

OKIPOS 408II

User's Guide

**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 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 printers marketed in Canada.

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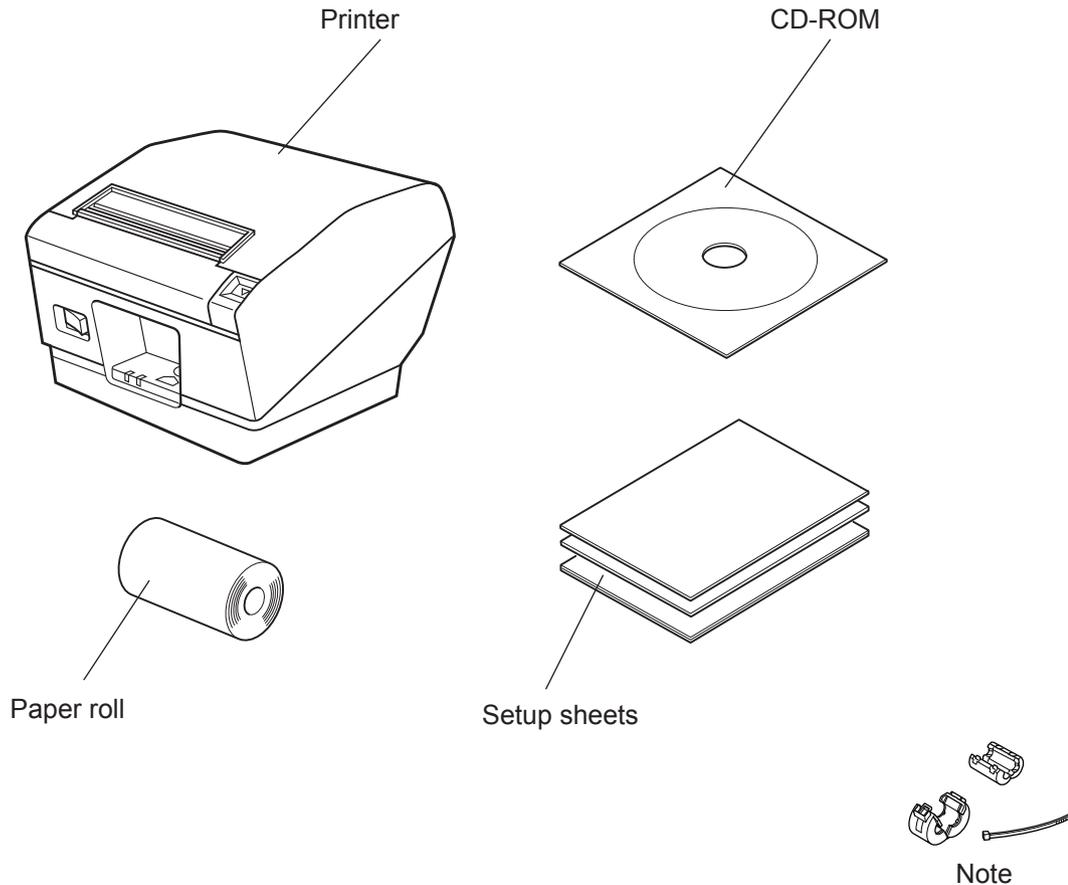
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1. Unpacking and Installation

1-1. Unpacking

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



Note: The ferrite core and fastener provided with your printer depend on your printer configuration.

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.

1-2. Choosing a place for the printer

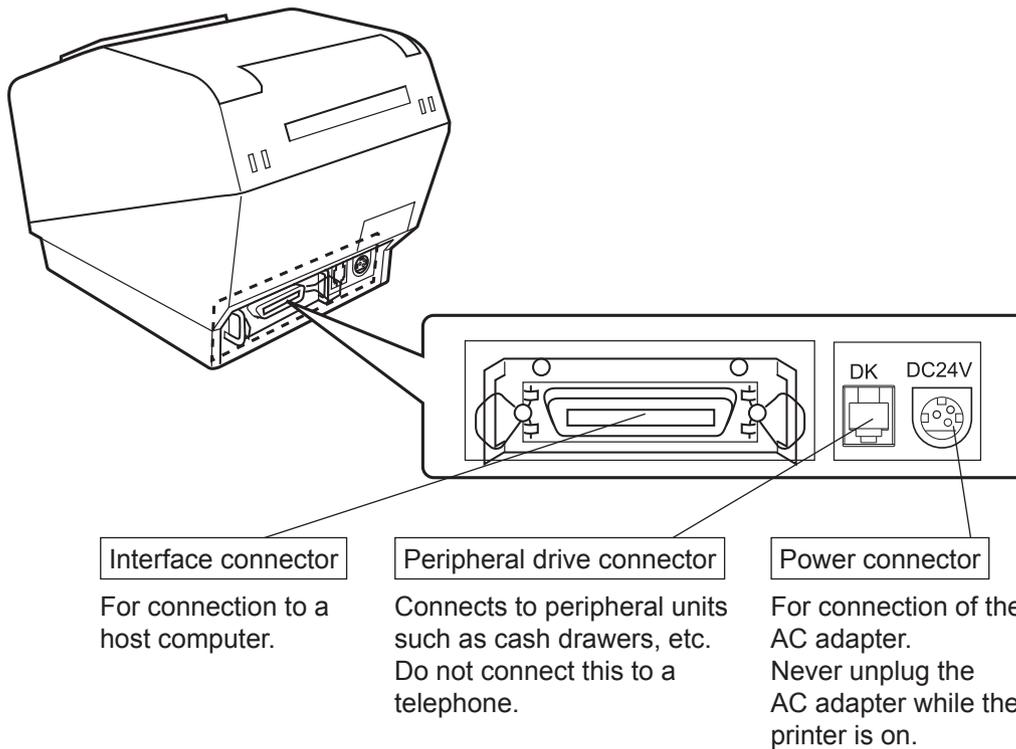
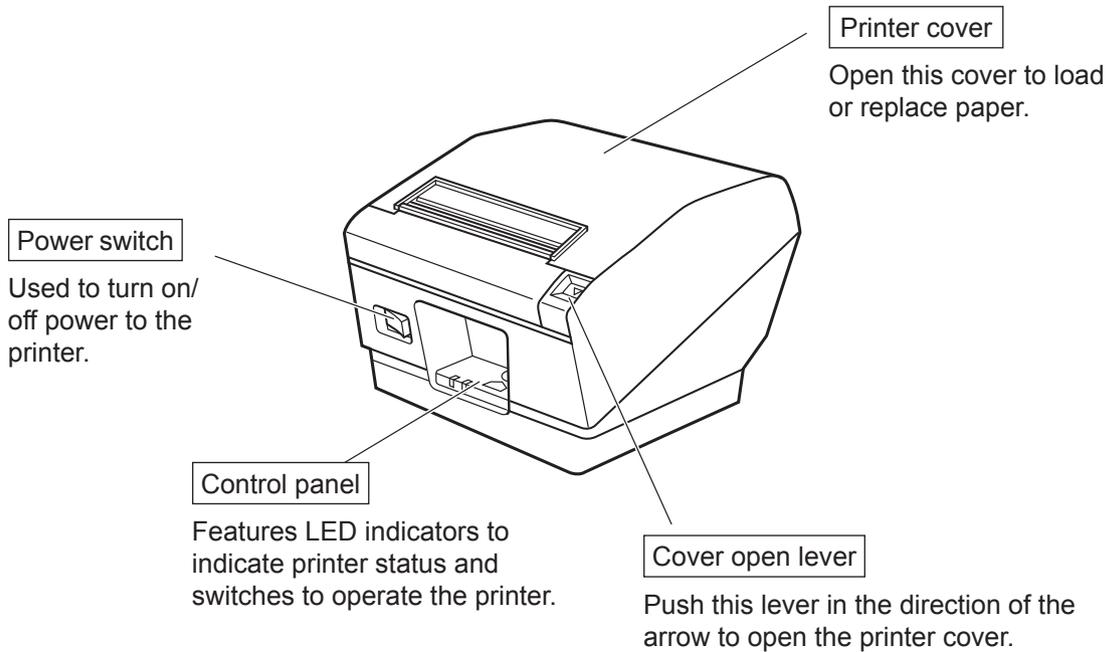
Before actually unpacking the printer, you should take a few minutes to think about where you plan to use it. Remember the following points when doing this.

- ✓ 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.

⚠ 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

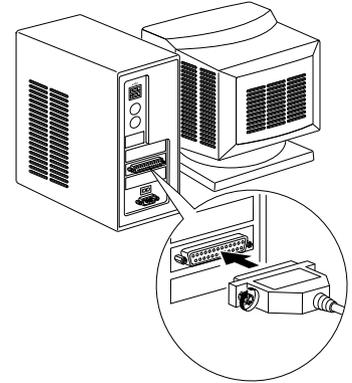


3. Setup

3-1. Connecting the Cable to the PC

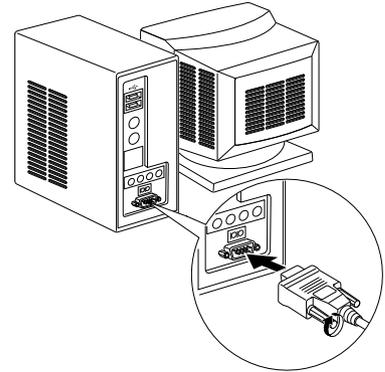
3-1-1. Parallel Interface Cable

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



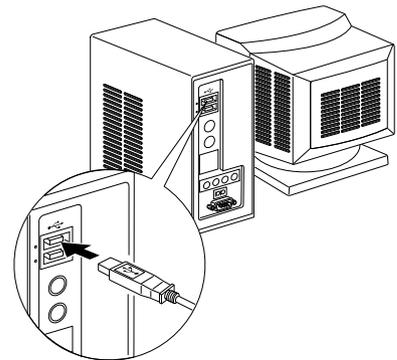
3-1-2. RS-232C Interface Cable

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



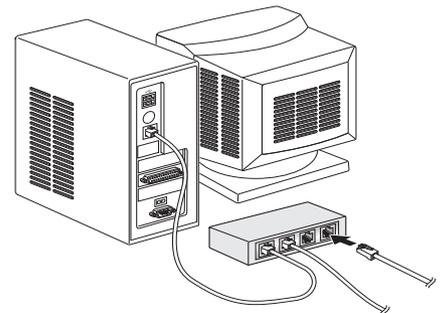
3-1-3. USB Interface Cable

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



3-1-4. Ethernet Interface cable

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



3-2. Connecting the Cable to the Printer

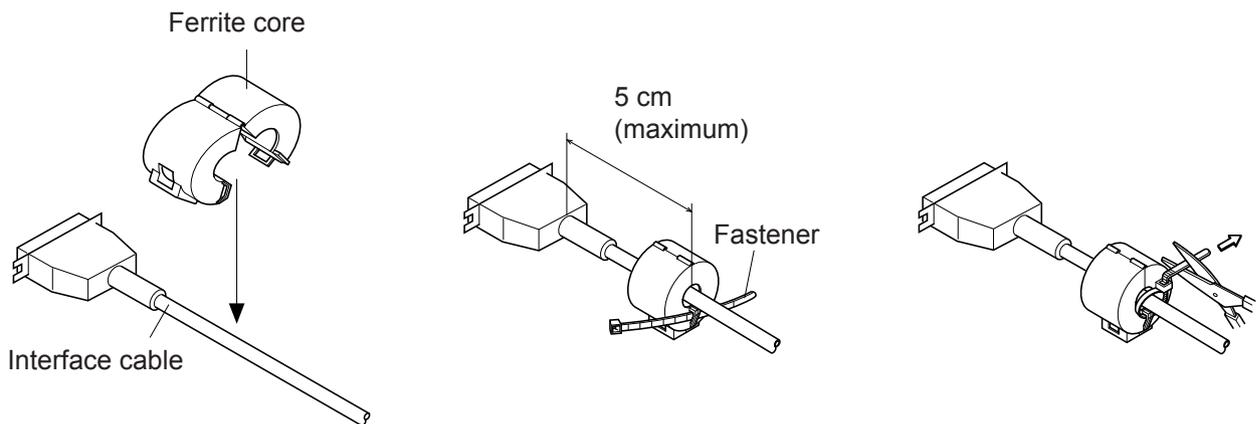
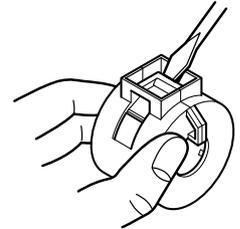
Note that the interface cable is not provided. Please use a cable that meets specifications.

⚠ CAUTION

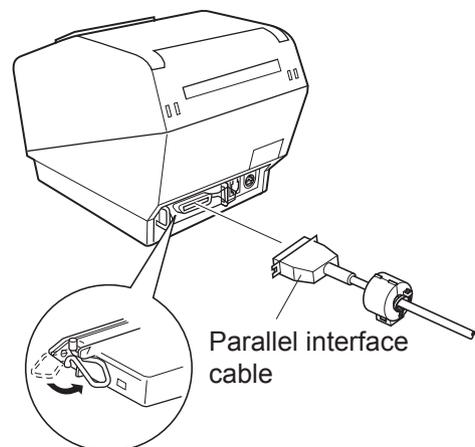
Before connecting/disconnecting the interface cable, make sure that power to the printer and all the devices connected to the printer is turned off. Also make sure the power cable plug is disconnected from the AC outlet.

3-2-1. Parallel Interface Cable

- (1) Make sure the printer is turn off.
- (2) Affix the ferrite core onto the cable as shown in the illustration.
- (3) Pass the fastener through the ferrite core.
- (4) Loop the fastener around the cable and lock it.
Use scissors to cut off any excess.



- (5) Connect the interface cable to the connector on the rear panel of the printer.
- (6) Fasten the connector clasps.



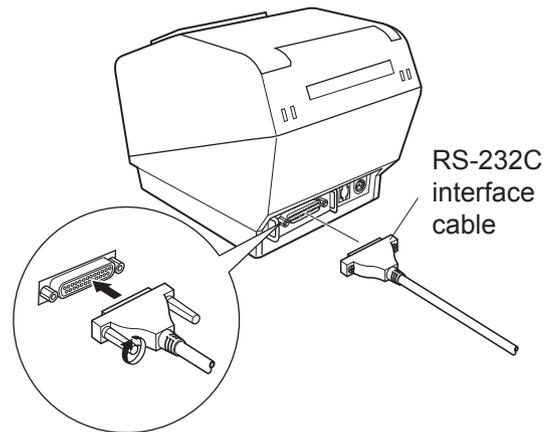
3-2-2. RS-232C Interface Cable

- (1) Make sure the printer is turn off.

