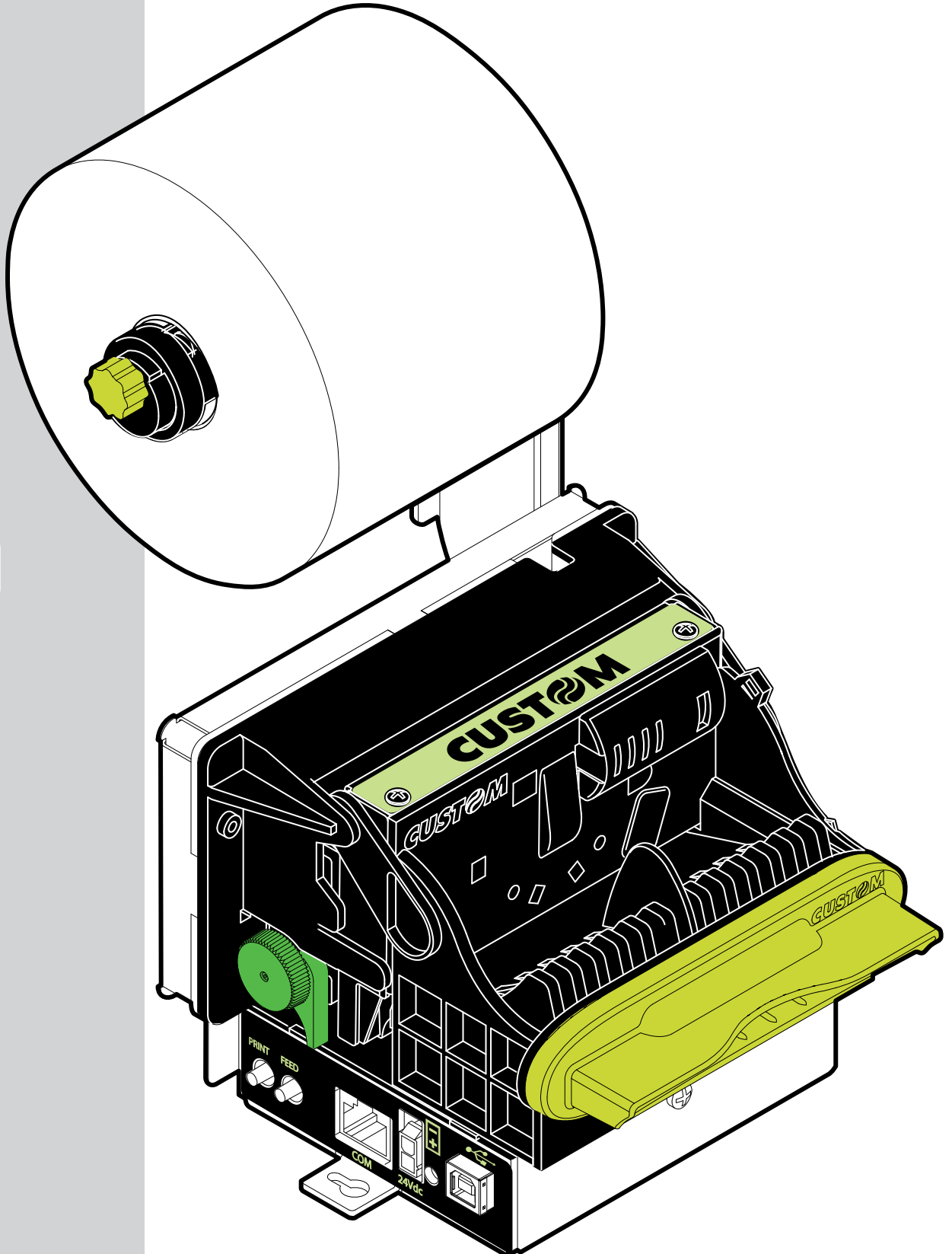


TG2480H

USER MANUAL



OEM

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[http: www.custom.it](http://www.custom.it)

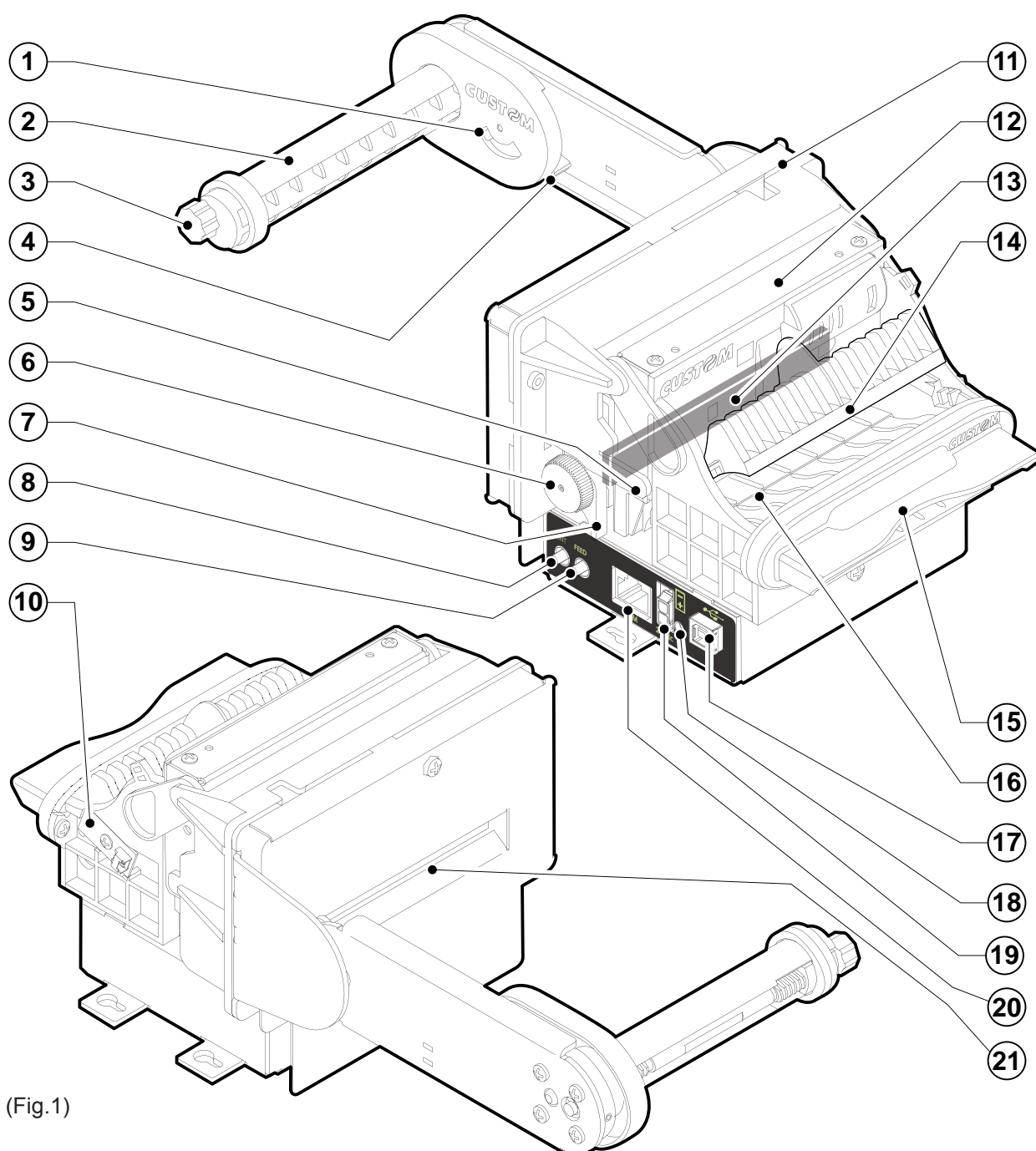
Customer Service Department:

Tel.: +39 059 88 69 587

Email: support@custom.it

PRINTER COMPONENTS

- | | | | |
|----|------------------------------------|----|------------------------------------|
| 1 | Near paper end sensor | 11 | Metal chassis |
| 2 | Paper roll holder support | 12 | Cutter group |
| 3 | Paper width adjustment | 13 | Print head |
| 4 | Near paper end sensor adjustment | 14 | Inspection door |
| 5 | Unblocking lever for cutter unit | 15 | Paper mouth |
| 6 | Rubbed roller manual feed | 16 | Ticket withdrawal sensor and notch |
| 7 | Unblocking lever for rubbed roller | 17 | USB interface connector |
| 8 | PRINT key | 18 | Status LED |
| 9 | FEED key | 19 | Power supply connector |
| 10 | Paper jam sensor | 20 | RS232 interface connector |
| | | 21 | Paper in |



(Fig.1)

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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 Technical Specifications of the printer
- Chapter 4: 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.

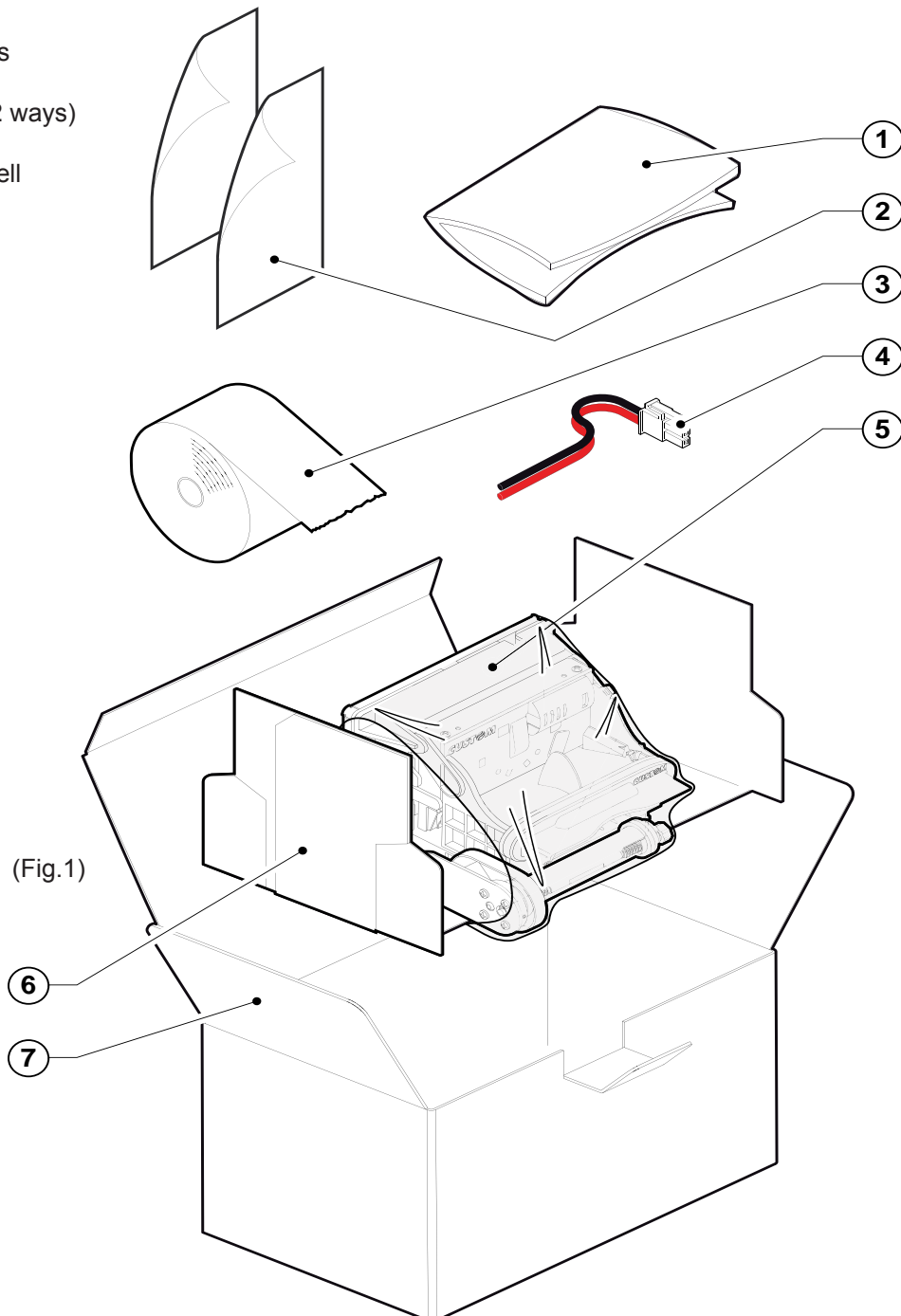
GENERAL SAFETY INFORMATION

- 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 adequate 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 manual 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. User manual
2. Installation instructions
3. Paper roll
4. Power supply cable (2 ways)
5. Printer
6. Protection packing shell
7. Box



- Open the printer packaging
- Take out the paper roll.
- Take out the user manual and the installation instructions.
- Take out the power supply cable.
- Lift the protection packing shell and take out the printer.
- Keep the box packing materials in the event the printer must be transported/shipped in the future

GENERAL FEATURES

Thermal printer for dispensing 80 mm tickets width, easy to install (3 fastening holes and ticket presentation to user incorporated). Thanks to the exclusive anti-paper-jam system, the ticket will always be promptly dispensed to the user. Thanks to an innovative type of paper roll holding bracket, it is possible to accommodate up to 73 metres of paper (max external Ø 80mm).

