Confidential

EPSON

micro dot printer

M-192G

Designer's Guide

STANDARD	
Rev. No.	C
Notes	

Copied Date	, ,
Copied by	

SEIKO EPSON CORPORATION

MATSUMOTO MINAMI PLANT
2070 KOTOBUKI KOAKA, MATSUMOTO-SHI, NAGANO, 399-8702 JAPAN
PHONE +81-263-86-5353 FAX +81-263-86-9925

Confidential

REVISION SHEET

The table below indicates which pages in this specification have been revised.
Before reading this specification, be sure you have the correct version of each page.

Revisions		Design Section			Sheet Rev. No.					
Rev.	Document	WRT	CHK	APL	Sheet	Rev.	Sheet	Rev.	Sheet	Rev.
A	Enactment	Takeuchi	--	Arai	I	C				
B	Change	Tsukada	Hirase	Kumagai	II	C				
C	Change									
					1	C				
					2	C				
					3	C				
					4	C				
					5	C				
					6	C				
					7	C				

TITLE	Front Part					Contents	Appendix	Total
	Cover	Rev. Sheet	Scope	Confidentiality Agreement	Table of Contents			
M-192G Designer's Guide (STANDARD)	1	2	--	1	1	7	--	12

Confidential

REVISION SHEET

REV.	SHEET	CHANGED CONTENTS
A		Enactment
B	All	All pages are changed due to add “Confidential” in the header.
	I	“Confidentiality Agreement” [added]
	1	Timing sensor circuit configuration (printer side) [changed]
		Diagram numbering [changed]
C	All	Rev.B → Rev.C
	3	1.3 Major Electronic Components and Manufacturer’s names are revised.
	6	2.4 Paper Exit Design is added, and all the following item numbers are changed. 2.5 Paper Cutter Design: content of 1) is revised, and 4) is added.
	7	2.8 Other Notes on Designing the Outer Case: 4) and 5) are added.

TITLE

M-192G

Designer’s Guide

(STANDARD)

Confidential

CONFIDENTIALITY AGREEMENT

BY USING THIS DOCUMENT, YOU AGREE TO ABIDE BY THE TERMS OF THIS AGREEMENT.
PLEASE RETURN THIS DOCUMENT IMMEDIATELY IF YOU DO NOT AGREE TO THESE TERMS.

1. This document contains confidential, proprietary information of Seiko Epson Corporation or its affiliates. You must keep such information confidential. If the user is a business entity or organization, you must limit disclosure to your employees, agents, and contractors who have a need to know and who are also bound by obligations of confidentiality.
2. On the earlier of (a) termination of your relationship with Seiko Epson, or (b) Seiko Epson's request, you must stop using the confidential information. You must then return or destroy the information, as directed by Seiko Epson.
3. If a court, arbitrator, government agency, or the like orders you to disclose any confidential information, you must immediately notify Seiko Epson. You agree to give Seiko Epson reasonable cooperation and assistance in the negotiation.
4. You may use confidential information only for the purpose of operating or servicing the products to which the document relates, unless you obtain the prior written consent of Seiko Epson for some other use.
5. Seiko Epson warrants that it has the right to disclose the confidential information. SEIKO EPSON MAKES NO OTHER WARRANTIES CONCERNING THE CONFIDENTIAL INFORMATION OR ANY OTHER INFORMATION IN THE DOCUMENT, INCLUDING (WITHOUT LIMITATION) ANY WARRANTY OF TITLE OR NON-INFRINGEMENT. Seiko Epson has no liability for loss or damage arising from or relating to your use of or reliance on the information in the document.
6. You may not reproduce, store, or transmit the confidential information in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise) without the prior written permission of Seiko Epson.
7. Your obligations under this Agreement are in addition to any other legal obligations. Seiko Epson does not waive any right under this Agreement by failing to exercise it. The laws of Japan apply to this Agreement.