△ CAUTION

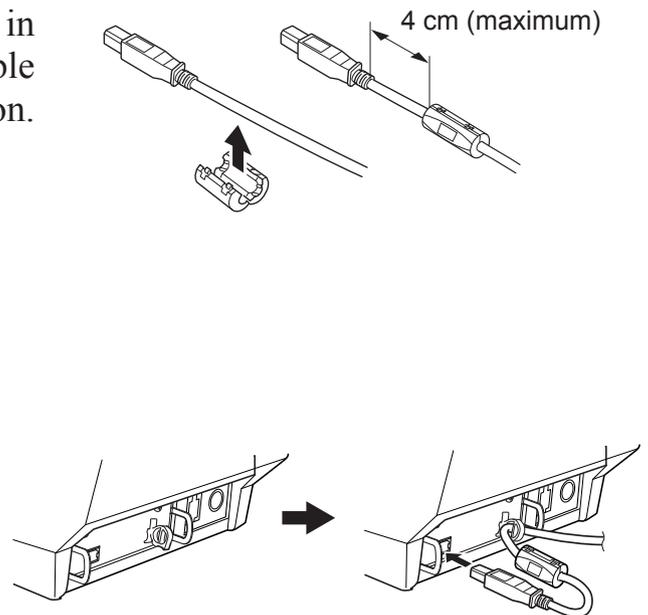
Before connecting/disconnecting the interface cable, make sure that power to the printer and all the devices connected to the printer is turned off. Also make sure the power cable plug is disconnected from the AC outlet.

- (2) Connect the interface cable to the connector on the rear panel of the printer.
- (3) Tighten the connector screws.



3-2-3. USB Interface Cable

Affix the ferrite core onto the USB cable as shown in the illustration below and make sure to pass the cable through the cable support as shown in the illustration.



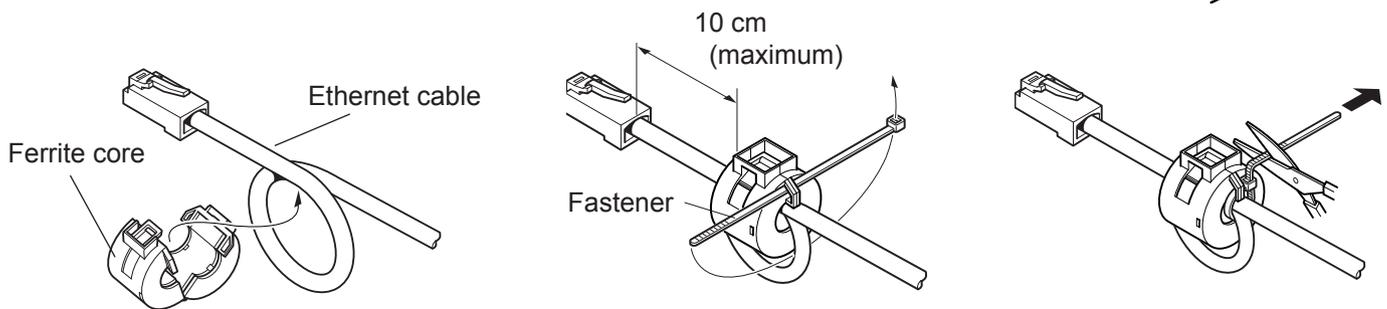
3-2-4. Connecting Ethernet Cable

If a ferrite core is included, install the ferrite core onto the Ethernet cable according to the following procedure to prevent electrical noise.

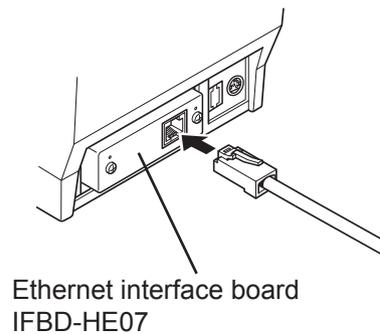
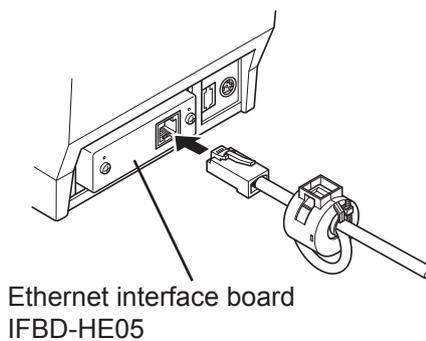
If a ferrite core is not included, perform steps (1) and (5) only.

When using an Ethernet cable that is 10 m or less, shielded cable is recommended.

- (1) Make sure the printer is turned off.
- (2) Install the ferrite core onto the ethernet cable as shown in the illustration below.
- (3) Pass the fastener through the ferrite core.
- (4) Loop the fastener around the cable and lock it. Use scissors to cut off any excess.



- (5) Connect the interface cable to the connector on the rear panel of the printer.

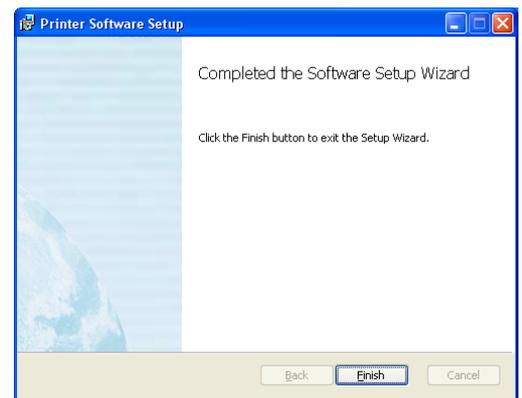
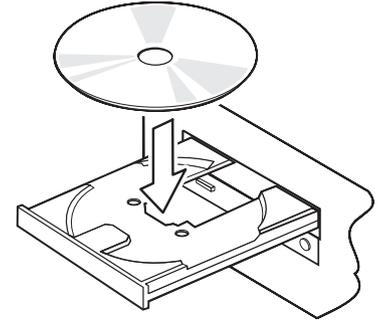


3-3. Installing the Printer Software

Here is the procedure for installing the printer driver and utility software, which are stored on the supplied CD-ROM.

The procedure applies to the Windows operating systems shown below.

- Windows XP (SP2 or later)
 - Windows Vista
 - Windows 7
- (1) Turn ON the power to your PC 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) The dialog shown in the illustration indicates that the procedure has been completed. Click “Finish”.



The dialog that appears on the screen varies with your system. This completes the installation of the printer software. A message will appear, prompting you to restart. Restart Windows.

3-4. Connecting the Optional AC Adapter

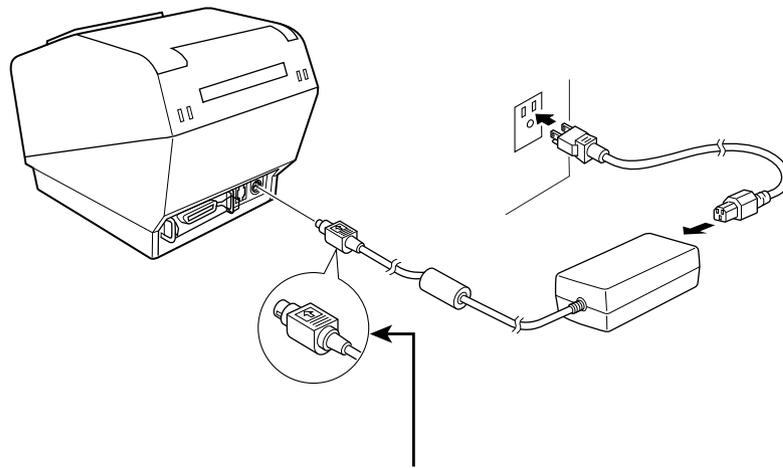
Note: Before connecting/disconnecting the AC adapter, make sure that power to the printer and all the devices connected to the printer is turned off. Also make sure the power cable plug is disconnected from the AC outlet.

(1) 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

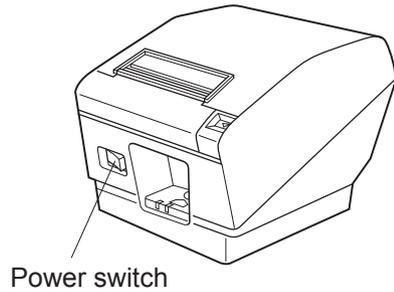
When disconnecting the cable, take hold of the cable connector to pull it out. Releasing the lock makes it easy to disconnect the connector.

Pulling the cable excessively could cause damage to the connector.

3-5. Turning Power On

Make sure that the Power cord has been connected as described in 3-4.

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 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. Connecting to a Peripheral Unit

You can connect a peripheral unit to the printer using a modular plug. See “Modular plug” on page 53 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

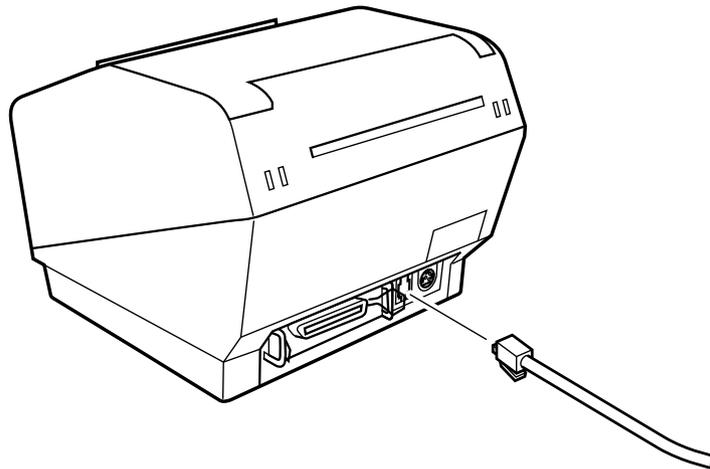
Make sure that the printer is turned off and unplugged from the AC outlet and that the computer is turned off before making connections.

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

⚠ CAUTION

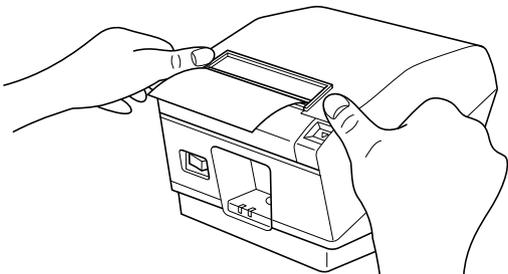
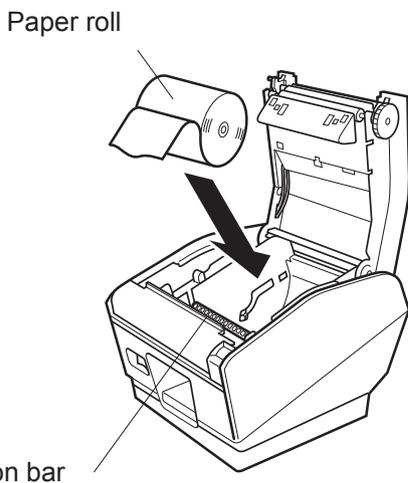
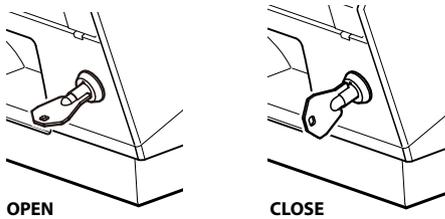
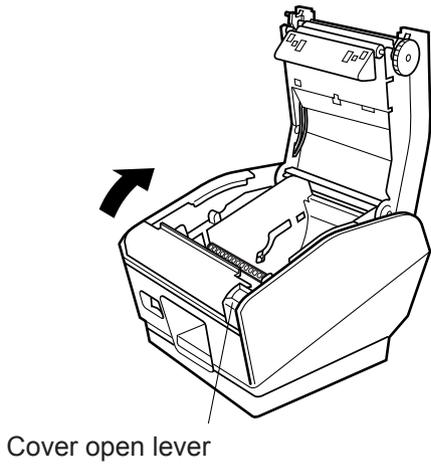
Do not connect a telephone line into the peripheral drive connector. Failure to observe this may result in damage to the printer.

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



3-7. Loading the Paper Roll

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



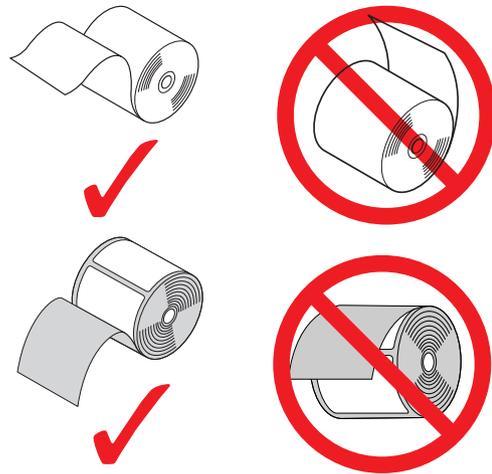
- ① Push the cover open lever and open the printer cover.

For the RX model:

Turn the key under the cover open lever so that the lock is "OPEN." Then, push down on the cover open lever and open the printer cover.

The key cannot be removed when the lock is "OPEN." Before you remove the key, turn it so that the lock is in the "CLOSE" position.

- ② Set the paper roll in the direction as shown, and pull on the leading edge of the paper towards you.



Note: Make sure not to pass the paper under the tension bar. In the following condition, remove the tension bar unit in accordance with the procedure described in paragraphs 3-7-1:

- Paper thickness between 100 μm and 150 μm

Note: When using a paper roll with an 79.5 mm width, attach the paper roll holder in accordance with the procedure described in paragraph 3-7-2.

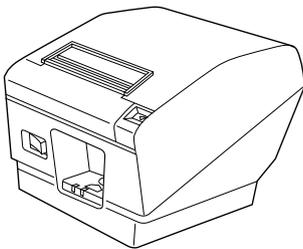
- ③ Push both sides as shown in order to close the printer cover.

Note: When closing the printer cover, make sure both sides close firmly, not just one side.

