VKP80II

OEM

STATUS
LINE FEED
FORM FEED
RS232
USB POWER

CUSTOM

PRINTER COMPONENTS

A. VKP80II - Front external view

1- Output paper mouth
2- Cutter
3- Serial connector RS232
4- USB connector
5- Power supply connector
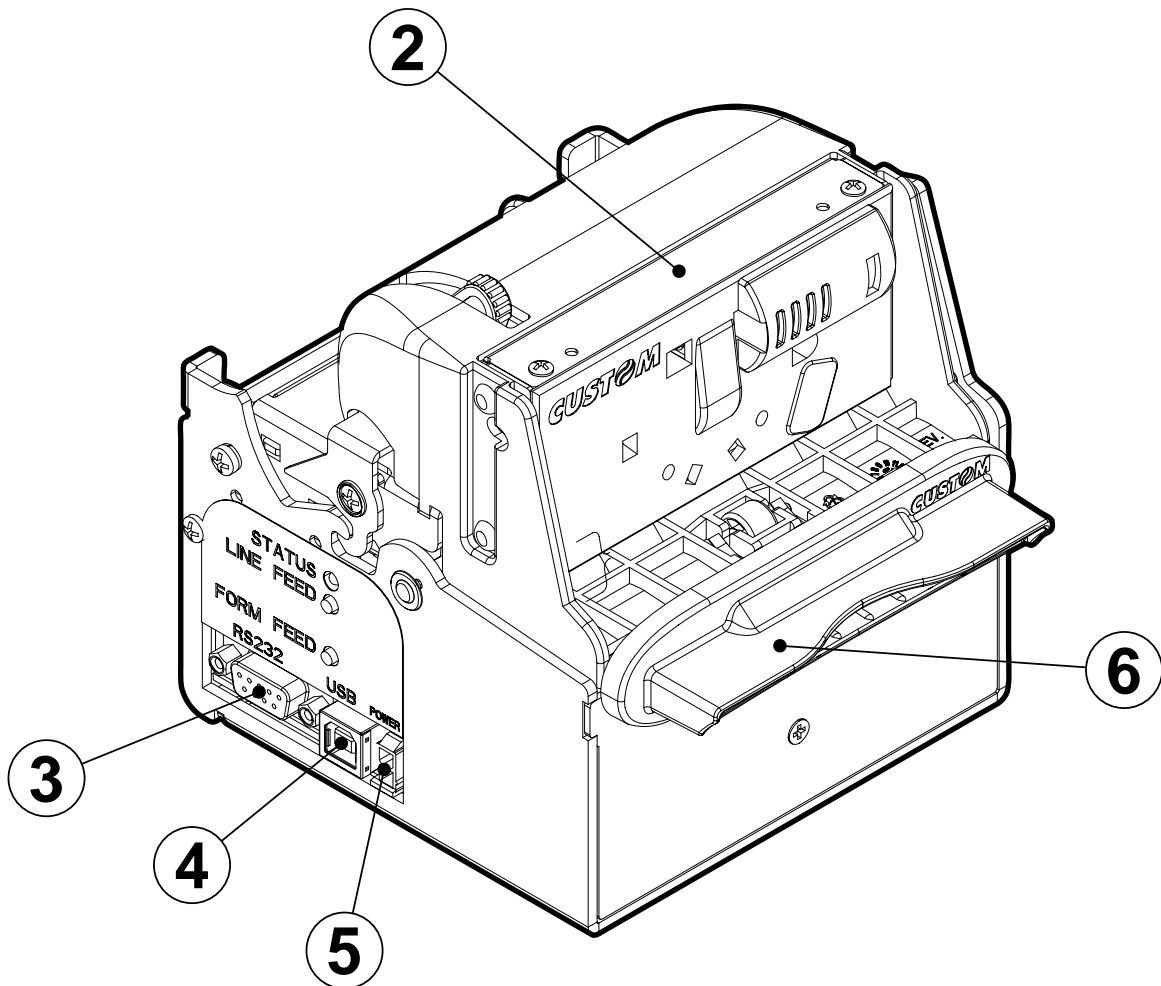
B. VKP80II – Rear external view

1- Paper input
2- Paper mouth cursors
3- Form Feed key
4- Line Feed key
5- Status led
6- Opening lever of head set + cutter

TABLE OF CONTENTS

MANUAL CONTENTS

In addition to the Introduction which includes a description of the explanatory notes used in the manual, general safety information, how to unpack the printer and a brief description of the printer including its basic features, this manual is organized as follows:

Chapter 1:   Contains the information required for correct printer installation and its proper use
Chapter 2:   Contains information on interface specifications
Chapter 3:   Contains a description of the printer command set
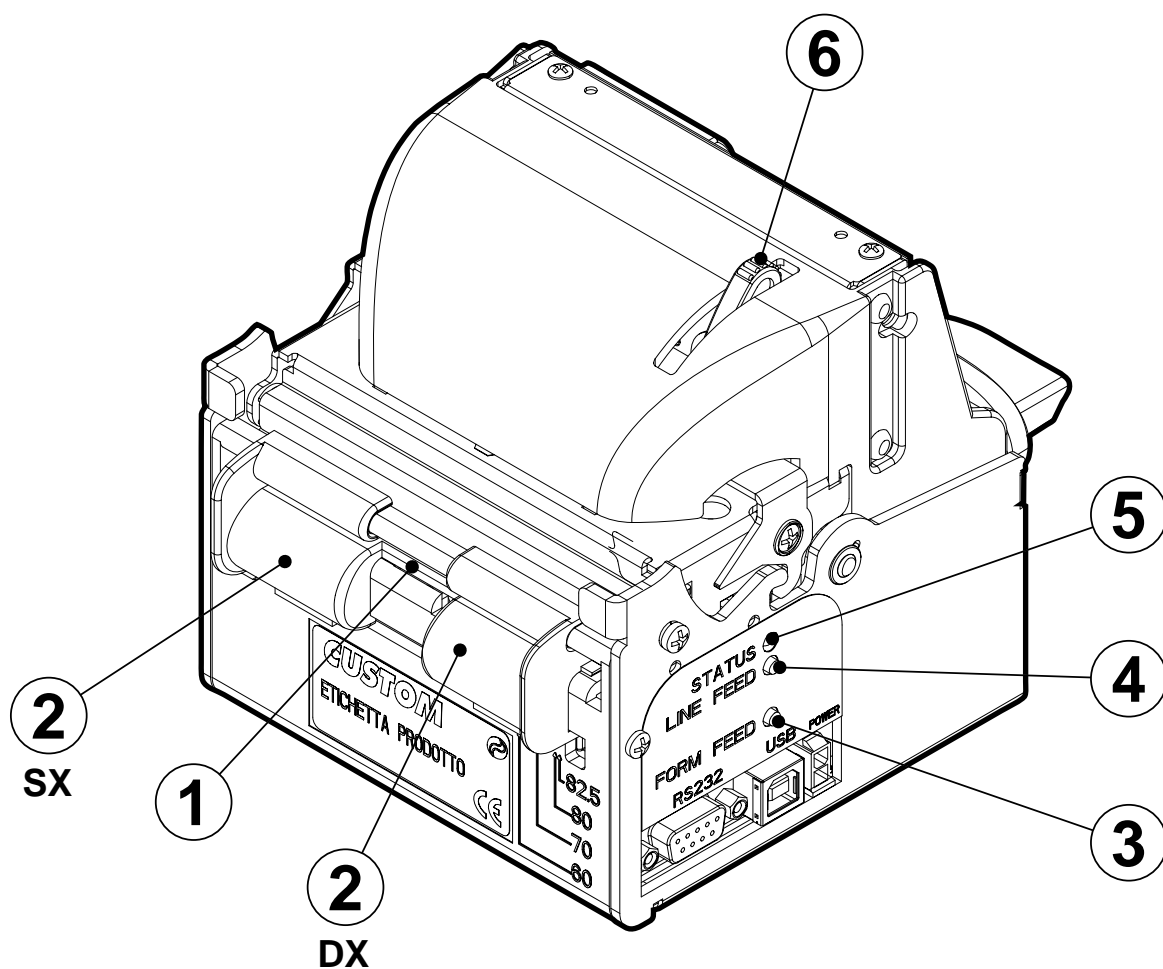Chapter 4:   Contains Technical Specifications of the printer
Chapter 5:   Contains the character sets (fonts) used by the printer

EXPLANATORY NOTES USED IN THIS MANUAL

N.B.
Gives important information or suggestions relative to the use of the printer.

WARNING
Information marked with this symbol must be carefully followed to guard against damaging the printer.

DANGER
Information marked with this symbol must be carefully followed to guard against operator injury or damage.

GENERAL SAFETY INFORMATION

• Read and keep the instructions which follow.
• Follow all warnings and instructions indicated on the printer.
• Before cleaning the printer, disconnect the power supply.
• Clean the printer with a damp cloth. Do not use liquid or spray products.
• Do not operate the printer near water.
• Do not use the printer on unstable surfaces that might cause it to fall and be seriously damaged.
• During the integration of the printer, we strongly warn to keep an adeguate paper loop outlet underneath the presenter, in order to allow the receipt being properly printed out.
• Only use the printer on hard surfaces and in environments that guarantee proper ventilation.
• Make sure the printer is placed in such a way as to avoid damage to its wiring.
• Use the type of electrical power supply indicated on the printer label. If in doubt, contact your retailer.
• Do not block the ventilation openings.
• Do not introduce foreign objects of any kind into the printer as this could cause a short circuit or damage parts that could jeopardize printer functioning.
• Do not spill liquids onto the printer.
• Do not carry out technical operations on the printer, with the exception of the scheduled maintenance procedures specifically indicated in the user manual.

- Disconnect the printer from the electricity supply and have it repaired by a specialized technician when:
  - A.   The feed connector has been damaged.
  - B.   Liquid has seeped inside the printer.
  - C.   The printer has been exposed to rain or water.
  - D.   The printer is not functioning normally despite the fact that all instructions in the users ma nual have been followed.
  - E.   The printer has been dropped and its outer casing damaged.
  - F.   Printer performance is poor.
  - G.   The printer is not functioning.

UNPACKING THE PRINTER

Remove the printer from its carton being careful not to damage the packing material so that it may be re-used if the printer is to be transported in the future.
Make sure that all the components illustrated below are present and that there are no signs of damage. If there are, contact Customer Service.

1.   Installation instructions
2.   Electrical supply cable
3.   Paper roll
4.   Printer
5.   Foam packing shell
6.   Box
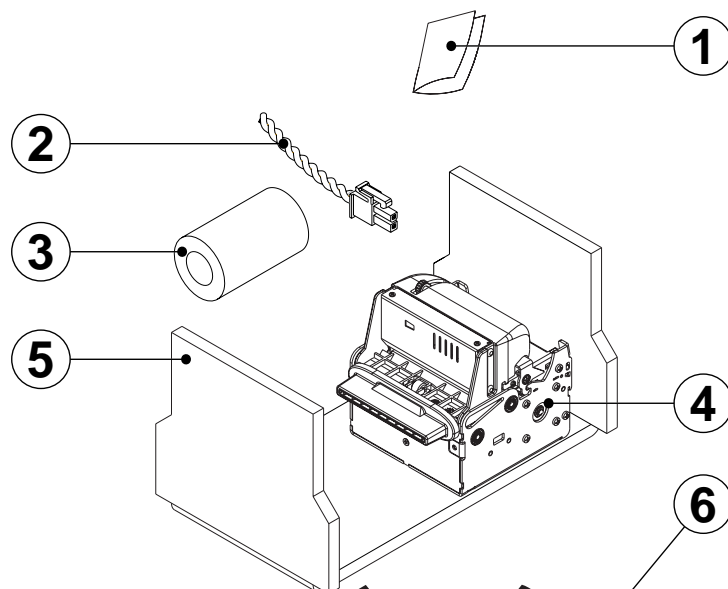
(Fig.1)

- Open the printer packaging
- Remove the paper roll
- Remove the manual (or CD-Rom)
- Remove the cable of power supply
- Take out the foam packing shell
- Take out the printer and remove it from its plastic covering.
- Keep the box, trays and packing materials in the event the printer must be transported/shipped in the future.

CUST⌀M
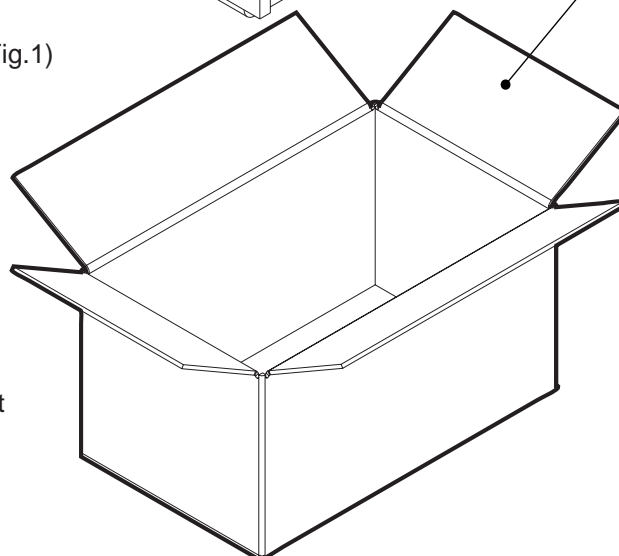
PRINTER FEATURES

VKP80 is the latest generation of ATMs, Kiosks and Ticket Printers with high printing speed 220mm/sec and a very small footprint; it's equipped with a 204 dpi (8 dots/mm) thermal printing mechanism.
In addition to normal printing functions, the printer offers a wide array of special features:

• High speed printing:

High Quality	80 mm/sec
Normal	180 mm/sec
High speed	220 mm/sec

• Easy paper changing (automatic paper loading).
• Paper width 60/76/80/82.5mm, adjustable by the user.
• Bar code UPC-A. UPC-E, EAN13, EAN8, CODE39, ITF, CODABAR, CODE93, CODE128 and CODE32.
• 3 standard and international character set fonts.
• Definition of function macros for automatic operation re-call.
• Graphic mode printing.
• Print density (-50% to +100%).
• Serial interfaces RS232: (from 1200 to 115200 bps)
• Interfaces: RS232-USB
• High reliability autocutter.
• Illuminated paper mouth.
• Paper pre-tensioner system for high capability paper roll.
• Double function ticket presentation: "ejecting" and "retracting".
• Sensors: paper end, ticket present, black mark, head temperature, opening of printing unit (near paper end on roll support is optional).

PRINTER DESCRIPTION

The printer (fig.2) is comprised of a metal frame, printing mechanism, a cutter and an ejector.
Located on the keypad are the following keys: LINE FEED (1), FORM FEED (2) and status LED (3).

• LINE FEED key. When the LINE FEED key is pressed, the printer advances the paper so that the paper may be inserted in the printing mechanism. During power-up, if the LINE FEED key is held down, the printer enters the SETUP routine.

• FORM FEED key. When the FORM FEED key is pressed, the printer advances the paper by a pre-set length. During power-up, if the FORM FEED key is held down, the printer will perform the FONT TEST routine.

• STATUS LED displays printer hardware status. In case of malfunction, the colour and flash frequency changing as follows:

STATUS LED	COLOR	DESCRIPTION	
Turned on	Green	Printer on: no error	
Flashing	Green	**Communication status**	
		Nr. Flashings	Description
		1	Receive data
		2	Reception errors (parity, frame error, overrun error)
		3	Misinterpret command
		4	Command reception time out
Flashing	Yellow	**Recovering error**	
		Nr. Flashings	Description
		2	Heading over temperature
		3	Paper end
		4	Paper jam
		5	Power supply voltage incorrect
		6	Cover opened
Flashing	Red	**Unrecovering error**	
		Nr. Flashings	Description
		3	RAM error
		4	EEPROM error
		5	Cutter error

(Tab.1)
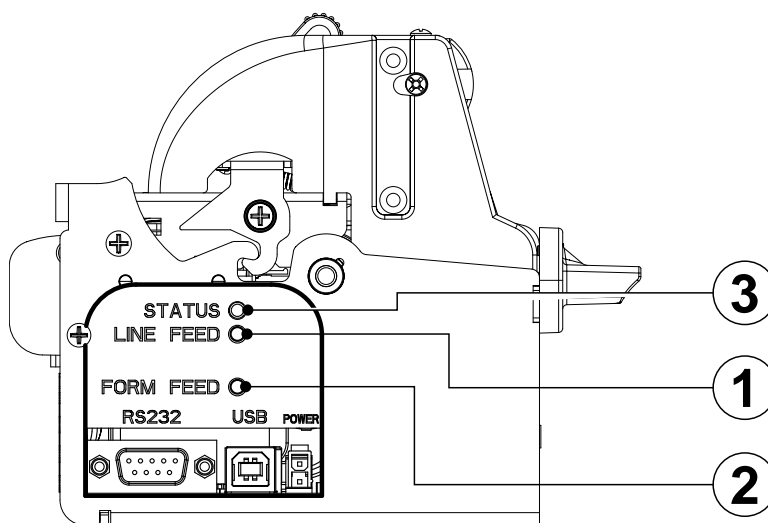
(Fig.2)

1.1 CONNECTIONS

(Fig.1.1)
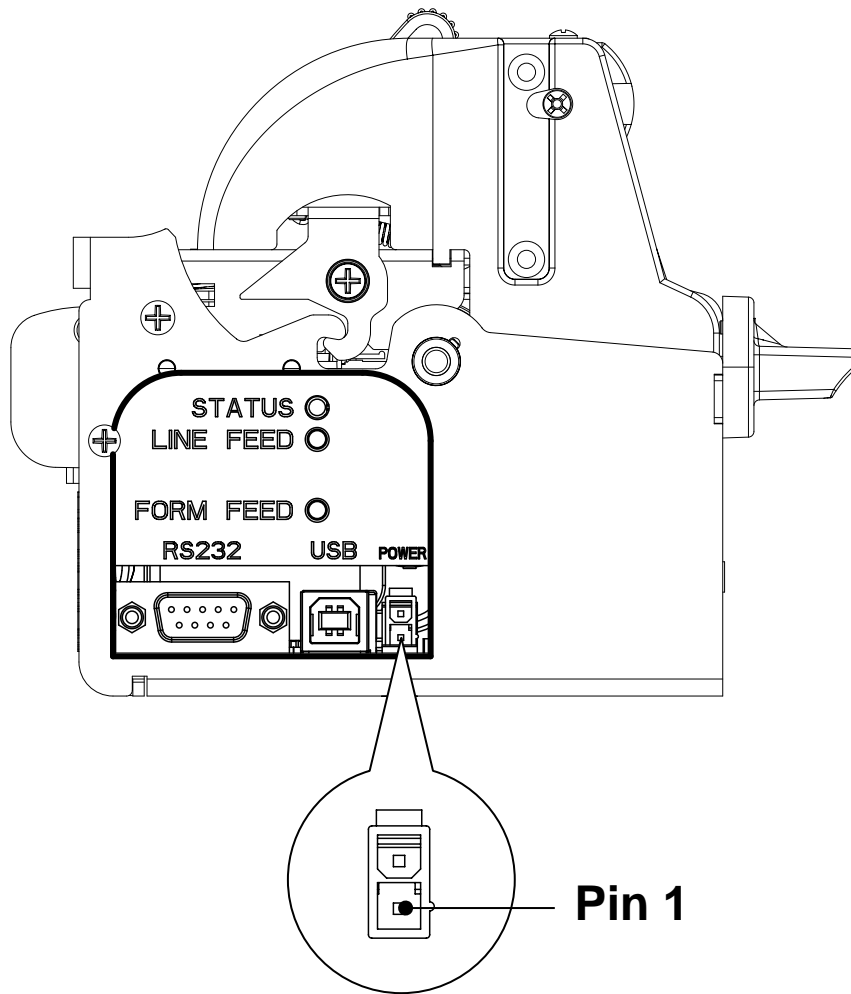
1.1.1 Power Supply

The printer is equipped with a 2 pin male molex connector series 5569 (Vertical), for the power supply (see Fig. 1.1). The connector pin configuration is as follows :

| Model no. type: | Header : | 90° Molex series 5569 (no. 39-30-1020) |
| | Housing: | Molex series 5557 (no. 39-01-3022) |

PIN	SIGNAL
1	+24 V
2	GND

(Tab.1.1)

⚠ **WARNING:**
Respect power supply polarity.

This picture shows the power supply cable included in the printer packaging :

(Fig.1.2)

MOLEX FEMALE
CONNETTOR 2 PIN

2
1

OPPOSITE VIEW SIDE
OF CABLE INSERTION
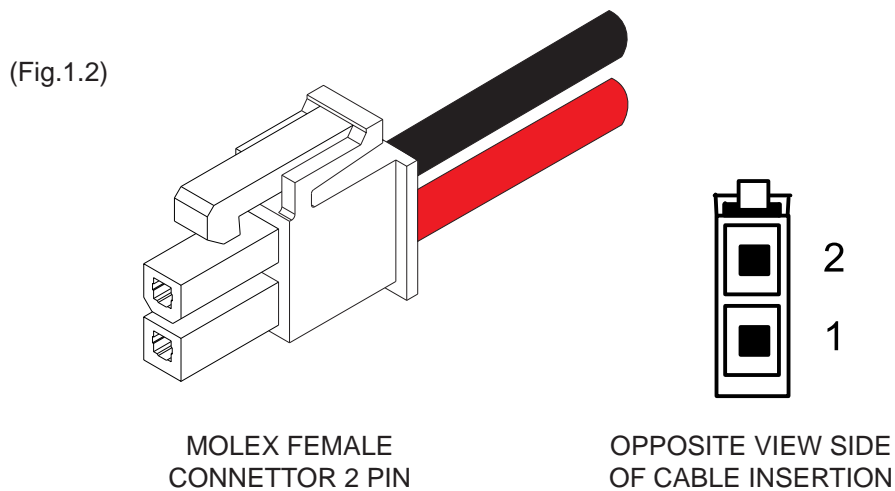
The connector pin configuration of this cable is as follows:

Female connector	Cable color
Pin 1	ROSSO
Pin 2	NERO

Note : The red cable is for +24 Vdc.
The black cable is for signal ground.

1.2 SELF-TEST

Printer operating status is indicated in the configuration print-out in which, next to the name of the components displayed (see figure 1.3), the following information is given:

- Under INTERFACE is given the interface present (RS232).
- Under PROGRAM MEMORY TEST, DYNAMIC RAM TEST, EEPROM TEST and CUTTER TEST, the message OK appears if functioning and NOT OK if faulty.
- Under HEAD VOLTAGE is given the voltage of the head.
- Under HEAD TEMPERATURE is given the temperature of the head.
- Under PAPER PRINTED is given the number of centimetres of paper printed.
- Under CUT COUNTER is given the number of cuts made.
- Under RETRACT COUNTER is given the number of retract made.
- Under POWER ON COUNTER is given the number of power-ups made.

PRINTER SETUP

INTERFACE RS232	
PROGRAM MEMORY TEST..........OK	
DYNAMIC RAM TEST....................OK	
EEPROM TEST.............................OK	
CUTTER TEST.............................OK	
HEAD VOLTAGE [V]	= 23,37
HEAD TEMPERATURE [°C]	= 25
PAPER PRINTED [cm]	= 40
CUT COUNTER	= 1
RETRAC COUNTER	= 0
POWER ON COUNTER	= 4

(Fig.1.3)

RS232 Baud Rate ....:	**19200 bps**
RS232 Data Length...................:	**8 bits/chr**
RS232 Parity ....:	**None**
RS232 Handshaking ....:	**Xon/Xoff**
Busy Condition ....:	**RcFull**
USB Address Number [1]............:	**0**
USB Status Monitor [2] ....:	**Disabled**
Autofeed ....:	**CR Disabled**
Print Mode ....:	**Normal**
Chars / inch ....:	**A=15 B=20 cpi**
Speed / Quality..........................:	**Normal**
Paper Retracting ....:	**Disabled**
Notch Alignment ....:	**Disabled**
Notch Threshold [3].....................:	**2.0V**
Notch Distance [mm] [3]..............:	**00**
Current ....:	**Normal**
Print Density.............................:	**0%**

[FF]   *key to enter setup*
[LF]   *key to skip setup*

[1] **N.B.:** This parameter is displayed if the printer has an USB interface; it's used to identify univocally the USB printer by a numerical address code, if on the PC are connected two printersS that are the same models for example two VKP80-UE.

[2] **N.B.:** This parameter is displayed if the printer has an USB interface. The Status Monitor is an additional printing driver component that allows the printer status monitoring. It must be enabled only if it was installed the Status Monitor specific driver.

[3] **N.B.:** If the "Notch Alignment" parameter is "Disabled" this parameter doesn't appear in the "Printer Setup" ticket.

1.3 CONFIGURATION

This printer permits the configuration of default parameters. The printer's configurable parameters are:

RS232 Baud Rate: 115200, 57600, 38400, 19200[D], 9600, 4800, 2400,1200.
RS232 Data length: 7, 8[D] bits/char.
RS232 Parity: None[D], Even or Odd.
RS232 Handshaking: XON/XOFF[D] or Hardware.
Busy condition: RxFullD o OffLine/RxFull[(4)].
USB Address Number: 0[D] , 1, 2, 3, 4, 5, 6, 7, 8, 9.
USB Status Monitor: Disabled[D] or Enabled.
Autofeed: CR disabled[D] or CR enabled.
Print mode: Normal[D] or Reverse.
Characters per inch: A=11 B=15 cpi, A=15 B=20 cpi[D], A=20 B=15 cpi.
Speed/Quality: High Quality, Normal[D], High Speed.
Paper retract [(5)]: Disabled[D] or Enabled.
Notch Alignment: Disabled[D] or Enabled.
Notch Threshold: 0.5, 1.0, 1.5, 2.0[D], 2.5, 3.0, 3.5, 4.0, 4.5.
Notch Distance [mm][(6)]: From 00[D] to 32 mm.
Current: Low, High, Normal[D].
Print density: -50%, -37%, -25%, -12%, 0%[D], +12%, +25%, +37%, +50%.

Please note: the parameters marked with the symbol [D] represent the default values.

[(4)] **N.B.:** parameter valid only wth serial interface; using this parameter, it is possible to select whether the Busy signal is activated when the printer is both in Off Line status and the buffer is full, or only if the reception buffer is full.

[(5)] **N.B.:** If, at power-up, paper is present on the ejector and if this parameter has been activated, the printer will retract the paper. Otherwise, if the parameter is deactivated, the printer will eject the paper.

[(6)] **N.B.:** During the setup phase it's possible to set the notch distance using a values range from 0 to 39 mm. The maximum distance accepted is 32 mm, so even if values from 33 to 39 mm are inserted, the distance remains 32 mm.

The settings made are stored in EEPROM (nonvolatile memory).
During power-up, if the LINE FEED key is held down, the printer enters the autotest routine and prints out the setup report. The printer will remain in standby in Hexadecimal dump mode (see section 1.5) until another key is pressed or characters are received through the printer communication port.
When the FORM FEED key is pressed, the printer enters parameter configuration.
When the LINE FEED key is pressed, the printer exits setup and terminates the Hexadecimal dump function.
When the receive buffer is full, if handshaking is set to XON/XOFF, the printer sends the XOFF ($13) on the serial port.
When the receive buffer has cleared once again, if handshaking is set to XON/XOFF, the printer sends the XON ($11) on the serial port.

1.4 Hexadecimal dump

This function is used to display the characters received from the communications port; the printer prints out both the hexadecimal code received as well as the corresponding ASCII code.
Once the autotest routine has finished, the printer enters Hexadecimal Dump mode. The printer remains in standby until a key is pressed or characters are received from the communications port; for every 24 characters received it prints hexadecimal values and ASCII codes (if the characters appear underlined, it means the receive buffer is full). Shown below is an example of a Hexadecimal Dump :

HEXADECIMAL DUMP   **ASCII DUMP**

0x000000   48 65 78 61 64 65 63 69 6D 61 6C 20 64 75 6D 70 20 66 75 6E 63 74 69 6F   Hexadecimal dump functio
0x000018   6E 20 30 31 32 33 34 35 36 37 38 39 20 61 62 63 64 65 66 67 68 69 6A 6B   n 0123456789 abcdefghijk
0x000030   6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 2E   lmnopqrstuvwxyz.

(Fig.1.4)

1.5 MAINTENANCE

1.5.1 Changing the paper roll

To change the roll of paper, proceed as follows:
1) Position the paper roll (1) so that it unrolls in the direction shown in fig. 1.11;
2) Insert the paper into the paper infeed opening and wait for it to load automatically (see fig. 1.5);
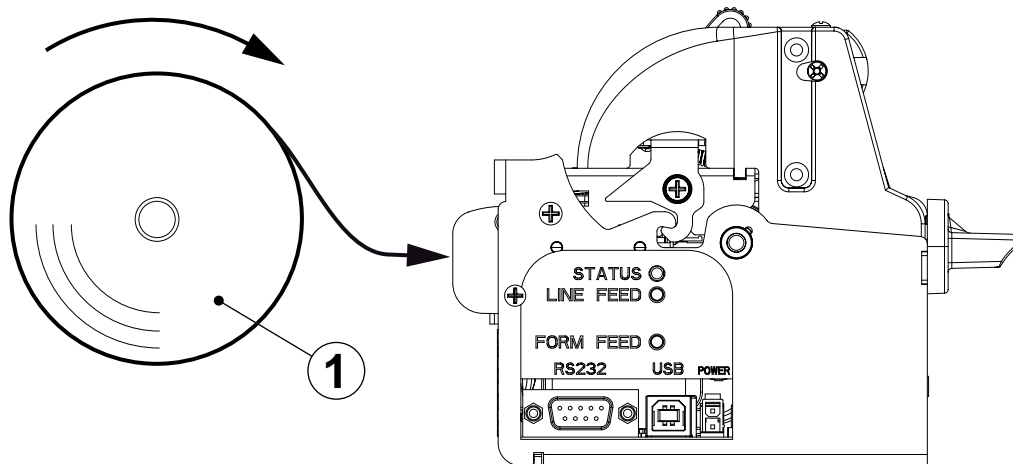
(Fig.1.5)

⚠ **WARNING**
Before inserting the paper, make sure the cut is straight.

⚠ **WARNING**
Follow loading specifications (fig.1.5)

1.5.2 Paper loading specifications

Fig. 1.6 gives alignment specifications for correct paper loading if no roll holder support is present:

(Fig.1.6)
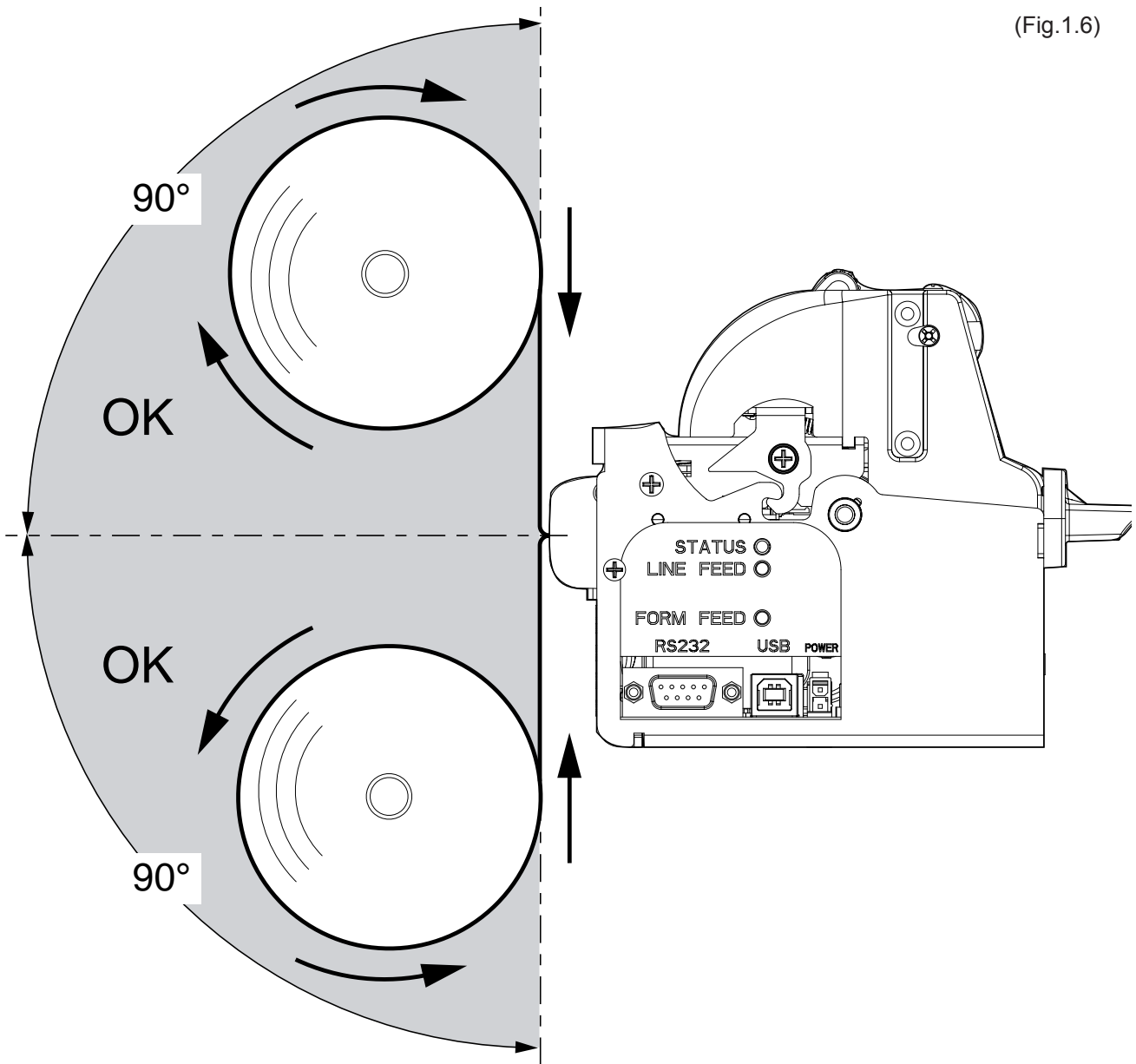
1.5.3 Ticket specifications

Paper with alignment notches may be used; referred to Appendix B on this manual to see the ticket specifications and management of notch alignment.

