LK-T210

Thermal Receipt printer
Technical manual

SEWOO TECH CO., LTD.
www.miniprinter.com

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1. General Specifications

1.1 Printing Specifications

1) Printing method:	Thermal line printing
2) Dot density:	180dpi x 180dpi
3) Printing direction:	Unidirectional with friction feed
4) Printing width:	72mm(2.84"), 512 dot positions (180dpi)
5) Characters per line(default):	Font A: 42
	Font B: 56
6) Printing speed:	High speed mode: (180dpi x 180dpi)
	47lines/second maximum
	(1/6inch feed) (at 24V, 20℃)
	Approximately 200mm/sec maximum
	(approximately 7.8inchs/sec maximum)

☞ **NOTE:** Speeds are switched depending on the applied voltage to the printer and head temperature conditions automatically.

☞ **NOTE:** There may be variations in printing after switching the mode of the printing speed. To prevent this for logo printing with **ESC*** command, using a downloaded bit image is recommended. Change in

printing speed does not occur during down loaded bit image printing.

7) Line spacing (default):	1/6 inch (4.23mm)
	Programmable by control command.

1.2 Character Specifications

1) Number of characters:
Alphanumeric characters: 95
Extended graphics 128 × 7 pages
(including one space page)
International characters: 32
① English
② Hangul
③ Chinese (GB2312,Big5)
④ Kanji

2) Character structure:
Font A: 12 × 24
Font B: 9 × 17
Hangul, Chinese: 24 × 24
Font A is selected as the default

3) Character size:

	EPSON Emulation			
Dot density	0.141 × 0.141mm/dot (180*180dpi)			
	[dpi: dots per 25.4mm{1"}]			
3)Printing direction	Unidirectional With friction feed			
4)Paper width	82.5mm (3.25")	80mm (3.15")	60mm (2.36")	58mm (2.28")
5)Maximum printable area	72.2mm (512dots)	72.2mm (512dots)	54.1mm (384dots)	50.8mm (360 dots)
6)Character / line				
Font A (12 × 24)	42	42	32	30
Font B (9 × 24)	56	56	42	40
Kanji Font (24 × 24)	21	21	16	15

1.3 Auto Cutter

Partial cut: Cutting with one point center uncut

NOTE: To prevent dot displacement, after cutting, paper must be fed approximately 1mm(14/360 inches) or more before printing.

1.4 Paper Roll Supply Device

1) Supply method: Drop-in paper roll

2) Near-end sensor:

a) Detection method: Photo Reflector

b) Paper roll spool diameter: Inside: 12mm(.47")
Outside: 18mm(.71")

c) Near-end adjustment: Adjusting screw

d) Remaining amount: Fixed position #1 (approximately 23mm(0.9"))
#2 (approximately 27mm(1.06"))

NOTE: You can use a command to stop printing upon detection of a paper near-end.

1.5 Paper Specification

1) Paper type: Specified thermal paper

2) Form: Paper roll

3) Paper width:

(82.5mm paper width model)
82 ±0.5mm (3.23" ±0.02")
(80mm paper width model)
79.5 ±0.5mm (3.13" ±0.02")
(60mm paper width model)
59.5 ±0.5mm (2.34" ±0.02")
(58mm paper width model)
57.5 ±0.5mm (2.26" ±0.02")

4) Paper roll size: Roll diameter : Maximum 83mm
Take-up paper roll width:
80 ± 0.5, 1.0mm(3.15"±0.020", 0.04")

