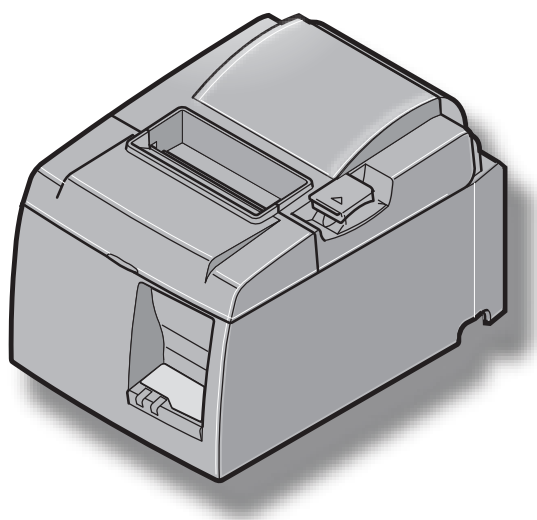


stair *TSP100* *futurePRNT*

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 printers 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 Regulationst**

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 printers marketed in Canada.

Trademark acknowledgments

TSP100: Star Micronics Co., Ltd.

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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Please access the following URL
<http://www.star-m.jp/eng/dl/dl02.htm>
for the latest revision of the manual.

1. Unpacking and Installation

1-1. Unpacking

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

1-1-1. U Model

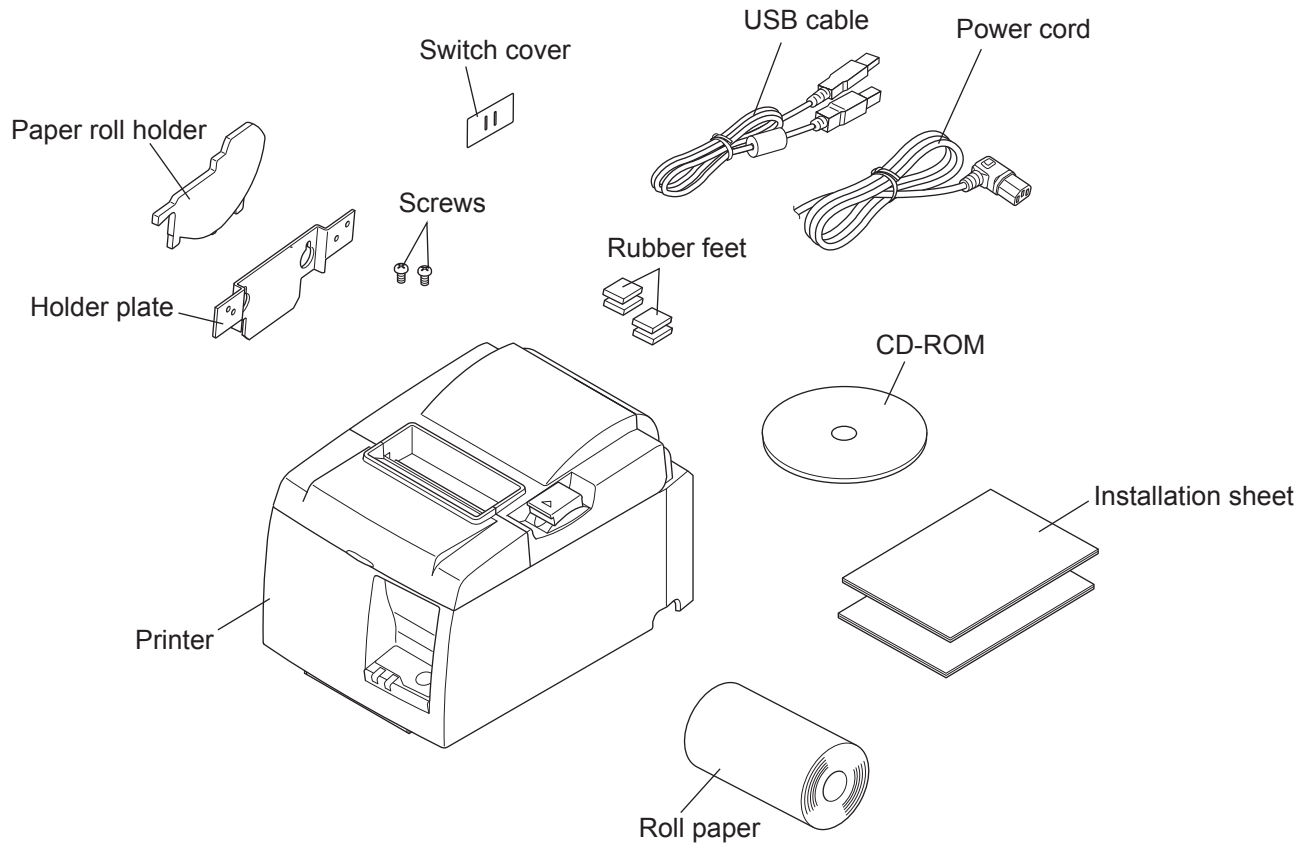
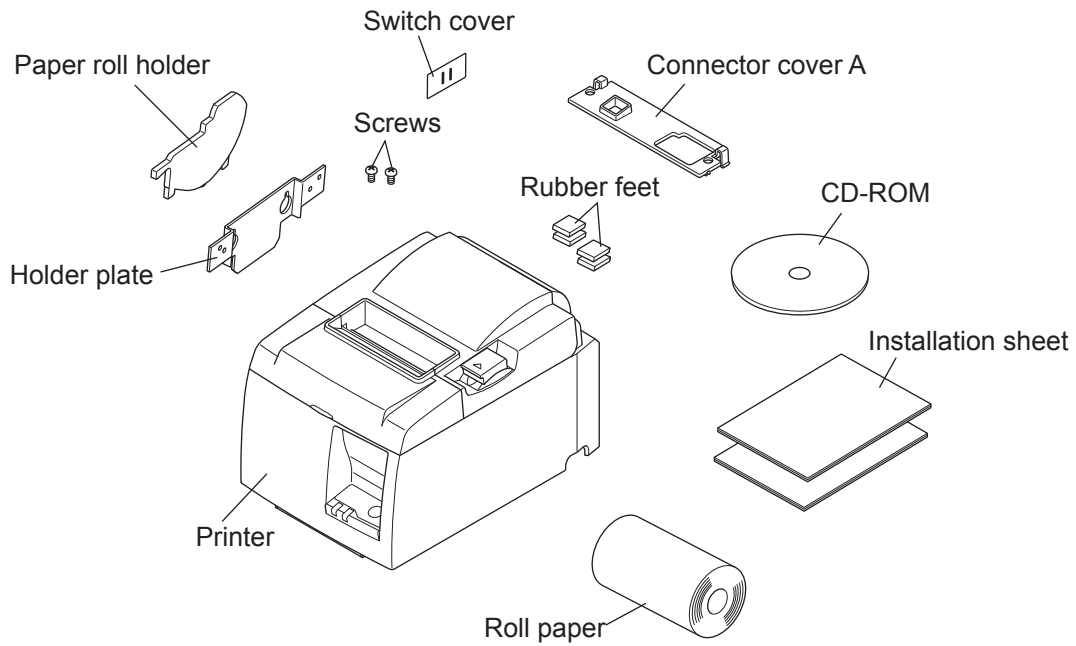


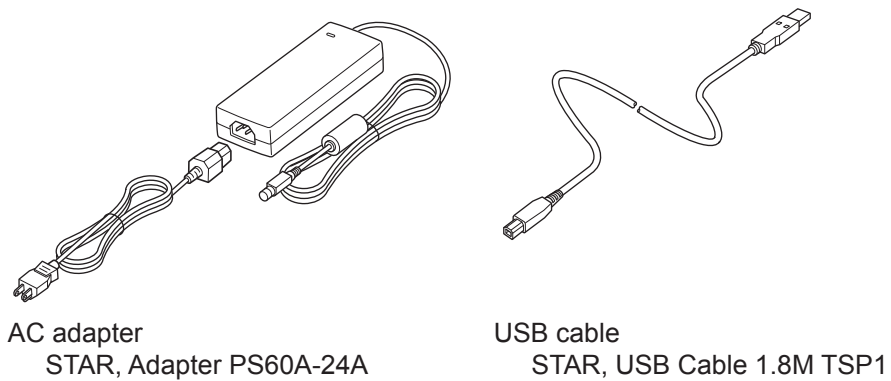
Fig. 1-1 Unpacking

If anything is missing, contact the dealer where you bought the printer and ask them to supply the missing part. Note that it is a good idea to keep the original box and all the packing materials just in case you need to pack the printer up again and send it somewhere at a later date.

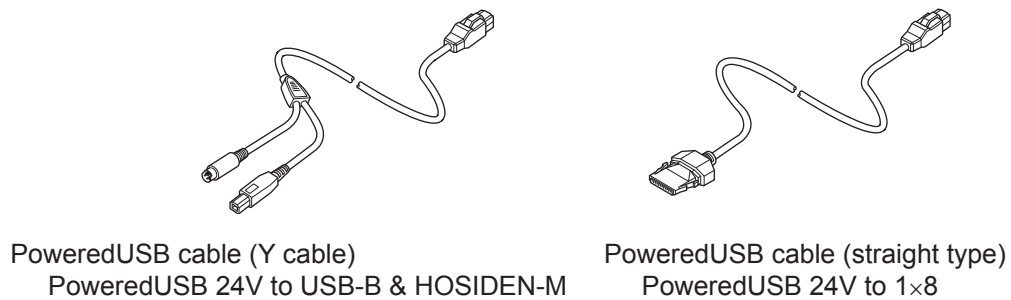
1-1-2. PU Model



[Options]

