

LINE THERMAL PRINTER
MODEL CBM-292/293
User's Manual

WEEE MARK

En

If you want to dispose this product, do not mix with general household waste. There is a separate collection systems for used electronics products in accordance with legislation under the WEEE Directive (Directive 2002/96/EC) and is effective only within European Union.

Ge

Wenn Sie dieses Produkt entsorgen wollen, dann tun Sie dies bitte nicht zusammen mit dem Haushaltsmüll. Es gibt im Rahmen der WEEE-Direktive innerhalb der Europäischen Union (Direktive 2002/96/EC) gesetzliche Bestimmungen für separate Sammelsysteme für gebrauchte elektronische Geräte und Produkte.

Fr

Si vous souhaitez vous débarrasser de cet appareil, ne le mettez pas à la poubelle avec vos ordures ménagères. Il existe un système de récupération distinct pour les vieux appareils électroniques conformément à la législation WEEE sur le recyclage des déchets des équipements électriques et électroniques (Directive 2002/96/EC) qui est uniquement valable dans les pays de l'Union européenne.

Les appareils et les machines électriques et électroniques contiennent souvent des matières dangereuses pour l'homme et l'environnement si vous les utilisez et vous vous en débarrassez de façon inappropriée.

Sp

Si desea deshacerse de este producto, no lo mezcle con residuos domésticos de carácter general. Existe un sistema de recogida selectiva de aparatos electrónicos usados, según establece la legislación prevista por la Directiva 2002/96/CE sobre residuos de aparatos eléctricos y electrónicos (RAEE), vigente únicamente en la Unión Europea.

It

Se desiderate gettare via questo prodotto, non mescolatelo ai rifiuti generici di casa. Esiste un sistema di raccolta separato per i prodotti elettronici usati in conformità alla legislazione RAEE (Direttiva 2002/96/CE), valida solo all'interno dell'Unione Europea.

Du

Deponeer dit product niet bij het gewone huishoudelijk afval wanneer u het wilt verwijderen. Er bestaat ingevolge de WEEE-richtlijn (Richtlijn 2002/96/EG) een speciaal wettelijk voorgeschreven verzamelstelsel voor gebruikte elektronische producten, welk alleen geldt binnen de Europese Unie.

Da

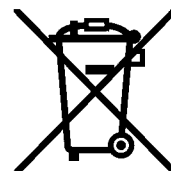
Hvis du vil skille dig af med dette produkt, må du ikke smide det ud sammen med dit almindelige husholdningsaffald. Der findes et separat indsamlingssystem for udtjente elektroniske produkter i overensstemmelse med lovgivningen under WEEE-direktivet (direktiv 2002/96/EC), som kun er gældende i den Europæiske Union.

Por

Se quiser deitar fora este produto, não o misture com o lixo comum. De acordo com a legislação que decorre da Directiva REEE – Resíduos de Equipamentos Eléctricos e Electrónicos (2002/96/CE), existe um sistema de recolha separado para os equipamentos electrónicos fora de uso, em vigor apenas na União Europeia.

Pol

Jeżeli zamierzasz pozbyć się tego produktu, nie wyrzucaj go razem ze zwykłymi domowymi odpadkami. Według dyrektywy WEEE (Dyrektywa 2002/96/EC) obowiązującej w Unii Europejskiej dla używanych produktów elektronicznych należy stosować oddzielne sposoby utylizacji.



Declaration of Conformity

This printer conforms to the following Standards:

Low Voltage Directive 73/23/EEC, 93/68/EEC and the EMC Directive 89/336/EEC, 92/31/EEC, 93/68/EEC.

LVD : EN60950

EMC : EN55022 Class A
EN61000-3-2
EN61000-3-3
EN55024

This declaration is applied only for 230V model.

Warning: This is a Class A products. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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CITIZEN es una marca registrada de CITIZEN WATCH CO., LTD., Japón

IMPORTANT SAFETY INSTRUCTIONS

- Read all of these instructions and save them for later reference.
- Follow all warnings and instructions marked on the product.
- Unplug this product from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
- Do not use this product near water.
- Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
- 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 of other similar surface. This product should never be placed near or over a radiator or heat register. 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.
- 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.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord will be walked on.
- 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.
- 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.
- Except as explained elsewhere in this manual, don't attempt to service this product by 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.
- 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.
- Please keep the poly bag which this equipment is packed in away from children or throw it away to prevent children from putting it on. Putting it on may cause suffocation to them.

WICHTIGE SICHERHEITSANWEISUNGEN

- Lesen Sie die nachfolgenden Anweisungen sorgfältig durch und bewahren Sie sie auf.
- Befolgen Sie alle auf dem Drucker vermerkten Hinweise und Anweisungen. Vor dem Reinigen grundsätzlich Stecker aus der Steckdose ziehen. Keine Flüssigkeiten oder Aerosolreiniger benutzen. Nur mit einem feuchten Tuch abwischen.
- Der Drucker darf nicht in der Nähe von Wasser aufgestellt werden.
- Drucker nicht auf einem instabilen Wagen, Stand oder Tisch aufstellen. Der Drucker könnte herunterfallen und dabei beschädigt werden.
- Schlitze und Öffnungen im Gehäuse, in der Rückwand und im Boden dienen der Belüftung. Sie dürfen keinesfalls zugedeckt oder blockiert werden, da sich der Drucker sonst überhitzt. Drucker nicht auf ein Bett, Sofa, Teppich oder dergleichen stellen. Drucker nicht in der Nähe eines Heizkörpers aufstellen. Drucker darf nicht eingebaut werden, falls nicht für ausreichende Belüftung gesorgt ist.
- Drucker nur mit der auf dem Typschild angegebenen Spannung betreiben. Wenn Sie sich nicht sicher sind, fragen Sie ihren Händler oder ihr zuständiges Elektrizitätswerk.
- Nichts auf das Stromanschlußkabel stellen. Kabel muß so verlegt werden, daß man nicht darauf treten kann.
- Ein etwaiges Verlängerungskabel muß der Stromstärke aller daran angeschlossenen Geräte entsprechen.
- Keine Gegenstände in die Gehäuseschlitze schieben.
- Drucker darf nur da gewartet werden, wo im Handbuch angegeben, Öffnen und. Abnehmen von Abdeckungen, die mit "Do not remove" gekennzeichnet sind, könnte gefährliche spannungsführende Stellen oder sonstige Gefahrenpunkte freilegen. Die Wartung solcher Stellen darf grundsätzlich nur von besonders ausgebildetem Fachpersonal vorgenommen werden.
 - A. Wenn das Stromanschlußkabel oder der Stecker beschädigt oder durch-gescheuert ist.
 - B. Wenn Flüssigkeit auf dem Drucker verschüttet wurde.
 - C. Wenn der Drucker im Regen gestanden hat oder Wasser darauf verschüttet wurde.
 - D. Wenn der Drucker trotz genauer Befolgung der Betriebsvorschriften nicht richtig arbeitet. Nur die in der Bedienungsanleitung angegebenen Einstellungen vornehmen. Ein Verstellen anderer Bedienungselemente könnte den Drucker beschädigen und macht umständliche Arbeiten eines qualifizierten Technikers erforderlich, um den Drucker Wieder auf den normalen Betrieb einzustellen.
 - E. Wenn der Drucker heruntergefallen ist oder das Gehäuse beschädigt wurde.
 - F. Wenn der Drucker in seiner Leistung nachläßt.
- Bitte halten Sie den Kunststoffbeutel, in den die Ware verpackt ist, von Kindern entfernt, oder werfen Sie ihn weg, damit er nicht in die Hände von Kindern gerät. Das Überstülpen des Beutels kann zum Erstickten führen.

Lärmemission kleiner 70dBA

IMPORTANT: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

CAUTION: Use shielded cable for this equipment.

Sicherheitshinweis

Die Steckdose zum Anschluß dieses Druckers muß nahe dem Gerät angebracht und leicht zugänglich sein.

For Uses in Canada

This digital apparatus does not exceed the class A limits for radio noise emissions from digital, apparatus, as set out in the radio interference regulations of the Canadian department of communications.

Pour L'utilisateurs Canadiens

Cet appareil numérique ne dépasse pas les limites de catégorie A pour les émissions de bruit radio émanant d'appareils numériques, tel que prévu dans les règlements sur l'interférence radio du département Canadien des communications.

<CAUTIONS>

1. Prior to using the equipment, be sure to read this User's Manual thoroughly. Please keep it handy for reference whenever it may be needed.
2. The information contained herein may be changed without prior notice.
3. Reproduction of part or all of this User's Manual without permission is strictly prohibited.
4. Never service, disassemble, or repair parts that are not mentioned in this User's Manual.
5. Note that we will not be responsible for damages attributable to a user's incorrect operation/ handling or an improper operating environment.
6. Operate the equipment only as described in this User's Manual; otherwise accidents or problems may result.
7. Data are basically temporary; they cannot be stored or saved permanently or for a long time. Please note that we will not be responsible for damages or losses of profit resulting from losses of the data attributable to accidents, repairs, tests, and so on.
8. If you have any questions or notice any clerical errors or omissions regarding the information in this manual, please contact our office.
9. Please note that, notwithstanding Item 8 above, we will not be responsible for any effects resulting from operation of the equipment.

SAFETY PRECAUTIONS ----- BE SURE TO OBSERVE

In order to prevent hazards to an operator or other persons and damage to property, be sure to observe the following precautions.

- The following describes the degrees of hazard and damages that can occur if the given instructions are neglected or the equipment is incorrectly operated.



WARNING

Negligence of this precaution may result in death or serious injury.



CAUTION

Negligence of this precaution may result in injury or damage to property.



This is an illustration mark used to alert your attention.



This is an illustration mark used to indicate such information as an instruction or the like.

 WARNING

- Never handle the equipment in the following manners, as it may break, become out of order, or overheat causing smoke and resulting in fire or electric shock.
- If you find any damage, problem, smoke, or abnormal odor/sound, turn off the power, disconnect the power cable, and contact your dealer. Never repair the equipment on your own - it is very dangerous.
- Do not allow the equipment to receive a strong impact or shock, such as kicking, stomping, hitting, dropping, and the like.
- Install the equipment in a well-ventilated place. Do not use it in such a manner that its ventilation port will be blocked.
- Do not install the equipment in a place like a laboratory where chemical reactions are expected, or in a place where salt or gases are contained in the air.
- Use only power of the specified voltage and current capacity.
- Do not connect/disconnect a power cord or a data cable, while holding the cable. Do not pull, install, use, or carry the equipment in such a manner that force will be applied to the cables.
- Do not drop or insert any foreign substances, such as clips or pins, into the equipment.
- Do not put many loads on one electrical outlet.
- Do not spill any liquid or spray any chemical-containing liquid over the equipment. If any liquid is spilled on it, turn off the power, disconnect the power cable and power cord from the plug socket, and so on, and contact our dealer.
- Do not disassemble or remodel the equipment. Negligence of this may cause fire or electric shock.
- An equipment packing bag must be discarded or kept away from children. A child can suffocate if the bag is placed over the head.



PRECAUTIONS FOR INSTALLATION

- Do not use or store the equipment in a place exposed to fire, moisture, or direct sunlight, or in a place near a heater or a thermal device where the prescribed operating temperature and humidity are not met, or in a place exposed to much oil, iron powder, or dust. The equipment may become out of order, emit smoke, or catch fire.
- Do not install the equipment in a place like a laboratory where chemical reactions are expected, or in a place where salt or gases are contained in the air. There is a danger of fire or electric shock.
- Firmly secure the equipment onto a flat and stable mounting panel free from vibrations and angled at 0° to 90° in a well-ventilated place.
- Do not install or use the equipment in a place where its operation could be hindered.
- Do not place anything on the equipment, as it can lead to problems.
- Use accessory fittings and screws to secure the equipment. Tighten the screws firmly and properly. Excessive tightening can result in problems or damage.
- Do not use the equipment near a radio or TV receiver. Do not share the power from a plug socket a radio or TV receiver is connected to. It may cause a reception problem.
- Use only power of the specified voltage and current capacity. Be careful not to mistake polarity. The equipment may become out of order, emit smoke, or catch fire.
- Confirm that a plug socket used for connection has sufficient capacity.
- Avoid composite wiring with a power cable or excessively extended wiring. Excessive electric current may cause heat generation/ignition of the supply line or shut off the power. Do not step on a cable or use the equipment with excessive force (tension, load) applied to it.
- Never connect a grounding cable to a gas pipe. There is a danger of explosion. When connecting or disconnecting the grounding cable, be sure to disconnect the power plug from the plug socket.
- When disconnecting/reconnecting the cables, be sure to turn off the power, including the mating side.
- Connect a connector cable securely. If a reverse-polarity connection is made, internal elements may be broken or a mating device may be adversely affected.
- Avoid routing a signal line too long or connecting to any noisy device, to protect against such effects as data deformation due to noise.
- Use the equipment in an environment where there is a plug socket near the main body and you can easily disconnect the power plug from it, to shut off the power.
- Keep the equipment in the printing-head-up state when transporting the equipment or when it will not be used for a long time.
- When transporting the equipment, remove the rolled paper from it.

**PRECAUTIONS FOR HANDLING**

Do not handle the equipment in the following manners, because problems may result.

- Do not print without setting a roll of paper.
- Be careful not to drop foreign substances, such as clips, pins, and screws, into the main body.
- Do not spill any liquid or spray any chemical-containing liquid over the equipment.
- Do not stamp on, drop, hit, or give a strong shock to the equipment.
- Never use a pointed object, such as a pen, to operate the operation panel.
- Do not use Scotch tape to fasten paper together for continuous use.
- With the printing head down, never rotate the paper feed knob or force to pull the set roll of paper by hand.

To Prevent Injury and Spreading of Damage

- Do not touch the printing part of the print head.
- When turning on the power, do not touch the moving parts, such as a cutter and gear inside the main body, or electric parts.
- Be careful to avoid bodily injure or damaging other objects with an edge of sheet metal.
- Should any error occur while operating the equipment, stop it immediately and disconnect the power plug from the plug socket.
- Should a problem occur, leave solving it to our serviceman. Do not disassemble the equipment on your own.
- When opening/closing the panel, and so on, be careful not to catch your hand or finger on the equipment.

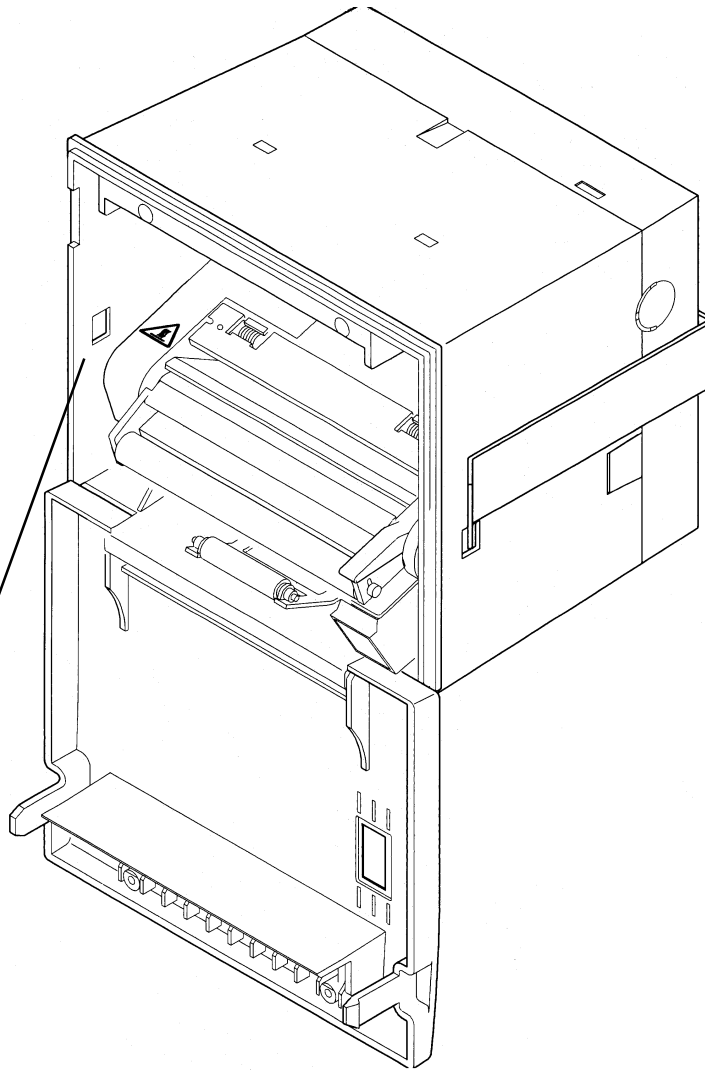
DAILY MAINTENANCE

- Prior to starting maintenance work, be sure to turn off the main body.
- When cleaning the platen roller, dip a cotton swab in ethyl alcohol and wipe off dust and stain.
- Use a dry soft cloth to wipe off stains and dust from the surfaces of the main body case. For severe soiling, dip the cloth in water and wring it, for wiping off the soil. Never use organic solvents, such as alcohol, thinner, trichlene, benzene, ketone, or chemical dusters.
- If the equipment is contaminated with paper powder, use a soft brush to clean it.



CAUTION: The printing head and motor are very hot. Do not touch them immediately after printing.

 A caution label has been pasted to the position shown in the figure below. Read the precautions for handling thoroughly, to operate the equipment correctly.



This label alerts you to the danger that touching the printing head or motor can cause a burn injury because they are hot.

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1. OUTLINE

The CBM-292/293 is a rack mountable thermal panel printer. It is widely applicable to various kinds of data communication terminals, POS terminals, measuring terminals, and others.

This small-size printer is provided with abundant features. It is available for different applications. Prior to using it, read this manual thoroughly for full understanding and safe operation.

1.1 Features

1. Rack mountable small-size line thermal printer.
2. High speed and low noise.
3. Long-life printing head used and high reliability due to a simple mechanism.
4. Serial/parallel interface selectable by a DIP switch.
5. Built-in input buffer.
6. Capable of printing the bar code(with a special command).
7. Provided with an auto cutter(CBM-293 only).
8. Capable of registering the external characters(up to 94 of them).
9. Runs on two types of power sources; external power source and accessory AC adapter.

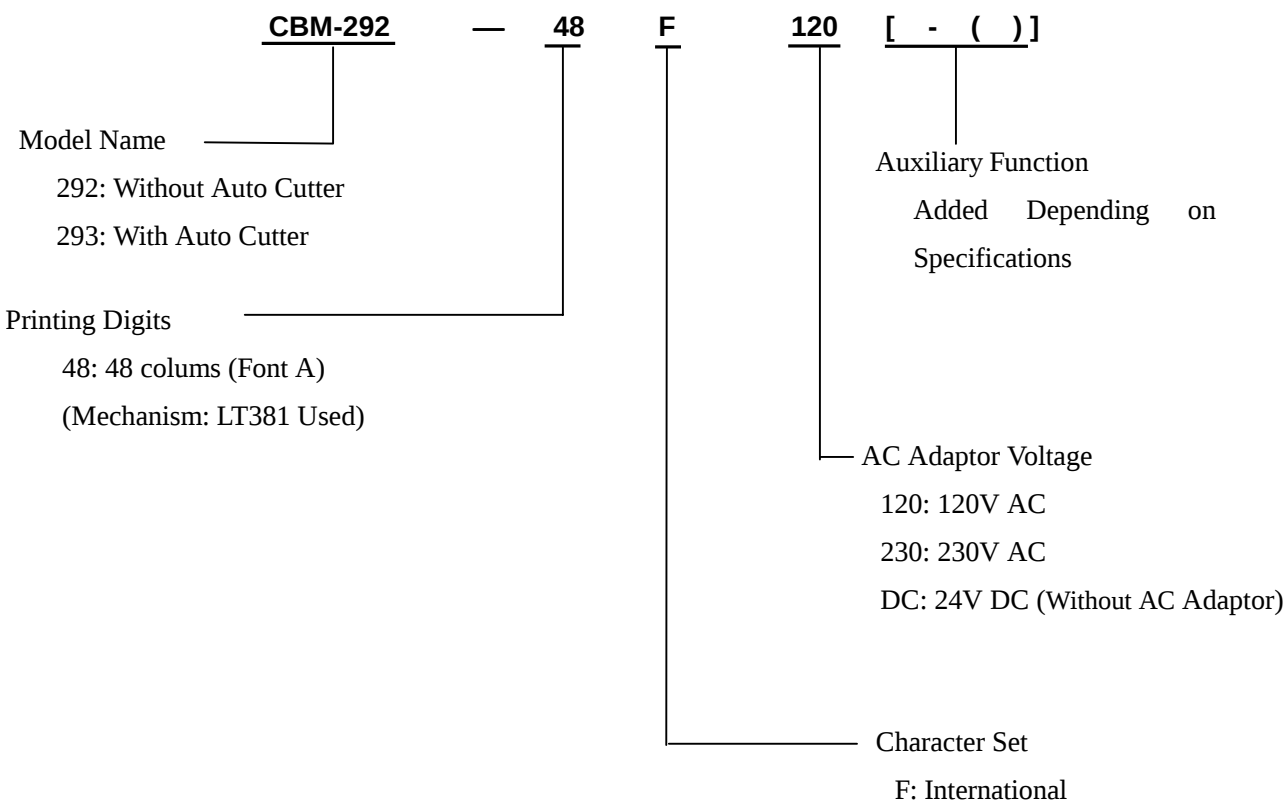
1.2 Accessories

When unpacking the printer, confirm that the following parts are included in the package.

