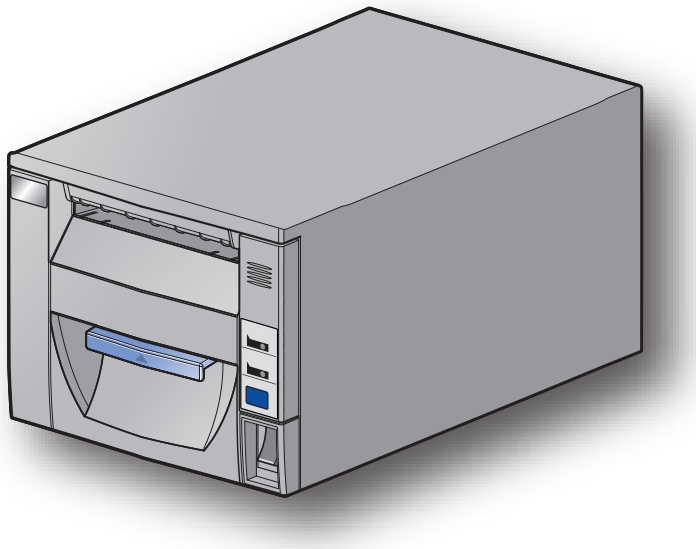
THERMAL PRINTER

FVP10 SERIES

Hardware Manual



Federal Communications Commission
Radio Frequency Interference
Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
This statement will be applied only for the equipments marketed in U.S.A.

FCC WARNING
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
For compliance with the Federal Noise Interference Standard, this equipment requires a shielded cable.
For RF interference suppression, if a ferrite core is provided with this device, affix it to the interface cable.

Statement of
The Canadian Department of Communications
Radio Interference Regulations

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
The above statement applies only to equipments marketed in Canada.

Trademark acknowledgments

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Notice

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- The contents of this manual are subject to change without notice.
- All efforts have been made to ensure the accuracy of the contents of this manual at the time of going to press. However, should any errors be detected, STAR would greatly appreciate being informed of them.
- The above notwithstanding, STAR can assume no responsibility for any errors in this manual.

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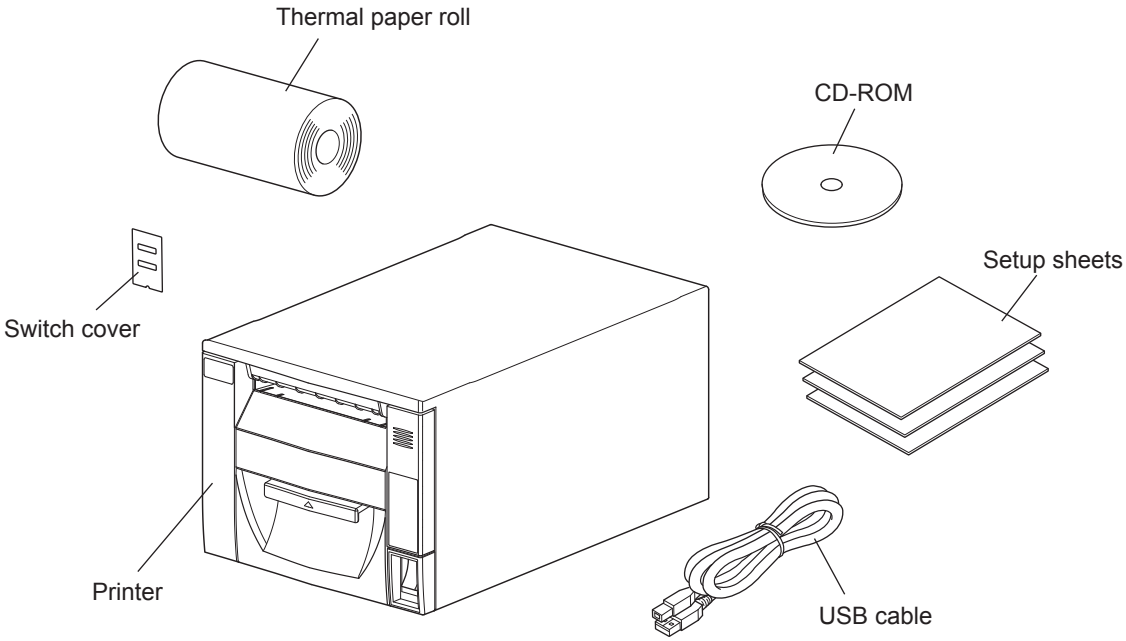
1. Unpacking and Installation

1-1. Unpacking

After unpacking the unit, check that all the necessary accessories are included in the package.



1-2. Notes about Installation

1. Place the printer on a firm, level desktop.
2. Do not install the printer where it may become unstable if its front cover were pulled out.

   The printer may fall and cause injury.

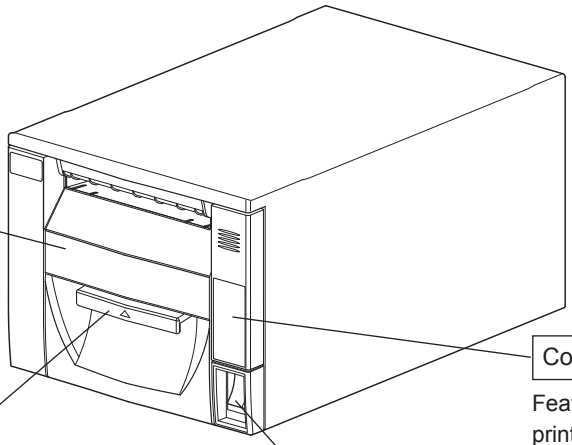
   If you need to install the printer in such a location, fix it in place.
3. Do not install the printer where an excessive amount of moisture, dust, oily mist, or iron is present. Doing so may result in malfunction, fire, or electric shock.
4. When placing objects on top of the printer, be sure that the force applied to the printer does not exceed 32.7 N (3 kgf). (Make sure that the load is not concentrated on the front section of the printer.)
5. Use the printer within boundaries indicated in the environmental requirements. Even when the ambient temperature and humidity are within the specifications, avoid radical changes in environmental conditions.
6. This device employs a DC motor and switches that have an electrical contact point.

   Avoid using the device in environments where silicon gas can become volatile.
7. When disposing of the printer, obey local regulations.

⚠ WARNING

- ✔ Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise. Immediately unplug the equipment and contact your dealer for advice.
- ✔ Never attempt to repair this product yourself. Improper repair work can be dangerous.
- ✔ Never disassemble or modify this product. Tampering with this product may result in injury, fire, or electric shock.

2. Parts Identification and Nomenclature



Front cover

Open to replace paper.
Do not open while printing.

Control panel

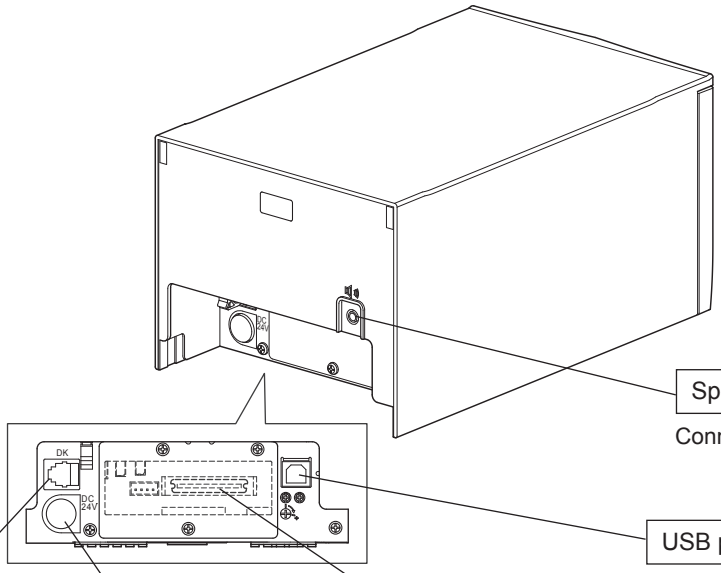
Features LEDs that indicate printer status and a button for operating the printer.

Cover open lever

Pull the cover open lever toward you to open the front cover.

Power switch

Turns the printer on and off.



Speaker jack

Connects to a speaker.

USB port

Connects to a host computer through a USB cable.

Peripheral drive connector

Connects to peripheral devices such as cash drawers.
Do not connect this to a telephone line.

Power connector

Connects to an optional AC adapter.

Optional interface board connector

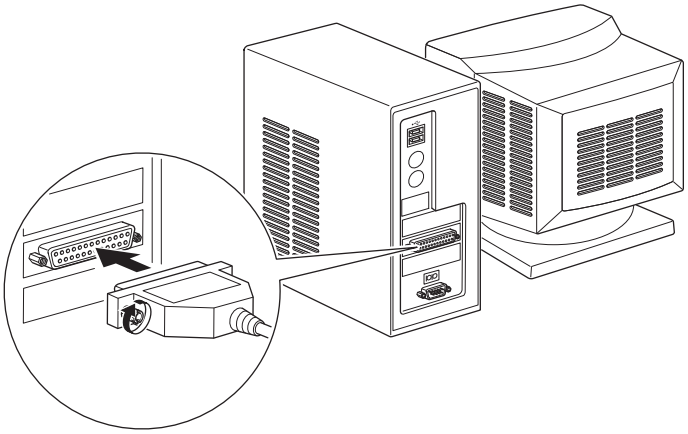
If you install an optional interface board, you can connect the printer to a host computer through a cable.

3. Setup

3-1. Connecting the Interface Cable to the PC

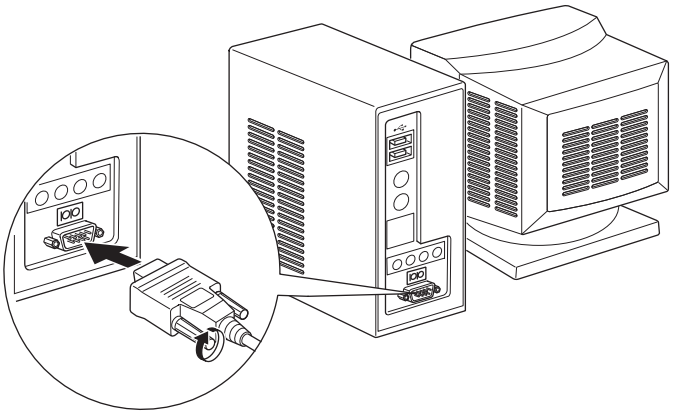
3-1-1. Parallel Interface Cable

Connect the parallel interface cable to a parallel port on your PC.



3-1-2. RS-232C Interface Cable

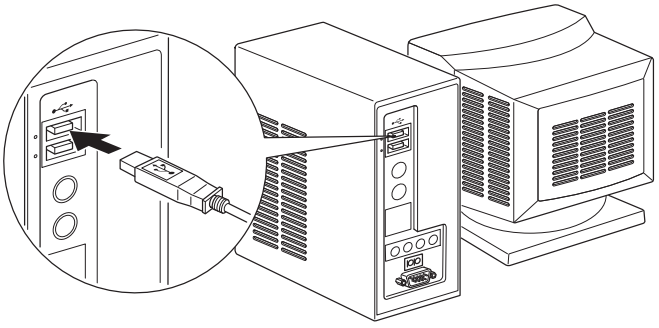
Connect the RS-232C interface cable to a RS-232C port on your PC.



3-1-3. USB Interface Cable

Connect the USB interface cable to a USB port on your PC.

Accessory: USB cable 1.8M TSP1 (P/N: 30729100)



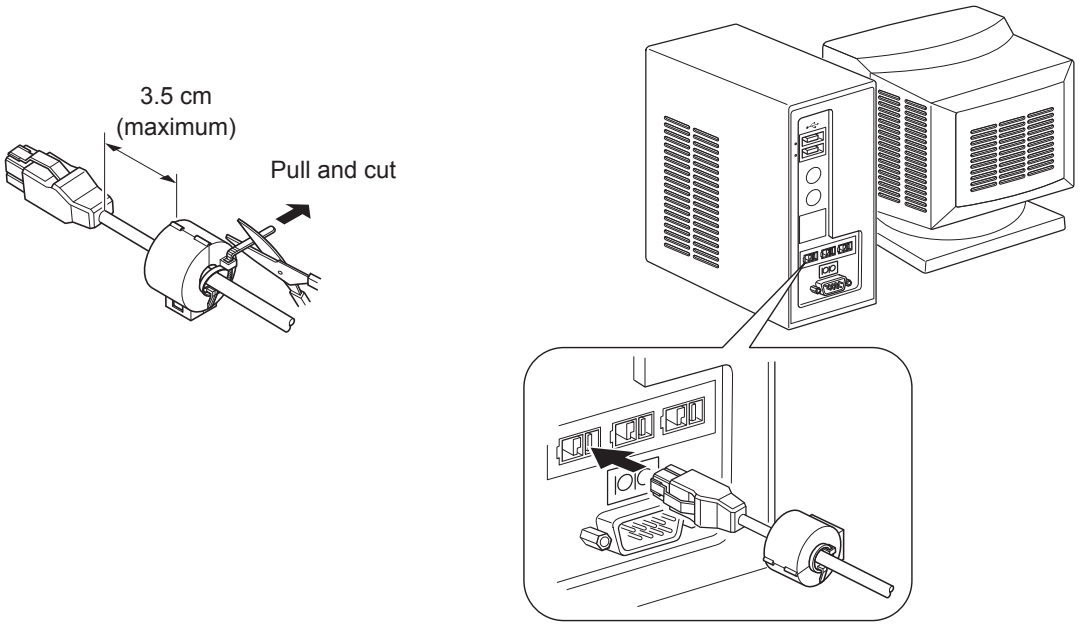
3-1-4. PoweredUSB Interface Cable

To protect the printer from electromagnetic interference, affix the ferrite core that came with the optional PoweredUSB interface board to the cable. Then, connect the cable to a PoweredUSB port on your PC.

Note: The optional PoweredUSB cable has been designed specifically for this printer.
Other PoweredUSB cables may not meet the EMC technical standards.

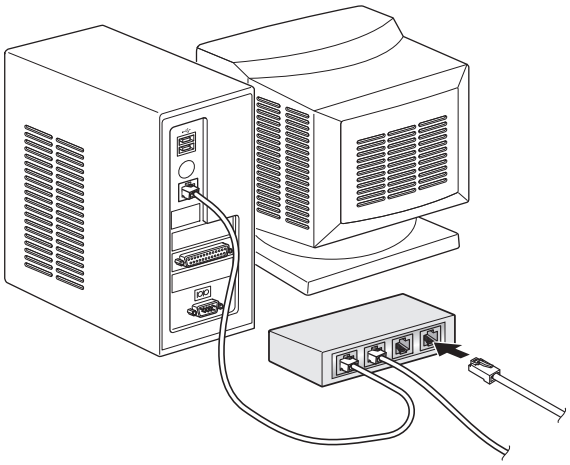
Option: PoweredUSB cable 1X8LNL 1.2M (P/N: 30729130)

Star-recommended PCI card: PCI to 4 Port PoweredUSB Card (Model: 301-1150-01; manufacturer: Digi)



3-1-5. Ethernet Interface Cable

To protect the printer from electromagnetic interference, affix the ferrite core that came with the optional Ethernet interface board to the cable. Then, connect the cable to an Ethernet port on your PC.

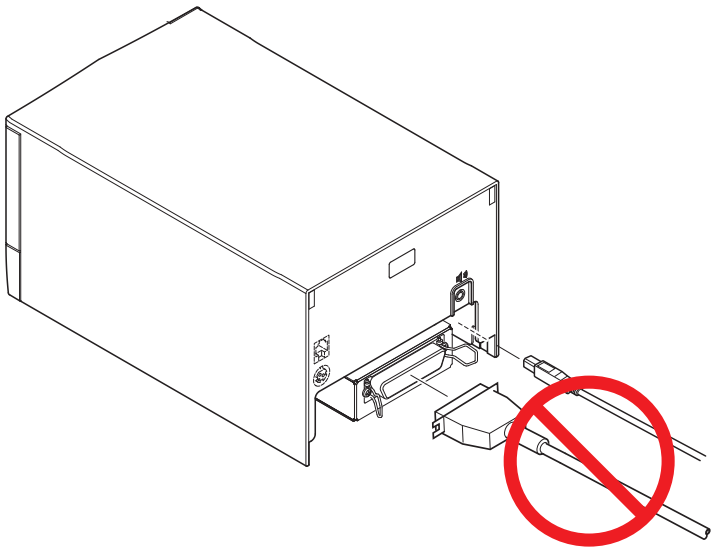


3-2. Connecting the Interface Cable to the Printer

Only a USB cable is provided. If you are using another type of cable, obtain a cable that meets the printer specifications. Because the appropriate interface cable differs depending on the system that you are connecting the printer to, contact your dealer if you are unsure about what cable to use.

Before connecting or disconnecting an interface cable, be sure to remove the AC adapter's power cable plug from the outlet.

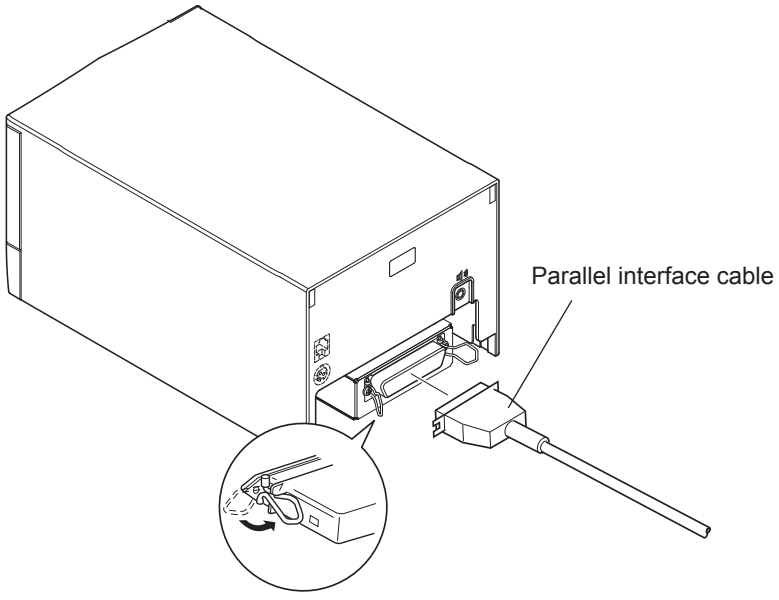
⚠ **CAUTION:** Do not connect move than one at any given time.



3-2-1. Parallel Interface Cable

You do not have to affix a ferrite core to a parallel interface cable.
To connect a parallel interface cable, follow the instructions given below.

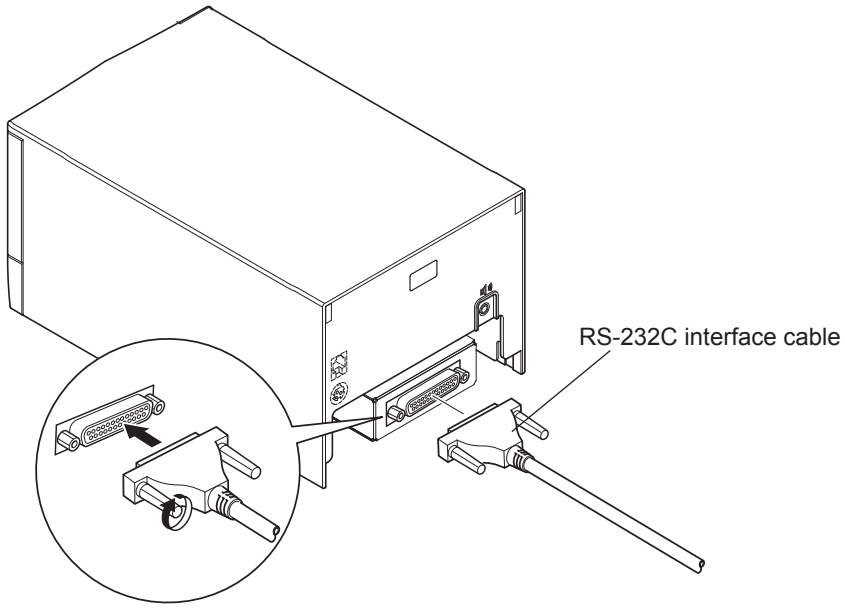
(1) Make sure that the AC adapter's power cable plug is not connected to the outlet.
(2) Connect the interface cable to the connector on the parallel interface board, and fasten the connector clasps.



3-2-2. RS-232C Interface Cable

You do not have to affix a ferrite core to an RS-232C interface cable.
To connect an RS-232C interface cable, follow the instructions given below.