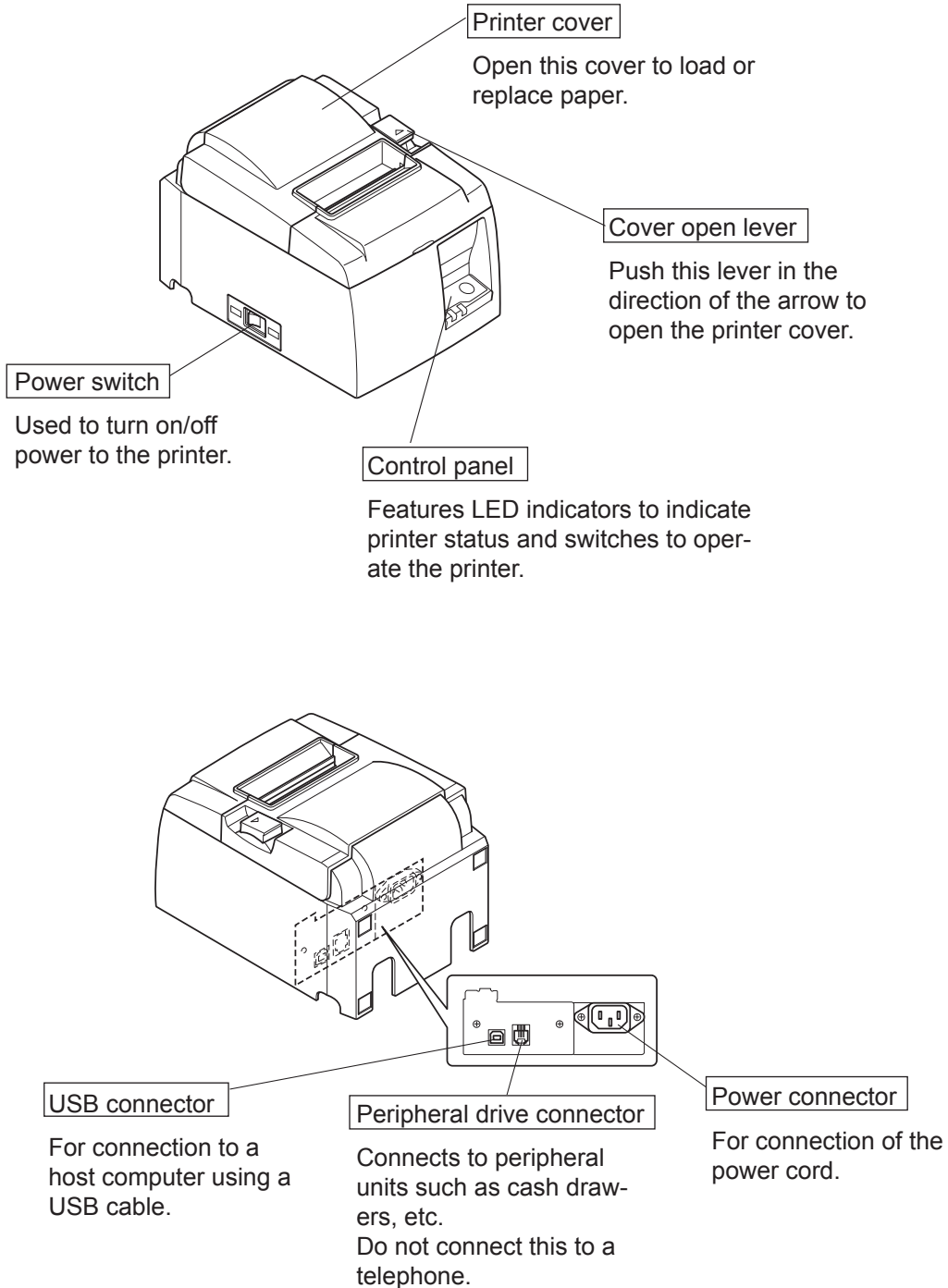


[Recommended cables]

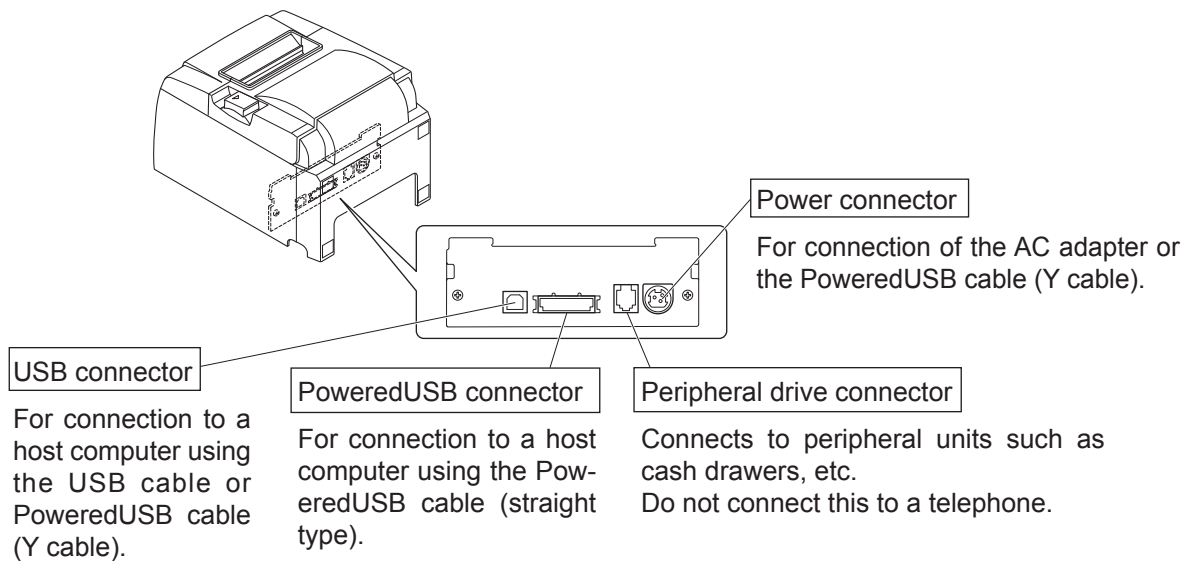
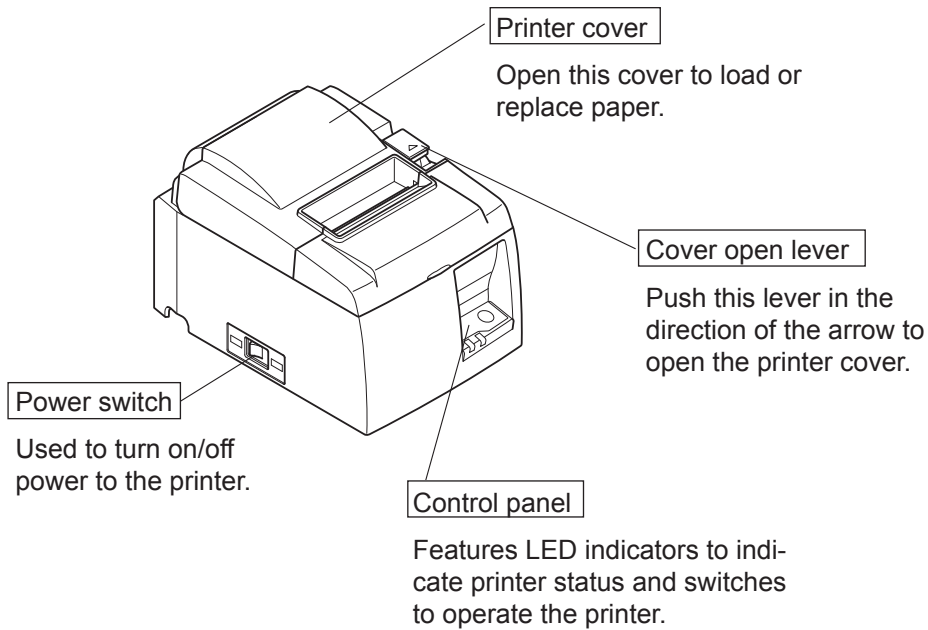


2. Parts Identification and Nomenclature

2-1. U Model



2-2. PU Model



2-3. Choosing a place for the printer

Before actually unpacking the printer, you should take a few minutes to think about where you plan to use it. Remember the following points when doing this.

- ✓ Choose a firm, level surface where the printer will not be exposed to vibration.
- ✓ The power outlet you plan to connect to for power should be nearby and unobstructed.
- ✓ Make sure that the printer is close enough to your host computer for you to connect the two.
- ✓ Make sure that the printer is not exposed to direct sunlight.
- ✓ Make sure that the printer is well away from heaters and other sources of extreme heat.
- ✓ Make sure that the surrounding area is clean, dry, and free of dust.
- ✓ Make sure that the printer is connected to a reliable power outlet. It should not be on the same electric circuit as copiers, refrigerators, or other appliances that cause power spikes.
- ✓ Make sure that the room where you are using the printer is not too humid.
- ✓ 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.

WARNING

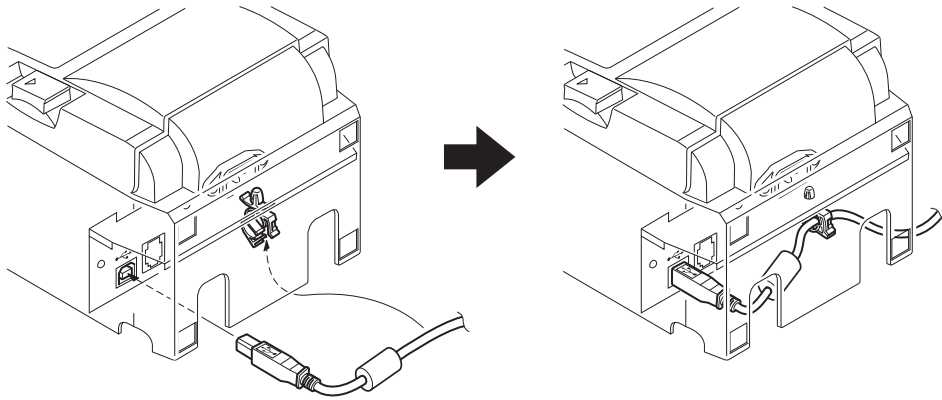
- ✓ Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise. Immediately unplug the equipment and contact your dealer for advice.
- ✓ Never attempt to repair this product yourself. Improper repair work can be dangerous.
- ✓ Never disassemble or modify this product.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

3. Setup

3-1. Connecting the USB/PoweredUSB Cable to the Printer

3-1-1. U Model

Pass the cable through the cable support as shown. Then, connect the USB interface cable to the printer.



