EPSON
EXCEED YOUR VISION

EU-m30

Developer's Guide

*Includes information on OT-BU30.

M00139800 EN

Rev.A

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ESC/POS® Command System

Epson ESC/POS is a proprietary POS printer command system that includes patented or patent-pending commands. ESC/POS is compatible with most Epson POS printers and displays.

ESC/POS is designed to reduce the processing load on the host computer in POS environments. It comprises a set of highly functional and efficient commands and also offers the flexibility to easily make future upgrades.

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Important Safety Information

This document presents important information intended to ensure safe and effective use of this product. Read this section carefully and store it in an accessible location.

Safety Precautions

⚠ **WARNING**: Handling the product improperly by ignoring this symbol can lead to death or serious injury.

In the following cases, immediately turn off the power and contact qualified service personnel.

Continued use may lead to fire or electric shock.

- If the product emits smoke, a strange odor, or unusual noise.
- If water or other liquid spills into the product.
- If the product is too hot to touch or the case is deformed.

Note the following points to avoid accidents such as fire, electric shock, or burn.

- Do not use this product where flammable fumes from gasoline, benzine, thinner, or other flammable liquids may be in the air.
- Do not use aerosol sprayers containing flammable gas inside or around the product.
- Do not cover the product with cloth, or place the product in locations subject to high levels of humidity or dust.
- Do not allow foreign objects or flammable objects to fall into the equipment.
- Do not touch the inside of the product except where mentioned in the manual.
- Do not use the product with any voltage and current other than the ones specified.
- Do not connect cables in ways other than those mentioned in the manual.
- Never disassemble or modify the product.

⚠ **CAUTION**: Handling the product improperly by ignoring this symbol can lead to injury and property damage.

Note the following points to avoid injury or malfunction.

- Setup the product on a firm, stable, horizontal surface.
- Do not place heavy objects on top of the product. Never stand or lean on the product.
- Do not press your hands or fingers against the cutter when removing printed paper or loading/replacing roll paper.
- Do not put your hands between the cover and the body of the product when opening/closing the cover.
- Never attempt to repair the product yourself.
- Do not connect a telephone line to the drawer kick connector (Model for specified customer only).
- For safety, turn off the power if the product will not be used for a long period.

Caution Labels

The caution labels on the product indicate the following precautions.



CAUTION: Do not touch the thermal head and the frame on its side because it can be very hot after printing.



CAUTION: The sharp edge can cut your fingers.

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 failsafes 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.

Product Overview

This chapter describes features of the product.

Features

This product (printer unit) is intended to be integrated into a self-service terminal.

For details on how to integrate it into a self-service terminal, refer to the following:

- Appendix M PRINTER INSTALLATION DESIGN GUIDE
- Appendix N INSTALLING THE POWER SWITCH AND POWER/FEED SWITCH COVER
- Appendix O REPLACEMENT FOR SMALL COVER OPEN LEVER
- Appendix P BEZEL OPTION (OT-BU30)
- Appendix Q RECOMMENDED POWER SUPPLY
- Appendix R PRINTER UNIT HANDLING

Product Configurations

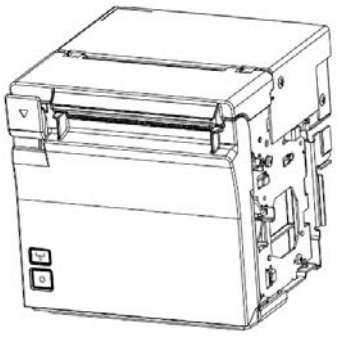
Models

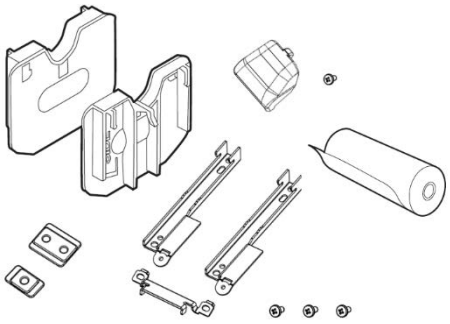
- Standard model
- Models for specified customers

Accessories

Included

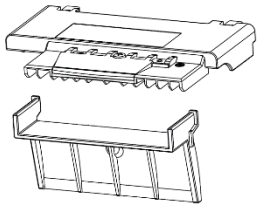
- Main unit
- Roll paper (φ 35 mm)
- Switch cover
    - For power switch
    - For power/feed switch
- Small cover open lever, including 1 spare screw
- Roll paper guides for 58 mm {2.28"} paper: 2
- Equipment mounting brackets: 2
- Product fixing brackets, including 2 screws + 1 spare (total of 3 screws)





Options

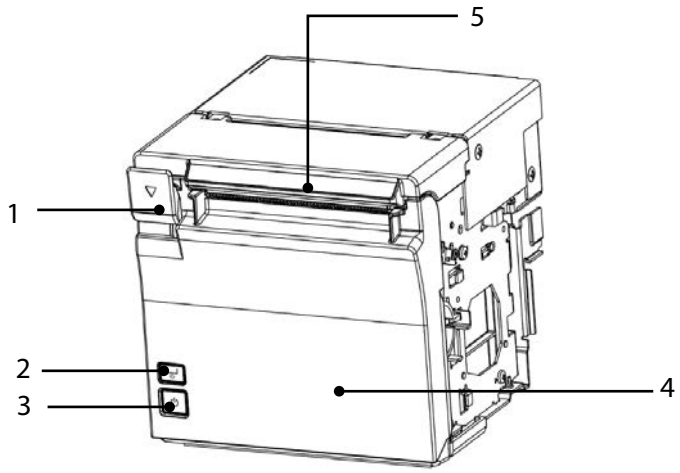
- Bezel option (Model: OT-BU30)



- AC Adapter (Model: PS-180)
- Optional external buzzer (Model: OT-BZ20) (Model for specified customer only)

Part Names and Function

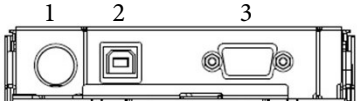
Front

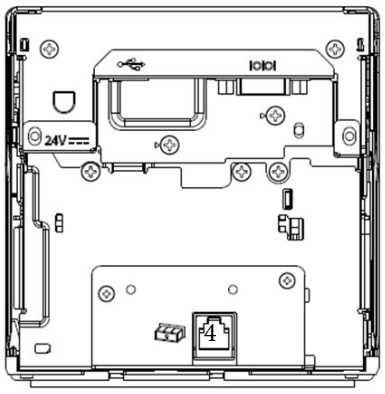


1	Cover open lever	Operate this lever to open the roll paper cover.
2	Feed button	Pressing this button once feeds roll paper for one line. Hold down this button to continue feeding roll paper.
3	Power switch	Turns the printer on or off.
4	Roll paper cover	Open this cover when loading or replacing roll paper.
5	Panel LED	For details on LED, see "Panel LED" on page 16.

NOTE	When turning off the printer without using the power switch, it is recommended to send a power-off command to the printer. If you use the power-off sequence, the latest maintenance counter values are saved. (Maintenance counter values are usually saved every two minutes.) For information about ESC/POS commands, see the ESC/POS Command Reference.

Connectors





1	Power supply connector	Connect the AC adapter.
2	USB connector (Type-B)	Connects the USB cable for connecting to a computer.
3	Serial connecter	Connects the serial cable for connecting to a computer.
4	Drawer kick connector (Model for specified customer only)	Connects the cash drawer or the optional external buzzer.

OUTLINE

(1) Scope of this document

This document applies to the EU-m30 and bezel option OT-BU30.

(2) Product safety precautions

1) Do not allow a voltage that exceeds the absolute maximum rating to be applied to the power connector.
If the applied voltage exceeds the absolute maximum rating, excess current may flow, causing thermal damage to components.

Absolute maximum rating

Articles	Rating	Units
Circuit input power supply voltage	26.4	V
Storage temperature	See 1.13 Environmental Conditions (2) Storage environment.	
Storage humidity		

2) Use the product within the range of operating conditions shown in the table below.

Operating conditions

Articles	Min.	Typ.	Max.	Units
Printer power supply voltage	22.3	24.0	25.7	V
Operating temperature	See 1.13 Environmental Conditions (1) Guaranteed operating environment.			
Operating humidity				

3) Do not create short circuits between connector terminals in the printer unit.
Do not create short circuits between power connector terminals.
A short circuit to a low-impedance power supply can create excess current, causing thermal damage to components.

4) During transport and storage, properly protect printer unit exterior (exposed) circuit boards and electronic components with conductive sponges, aluminum foil, and such.

5) Do not drop clips and other conductive materials onto the printer unit's circuit board.
Short circuits between component connectors (terminals) can create excess current, causing thermal damage to components.

6) Use only the cables indicated in this document. Also, use only the wiring indicated in this document.
Wiring done incorrectly can lead to a failure, fire, explosion, or other accident.

7) Do not disassemble or modify. Such actions can lead to injury or electric shock.

8) During operation, do not directly touch gears or other moving parts. You can get cut or otherwise injured.

9) Do not install in an unstable location (such as on an unsteady pedestal or sloping area). The product can fall and you can get injured.

10) Do not install in a damp or dusty location. Also, ensure that the product is not exposed to water droplets.
Failure to do so may result in product failure, fire, or electric shock.

11) If the product will not be used for a long period, be sure to turn off the power to the printer unit for safety.

12) The symbols shown below are used in order to ensure safety and proper use of this product.
Read and thoroughly understand the meaning of each symbol before using the product.



Caution



Caution: Hot Surface (See Appendix B.)



Caution: Sharp Edges (See Appendix P.)

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1 GENERAL SPECIFICATIONS

1.1 Print Specifications

(1) Print speed

- The maximum is 100 mm/s {3.94"/s} when printing ladder bar codes, 2-dimensional symbols, or multi-tone graphics.
- The print speed changes automatically depending on the voltage applied to the printer and the condition of the head temperature.
- Maximum print speed may not be achieved depending on the data transmission conditions and the combination of commands.
- If the print speed fluctuates or intermittent printing occurs due to the data transmission conditions, printing may be shaded or white lines may occur.

(2) Multi-tone graphics printing and limitations

- Multi-tone graphics printing is possible (up to 16 tones when using our specified paper).
- Multi-tone printing is not supported in Page mode.
- Voids (white spaces) may appear depending on the paper type (uneven application of chromogenic coating).
- It may not be possible to recreate an original image because a certain density level cannot be achieved due to the following causes:
  - Environmental temperature, power supply and voltage
  - Paper type (chromogenic characteristics)
  - Paper variations, such as variations among manufacturing lots
  - Printing pattern (effect of heat accumulation of the print head or of voltage drop/speed change due to high duty)
- For multi-tone printing, the preservative quality of materials printed using multi-tone printing decreases in direct relationship with the lighter the printing. Accordingly, do not use multi-tone printing when preservative quality is required.
- Reading quality of bar codes/2-dimensional symbols in multi-tone graphics printing is not guaranteed.

1.2 Character Specifications

- Can be changed via the software settings.
- For details, see 3.8.3 Software setting mode.

1.3 Autocutter

- The cut paper may be pulled at the cut edge when it is removed, causing reduced printing pitch for the first line of the next receipt.
  To prevent dot displacement, after cutting, feed the paper approximately 1 mm {16/406"} or more before the first line of printing. This operation can be enabled by enabling the pre-feed before next print, or by setting the top margin specification via backfeed to 8.5 to 2 mm.
  For the setting method, see 3.5.2. Software setting.
- When issuing paper whose vertical length is short, ensure at least 20 mm.

1.4 Paper Sensor

(1) Function

Detects whether paper is present in the paper path.

(2) Method

Microswitch

1.5 Roll Paper Supply Device

- Use roll paper that is not deformed, and ensure there is no slack when setting.

(1) Function

Supplies paper with a width of 80 mm {3.15"} or 58 mm {2.28"}

(2) Method

Drop-in roll paper

1.6 Paper Specifications

(1) Paper specifications

Table 1.6.1 Paper Specifications

		Paper width 58 mm	Paper width 80 mm
Paper types		Specified thermal paper	
Form		Roll paper, Chromogenic side: Outside	
Size	Roll paper diameter	83 mm {3.27"} maximum	
	Roll paper core	Outside diameter: 18 + 0.5/-0.1 mm {0.71 + 0.02/-0.004"} Inner diameter: 12 + 0.5/-0.1 mm {0.47 + 0.02/-0.004"} Width: Same as the roll paper width, or smaller than the paper width by 1 mm {0.04"} or less. *Paper must not be pasted to the roll paper core	
	Roll width when taken up	58 + 0.5/-1.0 mm {2.28 + 0.02/-0.04"}	80 + 0.5/-1.0 mm {3.15 + 0.02/-0.04"}
	Paper width	57.5 ± 0.5 mm {2.26 ± 0.02"}	79.5 ± 0.5 mm {3.13 ± 0.02"}
	Paper thickness	Maximum of 80 µm, minimum of 48 µm	

(2) Specified original paper

Use the following specified original papers to ensure print quality and reliability.

Table 1.6.2 Specified Original Paper

Specified original paper	Manufacturer
TF50KS-EY, TF60KS-E	NIPPON Paper Industries Co., Ltd.
PD160R, PD190R	Oji Imaging Media Co., Ltd.
P220AGB-1	Mitsubishi Paper Mills Limited.
AP45KS-ND, AP50KS-ND	Jujo Thermal Oy
F5047(55), F5047(48)	Mitsubishi HiTec Paper Europe GmbH
KT55FA, KT48FA, KT55PF, KT48PF	Papierfabrik August Koehler SE

(3) Print density adjustment depending on the specified original paper

- In order to ensure optimal print quality and reliability, we recommend using the print density settings in the table below.
- The initial setting is 100% print density.
- The print density can be changed using customized values.
- When the print density setting is too dark, the print speed tends to drop.
- When the print density setting is too dark, paper dust sticks to the print head surface, often resulting in faded print.

Table 1.6.3 Specified Original Paper and Recommended Print Density Setting

Specified original paper	Print density	Print speed
TF50KS-EY, TF60KS-E, PD160R, PD190R, P220AGB-1, AP45KS-ND, AP50KS-ND, KT55PF	100%	250 mm/s {9.84"/s}
KT48FA, KT55FA, KT48PF, P5047(55)	110%	250 mm/s {9.84"/s}

(4) Notes on preprinting

- Preprinted thermal paper may cause faulty printing and decreased print density due to the thermal head sticking to the recording surface. Therefore, it is preferable to avoid using preprinted thermal paper.
- If using preprinted thermal paper, make sure in advance that the conditions recommended by the original paper manufacturing company (type of ink, print conditions, etc.) are met, and that there is no faulty printing or decreased print density in the actual usage environment.

1.7 Print Area

(1) When paper width is set to 80 mm {3.15"}

(a) Maximum print area

72 ± 0.2 mm {2.84 ± 0.0079"} (576 dots)

(b) Left margin

Approx. 3.75mm {0.15"} for a paper width of 79.5 ± 0.5 mm {3.13 ± 0.02"}

(c) Right margin

Approx. 3.75 mm {0.15"} for a paper width of 79.5 ± 0.5 mm {3.13 ± 0.02"}

(2) When paper width is set to 58 mm {2.28"}

(a) Maximum print area

52.5 ± 0.2 mm {2 ± 0.00787"} (420 dots)

(b) Left margin

Approx. 2.5 mm {0.098"} for a paper width of 57.5 ± 0.5 mm {2.26 ± 0.02"}

(c) Right margin

Approx. 2.5 mm {0.098"} for a paper width of 57.5 ± 0.5 mm {2.26 ± 0.02"}

1.8 Printing and Cutting Positions

(1) Autocut

- Approx. 9.5 mm {0.37"} from the print position

(2) Emergency cutting

- Approx. 19.5 mm {0.77"} from the print position

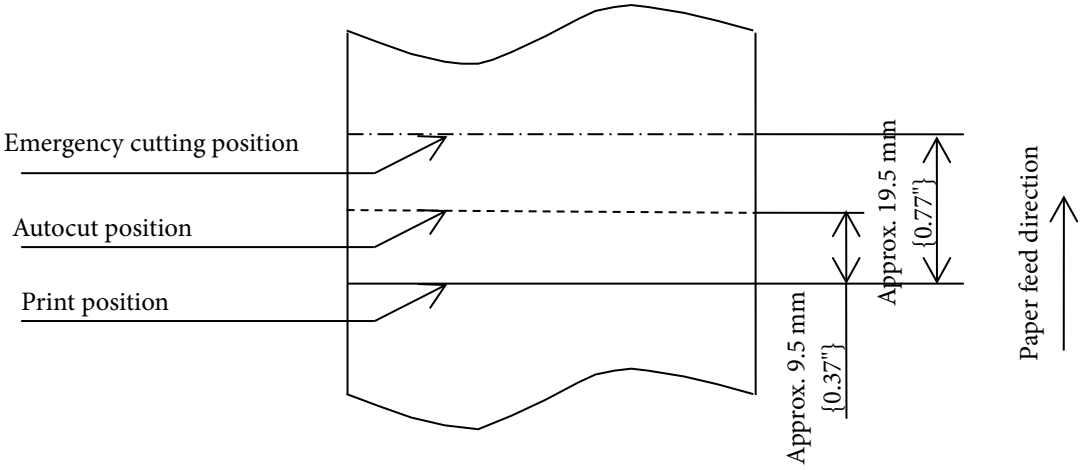


Figure 1.8.1 Printing and Cutting Positions

- These values are the design center values for the position of the structures, and vary from the top margin values.
- When setting the cut position, take into account that values may vary as a result of paper slack or variations in the paper.

1.9 Internal Memory

(1) Receive buffer

4 KB or 45 bytes (Select using software settings)

(2) Downloaded character area

12 KB (Shared with the downloaded bit image area)

(3) Macro area

2 KB

(4) NV graphics area

384 KB

(5) Downloaded graphics area

208 KB

(6) NV user memory area

1 KB

1.10 Electrical Characteristics

(1) Supply voltage

+24 VDC ± 7%

*Safety Information

Be sure to use a safety-standards-applied power source that meets the following specifications.

Rated output: 24V/2.1A - 10.0A, Maximum output: 240VA or less

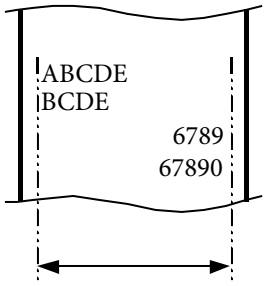
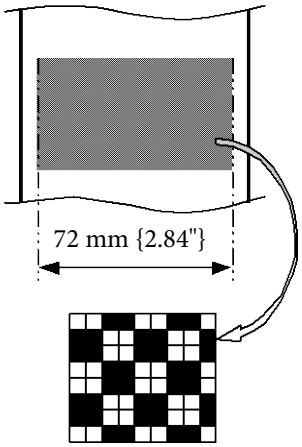
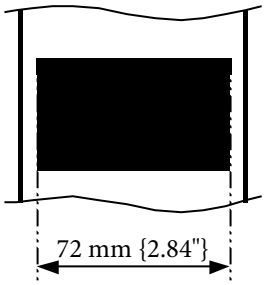
(2) DC current consumption (at 24 VDC, 25°C {77°F}, normal print density)

Operating: See Table 1.10.1 to 1.10.2.

