

AI-100 / AI-110

Thermal Printer User's Manual

KA02077-Y922-01

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The source code for software that is permitted to be used under the GNU GPL, LGPL, or another license that requires the source code to be provided can be provided at cost on request for a period of 3 years after the product has shipped. If you would like the source code, contact the following.

Contact details : fit-gsm@cs.jp.fujitsu.com

How to Use This Product Safely

● Using This Document

This document contains important information for using the product safely. Carefully read and understand this manual before using the product. After reading this manual, store it with care at a place where it can be found at any time, such as near the product.

● Using Recycled Parts


In consideration of the environment, some recycled parts have been used in this product.

在中国使用时的注意

警告

此为 A 级产品。在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对干扰采取切实可行的措施。

电子信息产品安全使用期限



这标记是按照 2006 年 2 月 28 日公布的[电子信息产品污染控制管理办法]以及 SJ/T11364-2006[电子信息产品污染控制标识要求]在中国销售的电子信息产品的环保使用期限。如遵守关于这产品的安全或使用上的注意，在这期限内(从生产日期起算)不会因产品中的有害物质漏到外部、或发生突然变异，而引起环境污染和对人体或财产的重大影响。

产品中有毒有害物质或元素的名称及含量

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
机械单元	×	○	○	○	○	○
电源适配器	×	○	○	○	○	○
印刷电路组件 PCA*	×	○	○	○	○	○
： 印刷电路组件包括所有印刷电路板（PCB）及其各自的离散组件、IC 和连接器。						
○：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363－2006规定的限量要求以下。						
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363－2006规定的限量要求。						

**Federal Communications Commission
Radio Frequency Interference Statement
For United States Users**

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 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

Notice to Canadian Users

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Notice



The contents of this manual may be revised without prior notice.







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Safety Precautions

- **Warning Marks**

This document uses the following warning marks in order to ensure safe and correct use of the product and to prevent any harm or damage to you or to others.

 Warning	 Caution
Used for instructions intended to alert the user to the risk of death or severe injury should the product be used improperly without paying attention to this mark.	Used for instructions intended to alert the user to the risk of injury or material damage should the product be used improperly without paying attention to this mark.

Graphic Symbols Used and their Meanings, with Examples	
	The  symbol alerts the user to warnings and cautions. The specific meaning of the symbol is determined by the design contained within the triangle (in this example, caution for electric shock).
	The  symbol alerts the user to actions that must never be carried out (prohibited action). The specific action that is prohibited is indicated inside or to the side of the circle (in this example, disassembly is prohibited).
	The symbol  alerts the user to actions that must necessarily be performed. The specific action is indicated by the design contained within the circle (in this example, the power plug must be removed from the outlet).

Warning



Only the AC adapter specified may be used with this printer. Using any other AC adapter carries the risk of fire and electric shock.

When connecting the drawer kick cable, do not use any method not specified in the instruction manual. This may result in fire or electric shock.

Do not place metals or vessels containing water, such as a vase, flower pot or cup on the top of, or near the product, or pour water on it.

This may result in electric shock or fire.



Do not place this product in places with high humidity, dust, smoke or bad ventilation, or in places with fire hazards. This may result in electric shock or fire.

When connecting the AC adapter, do not use voltages outside the range indicated on the adapter. In addition, avoid using multiple cords connected to one outlet. This may result in electric shock or fire.

Do not insert or remove the power plug using wet hands. This may result in electric shock or fire.

Do not scratch or tamper with the power cable. Placing heavy objects on the power cable, pulling it, bending it forcibly, twisting it, or tampering with it can damage the power cable and result in fire or electric shock. Do not insert or drop foreign matter, such as metals or combustible materials, into the product from its aperture. This may result in fire or electric shock.



In case of emergency involving heat, smoke or acrid fumes occurring, immediately turn off the power switch, and remove the power plug from the outlet. Request the sales company (or maintenance service center) for repair after confirming the smoke has gone. Users must under no circumstances whatsoever try to repair the product due to the dangers involved. Using the product in the abnormal state without taking any corrective action may result in fire or electric shock.

If any foreign matter (such as a piece of metal or water or other liquids) enters the product, immediately turn off the power switch and remove the power plug from the outlet. Afterwards, contact the sales company (or maintenance service center). This may result in fire or electric shock if no action is taken. When the product is dropped, or if the cover or some other part is damaged, turn off the power switch, and remove the power plug from the outlet. Afterwards, contact the sales company (or maintenance service center). Using the product without take any corrective action may result in fire or electric shock.



When inserting the power cable into the AC adapter to connect the product, be sure to confirm that the product power switch has been turned off. Also, when inserting it into the outlet, confirm that the AC adapter is properly connected to the product. Not doing so result in electric shock.



In order to prevent any hazards from the vinyl bag that packages this product, please place it out of the reach of children.

In case of any accident with the bag, please consult a doctor immediately.



If any dirt is found on or around the metal pins of the power plug, wipe it off using a dry cloth. Not doing so may result in fire.



Do not alter the product in any way. For internal check or repair, please request the sales company (or maintenance service center). There are high voltage parts and sharp parts inside which can cause electric shock or injury.

Caution



Do not place heavy objects on the product.

This may destroy the balance and cause the product to fall over or down, resulting in injuries.

Do not locate the product on a place with severe vibration, or on an unstable or inclined surface. The product may fall over or down, resulting in injuries.

Do not leave the product in high-temperature locations, such as directly under the sun or near a heater, for long periods of time. High temperature may cause the cover or other parts to be heated, deformed, or melted, and the temperature inside the product may also rise, resulting in fire.

Do not open the cover of the print section of the device and insert any objects including your fingers during or immediately after use. This may result in injury or burns.

Do not touch the print head or motor during or immediately after printing.

This may result in burns.

During printer operation, do not touch the movable parts, such as gears or cutters. Touching movable parts may result in injury.

Do not touch the cutter blade.

As there is a cutter at the paper exit, do not attempt to insert your hands inside it at any time, whether or not the printer is in operation.



Do not open the cover of the print section of the device and touch the print head during or immediately after use., This may result in injury or burns.



When shifting the product, be sure to remove the power plug from the outlet. In addition, also remove the connection cable, etc. Pay adequate attention to your feet while performing the operation.

Scratching the power cable may result in electric shock or fire, and injuries may also be caused if the product falls over or down.

When removing the power plug, instead of pulling the electric cord, be sure to remove it by gripping the power plug.

If the power cable is pulled, the core of the electric cord may become exposed or broken, resulting in fire or electric shock.

When the weather conditions indicate a chance of a lighting strike, be sure to remove the power plug from the outlet for safety.

Not doing so may result in fire.

When not using the device for a long time, be sure to remove the power plug from the outlet for safety.

Not doing so may result in fire.



Firmly insert the power plug into the outlet.

An improper connection may result in fire or electric shock.

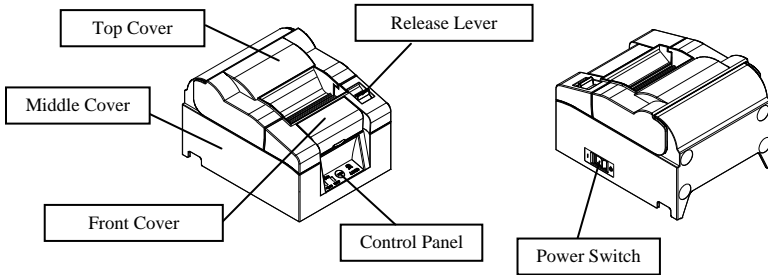
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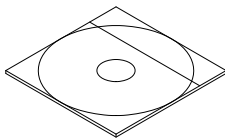
1. Appearance and Name of Components

1-1. Names of Components

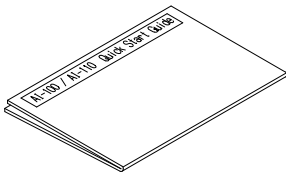


- **Top Cover**
Opens to replace paper.
- **Release Lever**
Used for opening the top cover.
- **Power Switch**
Turns the printer power ON/OFF.
- **Control Panel**
Contains switches for operating the printer and lamps that indicate the printer status.
- **Front Cover**
This can be removed in case of cutter jam or when the top cover does not open.

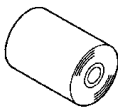
1-2. Package Contents



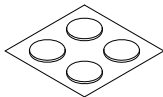
CD



Quick Start Guide



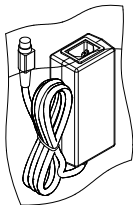
Thermal Paper



Rubber Feet
(For vertical installation)



58mm Width Separator



AC Adapter

*The AC Adapter is not supplied in some cases, depending on the printer model, region,etc.

2. AC Adapter

Only use the AC adapter specified below.

Item	No.	Remarks
AC Adapter	KA02951-0120	Input : 100 to 240 V, 50-60Hz Output : 24V \pm 5%, 1.5A

⚠ Caution: Only use authorized AC adapters.

⚠ Caution: Do not use any other bundled AC adapter other than designed for this printer.

3. Paper Specifications

Only use the thermal paper roll specified below.

3-1. Paper Width

- 80mm paper $80mm_{-1.0}^0$
- 58mm paper $58mm_{-1.0}^0$

3-2. Paper Thickness

- 65 - 85 μ m

3-3. Paper Roll

- Outside diameter: $\phi 83$ mm or less
- Core diameter: $\phi 12 \pm 0.5$ mm (inside) / $\phi 18 \pm 0.5$ mm (outside)
- Printing surface: outer surface of the roll
- Treatment of end of paper: The roll paper must not be glued to the core.
The end of the paper must also not be folded back.

⚠ Caution: Do not use rolls that have rough sides or sides from which pieces of paper extrude. Such paper may cause unstable paper feeding, resulting in printer trouble.

3-4. Recommended Thermal Paper

Manufacturer	Product Name	Quality Characteristic	Paper Thickness	Density
Oji Paper Co., Ltd.	PD160R	Monochrome thermal paper (high-grade preservation type)	75μm	100%
	PD190R	Monochrome thermal paper (mid-grade preservation type)	75μm	100%
Nippon Paper Industries Co., Ltd.	TF60KS-E	Monochrome thermal paper (normal type)	75μm	100%
	TP60KS-F1	Monochrome thermal paper (mid-grade preservation type)	75μm	100%
	TF50KS-E	Monochrome thermal paper (normal type)	65μm	100%
	TF62KS-E	Monochrome thermal paper (normal type)	85μm	100%

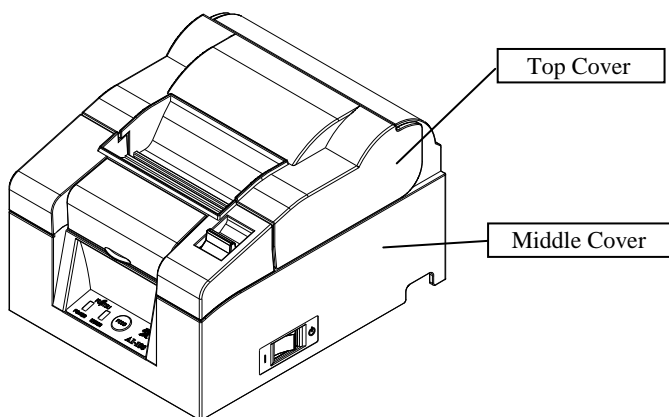
⚠ Caution: Using non-recommended paper may cause printer head damage, bad printing quality, etc.

4. Preparation

No printer cable is provided with the product. Obtain a printer cable suitable for the product interface. If you have any question, consult your dealer. Before connecting or disconnecting cables, make sure of the following:

- (1) The power to the printer and all other devices connected to the printer is turned off.
- (2) The AC adapter power cable has been unplugged from the outlet.

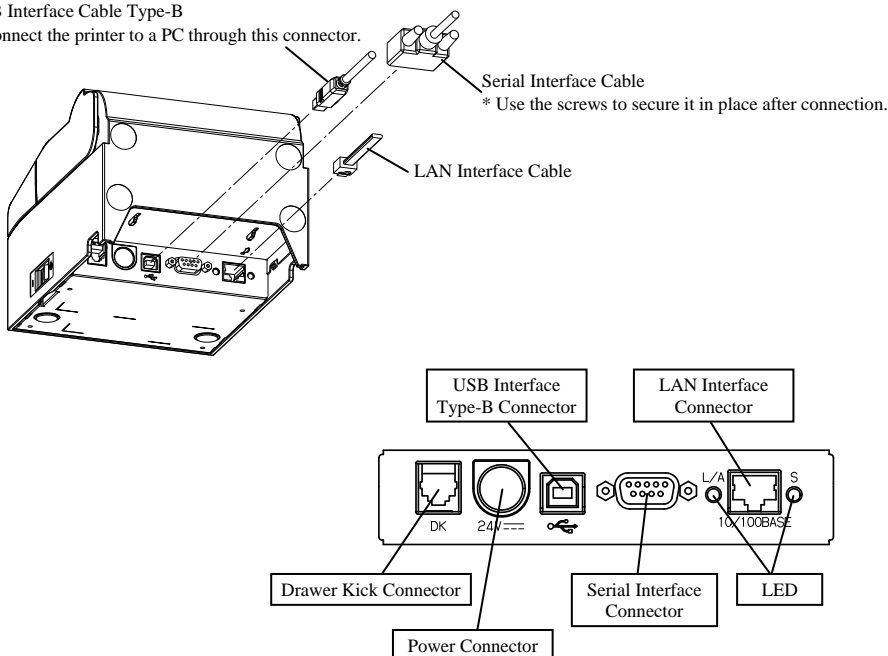
⚠ Caution: When connecting cables or moving the printer, hold the middle part of the printer cover on both sides. Holding the top cover may cause it to open.



4-1. Connecting the Interface Cable (to the printer)

USB Interface Cable Type-B

* Connect the printer to a PC through this connector.

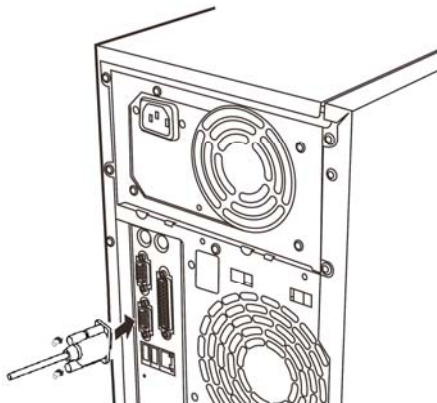


- ⚠ **Caution:** Do not connect the multiple interfaces at the same time.
- ⚠ **Caution:** While this printer supports 3 different interfaces, it is set to LAN Settings at time of shipment, so if you intend on using the USB or serial interfaces, please make sure to change settings prior to use. For more details on how to change setup settings, please refer to “9-4. LAN Setup Settings”.

