Provisional Version

<div style="border:1px solid">

Product Specifications

3-inch Small KIOSK Face Mount Printer

ＮＰ－Ｆ３０９＊

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Revision   0.01   2012.11.26   Provisional Edition

※This product is under development. Specifications may change.

All specifications described in this document are subject to change without prior notice.
Though we made assurance doubly sure to write this product specifications,
Please contact us if you find any mistakes and erroneous omitting.

Nippon Primex Inc.

Head Office:
    1-5-12 Unoki Ohta-ku Tokyo 146-8650 Japan
    TEL :+81-3-3750-1234   FAX :+81-3-3750-4555
    E-mail : overseas@primex.co.jp
    URL : http://www.primex.jp

Revision History

Rev.	V.	Descriptions			approval	PIC
		page	item	change		
0.01	Provisional		New released	Provisional version	suzuki 2012.11.27	abe 2012.11.26

[VCCI Class A]

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Under review
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[FCC Class A]

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Under review
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PRECAUTION

Handling the product in a wrong way may decline its performance and also damage the product. Read the notes below before handling the product. Detailed cautions are written on this document except this chapter, so please use this product after careful reading. Make sure to call attention to users.

[Failures]

In order to use this product for a long time and prevent troubles before happens, observe strictly followings.

1. In oreder to prevent any damage of electric heating element of head, IC, etc., static discharge prevention and body grounding must be made for dealing. Make sure to connect it to the earth ground for for ESD measures.
2. Avoid excessive force to the input terminals.
3. Use both hands when holding the product in order to prevent from dropping.
4. DO NOT scrabble or give impact to thermal head with sharp edge object or any hard materials, which may damage the heat elements.
5. This product is NOT protected against dust or dirt. If used in harsh environment like at dusty place, the thermal head may get damaged or paper feed may not run properly.
6. When cooling the product with a fan, keep the air exhaust slit away from the printer's paper exit area so that dust or dirt may not get in the thermal head.
7. This product is equipped with an infra-red reflection sensor. The product must be installed where there is NO direct sun light/infra-red light coming in, as otherwise, the sensor would not function properly. The sensor function may be affected also by the pre-printed paper if the pre-printed color appears on the side of paper roll.
8. The product should NOT be installed where it could be exposed to static electricity easily, strong vibration, electromagnetic field, corrosive gas, rain, fog and direct sunlight.
9. Avoid printing with no paper loaded. It can damage thermal head and also shorten its life-time.
10. DO NOT open the front cover while printing and/or cutter operation. It may damage thermal head and cutter.
11. DO NOT pull out the paper with the front cover closed.
12. DO NOT block the paper outlet while print operation. Also, DO NOT grab the paper while print operation.

[Safety]

For use this product safety, observe strictly followings.

1. Turn OFF the power before connecting or removing connectors. When disconnecting, handle with the connector body and DO NOT pull out by a cable.
2. The product is NOT protected from water or dew drop. DO NOT put water to the product nor handle it with wet hand because it may damage the product due to short circuit or heat or fire.
3. In order to prevent excessive current, add an electrolytic capacitor and a fuse (refer to power supply specifications for details).
4. DO NOT disassemble or modify the product.
5. In case of disposal, follow the regulations or rules of the local authorities.
6. Use power supply in conformity with LPS standard.
7. Plug off the printer when the product is not in use for a long time.
8. Do not touch cutter blade regardless of during cutter operating and stopping.

[Quality]

To use without spoil the quality of this product, beware of followings.

1. The product supports only control codes and commands authorized in this document.
2. In case printing and paper feeding is interrupted temporary due to data queing on printer from host while printing, etc., paper feeding may be jambled on a very first 1 to 4 dot line. Especially, beware when printing graphic, etc.
3. The print may jumble at the first 1-2 dot right after the paper cut action.
4. DO NOT touch the heating element part of the thermal head, since it could degrade the print quality due to soil.
5. In case of using print papers other than those specified in this document, print quality and lifetime of thermal head may not reach the level guaranteed.
6. DO NOT pull out the paper while the printer is in motion of printing, paper feeding or cutting. When removing the partially cut paper, pull it to either right or left direction.
7. Continuous motor running for a long time generates heat and may affect the printer performance. To avoid the case, it is necessary to limit the continuous motor running time to 6 minutes at maximum with the same interval time for each operation.
8. Motor may produce heat by continuously driving cutter motor for a long time and it may not perform necessary functions. Make sure to follow cutter tolerable frequency.　Using beyond it causes cutter destruction at worst.
9. Set the paper straightened with no slack.
10. A part of this product is made from coated steel plate. It does not affect the product's quality and performance at all even if the cut face of the steel plate get rusty after a long time period.
11. There is a possibility that Huskiness occurs in a printing side on this printer due to its structure.

[Others]

1. This product is designed to use with general electronic devices. (Computer, PC, OA etc.) This product is not designed and guaranteed to use with devices that require extremely high quality and reliability, also to use with devices that those failures may directly endanger human body and life. (Atomic power control device, aerospace aircraft device, transportation device, traffic signal device, ignition control device, medical device and various safety devices: hereafter called as "Specific application".) Users shall take full responsibility for using with such specific application.

2. DO NOT conduct operation that is not suggested in this instruction. It may cause accident or failure.

3. Data cannot be long-term stored, permanently stored and saved since it is basically evanescent. Nippon Primex Inc. is not responsible for any damages of data deletion or lost income due to breakdown, repair or inspection.

4. When selecting RTS/CTS in serial flow control, make sure to connect RTS/CTS signal to the flow control signal of the host side, otherwise flow control will not function and may cause garble character or printing disarray.

5. The coverage of warranty is limited within the product itself, Nippon Primex Inc. is NOT responsible for anything induced by the defect of the product and DO NOT pay for any compensation that may occur

Table of Contents

Appended reference documents (Please refer to documents as below about command and code table)

・Command reference [NP-F309*] (D-F10119)
  *Following Code tables are on Command reference in addition to command.
    Domestic code table, Overseas code, Code Page 858、International code,
    Code Page 1250、Code Page 1251、Code Page 1252、Code Page 1254

・Kanji code table [JIS C 6226・1983] (D-F10068)

1. Overview

1.1 Application

This book applies to NP-F309 series.

The specification in this document is for NP-F309 series.

(Notice: Usable paper, characters, power supply, environment, etc. may be different to other models.)

(Please refer to the separate specification for option products.)

(Notice: Usable paper, environment, etc. may be different to printers.)

1.2 Overview

This printer is categorized as follows:

NP－F3094D
① ②　③ ④

－000－＊＊
⑤

①Type (Fixed)
　F：Face mount type

②Mechanism (fixed)
　3：3 inch model

【Notice】
　・3 inch model represents NP-F309**(The following sentence is the same）

③Paper holder type(Default setting)
　Standard
　4：φ120_Arm（UPH-F369（Provisional title））

　Manufacturable specifications
　2：φ80_Arm（P091_PaperHolder_3）

④Interface (default setting)
　Standard
　D：Serial(RS232C) and USB(V2.0 FULL SPEED) are usable by selection

　Manufacturable specifications
　U：Only USB（V2.0 FULL SPEED）
　R：Only Serial(RS232C）

⑤OEM etc. (Default setting).
　No mark: original model

1.3 Features

This printer incorporates newly developed in-house printer mechanism which is compact and low-cost. Also, it is the KIOSK printer which realized price reduction by make its configuration simple. The configuration which the position of a paper roll is changeable freely enables optimal installation to various apparatus.

1) Face mount printer directly attachable to front panel.
2) Print side to eject is selectable for face up or face down printing.(Select when attaching.)
3) Easy to set paper roll by adoption of paper holder with a cantilever shaft.
4) Direction of paper roll setting is selectable either left or right(Select when attaching).
5) The position of paper roll is selectable either upward or center or downward.(Select when attaching).
6) Printing Speed MAX.150mm/sec
7) Equipped auto-cutter.
8) Equipped paper near end sensor.
9) High quality printing.
10) Interface available USB, Serial(Selectable).
11) Adaption to various 1D barcode.
12) Adaption to 2D barcode: QR code model2.
13) Capable to apply for various application.
14) Driver(Windows XP(32bit) / Windows Vista(32,64bit) / Windows 7(32,64bit) / Windows CE5.0 / Windows CE6.0　Linux (Sample))
15) Easy to re-write firmware note1 with Flash Memory & registration of 3 patterns of NV bit image is possible.
16) Easy paper setting by auto loading.
17) Option bezel is available. *Note2

*Note1 [F/W] indicates [Firmware] hereinafter.
*Note2　Refer to [1.5 option].

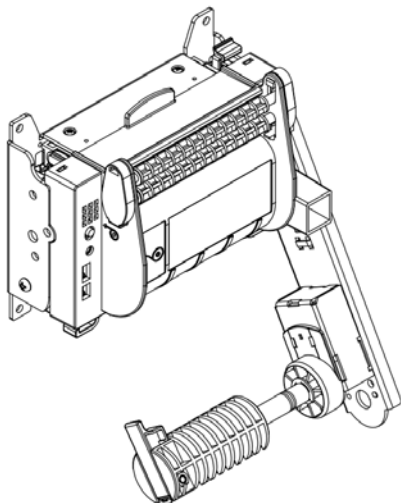## 1.4 Configuration

1) NP-F3094D（Standard）
Configured parts of NP-F3094D are as below.

No	Name	Specifications		Q'ty	NP-F3094D
1	NP-F3094D	φ120_Arm	USB, Serial	1	○

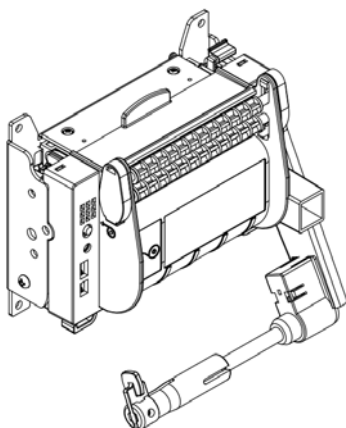*No accessories. No sample paper rolls.

NP-F3094D(φ120_Arm) [Default status]

Default status is under review.

2) NP-F3092D
Configured parts of NP-F3092D are as below.

No	Name	Specifications		Q'ty	NP-F3092D
1	NP-F3092D	φ80_Arm	USB, Serial	1	○

*No accessories. No sample paper rolls.

NP-F3092D(φ80_Arm)　[Default status]

Default status is under review.

1.5   Options

1) Power Supply PS8 (Under review)
   Adapter is available.
   Please refer to [Products specification D-F10058].

2) Bezel BEZ-430
   A bezel for NP-F309 is available.
   Please refer to [Products specification D-F10125].

2. Specifications

2.1 Basic Specifications

No.		Specifications		NP-F309*
1	Print head	1: Print method		Line thermal dot
		2: Total dots		576 dots
		3: Dot density		8dot/mm
		4: Print width (MAX)		72mm
2	Printing spec	1: Print speed (MAX) *Note1		MAX.150mm/sec
		Conditions		Head temp. 35ºC and more, Optimized drive print ratio 50% or less
				*except communication time
		2: Max. print digit		
		Font A (12×24)		48 digit
		Font B (9×17)		64 digit
		Kanji (24×24)		24 digit
		3: Paper feed pitch		0.125mm
3	Character	1: Character size		
		Font A (12×24)		1.50×3.00mm
		Font B (9×17)		1.13×2.13mm
		Kanji (24×24)		3.00×3.00mm
		2: Characters		
		Japanese		JIS C 6226・1983(Full size) Katakana character set (Half size) Extended graphic character set (Half size) Code Page 858 (Half size) International character set (Half size)
		Polish		Code Page 1250 (Half size)
		Russian		Code Page 1251 (Half size)
		Scandinavian		Code Page 1252 (Half size)
		Turkish		Code Page 1254 (Half size)
		3:Character Modifications		Double width
				Double height
				Quadruple
				Bold print
				Double strike
				Inverted
				90°clock-wise rotation
				underlined
		4:Line feed Q'ty (Default)		4.25mm (1/6 inch)

*Note 1 :   Print speed fluctuates depending on the condition.