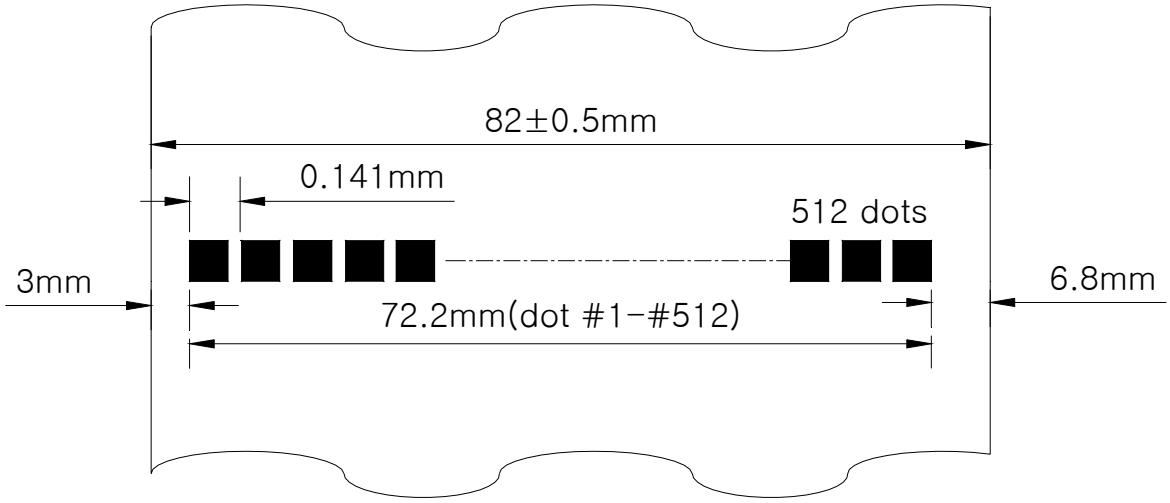
5) Paper roll spool diameter: Inside: 12mm(.47")
Outside: 18mm(.71")

NOTE: Paper must not be pasted to the paper roll spool.