In addition to normal printing function, the printer offers a wide array of special features:

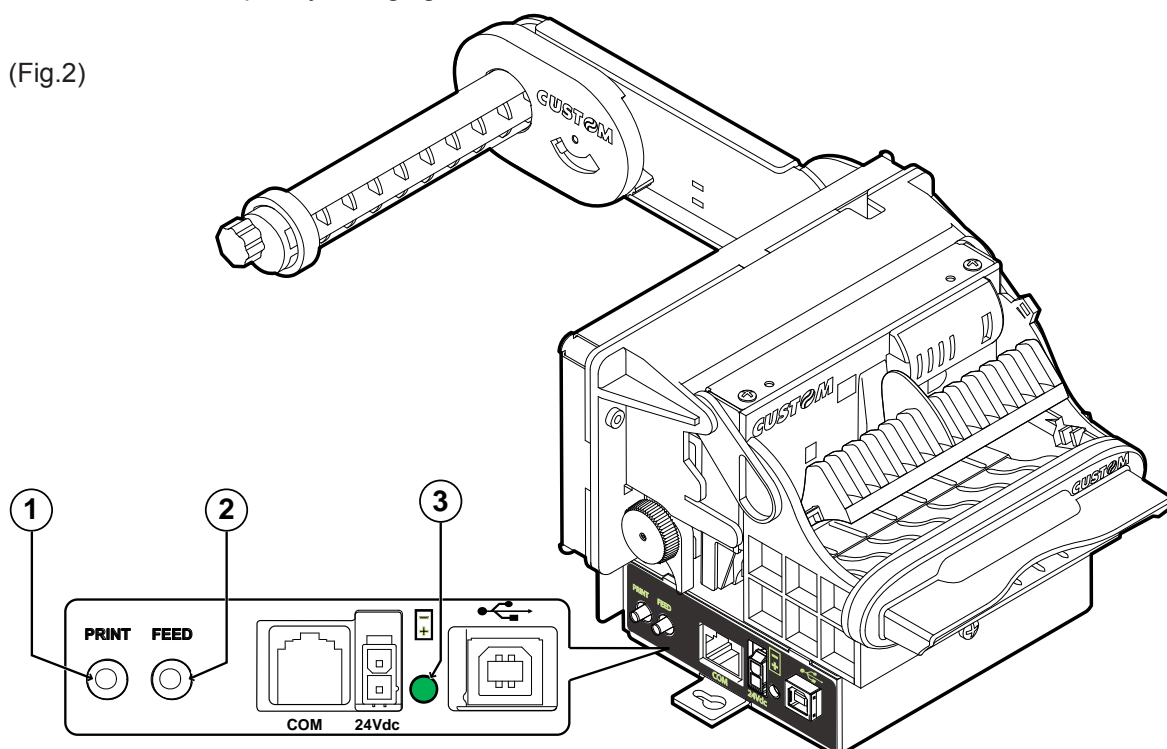
- Printing with extremely high graphic quality (resolution 204dpi).
- Autoload system.
- Integrated Auto-cutter.
- Paper dispense restriction device
- Accommodates paper thickness from 55 to 80 gr/m².
- Adjustable paper roll holder
- 24V power supply.
- USB and RS232 interfaces.
- Near paper end sensor, paper jam, ticket withdrawal sensor.

PRINTER DESCRIPTION

The printer has an ABS casing with paper roll holder and a rotating paper mouth unit which opens to allow access to print head. The control panel is located on the right side (see Fig.2) and has a PRINT key (1), a FEED key (2) and status LED (3).

- PRINT key
When the PRINT key is pressed, the printer perform a demo ticket with pre-set length.
- FEED key
When the FEED key is pressed, the printer advances the paper. During power-up, if the FEED key is held down, the printer prints the SETUP report. During the SETUP mode, holding down the FEED key for a short period it's possible to change the parameters value; pressing the FEED key for a long period it's possible to pass to the next parameter till the end of the SETUP.
- FEED+PRINT key
After printer on, when the FEED key is pressed and then the PRINT key is pressed, the printer will perform the FONT TEST routine.
- STATUS LED
STATUS LED displays printer hardware status. In case of malfunction, flash frequency changing as follows:

(Fig.2)



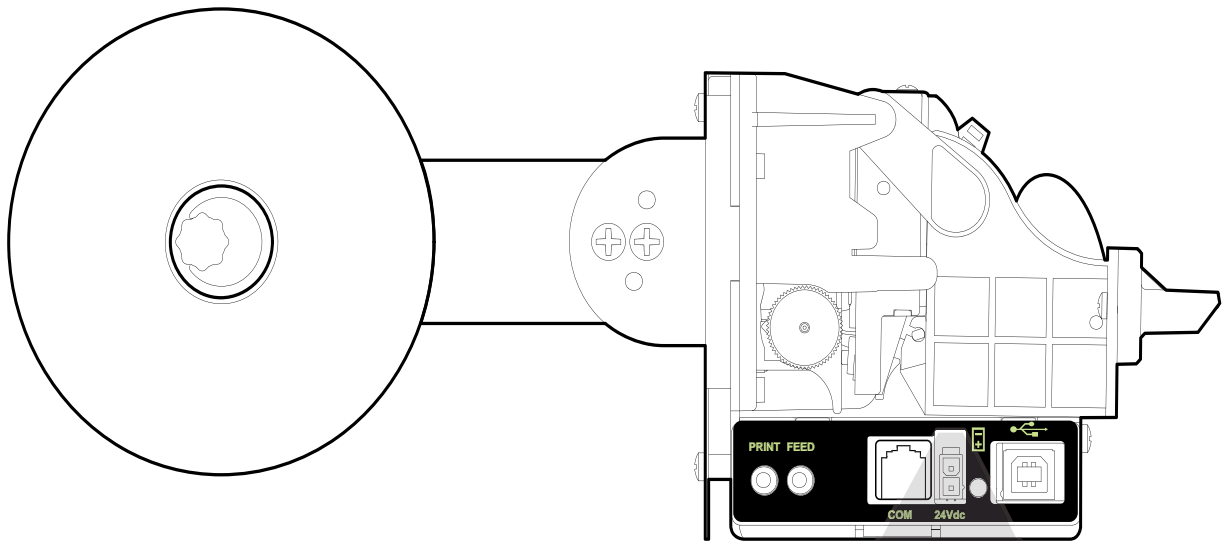
(Tab.1)

STATUS LED	COLOUR	DESCRIPTION	
Turned ON	GREEN	Printer ON: no error	
Flashing	GREEN	Recovering error	
		Nr. flashings	Description
		1	Receive data
		2	Heading over temperature
		3	Paper end
		4	Power supply voltage incorrect
		5	Reception errors (parity, frame error, overrun error)
		6	Command not recognized
		7	Command reception time out
		8	Rotating cover open
		9	Paper jam
		10	Near paper end
		Unrecovering error	
		11	Cutter error

1.1 CONNECTIONS

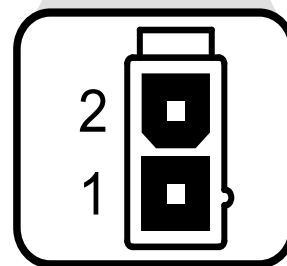
1.1.1 Power Supply

(Fig.1.1)



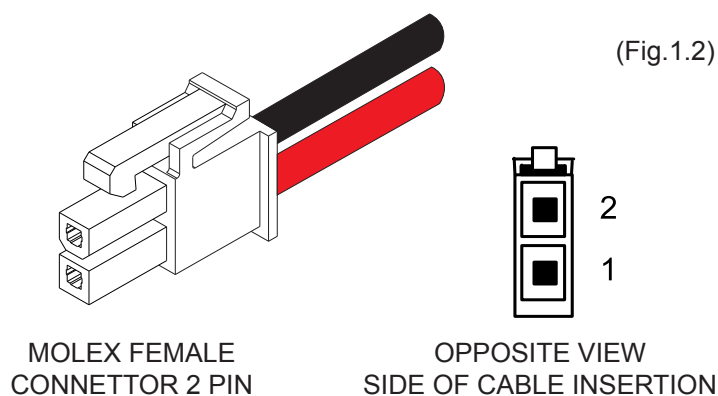
The printer is equipped with a 2 pin male molex connector series 5569 (Vertical), for the power supply (see Fig. 1.1). The connector pin configuration is as follows:

PIN	COLOUR	SIGNAL	DESCRIPTION
1	RED	+24 V	Power supply
2	BLACK	GND	Ground signal



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

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



(Fig.1.2)



WARNING:
Respect power supply polarity.

1. INSTALLATION AND USE

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 **HEAD VOLTAGE** is given the voltage of the head.
- Under **HEAD TEMPERATURE** is given the temperature of the head.
- Under **CUT COUNTER** is given the number of cuts made.
- Under **POWER ON COUNTER** is given the number of power-ups made.
- Under **PAPER PRINTED** is given the number of centimeters of paper printed.

(Fig.1.3)

PRINTER SETUP	
HEAD VOLTAGE [V]	= 24,07
HEAD TEMPERATURE [°C]	= 29
CUT COUNTER	= 1
POWER ON COUNTER	= 4
PAPER PRINTED [cm]	= 40
Baud Rate	115200 bps
Data Length	8 bits/chr
Parity	None
Handshaking	Hardware
Busy Condition ⁽¹⁾	RxFull
Autofeed	CR Disabled
USB Address Number	0
Print Mode	Normal
Code Table	PC437
Chars / inch	A=11 B=15 cpi
Speed / Quality	Normal
Print Width	76 mm
Notch Alignment	Disabled
Notch Threshold ⁽²⁾	1.75V
Notch Distance [mm] ⁽²⁾	+10.0
Print Density	0%
[Feed PUSH]	Enter setup
[Feed FAST PUSH]	Skip setup

1.3 CONFIGURATION

The printer enables the configuration of the printer default parameters pressing both the PRINT and the FEED keys during the printer power up. The parameters affected during configuration are:

- **Baud Rate:** 115200, 57600, 38400, 19200 ^D, 9600, 4800, 2400, 1200.
- **Data length:** 7, 8 ^D bits/car.
- **Parity:** None ^D, even or odd.
- **Handshaking:** XON/XOFF ^D or Hardware.
- **Busy Condition ⁽¹⁾:** RxFull ^D, OffLine/RxFull.

- **Autofeed:** CR disabled^D or CR enabled.
- **USB Address :** 0^D, 1, 2, 3, 4, 5, 6, 7, 8, 9.
- **Print mode:** Normal^D or Reverse.
- **Code Table:** PC437^D, PC850, PC860, PC863, PC865, PC858, PC866.
- **Chars / inch:** A=11 B=15cpi^D, A=15 B=20cpi.
- **Speed/Quality:** Normal^D, Low.
- **Print Width:** 54 mm, 56 mm, 58 mm, 60 mm, 62 mm, 64 mm, 66 mm, 68 mm, 70 mm, 72 mm, 74 mm, 76 mm^D, 78 mm, 80 mm.
- **Notch Alignment:** Disabled^D, Enabled.
- **Notch Threshold** ⁽²⁾: 0.75V, 1.00V, 1.25V^D, 1.50V, 1.75V, 2.00V, 2.25V, 2.50V, 2.75V.
- **Notch Distance [mm x 10]** ^{(2) (3)}: 0^D, 1.
- **Notch Distance [mm x 1]** ^{(2) (3)}: 0^D, 1, 2.
- **Notch Distance [mm x .1]** ^{(2) (3)}: 0^D, 1, 2, 3, 4, 5, 6, 7, 8, 9.
- **Print density:** -50%, -37%, -25%, -12%, 0%^D, +12%, +25%, +37%, +50%.


General notes:

The parameters marked with the symbol ^D are the default values. Settings remain active even after the printer has been turned off.

NOTE:

⁽¹⁾: 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.

⁽²⁾: If the "Notch Alignment" parameter is disabled this parameter is not displayed in the "Printer Setup".

⁽³⁾: The "Notch distance" parameter represents the distance in mm from the upper margin of the ticket to the black mark on the ticket. For example, to set notch distance to 11 mm, modify the following parameters in order to obtain the desired values as indicated :

Notch Dist. [mm x 10]	: 1
Notch Dist. [mm x 1]	: 1
Notch Dist. [mm x .1]	: 0

The settings made are saved on the EEPROM (non volatile memory).

During the setup routine the printer prints out the setup report and will remain in standby until another key is pressed or characters are received through the printer communication port. After this, each time the PRINT key is pressed, the parameter is modified and its current value is printed. Once the required value has been obtained, press the FEED key to proceed to the next parameter, and so on. Once all the parameters have been run through, the printing of a message signals the end of the setting procedure.

1.4 HEXADECIMAL DUMP

(Fig.1.4)

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 (see Fig.1.4).