No.	Specifications		NP-F309*
4	Print mode		Line mode
5	Barcode Specs.	1:1D barcode	UPC-A
			UPC-E
			JAN-13(EAN-13)
			JAN-8(EAN-8)
			CODE39
			ITF
			CODABAR
			CODE128
		2: 2D barcode	QR code Model Ⅱ
6	Interface	1: USB (D type,U type)	V2.0 FULL SPEED compliance
		2: Serial (D type, R type)	RS232C compliance
7	Autocutter	1:Cut Mode	Partial cut / Full cut * by command selection
8	Receive buffer		Approx. 15K byte
9	Alarm display		ALARM LED
10	Operation Switch		Feed switch Reset switch
11	External Dimensions	∗Shipping dimensions ∗Without stopper and paper.	NP-F3092: Approx.121.2(W) x 73.0(D) x 123.5(H) mm
			NP-F3094: Approx.122.2(W) x 97.6(D) x 160.8(H) mm
12	Weight	*without roll paper	NP-F3092: Approx. 520g NP-F3094: Approx. 597g
13	Position of attachment		Refer to [5.Printer Installation]
14	Packing	1:Individual dimensions(mm)	Approx.(W) x (D) x (H) mm
		2:Individual Weight(g)	Approx. g
		3:External Dimentions (mm)	Approx. (W) x (D) x (H) mm
		4,Weight(pcs)	Approx. kg

2.2　Paper Specifications

1) Paper width and thickness

	NP-F309*
Paper width	$80\ ^{0}_{-1}$mm
Paper thickness	59〜75μm

・Please use core width as same as paper width.

2) Paper form

・Form shall be roll one.

Arm	External diameter(Max)	Core I.D	Core O.D
φ80	φ80mm	φ12.0mm	φ18.0mm
		φ12.0mm	φ22.0mm
φ120	φ120mm	φ25.4mm	φ33.4mm

【Notice about paper】
- ・Use Thermal paper.
- ・DO NOT stick end of paper with glue and scotch tape.
- ・The core of roll paper should not be deformed.
- ・The core should not be stuck out over the side of the paper roll.
- ・DO NOT use paper having kept at high temperature and humidity.
- ・Roll paper should not be loosened.
- ・Printing surface shall be outer surface. (Involute paper is not applicable).
- ・Be careful when using pre-printed papers. Especially,to a paper sensor onn non-printed surface and a paper near end sensor at side.
- ・Do not use using the paper stored for long time because it may not be satisfied with its print quality.
- ・Make sure to use roll paper with core.

3) Recommended paper

Base paper part no.	Paper thickness	Manufacturer
TF50KS-E2D	59μm	Nihon Paper Co.,Ltd
PD160R	75μm	Oji Paper Co., Ltd

【Notice】
- ・Print quality may dtrop depending on environmental temperature and humidity, please determine print density setting upon verifying print quality under the environment to use.
  Print density can be set by a command [setting of print density] <GS~n>.
- ・Thermal paper may get contaminated or printer may get condensation by vapor arising from the thermal paper if printing at higher printing ratio is activated under lower temperature and higher humidity environment. Please be careful to refrain water from dropping to thermal head. It may cause galvanic corrosion.
  Please keep a power off until dew disappears if condensation arose.
- ・Please use high reliable thermal papers with low Na+ion, K+ion, and Cl-ion when papers other than recommended is used.

4) Paper near end setting

How to set
The position of paper near end sensor is fixed and cannot be moved.
The following setting is available by [Memory switch setting]. Please set after confirmation of core external diameter of paper roll to use.

External diameter of roll core	Memory switch setting		Detect external diameter value of paper near end	Factory setting	
				NP-F3092	NP-F3094
φ18mm	MS2-6	OFF	φ22±2.5mm	○	-
φ22mm		ON	φ28±2.5mm	-	-
φ33.4mm		ON	φ39±2.5mm	-	○

【NOTE】
*Refer to [4.1 Function setting] about memory switch setting.
*Regard detect external diameter value of paper near end as reference value due to it fluctuates depending on the type of paper, thickness, etc.
*In case detect external diameter value of paper near end:φ22mm is selected（MS2-6:OFF）and activated under following condition either ①or②, paper near end is detected at that point. (～φ28).
①When φ28mm or less paper is set.
②When power-on with setting φ28mm or less paper is set.

2.3 Print Area

Print View
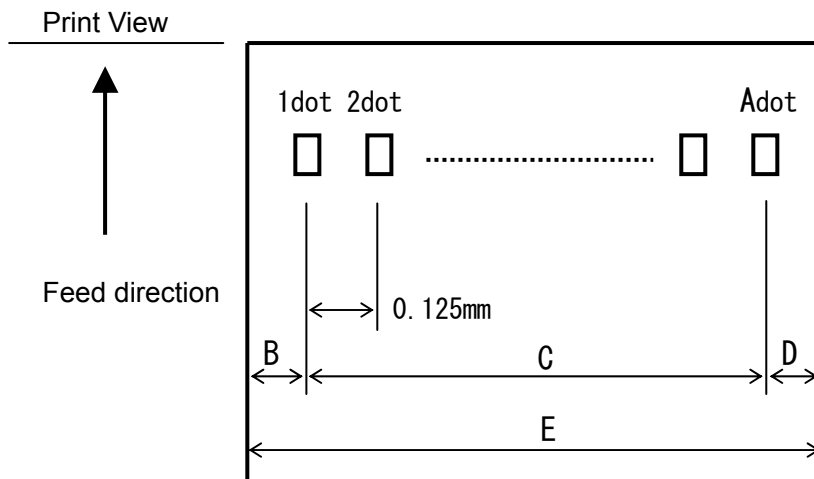
1) Name of Symbols

Symbol	Name
A	Print Dot Number
B	Left Margin
C	Area of Printing
D	Right Margin
E	Paper Width

2) Relationships between Paper Width and Print Area

	A(dot)	B(±1mm)	C(±0.2mm)	D(±1mm)	E($^{-1+0}$mm)
NP-F309*	576 dots	4 mm	72 mm	4 mm	80 mm

2.4   Specifications of Cutter
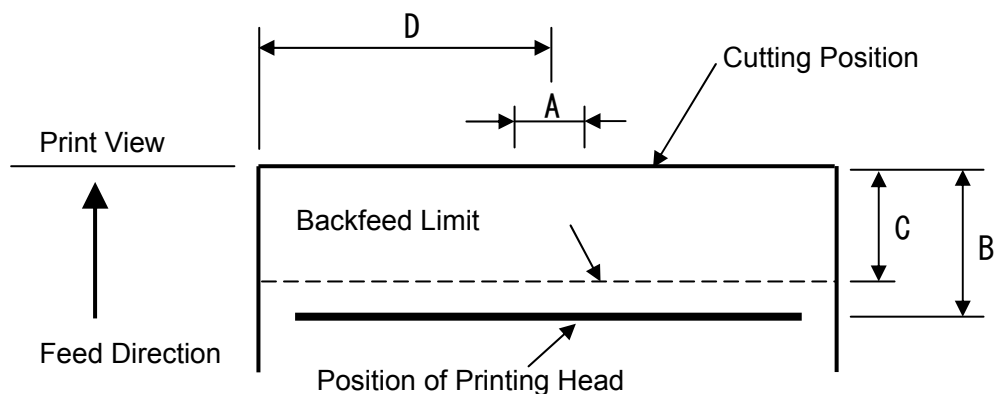
Symbol	Descriptions	Measurement
A	Tab size on Partial Cutting	1.0～2.5mm
B	Position of Printer Head from cut.	7.5±1.0mm
C	Limit of Backfeed	4.5mm
D	Tab on partial cutting	29mm

1) Cutting Method   : Slide System

2) Cutting Mode   : Partial cut / Full cut
                    ※Selectable by command.

3) Allowance of Cutting Frequency   : 20 cuts per minute

4) Paper Thickness   : Refer to [2.2 Paper specification]

5) Minimum cutting length   : 30mm

【NOTE】
   * Loading platen such as pulling out printed paper strongly after partial cut may cause next print
       line head deformed.
   *Feed paper for more than approx. 1mm (8 dot line) when activating print after a partial cut for
     prevention of deformed print line head
   *Tear off the paper, after a partial cut, by pulling it toward the hand holding tip of the paper either
     right or left side cut in order to avoid loading platen.
   *Above B measurement will be 9.5±1mm because Approx. 2mm paper feed is operated
     automatically for preventing paper jam after cutting.
   *Do not use like ingenerating strips by cutting.   It may cause paper jam.
   *Using partial cut is recommended in this product. In case using Full cut, depending on the
     environment, Cut paper may stick to paper exit by its static electricity. Make sure to confirm
     before using.

2.5　Paper sensor position
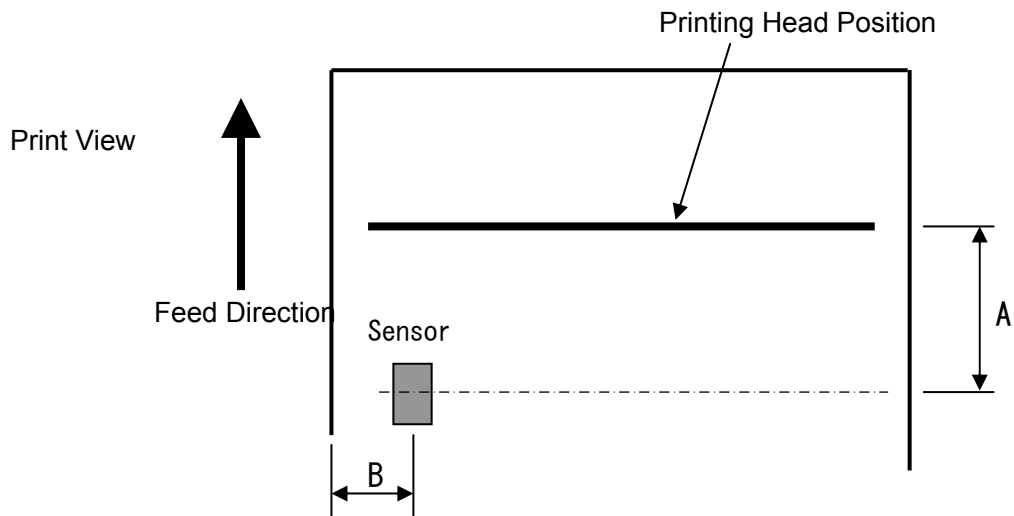
1) Name of Symbol

Symbol	Descriptions
A	Print Head position　~ Sensor Position
B	Sensor position

2) Sensor position

	A(±1mm)	B(±0.5mm)
NP-F309*	7.5mm	4.0mm

　*Remove dust / wisps of paper adhere to sensor constantly.