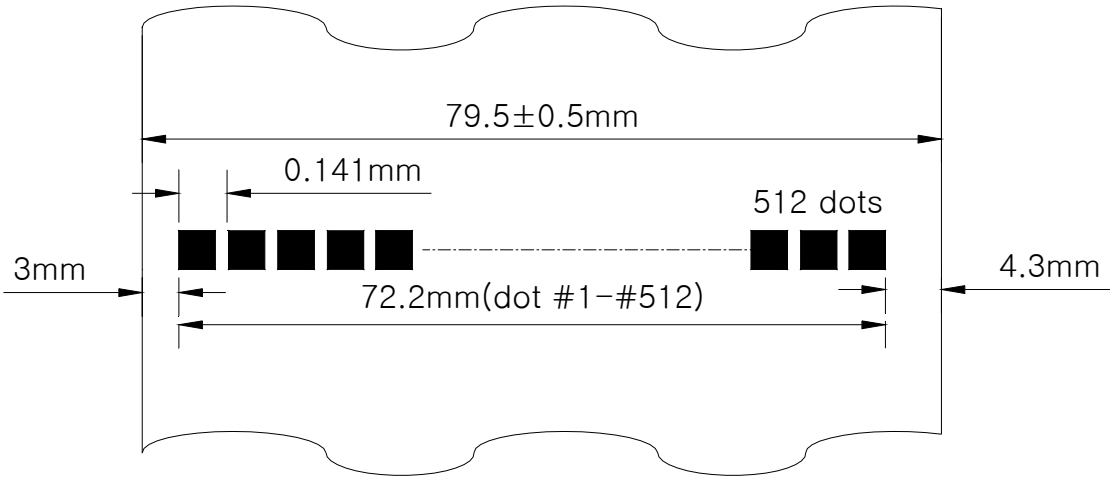
1.6 Printable Area

<EPSON Emulation>

<82.5mm {3.25"} paper width model>



<80 mm {3.15"} paper width model>



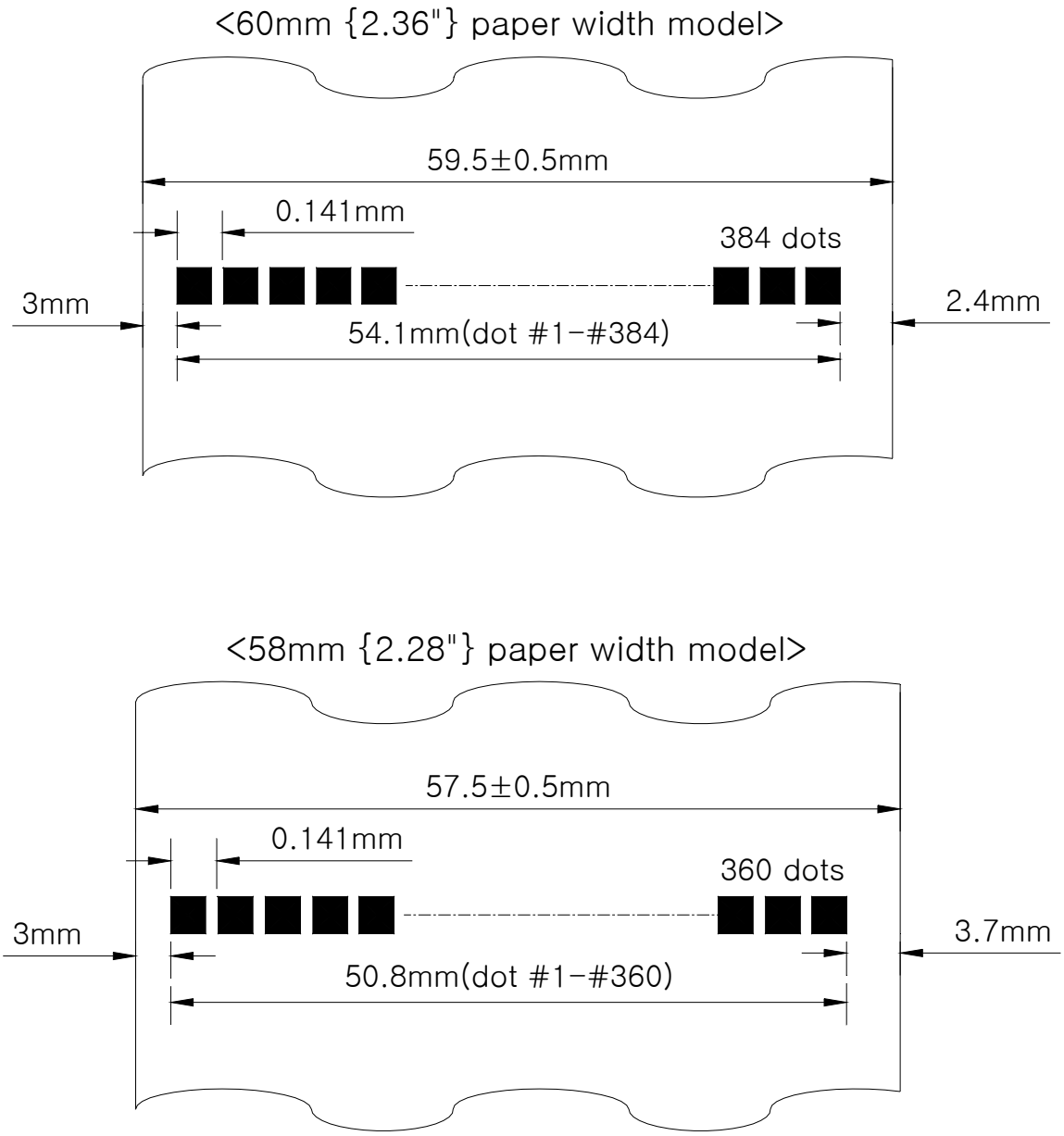


Figure 1.6.1 Printable Area for EPSON Emulation

1.7 Printing and Cutting Positions

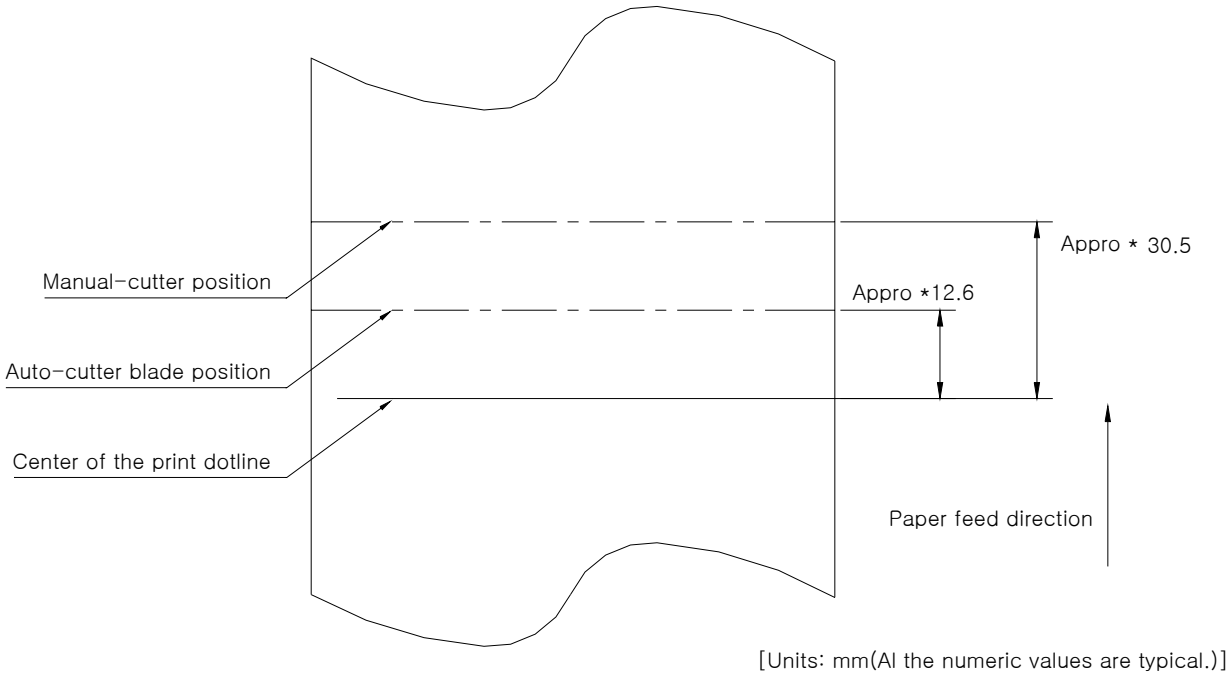


Figure 1.7.1 Printing and Cutting Positions

NOTE: Numeric values used here are center values to be used in designing. The values may vary slightly as a result of paper slack or variations in the paper. Take this into account when setting the cutting position of the autocutter.

1.8 Internal Buffer

1) Receive buffer: 4kbyte

1.9 Electrical Characteristics

1) Supply voltage: +24 VDC ± 7%
2) Current consumption (at 24V):
   Operating: Approx. 1.5A(at ASCII Printing)
   Peak:Approx. 10A(at print duty 100%, For 10 seconds or less)
   Stand-by: Approx. 0.15A

1.10 EMI and Safety Standards Applied

1) Europe: EMI – EN55022 CLASS A
   EMS – EN61000-3-2, EN61000-3-3, EN50082-1
   Safety Standard: EN60950-1

2) North America: EMI - FCC Part#15 Class A
   Safety Standards- UL(1950), c-UL(No.950)

1.11 Reliability

1) MCBF: 50 million lines
   (based on an average printing rate of 12.5% with paper thickness in the range 65 ㎛ to 75 ㎛).
   35 million lines
   (based on an average printing rate of 12.5% with paper thickness in the range 76 ㎛ to 150 ㎛)
2) Cutter Life: the cutter performs 1,500,000 cuts with thickness 65 ㎛, and/or 300,00cuts with thickness 100 ㎛ to the paper

