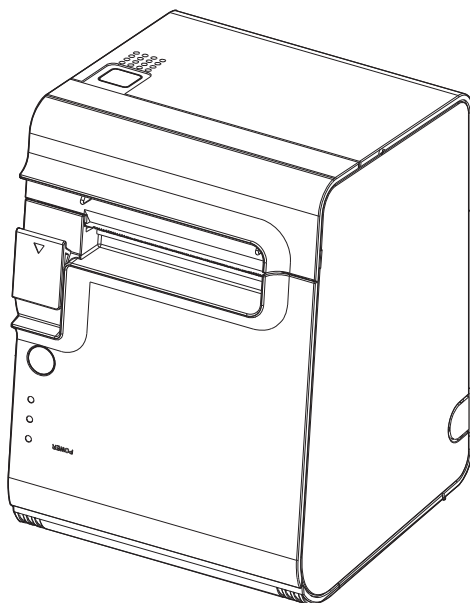


TM-L90-i

Technical Reference Guide



Product Overview

Describes features and general specifications for the product.

Setup

Describes setup and installation of the product and peripherals.

Application Development Information

Describes how to control the printer and necessary information when you develop applications.

Handling

Describes how to handle the product.

Appendix

Describes character code tables.

Cautions

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ESC/POS® Command System

EPSON has been taking industry's 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 (excluding the TM-C100) and displays. Moreover, its flexibility makes it easy to upgrade the future. The functionality and the user-friendliness is valued around the world.

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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.
 CAUTION	Provides information that must be observed to avoid damage to your equipment or a malfunction.
 NOTE	Provides important information and useful tips.

Warnings



- **To avoid risk of electric shock, do not set up this product or handle cables during a thunderstorm**
- **Never insert or disconnect the power plug with wet hands.**
Doing so may result in severe shock.
- **Handle the power cable with care.**
Improper handling may lead to fire or electric shock.
 - * Do not modify or attempt to repair the cable.
 - * Do not place any heavy object on top of the cable.
 - * Avoid excessive bending, twisting, and pulling.
 - * Do not place the cable near heating equipment.
 - * Check that the plug is clean before plugging it in.
 - * Be sure to push the plug all the way in.
- **Be sure to use the specified power source.**
Connection to an improper power source may cause fire or shock.
- **Do not place multiple loads on the power outlet.**
Overloading the outlet may lead to fire.
- **Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise.**
Continued use may lead to fire. Immediately unplug the equipment and contact your dealer or a Seiko Epson service center for advice.
- **Never attempt to repair this product yourself.**
Improper repair work can be dangerous.
- **Never disassemble or modify this product.**
Tampering with this product may result in injury or fire.
- **Do not allow foreign matter to fall into the equipment.**
Penetration by foreign objects may lead to fire.
- **If water or other liquid spills into this equipment, do not continue to use it.**
Continued use may lead to fire. Unplug the power cord immediately and contact your dealer or a Seiko Epson service center for advice.
- **If you open the DIP switch cover, be sure to close the cover and tighten the screw after adjusting the DIP switch.**
Using this product with the cover open may cause fire or electric shock.
- **Do not use aerosol sprayers containing flammable gas inside or around this product.**
Doing so may cause fire.

Cautions



- **Do not connect cables in ways other than those mentioned in this manual.**
Different connections may cause equipment damage or fire.
- **Be sure to set this equipment on a firm, stable, horizontal surface.**
The product may break or cause injury if it falls.
- **Do not use this product in locations subject to high humidity or dust levels.**
Excessive humidity and dust may cause equipment damage or fire.
- **Do not place heavy objects on top of this product. Never stand or lean on this product.**
Equipment may fall or collapse, causing breakage and possible injury.
- **Take care not to injure your fingers on the manual cutter**
 - * When you remove printed paper
 - * When you perform other operations such as loading/replacing roll paper
- **Do not open the roll paper cover without taking the necessary precautions, as this can result in injury from the autocutter fixed blade.**
- **To ensure safety, unplug this product before leaving it unused for an extended period.**
- **When connecting external devices to the USB (including Micro-USB) connectors, follow the precautions below.**
 - * Confirm the rated current of the external devices by checking the descriptions on the devices or manuals. Do not use a device whose rated current is unclear.
 - * Use the UL-approved external devices (only for North American users).
 - * Connect the external devices only when those total rated current is less than 2.0A.

Wireless LAN (OT-WL01) Important Safety Information



- **May exert electromagnetic interference on, and cause malfunction of, cardiac pacemakers.**
Before using this product, check that there is no one in the vicinity using a cardiac pacemaker.
- **May exert electromagnetic interference on, and cause malfunction of, sensitive medical equipment.**
Before using this product, check that there is no sensitive medical equipment in the vicinity.
- **Use of this product on aircraft may be restricted in some countries.**
Before using this product, check that use of this product is not restricted on the aircraft.
- **Never attempt to repair this product yourself.**
Improper repair work can be dangerous.
- **Never disassemble or modify this product.**
Tampering with this product may result in injury or fire.



- **OT-WL01 is only for indoor use.**
- **OT-WL01 should only be used for EPSON TM Intelligent Printers.**
If it is installed on another device, it may result in computer failure, damage, or malfunctions.
- **To comply with RF exposure compliance requirements, a distance of at least 20 cm must be maintained at all times between the antenna of OT-WL01 and people in the vicinity.**
- **Do not store in locations with high temperatures or high humidity.**
It may in particular be damaged or deformed if left in a vehicle with the windows shut, or placed in locations with unusually high temperatures for extended periods such as in direct sunlight.
- **Do not get OT-WL01 wet.**
This may cause malfunctions to occur.
- **Do not use near microwave ovens.**
Wireless communication may be interrupted by electromagnetic interference generated by microwave ovens.
- **Do not drop it, subject it to shocks, or place heavy objects on it.**

Wireless LAN (OT-WL01) Usage Precautions

Wireless Telegraphy Act Regulations

The following acts are prohibited by the Wireless Telegraphy Act.

- Modifying and disassembling (including the antenna)
- Removing the label of conformance

Notes on Security when Using Wireless LAN

(Important information on customer rights (maintaining privacy))

The advantage of using a wireless LAN over a LAN cable is that, because information is exchanged using radio signals, you can easily connect to the network if you are within range of the radio signals. A disadvantage of this is that within a certain range, the electromagnetic signals can pass through barriers such as walls, so that if security countermeasures are not implemented in some way, problems such as the following may occur.

- Communication data can be intercepted
A third party may be able to receive wireless transmissions without authorization, and they could obtain personal information from these transmissions such as IDs, passwords, or credit card numbers, or they could intercept the contents of personal e-mail messages.
- Unauthorized access to the network
A third party could access an individual or intra-company network without permission and carry out any of the following activities.
 - Retrieve personal data or other secret information (information leakage)
 - Pose as another user and send inappropriate data (impersonation)
 - Overwrite the contents of intercepted data and resend it (falsification)
 - Introduce a computer virus which could cause data loss or system crashes (damage)

Initially, the possibility that such problems could occur through settings concerning the security of the wireless LAN product and by using the product are decreased, because the wireless LAN card and the access point have security measures to deal with these problems. We recommend that you use this product after making security settings using our own judgement and assuming full responsibility, and with your full understanding of problems that may occur if you do not make any security settings.

Notes on Setting SSID (Service Set Identifier)

For protection of security, note the following precautions when setting the SSID.

- Change the SSID from the default setting.
- Do not set texts by which the owner can be identified as the SSID.

Notes on Setting Cryptographic Key

For protection of security, note the following precautions when setting the cryptographic key.

- Avoid using words on a dictionary as practicably as possible.
- Combine meaningless alphanumeric characters and symbols.
- Use texts consisted of at least 13 characters or more or of 20 characters or more if possible.

Restriction of Use

When this product is used for applications requiring high reliability/safety, such as transportation devices related to aviation, rail, marine, automotive, etc.; disaster prevention devices; various safety devices, etc.; or functional/precision devices, etc., you should use this product only after giving consideration to including fail-safes and redundancies into your design to maintain safety and total system reliability. Because this product was not intended for use in applications requiring extremely high reliability/safety, such as aerospace equipment, main communication equipment, nuclear power control equipment, or medical equipment related to direct medical care, etc., please make your own judgment on this product's suitability after a full evaluation.

About this Manual

Aim of the Manual

This manual was created to provide information on development, design, and installation of receipt issue systems and development and design of printer applications for developers.

Manual Content

The manual is made up of the following sections:

Chapter 1	Product Overview
Chapter 2	Setup
Chapter 3	Application Development Information
Chapter 4	Handling
Appendix	Character Code Tables

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Product Overview

This chapter describes features and specifications of the product.

Features

The TM-L90-i is a supporting ePOS-Print XML, high-speed, power-saving thermal receipt printer that can print on die-cut/full-surface labels and thick paper. Its compact size allows installation in a variety of areas. It is a model of the TM-i series.

Printing

- Printing on die-cut labels (labels pre-cut to the desired size) is possible.
- Printing on full-surface labels (labels cut to the desired size with an auto cutter) is possible.
- Printing on thick paper (up to 145μm) is possible.
- Supports a maximum paper width of 80mm, and paper widths of 38mm to 70mm when using a roll paper spacer.
- Roll paper with a maximum 90mm diameter can be used.

Handling

- Can be installed horizontally or vertically.
- Easy drop-in paper loading
- Cable connectors can be stored inside the printer.

Intelligent functions

- Supports ePOS-Print.
- Direct server printing with data sent from a web server to the printer (supported by ePOS-Print XML)
- Printer driver is not required.

Software

- Highly versatile through the adoption of control commands that conform with ESC/POS.
- In addition to a variety of bar codes, printing 2-dimensional symbols (PDF417, MaxiCode, QRCode) is possible.
- A maintenance counter function is supported.

Interface

- Ethernet interface, USB host with 4 ports.

Others

- Development kits such as MSDN are not required for application development.
- Registering web pages on the TM-L90-i makes them accessible on the Web.
- Methods to efficiently construct multiple systems are included. For details, see the "TM-i series Easy Setup Guide".

Product Configurations

Autocutter

- Full cut (cuts paper completely)

Colors

- ECW (Epson Cool White)
- EDG (Epson Dark Gray)

Accessories

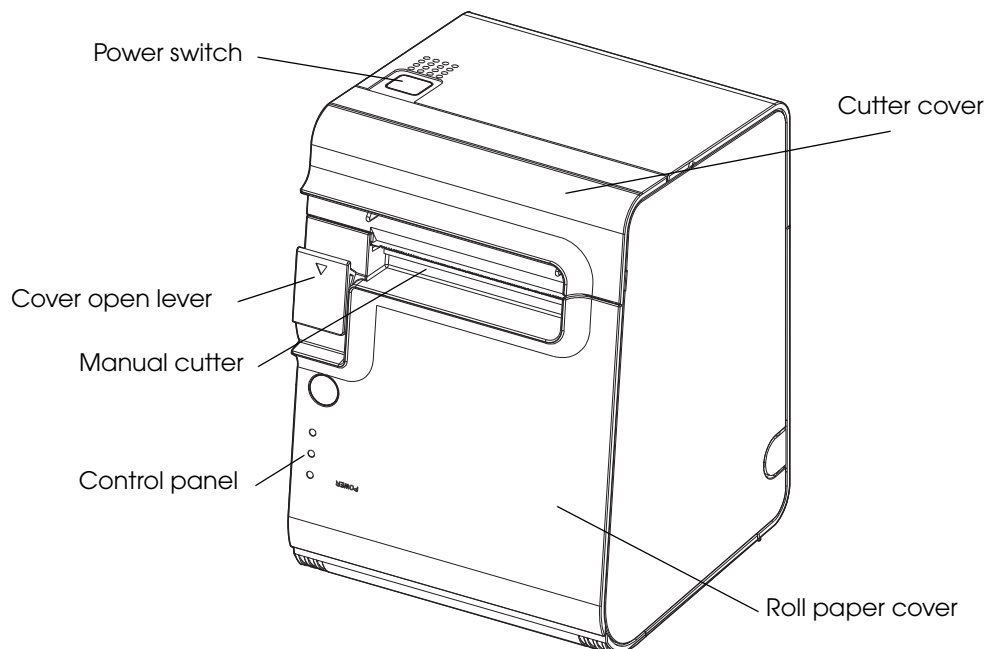
Included

- Dedicated AC adapter
- AC cable
- Power switch cover
- Paper roll spacer
- Screw for the paper roll spacer
- Panel label for horizontal installation
- Paper exit guide
- Label roll paper (for operation check)
- User's manual

Options

- Wireless LAN cable set (Model: OT-WL01)
- Affixing Velcro tape (Model: DF-10)

Part Names and Functions



Power Switch

When DIP switch 1 is OFF (power switch: enabled), the power is turned ON/OFF. Press and hold the switch for 1 second to turn the power on, and 3 seconds to turn the power off. After turning the power on, approximately 30 seconds is required before printing is possible.

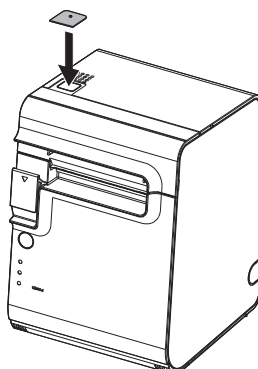
CAUTION

- Before turning on the printer, be sure to check that the AC adapter is connected to the power supply.
- It is recommended that a power-off processing command be sent to the printer before turning the power off. Doing so allows the latest maintenance counter value to be saved. (Maintenance counter values are generally saved every two minutes.)
For more information about commands, see the "ESC/POS Application Programming Guide".

Power Switch Cover

Install the power switch cover that comes with the TM-L90-i onto the printer to prevent inadvertent changing of the power switch, to prevent tampering, and to improve the appearance of the printer.

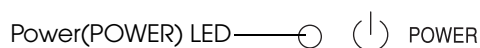
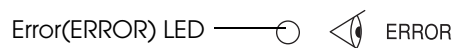
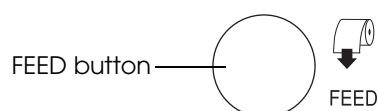
To reset the printer when the power switch cover is installed, insert a long, thin object (such as the end of a paper clip) into the hole in the power switch cover and press the power switch.



If a failure occurs while the power switch cover is attached, immediately remove the connector cover and remove the power cord.

Otherwise, using the printer in this condition could cause a fire.

Control Panel



NOTE

- If the printer is installed horizontally, affix the control panel label for horizontal use. The control panel for horizontal use is reversed top to bottom compared to the normal installation.
- A FEED button is also located on the inside of the roll paper cover.
(See ["Memory Switch Setting Mode" on page 128](#))

LEDs

Paper roll end(PAPER OUT) LED

- Lights when there is no more roll paper or there is little remaining.
- Off when there is a sufficient amount of roll paper remaining.
- Flashes when a self-test printing standby state and macro execution standby state.

NOTE

You can use the memory switch (Msw8-3) to set whether the PAPER LED flashes when there is little roll paper remaining.
(See ["Setting the Memory Switches" on page 96](#))

Error(ERROR) LED

- Lights when the end of the roll paper is detected, and when printing has stopped (offline). If this happens, replace the roll paper.
- Goes out during regular operation (online).
- Flashes when an error occurs. (For details about the flash codes, see ["Error Status" on page 24.](#))

Power(POWER) LED (green)

- Lights when the power supply is on.
- Goes out when the power supply is turned off.

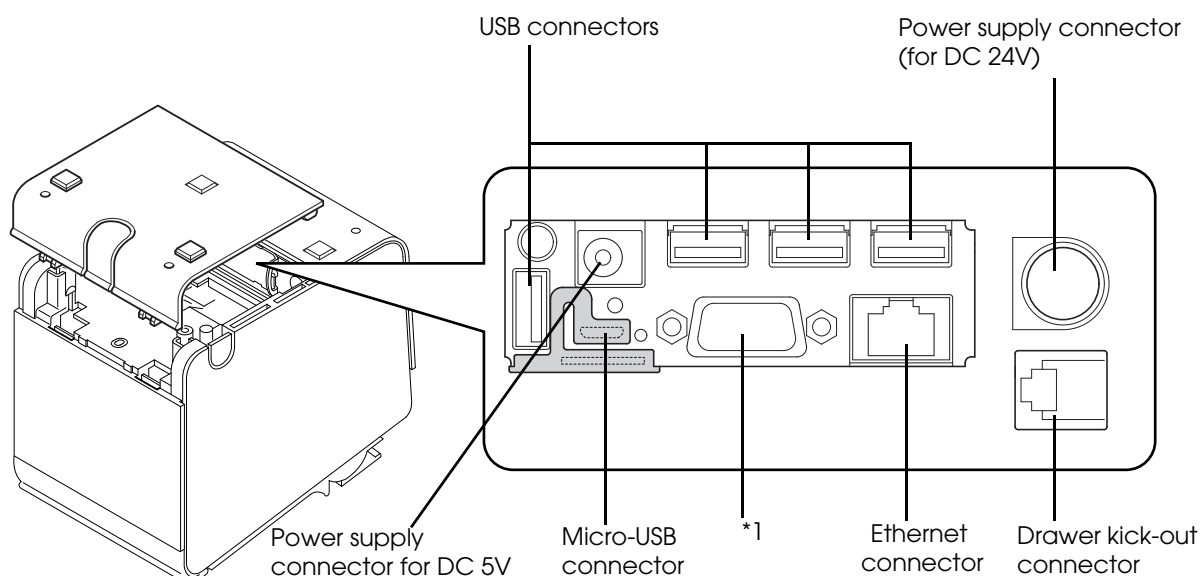
FEED button

When this button is pressed for receipt paper, the receipt is fed only 1line; for label paper, the entire sheet is fed.

Holding this button down feeds the roll paper continuously.

Connectors

When the connector cover is opened, you will see various connectors, a microSD card slot, and push buttons.



Connector

- | | |
|--------------------------------------|---|
| • USB connector: | Connects optional products. |
| • Power supply connector for DC 24V: | Connects a power supply unit. |
| • Drawer kick-out connector: | Connects a cash drawer or the optional buzzer unit. |
| • Ethernet connector: | Connects the printer with a host computer. |
| • Micro-USB connector: | Connect a micro USB (A-MicroB type) cable. This cable is used only for configuration. |
| • Power supply connector for DC 5V: | Connects a power supply unit. |

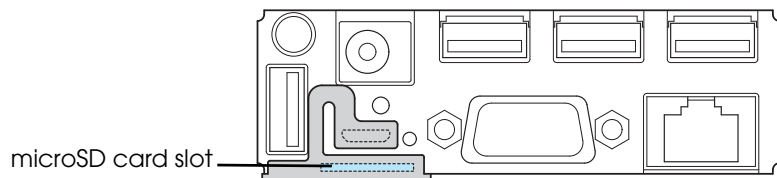
*1: Analog RGB connector (Currently not available.)

NOTE

For more information about connecting to a network, a power unit, a cash drawer, or other external devices, see ["Connecting the Printer to the System" on page 67](#), ["Connecting the Power Supply Unit" on page 65](#), ["Connecting the Cash Drawer" on page 63](#), and ["Connecting to External Devices" on page 137](#).

microSD Card Slot

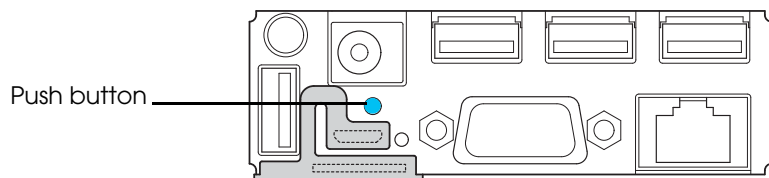
Insert a microSD card. When PHP functionality is enabled.



For more information about how to set up the PHP environment, see the "TM-i series PHP Setup Manual".

Push Button

The push button on the lower rear of the printer prints a status sheet or initializes the printer.



The push button has below function:

- Status sheet printing:
Make sure the printer is turned on, press the push button for approximately 3 seconds. When you release the button, a status sheet on which network parameters are printed will be ejected. (See "[Confirming with a status sheet](#)" on page 78.)
- Initialization:
Make sure the printer is turned on, press the push button for approximately 10 seconds. When you release the button, all setting will be initialized. (See "[Initializing the Network Setting](#)" on page 83.)

Offline

The printer automatically goes offline under the following conditions:

- During power on (including resetting with the interface) until the printer is ready
- During the self-test
- While paper is fed using the Feed button
- When the cover is open
- When there is no paper and printing is stopped
(when the roll paper end detector indicates there is no paper)
- Macro execution standby
- When an error has occurred

Error Status

There are three possible error types: automatically recoverable errors, recoverable errors, and unrecoverable errors. Check the error LED flash code.

When connection to external devices fails, check the status LEDs at the lower rear of the printer.

Automatically Recoverable Errors

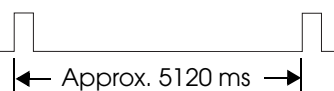
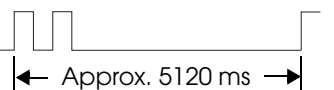
Printing is no longer possible when automatically recoverable errors occur. They can be recovered easily, as described below.

Error	Error description	Error LED flash code  Approx. 320 ms	Recovery measure
Roll paper cover open error *	The roll paper cover was opened during printing.		Recovers automatically when the roll paper cover is closed.
Print head temperature error	A high temperature outside the head drive operating range was detected.		Recovers automatically when the print head cools.

*: When memory switch 8-8 is set to OFF (roll paper cover open while printing: auto reset error)

Recoverable Errors

Printing is no longer possible when recoverable errors occur. They can be recovered easily by turning the power on again after eliminating the cause of the error.

Error	Error description	Error LED flash code 	Recovery measure
Roll paper cover open error *	The roll paper cover was opened during printing.		Close the roll paper cover, and reset by executing the error reset command or turning the power off and back on again.
Autocutter error	The autocutter does not work correctly.		Remove the jammed paper or foreign matter in the printer, close the roll paper cover, and then turn the power on to recover.
Paper layout error	Cannot detect the label or the black mark.		If the paper is jammed, clear the jam, close the roll paper cover, and then execute the error reset command or turn the power off and back on again.

*: When memory switch 8-8 is set to ON (roll paper cover open while printing: reset possible error)

CAUTION

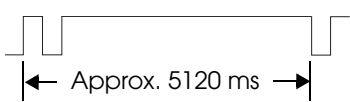
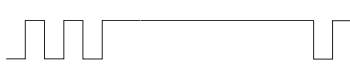
The error reset command is enabled only when a reset possible error (not including auto reset errors) occurs.

Unrecoverable Errors

Printing is no longer possible when unrecoverable errors occur. The printer must be repaired.

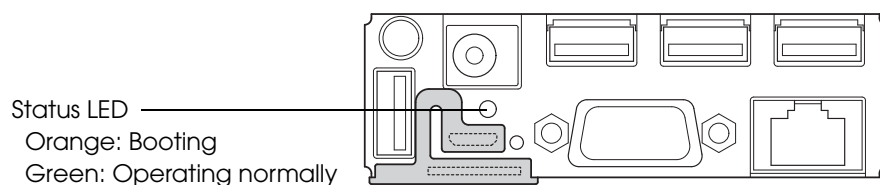


Turn off the power immediately when unrecoverable errors occur.

Error	Error description	Error LED flash code 
Memory R/W error	After R/W checking, the printer does not work correctly.	
High voltage error	The power supply voltage is extremely high.	
Low voltage error	The power supply voltage is extremely low.	
CPU execution error	The CPU is executing an incorrect address.	
Internal circuit connection error	Internal circuits are not connected correctly.	
Interface error	An abnormal operation occurs in interface.	

No Connection to External Devices

When connection to external devices is not possible, check the status LED at the back of the printer.



When the status LED is lit in green

- Check whether the interface cable or the optional wireless LAN cable set is connected correctly. (See ["Connecting to External Devices" on page 137.](#))
- Print the status sheet to check whether the network settings are correct. (See ["Confirming Network Setting" on page 78.](#))

When the status LED is lit in orange

When the status LED is off after turning on the printer or remains lit in orange even if 30 seconds have passed after turning on the printer, the interface board needs repairing.

NV Memory (Non-Volatile Memory)

The printer's NV memory stores data even after the printer power is turned off. NV memory contains the following memory areas for the user:

- NV graphics memory
- User NV memory
- Memory switches
- User-defined page
- Maintenance counter
- Paper layout settings

CAUTION

As a guide, NV memory rewriting should be 10 times or less a day when you program applications.

NV Graphics Memory

Graphics, such as shop logos to be printed on receipts, can be stored.

Use the TM Flash Logo Setup Utility to register graphics.

User NV Memory

You can store and read text data for multiple purposes, such as for storing a note including customizing or maintenance information of the printer.

Memory Switches

You can make a variety of printer settings, such as print density and printing speed.

For more information about memory switches, see ["Setting the Memory Switches" on page 96](#).

User-defined Page

You can store character data in the user-defined page (character code table: page 255) so that you can also print characters not resident in the printer.

Maintenance Counter

With this function, printer information, such as the number of line feeds, the number of autocuts, and printer operation time after the printer starts working, is automatically stored in NV memory. Refer to the counter information when performing regular maintenance and replacing parts.

Paper layout settings

Paper layouts can be registered in this printer.

Registration is performed through panel operations or by executing commands.

NOTE

If a paper layout is not registered, the printer will automatically determine the layout. The results of this determination are temporarily saved in the printer. Whenever the printer is turned on or the roll paper cover is closed, the paper is fed and the printer automatically determines the paper layout.

(See "[Auto paper determination](#)" on page 95.)

Product Specifications

Printing method		Thermal line printing
Cutting method		Full cut
Roll paper		79.5 ± 0.5 mm (3.13 ± 0.02") (Paper width: 80 mm) (with the paper roll spacer: 38 to 70mm)
Interfaces		Ethernet (10Base-T/100Base-TX) Wireless LAN (IEEE802.11b/g/n)* ¹ USB2.0 (for optional products) Micro-USB (for setting)
Buffers	Receive buffer	4 KB/45 bytes (selectable using DIP switch 1-2)
	User-defined buffer	Downloaded bit image: Approximately 12KB User-defined characters: Approximately 11KB
	Macro buffer	2KB
	NV graphics data area	0 to 384KB
	NV user memory	1 to 192KB
	Page mode area	106KB
Barcode/two-dimensional symbol/printing		JAN 8 (EAN 8), JAN 13 (EAN 13), UPC-A, UPC-E, CODE 39, ITF, CODABAR (NW-7), CODE 93, CODE 128, PDF417, QR CODE, MaxiCode
Power supply		EPSON AC ADAPTER, RA (Model: M266A)
Life* ²	Mechanism	Label: 1,000,000 labels issued Receipt(thickness type):10,000,000 lines Receipt: 20,000,000 lines
	Thermal head	150 million pulses 150 km
	MTBF	360,000 hours
	MCBF	70,000,000 lines
Temperature/humidity		Operating: 5 to 45°C {41 to 113°F}, 10 to 90% RH Storage: -10 to 50°C {14 to 122°F}, 10 to 90% RH
Overall dimensions		140 × 148 × 203 mm {5.51 × 5.83 × 7.99"} (W × D × H)
Weight (mass)		Approx. 1.9 kg {4.18 lb} (roll paper excluded)

*1: When the optional wireless LAN cable set (OT-WL01) is used.

