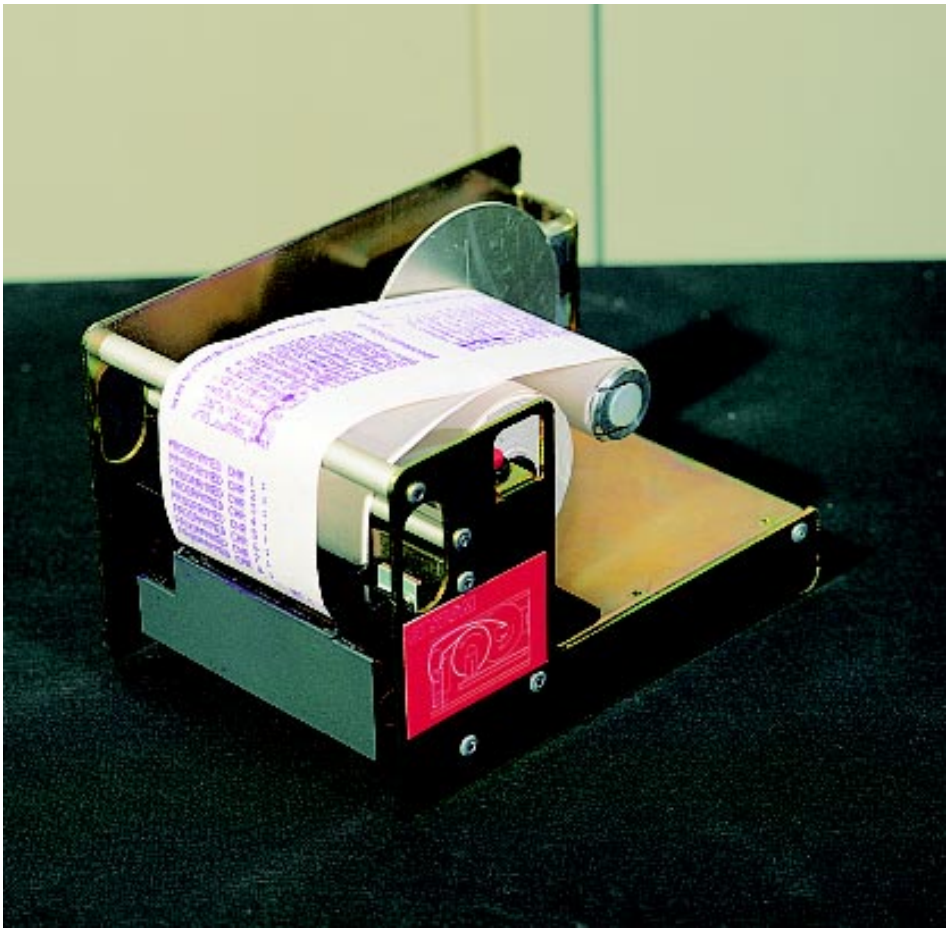
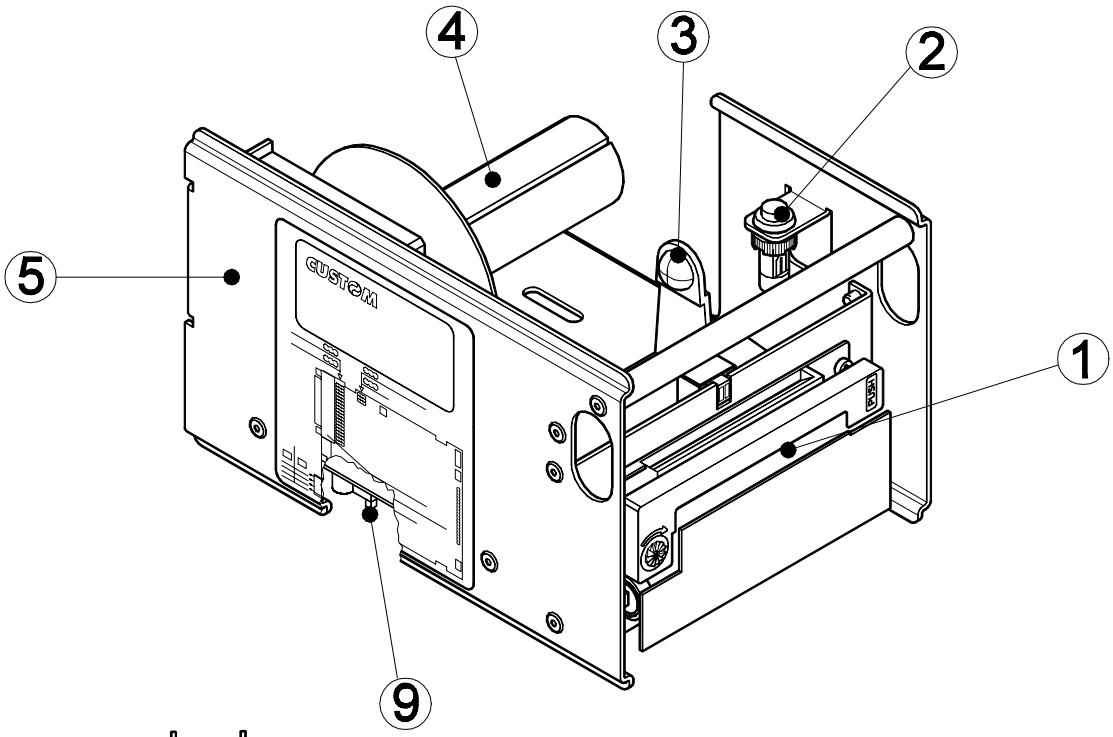
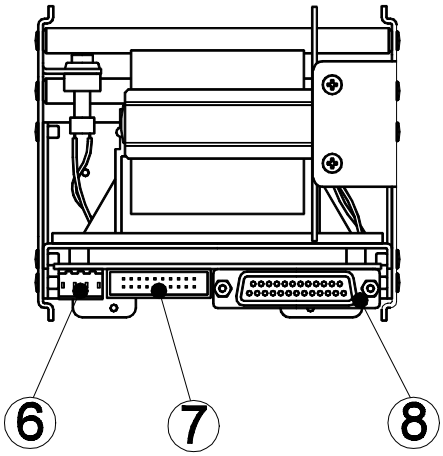
Impact rack printer
PR24/40
User's manual