Once the autotest routine has finished, the printer enters Hexadecimal Dump mode. The scanner remains in standby until a key is pressed or characters are received from the communications port; for every 8 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	
31 32 33 34 35 36 37 38	12345678
39 30 31 32 33 34 35 36	90123456
37 38 39 75 69 73 64 66	789uisdf
68 6B 6A 73 64 68 66 68	hkjsdhfh
73 64 66 6B 6A 68 73 64	sdfkjhsd
66 73 64 66 6B 68 6A 77	fsdfkhjw
65 69 6F 79 75 77 71 65	eiouywe
6F 72 69 75 77 65 72 69	oriuweri
6F 75 77 65 72 69 6F 75	ouweriou
77 65 72 69 6F 75 77 65	weriouwe
72 69 6F 75 77 65 72 68	riouwerh
6B 6C 73 64 66 68 6B 73	klcdfhks
64 66 6B 73 64 66 68 6A	dfksdfhj
73 64 66 6B 6A F2 73 64	sdfkj2sd
66 6B F2 6A 73 68 64 66	fk2jshdf
6A 6B 6C 68	jk1h

1.5 MAINTENANCE



WARNING

Make sure no water or other liquids seep inside the printer.



BEWARE

Before any type of work is done on the machine, disconnect the power supply cord from the mains outlet.



ATTENTION

Do not touch the head heating line with bare hands or metal objects. Do not perform any operation inside the printer immediately after printing because the head and motor tend to become very hot.

1.5.1 Open the printer

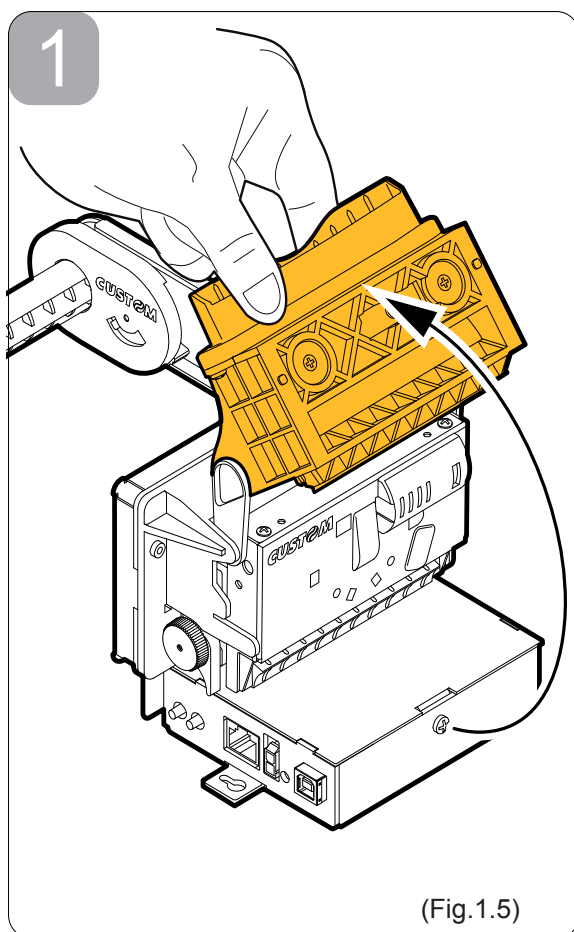
To open the printer proceed as follow:

- Rotate the paper mouth unit to the maximum opening position (see Fig.1.5); in this position the paper mouth unit stay opened.
- Widen the hooks that block the cutter unit and rotate the cutter unit up (see Fig.1.6).

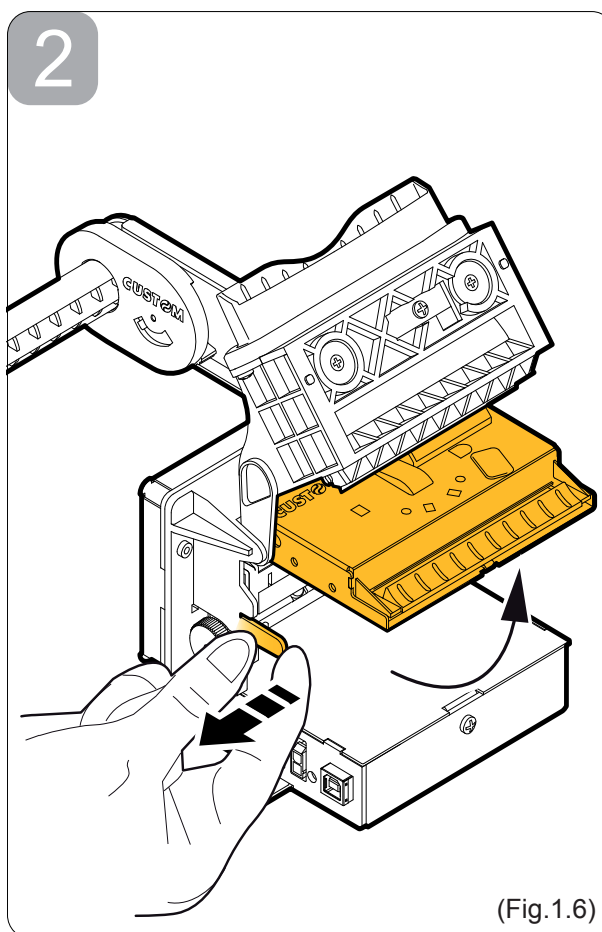


NOTE

After each maintenance operation is recommended to check and remove possible scraps of paper.



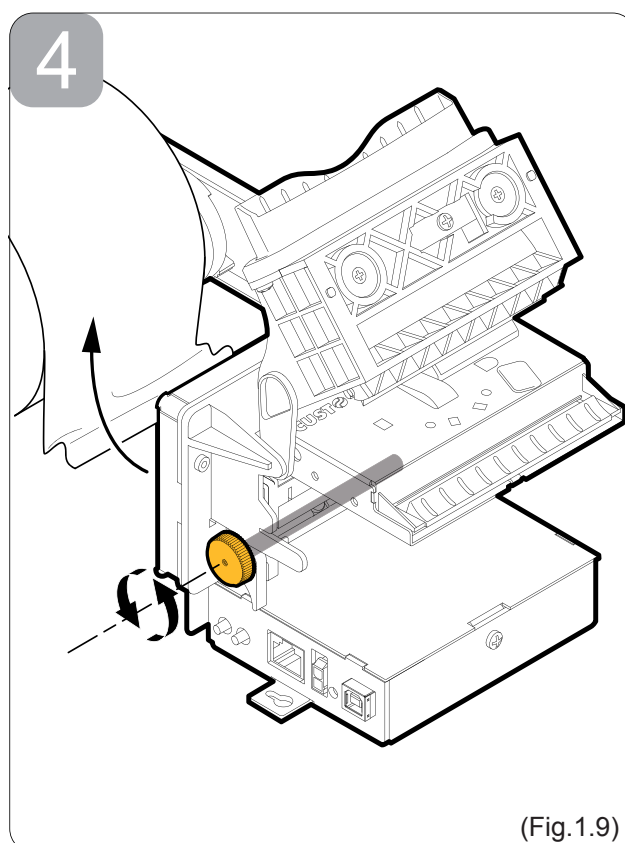
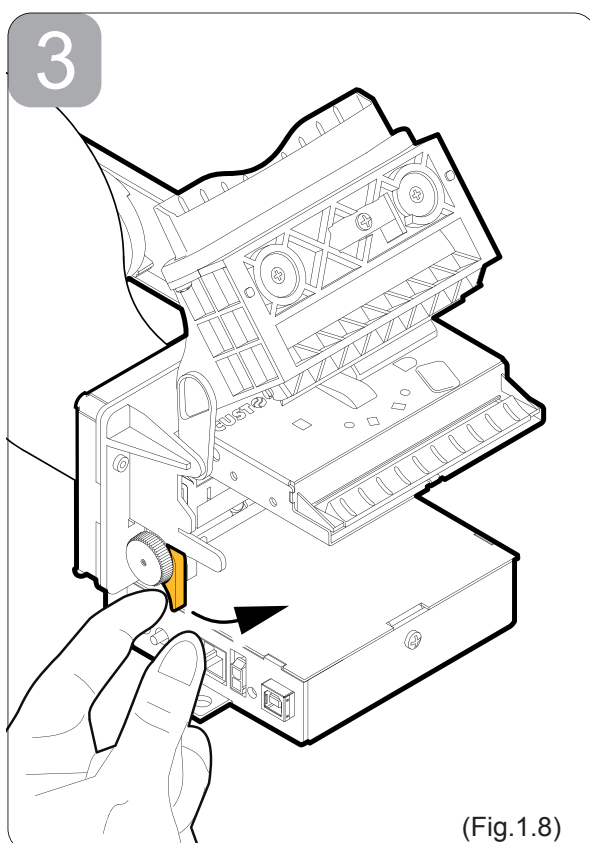
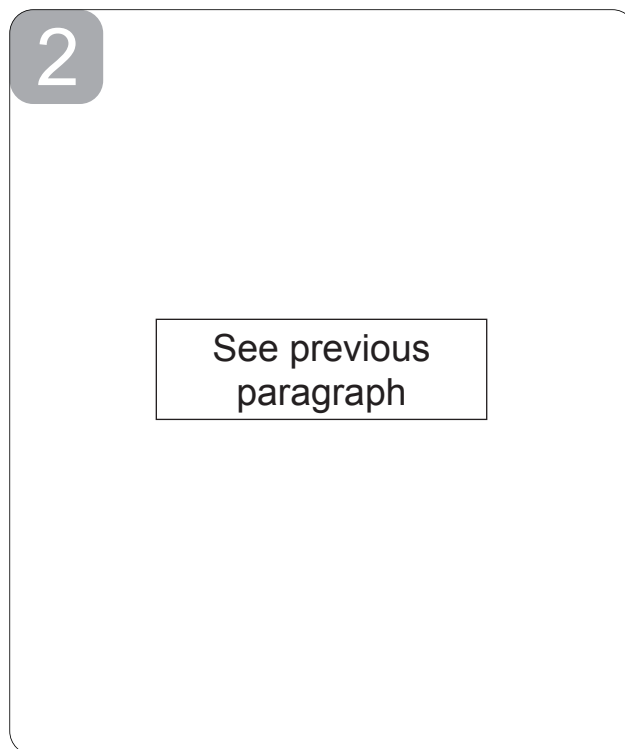
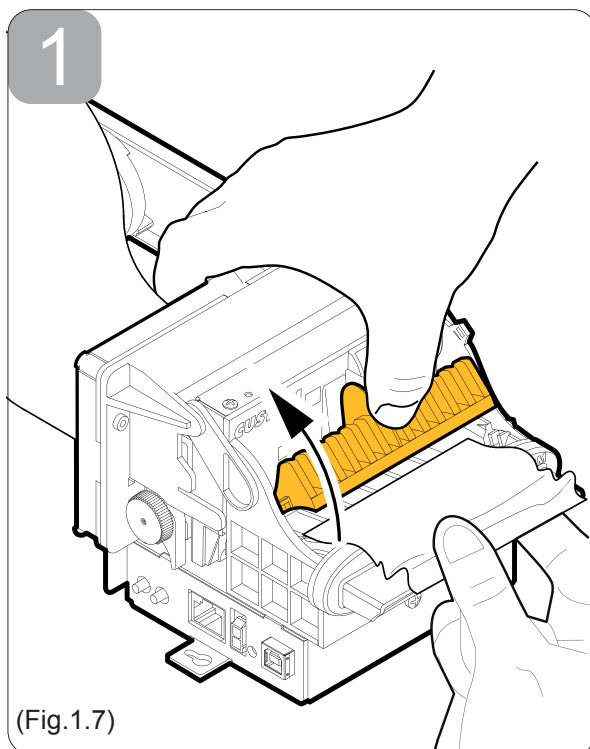
(Fig.1.5)



(Fig.1.6)