*2: This will vary according to the type and model of paper used.

Software Specifications

Print control	ePOS-Print API, ePOS-Print XML (XML Web service is used. No printer driver is required.)
Utility	EPSON TMNet WebConfig • Network setting (Ethernet/Wireless LAN) • Web contents registration • ePOS-Print setting
Controllable printer	WW Model • Following printers with the UB-E02 or UB-R03 embedded * TM-T88V * TM-T88IV* * TM-T70 * TM-T20* * TM-T90 * TM-L90* * TM-U220* • TM-P60II* *: Firmware Ver.3 or later
	TC Model • Following printers with the UB-E02 or UB-R03 embedded * TM-T88V * TM-T88IV * TM-T70 * TM-T90 * TM-L90* * TM-U220* *: Firmware Ver.3 or later
	SA Model • Following printers with the UB-E02 or UB-R03 embedded * TM-T88V * TM-T88IV * TM-T70 * TM-T90 * TM-L90* * TM-U220* *: Firmware Ver.3 or later

Controllable printer	SC Model	• Following printers with the UB-E02 or UB-R03 embedded * TM-T88IV * TM-T70* * TM-L90* * TM-U220* *: Firmware Ver.3 or later
	KO Model	• Following printers with the UB-E02 or UB-R03 embedded * TM-T88IV * TM-L90* * TM-U220* *: Firmware Ver.3 or later
	Number of printers	20 printers at maximum

Intelligent Section Specifications

CPU	Arm9/360MHz
ROM	256MB
RAM	256MB 30MB at maximum for Web contents
OS	Linux Ver. 2.6.30

Printing Specifications

Printing method	Thermal line printing
Dot density	203 × 203 dpi
Printing direction	Unidirectional with friction feed (Reverse feed is not supported.)
Printing width (when the paper width is 80mm)	72.0 mm (2.83"), 576 dots
Characters per line (when the paper width is 80mm)	Font A (12 × 24) 48
	Font B (9 × 17) 57
Maximum print speed* ¹	Normal printing : 120 mm/s High-speed printing : 150 mm/s
Line spacing	3.75 mm {0.15"} (Programmable by control command.)

dpi: dots per inch

*1: When printing with the default print density level at 24V and 25°C {77°F}.

CAUTION

- To change the paper width, you must install the roll paper spacer and change the memory switch. (See ["Customized value" on page 97](#))
- Since it is possible for some areas of the printer head and the auto cutter blades to become worn through direct contact with the platen, it is not possible to change from a narrow width to a wider width once operation has started.

Character Specifications

Number of characters		Alphanumeric characters: 95 Extended graphics: 128 × 11 pages (including one space page) International characters: 37 sets
Character structure		Font A (default): 12 × 24 Font B: 9 × 17
Character size	Font A	Standard: 1.50 × 3.0 mm Double-height: 1.50 × 6.0 mm Double-width: 3.0 × 3.0 mm Double-width, double-height: 3.0 × 6.0 mm
	Font B	Standard: 1.13 × 2.13 mm Double-height: 1.13 × 4.25 mm Double-width: 2.25 × 2.13 mm Double-width, double-height: 2.25 × 4.25 mm

Note:

1. The actual print character may be smaller than the size shown in the table above, because the above size includes spaces in the font.
2. Characters can be scaled up to 64 times as large as the standard size.
3. 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

Paper Specifications

Paper types	Specified thermal paper • Receipt paper, continuous label paper (without black mark) • Receipt paper (with black mark) • Die-cut label paper (without black mark) • Die-cut label paper (with black mark)
Form	Roll paper
Size	Paper width
	83 mm {3.27"} maximum • 79.5 ± 0.5 mm {3.13 ± 0.02"} • 37.5 ± 0.5 mm {1.48 ± 0.02"} to 69.5 ± 0.5 mm {2.74 ± 0.02"}
	Paper thickness
	• Thick receipt paper: 145μm or less • Receipt paper: 62 to 75μm
	Roll diameter
	Maximum 90 mm {3.54"}
	Roll paper spool
	• Receipt (paper thickness is 75μm or less) Inside: 12 mm {0.47"} or more Outside: 18 mm {0.71"} or more • Other than the above Inside: 25.4 mm {1.00"} Outside: 31.4 mm {1.24"}
	Roll width when taken up
	• $80 + 0.5/-1.0$ mm {$3.15+0.02"/-0.04$"} • $38 + 0.5/-1.0$ mm {$3.15+0.02"/-0.04$"} to $70 + 0.5/-1.0$ mm {$2.72+0.02"/-0.04$"}
Specified original paper type	
	Receipt
	• TF60KS-E* (paper thickness: 75μm) (Nippon Paper Industries Co., Ltd.) • TF11KS-ET (paper thickness: 145μm) (Nippon Paper Industries Co., Ltd.) • TF50KS-E* (paper thickness: 65μm) (Nippon Paper Industries Co., Ltd.) • PD150R* (paper thickness: 75μm) (Oji Paper Mfg. Co., Ltd.) • PD160R* (paper thickness: 75μm) (Oji Paper Mfg. Co., Ltd.) • P350* (paper thickness: 62μm) (Kanzaki Specialty Paper (USA)) • F5041* (paper thickness: 60μm) (Mitsubishi HiTec Paper Flensburg GmbH (Germany)) • KF50* (paper thickness: 62μm) (KANZAN Spezialpapiere GmbH (Germany))

Die-cut label paper/ Continuous label paper	• HD-75* (Nippon Paper Industries Co., Ltd.) • HW76B* (Nippon Paper Industries Co., Ltd.) • HW76C* (Nippon Paper Industries Co., Ltd.) • KL470* (NAKAGAWA MFG(USA).Inc.) • KL80GT* (NAKAGAWA MFG (Germany). GmbH.) • 150HA* (Ricoh Co., Ltd.)
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*: Paper for high-speed printing. Depending on the memory switch (customized values) settings, this paper can allow printing at the printer's maximum printing speed (Level 9: approximately 150mm/s).

CAUTION

- Paper must not be pasted to the paper roll spool.
- If a manual cutter is used to cut paper with a thickness of 100μm or greater, the paper will slide out of position easily. Take special care when cutting the paper.
- 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.
- To ensure high printing quality and performance, it is recommended that you make changes to the printing density settings ("[Customized value](#)" on [page 97](#)) according to the roll paper that is used.

Receipt Paper/Continuous Label Roll Paper

When using receipt paper/continuous label roll paper, be sure to use paper that meets the following requirements.

Requirements for Black Mark

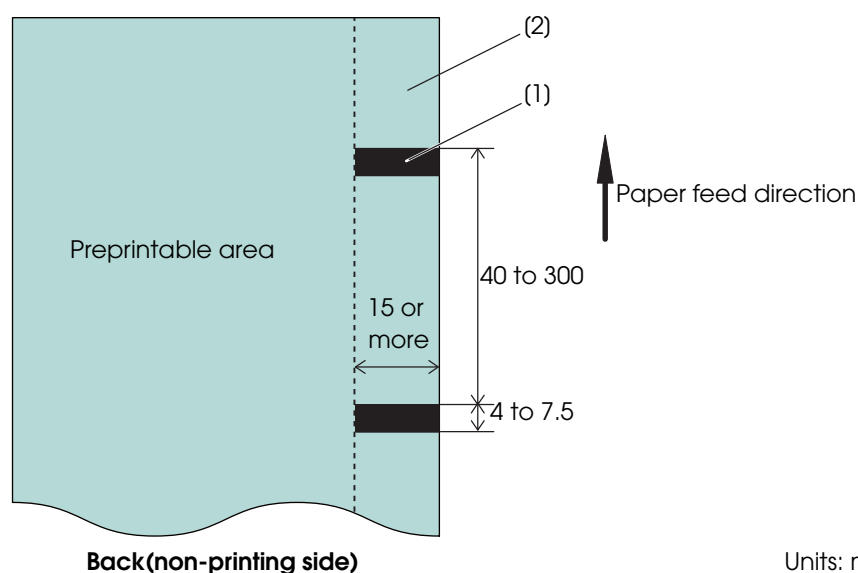
When using receipt paper/continuous label roll paper with black marks, be sure to use paper that meets the following requirements.



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 portions must be printed on the back of the paper (non-printing side).
- The reflecting rates of black mark portions [1] and non black mark portions [2] must meet the combinations shown in the table below :
(Reflecting rates are measured by the Macbeth PCM-II (Filter D) meter, using the back of the paper.)

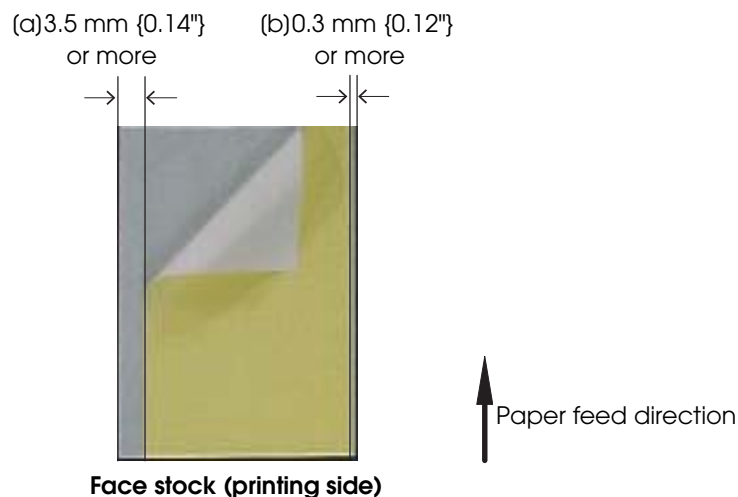
Reflecting rate of black mark portion (1)	17% less	16% less	15% less	14% less	13% less
Reflecting rate of the portion where the black mark does not exist (2)	90% more	85% more	80% more	75% more	70% more



Requirements for the Edge Cutoff of Continuous Label Roll Paper

To prevent the print head from sticking to the adhesive agent, be sure to use continuous label paper that edge cutoff ("Edge cutoff" 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.) has been done.

- When performing a full-cut, for the cutoff edge (a): 3.5 mm {0.14"} or more is not necessary; however, it is recommended that cutoff 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.
- When using a label with 80 mm {3.15"} paper width, the cutoff edge (b) is not necessary; however, it is recommended that cutoff 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.
- In consideration of the cutoff edges, allow the left and right margins of 2.8 mm or more outside the printable area.



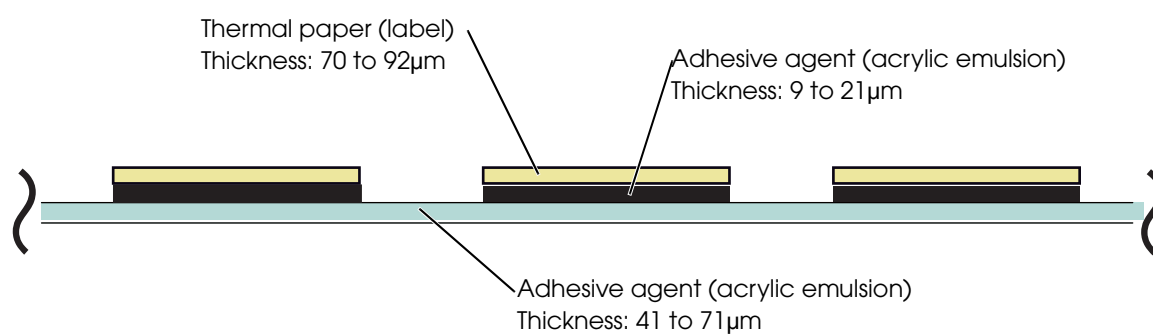
Requirements for thickness and adhesive agent of continuous label roll paper
Requirements if an original paper other than the specified original paper is used are as follows:

- Total amount of thickness of the thermal paper and backing paper: 145 μm or less (without adhesive agent).
- Adhesive agent: Acrylic emulsion

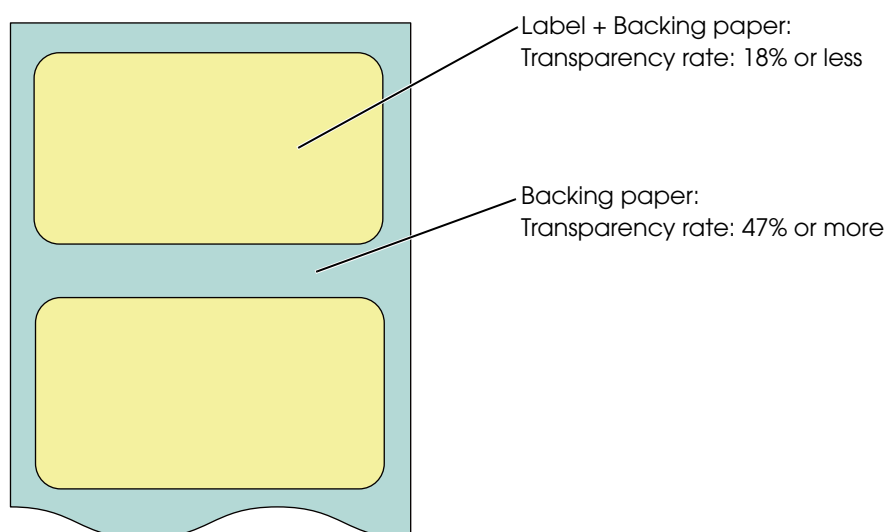
Die-cut Label

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:

1) Paper Thickness, peeling strength, and adhesive agent

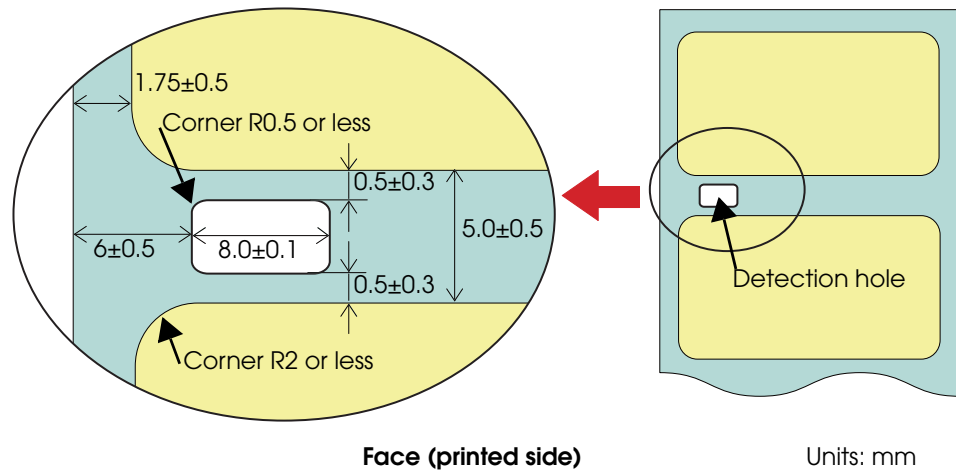


2) Requirements for transparency rate of die-cut label paper



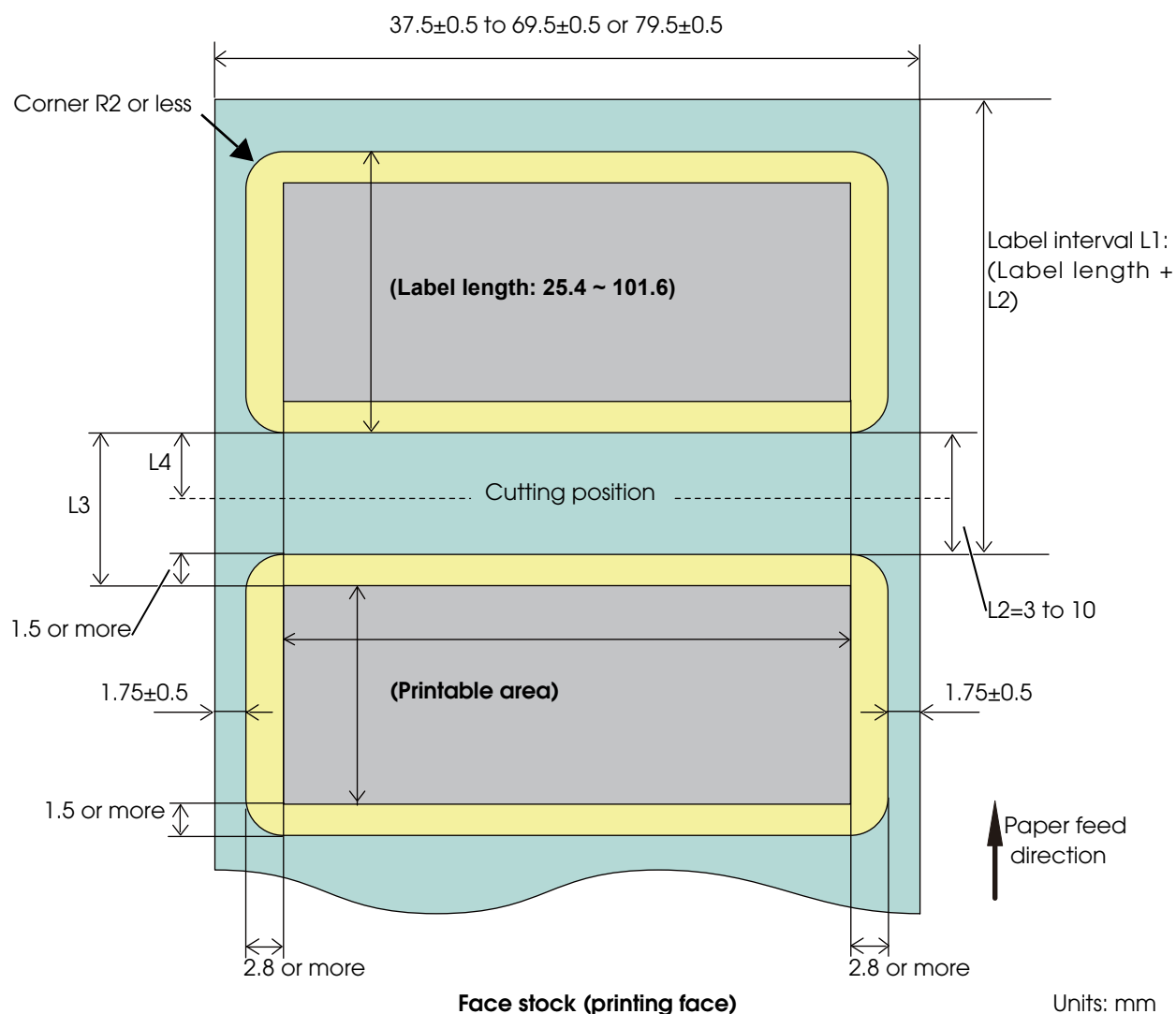
NOTE

- Transparency rates are measured by the Macbeth TD-904 (with a filter for infrared) photometer. The transparency rates are calculated as follows:
Use
 $\text{Density} = \text{Log10} (\text{Amount of irradiation} / \text{Amount of transparency})$
Then,
 $\text{Transparency rate (\%)} = (\text{Amount of transparency} / \text{Amount of irradiation}) \times 100$
- If the transparency rates are out of the specified range (label + backing paper: 18% or less, backing paper: 47% or more), the printer detects a layout error. However, paper identified with a layout error may be used when the detection hole is prepared as follows. The position to detect the label may be shifted by approximately 0.5 mm {0.02"}.



Requirements for die-cut label size (without black marks)

Die-cut labels (without black marks) must satisfy the following requirements.



- Be sure to set the cutting position (L4) to 1.5 mm {0.059"} or more from the label edges at the top and the bottom.
- Be sure that the distance from the cutting position to the print starting position (=L3-L4) is 2.75 mm {0.108"} or more. And the minimum label length must be 25.4 mm {1"}.

Requirements for die-cut label size (with black marks)

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.

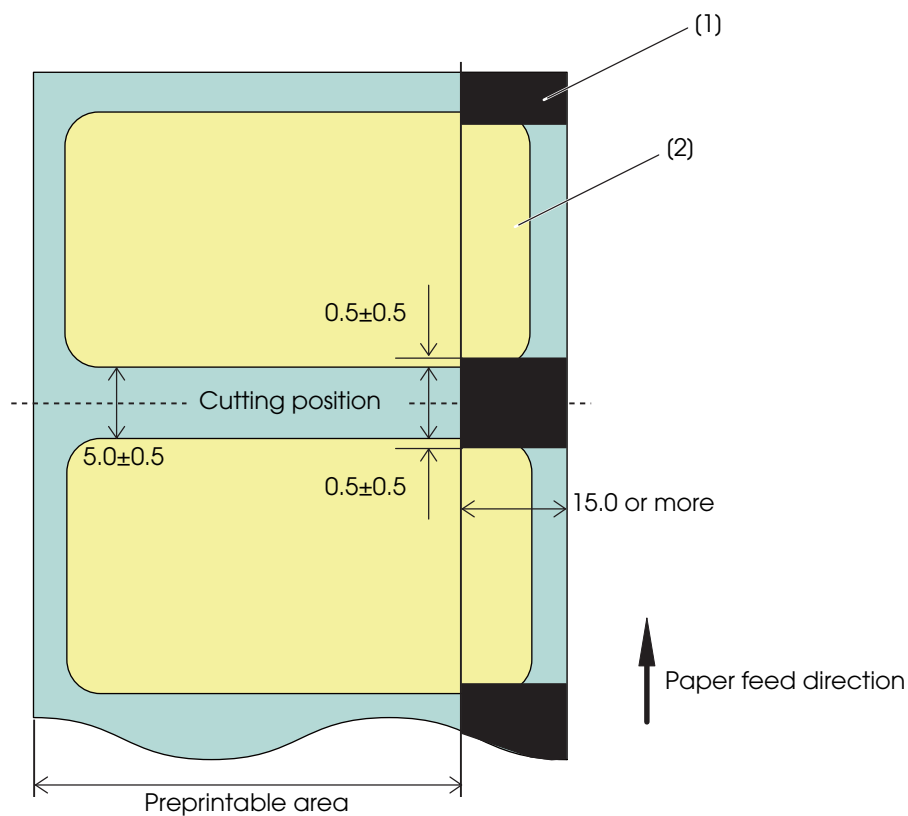
Requirements for Black Mark Position I (when the black mark overlaps the adjacent label)

- Black mark portions must be printed on the back of the paper (non-printing side).
- The length of the black mark must cover the space between labels (backing paper between labels) completely (overlapping labels by 0 to 1 mm).
- 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% less	16% less	15% less	14% less	13% less
Reflecting rate for label portion (2)	90% more	85% more	80% more	75% more	70% more

NOTE

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



Back (non-printing side)

Units: mm

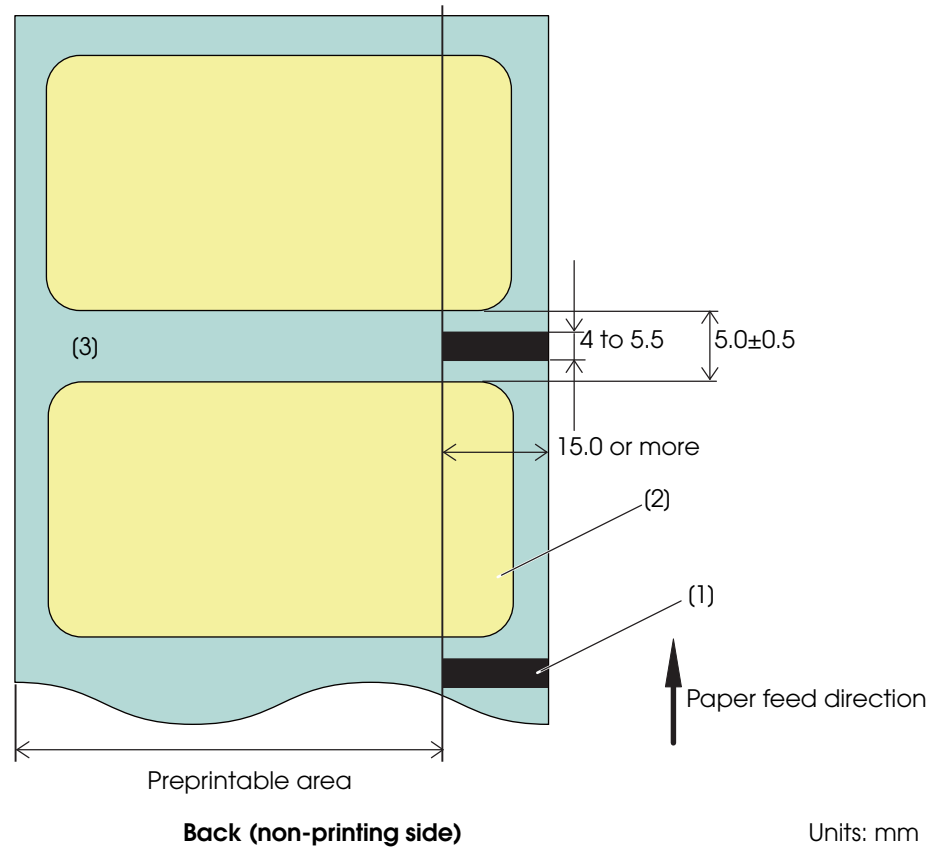
Requirements for Black Mark Position II (when the black mark is between two labels)

- Black mark portions must be printed on the back of paper (non-printing side).
- If label paper meets Black Mark Position Requirement I, it is not necessary to consider Black Mark Position Requirement II.
- The reflective rates of each portion [1], [2], and [3] must meet the combinations shown in the table below (the reflective rate is measured using the back of the paper, the non-printing side):

Reflective rate of black mark portion(1)	17% less	16% less	15% less	14% less	13% less
Reflective rate of the portion where the black mark does not exist (2)(3)	90% more	85% more	80% more	75% more	70% more

NOTE

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



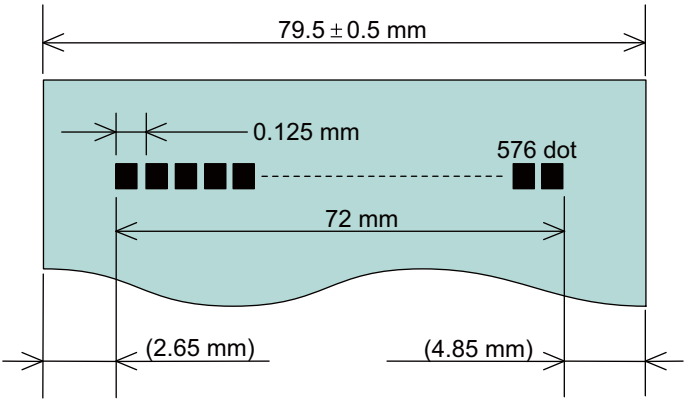
Printable Area

Receipt Paper/Continuous Label Roll Paper

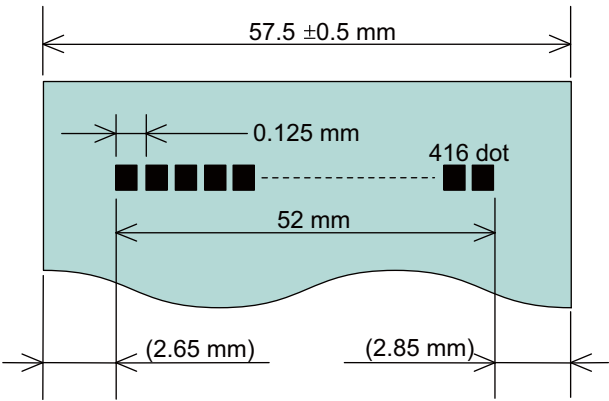
The printable area may be out of alignment by 2 mm {0.08"} maximum (left or right), due to the paper position or tolerance of parts. Please set by referring to the following.