Printer components

1- Print mechanism
2- “Feed” Key
3- Paper roll support
4- Paper winder
5- Case
6- Feed connector
7- Serial / TTL parallel interface connector
8- RS232 / CENTRONICS interface connector
9- “Print” Key





COD. DOME - PR24-40 REV. 1.20

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"CE" Declaration of conformity

In accordance with standards ISO/IEC Guide 22 and EN 45014

N°: DC0251498

Manufacturer's name: Custom Engineering s.r.l.

Manufacturer's address: Strada Berettine 2
Fontevivo (Parma)
Italy

Declares that the product

Product name: Rack printer with impact print mechanism

Product type: PR24, PR40

Model: PR24, PR40

is in conformity with the following directives:

Electromagnetic Compatibility Directive 89/336/CEE; 92/31/CEE; 93/68/CEE

In accordance with the following standards:

EN 55022 Class B	Limits and methods of measuring the characteristics of radio disturbance produced by information technology equipment	1995
EN 50082-1	Electromagnetic Compatilbility - General immunity requirements. Part 2: Industrial environments.	1992
EN 61000-4-2	Electrostatic discharge immunity tests. 4KV contact discharge, 8KV air discharge	1995
EN 61000-4-4	Electrical fast transient/burst immunity tests. Signal lines DC 0.5KV	1995
ENV 50140	Radio-frequency irradiated electromagnetic fields - Immunity test. 3V/m, 80MHz-1000MHz, 80% 1KHz AM	1993

March 1999

INTRODUCTION

1. INSTALLATION AND USE

2. INTERFACES

3. PRINTER FUNCTIONS

4. TECHNICAL SPECIFICATIONS

5. CHARACTER SETS

ATTACHMENT A - ACCESSORIES AND SPARE PARTS

CONTENTS OF THE MANUAL

In addition to the introduction which lists: the conventions used in the manual, general information relative to safety, unpacking of the printer and a brief description of the printer itself highlighting its main features, the manual is split up into the following chapters:

Chapter 1: Containing the information required for installing and using the printer correctly

Chapter 2: Containing the specifications of the interfaces

Chapter 3: Containing the description of the printer command set

Chapter 4: Containing the technical specifications of the printer

Chapter 5: Containing the character sets (fonts) used by the printer

CONVENTIONS USED IN THE MANUAL

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

WARNING
The information marked with this symbol must be carefully heeded to safeguard against damaging the printer

DANGER
The information marked with this symbol must be carefully heeded to safeguard against injury to the operator

GENERAL INFORMATION REGARDING SAFETY

- Read and keep the following instructions.
- Observe all warnings and follow all instructions attached to the printer.
- Before cleaning the printer, disconnect the feed cable.
- Clean the printer with a damp cloth. Do not use liquid or spray products
- Do not operate the printer near to water.