1.12 Environmental Conditions

1) Temperature:	Operating:	5° to 45°C
	Storage:	-20° to 60°C (except for paper)
2) Humidity:	Operating:	10 to 90%RH
	Storage:	10 to 90%RH (except for paper)

2. Configuration

2.1 Interface

2.1.1 RS-232 serial interface

2.1.2 Specifications

Data transmission:	Serial
Synchronization:	Asynchronous
Handshaking:	DTR/DSR or XON/XOFF control
Signal levels:	MARK= -3 to –15V: Logic “1”
	SPACE= +3 to +15V: Logic “0”
Baud rage:	9600,19200, 38400,115200 bps
length:	8 bits
Parity Settings:	None
Stop bits:	1
Connector (printer side):	Female DSUB-25 pin connector

NOTE: The data word length, baud rate, and parity depend on the DIP switch settings.

2.1.3 Switching between on-line and off-line

The printer does not have an on-line/off-line switch.

The printer goes off-line:

- Between when the power is turned on (including reset using the interface) and when the printer is ready to receive data.
- During the self-test.
- When the cover is open.
- During paper feeding using the paper feed button.
- When the printer stops printing due to a paper-end (in cases when an empty paper supply is detected by either paper roll end detector or the paper roll near-end detector with a printing halt feature by **ESC c4**).
- During macro executing stand by status.
- When a temporary abnormality occurs in the power supply voltage.
- When an error has occurred.