Printer body.....	1 unit
Sample paper roll	1 piece
Power and data cable	1 piece
Fitting.....	1 piece
Fitting setscrews.....	2 pieces
Wire clamp.....	1 piece
AC adapter	1 piece (AC adapter-specific model only)
(30AD or 31AD)	
Power cable.....	1 piece (AC adapter-specific model only)
User's manual	1 copy

2. BASIC SPECIFICATIONS

2.1 Model Classifications



2.2 Service Power Source

Use the accessory AC adapter (30AD or 31AD).

2.3 Basic Specifications

Item	Description
Printing method	Line Thermal Dot Printing
Printing speed	62.5 mm/sec. At maximum
Dot density	8 dots/mm (Horizontal and Vertical)
Printing columns	Font A: 48 columns, Font B: 64 columns
Character size	Font A: 1.25 mm × 3.00 mm (10 × 24 + 2 dots space), Font B: 0.88 mm × 2.13 mm (7 × 17 + 2 dots space),
Character types	Alphanumeric, international characters
Bar code types	UPC-A/E, JAN(EAN) 13 columns/8 columns, ITF, CODE 39, CODE 128, CODABAR
Line spacing	4.23 mm (1/6 inch), settable by a command
Paper	Thermal paper roll: 80 mm × φ50 mm(Max)
Interface	Parallel (CENTRONICS) or serial (RS-232C) Selectable by a DIP Switch.
Input buffer	3 KB
Paper end detection	Equipped (Stops printing when the paper runs out.)
Auto loading	Equipped (If new paper is set into the paper inlet, it will be fed automatically.)
Auto cutter (CBM-293 only)	Cuts the paper automatically by a command. Either full cut or partial cut is selectable.
International character set	Capable of setting the following 10 countries for specific character codes by a command. (U.S.A., France, Germany, U.K., Denmark I and II, Sweden, Italy, Spain, Japan, Norway)
Supply voltage and power consumption	24V DC +/-7%. Standby: Approx. 0.2A, Printing: Approx. 1.8A (Ave) / Peak: Approx. 6A
AC adapter(30AD/31AD)	Rated input: 100 ~ 240V AC, 50/60 Hz, 120VA Rated output: 24V DC, 1.8A
Operating temperature	5 ~ 40 °C, 35 ~ 85 % RH (No dew condensation)
Storage temperature	-20 ~ 60 °C, 10 ~ 90 % RH (No dew condensation)
Outer dimensions	126 (W) × 109 (H) × 99 (D) mm
Weight	CBM-292: Approx. 500g (Main body only) CBM-293: Approx. 670g (Main body only) Mounting Bracket: Approx. 53g AC adapter: Approx. 430g
Applicable standards *1	UL, CUL, TÜV (GS)
EMI *1	VCCI: Class A applicable, FCC: Class A applicable
Reliability	Printing head life: Pulse resistance --- 50,000,000 pulses (Print ratio: 12.5 %), Wear resistance --- 30km (With specified paper at normal temperature and humidity) Auto cutter life: 300,000 cuts (CBM-293)

*1: Applicable when the accessory AC adapter is used.

2.4 Paper Specifications

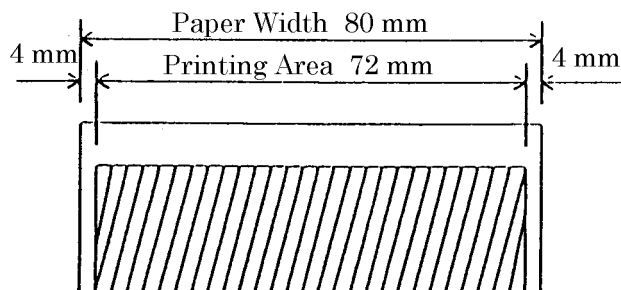
2.4.1 Recommended Paper

Type	: Thermal paper
Paper width	: 80 plus 0 / minus 1 mm
Paper thickness	: 65 plus 5 / minus 5 μ m
Roll diameter	: ϕ 50 mm(Max)
Printing surface	: Outside of the roll(Surface)
Recommended paper	: TF50KS-E2C by Nippon Seishi, or its equivalent
Core	: ϕ 12 mm(Inner diameter), ϕ 18 mm(Outer diameter)

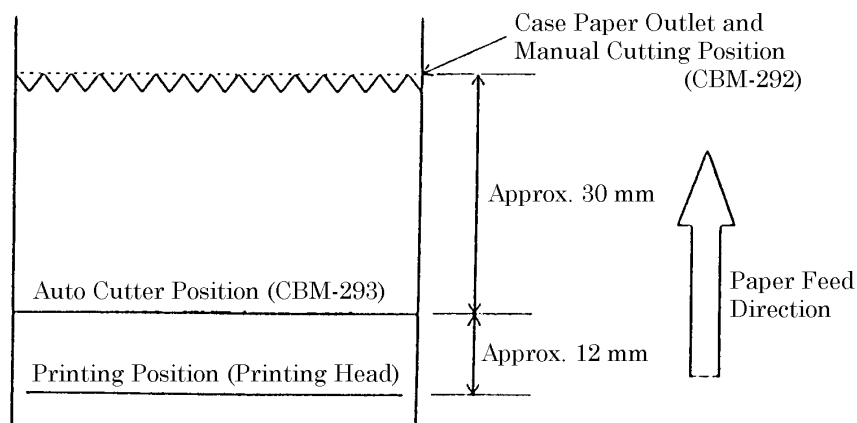


- CAUTION :**
1. Use the paper which has not been pasted to the core.
 2. Note that if the paper comes into contact with a chemical or oil, it may discolor or lose the printed record.
 3. Note that if the paper is rubbed strongly with a nail or hard metal, it may discolor.
 4. Discoloring will start at about 70°C. Watch out fully for effects of the heat, moisture, light, etc.

2.4.2 Printing Position

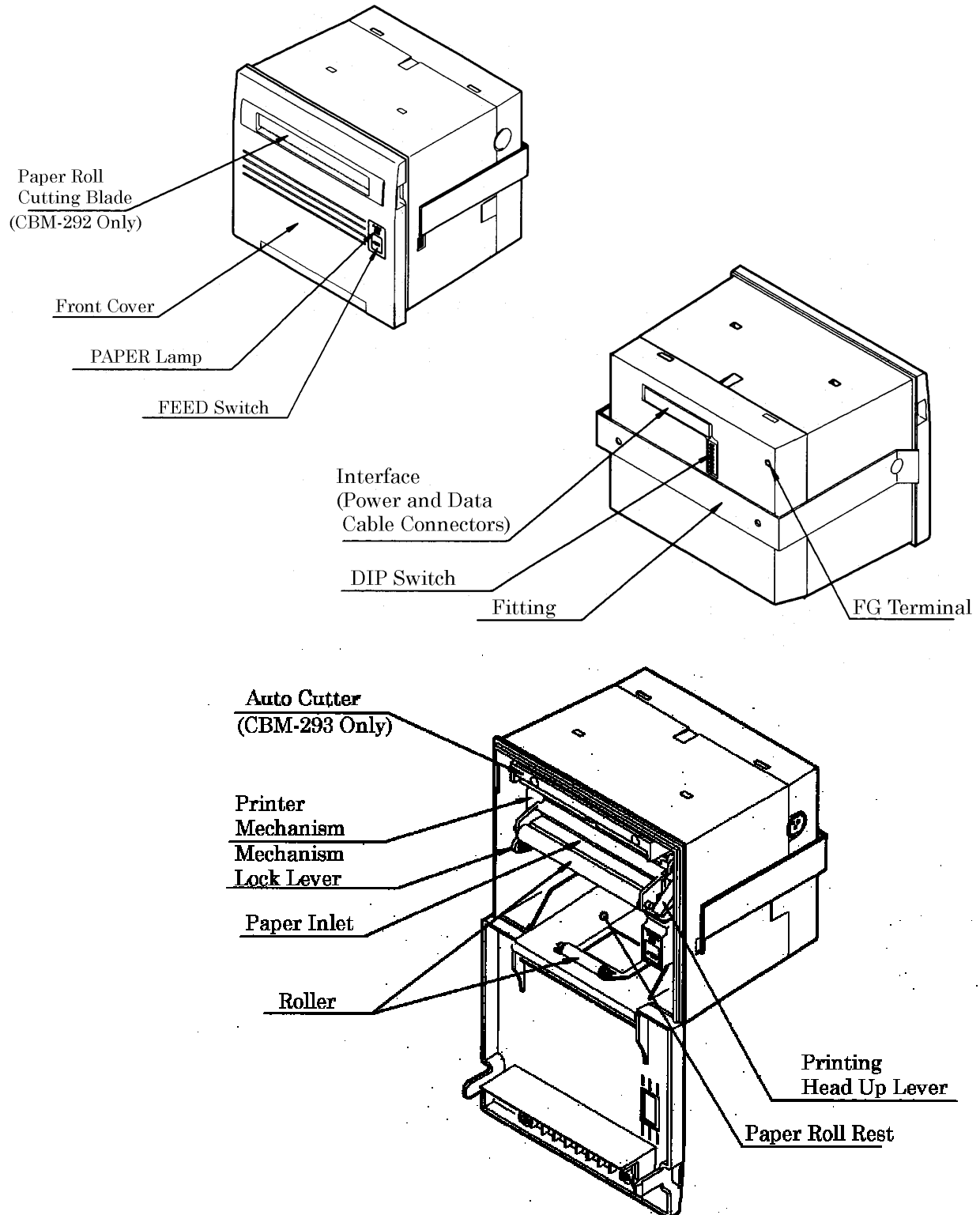


2.4.3 Printing Head and Cutter Layout



3. Outer Appearance and Component Parts

3.1 Outer Appearance and Component Parts



3.2 Description of Component Parts

- Front cover
Open and close the front cover when replacing the paper roll or the paper is jamming.
- PAPER lamp
Illuminated when the paper is running out.
- FEED switch
Press this switch when you want to feed the paper. The paper is fed while the switch is pressed. If the power is turned on with the switch held down, the printer will perform self-printing.
- Mechanism lock lever
Used to lower the mechanism when raising the printing head, when the paper is jamming or the auto cutter is being locked, or when manually discharging the paper or operating the cutter blade.
- Printing head up lever
Used to raise the printing head. The printing head has been kept up upon shipment.
- Roll paper cutting blade (CBM-292 only)
Used to cut the paper.
- Fitting metals
Used to fix the main body to the rack, etc.
- Interface connector
Connects the accessory data cable. Provides serial/parallel communications.
- DIP switch
Used to initially set communication(serial/parallel), printing concentration, etc.
- Power connector
Connects the accessory AC adapter(power source).
- FG terminal
Earth terminal for the main body frame. Wire as required.
- Auto cutter (CBM-293 only)
Automatically cuts the roll paper by a command. Either partial cut or full cut is selectable.

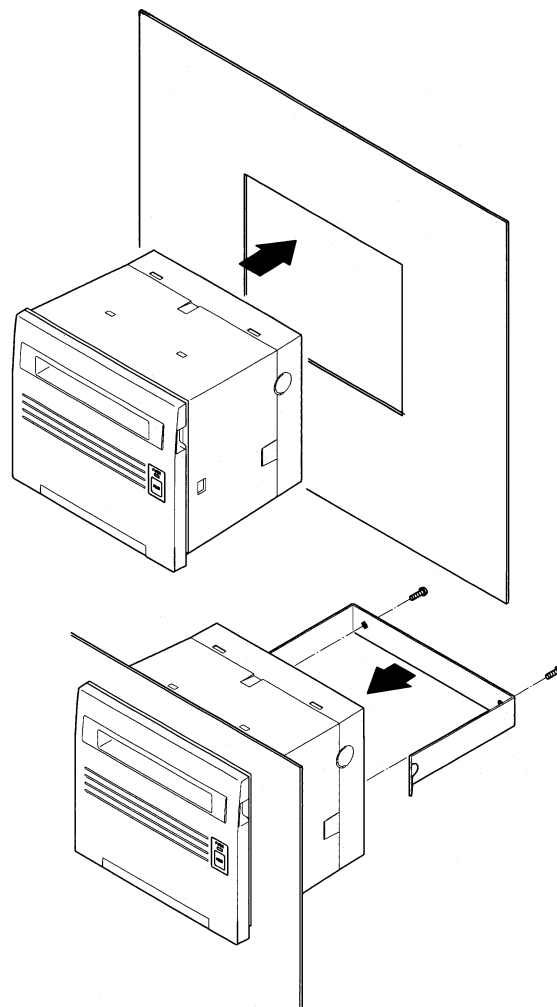
4. OPERATION

4.1 Mounting onto the Rack

- (1) Fit the main body into the specified rack, etc., as shown in the figure below.
- (2) Use the accessory fittings to catch the main body from the rear side, and secure it with the accessory screws.
- (3) After mounting, confirm that the front cover will open and close properly.
- (4) Tighten the screws to such an extent that the fittings and main body case will not be deformed. Excessive tightening not only imparts stress to the main body, it can also cause problems.
- (5) The mounting rack should be as thick as 1 to 3 mm.

Precautions for Installation

- This printer does not support natural falling of paper with full cut by auto cutter.
- Obstruction such as door, etc. shall not be located in front of the front cover. Otherwise, paper ejection is obstructed resulting in paper jam or the like.



CAUTION:

Mount the equipment to the rack angled from 0° to 90°.

The screws for the mounting bracket should be within 15 mm long.

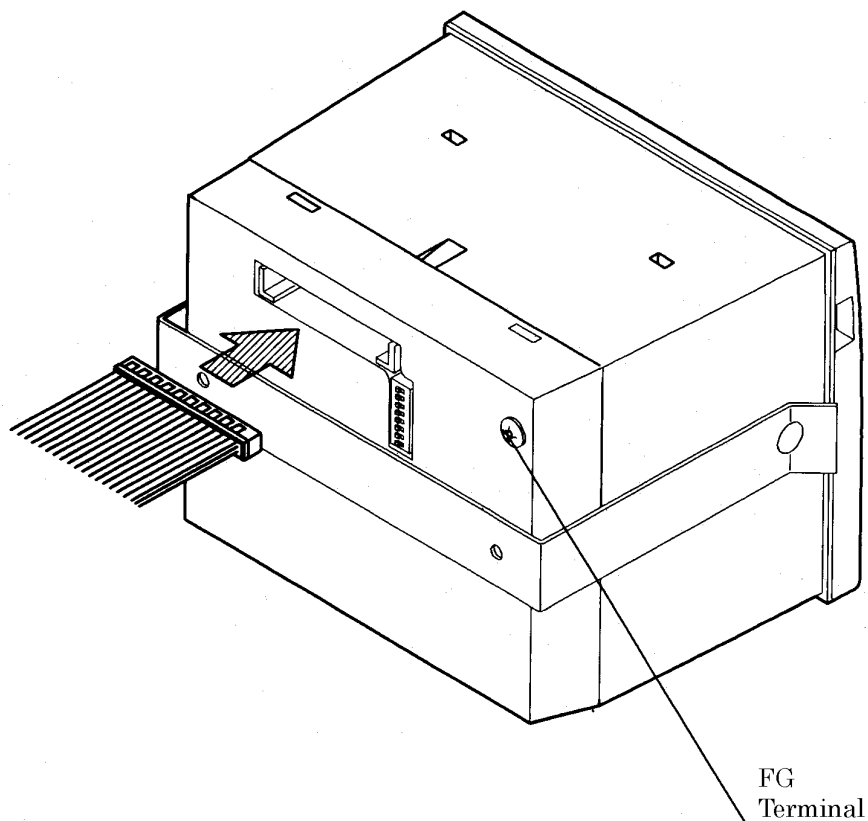
4.2 Connecting the Power Source and Data Cable

- (1) Make sure that the main power source is turned off.
- (2) Connect the accessory data cable firmly, making sure of its direction and wiring.
A connecting position is located on the back of the main body.
- (3) Plug the accessory AC adapter into a connector until it is locked.
- (4) Ground the frame of the main body as required, to prevent noise, static electricity, and so on. Secure a grounding conductor firmly to the ground terminal on the back, using a screw.



CAUTION :

- Note that the main body is turned on by plugging in an AC cord.
- Never connect the grounding conductor to a gas pipe.
- When disconnecting / reconnecting the cable, hold it by the base, as it can snap if held by the cable itself.



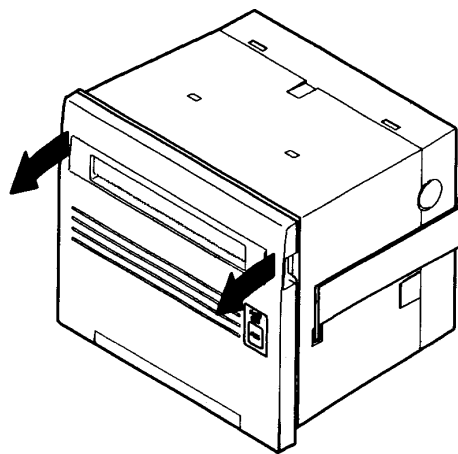
4.3 Opening/Closing the Front Cover

- (1) Put your finger in the left and right concavities of the front cover, and pull in the arrow-indicated direction.
The front cover opens about 180 ° downward.
- (2) When closing the front cover, hold and close it firmly. When closing, make sure that the roll of paper is not slackened. If closed with the paper slackened, it could jam.



CAUTION:

When opening the front cover, hold it firmly; because it opens about 180 °, it can break when opened.



4.4 Feeding the Paper

Press the FEED switch on the right panel of the front cover once. The paper is fed by one line. The paper is also fed while pressing the switch. When you want to feed the paper, do not pull it by force. Use the FEED switch. Even if the front cover is opened or the mechanism is lowered, pressing the switch feeds the paper, but it could cause a paper jam.



CAUTION:

Do not press the switch with a pointed object, as it can cause problems.

4.5 Auto Loading Function

The equipment is provided with a function to automatically load a roll of paper into the main body. If the roll of paper is brought to the paper inlet of the printer mechanism, it will be automatically fed by a constant amount.



CAUTION:

Note that pulling the paper can cause a paper jam or insertion miss.

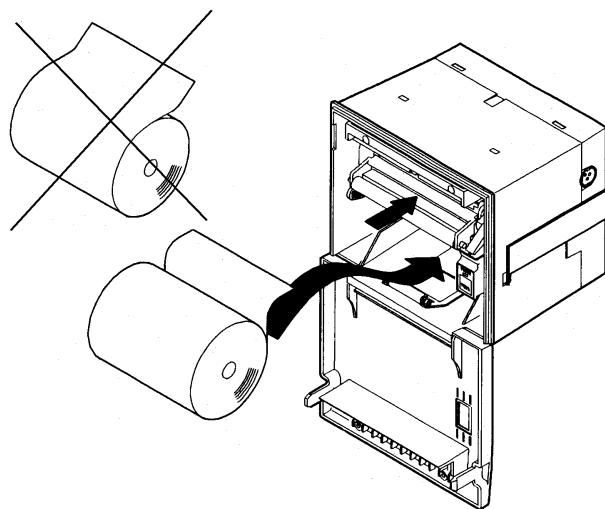
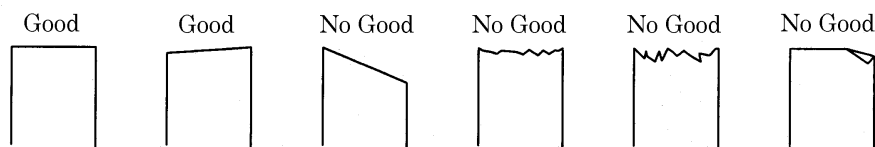
4.6 Setting the Printing Paper

- (1) Open the front cover.
- (2) Cut the end of the paper almost at a right angle.
- (3) Check the paper winding direction, and set the paper in the paper holder inside the case.
- (4) Insert the end of the paper straight into the paper inlet of the printer mechanism. The paper will be automatically inserted.
- (5) Remove slack from the paper, and close the front cover.
- (6) Press the FEED switch to feed the paper as required.
 - * The printing head is kept up at the time of shipment. The paper cannot be automatically inserted in the printing-head-up state. Shift the head up lever to the near side, to lower the printing head.
 - * Note that if there are data remaining in the printer buffer, printing will start after auto-loading (automatic insertion).



CAUTION:

- If the set paper is slanted or not properly fed, move up the printing head, remove the paper gently, and insert it again.
- When replacing the paper, move up the printing head and pull out the remaining paper gently.



4.7 Remedies for Paper Jam and Cutter Lock

If the paper jams or the auto cutter is locked, follow the procedure below to eliminate the cause. For your safety, be sure to turn off the power prior to starting the work.

- (1) Open the front cover.
- (2) Press the mechanical lock lever inward, to lower the mechanism.
- (3) Eliminating a paper jam. Eliminate all the jamming paper carefully and gently. When pulling out the paper from the printer mechanism, move up the printing head and pull it out gently.
- (4) Unlocking the cutter. Eliminate the paper from the cutter section, and turn on the power. Cutter unlocking operation will be completed if the cutter blade returns and the initial operation is performed.