Standby: Average current 0.1 A

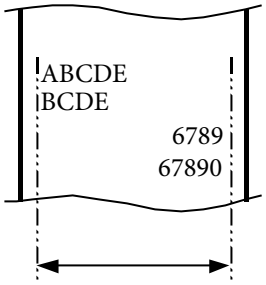
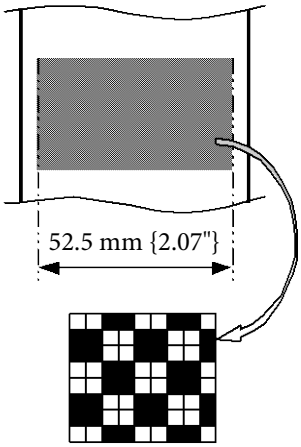
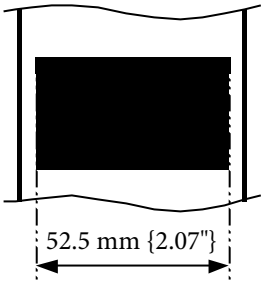
(a) When paper width is set to 80mm {3.15"}

Table 1.10.1 Current Consumption (Operating) (when paper width is set to 80 mm {3.15"})

Print ratio	Approximately 18% (with the print pattern below) Font A, ANK rolling pattern for 30 lines + paper feeing of 5 lines + autocutting (Repeats 20h to 7Fh)	50% (Printing length: 20 mm {0.79"})	100% (Printing length: 20 mm {0.79"})
Print example	 EU-m30: 48 columns		
EU-m30	Mean: Approximately 1.5 A	Mean: Approximately 3.5 A	Mean: Approximately 4.6 A

(b) When paper width is set to 58 mm {2.28"}

Table 1.10.2 Current Consumption (Operating)

Print ratio	Approximately 18% (with the print pattern below) Font A, ANK rolling pattern for 30 lines + paper feeing of 5 lines + autocutting (Repeats 20h to 7Fh)	50% (Printing length: 20 mm {0.79"})	100% (Printing length: 20 mm {0.79"})
Print example	 EU-m30: 35 columns		
EU-m30	Mean: Approximately 1.5 A	Mean: Approximately 3.1 A	Mean: Approximately 4.0 A

Note:

Printing with this product is assumed to be receipts or the equivalent. If printing is continuously performed with a high print ratio, the overcurrent limitation may be operated. Therefore, the printing length must not exceed 20mm {0.79"} when printing with 100% print ratio.

(3) AC power consumption (AC100 to 230 V / 50 to 60 Hz)

- EU-m30

Operating:	Approx. 24.2 W
Standby:	Approx. 0.8 W

*Average power under operating conditions. Depends on use conditions and model.

1.11 EMI and Safety Standards Applied

(1) Safety standards

Certified as part (component) installed and used in product: Recognized component product
*Not certified as final product: Not final product

- CB (IEC60950-1/IEC62368-1)
- TUV Bauart (EN62368-1)
- UL cULus UL62368-1/CAN/CSA No62368-1

(2) EMC

- Europe EMC Directive (EN55032/24) EMC Class A
- Oceania RCM AS/NZS CISPR32 Class A
- North America FCC Class A, ICES-003 Class A

Scope of static electricity evaluation is shown below.

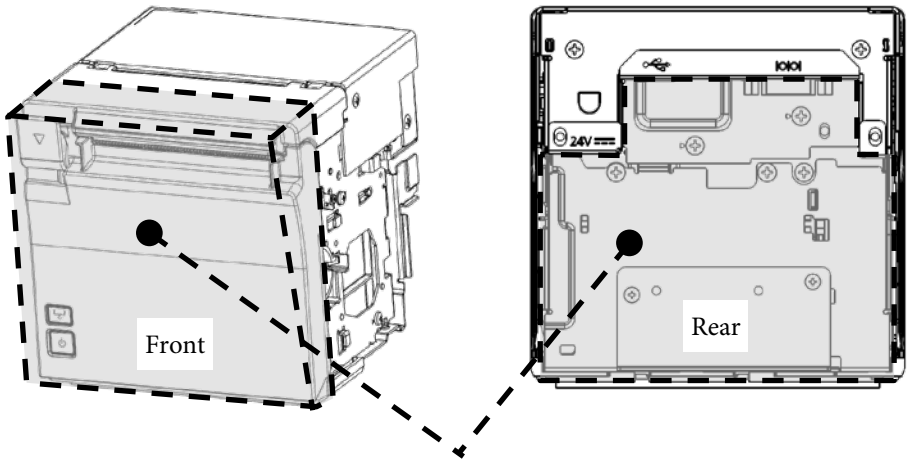


Figure 1.11.1 Scope of Static Electricity Evaluation

(3) Model for specified customer

In addition to aforementioned (1) safety standards and (2) EMC, acquire the following:

- CQC GB4943/GB9254 Class A
  *Product has no CQC mark displayed.

1.12 Reliability

(1) Life

- Printer mechanism: 17 million lines (Repeating 10 line-printing + 5 line-paper feeding)
- Print head 150 km
- Autocutter 1,500,000 cuts

(At room temperature and normal humidity with specified original paper type no. being TF50KS-EY, PD160R, KT55FA)

Note: End of life is defined as the point at which the component reaches the beginning of the wearout period.

(2) MTBF

360,000 hours

Note: Failure is defined as a random failure occurring at the time of the random failure period.

(3) MCBF

65,000,000 lines printed

Note: This is an average failure interval based on failures relating to wear-out and random failures up to the service life.

1.13 Environmental Conditions

(1) Guaranteed operating environment (Temperature and humidity)

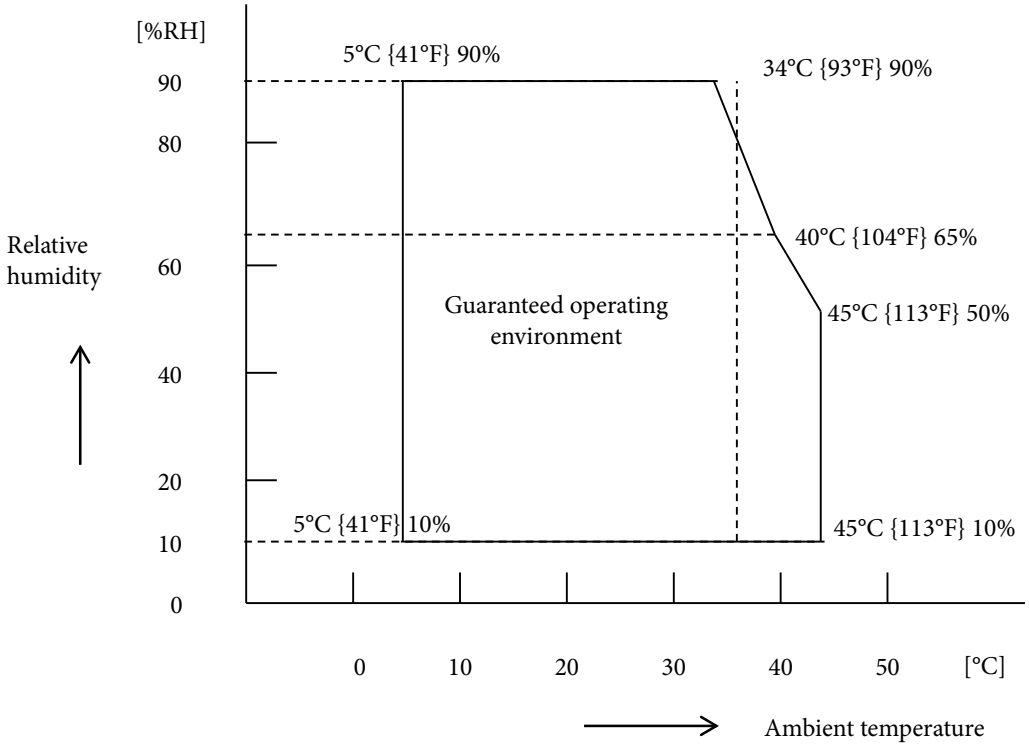


Figure 1.13.1 Guaranteed Operating Environment (Temperature and Humidity)

(2) Storage environment

-20 to 60°C {-4 to 140°F}, 10 to 90% RH

(3) Vibration resistance

(a) When packed

- Vibration conditions

  Frequency: 5 to 55 Hz
  Acceleration: Approximately 19.6 m/s² {2 G}
  Sweep: 10 minutes (half cycle)
  Duration: 1 hour
  Directions: x, y, and z

- Test method

  After applying vibration under the above conditions, visually inspect the interior and exterior and check operation.

- Test result

  No visible exterior or interior damage, and no abnormal operation.

(4) Impact resistance

(a) When packed

- Drop conditions

  Packing method: Epson standard package
  Height: 60 cm {23.62"}
  Directions: 1 corner, 3 edges, and 6 surfaces

- Test method

  After dropping under the above conditions, visually inspect the interior and exterior and check operation.

- Test result

  No visible exterior or interior damage, and no abnormal operation.

(b) When unpacked

- Drop conditions

  Height: 5 cm {1.97"}
  Directions: Lift one edge and release it (for all 4 edges)

- Test method

  After dropping under the above conditions, visually inspect the interior and exterior and check operation.

- Test result

  No visible exterior or interior damage, and no abnormal operation.

(c) When using included mounting brackets (impact resistance test specifications)

- Impact acceleration: Approximately 147 m/s² {15 G}
- Operation time: 11 ms
- Direction, count: 1 time each in Y, Z directions
- Point of impact: Unit installation point

Note: See Appendix M if impact may possibly be applied in X direction.

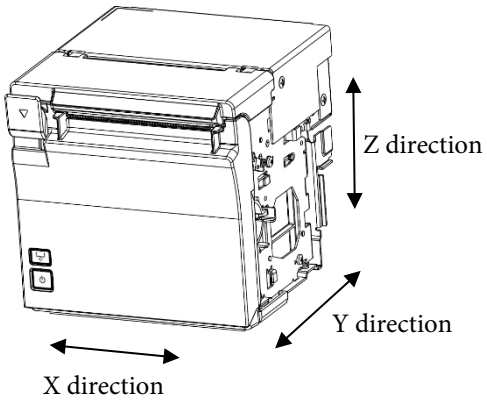


Figure 1.13.2 Direction of Impact

(5) Acoustic noise

(a) Operation noise

- Test conditions: Epson standard
- Test method: Epson standard
- Measuring result: Approx. 60 dB (Bystander position)

Note: Measured value fluctuates depending on the paper used and the print conditions (print pattern, print speed, print density, etc.).

(6) Altitude

- 3000m or less

1.14 Installation

- Install in a level place.

See Appendix M for details.

1.15 Interface

1.15.1 Interfaces equipped

Note: For details about printing on models equipped with multiple interfaces, see 3.13 Printing Using Multiple Interfaces.

Standard, for specified customer

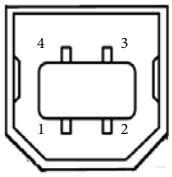
- USB interface
- RS-232 serial interface

1.15.2 USB interface

(1) USB connector

- Type USB upstream port connector (USB type-B connector)
- Pin assignments

Pin number	Signal name
1	VBUS
2	D-
3	D+
4	GND
Shell	Shield



(2) USB communication specifications

(a) USB functions

- Overall specifications: Complies with USB 2.0
- Communication speed: Full-Speed (12 Mbps)
- Communication method: USB bulk transmission method
- Power supply specifications: USB self power supply function
- Current consumed by USB bus: 2 mA (provided entirely from the main unit)
- USB packet size

  With full-speed connection

  USB bulk OUT: 64 bytes

  USB bulk IN: 64 bytes
- USB device class

  USB vendor-defined class and USB printer class

  Switching of the class can be set by the software settings on startup.

  (For the setting method, see 3.5.2.)

(b) Receiving the status from the printer

- The status of the printer is sent to the host computer via the USB bulk transmission method.
- The USB bulk transmission method is a host-controlled transmission method. Unlike RS-232 transmission, it cannot spontaneously interrupt data transmission to the host computer.
- The printer has a 128-byte status data buffer. Statuses that exceed the buffer capacity are canceled. In order to avoid lack of status data, it is necessary to periodically retrieve status data at the host computer.

(c) USB Device Requests of USB printer class

- GET PORT STATUS

  If this USB device request is requested, the printer returns the following statuses.

Bit	Field	Description
	Reserved	Reserved
5	Paper Empty	0: Paper Not Empty
		1: Paper Empty
4	Select	1: Select (Fixed)
3	Not Error	0: Error
		1: Not Error
2, 1, 0	Reserved	Reserved

- GET DEVICE ID

  If this USB Device Request is requested, the printer returns the following character string.

```
[00H][XXH]    *1
MFG:EPSON;
CMD:ESC/POS;
MDL:EU-m30;    *2
CLS:PRINTER;
DES:EPSON[SP]EU-m30; *2
CID:EpsonTM00001021;    *2
```

  *1: DeviceID character string size

  *2: The character string depends on the language model and mode.

- SOFT RESET

  The host computer uses this USB Device Request when initializing the printer input buffer.

(3) Notes

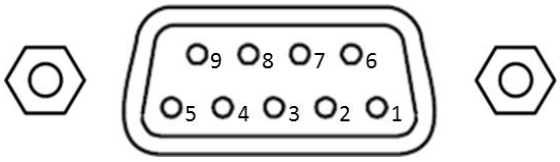
Use a cable that complies with the USB 2.0 standard.

1.15.3 RS-232 serial interface

(1) Connectors

- Type D-SUB9 (Male)
- Pin assignments

Pin number	Function
1	–
2	RXD
3	TXD
4	DTR
5	SG
6	DSR
7	RTS
8	–
9	–
Shell	Shield



(2) Specifications (Complies with RS-232)

Data transmission method:	Serial
Synchronization:	Asynchronous
Handshaking:	DTR/DSR or XON/XOFF control
Signal levels:	MARK = -3 to -15 V: Logic "1"/ OFF
	SPACE = +3 to +15 V: Logic "0"/ ON
Transmission speeds:	2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
	[bps: bits per second]
Bit length:	7 and 8-bit
Parity settings:	None, even, odd
Stop bits:	1 or more
Connector:	D-SUB9 (Male)

Notes:

- Handshaking, bit length, transmission speed and parity settings are the same as the setting of the communication conditions of the serial interface (3.5.2).
- The stop bit for data transfer from the printer is fixed at 1 bit.

(3) Online/Offline switching

This printer does not have an online/offline switch. This printer goes offline under the following conditions:

- During the period from when the power is turned on until the printer is ready to receive data after mechanism initialization
- During a self-test
- When the cover is open
- Feeding paper via Feed switch
- When the printer stops printing due to a paper-end (when a paper-end is detected by the roll paper-end sensor)
- When waiting for a switch to be pressed during macro execution
- When an error has occurred

(4) Interface connector terminal assignments and signal functions

Table 1.15.1 Signal Layout and Functions

<table>
<tr><th>Pin number</th><th>Signal name</th><th>Signal direction</th><th>Function</th></tr>
<tr><td>2</td><td>RXD</td><td>Input</td><td>Data reception</td></tr>
<tr><td>3</td><td>TXD</td><td>Output</td><td>Data transmission</td></tr>
<tr><td>4</td><td>DTR</td><td>Output</td><td>• When DTR/DSR control is selected:
This signal indicates whether the printer is busy.
SPACE indicates that the printer is ready to receive data, and MARK indicates that the printer is busy.
The printer becomes busy (MARK) under the following conditions:
<table>
<tr><th colspan="2" rowspan="2">Printer status</th><th colspan="2">Memory switch 1-3 status</th></tr>
<tr><th>ON</th><th>OFF</th></tr>
<tr><td rowspan="7">Offline</td><td>(1) During the period from when the power is turned on until the printer is ready to receive data after mechanism initialization</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>(2) During a self-test</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>(3) When the cover is open</td><td>----</td><td>BUSY</td></tr>
<tr><td>(4) Feeding paper via Feed switch</td><td>----</td><td>BUSY</td></tr>
<tr><td>(5) When the printer stops printing due to a paper-end</td><td>----</td><td>BUSY</td></tr>
<tr><td>(6) When waiting for a switch to be pressed during macro execution</td><td>----</td><td>BUSY</td></tr>
<tr><td>(7) When an error has occurred</td><td>----</td><td>BUSY</td></tr>
<tr><td colspan="2">(8) When the receive buffer is full (*1)</td><td>BUSY</td><td>BUSY</td></tr>
</table>
• When XON/XOFF control is selected:
The signal indicates whether the printer is correctly connected and is ready to receive data from the host computer.
SPACE indicates that the printer is correctly connected and is ready to receive data from the host computer. The signal is always SPACE except in the following cases:
• During the period from when the power is turned on until the printer is ready to receive data after mechanism initialization
• During a self-test</td></tr>
<tr><td>5</td><td>SG</td><td>–</td><td>Signal ground</td></tr>
<tr><td>6</td><td>DSR</td><td>Input</td><td>This signal indicates whether the host computer can receive data.
SPACE indicates that the host computer can receive data, and MARK indicates that the host computer cannot receive data. When DTR/DSR control is selected, the printer transmits data after confirming this signal (except when transmitting data by DLE EOT or GS a).
When XON/XOFF control is selected, the printer does not check this signal.</td></tr>
<tr><td>7</td><td>RTS</td><td>Output</td><td>Same as DTR</td></tr>
</table>

*1: Definition of “receive buffer full”

1) When the receive buffer capacity is specified as 4 KB (Memory switch 1-2 is off):

(1) If Memory switch 5-2 is OFF:

The printer status becomes "buffer full" from when the remaining space in the receive buffer drops to 128 bytes until such time that the remaining space in the receive buffer increases to 256 bytes.

(2) If Memory switch 5-2 is ON:

The printer status becomes "buffer full" from when the remaining space in the receive buffer drops to 128 bytes until such time that the remaining space in the receive buffer increases to 138 bytes.

2) When the receive buffer capacity is specified as 45 bytes (Memory switch 1-2 is ON):

The printer status becomes "buffer full" from when the remaining space in the receive buffer drops to 16 bytes until such time that the remaining space in the receive buffer increases to 26 bytes regardless of the Memory switch 5-2 status.

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

(5) XON/XOFF transmission timing

When XON/XOFF control is selected, the printer transmits an XON or XOFF signal at the timing shown below. The transmission timing differs depending on the Memory switch 1-3 setting.

	Printer status	Memory switch 1-3 status	
		ON	OFF
XON transmission	(9) First time the printer goes online after turning the power on	Transmit	Transmit
	(10) When the receive buffer full status is cleared	Transmit	Transmit
	(11) When the printer status changes from offline to online	––	Transmit
	(12) When the printer recovers from a recoverable error by use of a command	––	Transmit
XOFF transmission	(13) When the receive buffer becomes full	Transmit	Transmit
	(14) When the printer status changes from online to offline	––	Transmit

Notes:

- The XON code is <11>H and the XOFF code is <13>H.
- XON is not transmitted when the receive buffer is full even in case (3) above.
- XOFF is not transmitted when the receive buffer is full even in case (6) above.

(6) RS-232 connection example

Host computer side		Printer side
TXD	----------	RXD
DSR	----------	DTR
CTS	----------	RTS
RXD	----------	TXD
DTR	----------	DSR
F.G.	----------	F.G.
S.G.	----------	S.G.

Notes:

- Be careful that the status is not handshaking if connected to a DCE (data is discharged). (DCE: Data Circuit Terminating Equipment)
- Transmit data to this printer after turning on the power and initializing the printer.

(7) Notes on setting Memory switch 1-3 to ON

1) Print operation stops but the status does not become busy when an error has occurred, the cover is open, printing stops due to a paper-end, or paper is fed by using the Feed switch.

2) When setting Memory switch 1-3 to ON to enable handshaking with the printer, be sure to check the printer status using the GS a command and the automatic status back function of the data dependent on that command.

In this setting, the default value of n for GS a is 2. The printer automatically transmits the printer status when the online/offline status changes.

3) Be sure that the receive buffer does not become full when using DLE EOT, DLE ENQ, or DLE DC4.

- Notes on using a host computer that cannot transmit data when the printer is busy:

  DLE EOT, DLE ENQ, and DLE DC4 cannot be used if an error occurs when the printer is busy due to a receive buffer-full status.

- Notes on using a host computer that can transmit data when the printer is busy:

  A DLE EOT, DLE ENQ, or DLE DC4 command used while transmitting bit-image data is processed as bit-image data if the receive buffer becomes full while transmitting bit-image data.
  Data transmitted when the receive buffer is full may be lost.

Example:

Check the printer status using GS r after transmitting each line of data with a 4-KB receive buffer. The amount of data for one line must not make the receive buffer become full.

(8) Notes on setting Memory switch 1-7 to ON

1) When using #6 pin (DSR) to reset, turn memory switch 1-7 ON.