4-2. Connecting the Interface Cable (to the PC)

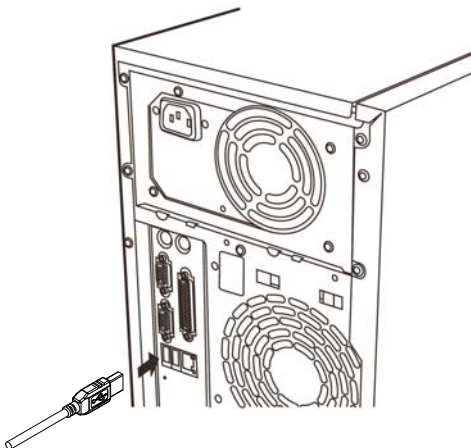
4-2-1 Serial Interface

- (1) Connect the connector of serial interface cable to the serial port on the computer as shown in the figure.



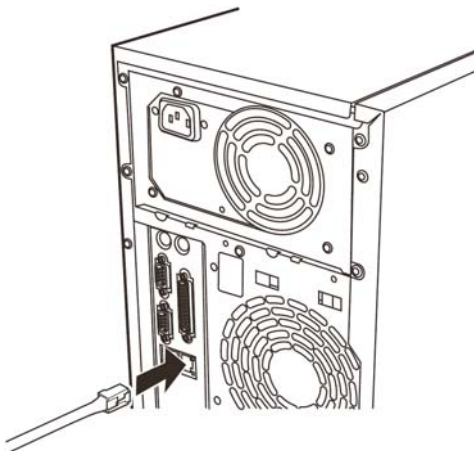
4-2-2 USB Interface

- (1) Connect the connector of USB interface cable to the USB port on the computer as shown in the figure.

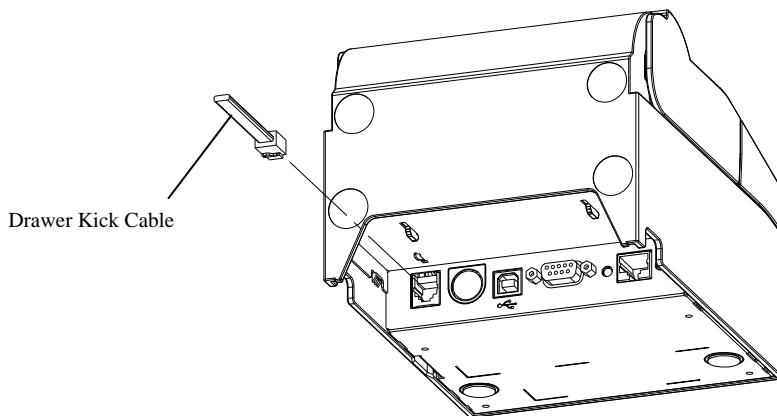


4-2-3 LAN Interface

- (1) Connect the connector of LAN interface cable to the LAN port on the computer as shown in the figure.



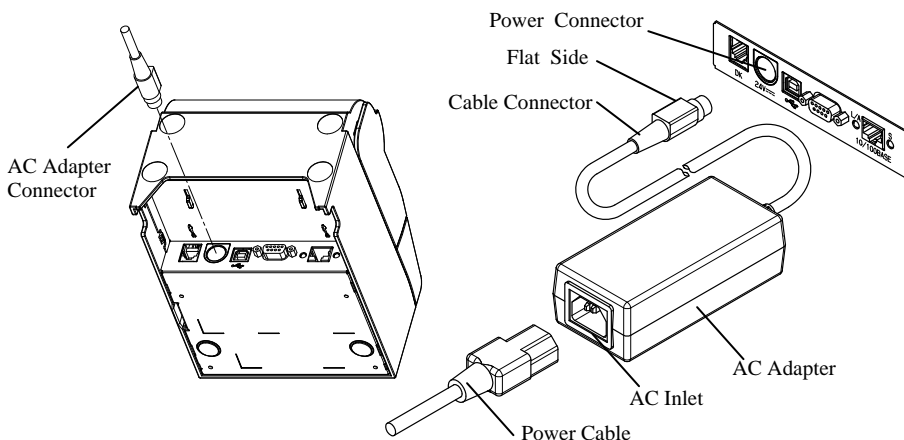
4-3. Connecting the Drawer Kick Cable



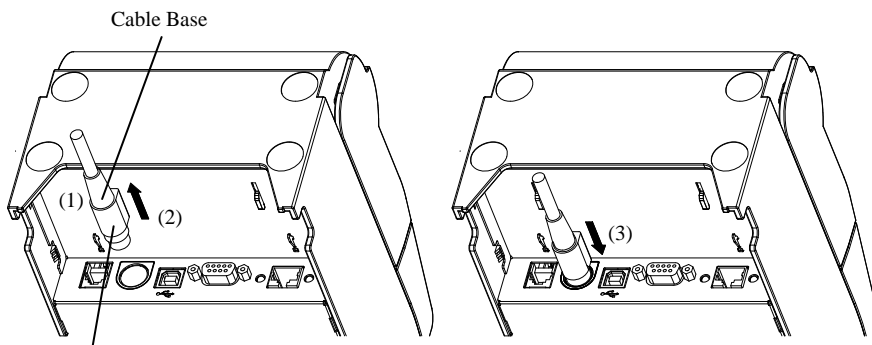
⚠ Caution: This product uses a special-purpose modular connector for the cash drawer. Do not attempt to use other types of connectors such as public telephone connectors.

4-4. Connecting the AC Adapter and Cable

- (1) Connect the cable connector of the AC adapter to the power connector.

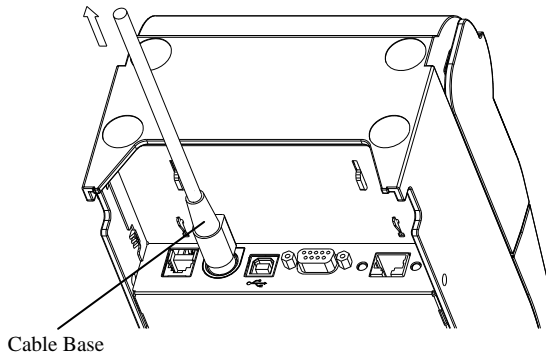


- ⚠ **Caution:** Before connecting the AC adapter, turn off the power switches on the printer and all the devices connected to the printer. Also, remove the plug of the AC adapter power cable from the outlet.
- ⚠ **Caution:** Use the specified AC adapters.
- ⚠ **Caution:** Perform the adapter connection with the device placed vertically for easy operation.
- ⚠ **Caution:** As the connector is clipped in place after insertion in order to prevent it from falling off, when performing insertion, (1) grip the cable base with one hand, (2) slide the outer part of the connector upwards with the other hand (3) and push in until it locks into place.

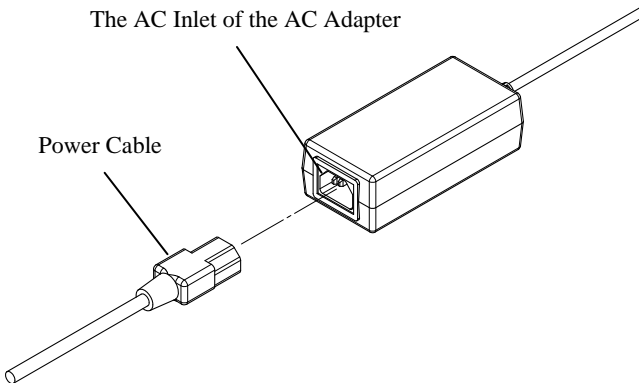


The Outer Section of the Connector

- (2) Confirm that the cable is locked in place by gently pulling on the cable base after connection.



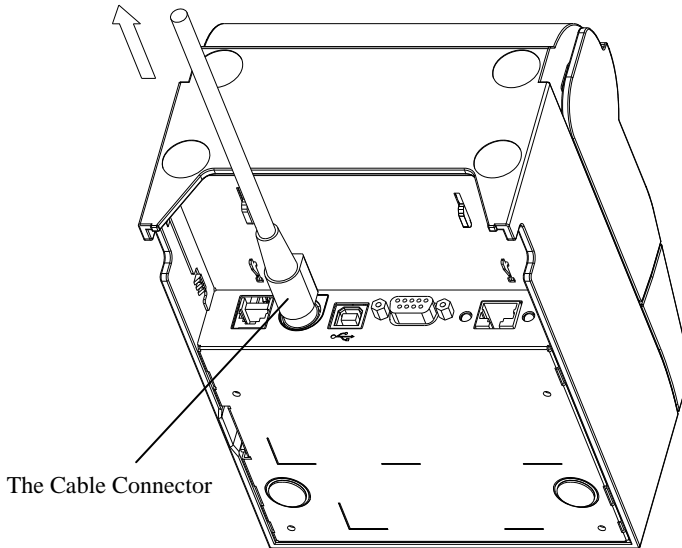
- (3) Connect the power connector to the AC inlet of the AC adapter.



- (4) Insert the plug of the power cable into the outlet.

4-5. Removing the AC Adapter

To remove the cable of the AC adapter, pull it while gripping the connector section on the cable side as shown in the following figure. The lock is released, making it easy to remove. Forcibly pulling the cable will damage the connector section.



- ⚠ Caution:** Before removing the AC adapter, turn off the power switches on the printer and all the devices connected to the printer. Also, remove the plug of the AC adapter power cable from the outlet.
- ⚠ Caution:** Perform adapter removal with the device placed vertically for easy operation.

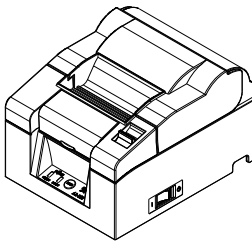
4-6. Installing the Printer

Both horizontal installation (the paper exit is on the topside) and vertical installation (the paper exit is on the front side) orientations are available.

In the case of vertical installation, attaching the optional splash-proof cover can protect the printer from water.

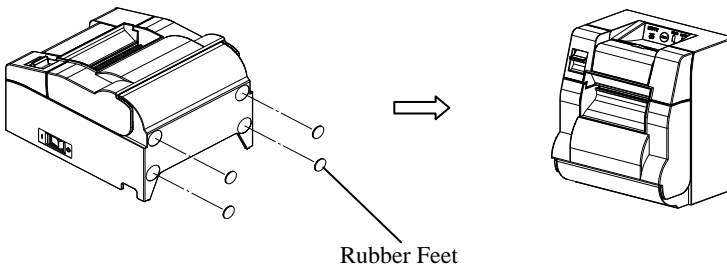
The printer can also be fixed to the wall by using the optional wall-hanging bracket.

Horizontal Installation



Vertical Installation

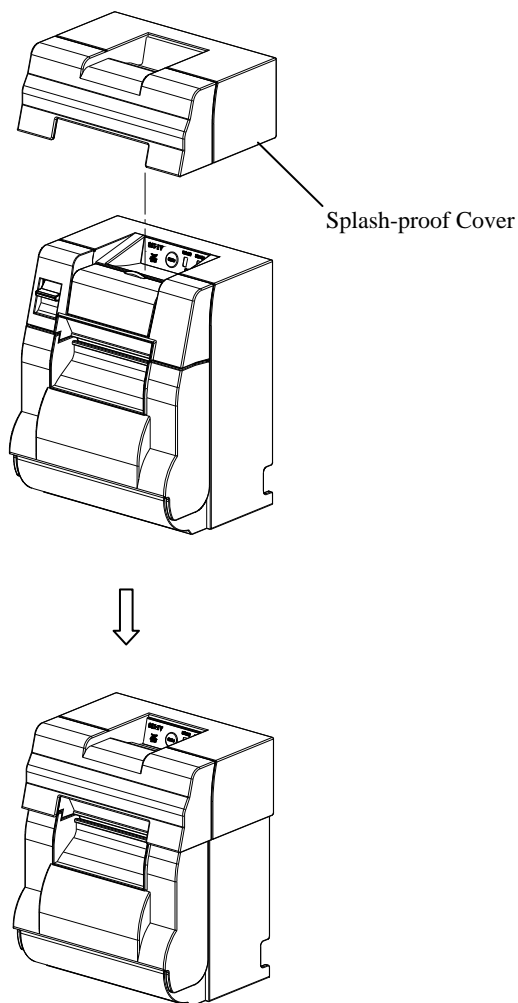
If the printer is installed vertically, stick the rubber feet (included in the package) into the round indents on the printer rear cover.



⚠ Caution: Before sticking on the rubber feet, wipe off any dirt inside the indents.

Splash-proof Cover (Optional)

Mount the splash-proof cover at the top when the printer is installed vertically.

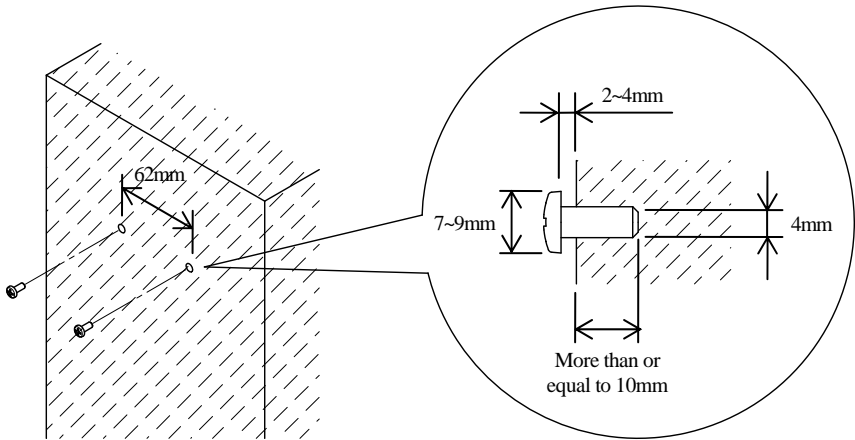


⚠ Caution: The splash-proof cover is used only for vertical installation.

Wall Hanging Bracket (Optional)

To fix the printer to a wall, follow the procedures below:

- (1) Mount two metal screws (thread diameter: $\Phi 4$, head diameter: $\Phi 7$) on the wall, spaced 62mm apart in a horizontal line, such that the length of each screw entering the wall is at least 10mm and the length protruding outside is 2-4mm.