1.5.4 Adjusting paper width

Paper width may be adjusted from 60mm to 82.5mm using the right (Dx) and Left (Sx) slides located at the paper infeed opening.

Move the right and left slides to adjust the paper width (see fig. 1.7).
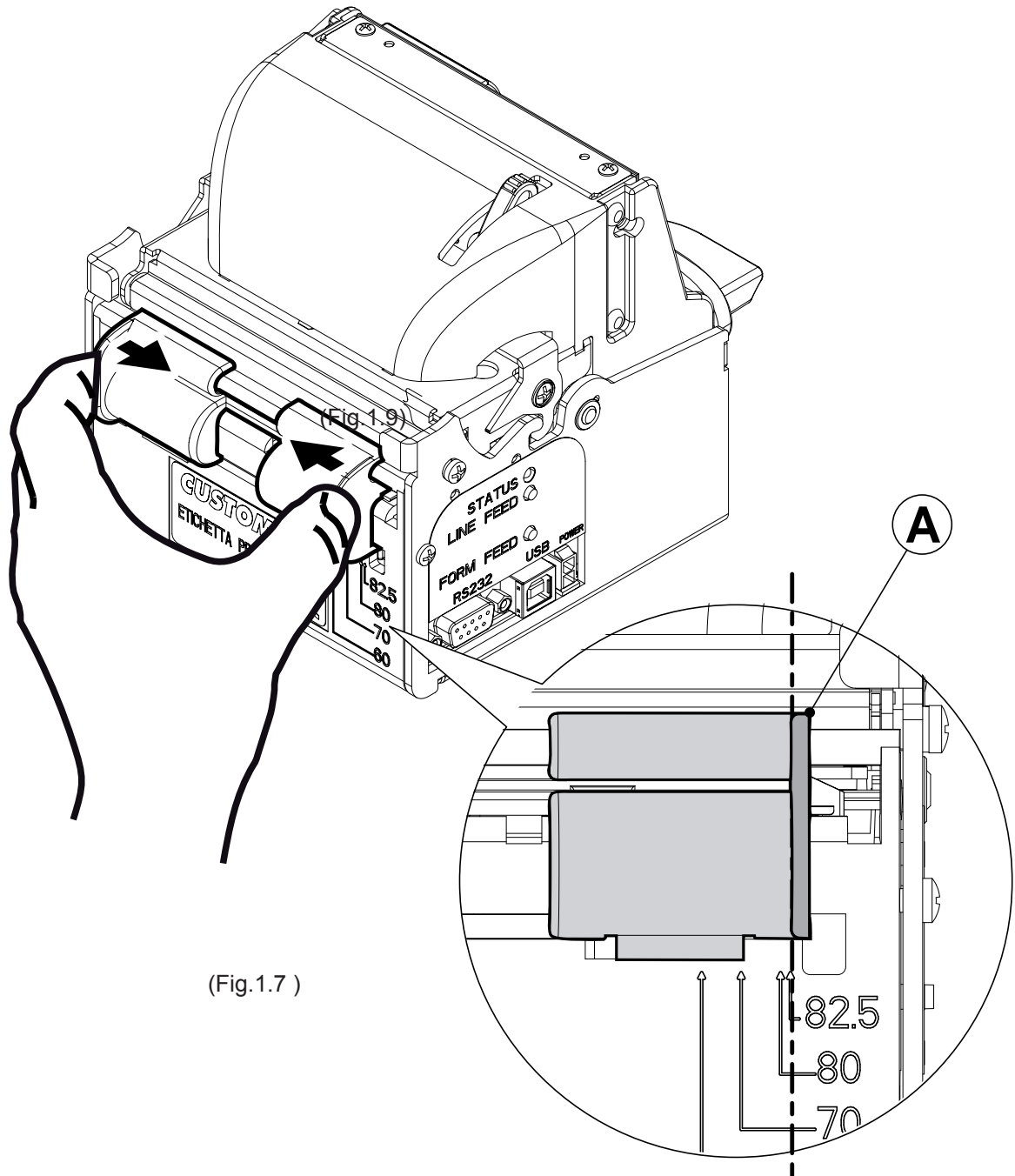
(Fig.1.7)

Below the right slide there are four point of reference for paper width (60, 70, 80 and 82.5mm).
Move the slides to align the internal side of the fin **(A)** with the point of reference.

1.5.5 Periodic cleaning

The printer inside needs a periodic cleaning. Check the inside of the printer
While pushing the opening lever down, lift the head/cutter unit (see figs. 1.8 and 1.9) until it locks into position.
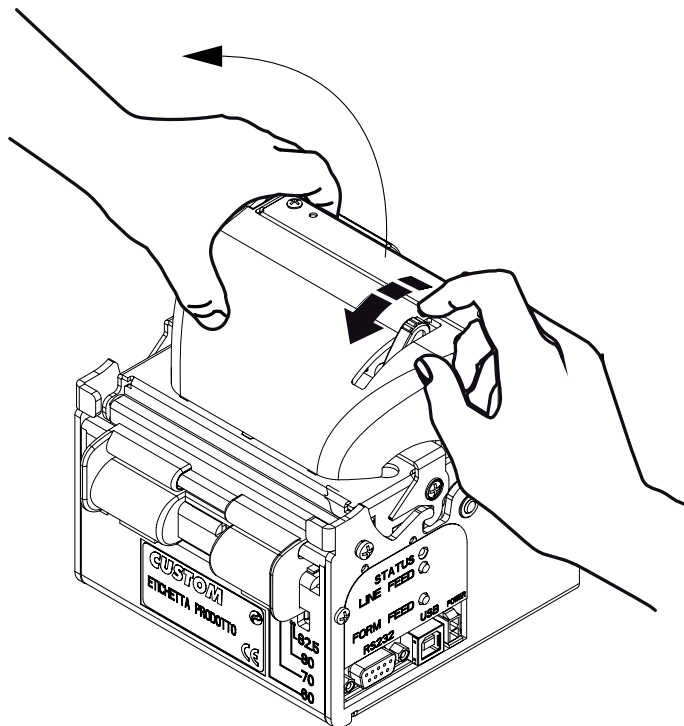
(Fig.1.8)
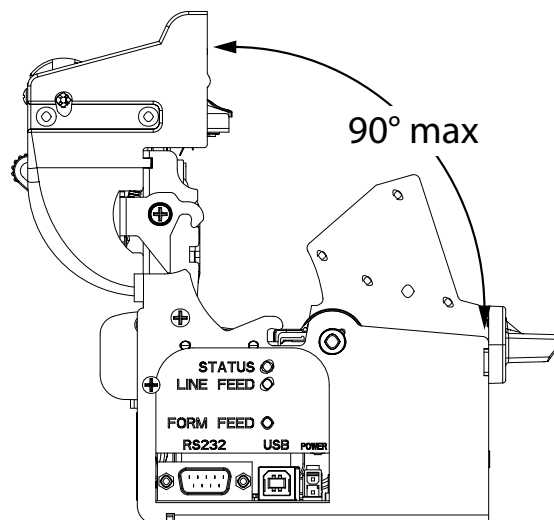
(Fig.1.9)

Check that there are no scraps of paper at the points indicated in fig. 1.10 (a) on the paper infeed and outfeed openings, on the cutter opening or the ejector roller. If there are, remove the scraps before proceeding with any other operation.
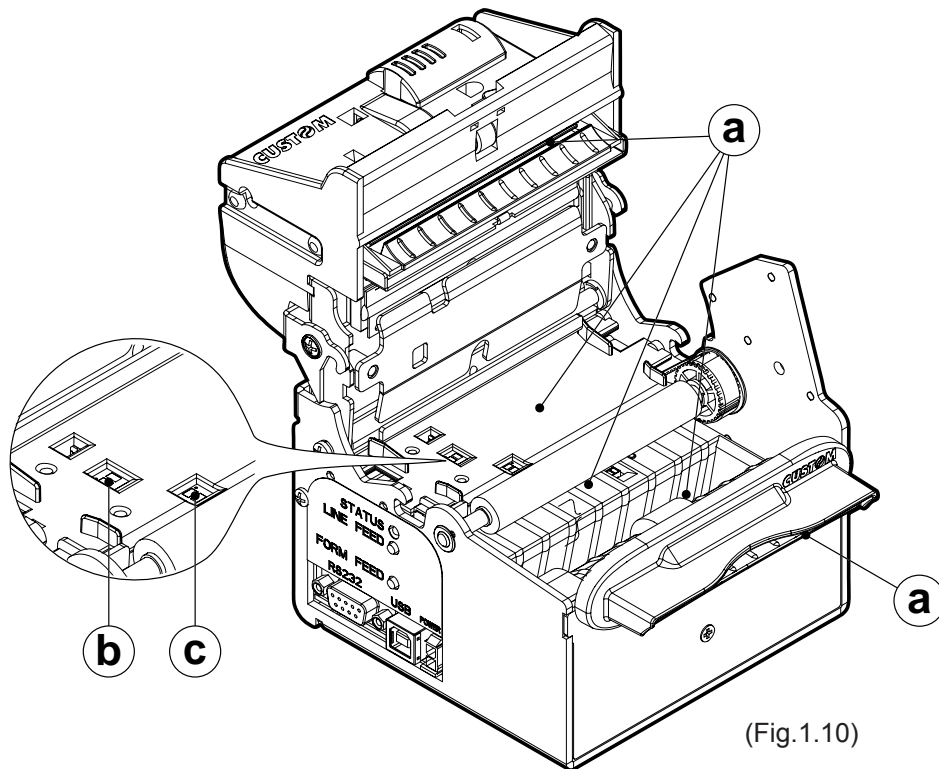
(Fig.1.10)

WARNING
Periodically remove accumulated paper dust from the upper plastic slide and the area around the paper outfeed sensor (see fig. 1.11). To clean, do not use harsh chemical solvents; the use of a soft, alcohol-moistened cloth and pneumatics air is recommended. Clean carefully the paper sensor, notch sesnor and paper outfeed sensor.

a = Upper plastic slide
b = Paper presence sensor
c = Notch sensor
d = Paper outfeed sensor
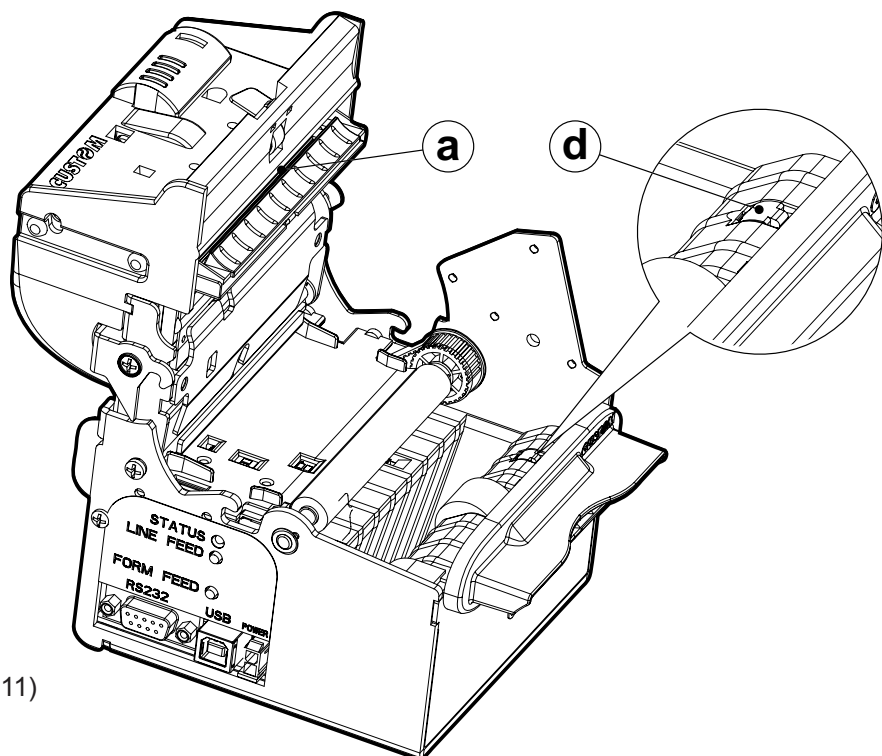
(Fig.1.11)

⚠ **WARNING**
To close the head/cutter unit:
1) push the opening lever down (see fig. 1.12);
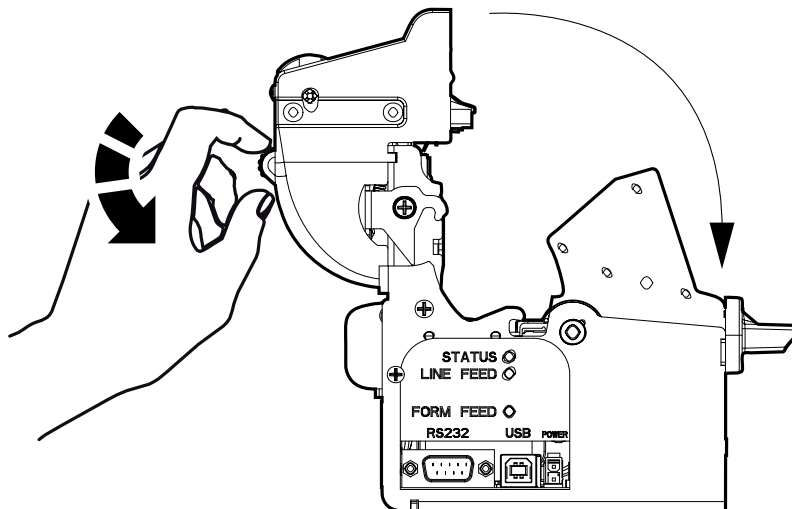
(Fig.1.12)

2) lower the head/ cutter unit and press hard in the position shown in fig. 1.13.

(Fig.1.13)

CUSTOM
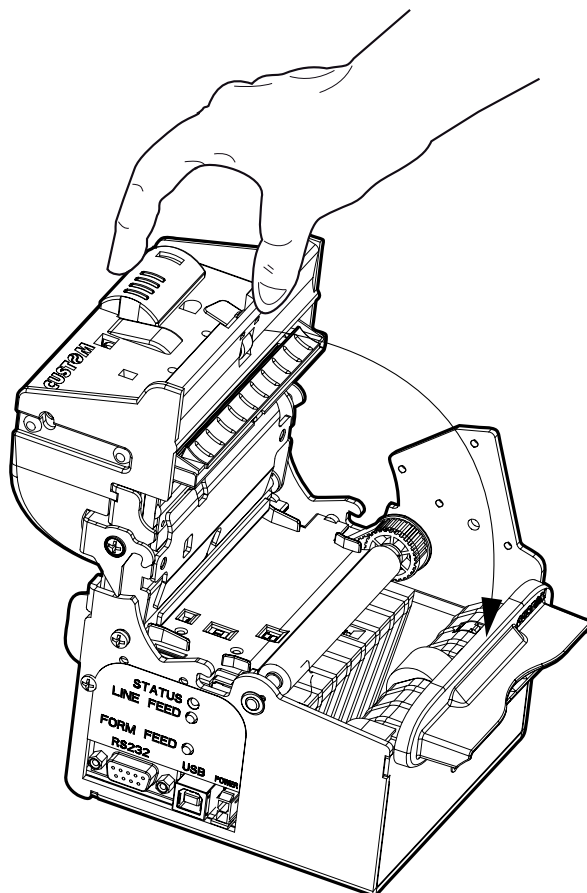
1.5.6 Notes for installation and use of printer with retracting
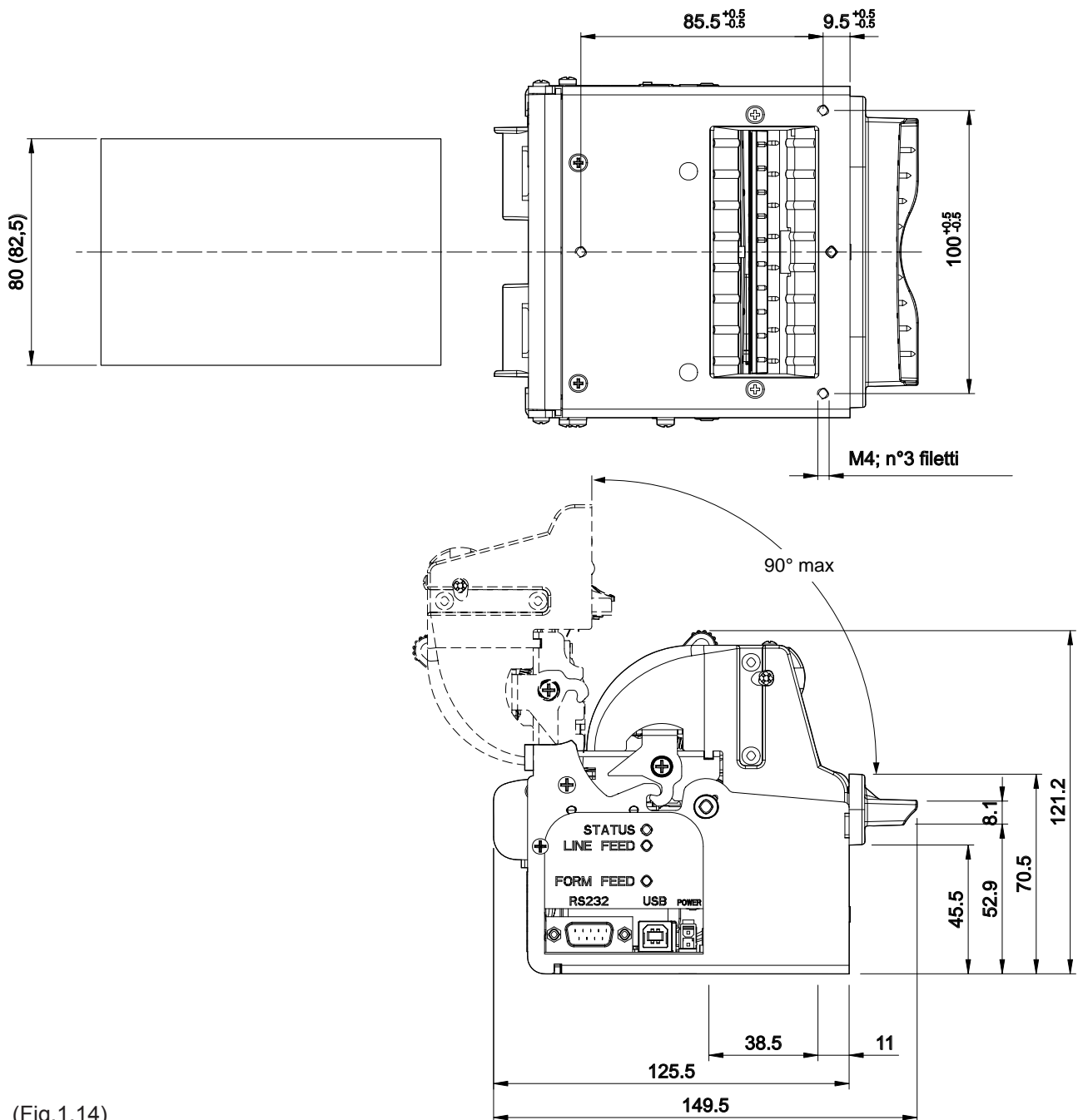
(Fig.1.14)

✏️ **N.B. "Ejector outfeed":** When assembling the printer on the machine, be sure to leave adequate space for the paper loop below. If this is not done, the ticket could crease at the cutting area, causing the ticket to jam in the paper outfeed opening.

In the following table are reported the length recommended for the tickets using of the retracting function:

TICKET LENGTH	TICKET PRESENTATION (MAX)
70 mm	10 mm
80 mm	10mm ÷ 30mm
80mm ÷ 220mm	10mm ÷ 30mm

1.5.7 Notes for installation and lower fastening of printer

3 FIXING POINT (BOTTOM)   (Fig.1.15)
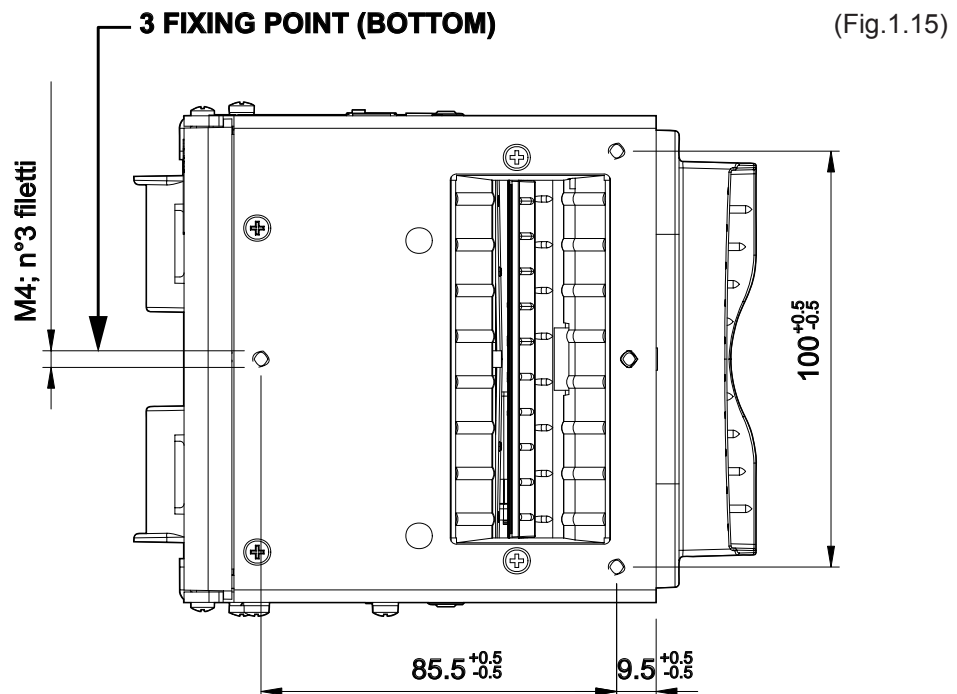
ATTENTION
It's very important to considere the screws length to not damage the internal sensor board near the lower fixing holes (see fig. 1.16).

On the basis of panel thickness calculate the screws length as follows :

$$Lv \leq Pn + Sp$$

where

        Lv : indicates screw length
        Pn : 8 mm
        Sp : panel thickness

For example if panel thickness is 10mm (Sp = 10mm) the max screw length will be 18mm.

(Fig.1.16)
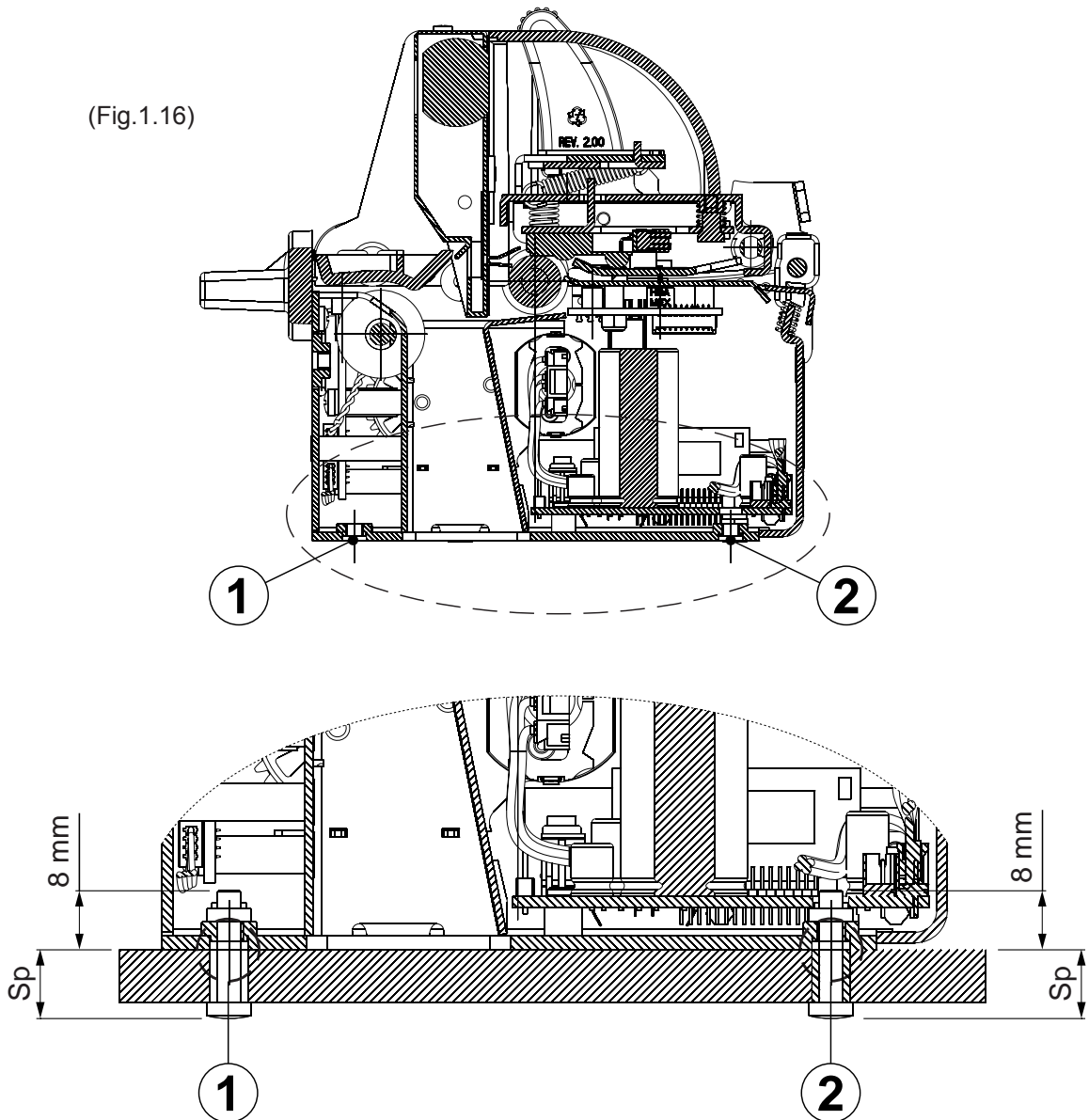
N.B.: The reference **(1)** indicates the screws that must located in the two external holes in front of the printer; the reference **(2)** indicates the screw that must located in the center hole of the rear side of the printer.

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CUST⌀M

(Fig.2.1)
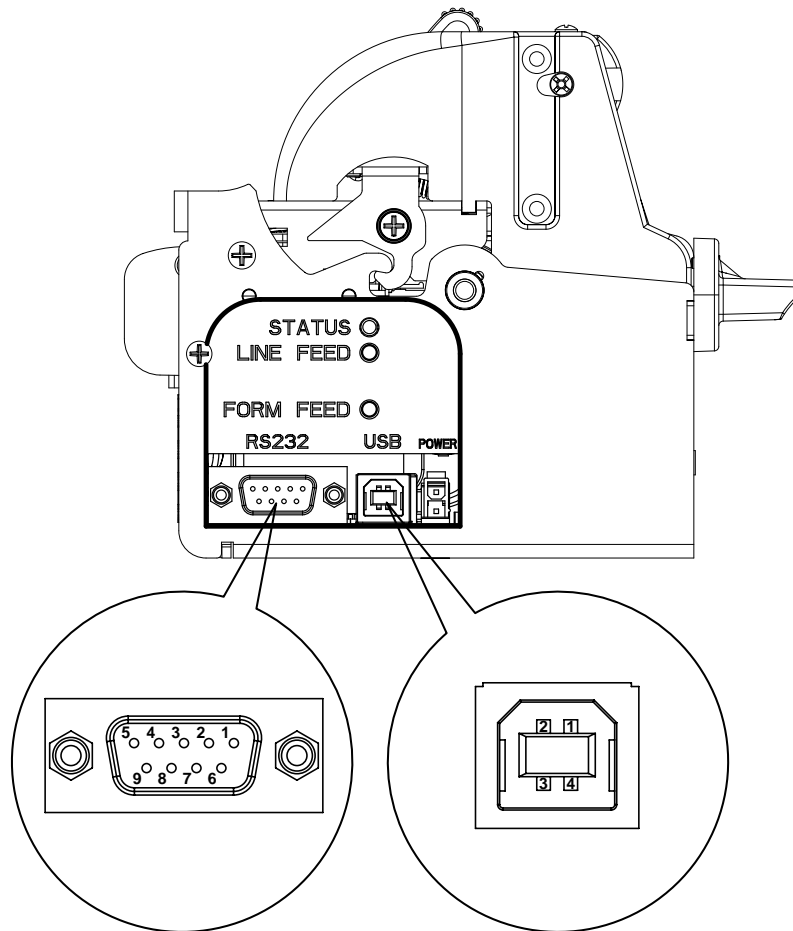
2.1 RS232 SERIAL

The printer has an RS232 interface with 9-pin female connector. Refer to the table below for the connector pin signals:

(Tab.2.1)

PIN	SIGNAL	IN/OUT	HOST	DESCRIPTION
1	DCD	OUT	DCD	Individuation Data Carrier. Printer on (active with RS232 level high)
2	TXD	OUT	RXD	Transmit data. Serial output (from the host)
3	RXD	IN	TXD	Receive data. Serial data input (to the host)
4	N.C.	-	N.C.	Not connected
5	GND	-	GND	Signal Ground
6	DTR	OUT	DSR	Ready to send. Printer on and operational (active with RS232 level high)
7	N.C.	-	N.C.	Not connected
8	RTS	OUT	CTS	Ready to send. Ready to receive data (active with RS232 level high)
9	N.C.	-	N.C.	Not connected

The diagrams below illustrate a sample connection between the printer and PC using a 25- or 9-pin female connector.

