

# **TM-L90/TM-L90 Peeler**

## **Technical Reference Guide**

**EPSON**

English

410019401



### Cautions

- ❑ 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 purchaser 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® and ESC/POS® are registered trademarks of Seiko Epson Corporation

### ESC/POS® Command System

EPSON has been taking industry initiatives with its own POS printer command system (ESC/POS). ESC/POS has a large number of commands, including patented ones. Its high scalability enables users to build versatile POS systems. The system is compatible with all types of EPSON POS printers and displays. Moreover, its flexibility makes it easy to upgrade in the future. The functionality and the user-friendliness are valued around the world.

### Revision Table

Rev	Page	Description
Rev. A	all pages	Newly authorized
Rev. B	all pages	Descriptions of horizontal installation deleted

## **For Safety**

### **Key to Symbols**

The symbols in this manual are identified by their level of importance, as defined below. Read the following carefully before handling the product.



#### **WARNING:**

*You must follow warnings carefully to avoid serious bodily injury.*



#### **CAUTION:**

*Provides information that must be observed to prevent damage to the equipment or loss of data.*

- Possibility of sustaining physical injuries.*
- Possibility of causing physical damage.*
- Possibility of causing information loss.*



#### **Note:**

*Provides important information and useful tips on handling the equipment.*

## Warnings

### **WARNING:**

- ❑ Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise. Continued use may lead to fire or electric shock. Immediately unplug the equipment.
- ❑ Only disassemble this product as described in this manual. Do not make modifications to the unit. Tampering with this product may result in injury, fire, or electric shock.
- ❑ Do not install this product or handle cables during a thunderstorm in order to avoid risk of electric shock.
- ❑ Be sure to use the specified power source. Connection to an improper power source may cause fire or shock.
- ❑ Never insert or disconnect the power plug with wet hands. Doing so may result in severe shock.
- ❑ Do not allow foreign matter to fall into the equipment. Penetration by foreign objects may lead to fire or electric shock.
- ❑ If water or other liquid spills into this equipment, turn off the power supply switch and unplug the power cord immediately. Continued usage may lead to fire or electric shock.
- ❑ Do not place multiple loads on power outlet. Overloading the outlet may lead to fire. Always supply power directly from a standard domestic power outlet.
- ❑ Handle the power cord with care. Improper handling may lead to fire or electric shock.
  - Do not modify or attempt to repair the cord.
  - Do not place any heavy object on top of the cord.
  - Avoid excessive bending, twisting, and pulling.
  - Do not place the cord near heating equipment.
  - Check that the plug is clean before plugging it in.
  - Be sure to push the plug all the way in.

## Cautions

### **CAUTION:**

- ❑ *Do not connect cables in ways other than those mentioned in this manual. Different connections may cause equipment damage and burning.*
- ❑ *Be sure to set this equipment on a firm, stable horizontal surface. Product may break or cause injury if it falls.*
- ❑ *Do not use in locations subject to high humidity or dust levels. Excessive humidity and dust may cause equipment damage, fire, or shock.*
- ❑ *Do not place heavy objects on top of this equipment. Never stand or lean on this equipment. Equipment may fall or collapse, causing breakage and possible injury.*
- ❑ *To ensure safety, unplug this equipment prior to leaving it unused for an extended period.*
- ❑ *Parts on the circuit board may become hot during operation. Therefore, wait approximately 10 minutes after turning the power off before touching them.*
- ❑ *To avoid injury, take care not to insert fingers or any part of the hand in the roll paper opening where the manual cutter is installed.*
- ❑ *Do not open the roll paper cover without taking the necessary precautions, as this can result in injury from the autocutter fixed blade.*
- ❑ *Be sure to replace the batteries correctly. Improper replacement may cause a battery burst. Only use batteries provided by EPSON. Follow the requirements of your regional to properly dispose of used batteries.*

## **Modular Connector**

Use the modular connectors specifically designed for the cash drawer for this product. Do not connect these connectors to an ordinary telephone line.

## **About This Manual**

### **Aim of the Manual**

This manual was created to provide all information necessary for system planning, design, installations and application of the printer for designers and developers of POS systems.

### **Manual Content**

The manual is made up of the following sections:

- Chapter 1 Product Overview
- Chapter 2 Setup
- Chapter 3 Connecting the Host Computer and Options
- Chapter 4 Application Development Information
- Chapter 5 ESC/POS Command Related Information
- Chapter 6 Product Specifications
- Appendix A Interfaces and Connectors
- Appendix B Consumable Supplies Specifications
- Appendix C Character Code Table
- Appendix D Option Specifications
- Appendix E Maintenance
- Appendix F Troubleshooting
- Appendix G Shipping Procedures

### **Related Documentation**

The following documents also relate to the TM-L90 / TM-L90 peeler specification.

<b>Name of document</b>	<b>Description</b>
TM-L90 User's Manual	Comes with the printer. Provides information to enable POS operators to use the TM-L90 safely and correctly.
TM-L90 with Peeler User's Manual	Comes with the printer. Provides information to enable POS operators to use the TM-L90 peeler specification safely and correctly.
ESC/POS Application Programming Guide	Provides detailed ESC/POS command information. Contact us to obtain this guide.



# Contents

Revision Table .....	1-i
For Safety .....	1-ii
Key to Symbols .....	1-ii
Warnings .....	1-iii
Cautions .....	1-iv
Modular Connector .....	1-iv
About This Manual .....	1-v
Aim of the Manual .....	1-v
Manual Content .....	1-v
Related Documentation .....	1-v

## Chapter 1 Product Overview

1.1 Product Structure .....	1-1
1.1.1 Models .....	1-1
1.1.2 Accessories .....	1-1
1.1.3 Option .....	1-2
1.2 Name and Description of Each Part .....	1-3
1.2.1 Part Names (TM-L90) .....	1-3
1.2.2 Part names (TM-L90 peeler specification) .....	1-4
1.2.3 Control Panel .....	1-5
1.2.4 Power Switch .....	1-7
1.2.5 Power switch cover .....	1-8
1.2.6 Mode switch (TM-L90 peeler specification only) .....	1-8
1.2.7 Connectors .....	1-9

## Chapter 2 Setup

2.1 Setup Flow .....	2-1
2.2 Installation Procedures .....	2-2
2.2.1 Precaution For Installation .....	2-2
2.2.2 Instructions for Installation .....	2-2
2.3 Adjusting Roll Paper Near-End Detection Position .....	2-4
2.3.1 With TM-L90 .....	2-4
2.3.2 With the TM-L90 peeler specification .....	2-8
2.4 Connecting Power Supply Unit (PS-180) .....	2-12
2.4.1 Attaching Power Supply Unit .....	2-12
2.4.2 Caution about Power Supply unit and Supply Voltage .....	2-13
2.5 Autocutter settings (TM-L90 only) .....	2-14
2.6 Setting Roll Paper Width .....	2-17
2.7 DIP Switch Settings .....	2-19
2.8 Setting Memory Switches .....	2-21
2.8.1 Items that can be set in the memory switch setting mode .....	2-22
2.8.2 Starting the Memory Switch Setting mode .....	2-23
2.8.3 Ending Memory Switch Setting mode .....	2-24
2.8.4 Operating procedure of Memory Switch Settings .....	2-25
2.9 Memory Switch Functions .....	2-33
2.9.1 TM-L90 memory switch settings .....	2-33
2.9.2 TM-L90 peeler specification memory switch settings .....	2-36
2.10 Paper Loading Method .....	2-39
2.10.1 With TM-L90 .....	2-39

2.10.2 With the TM-L90 peeler specification	2-40
2.10.3 Setting Paper Layout	2-44
2.10.4 Clearing Paper Layout Setting	2-48
2.11 TM Setup Items (Summary)	2-49
2.12 Operating Mode (Panel Switch Operation)	2-51
2.12.1 Self Test Mode	2-51

### **Chapter 3 Connecting to the Host Computer and Options**

3.1 Connecting the Cable	3-1
3.2 Connecting to the Host Computer	3-2
3.2.1 With the RS-232C interface	3-2
3.2.2 With the parallel (IEEE1284) interface	3-5
3.2.3 With the USB interface	3-5
3.2.4 With the Ethernet interface 'IEEE802.3' (TM-L90 only)	3-7
3.3 Connecting to the Drawer	3-9

### **Chapter 4 Application Development Information**

4.1 Introduction of Control Methods	4-1
4.1.1 Windows Driver (EPSON Advanced Printer Driver)	4-1
4.1.1.1 EPSON Advanced Printer Driver Overview	4-1
4.1.1.2 EPSON Advanced Printer Driver Contents	4-2
4.1.1.3 EPSON Advanced Printer Driver Support Environment	4-3
4.1.1.4 Driver Information and Download Destination	4-4
4.1.2 EPSON OPOS ADK	4-4
4.1.2.1 EPSON OPOS ADK (OPOS Control) Overview	4-5
4.1.2.2 EPSON OPOS ADK Contents	4-5
4.1.2.3 EPSON OPOS ADK Support Environment	4-6
4.1.2.4 Driver Information and Download Destination	4-7
4.1.3 ESC/POS Commands	4-7
4.1.4 Various Utilities	4-7
4.1.4.1 Address Setup Utility for Ethernet Interface (for UB-E01/UB-E02)	4-7
4.1.4.2 Electronic Logo Registration Utility for NVRAM	4-7
4.1.4.3 TM Printer Memory Switch Setup Utility	4-7
4.1.4.4 USB Interface ID Code Rewrite Utility	4-7
4.2 Sensors	4-8
4.2.1 Paper sensors	4-8
4.2.1.1 Roll paper near-end sensor	4-8
4.2.1.2 Roll Paper End Sensor	4-8
4.2.2 Printer Cover Sensor	4-8
4.2.2.1 Roll Paper Cover Open Sensor	4-8
4.2.2.2 Offline	4-9
4.2.2.3 Busy state	4-9
4.2.2.4 Receive buffer	4-10
4.2.3 Label peeling sensor (peeler specification only)	4-10
4.3 Setting of Paper Width	4-11
4.4 Print Density	4-11
4.5 Print Speed	4-11
4.5.1 Paper to use for high speed	4-11
4.6 Barcode Printing	4-12
4.7 CODE 128 Barcode	4-12
4.8 Precautions for Two-Dimensional Code Printing	4-16
4.9 Two-Color Printing	4-16
4.10 NV Memory	4-16
4.11 FAQ List	4-17

## Chapter 5 ESC/POS Command-Related Information

5.1 TM Printer Operation Performed When Power Supply Switch is Disabled	5-1
5.1.1 Power Supply Switch-Related User Operation List	5-1
5.1.2 Power Off Control by the Host	5-1
5.1.2.1 When the Power Supply Switch is Enabled	5-2
5.1.2.2 When the Power Supply Switch is Disabled	5-2
5.2 Head Divided Control	5-2
5.3 Control After Paper Cut	5-2
5.4 NV Memory	5-2
5.5 Customizing Printer	5-3
5.5.1 Printer initial setting up	5-3
5.5.2 Changing command default values	5-3
5.5.3 Using the NV Memory	5-3
5.6 Printer Status	5-4
5.6.1 Hexadecimal Dump Mode	5-4

## Chapter 6 Product Specifications

6.1 Product Specifications	6-1
6.1.1 TM-L90	6-1
6.1.2 TM-L90 peeler specification	6-3
6.2 Print Specifications	6-4
6.3 Reliability	6-5
6.3.1 TM-L90	6-5
6.3.2 TM-L90 peeler specification	6-7
6.4 Character Specifications	6-8
6.5 Paper Feed Specifications	6-9
6.5.1 Precautions for Printing and Paper Feed	6-9
6.6 Paper Specifications	6-9
6.7 Printing Area	6-10
6.7.1 Thermal Paper	6-10
6.7.2 Label	6-11
6.8 Printing Position in Relation to Cutter Position (TM-L90)	6-12
6.9 Printing Position, Peeling Position, Manual Cutter Position (TM-L90 Peeler Specification)	6-13
6.10 Overview of External Dimensions	6-14
6.10.1 Operating specifications	6-16

## Appendix A Interface And Connectors

A.1 RS-232 Serial Interface	A-1
A.1.1 Interface board specifications (RS-232 standard)	A-1
A.1.2 Functions of each connector pin	A-2
A.1.3 XON/XOFF	A-3
A.1.4 Code	A-3
A.2 IEEE1284 Parallel Interface	A-4
A.2.1 Mode	A-4
A.2.2 Interface Signals	A-5

## Appendix B Consumable Specifications

B.1 TM-L90 Roll Paper	B-1
B.1.1 Receipt Roll Paper	B-1
B.1.1.1 Specified Receipt Roll Paper	B-2
B.1.1.2 Specified Original Roll Paper	B-2
B.1.1.3 Print Density Adjustment	B-3
B.1.1.4 Paper to Use for High Speed	B-3

B.1.1.5	In case that paper other than the specified original paper is used	B-4
B.1.1.6	Requirements for Black Mark Position for Receipt Paper	B-4
B.1.2	Die-Cut Label Roll Paper	B-5
B.1.2.1	Die-Cut Label Paper	B-5
B.1.2.2	Specified Die-Cut Label Roll Paper Specifications	B-5
B.1.2.3	Specified Original Paper	B-6
B.1.2.4	Print Density Adjustment	B-6
B.1.2.5	Paper to Use for High Speed	B-6
B.1.2.6	In case that paper other than the specified original paper is used	B-7
B.1.2.7	Requirements for Die-Cut Label Paper Thickness, Peeling Strength, and Adhesive Agent	B-7
B.1.2.8	Requirements for Die-Cut Label Size	B-8
B.1.2.9	Requirements for Transparency Rate of Die-Cut Label Paper	B-9
B.1.2.10	Requirements for Black Mark Position for Die-Cut Label Paper	B-9
B.1.2.11	Requirements for Black Mark Position I	B-9
B.1.2.12	Requirements for Black Mark Position II	B-10
B.1.3	Continuous Label Roll Paper	B-11
B.1.3.1	Continuous Label Paper	B-11
B.1.3.2	Specified Continuous Label Roll Paper	B-11
B.1.3.3	Print Density Adjustment	B-12
B.1.3.4	Paper to Use for High Speed	B-12
B.1.3.5	Requirements for Size of Continuous Label Paper	B-12
B.2	TM-L90 with Peeler Roll Paper	B-13
B.2.1	Receipt Roll Paper	B-13
B.2.1.1	Specified Original Roll Paper	B-13
B.2.1.2	Print Density Adjustment	B-14
B.2.1.3	Paper to Use for High Speed	B-14
B.2.1.4	Requirements for Black Mark Position for Receipt Paper	B-15
B.2.2	Die-Cut Label Roll Paper	B-16
B.2.2.1	Die-Cut Label Paper	B-16
B.2.2.2	Specified Original Paper	B-16
B.2.2.3	Print Density Adjustment	B-17
B.2.2.4	Paper to Use for High Speed	B-17
B.2.2.5	If paper other than the specified original paper is used	B-17
B.2.2.6	Requirements for Die-Cut Label Paper Thickness, Peeling Strength, and Adhesive Agent	B-17
B.2.2.7	Requirements for Die-Cut Label Size	B-18
B.2.2.8	Requirements for Transparency Rate of Die-Cut Label Paper	B-19
B.2.2.9	Requirements for Black Mark Position for Die-Cut Label Paper	B-19
B.2.2.10	Requirements for Black Mark Position I	B-20
B.2.2.11	Requirements for Black Mark Position II	B-21
B.3	Notes On Paper Handling	B-22
B.3.1	Notes on Thermal Paper Handling	B-22
B.3.2	Notes on Storage	B-22
B.3.3	Notes on Two-Color Paper Handling	B-23

### **Appendix C Character Code Table**

C.1	Page 0 (PC437 : USA, Standard Europe)	C-1
C.2	Page 1 (Katakana)	C-2
C.3	Page 2 (PC850: Multilingual)	C-3
C.4	Page 3 (PC860: Portuguese)	C-4
C.5	Page 4 (PC863: Canadian-French)	C-5
C.6	Page 5 (PC865: Nordic)	C-6
C.7	Page 16 (WPC1252)	C-7
C.8	Page 17 (PC866: Cyrillic #2)	C-8
C.9	Page 18 (PC852: Latin2)	C-9

C.10 Page 19 (PC858: Euro) .....	C-10
C.11 Page 255 (Blank page) .....	C-11
C.12 International Character Set .....	C-12

### Appendix D **Option Specifications**

D.1 PS-180 .....	D-1
D.1.1 Electrical Characteristics .....	D-1
D.1.2 Case Specifications .....	D-1
D.1.2.1 Material .....	D-2
D.1.3 AC Cable Selection .....	D-2

### Appendix E **Maintenance**

E.1 Cleaning the autocutter (TM-L90 only) .....	E-1
E.2 Print Head Cleaning .....	E-3
E.3 Cleaning the peeler (TM-L90 peeler specification only) .....	E-5

### Appendix F **Troubleshooting**

F.1 Panel LED and Error Status .....	F-1
F.1.1 Power (POWER) LED .....	F-1
F.1.2 No Roll Paper (PAPER OUT) LED .....	F-2
F.1.3 Error (ERROR) LED .....	F-2
F.1.4 Error code .....	F-3
F.2 The autocutter is jammed or the roll paper cover will not open (TM-L90 only) .....	F-8
F.3 When a paper jam occurs (TM-L90 peeler specification) .....	F-9
F.4 The printer became inoperative after you change the interface reset signal in the memory switch setting mode .....	F-9

### Appendix G **Shipping Procedures**



## Chapter 1

# Product Overview

---

## 1.1 Product Structure

### 1.1.1 Models

- ❑ Product name: TM-L90 series/ TM-L90 peeler specification
  - Printing Thermal line
- Serial interface (RS-232C)
- Parallel interface (IEEE-1284 standard)
- USB interface (Supports USB full speed mode (12Mbps))
- Ethernet interface specification

### 1.1.2 Accessories

#### *TM-L90*

- ❑ Printer
- ❑ Label roll paper
- ❑ User's manual
- ❑ Power switch cover
- ❑ Control panel label used for horizontal installation
- ❑ Paper exit guide for horizontal installation
- ❑ Roll paper spacer
- ❑ Screw for installation of the roll paper spacer
- ❑ Hexagonal lock screws (2 pieces) (only for the serial interface)

#### *TM-L90 peeler specification*

- ❑ Printer (main unit)
- ❑ Label roll paper
- ❑ User's manual
- ❑ Power switch cover
- ❑ Operation label (an instruction label for the peeler open lever and the roll paper cover open lever)
- ❑ Roll paper spacer

### **1.1.3 Option**

#### *TM-L90*

- Velcro affixing tapes (model: DF-10)
- Wall hanging bracket (model: WH-10)
- External power supply unit EPSON PS-180 (\*1)(PS-180 supports power-saving feature)
- Power cables (model: AC-170)

(\*1) Power supply unit doesn't come with the printer. Purchase separately if needed.

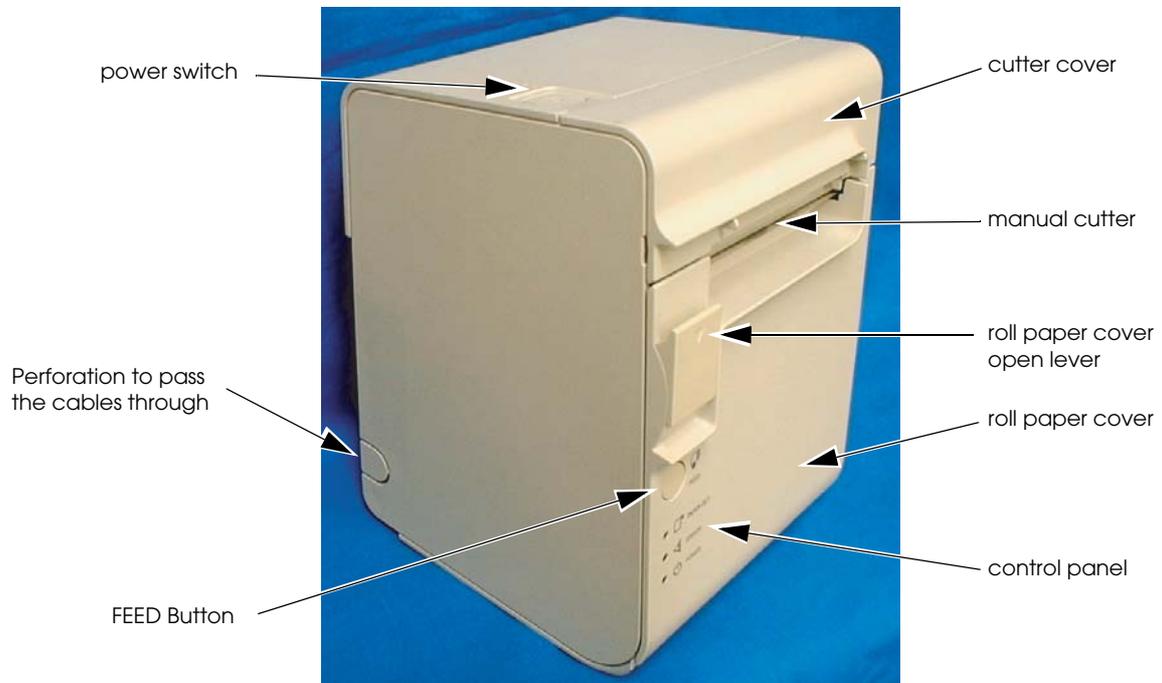
#### *TM-L90 peeler specification*

- Velcro for anchoring the printer (part number: DF-10)
- Wall fixture (part number: WH-10)
- External power unit Epson PS-180 (\*1) (PS-180 is an energy saving item)
- Various interface boards (UB series excluding UB-U05)

(\*1) The power unit is not included. Please purchase it separately.

## 1.2 Name and Description of Each Part

### 1.2.1 Part Names (TM-L90)



Printer Part Names

\* Refer to page 2-19 for the location of the DIP switches.

\* Another FEED button is located under the roll paper cover. Refer to page 2-23 for the location.

### 1.2.2 Part names (TM-L90 peeler specification)

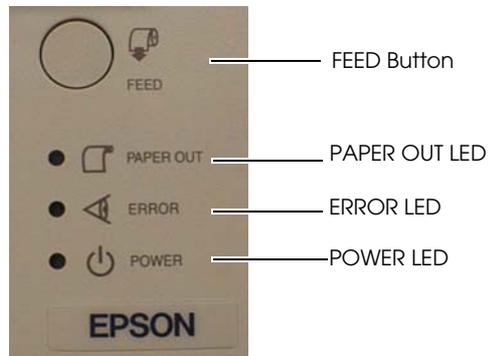


Part Names of TM-L90 Peeler Specification

\* Refer to page 2-19 for the DIP switch positions.

\* There is also a FEED button under the roll paper cover. Refer to page 2-23 for the position.

### 1.2.3 Control Panel



#### *FEED button (with TM-L90)*

Pressing the FEED button feeds the roll paper.

The printer paper feed depends on the line feed amount set. However, in the following cases, FEED cannot be used for paper feed.

- When the roll paper cover is open
- When performing cleaning
- When performing self-testing (Press the FEED button to stop self-testing and press it again to resume it.)
- When the FEED button has a defined function in a macro definition command. (When using ESC/POS commands)

#### *FEED button (with the TM-L90 peeler specification)*

FEED has the following 3 functions.

- Feeding roll paper
- Initializing the mechanism  
(After closing the roll paper cover, the status changes to waiting to print when FEED is pressed)
- Recovering from errors

#### ❑ Feeding roll paper

The printer paper feed depends on the line feed amount set. However, in the following cases, FEED cannot be used for paper feed.

- The roll paper runs out
- When the roll paper cover is open
- When waiting for label removal
- When waiting for FEED to be pressed
- When an error occurs

#### ❑ Initializing the mechanism(with TM-L90)

You can initialize the mechanism (paper feed operation) with the following procedure.

1. Open the roll paper cover.
2. Close the roll paper cover.
3. Press FEED.
  - If the roll paper is inserted after the roll paper cover is opened and closed, the printer waits for FEED to be pressed, and then the PAPER OUT LED flashes. In this case, press FEED.
  - Caution: When memory switch 8-6 is set to "ON," If the roll paper is inserted when the power is off, or if the roll paper cover is opened and closed then the power is turned on, press FEED.

#### ❑ Recovering from errors

When error recovery with FEED is enabled by memory switch 8-1, pressing FEED when a paper layout error occurs recovers from the error and performs automatic paper layout.

#### ❑ Initializing the mechanism(with TM-L90 with Peeler)

You can initialize the mechanism (paper feed operation) with the following procedure.

1. Open the peeler cover.
2. Open the roll paper cover.
3. Close the peeler cover and the roll paper cover.
4. Press FEED.
  - If the roll paper is inserted after the roll paper cover is opened and closed, the printer waits for FEED to be pressed, and then the PAPER OUT LED flashes. In this case, press FEED.
  - Caution: When memory switch 8-6 is set to "ON," If the roll paper is inserted when the power is off, or if the roll paper cover is opened and closed then the power is turned on, press FEED.

#### ❑ Recovering from errors

When error recovery with FEED is enabled by memory switch 8-1, pressing FEED when a paper layout error occurs recovers from the error and performs automatic paper layout.

#### *PAPER OUT LED (with TM-L90)*

- ❑ Lights when there is no more roll paper or there is little remaining.  
(Default setting. The LED condition varies according to the memory switch settings. Refer to “Starting the Memory Switch Setting mode” on page 2-23 and “Error code” on page F-3 for details.)
- ❑ Off when there is a sufficient amount of roll paper remaining.  
(Default setting. The LED condition varies according to the memory switch settings. Refer to “Starting the Memory Switch Setting mode” on page 2-23 and “Error code” on page F-3 for details.)
- ❑ Flashes when a self test is in progress or when the printer waits for the macro execution switch to go on.

#### *PAPER OUT LED (with the TM-L90 peeler specification)*

- ❑ Lights when there is no more roll paper or there is little remaining.  
(Default setting. The LED condition varies according to the memory switch settings. Refer to “Starting the Memory Switch Setting mode” on page 2-23 and “Error code” on page F-3 for details.)
- ❑ Off when there is a sufficient amount of roll paper remaining.  
(Default setting. The LED condition varies according to the memory switch settings. Refer to “Starting the Memory Switch Setting mode” on page 2-23 and “Error code” on page F-3 for details.)
- ❑ Flashes when a self test is in progress or when the printer waits for the macro execution switch to go on.
- ❑ When the roll paper is inserted and the roll paper cover is closed, one label is ejected and the LED starts flashing. It flashes until FEED is pressed.
- ❑ When a label is issued, flashing starts after it is issued. The LED flashes until the label is removed from the peeler.

#### *POWER LED*

- ❑ Lights when the power supply is on.
- ❑ Off when the power supply is turned off.
- ❑ Flashes during execution of each operation.

#### *ERROR LED*

- ❑ Lights when the printer is offline.
- ❑ Off under normal conditions.
- ❑ Flashes when an error occurs. (Refer to “Error code” on page F-3 for details)

### **1.2.4 Power Switch**

Refer to “Printer Part Names” on page 1-3 for the power switch location.  
Turn on the power by holding down the POWER button 1 second or longer. Turn off the power by holding down the POWER button 3 seconds or longer.

The printer is normally turned on/off with this switch. You can select whether to enable or disable the power switch using the DIP switches.

When the DIP switches are set to OFF (power switch enabled), the power switch controls the TM printer as follows.

When the TM is turned off:

The TM is powered ON when the power supply switch is pressed more than 1 second.

When the TM is turned on:

The TM is powered OFF when the power supply switch is pressed more than 3 seconds.

If for some reason pressing the power switch even more than 10 seconds does not turn the power off, the TM executes a forced power off.



**Note:**

When the DIP switches are set to ON (power switch disabled), use direct control of the printer with ESC/POS commands. (For details, refer to “TM Printer Operation Performed When Power Supply Switch is Disabled” on page 5-1.) The printer may not operate normally when using OPOS or the Advanced Printer Driver with the DIP switches set to ON.



**Note:**

When using OPOS or the Advanced Printer Driver, do not set the DIP switches to ON (power switch disabled). The printer may not operate normally if the DIP switches are set to ON.



**Note:**

Make sure to check whether the AC adapter is connected to the power supply before turning on the power switch of the printer.

### **1.2.5 Power switch cover**

To prevent unintentional contact or improper changes and to improve the appearance, use a cover. When using the power switch cover, to reset the TM printer, press the power switch through the hole in the power switch cover.

### **1.2.6 Mode switch (TM-L90 peeler specification only)**

With the TM-L90 peeler specification, you can select the peeling issuing mode and continuous issuing mode with the mode switch. The mode switch switches between the peeling issuing mode and continuous issuing mode.

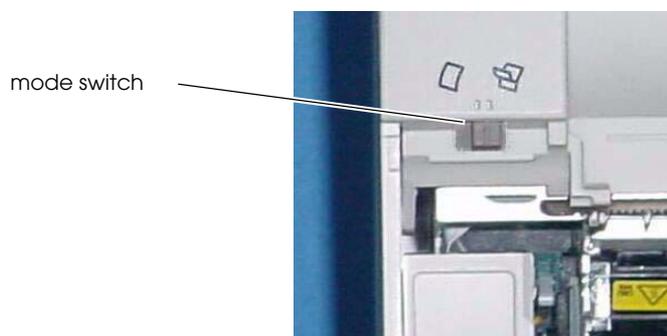
The mode switch is inside the top left of the printer when the roll paper cover is opened.



**Note:**

Be sure that the peeler cover and the roll paper cover are open when switching the modes. The setting is effective when the power is turned on or the covers are closed. If the mode is switched with the covers closed, the setting will not be changed.

Be sure not to use a ball point pen to switch the modes. A ball point pen can damage the switch.

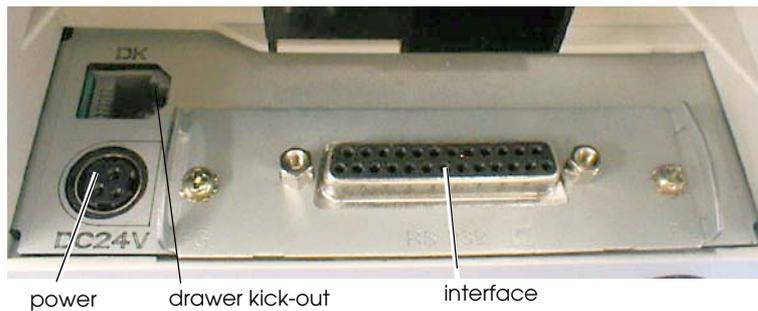
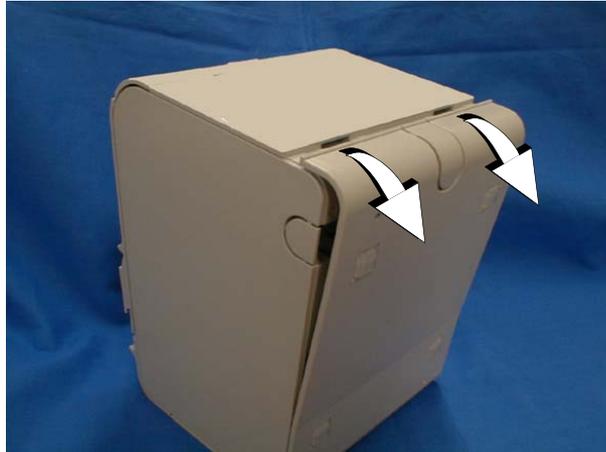


To use the peeling issuing mode, move the mode switch to the right.

To use the continuous issuing mode, move the mode switch to the left.

## 1.2.7 Connectors

Remove the bottom of the cover as shown in the illustration below. All cables are connected to the connector panel located on the lower rear side of the printer.



Connector Panel



**Note:**

The model pictured is a serial interface model. For other information on interfaces and connectors, refer to "Connecting the Cable" (Chapter 3)

## Chapter 2

# Setup

---

### 2.1 Setup Flow

Before using the printer, you need to set various settings to increase the printer's functionality. Configure the printer appropriately depending on the environment.

Determine how to install the printer (install it vertically or horizontally)



Set the Roll Paper Near-End Detector



Connect the power supply



Autocutter settings (TM-L90 only)



Set the Roll Paper width



DIP switch settings



Memory switch settings



Set the Paper layout

---

## **2.2 Installation Procedures**

### **2.2.1 Precaution For Installation**

❑ **TM-L90**

- Locate the printer on a flat surface, whichever orientation you choose.
- Avoid locations susceptible to dust and other foreign matter.
- Make sure to avoid bumping or otherwise exposing the printer to strong impact during operation.
- Avoid resting the printer on the power supply or other cables or other objects.
- Consider vibration during paper cutting and drawer usage. Take measures to prevent the printer from moving.

❑ **TM-L90 peeler specification**

- Locate the printer on a flat surface, whichever orientation you choose.
- Avoid locations susceptible to dust and other foreign matter.
- Make sure to avoid bumping or otherwise exposing the printer to strong impact during operation.
- Avoid resting the printer on the power supply or other cables or other objects.
- Consider vibration during paper cutting and drawer usage. Take measures to prevent the printer from moving.
- To prevent malfunction of the label peeling sensor, do not locate the printer in direct sunlight.

## 2.2.2 Instructions for Installation

The TM-L90 can be placed vertically (paper outlet in front), horizontally (paper outlet at the top), or attached to a wall (using the optional wall hanging set WH-10).

With the TM-L90 with peeler, you can use it vertically or wall mounted with either peeling issuing or with continuous issuing (not using the peeler).



**Note:**

*For the TM-L90 with Peeler, horizontal installation is prohibited to avoid jams caused by re-sticking of backing paper and a label.*

The illustration below shows the vertical installation for the TM-L90 with Peeler.



**Note:**

*To hang the printer on the wall, see the Wall Hanging Bracket Set Installation Manual provided with the WH-10 for instructions.*

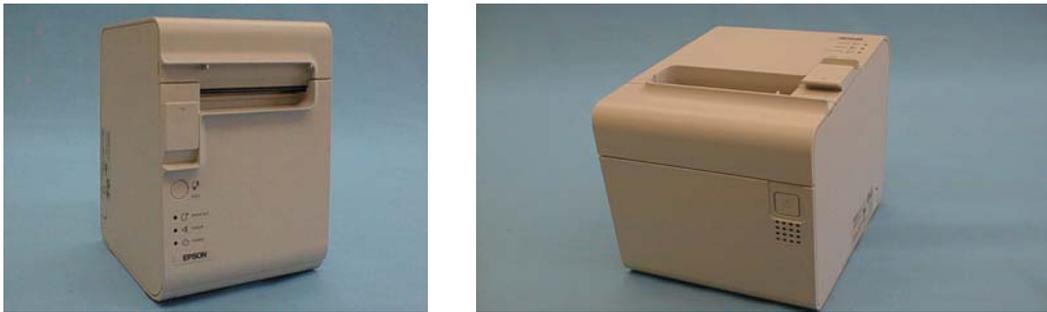
*It is recommended to take some measures so that the printer will be stable when paper is being loaded or a drawer is being used. The DF-10 (velcro fastening) for fixing the printer is provided as an option.*

*When using the printer with the peeling issuing mode, be sure to install the printer so that a peeled label will not contact the used backing paper. Re-sticking of a peeled label to the backing paper will cause jams.*

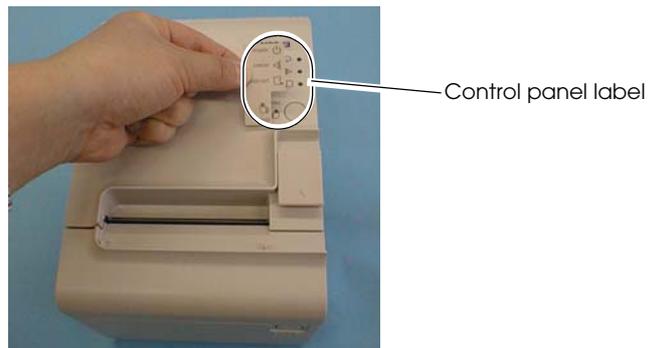
For the TM-L90, when changing the way of installation, you need to adjust the following items:

- Control panel label used for horizontal installation
- The location of the Roll Paper Near-End Detector

The following figure shows the TM-L90 placed both vertically and horizontally.



When you install the printer horizontally, attach the control panel label as shown in the illustration below.