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
Total number of dots	576	512	472	432	416	352	312	256

Example: 80mm paper width



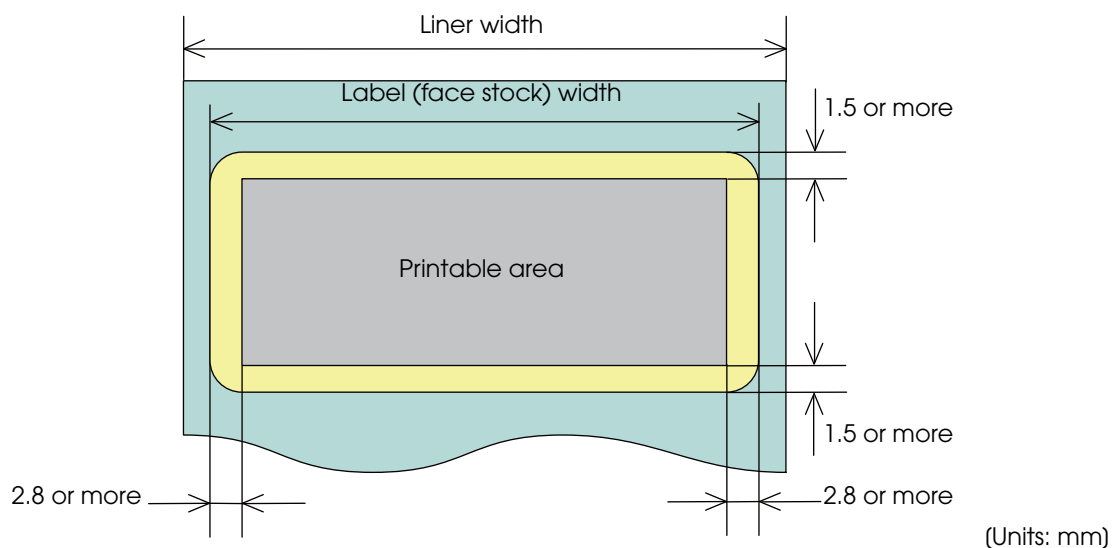
Example: 58mm paper width



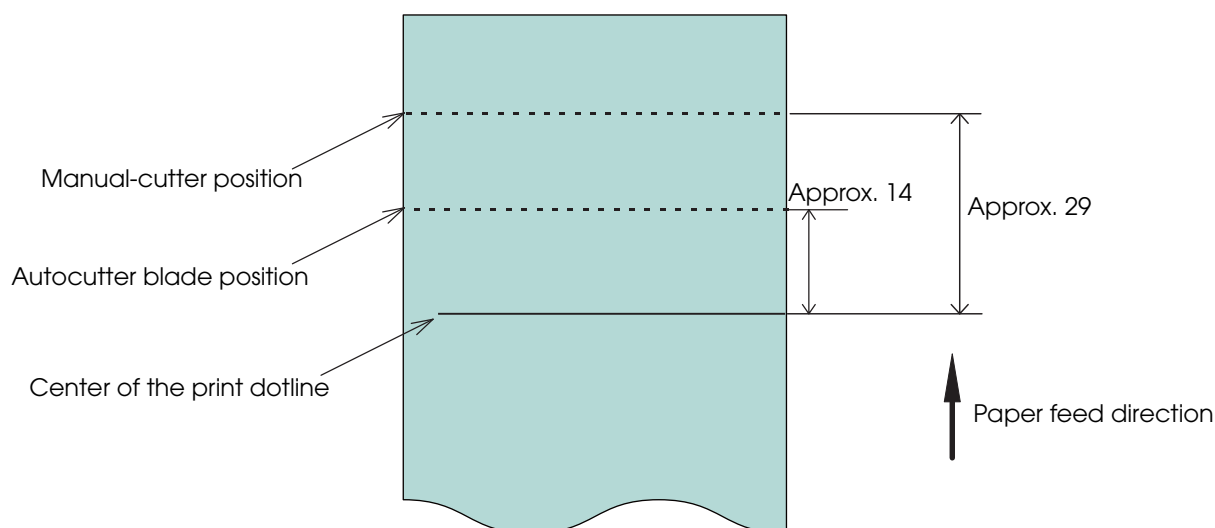
Die-cut Label

Make a margin of 2.8 mm {0.11"} or more from the label edges on both left and right sides and also a margin of 1.5 mm {0.059"} or more from the label edges on top and bottom of the printable area of the label (face stock).

Liner width (mm)	80	70	60	50	45	38
Label 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
Total number of dots	560	480	400	320	280	224



Printing and Cutting Positions



CAUTION

- The values above may vary slightly as a result of paper slack or variations in the paper. Take this into account when setting the cutting position of the autocutter.
- Partial cuts (a portion of the left edge remains) can be made only on receipt paper without black marks or full-surface label paper without black marks.
- When making a partial cut (leaving a portion of the left edge), do not perform a back feed.

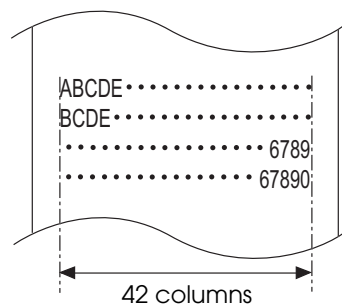
Lengths of receipts/labels

To prevent paper jams or to make it easier to remove printed receipts/labels, the following lengths are recommended for printing receipts/labels.

Use condition	Recommended issuing length
Horizontal installation (full cut)	37.5 mm or more
Horizontal installation (partial cut)	25.4 mm or more
Vertical installation	

Electrical Characteristics

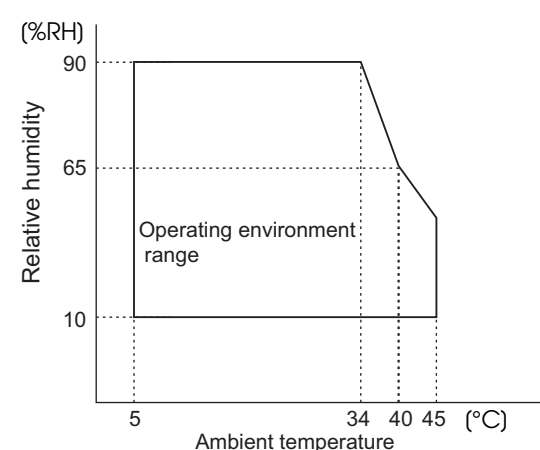
Supply voltage		DC 24V $\pm$ 7%
Current consumption (at 24V, 25°C, normal print density)	Standby	Mean: Approximately 0.1A Maximum 1A for drawer kick-out driving.
	Operating	DC 24V Mean: Approximately 1.7A DC 5V*: Maximum 1.0A/2.5A Note: When print ratio is approximately 18% • Continuous printing for 100 lines (repeating 20H-7FH) * Font A * 42 columns * ASCII character



* When the supply current from the USB connectors is

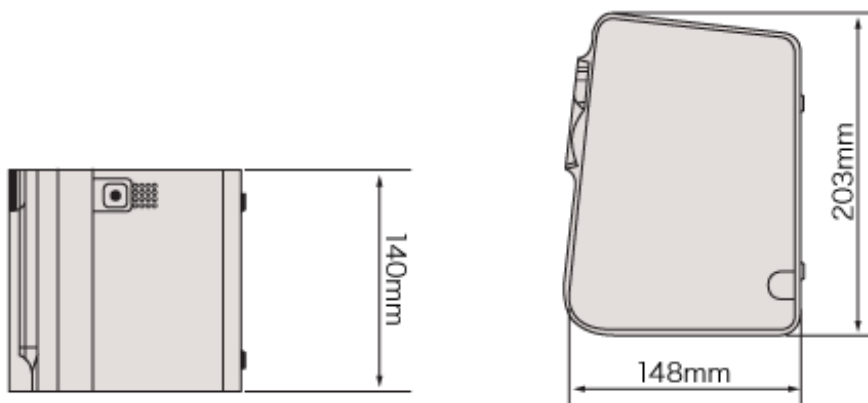
- less than 600mA: Maximum 1.0A
- more than 600mA: Maximum 2.5A

Environmental Conditions

Temperature/ Humidity	Operating	5 to 45°C {41 to 113°F}, 10 to 90% RH (See the operating temperature and humidity range below.)
	Storage (Factory packing)	-10 to 50°C {14 to 122°F}, 10 to 90% RH (except for paper)
		
Acoustic noise (operating)		Approximately 53 dB (bystander position) Note: The values above are measured in the Epson evaluation condition. Acoustic noise differs depending on the paper used, printing contents, and the setting values, such as print speed or print density.

External Dimensions and Mass

- Height: Approximately 203 mm {7.99"}
- Width: Approximately 140 mm {5.51"}
- Depth: Approximately 148 mm {5.83"}
- Mass: Approximately 1.9 kg {4.18 lb} (except for roll paper)



TM-L90-i Dedicated AC Adapter

Input conditions	Input voltage: AC 100V to 240V
	Frequency: 50/60 Hz
	Input current (rating): 1.3A
Output conditions	Output voltage (rating): DC 24V $\pm$ 5%
	Output current (rating): 2.1A

Option Specifications

Wireless LAN Cable Set (OT-WL01)

Wireless module	ELPAP07: 802.11b/g/n wireless LAN Module (EPSON)
Standard	IEEE802.11b/g/n (Wi-Fi certificated)
SSID	1 to 32 one-byte alphabet and numbers
Connection mode	Ad hoc mode, Infrastructure mode
Authentic method, Encryption algorithm	Open+WEP, Shared+WEP, WPA-PSK+TKIP, WPA-PSK+AES, WPA2-PSK+AES, WEP64, WEP128, TKIP, AES
Power voltage	DC 4.5V to 5.5V
Current consumption	300mA at maximum
Frequency range	2.4 GHz band
Potential interference range	40 m
Overall dimensions	Wireless LAN unit: Approx. 24 × 51 × 10 (W × D × H) USB extension cable: 1 m (length)



Setup

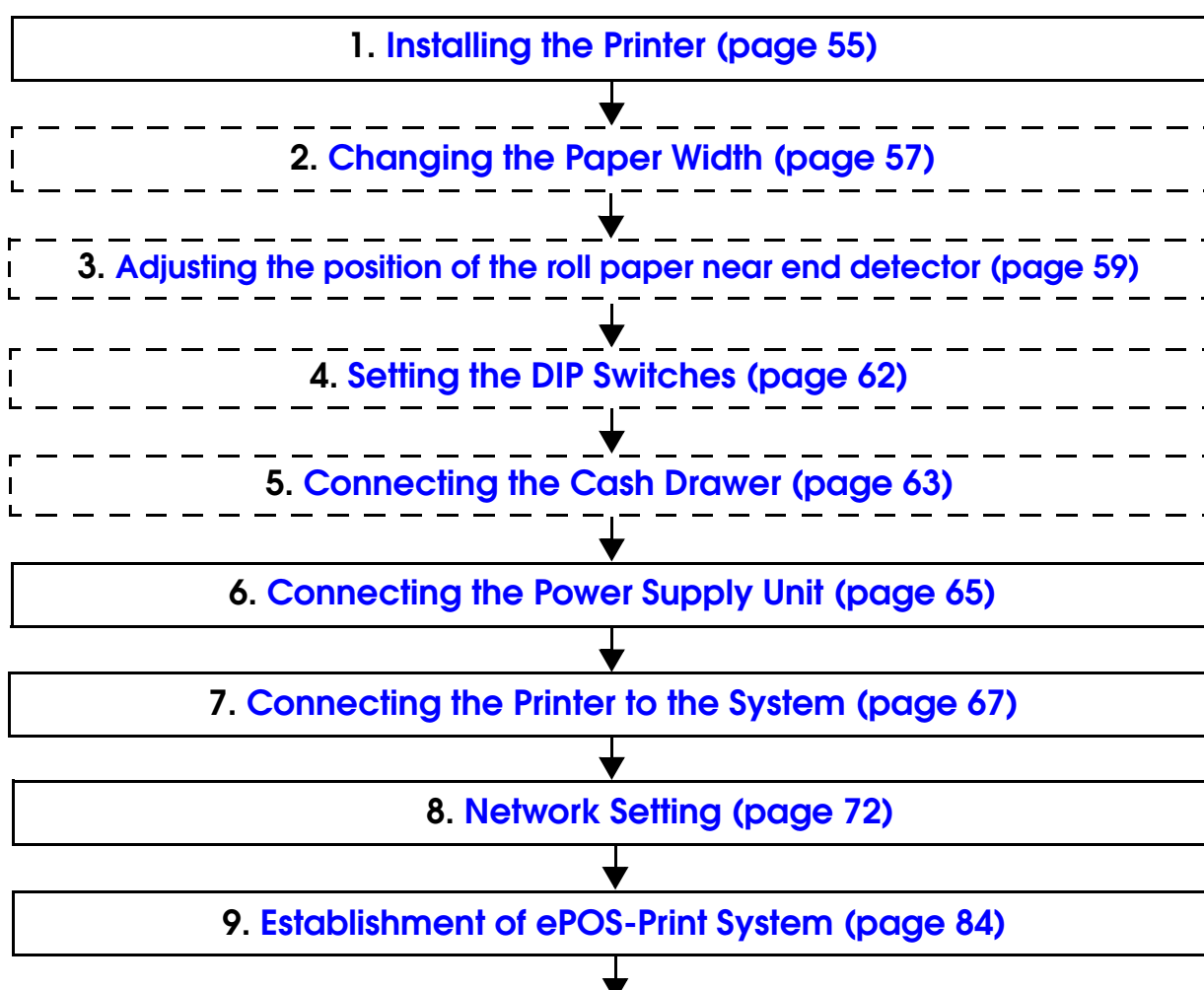
This chapter describes setup and installation of the product and peripherals, and setup for ePOS-Print.

Flow of Setup

This chapter consists of the following sections along with the setup flow of the product and peripherals.

NOTE

In this setup flow, necessary items are in a frame with a solid line. Optional items are explained in an frame with a dotted line.



```
graph TD; A[ ] --> B[10. Setting for Connected Devices (page 87)]; B -.-> C[11. Registering Web Pages (page 89)]; C -.-> D[12. Paper Layout Settings (page 92)]; D -.-> E[13. Setting the Memory Switches (page 96)]; E -.-> F[14. Handling Cables (page 101)];
```

10. [Setting for Connected Devices \(page 87\)](#)

11. [Registering Web Pages \(page 89\)](#)

12. [Paper Layout Settings \(page 92\)](#)

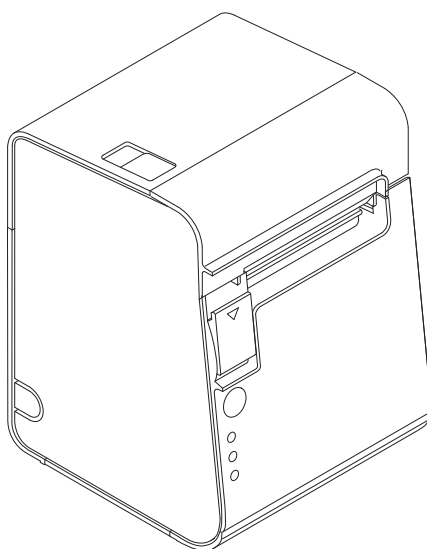
13. [Setting the Memory Switches \(page 96\)](#)

14. [Handling Cables \(page 101\)](#)

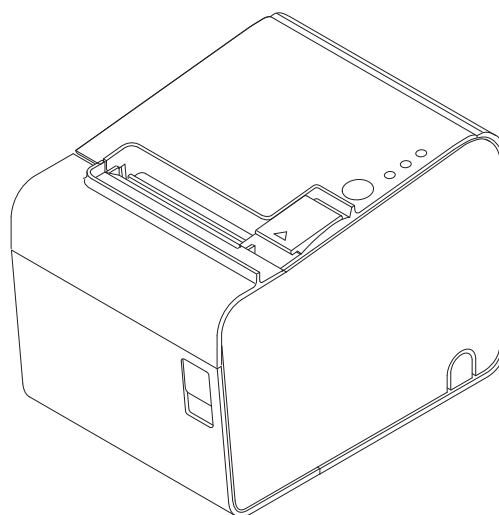
Installing the Printer

Although this printer is normally installed and used vertically (with the paper discharged to the front), it can also be installed and used horizontally (with the paper discharged to the top).

Horizontal position



Vertical position



CAUTION

- Do not place the printer in dusty locations.
- Do not knock or strike the printer. This may cause defective print.
- Do not catch cables or place foreign matter under the printer.

If you install the printer horizontally, affix the control panel labels for horizontal use.
(see ["Control panel label for horizontal use" on page 56](#))

In addition, if the auto cutter is used to make full cuts with the printer installed horizontally, the included paper discharge guide must also be installed.
(see ["Installing the paper discharge guide" on page 56](#))

Control panel label for horizontal use

When using the printer in the horizontal position, affix the control panel label for horizontal use as shown in the figure.



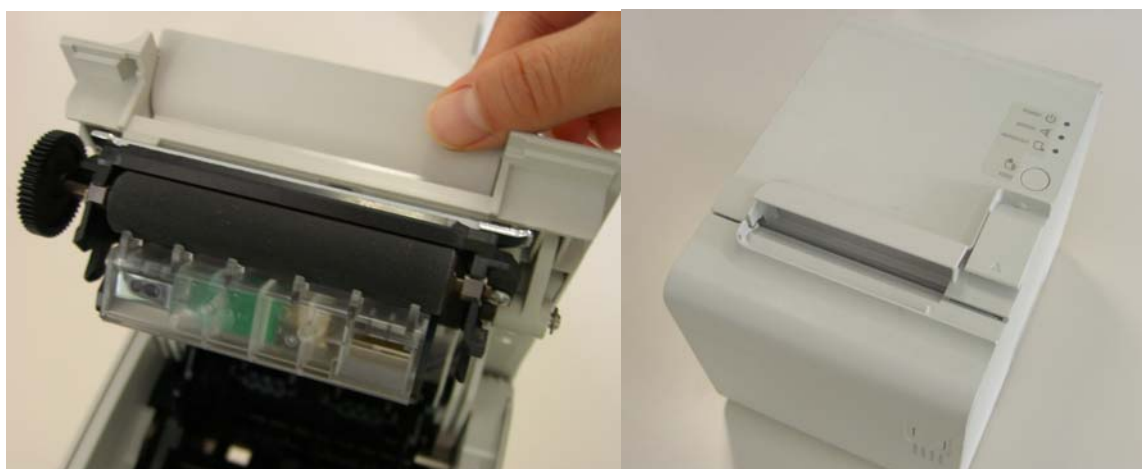
Installing the paper discharge guide

If the auto cutter is used to make full cuts with the printer installed horizontally, the paper discharge guide must be installed as shown in the figure.

This will prevent the cut paper from falling into the paper path, which could cause double cuts and paper jams.

CAUTION

If roll paper with an inner diameter smaller than 25.4mm and an outer diameter smaller than 31.4mm is used, paper jams are likely to occur. Therefore, do not install the paper discharge guide.



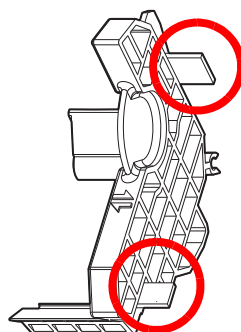
Changing the Paper Width

This printer is shipped from the factory with the roll paper width set to 80mm. To use roll paper with a width of 38mm to 70mm, install a roll paper spacer using the following procedure.

CAUTION

- Since it is possible for some areas of the printer head and the auto cutter blades to become worn through direct contact with the platen, it is not possible to change from a narrow width to a wider width once operation has started.
- To change the paper width, use the memory switch to change the paper width settings.

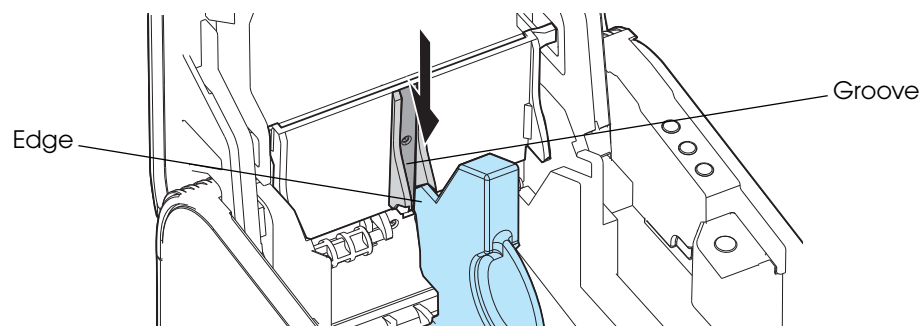
- 1 To use roll paper with a width of 61mm to 70mm, fold the tabs in two locations on the roll paper spacer.



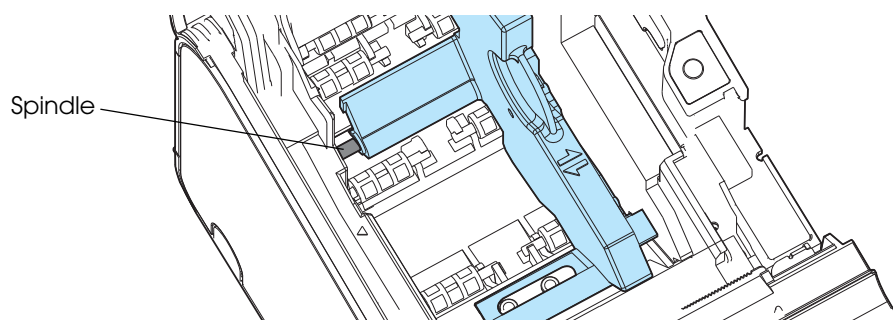
NOTE

Even if the tabs are folded, you can still use roll paper with a width of 38mm to 60mm.

- 2 Open the roll paper cover.
- 3 Insert the roll paper spacers through the grooves on the inside edges of the printer, and downward.



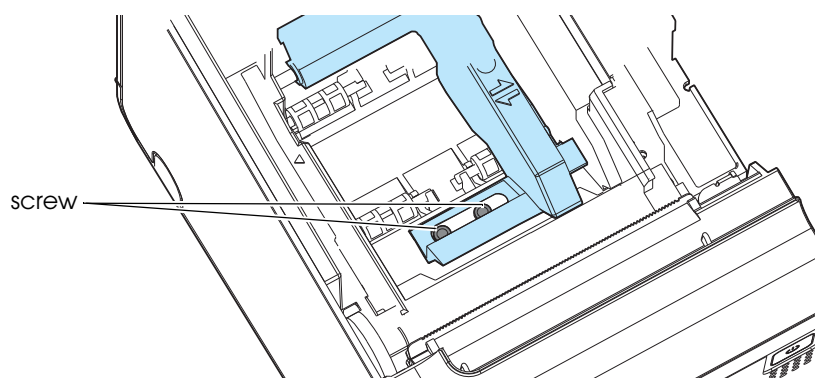
- 4** Press the spacers firmly into the spindle at the bottom surface.



- 5** Make sure the roll paper spacers slide smoothly to the left and right.

- 6** Move the roll paper spacers to the left and right, align them with the position of the roll paper to be used, and fix them into place with the included screws.

Set the roll paper spacers with an additional margin of 0.5mm over the maximum value for the width of the roll paper. Use a ruler if necessary.



Adjusting the position of the roll paper near end detector

The position of the roll paper near end detector must be adjusted in the following situations.

- When the installation direction of the printer is changed (from vertical to horizontal, or vice-versa)
- When changing the remaining amount of roll paper detected by the near end detector

CAUTION

- Since the center of the roll paper has a slightly different shape than the specifications indicate, the near end cannot be detected precisely.
- In order for the near end detector to correctly detect the amount of roll paper remaining, use receipt paper with an inner diameter of 12mm or greater and an outer diameter of 18mm or greater; all other roll paper should have an inner diameter of 25.4mm and an outer diameter of 31.4mm.

NOTE

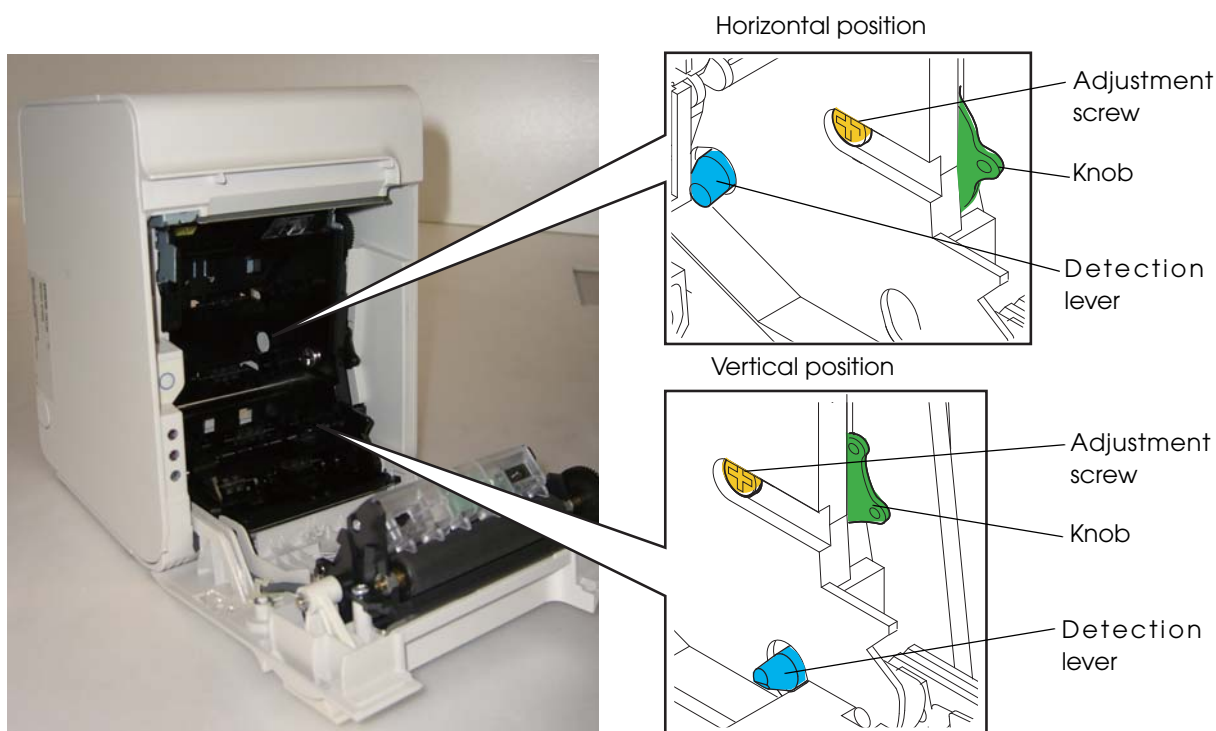
When shipped from the factory, this printer is adjusted for use in the vertical position.