(Fig.2.2)

VKP80II

PC

CUSTOM
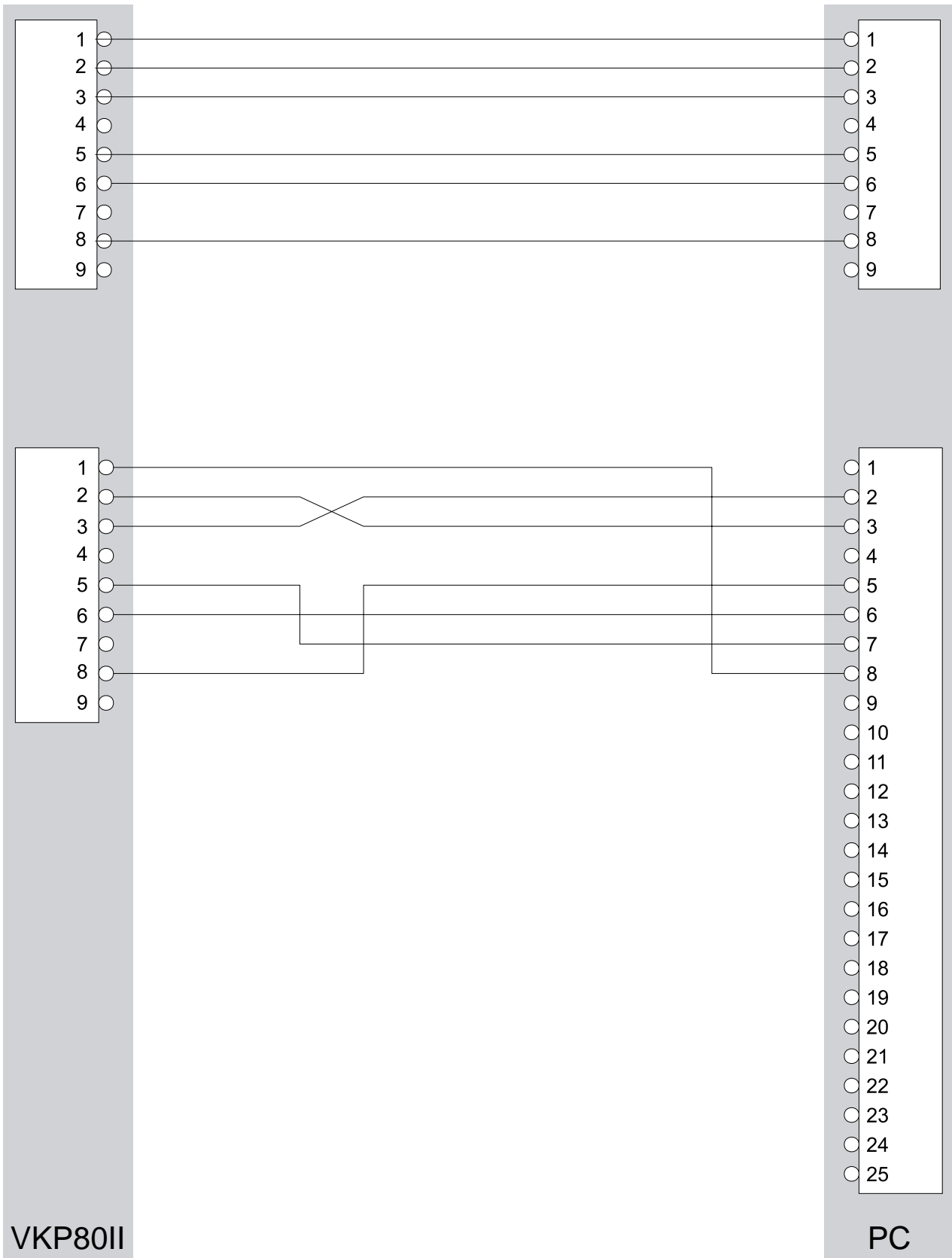
2.2 USB SERIAL INTERFACE

Printers with USB serial interface conform to USB 1.1 standards and have the following specifications:

• Communication speed 12 Mbit/sec
• "Receptacle series B" - type connector.

Refer to the table below for the connector pin signals and connection to a device:

(Tab.2.2)

PIN	SIGNAL	DESCRIPTION
1	VBUS	N.C.
2	D-	Data -
3	D+	Data +
4	GND	Segnale di massa

Fig. 2.3 illustrates USB interface connector pin layout:

(Fig.2.3)

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CUST⌀M
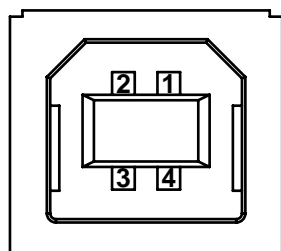
3.1 PRINT DIRECTION

The printer has two printing directions which can be selected by means of the control characters: normal and reverse.
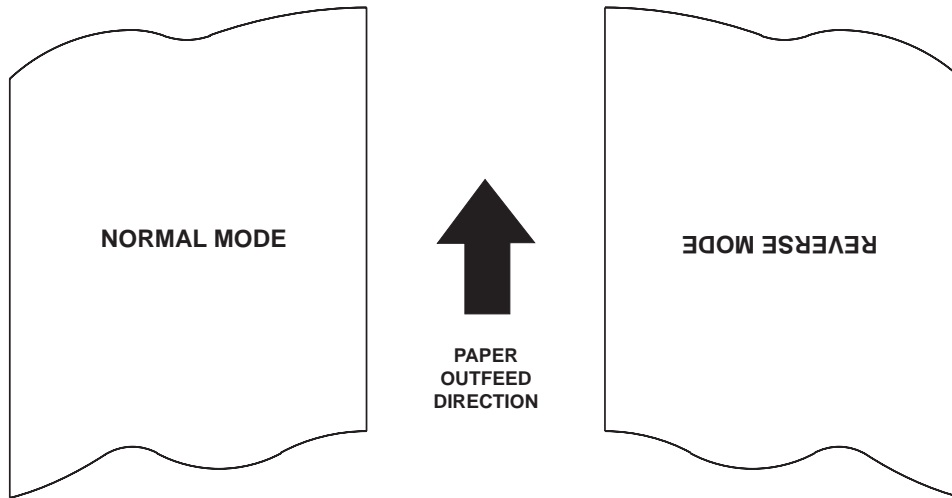
(Fig.3.1)

3.2 COMMAND DESCRIPTIONS

The table 3.1 shows the commands list, ordered by their hexadecimal value.

LEGEND :

Symbol	**Function**
$	indicates the representation of the command hexadecimal value (for example $40 means HEX 40).
{ }	indicates an ASCII character not performable.
n, m, t, x, y	are optional parameters that can have different values.

3.2.1 ESC/POS Emulation

The following table lists all the commands for function management in ESC/POS Emulation of the printer. The commands can be transmitted to the printer at any moment, but they will only be carried out when the commands ahead of them have been executed. The commands are carried out when the circular buffer is free to do so.

(Tab.3.1)

COMMAND DESCRIPTION TABLE

Com. HEX	Com. ASCII	Description	Note
$08	BS	Back space	
$09	HT	Horizontal tab	
$0A	LF	Print and line feed	
$0C	FF	Form feed	
$0D	CR	Print and carriage return	
$10 $04 n	DLE EOT n	Real-time status transmission	
$18	CAN	Cancel current line transmitted	
$1B $0C	ESC FF	Print in page mode	
$1B $20 n	ESC SP n	Set character right-side spacing	
$1B $21 n	ESC ! n	Set print mode	
$1B $24 nL nH	ESC $ nL nH	Set absolute position	
$1B $25 n	ESC % n	Select/cancel user-defined character set	

$1B $26 y c1 c2	ESC & y c1 c2	Define user-defined characters	
$1B $28 $76 nL nH	ESC (v nL nH	Set relative vertical print position	
$1B $2A m nL nH d1...dk	ESC * m nL nH d1...dk	Select image print mode	
$1B $2D n	ESC - n	Turn underline mode on/off	
$1B $30	ESC 0	Select 1/8-inch line spacing	
$1B $32	ESC 2	Select 1/6-inch line spacing	
$1B $33 n	ESC 3 n	Set line spacing using minimum units	
$1B $34 n	ESC 4 n	Set/reset script mode	
$1B $3D n	ESC = n	Select device	
$1B $3F n	ESC ? n	Cancel user-defined characters	
$1B $40	ESC @	Initialize printer	
$1B $44 n1...nk $00	ESC D n1...nk NUL	Set horizontal tab positions	
$1B $45 n	ESC E n	Select emphasized mode	
$1B $47 n	ESC G n	Select double-strike mode	
$1B $4A n	ESC J n	Print and feed paper	
$1B $4C	ESC L	Select page mode	
$1B $4D n	ESC M n	Select character font	
$1B $52 n	ESC R n	Select international character set	
$1B $53	ESC S	Select standard mode	
$1B $54 n	ESC T n	Select print direction in page mode	
$1B $56 n	ESC V n	Select print mode 90° turned	
$1B $57 xL xH yL yH dxL dxH dyL dyH	ESC W xL xH yL yH dxL dxH dyL dyH	Set printing area in page mode	
$1B $5C nL nH	ESC \ nL nH	Set relative print position	
$1B $61 n	ESC a n	Select justification	
$1B $63 $35 n	ESC c 5 n	Enable/disable front panel buttons	
$1B $64 n	ESC d n	Print and feed paper n lines	
$1B $69	ESC i	Total cut	
$1B $74 n	ESC t n	Select character code table	
$1B $76	ESC v	Transmit printer status	
$1B $7E n	ESC { } n	Set/cancel upside-down character printing	
$1B $C1	ESC { } n	Set/cancel cpi mode	
$1B $FA n xH xL yH yL	ESC { } n xH xL yH yL	Print graphic	
$1B $FF n nL nH	ESC { } n nL nH	Receive graphic page from communication port	ONLY FOR SERIAL For this command set the comunication protocol as ""Hardware""
$1C $C0 xH xL yH yL dxH dxL dyH dyL xLH xLL yLH yLL num	FS { } xH xL yH yL dxH dxL dyH dyL xLH xLL yLH yLL num	Select logo share and print it in any graphic page point	

CUST⌖M

$1D $21 n	GS ! n	Select character size	
$1D $24 nL nH	GS $ nL nH	Set absolute vertical print position in page mode	
$1D $2A x y d1...d(x x y x 8)	GS * x y d1...d(x x y x 8)	Define downloaded bit image	
$1D $2F m	GS / m	Print downloaded bit image	
$1D $3A	GS :	Set start/end of macro definition	
$1D $42 n	GS B n	Turn white/black reverse printing mode on/off	
$1D $43 $30 n m	GS C 0 n m	Select counter print mode	
$1D $43 $31 aL aH bL bH n r	GS C 1 aL aH bL bH n r	Select count mode (A)	
$1D $43 $32 nL nH	GS C 2 nL nH	Select counter	
$1D $43 $3B sa $3B sb $3B sn $3B sr $3B sc $3B	GS C ; sa ; sb ; sn ; sr ; sc ;	Select count mode (B)	
$1D $48 n	GS H n	Select printing position of HRI characters	
$1D $49 n	GS I n	Transmit printer ID	
$1D $4C nL nH	GS L nL nH	Set left margin	
$1D $50 x y	GS P x y	Set horizontal and vertical motion units (mode 1)	
$1D $56 m	GS V m	Select cut mode	
$1D $57 nL nH	GS W nL nH	Set printing area width	
$1D $5C nL nH	GS \ nL nH	Set relative print position	
$1D $5E r t m	GS ^ r t m	Execute macro	
$1D $63	GS c	Print counter	
$1D $65 n [m]	GS e n [m]	Ejector commands	
$1D $66 n	GS f n	Select font for HRI characters	
$1D $68 n	GS h n	Select height of bar code	
$1D $6B m $00	GS k m NUL	Print bar code	
$1D $72 n	GS r n	Transmit status	
$1D $76 $30 m xL xH yL yH d1...dk	GS v 0 m xL xH yL yH d1...dk	Print raster image	
$1D $77 n	GS w n	Select horizontal size (enlargement) of bar code	
$1D $7C n	GS { } n	Set printing density	
$1D $7E	GS { } n	Set superscript / subscript	
$1D $D0 xH xL yH yL	GS { } xH xL yH yL	Set horizontal and vertical motion units (mode 2)	
$1D $E0 n	GS { } n	Enable / disable automatic FULL STATUS back	
$1D $E1	GS { }	Reading of length paper (cm) available before virtual paper end	
$1D $E2	GS { }	Reading number of cuts performed from the printer	
$1D $E3	GS { }	Reading of length (cm) of printed paper	
$1D $E4	GS { }	Reading number of retracting	
$1D $E5	GS { }	Reading number of power up	
$1D $E6 nH nL	GS { } nH nL	Virtual paper end limit	

$1D $E7 nH nL	GS { } nH nL	Set notch distance	
$1D $F0 n	GS { } n	Set printing speed	
$1D $F6	GS { }	Ticket align at print	
$1D $F8	GS { }	Ticket align at cut	

Given below are more detailed descriptions of each command.

$08

[Name]	**Back space**	
[Format]	ASCII	BS
	Hex	08
	Decimal	8
[Description]	Moves print position to previous character.	
[Notes]	Can be used to put two characters at the same position.	
[Default]		
[Reference]		
[Example]		

$09

[Name]	**Horizontal tab**	
[Format]	ASCII	HT
	Hex	09
	Decimal	9
[Description]	Moves the print position to the next horizontal tab position.	

[Notes]
• Ignored unless the next horizontal tab position has been set.
• If the command is received when the printing position is at the right margin, the printer executes print buffer full printing and horizontal tab processing from the beginning of the next line.

[Default]
[Reference]
[Example]

CUST⌖M

$0A

[Name]	**Print and line feed**	
[Format]	ASCII	LF
	Hex	0A
	Decimal	10
[Description]	Prints the data in the buffer and feeds one line based on the current line spacing.	
[Notes]	• Sets the print position to the beginning of the line.	
[Default]		
[Reference]		
[Example]		

$0C

[Name]	**Form Feed**	
[Format]	ASCII	FF
	Hex	0C
	Decimal	12
[Description]	Prints the data in the buffer, cuts the paper and presents the ticket.	
[Notes]		
[Default]		
[Reference]		
[Example]		

$0D

[Name]	**Print and carriage return**	
[Format]	ASCII	CR
	Hex	0D
	Decimal	13
[Description]	When autofeed is "CR enabled", this command functions in the same way as **$0A**, otherwise it is disregarded.	
[Notes]	• Sets the print position to the beginning of the line.	
[Default]	See "Autofeed in setup" parameter.	
[Reference]	**$0A**	
[Example]		

$10 $04 n

[Name]	**Real-time status transmission**		
[Format]	ASCII	DLE	EOT	n
	Hex	10	04	n
	Decimal	16	4	n
[Range]	$1 \le n \le 4$; n=17, n=20		
[Description]	Transmits the selected printer status specified by n in real time according to the following parameters:		

n = 1   transmit printer status
n = 2   transmit off-line status
n = 3   transmit error status
n = 4   transmit paper roll sensor status
n = 17 transmit print status
n = 20 transmit FULL STATUS

[Notes]	• This command is executed when the data buffer is full.
	• This status is transmitted whenever data sequence $10 $04 n is received.
[Default]	

[Reference]   See tables below.
[Example]

n=1: Printer status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED
1	-	-	-	RESERVED
2	-	-	-	RESERVED
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	-	-	-	RESERVED
5	-	-	-	Not defined
6	-	-	-	Not defined
7	-	-	-	RESERVED

n=2: Off-line status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED
1	-	-	-	RESERVED
2	Off	00	0	Cover closed.
	On	04	4	Cover opened.
3	Off	00	0	Paper isn't feeded by LINE FEED button.
	On	08	8	Paper is feeded by LINE FEED button.
4	-	-	-	RESERVED
5	Off	00	0	Paper present.
	On	20	32	Printing stop due to paper end.
6	Off	00	0	No error.
	On	40	64	Error.
7	-	-	-	RESERVED

n=3: Error status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED
1	-	-	-	RESERVED
2	-	-	-	RESERVED
3	Off	00	0	Cutter ok.
	On	08	8	Cutter error.
4	-	-	-	RESERVED
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error.
6	Off	00	0	No auto-recoverable error.
	On	40	64	Auto-recoverable error.
7	-	-	-	RESERVED

CUSTOM

n=4: Paper roll sensor status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED
1	-	-	-	RESERVED
2,3	Off	00	0	Paper present in abundance.
	On	0C	12	Near paper end.
4	-	-	-	RESERVED
5, 6	Off	00	0	Paper present.
	On	60	96	Paper not present.
7	-	-	-	RESERVED

n=17: Print status

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	RESERVED
1	-	-	-	RESERVED
2	Off	00	0	Paper drag motor off.
	On	04	4	Paper drag motor on.
3	-	-	-	RESERVED
4	-	-	-	RESERVED
5	Off	00	0	Paper present.
	On	20	32	Paper absent.
6	-	-	-	RESERVED
7	-	-	-	RESERVED

n=20: FULL status (6 bytes)
1° byte = $10 (DLE);   2° byte = $0F;   3° byte = Paper status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper present.
	On	01	1	Paper not present.
1	-	-	-	RESERVED
2	Off	00	0	Paper present in abundance.
	On	04	4	Near paper end.
3	-	-	-	RESERVED
4	-	-	-	RESERVED
5	Off	00	0	Ticket not present in output.
	On	20	32	Ticket present in output.
6	Off	00	0	Not virtual paper end (*).
	On	40	64	Virtual paper end (*).
7	-	-	-	RESERVED

(*) Virtual paper end is set when the paper length available, read by $1D $E1, is 0.

4° byte = USER STATUS

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Cover closed.
	On	01	1	Cover opened.
1	Off	00	0	Cover closed.
	On	02	2	Cover opened.
2	Off	00	0	No spooling
	On	04	4	Spooling
3	Off	00	0	Drag paper motor off.
	On	08	8	Drag paper motor on.
4	-	-	-	RESERVED
5	Off	00	0	LF key released.
	On	20	32	LF key pressed.
6	Off	00	0	FF key released.
	On	40	64	FF key pressed.
7	-	-	-	RESERVED

5° byte = Recoverable error Status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Head temperature ok.
	On	01	1	Head temperature error.
1	Off	00	0	No COM error.
	On	02	2	RS232 COM error.
2	-	-	-	RESERVED
3	Off	00	0	Power supply voltage ok.
	On	08	8	Power supply voltage error.
4	-	-	-	RESERVED
5	Off	00	0	Acknowledge command.
	On	20	32	Not acknowledge command error.
6	Off	00	0	Free paper path.
	On	40	64	Paper jam.
7	-	-	-	RESERVED

6° byte = Unrecoverable error Status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Cutter ok.
	On	01	1	Cutter error
1	-	-	-	RESERVED
2	Off	00	0	RAM ok.
	On	04	4	RAM error.
3	Off	00	0	EEPROM ok.
	On	08	8	EEPROM error.
4	-	-	-	RESERVED
5	-	-	-	RESERVED
6	Off	00	0	Flask ok.
	On	40	64	Flash error.
7	-	-	-	RESERVED

$18

[Name]	**Cancel current line transmitted**	
[Format]	ASCII	CAN
	Hex	18
	Decimal	24

[Description]   Deletes current line transmitted.
[Notes]   • Sets the print position to the beginning of the line.
   • However, this command does not clear the receive buffer.
[Default]
[Reference]
[Example]

$1B $0C

[Name]	**Print data in page mode**	
[Format]	ASCII	ESC FF
	Hex	1B 0C
	Decimal	27 12

[Description]   In page mode, prints all buffered data in the printing area collectively.
[Notes]   • This command is enabled only in page mode.
   • After printing, the printer does not clear the buffered data, setting values for **$1B $54** and **$1B $57**, and the position for buffering character data.
[Reference]   **$0C, $1B $4C, $1B 53**
[Example]

$1B $20 n

[Name]	**Set right-side character spacing**		
[Format]	ASCII	ESC	SP n
	Hex	1B	20 n
	Decimal	27	32 n

[Range]   0 ≤ n ≤ 255
[Description]   Sets the character spacing for the right side of the character to [n x horizontal or vertical motion units].

[Notes]   • The right character spacing for double-width mode is twice the normal value.
                 When the characters are enlarged, the right side character spacing is m (2 or 4) times the normal value.
                 • The horizontal and vertical motion units are specified by **$1D $50**. Changing the horizontal or vertical motion units does not affect the current right side spacing.
                 • The **$1D $50** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount.
                 • In standard mode, the horizontal motion unit is used.
                 • The maximum right side spacing is 255/200 inches.
[Default]   n = 0
[Reference]   **$1D $50 or $1D $D0**
[Example]

$1B $21 n

[Name]   **Select print modes**
[Format]   ASCII   ESC   !   n
                 Hex   1B   21   n
                 Decimal   27   33   n
[Range]   0 ≤ n ≤ 255
[Description]   Selects print modes using n (see table below):

Bit	Off/On	Hex	Deci-mal	Function	11/15 cpi	15/20 cpi
0	Off	00	0	Character font A selected.	18 x 24	14 x 24
	On	01	1	Character font B selected.	14 x 24	10 x 24
1	-	-	-	Undefined.		
2	-	-	-	Undefined.		
3	Off	00	0	Expanded mode not selected.		
	On	08	8	Expanded 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	Off	00	0	Italic mode not selected.		
	On	40	64	Italic mode selected.		
7	Off	00	0	Underline mode not selected.		
	On	80	128	Underline mode selected.		

[Notes]   • The printer can underline all characters, but cannot underline the spaces set by **$09, $1B $24, $1B $5C** and 90°/270° rotated characters.
                 • When characters are enlarged to different heights on one line, the characters are aligned at the baseline or topline (see **$1D $7E**).
                 • This command resets the left and right margin at default value (see **$1D $4C, $1D $57**).
                 • **$1B $45** can also be used to turn the emphasized mode on/off. However, the last-received setting command is the effective one.
                 • **$1B $2D** can also be used to turn the underlining mode on/off. However, the last-received setting command is the effective one.
                 • **$1B $34** can also be used to turn the italic mode on/off. However, the last-received setting command is the effective one.

	• **$1D $21** can also be used to select character height/width. However, the last-received setting command is the effective one.
[Default]	n = 0
[Reference]	**$1B $2D, $1B $45, $1B $34, $1D $21**
[Example]	

$1B $24 nL nH

[Name]	**Set absolute print position**			
[Format]	ASCII	ESC	$	nL	nH
	Hex	1B	24	nL	nH
	Decimal	27	36	nL	nH
[Range]	0 ≤ nL ≤ 255				
	0 ≤ nH ≤ 255				
[Description]	Sets the distance from the beginning of the line to the position at which subsequent cha racters are to be printed.				
	The distance from the beginning of the line to the print position is [(nL + nH ´ 256) ´ (vertical or horizontal motion unit)] inches.				
[Notes]	• Settings outside the specified printable area are ignored.				
	• The horizontal and vertical motion unit are specified by **$1D $50** or **$1D $D0**.				
	• $1D $50 or $1D $D0 can change the horizontal (and vertical) motion unit.				
	However, the value cannot be less than the minimum horizontal movement amount.				
	• In standard mode, the horizontal motion unit (x) is used.				
	• If the setting is outside the printing area width, it sets the absolute print position, but the left or right margin is set at default value.				
[Default]					
[Reference]	**$1B $5C, $1D $50, $1D $D0**				
[Example]					

$1B $25 n

[Name]	**Select/cancel user-defined characters**		
[Format]	ASCII ESC	%	n
	Hex 1B	25	n
	Decimal 27	37	n
[Range]	0 ≤ n ≤ 255		
[Description]	Selects or cancels the user-defined character set.		
	When the Least Significant Bit (LSB) of n is 0, the user-defined character set is cancelled.		
	When the LSB of n is 1, the user-defined character set is selected.		
[Notes]	• Only the LSB of n is applicable.		
	• When the user-defined character set is cancelled, the internal character set is automatically selected.		
[Default]	n=0		
[Reference]	**$1B $26, $1B $3F**		
[Example]			

$1B $26 y c1 c2 [x1 d1...d (y x x1)]...[xkd1...d (y x xk)]

[Name]	**Defines user-defined characters**				
[Format]	ASCII	ESC	&	y	c1	c2

	Hex	1B	26	y	c1	c2
	Decimal	27	37	y	c1	c2

[Range] y = 3
32 ≤ c1 ≤ c2 £ 126
0 ≤ x ≤ 16 (Font (18 * 24))
0 ≤ x ≤ 13 (Font 14 * 24)
0 ≤ x ≤ 10 (Font 10 * 24)
0 ≤ d1 … d (y * xk) ≤ 255
k = c2 – c1 + 1

[Description] Defines 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.

[Notes] • The allowable character code range is from ASCII $20 (32) to $7E (126) (95 characters).
• It is possible to define multiple characters for consecutive character codes. If only one cha racter is desired, use c1 = c2.

• If c2 < c1, the command is not executed.

• d is the dot data for the characters. The dot pattern is in the horizontal direction starting from the left. Any remaining dots on the right remain blank.
• The data to define a user-defined character is (x x y) bytes.
• To print a dot, set the corresponding bit to 1; to not have it print, set to 0.
• This command can define different user-defined character patterns for each font. To select the font, use **$1B $21, $1B $C1**.
• The user-defined character definitions are cleared when:
$1B $40 or **$1D $2A** or **$1B $3F** are executed or the printer is reset or the power shut off.

[Default] Internal character set.
[Reference] **$1B $25, $1B $3F**
[Example]

18 dots (11 cpi)
14 dots (15 cpi)

p1

MSB

LSB

p2

CUSTØM

$1B $2A 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
              $0 \leq nL \leq 255$
              $0 \leq nH \leq 3$
              $0 \leq d \leq 255$
[Description] Selects a bit image mode using m for the number of dots specified by nL and nH, as follows:

m	Mode	Vertical direction		Horizontal direction	
		N° dots	DPI	DPI	N. of data (k)
0	8 dot single density	8	67	100	nL + nH x 256
1	8 dot double density	8	67	200	nL + nH x 256
32	24 dot single density	24	200	100	(nL + nH x 256) x 3
33	24 dot double density	24	200	200	(nL + nH x 256) x 3

[Notes]   • The nL and nH commands indicate the number of dots of the bit image in the horizontal direction. The number of dots is calculated using: nL + nH x 256.
              • If the bit image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
              • d indicates the bit image data. Set a corresponding bit to 1 to print a dot, or to 0 to not print the dot.
              • If the value of m is outside the specified range, nL and data following it are processed as normal data.
              • If the width of the printing area set by **$1D $4C** and **$1D $57** is less than the width required by the data set using **$1B $2A**, the excess data are ignored.
              • To print the bit image use **$0A, $0D, $1B $4A** or **$1B $64**.
              • After printing a bit image, the printer returns to normal data processing mode.
              • This command is not affected by the emphasized, double-strike, underline (etc.) print modes, except for the upside-down mode.
              • The relationship between the image data and the dots to be printed is as follows:

8-dot bit image
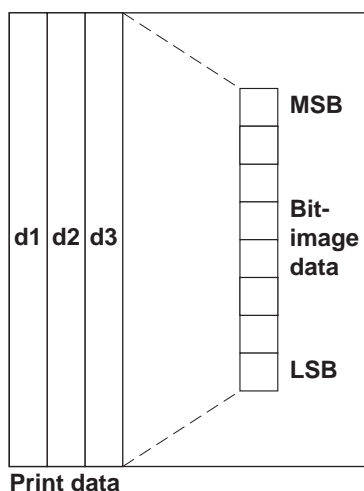
24-dot bit image
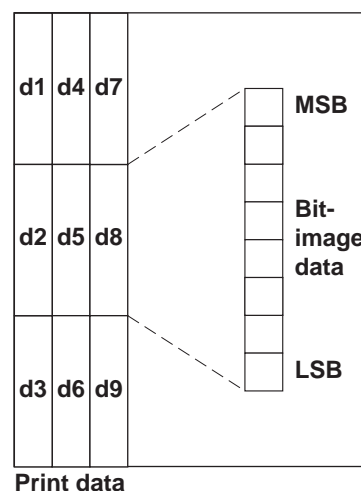
[Default]
[Reference]
[Example]

$1B $2D n

[Name]	**Turn underline mode on/off**			
[Format]	ASCII	ESC	-	n
	Hex	1B	2D	n
	Decimal	27	45	n
[Range]	0 ≤ n ≤ 2, 48 ≤ n ≤ 50			

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

n = 0, 48	Turns off underline mode
n = 1, 49	Turns on underline mode (1-dot thick)
n = 2, 50	Turns on underline mode (2-dot thick)

[Notes]
• The printer can underline all characters, but cannot underline the space set by **$09** and right-side character spacing.
• The printer cannot underline 90°/270° rotated characters and white/black inverted characters.
• When underline mode is turned off by setting the value of n to 0 or 48, the data which follows is not underlined.
• Underline mode can also be turned on or off by using **$1B $21**. Note, however, that the last received command is the effective one.

[Default] n=0
[Reference] **$1B $21**
[Example]

$1B $30

[Name]	**Select 1/8-inch line spacing**		
[Format]	ASCII	ESC	0
	Hex	1B	30
	Decimal	27	48

[Description] Selects 1/8-inch line spacing
[Notes]
[Default]
[Reference] **$1B $32, $1B $33**
[Example]

$1B $32

[Name]	**Select 1/6-inch line spacing**		
[Format]	ASCII	ESC	2
	Hex	1B	32
	Decimal	27	50

[Description] Selects 1/6-inch line spacing.
[Notes]
[Default]
[Reference] **$1B $30, $1B $33**
[Example]

$1B $33 n

[Name]   **Set line spacing**
[Format]   ASCII   ESC   3   n
              Hex   1B   33   n
              Decimal   27   51   n
[Range]   0 ≤ n ≤ 255
[Description] Sets line spacing to [n * (vertical or horizontal motion unit)] inches.
[Notes]   • The horizontal and vertical motion unit are specified by **$1D $50** or **$1D $D0**. Changing the
              horizontal or vertical motion unit does not affect the current line spacing.
              • The **$1D $50** or **$1D $D0** command can change the horizontal (and vertical) motion unit.
              However, the value cannot be less than the minimum vertical movement amount.
              • In standard mode, the vertical motion unit is used.
[Default]   n = 64 (1/6 inch)
[Reference]   **$1B $30, $1B $32, $1D $50 or $1D $D0**
[Example]

$1B $34 n

[Name] **Set/reset italic mode**
[Format]   ASCII   ESC   4   n
              Hex   1B   34   n
              Decimal   27   52   n
[Range]   0 ≤ n ≤ 1, 48 ≤ n ≤ 49
[Description] Turns italic mode on or off, based on the following values of n:

n	Function
0,48	Turns off italic mode
1,49	Turns on italic mode

[Notes]   • The printer can print any character in italic mode.
              • When italic mode is turned off by setting the value of n to 0 or 48, the data which follows is
              printed in normal mode.
              • Italic mode can also be turned on or off using **$1B $21**. Note, however, that the last recei
              ved command is the effective one.
[Default]   n = 0
[Reference]   **$1B $21**
[Example]

$1B $3D n

[Name]   **Select peripheral device**
[Format]   ASCII   ESC   =   n
              Hex   1B   3D   n
              Decimal   27   61   n
[Range]   0 ≤ n ≤ 255

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

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled.
	On	01	1	Printer enabled.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	-	-	-	Undefined.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	00	0	Pass-trough function disabled
	On	80	128	Pass-trough function enabeld

[Notes]   • When the printer is disabled, it ignores all transmitted data until the printer is enabled through this command.
                • When the Pass-trough function is enabled, all transmitted data are sent on the 2nd serial.
[Default]   n = 1
[Reference]
[Example]

$1B $3F n

[Name]   **Cancel user-defined characters**
[Format]   ASCII   ESC   ?   n
                Hex   1B   3F   n
                Decimal   27   63   n
[Range]   32 ≤ n ≤ 126
[Description]   Cancels user-defined characters.
[Notes]   • This command cancels the pattern defined for the character code specified by n. After the user-defined character is cancelled, the corresponding pattern for the internal character is printed.
                • This command deletes the pattern defined for the specified character code in the font selected by **$1B $21**.
                • If the user-defined character has not been defined for the specified character code, the printer ignores this command.
[Default]
[Reference]   **$1B $26, $1B $25**
[Example]

$1B $40

[Name]   **Initialize printer**
[Format]   ASCII   ESC   @
                Hex   1B   40
                Decimal   27   64
[Description]   Clears the data in the print buffer and resets the printer mode to that in effect when power was turned on.
[Notes]   • The data in the receiver buffer is not cleared.
                • The macro definitions are not cleared.
[Default]
[Reference]
[Example]

CUST⦵M

$1B $44 [n1...nk] $00

[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 ≤ n ≤ 255				
	0 ≤ k ≤ 32				
[Description]	Sets horizontal tab positions				

[Description] Sets horizontal tab positions
• n specifies the column number for setting a horizontal tab position calculated from the be ginning of the line.
• k indicates the total number of horizontal tab positions to be set.

[Notes] • The horizontal tab position is stored as a value of [character width x n] measured from the beginning of the line. The character width includes the right-side character spacing and dou ble-width characters are set with twice the width of normal characters.
• This command cancels previous tab settings.
• When setting n = 8, the print position is moved to column 9, by sending **$09**.
• Up to 32 tab positions (k = 32) can be set. Data exceeding 32 tab positions is processed as normal data.
• Send [n] k in ascending order and place a 0 NUL code at the end. When [n] k is less than or equal to the preceding value [n] k-1, the setting is complete and the data which follows is processed as normal data.
• **$1B $44 $00** cancels all horizontal tab positions.
• The previously specified horizontal tab position does not change, even if the character width is modified.

[Default] Default tab positions are set at intervals of 8 characters (columns 9, 17, 25, …) for Font A when the right-side character spacing is 0.

