

User's Manual

CITIZEN
DOT MATRIX PRINTER
MODEL **CBM-710**
CBM-720
CBM-730
CBM-750

Japan CBM Corporation

Declaration of Conformity

Manufacturer's Name : Japan CBM Corporation

Manufacturer's Address: CBM Bldg., 5-68-10, Nakano, Nakano-ku
Tokyo, 164-0001, Japan

Declare the Product

Product Name: Dot Matrix Printer

Model Number(s): CBM-710,720,750 Series
(CBM-710R, CBM-710P, CBM-720R, CBM-720P,
CBM-750R, CBM-750P)
(S.No.9910001 ~)

Conform to the following Standards:

LVD:	EN60950	: A4 :1997
EMC:	EN55022	: 1994 Class B
	EN50082-1	: 1992
	IEC801-2	: 1991 4KV CD, 8KV AD
	IEC801-3	: 1984 3V/m, 27MHz-500MHz
	IEC801-4	: 1988 0.5KV Signal Line 1KV AC mains

Supplementary Information

“The product complies with the requirements of the Low Voltage Directive 73/23/EEC, 93/68/EEC and the EMC Directive 89/336/EEC, 92/31/EEC, 93/68EEC”

Place Tokyo, Japan

Signature:

Date January.1999



Full Name : Mikio Moriya
Position : General Manager
R & D Department

European Contact :

Norco Declaration AB
Box 7146 S-250 07 Helsingborg, Sweden

This declaration is applied only for 230V model.

IMPORTANT SAFETY INSTRUCTIONS

- Read all of these instructions and save them for future 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 back or bottom of the case are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, do not block or cover these openings. The openings should never be blocked by placing the product on a bed, sofa, rug or other similar surface. This product should never be placed near or over a radiator or heater. 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 place 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 of the products plugged into the extension cord does 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, do not attempt to service this product by yourself. Opening and removing the 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.

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.

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<p>ATTENTION: Please RESET the printer to clear the input buffer before getting started. (Ref. to Chapter 7-2)</p>

1. INTRODUCTION

The CBM-710, CBM-720, CBM-730 and CBM-750 are dot impact printers which can be utilized for a wide range of applications, such as data communications terminals, ECR terminals and kitchen printers. High speed performance is made possible by a bidirectional printing system and, since these printers are compact, lightweight and equipped with an abundance of functions, they can be easily employed for a variety of different tasks.

The CBM-720 and CBM-750 have a built-in automatic cutter capable of performing a partial cut (three connecting points remaining) or full cut (one connecting point remaining), which can be controlled through printer command codes.

Before using your printer, please read this manual carefully to be certain you have an adequate understanding of its operation.

1.1 Features

- (1) Desktop compact dot impact printer
- (2) High Speed Printing (Bidirectional Printing System)
- (3) Built-in Auto Cutter (Partial Cut/Full Cut) (CBM-720 and CBM-750)
- (4) Black & Red 2 Color Printing or All Black Printing
- (5) Paper End Detection Function
- (6) Input Buffer Back-up Function
- (7) Low Power Consumption

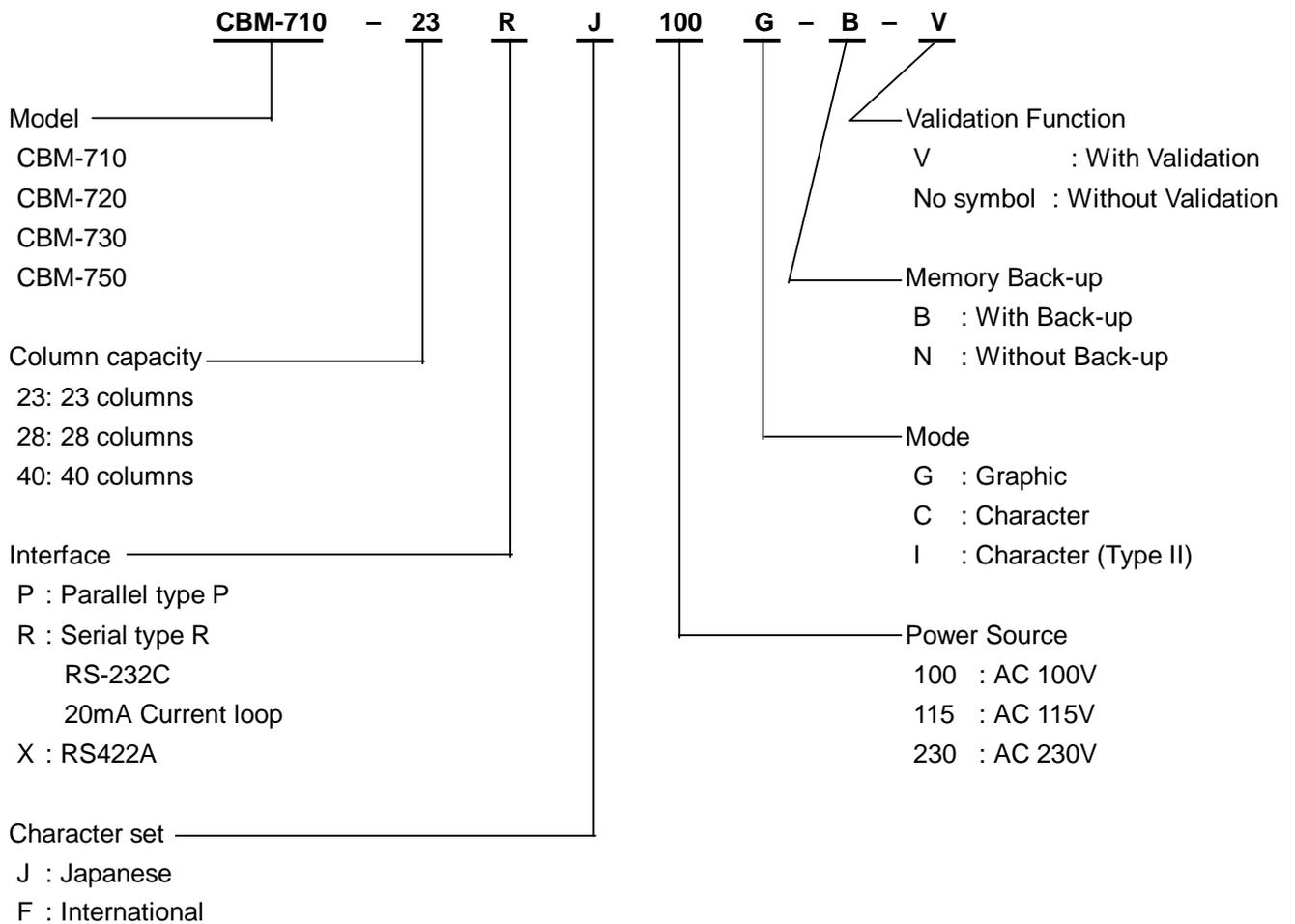
1.2 Accessories

Paper Roll	(1 pc)	- CBM-710, CBM-720, CBM-750
Cassette Ribbon	(1 pc)	
Base Stoppers	(2 pcs)	- CBM-750
Hanger	(1 pc)	- CBM-750
Screws	(2 pcs)	- CBM-750

2. TYPE CLASSIFICATIONS

Printer types are classified according to the system shown below.

CBM-710	23 28 40	O R X	J F	100 115 230	G C	B N	V -
CBM-720	↑	↑	↑	↑	↑	↑	-
CBM-730	↑	↑	↑	↑	↑	↑	-
CBM-750	↑	↑	↑	↑	↑	↑	-



The exclusive paper winder mechanism (Model AW-2) is available separately. This mechanism can be mounted on any of the printer types, except CBM-710, 720.

3. SPECIFICATIONS

3.1 General Specifications

Item		CBM-710, 730	CBM-720, 750
1	Print Method	Bidirectional serial dot impact method	
2	Character composition	7 × 7 dots (Incl. half-dots)	
3	Character number per line	23 columns: 230 dot/line 28 columns: 280 dot/line 40 columns: 360 dot/line	
4	Print speed	23 columns: approx.4.0 line/sec. 28 columns: approx. 3.5 line/sec. 40 columns: approx. 3.0 line/sec.	
5	Character size	23 columns: 1.8(W) × 2.4 (H) mm 28 columns: 1.5(W) × 2.4 (H) mm 40 columns: 1.36(W) × 2.4 (H) mm	
6	Line pitch	C: Character Type: 4.23 mm (1/6 inch) G: Graphic Type: 2.82 mm (1/9 inch)	
7	Paper size	Friction Type: 76.0 ~ 0.5 mm (W) × 80 mm (Dia.) 3.0 inch (W) × 3.0 inch (Dia.) Pin Wheel Type: 76 ~ 89 mm (W) 3 ~ 3.5 inch (W)	
8	Interface	P: Parallel interface (8 Bit) R: Serial interface (RS232C, 20 mA current loop) X: Serial interface (RS422A)* ²	
9	Input buffer	7K bytes or 2 line buffer	
10	Input buffer back-up	N Type: Without back-up. B Type: Duration of back-up: More than 100 hours. (But after 10 minutes operation)	
11	Paper end detection	When paper is near the end, the buzzer actuates and print operation is interrupted, or PE signal is issued.	

Item		CBM-710, 730	CBM-720, 750
12	Validation Print	Available only for V-Type (1 line print)	
13	Auto cutter	Without cutter	With cutter Partial cut/Full cut* ³
14	Cassette ribbon	Two color (Black and Red) print IR-61R/B* ⁴	
15	Paper winder	Model AW-2 available as option.	
16	Power voltage* ⁵	100V ± 10%, 50/60 Hz (For Japan) 115V ± 10%, 60 Hz (For United States) 230V ± 10%, 50/60Hz (For Europe)	
17	Power consump.	Approx. 30W	
18	Operation temp. & humidity	5° to 35°C / 41° to 95°F 10% to 85% RH	
19	Storage temp.	-20° to 70°C	
20	Net weight	Approx. 3.1 kg (710) Approx. 3.3 kg (730)	Approx. 3.3 kg (720) Approx. 3.6 kg (750)
21	External dimensions	Refer to Section 14.	

Notes: *1 Paper weight of 45 kg refers to 1,000 sheets of 788×1,091 mm.

*2 RS-422A interface specifications are not included in this manual

1. With the RS422A type interface, only a one line input buffer can be selected.

2. However, when the input buffer is set for two lines, back-up of graph data is not possible.

*3 Partial cut is three connecting points remaining. Full cut is one connecting point remaining.

*4 Single color print ribbon is available as option.

Black print: IR-61B

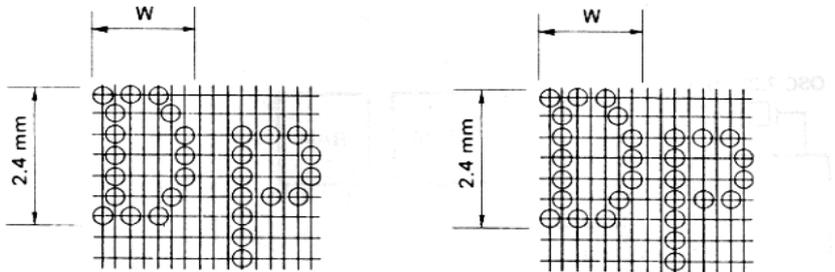
Purple print: IR-61P

V Type: Use only single color print ribbon.

*5 Power voltage setting is performed at the factory.

3.2 Print Format

(1) Character Font 7 × 7 dot.



