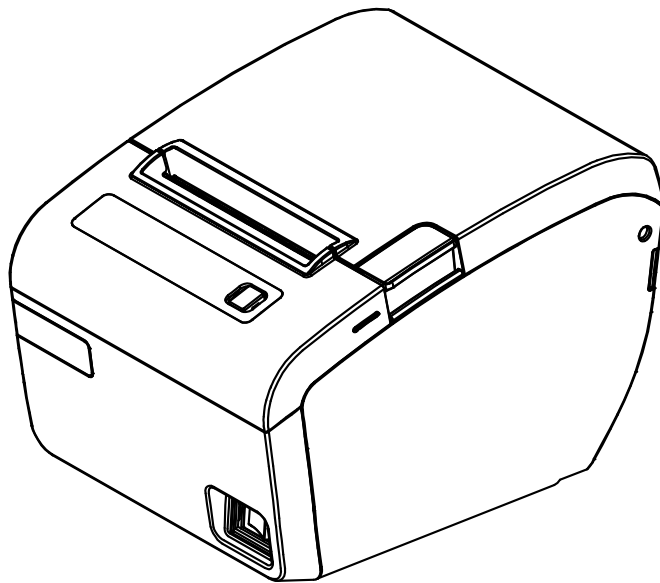# SERVICE MANUAL

POS PRINTER
SR 85

All specifications are subject to change without notice.

PREFACE

This service manual provides the technical information for many individual component systems, circuits and gives an analysis of the operations performed by the circuits. If you need more technical information, please contact Technical Support. Schematics and specifications provide the needed information for the accurate troubleshooting.

All information in this manual is subject to change without prior notice. Therefore, you mu st check the correspondence of your manual with your machine. No part of this manual may be copied or reproduced in any form.

SR85 Service Manual

Version: A00

Code: 88060042

Date: 28.02.2013

ALERT MESSAGE & SYMBOL

This manual uses the following conventions to show the alert messages. An alert message consists of an alert signal and alert statements. The alert signal consists of an alert symbol and a signal word or just a signal word. The following are the alert signals and their meanings:

⚠DANGER

This indicates a hazardous situation likely to result in _serious personal injury_ if the user does not perform the procedure correctly.

⚠WARNING

This indicates a hazardous situation could result in _personal injury_ if the user does not perform the procedure correctly.

⚠CAUTION

This indicates a hazardous situation could result in _minor or moderate personal injury_ if the user does not perform the procedure correctly. This alert signal also indicates that damages to the product or other property, _may_ occur if the user does not perform the procedure correctly.

IMPORTANT

This indicates information that could help the user use the product more efficiently.

CONTENTS

Chapter

1

Precaution Statement

1.1 Safety Precaution

1.2 Servicing Precaution

1.3 Precaution for Electrostatic Sensitive Device

1.4 Operational Precaution

Follow these safety, servicing and ESD precautions to prevent damage and to protect against potential hazards such as electrical shock

ASEM

1.1 Safety Precaution

1-1-1   Be sure that all built-in protective devices are replaced. Restore any missing protective shields.

1-1-2   When reinstalling the chassis and its assemblies, be sure to restore all protective devices, including nonmetallic control knobs and compartment covers.

1-1-3   Make sure there are no cabinet openings through which people - particularly children - might insert fingers and contact dangerous voltages. Such openings include excessively wide cabinet ventilation slots and improperly fitted covers and drawers.

1-1-4   Design Alteration Warning:

Never alter or add to the mechanical or electrical design of the Printer. Unauthorized alterations might create a safety hazard. Also, any design changes or additions will void the manufacturer's warranty.

1-1-5   Components, parts and wiring that appear to have overheated or that are otherwise damaged should be replaced with parts that meet the original specifications. Always determine the cause of damage or over heating, and correct any potential hazards.

1-1-6   Observe the original lead dress, especially near the following areas; sharp edges, and especially the AC and high voltage supplies. Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board. Check the AC power cord for damage. Make sure that leads and components do not touch thermally hot parts.

1-1-7   Product Safety Notice:

Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they give might be lost if the replacement component differs from the original - even if the replacement is rated for higher voltage, wattage, etc.

Components that are critical for safety are indicated in the circuit diagram by shading, (⚠) or (⚠). Use replacement components that have the same ratings, especially for flame resistance and dielectric strength specifications. A replacement part that does not have the same safety characteristics as the original might create shock, fire or other hazards.

⚠ **WARNING**

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose used batteries according to the manufacturer's instructions.

ASEM

1.2 Servicing Precaution

1-2-1   Servicing precautions are printed on the cabinet. Follow them

1-2-2   Always unplug the units AC power cord from the AC power source before attempting to:

   (a) Remove or reinstall any component or assembly.

   (b) Disconnect an electrical plug or connector.

   (c) Connect a test component in parallel with an electrolytic capacitor.

1-2-3   Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.

1-2-4   After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the portion around the serviced part has not been damaged.

1-2-5   Check the insulation between the blades of the AC plug and accessible conductive part.

   (Example: metal panels and input terminals).

1-2-6   Insulation Checking Procedure:

   Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500V) to the blades of AC plug.

   The insulation resistances between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 Mega-ohm.

1-2-7   Never defeat any of the B+ voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.

1-2-8   Always connect an instrument's ground lead to the instrument chassis ground before connecting the positive lead; always remove the instrument's ground lead last.

⚠ WARNING

An electrolytic capacitor installed with the wrong polarity might explode.

⚠ CAUTION

First read the Safety Precautions section of this manual. If some unforeseen circumstance creates a conflict between the servicing and safety precautions, always follow the safety precautions.

1.3 Precaution for Electrostatic Sensitive Device

1-3-1   Some semiconductor (solid state) devices are easily damaged by static electricity. Such components are called Electrostatic Sensitive Devices (ESDs); examples include integrated circuits and some field-effect transistors. The following techniques will reduce the occurrence of component damage caused by static electricity.

1-3-2   Immediately before handling an y semiconductor components or assemblies, drain the electrost atic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. (Be sure to remove it prior to applying power - this is an electric shock precaution)

1-3-3   After removing an ESD-equipped assembly, place it on a conducti ve surface su ch as alum inum foil to prevent accumulation of electrostatic charge.

1-3-4   Do not use Freon-propelled chemicals. These can generate electrical charges that damage ESDs.

1-3-5   Use only a grounded-tip soldering iron when soldering or unsoldering ESDs.

1-3-6   Use only an anti-static solder removal device. Man y solder re moval devices are not rated as anti-static; these can accumulate sufficient electrical charge to damage ESDs.

1-3-7   Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.

1-3-8   Immediately before removing the protective m aterial from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

1-3-9   Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushin g clothes together or lifting a foot from a carpeted floor can generate enough static electricity to damage an ESD.

1.4 Operational Precaution

1-4-1   The hitting element of the printer mechanism's thermal head and the driver IC are easily damage. Never allow these components to come into contact with metal or other hard objects.

1-4-2   Never touch the printer mechanism's heating element with your hand. Doing so can dam age the heating element and affect proper operation.

1-4-3   The head and motor areas are very hot during and immediately after printing. Do not touch components in these areas directly with your hand.

1-4-4   Do not use an y paper other than these specified in this manual, otherwise print head reliability and print quality are affected adversely.

1-4-5   Thermal paper starts to color at around 70℃. Take care to protect unused and printed thermal paper against the affects of heat, light and humidity, which can cause the paper to color and characters on the paper to feed.

1-4-6   Take the roll paper out of the printer when you will not use the printer for a long time in a high temperature and humidity environment.

Chapter

2

Product Specification

ASEM

2.1 General Specification

Item	Description	Remark
Processor	• RENESAS R5F5631ECDFB • Cache Memory Size : 8K Byte	
Memory	• SDRAM : 64Mbits • CPU ON CHIP FLASH ROM : 16Mbits • SERIAL FLASH MEMORY : 64Mbits	
Display	• SR85 : LED	
Interface Serial (RS-232C)	• Flow Control : 　① DTR / DSR (H/W Flow Control) 　② XON / XOFF (S/W Flow Control) • Baud Rate : 2400 / 4800 / 9600 / 14400 / 19200 / 　　　　　　38400 / 57600 / 115200 bps • Receive Buffer : 4 Kbytes • Connector : DB25P Female/ DB9P Female/RJ45 　　　　　　　(I/F PBA Side)	The Flow Control, Baud Rate, Stop Bit and Parity Are determined by DIP S/W position.
Interface Parallel	• Mode 　① Forward Mode : Compatibility Mode 　②Reverse Mode : Nibble / Byte Mode • Connector : 36 Pin Centronics (Ribbon Type)	
USB	• Transfer Type : BULK • Speed : 12 Mbps (Full-Speed) • Power : Self-Powered	
Ethernet	• Network Interface : Static and Dynamic IP Address • Speed : 10/100 Mbps	
Wireless LAN	• RF Protocol : IEEE802.11b/g/n compatible • WIFI MODE : Infrastructure, Limited AP • Security Protocol : WPA, WPA2-PSK, WEP, Enterprise • Networking Protocol : TCP/IP (IPv4), DHCP, HTTP/HTTPS Client 　　　　　　　　and Server	
Auto Cutter	• Type : Guillotine • Cutting Method : 1 Point Partial Cutting / Full cutting	
Power Consumption	• Approx. 27W (Peak)	

2.1 General Specification

Item	Description		Remark
AC Adapter	• Input	: AC 90V ~ 264V, 50Hz ~ 60Hz	
	• Output	: DC 24V, 2.5A	
Environmental Temperature	• Operation	: 5℃ ~ 45℃	
	• Storage	: -10 ~ 50℃	
Humidity	• Operation	: 10% ~ 90% RH	
	• Storage	: 10% ~ 90% RH (Except for Paper)	
Option	• Wall Mount Kit • Paper Separator (58mm) • Splash Cover		
Weight	• 2.0 Kg (Only Set) / 3.3 Kg (With Packing)		
Dimensions(mm)	• 144(W) × 195(D) × 137(H)		

2.2 Appearance

2.2.1 Printer Dimension (mm) : 144(W) X 195(D) X 137(H)
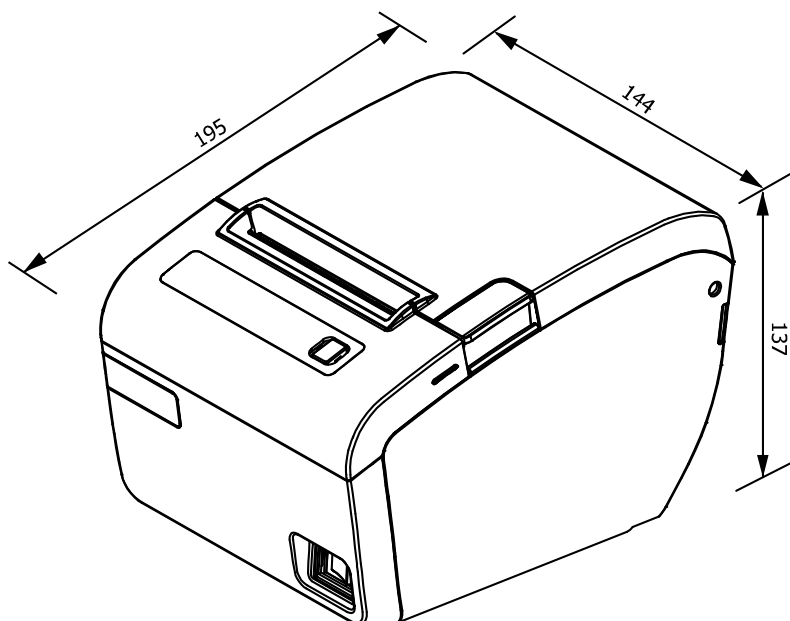
2.2.2 AC Adapter Dimension (mm) : 56(D) X 120(D) X 31(H)
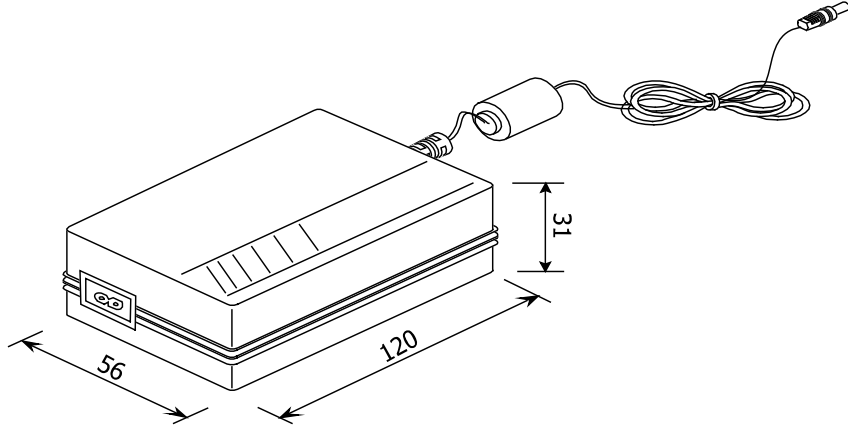
2.2.3 Feature Location
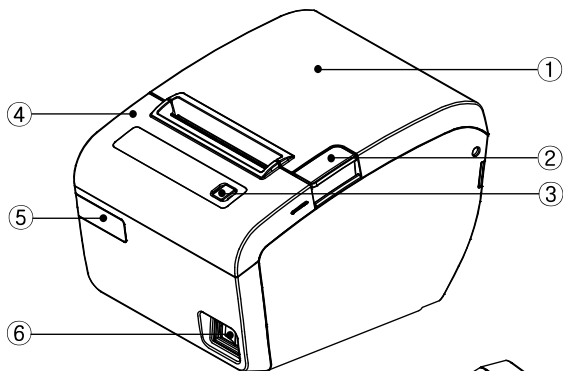
① Cover Open	⑥ Power switch
② Open Button	⑦ Power Jack
③ Feed Button	⑧ Drawer Connector
④ Cover Led	⑨ USB port
⑤ Cover brand	⑩ Interface Port-
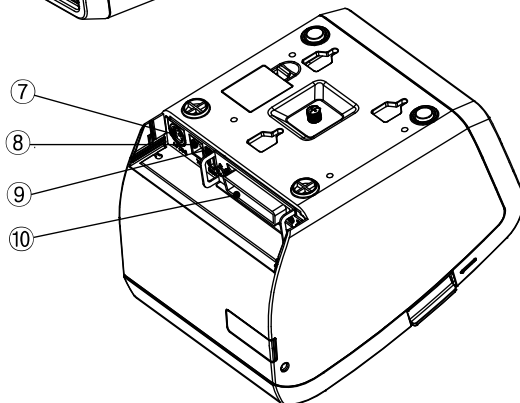
2.3 Thermal Printer Specification

2.3.1 Printer Specification

Item	Description	Remark
Model	• SR85	
Print Method	• Thermal Line Printing	
Dot Density	• 0.141 mm (7.09 Dots/mm)	
Printing Direction	• Unidirectional with friction feed	
Paper Width	• Max. 80.0mm / 58.0mm	
Printing Width	• Mono Paper 80mm : 72.192mm (512 Dots Position) • Mono Paper 58mm : 50.76mm (360 Dots Position)	
Character / Line	• Font A (12×24) : 42(80mm) / 30(58mm) • Font B (9×17) : 56(80mm) / 40(58mm)	
Character Spacing	• 0.28mm (0.01") (2 dots) (Font A) • 0.28mm (0.01") (2 dots) (Font B)	
Printing Speed	• Mono Paper 80mm : Max. 220 mm/sec (52 ines/Sec) • Mono Paper 58mm : Max. 150 mm/sec (35.5 ines/Sec) • Two Color Paper : Max. 100 mm/sec (23.6 ines/Sec)	
Paper feeding Speed	• Approx. 220 mm/Sec (Mono Paper 80mm)	

2.3.2 Character Specification

Item	Description	Remark
Number of Character	• Alphanumeric Characters : 95	
	• Extended Characters : 128 × 11 Page (Including one space page)	
	• International Characters : 37	
Character Structure	• 12 × 24 (Font A) (Including 2-dot spacing in horizontal) • 9 × 17 (Font B) (Including 2-dot spacing in horizontal) Font A is selected as the default	

2.3.3 Paper Specification

Item	Description	Remark
Paper Form	• Paper Roll	
Paper Width	• Max 58.0 / 80.0 mm	
Paper Roll Size	• Max Φ83 mm	
Spool Inside Dia.	• 12 mm (0.47")	
Spool Outside Dia.	• 18 mm (0.71")	

2.3.4 Reliability and Environment Specification

Item	Description	Remark
Life	• Head : 1×10^8 Pulses / 150Km • Auto Cutter : 1,500,000 Cut	
MCBF	• 70,000,000 Line	
Environmental Temperature	• Operating : 5℃ ~ 45℃ • Storage : -10℃ ~ +50℃	
Humidity	• Operating : 10% ~ 90% RH • Storage : 10% ~ 90% RH (Except for Paper)	

2.3.5 Printable Area

[80mm Paper Width Model]

The Printable area of a paper with width of 79.5 mm is 72.192 mm (512 Dots) and the space on the right and left sides are approximately 3.6 mm.
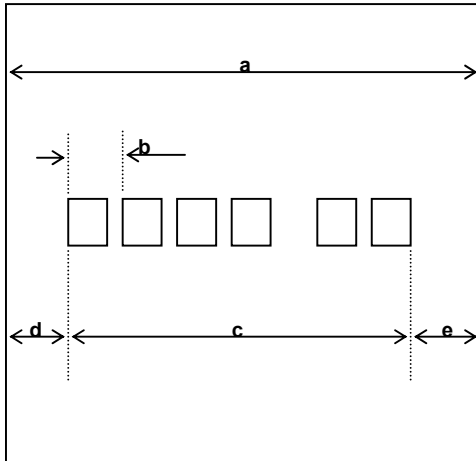
a = 79.5 mm ±0.5 mm (Paper Width)

b = 0.141mm (1 Dot)

c = 72.192mm (512 Dots/Printable Area)

d = 3.6mm (Left Space)

e = 3.6mm (Right Space)

[All the numeric values are typical]

[58mm Paper Width Model]

The Printable area of a paper with width of 57.5 mm is 50.76 mm (360 Dots) and the space on the right and left sides are approximately 3.14 and 3.6 mm.
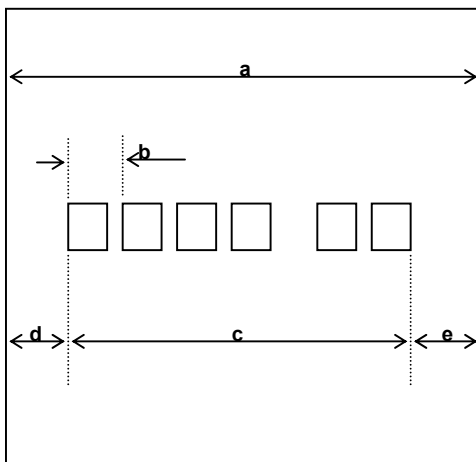
a = 57.5 mm ±0.5 mm (Paper Width)

b = 0.141mm (1 Dot)

c = 50.76mm (360 Dots/Printable Area)

d = 3.6mm (Left Space)

e = 3.14mm (Right Space)

[All the numeric values are typical]

2.3.6 TPH(Thermal Printer Head) Specification

Item	Description	Remark
Heat Element Structure	• 2 Heaters / Dot	
Number of Heat Element	• 512 Dots	
Heat Element Pitch	• 0.141 mm/dot, 7.09 Dot/mm (180DPI)	
Print Width	• 72.192 mm	
Average Resistance	• 650Ω ± 3%	
Thermister	• Resistance R25　　: 30 ㏀ ± 5% (At 25℃) • B Value　　　　　: 3950 K± 2% • Temperature　　　: -20℃ ~ +80℃	

2.3.7 TPH(Thermal Printer Head) Maximum Condition : At 25℃

Item	Maximum Conditions	Unit	Conditions
Print Cycle(S.L.T.)	0.64	ms/Line	Tsub = 25℃
Supply Energy	0.233	mJ/Dot	
Supply Voltage	26.4	V	Vp < 28.0V (Vp : Peak of VH)
Substrate Temperature	65	℃	Thermister Temperature
Number of Dots to be Energized simultaneously	512	Dots	
Logic Supply Voltage (Vdd)	7	V	Include Peak Voltage of Vdd
Logic Input Voltage (Vin)	-0.5 ~ Vdd+0.5	V	

2.3.8 Other Component Specification

Item	Description	Remark
Auto Cutter	• Type　　　　　: Guillotine Type • Motor　　　　: Stepping Motor SP-20RF-410 • Voltage　　　: 24V DC ± 7 % • Current　　　: 350mA (Peak)	PM Type Bi-Polar Driver
Paper Feed Motor	• Model　　　　: PM42L-048-YKE5 [ELLIX40] • Type　　　　　: 2-2Phase • Voltage　　　: 24V ± 10% DC • Resistance　: 20Ω at 25℃ per Phase	PM Type Bi-Polar Driver
Paper End Sensor	• Micro SW TYPE	

Paper Roll Near End Sensor	• Micro SW TYPE	

2.4 SMPS Specification

2.4.1 SMPS(Switching Mode Power Supply) Specification

Item	Description	Remark
Input Voltage	• Typical : 120V / 230V AC • Min : 90V AC • Max : 264V AC	
Input Current	• Max : 1.5 A(When 120V), 0.75A(When 230V)	
In rush Current	• Max : 40 A (Peak to Peak)	
Line Regulation	• +24V ± 1 %	
Load Regulation	• +24V ± 5 %	
Ripple Noise	• Peak 300mV	
O.C.P (Over Current Protect)	• 3.0 A ~ 6.0 A	
S.C.P (Short Current Protect)	• Fold-Back Method	

2.4.2 SMPS Output Connector

Pin Number	Signal Name
1	DC +24V
2	GND
3	N.C
Shield	Frame GND

2.5 Interface Specification

2.5.1 RS-232C Serial Interface

2.5.1.1 RS-232C Specification

Item	Description	Remark
Data Transmission	• Serial	
Synchronization	• Asynchronous	
Hand Shaking (Flow Control)	• H/W : DTR / DSR • S/W : XON / XOFF	XON : ASC Code 11h XOFF : ASC Code 13h
Signal Level	• Logic"1" (MARK) : -3V ~ -15V • Logic"0" (SPACE) : +3V ~ +15V	
Baud Rate	• 2400 / 4800 / 9600 / 14400 / 19200 / 38400 / 57600 / 115200 bps	Default 115200 bps
Data Word Length	• 7 Bit / 8 Bit	
Parity	• None / Even / Odd	
Connector	• DB25P Female / DB9P Female / RJ45 Modular Jack (I/F PBA)	

IMPORTANT

The Hand Shaking(Flow Control) / Baud Rate / Data Word Length / Parity functions depend on the DIP switch settings. Refer to "Chap. 3.2."

2.5.1.2 RS-232C(DSUB25) Signal Description

PIN NO DSUB25(Female)	Signal Name	Direction	Function
3	RXD	IN	Receive Data
2	TXD	OUT	Transmit Data
20	DTR	OUT	Data Set Ready
7	GND	-	-
6	DSR	IN	Data Terminal Ready
4	RTS	OUT	Request To Send
5	CTS	IN	Clear To Send
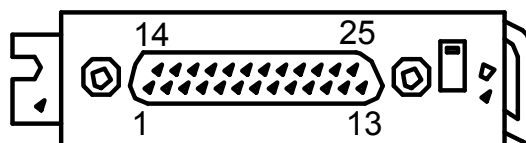
(EXPLODED VIEW)

2.5.1.3 RS-232C(DSUB25) Interface Cable

HOST SIDE **(DSUB9 FEMALE)**	**15m** (F.GND) ← (F.GND) 1(DCD) ← 8(DCD) 2(RXD) ← 3(RXD) 3(TXD) → 2(TXD) 4(DTR) → 20(DTR) 5(S.GND) ← 7(S.GND) 6(DSR) ← 6(DSR) 7(RTS) → 4(RTS) 8(CTS) ← 5(CTS) 9(RI) ← 22(RI) **(INTERFACE CABLE PIN CONNECTION)**	**PRINTER SIDE** **(DSUB25 MALE)**
HOST SIDE **(RJ4 5)**	**15m** 4(RXD) ← 3(RXD) 3(TXD) → 2(TXD) 2(DSR) ← 20(DTR) 7(S.GND) ← 7(S.GND) 8(DTR) → 6(DSR) 5(RTS) → 4(RTS) 6(CTS) ← 5(CTS) **(INTERFACE CABLE PIN CONNECTION)**	**PRINTER SIDE** **(DSUB25 MALE)**
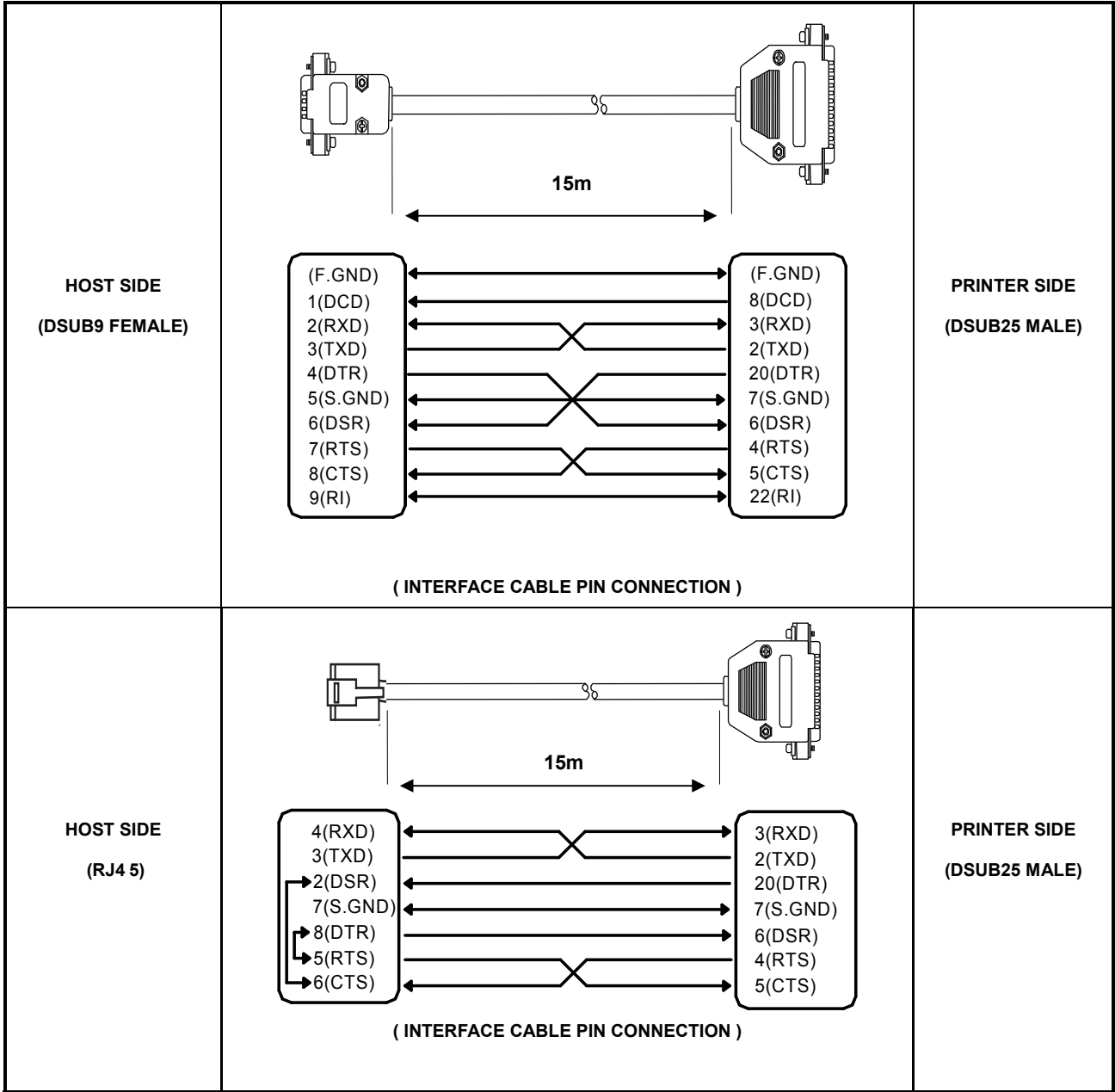
2.5.1.4 RS-232C(DSUB9&RJ45 COMBO) Signal Description