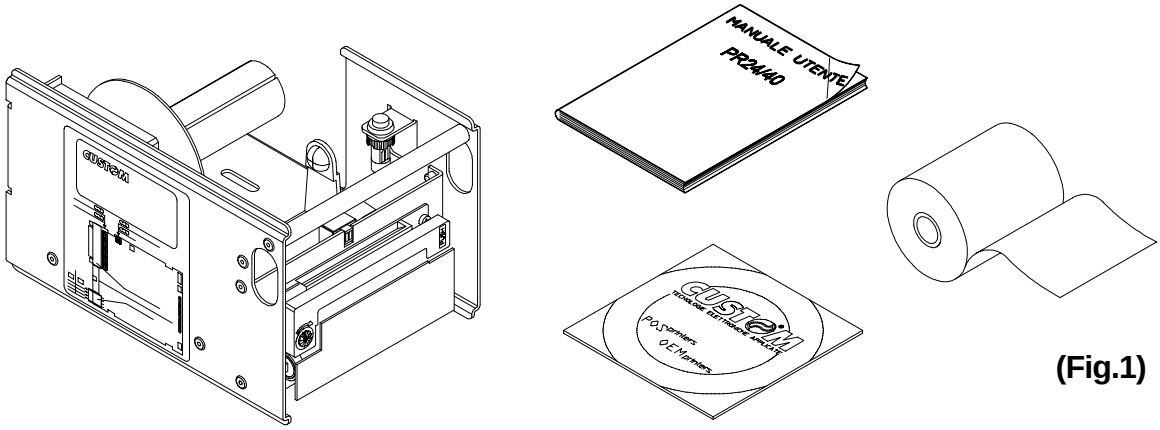
- Do not place the printer on unsteady surfaces. It could fall and get seriously damaged.
- Use the type of electricity supply marked on the printer label. In the event of uncertainty, contact the seller.
- Position the printer in such a way as to ensure that the cables connected to it will not be damaged.
- Ensure that the maximum absorbed current of the printer does not exceed the maximum acceptable current for the type of feed cable used.
- Do not put objects of any kind inside the printer as they could cause a short circuit or damage parts which could affect its performance.
- Do not spill liquids on the printer.
- Do not carry out technical operations on the printer with the exception of the scheduled maintenance operations specifically indicated in the user's manual.
- Disconnect the printer from the electricity supply and have it repaired by a specialized technician should any of the following conditions occur:
    A. The feed connector has been damaged;
    B. LIQUID has penetrated to the inside of the printer;
    C. The printer has been exposed to rain or water;
    D. The printer is not operating normally despite the instructions in the user's manual having been followed;
    E. The printer has been dropped and its case damaged;
    F. The performance of the printer is poor;
    G. The printer does not work.

UNPACKING THE PRINTER

Remove the printer from the box, taking care not to damage the packing material, as it could be needed for future transportation of the machine.

Ensure that all the components illustrated are in fact present and that they are in perfect condition. If this is not the case, contact the after-sales assistance department immediately.