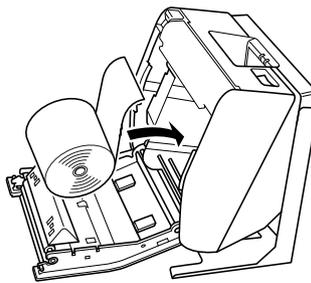
3-7-1. Removing the Tension Bar

When using thermal paper roll, the tension bar unit may or may not be necessary, depending on the paper thickness. If the tension bar unit is unnecessary, remove it in accordance with the procedure indicated below. The tension bar unit is unnecessary when using thermal label paper roll (tack label paper).

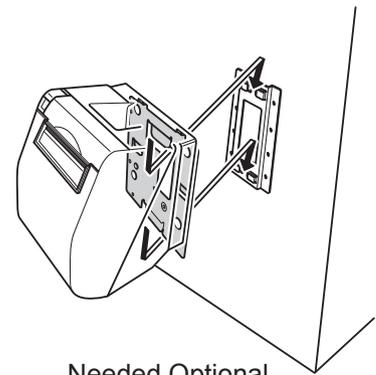
| | |
|--------------------------------------------------------------------|-------------|
| Paper thickness between 100 μm and 150 μm | Necessary |
| Paper thickness between 65 μm and 100 μm | Unnecessary |



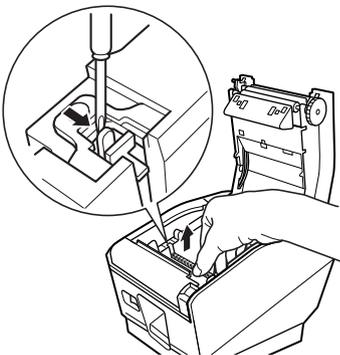
Horizontal



Needed Optional
Vertical Kit



Needed Optional
Wall-mount Kit

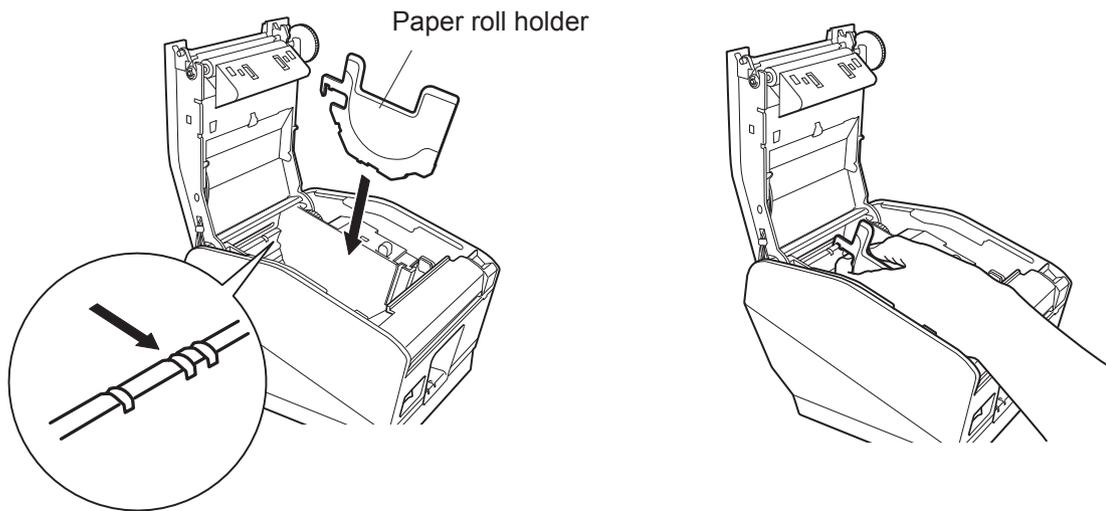


Use a flat head screwdriver as shown to remove the clips at both ends of the tension bar. Then, remove the tension bar unit.

3-7-2. Removing the Paper Roll Holder

When using a paper roll with an 79.5 mm width, install the paper roll holder into the groove as shown. And change the setting at memory switch #4. For instructions on setting the memory switch, refer to the separate Programmer's Technical Reference manual.

Note: After using a paper roll with a width of 79.5 mm, do not change to a paper roll with a width of 115.5 mm. This is because the printer head has deteriorated as a result of a portion of the head having been in direct contact with the rubber roller.



Caution Symbol



This symbol is placed near the thermal head to indicate that it may be hot. Never touch the thermal head immediately after the printer has been used. Let the thermal head cool for a few minutes before touching it. Never touch the thermal head with your hands because it can generate static electricity, which can damage the device in the thermal head.



This symbol is placed near the cutter. Never touch the cutter blade, which could cut your finger.



This symbol is placed near the peripheral drive connector. Do not connect this to a telephone.

⚠ 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.*

⚠ 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 cable, 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.*
-

△ Notes on Using the Auto Cutter

- 1) *To print after a cut, feed 1 mm (8-dot line) or more of paper.*
 - 2) *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.*
 - 3) *If the printer is placed horizontally, the use of the partial cut is recommended. If you use the full cut, the cut pieces of paper may fall into the paper outlet passage, causing a paper jam as a result of cutting multiple pieces of paper. Therefore, do not use the full cut if the printer is placed horizontally.*
 - 4) *If you use the full cut, make sure to remove the piece of paper after each cut.*
 - 5) *Do not attempt to remove the paper during a cut, as this can cause a paper jam.*
-

4. Consumable Parts and AC Adapter

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

Make sure that the AC adapter specified in the table is used.

Use of consumable parts or AC adapter which are not specified in the table may result in damage to the printer, fire or electric shock.

4-1. Thermal Paper Roll

(1) Paper roll specification

Width: 115.5±0.5 mm or 79.5±0.5 mm

Outer roll diameter: ø100 mm or less

Take up paper roll width: 112^{+0.5}₋₁ mm or 80^{+0.5}₋₁ mm

Thickness: 65~150 µm (when using 115.5 mm width paper)

65~85 µm (when using 79.5 mm width paper)

Core outer/inner diameter

| Paper thickness | Core outer | Core inner |
|-----------------|------------|------------|
| 65~75 µm | ø18±1 mm | ø12±1 mm |
| 65~75 µm | ø32±1 mm | ø25.4 mm |
| 75~150 µm | ø32±1 mm | ø25.4 mm |

Printed surface: Outer edge of roll

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

Do not fold the tail end of the paper.

(2) Recommended paper

| Manufacture | 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 |
| | P220AGB | normal type paper, card ticket | 80 |
| | P220AB | normal type paper, card ticket | 85 |
| | P220AC-1 | normal type paper, card ticket | 95 |
| | P220AC | normal type paper, card ticket | 105 |
| | P220AD | normal type paper, card ticket | 130 |
| | P220AE-1 | normal type paper, card ticket | 150 |
| | PB670 | 2 color paper: Red & Black | 75 |
| Mitsubishi HiTec Paper Flensburg GmbH | F5041 | normal type paper | 60 |

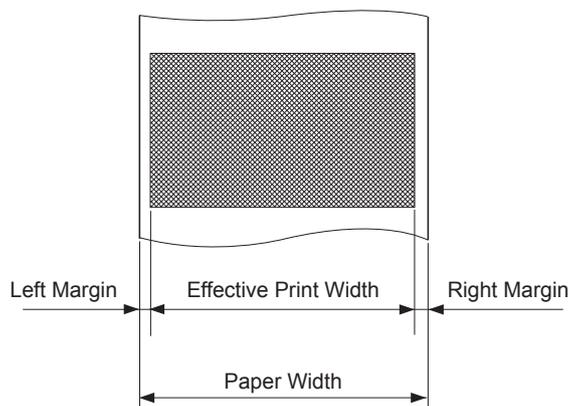
| Manufacture | Product name | Quality characteristics/Use | Paper thickness (μm) |
|--------------------------------------|--------------|-----------------------------|----------------------|
| Oji Paper Co., Ltd. | PD150R | normal type paper | 75 |
| | PD160R | high image stability paper | 65/75 |
| | PD450 | normal type paper | 65 |
| Nippon Paper Industries | TF50KS-E2D | normal type paper | 59 |
| Kanzaki Speciality Papers Inc. (KSP) | P300/P310 | normal type paper | 57/58 |
| | P320RB | 2 color paper: Red & Black | 65 |
| | P320BB | 2 color paper: Blue & Black | 65 |

Note:

- 1) Depending on the type and thickness of the paper, it may be necessary to change the settings for printing darkness. To change the darkness settings, use the printing darkness settings command <ESC><RS> ‘d’ n. Refer to the separate programmer’s manual for details.
- 2) The print density may vary depending on the type of paper roll and the operating environment.
- 3) 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.

(3) Effective Print Width

| Paper Width (mm) | Right / Left Margin (mm) | Effective Print Width (mm) | Number of Print Columns (12 × 24 Font) |
|------------------|--------------------------|----------------------------|----------------------------------------|
| 115.5 ± 0.5 | 4 | 104 | 69 |
| 79.5 ± 0.5 | 4 | 72 | 48 |



4-2. Thermal Label Paper Roll (Tack Label Paper)

(1) Label paper specification

| | |
|----------------------------|----------------------------------------------------------------------------------------------------------|
| Backing paper width: | 110±0.5 mm |
| Outer roll diameter: | ø100 mm or less |
| Take up paper roll width: | 112 ^{+0.3} ₋₁ mm |
| Thickness: | Max. 150 µm |
| Core outer/inner diameter: | core inner diameter ø25.4±1 mm/core outer diameter ø32±1 mm |
| Printed surface: | Outer edge of roll |
| Tail end handling: | Do not use paste or glue to secure the paper roll or its core. Do not fold the tail end of the paper. |

(2) Recommended label paper

| Manufacturer | Product name | Quality features/ applications | Thickness (µm) | | | Adhesion type |
|-------------------------|------------------|-----------------------------------------|----------------|------------|-----------------|---------------|
| | | | Base material | Separ-ator | Total thickness | |
| Nippon Paper Industries | HD75 | For FA and industry | 78 | 60 | 114 | High adhesion |
| Ojitec Co., Ltd. | GS75 / P22 / G6W | For distribution or information control | 61 | 41 | 115 | High adhesion |
| Lintec | LD2114 | For distribution or information control | 65 | 41 | 115 | High adhesion |
| Lintec | LD3330 | For distribution or information control | 85 | 60 | 150 | High adhesion |

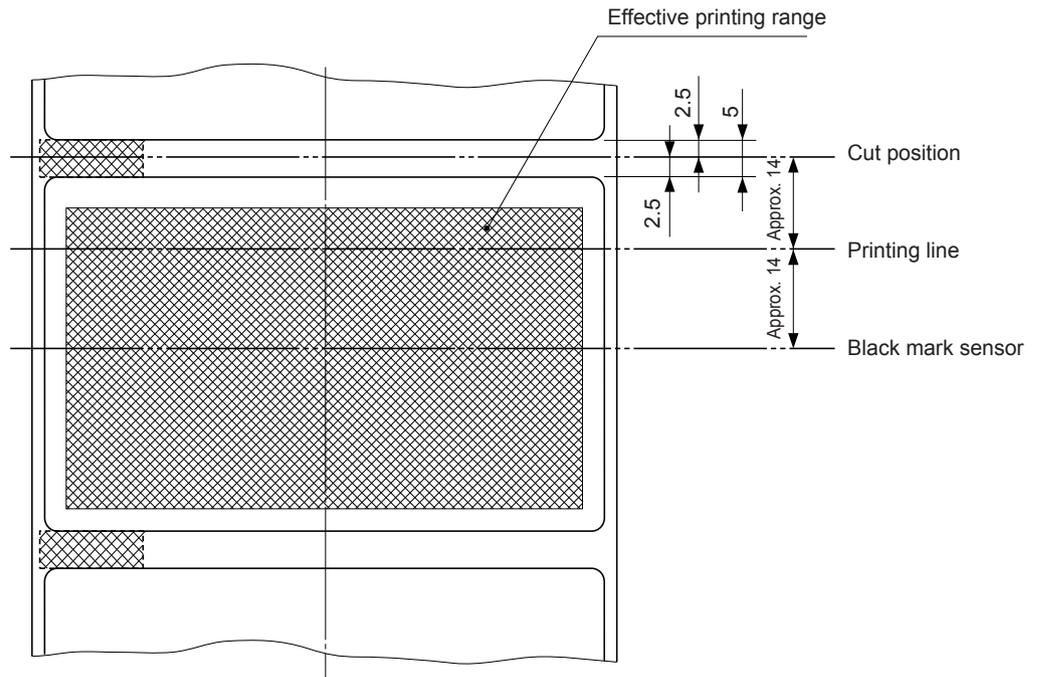
Note:

- 1) Depending on the type and thickness of the paper, it may be necessary to change the settings for printing darkness. To change the darkness settings, use the printing darkness settings command <ESC><RS> 'd' n. Refer to the separate programmer's manual for details.
- 2) The print density may vary depending on the type of paper roll and operating environment.
- 3) 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.

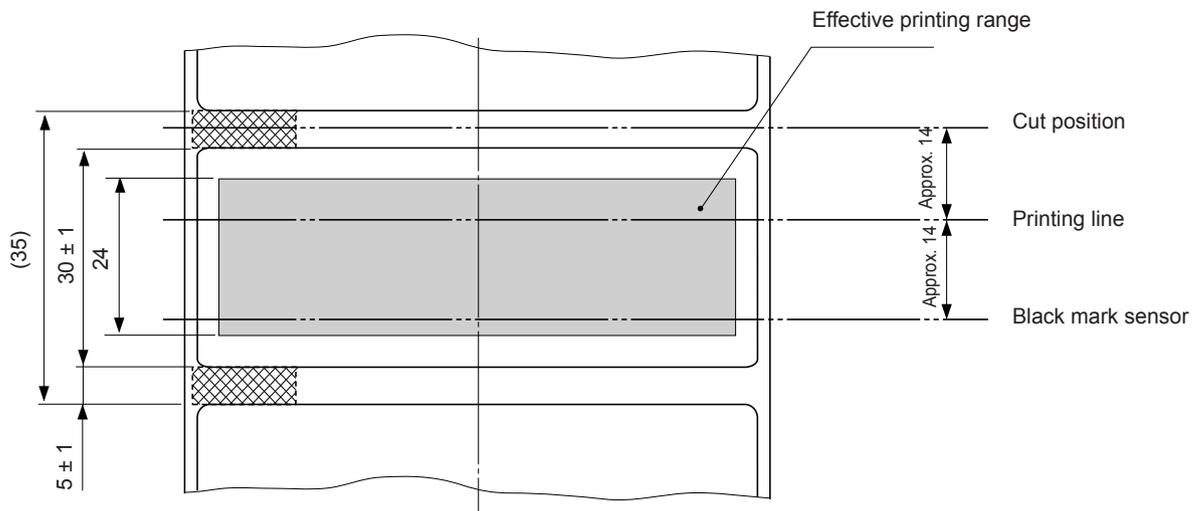
(3) Effective Print Width

| Paper Width (mm) | Right / Left Margin (mm) | Effective Print Width (mm) | Number of Print Columns (12 × 24 Font) |
|------------------|--------------------------|----------------------------|----------------------------------------|
| 105 ± 0.5 | 5 | 95 | 63 |

- Cut Position / Printing Line / Black Mark Sensor's Positional Relationship



- Min. Label Pitch / Cut Position / Printing Line / Black Mark Sensor's Positional Relationship



4-3. AC adapter (option)

AC adapter which are not specified may result in damage to the printer, fire or electric shock.