Cautions

1. This document shall apply only to the product(s) identified herein.
2. The examples, such as circuits movements or control methods for products described in this document are for the purpose of designing a model only, and Seiko Epson Corporation shall not provide any sort of warranty that the contents of the document do not infringe on any intellectual property right of a third party.
3. No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Seiko Epson Corporation.
4. The contents of this document are subject to change without notice. Please contact us for the latest information.
5. While every precaution has been taken in the preparation of this document, Seiko Epson Corporation assumes no responsibility for errors or omissions.
6. Neither is any liability assumed for damages resulting from the use of the information contained herein.
7. Neither Seiko Epson Corporation nor its affiliates shall be liable to the purchaser of this product or third parties for damages, losses, costs, or expenses incurred by the purchaser or third parties as a result of: accident, misuse, or abuse of this product or unauthorized modifications, repairs, or alterations to this product, or (excluding the U.S.) failure to strictly comply with Seiko Epson Corporation's operating and maintenance instructions.
8. Seiko Epson Corporation shall not be liable against any damages or problems arising from the use of any options or any consumable products other than those designated as Original EPSON Products or EPSON Approved Products by Seiko Epson Corporation.

Trademarks

EPSON® is a registered trademark of Seiko Epson Corporation.
General Notice: Other product and company names used herein are for identification purposes only and may be trademarks of their respective companies.

