

DH TECH

308237

specifications for  
impact dot matrix mini printer  
**Model-260A**

(Rev. A)

August 22nd, 1987

**EPSON**

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## SPECIFICATIONS FOR CUTTER UNIT

This unit performs Partial cut and Full cut of paper through detection of the cutter blade by mechanical contact method and through rotating direction control of its motor for exclusive use by energizing.

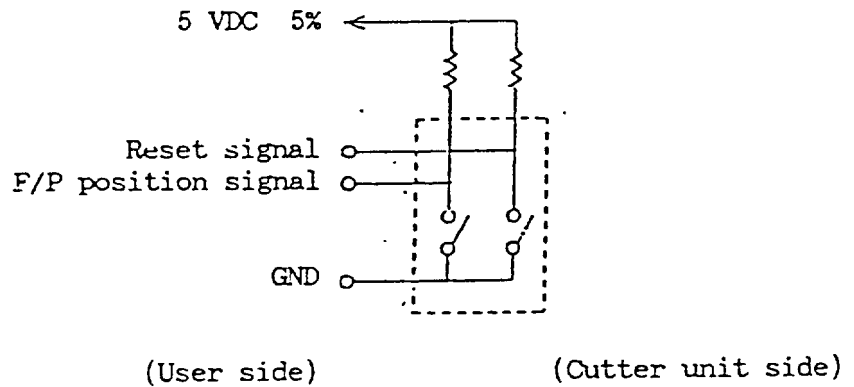
### 1.1 Detector

In this detector mechanical contact method by brush is adopted. It generates position signal F/P (Full cut/Partial cut signal), which corresponds to the reset signal and the transportation value of the cutter blade.

This signal should be wave-shaped on the user side.

#### 1) Contact rating

- a) Voltage: 5 VDC  $\pm$ 5%
- b) Current: 0.1 mA to 0.5 mA



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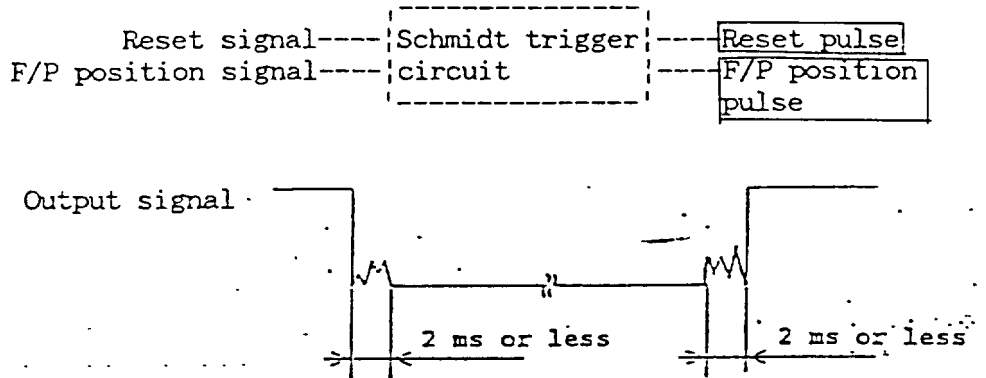
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## 2) Processing the Detector Output Signal

Because there is a chattering after the falling edge and before the leading edge of each output signal, the signal must be wave-shaped on the user side before it is used as any pulse.

(Example)



## 3) Pulse Judgement (noise countermeasure)

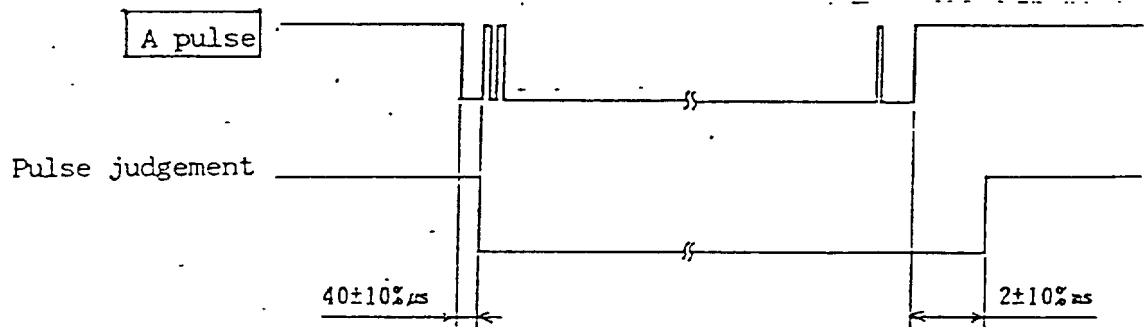
The leading and falling edges of each output signal should be detected as follows:

### \* Falling edge (when pattern is connected):

First the edge of a pulse is detected. After confirming the continuous falling condition for  $40 \pm 10\% \mu\text{s}$ , the pulse must be judged.

### \* Leading edge (when pattern is not connected):

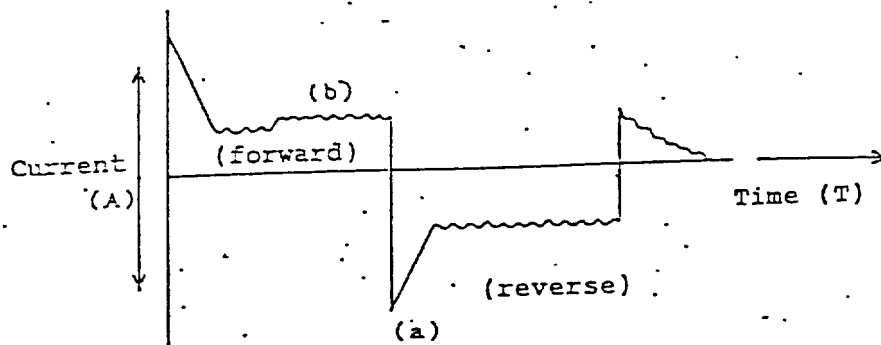
First the edge of a pulse is detected. After confirming the pulse condition in the cycle time of  $40 \mu\text{s}$  or less, and confirming the continuous leading condition of more than  $2 \pm 10\% \text{ms}$ , the signal should be judged.