3-1-2. PU Model

⚠ CAUTION

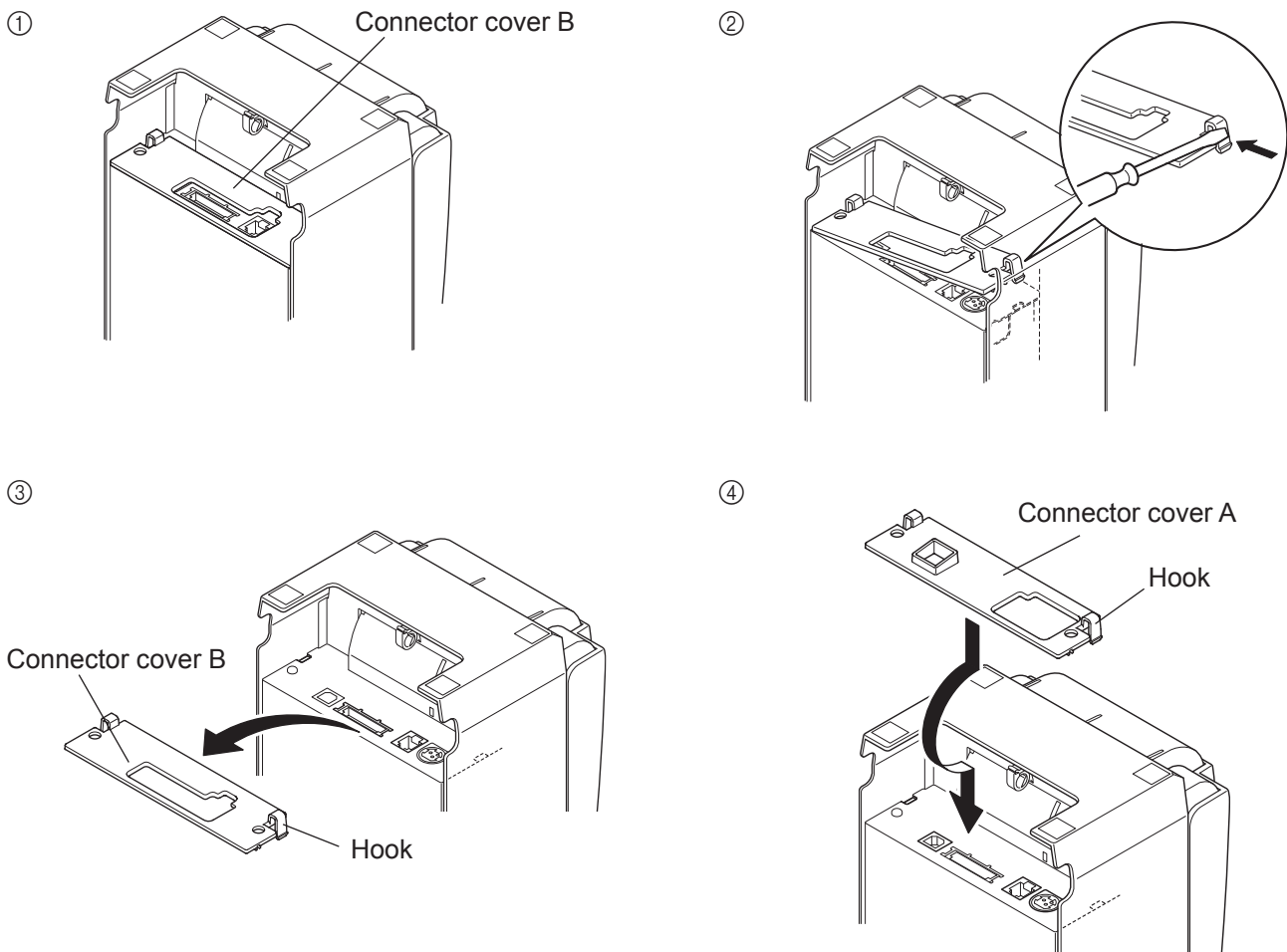
Make sure that the printer is turned off before connecting the PoweredUSB cable (Y cable) or PoweredUSB cable (straight type).

(1) According to the cable used, install the connector cover onto the printer to prevent improper cable connections.

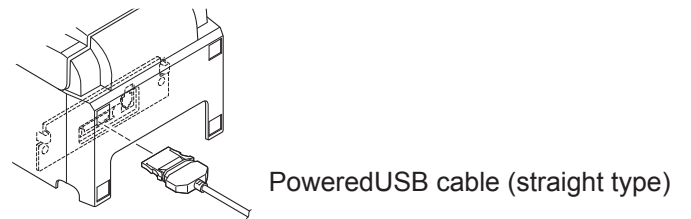
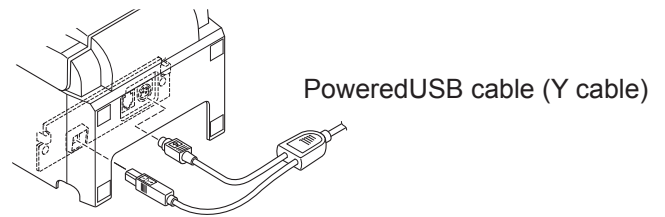
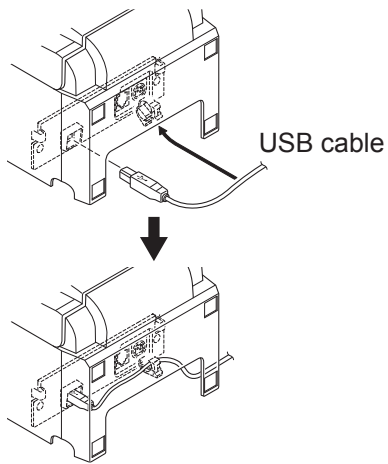
USB cable or PoweredUSB cable (Y cable).....Connector cover A
PoweredUSB cable (straight type)Connector cover B

The printer is shipped with connector cover B installed. This cover does not need to be removed when using the PoweredUSB cable (straight type). When using a USB cable or PoweredUSB cable (Y cable), remove connector cover (B) and install connector cover (A) to the printer until a click is heard.

To remove connector cover (B), use a flat-head screwdriver as shown to push in the hook on the cover.



(2) Connect the interface cable to the printer as shown. When using the USB cable, secure the cable with the hook.



3-2. Connecting to a Peripheral Unit

You can connect a peripheral unit to the printer using a modular plug. The following describes how to install the ferrite core and make the actual connection. See “Modular plug” on page 30 PoweredUSB for details about the type of modular plug that is required. Note that this printer does not come with a modular plug or wire, so it is up to you to obtain one that suits your needs.

⚠ CAUTION

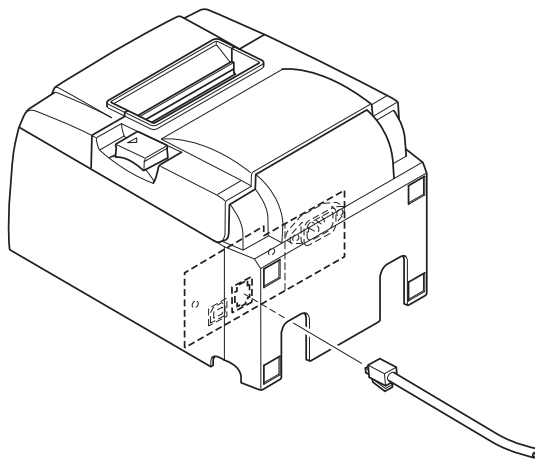
Make sure that the printer is turned off and unplugged from the AC outlet and that the computer is turned off before making connections.

(1) Connect the peripheral drive cable to the connector on the rear panel of the printer.

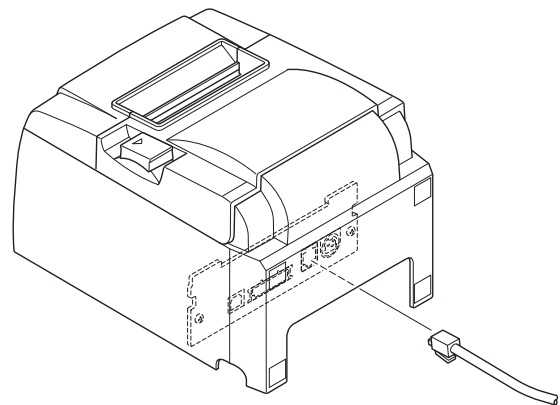
⚠ CAUTION

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.



[U Model]

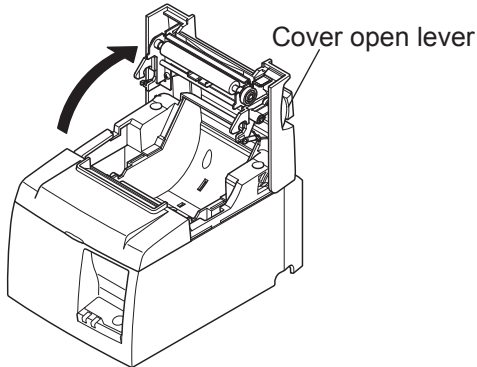


[PU Model]

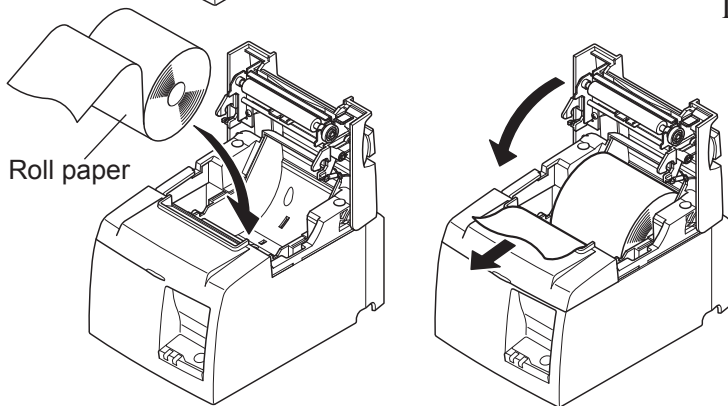
3-3. Loading the Roll Paper

Be sure to use roll paper that matches the printer's specification.

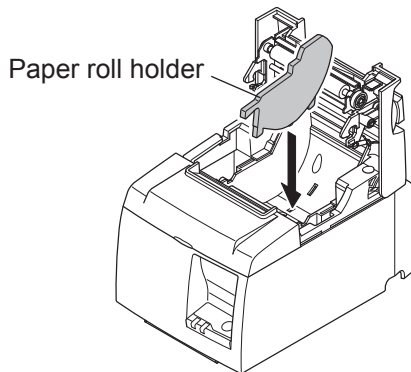
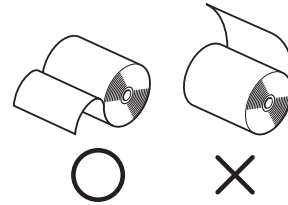
When using a paper roll with an 57.5 mm width, install the paper roll holder as described on the following page.



1) Push the cover open lever, and open the printer cover.