[Reference] **$09**

[Example]

$1B $45 n

[Name]	**Turn emphasized mode on/off**			
[Format]	ASCII	ESC	E	n
	Hex	1B	45	n
	Decimal	27	69	n
[Range]	0 ≤ n ≤ 255			
[Description]	Turns emphasized mode on/off.			

[Description] Turns emphasized mode on/off.
• When the LSB of n is 0, the emphasized mode is off.
• When the LSB of n is 1, the emphasized mode is on.

[Notes] • Only the LSB of n is effective.
• **$1B $21** also turns on and off the emphasized mode. However, the last received command is the effective one.

[Default] n = 0

[Reference] **$1B $21**

[Example]

$1B $47 n

[Name]	**Turn double-strike mode on/off**			
[Format]	ASCII	ESC	G	n
	Hex	1B	47	n
	Decimal	27	71	n
[Range]	0 ≤ n ≤ 255			
[Description]	Turns double-strike mode on or off.			

	• When the LSB of n is 0, the double-strike mode is off.
	• When the LSB of n is 1, the double-strike mode is on.
[Notes]	• Only the LSB of n is effective.
	• Printer output is the same in double-strike and emphasized mode.
[Default]	n = 0
[Reference]	**$1B $45**
[Example]	

$1B $4A n

[Name]	**Print and paper feed**			
[Format]	ASCII	ESC	J	n
	Hex	1B	4A	n
	Decimal	27	74	n
[Range]	0 ≤ n ≤ 255			
[Description]	Prints the data in the print buffer and feeds the paper [n * (vertical or horizontal motion unit)] inches.			
[Notes]	• After printing has been completed, this command sets the print starting position to the be ginning of the line.			
	• The paper feed amount set by this command does not affect the values set by **$1B $32** or **$1B $33**.			
	• The horizontal and vertical motion units are specified by **$1D $50** or **$1D $D0**.			
	• *$1D $50* or **$1D $D0** can change the vertical (and horizontal) motion unit. However, the value cannot be less than the minimum vertical movement amount.			
	• In standard mode, the vertical motion unit is used.			
	• The maximum paper feed amount is 4095 mm (161 inches).			
[Default]				
[Reference]	**$1D $50 or $1D $D0**			
[Example]				

$1B $4C

[Name]	**Select page mode**		
[Format]	ASCII	ESC	L
	Hex	1B	4C
	Decimal	27	76
[Description]	Switches from standard mode to page mode.		
[Notes]	• This command is enabled only when processed at the beginning of a line in standard mode.		
	• This command has no effect in page mode		
	• After printing by **$0C** is completed or by using **$1B $53**, the printer returns to standard mode.		
	• This command sets the position where data is buffered to the position specified by **$1B $54** within the printing area defined by **$1B $57**.		
	• This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for page mode:		
	1) Set right-side character spacing: **$1B $20**		
	2) Select default line spacing: **$1B $32, $1B $33**		
	• Only value settings is possible for the following commands in page mode; these commands are not executed.		
	1) Turn 90° clockwise rotation mode on/off: **$1B $56**		
	2) Select justification: **$1B $61**		
	3) Turn upside-down printing mode on/off: **$1B $7B**		
	4) Set left margin: **$1D $4C**		
	5) Set printable area width: **$1D $57**		

• The following command is not available in page mode:

1) Print raster bit image: **$1D $76 $30**

• The printer returns to standard mode when power is turned on, the printer is reset, or **$1B $40** is used.

[Reference]   **$0C, $1B $53, $1B $54, $1B $57, $1D $24, $1D $5C**

[Example]

$1B $4D n

[Name]   **Select character font**

[Format]
ASCII	ESC	M	n
Hex	1B	4D	n
Decimal	27	77	n

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

[Description] Selects characters font depending of cpi value set (Char/Inch) as follows :

Char /Inch	n	Function
A=11cpi B=15cpi	0,48	Font 11 cpi (18x24)
	1,49	Font 15 cpi (14x24)
A=15cpi B=20cpi	0,48	Font 15 cpi (14x24)
	1,49	Font 20 cpi (10x24)
A=20cpi B=15cpi	0,48	Font 20 cpi (10x24)
	1,49	Font 15 cpi (14x24)

[Notes]

[Default]

[Reference]   **$1B $C1**

[Example]

$1B $52 n

[Name]   **Select an international character set**

[Format]
ASCII	ESC	R	n
Hex	1B	52	n
Decimal	27	82	n

[Range]   0 ≤ n ≤ 10

[Description] Selects the international character set n according to the table below:

	Hex	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
n	Character set												
0	U.S.A.	#	$	@	[	\	]	^	`	{	|	}	~
1	France	#	$	à	°	ç	§	^	`	é	ù	è	"
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	b
3	United Kingdom	£	$	@	[	\	]	^	`	{	|	}	~
4	Denmark I	#	$	@	Æ	Æ	Å	^	`	æ	f	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain 1	Pt	$	@	i	Ñ	¿	^	`	"	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
9	Norway	#	¤	É	Æ	Æ	Å	Ü	é	æ	f	å	ü
10	Denmark II	#	$	É	Æ	Æ	Å	Ü	é	æ	f	å	ü

[Default]   n = 0
[Reference]
[Example]

$1B $53

[Name]   **Select standard mode.**
[Format]   ASCII   ESC   S
                Hex   1B   53
                Decimal 27   83
[Description] Switches from page mode to standard mode.
[Notes]   • This command is effective only in page mode.
                • Data buffered in page mode are cleared.
                • This command sets the print position to the beginning of the line.
                • The printing area set by **$1B $57** are initialized.
                • This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for standard mode:
                1) Set right-side character spacing: **$1B $20**
                2) Select default line spacing: **$1B $32, $1B $33**
                • The following commands are enabled only to set in standard mode.
                1) Set printing area in page mode: **$1B $57**
                2) Select print direction in page mode: **$1B $54**
                • The following commands are ignored in standard mode.
                1) Set absolute vertical print position in page mode: **$1D $24**
                2) Set relative vertical print position in page mode: **$1D $5C**
                • Standard mode is selected automatically when power is turned on, the printer is reset, or command **$1B $40** is used.
[Reference] **$0C, $1B $4C**
[Example]

$1B $54 n

[Name]   **Select print direction in page mode.**
[Format]   ASCII   ESC   T   n
                Hex   1B   54   n
                Decimal 27   84   n

[Range]   0 ≤ n ≤ 3
                 48 ≤ n ≤ 51

[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
1,49	Bottom to top	Lower left
2,50	Right to left	Lower right
3,51	Top to bottom	Upper right

[Notes]   • When the command is input in standard mode, the printer executes only internal flag ope ration. This command does not affect printing in standard mode.
                 • This command sets the position where data is buffered within the printing area set by **$1B $57**.
                 • Parameters for horizontal or vertical motion units (x or y) differ as follows, depending on
the   starting position of the printing area:
                 1) If the starting position is the upper left or lower right of the printing area, data is buffered in the direction perpendicular to the paper feed direction:
                 Commands using horizontal motion units: **$1B $20, $1B $24,$1B $5C**
                 Commands using vertical motion units: **$1B $33, $1B $4A, $1D $24, $1D $5C**.
                 2) If the starting position is the upper right or lower left of the printing area, data is buffered in the paper feed direction:
                 Commands using horizontal motion units: **$1B $33, $1B $4A, $1D $24, $1D $5C**.
                 Commands using vertical motion units: **$1B $20, $1B $24,$1B $5C**.
Default]   n = 0
[Reference]   **$1B $24, $1B $4C, $1B $57, $1B $5C, $1D $24, $1D $50, $1D $5C**
[Example]

$1B $56 n

[Name]   **Set 90° rotated print mode.**
[Format]   ASCII   ESC   V   n
                 Hex   1B   56   n
                 Decimal   27   86   n
[Range]   0 ≤ n ≤ 1
                 48 ≤ n ≤ 49
[Description]   Turns 90° rotation mode on/off. n is used as follows :

n	Function
0,48	Turns off 90° rotation mode
1,49	Turns on 90° rotation mode

[Notes]   • When underlined mode is turned on, the printer does not underline 90° rotated characters. All the same it's possible select the underline mode.
                 • Double-width and double-height commands in 90° rotation mode enlarge characters in the opposite directions from double-height and double-width commands in normal mode.
                 • This command is not available in Page mode.
                 • If this command is entered in Page mode, the printer all the same save the setting.

Default]   n = 0
[Reference]   **$1B $21, $1B $2D**
[Example]

$1B $57 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
Dec.	27	87	xL	xH	yL	yH	dxL	dxH	dyL	dyH

[Range]   0 ≤ xL, xH, yL, yH, dxL, dxH, dyL, dyHn ≤ 255 (except dxL= dxH = 0 or dyL = dyHn = 0)
[Description]   The horizontal starting position, vertical starting position, printing area width, and printing area height are defined as x0, y0, dx (inch), dy (inch), respectively.
Each setting for the printing area is calculated as follows:
x0 = [(xL + xH x 256) x (horizontal motion unit)]
y0 = [(yL + yH x 256) x (vertical motion unit)]
dx = [dxL + dxH x 256) x (horizontal motion unit)]
dy = [dyL + dyH x 256) x (vertical motion unit)]
The printing area is set as shown in the figure below.
[Notes]   • If this command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.
• If the horizontal or vertical starting position is set outside the printable area, the printer stops command processing and processes the following data as normal data.
• If the printing area width or height is set to 0, the printer stops command processing and processes the following data as normal data.
• This command sets the position where data is buffered to the position specified by **$1B $54** within the printing area.
• If (horizontal starting position + printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area -horizontal starting position).
• If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area - vertical starting position).
• The horizontal and vertical motion unit are specified by **$1D $50**. Changing the horizontal or vertical motion unit does not affect the current printing area.
• The **$1D $50** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of minimum horizontal movement amount.
• Use the horizontal motion unit (x) for setting the horizontal starting position and printing area width, and use the vertical motion unit (y) for setting the vertical starting position and printing area height.
• When the horizontal starting position , vertical starting position, printing area width, and printing area height are defined as X, Y, Dx, and Dy respectively, the printing area is set.
[Default]
[Reference]
[Example]

$1B $5C nL nH

[Name]   **Set relative print position**
[Format]

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

[Range]   0 ≤ nL ≤ 255
0 ≤ nH ≤ 255
[Description]   Sets the print starting position based on the current position by using the horizontal or vertical motion unit.
Sets the distance from the current position to [(nL+ nH ´ 256) ´ (horizontal or vertical motion unit)].

CUST⊘M

[Notes]   • Any setting that exceeds the printable area is ignored.
                 • When the starting position is specified by n motion units to the right:
                 nL + nH * 256 = n
                 When the starting position is specified by n motion units to the left (negative direction), use
                 the complement of 65536:
                 nL + nH * 256 = 65536 – n
                 • If setting exceeds the printing area width, the left or right margin is set to the default value.
                 • The horizontal and vertical motion unit are specified by **$1D $50** or **$1D $D0**.
                 • **$1D $50** or **$1D $D0** can change the horizontal (and vertical) motion units. However, the
                 value cannot be less than the minimum horizontal movement amount.
                 • In standard mode, the horizontal motion unit is used.

[Default]
[Reference]   **$1B $24, $1D $50** or **$1D $D0**
[Example]

$1B $61 n

[Name]   **Select justification**
[Format]   ASCII   ESC   a   n
                 Hex   1B   61   n
                 Decimal   27   97   n
[Range]   0 ≤ n ≤ 2, 48 ≤ n ≤ 50
[Description]   Aligns all data in one line to the specified position. n selects the type of justification as
                 follows:

n	Justification
0, 48	Flush left
1, 49	Centered
2, 50	Flush right

[Notes]   • This command is only enabled when inserted at the beginning of a line.
                 • Lines are justified within the specified printing area.
                 • Spaces set by HT, ESC $ and ESC \ will be justified according to the previously-entered
                 mode.
[Default]   n = 0
[Reference]
[Example]

Flush left	Centered	Flush right
ABC	ABC	ABC
ABCD	ABCD	ABCD
ABCDE	ABCDE	ABCDE
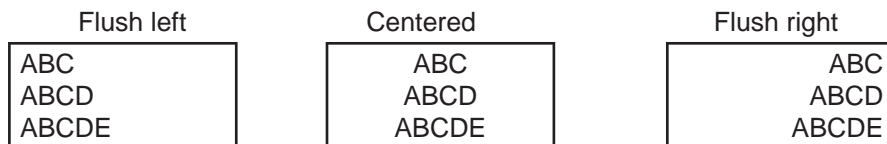
$1B $64 n

[Name] **Print and feed paper n rows**
[Format]   ASCII   ESC   d   n
                 Hex   1B   64   n
                 Decimal   27   100   n
[Range]   0 ≤ n ≤ 255
[Description]   Prints the data in the print buffer and feeds the paper n rows.
[Notes]   • Sets the print starting position at the beginning of the line.
                 • This command does not affect the line spacing set by **$1B $32** or **$1B $33**.
                 • The maximum paper feed amount is 254 rows. Even if a paper feed amount of more than
                 254 rows is set, the printer feeds the paper only 254 rows.
[Default]
[Reference]   **$1B $32, $1B $33**
[Example]

$1B $69

[Name]	**Total cut**		
[Format]	ASCII	ESC	i
	Hex	1B	69
	Decimal	27	105
[Description]	This command prints the data in the buffer and enables cutter operation. If there is no cutter, a disabling flag is set and any subsequent cut commands will be ignored.		
[Notes]	• The printer waits to complete all paper movement commands before it executes a total cut.		
[Default]			
[Reference]			
[Example]			

$1B $74 n

[Name]	**Select character code table**			
[Format]	ASCII	ESC	t	n
	Hex	1B	74	n
	Decimal	27	116	n
[Range]	n = 0, 2, 3, 4, 5, 19, 255			
[Description]	Selects a page n from the character code table, as follows:			

n	Page
0	0 (PC437 [U.S.A., Standard Europe])
2	2 (PC850 [Multilingual])
3	3 (PC860 [Portuguesel])
4	4 (PC863 [Canadian-French])
5	5 (PC865 [Nordic])
19	19 (PC858 for Euro symbol at position 213))
255	Space page

[Notes]	
[Default]	n = 0
[Reference]	See character code tables
[Example]	For printing Euro symbol (€), the command sequence is: $1B, $74, $13, $D5

$1B $76

[Name]	**Transmit paper sensor status**		
[Format]	ASCII	ESC	v
	Hex	1B	76
	Decimal	27	118
[Description]	When this command is received, transmit the current status of the paper sensor. The status to be transmitted is shown in the table below:		

CUST⌀M

Bit	Off/On	Hex	Decimal	Function
0,1	Off	00	0	Near paper-end sensor: Paper present
	On	03	3	Near paper-end sensor: Paper not present
2,3	Off	00	0	Paper-end sensor: Paper present
	On	(0C)	(12)	Paper-end sensor: Paper not present
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off.

[Notes]   • This command is executed immediately, even when the data buffer is full (Busy).
• After the paper autoload all buffers (receive and print) are cleared.
[Default]
[Reference]   **$10 $04**
[Example]

$1B $7B n

[Name]   **Turn upside-down printing mode on/off**
[Format]   ASCII   ESC   {   n
Hex   1B   7B   n
Decimal   27   123   n
[Range]   0 ≤ n ≤ 255
[Description]   Turns upside-down printing mode on or off.
• When the LSB of n is 0, the upside-down printing mode is off.
• When the LSB of n is 1, the upside-down printing mode is on.
[Notes]   • Only the LSB of n is effective.
• This command is valid only if entered at the beginning of a line.
• In upside-down printing mode, the printer rotates the line to be printed 180° and then prints it.
[Default]   n = 0
[Reference]
[Example]   Upside-down printing Off   Upside-down printing On

ABCDEFG
123456

Printing direction
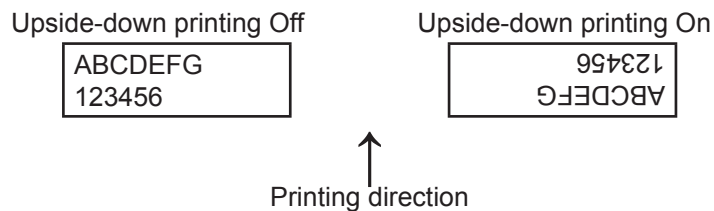
$1B $C1 n

[Name]   **Set/cancel cpi mode**
[Format]   ASCII   ESC   { }   n
Hex   1B   C1   n
Decimal   27   193   n
[Range]   0 ≤ n ≤ 2, 48 ≤ n ≤ 50

[Description]   Sets cpi mode based on the following values of n:

n	Function
0,48	Font A= 11 cpi
	Font B= 15 cpi
1,49	Font A= 15 cpi
	Font B= 20 cpi
2,50	Font A= 20 cp
	Font B= 15 cp

[Default]   n = 0
[Reference]   **$1B $21**
[Example]

$1B $FA n xH xL yH yL

[Name]   **Print graphic bank (608 x 862 dots).**
[Format]   ASCII   ESC   {}   n   xH   xL   yH   yL
                Hex   1B   FA   n   xH   xL   yH   yL
                Decimal   27   250   n   xH   xL   yH   yL
[Range]   1 ≤ n ≤ 2
                0 ≤ xH, xL, yH, yL ≤ 255
[Description]   Prints graphic logo from flash or from ram. n selects the graphic source as follows:

n	Function
1	Print logo 1 from flash bank
2	Print logo 2 from flash bank

xL + xH * 256 specifies the starting dotline (1 ÷ 862).
yL + yH * 256 specifies the number of lines to print.

[Notes]   • If (xL + (xH * 256)) > 862 the printer does not execute the command.
                • If (xL + (xH * 256) + yL +(yH * 256))> 862 the printer prints only 862 - xL + (xH * 256) +1 dotline.
                • If the logo has been previously saved in the flash bank it will be printed correctly. If not a "NAK" ($15) will be returned.
[Default]
[Reference]
[Example]   To print from ram bank dotline 100 to dotline 299, send:
                $1B $FA $00 $00 $64 $00 $C7

$1B $FF n nL nH

[Name]   **Riceive the graphic page from the comunication port.**
[Format]   ASCII ESC   {}   n   nL   nH
                Hex   1B   FF   n   nL   nH
                Decimal   27   255   n   nL   nH
[Range]   1 ≤ n ≤ 2
                0 ≤ nL, nH ≤ 255
[Description]   Riceive [nL + (nH * 256)] word from the comunication port and save them in the flash bank specified by n as shown in the following table:

n	Function
1	Save logo in the flash bank 1
2	Save logo in the flash bank 2

[Notes]   • Set the comunication protocol on "Hardware" for this command.

• The number of received data bytes is [nL + (nH * 256)] * 2.

• Every word is received first as MSByte and then as LSByte.

• If [nL + (nH * 256)] is more than 32756, the following data are processed as normal data.

• In the horizontal dotline there are 38 words.

• The flash bank for graphic print dimensions are: 608 horizontal dots (76 bytes/line) * 862 vertical dots (65512 bytes).

[Default]
[Reference]
[Example]

$1C $C0 xH xL yH yL dxH dxL dyH dyL xlH xlL ylH ylL num

[Name]   **Prints graphic logo in the graphic page.**

[Format]

			xH	xL	yH	yL	dxH	dxL	dyH	dyL	xlH	xlL	ylH	ylL	num
ASCII	FS	{ }	xH	xL	yH	yL	dxH	dxL	dyH	dyL	xlH	xlL	ylH	ylL	num
Hex	1C	C0	xH	xL	yH	yL	dxH	dxL	dyH	dyL	xlH	xlL	ylH	ylL	num
Decimal	28	192	xH	xL	yH	yL	dxH	dxL	dyH	dyL	xlH	xlL	ylH	ylL	num

[Range] $dx + xl \leq 608$

$dx + x \leq 608$

$dy + yl \leq 862$

$0 \leq num \leq 1$

[Description]   Allow graphic logo parts selection and coordinates of the graphic page point input for the graphic logo part printing.

(xl, yl) = graphic logo point coordinates;

$xl = xlL + (xlH * 256)$; $yl = ylL + (ylH * 256)$

dx = horizontal dimension of the graphic logo part which must be printed:

$dx = dxL + (dxH * 256)$

dy = vertical dimension of the graphic logo part which must be printed:

$dy = dyL + (dyH * 256)$

(x, y) = coordinates of the graphic page point where must be printed the graphic logo part:

$x = xL + (xH * 256)$; $y = yL + (yH * 256)$

num = parameter for the graphic logo selection between the two logos available.

[Note]
[Default]
[Reference]
[Example]

LOGO   **GRAPHIC PAGE**

$1D $21 n

[Name]	**Select character size**		
[Format]	ASCII	GS	!	n
	Hex	1D	21	n
	Decimal	29	33	n
[Range]	0 ≤ n ≤ 255		
[Description]	Selects character height and width, as follows:		

[Description]   Selects character height and width, as follows:
- Bits 0 to 3: to select character height (see table 2).
- Bits 4 to 7: to select character width (see table 1).

<div style="display:flex">

Table 1 Select Character Width

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

Table 1 Select Character Height

Hex	Decimal	Altezza
00	0	1 (normal)
01	1	2 (height = 2x)
02	2	3 (height = 3x)
03	3	4 (height = 4x)
04	4	5 (height = 5x)
05	5	6 (height = 6x)
06	6	7 (height = 7x)
07	7	8 (height = 8x)

</div>

[Notes]
- This command is effective for all characters (except HRI characters).
- If n falls outside the defined range, this command is ignored.
- Characters enlarged to different heights on the same line are aligned at the baseline or topline (see **$1D $7E**).
- **$1B $21** can also be used to select character size. However, the setting of the last recei ved command is the effective one.

[Default]   n = 0
[Reference]   **$1B $21**
[Example]

$1D $24 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 x 256) x (vertical or horizontal motion unit)] inches.

[Notes]
- This command is effective only in page mode.
- If the [(nL + nH x 256) x (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.
- The horizontal starting buffer position does not move.
- The reference starting position is that specified by **$1B $54**.
- This command operates as follows, depending on the starting position of the printing area specified by **$1B $54**:
1) When the starting position is set to the upper left or lower right, this command sets the absolute position in the vertical direction.

2) When the starting position is set to the upper right or lower left, this command sets the absolute position in the horizontal direction.
• The horizontal and vertical motion unit are specified by $1D $50.
• The **$1D $50** command can change the horizontal and vertical motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

[Reference]	**$1B $24, $1B $54, $1B $57, $1B $5C, $1D $50, $1D $5C**

[Example]

$1D $2A x y d1...d (x x y x 8)

[Name]	**Define dowloaded bit image**				
[Format]	ASCII	GS	*	x	y	d1...d(x x y x 8)
	Hex	1D	2A	x	y	d1...d(x x y x 8)
	Decimal	29	42	x	y	d1...d(x x y x 8)

[Range]
$1 \leq x \leq 255$
$1 \leq y \leq 48$
x x y ≤ 1536
$0 \leq d \leq 255$

[Description]
Defines a downloaded bit image using the number of dots specified by x and y.
• x specifies the number of dots in the horizontal direction.
• y specifies the number of dots in the vertical direction.

[Notes]
• The number of dots in the horizontal direction is x x 8, in the vertical direction it is y x 8.
• If x x y is out of the specified range, this command is disabled.
• The d indicates bit-image data. Data (d) specifies a bit printed to 1 and not printed to 0.
• The downloaded bit image definition is cleared when:
1) **$1B $40** is executed.
2) **$1B $26** is executed.
Printer is reset or the power is turned off.
• The following figure shows the relationship between the downloaded bit image and the printed data.
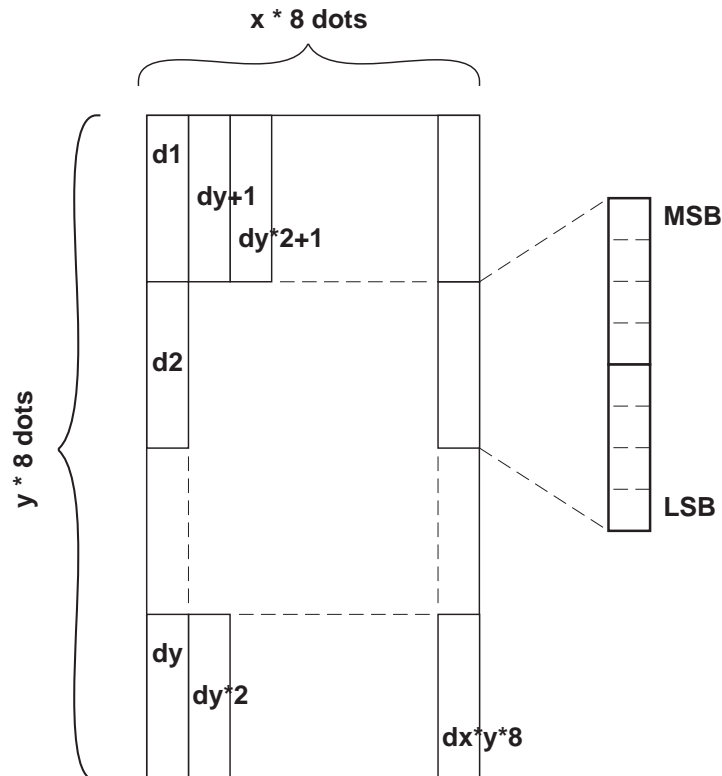
[Reference]   **$1D $5C**
[Example]

$1D $2F m

[Name]   **Print dowloaded bit image**
[Format]   ASCII   GS   /   m
                Hex   1D   2F   m
                Decimal   29   47   m
[Description]   Prints a downloaded bit image using the mode specified by m. m selects a mode from the table below :

m	Mode
0,48	Normal
1,49	Double-width
2,50	Double-height
3,51	Quadruple

[Notes]   • This command is ignored if a downloaded bit image has not been defined.
                • In standard mode, this command is effective only when there is no data in the print buffer.
                • This command has no effect in the print modes (emphasized, underline, character size, or white/black reverse printing), except for upside-down printing mode.
                • If the downloaded bit-image to be printed exceeds the printable area, the excess data is not printed
                • If the printing area width set by $1D $4C and $1D $57 is less than one line in vertical, the following processing is performed only on the line in question:
                1) The printing area width is extended to the right up to one line in vertical. In this case, prin ting does not exceed the printable area.
                2) If the printing area width cannot be extended by one line in vertical, the left margin is reduced to accommodate one line in vertical.
[Reference]   **$1D $2A**
[Example]

$1D $3A

[Name]   **Start/end macro definition**
[Format]   ASCII   GS   :
                Hex   1D   3A
                Decimal   29   58
[Description]   Starts or ends macro definition.
[Notes]   • Macro definition starts when this command is received during normal operation.
                • When **$1D $5E** is received during macro definition, the printer ends macro definition and clears all definitions.
                • Macros are not defined when power is turned on to the machine.
                • Macro content is not cancelled by the **$1B $40** command. Therefore, **$1B $40** may be included in the content of macro definitions.
                • If the printer receives **$1D $3A** a second time after previously receiving **$1D $3A**, the prin ter remains in macro undefined status.
                • The contents of the macro can be defined up to 1024 bytes. If the macro definition exceeds 1024 bytes, excess data is not stored.
[Default]
[Reference]   **$1D $5E**
[Example]

$1D $42 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			
[Description]	Turns white/black reverse printing mode on or off.			

[Description] Turns white/black reverse printing mode on or off.
• When the LSB of n is 0, white/black reverse printing is turned off.
• When the LSB of n is 1, white/black reverse printing is turned on.

[Notes] • Only the LSB di n is effective.
• This command is available for both built-in and user-defined characters.
• This command does not affect bit image, downloaded bit image, bar code, HRI characters and spacing skipped by **$09, $1B $24** and **$1B $5C**.
• This command does not affect white space between lines.
• White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it will be disabled (but not cancelled) when white/black reverse mode is se lected.

[Default] n = 0
[Reference]
[Example]

$1D $43 $30 n m

[Name]	**Select counter print mode**				
[Format]	ASCII	GS	C	0	n	m
	Hex	1D	43	30	n	m
	Decimal	29	67	48	n	m

[Range] 0 ≤ n ≤ 5
m = 0, 1, 2, 48, 49, 50

[Description] Selects a print mode for the serial number counter.
• n specifies the number of digits to be printed as follows:
when n = 0, the printer prints the actual digits indicated by the numeric value.
when n = 1 to 5, the command sets the number of digits to be printed.
• m specifies the printing position within the entire range of printed digits as follows:

m	Printing position	Processing of digits less than those specified
0,48	Flush right	Adds spaces to the left
1,49	Flush right	Adds a '0' to the left
2,50	Flush left	Adds spaces to the right

[Notes] • If n or m is out of the defined range, the previously set print mode is not changed.
• If n = 0, m is not applicable.
[Default] n = 0, m = 0
[Reference] **$1D $43 $31, $1D $43 $32, $1D $43 $3B, $1D $63**
[Example] n = 3,m = 0   n = 3, m = 1   n = 3, m=2
□ □ 1   001   1 □ □

□ indicates a space

$1D $43 $31 aL aH bL bH n r

[Name]	**Select count mode (A).**								
[Format]	ASCII	GS	C	1	aL	aH	bL	bH	n	r
	Hex	1D	43	31	aL	aH	bL	bH	n	r
	Decimal	29	67	49	aL	aH	bL	bH	n	r

[Range] $0 \le aL, aH \le 255$
$0 \le bL, bH \le 255$
$0 \le n, r \le 255$

[Description]   Selects a count mode for the serial number counter.
• aL, aH or bL, bH specify the counter range.
• n indicates the unit amount when counting up or down.
• r indicates the repetition number when the counter value is fixed.

[Notes]   • Count-up mode is specified when:
$[aL + (aH * 256)] < [bL + (bH * 256)]$ and $n \ne 0$ and $r \ne 0$
• Count-down mode is specified when:
$[aL + (aH * 256)] > [bL + (bH * 256)]$ and $n \ne 0$ and $r \ne 0$
• Counting stops when:
$[aL + (aH * 256)] = [bL + (bH * 256)]$ or $n = 0$ or $r = 0$
• Setting the count-up mode, the minimum counter value is $[aL + (aH * 256)]$ and the maximum value is $[bL + (bH * 256)]$. If the counting up reaches a value that exceeds the maximum, it resets to the minimum value.
• Setting the count-down mode, the maximum counter value is $[aL + (aH * 256)]$ and the minimum value is $[bL + (bH * 256)]$. If the counting down reaches a value less than the minimum, it resets to the maximum value.
• When this command is executed, the internal count that indicates the repetition number specified by r is cleared.

[Default]   aL = 1, aH = 0, bL = 255, bH = 255, n = 1, r = 1
[Reference]   **$1D $43 $30, $1D $43 $32, $1D $43 $3B, $1D $63**
[Example]

$1D $43 $32 nL nH

[Name]	**Set counter**					
[Format]	ASCII	GS	C	2	nL	nH
	Hex	1D	43	32	nL	nH
	Decimal	29	67	50	nL	nH

[Range] $0 \le nL, nH \le 255$
[Description]   Sets the serial number counter value.
• nL and nH determine the value of the serial number counter set by $[nL + (nH * 256)]$.

[Notes]   • In count-up mode, if the counter value specified by this command goes out of the counter operation range specified by **$1D $43 $31** or **$1D $43 $3B** it is forced to convert to the minimum value through $1D $63.
• In count-down mode, if the counter value specified by this command goes out of the counter operation range specified by **$1D $43 $31** or **$1D $43 $3B** it is forced to convert to the maximum value through **$1D $63**.