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1.2 Cutter motor

	12 V	24 V
1) Terminal Voltage	12 $\pm$ 10%VDC	24 $\pm$ 10%VDC
2) Current		
a) Peak:	Approx. 4 A (12 VDC, 25°C, at reversing)	Approx. 3 A (24 VDC, 25°C, at reversing)
<Worst case>	4 A or less	3 A or less
b) Average:	Approx. 800mA (12 VDC, 25°C, excluding start-up)	Approx. 500mA (24 VDC, 25°C, excluding start-up)



3) Motor drive

a) Speed Control: None

b) Driving and control:

Voltage (12 or 24 VDC) is applied to the motor to start it.

(Reversing) Reverse rotation of the motor, when it is rotating, must be done within 1 ms after voltage application is stopped.

(Stop) Termination of motor rotation, when it is rotating, must be done by stopping voltage application and by short-circuiting between the motor terminals by a transistor. When stopping, the braking time of short circuit (100 ms or more) and the time when voltage is applied to the motor must not overlap.

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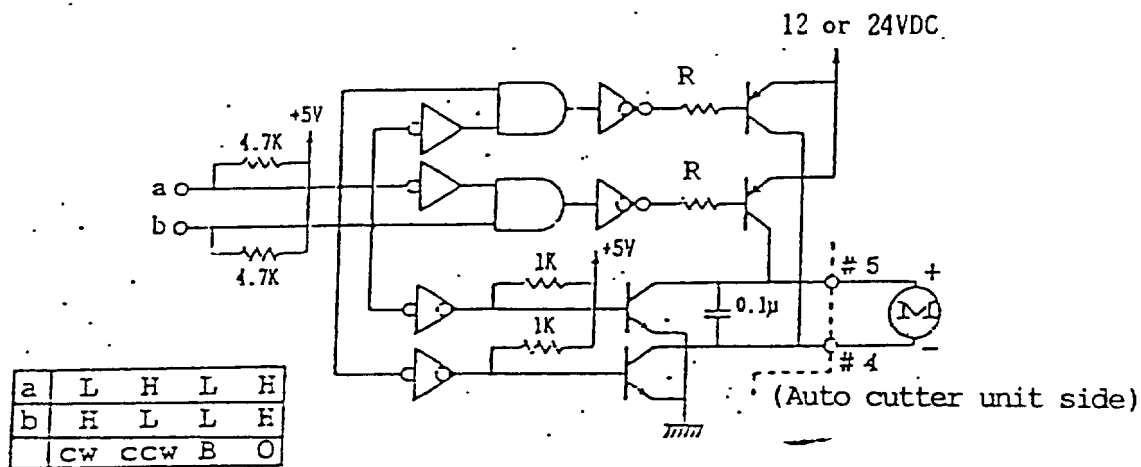
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<Circuit example>



B: In braking state  
O: OFF condition (Normal)

	12 V	24 V
Driver	SANKEN STA437A or equivalents	SHINDENGEN TH3C10 or equivalents
Resistance of R	2.2 K ohms	4.7 K ohms

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c) Lock Protection for the Cutter Motor

In case of cutter motor lock, excessive current flow could damage the motor. To prevent this, the motor must be protected using the following motor lock judgement time. (Refer to 1.3 Auto cutter timing chart.)

- (1) When A (the span after the cutter motor is started) exceeds 200 ms ( $A \geq 200$  ms), immediately stop energizing the motor of the auto cutter unit and the printer. Then promptly remove the external cause of the obstacle.
- (2) When B (the span after the falling edge of the reset pulse) exceeds 500 ms ( $B \geq 500$  ms), immediately stop energizing the cutter motor, then reverse the rotation to return the cutter blade to the home position, and then cut off the motor power of the cutter unit and the printer. Then promptly remove the external cause of the obstacle.

In this process, if the time between the start of the reverse rotation of the cutter motor and the leading edge of the reset pulse becomes 500ms or more, immediately stop energizing the motor of the cutter unit and the printer. Then promptly remove the external cause of the obstacle.

(at Partial cut and Full cut)

- (3) When C (the span after the falling edge of the F/P position pulse) exceeds 300 ms ( $C \geq 300$  ms), stop energizing the cutter motor, then reverse the rotation to return the cutter blade to the home position, then shut off the motor power of the cutter unit and the printer. Then promptly remove the external cause of the motor lock.

In this process, if the time between the start of the reverse rotation of the cutter motor and the leading edge of the reset pulse exceeds 500 ms, shut off the motor power of the auto cutter unit and the printer immediately. Then promptly remove the external cause of obstacle.

(at Full cut)

- (4) When D (the period between the start of reverse rotation of the cutter motor and the leading edge of reset pulse) exceeds 500 ms ( $D \geq 500$  ms), shut off the motor power of the auto cutter and the printer immediately. Then promptly remove the external cause of obstacle.