Printer
Manual (or Cdrom)
Paper roll



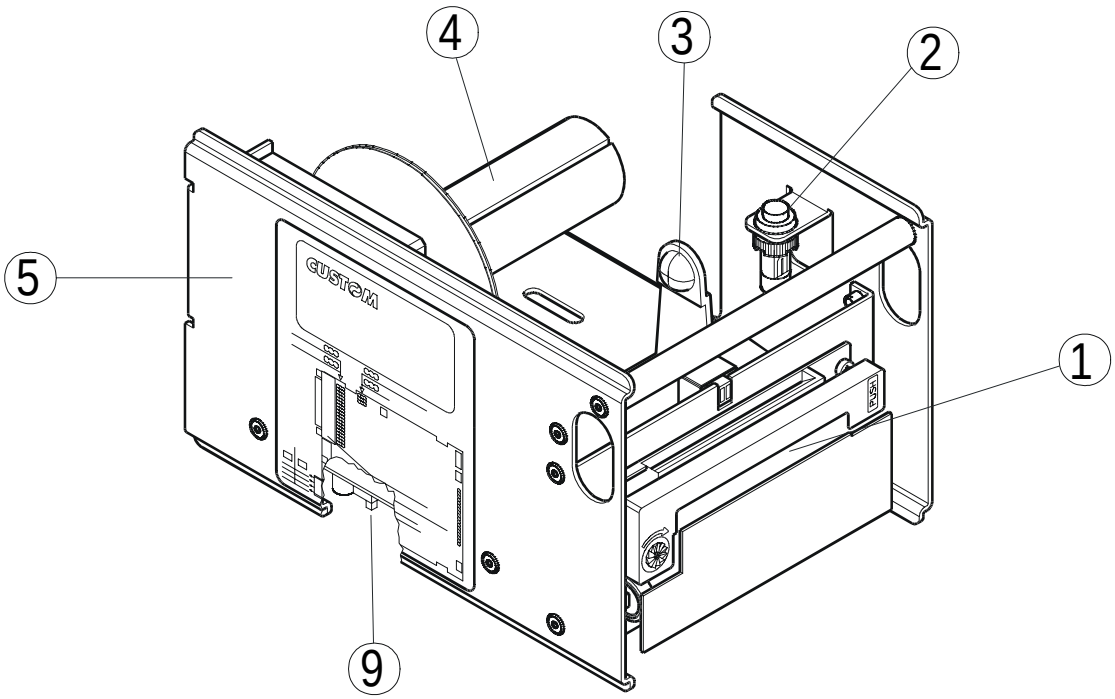
(Fig.1)

GENERAL FEATURES

The PR24/40 is a rack printer that is extremely practical and easy to use.
It is, therefore, the ideal solution for applications which require the immediate printing of data on a ticket, whether they be of an industrial, professional or laboratory nature. It is especially useful for the recording of events.
It is equipped with an 8-needle impact print mechanism and uses 57.5 mm paper rolls.
It has a 150-byte print buffer and is equipped with a 2-Kbyte EEPROM. It has TTL, serial, TTL parallel, RS232 serial and CENTRONICS parallel interfaces. It can also be equipped with a Real Time Clock. It is available in two models: the 24-column and 40 column model.

DESCRIPTION OF THE PRINTER

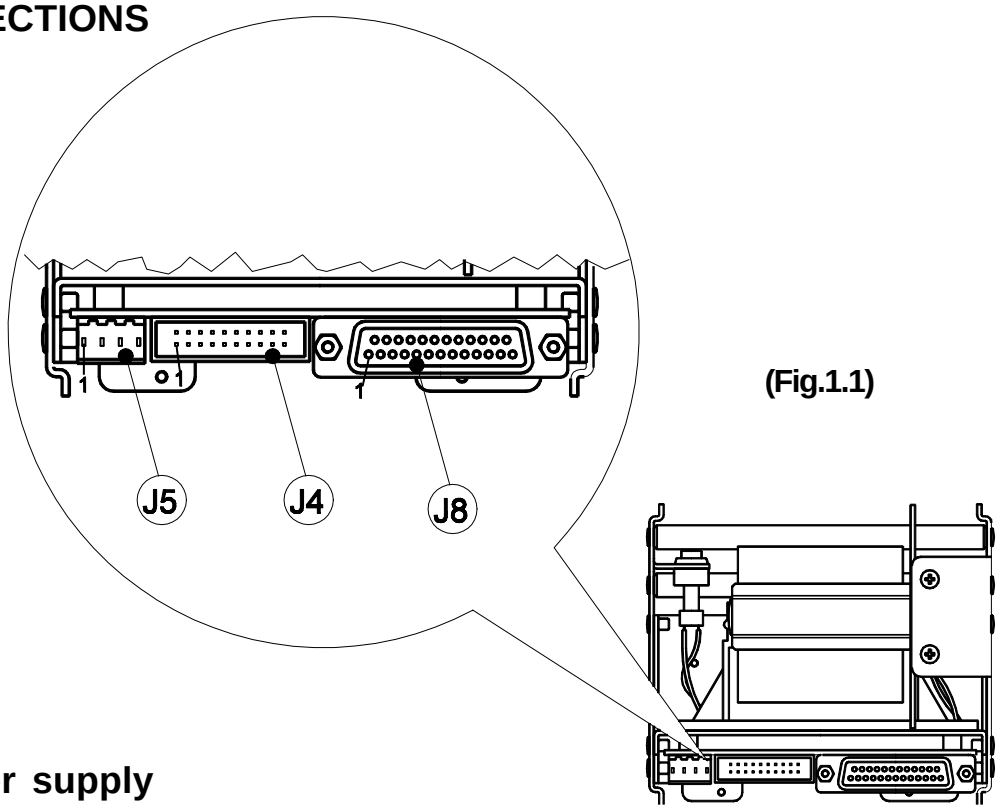
The PR24/40 printer has a case (5) with two support tabs for the paper roll (3) and a paper winder (4) that feeds forward together with the paper when the “FEED” key (2) is pressed.
The “PRINT” key (6) is located on the printed circuit board, while the print mechanism is housed on the front (1).