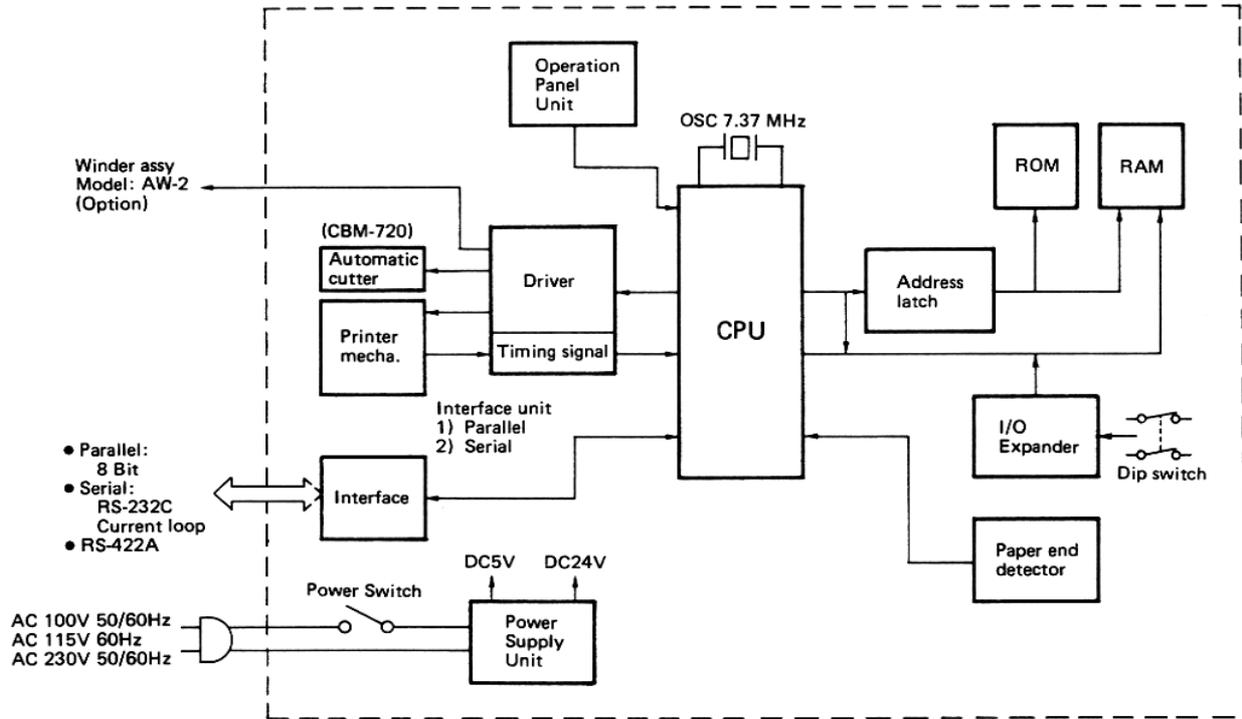
23 columns: W = Approx. 1.8 mm
 28 columns: W = Approx. 1.5 mm
 7×7 dots (Incl. half-dots)

40 columns: W = Approx. 1.36 mm
 7×7 dots (Incl. half-dots)

3.3 Paper Specifications

- (1) Form Friction specification :
- Roll paper
 - 76 - 0.5 mm (Width) × 80 mm (Outer dia.)
- Pin wheel specification:
- Fan fold paper
 - Width 76 mm (3 inches) ~ 89mm (3.5 inches)
- (2) Type High quality paper with smooth surface
- (3) Recommended Paper (Single paper) 45 - 55 kg/1000 sheets/1091 × 788 mm
- (Copy) Non-carbon paper
- Friction specification:
- Original 1 + Copy 1, Each 34 kg paper
 - Total thickness: 0.13 mm or less
- Pin wheel specification:
- Original 1 + Copy 2
 - Use only single color print ribbon
 - Total thickness: 0.2 mm or less