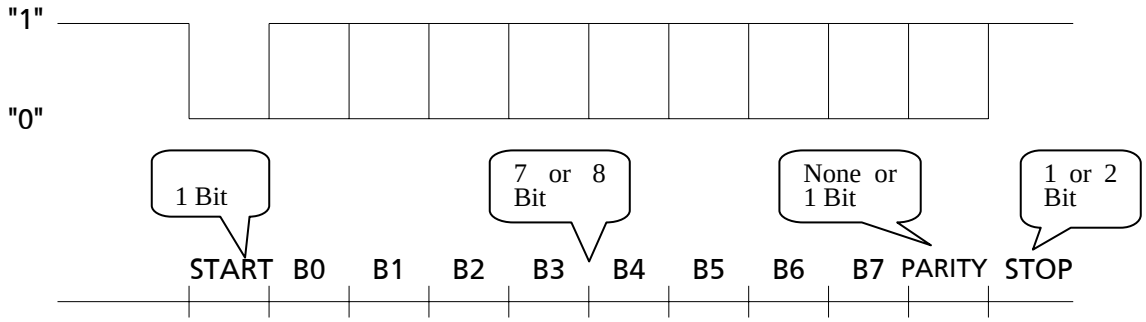
2.1.4 Interface connector terminal assignments and signal functions

PIN	SIGNAL	I/O	DESCRIPTION
2	TXD	-	Printer transmit data line RS-232C level
3	RXD	-	Printer receive data line RS-232C level
4, 20	DTR	Output	Printer handshake to host line RS-232C level
6	DSR	Input	Data Send Ready
1,7	GND	-	System Ground

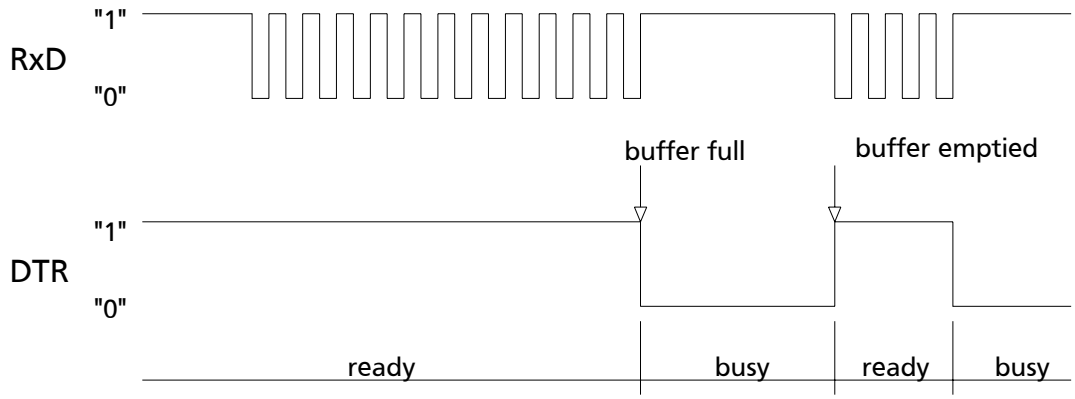
2.1.5 Serial interface connection example

Host side		Printer side
TXD	.....	RXD
DSR	.....	DTR
RXD	.....	TXD
DTR	.....	DSR
FG	.....	FG
SG	.....	SG

DETAILS: ◦Set the handshaking so that the transmit data can be received.
◦Transmit data to the printer after turning on the power and initializing the printer.