(Fig.2)

- FEED key. When this is pressed the paper feeds forward manually. If this key is pressed briefly, when the RTCK option is installed, the date and time of day is printed.

1.1 CONNECTIONS



(Fig.1.1)

1.1.1 Power supply

The PR24/40 printer is equipped with a standard 4-pin male AMPMODU1-type feed connector (J5). The signals on the connector pins are as follows:

WARNING
Respect the polarity of the power supply

5V VERSION

PIN	SIGNAL	NOTES
1	GND	
2	GND	
3	+VT: 5 Vdc ± 15%	(printer needle power supply)
4	+VCC: 5 Vdc ± 7%	(logic card power supply)

(Tab.1.1)

9 - 40V VERSION

PIN	SIGNAL	NOTES
1	GND	
2	GND	
3	from 9 Vdc to 40 Vdc	
4	N.C.	

(Tab.1.2)

It is possible to avoid connection with the feed connector (J5) by using the logic circuitry's flat 20-pin connector (J4), thus connecting the printer's power supply and signals with a single cable. In this case, however, the flat cable must not exceed 30 cm in length because, when electrical current runs inside small diameter wires, voltage failures can occur, thus interfering with the correct operation of the printer.

WARNING: when supplying the printer through J5, use a 5 Vdc power supply only.

1.1.2 Power supply configuration.

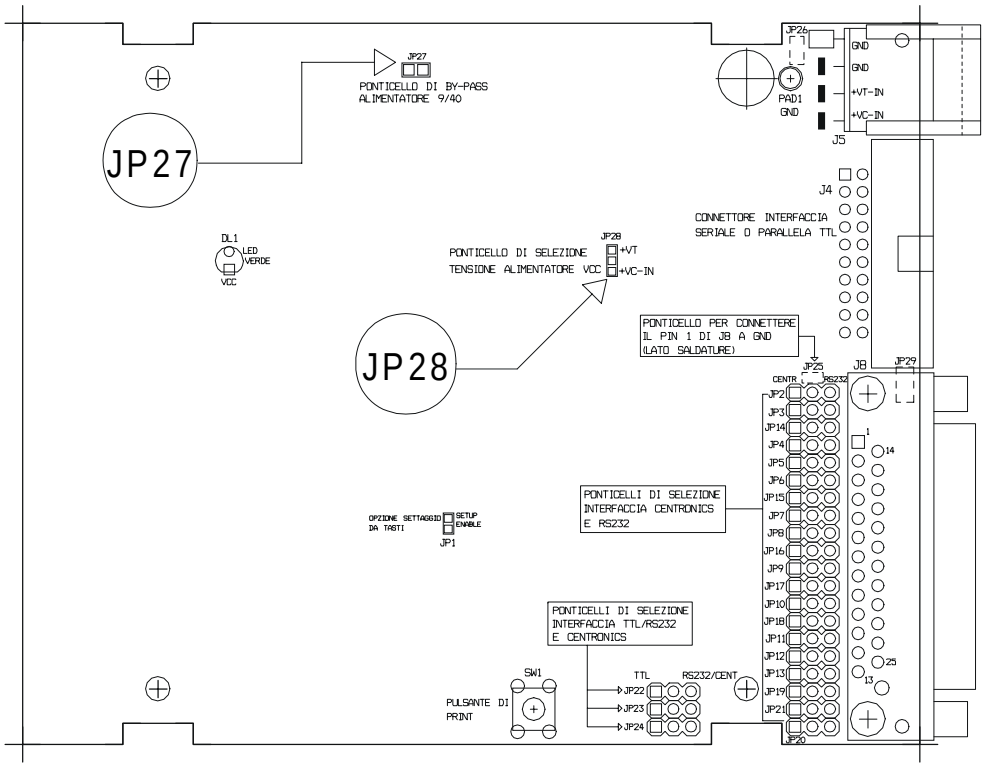
JP27	
Close	5V
Open	9/40

(Tab.1.3)

JP28	
Pin 1-2	5V
Pin 2-3	9/40

(Tab.1.4)

For the jumpers position look at Fig. 1.2.