4. BLOCK DIAGRAM



5. EXTERNAL APPEARANCE AND PARTS DESCRIPTIONS

5.1 CBM-710 External Appearance

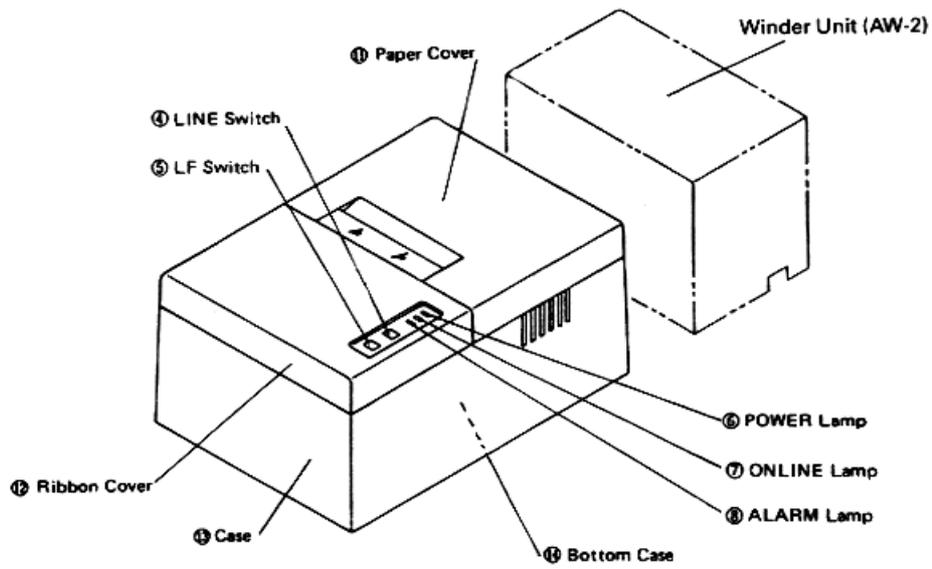


Fig. 1 Front View

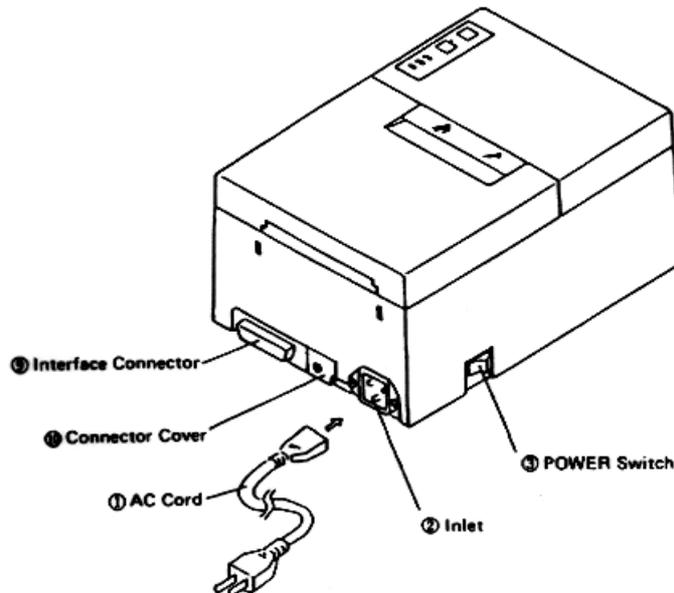


Fig. 2 Rear View

5.2 CBM-720 External Appearance

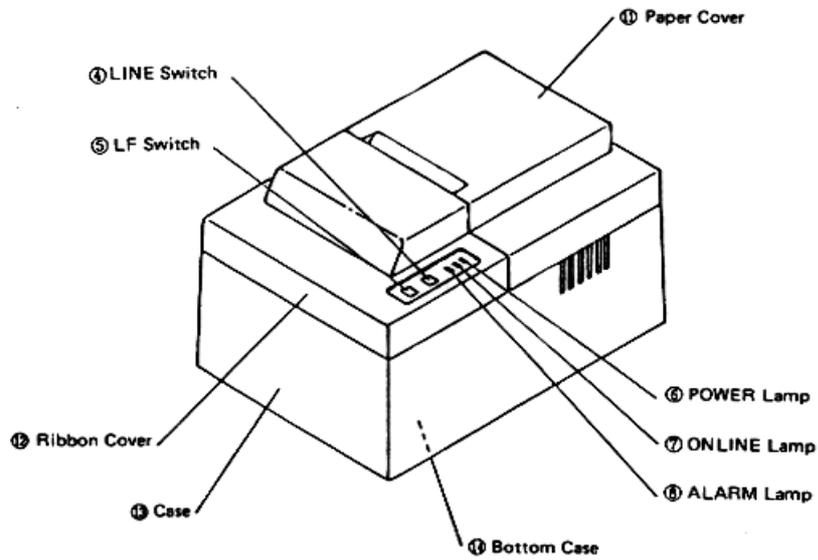


Fig. 3 Front View

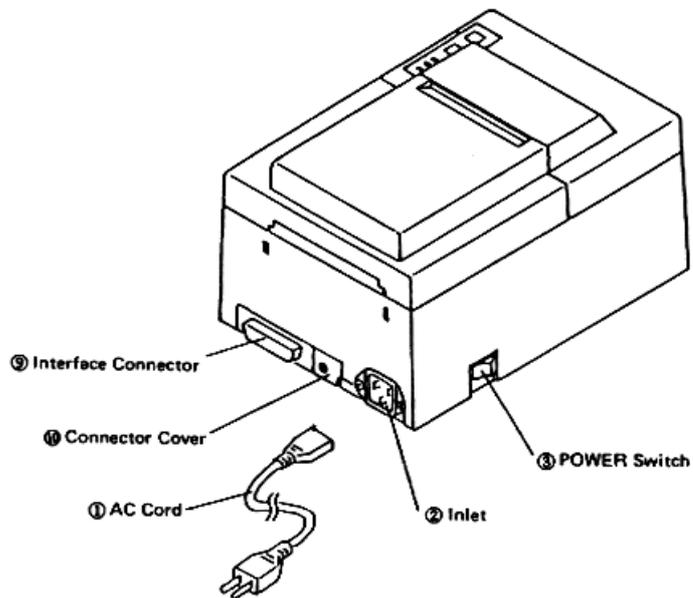


Fig. 4 Rear View

5.3 CBM-730 External Appearance

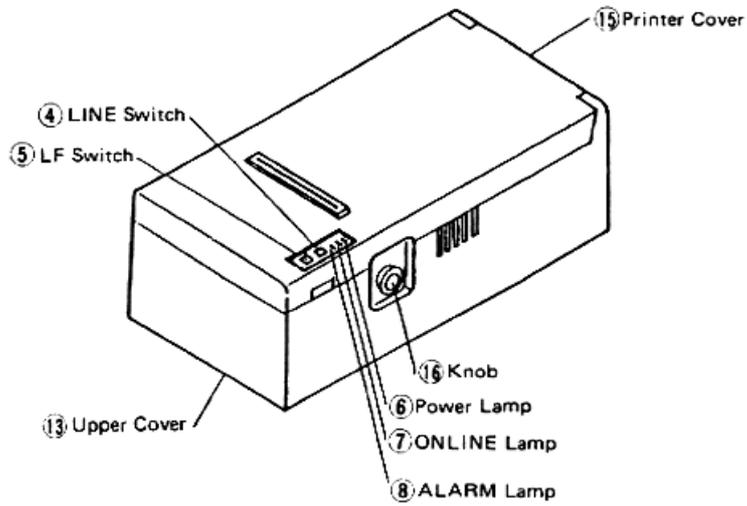


Fig. 5 Front View

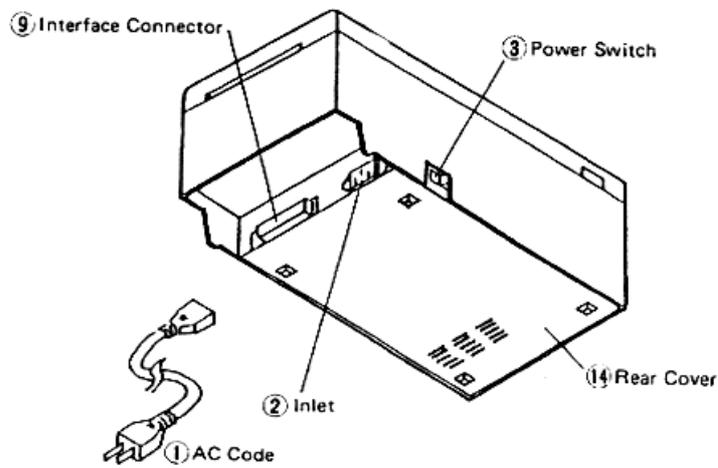


Fig. 6 Rear View

5.4 CBM-750 External Appearance

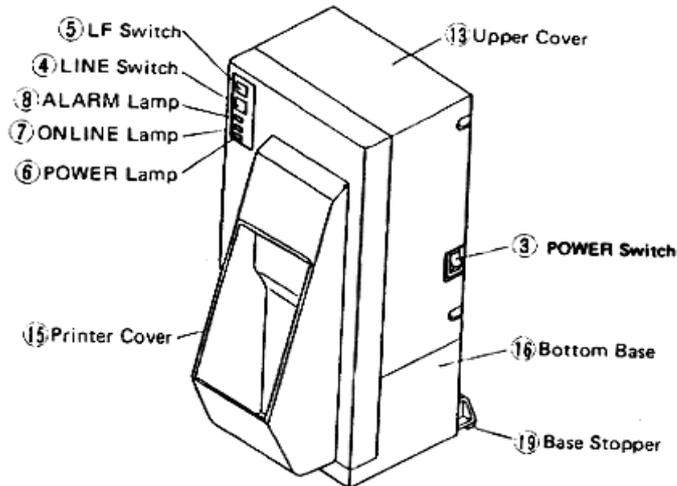


Fig. 7 Front View

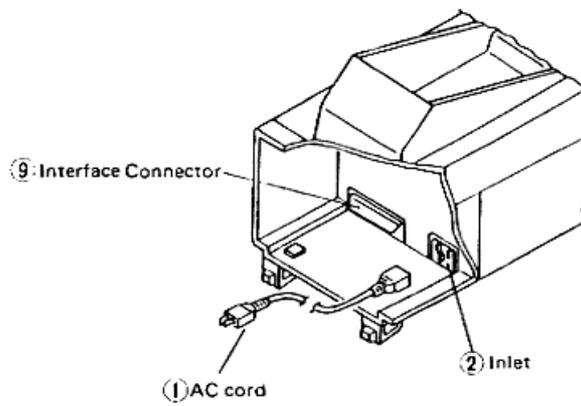


Fig. 9 Rear View

5.5 Part Descriptions

- | | |
|-------------------------|--|
| (1) Power Cord | Attach the connector end to the printer inlet, and insert the plug end into an electric outlet. |
| (2) Inlet | This is the electric power inlet. Attach the connector end of the power cord here. |
| (3) Power Switch | Power is supplied to the printer by turning this switch on. |
| (4) Line Switch | When this switch is pressed, the printer enters select (on line) status. When pressed again, the printer enters deselect (off line) status. This switch is also used when clearing an alarm condition. |
| (5) LF Switch | Paper feeding is performed when this switch is pressed (in deselect status only). This is used when inserting the paper and for spacing up etc. |
| (6) Power Lamp | This lights up when the power switch is "on" and goes out when turned "off". |
| (7) On Line Lamp | This lights up when the printer is in select (on line) status, and goes out when in deselect (off line) status. Printing operation is performed only when this lamp is on. |
| (8) Alarm Lamp | This lights up when printer operation is abnormal. When in an alarm condition, printing and line feed operations are not performed. |
| (9) Interface Connector | Connects through a cable to a computer etc. Please be certain that power to both the printer and the computer are turned off when connection is made. |
| (10) Connector Cover | Covers the connector which is used for the paper winder mechanism (AW-2). |
| (11) Paper Cover | Opens when replacing the paper roll. |
| (12) Ribbon Cover | Opens when replacing the ribbon. |
| (13) Top Case | |
| (14) Bottom Plate | |
| (15) Printer Cover | |
| (16) Paper-Feed Knob | |
| (17) Bottom Base | |
| (18) Base Stoppers | |

6. OPERATION

6.1 Setting and Removing the Paper and Ribbon Covers

- 1) To open, grasp the  sections of the cover with both hands and lift upward.
- 2) In order to replace the cover, engage the hook section in the middle and press downward in the direction of the arrow.

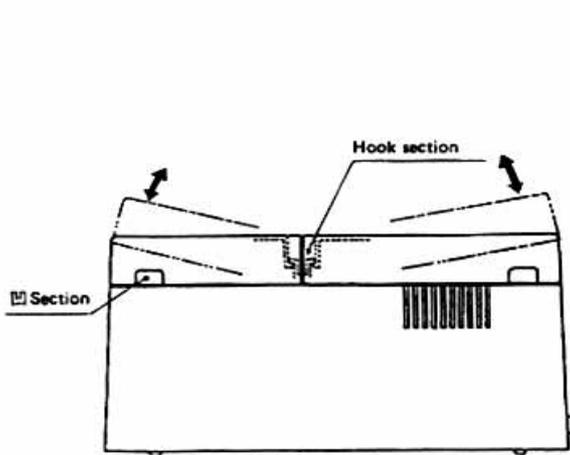


Fig. 9

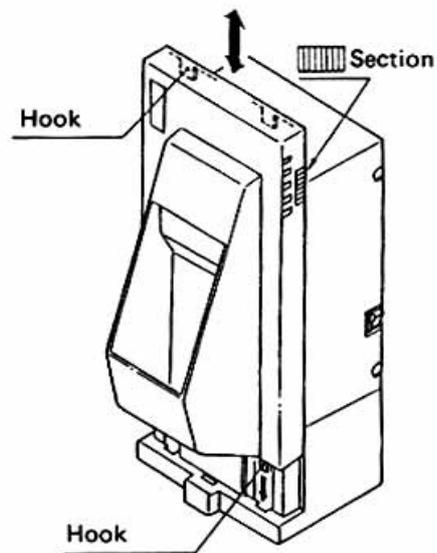


Fig. 10

- 3) To open the CBM-750's printer cover, grasp the  (lines-engraved) section with both hands and lift upward.
- 4) For replacing the cover of the CBM-750, set 4 pieces of rear hooks into each square hole of the main unit, as shown in figure 10.

6.2 Opening and Closing the Cutter Unit (CBM-720. CBM-750)

- 1) To open the unit, grasp two levers and lift upward.
- 2) When closing the unit, press downward until it completely locks into place.

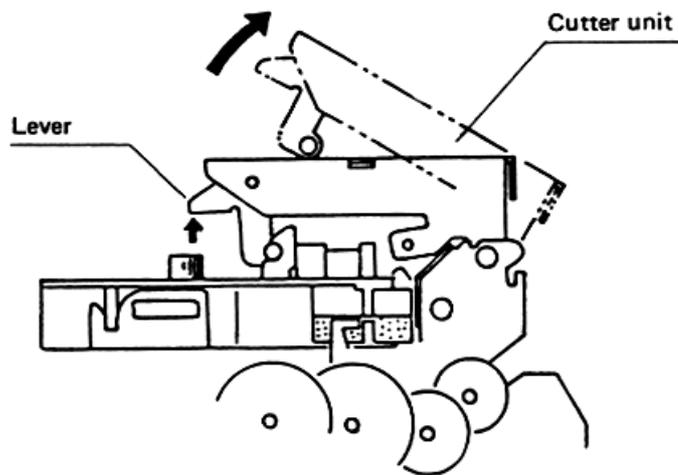


Fig. 11

6.3 Installing the Cassette Ribbon

- 1) First remove the ribbon cover (CBM-710, CBM-730). In the case of the CBM-720, 750 remove both the ribbon and paper covers and then open the cutter unit. (Refer to figures 9, 10 & 11.)
- 2) While inserting the ribbon into the space between the print head and the ribbon guide, press the cassette into the holder unit until it clicks into place. (Refer to figure 12 & 13.)
- 3) Turn the ribbon cassette knob in the direction of the arrow to take up slack in the ribbon.

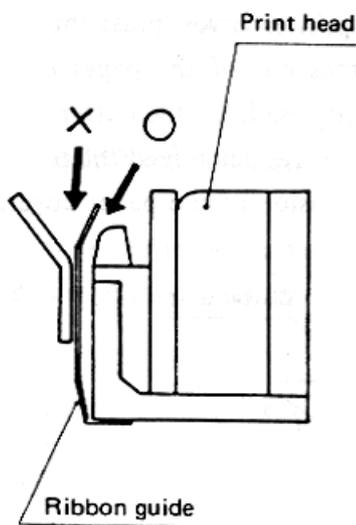


Fig. 12

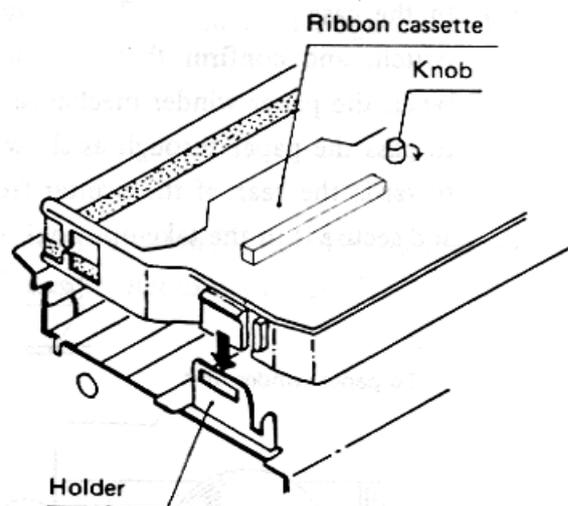


Fig. 13

6.4 Installing and Changing the Paper

(1) Installing the Paper

- 1) Remove the paper cover.
- 2) Put the end of the paper off at a right angle as shown in figure 14.

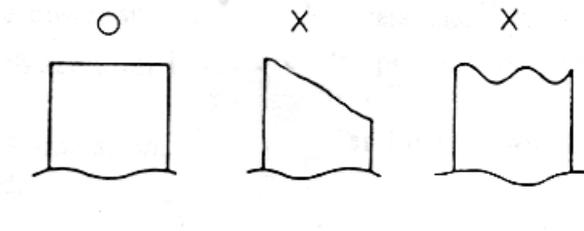


Fig. 14

- 3) Put the end of the paper into the paper entrance of the printer. (Refer to figure 17.)
- 4) After turning the power switch on and confirming that the printer is in deselect (off line) status, press the LF switch to feed the paper into the printer.
- 5) In the case of the CBM-730, set the imprint face of the paper downward and put it into the paper entrance (If using 3.0" width paper, place the paper between 2 bars).

If necessary to adjust the sprocket-wheels' position, free them by the lever and slide to the appropriate position, and lock it back. (Refer to figure 15.)

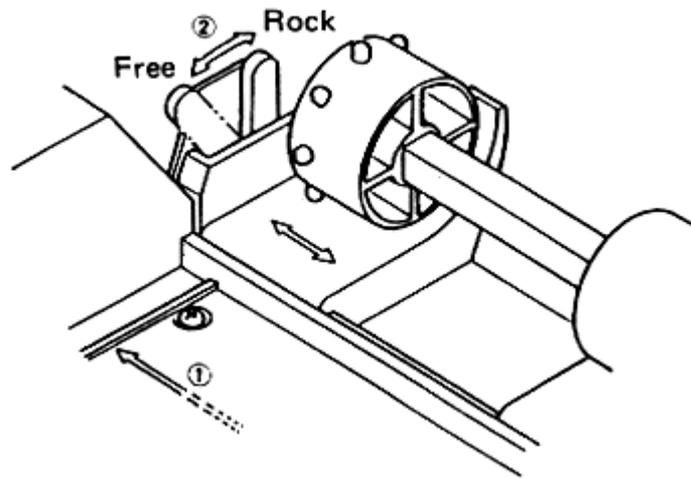


Fig. 15

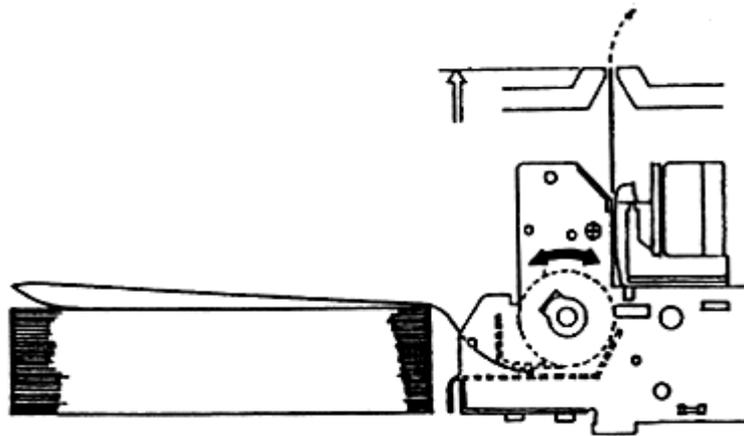


Fig. 16

Hook some of the paper's perforations on the sprockets and forward the paper into the printer by turning the paper-feed knob until the paper's tip protrudes 5 - 6 cm from the printer.