Adjustment procedure

- 1 Open the roll paper cover.
- 2 Use a coin or similar object to loosen the adjustment screw on the detector.
- 3 Push the detection lever all the way to the rear window, and then turn the knob until the detection lever is set in the position shown in the figure below.

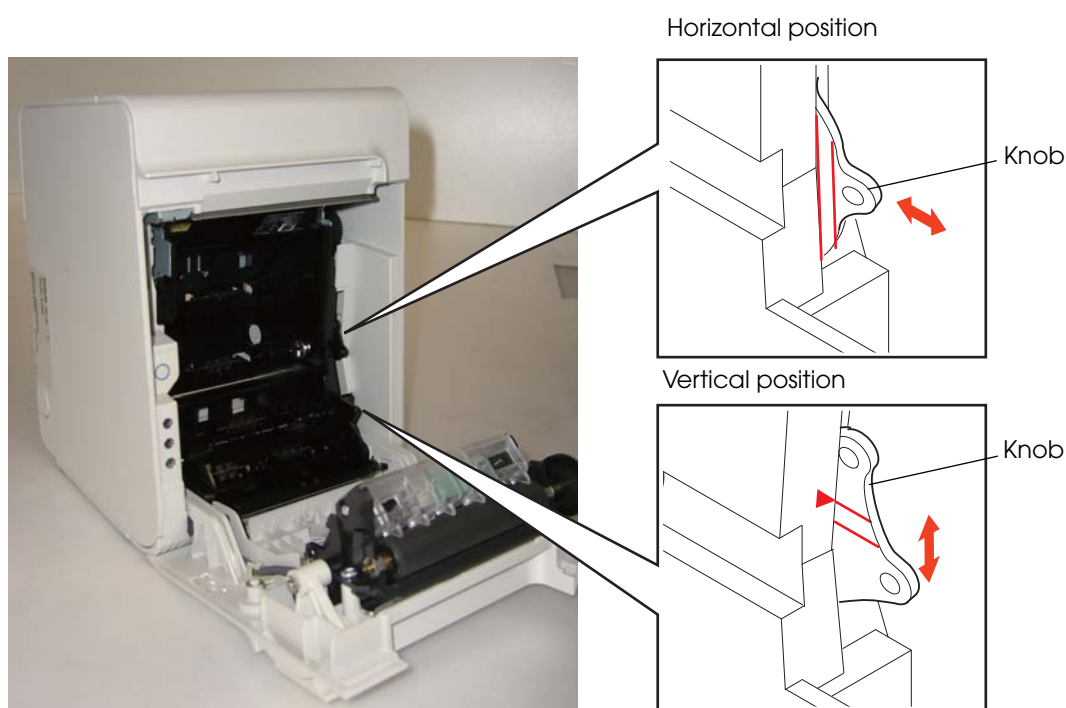
Changing from horizontal to vertical : Turn the knob towards you.

Changing from vertical to horizontal : Turn the knob away from you.



- 4** Move the knob forward/back or up/down, and align the line in the knob with the position shown below.

Roll paper diameter for near end detection	Vertical position	Horizontal position
41 mm	Top	Left
36 mm	Under (Default)	Right



- 5** Tighten the adjustment screw on the detector.
- 6** Press the detection lever with your finger to check if it moves smoothly.

Setting the DIP Switches

You can use the DIP switches to enable/disable the power switch. The initial setting is "Enabled".

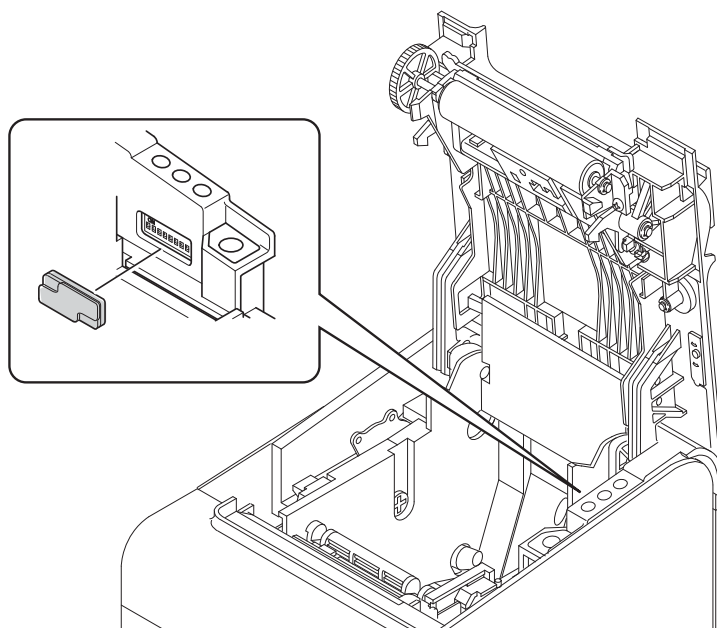
Setting Procedure

Follow the steps below to change the DIP switch settings.

CAUTION

Be sure to turn the power off before setting the DIP switch.

- 1** Make sure the power supply for the printer is turned off.
- 2** Open the roll paper cover.
- 3** Remove the DIP switch cover.



- 4** Set the DIP switch 1, using the tip of a tool, such as a small screwdriver.
ON : Power switch is Disable
OFF : Power switch is Enable

CAUTION

Do not make any change to DIP switches other than DIP switch 1.

- 5** Install the DIP switch cover, and close the roll paper cover.

Connecting the Cash Drawer

When using a cash drawer, connect the cash drawer.

Use the cash drawer handled by EPSON or your dealer.

Connecting the Drawer Kick-out Cable



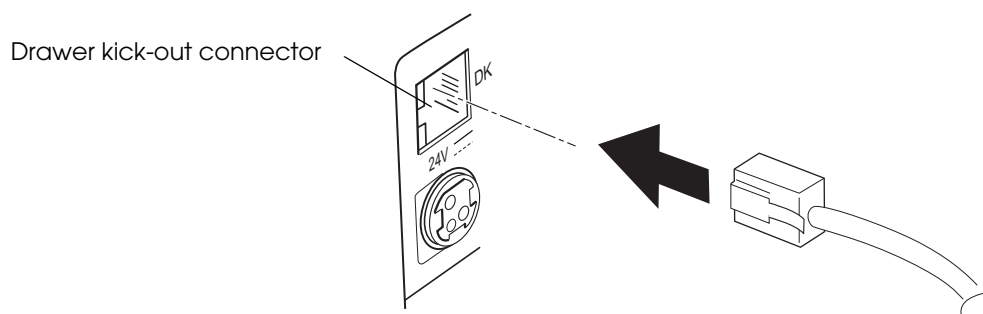
- **Specifications of drawers differ depending on makers or models. When you use a drawer other than specified, make sure its specification meets the following conditions.**

Otherwise, devices may be damaged.

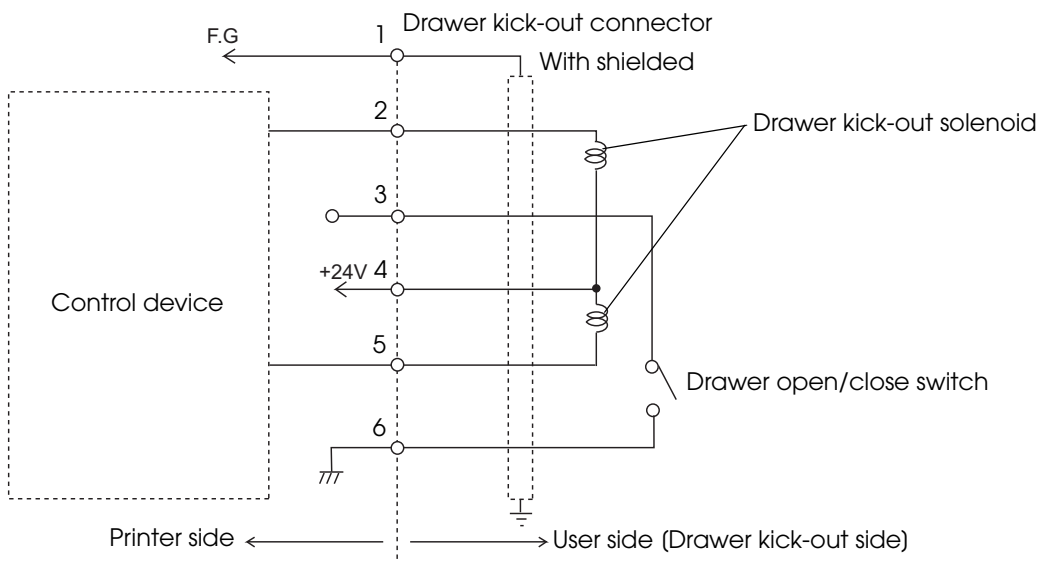
- * The load, such as a drawer kick-out solenoid, must be connected between pins 4 and 2 or pins 4 and 5 of the drawer kick-out connector.
- * When the drawer open/close signal is used, a switch must be provided between drawer kick-out connector pins 3 and 6.
- * The resistance of the load, such as a drawer kick-out solenoid, must be $24\ \Omega$ or more or the input current must be 1A or less.
- * Be sure to use the 24V power output on drawer-kick out connector pin 4 for driving the equipment.
- **Use a shield cable for the drawer connector cable.**
- **Two driver transistors cannot be energized simultaneously.**
- **Leave intervals longer than 4 times the drawer driving pulse when sending it continuously.**
- **Be sure to use the printer power supply (connector pin 4) for the drawer power source.**
- **Do not insert a telephone line into the drawer kick-out connector.**

Doing so may damage the telephone line or printer.

Connect the connector of the drawer kick-out cable to the printer.



Drawer Connection Circuitry



Connecting the Power Supply Unit

Use the TM-L90-i dedicated AC adapter and the AC cable included with the product as the power supply unit.



WARNING

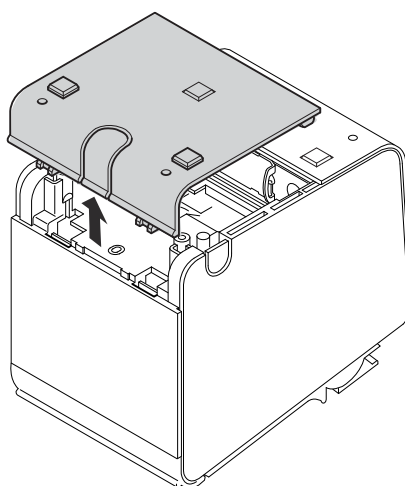
- **Be sure to use the included AC adapter as the power supply unit.**
Using a nonstandard power supply can result in electric shock and fire.
- **Should a fault ever occur in the included AC adapter, immediately turn off the power to the printer and unplug the power supply cable from the wall socket.**
- **Be sure to unplug the power supply unit's 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.
- **Make sure 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 and the printer.

CAUTION

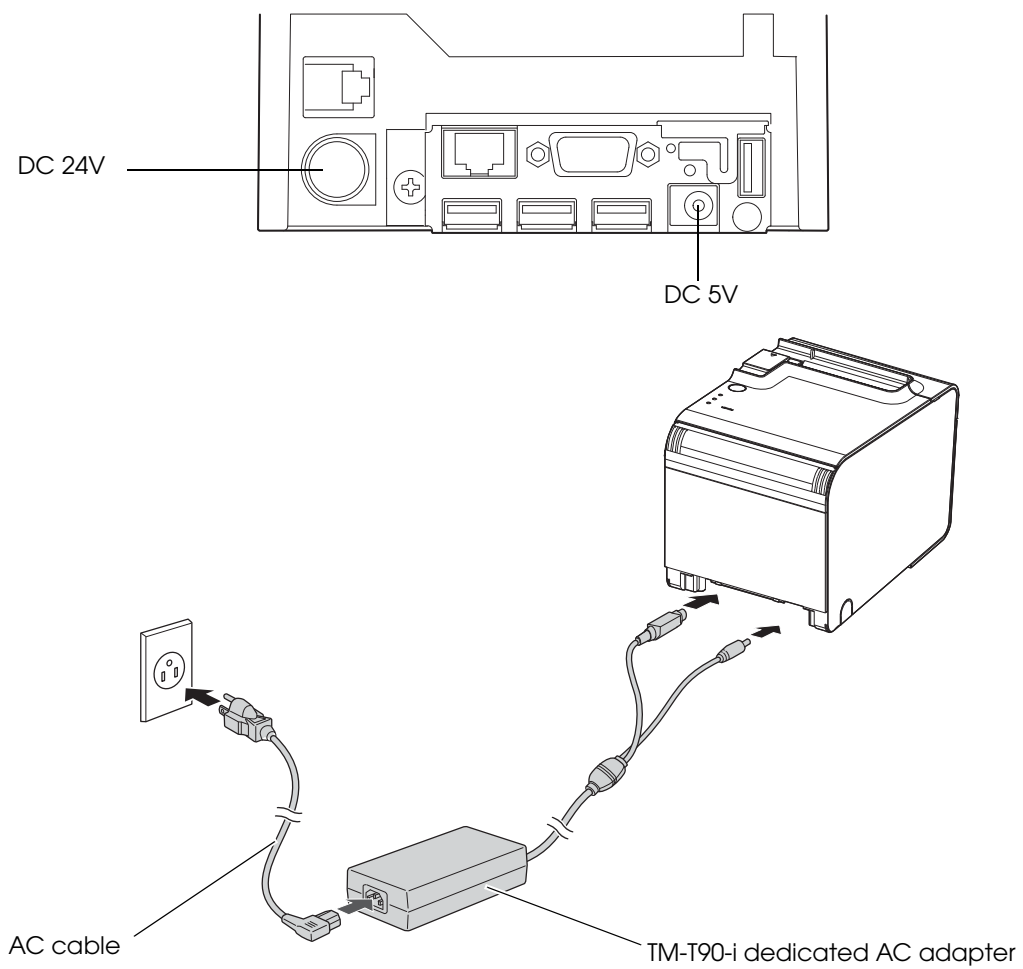
For more information about how to handle cables, see ["Handling Cables" on page 101](#).

Connecting the Power Supply Unit

- 1 Make sure the power supply for the printer is turned off.
- 2 Remove the connector cover.



3 Connect the AC adapter and AC cable.



Connecting the Printer to the System

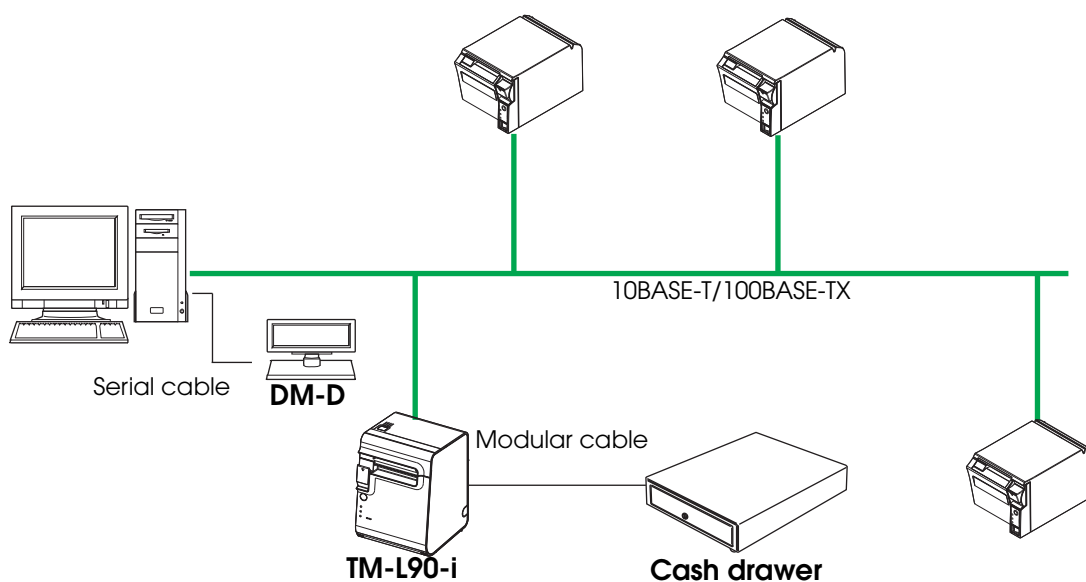
CAUTION

- The printer uses a modular connector specifically designed for the cash drawer. Do not connect the connector to an ordinary telephone line.
- For more information about how to handle cables, see ["Handling Cables" on page 101](#).

For Ethernet Interface

Connect the printer to a network by a LAN cable via a hub.

Ethernet interface connection diagram

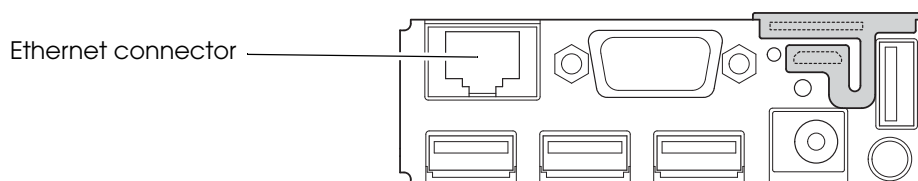


Connecting the Ethernet interface cable



- **When LAN cables are installed outdoors, make sure devices without proper surge protection are cushioned by being connected through devices that do have surge protection.**
Otherwise, the devices can be damaged by lightning.
- **Never attempt to connect the customer display cable, drawer kick-out cable, or a standard telephone line cable to the 10BASE-T/100BASE-TX LAN connector.**

Connect a 10BASE-T/100BASE-TX cable to the 10BASE-T/100BASE-TX LAN connector by pressing firmly until the connector clicks into place.



For Wireless LAN Interface

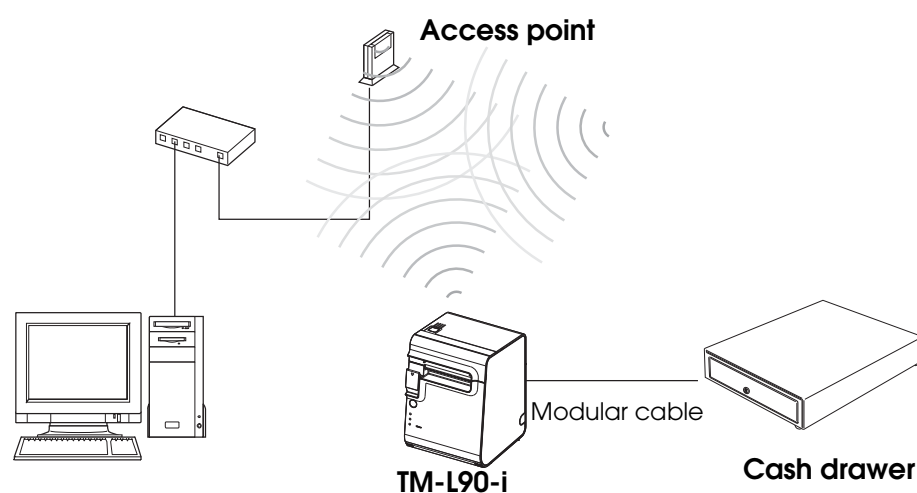
The optional wireless LAN cable set (OT-W01) enables you to use the printer with a wireless LAN connection.

Be sure not to connect a LAN cable when you use the wireless LAN cable set.

CAUTION

This printer cannot be used with the LAN connection and wireless LAN connection at the same time. When the printer is set and installed for both of them, only the LAN connection works.

Wireless LAN interface connection diagram



Connecting the wireless LAN cable set

Check whether the following items are included. If any item is damaged, contact your dealer.

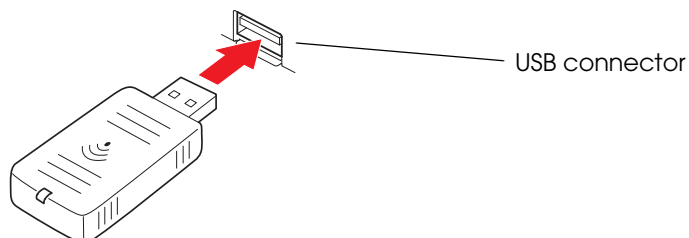
- Wireless LAN unit
- USB extension cable
- Affixing tape (1 pair, 2 pieces)
- Rubber cover
- User's manual

To connect the wireless LAN unit to the printer, you can connect directly or use the USB extension cable.

If connecting the wireless LAN unit directly causes interference with other cables or bad communication, use the included USB extension cable.

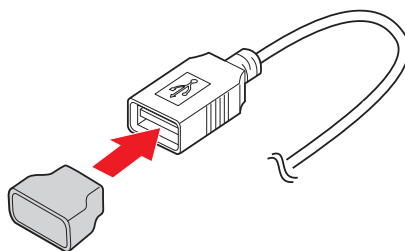
Connecting the unit directly with the printer

Install the wireless LAN unit to a USB connector of the printer.

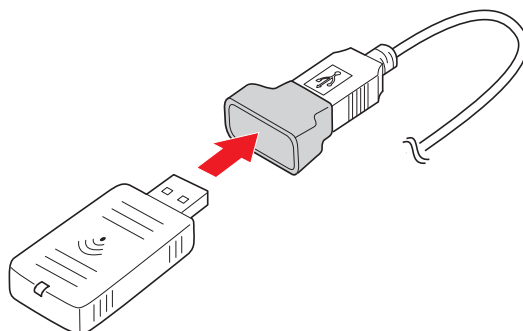


Using the USB extension cable

- 1 Attach the included rubber cover to the connector of the USB extension cable into which the wireless LAN unit will be inserted, to prevent the unit from coming off.



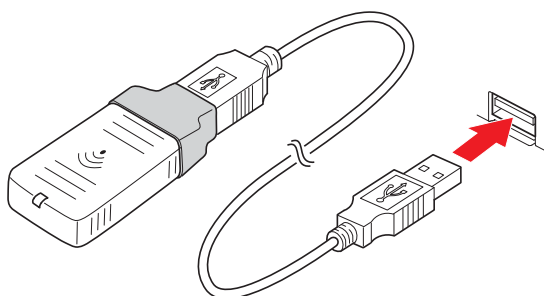
- 2 Insert the wireless LAN unit into the connector of the cable.



CAUTION

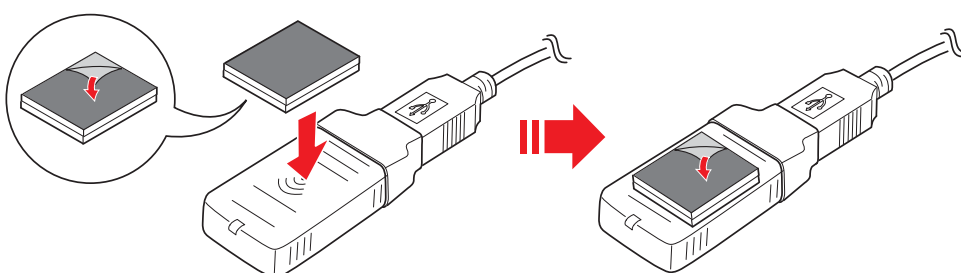
Adjust the position of the rubber cover so that the description on the label on the back side of the wireless LAN unit is not covered.

3 Connect the USB extension cable to the USB connector of the printer.



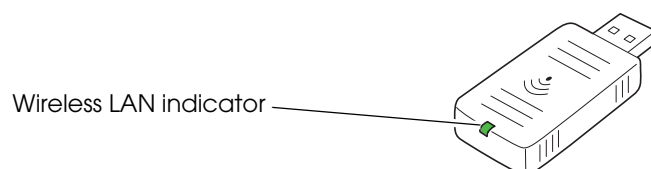
NOTE

If you want to fix the wireless LAN unit, cut the included affixing tape to fit and put on the unit, and fix the unit in a place with good communication.



Wireless LAN indicator

The position of the wireless LAN indicator is shown in the illustration below.



Wireless LAN indicator (Green)	Status
Off	The wireless LAN unit is not connected to the printer. Or the printer power is OFF.
Flashing	This wireless LAN unit is connected to the printer and is in operation.
Flashing rapidly	This wireless LAN unit is connected to the printer and is in operation. This unit is communicating on a network.

Network Setting

There are two methods for network settings.

- EPSON TMNet WebConfig: Set from the computer's web browser
- EpsonNet Config: Set from EpsonNet Config, which is first installed on the computer.

The initial value for the IP address is the value acquired via DHCP. If automated acquisition of an IP address via DHCP fails, set "192.168.192.168" as the IP address. When the printer is turned on, the IP address is acquired automatically and then printed. The setting method using EPSON TMNet WebConfig is explained here. For more information about how to use EpsonNet Config, refer to the EpsonNet Config Operations Guide.

NOTE

- For more information about how to use EPSON TMNet WebConfig, see ["EPSON TMNet WebConfig" on page 105](#).
- With either connection, wired LAN or wireless LAN, network setting for both the wired LAN and wireless LAN is possible.

Wired LAN Setting

Follow the steps below to set for wired LAN by using EPSON TMNet WebConfig.

