-tite. F screw (M2 × 3)	Cross-recessed P-tite self tapping flat end screw, 2 × 3, F/Ni

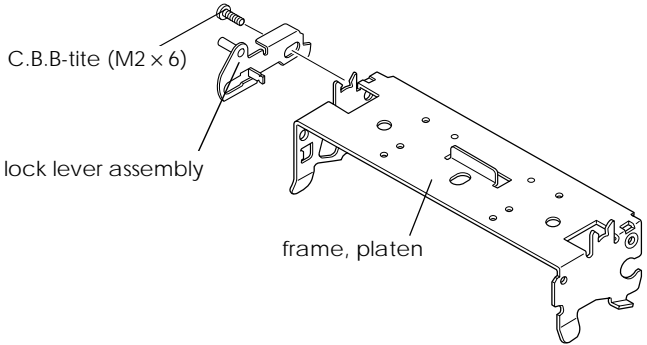
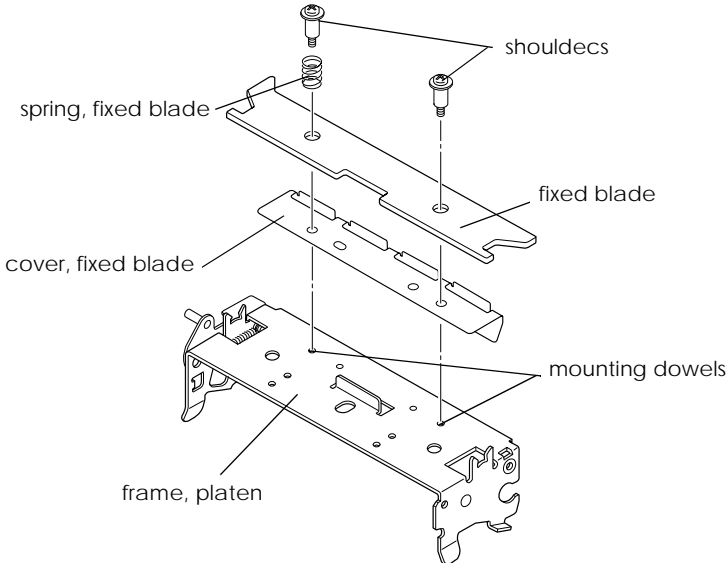
## Pre-assembly A: Paper guide, straight, back unit

Reassembly step	Part name	Assembly procedure
1	Paper detector assembly	<p>❑ Slide the Paper detector assembly onto the Paper guide, straight, back*.</p> 
2	<p><b>Paper guide, straight, back</b> (for the M-T532AF and the M-T532AP)</p> <p>*For the M-T542AF, attach the <b>Paper guide, straight, back, B</b>.</p>	
★		<p>&lt;Check&gt;</p> <p>❑ Make sure that the <b>Paper detector assembly</b> is installed securely, as shown below.</p> 

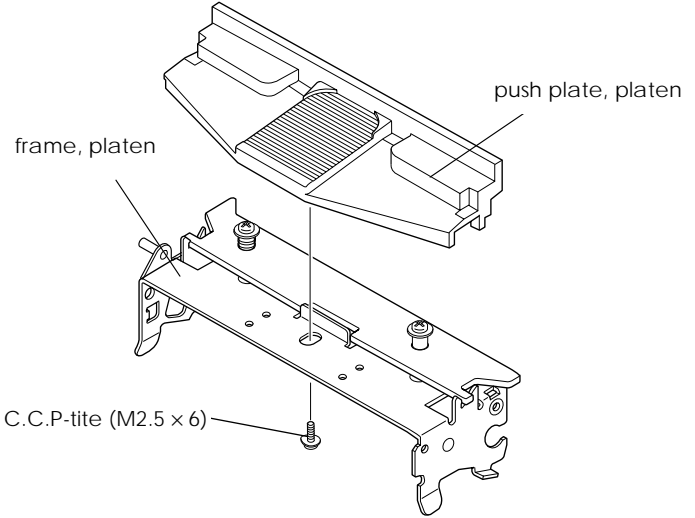
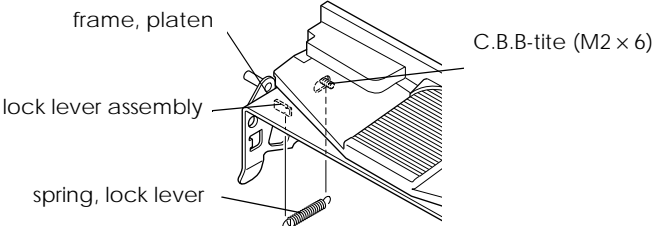
## Pre-assembly B: Paper guide, curl, bottom unit

Reassembly step	Part name	Assembly procedure
1	Paper detector assembly	<p><input type="checkbox"/> Slide the <b>Paper detector assembly</b> onto the <b>Paper guide, curl, bottom assembly</b>*</p>  <p>paper detector assembly</p> <p>paper guide, curl, bottom assembly</p> <p>&lt;Check&gt;</p> <p><input type="checkbox"/> Make sure that the <b>Paper detector assembly</b> is installed securely, as shown below.</p>  <p>Install securely.</p>
2	<b>Paper guide, curl, bottom assembly:</b> (for the M-T532AF and the M-T532AP)	
	*For the M-T542AF, attach the <b>Paper guide, curl, bottom, B assembly</b> .	
★		
3	Paper holding roller	<p><input type="checkbox"/> Pass the <b>Paper holding roller spring</b> through the <b>Paper holding roller</b>, and install it to the <b>Paper guide, curl, bottom assembly</b>.</p>  <p>paper holding roller</p> <p>paper holding roller spring</p> <p>paper guide, curl, bottom assembly</p> <p>slot</p>
4	Paper holding roller spring	
★		
		<p>&lt;Check&gt;</p> <p><input type="checkbox"/> Push the <b>Paper holding roller</b> and the <b>Paper holding roller spring</b> into the slot on the <b>Paper guide, curl, bottom assembly</b>; then push them firmly until they click into place.</p>

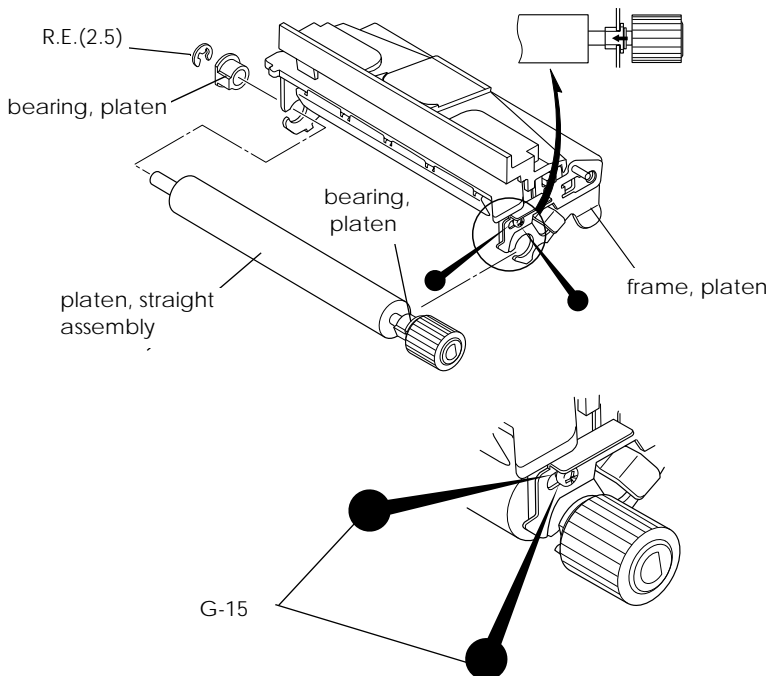
## Pre-assembly C: Frame, platen, straight unit

Reassembly step	Part name	Assembly procedure
1	Frame, platen	
2	Lock lever assembly C.B.B-tite (M2 x 6) × 1	<p>❑ Install the <b>Lock lever assembly</b> on the <b>Frame, platen</b>, and secure it with a screw.</p>  <p>C.B.B-tite (M2 x 6)</p> <p>lock lever assembly</p> <p>frame, platen</p>
★		<p>&lt;Check&gt;</p> <p>❑ Tightening torque: 294 to 343 mN•m {3.0 to 3.5 kg•cm}</p> <p>❑ Make sure that the screw does not skew during tightening.</p>
3	Cover, fixed blade	
4	Fixed blade	<p>❑ Install the <b>Cover, fixed blade</b> and the <b>Fixed blade</b> on the <b>Frame, platen</b>; then secure them with <b>Shouldecs</b>.</p>
5	Spring, fixed blade Shouldec (2 x 6 x 2) × 2	<p>At this time, install the <b>Spring, fixed blade</b> on one of the <b>Shouldecs</b>, as shown below.</p>  <p>spring, fixed blade</p> <p>shouldecs</p> <p>fixed blade</p> <p>cover, fixed blade</p> <p>mounting dowels</p> <p>frame, platen</p>
★		<p>&lt;Check&gt;</p> <p>❑ Tightening torque: 147 to 196 mN•m {1.5 to 2.0 kg•cm}</p> <p>❑ Make sure to install the <b>Fixed blade</b> right-side-up.</p> <p>❑ Make sure that the dowels on the <b>Frame, platen</b> fit securely into the holes on the <b>Cover, fixed blade</b>.</p> <p>❑ Make sure to install the <b>Spring, fixed blade</b> in the correct position.</p>

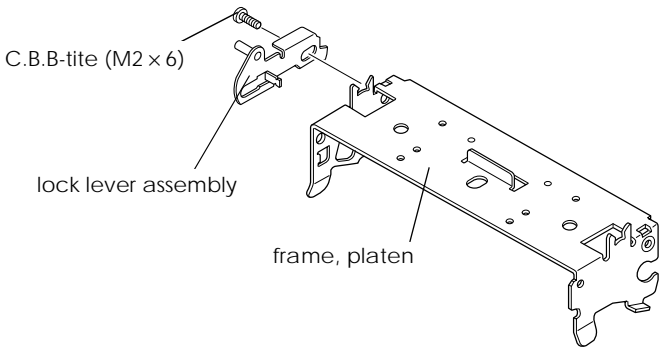
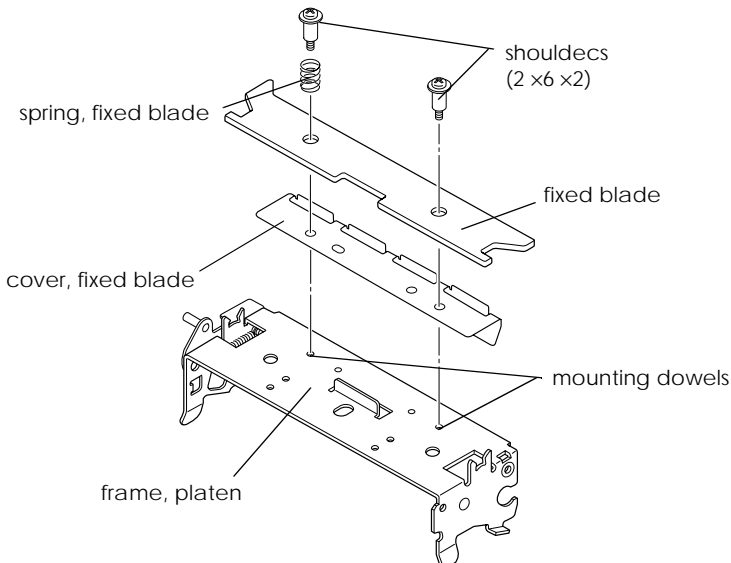
**Pre-assembly C**