[Default]   nL = 1, nH = 0
[Reference]   **$1D $43 $30, $1D $43 $31, $1D $43 $3B, $1D $63**
[Example]

$1D $43 $3B sa ; sb ; sn ; sr ; sc ;

[Name]	**Select count mode (B)**													
[Format]	ASCII	GS	C	;	sa	;	sb	;	sn	;	sr	;	sc	;
	Hex	1D	43	3B	sa	3B	sb	3B	sn	3B	sr	3B	sc	3B
	Dec.	29	67	59	sa	59	sb	59	sn	59	sr	59	sc	59

[Range]	0 ≤ sa, sb, sc ≤ 65535
	0 ≤ sn, sr ≤ 255
	These values are all character strings.
[Description]	Selects a count mode for the serial number counter and specifies the value of the counter.
	• sa, sb, sn, sr and sc are all displayed as ASCII characters using codes from '0' to '9'.
	• sa and sb specify the counter range.
	• sn indicates the unit amount for counting up or down.
	• sr indicates the repetition number when the counter value is fixed.
	• sc indicates the counter value.
[Notes]	• Count-up mode is specified when: sa < sb and sn ≠ 0 and sr ≠ 0
	• Count-down mode is specified when: sa > sb and sn ≠ 0 and sr ≠ 0
	• Counting stops when:
	sa = sb or sn = 0 or sr = 0
	• In setting count-up mode, the minimum value of the counter is sa and the maximum value is sb. If counting up reaches a value exceeding the maximum, it resets to the minimum value. If the counter value set by sc is outside the counter operation range, the counter value is forced to convert to the minimum value by executing **$1D $63**.
	• In setting count-down mode, the maximum value of the counter is sa and the minimum value is sb. If counting down reaches a value less than the minimum, it resets to the maximum value. If the counter value set by sc is outside the counter operation range, the counter value is forced to convert to the maximum value by executing **$1D $63**.
	• Parameters sa to sc can be omitted. If omitted, they remain unchanged.
	• Parameters sa to sc cannot contain characters other than '0' to '9'.
[Default]	sa = 1, sb = 65535, sn = 1, sr = 1, sc = 1
[Reference]	**$1D $43 $30, $1D $43 $32, $1D $43 $31, $1D $63**
[Example]	

$1D $48 n

[Name]	**Select printing position of Human Readable Interpretation (HRI) characters**			
[Format]	ASCII	GS	H	n
	Hex	1D	48	n
	Decimal	29	72	n
[Range]	0 ≤ n ≤ 3, 48 ≤ n ≤ 51			
[Description]	Selects the printing position of HRI characters when printing bar codes. n selects the printing positions as follows:			

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

[Notes]	• HRI characters are printed using the font specified by $1D $66.
[Default]	n = 0
[Reference]	**$1D $66, $1D $6B**
[Example]	

$1D $49 n

[Name]	**Transmit printer ID**			
[Format]	ASCII	GS	I	n
	Hex	1D	49	n
	Decimal	29	73	n

[Range]   1 ≤ n ≤ 3, 49 ≤ n ≤ 51
[Description] Transmits the printer ID specified by n follows:

n	Printer ID	Specification
1, 49	Printer model ID	$5D (VKP80 200 dpi)
2, 50	Type ID	Undefined
3, 51	ROM version ID	Depends on ROM version (4 character)

[Notes]   • The printer only transmits 1 byte (printer ID) without confirmation that the host is ready to receive data.
               • This command is executed when the data is processed in the data buffer. Therefore, there could be a time lag between command reception and data transmission, depending on data buffer status.
[Default]
[Reference]
[Example]

$1D $4C nL nH

[Name]   **Set left margin**
[Format]   ASCII   GS   L   nL   nH
               Hex   1D   4C   nL   nH
               Decimal   29   76   nL   nH
[Range]   0 ≤ nL, nH ≤ 255
[Description] Sets the left margin.
               • The left margin is set to [(nL + nH * 256) * (horizontal motion unit)] inches.

Printable area

Left margin   **Printing area width**
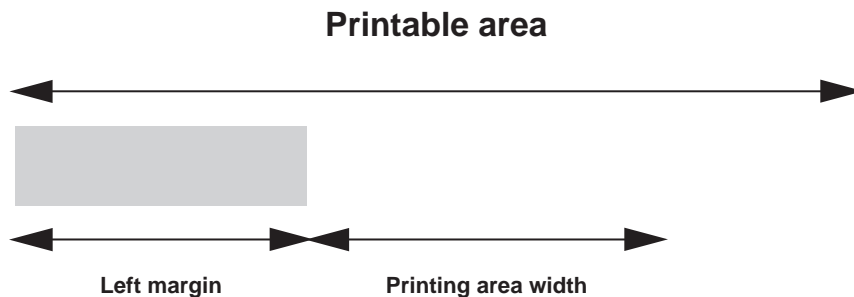
[Notes]   • This command is enabled only if set at the beginning of the line.
               • If the setting exceeds the printable area, the maximum value of the printable area is used.
               • If the left margin + printing area width is greater than the printable area, the printing area width is set at maximum value.
               • The horizontal and vertical motion unit are specified by **$1D $50** or **$1D $D0**. Changing the horizontal or vertical motion unit does not affect the current left margin.
               • The **$1D $50** or **$1D $D0** command can change the horizontal (and vertical) motion unit.
               • However, the value cannot be less than the minimum horizontal movement amount and it must be in even units of the minimum horizontal movement amount.
[Default]
[Reference]   **$1D $50 or $1D $D0, $1D $57**
[Example]

CUST⊘M

$1D $50 x y (modo 1)

[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 ≤ x, y ≤ 255				
[Description]	Sets the horizontal and vertical motion units to 1/x inch and 1/y inch respectively.				

[Description] Sets the horizontal and vertical motion units to 1/x inch and
1/y inch respectively.
When x is set to 0, the default setting value is used.
When y is set to 0, the default setting value is used.

[Notes] • The horizontal direction is perpendicular to the paper feed direction.
• In standard mode, the following commands use x or y, regardless of character rotation (upside-down or 90° clockwise rotation):
① Commands using x : **$1D $4C, $1D $57**.
② Commands using y : **$1B $4A**.
• This command does not affect the previously specified values.
• The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch or an exact multiple of that value.

[Default] x = 204, y = 408(for the 204 dpi model)
[Reference] **$1B $4A, $1D $4C, $1D $57, $1D $D0**

① $1D $56 m, ② $1D $56 m n

[Name]	**Select cut mode**					
[Format]	①	ASCII	GS	V	m	
		Hex	1D	56	m	
		Decimal	29	86	m	
	②	ASCII	GS	V	m	n
		Hex	1D	56	m	n
		Decimal	29	86	m	n
[Range]	①	m = 0, 48				
	②	m = 65, 0 ≤ n ≤ 255				

[Description] Selects cut mode and executes the cut command. m selects cut mode as follows:

m	Function
0, 48	Total cut.
65	Form feed (cut position + [n x vertical motion unit]) and total cut

[Notes] • This command is only enabled if set at the beginning of the line.
• The horizontal and vertical motion units are specified by **$1D $50** or **$1D $D0**.

[Default]
[Reference] **$1B $69**
[Example]

$1D $57 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 ≤ nL, nH ≤ 255
                   0 ≤ nL + nH x 256) ≤ nMAX
[Description]   Sets the printing area width to the area specified by nL and nH.
                   The nMAX value is 576.
                   • The left margin is set to [(nL + nH * 256) ´ (horizontal motion unit)] inches.

Printable area

Left margin   Printing area width
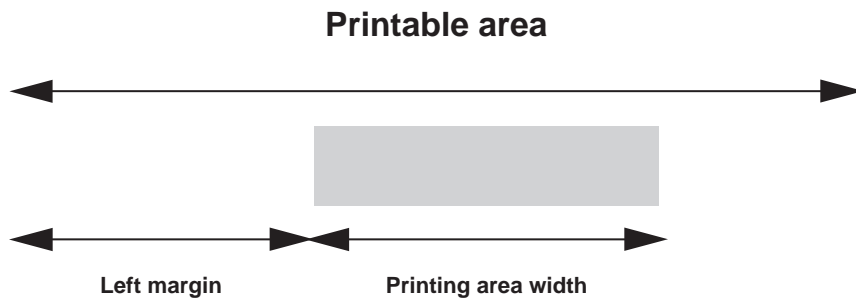
[Notes]   • This command is only enabled if set at the beginning of the line.
                   • If the right margin is greater than the printable area, the printing area width is set at maxi
                   mum value.
                   • If the printing area width = 0, it is set at the maximum value.
                   • The horizontal and vertical motion units are specified by **$1D $50** or **$1D $D0**. Changing
                   the horizontal or vertical motion unit does not affect the current left margin.
                   • The **$1D $50** or **$1D $D0** command can change the horizontal (and vertical) motion unit.
                   • However, the value cannot be less than the minimum horizontal movement amount and it
                   must be in even units of the minimum horizontal movement amount.
[Default]
[Reference]   **$1D $4C, $1D $50, $1D $D0**
[Example]

$1D $5C 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]   • Sets 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 x 256) x vertical or
                   horizontal motion unit] inches.
Notes]   • This command is ignored unless page mode is selected.
                   • When N is specified to the movement downward:
                   nL + nH x 256 = N
                   • When N is specified to the movement upward (the negative direction), use the complement
                   of 65536.
                   • When N is specified to the movement upward:
                   nL + nH x 256 = 65536 - N
                   • Any setting that exceeds the specified printing area is ignored.
                   • This command function as follows, depending on the print starting position set by **$1B $54**:
                   1) When the starting position is set to the upper left or lower right of the printing, the vertical
                   motion unit (y) is used.
                   2) When the starting position is set to the upper right or lower left of the printing area, the
                   horizontal motion unit (x) is used.
                   • The horizontal and vertical motion unit are specified by **$1D $50**.
                   • The **$1D $50** command can change the horizontal (and vertical) motion unit. However, the
                   value cannot be less than the minimum horizontal movement amount, and it must be in even
                   units of the minimum horizontal movement amount.

[Reference]   **$1B $24, $1B $54, $1B $57, $1B $5C, GS $, $1D $50**
[Example]

$1D $5E 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]   0 ≤ r, t ≤ 255
              0 ≤ m ≤ 1
[Description] Executes a macro.
              • r specifies the number of times to execute the macro.
              • t specifies the waiting time for executing the macro.
              The waiting time is t * 100 msec. for each macro execution.
              • m specifies macro executing mode:
              When the LSB of m = 0, the macro is executed r times continuously at the interval specified
              by t.
              When the LSB of m = 1, after waiting for the period specified by t, the LED indicator blinks
              and the printer waits for the FEED button to be pressed. After the button is pressed, the prin
              ter executes the macro once. The printer repeats the operation r times.
              [Notes] • This command has an interval of (t * 100 msec.) after a macro is executed by t.
              • If this command is received while a macro is being defined, the macro definition is aborted
              and the definition is cleared.
              • If the macro is not defined or if r is 0, nothing is executed.
              • When the macro is executed by pressing the FEED button (m=1), the paper cannot be fed
              using the FEED button.
[Default]
[Reference]   **$1D $3A**
[Example]

$1D $63

[Name] **Print counter**
[Format]   ASCII   GS   c
              Hex   1D   63
              Decimal   29   99
[Description] Sets the serial counter value in the print buffer and increments or decrements the counter
              value.
[Notes]   • After setting the current counter value in the print buffer as print data (a character string),
              the printer counts up or down based on the count mode set. The counter value in the print
              buffer is printed when the printer receives a print command or the buffer is full.
              • The counter print mode is set using **$1D $43 $30**.
              • The counter mode is set using **$1D $43 $31** or **$1D $43 $3B**.
              • In count-up mode, if the counter value set by this command goes out of the counter opera
              tion range set by **$1D $43 $31** or **$1D $43 $3B** it is forced to revert to the minimum value.
              • In count-down mode, if the counter value set by this command goes out of the counter
              operation range set by **$1D $43 $31** or **$1D $43 $3B** it is forced to revert to the maximum
              value.
[Default]
[Reference]   **$1D $43 $30, $1D $43 $31, $1D $43 $32, $1D $43 $3B**
[Example]

$1D $65 n [m]

[Name]	**Ejector commands**
[Format]	ASCII GS e n m t
	Hex 1D 65 n m t
	Decimal 29 101 n m t
[Range]	$1 \le n \le 3$, $n = 8$, $n = 18$, $n = 20$, $n = 32$ $0 \le t \le 255$
[Description]	This command handles tickets ejector:

$n = 1$

$n = 2$ Execute a ticket retract (only if Paper retracting is enabled)

$n = 3$ Produce a ticket with m steps (1 step = 7.3 mm)

$n = 5$ Eject ticket

$n = 6$ Transmit the status byte of the ejector

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper present in abundance.
	On	01	1	Near paper end.
1	Off	00	0	RESERVED
2	Off	00	0	Paper end sensor (paper not present).
	On	04	4	Paper end sensor (paper present).
3	Off	00	0	Ticket not present on the output.
	On	08	8	Ticket present on the output.
4	Off	00	0	Printer's stepper motor off.
	On	10	16	Printer's stepper motor on.
5	Off	00	0	Emitter motor off.
	On	20	32	Emitter motor on.
6	Off	00	0	No error.
	On	40	64	Error
7	Off	00	0	Free paper route.
	On	80	128	Paper jam.

$n = 8$ sets the length of thicket dispense.

$n = 18$ Disable the dispenser continuous mode, sets the normal functioning: when printing the ticket remaines in the outlet paper mouth, unitl a cut command or eject command will be sent .

$n = 20$ Enable the dispenser continuous mode: when printing the ticket doesn't remain in the outlet paper mouth, but continuously presented it .

$n = 32$ Produce a ticket with m steps (1 step = 7.3 mm) and a timeout t

(t= 1 z1 sec; t = 2 z2 sec).

[Notes]	m must be sent with $n = 3$, $n = 8$ and $n = 32$;

• with $n = 3, 8, 32$ the printer execute a check of the ticket produced length: if the m input has a too high value automatically the ticket produced is ejected with the maximum length allowed.

• with $n = 3, 32$ if the ticket is not yet cutted, before to perform the command, the printer made a total cut.

• with $n = 32$ it's necessary set a timeout that indicate how long th ticket remain presented; if send a now print before the timeout it's execute a ticket retract or ticket eject in according to printer setup setting, when timeout occurs the printer executes a ticket retract or ticket eject in according to printer setup settings.

[Reference]

[Example]   The correct commands sequence to print a ticket is:
                  1. Clear dispenser   Ejection ($1D $65 $05) or Retraction ($1D $65 $02)
                  2. Prints ticket
                  3. Cuts paper   Total cut ($1B $69)
                  4. Dispense   Presents ticket with @ 87 mm ($1D $65 $03 $0C)

$1D $66 n

[Name]   **Select font for HRI characters**
[Format]   ASCII   GS   f   n
              Hex   1D   66   n
              Decimal   29   102   n
[Range]   n = 0, 1, 48, 49
[Description] Selects a font for the HRI characters used when printing a bar code. n selects a font from
              the following table:

n	Function
0, 48	Font A
1,49	Font B

[Notes]   HRI characters are printed at the position specified by **$1D $48**.
[Default]   n = 0
[Reference]   **$1D $48, $1D $6B**
[Example]

$1D $68 n

[Name]   **Set bar code height**
[Format]   ASCII   GS   h   n
              Hex   1D   68   n
              Decimal   29   104   n
[Range] $1 \leq n \leq 255$
[Description] Sets the height of the bar code. n specifies the number of vertical dots.
[Notes]
[Default]   n = 162 (20.25 mm)
[Reference]   **$1D $6B**
[Example]

---

① $1D $6B m [d1...dk] $00, ② $1D $6B m [d1...dn]

[Name]   Print bar code
[Format]   ①   ASCII   GS   k   m   NUL
                    Hex   1D   6B   m   00
                    Decimal   29   107   m   0
              ②   ASCII   GS   k   m   n
                    Hex   1D   6B   m   n
                    Decimal   29   107   m   n
[Range]   ① $0 \leq m \leq 20$
,   ② $65 \leq m \leq 90$

[Description]   Selects a bar code system and prints the bar code. m selects a bar code system as follows:

	m	Barcode system	No. of characters	Remarks
①	0	UPC-A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
	1	UPC-E	11 ≤ k ≤ 12	48 ≤ d ≤ 57
	2	EAN13 (JAN)	12 ≤ k ≤ 13	48 ≤ d ≤ 57
	3	EAN8 (JAN)	7 ≤ k ≤ 8	48 ≤ d ≤ 57
	4	CODE39	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, 32, 36, 37, 43, 45, 46, 47
	5	ITF	1 ≤ k (even number)	48 ≤ d ≤ 57
	6	CODABAR	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d1 ≤ 68, 36, 43, 45, 46, 47, 58
	7	CODE93	1 ≤ k ≤ 255	1 ≤ d ≤ 127
	8	CODE128	2 ≤ k ≤ 255	1 ≤ d ≤ 127
	20	CODE32	8 ≤ k ≤ 9	48 ≤ d ≤ 57

	m	Barcode system	No. of characters	Remarks
②	65	UPC-A	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	66	UPC-E	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	67	EAN13 (JAN)	12 ≤ n ≤ 13	48 ≤ d ≤ 57
	68	EAN8 (JAN)	7 ≤ n ≤ 8	48 ≤ d ≤ 57
	69	CODE39	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, 32, 36, 37, 43, 45, 46, 47
	70	ITF	1 ≤ n ≤ 255	48 ≤ d ≤ 57
	71	CODABAR	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d1 ≤ 68, 36, 43, 45, 46, 47, 58
	72	CODE93	1 ≤ n ≤ 255	1 ≤ d ≤ 127
	73	CODE128	2 ≤ n ≤ 255	1 ≤ d ≤ 127
	90	CODE32	8 ≤ n ≤ 9	48 ≤ d ≤ 57

[Notes]   • If d is outside of the specified range, the printer prints the following message: "BAR CODE GENERATOR IS NOT OK!" and processes the data which follows as normal data.
• If the horizontal size exceeds the printing area, the printer only feeds the paper.
• This command feeds as much paper as is required to print the bar code, regardless of the line spacing.
• After printing the bar code, this command sets the print position to the beginning of the line.
• This command is not affected by print modes (emphasized, double-strike, underline or character size), except for upside-down and justification mode.

[Notes per ①]   • This command ends with a NUL code.
• When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 11 (without check digit) or 12 (with check digit) bytes bar code data.
• When the bar code system used is EAN13, the printer prints the bar code data after receiving 12 (without check digit) or 13 (with check digit) bytes bar code data.
• When the bar code system used is EAN8, the printer prints the bar   code   data after receiving 7 (without check digit) or 8 (with check digit) bytes bar code data.
• The number of data for ITF bar code must be even numbers. When an odd number of data is input, the printer ignores the last received data.

[Notes per ②] • If n is outside of the specified range, the printer stops command processing and processes the following data as normal data.

When CODE93
 is used: • The printer prints an HRI character (o) as a start character at the beginning of the HRI character string.
• The printer prints an HRI character (o) as a stop character at the end of the HRI character string.
• The printer prints an HRI character (n) as a control character ($00 to $1F and $7F).

When CODE128
is used: • When using CODE128 in this printer, please note the following regarding data transmission:
• The top part of the bar code data string must be a code set selection character (CODE A, CODE B or CODE C) which selects the first code set.
• Special characters are defined by combining two characters "{" and one character. ASCII character "{" is defined by transmitting "{" twice, consecutively.

Specific character	Data transmission		
	ASCII	Hex	Decimal
SHIFT	{S	7B, 53	123, 83
CODE A	{A	7B, 41	123, 65
CODE B	{B	7B, 42	123, 66
CODE C	{C	7B, 43	123, 67
FNC1	{1	7B, 31	123, 49
FNC2	{2	7B, 32	123, 50
FNC3	{3	7B, 33	123, 51
FNC4	{4	7B, 34	123, 52
'{'	{{	7B, 7B	123, 123

[Default]
[Reference] **$1D $48, $1D $66, $1D $68, $1D $77**
[Example]

$1D $72 n

[Name]   Transmit status
[Format]   ASCII   GS   r   n
              Hex   1D   72   n
              Decimal   29   114   n
[Range]   n = 1, 49
[Description] Transmits the status specified by n as follows:

n	Function
1, 49	Transmits paper sensor status (as for $1B $76).

Paper sensor status (n = 1, 49)

Bit	Off/On	Hex	Decimale	Function
0,1	Off	00	0	Near paper-end sensor: Paper present
	On	03	3	Near paper-end sensor: Paper not present
2,3	Off	00	0	Paper-end sensor: Paper present
	On	(0C)	(12)	Paper-end sensor: Paper not present
4	-	-	-	RESERVED
5	-	-	-	Undefined
6	-	-	-	Undefined
7	-	-	-	RESERVED

[Notes]   • This command is executed when the data is processed in the data buffer. Therefore, there may be a time lag between receiving the command and transmitting the status, depending on data buffer status.

[Default]
[Reference]   **$10 $04, $1B $76**
[Example]

$1D $76 $30 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] $0 \le m \le 3$, $48 \le m \le 51$
$0 \le xL \le 255$
$0 \le xH \le 255$ $(1 \text{£} xL + xH \times 256 \text{£} 65535)$
$0 \le yL \le 255$
$0 \le yH \le 8$ $(1 \text{£} yL + yH \times 256 \text{£} 2047)$
$0 \le d \le 255$
$k = (xL + xH \times 256) + (yL + yH \times 256)$
(except for $k = 0$)

[Description]   Selects raster bit image mode. The value of m selects the mode as follows:

m	Mode
0,48	Normal
1, 49	Double-width
2, 50	Double-height
3, 51	Quadruple

• xL, xH selects the number of data bits (xL+xH x 256) in the horizontal direction for the bit image.
• yL, yH selects the number of data bits (yL+yH x 256) in the vertical direction for the bit image.
k indicates no. of the image data. k is an explanation parameter; it is not necessary to be transmitted.
• d indicates the image data.

[Notes]   • In standard mode for receipt paper, this command is effective only when there is no data in the print buffer.
• (d) indicates the bit image data. Set a corresponding bit to 1 to print a dot, or to 0 to not print the dot.

If the bit image data exceeds the number of dots to be printed on a line, the excess data is ignored.

• This command has no effect in all print modes (character size, emphasized,double-strike, upside-down, underline, white/black reverse printing, etc.) for raster bit image.

• This command feed the the paper as much as necessary to print the bit image without using spacing set by **$1B $32** or **$1B $33**.

• Do not use this command during a macro executing because this command should not be included in a macro.

• After printing has been completed, this command sets the print starting position to the be ginning of the line.

• The following figure shows the relationship between the downloaded bit image and the printed data:

d1	d2	...	dx
dX+1	dX+2	...	dX x 2
:	:	...	:
...	dk-2	dk-1	dk

[Reference]
[Example]

$1D $77 n

[Name]	**Set bar code width**		
[Format]	ASCII	GS	w	n
	Hex	1D	77	n
	Decimal	29	119	n

[Range] $1 \leq n \leq 6$
[Description] Sets the horizontal size of the bar code. n specifies the bar code width as follows:

n	Module width (mm)
1	0.125
2	0.25
3	0.375
4	0.5
5	0.625
6	0.75

[Notes]
[Default]   n = 3
[Reference]   **$1D $6B**
[Example]

$1D $7C n

[Name]	**Set printing density**		
[Format]	ASCII	GS	{ }	n
	Hex	1D	7C	n
	Decimal	29	124	n

[Range] $0 \leq n \leq 8, 48 \leq n \leq 56$

[Description]   Sets printing density. n specifies printing density as follows:

n	Printing density
0, 48	- 50%
1, 49	- 37.5%
2, 50	- 25%
3, 51	- 12.5%
4, 52	0%
5, 53	+ 12.5%
6, 54	+ 25%
7, 55	+ 37.5%
8,56	+ 50%

[Notes]   • Printing density reverts to the default value when the printer is reset or turned off.
[Default]   n = 4
[Reference]
[Example]

$1D $7E n

[Name]   **Set superscript/subscript**
[Format]   ASCII   GS   { }   n
               Hex   1D   7E   n
               Decimal   29   126   n
[Range]   n = 0, 1, 48, 49
[Description]   Sets superscript or subscript character position. n specifies the position as follows:

n	Function
0, 48	Subscript character position
1, 49	Superscript character position

[Notes]   • This command is executed if there are characters of different height on the same line.
[Default]   n = 0
[Reference]   **$1B $21, $1D $21**
[Example]

$1D $D0 xH xL yH yL (mode 2)

[Name]   **Set horizontal and vertical motion units**
[Format]   ASCII   GS   { }   xH   xL   yH   yL
               Hex   1D   D0   xH   xL   yH   yL
               Decimal   29   208   xH   xL   yH   yL
[Range] $0 \leq ((xH * 256) + xL) \leq 2040$
               $0 \leq ((yH * 256) + yL) \leq 4080$
[Description]   Sets the horizontal and vertical motion units to $1/((xH * 256) + xL)$ inch and $1/((yH * 256) +$
               $yL)$ inch respectively.
               When x is set to 0, the default setting value is used.
               When y is set to 0, the default setting value is used.

[Notes]
• The horizontal direction is perpendicular to the paper feed direction.
• In standard mode, the following commands use x or y, regardless of character rotation (upside-down or 90° clockwise rotation):
①   Commands using x : **$1D $4C, $1D 57.**
②   Commands using y : **$1B $4A, $1B $33**.
• This command does not affect the previously specified values.
• The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch or an exact multiple of that value.

[Default]   x = 204, y = 408
[Reference]   **$1B $4A, $1D $4C, $1D $57, $1D $50**
[Example]

$1D $E0 n

[Name]   **Enable / disable automatic FULL STATUS back**
[Format]

ASCII	GS	{ }	n
Hex	1D	E0	n
Decimal	29	224	n

[Range]   0 ≤ n ≤ 255
[Description]   Enable / disable automatic full status back.
n specifies the composition of FULL STATUS as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Disable Paper status.
	On	01	1	Enable Paper status.
1	Off	00	0	Disable User status.
	On	02	2	Enable User status.
2	Off	00	0	Disable Recoverable Error Status.
	On	04	4	Enable Recoverable Error Status.
3	Off	00	0	Disable Unrecoverable Error Status.
	On	08	8	Enable Unrecoverable Error Status.
4	-	-	-	Undefined.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	-	-	-	Undefined.

[Notes]
• Once enable at least one byte of the FULL STATUS, for each change of at least one of the bits which compose the required status, the status sent in automatic from the printer will be so composed as follows:
1° byte = $10 (DLE)
2° byte = n
Next byte (depends how many bits are active in n)

[Reference]   **$10 $04 n**
[Example]

$1D $E1

[Name]   **Reading of length paper (cm) available before virtual paper-end**
[Format]

ASCII	GS	{ }	
Hex	1D	E1	
Decimal	29	225	

[Description]   Reading of length (cm) paper available before virtual paper-end.
               The command return a string pointing out how much paper is available, for example if there are 5.1 m before the paper end, it will be: '510cm'
[Notes]   • The lenght of residual paper reported is just as an indication
               because tolerances and other factors are not taken into consideration (paper thickness, roll core diameter, roll core thickness). The virtual paper-end limit is set by the command **$1D $E6**.
               • To set virtual paper-end limit, measure the length of the paper from near paper end to the end of the roll, using several of them.
[Default]
[Reference]   **$1D $E6**
[Example]

$1D $E2

[Name]   **Reading number of cuts performed from the printer**
[Format]   ASCII   GS   { }
               Hex   1D   E2
               Decimal   29   226
[Description] Reading the number of cuts performed from the printer.
[Notes]   The command return a string that points out how many cuts are performed by the printer, for example if there are performed 2376 cuts, it will be: '2376 cuts'
[Default]
[Reference]
[Example]

$1D $E3

[Name]   **Reading of length (cm) of printed paper**
[Format]   ASCII   GS   { }
               Hex   1D   E3
               Decimal   29   227
[Description] Reading of length (cm) of printed paper.
[Notes]   The command return a string pointing out how much paper is printed, for example if the printer has print about 2515,5 m, it will be: '251550cm'
[Default]
[Reference]
[Example]

$1D $E4

[Name]   Reading number of retracting
[Format]   ASCII   GS   { }
               Hex   1D   E4
               Decimal   29   228
[Description] Reading number of retracting of the printer.
[Notes]   • The command return a string pointing out the number of retracting of the printer, for example if the printer has retracted the paper 512 times, it will be: '512ret'
[Default]
[Reference]
[Example]

CUSTOM

$1D $E5

[Name]	**Reading number of power up**		
[Format]	ASCII	GS	{ }
	Hex	1D	E5
	Decimal	29	229
[Description]	Reading number of power up of the printer.		
[Notes]	• The command return a string pointing out the number of turning on of the printer, for exam ple if the printer is turned on 512 times, it will be: '512on'		
[Default]			
[Reference]			
[Example]			

$1D $E6 nH nL

[Name]	**Virtual paper-end limit**				
[Format]	ASCII	GS	{ }	nH	nL
	Hex	1D	E6	nH	nL
	Decimal	29	230	nH	nL
[Range]	$0 \leq nH, nL \leq 255$				
[Description]	This command sets the limit after which is pointed out the virtual paper-end.				
[Notes]	• The calculation limit of the near paper-end is in centimetres.				
	• This value is expressed as [(nH x 256)+nL]				
[Default]	nH = $00				
	nL = $F0				
[Reference]					
[Example]	If you want that the virtual paper-end is pointed out after 15 metres from first near paper-end data acquisition, you have to convert 15 metres in 1500 centimetres, and after you have to calculate nH and nL as it follows:				

nH = 1500 / 256 = 5
nL = 1500 - (nH x 256) = 1500 - (5 x 256) = 220
And which the command will be:

Hex:	$1D	$E6	$05	$DC
Decimal:	29	230	5	220

$1D $E7 nH nL

[Name]	**Set notch distance**				
[Format]	ASCII	GS	{ }	nL	nH
	Hex	1D	E7	nL	nH
	Decimal	29	231	nL	nH
[Range]	$0 \leq nH \leq 255$				
	$0 \leq nL \leq 255$				
[Description]	Sets notch distance in mm from the beginning of the document (see appendix B).				
[Notes]	• This value is expressed as [(nH x 256)+nL]				
	• It's possible to put in the notch distance maximum limit during the setup phase. The notch distance value range goes from 0 to 32 mm.				
	The setting are saved in the EEPROM to keep the value when the printer is turned off.				
[Default]	nH = $00				
	nL = $00				
[Reference]					
[Example]					

$1D $F0 n

[Name]	**Set printing speed**			
[Format]	ASCII	GS	{ }	n
	Hex	1D	F0	n
	Decimal	29	240	n
[Range]	0 ≤ n ≤ 2			
[Description]	Sets printing speed. n specifies the printing speed as follows:			

n	Printing speed
0	High quality
1	Normal
2	High speed

[Notes]   • Printing speed reverts to the default value when the printer is reset or turned off.
[Default]   n = 1
[Reference]
[Example]

$1D $F6

[Name]	**Align the print head with the notch**		
[Format]	ASCII	GS	{ }
	Hex	1D	F6
	Decimal	29	246

[Description] Set the print head notch alignment. With the $1D $E7 command it's possible to program the printing start distance from the notch.
[Notes]   • The distances range goes from 0 to 32 mm.
[Default]   0
[Reference] **$1D $E7, $1D $F8**
[Example]

$1D $F8

[Name]	**Align the autocutter with the notch**		
[Format]	ASCII	GS	{ }
	Hex	1D	F8
	Decimal	29	248

[Range]
[Description] Set the autocutter notch alignment. With the $1D $E7 command it's possible to program the paper cut start distance from the notch.
[Notes]   • The distances range goes from 0 to 32 mm.
[Default]   0
[Reference] **$1D $E7, $1D $F6**
[Example]

4.1 TECHNICAL SPECIFICATIONS

Table 4.1 gives the main technical specifications for the 204 dpi printer model.

(Tab.4.1)

Print method	Thermal, fixed head (8 dot/mm)		
Resolution	204 DPI (8 dot/mm)		
Paper specifications			
Type of paper	Thermal rolls Heat-sensitive side on outside of roll		
Recommended types of paper	da 55 g/m^2 a 110$^{(1)}$ g/m^2 (KANZAN)		
Width	from 60$^{(2)}$ to 82,5 mm		
Internal roll core diameter	25mm		
External roll diameter	max Ø180 mm $^{(3)(4)}$		
	OPTIONAL	Upper attachment max Ø170 mm $^{(5)}$	
	OPTIONAL	Rear attachment max Ø180 mm $^{(5)}$	
	OPTIONAL	Lower attachment max Ø180 mm $^{(5)}$	
Core type	Cardboard or plastic		
Sensors	Head temperature, black mark, paper end, ticket presence on output, opening of printing unit, (near paper end on roll support is optional)		
Printing mode	Straight, 90°, 180°, 270°		
Printing format	Height/Width from 1 to 8, bold, reverse, underlined, italic		
Character fonts	PC437, PC850, PC860, PC863, PC865, PC858.		
Available interfaces	RS232-USB		
Baud rate	Da 1200 a 115200 bps		
Receive buffer	16 Kbytes		
Flash memory	384 Kbytes		
Graphics memory	2 logos of 608 x 862 dots (for 80/82,5mm paper width)		
Printing Driver	Windows™ 95, 98, ME, NT4, 2K, XP, Linux		
Dimensions	W=115mm H=115mm L=115mm		
Weight$^{(1)}$	2117 gr.		
Printing speed			
High quality	90 mm/sec		
Normal	120 mm/sec		
High speed	140 mm/sec		

NOTE: $^{(1)}$ For paper from 90 to 110 g/m^2 enable the dispenser continuous mode:
$1D $65 n [m]
$^{(2)}$ For ticket width = 60 mm do not exceed a max length of 250 mm.
$^{(3)}$ Referred to model without paper holder support.
$^{(4)}$ It's better to use an external shock absorber for rolls with a diameter higher than or equal to 100 mm.
$^{(5)}$ Referred to model without paper holder support.