　*In order to prevent malfunction of paper sensor, do not pre-print on paper feed direction of
　　sensor position ±5mm width.
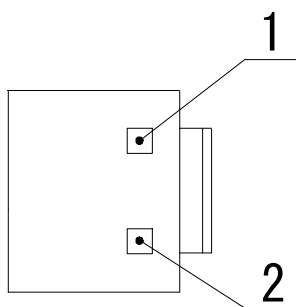
2.6 Power Supply Specifications

1) Power supply input connector

2pin connector CN1
Printer side connector : S2P-VH(JST) or equivalent.
Externally-supplied connector : VHR-2N(JST) or equivalent.

Terminal No	Function
1	DC+24V
2	GND

Connector fig (From mating side)

2) Power Supply Voltage   DC24V±5%

3) Consumption current

UnderConsideration (TBD)

【NOTE】
   *Do not exceed a range of power supply voltage under any conditions whatsoever because degradation/destruction may happen once voltage exceed over a range.
   *Because large peak current follows depending on power supply voltage and print contents, in order to assure print quality, use a power supply which has enough capacity and connect all wires regarding power supply. Also, beware of allowable current of wiring material.
   * Although current capacity of thermal head itself is 10.2A, current capacity of connector cable is not included to this, determine dot number of simultaneous current-carrying not to exceed the current capacity.
   * If power supply cable is excessively long, the operation may become unstable. Cable should be made as short as possible. If not possible, connect cables near the printer and place an electrolytic capacitor of rated voltage 35V, electrostatic capacity of 2200µF between power supply and GND.
   * Please set element for excessive current protection and appropriate fuse to the power line.
   * Use LPS power supply.

2.7 Reliability Specifications

1) Life time

① Thermal Head
  Anti-pulse Characteristics   :100 million pulse
  Anti-abrasion characteristics   :100km

②Cutter life   : 0.8million cut

③Life Definition
  ・Entering point of abrasion failure period.
  ・Condition to satisfy life is as follows;
    Average Print Ratio : 12.5%
    Recommended thermal paper : Recommended thermal paper
    Print Density   : 100%
    Temperature/humidity : 20℃、60%

【NOTE】
  ＊In case of using paper other than recommended paper, since life time will differ depending on
   paper quality, width and thickness, confirm with paper in actual use at the user's side.

2) MTBF（Mean time between failure）
  ＊＊×＊＊＊   hours

2.8 Environment Specifications

1) Operating Environment
    Temperature : -5～50℃ （print warranty is 5～40℃）
    Humidity : 20～80%RH
        Except, 85%RH assumes 35ºC for no condensation

  *Warrant scope of Print Quality (P/Q) & Print Operable (P/O) range

▨	P/Q temp. & humidity range
▨	P/O temp. & humidity range
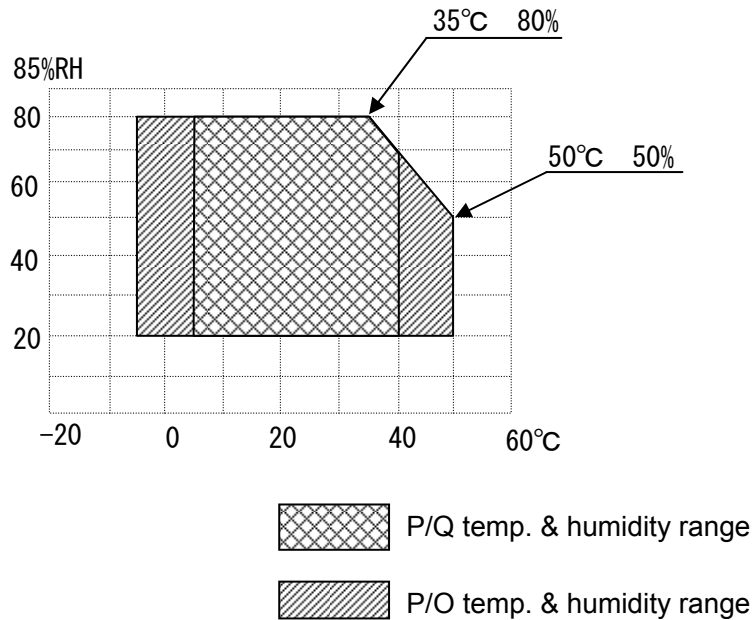
2) Storage Environment (except for papers)
    Temperature : -20～70℃
    Humidity : 10～90%RH
        Except, no condensation.
    High temp and humidity: 40ºC90%RH (no condensation) shall be the worst value.

2.9 Regulations

Regulations on this product are as below.

	NP-F309**	Remarks
CE Mark	Under review	
UL60950-1	Under review	Note 1
VCCI	Under review	
FCC	Under review	

Note 1 Not applicable in case exterior appearance differs to standard shipping.

2.10 External Dimension

1) NP-F3092 (φ80_Arm)
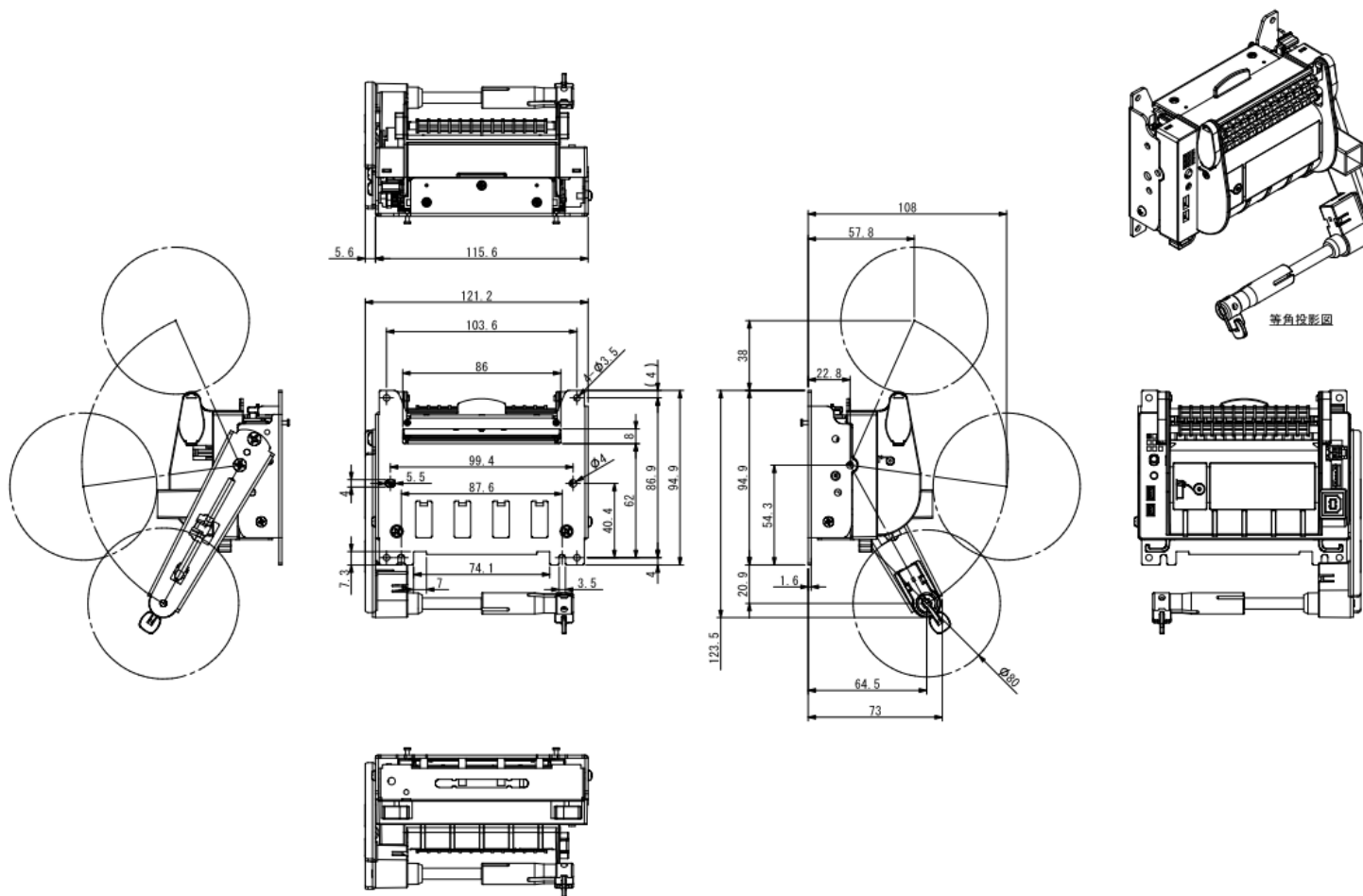
単位：mm

This drawing shows status when attaching paper holder to the right looking from paper inlet side.
 (Paper load will be conducted from the left side.)
In case of attaching paper holder to the opposite side, it will be symmetry position against to "Paper center".

2) NP-F3094 (φ120_Arm)
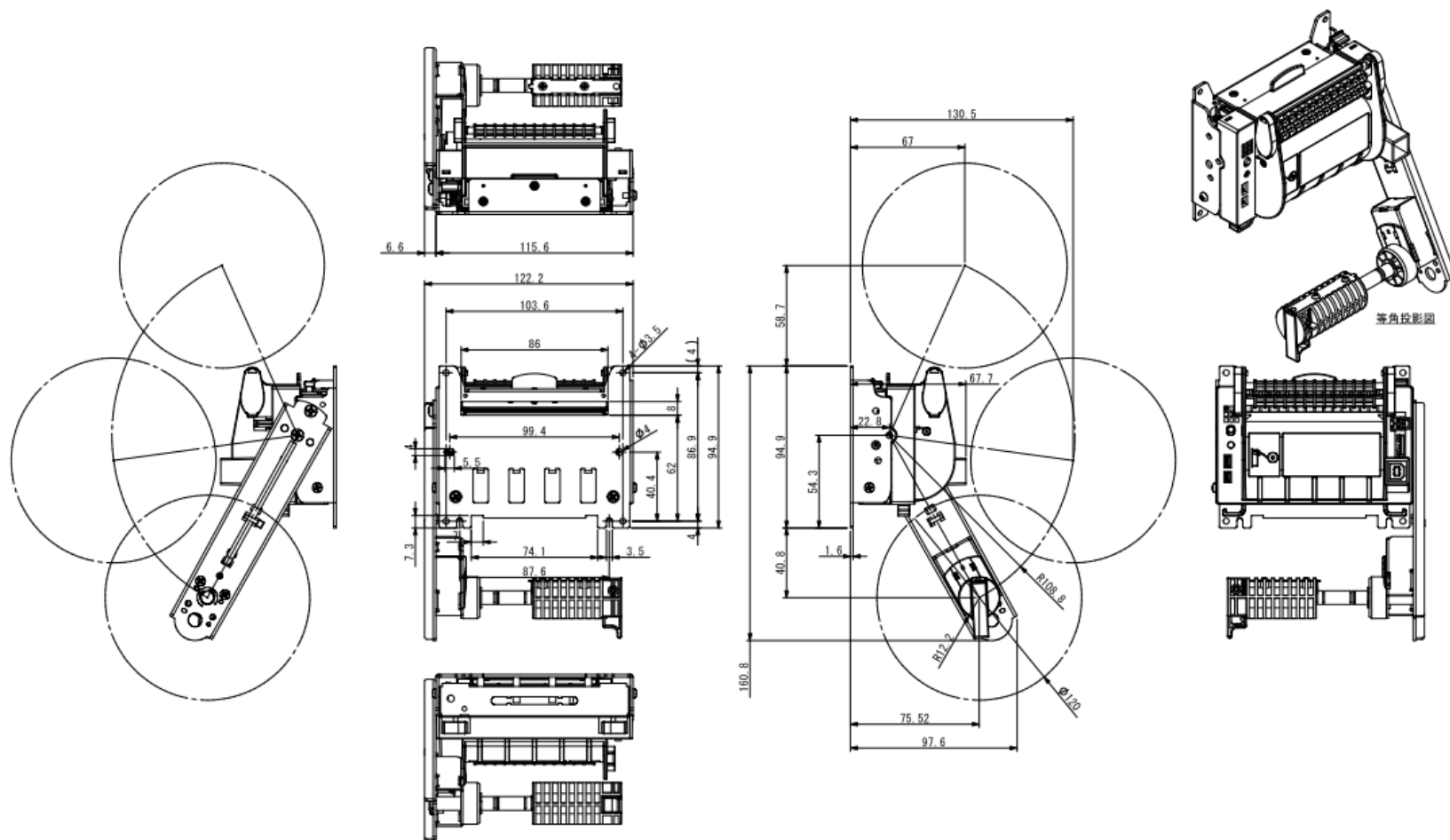
等角投影図

単位：mm

This drawing shows status when attaching paper holder to the right looking from paper inlet side.
 (Paper load will be conducted from the left side.)
In case of attaching paper holder to the opposite side, it will be symmetry position against to [Paper center].