Reassembly step	Part name	Assembly procedure
6	Push plate, platen C.C.P-tite (M2.5 × 6) × 1	<p>❑ Install the <b>Push plate, platen</b> to the <b>Frame, platen</b> and secure it with a screw.</p> 
★		<p>&lt;Check&gt;</p> <p>❑ Tightening torque: 392 to 490 mN•m {4.0 to 5.0 kg•cm}</p>
7	Spring, lock lever	<p>❑ Hook the ends of the <b>Spring, lock lever</b> onto the <b>Lock lever assembly</b> and <b>C.B.B-tite (M2 × 6)</b> from the inside of the <b>Frame, platen</b>.</p> 
★		<p>&lt;Check&gt;</p> <p>❑ Make sure that the <b>Spring, lock lever</b> is hooked securely.</p>

### Pre-assembly C

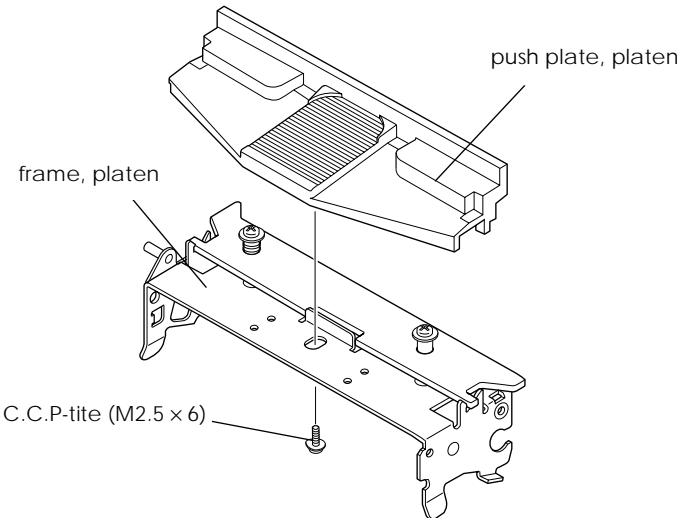
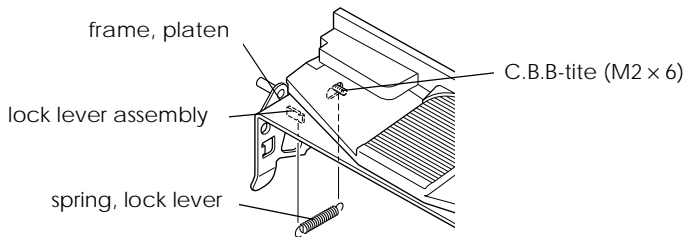
Reassembly step	Part name	Assembly procedure
8	Platen, straight assembly	
9	Bearing, platen R.E. (2.5) × 1	<p>❑ After Installing the <b>Platen, straight assembly</b> to the <b>Frame, platen</b>, install the <b>Bearing, platen</b> from the outside of the <b>Frame, platen</b>; then secure it with an <b>R.E.</b>.</p> <p>❑ Lubricate with G-15 two points where the screw on the <b>Lock lever assembly</b> is secured.</p> 
10		

## Pre-assembly D: Frame, platen, curl unit

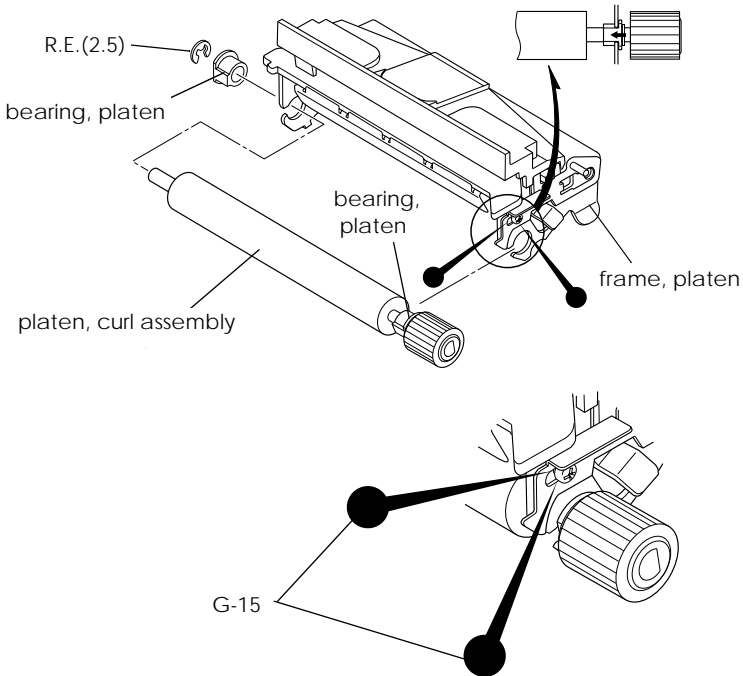
Reassembly step	Part name	Assembly procedure
1	Frame, platen	
2	Lock lever assembly C.B.B-tite (M2 x 6) × 1	<p>❑ Install the <b>Lock lever assembly</b> to the <b>Frame, platen</b>, and secure it with a screw.</p> 
★		<p>&lt;Check&gt;</p> <p>❑ Tightening torque: 294 to 343 mN•m {3.0 to 3.5 kg•cm}</p> <p>❑ Make sure that the screw does not skew during tightening.</p>
3	Cover, fixed blade	
4	Fixed blade	<p>❑ Install the <b>Cover, fixed blade</b> and the <b>Fixed blade</b> to the <b>Frame, platen</b>; then secure them with <b>Shouldecs</b>.</p>
5	Spring, fixed blade Shouldec (2 x 6 x 2) × 2	<p>At this time, install the <b>Spring, fixed blade</b> on one of the <b>Shouldecs</b>, as shown below.</p> 
★		<p>&lt;Check&gt;</p> <p>❑ Tightening torque: 147 to 196 mN•m {1.5 to 2.0 kg•cm}</p> <p>❑ Make sure to install the <b>Fixed blade</b> right-side-up.</p> <p>❑ Make sure that the dowels on the <b>Frame, platen</b> fit securely into the holes on the <b>Cover, fixed blade</b>.</p> <p>❑ Make sure to install the <b>Spring, fixed blade</b> to the correct position.</p>



## Pre-assembly D

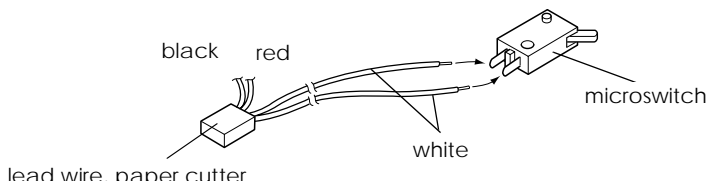
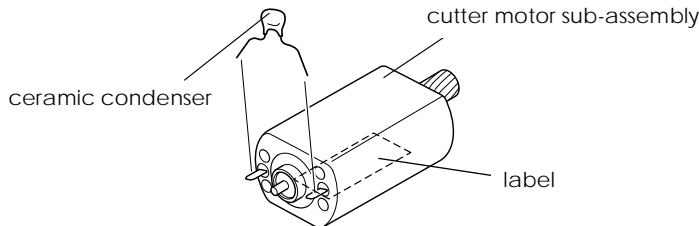
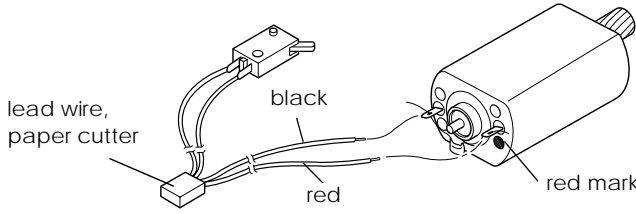
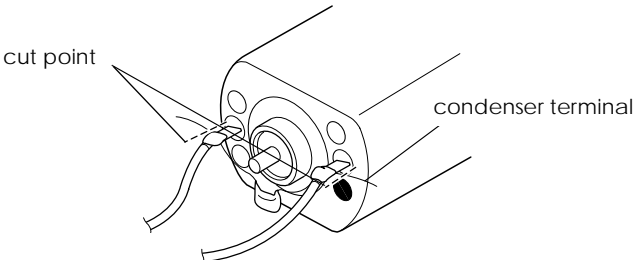
Reassembly step	Part name	Assembly procedure
6	Push plate, platen C.C.P-tite (M2.5 × 6) × 1	<p>❑ Install the <b>Push plate, platen</b> to the <b>Frame, platen</b> and secure it with a screw.</p>  <p>The diagram illustrates the assembly of the push plate, platen onto the frame, platen. A C.C.P-tite (M2.5 x 6) screw is used to secure the push plate, platen to the frame, platen.</p>
★		<p>&lt;Check&gt;</p> <p>❑ Tightening torque: 392 to 490 mN•m {4.0 to 5.0 kg•cm}</p>
7	Spring, lock lever	<p>❑ Hook the ends of the <b>Spring, lock lever</b> to the <b>Lock lever assembly</b> and <b>C.B.B-tite (M2 × 6)</b> from the inside of the <b>Frame, platen</b>.</p>  <p>The diagram illustrates the assembly of the spring, lock lever onto the lock lever assembly and C.B.B-tite (M2 x 6) from the inside of the frame, platen.</p>
★		<p>&lt;Check&gt;</p> <p>❑ Make sure that the <b>Spring, lock lever</b> is hooked securely.</p>

*Pre-assembly D*

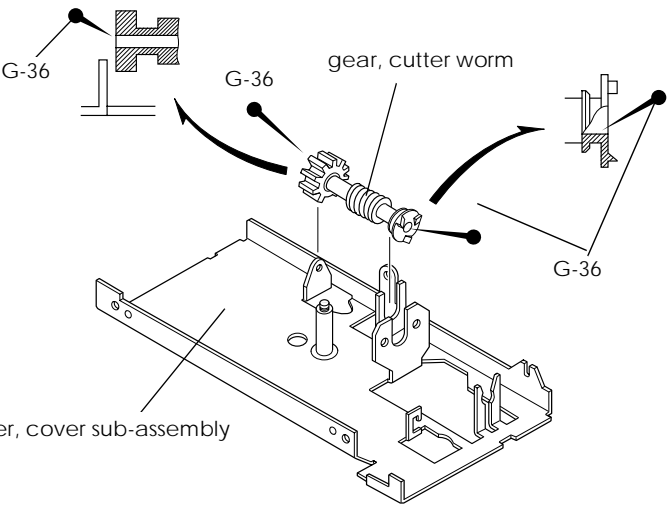
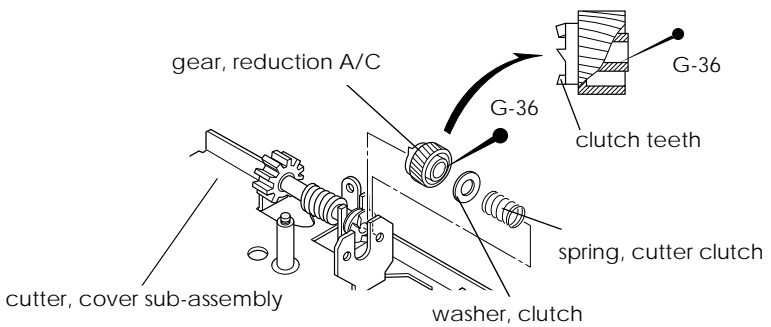
Reassembly step	Part name	Assembly procedure
8	Platen, curl assembly	
9	Bearing, platen R.E. (2.5) × 1	<p>❑ After installing the <b>Platen, curl assembly</b> to the <b>Frame, platen</b>, install the <b>Bearing, platen</b> from the outside of the <b>Frame, platen</b>; then secure it with an <b>R.E.</b>.</p> <p>❑ Lubricate with G-15 two points where the screw on the <b>Lock lever assembly</b> is secured.</p> 
10		