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### 1.3 Auto Cutter Timing Chart

#### 1) Partial Cut

Cutter motor drive CCW  
(#4 Input)

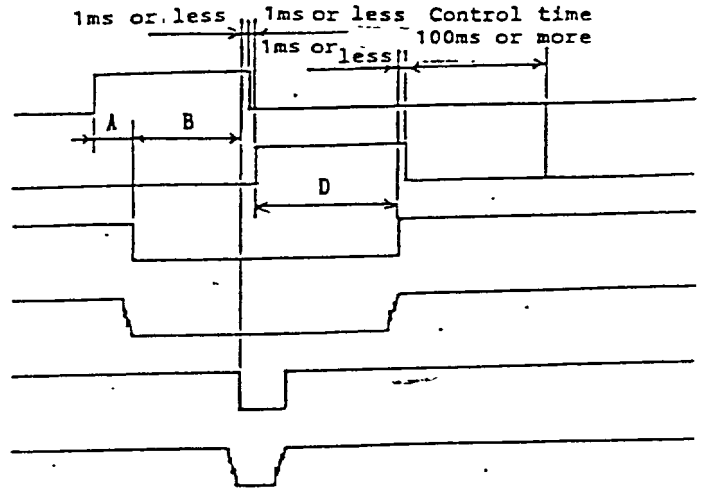
Cutter motor drive CW  
(#5 Input)

Reset pulse

Reset signal

F/P position pulse

F/P position signal



#### 2) Full Cut

Cutter motor drive CCW  
(#4 Input)

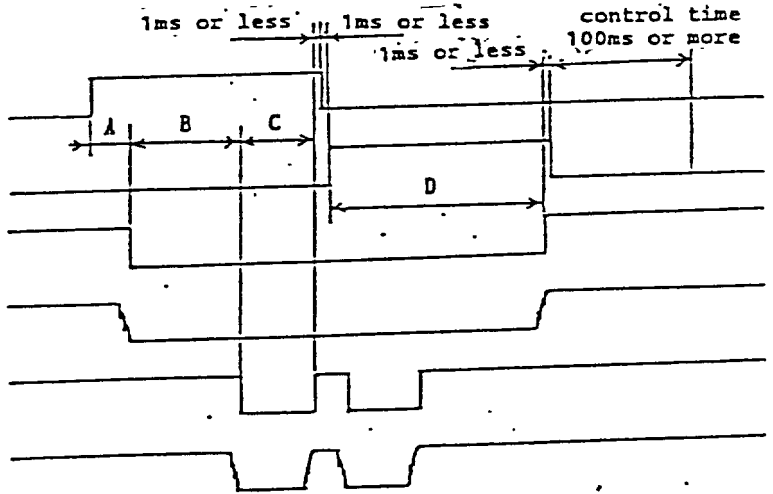
Cutter motor drive CW  
(#5 Input)

Reset pulse

Reset signal

F/P position pulse

F/P position signal



(See the next sheet.)

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[ Notes on Timing Chart ]

- \* 1) For each distinguishing time of A, B, C and D, refer to "Lock Protection for the Cutter Motor" in these specifications.
- 2) Printing and paper feeding of the printer must be performed only after the leading edge of the reset pulse of the auto cutter unit is confirmed.

When the reset pulse is at the falling edge before the cutter motor starts or after the cutter motor stops, make sure to return the cutter blade to the home position. (Reset pulse should be at the leading edge.) In this process, use electric braking after the leading edge of the reset pulse.

In this process, after the cutter motor starts, the reset pulse does not rise within 200 ms, shut off the motor power for the auto cutter unit and for the printer immediately, and then promptly remove the external cause of the obstacle.

- 3) When reversing the cutter motor rotation, mask for  $50 \pm .5^0$  ms after the motor reverse rotation to avoid the breaking of waveform caused by chattering.
- 4) When performing Full cut, mask for  $10 \pm 10\%$  ms after the falling edge of the F/P position pulse. (C area)

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## 2. General Specifications

### 2.1 Paper

- (1) Type: Normal paper
- (2) Paper width: 76  $\pm$ 0.5 mm, 57.5  $\pm$ 0.5 mm
- (3) Paper thickness:
  - 1-sheet: 0.06 to 0.085 mm (45 to 55kg)
  - 2-sheet: 0.06 + 0.06 mm,  
Total thickness is 0.12 mm or less

### 2.2 Reliability

MCBF: 300,000 cut

(MCBF of Full cut and MCBF of Partial cut are summed up.)

### 2.3 Cutter Unit External Dimensions

Approx. 103 (W) x 21.5 (H) x 71.5 (D) mm

2.4 Weight: Approx. 400 g

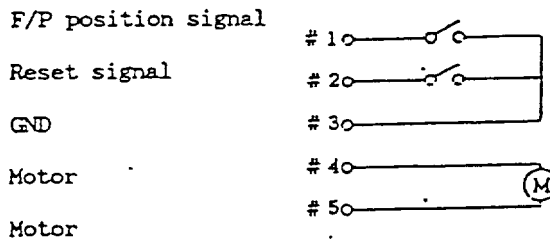
### 2.5 Connectors

#### 1) Part Numbers

Cutter unit side: Molex 5102 - 05

User side :  
5045 - 05 (Wafer assembly)  
5046 - 05 (Wafer assembly)  
5240 - 05 (Connector housing for  
5240 - 051 relay)