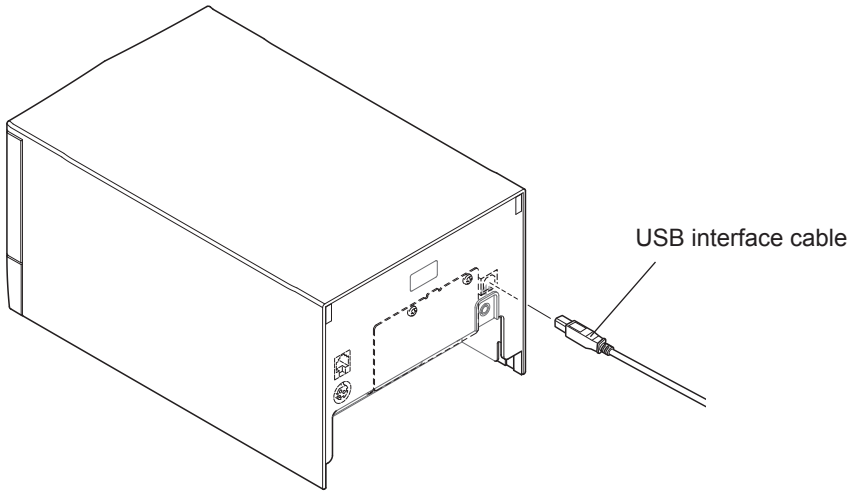
(1) Make sure that the AC adapter's power cable plug is not connected to the outlet.
(2) Connect the RS-232C interface cable to the connector on the RS-232C interface board, and tighten the left and right connector screws.



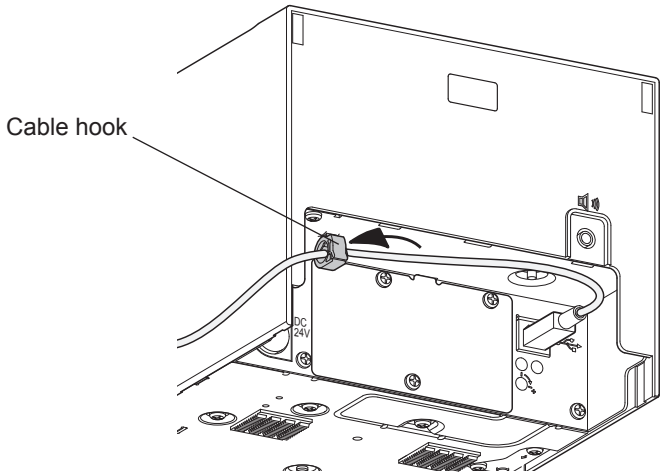
3-2-3. USB Interface Cable

You do not have to affix a ferrite core to a USB interface cable.
To connect a USB interface cable, follow the instructions given below.
Accessory: USB cable 1.8M TSP1 (P/N: 30729100)

(1) Make sure that the AC adapter's power cable plug is not connected to the outlet.
(2) As shown in the figure, connect the USB interface cable to the USB interface connector.



(3) Pass the cable through the cable hook.



3-2-4. PoweredUSB Interface Cable

⚠ **CAUTION:** The optional PoweredUSB cable has been designed specifically for this printer.
Other PoweredUSB cables may not meet the EMC technical standards.

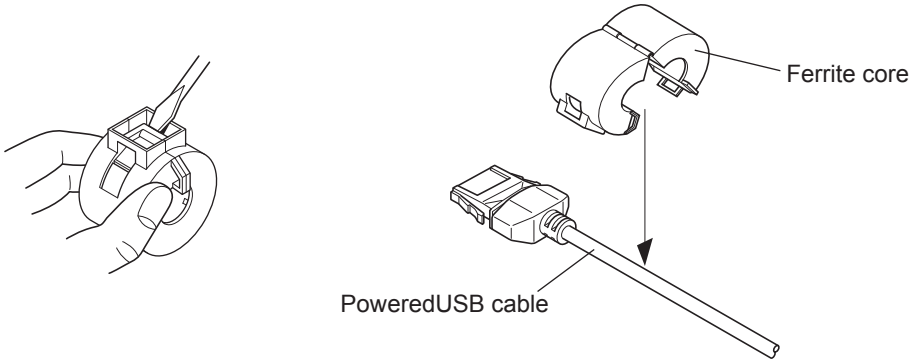
To protect the printer from electromagnetic interference, affix the ferrite core that came with the optional interface board to the cable. To connect the cable, follow the instructions given below.

(1) Turn the power switch off.

(2) If the AC adapter is connected, remove the power cable plug from the outlet, and then remove the plug from the printer's power connector.

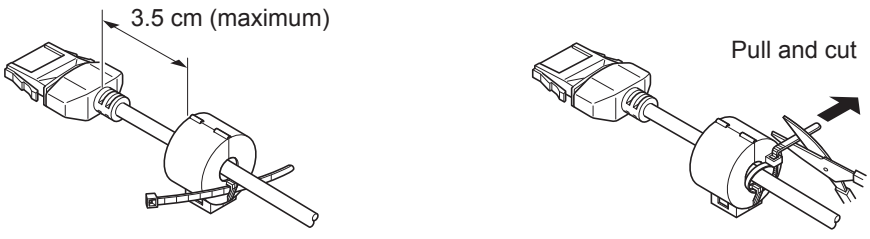
⚠ **CAUTION:** Do not connect the AC adapter while the PoweredUSB cable is connected. Doing so may result in malfunction.

(3) Affix the included ferrite core to the PoweredUSB cable as shown in the figure.
Option: PoweredUSB cable 1X8LNL 1.2M (P/N: 30729130)

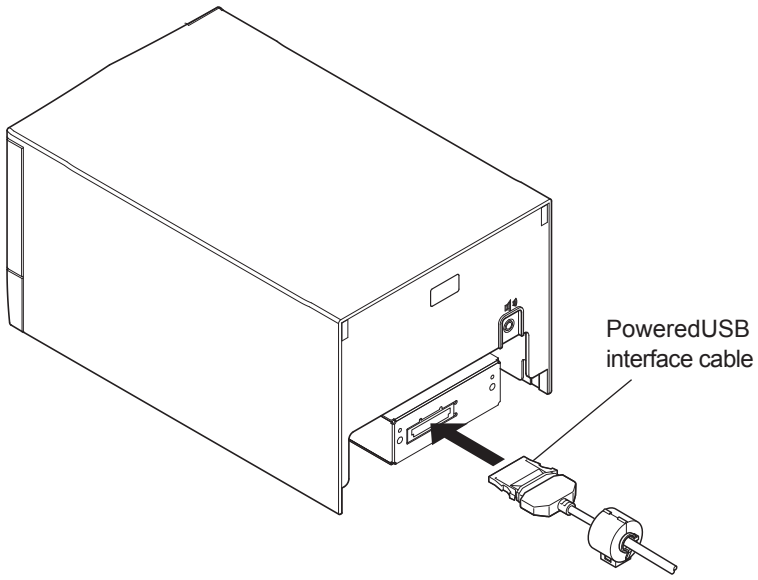


(4) Pass the fastener through the ferrite core.

(5) Loop the fastener around the PoweredUSB interface cable, and lock it.
Use scissors to cut the excess part of the fastener.



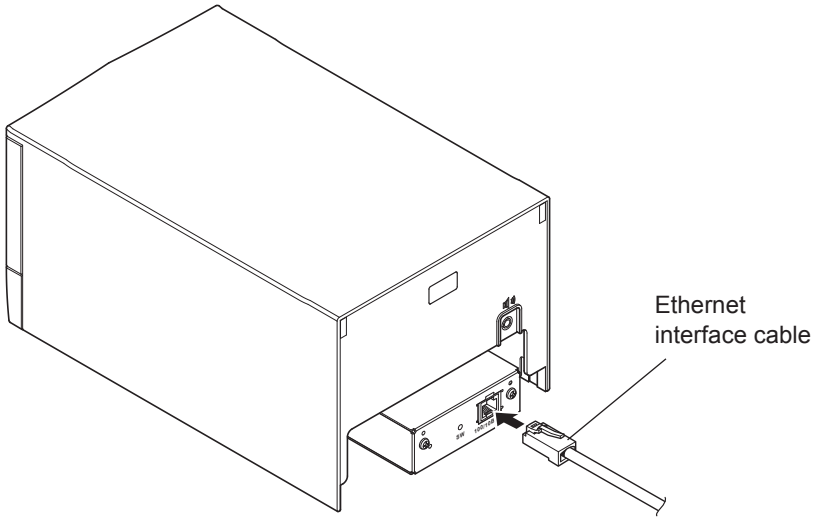
(6) Connect the PoweredUSB interface cable to the connector on the PoweredUSB interface board.



3-2-5. Ethernet Interface Cable

(1) Make sure that the AC adapter's power cable plug is not connected to the outlet.

(2) Connect the Ethernet interface cable to the connector on the Ethernet interface board.



Link disconnection detection feature

The Ethernet interface model is equipped with a link disconnection detection feature. If the printer is turned on when an Ethernet cable is not connected to it, the POWER and ERROR lamps are simultaneously turned on and off at 2-second intervals to indicate the disconnection.

Be sure to connect the Ethernet cable from a PC or hub to the printer, and then turn the printer on.

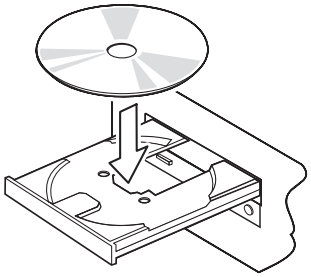
3-3. Installing the Printer Software

This section gives instructions for installing the printer driver and utility software, which are on the supplied CD-ROM. The following Windows versions are supported.

- **Windows XP (Service Pack 2 or later)**
- **Windows Vista 32-bit and 64-bit**
- **Windows 7 32-bit and 64-bit**

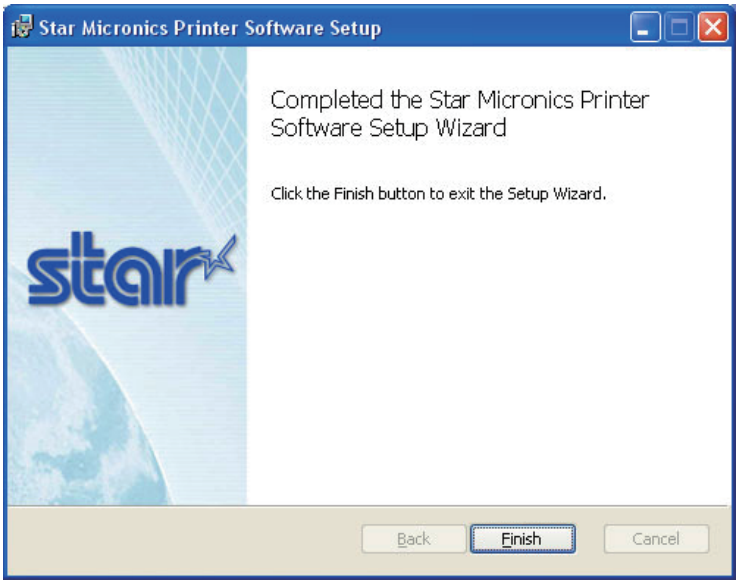
(1) Turn your PC on to start Windows.

(2) Insert the supplied CD-ROM (Drivers and Utilities) into the CD-ROM drive.



(3) Follow the instructions that appear on the screen.

(4) When the dialog box shown in the figure appears, the installation is complete. Click “Finish”.



Note: The dialog box that appears varies depending on your environment.

This completes the installation of the printer software.
If a message appears prompting you to restart Windows, do so.

3-4. Connecting the AC Adapter

Note: Before connecting or disconnecting the AC adapter, make sure that the printer and all the devices connected to it are turned off.

Then remove the power cord plug from the outlet.

(1) Connect the AC adapter to the power cable.

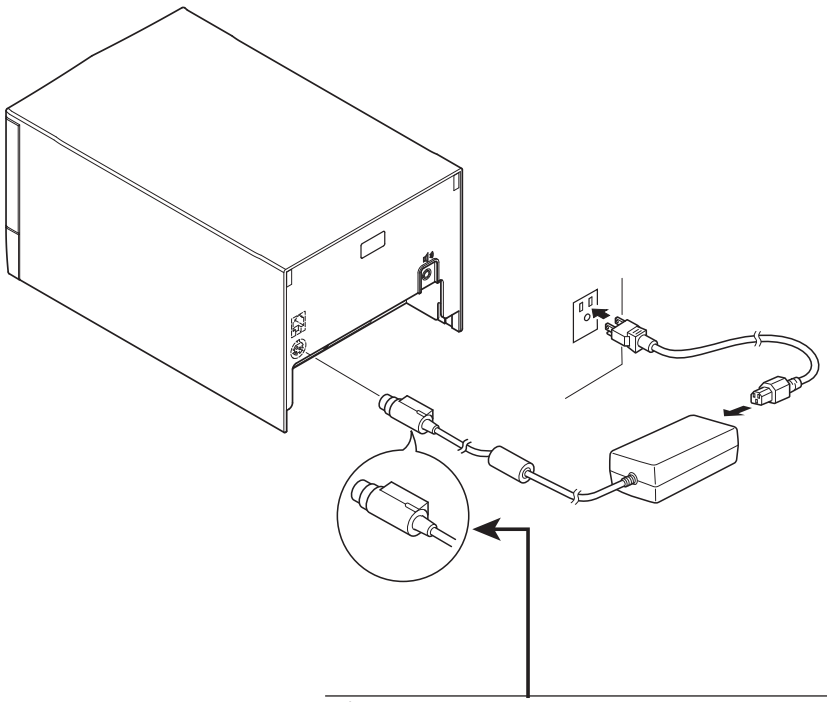
Note: The optional AC adapter has been designed specifically for this printer.

Other AC adapters may not meet the EMC technical standards.

Option: PS60A-24B

(2) Connect the AC adapter to the connector on the printer.

(3) Insert the power cable plug into an AC outlet.



⚠ CAUTION

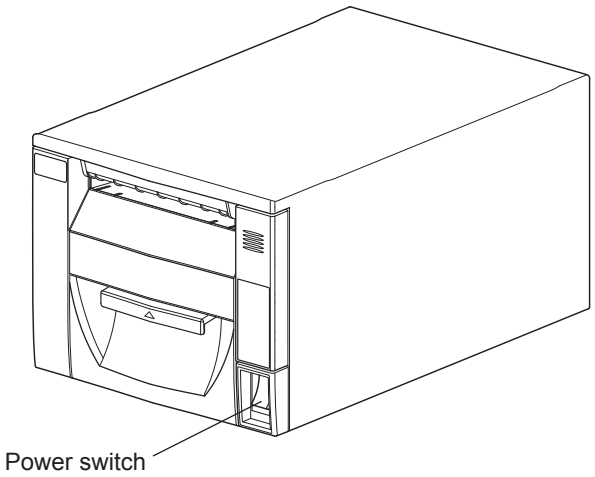
When disconnecting the cable, take hold of the cable connector to pull it out. Releasing the lock makes it easy to disconnect the connector.

Pulling the cable excessively could cause damage to the connector.

3-5. Turning the Power On

Connect the power cord according to the instructions in section 3-4, “Connecting the AC Adapter”.

Turn on the power switch on the front of the printer.
The POWER lamp on the control panel will light.



⚠ CAUTION

We recommend that you unplug the printer from the power outlet whenever you do not plan to use it for long periods. Because of this, you should locate the printer so that the power outlet it is plugged into is nearby and easy to access.

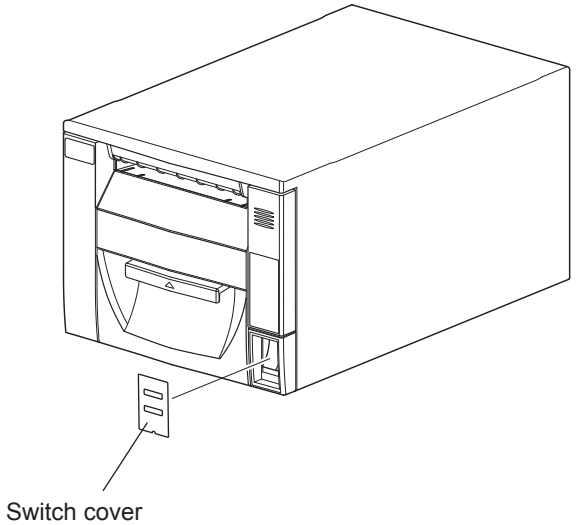
When an Switch blind is affixed to the printer above the power switch, the ON/OFF marks of the power switch may be hidden. If this occurs, remove the power cord from the outlet to turn the printer OFF.

3-6. Attaching the Switch Cover

You do not have to attach the switch cover. Do so only if you need to.
Attaching the switch cover will:

- Prevent unintentional operation of the power switch.
- Prevent other people from easily operating the power switch.

Attach the switch cover as shown in the figure below.



You can turn the power switch on (I) and off (O) by inserting a ballpoint pen or an object with a pointed tip into the holes in the switch cover.

⚠ CAUTION

We recommend that you unplug the printer from the power outlet whenever you do not plan to use it for long periods. Because of this, you should locate the printer so that the power outlet it is plugged into is nearby and easy to access.

3-7. Connecting to a Peripheral Device

You can connect a peripheral device to the printer using a modular plug.
Follow the instructions given below. For details about the recommended type of modular plug, see chapter 17, “Peripheral Drive Circuit”.

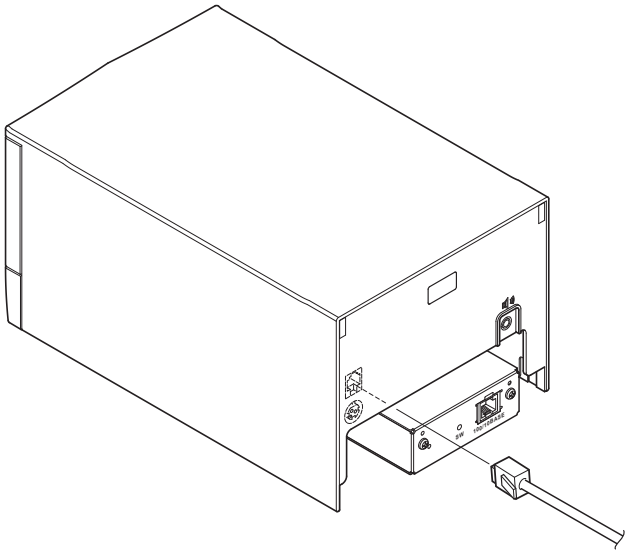
(1) Make sure that the AC adapter’s power cable plug is not connected to the outlet.

(2) Connect the end of the cable to the peripheral drive connector on the rear panel of the printer.
Connect the other end of the cable to the modular jack of the peripheral device.

⚠ CAUTION

Do not connect a telephone line into the peripheral drive connector. Failure to observe this may result in damage to the printer.

Also, for safety purposes, do not connect wiring to the external drive connector if there is a chance it may carry peripheral voltage.

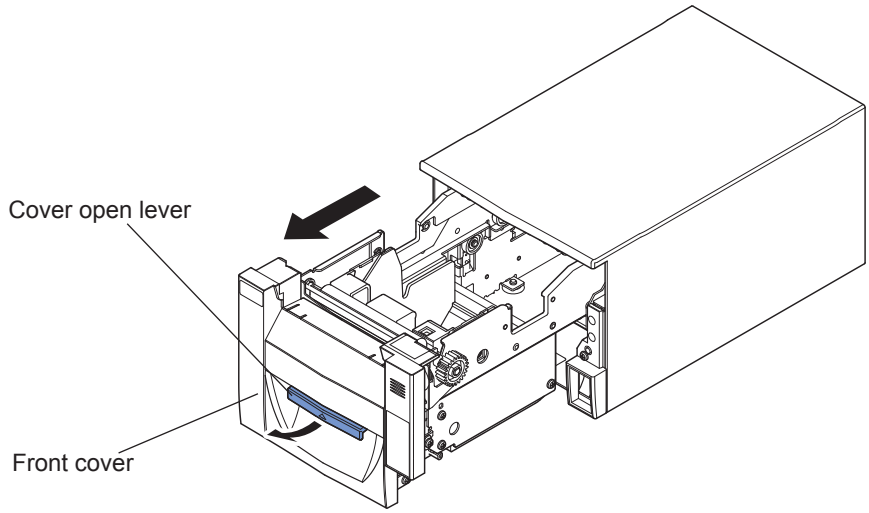


4. Loading Paper and Configuring the Cutter

4-1. Loading a Paper Roll

Use a paper roll that complies with the printer specifications. (See chapter 5, “Consumable Parts and AC Adapter”.)

(1) Pull the cover open lever toward you, and pull the front cover out to open it.



(2) Load the paper roll into the printer in the direction indicated by the figure, and pull the leading edge of the paper straight toward you.