## Pre-assembly E

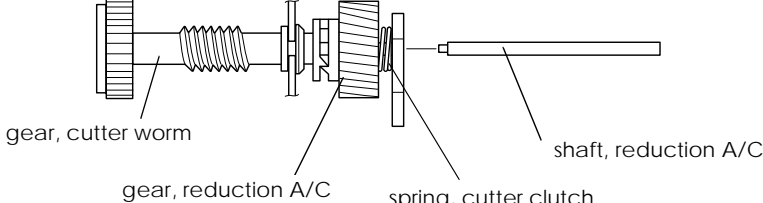
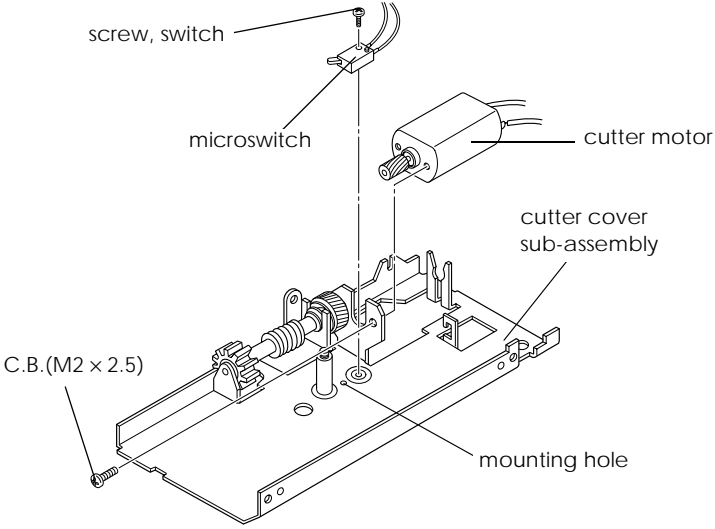
## Cutter motor assembly

Reassembly step	Part name	Assembly procedure
1	Microswitch	
2	Lead wire, paper cutter	<p>❑ Solder the white lead wire of the <b>Lead wire, paper cutter</b> to the <b>Microswitch</b>.</p>  <p>*No polarity</p>
3	Cutter motor sub-assembly	
4	Ceramic condenser	<p>❑ Install the <b>Ceramic condenser</b> to the <b>Cutter motor sub-assembly</b>, and solder it.</p> 
★		<p>&lt;Check&gt;</p> <p>❑ Solder the <b>Ceramic condenser</b> to the non-labeled side of the <b>Cutter motor sub-assembly</b>.</p>
5		<p>❑ Solder the red wire of the <b>Lead wire, paper cutter</b> to the red marked terminal side of the <b>Cutter motor sub-assembly</b>, and solder the black lead wire to the other terminal.</p> 
★		<p>&lt;Check&gt;</p> <p>❑ Make sure to arrange the lead wires properly.</p>
6		<p>❑ Cut excess wires from the <b>Ceramic condenser</b> terminals.</p> 

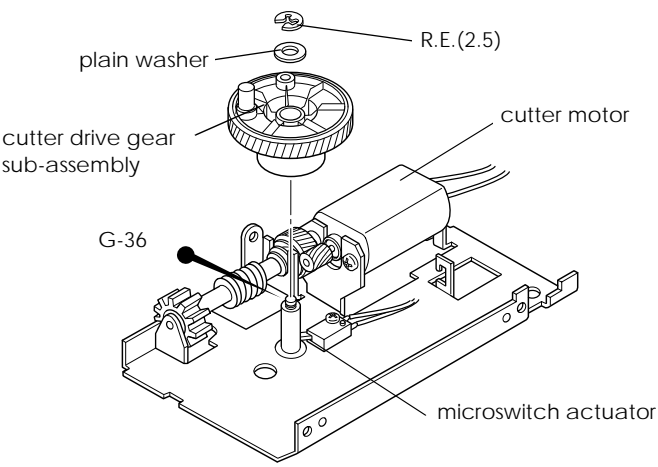
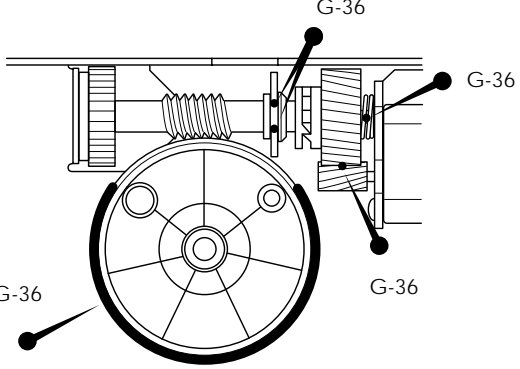
### Pre-assembly F: Cutter, cover sub-unit

Reassembly step	Part name	Assembly procedure
1	Cutter, cover sub-assembly Gear, cutter worm	<p>❑ Lubricate with G-36 the bore of the <b>Gear, cutter worm</b> and the point where the <b>Gear, cutter worm</b> comes in contact with the <b>Cutter, cover sub-assembly</b>; then install it on the <b>Cutter, cover sub-assembly</b>.</p>  <p>Labels in diagram: G-36, gear, cutter worm, cutter, cover sub-assembly.</p>
4	Gear, reduction A/C Washer, clutch	<p>❑ After lubricating the bore of the <b>Gear, reduction A/C</b> with G-36, attach the <b>Washer, clutch</b> and the <b>Spring, cutter clutch</b> to the <b>Gear, reduction A/C</b>; then, install it to the <b>Cutter cover sub-assembly</b>.</p>  <p>Labels in diagram: gear, reduction A/C, G-36, clutch teeth, spring, cutter clutch, washer, clutch, cutter, cover sub-assembly.</p>
5	Spring, cutter clutch	
★		<p>&lt;Check&gt;</p> <p>❑ Make sure not to damage the clutch teeth when installing the <b>Gear, reduction A/C</b>.</p>

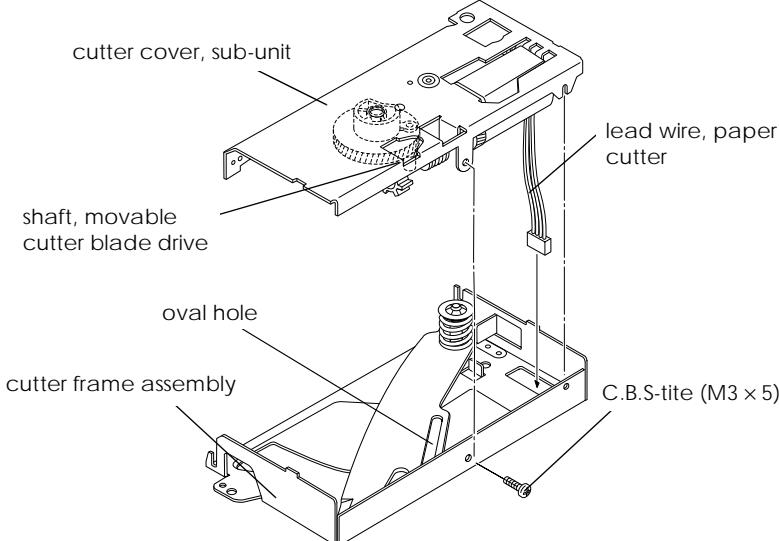
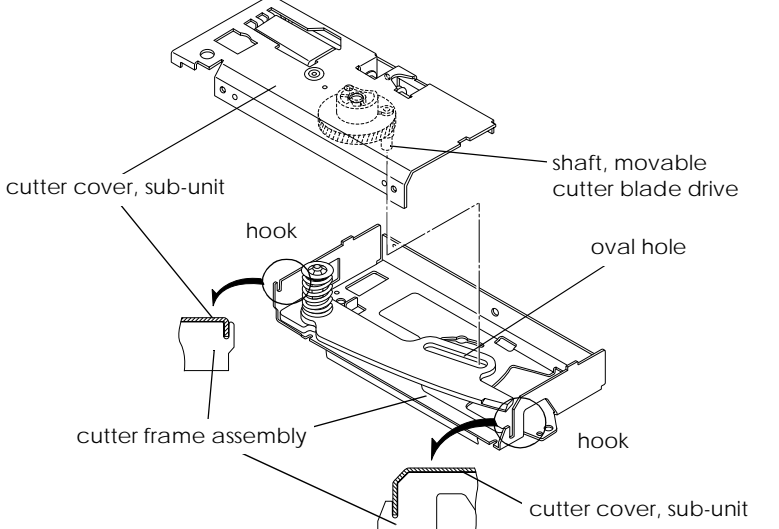
## Pre-assembly F

Reassembly step	Part name	Assembly procedure
6	Shaft, reduction A/C	<p>❑ Insert the <b>Shaft, reduction A/C</b> to the bores of the <b>Gear, reduction A/C</b> and the <b>Gear, cutter worm</b>.</p> 
★		<p>&lt;Check&gt;</p> <p>❑ Make sure that the <b>Shaft, reduction A/C</b> is oriented properly before insertion.</p>
7	Cutter, motor assembly C.B.(M2 x 2.5) × 1 Screw, switch	<p>❑ Install the <b>Cutter, motor</b> to the <b>Cutter cover sub-assembly</b>, and secure it with the <b>C.B.(M2 x 2.5)</b>.</p> <p>❑ Install the <b>Microswitch</b> to the <b>Cutter cover sub-assembly</b>, and secure it with the <b>Screw, switch</b>.</p> 
★		<p>&lt;Check&gt;</p> <p>❑ Tightening torque: 245 to 294 mN•m {2.5 to 3.0 kg•cm} (<b>C.B.(M2 x 2.5)</b>)</p> <p>❑ Tightening torque: 108 to 147 mN•m {1.1 to 1.5 kg•cm} (<b>Screw, switch</b>)</p> <p>❑ Make sure to install the <b>Cutter, motor</b> with the labeled side down.</p> <p>❑ Make sure that the <b>Cutter, motor</b> is installed securely.</p> <p>❑ Make sure that the dowel on the <b>Microswitch</b> fits securely in the mounting hole on the <b>Cutter cover sub-assembly</b>.</p>