Power supply	24 Vdc ± 10% (optional external power supply)		
Absorption (current setting = Normal)			
Stand-by	0,1 A		
Medium (50% dot ON)	2,2 A		
Environmental conditions			
Operating temperature	0°C - 50°C		
Relative humidity	10% - 80% w/o condensation		
Storage temperature / Humidity	-20°C - 70°C / 10% - 90%		
OPTIONS	Roll holder support		
Emulation	ESC/POS™		
Character density	**11 cpi**	**15 cpi**	**20 cpi**
Number of columns	88	123	160
Chars / sec	1760	2460	3200
Lines / sec	20	20	20
Characters			
Normal	2,25x3	1,625 x 3	1,25 x 3
Retracting function			
Ticket length	**Ticket presentation**		
70 mm	10 mm		
80 mm	10 mm - 30 mm		
80 mm - 220 mm	10 mm - 30 mm		
Ejecting function			
Ticket length	**Ticket presentation**		
70 mm	10 mm		
> 80 mm	10 mm - 30 mm		
350 mm [6]	10 mm - 30 mm		

NOTE: [6] Maximum length recommended to guarantee the printer efficiency.

4.2 DIMENSIONS

In the following figures shows the dimensions of the printer.

3 FIXING POINT (BOTTOM)

Bottom view
(Fig. 4.1)

M4; n°3 filetti

$100 ^{+0.5}_{-0.5}$

$85.5 ^{+0.5}_{-0.5}$ $9.5 ^{+0.5}_{-0.5}$

Top view
(Fig. 4.2)

83 max usable

REV. 2.02

95

110

Front view
(Fig. 4.3)

123.5

Left side view (SX)
(Fig. 4.4)

STATUS
LINE FEED

FORM FEED
RS232   USB   POWER

121.2
8.1
70.5
52.9
45.5

125.5

149.5
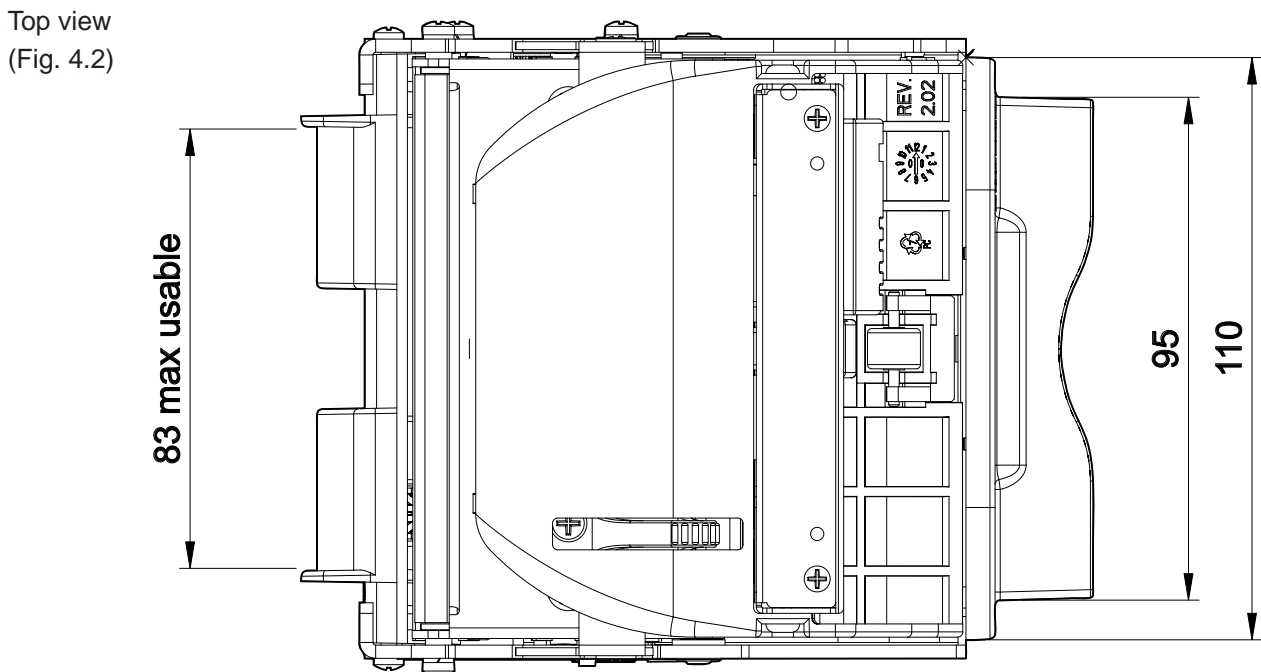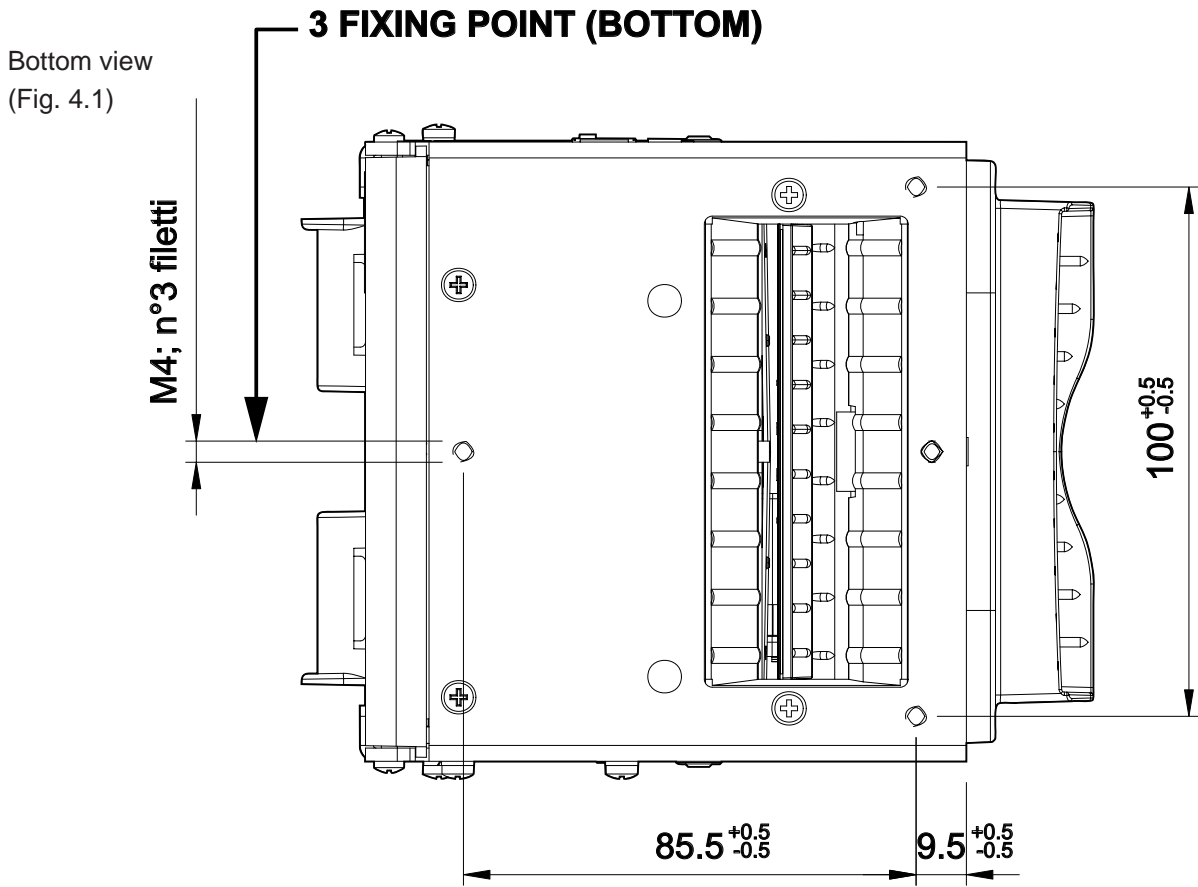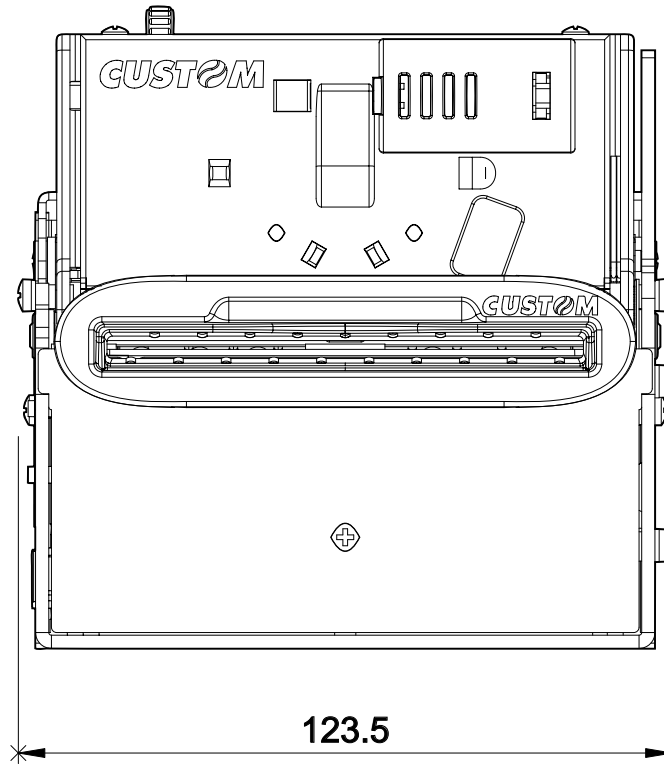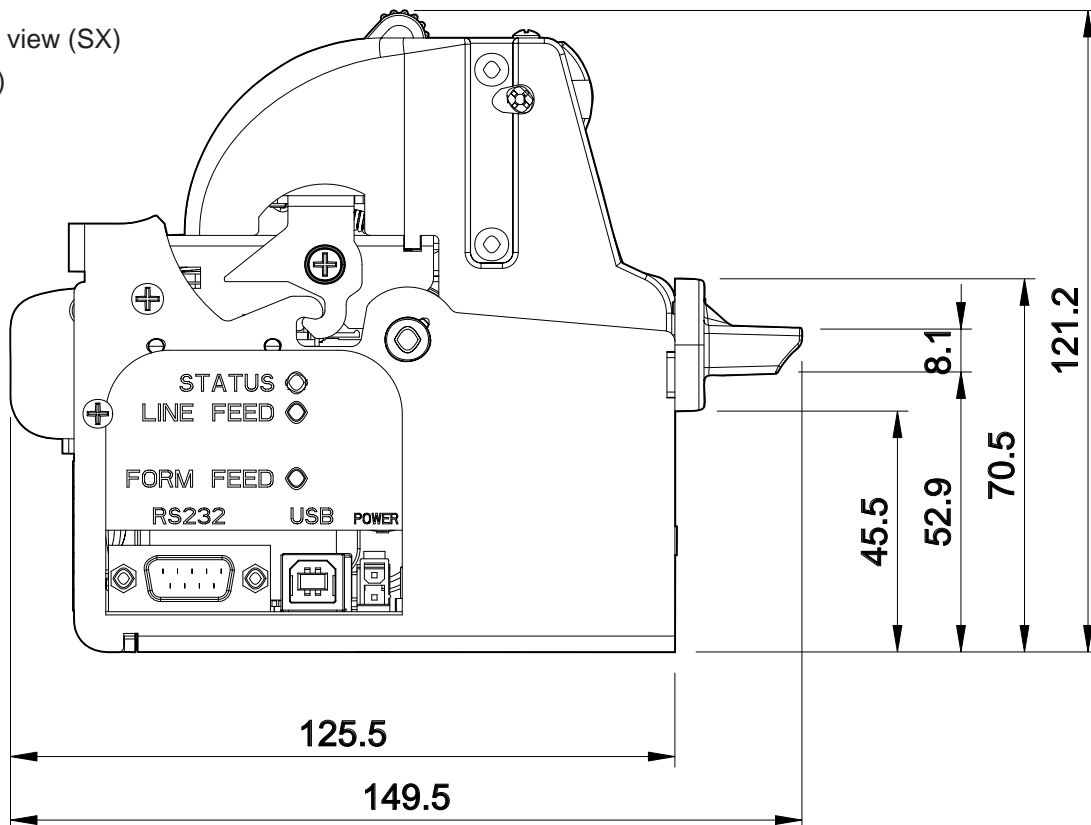
5.1 CHARACTER SETS

The printer has 3 fonts of varying width (11, 15 and 20 cpi) which may be accessed through programming (section 1.2) or control characters (section 3.2). Each of these fonts offers the following code tables: PC437, PC850, PC860, PC863, PC865, PC858.
Shown below in figures 5.1 are examples of the 11 cpi character set.

(Fig.5.1)

PC437
(Usa,Standard,Europe)

PC850
(Multilingual)

PC860
(Portuguese)

PC863
(Canadian-French)

PC865
(Nordic)

PC858
(Euro symbol)

To print the Euro (€) symbol, the command sequence is: $1B, $74, $13, $D5 (see Chapter 3).

Blank page

A.1 ACCESSORIES

A.1.1 Power Supply

The figure below illustrates the power supply provided by Custom to be used for printer operation.

(Fig.A.1)

RANGE		TOLERANCE
		B
< 8		0.1
8	25	0.15
25	80	0.25
80	250	0.4
250	800	0.8
800	2600	1.5
ANGULAR		0.3°

Note : Dimensioni in mm
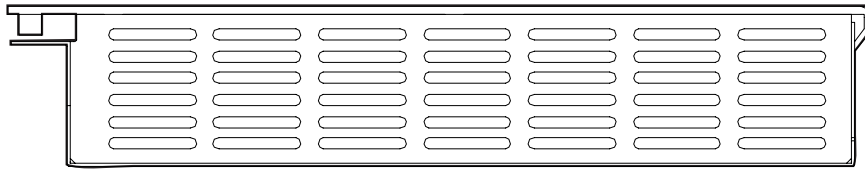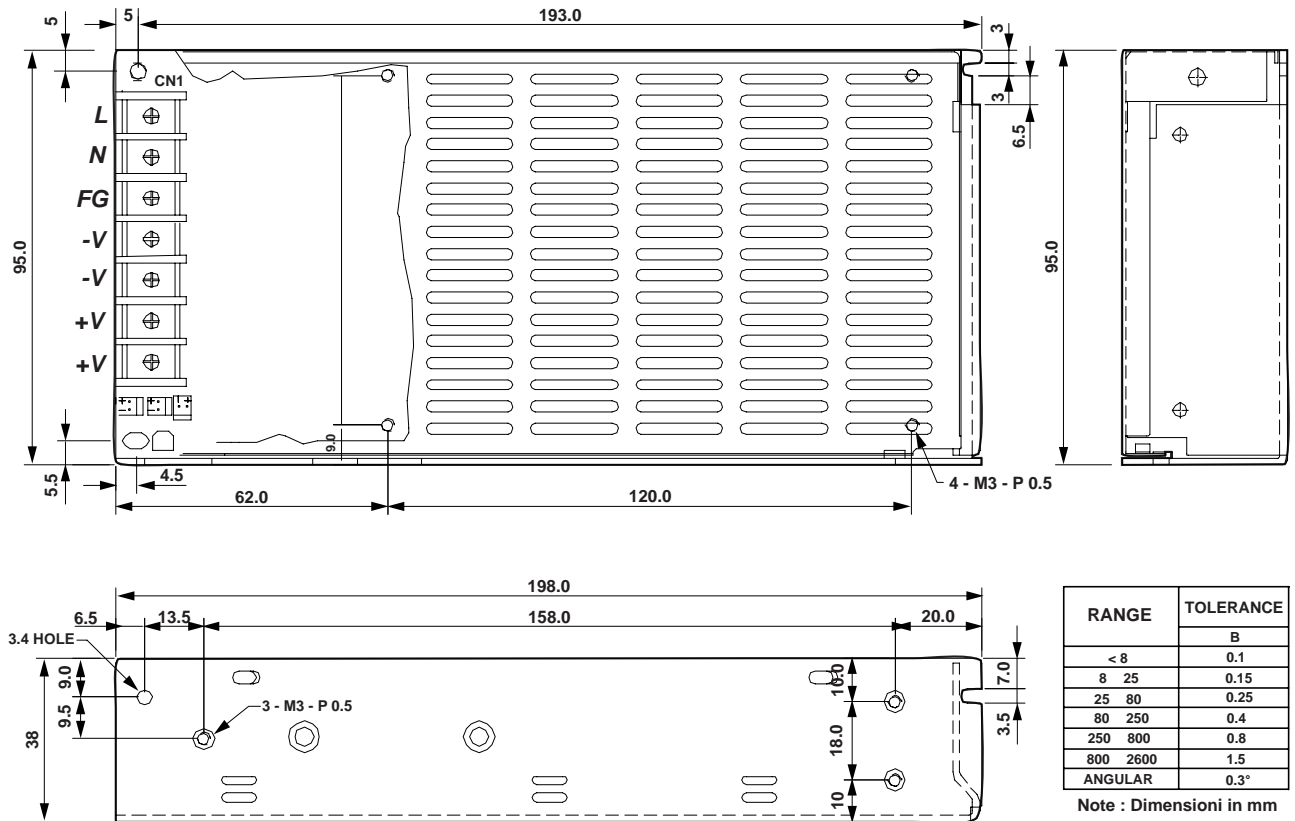
(Tab.A.1)

PPSPS-100-24V	Switching power supply 24V 100W	
Input specification	Input voltage	85V ÷ 264V
	Current	0A ÷ 4.5A
	Input frequency	47Hz ÷ 63Hz
Output specification	Output voltage	24V
	Output current	0A ÷ 4,5A
	Efficiency	80%
Environmental condition	Operating temperature	0°C ÷ 70°C
	Humidity	20% ÷ 85% Rh (w/o condensation)
	Storage temperature / Humidity	-10°C ÷ 75°C/ 10% ÷ 95% (w/o condensation)

Protection devices: Shortcircuit, overload and overvoltage.

A.1.2 CD Full driver

DOCD-VKP80II	CD-ROM Full driver for VKP80II

A.1.3 Adjustable paper holder support

An adjustable paper holder support kit (see fig. A.2) is available for the printer to make it possible to use larger-width rolls of paper (130mm max.).

PCXSP-VKP80II	Paper roll holder kit with sensor for VKP80II

The kit includes (see fig. A.2) :
1   Instruction sheet
2   Tie for roll blocking
3   N°4 fastening screws
4   Paper holder support assembled
    complete of:
    - Near paper end sensor
    - paper width regulating system

(Fig.A.2)
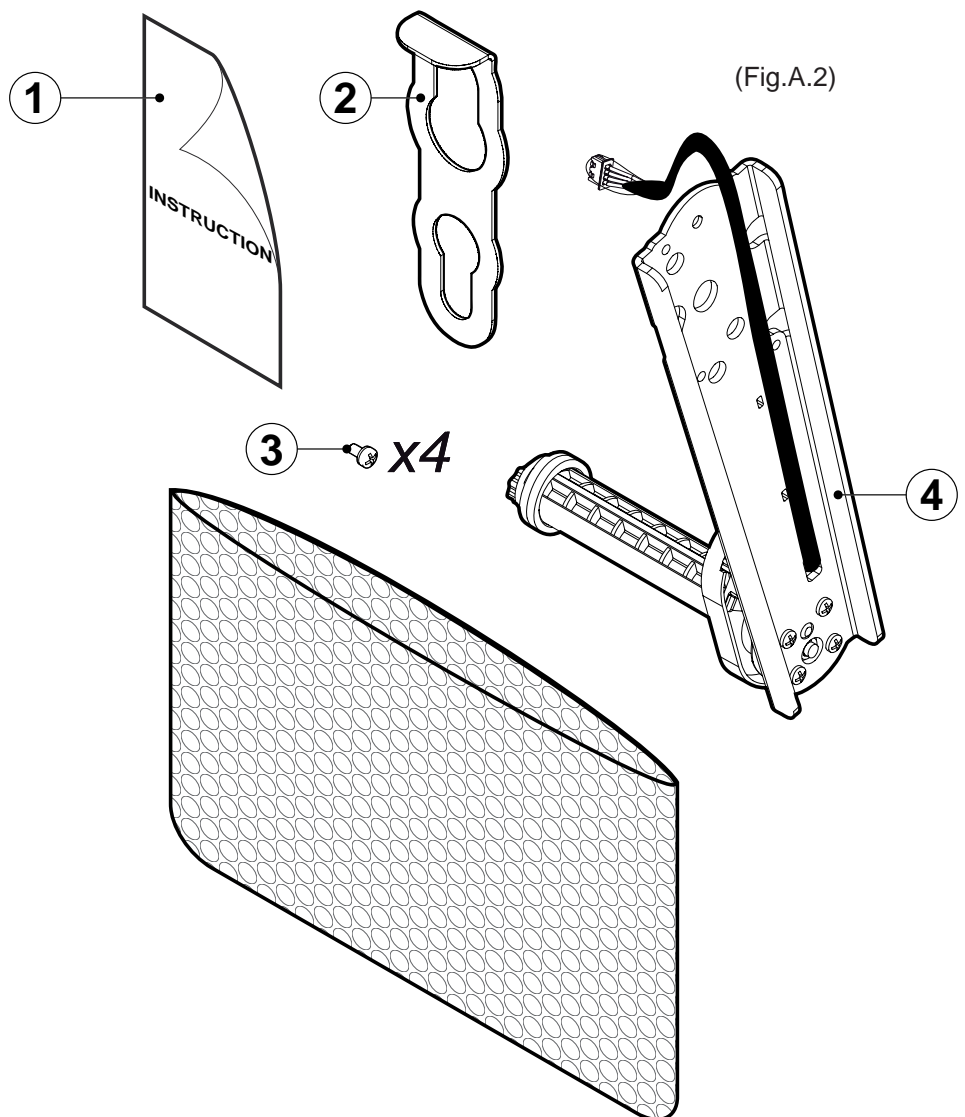
N.B.: Mounting the paper holder support using the instruction sheet enclosed with the kit.

Assembly instructions

The position of the roll holder support is not fixed and its rear, lower and upper position may be adjusted. The support is attached to the printer frame at fout points, as shown in figure A.3.

(Fig.A.3)
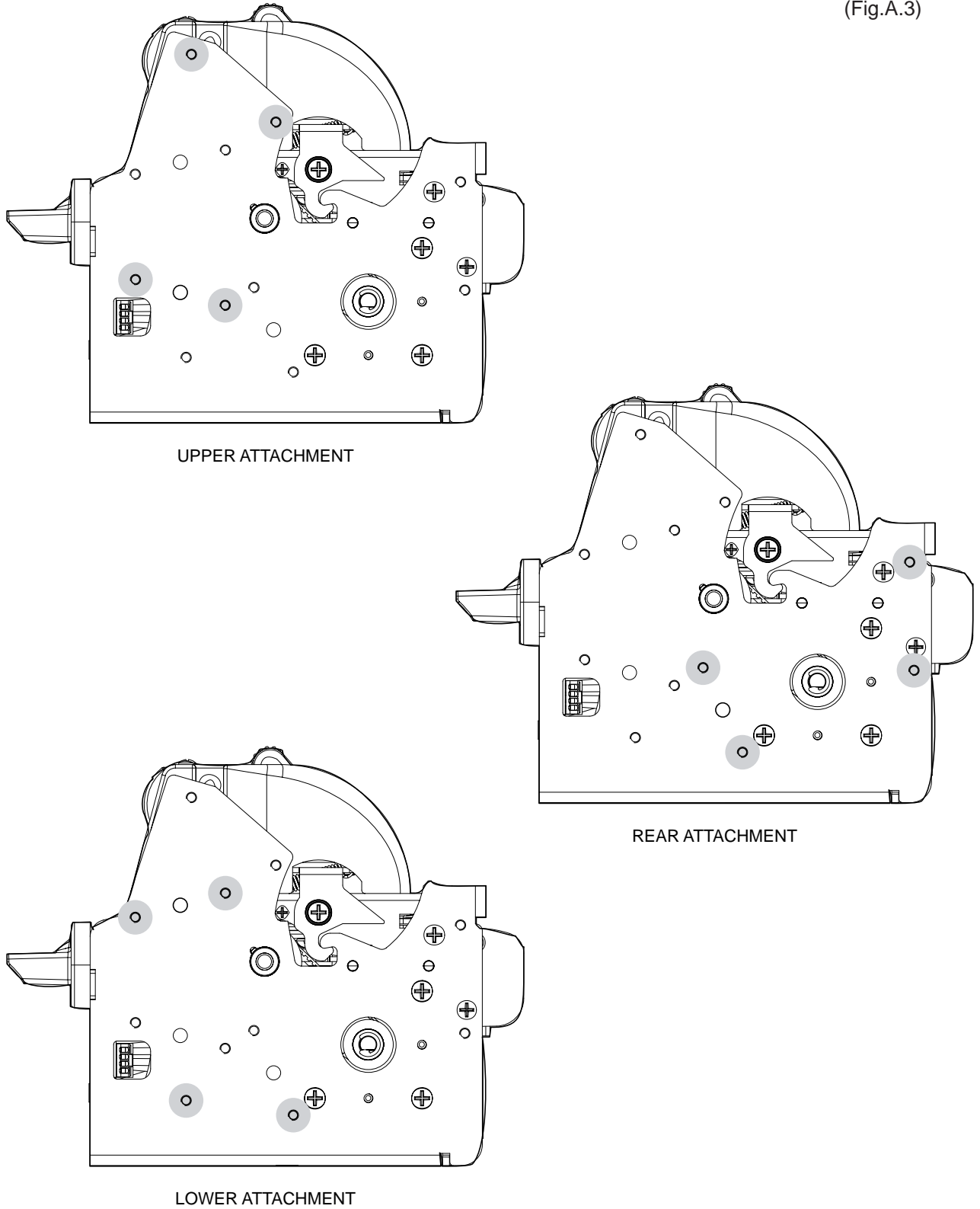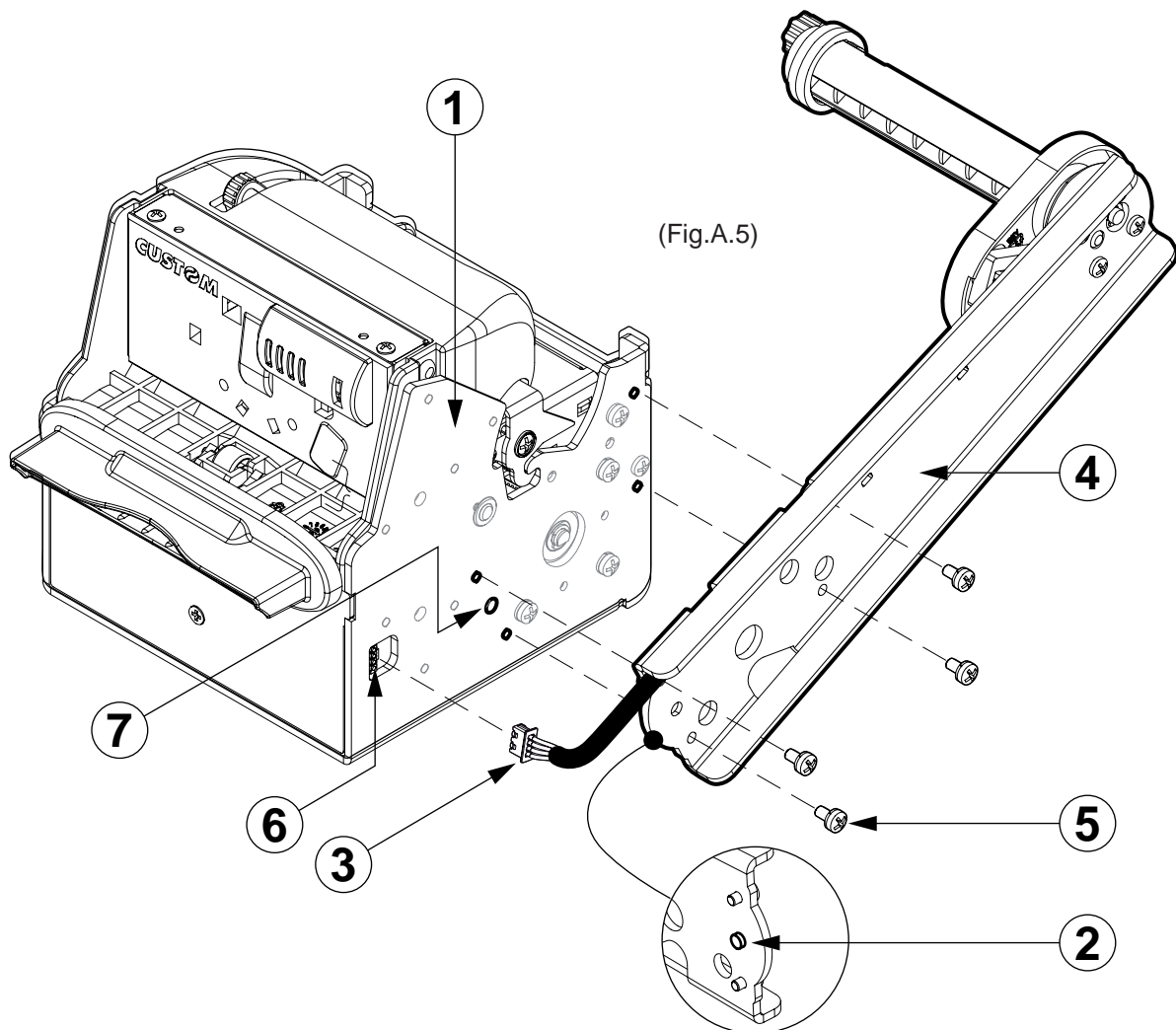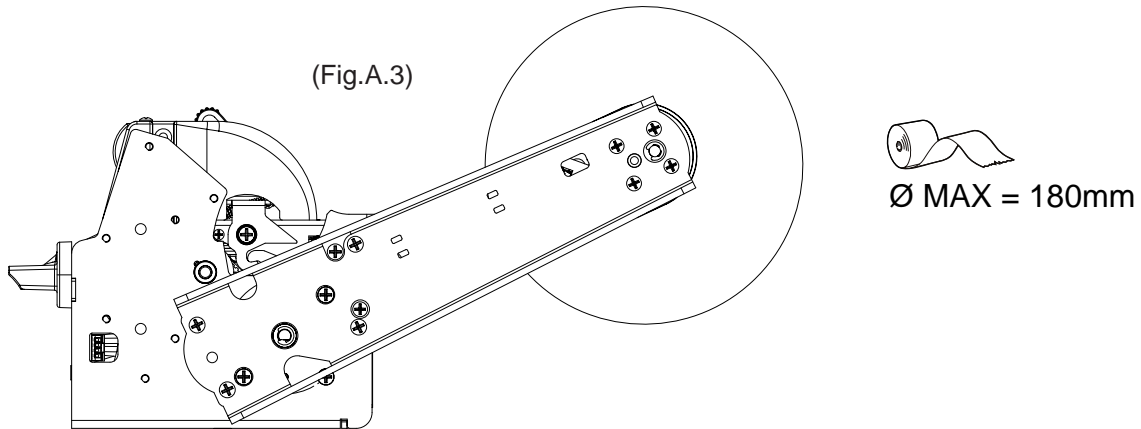
UPPER ATTACHMENT

REAR ATTACHMENT

LOWER ATTACHMENT

Rear attachment

(Fig.A.3)

Ø MAX = 180mm

(Fig.A.5)

1. Put the paper holder support near the printer body. Insert the point of reference (2) (paper holder sup port) into the hole (7) (printer body) (see fig. A.5).
2. Attach the paper holder support (4) to the printer body (1) using four M4x8 screws (5) supplied with the kit (see fig. A.5).
3. Insert the near paper end sensor connector (3) of the paper holder support into the connector of the sen sor card located on the printer (6) (see fig. A.5).