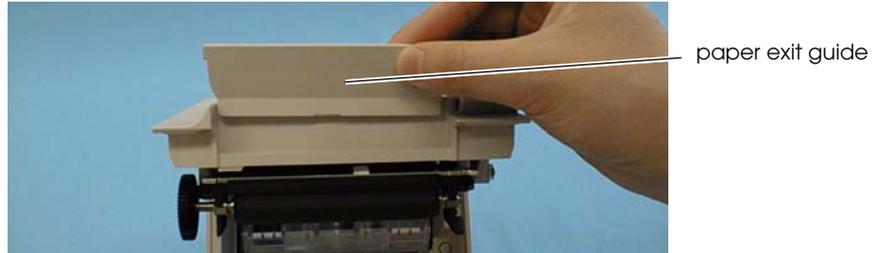
**Note:**

To hang the printer on the wall, see the *Wall Hanging Bracket Set Installation Manual* provided with the WH-10 for instructions.

When you use TM-L90 horizontally, peel off the backing sheet of the paper exit guide and attach it as shown below to prevent cut paper from falling inside the printer after paper is cut by the autocutter.

**⚠ CAUTION:**

When using the paper exit guide, do not use roll paper with a core that is smaller than the specification (inside diameter: 25.4 mm, outside diameter: 31.4 mm). Using a smaller one may cause a paper jam at the attached paper exit guide.



## 2.3 Adjusting Roll Paper Near-End Detection Position

### 2.3.1 With TM-L90

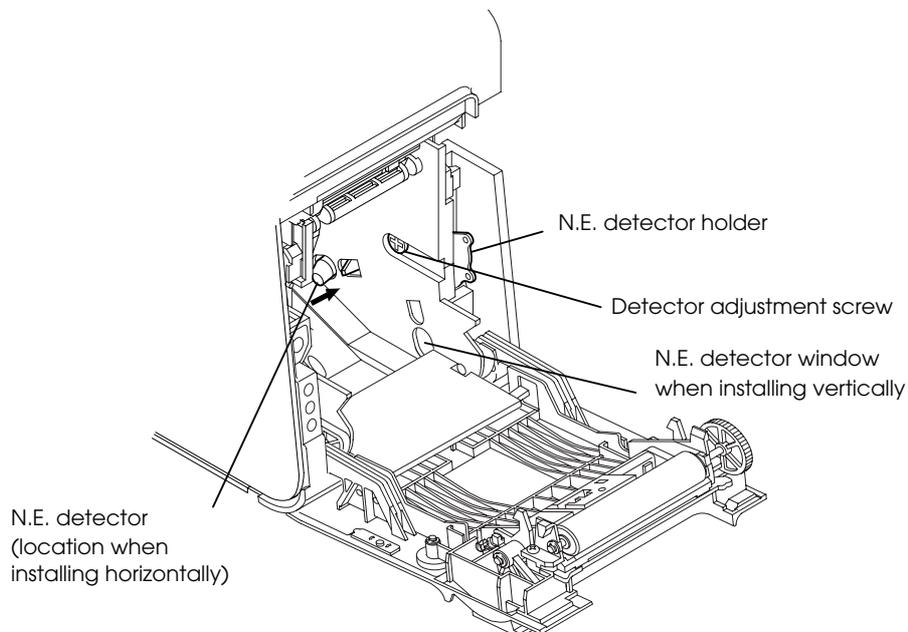
Below are three situations when roll paper N.E. detector adjustment is required.

- ❑ When changing the way of installation. (Vertically↔Horizontally)
- ❑ To adjust the location of detection to suit the diameter of the roll paper core used.
- ❑ To adjust the amount of remaining paper desired.



**Note:**

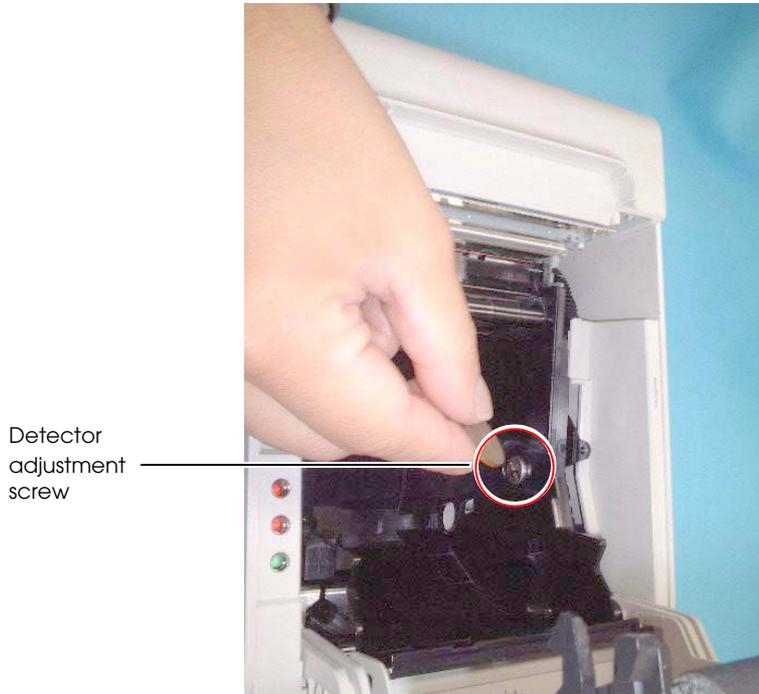
Roll paper centers are manufactured according to various specifications, making it impossible to exactly detect the remaining amount of paper.



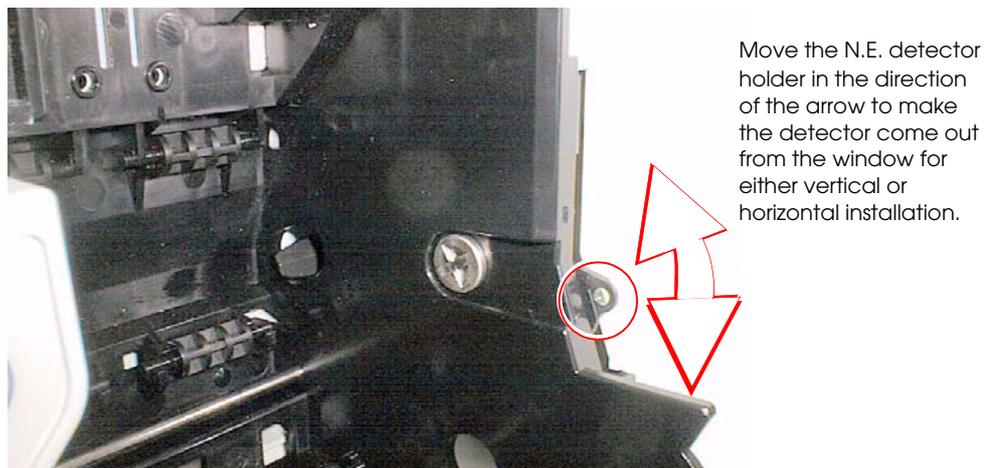
*Part names and the locations of N.E. detector components*

1. Open the roll paper cover.
2. Remove the roll paper.

3. Loosen the detector adjustment screw using a coin or similar tool.



4. The adjustment position of the roll paper Near-End detector changes depending on the way of installation. In either case (vertical or horizontal), adjust the detector so that its tab comes out from the hole near the bottom of the printer. (Refer to "Adjusting Roll Paper Near-End Detection Position" on page 2-6, "Adjustment Positions of N.E. Detector" on page 2-8



 **Note:**

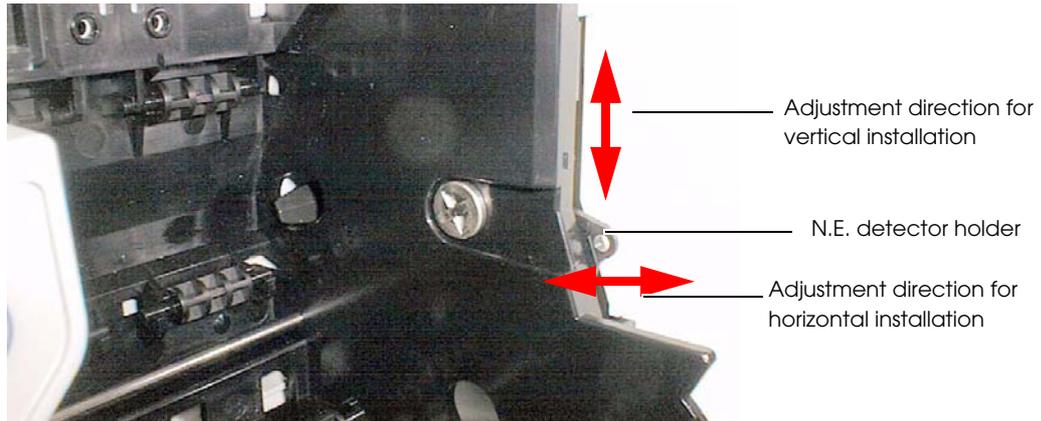
When changing the position of the N.E. detector in accordance with the change of installation, move the roll paper N.E. detector as the above arrow shows while holding down the detector.

- To fine tune the amount of remaining paper that is detected by the N.E. detector, move the N.E. detector holder shown in the illustration "N.E. Detector Holder" on page 2-8 and adjust the position.



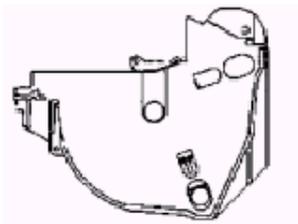
**Note:**

Note that the direction to move the roll paper N.E. detector varies depending on the method of printer installation (vertical/horizontal).



*N.E. Detector Holder*

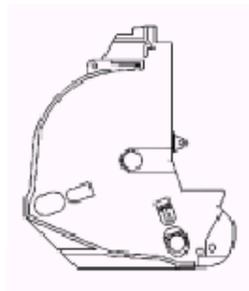
Adjustment Position Number	Specified Thermal Paper Dimension
#1	Approximately 36 mm {1.42"}
#2	Approximately 41 mm {1.61"}



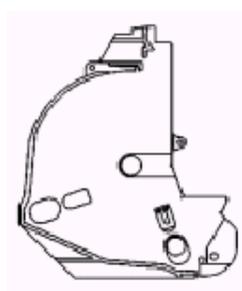
Holder Position #1 for horizontal



Holder Position #2 for horizontal



Holder Position #1 for vertical

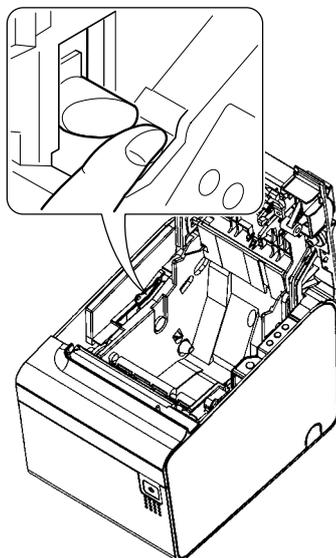


Holder Position #2 for vertical

*Adjustment Positions of N.E. Detector*

6. Tighten the detector adjustment screw using a coin or similar tool.
7. Move the N.E. detect lever by hand (finger) to confirm that it moves freely.

Check that the N.E. detect lever is operating properly.



8. Load the roll paper.
9. Close the roll paper cover.

### 2.3.2 With the TM-L90 peeler specification

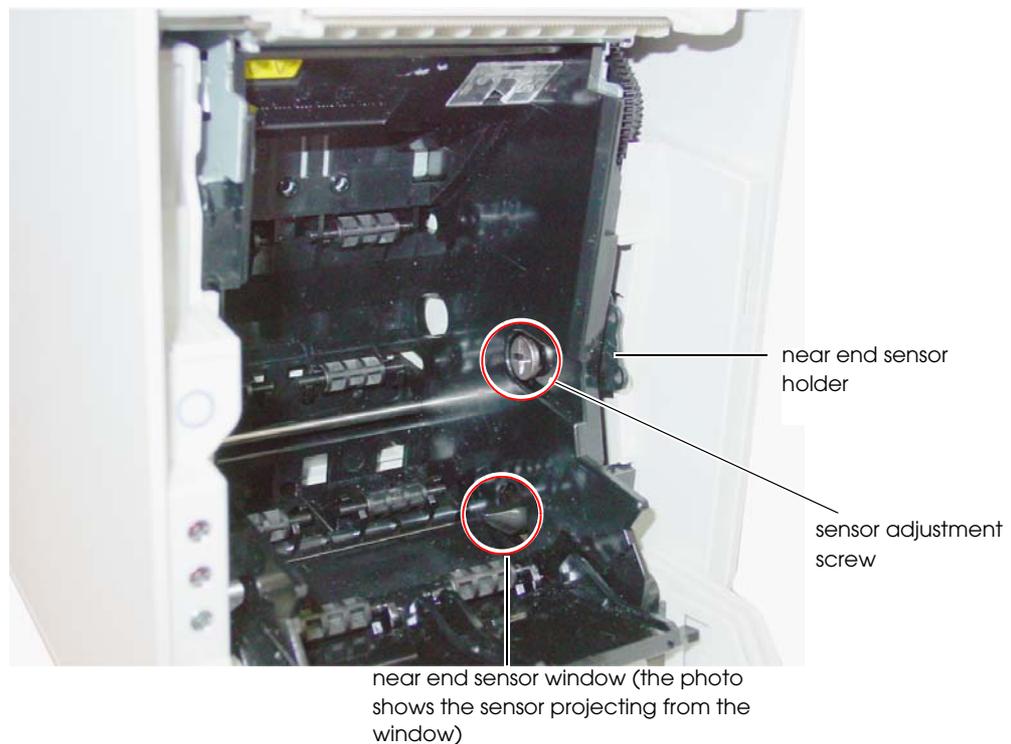
In the following 2 cases, it is necessary to adjust the position of the roll paper near end sensor.

- ❑ When adjusting the detection position according to the thickness of the roll paper core
- ❑ When adjusting the amount remaining paper desired



**Note:**

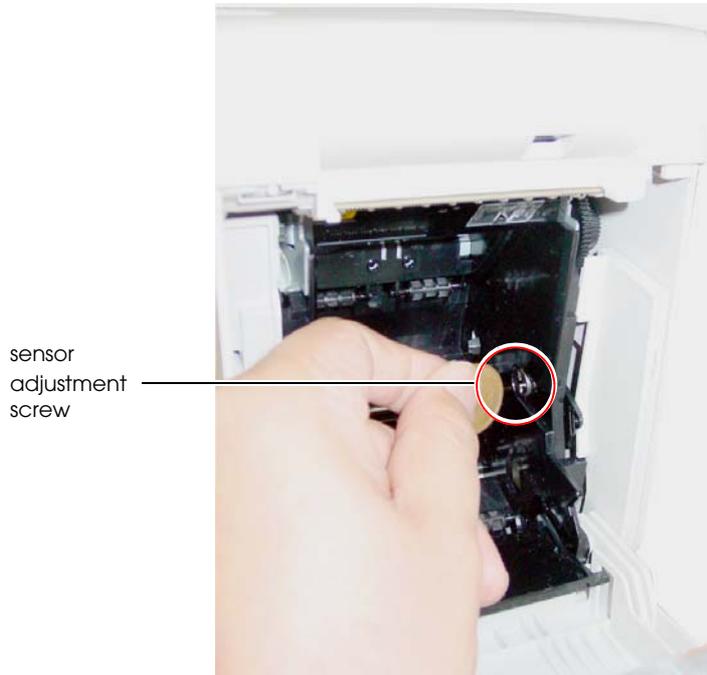
Since the shape of the central part of the roll paper may differ slightly according to the specification, it is not possible to detect near end exactly.



*Part names and the locations of N.E. detector components*

1. Open the peeler cover.
2. Open the roll paper cover.
3. Take out the roll paper.

- Using a coin or similar object, loosen the sensor adjustment screw.



- Adjust the roll paper near end sensor so that the claw of the roll paper near end sensor projects from the hole near the bottom of the device. (Refer to "Part names and the locations of N.E. detector components" on page 2-6 and "Near end sensor adjustment position" on page 2-12.)



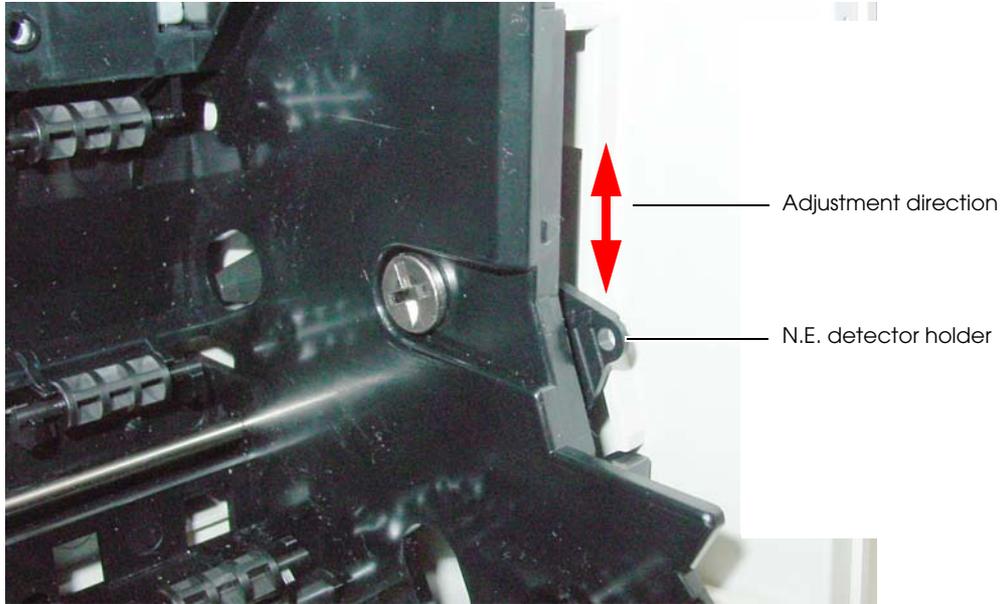
Adjust the sensor so that it projects from the window.

- To make fine adjustments to the amount of paper remaining detected by the roll paper near end sensor, finely adjust the position of the near end sensor holder by moving it in the direction of the arrows as shown in the figure "N.E. Detector Holder" on page 2-8.



**Note:**

Move the N.E. detector in the direction shown by arrow.



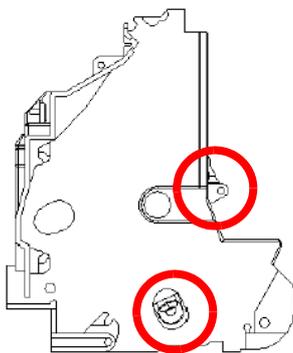
*Near end sensor holder*

Adjustment scale	Outside diameter of specified thermal paper
#1	Approximately 36 mm {1.42"}
#2	Approximately 41 mm {1.61"}

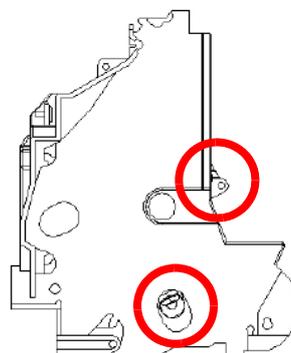


**Note:**

Adjust the sensor while checking the position of the parts circled in the following figure.



when the sensor holder position is #1

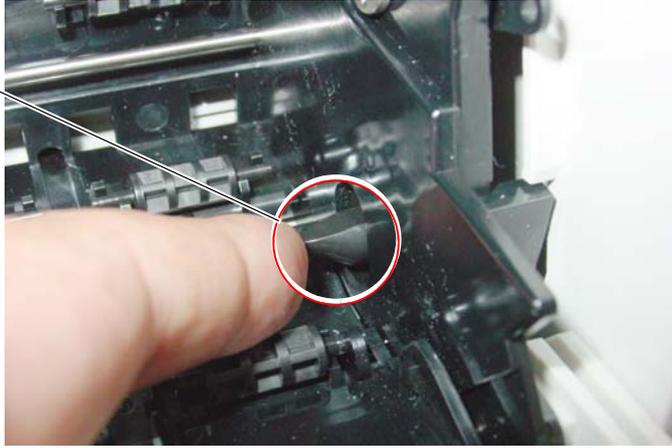


when the sensor holder position is #2

*Near end sensor adjustment position*

7. Using a coin or similar object, tighten the sensor adjustment screw.
8. Push the near end sensor with your finger and check that it moves smoothly.

push the near end sensor with your finger and check that it moves smoothly



9. Set the roll paper.
10. Close the roll paper cover.

## 2.4 Connecting Power Supply Unit (PS-180)

Be sure to use the EPSON PS-180 or the equivalent product as the power supply unit.

### **WARNING:**

*Always use the EPSON PS-180 or equivalent product as the power supply unit. Using a nonstandard power supply can result in shocks and even fire.*

*Should a fault ever occur in the EPSON PS-180 or equivalent product, immediately turn off the power to the printer and remove the power supply cable from the wall socket.*

### **CAUTION:**

*Be sure to remove the power supply cable from the wall socket whenever connecting or disconnecting the power supply unit to the printer. Failure to do so may result in damage to the power supply unit or the printer.*

*Be sure to confirm that the wall socket power supply satisfies the rated voltage requirements of the power supply unit. Never insert the power supply cable plug into a socket that does not meet the rated voltage requirements of the power supply unit. Doing so may result in damage to both the power supply unit and the printer.*

### 2.4.1 Attaching Power Supply Unit

The following is an explanation of the procedure for attaching the power unit to the TM-L90.

1. Confirm that the printer's power supply is turned off and the power supply unit's power cable has been removed from the wall socket.
2. To place cables, first break off by hand any of the three perforations to pass the cables through indicated by circles in the illustration (the other one is on the right). Then put the cables through the holes and replace the bottom of the cover.



3. Remove the bottom of the cover as shown in the illustration below.



4. Install the connector of the power supply cable onto the power supply connector (labeled DC24V).



Power supply connector

#### Power Supply Connector



**Note:**

When removing the DC cable connector from the EPSON PS-180, first confirm that the power supply cable has been disconnected from the power supply unit; then grasp the arrow marked section of the connector and pull straight out.

#### 2.4.2 Caution about Power Supply unit and Supply Voltage

- ❑ ERROR LED flashes when a high voltage or low voltage error occurs. In such cases, immediately turn the power off.

## 2.5 Autocutter settings (TM-L90 only)

The TM-L90 has an autocutter attached for cutting the paper. The autocutter can perform 2 cuts, "partial cut," in which a small part is left uncut on the left edge, and "full cut" (default setting), in which the paper is cut completely. By adjusting the attachment position of the cutter unit, you can select between "partial cut" and "full cut."



### Note:

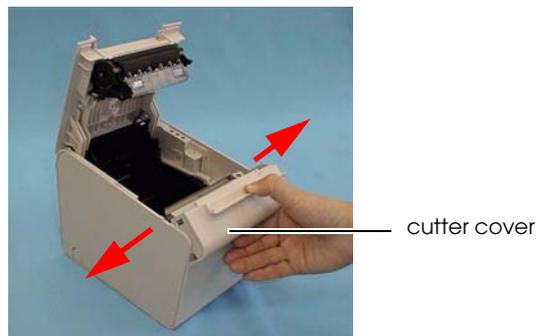
You can't configure the autocutter setting (Partial cut/Full cut) through a software command.

You can't change from partial cut setting to full cut setting after using the printer with partial cut setting. Since the partial cut doesn't use the tip of the blade, it might have deteriorated. Contact the nearest EPSON service center if you'd like to do the above change.

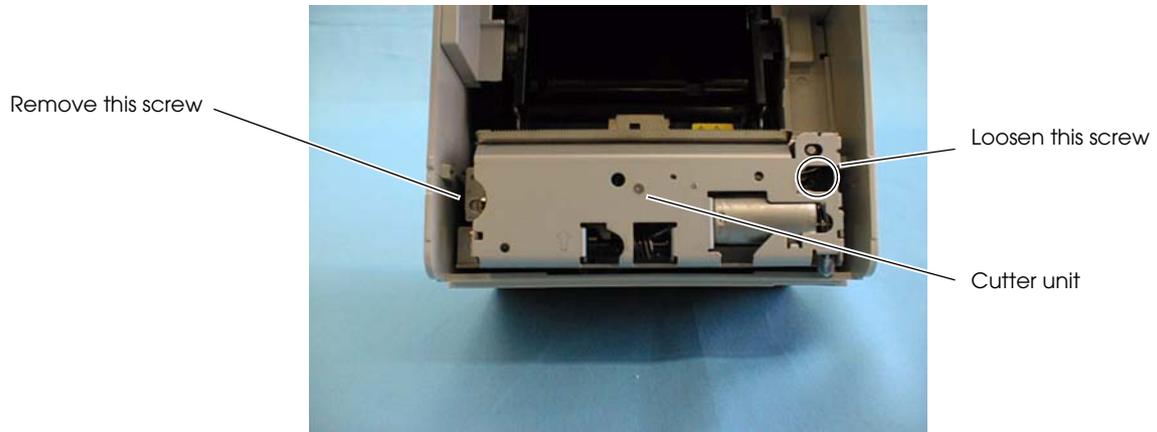
To disable the autocutter, change the memory switch (MSW2-2) settings. (Refer to "Setting Memory Switches" on page 2-23).

Performing full cut without the paper exit guide when the printer installed horizontally may cause a double-cut, paper jam or autocutter error because a cut sheet may drop in the paper path. Be sure to attach the paper exit guide when performing a full cut in the horizontal installation. (Refer to "Instructions for Installation" on page 2-3 for instructions on attaching the guide.)

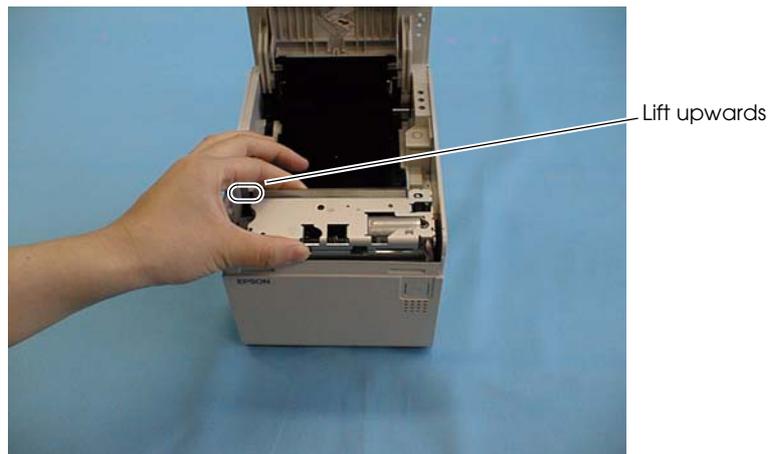
1. Turn off the power.
2. Press the roll paper cover open lever, and open the roll paper cover.
3. Push the body case outward (in the direction of the 2 arrows) and remove the cutter cover.



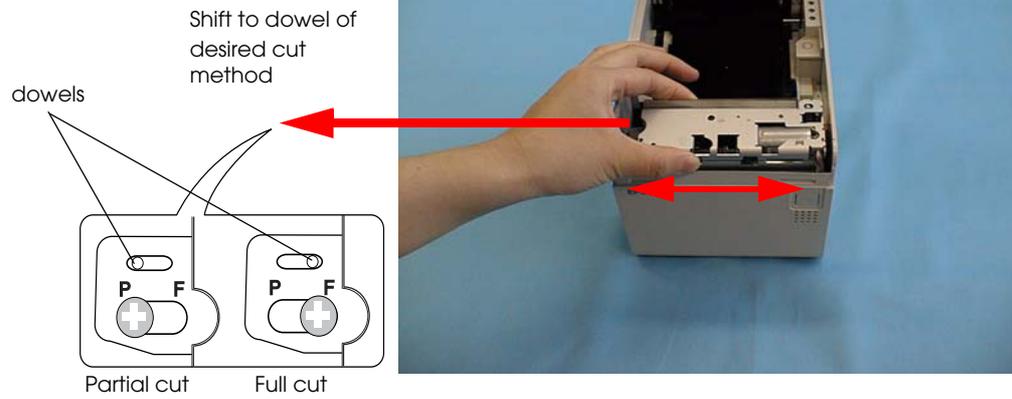
4. Remove the single screw retaining the cutter unit and loosen the screw indicated by the circle in the illustration below.



5. Lift the top of the cutter unit upward and remove it.



6. Moving the cutter unit in a lateral direction, shift to the dowel position of the desired cut method.



7. Secure the cutter unit again using the removed screw and the loosened screw.
8. Install the cutter cover.
9. Close the roll paper cover.

## 2.6 Setting Roll Paper Width

The TM-L90 / TM-L90 peeler specification uses a roll paper 80 mm wide in the default state. When using a roll paper 38 to 70 mm wide with this printer, attach the roll paper spacer in accordance with the following procedure.

 **Note:**

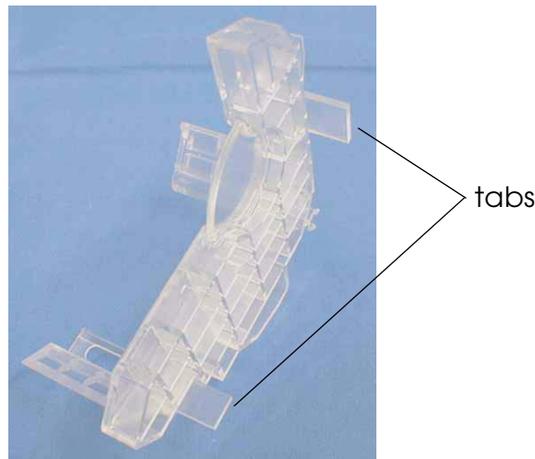
*If a printer has already been used, the paper width cannot be changed from narrow to wide. This is because the part of the head that made direct contact with the platen may have been damaged when narrow roll paper was used. The paperless part of the cutter blade may also have worn. Only when the printer is not yet used can the paper width be changed from narrow to wide.*

The following explains the procedure for setting the roll paper width for the TM-L90.

1. When using 61 mm to 70 mm roll paper, break off the two tabs of the roll paper spacer.

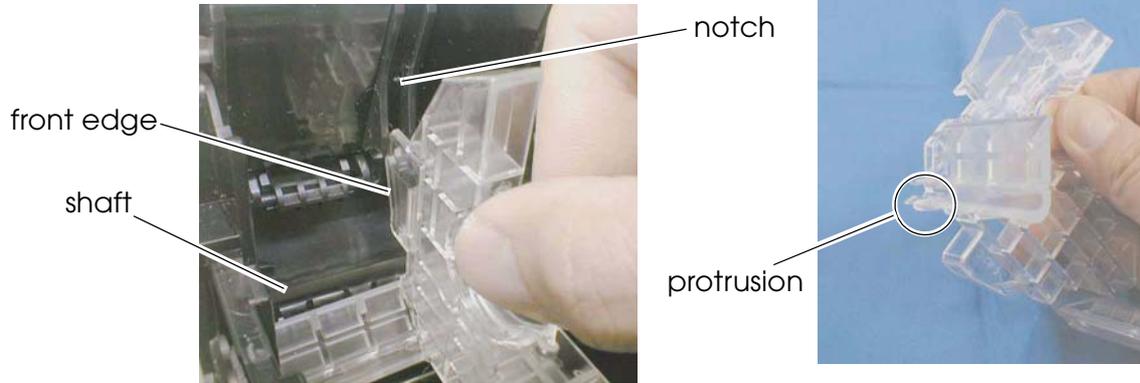
 **Note:**

*You can still use widths from 38 mm to 60 mm after breaking the tabs off.*



2. Open the roll paper cover.

3. As shown below, insert the roll paper spacer so that the front edge goes through the notch in the printer, and fit the protrusion of the roll paper spacer on the shaft.



4. Push the roll paper spacer until it clicks.



**Note:**

*Check that the roll paper spacer slides smoothly from side to side.*

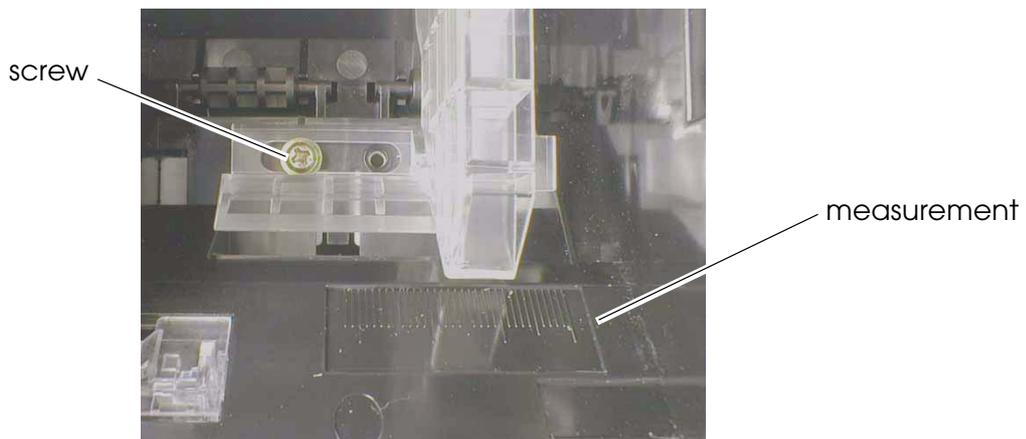
5. Slide the roll paper spacer side-to-side and set it to the appropriate position. Use the measurement lines if necessary.



**Note:**

*Roll paper is placed on the tab-free side of the roll paper spacer.*

*When positioning the roll paper spacer, provide 0.5 mm of room for the maximum roll paper width.*



6. Secure the roll paper spacer with the supplied screw. (See above.)
7. Set the paper width using any of various drivers, the memory setup utility or the memory switch setting mode.  
(For the memory switch setting mode, refer to "Setting Memory Switches" on page 2-23.)

## 2.7 DIP Switch Settings

With the TM-L90 / TM-L90 peeler specification, you can make various settings with the DIP switches. The DIP switches are inside the roll paper cover.



Before setting DIP switches, remove the DIP switch cover.



**Note:**

Set the DIP switches after turning off the printer. The settings will not be enabled if they are set with the power on.



DIP switch settings (Serial interface mode)

Switch No.	Function	ON	OFF
1	Enable/disable Power switch.	Switches power supply On/Off using commands. (Power supply switch is disabled.)	Power supply switch is used to switch power On/Off.
2	Select for serial communication condition.	Set using DIP switch 1-7, 1-8	Set using memory switches.
3	Handshake	XON/XOFF	DTR/DSR
4	Bit length	7 bits	8 bits
5	Parity check	Yes	No
6	Parity type	Even	Odd
7	Baud rate (bps)	7	8
8		ON ON :2400 OFF ON :4800 ON OFF :9600 OFF OFF :19200	

bps: Indicates the number of bits transferred per second.

DIP switches 2 to 8 are for serial communication. Not used in parallel communication.



**Note:**

When using an OPOS or Advanced Printer Driver, do not change the DIP switch 1-1 from the OFF position (power supply switch enabled). The printer may not operate normally if the DIP switches are set to ON.

When you set the baud rate with the memory switch, you can set faster communication than with the DIP switch. (Refer to "Communication Condition" on page 2-29, "Error code" on page F-3)

In serial communication, intermittent printing\* may occur. This is because when the communication speed is low, a data transmission waiting state occurs frequently since the printing mechanism speed is high. Increasing the communication speed may reduce this symptom.

\* Intermittent printing: White streaks as large as one or two hairs appear horizontally in a printing result.

DIP switch settings (Parallel, USB, Ethernet model)

Switch No.	Function	ON	OFF
1	Enable/disable Power switch.	Switches power supply On/Off using commands. (Power supply switch is disabled.)	Power supply switch is used to switch power On/Off.
2	Reserved	Fixed to on	--
3	Reserved	--	Fixed to off
4	Reserved	--	Fixed to off
5	Reserved	--	Fixed to off
6	Reserved	--	Fixed to off
7	Reserved	--	Fixed to off
8	Reserved	--	Fixed to off

bps: Indicates the number of bits transferred per second.

DIP switches 2 to 8 are for serial communication. Not used in parallel communication.

 **Note:**

When using an OPOS or Advanced Printer Driver, do not change DIP switch 1-1 from the OFF position (power supply switch enabled). The printer may not operate normally if the DIP switches are set to ON.

## 2.8 Setting Memory Switches

With the TM-L90 / TM-L90 peeler specification, you can make various other settings with the software settings saved in the non-volatile memory inside the printer called the memory switches.

The memory switches can be set in 2 ways, using the memory switch setting mode of the printer, or from the application. Depending on the setting items, some settings can only be set from the application.

 **Note:**

When using the OPOS or Advanced Printer Driver, it is generally unnecessary to set the memory switches. However, set the memory switches in either of the following cases.