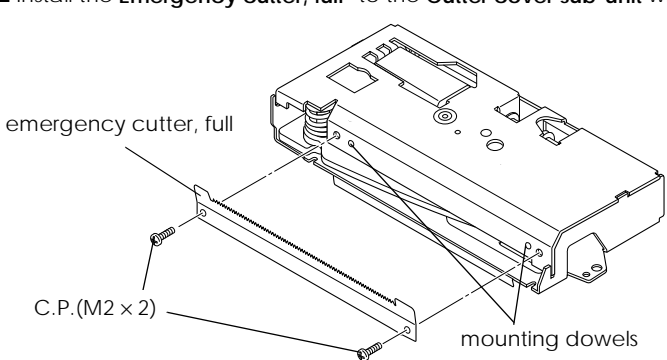
*Pre-assembly F*

Reassembly step	Part name	Assembly procedure
⑤	Cutter drive gear sub-assembly Plain washer (3 × 0.5 × 7) × 1 R.E. (2.5) × 1	<p>❑ After lubricating the shaft on the <b>Cutter cover sub-assembly</b> with G-36, install the <b>Cutter drive gear sub-assembly</b> and the <b>Plain washer</b> on the shaft; then secure them with an <b>R.E.</b>.</p>  <p>&lt;Check&gt;</p> <p>❑ Make sure not to apply excessive pressure to the <b>Microswitch</b> actuator when installing the <b>Cutter drive gear sub-assembly</b>.</p> <p>❑ Make sure not to damage the <b>Cutter drive gear sub-assembly</b> when securing it with the <b>R.E.</b>.</p> <p>❑ Lubricate the specified areas with G-36.</p> 
★		

## Pre-assembly G: Cutter unit

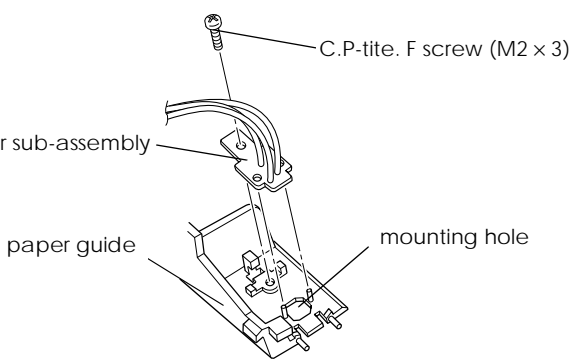
Reassembly step	Part name	Assembly procedure
1	Cutter cover sub-unit	<p>❑ Pass the <b>Lead wire, paper cutter</b> through the hole on the <b>Cutter frame assembly</b> and secure the <b>Cutter cover sub-unit</b> and the <b>Cutter frame assembly</b> with a screw.</p> <p>❑ When putting the <b>Cutter cover sub-unit</b> and the <b>Cutter frame assembly</b> together, insert the <b>Shaft, movable cutter blade drive</b> into the oval hole on the <b>Movable cutter blade</b>.</p> 
2	Cutter frame assembly C.B.S-tite (M3 x 5) × 1	
★		<p>&lt;Check&gt;</p> <p>❑ Tightening torque: 686 to 882 mN•m {7.0 to 9.0 kg•cm}</p> <p>❑ Make sure that the <b>Shaft, movable cutter blade drive</b> fits securely into the oval hole on the <b>Movable cutter blade</b>.</p> <p>❑ Make sure that the edges of the <b>Cutter cover sub-unit</b> fit into the hooks on the <b>Cutter frame assembly</b>.</p> 

**Pre-assembly G**

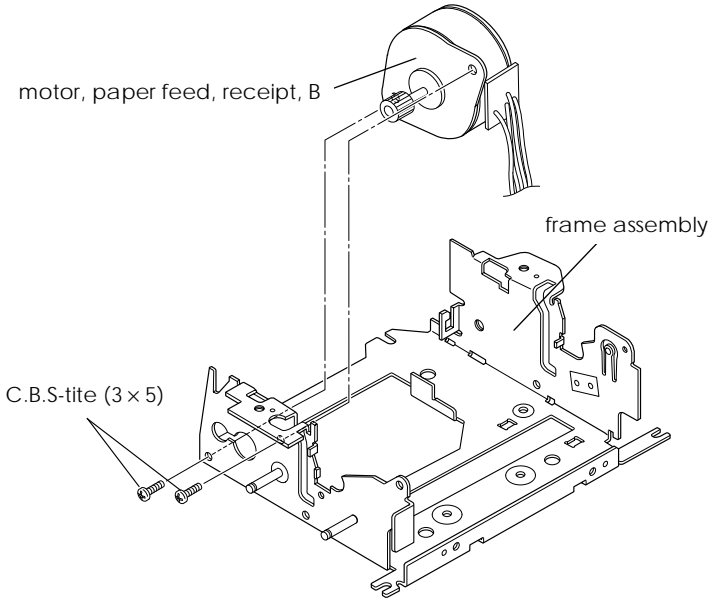
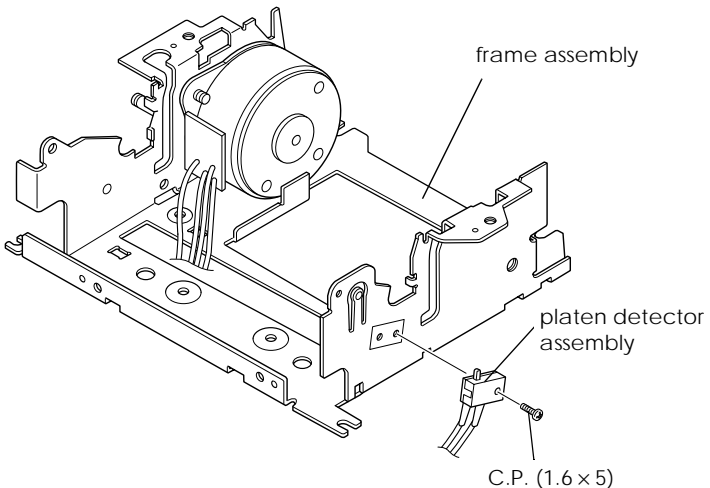
Reassembly step	Part name	Assembly procedure
3	<b>Emergency cutter, full</b> (for the full cut type) <b>C.P.(M2 × 2)</b> × 2  *For the partial cut type, install the <b>Emergency</b> <b>cutter, partial</b> .	<p><input type="checkbox"/> Install the <b>Emergency cutter, full</b>* to the <b>Cutter cover sub-unit</b> with screws.</p>  <p>&lt;Check&gt;</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Tightening torque: 147 to 196 mN•m {1.5 to 2.0 kg•cm}</li> <li><input type="checkbox"/> Make sure that the <b>Emergency cutter, full</b> is oriented properly.</li> <li><input type="checkbox"/> The mounting dowels on the <b>Cutter cover subunit</b> fit into the hole on the <b>Emergency cutter, full</b>.</li> </ul>
★		



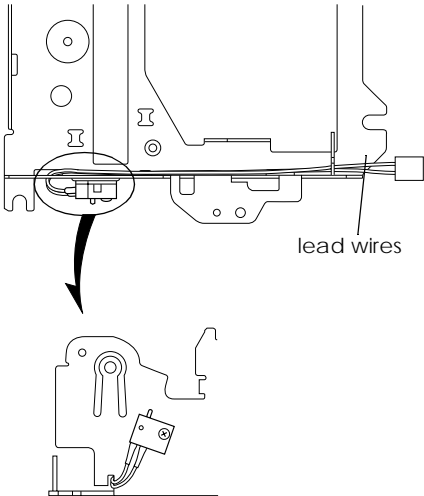
## Pre-assembly H: Black mark detector sub-assembly (optional)

Reassembly step	Part name	Assembly procedure
1	Black mark (B.M.) sub-assembly	<p>❑ Install the <b>B.M. detector sub-assembly</b> in one of the two detector mounting holes on the <b>Paper guide</b>, and secure it with a screw. Both the straight path and the curved path types can be installed this way.</p>  <p>&lt;Check&gt;</p> <p>❑ Tightening torque: 118 to 216 mN•m {1.2 to 2.2 kg•cm}</p> <p>❑ Make sure that the detector fits securely into the detector mounting hole on the <b>Paper guide</b>.</p>
2	Paper guide C.P-tite F screw (M2 x 3) × 1	
★		

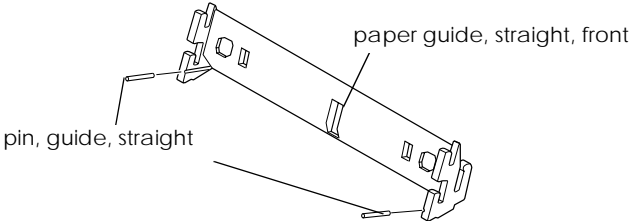
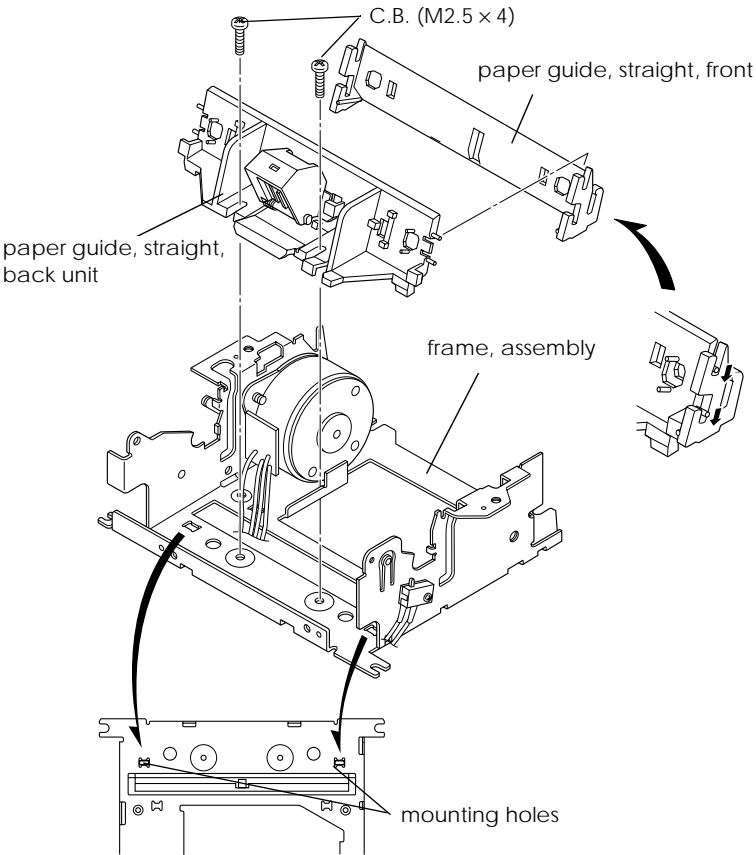
### Main Assembly A: Motor, paper feed, receipt, B and Platen detector

Reassembly step	Part name	Assembly procedure
1	Frame assembly	
2	Motor, paper feed, receipt, B C.B.S-tite (3 × 5) × 2	<p>□ Align the <b>Motor, paper feed, receipt, B</b> with the mounting position on the <b>Frame assembly</b> and secure it with screws.</p>  <p>motor, paper feed, receipt, B</p> <p>frame assembly</p> <p>C.B.S-tite (3 × 5)</p>
★		<p>&lt;Check&gt;</p> <p>□ Tightening torque: 686 to 882 mN•m {7.0 to 9.0 kg•cm}</p> <p>□ Make sure that the <b>Motor, paper feed, receipt, B</b> is oriented properly.</p>
3	Platen detector assembly C.P. (1.6 × 5) × 1	<p>□ Align the <b>Platen detector assembly</b> to the mounting position on the <b>Frame assembly</b>, and secure it with a screw.</p>  <p>frame assembly</p> <p>platen detector assembly</p> <p>C.P. (1.6 × 5)</p>