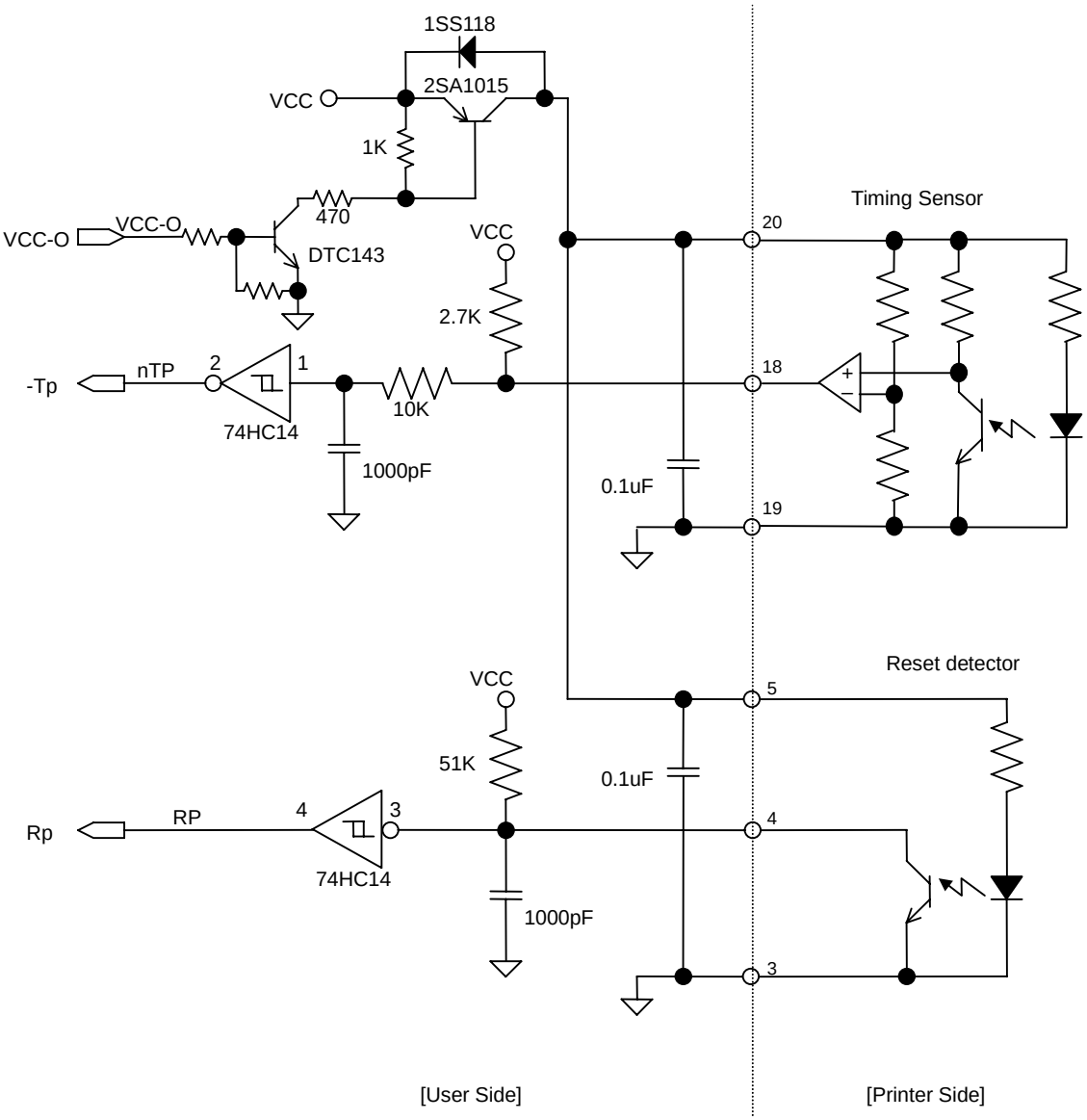
Confidential

Table of Contents

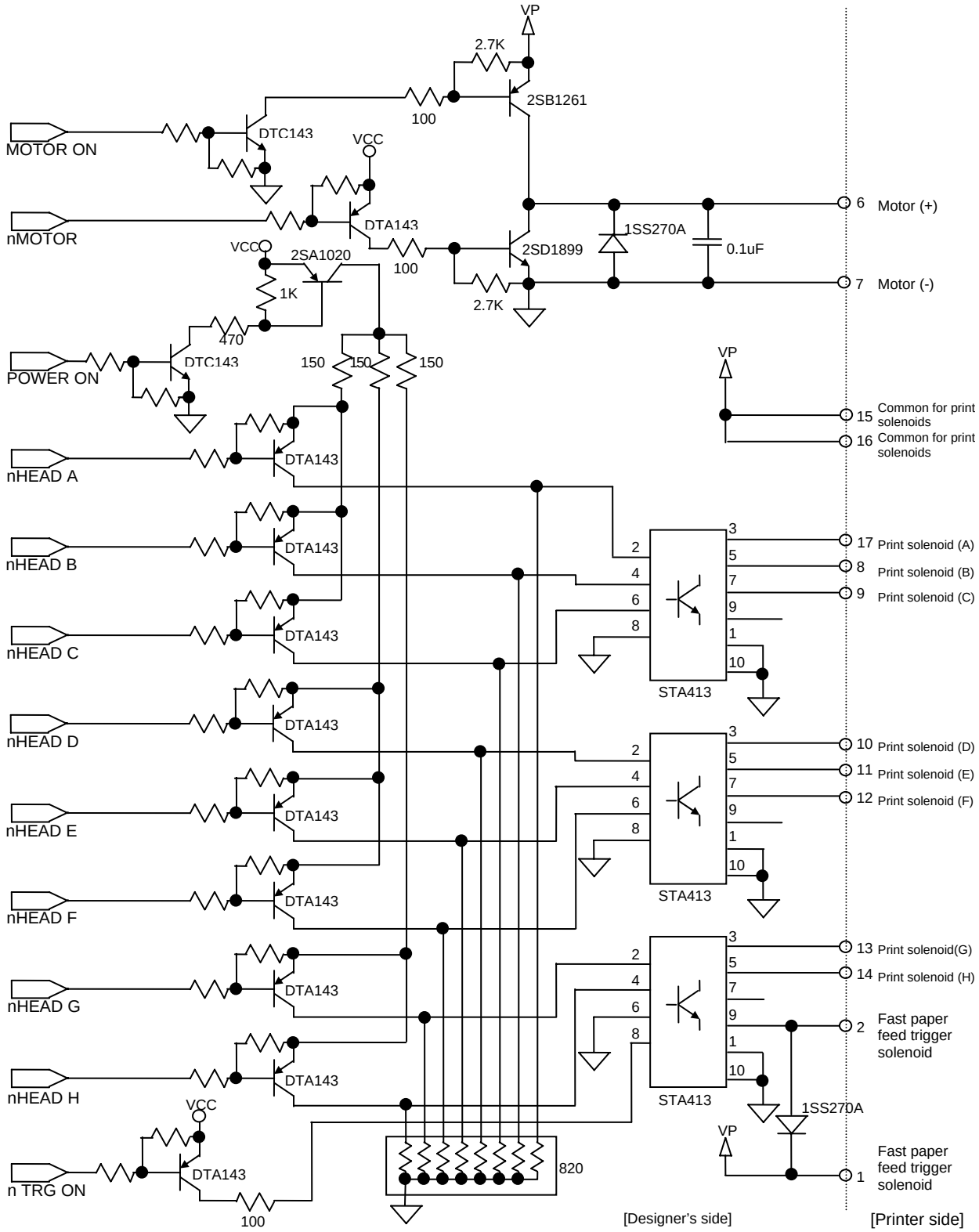
1 Reference for Circuit Design

1.1 Waveform Shaping Circuit for Timing Sensor and Reset Detector

(Epson Evaluation Circuit)

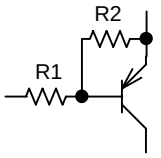
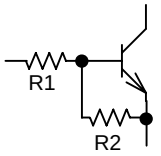
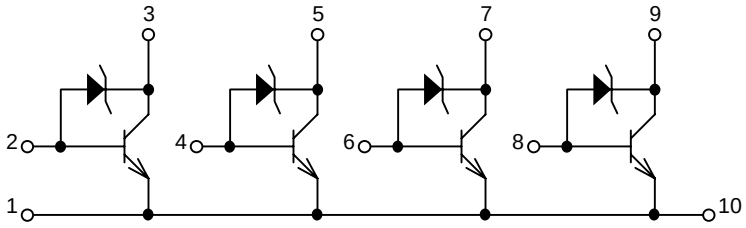


1.2 Motor Driver Circuit, Print Solenoid Drive Circuit, & Fast Paper Feed Trigger Solenoid Drive Circuit (Epson Evaluation Circuit)



EPSON	TITLE **M-192G** Designer's Guide (STANDARD)	SHEET REVISION C	NO. NEXT 3 SHEET 2

1.3 Major Electronic Components and its Manufacturer

Type	Manufacturer	Remarks
2SA1015	Toshiba	Ic (max) = –150 mA
DTA143Z	ROHM	Resistor-contained transistor R1 = 4.7 kΩ, R2 = 47 kΩ 
DTC143Z	ROHM	Resistor-contained transistor R1 = 4.7 kΩ, R2 = 47 kΩ 
2SB1261	NEC	hfe (min) = 100 Ic (max) = –5A
2SD1899	NEC	hfe (min) = 100 Ic (max) = 5A
STA413A	Sanken Electric	Zenor-diode contained transistor array 
1SS270A	Renesas	
2SA1020	Toshiba	Ic (max) = –2A
1SS118	Renesas	

2. Outer Case Design Guide

2.1 Connections

A copper foil edge connector with a 2.5 mm pitch is fixed to the printer frame. The printer can be connected to external circuits by soldering flat cables or lead wires to the copper foil pattern. When selecting and using cables and wires, the current capacity must be taken into account for each of the print solenoid signals, i.e. the common, A, B, C, D, E, F, G and H. Be sure that the soldered portions are not placed under mechanical stress. (For the detailed dimensions, refer to the figures illustrating the terminal assignment and the overall dimensions.)