PIN NO		Signal Name	Direction	Function
DSUB9(Female)	RJ45			
2	3	RXD	IN	Receive Data
3	4	TXD	OUT	Transmit Data
4	2	DTR	OUT	Data Set Ready
5	7	GND	-	-
6	5	DSR	IN	Data Terminal Ready
7	6	RTS	OUT	Request To Send
8	8	CTS	IN	Clear To Send
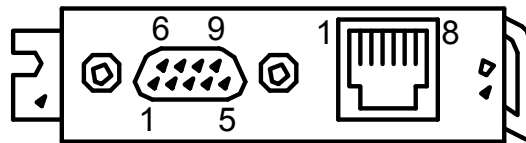
(EXPLODED VIEW)

2.5.1.5 RS-232C(DSUB9&RJ45 COMBO) Interface Cable

15m

HOST SIDE

(DSUB9 FEMALE)

| (F.GND) |
| 1(DCD) |
| 2(RXD) |
| 3(TXD) |
| 4(DTR) |
| 5(S.GND) |
| 6(DSR) |
| 7(RTS) |
| 8(CTS) |
| 9(RI) |

| (F.GND) |
| 1(DCD) |
| 2(RXD) |
| 3(TXD) |
| 4(DTR) |
| 5(S.GND) |
| 6(DSR) |
| 7(RTS) |
| 8(CTS) |
| 9(RI) |

PRINTER SIDE

(DSUB9 MALE)

(INTERFACE CABLE PIN CONNECTION)

2.5.1.5 RS-232C(DSUB9&RJ45 COMBO) Interface Cable
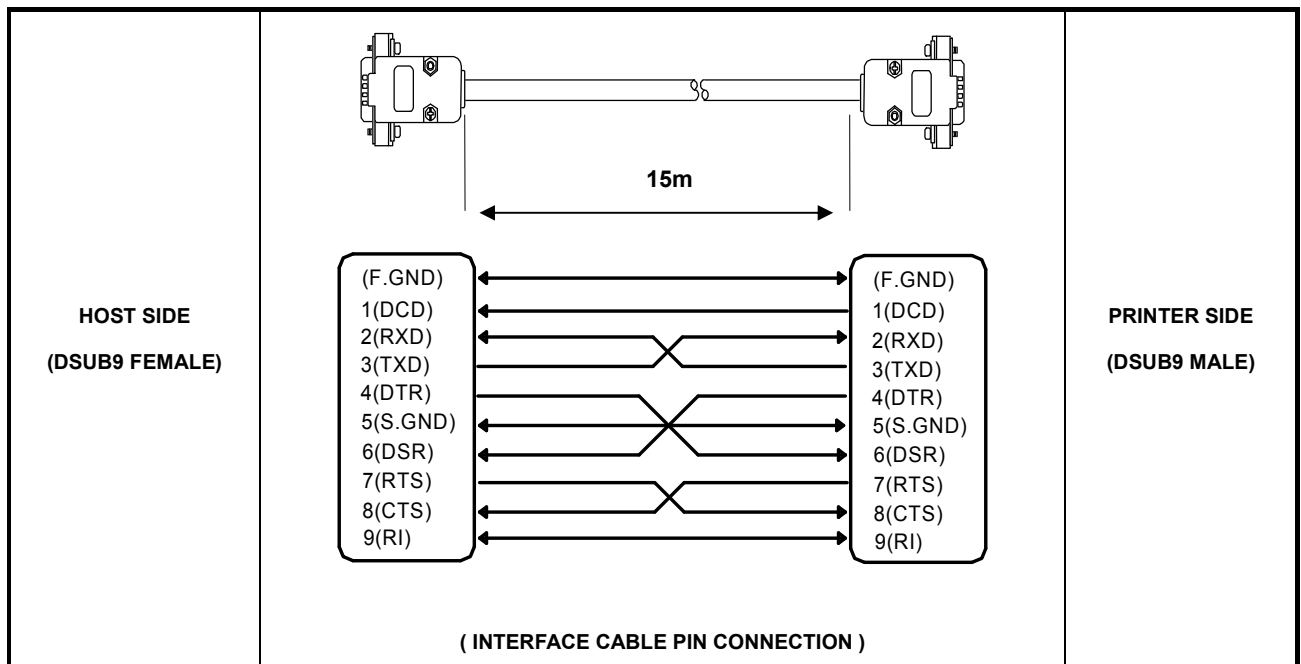
HOST SIDE (RJ4 5)	**15m** 4(RXD) ⟷ 2(RXD) 3(TXD) ⟷ 3(TXD) 2(DSR) ⟵ 4(DTR) 7(S.GND) ⟷ 5(S.GND) 8(DTR) ⟶ 6(DSR) 5(RTS) ⟶ 7(RTS) 6(CTS) ⟷ 8(CTS) **(INTERFACE CABLE PIN CONNECTION)**	PRINTER SIDE (DSUB9 MALE)
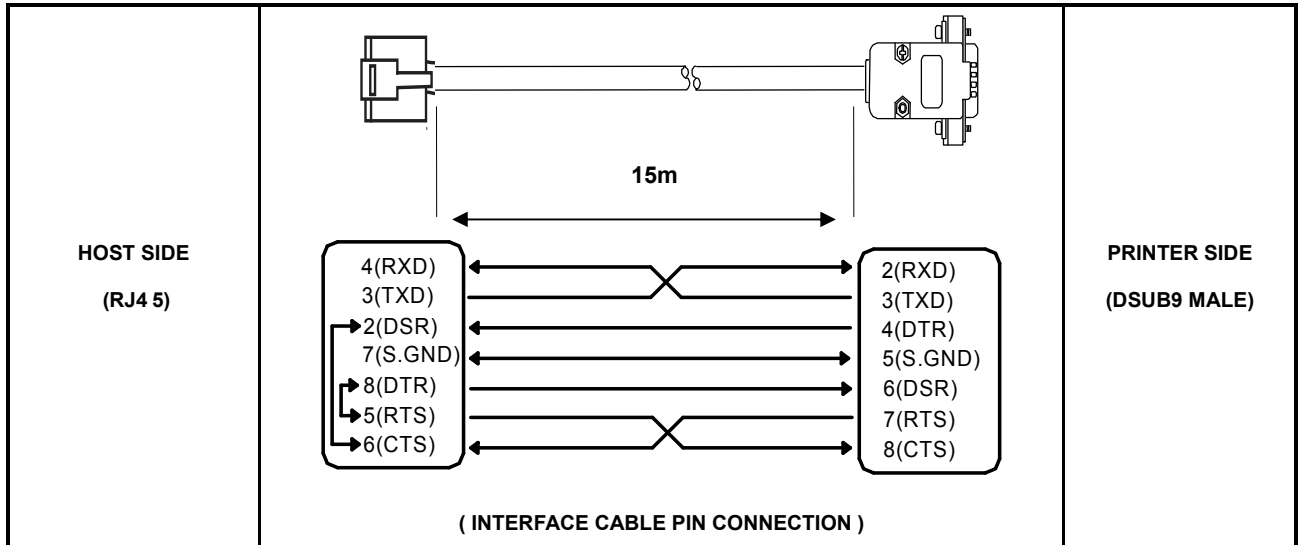
2.5.2 IEEE-1284 Parallel Interface

2.5.2.1 Parallel Interface Cable Pin Connection

(INTERFACE CABLE PIN CONNECTION)
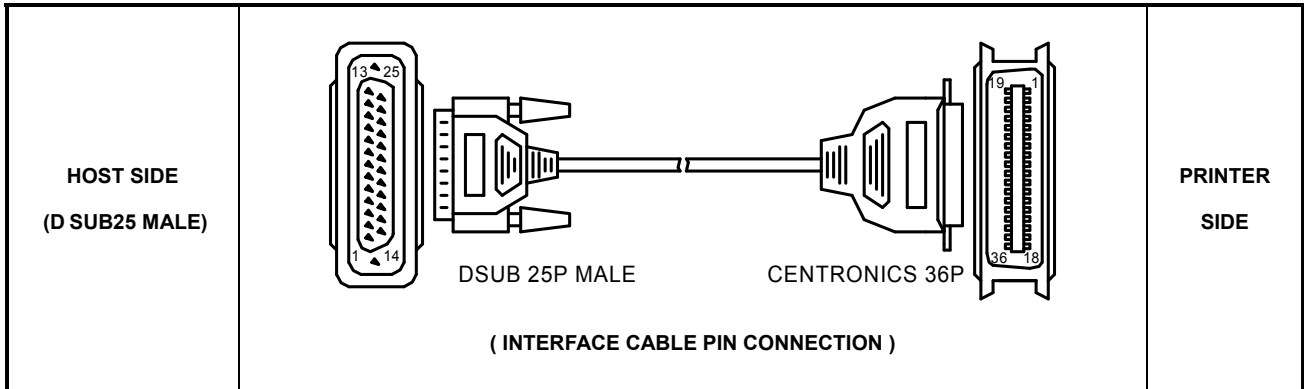
2.5.2.2 Parallel Signal Description

[IEEE-1284 DSUB 25P]

Pin No	Conn Pin Out	Pin No	Conn Pin Out	Pin No	Conn Pin Out
1	STROBE	10	ACK	19	GND
2	DATA1	11	BUSY	20	GND
3	DATA2	12	PAPER ERROR	21	GND
4	DATA3	13	AUTO FEED	22	GND
5	DATA4	14	FAULT	23	GND
6	DATA5	15	INIT	24	GND
7	DATA6	16	SERECTIN	25	GND
8	DATA7	17	GND	-	-
9	DATA8	18	GND	-	-

HOST SIDE

PRINTER SIDE

(EXPLODED VIEW)

(PARALLEL I/F PCB BOTTOM SIDE VIEW)
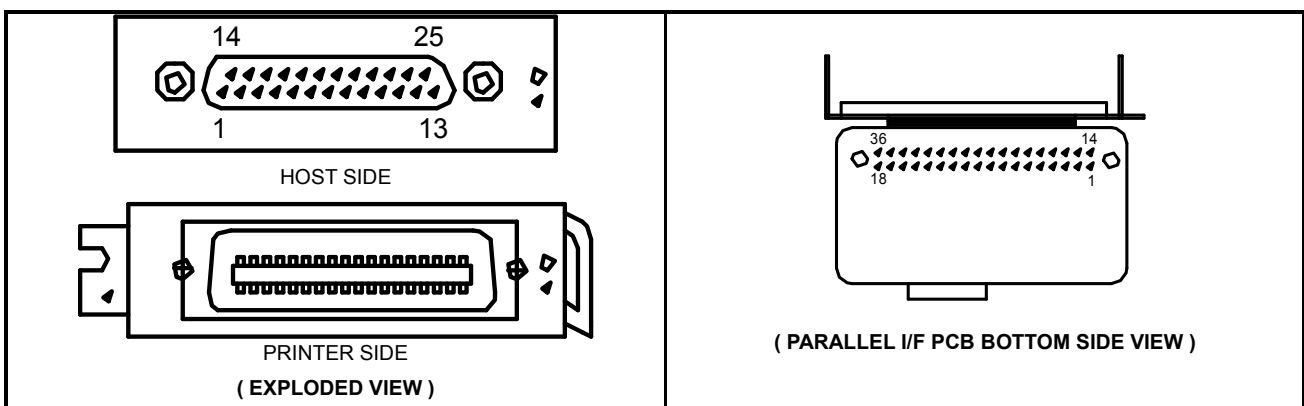
[IEEE-1284 CENTRONICS 36P]

Pin No.	Source	Compatibility Mode	Nibble Mode	Byte Mode
1	Host	nStrobe	HostClk	HostClk
2	Host / Printer	Data 0 (LSB)	-	Data 0 (LSB)
3	Host / Printer	Data 1	-	Data 1
4	Host / Printer	Data 2	-	Data 2
5	Host / Printer	Data 3	-	Data 3
6	Host / Printer	Data 4	-	Data 4
7	Host / Printer	Data 5	-	Data 5
8	Host / Printer	Data 6	-	Data 6
9	Host / Printer	Data 7 (MSB)	-	Data 7 (MSB)
10	Printer	nAck	PtrClk	PtrClk
11	Printer	Busy	PtrBusy / Data3,7	PtrBusy
12	Printer	Perror	AckDataR / Data2,6	AckDataReq
13	Printer	Select	Xflag / Data1,5	Xflag
14	Host	nAutoFd	HostBusy	HostBusy
15	-	NC	NC	NC
16	-	GND	GND	GND
17	-	FG	FG	FG
18	Printer	Logic-H	Logic-H	Logic-H
19-30	-	GND	GND	GND
31	Host	nInit	nInit	nInit
32	Printer	nFault	nDataAvail / Data0,4	nDataAvail
33	-	GND	ND	ND
34	Printer	DK_Status	ND	ND
35	Printer	+5V	ND	ND
36	Host	nSelectIn	1284-Active	1284-Active

2.5.3 USB Interface

2.5.3.1 USB Specification

Item	Description	Remark
Transfer Type	● BULK	
Data Signal	● Bi-Direction, Half-Duplex ● Differential Signal Pair (D+ / D-)	
Data Format	● NRZI Format ● Zero Bit Stuffing after 6 Ones	
Transceiver	● Differential Common Mode Range : 0.8 ~ 2.5[V] ● Differential Receive Sensitivity : 200[mV] ● Single End Receive Threshold : 0.8 ~ 2.5[V]	
Speed	● 12 Mbps	
Power	● Supply Self Power	
Cable & Connector	● Cable : 5m / 2m ● Connector : A type	
Support Spec	● USB Spec Version 2.0	

2.5.3.2 USB Signal Description

Pin No	Signal Name	Color	Function
SHELL	Shield	Drain Wire	Frame GND
1	VBUS	Red	-
2	D-	White	Differential Data Line
3	D+	Green	Differential Data Line
4	GND	Black	Signal GND

2.5.3.3 USB Interface Cable

HOST SIDE	USB A TYPE USB A TYPE (USB I/F CABLE)	PRINTER SIDE
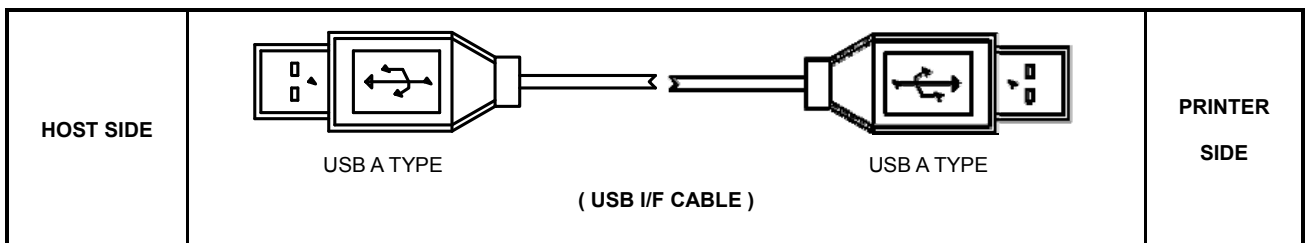
2.5.4 Ethernet Interface

2.5.4.1 Ethernet Signal Specification

Pin No	Signal Name	Signal Direction	Function
1	ENET TX+	OUT	Ethernet Transmit Data Line(+)
2	ENET TX-	OUT	Ethernet Transmit Data Line(-)
3	ENET RX+	IN	Ethernet Receive Data Line(+)
4	N.C	-	-
5	N.C	-	-
6	ENET RX-	IN	Ethernet Receive Data Line(+)
7	N.C	-	-
8	N.C	-	-

ETHERNET

(**EXPLODED VIEW**)

2.5.4.2 Ethernet Interface Cable

1
8

MAX 100M

1(ENET TX+)
2(ENET TX-)
3(ENET RX+)
4(N.C)
5(N.C)
6(ENET RX-)
7(N.C)
8(N.C)

1(ENET TX+)
2(ENET TX-)
3(ENET RX+)
4(N.C)
5(N.C)
6(ENET RX-)
7(N.C)
8(N.C)

HOST SIDE

(**PRINTER to HOST IRC I/F CABLE**)

1(ENET TX+)
2(ENET TX-)
3(ENET RX+)
4(N.C)
5(N.C)
6(ENET RX-)
7(N.C)
8(N.C)

1(ENET TX+)
2(ENET TX-)
3(ENET RX+)
4(N.C)
5(N.C)
6(ENET RX-)
7(N.C)
8(N.C)

P RINTER

SIDE

(**PRINTER to HUB IRC I/F CABLE**)
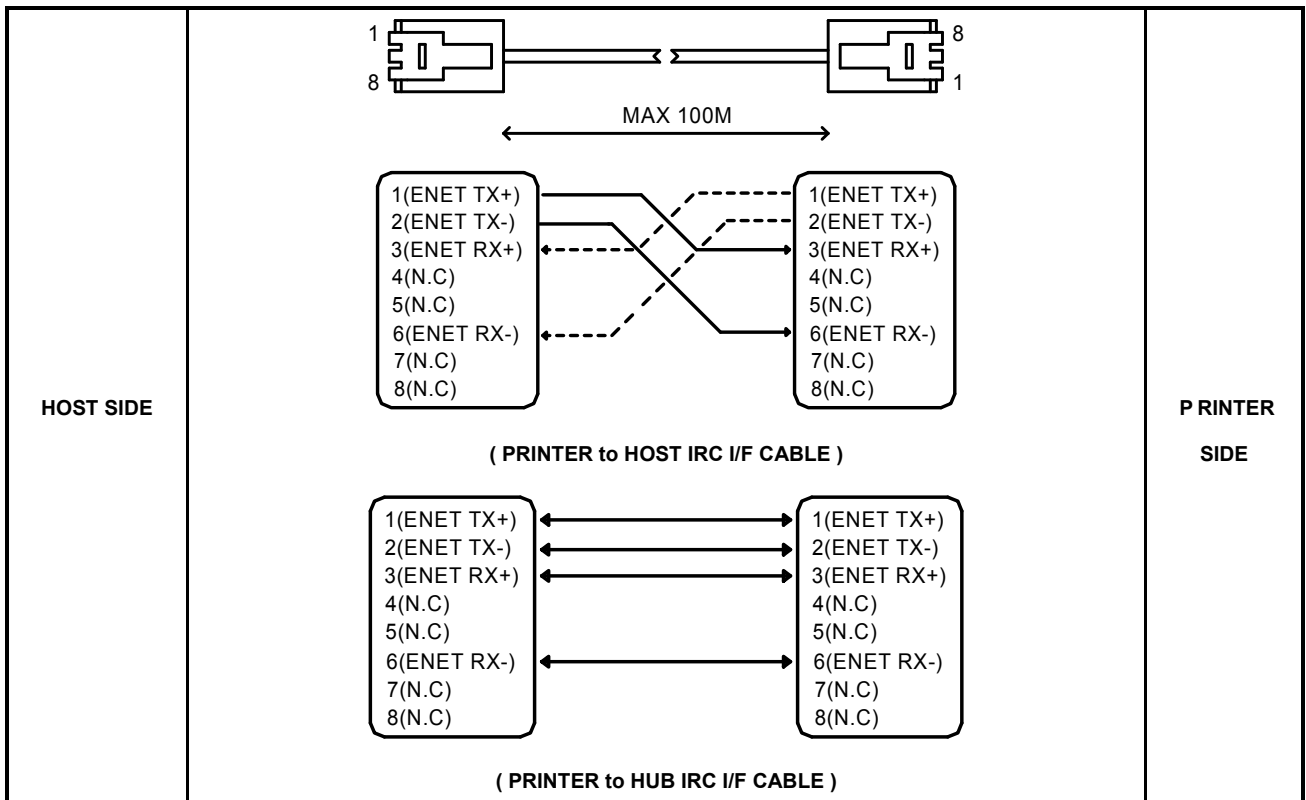
2.5.5 Wireless LAN Interface

2.5.5.1 Wireless LAN Specification

Item	Description	Remark
RF Protocol	● IEEE802.11b/g/n compatible	
WIFI MODE	● Infrastructure, Limited AP	
Security Protocol	● WPA, WPA2-PSK, WEP, Enterprise	
Networking Protocol	● TCP/IP (IPv4), DHCP, HTTP/HTTPS Client and Server	

RESET LINK WLAN

(EXPLODED VIEW)

2.5.5.2 Wireless LAN Interface Block Diagram

PRINTER SIDE

Wireless LAN I/F CARD

POS or HOST Device

LAN or USB

AP or Wireless LAN CARD

WIFI

WIFI MODULE (WIZFI220)

UART

UART TO PARALLEL CONVERTER (SC16C850)

PARALLEL

I/F CONN

HOST SIDE
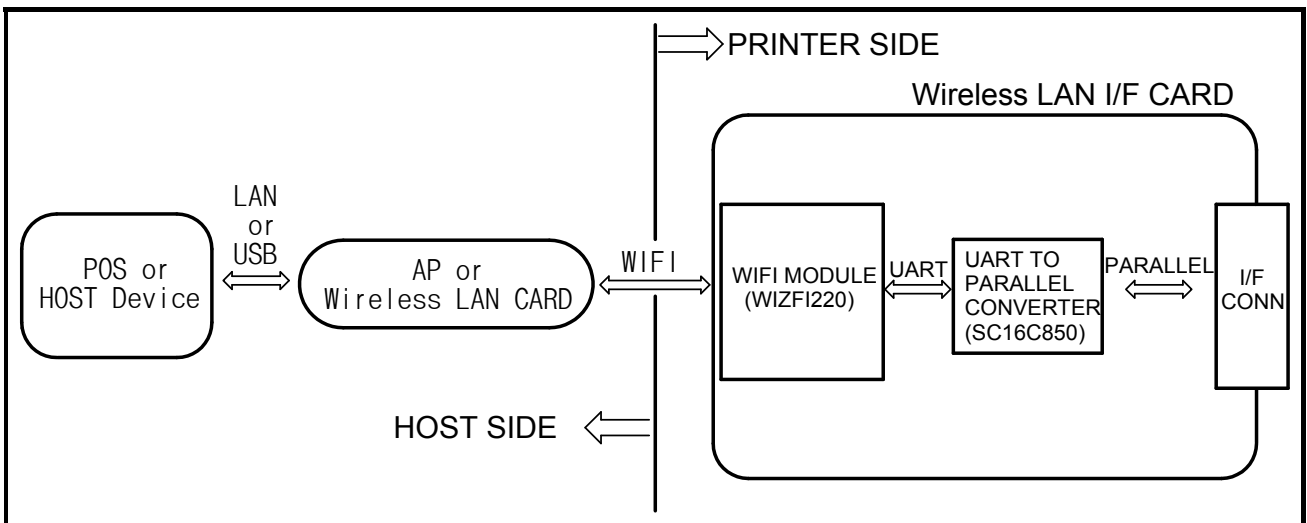
2.6 Drawer Kick-Out Specification

2.6.1 Drawer Signal Description

Pin No	Signal Name	Direction	Function
1	S.G	-	Signal GND
2	DRAWER#1	OUT	Drawer Kick-Out Driver Signal #1
3	DRACOMP	IN	Drawer Open / Close Signal
4	+24V	-	Supply DC +24[V]
5	DRAWER#2	OUT	Drawer Kick-Out Driver Signal #2
6	F.G	-	Frame GND

⚠CAUTION

Make sure that a "+24V Cash Drawer" is used.

Make sure that the Cash Drawer Solenoid Resistance is more than 20[Ohm]

+24V is always output through "PIN4" during power on.

2.6.2 Drawer Interface Cable

PRINTER SIDE

1
6
RJ11 6P

(DRAWER I/F CABLE)

DRAWER

COMPULSORY

6   1

(DRAWER CONNECTOR)

HOST SIDE
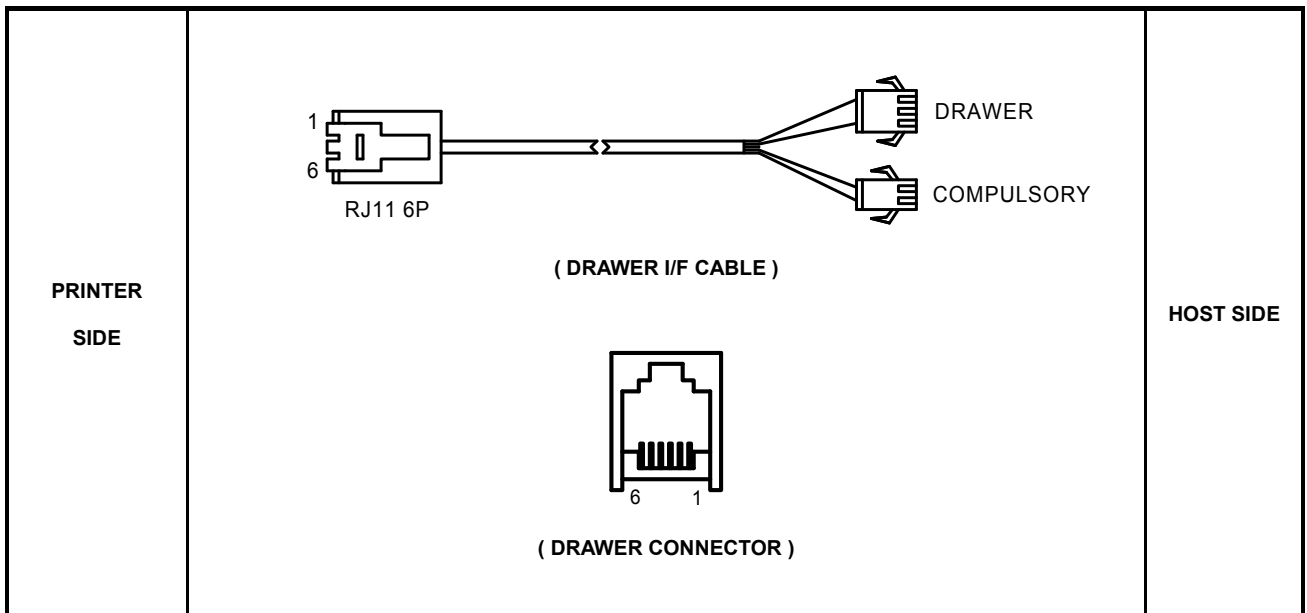
Chapter

3

Installation and Operation

3.1 Installation

3.2 Operation

3.1 Installation

3.1.1 AC Adapter, Interface and Drawer Cable Installation
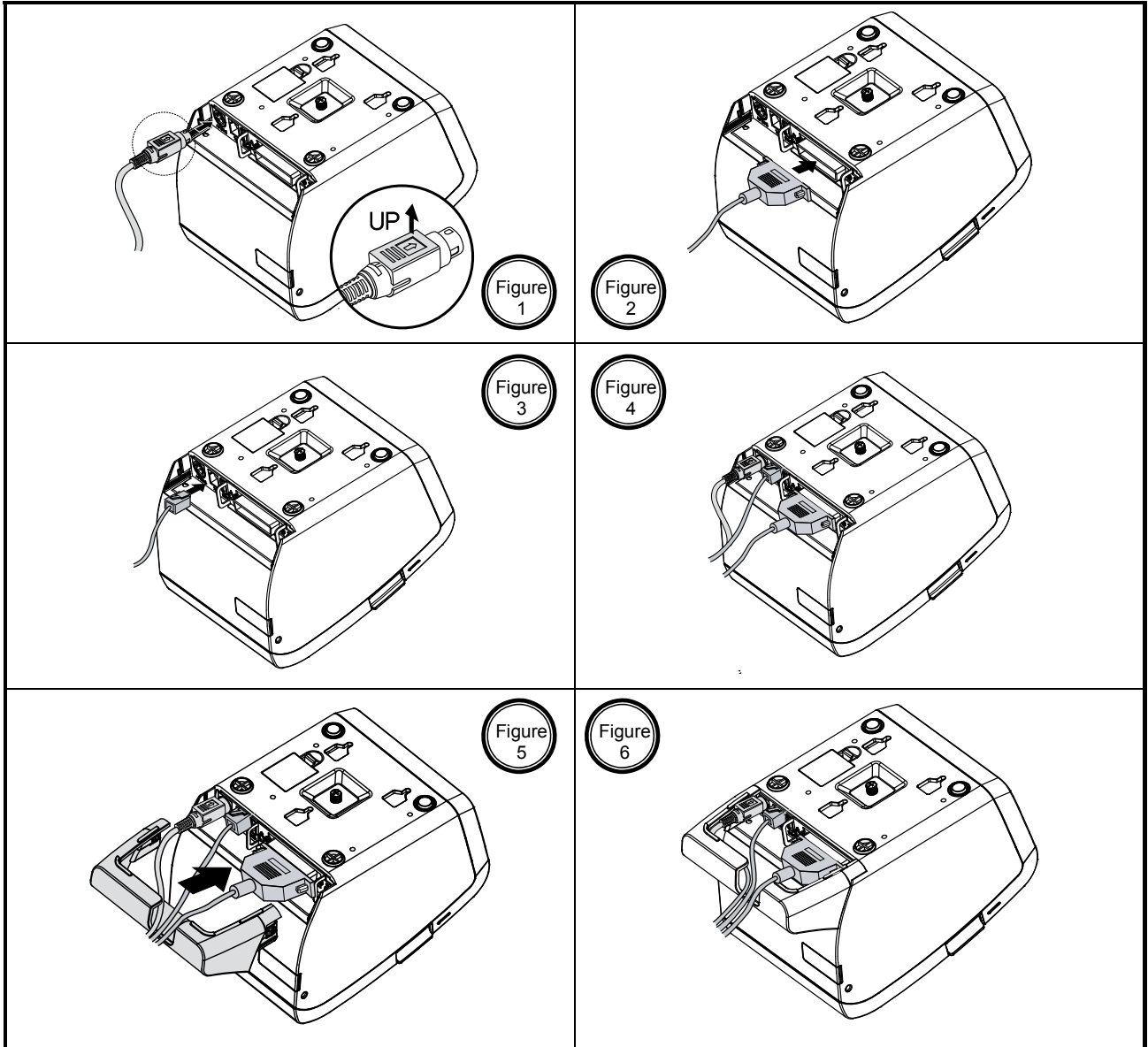
1.   Make sure the printer is turned off.