7

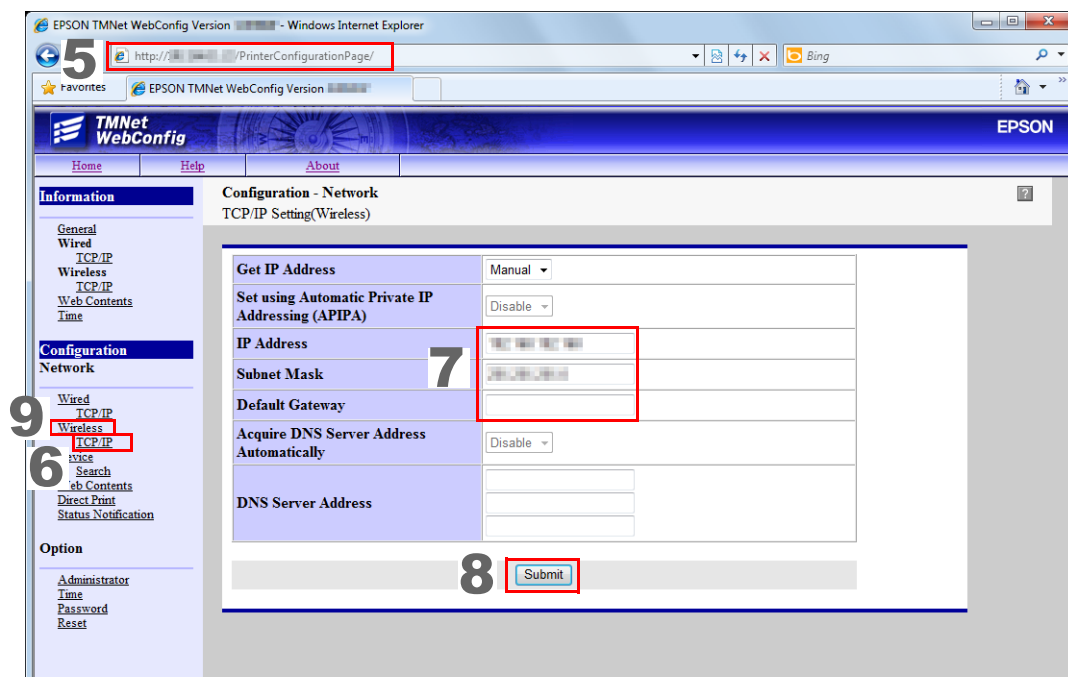
- 1** Connect a PC for setting to the network.
- 2** Connect the TM-L90-i printer to the network, and turn it on.
- 3** Print a status sheet.
For how to print a status sheet, see ["Confirming with a status sheet" on page 78](#).
- 4** Set the PC for setting as the same as the setting printed on the status sheet.
- 5** Start up the web browser on the PC for setting, and enter the printer's IP address printed on the status sheet in the address bar as shown below.
`http://xxx.xxx.xxx.xxx/PrinterConfigurationPage/`
EPSON TMNet WebConfig starts.
- 6** Select (Configuration), (Wired), and then (TCP/IP).
The [TCP/IP Setting (Wired)] screen appears.
- 7** Configure the printer's network setting.
For details, see ["TCP/IP Setting \(Wired\)" on page 113](#).
- 8** Click (Submit).

Wireless LAN Setting

Follow the steps below to set for wireless LAN (when the optional wireless LAN cable set, OT-WL01, is used) by using EPSON TMNet WebConfig.

CAUTION

This printer cannot be used with the LAN connection and wireless LAN connection at the same time. When the printer is set and installed for both of them, only the LAN connection works.



- 1 Connect a PC for setting to the network.
- 2 Connect the TM-L90-i printer to the network, and turn it on.
- 3 Print a status sheet.
For how to print a status sheet, see ["Confirming with a status sheet" on page 78](#).
- 4 Set the PC for setting as the same as the setting printed on the status sheet.
- 5 Start up the web browser on the PC for setting, and enter the printer's IP address printed on the status sheet in the address bar as shown below.
`http://xxx.xxx.xxx.xxx/PrinterConfigurationPage/`
EPSON TMNet WebConfig starts.

- 6** Select (Configuration), (Wireless), and then (TCP/IP).
The [TCP/IP Setting (Wireless)] screen appears.
- 7** Configure the printer's network setting.
For details, see "[TCP/IP Setting \(Wireless\)](#)" on page 116.
- 8** Click (Submit).
- 9** Select (Configuration), and then (Wireless).
The [Wireless Setting] screen appears.
- 10** Configure security settings for the network.
For details, see "[Security setting](#)" on page 76 and "[Wireless Setting](#)" on page 114.
- 11** Click (Submit).

Security setting

Set the following items depending on the network mode.

The screenshot shows the EPSON TMNet WebConfig interface in a Windows Internet Explorer browser. The page is titled "Configuration - Network" and "Wireless Setting". The left sidebar contains a navigation menu with sections: Information (General, Wired, TCP/IP, Wireless, TCP/IP, Web Contents, Time), Configuration (Network, Wired, TCP/IP, Wireless, TCP/IP, Device, Search, Web Contents, Direct Print, Status Notification), and Option (Administrator, Time, Password, Reset). The main content area displays the "Wireless Setting" form. The form includes the following fields: Network Mode (radio buttons for Infrastructure and Ad-Hoc), SSID (text box with "EpsonNet"), Ad-Hoc Channel (dropdown menu with "1"), Communication Standard (dropdown menu with "802.11b/g"), Authentication Method (dropdown menu with "Open System"), Security Mode (dropdown menu with "None"), Default WEP Key (dropdown menu with "WEP Key 1"), WEP Key 1, WEP Key 2, WEP Key 3, WEP Key 4 (text boxes), and WPA/WPA2 Pre-Shared Key (text box with "EpsonNet"). A "Submit" button is located at the bottom of the form.

Item	Description
Network Mode	Set the communication mode (Infrastructure/Ad-Hoc).
SSID	Same value as that for access point. 32 alphanumeric characters at maximum.
Ad-Hoc Channel	Set when (Ad-Hoc) is selected for (Network Mode). Selectable from 1 to 11.
Communication Standard	Set the communication standard.
Authentication Method	Set the authentication algorithm.
Security Mode	Set the encryption algorithm.
Default WEP Key	Set the WEP key to use.
WEP Key 1 to 4	Set character strings for WEP keys when using WEP for security setting.
WPA/WPA2 Pre-Shared Key	Set a character string (8 to 63 ASCII characters) for (WPA/WPA2 Pre-Shared Key) when using WPA/WPA2 for security setting.

CAUTION

- Initially, Authentication Method is set to Open System and Security Mode is set to None. To ensure security, be sure to change the settings before use.
- The following restrictions apply to the characters that can be specified for SSID, WEP keys, and WPA/WPA2 pre-shared keys.
 - * ASCII characters, excluding spaces

Confirming Network Setting

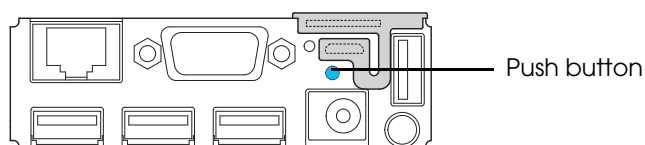
You can confirm the network setting with a status sheet or EPSON TMNet WebConfig.

Confirming with a status sheet

Make sure the printer is turned on, press the push button at the interface part for approximately 3 seconds. When you release the button, a status sheet on which network parameters are printed will be ejected.

With the status sheet, you can check the network settings.

Use a sharp-pointed object to press the push button.



NOTE

If you keep pressing the button for more than 10 seconds, the network settings are initialized.

Information on a status sheet

```
*****
EPSON Status Sheet
*****
```

<General Information>

```
Software
  X.XX
Model
  TM-L90-i
Time
  dd-mm-yyyy hh:nn:ss
  GMT+hh:nn
```

⋮

<Web Contents Update>

```
Use Automatic Update
  No
Date of Installed Web Contents
  yyyy-mm-dd hh:nn:ss
Date of Last Automatic Update
  -
Status of Last Automatic Update
  Not update automatically yet
```

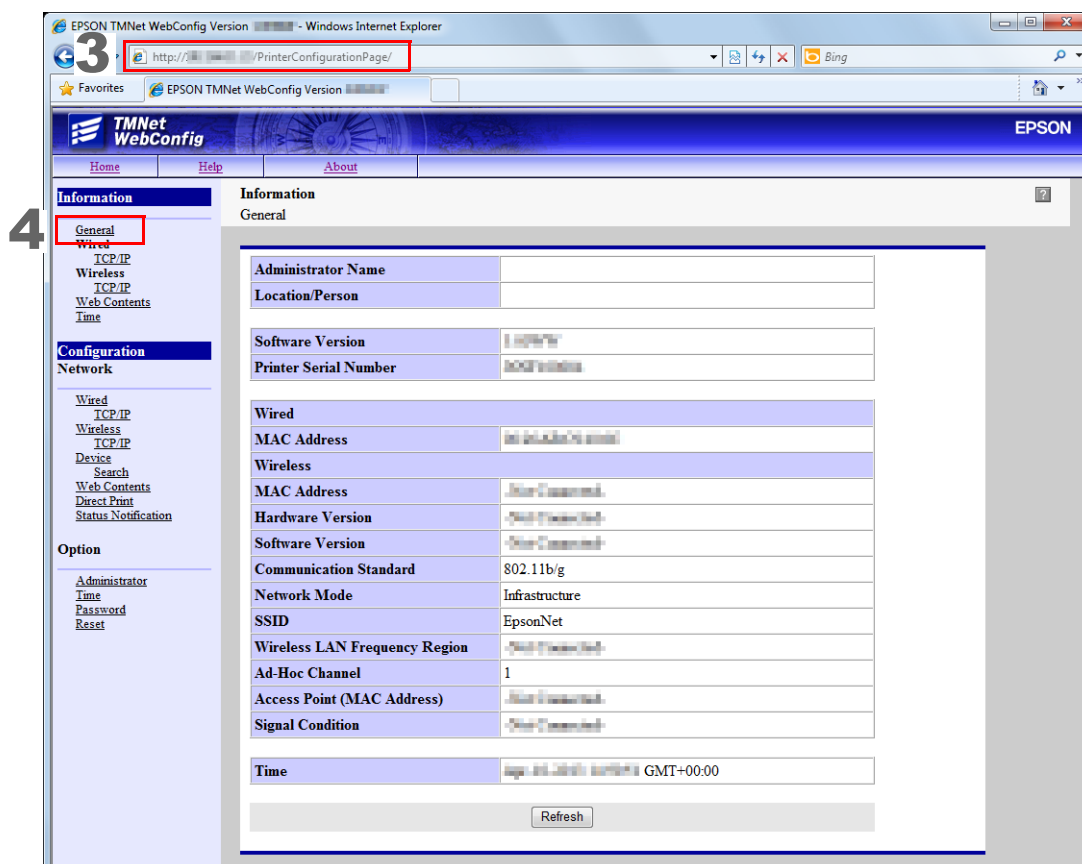
Item	Description
General Information	Shows the general information.
Software	Shows the printer's software version.
Model	Shows (TM-L90-I).
Time	Shows the present time and time difference
Wired	Shows wired LAN settings.
MAC Address	Shows the MAC address.
Link Speed & Duplex	Shows the speed of data link layer.
Wired TCP/IP	Shows TCP/IP settings for wired LAN.
Get IP Address	Shows the method of getting the IP address.
Set using Automatic Private IP Addressing (APIPA)	Shows the APIPA setting.
IP Address	Shows the IP address.
Subnet Mask	Shows the subnet mask.
Default Gateway	Shows the default gateway.
Acquire DNS Server Address Automatically	Shows the method of getting the address of the DNS server.
DNS Server Address	Shows the IP address of the DNS server.
Wireless	Shows wireless LAN settings.
MAC Address	Shows the MAC address.
Hardware Version	Shows the hardware version of the wireless LAN cable set (OT-WL01).
Software Version	Shows the software version of the wireless LAN cable set (OT-WL01).
Communication Standard	Shows the wireless LAN standard.
Network Mode	Shows the communication mode.
SSID	Shows the SSID.
Wireless LAN Frequency Region	Shows the frequency range.
Ad-Hoc Channel	Shows the ad-hoc channel.
Authentication Method	Sets the authentication method.
Security Mode	Sets the encryption scheme.

Item	Description
Wireless TCP/IP	Shows TCP/IP settings for wireless LAN.
Get IP Address	Shows the method of getting the IP address.
Set using Automatic Private IP Addressing (APIPA)	Shows the APIPA setting.
IP Address	Shows the IP address.
Subnet Mask	Shows the subnet mask.
Default Gateway	Shows the default gateway.
Acquire DNS Server Address Automatically	Shows the method of getting the address of the DNS server.
DNS Server Address	Shows the IP address of the DNS server.
Time Server Setting	Shows time settings.
Use Time Server	Shows whether to use the time server or not.
Get Time Server	Shows the method of getting the time server.
Time Server	Shows the IP address of the time server.
Time Server Status	Shows the result of communication with the time server.
Device	Shows the following information of the devices registered for ePOS-Print. • Device ID • Model number • IP address • Connection status
Web Contents Update	Shows update settings for web contents.
Use Automatic Update	Shows whether automatic updating of web contents is enabled or disabled.
Update Schedule*	Shows the update schedule for web contents.
File URL*	Shows the URL for the file to update automatically.
Use Proxy*	Shows the URL and port number for the proxy server to use.
File Access Test*	Shows whether the URL is specified correctly.

Item	Description
Date of Installed Web Contents	When Automatic Update Setting is enabled: Shows the date and time when the web contents (zip file) were created. When Automatic Update Setting is disabled: Shows the date and time when the web contents were uploaded.
Date of Last Automatic Update	Shows the date and time of last automatic updating.
Status of Last Automatic Update	Shows the result of last automatic updating.

* Printed only when the automatic update setting for web contents is enabled (see ["Web Contents Update Settings" on page 118](#)).

Confirming with EPSON TMNet WebConfig



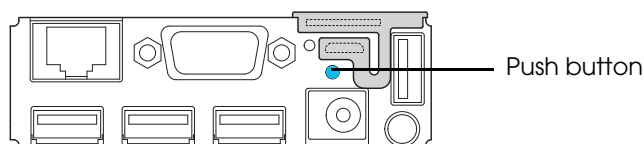
- 1 Start up a PC for setting.
- 2 Connect the TM-L90-i printer to the network, and turn it on.
- 3 Start up the web browser on the PC for setting, and enter the printer's IP address in the address bar as shown below.
`http://xxx.xxx.xxx.xxx/PrinterConfigurationPage/`
EPSON TMNet WebConfig starts.
- 4 Select (Information), and then (General).
The [General Information] screen appears. You can check the network settings.

Initializing the Network Setting

When network connection fails, follow the steps below to initialize the network setting to the default.

The TMNet WebConfig password is also initialized.

- 1** Load the paper on the printer and turn on the printer.
- 2** Push and hold the push button for 10 seconds or longer.
The following initialization start message is printed.
Use a sharp-pointed object to press the push button.



Resetting to Network Setting!
Please Wait...

**WARNING: DO NOT
TURN OFF POWER**

CAUTION

Do not turn off the power until the initialization is completed.

- 3** 20 to 25 seconds later, the following message is printed, and a status sheet is printed out.

Reset to Network Setting Finished!

EPSON Status Sheet

Establishment of ePOS-Print System

ePOS-Print is a function for controlling POS printers in a multi-platform environment. You can print directly to ePOS-Print printers from web browsers on computers, smartphones, and tablets. ePOS-Print printer is a generic term that refers to TM-i series printers such as this product as well as TM printers that support ePOS-Print. Two environments are provided for ePOS-Print.

- ePOS-Print API: This is an application programming interface for using ePOS-Print Service from client-side JavaScript.
- ePOS-Print XML: This is the POS printer command system with the main ESC/POS command system defined in XML.

NOTE

- For details on ePOS-Print, see ePOS-Print API User's Manual or ePOS-Print XML User's Manual.
- Regarding the system configuration for ePOS-Print API, the configuration method for the system for registering web applications in TM-L90-i ([page 85](#)) is explained in this manual. For more information about the configuration method for the system for registering web applications on a web server ([page 86](#)), see the ePOS-Print API User's Manual.

ePOS-Print API

- As long as you are within a network environment, you can print from anywhere on a device with an HTML5 compatible web browser.
- No need to install drivers or plugins.
- No need to set up a computer or server for printing.
- You can print from a public cloud or a private cloud.
- You can print out in any language supported by the web browser.
- The status of the TM printer is checked automatically before printing. There is no need to keep track of the TM printer status yourself.
- You can print out images drawn on HTML5 Canvas.

ePOS-Print XML

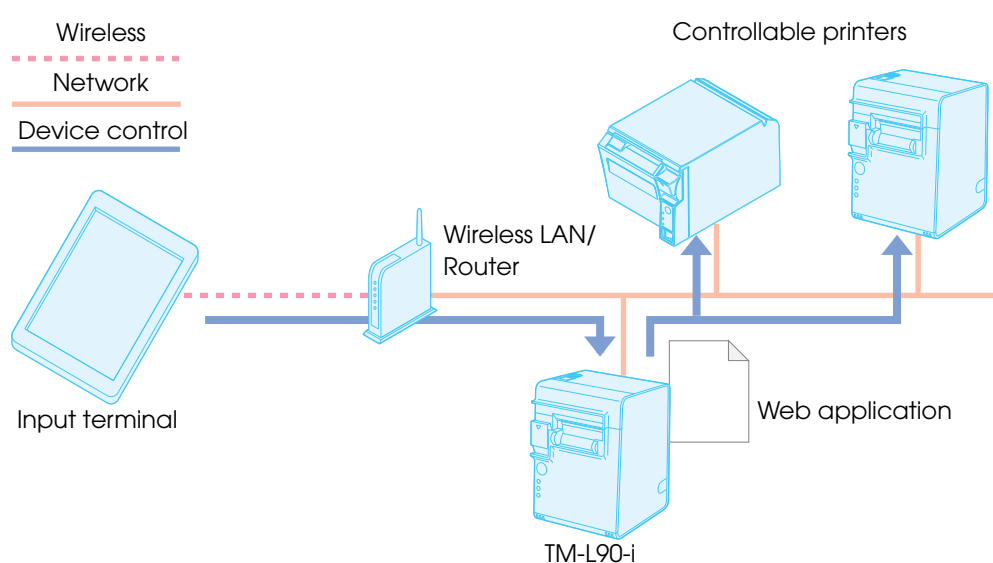
- You can print from a variety of devices that support SOAP/HTTP communication, independent of OS.
- No need to install drivers or plugins.
- No need to set up a computer or server for printing.
- The status of the TM printer is checked automatically before printing. There is no need to keep track of the TM printer status yourself.
- The status of the printer can be acquired even when the printer is offline.

Examples of System Establishment

Depending on where a web application is registered, the following examples of the system establishment are possible.

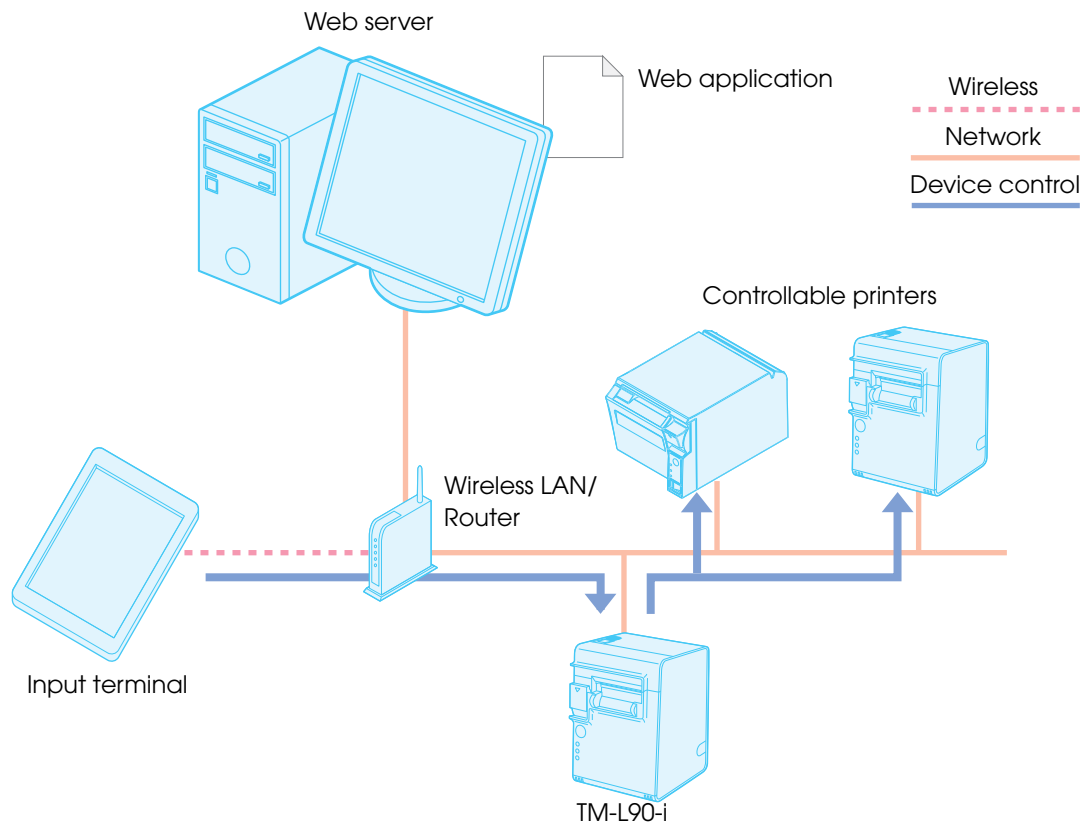
- Registering on the TM-L90-i
- Registering on a web server

Registering on the TM-L90-i



- Input terminal:
Executes the web application from a browser.
The browser must be HTML 5 compliant.
- TM-L90-i:
Receives the print document sent from the web browser, prints receipts, or controls other devices.

Registering on the web server



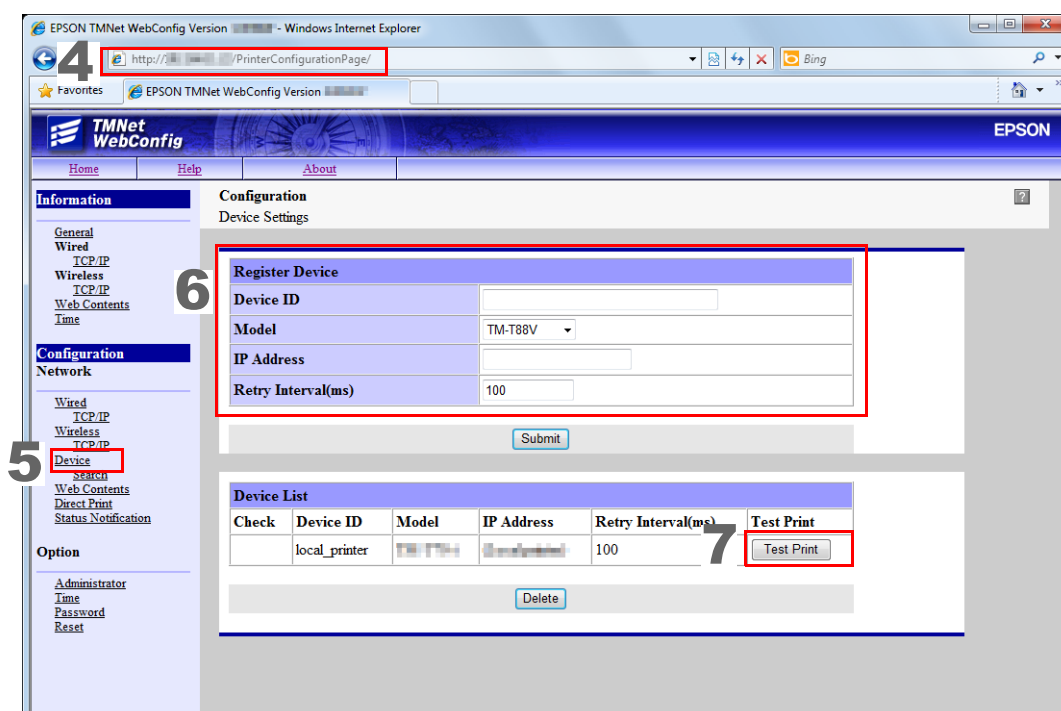
- Web server:
The web application is installed.
- Input terminal:
Executes the web application from a browser (HTML 5 compliant).
- TM-L90-i:
Receives the print document sent from the web browser, prints receipts, or controls other devices.

Setting for Connected Devices

Follow the steps below to set for devices controlled by the TM-L90-i printer by using EPSON TMNet WebConfig.

CAUTION

- This printer cannot be deleted from a device.
- The "device ID" for this printer can be changed.



- 1 Start up a PC for setting.
- 2 Connect all the printers to be controlled to the network, and turn them on.
- 3 Print a status sheet for each printer.
For how to print a status sheet, see ["Confirming with a status sheet" on page 78](#).
- 4 Start up the web browser on the PC for setting, and enter the TM-L90-i printer's IP address in the address bar as shown below.
`http://xxx.xxx.xxx.xxx/PrinterConfigurationPage/`
EPSON TMNet WebConfig starts.
- 5 Select (Configuration), and then (Device).
The [Device Settings] screen appears.

6 Set for the following items, and click (Register).

The information of the registered devices is shown in [Device List].

Item	Description
Device ID	Set an ID for a device to be controlled.
Model number	Select an model for a device to be controlled.
IP address	Enter an IP address for a device to be controlled. (See the status sheet printed in Step 3.)
Retry interval (ms)	Set a retry interval for a device to be controlled.

7 Click (Test Print) to check whether the registered printer operates correctly.

Registering Web Pages

When you register an application on the TM-L90-i printer, register web contents.

Specifications of the file to be registered

- Static contents such as HTML files, CSS files, JavaScript files, and image data.
- Zip the files to be registered all together. The zip file name is arbitrary.

CAUTION

- Use one-byte alphanumeric characters (ASCII characters) for a zip file name and sub-folder name.
- Do not use any of the following names for top folders in the web application.
 - * Printer Configuration Page * licenses * technical-support
 - * cgi-bin * firmware-update
- The maximum size of the files before being zipped is 30 MB. Otherwise, registering fails.
- If you access the URL of the web application when it is not registered, a 403-forbidden error will be returned instead of a 404-not found error.

Cautions for the files to be registered

- If PHP is disabled, files cannot be registered to microSD. Further, additional web pages cannot be registered. All files will be overwritten when registered. To register files, first compress all of the web content into a zip file.
- If PHP is enabled, files can be registered to microSD. Further, additional files can be registered. If the file name already exists, that file will be overwritten. However, if the file name does not already exist or the file is registered in a different folder, the existing file will be saved. If a file is to be deleted, deletion should be performed by the user.

Web content is saved in the following folder.

[microSD root folder]\webapp\

- Web pages cannot be registered additionally. All files are overwritten and registered. Zip web contents before registering.