2.2 Installation procedure for a printer (refer to Figure 2.2.1 and 2.2.2)

1) Be careful not to damage the printer frame when installing the printer.
2) For the X direction, position the printer as based on the frame face “A”.
3) For the Y direction, position the printer as based on the frame faces “B” and “C”.
4) Insert any three screws into mounting holes #1 to #4, and tighten them.
   Take in consideration that the printer frame may be deformed and functional problems may occur if all four screws are tightened.
5) For a printer with a manual feed knob, the case cannot be fixed with screw hole #4. The frame should be attached to the case with screw holes #1 to #3.
   Therefore, the frame should be guided at portions E and F (marked with oblique lines in the figure) so as to suppress frame shaking in the Z direction as much as possible.
6) Even though the frame near the knob is guided at portions E and F, frame shaking in the Z direction cannot be eliminated completely. Therefore, the case must be designed so that the manual feed knob does not touch the case when the frame shakes up and down.
7) The case should not touch the printer bottom except near the mounting holes.

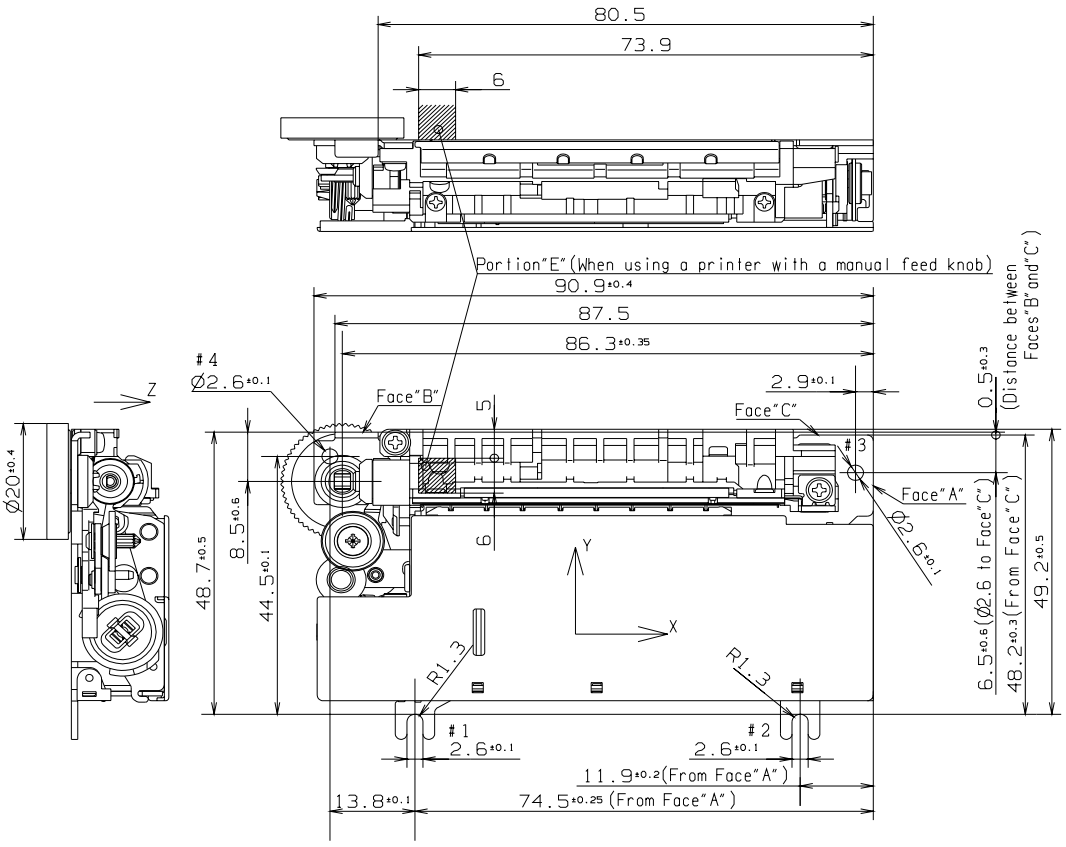


Figure 2.2.1

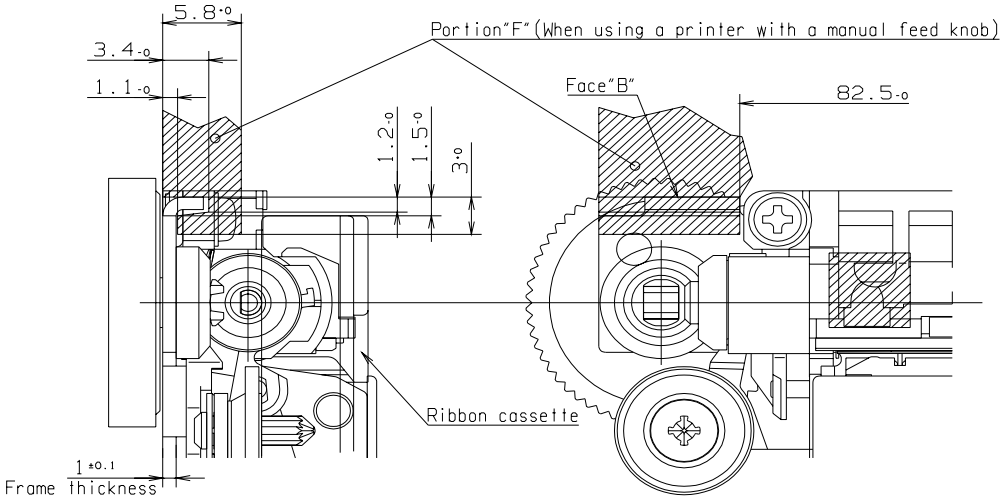


Figure 2.2.2

2.3 Paper Entrance and Paper Holder Design

1) The center of the paper holder on the case side must be aligned with the center of the paper entrance width on the printer side. The paper guide must be able to guide paper which is 57.5 ± 0.5 mm wide.

2) Clearance between the paper holder on the case side and the roll paper width must be 2.0 mm or less. However, the clearance must be sufficient to prevent the holder from pressing or rubbing against both sides of the paper roll.
(See the overall dimensions figure for the dimensions of the paper entrance.)

3) Paper supply load at the paper entrance should be 0.3 N {approximately 30 gf} or less.

2.4 Paper Exit Design

1) See the figure in "2.13 Overall Dimensions" for the position for the paper exit of the case. (If the paper is ejected right on the printer, it may be stained with ink.)

2) To prevent coins and other foreign objects from falling into the equipment, take measures such as setting a coin barrier.