If the cutter blade does not return or an error recurs, turn off the power, and turn the left inner knob of the cutter toward the far side, as shown in the figure below. Since the cutter blade withdraws, eliminate the caught paper gently. Then, turn on the power and confirm that the initial operation is performed.

- (5) After eliminating the cause, raise the mechanism back to its home position, return the head up lever, and turn on the power again.



CAUTION :

- Never work with the printing head or motor immediately after printing, as they are hot and can burn you. If such work is unavoidable, never touch them directly.
- Be careful to avoid injury by the metal edges.

4.8 Self-Printing Function

The characters used, ROM version, and DIP switch information are printed by turning on the power with the FEED switch held down or inputting a RESET signal. If the auto-cutter is attached, the paper will be cut after printing.

4.9 PE and Alarm

4.9.1 Paper End (PE)

The equipment detects if paper is still available. If the paper has run out, it will stop printing, output BUSY (DTR) and PE, and turn on the PAPER lamp.

If the paper is set, the signals will be canceled and the PAPER lamp will be turned off. After signal cancellation, the equipment starts printing or waits for data entry. If the paper has run out, but there are still some data remaining in the buffer, printing will be resumed after setting new paper.

4.9.2 Alarms

If the auto-cutter is locked, the printing head is up, the printing head temperature is increasing, or there is a certain failure, such as a paper jam, the equipment will halt printing, turn off the power for the motor and printing head, and output BUSY (DTR), ERROR, and FAULT (Parallel only) to the host.

ERROR output can directly connect to an LED.

- Error at power-on

The following faults are also possible, but a memory error has occurred. Turn off the power and contact your dealer.

- When the auto-cutter is locked or the paper is jamming

Turn off the power and eliminate the fault. When this is done, the data in the buffer are erased because the power has been turned off. Do not eliminate the fault with the power left on. To reset, turn on the power again after eliminating the fault.

- When the printing head is up

Shift the head up lever to the near side. The printing head is lowered, to enable printing.

- When the printing head temperature is increasing

If a large amount of data has been printed, such as in continuous printing, etc., the printing head temperature will increase. If this is the case, printing will stop, to protect the printing head. While printing is halted, various operations (paper feed, etc.) are not available. Wait for the printing head temperature to drop. After a while the printing head temperature will drop, enabling printing. If there are still some data remaining in the buffer, printing will be resumed.



CAUTION:

Never work with the printing head or motor immediately after printing, as they are hot and can burn you.

If such work is unavoidable, never touch them directly. Be fully careful of static electricity.

4.10 Power Supply Method and Connection

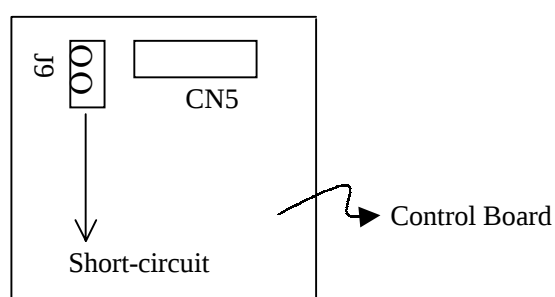
The power is generally supplied via an AC adapter. If you use an interface cable (accessory cable) to supply the power, connect the cable as follows:

- (1) Connect the accessory cable to the external power source.

Pin No.	Signal Name	Input/Output	Function
7, 8, 9, 10, 11, 12	V24	—	Power source (+24 V)
13, 14, 15, 16, 17, 18	GND	—	Power source (GND)

- (2) Remove the rear cover, to reveal the control board.

Short-circuit the Jumper(J9, Marked by silk print).



CAUTION:

If the power is supplied via the accessory cable, never connect the AC adapter.

5. DIP SWITCH SETTING

The DIP switch(DS1) is located on the back of the main body. When setting the switch, turn off the power for the main body. If the setting is changed with the power turned on, it will not become valid.

DIP Switch

	Function	ON	OFF	Setting upon Shipment
DS1- 1	Auto cutter	Yes	No	ON
2	CR switching	LF operated	Ignored	OFF
3	Printing density	Standard	Dark	OFF
4	DTR-DSR/XON-XOFF	XON-XOFF	DTR-DSR	OFF
5	Interface	See the table below		OFF
6	"			OFF
7	"			OFF
8	"			OFF

292(OFF)

Interface

DS1-8	DS1-7	DS1-6	DS1-5		Parity	Baud Rate (bps)
OFF	OFF	OFF	OFF	Parallel input	–	–
OFF	OFF	OFF	ON	Serial input	None	1,200
OFF	OFF	ON	OFF	"	"	2,400
OFF	OFF	ON	ON	"	"	4,800
OFF	ON	OFF	OFF	"	"	9,600
OFF	ON	OFF	ON	"	"	19,200
OFF	ON	ON	OFF	"	Odd	1,200
OFF	ON	ON	ON	"	"	2,400
ON	OFF	OFF	OFF	"	"	4,800
ON	OFF	OFF	ON	"	"	9,600
ON	OFF	ON	OFF	"	"	19,200
ON	OFF	ON	ON	"	Even	1,200
ON	ON	OFF	OFF	"	"	2,400
ON	ON	OFF	ON	"	"	4,800
ON	ON	ON	OFF	"	"	9,600
ON	ON	ON	ON	"	"	19,200

The main body has been preset with jumpers upon shipment.

Jumper

	Domestic Spec.	International Spec.
J1	Open	Short
J2	Open	Short
J3	Open	Short
J4	Short	Short
J5	Short	Short
J6	Short	Short
J7	Short	Short
J8	Short	Short

1. Domestic Specifications

- International characters : Japan
- Kanji : JIS code
- Auto loading function
- Input buffer : 3 KB
- Serial communication bit length : 8 bits

2. International Specifications

- International characters : U.S.A.
- Auto loading function
- Input buffer : 3 KB
- Serial communication bit length : 8 bits

* The DS1-4 is invalid if parallel input is specified.

* The DS1-1 results in an error if set to ON in case of the CBM-292.

6. CONNECTORS

The following lists the wiring of the accessory data cable. Be sure to wire correctly, observing the connecting direction and position.

6.1 Connector's Pin Configurations

Pin No.	Signal	I/O	Function
1~3, 7~18	—	—	Unused (Unavailable)
4~6	GND	—	Circuit common GND
19	—	—	Unconnectable
20	$\overline{\text{ERROR}}$	Output	ERROR LED output (Directly connectable)
21	—	—	Unconnectable
22	DTR	Output	Serial interface DTR
23	TXD	Output	Serial interface TXD
24	RXD	Input	Serial interface RXD
25	DSR	Input	Serial interface DSR
26	$\overline{\text{STB}}$	Input	Parallel interface STROBE
27	BUSY	Output	Parallel interface BUSY
28	$\overline{\text{ACK}}$	Output	Parallel interface ACK
29	DATA0	Input	Parallel interface DATA0
30	DATA1	Input	Parallel interface DATA1
31	DATA2	Input	Parallel interface DATA2
32	DATA3	Input	Parallel interface DATA3
33	DATA4	Input	Parallel interface DATA4
34	DATA5	Input	Parallel interface DATA5
35	DATA6	Input	Parallel interface DATA6
36	DATA7	Input	Parallel interface DATA7
37	PE	Output	Parallel interface PE
38	$\overline{\text{FAULT}}$	Output	Parallel interface FAULT
39	$\overline{\text{RESET}}$	Input	Parallel interface RESET
40	—	—	Unconnectable

Connector used: LY20-40P-DT1-P5 (Made by JAE)

Applicable connector: LY10-DC40 (Made by JAE)

* The No. 19 and 21 pins are internally used; do not connect them externally.



CAUTION:

- Wrong wiring damages not only the main body, but the opponent host.
- Never connect the unconnectable pins because it may cause the main body to have a trouble or malfunction.

6.2 Precautions

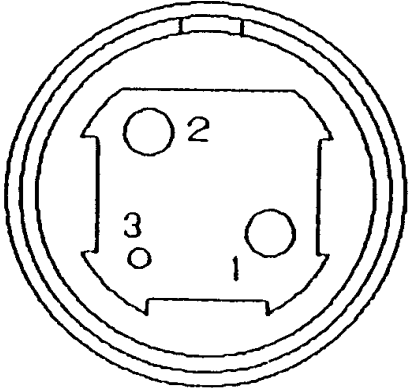
- (1) For the ERROR LED output, 330Ω is included in the circuit of the main body so that a current value will be approximately 10mA. Use the LED whose forward voltage is approximately 2V. If the current value exceeds 10mA in operation, the control board of the main body may go out of order or be broken.
- (2) Connect all grounding conductors.
- (3) The serial interface is equipped with a RS-232C driver and receiver. Be sure to use at the RS-232C level.
- (4) The RESET pin is pulled up at 3.3kΩ. Do not connect it if not used.
- (5) Either serial or parallel interface is available. If not necessary, do not connect it.
- (6) The accessory cable is approx. 300mm. Adjust the length as required. However, excessively extended wiring may cause malfunctioning due to an effect of noise, etc.
- (7) Only the pins for the serial interface should be connected to the 5V or higher power source. Otherwise, the control board of the main body may be broken.

6.3 Power Connector Specifications

This is a power supply connector from the AC adapter attached to the main body.

Connector's Pin Configurations

No.	Function
1	+24V
2	GND
3	N.C
SHELL	FG



Connector used : TSC7960-53-2010(Made by HOSHIDEN) or its equivalent

Applicable connector : TSC8927-63-1100(Made by HOSHIDEN) or its equivalent
TSC8927-53-1100(Made by HOSHIDEN) or its equivalent

7. PARALLEL INTERFACE

7.1 Specifications

Data input system	: 8-bit parallel system(DATA0 ~ 7)
Control signals	: $\overline{\text{ACK}}$, $\overline{\text{BUSY}}$, $\overline{\text{STROBE}}$, $\overline{\text{FAULT}}$, $\overline{\text{PE}}$, $\overline{\text{RESET}}$

7.2 Input and Output Signals

- DATA0 ~ 7 : An 8-bit parallel signal.(Positive logic)
- $\overline{\text{STROBE}}$: A strobe signal to read the 8-bit data.(Negative logic)
- $\overline{\text{RESET}}$: A signal to reset the entire control board.(Negative logic)
- $\overline{\text{ACK}}$: An 8-bit data request signal.
A pulse signal to be output at the end of the BUSY signal.(Negative logic)
- $\overline{\text{BUSY}}$: A signal to indicate the BUSY status. Input new data when "LOW."
(Positive logic)
- $\overline{\text{FAULT}}$: A signal turned to "LOW" in case of the alarm status.(Negative logic)
- $\overline{\text{PE}}$: A signal to be output when the printing paper runs out.(Positive logic)

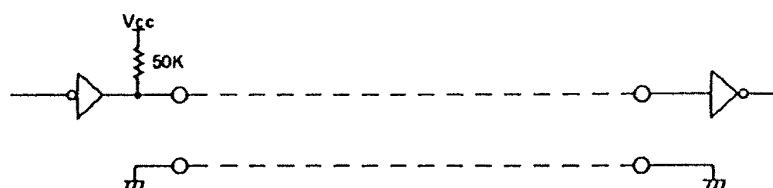
7.3 Electrical Characteristics

- (1) Input signal levels
 - "HIGH" level : 0.7V_{CC} at minimum
 - "LOW" level : 0.3V_{CC} at maximum
- (2) Output signal levels
 - "HIGH" level : V_{CC}-0.1V at minimum
 - "LOW" level : 0.1V at maximum
- (3) Input/output conditions

The STROBE and RESET input signals are all pulled up at 3.3k Ω . The others are pulled up at 50k Ω .

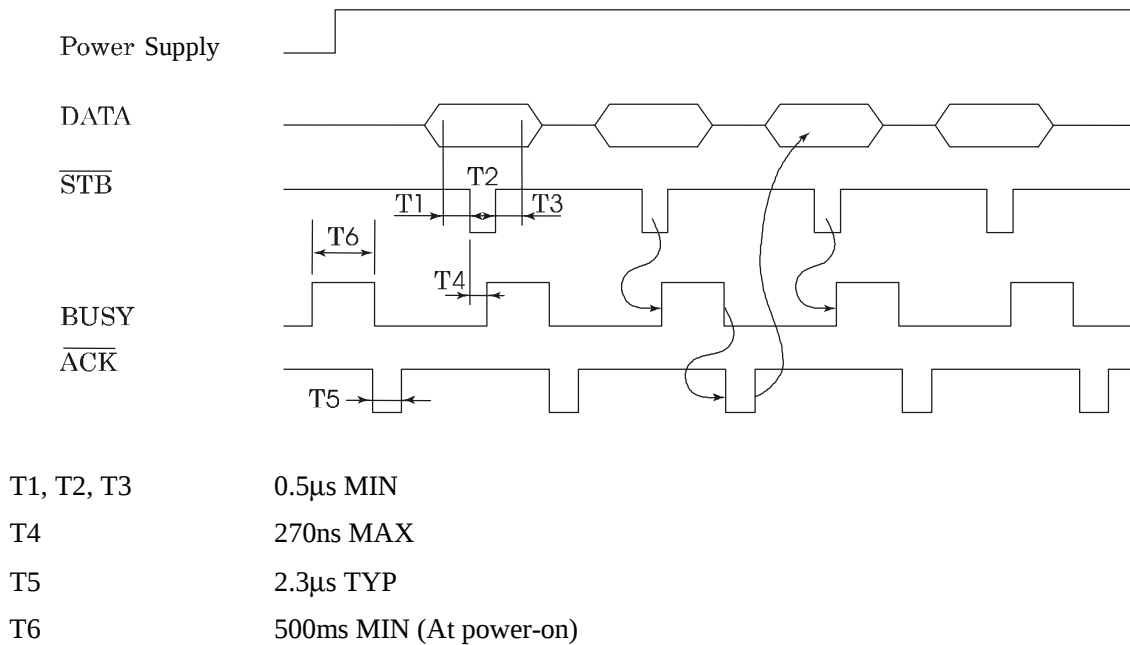


All the output signals are pulled up at 50k Ω .



7.4 Timing Chart

The following chart shows the data input and printing timings.



7.5 Data Receiving Control

When the BUSY signal is at "LOW," the data can be received from the host, but when at "HIGH," it cannot be received.

7.6 Buffering

The main body has a 3KB input buffer. The host side is immediately released because a large amount of data can be buffered.

8. SERIAL INTERFACE

8.1 Specifications

- (1) Synchronizing system : Asynchronous
- (2) Baud rate : 1,200, 2,400, 4,800, 9,600, or 19,200 bps (User selectable)
- (3) Configuration of one word
 - Start bits : 1 bit
 - Data bits : 8 bits
 - Parity bits : Odd, even, or no parity (User selectable)
 - Stop bits : 1 bit or more
- (4) Signal polarity
 - RS-232C
 - Mark = Logic "1" (−3 ~ −12 V)
 - Space = Logic "0" (+3 ~ +12 V)
- (5) Received data (RXD signal)
 - RS-232C
 - Mark = 1
 - Space = 0
- (6) Reception control (DTR signal)
 - Mark : Data transfer disabled (BUSY)
 - Space : Data transfer enabled
- (7) Transmitted data (TXD signal)
 - Mark = 1
 - Space = 0
- (8) Transmission control (DSR signal)
 - Mark : TXD data transmission disabled
 - Space : TXD data transmission enabled
- (9) Transmission control (TXD signal: X-ON/X-OFF control)
 - DC1 code(11H) X-ON : Data reception enabled
 - DC3 code(13H) X-OFF : Data reception disabled

8.2 Input and Output Signals

(1) TXD

If the input buffer on the printer side has 128 or less remaining bytes while receiving the data, the DC3(13h) data reception disabled signal will be output. If the input buffer has 256 or more remaining bytes, the DC1(11H) data reception enabled signal will be output to the host side. At the time of sending the status information, if DTR/DSR control is selected, the data will be sent after confirming that DSR is Space. If DTR/DSR is not selected, the data will be sent, ignoring DSR.

(2) RXD

A serial received data signal. If there is a framing error, overrun error, or parity error, that data will be printed as "?".

(3) DTR

When this signal is Space, write a data or command. If written at Mark time(BUSY), an overrun error will result, ignoring the data. The data can be written in the input buffer even during printing. Mark(BUSY) will be generated at power-on, during test printing, at on-line mode, or at reset time as well.

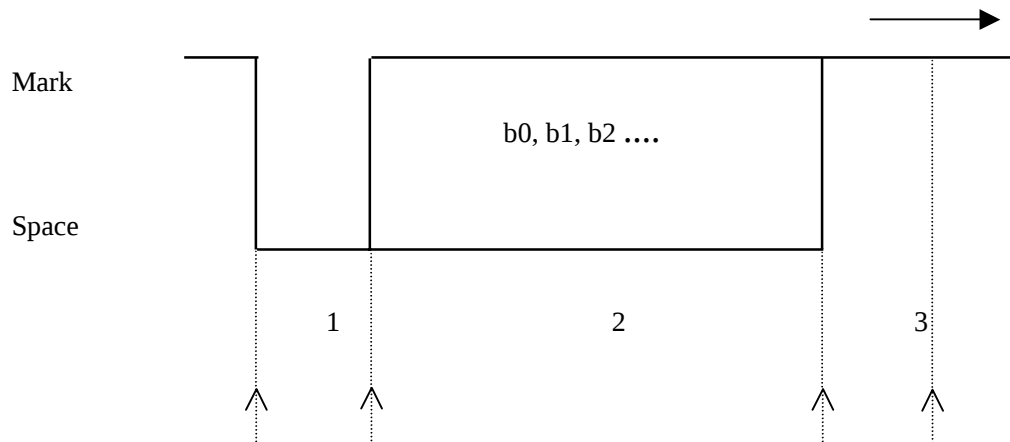
(4) DSR

Set to Space when sending the data from the printer to the host in printer status transmission. When set to Mark, the printer will wait to transmit until the Space status takes effect, without transmitting the data. Ignored in case of X-ON/X-OFF control.

(5) GND

A signal line at the same level as the GND for the circuit driving power.

8.3 Data Configuration



1. Start Bit
2. Data Bits(+ Parity Bit)
3. Stop Bits (1 or More)

(1) Start bit

When a 1/2 bit passes from a fall edge of Mark to Space, the status is read again. If it is Space, it will be recognized as the start bit. If it is Mark, it will not be recognized as the start bit. An attempt to detect the start bit will be made again without taking it as an error.

(2) Data bits + parity bit

The data is sampled at 1 bit worth of time from the 1/2 start bit and the then status is taken as the data for the relevant bit. The bits are arranged in order of Bit 0, Bit 1,..., Parity Bit, counting from the one closest to the start bit.

(3) Stop bit

The stop bit is the Mark level of 1 bit or more. If Space is detected at stop bit detection time, a framing error will result.

8.4 Error Detection

Errors detected include parity error, framing error, and overrun error.

(1) Framing error

If the Space status is detected at stop bit detection time, an error will result and that data will be stored in the input buffer as "?".

(2) Parity error

If a parity check has been specified and an error is detected in the parity check, that data will be stored in the input buffer as "?".

(3) Overrun error

If an overrun error is detected, that data will be stored in the input buffer as "?".

8.5 Data Receiving Control

If DTR/DSR control has been selected and the DTR signal is at "LOW," the data will be received from the host. If at "HIGH," it cannot be received. If DTR/DSR control has not been selected, the data will be received from the host after sending X-ON, but it cannot be sent after sending X-OFF.

8.6 Buffering

There are TxD and DTR signals as control signals for data transfer to the input buffer.

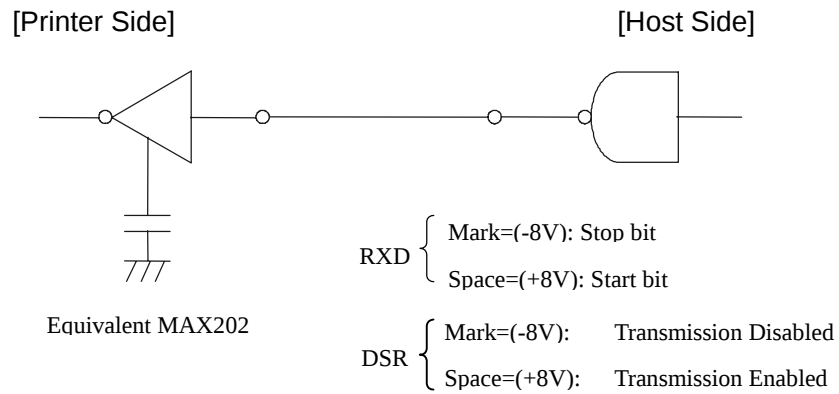
(1) TXD signal (See 8.2 (1))

(2) DTR signal (See 8.2 (3))

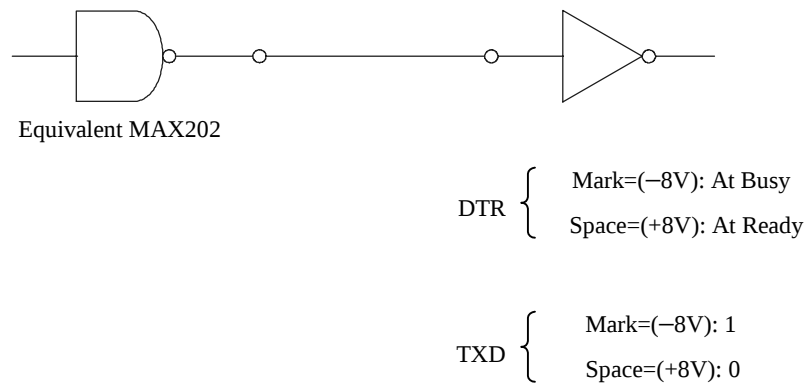
8.7 Electrical Characteristics

(1) RS-232C circuit

Input (RXD, DSR)



Output (DTR, TXD)



9. MAINTENANCE AND SERVICE

For the information on maintenance and service, please contact our dealer.