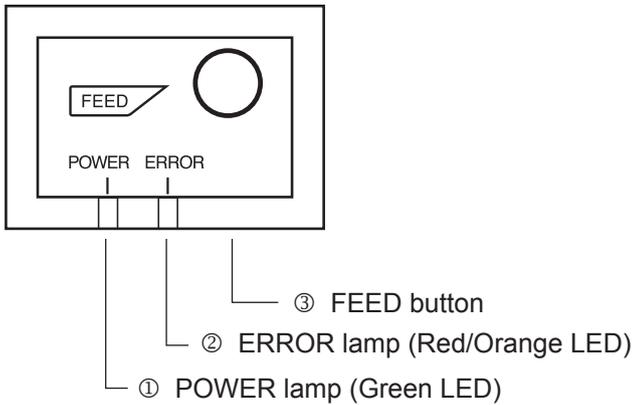
Model name: PS60A-24 series

Input: 90 to 264 V AC, 50/60 Hz

Output: DC24±5%, 2.0 A (5.0 A Load 10 sec. Max.)

5. Control Panel and Other Functions

5-1. Control Panel



- ① POWER lamp (Green LED)
When the printer is online, power lamp is ON and ERROR lamp is OFF.
- ② ERROR lamp (Red/Orange LED)
Indicates various errors in combination with POWER lamp.
- ③ FEED button
Press the FEED button to feed paper roll.

5-2. Errors

1) 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. |
| Cover open error | ON | ON (Red) | Automatically recovered by closing the printer cover. |
| Paper out error | ON | ON (Orange) | Automatically recovered by loading a new paper roll, then closing the printer cover. |
| Paper near end | ON | Flashes orange lamp at 1 second intervals | Indicators show that the paper end is approaching, but the printer continues to print. |
| Black mark paper size error | ON | ON (Orange) | Recovered by loading a new paper roll, then closing the printer cover. |
| Paper cut error | OFF | Flashes red lamp at 0.125 second intervals | Recovered if the cutter returns to the home position after turning the power OFF and ON. (See Notes 1 and 2.) |

Note:

- 1) If the cutter doesn't return to the home position or doesn't perform the initial movement, it cannot be recovered.
- 2) If the paper is jammed, turn the power off, clear the jammed paper, then turn the power ON.

2) Non-recoverable errors

| Error Description | POWER Lamp | ERROR Lamp | Recovery Conditions |
|-----------------------|------------|---------------------------------------------|----------------------------------|
| Flash access error | OFF | Flashes Orange lamp at 0.5-second intervals | This is not a recoverable error. |
| EEPROM error | OFF | Flashes Red lamp at 0.75-second intervals | This is not a recoverable error. |
| SRAM error | OFF | Flashes Orange lamp at 1-second intervals | This is not a recoverable error. |
| Head thermistor error | OFF | Flashes Red lamp at 1.5-second intervals | This is not a recoverable error. |
| Power voltage error | OFF | Flashes Orange lamp at 2-second intervals | This is not a recoverable error. |

Note:

- 1) If a non recoverable error occurs, turn the power OFF immediately.
- 2) When Power supply error occurs, there is a possibility that the power supply unit has a trouble.

For other non recoverable errors, please consult the dealer for repairs.

5-3. Self-Printing

5-3-1. Test Printing

Place the thermal paper roll on the printer.

Turn the power ON while holding the FEED button depressed. The printer will run a test print according to the Ver. No., DIP switch settings, and memory switch settings, etc.

```
*** Ver1.0 ***  
  
Interface : Parallel  
  
-- Dip Switch 1 --  
Sw 123456789A  
On *****  
Off  
  
-- Dip Switch 1 Detail --  
1,2= Emulation : Star Line/T  
5 = INIT Reset : Enable  
6 = BUSY : All  
7 = ASB : Invalid  
8 = NSB : Invalid  
  
-- Memory Switch --  
FEDCBA9876543210 HEX.  
<0> 0000000000000000 0000  
<1> 0000000000000000 0000  
<2> 0000000000000000 0000  
<3> 0000000000000000 0000  
<4> 0000000000000000 0000  
<8> 0000000000000000 0000  
<9> 0000000000000000 0000
```

← Command emulation

5-3-2. Hexadecimal Dump Mode

Place the thermal paper roll on the printer.

Open the printer cover, then turn the power on while holding the FEED button.

When the cover is closed, “*** HEX DUMP PRINTING ***” is printed, and the printer enters the Hexadecimal Dump Mode.

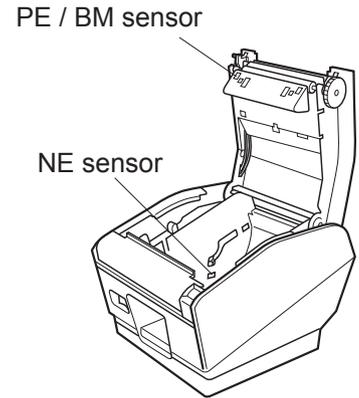
Each of the signals sent from the computer to the printer will be printed out in hexadecimal code. This function allows you to check if a control code sent to the printer by the program being used is correct or not. The final line is not printed if its data is less than one full line. However, if the FEED button is pushed, the final line is printed. To turn off the mode, it is necessary to turn off the printer completely.

```
*** HEX DUMP PRINTING ***  
  
00 01 02 03 04 05 06 07 .....  
08 09 0A 0B 0C 0D 0E 0F .....  
10 11 12 13 14 15 16 17 .....  
18 19 1A 1B 1C 1D 1E 1F .....  
20 21 22 23 24 25 26 27 !"#%&'  
28 29 2A 2B 2C 2D 2E 2F ()*+,-./  
30 31 32 33 34 35 36 37 01234567  
38 39 3A 3B 3C 0A 89:;<.
```

6. Adjusting the Sensor

This printer is equipped with the following two paper sensors:

- PE and BM (Paper End and Black Mark) Sensor
Detects whether a roll paper is loaded in the printer.
In addition, detects the Black Mark that is pre-printed on the paper's print side.
- NE (Near End) sensor
Detects whether the roll paper is nearing its end.



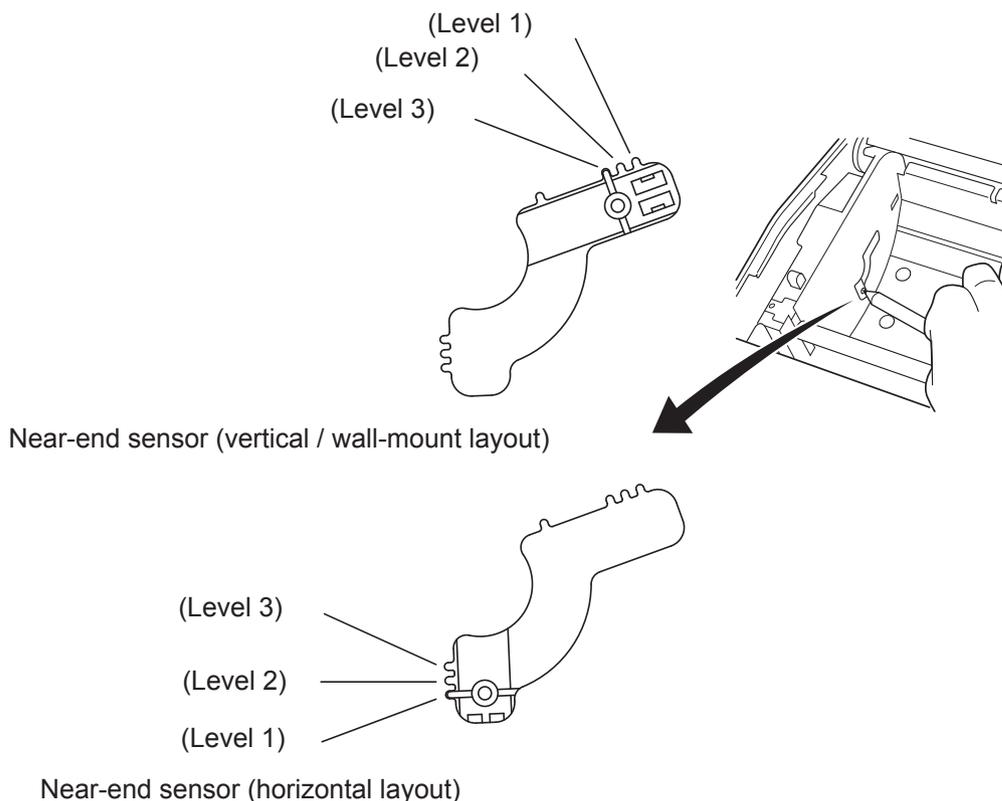
6-1. Adjusting the Near End Sensor Position

Use the following procedure to adjust the near-end sensor so it is compatible with the size of paper roll you are using.

However, for vertical or wall-mount use, keep the adjuster fixed to level 3, without changing its position.

- ① Open the printer cover.
- ② Determine the diameter of the paper roll you are using and find the required setting in the table below.
- ③ Insert the tip of a ballpoint pen or similar object into the hole of the adjuster, and then push and side the adjuster to the desired setting.

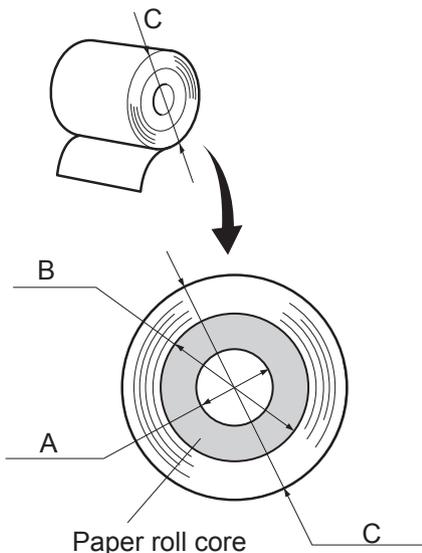
When changing the setting, make sure that the position of the hole is aligned with the alignment mark indicated by the arrow.



Adjustment value according to the paper you are using

| Paper thickness (μm) | When using the paper roll with a core whose inside diameter (A): $\phi 12$, outside diameter (B): $\phi 18$ | | | | | |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------|-----------|--------------------------------------|---------|---------|
| | Detected diameter (C) (Approx. mm) | | | Remained paper length (Approx. m) | | |
| | Level 1 | Level 2 | Level 3 | Level 1 | Level 2 | Level 3 |
| 65 | $\phi 23$ | $\phi 27$ | $\phi 31$ | 2.5 | 4.9 | 7.7 |
| 75 | | | | 2.1 | 4.2 | 6.7 |

| Paper thickness (μm) | When using the paper roll with a core whose inside diameter (A): $\phi 25.4$, outside diameter (B): $\phi 32$ | | | | | |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------|-----------|--------------------------------------|---------|---------|
| | Detected diameter (C) (Approx. mm) | | | Remained paper length (Approx. m) | | |
| | Level 1 | Level 2 | Level 3 | Level 1 | Level 2 | Level 3 |
| 65 | $\phi 36$ | $\phi 40$ | $\phi 44$ | 2.8 | 6.4 | 10.4 |
| 75 | | | | 2.4 | 5.5 | 9.0 |
| 85 | | | | 2.1 | 4.9 | 7.9 |
| 95 | | | | 1.9 | 4.4 | 7.1 |
| 105 | | | | 1.7 | 4.0 | 6.4 |
| 130 | | | | 1.4 | 3.2 | 5.2 |
| 150 | | | | 1.2 | 2.8 | 4.5 |