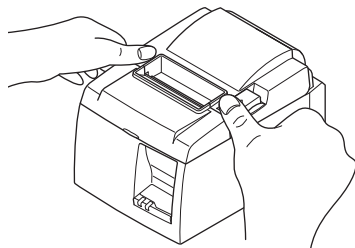


2) While observing the direction of the roll, set the paper roll into the hollow, and pull on the leading edge of the paper toward you.



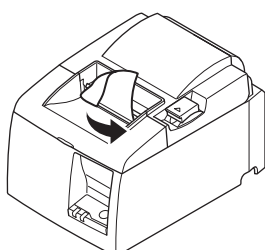
Note: When using a paper roll with an 57.5 mm width, install the paper roll holder in the groove in the printer.

If a paper roll with a 57.5 mm width has been used, a paper roll with a 79.5 mm width cannot be used. (Changing from the smaller roll to a larger roll will cause part of the print head to rub against the platen and deteriorate.)



3) Push down both sides of the printer cover to close.

Note: Make sure that the printer cover is securely closed.



Tear Bar Model

4) **Tear Bar Model:**

Tear off the paper as shown.

Auto Cutter Model:

If the printer cover is closed after turning on the power, the cutter operates automatically and the front end of the paper is cut.

Caution Symbol



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 symbol is placed near the cutter.

Never touch the cutter blade, as you could injure your fingers.

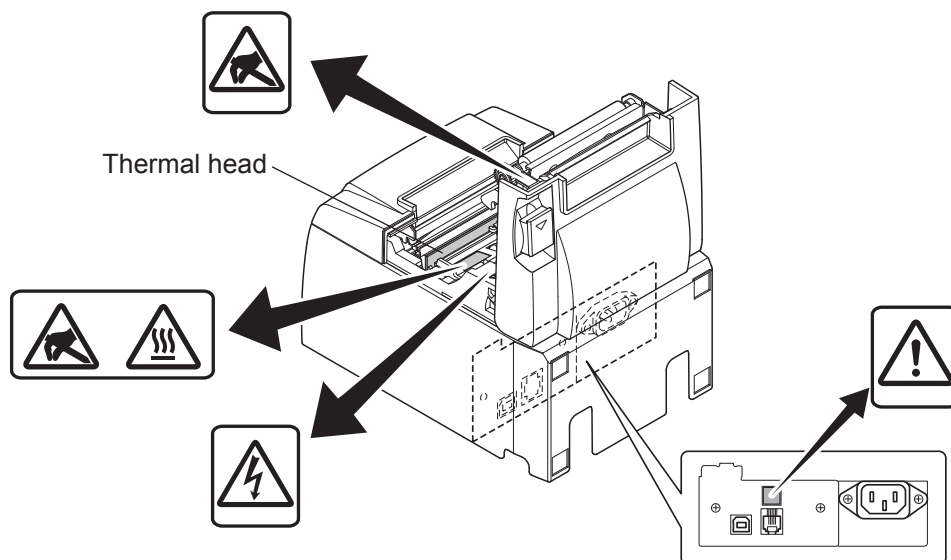


This symbol is placed near the peripheral drive connector.

Do not connect this to a telephone.



This symbol label or stamp is placed near the screws securing the case or the protective plate, 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

- 1) *Do not touch the cutter blade.*
 - *There is a cutter inside the paper outlet slot. Not only should you not put your hand in the paper outlet slot while printing is in progress, never put your hand into the outlet even when printing is not in progress.*
 - *The printer cover can be opened when replacing the paper. However, since the cutter blade is on the inside of the printer cover, be careful not to place your face or hands too close to the cutter blade.*
 - 2) *During and immediately after printing, the area around the thermal head is very hot. Do not touch it, as you could be burned.*
 - 3) *Unplug the equipment immediately if it produces smoke, a strange odor, or unusual noise and contact your dealer for advice.*
 - 4) *Never attempt to repair this product yourself. Improper repair work can be dangerous.*
 - 5) *Never disassemble or modify this product. Tampering with this product may result in injury, fire, or electric shock.*
-

⚠ CAUTION

- 1) *Do not operate the cover open lever while pressing on the printer cover with your hand.*
 - 2) *Do not push the cover open lever and open the printer cover when printing is in progress or when the auto cutter is operating.*
 - 3) *Do not push out paper while the printer cover is closed.*
 - 4) *The heating element and the driver IC of the thermal head are easily damaged. Do not touch them with metal objects, sandpaper, etc.*
 - 5) *Printing quality may suffer if the thermal head heating element becomes soiled by being touched with your hands. Do not touch the thermal head heating element.*
 - 6) *There is a risk of damage to the driver IC of the thermal head from static electricity. Never directly touch the IC.*
 - 7) *The printing quality and working life of the thermal head cannot be guaranteed if any paper other than that recommended is used. In particular, paper containing [Na⁺, K⁺, Cl⁻] may drastically reduce the working life of the thermal head. Please exercise caution.*
 - 8) *Do not operate the printer if there is moisture on the front surface of the head from condensation, etc.*
 - 9) *A printed piece of thermal paper may become electrically charged. If the printer is placed vertically or mounted on a wall, the cut piece of paper may stick to the printer, instead of falling. Beware that this could cause a problem if you use a stacker that stores the pieces of paper that fall freely.*
 - 10) *Do not change the paper width during use. The thermal printing head, rubber roller, and cutter wear differently according to the paper width. This can cause the printing or cutter movement to malfunction.*
 - 11) *Do not transport the printer with its cover open and holding it by the cover.*
 - 12) *Do not forcibly pull on the interface cable, power cord, or cash drawer cable that is connected. To detach a connector, make sure to grasp it at the connector portion, without applying excessive stress on the connector at the printer*
 - 13) *If your printer gets hang-up, you must reset it by plugging out/in the USB cable. However, the intervals of per plugging out/in must be 5 seconds or more. Shorter interval may cause malfunction.*
 - 14) *Do not turn off the computer or put the computer in stand-by mode during printing.*
 - 15) *Do not unplug the power cord or disconnect the USB cable during it is working.*
-

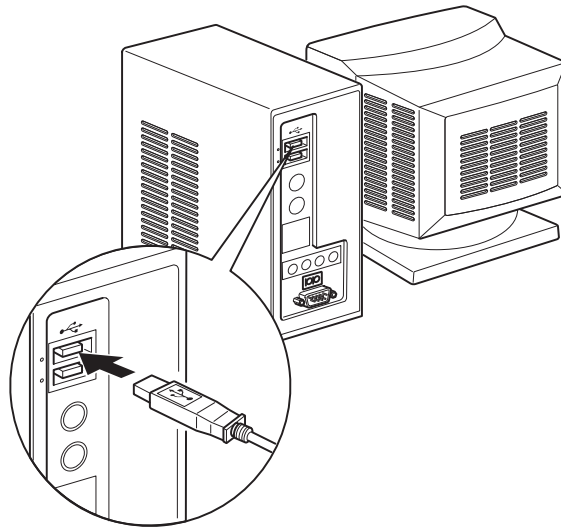
⚠ Notes on Using the Auto Cutter

- 1) *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.*
 - 2) *A margin of 5 mm or more is recommended from the end of the printed area to the cutting position.*
 - 3) *Do not attempt to remove the paper during a cut, as this can cause a paper jam*
-

3-4. Connecting the USB/PoweredUSB Cable to the PC

3-4-1. U Model

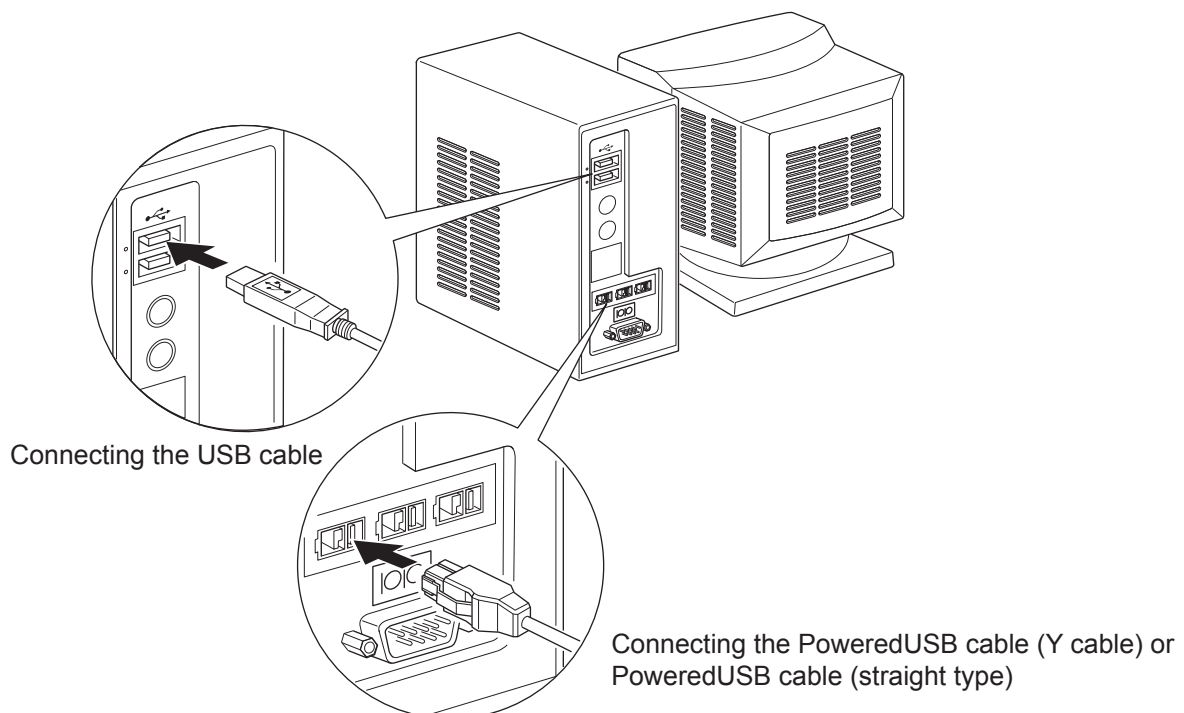
Connect the USB interface cable to a USB port of your PC.



3-4-2. PU Model

⚠ CAUTION

Make sure that the PC is turned off before connecting the PoweredUSB cable (Y cable) or PoweredUSB cable (straight type).



