

User's Manual

CITIZEN
LINE THERMAL PRINTER
MODEL **CBM-262**

Japan CBM Corporation

Cautions

1. Please read this user's manual thoroughly before attempting to use this printer. After reading, keep this manual in a secure place where it can be referred to easily if necessary.
2. The contents of this user's manual are subject to partial modification without prior notice.
3. Transfer of the contents of this user's manual, either in part or in whole, without permission is strictly prohibited.
4. Do not attempt maintenance, disassembly or repairs of any parts of this printer except as indicated in this user's manual.
5. This company shall not be responsible for damages caused by improper operation or handling of this printer by the customer, or caused by the operating environment.
6. Do not attempt any operations which are not described in this user's manual. doing so could cause an accident or breakdown.
7. Data, etc. are basically temporary, and cannot be stored or preserved for extended periods or permanently by this printer. This company shall not be liable in any way for damages of loss of profits, etc. resulting from loss of data due to breakdown, repairs or inspections, etc. Please understand this point in advance.
8. If you find any points in these materials which are uncertain, are misprinted or are missing, please notify this company.
9. Please note that this company shall not be liable for any influence which may effect operation of this printer arising from 8 items above.

FCC COMPLIANCE STATEMENT FOR AMERICA 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 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.

EMI COMPLIANCE STATEMENT FOR CANADIAN USERS

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. This equipment is designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Use shielded cables to connect this device to computers.

Any changes or modifications not expressly approved by the grantee of this device could void the use's authority to operate the equipment.

ETAT DE CONFORMITE EMI A L'USAGE DES UTILISATEURS CANADIENS

Cet équipement produit et utilise l'énergie à radiofréquences et s'il n'est pas installé et utilisé correctement, c'est à dire en accord strict avec les instructions du fabricant, il risque de provoquer des interférences avec la réception de la radio et de la télévision.

Le présent appareil numérique n'émet pas de bruite radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Cet équipement est conçu pour fournir une protection satisfaisante contre de telles interférences dans une installation résidentielle. Cependant, il n'y a pas de garantie contre les interférences avec les réceptions radio ou télévision, provoquées par la mise en et hors circuit de l'équipement; aussi, il est demandé à l'utilisateur d'essayer de corriger l'interférence par l'une ou plus des mesures suivantes:

- Réorienter l'antenne de réception.
- Installer l'ordinateur autre part, par égard pour le récepteur.
- Brancher l'ordinateur dans une prise de courant différente de façon à ce que l'ordinateur et le récepteur soient branchés sur des circuits différents.

Important Safety Instructions

1. Read all of these instructions and save them for later reference.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water.
5. Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
6. Slots and openings on the cabinet and the back or bottom are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, do not block or cover these openings. The openings should never be blocked by placing the product on a bed, sofa, rug or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
8. This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.
9. Do not allow anything to rest on the power cord. Do not locate this product where cord will be walked on.
10. If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.
11. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
12. Except as explained elsewhere in this manual, don't attempt to service this product yourself. Opening and removing those covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks. Refer all servicing on those compartments to service personnel.
13. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - A. When the power cord or plug is damaged or frayed.
 - B. If liquid has been spilled into the product.
 - C. If the product has been exposed to rain or water.
 - D. If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
 - E. If the product has been dropped or the cabinet has been damaged.
 - F. If the product exhibits a distinct change in performance, indicating a need for service.

Cautions for Safety

The following items are included in this manual to point out precautions that must be taken in order to prevent injury to the user or other persons or damage to property.

- The degree of injury or damage caused by improper operation without heeding the warnings given herein is described as follows.



Warning

This indicates contents in which improper operation of this product without heeding the warnings given may lead to death or severe injury.



Caution

This indicates contents in which improper operation of this product without heeding the cautions given may lead to personal injury or physical damage.



This icon is displayed for items where the user is urged to exercise caution.



This icon is displayed to point out information on how to do important tasks, etc.



Warning

Doing the following actions may cause damage to this product or cause it to break down, overheat, and could also cause fire or electric shock, so by all means do not do them.

If there is damage or breakdown, switch off the power and pull the plug out of the outlet. Contact your dealer immediately.

- Do not step on, drop, hit or otherwise apply a strong impact to the printer.
- Do not install this product in a place with poor ventilation and do not use it with its air vent blocked.
- Do not install this product in a place such as a research laboratory where there are chemical reactions, and do not install it in a place where there is salt or gas in the air.
- Do not use this product at a voltage and frequency other than the specified voltage and frequency.
- Do not disconnect the power cord or data cable by grasping the cable, and do not pull on this product while a heavy weight is bearing on the cables or attempt to carry it by holding the cables.
- Do not drop or poke foreign objects such as paper clips, straight pins, etc. inside this product.
- Do not plug this product into a heavily loaded circuit.
- Do not spill drinks such as tea, coffee or juice on this product, or spray it with insecticides. If water or other liquid is spilled on it by accident, switch off the power immediately and disconnect the power plug from the outlet, then contact your dealer.
- Do not attempt to disassemble or modify this product. It could cause fire or electric shock.

Keep the plastic bag used to pack this product out of the reach of children so they cannot smother themselves with it, or dispose of it promptly. If they pull it over their head, there is danger of them suffocating to death.



Cautions for Installation

- Do not use or store this product in a place where there is fire or water vapor, where it will be exposed to direct sunlight, in a place where it will be exposed to heat or humidity conditions that it was not specified for, such as next to a heater or burner, or a place where there is a lot of oil, iron filings, dust or dirt, etc. Doing so could cause it to break down, emit smoke or catch fire.
- Do not install this product in a place such as an experimental laboratory where there are chemical reactions taking place, or where there is salt or gas in the air. This could cause fire or electric shock.
- Install on a level, stable table which doesn't vibrate, in a location where there is good ventilation. (Do not cover the air holes.)
- Do not place any articles on top of the printer. It could cause it to break down.
- Do not use this printer near, or plug it into the same outlet with, a radio or television receiver. Doing so could interfere with reception.
- Do not use this product at a voltage and frequency other than the specified voltage and frequency.
- Make sure the circuit where this printer is plugged in has sufficient surplus capacity to operate this printer without trouble.
- Avoid attaching this printer's power cord to an overloaded electric circuit. If the circuit is overloaded, it could cause the electric line to overheat and cause a fire, or trip the circuit breaker. Also, do not walk on the power cable or place objects on top of it.
- When disconnecting cables, always switch off the power first, then take hold of the plug or connector and disconnect them. Do not pull on this product while a heavy weight is bearing on the cables or attempt to carry it by holding the cables.
- Connect the cable connectors securely. Particularly, if the cables are connected with the polarity reversed, it could destroy the internal components, and also have a bad effect on the device on the other end of the cable.
- In order to avoid garbling of data, etc. due to noise, always use shielded signal lines or twisted pair lines. Also, please avoid connecting this printer with a device that generates a lot of noise.
- Use this printer in a place where it is near to an outlet, and the power plug can be pulled out easily, and under conditions where the power supply can be cut off easily.



Cautions for Handling

The following methods of handling may lead to breakdown, so please do not use this printer by these methods.

- Do not attempt to print without paper being set in the printer.
- Be careful not to let paper clips, straight pins, screws or other foreign objects fall inside the printer.
- Do not spill any liquids on this product, or let it absorb any chemicals.
- Do not subject this product to a strong impact, such as stepping on it, dropping it or hitting it.
- Never attempt to operate the operation panel using a sharp object such as the point of a pen.
- Do not tape sheets of paper using cellophane tape, etc. and try to print continuously.
- Do not pull hard on the paper once it is set in the printer.

To avoid injury and extended damage,

- Do not touch the printing unit on the print head.
- While the power is on, do not touch the printer's internal cutter, gears or other moving parts, or electrical components with bare hands.
- Be careful not to injure yourself or damage other objects by the edges of metal panels, etc.
- If anything abnormal occurs during operation, stop use immediately and pull the power plug out of the outlet.
- When the printer breaks down, contact your service man. Do not attempt to disassemble the printer yourself.



Daily Maintenance

- When carrying out routine maintenance, always be sure to disconnect the power.
- When cleaning the platen, dampen a cloth with ethyl alcohol and wipe off the dust, etc.
- Wipe off dirt, dust, etc. from the printer's case using a dry, soft cloth. If extremely dirty, wipe it off with a cloth dipped in water and thorough wrung out. Never use alcohol, paint thinner, trichloroethylene, benzene or ketone based organic solvents, or a chemical cleaning rag.

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Chapter 1

Outline

This printer is a tandem type 2-station line thermal printer which accepts 58 mm wide paper, developed for use in PC-POS/ECR terminals and all types of data communications terminals, etc.

Features
Accessories
Names and Functions of Parts

Features

- Compact design with the two rolls of paper set front to back to keep the printer's width narrow.
- Power switch and operation panel are located on the front, and cable connections are made in an indented part, giving it a shape without projections on the sides and rear, which makes installation easy.
- The thermal line head reduces noise and achieves high speed printing at 62.5 mm/sec.
- An auto cutter is standard equipment in the receipt printer.
- Simple controls which conform to ESC/POS™.
- Drawer control is enabled using the drawer kick interface.
- Paper setting chore is simplified by the roll drop-in type auto loading feature.
- A coin tray, magnet plate and writing table are standard equipment.

Accessories

Standard Specifications (without Journal Protection Key)

- Roll Paper x 2
- Adapter x 1
- Power Cord x 1
- User's manual x 1

Optional Specifications (with Journal Protection Key)

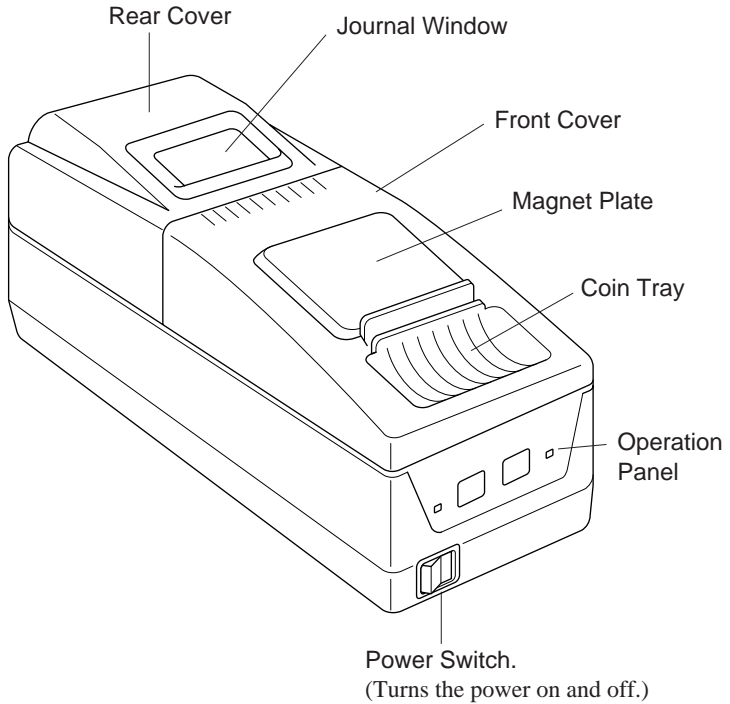
- Roll Paper x 2
- Adapter x 1
- Power Cord x 1
- User's manual x 1
- Journal Protection Key x 1

[NOTE] Japan CBM Corp., Type 26AD-U Adapter is provided for use in the United States and Canada.

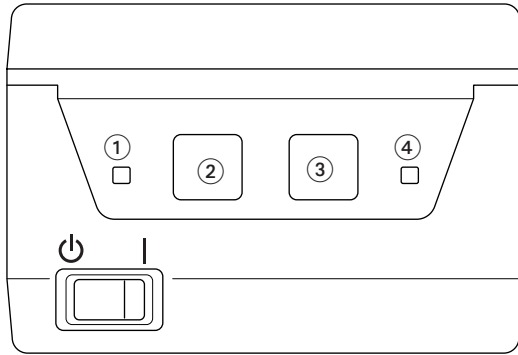
Japan CBM Corp., Type 26AD-E Adapter is provided for use in Europe.

Names and Functions of Parts

Printer Unit



Operation Panel



① **POWER Indicator (Green)**

Lights up when the power switch is turned on and power is being supplied to the printer.

② **RECEIPT Key**

Feeds receipt paper. Pressing once causes the paper to advance one line, based on the amount for a carriage return set previously. If the key is pressed continuously, the paper is fed continuously.

③ **JOURNAL Key**

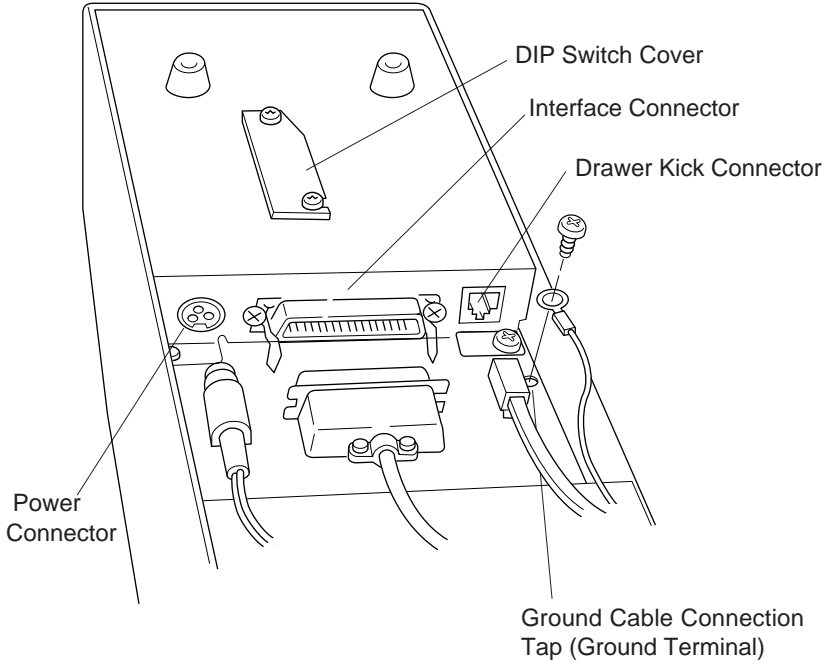
Feeds journal paper. Pressing once causes the paper to advance one line, based on the amount for a carriage return set previously. If the key is pressed continuously, the paper is fed continuously.

④ **ERROR Indicator (Orange)**

Lights up or blinks when an error occurs. The content of the error is indicated by the indicator lighting up or blinking (see “Chapter 5 - Sensors and Error Indications,” on page 30). Goes off when the printer's condition returns to normal.

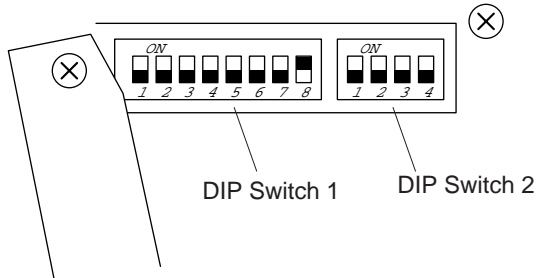
- When the RECEIPT key and JOURNAL key are pressed separately, or are pressed together when the power is switched on, it is possible to enter the test printing and the printer internal setting mode (see “Chapter 4 - Using the Printer,” on pages 21~24).

Connectors



Bottom View

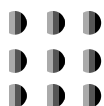
1 Factory DIP Switch Settings



The above switches are shown in the OFF position.

- DIP switch 2 is used for the serial interface only. (See “Chapter 4 - Using the Printer,” on pages 25 and 26).

Chapter 2



Getting Started

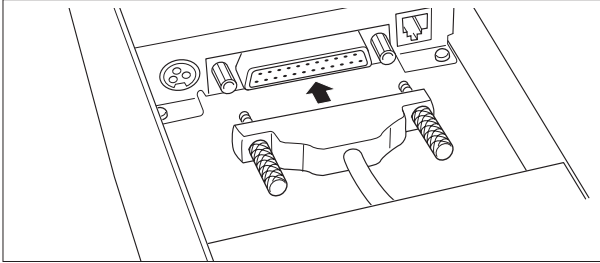
- After all the connections are completed, insert the power cord plug in the receptacle.
- When redoing connections, be sure to turn off the power to the printer main unit and the terminal first.

Connecting the Interface Cable
Connecting the Drawer Kick Cable
Connecting the Power Supply

Connecting the Interface Cable

1. Insert the cable's connector into the interface connector.

Align the top and bottom of the male and female connectors and connect the two connectors.

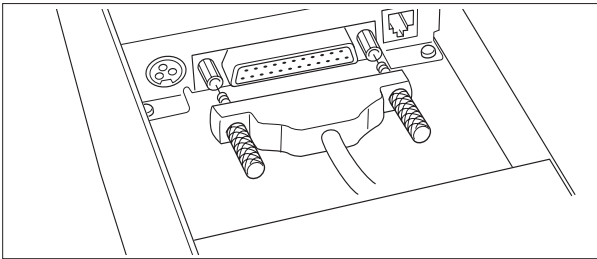


2. Fastening the Cable Terminals

Fastening the Serial Interface Connector:

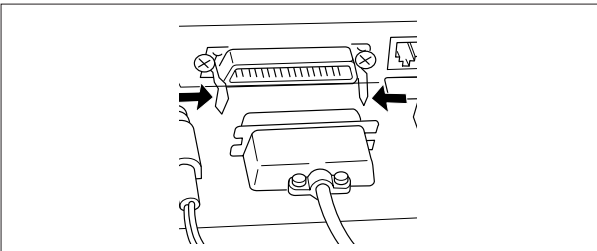
After making sure the connector is inserted fully, tighten the screws to fasten the connector in place.

- Use screws which can be tightened by hand to fasten the connector to the interface.



Fastening the Parallel Interface Connector:

After making sure the connector is inserted fully, turn the wire clamps in the arrow direction to fasten the connector in place.



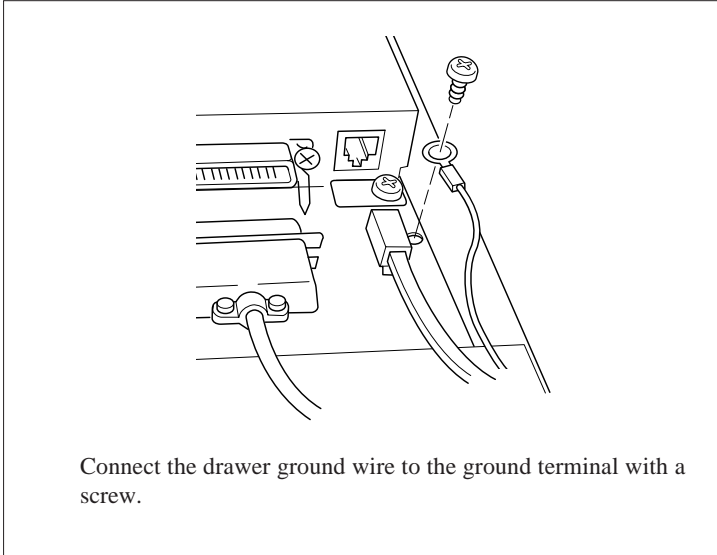
3. Connecting the Cable to the Computer Terminal.

Be sure to turn off the power to the computer first, then make connections.

Connecting the Drawer Kick Cable

Connect the drawer kick cable to the drawer kick connector.

Align the top and bottom of the cable connector and the drawer kick connector, then insert the connector until it makes a clicking sound.

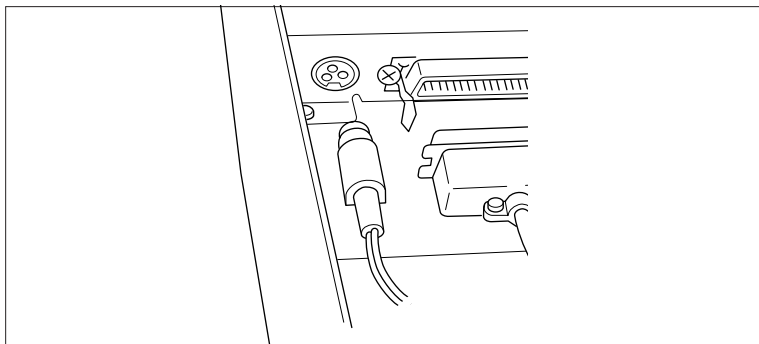


- Do not connect the connector for any other drawer (solenoid) to the drawer kick connector than that specified.
- Use a M3 X 6 self tapping screw to fasten the grand wire.