2.   If it is necessary to connect the interface, plug the interface connector into the interface port on the printer.

3.   Plug the DC cord connector into the power jack on the printer.

4.   If it is necessary to connect the drawer, plug the drawer connector into the drawer port on the printer.

⚠CAUTION

Be careful of the manual cutter.

[Sharp Serrated Edge]
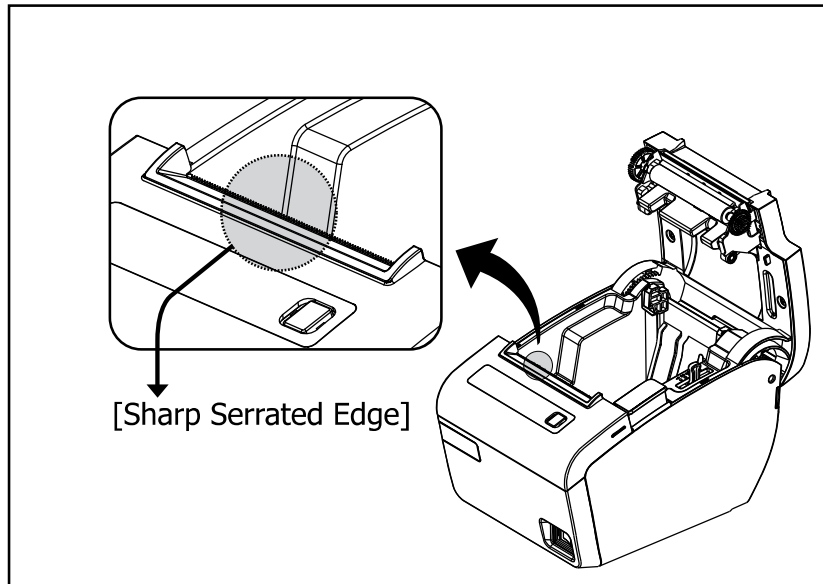
⚠WARNING

Make sure that you use the attached Power supply or equivalent. Using an incorrect power supply may cause fire or electrical shock.

⚠CAUTION

- When connecting or disconnecting the power supply from the printer, make sure that the power supply is not plugged into an electrical

   outlet. Otherwise you may damage the power supply or the printer.

- If the power supply's rated voltage and your outlet's voltage do not match, contact your dealer for assistance. Do not plug in the power

   cord. Otherwise, you may damage the power supply or the printer.

IMPORTANT

- To remove the DC cable connector, make sure that the power supply's power cord is unplugged; then grasp the connector at the arrow and

   pull it straight out.

3.1.2 Paper Roll Installation

Figure 7

Figure 8

Figure 9

Figure 10
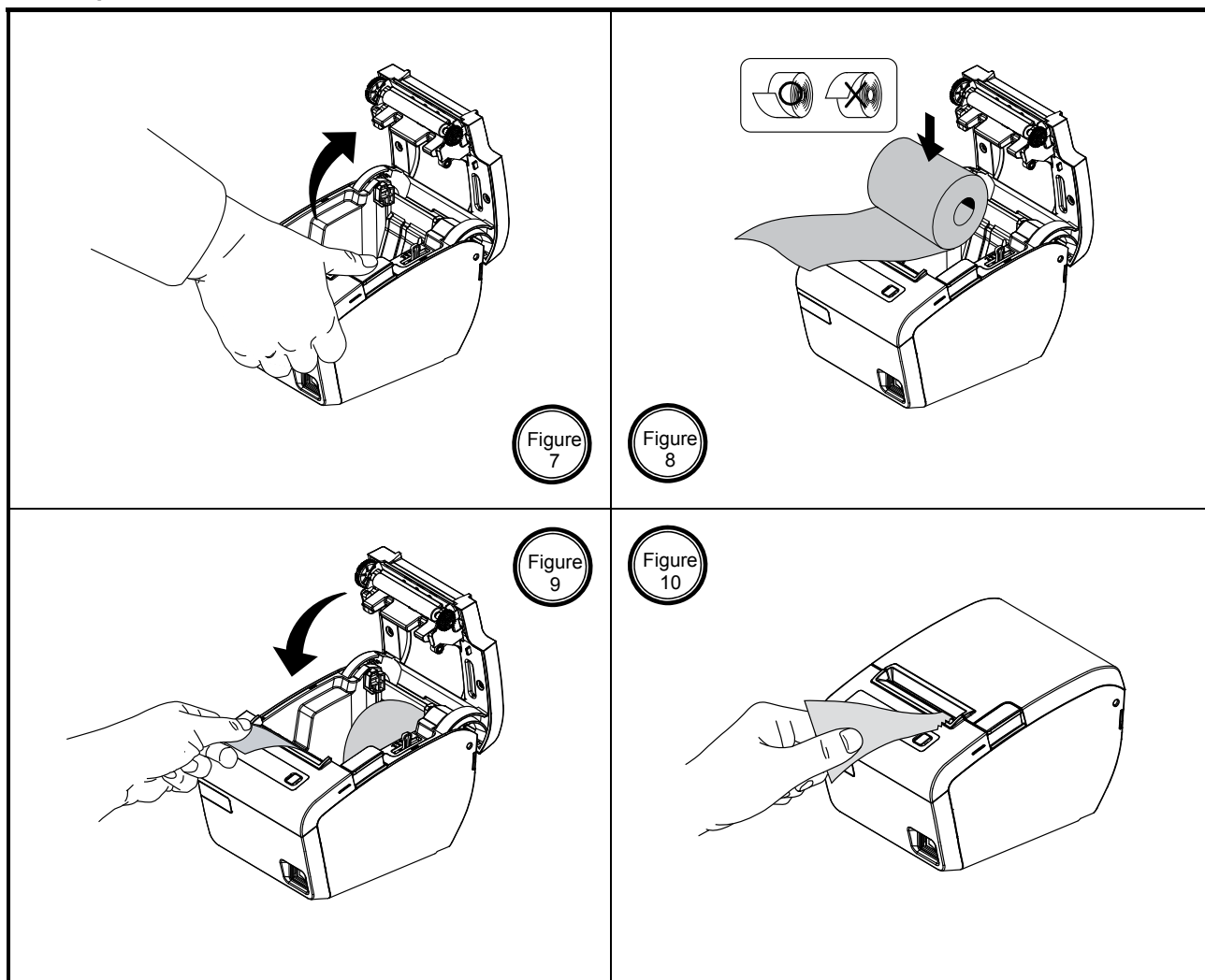
1. Open the paper roll cover by pressing the cover-open button. (Fig-7)

2. Remove the used paper roll core if there is one.

3. Insert the paper roll as shown. (Fig-9)

4. Be sure to note the correct direction that the paper comes off the roll.

5. Pull out a small amount of paper, as shown. Then close the cover. (Fig-10)

6. Tear off the paper as shown. (Fig-10)

IMPORTANT

Be sure to use paper rolls that meet the specifications. Do not use paper rolls that have the paper glued to the core because the printer cannot detect the paper end correctly.

3.1.3 Partition Installation

Figure 11

Figure 12

Open

Figure 13

Figure 14
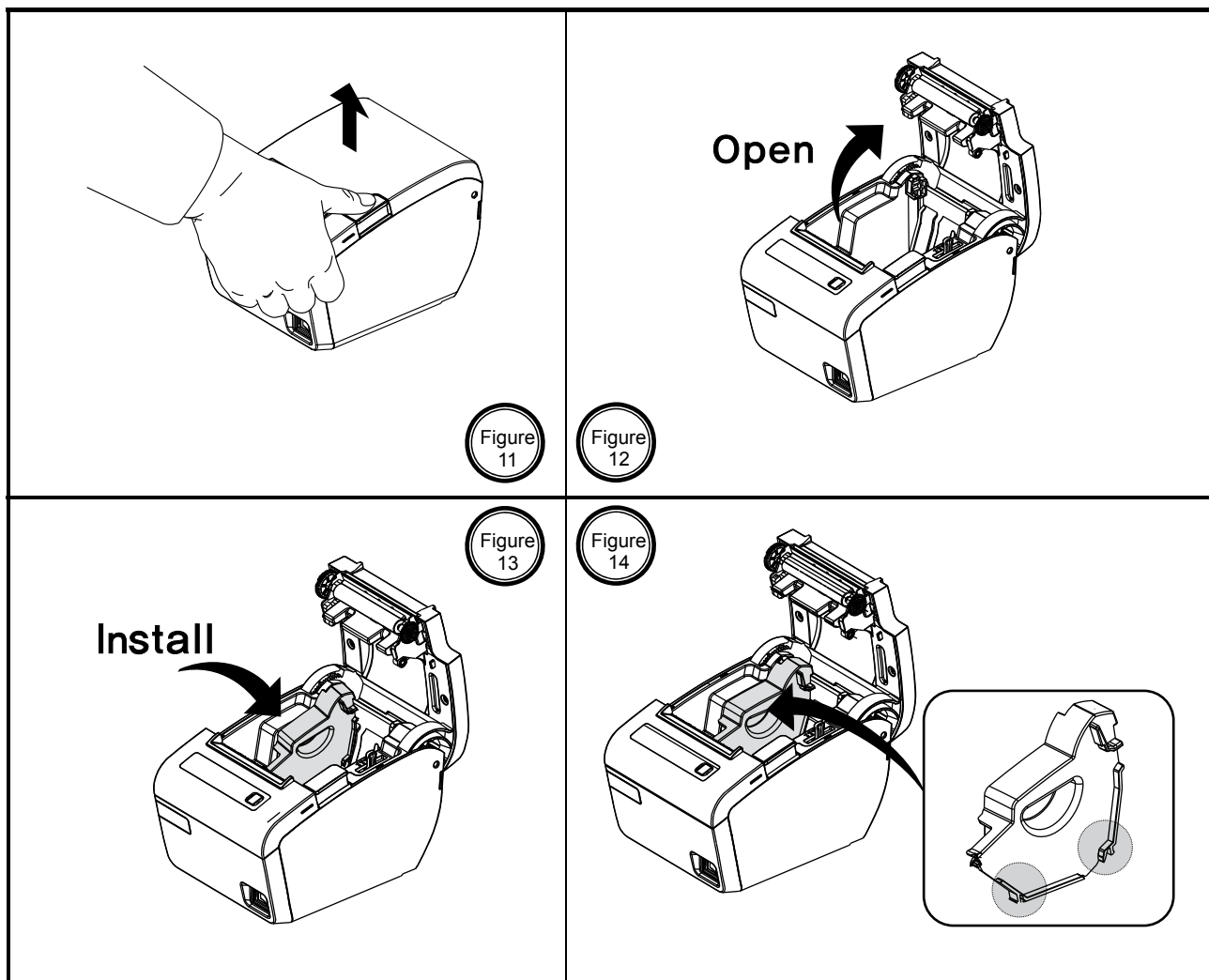
Install

You can install the partition for 58mm paper printing on ELLIX30/40.

1. Push the Open-Button and open the cover. (Fig-11,12)

2. Insert the Partition into the Paper-Supply as shown. (Fig-13)

3. Push the Partition until it looks firmly in plate. (Fig-14)

IMPORTANT

The Paper partition is dealer option item.

3.1.4 Wall Mount Installation

Figure 15

Figure 16
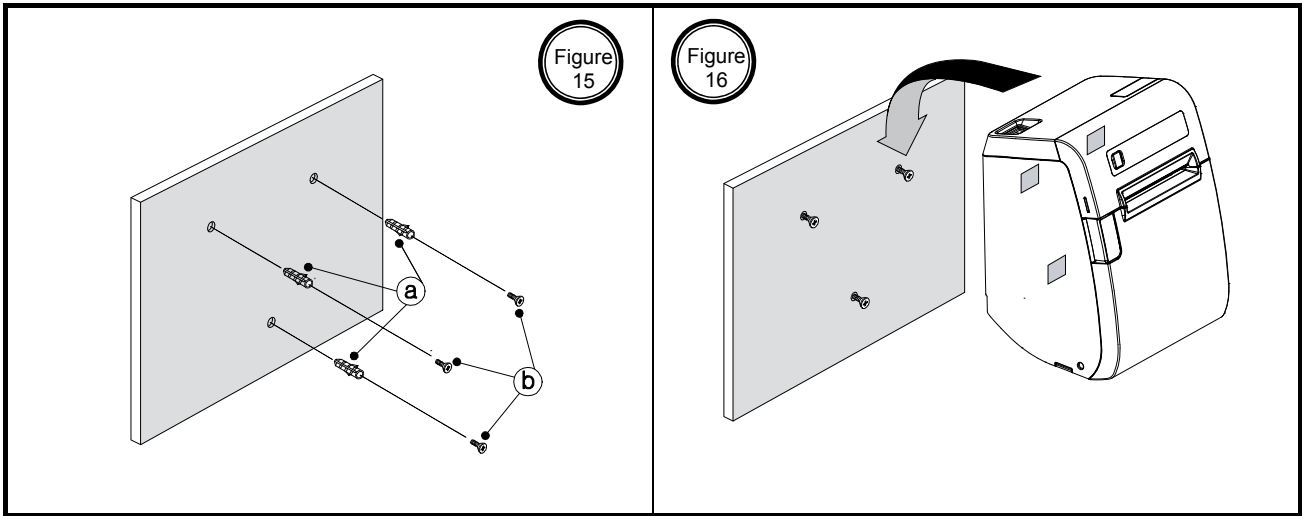
1. Drill the wall to make the three holes ø6.5mm, depth over 35mm and put the three anchors ⓐ into the each hole. (Notice the position of the holes.)
2. Tighten the three screws ⓑ into the each anchor to fix the BRKT-Wall to the wall as shown. (Fig-15)
3. Hang the printer on the three hooks and fix it down. (Fig-16)

Wall mount hole data

66mm(2.6inch)

Ø6.5 hole

68mm(2.68inch)
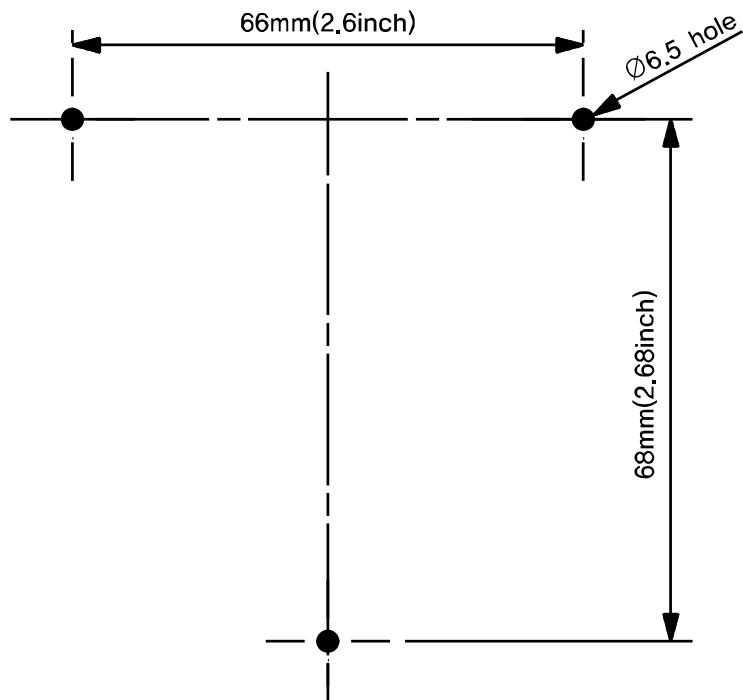
3.2 Operation

3.2.1 Setting the DIP Switch

The DIP switches are located on the bottom of the printer. The DIP switches are used to set the printer to perform various functions. Follow these steps when changing DIP switches setting:

1. Turn the power switch off.

2. Open the DIP switch cover as shown.

3. Flip the DIP switches using tweezers or another narrow-ended tool. (Switches are on when up and off when down in the Figure.)

4. The new setting takes effect when you turn on the printer.
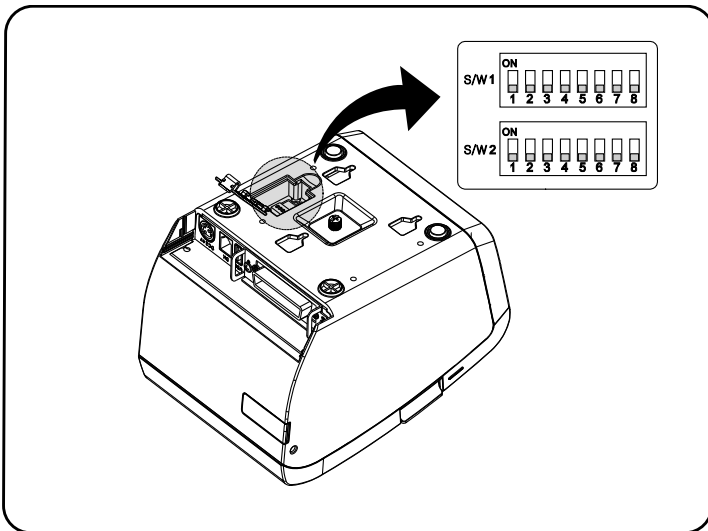
IMPORTANT

Always change DIP switch settings only when the printer is turned off. Change made with the power on have no effect until the powered off and then on again.

3.2.1.1 DIP Switch1 Setting Function

Switch No.	Function	ON	OFF	Default
SW-1	Handshaking	XON/XOFF	DSR/DTR	OFF
SW-2	Word Length	7 Bits	8 Bits	OFF
SW-3	Parity Check	Yes	No	OFF
SW-4	Parity Selection	EVEN	ODD	OFF
SW-5	Baud Rate Selection	Refer to the following table		OFF
SW-6				OFF
SW-7				OFF
SW-8	USB Mode	VCOM	USB	OFF

3.2.1.2 Baud Rate Selection

Transmission Speed	SW-5	SW-6	SW-7	Remark
2400 Baud	ON	ON	ON	-
4800 Baud	ON	ON	OFF	-
9600 Baud	ON	OFF	ON	-
14400 Baud	ON	OFF	OFF	-
19200 Baud	OFF	ON	ON	-
38400 Baud	OFF	ON	OFF	-
57600 Baud	OFF	OFF	ON	-
115200 Baud	OFF	OFF	OFF	Default

3.2.1.3 DIP Switch 2 Setting Function

Switch No.	Function	ON	OFF	Default
SW-1	Mode Selection	STAR	EPSON	OFF
SW-2	Kitchen Bell Á	Enable	Disable	OFF
SW-3	Black Mark	Enable	Disable	OFF
SW-4	Self Test	Hexa Dump Mode	Self Test Mode	OFF
SW-5	Select Print Density	Refer to the following table		OFF
SW-6				OFF
SW-7	Download Mode	USB M/S	I/F	OFF
SW-8	Ô˘ œˆ¦ T˘ } ą *	ÁÁON	OFF	OFF

3.2.1.4 Printing Density Selection

Density Level	SW-5	SW-6	Remark
1 (Light)	ON	ON	-
2	OFF	OFF	Default
3	ON	OFF	-
4 (Dark)	OFF	ON	-

3.2.3 Hexadecimal dumping

This feature allows experienced users to see exactly what data is coming to the printer. This can be useful in finding software problems. When you turn on the hexadecimal dump function, the printer prints all commands and data in hexadecimal format along with a guide section to help you find specific commands.

To use the hexadecimal dump function, follow these steps;

1. Make sure Hexadecimal dumping mode.

    DIP Switch Setting: DIP Switch 2-4 ON.

    LCD menu Setting : Generic → SelfTest mode→ Hexadump

2. Power the printer off.

3. Turn on the power while pressing the FEED button or executing **GS (A** command; then the printer prints "HEXADECIMAL DUMP MODE …" on the paper roll and enter the hexadecimal dump mode.

4. Run any software program that sends data to the printer. The printer will print all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that correspond to the codes.

<div align="center">

HEXADECIMAL DUMP MODE

PRESS PAPER FEED BUTTON THREE

TIMES TO EXIT DUMP MODE

</div>

```
1D  57  00  02  1D  48  02  42  61  72    . W . . . H . B a r
43  6F  64  65  20  50  72  69  6E  74    C o d e   P r i n t
69  6E  67  0A  0A  1D  6B  00  31  32    i n g . . . K . 1 2
```

IMPORTANT

- • A period (.) is printed for each code that no ASCII equivalent.
- • During the hexadecimal dump all commands expect **DLE EOT** and **DLE ENQ** are disabled.(Serial , Parallel Interface)

5. When the printing finishes, turn off the printer or press the FEED button three times, and then change Self-Test mode.

    DIP switch Setting : DIP switch Setting 2-4 OFF

    LCD menu setting : Generic → SelfTest mode→ Self-Test

6. Turn on the printer and then the hexadecimal mode is off.

3.2.4 The Self Test Mode

The self-test checks whether the printer has any problem. If the printer does not function properly, contact your dealer.

The self-test checks the following;

1. Make sure paper roll has been installed properly.

2. Turn on the power while holding down the FEED button. The self-test begins. (Fig-17,18)

3. The self-test prints the current printer status, which provides the control ROM version and the printer setting.

4. After printing the current printer status, self-test printing will print the following and pause

   (The PAPER LED / The LCD light blinks).

> **SELF TEST PRINTING.**
>
> **PLEASE PRESS PAPER FEED BUTTON**

5. Press the FEED button to continue printing. The printer prints a pattern using the built-in character set.

6. The self-test automatically ends and cuts the paper after printing the following.

> **** End Self-Test ****

Figure 17 / Figure 18
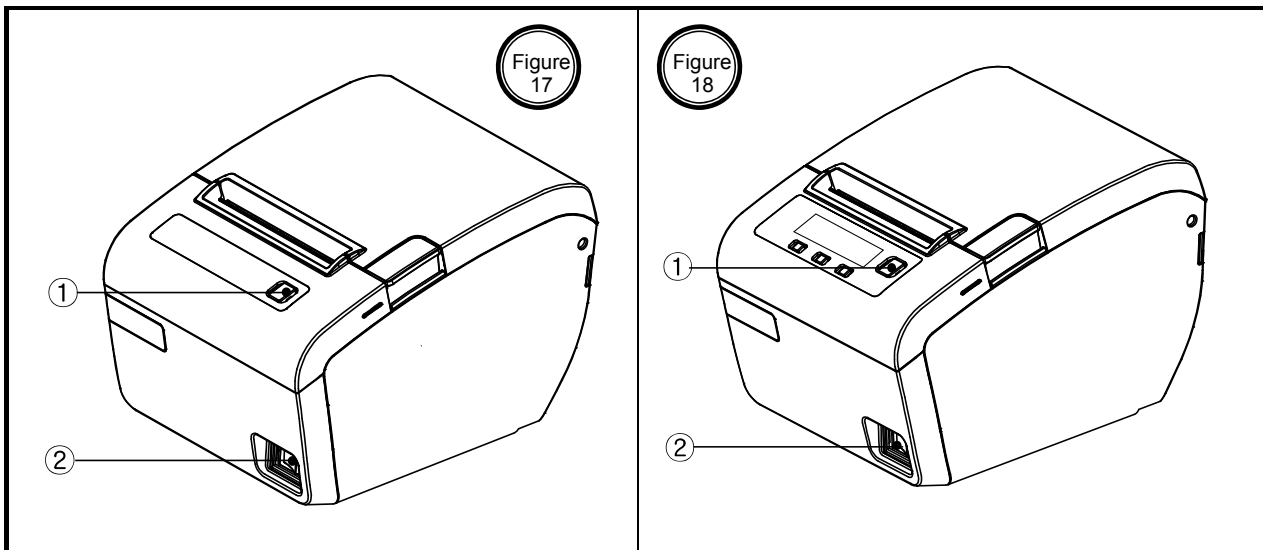
3.2.4 The Self Test Mode - continue

The printer is ready to receive data as soon as it completes the self-test.

Column 1:

```
SR85
                    VERSION STD 1.02
                    PGM CHECKSUM : 3B51

PRINTING SPEED    : 180mm/sec
SERIAL(RS-232C) INTERFACE
BAUD RATE         : 115200 BPS
PARITY            : NONE
DATA BITS         : 8 BITS
STOP BIT          : 1 BIT
HANDSHAKING       : DTR/DSR
RECEIVE BUF SIZE  : 4 Kbytes
EMULATION         : EPSON
USE KP BELL       : NO
AUTO-CUTTER       : Enable
PRINT DENSITY     :
              LIGHT[ 1 2 3 4 ]DARK

DIP S/W status(memory S/W 1,2)
Memory DIP switch Report
```

DIP SW1	1 2 3 4 5 6 7 8
ON OFF	▮▮▮▮▮▮▮▮

DIP SW2	1 2 3 4 5 6 7 8
ON OFF	▮▮▮▮▮▮▮▮

Column 2:

SW	FUNCTION	ON	OFF
1	Handshaking	XON/XOFF	DSR/DTR
2	Word length	7bit	8bit
3	Parity check	Yes	No
4	Parity select	Even	Odd
5 6 7	Baudrate select	Table 1-1	
8	USB Mode	VCOM	USB

Table 1-1 : Baudrate table

Transmission speed	SW5	SW6	SW7
2400 Baud	ON	ON	ON
4800 Baud	ON	ON	OFF
9600 Baud	ON	OFF	ON
14400 Baud	ON	OFF	OFF
19200 Baud	OFF	ON	ON
38400 Baud	OFF	ON	OFF
57600 Baud	OFF	OFF	ON
115200 Baud	OFF	OFF	OFF

DIP SW 2

SW	FUNCTION	ON	OFF
1	Mode select	STAR	EPSON
2	Kitchen bell	Enable	Disable
3	Black Mark	Enable	Disable
4	Self test	HexaDump	SelfTest
5 6	Print density	Table 2-1	
7	Download Mode	USB M/S	I/F
8	Cutter Tuning	Enable	Disable

Table 2-1 : Print density table

Print Density	SW5	SW6
1(Light)	ON	ON
2	OFF	OFF
3	ON	OFF
4(Dark)	OFF	ON

```
** N O T E **
Always change DIP switch settings only
when the printer is turned off. Change
made with the power on have no effect
until the powered off and then on again.


SELF TEST PRINTING.
PLEASE PRESS PAPER FEED BUTTON
```

Column 3:

```
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd
<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcde
=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdef
>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefgh
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghi
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghij
BCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijk
CDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijkl
DEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklm
EFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
FGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
GHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
HIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
IJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
JKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
KLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
MNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
NOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy
QRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz
RSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{
STUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|
TUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}
UVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
VWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~0
WXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~01
XYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~012
YZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~0123
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd


** End Self-Test **
```
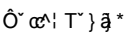
• Self-Test sheet

3. Installation and Operation

```
SR85
                    VERSION STD 1.02
                    PGM CHECKSUM : CCBE
_____

PRINTING SPEED    : 220mm/sec
Graphic LCD Display
SERIAL(RS-232C) INTERFACE
BAUD RATE         : 115200 BPS
PARITY            : NONE
DATA BITS         : 8 BITS
STOP BIT          : 1 BIT
HANDSHAKING       : DTR/DSR
RECEIVE BUF SIZE  : 4 Kbytes
EMULATION         : EPSON
USE KP BELL       : NO
AUTO-CUTTER       : Enable
PRINT DENSITY     :
          LIGHT[ 1 2 3 4 ]DARK
                    █


SELF TEST PRINTING.
PLEASE PRESS PAPER FEED BUTTON
```

```
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd
<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcde
=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdef
>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefgh
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghi
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghij
BCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijk
CDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijkl
DEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklm
EFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
FGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
GHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
HIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
IJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
JKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
KLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
MNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
NOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy
QRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz
RSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{
STUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|
TUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}
UVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
VWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~0
WXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~01
XYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~012
YZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~0123
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd

          ** End Self-Test **
```

• Self-Test sheet

3.2.5 Control Command

HT

[Name]   Horizontal Tab.