3. Configurations

3.1 Interface 【USB(V2.0 FULL SPEED)】

1) Version : V2.0 FULL SPEED (12Mbps)

2) Port : Upstream port (B jack)

3) Power Supply : Self Powered

4) RESET Function : Printer get Automatic RESET when USB cable connected to the host is inserted to printer side.

*When using with USB interface, please make sure to use driver[NOTE1] we provide.
When direct transfer, make sure to monitor receive buffer remaining amount[NOTE2] and do not transmit data exceeding this amount.

[NOTE1]: Please use either one of the following drivers or latest version NPI drivers(NPI EX driver is recommended).
   NPI EX driver Ver.*.*.*.*
   NPI Printer_DS2.0

[NOTE2]: Receive buffer remaining amount's auto-reply format (when MS2-5: OFF)
   [FF]h + [01]h + [00]h + [00]h + [00]h + n   *[00 ≤ n ≤ 0F]h
   n = Receive buffer remaining amount (0 ~ 15K Byte)

3.2 Interface [SERIAL (RS-232C compliance)]

1) Synchronization : Asynchronous

2) Transmission Speed : 2400,4800,9600,14400,19200,38400, 57600, 115200bps(user selection)

3) 1 word consists of
   Start bit : 1bit
   Data bit : 7 or 8 bit (user selection)
   Parity bit : odd, even or no parity (user selection)
   Stop bit : more than 1 bit

4) Signal Polarity
   RS-232C
   Mark = Logic " 1 " /OFF （-3V～-12V)
   Space = Logic " 0 " /ON （+3V～+12V)

5) Receive Data (RXD signal)
   Mark ＝ 1
   Space ＝ 0

6) Transmit Data (TXD signal) *4
   Mark ＝ 1
   Space ＝ 0

   XON/XOFF when controlled
   《DC1》〔11〕h code, XON : Possible to receive data [*NOTE1]
   《DC3》〔13〕h code, XOFF : Impossible to receive data [*NOTE2]

7) Receive-Control (RTS signal)
   Mark : Impossible to receive data [*NOTE3]
   Space : Possible to receive data [*NOTE1]

8) Transmit-Permission (CTS signal)
   Mark : Impossible to transfer data
   Space : Possible to transfer data

[*NOTE1]: Occur after power ON or after self diagnostic print also after software reset or when releasing receiving buffer full and firmware rewrite.

[*NOTE2]: Occur when receiving buffer full or after receiving memory switch setting command also after receiving software reset command and firmware rewrite.

[*NOTE3]: Occur when power OFF or during self diagnostic print and software reset or when receiving buffer full or after receiving memory switch setting command and firmware rewrite.

[*NOTE4] Data transmitting will not be operated while data receiving. In case data receiving continuously, data transmitting will be operated after data receiving stop. Also, the timing of data transmitting may change depending on while printing or the situation of data receiving.

3.3 Connector Signal Details

1) CN1 : Power Input Connector (2 pin connector)
*Please refer to [2.5 Power Specifications]

2) CN3 : USB Data Signal Input Connector
Printer side : B jack　CU02SCV1000 （CviLux)equivalent
Host side 　　: B plug or equivalent

Pin №	Signal	INPUT/OUTPUT	Function	Remark
1	VBUS	INPUT	Power line	Non twist power line
2	D-	INPUT/OUTPUT	Data line	Twist pair signal line
3	D+	INPUT/OUTPUT	Data line	Twist pair signal line
4	GND	–	Power line	Non twist power line
Shell	Shield	–		

*Use USB cable that conforms to the standard (FULL SPEED)
*Performance with a non-standard USB cable is not guaranteed.

3) CN4 : SERIAL Data Signal Input Connector
Printer side : S5B-PH-K-S(JST) equivalent
Host side 　　: PHR-5(JST) equivalent

Pin №	Signal	INPUT/OUTPUT	Function	Remark
1	RXD	INPUT	Serial receiving data	
2	TXD	OUTPUT	Serial transmitting data	
3	RTS	OUTPUT	Receiving permission signal	
4	CTS	INPUT	Transmit permission signal	
5	GND	–	Ground for signal	

*In case of actual use, use after sufficient confirmation by the user's side.

4) CN2 :　Paper Near End Connector
Connect to "Standard paper near end sensor"

【NOTE】
・Please do not connect other than "Standard paper near end sensor"
・Please valid memory switch MS2-4.

CN1
Pin No.1side

CN1:Power Input connector

CN4:　RS232C Connector

CN3:　USB Connector

CN2:　Paper
NE Connector

CN2
Pin No.1side

CN4
Pin No.1side
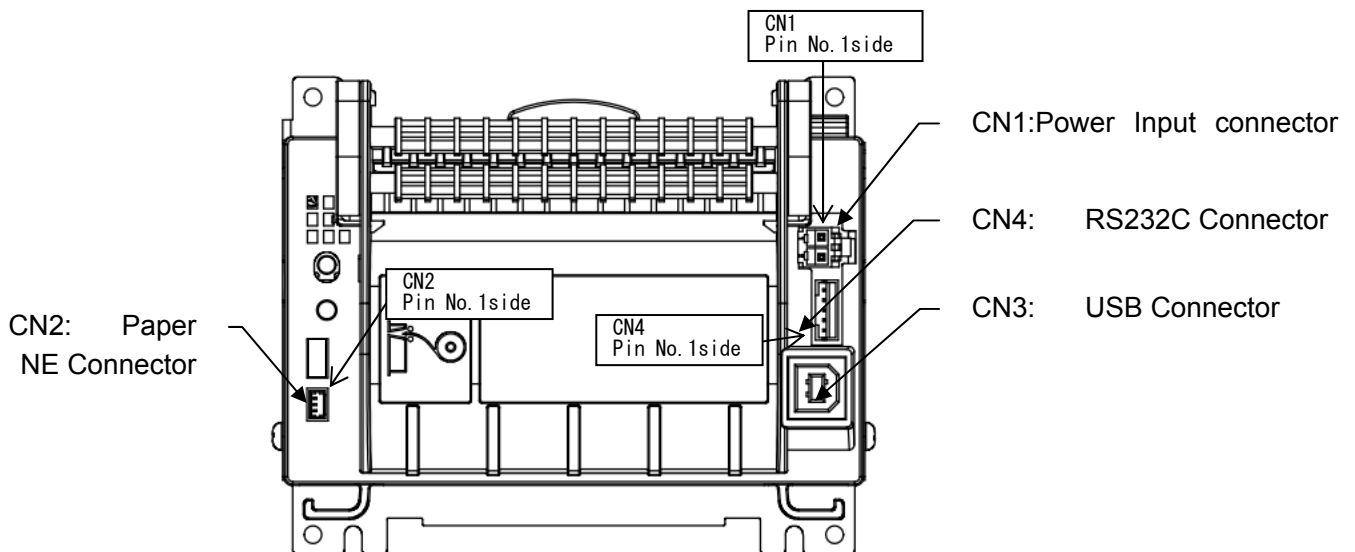
4. Functions

4.1 Function Setting
4.1.1 Switch Setting
1) Memory Switch MS1

	Function	O N	OFF	Factory Setting NP-F309*D
MS1-1	Communication Setting	Refer to table 1		OFF
MS1-2				OFF
MS1-3				OFF
MS1-4	SERIAL transmit speed	Refer to table 2		O N
MS1-5				OFF
MS1-6				O N
MS1-7	SERIAL flow control*NOTE1	XON/XOFF	RTS/CTS	OFF
MS1-8	Auto cutter control	INVALID	VALID	OFF

Table 1: Communication Setting

Interface	Bit length	Parity setting	MS1-1	MS1-2	MS1-3	Factory Setting
SERIAL	8bit	NIL	OFF	OFF	OFF	○
			O N	OFF	OFF	—
		ODD	OFF	O N	OFF	—
		EVEN	O N	O N	OFF	—
	7bit	NIL	OFF	OFF	O N	—
		ODD	O N	OFF	O N	—
		EVEN	OFF	O N	O N	—
Reserved	–	-	O N	O N	O N	—

※ *Do not set as MS1-1=MS1-2=MS1-3=ON.

※ About interface;

Even when setting as SERIAL, if the printer detects VBUS signal by connecting USB cable, interface of the printer will automatically switch to USB mode.

Even if USB cable is disconnected, interface of the printer will not automatically switch to serial mode.

Please turn the power OFF/ON when switching to serial mode.

USB is not available in R-type. SERIAL is not available in U-type.

Table 2: SERIAL transmission speed

SERIAL transmit speed	MS1-4	MS1-5	MS1-6	Factory Setting
115200	OFF	OFF	OFF	—
57600	O N	OFF	OFF	—
38400	OFF	O N	OFF	—
19200	O N	O N	OFF	—
14400	OFF	OFF	O N	—
9600	O N	OFF	O N	○
4800	OFF	O N	O N	—
2400	O N	O N	O N	—

NOTE1) *Flow control   when XON/OFF control

(i) All of the statuses when XON/OFF control will be transmitted by ASCII conversion data in ·····
of 0xFF 0xFE ····· 0x00.