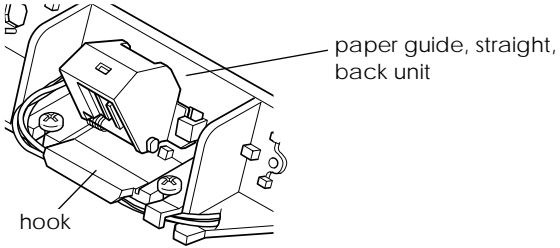
Main Assembly A

Reassembly step	Part name	Assembly procedure
★		<div> <div>&lt;Check&gt;</div> <div> <div>❑ Tightening torque: 98 to 147 mN•m {1.0 to 1.5 kg•cm}</div> <div>❑ After installing the <b>Platen detector assembly</b>, arrange the lead wires.</div> </div> <div>  <div>lead wires</div> </div> </div>

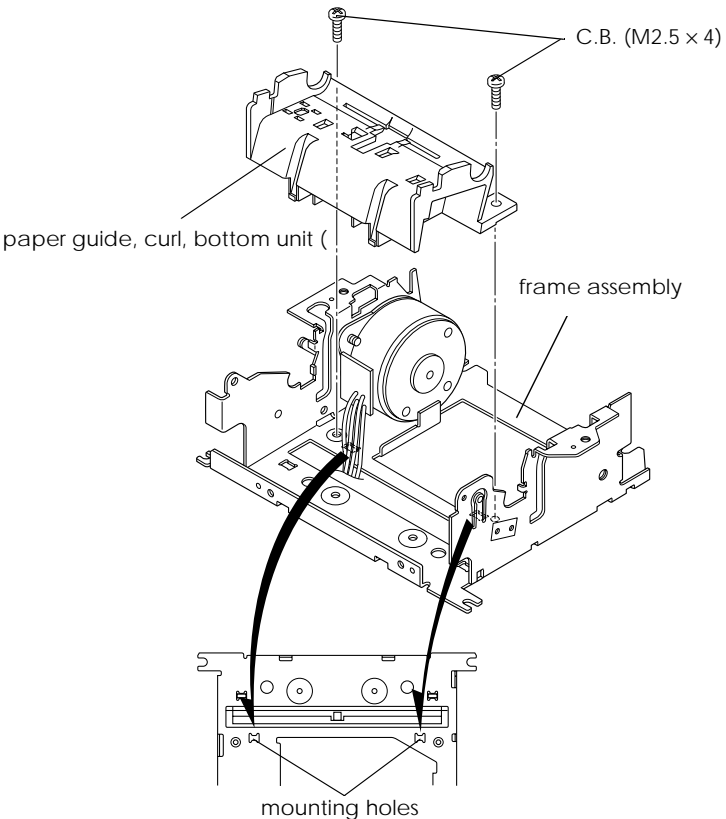
## Main Assembly B: Paper guide, straight, front and Paper guide, straight, back Unit

Reassembly step	Part name	Assembly procedure
1	<b>Paper guide, straight, front</b> (for the M-T532AF and the M-T532 AP)  *For the M-T542AF and the M-T542AP, use the <b>Paper guide, straight, front, B</b> .	
2	<b>Pin, guide, straight</b> × 2	<div> <input type="checkbox"/> Insert the <b>Pin, guide, straight</b> into the holes on the <b>Paper guide, straight, front</b>*. </div> 
3	<b>Paper guide, straight, back unit</b> (for the M-T532AF and the M-T532AP) <b>C.B. (2.5 × 4)</b> × 2  *For the M-T542AF and the M-T542AP, use the <b>Paper guide, straight, back, B unit</b> .	<div> <input type="checkbox"/> After putting the <b>Paper guide, straight, front</b> and the <b>Paper guide, straight, back unit</b>* together, install them to the mounting holes on the <b>Frame assembly</b> and secure them with screws. </div> 

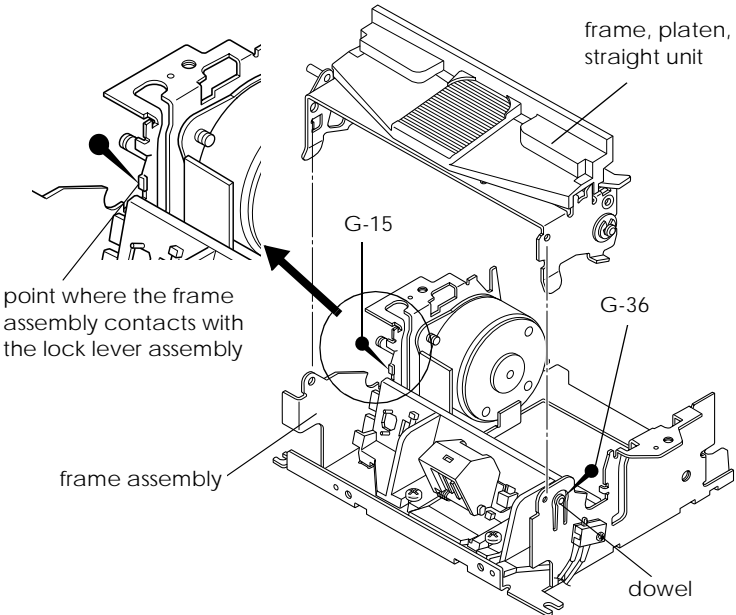
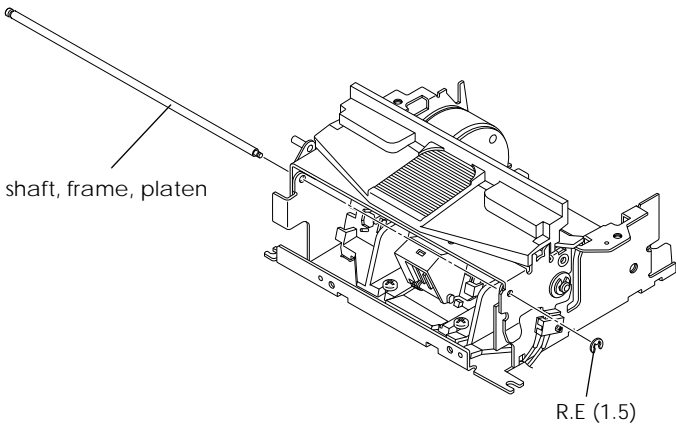
## Main Assembly B

Reassembly step	Part name	Assembly procedure
		<p>&lt;Check&gt;</p> <ul style="list-style-type: none"> <li>❑ Tightening torque: 588 to 637 mN•m {6.0 to 6.5 kg•cm}</li> <li>❑ The dowels on the <b>Paper guide, straight, back unit</b> fit securely into the holes on the <b>Frame assembly</b>.</li> <li>❑ Make sure that the lead wires of the <b>Paper detector assembly</b> are not caught between the <b>Frame assembly</b> and the <b>Paper guide, straight, back unit</b>.</li> <li>❑ Make sure that the wires of the <b>Paper detector assembly</b> are passed under the hook on the <b>Paper guide, straight, back unit</b>.</li> </ul> 

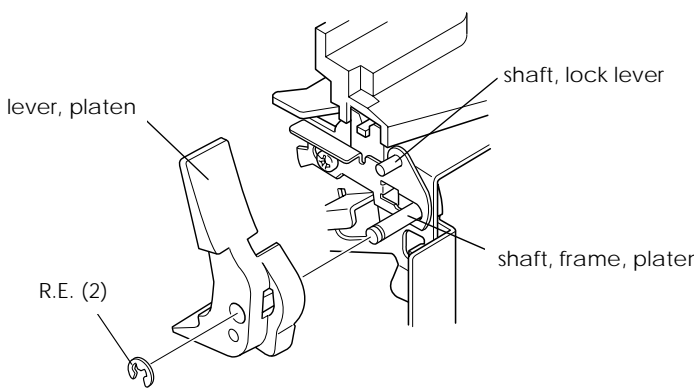
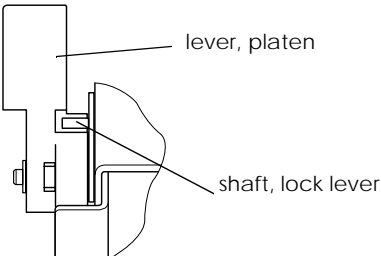
## Main Assembly C: Paper guide, curl, bottom unit

Reassembly step	Part name	Assembly procedure
1	<p><b>Paper guide, curl, bottom unit</b> (for the M-T531AF and the M-T531AP)  <b>C.B. (M2.5 × 4)</b> × 2</p> <p>* for the M-T541AF and the M-T541AP, install the <b>Paper guide, curl, bottom, B unit</b>.</p>	<p>❑ Install the <b>Paper guide, curl, bottom unit*</b> to the mounting holes on the <b>Frame assembly</b>, and secure it with screws.</p>  <p>&lt;Check&gt;</p> <p>❑ Tightening torque: 588 to 637 mN•m {6.0 to 6.5 kg•cm}</p> <p>❑ Make sure that the dowels on the <b>Paper guide, curl, bottom unit</b> fit securely into the holes on the <b>Frame assembly</b>.</p> <p>❑ Make sure that the lead wires of the <b>Paper detector assembly</b> are not caught between the <b>Frame assembly</b> and the <b>Paper guide, curl, bottom unit</b>.</p>
★		

## Main Assembly D: Frame, platen, straight unit

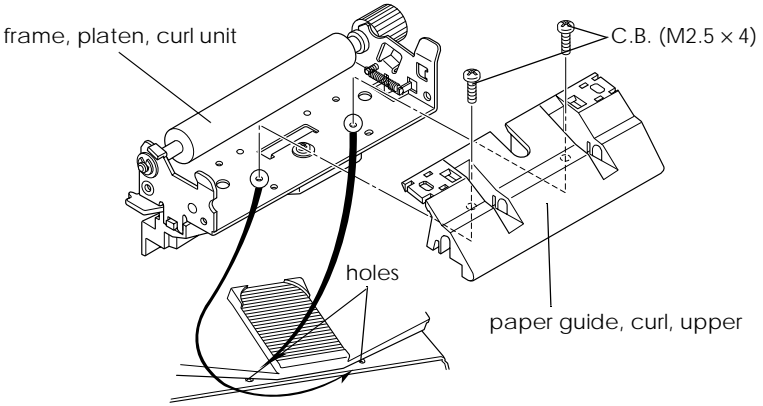
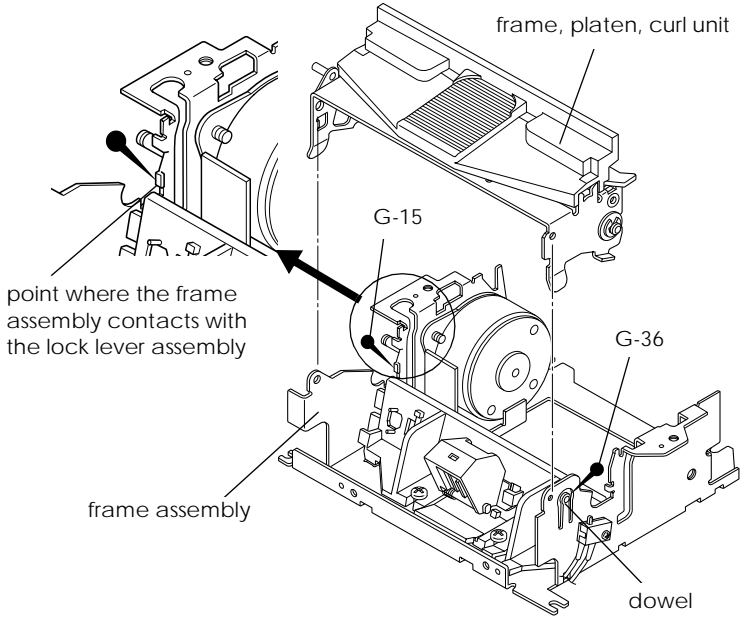
Reassembly step	Part name	Assembly procedure
② 3	Frame, platen, straight unit	<p> <input type="checkbox"/> Lubricate the dowel on the <b>Frame assembly</b> with G-36.         </p> <p> <input type="checkbox"/> Lubricate the point where the <b>Frame assembly</b> contacts with the <b>Lock lever assembly</b> with G-15.         </p> <p> <input type="checkbox"/> Install the <b>Frame, platen, straight unit</b> to the <b>Frame assembly</b>.         </p> 
4	Shaft, frame, platen R.E. (1.5) × 1	<p> <input type="checkbox"/> Align the holes on the <b>Frame assembly</b> and the <b>Frame, platen, straight unit</b>, and insert the <b>Shaft, frame, platen</b> into these holes; then, secure it with an <b>R.E.</b>.         </p> 