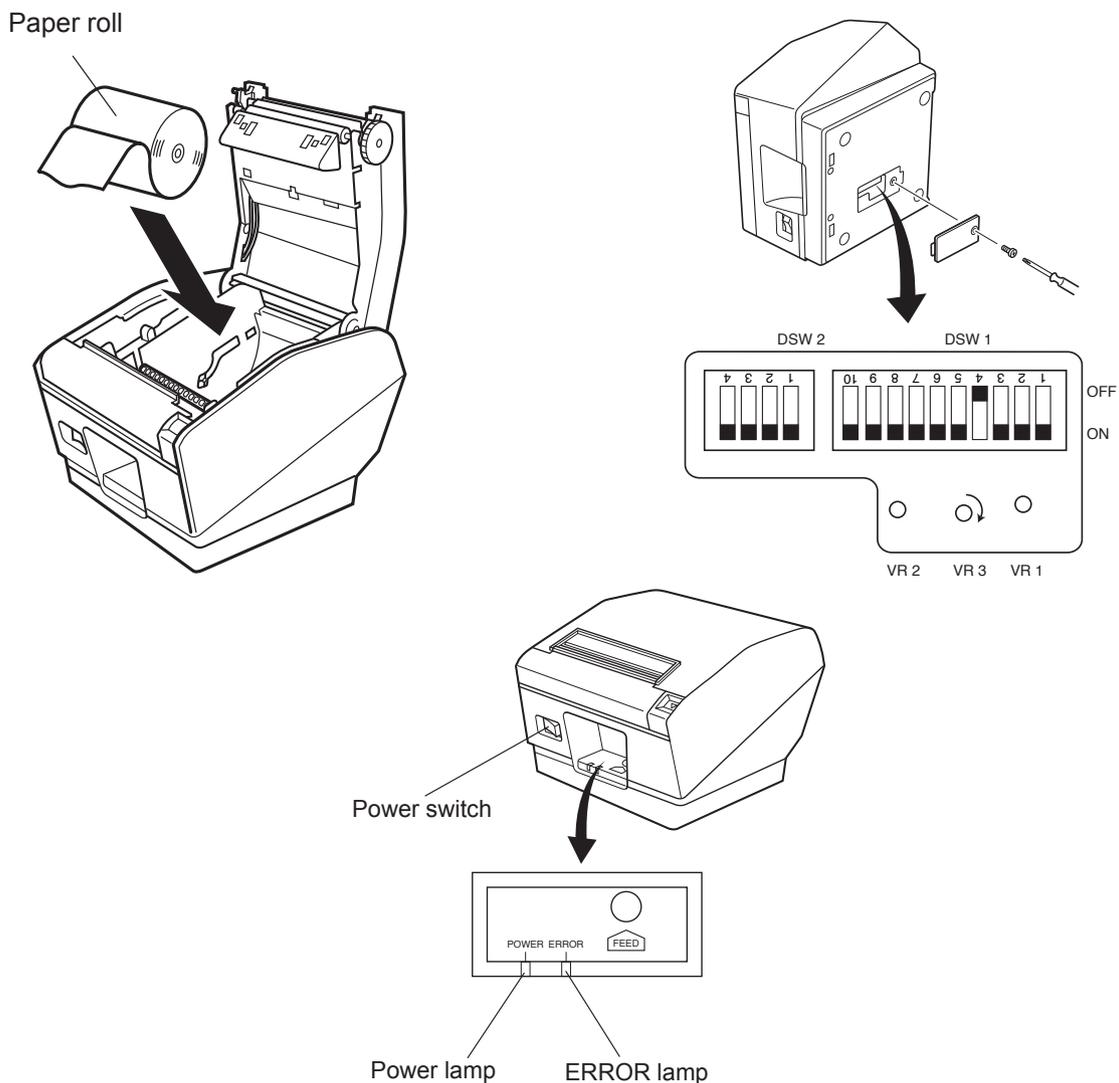
Note:

- 1) The adjuster is factory-set at level 1 on the horizontal layout and level 3 on the vertical/wall-mount layout.
- 2) The detected diameter and remained paper length given above are calculated values, and there may be some variances depending on the rolled state of the paper or the actual mechanism.
- 3) If thick paper is used (paper thickness between $100\ \mu\text{m}$ and $150\ \mu\text{m}$), the paper roll may loosen and cause variances in the detected values. Therefore, set the adjuster to Level 3 for horizontal layout.
- 4) The near end sensor doesn't correspond to the thermal label paper roll (tack label paper).

6-2. PE and BM (Paper End and Black Mark) Sensor Adjustment

The sensitivity of the sensor is calibrated at the factory, so sensor adjustment is not necessary under ordinary conditions. However, you may need to make adjustments when using non-recommended paper or when the surrounding environment prevents the sensor from working properly.

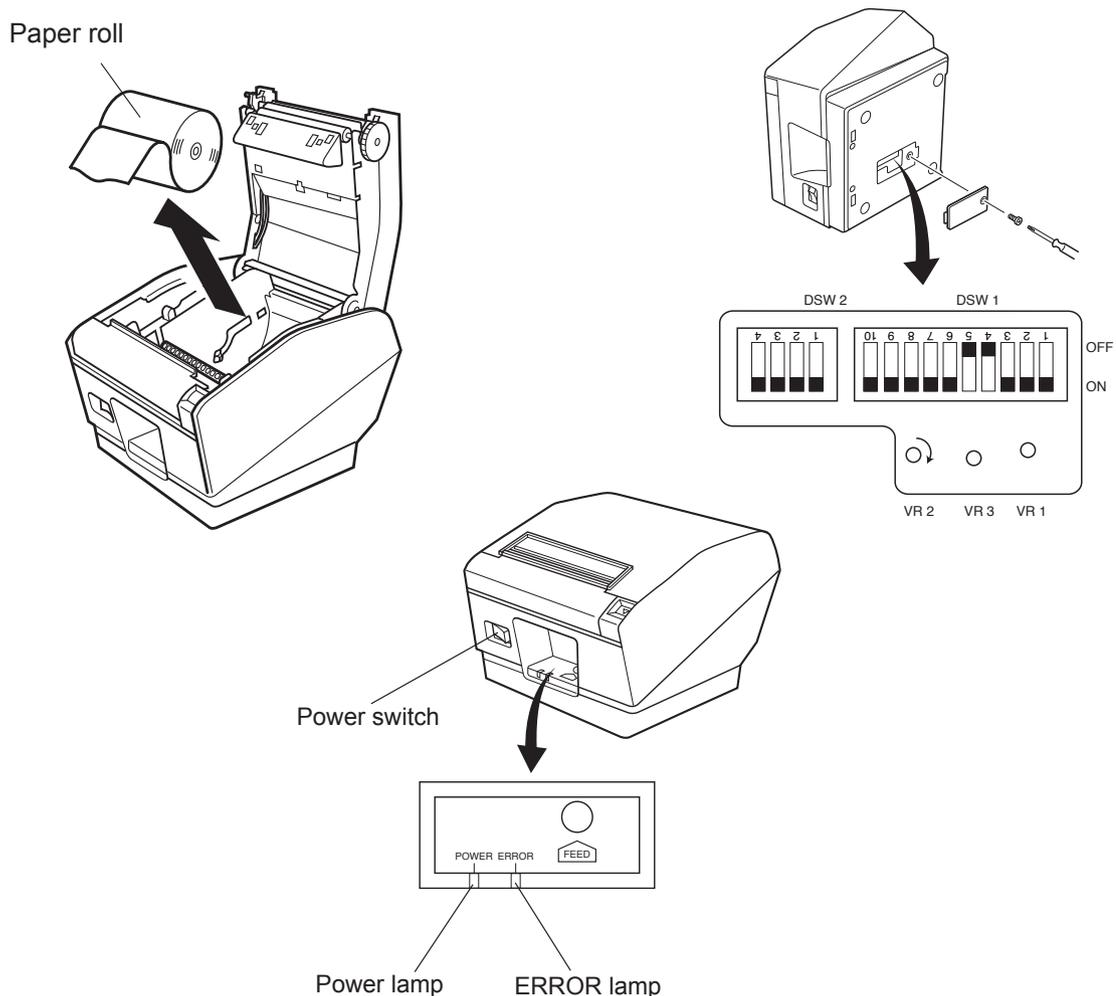
- ① Make sure that the printer is turned OFF.
- ② Open the printer cover, load the roll paper, and set the printer to the "paper present" state.
- ③ Remove the screw from the DIP switch cover on the bottom of the printer. Then take off the DIP switch cover, as shown in the illustration below.
- ④ Using the tip of a ballpoint pen or a similar tool, set the DIP switches as follows: DIP SW1-4 OFF, DIP SW1-5 ON, DIP SW1-6 ON, and DIP SW1-7 ON. Turn the printer power ON. The lamps on the control panel will flash, and the printer will enter the sensor adjustment mode.
- ⑤ Using a small slot screwdriver, turn VR3 as shown below, and adjust it so that the green POWER LED and the red ERROR LED light.
- ⑥ Turn the printer power OFF, and restore the following DIP switches to their original settings: DIP SW1-4, DIP SW1-5, DIP SW1-6, and DIP SW1-7.



6-3. NE (Near End) Sensor Adjustment

The sensitivity of the sensor is calibrated at the factory, so sensor adjustment is not necessary under ordinary conditions. However, you may need to make adjustments when using non-recommended paper or when the surrounding environment prevents the sensor from working properly.

- ① Make sure that the printer is turned OFF.
- ② Open the printer cover, remove the roll paper and set the printer to the "paper absent" state.
- ③ Remove the screw from the DIP switch cover on the bottom of the printer. Then take off the DIP switch cover, as shown in the illustration below.
- ④ Using the tip of a ballpoint pen or a similar tool, set the DIP switches as follows: DIP SW1-4 OFF, DIP SW1-5 OFF, DIP SW1-6 ON, and DIP SW1-7 ON. Turn the printer power ON. The lamps on the control panel will flash, and the printer will enter the sensor adjustment mode.
- ⑤ Use a small slot screwdriver to turn VR2 clockwise as far as it will go. If the POWER LED lights, go to step 6. If the POWER LED does not light, turn VR2 so that both the ERROR LED and the POWER LED light.
- ⑥ Turn the printer power OFF, and restore the following DIP switches to their original settings: DIP SW1-4, DIP SW1-5, DIP SW1-6, and DIP SW1-7.



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 lever toward you to open the printer cover.
- (3) Remove the jammed paper.

Note 1: To prevent parts such as the thermal head or the rubber roller from damage or deformation, do not forcibly pull on the paper with the printer cover closed.

Note 2: If label paper gets jammed, the glue from the labels could stick to the parts. If this occurs, make sure to wipe them clean of the glue.

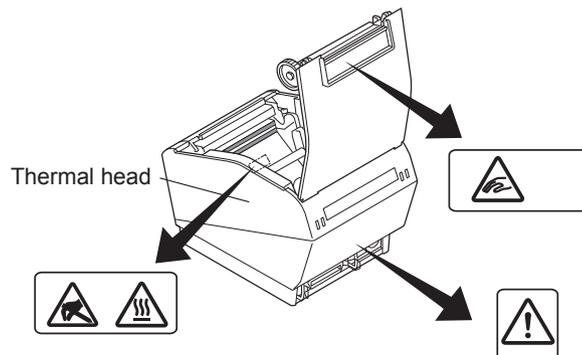
- (4) Position the paper roll straight and close the printer cover gently.

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 centre. 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



This symbol is placed near the thermal head to indicate that it may be hot. Never touch the thermal head immediately after the printer has been used. Let the thermal head cool for a few minutes before touching it. Never touch the thermal head with your hands because it can generate static electricity, which can damage the device in the thermal head.



This symbol is placed near the cutter. Never touch the cutter blade, which could cut your finger.



This symbol is placed near the peripheral drive connector. Do not connect this to a telephone.

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. If the printer uses label paper, clean it on a monthly basis or after printing approximately 200,000 lines.

8-1. Cleaning the Thermal Head

To remove the dark paper dust that has accumulated on the thermal head surface, wipe it clean with cotton swab (or soft cloth) dipped in alcohol (ethanol, methanol, or isopropyl alcohol). If the printer uses label paper, wipe it clean of the glue that may have accumulated.

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

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

Note 3: Beware of the risk of damaging the thermal head as a result of static electricity that may be created during cleaning.

Note 4: Turn the power ON only after the alcohol has dried completely.

8-2. Cleaning the Rubber Roller

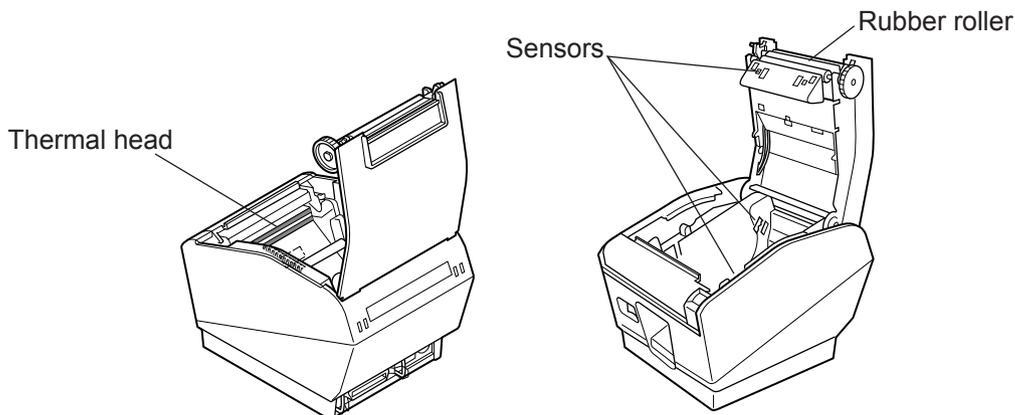
Use a dry, soft cloth to wipe off the dust that may have accumulated on the rubber roller.

8-3. Cleaning the Sensors and the Surrounding Areas

Clean the sensors (mainly the reflector type sensors) of debris, dust, paper particles, glue, etc. that may have accumulated.

8-4. Cleaning the Paper Holder and the Surrounding Area

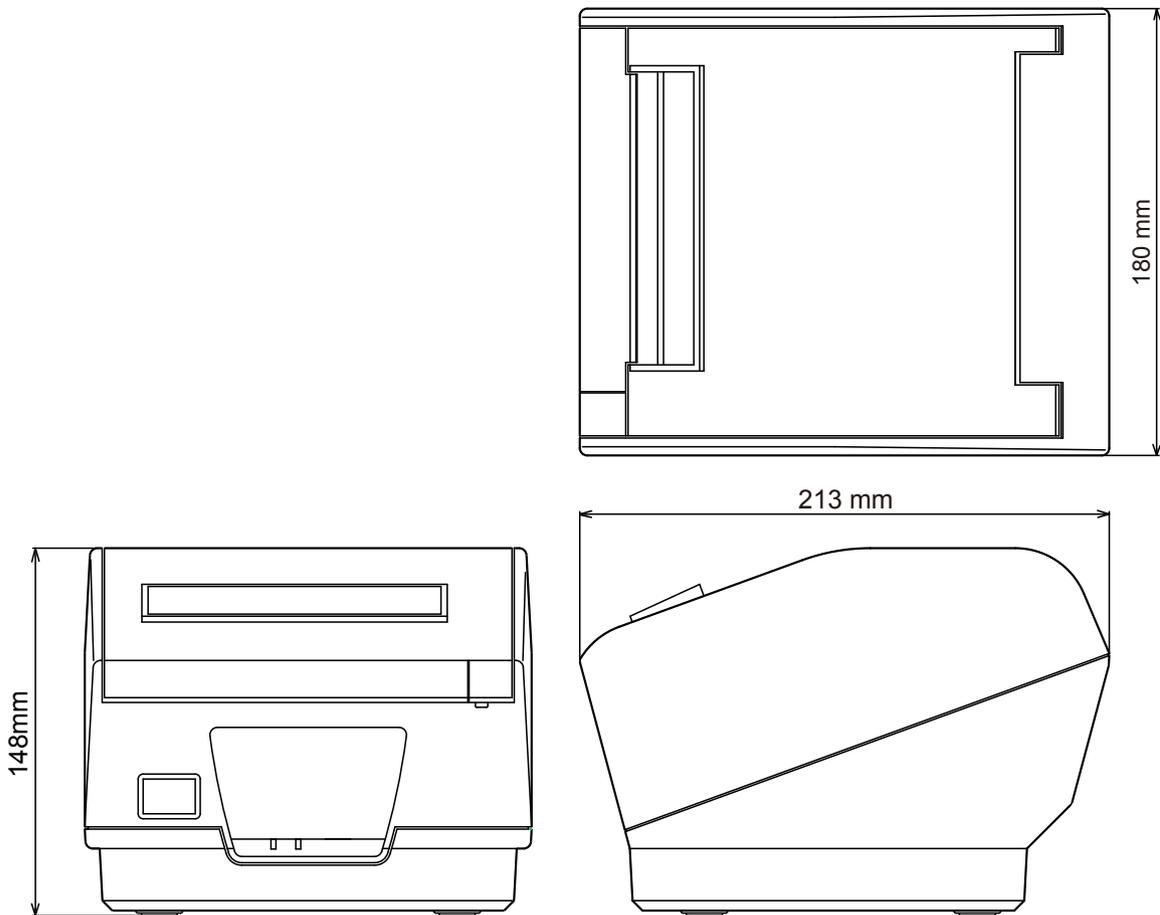
Clean the paper holder of debris, dust, paper particles, glue, etc. that may have accumulated.