Connecting the Power Supply

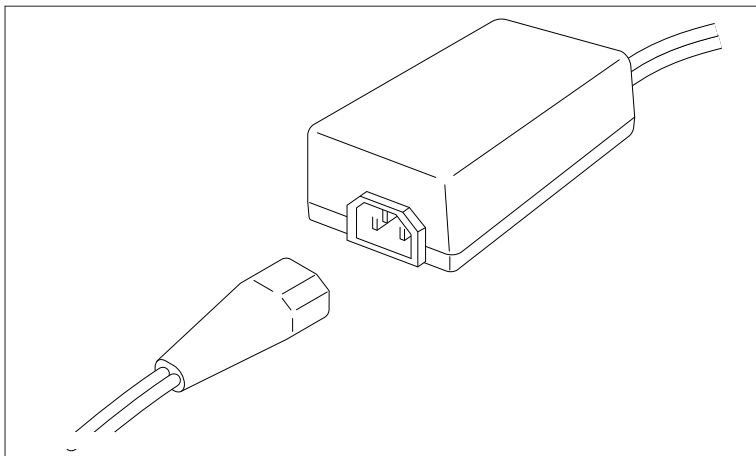
- 1. Connect the connector at the end of the AC adapter cable to the power supply connector.**

Align the top and bottom of the cable and connector to connect them.



When the AC adapter's plug is disconnected from the printer, grasp the plug with your fingers to pull it out.

- 2. Connect the AC power cord and the AC adapter.**



- 3. Connect the power cord to the receptacle.**

Connect the AC adapter with the printer's power supply switched off.

Chapter 3

Paper Handling

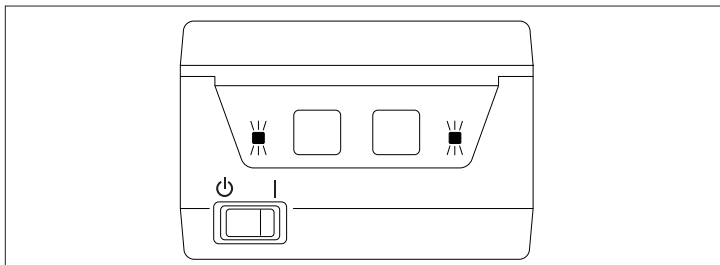
3

Setting the Receipt Roll Paper
Setting the Journal Roll Paper
Replacing Roll Paper
Specified Paper and Printing Area

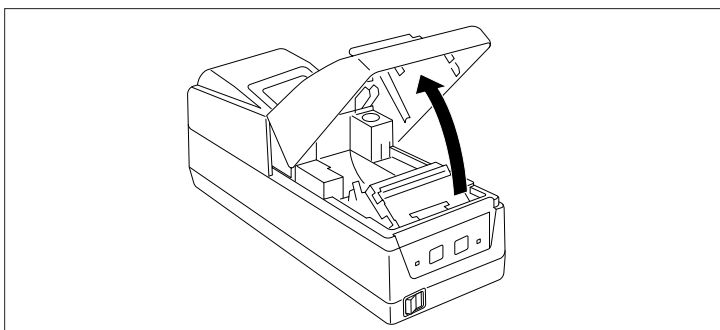
Setting the Receipt Roll Paper

- 1. Press the I side of the power switch to turn the power on.**

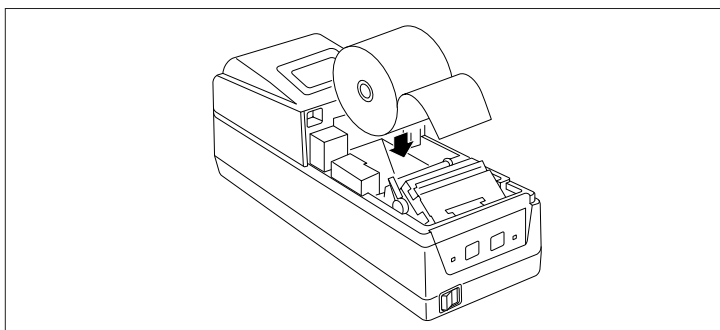
The POWER indicator lights up and the ERROR indicator blinks.



- 2. Remove the front cover.**

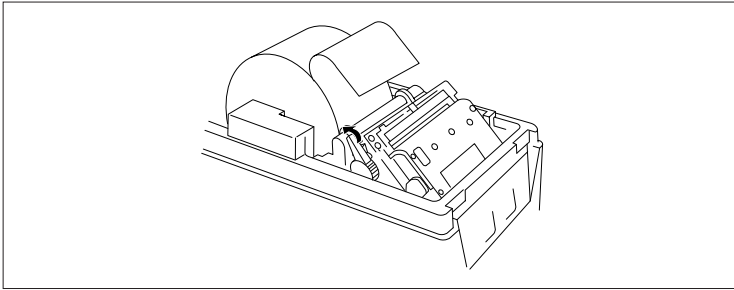


- 3. Place the roll paper in the paper holder as shown in the illustration.**



- Be sure the roll paper's winding direction is correct when inserting the roll.
- Make sure the roll paper turns smoothly in the paper holder.

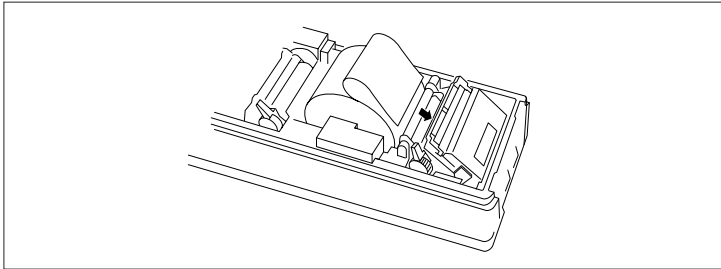
4. Make sure the head is in the down state.



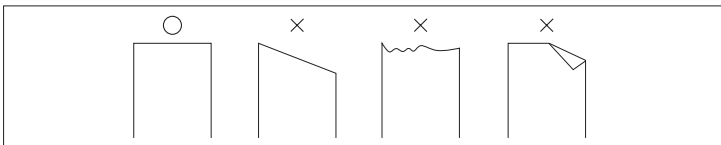
3

5. Insert the end of the roll of paper straight into the printer's paper insertion slot.

The proper amount of paper is then loaded automatically (auto loading).

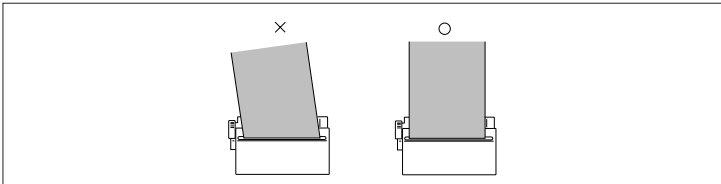


- If the end of the roll of paper is feathered or folded, cut off the end with scissors, etc. so that the end is squared off.



When operation stops, then setting of the roll paper is completed.

- If the paper is inserted crooked, move the head up lever forward, then correct the paper's path manually with the head in the up condition.

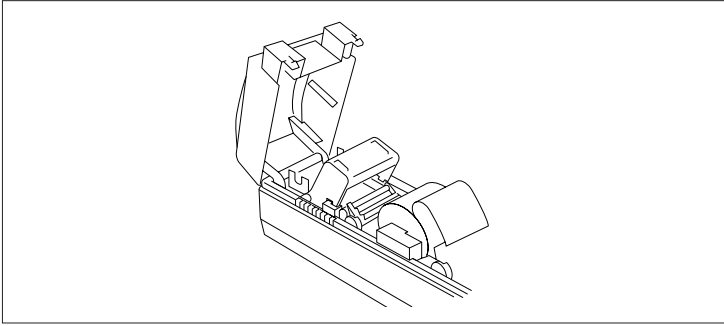


Next, set the journal roll paper.

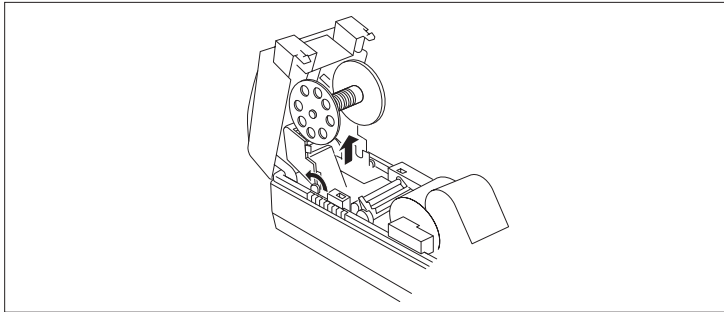
Setting the Journal Roll Paper

1. Open the rear cover.

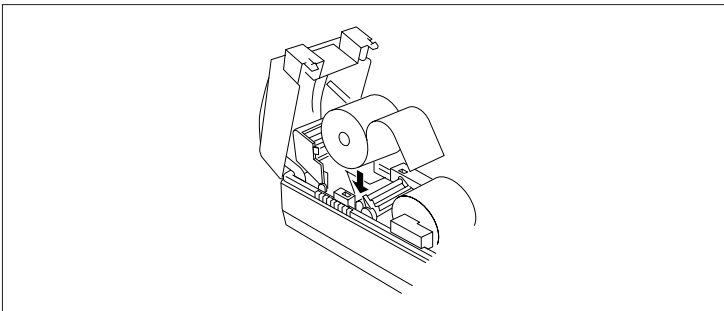
- Be sure to remove the front cover before opening the rear cover.



2. Remove the spool, then lower the writing table to the rear.



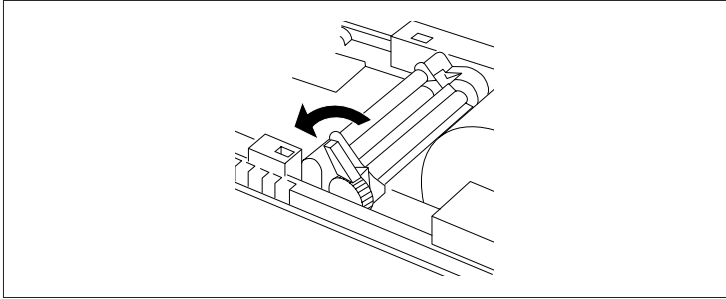
3. Place the roll paper in the paper holder as shown in the illustration.



- Be sure the roll paper's winding direction is correct when inserting the roll.
- Make sure the roll paper is turning smoothly in the paper holder.

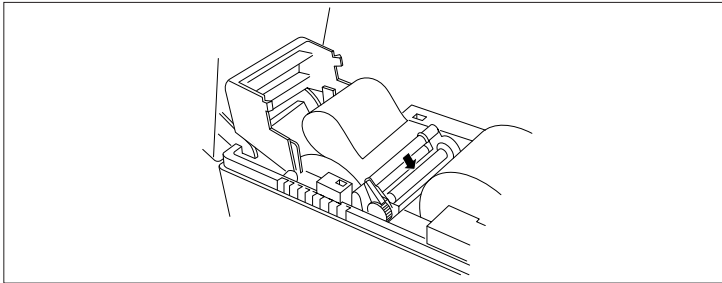
4. Lower the head up lever in the arrow direction.

The head will move to the head down condition, with the head platen closed.



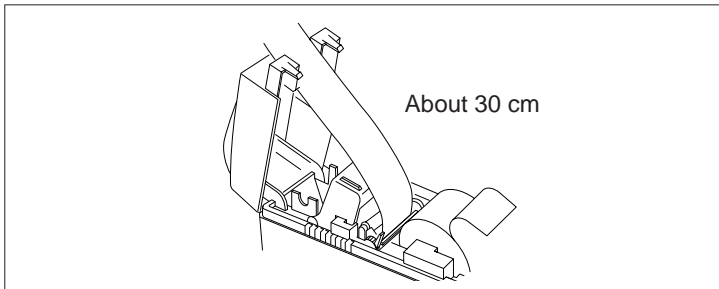
5. Insert the end of the roll of paper straight into the printer's paper insertion slot.

The proper amount of paper is then loaded automatically (auto loading).

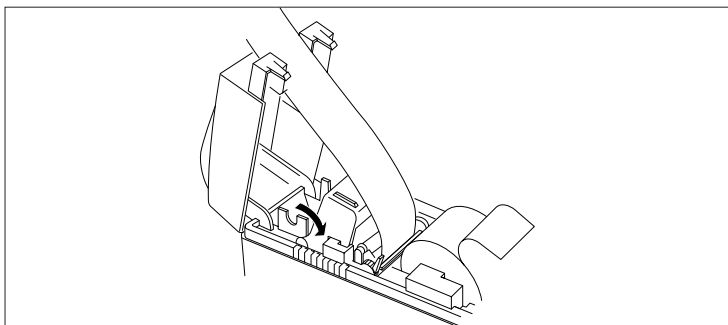


- If the end of the roll of paper is feathered or folded, cut off the end with scissors, etc. so that the end is squared off.
- If the paper is inserted crooked, move the head up lever forward, then correct the paper's path manually with the head in the up condition.

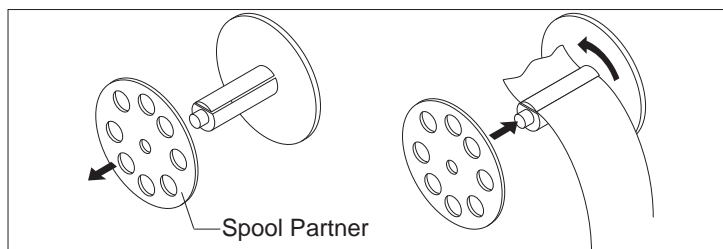
6. Press the JOURNAL key and advance about 30 cm (12 inch) of the roll paper.



7. Move the writing table back to its original position and lock it.



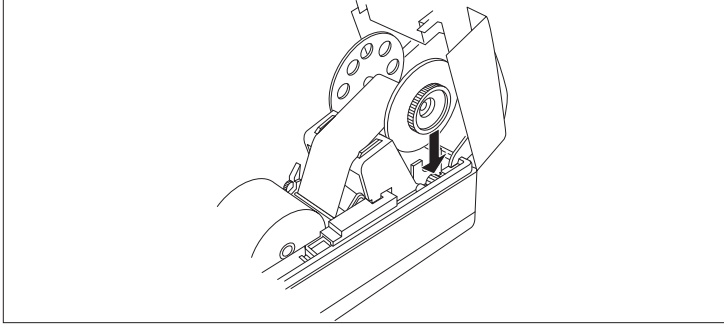
8. Remove the spool partner from the spool temporarily, then insert the end of the roll of paper into the slot in the spool and wind up the paper on the spool two or three times so it will not come off the spool. Replace the spool partner on the spool.



- Wind up the roll paper, making sure it is winding in the correct winding direction when taking up paper from the roll paper.

9. Insert the spool in the spool holder while winding up the paper on the spool.

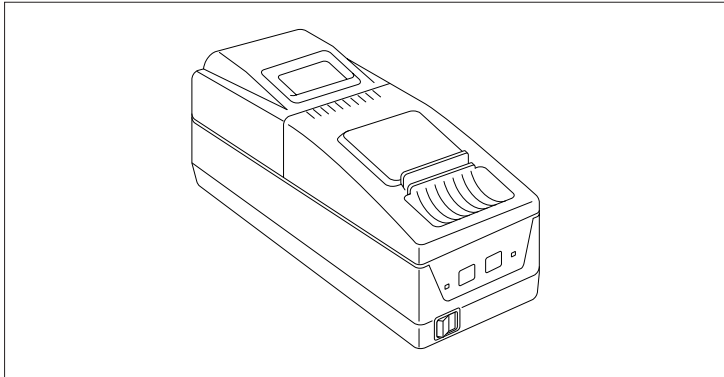
While winding the paper onto the spool so there is no slack, make sure it is moving along the guide in the writing table.



- Make sure the gear of the spool is engaged in the printer gear.

10. Close the rear cover, then replace the front cover, following the procedure used for removing the covers in the reverse order.

The ERROR indicator on the operation panel will go off.



- If the front cover is not closed securely, the ERROR indicator may not go off. At such a time, replace the cover securely once more.

That completes setting of the roll paper.

Replacing the Roll Paper

If the amount of roll paper remaining becomes low, the ERROR indicator blinks, reminding the operator that it will soon be time to replace the roll paper.

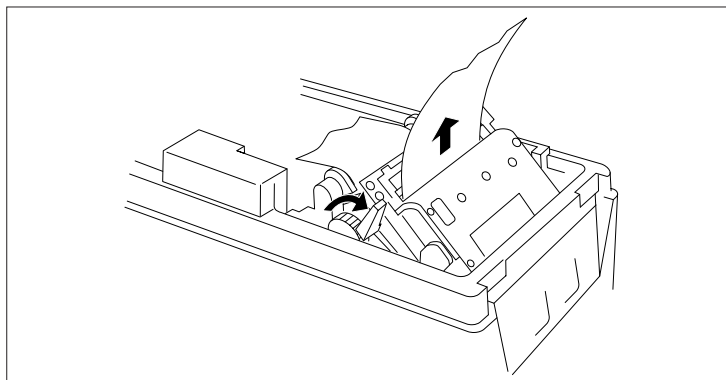
Printing will stop automatically if the printer runs out of roll paper.



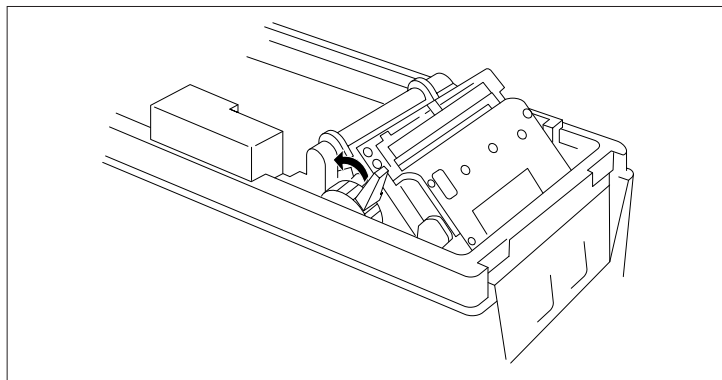
The print head and auto cutter are hot during or immediately after printing. Please wait until the print head and auto cutter have cooled sufficiently before replacing the roll paper.

3

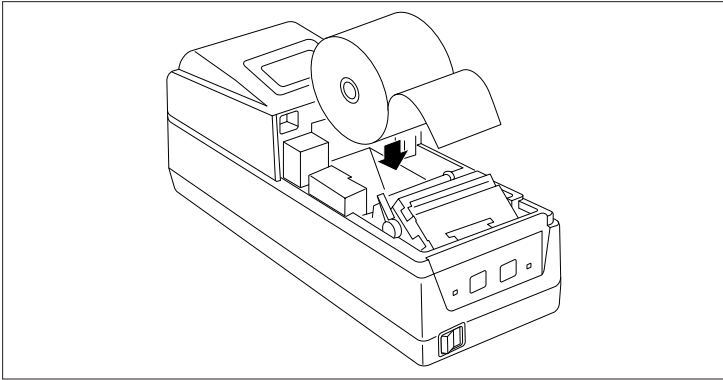
- 1. Remove the cover.**
- 2. Move the head up lever in the arrow direction.**
- 3. Pull the remaining roll paper out of the paper outlet and remove it.**



- 4. Return the head up lever to its original position.**



5. Set a new roll of roll paper.



- When replacing the journal roll paper, take out the spool and move the writing table back, then set the roll paper.
- If the paper is inserted crooked, move the head up lever to move the head to the up condition, then correct the paper's path manually.
- Remove the finished journal roll paper from the spool.

Follow the procedure below when replacing the journal roll paper.

1. Press the JOURNAL key and wind about 30 cm of paper.
2. Place the roll paper along the guide in the writing table while winding the roll paper onto the spool, then place the spool in the spool holder (see steps 9 and 10 of “Setting the Journal Roll Paper” (page 17)).
3. Return the writing table to its original position.

6. Replace the cover.

Specified Paper and Printing Area

Specified Paper

Type: Specified thermal printing paper.