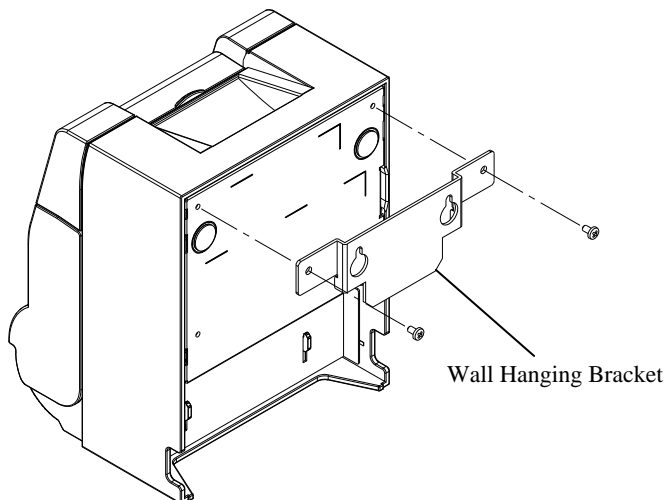
⚠ Caution: In order to firmly fix the printer, mount the wall hanging bracket onto a wooden, concrete or metal wall. It is recommended that the wall thickness should be 10mm or more.

Use metal screws.

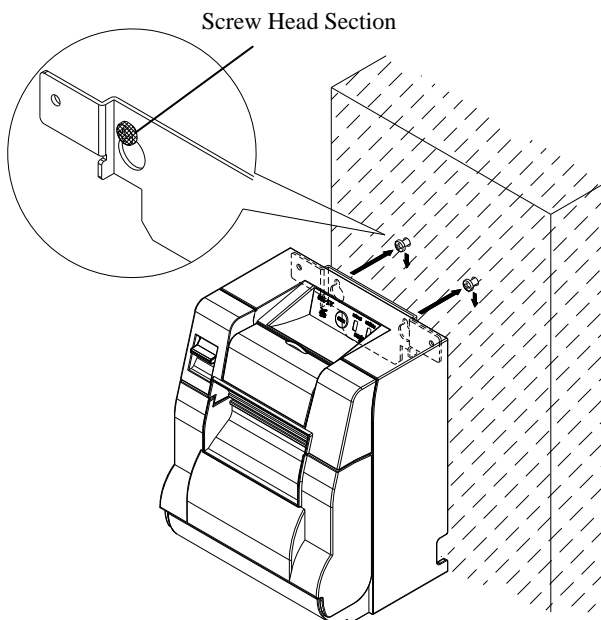
The screws mounted on the wall are required to have a pull-out strength of 150N (15.3kgf) or more.

⚠ Caution: The wall hanging bracket can be used only for printers that use an external AC adapter (Standard Model).

- (2) Attach the wall hanging bracket to the printer and fix it securely with the enclosed screws.

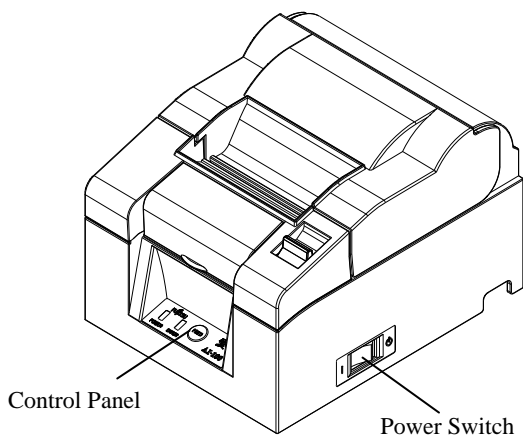


- (3) Align the holes of the wall hanging bracket with the screws mounted to the wall and hang the printer securely.



4-7. Power On

- (1) Connect to the power cable according to 4-4 above.
- (2) Turn on the power switch at the side of the printer.
After turning the power on, the POWER lamp on the control panel will light up.



4-8. Installing the Printer Software

Refer to the "Installation Guide"(*1) in the enclosed CD for instructions on installing the printer driver and utility software.

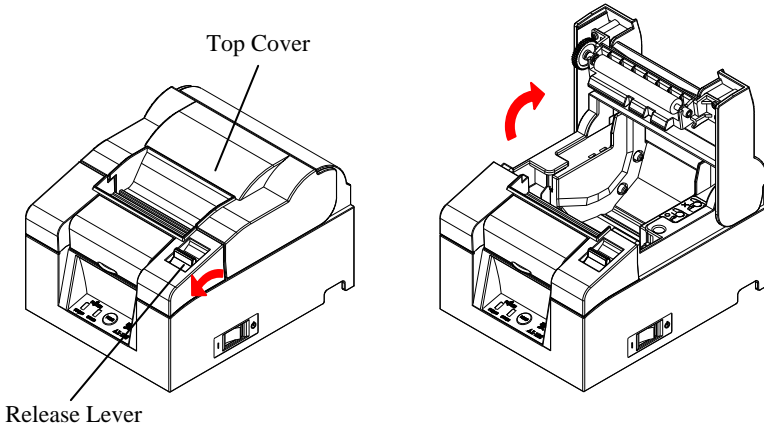
*1: \Manual\Software\English\AI100_InstallGuide_en.pdf

The "Installation Guide" can also be viewed by loading the CD in your PC's CD drive and selecting "Manuals" on the "Thermal Printer Setup" screen that appears.

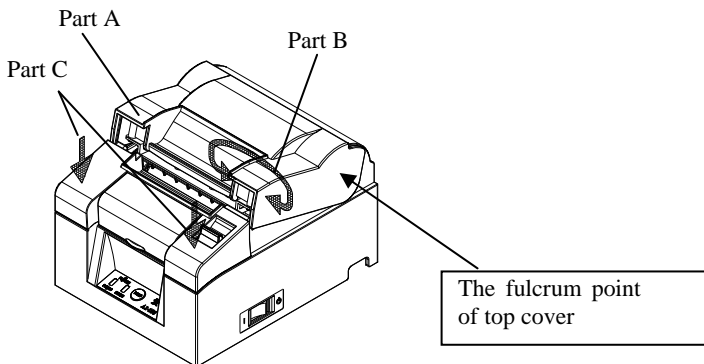
5. Inserting Paper

5-1. Opening the Top Cover

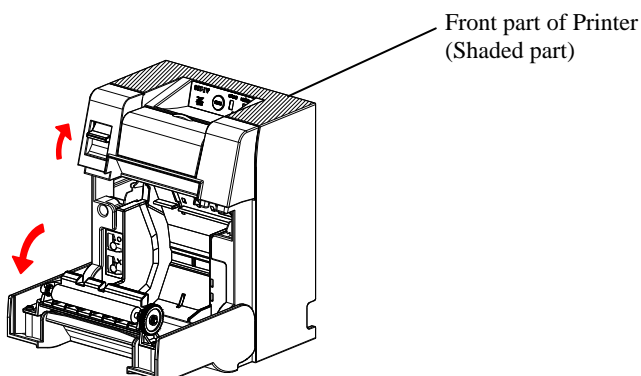
- (1) Pull the release lever in the direction of the arrow, and then open the top cover.



⚠ Caution: Lift the cover until it is vertical so that it will stay open.



⚠ Caution: To open the cover, use either side of part C to hold the printer steady and use part A or part B to lift the cover. To prevent your fingers being pinched, please do not touch the area around the top cover hinge.



⚠ Caution: When using printer vertically, steady the front part of the printer (shaded part in the above picture) to open the top cover.

5-2. Paper Width Setting (Width: 58mm / 80mm)

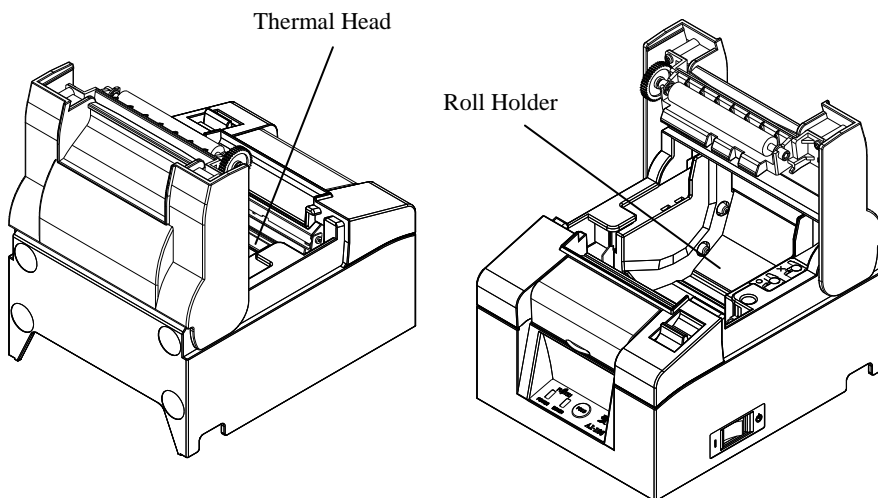
As the factory setting for paper width is 80mm, follow the instructions in "5-3. Setting the Paper" to set the paper roll when using 80mm paper.

When using 58mm paper, first attach the separator in accordance with the instructions in "5-2-1. Attaching the Separator" and then set the paper roll.

Also, follow the instructions in "9-2. Changing the Setup" to set the "Paper Width" in the printer setup to "58mm/35columns" or "58mm/32columns".

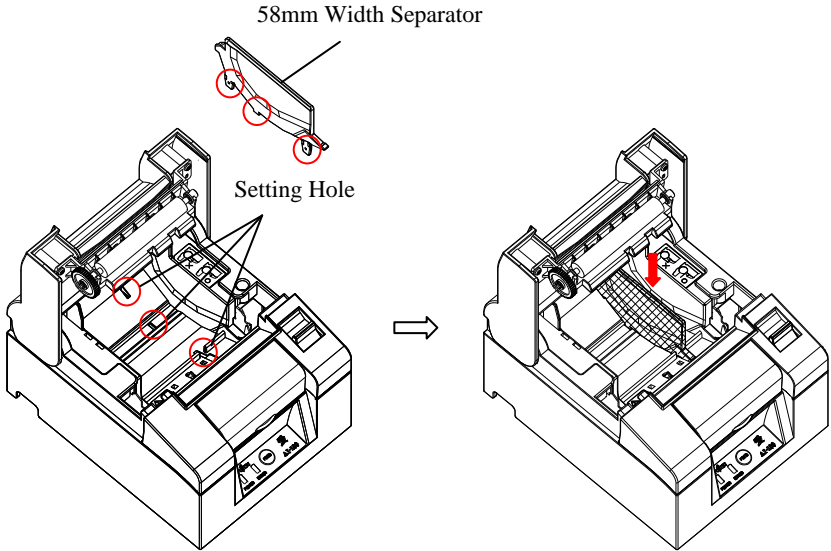
⚠ Caution: Do not switch from the 58mm width paper to 80mm width paper when printing is in progress. When using narrow-width paper, a part of the thermal head may directly come in contact with the platen roller without any paper present. This causes the head to wear down, resulting in poor printing quality. In addition, as the cutter blade also works on sections without paper, the cutter blade may wear down, resulting in a bad cut.

⚠ Caution: As the thermal head may be damaged by static electricity, do not touch the thermal head except for cleaning.



5-2-1 Attaching the Separator

- (1) Align the three lugs of the supplied 58mm width separator with the corresponding holes on the printer body, then push it into place.



- ⚠ **Caution:** Push the plate until it locks with a clicking sound and confirm that the top side of the separator is horizontal.
- ⚠ **Caution:** When moving the separator follow the instructions in the Special Mode section to set the paper width and align it with the printing area.
(Refer to 9 Special Mode: 9-2. Changing the Setup.)

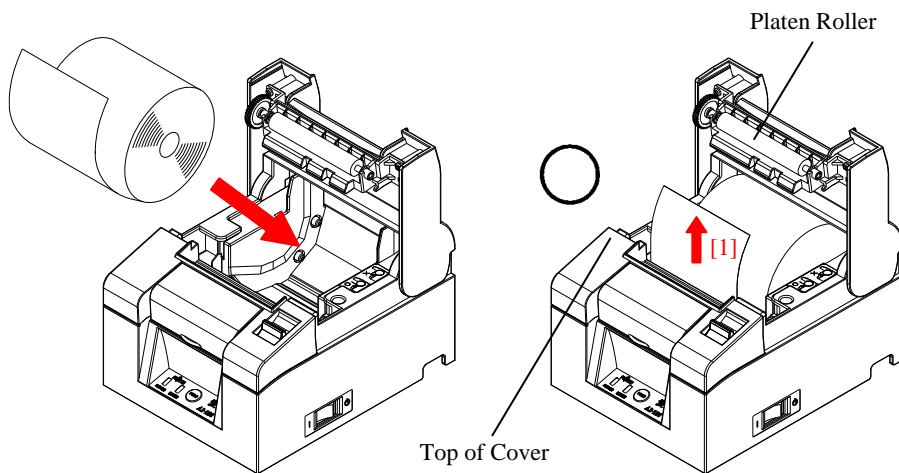
5-3. Setting the Paper

- (1) In the case of a new roll of paper, remove the glued portion and tape on the paper roll.

When replacing the roll paper, first remove the old paper core.

⚠ Caution: Since the glued portion of the paper should not be printed on, remove about one turn (about 30 cm) of the roll paper from the beginning so that none of the remaining paper has glue on it. Any adhesive or other matter remaining from the glue may adhere to the thermal head and cause a problem, such as voids on printouts. Therefore, do not forget to remove the glued portion of the paper.

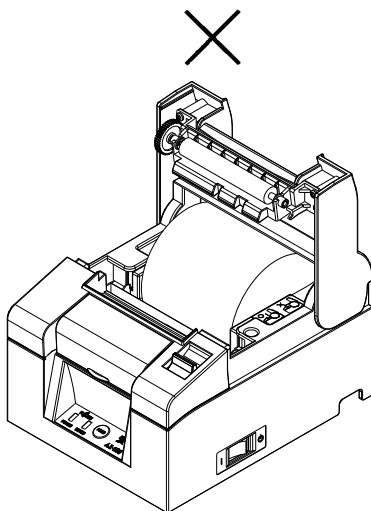
- (2) After inserting the new roll of paper with the orientation shown, pull the end of the paper in the direction indicated by the arrow [1].



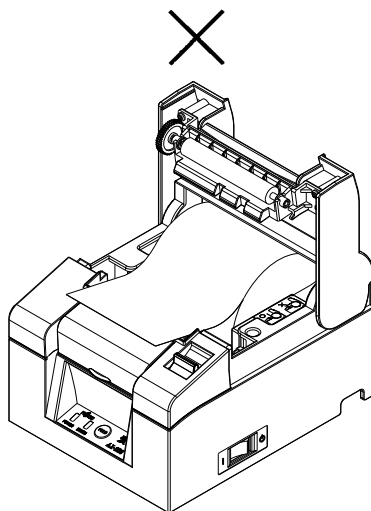
⚠ Caution: Pull the end of the paper so that it passes over the top of the cover.

⚠ Caution: Do not damage or dent the platen roller.
Dents on the platen roller will cause gaps in the printing and/or line feed failure.