(ii) ASCII conversion method is;
Higher 4 bits   = 0x30 + higher-order 4 bits > 4
Lower 4 bits   = 0x30 + lower 4 bits
Thus, convert to the below mentioned values.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	10	20	30	40	50	60	70	80	90	:0	;0	<0	=0	>0	?0
1	01	11	21	31	41	51	61	71	81	91	:1	;1	<1	=1	>1	?1
2	02	12	22	32	42	52	62	72	82	92	:2	;2	<2	=2	>2	?2
3	03	13	23	33	43	53	63	73	83	93	:3	;3	<3	=3	>3	?3
4	04	14	24	34	44	54	64	74	84	94	:4	;4	<4	=4	>4	?4
5	05	15	25	35	45	55	65	75	85	95	:5	;5	<5	=5	>5	?5
6	06	16	26	36	46	56	66	76	86	96	:6	;6	<6	=6	>6	?6
7	07	17	27	37	47	57	67	77	87	97	:7	;7	<7	=7	>7	?7
8	08	18	28	38	48	58	58	78	88	98	:8	;8	<8	=8	>8	?8
9	09	19	29	39	49	59	69	79	89	99	:9	;9	<9	=9	>9	?9
A	0:	1:	2:	3:	4:	5:	6:	7:	8:	9:	::	;:	<:	=:	>:	?:
B	0;	1;	2;	3;	4;	5;	6;	7;	8;	9;	:;	;;	<;	=;	>;	?;
C	0<	1<	2<	3<	4<	5<	6<	7<	8<	9<	:<	;<	<<	=<	><	?<
D	0=	1=	2=	3=	4=	5=	6=	7=	8=	9=	:=	;=	<=	==	>=	?=
E	0>	1>	2>	3>	4>	5>	6>	7>	8>	9>	:>	;>	<>	=>	>>	?>
F	0?	1?	2?	3?	4?	5?	6?	7?	8?	9?	:?	;?	<?	=?	>?	??

*Inside the table indicates character strings.

(iii) Contents assigned in ···· apply to all of the data including standard status, status header (0xFF).
(iv) Printer ignores ESC s FEh command.
(v) Do not issue ESC s FEh command from driver and tool.

2) Memory Switch MS2

	Function		O N	OFF	Factory Setting	
					NP-F3092D (φ80_Arm)	NP-F3094D (φ120_Arm)
MS2-1	Japanese Kanji code		Shift JIS	JIS	OFF	OFF
MS2-2	Reserved		—	—	OFF	OFF
MS2-3	Reserved		—	—	OFF	OFF
MS2-4	Paper Near End detection[Note2]		VALID	INVALID	O N	O N
MS2-5	Receive buffer remaining size auto-reply (USB)[Note3]		INVALID	VALID	OFF	OFF
MS2-6	Paper Near End detection correction	NP-F3092D[Note4]	φ28	φ22	OFF	-
		NP-F3094D[Note5]	φ39	-	-	ON
MS2-7	Reserved		—	—	OFF	OFF
MS2-8	Reserved		—	—	OFF	OFF

*Make sure to turn OFF MS2-2, MS2-3, MS2-7, MS2-8.

Note2   In case of disconnecting PNE (standard is connect), make sure to turn MS2-4 OFF.

Note3   In case of setting MS2-5:ON, beware since print failure such as garble character etc. may occur when transmitting large volumes of data at one time.
VALID only when USB interface.

Note4   Refer to 2.2.4) Pape near end setting when using NP-F3092D(φ80_Arm).
When MS2-6 : In case OFF, paper near end will be detected(Detect signal ON) after sensor detects and Approx. 3.7mm paper feed is executed.
However, soon after power-on and replacement of paper, when paper near end is detected, paper near end will be detected at that time.
When MS2-6 : In case ON, paper near end will be detected(Detect signal ON) immediately after paper near end sensor detects.
Regard detection value as reference value due to it fluctuates depending on the paper condition.

Note5   When you use NP-F3094D(φ120_Arm), Make sure turn MS2-6 to ON.

4.1.2 Memory Switch setting by manual

When setting (or changing) memory switch configuration manually, follow the instructions as below under printable condition.

1) Shift operation to setting mode

    (i)   Set paper (Close Printer unit, Power OFF)
    (ii)   FEED switch: ON (Hold switch down until (iii) (iv) finish.)
    (iii)   Turn ON power (Confirm printer startup)
    (iv)   Printer unit OPEN → CLOSE
    (v)   FEED switch: OFF (Release hold.)
    (vi)   Enter into setting mode and comments with "** MEMORY SW SETTING MODE **"and for multiple lines will be printed.

2) How to set each switch
Sequentially set [ON][OFF] from MS1-1 to MS2-8 by confirming print under Setting mode .

| Setting [ON] | Long press FEED switch (more than 1sec) |
| Setting [OFF] | Short press FEED switch (less than 1sec) |

Setting finishes after repeating 16 times of the above operations. Print out list of set contents right before automatically entering into software reset movement. The latest setting becomes effective.

＊In case of stopping set procedure in the middle, OPEN platen arm and press FEED switch 1 time, then CLOSE the front cover to complete setting.
(Setting already completed at this moment becomes effective, while all MS remainders are automatically set as OFF.)

4.1.3 Memory Switch setting by on-line command

When setting (or changing) memory switch configuration in on-line command, make sure that paper is loaded and the printer is ready for on-line print, and set by the following commands from the host.
Once the printer normally receives set commands, it activates software reset after printing out setting contents and new settings become effective.

1) Setting command
[Memory Switch Setting and Printing] «GS M n d1 d2»
This command is to set the memory switches MS1/MS2 and also to print out the set contents.

*Refer to "4.1.1 Switch Setting" for each MS(=Memory Switch) content and [NOTE].
*Refer to [Memory Switch Setting and Printing] <GS M n d1 d2> for MS setting by command.
*It is also possible to transmit MS setting command by using NiiPrinterTool etc.

4.1.4 Self-diagnostic Print

1) Check points by self-diagnostic print
- Function of control circuit board
- Version of control F/W
- Setting statuses of Memory Switch (MS)
- Movement of paper end sensor (paper sensor)

2) Start / finish of self-diagnostic print

Turn ON the power while pressing FEED switch and release the FEED switch after initialization response of the printer mechanism. Then self-diagnostic print activates. Finish after printing out prescribed printing patterns. During self-diagnostic printing, printer is in off-line status.

4.1.5 Paper Detector (Paper Sensor)

Paper detection sensor is mounted on paper path inside the printer mechanism. This detects status that paper runs out completely. When detection, the printer transmits the paper end status and stops printing.

Please do not use a roll paper that is glued (or taped) to the core at the end of paper because that kind of a roll paper is impossible for the sensor to detect paper end status.

Please replace a paper roll as soon as paper-out status is detected.

4.2 Error Handling

1) Details of Error Detections

Item	Status	Status Information	ALARM Status	Release method
Communication Error	232C communication error Parity Overrun Framing	-	-	Rectify Communication Conditions
Normal	Normal status	-	OFF	
Print Start Status	Print start setting by command (not error)	bit7 1	OFF	Print end setting by command
Voltage Abnormal	Voltage abnormal	bit6 1	BLINK	Power OFF→ON after removing error factor
Auto Cutter Error	Cutter PaperJam	bit4 1	BLINK	Open printer unit and close after removing error factor.
Head Temperature Abnormal	Head temperature at over approx. 70ºC~	bit3 1	BLINK	Auto recovery at approx. 60ºC of head
Paper End	No paper	bit2 1	ON	Paper replenishment
Printer Unit Open	Printer Unit Open	bit1 1	ON	Close printer unit
Paper Near End	Detection of remaining paper Paper NE sensor detection (MS2-4: when PNE valid)	bit0 1	BLINK	Paper replenishment

• Printer stops all operations when detecting above errors except "Communication Error", "Paper NE" and "Print start status".

• No automatic loading when detecting above errors except "Paper NE", "Paper End" and "Print start status".

• Turns ON error bit of status information.

• Please refer to "4.6 Operation Panel" for details about ALARM status.

• After releasing paper near end, it full cuts after auto loading the paper.

• After releasing platen open, it full cuts after feeding the paper.

4.3 Buffer Full Print

Auto line feed will be executed at the time when a printer receives data of the amount of 1 line*1 based on [Line Feed Amount Setting of Smallest Paper Feed Pitch Unit] « ESC 3 n »command.

*1 Volume of buffer full data (Largest print digit number) differs depending on each size of ANK / Japanese Kanji (Refer to 2.1.2 Print specification).

4.4 Drive Mode Selection

Fixed partition (no partition, 2 partition, 4 partition) or optimization are selectable by command. Select after considering consumption current by print ratio. (Refer to [2. 6 3 Consumption current]).

1) Partition drive selection
Please refer to [Partition Drive Selection] command.

	No partition	2 partition	4 partition
Dots number of Simultaneous current-carrying	576dot	288dot	144dot

※Printing speed decreases when except No partition is selected. Blank line (Max. 1 dot line) may happen depending on the print contents (like the pattern whose print ratio changes).

2) Optimization
Switch to high speed, standard, current-saving (low), and current-saving (high) depending on total dot number /1 line to print.

	High speed	Standard	Current-saving (low)	Current-saving (high)
Dots number of Simultaneous current-carrying	288dot	144dot	72dot	48dot

*When optimization is selected, printing speed will be fluctuated depending on print ratio, and there is some printing sound.
*When oprimization is selected, blank line (Max. 1 dot line) may occur and print quality may decline somewhat.

4.5 Print Selection of Full size / Half size

Language Font	Selecting Method
Japanese	Command [FS &], [FS .] or shift JIS code switch
Polish	Fixed (only half size)
Russian	Fixed (only half size)
Scandinavian	Fixed (only half size)
Turkish	Fixed (only half size)

4.6 Operation Panel
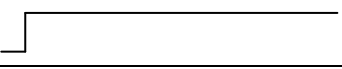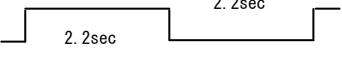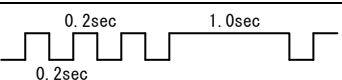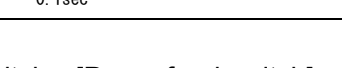
Printer equips with the following operation parts.

1) ALARM LED (red) [alarm lamp]:
Indicate printer status by patterns of ALARM LED.
BLINK/ON/OFF when rewriting to Flash ROM.
*ALARM LED patterns are shown in below chart.

Display Pattern	Printer Status	Priority (8:High~1:Low)
1 / O ————————	Normal / Print (receive) enable	1
1 / O ⊓⊔⊓⊔⊓⊔ (0.2sec / 0.2sec)	Paper Near End	2
1 / O ⎺⎽⎺⎺⎺⎺	Paper out	3
	Printer unit open status	4
1 / O ⎽⎺⎽⎺ (2.2sec / 2.2sec)	Head temperature abnormal (approx. 70ºC or more) or inappropriate head connection	5
1 / O ⊓⊔⊓⊔⎺⎽ (0.2sec / 0.2sec / 1.0sec)	Auto cutter error	6
	Voltage abnormal	7
1 / O ⊓⊔⊓⊔⊓⊔ (0.1sec / 0.1sec)	F/W write mode	8

2) FEED Switch   [Paper feed switch]
Switch to feed paper in the forward direction
Used also in self-diagnostic test print, memory switch setting.
*Switchable to valid or invalid by setting [FEED switch VALID/INVALID] <ESC c 5>command.
*When conducting FEED switch, full-cut is activated after feeding paper..

3) RESET Switch
Pressing by fingers is not available for preventing malfunction.
(Press lightly and release with ballpoint pen.)
Resetting is required due to printer returns to initial status when power-on by activing reset switch.
Beware in case data remains in buffer because they will be deleted.