Paper Width: 58 +0/-1 mm

Paper Thickness: 60~75 μ

Roll Diameter: 83 dia. mm or less

Printing Surface: Roll Outside (Surface)

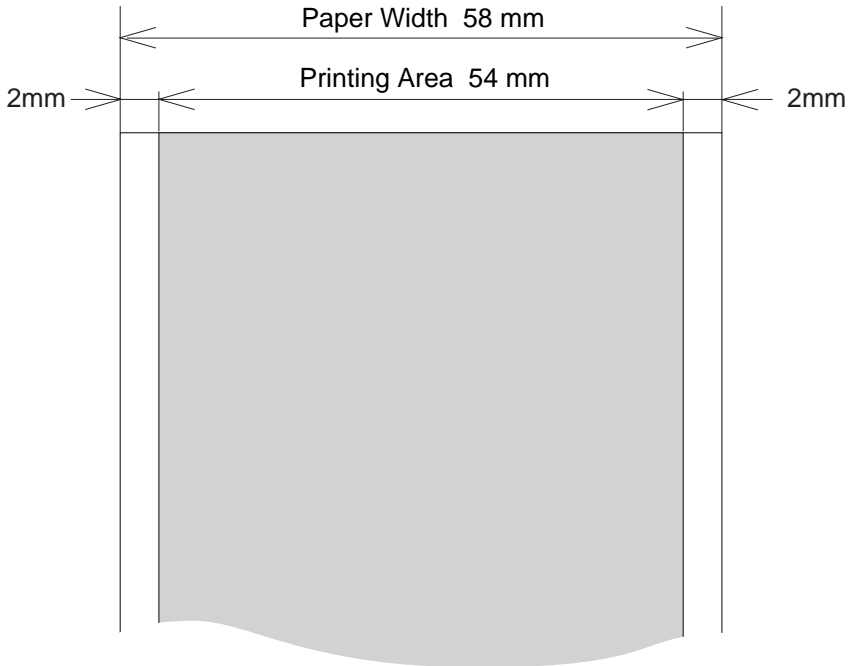
Specified Paper: Mitsubishi Paper Co. (Ltd.) F220VP

Shinoji Paper Co. (Ltd.) PD160R, PD160R-N

Nihon Paper Co. (Ltd.) TF 50KS-E2C

- Print density may differ depending on the paper used. In such cases, please adjust the print density. (See “Chapter 4 - Using the Printer,” on pages 22 and 23.)

Printing Area



Chapter 4

⋮⋮⋮ **Using the Printer**

4


**Settings Using the Operating Buttons
Setting the DIP Switches**

Operation Panel Keys

Use the RECEIPT key and JOURNAL key, in accordance with the query printing system, to set the printer internally.

Items which can be set are as follows.

- **Receipt print density.**
Adjusts the receipt print density. (See the table below.)
 - **Journal print density.**
Adjusts the journal print density. (See the table below.)
 - **Cover Open**
Sets the cover sensor on enabled or disabled.
 - **Auto Cutter**
Sets the auto cutter on enabled or disabled.
 - **Auto Loading**
Sets the auto loading function on enabled or disabled for setting roll paper.
 - **Receipt Paper Near End**
Sets the print stop function on enabled or disabled in response to signals from the receipt paper near end sensor.
 - **Journal Paper Near End**
Sets the print stop function on enabled or disabled in response to signals from the journal paper near end sensor.
 - **CR Operation**
Sets CR+LF / LF / Disregard.
 - **Reset by DSR**
Sets enabling or disabling of reset by the serial interface DSR signal.
 - **Reset by INIT**
Sets enabling or disabling of reset by the serial interface INIT signal.
 - **Error Handshake**
Sets whether the interface is changed to the BUSY state when a printer error occurs.
- * Relationship between each specified paper and print density (Use this as a standard.)

Print Density Level	Paper	Condition
1	TF50KS-E2c, F220vp.	Light  Dark
2		
3	PD160R, PD160R-N	
4		

Entering Configuration Mode

Select YES (R) or NO (J) to the printed question and set it.

If YES: Press the RECEIPT key.

If NO: Press the JOURNAL key.

- Perform the operation with the front cover removed.

1. With roll paper set, switch the power on while pressing both the RECEIPT key and the JOURNAL key.

This causes the printer to enter the printer configuration setting mode, and the printer will print the following text in accordance with the selected menu for each item.

```

#####ENTER SETTING MODE
YES Push (R)Receipt Key
NO Push (J)Journal Key
#####
#ROM-Ver# A9D-09A
#ROM-Date# A9D-09A
#ROM Data# MAY-28-1996
Reset Current Settings? YES (R) NO (J)
Print Current Settings? YES (R) NO (J)
#####
#####Current Settings#####
#####
#HOME# SETTINGS
# RECEIPT SENSITIVITY J/2/S/A
# JOURNAL SENSITIVITY J/2/S/A
# COVER OPEN SENSOR VALID/INVALID
# AUTO CUTTER VALID/INVALID
# AUTO LOAD NG VALID/INVALID
# R PAPER NEAR END VALID/INVALID
# J PAPER NEAR END VALID/INVALID
# CR CONTROL VALID/INVALID
# KARU MODE VALID/INVALID
# RESET BY INT VALID/INVALID
# RESET BY OSS VALID/INVALID
# ERROR HANDSHAKE VALID/INVALID
# CHARACTER SETTING
# CHARACTER TABLE U.S.A./JAPAN
# COUNTRY ##### U.S.A.
#####
# SERIAL SETTINGS
# PARITY NO/EVEN
# STOP BIT 1/2
# Baudrate ##### 19200
#####
Change Current Setting? YES(R) NO(J)
#####
# RECEIPT SENSITIVITY 1 ##### YES(R) NO(J)
#####
# JOURNAL SENSITIVITY 1 ##### YES(R) NO(J)
#####
# COVER OPEN SENSOR VALID ##### YES(R) NO(J)
#####
# AUTO CUTTER VALID ##### YES(R) NO(J)
#####
# AUTO LOAD NG VALID ##### YES(R) NO(J)
#####
# R PAPER NEAR END INVALID ##### YES(R) NO(J)
#####
# J PAPER NEAR END INVALID ##### YES(R) NO(J)
#####
# CR CONTROL CR-F ##### YES(R) NO(J)
#####
# KARU MODE INVALID ##### YES(R) NO(J)
#####
# RESET BY INT VALID ##### YES(R) NO(J)
#####
# RESET BY OSS VALID ##### YES(R) NO(J)
#####
# ERROR HANDSHAKE BDY ##### YES(R) NO(J)
#####
#####Current Settings#####
#####
# RECEIPT SENSITIVITY J/2/S/A
# JOURNAL SENSITIVITY J/2/S/A
# COVER OPEN SENSOR VALID/INVALID
# AUTO CUTTER VALID/INVALID
# AUTO LOAD NG VALID/INVALID
# R PAPER NEAR END VALID/INVALID
# J PAPER NEAR END VALID/INVALID
# CR CONTROL CR-F/INVALID
# KARU MODE VALID/INVALID
# RESET BY INT VALID/INVALID
# RESET BY OSS VALID/INVALID
# ERROR HANDSHAKE VALID/INVALID
#####
SETTING MODE END#
    
```

1. Prints the ROM version and the date.
2. If YES is selected, it resets the factory default settings, then moves to the following line. If NO is selected, the following line is printed.
3. If YES is selected, the currently set menus are printed. If NO is selected, the line in 5 is printed.
4. The input buffer, character settings (International character code) and serial protocol settings are as set by the DIP switches.
5. If YES is selected, after the line in 6, printing of the settings for each item is begun. If NO is selected, the printing of 8 is done, and setting of the printer ends.
6. Select NO until the menu of all the setting items is set as desired. When the content is correct, select YES. If YES is selected, the setting contents are recorded in non-volatile memory and the printer prints the next item. When Error handshake setting item is ended, the set contents (7) and 8 are printed, then printer set up is ended.



2. Turn the power off, then turn it on again.

The set contents become enabled.

Test Printing

Test printing can be done by turning the printer's power switch ON while pressing the RECEIPT key.

Test Printing Mode

DIP Switches

DIP switches are located inside the DIP switch cover on the bottom of the printer. Loosen the screws, then turn the DIP switch cover.

- Turn the power off before setting the DIP switches.

The contents of DIP switches are as shown in the following tables.

DIP Switch 1 **(Bold character indicates Factory Default)**

No.	Content	OFF	ON
1	Serial Interface Data Length	8bits	7bits
2	Serial Interface Protocol	DTR/DSR	XON/XOFF
3	Input Buffer	8KB	1 Line
4	Code Page	PC437	PC850
5	International Characters		See the following table.
6			
7			
8			

* 1 and 2 are effective for the serial interface only.

Setting International Characters

SW1-5	SW1-6	SW1-7	SW1-8	International Character Set
OFF	OFF	OFF	OFF	Japanese
OFF	OFF	OFF	ON	U.S.A
OFF	OFF	ON	OFF	French
OFF	OFF	ON	ON	German
OFF	ON	OFF	OFF	U.K
OFF	ON	OFF	ON	Danish
OFF	ON	ON	OFF	Swedish
OFF	ON	ON	ON	Italian
ON	OFF	OFF	OFF	Spanish
ON	OFF	OFF	ON	Norwegian
ON	OFF	ON	OFF	Danish 2
ON	OFF	ON	ON	Spanish 2
ON	ON	OFF	OFF	Latin America
ON	ON	OFF	ON	Korean
ON	ON	ON	OFF	Legal

DIP Switch 2 (Bold character indicates Factory Default)

No.	Content	OFF	ON
1	Baud Rate	See Table ① below.	
2			
3	Parity	See Table ② below.	
4			

① Baud Rate Settings

SW2-2	SW2-1	Baud Rate Setting
OFF	OFF	9600
OFF	ON	4800
ON	OFF	2400
ON	ON	19200

② Parity Settings

SW2-4	SW2-3	Parity Setting
OFF	OFF	No Parity
OFF	ON	Odd Parity
ON	OFF	Even Parity
ON	ON	–

- DIP switch 2 is included only in the case of a Serial interface.

Chapter 5

Sensors **and** **Error Indications**

This chapter explains the various sensors that this printer is equipped with and the error indications accompanying them.

5

Sensors
Error Indications

Sensors

Printer Cover Open Sensor

This sensor reacts when the front cover is removed, indicated by the ERROR indicator (cover open error). Printing is halted.

Head Up Sensor

If the head is moved to the head up position using the head up lever, it is indicated by the ERROR indicator (Head Up Error.) Printing is halted.

Head Temperature Sensor

To protect the print head from overheating, this sensor functions when the head's temperature becomes high (approximately 60°C (140°F) or higher) and is indicated by the ERROR indicator (Head Overheat). Printing is halted. When the head's temperature drops (approximately 55°C (131°F) or lower), printing resumes automatically.

Paper Sensor

This sensor is located in the paper path of the receipt printer and the journal printer. When paper is inserted in the printer's paper path, the paper is loaded. If the paper in the paper path runs out, it is indicated by the ERROR indicator (Paper End Error). Printing is halted.

Cutter Position Sensor

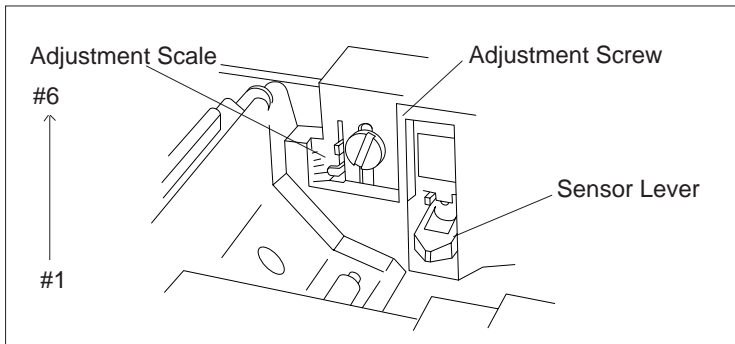
Cutter control is executed by means of the cutter position detection sensor. If detection of the sensor remains ON or OF for 1 second or longer during cutter motor operation, the printer judges that the cutter motor is locked and halts further cutter operation and printing at that point.

Paper Near End Sensor

This sensor is located on the roll paper holder on the receipt side and the journal side. When the winding diameter of the roll paper becomes small, it is indicated by the ERROR indicator. Since the amount of roll paper remaining may differ depending on the thickness of the winding core, the near end sensor can be set so as to correspond to the thickness of the winding core.

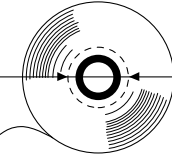
Setting Method

1. Loosen the adjustment screw holding the sensor lever.
2. Set the top end of the sensor lever on the correct step on the adjustment scale.



When the specified paper with a winding core whose outer diameter is $\phi 18$ mm and inner diameter is $\phi 12$ mm is used, the approximate adjustment scale step are as follows. The factory default setting of the scale is lowest position.

Adjustment Scale Step	Dimension T
Lowest position	Approx. 18.5-20.5 mm (Paper length: 20-110 cm)
#2	Approx. 20-23 mm (Paper length: 80-230 cm)
#3	Approx. 25-27.5 mm (Paper length: 300-480 cm)

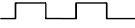

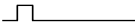





*Dimension T = Amount of outer diameter remaining on roll of paper.

- Dimension T, corresponding to the step on the adjustment scale, may vary somewhat.
3. Tighten the adjustment screw and close the sensor lever.
Check if the sensor lever is operating smoothly.

Error Indications

Error contents and error indications, as well as recovery instructions in each case, are as shown below.

Error Content	Indication		Recovery
	POWER LED	ERROR LED	
System Error	Lights up.	Lights up.	Recovery impossible.
Cover Open	Lights up.	 (Blinks slowly.)	Close the cover.
Head Up	Lights up.	 (Blinks fast.)	Return head up lever to original position.
Head Overheat	Lights up.	 (Blinks once.)	Recovers automatically when the temperature drops.
Paper End or Paper Near End	Lights up.	 (Blinks once.)	Set new roll paper.
Cutter Motor Lock	Lights up.	 (Blinks fast + blinks slow.)	Clear the paper jam.
Macro Execution Wait	Lights up.	 (Blinks twice.)	Press the RECEIPT or JOURNAL key.

Chapter 6

Interfaces

Serial Interface
Parallel Interface
Drawer Kick Connector

Serial Interface

Specifications

Transmission Method	Start-Stop Synchronous Full Duplex Communications
Signal Level	RS-232C
Baud Rate	2400, 4800, 9600, 19200
Data Length	7 or 8 bits
Start Bit	1 bit
Stop Bit	Receiving 1 bit; Transmitting 2 bits or more
Parity	Even, Odd, No Parity
Connector	Printer Side Compatible with DDK 17LE-13250-27

Signal Lines and Pin Arrangement

Pin No.	Signal Name	Direction	X-ON/X-OFF	DTR/DSR
1	F.GND		Connects the Host CPU and printer.	←
2	TXD	OUT	Sends transmission data and X-ON/X-OFF signals to the Host CPU from the printer.	Not used.
3	RXD	IN	Transmission data from the Host CPU to the printer.	←
4	RTS	OUT	Pulls up the signal to +10V at 3.3k ohms.	←
6	DSR	IN	Not used.	Data are sent when the status information send signal is "HIGH."
7	S.GND			
20	DTR	OUT	Always HIGH.	LOW when Busy. HIGH when Ready.
25	INIT	IN(*1)	Printer's Reset signal.	←

- IN indicates a signal from the Host to the printer. OUT indicates a signal from the printer to the Host.

*1 25pin, INIT is HIGH or the TTL-HIGH level of input (+2V~+15V).

Explanation of Signal Names

F. GND (Frame Ground)

Connected to the printer case.

TXD (Transmit Data (Send Data))

Transmission line for sending serial data from the printer to the Host.

RXD (Receive Data)

Transmission line for the printer to receive serial data from the Host.

DSR (Data Set Ready)

Signal line which indicates to the printer that the Host is ready to receive.

A low level reset can be carried out through the menu setting.

S. GND (Signal Ground)

The GND (earth) for the signal line.

DTR (Data Terminal Ready)

Signal line which indicates to the Host that the printer is ready to receive.

RTS (Request To Send)

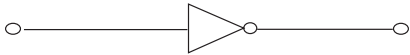
Pulled up to +10V at 3.3k ohms.

INIT

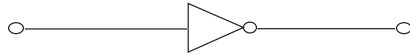
This is the signal line used by the host to send a reset command to the printer. (However, this is when enabling of the INIT signal by the menu setting has been selected.)

Input/Output Circuits

Input Circuit

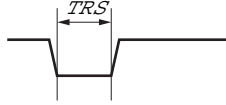
Signal Name	Configuration
RXD	 <p>Compatible with μPD4721.</p>
DSR	

Output Circuit

Signal Name	Configuration
TXD	 <p>Compatible with μPD4721.</p>
DTR	

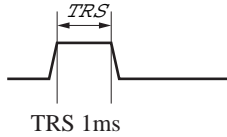
Reset by DSR

Resets if the voltage becomes $-15V \sim -3V$.



Reset by INIT

Resets if the voltage becomes $+2V \sim +15V$.



Protocols

X-ON/X-OFF Protocol

Control is by output of the codes for the data transmission request signal X-ON (11 Hex) and the data transmission stop signal X-OFF (13 Hex). When sending the printer's status to the Host, this is sent irrespective of the level of the DSR signal.

Conditions for Output of the X-ON Code

- When all errors have been cleared.
- When the remaining buffer capacity is greater than Non bytes.
- After the power is turned on, when in the Ready to Receive state.

Conditions for Output of the X-OFF Code

- When the printer has generated an error and has switched from Online to Offline.
- When the remaining buffer capacity is Noff bytes or less.
 - * Even if the X-ON/X-OFF code output conditions are established, the same code is not output two times in succession. However, times when the power is turned ON are expected.
 - * When the menu setting error handshake is disabled, XON/XOFF is not output when the error status changes.

DTR/DSR Protocol

Control is by the level of the DTR signal, Ready “High” /Busy “Low”.

If the printer's status is sent to the Host, it is sent when DSR is “High.” If DSR is “Low,” the printer waits until it goes “High.”

Conditions for the DTR Signal to become Ready “High”

- When all the errors have been cleared.
- When the remaining buffer capacity is greater than Non bytes.
- After the power is turned on, when in the Ready to Receive state.

Conditions for the DTR Signal to become Busy “Low”

- When the printer has generated an error and has switched from Online to Offline.
- When the remaining buffer capacity is Noff bytes or less.
 - * When the menu setting error handshake is disabled, the DTR signal does not change.

Conditions for Non and Noff (Units: Bytes)

- When there is an 8 KB buffer.
Non=2048
Noff=1024
- When there is a one line buffer.
Non= 20
Noff=10

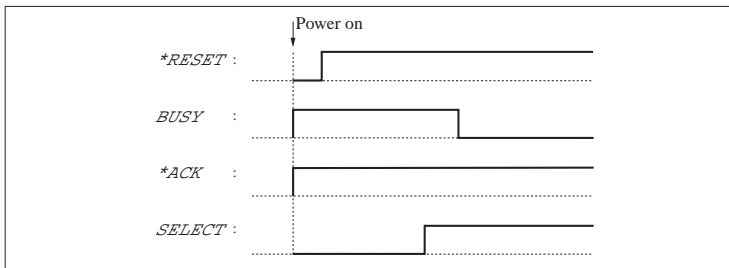
Parallel Interface

Specifications

Transmission Method	8 bit Parallel
Signal Level	TTL Level
Connector	Corresponds to DDK 57RE-40360-803B.

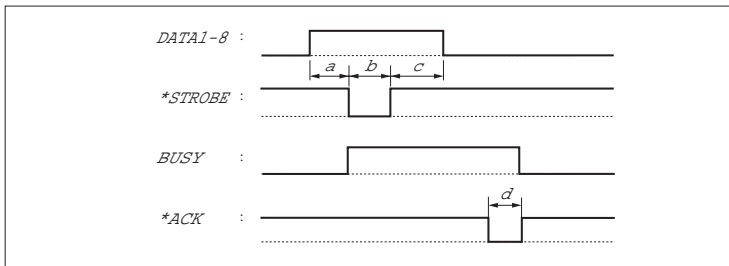
Timing Chart

[At Power On] (If the printer goes Online.)



The * means negative logic signals.

[During Data Reception]



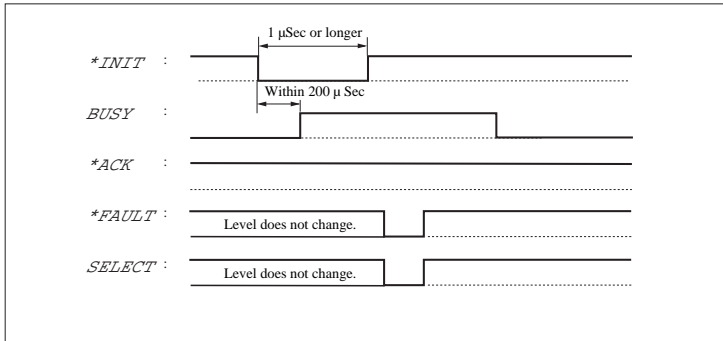
a: Min. 0.5 μ Sec*

b: Min. 0.5 μ Sec*

c: Min. 0.5 μ Sec*

d: Approx. 2.9 μ Sec

*: Value at the receiving end.