⚠ Caution: Setting the paper as shown in the following figures may cause paper or printing jams.

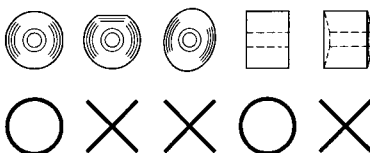


The paper does not pass over the top of the cover.



The paper has been set incorrectly.

⚠ Caution: Do not use deformed roll paper. Using rolls such as those shown below may cause trouble such as paper or printing jams.

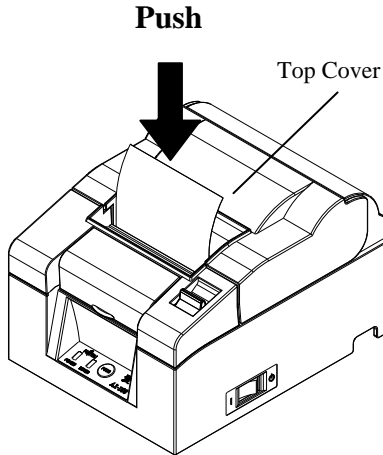


⚠ Caution: If the roll paper is loose (slack) as shown below, remove the slack before using the roll. Using without removing the slack may cause paper or printing jams, or result in failure to detect the paper near end condition.

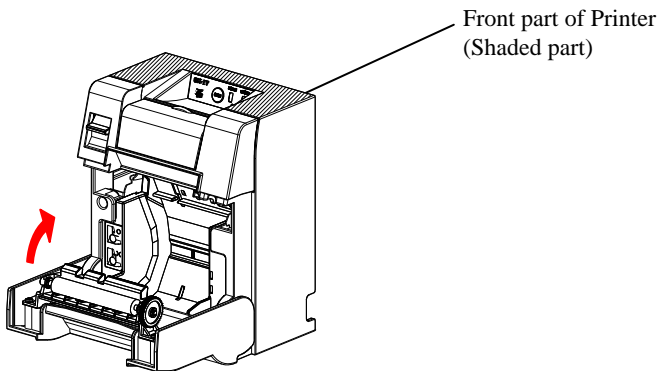


5-4. Closing the Top Cover

Set the paper correctly and carefully close the top cover.



- ⚠ **Caution:** Set the paper correctly. Closing the top cover while the paper is skewed may cause a paper jam or messy printing.
- ⚠ **Caution:** When closing the top cover, close it securely by pressing around the central position (shown by the arrow in the figure) until you hear a clicking sound. If the cover has not locked into place, the printer may not function.

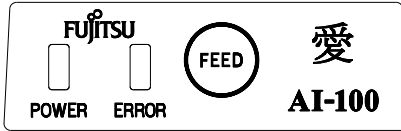


- ⚠ **Caution:** When the printer is mounted vertically, use the front of the printer (shaded part in the above picture) to hold it steady when opening the top cover.

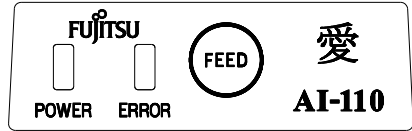
6. Control Panel

6-1. Control Panel

AI-100



AI-110



POWER lamp(●)

If the power switch is turned on and the printer is supplied with power, this lamp will light up.

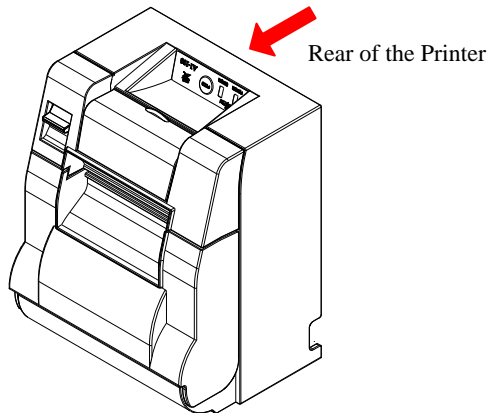
ERROR lamp(●)

This lamp lights up or blinks to indicate an error.

FEED Button

Pressing this button once causes the printer to feed the paper by an amount equivalent to one line.

Holding it down feeds the paper continuously.


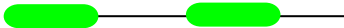


⚠ Caution: When the printer is mounted vertically, always hold the rear of the printer when you press the FEED button to keep the printer steady and prevent it from falling over.

6-2. Error Indications

Recoverable errors

Error State	LED Lamp	Blinking Pattern
No paper Paper end	POWER (●)	Constantly on
	ERROR (●)	Constantly on
Cover open	POWER (●)	Constantly on
	ERROR (●)	Constantly on
Cutter jam	POWER (●)	Constantly on
	ERROR (●)	Constantly on

Error State	LED Lamp	Blinking Pattern
Paper near end	POWER (●)	Constantly on
	ERROR (●)	
Head hot	POWER (●)	
	ERROR (●)	● Remains unchanged.

Unrecoverable errors

Error State	LED Lamp	Blinking Pattern
Internal error	POWER(●)	— ● — ● —
	ERROR(●)	● —————
		Repetition of two blinks of the ● lamp and one blink of the ● lamp
Head not installed	POWER(●)	— ● — ● — ● —
	ERROR(●)	● —————
		Repetition of three blinks of the ● lamp and one blink of the ● lamp
Low voltage	POWER(●)	— ● — ● — ● — ● —
	ERROR(●)	● —————
		Repetition of four blinks of the ● lamp and one blink of the ● lamp
Over voltage	POWER(●)	— ● — ● — ● — ● — ● —
	ERROR(●)	● —————
		Repetition of five blinks of the ● lamp and one blink of the ● lamp
Watchdog timer error	POWER(●)	— ● — ● — ● — ● — ● — ● — ● —
	ERROR(●)	● —————
		Repetition of eight blinks of the ● lamp and one blink of the ● lamp
SPI Flash ROM error	POWER(●)	— ● — ● — ● — ● — ● — ● — ● — ● —
	ERROR(●)	● —————
		Repetition of nine blinks of the ● lamp and one blink of the ● lamp

7. Paper Jam Prevention and Removal

7-1. Paper Jam Prevention

Do not touch the paper while it is coming out or before cutting is complete. Pressing or pulling the paper with your hand while it is coming out may cause a paper jam, bad cut, or bad line feed.

7-2. Paper Jam Removal

In case of a paper jam, remove the paper as follows:

- (1) Turn off the power switch to disconnect the printer from the power.
- (2) Pull the release lever towards you, and then open the top cover.
If the top cover does not open, refer to the instructions in "7-3. If the Top Cover Does Not Open" to remove the cutter jam.
- (3) Press the printer and remove the jammed paper.

⚠ Caution: When removing paper, remove the paper slowly without pulling it forcibly.

⚠ Caution: As the thermal head may be damaged by static electricity, do not touch the thermal head. Also, do not touch the thermal head as it may still be hot after printing.

- (4) Set the paper correctly and carefully close the top cover.

⚠ Caution: Set the paper correctly. Closing the top cover while the paper is skewed may cause a paper jam or messy printing.

⚠ Caution: When closing the top cover, close it securely by pressing around the central position until you hear a clicking sound. If the cover has not locked into place, the printer may not function.

- (5) Turn on the power switch . Also, at this time confirm that the ERROR lamp has turned off.

⚠ Caution: As printing data cannot be received while the ERROR lamp is on, firmly close the top cover.

7-3. If the Top Cover Does Not Open

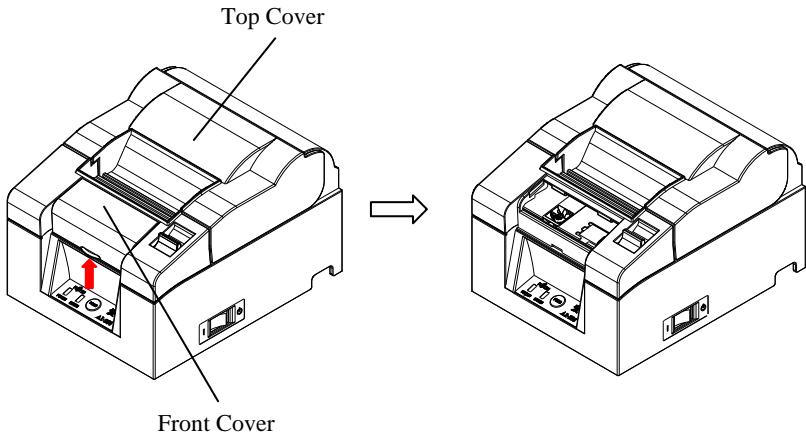
When the printer has stopped with the cutter blade exposed due to some abnormality such as a paper jam, the top cover will not open.

In such a case, instead of opening it forcibly, perform the following steps:

- (1) Turn off the power switch to disconnect the printer from the power.
- (2) Turn the power on again. This causes the cutter to operate and may clear the paper jam.
- (3) Pull the release lever toward you to check whether the top cover opens. If so, turn the power off again and follow the instructions from step (6) to clear the paper jam.

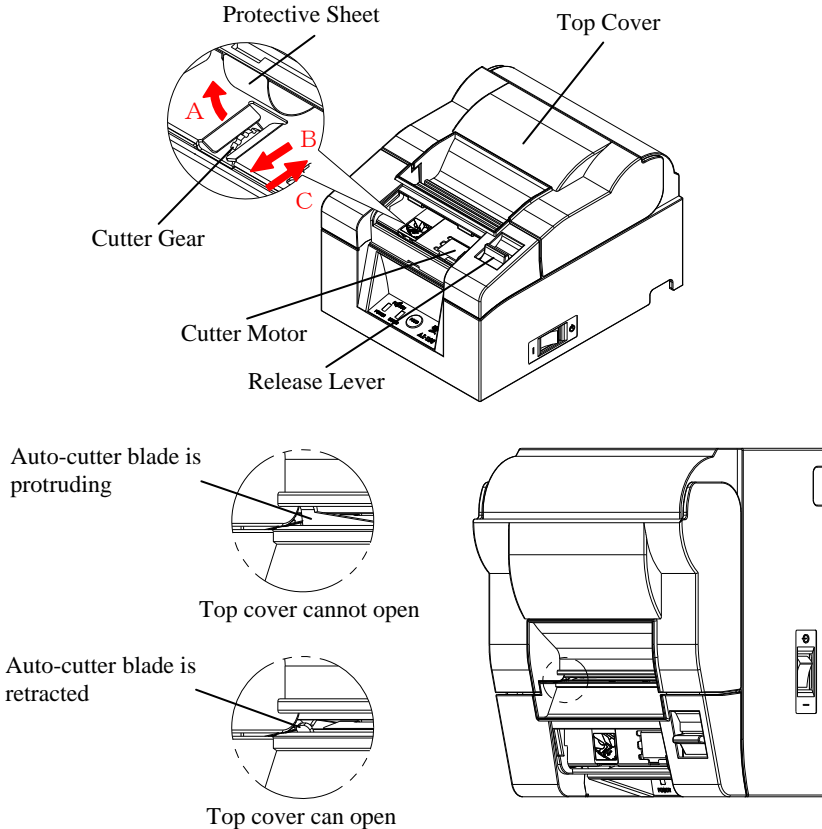
If the top cover still cannot be opened after the power is turned on, turn the power off again and follow the instructions from step (4) to clear the paper jam.

- (4) Remove the front cover by lifting it as shown by the arrow.



- (5) Lift the protective sheet as indicated by arrow A and rotate the cutter gear in the direction indicated by arrow B while pulling the release lever toward you.

If the auto-cutter blade fails to move despite rotating the cutter gear and the top cover still will not open, pull the release lever toward you and rotate the cutter gear in the opposite direction (indicated by arrow C) until the top cover is able to open.



- ⚠ Caution: Do not touch the cutter motor, as it may still be hot after printing.**
- ⚠ Caution: Do not touch the auto cutter, as its blade end is sharp and dangerous.**
- ⚠ Caution: When you cannot open Top Cover with rotating Cutter Gear to either direction, call your service provider.**

(6) Open the top cover and remove the jammed paper while holding the printer steady.

⚠ Caution: When removing paper, remove the paper slowly without pulling it forcibly.

⚠ Caution: As the thermal head may be damaged by static electricity, do not touch the thermal head. Also, do not touch the thermal head as it may still be hot after printing.

(7) Set the paper correctly and carefully close the top cover.

⚠ Caution: Set the paper correctly. Closing the top cover while the paper is skewed may cause a paper jam or messy printing.

⚠ Caution: When closing the top cover, close it securely by pressing around the central position until you hear a clicking sound. If the cover has not locked into place, the printer may not function.

(8) Turn on the power switch. Also, at this time confirm that the ERROR lamp has turned off.

⚠ Caution: As printing data cannot be received while the ERROR lamp is on, firmly close the top cover.

8. Troubleshooting

This section provides solutions for printer malfunctions and print quality problems.

8-1. Problems at Power-on and Other Errors

Symptom	Cause	Solution
Although the power has been turned on, the POWER lamp on the control panel does not light up and the printer does not start.	(1) The power cable is disconnected. (2) The AC adapter is not plugged in.	(1) Connect the power cable. * Refer to 4-4. Connecting the AC Adapter and Cable. (2) Connect the connector of the AC adapter. * Refer to 4-4. Connecting the AC Adapter and Cable.
The ERROR lamp on the control panel lights up and the printer does not work.	(1) There is no paper in the printer. (2) The top cover is not completely closed. (3) The thermal head is excessively hot.	(1) Set the paper. * Refer to 5. Inserting Paper. (2) Close the top cover completely. * Refer to 5. Inserting Paper. (3) Wait for the thermal head to cool down.

8-2. Cutter Problems

Symptom	Cause	Solution
The paper is not cut.	(1) The cutter blade is damaged or worn out. (2) Paper fragments or other foreign matter are stuck around the cutter or the sliding section.	(1) Turn off the power and request repair. (2) Remove the paper fragments or other foreign matter.
The cutter does not return to its correct position.	Paper fragments or other foreign matter are stuck around the cutter or the sliding section.	Remove the paper fragments or other foreign matter.