#### 2) Connection



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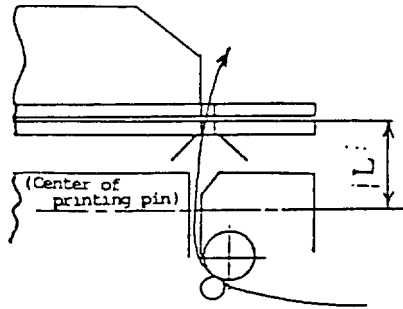
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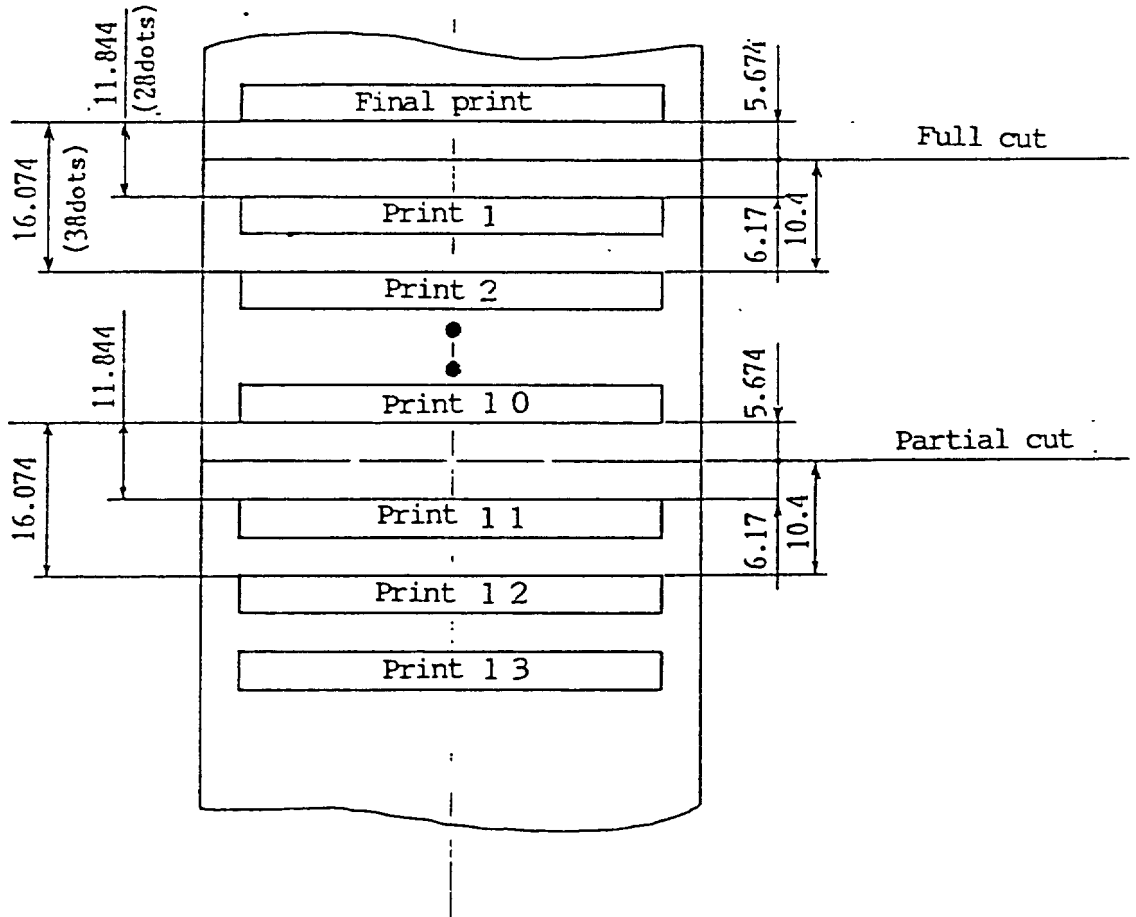
3. Cutting position



Dimension of L	Application type	
10.4 mm	12 V	Type 1
	24 V	Type 1
14.4 mm	12 V	Type 2
	24 V	Type 2

4. Example for Journal Print

1) <12 V, 24 V - Type 1>



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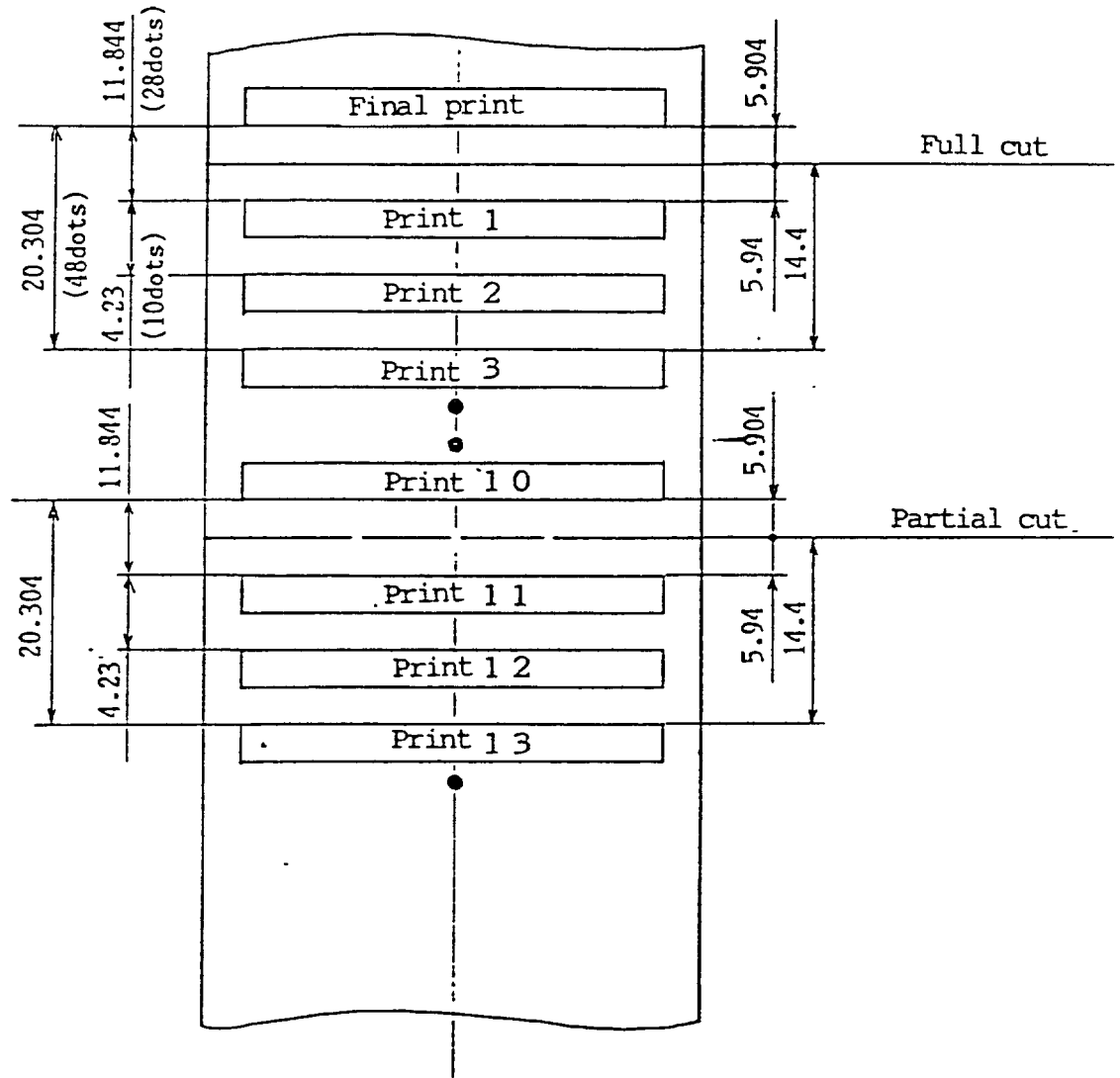
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2) <12 V, 24 V - Type 2>