### Main Assembly D

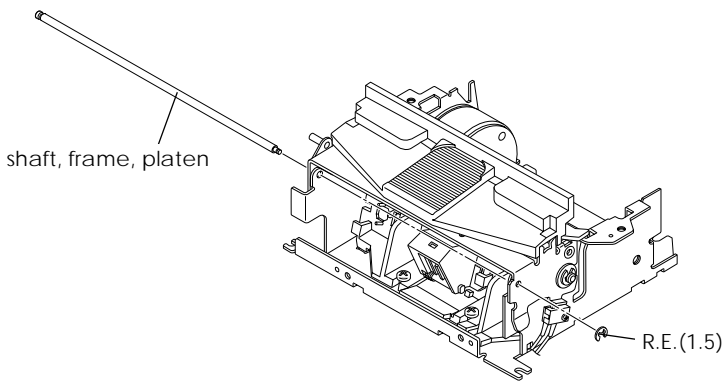
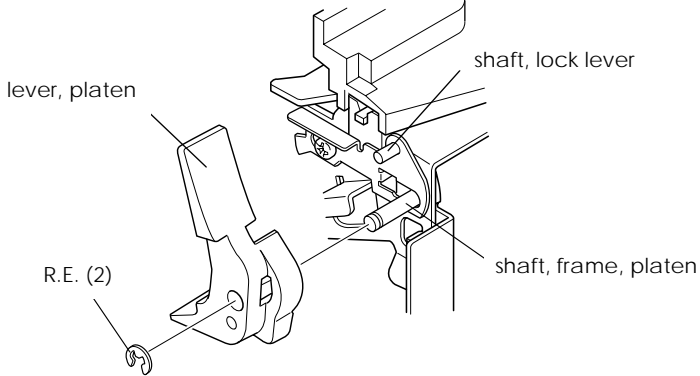
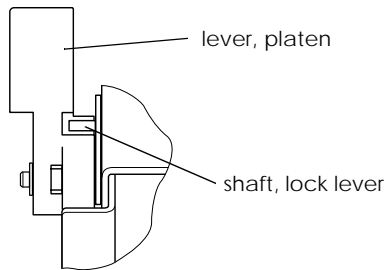
Reassembly step	Part name	Assembly procedure
5  ★	Lever, platen R.E. (2)  × 1 × 1	<p>❑ Install the <b>Lever, platen</b> to the <b>Shaft, frame, platen</b>, and secure it with an R.E..</p>  <p>&lt;Check&gt;</p> <p>❑ Make sure that the <b>Shaft, lock lever</b> is placed properly into the specified position on the <b>Lever, platen</b>.</p> 



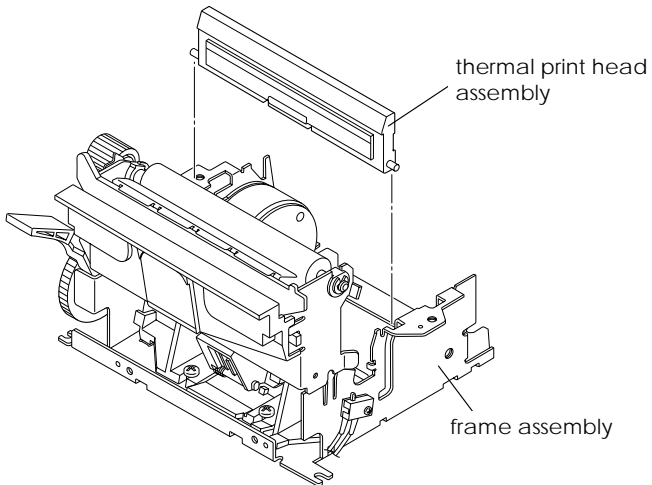
## Main Assembly E: Frame, platen, curl unit

Reassembly step	Part name	Assembly procedure
1	Frame, platen, curl unit	
2	Paper guide, curl, upper C.B. (M2.5 x 4) × 2	<p>□ Align the <b>Paper guide, curl, upper</b> to the mounting holes on the <b>Frame, platen, curl unit</b>, and secure it with screws.</p>  <p>frame, platen, curl unit</p> <p>holes</p> <p>paper guide, curl, upper</p> <p>C.B. (M2.5 x 4)</p>
★		<p>&lt;Check&gt;</p> <p>□ Tightening torque: 588 to 637 mN•m {6.0 to 6.5 kg•cm}</p> <p>□ Make sure that the dowels on the <b>Paper guide, curl, upper</b> fit securely into the holes on the <b>Frame, platen, curl unit</b>.</p> <p>□ Lubricate the dowel on the <b>Frame assembly</b> with G-36.</p>
④		<p>□ Lubricate the point where the <b>Frame assembly</b> contacts with the <b>Lock lever assembly</b> with G-15.</p>
5	Frame, platen, curl unit	<p>□ Install the <b>Frame, platen, curl unit</b> to the <b>Frame assembly</b>.</p>  <p>frame, platen, curl unit</p> <p>G-15</p> <p>G-36</p> <p>dowel</p> <p>point where the frame assembly contacts with the lock lever assembly</p> <p>frame assembly</p>

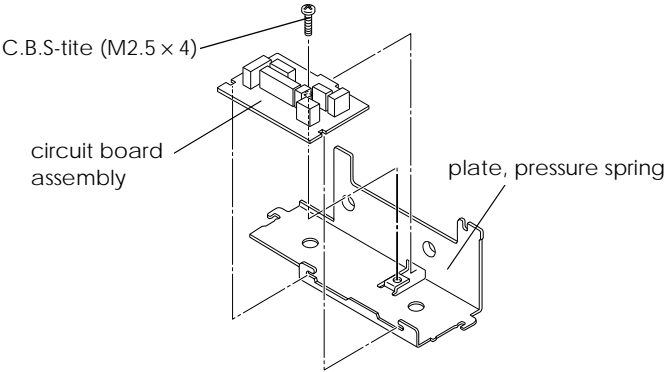
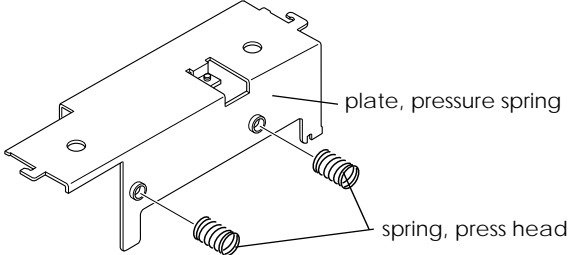
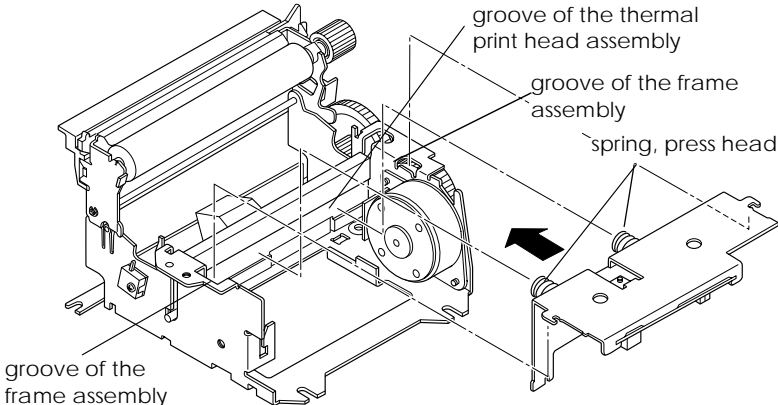
## Main Assembly E

Reassembly step	Part name	Assembly procedure
6	Shaft, frame, platen R.E. (1.5) × 1	<p>□ Align the holes on the <b>Frame assembly</b> and the <b>Frame, platen, curl unit</b>, and insert the <b>Shaft, frame, platen</b> into these holes; then, secure it with an R.E..</p> 
7	Lever, platen R.E. (2) × 1	<p>□ Install the <b>Lever, platen</b> to the <b>Shaft, frame, platen</b>, and secure it with an R.E..</p> 
★		<p>&lt;Check&gt;</p> <p>□ Make sure that the <b>Shaft, lock lever</b> is placed properly into the specified position on the <b>Lever, platen</b>.</p> 

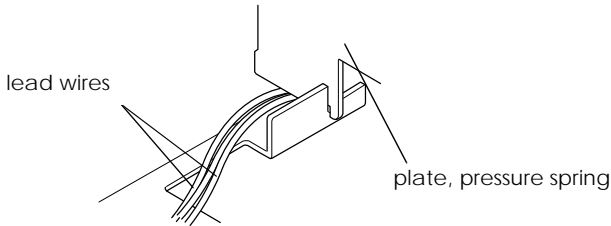
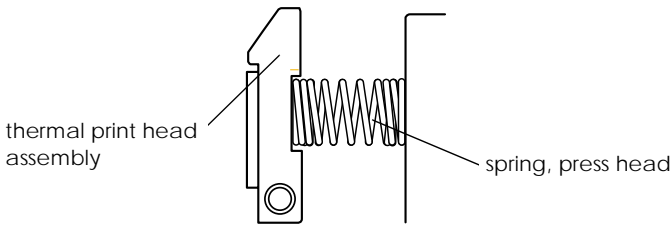
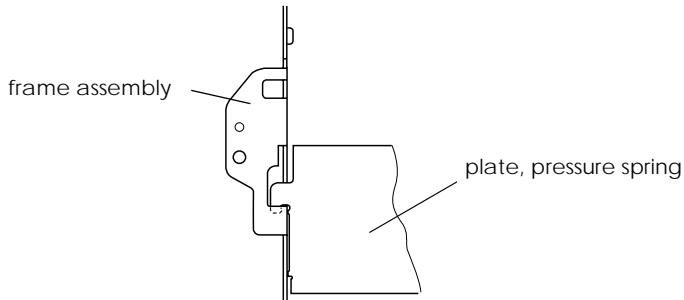
## Main Assembly F: Thermal print head assembly

Reassembly step	Part name	Assembly procedure
1	Thermal print head assembly	<p><input type="checkbox"/> Install the <b>Thermal print head assembly</b> in the grooves on the <b>Frame assembly</b>.</p>  <p>&lt;Check&gt;</p> <p><input type="checkbox"/> When handling the <b>Thermal print head assembly</b>, use proper body grounding procedures to avoid static electricity. (Use a conductive mat and wrist band during assembly.)</p> <p><input type="checkbox"/> Do not touch the connector terminals and the surface of the <b>Thermal print head assembly</b>. If foreign matter attaches to them, wipe off the foreign matter lightly, using a cotton swab dampened with alcohol.</p>
★		