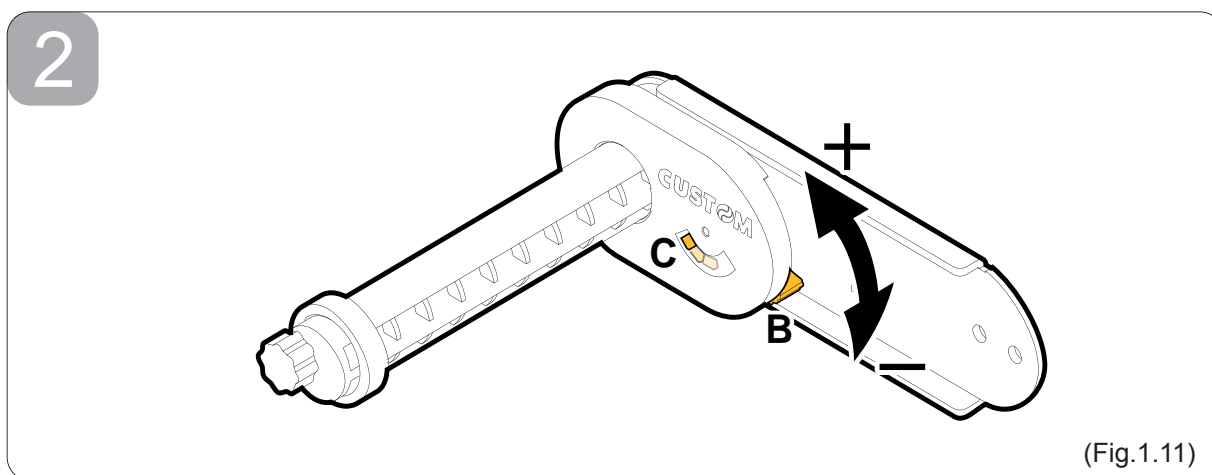
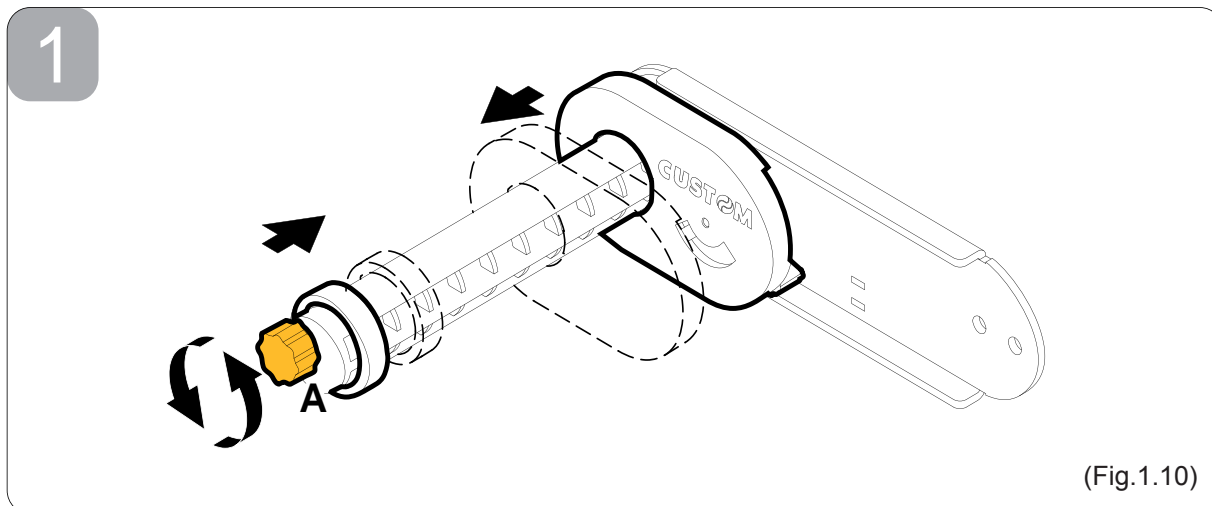
1.5.2 Paper jam

- Lift the inspection door and remove possible scraps of paper (see Fig.1.7).
- Open the printer (see previous paragraphs).
- Lift the unblocking lever for rubbed roller (see Fig.1.8).
- Rotate the rubbed roller clockwise to eject the paper (see Fig.1.9).



1.5.3 Adjustment for paper roll holder support

- Rotate the knob (A) to adjust the housing width for paper roll (see fig. A.10). So it is possible to use paper width less than 80 mm as needed.
- Rotate the lever (B) to adjust the sensor position for nearly paper end (C). Move the lever up to increase the reserve of paper, move the lever down to decrease the reserve of paper (see Fig. 1.11).



1.5.4 Positioning paper roll holder support

The paper roll holder support positioning isn't fixed but adjustable on 3 different positions (rear **P1**, lower **P2** and upper **P3**). To fastening the paper roll holder support proceed as follow:

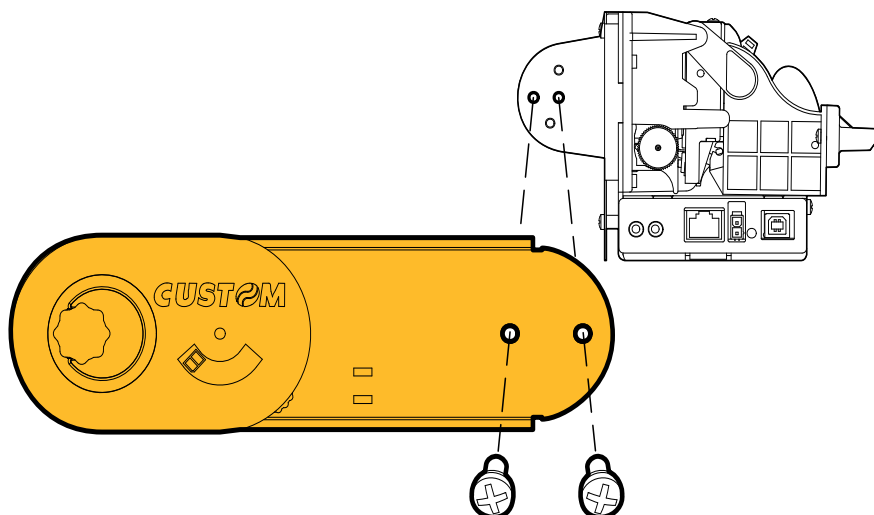
1. Bring up the paper roll holder support. Move it until the two holes coincide with the two holes on the printer body.
2. Fasten the paper roll holder support with the printer body by the two M4x6 fastening screws supplied.



WARNING

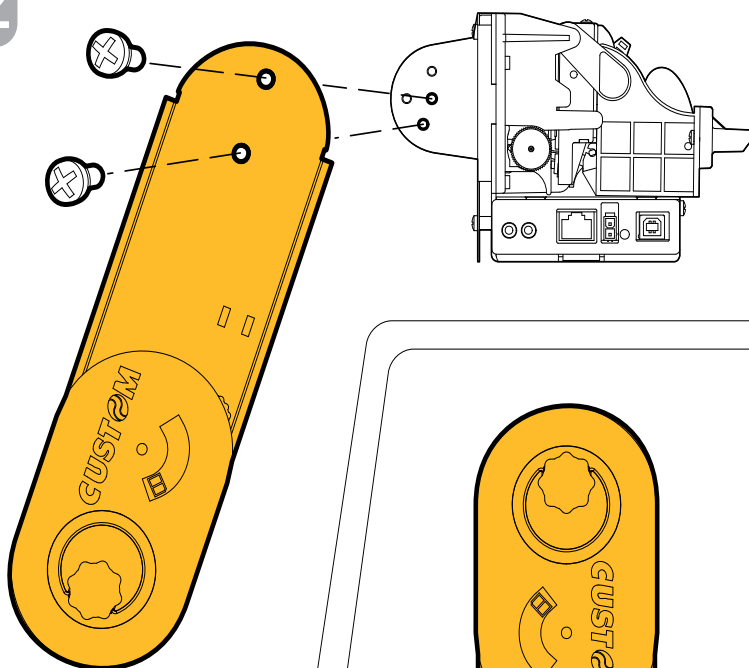
Before fastening the paper roll holder support check the cable path (near paper end sensor) is correct. Incorrect positions of the cable could cause damage on it.

P1



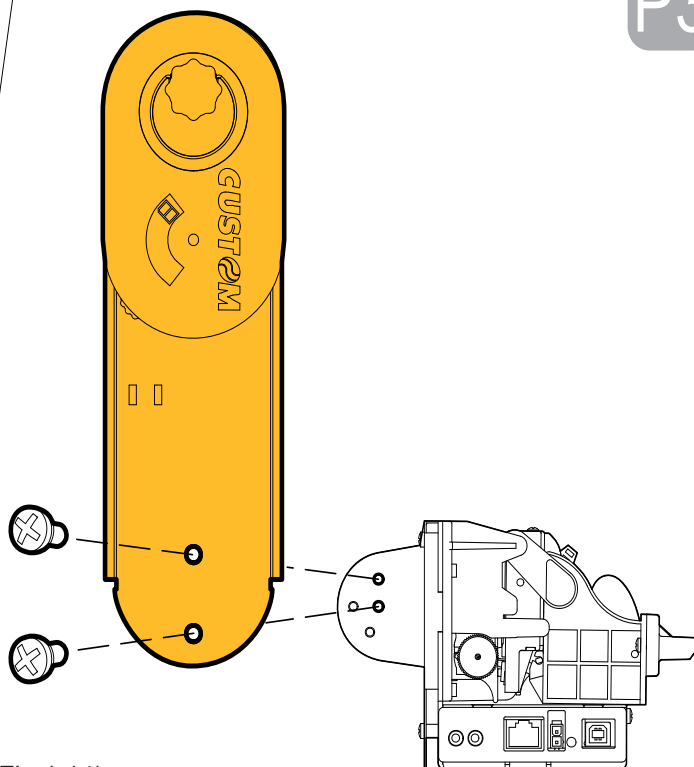
(Fig.1.12)

P2



(Fig.1.13)

P3



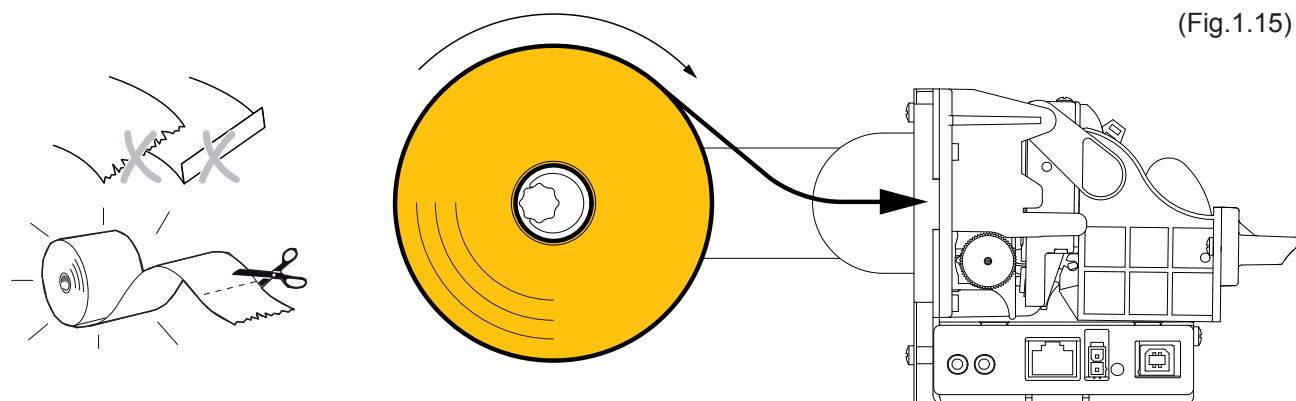
(Fig.1.14)

1. INSTALLATION AND USE

1.5.5 Replace paper roll

To replace the paper roll proceed as follow:

- Put the paper roll on the paper roll holder support.
- Insert the paper into the paper infeed opening so that it unrolls in the direction shown and wait for it to load automatically (see Fig.1.15);

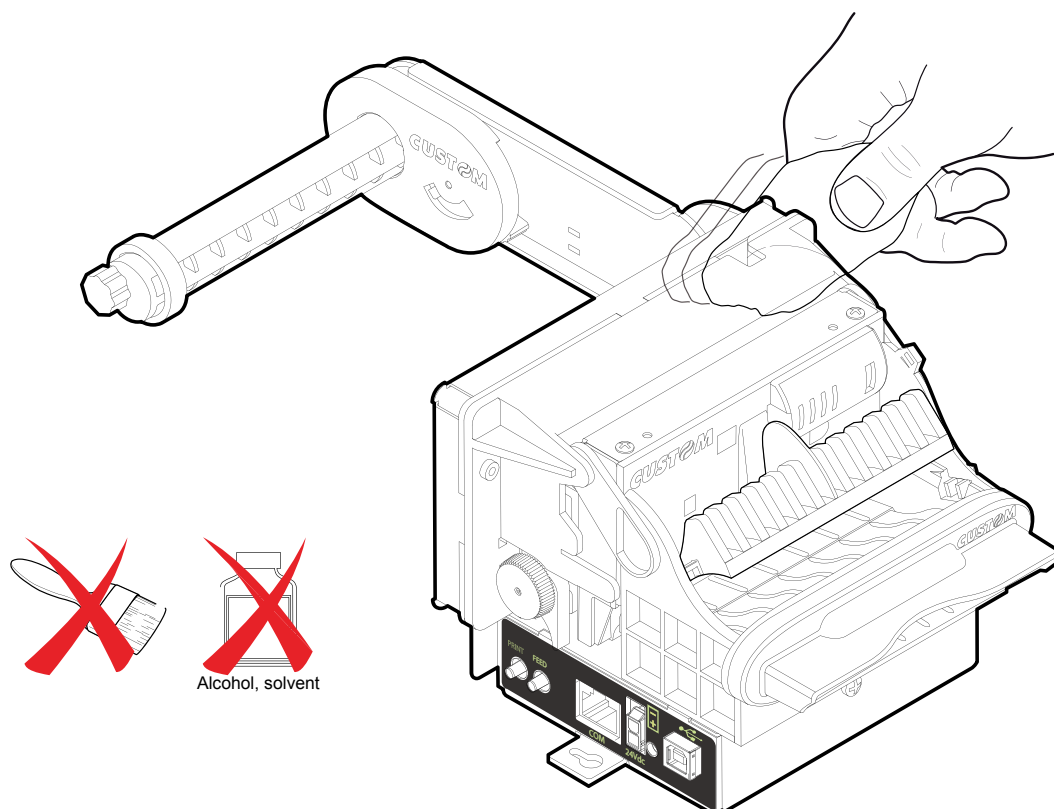


WARNING

Before inserting the paper, make sure the cut is straight.
Follow loading specifications (Fig.1.15)

1.5.6 Cleaning the printer case

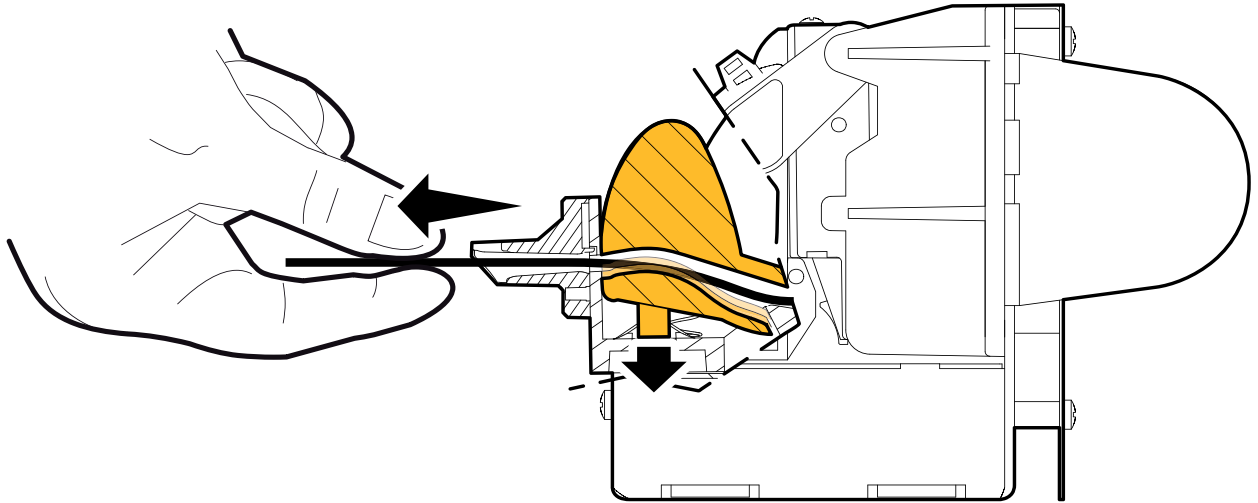
The user is responsible for cleaning the printer case. To clean the unit, use compressed air or a soft cloth. Do not use alcohol, solvents or stiff brushes.