2) When memory switch 1-7 is turned ON, the printer enters reset status when MARK level is input to #6 pin (DSR) or connector (terminal) is open.

1.16 Connectors

1.16.1 Interface connector

(1) See Section 1.15. Interfaces.

1.16.2 Power supply connector

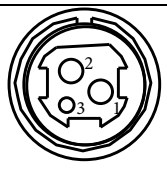
(1) Function

This is the connector for the external power supply.

Using PS connector, it is possible to connect optional power supply PS-180, etc.

(2) Pin assignments

Pin number	Function
1	+24 V
2	GND
3	N.C
SHELL	F.G



(3) Model

Printer side: Hosiden TCS7960-532010 or equivalent
User side: Hosiden TCP8927-631167 or equivalent

1.16.3 Drawer kick connector (modular connector) *For specified customer only

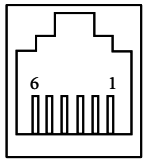
(1) Function

Connect to the drawer or the optional external buzzer.

- The pulse specified by the ESC p or DLE DC4 command is output to this connector.
- The host computer can confirm the status of the input signal by using the DLE EOT, GS a, or GS r command.

(2) Pin assignments

Pin number	Signal name	Direction
1	Frame GND	–
2	Drawer kick drive signal 1	Output
3	Drawer kick open/close signal	Input
4	+24 V	–
5	Drawer kick drive signal 2	Output
6	Signal GND	–



Note: +24 V is output through pin 4 when the power is turned on. However, pin 4 must be used only for the drawer or the optional external buzzer.

(3) Connector model

- Printer side: MOLEX 52065-6615 or the equivalent
- User side: 6-position 6-contact (RJ12 telephone jack)

(4) Drawer kick drive signal

- Output voltage: Approximately 24 V
- Output current: 1 A or less
- The drawer kick solenoid must have a resistance value of 24 Ω or higher.
- Do not use one that is less than 24 Ω, as it will result in an overcurrent.
- Figure 1.17.1 shows the ON/OFF signal of the drawer kick solenoid.
- t1 (ON time) and t2 (OFF time) are specified by ESC p or DLE DC4.

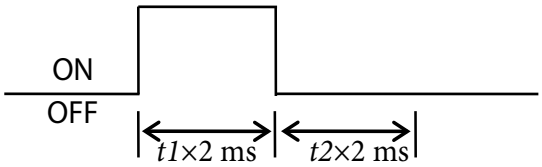


Figure 1.16.1 Drawer Kick Drive Signal

(5) Drawer open/close signal

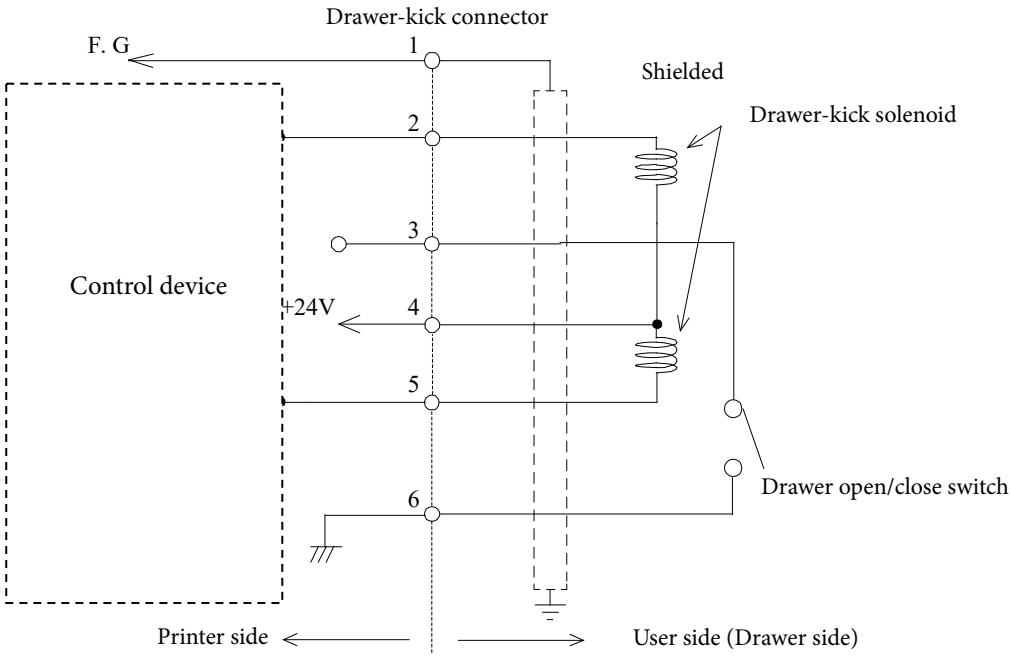
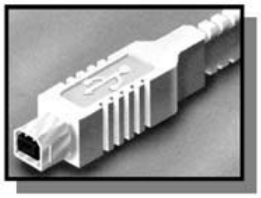


Figure 1.16.2 Drawer Kick Connection Diagram

- Use a shielded cable for the drawer connector cable.
- Two driver transistors cannot be energized simultaneously.
- The drawer drive duty should be designed by the user so as to use the following ratio.

$$\frac{\text{ON time}}{(\text{ON time} + \text{OFF time})} \leq 0.2$$

- Be sure to use the printer power supply (connector pin 4) for the drawer power source.
- The resistance of the drawer kick solenoid must not be less than specified. Otherwise, an overcurrent could damage the solenoid.
- Do not connect a telecommunication network to the drawer kick connector.
- Do not insert the USB connector ("B" Plugs of the series B connectors) into the drawer kick connector. Doing so may damage the connector, printer, or the host computer system.

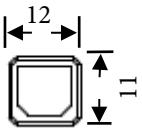


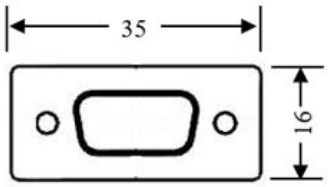
"B" Plugs
(From the Host System)

(6) Connection of the optional external buzzer

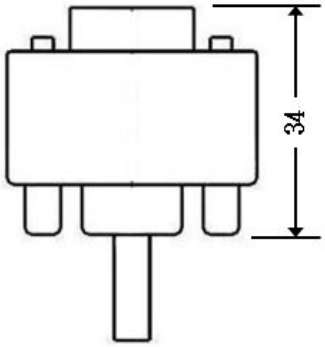
- The optional external buzzer can be connected to the drawer kick connector.
- When the optional external buzzer is connected, be sure to set the optional external buzzer to Enable with the software setting. (See 3.5.2 for how to change the setting.)
- When the optional external buzzer is used, a drawer cannot be used. It is prohibited that both the optional external buzzer and the drawer are connected at the same time by using a branched connector.

1.16.4 Allowable interface/power supply cable dimensions



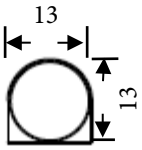






<USB cabel>
(Type-B Plug)

<Serial cable>





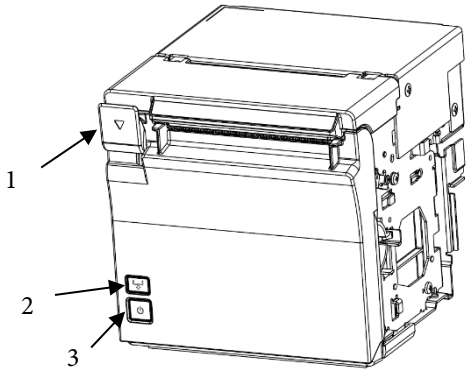
<Power supply cable>

Note: User must confirm that the connector plug and cable fit in the storage space.

2 Structure

2.1 EU-m30, Standard model

(1) Exterior

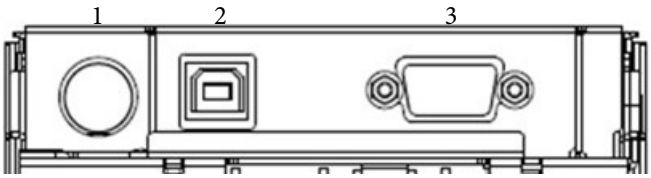


1: Cover open lever 2: Feed button 3: Power switch

(2) Interfaces equipped

USB and serial (RS-232, D-Sub 9 pin)

(3) Connector layout



1: Power supply connector 2: USB connector (Type-B) 3: Serial connector

(4) Accessories

- Roll paper (φ 35 mm)
- Switch cover
  - For power switch
  - For power/feed switch
- Small cover open lever, including 1 spare screw
- Roll paper guides for 58 mm {2.28"} paper: 2
- Equipment mounting brackets: 2
- Product fixing brackets, including 2 screws + 1 spare (total of 3 screws)

(5) Options

- Bezel option: Model: OT-BU30
- Power supply adapter: Model: PS-180

2.2 For specified customer

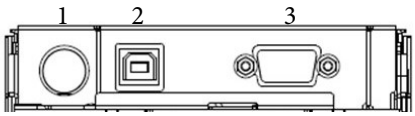
(1) Exterior

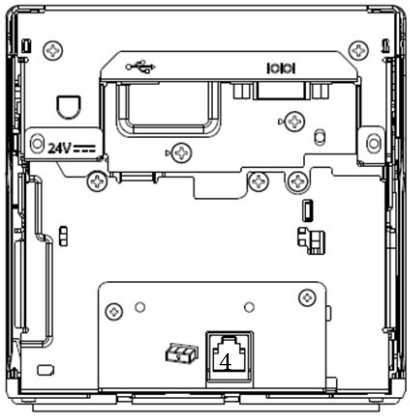
Same as EU-m30 (See 2.1.(1).)

(2) Interfaces equipped

USB and serial (RS-232, D-Sub 9 pin)

(3) Connector layout





1: Power supply connector 2: USB connector (Type-B) 3: Serial connector 4: DK connector

(4) Accessories

- Roll paper (φ 35 mm)
- Switch cover
  - For power switch
  - For power/feed switch
- Small cover open lever, including 1 spare screw
- Roll paper guides for 58 mm {2.28"} paper: 2
- Equipment mounting brackets: 2
- Product fixing brackets, including 2 screws + 1 spare (total of 3 screws)

(5) Options

- Bezel option: Model: OT-BU30
- Power supply adapter: Model: PS-180
- Optional external buzzer: Model: OT-BZ20

3 Function

3.1 Control Commands

See "ESC/POS Command Reference" (www.epson-biz.com/pos/reference/).

3.2 Character Code Tables

See "Character Code Tables for TM Printers"(www.epson-biz.com/pos/reference/).

3.3 Switches

3.3.1 Power switch

(1) Type

Locking push switch

(2) Function

(a) Turn the power on or off.

Notes:

- Operate the power switch with the power connector connected.
- If turning on the power after turning the power off, first check that the panel LED has turned off before doing so.
- If turning off the power without using the power switch, or if you do not execute the DLE DC4 (fn = 2) command, the maintenance counter value may not be updated properly. For the proper usage of the maintenance counter, see Appendix D.

3.3.2 Feed button

(1) Type

Non-locking push switch

(2) Function

1) Executes paper feeding. Press once to feed paper based on the line spacing set by the ESC 2 and ESC 3 commands, or press and hold to continue feeding paper.

   Note: Paper feeding cannot be performed under the following conditions.

   - When the paper is at the end
   - When the roll paper cover is open
   - While printing is in progress
   - When set to disabled by ESC c 5.

2) If you push this button when the printer is in the macro execution standby state, the defined macro is executed.
3) When executing a self-test, use the button to temporarily stop or restart the test.
4) Starts printing/setting mode for each type of information, selects the menu, and executes it.

3.4 Indicators

3.4.1 Displayed color and icon



1: POWER LED (Blue) 2: ERROR LED (Orange) 3: Flashing LED (Blue)

3.4.2 Displayed patterns

(1) Printer status icon

	POWER LED	ERROR LED	Flashing LED
Normal status	On	Off	On or [Off]*3
Initializing after power-on	On	On	On
Executing self-test	On	*1	Off
Continued self-test standby	On	Flashing - (1)	Off
Paper is being fed by the Feed button	On	*1	Off
Macro execution standby	On	Flashing - (1)	Off
Roll paper cover open when not printing	On	On	Off
Paper-end	On	On	Off
Near-end	On	Flashing - (3) *5	According to normal status above
Errors that recover automatically	On	On	Off
Recoverable errors	On	On	Off
Unrecoverable errors	On	Flashing - (4)	Off
Updating firmware	Flashing - (1)	Off	Off
In firmware forced update mode	On	On	On
Power OFF in process	Flashing - (1)	On	Off
Power OFF standby *2	Flashing - (2)	Off	Off
Printing completed flashing (Attention flashing)	On	*1	[Flashing - (5) *4 *5] or Off *3

Flashing - (1): Repeats between on for 320 ms then off for 320 ms.

Flashing - (2): Repeats between on for 160 ms then off for 2,400 ms.

Flashing - (3): Repeats between on for 320 ms then off for 2240 ms.

Flashing - (4): Repeats between on for 480 ms then off for 160 ms.

Flashing - (5): Repeats between on for 640 ms then off for 640 ms.

*1 Depends on the paper sensor status. It is Off if there is paper, and On if there is no paper. Furthermore, when a near-end is detected (if equipped with near-end sensor), the light is Flashing - (4), and when a near-end is not detected, it depends on the paper sensor status.

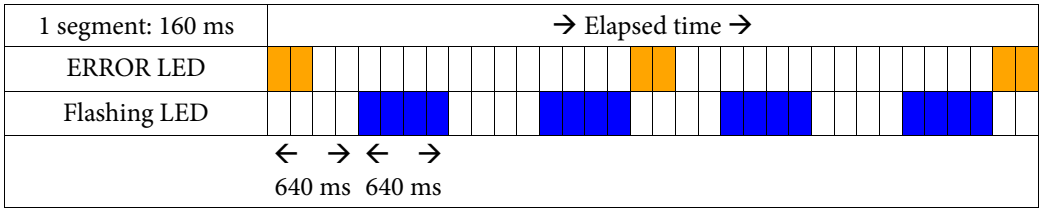
*2 See Appendix D.2.

*3 Can select with the EU-m30 Utility. [ ]: Set when shipped.

*4 Flashing starts when print job is completed. Can select the flashing duration with the EU-m30 Utility. When the flashing duration ends, the light turns Off.
If, however, a new print job is received during the preset duration and printing starts, the flashing stops at

that time.
Also, if the time from the completion of a print job (end of operation) to the start of the next print job is less than 640 ms, the next print job will start without flashing.
For details, see 3.5.2 Software setting.

*5 A Near-End Error (orange) LED and Printing Completed (blue/attention) LED will not flash at the same time.



3.5 Printer Setting

3.5.1 DIP switch settings

This printer is not equipped with DIP switches.

3.5.2 Software setting

(1) Memory switches

Can be changed using one of the following methods.

(a) User setup commands: GS (E

Step 1: Moves to the user setting mode with GS (E <Function 1>
Step 2: Change settings with GS (E <Function 3>.
Step 3: End the user setting mode with GS (E <Function 2>.
For details, see "ESC/POS Command Reference" (www.epson-biz.com/pos/reference/).

(b) Software setting mode (except some functions)

For details, see 3.8.3 Software setting mode.

(c) EU-m30 Utility

Table 3.5.1 Memory Switch 1 (Msw1)

Msw	Function	Setting value		Factory setting
		48 (OFF)	49 (ON)	
1-1	(Reserved)	-	-	48 (OFF)
1-2	Receive buffer capacity	4 KB	45 bytes	48 (OFF)
1-3	Condition for BUSY	Receive buffer full and offline	Receive buffer full	48 (OFF)
1-4	Data processing with reception error	Replace with "?"	Ignored	48 (OFF)
1-5	Automatic line feed	Always disabled	Always enabled	48 (OFF)
1-6	(Reserved)	-	-	48 (OFF)
1-7	Pin 6: Reset signal selection	Not used	Used	48 (OFF)
1-8	(Reserved)	-	-	48 (OFF)

Table 3.5.2 Memory Switch 5 (Msw5)

Msw	Function	Setting value		Factory setting
		48 (OFF)	49 (ON)	
5-1	USB power-saving function *1	Enabled	Disabled	48 (OFF)
5-2	(Reserved)	–	–	48 (OFF)
5-3	Paper sensors to output paper end signal	Roll paper end, near-end sensor enabled	Disabled	48 (OFF)
5-4	Error signal output	Enabled	Disabled	48 (OFF)
5-5	Pre-feed before next print *2	Disabled	Enabled	48 (OFF) *3
5-6	Roll paper near-end sensor	Disabled	Enabled	49 (ON)
5-7	(Reserved)	–	–	48 (OFF)
5-8	(Undefined)	–	–	48 (OFF)

*1: Valid only when the USB interface communication condition is set to the vendor-defined class and the system configuration is set so that the USB driver can support the USB power-saving function.

*2: When a customized value (specification for the top margin by backfeed) is set and back feed occurs, this setting is disabled.

*3: Japanese model only, default setting 49 (ON).

(2) Customized value setting

Can be changed using one of the following methods.

(a) User setup commands: GS (E

Step 1: Moves to the user setting mode with GS (E <Function 1>

Step 2: Change the setting with GS (E <Function 5>.

Step 3: End the user setting mode with GS (E <Function 2>.

For details, see "ESC/POS Command Reference" (www.epson-biz.com/pos/reference/).

(b) Software setting mode (except some functions)

For details, see 3.8.3 Software setting mode.

(c) EU-m30 Utility (except some functions)

Table 3.5.3 Types of Customized Values

Function	Selectable values	Factory setting
NV user memory capacity	1 KB, 64 KB, 128 KB, 192 KB	1 KB
NV graphics memory capacity	None, 64 KB, 128 KB, 192 KB, 256 KB, 320 KB, 384KB	384 KB
Roll paper width *2	80 mm {3.15"}, 58 mm {2.28"}	80 mm {3.15"}
Print density	70 to 130% (In 5% units)	100%
Print speed	Level 1 to 13 (Low speed to high speed)	Level 13
Thai character print mode	Thai 1 pass / Thai 3 pass	Thai 1 pass
Default character code table	43 pages selectable with ESC t	0
Default international character	18 types selectable with ESC R	0

Function	Selectable values	Factory setting
Selection of the interface	Fixed to serial interface Fixed to built-in USB Serial/USB automatic switching All interfaces enabled	All interfaces enabled
Command execution (offline)	Enabled/Disabled	Enabled
Specification for the top margin by backfeed *3	9.5 to 2 mm (in 0.5 mm units)	9.5 mm {0.37"}
Switchover time for a valid interface	1 to 10 seconds (1 second units)	1 second
Selection of primary connection interface	Auto (Interface where data was first received)/Serial/USB/No primary connection	Auto
Power supply capacity *5	Power supply capacity level 1 to 3	Capacity: High
Autocutting of roll paper when the roll paper cover is closed	Does not cut/cuts	Cuts
(ARP) Reduction of excessive top margin	Does not reduce/reduces	Does not reduce
(ARP) Reduction of excessive bottom margin	Does not reduce/reduces	Does not reduce
(ARP) Reduction ratio of line spacing	Does not reduce/reduces 25%/ reduces 50%/reduces 75%	Does not reduce
(ARP) Reduction ratio of line spacing where extra line feeds are included	Does not reduce/reduces 25%/ reduces 50%/reduces 75%	Does not reduce
(ARP) Reduction ratio of bar code height	Does not reduce/reduces 25%/ reduces 50%/reduces 75%	Does not reduce
(ARP) Reduction ratio of character height	Does not reduce/reduces 25%/reduces 50%/reduces 75%/reduces 75% and shortens character height	Does not reduce
Font A auto replacement	Does not replace/Font B/Font C	Does not replace
Font B auto replacement	Does not replace/Font A/Font C	Does not replace
Font C auto replacement	Does not replace/Font A/Font B	Does not replace
Print density during multi-tone printing	70 to 130% (In 5% units)	100%
Buzzer function: Optional external buzzer enabled/disabled *For specified customer only	Enabled/Disabled	Disabled
Buzzer function: Buzzer frequency (Error) *1	Does not sound/sounds 1 time/ Sounds continuously	Sounds continuously
Buzzer function: Sound pattern (Autocut) *1	Patterns A to E	Pattern A
Buzzer function: Buzzer frequency (Autocut) *1	Does not sound/sounds 1 time	Sounds 1 time
Buzzer function: Sound pattern (Pulse 1) *1	Patterns A to E	Pattern A
Buzzer function: Buzzer frequency (Pulse 1) *1	Does not sound/sounds 1 time	Sounds 1 time
Buzzer function: Sound pattern (Pulse 2) *1	Patterns A to E	Pattern B
Buzzer function: Buzzer frequency (Pulse 2) *1	Does not sound/sounds 1 time	Sounds 1 time
Command-compatible mode	EU-m30/TM-m30/TM-m30II	EU-m30
Selection of batch print enabled/disabled and print direction	Disabled/enabled (forward)/enabled (reverse)	Disabled

*1: The functions are enabled for the optional external buzzer. *For specified customer only

*2: For the method for changing the paper width, see Appendix I.