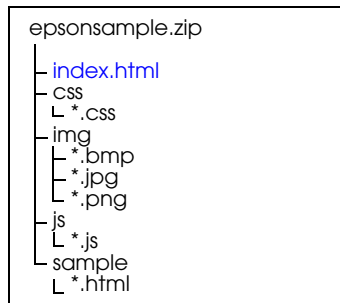
<Example for sample program>

```
ePOS-Print_UM_E_Sample.zip ..... : Zip file
├── index.html
├── css
│   └── *.css
├── img
│   ├── *.bmp
│   ├── *.jpg
│   └── *.png
├── js
│   └── *.js
└── sample
    └── *.html
```

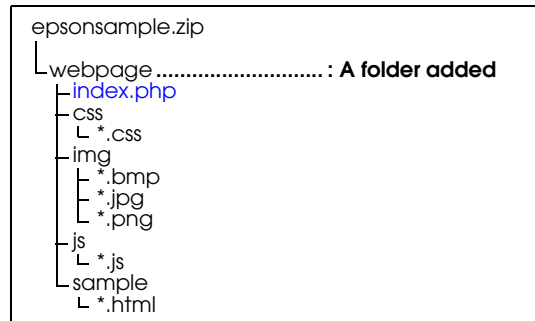
- When you access to registered web contents from an input terminal and so on, the URL differs depending on the folder structure in the zip file.

- ① `http://[the TM-L90-i printer's IP address]/index.html`
- ② `http://[the TM-L90-i printer's IP address]/webpage/index.html`

①

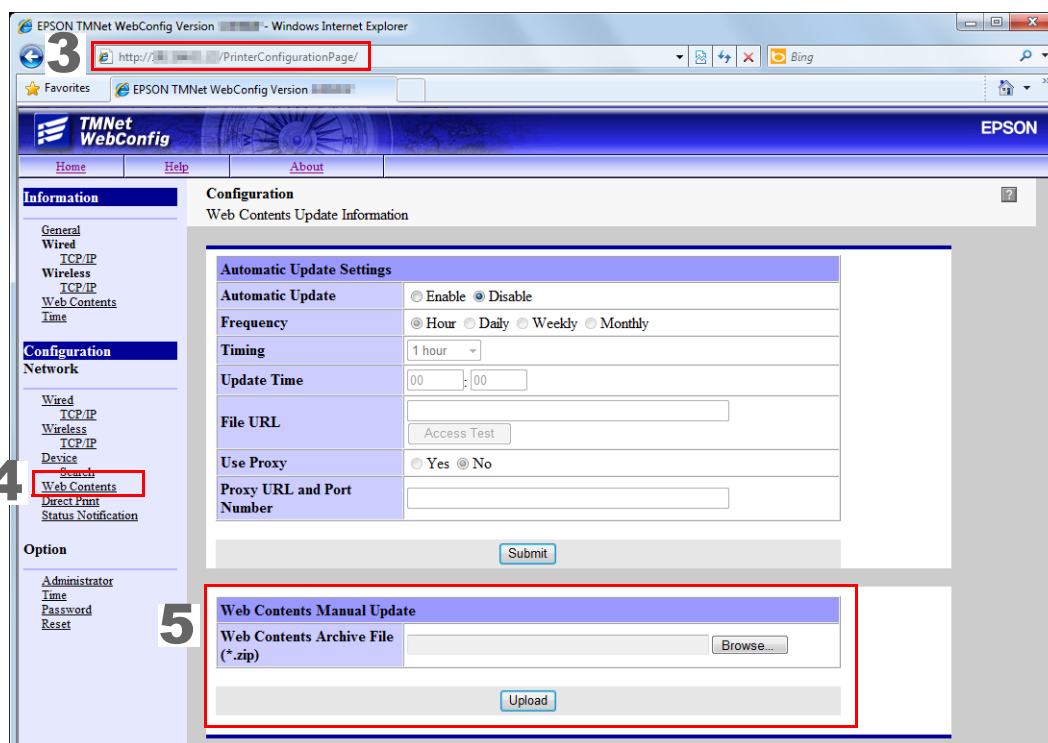


②



How to Register

Follow the steps below to register web pages by using EPSON TMNet WebConfig.



- 1 Start up a PC for setting.
- 2 Connect the TM-L90-i printer to the network, and turn it on.
- 3 Start up the web browser on the PC for setting, and enter the TM-L90-i printer's IP address in the address bar.
EPSON TMNet WebConfig starts.
- 4 Select (Configuration), and then (Web Contents).
The [Web Contents Update Settings] screen appears.
- 5 Click (Browse...), specify the zip file to be registered, and then click (Upload).

Paper Layout Settings

To use die-cut labels or receipt paper with black marks with this printer, you must set a paper layout according to the type and dimensions of the paper. Perform automatic settings ([page 92](#)) and then set the paper layout.

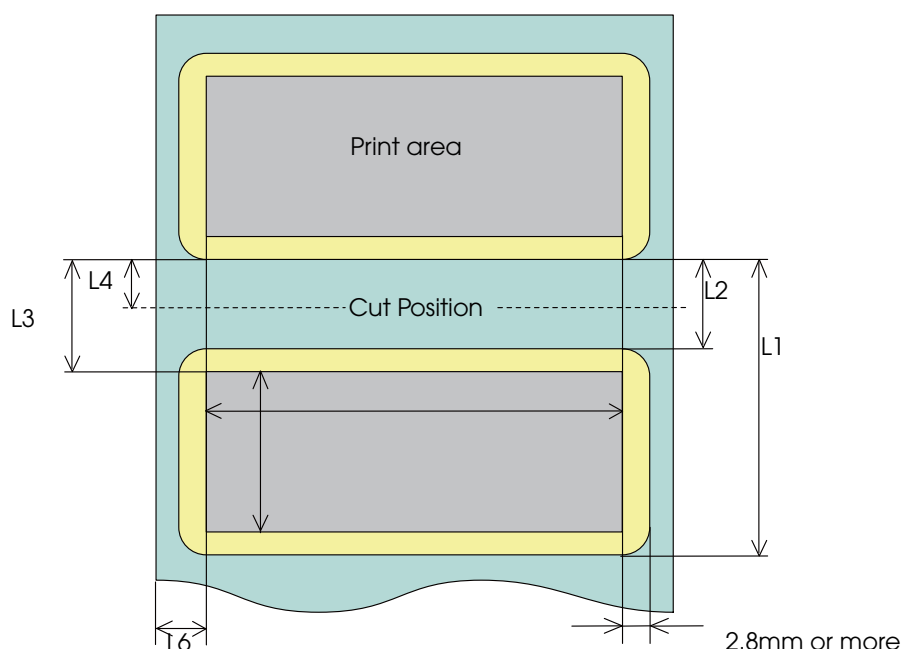
In addition, if a paper layout error occurs, you can dismiss the error and at the same time set a new paper layout.

NOTE

- In the initial settings, no paper layout is set.
- When using full-surface label paper or receipt paper, it is not necessary to set a paper layout.
- Manual settings, possible by executing commands, allow more detailed settings than when using automatic settings. For more information about commands, see the "ESC/POS Application Programming Guide".
- When using die-cut labels with black marks, automatic paper settings are not performed. Make these settings manually.

Automatic paper layout settings

If you use the following procedure to perform an automatic setting of paper layout, the printer will automatically determine the type of the loaded paper. If the loaded paper is die-cut label paper (without black marks) or receipt paper (with black marks), the intervals between labels or black marks are measured and then the paper layout is set and saved as shown below.

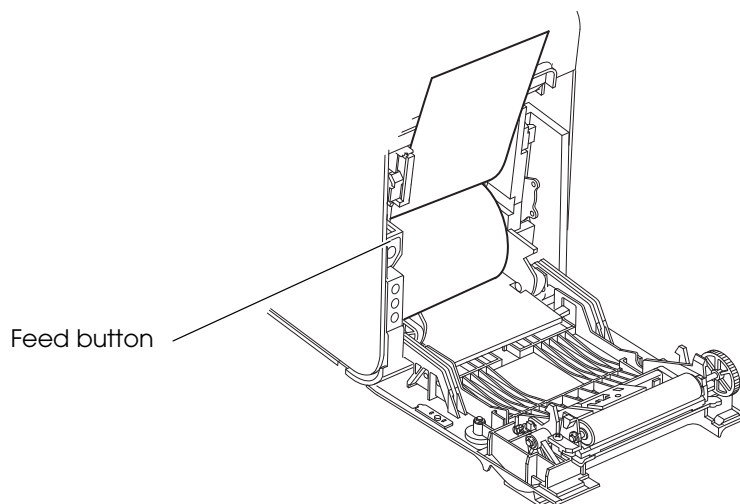


- L1 (Measured by the printer): Label length + L2
- L2 (Measured by the printer): Label length

- L3 : (L2+1.5) mm
- L4 : (L2*2/5) mm
If L2 is less than 4mm: (L2 x 1/2)
- L5 : (L1-L2-3) mm
- L6 : 4.7 mm(Fixed)
- If the paper width is 78mm or greater: 70mm
If the paper width is less than 78mm: (paper width - 8)mm

Starting auto setting mode

- 1** Make sure the power to the printer is off.
- 2** Open the roll paper cover.
- 3** Load the roll paper.
For detail, refer to ["Installing and Replacing Roll Paper" on page 131](#)
- 4** Press the FEED button while turning the power on.



- 5** When the ERROR LED comes on, goes out, and then comes on again, release the FEED button.
 - 6** Press the FEED button six times.
 - 7** Close the roll paper cover.
The paper is fed automatically, and the new paper layout setting is saved.
- Once a setting is completed, the auto setting mode ends and the printer returns to normal printing status.

Paper layout settings by dismissing an error

If paper is loaded that is different from the set paper layout, a paper layout error occurs. (See ["Recoverable Errors" on page 25](#)) If memory switch 8-2 is set to OFF, and the following procedure is used to dismiss the paper layout error, the paper layout will be automatically reset according to the paper that is loaded.

NOTE

- In some instances it will not be possible to use this setting if die-cut label paper with black marks is used. If so, use a command to make the setting manually.
- For more information about memory switch settings, see ["Setting the Memory Switches" on page 96](#).
- This function is available starting with firmware version 1.05.

- 1** Open the roll paper cover.
- 2** Load the roll paper.
For detail, refer to ["Installing and Replacing Roll Paper" on page 131](#).
- 3** Close the roll paper cover.
The paper is fed automatically, and the new paper layout setting is saved.

Clearing paper layout settings

To delete a paper layout settings that has been saved in the printer and return to the initial settings (no paper layout set), use the following procedure.

- 1** Open the roll paper cover.
- 2** Press the FEED button inside the printer while turning the power on.
Press and hold the FEED button until the ERROR LED comes on.
- 3** Press the FEED button four times.
- 4** Close the roll paper cover.
Paper layout settings are initialized.

Once initialization is complete, the printer returns to normal printing status.

Auto paper determination

If no paper layout is registered and paper is loaded into the printer, the printer will attempt to automatically determine the type of paper every time the printer is turned on or the roll paper cover is closed.

During auto paper determination, the printer will automatically feed the paper to determine its type. If the loaded paper is die-cut label paper or receipt paper with black marks, the printer will measure the intervals between labels or black marks and saves this data temporarily in memory. The printing area is not set according to the paper width.

Setting the Memory Switches

This printer has memory switches as software switches for making a variety of settings.

Memory switches include 1/2/8 and customized values.

Memory switch settings are made in memory switch setting mode or with the memory switch setting utility.

NOTE

- For more information about memory switch setting mode, see ["Memory Switch Setting Mode" on page 128](#).
- For more information about the memory switch setting utility, see the Memory Switch Setting Utility User's Manual.
- For more information about commands, see the "ESC/POS Application Programming Guide".

Memory Switch 1

SW	Function	ON	OFF	Initial setting
1-1	Transmit the power ON information	Transmits	Does not transmit	OFF
1-2	Capacity of receive buffer	45 bytes	4KB	OFF
1-3	Reserved	Fixed to ON		ON
1-4	Data processing for receiving error	Ignored	Prints "?"	OFF
1-5	Automatic line feed	Enabled	Disabled	OFF
1-6	Reserved	--	Fixed to Off	OFF
1-7	Pin #6: Selection of reset signal	Used	Not used	OFF
1-8	Reserved	Fixed to ON		ON

Memory Switch 2

SW	Function	ON	OFF	Initial setting
2-1	Reserved	Fixed to On (Do not change the setting)		ON
2-2	Autocutter operation	Enabled	Disabled	ON
2-3 to 2-8	Reserved	--	--	OFF

Memory Switch 8

SW	Function	ON	OFF	Initial setting
8-1	Reserved	--	--	OFF
8-2	Method to recover from the paper layout error	Receive the command	Receive the command or the cover open/close.	OFF
8-3	PAPER LED coming on when an near-end detected	Does not come on	Comes on	OFF
8-4	Selection of the maximum length of automatic paper measurement *	300 mm	160 mm	OFF
8-5	Enable left or right margin of bar code print	Enables margin	Does not enable margin	OFF
8-6	Feeding paper to the print starting position at power on	Disabled	Enabled	OFF
8-7	Reserved	--	--	OFF
8-8	Printer cover open during operation	Errors that can possibly recover	Errors that automatically recover	ON

* If the power to this printer is turned on with paper set but without a paper layout setting, the length of the paper will be fed automatically to determine the type of paper (refer to ["Auto paper determination" on page 95](#)).

NOTE

When the printer recovers from the paper layout error if Msw 8-2 is off, the automatic paper measurement is done. If the settings for the paper layout are already stored in the NV memory, these settings are overwritten with the result of the automatic paper recognition. (refer to ["Paper layout settings by dismissing an error" on page 94](#))

Customized value

Selection of the NV user memory capacity

- 1 KB (initial setting)
- 64 KB
- 128 KB
- 192 KB

Selection of the NV graphics memory capacity

Since the NV graphics data memory region and the user NV memory region share the same area, the capacity that can be set for the NV graphics memory will vary according to the capacity set for the user NV memory. If a capacity is set that is not possible for the NV graphics memory, the capacity will be automatically changed to a value that possible.

NV user memory capacity	NV graphics memory capacity
1 KB	• None • 64 KB • 128 KB • 192 KB • 256 KB • 320 KB • 384 KB (initial setting)
64 KB	• None • 64 KB • 128 KB • 192 KB • 256 KB
128 KB	• None • 64 KB • 128 KB
192 KB	• None

Selection of the paper width

Select from 38mm to 80mm (in units of 1mm)

Initial setting : 80 mm

CAUTION

A setting from 71mm to 79mm is not possible.

Setting the number of head energizing parts

- One-part energizing (initial setting)
- Two-part energizing
- Three-part energizing
- Four-part energizing

NOTE

- Usually, the number of head energizing parts does not need to be changed.
- The maximum printing speed is enabled only when a single power split is selected.
- If a quarter power split is set, current consumption can be suppressed.

Setting the print density

Level	Guide
Level 1	70%
Level 2	75%
Level 3	80%
Level 4	85%
Level 5	90%
Level 6	95%
Level 7 (initial setting)	100%
Level 8	105%
Level 9	110%
Level 10	115%
Level 11	120%
Level 12	125%
Level 13	130%
Level 14	135%
Level 15	140%

CAUTION

The higher the print density is set, the lower the printing speed is likely to fall.

Setting the print speed

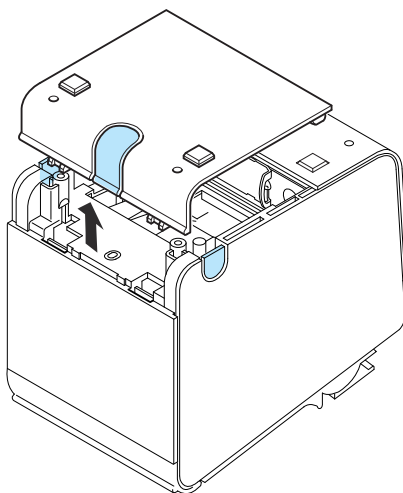
Level	Guide (maximum printing speed)
Level 1	26 mm/s
Level 2	
Level 3	
Level 4	
Level 5	
Level 6 (initial setting)	120 mm/s
Level 7	
Level 8	
Level 9	150 mm/s

CAUTION

- Depending on print conditions, such as print duty and print head temperature, print speed is automatically adjusted, which may cause white lines due to intermittent print (the motor sometimes stops). To avoid this, keep the print speed constant by setting it lower.
- If the printing speed is set to Level 9, you should use high-speed printing paper (refer to ["Paper Specifications" on page 35](#)) .

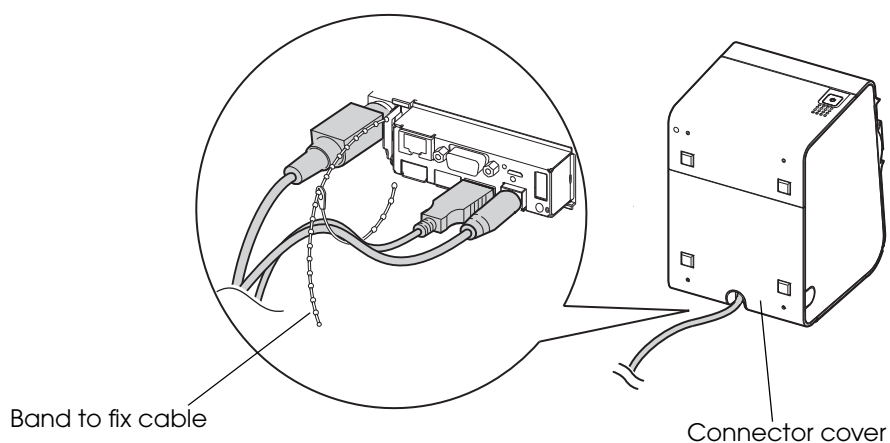
Handling Cables

Cut one of the three cable outlet locations, and pull out the cable.

**NOTE**

Pull out cables from multiple cable outlets in the connector cover, according to the number of cables necessary. After installation, make sure the cables are not pinched by the connector cover.

If a cable with a connector that does not lock (USB cable or DC5V cable) is pulled to the rear of the printer, fix that cable with a band to prevent it from being pulled out, as shown in the figure below.





Application Development Information

This chapter describes how to control the printer and gives information useful for printer application development.

How to Control the Printer

Use ePOS-Print XML to control the printer. See the appropriate manual for details.

NOTE

- Set a longer time to the timeout for printing graphics since it takes longer than printing texts.
- White lines may appear on the printed graphics.
- It is recommended that you use Page Mode to print graphics.

Software and Manuals

The following software and manuals are provided for application development.

CAUTION

- To use the Utility, connect the printer with a PC for setting via the Micro-USB cable or LAN cable. Connecting the printer with a PC via an wireless LAN is not possible.
- After using the Utility, be sure to turn off the printer, and then turn it on.

Utilities

Software/Manual	Description
TMFLogo Utility (TM-FLOGO)	The printer's non-volatile memory (NV memory) is used to register store logos and other similar information.
Memory Switch Setting Utility	It is used when making changes to the printer's memory switches and customized value settings.
TM-i series WebConfig API User's Manual	See this manual when you use API to set or check the settings for the TM-L90-i.
TM-i series PHP Setup Manual	See this manual when you establish the environment where you use the PHP function and store data in micro SD cards with the TM-L90-i.
ePOS-Print XML User's Manual	See this manual for details about the ePOS-Print XML system configuration and application development methods used for this product.

How to Get Manuals and the Utility

You can obtain manuals and Utilities from one of the following URLs.

For customers in North America, go to the following web site:

<http://www.epsonexpert.com/> and follow the on-screen instructions.

For customers in other countries, go to the following web site:

<https://download.epson-biz.com/?service=pos>

EPSON TMNet WebConfig

EPSON TMNet WebConfig is a Utility to set the printer on a web browser.

This section describes EPSON TMNet WebConfig using Internet Explorer as a browser.

NOTE

You can use API to check and make settings for this product from a user application. For details, see TM-i Series WebConfig API User's Manual.

Starting EPSON TMNet WebConfig

Follow the steps below to start up EPSON TMNet WebConfig.

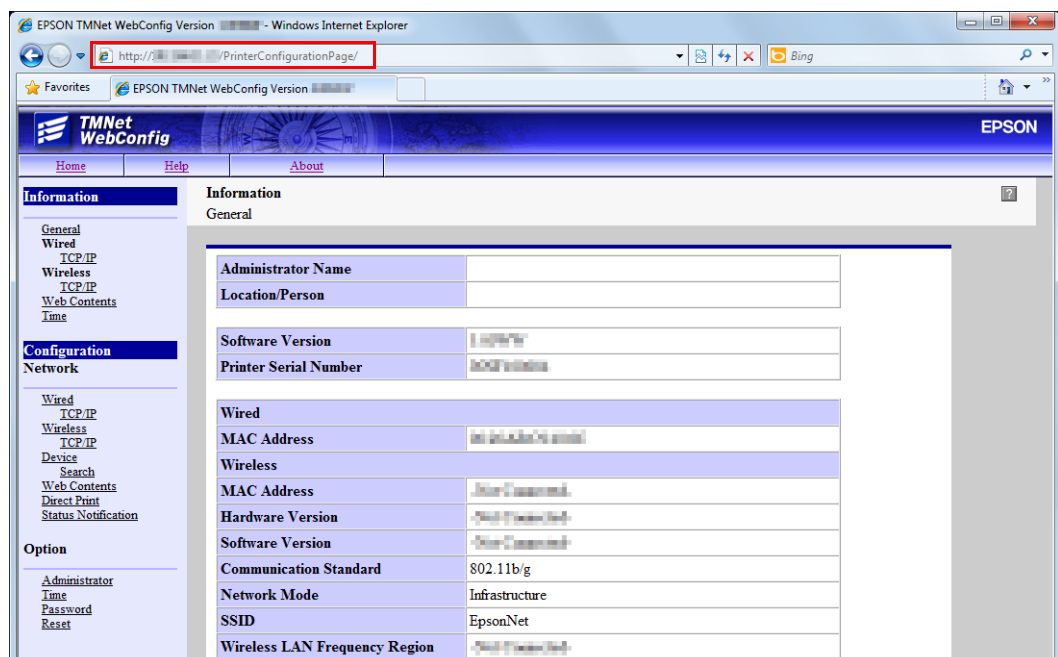
- 1 Start up a PC connected to the network.
- 2 Start up the web browser and input the printer's IP address (http://printer's IP address) in the address bar as shown below.

http://xxx.xxx.xxx.xxx/PrinterConfigurationPage/

EPSON TMNet WebConfig starts.

CAUTION

- For the printer's IP address, see the status sheet. For the status sheet, see ["Confirming with a status sheet" on page 78](#).
- A user name and a password will be required on the authentication screen. Enter "epson" for both the user name and the password. You can change the password on the [Password Setting] screen (see ["Password Setting" on page 124](#)).



General Information

You can check the general information of the TM-L90-i.

The screenshot shows the TMNet WebConfig interface for an EPSON printer. The left sidebar contains navigation links for Information, Configuration, and Option. The main content area is titled 'Information' and 'General'. It displays the following fields:

- Administrator Name: [Empty field]
- Location/Person: [Empty field]
- Software Version: 1.00/0.00
- Printer Serial Number: 00000000
- Wired section:
 - MAC Address: 00:00:00:00:00:00
- Wireless section:
 - MAC Address: [Not Connected]
 - Hardware Version: [Not Connected]
 - Software Version: [Not Connected]
 - Communication Standard: 802.11b/g
 - Network Mode: Infrastructure
 - SSID: EpsonNet
 - Wireless LAN Frequency Region: [Not Connected]
 - Ad-Hoc Channel: 1
 - Access Point (MAC Address): [Not Connected]
 - Signal Condition: [Not Connected]
- Time: 2008.08.08 10:00:00 GMT+00:00

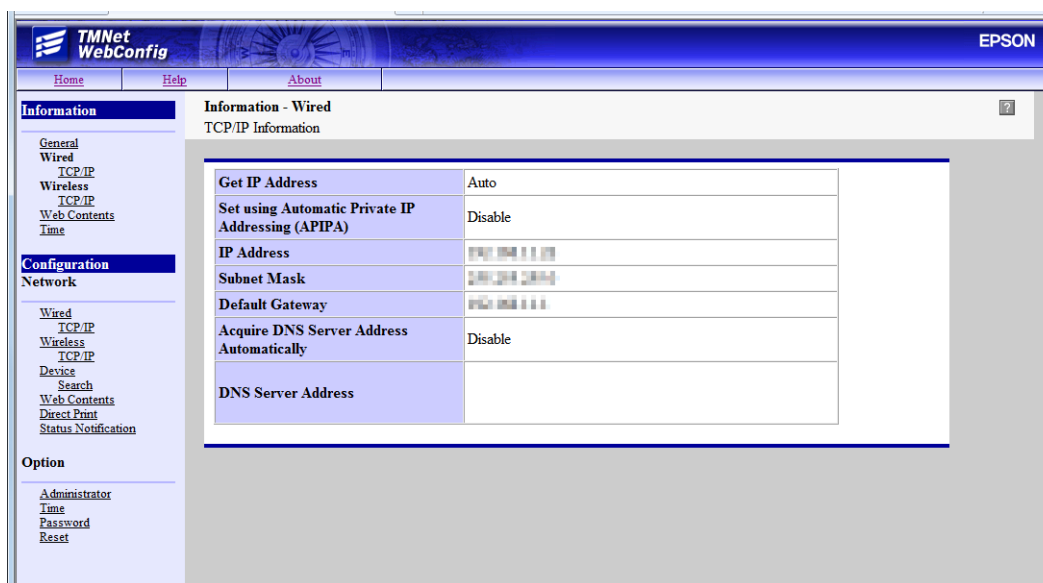
A 'Refresh' button is located at the bottom of the main content area.

Item		Description
Administrator Name		Shows the administrator name.
Location/Person		Shows the user name
Software Version		Shows the software version of the TM-L90-i.
Printer Serial Number		Shows the serial number of the TM-L90-i.
Wired	MAC Address	Shows the MAC address for wired LAN.

Item		Description
Wireless	MAC Address	Shows the MAC address for wireless LAN.
	Hardware Version	Shows the hardware version for wireless LAN.
	Software Version	Shows the software version for wireless LAN.
	Communication Standard	Shows the communication standard.
	Network Mode	Shows the communication mode.
	SSID	Shows the SSID.
	Wireless LAN Frequency Region	Shows region codes.
	Ad-Hoc Channel	Shows the ad-hoc channel.
	Access Point (MAC Address)	Shows the MAC address for the access point.
	Signal Condition	Shows the signal strength.
Time	Time	Shows the present time.