10. PRINT CONTROL FUNCTIONS

10.1 Commands List

	Control Code	Function	Code	Page
1	HT	Horizontal tab	09H	42
2	LF	Printing and paper feed	0AH	42
3	CR	Print	0DH	43
4	ESC SP	Setting the right space amount of the character	1BH 20H n	43
5	ESC !	Collective specifying printing mode	1BH 21H n	44
6	ESC %	Specifying/canceling download character set	1BH 25Hn	46
7	ESC &	Defining download characters	1BH 26H 5 n m[a p1 p2 ... psxa]m-n+1	47
8	ESC *	Specifying the bit image mode	1BH 2AH mn1n2[d]k	49
9	ESC –	Specifying/canceling underline	1BH 2DH n	51
10	ESC 2	Specifying 1/6-inch line feed rate	1BH 32H	51
11	ESC 3	Setting line feed rate of minimum pitch	1BH 33H n	52
12	ESC =	Data input control	1BH 3DH n	53
13	ESC @	Initializing the Printer	1BH 40H	54
14	ESC D	Setting horizontal tab position	1BH 44H [n]k00H	55
15	ESC E	Specifying/canceling highlighting	1BH 45H n	56
16	ESC G	Specifying/canceling double printing	1BH 47H n	57
17	ESC J	Printing and feeding paper n/203 inch	1BH 4AH n	57
18	ESC R	Selecting the international character set	1BH 52H n	58
19	ESC V	Specifying/Canceling 90° -right- turned Characters	1BH 56H n	59
20	ESC a	Aligning the characters	1BH 61H n	60
21	ESC c3	NOP		
22	ESC c4	NOP		
23	ESC c5	Enabling/disabling the panel switches	1BH 63H 35H n	61
24	ESC d	Printing and feeding the paper by n lines	1BH 64H n	61
25	ESC i	Activating auto cutter (Full cut)	1BH 69H	62
26	ESC m	Activating auto cutter (Partial cut)	1BH 6DH	63
27	ESC p	NOP		
28	ESC t	Selecting the character code table	1BH 74H n	64
29	ESC u	NOP		
30	ESC v	Transmitting the printer status (Serial type)	1BH 76H n	65
31	ESC {	Specifying/canceling the inverted characters	1BH 7BH n	66
32	ESC \$	Specifying the absolute positions	1BH 24H n1 n2	67
33	ESC ¥	Specifying the relative positions	1BH 5C n1 n2	68
34	GS k	Printing the bar code	1DH 6BH n ["d"]k00H	69
35	GS w	Selecting the horizontal size (scale factor) of bar code	1DH 77H n	73
36	GS h	Selecting the height of the bar code	1DH 68H n	74
37	GS H	Selecting of print position of HRI code	1DH 48H n	75
38	GS f	Selecting the font of HRI code	1DH 66H n	76
39	GS *	Defining the download, bit image	1DH2An1n2[d]n1xn2x8	77
40	GS /	Printing the download, bit image	1DH 2FH m	79
41	GS :	Starting/ending macro definition	1DH 3AH	80
42	GS ^	Executing the macro	1DH 5E n1n2 n3	81

10.2 Command Details

10.2.1 Description of Items

XXXX**ALL**

[Function]	Command Function
[Code]	A sequence of code constituting a command is represented in hexadecimal number for < >H, binary number for < >B, and decimal number for < >, respectively; []k represents a repeat count of k-times.
[Range]	Describes an argument value(Setting range) for the command.
[Outline]	Describes a command outline.
[Caution]	Describes a caution as required.
[Default]	Describes an initial value for the command when accompanied by an argument.
[See Also]	Describes the associated commands for use.
[Sample Program]	Describes a coding example in the Q-BASIC sample program. * This example is only for your reference and differs depending on the language used, version, and so on. For details, see the manual for the language used.

10.2.2 Details

HT

[Function]	Horizontal Tab
[Code]	<09>H
[Outline]	Shifts the printing position to the next horizontal tab position. • Ignored when the next horizontal tab position has not been set.
[Caution]	• The horizontal tab position is set by ESC D. • Initial setting of the horizontal tab position is each 8 characters in 9th, 17th, 25th, columns.
[See Also]	ESC D
[Sample Program]	<pre>LPRINT "0123456789012345678901" ; LPRINT CHR\$ (&HA) ; LPRINT CHR\$ (&H9) + "AAA" ; LPRINT CHR\$ (&H9) + "BBB" ; LPRINT CHR\$ (&HA); LPRINT CHR\$ (&H1B) + "D" ; LPRINT CHR\$ (3) + CHR\$ (7) + CHR\$ (14) + CHR\$ (0) ; LPRINT CHR\$ (&H9) + "AAA" ; LPRINT CHR\$ (&H9) + "BBB" ; LPRINT CHR\$ (&H9) + "CCC" + CHR\$ (&HA) ;</pre>
[Print Results]	012345678901234567890 1 AAA BBB ← Initially set horizontal tab AAA BBB CCC ← When set to the 4th, 8th, and 15th digits

LF

[Function]	Printing and Paper Feed
[Code]	<0A>H
[Outline]	Prints data inside the input buffer and feeds lines based on the line feed amount having been set. • The head of the line becomes the next print starting position.
[See Also]	ESC 2, ESC 3
[Sample Program]	<pre>LPRINT "AAA" + CHR\$ (&HA) ; LPRINT "BBB" + CHR\$ (&HA) ; LPRINT CHR\$ (&HA) ; LPRINT "CCC" + CHR\$ (&HA) ;</pre>
[Print Results]	AAA ← Print and line feed BBB ← Print and line feed ← Line feed only CCC ← Print and line feed

CR

[Function]	Print
[Code]	<0D>H
[Outline]	1) When DS 1 -2 is OFF: This command is ignored. 2) When DS 1- 2 is ON: With data held inside the internal print buffer, printing and line feed are performed. Without data inside the internal print buffer, however, no printing is performed.
[See Also]	LF
[Sample Program]	<pre>LPRINT "AAA" + CHR\$ (&HD) ; LPRINT "BBB" + CHR\$ (&HD) ; LPRINT CHR\$ (&HD) ; LPRINT "CCC" + CHR\$ (&HD) ;</pre> [Print Results] <pre>AAA BBB CCC</pre> ← Print and line feed ← Print and line feed ← Line feed only ← Print and line feed

ESC SP n

[Function]	Setting the right space amount of the character
[Code]	<1B>H<20>H<n>
[Range]	{0 ≤ n ≤ 20} Data is described in Hex code.
[Outline]	The rightward space amount is set in dot unit (1/203 inch unit). In the initial value, it is n=0.
[Caution]	The rightward space amount in double wide mode is made double of the set volume.
[Default]	n = 0
[Sample Program]	<pre>LPRINT CHR\$ (&H1B) + " " + CHR\$ (0) ; LPRINT "AAAAA" + CHR\$ (&HA) ; LPRINT CHR\$ (&H1B) + " " + CHR\$ (1) ; LPRINT "AAAAA" + CHR\$ (&HA) ; LPRINT CHR\$ (&H1B) + " " + CHR\$ (12) ; LPRINT "AAAAA" + CHR\$ (&HA) ;</pre>
[Print Results]	<pre> A A A A A ← 0-dot space A A A A A ← 1-dot space A A A A A ← 12-dot space</pre>

ESC ! n

[Function] Collective Specifying Printing Mode

[Code] <1B>H<21>H<n>

[Range] {0 ≤ n ≤ FF} Data is described in Hex code.

[Outline] Printing mode is assigned. Each n bit indicates the following:

Bit	Function	Value	
		0	1
0	Character Font	Font A	Font B
1	Undefined		
2	Undefined		
3	High-lighting	Canceled	Specified
4	Double height	Canceled	Specified
5	Double width	Canceled	Specified
6	Undefined		
7	Underline	Canceled	Specified

- [Caution]
- With double height and double width being specified simultaneously, double wide and double high characters are consisted.
 - An underline is attached to the full character width, which, however, is not attached to the part having been skipped by the horizontal tab.
Neither is it attached to 90° -right-turned characters.
 - The underline width is as having been specified by <ESC - >.
(The default setting is 1 dot width.)
 - Specification with this command is invalid to Kanji, except specification and cancellation of highlighting
 - In case that double wide character and normal character exist in same one line, the layout of underline is consistent one.

[Default] n = 0

[See Also] ESC E, ESC –

[Sample Program]

```

LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H00) + "H" ;
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H01) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H08) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H10) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H20) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H80) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&HB9) + "H";
LPRINT CHR$ (&HA) ;

```

[Print Results]

Font A
 Font B
 Font A + Highlighting
 Font B + Highlighting + Quadruple + Underline
 Font A + Underline
 Font A + Double Width
 Font A + Double Height

ESC % n

[Function] Specifying/Canceling Download Character Set

[Code] <1B>H<25>H<n>

[Range] {0 ≤ n ≤ FF} data is described in Hex code.

[Outline] Specifying/canceling download characters. Further, only the lowest bit (n0) is valid for n. The lowest bit (n0) indicates the following.

n0	Function
0	Canceling download character set
1	Specifying download character set

[Caution] Download characters and download bit images can not be defined simultaneously.

[Default] n = 0

[See Also] ESC &

[Sample Program]

```

GOSUB SETCHR          DATA 6
LPRINT CHR$ (&H1B) + "%" + CHR$ (0) ; DATA &HFF, &H80, &H00
LPRINT "@A" + CHR$ (&HA) ; DATA &H80, &H80, &H00
LPRINT CHR$ (&H1B) + "%" + CHR$ (1) ; DATA &H80, &H80, &H00
LPRINT "@A" + CHR$ (&HA) ; DATA &H80, &H80, &H00
END                   DATA &HFF, &HFF, &HFF
  SETCHR :            DATA &HFF, &HFF, &HFF
LPRINT CHR$ (&H1B) + "&" ; DATA 12
LPRINT CHR$ (3) + "@" + "A" ; DATA &HFF, &HFF, &HFF
  FOR J=1 TO 2        DATA &H80, &H07, &HF9
    READ REP          DATA &H80, &HFF, &HF9
    LPRINT CHR$ (REP) ; DATA &H87, &HFE, &H01
    FOR I=1 TO REP*3  DATA &H9F, &H06, &H01
      READ D           DATA &HF8, &H06, &H01
      LPRINTCHR$ (D) ; DATA &HF8, &H06, &H01
    NEXT I            DATA &H9F, &H06, &H01
    NEXT J            DATA &H87, &HFE, &H01
  RETURN              DATA &H80, &HFF, &HF9
                     DATA &H80, &H07, &HF9
                     DATA &HFF, &HFF, &HFF

```

[Print Results]

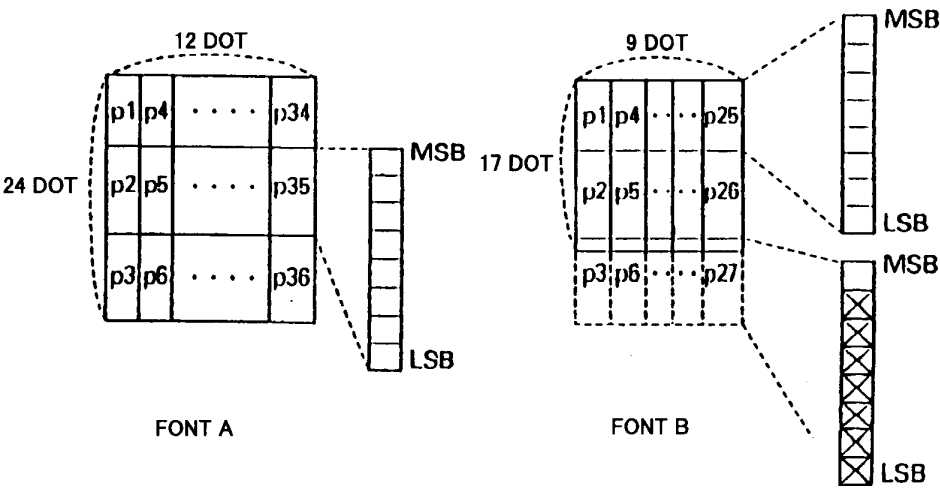
@ A ← Internal Character Set

☐ ☒ ← Download Character

ESC & s n m [a [p] s × a] m – n + 1

[Function]	Defining Download Character
[Code]	<1B>H<26>H<s><n><m> [<a><p1><p2> • • <ps×a>]m-n+1
[Range]	{s = 03} {20 (Hex) ≤ n ≤ m ≤ 7E (Hex)} {0 ≤ a ≤ 0C(Hex)} (Font A) {0 ≤ a ≤ 0A(Hex)} (Font B)
[Outline]	Defines the font of download characters of alphanumeric characters. • "s" indicates the number of bytes in vertical direction. • "n" indicates the start character code and m the end character code. To define only one character, set n=m. • Character codes definable includes 95 ASCII codes in total between <20>H ~ <7E>H. • "a" indicates the number of dots in horizontal direction for definition. • "p" is the data to be defined, which indicate a pattern equal to "a" dot in horizontal direction from the left end. The rest of the pattern on the right side is filled with space. The rest of data to be defined is s x a. • Download characters thus defined remain valid until redefinition, ESC @ execution, GS * execution, or power OFF is practiced.
[Caution]	Download characters and download bit images can not be defined simultaneously. Running this command clears the definition of the download bit image.
[Default]	Same as the internal character set

[Example]



Create each data bit by setting "1" for a printed dot and "0" for an unprinted dot.

[Sample Program]

[Print Results]

See Sample Program and Print Results for ESC % on Page 46.

ESC * m n1 n2 [d] k

[Function] Specifying the Bit Image Mode

[Code] <1B>H<2A>H<m><n1><n2> [<d>] k

[Range] {m= 0, 1, 32, 33 bit image mode (See the table below.)}

{0 ≤ n1 ≤ FF(Hex)}

{0 ≤ n2 ≤ 03(Hex)}

{0 ≤ d ≤ FF(Hex)}

{k = n1 + FF(Hex) × n2 (m = 0, 1)}

{k = (n1 + FF(Hex) × n2) × 3} (m = 32, 33)

[Outline] According to the number of dots specified in n1, n2, specify the bit image of mode n.

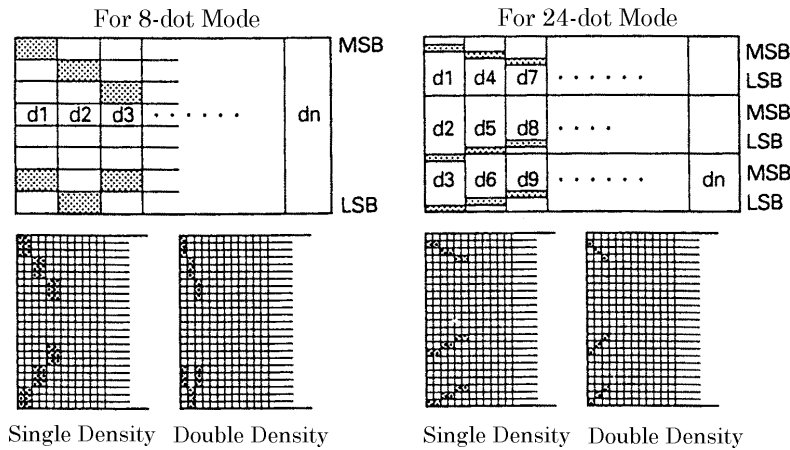
- The No. of dots printed is divided by 256, whose quotient is taken as n2 and residual as n1.
- The total no. of dots printed in the bit image is equal to n1 + (256 × n2).
- When bit image data have been input in excess of dot position of one line(448 dots), the excess data are discarded.
- d is bit image data, the bits subject to printing are taken as "1" and those not as "0".
- The bit image modes specified by m are shown as follows:

m(Hex)	Mode	Vertical Direction		Horizontal Direction	
		No. of Dots	Dot Density	Dot Density	Max. No. of Dots
0	8-dots single density	8	67 DPI	101 DPI	288
1	8-dots double density	8	67 DPI	203 DPI	576
20	24-dots single density	24	203 DPI	101 DPI	288
21	24-dots double density	24	203 DPI	203 DPI	576

[Caution]

- When the values set in m (bit image mode) are out of the above range, the data following after n1 is processed as normal printing data.
- After completion of bit image printing, printer returns to normal data processing mode.

[Example]

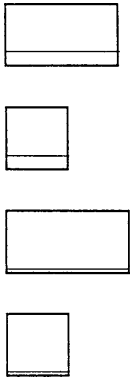


[Sample Program]

```
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (0) + CHR$ (20) + CHR$ (0); IMG1 :
GOSUB IMG1
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (1) + CHR$ (20) + CHR$ (0); NEXT I
GOSUB IMG1
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (32) + CHR$ (20) + CHR$ (0);
GOSUB IMG2
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (33) + CHR$ (20) + CHR$ (0);
GOSUB IMG2
LPRINT CHR$ (&HA);
END

LPRINT CHR$ (&HFF);
FOR I=1 TO 18
  LPRINT CHR$ (&H85);
LPRINT CHR$ (&HFF);
RETURN
IMG2 ;
LPRINT CHR$ (&HFF);
LPRINT CHR$ (&HFF);
LPRINT CHR$ (&HFF);
FOR I=1 TO 18
  LPRINTCHR$ (&H80);
  LPRINTCHR$ (&H00);
  LPRINTCHR$ (&H05);
NEXT I
LPRINT CHR$ (&HFF);
LPRINT CHR$ (&HFF);
LPRINT CHR$ (&HFF);
RETURN
```

[Print Results]



ESC – n

- [Function] Specifying/Canceling Underline
- [Code] <1B>H<2D>H<n>
- [Range] {0 ≤ n ≤ 02} data is described in Hex code.
- [Outline] Specifying/canceling an underline.

• Types of underlines by n value are shown below:

n (Hex)	Type
0	Canceling an underline.
1	Specifying an underline for 1-dot width.
2	Specifying an underline for 2-dots width.

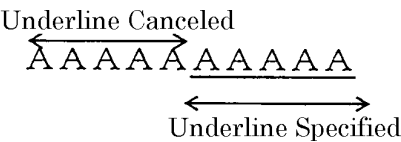
- [Caution] • An underline is attached to the full character width. It is, however, not attached to the part having been skipped by horizontal tab command.
- An underline is not attached to a 90 ° - right-turned characters.
- Specification/cancellation with this command is invalid to Kanji.

[See Also] ESC !, FS –

[Sample Program]

```
LPRINT CHR$ (&H1B) + "-" + CHR$ (0) ;
LPRINT "AAAAA" ;
LPRINT CHR$ (&H1B) + "-" + CHR$ (1) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
```

[Print Results]



ESC 2

- [Function] Specifying 1/6-inch Line Feed Rate
- [Code] <1B>H<32>H
- [Outline] The line feed rate per line is specified by 1/6 inch.
- [Sample Program]

[Print Results]

```
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "3" + CHR$ (0) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "3" + CHR$ (50) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "2" ;
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT "AAAAA" ;
LPRINT CHR$ (&H1B) + "J" + CHR$ (100) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
```

1/6-inch line feed

0/360-inch line feed

50/360-inch line feed

1/6-inch line feed

100/360-inch line feed

1/6-inch line feed

ESC 3 n

[Function]	Setting Line Feed Rate of Minimum Pitch
[Code]	<1B>H<33>H<n>
[Range]	{ $0 \leq n \leq FF$ } Data is described in Hex code.
[Outline]	The line feed rate per line is specified by $n/360$ inch. Since an actual mechanical pitch is 1/203 inch, it is internally converted approximate to the value specified with this command.
[Default]	• The initial value is $n = 60$ (1/6 inch) (18H), being 4.23 mm line feed rate.
[Sample Program]	
[Print Results]	See Sample Program and Print Results for ESC 2 on Page 51.

ESC = n

[Function]

Data Input Control

[Code]

<1B>H<3D>H<n>

[Range]

{0 ≤ n ≤ FF} Data is described in Hex code.

[Outline]

Selecting equipment in which data input from the host is effective.

- Each bit of n indicates as follows:

Bit	Equipment	Value	
		0	1
0	Printer	Invalid	Valid
1	Not defined		
2	Not defined		
3	Not defined		
4	Not defined		
5	Not defined		
6	Not defined		
7	Not defined		

[Caution]

- When the printer has not been selected, this printer abandons all the received data until it is selected by this command.
- Even when the printer has not been selected, it can become BUSY state through printer operation.
- When the printer is deselected, this printer discards all the data until it is selected with this command.
- The initial value of n is "1".