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Lower attachment
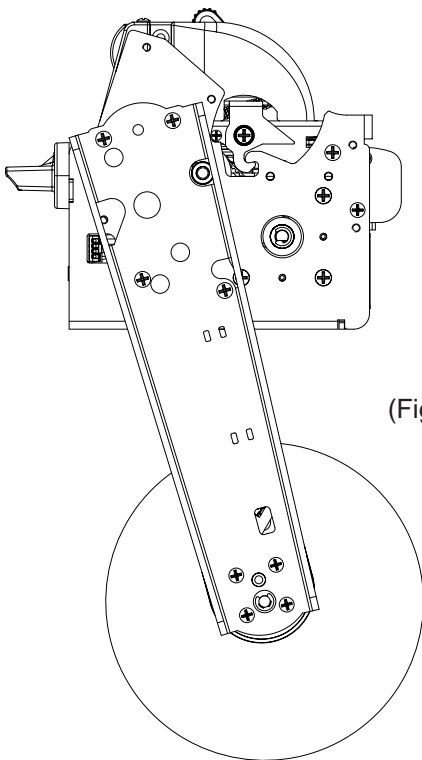
Ø MAX = 180mm

(Fig.A.6)
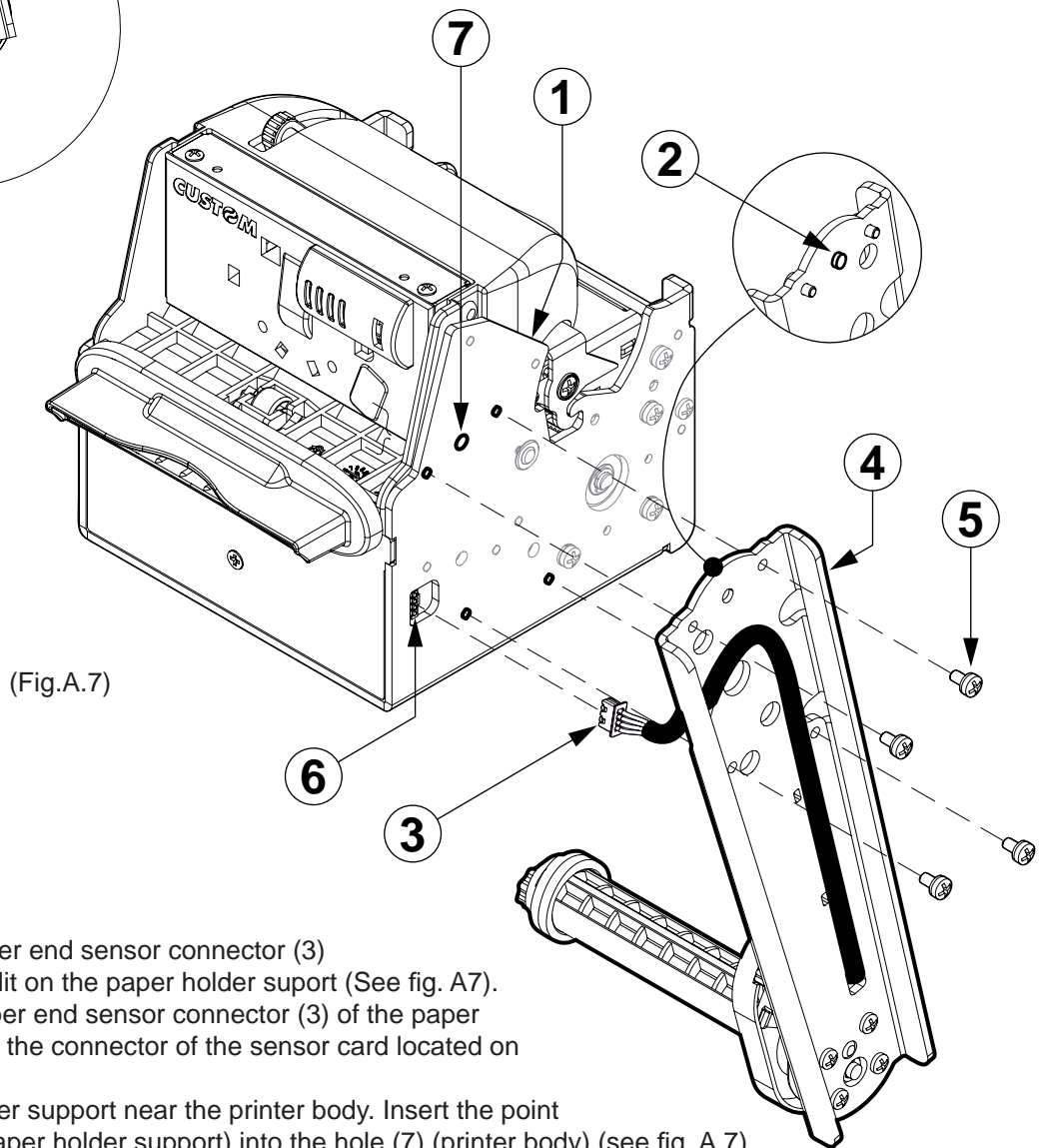
(Fig.A.7)

1. Have the near paper end sensor connector (3)
   pass through the slit on the paper holder suport (See fig. A7).
2. Insert the near paper end sensor connector (3) of the paper
   holder support into the connector of the sensor card located on
   the printer (6).
3. Put the paper holder support near the printer body. Insert the point
   of reference (2) (paper holder support) into the hole (7) (printer body) (see fig. A.7).
4. Attach the paper holder support (4) to the printer body (1) using four M4x8 screws (5)
   supplied with the kit (see fig. A.7).

Upper attachment
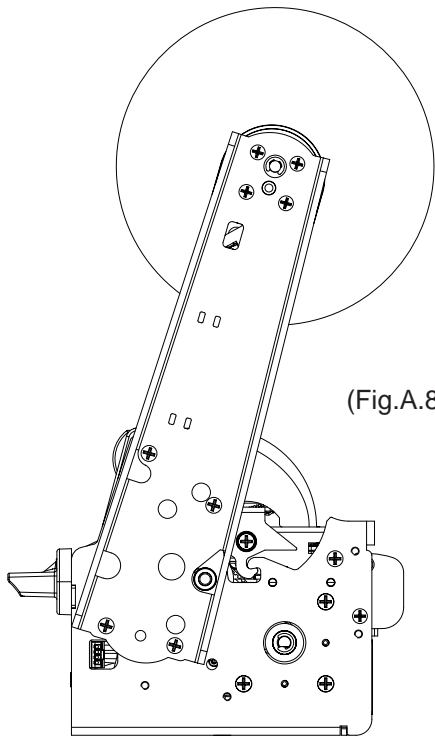
(Fig.A.8)

Ø MAX = 170mm
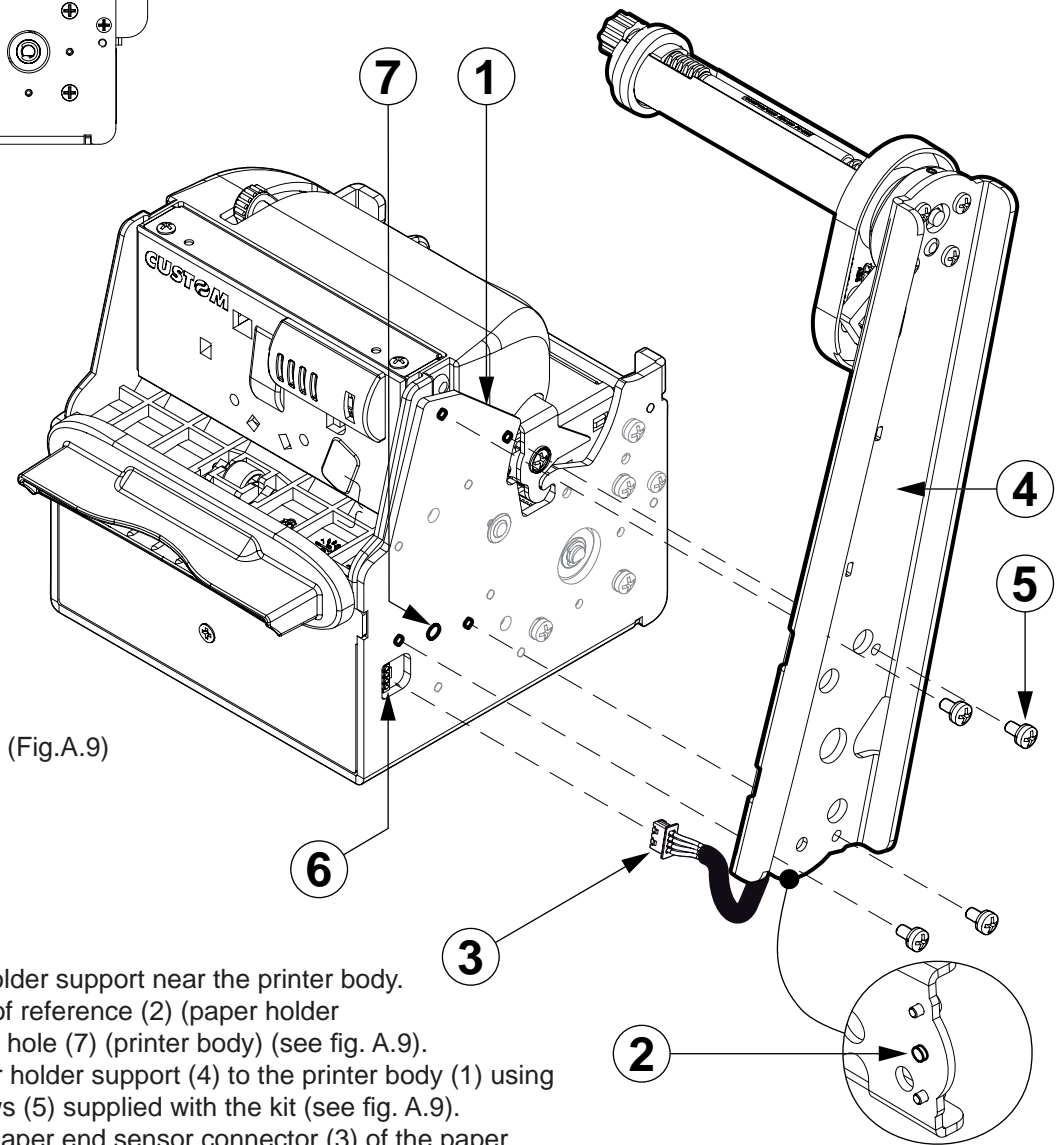
(Fig.A.9)

1. Put the paper holder support near the printer body. Insert the point of reference (2) (paper holder support) into the hole (7) (printer body) (see fig. A.9).
2. Attach the paper holder support (4) to the printer body (1) using four M4x8 screws (5) supplied with the kit (see fig. A.9).
3. Insert the near paper end sensor connector (3) of the paper holder support into the connector of the sensor card located on the printer (6) (see fig. A.9).

CUSTOM

Paper width adjustment with roll holder support

Paper width may be set from 60mm to 82.5mm max. Rotate the knob (1) to adjust the width of the housing for paper roll (see fig. A.10).

(Fig.A.10)
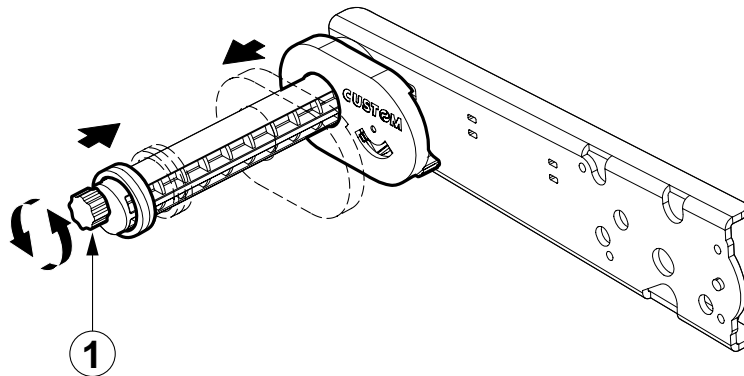
Near paper end adjustment

Rotate the lever (1) to adjust the sensor position for nearly paper end. Move the lever up to in-crease the reserve of paper, move the lever down to decrease the reserve of paper (see fig. A.11).

(Fig.A.11)
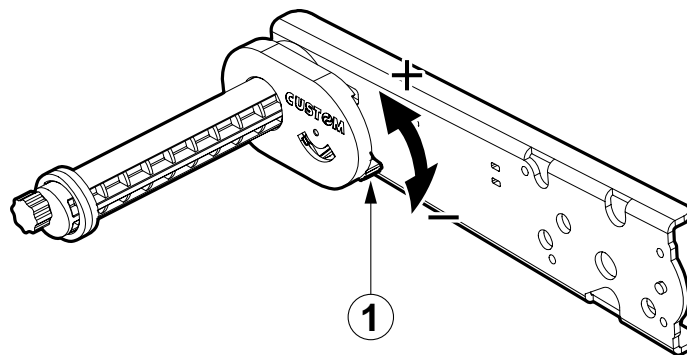
"Tie" for roll blocking
Insert the "tie" (1) as shown in figure A.12 to avoid the paper roll come out accidentally from the pin.

(Fig.A.12)
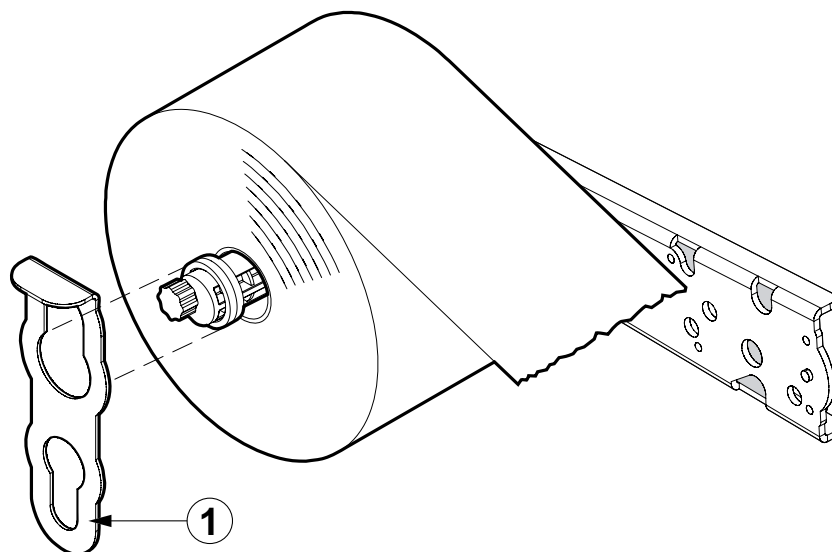
Printer dimensions with roll holder support

(Fig.A.13)
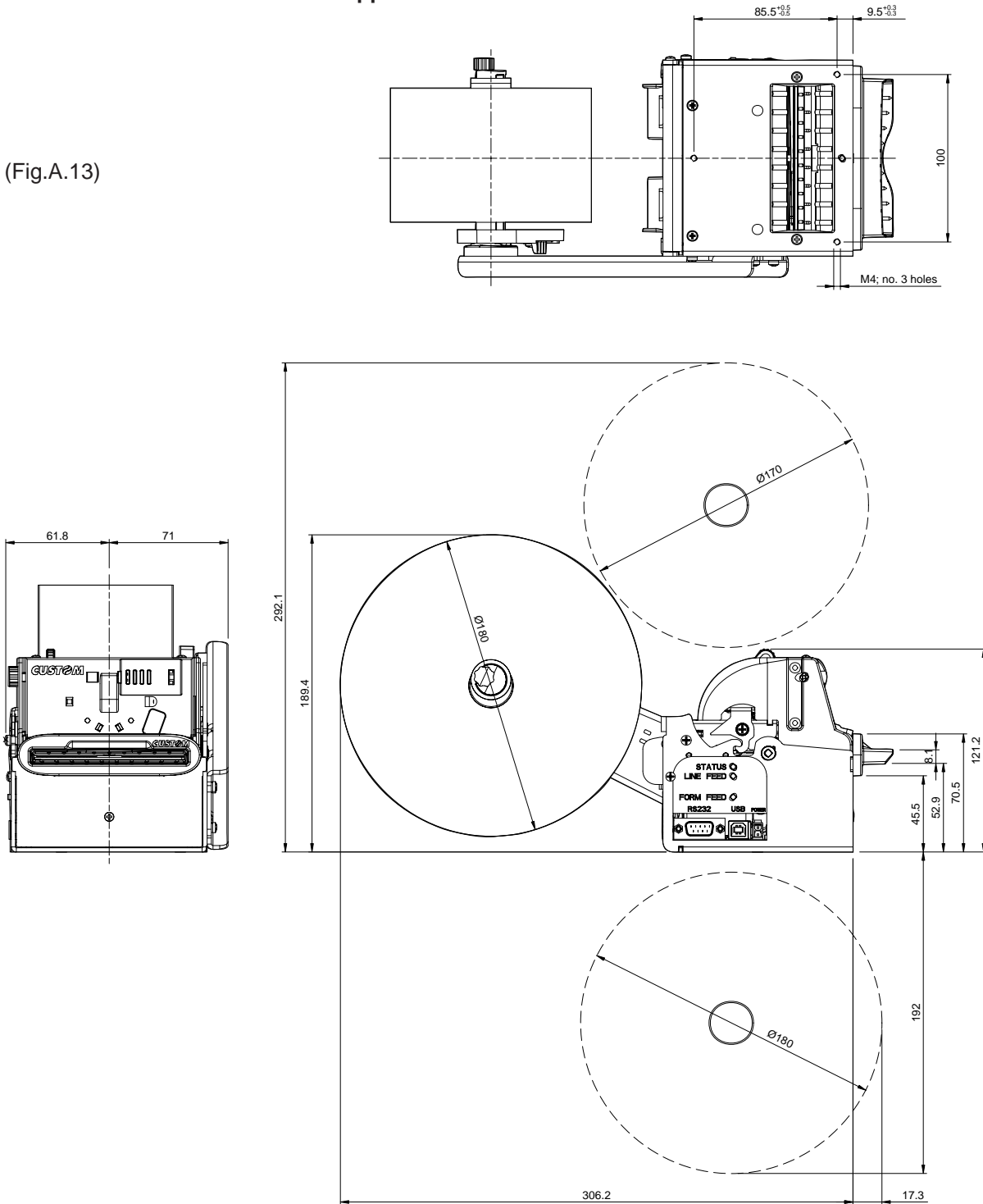
A.2 SUPPLIES

RCT80X48-25MM-RS	80mm thermal paper roll back side pre-printed

Paper roll with paper holder support

RCT80X130-25MM	Thermal paper roll 80mm

A.3 NOTES FOR TECHNICAL ASSISTANCE

⚠ **ATTENTION:** The operations here described are exclusively aimed to the personnel handling the technical assistance of the printer.

A.3.1 Replacing fuse

⚠ **ATTENTION:** Before replacing the fuse, it's important to check up that the supply cable of the printer is out.

The fuse is on the control board of the printer, near the supply connector (fig. A.18), proceed as follows :

- unscrew the two fixing screw for the back closing. Move back closing down and then remove as shown in fig. A. 14;
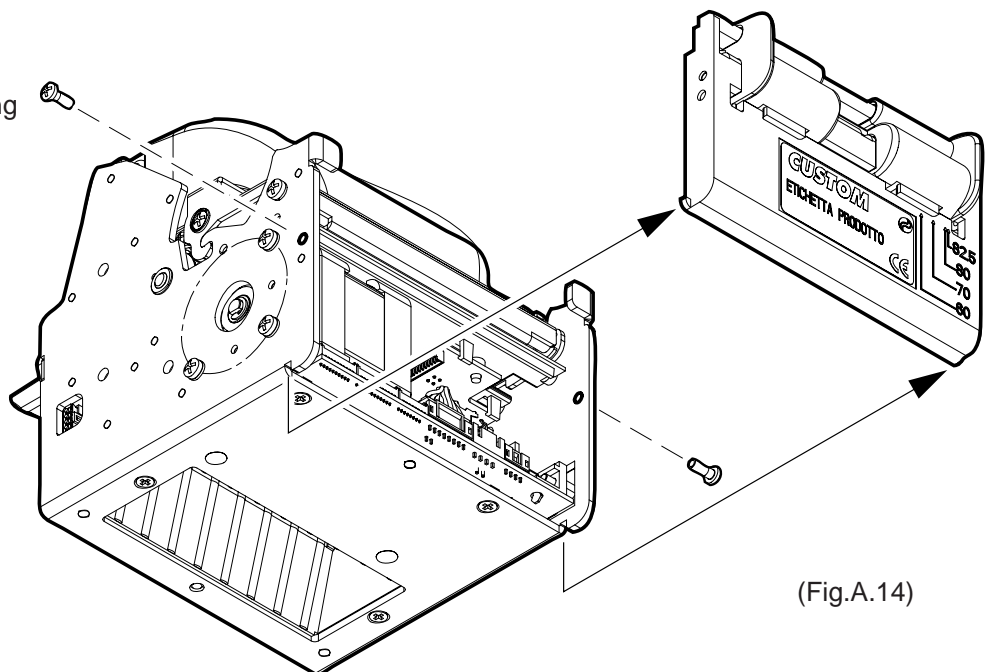
(Fig.A.14)

- Unscrew the two screws that fixing control board to the chassis as shown in fig. A.15.
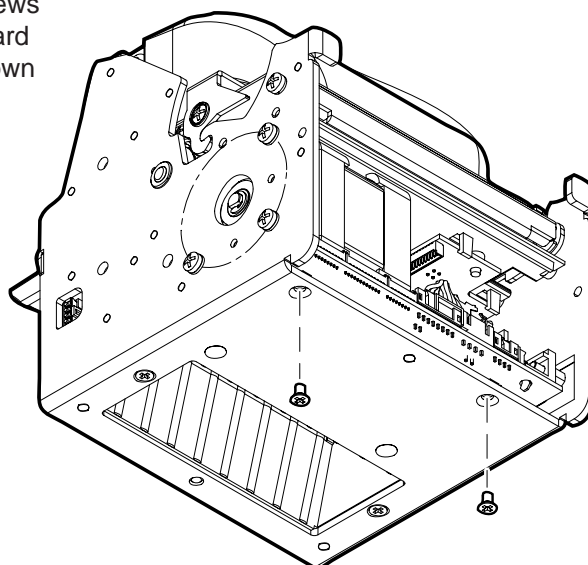
(Fig.A.15)

- Unlock the control board position pushing in the direction indicated by the arrow as shown in fig. A.16.
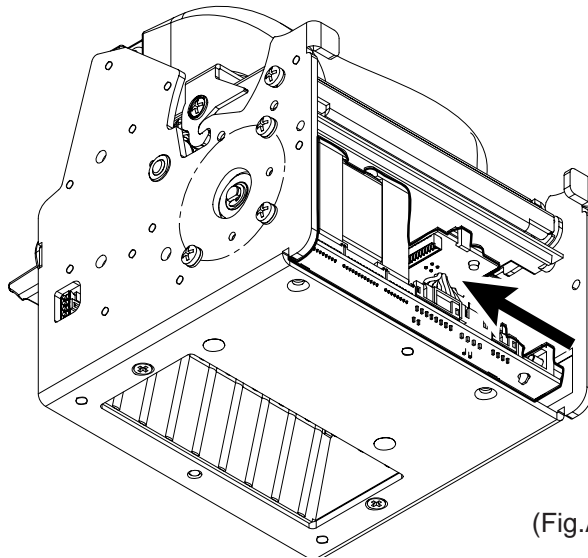
(Fig.A.16)

- Extract the control board from its seating in the direction indicated by the arrow as shown in fig. A.17.
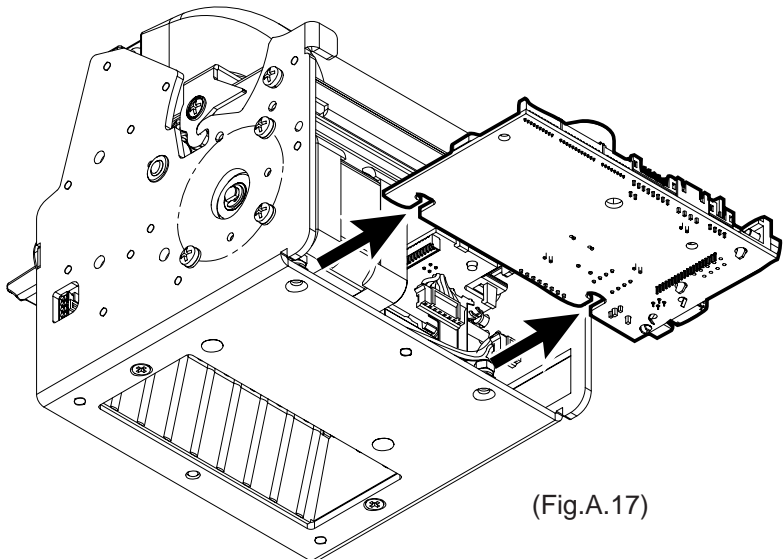
(Fig.A.17)

- The fuse is on the control board of the printer, near the supply connector (fig A.18). Unsolder the fuse at his end, paying attention to not heat excessively the closed components, to not take any risk to damage it.
- Replace the fuse with a new one with same specifications (4A, 125V) and place it again in its seating.
- Reassemble the printer.

(Fig.A.18)

CUSTOM
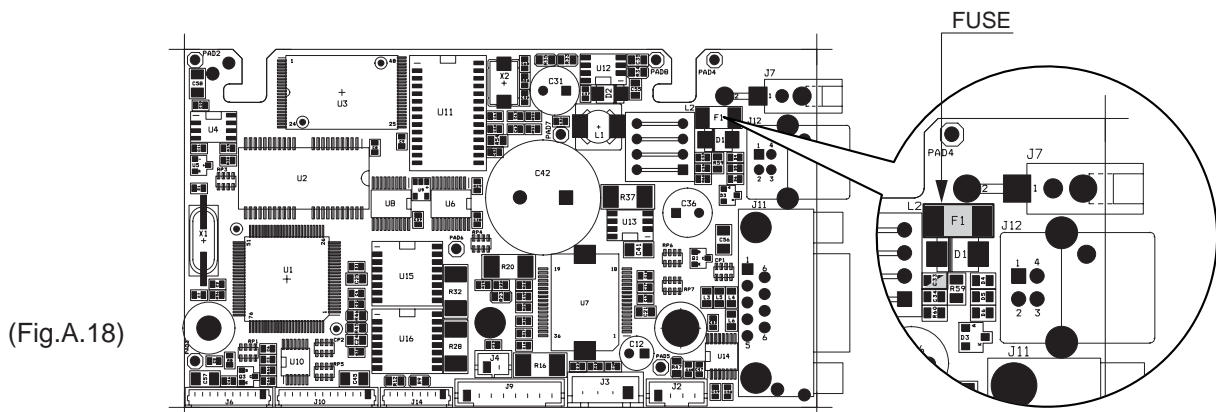
B.1 TICKET ALIGNMENT

B.1.1 Ticket alignment

Paper with an alignment notch can be used in order to handle tickets with pre-printed fields and a fixed length.

To guarantee the alignment it is necessary that the *"Notch Alignment"* parameter is enabled from the key setup (see setting configuration parameters), that the alignment sensor is calibrated and that the parameters are set.

The calibration of the sensor occurs automatically within the printer setup.

B.1.2 Enabling, calibrating and setting of parameters.

The notch sensor is a reflection sensor that emits a band of light and detects the quantity of light reflected to it.

The presence of the notch is therefore detected by the amount of light that returns to the sensor, taking into account that the light is reflected by the white paper and absorbed by the black.

Calibration of the sensor occurs automatically and consists in adjusting the quantity of light emitted to adapt it to the degree of whiteness of the paper used.

To start self-calibration, the *"Notch Alignment"* parameter will have to be enabled from the printer setup (see setting configuration parameters):

> *Notch Alignment*　　　: **Enabled**

The printer will perform some paper FEEDS, at the end of which it will print the value settings, for example:

> *Autosetting Notch*　　　: **OK**
> *Threshold White*　　　: **1.9V [39%]**

The *"Autosetting Notch"* parameter indicates the operating condition of the self-calibration process; OK will appear if it has been successful, but if it has failed the words NOT OK will appear.

In this case the default parameters concerning the *"Threshold White"* parameter will be set.

The *"Threshold White"* parameter indicates the power-up level of the sensor emitting side; its value ranges from 0V to 5V with the corresponding value appearing as a percentage (from 0% to 100%).

Another parameter that needs to be set is the threshold:

> *Notch Threshold..*　　　: 3.0V

It is used to detect the presence of the notch: if the voltage value read by the sensor exceeds the threshold value set the notch is identified, otherwise the white paper is considered.

In order to better identify the optimum threshold for the paper being used, a paper characterisation function is also available in setup.

> *Characterize Paper.*　　:Yes

By activating this parameter the outgoing voltage of the sensor will be presented in a graphic form as shown in figure B.1 below:

PAPER CHARACTERIZATION
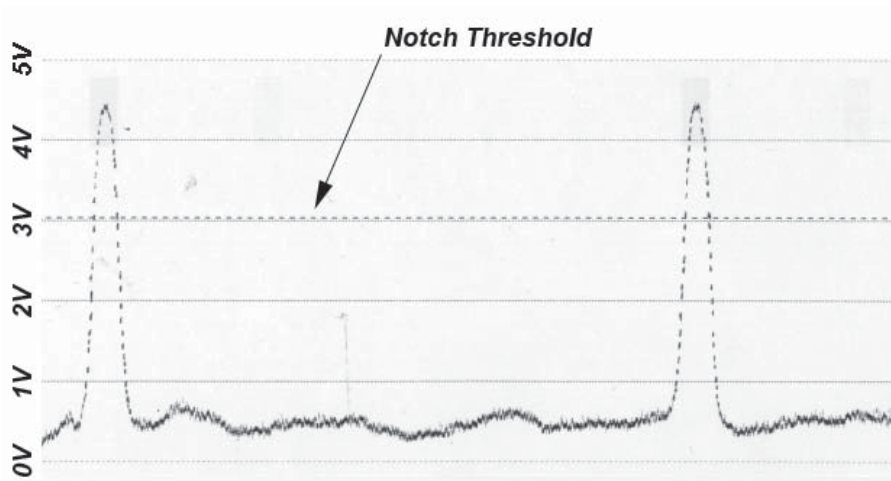
(Fig.B.1)

The graphic shows the references in Volts (from 0 to 5V) and the threshold value previously set. It is clear that by adjusting the threshold value it is possible to find the best position that takes into account the signal peak and the small oscillations around zero.

The ALIGNMENT POINT is defined as the position inside the ticket that is the desired alignment point. The ALIGNMENT POINT can be defined over the notch or near this one; for this reason, the final parameters to be set in setup are:

      Notch Dist. [mm x 10] . : 1
      Notch Dist. [mm x 1] .   : 5

These parameters define the "Notch Distance" that represents the distance from the notch to alignent; in the above example the notch distance is 15 mm.
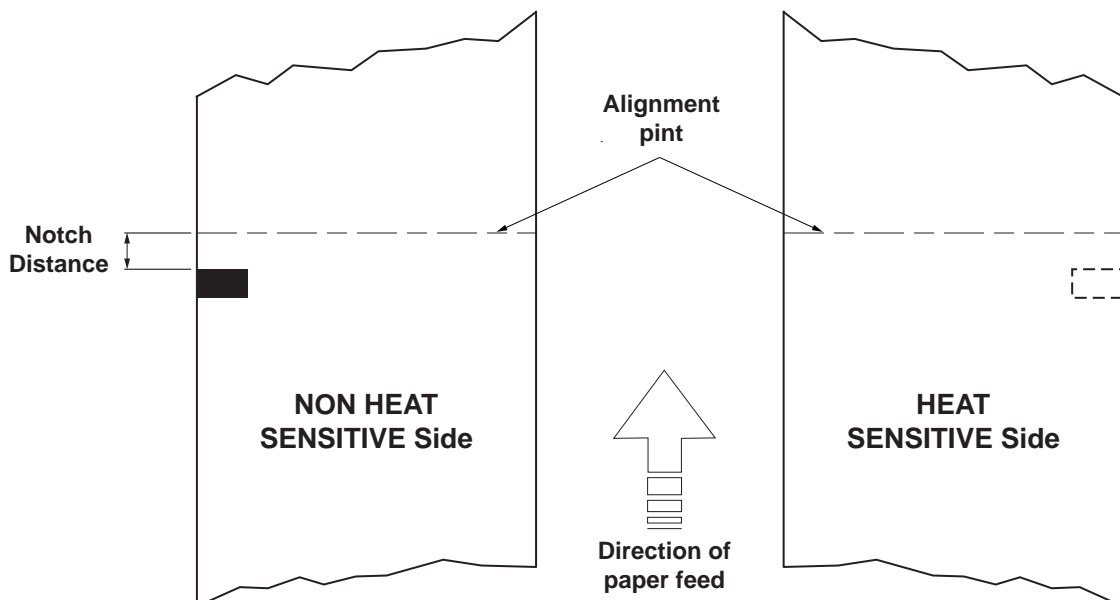
(Fig.B.2)

Figure B2 shows how the *"Notch Distance"* parameter represents the distance that exists between the notch and the desired alignment point. This parameter can have a minimum value of 0mm (in this case the alignments occur in proximity of the beginning of the notch) and a maximum of 32 mm. In reality the maximum distance corresponds to the mechanical distance between the notch sensor and the head, and it is for this reason that higher values are not permitted, and negative values are not envisaged.