TCP/IP Information (Wired)

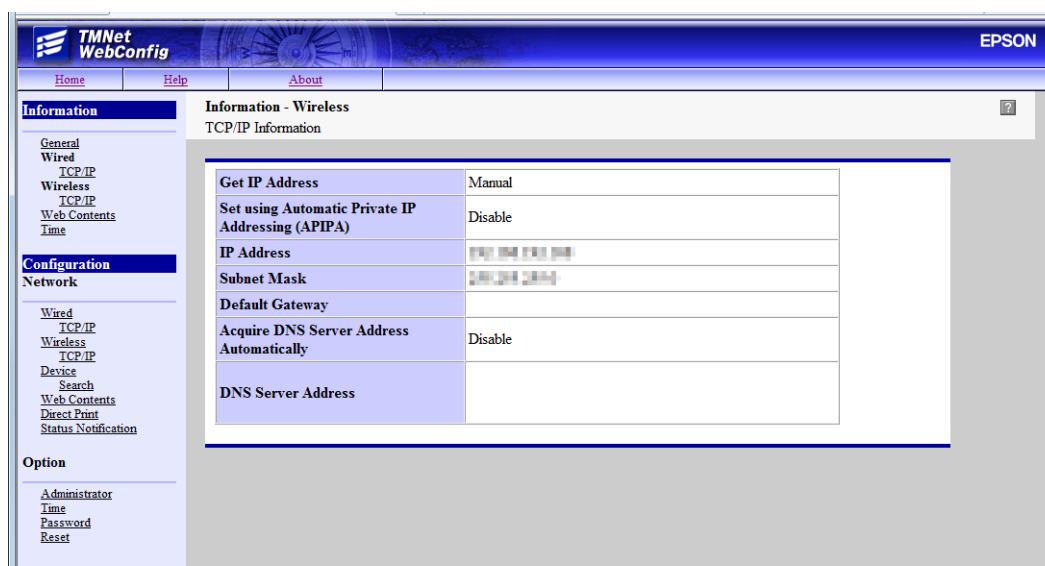
You can check the TCP/IP setting for a wired LAN.



Item	Description
Get IP Address	Shows the method of getting the IP address.
Set using Automatic Private IP Addressing (APIPA)	Shows the APIPA setting.
IP Address	Shows the IP address when (Get IP Address) is set to (Manual).
Subnet Mask	Shows the subnet mask when (Get IP Address) is set to (Manual).
Default Gateway	Shows the default gateway when (Get IP Address) is set to (Manual).
Acquire DNS Server Address Automatically	Shows the method of getting the address of the DNS server.
DNS Server Address	Shows the addresses of the DNS server in order of usage when (Acquire DNS Server Address Automatically) is set to (Disable).

TCP/IP Information (Wireless)

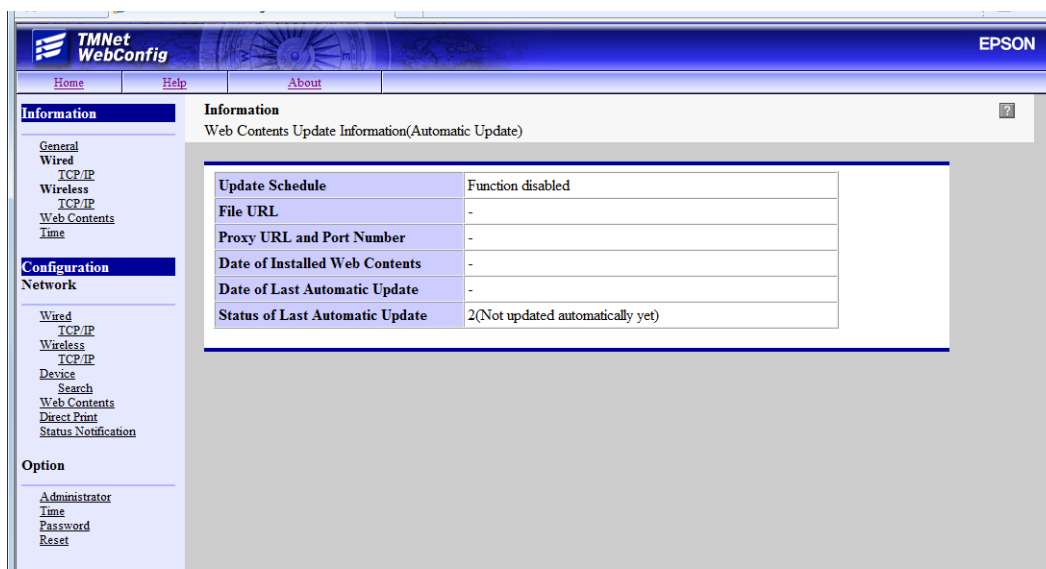
You can check the TCP/IP setting for a wireless LAN when the optional wireless LAN cable set (OT-WL01) is used.



Item	Description
Get IP Address	Shows the method of getting the IP address.
Set using Automatic Private IP Addressing (APIPA)	Shows the APIPA setting.
IP Address	Shows the IP address when (Get IP Address) is set to (Manual).
Subnet Mask	Shows the subnet mask when (Get IP Address) is set to (Manual).
Default Gateway	Shows the default gateway when (Get IP Address) is set to (Manual).
Acquire DNS Server Address Automatically	Shows the method of getting the address of the DNS server.
DNS Server Address	Shows the addresses of the DNS server in order of usage when (Acquire DNS Server Address Automatically) is set to (Disable).

Web Contents Update Information

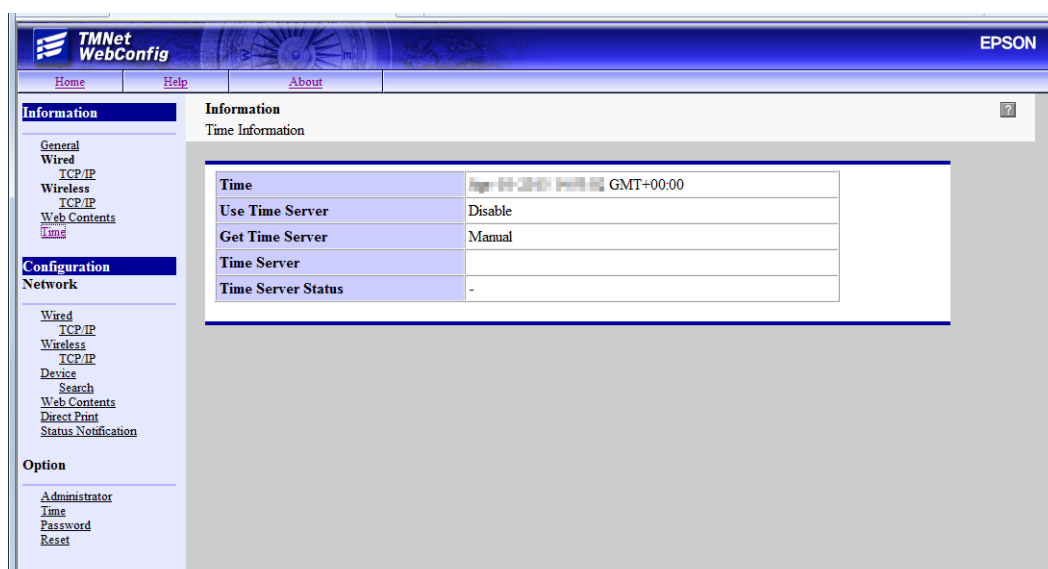
You can check the update setting for web contents.



Item		Description
Automatic Update	Update Schedule	Shows the automatic update setting for installing web contents.
	File URL	Shows the URL for the file to update automatically.
	Proxy URL and Port Number	Shows the URL and port number for the proxy server to use.
	Date of Installed Web Contents	When automatic update setting is enabled: Shows the date and time when the web contents (zip file) were created. When manual update setting is disabled: Shows the date and time when the web contents were uploaded.
	Date of Last Automatic Update	Shows the latest date and time when the web contents were installed on the TM-T70-i automatically.
	Status of Last Automatic Update	Shows the result of the last update of web contents on the TM-T70-i.

Time Information

You can check the time setting.



Item	Description
Time	Shows the present time.
Use Time Server	Shows whether time server is used for time setting.
Get Time Server	Shows the method of getting time server.
Time Server	Shows the IP address or host name of the time server.
Time Server Status	Shows the result of communication with the time server.

Wired Setting

You can make settings for a wired LAN network.

The screenshot shows the TMNet WebConfig interface for an EPSON device. The top navigation bar includes 'Home', 'Help', and 'About' links. The left sidebar is divided into three sections: 'Information' (with links for General, Wired, TCP/IP, Wireless, TCP/IP, Web Contents, and Time), 'Configuration' (with a 'Network' sub-section containing links for Wired, TCP/IP, Wireless, TCP/IP, Device, Search, Web Contents, Direct Print, and Status Notification), and 'Option' (with links for Administrator, Time, Password, and Reset). The main content area is titled 'Configuration - Network' and 'Wired Setting'. It features a 'Link Speed & Duplex' section with a dropdown menu currently set to 'Auto Negotiate' and a 'Submit' button below it.

Item	Description
Link Speed & Duplex	Sets the speed of data link layer.
Submit	Submits the setting to the TM-L90-i.

TCP/IP Setting (Wired)

You can make settings for a wired LAN such as IP address.

The screenshot shows the TMNet WebConfig interface for the Epson TM-L90-i. The main content area is titled 'Configuration - Network' and 'TCP/IP Setting(Wired)'. It contains the following settings:

- Get IP Address:** A dropdown menu set to 'Auto'.
- Set using Automatic Private IP Addressing (APIPA):** A dropdown menu set to 'Enable'.
- IP Address:** A text input field with a small icon to the right.
- Subnet Mask:** A text input field with a small icon to the right.
- Default Gateway:** A text input field with a small icon to the right.
- Acquire DNS Server Address Automatically:** A dropdown menu set to 'Disable'.
- DNS Server Address:** Two stacked text input fields.

A 'Submit' button is located at the bottom right of the configuration area.

Item	Description
Get IP Address	Sets the method of getting the IP address.
Set using Automatic Private IP Addressing (APIPA)	Enables or disables the APIPA setting.
IP Address	Sets the IP address when (Get IP Address) is set to (Manual).
Subnet Mask	Sets the subnet mask when (Get IP Address) is set to (Manual).
Default Gateway	Sets the default gateway when (Get IP Address) is set to (Manual).
Acquire DNS Server Address Automatically	Sets the method of getting the address of the DNS server.
DNS Server Address	Sets the addresses of the DNS server in order of usage when (Acquire DNS Server Address Automatically) is set to (Disable).
Submit	Submits settings to the TM-L90-i.

Wireless Setting

You can make settings for a wireless LAN network when the optional wireless LAN cable set (OT-WL01) is used.

The screenshot shows the 'TMNet WebConfig' interface for an EPSON device. The left sidebar lists navigation options: Information (General, Wired, Wireless, TCP/IP, Web Contents, Time), Configuration (Network, Wired, TCP/IP, Wireless, TCP/IP, Device, Search, Web Contents, Direct Print, Status Notification), and Option (Administrator, Time, Password, Reset). The main content area is titled 'Configuration - Network' and 'Wireless Setting'. It contains the following settings:

- Network Mode:** Infrastructure (selected) or Ad-Hoc
- SSID:** EpsonNet
- Ad-Hoc Channel:** 1
- Communication Standard:** 802.11b/g
- Authentication Method:** Open System
- Security Mode:** None
- Default WEP Key:** WEP Key 1
- WEP Key 1, 2, 3, 4:** Empty text boxes
- WPA/WPA2 Pre-Shared Key:** EpsonNet
- Submit:** A button at the bottom of the form.

Item	Description
Network Mode	Sets the communication mode.
SSID	Sets the SSID.
Ad-Hoc Channel	Sets the ad-hoc channel. (Available only in the ad-hoc mode)
Communication Standard	Sets the communication standard.
Authentication Method	Sets the authentication algorithm.
Security Mode	Sets the encryption algorithm.
Default WEP Key	Sets the WEP key to use.
WEP Key 1	Sets the WEP key 1.
WEP Key 2	Sets the WEP key 2.
WEP Key 3	Sets the WEP key 3.

Item	Description
WEP Key 4	Sets the WEP key 4.
WPA/WPA2 Pre-Shared Key	Sets the network key.
Submit	Submits settings to the TM-L90-i.

CAUTION

- Initially, Authentication Method is set to Open System and Security Mode is set to None . To ensure security, be sure to change the settings before use.
- The following restrictions apply to the characters that can be specified for SSID, WEP keys, and WPA/WPA2 pre-shared keys.
 - * Before firmware version 3.0: English alphabet only
 - * Firmware version 3.0 or later: ASCII characters, excluding spaces

TCP/IP Setting (Wireless)

You can change settings for a wireless LAN such as IP address when the optional wireless LAN cable set (OT-WL01) is used.

The screenshot shows the TMNet WebConfig interface for an EPSON device. The main content area is titled 'Configuration - Network' and 'TCP/IP Setting(Wireless)'. It contains the following settings:

- Get IP Address:** A dropdown menu set to 'Manual'.
- Set using Automatic Private IP Addressing (APIPA):** A dropdown menu set to 'Disable'.
- IP Address:** A text input field.
- Subnet Mask:** A text input field.
- Default Gateway:** A text input field.
- Acquire DNS Server Address Automatically:** A dropdown menu set to 'Disable'.
- DNS Server Address:** Two text input fields.

A 'Submit' button is located at the bottom of the configuration area.

Item	Description
Get IP Address	Sets the method of getting the IP address.
Set using Automatic Private IP Addressing (APIPA)	Enables or disables the APIPA setting.
IP Address	Sets the IP address when (Get IP Address) is set to (Manual).
Subnet Mask	Sets the subnet mask when (Get IP Address) is set to (Manual).
Default Gateway	Sets the default gateway when (Get IP Address) is set to (Manual).
Acquire DNS Server Address Automatically	Sets the method of getting the address of the DNS server.
DNS Server Address	Sets the addresses of the DNS server in order of usage when (Acquire DNS Server Address Automatically) is set to (Disable).
Submit	Submits settings to the TM-L90-i.

Device Settings

You can set devices controlled by the TM-L90-i or check their operation.

CAUTION

- This printer cannot be deleted from a device.
- The "device ID" for this printer can be changed.

Item		Description
Register Device	Device ID	Sets the ID of a device to control.
	Model	Sets the model of a device to control.
	IP Address	Sets the IP address of a device to control.
	Retry Interval (ms)	Sets the retry interval of a device to control.
	Submit	Adds a device to the Device List.
Device List	Device	Lists devices controlled by the TM-L90-i and their settings. When a device is checked, (Delete) is available. Clicking (Test Print) performs a test print with the device.
	Delete	Deletes the checked device.

Web Contents Update Settings

You can set how to install and update web contents to register on the TM-L90-i or update them. See also ["Registering Web Pages" on page 89](#).

Item		Description
Automatic Update Settings	Automatic Update	Sets the method of installing web contents. When it is enabled, configure other settings in (Automatic Update Settings). When it is disabled, install web contents manually.
	Frequency	Sets the frequency of automatic update for web contents.
	Timing	Sets the timing of automatic update for web contents.
	Update Time	Sets the start time of automatic update for web contents.
	File URL	Specifies the URL for a file to update automatically. After specifying it, clicking (File Access Test) checks whether the URL is specified correctly.

Item		Description
Automatic Update Settings	Use Proxy	Sets whether to use the proxy server or not. When (Yes) is selected, set (Proxy URL and Port Number).
	Proxy URL and Port Number	Sets the URL and port number for the proxy server to use.
	Submit	Submits settings to the TM-T70-i.
Web Contents Manual Update	Web Contents Archive File (*.zip)	Specifies the web contents to install.
	Upload	Registers the specified web contents on the TM-L90-i.

Server Direct Print Setting

You can set server direct print for the TM-L90-i.

The screenshot shows the TMNet WebConfig interface for an EPSON device. The left sidebar contains navigation links under 'Information' (General, Wired, TCP/IP, Wireless, TCP/IP, Web Contents, Time), 'Configuration' (Network, Wired, TCP/IP, Wireless, TCP/IP, Device, Search, Web Contents, Direct Print, Status Notification), and 'Option' (Administrator, Time, Password, Reset). The main content area is titled 'Configuration' and 'Server Direct Print Setting'. It contains a form with the following fields:

- Server Direct Print:** Radio buttons for 'Enable' (selected) and 'Disable'.
- ID:** Text input field with 'local_printer' entered.
- Password:** Text input field.
- URL:** Text input field with a placeholder URL, and an 'Access Test' button.
- Interval(s):** Text input field with '5' entered.
- Submit:** A button at the bottom of the form.

Item	Description
Server Direct Print	Sets whether to use the Server Direct Print function or not. Select (Enable) or (disable).
ID	Sets the web server ID when (Server Direct Print) is set to (Enable).
Password	Sets the web server password when (Server Direct Print) is set to (Enable).
URL	Sets the web server URL for acquiring print data when (Server Direct Print) is set to (Enable). After this is set, you can click (Access Test) to check if the URL has been set correctly.
Interval(s)	Sets the interval for acquiring print data when (Server Direct Print) is set to (Enable).
Submit	Submits settings to the TM-L90-i.

Status Notification Setting

You can set Status Notification for the TM-L90-i.

The screenshot shows the 'TMNet WebConfig' interface for an EPSON device. The left sidebar has a tree view with categories: Information (General, Wired, TCP/IP, Wireless, TCP/IP, Web Contents, Time), Configuration (Network: Wired, TCP/IP, Wireless, TCP/IP, Device, Search; Web Contents: Web Contents, Direct Print, Status Notification), and Option (Administrator, Time, Password, Reset). The main area is titled 'Configuration' and 'Status Notification Setting'. It contains a form with the following fields: 'Status Notification' with radio buttons for 'Enable' (selected) and 'Disable'; 'ID' with a text box containing 'local_printer'; 'Password' with a text box; 'URL' with a text box and an 'Access Test' button; and 'Interval(s)' with a text box containing '5'. A 'Submit' button is at the bottom of the form.

Item	Description
Status Notification	Sets whether to use the Status Notification function or not. Select (Enable) or (disable).
ID	Sets the web server ID when (Status Notification) is set to (Enable).
Password	Sets the web server password when (Status Notification) is set to (Enable).
URL	Sets the web server URL for sending status notifications when (Status Notification) is set to (Enable). After this is set, you can click (Access Test) to check if the URL has been set correctly.
Interval(s)	Sets the interval for sending status notifications when (Status Notification) is set to (Enable).
Submit	Submits settings to the TM-L90-i.

Administrator Setting

You can set the information for the administrator of the TM-L90-i.

The screenshot shows the TMNet WebConfig interface for the TM-L90-i. The top navigation bar includes 'Home', 'Help', and 'About' links. The left sidebar is divided into 'Information' and 'Configuration' sections. Under 'Information', there are links for 'General', 'Wired' (with sub-links for 'TCP/IP'), 'Wireless' (with sub-links for 'TCP/IP'), 'Web Contents', and 'Time'. Under 'Configuration', there is a 'Network' section with links for 'Wired' (with sub-links for 'TCP/IP'), 'Wireless' (with sub-links for 'TCP/IP'), 'Device', 'Search', 'Web Contents', 'Direct Print', and 'Status Notification'. Below the 'Network' section is an 'Option' section with links for 'Administrator', 'Time', 'Password', and 'Reset'. The main content area is titled 'Configuration - Option' and 'Administrator Setting'. It contains two input fields: 'Administrator Name' and 'Location/Person'. A 'Submit' button is located below these fields.

Item	Description
Administrator Name	Sets the name of the administrator of the TM-L90-i.
Location/Person	Sets the location where the TM-L90-i is installed.
Submit	Submits settings to the TM-L90-i.

Time Setting

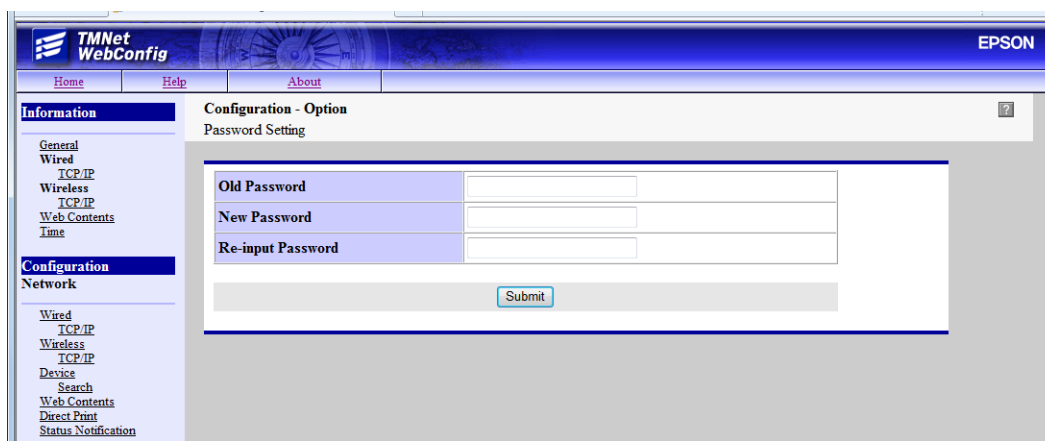
You can set the time for the TM-L90-i.

The screenshot shows the TMNet WebConfig interface for the TM-L90-i. The left sidebar contains navigation links under 'Information' (General, Wired, Wireless, TCP/IP, Web Contents, Time) and 'Configuration' (Network, Wired, Wireless, TCP/IP, Device, Search, Web Contents, Direct Print, Status Notification, Option). The main content area is titled 'Configuration - Option' and 'Time Setting'. It includes a 'Time' section with a digital clock display and a 'Get Time' button. Below this is the 'Time Zone(Hour)' dropdown menu set to 'GMT+00:00'. The 'Time Server Setting' section includes 'Use Time Server' (Disable), 'Get Time Server' (Manual), 'Time Server' (text input), and 'Time Server Status' (displaying '-'). A 'Submit' button is at the bottom.

Item		Description
Time		Sets the time. Clicking (Get Time) shows the present time.
Time Zone (Hour)		Sets the time zone.
Time Server Setting	Use Time Server	Sets whether to use the time server or not for time setting.
	Get Time Server	Sets the method of getting the IP address/host name for the time server.
	Time Server	Sets the IP address/host name for the time server when (Get Time Server) is set to (Manual).
	Time Server Status	Shows the result of communication with the time server.
Submit		Submits settings to the TM-L90-i.

Password Setting

You can change a password.

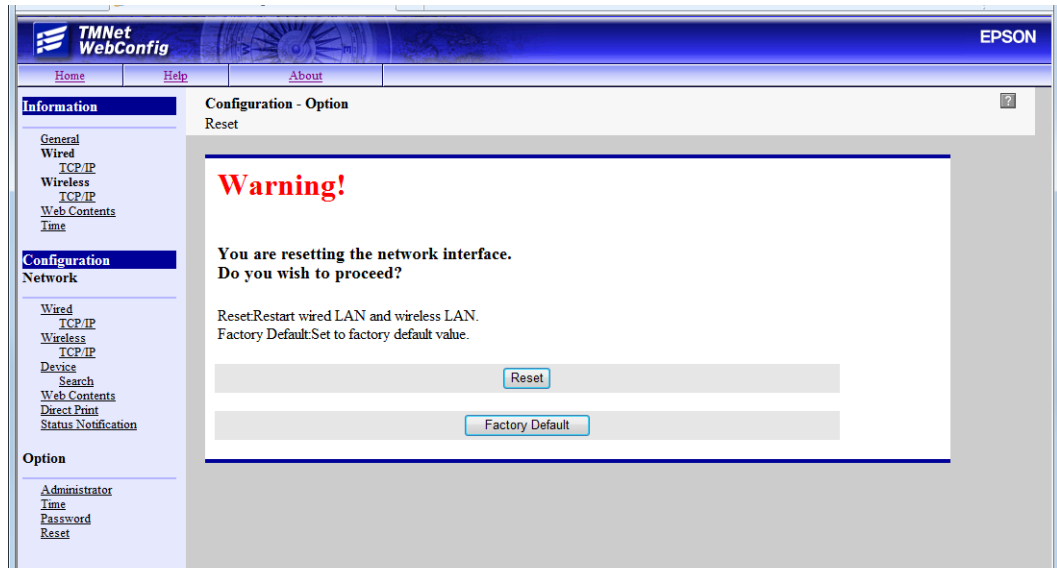


Item	Description
Old Password	Enter the current password.
New Password	Enter the new password.
Re-input Password	Enter the new password for confirmation.
Submit	Submits settings to the TM-L90-i.

CAUTION

A user name and a password will be required on the authentication screen when you start up this utility and when you change settings. Enter “epson” for the user name and the password you set for the password.

Reset



Item	Description
Reset	Resets the network interface, and reboots wired LAN and wireless LAN functions after applying the changes made in the settings window.
Factory Default	Returns settings of the TM-L90-i to default ones. All settings are initialized, except for the internal clock.

Settings Confirmation Mode

In addition to normal printing mode, there is also a self test mode and hexadecimal dump mode to check the various printer settings.

Self-test Mode

In self test mode, you can print the printer status and a rolling printout of installed characters. When printing the printer status, you can check the following items.

- Control circuit functions
- Printer mechanism functions
- Printing quality
- Control software version
- DIP switch settings
- Memory switch settings
- Paper width settings

Run the Self-test Mode

Follow the steps below to run this mode.

- 1** Close the roll paper cover.
- 2** Press the FEED button on the control panel while turning the power on. (Press and hold the FEED button until printing starts.)
The printer prints current status of the printer.

NOTE

For a fixed IP address, printing will start in approximately 6 seconds; for automatically acquired settings, printing will start in approximately 13 seconds. (More time might be required, depending on the response time from the host.)

When printing is complete, the following message is printed, the PAPER LED flashes, and the printer waits in test printing mode.

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

- 3** To perform a test printing, press the FEED button.
During test printing, a rolling pattern of installed characters is printed.
When printing is complete, "*** completed ***" is printed.
After the printer is initialized, it returns to normal printing mode.

Hexadecimal Dumping Mode

In the hexadecimal dumping mode, the printer prints the data transmitted from a host computer in hexadecimal numbers and their corresponding characters.

Starting Hexadecimal Dump Mode

Follow the steps below to run this mode.

CAUTION

- If there is no character corresponding to print data, "." is printed.
- If print data is less than one line, press the Feed button to print the line.
- Applications that confirm printer status may not work correctly during the hexadecimal dumping mode. The printer returns only the status for "Transmit real-time status."

- 1 Open the roll paper cover.
- 2 Press the FEED button inside the printer while turning the power on.
- 3 Close the roll paper cover.
The printer starts printing data received from then on in hexadecimal numbers and their corresponding characters.

Turn off the printer or press the Feed button three times to return to the normal mode.