[Default]

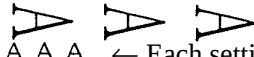
[Sample Program]

```
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "=" + CHR$ (0);
LPRINT "aaaaa" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "=" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]

```
A A A A A A A A A A
      ↑
    a a a a a is not printed
```

ESC @

[Function]	Initializing the Printer
[Code]	<1B>H<40>H
[Range]	Clears data stored in the print buffer and brings various settings to the initial state (Default state).
[Caution]	• Data inside the internal input buffer are not cleared. • Dipswitches setting are red once again.
[Sample Program]	<pre> LPRINT CHR\$ (&H1B) + " !" + CHR\$ (&H30) ; LPRINT CHR\$ (&H1B) + "V" + CHR\$ (1) ; LPRINT "AAA" + CHR\$ (&HA) ; LPRINT CHR\$ (&H1B) + "@" ; LPRINT "AAA" + CHR\$ (&HA) ; </pre>
[Print Results]	 ← Each setting are initialized by reset command.

ESC D [n] k NUL

[Function]	Setting Horizontal Tab Position
[Code]	<1B>H<44>H [<n>] k<00>H
[Range]	{0 ≤ n ≤ FFH} {0 ≤ k ≤ 20H} Data is described in Hex code.
[Outline]	Specifying a horizontal tab position. • "n" indicates the no. of columns from the beginning to the horizontal tab position. At this time, n= set position- 1 is to be specified. For example, to set the position at 9th column, n=8 is to be specified. • k denotes the number of horizontal tab positions you want to set. • The tab position is set at position where it is "character width x n" from the line beginning. The character width, at this time, includes the rightward space amount. In double wide characters, it is made double of the ordinary case. • Tab positions can be specified are maximum 32. Specifying exceeding this is ignored. • <n> k, which denotes a setting position, is input in the increasing order and ends at <00> H. • ESC D NUL clears all the set tab positions. Following clearing, horizontal tab command is ignored.
[Caution]	When the data, <n> k, is equal to or smaller than its preceding data, <n> k-1, it is assumed that tab setting is finished. If this is the case, the next data onward will be processed as normal data. When the data, <n> k, exceeds a 1-line print area, set the horizontal tab position, assuming "Set digit position = Maximum print digits + 1." The horizontal tab position does not change even if the character width is altered after setting the horizontal tab position.
[Default]	• Initial value is specified for each eight characters(9th.17th.25th columns) of ANK characters.
[See Also]	HT
[Sample Program]	
[Print Results]	See Sample Program and Print Results for HT on Page 42.

ESC E n

[Function] Specifying/canceling highlighting

[Code] <1B>H<45>H<n>

[Range] {0 ≤ n ≤ FF} Data is described in Hex code.

[Outline] Specifying/canceling the highlighting characters.

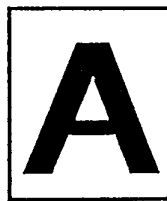
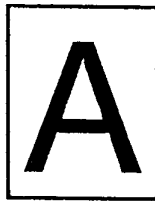
- "n" is valid only for the lowest bit (n0).
- Control by the lowest bit (n0) is shown as follows:

n0	Type
0	Canceling highlighting.
1	Specifying highlighting.

- This is effective to all characters.
 - Dot configuration of a highlighted character includes one extra dot added at its side.
- [Caution] • The print result of Double printing and highlight character printing is completely same.

[See Also] ESC !

[Example]



[Sample Program]

```
LPRINT CHR$ (&H1B) + "E" + CHR$ (0) ;
LPRINT "AAABBB" + CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "E" + CHR$ (1) ;
LPRINT "AAABBB" + CHR$ (&HA) ;
```

[Print Results]

A A A B B B ← Highlighting canceled

A A A B B B ← Highlighting canceled

ESC G n

[Function] Specifying/canceling Double Printing (ESC G n)

[Code] <1B>H<47>H<n>

[Range] {0 ≤ n ≤ FF} Data is described in Hex code.

[Outline] Specifying/canceling the double printing.

- "n" is valid only for the lowest bit (n0).
- Control by n is shown as follows.

n0	Type
0	Canceling double printing.
1	Specifying double printing.

This is effective to all characters.

[Caution] • The print result of Double printing and highlight character printing is completely same.

[See Also] ESC E

[Sample Program]

```
LPRINT CHR$ (&H1B) + "G" + CHR$ (0) ;
LPRINT "AAABBB" + CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "G" + CHR$ (1) ;
LPRINT "AAABBB" + CHR$ (&HA) ;
```

[Print Results]

A A A B B B ← Highlighting canceled

A A A B B B ← Highlighting canceled

ESC J n

[Function] Printing and feeding paper n/203 inch

[Code] <1B>H<4A>H<n>

[Range] {0 ≤ n ≤ FF} Data is described in Hex code.

[Outline] Prints data inside the print buffer and feeds paper by n/360 inch. Since an actual mechanical pitch is 1/203 inch, it is internally converted approximate to the value specified with this command.

- Specified volume does not remain.
- The beginning of the line is to be considered as the next printing start position.
- Initial value is not defined.

[Sample Program]

[Print Results]

See Sample Program and Print Results for ESC 2 on Page 51.

ESC R n

- [Function]

Selecting the International Character set
- [Code]

<1B>H<52>H<n>
- [Range]

{0 ≤ n ≤ 0A) Data is described in Hex code.
- [Outline]

Depending on the value of n, following character sets are specified.

n(Hex)	Character Set
0	U.S.A.
1	France
2	Germany
3	U.K.
4	Denmark I
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
A	Denmark II

- [Default]

The initial value of n are shown below.

• When domestic mode is selected : 8(Japan)

• When international is selected : 0(U.S.A.)

[See Also]

Character Code Table (International Character Set)

[Sample Program]

```
FOR I=0 TO 10
LPRINT CHR$ (&H1B) + "R" + CHR$ (I) ;
LPRINT " #${[¥]^" ;
LPRINT CHR$ (&H60) + "{ }~";
LPRINT "n=" + STR$ (I) ;
LPRINT CHR$ (&HA) ;
NEXT I
```

[Print Results]

```
#{[\]^_{ }~ n = 0
#{à°ç§^`éùè" n = 1
#{$ÅÖÜ^`äöüß n = 2
#{[¥]^_{ }~ n = 3
#{£$@[\]^_{ }~ n = 4
#{ÉÄÖÅÜéäöäü n = 5
#{°\é^ûàòè¹ n = 6
#{£$@;ñ¿^`"n}~ n = 7
#{[¥]^_{ }~ n = 8
#{É£ÖÅÜéæøäü n = 9
#{££ÖÅÜéæøäü n = 10
```

ESC V n

- [Function] Specifying/Canceling 90° -right- turned Characters
- [Code] <1B>H<56>H<n>
- [Range] {0 ≤ n ≤ 1} Data is described in Hex code.
- [Outline] Specifying/canceling characters 90° -right- turned character.
 - "n" means the followings.

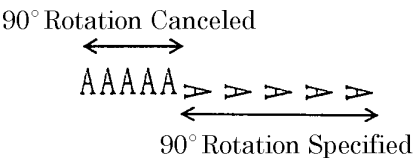
n (Hex)	Condition
0	Canceling 90° -right- turned Characters
1	Specifying 90°-right- turned Characters

- [Caution]
 - No underlines are attached to 90° -right- turned characters .
- [Default]
 - The initial value of n is "0".

[Sample Program]

```
LPRINT CHR$ (&H1B) + "V" + CHR$ (0) ;
LPRINT "AAAAA" ;
LPRINT CHR$ (&H1B) + "V" + CHR$ (1) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
```

[Print Results]



ESC a n

- [Function]

Aligning the characters
- [Code]

<1B>H<61>H<n>
- [Range]

{0 ≤ n ≤ 2} Data is described in Hex code.
- [Outline]

All the printed data within one line are aligned in the specified position.

• Depending on n value, positional alignment is carried out as in the table below:

n (Hex)	Position
0	Left end alignment
1	Centering
2	Right end alignment

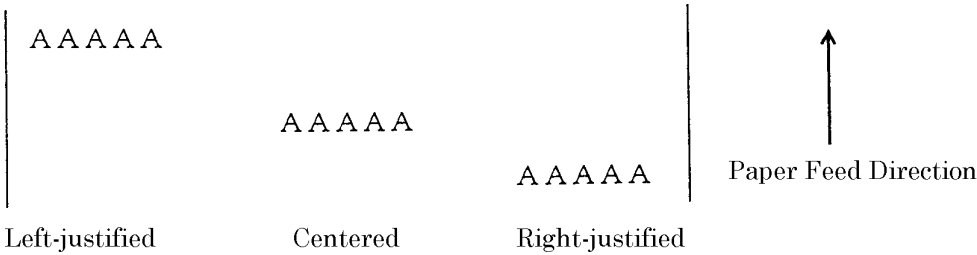
- [Caution]

- This is valid only when n is inputted at the beginning of line.
 - The initial value of n is "0".

[Sample Program]

```
LPRINT CHR$ (&H1B) + "a" + CHR$ (0) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "a" + CHR$ (1) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "a" + CHR$ (2) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
```

[Print Results]



ESC c5 n

[Function] Enabling/Disabling Panel Switches

[Code] <1B>H<63>H<35>H<n>

[Range] {0 ≤ n ≤ FF} Data is described in Hex code.

[Outline] Selecting the LF switch valid/invalid.

- "n" is valid only in the lowest bit (n0).
- "n" bit means the followings.

n0	Condition
0	LFSW valid.
1	LFSW invalid.

[Caution] When the panel switch is disabled with this command, the LF switch is disabled. Therefore, the paper cannot be fed by operating the LF switch.

[Default] • The initial value of n is "0".

[Sample Program]

```
LPRINT CHR$ (&H1B) + "c5" + CHR$ (0) ; ..... When enabling the LF switch
LPRINT CHR$ (&H1B) + "c5" + CHR$ (1) ; ..... When disabling the LF switch
```

ESC d n

[Function] Printing and Feeding the paper by n lines

[Code] <1B>H<64>H<n>

[Range] * {0 ≤ n ≤ FF} Data is described in Hex code.

[Outline] Prints data inside the buffer and feeds paper by n lines.

- Specified line does not remain.
- The beginning of the line is to be considered as the next printing start position.
- The initial value is not defined.

[Default]

[Sample Program]

```
LPRINT "AAAAA"
LPRINT CHR$ (&H1B) + "d" + CHR$ (2) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
```

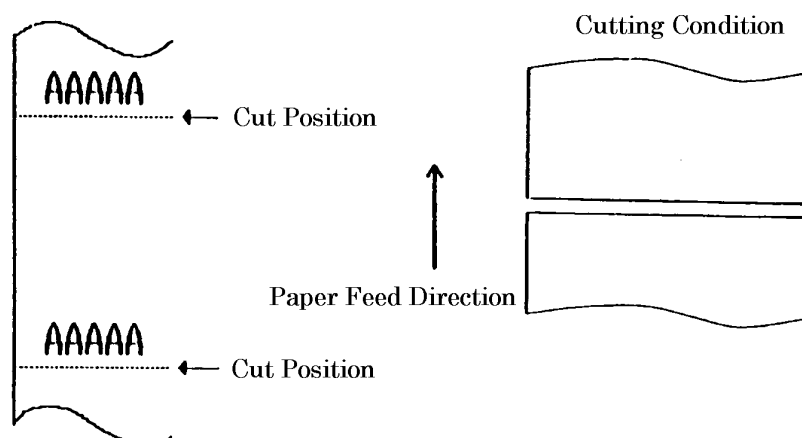
[Print Results]

```

A A A A A
  |
  | 2/6-inch line feed
  |
A A A A A
```

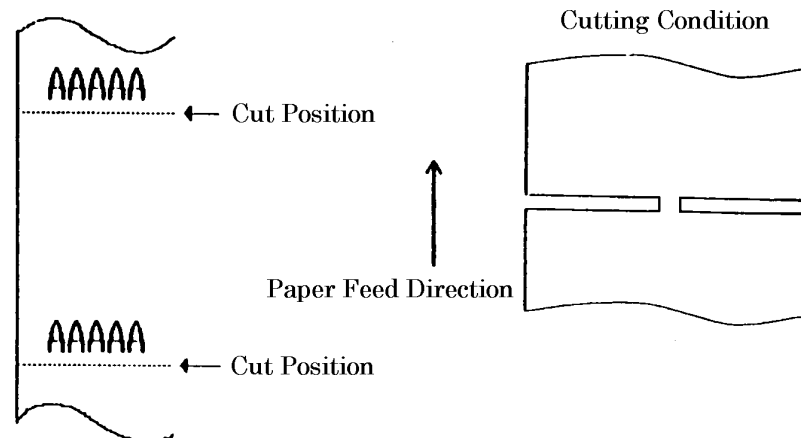
ESC i (When Using Auto Paper Cutter)

[Function]	Full Cut
[Code]	<1B>H<69>H
[Outline]	Activating auto cutter unit (Full cut)
[Caution]	• This is valid only when n is inputted at the beginning of line. • Prior to cutting the paper, feed the paper from the printing position to beyond the paper cutting position of the cutter. Otherwise, the character just after print will remain on this side of the cutter.
[Sample Program]	<pre> LPRINT "AAAAA"; LPRINT CHR\$ (&H1B) + "J" ; LPRINT CHR\$ (150) ; LPRINT CHR\$ (&H1B) + "i" ; LPRINT "AAAAA"; LPRINT CHR\$ (&H1B) + "J" ; LPRINT CHR\$ (150) ; LPRINT CHR\$ (&H1B) + "i" ; </pre>
[Print Results]	



ESC m (When Using Auto Paper Cutter)

[Function]	Partial Cut
[Code]	<1B>H<6D>H
[Outline]	Activating auto cutter unit (Partial cut)
[Caution]	• This is valid only when n is inputted at the beginning of line. • Prior to cutting the paper, feed the paper from the printing position to beyond the paper cutting position of the cutter. Otherwise, the character just after print will remain on this side of the cutter.
[Sample Program]	<pre> LPRINT "AAAAA"; LPRINT CHR\$ (&H1B) + "J" ; LPRINT CHR\$ (150) ; LPRINT CHR\$ (&H1B) + "m" ; LPRINT "AAAAA"; LPRINT CHR\$ (&H1B) + "J" ; LPRINT CHR\$ (150) ; LPRINT CHR\$ (&H1B) + "m" ; </pre>
[Print Results]	



ESC t n

- [Function] Selecting Character Code Table
- [Code] <1B>H<74>H<n>
- [Range] { $0 \leq n \leq 1$ } Data is described in Hex code.
- [Outline] Selecting Page n on the character code table:
The character code table is selected depending on the value of n.
"n" means the followings.

n (Hex)	Condition
0	Page0(IBM Character #2)
1	Page1(Domestic Characters)

- [Default] The initial value of n are shown below
- When Japan is selected : 1(Domestic characters)
 - When non-Japan is selected : 0(IBM characters #2)
- [See Also] Character Code Table
- [Sample Program]

```
LPRINT CHR$ (&H1B) + "t" + CHR$ (0) ;
LPRINT " n=0" ;
FOR C=&HB1 TO &HB5
LPRINT CHR$ (C) ;
NEXT C
LPRINT CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "t" + CHR$ (1) ;
LPRINT " n=1" ;
FOR C=&HB1 TO &HB5
LPRINT CHR$ (C) ;
NEXT C
LPRINT CHR$ (&HA) ;
```

- [Print Results]

n = 0 ☒|H ← Page 0

n = 1 アイエオ ← Page 1

ESC v (Serial Interface Only)

- [Function] Transmitting the printer status(Serial Type)
- [Code] <1B>H<76>H
- [Outline] Current printer status is transmitted..
- [Caution]
- Status sent out consists of 1 byte whose content is as in the table below.
 - In DTR/DSR control, after receptible state of the host (DSR signal being in SPACE state) is confirmed, only 1 byte is transmitted. In XON/XOFF control, DSR signal state not being confirmed, only 1 byte is transmitted.
 - In DTR/DSR control, when the host is in unreceptible state(DSR signal being in MARK state), it waits until receptible state is created.
 - In paper end (paper near end) status, this command may be unreceptible state due to BUSY state.

Remarks. This command is valid only for serial interface model.

Bit	Function	Value	
		0	1
0	Not defined		
1	Not defined		
2	Paper end	With paper	Without paper
3	Not defined		
4	Not used	Fixed to 0	—
5	Not defined		
6	Not defined		
7	Not defined		

[Sample Program]

```
OPEN "COM1:N81NN" AS #1 ;
PRINT #1, CHR$ (&H1B) + "v" ;
A$ = INPUT$ (1, #1) ;
CLOSE #1
```

ESC { n

- [Function] Specifying/Canceling the Inverted Characters
- [Code] <1B>H<7B>H<n>
- [Range] {0 ≤ n ≤ FF} Data is described in Hex code.
- [Outline] Specifying/canceling inverted characters.

- "n" is valid only for the lowest bit (n0).
- Bit n (n0) means the followings.

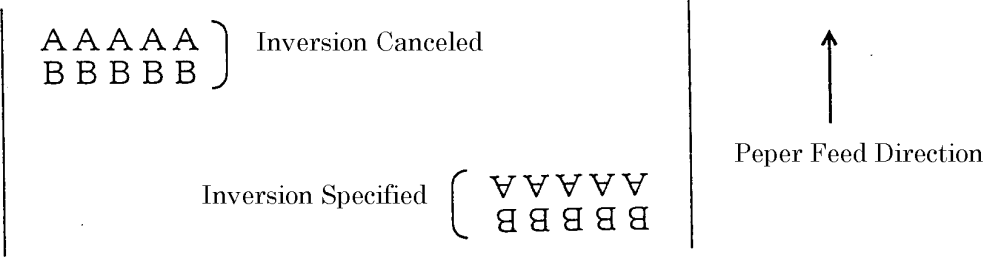
n0	Condition
0	Canceling inverted characters.
1	Specifying inverted characters.

- [Caution] • Inverted printing means printing the line at 180° turned.
- This is valid only when this is specified at the beginning of a line.
- [Default] • The initial value of n is "0".

[Sample Program]

```
LPRINT CHR$ (&H1B) + "{" + CHR$ (0) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT "BBBBB" + CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "{" + CHR$ (1) ;
LPRINT "AAAAA" + CHR$ (&HA) ;
LPRINT "BBBBB" + CHR$ (&HA) ;
```

[Print Results]



ESC \$ n1 n2

[Function]	Specifying the Absolute Positions
[Code]	<1B>H<24>H<n1><n2>
[Range]	{ $0 \leq n1 \leq FF$ } { $0 \leq n2 \leq 1$ } Data is described in Hex code.
[Outline]	The printing start position is specified in the number of dots (1/203 inch unit) from the beginning of line. • The number of dots is divided by 256, whose quotient is taken as n2 and the residual as n1. • Therefore, the printing start position is equal to $n1 + n2 \times 256$ from the beginning of line.
[Caution]	• Specifying beyond the line end is ignored.
[Default]	• The initial value is not specified.
[See Also]	ESC ¥
[Sample Program]	

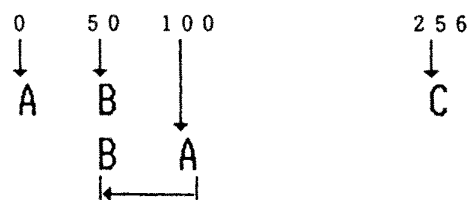
```