< Figure 2.1 Serial transmission bit frame >



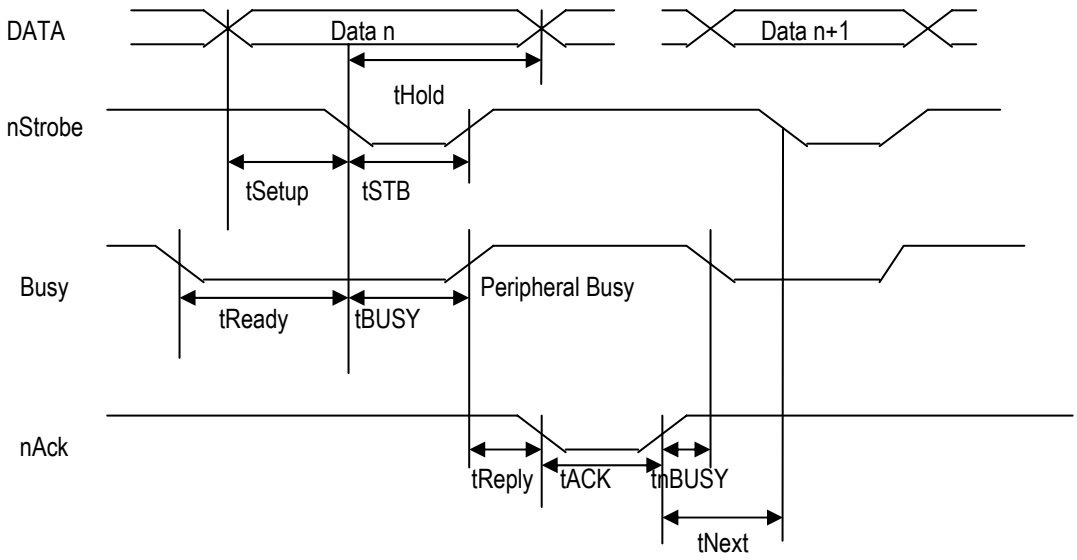
< Figure 2.2 Line transmission with protocol >

2.1.6 Centronics parallel interface

PIN	SIGNAL	I/O	DESCRIPTION
1	STROBE-	Input	Synchronize signal Data received
2-9	DATA0-7	Input	Data bit Transmitted 0-7
10	ACK-	Output	Data receiving competed
11	BUSY	Output	Impossible to printer data receiving
12	PE	Output	Paper empty
13	SELECT	Output	Printer's status for ON/OFF line
14	AUTO FEED-	Input	ND
15	GROUND	-	System Ground
16	GROUND	-	System Ground
17	NC	-	
18	LOGIC-H	-	+5V
19-30	GROUND	-	System Ground
31	INIT-	Input	Initialize
32	ERROR-	Output	Printer Error
33	GROUND	-	System Ground
34	NC	-	
35	+5V	-	+5V
36	SELECT IN-	Input	ND

1) Specifications

Data transmission: 8-bit parallel
Synchronization: STROBE pulse supplied by host computer.
Handshaking: ACK and BUSY
Connector: D-SUB 36(female) or equivalent



2.1.7 Data Receiving Timing (Compatibility Mode)

Characteristics	Symbol	Specifications	
		Min [ns]	Max [ns]
Data Hold Time (host)	tHold	750	--
Data Setup Time	tSetup	750	--
STROBE Pulse Width	tSTB	750	--
READY Cycle Idle Time	tReady	0	--
BUSY Output Delay Time	tBUSY	0	500
Data Processing Time	tReply	0	∝
ACKNLG Pulse Width	tACK	500	10us
BUSY Release Time	tnBUSY	0	∝
ACK Cycle Idle Time	tNEXT	0	--

- The printer latches data at a nStrobe ↓timing

2.1.8 USB Interface

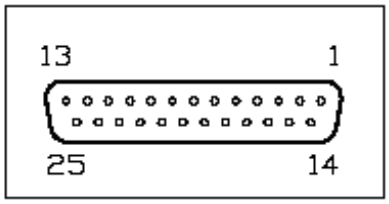
PIN	SIGNAL	I/O	DESCRIPTION
1	+5V	-	+5V
2	DATA-	-	Printer transmit data line
3	DATA+	-	Printer transmit data line
4	GND	-	System Ground