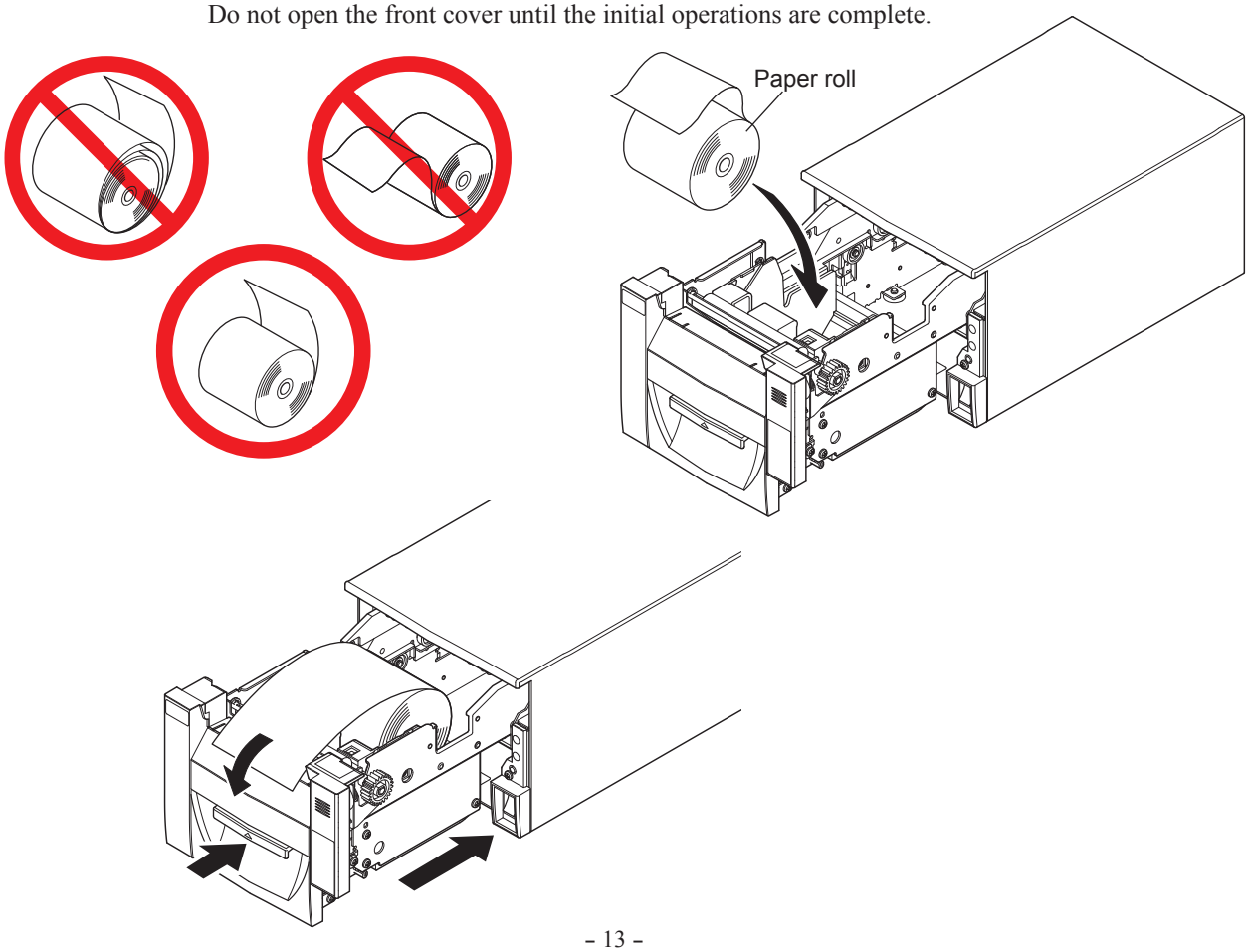
⚠ **CAUTION 1:** Pull the paper out while keeping it tight.

2: Be careful not to pull the paper out at an angle, because doing so may cause the paper to jam or skew.

(3) Push the front of the printer to securely close the front cover.

⚠ **CAUTION 1:** Be careful not to get your fingers caught when closing the printer’s front cover.

2: After the front cover is closed, the printer performs the initial operations (paper feeding to paper cutting). Do not open the front cover until the initial operations are complete.

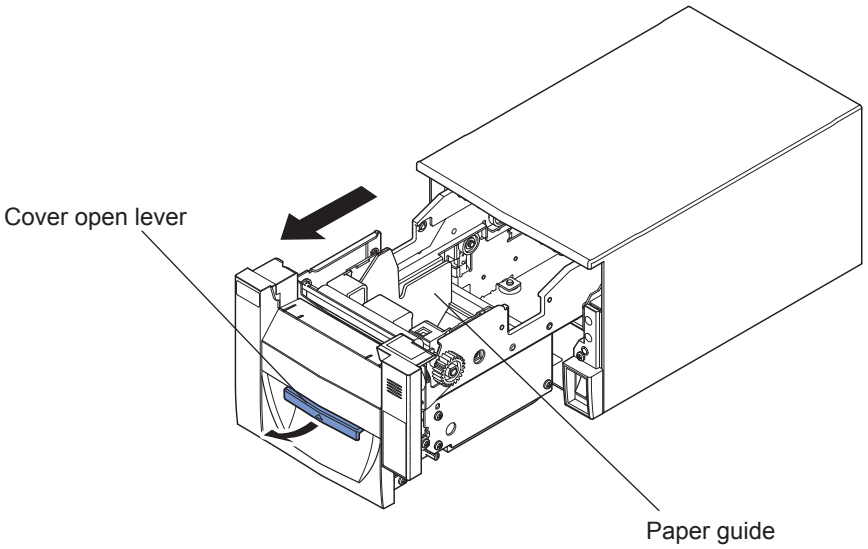


4-2. Changing the Paper Width

Move the paper guide to match the paper roll width.

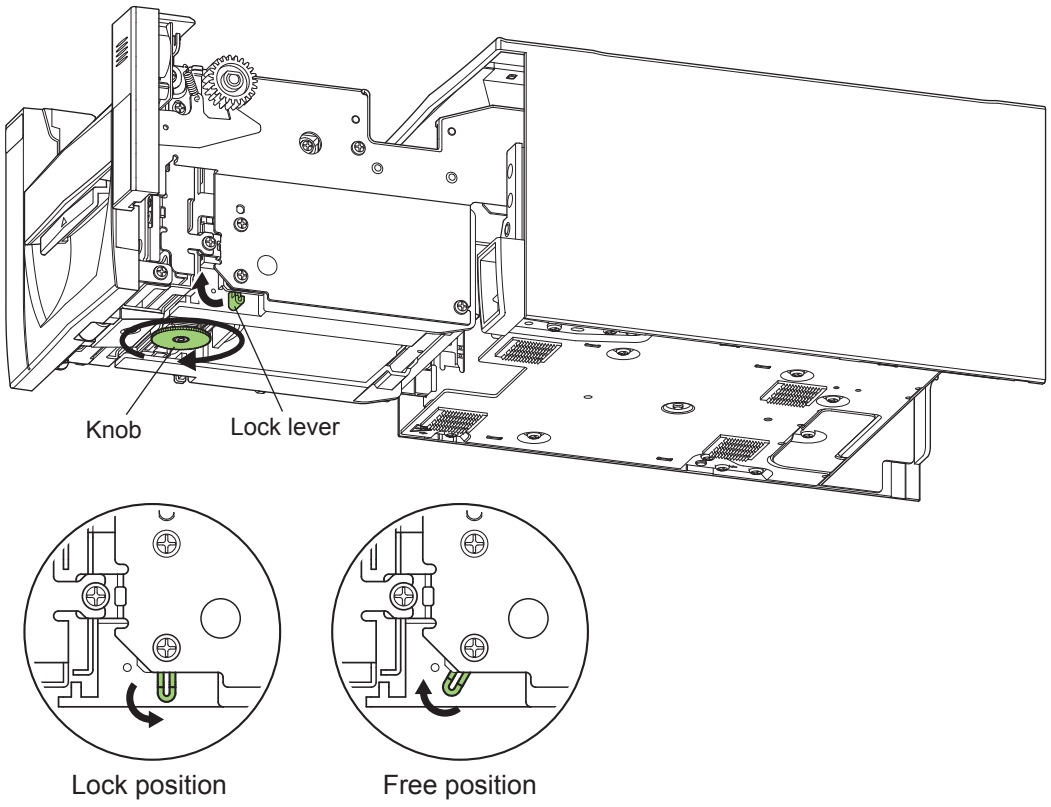
* The following instructions are for changing the paper width from 79.5 mm to 57.5 mm.

(1) Pull the cover open lever toward you, and pull the front cover out to open it.



(2) Move the lock lever to the free position.

(3) Turn the knob clockwise until it stops. Move the lock lever to the lock position.



Note: Do not change the paper width while the printer is in use.

4-3. Changing the Paper Thickness

To change the paper thickness setting, change the tension and the slide lever positions.

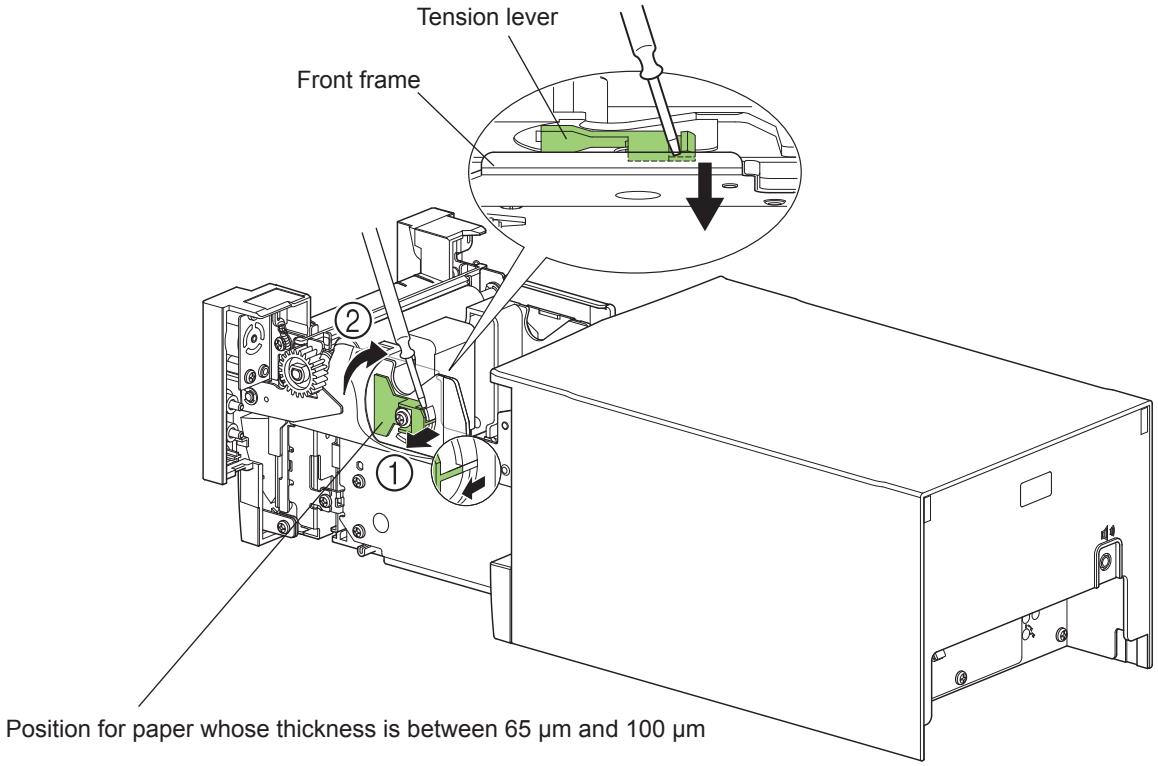
4-3-1. Setting the Tension Lever Position

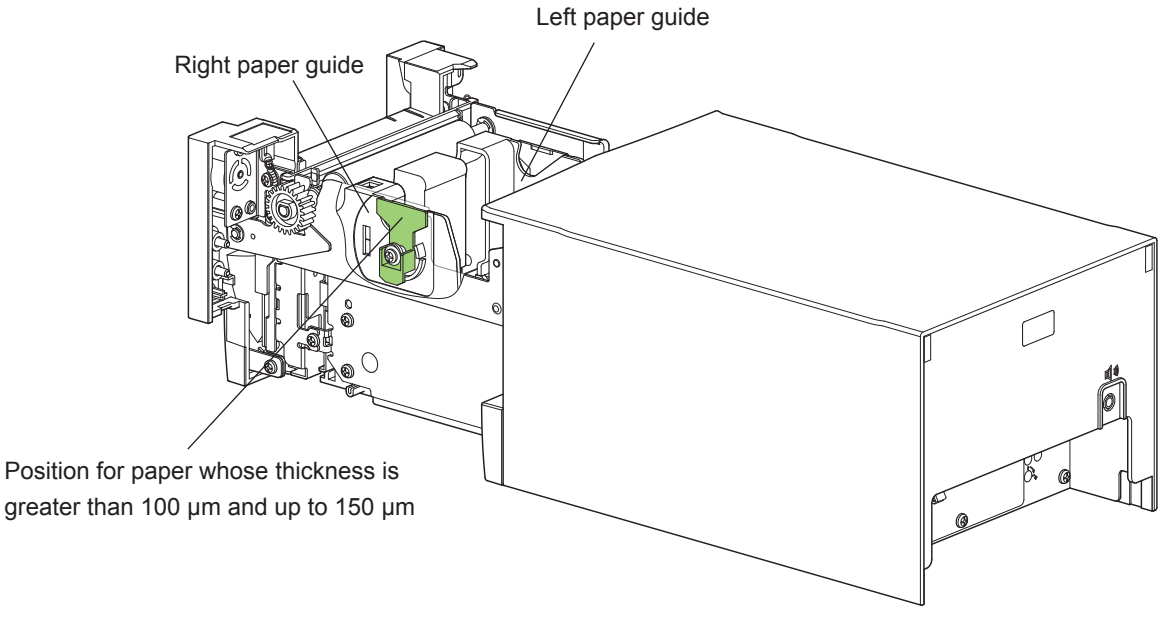
By factory default, the tension lever is set for paper thicknesses between 65 µm and 100 µm.

To use paper whose thickness is greater than 100 µm and up to 150 µm, change the left and right paper guides' tension lever positions according to the instructions given below.

(1) Pull the cover open lever toward you, and pull the front cover out to open it.

(2) Insert a precision flat-blade screwdriver between the front frame and the paper guide, and as shown in the figure, push the part of the tension lever that is set in the paper guide outward to release it, and turn the lever clockwise.





4-3-2. Setting the Slide Lever Position

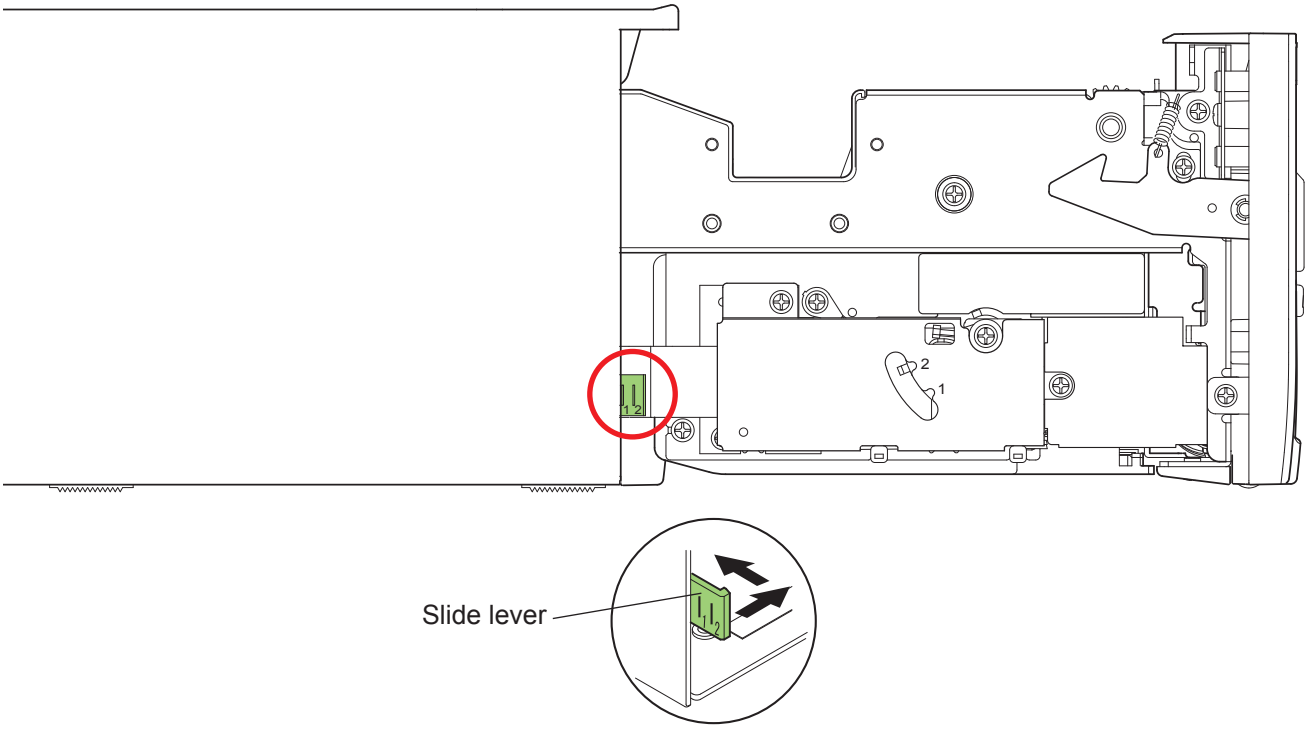
By factory default, the tension lever is set for paper thicknesses between 65 µm and 100 µm.

To use paper whose thickness is greater than 100 µm and up to 150 µm, change the slide lever position according to the instructions given below.

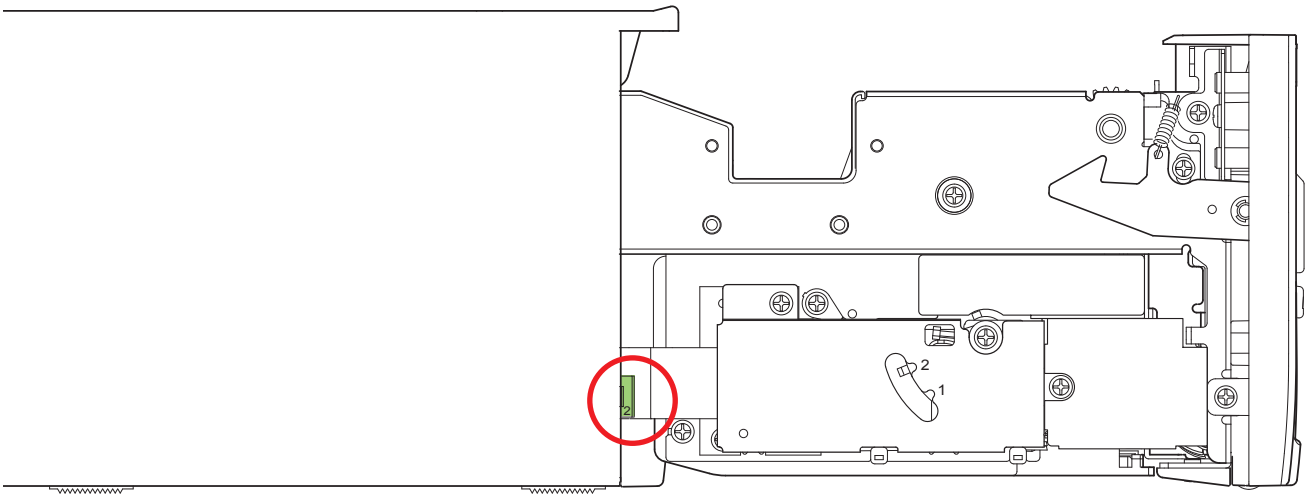
(1) Pull the cover open lever toward you, and pull the front cover out to open it.

(2) While pushing the slide lever that is on the left side of the case inward, change the lever position.

Position for paper whose thickness is between 65 µm and 100 µm



Position for paper thicknesses greater than 100 µm and up to 150 µm

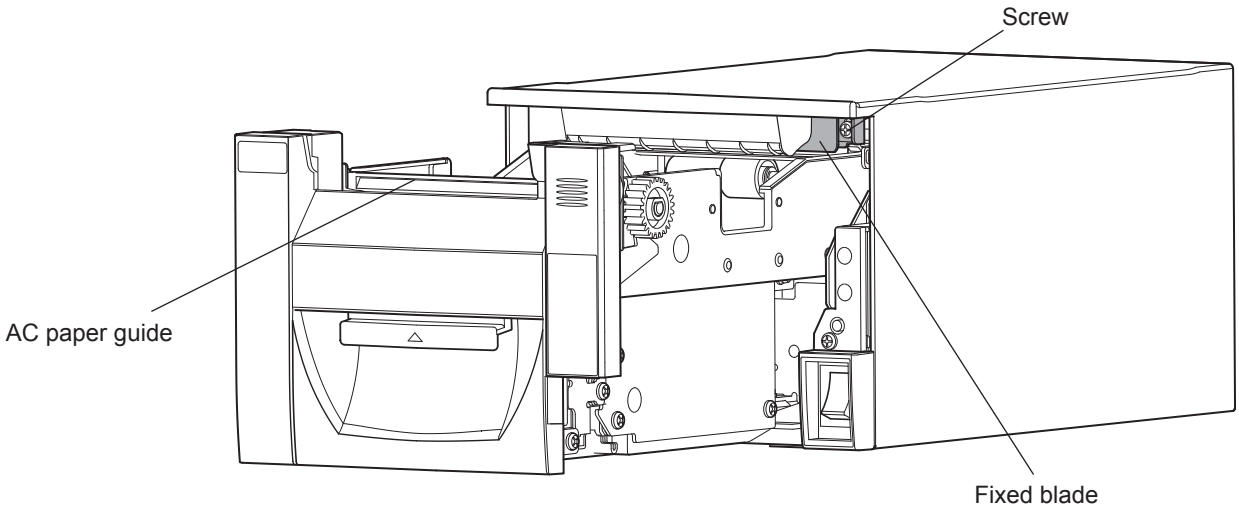


4-4. Changing the Cutter Mode

To change the cutter mode from partial to full, follow the instructions given below.