3) It is desirable to create a clearance between the case and printer so that no paper jam occurs even if the paper exit is blocked accidentally.

2.5 Paper Cutter Design

1) See the figure in "2.13 Overall Dimensions" for the paper cutter mounting position. (If the paper is ejected right on the printer, it may be stained with ink.)

2) The more the paper near the paper exit (i.e. paper cutter mounting position) approaches the vertical, the more the paper resonates, making printing noise greater.

3) On the other hand, the more the paper approaches the horizontal, the more the paper feed load increases. This may cause paper feeding problems.

4) Be sure to take special note of the safety so as to prevent the users from injuring their hands by touching the paper cutter.

2.6 Case Design around the Manual Feed Knob

Because the Manual Feed Knob rotates while the printer is operating, the following items should be considered:

1) The manual feed knob must not touch the case.

2) The knob must not project outside the case. The knob should be protected.

2.7 Paper Roll-in Protection

When designing the case, be sure to prevent printed paper from being taken up again.

2.8 Other Notes on Designing the Outer Case

1) The openings in the case, such as the paper entrance and paper cut position (i.e. Paper Exit) should be as small as possible in order to minimize noise.

2) To remove the ribbon cassette, push the portion marked PUSH with a finger. Consider it in designing the case. (See 2.13 Overall dimensions in the specification)

3) Since the timing sensor and reset sensor circuits use photosensors consisting of a LED and phototransistor pair, the case must be designed to protect these sensors from external light, in order to prevent operation errors.

4) While the printer is in operation, the case may resonate, making the printing noise greater. To prevent this, it is desirable to design the outer case as follows.

1. Apply a buffer material such as rubber to the printer mounting screws to prevent the printer vibration from traveling directly to the case.
2. Improve the strength of the case by thickening the case as much as possible or by applying ribs or other parts to reduce the degree of the resonance of the case.

5) Attach the ground wire using the printer frame mounting holes (figure 2.2.1; #3 or #4).