9. Specifications

9-1. General Specifications

| | |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) Printing method | Direct line thermal printing |
| (2) Print speed | Max. 1440 dots/sec. (180 mm/sec.) |
| (3) Dot density | 203 dpi: 8 dots/mm (0.125 mm/dot) |
| (4) Printing width | Max. 104 mm |
| (5) Number of print columns | 69 (12 × 24 dots) |
| (6) Paper roll | Refer to chapter 4 for details on the recommended paper roll. Paper width: 111.5 ± 0.5 or 79.5 ± 0.5 mm Roll diameter: $\varnothing 100$ mm or less |
| (7) Overall dimension | 180 (W) × 213 (D) × 148 (H) mm |
| (8) Weight | Approx. 1.9 kg |
| (9) Noise Approx. | 56 dB |



9-2. Auto Cutter Specifications

- | | |
|------------------------|--------------------------------------------------------------------------------------------------------|
| (1) Cutting frequency | Max. 20 cuts per minute |
| (2) Thickness of paper | 0.065 ~ 0.15 mm (when using 115.5 mm width paper) 0.065 ~ 0.085 mm (when using 79.5 mm width paper) |

9-3. Interface

RS-232C serial interface / Two-way parallel interface (IEEE1284) / USB interface / Ethernet interface

9-4. AC Adapter (Option)

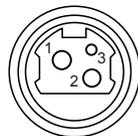
- | | |
|-----------------------|------------------------------------------------------------------------------|
| (1) Operating Voltage | Input Voltage: 90 to 264 V AC, 50/60 Hz Output Voltage: DC 24 V \pm 10% |
|-----------------------|------------------------------------------------------------------------------|

- (2) Current Consumption (DC 24 V at room temperature)

| | |
|-----------------------------------------------------------------------------------------------|---------------------------------------------|
| Standby: | Approx. 0.12 A |
| ASCII printing: (Approx. 17.5% printing rate) | Approx. average 2.0 A |
| 100% print duty: (Solid printing): (Continuous solid printing should be 50 mm or less.) | Approx. peak 8.6 A Approx. average 4.2 A |

- (3) Power Connector

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



<Viewed from Connector Surface>

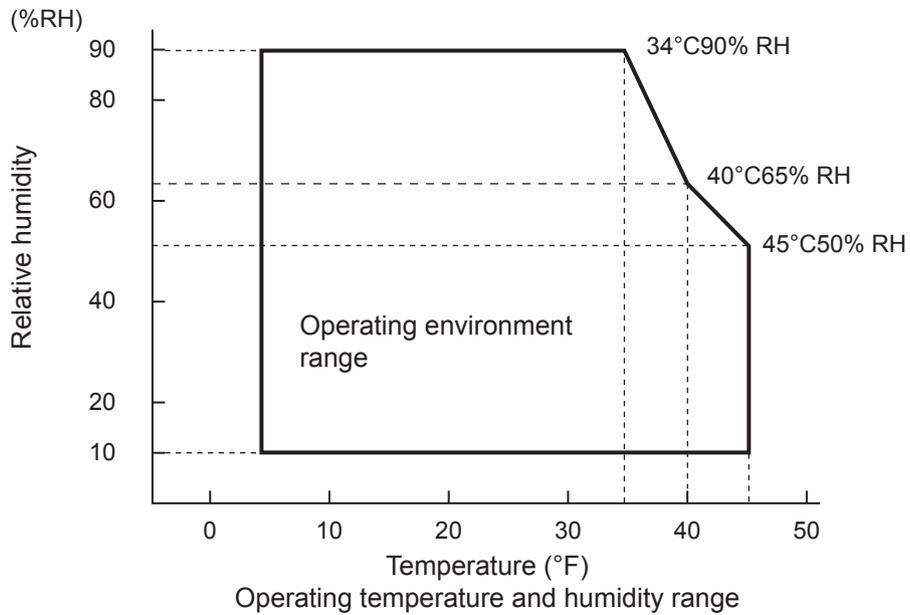
Note:

- When using a printer power supply other than the optional AC adaptor (PS60A-24 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. Max.) with SELV output and LPS or Class 2 output approved by IEC60950-1.
- 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.

9-5. Environmental Requirements

(1) Operating
Temperature
Humidity

41°F to 113°F (5°C to 45°C)
10% to 90% RH (without condensation)



(2) Transport/storage (except for paper)

Temperature
Humidity

-4°F to 140°F (-20°C to 60°C)
10% to 90% RH (without condensation)

9-6. Reliability Specifications

- (1) Life Mechanical: 20 million lines
 Print Head: 150 km (150 million pulses)
 Auto Cutter: 2 million cuttings

<Conditions>

| | |
|-------------------------|-----------------------------------------|
| Paper roll: | P220AG (Mitsubishi Paper Mills Limited) |
| Paper thickness: | 65 μm |
| Paper width: | 115.5 mm |
| Cutting Mode: | Partial cut |
| Average printing ratio: | 12.5% |

Note:

The life of the print head and the auto cutter are strongly influenced by factors such as the type of paper that you use. For information about the life of the print head and auto cutter when they are not used under the conditions described above, refer to the separate Specifications Manual

- (2) MCBF: 37 million lines

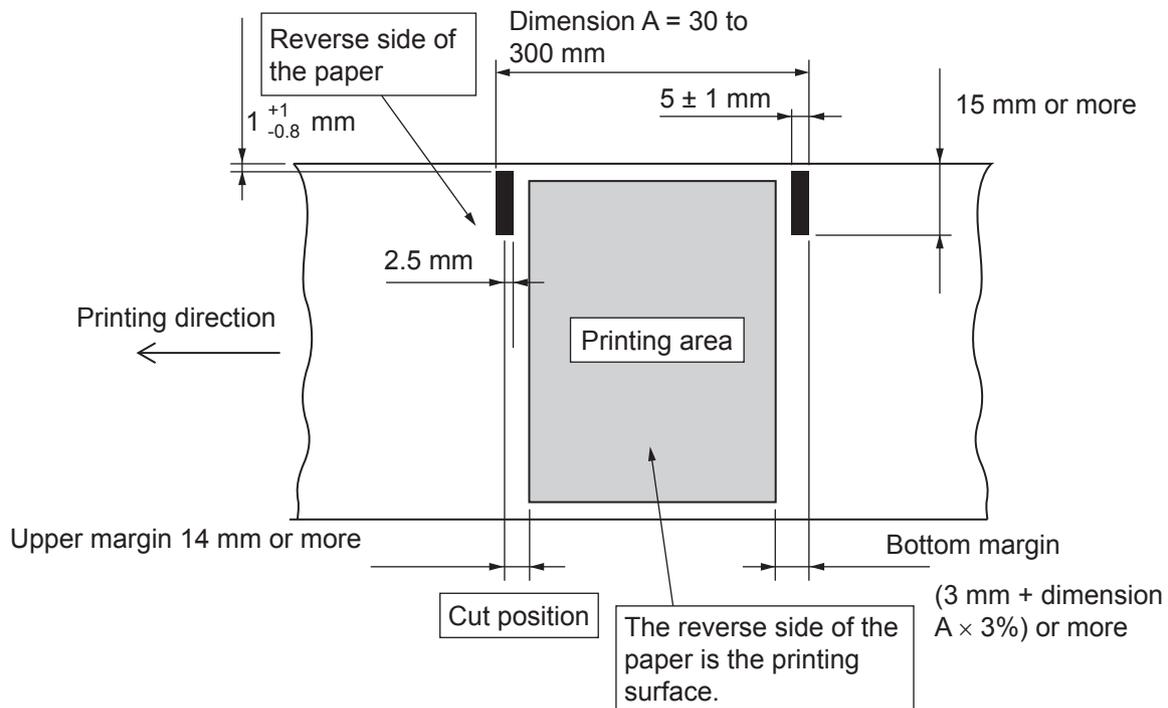
The Mean Cycle Between Failure (MCBF) is defined to be the overall failure cycle, which includes random or wear failures that occur until the printer reaches its mechanical life of 20 million lines.

As the mechanical remains at 20 million lines, the MCBF of 37 million lines does not indicate its useful life.

Note :

- 1) When recommended thermal paper whose thickness is above 75 μm but not more than 150 μm is used, the mechanical life of the printer is 10 million lines and the MCBF is 25 million lines.
- 2) 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.

9-7. Black mark specifications



<Remarks>

- 1) The cut position shown above is when the print starting position correct value for Section 15: memory switch 9 is the default setting.
- 2) The black mark's PCS value must be 0.90 or more.
- 3) Note that accuracy of starting printing with the black mark sensor must be within ± 2 mm of the standard printing positions, the printing length must be within ± 2 mm of the set value in consideration of discrepancies occurring in the processing accuracy of the platen diameter and environmental temperature in the initial state, and a -5% error margin against the set value must be taken into account in consideration of life expectancy and attention paid to the print layout when using pre-printed paper.
- 4) The printing area must be within the usable range shown in the above diagram when using black marks. With regards to the top margin, approximately 13 mm is established between the print position and the cut position (auto cutter,) and the paper is fed through 1 mm or more (eight dot lines) if printing is performed after the cutting operations, making a total of 14 mm or more for the margin. Ensure that the margin shown in the above diagram is used to prevent the printing area value in the paper feed direction from exceeding the pitch of the black mark. Note that if this margin is not used, it may result in pages being skipped and other defects.

[Example of the printing area setting]

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

Top margin: 14 mm / bottom margin: $3 \text{ mm} + (100 \text{ mm} \times 0.03) = 6 \text{ mm}$

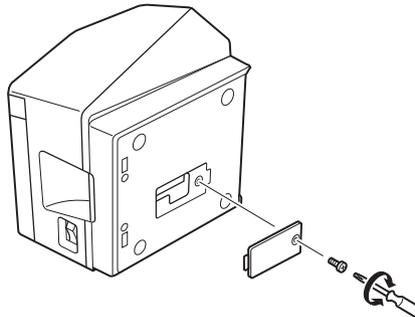
From this, it is clear that the printing area in the paper feed direction must be 80 mm or less.

10. Dip Switch Setting

Two DIP switches are provided at the bottom of the printer, and can be set as given in the table below. Be sure to set the power switch to off before changing the settings. It is recommended to use a pointed item like a pen or flat-blade driver screw to change the settings. The settings will become effective when the power switch is set to on again.

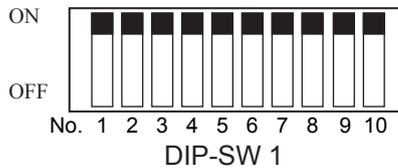
The following is the procedure for changing the settings on DIP switches.

1. Make sure the printer is turned off.
2. Remove the screw from the DIP switch cover. Then take off the DIP switch cover, as shown in the illustration below.



3. Set the switches using a pointed tool, such as a pen or flat-blade screwdriver.
4. Replace the DIP switch cover. Then secure it with the screw. The new settings take effect when you turn on the printer.

10-1. Parallel Interface Model



DIP-SW 1

| Switch 1-1 | Switch 1-2 | Command emulation |
|------------|------------|-------------------|
| ON | ON | Star Line Mode |
| OFF | ON | Star Page Mode |
| ON | OFF | - |
| OFF | OFF | ESC/POS Mode |

The factory settings of DIP switch are all on.

The functions of switches 1-3 through 1-10 will change according to the command emulation that has been set using switch 1-1 and 1-2.

(1) Star Line Mode

| Switch | Function | ON | OFF |
|-----------|----------------------------------------------|--------------------------------|---------------------|
| 1-1 | Command emulation | Always ON | |
| 1-2 | Command emulation | Always ON | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Pin #31 (INIT) reset signal | Valid | Invalid |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Invalid | Valid |
| 1-8 | NSB function *2 | Invalid | Invalid |
| 1-9 ~1-10 | Should not be changed (Should be set to on) | | |

(2) Star Page Mode

| Switch | Function | ON | OFF |
|-----------|----------------------------------------------|--------------------------------|---------------------|
| 1-1 | Command emulation | Always OFF | |
| 1-2 | Command emulation | Always ON | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Pin #31 (INIT) reset signal | Valid | Invalid |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Invalid | Valid |
| 1-8 | NSB function *2 | Invalid | Invalid |
| 1-9 ~1-10 | Should not be changed (Should be set to on) | | |

(3) ESC/POS mode

| Switch | Function | ON | OFF |
|--------|----------------------------------------------|--------------------------------|---------------------|
| 1-1 | Command emulation | Always OFF | |
| 1-2 | Command emulation | Always OFF | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Pin #31 (INIT) reset signal | Valid | Invalid |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Invalid | Valid |
| 1-8 | Should not be changed (Should be set to on) | | |
| 1-9 | Graphic adjustment | 203 DPI | 180 DPI |
| 1-10 | Should not be changed (Should be set to on) | | |

*1 ASB Function

When this function is enabled, status information is automatically sent to the host whenever the printer status changes (such as when the cover is opened, paper runs out, or an error occurs). For information about automatic status information transmission, refer to the separate Programmer's Technical Reference manual (Star Line Mode, Star Page Mode, and ESC/POS Mode).