- When you want to set the communication speed (38,400/57,600/115200 bps) higher than that available with the DIP switches in serial communication speed setting
- When you set the thermal paper width and select single color or two colors (when using the Advanced Printer Driver)
  - \* For thermal paper width setting and single color/two colors selection in the OPOS ADK, you need not set the memory switches separately since the memory switches are automatically set by making changes with the Setup POS Utility packed with OPOS ADK.

(For the OPOS and Advanced Printer Drivers, refer to “Introduction of Control Methods” on page 4-1.

### 2.8.1 Items that can be set in the memory switch setting mode

The items that can be set in the memory switch setting mode are as follows.

- ❑ Autocutter settings (TM-L90 only)
- ❑ Paper selection / print density
- ❑ Serial communication conditions
  - Baud Rate Setup
  - data length, handshake, Parity
- ❑ Communication related
  - Receive buffer size
  - Receive error handling
  - BUSY conditions
- ❑ Interface reset signal
  - Parallel interface #31 pin: Selecting reset signal
  - Serial interface #25 pin: Selecting reset signal
  - Serial interface #6 pin: Selecting reset signal
- ❑ Paper width selection
- ❑ FEED button operational settings (TM-L90 peeler specification only)
- ❑ Label Settings
  - Maximum length of automatic paper measurement
  - With or without the function of feeding paper to the print starting position at power on
  - Recovery from paper layout error



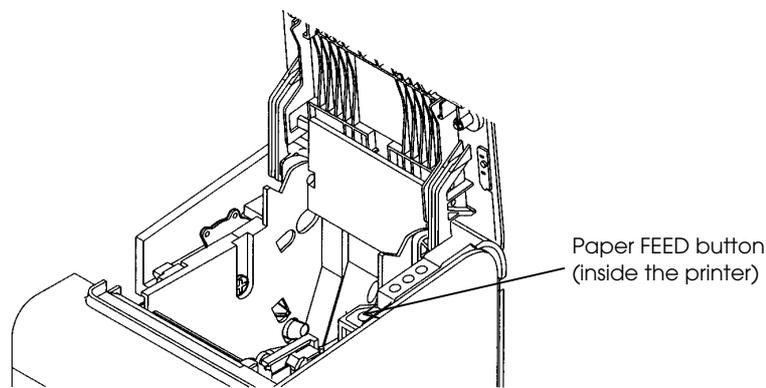
**Note:**

*Turning off the power supply in the memory switch setting mode clears all settings. After performing the complete operation, turn off the power using the correct procedure.*

## 2.8.2 Starting the Memory Switch Setting mode

Use the following procedure to start the memory switch setting mode.

1. For the TM-L90, open the roll paper cover. For the TM-L90 with Peeler, open the peeler cover and the roll paper cover.
2. Load roll paper.
3. Turn on the power while pressing FEED inside the printer. Keep pressing FEED until the POWER, ERROR, and PAPER OUT LEDs all come on. The figure shows the TM-L90.



*The location of the FEED button (inside the roll paper cover)*

4. While the POWER, ERROR, and PAPER OUT LEDs are on, press FEED inside the printer twice.
5. Close the cover. The printer will print out a guidance for the memory switch setting mode and then enter the memory switch setting mode. With the peeling issuing mode, after closing the roll paper cover, the PAPER OUT LED flashes. After inserting the label into the peeler path, press FEED.
6. Follow the guidance to use the mode. (Refer to the flowchart "Operating procedure of Memory Switch Settings" on page 2-27)

### 2.8.3 Ending Memory Switch Setting mode

Once the setting is completed, the contents of the setting are stored; then the printer executes the initialization. When initialization is finished, the printer returns to normal operating mode.



**Note:**

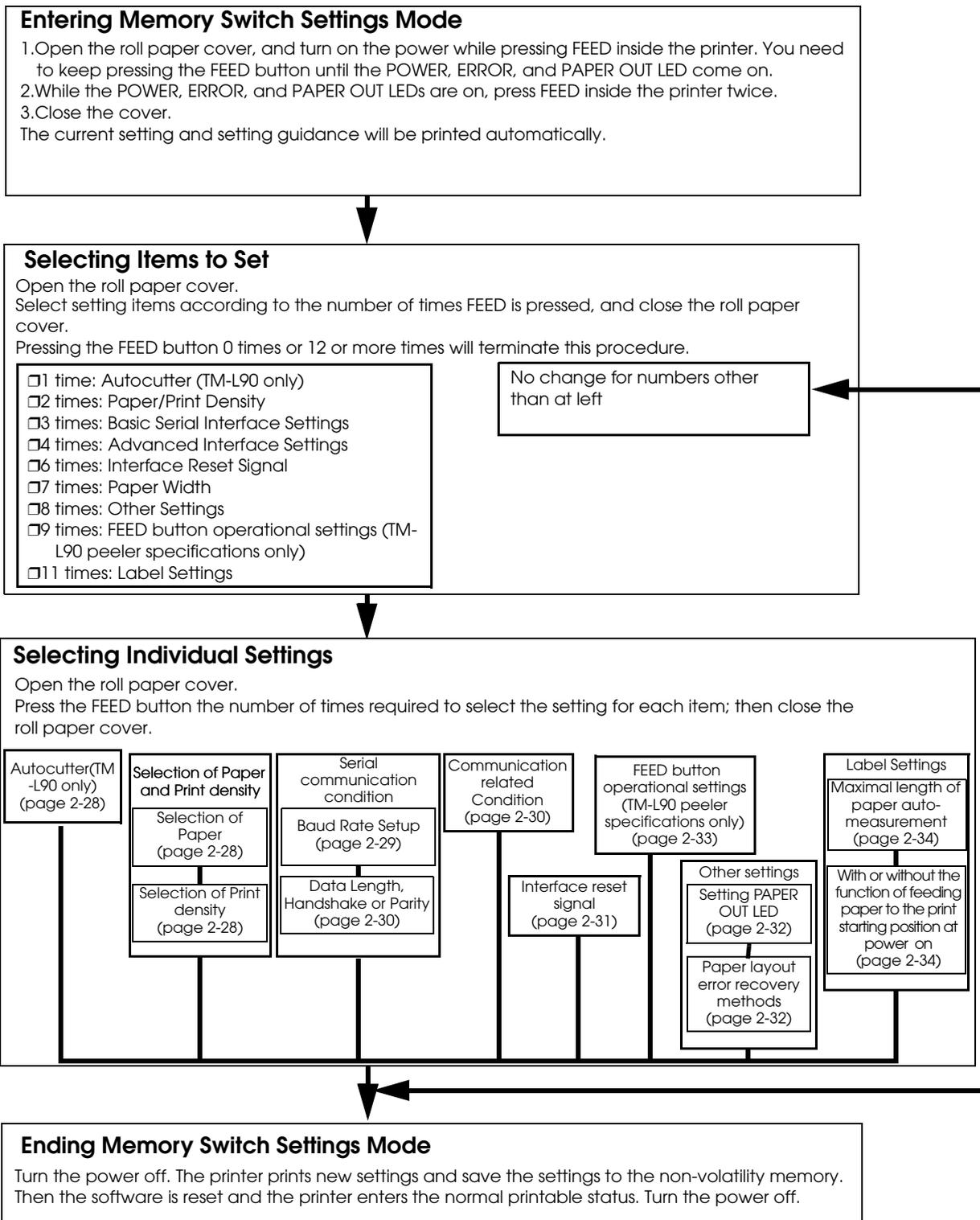
*We recommend that you to perform the memory switch setting after finishing the paper layout setting since the roll paper cover needs to be opened and closed for the memory switch setting. For paper layout settings, refer to "Setting Paper Layout" on page 2-45.*

*When executing the memory switch setting mode without setting the paper layout, paper is fed every time the roll paper cover is opened and closed, so paper is wasted.*

*When you'd like to change the memory switch settings with paper layout unchanged, it is better to change it using the memory switch setting utility or other means.*

## 2.8.4 Operating procedure of Memory Switch Settings

The procedures used for this process are described below.



### Selecting individual settings

#### ❑ Setting autocutter (TM-L90 only)

First, select the setting for the paper to use by the number of times FEED is pressed. Press the FEED button the number of times required to select the desired autocutter setting.

Press FEED button	Setting to select
0 times:	No change
1 time:	Installed
2 times:	Not Installed
3 or more times:	No Change

#### ❑ Selection of Paper and Print density

First, select the setting for the paper to use by the number of times FEED is pressed. And then select the print density by pressing the FEED button the required number of times.

- Selection of Paper

Press FEED button	Paper type
0 times:	No change
1 time:	Monochrome thermal roll paper
2 times:	Two-color thermal roll paper
3 or more times:	No change

- Selection of Print density

Press FEED button	Print density	Press FEED button	Print density
0 times:	No change	9 times:	140%
1 time:	100%	10 times:	70%
2 times:	105%	11 times:	75%
3 times:	110%	12 times:	80%
4 times:	115%	13 times:	85%
5 times:	120%	14 times:	90%
6 times:	125%	15 times:	95%
7 times:	130%	16 or more times:	No change
8 times:	135%		

❑ Communication Condition

To select Transmission Conditions, first choose "Serial Interface Settings", then select "Data Length, Handshake, or Parity."

 **Note:**

The serial communication conditions in the memory switch setting mode take effect only when selecting "Set using memory switches" for the DIP switch 2.

- Serial Interface Communication Condition

Press the FEED button the number of times required to select the desired "Serial interface setting" as the communication conditions.

Press FEED button	Setting to select
0 times:	No change
1 time:	115200 bps
2 times:	57600 bps
3 times:	38400 bps
4 times:	19200 bps
5 times:	9600 bps
6 times:	4800 bps
7 times:	2400 bps
8 or more times:	No Change

bps: Indicates the number of transmitted bits per second (bps).

- Data Length, Handshake or Parity

Press the FEED button the number of times required to select the desired "Data length, Handshake or Parity" as the communication conditions.

Press FEED button	Setting to select		
	Data Length	Handshake	Parity
0 times:	No change		
1 time:	8 bits	DTR/DSR control	No parity
2 times:			Even
3 times:			Odd
4 times:		XON/XOFF control	No parity
5 times:			Even
6 times:			Odd
7 times:	7 bits	DTR/DSR control	No parity
8 times:			Even
9 times:			Odd
10 times:		XON/XOFF control	No parity
11 times:			Even
12 times:			Odd
13 or more times:	No change		

#### ❑ Communication Related Conditions

Press the FEED button the number of times required to select the desired "Receive buffer size, Receive error sequence, or Busy condition" as communication related conditions.

Press FEED button	Setting to select		
	Receive buffer size	Receive error handling	BUSY conditions
0 times:	No change		
1 time:	Large (4,096 bytes)	Change to '?'	Receive buffer full or offline
2 times:			Receive buffer full
3 times:		Ignore	Receive buffer full or offline
4 times:			Receive buffer full
5 times:	Small (45 bytes)	Change to '?'	Receive buffer full or offline
6 times:			Receive buffer full
7 times:		Ignore	Receive buffer full or offline
8 times:			Receive buffer full
9 or more times:	No change		

❑ Interface Reset Signal

Pins #25 and #6 of the serial interface board unit (UB-S01/02) are input pins for the reset signal. This item is used to "Enable (acknowledge)" or "Disable (not acknowledge)" input of the reset signal from one of these pins. Press the FEED button the number of times required to select the desired Interface reset signal setting.

Press FEED button	Setting to select		
	Parallel interface #31 pin	Serial interface #25 pin	Serial interface #6 pin
0 times:	No change		
1 time:	Enable	Disable	Disable
2 times:			Enable
3 times:		Enable	Disable
4 times:			Enable
5 times:	Disable	Disable	Disable
6 times:			Enable
7 times:		Enable	Disable
8 times:			Enable
9 or more times:	No change		

❑ Selection of Paper width

Select Paper width by pressing the FEED button the number of times required.

Press FEED button	Paper width
0 times:	No change
1 time:	38mm
2 times:	58mm
3 times:	60mm
4 times:	70mm
5 times:	80mm
6 or more times:	No change



**Note:**

When using label roll paper that can't be selected in the memory switch setting mode within the range from 38 mm to 80 mm, configure the paper width using any one of 3 control systems: OPOS, Advanced Printer Driver, or ESC/POS. The brief introduction of the control systems is in "Introduction of Control Methods" on page 4-1.

## ❑ Other Settings

In "Other Settings", select a PAPER OUT LED setting and then choose the paper layout error recovery methods.

- Setting PAPER OUT LED

Select the ON/OFF operation of the PAPER OUT LED at paper near-end occurrence. Make the setting to suit your own preferences.

Press FEED button	ON/OFF operation of PAPER OUT LED at paper near-end
0 times:	No change
1 time:	ON
2 times:	OFF
3 or more times:	No change

- Paper layout error recovery methods

Select the recovery methods at paper layout error occurrence. Make the setting to suit your own preferences.

With TM-L90

Press FEED button	Paper layout error recovery means
0 times:	No change
1 time:	Transmit the error recovery command, or recover from the error by opening and closing the roll paper cover. After recovering from the error, the printer automatically feeds paper and changes the paper layout setting to meet the loaded paper to avoid error recurrence.
2 times:	Send the error recovery command. (Since the printer paper layout is not changed, a paper layout error recurs unless correct paper is loaded.)
3 or more times:	No change

With the TM-L90 peeler specification

Press FEED button	Paper layout error recovery means
0 times:	No change
1 time:	Transmit the error recovery command(Since the printer paper layout is not changed, if the correct paper is not inserted, the paper layout error will occur again.)
2 times:	Transmit the error recovery command, or recover from the error by opening and closing the roll paper cover.After error recovery, the printer automatically feeds paper. To avoid the error again, reset paper layout for the paper inserted.
3 times:	Transmit the error recovery command, or press FEED.After error recovery, the printer automatically feeds paper. To avoid the error again, reset paper layout for the paper inserted.
4 times:	Transmit the error recovery command, press FEED, or open and close the roll paper cover.After error recovery, the printer automatically feeds paper. To avoid the error again, reset paper layout for the paper inserted.
5 or more times:	No change



**Note:**

*A paper layout error occurs when the paper layout set to the printer differs from that of the loaded paper.*

- FEED button operational settings (TM-L90 peeler specification continuous issuing mode only)

With the TM-L90 peeler specification, this sets the operation when FEED is pressed.

Number of times FEED is pressed	Feed button operation
0 times:	No change
1 time:	Moves the paper to the next printing start position (feed to the start position)
2 times:	Moves the paper to the manual cutter position
3 or more times:	No change

## □ Label Settings

In "Label Settings", select the maximum length for automatic paper measurement, and then choose whether with or without the function of feeding paper to the print starting position at power on.

- Maximum length of automatic paper measurement

Select the maximum length of automatic paper measurement. Match the maximum length of the auto-measurement with the black mark spacing of the paper used.

Press FEED button	Selected maximum length for automatic paper measurement
0 times:	No change
1 time:	160mm
2 times:	300mm
3 or more times:	No change

- With or without the function of feeding paper to the print starting position at power on

Press the FEED button the number of times required to select whether with or without the function of feeding paper to the print starting position at power on.

Press FEED button	Selected paper
0 times:	No change
1 time:	Feeding paper to print starting position is executed at power-on
2 times:	Feeding paper to print starting position is not executed at power-on
3 or more times:	No change

### *Setting Various Items via Utilities*

Besides the items that can be set in the memory switch setting mode, you can set a variety of items using the utility software for TM series printers provided by Epson. The utilities are explained in "Various Utilities" on page 4-7. For details, refer to the relevant materials.

### *How to Set Various Items with ESC/POS Commands*

Besides the items that can be set in the memory switch setting mode, you can set a variety of items using the ESC/POS commands. The ESC/POS commands are explained in "Introduction of Control Methods" on page 4-1. (For details, refer to "Error code" on page F-3.)

## 2.9 Memory Switch Functions

This printer has the following software switches, called memory switches, in the non-volatile memory.

- Msw 1, Msw 2, Msw 8
- Customized values
- Serial communication conditions

These settings can be made by the memory switch setup utility (see page 4-7) or ESC/POS commands. Refer to the “ESC/POS Application Programming Guide” for details of the commands.

### 2.9.1 TM-L90 memory switch settings

Some settings of Msw 2 and Msw 8 can be made in the memory switch setting mode. (See page 2-27)

#### MSW1

Bit	Function	0 (OFF)	1 (ON)
1	Send power on notification	Not sent *	Sent
2	Select receive buffer capacity	Large (4K bytes) *	Small (45 bytes)
3	Conditions for Busy status	Receive buffer full or offline *	Receive buffer full
4	Data processing when reception error occurs	Substitute with "?" *	Ignored
5	Automatic line feed	Invalid *	Valid
6	Reserved	Fixed *	—
7	#6 pin: Select reset signal	Not used *	Used
8	#25 pin: Select reset signal	Not used *	Used

Msw 1-7, 1-8 are effective only when serial interface is used.

\*: Factory setting

#### MSW2

Bit	Function	0 (OFF)	1 (ON)
1	Reserved	--	Fixed to 1 (ON) (do not change setting) *
2	Autocutter operation	Disabled	Enabled *
3-8	Reserved	Fixed to OFF	--

\*: Factory setting

## MSW8

Bit	Function	Value	
		0 (OFF)	1 (ON)
1	Reserved	Recovery by pressing FEED	No recovery by pressing FEED
2	Paper layout error recovery means	Send the error recovery command or open/close the cover. *	Send the error recovery command.
3	PAPER OUT LED behavior at paper near-end occurrence	On *	Off
4	Select maximum length for automatic measurement of paper	160 mm	300 mm
5	Insert left and right margins to barcode	Not inserted *	Inserted
6	Feeding paper to the print starting position at power on	Enabled *	Disabled
7	Reserved	Fixed to OFF	--
8	Printer cover open during operation	Automatically recoverable error	Recoverable error * (Recovered by error recovery command)

When (Msw 8-2) is OFF, the paper layout is automatically measured and saved into the non-volatile memory of the printer after recovery from the error.

If (Msw8-2) is ON, the printer paper layout is not changed after error recovery. If the correct paper is not inserted, the paper layout error will occur again.

The (Msw 8-4) setting influences initialization at power-on when "label paper" or "receipt paper with black mark" is specified for the paper layout. Refer to "Setting Paper Layout" on page 2-45 for the paper layout.

When (Msw 8-6) is set to "Feeding paper to the print starting position at power on is disabled", the printer does not execute the operation of feeding paper to the print starting position at power on (the printer executes the operation when its cover is opened and closed). Hence, the user should note the following points since the printer operates on the assumption that the paper has already been fed to the print starting position at power on.

- a) Turn off the power supply after feeding of paper to the print starting position.
- b) Do not open the cover while power is off.
- c) If you have opened the cover with power off, turn power on, then open and close the cover once before starting printing, and perform the operation of feeding paper to the print starting position.

If the print starting position has not been set at power-on, the printing position of the first sheet may shift, or a paper layout error may occur.

\*: Factory setting

### Customized values

Item	Value
<b>Selection of user NV memory capacity</b>	1 KB * 64 KB 128 KB 192 KB
<b>Selection of NV graphics memory capacity</b>	None 64 KB 128 KB 192 KB 256 KB 320 KB 384 KB *
<b>Selection of paper width</b>	38 mm, 39 mm, ..... 70 mm, 80 mm * (43 kinds in 1 mm increments (71 to 79 mm are unavailable as the roll paper spacer does not support them))

Customized values

<b>Selection of the number of parts for the thermal head energizing</b>	One-part energizing * Two-part energizing Three-part energizing Four-part energizing
<b>Selection of print density</b>	70%    75% 80%    85% 90%    95% 100% * 105% 110%   115% 120%   125% 130%   135% 140%
<b>Selection of print color</b>	Single color *, two colors
<b>Selection of print speed</b>	Speed level 1 (max. 26 mm/s) Speed level 2      Speed level 3 Speed level 4      Speed level 5 Speed level 6 (max. 120 mm/s) * Speed level 7      Speed level 8 Speed level 9 (max. 150 mm/s)
<b>Black density for two-color printing</b>	Low, normal *, high

 **Note:**

The maximum print speed is available for only the one-part energizing mode. However, if the print duty is too high in the one-part energizing mode, the printer will automatically reduce the printing speed.

The four-part energizing mode reduces power consumption.

The print width can be set in 43 ways with 1 mm pitches in the range from 38 mm to 80 mm. However, it cannot be set in the range from 71 mm to 79 mm.

\*: Factory setting

Serial Communication condition

Item	Option
Baud rate	115200 bps    9600 bps 57600 bps    4800 bps 38400 bps    2400 bps 19200 bps
Parity	None/ Odd/ Even
Flow Control	DTR/DSR Control XON/XOFF Control
Data Length	7-bit/8-bit

 **Note:**

The memory switch serial communication conditions are applied only if the DIP switch 2 setting is "set with memory switch."

## 2.9.2 TM-L90 peeler specification memory switch settings

Among the settings shown below, some can be set with the memory switch setting mode. Refer to page 2-27.

### MSW1

Bit	Function	0 (OFF)	1 (ON)
1	Send power on notification	Not sent *	Sent
2	Select receive buffer capacity	Large (4K bytes) *	Small (45 bytes)
3	Conditions for Busy status	Receive buffer full or offline *	Receive buffer full
4	Data processing when reception error occurs	Substitute with "?" *	Ignored
5	Automatic line feed	Invalid *	Valid
6	Reserved	Fixed *	—
7	#6 pin: Select reset signal	Not used *	Used
8	#25 pin: Select reset signal	Not used *	Used

Msw 1-7, 1-8 are effective only when serial interface is used.

\*: Factory setting

### MSW2

Bit	Function	0 (OFF)	1 (ON)
1	Reserved	--	Fixed to 1 (ON) (do not change setting) *
2	Reserved	--	--
3-8	Reserved	OFF fixed	

\*:Default setting

### MSW7

Bit	Function	0 (OFF)	1 (ON)
1-7	Reserved	--	--
8	FEED button operational settings (applied only during printing with continuous issuing)	Moves the paper to the next printing start position	Pressing FEED once moves the paper to the manual cutter position.Pressing FEED twice moves the paper to the next label printing start position.Thereafter, pressing FEED repeats the operation above.

\*: Default setting

MSW8

Bit	Function	Value	
		0 (OFF)	1 (ON)
1	Means of recovery from paper layout error	Recovery by pressing FEED	No recovery by pressing FEED
2	Paper layout error recovery means	Recovery by pressing FEED	No recovery by pressing FEED
3	PAPER OUT LED behavior at paper near-end occurrence	On *	Off
4	Select maximum length for automatic measurement of paper	160 mm	300 mm
5	Insert left and right margins to barcode	Not inserted *	Inserted
6	Feeding paper to the print starting position at power on	Enabled *	Disabled
7	Reserved	Fixed to OFF	--
8	Printer cover open during operation	Automatically recoverable error	Recoverable error * (Recovered by error recovery command)

If (Msw8-1) is OFF, the paper is determined automatically if the printer recovers from the paper layout error. Furthermore, the results of automatic paper determination are overwritten if the settings for paper layout are already saved in the NV memory.

If (Msw8-2) is OFF, the paper is determined automatically if the printer recovers from the paper layout error. Furthermore, the results of automatic paper determination are overwritten if the settings for paper layout are already saved in the NV memory.

The (Msw 8-4) setting influences initialization at power-on when "label paper" or "receipt paper with black mark" is specified for the paper layout. Refer to "Setting Paper Layout" on page 2-45 for the paper layout.

When (Msw 8-6) is set to "Feeding paper to the print starting position at power on is disabled", the printer does not execute the operation of feeding paper to the print starting position at power on (the printer executes the operation when its cover is opened and closed). Hence, the user should note the following points since the printer operates on the assumption that the paper has already been fed to the print starting position at power on.

- a) Turn off the power supply after feeding of paper to the print starting position.
- b) Do not open the cover while power is off.
- c) If you have opened the cover with power off, turn power on, then open and close the cover once before starting printing, and perform the operation of feeding paper to the print starting position.

If the print starting position has not been set at power-on, the printing position of the first sheet may shift, or a paper layout error may occur.

\*: Factory setting

Customized values

Item	Value
<b>Selection of user NV memory capacity</b>	1 KB * 64 KB 128 KB 192 KB
<b>Selection of NV graphics memory capacity</b>	None 64 KB 128 KB 192 KB 256 KB 320 KB 384 KB *

Customized values

<b>Selection of paper width</b>	38 mm, 39 mm, ..... 70 mm, 80 mm * (43 kinds in 1 mm increments (71 to 79 mm are unavailable as the roll paper spacer does not support them))
<b>Selection of the number of parts for the thermal head energizing</b>	One-part energizing * Two-part energizing Three-part energizing Four-part energizing
<b>Selection of print density</b>	70%      75% 80%      85% 90%      95% 100% *   105% 110% 120%    125% 130%    135% 140%
<b>Selection of print color</b>	Single color *, two colors
<b>Selection of print speed</b>	Speed level 1 (max. 26 mm/s) Speed level 2      Speed level 3 Speed level 4      Speed level 5 Speed level 6 (max. 120 mm/s) * Speed level 7      Speed level 8 Speed level 9 (max. 150 mm/s)
<b>Black density for two-color printing</b>	Low, normal *, high



**Note:**

The maximum print speed is available for only the one-part energizing mode. However, if the print duty is too high in the one-part energizing mode, the printer will automatically reduce the printing speed.

The four-part energizing mode reduces power consumption.

The print width can be set in 43 ways with 1 mm pitches in the range from 38 mm to 80 mm. However, it cannot be set in the range from 71 mm to 79 mm.

\*: Factory setting

Serial Communication condition

Item	Option
Baud rate	115200 bps    9600 bps 57600 bps    4800 bps 38400 bps    2400 bps 19200 bps
Parity	None/ odd/ even
Flow Control	DTR/DSR Control XON/XOFF Control
Data Length	7-bit/8-bit



**Note:**

The serial communication condition of the memory switch is applied only when the setting of DIP switch 1-2 is set to "Set by the memory switch."

## 2.10 Paper Loading Method

### **WARNING:**

Do not open the roll paper cover (for the TM-L90 with Peeler, do not open the peeler cover and the roll paper cover) during the operation. Doing so may damage the printer.

Do not touch the manual cutter with your hands when installing or replacing roll paper. Touching the manual cutter may result in injury.

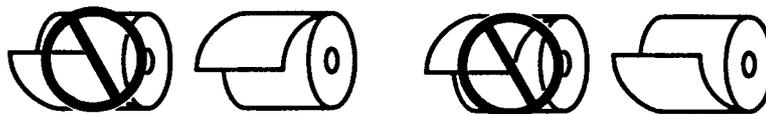
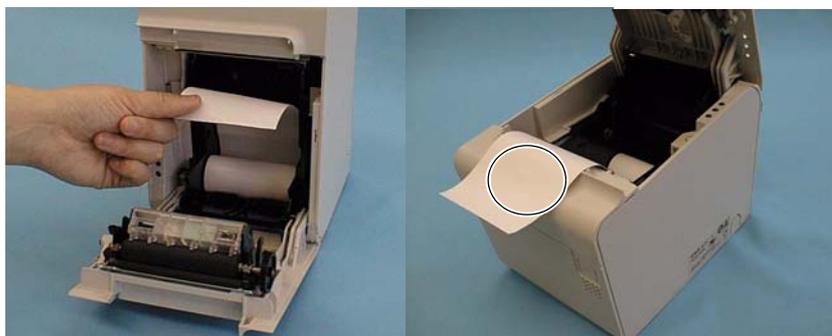
For the TM-L90, when the printer is placed horizontally, the raised roll paper cover may close suddenly depending on the inclining angle of the printer. Take care not to get your finger caught in it.

### **Note:**

Be sure to use roll paper that meet the specifications.

### 2.10.1 With TM-L90

1. Open the roll paper cover, using the cover open lever.
2. Pull out a small amount of remaining paper and insert new roll paper, aligning the paper with the guide, as shown below.



3. Close the roll paper cover; then cut off the paper with the manual cutter.

### **WARNING:**

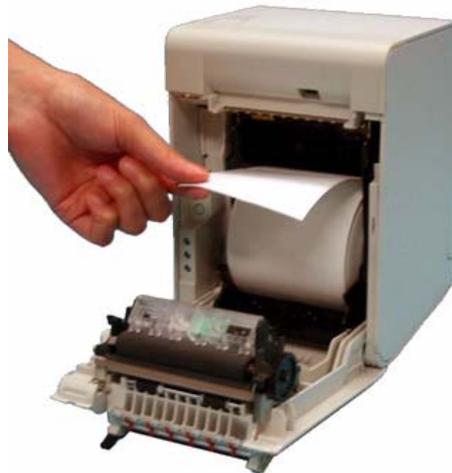
Be careful that your finger is not inside the printer when you close the cover because you can get your finger caught inside.

## 2.10.2 With the TM-L90 peeler specification

With the TM-L90, the paper loading method differs depending on whether peeling issuing or continuous issuing is used. They are explained as follows.

### *Paper setting with peeling issuing*

1. Press the peeler cover open lever, and open the peeler cover.
2. Press the roll paper cover open lever, and open the roll paper cover.
3. If there is a roll paper with little paper remaining inside the TM-L90 peeler, take it out.
4. Check that the printer is on. If it is not on, turn it on.
5. Put a new roll paper in the TM-L90 peeler. Make sure that the roll paper is oriented as shown in the following figure.



6. Slide the mode switch to the right (peeling issuing mode).



7. As shown in the following figure, pull the end of the paper to the bottom of the square hole above the manual cutter (label peeling sensor), and close the roll paper cover.



**Note:**

*Matching the leading edge of the roll paper with the printed marks on the printer ensures that the fewest possible labels are ejected automatically.*



 **WARNING:**

*Do not close the roll paper cover with your finger still inside the roll paper cover. Doing so may lead to injury.*

8. A few labels are fed automatically and the PAPER OUT LED starts flashing.
9. Pass the backing paper that you pulled out to the other side of the peeler cover as shown in the following figure, and close the peeler cover.



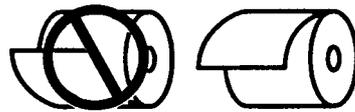
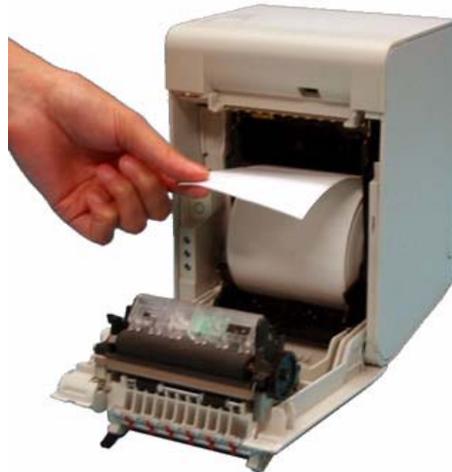
10. Press FEED. The printer automatically feeds the paper to the start position, and the PAPER OUT LED goes off.



**Note:**

*If the paper is not set properly when FEED is pressed, there may be label adhesive on the rollers of the peeler. Peel off one label, and remove the adhesive from the roller by lifting it off with the adhesive side of the label. For the cleaning method, refer to page E-5. Paper setting with continuous issuing (not using the peeler)*

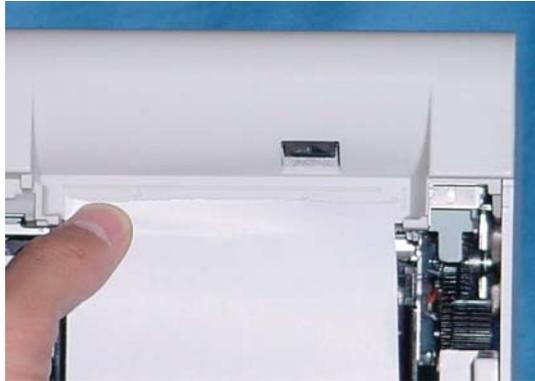
1. Press the peeler cover open lever, and open the peeler cover.
2. Press the roll paper cover open lever, and open the roll paper cover.
3. If there is roll paper with little paper remaining inside the printer, take it out.
4. Put new roll paper in the printer as shown in the following figure.



5. Slide the mode switch to the left (continuous issuing mode).



6. As shown in the following figure, pull the end of the paper to the bottom of the square hole above the manual cutter (label peeling sensor).



**Note:**

Matching the leading edge of the roll paper with the printed marks on the printer ensures that the fewest possible labels are ejected automatically.

7. Pressing down the end of the paper, close the roll paper cover. The printer automatically feeds the paper to the start position.



**WARNING:**

Do not close the roll paper cover with your finger still inside the roll paper cover. Doing so may lead to injury.

8. Close the peeler cover and cut off the excess paper with the manual cutter.

### 2.10.3 Setting Paper Layout

Before printing, it is necessary to set the layout information for paper type and size in the printer. Doing paper feeding or printing without this layout setting may result in a paper out (no paper left) or an error. In all of the following cases, therefore, make layout settings before use.

- When using label paper for the first time (except when replacing label paper of the same type)
- When you change the paper type (full-surface label paper/receipt paper, label paper, receipt paper with black mark)
- When changing the size of the label paper
- When you change the label liner color or change the liner for one of different transmittance.

There are automatic and manual layout settings. The setting procedure is as follows.

If you use the printer without making a layout setting and a paper out (no paper left) or an error occurs as a result (refer to page F-3), opening and closing the cover automatically sets a new layout.



**Note:**

*The above automatic layout setting by opening and closing the cover is available with firmware version 1.05 or later. It enables you to make layout setting by intentionally generating an error in paper feeding on printing. This function can be turned off using the memory switch setup utility.*

### Automatic paper layout setting

Automatic paper layout setting sets a paper layout on the basis of the black mark or label position detected by the printer.

This method is available for label paper, receipt paper, and receipt paper with black mark.



**Note:**

*When using label paper with black mark, it is necessary to make manual setting of paper layout (set using the memory switch setup utility or ESC/POS command).*

This automatic paper layout setting can be used with any of the following three methods.

- Use the automatic paper layout setting mode provided for the printer.
- Use the memory switch setup utility.
- Directly control the printer using ESC/POS commands.



**Note:**

*For the memory switch setup utility and ESC/POS commands, refer to "Introduction of Control Methods" on page 4-1.*

*When using Advanced Printer Driver (APD) or ESC/POS commands, set the print area as required. The print area position influences the paper layout.*

Described below is a procedure for automatic setting of paper layout that allows you to independently set the paper layout on the printer.

It is also possible to cause an error intentionally so that the printer will feed several labels and remember the label paper size. See the instructions below.

- ❑ TM-L90 setting procedure (Procedure for setting the paper type and size to the printer)
  1. Install the printer.
  2. Connect the power and other cables.
  3. Open the roll paper cover (lid).
  4. Set the roll paper in the printer.

5. With the roll paper cover open, turn on the power while pressing FEED inside the printer.  
(Keep pressing FEED until the ERROR LED comes on.)
  6. Check that the ERROR LED is on, and release FEED.
  7. Press FEED 6 times.
  8. Then, close the roll paper cover.  
The printer feeds several labels and remembers the label paper size. This completes the task.
- TM-L90 peeler specification setting procedure (procedure for setting the paper type and size in the printer)

There are the following 2 cases.

<When the power is off>

1. Open the peeler cover.
2. Open the roll paper cover.
3. Set the roll paper in the printer.
4. With the roll paper cover open, turn on the power while pressing FEED inside the printer.  
(Keep pressing FEED until the ERROR LED comes on.)
5. Check that the ERROR LED is on, and release FEED.
6. Press FEED 6 times.
7. 6.For peeling issuing, set the end of the roll paper in the peeler, and for continuous issuing, set it in the ejection path, and close the roll paper cover. The printer feeds several labels and remembers the label paper size. This completes the task.
8. For peeling issuing, after setting the paper, the PAPER OUT LED flashes. To print, insert the label into the peeler path, and press FEED.

<When the power is on>

1. Open the peeler cover.
2. Open the roll paper cover.
3. With the roll paper cover open, press FEED inside the printer.
4. Close the roll paper cover.  
The PAPER OUT LED flashes.

5. For peeling issuing, set the end of the roll paper in the peeler, and for continuous issuing, set it in the ejection path, and close the roll paper cover. The printer feeds several labels and remembers the label paper size. This completes the task.
6. For peeling issuing, after setting the paper, the PAPER OUT LED flashes. To print, insert the label into the peeler path, and press FEED.