Printing example:

```
Hexadecimal Dump
To terminate hexadecimal dump,
press FEED button three times.

1B 21 00 1B 26 02 40 40 1B 69 . ! . . & . @ @ . i
1B 25 01 1B 63 34 00 1B 30 31 . % . . c 4 . . 0 1
41 42 43 44 45 46 47 48 49 4A A B C D E F G H I J

*** completed ***
```

Memory Switch Setting Mode

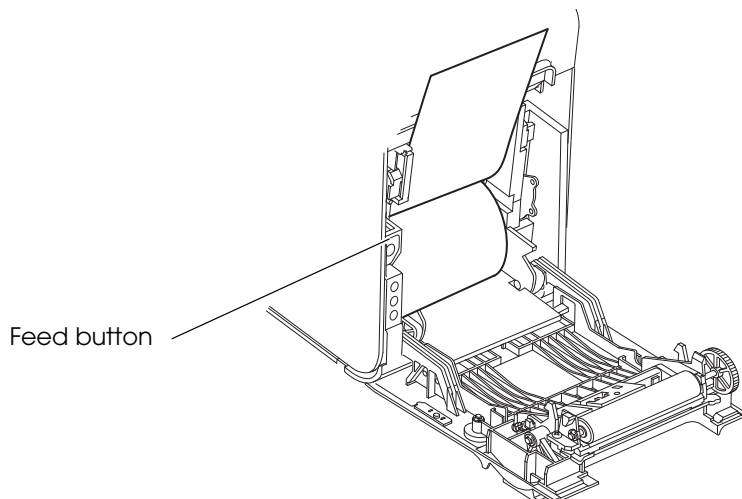
You can configure the memory switches (customized values) of the printer.

- Enabling/Disabling the Auto Cutter
- Reception buffer capacity
- Handling data when a reception error occurs
- BUSY conditions
- Interface reset signal
- Paper width
- Print density
- Label settings

Starting Remote Switch Setting Mode

Follow the steps below to run this mode.

- 1** Make sure that roll paper is loaded and the printer is turned off.
- 2** Open the roll paper cover.
- 3** Press the FEED button while turning the power on.



- 4** When the ERROR LED comes on, goes out, and then comes on again, release the FEED button.
- 5** Press the FEED button 2 times, and then close the roll paper cover.
The setting items and operation method guidance are printed. Perform the operations indicated in the guidance information.

When the settings are complete, they are saved. The printer is initialized, and then returns to normal printing status.



Handling

This chapter describes basic handling of the printer.

Installing and Replacing Roll Paper



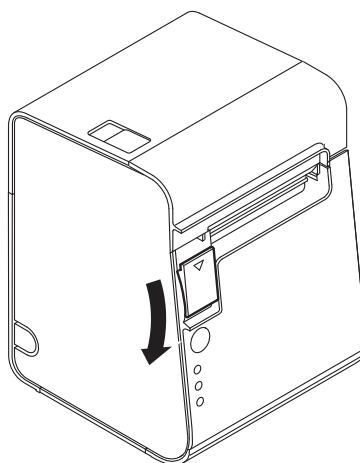
WARNING

- **Do not open the roll paper cover during printing.**
The printer may be damaged.
- **Do not touch the manual cutter with your hands when installing or replacing the roll paper.**
Otherwise, you may be injured because the manual cutter blade is sharp.

CAUTION

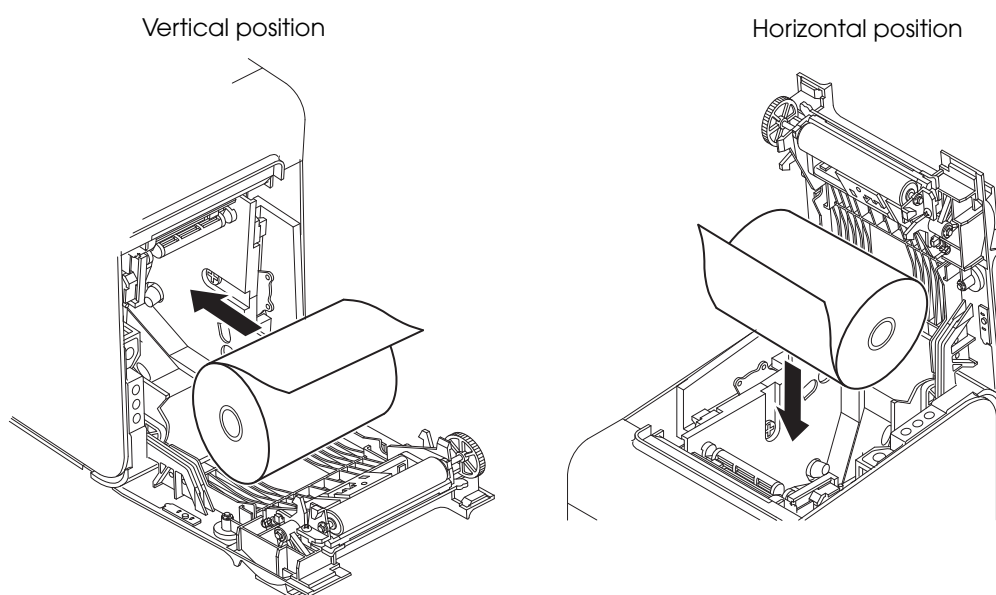
- Use roll paper that meets the printer specification. For details about paper specification, see ["Paper Specifications" on page 35](#).
- Paper must not be pasted to the roll paper spool.

- 1 Press the cover open lever to open the roll paper cover.

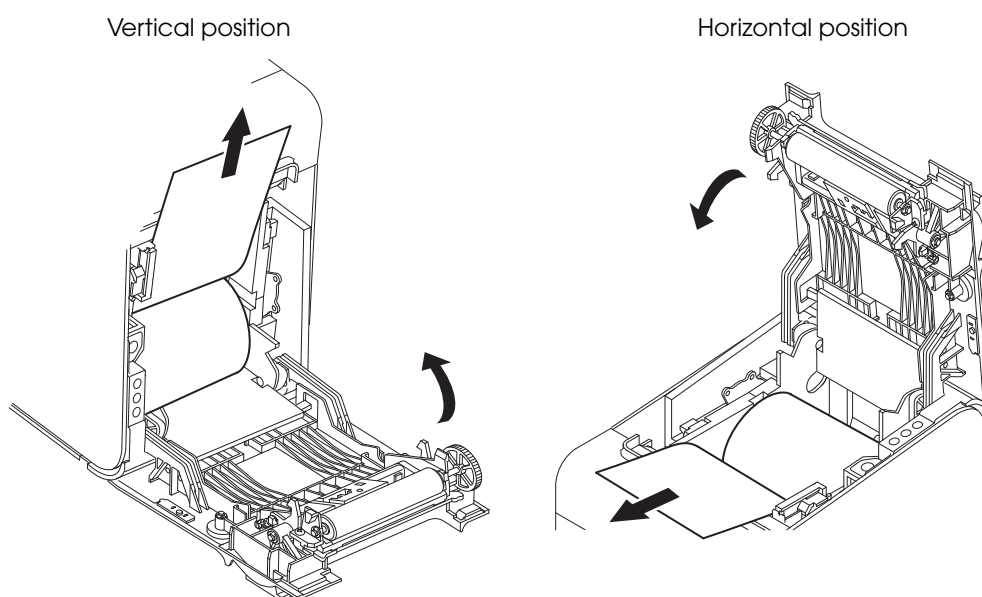


- 2 Remove the used roll paper core, if any.

3 Install the roll paper in the correct direction.

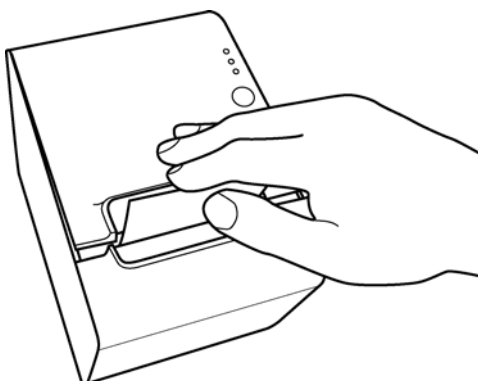


4 Pull the edge of the roll paper out slightly along the guide, and then close the roll paper cover.

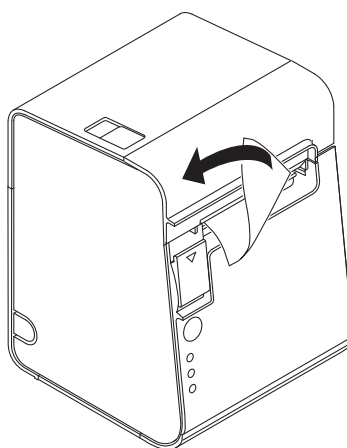


CAUTION

Press down on the center of the roll paper cover to firmly close the cover.



- 5** Tear off the roll paper with the manual cutter.



Removing Jammed Paper

When a paper jam occurs, never pull out the paper forcibly. Open the roll paper cover and remove the jammed paper.



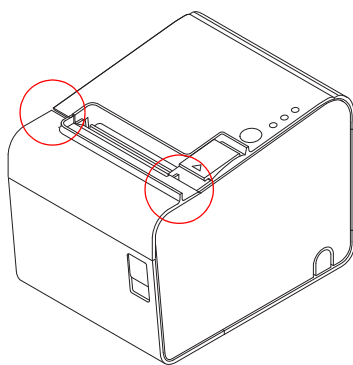
Do not touch the thermal head (See ["Cleaning the Thermal Head" on page 136.](#)) because it can be very hot after printing.

- 1** Turn off the printer.
- 2** Open the roll paper cover.
- 3** Remove the jammed paper. Reload the roll paper, and close the roll paper cover.

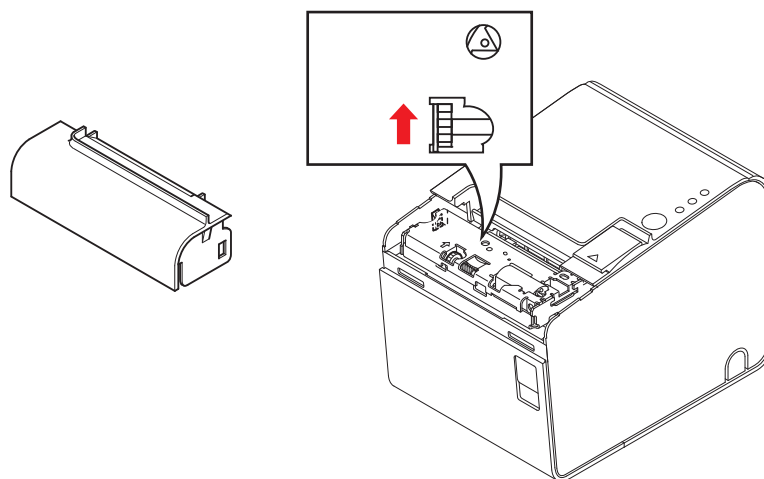
When the roll paper cover will not open

If the jammed paper is caught on the auto cover and the roll paper cover will not open, use the following procedure to open the roll paper cover.

- 1** Turn off the printer.
- 2** Insert a screwdriver into the notches on both sides of the printer, and then lift and remove the cutter cover.



- 3** Turn the knob until you see a triangle in the opening.
The auto cutter blade returns to its standard position, and the roll paper cover can now be opened.



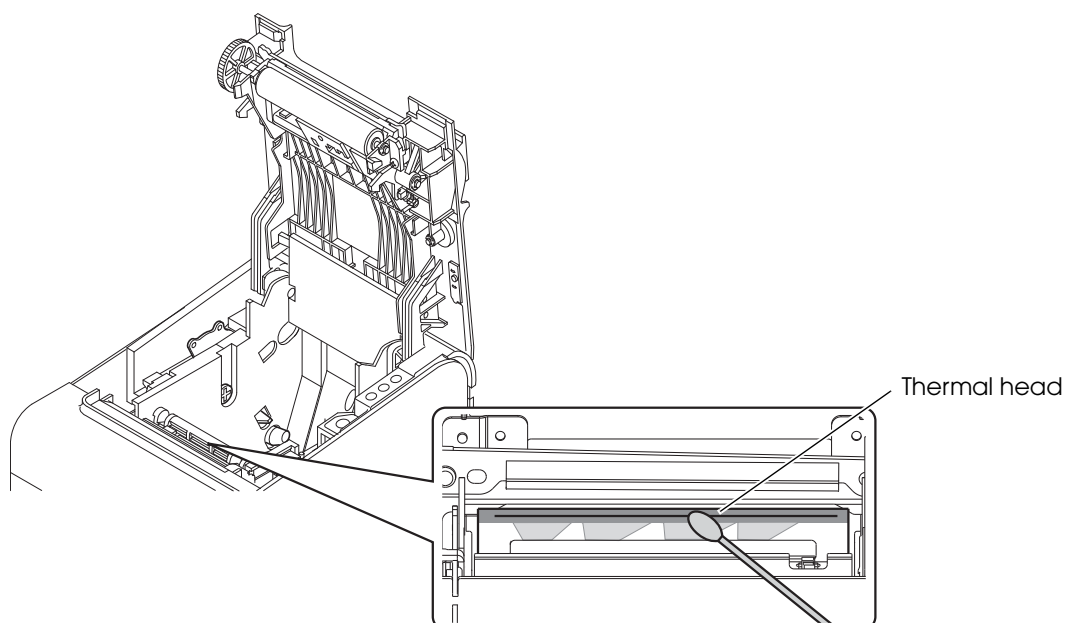
Cleaning the Thermal Head

Epson recommends cleaning the thermal head periodically (generally every 3 months) to maintain receipt print quality.



- After printing, the thermal head can be very hot. Do not touch it and let it cool before you clean it.
- Do not damage the thermal head by touching it with your fingers or any hard object.

Turn off the printer, open the roll paper cover, and clean the thermal elements of the thermal head with a cotton swab moistened with an alcohol solvent (ethanol or IPA).



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. Turn on the printer power only after the water has completely dried.

Connecting to External Devices

Follow the steps below to connect external devices to the interface section.



CAUTION

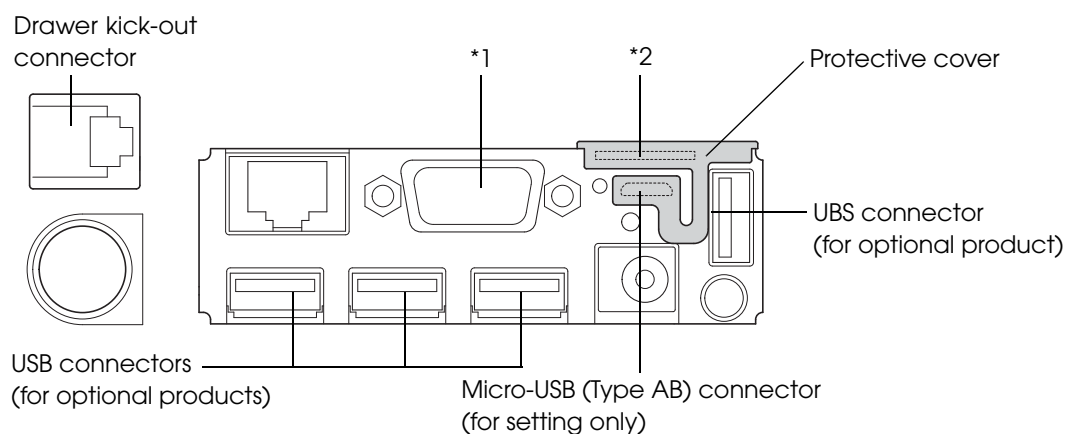
- When connecting external devices to the USB (including Micro-USB) connectors, follow the precautions below.
 - * Confirm the rated current of the external devices by checking the descriptions on the devices or manuals. Do not use a device whose rated current is unclear.
 - * Use the UL-approved external devices (only for North American users).
 - * Connect the external devices only when those total rated current is less than 2.0A.
- When using the printer, make sure the protective cover fits firmly into place.
- When LAN cables are installed outdoors, make sure devices without proper surge protection are cushioned by being connected through devices that do have surge protection. Otherwise, the devices can be damaged by lightning.



NOTE

- Connecting the optional Wireless LAN Cable Set (OT-WL01) to the USB connector enables the wireless LAN connection. (See ["Connecting the wireless LAN cable set" on page 69.](#)) While connecting via wireless LAN, keep the Ethernet cable unconnected to the printer.
- For the Micro-USB connector, use the Micro USB (A-Micro B type) cable.

1 Connect each cables to the connectors at the back of the printer.



*1: Analog RGB connector (not available currently)

*2: Micro SD card slot (available when using the PHP function .)

2 Connect other ends of the cables to external devices.

Preparing for Transport

Follow the steps below to transport the printer.

- 1** Turn off the printer.
- 2** Make sure the POWER LED is off.
- 3** Remove the power supply connector.
- 4** Remove the roll paper.
- 5** Pack the printer upright.

Appendix

Character Code Tables

CAUTION

- The character code tables show only character configurations. They do not show the actual print pattern.
- "SP" in the table shows a space.

Common to All Pages

When International character set (See ["International Character Sets" on page 151.](#)) is USA:

HEX	0	1	2	3	4	5	6	7
0	NUL 00	DLE 16	SP 32	0 48	@ 64	P 80	` 96	p 112
1		XON 17	! 33	1 49	A 65	Q 81	a 97	q 113
2			" 34	2 50	B 66	R 82	b 98	r 114
3		XOFF 19	# 35	3 51	C 67	S 83	c 99	s 115
4	EOT 04	DC4 20	\$ 36	4 52	D 68	T 84	d 100	t 116
5	ENQ 05	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117
6	ACK 06		& 38	6 54	F 70	V 86	f 102	v 118
7			' 39	7 55	G 71	W 87	g 103	w 119
8		CAN 24	(40	8 56	H 72	X 88	h 104	x 120
9	HT 09		) 41	9 57	I 73	Y 89	i 105	y 121
A	LF 10		* 42	: 58	J 74	Z 90	j 106	z 122
B		ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123
C	FF 12	FS 28	, 44	< 60	L 76	¥ 92	l 108	 124
D	CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125
E		RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126
F			/ 47	? 63	O 79	— 95	o 111	SP 127

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

Page 1 (Katakana)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	ー	上	SP	ー	タ	ミ	=	×
		128	144	160	176	192	208	224	240
1	0001	ー	下	。	ア	チ	ム	ト	円
		129	145	161	177	193	209	225	241
2	0010	ー	ナ	「	イ	ツ	メ	千	年
		130	146	162	178	194	210	226	242
3	0011	ー	ト	」	ウ	テ	モ	コ	月
		131	147	163	179	195	211	227	243
4	0100	ー	ー	、	エ	ト	ヤ	▲	日
		132	148	164	180	196	212	228	244
5	0101	ー	ー	・	オ	ナ	ユ	▲	時
		133	149	165	181	197	213	229	245
6	0110	ー	ナ	ヲ	カ	ニ	ヨ	▼	分
		134	150	166	182	198	214	230	246
7	0111	ー	ナ	ア	キ	ヌ	ラ	▼	秒
		135	151	167	183	199	215	231	247
8	1000	ナ	「	イ	ク	ネ	リ	♠	千
		136	152	168	184	200	216	232	248
9	1001	ナ	ナ	ウ	ケ	ノ	ル	♥	市
		137	153	169	185	201	217	233	249
A	1010	ナ	ナ	エ	コ	ハ	レ	♦	区
		138	154	170	186	202	218	234	250
B	1011	ナ	ナ	オ	サ	ヒ	ロ	♣	町
		139	155	171	187	203	219	235	251
C	1100	ナ	ナ	ヤ	シ	フ	ワ	●	村
		140	156	172	188	204	220	236	252
D	1101	ナ	ナ	ユ	ス	ヘ	ン	○	人
		141	157	173	189	205	221	237	253
E	1110	ナ	ナ	ヨ	セ	ホ	・	／	罫
		142	158	174	190	206	222	238	254
F	1111	ナ	ナ	ツ	ソ	マ	・	＼	SP
		143	159	175	191	207	223	239	255

	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	$\frac{3}{4}$ 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	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	ˆ 247
8	1000	ê 136	ÿ 152	ı 168	© 184	200	İ 216	ƒ 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	$\frac{1}{2}$ 171	187	203	219	Ü 235	¹ 251
C	1100	î 140	£ 156	$\frac{1}{4}$ 172	188	204	220	ý 236	³ 252
D	1101	ì 141	Ø 157	ı 173	¢ 189	205	221	Ý 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	206	222	— 238	■ 254
F	1111	Å 143	f 159	» 175	191	207	223	´ 239	SP 255

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 ₁₂₈	É ₁₄₄	á ₁₆₀	 ₁₇₆	┐ ₁₉₂	⌋ ₂₀₈	α ₂₂₄	≡ ₂₄₀
1	0001	ü ₁₂₉	À ₁₄₅	í ₁₆₁	 ₁₇₇	┌ ₁₉₃	⌈ ₂₀₉	β ₂₂₅	± ₂₄₁
2	0010	é ₁₃₀	È 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	ã ₁₃₂	õ ₁₄₈	ñ ₁₆₄	┐ ₁₈₀	— ₁₉₆	┌ ₂₁₂	Σ ₂₂₈	∫ ₂₄₄
5	0101	à ₁₃₃	ò ₁₄₉	Ñ ₁₆₅	┐ ₁₈₁	⊕ ₁₉₇	┐ ₂₁₃	σ ₂₂₉	J ₂₄₅
6	0110	Á ₁₃₄	Ú ₁₅₀	a ₁₆₆	┐ ₁₈₂	┐ ₁₉₈	┐ ₂₁₄	μ ₂₃₀	÷ ₂₄₆
7	0111	ç ₁₃₅	ù ₁₅₁	o ₁₆₇	┐ ₁₈₃	┐ ₁₉₉	⊕ ₂₁₅	τ ₂₃₁	≈ ₂₄₇
8	1000	ê ₁₃₆	Ì ₁₅₂	¿ ₁₆₈	┐ ₁₈₄	┐ ₂₀₀	⊕ ₂₁₆	Φ ₂₃₂	° ₂₄₈
9	1001	Ê ₁₃₇	Õ ₁₅₃	Ò ₁₆₉	┐ ₁₈₅	┐ ₂₀₁	┐ ₂₁₇	θ ₂₃₃	• ₂₄₉
A	1010	è ₁₃₈	Ü ₁₅₄	¬ ₁₇₀	₁₈₆	⊥ ₂₀₂	┐ ₂₁₈	Ω ₂₃₄	· ₂₅₀
B	1011	Í ₁₃₉	¢ ₁₅₅	$\frac{1}{2}$ ₁₇₁	┐ ₁₈₇	┐ ₂₀₃	■ ₂₁₉	δ ₂₃₅	√ ₂₅₁
C	1100	Ô ₁₄₀	£ ₁₅₆	$\frac{1}{4}$ ₁₇₂	┐ ₁₈₈	┐ ₂₀₄	■ ₂₂₀	∞ ₂₃₆	n ₂₅₂
D	1101	ì ₁₄₁	Ù ₁₅₇	¡ ₁₇₃	┐ ₁₈₉	= ₂₀₅	■ ₂₂₁	ø ₂₃₇	² ₂₅₃
E	1110	Ã ₁₄₂	Pt ₁₅₈	« ₁₇₄	┐ ₁₉₀	⊕ ₂₀₆	■ ₂₂₂	∈ ₂₃₈	■ ₂₅₄
F	1111	Â ₁₄₃	Ó ₁₅₉	» ₁₇₅	┐ ₁₉₁	⊥ ₂₀₇	■ ₂₂₃	∩ ₂₃₉	SP ₂₅₅

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

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	J ₂₄₅
6	0110	å ₁₃₄	û ₁₅₀	a ₁₆₆	┘ ₁₈₂	┘ ₁₉₈	┘ ₂₁₄	μ ₂₃₀	÷ ₂₄₆
7	0111	ç ₁₃₅	ù ₁₅₁	o 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	$\frac{1}{2}$ ₁₇₁	┘ ₁₈₇	┘ ₂₀₃	■ ₂₁₉	δ ₂₃₅	√ ₂₅₁
C	1100	î ₁₄₀	£ ₁₅₆	$\frac{1}{4}$ 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

	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	Đ 208	à 224	ð 240
1	0001	SP 129	‘ 145	ì 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	Ö 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 ^{1/4} 188	Ì 204	Ü 220	ì 236	ü 252
D	1101	SP 141	SP 157	- 173	½ ^{1/2} 189	Í 205	Ý 221	í 237	ý 253
E	1110	Ž 142	ž 158	® 174	¾ ^{3/4} 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

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	ё 243
4	0100	Д 132	Ф 148	д 164	 180	 196	 212	ф 228	ï 244
5	0101	Е 133	Х 149	е 165	 181	 197	 213	х 229	ï 245
6	0110	Ж 134	Ц 150	ж 166	 182	 198	 214	ц 230	ÿ 246
7	0111	З 135	Ч 151	з 167	 183	 199	 215	ч 231	ÿ 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

	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	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	˘ 243
4	0100	ä 132	ö 148	À 164	 180	 196	ď 212	ń 228	˙ 244
5	0101	û 133	Ĺ 149	à 165	Á 181	 197	Ň 213	ň 229	§ 245
6	0110	ć 134	ĩ 150	ž 166	Â 182	Ă 198	í 214	š 230	÷ 246
7	0111	ç 135	ś 151	ž 167	Ě 183	ă 199	î 215	ș 231	˚ 247
8	1000	ì 136	ś 152	Ǝ 168	Ş 184	 200	ě 216	Ŕ 232	° 248
9	1001	ë 137	Ö 153	ę 169	 185	 201	 217	Ú 233	“ 249
A	1010	Ö 138	Ü 154	 170	 186	 202	 218	ŕ 234	˙ 250
B	1011	ö 139	Ť 155	ž 171	 187	 203	 219	Ů 235	ũ 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	ž 190	 206	Ũ 222	ı 238	■ 254
F	1111	Ć 143	č 159	» 175	 191	α 207	 223	’ 239	SP 255

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	Ł 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	o ₁₆₇	À ₁₈₃	Ã ₁₉₉	Î ₂₁₅	þ ₂₃₁	· ₂₄₇
8	1000	ê ₁₃₆	ÿ ₁₅₂	¿ ₁₆₈	© ₁₈₄	Ł 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	$\frac{1}{2}$ ₁₇₁	⌞ ₁₈₇	⌞ ₂₀₃	■ ₂₁₉	Ü ₂₃₅	¹ ₂₅₁
C	1100	î ₁₄₀	£ ₁₅₆	$\frac{1}{4}$ ₁₇₂	⌞ ₁₈₈	⌞ ₂₀₄	■ ₂₂₀	Ý ₂₃₆	³ ₂₅₂
D	1101	ì ₁₄₁	Ø ₁₅₇	¡ ₁₇₃	¢ ₁₈₉	= ₂₀₅	₂₂₁	Ý ₂₃₇	² ₂₅₃
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

	HEX	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

International Character Sets

Country	ASCII code (Hex)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
USA	#	\$	@	[	\	]	^	`	{		}	~
France	#	\$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	£	\$	@	[	\	]	^	`	{		}	~
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	\$	@	í	Ñ	¿	^	`	¨	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	í	Ñ	¿	é	`	í	ñ	ó	ú
Latin America	#	\$	á	í	Ñ	¿	é	ü	í	ñ	ó	ú
Korea	#	\$	@	[	₩	]	^	`	{		}	~