*3: For notes on using the backfeed, see Appendix J.

(3) Set the customized values of model-specific

Can be changed using one of the following methods.

(a) User setup commands: GS (E

Step 1: Moves to the user setting mode with GS (E <Function 1>

Step 2: Change settings with GS (E <Function 97>.

Step 3: End the user setting mode with GS (E <Function 2>.

For details, see "ESC/POS Command Reference" (www.epson-biz.com/pos/reference/).

(b) Software setting mode (except some functions)

For details, see 3.8.3 Software setting mode.

Table 3.5.4 Model-specific Customized Values

Function	Selectable values	Factory setting
Selection of built-in character types	South Asia languages / Simplified Chinese	South Asia languages

(4) USB interface communication condition setting

Can be changed using one of the following methods.

(a) User setup commands: GS (E

Step 1: Moves to the user setting mode with GS (E <Function 1>

Step 2: Change settings with GS (E <Function 15>.

Step 3: End the user setting mode with GS (E <Function 2>.

For details, see "ESC/POS Command Reference" (www.epson-biz.com/pos/reference/).

(b) Software setting mode (except some functions)

For details, see 3.8.3 Software setting mode.

(c) EU-m30 Utility (except some functions)

Table 3.5.5 USB Interface Communication Condition

Function	Selectable values	Factory setting
Class	Vendor-defined class/Printer class	Printer class

(5) Serial interface communication condition setting

The settings for the serial interface communication condition can be changed using one of the following methods.

- User setup commands: GS (E

  (1) Moves to the user setting mode with GS (E <Function 1> command.

  (2) Change settings with GS (E <Function 11>.

  (3) End the user setting mode with GS (E <Function 2> command.

  * For details, see "ESC/POS Command Reference" (www.epson-biz.com/pos/reference/).
- Software setting mode

  See 3.8.3. Software setting mode.
- EU-m30 Utility

Table 3.5.6 Serial Interface Communication Condition

Function	Selectable values	Factory setting
Transmission speeds	2400 bps/4800 bps/9600 bps/19200 bps/38400 bps/57600 bps/115200 bps	115200 bps
Parity settings	No parity/odd parity/even parity	No parity
Handshaking	DTR/DSR control/XON/XOFF control	DTR/DSR control
Bit length	7-bit length/8-bit length	8-bit length

(6) Receipt enhancement setting

Can be changed using one of the following methods.

(a) Group of commands for receipt enhancement control: FS (E

For details, see "ESC/POS Command Reference" (www.epson-biz.com/pos/reference/).

(b) EU-m30 Utility (except some functions)

Table 3.5.7 Receipt Enhancement

Function	Selectable values	Factory setting
Auto top logo print setting	Key code	Undefined
	Justification (left/center/right)	Undefined
	Number of lines to be deleted below top logo	Undefined
Auto bottom logo print setting	Key code	Undefined
	Justification (left/center/right)	Undefined
Extended settings for auto top logo/bottom logo printing	Prints the top logo while paper feeding to the cutting position: Enabled/disabled	Enabled
	Prints the top logo at power-on: Enabled/disabled	Disabled
	Prints the top logo when the roll paper cover is closed: Enabled/disabled	Enabled
	Prints the top logo while clearing the buffer to recover from a recoverable error: Enabled/disabled	Enabled
	Prints the top logo after paper feeding with the Feed button has finished: Enabled/disabled	Disabled

(7) Flashing LED setting

The following settings can be changed using the EU-m30 Utility.

Table 3.5.8 Flashing LED Setting

Function	Selectable values	Factory setting
Light on in normal status	Enabled (On)/Disabled (Off)	Disabled (Off)
Printing completed flashing (Attention flashing)	Enabled/Disabled	Enabled
Printing completed flashing Flashing duration	5, 6, 7, 8, 9, 10, 11,12, 13, 14, or 15 (sec) from end of print job	8 (sec)

3.6 Self-test

3.6.1 Self-test function

Executes printer status printing and rolling pattern printing.

(a) Printer status printing

- Product name
- Firmware version
- Product serial number
- Interface information
- Built-in character fonts
- Maintenance information (Head running length, number of times of autocutting)

(b) Rolling pattern printing

- A rolling pattern using the built-in character set

3.6.2 Running self-test

Can be executed using one of the following methods.

(a) Execution using Feed button

Step 1: With the roll paper cover closed, turn the printer power on while pressing the Feed button.

Step 2: Execute printing of the printer status.

Step 3: After printing the current printer status, the printer prints the following message:

```
Select Modes by pressing Feed Button.
  Continue SELF-TEST: Less than 1 second
  Mode Selection    : 1 second or more
```

The ERROR LED indicator flashes and the printer enters the Rolling pattern printing standby state.

Step 4: Briefly press the Feed button to start rolling pattern printing.

Step 5: When a certain number of lines of rolling pattern printing is completed,

```
***  completed  ***
```

is printed, and the software reset is automatically executed.

(b) Executing using a command

Step 1: Transmit the GS (A command (printer status print).

Step 2: Transmit the GS (A command (rolling pattern print).

Step 3: When a certain number of lines of "test printing" is completed,

```
***  completed  ***
```

is printed, and the software reset is automatically executed.

3.7 Hexadecimal Dumping

3.7.1 Hexadecimal dumping function

Prints the data sent from the host in a hexadecimal and corresponding text.

3.7.2 Running hexadecimal dumping

Can be executed using one of the following methods.

(a) Execution using Feed button

Step 1: Open the roll paper cover.

Step 2: Holding the Feed button, turn on the power then close the roll paper cover.

Step 3: Turn off the power, or press the Feed button three times to complete this procedure.

(b) Executing using a command

Step 1: Transmit the GS (A command (Hexadecimal dump print).

Step 2: Turn off the power, or press the Feed button three times to complete this procedure.

Notes:

- If no characters correspond to the data received, the printer prints ".".
- During hexadecimal dumping, any commands other than DLE EOT do not function.
- Print data that is less than one line can be printed by pressing down the Feed button

<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  .%..c4..01
41 42 43 44 45 46 47 48 49 4A  ABCDEFGHIJ