[When Receiving the INIT Signal]

Input/Output Circuits

Input Circuit

Signal Name	Configuration	
DATA1-8 *INIT	<p style="text-align: center;">CMOS</p>	VH=2.0V VL=0.8V
*STROBE	<p style="text-align: center;">CMOS (Schmidt)</p>	VH=1.8V VL=0.9V

Output Circuit

Signal Name	Configuration
SELECT *FAULT *ACK PE BUSY DRAWER KICK STATUS	<p style="text-align: center;">Compatible with 7406.</p>

6

Signal Lines and Pin Arrangement

Pin No.	Signal Name	Direction	Function
1	*STROBE	IN	Synch signal for reading DATA 1-8.
2	DATA1	IN	8-bit parallel data (DATA1: LSB, DATA8: MSB)
3	DATA2		
4	DATA3		
5	DATA4		
6	DATA5		
7	DATA6		
8	DATA7		
9	DATA8		
10	*ACK	OUT	Data request signal output when ready for receiving data.
11	BUSY	OUT	Goes “Low” when ready to receive data, and “High” when not ready. Goes “High” under the following conditions. <ul style="list-style-type: none"> • Printer is in an error state. • The buffer is full and data cannot be received. • After receiving the INIT signal, after printing of the data in the buffer, during the interval until initialization is completed.
12	PE	OUT	In the case that “Paper End” detection is enabled by the control code, it goes “High” during the paper end state.
13	SELECT	OUT	Indicates whether the printer is in the Online state or the Offline state. Goes “Low” when a printer error occurs.
14			Not used.
15			Not used.
16	GND		Signal line ground.
17	FG		Connected to the printer case.
18	+5V		Connected to +5 V inside the printer. (Cannot be used by the customer.)
19-30	GND		Signal line ground.

Pin No.	Signal Name	Direction	Function
31	*INIT	IN	When this signal goes “Low,” the printer becomes BUSY. It is initialized after all the data are printed. BUSY is not cleared until this signal goes “High.” A pulse width of 1 μ sec or longer is required at the receiving end. (See “When Receiving the INIT Signal.”)
32	*FAULT	OUT	This signal indicates that the printer is in the error state. It goes “Low” under any one of the following conditions. <ul style="list-style-type: none"> • Paper End • When an abnormal operation is detected.
33	GND		Signal line ground.
34	DRAWER KICK STATUS	OUT	The drawer kick connector's status signal is output.
35	FUSE	OUT	Connected to +5 V through a 3.3k ohm resistor.
36			Not used.

- IN indicates signals from the Host to the printer, and OUT indicates signals from the printer to the Host.

* means negative logic signals.

Drawer Kick Connector

Specifications

Drawer Kick Drive Signal

Outputs a pulse signal specified by the ESCp command. Also, the status of SW (+) can be known from pin 34 of the interface connector in the case of the parallel interface and by the GSr, for instance command in the case of the serial interface.

Electrical Characteristics

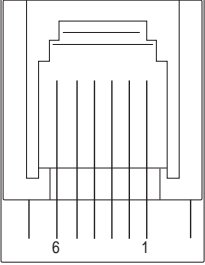
Drive Voltage: DC 24 V

Drive Current: Max. 0.8 A (should be within 510 ms)

SW Signal: Signal level “L”= 0~0.5 V
 “H”= 3~5 V

Connector Connection Diagram

NO.	Signal Name	Function
1	FG	Safety ground.
2	DRAWER1	Drawer 1 drive signal.
3	DRSW	Drawer switch input.
4	VDR	Drawer drive power supply.
5	DRAWER2	Drawer 2 drive signal.
6	GND	Common ground in the circuit.

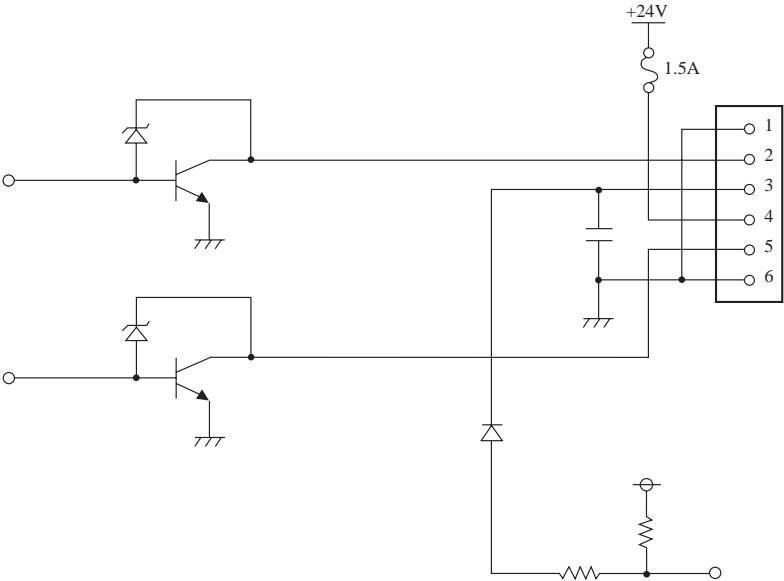


Connector Used: TM5RJ3-66 (Hirose)

Compatible Connector: Compatible with TM3P-66P (Hirose)

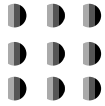
- No signals are output during printing.
- Both drawers 1 and 2 cannot be driven simultaneously.
- Use a 36 ohm or higher drawer solenoid. (Be careful not to let the output current exceed 0.8A. If the output current exceeds 0.8 A, results cannot be guaranteed.)
- The drawer kick connector is not the type used for connections to telephone lines. Do not connect to any device other than a solenoid.

Drive Circuit



6

Chapter 7



Print Control Codes

List of Control Codes
Input Data Format

List of Control Codes

	Character	Command	Page
1	HT	Horizontal tab	49
2	LF	Line feed	49
3	CR	Print comand	49
4	FF	Printing in the page mode and return	50
5	CAN	Canceling of print data in the page mode	50
6	RS	Journal tab	50
7	DLE EOT	Sending the status in real time	50
8	ENQ	Real time enquiry to printer	54
9	ESC FF	Printing of data in the page mode	54
10	SP	Setting the space between characters	55
11	!	Specifying the print mode all at once	56
12	\$	Specifying the absolute print position	57
13	%	Specifying/Clearing the download character set	57
14	&	Defining download characters	58
15	*	Specifying a bit image	61
16	-	Specifying/Clearing underline	63
17	2	Specifying the 1/6 inch line feed amount	63
18	3	Specifying the line feed amount	64
19	=	Controlling data input	65
20	?	Erasing download characters	65
21	@	Printer initialization	66
22	D	Setting the horizontal tab position	66
23	E	Specifying/Clearing bold characters	66
24	G	Specifying/Clearing double strike characters	67
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: Parallel only

:Serial only

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: Parallel only

:Serial only

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66	r	Sending of the status	103
67	w	Selecting the horizontal size of a bar code	105

: Parallel only
:Serial only

Input Data Format

(1) Horizontal tab (HT)

Code: [09] h

Moves the printing position to the next horizontal tab position. The horizontal tab position is set by ESC D. Initial horizontal tab positions are set at every eighth character in Font A (9th, 17th, 25th and 33rd columns).

(2) Line feed (LF)

Code: [0A] h

Menu Setting: The operation differs according to the contents set by the CR operation.

In the case of CR + LF

If data exist in the print buffer, a line feed is executed after printing. If no data exist, a line feed only is executed.

A LF code input immediately following a CR code is disregarded.

In the case of LF and in the case of Disregard

If data exist in the print buffer, a line feed is executed after printing. If no data exist, a line feed only is executed.

A LF code input immediately following a CR code is disregarded.

(3) Print command (CR)

Code: [0D] h

Menu Setting: The operation differs according to the contents set by the CR operation.

In the case of + LF

If data exist in the print buffer, a line feed is executed after printing. If no data exist, a line feed only is executed.

A CR code input immediately following a LF code is disregarded.

In the case of LF

If data exist in the print buffer, a line feed is executed after printing. If no data exist, a line feed only is executed.

A CR code input immediately following a LF code is not disregarded.

In the Case of Disregard

This code is disregarded.

(4) Printing in the page mode and return (FF)

Code: [0C] h

The data developed in the entire printing area are printed all at once and the printer returns to the Standard mode.

- All the developed data are cleared after printing.
- The printing area set by ESC W is initialized.
- The paper cut is not executed.
- The head of the line is made the next printing position.
- This is valid only in the Page mode.

(5) Canceling of print data in the page mode

Code: [18] h

In the Page mode, this cancels all the data in the currently set printing area.

- Valid when Page mode is selected only.
- The portions of data included in the currently set printing area are canceled even if they are data from a previously set printing area.

(6) Journal tab (RS)

Code: [1E] h

Moves the print position to the head of the journal paper.

[Note] Valid only when Receipt/Journal is selected, printing of the same data by the receipt and journal printers is cleared and the print position is in the receipt area.

(7) Sending the status in real time [DLE EOT n]

Code: [10] h + [04] h + n

* (1 n 4) Data are expressed in Hex code.

The status is sent in real time according to the n specification.

- n is as follows.
 - n = 1: Sends the printer status.
 - n = 2: Sends the off-line factor status.
 - n = 3: Sends the error factor status.
 - n = 4: Sends the paper sensor status.

- Each status shows the current state. Also, each status is 1 byte of data.
- The status is sent without confirming the receiving ready state of the host computer.
- Executed in the off-line state, when the receiving buffer is full and in the error state.
- This command is processed during reception.
- In cases where the [10] h [04] h n (1 n 4) data string is received, even when it is other than this command, the user's attention is necessary because the printer's operation will be the same as when this command is executed.

[Example]

In ESC* m nl nh [dl...dk], d1 = [10] h, d2 = [04] h, d3 = [01] h.

- Do not insert this command in the code strings of other commands consisting of codes with 2 bytes or more.

[Example]

If the host side wants to send ESC 3 n, then DLE EOT 3 is sent just at the point where ESC 3 has been sent, the printer will process the command as ESC 3 [10] h. Therefore, the user's attention is necessary.

- In cases where ASB is valid due to GS a, it is necessary to distinguish between the status by this command and the ASB status.

Distinguishing the Sending Status

Since the values of specific bits in the status sent by this printer, it is possible to distinguish which command's status is received.

However, in the case where ASB is used, after confirming the first byte of ASB, process the next 3 bytes, excluding the XOFF, as ASB data. If this is not done, it will be impossible to distinguish between status messages such as ESC u and the second and subsequent bytes of ASB.

Command and Function	Status
GS I	<0**0****>B
GS r	<0**0****>B
XON	<00010001>B
XOFF	<00010011>B
DLE EOT	<0**1**10>B
ASB (1st byte)	<0**1**00>B
ASB (2nd through 4th byte)	<0**0****>B

① Printer Status (when n=1 is specified)

Bit	Function	0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 1	
2	Status of drawer pint No. 3	“L”	“H”
3	On-line/Offline	On-line	Off-line
4	Not used	Fixed at 1	
5	Not defined	—	—
6	Not defined	—	—
7	Not used	Fixed at 0	

② Off-line Factor Status (when n = 2 is specified)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 1	
2	Cover Open	Cover Closed	Cover Closed
3	Paper Feed by paper feed switch	No paper feed	Paper feed in progress
4	Not used	Fixed at 1	
5	Printing not stopped by No Paper	No stopped	Stopped
6	Error generated	None	Error exists
7	Not used	Fixed at 0	

Bit 5: When the roll paper end sensor signals that there is no paper, or when there is no paper when the roll paper near end sensor is enabled by ESC c 4, printing is stopped. At this time, bit 5 = 1.

③ Error Factor Status (when n = 3 is specified)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 1	
2	Fixed at 1	—	—
3	Auto cutter error generated	No error	Error occurred
4	Not used	Fixed at 1	
5	Unrecoverable error	No error	Error occurred
6	Auto recovery error generated	No error	Error occurred
7	Not used	Fixed at 0	

Bit 3: If this error is generated due to a paper jam, etc., you can recover by DLE ENQ n (1 n 2) after the error cause is eliminated. If the error was generated due to a fault in the circuit (broken connection, etc.), then you cannot recover.

Bit 6: If an abnormally high temperature is detected in the print head and during the time that printing is stopped until the head temperature drops, bit 6 = 1.

④ Continuous Paper Sensor Status (when n = 4 is specified)

Bit	Function	Value	
		0	1
0	Not used	Fixed at 0	
1	Not used	Fixed at 1	
2	Journal near end detection	Paper present	No paper
3	Receipt near end detection	Paper present	No paper
4	Not used	Fixed at 1	
5	Journal end detection	Paper present	No paper
6	Receipt end detection	Paper present	No paper
7	Not used	Fixed at 0	

(8) Real time enquiry to printer (DLE ENQ n)

Code: [10] h + [05] h + n

* (1 n 2) Data are expressed in Hex code.

The printer responds to the requests from the host in real time according to the specification of n.

n = 1: Resumes printing from the head of the line where an error occurred after recovery from that error.

n = 2: The printer recovers from the error after clearing the receiving buffer and the print buffer.

- This command is enabled only when an auto cutter error has occurred.
- This command is processed when it is received.
- This command is executed even when the receiving buffer is full.
- In cases where the [10] h [05] h n (1 n 2) data string is received, even when it is other than this command, the user's attention is necessary because the printer's operation will be the same as when this command is executed.

[Example]

In ESC* m nl nh [d] k, d1 = [10] h, d2 = [05] h, d3 = [10] h.

- Do not insert this command in the code strings of other commands consisting of codes with 2 bytes or more.

[Example]

If the host side wants to send ESC 3 n, then DLE EOT 3 is sent just at the point where ESC 3 has been sent, the printer will process the command as ESC 3 [10] h. Therefore, the user's attention is necessary.

- Even if DLE ENQ 2 is executed, the printer will maintain the state it was in when an error with contents set by ESC !, ESC 3, etc. was generated. The printer can be completely initialized by this command and ESC@.

(9) Printing of data in the page mode (ESC FF)

Code: [1B] h + [0C] h

This prints out all the data developed in the entire printing area in the Page mode at once.

- This command is enabled only when Page mode is selected.
- The printer prints on the printing sheet selected by ESC c 0.
- The developed data, ESC T and ESC W setting values, and character development positions are maintained even after printing.

(10) Setting the space between characters (ESC SP n)

Code: (1B) h + [20] h + n

* (0 n 20) Data are expressed in Hex code.

The space to the right of characters is set in [n x basic calculated pitch] inches.

- When the horizontal magnification of characters is 2 or greater, the amount of space on the right becomes larger at the same magnification.
 - ① This does not effect Kanji.
- The amount of space on the right side of characters can be set independently in the Standard mode and the Page mode.
- The basic calculated pitch is set by GS P. Also, after the amount of right space is set, this amount of space does not change even if the basic calculated pitch is changed by GS P.
- If there is a fraction, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.
- In the Standard mode, the basic calculation pitch (x) in the horizontal direction is used.
- In the Page mode, the basic calculation pitch used according to the starting point is as follows.
 - ① If the starting point is specified as "top left" or "bottom right" by ESC T, the horizontal basic calculation pitch (x) is used.
 - ② If the starting point is specified as "top right" or "bottom left" by ESC T, the vertical basic calculation pitch (y) is used.
- The maximum value that can be set for the amount of right space is 255/203 inch. Settings which exceed this maximum value are rounded to the maximum value.
- The minimum value is "n = 0".

(11) Specifying the print mode all at once (ESC ! n)

Code: [IB] h + [21] h + n

* (0 n FF) Data are expressed in Hex code.

This command specifies the print mode.

- Each bit of n is as shown in the following table.

Bit	Function	Value	
		0	1
0	Character Font	Font A	Font B
1	Not defined		
2	Not defined		
3	Bold	Clear	Specify
4	Vertical double enlargement	Clear	Specify
5	Horizontal double enlargement	Clear	Specify
6	Not defined		
7	Underline	Clear	Specify

- If both vertical and horizontal double enlargement are specified at the same time, quadruple enlargement characters can be configured.
- Underlines are applied to all the characters printed, but portions skipped with a horizontal tab (HT) and portions with characters which are rotated 90 degrees to the right are not underlined.
- The underline width is the width set in ESC _ with no relation to the character size.
- Mixed printing with double enlarged characters, and with characters of different sizes, is possible.
- Character sizes can also be specified by GS !, but the command that is set last is the one that is valid.
- The initial value is “n = 0”.

(12) Specifying the absolute print position (ESC \$ n1 n2)

Code: [1B] h + [24] h + n1 + n2

* (0 n1 FF)

(0 n2 3) Data are expressed in Hex code.

The next printing start position is specified as an absolute position with the left margin position as the reference. The next printing start position is [(n1 + n2 x 256) x basic calculation pitch] inch from the left margin position.

- A specification that exceeds the printing area is disregarded.
- The basic calculation pitch is set by GS P.
- If there is a fraction in the calculation results, it is interpolated at the mechanism's minimum pitch. Remainders are cut off.
- The horizontal basic calculation pitch (x) is used in the Standard mode.
- The following operations are executed in the Page mode according to the starting point.

① If the starting point is specified as "top left" or "bottom right" by ESC T, an absolute position in a direction perpendicular to the paper feed direction (the character's horizontal direction) is specified. The horizontal basic calculation pitch (x) is used in calculations at this time.

② If the starting point is specified as "top right" or "bottom left" by ESC T, the absolute position in the paper feed direction (the character's horizontal direction) is specified. The vertical basic calculation pitch (y) is used at this time.

(13) Specifying/Clearing the download character set (ESC % n)

Code: [1B] h + [25] h + n

* (0 n FF) Data are expressed in Hex code.

This command specifies and clears download characters.

- In n, the least significant bit (n0) becomes enabled. The meaning of the least significant bit (n0) is as follows.
 - n0 = 0: The download character set is cleared.
 - n0 = 1: The download character set is specified.
- Download characters and a download bit image (GS *) cannot be defined at the same time.
- The initial value is "n0 = 0".

(14) Defining download characters (ESC & s n m a (D1 D2~Dn))

Code: [1B] h + [26] h + s + n + m + a + Dn

* (s = 03)

(20 n 7E)

(20 m 7E)

(In the case of Font A, (0 a 0C)

(In the case of Font B, (0 a 09)

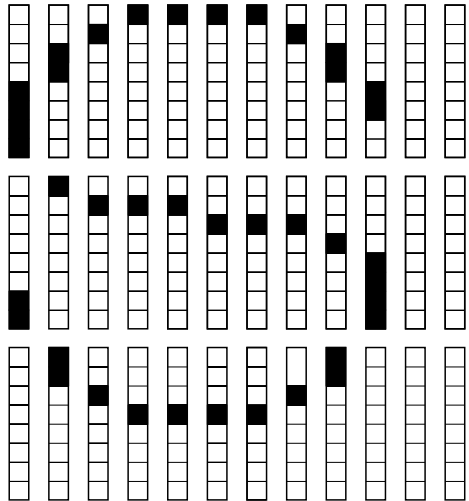
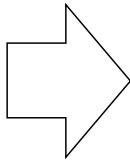
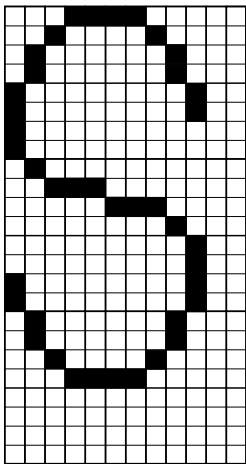
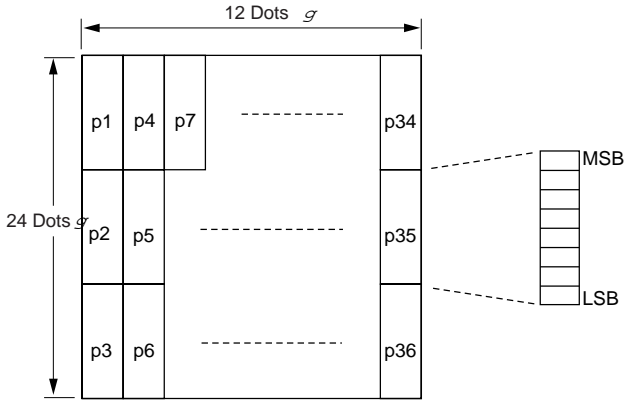
Data are expressed in Hex code.

This command defines download alphanumeric characters.