In the case of the CBM-710, use the LF switch to feed the paper.

- 6) When using the paper winder mechanism (AW-2), feed the paper toward the rear of the printer from the inside of the paper cover, and secure it to the take-up spool.

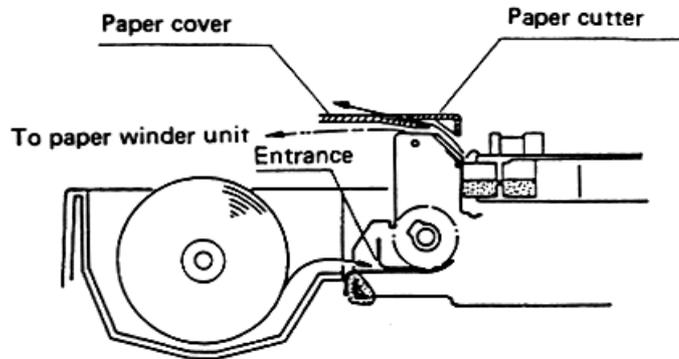


Fig. 17

- 7) In the case, of the CBM-720, attach the printer cover, press the LFswitch, and confirm that the paper comes out of the paper exit. When the paper winder mechanism is being used, lift the cutter unit to pass the paper through as shown in figure 18, Then feed the paper towards the rear of the printer from the inside of the paper cover, and secure it to the take-up spool.

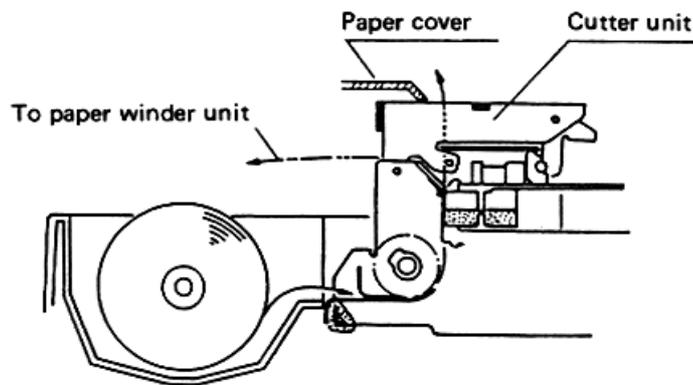


Fig. 18

(2) Changing the Paper

- 1) Cut off the remaining paper near the entrance to the printer.
- 2) If the alarm lamp is on, turn it off by pressing the line switch.
- 3) Feed the paper out of the printer by pressing the LF switch or pull it out from the paper exit.
- 4) Install a new paper roll. (Refer to section 6.4 (1) Installing the paper.)
- 5) When the line switch is pressed again, the printer enters select (on line) status and printing may be resumed once again.

6.5 Self Print Function

Your printer has a built in self print function for the purpose of checking print operation without the need for any other external device.

Procedures for Actuating the Self Print Function

- [1] Be sure that a paper roll is properly loaded.
- [2] Confirm that the inked ribbon is properly installed and turn the power switch off.
- [3] Turn the power switch ON while pressing the LF switch, and release the LF switch after the self print operation has begun.

In the above operation, the self print function will stop automatically when completed.

However, the self print function will not operate without paper when the printer is set for internal process of the paper end detection function.

6.6 Paper End Detector

Your printer provides a paper end detection function which is able to detect when the paper is near the end. In addition, two different responses to this situation may be selected.

- [1] Issue the PE signal to an external unit(s).
- [2] Perform internal processing, whereby the buzzer is sounded and the print operation of your printer is interrupted.

6.7 Installation of the CBM-750

1) Table-top use

Put the AC cord into the "T" hole of the bottom base. Install the base stoppers, as shown in the figure 19.

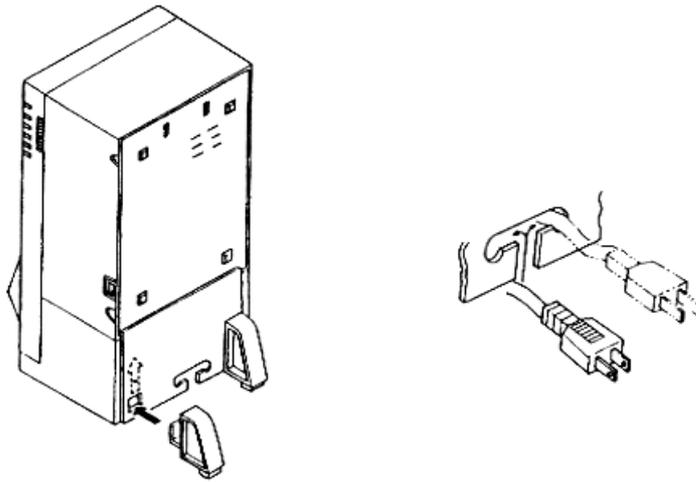


Fig. 19

2) Wall-mounting use

Fix the hanger with 2 screws to the wall and hook the unit as shown in the figure 20.

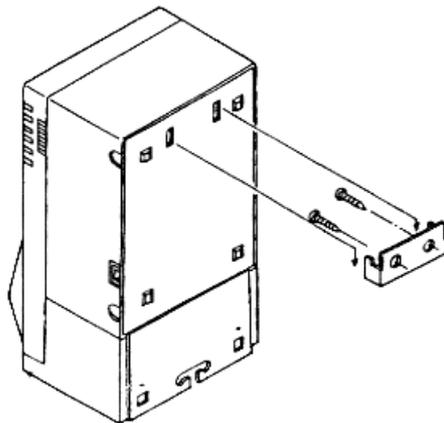


Fig. 20

7. INPUT BUFFER BACK-UP FUNCTION

7.1 Input Buffer Back-up

If the power is turned off, or there is a power failure during printing, the data in the input buffer will be retained. When the power comes back on, the power failure symbol (..... PD) will be printed in red, and then the data which was interrupted will be printed from the beginning of the line where the interruption occurred.

Note: The input buffer back-up function may not operate properly if the related capacitor is not sufficiently charged. This may be the case if the printer has not been operated for a long period of time. After the printer power switch has been turned on for 10 minutes, the buffer back-up should be effective for approximately 100 hours or more.

7.2 Clearing the Input Buffer

In case it is desired to delete the data in the input buffer, the power switch should be turned on while pressing the LINE switch. When deletion of the buffer is completed the buzzer will sound. Please be sure to continue pressing the LINE switch until that time.

If the printer fails to work properly at the time the power switch turned on, please delete the input buffer as described above before inputting new data.

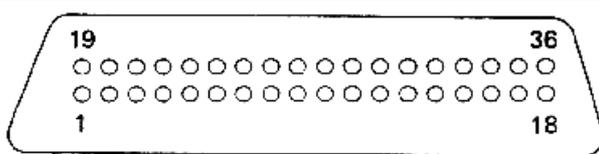
8. PARALLEL INTERFACE

8.1 Specifications

- a) Data Input system: 8 bit parallel (DATA 1 - 8).
- b) Control Signals: $\overline{\text{ACK}}$, $\overline{\text{BUSY}}$, $\overline{\text{STB}}$, $\overline{\text{FAULT}}$, $\overline{\text{PE}}$, $\overline{\text{RESET}}$
- c) Compatible Connectors: Printer side: 57LE-40360 (AMPHENOL or equivalent)
Cable side: 57-30360 (AMPHENOL or equivalent)

8.2 Connector Pin Assignment

Pin No.	Signal Name	Pin No	Signal Name
1	$\overline{\text{STB}}$	19	Twisted Pair GND
2	DATA 1	20	↑
3	DATA 2	21	↑
4	DATA 3	22	↑
5	DATA 4	23	↑
6	DATA 5	24	↑
7	DATA 6	25	↑
8	DATA 7	26	↑
9	DATA 8	27	↑
10	$\overline{\text{ACK}}$	28	↑
11	$\overline{\text{BUSY}}$	29	↑
12	$\overline{\text{PE}}$	30	↑
13	+5V Level	31	$\overline{\text{RESET}}$
14	GND	32	$\overline{\text{FAULT}}$
15		33	GND
16	GND	34	
17	FRAME GND	35	
18	+ 5V DC	36	



8.3 Description of Input/Output Signals

(1) Input/Output Signals

a) Input Signals (To Printer)

- *DATA : 8 bit parallel signal. (Positive logic)
- $\overline{*STB}$: A strobe signal for reading in 8 bit data. (Negative logic)
- $\overline{*RESET}$: A signal which resets the entire printer. (Negative logic. 1 ms or more)

b) Output Signals (From Printer)

- $\overline{*ACK}$: This is a pulse signal for requesting 8 bit data, issued at the end of a BUSY signal. (Negative logic)
- *BUSY : This signal indicates that your printer is in a BUSY state. New data should be input when this signal is "LOW". (Positive logic)
- $\overline{*FAULT}$: When your printer is in an alarm state, this signal is "LOW". At this time, all control circuits of your printer are interrupted. (Negative logic)
- *PE : When the paper is near its end, this signal is issued. (Positive logic)

Note: An alarm condition occurs when the timing of the print head movement sensor is abnormal.

c) Power Source

- *+5V DC : The same +5V output as that of the power source which actuates the control circuits. This should be less than 30 mA.
- *GND : The common circuit ground.
- *FRAME GND : Equivalent to "case ground".

(2) Electrical Characteristics

a) Input Signal Level

All input signals are TTL level.

"HIGH" level 2.0V Min.

"LOW" level 0.8V Max.

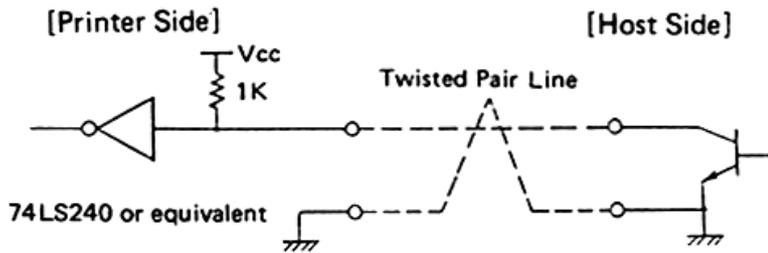
b) Output Signal Level

"HIGH" level 2.4V Min.

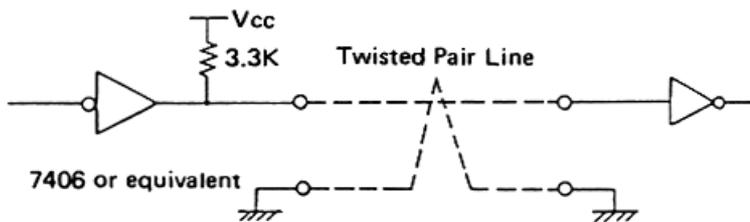
"LOW" level 0.4VMax.

c) Input/Output Conditions

All of the input signals are pulled up by 1K ohms.

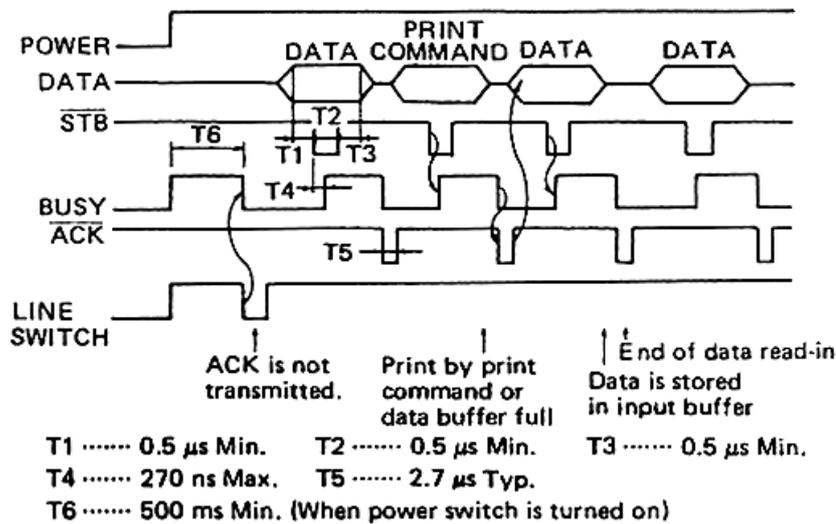


All of the output signals are pulled up by 3.3K ohms.