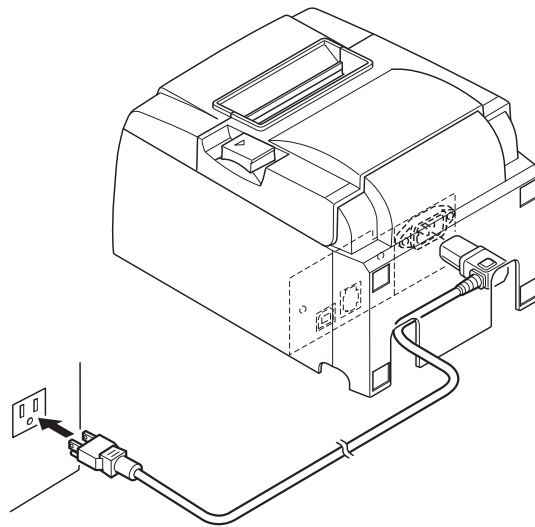
Connect the interface cable to a USB port of your PC.

3-5. Connecting the Power Cord

3-5-1. U Model

Note: Before connecting/disconnecting the power cord, make sure that power to the printer and all the devices connected to the printer is turned off. Also make sure the power cable plug is disconnected from the AC outlet.

- (1) Check the label on the back or bottom of the printer to make sure its voltage matches that of the AC outlet. Also make sure the plug on the power cord matches the AC outlet.
- (2) If the power cord is not attached to the printer, plug the appropriate end into the AC inlet on the back of the printer.
- (3) Plug the power cord into a properly grounded AC outlet.



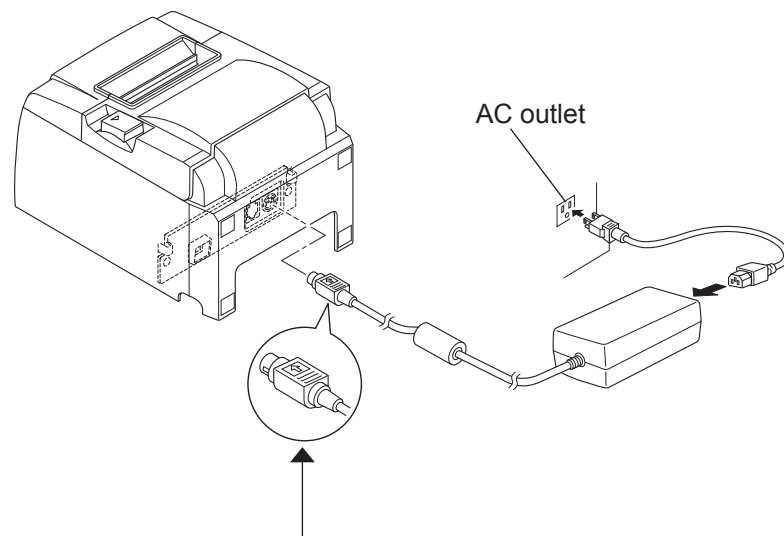
⚠ CAUTION

If the voltage shown on the label on the bottom of your printer does not match the voltage for your area, contact your dealer immediately.

3-5-2. PU Model

Note: Before connecting/disconnecting the AC adapter, make sure that power to the printer and all the devices connected to the printer are turned off. Also make sure the power cable plug is disconnected from the AC outlet.

- (1) Connect the AC adapter to the power cable.
Note: Use only the standard AC adapter and power cable.
- (2) Connect AC adapter to the connector on the printer.
- (3) Insert the power cable plug into an AC outlet.



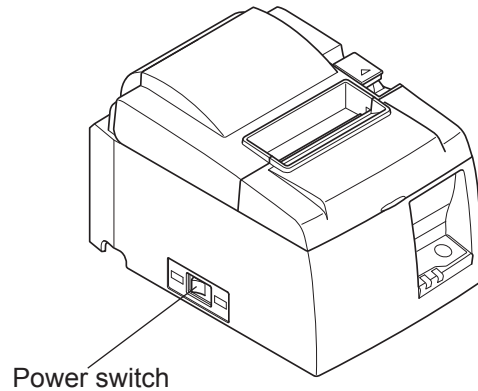
⚠ CAUTION

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.

3-6. Turning Power On

Make sure that the Power cord has been connected as described in 3-6.

- (1) Turn ON the power switch located on the front of the printer.
The POWER lamp on the control panel will light up.



⚠ 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 cover 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.

4. Attaching the Accessories

The following accessories are necessary when mounting the printer to a wall.

- Holder plate and two flangeless screws

The following accessories are necessary when positioning the printer vertically.

- Four rubber feet

The following accessories do not necessarily have to be attached. Attach it if necessary.

- Switch cover

4-1. Attaching the Holder Plate

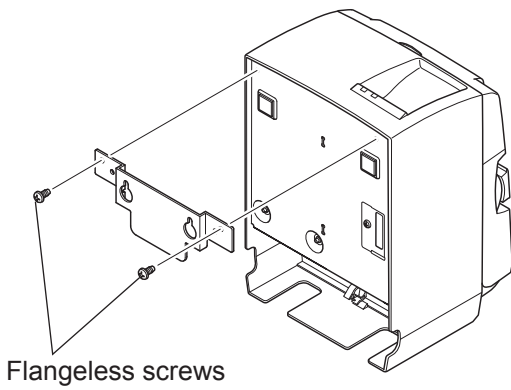
- The holder plate is attached to the printer using the included screws and is hooked onto screws that are installed into the wall.
- The screws on the wall are not included.
Use commercially available screws (4 mm diameter) that are suitable for the wall material (wood, steel beam, concrete, etc.).
- The printer's weight is approximately 2.4 kg when the largest diameter roll paper is loaded. Use screws on the wall that have both shear strength and pulling-out strength to withstand a force of at least 12 kgf (118 N).

Precautions regarding installation

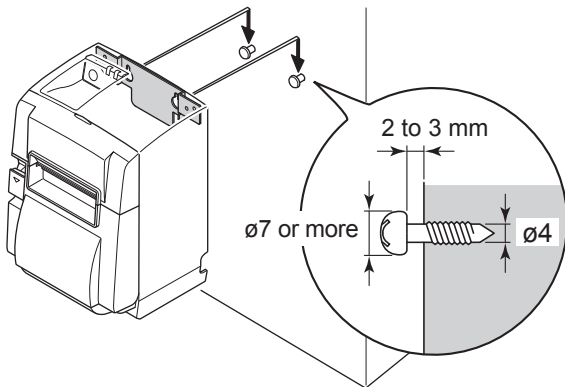
⚠ CAUTION

This caution indicates information that, if ignored, could lead to personal injury or property damage.

- *Be sure to have qualified personnel install the specified screws and printer to the wall. Star is not responsible for any accidents or injuries that occur as a result of improper installation, misuse, or modifications.
Especially when installing the printer at a high location, make sure that the printer is securely installed to the wall.
If the printer is not installed securely and falls, personal injury or damage to the printer may result.*
- *Make sure that the mounting surface and installation screws are strong enough to install the printer.
Securely install the printer so that the weight of the printer and any connected cables will not cause the printer to fall.
Otherwise, personal injury or damage to the printer may result.*
- *Do not install the printer in an unstable location or a location that is exposed to vibration and shocks.
If the printer falls, personal injury or damage to the printer may result.*



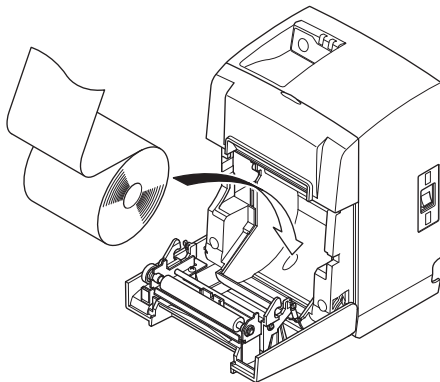
- (1) Attach the holding plate to the printer. Then tighten the two screws that were supplied to secure it in place.



- (2) Position the printer over the screws, etc., on the wall and then slide it downward to set it in place. After setting the printer in place, check the screws on the wall again to make sure that they are able to support the printer's weight.

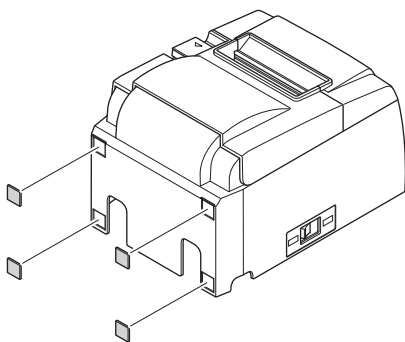
⚠ CAUTION

- The printer's weight is approximately 2.4 kg when the largest diameter roll paper is loaded.
- Use screws on the wall that have both shear strength and pulling-out strength to withstand a force of at least 12 kgf (118 N).

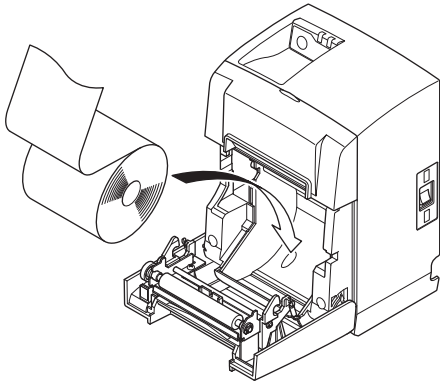


- (3) Push the cover open lever, and open the printer cover.
- (4) Insert the roll paper as shown.

4-2. Attaching the Rubber Feet



- (1) Attach the four rubber feet in the positions shown in the figure. Ensure that any soiling has been completely wiped off before attaching the rubber feet.



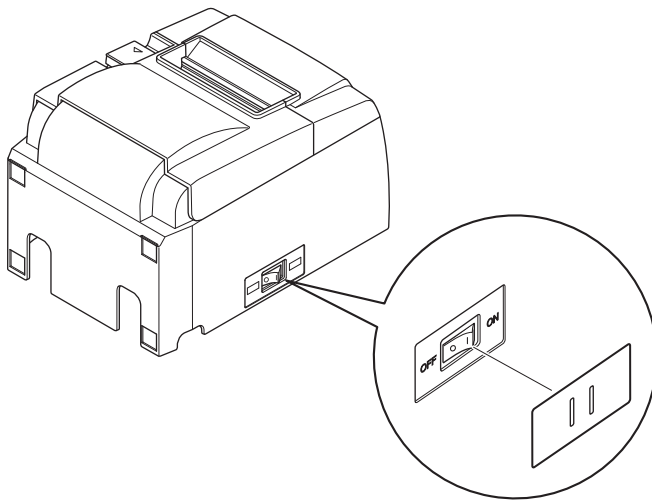
- (2) Push the cover open lever, and open the printer cover.
- (3) Insert the roll paper as shown.