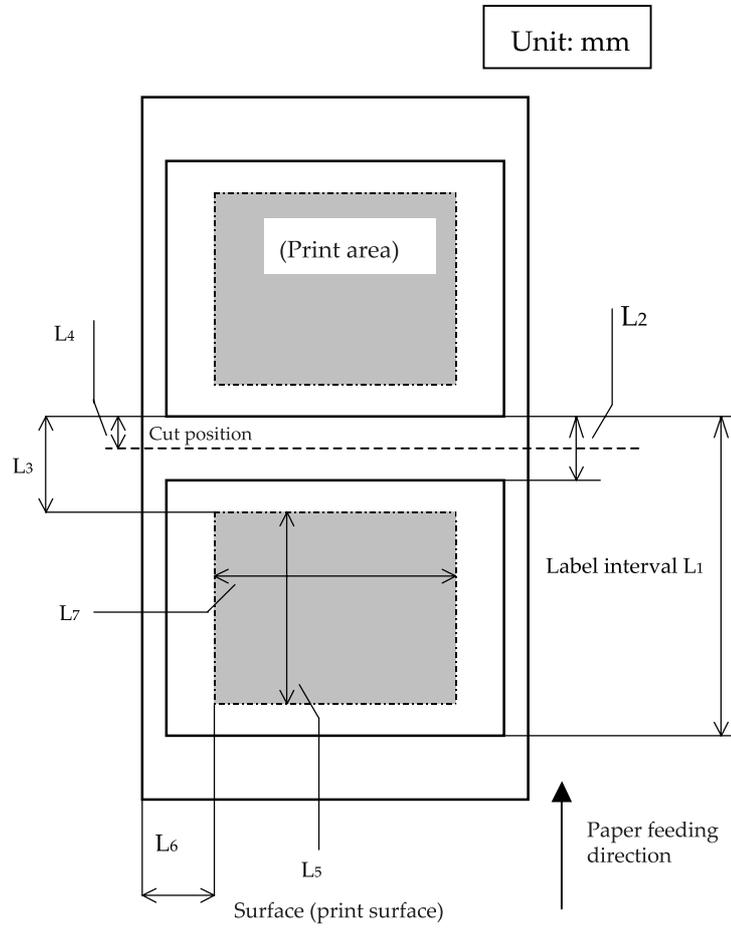
If an error occurs without completing the setting, turn the power off, and repeat the operation from step 3.

The automatic paper layout value is set according to the following expression.

- |     |  |
|-----|--|
| L3: | $(L2+1.5)$ mm:   |
| L4: | $(L2 \times 2/5)$ mm:  |
| L5: | $(L1-L2-3)$ mm   |
| L6: | 4.7 mm (fixed value)   |
| L7: | When the liner width is 78 mm or more:70 mm<br>When the liner width is less than 78 mm:(Liner width -8) mm |

 **Note:**

L1 and L2 are measured by the printer. See the following sketch for the lengths L1 to L7.



*Parameters Calculated for Automatic Layout Setting*

#### ❑ Manual paper layout setting

Manual paper layout setting is to directly enter paper data into the non-volatile memory of the printer to execute the "paper layout setting" function. As compared to automatic setting, manual setting enables finer adjustment of the paper layout. You can set the paper type, mark-to-mark distance, mark length, paper width and print area.

This "manual paper layout setting" can be used in either of the following two methods. Refer to the corresponding manuals for how to use these methods.

- Use the memory switch setup utility.  
(Manual: Memory Switch Setup Utility, User's Manual)
- Directly control the printer using ESC/POS commands.  
(Manual: ESC/POS Application Programming Guide)



**Note:**

*For the memory switch setup utility and ESC/POS commands, refer to "Introduction of Control Methods" on page 4-1.*

*When using the Advanced Printer Driver (APD) or ESC/POS commands, set the print area as required. The print area position influences the paper layout. When using label paper with black mark, always make a manual setting of paper layout.*

### 2.10.4 Clearing Paper Layout Setting

This printer has a function to reset the paper layout set in the automatic paper layout setting mode or by manual setting to the factory setting.



**Note:**

*This function may be unavailable depending on when you purchased your printer. You cannot use this function if the firmware version of the printer printed in a self test ("Self Test Mode" on page 2-53) is 1.04 or earlier. For more information, please contact your sales representative.*

The method of clearing the paper layout settings in the printer is as follows.

1. Open the peeler cover.
2. Open the roll paper cover.
3. Load roll paper.
4. Until the ERROR lamp is on, hold down the FEED button (on the inside of the roll paper cover: see page 2-25) and turn on the power supply.  
(At this time, hold down the paper feed switch until the ERROR lamp is lit.)
5. When the ERROR LED comes on, release FEED (inside the roll paper cover).
6. Press FEED 4 times.

7. Close the roll paper cover.  
The paper information in the NV memory in the printer is cleared, and to indicate that the layout information is cleared, the printer automatically feeds paper.

## 2.11 TM Setup Items (Summary)

Items of TM setup are shown below; refer to the table below for information about setting items and adequate switches.

Item	Description	Setting method			Setting Memory switch
		Mechanic	DiP switch	Memory switch	
Autocutter	Setting cut type	Refer to "Autocutter settings (TM-L90 only)" on page 2-24	--	Switching Enable/Disable	See "Items that can be set in the memory switch setting mode" on page 2-24
Paper width	When changing paper width	See "Setting Roll Paper Width" on page 2-19	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
Roll paper near-end adjusting	Adjusting detector of near end roll paper	See "Adjusting Roll Paper Near-End Detection Position" on page 2-6	--	--	--
Enable/disable power switch (*)	Power switch can be invalidated.	--	DIP switch 1-1 "DIP Switch Settings" on page 2-21	--	--
Select for serial communication condition	Serial communication settings can be made either by DIP switch or memory switch. If DIP switch 2 is on, the DIP switch setting is read; if DIP switch 2 is off, the memory switch setting is read.	--	DIP switch 1-2 "DIP Switch Settings" on page 2-21	--	--
Set for serial communication condition	Handshake, Bit length, presence of Parity check, Parity select, Baud rate select.	--	DIP switch 1-3 to 1-8 "DIP Switch Settings" on page 2-21	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24

Select receive buffer capacity(*)	Select capacity of receive buffer: large or small.	--	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
Conditions for Busy Status (*)	Select condition for Busy.	--	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
Data processing when reception error occurs	Select print "?" or ignored.	--	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
#6 pin signal select for reset	Serial interface reset	--	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
#25 pin signal select for reset	Serial interface reset	--	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
#31 pin signal select for reset	Parallel interface reset	--	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
FEED button operational settings	FEED button operational settings"	"FEED button operational settings (TM-L90 peeler specification continuous issuing mode only)" on page 2-33	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
Maximum measurable length in auto-setting of paper layout mode.	Maximum measurable intervals between black marks in auto-setting of paper layout mode.	--	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24
Feeding or not feeding paper at power on.	Determine with or without the feeding function at power on.	--	--	Memory switch	See "Items that can be set in the memory switch setting mode" on page 2-24

## **2.12 Operating Mode (Panel Switch Operation)**

In order to check the setting condition of the printer, it has the self-testing mode other than the normal-printing mode.

### **2.12.1 Self Test Mode**

In self test mode, following items are checked and printed out:

- Control circuit functions
- Printer mechanisms
- Print quality
- Control software ROM version
- DIP switch settings
- Memory switch setting
- Paper layout setting

Use the following procedure to start a self test.

*With TM-L90*

1. First, open the roll paper cover; then close the roll paper cover while pressing and holding down the FEED button until the ERROR LED flashes. The printer prints out the various printer states.
2. When all printer states have been printed, make sure that the following message is displayed and the PAPER OUT LED flashes.

"If you want to continue SELF-TEST printing, please press FEED button."

The printer is now in the self test wait mode.

3. To start a test print, press the FEED button when the printer is in the self test wait mode.
4. Check that the following has been printed.

\*\*\*\* completed \*\*\*\*

This indicates that the printer has been initialized and made the transition to the normal mode.

*With the TM-L90 peeler specification*

1. With the roll paper cover open, turn on the power while pressing FEED. Keep pressing it until the ERROR LED comes on.  
The printer status is printed on the paper.
2. When the printer status has finished printing, the following content is printed. Check that the PAPER OUT LED flashes.
  - Control ROM version
  - DIP switch setting status
  - Memory switch setting status
  - When the above has finished printing, the following message is printed.  
"If you want to continue SELF-TEST printing, please press FEED button"

This status is the "waiting to continue self-test status."

3. Press FEED.  
Test printing starts.
4. Check that the following message is printed.

"\*\*\* completed \*\*\*"

The printer is initialized, and changes to the normal mode.

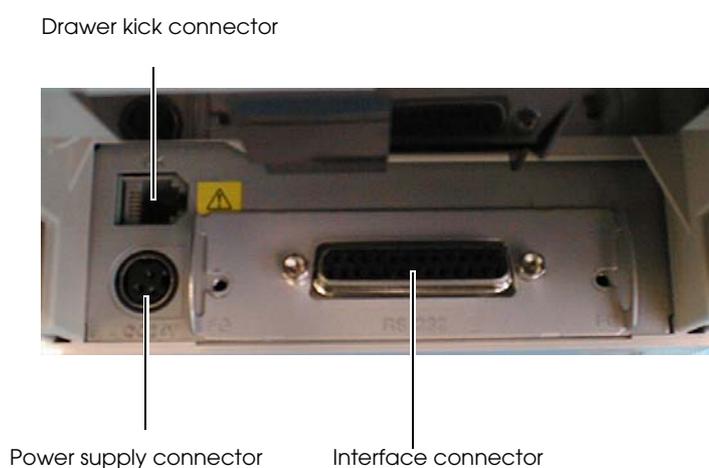
## Chapter 3

# Connecting to the Host Computer and Options

### 3.1 Connecting the Cable

This printer has 4 types of interface, serial, parallel, USB, and Ethernet. The method of connecting such options as a customer display varies depending on the interface type. Note that some interfaces do not accept specific connection methods.

All cables are connected to the connector panel located on the lower rear side of the printer.



Connector Panel

 **Note:**

The figure above shows the connector panel for RS-232 interface model printer. The shape of the interface connector varies according to the type of interface used.

Be sure to turn off the power supply for both the printer and the host computer unit before connecting the various cables.

Be sure to unplug the power cord before inserting or removing the interface board.

## 3.2 Connecting to the Host Computer

### 3.2.1 With the RS-232C interface

When the TM printer is connected to a host PC with a serial interface, the following connection forms are possible:

- Stand alone
- Pass-through

Connections of available serial cross cables are as follows:

Type A

D-Sub 25P(TM)			D-Sub 9P(PC)	
Pin No	Signal		Signal	Pin No
1	FG		DCD	1
2	TXD		TXD	3
3	RXD		RXD	2
20	DTR		DTR	4
6	DSR		DSR	6
4	RTS		RTS	7
5	CTS		CTS	8
7	GD		GD	5
25	RESET		RI/RESET	9

Type B

D-Sub 25P(TM)			D-Sub 9P(PC)	
Pin No	Signal		Signal	Pin No
1	FG		DCD	1
2	TXD		TXD	3
3	RXD		RXD	2
20	DTR		DTR	4
6	DSR		DSR	6
4	RTS		RTS	7
5	CTS		CTS	8
7	GD		GD	5
25	RESET		RI/RESET	9

The types of cable (Type A or B) varies depending on the combination of the operation method and the handshake for the TM printer. You can operate the TM printer by a Windows driver, OPOS, or ESC/POS commands. Xon/Xoff, DTR/DSR or RTS/CTS are available as handshake control. See tables in the following sections for the cable type for each connection.

 **Note:**

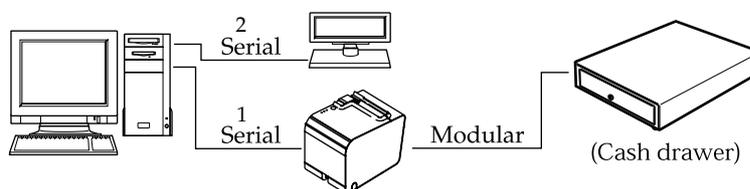
Refer to Chapter 4 for the Windows driver, OPOS ADK, and ESC/POS commands. Refer to "Connecting the Cable" on page 3-1 for the cable connection procedure.

DTR/DSR control is available for OPOS.

Xon/Xoff or CTS/RTS control is available for APD. When using APD in serial connection, read the Note in "EPSON Advanced Printer Driver Support Environment" on page 4-3 that contains precautions for TrueType font printing.

**Direct Connection (Stand alone)**

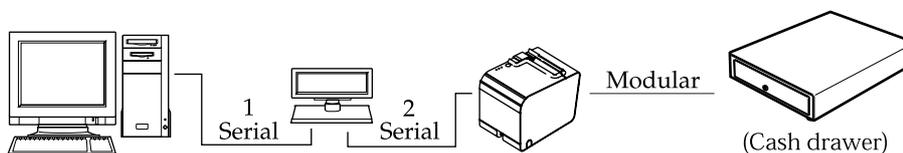
Both TM printer and DM-D are connected to the host PC directly via serial port. The following table shows the application control and cable connection types.



Application control		Xon/Xoff (except OPOS)	DTR/DSR (DOS, Windows (only OPOS))	RTS/CTR (DOS, Windows (hardware control: Windows driver))
TM side control setting				
Xon/Xoff	1	Type A or B	—	—
	2	DM-D500: A, B Other DM-D: not available	—	—
DTR/DSR	1	—	Type A or B	Type B
	2	—	Type A or B	Type B

**Pass-through Connections**

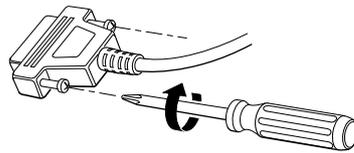
TM printer is connected to DM-D via serial port and DM-D is connected to the host PC via serial port. The following table shows the application control and cable connection types.



Application control TM side control setting		Xon/Xoff (except OPOS)	DTR/DSR (DOS, Windows (only OPOS))	RTS/CTR (DOS, Windows (hardware control: Windows driver))
Xon/Xoff		Not available	—	—
DTR/DSR	1	—	Type A or B	Type B
	2	—	Type A or B	Type A or B

### Connection procedure

1. Press the connector on the end of the interface cable firmly onto the interface connector located on the connector panel.
2. When using connectors equipped with screws, use the screws to tighten the connectors firmly in place.



*Tightening Screws*



**Note:**

The printer comes with hexagon lock bolts with bolt-head threads designed to inch specifications. Users with interface cables that use metric thread screws can replace the inch thread lock bolts with the metric lock bolts that come with the printer using a hexagonal (5 mm) screwdriver.

Identified by encircling line mark



With hole threaded in inches



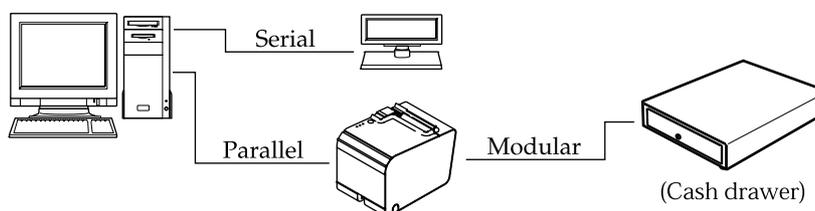
With hole threaded in millimeters

*Hexagon Bolts Threaded in Inches and Millimeters*

3. For interface cables equipped with a ground line, attach the ground line to the screw hole marked "FG" on the printer.
4. Connect the other end of the interface cable to the host computer.

### 3.2.2 With the parallel (IEEE1284) interface

TM printer is connected to the host PC via parallel port mounting parallel interface board (UB-P02II). DM-D is connected to the host PC via serial port.

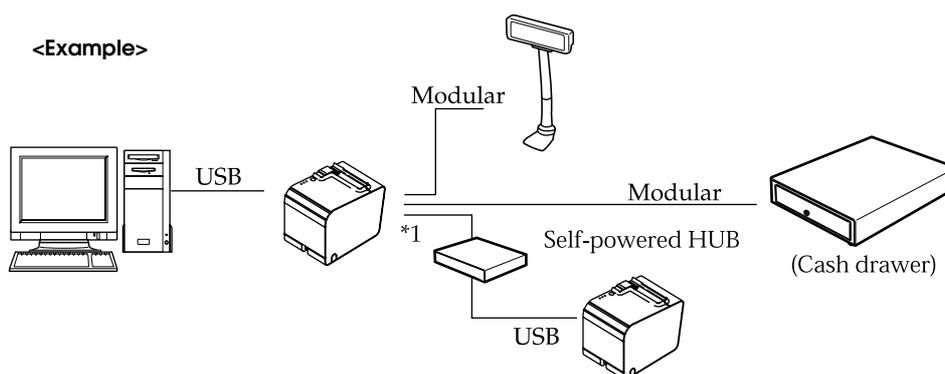


#### Connection procedure

1. Press the connector on the end of the interface cable firmly onto the interface connector located on the connector panel.
2. Press down the clips on either side of the connector to lock it in place.
3. For interface cables equipped with a ground line, attach the ground line to the screw hole marked "FG" on the printer.
4. Connect the other end of the interface cable to the host computer.

### 3.2.3 With the USB interface

A USB interface TM printer is connected to the host PC via USB. The second TM printer can be connected via a self-powered USB hub from the printer connected to the host PC.



- \*1 Only the printer with the USB hub function allows another TM printer to be connected using a USB cable.
- \*2 EPSON does not supply the port driver or similar program necessary to control the USB interface printer with the ESC/POS commands. Control it with the driver (APD, OPOS).

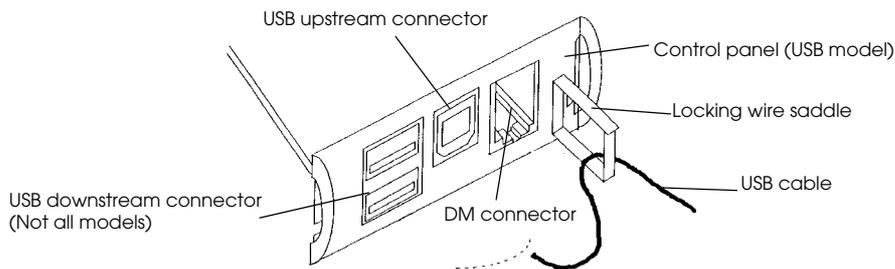
### Connection procedure

1. Attach the locking wire saddle at the location shown in figure below.
2. Hook the USB cable through the locking wire saddle as shown in the figure below.



**Note:**

Hooking the USB cable through the locking wire saddle as shown in figure below will prevent the cable from coming unplugged.



Attaching Locking Wire Saddle

3. Connect the USB cable from the host computer to the USB upstream connector.
4. For models that have the UB-U01 installed, a maximum of two USB devices can be connected to the USB downstream connector.



**Note:**

The hub installed in the USB model's control panel is a bus power-supply hub. Therefore, it is important to note that bus power supply hubs (including other USB models) and bus power supply functions with 100 mA or more consumption current cannot be connected directly to the printer.



**Note:**

To use USB model TM printer, you need to install the USB device driver on host computer after connecting TM printer to the host computer. For information on how to obtain the required device drivers and their installation procedures, contact EPSON or your dealer.

If you connect a customer display (DM-D), set the DIP switch settings as follows. For details, see the User's Manual packed with your customer display.

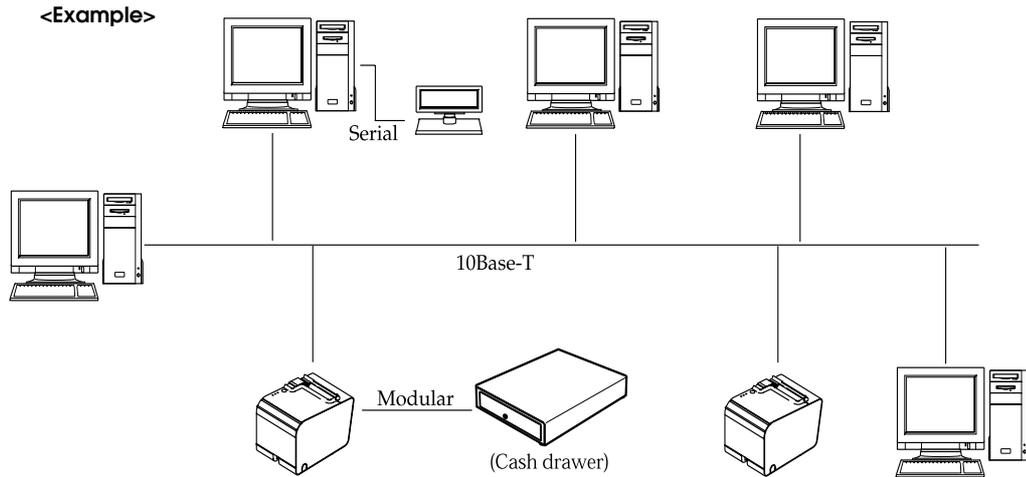
Item	Selection	
Transmission setting	Transmission speed	19200 bps
	Parity	None
	Data word length	8 bits

Before turning on the printer, be sure to turn on the customer display (DM-D). If you reverse the order, the customer display will not be recognized correctly.

To satisfy the EMI standard, be sure to mount the ferrite core on the display module cable. To mount the ferrite core, put the display module cable into the ferrite core.

### 3.2.4 With the Ethernet interface 'IEEE802.3' (TM-L90 only)

TM printer with the ethernet interface is connected to a network with the ethernet cable via a Hub.



 **Note:**

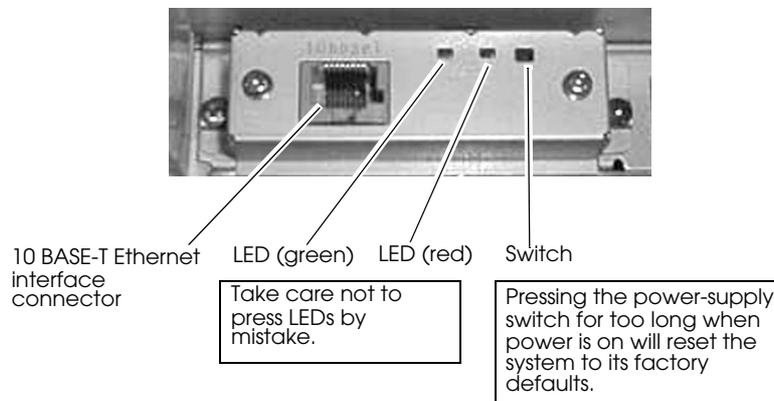
The Ethernet interface TM printer does not accept a customer display (DM-D). Connect the customer display to a POS terminal or appropriate equipment other than the printer.

 **Note:**

When controlling the printer with OPOS, it is necessary to use exclusive control. Therefore, when using 1 printer with several PCs, it is necessary to take into account application programming whereby a PC that already has the exclusive right must release it, then another PC must claim it.

## Names of parts

The names of the various parts of the Ethernet interface are shown below.



Name of Parts

## Connection procedure

### **CAUTION:**

Connecting devices directly to LAN cables that are installed outdoors will expose them to damage from power surges caused by lightning and other inductive sources. It is best to make sure that devices without proper surge protection are cushioned by being connected through devices that do have surge protection. Otherwise, it is better not to connect them to outdoor lines.

Never attempt to connect the customer display cable, drawer kick out cable or the standard telephone line cable to the 10 Base-T Ethernet connector.

1. Confirm that the power supplies for both the printer and the host computer have been turned off.
2. Connect the 10 Base-T cable to the 10 Base-T Ethernet connector by pressing firmly until the connectors click.

### **Note:**

For the various methods of setting the Ethernet interface, refer to the "Detailed UB-E01 Manual," or the "Detailed UB-E02 Manual"

### 3.3 Connecting to the Drawer

#### **CAUTION:**

Be sure to connect a drawer that meets printer specifications. Connecting a drawer of the wrong specifications may result in damage to both the drawer and the printer.

Never connect the telephone line to the drawer kick out connector (labeled "DK"). Doing so may result in damage to both the telephone line and the printer.

Never connect the drawer cable to the customer display connector (labeled "DM-D"). Doing so may result in damage to both the drawer cable and the printer.

1. Connect the drawer cable to the drawer kick out connector (labeled DK) on the connector panel.



Drawer kick out connector



## Chapter 4

---

# Application Development Information

This chapter introduces how to control this printer and the information useful for development of applications using this printer.

---

### 4.1 Introduction of Control Methods

The TM printer can print and be controlled by any of the following three methods.

1. Windows printer driver (EPSON Advanced Printer Driver)
2. EPSON OPOS ADK
3. ESC/POS commands

Depending on the driver and interface used, the IP setup tool for Ethernet specifications, USB device driver, printing logo registration utility (TMFlash logo utility), etc. are available. Get the latest information from the following URL.

For customers from North America, go to the following web site: <http://pos.epson.com/>

For customers from other countries, go to the following web site: <http://www.epson-pos.com/>  
Select the product name from the "Select any product" pull down menu.

#### 4.1.1 Windows Driver (EPSON Advanced Printer Driver)

EPSON Advanced Printer Driver is a Windows driver for TM printers.

##### 4.1.1.1 EPSON Advanced Printer Driver Overview

EPSON Advanced Printer Driver has the following features.

- Supplies the Windows printer driver for TM printers to enable printing from a general Windows application.
- Can execute POS printer-specific functions such as paper cutting and drawer opening.
- Can print the printer resident font by selecting the font type.
- Can get the printer status using programming languages such as VB via Status API. This uses the bidirectional communication of the TM printer in the Windows standard printer driver operation environment.



**Note:**

Status API is the printer control API supplied originally by EPSON. This can be used to get the printer status and send ESC/POS commands.

#### 4.1.1.2 EPSON Advanced Printer Driver Contents

The installer automatically judges the target PC environment and automatically installs the DLL and software components necessary for operation. You can select the drivers, sample programs, and manuals to be installed.

##### *Drivers*

You can select the driver according to the purpose of use. (Drivers can be installed simultaneously.)

They include two-color printing, smoothing, continuous printing, cutting method option and other functions.

- With TM-L90
  - Receipt: For receipt printing
  - Reduce 35: A4 vertical size can be reduced 35% to enable printing on receipts of 80 mm width.
  - Label: For label printing
- With the TM-L90 peeler specification
  - Receipt: For continuous printing
  - Label: For printing label paper

##### *Sample programs*

Sample programs in Visual Basic and Visual C++ to use Status API can be installed.

##### *Manuals*

The following manuals can be installed.

- With TM-L90
  - Driver: User's Manual
  - Status API: Reference Manual
- With the TM-L90 peeler specification
  - User's Guide (Developer's Guide)

### 4.1.1.3 EPSON Advanced Printer Driver Support Environment

#### Supported interfaces

- Serial, Parallel, USB, EtherNet

#### Supported OSs (with confirmation of system operation)

- ❑ WITH TM-L90
  - Windows 95 Standard, OSR 2.5
  - Windows 98 Second Edition
  - Windows NT Ver. 4.0 SP5, SP6
  - Windows 2000
  - Windows XP
- ❑ With the TM-L90 peeler specification
  - Windows NT Ver. 4.0 Workstation SP6
  - Windows 2000 Professional SP4
  - Windows XP Professional SP1

*Refer to the release note of the driver for the latest information.*

#### Supported development languages

- Visual Basic (5.0 or later)
- VisualC++

#### Supported devices

(Refer to the release note of the driver for details of available equipment.)

- EPSON receipt printer
- EPSON customer display
- EPSON cash drawer

**Note:**

With TM-L90, a USB device driver is required for USB specification printers, and an IP setting utility is required for Ethernet specification printers. For details, refer to the packaged APD manual. With the TM-L90 peeler specification, an IP setting utility is required for Ethernet specification printers. For details, refer to the packaged APD manual.

When the TM-L90 is connected via a serial interface, it is recommended to use the printer resident font since use of the TrueType font will decrease printing speed due to the transfer speed of the serial interface. For how to use the resident font, refer to the PDF User's Manual of APD.

The other interfaces (parallel, USB, Ethernet) do not pose problems in terms of the transfer speed but may have some influence on customer applications. In that case, use the printer resident font. When OPOS is used, this problem does not arise because only the printer resident font is available.

#### 4.1.1.4 Driver Information and Download Destination

Please contact EPSON or your dealer.

#### 4.1.2 EPSON OPOS ADK

EPSON OPOS ADK supports the development environment required for OPOS application development by OPOS Control proposed by the OLE for Retail POS (hereafter OPOS) Technology Association to supply the OPOS-compliant printer driver (OCX).

Use this control method to develop an OPOS-compliant application. EPSON OPOS ADK has the following features.

- ❑ EPSON OPOS ADK totally supports the development environment required for OPOS application development for customers, including not only OPOS Control (CO + SO) proposed by the OPOS Association, but also the contents necessary for development, ranging from the installers and setup utilities to sample programs and manuals, the function to get a log for debugging, and silent installation that realizes ease of installation to a target PC.
- ❑ EPSON OPOS ADK enables you to reduce the man-hours for the application development since it includes the following functions that application developers have to consider. The functions are: Support with the EPSON-original Direct IO with a parameter, the power-on notification, and off-line buffer clear processing.

**Note:**

For detailed information on the API functions, see the UnifiedPOS specification available at the following web site:

<http://www.nrf-arts.org/UnifiedPOS/>

#### 4.1.2.1 EPSON OPOS ADK (OPOS Control) Overview

OPOS Control included with EPSON OPOS ADK has the following features.

- ❑ Supplies CO for each device class and SO for EPSON devices.
- ❑ Direct IO with parameters available.
  - Gets the maintenance counter value of the printer.
  - NVRAM-registered electronic logo (bit image) printing, etc. (For the electronic logo, refer to “Electronic Logo Registration Utility for NVRAM” on page 4-7)
- ❑ Power-on notification function (at power-on, this function automatically restores the printer to the state prior to the power-off)
- ❑ Offline buffer clear processing (clears the print buffer contents in the offline mode)
- ❑ Debugging function (trace function)
  - Gets a log between the application and CO (target: Used API and its return value)
  - Device status getting log (gets the offline and error factors that actually occurred in the devices)

and so on.

#### 4.1.2.2 EPSON OPOS ADK Contents

The installer of EPSON OPOS ADK Ver. 2.10 or later has the silent installation function, which can install the OPOS environment without a user interface, to facilitate installation. With the installer, the following OPOS-compliant OPOS Control for EPSON devices, manuals, various utilities and sample programs can be installed.

- ❑ OPOS Control for EPSON devices

Header files for CO, SO, C++, header file for VB, TLB file of CO, device information file, etc. can be installed.

- ❑ Manuals
  - User's Guide (Environment construction manual: Installation/uninstallation, various utility using methods)
  - Application Development Guide (Manual for OPOS-compliant application developer: Common manual, Each device manual)

❑ Utilities packed with various drivers

- SetUpPOS Utility

Equipment and connection ports can be selected, and various settings can be made. (Paper size, single color/two colors selection (two-color printer only), print waiting time setting, etc.)

- TM Flash logo utility

A bitmap file can be registered to the printer or customer display, for example.

- USB device driver

Driver necessary to connect the USB interface printer.

- Sample programs

Sample programs in VB, VC++ can be installed.

#### **4.1.2.3 EPSON OPOS ADK Support Environment**

##### *Supported interfaces*

- Serial, Parallel, USB, EtherNet

##### *Supported OSs (with confirmation of system operation)*

❑ WITH TM-L90

- Windows 95 Standard, OSR 2.5
- Windows 98 Second Edition
- Windows NT Ver. 4.0 SP5, SP6
- Windows 2000 Professional
- Windows XP Professional

❑ With the TM-L90 peeler specification

- Windows NT 4.0 Workstation SP6
- Windows 2000 Professional SP4
- Windows XP Professional SP1

*Refer to the release notes of the driver for the latest information.*

##### *Supported development languages*

- Visual Basic
- VisualC++

#### 4.1.2.4 Driver Information and Download Destination

Please contact EPSON or your dealer

#### 4.1.3 ESC/POS Commands

Printing/control via ESC/POS commands is a method proposed by EPSON to directly control the TM printer using ESC/POS commands. The printer can be controlled directly by sending ESC/POS commands from an application to the printer. For detailed information on the ESC/POS commands, please contact EPSON.



**Note:**

*The printer of Ethernet specifications requires the IP setup utility separately. Please contact EPSON or your dealer to obtain the utility.*

#### 4.1.4 Various Utilities

We provide the utilities as described below. Get the utilities from the following URL.

For customers from North America, go to the following web site: <http://pos.epson.com/>

For customers from other countries, go to the following web site: <http://www.epson-pos.com/>  
Select the product name from the "Select any product" pull down menu.

##### 4.1.4.1 Address Setup Utility for Ethernet Interface (for UB-E01/UB-E02)

The utility, which sets an IP address to a 10BASE-T Ethernet interface for TM printer, and its detailed manual for developers are available. The customer who purchases the Ethernet interface TM printer needs this utility.

##### 4.1.4.2 Electronic Logo Registration Utility for NVRAM

This utility is designed to register a logo to the NVRAM (non-volatile memory) built in the printer. Using this utility saves shop logos to the NVRAM to increase logo printing speed.

##### 4.1.4.3 TM Printer Memory Switch Setup Utility

This utility is designed to perform the memory switch-related functions of the TM printer easily.

- You can execute a communication test and self-test.
- You can set the switches, etc. (such as the memory switches and customized values).
- You can set the paper layout for the TM-L90.

##### 4.1.4.4 USB Interface ID Code Rewrite Utility

This utility is designed to edit the identification code of a USB interface according to the purpose of the user of USB interface TM printer. When you do not want to change the USB port setting of the driver after replacement of the TM printer, you need not change the port number by setting the same IP.

---

## 4.2 Sensors

### 4.2.1 Paper sensors

The printer has two paper sensors.

#### 4.2.1.1 Roll paper near-end sensor

The roll paper near-end sensor is to detect the condition when the remaining amount of the paper is getting low and it is located on the roll paper supply unit. It detects the near-end of the roll paper by detecting the roll paper diameter. You can adjust the sensor position. See page 2-6 for details for adjustment.

The normal printing task will be performed even in the near-end status.



**Note:**

*The detecting the near-end status of the sensor does not necessarily indicate the complete end of the roll paper. Use the sensor as an indication of replacing a roll paper.*

#### 4.2.1.2 Roll Paper End Sensor

The roll paper end sensor is located in the paper path. It detects the presence of paper through the roll paper in the paper path.

When there is no paper in the path (paper end status), the ERROR LED and the PAPER OUT LED indicator will light and it will be in the error status.

If the sensor detects the roll paper end, the printer will stop printing even in the process of printing. It is recommended that you mainly use the roll paper near-end sensor and use the roll paper end sensor secondarily.

### 4.2.2 Printer Cover Sensor

#### 4.2.2.1 Roll Paper Cover Open Sensor

The cover-open sensor monitors the roll paper cover. When the sensor detects an open cover while printing, the printer stops printing immediately and automatically goes offline. Depending on the Msw 8-8 setting, an open cover error is handled as either a recoverable error or unrecoverable error as described below.

- Msw 8-8 off: Automatically recoverable error. The ERROR LED flashes. When the printer cover is closed, the ERROR LED goes off, and the printer goes online and starts printing at the beginning of the line it was printing when the cover was opened.
- Msw 8-8 on: (Default) Recoverable error. The ERROR LED flashes. Since the ERROR LED still flashes after the cover is closed, send the error recovery command to recover from the error.

When the printer recovers, it feeds paper to take up the slack, and starts printing from the beginning of the line where the error occurred. In this case, double printing and printing position shift may occur. It is recommended to set the memory switch Msw 8-8 to ON, clear the printer buffers by a command from the driver, and resend the print data. Whether the cover is open or not does not affect the status reported by the roll paper end sensor.



**Note:**

When OPOS or Advanced Printer Driver is used, do not change the default setting of the memory switch.

#### 4.2.2.2 Offline

This printer is not equipped with an online/offline switch. The printer goes offline under the following conditions automatically.

- When the power is turned on (including reset using the interface) and while the printer is ready to receive data.
- During the self test.
- When the roll paper cover is open.
- During paper feeding using the FEED button.
- When the printer stops printing due to a paper-end (in cases when an empty paper supply is detected by roll paper end detector or when it has been set to stop printing by the driver when the roll paper near-end sensor detects a paper end.)
- When an error has occurred.
- During macro executing standby status.
- Waiting for FEED status when inserting the roll paper (to complete the task of inserting the roll paper by pressing FEED)



**Note:**

The off-line status also happens infrequently when the pulse of the drawer kick out is sent.

#### 4.2.2.3 Busy state

Selecting conditions that invoke a BUSY State

The conditions that invoke a BUSY condition are selected with memory switch setting mode or memory switch Msw1-3 as follows.