(3) Timing Chart

a) Data Input and Print Timing



(4) Data Receiving Control

Your printer is able to receive data sent from the host side when the BUSY signal is LOW, but unable to receive when the BUSY signal is HIGH.

(5) Buffering

1) N Type

Your printer is provided with a two line input buffer.

2) B Type

Your printer is provided with a 7K byte input buffer. This makes possible a large amount of data buffering, and therefore, the host side is free immediately after data transmission.

9. SERIAL INTERFACE

9.1 Specifications

- a) Synchronism : Asynchronous
- b) Baud rate:
 RS-232C type : 110, 150, 300, 600, 1200, 2400, 4800, 9600BPS (Selected by user)
 Current Loop type : 110, 150, 300, 600, 1200BPS (Selected by user)
- c) Composition of one word:
 Start bit : 1bit
 Data bit : 7 or 8 bits (selected by user)
 Parity bit : Odd, even or no parity (Selected by user)
 Stop bit : 1bit or more
- d) Signal Polarity :
 RS-232C type : *Mark = Logic "1" (-3V to -12V)
 *Space = Logic "0" (+3V to +12V)
 Current Loop type : *Mark = Logic "1" (Current ON)
 *Space = Logic "0" (Current OFF)
- e) Received Data:
 RS-232C & Current Loop (RD signal)
 *Mark = 1
 *Space = 0
- f) Receiving Control (DTR signal)
 RS-232C : *Mark: Data Transfer not possible
 *Space: Data Transfer possible
 Current Loop: *Mark (Current ON): Data Transfer possible
 *Space (Current OFF): Data Transfer not possible
- g) Transmission Control (TD signal)
 DC1 code (11H) "X" ON : Data Receiving possible
 DC3 code (13H) "X" OFF: Data Receiving not possible
 However, this is valid only for type B input buffer (7K).

9.2 Connector Pin Assignment

Signal Pin	Return Signal Pin	Signal Name	Direction Host/ Printer	Function	RS-232C	Current Loop	TTL
1		FG		Safety Ground	O		
7		GND		Signal Ground	O		
3		RD	→	Received Data	O		
20		DTR	←	Printer BUSY Signal	O		
2	22	TD	←	Transmitted Date	O	O	
11		PE	←	Paper End Signal			O
12		$\overline{\text{FAULT}}$	←	Printer ALARM Signal	O		
13	14	DTR	←	Printer BUSY Signal		O	
18	16	RD	→	Received Data		O	
23		$\overline{\text{RESET}}$	→	Printer RESET Signal			O

- Notes:
- [1] The signals for RS-232C use are based on EIA RS-232C level.
 - [2] The loop current for Current Loop signal use should be restricted within the range of 10 to 20mA.
 - [3] Please always maintain the "mark state", when received data are not being transferred.
 - [4] The assignment of RS-232C/Current loop/TTL can be performed with the preset jumper (Refer to 10. Slide Switch Setting).

Compatible Connector (D-Sub connector) :

*Printer: 17LE-13 250 (AMPHENOL or equivalent)

*Cable Side: 17JE-23 250 (AMPNENOL or equivalent)

9.3 Description of Input/Output Signals

(1) Input/Output Signals

a) RD :

This is the serial signal for received data. When framing, overrun or parity errors occur, the data concerned are ignored.

b) DTR :

Please write in data or commands when this signal is in a "ready" state. If written in when in a BUSY state, an overrun error will occur and the data will be ignored. Data can be written into the input buffer even during printing. Further, a BUSY signal is generated when the power is turned on, while test printing, when ONLINE and during reset.

c) $\overline{\text{FAULT}}$:

When there is a problem in the printer mechanism the FAULT signal will be issued, and all control circuits will be interrupted. To RESET this signal, first correct the cause of trouble in the printer mechanism. Then, by pressing the LINE switch or by inputting "0" (LOW LEVEL) at the RESET terminal, the FAULT can be cleared.

Causes of the FAULT signal are lack of paper and errors in the printer mechanism. Printer errors include such as, the print head stopping during print operation or failure of the print head to return to the home position.

d) $\overline{\text{RESET}}$:

This signal resets the entire printer.

e) PE :

This signal is output when the paper roll is near the end.

f) TD (Valid only for type B):

When receiving data signals, and when the printer's input buffer has less than 1K bytes remaining open, the DC3 code (13H) is issued, indicating that receipt of data is not possible. When the data in the input buffer is reduced to 2K bytes, the DC1 (11H) code is issued, which indicates that data receipt is possible.

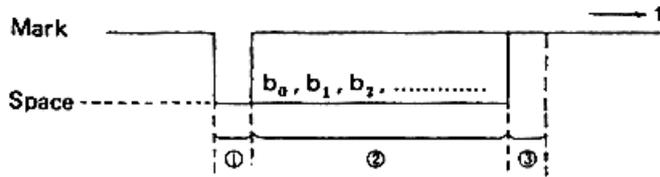
g) FG:

Frame Ground

h) GND:

Common ground for all circuits.

(2) Data Composition



- [1] Start bit
- [2] Data bits (and parity bit)
- [3] Stop bit (1 bit or more)

[1] Start bit

1/2 bit past the line dropping from MARK to SPACE, a status reading is taken again. If the reading is SPACE, a start bit is recognized, but if it is MARK, it is not taken as a start bit. This is not regarded as an error, but the search for the start bit is performed once again.

[2] Data bit and Parity bit

Data bits and parity bits are the data of the bits in question, which are represented by the state at the times sampling is performed. This is accomplished at time intervals equal to one bit in length, beginning from the middle of the start bit. The order of the bits is, starting with the bit closest to the start bit, bit-0, bit-1, parity bit. (Note: data bits are based on "one point sampling".)

[3] Stop bit

The stop bit consists of one or more bits at "mark" level. When "space" level is detected for a stop bit, a framing error occurs.

(3) Error Detection

Parity, framing and overrun errors can be detected by your printer. When an error is detected, the ALARM lamp goes on, the buzzer is sounded, the related data is abandoned, and the printer shifts to the next incoming data. The ALARM lamp can be turned off by pressing the LINE switch.

[1] Framing error

When "space" state is detected during stop bit sampling, the ALARM lamp goes on, the buzzer sounds, and the related data is ignored.

[2] Parity error

When parity check is designated, and if when checked an error is detected, the ALARM lamp goes on, the buzzer sounds and the related data is ignored.

[3] Overrun error

When an overrun error is detected, the ALARM lamp goes on, the buzzer sounds and the related data is ignored.

[4] Other errors

When trouble is detected in the printer mechanism, the ALARM lamp goes on, the buzzer is sounded, the FAULT signal is output, and the DTR signal becomes BUSY. After the cause of the trouble has been corrected, the ALARM lamp can be turned off by pressing the LINE switch or by making RESET = "0". When the printer is put ONLINE, data receiving restarts.

(4) Data Receiving Control

When the BUSY signal is LOW, your printer receives data from the host side, but when this signal is HIGH, it cannot receive data.

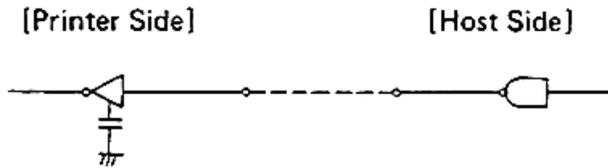
(5) Buffering

Data transfer to the input buffer is controlled by the DTR and TD signals. Please refer to 9.3 b) for the DTR signal and 9.3 f) for the TD signal.

(6) Electrical Characteristics

a) RS-232C Circuit

Input (RD)



MAX232 or equivalent

Mark = (-8V): Stop bit
Space = (-8V): Start bit

Output (DTR, TD, $\overline{\text{FAULT}}$)

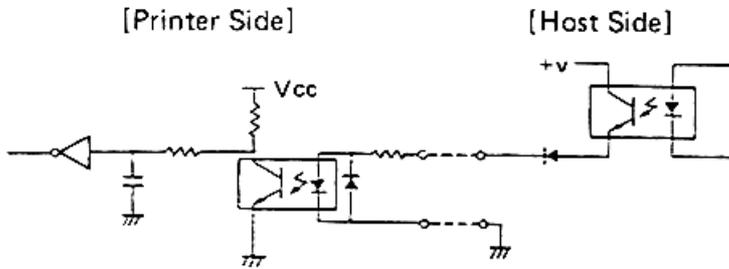


MAX232 or equivalent

*DTR	(-8V): BUSY	*TD	Mark = (-8V): 1
	(+8V): READY		Space = (+8V): 1
* $\overline{\text{FAULT}}$	(-8V): Normal		
	(+8V): Abnormal		

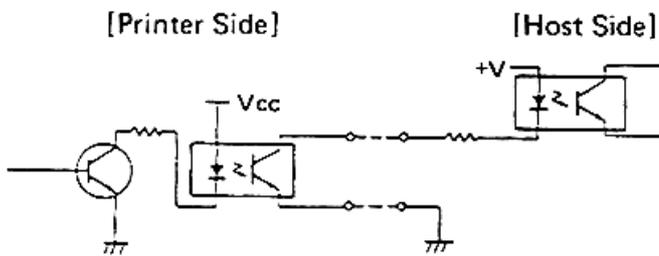
b) Current Loop Circuit

Input (RD)



Mark = Current ON
Space = Current OFF

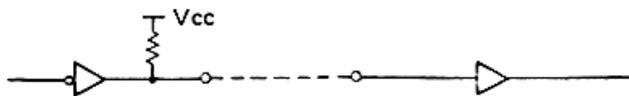
Output (DTR, TD)



*DTR Current ON : READY
 Current OFF : BUSY
*TD Mark = Current ON
 Space = Current OFF

c) TTL Circuit

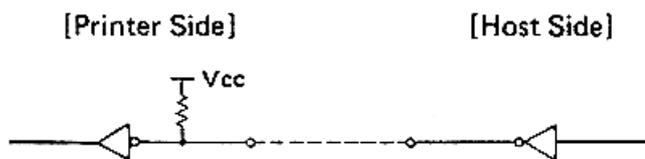
Output (PE)



7406 or equivalent

*PE H : Paper empty
 L : Paper reaming

RESET



7406 or equivalent

LOW for RESET

10. FUNCTION SELECTION

In order to meet the widest possible range of needs, various conditions can be selected by setting the DIP switches and slide switches.

(1) Setting DIP Switch DS1

No.	Function	Off	On	Factory Setting
1	Auto Cutter	No	Yes	*1
2	International country switching	(Refer to the table below)		Off
3				Off
4	Input buffer	7K Byte	2 Line	*1
5	Character direction	Normal	Inverted	*1
6	CR cord	CR	CR + LF	Off
7	Mode	Character	Graphic	*1
8	SEL/DESEL at "power on"	SELECT	DESELECT	Off

Note : *1) Setting is variable, depending on the type of printer.