1.6 TICKET WITHDRAWAL SENSOR

The printer is equipped with a paper dispense restriction device to prevent damage on the printing mechanism in case of ticket withdrawal before the printing is end. This device is composed of an oscillating plane under the inspection door, linked with a sensor.

When the user make a ticket withdrawal before the printing is end, the ticket stretch causing the lowering of the oscillating plane. Ticket printing immediately stops, and the printer perform the ticket cut.

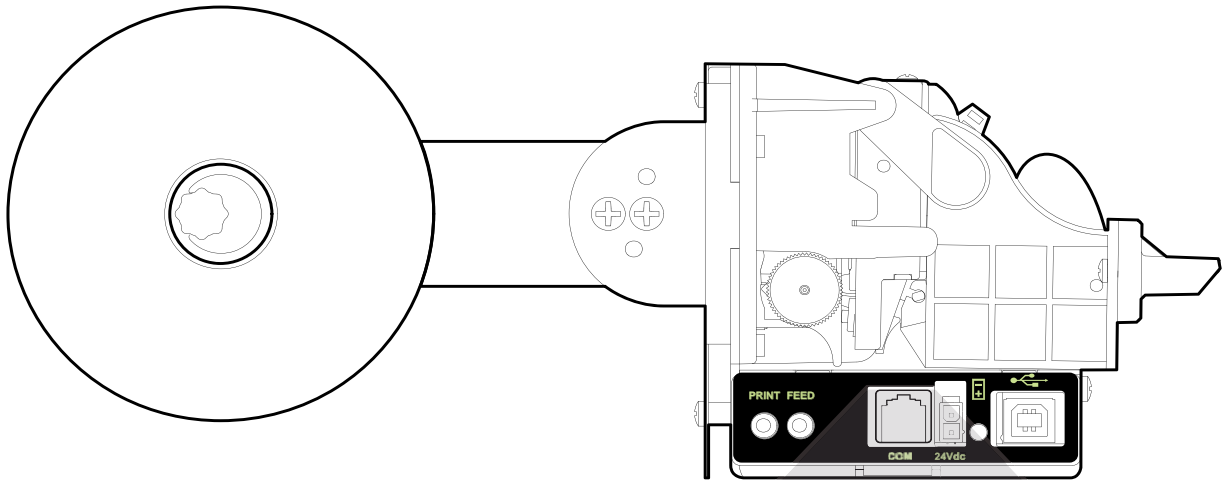


(Fig.1.17)

Blank page

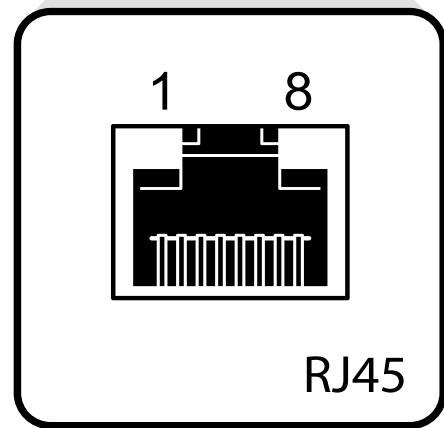
2.1 RS232 SERIAL INTERFACE

(Fig.2.1)



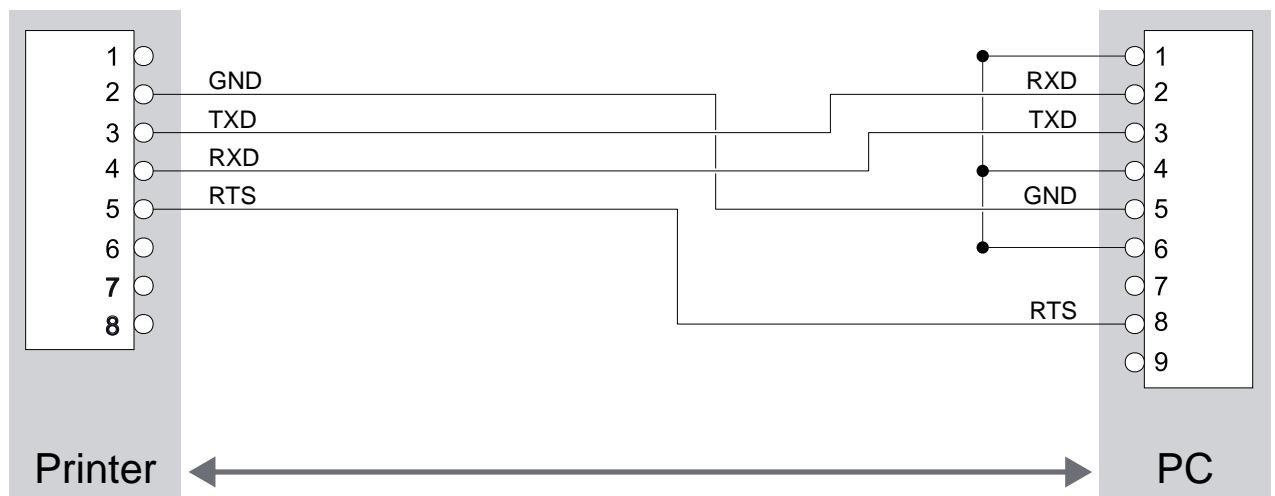
The printer with a serial RS232 interface has a female RJ45 connector. Refer to the table below for the connector pin signals:

PIN	SIGNAL	DESCRIPTION
1	N.C.	Not connected
2	GND	Ground signal
3	TXD	Data transmission
4	RXD	Data reception
5	RTS	Ready to send
6	N.C.	Not connected
7	N.C.	Not connected
8	N.C.	Not connected



The diagrams below show a sample connection between printer and PC using a 8 pin male RJ45 connector and a 9 pin female connector:

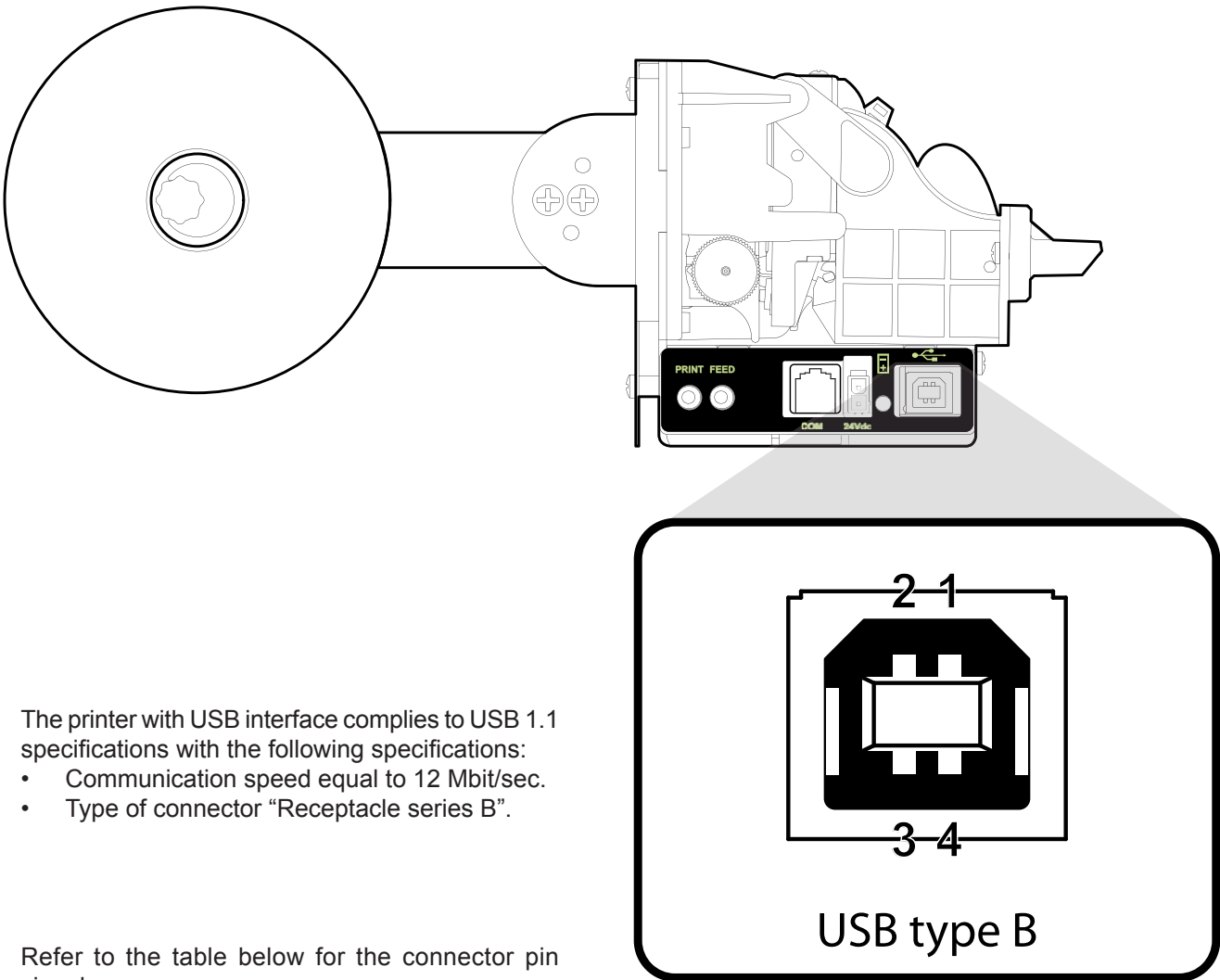
(Fig.2.2)



2. INTERFACES

2.2 USB INTERFACE

(Fig.2.3)



(Tab.2.1)

PIN	SIGNAL	DESCRIPTION
1	VBUS	N.C.
2	D-	Data -
3	D+	Data +
4	GND	Ground signal
Shell	Shield	Cable shielding

3.1 TECHNICAL SPECIFICATIONS

Table 3.1 gives the main technical specifications for the printer.