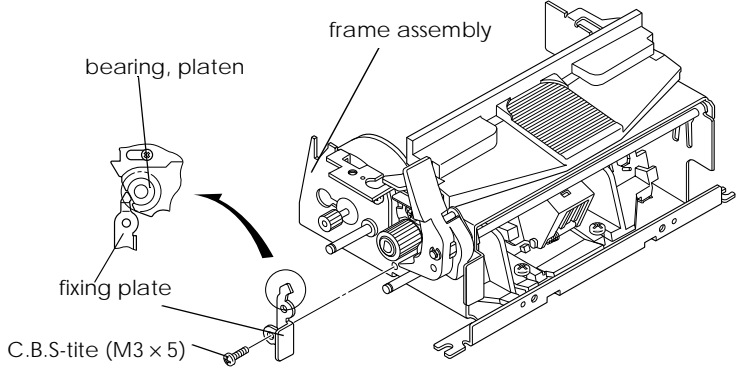
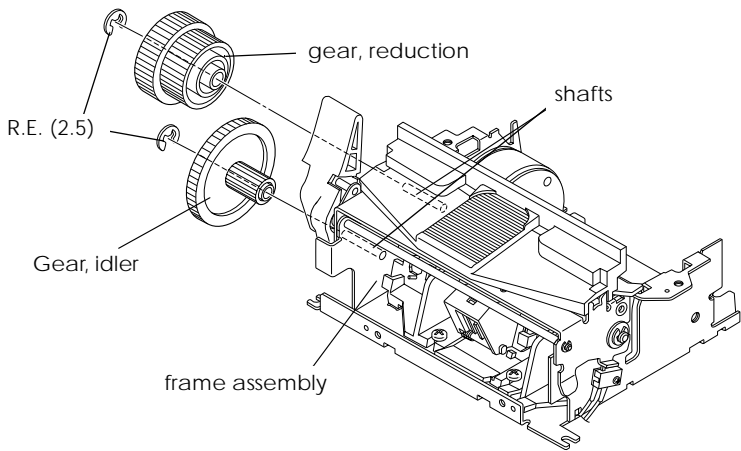
**Main Assembly G: Plate, pressure spring**

Reassembly step	Part name	Assembly procedure
1	Plate, pressure spring	
2	Circuit board assembly C.B.S-tite (M2.5 × 4) × 1	<p>□ Install the <b>Circuit board</b> to the <b>Plate, pressure spring</b>, and secure it with a screw.</p> 
★		<p>&lt;Check&gt;</p> <p>□ Tightening torque: 588 to 637 mN•m {6.0 to 6.5 kg•cm}</p>
3	Spring, press head × 2	<p>□ Install the <b>Spring, press heads</b> to the <b>Plate, pressure spring</b>.</p> 
★		<p>&lt;Check&gt;</p> <p>□ Make sure that the <b>Spring, press head</b> is pushed securely into the <b>Plate, pressure spring</b>.</p>
4		<p>□ Hook the edge of the <b>Spring, press head</b> to the groove of the <b>Thermal print head assembly</b> while pushing the <b>Plate, pressure spring</b> in the arrow direction; then hook it to the groove of the <b>Frame assembly</b>.</p> 

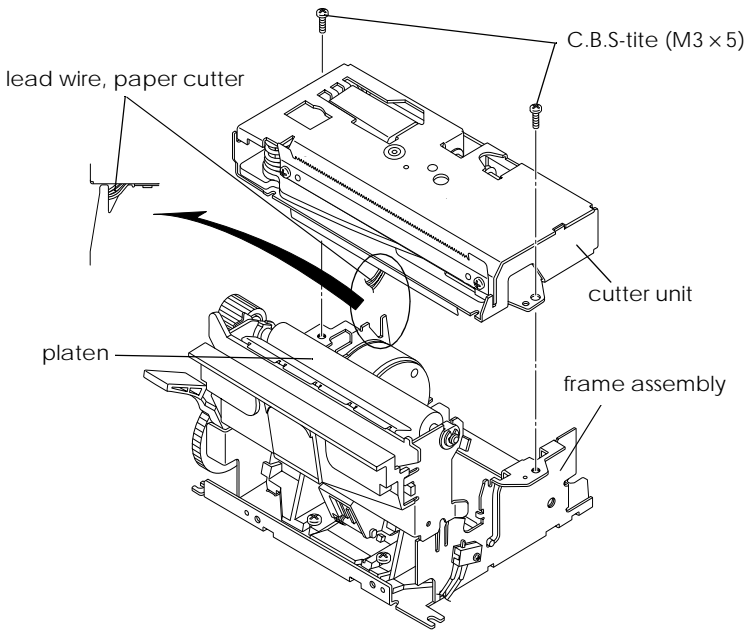
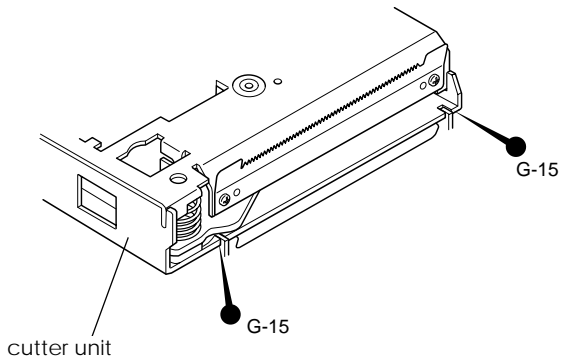
## Main Assembly G

Reassembly step	Part name	Assembly procedure
★		<p>&lt;Check&gt;</p> <ul style="list-style-type: none"> <li>❑ Make sure that the lead wires, such as those for the <b>Paper detector assembly</b> are not caught between any places when installing the <b>Spring, press head</b>.</li> <li>❑ Make sure that the lead wires of the <b>Paper detector assembly</b> and the <b>Paper detector assembly</b> are passed under the <b>Plate, pressure spring</b>.</li> </ul>  <p>lead wires</p> <p>plate, pressure spring</p> <ul style="list-style-type: none"> <li>❑ Make sure that the edge of the <b>Spring, press head</b> fits securely into the groove on the <b>Thermal print head assembly</b>.</li> </ul>  <p>thermal print head assembly</p> <p>spring, press head</p> <ul style="list-style-type: none"> <li>❑ Make sure that the <b>Plate, pressure spring</b> is hooked securely into the hole on the <b>Frame assembly</b>.</li> </ul>  <p>frame assembly</p> <p>plate, pressure spring</p>

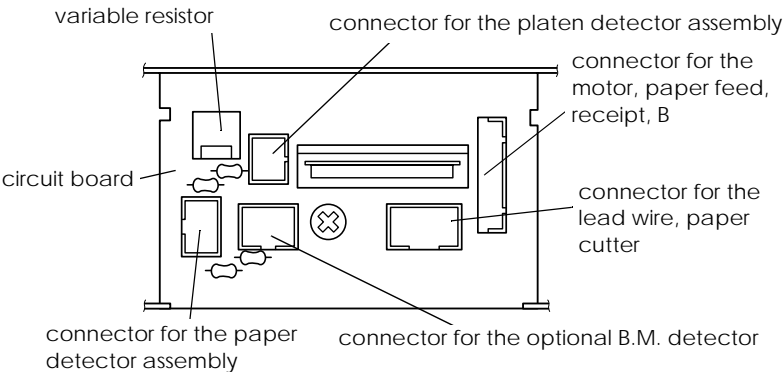
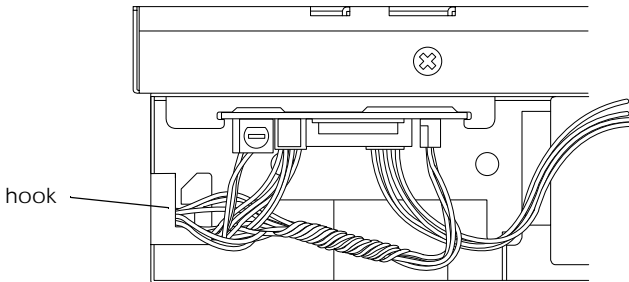
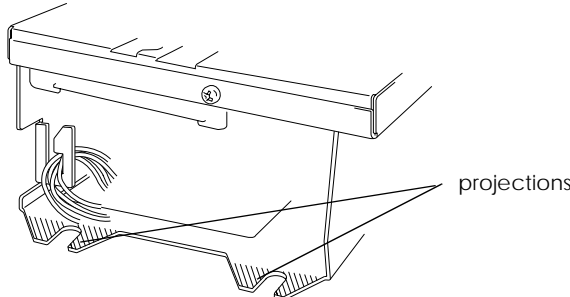
## Main Assembly H: Fixing plate, Gear, reduction and Gear, idler

Reassembly step	Part name	Assembly procedure
1	Fixing plate C.B.S-tite (M3 x 5) × 1	<p>❑ Install the <b>Fixing plate</b> to the <b>Frame assembly</b>, and secure it with the screw while pushing the edge of the <b>Fixing plate</b> to the <b>Bearing, platen</b>.</p>  <p>&lt;Check&gt;</p> <p>❑ Tightening torque: 686 to 882 mN•m {7.0 to 9.0 kg•cm}</p> <p>❑ Make sure that the edge of the <b>Fixing plate</b> is pushed securely to the <b>Bearing, platen</b>.</p>
2	Gear, reduction	<p>❑ Install the <b>Gear, reduction</b> and the <b>Gear, idler</b> to the shafts on the <b>Frame assembly</b>, and secure them with <b>R.E.s</b>.</p>  <p>&lt;Check&gt;</p> <p>❑ Make sure not to deform the shaft on the <b>Frame assembly</b> when securing with the <b>R.E.</b>.</p>
3	Gear, idler R.E. (2.5) × 2	
★		

## Main Assembly I: Cutter unit

Reassembly step	Part name	Assembly procedure
1	Cutter unit C.B.S-tite (M3 x 5) × 2	<p>❑ Install the <b>Cutter unit</b> to the <b>Frame assembly</b> and secure it with screws, while the <b>Lead wire, paper cutter</b> is passed through the hook on the <b>Frame assembly</b>.</p>  <p>lead wire, paper cutter</p> <p>C.B.S-tite (M3 x 5)</p> <p>cutter unit</p> <p>platen</p> <p>frame assembly</p> <p>★</p> <p>&lt;Check&gt;</p> <ul style="list-style-type: none"> <li>❑ Tightening torque: 686 to 882 mN•m {7.0 to 9.0 kg•cm}</li> <li>❑ Make sure that the <b>Lead wire, paper cutter</b> is passed through the hook on the <b>Frame assembly</b> properly as shown above.</li> <li>❑ Make sure that the <b>Lead wire, paper cutter</b> is not caught between any places when securing the <b>Cutter unit</b>.</li> <li>❑ Install the <b>Cutter unit</b> in the platen-up state.</li> </ul> <p>②</p> <p>❑ Lubricate the point where the <b>Fixed blade</b> of the cutter unit contacts the <b>Cutter frame</b> with G-15.</p>  <p>cutter unit</p> <p>G-15</p> <p>G-15</p>