LPRINT CHR$ (&H1B) + "$" ;
LPRINT CHR$ (0) + CHR$ (0) + "A" ;
LPRINT CHR$ (&H1B) + "$" ;
LPRINT CHR$ (50) + CHR$ (0) + "B" ;
LPRINT CHR$ (&H1B) + "$" ;
LPRINT CHR$ (0) + CHR$ (1) + "C" ;
LPRINT CHR$ (&HA) ;
LPRINT CHR$ (&H1B) + "$" ;
LPRINT CHR$ (100) + CHR$ (0) + "A" ;
LPRINT CHR$ (&H1B) + "¥" ;
LPRINT CHR$ (&HC2) + CHR$ (&HFF) + "B" ;
LPRINT CHR$ (&HA) ;

```

[Print Results]

Absolute Position Specified



Relative Position Specified — 62

ESC ¥ n1 n2

[Function]	Specifying the Relative Positions
[Code]	<1B>H<5C>H<n1>< n2>
[Range]	{0 ≤ n1 ≤ FF} {0 ≤ n2 ≤ FF} Data is described in Hex code.
[Outline]	The printing start position is specified in the number of dots(1/203 inch unit) from the current position. • Rightward direction is taken as plus and leftward direction as minus. • To specify N dot in minus (left) direction, use a complement of N for assignment. -N dots = 65536 - N • The number of dots is divided by 256, whose quotient is taken as n2 and the residual as n1.
[Caution]	• Specifying exceeding the top of line or the end of line is ignored.
[Default]	• The initial value is not specified.
[See Also]	ESC \$
[Sample Program]	
[Print Results]	

See Sample Program and Print Results for ESC \$ on Page 67.

GS k n [d] k NUL

[Function] Printing the Bar Code

[Code] <1D>H<6B>H<n> [<d>] k <00>H

[Range] {0 ≤ n ≤ 7} Data are described in Hex code.

[Outline] Specifying a type of bar code and printing bar codes.

- The beginning of line is considered as the next printing start position.
- Depending on the value of n, the following bar code can be selected. d indicates a character code to be printed and k indicates the number of character to be printed.

n (Hex)	Bar Code System	Maximum Columns
0	UPC-A	---
1	UPC-E	---
2	JAN13 (EAN)	---
3	JAN 8 (EAN)	---
4	CODE 39	19
5	ITF	35
6	CODABAR (NW-7)	25
7	CODE 128	23

- [Caution]
- When data being held in the print buffer, this command is ignored.
 - Regardless of the specified feed pitch, this command feeds the paper to be required to print a bar code.
 - If the character code d cannot be printed in the respective bar code system, the bar code so far will be printed, processing the subsequent data as normal data.
 - When a bar code whose number of characters to be printed is fixed has been selected, the number of characters k have to be always made equal to the number of characters to be printed. (The bar code is not printed when not matching.)
 - When the horizontal direction exceeds one line length, the excess part is not printed.
- [Default]
- The initial value is not specified.

[Description of Bar Codes] <For print examples, see Page 71.>

UPC-A This bar code, consisting of numerals only, has a fixed length of 12 column; a 11-columns number entered from the host or application software plus a check column(12th column) automatically calculated inside the printer. If the 12th-column numeral is sent from the host, the entire bar code will be printed as it is.

UPC-E This bar code, consisting of numerals only, has a fixed length of 8 column; the first number system character is "0" stationary. A 12-column numeral entered from the host or application software is compressed to 8 columns with a check column and printed. The 12th-column check column is automatically calculated inside the printer and sent from the host, the entire bar code will be printed, compressed to 8 columns.

JAN-13(EAN) This bar code, consisting of numerals only, has a fixed length of 13 column; a 12-column number entered from the host or application software plus a check column(13th column) automatically calculated inside the printer. If the 13th-column numeral is sent from the host, the entire bar code will be printed as it is.

JAN-8(EAN) This bar code, consisting of numerals only, has a fixed length of 8 column; a 7-column number entered from the host or application software plus a check column(8th column) automatically calculated inside the printer. If the 8th-column numeral is sent from the host, the entire bar code will be printed as it is.

CODE39 This bar code, consisting of uppercase alphabets and numerals, has a variable length of column. A start/stop code "*" is automatically added by the printer. Available characters include a space and " \$ % * + - · / 0 1 2 3 4 5 6 7 8 9 " and uppercase alphabets.

ITF This bar code, consisting of numerals only, has a variable length of even column. If an odd-column code is transferred, nothing will be printed.

CODABAR (NW-7)

This bar code, consisting of alphanumerals, has a variable length of column. Available characters include " 0 1 2 3 4 5 6 7 8 9 A B C D \$ + - · / : " A start/stop code is required; any one of A, B, C, and D is used.

- CODE128**
- This bar code consists of all of 128 ASCII code characters and has a variable length of column. This printer supports the code subsets A, B, and C. By prefixing a transfer code with any one character of A, B, and C, you can select the code subset to start from. If not prefixed with A, B, or C, the code subset B will be selected.
 - The code subset A is the bar code consisting of standard uppercase alphabets, numerals, symbols, and special codes.
 - The code subset B is the bar code consisting of standard uppercase/lowercase alphabets, numerals, symbols, control codes, and special codes.
 - The code subset C is the bar code consisting of special characters and 100 kinds of numbers ranging from 00 to 99.
 - The check column automatically calculated inside the printer is added to the end of the entered column to be printed.
 - Processing of the special characters

The characters above the ASCII code number 96 are considered special characters. The following lists the converted characters for entering these characters.

ASCII Code	Converted Character	Subset Code A	Subset Code B	Subset Code C
96	80h	FNC 3	FNC 3	-N/A-
97	81h	FNC 2	FNC 2	-N/A-

98	82h	SHIFT	SHIFT	-N/A-
99	83h	CODE C	CODE C	-N/A-
100	84h	CODE B	FNC 4	CODE B
101	85h	FNC 4	CODE A	CODE A
102	86h	FNC 1	FNC 1	FNC 1

The following exemplifies a selection of the code subset as a method to utilize the special characters.

<Selection of Code Subset>

- Initial selection: Enter any one character of A, B, and C.
- Conversion on the way: Enter any one character of 82h through 85h

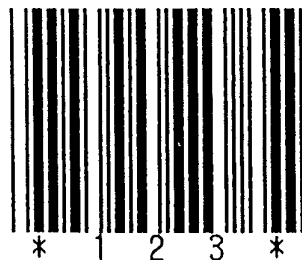
Example) When initially testing with the code subset B, and then, printing the bar code, "123," with the code subset A

- Input code : B TEST <85> 123
- Bar code data : <CODE B>TEST<CODE A>123

[Sample Program]

```
LPRINT CHR$ (&H1D) + "H" + CHR$ (2) ;
LPRINT CHR$ (&H1D) + "k" ;
LPRINT CHR$ (4) ;
LPRINT "123" + CHR$ (0) ;
```

[Print Results]



When the data "123" is printed with the code 39

[Description of Bar Codes]

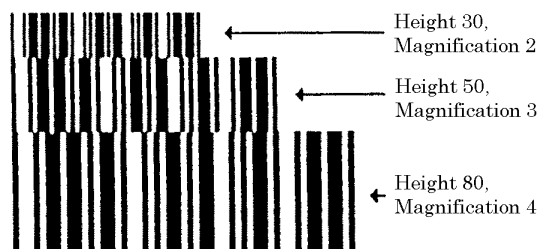
UPC-A, UPC-E, JAN-13 (EAN), JAN-8 (EAN), CODE39, ITF, CODABAR, CODE128

Type	Print Sample	Outline of Symbol	Max. column
UPC-A		12-columns fixed-length bar code consisting of numerals only	—
UPC-E		8-columns fixed-length bar code consisting of numerals only. Abbreviated version of UPC-A	—
JAN-13		13-columns fixed-length bar code consisting of numerals only	—
JAN-8		8-columns fixed-length bar code consisting of numerals only	—
CODE39		Variable-length bar code consisting of alphabets and numerals. The start/stop code "*" is automatically added.	19
ITF		Even-columns variable-length bar code consisting of numerals only	35
CODABAR (NW-7)		Variable-length bar code consisting of alphanumerals. Any one of A, B, C, and D is required as the start/stop code.	25
CODE128		Variable-length bar code consisting of all 128 ASCII code characters.	23

Printing is done depending on bar code specification type, number of print column, bar code height, width (Magnification), visible code presence, and bar code data specification.

GS w n

[Function]	Selecting the horizontal size(Scale factor) of the Bar Code
[Code]	<1D>H <77>H<n>
[Range]	{ $2 \leq n \leq 4$ } Data is described in Hex code.
[Outline]	Selecting bar code width. n denotes the number of dots in fine element width.
[Default]	The initial value of this width is "3".
[Sample Program]	<pre> LPRINT CHR\$ (&H1D) + "h" + CHR\$ (30) ; LPRINT CHR\$ (&H1D) + "w" + CHR\$ (2) ; GOSUB BC LPRINT CHR\$ (&H1D) + "h" + CHR\$ (50) ; LPRINT CHR\$ (&H1D) + "w" + CHR\$ (3) ; GOSUB BC LPRINT CHR\$ (&H1D) + "h" + CHR\$ (80) ; LPRINT CHR\$ (&H1D) + "w" + CHR\$ (4) ; GOSUB BC END BC : LPRINT CHR\$ (&H1D) + "k" ; LPRINT CHR\$ (4) ; LPRINT "12" + CHR\$ (0) ; RETURN </pre>
[Print Results]	



GS h n

[Function]	Selecting the height of the Bar Code
[Code]	<1D>H<68>H<n>
[Range]	{ $1 \leq n \leq FF$ } Data is described in Hex code.
[Outline]	Selecting bar code height. n denotes the number of dots in the vertical direction.
[Default]	• The initial value of n is "162".
[Sample Program]	
[Print Results]	

See Sample Program and Print Results for GS w on page 73.

GS H n

[Function]	Selecting of Printing Position of HRI Code
[Code]	<1D>H<48>H<n>
[Range]	{0 ≤ n ≤ 3} Data is described in Hex code.
[Outline]	Selecting printing position of HRI code in printing bar codes.

- "n" means the followings.

n (Hex)	Printing Position
0	No printing
1	Above the bar code
2	Below the bar code
3	Both above and below the bar code

The HRI code refers to the bar code-turned characters so that you can read them.

[Caution]	The HRI code is printed in the font selected with GS f.
-----------	---

Specify before the GS k command.

[Default]	• The initial value of n is "0".
-----------	----------------------------------

[See Also]	GS f
------------	------

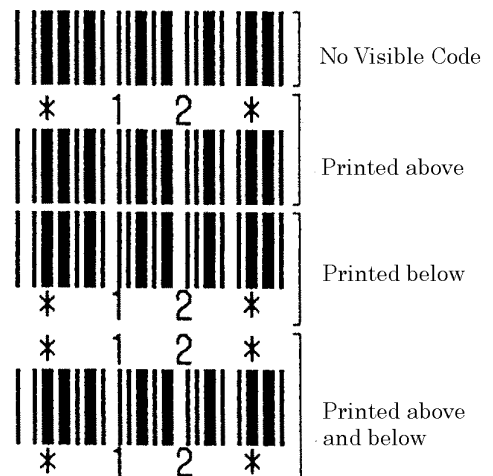
[Sample Program]

[Print Results]

```

LPRINT CHR$ (&H1B) + "3" + CHR$ (5) ;
LPRINT CHR$ (&H1D) + "h" + CHR$ (50) ;
LPRINT CHR$ (&H1D) + "H" + CHR$ (0) ;
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (1) ;
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (2) ;
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (3) ;
GOSUB BC
END
BC :
LPRINT CHR$ (&H1D) + "k" ;
LPRINT CHR$ (4) ;
LPRINT "12" + CHR$ (0) ;
LPRINT CHR$ (&HA) ;
RETURN

```



GS f n

- [Function] Selecting the font of HRI code
- [Code] <1D>H<66>H<n>
- [Range] n = 0, 1
- [Outline] Selecting the font of HRI code in printing bar code.
The type of font can be printed by selecting n is as follows.

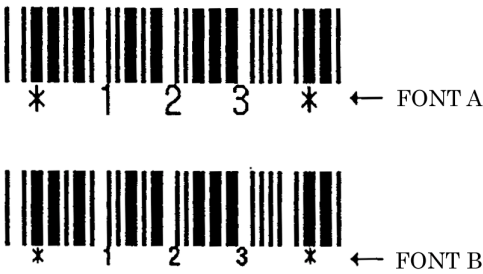
n	Font
0	Font A
1	Font B

The HRI code refers to the bar code-turned characters so that you can read them.

- [Caution] The HRI code is printed at the position specified with GS h on page 74.
- [Default] The initial value of n is "0".
- [See Also] GS H
- [Sample Program]

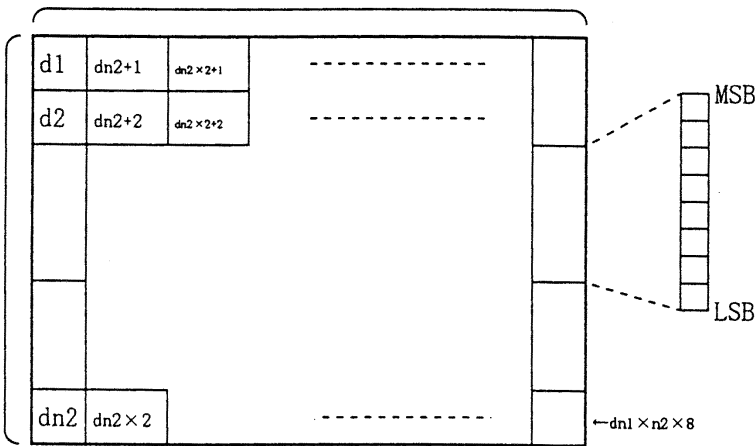
```
LPRINT CHR$ (&H1D) + "h" + CHR$ (50) ;
LPRINT CHR$ (&H1D) + "H" + CHR$ (2) ;
LPRINT CHR$ (&H1D) + "f" + CHR$ (0) ;
GOSUB BC
LPRINT CHR$ (&H1D) + "f" + CHR$ (1) ;
GOSUB BC
END
BC :
LPRINT CHR$ (&H1D) + "k" ;
LPRINT CHR$ (4) ;
LPRINT "123" + CHR$ (0) ;
LPRINT CHR$ (&HA) ;
RETURN
```

[Print Results]



GS * n1 n2 [d] n1 × n2 × 8

[Function]	Defining the Download Bit Image
[Code]	<1D>H<2A>H<n1><n2> [<d>] n1 × n2 × 8
[Range]	{1 ≤ n1 ≤ FF} {1 ≤ n2 ≤ 30} {n1 × n2 ≤ 51F} Data is described in Hex code.
[Outline]	Defines downloading bit images of the number of dots specified by n1/n2. • The numbers of dots are n1 x 8 in horizontal direction and n2 x 8 in vertical direction. • d indicates bit image data. • The download bit image thus defined remains effective until redefinition, ESC @ execution, ESC &, or power OFF takes place.
[Caution]	• A download character and a download bit image can not be defined simultaneously. With this command executed, defined content of a download character is cleared. • Relations between the bit image data and the dot defined are shown below:
[See Also]	GS /



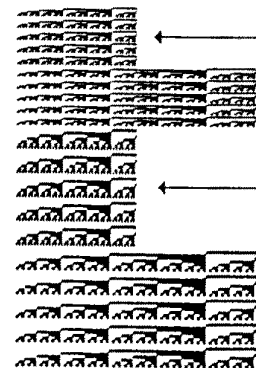
[Sample Program]

```

GOSUB IMG
LPRINT CHR$ (&H1D) + "/" + CHR$ (0) ;
LPRINT CHR$ (&H1D) + "/" + CHR$ (1) ;
LPRINT CHR$ (&H1D) + "/" + CHR$ (2) ;
LPRINT CHR$ (&H1D) + "/" + CHR$ (3) ;
END
IMG :
  n 1 = 10 : n 2 = 5
  LPRINT CHR$ (&H1D) + "*";
  LPRINT CHR$ (n1) + CHR$ (n2) ;
  FOR J=1 TO n1*8
    FOR I=1 TO n2
      LPRINT CHR$ (J) ;
    NEXT I
  NEXT J
  RETURN

```

[Print Results]



← Normal Mode
 ← Double Width Mode
 ← Double Height Mode
 ← Quadruple Mode

GS / m

- [Function] Printing the Download, Bit Image
- [Code] <1D>H<2F>H<m>
- [Range] {0 ≤ m ≤ 03} Data is described in Hex code.
- [Outline] Prints download bit image in a mode specified by m.
- Modes can be selected by m are shown below.

m	Mode Name	Dot Density in Vertical Direction	Dot Density in Horizontal Direction
0	Normal mode	203 DPI	203 DPI
1	Double wide mode	203 DPI	101 DPI
2	Double high mode	101 DPI	203 DPI
3	Double wide/double high mode	101 DPI	101 DPI

- [Caution] • When data exist inside the print buffer, this command is ignored.
- When a download bit image has not been defined, this command is ignored.
 - A portion of a download bit image exceeding one line length is not printed.
 - A download character and a download bit image cannot be defined simultaneously.
- [Default] • The initial value is not specified.
- [See Also] GS *
- [Sample Program]
- [Print Results]

See Sample Program and Print Results for GS * on Page 77.

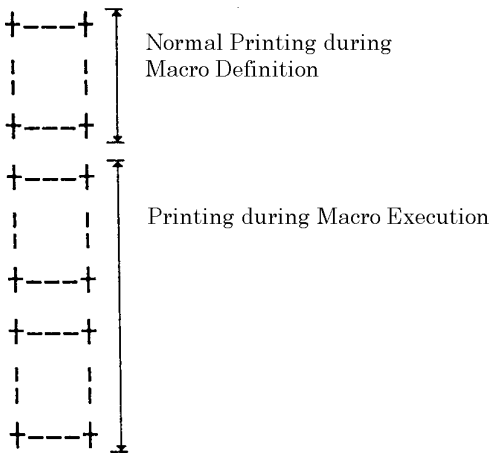
GS :

[Function]	Starting / Ending Macro Definition
[Code]	<1D>H<3A>H
[Outline]	Specifying starting / ending macro definition. Means termination when received while defining a macro.
[Caution]	Maximum content available for macro definition is 2048 bytes. A portion exceeding 2048 bytes is not defined. • Even with ESC @ (initialization of the printer) having been executed, defined content is not cleared. Therefore, it is possible to include ESC @ into the content of macro definition. • Normal printing operation is carried out even while in macro definition.
[Default]	• Initially, Macro is not specified.
[See Also]	GS ^

[Sample Program]