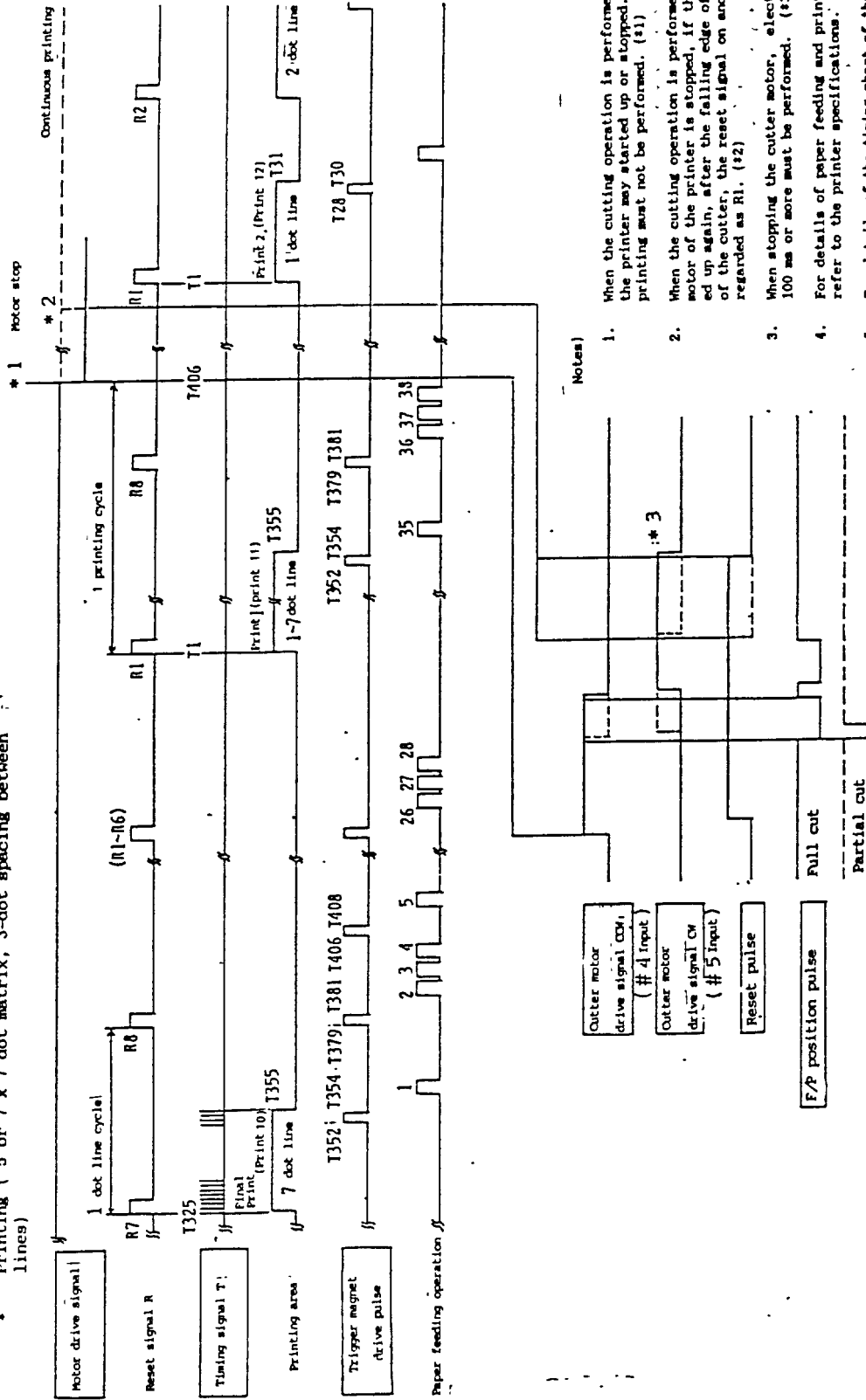
\* Timing charts of each print example are showed from the next page.

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5. Timing chart for journal print example

1) <12 V, 24 V - Type 1>

2) Printing ( 5 or 7 x 7 dot matrix, 3-dot spacing between lines)