ALARM LED
FEED switch
RESET switch
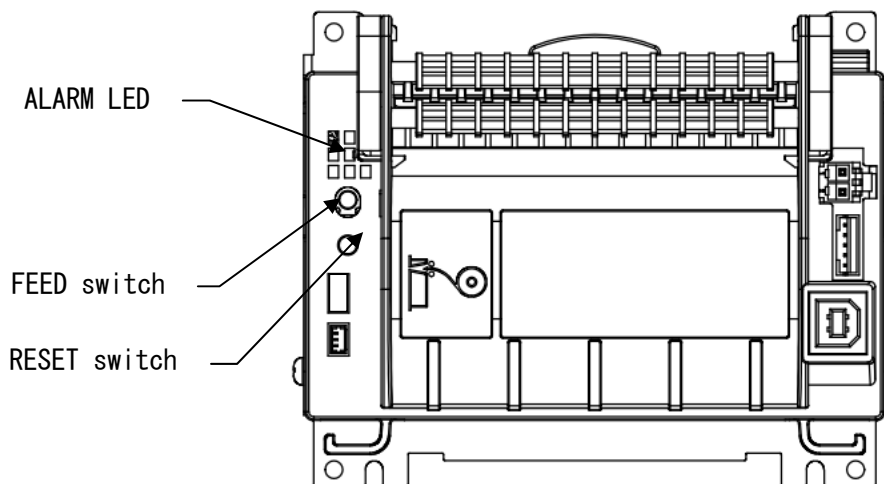
4.7 How to set a paper roll

1) NP-F3092D（φ80_Arm）How to set a paper roll

・Turn the power ON.
・Please convert paper roll stopper to (B) status.
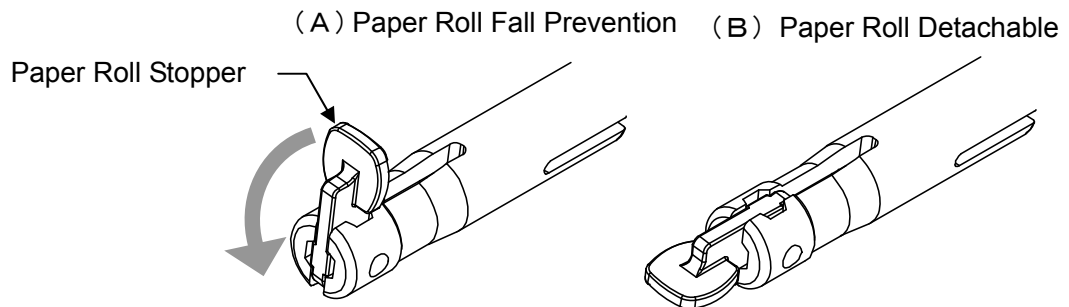
（A）Paper Roll Fall Prevention 　（B）Paper Roll Detachable

Paper Roll Stopper

・Confirm winding direction of the paper roll and put through the center hole into the paper holder shaft. (Please follow "figure" of the printer main body for paper roll winding direction).
・Turn a paper roll stopper upright.
・Straightly insert tip of the paper roll into the paper entrance (Between 2 paper rollers).
・Paper sensor detects the paper and the paper will automatically be loaded.
 (Please make sure to insert firmly until loading operation starts.)
・Print operation becomes available after pulling constant length and cutting.

Insert paper between 2 paper rollers.

Paper Inlet

Print Surface

Paper Roll

Paper Holder Shaft

Paper Tip Form

○　　×　　×
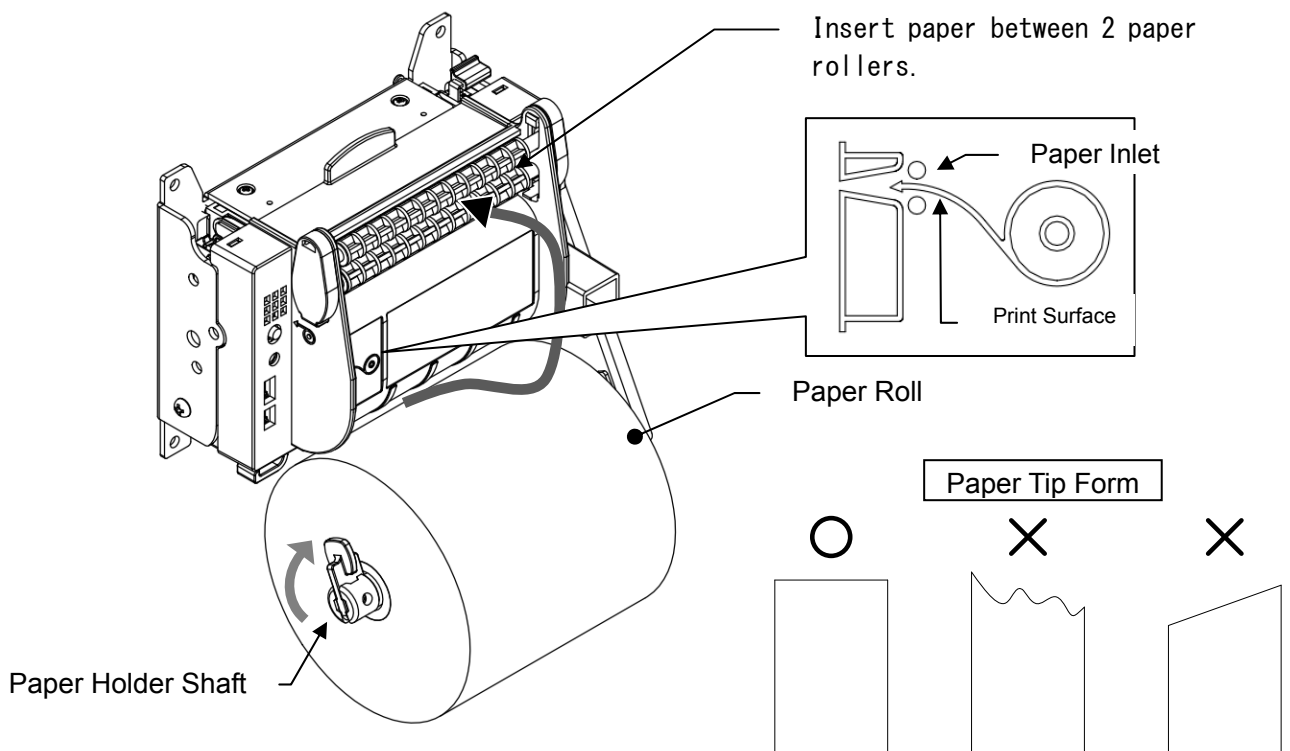
【NOTE】
　　　・Remove axis core of the old paper roll before inserting a new paper roll.
　　　・Please load paper roll without slack. (It causes paper jam.)
　　　・Tip of paper must be straightened at right angle. (Please refer to "Paper Tip Form" drawing.)
　　　・When inserting paper tip with fracture or bias status, it may not be able to conduct loading operation.
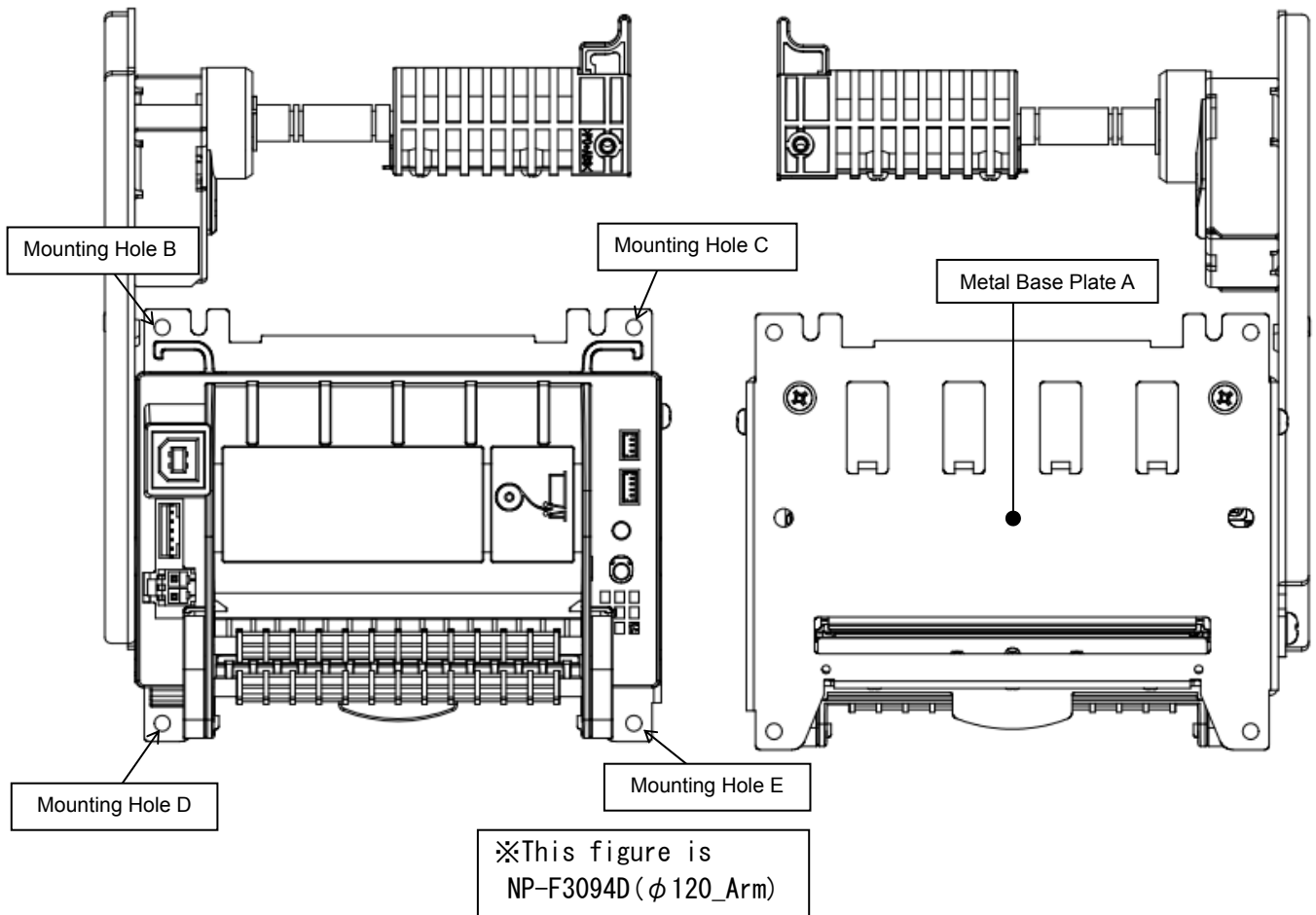　　　・Since thermal head right after printing will be highly heated, please beware not to touch with your finger or hands etc.
　　　・Please beware not to clamp your finger or hands etc.

2) How to set paper roll of NP-F3094D（φ120_Arm）.

・Power on
・Keep a roll paper stopper (B) condition.
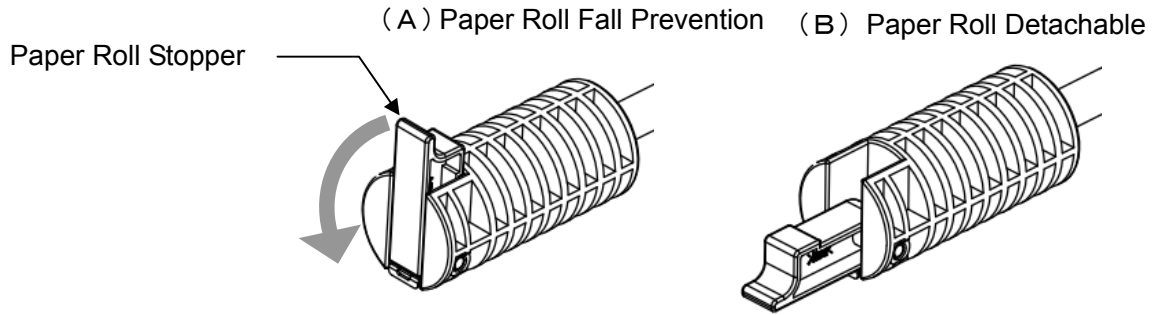
（A）Paper Roll Fall Prevention　（B）Paper Roll Detachable

Paper Roll Stopper

・Confirm winding direction of the paper roll and put through the center hole into the paper holder shaft. (Please follow "figure" of the printer main body for paper roll winding direction).
・Turn a paper roll stopper to upright position.
・Straightly insert tip of the paper roll into the paper entrance(Between 2 paper rollers).
・Paper sensor detects the paper and the paper will automatically be loaded.
　(Please make sure to insert firmly until loading operation starts.)
・　　　Print operation becomes available after loading constant length and cutting.