To change the cutter mode, change Dip switch DIPSW1-10 (see chapter 12, "Dip Switch Settings").

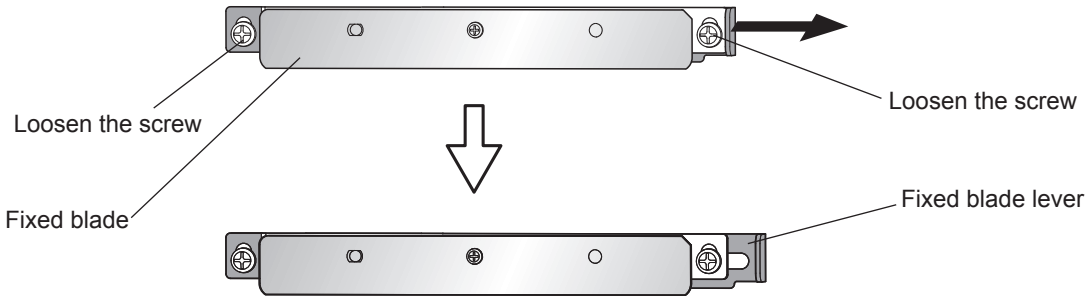
(1) Pull the cover open lever toward you, and pull the front cover out to open it.



(2) Loosen the two screws at the fixed blade section.

Note: To keep the screws from falling, only turn them once or twice.

(3) Move the fixed blade lever in the direction of the arrow until it stops.

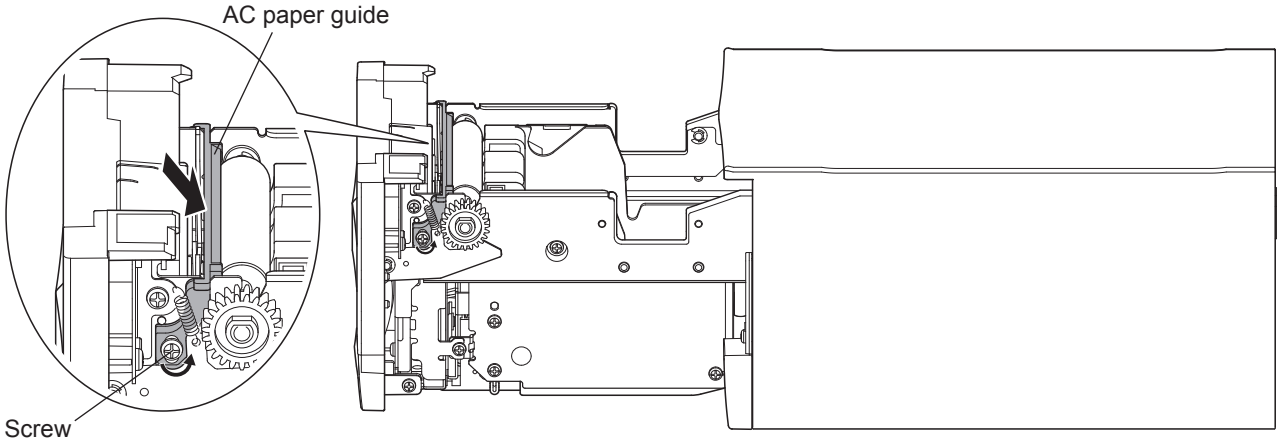


(4) Tighten the two screws.

(5) Loosen the screw on either side of the AC paper guide section.

Note: To keep the screws from falling, only turn them once or twice.

(6) Lower the AC paper guide until it stops. Then, tighten the two screws.



Note: Do not change the cutter mode while the printer is in use.

Caution Symbols

These labels are located near the thermal print head.
Because the thermal print head is hot immediately after printing, do not touch it. Static electricity can damage the thermal print head. To protect the thermal print head from static electricity, do not touch it.

This label is located near the peripheral drive connector.
Do not connect this to a telephone line.

This symbol label or stamp is placed near the screws securing the case, which should not be opened by individuals other than service personnel.
Individuals, other than service personnel, should not remove these screws.
High voltage areas in the case can be dangerous.

⚠ WARNING

- ✔ If you notice smoke or strange odors coming from the printer, turn the power switch off immediately, and remove the power plug from the AC outlet. For repairs, contact the dealer that you bought the printer from.
- ✔ Never attempt to repair this product yourself. Improper repair work can be dangerous.
- ✔ Never disassemble or modify this product. Tampering with this product may result in injury, fire, or electric shock.
- ✔ Do not touch the cutter blade.
  - – There is a cutter inside the paper outlet slot. Never put your hand in the slot regardless of whether or not the printer is in operation.
  - – You must open the front cover to replace paper. However, because the cutter blade is on the inside of the front cover, be careful not to bring your face and hands too close to the blade.
- ✔ During and immediately after printing, the area around the print head is very hot. Never touch it because you could be burned.
- ✔ When replacing paper, cleaning the head, or performing other maintenance tasks, be careful not to injure yourself when you put your hands inside the printer.
- ✔ Be sure to turn off the printer first when maintenancing the cutter. Failure to do so is dangerous.
- ✔ Be careful not to get your fingers caught when opening and closing the printer's front cover.
  When fixing the printer in place, hold the sides of the case.

⚠ CAUTION

- ✔ We recommend that you unplug the printer from the power outlet whenever you do not plan to use it for long periods.
  Because of this, you should locate the printer so that the power outlet it is plugged into is nearby and easy to access.
- ✔ If the voltage shown on the label on your printer does not match the voltage for your area, contact your dealer immediately.
- ✔ Make sure that the printer and the computer are turned off and unplugged from the AC outlet before you make connections.
- ✔ Do not connect a telephone line to the peripheral drive connector. Doing so may cause the printer to malfunction. Also, for safety purposes, do not connect a wire that may carry excessive voltage to the peripheral drive connector.
- ✔ Do not push the cover open lever and open the front cover while the printer or the cutter is in operation.
- ✔ Do not pull out paper when the front cover is closed.

- ✔ If liquid or foreign objects (coins, clips, etc.) enter the inside of the printer, turn the power switch off, remove the power plug from the AC outlet, and consult your dealer.
  Continuing to use the printer may cause electric shock or fire due to short-circuit.
- ✔ The heating element and the driver IC of the thermal print head are easily damaged. Do not touch them with metal objects, sandpaper, etc.
- ✔ Printing quality may suffer if you touch the thermal print head heating element and make it dirty. Do not touch it.
- ✔ Static electricity can damage the driver IC of the thermal print head. Avoid touching it directly.
- ✔ The printing quality and thermal print head's service life cannot be guaranteed if paper other than that recommended is used.
  In particular, thermal paper containing Na^+, K^+, or $C1^-$ may drastically reduce the service life of the thermal print head.
  We recommend that you use paper with the following maximum ion densities: 500 ppm of Na^+, 150 ppm of K^+, and 300 ppm of Cl^-.
- ✔ Do not operate the printer if there is moisture on the front surface of the head from condensation, etc.

⚠ Notes on Using the Auto Cutter

- ✔ To print after a cut, feed 1 mm (8-dot line) or more of paper.
- ✔ If the cutter is not in its home position after an error, first eliminate the cause of the error; then, turn the power back on.
- ✔ We recommend a margin of 5 mm or more from the end of the printed area to the cutting position.
- ✔ Do not remove the paper while it is being cut, because this can cause a paper jam.
- ✔ Remove the paper only after the full-cut or partial-cut operation has been completed.
  If you try to remove the paper while it is being cut, paper scraps, paper jams, and other problems may occur.
- ✔ After a full-cut operation, be sure to remove the paper one piece at a time.

5. Consumable Parts and AC Adapter

Use paper that meets the specifications.

5-1. General Thermal Paper Roll

5-1-1. Paper Roll Specifications

(1) Paper thickness: 65 µm to 150 µm (excluding Mitsubishi HiTec F5041)

(2) Paper width: 79.5 ± 0.5 mm

57.5 ± 0.5 mm

Note: Never change the paper width while the printer is in use.

(3) Outer roll diameter: ø83 mm or less

Take up paper roll width: $80\ ^{+0.5}_{-1}$ mm or $58\ ^{+0.5}_{-1}$ mm

(4) Core inner and outer diameters:

65 µm to 75 µm: core inner ø12 ± 1 mm, core outer ø18 ± 1 mm

core inner ø25.4 ± 1 mm, core outer ø32 ± 1 mm

75 µm to 150 µm: core inner ø25.4 ± 1 mm, core outer ø32 ± 1 mm

(5) Printed surface: Outer edge of roll *** Do not use inner-wrapped paper rolls.**

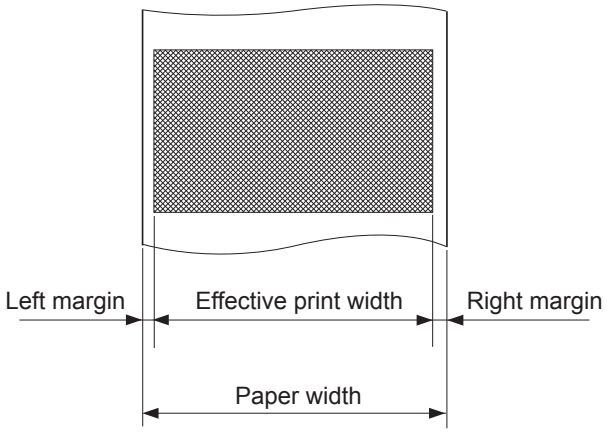
Note 1: Do not glue or tape the paper roll and shaft core together.

2: Do not fold the tail end of the paper.

3: We do not recommend the use of paper that has black marks printed on its near-end-sensor side, because near-end sensing may fail when the near-end sensor deteriorates.

5-1-2. Effective Print Width

Paper width (mm)	Left and right margins (mm)	Effective print width (mm)	Number of print columns (12 × 24 font)
79.5 ± 0.5	4	72	48
57.5 ± 0.5	2.75, 3, 3.6	52.5, 52.0, 50.8	35, 34, 33



5-2. Thermal Label Paper Roll (Tack label paper and full-face thermal label paper)

5-2-1. Paper Roll Specifications

(1) Total paper thickness: 150 µm or less

(2) Paper width: 79.5 ± 0.5 mm

(3) Outer roll diameter: ø83 mm or less

Take up paper roll width: $80\ ^{+0.5}_{-1}$ mm or $58\ ^{+0.5}_{-1}$ mm

(4) Core inner and outer diameters:

core inner ø25.4 ± 1 mm, core outer ø32 ± 1 mm

(5) Printed surface: Outer edge of roll *** Do not use inner-wrapped paper rolls.**

Note 1: Set the tension lever to the position for paper thicknesses greater than 100 µm and up to 150 µm.

2: Set the slide lever to the position for paper thicknesses greater than 100 µm and up to 150 µm.

3: Do not glue or tape the paper roll and shaft core together.

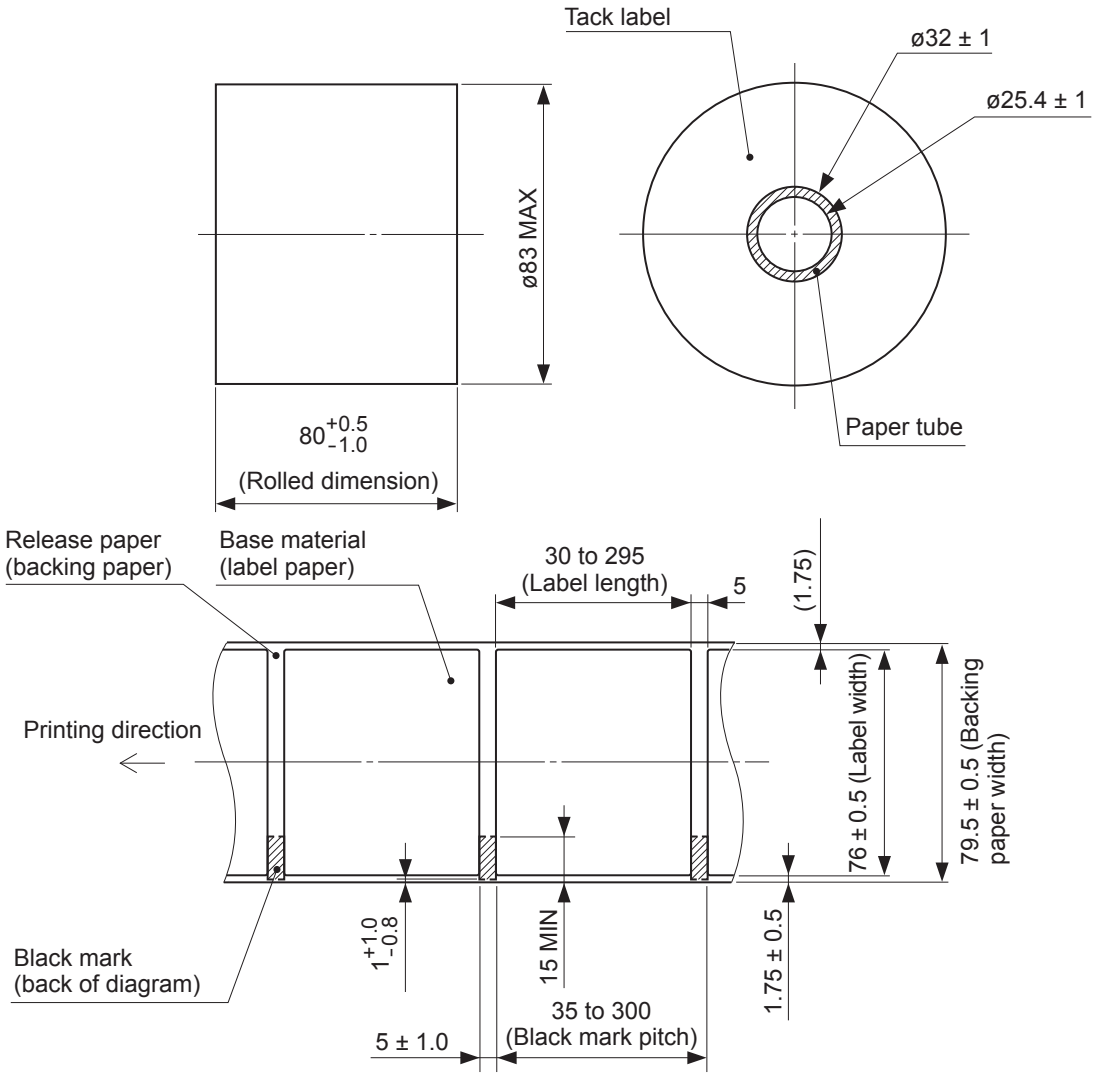
4: Do not fold the tail end of paper.

5: When using tack label paper, be sure to cut the backing paper.

5-2-2. Effective Print Width

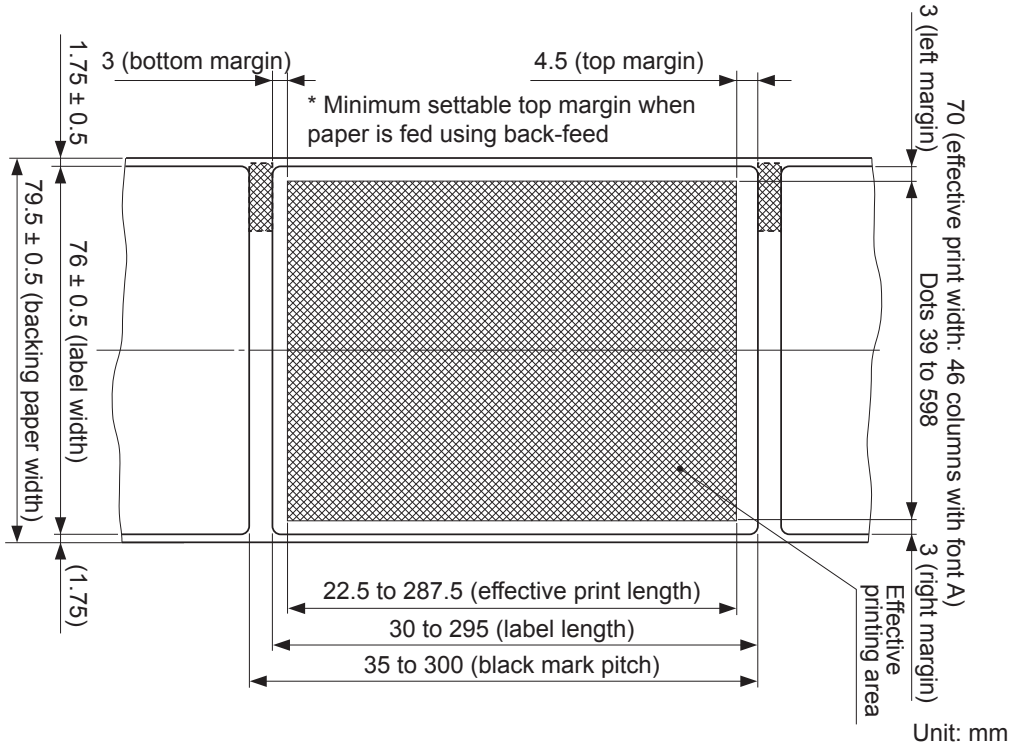
	Paper width (mm)	Left and right margins (mm)	Effective print width (mm)	Number of print columns (12 × 24 font)
Tack label paper	76 ± 0.5	3	70	46
Full-face thermal label paper	79.5 ± 0.5	4	72	48

■ **Detailed Diagrams of Recommended Tack Label Specifications**



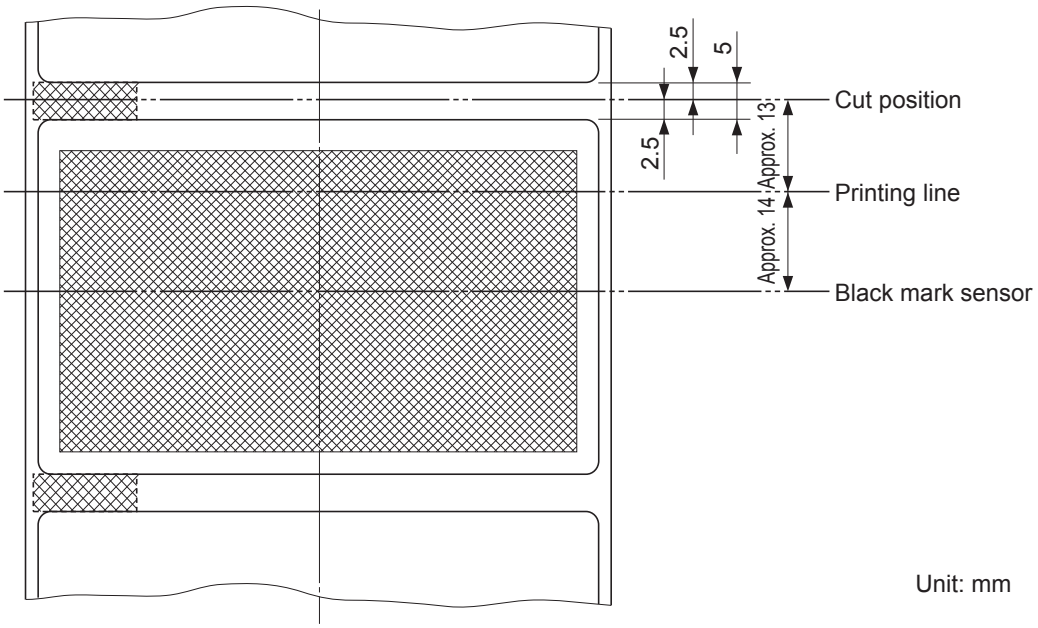
Unit: mm

■ **Detailed Diagram of Effective Printing Area**



Unit: mm

■ **Diagram of Cut Position, Printing Line, and Black Mark Sensor Position**



Unit: mm

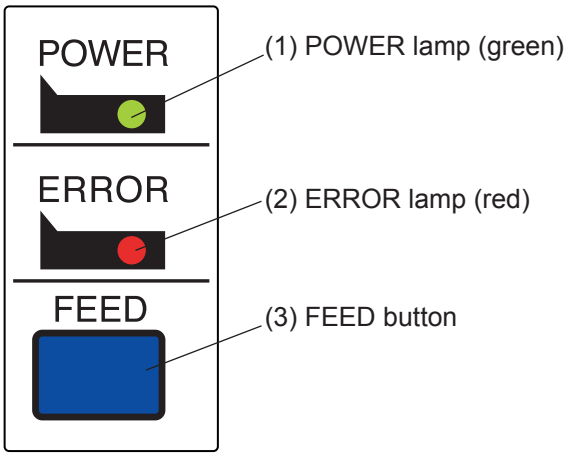
5-3. AC Adapter (Option)

Note: The optional AC adapter has been designed specifically for this printer.
Other AC adapters may not meet the EMC technical standards. They may also cause damage to the printer, electric shock, or fire.

Model name: PS60A-24B
Input: 90 to 264 V AC, 50/60 Hz
Output: 24±10% V DC, 2.1 A

6. Control Panel and Other Functions

6-1. Control Panel



(1) POWER lamp (green)
Lights when the printer is online.
This lamp also indicates errors, in combination with other lamps.

(2) ERROR lamp (red)
Lights when the cover is open.
This lamp also indicates errors, in combination with other lamps.

(3) FEED button
When the printer is online, pressing this button feeds the paper roll.
When an audio error message is being played, pressing this button stops the message.
Press this button again if you want to hear the message again.