4-3. Switch Cover Installation

It is not necessary to install the switch cover. Only install it if it is necessary for you. By installing the switch cover, the following become possible.

- Preventing the power switch from being operated by mistake.
- Ensuring that other people can not easily operate the power switch.

Install the switch cover as shown in the diagram below.



The power switch can be turned ON (I) and OFF (O) by inserting a narrow instrument (ball pen etc.) in 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.

5. Thermal Roll Paper Specification

When consumable parts have run out, use those specified below.

5-1. Roll paper specification

Thermal paper

Thickness: 57~85 μm (excluding Mitsubishi HiTec F5041)

Note: When using thin paper with a thickness of less than 65 μm , only the F5041 (Mitsubishi HiTec Paper Flensburg GmbH), TF50KS-E2D (Nippon Paper Industries) and P300/P310 (KSP) paper types are recommended.

Width: 79.5 \pm 0.5 mm (57.5 \pm 0.5 mm when the paper roller holder is used)

Outer roll diameter: ϕ 83 mm or less

Take up paper roll width: 80 $^{+0.5}_{-1}$ mm or (58 $^{+0.5}_{-1}$ mm when the paper roller holder is used)

Core outer/inner diameter: **Core outer** **Core inner**
 ϕ 18 \pm 1 mm ϕ 12 \pm 1 mm

Printed surface: Outer edge of roll

Tail end handling: Do not use paste or glue to secure the roll paper or its core.
 Do not fold the tail end of the paper.

5-2. Recommended paper

Note:

- 1) The print density may vary depending on the type of roll paper, operating environment, and power consumption mode.
- 2) A reader or scanner may not be able to scan a printed bar code or characters depending on the print density. Make sure that your reader or scanner is able to scan correctly beforehand.

5-2-1. U Model

Manufacturer	Product name	Quality characteristics/Use	Paper thickness (μm)
Mitsubishi Paper Mills Limited	P220AG	normal type paper	65
	HP220A	high image stability paper	65
	HP220AB-1	high image stability paper	75
Mitsubishi HiTec Paper Flensburg GmbH	F5041	normal type paper	60
Oji Paper Co., Ltd.	PD150R	normal type paper	75
	PD160R	high image stability paper	75
	PD170R	high image stability paper	75
	PD190R	middle image stability paper	75
Nippon Paper Industries	TF50KS-E2D	normal type paper	59
Kanzaki Specialty Papers Inc. (KSP)	P320RB	2 color paper: Red & Black	65
	P320BB	2 color paper: Blue & Blac	65
	P300 / P310	normal type paper	57 / 58

Note: The P300/P310 (KSP) paper types cannot be used when the printer is positioned vertically.

5-2-2. PU Model

Manufacturer	Product name	Quality characteristics/Use	Paper thickness (μm)	Power consumption mode
Mitsubishi Paper Mills Limited	P220AG	normal type paper	65	
	HP220A	high image stability paper	65	
	HP220AB-1	high image stability paper	75	
Mitsubishi HiTec Paper Flensburg GmbH	F5041	normal type paper	60	
Oji Paper Co., Ltd.	PD150R	normal type paper	75	
	PD160R	high image stability paper	75	
	PD170R	high image stability paper	75	
	PD190R	middle image stability paper	75	
Nippon Paper Industries	TF50KS-E2D	normal type paper	59	
Kanzaki Specialty Papers Inc. (KSP)	P320RB	2 color paper: Red & Black	65	Standard mode only
	P320BB	2 color paper: Blue & Blac	65	Standard mode only
	P300 / P310	normal type paper	57 / 58	

Note: The P300/P310 (KSP) paper types cannot be used when the printer is positioned vertically.

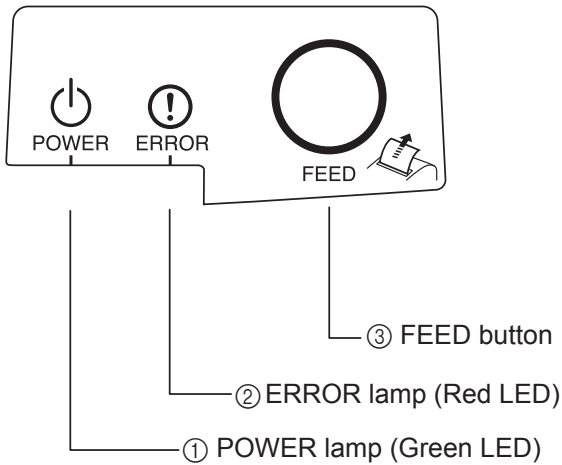
Note:

Access the following URL for the information of the recommended paper.

<http://www.star-m.jp/eng/dl/dl02.htm>

6. Control Panel and Other Functions

6-1. Control Panel



- ① POWER lamp (Green LED)
Lights when the power is ON.
- ② ERROR lamp (Red LED)
Indicates various errors in combination with POWER lamp.
- ③ FEED button
Press the FEED button to feed roll paper.

6-2. Errors

1) Automatically recoverable errors

Error Description	POWER Lamp	ERROR Lamp	Recovery Conditions
Head high temperature detection	Flashes at 0.5-second intervals	Off	Automatically recovered after the print head has cooled.
Board high temperature detection	Flashes at 2-second intervals	Off	Automatically recovered after the board has cooled.
Cover open error	On	On	Automatically recovered after the printer cover is closed.

2) Non-recoverable errors

Error Description	POWER Lamp	ERROR Lamp	Recovery Conditions
Head thermistor error	Flashes at 0.5-second intervals	Flashes at 0.5-second intervals	Non-recoverable
Board thermistor error	Flashes at 2-second intervals	Flashes at 2-second intervals	Non-recoverable
VM voltage error	Off	Flashes at 1-second intervals	Non-recoverable
VCC voltage error	Flashes at 1-second intervals	Flashes at 1-second intervals	Non-recoverable
EEPROM error	Flashes at 0.25-second intervals	Flashes at 0.25-second intervals	Non-recoverable
USB error	Flashes at 5-second intervals	Flashes at 5-second intervals	Non-recoverable
CPU error	Off	Off	Non-recoverable
RAM error	Off	On	Non-recoverable

Note:

- 1) If a non-recoverable error occurs, turn the power OFF immediately.
- 2) If a non-recoverable error occurs, please consult the dealer for repairs.

3) Paper cut error

Error Description	POWER Lamp	ERROR Lamp	Recovery Conditions
Paper cut error	Off	Flashes at 0.125-second intervals	Recovered by turning the power OFF, eliminating the cause of the error such as jammed paper, returning the cutter to its home position, and turning the power ON (see 7-3).

Note:

If the cutter does not return to its home position or does not perform the initial movement, it will result in a non-recoverable error.

4) Paper detection error

Error Description	POWER Lamp	ERROR Lamp	Recovery Conditions
Paper out error	On	Flashes at 0.5-second intervals	Automatically recovered by loading a new paper roll, then closing the printer cover.

6-3. Self-Printing

Test Printing

Turn the power ON while holding the FEED button depressed. Test printing is performed. The version number and printer settings are printed. After the printer starts printing, release your hand from the FEED button. After self-printing is completed, the printer will start in the normal mode.

```
*** TSP100 Ver1.0
Unit   : Cutter
        FEDCBA9876543210
<2>   000000000000000000
<4>   000000000000000000
<C>   000000000000000000
USB-ID : Disable
Class  : Printer
Cutter : Enable
```

7. Preventing and Clearing Paper Jams

7-1. Preventing Paper Jams

The paper should not be touched during ejection and before it is cut. Pressing or pulling the paper during ejection may cause a paper jam, paper cutting failure or line feed failure.

7-2. Removing Paper Jam

If a paper jam occurs, clear it as described below.

(1) Set the power switch to off to turn off power to the printer.

(2) Push the cover open lever, and open the printer cover.

If the printer cover will not open on auto cutter models, it means that the auto cutter is not at the home position. In this case, return the auto cutter to the home position by following the instructions provided in section 7-3. Then open the printer cover after the paper jam has been removed.

(3) Remove the jammed paper.

CAUTION

Take care not to damage the printer when removing the jammed paper.

Since it is easy to damage the thermal head in particular, take care not to touch it.

(4) Position the roll paper straight and close the printer cover gently.

Note 1: Make sure that the paper is positioned straight. If the printer cover is closed with the paper skewed, a paper jam may result.

Note 2: Lock the printer cover by pressing down on the sides. Do not try to close it by pressing down on the center. The cover may not lock properly.

(5) Set the power switch to on to turn on power to the printer. Make sure that the ERROR LED is not lit.

Note: While the ERROR LED is lit, the printer will not accept any commands such as the print command, so make sure that the printer cover is locked properly.

Caution Symbol



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 symbol is placed near the cutter.

Never touch the cutter blade, as you could injure your fingers.



This symbol is placed near the peripheral drive connector.

Do not connect this to a telephone.



This symbol label or stamp is placed near the screws securing the case or the protective plate, 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.

7-3. Releasing a Locked Cutter (Auto Cutter Mode only)

If the auto cutter locks up, set the power switch to OFF to turn off the printer, and then set the power switch to ON to turn the printer back on. A typical locked cutter will be restored when you restart the printer.

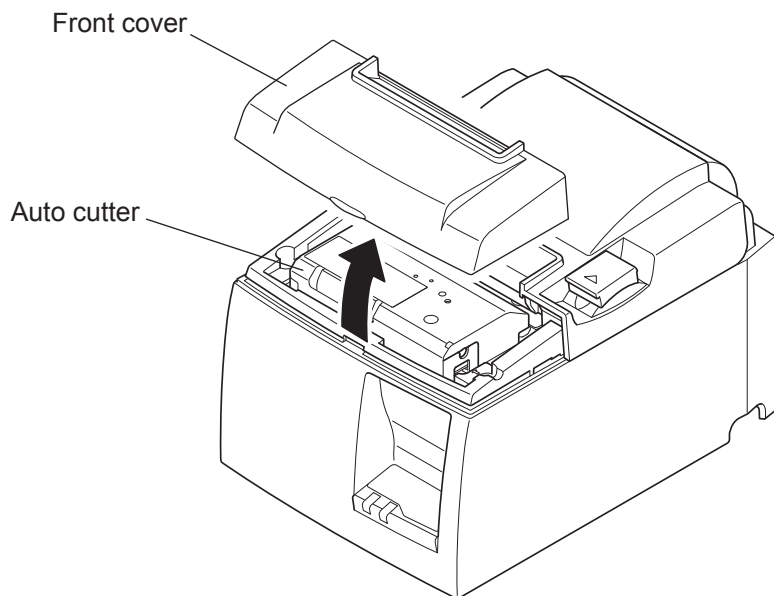
If restarting the printer does not release the locked cutter, follow the steps below.