Insert paper between 2 paper rollers.

Paper Inlet

Print Surface

Paper roll

Paper Tip Form

○　　×　　×

Paper Holder Shaft
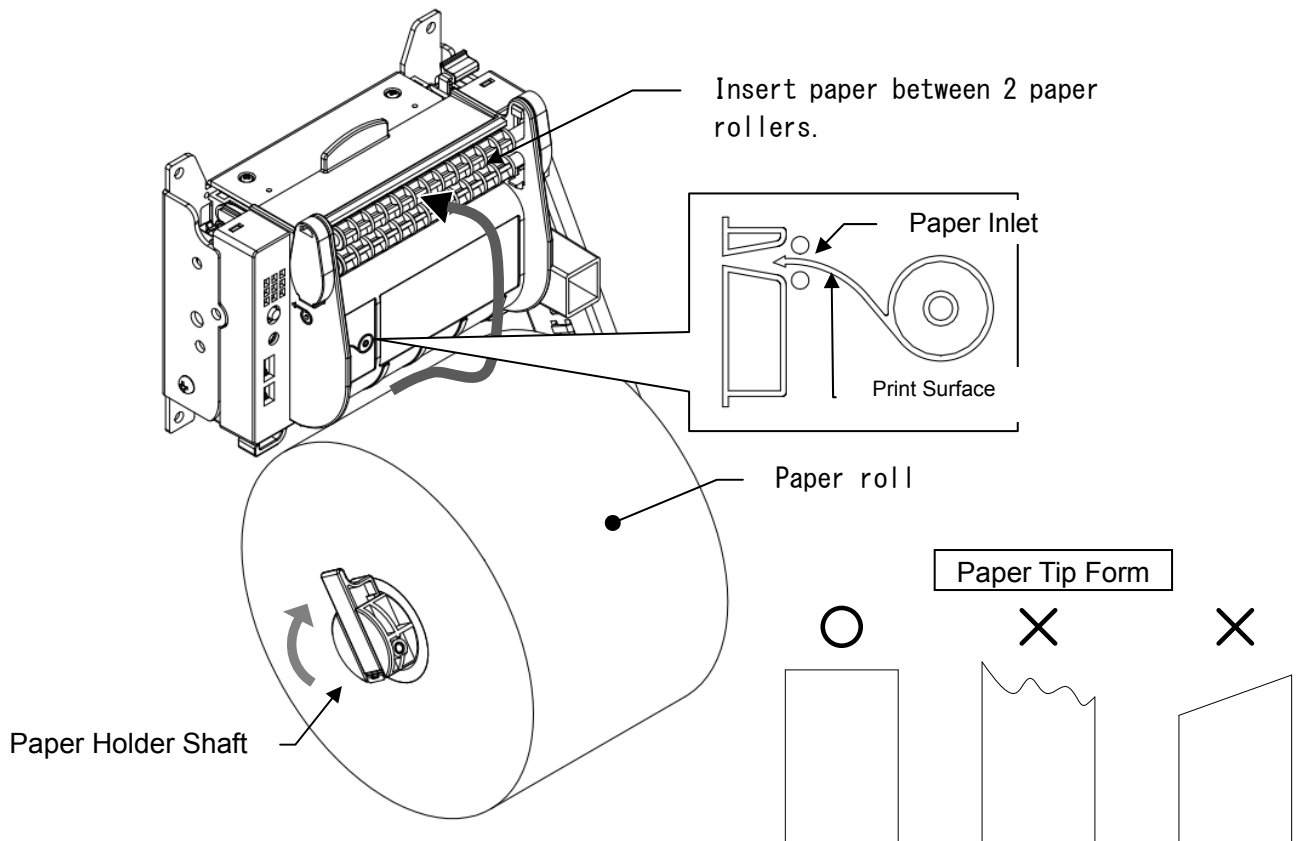
【NOTE】
・Remove axis core of the old paper roll before replenishing a new paper roll.
・Please load paper roll without slack. (It causes paper jam.)
・Tip of paper must be straightened at right angle. (Please refer to "Paper Tip Form" drawing.)
・When inserting paper tip with fracture or bias status, it may not be able to conduct loading operation.
・Since thermal head right after printing will be highly heated, please beware not to touch with your finger or hands etc.
・Please beware not to clamp your finger or hands etc.

4.8 How to remove the remained and jammed paper

・Handle printer unit and open after converting open lever as shown in the figure.
・Please remove all of the paper on the paper path.
・When closing printer unit, push the knob part and make sure to lock firmly until hearing a click sound.

【Notice】
　・In case printer unit is not opened because of sticking out cutter blade, please let cutter blade return to the standby position by restarting the power.
　・Since thermal head right after printing will be highly heated, please beware not to touch with your finger or hands etc.
　・Please beware not to touch metal edge when printer unit is opened.
　・In case of closing the printer unit, please push knob in the center part and close for sure.
　・When opening the printer unit, please do not apply excessive force by crossing over stop position.
　・Please beware not to clamp your finger or hands etc.
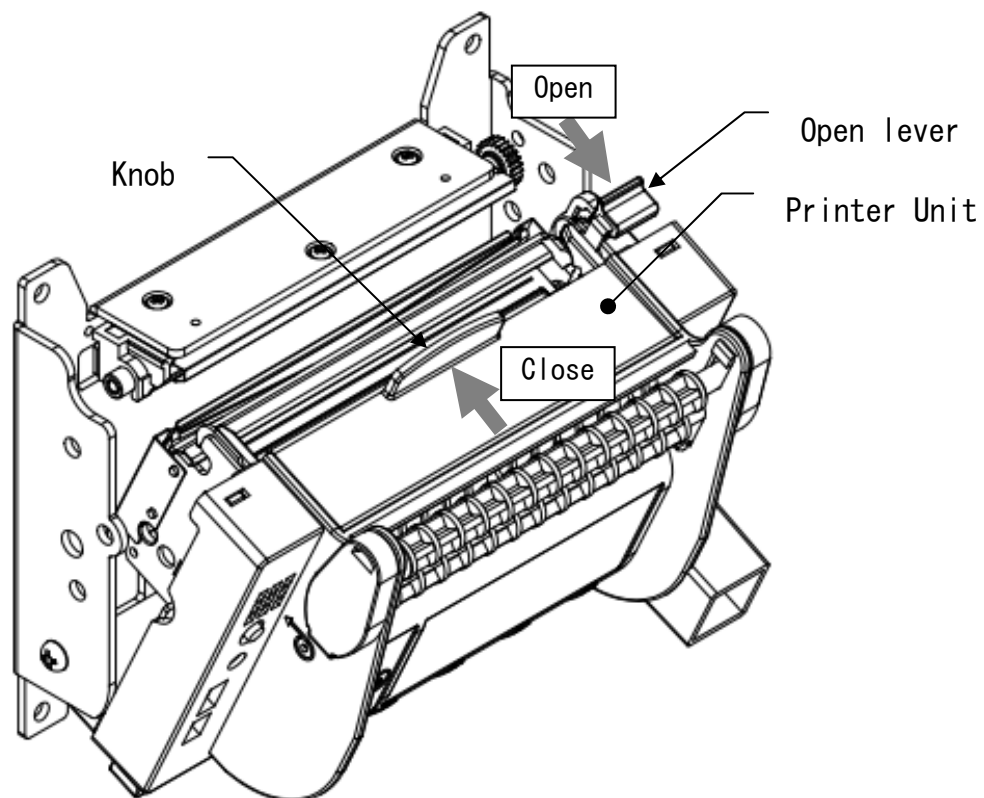
4.9 Cleaning Method for thermal head and others

Print quality may decline by paper chaff etc. adhered to the heating element of thermal head.
Also, paper dust may adhere to the platen or sensor part.
In such case, turn OFF the power and open printer unit and follow cleaning instructions below.
Please refer to "4.8 How to remove the remained and jammed paper" for printer unit open/close.

1) Thermal Head
    Clean surface of heating element with a cotton swab moistened with ethanol or IPA. (Beware not touch to the other parts.)

2) Platen
    Remove trash and dust on the surface by wiping like rubbing slightly with dry cloth.

3) Paper sensor and its surrounding
    Remove trash / dust adhered to sensor with a soft-bristled brush or a cotton swab.

4) Auto-cutter
    Remove dust etc. adhered by air-blower. (Reference: every 100,000 times movement)

【Notice】
    ・Since thermal head right after printing will be highly heated, please beware not to touch with your finger or hands etc.
    ・Do not touch directly with metal or by your hand to the heating element of the thermal head.
    ・Please beware of static electricity while cleaning because it may damage the thermal head.
    ・Since it may have abnormal bloom of paper depending on papers, please check the period of maintenance after verifying paper and decide what kind of a paper to use.
    ・Please make sure to turn ON the power after ethanol or IPA is completely dried.
    ・When you open printer unit, Do not apply excessive force by crossing over stop position.

Thermal head

Platen

Paper sensor
Open/Close Detection Switch
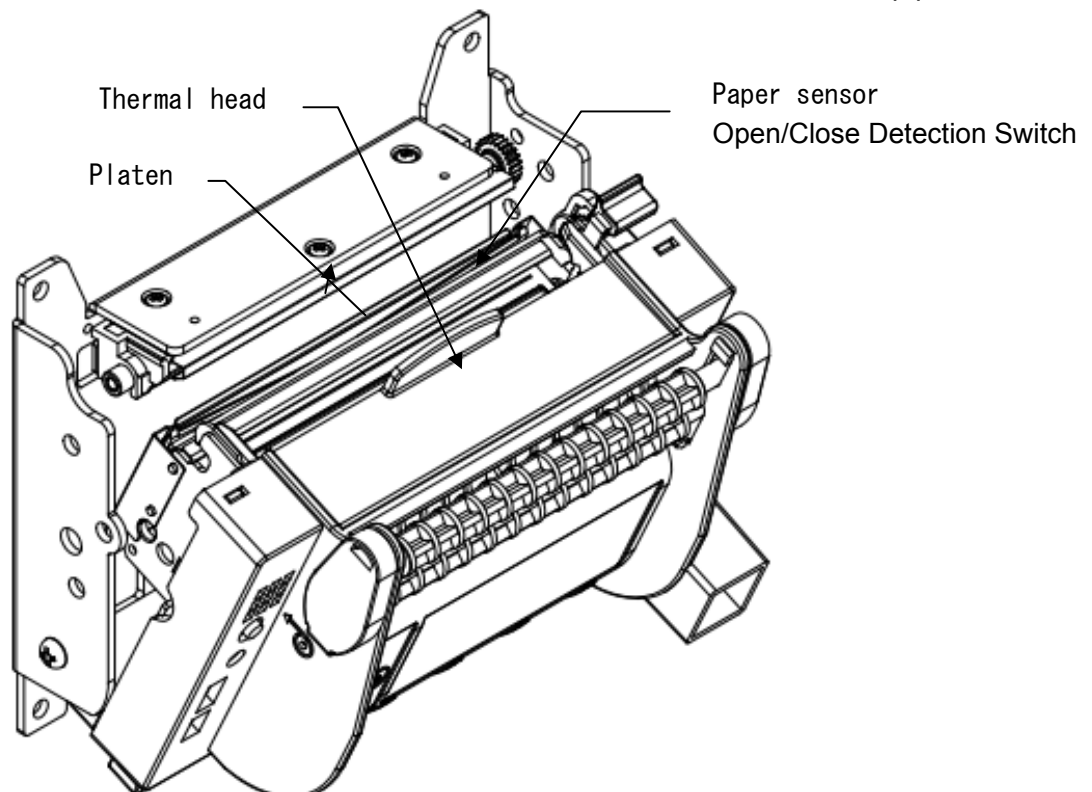
4.10 Frame Ground

Please connect frame ground (FG) of this product and frame ground (FG) of mounting side chassis in order to prevent malfunction, breakage of thermal head and control board due to static electricity.