[Format]   ASCII   HT

                  Hex   09

                  Decimal   9

[Description]   Move the print position to the next horizontal tab position.

LF

[Name]   Print and line feed.

[Format]   ASCII   LF

                  Hex   0A

                  Decimal   10

[Description]   Print the data in the print buffer and feeds one line based on the current line spacing.

FF

[Name]   Print and return to standard mode in page mode.

[Format]   ASCII   FF

                  Hex   0C

                  Decimal   12

[Description]   Print the data in the print buffer collectively and returns to standard mode.

CR

[Name]   Print and carriage return.

[Format]   ASCII   CR

                  Hex   0D

                  Decimal   13

[Description]   This command is ignored.

CAN

[Name]   Cancel print data in page mode.

[Format]   ASCII   CAN

                  Hex   18

                  Decimal   24

[Description]   In page mode, deletes all the print data in the current printable area.

3.2.4 Control Command   - continue

DLE EOT *n*

[Name]   Transmit real-time status.

[Format]   ASCII   DLE   EOT   *n*

Hex   10   04   *n*

Decimal   16   4   *n*

[Range]   1 ≤ *n* ≤ 4

[Description]   Transmit the selected printer status specified by *n* in real time, according to the following parameters: [*n* = 1 : Printer status]

Bit	ON/OFF	Hex	Decimal	Function
0	OFF	00	0	Not used. Fixed to off.
1	ON	02	2	Not used. Fixed to on.
2	OFF	00	0	Drawer open/close signal is LOW (connector pin 3).
	ON	04	4	Drawer open/close signal is HIGH (connector pin 3).
3	OFF	00	0	On-line.
	ON	08	8	Off-line.
4	ON	10	16	Not used. Fixed to on.
5-6	-	-	-	Undefined.
7	OFF	00	0	Not used. Fixed to off.

[*n* = 2 : Off-line status]

Bit	ON/OFF	Hex	Decimal	Function
0	OFF	00	0	Not used. Fixed to off.
1	ON	02	2	Not used. Fixed to on.
2	OFF	00	0	Cover is closed.
	ON	04	4	Cover is open.
3	OFF	00	0	Paper is not being fed by using the PAPER FEED button.
	ON	08	8	Paper is being fed by the PAPER FEED button.
4	ON	10	16	Not used. Fixed to on.
5	OFF	00	0	No paper-end stops.
	ON	20	32	Printing stops due to paper end.
6	OFF	00	0	No error.
	ON	40	64	Error occurs.
7	OFF	00	00	Not used. Fixed to off.

• Bit 5 : Becomes on when the paper end sensor detects paper end and printing stops.

3.2.4 Control Command - continue

DLE EOT *n*   - continue

[*n* = 3 : Error status]

Bit	ON/OFF	Hex	Decimal	Function
0	OFF	00	0	Not used. Fixed to off.
1	ON	02	2	Not used. Fixed to on.
2	-	-	-	Undefined.
3	OFF	00	0	No auto-cutter error.
	ON	08	8	Auto-cutter error occurs.
4	ON	10	16	Not used. Fixed to on.
5	OFF	00	0	No unrecoverable error.
	ON	20	32	Unrecoverable error occurs.
6	OFF	00	0	No auto-recoverable error.
	ON	40	64	Auto recoverable error occurs.
7	OFF	00	0	Not used. Fixed to off.

• Bit 5 : If these errors occur due to paper jams or the like, it is possible to recover by correcting the cause of the error

and executing **DLE ENQ *n***($1 \le n \le 2$). If an error due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.

• Bit 6 : When printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper

roll cover is open during printing, Bit 6 is on.

[*n* = 4 : Continuous paper sensor status]

Bit	ON/OFF	Hex	Decimal	Function
0	OFF	00	0	Not used. Fixed to off.
1	ON	02	2	Not used. Fixed to on.
2	OFF	00	0	Paper roll near-end sensor. Paper adequate.
3	ON	0C	12	Paper near-end is detected by the paper roll near-end sensor.
4	ON	10	16	Not used. Fixed to on.
5	OFF	00	0	Not roll end sensor. Paper present.
6	ON	60	96	Paper is detected by the paper roll end sensor.
7	OFF	00	0	Not used. Fixed to off.

3.2.4 Control Command - continue

DLE ENQ *n*

[Name]   Real-time is request to printer.

[Format]   ASCII   DLE   ENQ   *n*

Hex   10   05   *n*

Decimal   16   5   *n*

[Range] $1 \le n \le 2$

[Description]   Recover from an error and restart printing from the line where the error occurred

n	Request
0	Works the same as when the paper FEED button is pressed once during waiting status during the operation of the **GS ^** command.
1	Recovers from an error and restarts printing from the line where the error occurred.
2	Recovers from an error after clearing the receive and print buffers.

DLE DC4 *fn m t* (*fn* = 1)

[Name]   Generate pulse in real-time

[Format]   ASCII   DLE   DC4   *fn*   *m*   *t*

HEX   10   14   *1*   *m*   *t*

Decimal   16   20   *1*   *m*   *t*

[Range] $0 \le m \le 8$

$1 \le t \le 8$

[Description]   Output the pulse specified by *t* in real-time to the connector pin specified by *m* as follows:

m	Connector Pin #
0	2
1	5

• The pulse ON time and OFF time is set to [t x 100 ms].

DLE DC4 *fn a b* (*fn* = 2)

[Name]   Generate pulse in real-time

[Format]   ASCII   DLE   DC4   *fn*   *a*   *b*

HEX   10   14   *2*   *a*   *b*

Decimal   16   20   *2*   *a*   *b*

[Range]   *a* = 1   *b* = 8

[Description]   Execute the printer power-off.

• Store the values of the maintenance counter.

3.2.4 Control Command   - continue

DLE DC4 *fn d1 … d7* (*fn* = 8)

[Name]   Clear buffer(s)

[Format]   ASCII   DLE   DC4   *fn*   *d1… d7*

             HEX   10   14   *2*   *d1… d7*

             Decimal   16   20   *2*   *d1… d7*

[Range]   *d1* = 1   *d2* = 3   *d3* = 20   *d4* = 1   *d5* = 6   *d7* = 2   *d8* = 8

[Description]   Clear all data stored in the receive buffer and the print buffer.

• Transmits the following three bytes of data

	Hexadecimal	Decimal	Amount of data
Header	37H	55	1 byte
Flag	25H	37	1 byte
NUL	00H	0	1 byte

• Enter standard mode.

ESC FF

[Name]   Print data in page mode

[Format]   ASCII   ESC   FF

             Hex   1B   0C

             Decimal   27   12

[Description]   In page mode, print all buffered data in the printing area collectively.

ESC SP *n*

[Name]   Set right-side character spacing.

[Format]   ASCII   ESC   SP   *n*

             Hex   1B   20   *n*

             Decimal   27   32   *n*

[Range] $0 \leq n \leq 255$

[Default]   *n* = 0

[Description]   Set the character spacing for the right side of the character to [*n* x horizontal or vertical motion units].

ESC ! *n*

[Name]   Select print modes.

[Format]   ASCII   ESC   !   *n*

             Hex   1B   21   *n*

             Decimal   27   33   *n*

[Range] $0 \leq n \leq 255$

[Default]   *n* = 0

3.2.4 Control Command - continue

ESC ! n - continue

[Description]   Select print mode(s) using n as follows:

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Character font A (12 × 24)
	On	01	1	Character font B (9 × 17)
1-2	-	-	-	Undefined.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double-height mode not selected.
	On	10	16	Double-height mode selected.
5	Off	00	0	Double-width mode not selected.
	On	20	32	Double-width mode selected.
6	-	-	-	Undefined.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

ESC $ nL nH

[Name]   Set absolute print position.

[Format]   ASCII   ESC $ nL   nH

                Hex   1B   24   nL   nH

                Decimal   27   36   nL   nH

[Range] $0 \leq nL \leq 255$

                $0 \leq nH \leq 255$

[Description]   Set the distance from the beginning of the line to the position at which subsequent characters are to be printed.

                The distance from the beginning of the line to the print position is [(nL + nH x 256) x (vertical or horizontal motion unit)] inches.

3.2.4 Control Command   - continue

ESC % *n*

[Name]   Select/Cancel user-defined character set.

[Format]   ASCII   ESC   %   *n*

             Hex   1B   25   *n*

             Decimal   27   37   *n*

[Range] $0 \le n \le 255$

[Default]   *n* = 0

[Description]   Select or cancel the user-defined character set.

- When the LSB of n is 0, the user-defined character set is canceled.

- When the LSB of n is 1, the user-defined character set is selected.

ESC & *y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]*

[Name]   Define user-defined characters.

[Format]   ASCII   ESC   &   *y*   *c1*   *c2*   *[x1 d1...d(y × x1)]...[xk d1...d(y × xk)]*

             Hex   1B   26   *y*   *c1*   *c2*   *[x1 d1...d(y × x1)]...[xk d1...d(y × xk)]*

             Decimal   27   38   *y*   *c1*   *c2*   *[x1 d1...d(y × x1)]...[xk d1...d(y × xk)]*

[Range]   *y* = 3

             $32 \le c1 \le c2 \le 126$

             $0 \le x \le 12$ Font A (12 × 24)

             $0 \le x \le 9$ Font B (9 × 17)

             $0 \le d1 ... d(y × xk) \le 255$

[Description]   Define user-defined characters.

- *y* specifies the number of bytes in the vertical direction.

- *c1* specifies the beginning character code for the definition, and *c2* specifies the final code.

- *x* specifies the number of dots in the horizontal direction.

- *d* specifies the definition data

ESC * *m nL nH d1…dk*

[Name]   Select bit-image mode.

[Format   ASCII   ESC   *   *m*   *nL*   *nH*   *d1 … dk*

             Hex   1B   2A   *m*   *nL*   *nH*   *d1 … dk*

             Decimal   27   42   *m*   *nL*   *nH*   *d1 … dk*

[Range]   *m* = 0, 1, 32, 33

             $1 \le (nL + nH × 256) \le 1023$ $(0 \le nL \le 255 , 0 \le nH \le 3)$

             $0 \le d \le 255$

3.2.4 Control Command   - continue

ESC * *m nL nH d1…dk*   - continue

[Description]   Select a bit-image mode using m for the number of dots specified by *nL* and *nH*, as follows:

m	Mode	Vertical Direction		Horizontal Direction	
		Number of Dots	Dot Density	Dot Density	Number of Data(*k*)
0	8-dot single-density	8	60 DPI	90 DPI	*nL + nH* x 256
1	8-dot double-density	8	60 DPI	180 DPI	*nL + nH* x 256
32	24-dot single-density	24	180 DPI	90 DPI	(*nL + nH* x 256) x 3
33	24-dot double-density	24	180 DPI	180 DPI	(*nL + nH* x 256) x 3

ESC _ *n*

[Name]   Turn underline mode on/off.

[Format]   ASCII   ESC   _   *n*

Hex   1B   2D   *n*

Decimal   27   45   *n*

[Range] $0 \leq n \leq 2$

$48 \leq n \leq 50$

[Default]   *n* = 0

[Description]   Turn underline mode on or off, based on the following values of *n*:

n	Function
0, 48	Turn off underline mode.
1, 49	Turn on underline mode (1-dot thick).
2, 50	Turn on underline mode (2-dots thick).

ESC 2

[Name]   Select default line spacing.

[Format]   ASCII   ESC   2

Hex   1B   32

Decimal   27   50

[Description]   Select 1/6-inch line (approximately 4.23mm) spacing.

3.2.4 Control Command - continue

ESC 3 *n*

[Name]   Set line spacing.

[Format]   ASCII   ESC   3   *n*

                Hex   1B   33   *n*

                Decimal   27   51   *n*

[Range]   0 ≤ *n* ≤ 255

[Default]   Approximately 4.23 mm (1/6 ")

[Description]   Set the line spacing to [*n* × vertical or horizontal motion unit] inches.

ESC = *n*

[Name]   Set peripheral device.

[Format]   ASCII   ESC   =   *n*

                Hex   1B   3D   *n*

                Decimal   27   61   *n*

[Range]   0 ≤ *n* ≤ 1

[Description]   Select device to which host computer sends data, using *n* as follows:

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Printer disabled.
	On	01	1	Printer enabled.
1-7	-	-	-	Undefined.

ESC ? *n*

[Name]   Cancel user-defined characters.

[Format]   ASCII   ESC   ?   *n*

                Hex   1B   3F   *n*

                Decimal   27   63   *n*

[Range]   32 ≤ *n* ≤ 126

[Description]   Cancel user-defined characters.

ESC @

[Name]   Initialize printer.

[Format]   ASCII   ESC   @

                Hex   1B   40

                Decimal   27   64

[Description]   Clear the data in the print buffer and reset the printer mode to the mode that was in effect when the power was turned on.

3.2.4 Control Command   - continue

ESC D *n1...nk NUL*

[Name]	Set horizontal tab positions.				
[Format]	ASCII	ESC	D	*n1...nk*	*NUL*
	Hex	1B	44	*n1...nk*	*00*
	Decimal	27	68	*n1...nk*	*0*

[Range] $1 \leq n \leq 255$

$0 \leq k \leq 32$

[Default]   *n* = 8, 16, 24, 32, 40 … 232, 240, 248

[Description]   Set horizontal tab position.

- *n* specifies the column number for setting a horizontal tab position from the beginning of the line.

- *k* indicates the total number of horizontal tab positions to be set.

ESC E *n*

[Name]	Turn emphasized mode on/off.			
[Format]	ASCII	ESC	E	*n*
	Hex	1B	45	*n*
	Decimal	27	69	*n*

[Range] $0 \leq n \leq 255$

[Default]   *n* = 0

[Description]   Turn emphasized mode on or off.

- When the LSB is 0, emphasized mode is turned off.

- When the LSB is 1, emphasized mode is turned on.

ESC G *n*

[Name]	Turn on/off double-strike mode.			
[Format]	ASCII	ESC	G	*n*
	Hex	1B	47	*n*
	Decimal	27	71	*n*

[Range] $0 \leq n \leq 255$

[Default]   *n* = 0

[Description]   Turn double-strike mode on or off.

- When the LSB is 0, double-strike mode is turned off.

- When the LSB is 1, double-strike mode is turned on.

3.2.4 Control Command - continue

ESC J *n*

[Name]	Print and feed paper.

[Format]   ASCII   ESC   J   *n*

     Hex   1B   4A   *n*

     Decimal   27   74   *n*

[Range] $0 \leq n \leq 255$

[Description]   Print the data in the print buffer and feeds the paper [$n \times$ vertical or horizontal motion unit] inches unit.

ESC L

[Name]   Select page mode

[Format]   ASCII   ESC   L

     Hex   1B   4C

     Decimal   27   76

[Description]   Switch from standard mode to page mode.

ESC M *n*

[Name]   Select character font.

[Format]   ASCII   ESC   M   *n*

     Hex   1B   4D   *n*

     Decimal   27   77   *n*

[Range]   *n* = 0, 1, 48, 49

[Default]   *n* = 0

[Description]   Select character fonts.

n	Function
0, 48	Character font A (12 $\times$ 24) selected.
1, 49	Character font B (9 $\times$ 17) selected.

ESC R *n*

[Name]   Select an international character set.

[Format]   ASCII   ESC   R   *n*

     Hex   1B   52   *n*

     Decimal   27   82   *n*

[Range]   *n* = 0

    $0 \leq n \leq 13$

3.2.4 Control Command - continue

ESC R *n* - continue

[Default]   Except for Korean model : *n* = 0

For Korean model : *n* = 13

[Description]   Select an international character set *n* from the following table.

n	Character Set	*n*	Character Set
0	U.S.A.	7	Spain
1	France	8	Japan
2	Germany	9	Norway
3	U.K.	10	Denmark II
4	Denmark I	11	Spain II
5	Sweden	12	Latin America
6	Italy	13	Korea

ESC S

[Name]   Select standard mode

[Format]   ASCII   ESC   S

Hex   1B   53

Decimal   27   83

[Description]   Switch from page mode to standard mode.

ESC T *n*

[Name]   Select print direction in page mode

[Format]   ASCII   ESC   T   *n*

Hex   1B   54   *n*

Decimal   27   84   *n*

[Range] $0 \leq n \leq 3$

$48 \leq n \leq 51$

[Default]   *n* = 0

3.2.4 Control Command - continue

ESC T *n* - continue

[Description]   Select the print direction and starting position in page mode. *n* specifies the print direction and starting position as follows:

n	Print Direction	Starting Position
0, 48	Left to right	Upper left (A in the figure)
1, 49	Bottom to top	Lower left (B in the figure)
2, 50	Right to left	Lower right (C in the figure)
3, 51	Top to bottom	Upper right (D in the figure)

```
A →→→→                                    D
                                          ↓
                                          ↓
                                          ↓

              Print area

     ↑
     →→→
  →→
B  ↑                                 ←←←← C
```

ESC V *n*

[Name]   Turn 90°clockwise rotation mode on/off.

[Format]   ASCII   ESC   V   *n*

Hex   1B   56   *n*

Decimal   27   86   *n*

[Range] $0 \leq n \leq 1$ $48 \leq n \leq 49$

[Default]   *n* = 0

[Description]   Turn 90°clockwise rotation mode on/off n is used as follows:

n	Function
0, 48	Turn off 90°clockwise rotation mode.
1, 49 2, 50	Turn on 90°clockwise rotation mode.

ESC W *xL xH yL yH dxL dxH dyL dyH*

[Name]   Set printing area in page mode

[Format]   ASCII   ESC   W   *xL*   *xH*   *yL*   *yH*   *dxL*   *dxH*   *dyL*   *dyH*

Hex   1B   57   *xL*   *xH*   *yL*   *yH*   *dxL*   *dxH*   *dyL*   *dyH*

Decimal   27   87   *xL*   *xH*   *yL*   *yH*   *dxL*   *dxH*   *dyL*   *dyH*

[Range] $0 \leq (xL + xH \times 256) \leq 65535$ $(0 \leq xL \leq 255, 0 \leq xH \leq 255)$

$0 \leq (yL + yH \times 256) \leq 65535$ $(0 \leq yL \leq 255, 0 \leq yH \leq 255)$

$1 \leq (dxL + dxH \times 256) \leq 65535$ $(0 \leq dxL \leq 255, 0 \leq dxH \leq 255)$

$1 \leq (dyL + dyH \times 256) \leq 65535$ $(0 \leq dyL \leq 255, 0 \leq dyH \leq 255)$

3.2.4 Control Command   - continue

ESC W *xL xH yL yH dxL dxH dyL dyH*   - continue

[Default]   • When a paper width of 80mm is selected : $x0 = y0 = 0$, $dx = 512$, $dy = 1662$

             • When a paper width of 58mm is selected : $x0 = y0 = 0$, $dx = 360$, $dy = 1662$

[Description]   The horizontal starting position, vertical staring position, printing area width, and printing area height are defined as *x0, y0, dx ,dy* respectively.

             • $x0 = [(xL + xH \times 256)] \times$ (horizontal motion unit)]

             • $y0 = [(yL + yH \times 256)] \times$ (vertical motion unit)]

             • $dx = [(dxL + dxH \times 256)]$ x (horizontal motion unit)]

             • $dy = [(dyL + dyH \times 256)]$ x (vertical motion unit)]

ESC \ *nL nH*

[Name]   Set relative print position.

[Format]

ASCII	ESC	\	*nL*	*nH*
Hex	1B	5C	*nL*	*nH*
Decimal	27	92	*nL*	*nH*

[Range] $0 \le nL \le 255$

             $0 \le nH \le 255$

[Description]   Set the print starting position based on the current position by using the horizontal or vertical motion unit.

             This command sets the distance from the current position to $[(nL + nH \times 256) \times$ horizontal or vertical motion unit]

ESC a *n*

[Name]   Select justification.

[Format]

ASCII	ESC	a	*n*
Hex	1B	61	*n*
Decimal	27	97	*n*

[Range] $0 \le n \le 2$

             $48 \le n \le 50$

[Default] $n = 0$

[Description]   Align all the data in one line to the specified position. *n* selects the type of justification as follows:

n	Justification
0, 48	Left justification
1, 49	Centering
2, 50	Right justification

3.2.4 Control Command - continue

ESC c 3 *n*

[Name]   Select paper sensor(s) to output paper end signals.

[Format]   ASCII   ESC   c   3   *n*

              Hex   1B   63   33   *n*

              Decimal   27   99   51   *n*

[Range] $0 \leq n \leq 255$

[Default]   *n* = 12

[Description]   Select the paper sensor(s) to output paper end signals. Each bit of *n* is used as follows:

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor disabled.
	On	01	1	Paper roll near-end sensor enabled.
1	Off	00	0	Paper roll near-end sensor disabled.
	On	02	2	Paper roll near-end sensor enabled.
2	Off	00	0	Paper roll end sensor disabled.
	On	04	4	Paper roll end sensor enabled.
3	Off	00	0	Paper roll end sensor disabled.
	On	08	8	Paper roll end sensor enabled.
4-7	-	-	-	Undefined.

• This command is available only with a parallel interface and is ignored with a serial interface.

ESC c 4 *n*

[Name]   Select paper sensor(s) to stop printing.

[Format]   ASCII   ESC   c   4   *n*

              Hex   1B   63   34   *n*

              Decimal   27   99   52   *n*

[Range] $0 \leq n \leq 255$

[Default]   *n* = 0

[Description]   Select the paper sensor(s) used to stop printing when a paper-end is detected, using *n* as follows:

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Roll paper near-end sensor disabled.
	On	01	1	Roll paper near-end sensor enabled.
1	Off	00	0	Roll paper near-end sensor disabled.
	On	02	2	Roll paper near-end sensor enabled.
2-7	-	-	-	Undefined.

3.2.4 Control Command   - continue

ESC c 5 *n*

[Name]   Enable/Disable panel buttons.

[Format]   ASCII   ESC   c   5   *n*

               Hex   1B   63   35   *n*

               Decimal   27   99   53   *n*

[Range]   0 ≤ *n* ≤ 255

[Default]   *n* = 0

[Description] Enable or disable the panel buttons.

               • When the LSB is 0, the panel buttons are enabled.

               • When the LSB is 1, the panel buttons are disabled.

Bit	ON/OFF	Hex	Decimal	Function
0	OFF	00	0	FEED button enable.
	ON	01	1	FEED button disable.
1-7	-	-	-	Undefined.

ESC d *n*

[Name]   Print and feed n lines.

[Format]   ASCII   ESC   d   *n*

               Hex   1B   64   *n*

               Decimal   27   100   *n*

[Range]   0 ≤ *n* ≤ 255

[Description] Print the data in the print buffer and feed *n* lines.

ESC p *m t1 t2*

[Name]   Generate pulse.

[Format]   ASCII   ESC   p   m   *t1*   *t2*

               Hex   1B   70   m   *t1*   *t2*

               Decimal   27   112   m   *t1*   *t2*

[Range]   *m* = 0, 1, 48, 49

               0 ≤ *t1* ≤ 255

               0 ≤ *t2* ≤ 255

3.2.4 Control Command   - continue

ESC p *m t1 t2*

[Description]   Output the pulse specified by *t1* & *t2* to connector pin *m* as follows:

m	Connector Pin
0,48	Drawer kick-out connector pin 2
1,49	Drawer kick-out connector pin 5

• *t1* specifies the pulse ON time as [*t1* × 2 ms] and *t2* specifies the pulse OFF time as [*t2* × 2 ms].

• If *t2* is smaller than *t1*, OFF time is set as [*t1* × 2 ms].

ESC t *n*

[Name]   Select character code table.

[Format]   ASCII   ESC   t   *n*

Hex   1B   74   *n*

Decimal   27   116   *n*

[Range] $0 \le n \le 5$,   n = 14, $16 \le n \le 19$, n = 21,n = 26, $33 \le n \le 34$, $36 \le n \le 37$, n = 41, n = 45, n = 46 , n = 47

$49 \le n \le 51$, $95 \le n \le 99$, *n* = 255

[Default]   *n* = 0

[Description]   Select a page *n* from the character code table.

n	page	*n*	page
0	PC437 [U.S.A., standard Europe]	36	PC862 [Hebrew]
1	Katakana	37	PC864 [Arabic]
2	PC850 [Multilingual]	41	Farsi
3	PC860 [Portuguese]	45	WPC1250
4	PC863 [Canadian-French]	46	WPC1251
5	PC865 [Nordic]	47	WPC1253
14	PC737 [Greek]	49	WPC1255
16	WPC1252	50	WPC1256
17	PC866 [Cyrillic #2]	51	WPC1257
18	PC852 [Latin 2]	95	Thai Industrial Standard 620
19	PC858 [EURO]	96	Thai 42
21	Thai 11	97	Thai 14
26	Thai 18	98	Thai 16
33	PC775 [Baltic]	99	System Iran Code
34	PC855 [Cyrillic]	255	Space Page

3.2.4 Control Command - continue

ESC { *n*

[Name]   Turn on/off upside-down printing mode.

[Format]   ASCII   ESC   {   *n*

              Hex   1B   7B   *n*

              Decimal   27   123   *n*

[Range] $0 \leq n \leq 255$

[Default]   *n* = 0

[Description] Turn upside-down printing mode on or off.

              • When the LSB is 0, upside-down printing mode is turned off.

              • When the LSB is 1, upside-down printing mode is turned on.

FS p *n m*

[Name]   Print NV bit image

[Format]   ASCII   FS   p   *n*   *m*

              Hex   1C   70   *n*   *m*

              Decimal   28   112   *n*   *m*

[Range] $1 \leq n \leq 255$

              $0 \leq m \leq 3$

              $48 \leq m \leq 51$

[Description] Print a NV bit image *n* using the mode specified by *m*.

m	Mode	Vertical Dot Density (DPI)	Horizontal Dot Density (DPI)
0.48	Normal	180	180
1.49	Double-width	180	90
2.50	Double-height	90	180
3.51	Quadruple	90	90

• *n* is the number of the NV bit image (defined using the **FS q** command).

• *m* specifies the bit image mode.

FS q *n [xL xH yL yH d1…dk]1…[xL xH yL yH d1…dk]n*

[Name]   Define NV bit image

[Format]   ASCII   FS   q   n   *[xL xH yL yH d1…dk]1…[xL xH yL yH d1…dk]n*

              Hex   1C   71   n   *[xL xH yL yH d1…dk]1…[xL xH yL yH d1…dk]n*

              Decimal   28   113   n   *[xL xH yL yH d1…dk]1…[xL xH yL yH d1…dk]n*

[Range] $1 \leq n \leq 255$

              $0 \leq d \leq 255$

3.2.4 Control Command - continue

FS q *n [xL xH yL yH d1…dk]1…[xL xH yL yH d1…dk]n* - continue

[Range] $1 \leq (xL + xH \times 256) \leq 1023$ $(0 \leq xL \leq 255,\quad 0 \leq xH \leq 3)$

$1 \leq (yL + yH \times 256) \leq 288$ $(0 \leq yL \leq 255,\quad yH = 0,1)$

$k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$

• Either one of the total capacity data [0, 64K, 128K, 192K, 256K, 320K, 384K] bytes can be selected by **GS (E**.

The default value is 384KB.

[Description]   Define the NV bit image specified by *n*.

• *n* specifies the number of the defined NV bit image.

• *xL, xH* specifies $(xL + xH \times 256) \times 8$ dots in the horizontal direction for the NV bit image you are defining.

• *yL, yH* specifies $(yL + yH \times 256) \times 8$ dots in the vertical direction for the NV bit image you are defining.

• If this command is processed when NV graphics are defined with **GS (L** or **GS 8 L**, deletes all NV graphics data, then defines the bit image data with this command.

GS ! *n*

[Name]   Select character size.