6-2. Errors

(1) Recoverable errors

Error description	POWER	ERROR	Recovery condition
Thermal head high temperature detection error	Flashes at 2 second intervals	Off	The printer recovers automatically when the thermal head cools.
Paper roll near-end detection*1	On	Flashes at 2 second intervals	Indicates that the paper roll is near the end. The printer recovers when you set a new paper roll and close the front cover.
Cover open error	On	On	The printer recovers when you close the cover.
Paper out error	On	Flashes at 0.5 second intervals	The printer recovers when you set a new paper roll and close the front cover.
Black mark error	On	Flashes at 1 second intervals	The printer recovers when you change the black mark paper (readjust in PE and BM sensor adjustment mode).
Link disconnection detection*2	Flashes at 2 second intervals	Flashes at 2 second intervals	Connect an Ethernet cable. For details, see section 3-2-5, "Ethernet Interface Cable."

*1 Near-end detection does not work until the paper is fed for 100 mm after the cover is opened and then closed.

*2 Ethernet interface model only

Note 1: If the cutter cannot return to the home position, or the printer cannot initialize, the error is unrecoverable. For details, see section 9-3, “Releasing the Cutter Lock”.

2: If the paper is jammed, turn the power off, clear the jammed paper, and then turn the power on. For details, see section 9-2, “Removing Paper Jams”.

(2) Errors that the printer cannot recover from

Error description	POWER	ERROR	Cause	Recovery condition
Cutter error	Off	Flashes at 0.25 second intervals	Cutter failure.	The printer cannot recover from this error.
Flash memory error	Off	Flashes at 0.5 second intervals	Flash memory access error.	The printer cannot recover from this error.
EEPROM error	Off	Flashes at 0.75 second intervals	EEPROM access error.	The printer cannot recover from this error.
SRAM error	Off	Flashes at 1 second intervals	SRAM access error.	The printer cannot recover from this error.
Head thermistor error	Off	Flashes at 1.5 second intervals	Head thermistor error has been detected.	The printer cannot recover from this error.
Power voltage error	Off	Flashes at 2 second intervals	Power voltage error has been detected.	The printer cannot recover from this error.

Note 1: If an unrecoverable error occurs, turn the power off immediately.

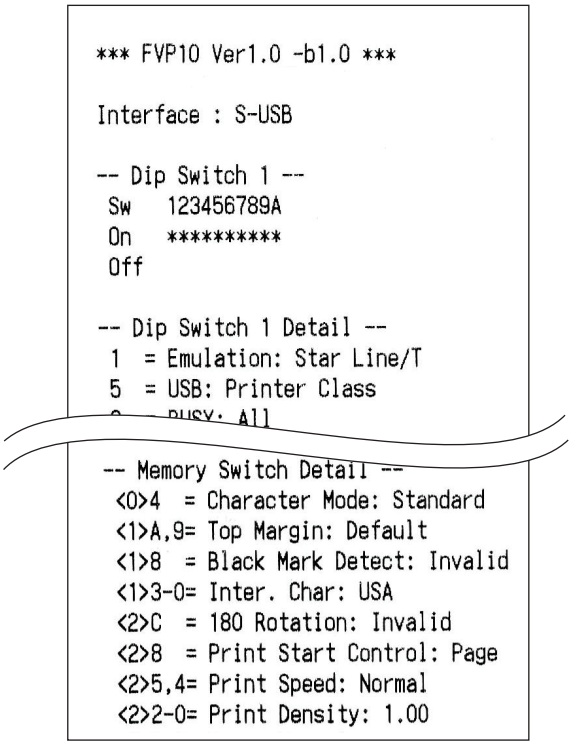
2: A power voltage error may be a result of a power supply malfunction. If other unrecoverable errors occur, contact your dealer for repairs.

* When an error occurs, an audio error message is played. For details, see section 8-4, “Audio Error Messages”.

6-3. Self-Printing

6-3-1. Test Printing

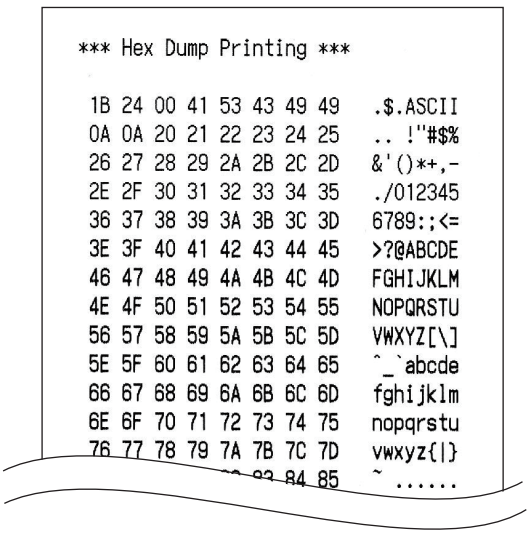
(1) Load a paper roll into the printer.
(2) With the front cover closed, turn the power switch on while holding down the FEED button.
(3) The internal speaker produces a buzzer sound, and the printer starts a test print.
The printer prints its version number, DIP switch settings, memory switch settings, etc. When the test print is finished, the printer returns to normal mode.



```
*** FVP10 Ver1.0 -b1.0 ***

Interface : S-USB

-- Dip Switch 1 --
 Sw   123456789A
 On   **********
 Off

-- Dip Switch 1 Detail --
 1  = Emulation: Star Line/T
 5  = USB: Printer Class
 6  = BUSY: All

-- Memory Switch Detail --
 <0>4  = Character Mode: Standard
 <1>A,9= Top Margin: Default
 <1>8  = Black Mark Detect: Invalid
 <1>3-0= Inter. Char: USA
 <2>C  = 180 Rotation: Invalid
 <2>8  = Print Start Control: Page
 <2>5,4= Print Speed: Normal
 <2>2-0= Print Density: 1.00
```

6-3-2. Hexadecimal Dump Mode

(1) With the front cover open, turn the power on while holding down the FEED button.
(2) When you close the front cover after the printer initialization has been completed, the printer prints "*** Hex Dump Printing ***" and enters Hexadecimal Dump mode.
(3) All the signals received from the host computer are printed in hexadecimal code. You can use this mode to check whether the control codes sent from your program are being received correctly by the printer.
(4) If the last line of program data is less than one line, you can press the FEED button to print it.
To clear this mode, turn the printer off.



```
*** Hex Dump Printing ***

 1B 24 00 41 53 43 49 49   .$.ASCII
 0A 0A 20 21 22 23 24 25   .. !"#$%
 26 27 28 29 2A 2B 2C 2D   &'()*+,-
 2E 2F 30 31 32 33 34 35   ./012345
 36 37 38 39 3A 3B 3C 3D   6789:;<=
 3E 3F 40 41 42 43 44 45   >?@ABCDE
 46 47 48 49 4A 4B 4C 4D   FGHIJKLM
 4E 4F 50 51 52 53 54 55   NOPQRSTU
 56 57 58 59 5A 5B 5C 5D   VWXYZ[\]
 5E 5F 60 61 62 63 64 65   ^_`abcde
 66 67 68 69 6A 6B 6C 6D   fghijklm
 6E 6F 70 71 72 73 74 75   nopqrstu
 76 77 78 79 7A 7B 7C 7D   vwxyz{|}
 7E 80 82 83 84 85         ~ ......
```

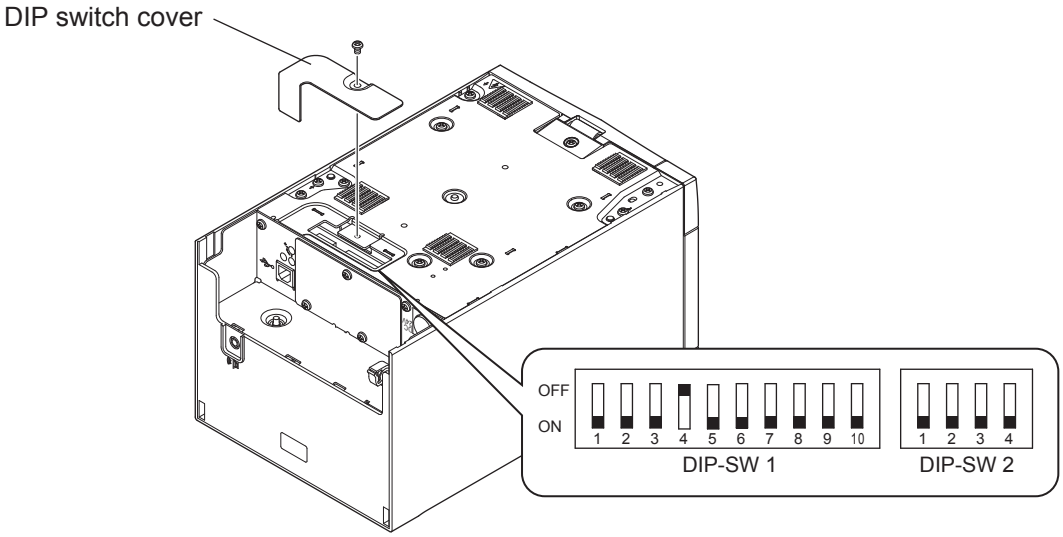
6-4. Adjusting Sensors

6-4-1. PE and BM Sensor Adjustment Mode

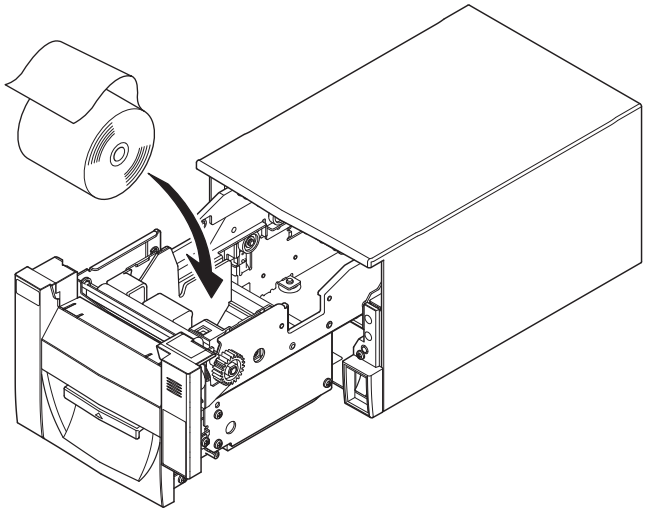
(1) Check that the printer is turned off.

(2) Unfasten the screw holding the DIP switch cover at the bottom of the printer, and remove the cover.

(3) Using a pointed object, set DIP switch DIPSW1-4 to OFF and DIP switches DIPSW1-5, DIPSW1-6, and DIPSW1-7 to ON.



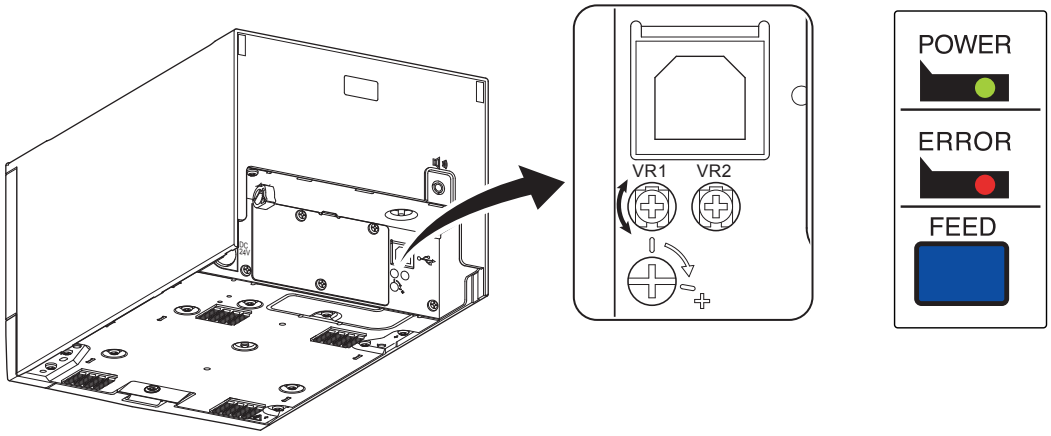
(4) Open the front cover, and set a paper roll into the printer.



(5) Turn the printer on.

The lamps on the control panel will flash, and the printer will enter sensor adjustment mode.

(6) As shown in the figure below, turn VR1 with a precision flat-blade screwdriver so that both the POWER lamp (green) and ERROR lamp (red) light.



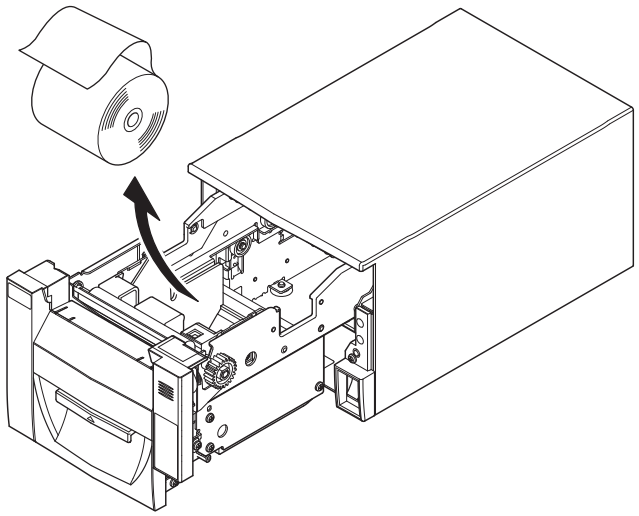
(7) Turn the printer off, and set DIP switches DIPSW1-4, DIPSW1-5, DIPSW1-6, and DIPSW1-7 to their original settings.

(8) Attach the DIP switch cover.

6-4-2. NE Sensor Adjustment Mode

(1) Check that the printer is turned off.

(2) Open the front cover, remove the paper roll from the printer, and close the front cover.



(3) Unfasten the screw holding the DIP switch cover at the bottom of the printer, and remove the cover.

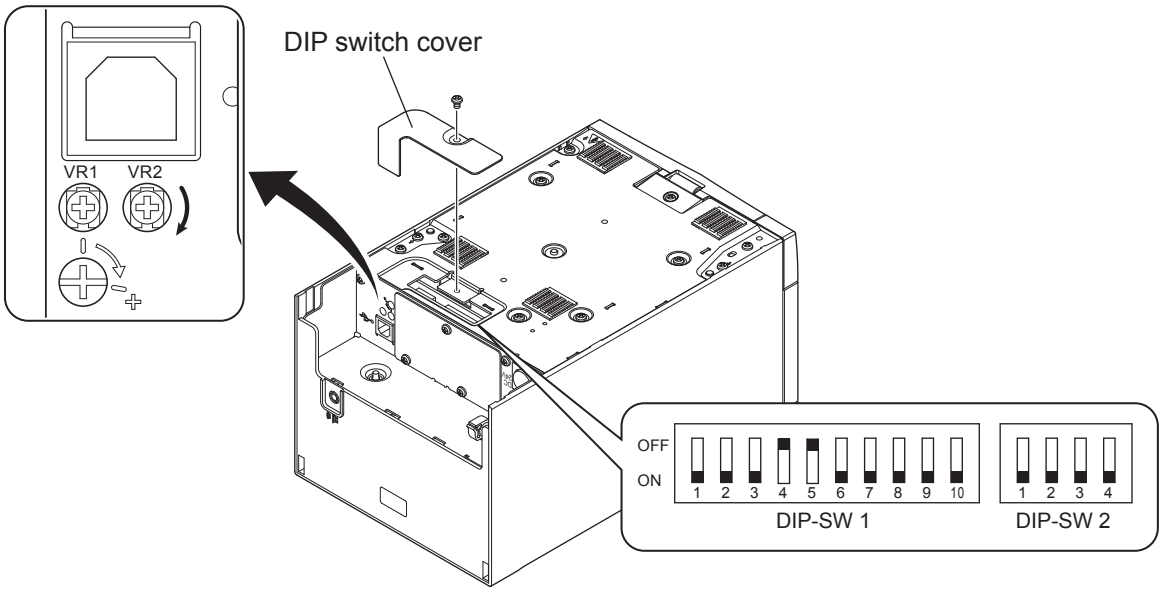
(4) Using a pointed object, set DIP switches DIPSW1-4 and DIPSW1-5 to OFF and DIP switches DIPSW1-6 and DIPSW1-7 to ON. Then turn the printer on.

The lamps on the control panel will flash, and the printer will enter sensor adjustment mode.

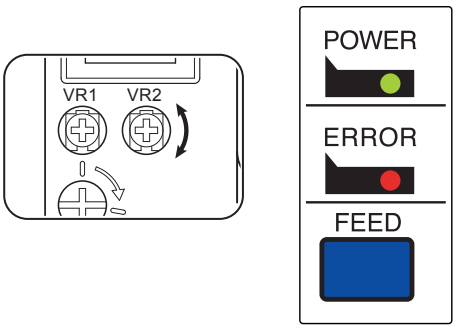
(5) Turn VR2 clockwise all the way with a precision flat-blade screwdriver as shown in the figure below.

If the POWER lamp (green) is on at this point, proceed to step (7).

If the POWER lamp (green) is off, proceed to step (6).

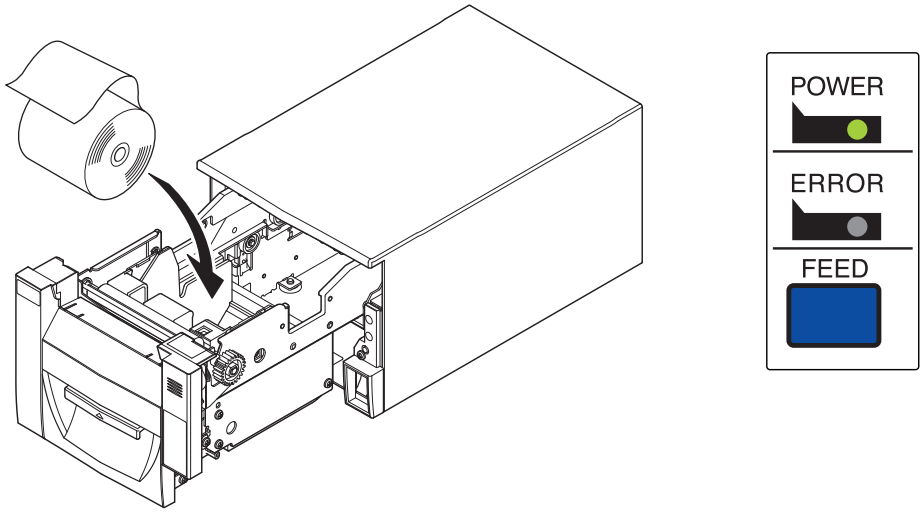


(6) Turn VR2 so that both the POWER lamp (green) and ERROR lamp (red) light.

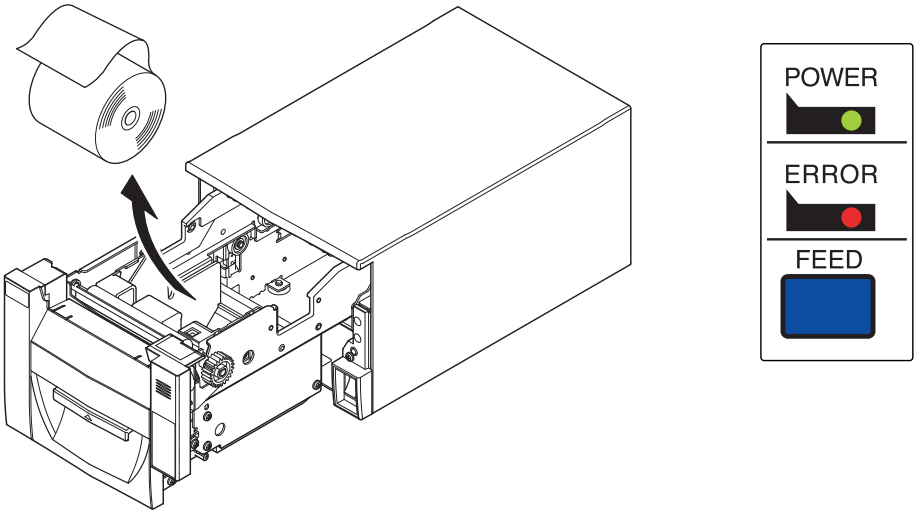


(7) Press the FEED button. The LED will flash, and the printer will enter sensor check mode.

(8) Open the front cover, set a paper roll into the printer, and close the front cover.
Check that the POWER lamp (green) is lit and the ERROR lamp (red) is off.



(9) Open the front cover, remove the paper roll from the printer, and close the front cover.
Check that both the POWER lamp (green) and ERROR lamp (red) are lit.