             ***  completed  ***
```

3.8 Information Print Modes and Setting Modes

3.8.1 NV graphics information print mode

(1) NV graphics information printing function

Prints the NV graphics information registered in the printer.

The following information is printed.

- Capacity of the NV graphics
- Occupied capacity of the NV graphics
- Unused capacity of the NV graphics
- Number of NV graphics that are registered
- Key code, number of dots in X direction, and number of dots in Y direction for each piece of data
- NV graphics data

(2) Starting the mode

Step 1: With the roll paper cover closed, turn the printer power on while pressing the Feed button until printing of the printer status starts.

Step 2: After the printer status is printed, press the Feed button until printing of the instructions for operation method starts.

Step 3: After the instructions for operation are printed, press the Feed button once.

Step 4: Then, press and hold the Feed button until printing of the NV graphics information starts.

(3) Ending the mode

Turn the power off.

3.8.2 R/E (receipt enhancement) information print mode

(1) R/E (receipt enhancement) information printing function

Prints the following R/E information presently registered in the printer.

The following information is printed.

- Auto top logo print setting
- Auto bottom logo print setting
- Extended settings for auto top logo/bottom logo printing

(2) Starting the mode

Step 1: With the roll paper cover closed, turn the printer power on while pressing the Feed button until printing of the printer status starts.

Step 2: After the printer status is printed, press the Feed button until printing of the instructions for operation method starts.

Step 3: After the instructions for operation are printed, press the Feed button twice.

Step 4: Then, press and hold the Feed button until printing of the R/E information starts.

(3) Ending the mode

Turn the power off.

3.8.3 Software setting mode

(1) Software setting function

Executes software settings using the buttons on the printer.

The software setting values that can be set are as follows:

- Print density
- Auto reduction of amount of paper to use
- Enabling/disabling paper autocutting at cover close
- Paper width setting *1
- Thai character print control method
- Selection of built-in character types
- Auto replacement of font
- Communication conditions using a USB interface
- Print speed
- NV user memory capacity
- Command execution (offline)
- Specification for the top margin by backfeed
- Optional external buzzer control *For specified customer only
- Power supply capacity
- Interface setting
- Switchover time for a valid interface
- Selection of primary connection interface
- Enabling/disabling Display when interface is activating
- Enabling/disabling the pre-feed before next print function
- Enabling/disabling the roll paper near-end sensor
- Command-compatible mode (model name setting)

*1: Regarding the paper width setting, see Appendix I.

(2) Starting the mode

Step 1: With the roll paper cover closed, turn the printer power on while pressing the Feed button until printing of the printer status starts.

Step 2: After the printer status is printed, press the Feed button until printing of the instructions for operation method starts.

Step 3: After the instructions for operation are printed, press the Feed button three times.

Step 4: Then, press and hold the Feed button until printing of the software setting mode starts.

Step 5: The instructions for the setting method are printed. Perform settings in accordance with the instructions.

(3) Ending the mode

After completing the setting, the set content is stored, and the printer is initialized.

When printer initialization ends, the printer is ready for normal printing.

3.8.4 Initial setting restoration mode

(1) Initial setting restoration function

Restores current settings to the saved settings (if settings have been saved for restoration).

(2) Starting the mode

Step 1: With the roll paper cover closed, turn the printer power on while pressing the Feed button until printing of the printer status starts.

Step 2: After the printer status is printed, press the Feed button until printing of the instructions for operation method starts.

Step 3: After the instructions for operation are printed, press the Feed button four times.

Step 4: Then, press and hold the Feed button until printing of the initial setting restoration mode starts.

Step 5: After the instructions are printed, press the Feed button once.

Step 6: Press and hold the Feed button until the restoration complete message is printed.

(3) Ending the mode

Turn the power off.

3.9 Error Processing

3.9.1 Errors that recover automatically

(1) Head temperature error

- Error contents: Detected a (hot) head temperature in excess of the appropriate range.
- LED display pattern: See 3.4.2.
- Recovery method: Automatically stops printing and automatically recovers when the head temperature drops.

(2) Roll paper cover open error

- Error contents: Detected the roll paper cover was open during printing.
- LED display pattern: See 3.4.2.
- Recovery method: Automatically recovers when the roll paper cover is closed.

3.9.2 Recoverable errors

(1) Autocutter error

- Error contents: Detected an error in the autocutter operation.
- LED display pattern: See 3.4.2.
- Recovery method: Execute DLE ENQ 1 and DLE ENQ 2.
  Remove any paper jams or foreign objects and close the roll paper cover.
  Note: See Appendix A if this does not solve the error.

3.9.3 Unrecoverable errors

(1) R/W error in memory

- Error contents: Detected an error during memory R/W.
- LED display pattern: See 3.4.2.
- Recovery method: Unable to recover

(2) High voltage error

- Error contents: Detected abnormal voltage (high) in the power source.
- LED display pattern: See 3.4.2.
- Recovery method: Unable to recover

(3) Low voltage error

- Error contents: Detected abnormal voltage (low) in the power source.
- LED display pattern: See 3.4.2.
- Recovery method: Unable to recover

(4) CPU execution error

- Error contents: The CPU executes an incorrect address.
- LED display pattern: See 3.4.2.
- Recovery method: Unable to recover

(5) Internal circuit connection error

- Error contents: Detected an error in the internal circuit connection.
- LED display pattern: See 3.4.2.
- Recovery method: Unable to recover

Note: When any error shown above occurs, turn off the power as soon as possible.

3.10 Open Cover

- Operate the cover open lever to open the roll paper cover.
- Opening the roll paper cover during printing will cause an error to occur and printing to stop. Close the roll paper cover to recover.
- Opening the roll paper cover during standby will send the printer offline. Close the roll paper cover to recover.
- The status just before the cover was opened is maintained while the cover is open.

  Notes:
  - When opening the roll paper cover, be sure to use the cover open lever.
  - Do not open the roll paper cover during printing.
  - Never open the cover while the autocutter is operating. Doing so may cause mechanical damage.

3.11 Print Buffer-full Printing

(1) When in Standard mode

When subsequent data is received after the printer processes one line of data in the print buffer, the printer automatically prints the processed line and feeds the paper by one line.

(2) When in Page mode

When subsequent data is received after the printer processes one line of data in the print buffer, the printer automatically moves the printing position to one line below the processed line.

3.12 Optional external buzzer *For specified customer only

(1) Optional external buzzer settings

The optional external buzzer (OT-BZ20) can be used by connecting it to the drawer kick connector and, under software settings, setting the "Optional external buzzer enabled/disabled" item to "Enabled".

(a) Sounding/stopping by the buzzer commands

- It is possible to sound the buzzer by setting a sound pattern and a buzzer frequency with ESC (A.
- It is possible to stop sounding the buzzer with DLE DC4 <Function 3>.

(b) Cooperative sounding by using commands other than the buzzer commands

- Buzzer sounding is possible by autocutting commands/operations (GS V 0, GS V 65, ESC i, ESC m, autocutting for automatic top logo printing, automatic cutting at cover close).
- Buzzer sounding is possible by the commands that generate the specified pulse (drawer kick) (ESC p, DLE DC4 <fn = 1>).
- The sound pattern and buzzer frequency can be set with the software setting. (See 3.5.2 for how to change the setting.)

(c) Autonomic sound

- Buzzer sounding is possible when a paper-end is detected.
- Buzzer sounding is possible when an error occurs.
- The buzzer frequency can be set with the software setting. (See 3.5.2 for how to change the setting.)

(d) Stopping the buzzer sounding

- It is possible to stop sounding the buzzer with DLE DC4 <Function 3>.
- It is possible to stop sounding the buzzer by opening the cover. (However, if the cause for sounding remains when the cover is closed, the buzzer will begin sounding again.)

(2) Notes for when connecting, installing, and using

1) When, in the software settings, the "Optional external buzzer enabled/disabled" item is set to "Enabled", a pulse is not output to the drawer kick connector pin, and therefore, the drawer cannot be driven.
2) When the optional external buzzer is used, it is prohibited that both the optional external buzzer and the drawer are connected at the same time by using a branched connector.
3) The optional external buzzer does not sound when the optional external buzzer is connected after the printer power is on or if the optional external buzzer is disconnected and reconnected while the printer power is on; therefore, be sure to turn on the printer with the optional external buzzer connected and do not disconnect the optional external buzzer when the printer power is on.
4) Be sure to fix the buzzer to the printer unit with the affixing tape (bundled with the optional external buzzer).
5) Do not install the optional external buzzer on the roll paper eject surface, as doing so will block paper eject.
6) Be sure to clean and dry the surface of the printer and the optional external buzzer where the affixing tape is attached before attaching the affixing tape to the printer and the optional external buzzer.
7) To prevent liquid from entering, it is recommended to install the optional external buzzer so that the volume adjustment knob is positioned sideways or downward.

8) Do not purposely put any water, oil, chemicals, or any other water-based material on the buzzer. Doing so may cause a malfunction.

3.13 Printing Using Multiple Interfaces

- Models with multiple interfaces do not fix the interface to be used, but can use all the interfaces (*1).
- You can select just one interface as the primary connection interface (*1). There are no limitations on command functions for the primary connection interface, and priority is given to processing received data.
- Other interfaces are set as secondary connection interfaces. There are limitations on command functions for the secondary connection interface (*2), and priority is not given to processing received data.
- The following table describes the differences between the primary connection interface and the secondary connection interfaces.

Connection I/F	Connection priority	Function limitation when using Epson ePOS SDK	Function limitation on ESC/POS commands (*2)	Print settings when connection is closed (*3)
Primary	High	None	None	Maintained
Secondary	Low	None	Yes	Initialized

- Set the interface you want to constantly use as the primary connection interface. Be aware that if you set primary connection interface selection to "Auto" (the interface where data is first received), the primary connection interface may not be determined uniquely based on the order of data received from each interface.
- When the primary connection interface selection is "Auto" and the primary connection interface is not determined because data is not being received, the interface to be printed is determined as the primary connection interface.
- The printer has an independent receive buffer for each interface, data can always be received on each interface.
- If using multiple interfaces, set the receive buffer capacity to 4 KB (initial setting) (*4).
- The printer switches the active interface in accordance with the priority, and processes the data in each receive buffer sequentially.
- The active interface can be switched when all the following conditions are met.
  - The receive buffer for the active interface has been empty (there is no unprocessed data) for the set time (*5) or longer.
  - Printing has stopped.

(*1) For interface types and how to select the primary connection interface, see "3.5.2 Software setting (2) Customized value setting."

(*2) The following ESC/POS commands are disabled for the secondary connection interface.
DLE DC4 (fn = 2), ESC &, ESC ?, GS (D, GS (L <Functions 81,82,83>, GS *, GS :, GS D <Function 83>, GS ^, FS 2

(*3) If you are using ePOS-Print SDK or Epson ePOS SDK, the maintaining or initializing of print settings when closing the connection does not affect the operations of the application.

(*4) For the method to set the receive buffer capacity, see Section 3.5.2 Software setting, (1) Memory switches.

(*5) For the method to set the set time (Switchover wait time for a valid interface), see Section 3.5.2 Software setting, (2) Customized value setting.

3.14 Updating Firmware

(1) Method for updating firmware

You can update the firmware on this printer using the following method.

Step 1: With the printer's power on, execute the firmware update tool.

Step 2: When the printer begins the firmware update processing, the Power LED flashes.

Note: Do not to turn off the printer's power while the firmware update tool is performing the update.

(2) Recovery method for when updating the firmware fails

If updating the firmware fails, and the Power and Error LEDs flash at the same time when the power is turned on, try updating the firmware again by using the firmware update tool. However, in such cases you can only use the USB interface.

4 Case Specifications

4.1 External Dimensions and Mass

4.1.1 Bezel Option Not Equipped

- Width: Approximately 127 mm {5"}
- Depth: Approximately 131.2 mm {5.17"}
- Height: Approximately 127 mm {5"}
  Approximately 129 mm {5.1"} (including protrusions)
- Mass: Approximately 1.3 kg {2.87 lb} (roll paper excluded)

4.1.2 Bezel Option Equipped

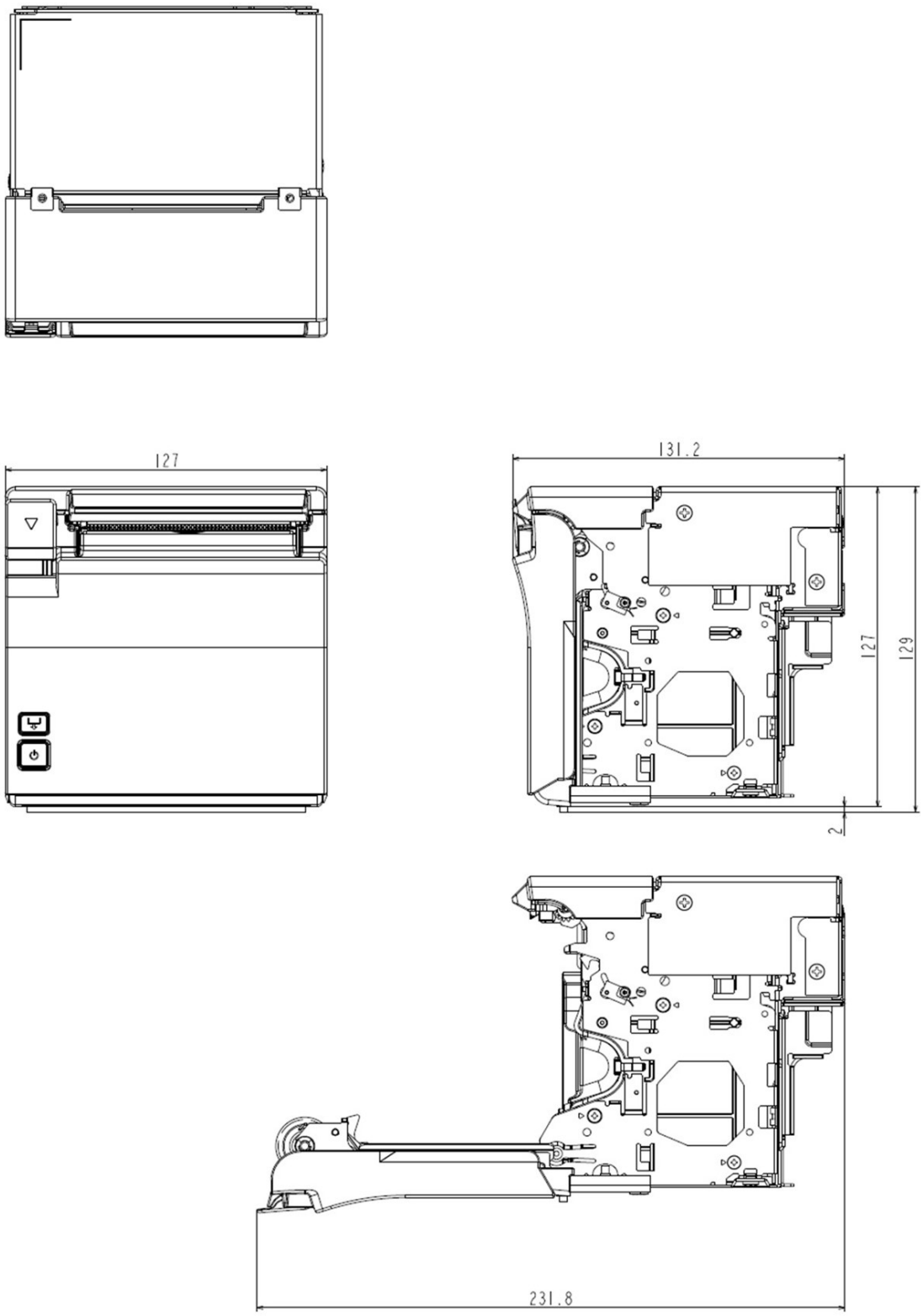
- Width: Approximately 127 mm {5"}
- Depth: Approximately 155.9 mm {6.14"}
- Height: Approximately 127 mm {5"}
  Approximately 129 mm {5.1"} (including protrusions)
- Mass: Approximately 1.3 kg {2.87 lb} (roll paper excluded)

4.2 Color

EPSON standard color: ENB9, EBCK

4.3 External Dimensions

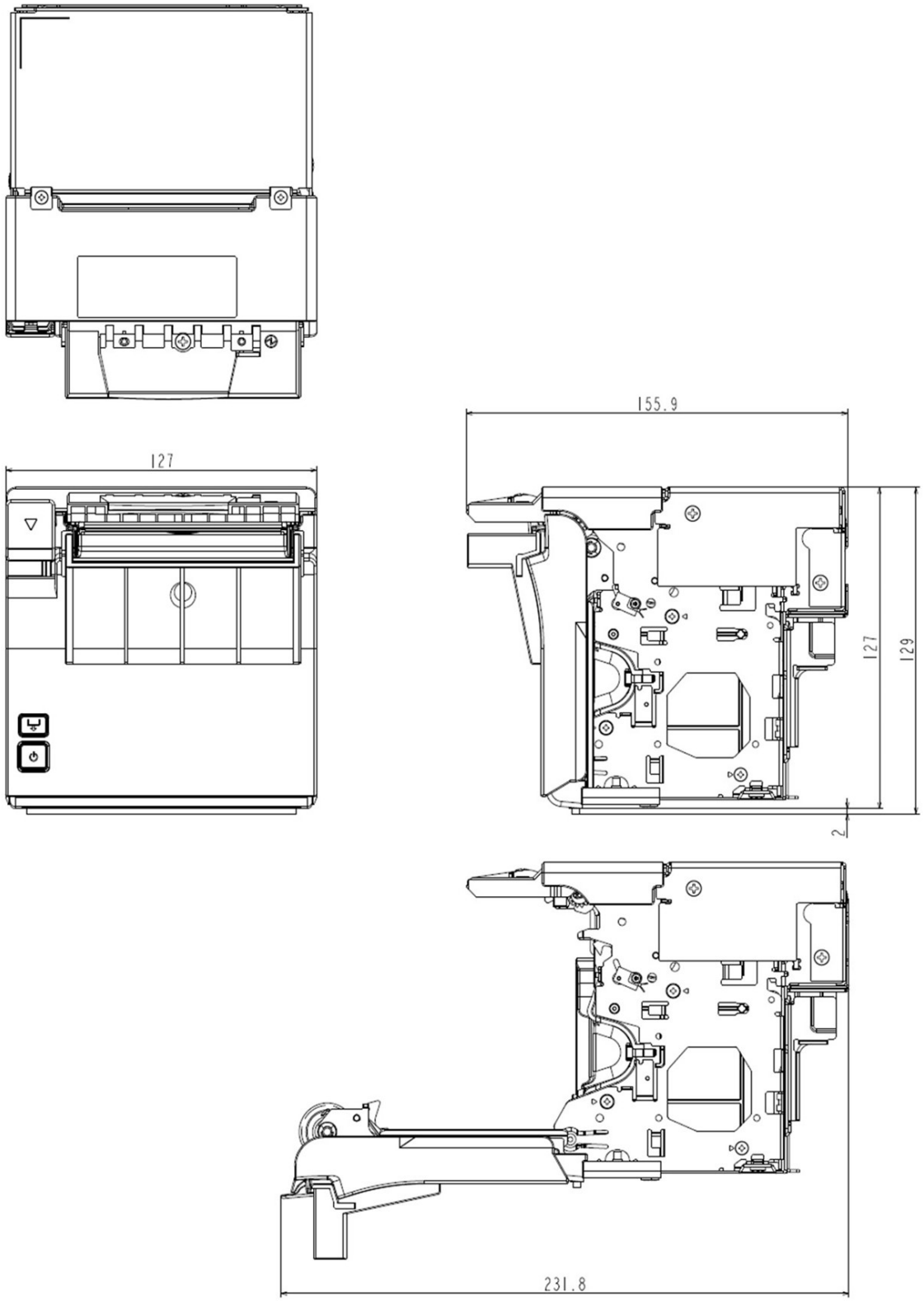
4.3.1 Bezel Option Not Equipped



[Units: mm]

Figure 4.3.1 External Dimensions (Bezel Option Not Equipped)

4.3.2 Bezel option equipped



[Units: mm]

Figure 4.3.2 External Dimensions (Bezel Option Equipped)

4.4 Dimensions for Installing to Customer Device

See Appendix M.

Appendix A RECOVERY FROM AN AUTOCUTTER ERROR

A.1 If You Can Open the Roll Paper Cover

- If a foreign object such as a push pin or paper clip drops in the autocutter and causes the autocutter to lock up, the printer enters an error state and begins the recovery operation automatically.
- If the problem is not serious, the autocutter recovers and returns to its normal position.
- If the error cannot be resolved even after recovery operations, open the roll paper cover, remove any foreign objects or paper jams, set the roll paper, then close the roll paper cover.

A.2 If You Cannot Open the Roll Paper Cover

- Turn the printer off then on again.

Appendix B PRINT HEAD AND PLATEN ROLLER CLEANING

B.1 Thermal Head

Paper dust or other foreign objects on the thermal elements may lower the print quality. In this case, clean the print head as follows:

Step 1: Open the roll paper cover.

Step 2: Clean the thermal elements of the print head using a cotton swab moistened with alcohol solvent (ethanol or IPA).

Notes:

- Do not touch the print head thermal elements.
- Be careful not to scratch the print head during cleaning.

Step 3: Insert roll paper, pull out some paper, and close the roll paper cover.

Notes:

- The print head becomes very hot immediately after printing. Be sure to allow the print head to cool down (after printing) before cleaning it.
- Also, be sure to turn off the printer power before cleaning the print head.
- Turn on the printer power only after alcohol has completely dried.

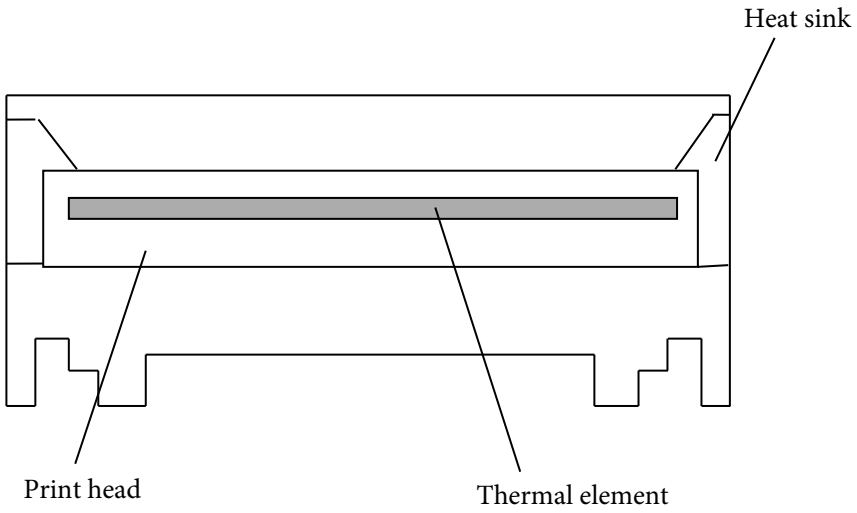


Figure B.1.1 Print Head Thermal Element

B.2 Platen Roller

Depending on the roll paper used, paper dust may stick to the platen roller and the paper may not be fed correctly. To remove the paper dust, clean the platen roller with a cotton swab moistened with water as described in the thermal head section above. Turn on the printer power only after the water has completely dried.

Appendix C NOTES ON USING THE DRAWER KICK CONNECTOR *For specified customer only

C.1 Conditions for Using the Drawer Kick Connector

Drawer specifications differ significantly depending on the manufacturer and the model. Make sure that the specifications of the drawer used meet the following conditions when connected to the drawer kick connector. These conditions also apply to any other devices to be connected to the drawer kick connector.

Never use a drawer (or other devices) that does not meet all of the following conditions:

[Conditions]

- The load, such as a drawer kick solenoid, must be connected between pins 4 and 2 or pins 4 and 5 of the drawer kick connector. (*1)
- When the drawer open/close signal that indicates the state of the drawer is used, a switch must be provided between drawer kick connector pins 3 and 6. (*2)
- The resistance of the load, such as a drawer kick solenoid, must be 24 Ω or more or the input current must be 1 A or less. (*3)
- Make sure to use the drawer kick connector 4 pin (24 V power supply) for driving the drawer. Never connect any other power supply to the drawer kick connector. (*4)
- The peak current is 1 A. See item (2) below for power status.

*1: Proper operation is not guaranteed with different connections.

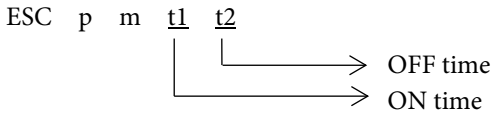
*2: Proper operation is not guaranteed with different connections or connection to a component other than a switch.

*3: Connection to equipment whose resistance is less than 24 Ω or whose input current is more than 1 A may cause an overcurrent and damage the connected equipment as well as the printer.

*4: Operation is not guaranteed with other power supplies.

C.2 Notes on the pulse generating command (ESC p)

When using ESC p to drive the drawer connected to the drawer kick connector, set the command parameters to meet the following conditions:



$$\frac{\text{ON time}}{\text{ON time} + \text{OFF time}} \leq 0.2 \quad \cdots\cdots \text{Formula C-1}$$

Or, $\text{OFF time} \geq \text{ON time} \times 4 \quad \cdots\cdots \text{Formula C-2}$

Figure C.1.1 shows the drive signal waveform generated when the drawer is driven according to the above conditions.

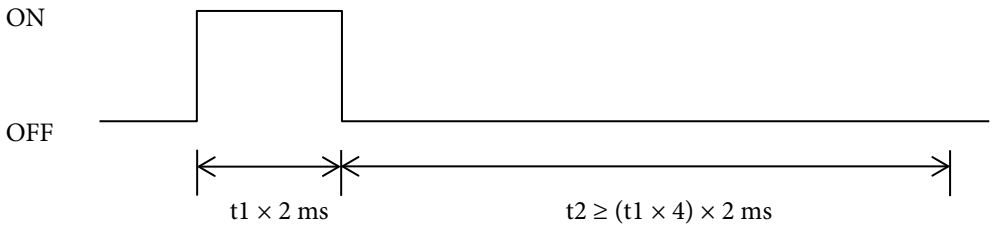


Figure C.1.1 Drawer Drive Signal Waveform

The ON time depends on the specifications of the drawer used. Be sure to check the drawer specifications and set a suitable time. To use a drawer that does not meet the conditions of Formulas C-1 and C-2, see C.3.

C.3 Using a drawer that does not meet the conditions in C.2 (ESC p, DLE DC4)

For ESC p

Setting the values of t1 and t2 according to the conditions in C.2 results in a maximum ON time of 126 ms ($0 \leq t1 \leq 63$), since the setting ranges of t1 and t2 are 0 to 255.

To use a drawer that requires an ON time exceeding 126 ms, the following conditions must be met:

$$\frac{\text{ON time}}{\text{ON time} + (\text{OFF time} + \alpha)} \leq 0.2 \qquad \cdots\cdots \text{Formula C-3}$$

α: processing time of other sequence

α is the period from the OFF time until the next ON time when the drawer-driving is prohibited.

For DLE DC4

Since DLE DC4 sets ON time equal to OFF time, use α so that Formula C-3 is met.

An example program in which the drawer connected to drive signal 1 is driven with an ON time of 200 ms is shown below.