- s indicates the number of bytes in the vertical direction.
- n indicates the starting character code and m indicates the end character code. If only one character is defined, n is made equal to m.
- Definable character codes are within the range (20) H ~ (7E) H of ASCII code. A total of 95 characters can be defined.
- a indicates the number of horizontal dots that are defined.
- Dn are the defining data and indicate the pattern of “a” dots from the left end in the horizontal direction. The pattern remaining on the right end is filled with spaces.
- Once it is defined, a download character remains valid until it is redefined, until ESC @ is executed, until GS * is executed or until the power is switched OFF.
- It can be known whether characters are downloaded or not by executing ESC v.
(In the case of Serial only.)

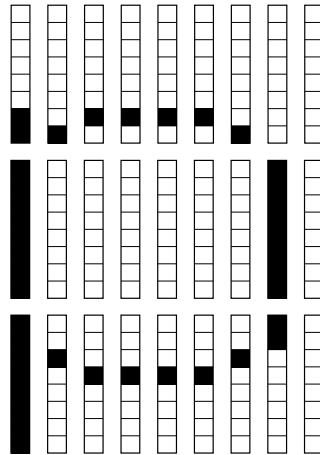
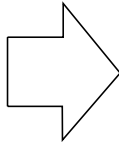
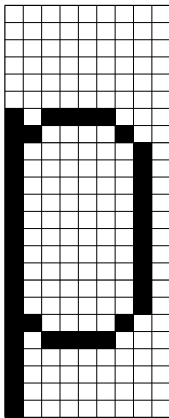
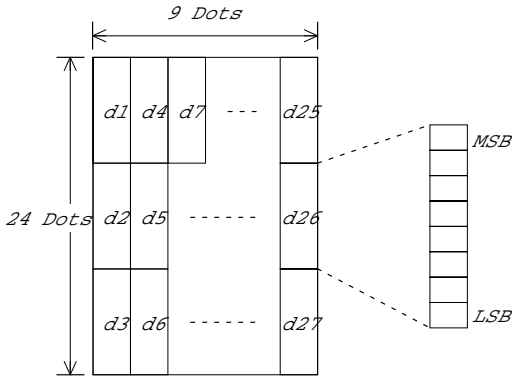
Example

- In the case of Font A



p1=<0F>H	p4=<30>H	p7=<40>H @ @ @ c
p2=<03>H	p5=<80>H	p8=<40>H @ @ @ c
p3=<00>H	p6=<C0>H	p9=<20>H @ @ @ c

- In the case of Font B



$d1 = <03>H @ @ @d4 = <01>H @ @ @d7 = <02>H @$
 $d2 = <FF>H @ @ @d5 = <00>H @ @ @d8 = <00>H @$
 $d3 = <FF>H @ @ @d6 = <20>H @ @ @d9 = <10>H @$

(15) Specifying a bit image (ESC * m n1 n2 D1~Dn)

Code: [1B] h + [2A] h + m + n1 + n2 + Dn

* (m = Bit Image Mode (See the following table.)

(0 n1 FF)

(0 n2 03) Data are expressed in Hex code.

Data are printed in a bit image in accordance with the Bit Image mode specified by m.

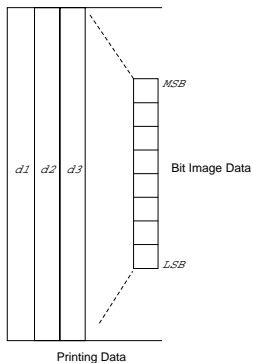
- The number of dots printed in the horizontal direction is divided by 256, with n2 being the product and n1 the remainder.
- The total number of dots printed as the bit image is $n1 + (256 \times n2)$.
- If bit image data which exceed the space of one line are input, the portion of data that runs over the end is dropped.
- Bit image data (Dn) are specified by "1" in printed bits and by "0" in nonprinted bits.
- The Bit Image mode is as shown in the following table.

m(Hex)	Mode	Vertical Direction		Horizontal Direction
		Number of dots	Dot Density	Dot Density
0	8 dot single density	8	67 DPI	101 DPI
1	8 dot double density	8	67 DPI	203 DPI
20	24 dot single density	24	203 DPI	101 DPI
21	24 dot double density	24	203 DPI	203 DPI

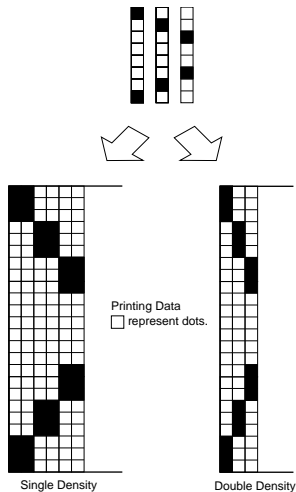
- If they deviate from the conditions of the values set in m (Bit Image mode), n1 and subsequent data are processed as ordinary character data.

Relationship between bit image data and printed dots

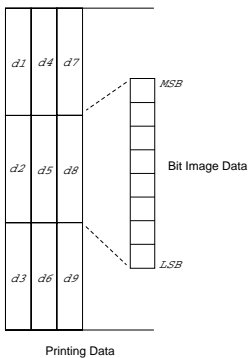
8-dot bit image



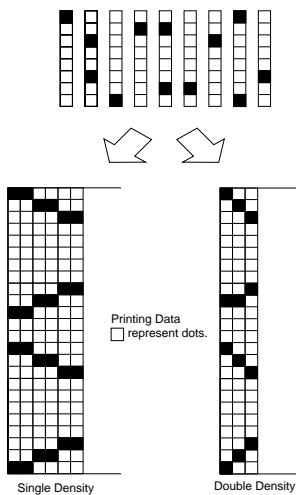
Bit Image Data



24-dot bit image



Bit Image Data



7

(16) Specifying/Clearing underline (ESC - n)

Code: [1B] h + [2D] h + n

* (0 n 02, 30 n 32) Data are expressed in Hex code.

This command specifies or clears underlines.

- Underlines are applied to the full width of all the characters printed, but portions skipped with a horizontal tab (HT) or by a relative/absolute print position specification (ESC (, ESC \$), and characters which are rotated 90 degrees to the right, are not underlined.
- During the printing of Kanji, this underline specification/clearing command cannot be applied.
- The type of underline is distinguished by the value of n, as follows.
n = 0, 30: Underline is cleared.
n = 1, 31: A one dot wide underline is specified.
n = 2, 32: A two dot wide underline is specified.
- The initial value is "n = 0".

(17) Specifying the 1/6 inch line feed amount (ESC 2)

Code: [1B] h + [32] h

Sets the line feed amount at 1/6 inch per line.

- The line feed amount for a set sheet selected by ESC c1 is set by this command.

(18) Specifying the line feed amount (ESC 3 n)

Code: [1B] h + [33] h + n

* (0 n FF) Data are expressed in Hex code.

This command sets the line feed amount per line in [n x basic calculation pitch] inches.

- Sets the line feed amount for a set sheet selected by ESC c1.
- The line feed amount can be set independently for the receipt and journal printers, but if printing of the same data by both the receipt and journal printers is specified, and printing is done in the Page mode, the line feed amount set for the journal printer is disregarded and the amount set for the receipt printer is made valid.
- The line feed amount can be set independently in the Standard mode and the Page mode.
- The basic calculation pitch is set by GS P. Also, once the line feed amount has been set, it does not change even if the basic calculation pitch is changed by GS P.
- If there is a fraction as a result of calculations, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.
- In the Standard mode, the basic calculation pitch (y) for the vertical direction (paper feed direction) is used.
- If used in the Page mode, movement from the starting point is as follows.
 - ① If the starting point is specified as "top left" or "bottom right" by ESC T, the vertical basic calculation pitch (y) (the paper feed direction) is used.
 - ② If the starting point is specified as "top right" or "bottom left" by ESC T, the horizontal basic calculation pitch (x) (perpendicular to the paper feed direction) is used.
- The maximum line feed amount that can be set is 40 inches. Settings that exceed the maximum value are rounded to the maximum value.
- The initial value is a line feed amount corresponding to 1/6 inch.

(19) Controlling data input (ESC = n)

Code: [1B] h + [3D] h + n

* (0 n FF) Data are expressed in Hex code.

- Each bit of n is as shown in the following table.

Bit	Function	Value	
		0	1
0	Printer	Disable	Enable
1	Not defined		
2	Not defined		
3	Not defined		
4	Not defined		
5	Not defined		
6	Not defined		
7	Not defined		

- If the printer is not selected, all the data received are destroyed until the printer is selected by this command.
- Even if the printer is not selected, the printer may, according to its operation, enter the BUSY state.
- The initial value is “n = 1”.

(20) Erasing download characters (ESC ? n)

Code: [1B] h + [3F] h + n

* (20 n 7E) Data are expressed in Hex code.

The download characters with the specified code are erased.

- n indicates the character code that erases the definition pattern. After erasure, printing of the same pattern as internal characters is done.
- The specified code definition patterns of character fonts selected by ESC ! are erased.
- If the specified character code is not defined, this command is disregarded.

(21) Printer initialization (ESC @)

Code: [1B] h + [40] h

Clears data stored in the internal print buffer and sets each setting in its initial state (default state).

- Data in the internal input buffer are not cleared.
- Macro definition contents are not cleared.

(22) Setting the horizontal tab position (ESC D n NUL)

Code: [1B] h + [44] h + n + [00] h

* (1 n FF) Data are expressed in Hex code.

This command sets the horizontal tab position.

- n indicates the number of lines from the left margin to the horizontal tab position.
- The tab position is set at the character width x n position from the top of the line. At this time, the character width includes the space to the right of the character and when the horizontal enlargement rate is 2 or greater, the character width is also made larger corresponding to the enlargement rate.
- The maximum number of places a tab position can be set is 32 positions. Settings exceeding this number are disregarded.
- ESC D NUL clears all the set tab positions. After clearing, the horizontal tab (HT) is disregarded.
- The initial value is every 8 characters for Font A and the amount of right space at 0 (9th column, 17th column...).

(23) Specifying/Clearing bold characters (ESC E n)

Code: [1B] h + [45] h + n

* (0 n FF) Data are expressed in Hex code.

This command specifies and clears bold characters.

- The least significant bit (n0) in n is valid.
- Control by the least significant bit (n0) is as follows.
n0 = 0: Clears bold printing.
n0 = 1: Specifies bold printing.
- This is valid for all characters.
- The dot configuration of bold characters is one dot each added to each character horizontally.

(24) Specifying/Clearing double strike characters (ESC G n)

Code: [1B] h + [47] h + n

* (0 n FF) Data are expressed in Hex code.

This command specifies and clears double strike characters.

- The least significant bit (n0) in n is valid.
- Control by the least significant bit (n0) is as follows.
 - n0 = 0: Clears double strike characters.
 - n0 = 1: Specifies double strike characters.
- In this printer, the effects of double strike printing are the same as those of bold printing.

(25) Printing and paper feeding (ESC J n)

Code: [1B] h + [4A] h + n

* (0 n FF) Data are expressed in Hex code.

This command prints the data in the print buffer and feeds the paper [n x basic calculation pitch] inches.

- After execution, the top of the line becomes the next print position.
- This has no influence on the line feed amount set by ESC 2 or ESC 3.
- The basic calculation pitch is set by GS P.
- If there is a fraction as a result of calculations, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.
- In the Standard mode, the basic calculation pitch (y) for the vertical direction is used.
- If used in the Page mode, movement from the starting point is as follows.
 - ① If the starting point is specified as "top left" or "bottom right" by ESC T, the printing position is moved in the paper feed direction (the vertical direction of the characters). At this time, the vertical basic calculation pitch (y) is used.
 - ② If the starting point is specified as "top right" or "bottom left" by ESC T, the printing position is moved in the direction perpendicular to the paper feed direction (the vertical direction of the characters). At this time, the horizontal basic calculation pitch (x) is used.
- If [n x basic calculation pitch] exceeds 40 inches, the 40 inch portion of the paper feed is executed.

(26) Selecting the page mode (ESC L)

Code: [1B] h + [4C] h

This command switches the printer from the Standard mode to the Page mode.

- This command is valid when it is input at the top of a line.
- This command is invalid when input in the Page mode.
- The printer returns to the Standard mode after printing by FF is completed, or by execution of ESC S.
- The character development position is the starting point specified by ESC T within the printing area specified by ESC W.
- The values set in the following commands which are set independently in the Page mode and the Standard mode, respectively, are switched to the values set in the Page mode.
 - ① Space amount setting ESC SP, FS S
 - ② Line feed amount setting ESC 2, ESC 3
- The following commands are valid only when set in the Page mode.
 - ① ESC V Specifying/Clearing 90 degree right rotated characters.
 - ② ESC a Arranging the position
 - ③ ESC { Specifying/Clearing inverted characters.
 - ④ GS L Setting the left margin.
 - ⑤ GS W Setting the printing area
- The printer is returned to the Standard mode by ESC @.

(27) Selecting international characters (ESC R n)

Code: [1B] h + [52] h + n

* (0 n 0D, n = 40) Data are expressed in Hex code.

This command carries out selection of international characters.

- The international character set is set by the value of n, as shown in the following table.

n(Hex)	Character Set
0	U. S. A.
1	French
2	German
3	U. K.
4	Danish
5	Swedish
6	Italian
7	Spanish
8	Japanese
9	Norwegian
0A	Danish 2
0B	Spanish 2
0C	Latin America
0D	Korean
40	Legal

- The initial value of n becomes the character set of the country specified by the DIP switch.

(28) Selecting the standard mode (ESC S)

Code: [1B] h + [53] h

This command switches the printer from the Page mode to the Standard mode.

- This command is valid only when input in the Page mode.
- Data developed in the Page mode are erased.
- The top of the line is made the next printing position.
- The printing area set by ESC W is initialized.
- The values set in the following commands which are set independently in the Page mode and the Standard mode, respectively, are switched to the values set in the Page mode.

① Space amount setting ESC SP, FS S

② Line feed amount setting ESC 2, ESC 3

(29) Selecting the character printing direction in page mode (ESC T n)

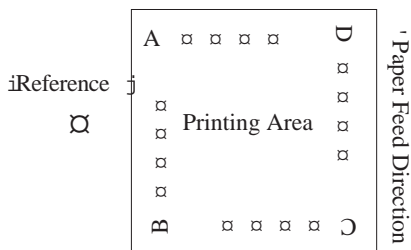
Code: [1B] h + [54] h + n

* (0 n 3)

(30 n 33) Data are expressed in Hex code.

This command selects the character printing direction and starting point in the Page mode.

n	Printing Direction	Starting Point
0, 30	Left to Right	Top Left (A in diagram at right)
1, 31	Bottom to Top	Bottom Left (B in diagram at right)
2, 32	Right to Left	Bottom Right (C in diagram at right)
3, 33	Top to Bottom	Top Right (D in diagram at right)



- If this command is input while Standard mode is selected, the printer's internal flag operation only is executed. In this case, it has no influence on printing in the Standard mode.
- The character development position becomes the starting point within the printing area set by ESC W.
- The basic calculation pitch (x or y) used in the following commands differs according to the starting point.
 - ① If the starting point is "top left" or "bottom right," (characters are developed in the direction perpendicular to the paper feed direction)
 - Commands which use x: ESC SP, ESC \$, ESC \
 - Commands which use y: ESC 3, ESC J, GS \$, GS \
 - ② If the starting point is "top right" or "bottom left," (characters are developed in the paper feed direction)
 - Commands which use x: ESC 3, ESC J, GS \$, GS \
 - Commands which use y: ESC SP, ESC \$, ESC \
- The initial value is "n = 0".

(30) Specifying/Clearing 90 degree right rotated characters (ESC V n)

Code: [1B] h + [56] h + n

* (0 n 1, 30 n 31) Data are expressed in Hex code.

This command specifies or clears 90 degree right rotated characters.

- 90 degree right rotated characters cannot be underlined.
- The following is determined by the value of n.
 - n = 0, 30: 90 degree right rotated characters are cleared.
 - n = 1, 31: 90 degree right rotated characters are specified.
- If this command is input when Page mode is selected, the printer's internal flag only operates and there is no influence on the Page mode.
- The initial value is "n = 0".

(31) Setting the printing area in the page mode (ESC W)

Code: [1B] h + [57] h + x1 x2 y1 y2 dx1 dx2 dy1 dy2

* 0 x1 x2 y1 y2 dx1 dx2 dy1 dy2 FF

However, except when dx1 = dx2 = 0 or dy1 = dy2 = 0.

Sets the printing area position and size.

Horizontal Starting Point = [(x1 + x2 x 256) x basic calculation pitch] inches

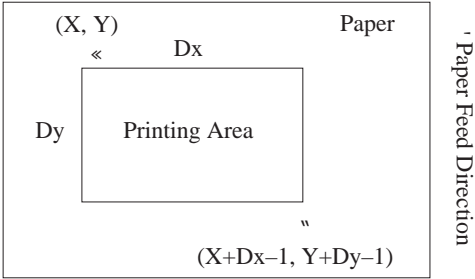
Vertical Starting Point = [(y1 + y2 x 256) x basic calculation pitch] inches

Horizontal Length = [(dx1 + dx2 x 256) x basic calculation pitch] inches

Vertical Length = [(dy1 + dy2 x 256) x basic calculation pitch] inches

- If this command is input when the Standard mode is selected, the printer's internal flag operations only are executed. In this case, Standard mode printing is not influenced.
- If the horizontal starting point or the vertical starting point is outside the area where printing is possible, command processing is terminated and the next data are processed as ordinary data.
- If the horizontal length or vertical length is 0, command processing is terminated and the next data are processed as ordinary data.
- The character development position is the starting point in the printing area specified by ESC T.
- If (horizontal starting point + horizontal length) exceed the area that can be printed in the horizontal direction, (the printable area in the horizontal direction - the horizontal starting point) is made the horizontal length.
- If (vertical starting point + vertical length) exceed the area that can be printed in the vertical direction, (the printable area in the vertical direction - the vertical length) is made the vertical length.
- The basic calculation pitch is set by GS P. Also, once the printing area has been set, it will not change even if the basic calculation pitch is changed by GS P.

- If there is a fraction as a result of calculations, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.
- The basic calculation pitch (x) is used in calculating the horizontal starting point and the horizontal length and the basic calculation pitch (y) is used in calculating the vertical starting point and the vertical length.
- If X is the horizontal starting point, Y is the vertical starting point, Dx is the horizontal length and Dy is the vertical length, the printing area becomes as shown in the following diagram.



- The area which this printer can print is a 432/203 inch in the horizontal direction and 938/203 inch in the vertical direction.
- The initial values are $x1 = x2 = y1 = y2 = 0$, $dx1 = b0$, $dx2 = 01$, $dy1 = AA$ and $dy2 = 03$.

(32) Specifying the relative printing position (ESC \ n1 n2)

Code: [1B] h + [5C] h + n1 + n2

* (0 n1 FF)

(0 n2 FF) Data are expressed in Hex code.

This command specifies the next printing start position with the current position as the reference point. the next printing start position is a position $[(n1 + n2 \times 256) \times \text{basic calculation pitch}]$ inches from the current position.

- This command is disregarded if the specification exceeds the printing area.
- If a position is specified which is to the right of the current position with respect to the character orientation, the value is a positive number (plus), and if a position is specified which is to the left, the value is a negative number (minus).
- Negative numbers are expressed as a complement of 65536.
For example, if shifting by N pitch to the left, this is expressed by $n1 + n2 \times 256 = 65536 - N$.
- The basic calculation pitch is set by GS P.
- If there is a fraction as a result of calculations, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.
- The horizontal basic calculation pitch (x) is used in the Standard mode.
- In the Page mode, operation is as follows according to the starting point.
 - ① If the starting point is specified as "top left" or "bottom right" by ESC T, the relative position in the direction perpendicular to paper feed (the characters' horizontal direction) is specified. At this time, the horizontal basic calculation pitch (x) is used.
 - ② If the starting point is specified as "top right" or "bottom left" by ESC T, the relative position in the paper feed direction (the characters' horizontal direction) is specified. At this time, the horizontal basic calculation pitch (y) is used.

(33) Arranging the printing position (ESC a n)

Code: [1B] h + [61] h + n

* (0 n 2, 30 n 32) Data are expressed in Hex code.

- This command arranges all the print data on one line in specified positions.
- Printing arrangement is executed as follows in accordance with the value of n.
n = 0, 30: Specifies left alignment.
n = 1, 31: Specifies centering.
n = 2, 32: Specifies right alignment.
- This command is valid only if input at the head of a line.
- If this command is input when selecting the Page mode, the printer's internal flag only is operated.
- This command does not influence the Page mode.
- The initial value is "n = 0".

(34) Selecting the printing sheet (ESC c 0 n)

Code: [1B] h + [63] h + [30] h + n

* (1 n 3) Data are expressed in Hex code.

Selects the sheet (receipt/journal) which is printed.

- Each bit of n is as shown in the following table.