B.2 COMMANDS

B.2.1 Ticket Alignment.

Two alignment commands are available: $1D **$F6** and $1D **$F8**.
The command $1D **$F6** performs an alignment to the print head: the paper is fed through until the print head is at the first available alignment point.
The command $1D **$F8** on the other hand refers to the cutter: the paper is fed through until the cutter is at the set alignment point, so that a subsequent cut will occur precisely at the alignment point.
Further explanations can be found in chapter 3 of this manual for command documentation.

B.2.2 Setting the alignment distance.

The "Notch Distance" parameter can be changed via the printer setup or by using the command $1D **$E7 nH nL**. For further information refer to the command itself.

B.2.3 Examples.

N.B.: To a better comprehension, in the following figures, the Notch is indicated on the same side of the printing text.

Example 1.

To print a ticket's sequence witch the cut is made over the notch it's necessary set the notch distance to zero as follows (this setting have effect after the ticket already in the printer):

{Set Notch Distance}
$1D,$E7,$00,$00,

{Print text}
'TICKET 1',$0A,'FIRST LINE',$0A,'SECOND LINE',$0A
{Cut alligment}
$1D, $F8,
{Cut}
ESC,'i',
...

{Print text}
'TICKET 1',$0A,'FIRST LINE',$0A,'SECOND LINE',$0A
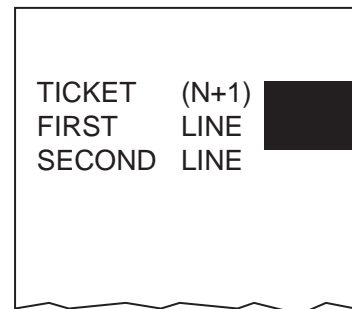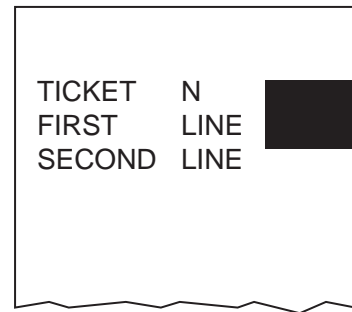*{Cut alligment}*
$1D,$F8,
{Cut}
ESC,'i',
...

```
TICKET     N
FIRST      LINE
SECOND     LINE
```

```
TICKET     (N+1)
FIRST      LINE
SECOND     LINE
```
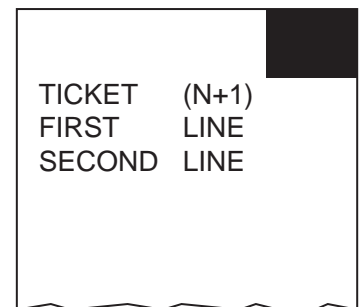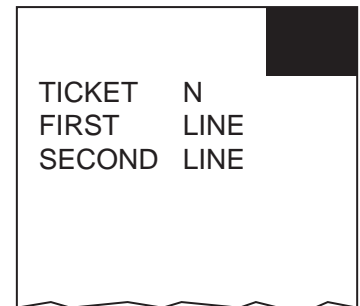
(Fig.B.3)

**Example 2**

To cut 10 mm before the notch the command sequence is (this setting have effect after the ticket already in the printer):

$1D, $E7, $00, $0A,

{Print text}
'TICKET 1',$0A,'FIRST LINE',$0A,'SECOND LINE',$0A
{Cut alligment}
$1D, $F8,
{Cut}
ESC,'i',
...

TICKET   N
FIRST   LINE
SECOND   LINE

{Print text}
'TICKET 1',$0A,'FIRST LINE',$0A,'SECOND LINE',$0A
{Cut alligment}
$1D,$F8,
{Cut}
ESC,'i',
...

TICKET   (N+1)
FIRST   LINE
SECOND   LINE
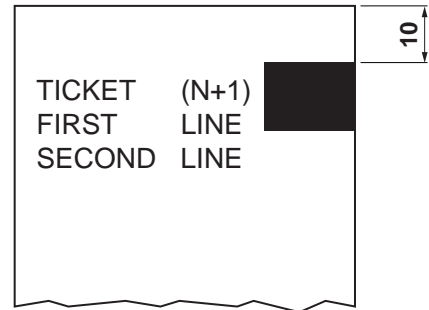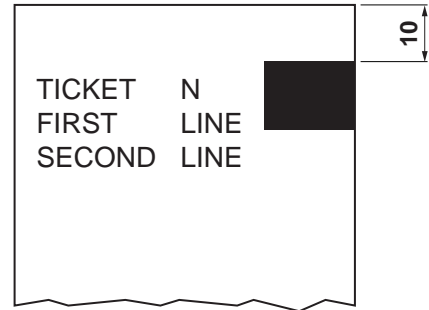
(Fig.B.4)

Example 3.

To print over the notch the command sequence is (this setting have effect after the ticket already in the printer):

{Set Notch Distance}
$1D,$E7,$00,$00,
{Print text}
'TICKET 1',$0A,'FIRST LINE',$0A,'SECOND LINE',$0A
{Cut}
ESC,'i'
...

TICKET   N
FIRST   LINE
SECOND   LINE

{Set Notch Distance}
$1D,$E7,$00,$00,
{Print text}
'TICKET 1',$0A,'FIRST LINE',$0A,'SECOND LINE',$0A
{Cut}
ESC,'i',
...

TICKET   (N+1)
FIRST   LINE
SECOND   LINE

(Fig.B.5)

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Example 4.

To print 15 mm before the notch the command sequence is (this setting have effect after the ticket already in the printer):

{Set Notch Distance}
$1D,$E7,$00,$00,

{Print text}
'TICKET 1',$0A,'FIRST LINE',$0A,'SECOND LINE',$0A
{Cut alligment}
$1D, $F8,
{Cut}
ESC,'i',
...

{Print text}
'TICKET 1',$0A,'FIRST LINE',$0A,'SECOND LINE',$0A
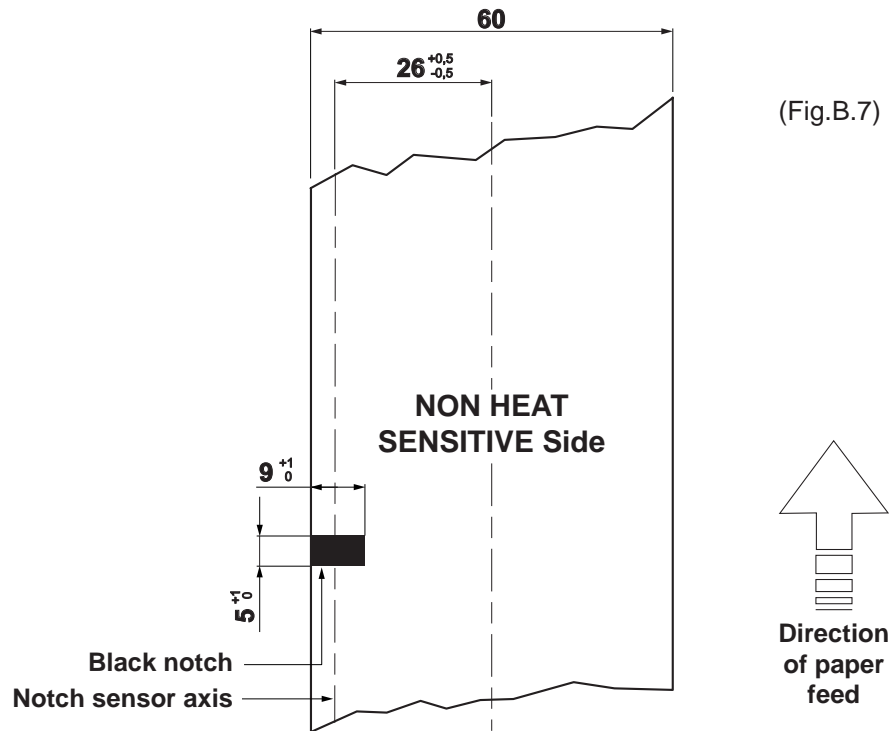*{Cut alligment}*
$1D,$F8,
{Cut}
ESC,'i',

TICKET	N
FIRST	LINE
SECOND	LINE

15

TICKET	(N+1)
FIRST	LINE
SECOND	LINE

15
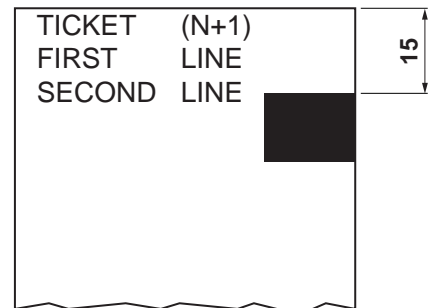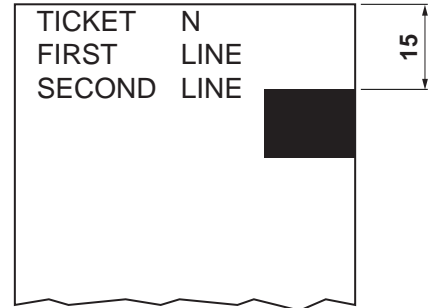
(Fig.B.6)

B.3 CHARACTERISTICS OF THE PAPER.

B.3.1 Dimensions and position of the notch.

The notch must be positioned on the non-heat sensitive side of the paper as shown in figures B.3, B.4, B.5 and B.6, showing some fac-similes of paper with alignment notch depending on the width of the paper used.
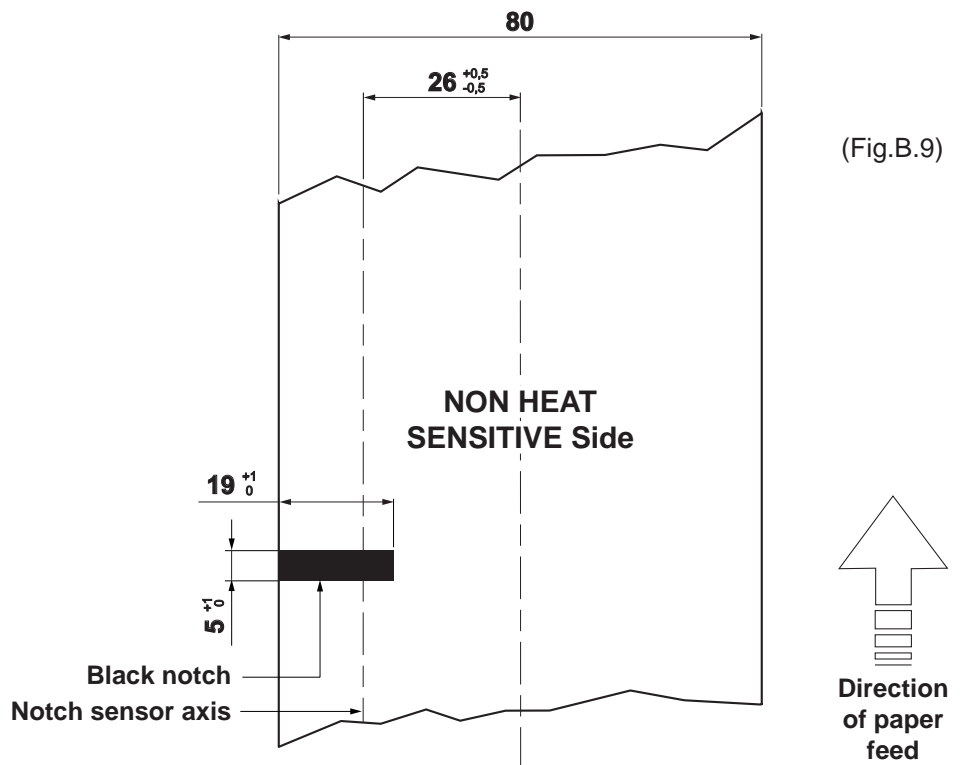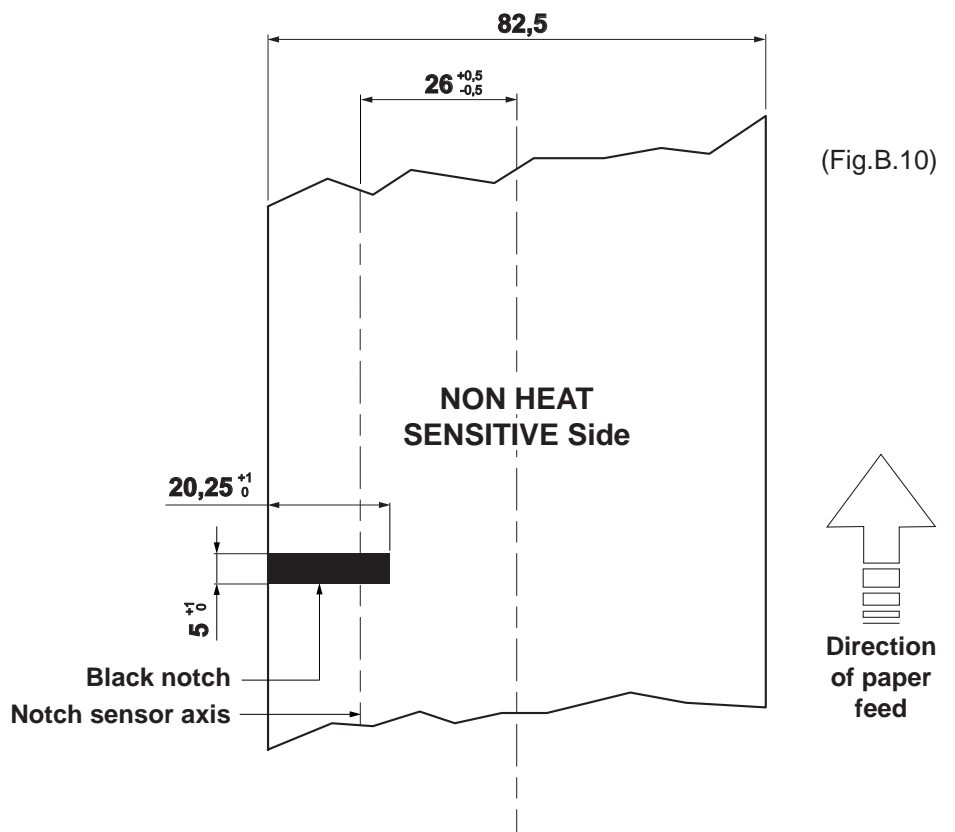
Notch on 60mm paper

(Fig.B.7)

Notch on 76 mm paper

(Fig.B.8)

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80

26 $^{+0,5}_{-0,5}$

(Fig.B.9)

Notch on 80 mm paper

**NON HEAT
SENSITIVE Side**

19 $^{+1}_{0}$

5 $^{+1}_{0}$

Black notch

Notch sensor axis

**Direction
of paper
feed**

82,5

26 $^{+0,5}_{-0,5}$

(Fig.B.10)

Notch on 82,5 mm paper

**NON HEAT
SENSITIVE Side**

20,25 $^{+1}_{0}$

5 $^{+1}_{0}$

Black notch

Notch sensor axis

**Direction
of paper
feed**
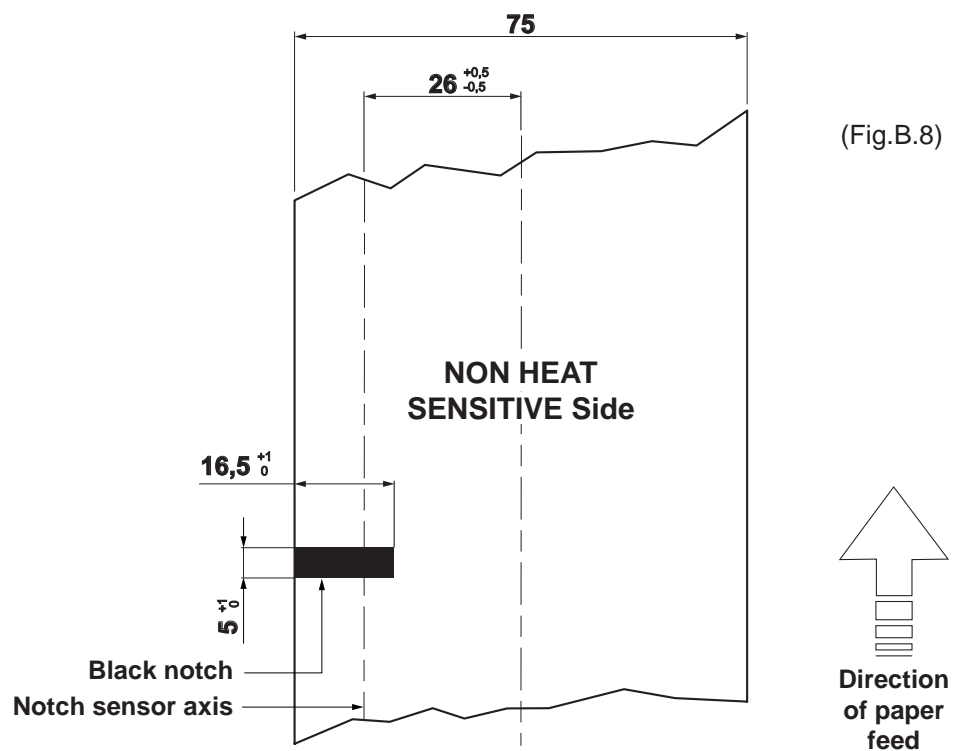
B.3.2 Position of sensors

Figure B.11 shows a section of the printer and the distances between the head, the cutter and the notch sensor.
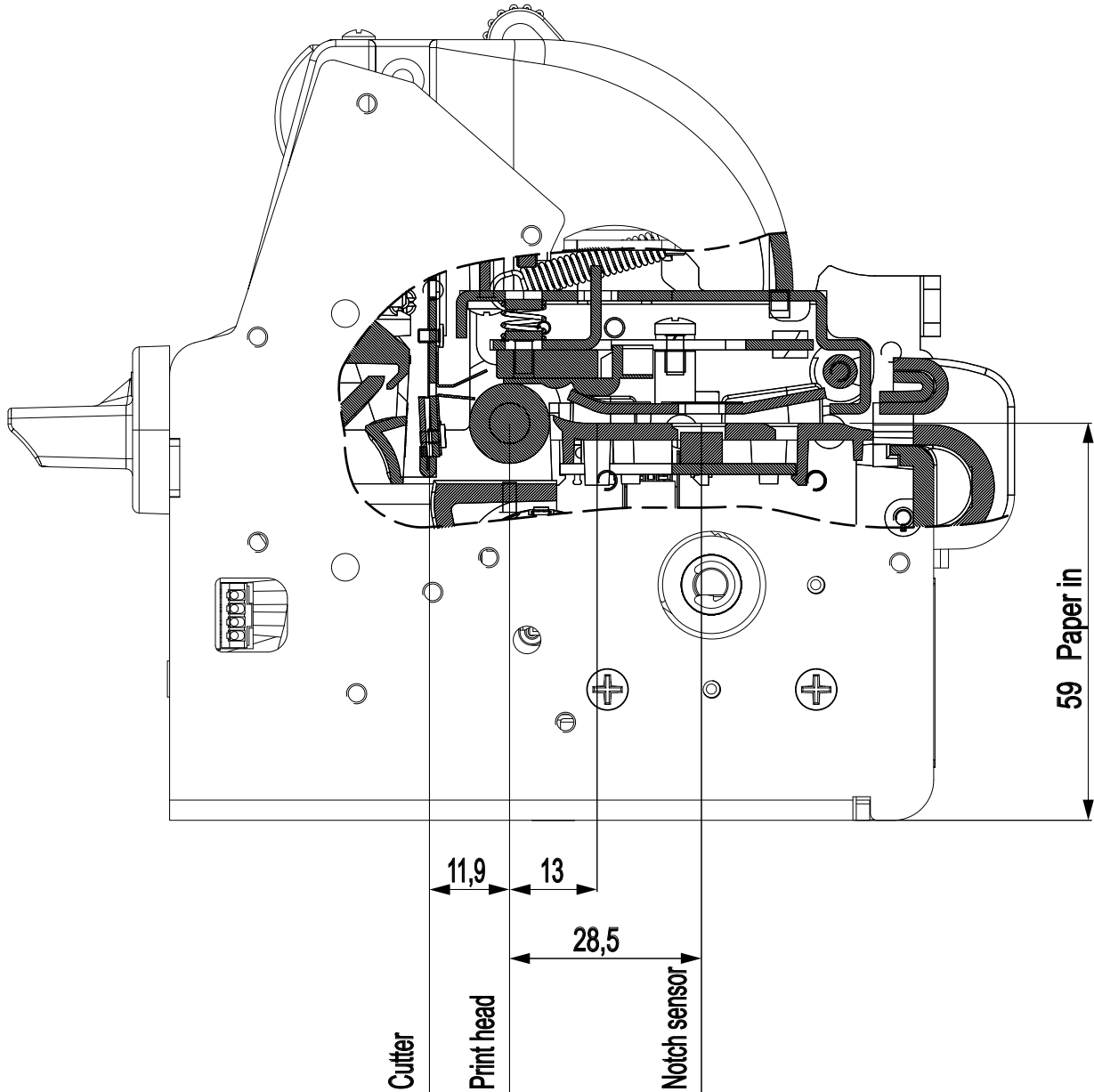
(Fig.B.11)

Figure B.11 clearly shows why the alignment distance (Notch Distance) cannot exceed the notch sensor-head distance. The moment that the notch sensor detects a notch, the head is already mechanically positioned 32 mm upstream of the of the notch in order therefore for it to align itself with this notch, as a reference the paper can only be fed forward, and so reduce the distance already there.

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B.3.3 Dimension of tickets

It is very important to well calibrate the height of the printer area, according to the distance between the two edges of the notch.

In order not to miss a notch (a ticket must therefore contain only one notch) the following equation must be used:

INTER-NOTCH DISTANCE>PRINTED AREA HEIGHT + NON-PRINTABLE AREA

where

INTER-NOTCH DISTANCE = the distance between two notch edges
NON-PRINTABLE AREA = cutter-head distance

The picture in figure B.12 shows a sequence of printed tickets aligning each one at the cut. It can be noted that increasing the printed area will result in superimposing what is to be printed at the subsequent notch. The size of the print area can be enlarged until it renders the alignment feed void, but not beyond. It is very important never to forget about the non-printable area that corresponds to the cutter-head distance and is the result of every cut.

LEGEND:
A = Alignment feed
H = Printing area height
B = Non printable area (CUTTER - PRINT HEAD)

PAPER IN THE PRINTER

TICKET PRODUCED

Direction of paper

Printing area

PRINT HEAD

CUTTER

A

H

A
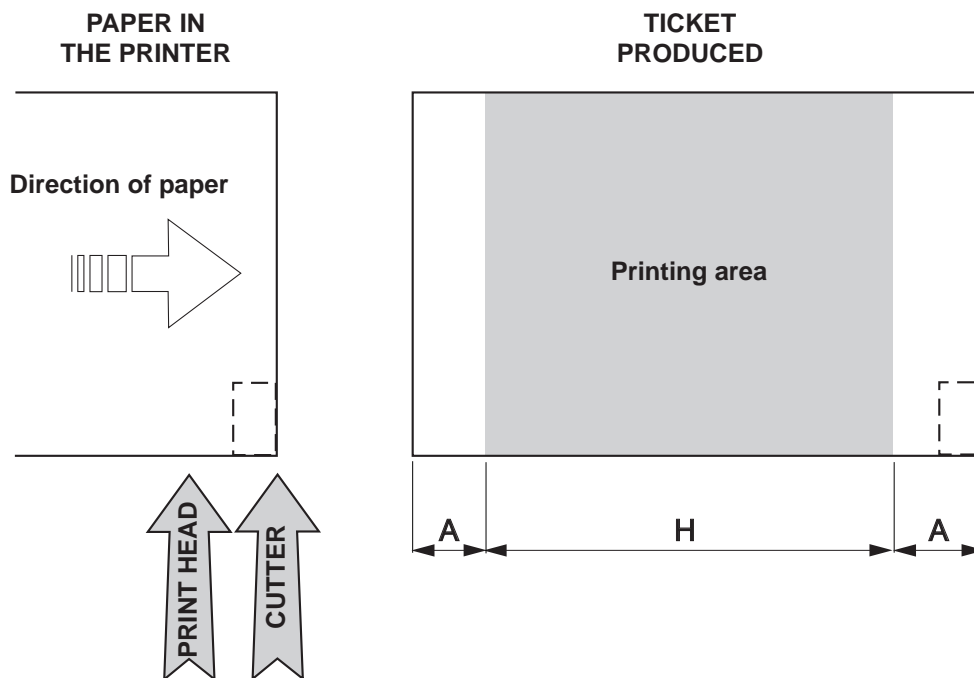
(Fig.B.12)

B.4 METHODS OF USAGE

B.4.1 Command sequences

It is possible, when printing sequences of tickets, to primarily identify two different methods of operation that involve the alignment: ticket aligned at the cut and ticket aligned at printing.
Another very important aspect to bear in mind is the condition from which printing commences. In figure B.12, that shows a ticket aligned at the cut, it can be seen how every time a ticket printing begins this originates from an alignment at the cut, and therefore the distance between the start of the print area and the alignment line is equal to the head-cutter distance. The same situation applies to an alignment at printing.

B.4.1.1 Alignment at the cut

The sequence of commands to be entered when wanting to align a ticket at the cut is as follows:

1.   Ticket general setting; formatting of characters, print density, margins etc.
2.   Print ticket: Printing of text, logos or any other graphics.
3.   Alignment at the cut command: $1D $F8
4.   Cut command

The result is shown in figure B.13.

(Fig.B.13)
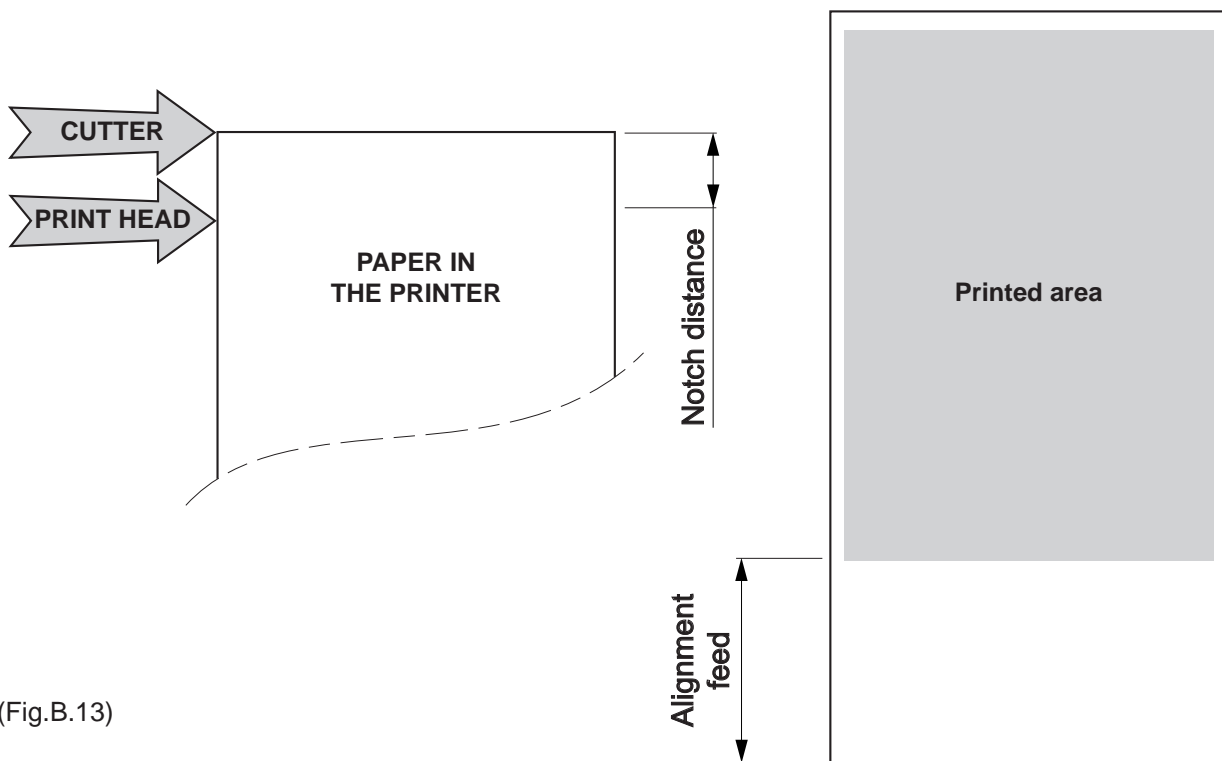
It is possible to see how the start of the ticket print area is not aligned, but the print starts in the rest position that the head took up at the moment the previous ticket was cut. At the end of the print area the printer has fed the paper through to align itself and perform the cut at the desired position.

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B.4.1.2 Alignment at printing

Alignment at printing requires the following sequence of commands:
1. Ticket general setting; formatting of characters, print density, margins etc.
2. Print alignment commands: $1D $F6
3. Print ticket: Printing of text, logos or any other graphics.
4. Cut commands

The result is shown in figure B.14.

Unlike the previous case, the alignment feed takes place before the start of printing, so as to align the print area in the position required.

(Fig.B.14)

UNI EN ISO 9001
CERTIFIED QUALITY
SYSTEM

TÜV
SÜD
ISO 9001
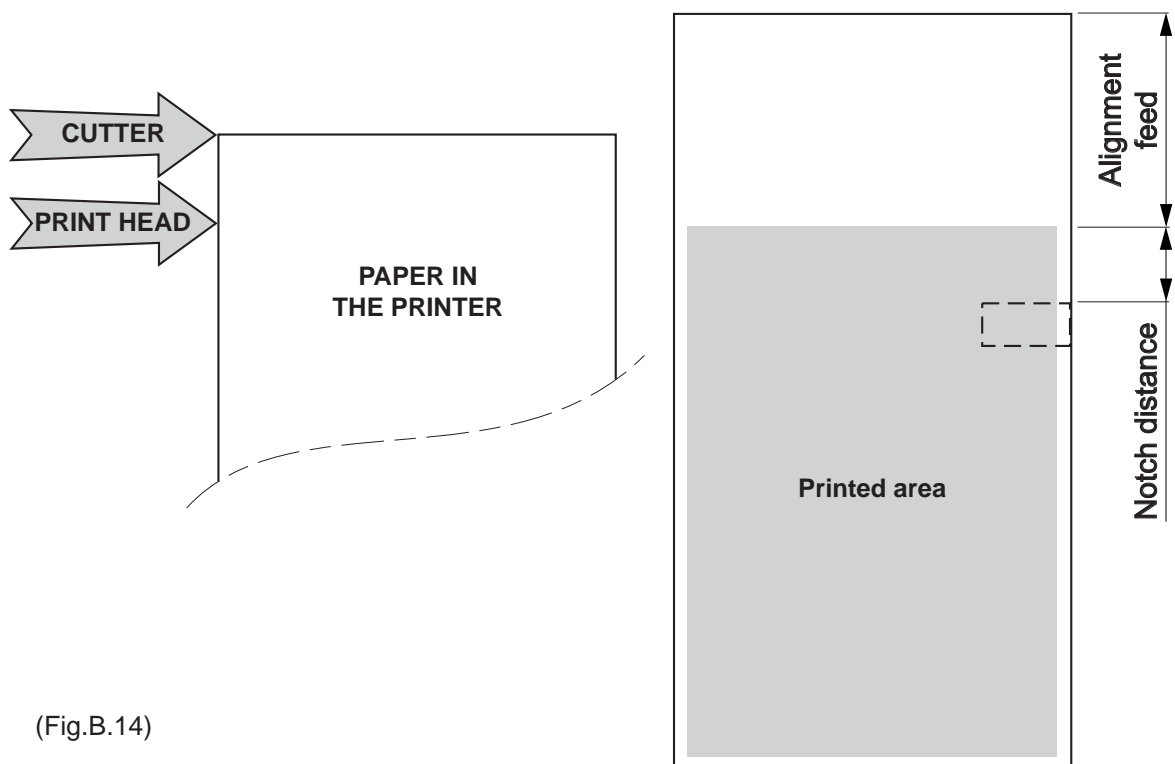
M . U . R . S . T .
Ministry University
Research Scientific
T e c h n o l o g y
Authorized laboratory
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