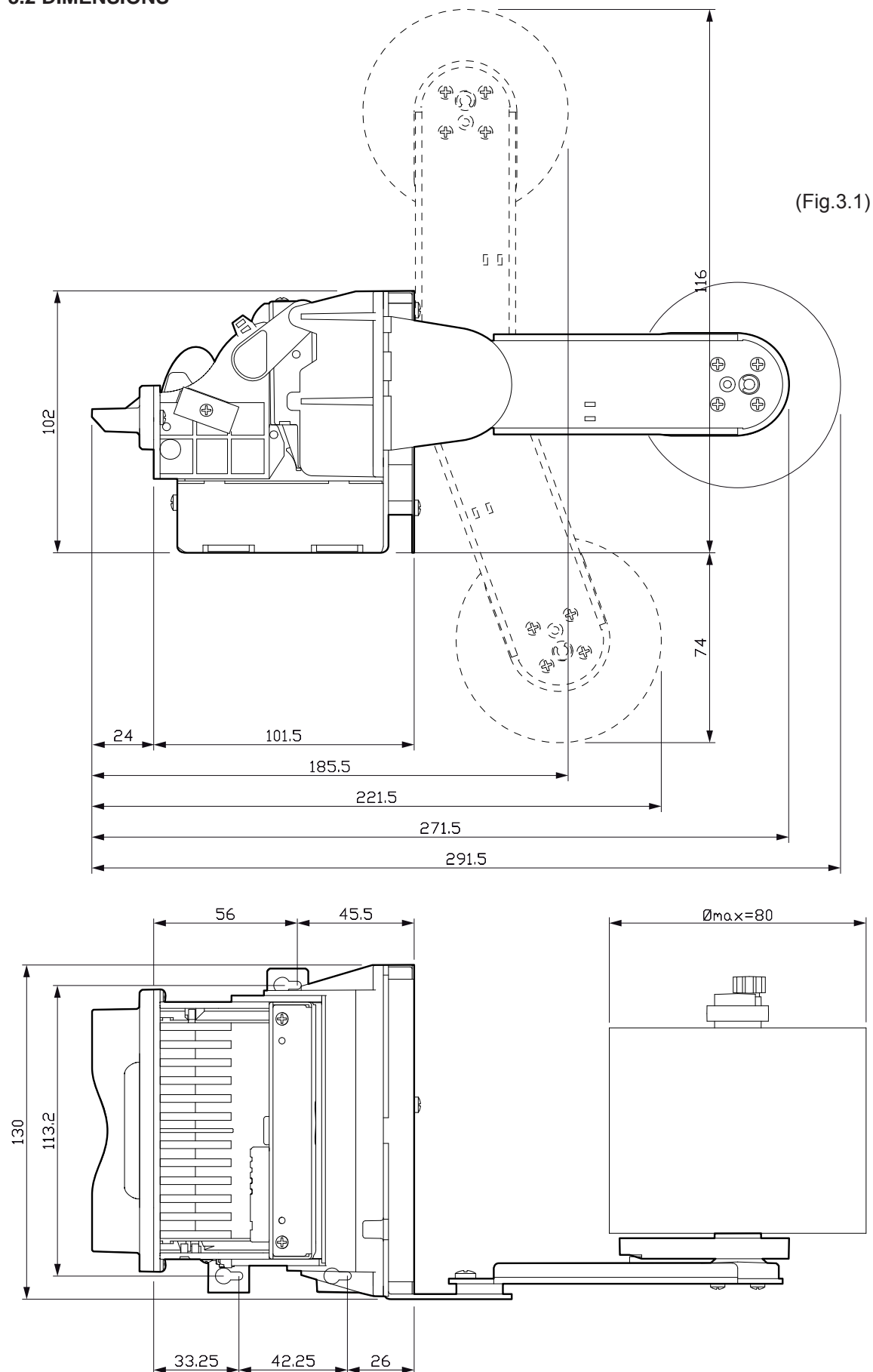
(Tab.3.1)

Available interfaces	Serial RS232	USB
Baud rate	From 1200 to 115200 bps	-
Sensors	Head temperature, paper presence, paper jam, ticket withdrawal OPTIONAL: Near paper end (external)	
Printing driver	Window™ 2K, XP, Vista	
Receive buffer	2 Mbytes	
Flash memory	1 Mbyte	
Emulation	ESC/POS	
PRINTER SPECIFICATIONS		
Print method	Thermal, fixed head	
Resolution	203 DPI (8 dot/mm)	
Printing mode	Straight, 180°	
Printing format	Normal, height / width from 1 to 4, bold, reverse, underlined, italic	
Character fonts	PC437, PC850, PC860, PC863, PC865, PC858, PC866.	
Graphics memory	2 Logos (608 x 430 dots)	
PAPER SPECIFICATIONS		
Type of paper	Thermal rolls (heat-sensitive side on outside of roll)	
Paper width	80 mm ±0.5 mm	
External roll diameter	Max 80 mm	
Recommended types of paper	55 g/m ² – 80 g/m ² (KANZAN KF50 or KP460, MITSUBISCHI PG5075 or TL4000)	
Paper thickness	0,85 ÷ 0,061 mm	
Internal roll core diameter	25 mm (not attached to roll core)	
Core type	Cardboard or plastic	
ELECTRICAL SPECIFICATIONS		
Power Supply	24 Vdc ± 10%	
Absorptions		
Medium (12,5% Dot ON)	0.8 A	
Stand by	0.05 A	
ENVIRONMENTAL CONDITIONS		
Operating temperature	0-50°C	
Relative humidity	10-85% Rh	
Storage temperature / Humidity	-20 °C – 70 °C / 10% - 90% Rh	
MECHANICAL CHARACTERISTICS		
Dimensions (without paper roll)	Length [mm] =	250
	Width [mm] =	130
	Height [mm] =	110
Weight [gr]	1130 (without paper roll)	

3. TECHNICAL SPECIFICATIONS

ESC/POS EMULATION			
Number of columns	43	60	76
Printing speed			
Lines / sec.	30	30	30
Chars / sec.	1290	1800	2280
Characters (L x H mm)			
Normal	1.7 x 3	1.2 x 3	1 x 3
Char set	3		

3.2 DIMENSIONS



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4. CHARACTER SETS

If it has the version with chinese simplified font GB2312 (option 0104) at the end of the FONT TEST is printed all characters set (about 7000) as shown in the fig. 5.3.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
A1A0	. - ~ " // 々 ~ ... ' "															
B0	“ ”	〔 〕	〈 〉	《 》	「 」	『 』	【 】									
C0	±	×	÷	:	∧	∨	Σ	Π	U	∩	∈	:	√	⊥	//	∠
D0	∪	⊙	∫	∫	≡	≡	≈	∞	∞	≠	¢	¥	≤	≥	∞	∞
E0	∴	♂	♀	°	′	″	℃	\$	¤	£	%	‰	§	No	☆	★
F0	○	●	◎	◇	◆	□	■	△	▲	※	→	←	↑	↓	■	■
A2A0	1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15.															
B0	16. 17. 18. 19. 20. (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)															
C0	(12) (13) (14) (15) (16) (17) (18) (19) (20) ① ② ③ ④ ⑤ ⑥ ⑦															
D0	⑧ ⑨ ⑩ (-) (二) (三) (四) (五) (六) (七) (八) (九) (十)															
E0	I II III IV V VI VII VIII IX X XI XII															
F0	! " # ¥ % & ' () * + , - . /															
A3A0	0 1 2 3 4 5 6 7 8 9 : ; < = > ?															
B0	@ A B C D E F G H I J K L M N O															
C0	P Q R S T U V W X Y Z [\] ^ _															
D0	' a b c d e f g h i j k l m n o															
E0	p q r s t u v w x y z { }															
F0	あ い う え お か き く															
A4A0	ぐ げ こ ご さ し す せ そ た															
B0	だ ち っ つ づ て と ど な に ぬ ね の は															
C0	ば び び び ふ ぶ へ べ へ ぼ ぼ ぼ ま み															
D0	む め も や や ゆ ゆ よ ょ り る れ ろ わ わ															
E0	る ゑ を ん															
F0	ア イ ウ エ オ カ キ ク															
A5A0	グ ケ コ ゴ サ シ ス セ ソ タ															
B0	ダ チ ヅ ツ ズ テ ト ナ ニ ヌ ネ ノ ハ															
C0	バ パ ビ ビ ビ フ ブ ヘ ベ ホ ボ マ ミ															
D0	ム メ モ ヤ ャ ュ ユ ヨ ヲ ラ リ ル レ ロ ヲ ヲ															
E0	ヰ ヱ ヲ ヲ ヲ ヲ															
F0	キ エ ヲ ヲ ヲ ヲ															
A6A0	Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο															
B0	Π Ρ Σ Τ Τ Φ Χ Ψ Ω															
C0	α β γ δ ε ζ η θ ι κ λ μ ν ξ ο															
D0	π ρ σ τ υ φ χ ψ ω															
E0																
F0																
A7A0	А Б В Г Д Е Ё Ж З И Й К Л М Н															
B0	О П Р С Т У Ф Х Ц Ч Ш Щ Ъ Ы Ь Э															
C0	Ю Я															
D0	а б в г д е ё ж з и й к л м н															
E0	о п р с т у ф х ц ч ш щ ъ ы ь э															
F0	ю я															
A8A0	ā á â ã ä å ē ё è é ê ë ī í î ï ò ó ô															
B0	ō ū															

(Fig.4.2)

With this version must be send two bytes to addressing characters: the first byte identifies the table, the second byte identifies the row and column in the table. In the fig. 5.4 is reported an example of characters mapping; the x symbol identifies the caracter to address.

1st byte

Range: $161 \leq n \leq 169$ (A1 ÷ A9),
 $176 \leq n \leq 247$ (B0 ÷ F7),

2nd byte

Range: $160 \leq m \leq 255$ (A0 ÷ FF).

Address: A1E8	A1	A0	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
		B0																
		C0																
		D0																
		E0									X							
		F0																
Address: B0C5	A9	A0	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
		B0																
		C0																
		D0																
		E0																
		F0																
Address: B0C5	B0	A0	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
		B0																
		C0						X										
		D0																
		E0																
		F0																
Address: F7FF	F7	A0	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
		B0																
		C0																
		D0																
		E0																
		F0																X

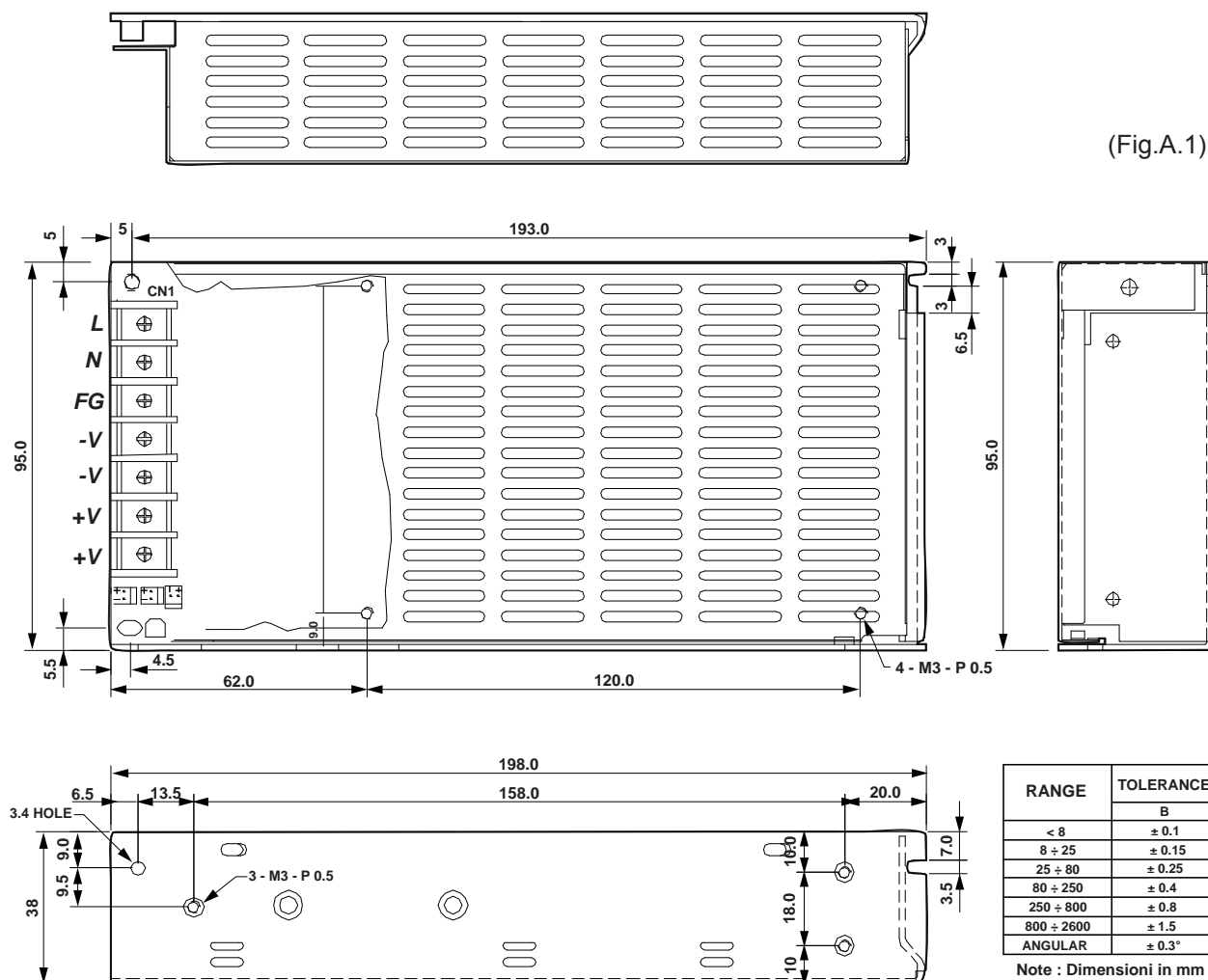
(Fig.4.3)

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A.1 ACCESSORIES

A.1.1 Power supply

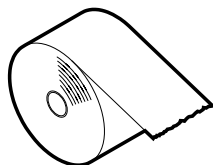
The figure below illustrates the power supply to be used for printer operation:



PPSPS-100-24	Switching power supply 24V 100W
Input specifications	
Input voltage	85 ÷ 264 V
Current	0 ÷ 4.5 A
Input frequency	47 ÷ 63 Hz
Output specifications	
Output voltage	24 V
Output current min.-max.	0 ÷ 4.5 A
Efficiency min.	80%
Environmental conditions	
Operating temperature	0 ÷ 70 °C
Humidity	20 ÷ 85 % Rh (w/o condensation)
Storage temperature / Humidity	-10 ÷ 85 °C / 10 ÷ 95 % Rh (w/o condensation)
Protection devices:	Short-circuit, overload

A.2 SPARE PARTS

A.2.1 Supplies



RCT80X90-25MM				
Thermal paper roll 80 mm Ø=90 core 25 mm				
Quantity recommended per no. machines purchased				
No. machines	<10	<50	<100	>100
Quantities recommended	5	30	60	90

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**
PWM Duty cycle : **45%**

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.