⚠ WARNING

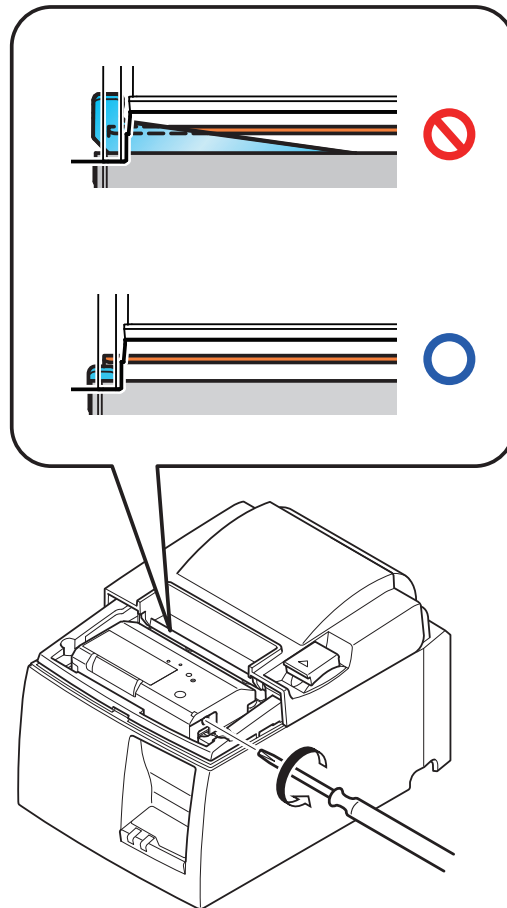
Since working on the cutter may be dangerous, be sure to turn off the printer first.

- (1) Set the power switch to OFF to turn off the printer.
- (2) Remove the front cover to reveal the auto cutter.
- (3) Remove any jammed paper.

Note: Be careful not to damage the printer while removing any jammed paper. Since the thermal print head is particularly sensitive, be sure not to touch it.



- (4) Insert a Philips screwdriver into the manual operation hole on the side of the cutter, and turn it in the direction of the arrow shown on the right until the rear cover is opened.
- (5) Open the printer cover, remove any jammed paper, and then reinstall the paper roll.
- (6) Install the front cover, and then set the power switch to ON.



8. Periodical Cleaning

Printed characters may become partially unclear due to accumulated paper dust and dirt. To prevent such a problem, paper dust collected in the paper holder and paper transport section and on the surface of the thermal head must be removed periodically. Such cleaning is recommended to be carried out once six month or one million lines.

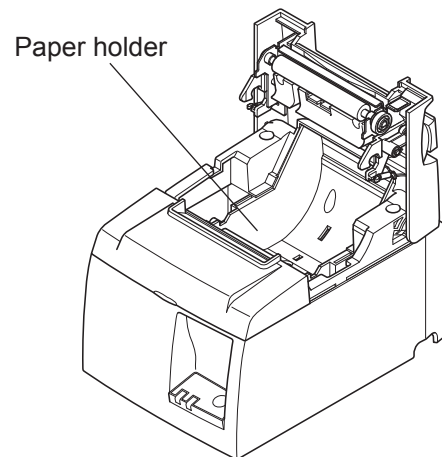
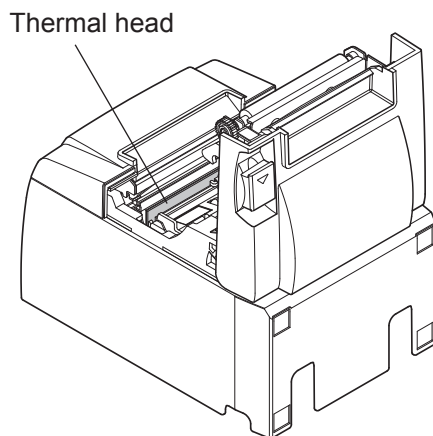
8-1. Cleaning the Thermal Head

To remove blackish dust collected on the surface of the thermal head, wipe it with Isopropyl alcohol (IPA).

Note: The thermal head is easy to damage, so clean it gently with a soft cloth. Take sufficient care not to scratch it when cleaning it.

8-2. Cleaning the Paper Holder

Use a soft cloth to remove paper dust from the paper holder and paper transport section.



9. Peripheral Unit Drive Circuit

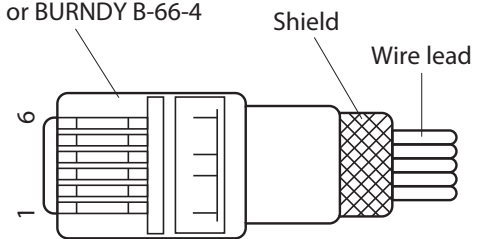
Peripheral unit drive circuit connector only connects to peripheral units such as cash drawers, etc. Do not connect it to a telephone. Use cables which meet the following specifications.

Peripheral Drive Connector

Pin No.	Signal name	Function	I/O direction
1	FG	Frame ground	—
2	DRD1	Drive signal 1	OUT
3	+24V	Drive power	OUT
4	+24V	Drive power	OUT
5	DRD2	Drive signal 2	OUT
6	DRSNS	Sense signal	IN

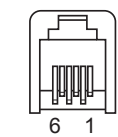
Modular plug

Modular plug: MOLEX 90075-0007, AMP641337, or BURNDY B-66-4

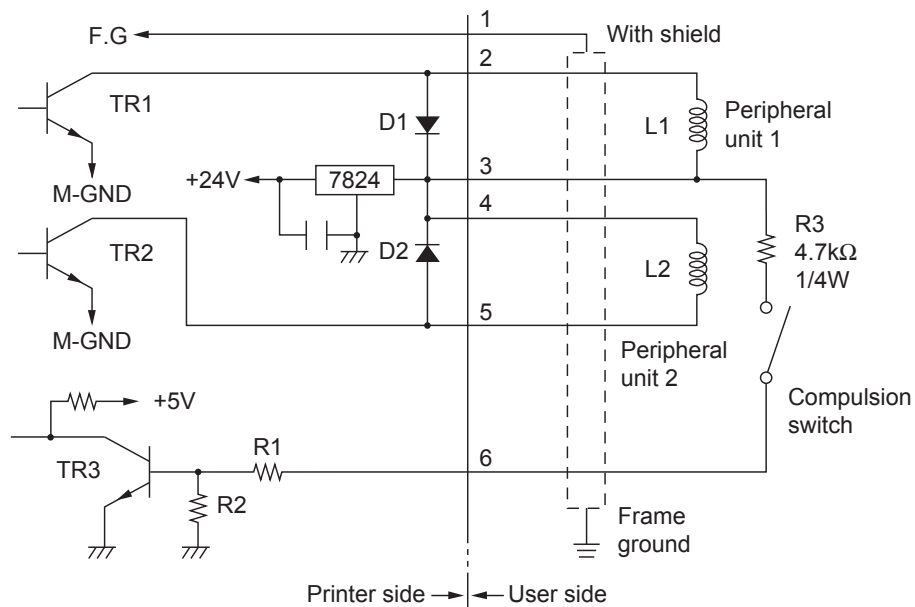


Drive circuit

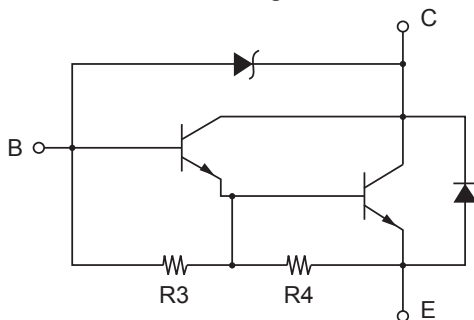
The recommended drive unit is shown below.



6-P Modular jack connector



Reference
2SD 1866 Circuit Configuration



R3= 3.5kΩ
R4= 300Ω

Drive Output: 24V, Max. 1.0A
TR1, TR2: Transistor 2SD1866 or equivalent
R1=10 kΩ
R2=33 kΩ

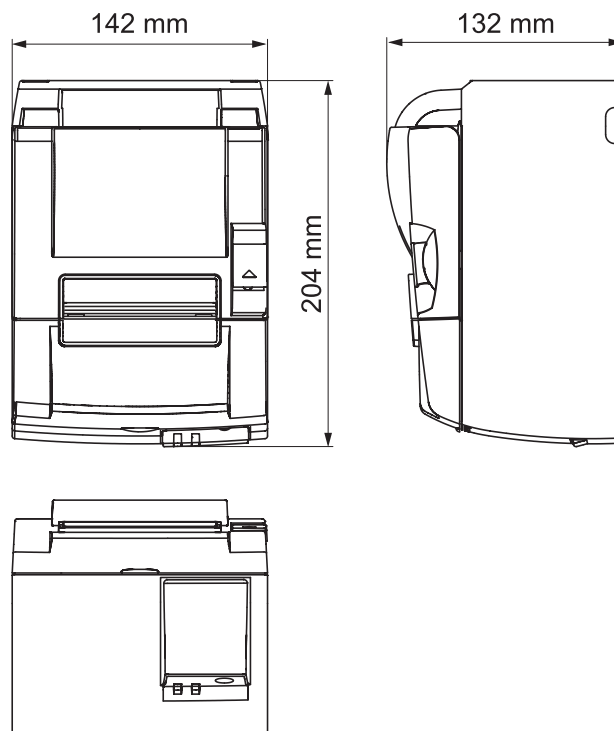
- Notes:**
1. Pin 1 must be shield drain wire connected to peripheral device frame ground.
 2. It is not possible to drive two drives simultaneously.
 3. The peripheral drive duty must satisfy the following:
ON time / (ON time + OFF time) \leq 0.2
 4. Minimum resistance for coils L1 and L2 is 24 Ω .
 5. Absolute maximum ratings for diodes D1 and D2 (Ta = 25°C) are:
Average Rectified Current Io = 1A
 6. Absolute maximum rating for transistors TR1 and TR2 (Ta = 25°C) are:
Collector current Ic = 2A

10. Specifications

10-1. General Specifications

- | | |
|-----------------------|---|
| (1) Printing method | Direct line thermal printing |
| (2) Print speed | Max. 1000 dots/sec. (125 mm/sec.) |
| (3) Dot density | 203 dpi: 8 dots/mm (0.125 mm/dot) |
| (4) Printing width | Max. 72 mm |
| (5) Roll paper | Refer to chapter 5 for details on the recommended roll paper.
Paper width: 79.5±0.5 mm (57.5±0.5 mm when the paper roll holder is used)
Roll diameter: ø83 mm or less |
| (6) Overall dimension | 142 (W) × 204 (D) × 132 (H) mm |
| (7) Weight | Auto cutter model : 1.72 kg (without roll paper)
Tear bar model : 1.56 kg (without roll paper) |
| (8) Noise Approx. | U Model
49 dB (Auto cutter model)
48 dB (Tear bar model)
PU Model
50 dB (Auto cutter model)
50 dB (Tear bar model) |

Note: The noise measurements listed above were obtained according to conditions established by this company. The noise measurements may vary depending on the type of paper used, type of printing, operating environment, and power consumption mode.