8-3. Printing Problems

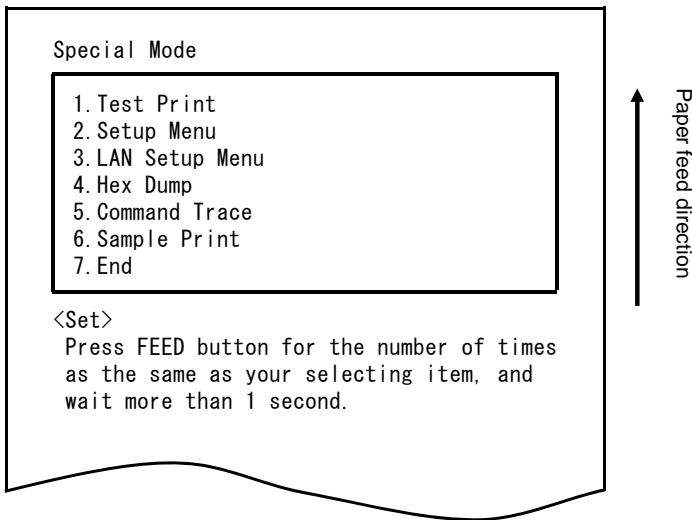
Symptom	Cause	Solution
The printer does not print.	(1) The interface cable is disconnected or broken. (2) The printer setup is not correct.	(1) Connect the interface cable correctly, or replace it. * Refer to 4-1. Connecting the Interface Cable (2) Amend the setting. Example: Baud rate mismatch * Refer to 9-2,9-4. Changing the Setup.
Print is too dark or blurred.	(1) Print density setting in the printer setup is incorrect. (2) The thermal head is damaged.	(1) Set the printer at the suitable print density and/or print speed for the print paper. * Refer to 9-2. Changing the Setup. (2) Turn off the power and request repair.
Print is too faint.	(1) Print density setting in the printer setup is incorrect. (2) The thermal head is damaged.	(1) Set the printer at the suitable print density and/or print speed for the print paper. * Refer to 9-2. Changing the Setup. (2) Turn off the power and request repair.
Printing is uneven.	(1) Paper fragments or other foreign matter are stuck to the heating elements of the thermal head. (2) The setting of the printer setup is incorrect. (3) Foreign matter is stuck on the platen roller. (4) The thermal head is damaged.	(1) Check and clean the thermal head. * Refer to 10-3. Cleaning the Thermal Head (2) Set the printer at the suitable print density and/or print speed for the print paper. Amend the setting. * Refer to 9-2. Changing the Setup. (3) Remove the foreign matter from the platen roller. * Refer to 10-2. Cleaning the Platen Roller (4) Turn off the power and request repair.
Vertical marks appear on the printout.	(1) Foreign matter is stuck in or dropped into the paper transport. (2) Foreign matter is stuck on the thermal head. (3) The thermal head is damaged.	(1) Clean the paper transport. * Refer to 10-1. Cleaning Paper Holder and Paper transport (2) Clean the thermal head. * Refer to 10-3. Cleaning the Thermal Head (3) Turn off the power and request repair.

9. Special Mode (Test Print, Setup Menu...)

9-1. Test Print

Ensure that paper is set in the printer. Turn off the power switch on the printer, then turn it on again while pressing the FEED button on the control panel. This outputs the following printout.

⚠ Caution: Press and hold the FEED button until the printer starts printing.



Then Press the FEED button **once times** (select 1. Test Print) to start a test print.

The printer automatically cuts the paper and stops after performing a set amount of printing. To terminate the test print while in progress, press the FEED button. This cuts the paper and terminates printing.

Test Print (Example)

AI-100

Firmware Number KA02041-Jxxx
Firmware Version 01A (0xxxxx)
123456

Memory Switch 1

Power On Status Disable
Receive Buffer 4KByte
Busy Condition Bufferfull
Receive Error ?Print
Auto LF Disable
DSR(#6)Reset Disable
USB Soft Reset Enable

Memory Switch 2

Cover Open Error Auto Recovery
Error Auto Recovery
Batch (COM IF) Enable
Batch (Other IF) Disable
Serial Number Disable
ASB Enable

Print

Paper Width 80mm/48columns
Max Speed 180mm/s
Print Density 100%

Hardware

Error Alert None
Buzzer Interval Pattern 2
Buzzer Repetition Three
Graph/User NV-MEM 384KB/192KB
Cut at CoverClose Enable
PNE Detect Enable

Interface

Baudrate 115200BPS
Format 8NONE1
Protocol DSR/DTR
USB Printer

LAN

Enable
Mac Address [xx:xx:xx:xx:xx:xx]
root Password "*****"
Printer Name "AI-100"
DHCP Enable
IP Address 192.168. 1. 1
Subnet Mask 255.255.255. 0
Default Gateway 0. 0. 0. 0

! " # \$ % & ' () * + , - . / 0 1 2 3 4
5 6 7 8 9 : ; < = > ? @ A B C D E F G H I
J K L M N O P Q R S T U V W X Y Z [\] ^
_ ~ a b c d e f g h i j k l m n o p q r s

Paper feed direction

AI-110

Firmware Number KA02041-Jxxx
Firmware Version 01A (0xxxxx)
123456

Memory Switch 1

Power On Status Disable
Receive Buffer 4KByte
Busy Condition Bufferfull
Receive Error ?Print
Auto LF Disable
DSR(#6)Reset Disable
USB Soft Reset Enable

Memory Switch 2

Cover Open Error Auto Recovery
Error Auto Recovery
Batch (COM IF) Enable
Batch (Other IF) Disable
Serial Number Disable
ASB Enable

Print

Paper Width 80mm/48columns
Max Speed 220mm/s
Print Density 100%

Hardware

Error Alert None
Buzzer Interval Pattern 2
Buzzer Repetition Three
Graph/User NV-MEM 384KB/192KB
Cut at CoverClose Enable
PNE Detect Enable

Interface

Baudrate 115200BPS
Format 8NONE1
Protocol DSR/DTR
USB Printer

LAN

Enable
Mac Address [xx:xx:xx:xx:xx:xx]
root Password "*****"
Printer Name "AI-110"
DHCP Enable
IP Address 192.168. 1. 1
Subnet Mask 255.255.255. 0
Default Gateway 0. 0. 0. 0

! " # \$ % & ' () * + , - . / 0 1 2 3 4
5 6 7 8 9 : ; < = > ? @ A B C D E F G H I
J K L M N O P Q R S T U V W X Y Z [\] ^
_ ~ a b c d e f g h i j k l m n o p q r s

Paper feed direction

9-2. Changing the Setup

This section explains how to setup the printer without using a PC.

Alternatively, when the printer is connected to a Windows PC, the settings can be changed using the utility software on the enclosed CD.

For instructions on installing and using the utility software, refer to the "Installation Guide" and "Utility User's Guide" located in the \Manual\Software\English folder of the CD.

- Installation Guide : AI100_InstallGuide_en.pdf
- Utility User's Guide : AI100_UtilityGuide_en.pdf

The "Installation Guide" and "Utility User's Guide" can also be viewed by loading the CD in your PC's CD drive and selecting "Manuals" on the "Thermal Printer Setup" screen that appears.

Setting Example Select a higher print density

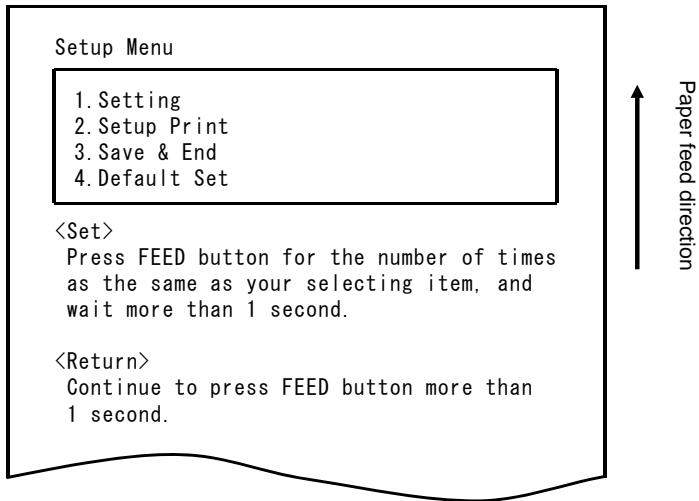
Print Density Changed from 100% to 130%

Perform setup as follows:

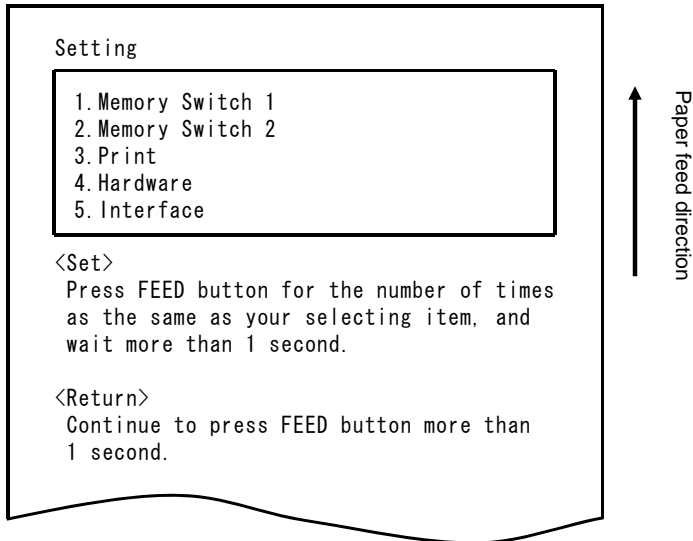
1. Check the printer state prior to setting.
 - (1) The power is off.
 - (2) The paper roll is set.
 - (3) The cover is closed.

2. Ensure that paper is set in the printer. Turn off the power switch on the printer, then turn it on again while pressing the FEED button on the control panel. This outputs the printout shown in section 9-1.

Then Press the FEED button **twice times** (to select 2. Setup Menu) enters setup mode and prints the following menu.

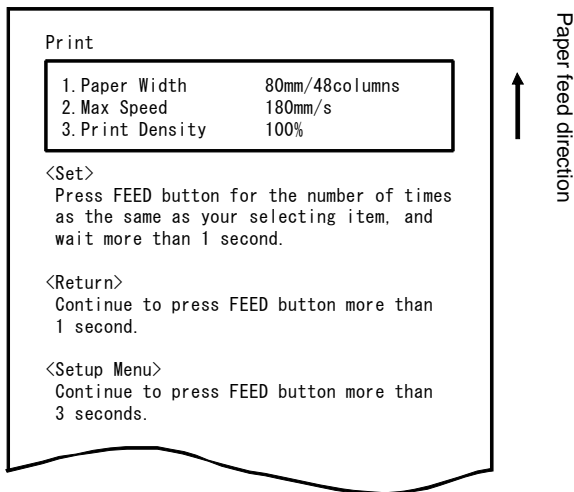


3. **Then Press** the FEED button **once times** (to select 1. Setting) enters setting mode and prints the following setting groups.

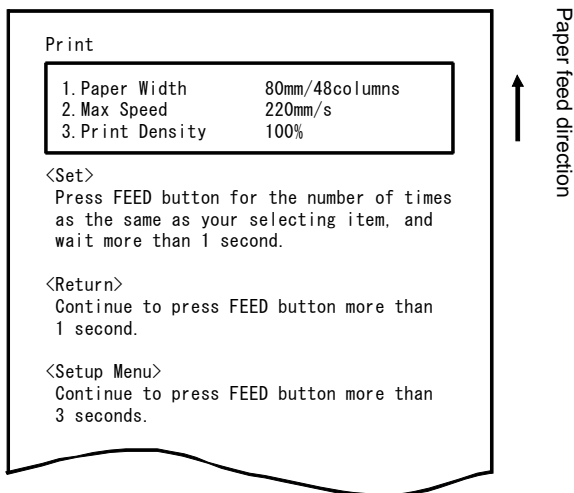


4. **Then Press** the FEED button **three times** (to select 3. Print) selects the Print group and prints the following setting options.

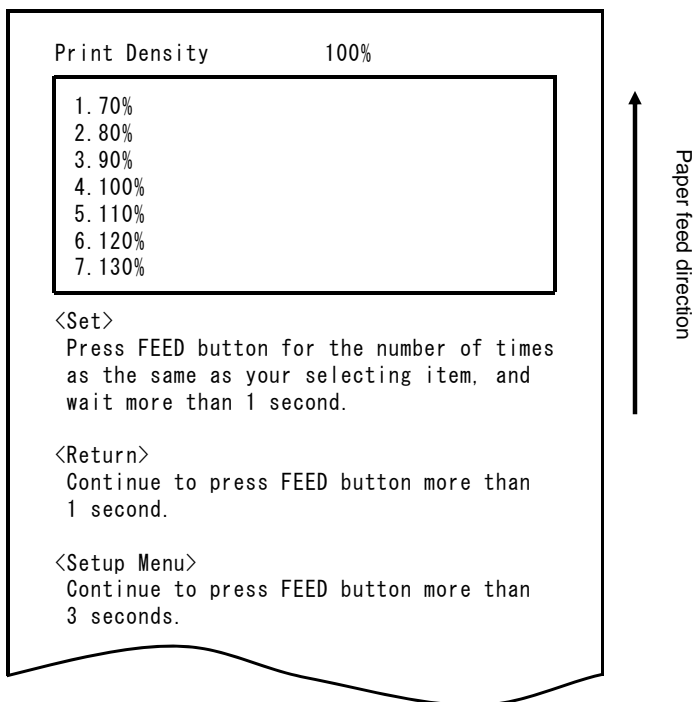
AI-100



AI-110

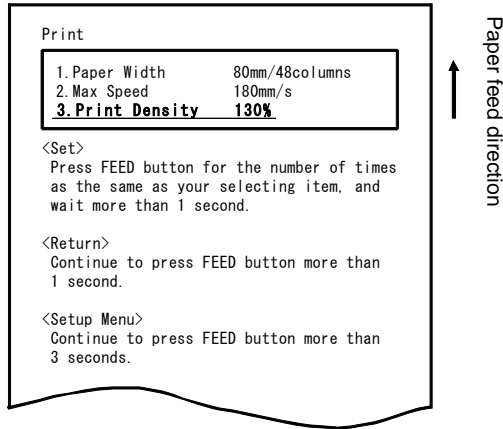


5. **Then Press** the FEED button **three times** (select 3.Print Density) selects the Print Density setting and prints the following Print Density settings.

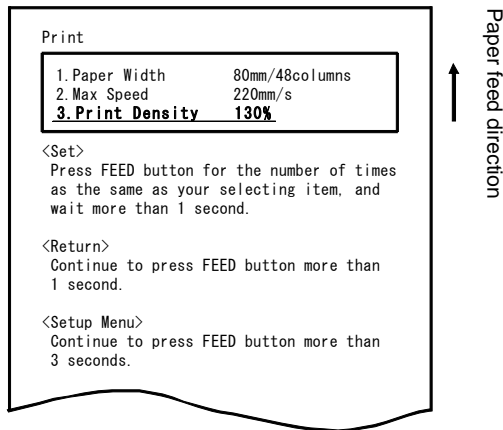


6. **Then Press** the FEED button **seven times** (to select 7. 130%) returns to the Print settings group.
Changed items are displayed in bold and underlined.