```
LPRINT CHR$ (&H1D) + " : " ;
LPRINT "+ - - - +" + CHR$ (&HA) ;
LPRINT "|          |" + CHR$ (&HA) ;
LPRINT "+ - - - +" + CHR$ (&HA) ;
LPRINT CHR$ (&H1D) + " : " ;
LPRINT CHR$ (&H1D) + " ^ " ;
LPRINT CHR$ (2) + CHR$ (10) ;
LPRINT CHR$ (0) ;
```

[Print Results]



GS ^ n1 n2 n3

[Function] Executing the Macro

[Code] <1D>H<5E>H<n1><n2><n3>

[Range] {0 ≤ n1 ≤ FF}

 {0 ≤ n2 ≤ FF}

 {0 ≤ n3 ≤ 1} Data is described in Hex code.

[Outline] Executing contents defined in macro.

- "n1 ~ n3" indicate as follows:

 n1 : The number of times of macro execution

 n2 : Waiting time on macro execution

 Waiting time of n2 x 100 msec is given for every execution.

 n3 : Macro execution mode

n3	Mode
0	Continuous execution
1	Execution by LFSW

Continuous execution: The Macro is executed n1 times continuously at the time intervals specified by n2.

Execution by FEED S: After waiting for lapse of time specified by n2, the ALAME LED flickers and the LF switch is waited to be pressed. When it is pressed, the macro is executed once.
This action is repeated n1 times.

[Caution] • When this command is received while in macro definition, suspension of macro definition is indicated. At this time, the defined content is cleared.

- No execution takes place when macro is held undefined or n1=0.

- While in macro execution with n3=1, paper feed with the LF SW is not available.

[Default] • Initially, this command is not specified.

[See Also] GS :

[Sample Program]

[Print Results]

See Sample Program and Print Results for GS : on Page 80.

11. CHARACTER CODES TABLE

11.1 International

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	.	p	Ç	E	á		┐	┐	∞	≡
1		ION	!	1	A	Q	a	q	ü	æ	í		┐	┐	β	±
2			"	2	B	R	b	r	é	Æ	ó		┐	┐	Γ	≡
3		XOF	#	3	C	S	c	s	á	ô	ù	┐	┐	┐	π	≡
4			\$	4	D	T	d	t	à	ö	ñ	┐	┐	┐	Σ	┐
5			%	5	E	U	e	u	à	ó	Ñ	┐	┐	┐	σ	┐
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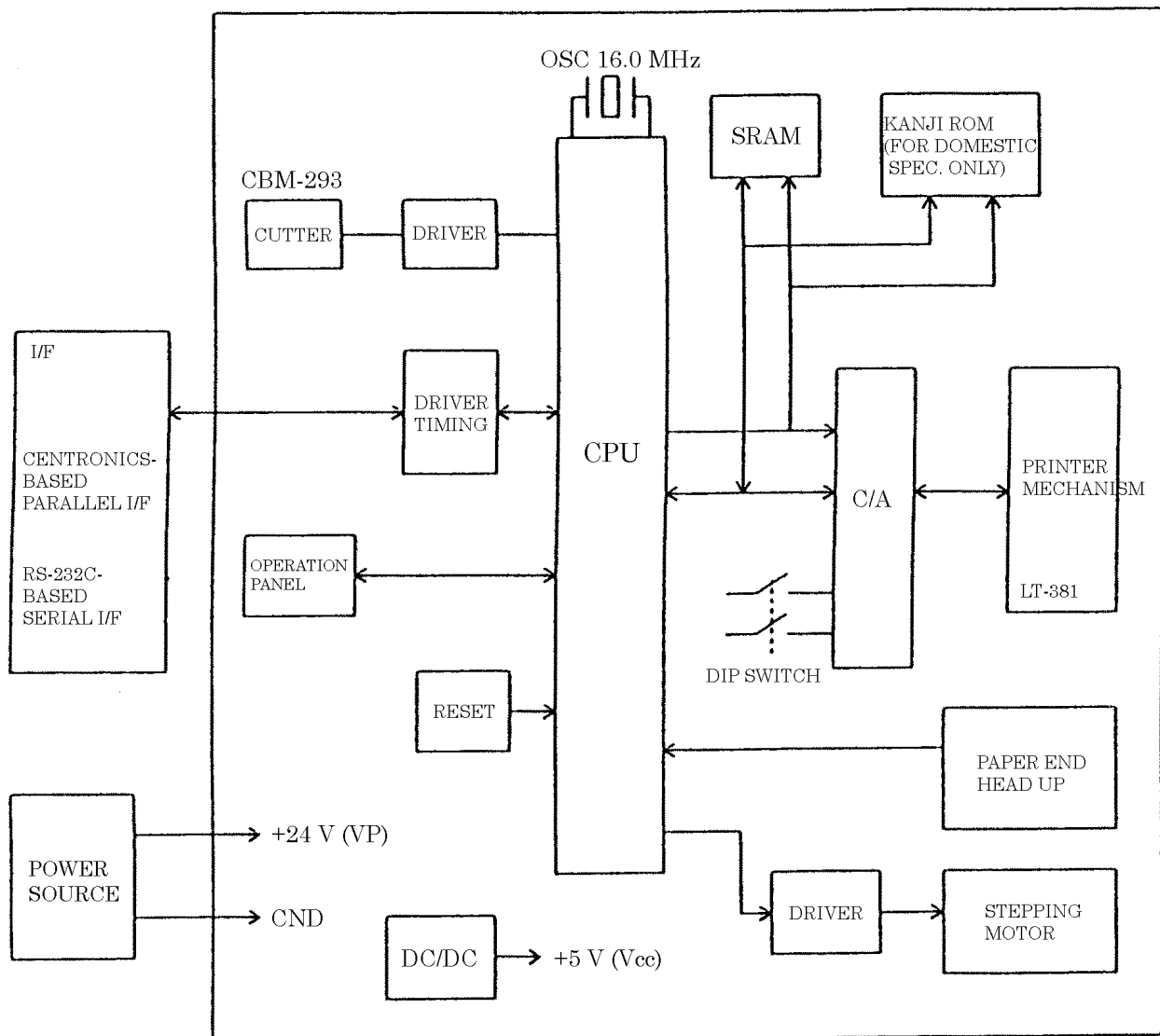
11.2 Domestic

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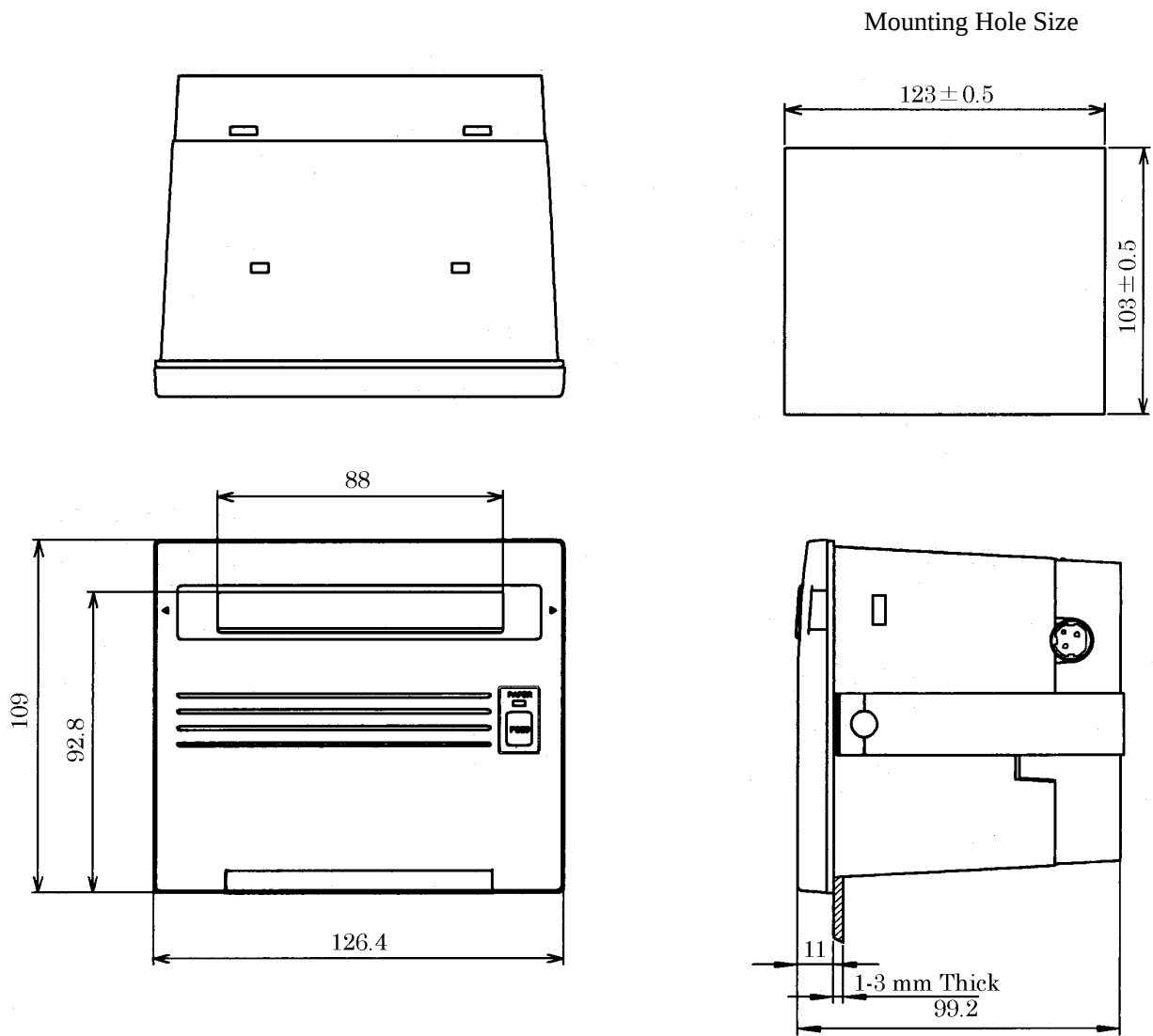
11.3 International Character Code Table

	Country	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A.	#	\$	@	[	\	]	^	`	{		}	~
1	France	#	\$	a	•	ç	§	^	`	é	ù	è	"
2	Germany	#	\$	§	λ	ü	ü	^	`	a	o	u	ß
3	U.K.	£	\$	@	[	\	]	^	`	{		}	~
4	Denmark I	#	\$	@	Æ	Ø	Λ	^	`	æ	ø	ä	~
5	Sweden	#	☒	é	λ	ö	Λ	ü	é	a	o	ä	ü
6	Italy	#	\$	@	•	\	é	^	ù	a	ò	è	ì
7	Spain	₧	\$	@	i	ñ	¿	^	`	"	ñ	}	~
8	Japan	#	\$	@	[	¥	]	^	`	{		}	~
9	Norway	#	☒	é	Æ	Ø	Λ	ü	é	æ	ø	ä	ü
10	Denmark II	#	\$	é	Æ	Ø	Λ	ü	é	æ	ø	ä	ü

APPENDIX 1. BLOCK DIAGRAM



APPENDIX 2. OUTLINE DRAWING



<<< German >>>

<VORSICHT>

1. Bitte lesen Sie die Bedienungsanleitung vor dem Betrieb des Geräts aufmerksam durch und bewahren Sie die Anleitung anschließend für späteres Nachschlagen an einem sicheren Platz auf.
2. Änderungen des Inhalts dieser Anleitung bleiben ohne Vorankündigung vorbehalten.
3. Die Vervielfältigung dieser Bedienungsanleitung ohne vorherige Genehmigung verstößt, auch auszugsweise, gegen das Urheberrecht.
4. Niemals versuchen, in dieser Anleitung nicht erwähnte Geräteteile eigenhändig zu warten, zerlegen oder zu reparieren.
5. Bitte beachten Sie, daß wir keinerlei Haftung für Schäden übernehmen, die auf unsachgemäße Bedienung, falsche Handhabung oder eine ungeeignete Betriebsumgebung zurückzuführen sind.
6. Zur Vermeidung von Unfällen und sonstigen Problemen ist das Gerät ausschließlich auf die in der Bedienungsanleitung beschriebene Weise zu betreiben.
7. Daten sind grundsätzlich temporär, d.h. sie können nicht permanent gesichert oder über längere Zeit gespeichert werden. Es sei deshalb darauf hingewiesen, daß wir für finanzielle Schäden oder Profitrückgänge als Folge von Datenverlust, Unfällen, Reparaturen, Tests usw. keinerlei Haftung übernehmen.
8. Bitte wenden Sie sich mit Fragen oder Hinweisen auf Fehler oder Auslassungen im Text dieser Anleitung an unsere Geschäftsstelle.
9. Beachten Sie jedoch, daß wir, ungeachtet des obigen Punkts 8, keinerlei Haftung für negative Folgeerscheinungen im Zusammenhang mit dem Betrieb dieses Geräts übernehmen.

 VORSICHT

Dieses Gerät ist ein Datentechnologiesystem der Klasse A basierend auf den Normen des Freiwilligen Selbstüberwachungsrats zur Funkstörung von Datenverarbeitungssystemen (VVICI). Beim Heimbetrieb des Geräts können Funkstörungen auftreten. Der Benutzer ist in diesem Fall eventuell dazu angehalten, geeignete Abhilfemaßnahmen zu treffen.

ZU BEACHTENDE SICHERHEITSMASSENREGELN

Zur Vermeidung von Gefahren gegenüber dem Bediener und anderen Personen und Sachschäden sind die folgenden Vorsichtsmaßnahmen unbedingt zu beachten.

- Der folgende Text beschreibt das Ausmaß der Gefahren und potentiellen Sachschäden, die durch eine Mißachtung der Bedienungshinweise oder durch die unsachgemäße Handhabung des Geräts entstehen können.



WARNUNG

Die Mißachtung dieser Vorsichtsmaßregel kann zu Körperverletzungen mit möglicher Todesfolge führen.



VORSICHT

Die Mißachtung dieser Vorsichtsmaßregel kann zu Körperverletzungen oder Sachschäden führen.



Dieses Symbol ruft den Bediener zu erhöhter Wachsamkeit auf.



Dieses Symbol weist auf wichtige Informationen, wie z.B. Bedienungsschritte oder dergleichen, hin.

**WARNUNG**

- Beim Betrieb des Geräts sind die nachfolgenden Vorsichtsmaßnahmen unbedingt zu beachten. Eine Mißachtung dieser Hinweise kann zu Schäden, Funktionsstörungen, Rauchentwicklung und Brandgefahr durch Überhitzen und zu elektrischen Schlägen führen.
Falls Schäden, Störungen, anormale Gerüche oder Geräusche auftreten, das Gerät sofort ausschalten, das Netzkabel trennen und an einen Fachhändler wenden. Niemals versuchen, das Gerät eigenhändig zu reparieren, um ernsthafte Gefahren zu vermeiden.
- Das Gerät vor starken Stößen und Erschütterungen, wie z.B. Tritte, Stampfen, Schläge, Herunterfallen usw., schützen.
- Das Gerät an einem gut belüfteten Platz aufstellen, und darauf achten, die Belüftungsöffnung nicht zu blockieren.
- Bei der Aufstellung des Geräts Plätze vermeiden, an denen chemische Reaktionen auftreten, wie z.B. in einem Labor, sowie Plätze mit salz- oder gashaltiger Umgebungsluft.
- Das Gerät ausschließlich mit der vorgeschriebenen Betriebsspannung und Netzkapazität betreiben.
- Netz- und Datenkabel niemals am Kabel haltend anschließen oder abziehen. Bei Betrieb, Verrücken oder Tragen des Geräts darauf achten, daß die Kabel keiner Gewalteinwirkung ausgesetzt sind.
- Darauf achten, daß keine Fremdkörper, wie z.B. Nadeln oder Büroklammern, in das Gerät gelangen.
- Niemals mehrere Geräte an die gleiche Steckdose anschließen.
- Darauf achten, keine Flüssigkeiten auf dem Gerät zu vergießen oder chemische Substanzen enthaltende Sprays darüber zu versprühen. Bei versehentlichem Naßwerden das Gerät sofort ausschalten, das Stromanschlußkabel abziehen, das Netzkabel von der Steckdose trennen usw. und an einen Fachhändler wenden.
- Das Gerät niemals eigenhändig zerlegen oder modifizieren. Eine Mißachtung dieser Vorsichtsmaßregel kann zu Bränden und elektrischen Schlägen führen.
- Verpackungsbeutel sind vorschriftsgemäß zu entsorgen oder ansonsten von Kindern fernzuhalten. Kleinkinder können durch Überstreifen eines Plastikbeutels ersticken.

VORSICHTSMASSREGELN FÜR DIE AUFSTELLUNG

- Das Gerät nicht an Plätzen abstellen oder betreiben, an denen es Feuer, Feuchtigkeit oder direkter Sonnenbestrahlung ausgesetzt ist. Ebenso sind Plätze in der Nähe von Heizkörpern und sonstigen Wärmequellen zu vermeiden, an denen Umgebungstemperatur und Luftfeuchtigkeit nicht den vorgeschriebenen Betriebsbedingungen entsprechen, sowie Plätze, an denen das Gerät Öl, Metallspänen oder Staub ausgesetzt ist. Andernfalls können Funktionsstörungen sowie Rauch- und Brandentwicklung die Folge sein.
- Bei der Aufstellung des Geräts Plätze vermeiden, an denen chemische Reaktionen auftreten, wie z.B. in einem Labor, sowie Plätze mit salz- oder gashaltiger Umgebungsluft. Hierbei besteht die Gefahr von Bränden und elektrischen Schlägen.
- Das Gerät auf einer ebenen und stabilen Fläche in einem Winkel zwischen 0° und 90° aufstellen. Der Aufstellplatz sollte gut belüftet und frei von Erschütterungen sein.
- Für die Aufstellung einen Platz wählen, der den ungehinderten Betrieb des Geräts gewährleistet.
- Keine Gegenstände auf dem Gerät abstellen, da hierdurch Probleme auftreten können.
- Das Gerät mit den mitgelieferten Montageteilen und Schrauben befestigen und die Schrauben korrekt festziehen. Übermäßig festgezogene Schrauben können Probleme und Schäden verursachen.
- Das Gerät nicht in der Nähe eines Radios oder Fernsehers verwenden und nicht zusammen mit einem Radio oder Fernseher an die gleiche Steckdose anschließen. Hierdurch können Empfangsstörungen auftreten.
- Das Gerät ausschließlich mit der vorgeschriebenen Betriebsspannung und Netzkapazität betreiben. Beim Anschließen auf die korrekte Polarität achten.
- Vergewissern, daß die für den Anschluß des Netzkabels verwendete Steckdose über eine ausreichende Kapazität verfügt.
- Das Netzkabel nicht zusammen mit anderen Kabeln verlegen und keine überlangen Verlängerungskabel verwenden, um ein Erwärmen der Netzleitung und eine mögliche Unterbrechung der Stromversorgung zu vermeiden. Nicht auf Kabel treten, und das Gerät nicht mit übermäßiger Belastung betreiben.
- Erdungskabel niemals an ein Gasrohr anschließen, da hierbei Explosionsgefahr besteht. Vor dem Anschließen oder Trennen eines Erdungskabels unbedingt zuerst den Netzstecker aus der Steckdose ziehen.
- Darauf achten, vor dem Trennen und Wiederanschließen von Kabeln die Netzversorgung auszuschalten, einschließlich die Kontaktseite.
- Steckerkabel sind fest anzuschließen. Durch Anschluß mit umgekehrter Polarität können Innenbauteile oder Paßflächen beschädigt werden.
- Signalübertragungsleitungen sollten nicht zu lang sein und nicht an rauscherzeugende Geräte angeschlossen werden, um durch Rauschstörungen verursachten Datenverlust usw. zu vermeiden.
- Das Gerät an einem Platz in der Nähe einer Steckdose betreiben, wo sich der Netzstecker zum Unterbrechen der Stromversorgung jederzeit schnell und mühelos abziehen läßt.
- Beim Transport oder bei längerer Nichtbenutzung das Gerät mit hochgestelltem Druckkopf transportieren bzw. lagern.
- Vor einem Transport die Papierrolle aus dem Gerät herausnehmen.



VORSICHTSMASSENREGELN FÜR DIE HANDHABUNG

Zur Vermeidung von Problemen sind bei der Handhabung des Geräts die folgenden Vorsichtsmaßnahmen zu beachten.

- Niemals ohne eingelegte Papierrolle drucken.
- Darauf achten, daß keine Fremdkörper, wie z.B. Nadeln, Büroklammern oder Schrauben, in das Gehäuse gelangen.
- Darauf achten, keine Flüssigkeiten auf dem Gerät zu vergießen oder chemische Substanzen enthaltende Sprays darüber zu versprühen.
- Das Gerät vor starken Stößen und Erschütterungen bewahren und nicht fallen lassen.
- Niemals mit spitzen Objekten, wie z.B. einem Kugelschreiber, auf das Bedienfeld drücken.
- Papierblätter niemals zum fortlaufenden Drucken mit Klebestreifen zusammenkleben.
- Den Papiervorschubknopf niemals mit herabgesenktem Druckkopf drehen oder das Papier gewaltsam von Hand herausziehen.

Zur Vermeidung von Verletzungen und Schäden

- Den druckenden Abschnitt des Druckkopfes nicht berühren.
- Bei Einschalten keine beweglichen Teile, wie z.B. Schneidklinge und Zahnrad im Druckergehäuse, oder elektrische Teile berühren.
- Darauf achten, körperliche Verletzungen und die Beschädigung anderer Objekte durch scharfe Kanten zu vermeiden.
- Bei Auftreten jeglicher Störungen während des Betriebs den Drucker sofort ausschalten, und das Netzkabel aus der Steckdose ziehen.
- Die Beseitigung von Betriebsstörungen ist qualifiziertem Fachpersonal zu überlassen. Niemals versuchen, das Gerät eigenhändig zu zerlegen.
- Beim Öffnen/Schließen der Frontabdeckung darauf achten, nicht die Finger oder die Hand einzuklemmen.

TÄGLICHE WARTUNG

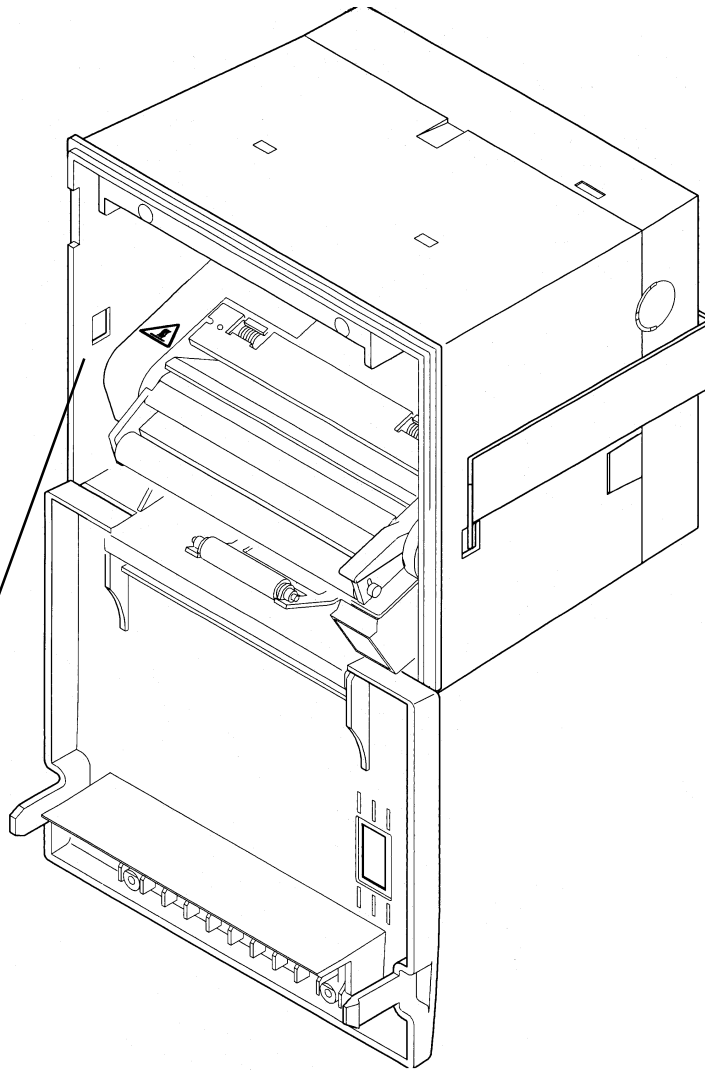
- Vor der Wartung zuerst den Drucker ausschalten.
- Zum Säubern der Druckwalze ein Wattestäbchen mit Äthylalkohol anfeuchten und Staub und Schmutz damit abwischen.
- Schmutz und Staub mit einem trockenen, weichen Tuch vom Druckergehäuse abwischen. Bei starker Verschmutzung einen Lappen in Wasser anfeuchten, auswringen und damit abwischen. Hierzu niemals flüchtige organische Lösungsmittel, wie z.B. Alkohol, Terpentin, Trichlorethan, Benzol, Keton oder chemische Staubentfernungsmittel, verwenden.
- Papierstaub mit einer weichen Bürste vom Gehäuse entfernen.



VORSICHT:

Druckkopf und Motor sind sehr heiß und sollten niemals unmittelbar nach dem Drucken berührt werden.

- ⚠ An der unten gezeigten Stelle (siehe Abbildung) befindet sich ein Warnaufkleber. Die darauf angegebenen Vorsichtsmaßnahmen zur Handhabung des Geräts sind unbedingt zu befolgen.