[Format]

ASCII	GS	!	*n*
Hex	1D	21	*n*
Decimal	29	33	*n*

[Range] $0 \leq n \leq 255$ (1 ≤ vertical number of times ≤ 8, 1 ≤ horizontal number of times ≤ 8)

[Default]   *n* = 0

[Description]   Select the character height using bits 0 to 3 and selects the character width using bits 4 to 7, as following:

Bit	Function
0-3	Character height selection. See Table 2
4-7	Character width selection. See Table 1

[Table1] Character Width Selection

Hex	Decimal	Width
00	0	1 (normal)
10	16	2 (double-width)
20	32	3
30	48	4
40	64	5
50	80	6
60	96	7
70	112	8

[Table2] Character Height Selection

Hex	Decimal	Height
00	0	1 (normal)
01	1	2 (double-height)
02	2	3
03	3	4
04	4	5
05	5	6
06	6	7
07	7	8

3.2.4 Control Command *- continue*

GS $ *nL nH*

[Name]	Set absolute vertical print position in page mode

[Format]

ASCII	GS	$	*nL*	*nH*
Hex	1D	24	*nL*	*nH*
Decimal	29	36	*nL*	*nH*

[Range] 0 ≤ *nL* ≤ 255

0 ≤ *nH* ≤ 255

[Description] Set the absolute vertical print starting position for buffer character data in page mode.

This command sets the absolute print position to [(*nL* + *nH* × 256) × (vertical or horizontal motion unit)] inches.

GS (A *pL pH n m*

[Name]	Execute test print

[Format]

ASCII	GS	(	A	*pL*	*pH*	*n*	*m*
Hex	1D	28	41	*pL*	*pH*	*n*	*m*
Decimal	29	40	65	*pL*	*pH*	*n*	*m*

[Range](*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

0 ≤ *n* ≤ 2

48 ≤ *n* ≤ 50

1 ≤ *m* ≤ 3

49 ≤ *m* ≤ 51

[Description] Execute a test print with a specified test pattern on a specified paper type (roll paper).

n specify the paper type as listed below to be tested :

n	Paper type
0,48 1,49 2,50	Roll paper

m specify a test pattern as listed below :

m	Test pattern
1,49	Hexadecimal dump
2,50	Printer status print
3,51	Rolling pattern print

3.2.4 Control Command - continue

GS (C *pL pH m fn b [c1 c2] [d1…dk]*

[Name]   Edit user NV memory

[Description]   Delete, store, and move data in the NV user memory specified by the function code *fn*.

fn	Format	No.	Function
0,48	**GS (C *pL pH m fn b c1 c2***	0	Delete the specified record.
1,49	**GS (C *pL pH m fn b c1 c2 d1…dk***	1	Store data in the specified record.
2,50	**GS (C *pL pH m fn b c1 c2***	2	Transmit the data in the specified record
3,51	**GS (C *pL pH m fn b***	3	Transmit the number of bytes of memory used.
4,52	**GS (C *pL pH m fn b***	4	Transmit the number of bytes of remaining memory (unused area).
5,53	**GS (C *pL pH m fn b***	5	Transmit the key code list identifying the stored record.
6,54	**GS (C *pL pH m fn b d1 d2 d3***	6	Delete all data in the NV user memory.

• *pL*, *pH* specify (*pL* + *pH* × 256) for the number of bytes after *pH* (*m*, *fn*, *b*, [*c1 c2*], [*d1…dk*]).

  (*c1*, *c2* specify the key code which identifies the record).

GS (C *pL pH m fn b c1 c2* (*fn* = 0, 48)   **Function 0**

[Format]   ASCII   GS   (C   *pL*   *pH*   *m*   *fn*   *b*   *c1*   *c2*

          Hex   1D   28   43   *pL*   *pH*   *m*   *fn*   *b*   *c1*   *c2*

          Decimal   29   40   67   *pL*   *pH*   *m*   *fn*   *b*   *c1*   *c2*

[Range]   (*pL* + *pH* × 256) = 5 (*pL* = 5, *pH* = 0)

        m = 0   *b* = 0

        32 ≤ *c1* ≤ 126

        32 ≤ *c2* ≤ 126

[Description]   Delete the specified record specified by *c1* and *c2* in the NV user memory.

GS (C *pL pH m fn b c1 c2 d1...dk* (*fn* = 1, 49)   **Function 1**

[Format]   ASCII   GS   (C   *pL*   *pH*   *m*   *fn*   *b*   *c1*   *c2*   *d1...dk*

          Hex   1D   28   43   *pL*   *pH*   *m*   *fn*   *b*   *c1*   *c2*   *d1...dk*

          Decimal   29   40   67   pL   *pH*   *m*   *fn*   *b*   *c1*   *c2*   *d1...dk*

[Range]   6 ≤ (*pL* + *pH* × 256) ≤ 65535   (0 ≤ *pL* ≤ 255, 0 ≤ *pH* ≤ 255)

        m = 0   *b* = 0

        32 ≤ *c1* ≤ 126   32 ≤ *c2* ≤ 126

        32 ≤ *d* ≤ 254

        k = (*pL* + *pH* × 256) - 5

[Description]   Store the data in the record specified by *c1* and *c2* in the NV user memory.

        The new data overwrites the data already stored, if there is data already stored.

3.2.4 Control Command - continue

GS (C *pL pH m fn b c1 c2* (*fn* = 2, 50) **Function 2**

[Format]

	ASCII	GS	(	C	*pL*	*pH*	*m*	*fn*	*b*	*c1*	*c2*
	Hex	1D	28	43	*pL*	*pH*	*m*	*fn*	*b*	*c1*	*c2*
	Decimal	29	40	67	*pL*	*pH*	*m*	*fn*	*b*	*c1*	*c2*

[Range]   (*pL* + *pH* × 256) = 5 (*pL* = 5, *pH* = 0)

m = 0   32 ≤ *c1* ≤ 126

b = 0   32 ≤ *c2* ≤ 126

[Description]   Transmit data for the record specified by *c1, c2* in the NV user memory.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	70H	112	1 byte
Status	40H or 41H	64 or 65	1 byte
Data	20H - FEH	32 - 254	0 through 80 bytes
NUL	00H	0	1 byte

If the specified record cannot be detected, the following data is transmitted:

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	70H	112	1 byte
Status	40H	64	1 byte
NUL	00H	0	1 byte

After [Header – NUL] is transmitted, the printer receives a response from the host: Then it performs the process defined in the response. See

the tables below.   When the status (existence of the next data block) is Hexadecimal = 41H / Decimal = 65

Response		Process Performed
ASCII	Decimal	
ACK	6	Transmits the next data
NAK	21	Transmits the previous data again
CAN	24	Ends the process

When the status (existence of the next data block) is Hexadecimal = 40H / Decimal = 64

Response		Process Performed
ASCII	Decimal	
ACK	6	Ends the process
NAK	21	Transmits the previous data again
CAN	24	Cancels the process

3.2.4 Control Command   - continue

GS (C *pL pH m fn b* (*fn* = 3, 51)   Function 3

[Format]   ASCII   GS   (C   *pL*   *pH*   *m*   *fn*   *b*

              Hex   1D   28   43   *pL*   *pH*   *m*   *fn*   *b*

              Decimal 29   40   67   *pL*   *pH*   *m*   *fn*   *b*

[Range]   ($pL + pH \times 256$) = 3 (pL = 3, pH = 0)

              m = 0

              b = 0

[Description]   Transmit the number of bytes of memory used in the NV user memory.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	28H	40	1 byte
Number of Bytes of Memory Used	30H - 39H	48 - 57	1 - 6 bytes
NUL	00H	0	1 byte

GS (C *pL pH m fn b* (*fn* = 4, 52)   Function 4

[Format]   ASCII   GS   (C   *pL*   *pH*   *m*   *fn*   *b*

              Hex   1D   28   43   *pL*   *pH*   *m*   *fn*   *b*

              Decimal 29   40   67   *pL*   *pH*   *m*   *fn*   *b*

[Range]   ($pL + pH \times 256$) = 3 (pL = 3, pH = 0)

              m = 0

              b = 0

[Description]   Transmit the number of bytes of remaining memory (unused area) in the NV user memory.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	29H	41	1 byte
Number of Bytes of Remaining Memory	30H - 39H	48 - 57	1 - 6 bytes
NUL	00H	0	1 byte

3.2.4 Control Command   - continue

GS (C *pL pH m fn b* (*fn* = 5, 53)   Function 5

[Format]

	ASCII	GS	(	C	*pL*	*pH*	*m*	*fn*	*b*
	Hex	1D	28	43	*pL*	*pH*	*m*	*fn*	*b*
	Decimal	29	40	67	*pL*	*pH*	*m*	*fn*	*b*

[Range] $(pL + pH \times 256) = 3$ ($pL = 3$, $pH = 0$)

$m = 0$ $b = 0$

[Description]   Transmit the key code list identifying the stored record.

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	71H	113	1 byte
Status	40H or 41H	64 or 65	1 byte
Data	20H - FEH	32 - 254	2 - 80 bytes
NUL	00H	0	1 byte

Data consist of the data groups identified with key codes.

If the specified record cannot be detected, the contents of the transmitted data are as follows:

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	71H	113	1 byte
Status	40H	64	1 byte
NUL	00H	0	1 byte

After the [Header - NUL] is transmitted, the printer receives a response from the host: Then it performs the process defined by the response

(See the tables below). When the status (existence of the next data block) is Hexadecimal = 41H / Decimal = 65

Response		**Process Performed**
ASCII	**Decimal**	
ACK	6	Transmits the next data
NAK	21	Transmits the previous data again
CAN	24	Ends the process

When the status (existence of the next data block) is Hexadecimal = 40H / Decimal = 64

Response		**Process Performed**
ASCII	**Decimal**	
ACK	6	Ends the process
NAK	21	Transmits the previous data again
CAN	24	Cancels the process

3.2.4 Control Command - continue

GS (C *pL pH m fn b d1 d2 d3* (*fn* = 6, 54)   Function 6

[Format]	ASCII	GS	(	C	*pL*	*pH*	*m*	*fn*	*b*	*d1*	*d2*	*d3*
	Hex	1D	28	43	*pL*	*pH*	*m*	*fn*	*b*	*d1*	*d2*	*d3*
	Decimal	29	40	67	*pL*	*pH*	*m*	*fn*	*b*	*d1*	*d2*	*d3*

[Range] $(pL + pH \times 256) = 6$ (pL = 6, pH = 0)

m = 0 $d1$ = 67

b = 0 $d2$ = 76

              $d3$ = 82

[Description]   Delete all data in the NV user memory.

GS (D *pL pH m [a1 b1]...[ak bk]*

[Name]   Enable/disable real-time command

[Format]	ASCII	GS	(	D	*pL*	*pH*	*m*	*[a1 b1]...[ak bk]*
	Hex	1D	28	44	*pL*	*pH*	*m*	*[a1 b1]...[ak bk]*
	Decimal	29	40	68	*pL*	*pH*	*m*	*[a1 b1]...[ak bk]*

[Range] $3 \le (pL + pH \times 256) \le 65535$

m = 20

a = 1, 2

b = 0, 1, 48, 49

[Default]

a	Type(s) of Real-Time Commands	Default
1	**DLE DC4 *fn m t*** (*fn*= 1) : Generate pulse in real time	Enabled (*b*= 1)
2	**DLE DC4 *fn a b*** (*fn*= 2) : Execute power-off sequence	Disabled (*b*= 0)

[Description]   Enable or disable the following real-time commands.

a	*b*		Function
1	0, 48	**DLE DC4 *fn m t***	(*fn* = 1) : Not processed (disabled)
	1, 49	**DLE DC4 *fn m t***	(*fn* = 1) : Processed (enabled)
2	0, 48	**DLE DC4 *fn a b***	(*fn* = 2) : Not processed (disabled)
	1, 49	**DLE DC4 *fn a b***	(*fn* = 2) : Processed (enabled)

• *pL, pH* specify (*pL*+ *pH* × 256) as the number of bytes after *pH* (*m* and *[a1 b1]…[ak bk]*).

• *a* specify the type of real-time command.

• *b* specify enabled or disabled.

3.2.4 Control Command   - continue

GS (E *pL pH fn [parameter]*

[Name]   User setup commands

[Description]   Customize the NV user memory area. The table below explains the functions available in this command.

Execute commands related to the user setting mode by specifying the function code *fn*.

fn	Format	No.	Function
1	**GS (E *pL pH fn d1 d2***	1	Changes into the user setting mode
2	**GS (E *pL pH fn d1 d2 d3***	2	Ends the user setting mode session. (Performs a soft reset.)
3	**GS (E *pL pH fn [a1 b18...b11]… [ak bk8...bk1]***	3	Sets value(s) for the memory switch.
4	**GS (E *pL pH fn a***	4	Transmits the settings of the memory switch to the host.
5	**GS (E *pL pH fn [a1 n1L n1H]… [ak nkL nkH]***	5	Sets the customized value(s).
6	**GS (E *pL pH fn a***	6	Transmits the customized value settings.
7	**GS (E *pL pH fn a d1 d2***	7	Copies the user-defined page.
8	**GS (E *pL pH fn y c1 c2 [x d1… d(y × x)]k***	8	Defines data in column format for the character code page in the active area.
9	**GS (E *pL pH fn x c1 c2 [y d1… d(y × x)]k***	9	Defines data in raster format for the character code page in the active area.
10	**GS (E *pL pH fn c1 c2***	10	Deletes the data in the character code page in the active area.
11	**-**	-	-
12	**GS (E *pL pH fn a***	12	Transmits the communication conditions for the serial interface.

- *pL, pH* specify (*pL* + *pH* × 256) as the number of bytes after *pH* (*fn* and *[parameter]*).

- The user setting mode is a special mode to change the values in the NV user memory with this command.

- In Function 2, the printer performs software reset. Therefore, the printer clears the receive and print buffers, and resets all settings (user-defined characters, macros, and the character style) to the mode in effect at power on.

- The customized values can be ascertained with Function 4, 6, or 12, even though the printer does not enter the user setting mode.

3.2.4 Control Command - continue

GS (E *pL pH fn d1 d2* (*fn* = 1)   Function 1

[Format]	ASCII	GS	(	E	*pL*	*pH*	*fn*	*d1*	*d2*
	Hex	1D	28	45	*pL*	*pH*	*fn*	*d1*	*d2*
	Decimal	29	40	69	*pL*	*pH*	*fn*	*d1*	*d2*

[Range] $(pL + pH \times 256) = 3$ (pL = 3, pH = 0)

$d1$ = 73 $d2$ = 78

[Description]   Enter the user setting mode and notifies the host that the mode has changed.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	20H	32	1 byte
NUL	00H	0	1 byte

• The following commands are enabled in the user setting mode. Function 2 through Function 12 of GS (E, GS I

GS (E *pL pH fn d1 d2 d3* (*fn* = 2)   Function 2

[Format]	ASCII	GS	(	E	*pL*	*pH*	*fn*	*d1*	*d2*	*d3*
	Hex	1D	28	45	*pL*	*pH*	*fn*	*d1*	*d2*	*d3*
	Decimal	29	40	69	*pL*	*pH*	*fn*	*d1*	*d2*	*d3*

[Range] $(pL + pH \times 256) = 4$ (pL = 4 , pH = 0)

$d1$ = 79 $d2$ = 85 $d3$ = 84

[Description]   End the user setting mode and performs a software reset. Therefore, the printer clear the receive and print buffers,

and reset all settings (user-defined characters, downloaded bit images, macros, and the character style) to the mode

that was in effect at power on. This function code (*fn* = 2) is enabled only in the user setting mode.

GS (E *pL pH fn [a1 b18...b11]...[ak bk8...bk1]* (*fn* = 3)   Function 3

[Format]	ASCII	GS	(	E	*pL*	*pH*	*fn*	*[a1 b18 ... b11] ... [ak bk8 ... bk1]*
	Hex	1D	28	45	*pL*	*pH*	*fn*	*[a1 b18 ... b11] ... [ak bk8 ... bk1]*
	Decimal	29	40	69	*pL*	*pH*	*fn*	*[a1 b18 ... b11] ... [ak bk8 ... bk1]*

[Range] $10 \le (pL + pH \times 256) \le 65535$

a = 1

b = 48, 49, 50

[Default]   All setting value Off (b = 48)

[Description]   Changes printer setting value specified by to the values specified by b.

• When b = 48, the applicable bit is turned to off.

• When b = 49, the applicable bit is turned to on.

• When b = 50, the applicable bit is not changed.

3.2.4 Control Command   - continue

GS (E *pL pH fn [a1 b18...b11]...[ak bk8...bk1]* (*fn* = 3)   **Function 3**   - continue

When *a* =1 as follows:

Bit	Setting Value	Function
1	48	Does not transmit the power ON information.
	49	Transmits the power ON information.
2	50	Reserved.
3	50	Reserved.
4	50	Reserved.
5	50	Reserved.
6	50	Reserved.
7	50	Reserved.
8	50	Reserved.

The power on information consists of the data as follows:

	Hexadecimal	Decimal	Amount of Data
Header	3BH	59	1 byte
Flag	31H	49	1 byte
NUL	00H	0	1 byte

• This function code (*fn* = 3) is enabled only in the user setting mode.

GS (E *pL pH fn a* (*fn* = 4)   **Function 4**

[Format]	ASCII	GS	(	E	*pL*	*pH*	*fn*	*a*
	Hex	1D	28	45	*pL*	*pH*	*fn*	*a*
	Decimal	29	40	69	*pL*	*pH*	*fn*	*a*

[Range] $(pL + pH \times 256) = 2$ ($pL = 2$, $pH = 0$)

a = 1, 2

[Description]   Transmit the setting value(s) of the memory dip switch specified by a.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	21H	33	1 byte
Data	30H or 31H	48 or 49	8 bytes
NUL	00H	0	1 byte

Data for the setting is transmitted as 8 bytes or a data string in the order from bit 8 to bit 1, as follows:

• OFF: Hexadecimal = 30H / Decimal = 48

• ON: Hexadecimal = 31H / Decimal = 49

3.2.4 Control Command - continue

GS (E *pL pH fn [a1 n1L n1H]...[ak nkL nkH]* (*fn* = 5)   Function 5

[Format]

	ASCII	GS	(	E	*pL*	*pH*	*fn*	*[a1 n1L n1H] ... [ak nkL nkH]*
	Hex	1D	28	45	*pL*	*pH*	*fn*	*[a1 n1L n1H] ... [ak nkL nkH]*
	Decimal	29	40	69	*pL*	*pH*	*fn*	*[a1 n1L n1H] ... [ak nkL nkH]*

[Range] $4 \leq (pL + pH \times 256) \leq 65535$ a = 5, 97, 116, 118

$1 \leq (nL + nH \times 256) \leq 65535$ $1 \leq a \leq 3$

[Default]   • When a = 1: $(nL + nH \times 256)$ = 1   • When a = 2: $(nL + nH \times 256)$ = 7   • When a = 3: $(nL + nH \times 256)$ = 6

• When a = 116: $(nL + nH \times 256)$ = 1   • When a = 118: $(nL + nH \times 256)$ = 85

[Description]   Change the setting of the customized value that is specified with a as $(nL + nH \times 256)$.

a	Function
1	Specify the capacity of the NV user memory.
2	Specify the capacity of the NV graphics memory.
3	Select the paper width.
116	Select the type of paper (single-color or two-color).
118	Select the black-color density in two-color printing.

When a = 1, the capacity of the NV user memory is selected as the size specified with $(nL + nH \times 256)$.

Value of (*nL* + *nH* × 256)	Memory Size
1	64KB
2	128KB
3	192KB
4	256KB
5	320KB

When a = 2, the capacity of the NV graphics memory is selected as the size specified with $(nL + nH \times 256)$.

Value of (*nL* + *nH* × 256)	Memory Size
1	None
2	64KB
3	128KB
4	192KB
5	256KB
6	320KB
7	384KB

3.2.4 Control Command   - continue

GS (E *pL pH fn [a1 n1L n1H]...[ak nkL nkH]* (*fn* = 5)   **Function 5**   - continue

The combination that can be specified for the NV user memory capacity and the NV bit image capacity are as shown in the table below.

Even if the printer receives an impossible combination, the printer automatically set a possible combination for each memory size.

Memory Size of NV User Memory	Memory Size of NV Bit Image Memory
64KB	384KB or less
128KB	256KB or less
192KB	128KB or less
256KB	0

When *a* = 3, the paper width is selected as the size specified with (*nL* + *nH* × 256).

Value of (*nL* + *nH* × 256)	Paper Width
2	58 mm
6	80 mm

When *a* = 116, the paper is selected as the paper specified with (*nL* + *nH* × 256).

Value of (*nL* + *nH* × 256)	Paper
1	Specified single-color paper
257	Recommended two-color paper

When *a* = 118, the black-color density is selected as the number specified with (*nL* + *nH* × 256).

Value of (*nL* + *nH* × 256)	Black-Color Density
70	Light
85	Medium
100	Dark

Adjustment of black-color density:

- The black-color density is affected only in two-color printing. This is not affected for single-color printing.

The values changed with this command become effective with the following:

- Execution of [Function 2] of this command (recommended)

- Turning the power on again

When paper width set 58mm, default printing condition will be change below :

- Print speed set 150mm/sec

3.2.4 Control Command - continue

GS (E *pL pH fn a* (*fn* = 6)   Function 6

[Format]   ASCII   GS   (E   *pL*   *pH*   *fn*   *a*

Hex   1D   28   45   *pL*   *pH*   *fn*   *a*

Decimal   29   40   69   *pL*   *pH*   *fn*   *a*

[Range]   (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

1 ≤ *a* ≤ 3

a = 116, 118

[Description]   Transmit the customized value corresponding to the number specified by *a*.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	27H	39	1 byte
Customized Value Number	30H – 39H	48 – 57	1 – 3 bytes
Separator	1FH	31	1 byte
Customized Value	30H – 39H	48 – 57	1 – 5 bytes
NUL	00H	0	1 byte

The customized value number is as follows:

a	Transmission Data		
	1st Byte	**2nd Byte**	**3rd Byte**
1	49	--	--
2	50	--	--
3	51	--	--
116	49	49	54
118	49	49	56

Configuration of the customized value When the NV user memory capacity (*a* = 1) is specified:

Setting Status		Transmission Data				
Data to be Stored	**Memory Capacity**	**1st Byte**	**2nd Byte**	**3rd Byte**	**4th Byte**	**5th Byte**
1	64KB	49	--	--	--	--
2	128KB	50	--	--	--	--
3	192KB	51	--	--	--	--
4	256KB	52	--	--	--	--
5	320KB	53	--	--	--	--

3.2.4 Control Command   - continue

GS (E *pL pH fn a* (*fn* = 6)   Function 6   - continue

When the NV graphics memory capacity (*a* = 2) is specified:

Setting Status		Transmission Data				
Data to be Stored	Memory Capacity	1st Byte	2nd Byte	3rd Byte	4th Byte	5th Byte
1	None	49	--	--	--	--
2	64KB	50	--	--	--	--
3	128KB	51	--	--	--	--
4	192KB	52	--	--	--	--
5	256KB	53	--	--	--	--
6	320KB	54	--	--	--	--
7	384KB	55	--	--	--	--

When the paper width (*a* = 3) is specified:

Setting Status		Transmission Data				
Data to be Stored	Paper width	1st Byte	2nd Byte	3rd Byte	4th Byte	5th Byte
2	58 mm	50	--	--	--	--
6	80 mm	54	--	--	--	--

When the type of paper (*a* = 116) is specified:

Setting Status		Transmission Data				
Data to be Stored	Print Control Method	1st Byte	2nd Byte	3rd Byte	4th Byte	5th Byte
1	Single-color paper	49	--	--	--	--
257	Two-color paper	50	53	55	--	--

When black-color density (*a* = 118) is specified for two-color:

Setting Status		Transmission Data		
Data to be Stored	Black-Color Density	1st Byte	2nd Byte	3rd Byte
70	Light	55	48	--
85	Medium	56	53	--
100	Dark	49	48	48

3.2.4 Control Command   - continue

GS (E *pL pH fn a d1 d2* (*fn* = 7)   Function 7

[Format]

ASCII	GS	(	E	*pL*	*pH*	*fn*	*a*	*d1*	*d2*
Hex	1D	28	45	*pL*	*pH*	*fn*	*a*	*d1*	*d2*
Decimal	29	40	69	*pL*	*pH*	*fn*	*a*	*d1*	*d2*

[Range]   ($pL + pH \times 256$) = 4 (pL = 4, pH = 0)

         a = 10, 12

[Description]   Copy the data on the user-defined code page specified with *a*.

Font No. (*a*)	Font Type	Data Configuration	
		Number of Dots in Horizontal Direction	**Number of Dots in Vertical Direction**
10	9 × 17	9	17
12	12 × 24	12	24

d1	*d2*	Function
31	30	Load the character code page data of the font specified with *a* in the storage area to the active area.
30	31	Save the character code page data in the active area to the storage area specified by the font specified with *a*.

- Active area: Volatile memory (RAM)

- Storage area: Non-volatile memory (Flash ROM)

- User-defined code page: Page 255 (space page)

This function code *fn* = 7 is enabled only in the user setting mode.

3.2.4 Control Command - continue

GS (E *pL pH fn y c1 c2 [x d1 … d(y × x)]k* (*fn* = 8)   **Function 8**

[Format]	ASCII	GS	(	E	*pL*	*pH*	*fn*	*y*	*c1*	*c2*	*[x d1...d(y × x)]k*
	Hex	1D	28	45	*pL*	*pH*	*fn*	*y*	*c1*	*c2*	*[x d1...d(y × x)]k*
	Decimal	29	40	69	*pL*	*pH*	*fn*	*y*	*c1*	*c2*	*[x d1...d(y × x)]k*

[Range] $5 \le (pL + pH \times 256) \le 65535$

$128 \le c1 \le c2 \le 255$ $0 \le d \le 255$

$y = 3$ $0 \le x \le 12$ (when font A (12 × 24) is selected)

$0 \le x \le 9$ (when font B (9 × 17) is selected)

$k = c2 - c1 + 1$

[Description]   Define the data for each character on the character code page in the active area (RAM).

The character pattern is defined as the column type. This function code *fn* = 8 is enabled in the user setting mode.

The data configuration is as follows: (Example: 9 dots horizontally × 17 dots vertically)

Bit	d1 / d3	d4 / d6	d7 / d9	d10 / d12	d13 / d15	d16 / d18	d19 / d21	d22 / d24	d25 / d27	
7	○	○	○	○	○	○	○	○	○	
6	○	○	●	●	○	○	○	○	○	
5	○	○	●	●	○	○	○	○	○	
4	○	○	●	●	○	○	○	○	○	
3	○	○	●	●	○	○	○	○	○	
2	○	●	●	●	●	○	○	○	○	
1	○	●	○	○	●	○	○	○	○	
0	○	●	○	○	●	○	○	○	○	
7	○	●	○	○	●	○	○	○	○	
6	○	●	●	●	●	○	○	○	○	
5	○	●	○	○	●	○	○	○	○	
4	●	●	○	○	●	●	○	○	○	
3	●	○	○	○	○	●	○	○	○	
2	●	○	○	○	○	●	○	○	○	
1	●	○	○	○	○	●	○	○	○	
0	●	○	○	○	○	●	○	○	○	
7	●	○	○	○	○	●	○	○	○	← Only Bit7 is printed.
6	○	○	○	○	○	○	○	○	○	Even if 1 is specified
5	○	○	○	○	○	○	○	○	○	for any Bit from 6 to 0,
4	●	●	●	●	●	●	○	○	○	it is not printed
3	○	○	○	○	○	○	○	○	○	
2	○	○	○	○	○	○	○	○	○	
1	○	○	○	○	○	○	○	○	○	
0	○	○	○	○	○	○	○	○	○	

3.2.4 Control Command - continue

GS (E *pL pH fn x c1 c2 [y d1...d(x × y)]k* (*fn* = 9)   **Function 9**

[Format]

ASCII	GS	(	E	*pL*	*pH*	*fn*	*x*	*c1*	*c2*	*[y d1...d(x × y)]k*
Hex	1D	28	45	*pL*	*pH*	*fn*	*x*	*c1*	*c2*	*[y d1...d(x × y]k*
Decimal	29	40	69	*pL*	*pH*	*fn*	*x*	*c1*	*c2*	*[y d1...d(x × y)k*

[Range] $5 \le (pL + pH \times 256) \le 65535$

$128 \le c1 \le c2 \le 255$ $0 \le d \le 255$

$x = 2$ $0 \le y \le 24$ (when font A (12 × 24) is selected)

$0 \le y \le 17$ (when font B (9 × 17) is selected)

$k = c2 - c1 + 1$

[Description] Define the data for each character on the character code page in the active area (RAM).