1) Specifications
Data transmission: USB 2.0
Connector: USB "A" type connector

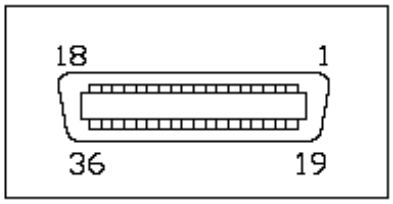
2) USB interface connection example

Host side	Printer side
VCC	VCC
DATA+	DATA+
DATA-	DATA-
GND	GND

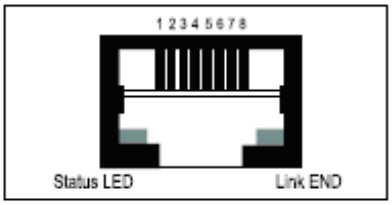
2.1.9 Interface Connector



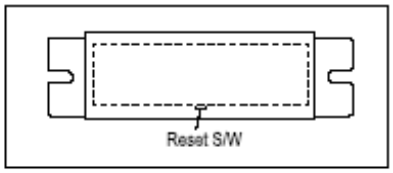
<D-SUB 25 Female Serial>



<Centronics Parallel>



<Ethernet>



<Wi-fi>

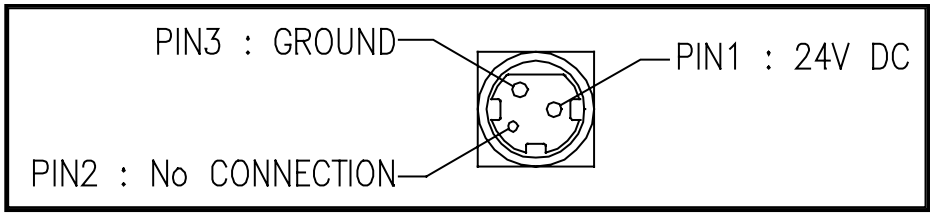
3. Connectors

3.1 Interface Connectors

Refer to Section 2.1, Interface

3.2 Electrical Characteristics

1) Input Voltage: DC 24V ± 10%
2) Current Consumption: Operating: Approx. 1.5 A (at ASC II printing)
   Peak: Approx. 10 A (at print duty 100%, For 10 seconds or less)
   Stand-by: Approx. 0.15 A
3) Power Connector



3.3 Drawer Kick-out Connector (Modular Connector)

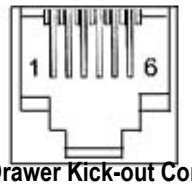
The pulse specified by ESC p or DLE DC4 is output to this connector.
The host can confirm the status of the input signal by using the
DLE EOT, **GS a**, or **GS r** commands.

1) Pin assignments: Refer to Table 2.2.2
2) Connector model:
   Printer side: DAEEUN DEK-623PCB-6-B or Equivalent
   User side: 6-position 6-contact (RJ12telephone jack)

< Drawer Kick-out Connector Pin Assignments >

Pin Number	Signal Name	Direction
1	Frame GND	-
2	Drawer kick-out drive signal 1	Output
3	Drawer open/close signal	Input
4	+24V	-
5	Drawer kick-out drive signal 2	Output
6	Signal GND	-

+24V is output through pin 4 when the power is turned on. However, pin 4 must by used only for the drawer.

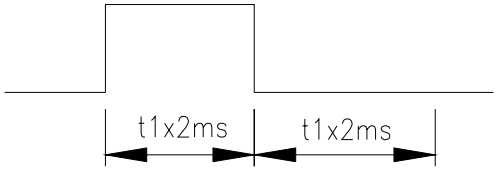


< Figure 3.1 Drawer Kick-out Connector >

3) Drawer kick-out drive signal
   Output signal: Output voltage: Approximately 24V
   Output current: 1A or less

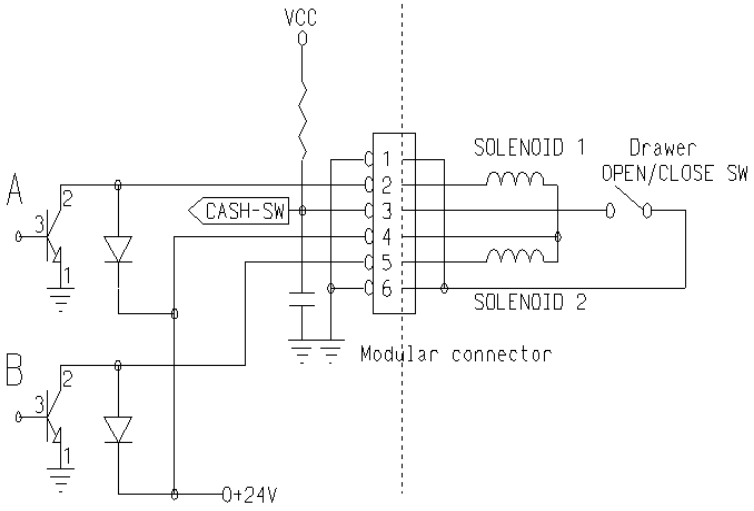
CAUTION: To avoid an overcurrent, the resistance of the drawer kick-out solenoid must be 24 Ω or more.