```
PRINT#1, CHR$(&H1B); "p"; CHR$(0); CHR$(100); CHR$(250);
GOSUB *WAIT300MS
        :
        :
*WAIT300MS
  300 [ms] wait routine
  RETURN
```

ON time 200 ms

OFF time 500 ms

(*1)

*1: Corresponds to α of Formula C-3. Set the value so that it satisfies Formula C-3 (or include an internal processing time that is equal to or longer than this wait routine).

The drive signal waveform generated when the drawer is driven according to the above conditions is shown in Figure C.1.2.

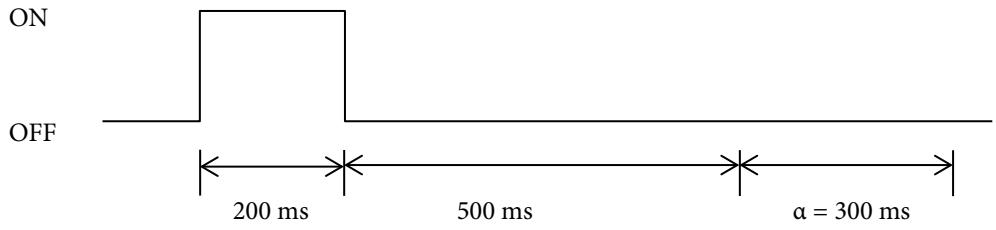


Figure C.1.2 Drawer Drive Signal Waveform

Appendix D NOTES ON UPDATING THE MAINTENANCE COUNTER AND TURNING THE PRINTER'S POWER OFF

D.1 About Updating the Maintenance Counter

- This printer has a maintenance counter with functions as described in the command description for GS g 0 and GS g 2.
- The values of the maintenance counter are automatically stored in the NV memory every 2 minutes (or 4 minutes maximum) when the printer is operating, except in the power save mode.
- However, if the power off is performed as described in Section D.2, the printer stores the latest values of the maintenance counter and executes the power off control, regardless of the updating interval described above.
- If the printer is not sending/receiving data or is not operating while the power is turned on, the printer enters the power-saving mode.

D.2 Printer Power-off Procedures

- If turning the power off without using the power switch, we recommend doing so after executing the power-off sequence command DLE DC4 (fn = 2).
- The following is an example of the printer power off process when the printer is turned off using the DLE DC4 (fn = 2) command.

Step 1: The host computer transmits the following continuous procedure before the system is turned off:
(1) Executes GS (D pL pH m a b (pL=3, pH =0, m =20, a =2, b =1)
(2) Executes GS r n (n =1)

Step 2: The host computer waits for the paper sensor status sent from the printer in response to the GS r n command.

Step 3: The host computer transmits DLE DC4 fn a b (fn = 2, a = 1, b = 8).

Step 4: The host computer waits for the power-off notice.

Step 5: After receiving the power-off notice, wait one second or longer, then turn off the power.

Notes:

- The power-off sequence is performed within approximately 5 seconds after DLE DC4 fn a b is sent, and then the power-off notice is sent. After that, the printer enters power-off standby.
- If the power-off notice is not confirmed, wait for at least 5 seconds after transmitting DLE DC4 fn a b. At this time, the printer has only performed software processing, and the power is not turned off.
- Do not reset the printer until you have confirmed the power-off notice after transmitting DLE DC4 (fn = 2).

- User must set the quiet zone, depending on the bar code standards.
- When printing PDF417 (2-dimensional symbols), it is recommended to set the height of one step of the symbol to three to five times the width of one module. The total height of code should be approximately 5 mm {0.20"} or more.
- The recognition rate of ladder bar codes and 2-dimensional symbols may vary depending on widths of the modules, print density, environmental temperature, type of roll paper (thermal paper), and characteristics of the reader. Therefore, user must check the recognition rate before setting the use conditions so that the restrictions of the reader are satisfied.
- Reading quality of bar codes/2-dimensional symbols in multi-tone graphics printing is not guaranteed.
- When printing ladder bar codes/2-dimensional symbols with graphics printing, instead of using the bar codes/2-dimensional symbols print commands, set the print speed to speed level 5.
  The print speed level can be set with GS (K.

Appendix F NOTES ON SCANNING THE PRINT RESULT ON THE RECEIPT

To determine whether the ability of the reader (scanner) can be satisfied by using bar codes, 2-dimensional symbols, or characters printed on receipt (roll paper), take the following points into consideration.

1) Print density
   The print density may vary depending on the type of roll paper or the environmental conditions.
2) Slant of the Print
   The printed bar code or characters may not be horizontal to the paper as shown in the figure below. They may slant in the range of ± 1.6° and the slanting direction or the angle varies during printing or each time a receipt is issued.

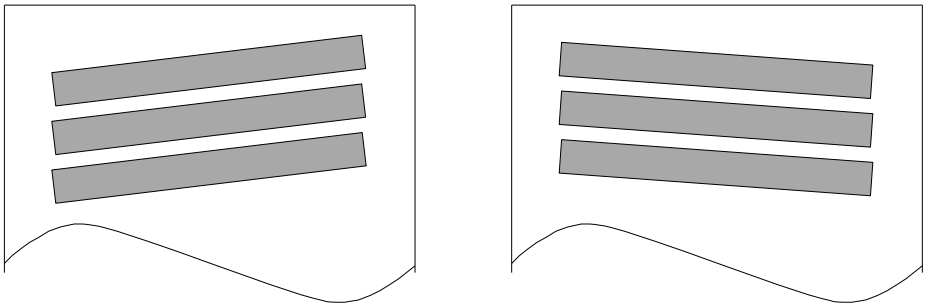


Figure F.1 Slant of the Print

Note: If paper other than the ones described in Section 1.6, Paper Specifications, is used or if the paper is used out of the range described in Section 1.13, Environmental Conditions, the print density may vary or the slant of print result may become wider.

Appendix G NOTES ON USING THE ASB STATUS

Any accumulated ASB status signals left for transmission from the last to the newest ASB status transmission shall be transmitted together at a time as one ASB status showing the presence of change, followed by the latest ASB status.

Example: In the normal (standby) state, the ASB status is configured as follows.

First byte	Second byte	Third byte	Fourth byte
0001 0100	0000 0000	0000 0000	0000 1111

The following pieces of data are accumulated when the following printer status changes occur: 1) the cover is opened, 2) the paper is removed and the cover is closed, 3) the cover is opened, and 4) the cover is closed.

(1)	0011 1100	0000 0000	0000 0000	0000 1111
(2)	0001 1100	0000 0000	0000 1111	0000 1111
(3)	0011 1100	0000 0000	0000 1111	0000 1111
(4)	0001 1100	0000 0000	0000 1111	0000 1111

When the ASB status is received following this, the actual ASB that is sent is a total of eight (8) bytes, consisting of the combined ASB (1 + 2 + 3 + 4) and the latest ASB (4).

Combined ASB (1 + 2 + 3 + 4)	0011 1100	0000 0000	0000 0000	0000 1111
+				
The latest ASB (4)	0001 1100	0000 0000	0000 1111	0000 1111

Note: When the primary connection interface selection is set to "Auto", set ASB with the secondary connection interface if you wish to obtain ASB with said interface.

Appendix H NOTES ON ARP (AUTOMATIC REDUCTION OF PAPER) AND AUTOMATIC LOGO PRINTING FUNCTION

H.1 ARP: Reduction of Excessive Top Margin, Reduction of Excessive Bottom Margin, Reduction of Line Spacing, and Reduction of Line Spacing Where Extra Line Feeds Are Included

- Paper reduction is not performed for space dot lines of graphics printing data.

H.2 ARP: Reduction of Bar Code Height

- When reducing bar code height, reading of the bar code is not guaranteed. Be sure to check reading a bar code with a user's bar code reader in advance.

H.3 Automatic Logo Printing Function

- The automatic bottom logo printing is a function of logo printing that works with an autocutting command and produces good printing quality when using the GS V m n (paper feeding + paper cutting) command. When using cutting-only commands (GS V m, ESC i, or ESC m), extra line spacing above a bottom logo occurs, depending on the paper feeding command before the cutting command.
- When printing a top logo during paper feeding to the cutting position, the GS V m n (paper feeding + paper cutting) command will produce good printing quality. When using cutting only commands, printing a logo before cutting is not performed.

Appendix I SETTING PAPER WIDTH

I.1 Notes

- If changing the paper width from 80 mm {3.15"} to 58 mm {2.28"}, install the included roll paper guides for 58 mm {2.28"} paper width.
- Be sure to set the paper width using software settings to align the print area. (For the setting method, see 3.5.2 (2).)

Note: After changing the paper width from 80 mm {3.15"} to 58 mm {2.28"}, while using 58 mm {2.28"}, you are prohibited from changing the paper width again back to 80 mm {3.15"}.
(If using paper with a 58 mm {2.28"} width, part of the head will rub directly against the platen without any paper, so the part of the head that rubbed against the platen may be damaged. Also, the section of the cutter blade without paper may be dulled. Therefore, printing and auto-cutting cannot be done for the expanded section of the paper width.)

I.2 Method for Installing 58 mm {2.28"} Roll Paper Guides

Step 1: Check that the printer's power is off, then open the roll paper cover.

Step 2: Align the three protrusions of the 58 mm {2.28"} width roll paper guide (marked as L SIDE) with the slits on the Power button side of the printer, and insert them.

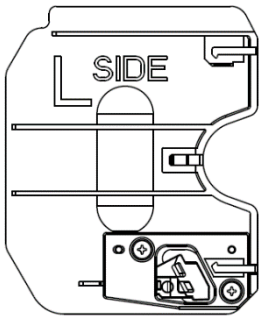


Figure I.1

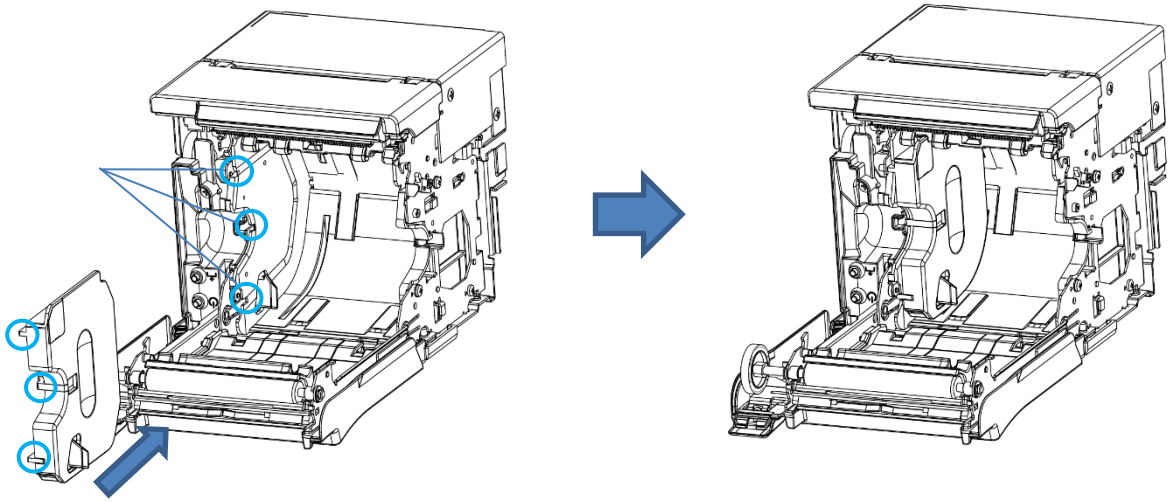


Figure I.2

Step 3: Align the three protrusions of the other 58 mm {2.28"} width roll paper guide (not marked as L SIDE) with the slits on the opposite side of the printer, and insert them.

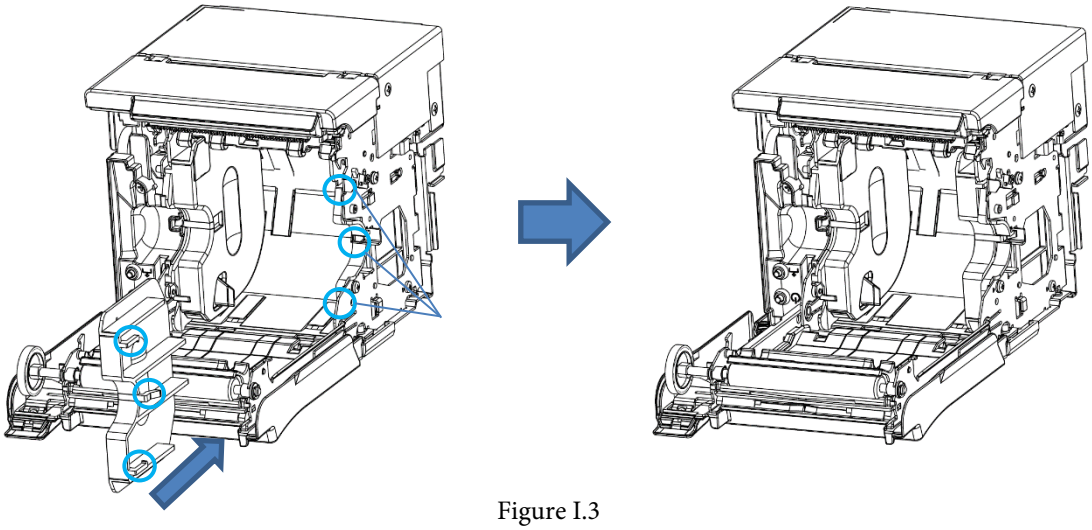


Figure I.3

Step 4: Set the roll paper.

Step 5: Close the roll paper cover, then turn the printer power on.

Appendix J NOTES ON PRINTING AND BACKFEED

1) If top margin specification via backfeed (3.5.2 (2)) is enabled, the backfeed operation is performed before starting printing directly after the autocut. If top eject, this backfeed operation is performed after the paper in the eject port is removed.
2) If enabling the top margin specification via backfeed (3.5.2 (2)), we recommend disabling the auto top logo printing (3.5.2 (6)). Backfeeding a paper that uses top logo printing can often cause paper jams.
3) Even if top margin specification via backfeed (3.5.2 (2)) is enabled, the backfeed is not performed in the following cases.
   - Backfeeding directly after autocutting of roll paper when the roll paper cover is closed
   - Backfeeding during the self-test
4) When backfeeding is performed, slack in paper can cause wrinkles and friction marks. Check with the user before using. If you wish to prevent friction marks, use thermal paper that has high resistance to abrasion.
5) Perform autocutter operation after feeding paper a minimum of 20 mm.
   (This is to prevent small pieces of cut paper from dropping into the autocutter and causing paper jams.)