The character pattern is defined as the raster type. This function code *fn* = 9 is enabled only in the user setting mode.

The data configuration is as follows: (Example: 12 dots horizontally × 24 dots vertically)

	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	
d1 d	2	○	○	○	○	○	○	○	●	○	○	○	○	○	○	●	○	← All dots in odd bytes
d3 d	4	○	○	○	○	○	○	●	●	○	○	○	○	○	●	○	○	are printed.
d5 d	6	○	○	○	○	○	●	○	●	○	○	○	○	○	●	●	○	Bits 7 through 4
d7 d	8	○	○	○	○	○	●	●	●	○	○	○	○	●	○	○	○	in even dots
d9 d	10	○	○	○	○	●	○	○	●	○	○	○	○	●	○	●	○	are printed.
d11 d	12	○	○	○	○	●	○	●	●	○	○	○	○	●	●	○	○	Even if 1 is specified
d13 d	14	○	○	○	○	○	○	○	●	○	○	○	○	○	○	●	○	for any bit from
d15 d	16	○	○	○	○	○	○	●	●	○	○	○	○	○	●	○	○	3 to 0,
d17 d	18	○	○	○	○	○	●	○	●	○	○	○	○	○	●	●	○	it is not printed
d19 d	20	○	○	○	○	○	●	●	●	○	○	○	○	●	○	○	○	
d21 d	22	○	○	○	○	●	○	○	●	○	○	○	○	●	○	●	○	
d23 d	24	○	○	○	○	●	○	●	●	○	○	○	○	●	●	○	○	
d25 d	26	○	○	○	○	○	○	○	●	○	○	○	○	○	○	●	○	
d27 d	28	○	○	○	○	○	○	●	●	○	○	○	○	○	●	○	○	
d29 d	30	○	○	○	○	○	●	○	●	○	○	○	○	○	●	●	○	
d31 d	32	○	○	○	○	○	●	●	●	○	○	○	○	●	○	○	○	
d33 d	34	○	○	○	○	●	○	○	●	○	○	○	○	●	○	●	○	
d35 d	36	○	○	○	○	●	○	●	●	○	○	○	○	●	●	○	○	
d37 d	38	○	○	○	○	○	○	○	●	○	○	○	○	○	○	●	○	
d39 d	40	○	○	○	○	○	○	●	●	○	○	○	○	○	●	○	○	
d41 d	42	○	○	○	○	○	●	○	●	○	○	○	○	○	●	●	○	
d43 d	44	○	○	○	○	○	●	●	●	○	○	○	○	●	○	○	○	
d45 d	46	○	○	○	○	●	○	○	●	○	○	○	○	●	○	●	○	
d47 d	48	○	○	○	○	●	○	●	●	○	○	○	○	●	●	○	○	

3.2.4 Control Command   - continue

GS (E *pL pH fn c1 c2* (*fn* = 10)   **Function 10**

[Format]   ASCII   GS   (E   *pL*   *pH*   *fn*   *c1*   *c2*

          Hex   1D   28   45   *pL*   *pH*   *fn*   *c1*   *c2*

          Decimal   29   40   69   *pL*   *pH*   *fn*   *c1*   *c2*

[Range]   (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)

          128 ≤ *c1* ≤ *c2* ≤ 255

[Description]   Delete the data for each character in the character code page in the active area (RAM).

          After deleting the data, space patterns (no printing) are given.

          This function code *fn* = 10 is enabled only in the user setting mode.

GS (E *pL pH fn a* (*fn* = 12)   **Function 12**

[Format]   ASCII   GS   (E   *pL*   *pH*   *fn*   *a*

          Hex   1D   28   45   *pL*   *pH*   *fn*   *a*

          Decimal   29   40   69   *pL*   *pH*   *fn*   *a*

[Range]   (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

          1 ≤ *a* ≤ 4

[Description]   Transmit the communication conditions of the serial interface specified by *a*.

a	Communication Conditions
1	Baud rate
2	Parity
3	Handshake control
4	Data length

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	33H	39	1 byte
Type of Communication Condition	31H-34H	49-52	1 byte
Separator	1FH	31	1 byte
Setting Value	30H-39H	48-39	1 – 6 byte
NUL	00H	0	1 byte

Configuration of the setting value

3.2.4 Control Command   - continue

GS (E *pL pH fn a* (*fn* = 12)   **Function 12**   - continue

When the baud rate (*a* = 1) is specified:

Baud Rate (bps)	d1	d2	d3	d4	d5	d6
2400	50	52	48	48	--	--
4800	52	56	48	48	--	--
9600	57	54	48	48	--	--
19200	49	57	50	48	48	--
38400	51	56	52	48	48	--
57600	53	55	54	48	48	--
115200	49	49	53	50	48	48

When the parity setting (*a* = 2) is specified:

Parity	d1
No parity	48
Odd parity	49
Even parity	50

When the handshake control (*a* = 3) is specified:

Handshake control	d1
DSR / DTR	48
XON / XOFF	49

When the data length (*a* = 4) is specified:

Data Length	d1
7 bits	55
8 bits	56

If is out of range, this command ignores the value specified with *a*.

GS (K *pL pH fn m*

[Name]   Print control method(s)

[Description]   Set the print control specified by *fn*.

fn	Function
48	Specify the print control mode.

3.2.4 Control Command   - continue

GS (K *pL pH fn m* (*fn* = 48)   **Function 48**

[Format]

	ASCII	GS	(	K	*pL*	*pH*	*fn*	*m*
	Hex	1D	28	4B	*pL*	*pH*	*fn*	*m*
	Decimal	29	40	75	*pL*	*pH*	*fn*	*m*

[Range] $(pL + pH \times 256) = 2$ $(pL = 2, pH = 0)$

$1 \le m \le 4$

$49 \le m \le 52$

[Default] $m = 1$

[Description]   Select the print control mode.

m	Print Control Mode
1, 49	Select print control mode 1 (standard).
2, 50	Select print control mode 2 (fence bar code).
3, 51	Select print control mode 3 (ladder bar code).
4, 52	Select print control mode 4 (2-dimensional code).

① **GS (L *pL pH m fn [parameters]***
② **GS 8 L *p1 p2 p3 p4 m fn [parameters]***

[Name]   Select graphics data

[Format]

		ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*		*[parameters]*
		Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*		*[parameters]*
		Decimal	29	40	76	*pL*	*pH*	*m*	*fn*		*[parameters]*
	②	ASCII	GS	8	L	*p1*	*p2*	*p3*	*p4*	*m*	*fn*	*[parameters]*
		Hex	1D	38	4C	*p1*	*p2*	*p3*	*p4*	*m*	*fn*	*[parameters]*
		Decimal	29	56	76	*p1*	*p2*	*p3*	*p4*	*m*	*fn*	*[parameters]*

In the description below **GS (L** is used for explanation.

Note that **GS (L** and **GS 8 L** have the same function.

If the *[parameters]* of each format exceeds 65535 bytes use **GS 8 L**.

3.2.4 Control Command   - continue

> ① **GS (L *pL pH m fn [parameters]***
>
> ② **GS 8 L *p1 p2 p3 p4 m fn [parameters]***   - continue

[Description]   Process graphics data according to the function code *fn.*

fn	Format	No.	Function
0, 48	**GS (L *pL pH m fn***	48	Transmits the NV graphics memory capacity.
2, 50	**GS (L *pL pH m fn***	50	Prints the graphics data in the print buffer.
3, 51	**GS (L *pL pH m fn***	51	Transmits the remaining capacity of the NV graphics memory.
64	**GS (L *pL pH m fn d1 d2***	64	Transmits the defined NV graphics key code list.
65	**GS (L *pL pH m fn d1 d2 d3***	65	Deletes all NV graphics data.
66	**GS (L *pL pH m fn kc1 kc2***	66	Deletes the specified NV graphics data.
67	**GS (L *pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b***	67	Defines the raster graphics data in the non-volatile memory.
69	**GS (L *pL pH m fn kc1 kc2 x y***	69	Prints the specified NV graphics data.
112	**GS (L *pL pH m fn a bx by c xL xH yL yH d1...dk***	112	Stores the raster graphics data in the print buffer memory.

• *pL, pH* specify (*pL* + *pH* × 256) as the number of bytes after *pH* or *p4* (*m, fn*, and *[parameter]*).

> **GS (L *pL pH m fn*** (*fn* = 0, 48)   **Function 48**

[Format]   ASCII   GS   (L   *pL*   *pH*   *m*   *fn*

               Hex   1D   28   4C   *pL*   *pH*   *m*   *fn*

               Decimal   29   40   76   *pL*   *pH*   *m*   *fn*

[Range]   (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

               m = 48

[Description]   Transmit the total capacity of the NV graphics memory (number of bytes in the memory area).

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	30H	48	1 byte
Data	30H – 39H	48 – 57	1 – 8 bytes
NUL	00H	0	1 byte

• The data describing total capacity is converted to character codes corresponding to decimal data, then transmitted from the MSB.

• The data length is variable.

- The total capacity of the NV graphics memory is selectable as any one of these:

[0, 64K, 128K, 192K, 256K, 320K, 384K] bytes with **GS (E**. The default value is 384KB.

3.2.4 Control Command - continue

GS (L *pL pH m fn* (*fn* = 2, 50)	**Function 50**

[Format]	ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*
	Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*
	Decimal	29	40	76	*pL*	*pH*	*m*	*fn*

[Range]   (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

m = 48

[Description]   Print the buffered graphics stored by the process of Function 112.

Feed paper by the amount corresponding to the number of dots in the *y* direction of the buffered graphics.

GS (L *pL pH m fn* (*fn* = 3, 51)	**Function 3,51**

[Format]	ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*
	Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*
	Decimal	29	40	76	*pL*	*pH*	*m*	*fn*

[Range]   (*pL* + *pH* x 256) = 2 (*pL* = 2, *pH* = 0)

m = 48

[Description]   Transmit the number of bytes of remaining memory (unused area) in the NV graphics memory.

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	31H	49	1 byte
Data	30H – 39H	48 – 57	1 – 8 bytes
NUL	00H	0	1 byte

The number of bytes of remaining memory is converted to character codes corresponding to decimal data, and then transmitted from the

MSB.   The data length is variable.

GS (L *pL pH m fn d1 d2* (*fn* = 64)	**Function 64**

[Format]	ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*d1*	*d2*
	Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*d1*	*d2*
	Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*d1*	*d2*

[Range]   (*pL* + *pH* × 256) = 4 (*pL* = 4, *pH* = 0)

m = 48

d1 = 75

d2 = 67

3.2.4 Control Command   - continue

GS (L *pL pH m fn d1 d2* (*fn* = 64)   **Function 64**   - continue

[Description]   Transmit the defined NV graphics key code list. When the key code is present:

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	72H	114	1 byte
Status	40H or 41H	64 or 65	1 byte
Data	30H – 39H	48 – 57	2 – 80 bytes
NUL	00H	0	1 byte

When the key code is not present:

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	72H	114	1 byte
Status	40H	64	1 byte
NUL	00H	0	1 byte

If the number of the key code exceeds 40, divide the key code by 40 for transmission.

• The status if the continuous transmission data block is present is 41H.

• The status if the continuous transmission data block is not present is 40H.

After the [Header–NUL] is transmitted, the printer receives a response from the host, then it performs the process defined by the response

(See the tables below).

When the status (existence of the next data block) is Hexadecimal = 41H / Decimal = 65

Response		**Process Performed**
ASCII	**Decimal**	
ACK	6	Transmits the next data.
NAK	21	Transmits the previous data again.
CAN	24	Ends the process.

When the status (for the last data block) is Hexadecimal = 40H / Decimal = 64

Response		**Process Performed**
ASCII	**Decimal**	
ACK	6	Ends the process.

NAK	21	Transmits the previous data again.
CAN	24	Cancels the process.

3.2.4 Control Command   - continue

GS (L *pL pH m fn d1 d2 d3* (*fn* = 65)   Function 65

[Format]	ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*d1*	*d2*	*d3*
	Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*d1*	*d2*	*d3*
	Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*d1*	*d2*	*d3*

[Range]   (*pL* + *pH* × 256) = 5 (*pL* = 5, *pH* = 0)

m = 48   *d1* = 67   *d2* = 76   *d3* = 82

[Description]   Delete all defined NV graphics data.

GS (L *pL pH m fn kc1 kc2* (*fn* = 66)   Function 66

[Format]	ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*
	Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*
	Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*

[Range]   (*pL* + *pH* × 256) = 4 (*pL* = 4, *pH* = 0)

m = 48   32 ≤ *kc1* ≤ 126

32 ≤ *kc2* ≤ 126

[Description]   Delete the NV graphics data defined by the key codes *kc1* and *kc2*.

GS (L *pL pH m fn a kc1 kc2 b xL xH yL yH [c d1....dk]1… [c d1....dk]b* (*fn* = 67)   Function 67

[Format]	ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*a*	*kc1*	*kc2*
		b	*xL*	*xH*	*yL*	*yH*	*c*	*d1...dk*			
	Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*a*	*kc1*	*kc2*
		b	*xL*	*xH*	*yL*	*yH*	*c*	*d1...dk*			
	Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*a*	*kc1*	*kc2*
		b	*xL*	*xH*	*yL*	*yH*	*c*	*d1...dk*			

[Range]   12 ≤ (*pL* + *pH* × 256) ≤ 65535 (0 ≤ *pL* ≤ 255, 0 ≤ *pH* ≤ 255)

m = 48

a = 48   32 ≤ *kc1* ≤ 126

b = 1   32 ≤ *kc2* ≤ 126

c = 49   1 ≤ (*xL* + *xH* × 256) ≤ 8192

0 ≤ *d* ≤ 255   1 ≤ (*yL* + *yH* × 256) ≤ 2304

k = (int ((*xL* + *xH* × 256) + 7) / 8) × (*yL* + *yH* × 256)

The total capacity of the NV graphics memory is selectable as any one of these:

[0, 64K, 128K, 192K, 256K, 320K, 384K] bytes with **GS (E**. The default value is 384KB.

[Description] Define the raster graphics data in the NV graphics area. *b* specifies the number of the color of the defined data.

- *xL, xH* specify the defined data in the horizontal direction as ($xL + xH \times 256$) dots.

- *yL, yH* specify the defined data in the vertical direction as ($yL + yH \times 256$) dots.

3.2.4 Control Command   - continue

GS (L *pL pH m fn kc1 kc2 x y* (*fn* = 69)   Function 69

[Format]	ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*	*x*	*y*
	Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*	*x*	*y*
	Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*kc1*	*kc2*	*x*	*y*

[Range] ($pL + pH \times 256$) = 6 (pL = 6, pH = 0)

m = 48

x = 1,2

y = 1,2

$32 \leq kc1 \leq 126$

$32 \leq kc2 \leq 126$

[Description] Print the NV graphics data defined by the key codes *kc1* and *kc2*.

The graphics data is enlarged by *x* and *y* in the horizontal and vertical directions.

.GS (L *pL pH m fn a bx by c xL xH yL yH d1...dk* (*fn* = 112)   Function 112

[Format]	ASCII	GS	(	L	*pL*	*pH*	*m*	*fn*	*a*	*bx*	*by*
		c	*xL*	*xH*	*yL*	*yH*	*d1... dk*				
	Hex	1D	28	4C	*pL*	*pH*	*m*	*fn*	*a*	*bx*	*by*
		c	*xL*	*xH*	*yL*	*yH*	*d1...dk*				
	Decimal	29	40	76	*pL*	*pH*	*m*	*fn*	*a*	*bx*	*by*
		c	*xL*	*xH*	*yL*	*yH*	*d1...dk*				

[Range] $11 \leq (pL + pH \times 256) \leq 65535$

($0 \leq pL \leq 255$, $0 \leq pH \leq 255$)

m = 48

a = 48 bx = 1, 2

c = 49 by = 1, 2

$1 \leq (xL + xH \times 256) \leq 1024$

$1 \leq (yL + yH \times 256) \leq 1662$ (when *by* = 1)

$1 \leq (yL + yH \times 256) \leq 831$ (when *by* = 2)

$0 \leq d \leq 255$

$k = (int ((xL + xH \times 256) + 7) / 8) \times (yL + yH \times 256)$

[Description] Store the raster graphics data, enlarged *bx* and *by* in the horizontal and vertical directions in the print buffer.

- *xL, xH* specify the raster graphics data in the horizontal direction as (*xL* + *xH* × 256) dots.

- *yL, yH* specify the raster graphics data in the vertical direction as (*yL* + *yH* × 256) dots.

3.2.4 Control Command   - continue

GS (M *pL pH fn m*

[Name]   Customize printer

[Description]   Protects or recovers values or data set or defined in the active area by commands.

fn	Function No.	Description
1, 49	Function 1	Copies the setting stored in the active area to the storage area (save settings).
2, 50	Function 2	Copies the setting stored in the storage area to the active area (load settings).
3, 51	Function 3	Enable or disable automatic loading of the setting upon initialization.

- Active area: Volatile memory (RAM)

- Storage area: Non-volatile memory (Flash ROM)

Lists of command that is affect by this command.

Setting Value		Command
Status		**ESC c 3, GS a**
Defined data		**GS :**
Characters	Kind of character	**ESC M, ESC R, ESC t**
	Style	**ESC !, ESC –, ESC E, ESC G, ESC V, ESC {, GS !, GS B, GS b, GS (N**
	Etc.	**ESC SP, ESC 2, ESC 3**
Bar codes		**GS H, GS f, GS h, GS w**
2-dimensional codes		Function 065 through Function 070 of **GS (k**
Print position		**ESC D, ESC T, ESC a, GS L, GS W**
Etc.		**ESC c 4, ESC c 5, GS (D , GS P**

GS (M *pL pH fn m* (*fn* = 1,49)   Function 1

[Format]	ASCII	GS	(	M	*pL*	*pH*	*fn*	*m*
	Hex	1D	28	4D	*pL*	*pH*	*fn*	*m*
	Decimal	29	40	77	*pL*	*pH*	*fn*	*m*

[Range]   (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

          m = 1, 49

[Description]   Copies the setting stored in the active area to the *m* th storage area.

3.2.4 Control Command   - continue

GS (M *pL pH fn m* (*fn* = 2,50)   Function 2

[Format]	ASCII	GS	(	M	*pL*	*pH*	*fn*	*m*
	Hex	1D	28	4D	*pL*	*pH*	*fn*	*m*
	Decimal	29	40	77	*pL*	*pH*	*fn*	*m*

[Range]   (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

m = 0, 1, 48, 49

[Description]   • When (*m* = 0, 48), initializes all settings in the active area, as described in these specifications.

• When (*m* = 1, 49), copies the setting stored in the *m* th storage area to the active area.

If no data in the storage area is protected, all settings in the active area are initialized, as described in these specifications.

GS (M *pL pH fn m* (*fn* = 3,51)   Function 3

[Format]	ASCII	GS	(	M	*pL*	*pH*	*fn*	*m*
	Hex	1D	28	4D	*pL*	*pH*	*fn*	*m*
	Decimal	29	40	77	*pL*	*pH*	*fn*	*m*

[Range]   (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

m = 0, 1, 48, 49

[Description]   • When (*m* = 0, 48), does not load data in the storage area to the active area upon initialization.

• When (*m* = 1, 49), loads data in the storage area to the active area upon initialization.

GS (N *pL pH fn [parameters]*

[Name]   Select character style

[Description]   Execute commands for the character style as specified by the function code *fn*.

fn	Format	No.	Description
48	**GS (N *pL pH fn m***	48	Selects character color.

GS (N *pL pH fn m* (*fn* = 48)   Function 48

[Format]	ASCII	GS	(	N	*pL*	*pH*	*fn*	*m*
	Hex	1D	28	4E	*pL*	*pH*	*fn*	*m*
	Decimal	29	40	78	*pL*	*pH*	*fn*	*m*

[Range]   (*pL* + *pH* × 256) = 2 (*pL* = 2, *pH* = 0)

fn = 48

m = 49   (when the single-color paper is selected)

m = 49, 50 (when two-color paper is selected)

[Default]   *m* = 49

3.2.4 Control Command   - continue

GS (N *pL pH fn m* (*fn* = 48)   Function 48   - continue

[Description]   Print characters in the color specified by *m*.

m	Color
49	Color 1 (black (a high level of energy) on the specified two-color thermal paper)
50	Color 2 (red (a low level of energy) on the specified two-color thermal paper)

GS (k *pL pH cn fn [parameters]*

[Name]   Setup and print symbol

[Description]   Various processes are performed to the symbol specified with *cn* based on the function code (*fn*) setting.

cn	Type of Symbol
48	PDF417 (2-dimensional code)

cn	*fn*	Format No.		Description
	65	**GS (k *pL pH cn fn n***	065	Sets the number of columns for PDF417.
	66	**GS (k *pL pH cn fn n***	066	Sets the number of rows for PDF417.
	67	**GS (k *pL pH cn fn n***	067	Sets the module width of PDF417.
48	68	**GS (k *pL pH cn fn n***	068	Sets the module height of PDF417.
	69	**GS (k *pL pH cn fn m n***	069	Sets the error correction level of PDF417 .
	80	**GS (k *pL pH cn fn m d1...dk***	080	Stores received data in the symbol storage area for PDF417.
	81	**GS (k *pL pH cn fn m***	081	Prints symbol data in the symbol storage area for PDF417.
49	65	**GS (k *pL pH cn fn n1 n2***	065	QR Code: Select the model.
	67	**GS (k *pL pH cn fn n***	067	QR Code: Set the size of module
	69	**GS (k *pL pH cn fn n***	069	QR Code: Select the error correction level.
	80	**GS (k *pL pH cn fn m d1...dk***	080	QR Code: Store the data into the symbol storage area
	81	**GS (k *pL pH cn fn m***	081	QR Code: Print the symbol data in the symbol storage area.

• "Symbol data" refers to the data *(d1…dk)* received with Function 080.

- • "Symbol storage area" refers to the range for storing data received with Function 080 before encoding.

3.2.4 Control Command - continue

| **GS (*k pL pH cn fn n*** (*fn* = 65) | | | | | | **Function 65** | | |

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*n*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*n*

[Range] $(pL + pH \times 256) = 3$ ($pL = 3$, $pH = 0$)

$cn = 48$ $0 \leq n \leq 30$

[Default] $n = 0$

[Description]   Set the number of columns of the data area for PDF417.

- • $n = 0$ specifies automatic processing. When automatic processing ($n = 0$) is specified, the number of columns is calculated with the number of code words based on the range of the printable area.

- • $n \neq 0$ sets the number of columns of the data area to n code words.

[Notes]   The following data is not included in the number of columns.

- • Start and stop patterns

- • Left and right indicator code words

| **GS (*k pL pH cn fn n*** (*fn* = 66) | | | | | | **Function 66** | | |

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*n*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*n*

[Range] $(pL + pH \times 256) = 3$ ($pL = 3$, $pH = 0$)

$cn = 48$ $3 \leq n \leq 90$

$n = 0$

[Default] $n = 0$

[Description]   Set the number of rows of data area for PDF417.

- • $n = 0$ specifies automatic processing. When automatic processing ($n = 0$) is specified, the number of rows is calculated with the number of code words or the range of the printable area.

- • $n \neq 0$ sets the number of rows to n.

| **GS (*k pL pH cn fn n*** (*fn* = 67) | | | | | | **Function 67** | | |

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*n*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*n*

[Range]   ($pL + pH \times 256$) = 3 (pL = 3, pH = 0)

            cn = 48   2 ≤ n ≤ 8

[Default] n = 3

[Description]   Set the module width of one PDF417 symbol to n dots.

3.2.4 Control Command - continue

GS (*k pL pH cn fn n* (fn = 68)   Function 68

[Format] | ASCII | GS | (| k | *pL* | *pH* | *cn* | *fn* | *n* |
            |-------|----|----|----|------|------|------|------|-----|
            | Hex | 1D | 28 | 6B | *pL* | *pH* | *cn* | *fn* | *n* |
            | Decimal | 29 | 40 | 107 | *pL* | *pH* | *cn* | *fn* | *n* |

[Range]   ($pL + pH \times 256$) = 3 (pL = 3, pH = 0)

            cn = 48

            2 ≤ n ≤ 8

[Default] n = 3

[Description]   Set the module height to [(module width) × n].

            The module width is set with Function 067 of this command.

GS (*k pL pH cn fn m n* (fn = 69)   Function 69

[Format] | ASCII | GS | (| k | *pL* | *pH* | *cn* | *fn* | *m* | *n* |
            |-------|----|----|----|------|------|------|------|-----|-----|
            | Hex | 1D | 28 | 6B | *pL* | *pH* | *cn* | *fn* | *m* | *n* |
            | Decimal | 29 | 40 | 107 | *pL* | *pH* | *cn* | *fn* | *m* | *n* |

[Range]   ($pL + pH \times 256$) = 4 (pL = 4, pH = 0)

            cn = 48

            m = 48, 49

            48 ≤ n ≤ 56 (when m = 48 is specified)

            1 ≤ n ≤ 40 (when m = 49 is specified)

[Default] m = 49

            n = 1

[Description]   Set the error correction level for PDF417 symbols.

            When m = 48, the error correction level is set by the "Level Setting" error correction code word.

n	Function	Error Correction Code Word
48	Select error correction level 0	2
49	Select error correction level 1	4
50	Select error correction level 2	8
51	Select error correction level 3	16
52	Select error correction level 4	32
53	Select error correction level 5	64

æ ASEM

54	Select error correction level 6	128
55	Select error correction level 7	256
56	Select error correction level 8	512

3.2.4 Control Command   - continue

GS (*k pL pH cn fn m n* (*fn* = 69)   **Function 69**   - continue

When *m* = 49, the error correction level is set to the level indicated by the data code word value. The rate is set to [*n* × 10%].

The error correction levels in the following table are determined by the calculation [Data code word × *n* × 0.1 = (A)]

(Round up fractions of 0.5 and over and truncate others).

Result (A)	Error Correction Level	Error Correction Code Word
0 - 3	Error correction level 1	4
4 - 10	Error correction level 2	8
11 - 20	Error correction level 3	16
21 - 45	Error correction level 4	32
46 - 100	Error correction level 5	64
101 - 200	Error correction level 6	128
201 - 400	Error correction level 7	256
401 or more	Error correction level 8	512

GS (*k pL pH cn fn m d1 …dk* (*fn* = 80)   **Function 80**

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*	*d1…dk*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*m*	*d1…dk*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*m*	*d1…dk*

[Range]   4 ≤ (*pL* + *pH* × 256) ≤ 65535 (0 ≤ *pL* ≤ 255, 0 ≤ *pH* ≤ 255)

cn = 48   0 ≤ *d* ≤ 255

m = 48   *k* = (*pL* + *pH* × 256) - 3

[Description]   Stores symbol data (*d1...dk*) in the PDF417 symbol storage area.

Bytes of ((*pL* + *pH* × 256) - 3) after *m* (*d1…dk)* are processed as symbol data.

GS (*k pL pH cn fn m* (*fn* = 81)   **Function 81**

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	30
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	48

[Range]   (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)

cn = 48

m = 48

[Description]   Print the PDF417 symbol data in the symbol storage area.

[Note]   Users must consider the quiet zone for the PDF417 symbols (Upward and downward spaces and left and right spaces for the

PDF417 symbols specified in the specifications for the PDF417 symbols.)

3.2.4 Control Command - continue

GS (*k pL pH cn fn n1 n2* (*cn* = 49, *fn* = 65)   Function 65

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n1*	*n2*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*n1*	*n2*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*n1*	*n2*

[Range]   (*pL* + *pH* × 256) = 4   (*pL = 4, pH = 0*)

cn = 49

fn = 65

n1 = 50

n2 = 0

[Default]   *n1 = 50, n2 = 0*

[Description]   Selects the model for QR Code.

n1	Function
50	Selects model 2 conversion processing.

GS (*k pL pH cn fn n* (*cn* = 49, *fn* = 67)   Function 67

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*n*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*n*

[Range]   (*pL* + *pH* × 256) = 3 (*pL = 3, pH = 0*)

cn = 49

fn = 67

1 ≤ n ≤ 16

[Default]   *n = 3*

[Description]   Sets the size of the module for QR Code to *n* dots.