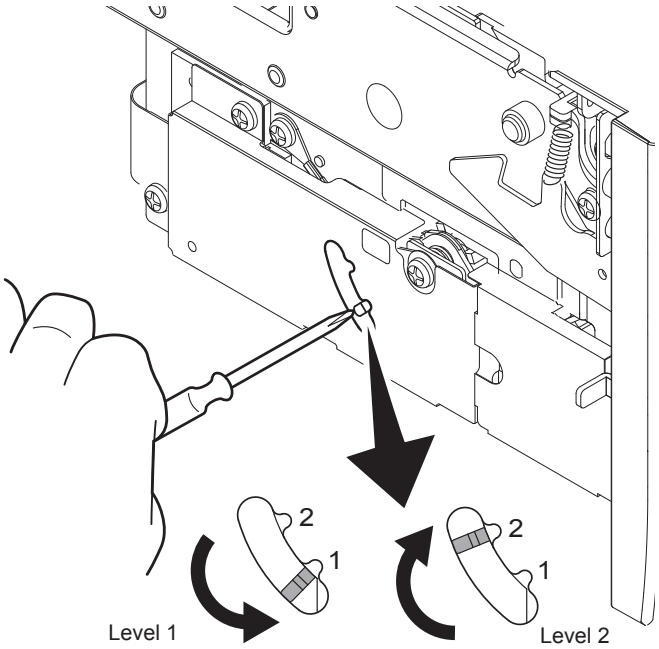
(10) Turn the printer off, and set DIP switches DIPSW1-4, DIPSW1-5, DIPSW1-6, and DIPSW1-7 to their original settings.

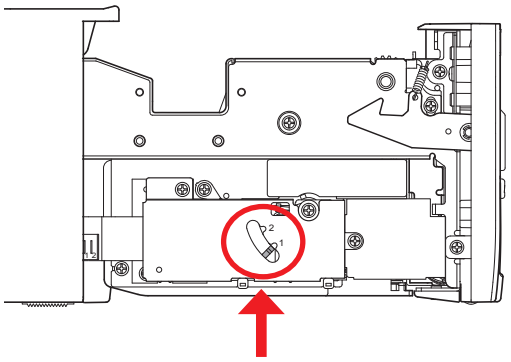
(11) Attach the DIP switch cover.

7. Adjusting the Near-End Sensor

To use the near-end sensor, set the remaining paper length to detect.
Follow the instructions given below.

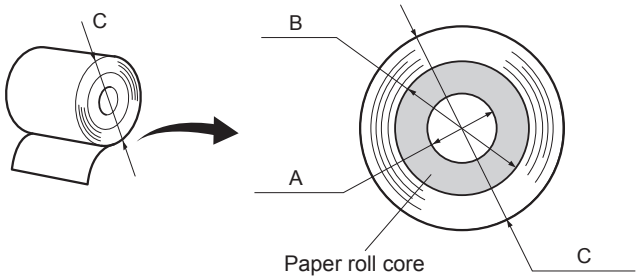
(1) Open the rear cover.
(2) Use a ballpoint pen or a pointed object to pull the sensor up and move it to the appropriate position.
Check that the position is correct.





Appropriate positions according to the type of paper

Thickness (µm)	Core paper roll with ø12 (A) inner diameter and ø18 (B) outer diameter				Core paper roll with ø25.4 (A) inner diameter and ø32 (B) outer diameter			
	Detected diameter (C; mm)		Remaining paper length (m)		Detected diameter (C; mm)		Remaining paper length (m)	
	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2
65	Approx. ø23	Approx. ø26	Approx. 2.5	Approx. 4.3	Approx. ø38	Approx. ø42	Approx. 5.1	Approx. 8.9
75			Approx. 2.1	Approx. 3.7			Approx. 4.4	Approx. 7.7
80					—		—	Approx. 7.3
95					—		—	Approx. 6.1
150					—		—	Approx. 3.9



Note:

1) The adjuster is factory set to level 1.
2) The detected diameter and remaining paper length given in the table are calculated values; there may be discrepancies depending on the rolled state of the paper, the actual mechanism, and the printing pattern.
3) With thick paper (whose thickness is greater than 75 µm) or label paper, the paper roll itself may become loose, causing errors in detection. So set the adjuster to level 2.

8. Speaker

8-1. Speaker Specifications

(1) Model number: SCG-16A

(2) External dimensions: ø16-h3

(3) Sound pressure:

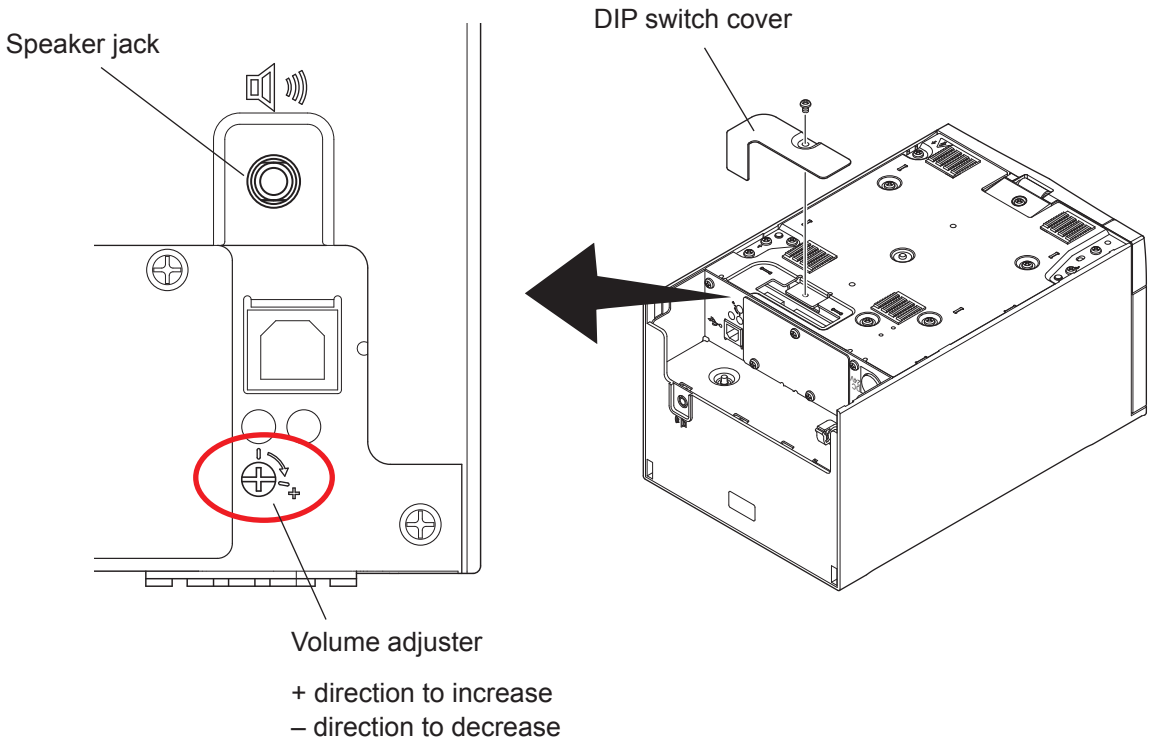
By itself	92.5 dB ± 3 dB (rated input: 0.3 W, measurement distance: 10 cm)
Embedded in printer	61.2 dB ± 3 dB (measurement distance: ISO7779 compliant; diagonally upwards from the printer at a distance of 67.5 cm)

8-2. Adjusting the Volume

To adjust the volume, follow the instructions given below.

(1) Unfasten the screw holding the DIP switch cover at the bottom of the printer, and remove the cover.

(2) Turn the volume adjuster with a precision flat-blade screwdriver to adjust the volume.



8-3. Speaker Jack

(1) Connector: ø3.5 monaural mini jack

(2) Target speaker: A speaker with an impedance of 8 Ω is recommended.

8-4. Audio Error Messages

When an error occurs, the printer produces an audio error message.

Status			Audio Message
On-Line	Warning output	Paper roll near-end detection*1	Paper Near End, please prepare for the paper refill.
Error	Auto recovery error	Thermal head high temperature detection error	Head Temperature is too high, please wait until Power lamp turns on.
	Errors that can be recovered from	Cover open error*2	Please close the printer cover.
		Paper out error	Paper end. Please refill paper.
		Black mark error	Black Mark error is detected. Please confirm the specification according to the Users Manual.
	Errors that cannot be recovered from	Cutter error	Cutter error. Please refer to the Users Manual for recovery.
		Flash error	Flash ROM error. Please turn off the printer and refer to the Users Manual for recovery.
		EEPROM error	EEPROM error. Please turn off the printer and refer to the Users Manual for recovery.
		SRAM error	SRAM error. Please turn off the printer and refer to the Users Manual for recovery.
		Head thermistor error	Thermistor error. Please turn off the printer and refer to the Users Manual for recovery.
		Power voltage error	Power Voltage error. Please turn off the printer and refer to the Users Manual for recovery.

*1 Near-end detection does not work until the paper is fed for 100 mm after the cover is opened and then closed.

*2 Output 5 seconds after a cover open error occurs.

9. Preventing and Removing Paper Jams

9-1. Preventing Paper Jams

When you set the paper roll into the printer, do not pull out the end of the paper at an angle.

Do not touch the paper roll when the printer is printing or paper-feeding or before the cut operation has finished completely.

Holding or pulling the paper while it is being fed may cause paper jams, improper cutting, or improper line breaks.

9-2. Removing Paper Jams

If a paper jam occurs, remove the paper according to the instructions given below.

(1) Turn the power switch off.

(2) Pull the cover open lever toward you to open the front cover.

(3) Remove the jammed paper.

⚠ **CAUTION:** Do not pull on the paper with the printer cover closed. Doing so may cause damage to or deformation of parts such as the thermal head and the rubber roller.

(4) Set the paper roll straight, and gently close the front cover.

⚠ **CAUTION 1:** Set the paper roll straight.
If you close the front cover with the paper roll skewed, paper jams may occur.

2: Close the front cover completely.
If the front cover is not closed completely, the printer may not print.

(5) Turn the power switch on.

Make sure that the ERROR lamp is not lit.

⚠ **CAUTION:** When the ERROR lamp is lit, the printer will not accept any commands. Be sure to close the front cover completely.

9-3. Releasing the Cutter Lock

If the cutter locks, release it according to the instructions given below.

⚠ **CAUTION:** Be sure to turn off the printer first when maintenancing the cutter.

(1) Turn the power switch off.

(2) Close the front cover, and turn the printer back on. In ordinary cases, this will release the lock.
If the lock is not released, contact your dealer.

10. Maintenance

Accumulation of paper dust and dirt may cause the printer to not print portions of characters.

To prevent such problems, perform periodic maintenance, such as removing paper dust from the paper transport section and removing the blackened paper dust from the thermal head surface.

Note: Turn the printer's power switch off before performing maintenance.

Use the following as a guideline for when to periodically clean the printer.

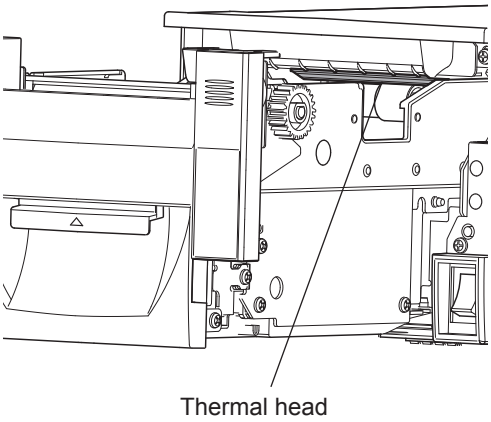
Thermal paper: Every six months or 1,000,000 lines of printing

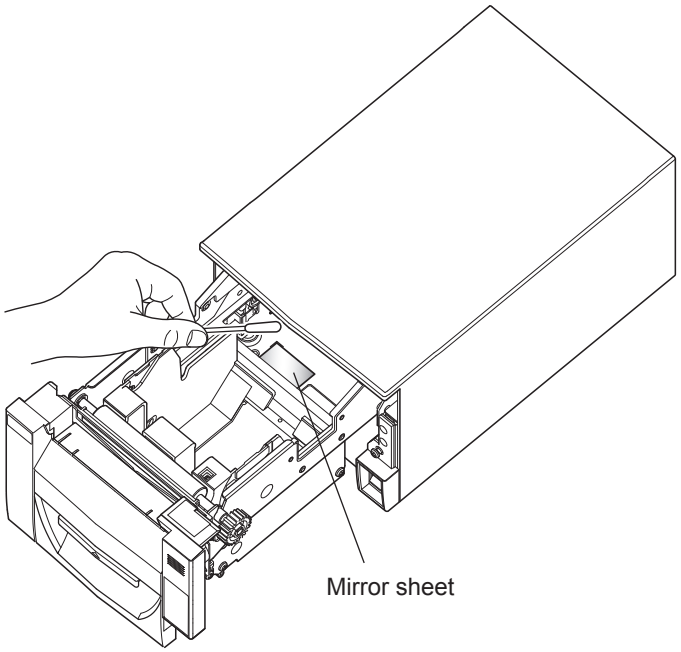
Label paper: Every month or 200,000 lines of printing

10-1. Thermal Head

To remove the blackened paper dust that has accumulated on the thermal head surface, wipe it clean with a cotton swab (or soft cloth) dipped in alcohol (ethanol, methanol, or isopropyl).

The thermal head is located where it is hard to look at directly. Use the mirror sheet to clean the head.





⚠ **CAUTION 1:** The thermal head is easily damaged, so clean it with a soft cloth, taking care not to scratch it.

2: Do not clean the thermal head immediately after printing, when it is hot.

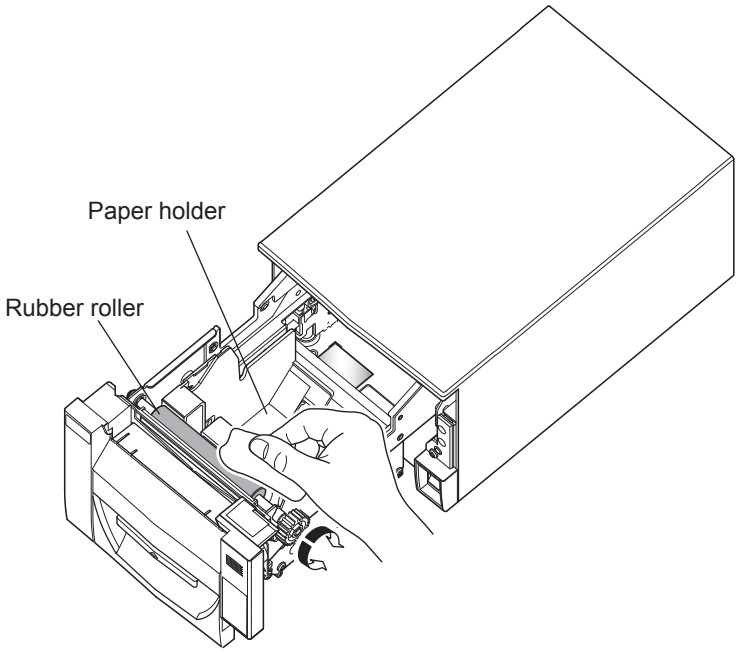
3: Be careful of static electricity while cleaning the thermal head. Static electricity can damage the head.

4: When label paper is used, paste adheres to the head, platen, and paper guides. Wipe off the paste. If you don't, paper transport problems and improper printing may occur. We recommend that you wipe off the paste frequently, not just during periodic maintenance.

5: Turn the power on only after the alcohol has dried completely.

10-2. Platen Rubber Roller

Apply alcohol (ethanol, methanol, or isopropyl) to a dry, soft cloth, and wipe off the dirt from the rubber roller. Clean the entire rubber roller by rotating it.

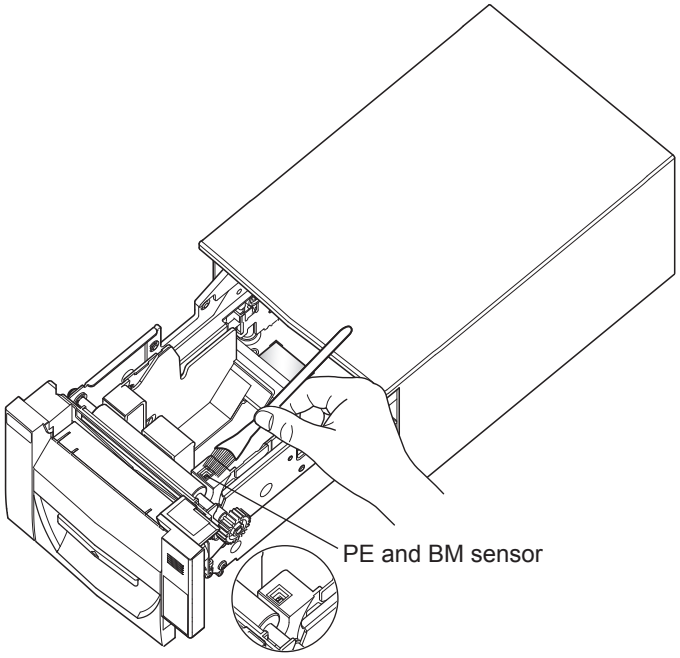


10-3. Paper Holder

Clean the paper holder of debris, dust, paper particles, glue, etc. that may have accumulated.

10-4. Sensors and Their Surrounding Area

Clean the sensors of debris, dust, paper particles, etc.
In particular, if the reflection sensors are dirty, detection will not be performed properly.
Cleaning is relatively easy if you use a brush or a similar tool.



11. Specifications

11-1. General Specifications

(1) Print method: Direct line thermal printing (thermal type)

(2) Print speed: Max. 2000 dots/sec. (250 mm/sec.; standard monochrome mode)

(3) Dot density: 203 dpi; 8 dots/mm (0.125 mm/dot)

(4) Printing width: Max. 72 mm
Settable between 30 mm and 72 mm at 1 mm intervals

(5) Number of print columns: Max. 48 columns (12 × 24 font)
Max. 64 columns (9 × 24 font)
Max. 36 columns (16 × 24)
Max. 24 columns (24 × 24 kanji font)

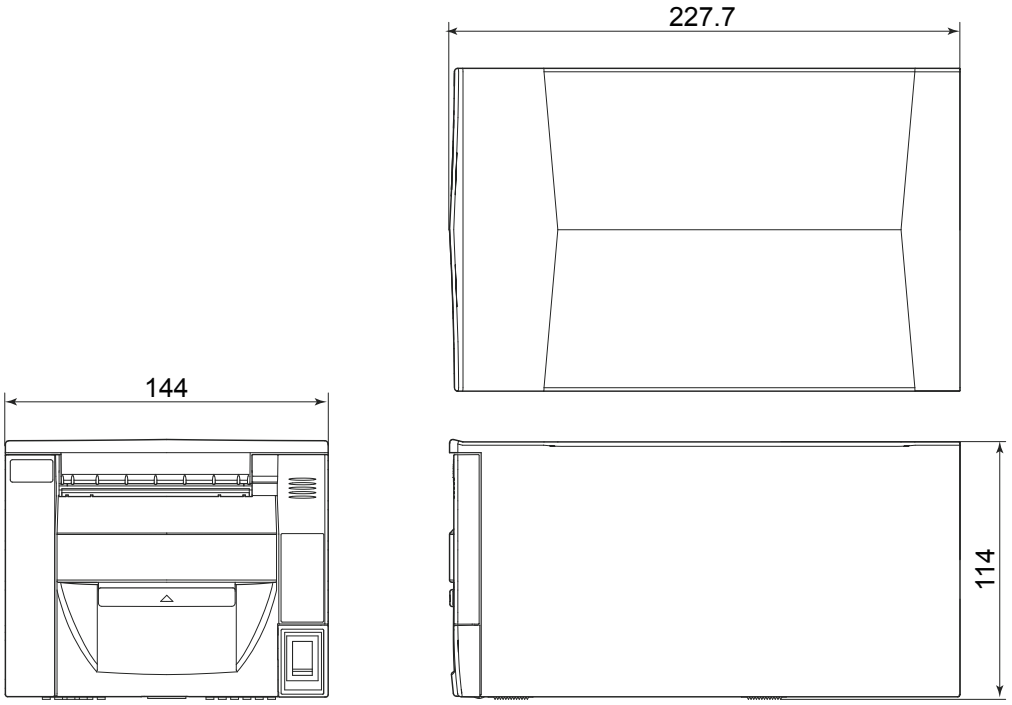
(6) Paper feed method: Friction feed
Feed pitch 0.125 mm

(7) Paper roll: See section 5-1, "General Thermal Paper Roll" and 5-2, "Thermal Label Paper Roll" in chapter 5, "Consumable Parts and AC Adapter".
Paper width:
General thermal paper: 79.5 ± 0.5, 57.5 ± 0.5 mm
Label paper: 79.5 ± 0.5 mm (backing paper width)
Roll diameter: Max. ø83 mm

(8) External dimensions: 144 mm (width) × 227.7 mm (depth) × 114 mm (height)
144 mm (width) × 316.2 mm (depth) × 114 mm (height); with cable cover attached
* Front section height is 115.5 mm.

(9) Weight: 2.8 kg (without paper roll)

(10) Noise: Approx. 53 dB



Unit: mm

11-2. Auto Cutter Specifications

(1) Cutting method: Guillotine type

(2) Cutter modes: Switchable between full cut and partial cut (leaves one uncut portion in center of paper)
(For instruction on how to switch the mode, see section 4-4, “Changing the Cutter Mode”.