Dieser Aufkleber weist darauf hin, daß ein Berühren von Druckkopf oder Motor zu Verbrennungen führen kann, da diese Teile nach dem Drucken heiß sind.

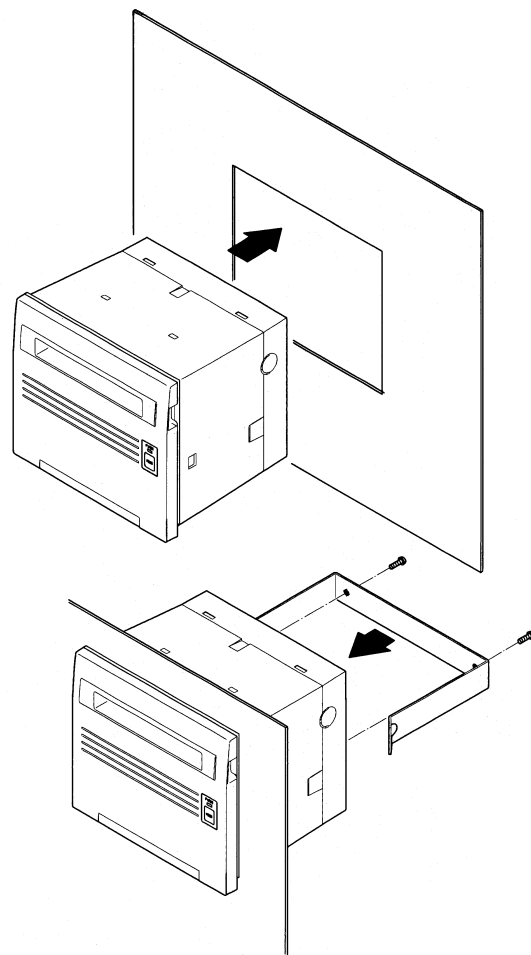
4. BETRIEB

4.1 Befestigung auf einem Gestell

- (1) Das Gerät wie in der untenstehenden Abbildung gezeigt auf einem geeigneten Gestell befestigen.
- (2) Die mitgelieferten Montageteile an der Geräterückseite anbringen und das Gerät mit den beiliegenden Schrauben befestigen.
- (3) Nach der Befestigung vergewissern, daß sich die Frontabdeckung ungehindert öffnen und schließen läßt.
- (4) Die Schrauben nicht zu fest anziehen, damit sich Montageteile und Gehäuse nicht verziehen. Übermäßig festgezogene Schrauben belasten nicht nur das Gehäuse, sondern können auch andere Probleme verursachen.
- (5) Das Montagegestell sollte 1 bis 3 mm stark sein.

Vorsichtsmaßnahmen zur Aufstellung

- Dieser Drucker unterstützt nicht natürliches Herunterfallen des Papiers bei Vollschnitt mit automatischem Papierschneider.
- Behinderungen wie Klappen o.ä. sollen sich nicht vor der Frontabdeckung befinden. Andernfalls kann der Papierauswurf behindert werden, und es kann Papierstau o.ä. verursacht werden.



VORSICHT:

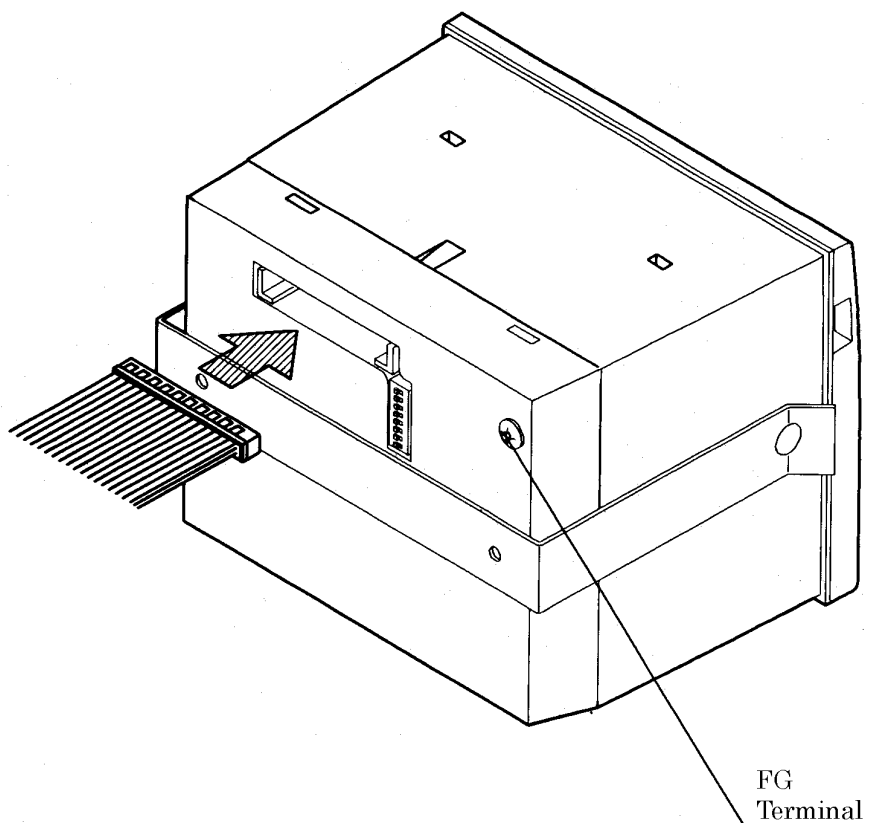
Das Gerät auf einer ebenen und stabilen Fläche in einem Winkel zwischen 0° und 90° aufstellen. Die Schrauben für die Montageteile sollten nicht länger als 15 mm sein.

4.2 Netz- und Datenkabelanschluß

- (1) Vergewissern, daß die Netzversorgung ausgeschaltet ist.
- (2) Das mitgelieferte Datenkabel sicher und korrekt ausgerichtet anschließen. Die Anschlußbuchse für das Kabel befindet sich an der Gehäuserückwand.
- (3) Den Stecker des mitgelieferten Akkus ebenfalls fest einschieben.
- (4) Falls notwendig das Gerätegehäuse erden, um Rauschen, statische Elektrizität usw. zu vermeiden. Hierzu eine Erdleitung fest an den Erdungsanschluß an der Rückwand anschrauben.

VORSICHT:

Bitte beachten, daß das Gerät durch Anschließen des Netzkabels eingeschaltet wird. Die Erdleitung niemals an ein Gasrohr anschließen. Das Kabel stets am Stecker haltend anschließen und abziehen, um Kabelschäden zu vermeiden.

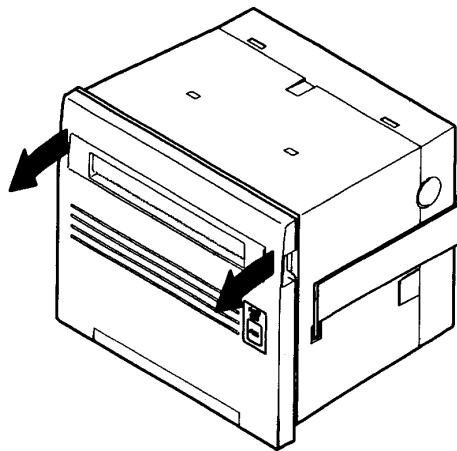


4.3 Öffnen/Schließen der Frontabdeckung

- (1) Mit den Fingern in die linke und rechte Aussparung der Frontabdeckung eingreifen und die Abdeckung in Pfeilrichtung ziehen. Die Frontabdeckung öffnet sich um etwa 180° nach unten.
- (2) Beim Schließen die Frontabdeckung halten und fest zuklappen. Hierbei darauf achten, daß das Rollenpapier gestrafft bleibt, da andernfalls Papierstaus auftreten können.

VORSICHT:

Die Frontabdeckung beim Aufklappen gut festhalten. Da sich die Abdeckung um etwa 180° öffnet, kann diese andernfalls brechen.



4.4 Papiervorschub

Die FEED-Taste an der rechten Tafel der Frontabdeckung einmal drücken. Das Papier wird hierdurch um eine Zeile vorgeschoben. Durch anhaltendes Drücken der Taste wird das Papier fortlaufend vorgeschoben. Das Papier niemals gewaltsam herausziehen, sondern stets durch Drücken der FEED-Taste vorschieben. Das Papier wird durch Drücken der Taste auch bei offener Frontabdeckung oder herabgesenktem Mechanismus vorgeschoben, jedoch können hierdurch Papierstaus entstehen.

VORSICHT:

Die Taste nicht mit spitzen Gegenständen drücken, da hierdurch Störungen auftreten können.

4.5 Automatischer Papiereinzug

Das Gerät verfügt über eine Funktion zum automatischen Einziehen des Papiers. Beim Einführen des Rollenpapiers in die Papiereinzugöffnung des Druckermechanismus wird eine bestimmte Menge Papier automatisch eingezogen.

VORSICHT:

Ein Ziehen am Papier kann zu Papierstaus oder zu Aussetzern beim Papiervorschub führen.

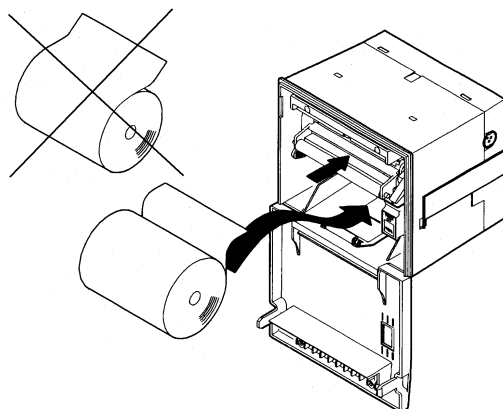
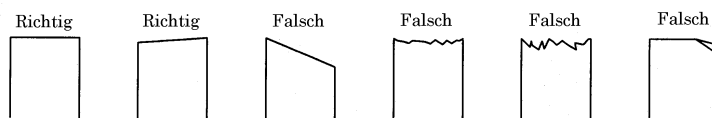
4.6 Einlegen des Druckpapiers

- (1) Die Frontabdeckung aufklappen.
- (2) Das Papierende in nahezu rechtem Winkel abschneiden.
- (3) Die Aufrollrichtung des Papiers bestätigen und die Papierrolle korrekt ausgerichtet ins Papierfach einlegen.
- (4) Das Papierende gerade in die Papiereinzugöffnung des Druckermechanismus einführen. Das Papier wird hierbei automatisch eingezogen.
- (5) Das Papier straffen und die Frontabdeckung schließen.
- (6) Falls notwendig, das Papier durch Drücken der FEED-Taste weiter vorschieben.
 - * Der Versand des Geräts erfolgt mit hochgestelltem Druckkopf. Der automatische Papiereinzug ist mit dieser Druckkopfsstellung nicht möglich. Zum Vorschieben des Papiers deshalb zuerst den Kopfhochstellhebel zur nahen Seite hin umstellen, um den Druckkopf zu senken.
 - * Bitte beachten, daß der Druckbetrieb nach dem automatischen Papiereinzug selbsttätig startet, wenn sich noch Daten im Druckpuffer befinden.



VORSICHT:

- Wenn das Papier schief ausläuft oder nicht korrekt eingezogen wird, den Druckkopf hochstellen, das Papier vorsichtig entfernen und noch einmal neu einführen.
- Zum Austauschen des Papiers den Druckkopf hochstellen und das restliche Papier vorsichtig herausziehen.



4.7 Beseitigung von Papierstaus

Wenn sich das Papier staut oder der Schneidmechanismus sperrt, ist die Ursache wie nachfolgend beschrieben zu beseitigen. Das Gerät zur Sicherheit vorher ausschalten.

- (1) Die Frontabdeckung aufklappen.
- (2) Den mechanischen Sperrhebel nach innen drücken, um den Mechanismus herabzusenken.
- (3) Den Papierstau durch vorsichtiges Entfernen des gestauten Papiers beseitigen. Zum Entfernen des Papiers aus dem Druckermechanismus zuerst den Druckkopf hochstellen und das Papier anschließend vorsichtig herausziehen.
- (4) Zum Freigeben des Schneidmechanismus zuerst das Papier aus dem Schneidbereich entfernen und anschließend das Gerät einschalten. Nach Rückkehr des Schneidmessers in die Ausgangsstellung und der Initialisierung des Druckers ist der Schneidmechanismus wieder funktionersfähig.

Wenn das Schneidmesser nicht zurückkehrt oder erneut eine Störung auftritt, das Gerät ausschalten und, wie in der untenstehenden Abbildung gezeigt, den linken innenliegenden Knopf des Schneidmechanismus zur entfernten Seite hin drehen. Hierdurch wird das Schneidmesser zurückgezogen, so daß das gestaute Papier vorsichtig entfernt werden kann. Anschließend das Gerät wieder einschalten und vergewissern, daß der Drucker initialisiert.

- (5) Nach Beseitigung der Ursache den Mechanismus wieder in die Ausgangsstellung heben, den Druckkopf-Hochstellhebel zurückstellen und das Gerät wieder einschalten.



VORSICHT:

Die obigen Schritte nicht unmittelbar nach dem Drucken ausführen, da Druckkopf und Motor in diesem Stadium sehr heiß sind und Verbrennungen verursachen können. Falls sich die Ausführung derartiger Arbeiten nicht vermeiden läßt, darauf achten, diese Teile nicht direkt zu berühren.

4.8 Selbstdruckfunktion

Durch Drücken der FEED-Taste und gleichzeitiges Einschalten der Netzversorgung oder durch die Eingabe eines RESET-Signals werden die verwendeten Zeichen, die ROM-Version und die DIP-Schalter-Information ausgedruckt. Sofern der automatische Papierschneider angebracht ist, wird das Papier nach dem Drucken abgeschnitten.

4.9 PE und Alarm

4.9.1 Papierende (PE)

Das Gerät erkennt, ob Papier vorhanden ist. Sobald das Papier aufgebraucht ist, stoppt das Gerät den Druckvorgang, gibt die Signale BUSY (DTR) und PE aus und schaltet das PAPER-Lämpchen ein.

Beim Nachlegen von Papier werden die Signale gelöscht, und das PAPER-Lämpchen erlischt wieder. Nach dem Löschen der Signale startet das Gerät den Druckbetrieb oder wartet auf die Eingabe von Daten. Falls bei der Unterbrechung des Druckvorgangs noch Daten im Druckpuffer vorhanden waren, wird der Druckbetrieb bei Nachlegen von Papier fortgesetzt.

4.9.2 Alarm

Wenn der automatische Papierschneider sperrt, der Druckkopf angehoben ist, die Druckkopftemperatur ansteigt oder bestimmte Störungen, wie z.B. ein Papierstau, auftreten, stoppt das Gerät den Druckbetrieb, unterbricht die Netzversorgung zu Motor und Druckkopf und schickt die Signale BUSY (DTR), ERROR und FAULT (nur parallel) an den Hauptrechner.

Der ERROR-Ausgang kann direkt an eine LED angeschlossen werden.

- Fehler beim Einschalten

Die folgende Störungen sind ebenfalls möglich, jedoch ist ein Speicherfehler aufgetreten.

Das Gerät ausschalten und an einen Fachhändler wenden.

- Wenn der automatische Papierschneider sperrt oder ein Papierstau eingetreten ist

Das Gerät ausschalten und die Störungsursache beseitigen. Hierbei werden die Daten im Druckpuffer durch das Abschalten der Netzversorgung gelöscht. Fehlerursachen niemals bei eingeschaltetem Gerät beseitigen.

Beim Wiedereinschalten nach der Fehlerbeseitigung wird das Gerät automatisch rückgestellt.

- Wenn der Druckkopf angehoben ist

Den Druckkopf-Hochstellhebel zur nahen Seite hin stellen. Der Druckkopf senkt sich, und der Druckvorgang kann fortgesetzt werden.

- Wenn die Druckkopftemperatur steigt

Nach Ausdrucken einer größeren Datenmenge, wie z.B. beim fortlaufendem Druckbetrieb usw., steigt die Druckkopftemperatur. In diesem Fall wird der Druckvorgang zum Schutz des Druckkopfes automatisch unterbrochen. Während einer solchen Unterbrechung sind bestimmte Funktionen (Papiervorschub usw.) nicht betriebsfähig. In diesem Fall warten, bis die Druckkopftemperatur gesunken ist. Sobald der Druckkopf abgekühlt ist, kann wieder gedruckt werden. Falls noch Daten im Druckpuffer vorhanden waren, wird der Druckvorgang hiernach automatisch fortgesetzt.



VORSICHT:

Druckkopf und Motor niemals unmittelbar nach dem Drucken berühren, da diese Teile sehr heiß sind und Verbrennungen verursachen können. Falls sich bestimmte Arbeiten in diesem Stadium nicht vermeiden lassen, darauf achten, diese Teile nicht direkt zu berühren. Vorsicht ist darüber hinaus auch vor statischer Elektrizität geboten.

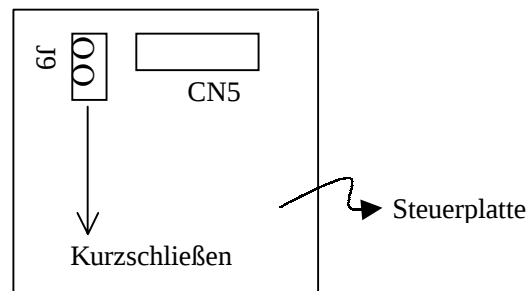
4.10 Betriebsstromversorgung und Anschluß

Betriebsstrom wird normalerweise über Netzteil zugeführt. Wenn Sie ein Schnittstellenkabel (Zubehörkabel) zur Betriebsstromversorgung verwenden, schließen Sie das Kabel wie folgt an:

- (1) Anschließen des Kabels an die externe Stromquelle

Pin-Nr.	Signalname	Eingang/Ausgang	Funktion
7, 8, 9, 10, 11, 12	V 24	–	Betriebsstromquelle (+24 V)
13, 14, 15, 16, 17, 18	GND	–	Betriebsstromquelle (GND)

- (2) Nehmen Sie die Rückabdeckung ab, so daß die Steuerplatte frei liegt. Schließen Sie den Jumperstecker J9 kurz (mit Siebdruck markiert).



VORSICHT:

Wenn Betriebsstrom über Zubehörkabel zugeführt wird, niemals das Netzteil anschließen.

5. EINSTELLUNG DER DIP-SCHALTER

Die DIP-Schalterleiste (DS1) befindet sich an der Rückseite des Hauptgeräts. Beim Einstellen der DIP-Schalter schalten Sie das Hauptgerät aus. Wenn die Schalter bei eingeschaltetem Hauptgerät umgestellt werden, werden die Einstellungen nicht wirksam.

DIP-Schalter

Segment Nr.	Funktion	ON	OFF	Werksseitige Einstellung
DS1 - 1	Auto-Schneider	Ja	Nein	OFF
2	CR-Umschaltung	LF-betrieben	Ignoriert	OFF
3	Druckdichte	Standard	Dunkel	OFF
4	DTR-DSR/XON-XOFF	XON-XOFF	DTR-DSR	OFF
5	Schnittstelle	Siehe Tabelle unten		OFF
6	"			OFF
7	"			OFF
8	"			OFF

293(ON)

Schnittstelle

DS1- 8	7	6	5		Parität	Baudrate
OFF	OFF	OFF	OFF	Paralleleingang	—	—
OFF	OFF	OFF	ON	Serieller Eingang	Keine	1200 bps
OFF	OFF	ON	OFF	"	"	2400 bps
OFF	OFF	ON	ON	"	"	4800 bps
OFF	ON	OFF	OFF	"	"	9600 bps
OFF	ON	OFF	ON	"	"	19200 bps
OFF	ON	ON	OFF	"	Ungerade	1200 bps
OFF	ON	ON	ON	"	"	2400 bps
ON	OFF	OFF	OFF	"	"	4800 bps
ON	OFF	OFF	ON	"	"	9600 bps
ON	OFF	ON	OFF	"	"	19200 bps
ON	OFF	ON	ON	"	Gerade	1200 bps
ON	ON	OFF	OFF	"	"	2400 bps
ON	ON	OFF	ON	"	"	4800 bps
ON	ON	ON	OFF	"	"	9600 bps
ON	ON	ON	ON	"	"	19200 bps

Das Hauptgerät ist werksseitig mit Jumpersteckern bestückt.

Jumperstecker

	Japanische Spezifikation	Internationale Spezifikation
J1	Offen	Kurzgeschlossen
J2	Offen	Kurzgeschlossen
J3	Offen	Kurzgeschlossen
J4	Kurzgeschlossen	Kurzgeschlossen
J5	Kurzgeschlossen	Kurzgeschlossen
J6	Kurzgeschlossen	Kurzgeschlossen
J7	Kurzgeschlossen	Kurzgeschlossen
J8	Kurzgeschlossen	Kurzgeschlossen

Japanische Spezifikation

Internationale Zeichen : Japan
Kanji : JIS-Code

Auto-Lade-Funktion
Eingangs-Pufferspeicher : 3 kB
Serielle Kommunikationsbit-Länge : 8 Bit

Internationale Spezifikation

Internationale Zeichen : USA
Auto-Lade-Funktion
Eingangs-Pufferspeicher : 3 kB
Serielle Kommunikationsbit-Länge : 8 Bit

* Der DS1-4 ist ungültig, wenn der parallele Eingang spezifiziert ist.

* Der DS1-1 bewirkt einen Fehler, wenn bei CBM-292 die Stellung ON gewählt ist.

9. WARTUNG UND KUNDENDIENST

Für Informationen über Wartung und Kundendienst wenden Sie sich bitte an unseren Händler.

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