3.2.4 Control Command   - continue

GS (*k pL pH cn fn n* (*cn* = 49, *fn* = 69)   Function 69

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*n*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*n*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*n*

[Range] $(pL + pH \times 256) = 3$ (*pL = 3, pH = 0*)

　　　　　cn = 49

　　　　　fn = 69

　　　　　48 ≤ n ≤ 51

[Default]   *n = 48*

[Description]   Selects the error correction level for QR Code

n	**Function**	*Reference: Approx. figure of recovery*
48	Select error correction level L	7%
49	Select error correction level M	15%
50	Select error correction level Q	25%
51	Select error correction level H	30%

GS (*k pL pH cn fn m d1 …dk* (*cn* = 49, *fn* = 80)   Function 80

[Name]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*	*d1…dk*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*m*	*d1…dk*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*m*	*d1…dk*

[Range] $4 ≤ (pL + pH \times 256) ≤ 7092$ ($0 ≤ pL ≤ 255$, $0 ≤ pH ≤ 27$)

　　　　　cn = 49

　　　　　fn = 80

　　　　　m = 48

　　　　　$0 ≤ d ≤ 255$

　　　　　$k = (pL + pH \times 256) - 3$

[Description]   Stores the QR Code symbol data (d1...dk) into the symbol storage area.

3.2.4 Control Command   - continue

GS (*k pL pH cn fn m* (*cn* = 49, *fn* = 81)   **Function 81**

[Format]	ASCII	GS	(	k	*pL*	*pH*	*cn*	*fn*	*m*
	Hex	1D	28	6B	*pL*	*pH*	*cn*	*fn*	*30*
	Decimal	29	40	107	*pL*	*pH*	*cn*	*fn*	*48*

[Range]   (*pL* + *pH* × 256) = 3 (*pL* = 3, *pH* = 0)

$cn = 49$

$fn = 81$

$m = 48$

[Description]   Encodes and prints the QR Code symbol data in the symbol storage area with GS (k.

[Note]   User must secure the quiet zone (left, right, upward, and downward space areas

defined by the QR Code symbol specifications) for QR Code printing.

GS * *x y d1…d(x × y × 8)*

[Name]   Define downloaded bit image.

[Format]	ASCII	GS	*	*x*	*y*	*d1…d(x × y × 8)*
	Hex	1D	2A	*x*	*y*	*d1…d(x × y × 8)*
	Decimal	29	42	*x*	*y*	*d1…d(x × y × 8)*

[Range] $1 \leq x \leq 255$

$1 \leq y \leq 48$

$x \times y \leq 1536$

$0 \leq d \leq 255$

[Description]   Define a downloaded bit image using the dots specified by *x* and *y.*

• *x* indicate the number of bytes in the horizontal direction.

• *y* indicate the number of bytes in the vertical direction.

3.2.4 Control Command - continue

GS / *m*

[Name]   Print downloaded bit image.

[Format]   ASCII   GS   /   *m*

              Hex   1D   2F   *m*

              Decimal   29   47   *m*

[Range]   0 ≤ *m* ≤ 3

              48 ≤ *m* ≤ 51

[Description]   Print a downloaded bit image using the mode specified by *m*. *m* selects a mode from the table below:

m	Mode	Vertical Dot Density (DPI)	Horizontal Dot Density (DPI)
0, 48	Normal	180 DPI	180 DPI
1, 49	Double-width	180 DPI	90 DPI
2, 50	Double-height	90 DPI	180 DPI
3, 51	Quadruple	90 DPI	90 DPI

GS :

[Name]   Start/End macro definition.

[Format]   ASCII   GS   :

              Hex   1D   3A

              Decimal   29   58

[Description]   Start or end macro definition.

GS B *n*

[Name]   Turn white/black reverse printing mode on/off.

[Format]   ASCII   GS   B   *n*

              Hex   1D   42   *n*

              Decimal   29   66   *n*

[Range]   0 ≤ *n* ≤ 255

[Default]   *n* = 0

[Description]   Turn on or off white/black reverse printing mode.

• When the LSB is 0, white/black reverse printing mode is turned off.

• When the LSB is 1, white/black reverse printing mode is turned on.

3.2.4 Control Command - continue

GS H *n*

[Name]	Select printing position of HRI characters.

[Format]   ASCII   GS   H   *n*

Hex   1D   48   *n*

Decimal   29   72   *n*

[Default]   *n* = 0

[Description]   Select the printing position of HRI characters when printing a bar code. *n* selects the printing position as follows:

n	Printing Position
0, 48	Not printed.
1, 49	Above bar code.
2, 50	Below bar code.
3, 51	Both above and below the bar code.

• HRI indicate Human Readable Interpretation.

GS I *n*

[Name]   Transmit printer ID.

[Format]   ASCII   GS   I   *n*

Hex   1D   49   *n*

Decimal   29   73   *n*

[Range]   *n* = 112

$1 \leq n \leq 3$

$49 \leq n \leq 51$

$65 \leq n \leq 69$

3.2.4 Control Command - continue

GS I *n* - continue

[Description] Transmit the printer ID specified by *n* as follows:

n	Printer ID	Specification	ID (hexadecimal)
1, 49	Printer model ID	SR85	20
2, 50	Type ID	-	02
3, 51	ROM version ID	Depends on ROM version	01

n specify the printer information.

n	Printer ID Type	ID
65	Firmware version	Depends on firmware version
66	Manufacturer	Asem
67	Printer name	SR85
68	Product ID	-
69	Type of model	STD ENGLISH
112	Status of DIP switches	See 'DIP switch status information' on the next sheet

Type ID

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Two-byte code characters not supported.
	On	01	1	Two-byte code characters supported.
1	Off	00	0	Auto cutter not installed.
	On	02	2	Auto cutter installed.
2	Off	00	0	Reserved.
3	Off	00	0	Reserved.
4	Off	00	0	Fixed.
5	Off	00	0	Reserved.
6	Off	00	0	Reserved.
7	Off	00	0	Fixed.

3.2.4 Control Command   - continue

GS I *n* - continue

1st byte of DIP switch status information

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	DIP1 SW 1: Off
	On	01	1	DIP1 SW 1: On
1	Off	00	0	DIP1 SW 2: Off
	On	02	2	DIP1 SW 2: On
2	Off	00	0	DIP1 SW 3: Off
	On	04	4	DIP1 SW 3: On
3	Off	00	0	DIP1 SW 4: Off
	On	08	8	DIP1 SW 4: On
4	Off	00	0	Reserved.
5	Off	00	0	Reserved.
6	On	40	64	Fixed.
7	Off	00	0	Fixed.

2nd byte of DIP switch status information

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	DIP1 SW 5: Off
	On	01	1	DIP1 SW 5: On
1	Off	00	0	DIP1 SW 6: Off
	On	02	2	DIP1 SW 6: On
2	Off	00	0	DIP1 SW 7: Off
	On	04	4	DIP1 SW 7: On
3	Off	00	0	DIP1 SW 8: Off
	On	08	8	DIP1 SW 8: On
4	Off	00	0	Reserved.
5	Off	00	0	Reserved.
6	On	40	64	Fixed.
7	Off	00	0	Fixed.

3.2.4 Control Command   - continue

GS I *n*   - continue

3st byte of DIP switch status information

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	DIP2 SW 1: Off
	On	01	1	DIP2 SW 1: On
1	Off	00	0	DIP2 SW 2: Off
	On	02	2	DIP2 SW 2: On
2	Off	00	0	DIP2 SW 3: Off
	On	04	4	DIP2 SW 3: On
3	Off	00	0	DIP2 SW 4: Off
	On	08	8	DIP2 SW 4: On
4	Off	00	0	Reserved.
5	Off	00	0	Reserved.
6	On	40	64	Fixed.
7	Off	00	0	Fixed.

4nd byte of DIP switch status information

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	DIP2 SW 5: Off
	On	01	1	DIP2 SW 5: On
1	Off	00	0	DIP2 SW 6: Off
	On	02	2	DIP2 SW 6: On
2	Off	00	0	DIP2 SW 7: Off
	On	04	4	DIP2 SW 7: On
3	Off	00	0	DIP2 SW 8: Off
	On	08	8	DIP2 SW 8: On
4	Off	00	0	Reserved.
5	Off	00	0	Reserved.
6	On	40	64	Fixed.
7	Off	00	0	Fixed.

3.2.4 Control Command - continue

GS L *nL nH*

[Name]	Set left margin.				
[Format]	ASCII	GS	L	*nL*	*nH*
	Hex	1D	4C	*nL*	*nH*
	Decimal	29	76	*nL*	*nH*
[Range]	$0 \leq nL \leq 255$				
	$0 \leq nH \leq 255$				
[Default]	*nL* = *nH* = 0				
[Description]	Set the left margin using *nL* and *nH*.				

The left margin is set to [(*nL* + *nH* × 256) × horizontal motion unit)] inches.

Printable area

Left margin   Printing area width
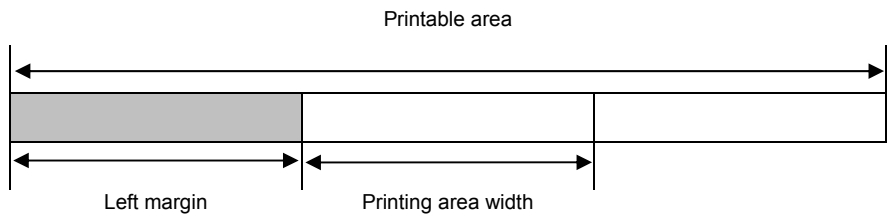
GS P *x y*

[Name]	Set horizontal and vertical motion units.				
[Format]	ASCII	GS	P	*x*	*y*
	Hex	1D	50	*x*	*y*
	Decimal	29	80	*x*	*y*
[Range]	$0 \leq nL \leq 255$				
	$0 \leq nH \leq 255$				
[Default]	*x* = 180				
	y = 360				
[Description]	Set the horizontal and vertical motion unit to approximately 25.4/*x* mm { 1/*x* inch } and approximately 25.4/*y* mm { 1/*y* inches }				

respectively.

When *x* and *y* are set to 0, the default setting of each value is used.

3.2.4 Control Command   - continue

---

① GS V *m*   ② GS V *m n*

[Name]   Select cut mode and cut paper.

[Format]   ① ASCII   GS   V   *m*   ② ASCII   GS   V   *m*   *n*

            Hex   1D   56   *m*   Hex   1D   56   *m*   *n*

            Decimal   29   86   *m*   Decimal   29   86   *m*   *n*

[Range]   ① *m* = 1, 49   ② *m* = 66, $0 \leq n \leq 255$

[Description]   Select a mode for cutting paper and executes paper cutting. The value of *m* selects the mode as follows:

m	Print Mode
0, 1, 49	Partial cut (one point left uncut)
66	Feeds paper (cutting position + [*n* × (vertical motion unit)]), and cuts the paper partially (one point left uncut)

GS W *nL nH*

[Name]   Set printing area width.

[Format]   ASCII   GS   W   *nL*   *nH*
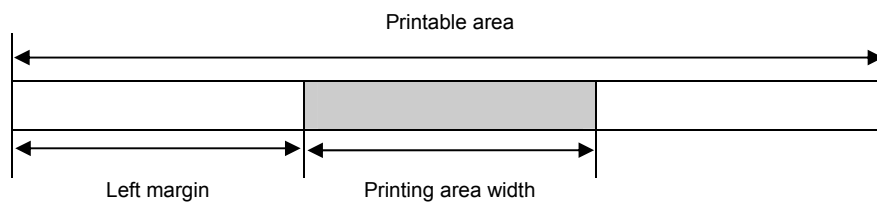
            Hex   1D   57   *nL*   *nH*

            Decimal   29   87   *nL*   *nH*

[Range] $0 \leq nL \leq 255$ $0 \leq nH \leq 255$

[Default]   (*nL* + *nH* × 256) = 512 (*nL* = 0, *nH* = 2)   (for 80 mm of the paper width)

         (*nL* + *nH* × 256) = 360 (*nL* = 104, *nH* = 1)   (for 58 mm of the paper width)

[Description]   Set the printing area width to the area specified by *nL* and *nH*.

         The printing area width is set to [(*nL* + *nH* × 256) × horizontal motion unit)] inches.

Printable area

Left margin   Printing area width

3.2.4 Control Command   - continue

GS \ *nL nH*

[Name]   Set relative vertical print position in page mode

[Format]   ASCII   GS   \   *nL*   *nH*

             Hex   1D   5C   *nL*   *nH*

             Decimal   29   92   *nL*   *nH*

[Range]   0 ≤ *nL* ≤ 255

             0 ≤ *nH* ≤ 255

[Description]   Set the relative vertical print starting position from the current position in page mode.

             This command sets the distance from the current position to [(*nL* + *nH* × 256) × vertical or horizontal motion unit] inches.

GS ^ *r t m*

[Name]   Execute macro.

[Format]   ASCII   GS   ^   *r*   *t*   *m*

             Hex   1D   5E   *r*   *t*   *m*

             Decimal   29   94   *r*   *t*   *m*

[Range]   *m* = 0, 1   0 ≤ *r* ≤ 255

                                    0 ≤ *t* ≤ 255

[Description]   • *r* specify the number of times to execute the macro.

             • *t* specify the waiting time for executing the macro.

             • *m* specify macro executing mode.

             • When the LSB of *m* = 0, the macro executes *r* times continuously at the interval specified by *t*.

             • When the LSB of *m* = 1, after waiting for the period specified by *t*, the PAPER OUT LED indicator blink and the

               printer wait for the FEED button to be pressed. After the button is pressed, the printer executes the macro once.

               The printer repeats the operation *r* times.

3.2.4 Control Command - continue

GS a *n*

[Name]   Enable/Disable Automatic Status Back.

[Format]   ASCII   GS   a   *n*

Hex   1D   61   *n*

Decimal   29   97   *n*

[Range] $0 \leq n \leq 255$

[Default]   *n* = 0

[Description]   Enable or disable ASB and specifies the status items to include, using *n* as follows:

Bit	ON/OFF	Hex	Decimal	Status for ASB
0	Off	00	0	Drawer kick-out connector pin 3 status disabled.
	On	01	1	Drawer kick-out connector pin 3 statuses enabled.
1	Off	00	0	On-line/off-line disabled.
	On	02	2	On-line/off-line enabled.
2	Off	00	0	Error status disabled.
	On	04	4	Error status enabled.
3	Off	00	0	Paper roll sensor status disabled.
	On	08	8	Paper roll sensor status enabled.
4-7	-	-	-	Undefined.

The status to be transmitted is the four bytes that follow: First byte (printer information)

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Fixed.
1	Off	00	0	Fixed.
2	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	04	4	Drawer kick-out connector pin 3 is HIGH.
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	On	10	16	Fixed.
5	Off	00	0	Cover is closed.
	On	20	32	Cover is open.
6	Off	00	0	Paper is not being fed by using the paper FEED button.
	On	40	64	Paper is being fed by using the paper FEED button.
7	Off	00	0	Fixed.

3.2.4 Control Command - continue

GS a *n* - continue

If the cover is open, the printer goes offline. Second byte (printer information)

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Not in on-line waiting status.
	On	01	1	During on-line waiting status.
1	Off	00	0	Panel button OFF.
	On	02	2	Panel button ON.
2	Off	00	0	No mechanical error.
	On	04	4	Mechanical error has occurred.
3	Off	00	0	No auto cutter error.
	On	08	8	Auto cutter error occurred.
4	Off	00	0	Fixed.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error has occurred.
6	Off	00	0	No automatically recoverable error.
	On	40	64	Automatically recoverable error has occurred.
7	Off	00	0	Fixed.

Third byte (paper sensor information)

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Roll paper near-end sensor: Paper adequate.
	On	01	1	Roll paper near-end sensor: Paper near end.
1	Off	00	0	Roll paper near-end sensor: Paper present.
	On	02	2	Roll paper near-end sensor: Paper not present.
2	Off	00	0	Roll paper end sensor: Paper present.
	On	04	4	Roll paper end sensor: Paper not present.
3	Off	00	0	Roll paper end sensor: Paper present.
	On	08	8	Roll paper end sensor: Paper not present.
4	Off	00	0	Fixed.
5	Off	00	0	Reserved.
6	Off	00	0	Reserved.
7	Off	00	0	Fixed.

3.2.4 Control Command   - continue

GS a *n*   - continue

The paper roll end sensor is unstable when the cover is open. Fourth byte (paper sensor information)

Bit	ON/OFF	Hex	Decimal	Function
0	On	01	1	Reserved.
1	On	02	2	Reserved.
2	On	04	4	Reserved.
3	On	08	8	Reserved.
4	Off	00	0	Fixed.
5	Off	00	0	Reserved.
6	Off	00	0	Reserved.
7	Off	00	0	Fixed.

[Note]   Any accumulated ASB status signals left for transmission from the last to the newest ASB status transmission shall be

transmitted together at one time as one ASB status, showing the presence of change, followed by the latest ASB status

Example :   In the normal (wait) state, the ASB status is configured as follows.

First Status	Second Status	Third Status	Fourth Status
0001 0000	0000 0000	0000 0000	0000 1111

.   When a sequence of operations Is performed, the near end is detected, the printer cover is opened, and then the

printer cover is closed, the following pieces of data are accumulated.

	First Status	Second Status	Third Status	Fourth Status	
①	0001 0000	0000 0000	0000 0011	0000 1111	Near end detection
②	0011 1000	0000 0000	0000 0011	0000 1111	The printer cover is opened
③	0001 0000	0000 0000	0000 0011	0000 1111	The printer cover is closed

When the ASB status is received following this, a total of eight (8) bytes of ASB will be transmitted as follows.

Accumulated ASB (①+②+③）

	First Status	Second Status	Third Status	Fourth Status
Accumulated ASB (①+②+③）	0011 1000	0000 0000	0000 0011	0000 1111

+

	First Status	Second Status	Third Status	Fourth Status
The latest ASB (③)	0001 0000	0000 0000	0000 0011	0000 1111

Fourth Status

3.2.4 Control Command   - continue

GS f *n*

[Name]   Select font for Human Readable Interpretation (HRI) characters.

[Format]   ASCII   GS   f   *n*

               Hex   1D   66   *n*

               Decimal 29   102   *n*

[Range]   *n* = 0, 1, 48, 49

[Default]   *n* = 0

[Description] Select a font for the HRI characters used when printing a bar code. *n* selects a font from the following table:

n	Font
0, 48	Font A (12 × 24)
1, 49	Font B (9 × 17)

GS h *n*

[Name]   Set bar code height.

[Format]   ASCII   GS   h   *n*

               Hex   1D   68   *n*

               Decimal 29   104   *n*

[Range] $1 \leq n \leq 255$

[Default]   *n* = 162

[Description] Set the height of the bar code.

               n specify the number of dots in the vertical direction.

① GS k *m d1... dk NUL*,   ② GS k *m n d1... dn*

[Name]   Print bar code.

[Format]   ① ASCII   GS   k   *m*   *d1...dk*   *NUL*

                  Hex   1D   6B   *m*   *d1...dk*   *00*

                  Decimal 29   107   *m*   *d1...dk*   *0*

               ② ASCII   GS   k   *m*   *n*   *d1... dn*

                  Hex   1D   6B   *m*   *n*   *d1... dn*

                  Decimal 29   107   *m*   *n*   *d1... dn*

[Range]   ① $0 \leq m \leq 6$ (*k* and d depends on the bar code system used.)

               ② $65 \leq m \leq 73$ (*n* and d depends on the bar code system used)

3.2.4 Control Command - continue

① **GS k *m d1... dk NUL*, ② GS k *m n d1... dn*** - continue

[Description]   Select a bar code system and prints the bar-code. *m* select a bar code system as follows:

	m	Bar Code System	Number of Characters	Remarks
①	0	UPC-A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	1	UPC-E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	2	EAN13	$12 \leq k \leq 13$	$48 \leq d \leq 57$
	3	EAN8	$7 \leq k \leq 8$	$48 \leq d \leq 57$
	4	CODE 39	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$
	5	ITF	$1 \leq k$ (even number)	$48 \leq d \leq 57$
	6	CODABAR	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$
②	65	UPC-A	$11 \leq n \leq 12$	$48 \leq d \leq 57$
	66	UPC-E	$11 \leq n \leq 12$	$48 \leq d \leq 57$
	67	EAN13	$12 \leq n \leq 13$	$48 \leq d \leq 57$
	68	EAN8	$7 \leq n \leq 8$	$48 \leq d \leq 57$
	69	CODE 39	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90, 32, 36, 37, 43, 45, 46, 47$
	70	ITF	$1 \leq n \leq 255$ (even number)	$48 \leq d \leq 57$
	71	CODABAR	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 68, 36, 43, 45, 46, 47, 58$
	72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$
	73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$

[Note]   **Description of the CODE128 Bar Code**

- In CODE128 bar code system, it is possible to represent 128 ASCII characters and 2-digit numerals using one bar code character that is defined by combining one of the 103 bar code characters and 3 code sets. Each code set is used for representing the following characters

Code set A: ASCII characters 00H to 5FH

Code set B: ASCII characters 20H to 7FH

Code set C: 2-digits numeral characters using one character (100 numerals from 00 to 99)

- The following special characters are also available in CODE128:

SHIFT character   In code set A, the character just after SHIFT is processed as a character for code set B.

In code set B, the character just after SHIFT is processed as the character for code set A.

SHIFT characters cannot be used in code set C.

Code set selection character (CODEA, CODEB, CODEC)

This character switches the following code set to code set A, B, or C.

Function character (FNC1, FNC2, FNC3, FNC4)

The usage of function characters depends on the application software.

In code set C, only FNC1 is available.

3.2.4 Control Command - continue

> ① **GS k** *m d1... dk NUL,* ② **GS k** *m n d1... dn* - continue

[Code Table] Printable characters in code set A

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
NUL	00	0	#	23	35	F	46	70
SOH	01	1	$	24	36	G	47	71
STX	02	2	%	25	37	H	48	72
ETX	03	3	&	26	38	I	49	73
EOT	04	4	'	27	39	J	4A	74
ENQ	05	5	(	28	40	K	4B	75
ACK	06	6	)	29	41	L	4C	76
BEL	07	7	*	2A	42	M	4D	77
BS	08	8	+	2B	43	N	4E	78
HT	09	9	,	2C	44	O	4F	79
LF	0A	10	-	2D	45	P	50	80
VT	0B	11	.	2E	46	Q	51	81
FF	0C	12	/	2F	47	R	52	82
CR	0D	13	0	30	48	S	53	83
SO	0E	14	1	31	49	T	54	84
SI	0F	15	2	32	50	U	55	85
DLE	10	16	3	33	51	V	56	86
DC1	11	17	4	34	52	W	57	87
DC2	12	18	5	35	53	X	58	88
DC3	13	19	6	36	54	Y	59	89
DC4	14	20	7	37	55	Z	5A	90
NAK	15	21	8	38	56	[	5B	91
SYN	16	22	9	39	57	\	5C	92
ETB	17	23	:	3A	58	]	5D	93
CAN	18	24	;	3B	59	^	5E	94
EM	19	25	<	3C	60	_	5F	95
SUB	1A	26	=	3D	61	FNC1	7B,31	123,49
ESC	1B	27	>	3E	62	FNC2	7B,32	123,50
FS	1C	28	?	3F	63	FNC3	7B,33	123,51
GS	1D	29	@	40	64	FNC4	7B,34	123,52
RS	1E	30	A	41	65	SHIFT	7B,53	123,83
US	1F	31	B	42	66	CODEB	7B,42	123,66
SP	20	32	C	43	67	CODEC	7B,43	123,67
!	21	33	D	44	68	-	-	-
"	22	34	E	45	69	-	-	-

3.2.4 Control Command - continue

① **GS k _m d1... dk NUL_,** ② **GS k _m n d1... dn_** - continue

[Code Table] Printable characters in code set B

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
SP	20	32	B	42	66	e	65	101
!	21	33	C	43	67	f	66	102
"	22	34	D	44	68	g	67	103
#	23	35	E	45	69	h	68	104
$	24	36	F	46	70	i	69	105
%	25	37	G	47	71	j	6A	106
&	26	38	H	48	72	k	6B	107
'	27	39	I	49	73	l	6C	108
(	28	40	J	4A	74	m	6D	109
)	29	41	K	4B	75	n	6E	110
*	2A	42	L	4C	76	o	6F	111
+	2B	43	M	4D	77	p	70	112
,	2C	44	N	4E	78	q	71	113
_	2D	45	O	4F	79	r	72	114
.	2E	46	P	50	80	s	73	115
/	2F	47	Q	51	81	t	74	116
0	30	48	R	52	82	u	75	117
1	31	49	S	53	83	v	76	118
2	32	50	T	54	84	w	77	119
3	33	51	U	55	85	x	78	120
4	34	52	V	56	86	y	79	121
5	35	53	W	57	87	z	7A	122
6	36	54	X	58	88	{	7B,7B	123,123
7	37	55	Y	59	89	|	7C	124
8	38	56	Z	5A	90	}	7D	125
9	39	57	[	5B	91	—	7E	126
:	3A	58	\	5C	92	DEL	7F	127
;	3B	59	]	5D	93	FNC1	7B,31	123,49
<	3C	60	^	5E	94	FNC2	7B,32	123,50
=	3D	61	_	5F	95	FNC3	7B,33	123,51
>	3E	62	`	60	96	FNC4	7B,34	123,52
?	3F	63	a	61	97	SHIFT	7B,53	123,83
@	40	64	b	62	98	CODEA	7B,41	123,66
A	41	65	c	63	99	CODEC	7B,43	123,67
-	-	-	d	64	100	-	-	-

3.2.4 Control Command - continue

① **GS k *m d1... dk NUL*,**   ② **GS k *m n d1... dn*** - continue

[Code Table] Printable characters in code set C

Character	Transmit Data		Character	Transmit Data		Character	Transmit Data	
	Hex	Decimal		Hex	Decimal		Hex	Decimal
00	00	0	35	23	35	70	46	70
01	01	1	36	24	36	71	47	71
02	02	2	37	25	37	72	48	72
03	03	3	38	26	38	73	49	73
04	04	4	39	27	39	74	4A	74
05	05	5	40	28	40	75	4B	75
06	06	6	41	29	41	76	4C	76
07	07	7	42	2A	42	77	4D	77
08	08	8	43	2B	43	78	4E	78
09	09	9	44	2C	44	79	4F	79
10	0A	10	45	2D	45	80	50	80
11	0B	11	46	2E	46	81	51	81
12	0C	12	47	2F	47	82	52	82
13	0D	13	48	30	48	83	53	83
14	0E	14	49	31	49	84	54	84
15	0F	15	50	32	50	85	55	85
16	10	16	51	33	51	86	56	86
17	11	17	52	34	52	87	57	87
18	12	18	53	35	53	88	58	88
19	13	19	54	36	54	89	59	89
20	14	20	55	37	55	90	5A	90
21	15	21	56	38	56	91	5B	91
22	16	22	57	39	57	92	5C	92
23	17	23	58	3A	58	93	5D	93
24	18	24	59	3B	59	94	5E	94
25	19	25	60	3C	60	95	5F	95
26	1A	26	61	3D	61	96	60	96
27	1B	27	62	3E	62	97	61	97
28	1C	28	63	3F	63	98	62	98
29	1D	29	64	40	64	99	63	99
30	1E	30	65	41	65	FNC1	7B,31	123,49
31	1F	31	66	42	66	CODEA	7B,41	123,65
32	20	32	67	43	67	CODEB	7B,42	123,66
33	21	33	68	44	68	-	-	-
34	22	34	69	45	69	-	-	-

3.2.4 Control Command - continue

GS r *n*

[Name]   Transmit status.

[Format]   ASCII   GS   r   *n*

                Hex   1D   72   *n*

                Decimal 29   114   *n*

[Range]   *n* = 1, 2, 49, 50

[Description]   Transmit the status specified by *n* as follows.

n	Function
1,49	Transmits paper sensor status.
2,50	Transmits drawer kick-out connector status.

Paper sensor status (*n* = 1, 49):

Bit	ON/OFF	Hex	Decimal	Function
0, 1	Off	00	0	Roll paper near-end sensor: paper adequate.
	On	03	3	Roll paper near-end sensor: paper near end.
2, 3	Off	00	0	Roll paper end sensor: paper present.
	On	0C	12	Roll paper end sensor: paper not present.
4	Off	00	0	Fixed.
5	Off	00	0	Reserved.
6	Off	00	0	Reserved.
7	Off	00	0	Fixed.

• **Bits 2 and 3**: This command cannot be executed, since the printer goes offline when the roll paper end sensor detects that the paper is not present. Therefore, the status of bit 2 (1) and bit 3 (1) is not transmitted.

Drawer kick-out connector status (*n* = 2, 50):

Bit	ON/OFF	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	01	1	Drawer kick-out connector pin 3 is HIGH.
1	Off	00	0	Reserved.
2	Off	00	0	Reserved.
3	Off	00	0	Reserved.
4	Off	00	0	Fixed.
5	Off	00	0	Reserved.
5	Off	00	0	Reserved.
7	Off	00	0	Fixed.