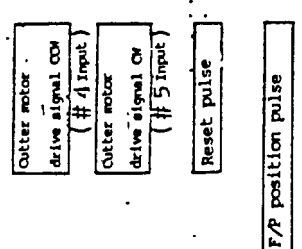
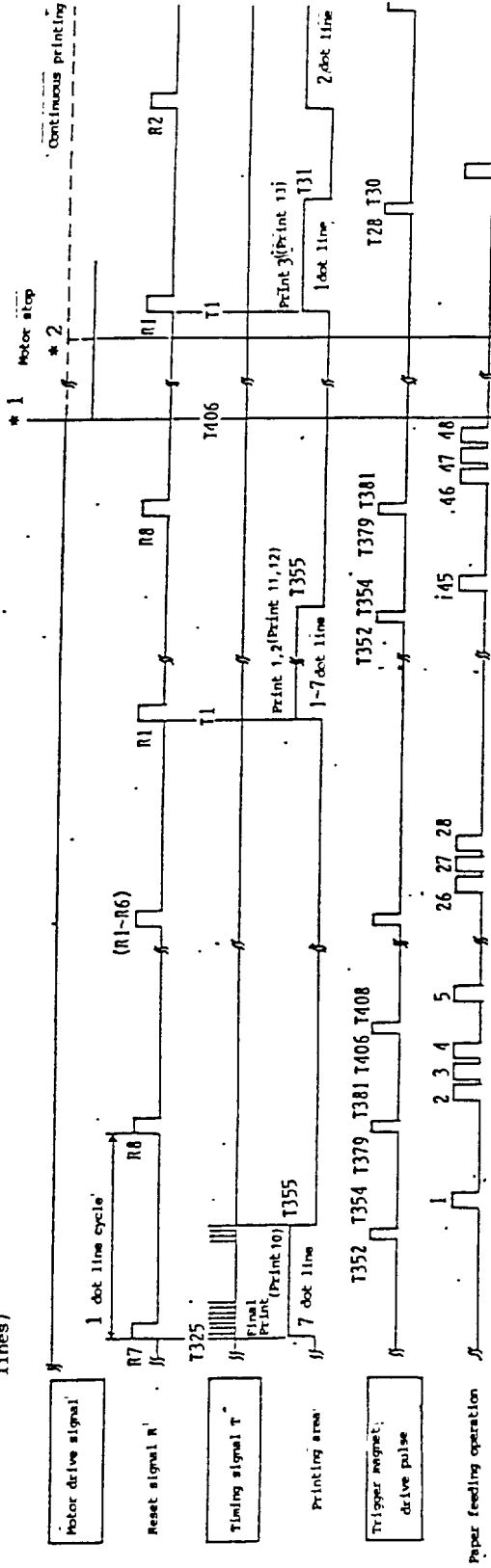
Notes

1. When the cutting operation is performed, the motor of the printer may started up or stopped. Paper feeding or printing must not be performed. (#1)
2. When the cutting operation is performed, after the motor of the printer is stopped, if the motor is started up again, after the falling edge of the reset pulse of the cutter, the reset signal on and after T45 must be regarded as R1. (#2)
3. When stopping the cutter motor, electrical braking for 100 ms or more must be performed. (#3)
4. For details of paper feeding and printing of the printer, refer to the printer specifications.
5. For details of the timing chart of the cutter unit, refer to the cutter unit specifications (1.3 Timing Chart).

Timing chart for journal print example

2) <12 V, 24 V - Type 2>

\* Printing (5 or 7 x 7 dot matrix, 3-dot spacing between lines)

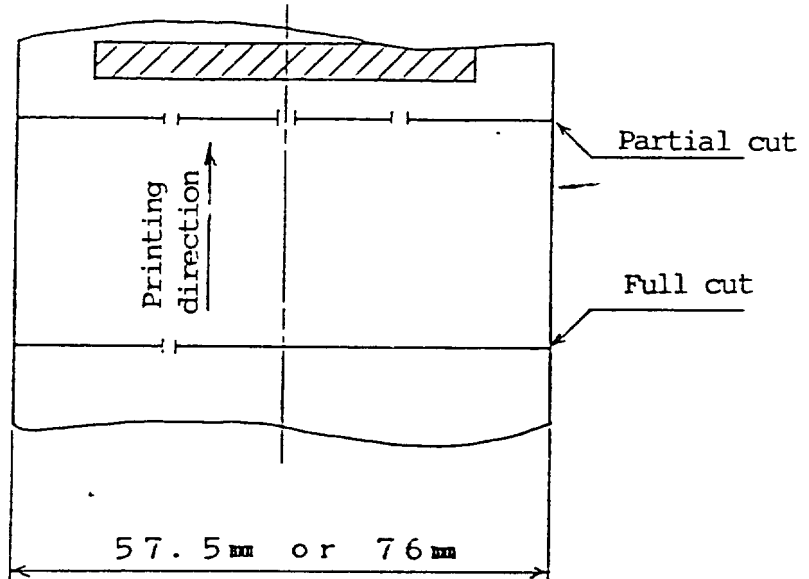


- Notes)
1. When the cutting operation is performed, the motor of the printer may started up or stopped. Paper feeding or printing must not be performed. (#1)
  2. When the cutting operation is performed, after the motor of the printer is stopped, if the motor is started up again, after the falling edge of the reset pulse of the cutter, the reset signal after T45 must be regarded as R1. (#2)
  3. When stopping the cutter motor, electrical braking for 100 ms or more must be performed. (#3)
  4. For details of paper feeding and printing of the printer, refer to the printer specifications.
  5. For details of the timing chart of the cutter unit, refer to the cutter unit specifications (1.3 Timing Chart)

( Appendix )

1. Cut portion of paper

Partial cut of this cutter unit is the type which has 3 uncut points. Full cut is the type which has 1 uncut point to prevent the paper from falling and being lost.  
(Cut-down type blade of Full cut will be provided if needed.)