- When the receive buffer is full
- When the receive buffer is full or the printer is off-line



**Note:**

In either case indicated above, it will be a BUSY status when turning on the power (including resetting with the interface), while the printer is in the state of receiving data and when executing a self-testing.

You do not need to change this item during the use of OPOS or Advanced Printer Driver.

### Printer BUSY conditions and the Msw1-3 status

Printer status		Memory switch Msw 1-3 state	
		ON	OFF
Offline	During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data.	BUSY	BUSY
	During the self test.	BUSY	BUSY
	When the cover is open.	-	BUSY
	During paper feeding using the paper feed button.	-	BUSY
	When the printer stops printing due to a paper-end. (only when the roll paper is not present)	-	BUSY
	When an error has occurred.	-	BUSY
When the receive buffer becomes full.		BUSY	BUSY

#### 4.2.2.4 Receive buffer

The capacity of the receive buffer is set using memory switch setting mode or memory switch Msw1-2. The definition of a receive buffer full is described in the following table.

The printer ignores the data received when the remaining space in the receive buffer is 0 bytes.

Memory switch Msw1-2	Receive buffer capacity	Buffer full definition
ON	45 bytes	From when the remaining space in the receive buffer drops to 16 bytes, to when the space increase to 26 bytes.
OFF	4 Kbytes	From when the remaining space in the receive buffer drops to 128 bytes, to when the space increase to 256 bytes.



**Note:**

When using OPOS or Advanced Printer Driver, you don't need to change the receive buffer.

#### 4.2.3 Label peeling sensor (peeler specification only)

This detects whether or not there is a peeled label. If a label is removed, the next label is moved to the printing start position.



**Note:**

If the printer is used in a location with direct sunlight, even when a label is removed, it may be determined as being present due to misdetection, and the printer continues waiting for label removal status. In this case, press FEED once to return the paper to the next label printing start position.

### 4.3 Setting of Paper Width

With the TM-L90 / TM-L90 peeler specification, you can set paper width to 38 to 70 mm or 80 mm. You can select the paper width by using memory switch setting mode (See "Operating procedure of Memory Switch Settings" on page 2-27. When you'd like to set other paper width that can't be selected in the memory switch setting mode, do the setting by using memory switch setting utility (See "TM Printer Memory Switch Setup Utility" on page 4-7) or ESC/POS commands.



**Note:**

*Paper width is not set automatically by auto paper layout settings. You need to do paper width setting before setting auto paper layout.*

### 4.4 Print Density

It is recommended to set print density according to paper type for adequate print quality and ensuring reliability. If the set density exceeds what is needed, it may lead to printer head dirt and blank dot printing. Adjust the print density as needed using the memory switch setting mode or memory switch setting utility.

*Original paper number and density level*

Roll Paper No.	Original Paper No.	Density Level
	P350	90%
	KF50	95%
ENTPC series ENTPD series	TF60KS-E, TF50KS-E, PD750R	100%
ENTPE series	PD160R, TF11KS-ET	105%
ENTLA series ENTLB series	--	130%

### 4.5 Print Speed

Default setting is normal print speed (120 mm/s maximum). High-speed printing (150 mm/s maximum) is selectable when the specified paper is selected.

Adjust the print speed as needed using the memory switch setting mode or memory switch setting utility.

#### 4.5.1 Paper to use for high speed

If any one of the following types of thermal paper is used, the customized value setting can be used to set the maximum print speed to 150 mm/s {5.91"/s} (level 9):

- ENTLA series
- TF60KS-E

- PD160R
- F50KS-E
- P350
- KF50

---

## **4.6 Barcode Printing**

The TM-L90 / TM-L90 peeler specification can print the types of bar code shown below.

UPC-A, UPC-E  
 JAN 8 (EAN 8), JAN 13 (EAN 13)  
 CODE 39  
 ITF (Interleaved 2 of 5)  
 CODABAR (NW-7)  
 CODE 93  
 CODE 128

Refer to each document of OPOS, Printer Driver or ESC/POS commands for the setting/printing procedures of each barcode.

---

## **4.7 CODE 128 Barcode**

The CODE 128 barcode allows a single barcode character to represent one character of a full-ASCII 128-character set or two-digit number from among the combinations of 103 different bar code characters and three different code sets.

- Code set A: Can represent ASCII characters 00H to 5FH.
- Code set B: Can represent ASCII characters 20H to 7FH.
- Code set C: One character can represent a two-digit number (100 numbers from 00 to 99).

In addition to the above characters, CODE 128 also provides the following special characters.

- Shift character (SHIFT)  
 The code set A handles the character right after SHIFT as a character of the code set B.  
 The code set B handles the character right after SHIFT as a character of the code set A.  
 SHIFT cannot be used in the code set C.
- Code set selection character (CODE A, CODE B, CODE C)  
 Changes the subsequent code set to A, B or C.
- Function character (FNC1, FNC 2, FNC3, FNC4)  
 The purpose of the function character changes depending on the application. The code set C accepts only FNC1.

Printable characters for code set A

characters	Transmission data		characters	Transmission data		characters	Transmission data	
	Hexadecimal code	Decimal code		Hexadecimal code	Decimal code		Hexadecimal code	Decimal code
NUL	00	0	(	28	40	P	50	80
SOH	01	1	)	29	41	Q	51	81
STX	02	2	*	2A	42	R	52	82
ETX	03	3	+	2B	43	S	53	83
EOT	04	4	,	2C	44	T	54	84
ENQ	05	5	-	2D	45	U	55	85
ACK	06	6	.	2E	46	V	56	86
BEL	07	7	/	2F	47	W	57	87
BS	08	8	0	30	48	X	58	88
HT	09	9	1	31	49	Y	59	89
LF	0A	10	2	32	50	Z	5A	90
VT	0B	11	3	33	51	(	5B	91
FF	0C	12	4	34	52	\	5C	92
CR	0D	13	5	35	53	)	5D	93
SO	0E	14	6	36	54	^	5E	94
SI	0F	15	7	37	55	_	5F	95
DLE	10	16	8	38	56	FNC1	7B,31	123,49
DC1	11	17	9	39	57	FNC2	7B,32	123,50
DC2	12	18	:	3A	58	FNC3	7B,33	123,51
DC3	13	19	;	3B	59	FNC4	7B,34	123,52
DC4	14	20	<	3C	60	SHIFT	7B,53	123,83
NAK	15	21	=	3D	61	CODEB	7B,42	123,66
SYN	16	22	>	3E	62	CODEC	7B,43	123,67
ETB	17	23	?	3F	63			
CAN	18	24	@	40	64			
EM	19	25	A	41	65			
SUB	1A	26	B	42	66			
ESC	1B	27	C	43	67			
FS	1C	28	D	44	68			
GS	1D	29	E	45	69			
RS	1E	30	F	46	70			
US	1F	31	G	47	71			
SP	20	32	H	48	72			
!	21	33	I	49	73			
"	22	34	J	4A	74			
#	23	35	K	4B	75			
\$	24	36	L	4C	76			
%	25	37	M	4D	77			
&	26	38	N	4E	78			
'	27	39	O	4F	79			

Printable characters for code set B

characters	Transmission data		characters	Transmission data		characters	Transmission data	
	Hexadecimal code	Decimal code		Hexadecimal code	Decimal code		Hexadecimal code	Decimal code
SP	20	32	H	48	72	p	70	112
!	21	33	I	49	73	q	71	113
"	22	34	J	4A	74	r	72	114
#	23	35	K	4B	75	s	73	115
\$	24	36	L	4C	76	t	74	116
%	25	37	M	4D	77	u	75	117
&	26	38	N	4E	78	v	76	118
'	27	39	O	4F	79	w	77	119
(	28	40	P	50	80	x	78	120
)	29	41	Q	51	81	y	79	121
*	2A	42	R	52	82	z	7A	122
+	2B	43	S	53	83	{	7B,7B	123,123
,	2C	44	T	54	84		7C	124
-	2D	45	U	55	85	}	7D	125
.	2E	46	V	56	86	—	7E	126
/	2F	47	W	57	87	DEL	7F	127
0	30	48	X	58	88	FNC1	7B,31	123,49
1	31	49	Y	59	89	FNC2	7B,32	123,50
2	32	50	Z	5A	90	FNC3	7B,33	123,51
3	33	51	(	5B	91	FNC4	7B,34	123,52
4	34	52	\	5C	92	SHIFT	7B,53	123,83
5	35	53	)	5D	93	CODEA	7B,41	123,66
6	36	54	^	5E	94	CODEC	7B,43	123,67
7	37	55	_	5F	95			
8	38	56	`	60	96			
9	39	57	a	61	97			
:	3A	58	b	62	98			
;	3B	59	c	63	99			
<	3C	60	d	64	100			
=	3D	61	e	65	101			
>	3E	62	f	66	102			
?	3F	63	g	67	103			
@	40	64	h	68	104			
A	41	65	i	69	105			
B	42	66	j	6A	106			
C	43	67	k	6B	107			
D	44	68	l	6C	108			
E	45	69	m	6D	109			
F	46	70	n	6E	110			
G	47	71	o	6F	111			

Printable characters for code set C

characters	Transmission data		characters	Transmission data		characters	Transmission data	
	Hexadecimal code	Decimal code		Hexadecimal code	Decimal code		Hexadecimal code	Decimal code
00	00	0	40	28	40	80	50	80
01	01	1	41	29	41	81	51	81
02	02	2	42	2A	42	82	52	82
03	03	3	43	2B	43	83	53	83
04	04	4	44	2C	44	84	54	84
05	05	5	45	2D	45	85	55	85
06	06	6	46	2E	46	86	56	86
07	07	7	47	2F	47	87	57	87
08	08	8	48	30	48	88	58	88
09	09	9	49	31	49	89	59	89
10	0A	10	50	32	50	90	5A	90
11	0B	11	51	33	51	91	5B	91
12	0C	12	52	34	52	92	5C	92
13	0D	13	53	35	53	93	5D	93
14	0E	14	54	36	54	94	5E	94
15	0F	15	55	37	55	95	5F	95
16	10	16	56	38	56	96	60	96
17	11	17	57	39	57	97	61	97
18	12	18	58	3A	58	98	62	98
19	13	19	59	3B	59	99	63	99
20	14	20	60	3C	60	FNC1	7B,31	123,49
21	15	21	61	3D	61	CODEA	7B,41	123,65
22	16	22	62	3E	62	CODEB	7B,42	123,66
23	17	23	63	3F	63			
24	18	24	64	40	64			
25	19	25	65	41	65			
26	1A	26	66	42	66			
27	1B	27	67	43	67			
28	1C	28	68	44	68			
29	1D	29	69	45	69			
30	1E	30	70	46	70			
31	1F	31	71	47	71			
32	20	32	72	48	72			
33	21	33	73	49	73			
34	22	34	74	4A	74			
35	23	35	75	4B	75			
36	24	36	76	4C	76			
37	25	37	77	4D	77			
38	26	38	78	4E	78			
39	27	39	79	4F	79			

---

## 4.8 Precautions for Two-Dimensional Code Printing

This printer can print two-dimensional codes. The following two-dimensional codes can be printed.

- ❑ PDF417
- ❑ QR Code
- ❑ MaxiCode

Note the following for two-dimensional code printing.

- ❑ The two-dimensional code recognition ratio changes depending on the module width, print density, environmental temperature, roll paper (thermal paper) type, reader performance, etc. Therefore, pre-check the recognition ratio and set the operating conditions to satisfy the restrictions of the reader.
- ❑ For PDF417 (two-dimensional code) printing, it is recommended to set the height of one symbol to three to five times greater than the module width. It is also recommended to set the overall height of the code to more than 5 mm (approximately).

---

## 4.9 Two-Color Printing

This printer can print two colors. For the two-color printing method, refer to the corresponding data of OPOS, Printer Driver, or ESC/POS commands.



**Note:**

*Depending on the print pattern, the colors of two-color printing may not be clear (Example: Red and black checkered pattern). In this case, the print result may be improved to some degree by setting an unprinted space between the first and second colors or by adjusting the print density. (The amount of space depends on the print density and paper.)*

*The reliability of two-color printing differs from that of single-color printing. Refer to “Reliability” on page 6-5 for details.*

---

## 4.10 NV Memory

NV memory is embedded in the printer. Please use NV memory with attention to the following:

- ❑ The following restrictions apply when performing nonvolatile memory operations (including data store and delete).
  - The paper feed switch must not be used to feed paper.
  - The real time command must not be executed.
  - The ASB status will not be sent, even when the ASB function in ESC/POS command is set to enable.

- ❑ The printer will sometimes enter the Busy state when data is being written to nonvolatile memory. It is important not to send data from the host computer while the printer is in the Busy state as it will be incapable of processing any received data.
- ❑ Frequent use of the functions for defining data to and deleting data from nonvolatile memory can damage the memory. As a rule, in using the various commands to write to NV memory, avoid writing more than an average of 10 times per day.

## **4.11 FAQ List**

The questions shown in the list below begin with "Q" and their replies with "A"

1. Look through sentences beginning with "Q" to find information relating to your question or problem.
2. Then follow the instructions described in the "A" sentence below it.

*Q: Print data dropout occurs.*

*A: Check the handshake process.*

Data dropout can occur when the handshake between the host computer and the printer is not performed correctly. This can result in errors related to print buffer capacity.

### *Confirmation procedure*

Use the following steps to check the handshake process.

1. Select a comparatively large volume of data for printing and send it to the printer.
2. Enable the on-line state by opening the printer cover while the printer is printing.
3. Check the data send operation.
  - If data send terminates: Handshake process is normal
  - If data send continues: Handshake process is abnormal
4. In cases where the handshake process is found to be abnormal, follow the steps listed in Corrective Procedure shown below and re-enter host unit and printer settings so that they match.

### *Corrective procedure*

1. Confirm the serial communication cable.  
Confirm the specification of cable connection. "Connecting the Cable" on page 3-1.
2. Confirm serial communication condition.  
Confirm serial communication condition of printer and host.

#### Serial communication conditions

- Baud rate
- Parity
- Flow control
- Data length

Confirmation and setting of printer are as follows.

1. Confirm serial communication condition of the printer by self-test (See page 2-53).
2. Confirm DIP SW 1-2.  
Printer serial communication condition can be set by DIP SW and memory switch. When the printer is powered on, DIP SW 1-2 selects DIP SW setting or memory switch setting as initial communication condition. Selected setting is printed by self-test.

DIP SW1-2 OFF: Used communication condition set by memory switch.  
ON: Used communication condition set by DIP SW.

3. Set communication condition  
When DIP SW1-2 is ON  
Follow the procedure (page 2-21) and set.

When DIP SW1-2 is OFF  
Follow the serial communication conditions (page 2-29). There are two ways to set it. Refer to "Items that can be set in the memory switch setting mode" on page 2-24 or "TM Printer Memory Switch Setup Utility" on page 4-7.

*Q: Drawer Kick does not operate properly.*

*A: Drawer specifications differ depending on the manufacturer and the part number.*

Refer to "Connecting to the Drawer" on page 3-9 and confirm connector pin assignments. Make sure that the specifications of the drawer to be used meet the following conditions before connecting it to the drawer kick-out connector. These conditions also apply to any other devices that use the drawer kick-out connector.  
Any devices that do not satisfy all the following conditions must not be used.

#### [Conditions]

- A load must be provided between drawer kick-out connector pins 4 and 2 or between pins 4 and 5. (\*1)
- When the drawer open/close signal is used, a switch must be provided between drawer kick-out connector pins 3 and 6. (\*2)
- The input current must be 1 A or less. (\*3)

#### NOTES

- (\*1) Operating the printer with incorrectly installed devices voids the warranty.
- (\*2) Connecting devices other than the drawer open/close switch voids the warranty.
- (\*3) Using with an input current of over 1A over current may cause a damage to the device.

Q: Unable to print a part of Page 0 (for example **ä, ü, ë**) in Visual Basic.

A: When programming with Visual Basic, limitations prevent data from 81h through 9Fh and E0h through FEh from being sent as characters. However, you can use the following procedure to send this data.

```
Dim Send_data(0) As Byte  
Send_data(0) = &h81 '1 byte of sending data  
MSComm1.Output = Send_data
```

Q: Does USB 2.0-compatible equipment accept the USB interface printer?

A: Yes, but note that the speed of communication between the USB2.0 equipment and the printer is "USB full speed mode."



**Note:**

USB2.0 defines three speeds: High speed (480 Mbps), Full speed (12 Mbps) and Low speed (1.5 Mbps). This printer supports only Full speed (12 Mbps) and Low speed (1.5 Mbps).lkLK



## Chapter 5

# ESC/POS Command-Related Information

This chapter introduces the printer operation settings that can be made with ESC/POS commands and their precautions.

### 5.1 TM Printer Operation Performed When Power Supply Switch is Disabled

When the power switch is disabled with the DIP switches (refer to “DIP Switch Settings” on page 2-21), the power switch is always on. In other words, the power of the TM printer is on when power is supplied, and is off when power is not supplied by the system.

When the power supply switch is disabled, the TM printer is reset by pressing the power switch more than 3 seconds. This is true for both recoverable and unrecoverable errors.

When the power supply switch is disabled, a software power off preparation process must be executed for the TM printer from the application before the power supply is turned off. When the power supply switch is disabled, main power does not turn off and the POWER LED flashes if a software power off process is executed.

\* Power off process: The TM printer stores the latest TM printer condition before power down. Refer to the ESC/POS Application Programming Guide for details.

#### 5.1.1 Power Supply Switch-Related User Operation List

	Power supply switch enabled	Power supply switch disabled
When you want to power on the TM	Press the power supply switch more than 1 second.	Power on the system power supply. Turn on the power breaker or outlet.
When you want to power off the TM	Press the power supply switch more than 3 seconds.	Execute the software power off process using a software command and wait until the POWER LED starts flashing. Then power off the system power supply.
When there is a power outage	The TM is powered off.	The TM is powered off.
When the power outage is over	The TM remains powered off. Press the power supply switch more than 1 second to turn the printer on.	The TM is powered on.
There is an unrecoverable error	Press the power supply switch more than 3 seconds to turn the power off; then turn the power on again.	Press the power supply switch over 3 seconds to reset the TM.

#### 5.1.2 Power Off Control by the Host

You can turn off the power of the TM printer from the application. When using the printer with the power switch disabled (DIP switch 1 on), turn off the printer by command before turning off the host. Power off control differs as follows according to the setting of the DIP switches.

### **5.1.2.1 When the Power Supply Switch is Enabled**

The TM printer is powered off when the power off command is sent from the application.

### **5.1.2.2 When the Power Supply Switch is Disabled**

When the power off command is sent from the application, the POWER LED of the TM printer flashes, and the printer waits for the system power to be turned off. (“Error (ERROR) LED” on page F-2.)



**Note:**

*While the printer is executing the power off process, do not reset the printer.*

---

## **5.2 Head Divided Control**

If a low capacity power supply is used, you can specify 2-4 head divided control and eliminate the power supply for part of the dots to save current consumption. (The default setting is 1 head divided control which supply power to all dots at the same time.)  
Print speed is slower if you increase the number of divisions.

ESC/POS commands allow you to change head divided control while printing. You can keep print speed by using the divided printing only when printing a high density area such as a logo.

---

## **5.3 Control After Paper Cut**

When command control is used for printing, feed paper more than 1 mm {16/406"} immediately after paper cutting, and then stop feeding. 1 mm {16/406"} is equivalent to about 8 dots. If paper is left unfed after cutting, a paper jam may occur in the autocutter at the next paper feed.

---

## **5.4 NV Memory**

The NV Memory of the printer can be roughly divided into 3 parts.

- Firmware program area
- NV memory area for product information. User cannot edit.
- NV memory area that user can access.

The following items are in the NV memory that the user can access.

- a) Memory switches  
(Msw1, Msw2, Msw8, Customize value such as the paper width and Serial communication conditions.)
- b) User NV memory
- c) NV graphics memory

- d) User defined code page (Page 255 (space page))
- e) Area of command default values specified by users

By changing those values, you can customize your printer.  
Note the following when writing to and erasing NV memory.

- ❑ The following restrictions apply when performing nonvolatile memory operations (including data store and delete).
  - The paper feed switch must not be used to feed paper.
  - No real time command can be executed.
  - The ASB status will not be sent, even when the ASB function in ESC/POS command is set to enable.
- ❑ The printer will sometimes enter the Busy state when data is being written to nonvolatile memory. It is important not to send data from the host computer while the printer is in the Busy state as it will be incapable of processing any received data.
- ❑ Frequent use of the functions for defining data to and deleting data from nonvolatile memory can damage the memory. As a rule, in using the various commands to write to NV memory, avoid writing more than an average of 10 times per day.

## **5.5 Customizing Printer**

You can customize your TM printer by changing memory switches and the command default value and saving the data onto the NV (nonvolatile) memory. Refer to the next section.

### **5.5.1 Printer initial setting up**

Printer initial setting up can be made by memory switches and character code page. Refer to page 2-23 for details of memory switches.

### **5.5.2 Changing command default values**

You can customize your TM by changing the command default value and save the data onto the nonvolatile memory.

### **5.5.3 Using the NV Memory**

There is free area in NV memory for user can use. You can use this free area as memo, write other character information or multipurpose. The data is enabled if you turn off the power. Refer to the "ESC/POS Application Programming Guide" how to read and write.

## **5.6 Printer Status**

There are three ways to get the printer status, and each method has the following features. Refer to the ESC/POS Application Guide for details.

- **Automatic status (ASB):**  
When processed as a normal command, the printer automatically transmits a status message whenever the status changes. It is always necessary to check the ASB status.
- **Real time status:**  
When the printer receives this command, it responds with the specified printer status. Reporting the printer status takes priority over any normal print data.
- **Status:**  
The printer transmits a specified printer status in the same way that it processes normal print data.

### **5.6.1 Hexadecimal Dump Mode**

TM printer can print the data transmitted from the host computer in hexadecimal numbers and in its corresponding characters. This is called hexadecimal dump mode, which allow you to make sure the transmission is correct by comparing the printed result with the programs.

Use the following procedure to output a hexadecimal dump.

1. With the roll paper cover open, press and hold down the FEED button to turn on the printer.
2. Close the roll paper cover.

Data received after this is printed in hexadecimal numbers and their corresponding characters.

3. When printing stops, turn off the power or press the FEED button three times or send a reset signal from the interface.



**Note:**

*Do not use this mode when using OPOS. To do so will cause continuous polling, ending in undesirable results.*





**Note:**

*Install the paper exit guide packed in the box with the printer when the autocutter is used with a full cut, positioning the printer horizontally. If the printer is installed horizontally without the paper exit guide and the autocutter full cut is used, a cut sheet may drop in the paper path and it may cause a double-cut, paper jam, or autocutter error. However, if the printer is installed vertically or if the autocutter is used with a partial cut, the paper exit guide does not have to be used.*

*Refer to "Instructions for Installation" on page 2-3 for information on how to attach the paper exit guide.*

*Partial cut or full cut is not controlled by a software command.*

*When using die cut labels, use care to cut between the labels. Cutting the label itself may require cleaning of the blade due to the label's bond adhesion.*

*The manual cutter in the autocutter unit is used to cut the receipt (paper thickness: approximately 75 mm) manually.*

*The cutting type (partial cut or full cut) must be selected before the printer is first used. If the cutting type is changed from partial cut to full cut after the printer has been used, the printer may not be reliable because the wear-out level of the cutter blade differs.*

### 6.1.2 TM-L90 peeler specification

<b>Print method</b>	Thermal line, 8 dots/mm × 8 dots/mm (203 dpi × 203 dpi)
<b>Print width</b>	80 mm (factory setting) or 38 to 70 mm can be set using a roll paper spacer
<b>Manual cutter specification</b>	With continuous issuing, it is possible to cut the paper by hand
<b>Possible thickness to be cut with a manual cutter</b>	100 μm or less
<b>Character sets</b>	95 alphanumeric, 37 international characters, Extended graphics 128 × 11 pages
<b>Interface (compatible)</b>	RS-232C / Bi-directional parallel Dealer option: USB, 10Base-T I/F, Ethernet
<b>Buffer</b>	Receive buffer: 4 KB/45 bytes
	User-defined buffer Downloaded bit image: Approximately 12KB (common for all models) User-defined characters: Approximately 11KB (for ANK/Multilingual model) Approximately 15KB (for Japanese model)
	Macro buffer: 2 KB
	Non-volatile graphics data buffer: 384 KB maximum User NV memory: 192 KB maximum Note) The combination of NV graphics data buffer and user NV memory is determined by the memory switch. Contact us for the details.
	Page mode area: 106 KB
<b>D.K.D. function</b>	2 drives
<b>Power Supply</b>	Power supplied by AC adapter PS-180 (option)
<b>Operating Voltage</b>	DC24 V ± 7%
<b>Current consumption</b>	<Single-/Two-color printing> Average: Approximately 1.7 A (Character font α-N, 42-column printing) Peak: Approximately 7.7 A Standby: Approximately 0.1 A
<b>Temperature</b>	Operating: 5 to 45 °C {41 to 113 °F} Storage: -10 to 50 °C {14 to 122 °F}
<b>Humidity</b>	10 to 90%
<b>Weight (mass)</b>	Approximately 1.9 kg {4.19 lb}

## 6.2 Print Specifications

Item	Specifications	
Printing method	Thermal line printing	
Dot density	0.125 mm/dot x 0.125 mm/dot (203 dpi x 203 dpi) (dpi: dots per 25.4 mm {1"})	
Printing direction	Unidirectional with friction feed	
Paper width	80mm (79.5±0.5mm) 60mm (59.5±0.5mm) 38mm (37.5±0.5mm)	
Maximum printable area	72 mm {2.83"}, 576 dot positions (when the paper width is 80 mm)	
Characters per line	Font	Characters per line (with 80 mm paper width )
	Font A 12 × 24	48
	Font B 10 × 24	57
	Font C 8 × 16	72
	Kanji 24 × 24	24
	Kanji 20 × 24	28
	Kanji 16 × 16	36
(Default setting is font A.)		
Print Speed	<Normal printing> (default setting) 120 mm/s {4.72"} maximum <High speed printing> (selected with the memory switch) 150 mm/s {5.91"} maximum (The high speed printing can be selected when the specified paper is used.) <Ladder bar code, two-dimensional code printing> 90 mm/s {2.76"} maximum <Two-color printing mode> 90 mm/s {2.76"} maximum	
Carriage return width	3.75 mm {0.15"} Programmable by control command.	



**Note:**

The print speed listed above is the value when the printer prints with the default print density level at 24 V and 25 °C. The print speed may be changed automatically with the condition of the supply voltage or the head temperature.

Printing speed may be slower depending on the data transmission speed and the combination of control commands.

## 6.3 Reliability

### 6.3.1 TM-L90

Life	When printing labels (face stock) with the ENTLA series (in monochrome mode)	1,000,000 labels issued (When the length of the label in the paper feeding direction is 25.4 mm {1"} through 63.5 mm {2.5"}. The value above corresponds to approximately 30 km to 70 km {18.64 to 43.5 miles} of running length. When printing labels whose length exceeds 63.5 mm, the label-issuing life is 70 km {43.5 miles} of running length.)
	When issuing receipts (thickness type) of the ENTPE series (in monochrome mode)	10,000,000 lines printed (3.75 mm {0.15"} for one line) (The value above is calculated based on the printer using 15-line feeding and 10-line printing repeatedly with a 145 µm paper thickness. The value above corresponds to approximately 60 km {37.28 miles} of running length.)
	When printing receipts with the ENTPD series (in monochrome mode)	20,000,000 lines printed (3.75 mm {0.15"} for one line) (The value above is calculated based on the printer using 15-line feeding and 10-line printing repeatedly with 75 µm of paper thickness. The value above corresponds to approximately 120 km {74.57 miles} of running length.)
	When printing labels (face stock) with the ENTLB series (in two-color mode)	500,000 labels issued (When the length of the label in the paper feed direction is 25.4 mm {1"} through 63.5 mm {2.5"}. The value above corresponds to approximately 15 km to 35 km {9.32 to 21.75 miles} of running length.)
	When printing receipts with the ENTPC series (in two-color mode)	10,000,000 lines printed (3.75 mm {0.15"} for one line) (The value above is calculated based on the printer using 15-line feeding and 10-line printing repeatedly. The value above corresponds to approximately 60 km {37.28 miles} of running length.)
	Thermal head	150 million pulses
	Autocutter	When cutting receipts: 2,000,000 cuts (except for KF50, when the paper thickness is less than 75 µm) 1,200,000 cuts (for KF50 (KANZAN)) 1,000,000 cuts (when the paper thickness is more than 75 µm and less than 145 µm) When cutting labels: 1,000,000 cuts (Cutting between the labels) 500,000 cuts (Cutting labels not die-cut. 1,000,000-cut is available by cleaning the blade.) Note:When cutting die cut labels, cut between the labels.
MTBF	360,000 hours (when printing receipts with the ENTPD series in monochrome) (Failure is defined as a random failure occurring during the random failure period.)	
MCBF	70,000,000 lines printed (when printing receipts with the ENTPD series in monochrome. This is an average failure interval based on failures relating to wear out and random failures up to the life of 20,000,000 lines printed.)	

Vibration resistance		<p>When packed: Frequency: 5 to 55 Hz  Acceleration: Approximately 19.6 m/s<sup>2</sup> {2 G}  Sweep: 10 minutes (half cycle)  Duration: 1 hour  Directions: x, y, and z</p> <p>No external or internal damage should be found after the vibration test, and the unit should operate normally.</p>
Impact resistance		<p>When packed: Package: EPSON standard package  Height: 60 cm {23.62"}  Directions: 1 corner, 3 edges, and 6 surfaces</p> <p>No external or internal damage should be found after the drop test, and the unit should operate normally.</p> <p>When unpacked: Height: 5 cm {1.97"}  Directions: Lift one edge and release it (for all 4 edges).</p> <p>When the printer is not printing, no external or internal damage should be found after the drop test.</p>
Acoustic noise (operating)		<p>Approximately 53 dB (ANSI bystander position)</p> <p>NOTE: The value as shown above is measured when the EPSON evaluation printing pattern is used. This value may be different, depending on the paper to be printed, the print duty, or the print conditions, such as the print speed or the print density.</p>

*The values in the above table are based on use of EPSON specified paper.*

### 6.3.2 TM-L90 peeler specification

Life	Labels (single color)	Issues 1,000,000 labels (With feed direction label length of 25.4 {1 inch} to 63.5 mm {2.5 inch}. Equivalent to a travel distance of about 30 to 70 km. When printing labels in excess of 63.5 mm, product lifetime in number of labels comes after a travel distance of 70 km)
	Receipts (single color)	20,000,000 lines printed (with 1 line at 3.75 mm) (Assuming repeated printing of 10 lines with paper thickness of 75 µm or less and 15 line feed. Equivalent to a travel distance of about 120 km)
	Labels (2- color)	Issues 500,000 labels (With feed direction label length of 25.4 {1 inch} to 63.5 mm {2.5 inch}. Equivalent to a travel distance of about 15 to 35 km)
	Receipts (2- color)	10,000,000 lines printed (with 1 line at 3.75 mm) (Assuming repeated printing of 10 lines with 15 line feed. Equivalent to a travel distance of about 60 km)
	Thermal head	150 million pulses
MTBF		360,000 hours (Using receipts (single color) during the product lifetime. Failure means random failure in the random failure period)
MCBF		70,000,000 lines printed (Using receipts (single color) during the product lifetime. Indicates the overall mean time between failures including wear-out failure and random failure up to product lifetime of 20 million lines printed)
Vibration resistance		When packed: Frequency: 5 to 55 Hz Acceleration: Approximately 19.6 m/s <sup>2</sup> {2 G} Sweep: 10 minutes (half cycle) Duration: 1 hour Directions: x, y, and z No external or internal damage should be found after the vibration test, and the unit should operate normally.
Impact resistance		When packed: Package: EPSON standard package Height: 60 cm {23.62"} Directions: 1 corner, 3 edges, and 6 surfaces No external or internal damage should be found after the drop test, and the unit should operate normally. When unpacked: Height: 5 cm {1.97"} Directions: Lift one edge and release it (for all 4 edges). When the printer is not printing, no external or internal damage should be found after the drop test.
Acoustic noise (operating)		Approximately 53 dB (ANSI bystander position) NOTE: The value as shown above is measured when the EPSON evaluation printing pattern is used. This value may be different, depending on the paper to be printed, the print duty, or the print conditions, such as the print speed or the print density.

The values in the above table are based on use of EPSON specified paper.

Depending on the paper, paper dust and adhesive may stick to the platen, head, and peeler unit.

## 6.4 Character Specifications

### Character Specifications

Item		Specifications
Character type	Alphanumeric	95 characters
	International	37 types
	Extended graphics	128 characters × 11 pages (including 1 blank page)
	JIS (JISX0208-1990)	6879 characters
	Special font	845 characters  <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">                     JIS code                      2D-21 to 2D-7E                      79-21 to 7C-7E                 </div> <div style="width: 45%;">                     Shift JIS code                      87-40 to 87-9D                      ED-40 to EE-FC                      FA-40 to FC-4E                 </div> </div>
Character configuration		See "Character Configurations and Dimensions" table. (Default is Font A.)
Character dimensions		See "Character Configurations and Dimensions" table. (Spaces between characters not included.)

### Character Configurations and Dimensions

	Standard	Double-height	Double-width	Double-width / Double-height
	W × H (mm)	W × H (mm)	W × H (mm)	W × H (mm)
Font A 12 × 24	1.50 × 3.0	1.50 × 6.0	3.0 × 3.0	3.0 × 6.0
Font B 10 × 24	1.25 × 3.0	1.25 × 6.0	2.5 × 3.0	2.5 × 6.0
Font C 8 × 16	1.0 × 2.0	1.0 × 4.0	2.0 × 2.0	2.0 × 4.0
Kanji 24 × 24	3.0 × 3.0	3.0 × 6.0	6.0 × 3.0	6.0 × 6.0
Kanji 20 × 24	2.5 × 3.0	2.5 × 6.0	5.0 × 3.0	5.0 × 6.0
Kanji 16 × 16	2.0 × 2.0	2.0 × 4.0	4.0 × 2.0	4.0 × 4.0

The actual print character is smaller than the size shown in the table above, because the above size includes spaces in the font.

Characters can be scaled up to 64 times as large as the standard size.

Character size not including the horizontal spacing in the standard scale is as follows:

Font A (12 × 24): 1.25 (W) × 3.0 (H) mm  
 Font B (9 × 17): 0.88 (W) × 2.13 (H) mm

## 6.5 Paper Feed Specifications

Item	Specifications
Paper feed method	Friction feed
Paper feed direction	Single-direction

### 6.5.1 Precautions for Printing and Paper Feed

- ❑ Being a line printer, this printer always feeds paper to print. Therefore, when the line spacing of a single line is set to less than that of the print data, paper may be fed more than the setting to print.  
For example, when the line spacing of a single line is set to 10 dots, paper feed of 10 dots is executed to only make a carriage return, but paper feed of 24 dots is executed to print a bit image. (See the following table.)

#### *Paper feed*

		Necessary paper feed (dots)
Standard character	Font A	24 × vertical magnification
	Font B	24 × vertical magnification
	Font C	16 × vertical magnification
Rotatable character	Font A	12 × vertical magnification
	Font B	10 × vertical magnification
	Font C	8 × vertical magnification
Bit image		24 × vertical magnification

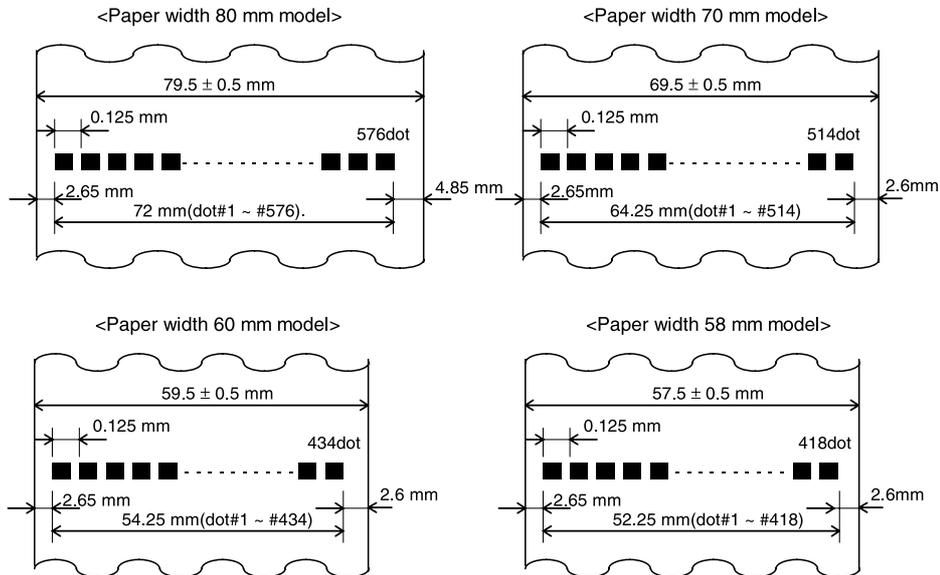
- ❑ When the printer is placed in the wait state for data from the host during printing, it temporarily stops printing and paper feed. When data is entered and printing restarts, paper feed may be disturbed between 1 to 3 dot lines at a print start. This especially affects the printing of a bit image.
- ❑ It is recommended to start autocutter operation after printing or paper feed of 10 or more lines. (This is because a small piece of cut paper is difficult to eject and may cause a paper jam.)