*2 NSB Function

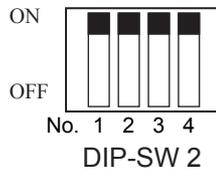
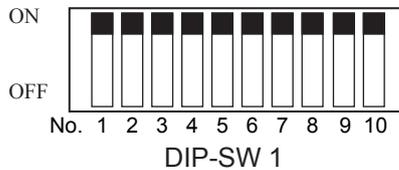
When this function is enabled, status information is sent automatically whenever the printer enters into reverse forwarding mode. For information about automatic status information transmission, refer to the separate Programmer's Technical Reference manual (Star Line Mode and Star Page Mode).

DIP-SW 2

| Switch | Function | ON | OFF |
|--------|-----------|---------------------|-----|
| 2-1 | Always ON | Should be set to on | |
| 2-2 | | | |
| 2-3 | | | |
| 2-4 | | | |

The factory settings of DIP switch are all on.

10-2. RS-232C Interface Model



DIP-SW 1

| Switch 1-1 | Switch 1-2 | Command emulation |
|------------|------------|-------------------|
| ON | ON | Star Line Mode |
| OFF | ON | Star Page Mode |
| ON | OFF | - |
| OFF | OFF | ESC/POS Mode |

The factory settings of DIP switch are all on.

The functions of switches 1-3 through 1-10 will change according to the command emulation that has been set using switch 1-1 and 1-2.

(1) Star Line Mode

| Switch | Function | ON | OFF |
|----------|----------------------------------------------|--------------------------------|---------------------|
| 1-1 | Command emulation | Always ON | |
| 1-2 | Command emulation | Always ON | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Should not be changed (Should be set to on) | | |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Invalid | Valid |
| 1-8~1-10 | Should not be changed (Should be set to on) | | |

(2) Star Page Mode

| Switch | Function | ON | OFF |
|-----------|----------------------------------------------|--------------------------------|---------------------|
| 1-1 | Command emulation | Always OFF | |
| 1-2 | Command emulation | Always ON | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Should not be changed (Should be set to on) | | |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Invalid | Valid |
| 1-8 ~1-10 | Should not be changed (Should be set to on) | | |

(3) ESC/POS mode

| Switch | Function | ON | OFF |
|--------|-------------------------------------------------|-----------------------------------|---------------------|
| 1-1 | Command emulation | Always OFF | |
| 1-2 | Command emulation | Always OFF | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Should not be changed (Should be set to on) | | |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Invalid | Valid |
| 1-8 | Should not be changed (Should be set to on) | | |
| 1-9 | Graphic adjustment | 203 DPI | 180 DPI |
| 1-10 | Should not be changed (Should be set to on) | | |

*1 ASB Function

When this function is enabled, status information is automatically sent to the host whenever the printer status changes (such as when the cover is opened, paper runs out, or an error occurs). For information about automatic status information transmission, refer to the separate Programmer's Technical Reference manual (Star Line Mode, Star Page Mode, and ESC/POS Mode).

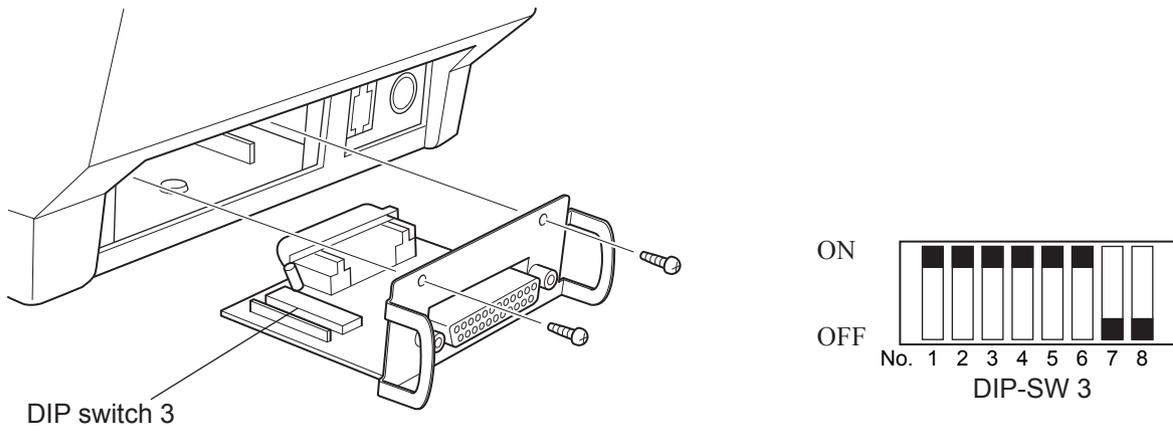
DIP-SW 2

| Switch | Function | ON | OFF |
|--------|-----------|---------------------|-----|
| 2-1 | Always ON | Should be set to on | |
| 2-2 | | | |
| 2-3 | | | |
| 2-4 | | | |

The factory settings of DIP switch are all on.

The following is the procedure for changing the settings on DIP switch No. 3.

1. Turn off the printer and all components connected to it.
2. Remove the 2 screws.
3. Remove the serial interface board unit.
4. Change the setting of the DIP switches.
5. Replace the serial interface board unit.
Then secure it with the screws.
6. Turn on the printer and all components connected to it.



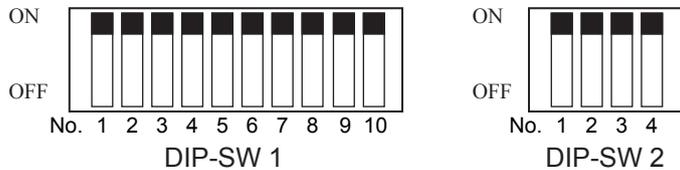
The factory settings of DIP switch are all on, except for switches 7 and 8.

DIP-SW 3

| Switch | Function | ON | OFF |
|--------|----------------------------------------------|-----------------|----------|
| 3-1 | Baud Rate | See table below | |
| 3-2 | | | |
| 3-3 | Data Length | 8 bits | 7 bits |
| 3-4 | Parity Check | Disabled | Enabled |
| 3-5 | Parity | Odd | Even |
| 3-6 | Handshake | DTR/DSR | XON/XOFF |
| 3-7 | Should not be changed (Should be set to off) | — | — |
| 3-8 | | | |

| Baud Rate | Switch 3-1 | Switch 3-2 |
|-----------|------------|------------|
| 4800BPS | OFF | ON |
| 9600BPS | ON | ON |
| 19200BPS | ON | OFF |
| 38400BPS | OFF | OFF |

10-3. USB Interface Model



DIP-SW 1

| Switch 1-1 | Switch 1-2 | Command emulation |
|------------|------------|-------------------|
| ON | ON | Star Line Mode |
| OFF | ON | Star Page Mode |
| ON | OFF | - |
| OFF | OFF | ESC/POS Mode |

The factory settings of DIP switch are all on.

The functions of switches 1-3 through 1-10 will change according to the command emulation that has been set using switch 1-1 and 1-2.

(1) Star Line Mode

| Switch | Function | ON | OFF |
|-----------|----------------------------------------------|--------------------------------|---------------------|
| 1-1 | Command emulation | Always ON | |
| 1-2 | Command emulation | Always ON | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | USB mode | Printer class | Vendor class |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Printer class | Valid |
| | | Vendor class | Invalid |
| 1-8 | NSB function *2 | Printer class | Valid |
| | | Vendor class | Invalid |
| 1-9 ~1-10 | Should not be changed (Should be set to on) | | |

*1 ASB Function

When this function is enabled, status information is automatically sent to the host whenever the printer status changes (such as when the cover is opened, paper runs out, or an error occurs). For information about automatic status information transmission, refer to the separate Programmer's Technical Reference manual (Star Line Mode, Star Page Mode, and ESC/POS Mode).

*2 NSB Function

When this function is enabled, status information is sent automatically whenever the printer enters into reverse forwarding mode.

For information about automatic status information transmission, refer to the separate Programmer's Technical Reference manual (Star Line Mode and Star Page Mode).

2) Star Page Mode

| Switch | Function | ON | OFF | |
|-----------|-------------------------------------------------|-----------------------------------|---------------------|---------|
| 1-1 | Command emulation | Always OFF | | |
| 1-2 | Command emulation | Always ON | | |
| 1-3 | Should not be changed (Should be set to on) | | | |
| 1-4 | Sensor adjustment | Invalid | Valid | |
| 1-5 | USB mode | Printer class | Vendor class | |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full | |
| 1-7 | ASB function *1 | Printer class | Valid | Invalid |
| | | Vendor class | Invalid | Valid |
| 1-8 | NSB function *2 | Printer class | Valid | Invalid |
| | | Vendor class | Invalid | Valid |
| 1-9 ~1-10 | Should not be changed (Should be set to on) | | | |

(3) ESC/POS mode

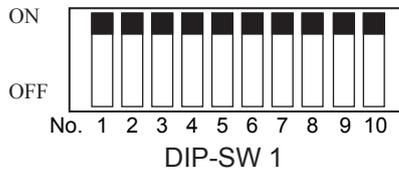
| Switch | Function | ON | OFF | |
|--------|-------------------------------------------------|-----------------------------------|---------------------|---------|
| 1-1 | Command emulation | Always OFF | | |
| 1-2 | Command emulation | Always OFF | | |
| 1-3 | Should not be changed (Should be set to on) | | | |
| 1-4 | Sensor adjustment | Invalid | Valid | |
| 1-5 | USB mode | Printer class | Vendor class | |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full | |
| 1-7 | ASB function *1 | Printer class | Valid | Invalid |
| | | Vendor class | Invalid | Valid |
| 1-8 | Should not be changed (Should be set to on) | | | |
| 1-9 | Graphic adjustment | 203 DPI | 180 DPI | |
| 1-10 | Should not be changed (Should be set to on) | | | |

DIP-SW 2

| Switch | Function | ON | OFF |
|--------|-----------|---------------------|-----|
| 2-1 | Always ON | Should be set to on | |
| 2-2 | | | |
| 2-3 | | | |
| 2-4 | | | |

The factory settings of DIP switch are all on.

10-4. EthernetInterface Model



DIP-SW 1

| Switch 1-1 | Switch 1-2 | Command emulation |
|------------|------------|-------------------|
| ON | ON | Star Line Mode |
| OFF | ON | Star Page Mode |
| ON | OFF | - |
| OFF | OFF | ESC/POS Mode |

The factory settings of DIP switch are all on.

The functions of switches 1-3 through 1-10 will change according to the command emulation that has been set using switch 1-1 and 1-2.

(1) Star Line Mode

| Switch | Function | ON | OFF |
|-----------|-------------------------------------------------|-----------------------------------|---------------------|
| 1-1 | Command emulation | Always ON | |
| 1-2 | Command emulation | Always ON | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Should not be changed (Should be set to on) | | |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Valid | Invalid |
| 1-8 | NSB function *2 | Valid | Invalid |
| 1-9 ~1-10 | Should not be changed (Should be set to on) | | |

2) Star Page Mode

| Switch | Function | ON | OFF |
|-----------|-------------------------------------------------|-----------------------------------|---------------------|
| 1-1 | Command emulation | Always OFF | |
| 1-2 | Command emulation | Always ON | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Should not be changed (Should be set to on) | | |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Valid | Invalid |
| 1-8 | NSB function *2 | Valid | Invalid |
| 1-9 ~1-10 | Should not be changed (Should be set to on) | | |

(3) ESC/POS mode

| Switch | Function | ON | OFF |
|--------|-------------------------------------------------|-----------------------------------|---------------------|
| 1-1 | Command emulation | Always OFF | |
| 1-2 | Command emulation | Always OFF | |
| 1-3 | Should not be changed (Should be set to on) | | |
| 1-4 | Sensor adjustment | Invalid | Valid |
| 1-5 | Pin #31 (INIT) reset signal | Valid | Invalid |
| 1-6 | Handshaking conditions (conditions for BUSY) | Offline or receive buffer full | Receive buffer full |
| 1-7 | ASB function *1 | Valid | Invalid |
| 1-8 | Should not be changed (Should be set to on) | | |
| 1-9 | Graphic adjustment | 203 DPI | 180 DPI |
| 1-10 | Should not be changed (Should be set to on) | | |

*1 ASB Function

When this function is enabled, status information is automatically sent to the host whenever the printer status changes (such as when the cover is opened, paper runs out, or an error occurs). For information about automatic status information transmission, refer to the separate Programmer's Technical Reference manual (Star Line Mode, Star Page Mode, and ESC/POS Mode).

*2 NSB Function

When this function is enabled, status information is sent automatically when the printer connects the printer port (TCP#9100). For information about automatic status information transmission, refer to the separate Programmer's Technical Reference manual (Star Line Mode and Star Page Mode).

DIP-SW 2

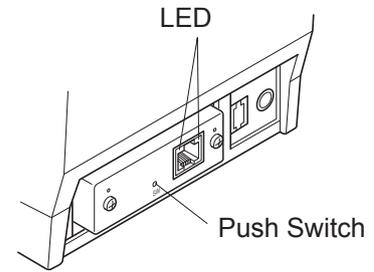
| Switch | Function | ON | OFF |
|--------|-----------|---------------------|-----|
| 2-1 | Always ON | Should be set to on | |
| 2-2 | | | |
| 2-3 | | | |
| 2-4 | | | |

The factory settings of DIP switch are all on.

■ Initializing Settings

Set the push switch as described below to initialize the setting information.

Push the switch for one to five seconds while running under normal operating mode. The green and red LEDs will flash with a regular pattern. After that, push the switch once again in that state to turn OFF both of the red and green LEDs. This will return the settings of the interface board to their default, or ex-factory, settings. After the interface board has been initialized, the printer will automatically reboot itself.



■ LED Display

Green : Lights when other party connection is recognized as 100BASE-TX.

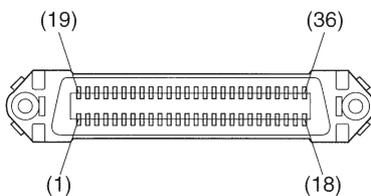
Red : Lights when packets are received.

11. Parallel Interface

The two-way parallel interface is compatible with the IEEE1284 compatibility mode and nibble mode. Refer to the separate Specifications Manual for details.