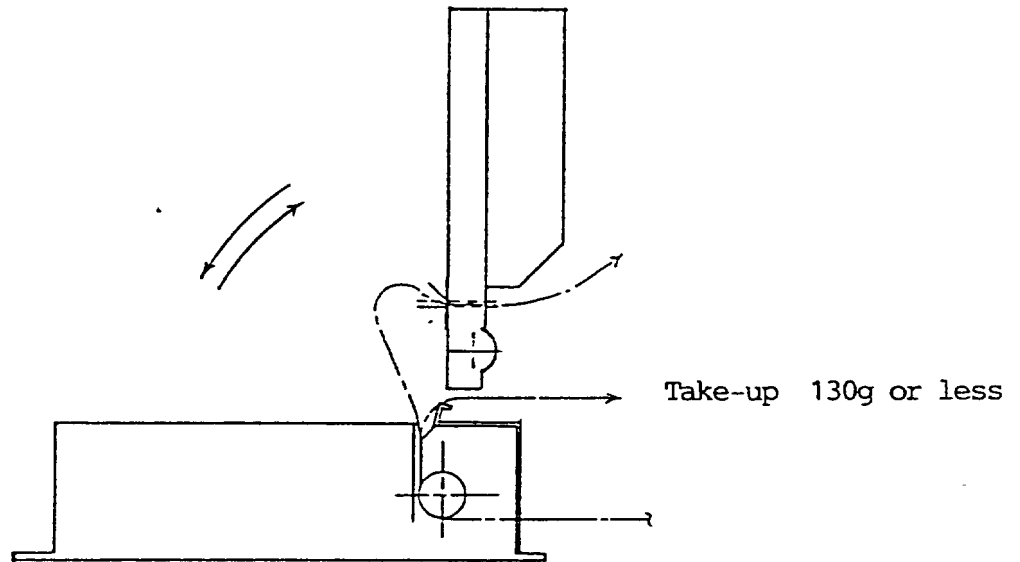
\* At Full cut, if around the uncut points is held and pulled straight, the paper might be pulled out a little.

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## 2. Setting of paper

Regarding setting paper to the cutter unit, insert the paper by hand, and comply with the following procedures.

- 1) Paper feeding of the printer must be performed when the cutter unit is open.
- 2) Put the paper through the paper exit portion of the cutter unit.  
(Regarding the model that can take up several-ply paper, set the paper as shown below.)
- 3) In order to prevent the slack paper from being caught between the cutter unit and the printer, shut the cutter unit.



\* The specifications of the printer are applied with other precautions about printer handling and the case design.

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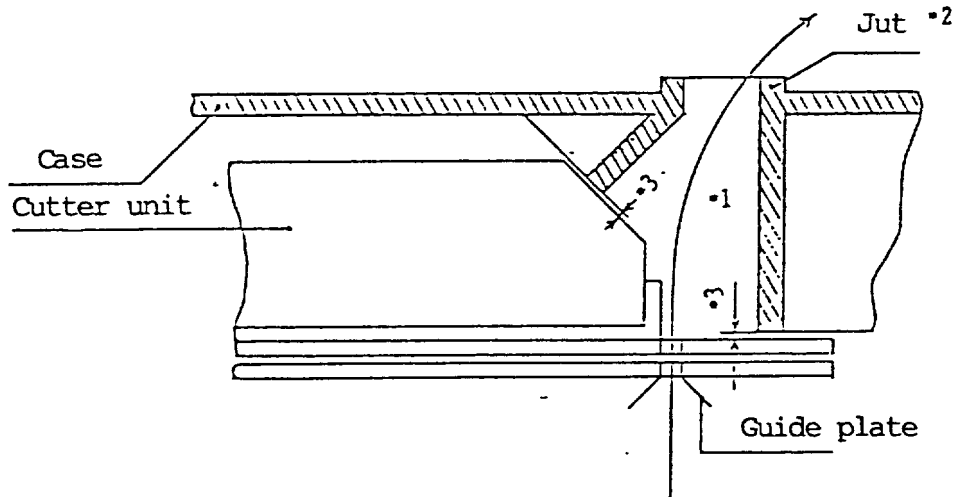
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3. Precautions regarding the casing

- 1) In order to prevent paper from being jammed at the cutter exit, consideration must be given so that the printed paper should not be caught around the cutter exit portion.  
So, as the casing design shown below, design so that a finger cannot be inserted, and keep the space by that slack paper can be held a little even if going out of the paper is obstructed at the exit. (\*1)
- 2) Regarding the casing of the cutter exit, consideration must be given so that the printed paper should not enter between the cutter unit and the case.
- 3) Regarding the casing of the paper exit, consideration must be given, such as providing the jut of the exit shown below, so that coins or clips should not enter the inside of the case. (\*2)



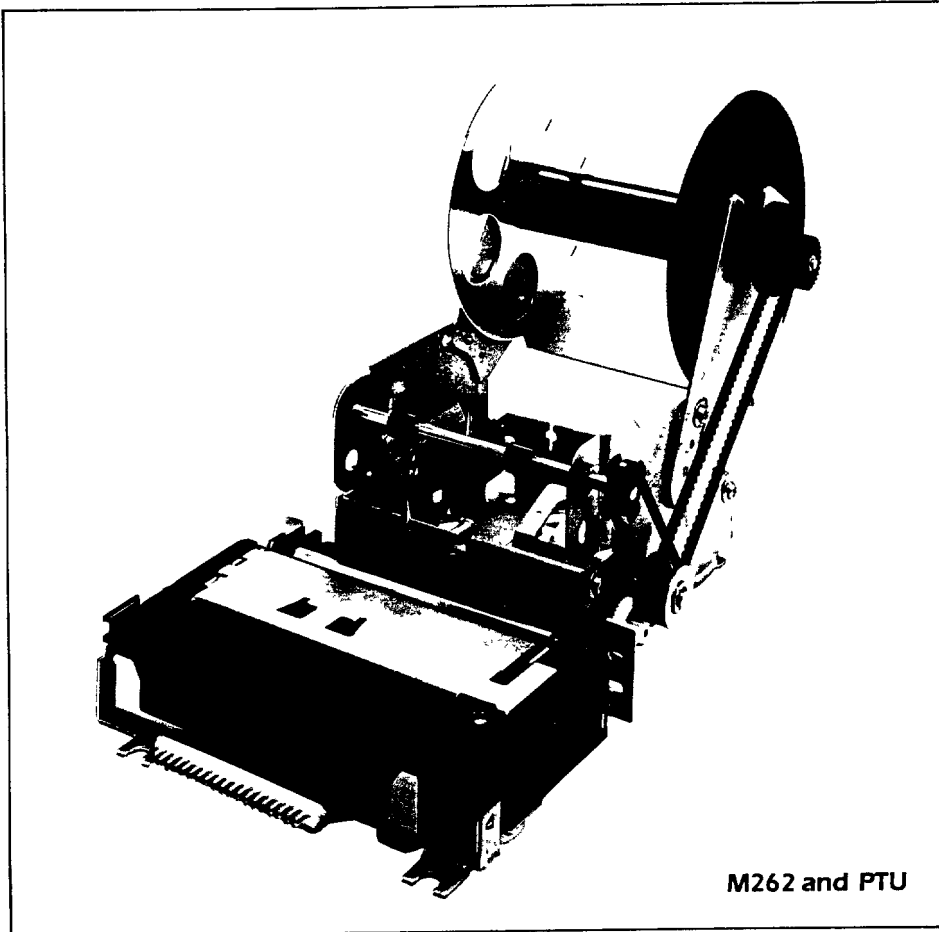
The space of  $\phi 3$  must be narrow as possible.