10-2. Auto Cutter Specifications

- (1) Cutting frequency Max. 20 cuts per minute
 (2) Thickness of paper 65~85 μm

10-3. Interface

- (1) Specifications USB 2.0 full speed
 Printer class and vendor class compatible
- (2) Connector
- | | |
|----------|---------------------------------|
| U Model | Type B |
| PU Model | Type B and PoweredUSB connector |

Type B connector:

DUSB-BRA42-T11(D2)-FA (manufacturer: DDK)

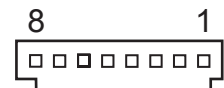
Pin No.	Signal name	Function
1	VBUS	USB Power pin (+5V DC)
2	D -	Serial Data -
3	D +	Serial Data +
4	GND	Signal ground



PoweredUSB connector:

69913-104LF (manufacturer: FCI)

Pin No.	Signal name	Function
1	F-GND	Frame ground
2	+24V	+24V DC
3	GND	Signal ground
4	D +	Serial Data +
5	D -	Serial Data -
6	VBUS	USB Power pin (+5V DC)
7	+24V	+24V DC
8	F-GND	Frame ground



10-4. Electrical Characteristics

10-4-1. U Model

- (1) Input Voltage 100 to 240 V AC, 50/60 Hz
- (2) Current Consumption Operating: Approx. 40 W (at ASCII printing)
 Stand-by: Approx. 3 W

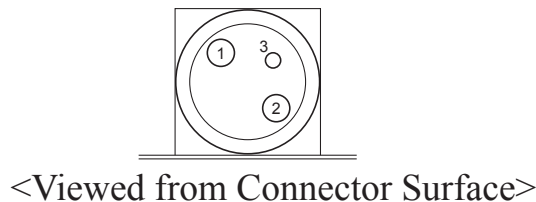
10-4-2. PU Model (AC adapter)

- (1) Input: 100 to 240V AC, 50/60 Hz
 (2) Output: DC 24V \pm 5%
 (3) Current Consumption (DC 24 V at room temperature)
- Low-power consumption mode:
- Stand-by: Approx. 0.1A
 Mean: Approx. 1.0A (at ASCII continuous printing)
 Peak: Approx. 5.0A
 (at print duty 100%, for 10 seconds or less)
- Standard mode:
- Stand-by: Approx. 0.1A
 Mean: Approx. 1.4A (at ASCII continuous printing)
 Peak: Approx. 10.0A
 (at print duty 100%, for 10 seconds or less)

To switch between the standard and low-power consumption modes, refer to chapter 11 for details on the DIP switch settings.

Notes: There is a danger that there will be a large incoming current when turning the printer back on after turning it off. Therefore, wait at least 5 seconds before turning the printer back on.

Pin No.	Function
1	Drive power (24V)
2	Signal GND
3	N.C.
Shell	Frame ground



(4) Power Connector

Notes:

- When using a printer power supply other than the optional AC adapter (PS60A-24A series), be sure that the following cautions are observed.
- Use a power supply of DC 24 V \pm 5% and more than 2.0 A (5.0 A Load 10 sec. Min.) with SELV output and LPS or Class 2 output approved by IEC60950.
- Be careful about installing the printer in an area where there is noise. Take the appropriate measures to protect against electrostatic AC line noise, etc.

10-4-3. PU Model (PoweredUSB cable)

When using the PoweredUSB cable, DC 24 V must be supplied to the printer from the system. Use a power supply for the printer that meets the following requirements.

Power Requirements

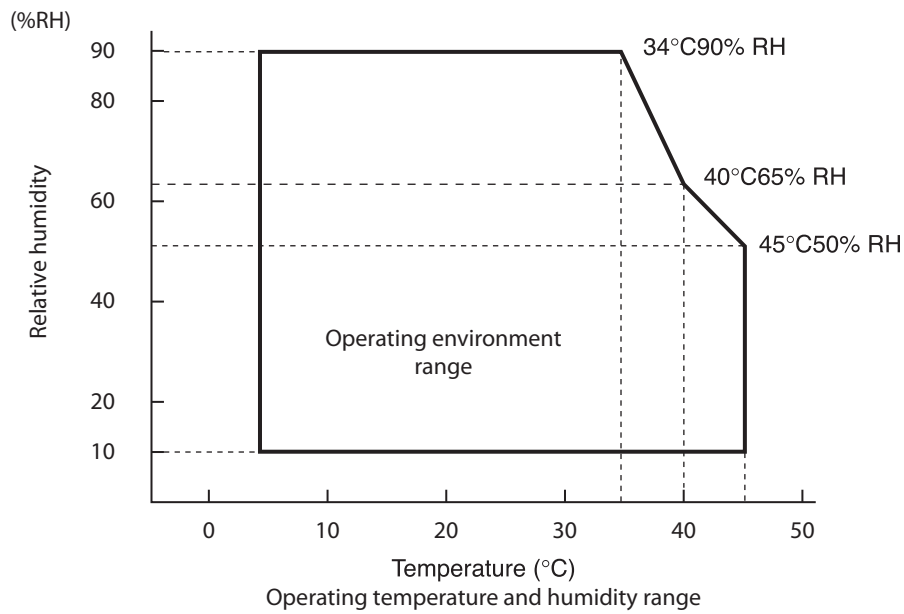
- (1) Output: DC 24V \pm 5%
- (2) Current Consumption (DC 24 V at room temperature)
 - Low-power consumption mode:
 - Stand-by: Approx. 0.1A
 - Mean: Approx. 1.0A (at ASCII continuous printing)
 - Peak: Approx. 5.0A
(at print duty 100%, for 10 seconds or less)
 - Standard mode:
 - Stand-by: Approx. 0.1A
 - Mean: Approx. 1.4A (at ASCII continuous printing)
 - Peak: Approx. 10.0A
(at print duty 100%, for 10 seconds or less)

To switch between the standard and low-power consumption modes, refer to chapter 11 for details on the DIP switch settings.

Notes: There is a danger that there will be a large incoming current when turning the printer back on after turning it off. Therefore, wait at least 5 seconds before turning the printer back on.

10-5. Environmental Requirements

- (1) Operating
Temperature 5°C to 45°C
Humidity 10% to 90% RH (without condensation)



- (2) Transport/storage (except for paper)
Temperature -20°C to 60°C
Humidity 10% to 90% RH (without condensation)

10-6. Reliability

- 1) Life
- | | |
|--------------|--|
| Mechanical: | 20 million lines |
| Head: | 100 million pulses, 100 km ($\pm 15\%$ max. average head resistance fluctuation)
For 2-color printing, 50 million pulses, 50 km ($\pm 15\%$ max. average head resistance fluctuation) |
| Auto cutter: | 1 million cuttings (provided the paper thickness is between 65 and 85 μm) |

<Conditions>

Average printing ratio: 12.5%

Recommended thermal paper: 65 μm

- 2) MCBF: 60 million 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 million lines.
- * As the mechanical remains at 20 million lines, the MCBF of 60 million lines does not indicate its useful life.
- 3) Auto Cutter (Life)
1 million cuttings (provided the paper thickness is between 65 and 85 μm)
- * All the reliability values indicated above are based on the use of the recommended thermal paper. No reliability can be guaranteed for the use of non-recommended thermal paper.

11. DIP Switch Settings

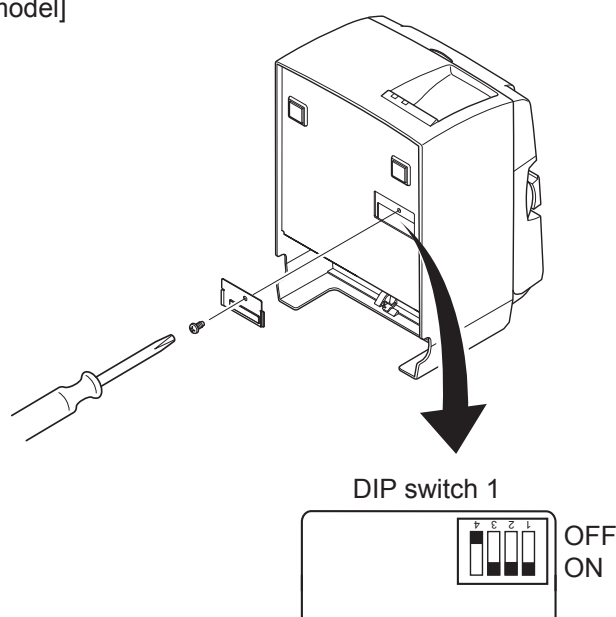
There are DIP switches located on the bottom of the PU model printers and various settings can be performed as shown in the following table.

When changing the settings, use the following procedure.

Note: For U model printers, the DIP switch settings do not need to be performed.

- (1) Turn the printer off and disconnect the power cable plug from the AC outlet.
- (2) Remove the screw, and then remove the DIP switch cover on the bottom of the printer.

[PU model]



When the printer is shipped, DIP switch 1-4 is set to OFF; all of the other switches are set to ON.

- (3) Use a tool with a narrow tip to change the DIP switch settings.
- (4) Install the DIP switch cover and secure it with the screw.

Note: The new settings will take effect after the printer is turned on.

DIP switch 1

Switch 1-1	Power consumption mode
OFF	Standard mode
ON	Low-power consumption mode (Default setting)

Always set DIP switches 1-2 and 1-3 to ON and DIP switch 1-4 to OFF.



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Please access the following URL
<http://www.star-m.jp/eng/dl/dl02.htm>
for the latest revision of the manual.

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