Bit	Function	Value	
		0	1
0	Journal	Disable	Enable
1	Receipt	Disable	Enable
2	Not defined		
3	Not defined		
4	Not defined		
5	Not defined		
6	Not defined		
7	Not defined		

- This command is valid if input at the head of a line.
- If a Page mode printing sheet is selected, execute this command before ESC L. Once the Page mode is selected, this command is disregarded.
- If the value of n deviates from the definition range, this command is disregarded.
- The initial value is "n = 3".

(35) Selecting the setting sheet (ESC c 1 n)

Code: [1B] h + [63] h + [31] h + n

* (1 n 3) Data are expressed in Hex code.

Selects the sheet which is the object of line feed settings set by ESC 2 and ESC 3.

- Each bit of n is as shown in the following table.

Bit	Function	Value	
		0	1
0	Journal	Disable	Enable
1	Receipt	Disable	Enable
2	Not defined		
3	Not defined		
4	Not defined		
5	Not defined		
6	Not defined		
7	Not defined		

- If the value of n deviates from the definition range, this command is disregarded.
- The initial value is “n = 3”.

(36) Selecting an effective paper end sensor for outputting the paper end signal (ESC c 3 n)

Code: [1B] h + [63] h + [33] h + n

* (0 n FF) Data are expressed in Hex code.

Selects which state of which sensor for outputting to the Centronics parallel interface PE signal.

Bit	Function	Value	
		0	1
0	Journal Near End Sensor	Disable	Enable
1	Receipt Near End Sensor	Disable	Enable
2	Journal End Sensor	Disable	Enable
3	Receipt End Sensor	Disable	Enable
4	Not defined		
5	Not defined		
6	Not defined		
7	Not defined		

- The initial value is “n = 3”.

[Note] This is valid for the parallel interface only.

(37) Selecting the paper end sensor that is effective for stopping printing (ESC c 4 n)

Code: [1B] h + [63] h + [34] h + n

* (0 n FF) Data are expressed in Hex code.

Selects which paper end sensor will stop printing.

Bit	Function	Value	
		0	1
0	Journal Near End Sensor	Disable	Enable
1	Receipt Near End Sensor	Disable	Enable
2	Not defined		
3	Not defined		
4	Not defined		
5	Not defined		
6	Not defined		
7	Not defined		

- Even if the sensor which has been enabled senses the paper end, if printing of that sheet is disabled, printing will not stop.
- If multiple sensors have been specified as enabled, printing will stop when any one of the sensors detects the paper end.
- If printing is stopped, the print operation actually stops after the current line has been printed and paper feed has been completed.
- If paper end is detected by the journal or receipt sensor, the printer goes off-line after printing stops.
- The initial value is the state specified in the menu setting.

(38) Enabling/Disabling the panel switch (ESC c 5 n)

Code: [1B] h + [63] h + [35] h + n

* (0 n FF) Data are expressed in Hex code.

This command enables or disables the paper feed key (Receipt/Journal key).

- In n, the least significant bit (n0) becomes enabled.
- The least significant bit (n0) is as follows.
n0 = 0: Enables the paper feed key.
n0 = 1: Disables the paper feed key.
- The paper feed key is enabled regardless of this setting when the cover is open.
- The initial value is "n0 = 0".

(39) Print and feed paper n lines (ESC d n)

Code: [1B] h + [64] h + n

* (0 n FF) Data are expressed in Hex code.

This command prints the data in the print buffer and feeds the paper n lines.

- The set amount does not remain.
- The next printing start position is the head of the line.
- If the paper feed amount exceeds 40 inches, paper feeding of 40 inches only is executed.

(40) Full cut (ESC I)

Code: [1B] h + [69] h

Executes a full cut of the receipt paper.

- This command is valid only if it is input at the head of a line.

(41) Partial cut (ESC m)

Code: [1B] h + [6D] h

Executes a partial cut (one point is left) of the receipt paper.

- This command is valid only if it is input at the head of a line.

(42) Generates a specification pulse (ESC p m n1 n2)

Code: [1B] h + [70] h + m + n1 + n2

* (0 n1 FF)

(0 n2 FF) Data are expressed in Hex code.

This command outputs the signals specified in n1 and n2 to connector pin m.

- The m bit (m0) is as follows.
m0 = 0: Drawer kick No. 2 pin
m0 = 1: Drawer kick No. 5 pin
- On time is n1 x 2 ms and Off time is n2 x 2 ms.
- If n2 is smaller than n1, Off time is made n1 x 2 ms.

(43) Selecting the character code table (ESC t n)

Code: [1B] h + [74] h + n

* (0 ≤ n ≤ 6, n = FF) Data are expressed in Hex code.

Selects the page n of the character code table.

n	Character Type
0	PC437 (USA)
1	Katakana
2	PC850 (Multilingual)
3	PC860 (Portuguese)
4	PC863 (Canadian-French)
5	PC865 (Nordic)
6	PC858 (Multilingual II)
FF	Blank page

- The initial value is “n = 0 or 2”. Depending on the setting of DIP switch.

See page 25

(44) Peripheral sevice status signal (ESC u n)

Code: [1B] h + [75] h + n

* (n = 0)

Sends the current status of pin No. 3 of the drawer kick connector.

- n is as follows.
n = 0: Drawer kick connector pin No. 3.
- The status sent is 1 byte. The contents are as shown in the following table.
- If nothing is connected to the connector, bit 0 of n is always "1."
- In the case of DTR/DSR control, after confirming that the host is ready to receive (the DSR signal is High), one byte only is sent. In the case of XON/XOFF control, one byte only is sent without confirming the status of the DSR signal.
- In the case of DTR/DSR control, if the host is not ready to receive (the DSR signal is Low), it waits until the host is ready to receive.

Bit	Function	Value	
		0	1
0	Level of Pin No. 3	"L"	"H"
1	Not defined		
2	Not defined		
3	Not defined		
4	Not used	Fixed at 0	
5	Not defined		
6	Not defined		
7	Not defined		

[Note] This is valid only with the Serial interface.

(45) Sending the printer status (ESC v)

Code: [1B] h + [76] h + n

This command sends the current printer status.

- The status sent is 1 byte. The contents are as shown in the following table.
- In the case of DTS/DSR control, after confirming that the host is ready to receive (the DSR signal is High), one byte only is sent. In the case of XON/XOFF control, one byte only is sent without confirming the status of the DSR signal.
- In the case of DTR/DSR control, if the host is not ready to receive (the DSR signal is Low), it waits until the host is ready to receive.

Bit	Function	Value	
		0	1
0	Journal near end sensor	Paper present	No paper
1	Receipt near end sensor	Paper present	No paper
2	Journal near end sensor	Paper present	No paper
3	Receipt end sensor	Paper present	No paper
4	Not used	Fixed at 0	
5	Downloading of character	No downloading	Downloading
6	Downloading of bit image	No downloading	Downloading
7	Not used	Fixed at 0	

[Note] This is valid only with the Serial interface.

(46) Specifying/Clearing printing of the same data by the receipt and journal printers (ESC z n)

Code: [1B] h + [7A] h + n

* (0 n FF) Data are expressed in Hex code.

This command specifies and clears the printing of the same data by the receipt and journal printers.

- In n, the least significant bit (n0) becomes enabled.
- The least significant bit (n0) is as follows.
n0 = 0: Printing of the same data is cleared.
n0 = 1: Printing of the same data is specified.
- This command is valid when it is input at the head of a line.
- Even if printing of the same data is specified, if both the receipt and journal printers are not selected as the printing sheet, the printing will not be the same for both printers.
- When Page mode is selected, this command is disabled.
- The initial value is “n0 = 0”.

(47) Specifying/Clearing inverted characters (ESC { n)

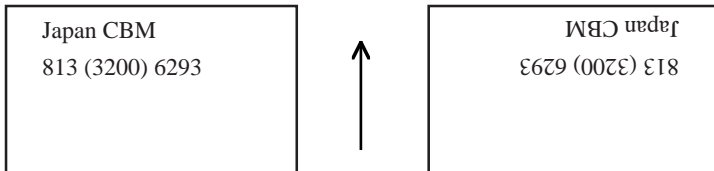
Code: [1B] h + [7B] h + n

* (0 n FF) Data are expressed in Hex code.

In n, the least significant bit (n0) becomes enabled.

- The least significant bit (n0) is as follows.
n0 = 0: Inverted characters are cleared.
n0 = 1: Inverted characters are specified.
- This command is valid when it is input at the head of a line.
- If this command is input when Page mode is selected, the printer's internal flag only operates, and there is no influence in the Page mode.
- The initial value is “n0 = 0”.
- The following shows a printing example.

If inverted characters are cleared: @ If inverted characters are specified: @



Paper Feed Direction @ @

(48) Specifying the character size (GS ! n)

Code: [1D] h + [21] h + n

* (0 n FF) Data are expressed in Hex code.

However, 1 Vertical Enlargement Rate 8,

1 Horizontal Enlargement Rate 8

This command specifies the character size (vertical enlargement rate/horizontal enlargement rate).

Bit	Function	Value	Enlargement Rate
0	Vertical enlargement rate specification	See the following Table 1.	
1			
2			
3			
4	Horizontal enlargement rate specification	See the following Table 2.	
5			
6			
7			

Table 1 (Vertical Enlargement Rate)

3210 Bits	Value	Enlargement Rate
000B	00	Normal Size
0001B	01	2 times
0010B	02	3 times
0011B	03	4 times
0100B	04	5 times
0101B	05	6 times
0110B	06	7 times
0111B	07	8 times

Table 2 (Horizontal Enlargement Rate)

7654 Bits	Value	Enlargement Rate
000B	00	Normal Size
0001B	01	2 times
0010B	02	3 times
0011B	03	4 times
0100B	04	5 times
0101B	05	6 times
0110B	06	7 times
0111B	07	8 times

- Except for HRI characters, this command is valid for all characters.
- If the setting of either the vertical enlargement rate or the horizontal enlargement rate deviates from the definition range, this command is disregarded.
- In the Standard mode, the vertical direction indicates the paper feed direction and the horizontal direction indicates the direction perpendicular to the paper feed direction. Therefore, in specifying 90 degree rotated characters, the vertical-horizontal relationship with respect to the characters is reversed.
- In the Page mode, the vertical direction indicates the vertical direction with respect to the characters and the horizontal direction indicates the horizontal direction with respect to the characters.
- If characters with a different vertical enlargement rate are mixed on the same line, they are arranged along the base line.
- Horizontal and vertical double enlargement can also be specified and cleared by ESC !, but the command that was processed last becomes the valid command.
- The initial value is “n = 0”.

(49) Specifying the character vertical absolute position in the page mode (GS \$ n1 n2)

Code: [1D] h + [24] h + n1 + n2

* (0 n1 FF)

(0 n2 FF) Data are expressed in Hex code.

In the Page mode, this command specifies the position in the characters' vertical direction of the data development start position as an absolute position with the starting point as the reference. The position in the characters' vertical direction of the next data development start position is a position $[(n1 + n2 \times 256) \times \text{basic calculation pitch}]$ inch from the starting point.

- This command is disregarded when a mode other than the Page mode is selected.
- An absolute position specification which exceeds the specified print area is disregarded.
- The data development start position does not shift in the characters' horizontal direction.
- The starting point used as the reference is specified by ESC T.
- Movements from the starting point specified by ESC T are as follows.
 - ① If “top left” or “bottom right” is specified as the starting point, the absolute position in the paper feed direction (characters' vertical direction) is specified. At this time, the vertical basic calculation pitch (y) is used.
 - ② If “top right” or “bottom left” is specified as the starting point, the absolute position in the direction perpendicular to the paper feed direction (characters' vertical direction) is specified. At this time, the horizontal basic calculation pitch (x) is used.
- The basic calculation pitch is set by GS P.
- If there is a fraction, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.

(50) Defining a downloaded bit image (GS * n1 n2 Dn)

Code: [1D] h + [2A] h + n1 + n2 + Dn

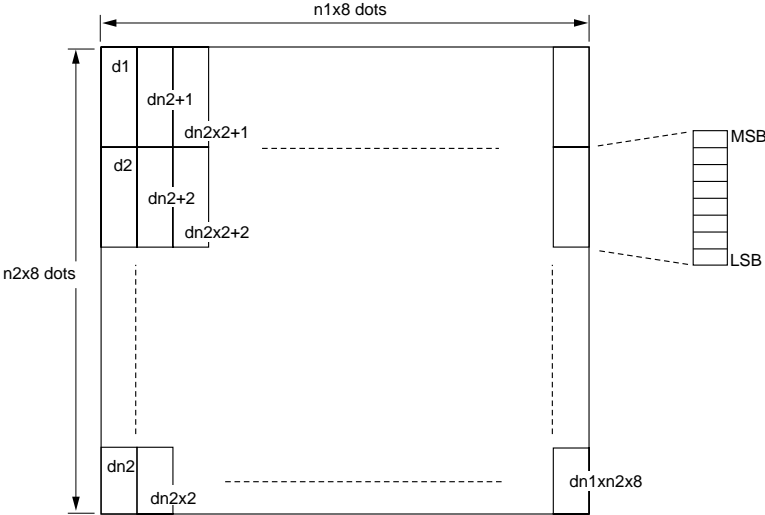
* (1 n1 FF)

(1 n2 30)

(n1 x n2 600) Data are expressed in Hex code.

This command defines a downloaded bit image with the number of dots specified in n1 and n2.

- The number of dots in the horizontal direction is n1 x 8 and the number of dots in the vertical direction is n2 x 8.
- Dn is the bit image data.
- Once a downloaded bit image has been defined, it is valid until it is redefined, ESC @ is executed, ESC & is executed or the power is switched OFF.
- Downloaded characters and a downloaded bit image cannot be defined at the same time. If this command is executed, contents defining a downloaded character are cleared.
- The relationship between bit image data and defined dots is shown in the following diagram.



(51) Printing a downloaded bit image (GS / m)

Code: [1D] h + [2F] h + m

* (0 m 3, 30 m 33) Data are expressed in Hex code.

This command prints a downloaded bit image in the mode specified by m.

- The modes selected by m are as shown in the following table.

m	Mode Name	Vertical Dot Density	Horizontal Dot Density
0,30	Normal Mode	203 DPI	203 DPI
1,31	Horizontal Double Mode	203 DPI	101 DPI
2,32	Vertical Double Mode	101 DPI	203 DPI
3,33	Quadruple Mode	101 DPI	101 DPI

- If data exist in the print buffer, this command is disregarded.
- If a downloaded bit image is not defined, this command is disregarded.
- The portion of a downloaded bit image that exceeds the length of a line is not printed.

(52) Starting and ending a macro definition (GS :)

Code: [1D] h + [3A] h

This command specifies starting and ending of a macro definition.

- Up to 2048 bytes can be used as contents in defining a macro. Any portion where this 2048 bytes is exceeded is not defined.
- The definition contents are not cleared even when ESC @ (printer initiation) is executed, so ESC @ can be included in the contents of a macro definition.
- Ordinary printing operations can be executed in the middle of macro definition.
- A “macro” is a string of commands corresponding to the user's purpose, taken from the control commands of this printer, which are arranged to form a single command in order to carry out daily operations efficiently. They can be used in exactly the same way as existing commands can be used.

(53) Specifying/Clearing Black/White reverse printing (GS B n)

Code: [1D] h + [42] h + n

* (0 n FF) Data are expressed in Hex code.

This command specifies or clears printing of black/white reversed characters.

- In n, the least significant bit (n0) becomes enabled.
The least significant bit (n0) is as follows.
n0 = 0: Clears printing of black/white reversed characters.
n0 = 1: Specifies printing of black/white reversed characters.
- Internal characters and downloaded characters can be printed as black/white reversed characters.
- The space to the right of characters, set by ESC SP, is also the object of black/white reversed printing.
- Bit images, downloaded bit images, bar codes, HRI characters and portions skipped due to HT, ESC \$, ESC (are not influenced.
- Spaces between lines are not influenced.
- Specification of black/white reversed printing has priority over underline specifications. Therefore, underlines are not added to black/white reversed characters, even when underline is specified. However, the underline setting state does not change.
- The initial value is “n0 = 0”.

(54) Selecting the HRI character print position (GS H n)

Code: [1D] h + [48] h + n

* (0 n 3, 30 n 33) Data are expressed in Hex code.

This command selects the HRI character print position when a bar code is printed.

- n has the meanings in the following table.

n (Hex)	Print Position
0,30	No printing
1,31	Above the bar code
2,32	Below the bar code
3,33	Both above and below the bar code

- HRI characters are printed in the font selected by GS f.
- The initial value is “n = 0”.

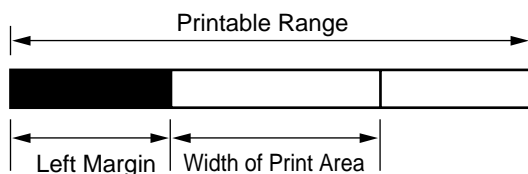
(55) Setting the left margin (GS L n1 n2)

Code: [1D] h + [4C] h + n1 + n2

* (0 n1 FF)

(0 n2 FF) Data are expressed in Hex code.

This command sets the left margin specified by n1 and n2.

The left margin is $[(n1 + n2 \times 256) \times \text{basic calculation pitch}]$ inch.

- This command is valid only when input at the head of a line.
- When Page mode is selected, if this command is input, the printer's internal flag operation only is executed.
- Setting of this command has no influence on the Page mode.
- The maximum settable left margin is the same as the area in the horizontal direction that can be printed. Settings that exceed the maximum value are rounded to the maximum value.
- The basic calculation pitch is set by GS P. Also, once the left margin is set, it will not change even if the basic calculation pitch is changed by GS P.
- The horizontal basic calculation pitch (x) in GS P is used in calculating the left margin. Also, if there is a fraction, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.
- The left margin is set for the set sheet selected as valid by ESC c 1.
- The left margin can be set independently for the receipt and journal printers, but if printing of the same data in the receipt and journal printers is specified, the left margin set in the journal printer is disregarded and that set in the receipt printer is enabled.
- The initial values are "n1 = 0" and "n2 = 2".

(56) Specifying/Clearing reduced character printing (GS M n)

Code: [1D] h + [4D] h + n

* (0 n FF) Data are expressed in Hex code.

However, bits 1, 2, 4, 5, and 6 should be 0.

This command specifies or clears printing of reduced characters.

Bit	Function	0	1
0	Reduced Character Printing in the Vertical Direction	Clear	Specify
1	Not used	Fixed at 0	
2	Not used	Fixed at 0	
3	Not defined	—	
4	Not used	Fixed at 0	
5	Not used	Fixed at 0	
6	Not used	Fixed at 0	
7	Not defined	—	

- This command is valid for printing of all characters except HRI characters.
- The reduction rate is 50%.
- Specification and clearing of printing reduced characters has no influence on the line feed amount.
- If printing of reduced characters in the vertical direction is specified in the Standard mode, then reduced characters are printed in the paper feed direction. Therefore, 90 degree right rotated characters are reduced in the characters' horizontal direction.
- If printing of reduced characters in the vertical direction is specified in the Page mode, then reduced characters are printed in the characters' vertical direction without relation to the printing direction selected by ESC T.
- If characters of different vertical sizes are mixed on the same line, they are arranged along the printing base line.
- If reduction printing is specified, underlines are not added, even when underlines are specified. However, the underline specifications are not cleared. Also, if an underline is specified or cleared in the middle of a reduced printing specification, the printer's internal flag operation only is executed.
- Characters with a high dot density may be difficult to read clearly.
- The initial value is "n = 0".

(57) Setting the basic calculation pitch (GS P x y)

Code: [ID] h + [50] h + x + y

* (0 x FF)

(0 y FF) Data are expressed in Hex code.

This command sets the basic calculation pitch in the horizontal direction at (1/x) inch and the basic calculation pitch in the vertical direction at (1/y) inch.

When $x = 0$, the horizontal basic calculation pitch returns to the initial value.

When $y = 0$, the vertical basic calculation pitch returns to the initial value.

- The vertical direction indicates the direction perpendicular to the paper feed direction, and the vertical direction indicates the paper feed direction.
- In the Standard mode, the parameters shown below are used without relationship to the characters' direction (inverted, rotated 90 degrees to the right, etc.).
 - ① Commands using x: ESC SP, ESC \$, ESC \, FS S, GS L, GS W
 - ② Commands using y: ESC 3, ESC J
- In the Page mode, the parameters shown below are used according to the characters' direction.
 - ① If the starting point is “top left” or “bottom right” by ESC T, (characters are developed in the direction perpendicular to the paper feed direction),
 - Commands using x: ESC SP, ESC \$, ESC W, ESC \, FS S
 - Commands using y: ESC 3, ESC J, ESC W, GS \$, GS \
 - ② If the starting point is “bottom right” or “top left,” (characters are developed in the paper feed direction)
 - Commands using x: ESC 3, ESC J, ESC W, GS \$, GS \
 - Commands using y: ESC SP, ESC \$, ESC W, ESC \, FS S
- Even when this command is executed, it has no influence on the various values that are already set.
- If there is a fraction as a result of calculations combined with other commands, interpolation is carried out at the mechanism's minimum pitch and remainders are cut off.
- The initial values are “x = 203” and “y = 203”.