Output waveform: Outputs the waveforms in Figure 3.2 to the points A and B in Figure 3.3
*t*1 (ON time) and *t*2 (OFF time) are specified by **ESC p** or **DLE DC4.**



< Figure 3.2 Drawer Kick-out Drive Signal Output Waveform >

4) Drawer open/close signal
Input signal level (connector pin 3):"L"= 0 to 0.8V
"H"= 3 to 5V



NOTE: 1. Use a shielded cable for the drawer connector cable.
2. Two driver transistors cannot be energized simultaneously.
3. The drawer drive duty must by as shown below.

$$\frac{\text{ON time}}{\text{(ON time + OFF time)}} \leq 0.2$$

4. Be sure to use the printer power supply (connector pin 4) for the drawer power source.
5. The resistance of the drawer kick-out solenoid must not be less than the specified. Otherwise, an overcurrent could damage the solenoid.
6. Do not connect telecommunication network to the drawer kick-out connector.

4 Control Command summary

No.	Command	Function	
1	HT	Horizontal tab	
2	LF	Print and line feed	
3	CR	Print and carriage return	
4	FF	Print end position label to start printing	
5	CAN	Cancel print data in page mode	
6	DLE EOT	Real-time status transmission	
7	DLE ENQ	Real-time request to printer	
8	DLE DC4	Generate pulse at real-time	
9	ESC FF	Print data in page mode	
10	ESC SP	Set character right-side spacing	
11	ESC !	Set print mode	
12	ESC $	Set absolute print position	
13	ESC %	Select/cancel user-defined character set	
14	ESC &	Define user-defined characters	
15	ESC *	Set bit image mode	
16	ESC -	Turn underline mode on/off	
17	ESC 2	Set 1/6 inch line spacing	
18	ESC 3	Set line spacing using minimum units	
19	ESC =	Select peripheral device	
20	ESC ?	Cancel user-defined characters	
21	ESC @	Initialize printer	
22	ESC D	Set horizontal tab positions	
23	ESC E	Select emphasized mode	
24	ESC G	Select double-strike mode	
25	ESC J	Print end feed paper using minimum units	
26	ESC L	Select page mode	
27	ESC M	Select character font	
28	ESC R	Select international character set	
29	ESC S	Select standard mode	
30	ESC T	Select print direction in page mode	
31	ESC V	Set/cancel 90° cw rotated character	
32	ESC W	Set printing area in page mode	
33	ESC \	Set relative position	
34	ESC a	Align position	
35	ESC c 3	Select paper sensor(s) to output paper-end signals	
36	ESC c 4	Select paper sensor(s) to stop printing	
37	ESC c 5	Enable/disable panel buttons	
38	ESC d	Print and feed paper *n* lines	
39	ESC p	General pulse	
40	ESC t	Select character code table	
41	ESC {	Set/cancel upside-down character printing	
42	FS p	Print NV bit image	
43	FS q	Define NV bit image	
44	GS !	Select character size	
45	GS $	Set absolute vertical print position in page mode	
46	GS *	Define downloaded bit image	
47	GS /	Print down-loaded bit image	
48	GS :	Start/end macro definition	Not avalible
49	GS B	Turn white/black reverse printing mode on/off	

50	GS H	Select printing position of HRI characters	
51	GS I	Transmit printer ID	
52	GS L	Set left margin	
53	GS P	Set horizontal and vertical motion units	
54	GS V	Cut paper	
55	GS W	Set printing area width	
56	GS \	Set relative vertical print position in page mode	
57	GS ^	Execute macro	Not avalible
58	GS a	Enable/disable Automatic Status Back(ASB)	
59	GS b	Turn smooting mode on/off	Not avalible
60	GS f	Select font for HRI characters	
61	GS h	Set bar code height	
62	GS k	Print bar code	
63	GS r	Transmit status	
64	GS v 0	Print raster bit image	
65	GS w	Set bar code width	
	< Add >		
1	ESC i	Full cut	
2	ESC m	Partial cut	