## 6.6 Paper Specifications

Refer to “Consumable Specifications” on page B-1.

## 6.7 Printing Area

### 6.7.1 Thermal Paper



Printable Area (For Thermal Paper)



**Note:**

The printable area may be out of alignment by 2 mm {0.08"} maximum (left or right), due to the paper position or tolerance of parts. Therefore, the print area must be set in the range of more than 2 mm from the edges of the paper. To make the margin for both sides safely, it is recommended to set a margin of 2.6 mm {0.1"} or more, as shown in figure above.

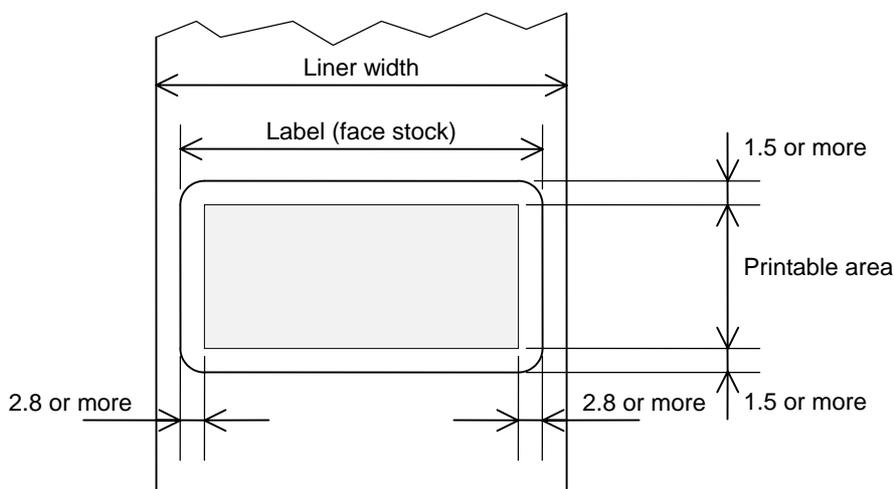
Paper Width and Printable Area

Paper width (mm)	(80)	(70)	(65)	(60)	(58)	(50)	(45)	(38)
Printable area (mm)	72	64	59	54	52	44	39	32
Left margin (mm)	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
Right margin (mm)	4.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85
Positioning dot number	1-576	1-512	1-472	1-432	1-416	1-352	1-312	1-256
Total number of dots	576	512	472	432	416	352	312	256

Numeric values used above table are center values in designing. Paper width is only for nominal dimension. The values in parentheses are the maximum value for the paper tolerance.

### 6.7.2 Label

Allow 2.8 mm or more from the left and right edges, and 1.5 mm or more from the top and bottom edges for the printable area.



[Units: mm]

Printable Area (for Label)



**Note:**

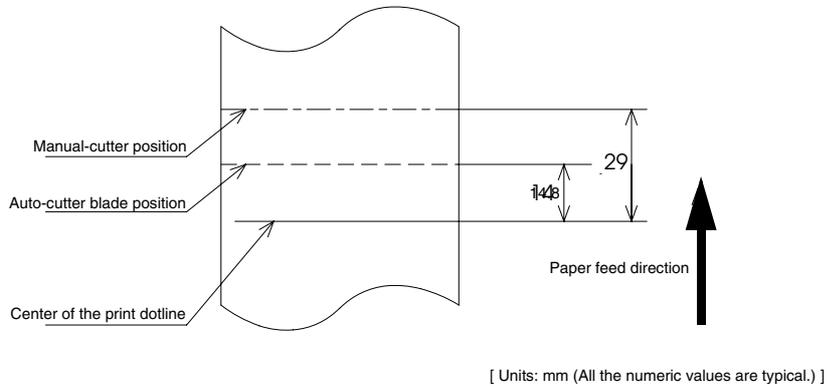
If the margins are not set, the printing may be off the label due to paper misalignment or the part tolerance.

Liner width (mm)	(80)	(70)	(60)	(50)	(45)	(38)
Label (face stock) width (mm)	76	66	56	46	41	34
Printable area (mm)	70	60	50	40	35	28
Left margin (mm)	2.9	2.9	2.9	2.9	2.9	2.9
Right margin (mm)	3.1	3.1	3.1	3.1	3.1	3.1
Positioning dot number	17 - 576	17 - 496	17 - 416	17 - 336	17 - 296	17 - 240
Total number of dots	560	480	400	320	280	224

The label must be positioned in the center of the liner. Numeric values used above table are center values in designing. Paper width is only for nominal dimension. The values in parenthesis are the maximum value for the paper tolerance.

## 6.8 Printing Position in Relation to Cutter Position (TM-L90)

The TM-L90 printing position and cutter positions are shown in the following figure.



Printing Position in Relation to Cutter Position



### Note:

The values in the figure are central values. Slackness and differences in paper type can result in differences developing between central values and cutter paper cut position. It is important to allow for a certain margin of error when setting cutter paper cut position.

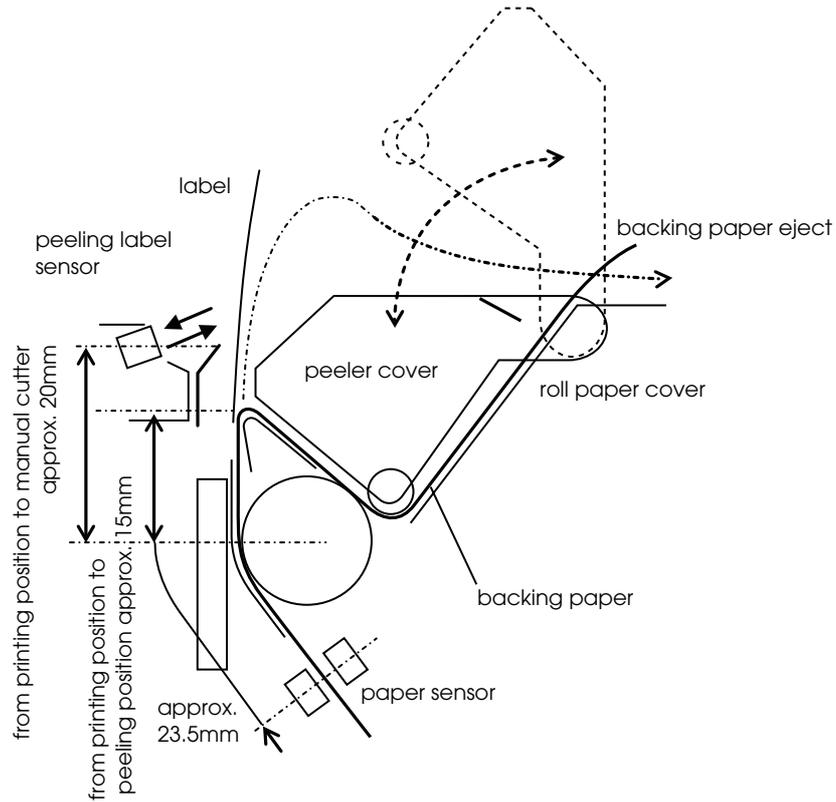
When operating using the ESC/POS commands, some paper-related commands allow you to feed paper backward after an autocut.

- Back feed maximum amount

Receipt (without black mark):	Approximately 11.5 mm (back feed amount is fixed)
Receipt (with black mark):	Approximately 10.5 mm
Die cut label (without black mark):	Approximately 10.5 mm
Die cut label (with black mark):	Approximately 10.5 mm
Label (no die cut) (without black mark):	Approximately 11.5 mm (back feed amount is fixed)

## 6.9 Printing Position, Peeling Position, Manual Cutter Position (TM-L90 Peeler Specification)

The TM-L90 peeler specification printing position, peeling position and manual cutter positions are shown in the following figure.



Printing Position in Relation to Cutter Position

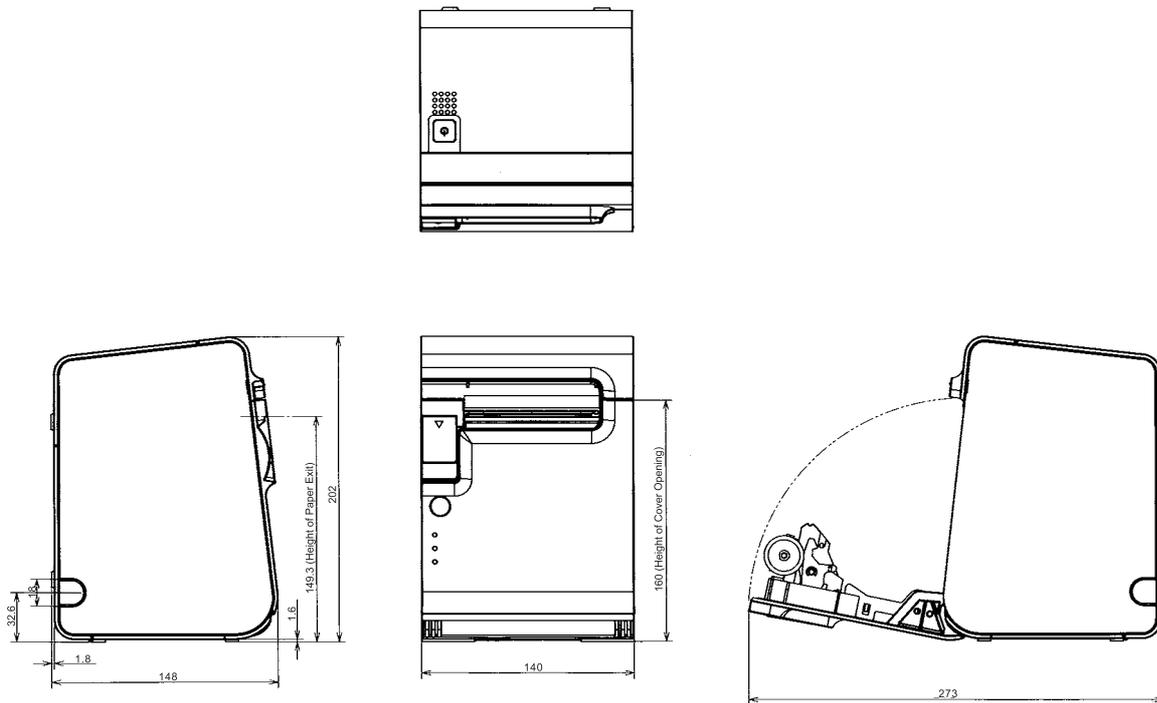
 **Note:**

The values in the figure above are design center values, and since the paper may be warped or irregular, allow a sufficient margin when setting the cutting position of the manual cutter.

## 6.10 Overview of External Dimensions

- ❑ Height: 203 mm
- ❑ Width: 140 mm
- ❑ Depth: 148 mm
- ❑ Weight: Approximately 1.9 kg (without roll paper)

External view (TM-L90)

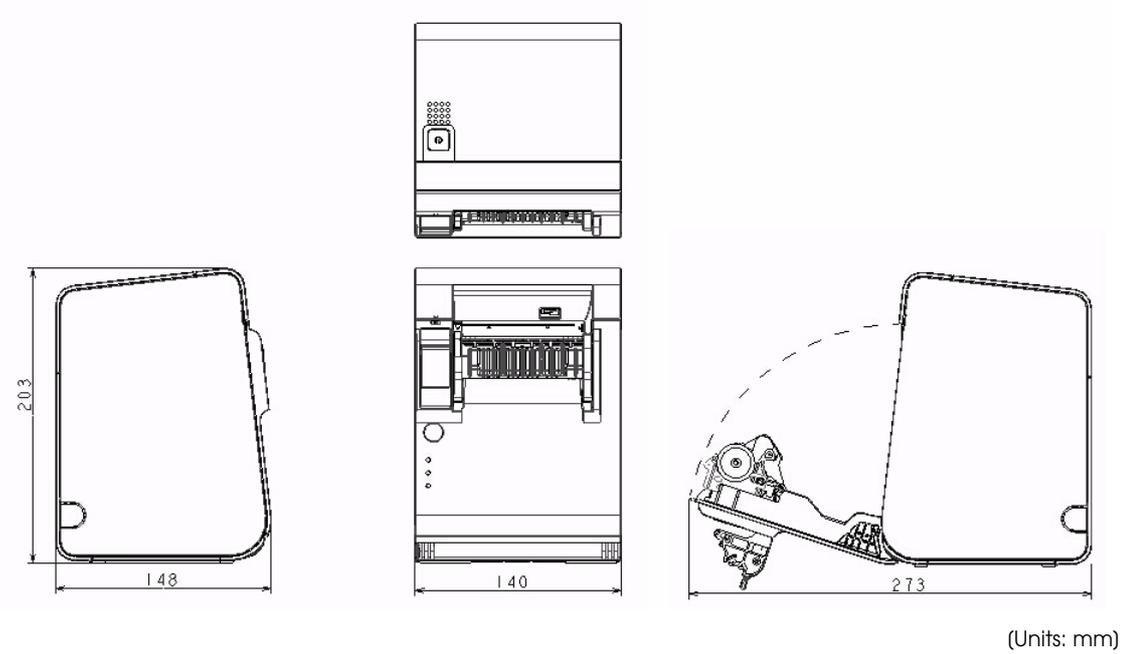


Note 1) The values in the above dimensional drawing are reference values. They are not guaranteed ones.

(Units: mm)

*External Appearance (TM-L90)*

External view (TM-L90 Peeler Specification)



External Appearance (TM-L90 Peeler Specification)

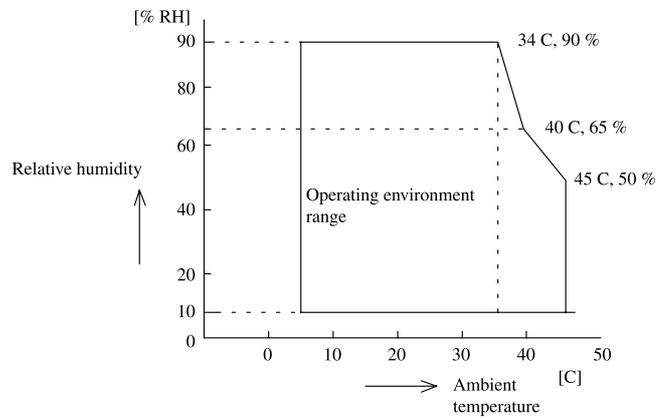


**Note:**

As the printer is partly made of coated steel-faced plate, the edges of it may rust. However, it doesn't affect performance of the printer.

### 6.10.1 Operating specifications

Item		Specifications
Temperature	When printing	5 to 45 °C {41 to 113 °F}
	During storage	-10 to 50 °C {14 to 122 °F} (except for paper)
Humidity	When printing	10 to 90% RH
	During storage	10 to 90% RH (except for paper)



## Appendix A

# Interface And Connectors

### A.1 RS-232 Serial Interface

#### A.1.1 Interface board specifications (RS-232 standard)

Item		Specifications
Data transfer method		Serial
Synchronization		Asynchronous
Handshake		Select one of the following using DIP switch 3 or the memory switches (switch operation/command (operation)). <input type="checkbox"/> DTR/DSR <input type="checkbox"/> XON/XOFF
Signal level	MARK	-3 V to -15 V logic "1" /On
	SPACE	+3 V to +15 V logic "0" /Off
Bit length		Select one of the following using DIP switch 4 or the memory switches (switch operation/command (operation)). <input type="checkbox"/> 7 bit <input type="checkbox"/> 8 bit
Baud rate		Select one of the following using DIP switches 7/8 or the memory switches (switch operation/command (operation)). <input type="checkbox"/> 115200 bps (can be set only using the memory switches) <input type="checkbox"/> 57600 bps (can be set only using the memory switches) <input type="checkbox"/> 38400 bps (can be set only using the memory switches) <input type="checkbox"/> 19200 bps <input type="checkbox"/> 9600 bps <input type="checkbox"/> 4800 bps <input type="checkbox"/> 2400 bps (bps: bits per second)
Parity check		Select one of the following using DIP switch 5 or the memory switches (switch operation/command (operation)). <input type="checkbox"/> Yes <input type="checkbox"/> No
Parity selection		Select one of the following using DIP switch 6 or the memory switches (switch operation/command (operation)). <input type="checkbox"/> Even <input type="checkbox"/> Odd
Stop bit		1 or more bits However, the stop bit of the transfer data from the printer is fixed at 1 bit.
Connector	Printer side	Dsub-25pin (female) connector

### A.1.2 Functions of each connector pin

Pin no.	Signal name	Signal direction	Function
1	FG	-	Frame ground
2	TXD	Output	Transfer data
3	RXD	Input	Reception data
4	RTS	Output	Memory Switch Msw 1-6 OFF: Same as DTR signal (Pin 20) Memory Switch Msw 1-6 ON: Logical product of DTR signals of DM-D and TM (If both are SPACE, the printer can receive data (SPACE).)
6	DSR	Input	This signal indicates whether the host computer can receive data. SPACE indicates that the host computer can receive data, and MARK indicates that the host computer cannot receive data. When DTR/DSR control is selected, the printer transmits data after confirming this signal.(Except as transmitted using some ESC/POS commands) When XON/XOFF control is selected, the printer does not check this signal. Changing the memory switch 1-7 setting enables this signal to be used as a reset signal for the printer. The printer is reset when the signal remains MARK for 1 ms or more.
7	SG	-	Signal ground
20	DTR	Output	1) When DTR/DSR control is selected, this signal indicates whether the printer is busy. SPACE indicates that the printer is ready to receive data, and MARK indicates that the printer is busy. The busy condition can be changed by using memory switch 1-3. (Refer to "Busy state" on page 4-9) 2) When XON/XOFF control is selected: The signal indicates whether the printer is correctly connected and is ready to receive data. SPACE indicates that the printer is ready to receive data. The signal is always SPACE except in the following cases: <ul style="list-style-type: none"> <li>• During the period from when the power is turned on to when the printer is ready to receive data.</li> <li>• During the self test</li> </ul>
25	INIT	Input	Changing the memory switch 1-8 setting enables this signal to be used as a reset signal for the printer. The printer is reset when the signal remains SPACE for 1 ms or more.

### A.1.3 XON/XOFF

When XON/XOFF control is selected, the printer transmits XON or XOFF signals as follows. Transmit timing differs depending on the memory switch 1-3 setting.

Signal	Printer status	Memory Switch 1-3	
		1(ON)	0(OFF)
XON	1) When the printer goes online after turning on the power (or reset using interface)	Transmit	Transmit
	2) When the receive buffer is released from the buffer full state	Transmit	Transmit
	3) When the printer switches from offline to online	-	Transmit
	4) When the printer recovers from an error using some ESC/POS commands.	-	Transmit
XOFF	5) When the receive buffer becomes full	Transmit	Transmit
	6) When the printer switches from online to offline	-	Transmit

### A.1.4 Code

The XON/XOFF codes are shown below.

❑ XON code: <11>H

❑ XOFF code: <13>H



**Note:**

*When the printer goes from offline to online mode and the receive buffer is full, XON is not transferred.*

*When the printer goes from online to offline mode and the receive buffer is full, XOFF is not transferred.*

*When memory switch Msw 1-3 is off, XON is not transferred as long as the printer is offline even if a receive buffer full state has been cleared.*

## **A.2 IEEE1284 Parallel Interface**

### **A.2.1 Mode**

The IEEE1284 parallel interface is comprised of the following two modes.

<b>Mode</b>	<b>Communication direction</b>	<b>Other information</b>
Compatibility Mode	Host → printer communication	Centronics standard
Reverse Mode	Printer → host communication	Assumes a data transfer from an asynchronous printer.

#### Compatibility Mode

Compatibility Mode is Data Transmission from Host to Printer: Centronics compatible.

#### Specifications

- Data transmission:8-bit Parallel
- Synchronization: Externally supplied n\*Strobe signals
- Handshaking: n\*Ack and Busy signals
- Signal levels: TTL compatible
- Connector: ADS-B36BLFDR176 (HONDA) or equivalent (IEEE 1284 Type B)
- Reverse communication (Printer Host):Nibble or Byte Mode

\* n before the signal name indicates active LOW.

#### Reverse Mode

The status data transmission from the printer to the host proceeds in the Nibble or Byte mode.

This mode allows data transmission from the asynchronous printer under the control of the host.

Data transmissions in the Nibble Mode are made via the existing control lines in units of four bits (Nibble). In the Byte Mode, data transmissions proceed by making the eight-bits data lines bidirectional.

Both modes fail to proceed concurrently with the Compatibility Mode, thereby causing half duplex transmission.

## A.2.2 Interface Signals

### Connector Pin Assignment

Pin	Source	Compatibility Mode	Nibble Mode	Byte Mode
1	Host	nStrobe	HostClk	HostClk
2	Host/Ptr	Data0(LSB)	Data0(LSB)	Data0(LSB)
3	Host/Ptr	Data1	Data1	Data1
4	Host/Ptr	Data2	Data2	Data2
5	Host/Ptr	Data3	Data3	Data3
6	Host/Ptr	Data4	Data4	Data4
7	Host/Ptr	Data5	Data5	Data5
8	Host/Ptr	Data6	Data6	Data6
9	Host/Ptr	Data7(MSB)	Data7(MSB)	Data7(MSB)
10	Printer	nAck	PtrClk	PtrClk
11	Printer	Busy	PtrBusy/Data3,7	PtrBusy
12	Printer	Perror	AckDataReq/Data2,6	AckDataReq
13	Printer	Select	Xflag/Data1,5	Xflug
14	Host	nAutoFd	HostBusy k	HostBusy
15		NC	ND	ND
16		GND	GND	GND
17		FG	FG	FG
18	Printer	Logic-H	Logic-H	Logic-H
19		GND	GND	GND
20		GND	GND	GND
21		GND	GND	GND
22		GND	GND	GND
23		GND	GND	GND
24		GND	GND	GND
25		GND	GND	GND
26		GND	GND	GND
27		GND	GND	GND
28		GND	GND	GND
29		GND	GND	GND
30		GND	GND	GND
31	Host	nInit	nInit	nInit
32	Printer	nFault	nDataAvail/Data0,4	nDataAvail
33		GND	ND	ND
34	Printer	DK_STATUS	ND	ND
35	Printer	+5V	ND	ND
36	Host	nSelectIn	1284-Active	1284-Active

\*NC : None Connect

ND : Not Defined



**Note:**

*A signal name prefixed by "n" indicates an "L" active signal.*

*Bidirectional communications cannot take place unless all signal names for both sides correspond to each other.*

*Connect all signal lines using twisted pair cables. Connect the return side to the signal ground level.*

*Make sure that the signals satisfy electrical characteristics.*

*Set the leading edge and trailing edge times to 0.5  $\mu$ s or less.*

*Do not ignore nAck or BUSY signals during a data transfer. Ignoring such signals may result in data corruption.*

*Make the interface cables as short as possible.*

## Appendix B

# Consumable Specifications

This chapter includes information on receipt roll paper and label roll paper.

For information on TM-L90 paper, see below. For information on TM-L90 peeler specification paper, refer to "TM-L90 with Peeler Roll Paper" on page B-13

### B.1 TM-L90 Roll Paper

This printer can use receipt roll paper and label roll paper with the following roll paper specifications:

Paper type	Thermal paper <ul style="list-style-type: none"> <li>• Receipt paper</li> <li>• Die-cut label paper</li> <li>• Continuous label paper</li> </ul>
Form	Roll paper
Paper width	<ul style="list-style-type: none"> <li>• <math>79.5 \pm 0.5</math> mm {<math>3.13 \pm 0.02</math>"}</li> <li>• <math>37.5 \pm 0.5</math> mm ~ <math>59.5 \pm 0.5</math> mm {<math>1.48 \pm 0.02</math> ~ <math>2.34 \pm 0.02</math>"}</li> </ul>
Take-up roll paper width	<ul style="list-style-type: none"> <li>• <math>80 + 0.5/-1.0</math> mm {<math>3.15 + 0.02/-0.04</math>"}</li> <li>• <math>38 \sim 70</math> mm <math>+0.5/-1.0</math> mm {<math>1.5 \sim 2.76 +0.02/-0.04</math>"}</li> </ul>
Roll paper spool diameter (inside)	<ul style="list-style-type: none"> <li>• Receipt paper: 12 {0.47"} mm or more (*)</li> <li>• Die-cut label paper: 25.4 mm {1"} or more</li> <li>• Continuous label paper: 12 {0.47"} mm or more (*)</li> </ul>
Roll direction	Printed side must face outside. Be sure that roll paper does not have any cuts or tears at any place in the roll.
Roll end position	Paper must not be pasted to the roll paper spool.
Outside diameter	Outside roll paper diameter: Maximum 90 mm {3.54"}

(\*) Using roll paper with an inside diameter of 25.4 mm {1"} or less may decrease the detection accuracy of the roll paper near-end sensor.

#### B.1.1 Receipt Roll Paper

The printer can use the following receipt paper:

- Receipt thermal paper with a thickness of 145  $\mu$ m or less
- Receipt thermal paper with a thickness of 62 ~ 75  $\mu$ m

### B.1.1.1 Specified Receipt Roll Paper

Epson provides the following:

Roll paper type no.	Printing method	Paper width	Length	Rolls/box	Other
NTP080-80	Thermal	80mm {3.15"}	Approx. 78m {3070.87 "}	3 rolls	--
NTP060-80	Thermal	60mm {2.36"}	Approx. 78m {3070.87 "}	3 rolls	Warranty period: 5 years with 20 degrees, humidity 60%
NTP080-ATG	Thermal	80mm {3.15"}	Approx. 39m {1535.43"}	3 rolls	Paper thickness: 0.145mm {0.0057"}
NTP080-RB	Thermal (two-color)	80mm {3.15"}	Approx. 80m {3149.61"}	3 rolls	Paper for two-color printing



**Note:**

The TM-L90 can use thermal roll paper with width of 38 ~ 70 mm or roll paper with width of 80 mm.

For two-color thermal roll paper, page B-23.

### B.1.1.2 Specified Original Roll Paper

The following original roll paper can be used:

The type number with (\*) indicates that it is used for specified roll paper.

❑ Single-color thermal roll paper type no.:

(*) TF50KS-E (paper thickness: 65 µm)	Nippon Paper Industries Co., Ltd.
(*) TF11KS-ET (paper thickness: 145 µm)	Nippon Paper Industries Co., Ltd.
TF60KS-E (paper thickness: 75 µm)	Nippon Paper Industries Co., Ltd.
PD160R (paper thickness: 75 µm)	Oji Paper Mfg. Co., Ltd.
P350 (paper thickness: 62 µm)	Kanzaki Specialty Paper (USA)
F5041 (paper thickness: 60 µm)	Mitsubishi HiTec Paper Flensburg GmbH (Germany)
KF50 (paper thickness: 62 µm)	KANZAN Spezialpapiere GmbH (Germany)

❑ Two-color thermal roll paper type no.:

(*) PD750R (paper thickness: 75 µm)	Oji Paper Mfg. Co., Ltd.
-------------------------------------	--------------------------



**Note:**

If specified original roll paper is not used, the thermal head may be damaged due to friction depending on paper.

### B.1.1.3 Print Density Adjustment

For best print quality and reliability, select the proper print density for the paper type used as described in the table below. If printing is performed with a density that exceeds the density described in the table below, the reliability ("TM-L90" on page 6-5) is not guaranteed. Print density can be set with a software command.

Roll paper type no.	Original paper no.	Density level
--	P350	90%
--	KF50	95%
NTP080-80, NTP060-80, NTP080-RB	TF60KS-E, TF50KS-EY, PD750R, F5041	100%
NTP080-ATG	PD160R, TF11KS-ET	105%

### B.1.1.4 Paper to Use for High Speed

If any of the following original paper types of receipt roll paper is used, the memory switch for the customized value setting can be used to set a maximum print speed up to 150 mm/s {5.91"/s} (level 9):

- TF60KS-E
- PD160R
- TF50KS-E
- P350
- F5041
- KF50

**B.1.1.5 In case that paper other than the specified original paper is used**

If the paper other than the specified original paper is used, confirm whether the paper meets the requirements for the thickness, the peeling strength, and the transparency rates.

**B.1.1.6 Requirements for Black Mark Position for Receipt Paper**

When manufacturing receipt paper with black marks, be sure to make paper that meets the following requirements.

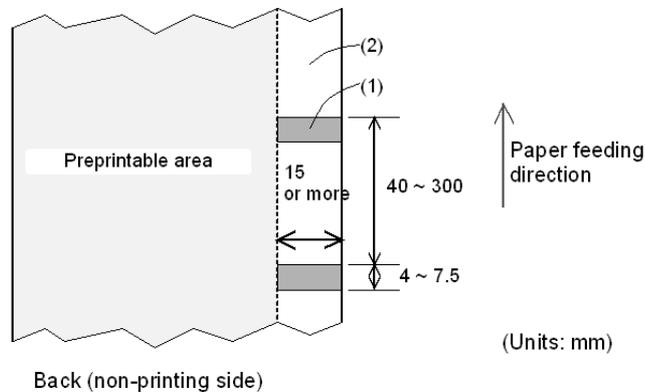
The reflecting rates of black mark portions (1) and non black mark portions (2) must meet the combinations shown in the table below:

- ❑ Black mark length in vertical: 4 ~ 7.5 mm {0.157~ 0.295"}
- ❑ Black mark position: Any places

Reflecting rate of black mark portion (1)	17%	16%	15%	14%	13%	Less
Reflecting rate of the portion where the black mark does not exist (2)	90%	85%	80%	75%	70%	More

NOTE: Reflecting rates are measured by the Macbeth PCM-II (Filter D) meter.

Paper without intervals between labels, such as continuous label paper, paper with perforated lines between labels, and paper with slits between labels, can also be used under the same requirements.

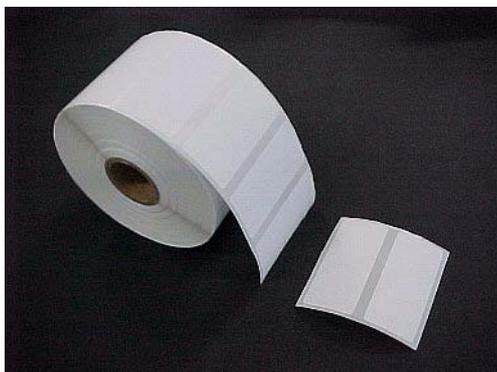


*Black Mark Interval Requirement*

## B.1.2 Die-Cut Label Roll Paper

### B.1.2.1 Die-Cut Label Paper

Die-cut label paper is shown below.



Example of transparency label roll paper

Features:

- Paper layout can be set automatically ("Memory Switch Functions" on page 2-35)
- Paper layout can be set manually ("Memory Switch Functions" on page 2-35)
- Transparency label roll paper or label roll paper with black marks can be used.

### B.1.2.2 Specified Die-Cut Label Roll Paper Specifications

Epson provides the following:

Roll paper type no.	Printing method	Paper width	Length	Rolls/box	Other
NTL080-901	Thermal label	80mm {3.15"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 1310 labels/roll Label size: 76mm(W) × 25.4mm(H)
NTL080-902	Thermal label	80mm {3.15"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 710 labels/roll Label size: 76mm(W) × 50.8mm(H)
NTL080-903	Thermal label	80mm {3.15"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 490 labels/roll Label size: 76mm(W) × 76.2mm(H)
NTL080-904	Thermal label	80mm {3.15"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 370 labels/roll Label size: 76mm(W) × 101.6mm(H)
NTL060-901	Thermal label	60mm {2.36"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 1310 labels/roll Label size: 56mm(W) × 25.4mm(H)
NTL060-902	Thermal label	60mm {2.36"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 710 labels/roll Label size: 56mm(W) × 50.8mm(H)
NTL060-903	Thermal label	60mm {2.36"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 490 labels/roll Label size: 56mm(W) × 76.2mm(H)
NTL060-904	Thermal label	60mm {2.36"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 370 labels/roll Label size: 56mm(W) × 101.6mm(H)
NTL038-901	Thermal label	38mm {1.50"}	Approx. 40m {1574.8"}	3 rolls	Number of labels: Approx. 1310 labels/roll Label size: 34mm(W) × 25.4mm(H)



**Note:**

The TM-L90 can use thermal roll paper with width of 38 ~ 70 mm or roll paper with width of 80 mm.

For two-color thermal roll paper, "Notes on Two-Color Paper Handling" on page B-23.

If solid printing or outline character printing on a label is executed, the print quality may be decreased.

**B.1.2.3 Specified Original Paper**

Use the following original paper types for die-cut label roll paper:

The type number with (\*) indicates that it is used for specified die-cut label roll paper.

- ❑ Single-color thermal label paper type no.:

(\*)HD-75                                      Nippon Paper Industries Co., Ltd.

150HA                                         Richo Co., Ltd.

- ❑ Two-color thermal label paper type no.:

BR21                                         OJITAC Co., Ltd.

**B.1.2.4 Print Density Adjustment**

For best print quality and reliability, select the proper print density for the paper type used as described in the table below. If printing is performed with a density that exceeds the density described in the table below, the reliability ("TM-L90" on page 6-5) is not guaranteed. Print density can be set with a software command.

Original paper no.	Original roll paper no.	Density level
NTL series	HD75	130%
--	150HA	120%

**B.1.2.5 Paper to Use for High Speed**

If any of the following original paper types of thermal paper are used, the memory switch for the customized value setting can be used to set the maximum print speed up to 150 mm/s {5.91"/s} (level 9):

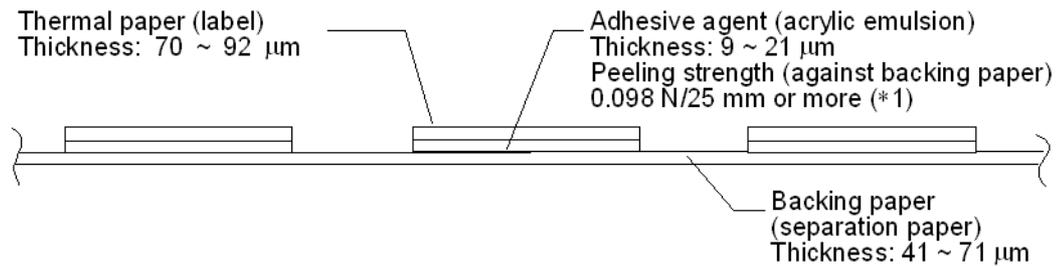
- ❑ HD-75, 150HA

**B.1.2.6 In case that paper other than the specified original paper is used**

If the paper other than the specified original paper is used, confirm whether the paper meets the requirements for the thickness, the peeling strength, and the transparency rates.