(58) Cutting of paper (GS V m, GS V m n)

Code: ① [1D] h + [56] h + m

② [1D] h + [56] h + m + n

* ① (0 m 1)

(30 m 31) Data are expressed in Hex code.

② (41 m 42)

(0 n FF) Data are expressed in Hex code.

This command executes the specified paper cut.

m	Function
0,30	Full Cut
1,31	Partial Cut (1 point left)
41	(Cutting position + [n x basic calculation pitch]) paper feed and full cut.
42	(Cutting position + [n x basic calculation pitch]) paper feed and partial cut (1 point left).

- In the Standard mode, this command is valid only if it is input at the head of the line.

In the case of ①:

- When m = 1 or m = 31, a partial cut (1 point left) is executed.

In the case of ②:

- When n = 0, after executing paper feed to the cutting position, the paper is cut.
- When n (0, after executing paper feed [n x basic calculation pitch] inch from the cutting position, the paper is cut.
- The basic calculation pitch is set by GS P.
- The paper feed amount is calculated by the vertical basic calculation pitch (y). Also, if there is a fraction, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.

(59) Setting the print area width (GS W n1 n2)

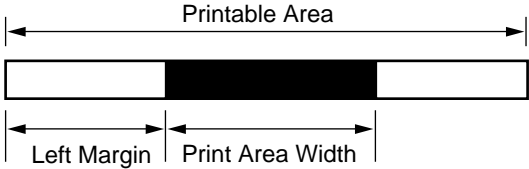
Code: [1D] h + [57] h + n1 + n2

* (0 n1 FF)

(0 n2 FF) Data are expressed in Hex code.

This command sets the print area width specified by n1 and n2.

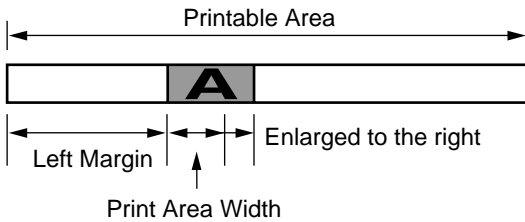
- The print area width is [(n1 + n2 x 256) x Basic calculation pitch] inch.



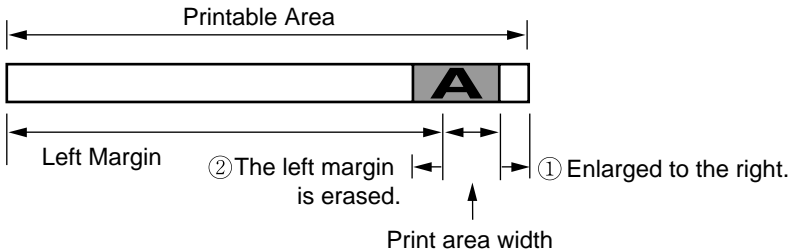
- This command is valid if it is input at the head of the line.
- When the Page mode is selected, if this command is input, the printer's internal flag operation only is executed.
- Setting of this command has no influence on the Page mode.
- The print area width is set for a setting sheet enabled by ESC c 1.
- The print area width of the receipt and journal printers can be set independently, but if printing of the same data in both the receipt and journal printers is specified, the print area width set in the journal printer is disregarded and the setting of the receipt printer is enabled.
- If a value which exceeds the printable area of one line is input, it is set with the entire area except the left margin used as the print area width.
- The basic calculation pitch is set by GS P. Also, once the print area width has been set, it will not change even if the basic calculation pitch is changed by GS P.
- The horizontal basic calculation pitch (x) in GS P is used in calculating the print area width. Also, if there is a fraction in the calculation results, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.

- When the first character at the head of a line is developed, if the print area width is too small for the horizontal width of the character you are attempting to develop (including the right space), the following processing is carried out for that line only.

- The printer enlarges the print area to the right to a size where that character can fit as long as it doesn't exceed the printable area.



- If a sufficient amount of space still cannot be secured by the processing in ①, the print area is enlarged to the left (the left margin is reduced).



- If a sufficient amount of space still cannot be secured by the processing in ②, the right space is erased.

- When developing a bit image (or a downloaded bit image), if the print area width does not fill the bit image's minimum horizontal width (2 dots for single density, 1 dot for double density), the following processing is carried out for that line only.

- The print area is enlarged to the right until it is equal to the minimum horizontal width of the bit image, as long as it doesn't exceed the printable area.
 - If a sufficient amount of space still cannot be secured by the processing in 1, the print area is enlarged to the left (the left margin is reduced).
- The initial value is "n1 = B0", "n2 = 1".

(60) Specifying the relative position of characters in the vertical direction in the page mode (GS \ n1 n2)

Code: [1D] h + [5C] h + n1 + n2

* (0 n1 FF)

(0 n2 FF) Data are expressed in Hex code.

This command specifies the position in the characters' vertical direction of the data development start position as the relative position with the current position as the reference, in the Page mode. The next data development start position is the position after shifting from the current position [(n1 + n2 x 256) x basic calculation pitch] inch.

- This command is disregarded except when the Page mode is selected.
- If the downward direction from the current position, with respect to the characters, is specified, the value is a positive number (plus). If the upward direction is specified, the value is a negative number (minus).
- Negative numbers are expressed as a complement of 65,536.
For example, if moving in the upward direction by N pitch,
 $n1 + n2 \times 256 = 65536 - N$.
- A relative position which exceeds the specified print area is disregarded.
- Operation according to the starting point by ESC T is as follows.
 - ① If the starting point is specified as “top left” or “bottom right”, the relative position in the paper feed direction (vertical direction of the characters) is specified. At this time, the vertical basic calculation pitch (y) is used.
 - ② If the starting point is specified as “top right” or “bottom left”, the relative position in the direction perpendicular to the paper feed direction (vertical direction of the characters) is specified. At this time, the horizontal basic calculation pitch (x) is used.
- The basic calculation pitch is set by GS P.
- If there is a fraction, interpolation is carried out at the mechanism's minimum pitch. Remainders are cut off.

(61) Execution of a macro (GS ^ n1 n2 n3)

Code: [1D] h + [5E] h + n1 + n2 + n3

* (0 n1 FF)

(0 n2 FF)

(0 n3 1) Data are expressed in Hex code.

This command executes the contents defined by a macro.

- The meanings of n1~n3 are as follows.
 - n1: Number of times the macro is executed.
 - n2: Wait time when a macro is executed.
The printer waits n2 x 100 msec each time a macro is executed.
 - n3: Macro execution mode
 - n3 = 0: Specifies continuous execution.
 - n3 = 1: Specifies execution when the paper feed key is pressed.
- Continuous Execution: The macro is executed continuously the number of times in n1, with the time interval specified in n2 inserted between executions.
- Execution by pressing the paper feed key: After waiting the length of time specified in n2, the ERROR indicator blinks and the printer waits for the paper feed key to be pressed. When the key is pressed, the macro is executed one time. This operation is repeated the number of times specified in n1.
- If this command is received during macro definition, it means that the macro definition is terminated. At this time, the contents of the definition are cleared.
- If the macro is not defined or if n1 = 0, nothing is executed.
- During execution of a macro in the case that n3 = 1, paper feed cannot be done using the paper feed switch.
- During the time the printer is waiting for macro execution, the ERROR indicator blinks.

(62) Enabling/Disabling automatic sending of the status (GS a n)

Code: [1D] h + [61] h + n

* (0 n FF) Data are expressed in Hex code.

This command selects the status that is the object of automatic status sending (ASB: Automatic Status Back).

Bit	Status that is Object of ASB	Value	
		0	1
0	Status of drawer kick connector pin No. 3.	Disable	Enable
1	On-line	Disable	Enable
2	Error status	Disable	Enable
3	Paper sensor	Disable	Enable
4	Not defined	—	—
5	Not defined	—	—
6	Not defined	—	—
7	Not defined	—	—

- If even one of the status items is enabled, the printer sends the status when this command is executed. After that, each time a status that is enabled changes, that status is sent. At that time, each status expresses the current status, so it is possible that a status that is not enabled for ASB will change.
- If every status is disabled, the auto status sending function (ASB function) is disabled.
- If the ASB function in the initial state is enabled, the status at the point when communications were first enabled after the power was switched on is sent.
- The 4-byte status shown below is sent without confirm whether the host is ready to receive or not. Except for the XOFF code, the 4-byte status is always continuous.
- This command is executed when the receiving buffer is developed, so there is a possibility of delay between the reception of the command and sending of the status due to the status of the receiving buffer.
- Even at times when the printer specification is disabled due to peripheral device selection (ESC =), if the status changes, the 4-byte status is sent.

- If DLE EOT, GS I and GS r are used, it is necessary to distinguish between the status from these commands and the ASB status. For the identification method, see pages 49 ~ 51.

① First Byte (Printer Information)

Bit	Status	Value	
		0	1
0	Not used	0	—
1	Not used	0	—
2	Drawer kick connector pin No. 3 status	LOW	HIGH
3	On-line/Off-line status	On-line	Off-line
4	Not used	—	1
5	Cover status	Closed	Open
6	Paper feed status from paper feed switch	Paper not feeding	Paper feeding
7	Not used	0	—

② Second Byte (Error Occurrence Information)

Bit	Status	Value	
		0	1
0	Not defined	—	—
1	Not defined	—	—
2	Not defined	—	—
3	Auto cutter error	No error	Error
4	Not used	0	—
5	Irrecoverable error	No error	Error
6	Auto recovery error	No error	Error
7	Not used	0	—

③ Third Byte (Paper Sensor Information)

Bit	Status	Value	
		0	1
0	Journal near end sensor status	Paper present	No paper
1	Receipt near end sensor status	Paper present	No paper
2	Journal end sensor status	Paper present	No paper
3	Receipt end sensor status	Paper present	No paper
4	Not used	0	—
5	Not defined	—	—
6	Not defined	—	—
7	Not used	0	—

④ Fourth Byte (Paper Sensor Information)

Bit	Status	Value	
		0	1
0	Not defined	—	—
1	Not defined	—	—
2	Not defined	—	—
3	Not defined	—	—
4	Not used	0	—
5	Not defined	—	—
6	Not defined	—	—
7	Not used	0	—

- The initial value is “n = 0” when menu setting error handshake is BUSY and “n = 2” when menu setting error handshake is disregarded.

(63) Selecting the font of HRI characters (GS f n)

Code: [1D] h + [66] h + n

* (0 n 1, 30 n 31) Data are expressed in Hex code.

This command selects the font of HRI characters when printing a bar code.

- n has the following meanings.

n(Hex)	Font
0, 30	Font A
1, 31	Font B

- The initial value is “n = 0”.

(64) Selecting the bar code height (GS h n)

Code: [1D] h + [68] h + n

* (1 n FF) Data are expressed in Hex code.

This command selects the bar code height.

- n indicates the number of dots in the vertical direction.
- The initial value is “n = A2”.

(65) Printing bar codes. (GS kn 1 Dn NUL)

Code: [1D] h + [6B] h + n1 + Ds + [00] h1

0 n1 6 Data are expressed in Hex code.

Code: [1D] h + [6B] h + n1 + s + Ds2

41 n1 49

* Data are expressed in Hex code.

This command selects the bar code system and carries out printing.

- The head of the line is made the next printing start position.
- n is as follows.

In the case of ①

m	Bar Code System	s Definition Range	D Definition Range
0	UPC-A	B s C	30 D 39
1	UPC-E	B s C	30 D 39
2	JAN13 (EAN)	C s C	30 D 39
3	JAN8 (EAN)	7 s 8	30 D 39
4	CODE39	1 s	30 D 39, 41 D 5A, 20, 24, 25, 2B, 2D, 2E, 2F
5	ITF	1 s (however, an even number)	30 D 39
6	CODABAR	1 s	30 D 39, 41 D 5A, 24, 2B, 2D, 2E, 2F, 3A

In the case of ②

m	Bar Code System	s Definition Range	D Definition Range
41h	UPC-A	B s C	30 D 39
42h	UPC-E	B s C	30 D 39
43h	JAN13 (EAN)	C s C	30 D 39
44h	JAN8 (EAN)	7 s 8	30 D 39
45h	CODE39	1 s FF	30 D 39, 41 D 5A, 20, 24, 25, 2B, 2D, 2E, 2F
46h	ITF	1 s (Even Number)	30 D 39
47h	CODABAR	1 s FF	30 D 39, 41 D 5A, 24, 2B, 2D, 2E, 2F, 3A
48h	CODE93	1 s FF	0 s 7F
49h	CODE128	2 s FF	0 s 7F

In the case of ①:

- This command is ended by a NULL code.
- In the case of UPC-A and UPC-E, the bar code is printed at the point when 12 bytes of bar code data have been input, then data following next are processed as ordinary data.
- In the case of JAN13, the bar code is printed at the point when 13 bytes of bar code data have been input, then data following next are processed as ordinary data.
- In the case of JAN8, the bar code is printed at the point when 8 bytes of bar code data have been input, then data following next are processed as ordinary data.
The number of data in an ITF bar code is always an even number. If the number of data should happen to be odd, the final data are disregarded.

In the case of ②:

- s indicates the number of data. Then from the next data, n bytes are processed as bar code data.
- If s deviates from the definition range, command processing is terminated and processing of data from the next data is as for processing of ordinary data.

In the case of the Standard mode:

- If D deviates from the definition range, a paper feed only is executed and processing of data from the next data is as for processing of ordinary data.
- If the horizontal width of a bar code exceeds the one line printing range, the bar code is not printed, but a paper feed only is executed.
- Paper feed by the amount of the bar code height (including HRI characters when HRI characters are specified) is executed without relationship to the line feed amount set by ESC 3, ESC 2, etc.
- This command is disregarded when data exist in the print buffer.
- When character code Dn is a character that cannot be printed, subsequent data are treated as ordinary characters.
- After printing of a bar code is completed, the head of the line is made the next print position.
- Except for inverted characters, the print mode (bold characters, double strike characters, underline, character size) has no influence.

In the case of Page Mode:

- Development of the bar code only is executed and printing is not done. When development of the bar code is completed, the next dot after the last bar code data is made the development start position for the next data.
- If D deviates from the definition range, command processing is terminated and processing of the next data is the same as for ordinary data.
- At this time, the data development start position is not shifted.
- If the horizontal width of a bar code exceeds the print area, the bar code is not printed and the data development start position is moved to the left edge of the place where it deviated from the print area.

(66) Sending of the status (GS r n)

Code: [1D] h + [72] h + n

* (1 n 2)

(31 n 32) Data are expressed in Hex code.

This command sends the specified status.

n = 1, 31: Sends the paper sensor status.

n = 2, 32: Sends the drawer kick connector status.

- When the printer has Serial interface specifications:

In the case of DTR/DSR Control: After confirming that the host computer is ready to receive, the status is sent. If it is impossible for the host to receive, waiting continues until it is possible for it to receive.

In the case of XON/OFF Control: The printer sends the status without confirming if it is possible or impossible for the host computer to receive.

- This command is executed during development of the receiving buffer, so if a command is received in accordance with the receiving buffer's state, there is a possibility of a delay occurring while the status is being sent.
- If ASB is enabled by GS a, it is necessary to distinguish between the status from this command and the status from ASB. See pages 50~53 for the identification method.
- Paper Sensor Status (n = 1, 31)

Bit	Printer Status	Value	
		0	1
0	Journal Near End Sensor Status	Paper present	No paper
1	Receipt Near End Sensor Status	Paper present	No paper
2	Journal End Sensor Status	Paper present	No paper
3	Receipt End Sensor Status	Paper present	No paper
4	Not used	0	—
5	Not defined	—	—
6	Not defined	—	—
7	Not used	0	—

Bits 2, 3: If there is no paper at the end sensors, this printer always goes off-line, so this command is not executed. Therefore, a status of bit 2 = 1 or bit 3 = 1 will not be sent.

- Drawer Kick Connector Status (n = 2, 32)

Bit	Printer Status	Value	
		0	1
0	Status of Drawer Kick Connector Pin No. 3	“L”	“H”
1	Not defined	—	—
2	Not defined	—	—
3	Not defined	—	—
4	Not used	0	—
5	Not defined	—	—
6	Not defined	—	—
7	Not used	0	—

(67) Selecting the horizontal size of a bar code (GS w n)

Code: [1D] h + [77] h + n

* (2 n 6) Data are expressed in Hex code.

Selects the horizontal size of a bar code.

- n indicates the number of dots of a fine bar in the horizontal direction.
- The initial value of the horizontal size is “n = 3”.

Chapter 8

Character Code Tables

Code Page
Japanese Code Table
International Character Code Table

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Code Page

PC 437 (USA)

L \ H	Bin.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Bin.	Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL		(SP)	0	@	P	·	p	Ç	É	á	█	L	⌘	α	≡
0001	1		XON	!	1	A	Q	a	q	ú	æ	í	█	⌘	⌘	β	±
0010	2			"	2	B	R	b	r	é	Æ	ó	█	⌘	⌘	Γ	≥
0011	3		XOF	#	3	C	S	c	s	â	ô	ú	|	⌘	⌘	π	≤
0100	4			\$	4	D	T	d	t	ä	ö	ñ	⌘	-	⌘	Σ	∫
0101	5			%	5	E	U	e	u	à	ò	Ñ	⌘	⌘	⌘	σ	∫
0110	6			&	6	F	V	f	v	á	û	*	⌘	⌘	⌘	μ	÷
0111	7			'	7	G	W	g	w	ç	ù	°	⌘	⌘	⌘	τ	≈
1000	8			(	8	H	X	h	x	ê	ÿ	ÿ	⌘	⌘	⌘	φ	°
1001	9	HT		)	9	I	Y	i	y	ë	Ö	⌘	⌘	⌘	⌘	θ	·
1010	A	LF		*	:	J	Z	j	z	è	Ü	⌘	⌘	⌘	⌘	Ω	·
1011	B		ESC	+	;	K	[	k	{	ÿ	ç	⌘	⌘	⌘	█	ø	√
1100	C		FS	,	<	L	\	l	!	ï	£	⌘	⌘	⌘	█	∞	∞
1101	D	CR	GS	-	=	M	]	m	}	ï	¥	;	⌘	=	█	ø	²
1110	E			.	>	N	^	n	~	Ä	⌘	«	⌘	⌘	█	ε	■
1111	F			/	?	O	-	o	(SP)	Å	f	»	⌘	⌘	█	∅	(SP)

PC 850 (MULTILINGUAL)

L \ H	Bin.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Bin.	Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL		(SP)	0	@	P	·	p	Ç	É	á	█	L	ø	ó	-
0001	1		XON	!	1	A	Q	a	q	ú	æ	í	█	⌘	ø	β	±
0010	2			"	2	B	R	b	r	é	Æ	ó	█	⌘	È	Ö	=
0011	3		XOF	#	3	C	S	c	s	â	ô	ú	|	⌘	È	Ö	¼
0100	4			\$	4	D	T	d	t	ä	ö	ñ	⌘	-	È	ø	¶
0101	5			%	5	E	U	e	u	à	ò	Ñ	Å	⌘	l	Ö	§
0110	6			&	6	F	V	f	v	á	û	*	Å	ä	í	μ	÷
0111	7			'	7	G	W	g	w	ç	ù	°	Å	Å	í	þ	.
1000	8			(	8	H	X	h	x	ê	ÿ	ÿ	⊙	⌘	È	È	·
1001	9	HT		)	9	I	Y	i	y	ë	Ö	⊙	⌘	⌘	⌘	Ó	·
1010	A	LF		*	:	J	Z	j	z	è	Ü	⌘	⌘	⌘	⌘	·	.
1011	B		ESC	+	;	K	[	k	{	ÿ	ç	⌘	⌘	⌘	█	Ø	¹
1100	C		FS	,	<	L	\	l	!	ï	£	⌘	⌘	⌘	█	ý	³
1101	D	CR	GS	-	=	M	]	m	}	ï	ø	;	⌘	=	;	ÿ	ÿ
1110	E			.	>	N	^	n	~	Ä	×	«	⌘	⌘	⌘	-	■
1111	F			/	?	O	-	o	(SP)	Å	f	»	⌘	⌘	█	·	(SP)