Appendix K THAI CHARACTER PRINTING

- To print using Thai characters, you can use the Thai character 1-pass print mode or Thai character 3-pass print mode. Select the Thai character print mode in the software settings. (See Section 3.5.2 for how to change the setting.)

K.1 Character Size for Printing Thai Characters

Table K.1.1 Thai Character Sizes (Thai Character 1-pass Print Mode)

Font (Structure of Thai characters)	Standard		Double-height		Double-width		Double width/double height	
	W × H (mm)	cpl	W × H (mm)	cpl	W × H (mm)	cpl	W × H (mm)	cpl
Font A (12 × 46)	1.25 × 5.75	48 35	1.25 × 11.50	48 35	2.50 × 5.75	24 17	2.50 × 11.50	24 17
Font B (10 × 46)	1.13 × 5.75	57 42	1.13 × 11.50	57 42	2.26 × 5.75	28 21	2.26 × 11.50	28 21
Font C (9 × 35)	0.88 × 4.38	64 46	0.88 × 8.75	64 46	1.75 × 4.38	32 23	1.75 × 8.75	32 23
Special font A (12 × 24)	1.25 × 3.00	48 35	1.25 × 6.00	48 35	2.50 × 3.00	24 17	2.50 × 6.00	24 17
Special font B (9 × 24)	0.88 × 3.00	64 46	0.88 × 6.00	64 46	1.75 × 3.00	32 23	1.75 × 6.00	32 23

(Space between characters is not included.)

(Characters can be scaled up to 64 times as large as the standard sizes.)

The upper columns of Table O.1.1 are for 80-mm paper width, and the lower columns are for 58-mm paper width.

Table K.1.2 Thai Character Sizes (Thai Character 3-pass Print Mode)

Font (Structure of Thai characters)	Standard		Double-height		Double-width		Double width/double height	
	W × H (mm)	cpl	W × H (mm)	cpl	W × H (mm)	cpl	W × H (mm)	cpl
Font A (12 × 72)	1.25 × 9.00	48 35	1.25 × 18.00	48 35	2.50 × 9.00	24 17	2.50 × 18.00	24 17
Font B (10 × 72)	1.13 × 9.00	57 42	1.13 × 18.00	57 42	2.26 × 9.00	28 21	2.26 × 18.00	28 21
Font C (9 × 51)	0.88 × 6.38	64 46	0.88 × 12.75	64 46	1.75 × 6.38	32 23	1.75 × 12.75	32 23
Special font A (12 × 72)	1.25 × 9.00	48 35	1.25 × 18.00	48 35	2.50 × 9.00	24 17	2.50 × 18.00	24 17
Special font B (9 × 72)	0.88 × 9.00	64 46	0.88 × 18.00	64 46	1.75 × 9.00	32 23	1.75 × 18.00	32 23

(Space between characters is not included.)

(Characters can be scaled up to 64 times as large as the standard sizes.)

The upper columns of Table O.1.2 are for 80-mm paper width, and the lower columns are for 58-mm paper width.

K.2 Character Structure for Thai Character 1-pass Print Mode

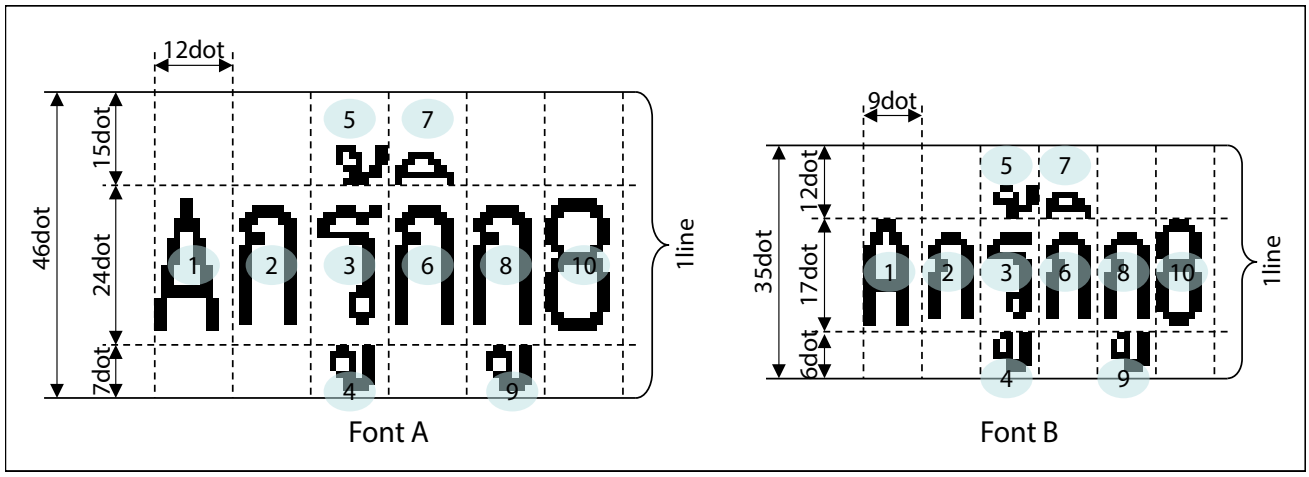


Figure K.2.1 Thai Character 1-pass Print Mode Fonts A and B

The numbers in the figure indicate the order in which character code data is transmitted.

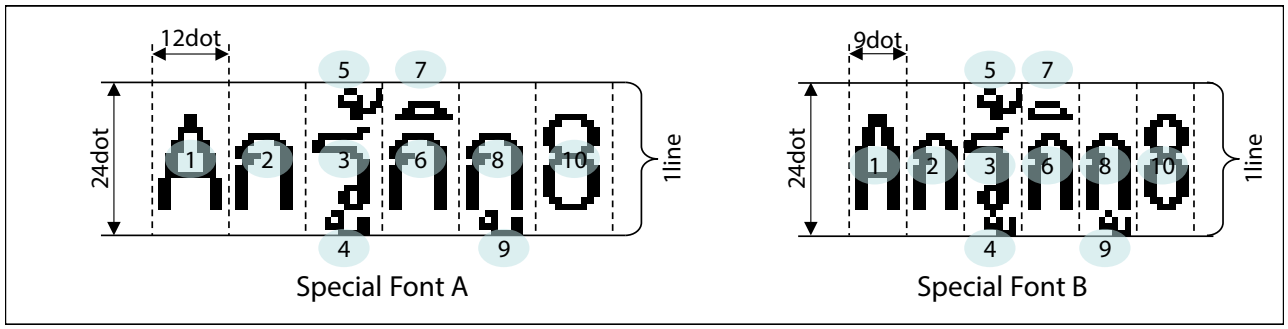


Figure K.2.2 Thai Character 1-pass Print Mode Special Fonts A and B

The numbers in the figure indicate the order in which character code data is transmitted.

K.3 Character Structure for Thai Character 3-pass Print Mode

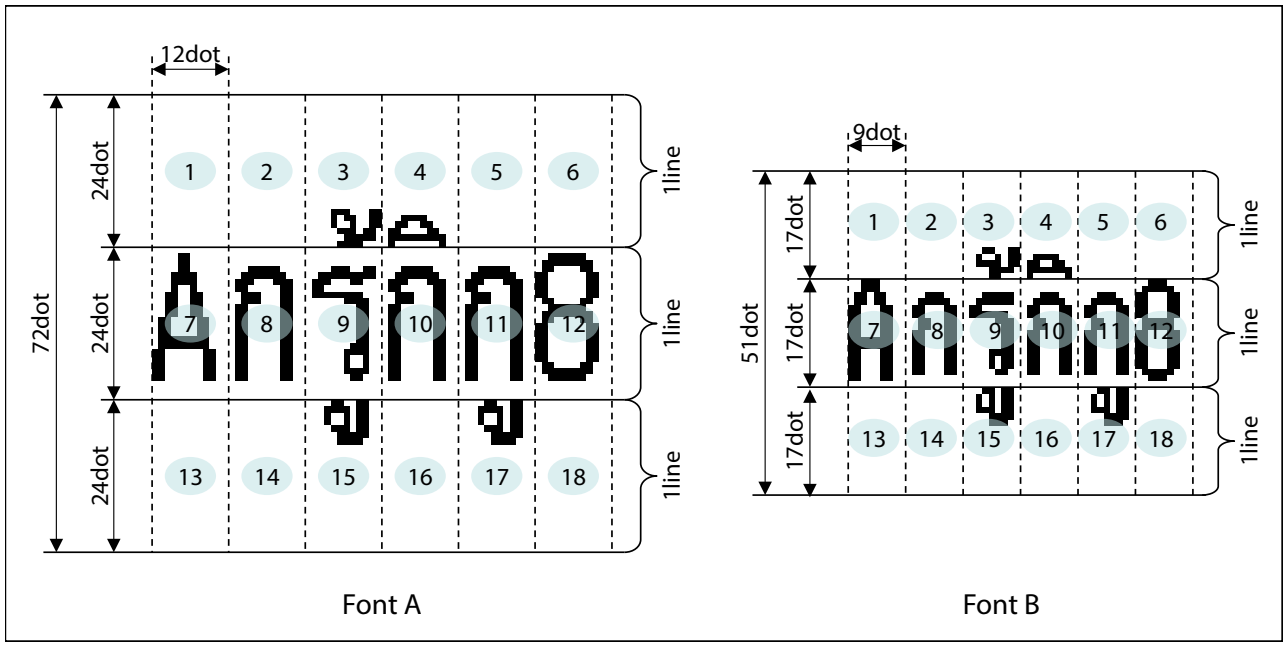


Figure K.3.1 Thai Character 3-pass Print Mode Fonts A and B

The numbers in the figure indicate the order in which character code data is transmitted.

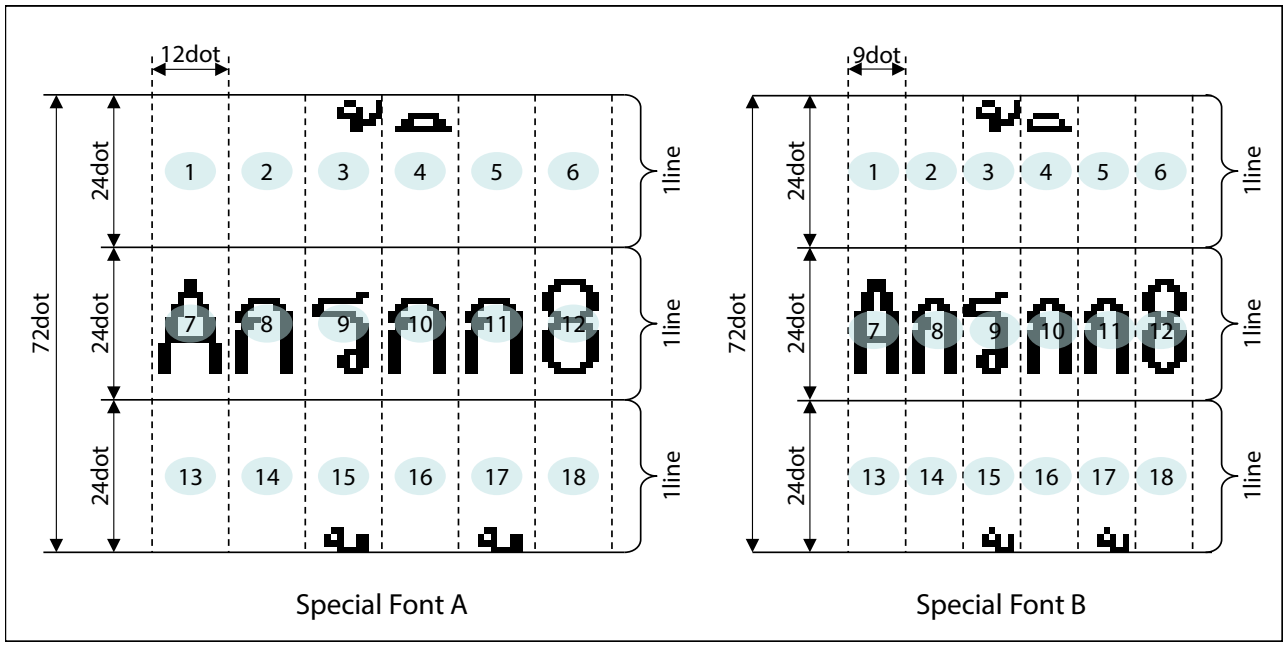


Figure K.3.2 Thai Character 3-pass Print Mode Special Fonts A and B

The numbers in the figure indicate the order in which character code data is transmitted.

Note: Special fonts A and B are recommended when using Thai character 1-pass print mode.

- If the power supply has low performance or the print duty is high, the power supply might become cut off. In such a cause, you may be able to avoid power supply cut-offs through the combination of the power supply capacity setting, print speed setting, and number of energized head divisions setting below.

  Note: However, operation with a power supply other than the PS-180 is not guaranteed.
- If the power supply capacity is set low and you perform printing with a high print duty, the print speed can be automatically lowered to reduce the current consumed per unit hour.
  You can use the customized values (memory switches) to change the setting from "Power supply capacity level 3 (Default, Capacity: High; PS-180 equivalent)" to "Power supply capacity level 2" or "Power supply capacity level 1 (Capacity: Low; Adapter C equivalent)."

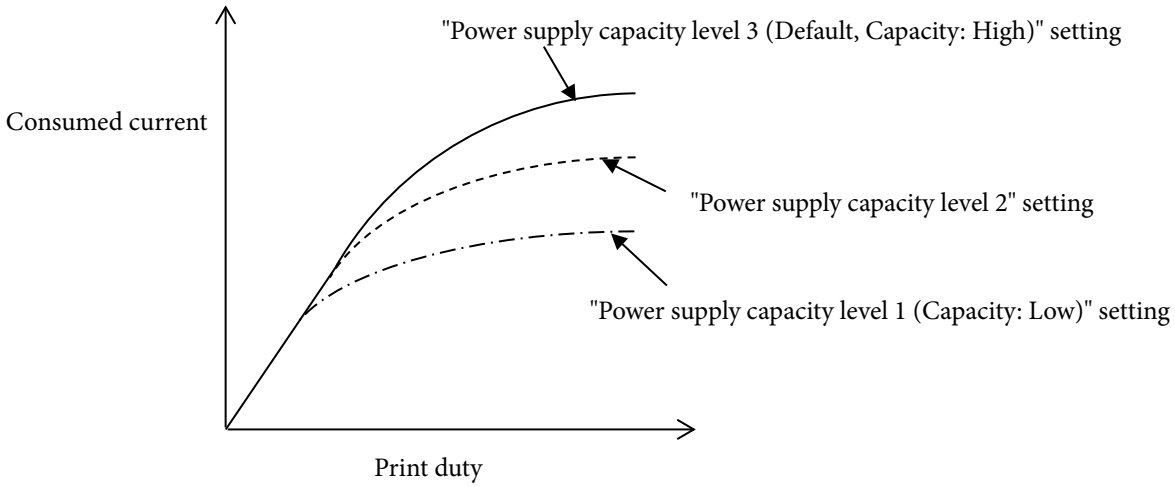


Figure L.1 Relationship between Power Supply Capacity Setting and Consumed Current (Illustration)

- Even if the print speed is set slow and you perform printing with a low print duty, you can reduce the current consumed per unit hour.
  You can use the customized values (memory switches) to change the print speed setting.
- By changing the number of energized head divisions setting from 1 division (default) to 2 or 4 divisions, you can reduce the peak current during printing. If you set the division printing to a setting other than 1 division (default), the print speed will automatically be limited.
  You can use the customized values (memory switches) to change the number of energized head divisions setting.

* Refer to section 3.5.2 for how to change the customized values (memory switches).

Appendix M PRINTER INSTALLATION DESIGN GUIDE

M.1 Notes on Printer Installation

- Take into consideration paper ejection and dropping performance when designing the printer's paper discharge port.
- Because plated steel is used in this product, edges may be subject to rust.
- Shape details may differ slightly from the actual parts.
- When installing the printer, use brackets that come with the product.
- Brackets include two equipment mounting brackets and one product fixing bracket for fastening the brackets to the EU-m30.

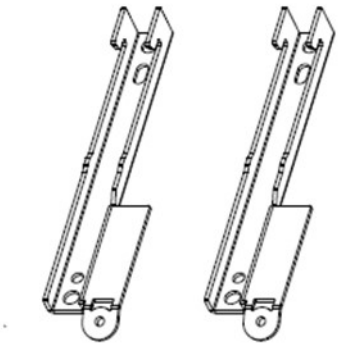


Figure M.1 Equipment Mounting Brackets



Figure M.2 Product Fixing Bracket

- The two equipment mounting brackets are fastened to the equipment with two screws (a, b).
  For the mounting position, see the drawings in M.2 Bezel Option Not Equipped and M.3 Bezel Option Equipped.

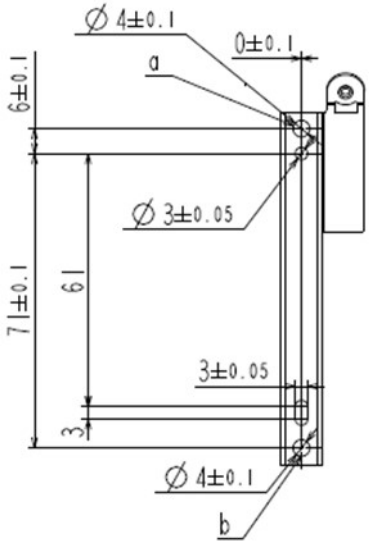


Figure M.3 Equipment Mounting Bracket: Installation Point Dimensions

- Fasten the two equipment mounting brackets, insert the printer from the interface side, and align the position such that the printer and bracket engagement points.

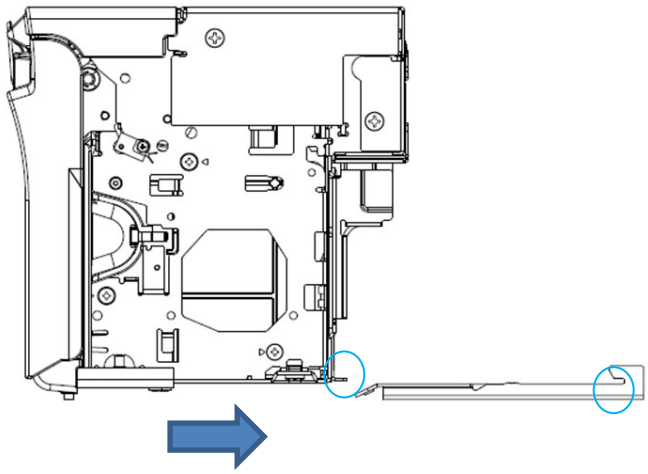


Figure M.4 Positioning the Printer

- Insert the protrusions of the product fixing bracket into the equipment mounting bracket holes, and fasten with screws.

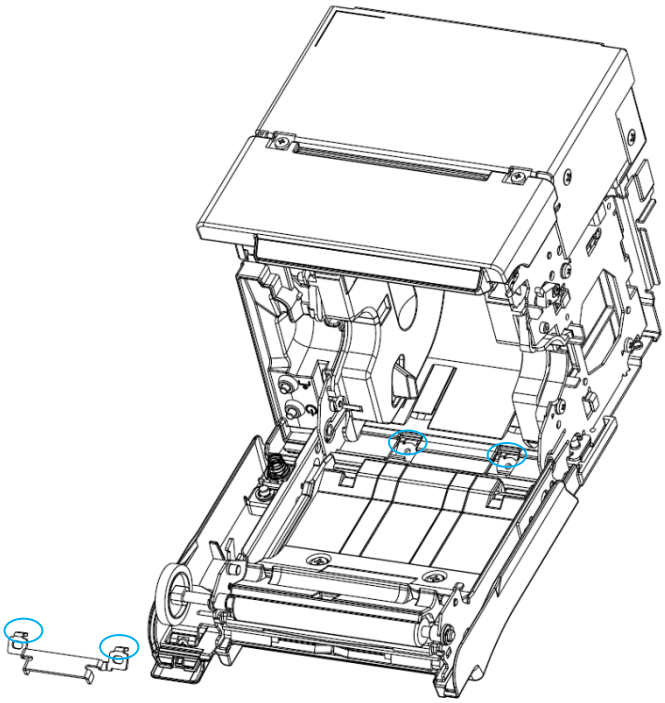
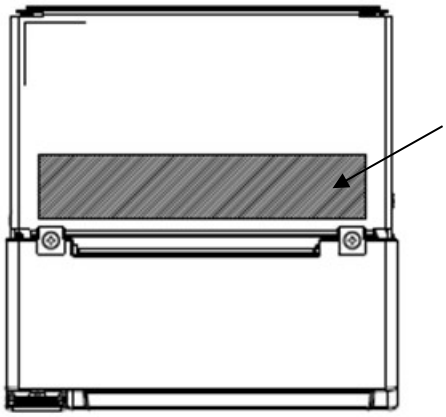
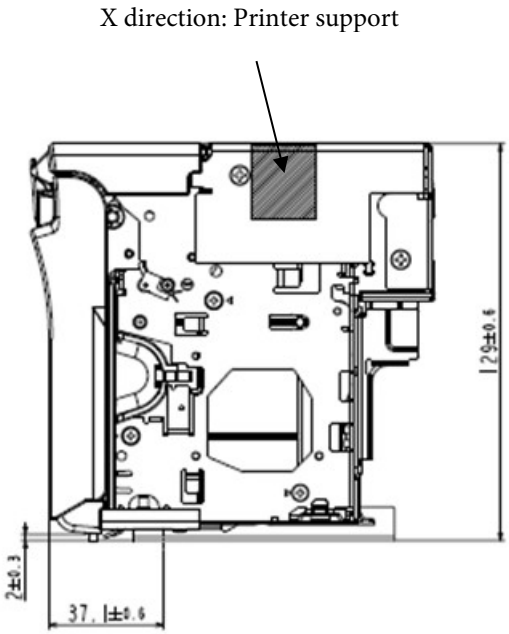


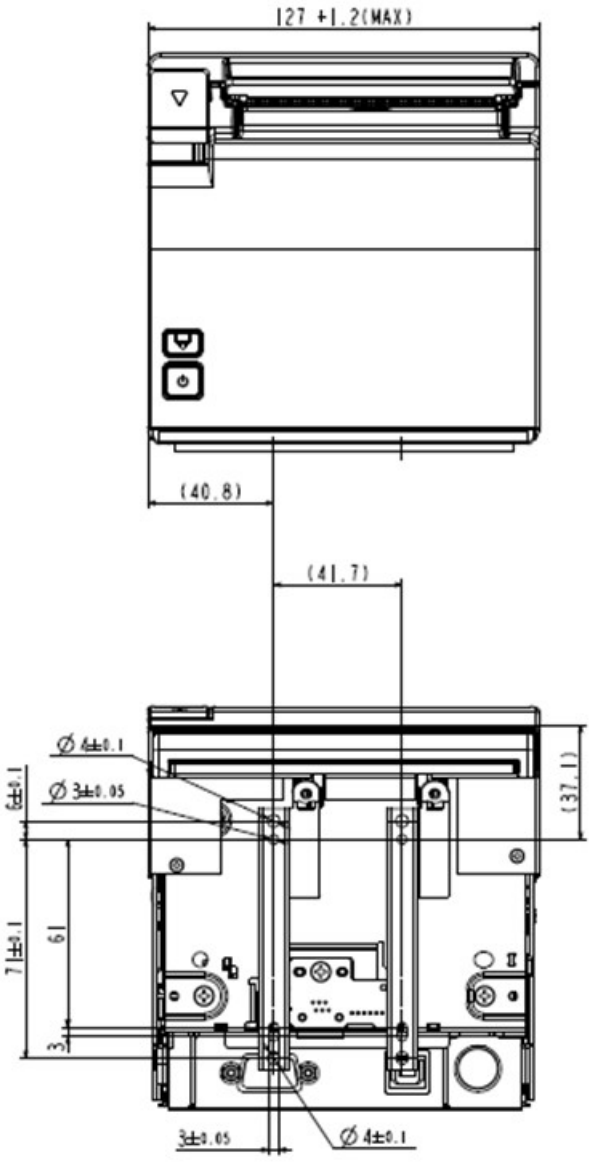
Figure M.5 Installation of Product Fixing Bracket

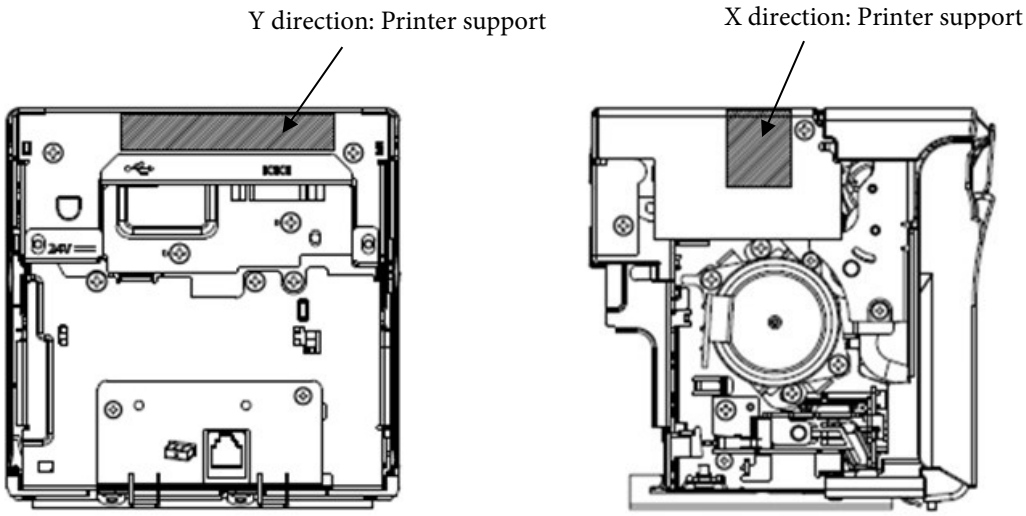
M.2 Bezel Option Not Equipped

- If impact may possibly be applied, provide support for the printer on the equipment side.



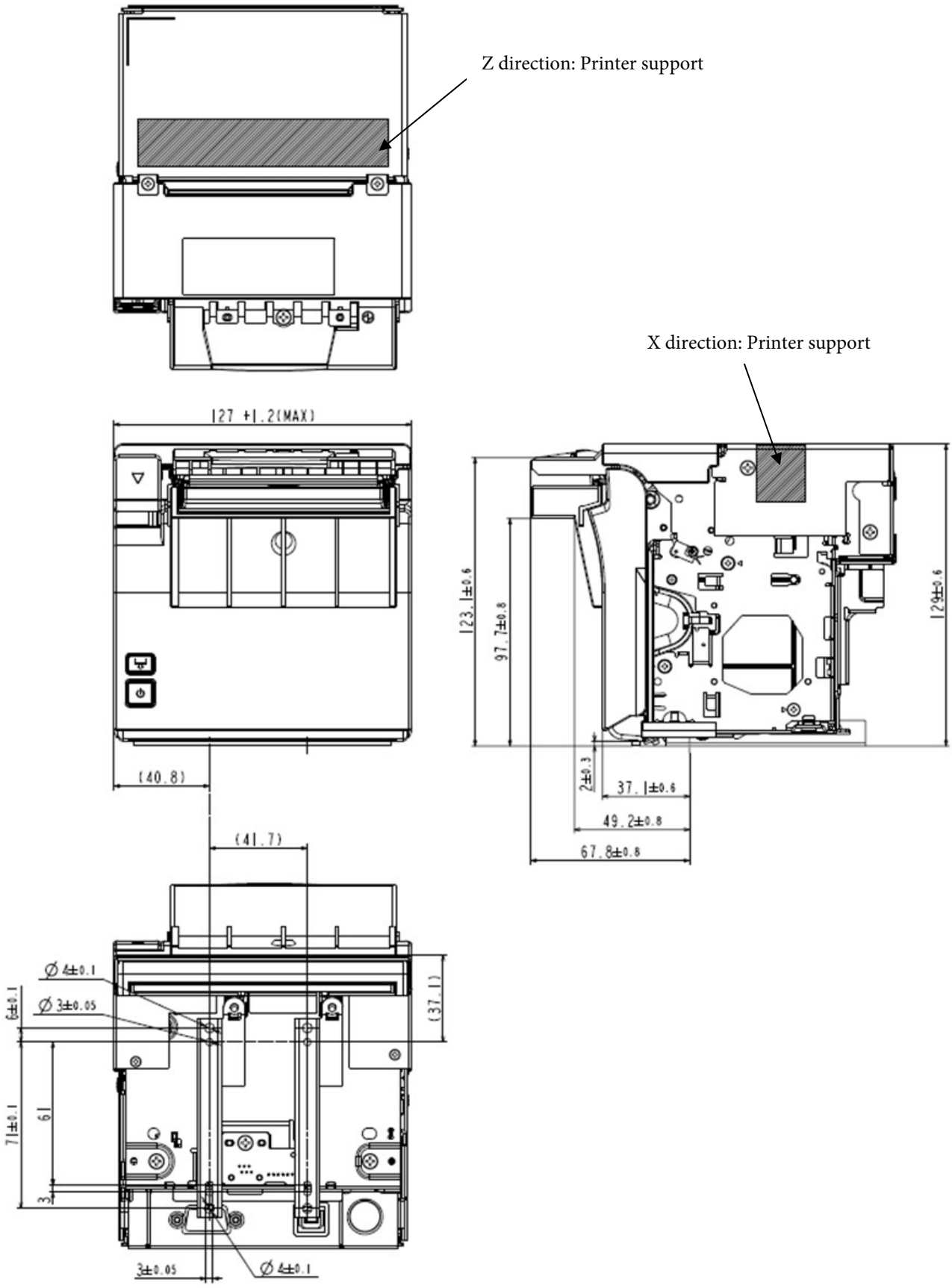




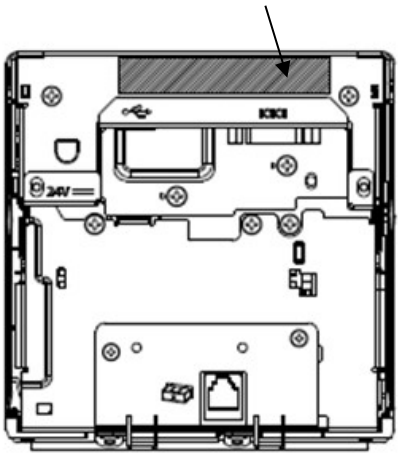

Y direction: Printer support
X direction: Printer support

M.3 Bezel Option Equipped

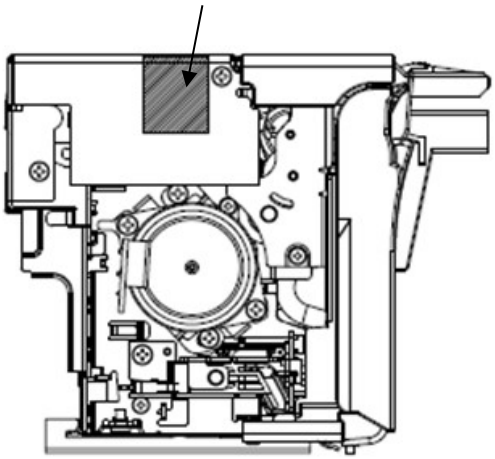
- If impact may possibly be applied, provide support for the printer on the equipment side.



Y direction: Printer support



X direction: Printer support



Appendix N INSTALLING THE POWER SWITCH AND POWER/FEED SWITCH COVER

N.1 Installing the Switch Cover

Step 1: Clean the area around the switch.

Step 2: Peel off the switch cover's double-sided adhesive tape, and affix such that the switch cover's rear protrusions enter the power switch's recesses.

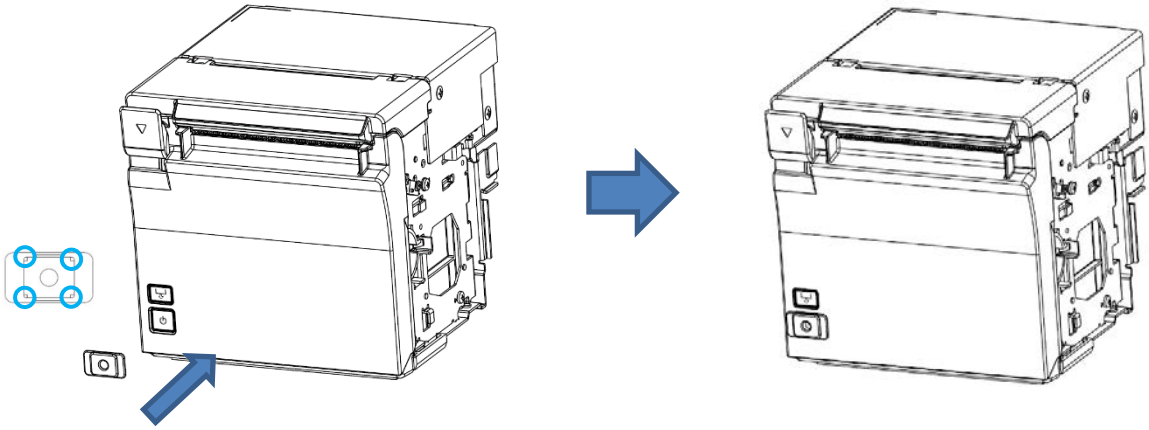


Figure N.1

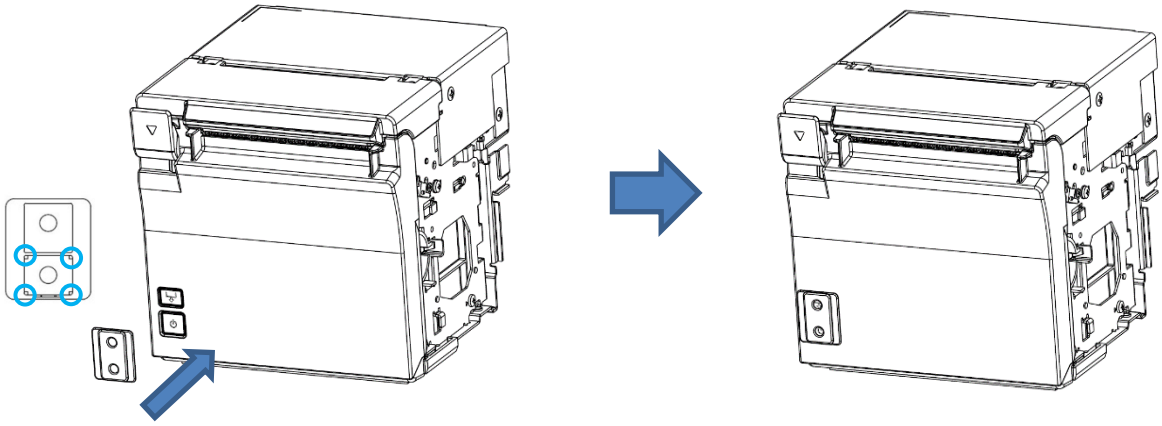


Figure N.2

Appendix O REPLACEMENT FOR SMALL COVER OPEN LEVER

To prevent malfunction, the cover open lever can be replaced with the included small cover open lever.

O.1 Replacement for Small Cover Open Lever

Step 1: Check that the printer's power is off, then open the roll paper cover.

Step 2: Press down on the cover open lever and remove the cover open lever screw.

Step 3: Pull the cover open lever out from the metal sheet part.

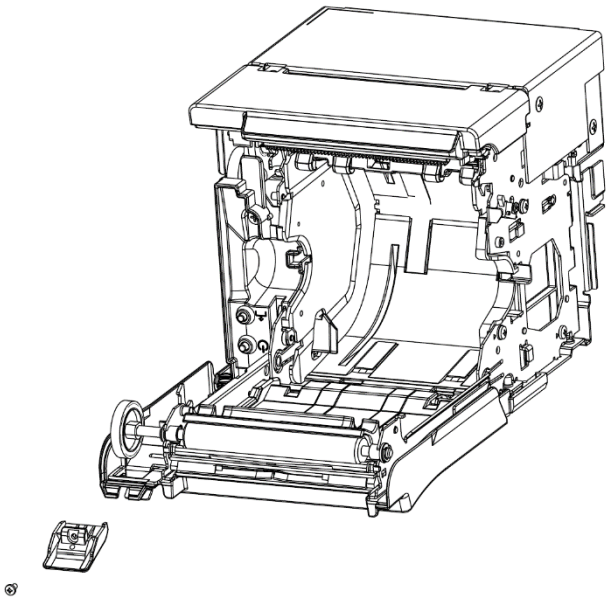


Figure O.1

Step 4: Insert the small cover open lever into the metal sheet part.

Step 5: Fasten the small cover open lever with the screw removed in step 2.

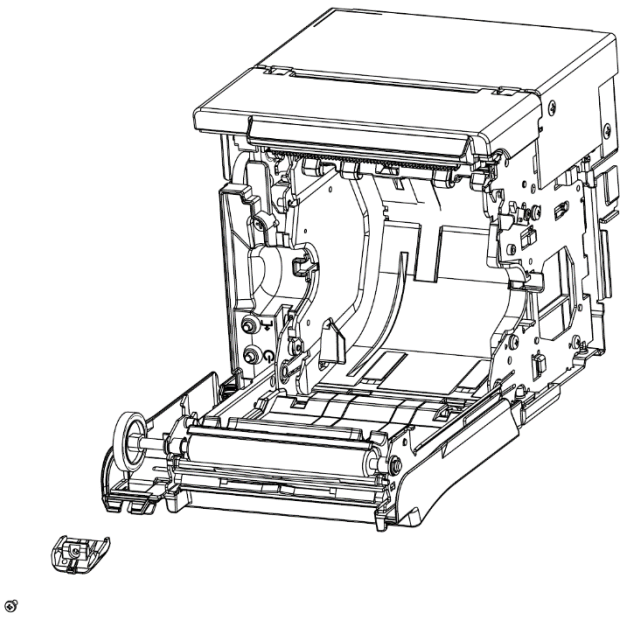


Figure O.2

Step 6: Set the roll paper.

Step 7: Close the roll paper cover, then turn the printer power on.

Appendix P BEZEL OPTION (OT-BU30)

P.1 Notes on Using the Bezel Option (OT-BU30)

1) A bezel option (OT-BU30) can be used with this printer.
2) If using the bezel option (OT-BU30), the printer's paper can only be ejected in the front direction.
3) Confirm that there is enough space even when the printer's roll paper cover is open.

P.2 Installing the Bezel Option (OT-BU30)

Step 1: Check that the printer's power is off, then open the roll paper cover.

Step 2: zRemove the screws that fasten the case containing the indicators.

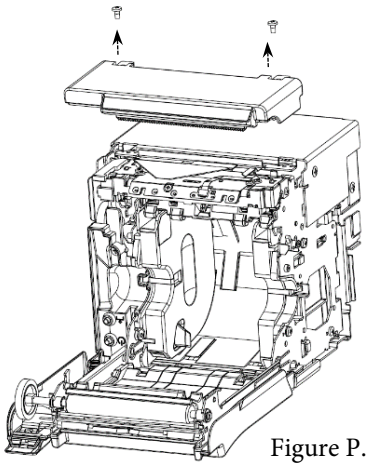


Figure P.1

Step 3: Remove the case containing the indicators.

Step 4: Install the case containing the indicators on top of the bezel option.

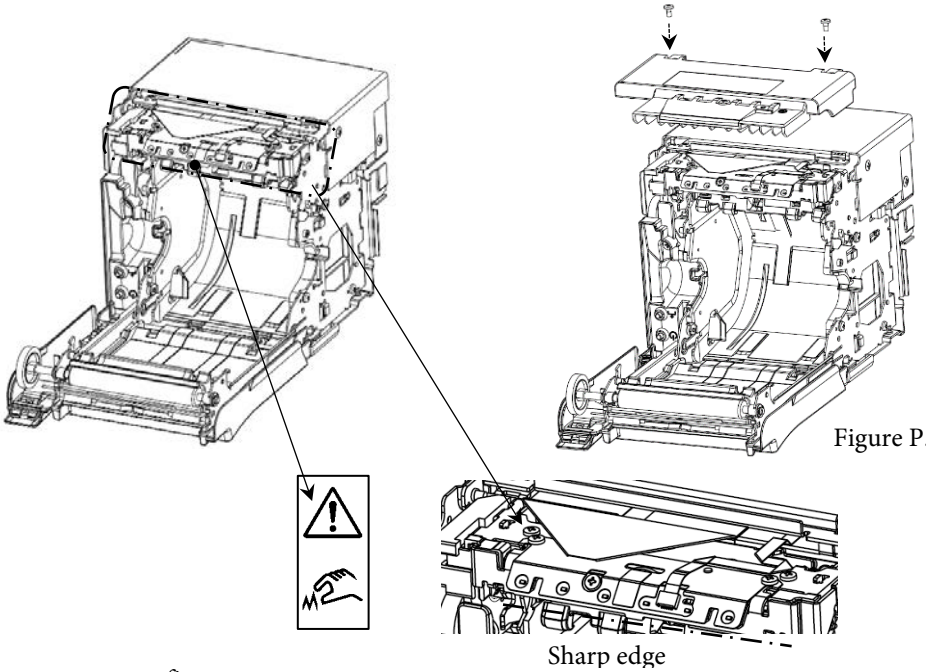


Figure P.2

Sharp edge

Note:

The sharp edge can cut your fingers.
Install the case without touching the sharp edge.

Step 5: Close the roll paper cover.

Step 6: Clean the roll paper cover.

Step 7: Peel off the backing from the tape attached to the part at the bottom of the bezel option. Then attach it such that the side of the bezel option fits in the ribs of the roll paper cover's paper discharge port.

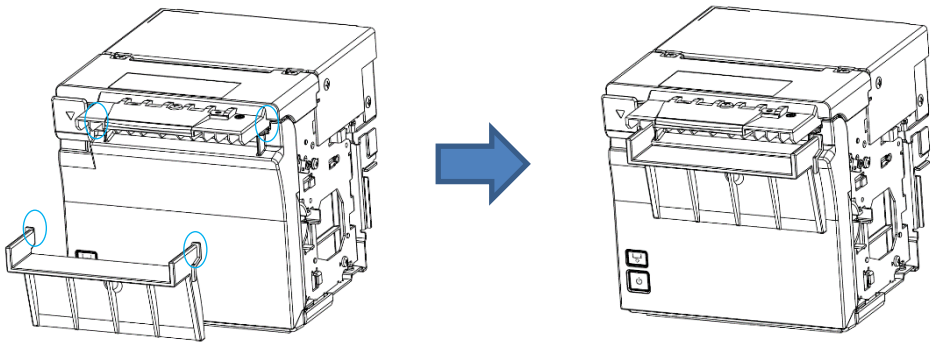


Figure P.3

Appendix Q RECOMMENDED POWER SUPPLY

- A power supply with a rating of 24 V/2.1 A or higher (50.6 W or higher) is recommended.
- If a power supply less than 24 V/2.1 A (less than 50.6 W) is used, printing may temporarily stop and uneven print density may occur.
    - Incidentally, by using customized value settings GS (E (fn = 5) and lowering the power supply capacity setting, you can reduce temporary printing stoppages and uneven print density occurrences. See Appendix L for details.

Appendix R PRINTER UNIT HANDLING