Table of Connection Signals for Each Mode

| Pin No. | Direction | Compatibility Mode Signal Name | Nibble Mode Signal Name |
|---------|-----------|-----------------------------------|----------------------------|
| 1 | In | nStrobe | Host Clock |
| 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 | Flame GND |
| 18 | OUT | +5 V | +5 V |
| 19~30 | | Twisted Pair Return | Twisted Pair Return |
| 31 | In | nInit | nInit |
| 32 | Out | nFault | nDataAvail/Data0,4 |
| 33 | | External GND | — |
| 34 | | — | — |
| 35 | | — | — |
| 36 | In | nSelectIn | 1284Active |



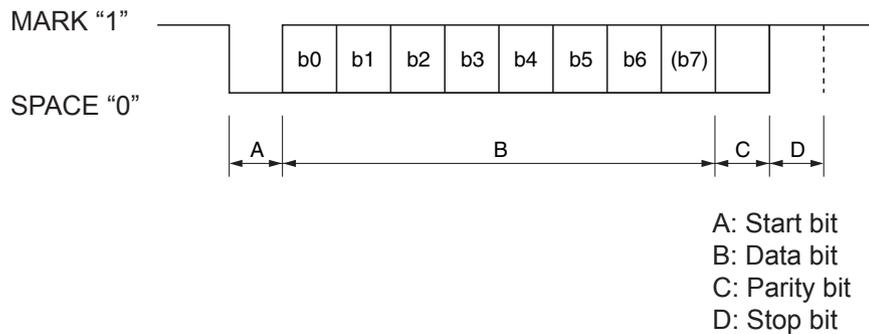
This connector mates with an Amphenol 57-30360 connector

Parallel interface connector (printer side)

12. RS-232C Serial Interface

12-1. Interface Specifications

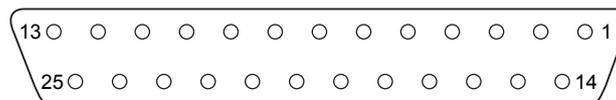
- ① Data transmission method: Asynchronous serial interface
- ② Baud rate: Selectable from 4800, 9600, 19200, 38400 bps
(Refer to “10. DIP Switch Setting”.)
- ③ Word length
Start bit: 1 bit
Data bit: 7 or 8 bits (selectable.)
Parity bit: Odd, even or none (selectable.)
Stop bit: 1 bit length
- ④ Signal polarity
RS-232C
MARK: Logic “1” (–3 V to –15 V)
SPACE: Logic “0” (+3 V to +15 V)



12-2. RS-232C Connector

| Pin No. | Signal name | Direction | Function |
|---------|-------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | F-GND | — | Frame ground |
| 2 | TXD | OUT | Transmission data |
| 3 | RXD | IN | Receive data |
| 4 | RTS | OUT | Same as DTR |
| 5 | N/C | | Not used. |
| 6 | DSR | IN | <p>1) Star Mode Not used.</p> <p>2) ESC/POS Mode <i>When DIP Switch 3-7 = OFF;</i> A) DTR communication mode Indicates whether data receive from host is enabled or disabled. Space: Receive enabled Mark: Receive disabled (except when transmitting data by DLE EOT, and GS a) B) X-ON/X-OFF communication mode Status of this signal is not checked.</p> <p><i>When DIP Switch 3-7 = ON;</i> This is an externally reset signal. A space above 1 ms pulse width engages reset.</p> |
| 7 | S-GND | — | Signal ground |
| 8~19 | N/C | | Not used. |
| 20 | DTR | OUT | <p>1) Star Mode A) DTR communication mode Indicates whether data receive from host is enabled or disabled. Space: Receive enabled Mark: Receive disabled</p> <p>B) X-ON/X-OFF communication mode Always space, except during following conditions:</p> <ul style="list-style-type: none"> • Period between reset and communication enabled • During self printing |

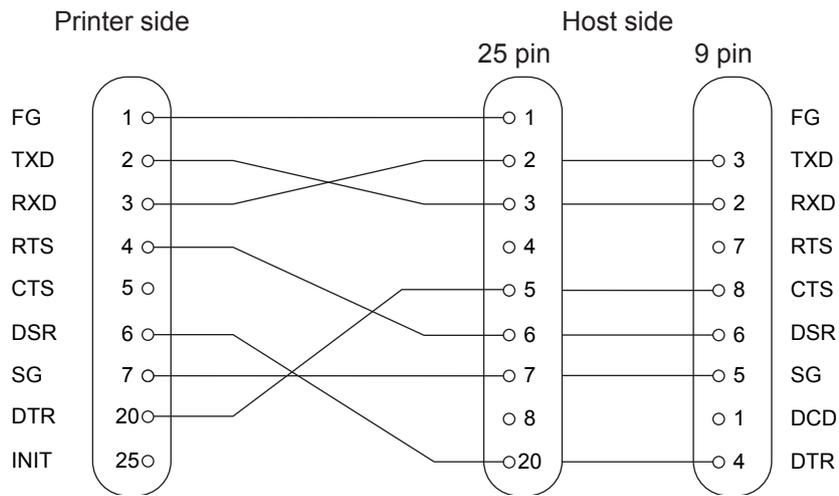
| Pin No. | Signal name | Direction | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|--|-----|----|-----------------------------------------------------------------------------------------------------------------------------------------------|------|------|------------------------------|------|------|----------------------------|---|------|---------------------------------------------|---|------|--------------------------------------------------------|---|------|-------------------------------------------|---|------|--------------------------------|---|------|------------------------------------------|------|------|
| 20 | DTR | OUT | <p>2) ESC/POS Mode</p> <p>A) DTR communication mode</p> <p>Indicates whether data receive from host is enabled or disabled.</p> <p>Space: Receive enabled Mark: Receive disabled</p> <p>The busy condition can be changed by using DIP Switch 1-6 as follows:</p> <table border="1"> <thead> <tr> <th rowspan="2">Printer status</th> <th colspan="2">DIP Switch 1-6</th> </tr> <tr> <th>OFF</th> <th>ON</th> </tr> </thead> <tbody> <tr> <td>1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data.</td> <td>BUSY</td> <td>BUSY</td> </tr> <tr> <td>2. During the self printing.</td> <td>BUSY</td> <td>BUSY</td> </tr> <tr> <td>3. When the cover is open.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>4. During the paper feeding by FEED button.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>5. When the printer stops printing due to a paper-end.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>6. During macro executing standby status.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>7. When an error has occurred.</td> <td>—</td> <td>BUSY</td> </tr> <tr> <td>8. When the receive buffer becomes full.</td> <td>BUSY</td> <td>BUSY</td> </tr> </tbody> </table> <p>B) X-On/X-Off Communication Mode</p> <p>Always space, except during following conditions:</p> <ul style="list-style-type: none"> • Period between reset and communication enabled • During self printing | Printer status | DIP Switch 1-6 | | OFF | ON | 1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data. | BUSY | BUSY | 2. During the self printing. | BUSY | BUSY | 3. When the cover is open. | — | BUSY | 4. During the paper feeding by FEED button. | — | BUSY | 5. When the printer stops printing due to a paper-end. | — | BUSY | 6. During macro executing standby status. | — | BUSY | 7. When an error has occurred. | — | BUSY | 8. When the receive buffer becomes full. | BUSY | BUSY |
| Printer status | DIP Switch 1-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | OFF | ON | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. During the period from when the power is turned on (including resetting using the interface) to when the printer is ready to receive data. | BUSY | BUSY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. During the self printing. | BUSY | BUSY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. When the cover is open. | — | BUSY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. During the paper feeding by FEED button. | — | BUSY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. When the printer stops printing due to a paper-end. | — | BUSY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. During macro executing standby status. | — | BUSY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. When an error has occurred. | — | BUSY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. When the receive buffer becomes full. | BUSY | BUSY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21~24 | N/C | | Not used. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | <u>INIT</u> | IN | <p>When DIP Switch 3-8 = OFF;</p> <p>Status of this signal is not checked.</p> <p>When DIP Switch 3-8 = ON;</p> <p>This is an externally reset signal.</p> <p>A space above 1 ms pulse width engages reset.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



D-sub 25 Pin

12-3. Cable Connections

The followings are a recommended interface cable connections.



Note: Use shielded wire less than 3 m in length.

12-4. Electrical Characteristics

| Voltage | Data signal | Control signal | Binary status |
|---------------|-------------|----------------|---------------|
| -3 V to -15 V | Mark | OFF | 1 |
| +3 V to +15 V | Space | ON | 0 |

13. USB and Ethernet Interface

13-1. USB Interface Specifications

1. General Specification: Conforms to USB 2.0 Specifications
2. Communication Speed: USB Full Speed Mode (12 Mbps)
3. Communication Method: USB Bulk Transmission Mode
4. Power Specifications: USB Self-power Function
5. Connector: USB Up-Stream Port Connector (USB Type-B)

13-2. Ethernet Interface Specifications

1. General Specification: Conforms to IEEE802.3
2. Communication Media: 10 Base-T/100 Base-TX
3. Communication Speed: 10/100 Mbps
4. Protocol: TCP/IP
5. TCP/IP detail: ARP, RARP, BOOTP, DHCP, LPR, #9100, FTP
HTTP, TELNET, TFTP
6. Connector: RJ-45 (8-pin modular)

Note: Factory-set login password for administrator

One of the following protocols may be used for changing the settings on this product: HTTP (web), TELNET, or FTP. To do so, it is necessary to log in using an administrator account for the product.

Use the following administrator account information on HTTP (web), TELNET, or FTP.

Administrator account name: “root” (required)

Password: “public” (required)

The password may be changed after logging in.

14. 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.

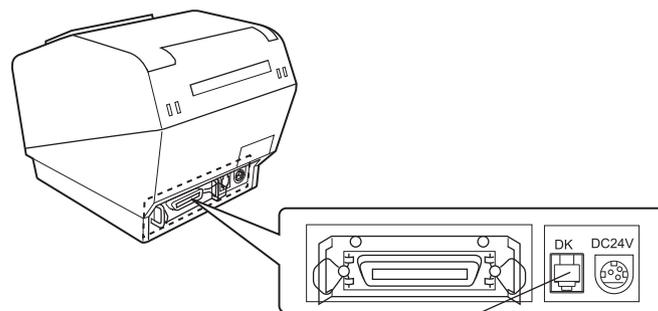
Use cables which meet the following specifications.

Peripheral Drive Connector

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

Drive circuit

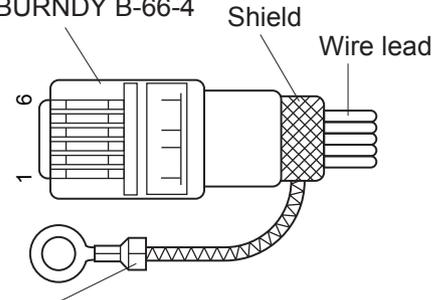
The recommended drive unit is shown below.



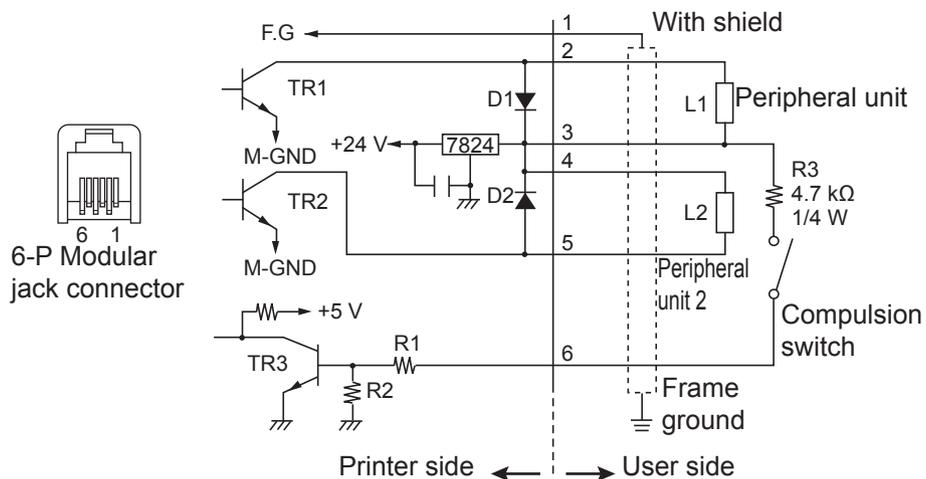
Peripheral drive connector

Modular plug

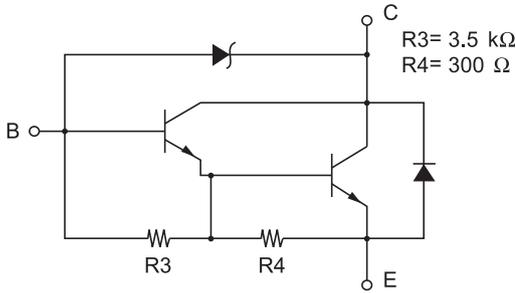
Modular plug: MOLEX 90075-0007, AMP641337, or BURNDY B-66-4



Separated Ground wire connected to shield (Europe only).



Reference
2SD 1866 Circuit Configuration



Drive Output: 24 V, Max. 1.0 A
TR1, TR2: Transistor 2SD 1866 or equivalent
R1=10 kΩ
R2=33 kΩ

Note:

- 1) Peripheral units 1 and 2 cannot be driven simultaneously.
- 2) To drive them continuously, set the duty cycle ratio to 20% or less (except when a peripheral buzzer is connected).
- 3) Never use the peripheral buzzer drive command if a device other than a peripheral buzzer is connected (i.e., cash drawer, etc.). Doing so can damage the connected device and this circuit.
- 4) The status of the compulsion switch can be known from the status command. Refer to the separate Programmer's Technical Reference manual for details.
- 5) Minimum resistance for coils L1 and L2 is 24Ω.
- 6) Absolute maximum ratings for diodes D1 and D2 ($T_a = 77^\circ\text{F}/25^\circ\text{C}$) are:
Average Rectified Current $I_o = 1\text{A}$
- 7) Absolute maximum rating for transistors TR1 and TR2 ($T_a = 77^\circ\text{F}/25^\circ\text{C}$) are:
Collector current $I_C = 2.0\text{A}$

15. Memory Switch Settings

Each memory switch is stored in EEPROM. For details on the functions and settings of memory switches, refer to the separate Programmer's Technical Reference manual.

The table below shows the factory settings for the memory switches.

| 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.