3.2.4 Control Command   - continue

GS v *0 m xL xH yL yH d1….dk*

[Name]	Print raster bit image								

[Format]

	ASCII	GS	v	0	m	xL	xH	yL	yH	d1….dk
	Hex	1D	76	30	m	xL	xH	yL	yH	d1….dk
	Decimal	29	118	48	m	xL	xH	yL	yH	d1….dk

[Range] $0 \leq m \leq 3$ $48 \leq m \leq 51$

$0 \leq (xL + xH \times 256) \leq 128$ $(0 \leq xL \leq 128, xH = 0)$

$0 \leq (yL + yH \times 256) \leq 4095$ $(0 \leq yL \leq 255, 0 \leq yH \leq 15)$

$0 \leq d \leq 255$ $k = (xL + xH \times 256) \times (yL + yH \times 256)$

[Description]   Select Raster bit-image mode. The value of *m* selects the mode, as follows:

M	Mode	Vertical Dot Density (DPI)	Horizontal Dot Density (DPI)
0, 48	Normal	180 DPI	180 DPI
1, 49	Double-width	180 DPI	90 DPI
2, 50	Double-height	90 DPI	180 DPI
3, 51	Quadruple	90 DPI	90 DPI

- *xL, xH*, select the number of data bits (*xL+xH*x256) in the horizontal direction for the bit image.

- *yL, yH*, select the number of data bits (*yL+yH*x256) in the vertical direction for the bit image.

GS w *n*

[Name]	Set bar code width.			

[Format]

	ASCII	GS	w	*n*
	Hex	1D	77	*n*
	Decimal	29	119	*n*

[Range] $2 \leq n \leq 6$

[Default] *n* = 3

[Description]   Set the horizontal size of the bar code. *n* specifies the bar code width as follows.

n	Module Width for Multi-Level Bar Code	Binary-Level Bar Code	
		Thin Element Width (mm)	Thick Element Width (mm)
2	0.282	0.282	0.706
3	0.423	0.423	1.129
4	0.564	0.564	1.411
5	0.706	0.706	1.834
6	0.847	0.847	2.258

- Multi-level bar codes are as follows: UPC-A, UPC-E, EAN13, EAN8, CODE93, and CODE128.

- Binary-level bar codes are as follows: CODE39, ITF, and CODABAR

3.2.4 Control Command - continue

[STAR Emulation Mode] Command Summary

Control	Hexadecimal codes	Function
<ESC> "R" n	1B 52 n	Select International character set
<ESC> <GS> t n	1B 1D 74 n	Select character table
<ESC> "/" "1"	1B 2F 31	Select slash zero
<ESC> "/" <1>	1B 2F 01	
<ESC> "/" "0"	1B 2F 30	Select normal zero
<ESC> "/" <0>	1B 2F 00	
<ESC> "b" n1 n2 n3 n4 d1…dk <RS>	1B 62 n1 n2 n3 n4 d1…dk 1E	Select bar code printing
<ESC> "M"	1B 4D	Select 12-dot pitch printing
<ESC> "p"	1B 70	Select 14-dot pitch Printing
<ESC> "P"	1B 50	Select 15-dot pitch Printing
<ESC> ":"	1B 3A	Select 16-dot pitch Printing
<ESC> <SP> n	1B 20 n	Set character spacing
<SO>	0E	Sets the printing magnified double in character width.
<DC4>	14	Resets the printing magnified in character width.
<ESC> "W" n	1B 57 n	Sets the magnification rate in character width.
<ESC> <SO>	1B 0E	Sets the printing magnified double in character height.
<ESC> <DC4>	1B 14	Resets the printing magnified in character height.
<ESC> "h" n	1B 68 n	Sets the magnification rate in character height.
<ESC> "-" "1"	1B 2D 31	Select underlining
<ESC> "-" <1>	1B 2D 01	
<ESC> "_" "1"	1B 5F 31	Select overlining
<ESC> "_" <1>	1B 5F 01	
<ESC> "4"	1B 34	Select White/Black reverse printing
<ESC> "5"	1B 35	Cancel White/Black reverse printing
<SI>	0F	Inverted printing

3.2.4 Control Command - continue

[STAR Emulation Mode] Command Summary - continue

Control	Hexadecimal codes	Function
<DC2>	12	Cancel inverted printing
<ESC> "E"	1B 45	Select emphasized printing
<ESC> "F"	1B 46	Cancel emphasized printing
<ESC> "C" n	1B 43 n	Set page length in lines
<ESC> "C" <0> n	1B 43 00 n	Set page length in inches
<ESC> "N" n	1B 4E n	Set bottom margin
<ESC> "O"	1B 4F	Cancel bottom margin
<ESC> "l" n	1B 6C n	Set left margin
<ESC> "Q" n	1B 51 n	Set right margin
<LF>	0A	Line Feed
<ESC> "a" n	1B 61 n	Feed paper n lines
<FF>	0C	Form Feed
<HT>	09	Horizontal tab
<VT>	0B	Vertical tab
<ESC> "z" "1"	1B 7A 31	Set line spacing to 4mm
<ESC> "0"	1B 30	Set line spacing to 3mm
<ESC> "J" n	1B 4A n	One time n/4 mm feed
<ESC> "I" n	1B 49 n	One time n/8 mm feed
<ESC> "B" n1 n2… <0>	1B 42 n1 n2 … 00	Set vertical tab stops
<ESC> "D" n1 n2…<0>	1B 43 n1 n2 … 00	Set horizontal tab stops
<ESC> <GS> "A" n1 n2	1B 1D 41 n1 n2	Absolute position setting
<ESC> <GS> "R" n1 n2	1B 1D 52 n1 n2	Relative position setting
<ESC> <GS> "a" n	1B 1D 61 n	Alignment
<ESC> "K" n1 n2 d1…dk	1B 4B n1 n2 d1…dk	Print normal density graphics
<ESC> "L" n1 n2 d1…dk	1B 4C n1 n2 d1…dk	Print high density graphics
<ESC> "k" n1 n2 d1…dk	1B 6B n1 n2 d1…dk	Print fine density graphics
<ESC> "X" n1 n2 d1…dk	1B 58 n1 n2 d1…dk	Print fine density graphics
<ESC> <FS> "p" n m	1B 1C 70 n m	Print NV bit image
<ESC> <FS> "q" n d1…	1B 1C 71 n d1…	Define NV bit image

3.2.4 Control Command - continue

[STAR Emulation Mode] Command Summary - continue

Control	Hexadecimal codes	Function
<ESC> "&" "1" "1 " n m1 m2 … m48	1B 26 31 31 n m1 m2…m48	Define download character
<ESC> "&" <1> <1> n m1 m2…m48	1B 26 01 01 n m1 m2…m48	
<ESC> "&" "1" "0" n	1B 26 31 30 n	Delete a download character
<ESC> "&" <1> <0> n	1B 26 01 00 n	
<ESC> "%" "1"	1B 25 31	Enable download character set
<ESC> "%" <1>	1B 25 01	
<ESC> "%" "0"	1B 25 30	Disable download character set
<ESC> "%" <0>	1B 25 00	
<ESC> <GS> "*" x y d1…d(x×y×8)	1B 1D 2A x y d1…d(x×y×8)	Definition of download bit image
<ESC> <GS> "/" m	1B 1D 2F m	Printing of download nit image
<ESC> <BEL> n1 n2	1B 07 n1 n2	Define drive pulse width for peripheral device #1
<BEL>	07	Control peripheral device #1
<FS>	1C	Control peripheral device #1 immediately
<EM>	19	Control peripheral device #2
<SUB>	1A	Control peripheral device #2 immediately
<ESC> "d" n	1B 64 n	Partial-cut command to the auto cutter
<CAN>	18	Cancel last line & Initialize printer immediately
<DC3>	13	Deselect printer
<DC1>	11	Set select mode
<RS>	1E	Beep the buzzer
<ESC> "@"	1B 40	Initialize printer
<ENQ>	05	Inquiry(Status inquiry)
<EOT>	04	Near end status inquiry
<ESC> "?" <LF> <NUL>	1B 3F 0A 00	Reset printer hardware (Perform test print)
<ESC> "8" n1 n2 d1…	1B 38 n1 n2 d1…	Registers a logo pattern
<ESC> "9" n1 n2	1B 39 n1 n2	Prints a logo pattern

3.2.6 Control Command

GS (*[parameters]*

[Name] Set black mark control functions

[Description]   This command performs various functions to control the black mark (BM) paper as follows:

m	Format	No.	Description
2	**GS (F pL pH m a nL nH**	2	Sets the paper feed amount to adjust the paper cutting position after sensing BM.
112	**GS (F pL pH m aL aH bL bH S**	112	Specifies the black mark paper format.

GS (F pL pH m a nL nH   *(m = 2)* Function 2

[Name]   Sets the paper feed amount to adjust the print starting position after sensing BM.

[Format]

ASCII	GS	(	F	pL	pH	m	a	nL	nH
Hex	1D	28	46	pL	pH	m	a	nL	nH
Decimal	29	40	70	pL	pH	m	a	nL	nH

[Range]   *(pL + pH x 256) = 4 (pL = 4, pH = 0)*

               m = 2

               a = 0, 48

               0 ≤ (nL + nH × 256) ≤ 65535 (0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255)

[Default]   *nL = 0, nH = 0*

[Description] This command sets the value for the adjustment of paper cutting position after sensing BM.

               • pL, pH specifies (pL + pH × 256) as the number of bytes after pH (m, a, nL, and nH)

               • nL, nH specifies [(nL + nH × 256) × vertical motion units] as the adjustment value.

[Remarks]   This command affects to the cutting operations as follows :

               • Paper cut by GS V m n.

               • Paper cut after paper feeding triggered by the paper FEED button.

               • Paper cut after paper feeding with the cover closed.

        This command is only effective for the forward paper feeding.

     The maximum adjustable length is 400 mm. If the adjustment value to be specified exceeds the maximum value,

     the adjustment value is automatically set to the maximum value.

3.2.6 Control Command - continue

| *GS (F pL pH m aL aH bL bH* | | | | | | *(m = 112)* | **Function 112** | | | |

[Name]   Specifies the black mark paper format

[Format]

ASCII	GS	(	F	pL	pH	m	nL	nH	bL	bH
Hex	1D	28	46	pL	pH	m	nL	nH	bL	bH
Decimal	29	40	70	pL	pH	m	nL	nH	bL	bH

[Range]   *(pL + pH x 256) = 5 (pL = 5, pH = 0)*

m = 112

aL = 141, aH = 0

0 ≤ (bL + bH × 256) ≤ 65535 (0 ≤ bL ≤ 255, 0 ≤ bH ≤ 255)

[Default]   *bL = 20, bH = 11 (BM interval (top of a BM ~ top of next BM): 400 mm)*

[Description]   This command sets the black mark paper format.

• pL, pH specifies (pL + pH × 256) as the number of bytes after pH (m, aL, aH,bL, bH).

• bL, bH specifies as [(bL + bH × 256) × vertical motion units] as the BM interval.

[Remarks]   The BM interval ranges from 40 to 400 mm.

If the BM interval specified is out of range, this command is ignored.

| **GS <** | |

[Name]   Black mark initialization

[Format]

ASCII	GS	<
Hex	1D	3C
Decimal	29	60

[Description]   This command performs the black mark initialization.

[Remarks]   This command initializes the values specified by the black mark control command GS (F.

• paper cutting position, black mark paper format.

The initialized values are the same as the ones that are set when the power is turned on.

Chapter

4

Disassembly and Assembly

4.1 Case-Assy Block

4.2 Cover-LED,LCD Block

4-3 Cover-Open Block

4.4 Paper Supply Block

4.5 Main Board Case Block
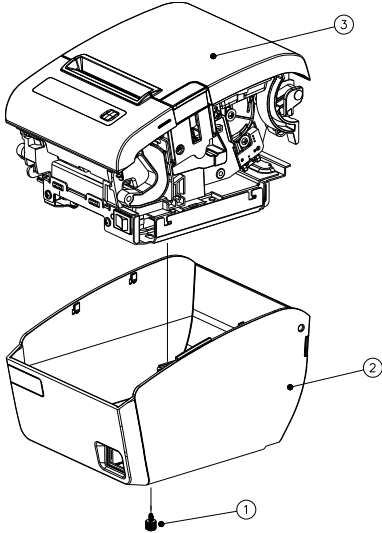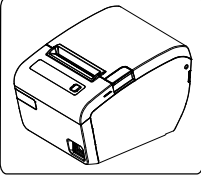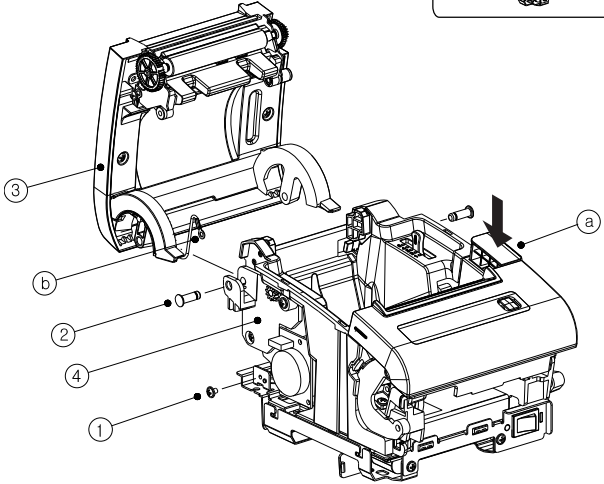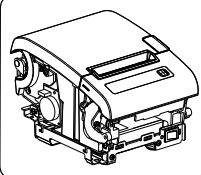
4.6 Roller Assy Block

4.7 Printer Block

⚠CAUTION

- ■ Before installation, be sure to turn off the power switch.
- ■ Use gloves to protect your hand from being cut by the angle and the chassis.
- ■ Connect all the cables correctly. When connecting or disconnecting the cables, be careful not to apply stress to the cables. (It may cause disconnection)
- ■ Be careful not to bind interface cables and AC power cord together.
- ■ To install, reverse the removal procedure.

4.1 Case-Assy Block

1. Remove the screw(①) and separate the Case-Upper ass'y(③) from the Case-Lower ass'y(②).

1. Push the Open-Button(ⓐ) to open the Cover-Open(③).

2. Remove the screw(①) and separate the GND-Cable(ⓑ).

WARNING!

When assemble, surely assemble the GND-Cable(ⓑ) with the screw(①).

3. Separate the two hinge pins(②) and separate the Cover-Open(③) from the Paper-Supply(④).

4.1 Case-Assy Block   - continue
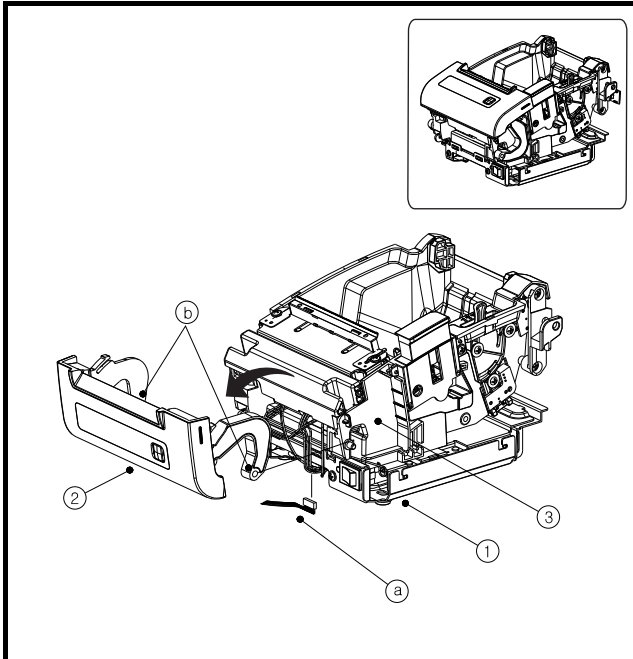
1. Separate the Cable(ⓐ) from the Main board(①).

2. Open the Cover-LED(②) in the direction of the arrows in the figure and p ull the Hinge-Part(ⓑ) out of the Paper-Supply(③).
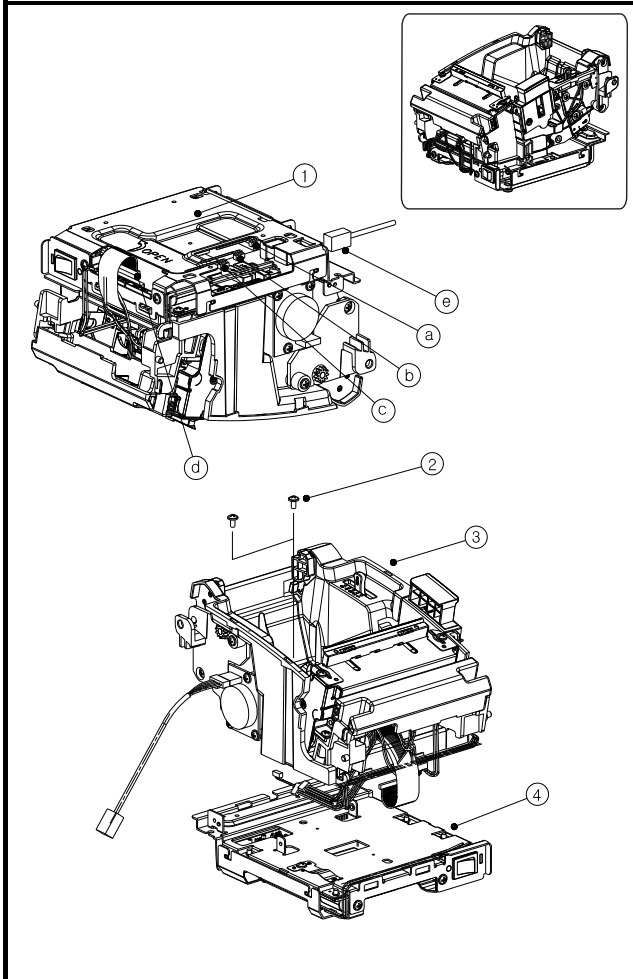
1. Turn the Printer upside down as shown.

2. Separate the five Cable(ⓐⓑⓒⓓⓔ) from the Main board(①).

3. Remove the two screws(②) and Separate the Paper-Supply(③) from the Main board(④).

4.2 Cover-LED, LCD Block

1. Remove the two screws(①) and separate the LED-Cover(③) from Holder-Display(②).

2. Remove the two screws(④) and separate the LED-Board(⑤) from the Holder-Display(②).

3. Separate the Cap-Hinge(⑦) and separate the Cable(ⓐ) from the LED-Board(⑤) and Holder-Display(②).

4. Separate the Holder-Button(⑥) from the LED-Board(⑤).

4.3. Cover-Open Block

1. Remove the four screws(①,②) and separate the Cover-Hinge(④) and Roller ass'y(③) from the Open-Cover(⑤).

2. Separate the Cap-Hinge(⑥) from the Cover-hinge(④) and separate the GND-Cable(ⓐ) from the Cover-Hinge(④).

WARNING!

When assemble, surely assemble the GND-Cable(ⓐ) with Roller ass'y(③).

3. Separate the Roller ass'y(③) from the Cover-Hinge(④).

4. Remove the one sc rew(⑦) and separate the GND-Cable(ⓐ) from the Roller ass'y(③).

4.4 Paper Supply Block

1. Remove the two screws(①) and separate the Cover-Dummy(②) from the Paper-Supply(⑤).

2. Remove the two screws(③) and separate the Printer-Mechanism(④) from the Paper-Supply(⑤).

4.4 Paper Supply Block - continue
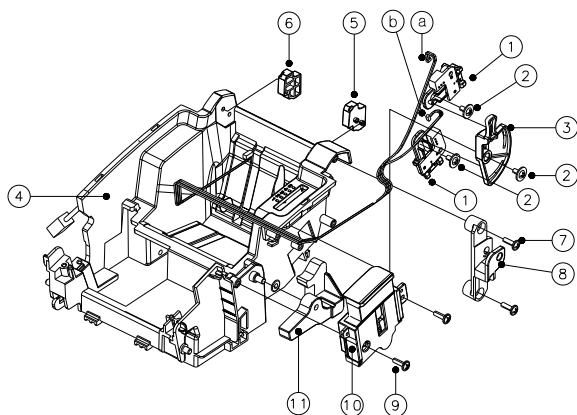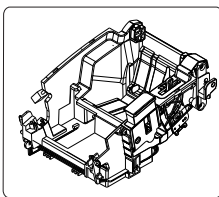
1. Pull the two Guide-Paper(⑤⑥) to separate from the Paper-Supply(④).

2. Remove the two screws(⑦) and separate Right-hinge(⑧).

3. Remove the three screws(②) and separate the Lever(③) and two Near-End(①) from the Paper-Supply(③).

4. Separate the two Cables(ⓐ,ⓑ) from the Near-End(①) and Paper-Supply(④).

5. Remove the two screws(⑨) and separate the Button ass'y(⑩) and Open-Lever(⑪).
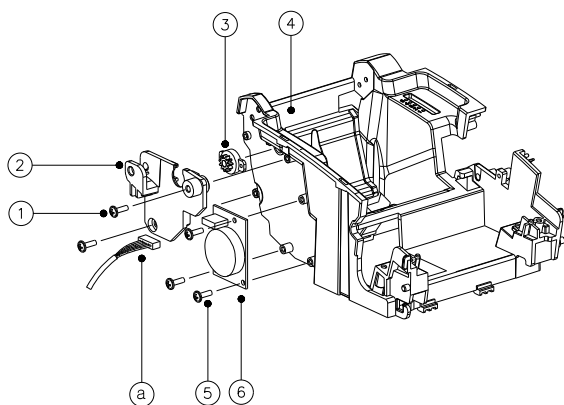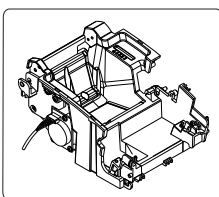
1. Remove the two screws(①) and separate the Left-Hinge(②) and Damper(③).

2. Remove the three screws(⑤) and separate the KitchenBell-Board(⑥) and Cable(ⓐ).

4.5-1 Main Board Case Block
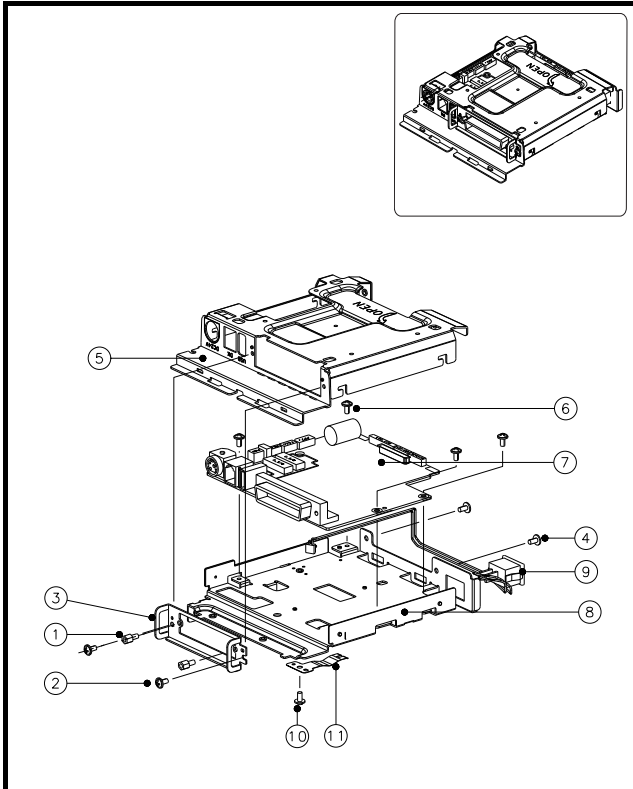
1. Remove the four screws(①②) and separate the BRKT-Interface(③) from the BRKT PCB-Lower(⑤).

2. Remove the two screws(④) and separate the BRKT PCB-Lower(⑤) from the BRKT PCB-Upper(⑧).

3. Remove the screw(⑩) to separate the Plate-Ground PRT(⑪).

WARNING!

When assemble, surely assemble the Plate-Ground PRT(⑪) with the BRKT PCB-Upper(⑧).

4. Remove the four screws(⑥)and separate the Main-Board(⑦) from the BRKT PCB-Upper(⑧).

5. Pull the Power-Switch(⑨) out of the BRKT PCB-Upper(⑧).

4.6 Roller assy Block
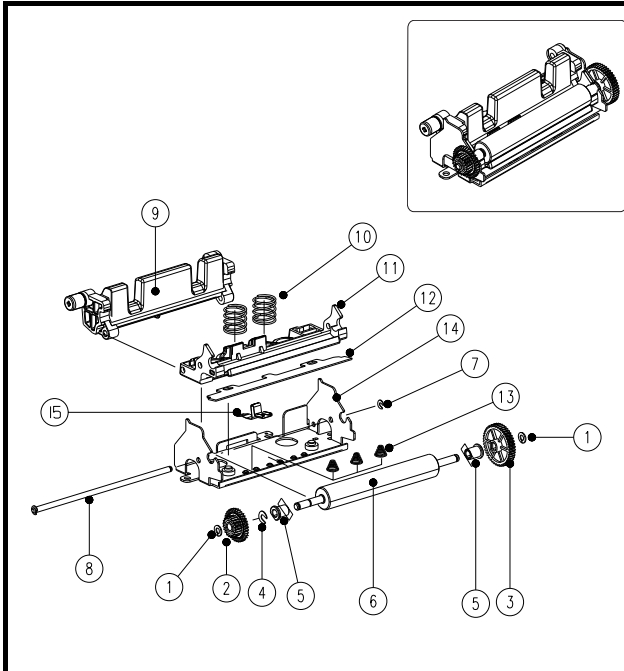
1. Remove the two Poly washers(①) and separate the two gears(②,③).

2. Separate the E-RING(④) and separate the two Bushings(⑤) and Roller (⑥).

3. Separate the E-RING(⑦) and separate the Shaft-Hinge(⑧).

4. Separate the BRKT-Lock(⑨) and Separate the two springs(⑩) and Frame-Roller(⑪).

5. Separate the Fixed-Blade(⑫) and three springs(⑬).

6. Separate the Plate-GND(⑮) From the Fixed-Blade(⑫).

4.7 Printer Block

.
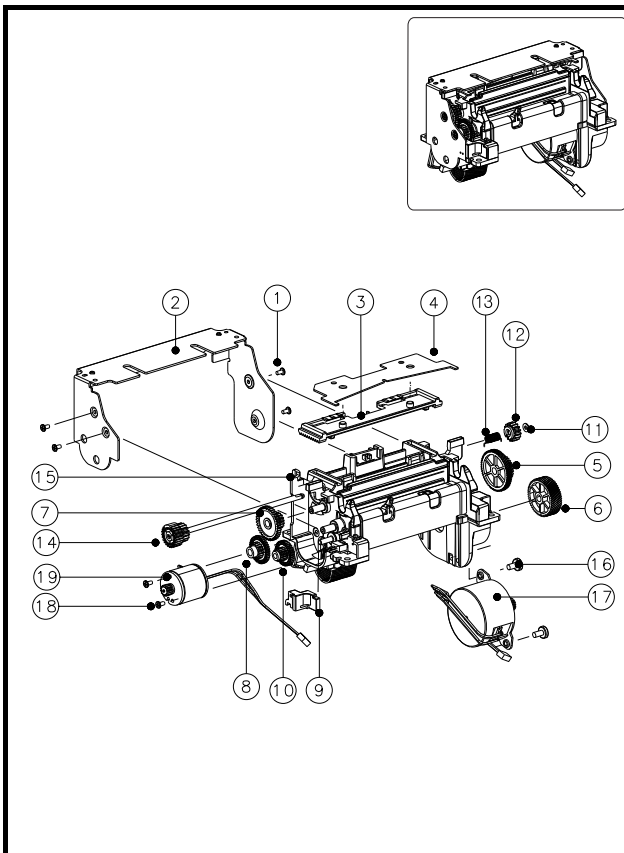
1. Remove the four screws(①) and separate the Cover-Frame(②).

2. Separate the Rack gear-Cutter(③) and Movable-Blade(④).

3. Separate the Hol der Cover-Sensor(⑨) and Separate the gears(⑤⑥⑦⑧⑩).

4. Remove the Po ly washer(⑪) and separate the gear(⑫), spring(⑬), Assy cutter gear(⑭).

5. Remove the two screws(⑯) and separate the Auto Cutter-Motor(⑰).

6. Remove the two screws(⑱) and separate the Feed-Motor(⑲).

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