**B.1.2.7 Requirements for Die-Cut Label Paper Thickness, Peeling Strength, and Adhesive Agent**

Requirements for the thickness of the die-cut label paper, peeling strength against backing paper, and the adhesive agent that can be used with the printer are shown in the figure below:



*Die-Cut Label Paper Thickness, Peeling Strength, and Adhesive Agent*

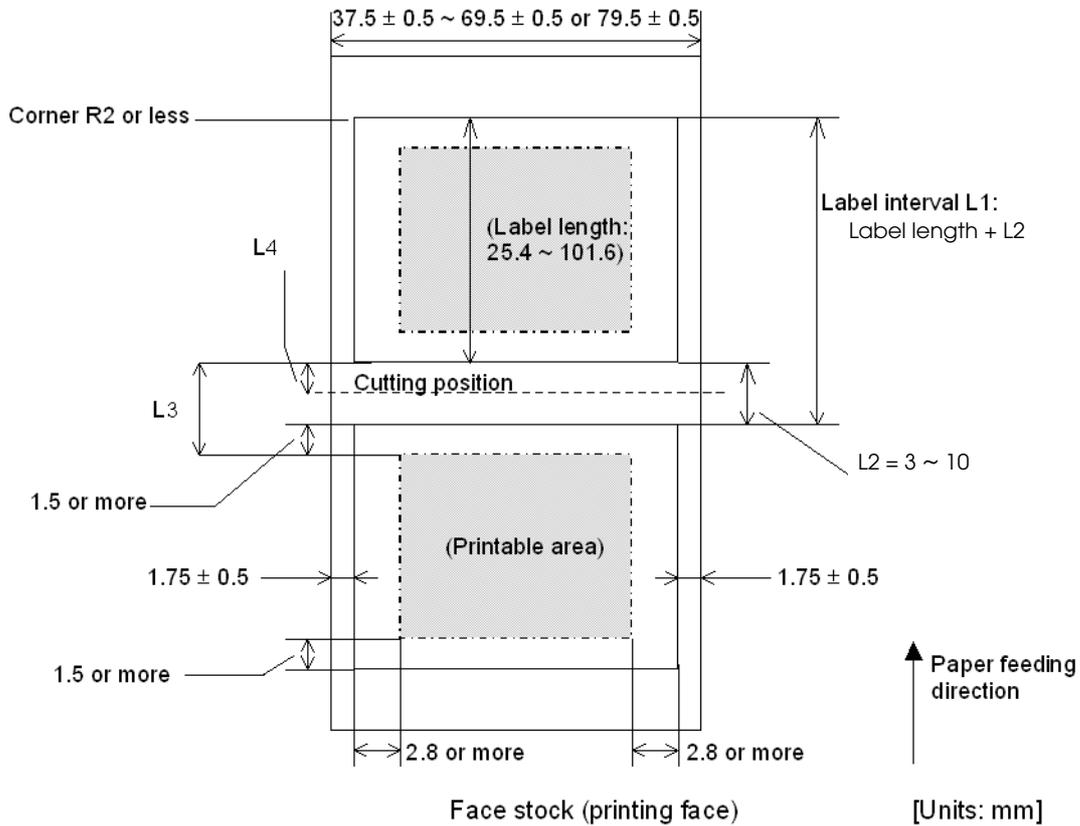
Peeling strength of the label against backing paper, measured by FINAT FTM-1 (Europe), ASTM D3330/D3330M-02 (U.S.A.).



- ❑ Total of thermal paper and backing paper: 145  $\mu\text{m}$  or less (excluding adhesive agent)
- ❑ Adhesive agent: acrylic emulsion

### B.1.2.8 Requirements for Die-Cut Label Size

When manufacturing die-cut label paper, be sure that the paper meets the following requirements.



Label Size Requirement

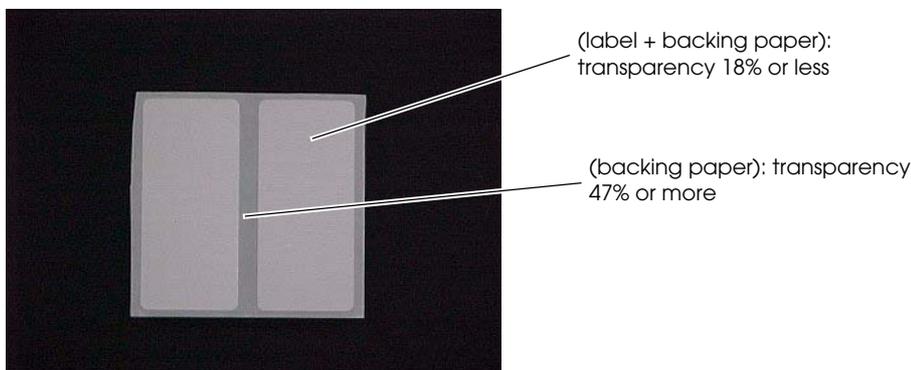


**Note:**

- Be sure to set the cutting position (L4) between labels.
- Be sure that the distance from the cutting position to the print starting position (=L3-L4) is 3.6 mm {0.14"} or more.

### B.1.2.9 Requirements for Transparency Rate of Die-Cut Label Paper

If transparency (without black marks) label is used, use a label that meets the following requirements so that the printer can recognize the label position:



 **Note:**

- ❑ Transparency rates are measured by the Macbeth TD-904 (with a filter for infrared) photometer. The transparency rates are calculated as follows:

Use

$$\text{Density} = \text{Log}^{10} (\text{Amount of irradiation} / \text{Amount of transparency})$$

Then,

$$\text{Transparency rate (\%)} = (\text{Amount of transparency} / \text{Amount of irradiation}) \times 100$$

### B.1.2.10 Requirements for Black Mark Position for Die-Cut Label Paper

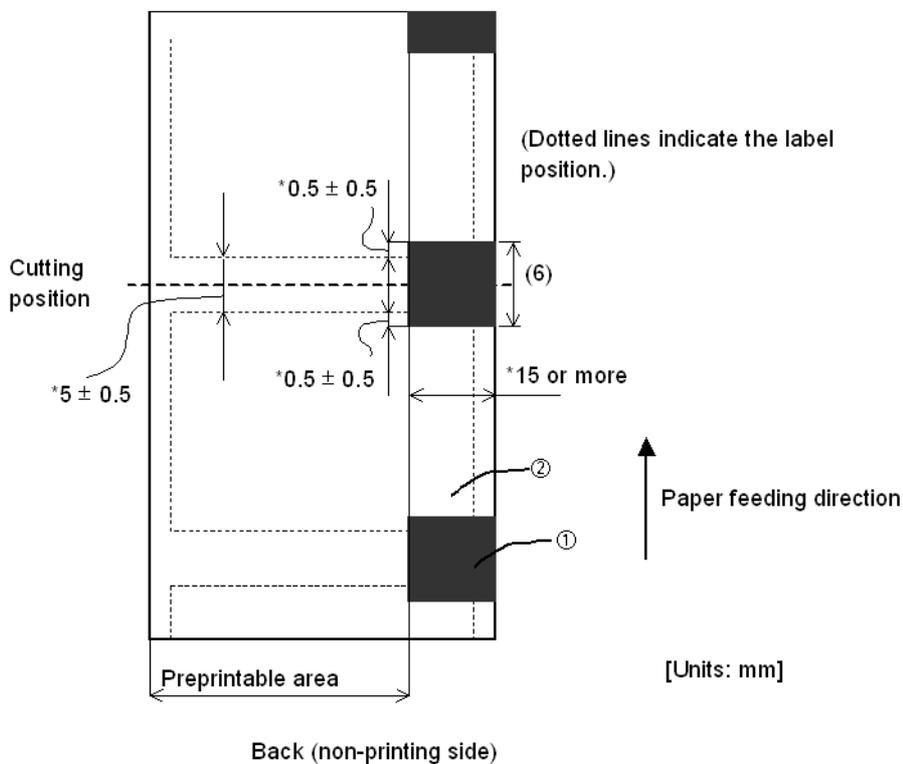
If die-cut label with black marks is used, there are two reflective rate requirements, depending on the size and position of black marks. Be sure to use label paper that meets either black mark position requirement I or II as follows:

#### B.1.2.11 Requirements for Black Mark Position I

The black mark positions on the paper to be manufactured must meet the requirements in the figure below. The reflective rates of the black mark portions 1 and label portions 2 must meet the combinations shown in the table below (the reflective rate is measured using the back of the paper, the non-printing side):

Reflecting rate for black mark portion 1	17%	16%	15%	14%	13%	Less
Reflecting rate for label portion 2	90%	85%	80%	75%	70%	More

NOTE: Reflective rates are measured by the Macbeth PCM-II (Filter D) meter.



**B.1.2.12 Requirements for Black Mark Position II**

The black mark positions on the paper to be manufactured must meet the requirements in the figure below (the reflective rate is measured using the back of the paper, the non-printing side):

- ❑ Black mark length in vertical: 4 ~ 7.5 mm {0.157~ 0.295"}
- ❑ Black mark position: Any places

Reflecting rate of black mark portion (1)	17%	16%	15%	14%	13%	Less
Reflecting rate of the portion where the black mark does not exist (2)	90%	85%	80%	75%	70%	More

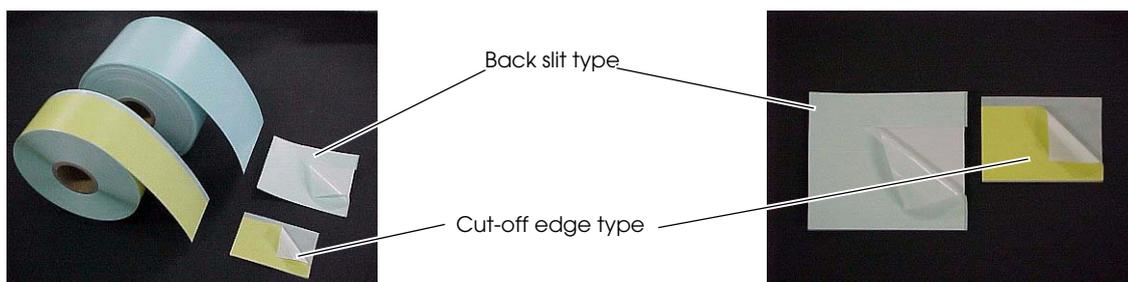
NOTE: Reflective rates are measured by the Macbeth PCM-II (Filter D) meter.

If label paper meets Black Mark Position Requirement I, it is not necessary to consider Black Mark Position Requirement II.

### B.1.3 Continuous Label Roll Paper

#### B.1.3.1 Continuous Label Paper

Continuous label paper is label roll paper without labels die cut in predefined sizes. There are types, back slit type or cut-off edge type:



Feature: Label size (length) is variable with an autocutter; therefore, it is possible to print labels of various sizes. Compared with die-cut label, it is economic because of no die-cut cut-off edges.

 **Note:**

*Cut-off edges make it easier to remove a label from backing paper.*

#### B.1.3.2 Specified Continuous Label Roll Paper

Epson provides the following:

Roll paper type no.	Printing method	Paper width	Length	Rolls/box	Other
NTL080-ZEN	Thermal label	80mm {3.15"}	Approx. 40m{1574.8"}	3 rolls	Continuous label, label size 76mm {2.99" }width

 **Note:**

*The TM-L90 can use thermal roll paper with width of 38 ~ 70 mm or roll paper with width of 80 mm.*

*For two-color thermal roll paper, "Notes on Two-Color Paper Handling" on page B-23.*

*If solid printing or outline character printing on a label is executed, the print quality may be decreased.*

### B.1.3.3 Print Density Adjustment

For best print quality and reliability, select the proper print density for the paper type used as described in the table below. If printing is performed with a density that exceeds the density described in the table below, the reliability ("TM-L90" on page 6-5) is not guaranteed. Print density can be set with a software command.

Original paper no.	Density level
NTL series	× 1.3

### B.1.3.4 Paper to Use for High Speed

If any of the following original paper types of thermal paper are used, the memory switch for the customized value setting can be used to set the maximum print speed up to 150 mm/s {5.91"/s} (level 9):

- NTL series

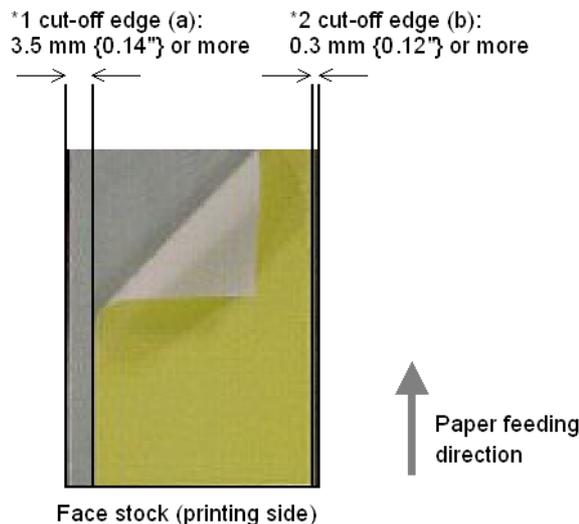
### B.1.3.5 Requirements for Size of Continuous Label Paper

To prevent the print head from sticking to the adhesive agent, be sure to use continuous label paper that has a cut-off edge.



**Note:**

"cut-off edge" is a method of cutting and removing the edge of the label in advance so that the label can be peeled off easily from the backing paper.



Requirements for Size of Label Paper of the Cut-Off Edge Type



**Note:**

When using a label with 80 mm {3.15"} paper width, the cut-off edge (b) is not necessary; however, it is recommended that cut-off edges with approximately 2 mm {0.79"} width be provided for both edges so that the label can be peeled off easily from the backing paper.

## B.2 TM-L90 with Peeler Roll Paper

This printer can use receipt roll paper and label roll paper with the following roll paper specifications:

Paper type	Thermal paper <ul style="list-style-type: none"> <li>• Receipt paper (without black marks)</li> <li>• Receipt paper (with black marks)</li> <li>• Die-cut label paper (without black marks)</li> <li>• Die-cut label paper (with black marks)</li> </ul>
Form	Roll paper
Paper width	<ul style="list-style-type: none"> <li>• 79.5 ± 0.5 mm {3.13 ± 0.02"}}</li> <li>• 37.5 ± 0.5 mm ~ 59.5 ± 0.5 mm {1.48 ± 0.02 ~ 2.34 ± 0.02"}}</li> </ul>
Take-up roll paper width	<ul style="list-style-type: none"> <li>• 80 + 0.5/-1.0 mm {3.15 + 0.02/-0.04"}}</li> <li>• 38 ~ 70 mm +0.5/-1.0 mm {1.5 ~ 2.76 +0.02/-0.04"}}</li> </ul>
Roll paper spool diameter (inside)	<ul style="list-style-type: none"> <li>• Receipt paper: 12 {0.47"} mm or more (*)</li> <li>• Die-cut label paper: 25.4 mm {1"} or more</li> </ul>
Roll direction	Printed side must face outside. Be sure that roll paper does not have any cuts or tears at any place in the roll.
Roll end position	Paper must not be pasted to the roll paper spool.
Outside diameter	Outside roll paper diameter: Maximum 90 mm {3.54"}}

(\*) Using roll paper with an inside diameter of 25.4 mm {1"} or less may decrease the detection accuracy of the roll paper near-end sensor.

### B.2.1 Receipt Roll Paper

The printer can use the following receipt paper:

- ❑ Receipt thermal paper with a thickness of 62 ~ 75 µm

#### B.2.1.1 Specified Original Roll Paper

The following original roll paper can be used:

The type number with (\*) indicates that it is used for specified roll paper.

- ❑ Single-color thermal roll paper type no.:

(*) TF50KS-E (paper thickness: 65 µm)	Nippon Paper Industries Co., Ltd.
TF60KS-E (paper thickness: 75 µm)	Nippon Paper Industries Co., Ltd.
PD150R (paper thickness: 75 µm)	Oji Paper Mfg. Co., Ltd.
PD160R (paper thickness: 75 µm)	Oji Paper Mfg. Co., Ltd.
P350 (paper thickness: 62 µm)	Kanzaki Specialty Paper (USA)
F5041 (paper thickness: 60 µm)	Mitsubishi HiTec Paper Flensburg GmbH (Germany)
KF50 (paper thickness: 62 µm)	KANZAN Spezialpapiere GmbH (Germany)

□ Two-color thermal roll paper type no.:

(\*) PD750R (paper thickness: 75 µm)

Oji Paper Mfg. Co., Ltd.



**Note:**

If specified original roll paper is not used, the thermal head may be damaged due to friction depending on paper.

### **B.2.1.2 Print Density Adjustment**

For best print quality and reliability, select the proper print density for the paper type used as described in the table below. If printing is performed with a density that exceeds the density described in the table below, the reliability ("TM-L90 peeler specification" on page 6-7) is not guaranteed. Print density can be set with a software command.

Original paper no.	Density level
P350	90%
KF50	95%
TF60KS-E, TF50KS-EY, PD750R, F5041	100%
PD160R, TF11KS-ET	105%

### **B.2.1.3 Paper to Use for High Speed**

If any of the following original paper types of receipt roll paper is used, the memory switch for the customized value setting can be used to set a maximum print speed up to 150 mm/s {5.91"/s} (level 9):

- TF60KS-E
- PD160R
- TF50KS-E
- P350
- F5041
- KF50

**B.2.1.4 Requirements for Black Mark Position for Receipt Paper**

When manufacturing receipt paper with black marks, be sure to make paper that meets the following requirements.

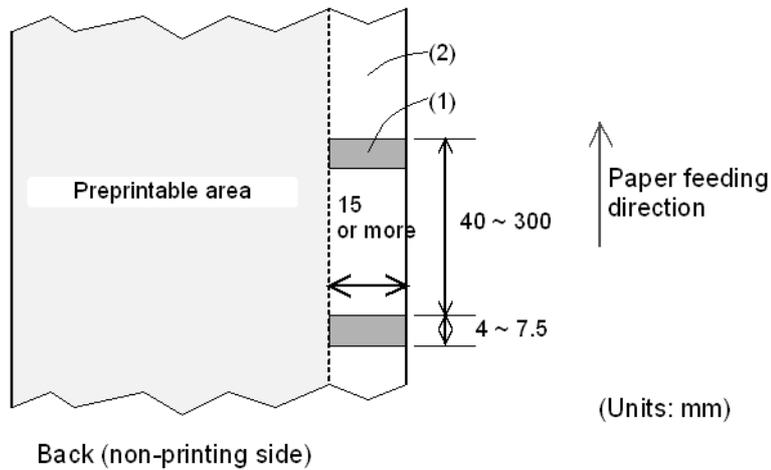
The reflecting rates of black mark portions (1) and non black mark portions (2) must meet the combinations shown in the table below:

- ❑ Black mark length in vertical: 4 ~ 7.5 mm {0.157~ 0.295"}
- ❑ Black mark position: Any places

Reflecting rate of black mark portion (1)	17%	16%	15%	14%	13%	Less
Reflecting rate of the portion where the black mark does not exist (2)	90%	85%	80%	75%	70%	More

NOTE: Reflecting rates are measured by the Macbeth PCM-II (Filter D) meter.

Paper without intervals between labels, such as continuous label paper, paper with perforated lines between labels, and paper with slits between labels, can also be used under the same requirements.

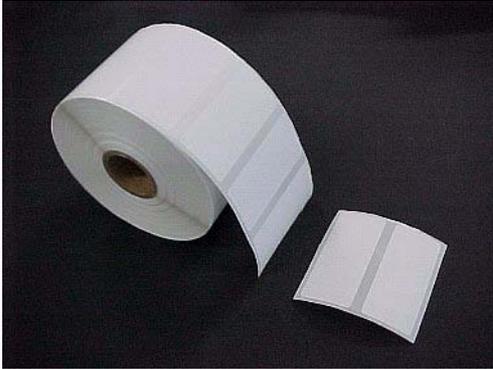


*Black Mark Interval Requirement*

## B.2.2 Die-Cut Label Roll Paper

### B.2.2.1 Die-Cut Label Paper

Die-cut label paper is shown below.



Example of transparency label roll paper

Features:

- Paper layout can be set automatically ("Memory Switch Functions" on page 2-35.)
- Paper layout can be set manually ("Memory Switch Functions" on page 2-35.)
- Transparency label roll paper or label roll paper with black marks can be used.



**Note:**

The TM-L90 can use thermal roll paper with width of 38 ~ 70 mm or roll paper with width of 80 mm.

For two-color thermal roll paper, "Notes on Two-Color Paper Handling" on page B-23.

If solid printing or outline character printing on a label is executed, the print quality may be decreased.

### B.2.2.2 Specified Original Paper

Use the following original paper types for die-cut label roll paper:

The type number with (\*) indicates that it is used for specified die-cut label roll paper.

- Single-color thermal label paper type no.:

(*)HW76B	Nippon Paper Industries Co., Ltd.
KL470	NAKAGAWA MFG (USA). Inc. (Face stock is Kanzaki Specialty Paper (USA))
KL80GT	NAKAGAWA MFG (Germany). GmbH. (Face stock is KANZAN Spezialpapiere GmbH (Germany))

### B.2.2.3 Print Density Adjustment

For best print quality and reliability, select the proper print density for the paper type used as described in the table below. If printing is performed with a density that exceeds the density described in the table below, the reliability ("TM-L90 peeler specification" on page 6-7) is not guaranteed. Print density can be set with a software command.

Original paper no.	Density level
HW76B, KL470, KL80GT	130%

### B.2.2.4 Paper to Use for High Speed

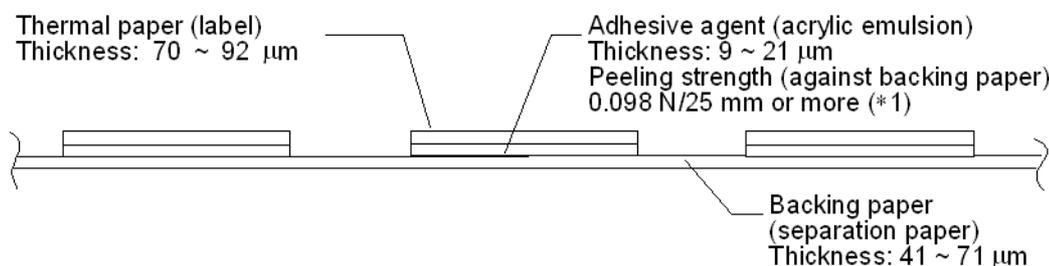
If any of the following original paper types of thermal paper are used, the memory switch for the customized value setting can be used to set the maximum print speed up to 150 mm/s {5.91"/s} (level 9); however when the peeling issuing mode is selected, set the maximum print speed to 120 mm/s or less.

### B.2.2.5 If paper other than the specified original paper is used

If paper other than the specified original paper is used, confirm whether the paper meets the requirements for the thickness, the peeling strength, and the transparency rates.

### B.2.2.6 Requirements for Die-Cut Label Paper Thickness, Peeling Strength, and Adhesive Agent

Requirements for the thickness of the die-cut label paper, peeling strength against backing paper, and the adhesive agent that can be used with the printer are shown in the figure below:



Die-Cut Label Paper Thickness, Peeling Strength, and Adhesive Agent

Peeling strength of the label against backing paper, measured by FINAT FTM-1 (Europe), ASTM D3330/D3330M-02 (U.S.A.).

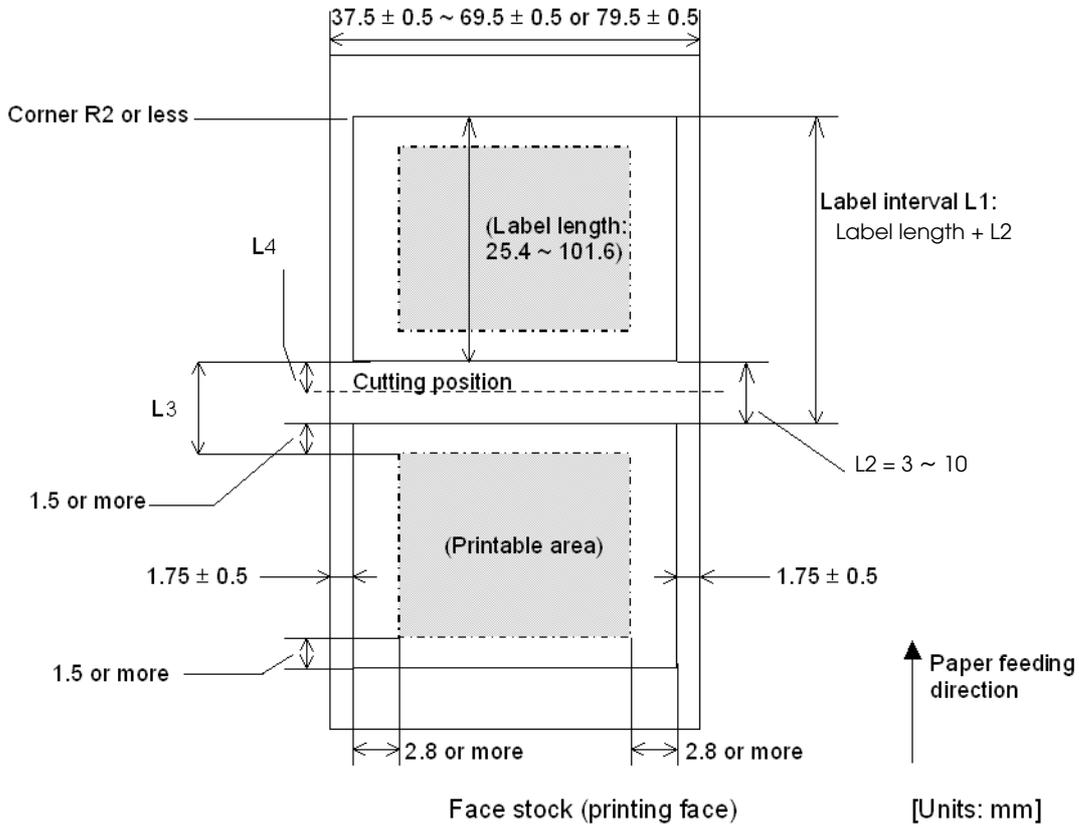


**Note:**

- ❑ Total of thermal paper and backing paper: 145 μm or less (excluding adhesive agent)
- ❑ Adhesive agent: acrylic emulsion

### B.2.2.7 Requirements for Die-Cut Label Size

When manufacturing die-cut label paper (with or without black marks), be sure that the paper meets the following requirements.



Label Size Requirement

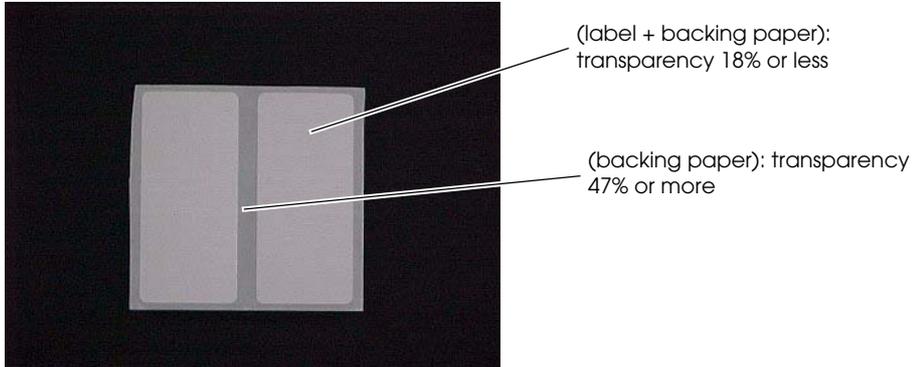


**Note:**

- ❑ Be sure to set the cutting position (L4) between labels.
- ❑ Be sure that the distance from the cutting position to the print starting position (=L3-L4) is 3.6 mm {0.14"} or more.

### B.2.2.8 Requirements for Transparency Rate of Die-Cut Label Paper

If transparency (without black marks) label is used, use a label that meets the following requirements so that the printer can recognize the label position:



 **Note:**

- Transparency rates are measured by the Macbeth TD-904 (with a filter for infrared) photometer. The transparency rates are calculated as follows:

Use

$Density = \text{Log}^{10} (\text{Amount of irradiation} / \text{Amount of transparency})$

Then,

$Transparency\ rate\ (\%) = (\text{Amount of transparency} / \text{Amount of irradiation}) \times 100$

### B.2.2.9 Requirements for Black Mark Position for Die-Cut Label Paper

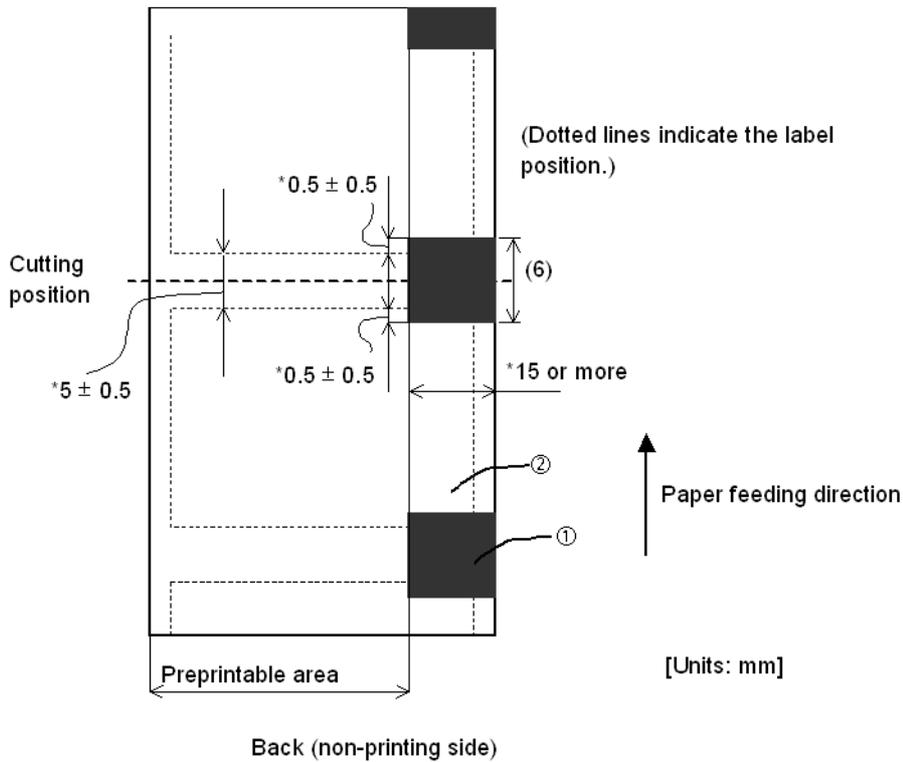
If a die-cut label with black marks is used, there are two reflective rate requirements, depending on the size and position of black marks. Be sure to use label paper that meets either black mark position requirement I or II as follows:

### B.2.2.10 Requirements for Black Mark Position I

The black mark positions on the paper to be manufactured must meet the requirements in the figure below. The reflective rates of the black mark portions 1 and label portions 2 must meet the combinations shown in the table below (the reflective rate is measured using the back of the paper, the non-printing side):

Reflecting rate for black mark portion 1	17%	16%	15%	14%	13%	Less
Reflecting rate for label portion 2	90%	85%	80%	75%	70%	More

NOTE: Reflective rates are measured by the Macbeth PCM-II (Filter D) meter.



**B.2.2.11 Requirements for Black Mark Position II**

The black mark positions on the paper to be manufactured must meet the requirements in the figure below (the reflective rate is measured using the back of the paper, the non-printing side):

- ❑ Black mark length in vertical: 4 ~ 7.5 mm {0.157~ 0.295"}
- ❑ Black mark position: Any places

Reflecting rate of black mark portion (1)	17%	16%	15%	14%	13%	Less
Reflecting rate of the portion where the black mark does not exist (2)	90%	85%	80%	75%	70%	More

NOTE: Reflective rates are measured by the Macbeth PCM-II (Filter D) meter.

If label paper meets Black Mark Position Requirement I, it is not necessary to consider Black Mark Position Requirement II.

## ***B.3 Notes On Paper Handling***

### ***B.3.1 Notes on Thermal Paper Handling***

Substances such as chemicals on thermal paper may cause color development or faded printing; therefore, pay attention to the following:

- ❑ Use water paste, starch paste, polyvinyl paste, or CMC paste when gluing thermal paper.
- ❑ Volatile organic solvents such as alcohol, ester, and ketone can cause discoloration.
- ❑ Some discoloration may occur, depending on adhesive materials. Printing may be faded, depending on materials of tapes.
- ❑ If thermal paper touches anything that includes phthalic acid ester plasticizer for a long time, it can reduce the image-formation ability of the paper and can cause the printed image to fade. Therefore, when storing thermal paper in a card case or sample notebook, be sure to use only products made from polyethylene, polypropylene, or polyester.
- ❑ If thermal paper touches diazo copy paper immediately after copying, the printed surface may be discolored.
- ❑ Thermal paper must not be stored with the printed surfaces against each other because the printing may be transferred between surfaces.
- ❑ If the surface of thermal paper is scratched with a nail or hard metal object, the paper may become discolored.

### ***B.3.2 Notes on Storage***

Since discoloration begins at 70 °C {158 °F}, thermal paper should be protected from high temperatures, humidity, and light, both before and after printing.

- ❑ Store paper away from high temperatures and humidity.  
Do not store thermal paper near a heater or in enclosed places exposed to direct sunlight.
- ❑ Avoid direct light.
- ❑ Extended exposure to direct light (as with placement of the printer near windows) may cause discoloration or faded printing.
- ❑ When the printer is not used for one week or more, it is recommended not to leave the thermal paper between the platen and the print head.

### **B.3.3 Notes on Two-Color Paper Handling**

- ❑ Two-color printing can be performed by selecting two-color paper with the memory switch (customized value) and using two-color paper as the print paper.
- ❑ In two-color printing, the hue might not be clear, depending on printing patterns.
- ❑ The reliability of two-color paper differs from that of single-color paper.
- ❑ With 2-color printing, be sure to use the specified 2-color thermal paper. Using other paper may damage the thermal head.
- ❑ When printing with a secondary color (red on the specified 2-color thermal paper), discoloration may occur depending on the environment. When it is necessary to keep the output paper, print with a primary color (black on the specified 1-color thermal paper).



Appendix C

Character Code Table

C.1 Page 0 (PC437 : USA, Standard Europe)

(International character set : when America is selected)

HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
HEX BIN	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	NUL	DLE	SP	0	@	P	~	p	Ç	É	Á	⌘	⌘	⌘	⌘	≡
1	0001	XON	!	1	A	Q	a	q	ü	Æ	Í	⌘	⌘	⌘	⌘	±
2	0010	02	"	2	B	R	b	r	é	Ⓐ	Ó	⌘	⌘	⌘	⌘	≥
3	0011	XOFF	#	3	C	S	c	s	â	ö	ú	⌘	⌘	⌘	⌘	≤
4	0100	EOT	\$	4	D	T	d	t	ã	õ	ñ	⌘	⌘	⌘	⌘	⌘
5	0101	ENG	%	5	E	U	e	u	ä	ö	ñ	⌘	⌘	⌘	⌘	⌘
6	0110	&	&	6	F	V	f	v	å	ù	ä	⌘	⌘	⌘	⌘	⌘
7	0111	,	,	7	G	W	g	w	ç	ù	ö	⌘	⌘	⌘	⌘	⌘
8	1000	CAN	(	8	H	X	h	x	è	ÿ	ç	⌘	⌘	⌘	⌘	⌘
9	1001	)	)	9	I	Y	i	y	é	ö	ç	⌘	⌘	⌘	⌘	⌘
A	1010	*	*	A	J	Z	j	z	ê	ù	~	⌘	⌘	⌘	⌘	⌘
B	1011	ESC	+	B	K	[	k	{	ë	ï	⌘	⌘	⌘	⌘	⌘	⌘
C	1100	FS	,	C	L	\	l	~	î	£	⌘	⌘	⌘	⌘	⌘	⌘
D	1101	GS	-	D	M	]	m	}	ï	¥	ï	⌘	⌘	⌘	⌘	⌘
E	1110	.	.	E	N	~	n	~	ä	Ⓔ	«	⌘	⌘	⌘	⌘	⌘
F	1111	/	/	F	O	?	o	SP	Å	ƒ	»	⌘	⌘	⌘	⌘	⌘

(NOTE) Characters shown in this table are just showing their shapes. They are not actual print samples.