AI-100



AI-110



To exit to the previous level (<Return>)
⇒ Go to Section 7-1

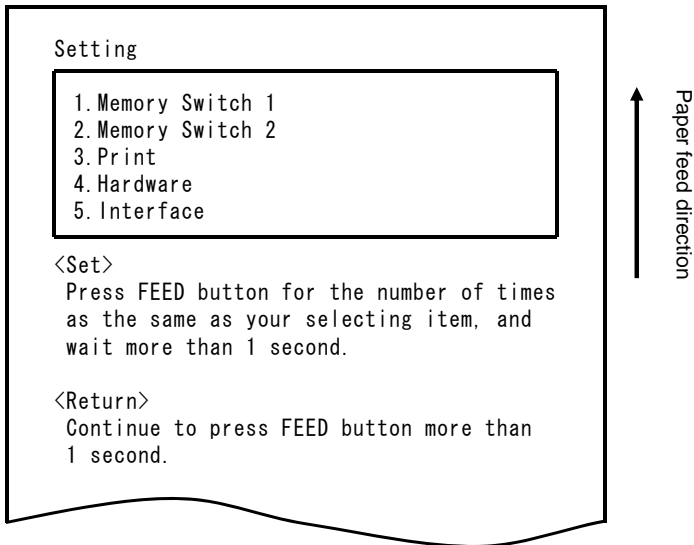
To exit directly to the setup menu (<Setup Menu>)
⇒ Go to Ssection 7-2

7-1. Exiting to Previous Level

Hold the FEED button down for **1 second or more** until the buzzer sounds twice.

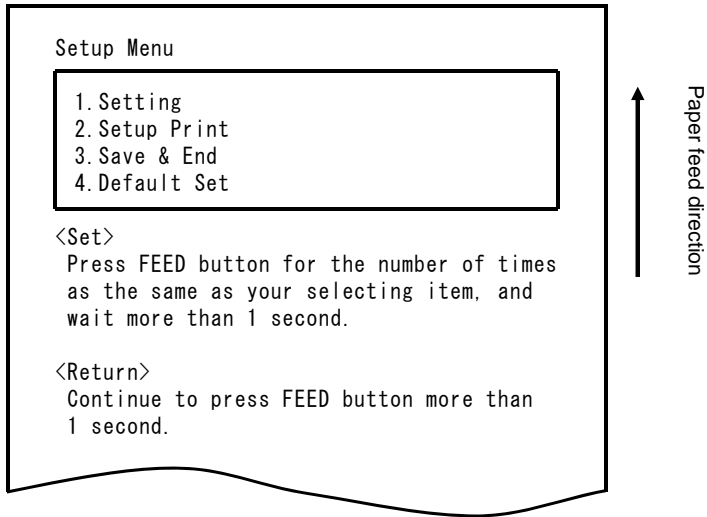
Release the FEED button after the buzzer sounds.

This returns to the previous level and prints the Setting group options.



Hold down the FEED button again for **1 second or longer** until the buzzer sounds twice. Release the FEED button after the buzzer sounds.

This returns to the previous level and prints the Setup Menu.



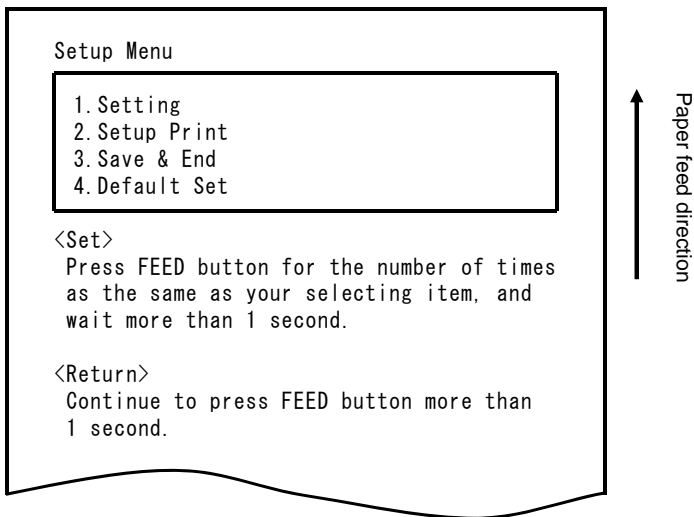
Proceed to step 8.

7-2. Exiting Directly to Setup Menu

Hold the FEED button down for **3 seconds or more** to return to the Setup Menu.

Although holding down the FEED button for a long time causes the buzzer to sound twice after 1 second, ignore this and continue to press the FEED button.

After about 3 seconds, the buzzer sounds three times and the following menu is printed.



Proceed to step 8.

8. **Pressing** the FEED button **three times** (to select 3. Save & End) saves the settings, cuts the paper, and then exits setup mode.

⚠ Caution: If the power switch of the printer is turned off without selecting "Save & End", any changes made will not be saved.

- **Checking the Settings**

To check that the settings have been applied, follow the instructions in section 9.1 to perform a test print.

The test print includes a list of printer settings. Use this to confirm your changes.

9-3. Setup Settings

Setting Groups

Settings Group		Description
1	Memory Switch 1	Memory Switch 1 settings
2	Memory Switch 2	Memory Switch 2 settings
3	Print	Print settings
4	Hardware	Hardware settings
5	Interface	Serial and USB interface settings

Setting Items and Detailed Setting Items

(Note) Setup items and the default values depend on the printer model and/or area.

(1) Memory Switch 1 Group

Item		Description	Setting Value	
1	Power On Status	Specifies Power ON notification.	1	Enable
			2	Disable
2	Receive Buffer	Specifies receiver buffer size.	1	45bytes
			2	4Kbytes
3	Busy Condition	Sets the printer as BUSY (data reception not available).	1	Buffer full
			2	Offline/Buffer full
4	Receive Error	Specifies what to do when a receive error occurs using the serial interface.	1	?Print
			2	Ignore
5	Auto LF	Specifies whether the CR code generates an automatic line feed.	1	Enable
			2	Disable
6	DSR(#6)Reset	Specifies whether receiving DSR (#6) via the serial interface triggers a hardware reset.	1	Enable
			2	Disable
7	USB Soft Reset	Specifies whether a USB Soft Reset triggers a hardware reset when using printer class USB.	1	Enable
			2	Disable

(2) Memory Switch 2 Group

Item		Description	Setting Value	
1	Cover Open Error	Recovery method for Cover Open Error during print	1 2	Auto Recovery Recovery by CMND
2	Error	What to do at power on or after recovery from error "Auto Recovery": Perform auto recovery to enable data reception. "Recovery by CMND": Discard any received data until a reset command is received.	1 2	Auto Recovery Recovery by CMND
3	Batch (COM IF)	Specifies whether to use batch printing for the serial interface	1 2	Enable Disable
4	Batch (Other IF)	Specifies whether to use batch printing for the USB or LAN interface	1 2	Enable Disable
5	Serial Number	Specifies iSerial Number notification for USB "Disable": Returns "0" as the iSerial Number. "Enable": Returns the manufacturing serial number as the iSerial Number	1 2	Enable Disable
6	ASB	Specifies whether to enable the automatic status transmission function (ASB: Automatic Status Back)	1 2	Enable Disable

(3) Print Group

AI-100

Item		Description	Setting Value	
1	Paper Width	Paper width and number of characters per line	1	80mm/48columns
			2	80mm/42columns
			3	58mm/35columns
			4	58mm/32columns
2	Max Speed	Maximum print speed The maximum for printing ladder barcodes and two-dimensional codes is 120mm/s.	1	100mm/s
			2	110mm/s
			3	120mm/s
			4	130mm/s
			5	140mm/s
			6	150mm/s
			7	160mm/s
			8	170mm/s
3	Print Density	Print density The smaller the value the lower the print density. The higher the value the higher the print density.	1	70%
			2	80%
			3	90%
			4	100%
			5	110%
			6	120%
			7	130%

AI-110

Item		Description	Setting Value	
1	Paper Width	Paper width and number of characters per line	1	80mm/48columns
			2	80mm/42columns
			3	58mm/35columns
			4	58mm/32columns
2	Max Speed	Maximum print speed The maximum for printing ladder barcodes and two-dimensional codes is 120mm/s.	1	100mm/s
			2	110mm/s
			3	120mm/s
			4	130mm/s
			5	140mm/s
			6	150mm/s
			7	160mm/s
			8	170mm/s
			9	180mm/s
			10	190mm/s
			11	200mm/s
			12	210mm/s
3	Print Density	Print density The smaller the value the lower the print density. The higher the value the higher the print density.	13	220mm/s
			1	70%
			2	80%
			3	90%
			4	100%
			5	110%
			6	120%
			7	130%

(4) Hardware Group

Item		Description	Setting Value	
1	Error Alert *1	Whether to sound a buzzer when an error occurs "None": Does not beep. "One Time": Beeps four times. "Continuous": Beeps continuously.	1 2 3	None One Time Continuous
2	Buzzer Interval *2	The buzzer tone to use during printing The buzzer beeps in the following cases during printing: <ul style="list-style-type: none"> FEED button pressed while cover open Buzzer command received (ESC p 03h t1 t2 t3) 	1 2 3 4 5	Pattern 1 Pattern 2 Pattern 3 Pattern 4 Pattern 5
3	Buzzer Repetition *2	The number of buzzer beeps during printing Zero specifies no buzzer. The buzzer beeps in the following cases during printing: <ul style="list-style-type: none"> FEED button pressed while cover open Buzzer command received (ESC p 03h t1 t2 t3) 	1 2 3 4 5 6	Zero One Two Three Four Five
4	Graph/User NV-MEM	NV graphic memory size and user NV memory size Specifies the size of the registration area for graphics images and NV bit images, and the size of the area for storing any user data.	1 2 3 4	384KB/192KB 448KB/128KB 512KB/64KB 576KB/0B
5	Cut at Cover Close	Whether to trigger the cutter when the cover is closed.	1 2	Enable Disable
6	PNE Detect	Whether to notify when near the paper end	1 2	Enable Disable

*1 "Error Alert"

The operation when a "continuous" buzzer tone is output is as follows:

(Note) To stop the buzzer during continuous beeping, press the FEED button.

- Recoverable Error (Excluding Paper Near End)
Continuous beeping of 500mSecON/200mSecOFF
- Hardware Error
Continuous beeping of 1000mSecON/500mSecOFF

*2 "Buzzer Interval"

The buzzer patterns are as follows:

- Pattern 1 40msON / 120msOFF
- Pattern 2 140msON / 140msOFF
- Pattern 3 200msON / 200msOFF
- Pattern 4 10msON / 50msOFF
- Pattern 5 30msON / 50msOFF

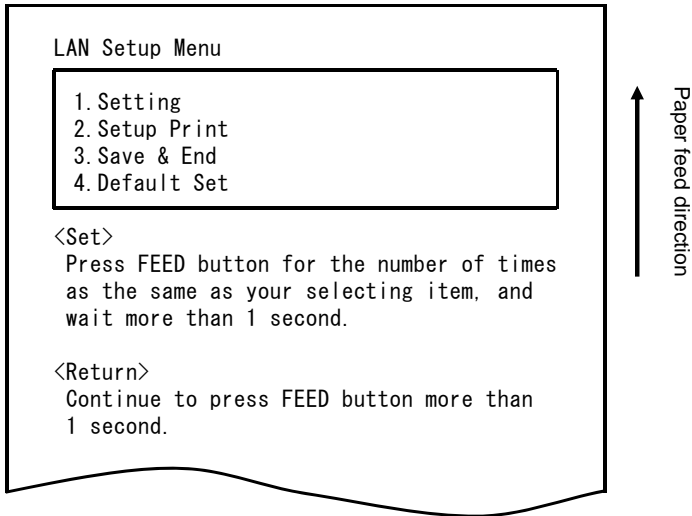
(5) Interface Group

Item		Description	Setting Value	
1	Baud rate	Baud rate for the serial interface	1	2400BPS
			2	4800BPS
			3	9600BPS
			4	19200BPS
			5	38400BPS
			6	57600BPS
			7	115200BPS
2	Format	Data format for the serial interface	1	7EVEN1
			2	7ODD1
			3	8NONE1
			4	8ENEN1
3	Protocol	Buffer control protocol for the serial interface	1	DSR/DTR
			2	XON/XOFF
4	USB	Class for USB interface	1	Printer
			2	V-COM

9-4. LAN Setup Settings

Ensure that paper is set in the printer. Turn off the power switch on the printer, then turn it on again while pressing the FEED button on the control panel. This outputs the printout shown in section 9-1.

Then Press the FEED button **three times** (to select 3. LAN Setup Menu) enters setup mode and prints the following menu.



Settings have the same operation method as described in paragraph 9-2.

Setting Item

Item		Description	Setting Value	
1	LAN	Specify interface "Enable": Runs on LAN interface. "Disable": Runs on either USB or serial interface. If both USB and serial interfaces are connected, USB will be prioritized.	1 2	Enable Disable

9-5. HEX Dump

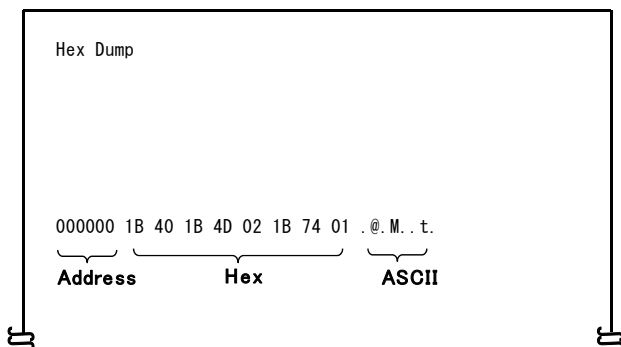
Ensure that paper is set in the printer. Turn off the power switch on the printer, then turn it on again while pressing the FEED button on the control panel. This outputs the printout shown in section 9-1.

Pressing the FEED button four **times** (select 4. Hex Dump) enters HEX dump mode.

This mode prints all the data sent to the printer as hex code. It is useful for checking whether the control codes being sent to the printer by the PC program are correct.

To clear this mode, turn the power switch off and on again.

HEX Dump Print (Example)



9-6. Command Trace

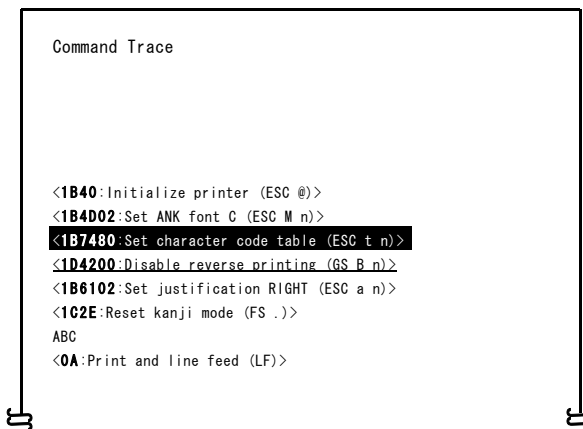
Ensure that paper is set in the printer. Turn off the power switch on the printer, then turn it on again while pressing the FEED button on the control panel. This outputs the printout shown in section 9-1.