Another parameter that needs to be set is the threshold:

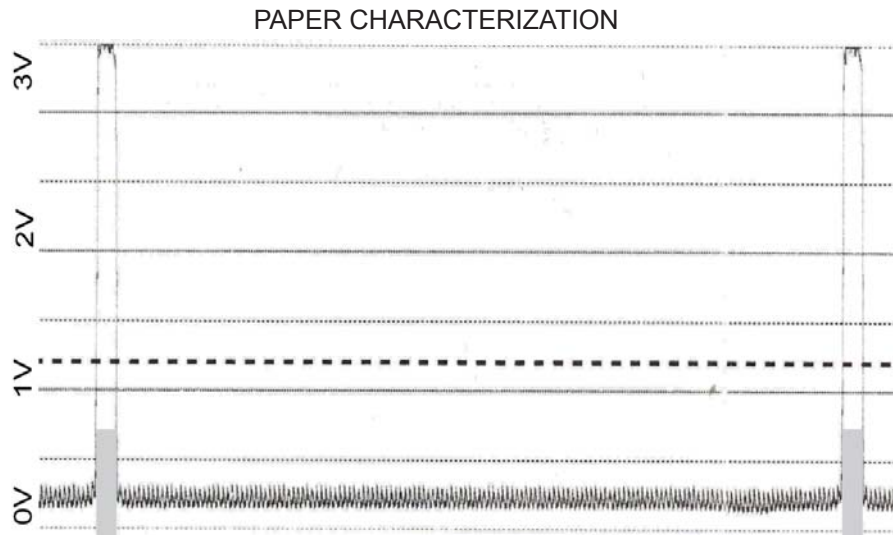
Notch Threshold.. : **0.75V**

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:



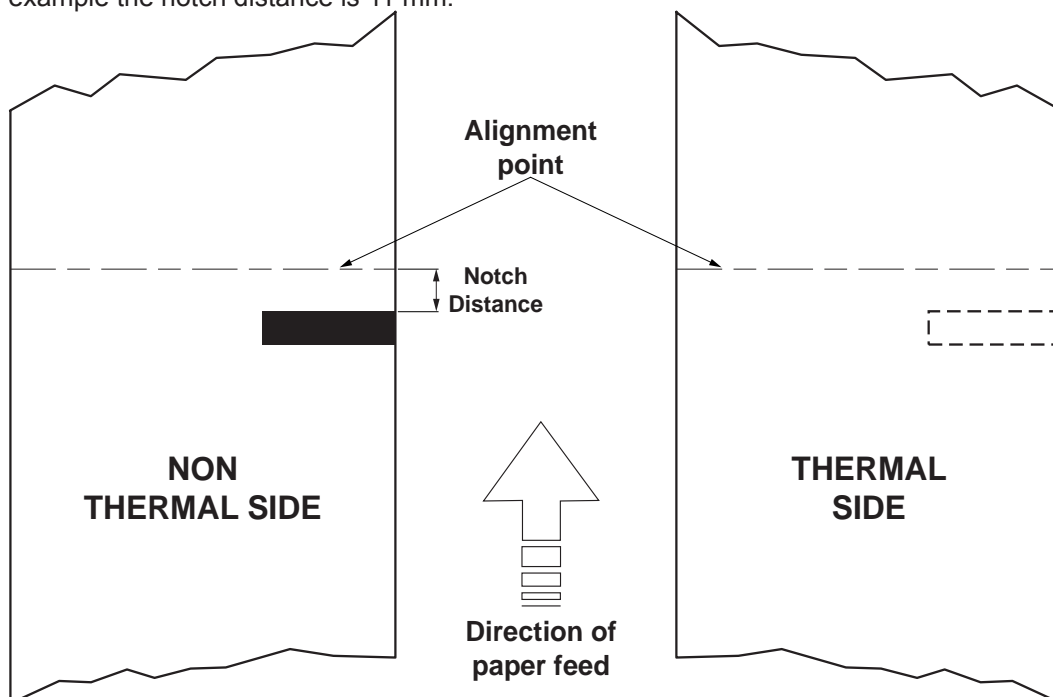
(Fig.B.1)

The graphic shows the references in Volts (from 0 to 3V) 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] . : 1
Notch Dist. [mm x 1] . : 0

These parameters define the “Notch Distance” that represents the distance from the notch to align; in the above example the notch distance is 11 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 12 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.

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 with 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 alignment}

\$1D, \$F8,

{Cut}

ESC,'I',

...

{Print text}

'TICKET 1',\$0A,'FIRST LINE',\$0A,'SECOND LINE',\$0A

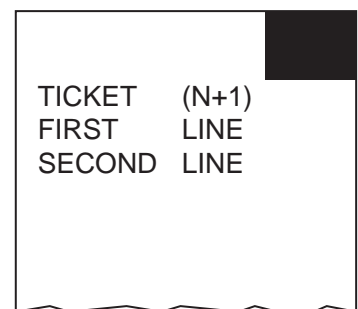
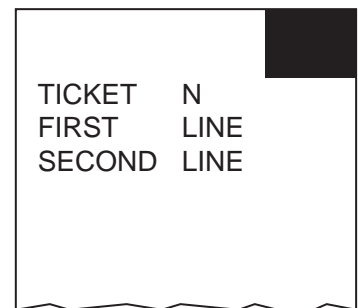
{Cut alignment}

\$1D,\$F8,

{Cut}

ESC,'I',

...



(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 alignment}
```

```
$1D, $F8,
```

```
{Cut}
```

```
ESC, 'i',
```

```
...
```

```
{Print text}
```

```
'TICKET 1', $0A, 'FIRST LINE', $0A, 'SECOND LINE', $0A
```

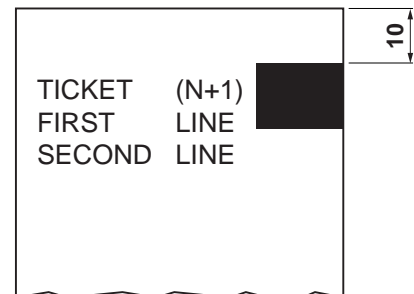
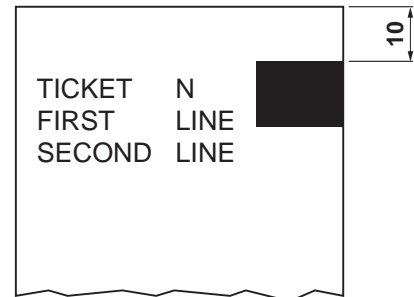
```
{Cut alignment}
```

```
$1D, $F8,
```

```
{Cut}
```

```
ESC, 'i',
```

```
...
```



(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'
```

```
...
```

```
{Set Notch Distance}
```

```
$1D, $E7, $00, $00,
```

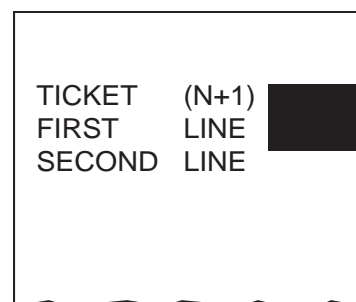
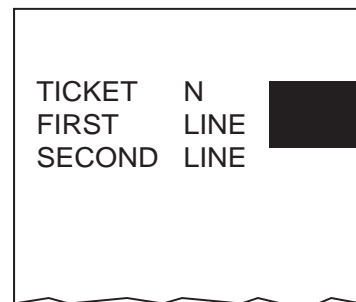
```
{Print text}
```

```
'TICKET 1', $0A, 'FIRST LINE', $0A, 'SECOND LINE', $0A
```

```
{Cut}
```

```
ESC, 'i',
```

```
...
```



(Fig.B.5)

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 alignment}

\$1D, \$F8,

{Cut}

ESC,'i',

...

{Print text}

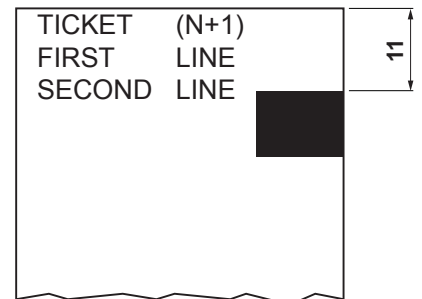
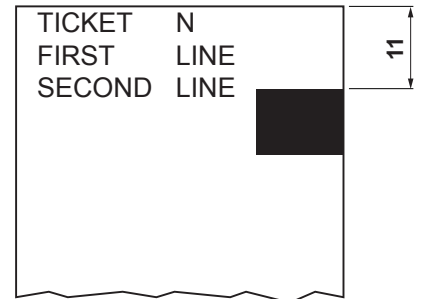
'TICKET 1',\$0A,'FIRST LINE',\$0A,'SECOND LINE',\$0A

{Cut alignment}

\$1D,\$F8,

{Cut}

ESC,'i',



(Fig.B.6)

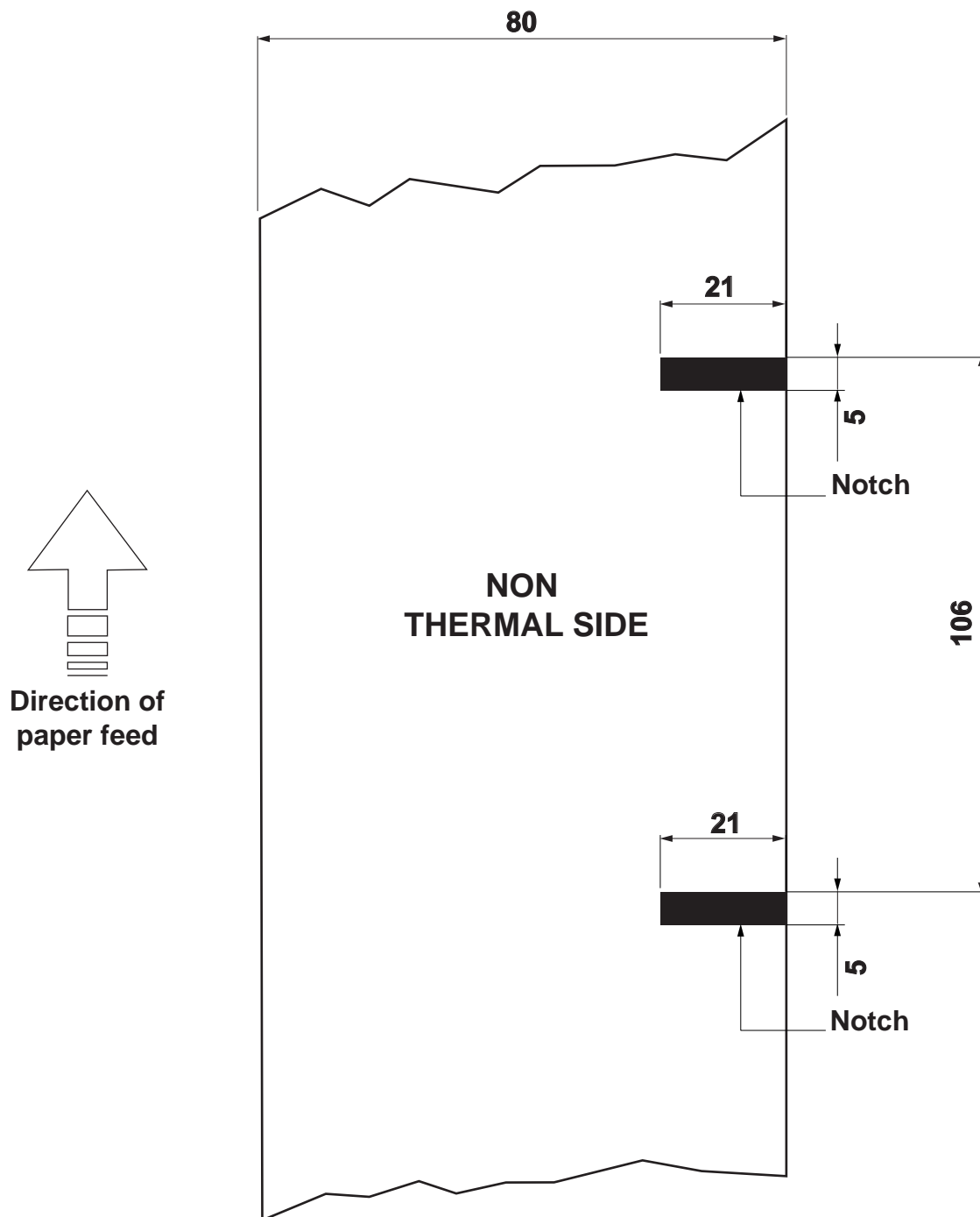
B.3 CHARACTERISTICS OF THE PAPER.

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 figure B.7, where is showing a fac-simile of paper with alignment notch.

Notch on 80 mm paper

(Fig.B.7)



B.3.2 Position of sensors

Figure B.8 shows a section of the printer and the distances between the head, the cutter and the notch sensor.