C.2 Page 1 (Katakana)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	┌ 128	┌ 144	SP 160	一 176	夕 192	ミ 208	二 224	× 240
1	0001	┌ 129	┌ 145	。○ 161	ア 177	チ 193	ム 209	ト 225	円 241
2	0010	┌ 130	┌ 146	「 162	イ 178	ツ 194	メ 210	≠ 226	年 242
3	0011	┌ 131	┌ 147	」 163	ウ 179	テ 195	モ 211	≠ 227	月 243
4	0100	┌ 132	┌ 148	、 164	エ 180	ト 196	ヤ 212	▲ 228	日 244
5	0101	┌ 133	┌ 149	・ 165	オ 181	ナ 197	ユ 213	▲ 229	時 245
6	0110	┌ 134	┌ 150	ヲ 166	カ 182	ニ 198	ヨ 214	▼ 230	分 246
7	0111	┌ 135	┌ 151	ア 167	キ 183	ヌ 199	ラ 215	▼ 231	秒 247
8	1000	┌ 136	┌ 152	「 168	ク 184	ネ 200	リ 216	♠ 232	〒 248
9	1001	┌ 137	┌ 153	「 169	ケ 185	ノ 201	ル 217	♥ 233	市 249
A	1010	┌ 138	┌ 154	「 170	コ 186	ハ 202	レ 218	◆ 234	区 250
B	1011	┌ 139	┌ 155	」 171	サ 187	ヒ 203	ロ 219	♣ 235	町 251
C	1100	┌ 140	┌ 156	「 172	シ 188	フ 204	ワ 220	● 236	村 252
D	1101	┌ 141	┌ 157	「 173	ス 189	ヘ 205	ン 221	○ 237	人 253
E	1110	┌ 142	┌ 158	「 174	セ 190	ホ 206	・ 222	／ 238	☼ 254
F	1111	┌ 143	┌ 159	「 175	ソ 191	マ 207	・ 223	＼ 239	SP 255

**C.3 Page 2 (PC850: Multilingual)**

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	⌘ 176	⌞ 192	ð 208	Ó 224	— 240
1	0001	ü 129	æ 145	í 161	⌘ 177	⌞ 193	Ð 209	ß 225	± 241
2	0010	é 130	Æ 146	ó 162	⌘ 178	⌞ 194	Ê 210	Ô 226	= 242
3	0011	â 131	ô 147	ú 163	 179	⌞ 195	Ë 211	Ò 227	<sup>3</sup> / <sub>4</sub> 243
4	0100	ä 132	ö 148	ñ 164	⌞ 180	— 196	È 212	õ 228	¶ 244
5	0101	à 133	ò 149	Ñ 165	Á 181	⌞ 197	ı 213	Õ 229	§ 245
6	0110	å 134	û 150	ä 166	Â 182	ã 198	Í 214	µ 230	÷ 246
7	0111	ç 135	ù 151	o 167	À 183	Ã 199	Î 215	þ 231	· 247
8	1000	ê 136	ÿ 152	ı 168	© 184	⌞ 200	İ 216	þ 232	° 248
9	1001	ë 137	Ö 153	® 169	⌞ 185	⌞ 201	⌞ 217	Ú 233	¨ 249
A	1010	è 138	Ü 154	⌞ 170	⌞ 186	⌞ 202	⌞ 218	Û 234	· 250
B	1011	ï 139	ø 155	<sup>1</sup> / <sub>2</sub> 171	⌞ 187	⌞ 203	■ 219	Ù 235	<sup>1</sup> / <sub>2</sub> 251
C	1100	î 140	£ 156	<sup>1</sup> / <sub>4</sub> 172	⌞ 188	⌞ 204	■ 220	Ý 236	<sup>3</sup> / <sub>4</sub> 252
D	1101	ì 141	Ø 157	ı 173	¢ 189	⌞ 205	ı 221	Ý 237	<sup>2</sup> / <sub>3</sub> 253
E	1110	Ä 142	× 158	« 174	¥ 190	⌞ 206	İ 222	— 238	■ 254
F	1111	Å 143	f 159	» 175	⌞ 191	⌞ 207	■ 223	’ 239	SP 255

**C.4 Page 3 (PC860: Portuguese)**

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç <small>128</small>	É <small>144</small>	á <small>160</small>	☼ <small>176</small>	⌒ <small>192</small>	⌒ <small>208</small>	α <small>224</small>	≡ <small>240</small>
1	0001	ü <small>129</small>	À <small>145</small>	í <small>161</small>	☼ <small>177</small>	⌒ <small>193</small>	⌒ <small>209</small>	β <small>225</small>	≠ <small>241</small>
2	0010	é <small>130</small>	È <small>146</small>	ó <small>162</small>	☼ <small>178</small>	⌒ <small>194</small>	⌒ <small>210</small>	Γ <small>226</small>	≥ <small>242</small>
3	0011	â <small>131</small>	ô <small>147</small>	ú <small>163</small>	<small>179</small>	⌒ <small>195</small>	⌒ <small>211</small>	π <small>227</small>	≤ <small>243</small>
4	0100	ã <small>132</small>	õ <small>148</small>	ñ <small>164</small>	⌒ <small>180</small>	— <small>196</small>	⌒ <small>212</small>	Σ <small>228</small>	∫ <small>244</small>
5	0101	à <small>133</small>	ò <small>149</small>	Ñ <small>165</small>	⌒ <small>181</small>	⌒ <small>197</small>	⌒ <small>213</small>	σ <small>229</small>	J <small>245</small>
6	0110	Á <small>134</small>	Ú <small>150</small>	a <small>166</small>	⌒ <small>182</small>	⌒ <small>198</small>	⌒ <small>214</small>	μ <small>230</small>	÷ <small>246</small>
7	0111	ç <small>135</small>	ù <small>151</small>	o <small>167</small>	⌒ <small>183</small>	⌒ <small>199</small>	⌒ <small>215</small>	τ <small>231</small>	≈ <small>247</small>
8	1000	ê <small>136</small>	î <small>152</small>	¿ <small>168</small>	⌒ <small>184</small>	⌒ <small>200</small>	⌒ <small>216</small>	Φ <small>232</small>	° <small>248</small>
9	1001	Ê <small>137</small>	Ï <small>153</small>	Ò <small>169</small>	⌒ <small>185</small>	⌒ <small>201</small>	⌒ <small>217</small>	θ <small>233</small>	• <small>249</small>
A	1010	è <small>138</small>	Û <small>154</small>	⌒ <small>170</small>	⌒ <small>186</small>	⌒ <small>202</small>	⌒ <small>218</small>	Ω <small>234</small>	· <small>250</small>
B	1011	Í <small>139</small>	ç <small>155</small>	½ <small>171</small>	⌒ <small>187</small>	⌒ <small>203</small>	■ <small>219</small>	δ <small>235</small>	√ <small>251</small>
C	1100	Ô <small>140</small>	£ <small>156</small>	¼ <small>172</small>	⌒ <small>188</small>	⌒ <small>204</small>	■ <small>220</small>	∞ <small>236</small>	n <small>252</small>
D	1101	ì <small>141</small>	Ù <small>157</small>	¡ <small>173</small>	⌒ <small>189</small>	⌒ <small>205</small>	■ <small>221</small>	∅ <small>237</small>	² <small>253</small>
E	1110	Ã <small>142</small>	Þ <small>158</small>	« <small>174</small>	⌒ <small>190</small>	⌒ <small>206</small>	■ <small>222</small>	∈ <small>238</small>	■ <small>254</small>
F	1111	Â <small>143</small>	Ó <small>159</small>	» <small>175</small>	⌒ <small>191</small>	⌒ <small>207</small>	■ <small>223</small>	∩ <small>239</small>	SP <small>255</small>

**C.5 Page 4 (PC863: Canadian-French)**

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	Ï 160	Ë 176	Ł 192	ł 208	ɑ 224	≡ 240
1	0001	ü 129	È 145	´ 161	Ë 177	ł 193	Ł 209	ß 225	± 241
2	0010	é 130	Ê 146	ó 162	Ë 178	ł 194	Ł 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	 179	ł 195	Ł 211	π 227	≤ 243
4	0100	Â 132	Ë 148	¨ 164	ł 180	ł 196	Ł 212	Σ 228	ƒ 244
5	0101	à 133	ï 149	· 165	ł 181	ł 197	Ł 213	σ 229	Ƶ 245
6	0110	¶ 134	û 150	³ 166	ł 182	ł 198	Ł 214	μ 230	÷ 246
7	0111	ç 135	ù 151	— 167	ł 183	ł 199	Ł 215	τ 231	≈ 247
8	1000	ê 136	ɑ 152	î 168	ł 184	ł 200	Ł 216	Φ 232	° 248
9	1001	ë 137	Ô 153	ƒ 169	ł 185	ł 201	Ł 217	θ 233	• 249
A	1010	è 138	Û 154	ƒ 170	ł 186	ł 202	Ł 218	Ω 234	· 250
B	1011	ï 139	¢ 155	½ 171	ł 187	ł 203	Ł 219	δ 235	√ 251
C	1100	î 140	£ 156	¼ 172	ł 188	ł 204	Ł 220	∞ 236	n 252
D	1101	= 141	Û 157	¾ 173	ł 189	ł 205	Ł 221	∅ 237	² 253
E	1110	À 142	Û 158	« 174	ł 190	ł 206	Ł 222	€ 238	■ 254
F	1111	§ 143	f 159	» 175	ł 191	ł 207	Ł 223	∩ 239	SP 255

**C.6 Page 5 (PC865: Nordic)**

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	☒ 176	┌ 192	└ 208	α 224	≡ 240
1	0001	ü 129	æ 145	í 161	☒ 177	└ 193	┘ 209	β 225	± 241
2	0010	é 130	Æ 146	ó 162	☒ 178	┘ 194	┘ 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	 179	└ 195	└ 211	π 227	≤ 243
4	0100	ä 132	ö 148	ñ 164	┘ 180	— 196	└ 212	Σ 228	ƒ 244
5	0101	à 133	ò 149	Ñ 165	≡ 181	┘ 197	┘ 213	σ 229	Ј 245
6	0110	å 134	û 150	а 166	┘ 182	┘ 198	┘ 214	μ 230	÷ 246
7	0111	ç 135	ù 151	о 167	┘ 183	┘ 199	┘ 215	τ 231	≈ 247
8	1000	ê 136	ÿ 152	ı 168	┘ 184	└ 200	┘ 216	Φ 232	° 248
9	1001	ë 137	Ö 153	┘ 169	≡ 185	┘ 201	┘ 217	θ 233	• 249
A	1010	è 138	Ü 154	┘ 170	 186	└ 202	┘ 218	Ω 234	· 250
B	1011	ï 139	ø 155	½ 171	┘ 187	┘ 203	■ 219	δ 235	√ 251
C	1100	î 140	£ 156	¼ 172	┘ 188	┘ 204	■ 220	∞ 236	n 252
D	1101	ì 141	Ø 157	ı 173	┘ 189	≡ 205	■ 221	ø 237	² 253
E	1110	Ä 142	Pt 158	« 174	┘ 190	┘ 206	■ 222	€ 238	■ 254
F	1111	Å 143	f 159	α 175	┘ 191	└ 207	■ 223	∩ 239	SP 255

**C.7 Page 16 (WPC1252)**

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	€ 128	SP 144	SP 160	° 176	À 192	Ð 208	à 224	ð 240
1	0001	SP 129	‘ 145	í 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	0010	, 130	, 146	¢ 162	² 178	Â 194	Ò 210	â 226	ò 242
3	0011	f 131	“ 147	£ 163	³ 179	Ã 195	Ó 211	ã 227	ó 243
4	0100	” 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	0101	… 133	· 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	0110	† 134	— 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	0111	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	+ 247
8	1000	^ 136	~ 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
9	1001	‰ 137	™ 153	© 169	¹ 185	É 201	Ù 217	é 233	ù 249
A	1010	Š 138	š 154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	1011	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	1100	Œ 140	œ 156	¬ 172	¼ <sup>1/4</sup> 188	Ì 204	Ü 220	ì 236	ü 252
D	1101	SP 141	SP 157	- 173	½ <sup>1/2</sup> 189	Í 205	Ý 221	í 237	ý 253
E	1110	Ž 142	ž 158	® 174	¾ <sup>3/4</sup> 190	Î 206	Þ 222	î 238	þ 254
F	1111	SP 143	ÿ 159	— 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

C.8 Page 17 (PC866: Cyrillic #2)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	А 128	Р 144	а 160	 176	 192	 208	р 224	Ё 240
1	0001	Б 129	С 145	б 161	 177	 193	 209	с 225	ё 241
2	0010	В 130	Т 146	в 162	 178	 194	 210	т 226	ѐ 242
3	0011	Г 131	У 147	г 163	 179	 195	 211	у 227	ѓ 243
4	0100	Д 132	Ф 148	д 164	 180	 196	 212	ф 228	ї 244
5	0101	Е 133	Х 149	е 165	 181	 197	 213	х 229	і 245
6	0110	Ж 134	Ц 150	ж 166	 182	 198	 214	ц 230	ў 246
7	0111	З 135	Ч 151	з 167	 183	 199	 215	ч 231	џ 247
8	1000	И 136	Ш 152	и 168	 184	 200	 216	ш 232	° 248
9	1001	Й 137	Щ 153	й 169	 185	 201	 217	щ 233	• 249
A	1010	К 138	Ъ 154	к 170	 186	 202	 218	ъ 234	· 250
B	1011	Л 139	Ы 155	л 171	 187	 203	 219	ы 235	√ 251
C	1100	М 140	Ь 156	м 172	 188	 204	 220	ь 236	№ 252
D	1101	Н 141	Э 157	н 173	 189	 205	 221	э 237	⊠ 253
E	1110	О 142	Ю 158	о 174	 190	 206	 222	ю 238	 254
F	1111	П 143	Я 159	п 175	 191	 207	 223	я 239	SP 255

**C.9 Page 18 (PC852: Latin2)**

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	☐ 176	☐ 192	d 208	Ó 224	- 240
1	0001	ü 129	Í 145	í 161	■ 177	☐ 193	Đ 209	ß 225	” 241
2	0010	é 130	Í 146	ó 162	■ 178	☐ 194	Ď 210	Ô 226	‘ 242
3	0011	â 131	ô 147	ú 163	☐ 179	☐ 195	Ě 211	Ň 227	ˇ 243
4	0100	ä 132	ö 148	À 164	☐ 180	☐ 196	ď 212	ń 228	ˇ 244
5	0101	û 133	Ě 149	ą 165	Á 181	☐ 197	Ň 213	ň 229	§ 245
6	0110	ć 134	ĭ 150	Ž 166	Â 182	Ă 198	í 214	Š 230	÷ 246
7	0111	ç 135	Ś 151	ž 167	Ě 183	ǎ 199	î 215	š 231	· 247
8	1000	ì 136	ś 152	Ę 168	Ş 184	☐ 200	ě 216	Ŕ 232	° 248
9	1001	ë 137	Ö 153	e 169	☐ 185	☐ 201	☐ 217	Ú 233	¨ 249
A	1010	Ö 138	Ü 154	☐ 170	☐ 186	☐ 202	☐ 218	ř 234	· 250
B	1011	ö 139	Ť 155	ź 171	☐ 187	☐ 203	■ 219	Ů 235	ů 251
C	1100	î 140	ť 156	Č 172	☐ 188	☐ 204	■ 220	ý 236	Ř 252
D	1101	Ž 141	Ł 157	ś 173	Ż 189	☐ 205	Ŧ 221	Ý 237	ř 253
E	1110	Ä 142	× 158	« 174	ż 190	☐ 206	Ů 222	ţ 238	■ 254
F	1111	Ć 143	č 159	» 175	☐ 191	☐ 207	■ 223	’ 239	SP 255

**C.10 Page 19 (PC858: Euro)**

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	⌘ 176	⌚ 192	Đ 208	Ó 224	— 240
1	0001	ü 129	æ 145	í 161	⌘ 177	⌚ 193	Đ 209	ß 225	± 241
2	0010	é 130	Æ 146	ó 162	⌘ 178	⌚ 194	Ê 210	Ô 226	= 242
3	0011	â 131	ô 147	ú 163	 179	⌚ 195	Ë 211	Ò 227	$\frac{3}{4}$ 243
4	0100	ä 132	ö 148	ñ 164	⌚ 180	— 196	È 212	õ 228	¶ 244
5	0101	à 133	ò 149	Ñ 165	Á 181	⌚ 197	€ 213	Ö 229	§ 245
6	0110	å 134	û 150	ä 166	Â 182	ã 198	í 214	μ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	À 183	Ã 199	î 215	þ 231	· 247
8	1000	ê 136	ÿ 152	¿ 168	© 184	⌚ 200	Ï 216	þ 232	° 248
9	1001	ë 137	ÿ 153	® 169	⌚ 185	⌚ 201	⌚ 217	Ú 233	¨ 249
A	1010	è 138	ÿ 154	⌚ 170	⌚ 186	⌚ 202	⌚ 218	Û 234	· 250
B	1011	ï 139	ø 155	$\frac{1}{2}$ 171	⌚ 187	⌚ 203	■ 219	Ü 235	<sup>1</sup> 251
C	1100	î 140	£ 156	$\frac{1}{4}$ 172	⌚ 188	⌚ 204	■ 220	Ý 236	<sup>3</sup> 252
D	1101	ì 141	Ø 157	ì 173	¢ 189	= 205	ì 221	Ý 237	<sup>2</sup> 253
E	1110	Ä 142	× 158	« 174	¥ 190	⌚ 206	ì 222	— 238	■ 254
F	1111	Å 143	f 159	» 175	⌚ 191	⌚ 207	■ 223	' 239	SP 255

**C.11 Page 255 (Blank page)**

HEX	BIN	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	SP 128	SP 144	SP 160	SP 176	SP 192	SP 208	SP 224	SP 240
1	0001	SP 129	SP 145	SP 161	SP 177	SP 193	SP 209	SP 225	SP 241
2	0010	SP 130	SP 146	SP 162	SP 178	SP 194	SP 210	SP 226	SP 242
3	0011	SP 131	SP 147	SP 163	SP 179	SP 195	SP 211	SP 227	SP 243
4	0100	SP 132	SP 148	SP 164	SP 180	SP 196	SP 212	SP 228	SP 244
5	0101	SP 133	SP 149	SP 165	SP 181	SP 197	SP 213	SP 229	SP 245
6	0110	SP 134	SP 150	SP 166	SP 182	SP 198	SP 214	SP 230	SP 246
7	0111	SP 135	SP 151	SP 167	SP 183	SP 199	SP 215	SP 231	SP 247
8	1000	SP 136	SP 152	SP 168	SP 184	SP 200	SP 216	SP 232	SP 248
9	1001	SP 137	SP 153	SP 169	SP 185	SP 201	SP 217	SP 233	SP 249
A	1010	SP 138	SP 154	SP 170	SP 186	SP 202	SP 218	SP 234	SP 250
B	1011	SP 139	SP 155	SP 171	SP 187	SP 203	SP 219	SP 235	SP 251
C	1100	SP 140	SP 156	SP 172	SP 188	SP 204	SP 220	SP 236	SP 252
D	1101	SP 141	SP 157	SP 173	SP 189	SP 205	SP 221	SP 237	SP 253
E	1110	SP 142	SP 158	SP 174	SP 190	SP 206	SP 222	SP 238	SP 254
F	1111	SP 143	SP 159	SP 175	SP 191	SP 207	SP 223	SP 239	SP 255

UD:undefined

## C.12 International Character Set

Country												
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
America	#	\$	@	[	\	]	^	`	{		}	~
France	#	\$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
UK	£	\$	@	[	\	]	^	`	{		}	~
Denmark I	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
Spain I	Pt	\$	@	ı	Ñ	ı	^	`	¨	ñ	}	~
Japan	#	\$	@	[	¥	]	^	`	{		}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain II	#	\$	á	ı	Ñ	ı	é	`	ı	ñ	ó	ú
Latin America	#	\$	á	ı	Ñ	ı	é	ü	ı	ñ	ó	ú
Korea	#	\$	@	[	₩	]	^	`	{		}	~

## Appendix D

# Option Specifications

This appendix describes the optional power supply (PS-180).

### D.1 PS-180

#### D.1.1 Electrical Characteristics

❑ Input conditions

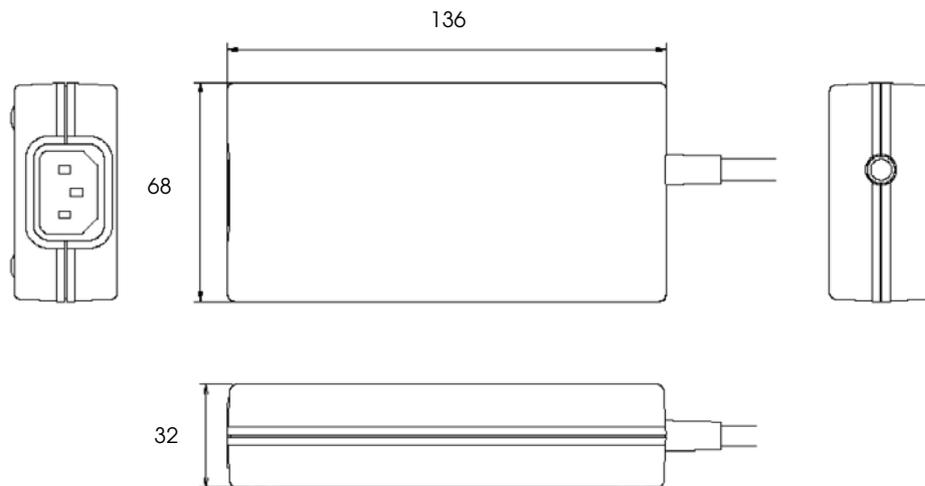
Input voltage (rating):	AC90V to AC264V (AC100 V -10% to AC230 V +15%)
Frequency (rating):	50/60Hz ± 3 Hz
Power consumption (rating):	100VA
AC switch	---
LED	---

❑ Output conditions

Output voltage (rating):	DC24 V ± 5%
Output current (rating):	2.0 A
Output electric power (rating):	48 VA
Output peak current:	4.5 A

#### D.1.2 Case Specifications

- ❑ Size: 68 mm (D) × 136 mm (L) × 32 mm (H) (excluding projections) Refer to figure below.
- ❑ Weight: Approx. 0.4 kg (excluding the AC cable)
- ❑ Material: Flame-resistance grade: V0
- ❑ Color: Black (matte)



Case specifications

### **D.1.2.1 Material**

No specific brominated flame retardants such as PBBE, PBB are used in this product.

### **D.1.3 AC Cable Selection**

- Select an AC cable that satisfies the following conditions.
  - Safety Standard product
  - Plug with P.E terminal
- Ground connection:                      Ground certainly for safety.

## Appendix E

# Maintenance

---

### E.1 Cleaning the autocutter (TM-L90 only)

If label paper adhesive has stuck to the autocutter, it may dull the cutting edge. In such a case, clean the cutter blade using the following procedure.

1. Turn off the power.
2. Disconnect the printer from the power connector.
3. Open the roll paper cover.



**Note:**

*If the roll paper cover will not open, take action in accordance with the troubleshooting of the autocutter (page F-8).*

4. As shown below, remove the adhesive residues accumulated on the cutter blade on the roll paper cover side with a cutter knife or similar tool.



*Adhesive adheres on cutter blade*



*Adhesive being removed with flat-blade screwdriver*

 **WARNING:**

*Do not touch the area beyond the cutter blade edge. To do so may lead to injury to your fingers.*

 **Note:**

*Remove the accumulated adhesive behind the edge of the cutter blade. It is not necessary to polish it to a mirror finish.*

*It is recommended not to use alcohol-based solvents. To do so may dissolve the adhesive and make removing it even more difficult.*

5. Insert the roll paper after removing the adhesive.  
For the method of inserting the roll paper, refer to "Paper Loading Method" on page 2-41.

 **WARNING:**

*Be sure to remove your finger from inside the roll paper cover when you close it, or you can get your finger caught inside.*

6. Close the roll paper cover.

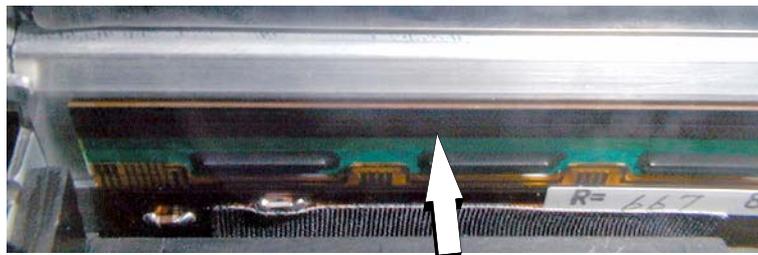
## **E.2 Print Head Cleaning**

### **⚠ CAUTION:**

*The print head is very hot right after printing and is very dangerous. Be sure to allow the print head to cool down (after printing) before cleaning it. Also, be sure to turn off the printer power before cleaning the print head.*

Paper dust on the heating elements may lower the print quality. In this case, clean the print head as follows.

1. Turn off the power.
2. Open the roll paper cover.
3. Clean the thermal elements of the print head using a cotton swab moistened with alcohol solvent (ethanol, methanol, IPA).



Print Head

### **⚠ CAUTION:**

*Do not touch the print head thermal elements with your bare hands. Doing so may have a bad effect on the head thermal elements due to the adhesion of dirt. Be careful not to scratch the print head when cleaning it.*

4. Install roll paper and close the roll paper cover.  
For the method of inserting the roll paper, refer to "Paper Loading Method" on page 2-41.
5. Close the roll paper cover.



**Note:**

*Depending on the roll paper used, paper dust may stick to the platen roller and roll paper end sensor. To remove the paper dust, clean the platen roller and roll paper end sensor with a cotton swab moistened with water.*

*EPSON recommends cleaning of the thermal head periodically (generally every three months) to maintain receipt print quality.*

*Keep pieces of metal away from contact with the head thermal elements and driver IC as they are extremely susceptible to damage.*

*If thermal paper contains Na, K, Cl or other ions, be sure to use the specified paper as ions may adversely affect the head thermal elements.*

### ***E.3 Cleaning the peeler (TM-L90 peeler specification only)***

If label adhesive accumulates on the rollers of the peeler, remove it with the following procedure.

1. Press the peeler cover open lever, and open the peeler cover.
2. Using a waste label or the like, remove the adhesive by dabbing the label on the roller. If it is left as it is, the adhesive may stick to an issued label.



3. After cleaning, close the peeler cover.



## Appendix F

# Troubleshooting

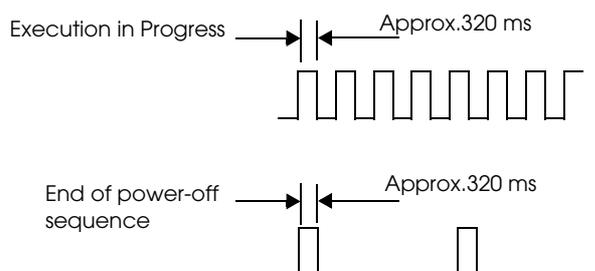
### F.1 Panel LED and Error Status

#### F.1.1 Power (POWER) LED

Power (POWER) LED

Item		Specifications
LED color		Green
On states	On	Power is supplied
	Off	Power is not supplied
	Flashing with short intervals *1	Execution in progress
	Flashing with long intervals *1	Powering down

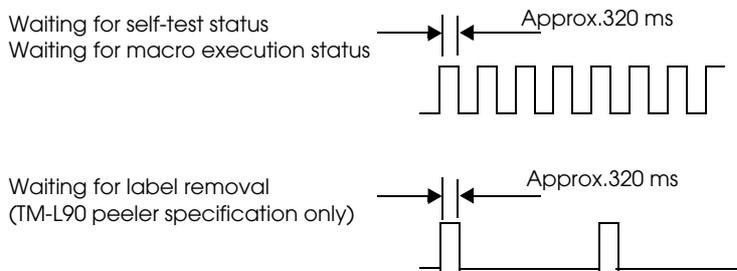
\*1: Power (POWER) LED flashes according to the following patterns.



### F.1.2 No Roll Paper (PAPER OUT) LED

Item		Specifications
LED color		Red
ON states	On	Roll paper near end (only small amount of paper left on roll) or paper end (no paper left) detected
	Off	Plenty of paper left on roll
	Blinking	TM-L90: Waiting for self-test status, or waiting for macro execution status TM-L90 peeler specification: Waiting for self-test status, waiting for macro execution status, or waiting for label removal After removing the issued label, if the PAPER OUT LED continues flashing, the label peeling sensor may be reacting to direct sunlight or the like. Press FEED once.

The PAPER OUT LED flashing pattern is as follows.



### F.1.3 Error (ERROR) LED

Error (ERROR) LED

Item		Specifications
LED color		Red
ON states	On	Roll paper near end (only small amount of paper left on roll) or paper end (no paper left) detected
	Off	Plenty of paper left on roll
	Blinking	Error state or self-test standby state or more standby state when the macro execution command is used.



**Note:**

If an unrecoverable error occurs, turn the power off quickly.

When the error status occurs, stop all of the operations (printing, feeding, autocutting, drawer driving, etc.)

You may choose to make the printer status BUSY or not depending on the memory switch setting. (Refer to the "Setting Memory Switches" on page 2-23 and "Error code" on page F-3.

### F.1.4 Error code

There are three types of error possible: Automatically Recoverable Errors, Recoverable Errors, and Unrecoverable Errors.

For the automatically recover errors, the users do not have to do anything special; instead it will recover automatically when the head temperature cools down or the cover is correctly closed.

For the recoverable errors, the user needs to perform some appropriate action suitable for the error to recover.

If an unrecoverable error occurs, the printer may be damaged. Turn the power off, and take the printer to a dealer for repairs.

#### Automatically recoverable errors

Although normal printer operation is no longer possible when automatically recoverable errors occur, they do not represent printer failure. They are easily corrected through use of the printer's controls.

#### Automatically recoverable errors

Error name	Type of error	Error LED	Flash code	Recovery measure
			Approx. 320 ms	
Roll paper cover open error (when the recoverable error is selected) (*1)	Printing on the roll paper is not performed correctly due to a cover-open			Automatic recovery by closing the roll paper cover
Print head temperature error (*2)	The head has become very hot.			Recovers automatically when the print head cools.



**Note:**

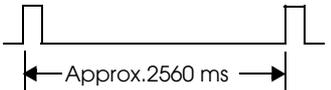
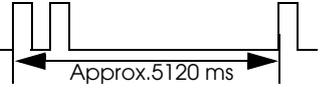
\*1 Use the memory switch Msw8-8 to determine the cover open error as an automatically recoverable error or a recoverable error. (Factory default setting is Recoverable Error.)

\*2 This is not any failure or abnormal condition; it just indicates an error condition in case the head temperature has become very hot due to the continuous use with heavy printing duty. If an abnormal value is detected because of the circuit, the printer judges it a drive circuit error and it becomes an unrecoverable error.

## Recoverable errors

Although normal printer operation is no longer possible when recoverable errors occur, they do not represent printer failure. You can recover from a recoverable error by turning on the power switch or issuing a command from the driver after eliminating the cause.

### Recoverable Errors

Error name	Type of error	Error LED flash code 	Recovery operation
Roll paper cover open error(*1)	Printing on the roll paper is not performed correctly due to a cover-open		After having closed the cover, perform either A or B to recover. A. Send the error recover command from the driver. B. Turn on the power switch again.
Autocutter error (TM-L90 only) (*2)	The autocutter does not work correctly.		After having eliminated the cause of the error, perform either A or B to recover. A. Send the error recover command from the driver. B. Turn on the power switch again.
Paper layout error (*3)	Cannot detect the label or the black mark. The wrong type of the paper, which is not stored in the printer, is currently set.		Perform either A or B to recover. A. Install the same type of paper that is stored in the printer, and then send the error recover command from the driver or turn on the power switch again. B. Turn off the power switch, and then reset the paper layout of the current paper in the printer.



#### Note:

- \*1: Use the memory switch Msw8-8 to determine the cover open error as an automatically recoverable error or a recoverable error. (Factory default setting is Recoverable Error.)
- \*2: With the TM-L90, if an autocutter error occurs due to a paper jam, turn off the power, remove the jammed paper, and turn the power on again.
- \*3: When a paper layout error occurs causing by jamming paper while printing, turn the power off and remove the jammed paper, then turn the power on again.  
You can easily set the paper layout by using the automatic paper layout setting. Refer to "Memory Switch Functions" on page 2-35.

Error recover command is valid only when a recoverable error (excluding automatically recoverable errors) occurs. When a recoverable error occurs, you can recover from the error by sending an error recover command from the driver after eliminating the cause of the error; you do not need to turn on the power switch again.

How to send the error recover command from each of the drivers is as follows.

- ❑ OPOS ADK  
Either use the ClearOutput method or send the error recover command of ESC/POS to the printer.  
For more details, see the manual supplied with your OPOS.
- ❑ APD (Advanced Printer Driver)  
Send the error recover command of ESC/POS to the printer using ControlA font  
For more details, see the manual supplied with your APD and the ESC/POS Application Programming Guide.
- ❑ ESC/POS  
Send the error recover command to the printer  
For more details, see the ESC/POS Application Programming Guide.



**Note:**

*Please contact EPSON for the ESC/POS Application Programming Guide.*

## Unrecoverable errors

Normal printer operation is no longer possible when unrecoverable errors occur. The printer may be out of order. Contact the store for repair.

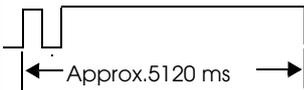
### ❑ TM-L90 unrecoverable errors

#### Unrecoverable Errors

Error name	Type of error	Error LED Flash code	Recovery measure
		 Approx.320 ms	
R/W error in memory	After R/W checking, the printer does not work correctly.	 Approx.5120 ms	Impossible to recover.
High voltage error	The power supply voltage is extremely high.		Impossible to recover.
Low voltage error	The power supply voltage is extremely low.		Impossible to recover.
CPU execution error	The CPU executes an incorrect address or I/F board is not connected.		Impossible to recover.
Internal circuit connection error	Internal circuits are not connected correctly.	 Approx.2560 ms	Impossible to recover.
UIB error	An abnormal operation occurs in UIB.		Impossible to recover.

❑ TM-L90 peeler specification unrecoverable errors

*Unrecoverable Errors*

Error name	Type of error	Error LED Flash code	Recovery measure
		 Approx.320 ms	
R/W error in memory	After R/W checking, the printer does not work correctly.	 Approx.5120 ms	Impossible to recover.
High voltage error	The power supply voltage is extremely high.	 Approx.2560 ms	Impossible to recover.
Low voltage error	The power supply voltage is extremely low.	 Approx.2560 ms	Impossible to recover.
CPU execution error	The CPU executes an incorrect address or I/F board is not connected.	 Approx.2560 ms	Impossible to recover.
Internal circuit connection error	Internal circuits are not connected correctly.	 Approx.2560 ms	Impossible to recover.
UIB error	An abnormal operation occurs in UIB.	 Approx.2560 ms	Impossible to recover.



**Note:**

When an unrecoverable error occurs, turn off the power supply immediately.  
Unplug the power cable from the printer body when the power switch is invalid.

***F.2 The autocutter is jammed or the roll paper cover will not open (TM-L90 only)***

1. Turn off the power.
2. Insert a flathead screwdriver into the groove shown in the figure, and push up the cover.



Side view closeup



**Note:**

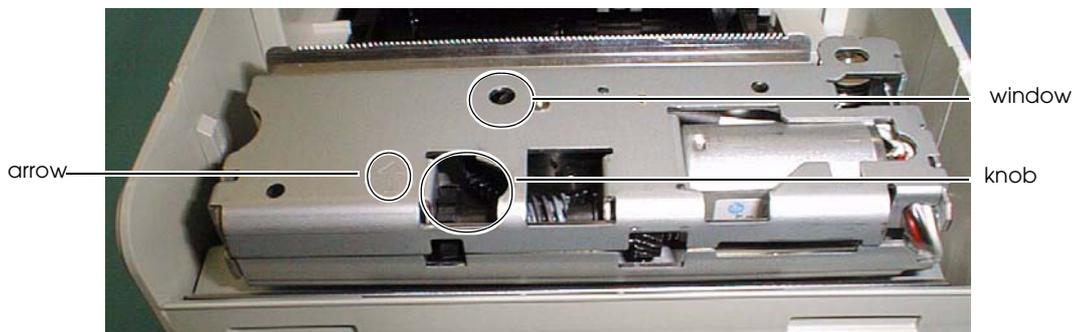
*There is also a similar slot on the opposite side face. You can easily remove the cutter cover by lifting it while pushing the printer cover out from both sides simultaneously.*

3. Remove the cutter cover.



cutter cover

4. Use a ballpoint pen or tweezers to turn the knob in the direction of the arrow indicated until you see the triangle in the window.



window

knob

arrow

---

**F.3 When a paper jam occurs (TM-L90 peeler specification)**

1. Turn off the power.
2. Press the peeler cover open lever, and open the peeler cover.
3. Press the roll paper cover open lever, and open the roll paper cover.
4. Check for a paper jam, and remove the paper.
5. Insert the roll paper.

---

**F.4 The printer became inoperative after you change the interface reset signal in the memory switch setting mode**

If you make a signal setting different from that of the connected interface while changing the interface reset signal in the memory switch setting mode, the printer may become inoperative (e.g. the FEED switch quits working).

In such a case, disconnect the connected cable to recover from the inoperative status temporarily. After that, set the interface reset signal again to meet your interface in the memory switch setting mode.



## Appendix G

---

# Shipping Procedures

Perform the following measures before shipping the printer.

1. Hold down the POWER switch 3 seconds or more, or turn off the printer from the host computer.
2. Check that the POWER LED is off.
3. Remove the power supply connectors.
4. Pack the printer, keeping it right-side-up.





**EPSON**

**SEIKO EPSON CORPORATION**

Printed in Japan