8

PC 860 (PORTUGAL)

L \ H	Bin.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Bin.	Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL		(SP)	0	@	P	`	p	Ç	É	á	█	Ł	ł	α	≡
0001	1		XON	!	1	A	Q	a	q	ü	À	í	█	ł	ł	β	±
0010	2			"	2	B	R	b	r	é	Ê	ó	█	ł	ł	Γ	≥
0011	3		XOF	#	3	C	S	c	s	â	ô	ú	ł	ł	ł	π	≤
0100	4			\$	4	D	T	d	t	ã	õ	ñ	ł	-	Ł	Σ	∫
0101	5			%	5	E	U	e	u	ä	ö	Ñ	ł	ł	ł	σ	∫
0110	6			&	6	F	V	f	v	Á	Ú	ª	ł	ł	ł	μ	÷
0111	7			'	7	G	W	g	w	ç	ù	º	ł	ł	ł	τ	≈
1000	8			(	8	H	X	h	x	ê	î	¿	ł	ł	ł	φ	°
1001	9	HT		)	9	I	Y	i	y	Ê	Ï	Ô	ł	ł	ł	θ	•
1010	A	LF		*	:	J	Z	j	z	è	Û	¬	ł	ł	ł	Ω	·
1011	B		ESC	+	;	K	[	k	{	í	é	¼	ł	ł	█	ø	√
1100	C		FS	,	<	L	\	l	!	ô	£	¾	ł	ł	█	∞	n
1101	D	CR	GS	-	=	M	]	m	}	ì	Û	¡	ł	=	█	ø	²
1110	E			.	>	N	^	n	~	Ä	Û	«	ł	ł	█	ε	■
1111	F			/	?	O	_	o	(SP)	Â	Ó	»	ł	ł	█	∅	(SP)

PC 863 (CANADA-FRENCH)

L \ H	Bin.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Bin.	Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL		(SP)	0	@	P	`	p	Ç	É	!	█	Ł	ł	α	≡
0001	1		XON	!	1	A	Q	a	q	ü	Ê	'	█	ł	ł	β	±
0010	2			"	2	B	R	b	r	é	Ê	ó	█	ł	ł	Γ	≥
0011	3		XOF	#	3	C	S	c	s	â	ô	ú	ł	ł	ł	π	≤
0100	4			\$	4	D	T	d	t	Â	È	"	ł	-	Ł	Σ	∫
0101	5			%	5	E	U	e	u	à	Ï	.	ł	ł	ł	σ	∫
0110	6			&	6	F	V	f	v	Œ	û	ª	ł	ł	ł	μ	÷
0111	7			'	7	G	W	g	w	ç	ù	¬	ł	ł	ł	τ	≈
1000	8			(	8	H	X	h	x	ê	ª	Ï	ł	ł	ł	φ	°
1001	9	HT		)	9	I	Y	i	y	ê	Ï	¬	ł	ł	ł	θ	•
1010	A	LF		*	:	J	Z	j	z	è	Û	¬	ł	ł	ł	Ω	·
1011	B		ESC	+	;	K	[	k	{	ı	é	¼	ł	ł	█	ø	√
1100	C		FS	,	<	L	\	l	!	ı	£	¾	ł	ł	█	∞	n
1101	D	CR	GS	-	=	M	]	m	}	=	Û	¼	ł	=	█	ø	²
1110	E			.	>	N	^	n	~	Ä	Û	«	ł	ł	█	ε	■
1111	F			/	?	O	_	o	(SP)	\$	f	»	ł	ł	█	∅	(SP)

PC 8 6 5 (NORWAY)

L \ H	Bin.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Bin.	Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL		(SP)	0	@	P	·	p	Ç	É	á		L	⊥	α	≡
0001	1		XON	!	1	A	Q	a	q	ú	æ	i		↓	⊥	β	±
0010	2			"	2	B	R	b	r	é	Æ	ó		⊥	⊥	Γ	≥
0011	3		XOF	#	3	C	S	c	s	â	ô	ú	|	⊥	⊥	π	≤
0100	4			\$	4	D	T	d	t	ä	ö	ñ	⊥	⊥	⊥	Σ	|
0101	5			%	5	E	U	e	u	à	ò	Ñ	⊥	⊥	⊥	σ	|
0110	6			&	6	F	V	f	v	å	û	°	⊥	⊥	⊥	μ	÷
0111	7			'	7	G	W	g	w	ç	ù	°	⊥	⊥	⊥	τ	≈
1000	8			(	8	H	X	h	x	ê	ÿ	¿	⊥	⊥	⊥	φ	·
1001	9	HT		)	9	I	Y	i	y	ë	ÿ	⊥	⊥	⊥	⊥	θ	·
1010	A	LF		*	:	J	Z	j	z	è	ü	⊥	⊥	⊥	⊥	Ω	·
1011	B		ESC	+	;	K	[	k	{	ï	ø	½	⊥	⊥	⊥	ø	√
1100	C		FS	,	<	L	\	l	!	í	É	¼	⊥	⊥	⊥	∞	n
1101	D	CR	GS	-	=	M	]	m	}	ì	Ø	ì	⊥	=	⊥	ø	z
1110	E			.	>	N	^	n	~	Ä	Æ	«	⊥	⊥	⊥	ε	■
1111	F			/	?	O	_	o	(SP)	Å	f	□	⊥	⊥	■	∩	(SP)

SPACES

L \ H	Bin.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Bin.	Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL		(SP)	0	@	P	·	p	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
0001	1		XON	!	1	A	Q	a	q	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
0010	2			"	2	B	R	b	r	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
0011	3		XOF	#	3	C	S	c	s	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
0100	4			\$	4	D	T	d	t	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
0101	5			%	5	E	U	e	u	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
0110	6			&	6	F	V	f	v	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
0111	7			'	7	G	W	g	w	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
1000	8			(	8	H	X	h	x	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
1001	9	HT		)	9	I	Y	i	y	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
1010	A	LF		*	:	J	Z	j	z	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
1011	B		ESC	+	;	K	[	k	{	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
1100	C		FS	,	<	L	\	l	!	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
1101	D	CR	GS	-	=	M	]	m	}	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
1110	E			.	>	N	^	n	~	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)
1111	F			/	?	O	_	o	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)	(SP)

Japanese Code Table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	-	⊥	SP	一	夕	ミ	ニ	×
1		XON	!	1	A	Q	a	q	-	⊥	。	ア	チ	ム	ト	円
2			“	2	B	R	b	r	-	⊥	「	イ	ツ	メ	キ	年
3		XOF	#	3	C	S	c	s	■	⊥	」	ウ	テ	モ	ヨ	月
4			\$	4	D	T	d	t	■	—	、	エ	ト	ヤ	▲	日
5			%	5	E	U	e	u	■	—	・	オ	ナ	ユ	▲	時
6			&	6	F	V	f	v	■	|	ヲ	カ	ニ	ヨ	▼	分
7			'	7	G	W	g	w	■	|	ア	キ	ヌ	ラ	▼	秒
8			(	8	H	X	h	x	|	⊥	イ	ク	ネ	リ	♠	〒
9	HT		)	9	I	Y	i	y	|	⊥	ウ	ケ	ノ	ル	♥	市
A	LF		*	:	J	Z	j	z	|	⊥	エ	コ	ハ	レ	◆	区
B		ESC	+	;	K	[	k	{	■	⊥	オ	サ	ヒ	ロ	♣	町
C		FS	,	<	L	¥	l	!	■	⊥	ヤ	シ	フ	ワ	●	村
D	CR	GS	-	=	M	]	m	}	■	⊥	ユ	ス	ヘ	ン	○	人
E			.	>	N	^	n	~	■	⊥	ヨ	セ	ホ	*	/	☐
F			/	?	O	_	o	SP	+	⊥	ッ	ソ	マ	°	\	SP

International Character Code Table

n	LANGUAGE	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	American English	#	\$	@	[	\	\]	^	'	{	|	}	~
1	French	#	\$	à	°	ç	Œ	^	'	é	ù	è	¨
2	German	#	\$	Œ	Ä	Ö	Ü	^	'	ä	ö	ü	ß
3	British English	£	\$	@	[	\	\]	^	'	{	|	}	~
4	Danish 1	#	\$	@	Æ	Ø	Å	^	'	æ	ø	å	~
5	Swedish	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italian	#	\$	@	°	\	é	^	ù	à	ò	è	ì
7	Spanish 1	Pt	\$	@	;	Ñ	¿	^	'	¨	ñ	}	~
8	Japanese	#	\$	@	[	¥	]	^	'	{	|	}	~
9	Norwegian	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Danish 2	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11	Spanish 2	#	\$	á	;	Ñ	¿	é	'	í	ñ	ó	ú
12	Latin American	#	\$	á	;	Ñ	¿	é	ú	í	ñ	ó	ú
13	Korean	#	\$	@	[	₩	]	^	'	{	|	}	~
64	Legal	#	\$	Œ	°	'	”	¶	'	©	®	†	™

Note) n indicates the ESC R parameter.

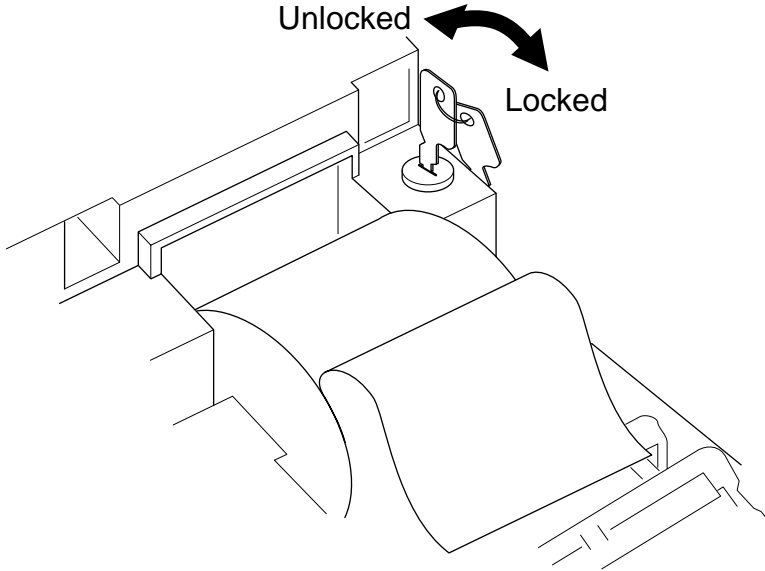
Chapter 9

Appendices

**Journal Protection Key
Maintenance, Cautions
Specifications
External View**

Journal Protection Key

If a printer with optional specifications is used, the rear cover can be locked using the journal protection key that is included.



Maintenance, Cautions

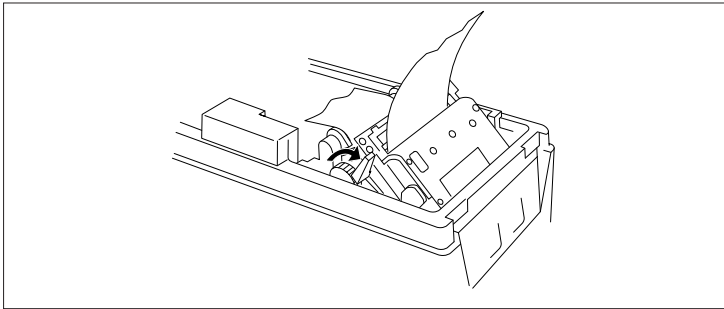
Removing Paper Jams

[Caution] The print head and auto cutter become hot. Do not touch the print head cover or the outside of the auto cutter with bare hands during printing or immediately after printing. When removing jammed paper, first check to make sure the temperature of the print head and auto cutter has dropped sufficiently.

1. Set the printer in the head up condition with the head platen open.

2. Remove the jammed paper with utmost care.

If the jammed paper is wrapped around the platen roller, take it out a little at a time while turning the paper feed knob.

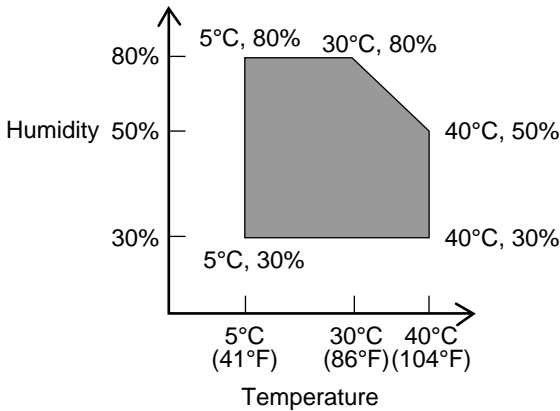


- When removing jammed paper, be sure to set the printer in the head up condition with the head platen open.
Turning the paper feed knob while in the head down state, or attempting to pull the paper out, could cause the printer to break down.
- If the printer is covered with paper dust, remove it using a brush and vacuum cleaner.

Cautions in Handling of Roll Paper

- If chemicals or oil touch the paper, it could become discolored and the printed data could fade away.
- Do not scrape the paper with fingernails or with hard metal objects, etc. This could cause the paper to become discolored.
- Discoloration begins from a temperature of approximately 70°C. (158°F) Be careful of the effects of heat, moisture and light, etc. on the roll paper.

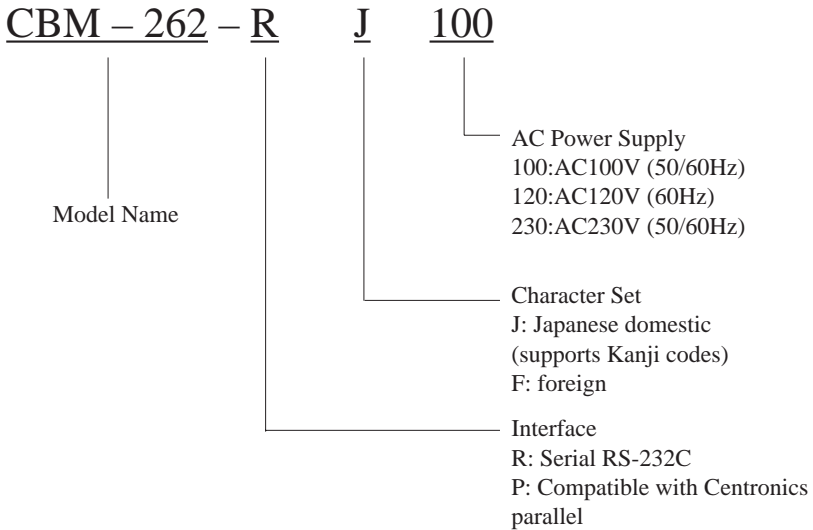
Operating Temperature and Humidity



Specifications

Model Classification

Different models are differentiated by the following model naming method.



- * Special AC adapter type and Power Cord
 26AD-J (100 V 2-wire Cord)
 26AD-U (120 V 3-wire Cord)
 26AD-E (230 V round Pin Cord)

Basic Specifications

Item	Content	Remarks
Printing Method	Line Thermal Printing Method	
Printing Width	54mm, 432 dots (Total dots in head: 448 dots)	Non-printing area: 2 mm on each end.
Dot Density	8 dots/mm (Horizontal/Vertical)	
Paper Feed Pitch	0.125mm	
Printing Speed	62.5 mm/sec. (500 dot line/sec)	at maximum speed
Number of Printing Columns	36 Columns (Horizontal 12 × Vertical 24 Font A) 48 Columns (Horizontal 9 × Vertical 24 Font B)	
Types of Characters	Alphanumeric, International Characters	
Emulations	ESC/POS™ compatible	
Bar Code Types	UPC-A/E, JAN(EAN)13 Columns/8 Columns, ITF CODE39, CODABAR	
Line Interval	4.23 mm (1/6 inch) Can be set by commands. Min. 1/203 inch.	
Paper	Thermal roll paper 58 × φ83 mm φ83 mm (See paper specifications.)	
Interfaces	RS-232C/Centronics	Factory Option
Input Buffer	72 Bytes/8K Bytes (Set by the operation panel.)	
Power Supply Voltage	AC120V±10% 60Hz AC230V±10% 50/60Hz	Factory Option
Power Consumption	42W	ASCII Slide Pattern Printing
Weight	Approx. 2.3 kg	Main unit only
External Dimensions	128 × 359.5 × 162.5mm	
Operating Temperature and Humidity	5~40°C 30~80%RH(There should be no condensation.)	see page 116
Storage Temperature and Humidity	- 10~60°C 10~90%RH	
Reliability	Print head life: Pulse resistance: 50 million pulses (Page coverage: 12.5%) Wear Resistance 30 Km (Normal temperature and humidity, using the recommended paper) Printer Mechanism: MCBF 5 million lines Auto Cutter Life: 300,000 cuts	

Paper Specifications

(1) Specified Paper

Type: Thermal Recording Paper

Paper Width: 58 +0/-1 mm

Paper Thickness: 60~75 μ m

Roll Diameter: ϕ 83 mm or less

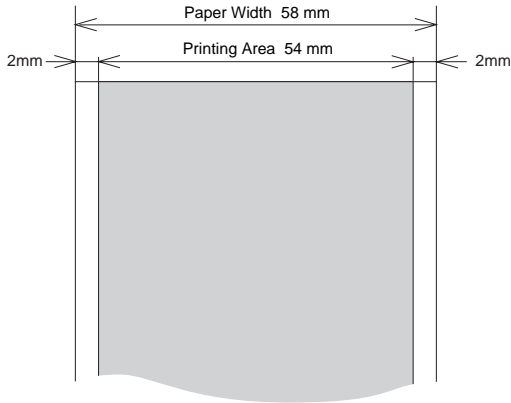
Printing Surface: Outside of roll (front)

Specified Papers: Mitsubishi Paper Co. (Ltd.) F220VP

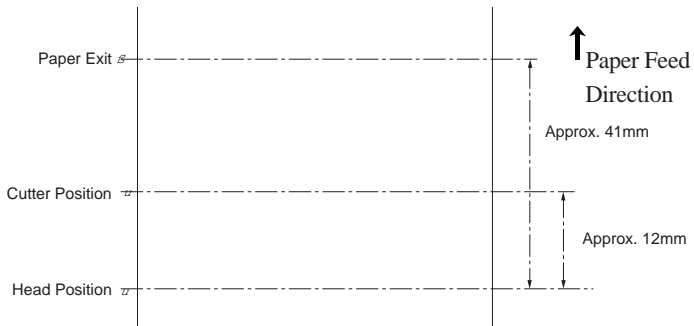
Shinoji Paper Co. (Ltd.) PD160R, PD160R-N

Nihon Paper Co. (Ltd.) TF 50KS-E2C

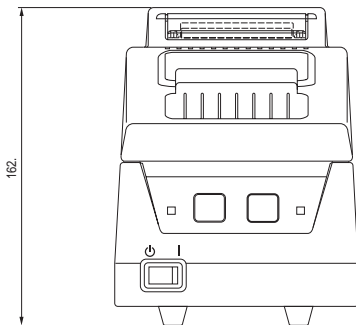
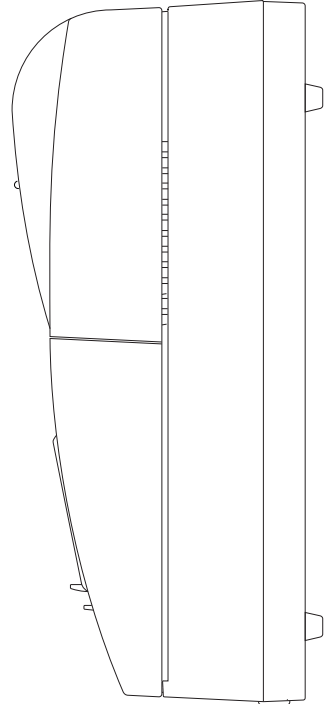
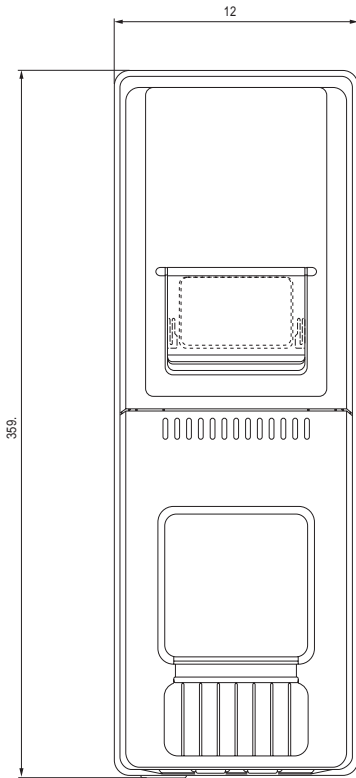
(2) Print Area



(3) Head and Cutter Positions



External View



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