R.1 When purchasing this product

- To prevent static electricity damage to thermal head elements and IC sensors, take steps to prevent static electricity and ensure that your body is grounded before handling the product.
- To prevent malfunction and static electricity damage to thermal head elements and IC sensors, ensure that the frame (casing) is properly grounded before installing the product.

R.2 Notes on use

- This printer uses a line thermal head. For longer head life, avoid using in areas that are noticeably dirty and dusty.
- Since a thermal head is used with this printer, do not expose it to condensation.
  If condensation is on the product, do not turn on the power until the condensation is gone.

R.3 Prohibitions

- Do not touch thermal head elements, driver ICs, and connectors directly with your fingers, a screwdriver, tweezers, etc.
- Protect the thermal head surface from mechanical stress and impacts (including friction from particles).
- During operation and right after the end of operation, do not directly touch areas near the thermal head and motor.
- Keep contaminants from adhering to the thermal paper and platen.
- Do not apply excessive force to the connectors.

R.4 When not using for a long period

- If roll paper is left set for a long period, it may discolor or fade, and may stick to the platen. Also, deformation of the platen rubber may cause some printing to lighten.

R.5 When using at low temperature

- When printing starts (particularly at low temperature), the initial printing may be somewhat light due to the head being cold.

R.6 When using at high temperature

- When printing at high temperature, print bleeding or other print quality problems may occur.

Appendix S Application Development Information

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

S.1 Controlling the Printer

The printer supports the following command systems:

- ESC/POS

Users can control the printer by using the aforementioned commands, or the following development kits or drivers.

- Epson ePOS SDK for Android
- OPOS ADK
- OPOS ADK for .NET
- JavaPOS ADK (Windows)
- EPSON Advanced Printer Driver (APD)
- EPSON TM Virtual Port Driver

S.1.1 ESC/POS

ESC/POS is the Epson original printer command system for POS printers and customer display. With ESC/POS commands, you can directly control all the printer functions, but detailed knowledge of printer specifications or combination of commands is required, compared to using drivers and applications.

For detailed information about ESC/POS commands, see the ESC/POS Command Reference that can be accessed from the following URL.

www.epson-biz.com/pos/reference/

S.2 Controlling the Cash Drawer (Model for specified customer only)

A pulse output is sent to drawer kick connector pin 2 or pin 5, and you can open the drawer.

You can also check the open/close status of the drawer by checking the signal level of the drawer kick connector pin 3.

These controls are executed by a driver or by commands.

Note: Whether or not pin 2 or pin 5 operates the drawer kick connector depends on the connected cash drawer.

S.2.1 ESC/POS Commands

Prepare the output command for the specified pulse and the status transmission command. For details, see the ESC/POS Command Reference.

S.2.2 For Windows Printer Drivers (APD)

You can set the drawer to open when printing is started. For details, see the manual for drivers. For details on control, see the manual for Status API of the driver.

S.2.3 OPOS (OCX Driver)

Register a cash drawer using the SetupPOS Utility, and control using the OpenDrawer method or the DirectIO function.

For details, see the "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE Cash Drawer" and the "UnifiedPOS Specification". You can acquire documents regarding the UnifiedPOS from the following link.
https://www.omg.org/retail/unified-pos.htm

S.2.4 OPOS for .NET

Register a cash drawer using the SetupPOS Utility, and control using the OpenDrawer method or the DirectIO function.

For details, see the "EPSON OPOS ADK for .NET MANUAL Application Development Guide Cash Drawer (EPSON Standard)" and the "UnifiedPOS Specification". You can acquire documents regarding the UnifiedPOS from the following link.

https://www.omg.org/retail/unified-pos.htm

S.2.5 Epson ePOS SDK for Android

The output command for the drawer kick pulse and the status transmission command are provided in each SDK library. For details, see the user's manuals provided with each SDK.

S.3 Controlling the Optional External Buzzer (Model for specified customer only)

You can set the optional external buzzer to buzz when an error occurs and when an automatic cut off occurs. By using the driver or the command, you can specify when to sound the buzzer.

In addition, the beep pattern and how many times to sound the buzzer can be changed.

S.3.1 ESC/POS Command

Use the buzzer control command or the output command for the specified pulse. For details, see the ESC/POS Command Reference.

S.3.2 For Windows Printer Drivers (APD)

Use the DirectIO function or the API for opening the drawer. For details, see the manual for Status API of the drivers.

S.3.3 OPOS (OCX Driver)

Register a POS printer using the SetupPOS Utility and control using the DirectIO function.

For details, see the "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE POSPrinter (TM Series)".

S.3.4 OPOS for .NET

Register a POS printer using the SetupPOS Utility and control using the DirectIO function.

For details, see the "EPSON OPOS ADK for .NET MANUAL Application Development Guide POSPrinter".

S.3.5 Epson ePOS SDK for Android

The command for the buzzer function is provided in each SDK library. For details, see the user's manuals provided with each SDK.

S.4 Software

The following software is provided for application development.

S.4.1 Development Kit

Software	Description
Epson ePOS SDK for Android	This is a development kit for controlling TM printers from native applications of smart devices. This includes libraries, manuals, and sample programs.
EPSON OPOS ADK	This OCX driver can control POS peripherals using OLE technology. *1 Because controlling POS peripherals with original commands is not required on the application side, efficient system development is possible.
EPSON OPOS ADK for .NET	The OPOS ADK for .NET is a POS industry standard printer driver compatible with Microsoft POS for .NET. It allows you to develop applications that are compatible with the UPOS (Unified POS) specification. When developing applications, use a separate development environment such as Microsoft Visual Studio .NET.
EPSON JavaPOS ADK (Windows)	JavaPOS is the standard specification which defines an architecture and device interface (API) to access various POS devices from a Java based system. Using JavaPOS standard API allows control with Java based applications of functions inherent to each device. A flexible design with Java language and JavaPOS enables many different types of computer systems, such as stand alone or network configuration, to use a same application. You can use JavaPOS to build applications and drivers independently of platforms. This allows flexible configurations using thin clients to meet the system requirements.

*1: OLE technology developed by Microsoft divides software into part blocks. The OPOS driver is presupposed to be used with a development environment, such as Visual Basic, unlike ordinary Windows printer drivers. It is not a driver to be used for printing from commercial applications. You can acquire documents regarding the UnifiedPOS from the following link.
https://www.omg.org/retail/unified-pos.htm

S.4.2 Drivers

Software	Description	Operating environment
EPSON Advanced Printer Driver (APD)	In addition to ordinary Windows printer driver functions, this driver has controls specific to POS. The Status API (Epson original DLL) that monitors printer status and sends ESC/POS commands is also attached to this driver.	Windows
EPSON TM Virtual Port Driver	This is a serial/parallel-USB/LAN conversion driver to make an Epson TM/BA/EU printer connected via USB or LAN accessible from a POS application through a virtual serial or parallel port. It allows you to directly control devices connected via USB or LAN with ESC/POS commands without making changes in the POS application that controls devices connected via a serial or parallel interface.	Windows

S.4.3 Utilities

Software	Description	Operating environment
Epson TM Utility	A utility that is available on the App Store or Google Play. Use this to perform wireless connection setup and change settings on the printer from iOS and Android devices. In addition, the utility has the following functions. • Sample receipt printing • Printer status display • Quick pairing by QR code • Firmware update	Android
EU-m30 Utility	A utility for checking and changing various printer settings. Use this utility to: • Check the current settings • Test operation • Store logos • Set paper saving • Set printing control • Set communication interfaces • Configure the network settings • Configure the TM-Intelligent function settings • Save/restore settings	Windows
Deployment Tool	Use to make network and printer settings simultaneously. Allows you to make settings efficiently at the time of introducing TM printers for the first time, or when configuring multiple TM printers at the same time.	Windows
Monitoring Tool	Use to check a list of status for the Epson printers connected to the network. You can also update certificates for multiple printers used for WPA-Enterprise in a batch.	Windows
EU-m30 Firmware Updater	Use this tool to update the printer's firmware. An executable file and the firmware are packaged together.	Windows

S.4.4 Download

You can obtain software and manuals from one of the following URLs. For customers in North America, go to the following web site:

→ www.epson.com/support/

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

→ www.epson-biz.com/