No.	USA	FRANCE	W.GERMANY	ENGLAND
2	OFF	ON	OFF	ON
3	OFF	OFF	ON	ON

(2) DIP Switch DS2 (Serial interface specifications only)

No.	Function	OFF	ON	Factory Setting
1	Word length setting	8 bits	7 bits	OFF
2	Parity check	YES	NO	ON
3	Parity condition	ODD	EVEN	OFF
4	Not in use			
5	Baud rate setting	(Refer to the table below)		OFF
6				OFF
7				ON
8				OFF

bps No	110	150	300	600	1200	2400	4800	9600
5	OFF	ON	OFF	ON	OFF	ON	OFF	ON
6	OFF	OFF	ON	ON	OFF	OFF	ON	ON
7	OFF	OFF	OFF	OFF	ON	ON	ON	ON
8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

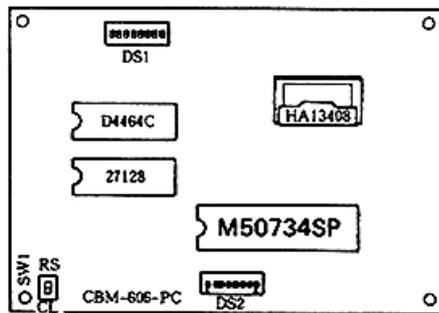
(3) Slide Switch Setting (Serial interface specifications only)

RS232-C or 20mA current loop can be selected by changing slide switch SW1 on the control board. The side labeled "RS" is for RS232-C and the side, labeled "CL" is for 20mA current loop. The switch is set at the factory for RS232-C.

(4) DIP Switch and Slide Switch Locations

DIP switches and slide switches are mounted on the control board to make function selection possible. When function selection is performed, remove the printer bottom cover.

Special care should be taken to avoid damage to electronic parts and wiring. Furthermore, be sure to disconnect the power plug from the electric outlet before opening the printer case.



- Note:
1. DS2 is mounted for RS232C and RS422A type only.
 2. SW1 is mounted for RS232C type only.

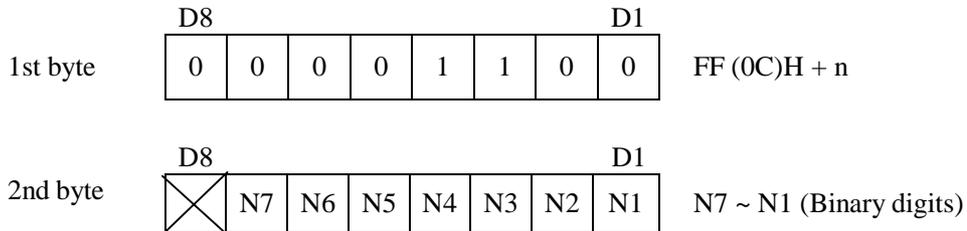
11. PRINT CONTROL FUNCTIONS

11.1 Control Codes

Function cord	Hex. Code	Functions
FF + n	0C+n	"n-line" paper feed command
SO	0E	Enlarged character command
SI	0F	Normal character command
LF	0A	Paper feed command
CR	0D	Print command
DC1	11	Initial set command
oc2	12	Inverted character command
DC3	13	Red color print command
CAN	18	Clear command
ESC+P+0	1B, 50, 00	Paper full cut command
ESC+P+1	1B, 50, 01	Paper partial cut command
ESC+P+2	1B, 50, 02	Validation print
BEL	07	Buzzer command
ESC + - + n	1B, 2D, n	Underline command
ESC + * + n1 + n2	1B, 2A, n1 , n2	Graphic command
ESC + 1	1B, 31	1/9 inch paper feed preset command
ESC + 2	1B, 32	2/9 inch paper feed preset command
ESC + C + n	1B, 43, n	Page length set command
ESC + f + 1	1B, 66, 01	Form feed command
ESC + N + n	1B, 4E, n	n line skip perforation command
ESC + 0	1B, 4F	Skip perforation cancel command

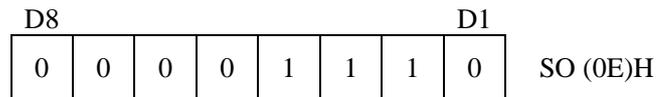
11.2 Input Data Formats

(1) Paper feed command for "n" lines



When the number of lines to be fed (2nd byte) is written-in following the paper feed command (1st byte), the paper will be fed by the number of lines specified. The number of lines to be fed can be specified from n=1 to 127. If "0" is specified, paper feed will not be carried out. When there is data in the print buffer at the time this command is applied, this data will first be printed out and then line feeding of "n" lines will be performed.

(2) Enlarged character command



The data following this command, are printed out in twice the normal width. This mode will continue until the corresponding cancel command is input, or automatically released after printing one line. Since enlarged characters are twice the normal width, care should be taken to avoid exceeding the column capacity.

(3) Enlarged character cancel command

D8	0	0	0	0	1	1	1	1	D1	SI (0F)H
----	---	---	---	---	---	---	---	---	----	----------

This command is used for canceling the enlarged character mode set by SO, and the following data will be printed out in the normal character mode.

(4) Paper feed command

D8	0	0	0	0	1	0	1	0	D1	LF (0A)H
----	---	---	---	---	---	---	---	---	----	----------

When there is data in the internal print buffer, line feed will be carried out after printing is completed. When the buffer is empty, line feed only will be carried out.

(5) Print command

D8	0	0	0	0	1	1	0	1	D1	CR (0D)H
----	---	---	---	---	---	---	---	---	----	----------

By means of this command, line feed is performed after printing is completed. In order to accommodate the print data output formats of various computers, the CR function is selectable. (Please refer to 10 (1) DIP Switch Setting)

(6) Clear command

D8	0	0	0	1	1	0	0	0	D1	CAN (18)H
----	---	---	---	---	---	---	---	---	----	-----------

Print data previously entered on the same line can be cleared by the command.

(7) Red color print command

D8	0	0	0	1	0	0	1	1	D1	DC3 (13)H
----	---	---	---	---	---	---	---	---	----	-----------

This command specifies red colored characters and all of the characters on one line will be printed in red. Since this command is cancelled after printing one line, it is necessary to use it for each line on which red printing is desired.

(8) Initial Set Command

D8	0	0	0	1	0	0	0	1	D1	DC1 (11)H
----	---	---	---	---	---	---	---	---	----	-----------

The controller is initialized by this command and the following conditions are established.

- * Internal input buffer cleared
- * Normal character mode selected
- * Black color print mode selected
- * Skip designation cancelled
- * Page length set to 66 lines
- * Line feed pitch set to 219 inch (graphic type only)

(9) Inverted character command

D8	0	0	0	1	0	0	1	0	D1	DC2 (12)H
----	---	---	---	---	---	---	---	---	----	-----------

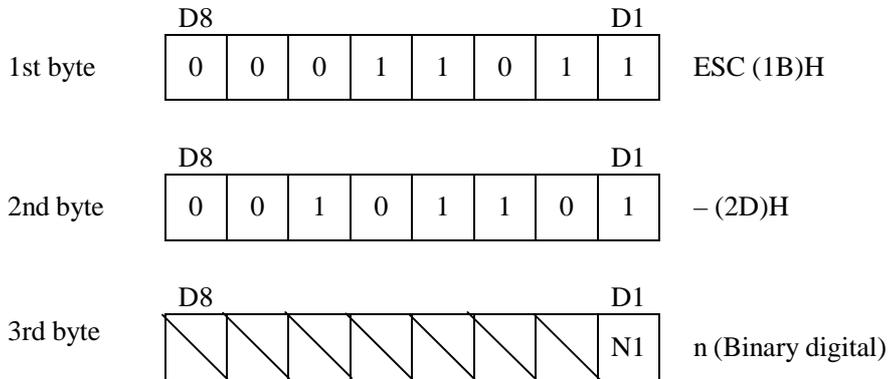
This command specifies inverted characters. By entering this command at the beginning of print data and then sending the data to the controller, all of the following characters will be printed upside down. This command remains valid until, either it is entered again or the initial set command is entered.

(10) Buzzer Command

D8	0	0	0	0	0	1	1	1	D1	BEL (07)H
----	---	---	---	---	---	---	---	---	----	-----------

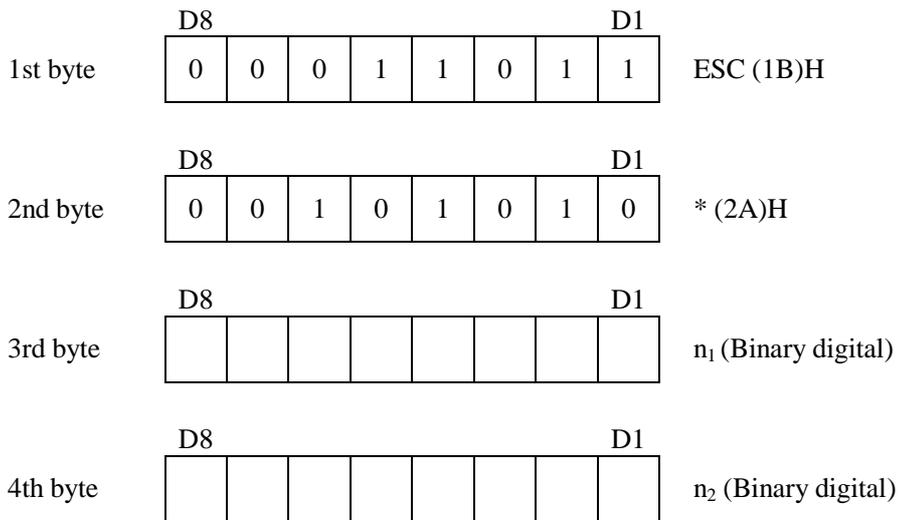
Command to activate the alarm buzzer for 0.3 second period.

(11) Underline Command



When n=1, the underline mode is set, and when n=0, it is cancelled.

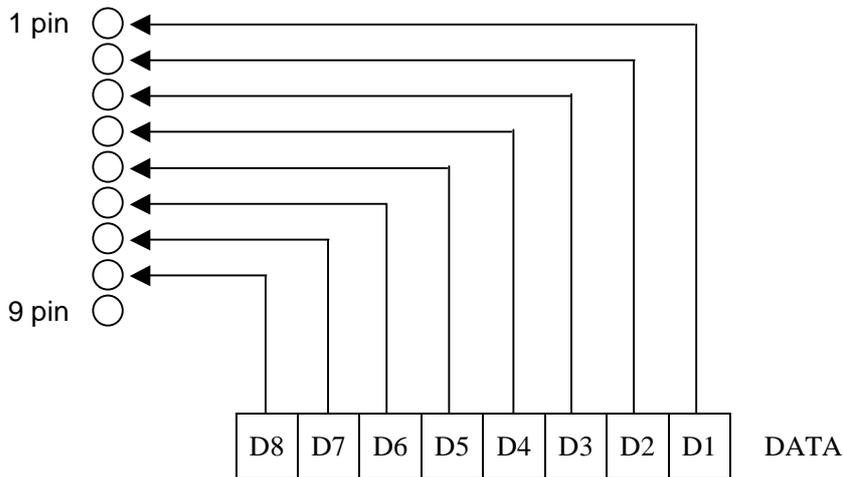
(12) Graphic Command (Graphic Type Only)



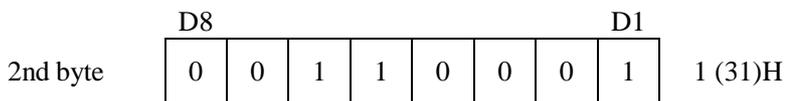
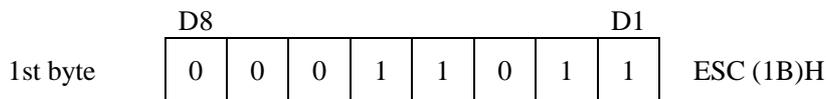
Bit image mode printing is performed by this command. (n₂ is the quotient when divided by 256, and n₁ is the remainder.) When data is received only for numbers specified by n₁ and n₂, printing and line feed are carried out automatically, and the bit image mode is cancelled.

However, since "half-dots" are being used, the next corresponding pin cannot print at the same time. Further, the maximum value of n1 and n2 is the number contained in one line, and this cannot be exceeded.