(Fig.B.8)

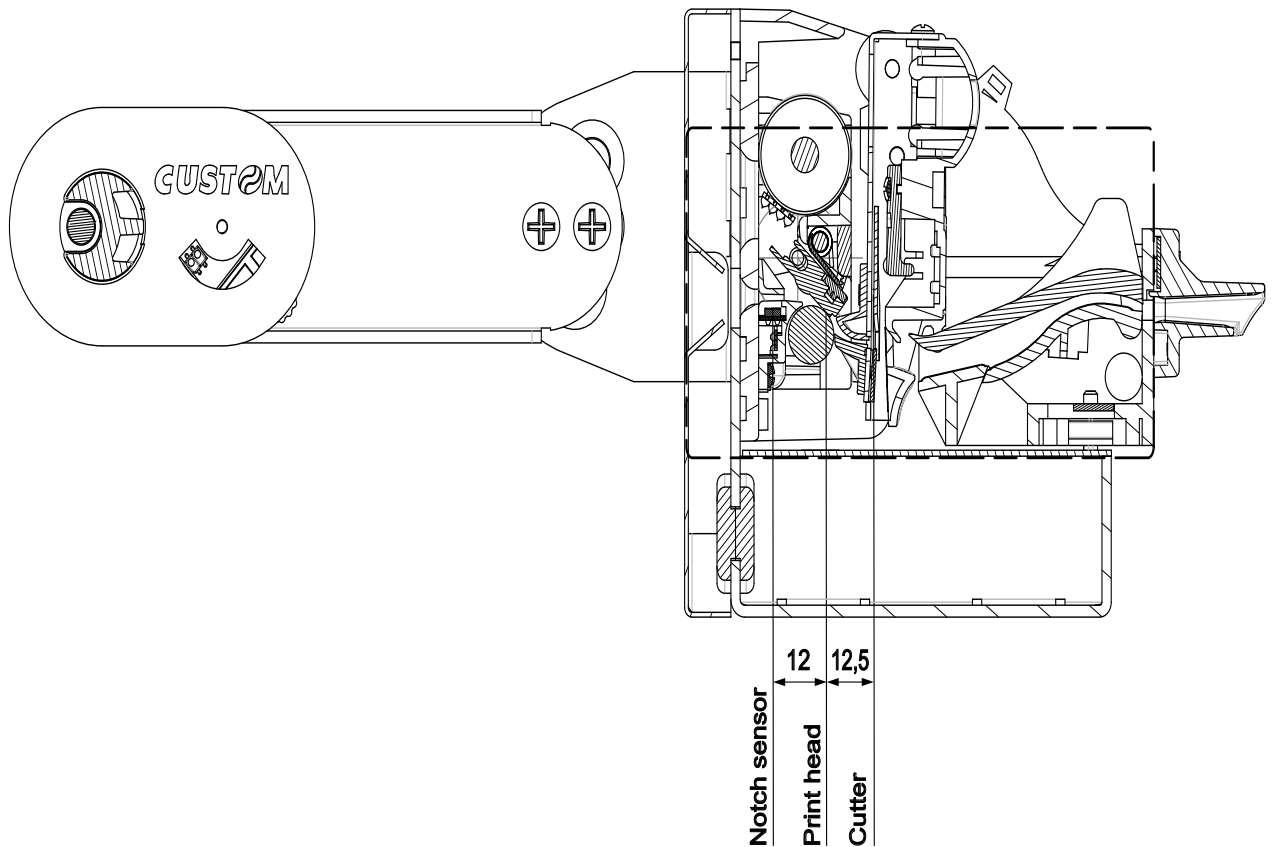


Figure B.8 clearly shows why the alignment distance (Notch Distance) cannot exceed the notch sensor-head distance. The moment that the notch sensor detects a notch, the head is already mechanically positioned 12 mm upstream of the notch in order therefore for it to align itself with this notch, as a reference the paper can only be fed forward, and so reduce the distance already there.

B.3.3 Ticket dimension

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:

$$\text{INTER-NOTCH DISTANCE} > \text{PRINTED AREA HEIGHT} + \text{NON-PRINTABLE AREA}$$

where

INTER-NOTCH DISTANCE = the distance between two notch edges

NON-PRINTABLE AREA = cutter-head distance

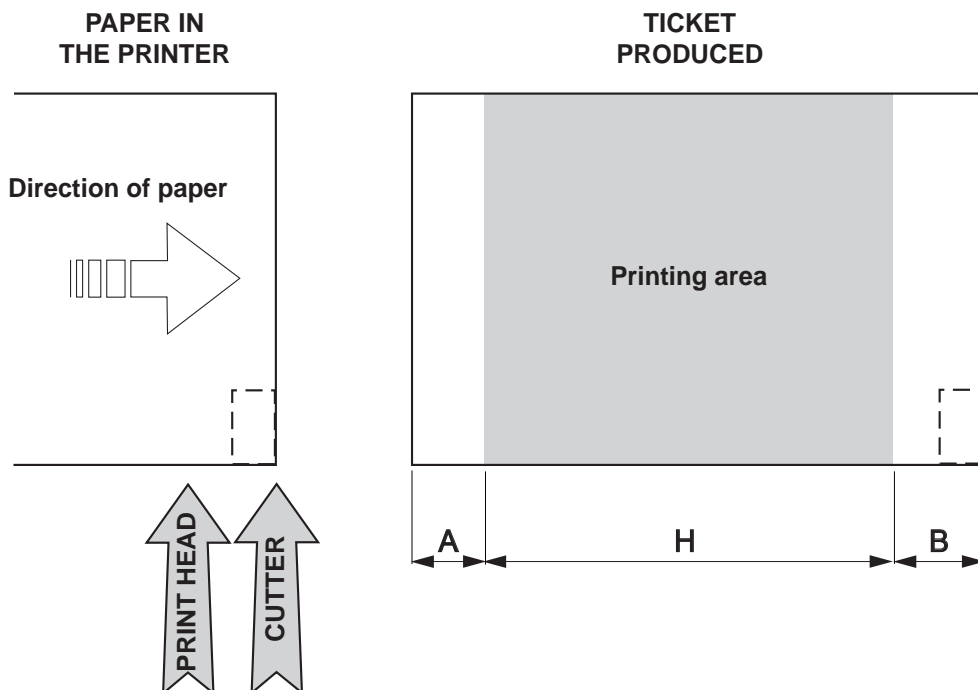
The picture in figure B.9 shows a sequence of printed tickets aligning each one at the cut. It can be noted that increasing the printed area will result in superimposing what is to be printed at the subsequent notch. The size of the print area can be enlarged until it renders the alignment feed void, 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)



(Fig.B.9)

B.4 METHODS OF USAGE

B.4.1 Command sequences

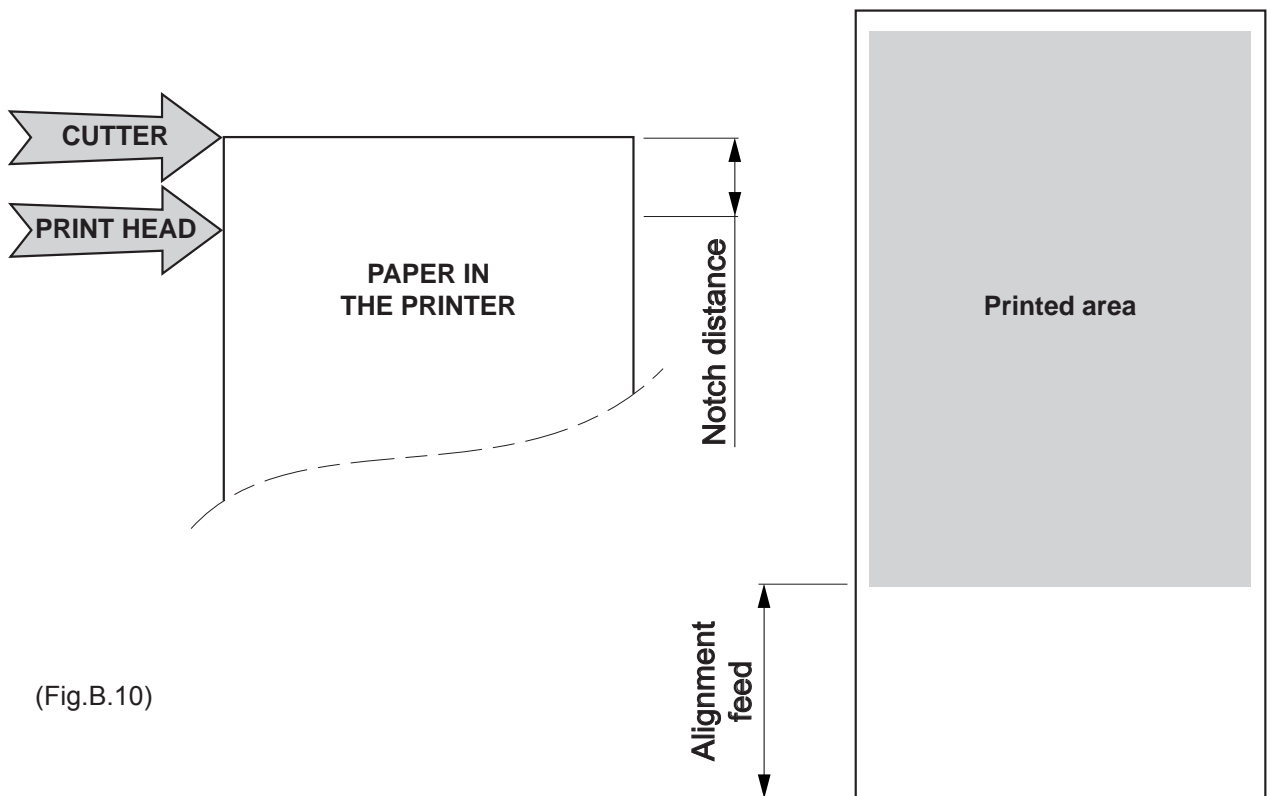
It is possible, when printing sequences of tickets, to primarily identify two different methods of operation that involve the alignment: ticket aligned at the cut and ticket aligned at printing. Another very important aspect to bear in mind is the condition from which printing commences. In figure B.9, 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.10.



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.

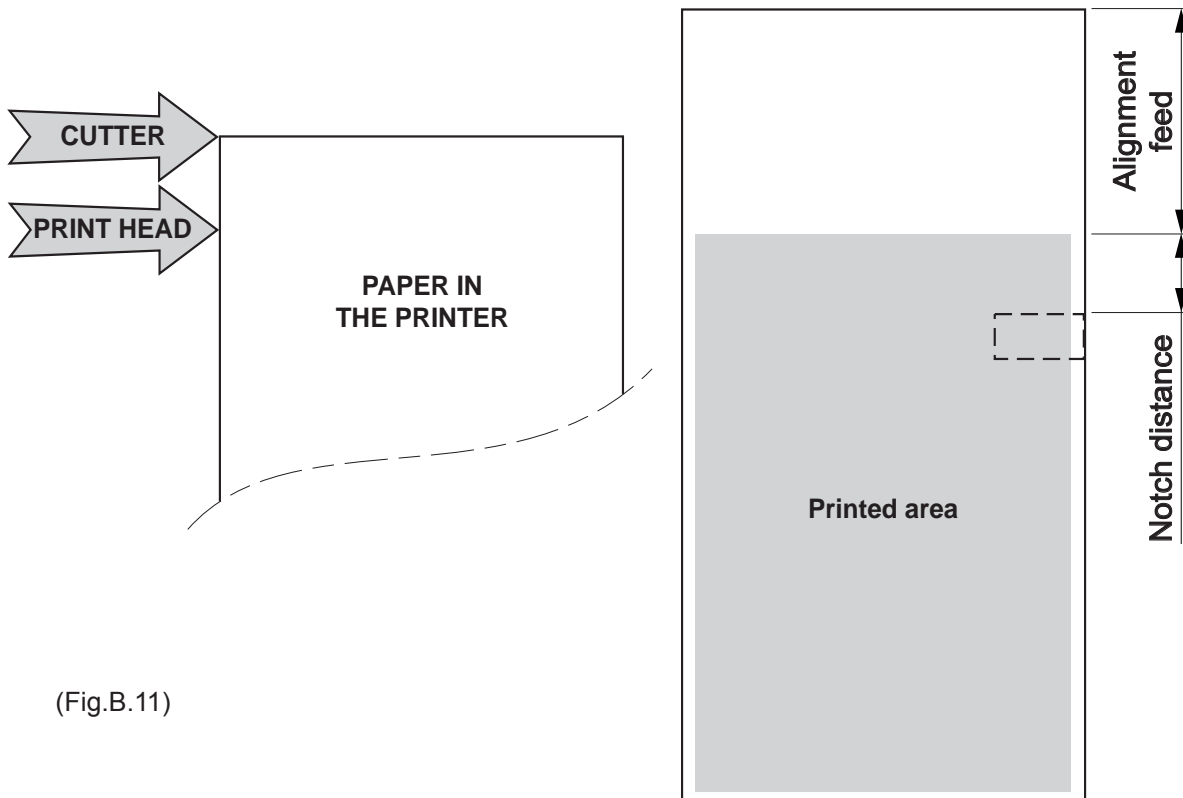
B.4.1.2 Alignment at printing

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.11.

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.11)

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