Pressing the FEED button **five times** (select 5. Command Trace) enters command trace mode.

This mode prints all the data sent to the printer in ASCII format (with ESC/POS command explanations). It can be used to analyze the ESC/POS commands sent to the printer by the PC program.

To clear this mode, turn the power switch off and on again.

Command Trace Print (Example)



- Undefined commands or commands with abnormal command parameters are treated as errors and printed with background and foreground reversed.
- Meaningless and unnecessary commands are printed with an underline as a warning.
- Command codes are printed in bold.

9-7. Sample Print

Ensure that paper is set in the printer. Turn off the power switch on the printer, then turn it on again while pressing the FEED button on the control panel. This outputs the printout shown in section 9-1.

Pressing the FEED button **six times** (select 6. Sample Print) enters sample print mode.

This mode prints an explanation of FEED button operation, performs a paper cut, and then prints sample patterns. (The FEED button explanation is only printed at the first time.)

" Press FEED button.

Short : Next pattern

Long : Same pattern"

After printing, pressing the FEED button briefly (less than one second) prints the following samples, one at a time.

* "Receipt" → "Coupon" → "Bar Code" → "Receipt" in turn. (Printing pauses after each sample. Press the FEED button to print the next sample.)

Pressing the FEED button for a long time (one second or longer) prints the previous sample again.

To clear sample print mode, turn the power switch off and on again.

Sample print mode performs a cut after each sheet is printed.

Sample print mode uses the 80mm or 58mm pattern depending on the paper width setting in setup.

If a recoverable error occurs, the sample print resumes after recovery.

The following page shows examples printouts.

<Printing Results of Sample Print, 80mm Pattern>

"Receipt" Pattern


LOGO

XXXX Supermarket
Tel : 987-654-321

Banana	\$2.50	1	\$2.50
Beer 350ml	\$2.40	6	\$14.40
Cake	\$2.50	3	\$7.50
Slipper	\$3.80	5	\$19.00
Fairy lamp	\$1.50	2	\$1.00
Candy	\$1.11	10	\$1.10
Strawberry	\$2.45	4	\$8.80
Pie	\$35.00	1	\$35.00
Pizza	\$20.00	1	\$20.00
Socks	\$3.30	6	\$18.80
Aspirin	\$12.80	1	\$12.80
Wine	\$99.80	1	\$99.80
Sub total			\$242.70
Tax (5%)			\$12.10
Total			\$254.80

Receipt No. : 9202
Cashier : XXXX

XX-XX-20XX


a 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 a

"Coupon" Pattern

LOGO

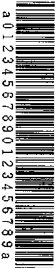
NO. 1234567890

Save 20 dollars on Grape Squash of XXX company.

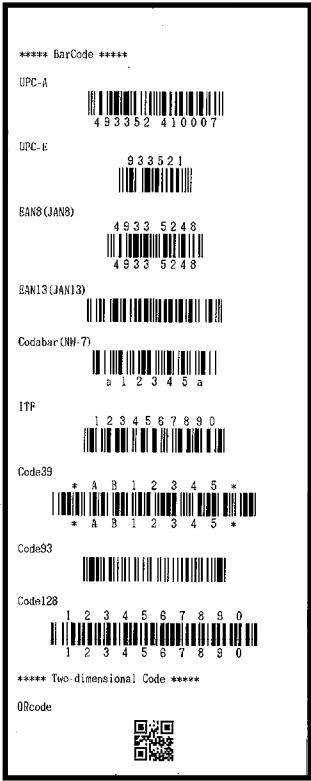
Coupon 20\$ OFF !!

Issue date : XX.XX.20XX

XXX will give a REAL LIFE to you



a 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 a

"Bar Code" Pattern



<Printing Results of Sample Print, 58mm Pattern>

"Receipt" Pattern




XXXX Supermarket
Tel : 987-654-321

Banana	02.50	1	\$2.50
Beer 350ml	02.40	6	\$14.40
Cake	02.50	3	\$7.50
Slipper	03.80	5	\$19.00
Fairy lamp	0.50	2	\$1.00
Candy	0.11	10	\$1.10
Strawberry	02.45	4	\$9.80
Pie	035.00	1	\$35.00
Pizza	020.00	1	\$20.00
Socks	05.30	6	\$18.80
Aspirin	012.80	1	\$12.80
Wine	099.80	1	\$99.80
Sub Total			\$242.70
Tax(5%)			\$12.10
Total			\$254.80

Receipt No. : 9202
Cashier : XXXX

XX-XX-20XX




a 0 1 2 3 4 5 6 7 8 9 a

"Barcode" Pattern

***** BarCode *****

UPC-A



4 9 3 3 5 2 4 1 0 0 0 7


UPC-E

9 3 3 5 2 1




EAN8(JAN8)

4 9 3 3 5 2 4 8




4 9 3 3 5 2 4 8

EAN13(JAN13)




Codebar (NM-F)



a 1 2 3 4 5 a


ITF

1 2 3 4 5 6 7 8 9 0




Code39

* A B 1 2 3 4 5 *




* A B 1 2 3 4 5 *

Code93



Code128


1 2 3 4 5 6 7 8 9 0




1 2 3 4 5 6 7 8 9 0

***** Two dimensional Code *****

QRcode



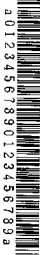
"Coupon" Pattern



Coupon 20\$ OFF!!
 Save 20 dollars on future purchase of XXX company.

Issue date : XX-XX-20XX

[X] will return 20\$ to you



a 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 a

NO.1234567890

10. Regular Cleaning

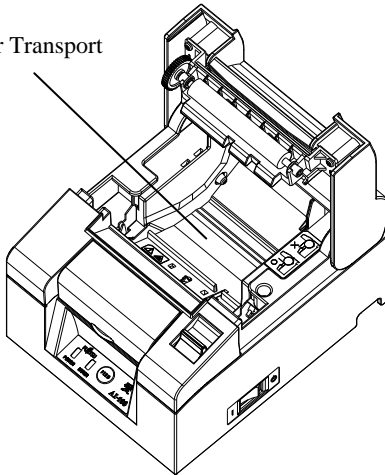
The print quality may be impaired by paper particles, dust, or other material. To avoid this problem, remove any paper particles or dust from the paper holder, the paper transport, the platen roller, and the thermal head as described below.

Perform cleaning every six months.

10-1. Cleaning Paper Holder and Paper Transport

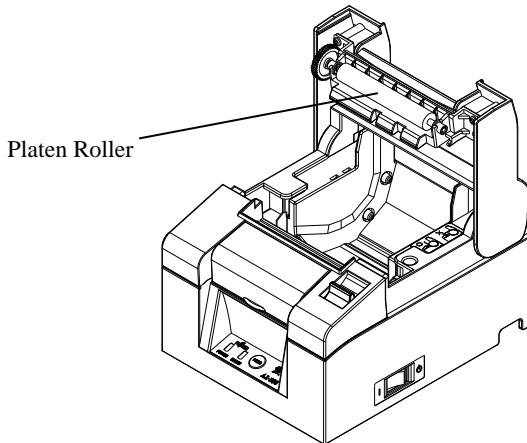
- (1) Be sure to turn off the printer power.
- (2) Open the top cover.
- (3) Wipe off any dust, paper particles, glue, or other foreign material from the paper holder and paper transport using a soft, dry cloth.

Paper Holder and Paper Transport



10-2. Cleaning the Platen Roller

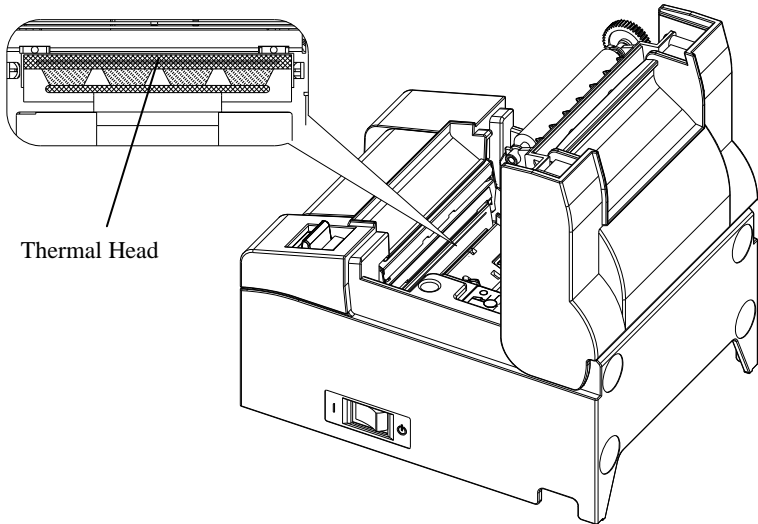
- (1) Be sure to turn off the printer power.
- (2) Open the top cover.
- (3) Wipe off any dust, paper particles, glue, or other foreign material from the platen roller using a soft, dry cloth.



⚠ Caution: Do not damage or dent the platen roller.
Dents on the platen roller will cause incomplete printing
and/or line feed failure.

10-3. Cleaning the Thermal Head

- (1) Be sure to turn off the printer power.
- (2) Open the top cover.
- (3) Using an alcohol solvent, remove black paper particles and other residue from the surface of the thermal head.



- ⚠ Caution:** The thermal head can easily be damaged. Clean it carefully using a soft cloth to avoid any damage.
- ⚠ Caution:** The thermal head is still hot immediately after printing. Leave it to cool for about ten minutes before cleaning.
- ⚠ Caution:** The thermal head may be damaged by static electricity. Take care to avoid exposing it to static electricity.
- ⚠ Caution:** Wait until alcohol from the cleaning solvent has thoroughly dried before turning on the printer power.
- ⚠ Caution:** Use only alcohol or isopropyl alcohol solvents.

11. Interface

11-1. Serial Interface

(1) Transmission Interface Specifications

Transmission Method	Asynchronous
Line Type	Full duplex
Input/Output Circuit	Input: MAX211 Equivalent Output: MAX211 Equivalent
Baud Rate	2400, 4800, 9600, 19200, 38400, 57600, 115200BPS (Setup Settings)
Transmission Code Type	7 or 8 bits
Transmission Code Format	Start bits: 1 bit Stop bits: 1 bit Data bits: 7 or 8 bits (Setup Settings) Parity: NONE, ODD, EVEN (Setup Settings) Mark(1) <div> <div>ST</div> <div>b0</div> <div>b1</div> <div>b2</div> <div>b3</div> <div>b4</div> <div>b5</div> <div>b6</div> <div>b7</div> <div>PT</div> <div>SP</div> </div> Space(0)
Transmission Sequence	LSB to MSB
Transmission Code	JIS code
Error Control	Parity check (Setup Settings)
Connection Line Length	Max. 15m: (When power is supplied from the power connector)
Protocol	DSR/DTR, XON/XOFF (Setup Settings)

(2) Serial Interface Connector

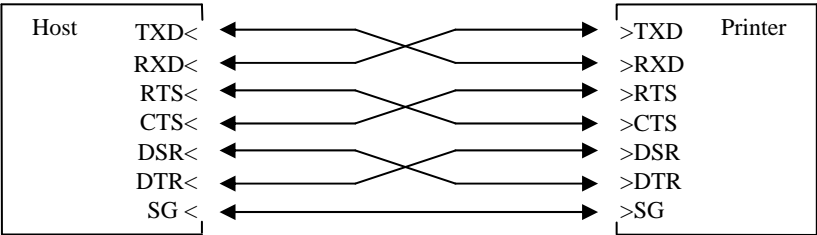
Pin No.	Signal Name	Direction	Signal Line Name
1	N.C	-	No Connection
2	TXD	Output	Transmit Data
3	RXD	Input	Receive Data
4	DSR	Input	Data Set Ready
5	SG	-	Signal Ground
6	DTR	Output	Data Terminal Ready
7	CTS	Input	Clear to Send
8	RTS	Output	Request to Send
9	N.C	-	No Connection

⚠ Caution: Use a lock screw with an imperial thread on the connector.

⚠ Caution: Please use a RS232C 9 Pin straight cable for your interface cable.

(3) Connection Cable

The connection setup shown in the following figure is recommended.



11-2. USB Interface

(1) Type-B Connector: 4 Pins

Pin No.	Signal Name	Direction	Signal Line Name
1	VBUS	Input	VBUS
2	D-inB	Input/Output	D-
3	D+inB	Input/Output	D+
4	SG	-	Signal Ground

 **Caution: Use a shielded USB cable.**

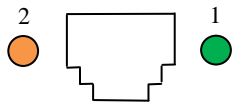
11-3. LAN Interface

(1) LAN Interface Connector

Pin No.	Signal Name	Direction	Signal Line Name
1	TX+	Output	Output data
2	TX-	Output	Output data
3	RX+	Input	Input data
4	N.C	-	-
5	N.C	-	-
6	RX-	Input	Input data
7	N.C	-	-
8	N.C	-	-

⚠ Caution: Use a straight LAN cable for the interface cable and connect it to the network via a HUB.

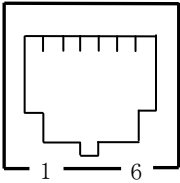
(2) LED



No.	Meaning	Description
1	S (Speed)	Lights up when the connection is recognized as 100BASE-TX Turns off when not connected or when it recognizes being connected to 10BASE-T.
2	L/A (Link/Act)	Lights up when the link is established with 100BASE-TX or 10BASE-T Flashes when sending and receiving packets.