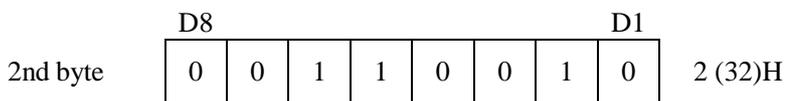
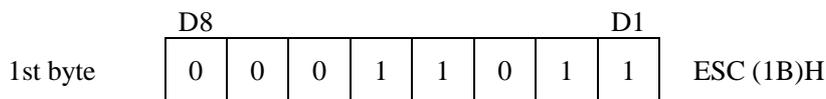
Relation of Head Pins to Data



(13) 1/9 inch Line Feed Pitch Set Command (Graphic Type)



(14) 2/9 inch Line Feed Pitch Set Command (Graphic Type)



(15) Page Length Set Command

1st byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="width: 10%; border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: none;"></td> </tr> </table>	D8								D1	0	0	0	1	1	0	1	1		ESC (1B)H
D8								D1												
0	0	0	1	1	0	1	1													

2nd byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="width: 10%; border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: none;"></td> </tr> </table>	D8								D1	0	1	0	0	0	0	1	1		C (43)H
D8								D1												
0	1	0	0	0	0	1	1													

3rd byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="width: 10%; border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">/</td> <td style="border: 1px solid black;">N7</td> <td style="border: 1px solid black;">N6</td> <td style="border: 1px solid black;">N5</td> <td style="border: 1px solid black;">N4</td> <td style="border: 1px solid black;">N3</td> <td style="border: 1px solid black;">N2</td> <td style="border: 1px solid black;">N1</td> <td style="border: none;"></td> </tr> </table>	D8								D1	/	N7	N6	N5	N4	N3	N2	N1		n (Binary digital)
D8								D1												
/	N7	N6	N5	N4	N3	N2	N1													

The length of one page is set to "n" lines by this command.
 (1 ≤ n ≤ 127)

(16) Form Feed Command

1st byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="width: 10%; border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: none;"></td> </tr> </table>	D8								D1	0	0	0	1	1	0	1	1		ESC (1B)H
D8								D1												
0	0	0	1	1	0	1	1													

2nd byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="width: 10%; border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: none;"></td> </tr> </table>	D8								D1	0	1	1	0	0	1	1	0		f (66)H
D8								D1												
0	1	1	0	0	1	1	0													

3rd byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="width: 10%; border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> </tr> </table>	D8								D1	0	0	0	0	0	0	0	0	1	1 (01)H
D8								D1												
0	0	0	0	0	0	0	0	1												

The input of this command feeds the paper to the top of the next page, after printing the data contained in the print buffer.

(17) Skip Perforation Command

	D8		D1						
1st byte	0	0	0	1	1	0	1	1	ESC (1B)H
	D8		D1						
2nd byte	0	1	0	0	1	1	1	0	N (4E)H
	D8		D1						
3rd byte	/	N7	N6	N5	N4	N3	N2	N1	n (Binary digital)

This command feeds the paper (skips) n lines without any printing.
 However, this cannot exceed the length of one page ($1 \leq n \leq 126$)

(18) Skip Perforation Cancel Command

	D8		D1						
1st byte	0	0	0	1	1	0	1	1	ESC (1B)H
	D8		D1						
2nd byte	0	1	0	0	1	1	1	1	0 (4F)H

This command cancels the skip perforation function.

(19) Validation Print Command

	D8		D1						
1st byte	0	0	0	1	1	0	1	1	ESC (1B)H
	D8		D1						
2nd byte	0	1	0	1	0	0	0	0	P (50)H
	D8		D1						
3rd byte	0	0	0	0	0	0	1	0	2 (02)H

Validation printing is performed by this command (one line only).

* This command cannot be used for printers with cutter specifications (Type A).

(18) Full Cut Command

1st byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: none;"></td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;"></td> <td style="border: none;"></td> </tr> </table>	D8										D1		0	0	0	1	1	0	1	1			ESC (1B)H
D8										D1														
	0	0	0	1	1	0	1	1																

2nd byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: none;"></td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: none;"></td> </tr> </table>	D8									D1		0	1	0	1	0	0	0	0		P (50)H
D8									D1													
	0	1	0	1	0	0	0	0														

3rd byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: none;"></td> <td style="border: 1px solid black;">0</td> <td style="border: none;"></td> </tr> </table>	D8									D1		0	0	0	0	0	0	0	0		0 (00)H
D8									D1													
	0	0	0	0	0	0	0	0														

A full cut of the paper is performed by this command (one connecting point remaining).

(20) Partial Cut Command

1st byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: none;"></td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">1</td> <td style="border: none;"></td> </tr> </table>	D8									D1		0	0	0	1	1	0	1	1		ESC (1B)H
D8									D1													
	0	0	0	1	1	0	1	1														

2nd byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: none;"></td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: 1px solid black;">1</td> <td style="border: 1px solid black;">0</td> <td style="border: none;"></td> </tr> </table>	D8									D1		0	1	0	1	0	0	0	0		P (50)H
D8									D1													
	0	1	0	1	0	0	0	0														

3rd byte	<table style="border-collapse: collapse; width: 100%; text-align: center;"> <tr> <td style="width: 10%; border: none;">D8</td> <td style="border: none;"></td> <td style="width: 10%; border: none;">D1</td> </tr> <tr> <td style="border: none;"></td> <td style="border: 1px solid black;">0</td> <td style="border: none;">1</td> </tr> </table>	D8									D1		0	0	0	0	0	0	0	0	1	1 (01)H
D8									D1													
	0	0	0	0	0	0	0	0	1													

A partial cut of the paper is performed by this command (one connecting point remaining).

12. CHARACTER CODE TABLES

International Character Codes

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p			£	U	ē	ū		
1		DC1	!	1	A	Q	a	q			Ɔ	β	ē	ç		
2		DC2	"	2	B	R	b	r			F	§	ī	ı		
3		DC3	#	3	C	S	c	s			Ω	α	ı	N		
4			\$	4	D	T	d	t			μ	ρ	ı	ñ		
5			%	5	E	U	e	u			Σ	·	ı	E		
6			&	6	F	V	f	v			σ	TL	T	o		
7			'	7	G	W	g	w			×	¹ ₂	ö	i		
8		CAN	(	8	H	X	h	x			©	N	ó	Á		
9			)	9	I	Y	i	y			×	T	ö	ı		
A	LF		*	:	J	Z	j	z			∞	Ψ	ö	θ		
B		ESC	+	:	K	[	k	{			±	¹ ₄	ö	ä		
C	FF		,	<	L	\	l	!			÷	A	ü	ä		
D	CR		-	=	M	]	m	}			κ	ë	ú	ä		
E	SO		.	>	N	`	n	—			Á	é	ü	ä		
F	SI		/	?	O	_	o	⋯			Ö	è	ü	ä		

The following codes are set as space characters.

20H, 80H-9FH, E0H-FFH.

Individual Country Character Codes

	U. S. A.	England	France	W. Germany
2 3 H	#	£	#	#
4 0 H	@	@	à	§
5 B H	[	[	•	Ä
5 C H	\	\	ç	Ö
5 D H	]	]	§	Ü
7 B H	{	{	ê	ä
7 C H	!	!	û	ö
7 D H	}	}	ë	ü
7 E H	—	—	“	ß

13. MAINTENANCE

13.1 Maintenance Procedures

It is recommended that users perform periodic cleaning of their printer.

(1) Exterior :

The exterior case of the printer can be cleaned with alcohol. Care should be taken to keep water from reaching the electronic parts and the printing mechanism .

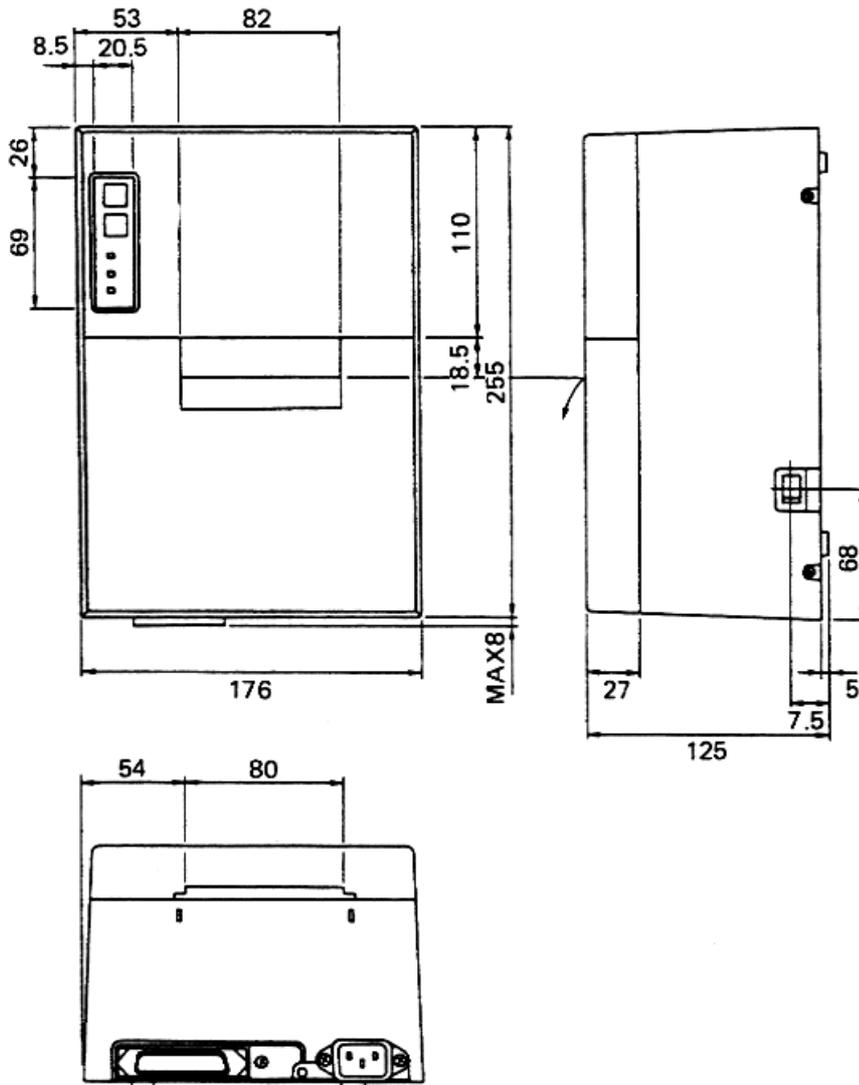
(2) Interior :

There is no particular requirement, however, when the printer case is opened to change settings etc., dust and other foreign matter may be removed from the printer mechanism and circuit boards with a soft brush.

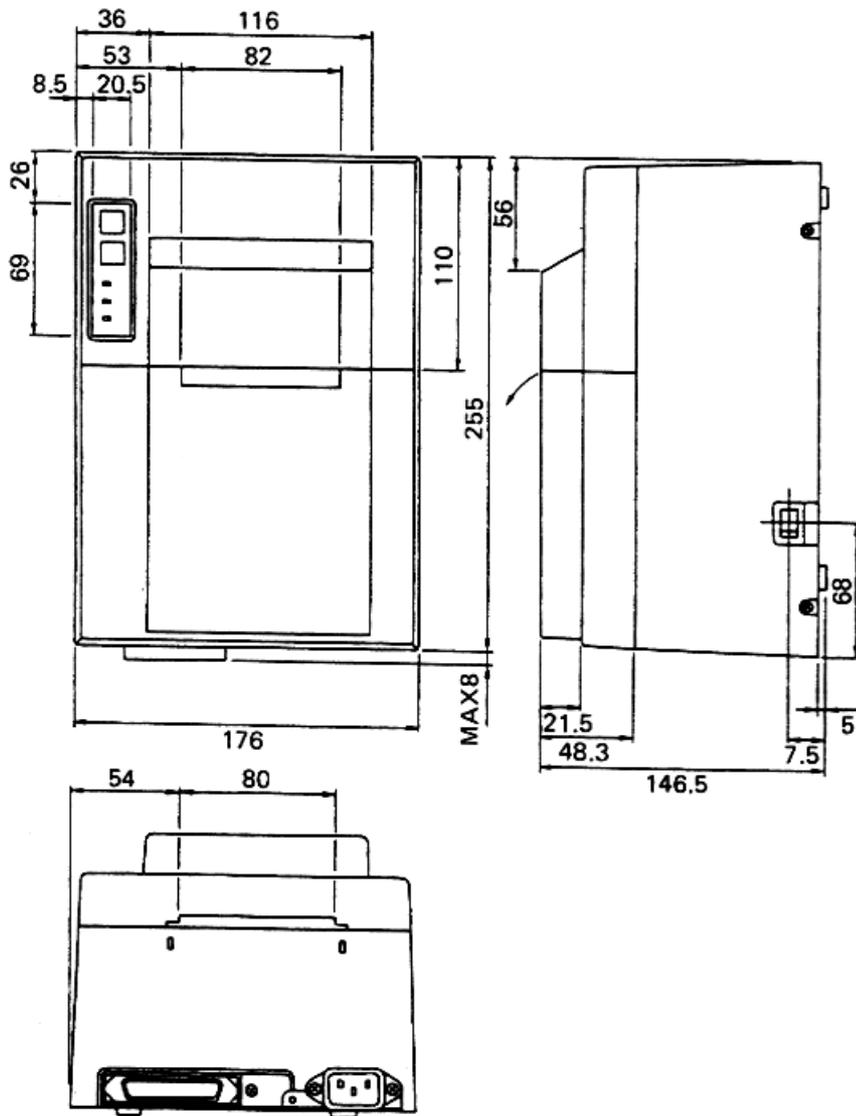
Special care should be taken to avoid damage to electronic parts and wiring. Furthermore, be sure to disconnect the power plug from the electric outlet before opening the printer case.