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# IMPACT PRINTERS



M262 and PTU

## M260/262

A breakthrough in compact printing mechanisms, the M260 offers 35/42 column printing from a compact and streamlined mechanism. The size and reliability of 1.5 million lines combine to make the M260 the ideal printer for a wide range of point of sale, receipt and ticketing applications. With a power supply of only 12V the M260 is eminently suitable for any portable and automotive applications. The M260 uses a shuttle head to print up to 42 columns on 76mm wide paper. The 7-solenoid shuttle head is capable of printing both characters and graphics at a speed of up to 2.3 lines per second. Characters can be printed either horizontally or vertically. There is a low cost paper take-up unit, the 260PTU, available as an option. The unit has the advantage of a cassette ribbon for ease of replacement. The M260 uses a single colour ribbon while the M262 offers the option of dual colour black/red print. Power supply: 12V DC at 2A. Dimensions 122mm(W) x 83mm(D) x 25.4mm(H).

## M280

Compact split platen mechanism using shuttle head. The M280 will print up to 15 characters on both receipt and journal rolls at a speed of up to 2.3 lines per second. The M280 also has a graphics capability. It incorporates a logo stamp and there is a full range of options based around the unit including take-up device, paper roll holder, low paper detector and manual cutter (rear side).

**M280A** - with autocutter

**M280V** - with validation

**M280VA** - with autocutter and validation

The mechanism uses paper of 37.5mm width

Power supply: 24V DC at 2A

Dimensions 125.4mm(W) x 209mm(D) x 155.6mm(H)

## M260A/M262A

The M260 range has been enhanced with the development of the M260A and M262A which incorporate a low cost autocutter specifically designed to complement the compact print mechanism. Ideal for vending applications, the M260A is compact and reliable.

Dimensions of autocutter 103mm(W) x 21.5mm(H) x 71.5mm(D)

## M260C

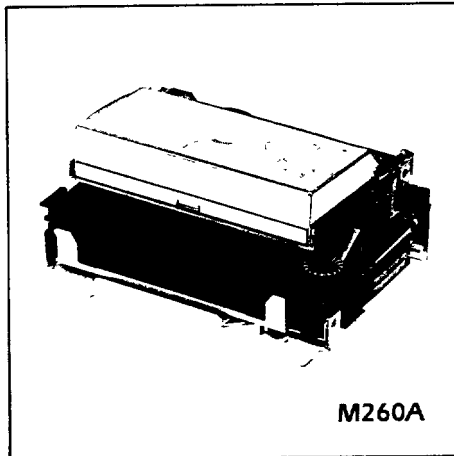
The M260C is a compact card/ticket printer based on the M260 series. It will print at up to 2.3 lines per second on a card/ticket 54mm(W) x 86mm(L), the size of a standard credit card. The unit has a 5-solenoid print head while the card feed is controlled by a stepping motor. Power supply: 12V DC at 2A. Dimensions: 123.5mm(W) x 95mm(D) x 89.3mm(H).

## M290

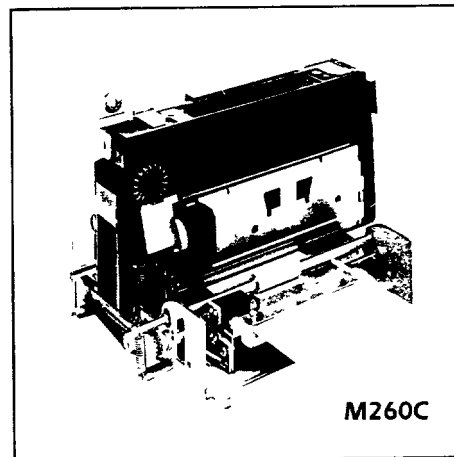
Flat-bed mechanism, the smallest of its kind in the World. The mechanism will print 42 columns at 2.3 lines per second and benefits from cassette ribbon for ease of change.

Power supply: 24V DC at 2A

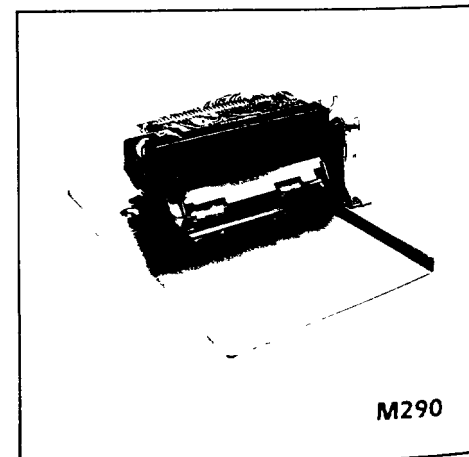
Dimensions 138mm(W) x 70.5mm(D) x 59.5mm(H)



M260A



M260C



M290