(3) Cutting duty cycle: Min. 3 seconds/cut

(4) Paper thickness: 65 µm to 150 µm

11-3. Interface Specifications

USB standard: Type-B

Options

Parallel: 36-pin Amphenol
IEEE1284 compliant (Compatibility and Nibble modes)

Serial RS-232C: D-SUB 25 pin

Ethernet: RJ-45

PoweredUSB: FCI 69913-104LF (1 x 8 right-angle type)

11-4. Power Supply Specifications

(1) Operating voltage: 24 V DC ± 10%

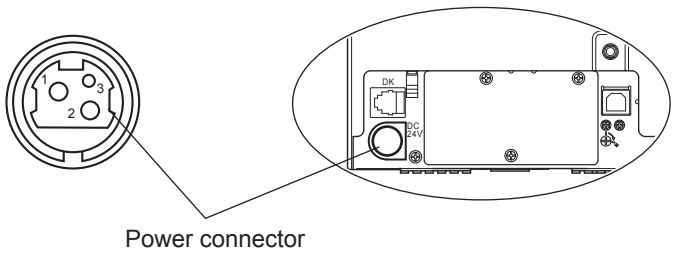
(2) Current consumption (24 V DC, room temperature):

Standby	Approx. 0.12 A
ASCII printing	Approx. average 1.56 A
100% duty cycle printing	Approx. peak 7.84 A
(Solid printing)	Approx. average 4.2 A

Note: Continuous solid printing should be 10 seconds or less.

(3) Power connector pinout:

Pin number	Function
1	+24 V
2	GND
3	N.C
Shell	Frame ground



Note: The optional AC adapter (PS60A-24B) has been designed specifically for this printer.
Other AC adapters may not meet the EMC technical standards.
If you are preparing your own power supply, without using the optional AC adapter, note the following points.

- Use a power supply that is rated 24 V DC and 2.1 A, or equivalent.
(Select a power supply with current capacity that is appropriate for the actual printing ratio.)
- Use a power supply that complies with SELV output or LPS (Limited Power Source).
- Take into consideration the noise in the environment that the printer is installed in, and take appropriate measures to protect the printer from static electricity, AC line noise, etc.

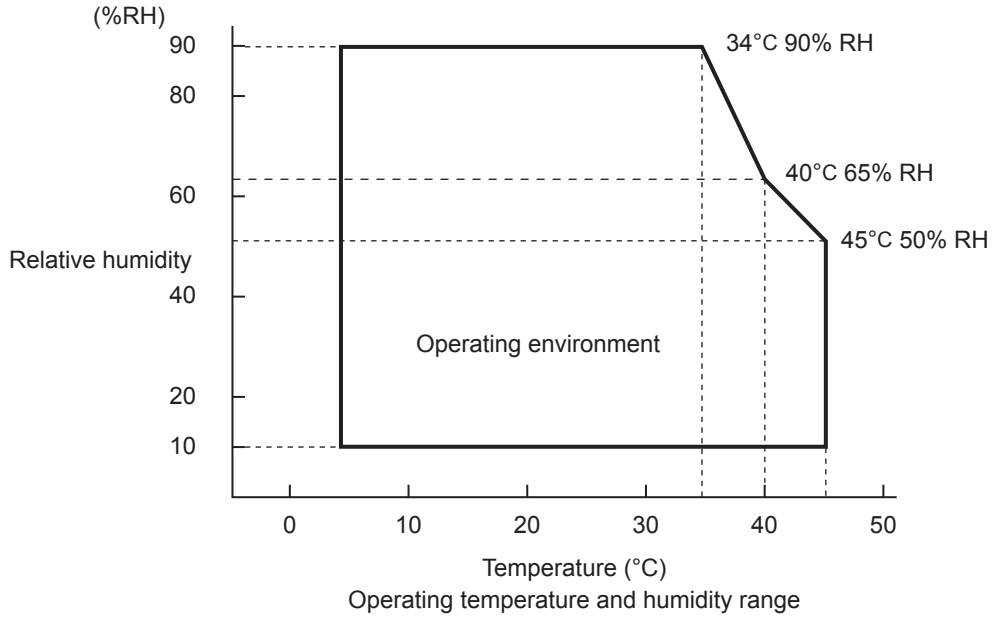
11-5. Environmental Requirements

Temperature and humidity

(1) During operation

Temperature: 5°C to 45°C

Humidity: 10% RH to 90% RH (no condensation)



Operating temperature and humidity range

(2) During storage (excluding paper)

Temperature: -20°C to 60°C

Humidity: 10% RH to 90% RH (no condensation)

Note: The maximum temperature and humidity combination is 40°C and 90% RH (without condensation).

11-6. Reliability Specifications

(1) Service life Mechanical: 20,000,000 lines

Head: 150 km, 150,000,000 dots (maximum for monochrome printing)

<Conditions>

Average printing ratio: 12.5%; recommended thermal paper: 65 µm (when using P220AG)

(2) MCBF: 60,000,000 lines

The Mean Cycle Between Failure (MCBF) is defined to be the overall failure cycle, which includes random or wear failures that occur until the printer reaches its mechanical life of 20,000,000 lines.

Note: The mechanical life is 20,000,000 lines. The MCBF of 60,000,000 lines does not indicate the durable service life.

(3) Auto cutter service life

Paper width of 79.5 mm and 57.5 mm including tack label backing paper

Paper width between 65 µm and 100 µm: 2,000,000 partial cuts, 2,000,000 full cuts

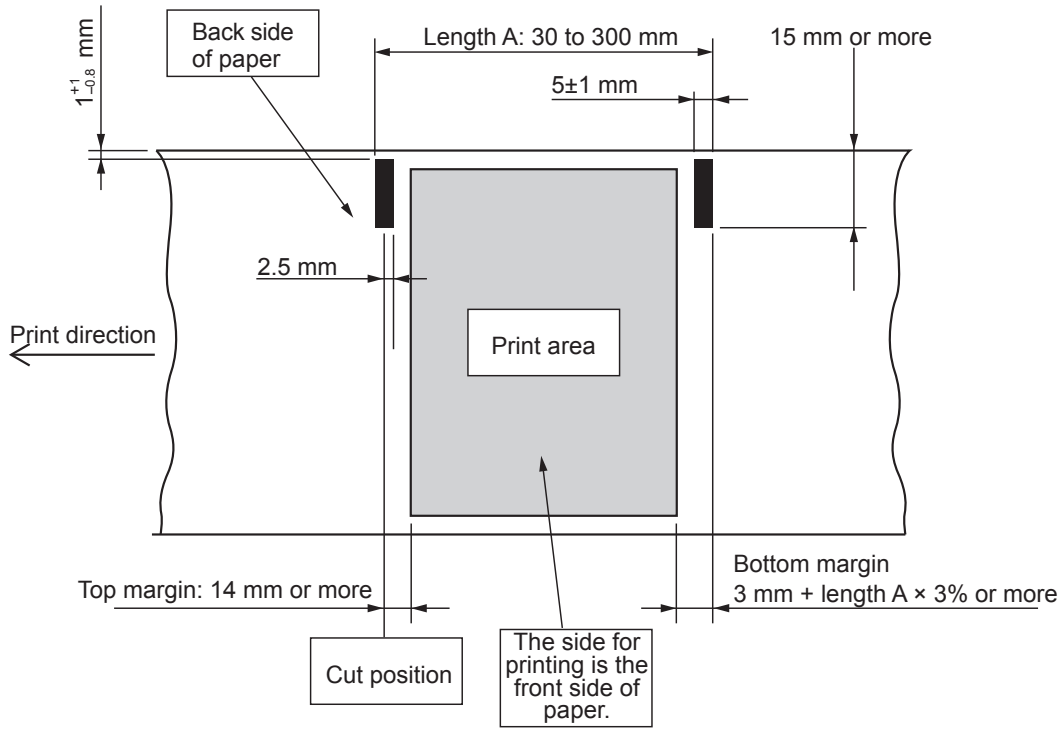
Paper width greater than 100 µm and up to 150 µm: 600,000 partial cuts, 600,000 full cuts

Paper width of 79.5 mm for full-face thermal label paper

300,000 partial cuts and 300,000 full cuts

Note: All the reliability values indicated above are based on the use of the recommended thermal paper. They are not guaranteed with the use of non-recommended thermal paper.

11-7. Black Mark Specifications



Note:

1) The cut position shown above is for when memory switch #2 (print start position adjustment) is set to its default setting.
2) The black mark's PCS value must be 0.90 or more.
3) With the factory default setting, the printer may not detect black marks correctly, depending on the paper that you are using and the printed condition of the black marks.

   We recommend that you make adjustments with the paper that you are using.
4) The accuracy of paper feeding to the start position through black mark detection is ±2 mm of the reference print position. The printing length accuracy is ±2% of the set value, taking into account the environmental temperature and the error in the manufacturing process of the platen core. Add a maximum of -5% error to the set value when taking the service life into account. If you are using pre-printed paper, pay attention to the print layout.
5) The printing area is as shown in the above diagram when you use black marks.

   The top margin consists of approximately 13 mm from the print position to the cut position (auto cutter) and at least 1 mm (8 dot lines) of paper feeding when printing after cut operations. Therefore, the minimum total margin is 14 mm.

   Ensure that the margin shown in the above diagram is used to prevent the printing length setting along the paper feed direction from exceeding the black mark pitch. Otherwise, pages may be skipped.

   [Example of printing area setting]

   <When the black mark pitch (length A) is 100 mm>

   Top margin: 14 mm/Bottom margin: 3 mm + (100 mm × 0.03) = 6 mm

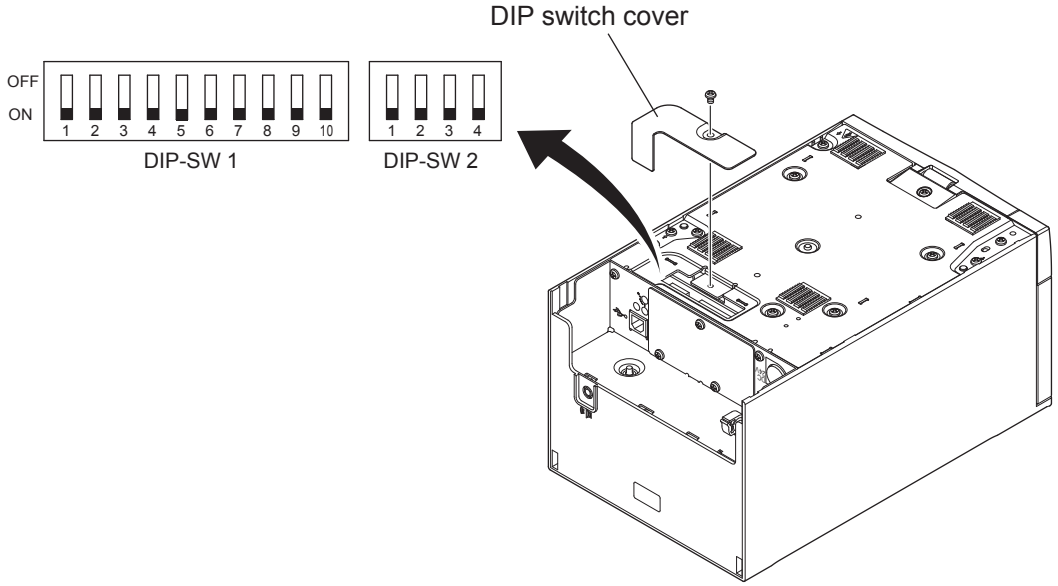
   Therefore, the printing length along the paper feed direction must be 80 mm or less.

12. DIP Switch Settings

Two DIP switches are provided at the bottom of the printer, and you can set them according to the tables that start on the next page.
To change the settings, follow the instructions given below.

(1) Check that the printer is turned off.

(2) Unfasten the screw holding the DIP switch cover at the bottom of the printer, and remove the cover.

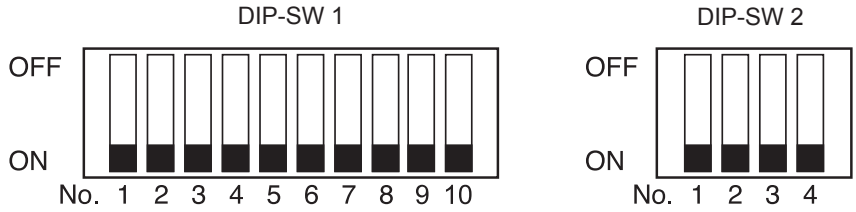


(3) Using a pointed object, set the DIP switches.

(4) Attach the DIP switch cover, and fasten it with screws.

Note: The new settings take effect when you turn on the printer.

12-1. Parallel Interface Model



■ DIP-SW 1

Switch	Function		ON	OFF
1-1	Emulation		STAR line mode	ESC/POS mode
1-2	STAR line mode	Reserved	Always ON	
	ESC/POS mode	Resolution correction	203 dpi	180 dpi
1-3	Reserved		Always ON	
1-4	Sensor adjustment		Invalid	Valid
1-5	Reset using the INIT signal (pin #31)		Valid	Invalid
1-6	Handshaking conditions (conditions for BUSY)		Receive buffer full or offline	Receive buffer full
1-7	ASB function*1		Invalid	Valid
1-8	STAR line mode	NSB function*2	Invalid	Valid
	ESC/POS mode	Reserved	Always ON	
1-9	Low peak current mode		Invalid	Valid
1-10	Installed cutter type		Partial cut	Full cut

*1 ASB function:

Automatically sends a status signal to the host whenever the printer status changes (cover open, paper out, error, etc.).
For details, see the separate command specifications (Star Line mode and ESC/POS mode).

*2 NSB function:

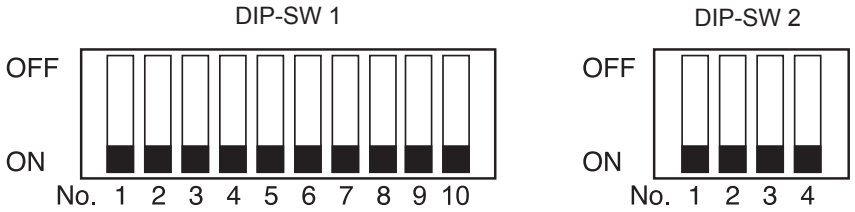
Automatically sends a status signal whenever the printer switches to reverse transfer mode.
For details, see the separate command specifications (Star Line mode).

■ DIP-SW 2

Switch	Function	ON	OFF
2-1 to 2-4	—	—	—

By factory default, all settings are set to ON.

12-2. RS-232C Interface Model



■ DIP-SW 1

Switch	Function		ON	OFF
1-1	Emulation		STAR line mode	ESC/POS mode
1-2	STAR line mode	Reserved	Always ON	
	ESC/POS mode	Resolution correction	203 dpi	180 dpi
1-3	Reserved		Always ON	
1-4	Sensor adjustment		Invalid	Valid
1-5	Reserved		Always ON	
1-6	Handshaking conditions (conditions for BUSY)		Receive buffer full or offline	Receive buffer full
1-7	ASB function*1		Invalid	Valid
1-8	Reserved		Always ON	
1-9	Low peak current mode		Invalid	Valid
1-10	Installed cutter type		Partial cut	Full cut

*1 ASB function:

Automatically sends a status signal to the host whenever the printer status changes (cover open, paper out, error, etc.).
For details, see the separate command specifications (Star Line mode and ESC/POS mode).

■ DIP-SW 2

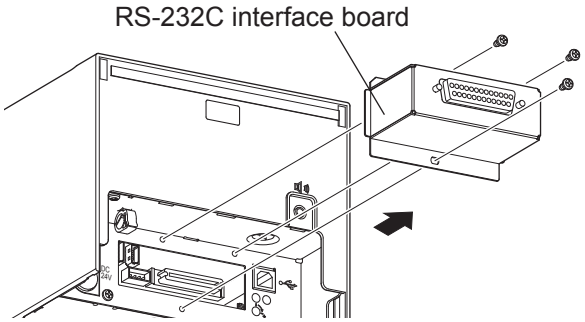
Switch	Function	ON	OFF
2-1 to 2-4	—	—	—

By factory default, all settings are set to ON.

To change DIP-SW 3, which is on the RS-232C interface PCB, follow the instructions given below.

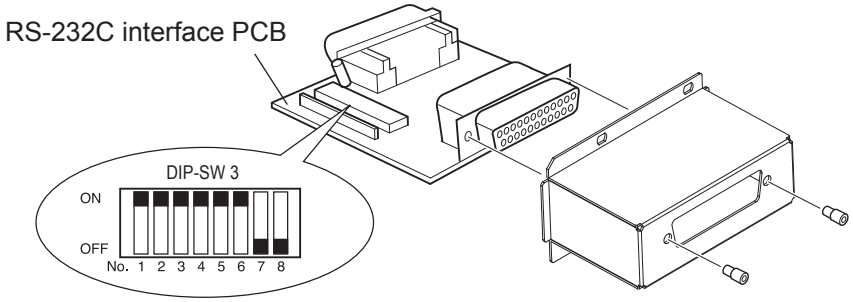
(1) Check that both the printer and the host computer are turned off.

(2) Remove the interface board from the printer.



(3) Remove the interface PCB from the interface board so that you can access DIP-SW 3.

(4) Change the DIP-SW 3 settings.



(5) Attach the RS-232C interface PCB following the procedure for removing it in reverse.

(6) Install the interface board onto the printer.

(7) Turn both the printer and the host computer on.

Note: The new settings take effect when you turn on the printer.

■ DIP-SW 3

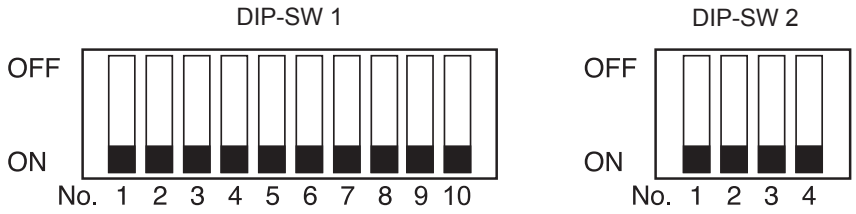
Switch	Function	ON	OFF
3-1	Baud rate	See the table below.	
3-2			
3-3	Data length	8 bits	7 bits
3-4	Parity check	Invalid	Valid
3-5	Parity	Odd	Even
3-6	Handshaking	DTR	XON/XOFF
3-7	Reserved	Always OFF	
3-8			

Baud rate settings

3-1	3-2	Baud rate
ON	ON	9600 bps
OFF	ON	4800 bps
ON	OFF	19200 bps
OFF	OFF	38400 bps

By factory default, 3-7 and 3-8 are OFF, and all other settings are ON.

12-3. USB and PoweredUSB Interface Model



■ DIP-SW 1

Switch	Function			ON	OFF
1-1	Emulation			STAR line mode	ESC/POS mode
1-2	STAR line mode	Reserved		Always ON	
	ESC/POS mode	Resolution correction		203 dpi	180 dpi
1-3	Reserved			Always ON	
1-4	Sensor adjustment			Invalid	Valid
1-5	USB mode			Printer Class	Vendor Class
1-6	Handshaking conditions (conditions for BUSY)			Receive buffer full or offline	Receive buffer full
1-7	ASB function*1	Printer Class		Valid	Invalid
		Vendor Class		Invalid	Valid
1-8	STAR line mode	NSB function*2	Printer Class	Valid	Invalid
			Vendor Class	Invalid	Valid
	ESC/POS mode	Reserved		Always ON	
1-9	Low peak current mode			Invalid	Valid
1-10	Installed cutter type			Partial cut	Full cut

*1 ASB function:

Automatically sends a status signal to the host whenever the printer status changes (cover open, paper out, error, etc.).
For details, see the separate command specifications (Star Line mode and ESC/POS mode).

*2 NSB function:

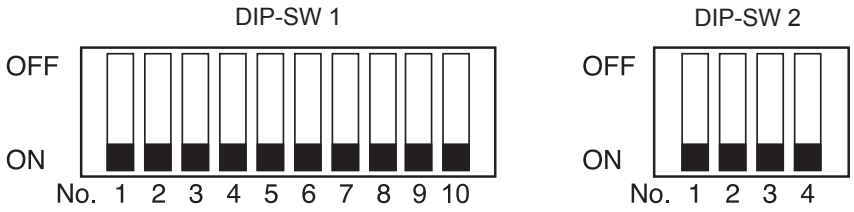
Automatically sends a status signal whenever the printer switches to reverse transfer mode.
For details, see the separate command specifications (Star Line mode).

■ DIP-SW 2

Switch	Function	ON	OFF
2-1 to 2-4	—	Always ON	

By factory default, all settings are set to ON.

12-4. Ethernet Interface Model



■ DIP-SW 1

Switch	Function		ON	OFF
1-1	Emulation		STAR line mode	ESC/POS mode
1-2	STAR line mode	Reserved	Always ON	
	ESC/POS mode	Resolution correction	203 dpi	180 dpi
1-3	Reserved		Always ON	
1-4	Sensor adjustment		Invalid	Valid
1-5	Reset using the INIT signal (pin #31)		Valid	Invalid
1-6	Handshaking conditions (conditions for BUSY)		Receive buffer full or offline	Receive buffer full
1-7	ASB function*1		Valid	Invalid
1-8	STAR line mode	NSB function*2	Valid	Invalid
	ESC/POS mode	Reserved	Always ON	
1-9	Low peak current mode		Invalid	Valid
1-10	Installed cutter type		Partial cut	Full cut

*1 ASB function:

Automatically sends a status signal to the host whenever the printer status changes (cover open, paper out, error, etc.).
For details, see the separate command specifications (Star Line mod and ESC/POS mode).