14. EXTERNAL DIMENSIONS

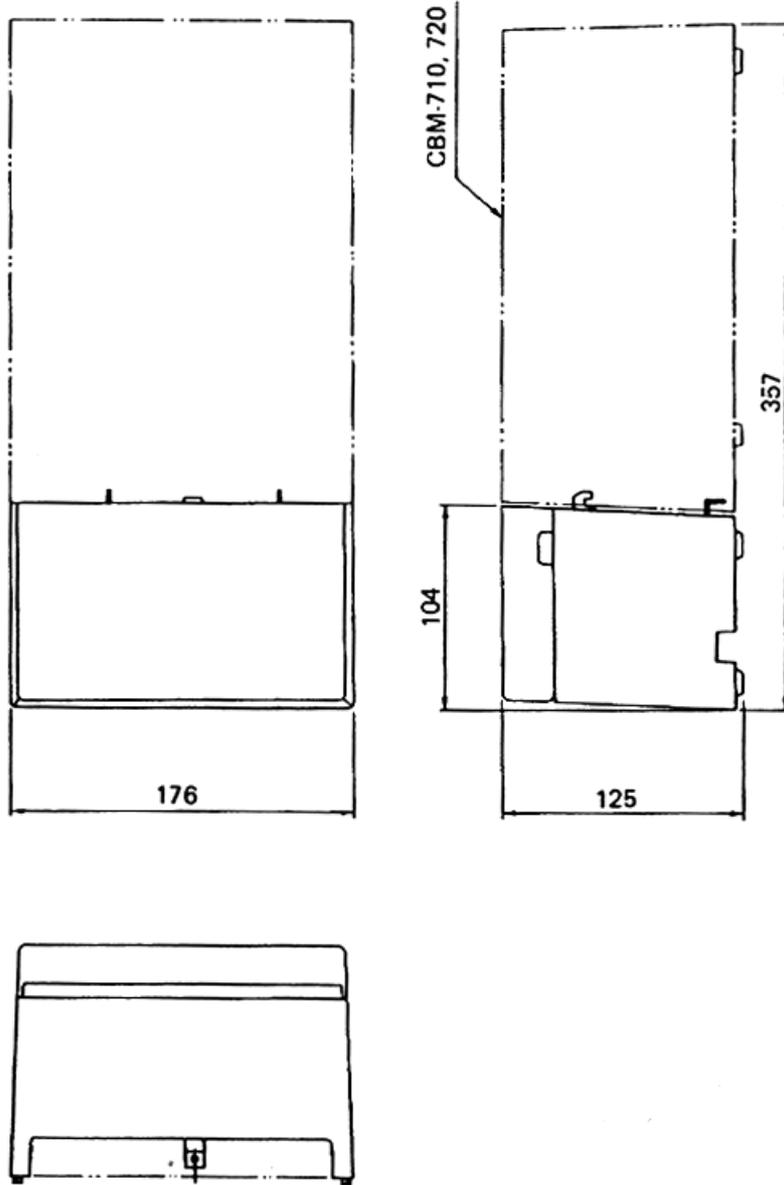
14.1 CBM-710



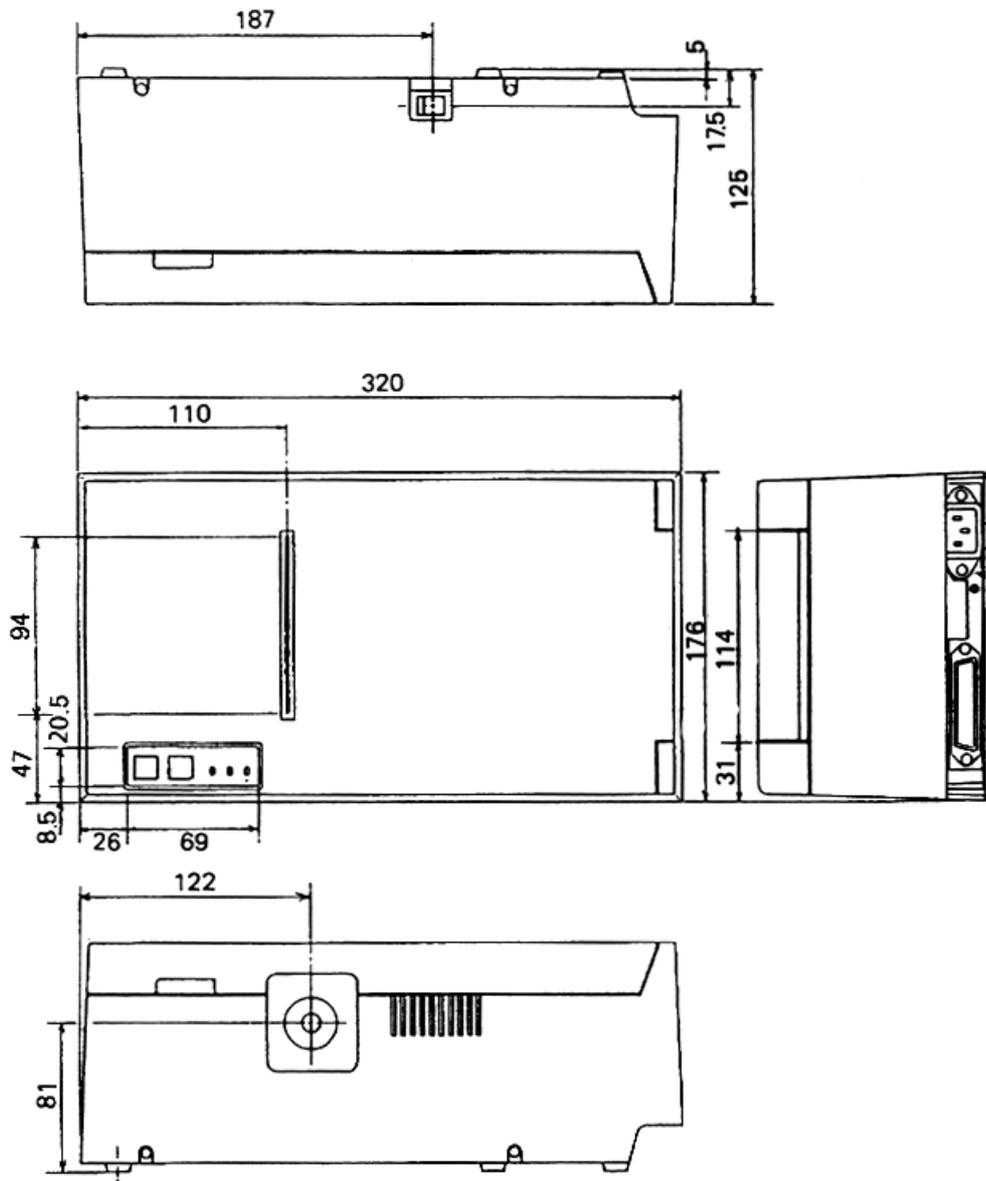
14.2 CBM-720



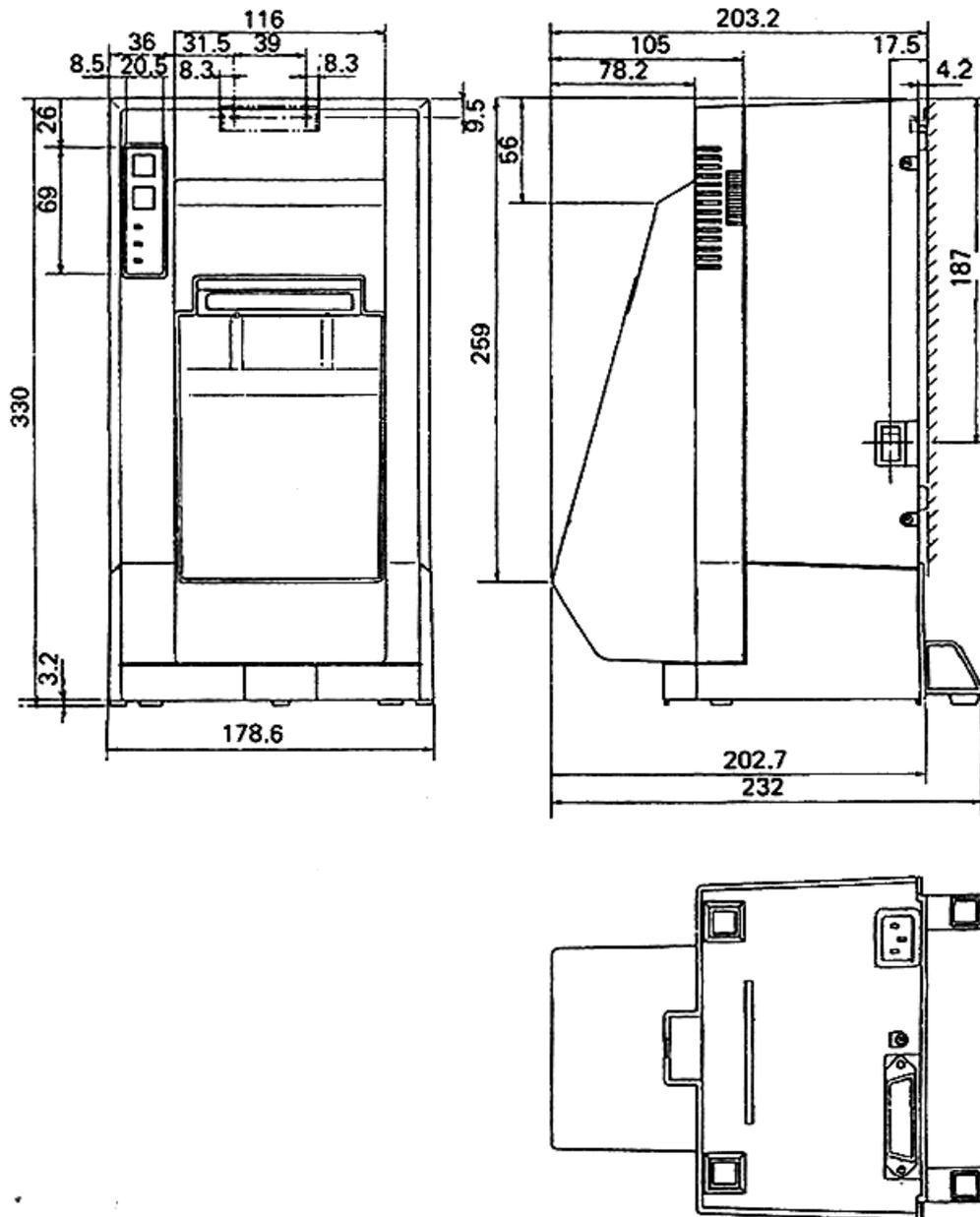
14.3 Paper Winder Unit AW-2



14.4 CBM-730



14.5 CBM-750



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