Mounting Hole B
Mounting Hole C
Metal Base Plate A
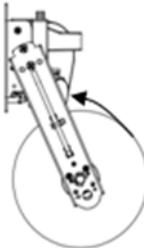Mounting Hole D
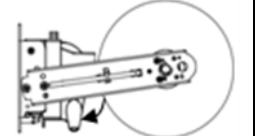Mounting Hole E

※This figure is
NP-F3094D(φ120_Arm)
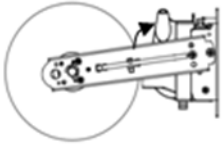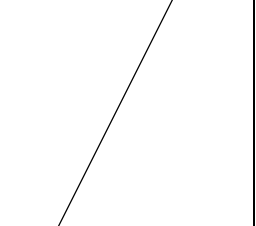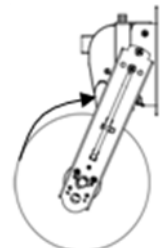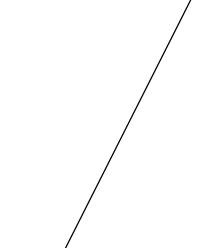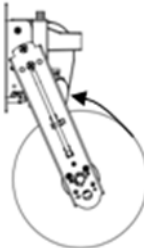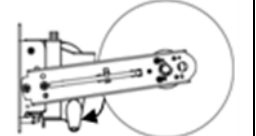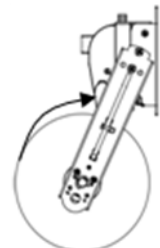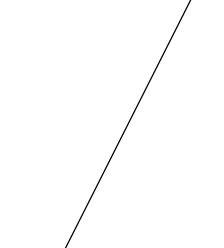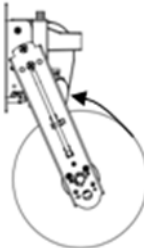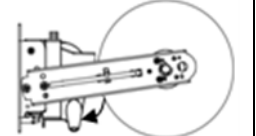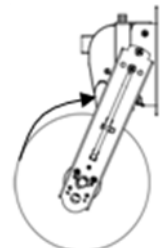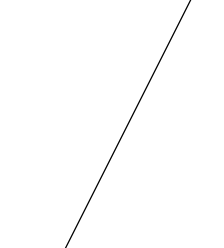
(1) In case the mounting part of mounting side chassis is frame ground (metal plate);
Frame ground will be connected by contact of frame ground of this product (Metal Base Plate A) and frame ground of mounting part of mounting side chassis.
＊Connection of frame ground will redouble strongly-fixed by using screws with toothed metal washer for "Mounting Hole B, C, D and E" when mounting this product.

(2) In case the mounting part of mounting side chassis is NOT frame ground;
Fix by screwing (recommend with toothed metal washer) frame ground of mounting side chassis and this product with using "Mounting Hole B, C, D and E" and connect frame ground with using electric wire of more than AWG#20 (recommended) at the shortest position.

5. Printer Installation

※The figure is NP-F3094D(φ120_Arm)

5.1 Receipt print surface and paper roll position selection

10 ways of installations in the below chart are selectable for this printer. Please refer to the chart below and select receipt print surface and paper roll position way that suits the most to build into the device.

	When setting paper roll to the rear (left), Attach paper holder unit to the "right surface"			When setting paper roll to the rear (right), Attach paper holder unit to the "left surface"		
	Paper Roll "Lower"	Paper Roll "Middle"	Paper Roll "Upper"	Paper Roll "Lower"	Paper Roll "Middle"	Paper Roll "Upper"
Face Down Print (recommend)	Ex-factory setting position					
Face Up Print						Ex-factory setting position

【Note】
・ We recommend to issue receipt with this printer showing a face down print. Operability of paper insertion and paper jam release etc., are better than face up print.
・ Please do not use at a tilt.
・ Note that there will be no problems with movement when using in a face up print with paper roll lower position,　paper may bend downwards.

5.2 Position Change of Paper Holder

※The figure is NP-F3094D(φ120_Arm)

1) When changing position at the same surface (ex-factory surface)
- Remove screw B (M4)
- Loosen slightly screw A (M4) of rotation center
- Rotate the paper holder centering screw A and fix with screw B at the desired position (B-1 ~ B-3)
- Tighten finally screw A

2) When switching to the other side of the surface
・Disconnect cable of PNE sensor.
・Detach paper holder by unscrewing screw A (M4) and screw B (M4)
・Attach paper holder by using screw A to the other side.(The screw is tightened provisionally)
・Rotate the paper holder centering screw A and fix with screw B at the desired position (B-1 ~ B-3)
・Tighten finally screw A
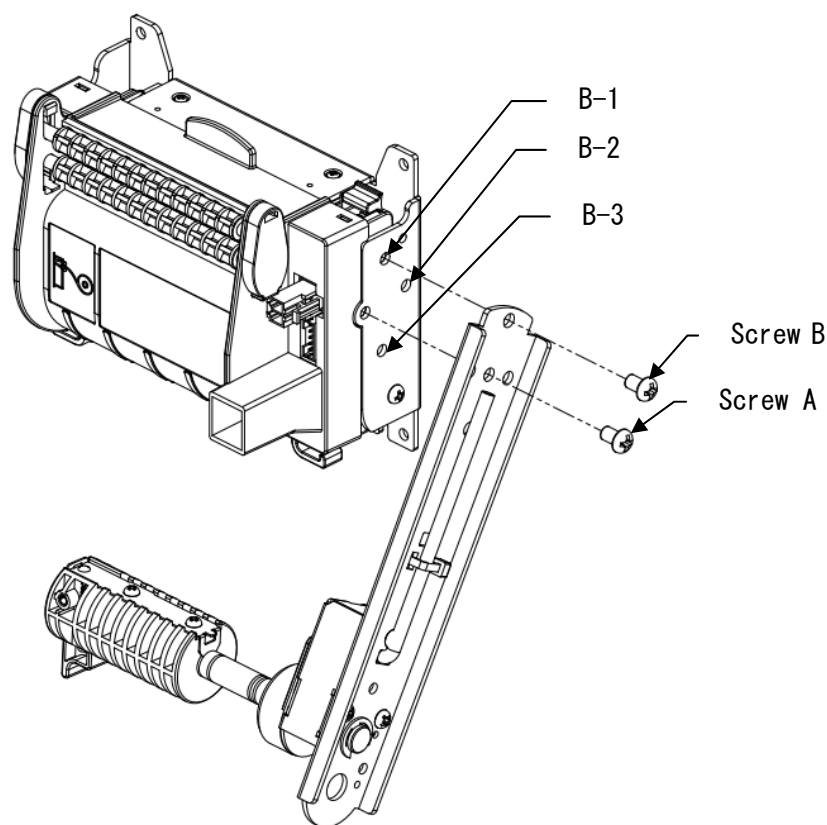
【Note】
　　　・Please handle cable of PNE sensor.
　　　・Screws (M4) are self-tapping type. When screwing to the new attachment hole, you may feel the rotating force of the screw driver heavy.
　　　・Although mounting positions of the paper holder are symmetric, there is no B-2 hole of left surface position. (2 holes in B-1, B-3)

　　　・Use a Phillips screwdriver (#2).

5.3 How to handle each cable

※The figure is NP-F3094D(φ120_Arm)

1) How to handle PNE cable

Depending on attaching position of the paper holder, PNE cable length may leave a leftover. There is "Cable Enclosure" equipped to the figure position below for storing extra wire length. Please use accordingly.
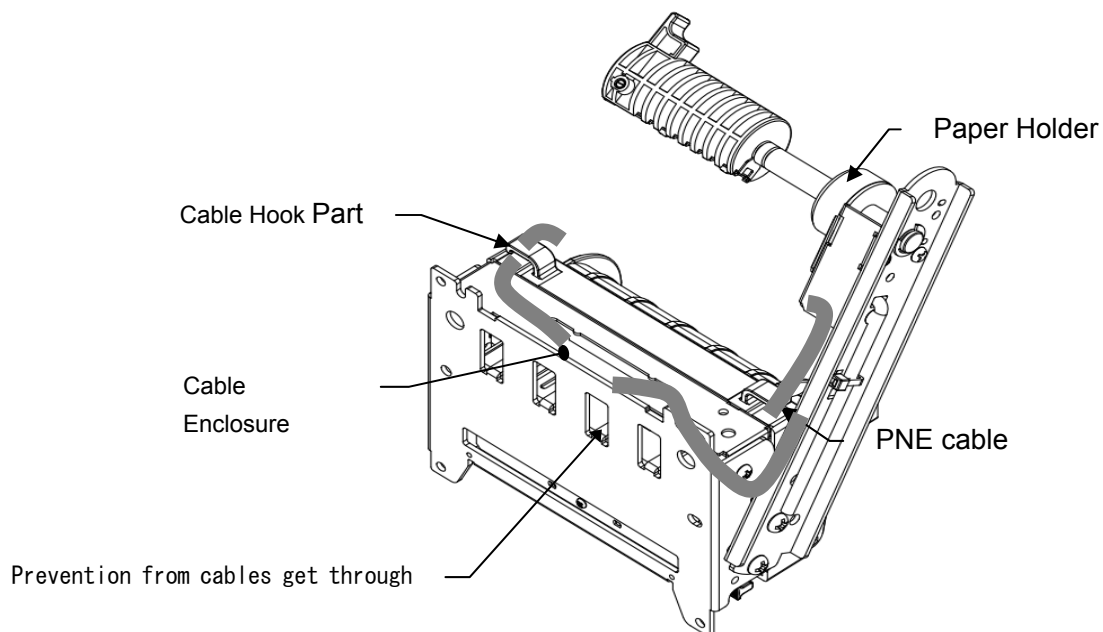
【Note】

・Enclosed cables must be used by [Prevention from cables get through] in [Cable housing],and do not push it in the gaps of chassis.

2) Handling interface cable and power cable

Depending on paper holder attaching direction, paper roll position, handling of the cable changes. Please handle accordingly not to trouble when operating such as paper roll replacement etc. There is "Cable Hook Part" equipped to the figure position below. Please use when necessary.