**Assembly J: Lead Wire Arrangement**

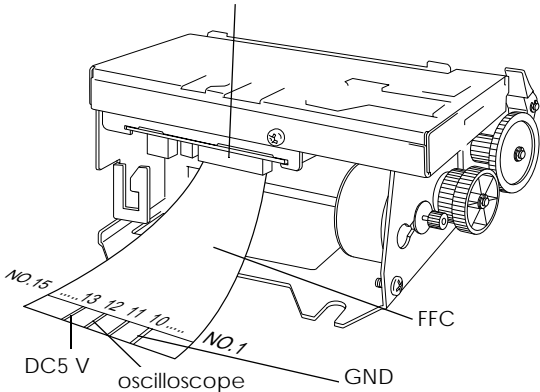
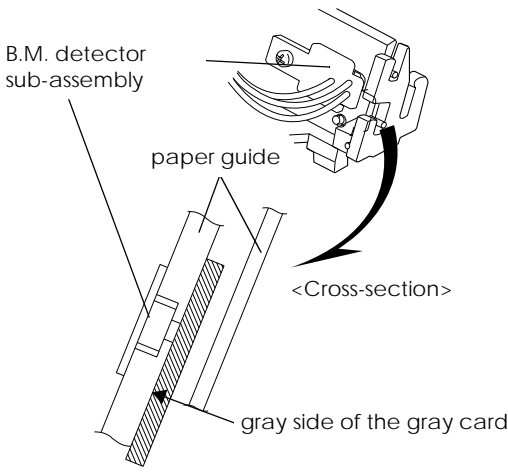
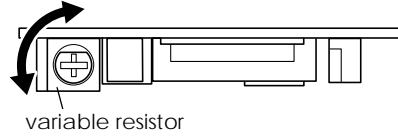
Reassembly step	Part name	Assembly procedure
1		<p><input type="checkbox"/> Insert the lead wire connectors to the connectors on the <b>Circuit board</b>.</p>  <p><b>&lt;Note on circuit board assembly replacement&gt;</b> No functional error will occur even though the new circuit board assembly may differ from the one you used previously in the number of the connectors and the resistors on the board.</p> <p>★</p> <p><b>&lt;Check&gt;</b></p> <p><input type="checkbox"/> Make sure that the connectors are oriented properly when connecting.</p> <p><input type="checkbox"/> Make sure that the connectors are inserted securely.</p>
2		<p><input type="checkbox"/> All lead wires should be passed through the hook on the <b>Frame assembly</b>, and arranged inside of the printer.</p>  <p>hook</p> <p>★</p> <p><b>&lt;Check&gt;</b></p> <p><input type="checkbox"/> Make sure that any of the lead wires are not caught by the projections (the colored part).</p> <p><input type="checkbox"/> Make sure not to damage the coats of the lead wires when arranging the lead wires.</p>  <p>projections</p>



## Adjustment

### Adjustment: Black mark detector

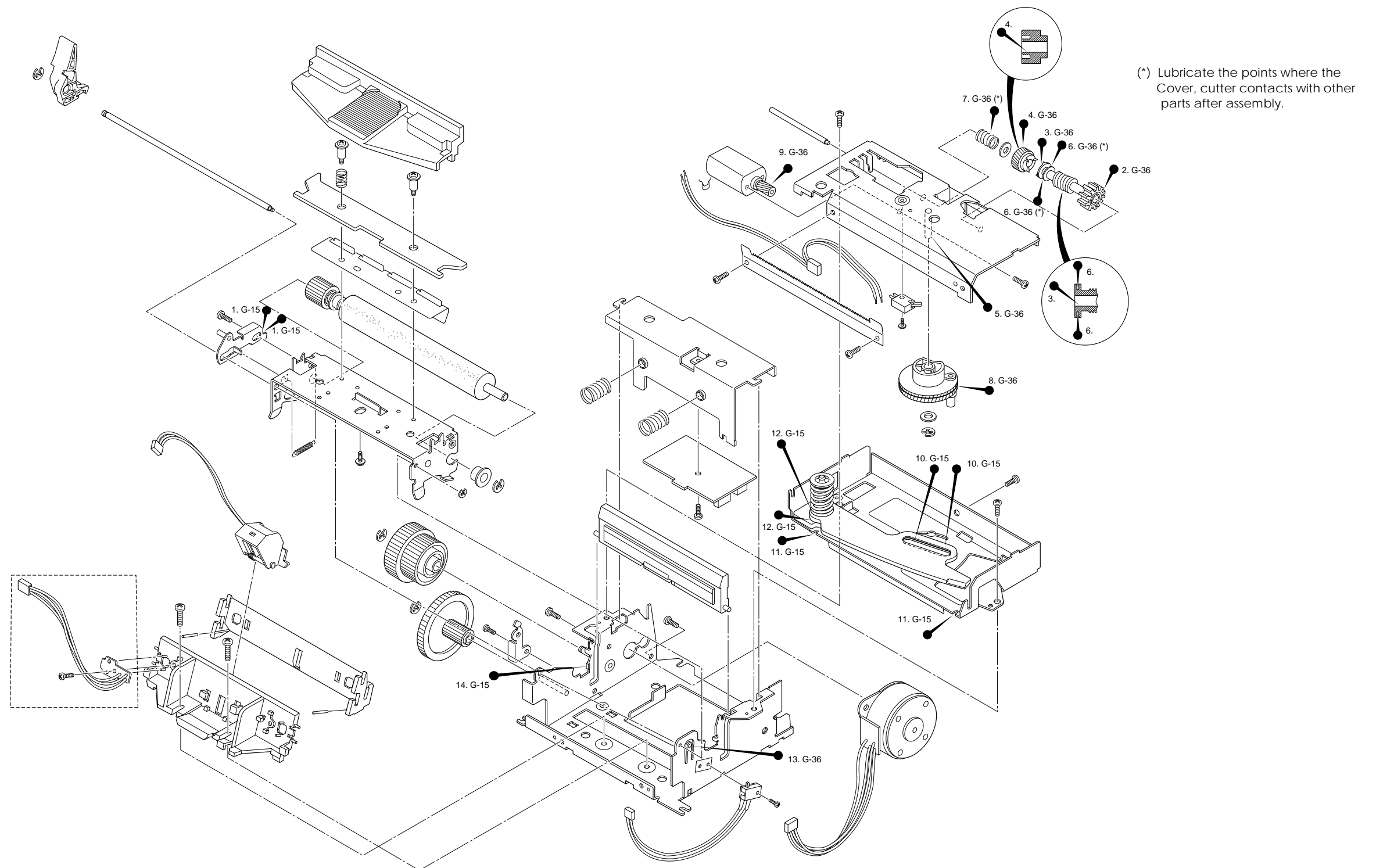
Adjust the Black mark (B.M.) detector using the following procedure.

Adjustment step	Adjustment procedure	Adjustment point
1.	<p>❑ Connect the FFC terminal No.12 to an oscilloscope to display the output power voltage of the B.M. detector on the oscilloscope screen.</p>	
2.	<p>❑ Input DC5 V to the FFC terminal No. 13.</p> <p>circuit board</p> 	
3.	<p>❑ Insert a "Kodak Gray Card" into the paper entrance.</p> <p>("Kodak Gray Card": A commercially available card for adjusting exposure.)</p>	<p>❑ Make sure that the gray side of the card is inserted along the <b>Paper guide</b> which the <b>B.M. detector sub-assembly</b> is installed.</p> 
4.	<p>❑ Adjust the output power voltage of the <b>B.M. detector</b> at 1.74 V using the variable resistor on the <b>Circuit board assembly</b>.</p>	<p>❑ Turn the slot on the variable resistor to the right and the left with a tool such as a flat-head driver, to adjust the output power voltage.</p> 

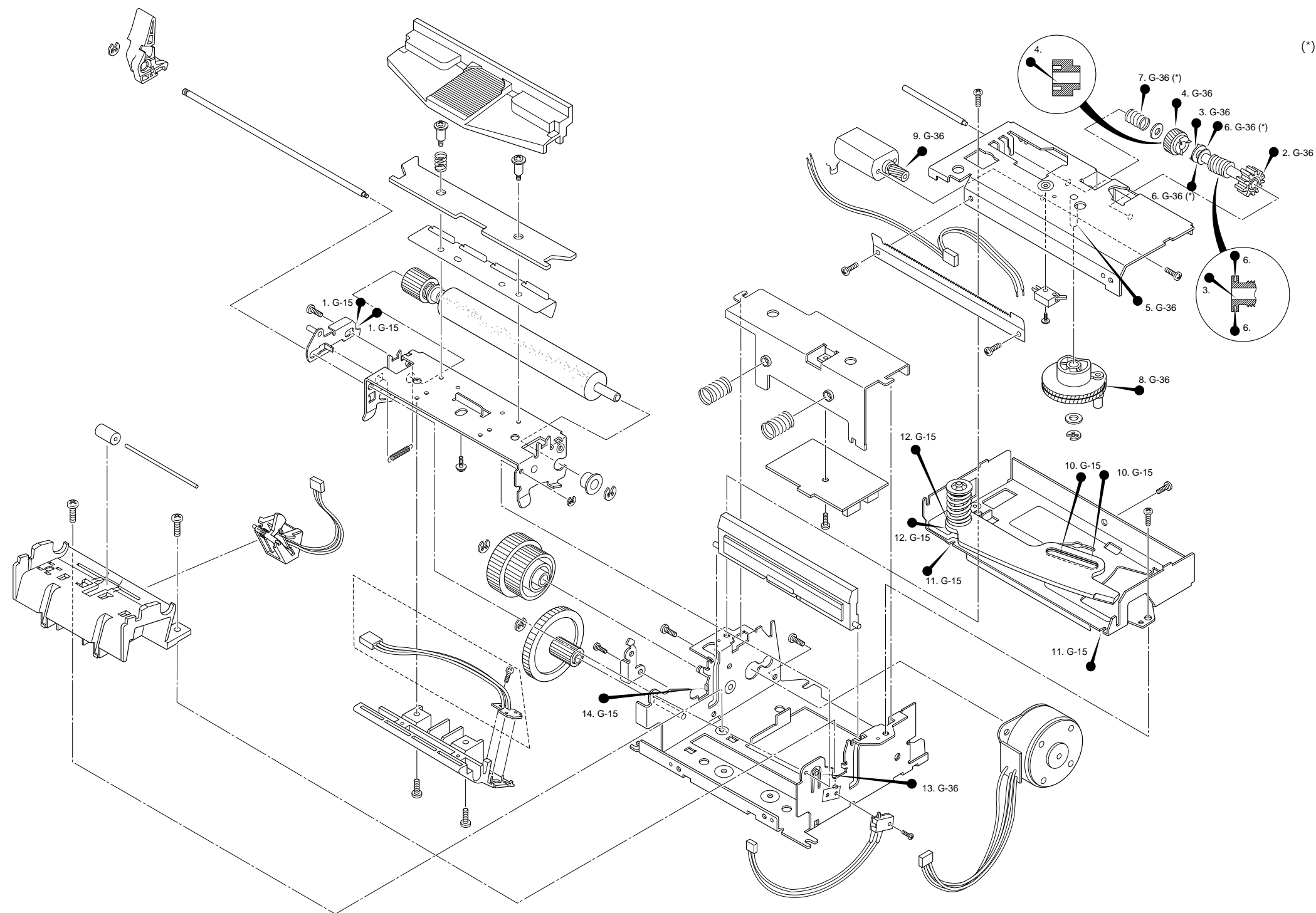




**M-T532A/T542A Lubrication Diagram (for Straight Path Type)**



M-T531A/T541A Lubrication Diagram (for Curved Path Type)



(\*) Lubricate the points where the Cover, cutter contacts with other parts after assembly.