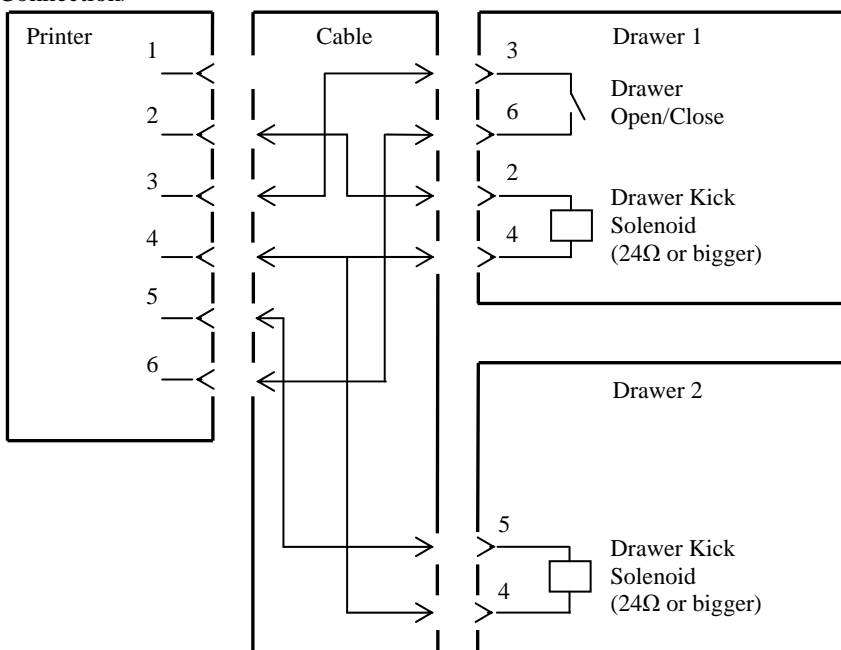
11-4. Drawer Kick Connector

Pin No.	Signal Name	Direction	Signal Line Name
1	FG	-	Frame Ground
2	*DRD1	Output	Drawer Kick Drive Signal 1
3	DRSNS1	Input	Drawer Sense Signal 1
4	+24V	-	Drive Power
5	*DRD2	Output	Drawer Kick Drive Signal 2
6	SG	-	Signal Ground



<Connecting side>

<Connection>



- ⚠ **Caution:** The drawer connection cable should be of the shielded type.
- ⚠ **Caution:** Simultaneous drive from the two drives is not available.
- ⚠ **Caution:** Specify the ON time and OFF time (t1 and t2) for the drawer using the pulse generation command (ESC p m t1 t2).
- ⚠ **Caution:** Set the drive duty cycle for the drawer in accordance with the following formula: $\text{ON time} / (\text{ON time} + \text{OFF time}) \leq 0.2$
- ⚠ **Caution:** Always use printer power (connector pin 4) for the drawer power.
- ⚠ **Caution:** Use a drawer kick solenoid with a resistance value of at least 24Ω. If it is under 24Ω, the solenoid may be damaged by excess current.
- ⚠ **Caution:** This product uses a special-purpose modular connector for the cash drawer and customer display connector. Do not attempt to use other types of connectors such as public telephone connectors.

11-5. Power Specifications

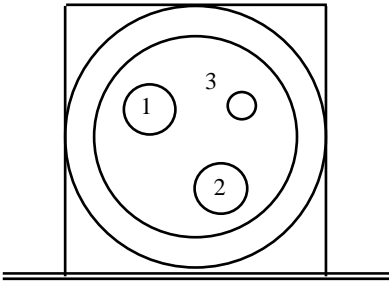
- (1) Rated Input Voltage: 100-240V, 50-60Hz
- (2) Rated Input Current: 1.1A
- (3) Operating Voltage: 24V \pm 10%
- (4) Power Consumption: During standby:
3.0W or less/0.1A on average

During operation: About38W/1.5A on average
(at 24V, 25°C, print density setting 100%, paper width 80mm, print duty 9%)

Note: Drawer Kick Drive Current: Max. 1A
However, do not operate two drawer kick at the same time.

Power Connector Pin Assignment

Pin No.	Signal Name
1	+24V
2	SG
3	N.C



- ⚠ Caution:** Use the specified AC adapter for the power supply.
- ⚠ Caution:** If our AC adapter is not used (power supply is supplied by the user), problems such as bad print quality, electromagnetic interference, or circuit noise may occur. In such cases, take note of the following points:
 - Use an AC adapter whose capacity corresponds to the printing rate that will actually be used.
 - Ensure in advance that there are no problems such as static electricity, electromagnetic interference, circuit noise, etc.

12. Specifications

12-1. General Specifications

- (1) Printing Method: Direct Line Thermal Printing
- (2) Print Speed: AI-100 Maximum 180 mm/s (Monochrome only)
 AI-110 Maximum 220 mm/s (Monochrome only)
- (3) Print Resolution: 8dot/mm (0.125mm)
- (4) Relationship between Number of Print Column and Character Size

Body face ((Width)x(Height) dot)

	Paper width: 58mm	
	32 column printing	35 column printing
ANK: Font A	32 columns: 12x24	35 columns: 12x24
ANK: Font B	38 columns: 10x22	42 columns: 10x22
Kanji: Font A	16 columns: 24x24	17 columns: 24x24
Kanji: Font B	19 columns: 20x24	21 columns: 20x24

Body face ((Width)x(Height) dot)

	Paper width: 80mm	
	42 column printing	48 column printing
ANK: Font A	42 columns: 12x24	48 columns: 12x24
ANK: Font B	51 columns: 10x22	57 columns: 10x22
Kanji: Font A	21 columns: 24x24	24 columns: 24x24
Kanji: Font B	25 columns: 20x24	28 columns: 20x24

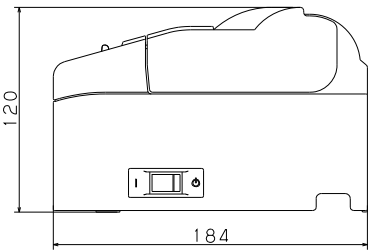
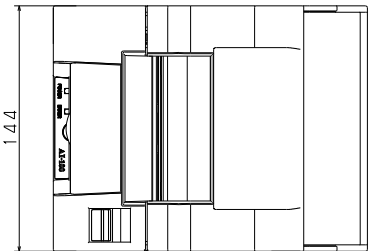
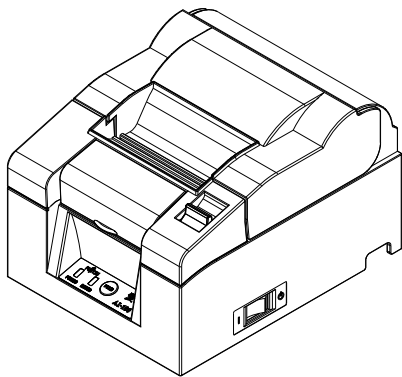
(5) Character Sets

- Alphanumeric character (95)
- International character (1 set)
- Enlarged graphics (128 x 2 pages : It contain a User-defined page)
- Down-loaded registration (96)
- GB18030-2000 character (28427)
- User-defined Kanji (94)

(6) Character Size

	Body face		Letter face	
	(Width)x(Height) dot	(Width)x(Height) mm	(Width)x(Height) dot	(Width)x(Height) mm
ANK: Font A	12 x 24	1.5 x 3.0	11 x 22	1.375 x 2.75
ANK: Font B	10 x 24	1.25 x 3.0	9 x 17	1.125 x 2.125
Kanji: Font A	24 x 24	3.0 x 3.0	24 x 24	3.0 x 3.0
Kanji: Font B	20 x 24	2.5 x 3.0	20 x 24	2.5 x 3.0

(7) Outline View



12-2. Cutter Specifications

- (1) Cutting Method: Partial cut (the paper remains connected at one point)

⚠ Caution: Do not use the cutter continuously at a rate exceeding 10 cuts per minute (1 cut per 6 seconds or more). Excessive use may cause a malfunction.

12-3. Paper Roll Supply Specifications

- (1) Loading Method: Rolls are loaded manually.
- (2) Paper Near End: Detected when the remaining paper length is inadequate.

⚠ Caution: Core diameter ϕ 18mm is supported.

12-4. Interface Specifications

- (1) Serial (RS-232C)
- (2) USB (USB 2.0 Full-speed)
- (3) LAN (10BASE/100BASE-T)

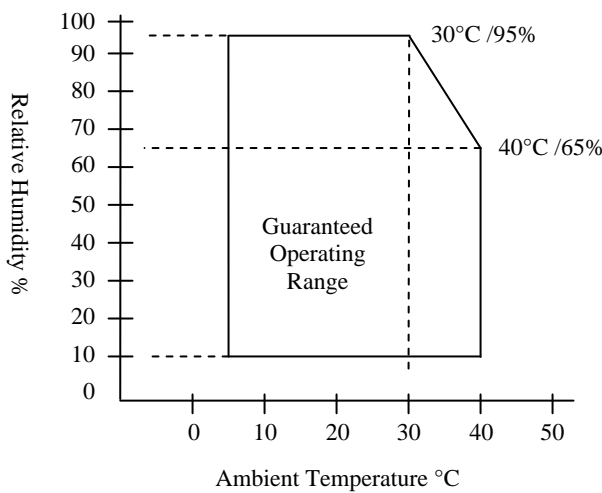
12-5. Environment Specifications

- (1) Temperature

Operating	Operation Guaranteed at:	0°C - 40°C
	Print Quality Guaranteed at:	5°C - 35°C
Non-operating		-5°C - 60°C
Transportation or storage (packaging)		-20°C - 60°C
- (2) Humidity

Operating	Operation Guaranteed at:	10%-95% RH (no condensation)
	Print Quality Guaranteed at:	10%-85% RH (no condensation)
Non-operating		8%-95% RH (no condensation)
Transportation or storage (packaging)		5%-95% RH (no condensation)
- (3) Maximum Wet Bulb Temperature

29°C or less



12-6. Reliability Specifications

- (1) Printer Life 20 million line-feed
 (When the recommended paper of 75μm is used)

- (2) Head Life Running Life: 100km
 (When the recommended paper of 75μm is used)
 Pulse Life: 100 million pulses
 (When the recommended paper of 75μm is used)

- (3) Cutter Life
 Paper Thickness 75μm: 1.5 million cuts
 (When the recommended paper of 75μm is used)
 65μm/85μm: 1.0 million cuts

13. Usage Precautions

13-1. Paper Related Precautions

- (1) High printing rates may cause blurred printing. Choose a suitable printing rate to avoid blurring. Alternatively, set a suitable combination of print speed and print density to avoid blurring.
(Refer to 9 Special Mode: 9-2. Changing the Setup.)
- (2) Printing characters from a non-standard character set in a thin serif or similar font will result in the characters appearing very faint. Use a bold sans serif font.
- (3) To achieve quality printing without uneven pitch (expansion or contraction), feed the paper 1mm (8 dots) or more when restarting printing or after cutting the paper.
- (4) In sequential printing, slow data transfer may cause white lines to run across the print, as printing and pausing are repeated alternately. If print quality has priority, use the Batch Print mode ("Batch (COM IF)", "Batch (OTHER IF)").
(Refer to 9 Special Mode: 9-2. Changing the Setup.)
- (5) The top margin can be set to either 12mm or 3mm by a command. If the top margin is set to 3mm, be sure to remove the printed paper each time the printing and cutting operation is completed as rollback of paper takes place before printing. If printed and cut paper is not removed, the partial cut section may be torn or the cut surface may be folded causing a paper jam. Also, use at least 30 mm of paper for each transaction.
- (6) Setting a high value for print density (110 % and over) can result in blurred or uneven printing at low temperatures, depending on the printing pattern. If print quality has priority, print at a lower speed.
(Refer to 9 Special Mode: 9-2. Changing the Setup.)
- (7) Do not switch from narrower paper to wider paper (e.g. 58mm to 80mm) when printing is in progress. When using narrow-width paper, a part of the thermal head may directly come in contact with the platen roller without any paper present. This causes the head to wear down, resulting in poor printing quality. In addition, as the cutter blade also works at sections without paper, the cutter blade may wear down, resulting in a bad cut. Do not change paper width when printing is in progress.

- (8) If the paper has been left in the printer for a long time, it may deform and cause faint printing. Therefore, if the paper has been left for a long time, feed the paper forward by 20-30mm before printing.
- (9) If non-recommended paper is used, print quality and/or the thermal head life cannot be guaranteed. In particular, use of paper containing “Na+, K+, or Cl-” may significantly shorten the life span of the thermal head.
- (10) Using a non-recommended AC adapter may cause blurred and/or uneven printing, so use only the recommended adapter.
- (11) The paper may get marked during paper changing or when the top cover is shut, so feed the paper forward by 20-30mm before printing.

13-2. Cutter Related Precautions

- (1) Do not use the cutter continuously at a rate exceeding 10 cuts per minute (1 cut per 6 seconds or more). Excessive use may cause a malfunction.
- (2) Do not remove paper while it is still being cut. Doing so may cause problems such as a paper jam.
- (3) If the top margin is set at 3mm, be sure to remove the printed paper each time the printing and cutting operation is completed as roll back of the printer paper takes place before printing. Not doing so may cause problems such as a paper jam.

13-3. Barcode/2D Code Printing Precautions

- (1) When using thick paper, the printing speed and density should be adjusted and readability should also be checked before using the printer as thick paper may cause blurring depending on the usage environment and the humidity.
(Refer to 9 Special Mode: 9-2. Changing the Setup.)
- (2) For 2D codes, adjust the printing speed and density to obtain a good recognition rate. As readability varies depending on the module width, print density, ambient temperature, type of thermal roll paper, and reader performance, check this before using the printer.
(Refer to 9 Special Mode: 9-2. Changing the Setup.)
- (3) If a barcode is printed at the top of the printer paper when it is first fed, or at the bottom when paper feeding is completed, readability should be checked as accuracy in paper feeding may become unstable.

13-4. USB Interface Usage Precautions

- (1) Connect the printer directly to the host computer.
- (2) Be sure to turn on the printer power before printing.
- (3) If an error occurs during printing, recover the printer from the error, and then retry printing.
- (4) Do not turn off the printer or disconnect the USB cable while printing is in progress. Using the host computer to set Stand-by mode, Sleep mode, Suspend mode or Pause mode is not recommended.

If the printer does not work properly even after implementing the above, try re-connecting the USB cable or turning on the printer power again. If the printer still does not print properly, restart the host computer.

13-5. LAN Interface Usage Precautions

- (1) The printer web settings should be configured when the printer is not printing.
If you change the web settings frequently while the printer is printing, the paper might not feed smoothly and uneven printing may occur.
- (2) Status monitor can be used with dedicated LAN ports.
It does not support Windows standard LAN ports.
- (3) When printing to multiple printers from a single PC, the printing might not operate correctly depending on the Windows standard TCP/IP port.
If this happens, set the bidirectional communication function in the printer driver to disabled before printing.
- (4) If the printer is turned off in the middle of printing, printing might not automatically resume when the printer is turned on.
If this happens, delete the print job data from the printer spooler and then execute the printing again.

13-6. Installation Precautions

- (1) Use the printer indoors only. Outdoor usage may cause printer malfunction due to dust or other factors.
- (2) When connecting a cable to the printer or shifting the position of the printer, perform the operation while holding the middle cover of the printer at the sides using both hands. If you perform the operation holding the top cover, the top cover may open.

13-7. Modular Type Connector Usage Precautions

- (1) This product uses a special-purpose modular connector for the cash drawer and customer display connector. Do not attempt to use other types of connectors such as public telephone connectors.