*2 NSB function:

Automatically sends a status signal whenever the printer switches to reverse transfer mode.
For details, see the separate command specifications (Star Line mode).

■ DIP-SW 2

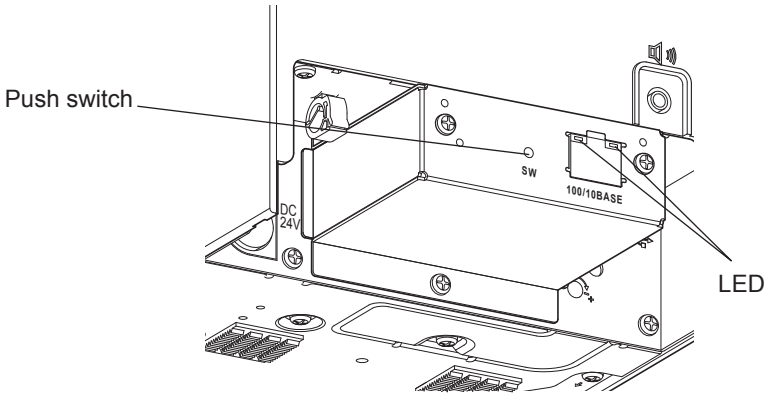
Switch	Function	ON	OFF
2-1 to 2-4	—	Always ON	

By factory default, all settings are set to ON.

■ Initializing Settings

To initialize the settings, use the push switch as follows:

(1) With the printer in normal operating mode, hold down the push switch for 1 to 5 seconds.
The green and red LEDs flash with a regular pattern.



(2) Push the switch again. The red and green LEDs both turn off, and the Ethernet interface settings are returned to their factory default values.

(3) When the Ethernet interface initialization has been completed, the printer automatically reboots.

■ LED Display

Green LED .....Lights when 100BASE-TX is detected on the other end of the connection

Red LED.....Lights when packets are received

13. Parallel Interface

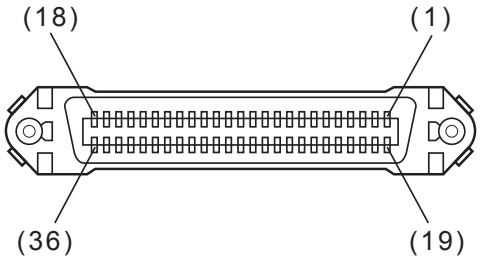
This bidirectional parallel interface is compatible with the IEEE1284 Compatibility and Nibble modes. Contact your dealer for details.

Pinout for the two modes

Pin number	Direction	Compatibility mode	Nibble mode
1	In	nStrobe	HostClk
2	In/Out	Data0	Data0
3	In/Out	Data1	Data1
4	In/Out	Data2	Data2
5	In/Out	Data3	Data3
6	In/Out	Data4	Data4
7	In/Out	Data5	Data5
8	In/Out	Data6	Data6
9	In/Out	Data7	Data7
10	Out	nAck	PtrClk
11	Out	Busy	PtrBusy/Data3,7
12	Out	PError	AckDataReq/Data2,6
13	Out	Select	Xflag/Data1,5
14		–	HostBusy
15		–	–
16		Signal GND	Signal GND
17		Frame GND	Frame GND
18	Out	+5V	+5V
19 ~ 30		Twisted Pair Return	Twisted Pair Return
31	In	nInit	nInit
32	Out	nFault	nDataAvail/Data0,4
33		EXT GND	–
34	In	Compulsion Status	–
35		–	–
36	In	nSelectIn	1284Active

Note 1) The prefix “n” on the signal name refers to low active signals.
If any of the signal lines listed above is not available on the host, bidirectional communication is not possible.

2) Be sure to use twisted pair wires for each signal line, and connect the return wires to signal ground.



Compatible with
Amphenol 57-30360

14. RS-232C Interface

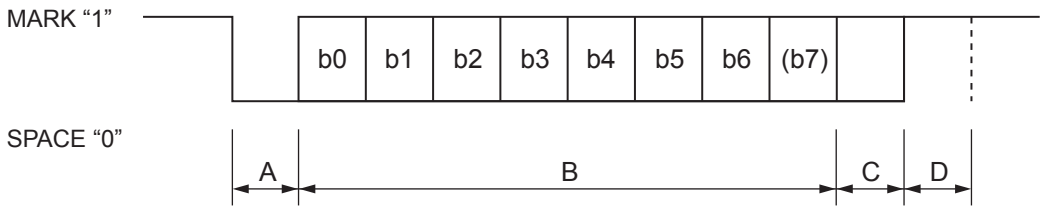
14-1. RS-232C Interface Specifications

(1) Data transmission method: Asynchronous start-stop

(2) Baud rate: 4800, 9600, 19200, 38400 bps (selectable with DIP switch)

(3) Data: 1 start bit
7 or 8 data bits (selectable with DIP switch)
Odd, even, or no parity (selectable with DIP switch)
1 stop bit

(4) Signal polarity: RS-232C
Mark: Logic “1” (-3 V to -15 V)
Space: Logic “0” (+3 V to +15 V)



A: Start bit
B: Data bit
C: Parity bit
D: Stop bit

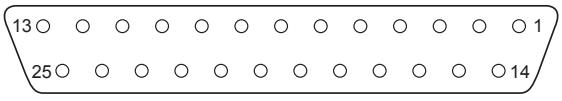
14-2. Connector and Signal Name

Pin number	Signal name	Direction	Function
1	FG	—	Frame ground
2	TXD	OUT	Transmission data
3	RXD	IN	Receive data
4	RTS	OUT	Same control as DTR
5	N.C	—	Not used
6	DSR	IN	(1) STAR line mode Not used (2) ESC/POS mode 1) DIP SW3-7 = OFF a) DTR/DSR mode Indicates whether the host can receive data. (This excludes data transmission that uses <DLE> <EOT> and <GS a> commands.) SPACE: The host can receive data. MARK: The host cannot receive data. b) X-ON/X-OFF mode Status of this signal is not checked. 2) DIP SW3-7 = ON Functions as an external reset signal. A mark signal with a pulse width of 1 ms or longer resets the printer.

<table>
<tr><th>Pin number</th><th>Signal name</th><th>Direction</th><th>Function</th></tr>
<tr><td>7</td><td>SG</td><td>—</td><td>Signal ground</td></tr>
<tr><td>8-19</td><td>N.C</td><td>—</td><td>Not used</td></tr>
<tr><td>20</td><td>DTR</td><td>OUT</td><td>(1) STAR line mode
a) DTR mode
Indicates whether the printer can receive data from the host.
SPACE: The printer can receive data.
MARK: The printer cannot receive data.
b) X-ON/X-OFF mode
Always set to SPACE, except during the following conditions
1. After a reset, until communication is enabled
2. During test printing

(2) ESC/POS mode
a) DTR/DSR mode
Indicates whether the printer can receive data from the host.
SPACE: The printer can receive data.
MARK: The printer cannot receive data.

The conditions that result in a BUSY state change according to the DIP switch settings.
<table>
<tr><th rowspan="2">Printer status</th><th colspan="2">DIP SW 1-6</th></tr>
<tr><th>OFF</th><th>ON</th></tr>
<tr><td>1. After power-on reset or interface reset but before communication is enabled</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>2. Test printing</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>3. Cover open</td><td>–</td><td>BUSY</td></tr>
<tr><td>4. Paper feeding through the paper feed switch</td><td>–</td><td>BUSY</td></tr>
<tr><td>4. Stopped because paper ran out</td><td>–</td><td>BUSY</td></tr>
<tr><td>5. Waiting for switch input for macro execution</td><td>–</td><td>BUSY</td></tr>
<tr><td>6. Other error</td><td>–</td><td>BUSY</td></tr>
<tr><td>7. Receive buffer full</td><td>BUSY</td><td>BUSY</td></tr>
</table>
b) X-ON/X-OFF mode
Always set to SPACE, except during the following conditions
1. After a reset, until communication is enabled
2. During test printing</td></tr>
<tr><td>21-24</td><td>N.C</td><td></td><td>Not used</td></tr>
<tr><td>25</td><td>INIT</td><td>IN</td><td>1) DIPSW3-8 = OFF
Status of this signal is not checked.
2) DIPSW3-8 = ON
Functions as an external reset signal. A space signal with a pulse width of 1 ms or longer resets the printer.</td></tr>
</table>

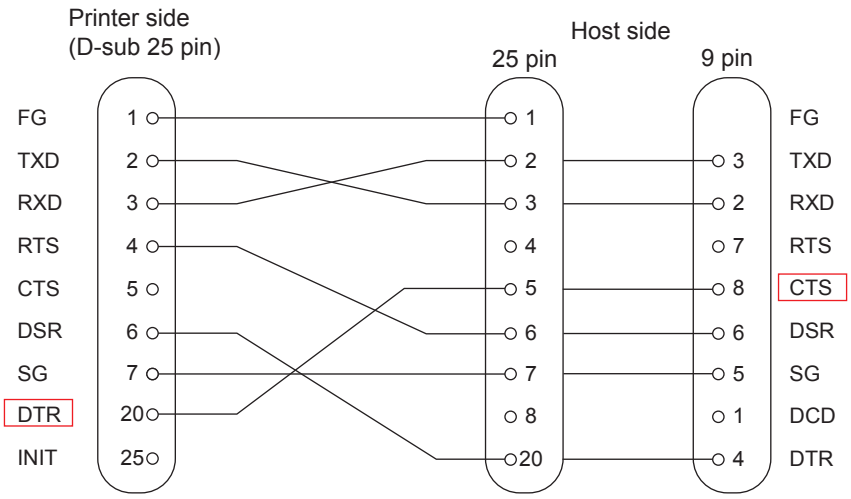


D-sub 25 pin

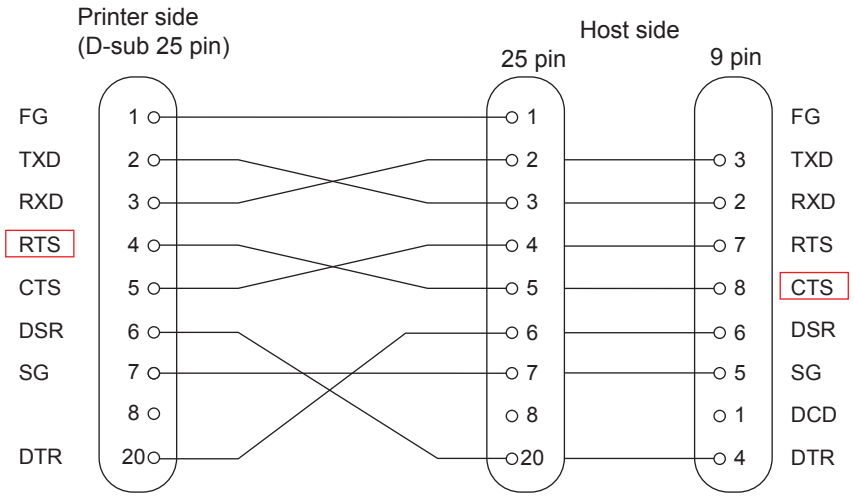
14-3. Cable Connections

Refer to the host computer's interface specifications, and connect the interfaces.

Typical connections (for hardware flow control) are shown below.



■ When using an RS-232C cable (reverse type) sold commercially



* In general, windows PCs that have serial interfaces receive printer's hardware flow control signal (DTR) through the CTS pin. But cables sold commercially connect the PC's CTS pin to the printer's RTS pin. Therefore, when using a cable sold commercially, we recommend the transmission method be changed to Xon/Xoff protocol mode.

Note: Use inch screws for the connector fixing screws.

15. USB and PoweredUSB Interface

15-1. USB and PoweredUSB Interface Specifications

(1) USB function

General specifications: Conforms to USB 2.0

Data rate: USB full speed mode (12 Mbps)

Transmission method: USB bulk transmission mode

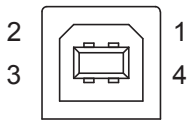
Power supply: Self-powered

(2) Connector: USB: USB up-stream port connector (USB Type-B)
PoweredUSB: 1 × 8 right-angle type

15-2. Connector and Signal Name

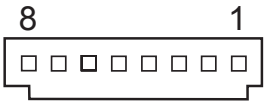
Type B connector
DUSB-BRA42-T11(D2)-FA (manufacturer: DDK)

Pin number	Signal name	Function
1	VBUS	USB Power pin (+5 V DC)
2	D-	Serial Data-
3	D+	Serial Data+
4	GND	Signal ground



PoweredUSB port
69913-104LF (manufacturer: FCI)

Pin number	Signal name	Function
1	F-GND	Frame ground
2	+24 V	+24 V DC
3	GND	Signal ground
4	D+	Serial Data+
5	D-	Serial Data-
6	VBUS	USB Power pin (+5 V DC)
7	+24 V	+24 V DC
8	F-GND	Frame ground



16. Ethernet Interface Specifications

(1) Communication specifications

General specifications:	Conforms to IEEE802.3
Communication media:	10Base-T and 100Base-TX
Data rate:	10 Mbps and 100 Mbps
Protocol:	TCP/IP
TCP/IP protocols:	ARP, RARP, BOOTP, DHCP, LPR, #9100, HTTP, TELNET, FTP, TFTP

(2) Connector: RJ-45 (8-pin modular)

Note: Factory-set login password for administrator

HTTP (Web), Telnet, or FTP protocol is used when you change the printer settings. To change the settings, you must log into the printer using an administrator account.

The administrator account login information for HTTP (Web), Telnet, and FTP are shown below.

Administrator account name	“root” (required)
Password	“public” (required)

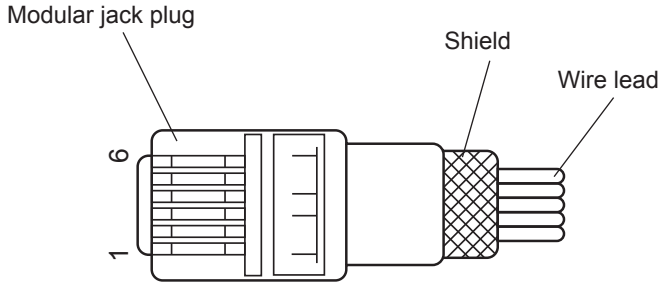
* You can change the password after logging in.

17. Peripheral Drive Circuit

This printer is equipped with a circuit for driving peripheral devices such as cash drawers.
There is a peripheral drive connector (6-pin modular plug) at the drive circuit output. To use the drive circuit, connect a cable to this connector (the cable is not included in the package).

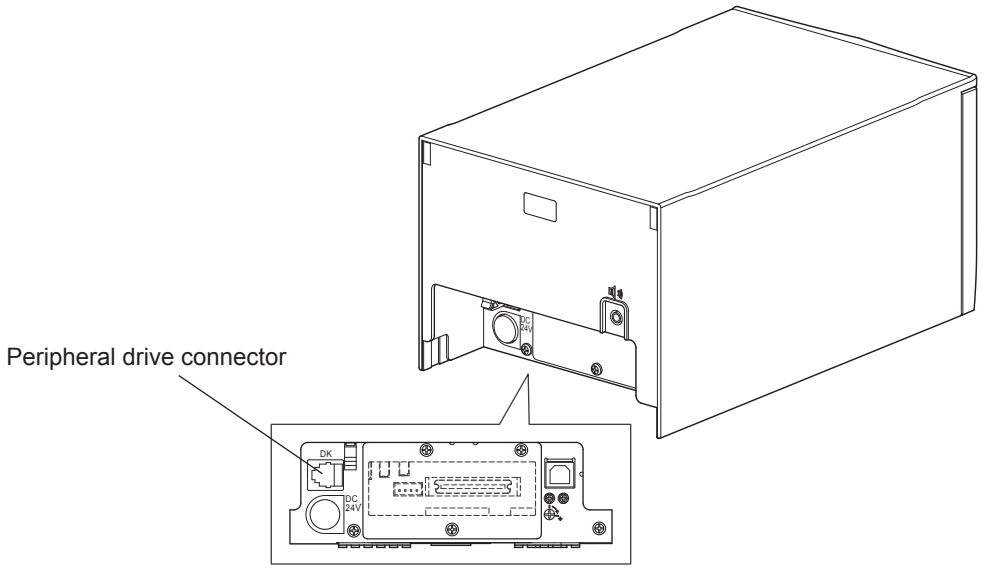
The recommended cable specifications are indicated below.

Recommended cable specifications

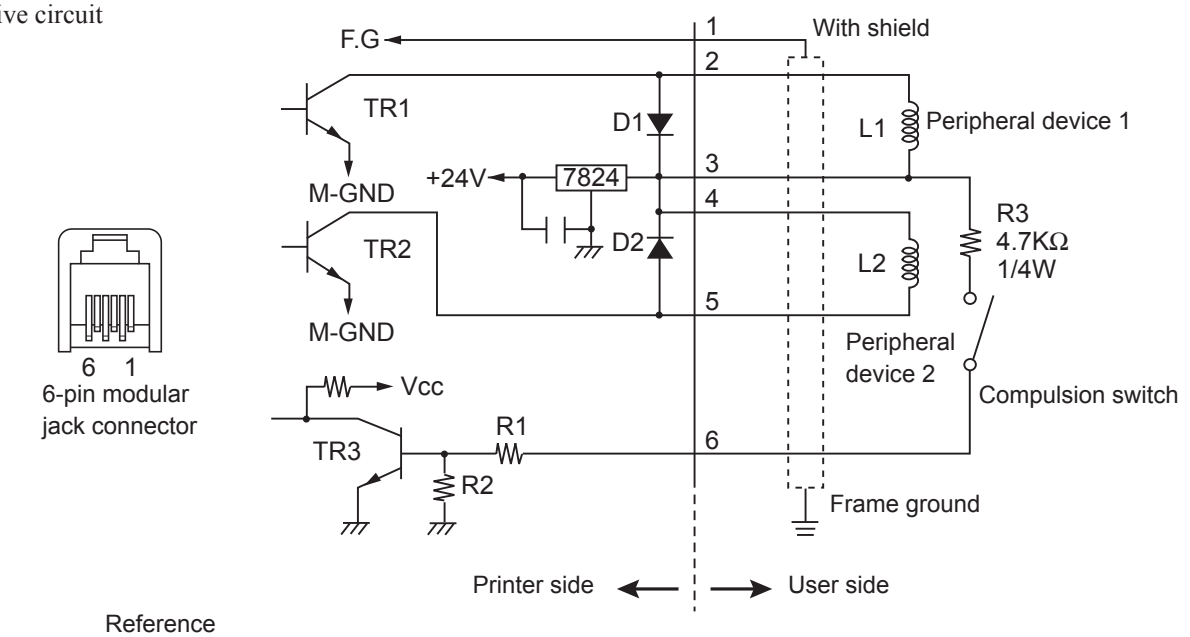


Manufacturer	Model
MOLEX	90075-0007
AMP	641337
FCI	B-66-4

Note: Connect a shielded wire to pin 1 (frame ground).

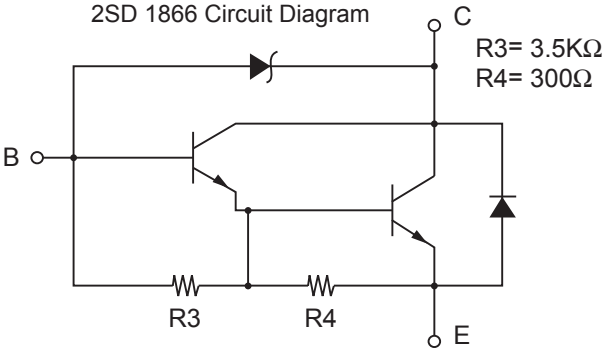


Drive circuit



Reference

2SD 1866 Circuit Diagram



Drive output	24 V, 1.0 A max.

TR1, 2: 2SD 1866 or equivalent

R1 = 10 kΩ

R2 = 33 kΩ

Handling Precautions

1) Peripheral devices 1 and 2 cannot be driven simultaneously.
2) To continuously drive the peripheral device, keep the duty cycle less than or equal to 20%.
3) If you connect a cash drawer or similar device, be sure not to set bit 2 of memory switch #7 to 1. Doing so may damage the connected device and the drive circuit.
4) You can use the status command to query the compulsion switch state.*
5) Minimum resistance for coils L1 and L2 is 24 Ω.
6) Absolute maximum rating of diodes D1 and D2 (Ta = 25°C)
   Average rectified current I_o = 1.0 A
7) Absolute maximum rating for transistors TR1 and TR2 (Ta = 25°C)
   Collector current I_C = 2.0 A

* For details of commands, see the separate Programmer's Manual.
http://www.star-m.jp/eng/dl/dl02.htm

18. Memory Switch Settings

On each printer model, the memory switches are factory-set to their appropriate settings.
Note that the printer may not operate properly depending on how you specify these settings.
For details on the functions and settings of memory switches, see the separate Specification Manual.

The table below shows the factory settings.

Memory switch	Hexadecimal code
#0	0000
#1	0000
#2	0000
#3	0000
#4	0000
#5	0000
#6	0000
#7	0000
#8	0000
#9	0000

⚠ WARNING

Changing the memory switch settings can cause the printer to fail to operate correctly.

19. Release History

Rev. No.	Revision date	Description
Rev. 1.0	Jan. 2010	New Release
Rev. 1.1	Nov. 2010	
Rev. 1.2	Sep. 2011	

URL: http://www.starmicronics.com/support/