1.2 CONFIGURATION

The PR24/40 enables the configuration of the printer default parameters. The parameters affected during configuration are:

- Selection of the number of columns (24 or 40)
- Print direction (normal or reverse)
- Selection of the character dimensions (normal, double width, double height, expanded)
- Selection of the font (font 1 or font 2)
- Enabling or disabling of the CR command
- Selection of the print speed in function of the absorption
- Selection of the parameters for serial and parallel communication
- Enabling or disabling of the 1Kbyte buffer
- Enabling setting of the real time clock
- Enabling of seconds printing in the real time clock function.

The settings are saved on the 2-Kbyte EEPROM, which contains 3 blocks: one 300 byte and two 700 byte blocks, in which information of any kind can be stored (only by programming from the PC).
Configuration can be carried either through the PC or through the printer's "PRINT" and "FEED" keys.

1.2.1 Configuration through PC

It is possible to configure the printer using an IBM or IBM-compatible personal computer with serial output, and this can be done using a program which is available on request. This user-friendly program contains the instructions for its own use in pull-down menus.

1.2.2 Configuration through PRINT and FEED keys

If when the printer is switched on, both keys are held down, the printer enters configuration mode and prints the first modifiable parameter. After this, each time the PRINT key (fig. 2) 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.

1.3 AUTOTEST

To run the autotest, hold down the FEED key, while switching on the printer. The autotest causes the printing of the printer's current setting data, a memory check and the printing of the complete ASCII character set.

1.4 PRECAUTIONS

WARNING:

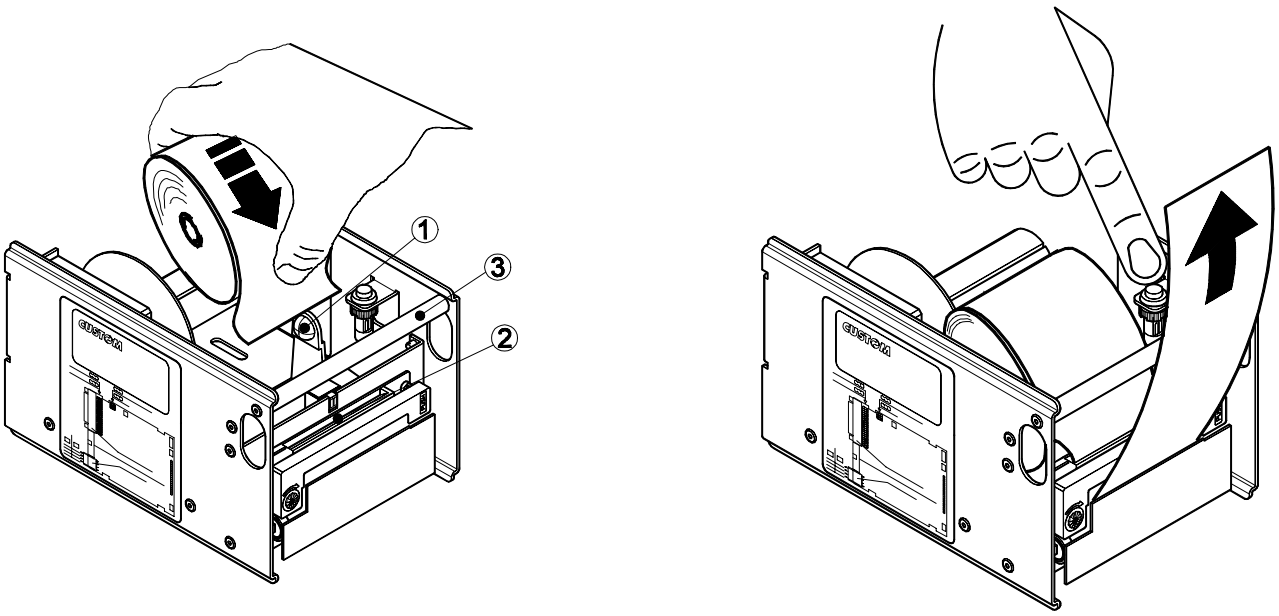
- Do not print without paper and/or ink ribbon; this leads to the rapid deterioration of the print needles.
- Do not pull the printer carriage manually when it is switched on.
- Do not put objects inside the printer.
- Avoid blows to any part of the printer, both during and after installation.

1.5 MAINTENANCE

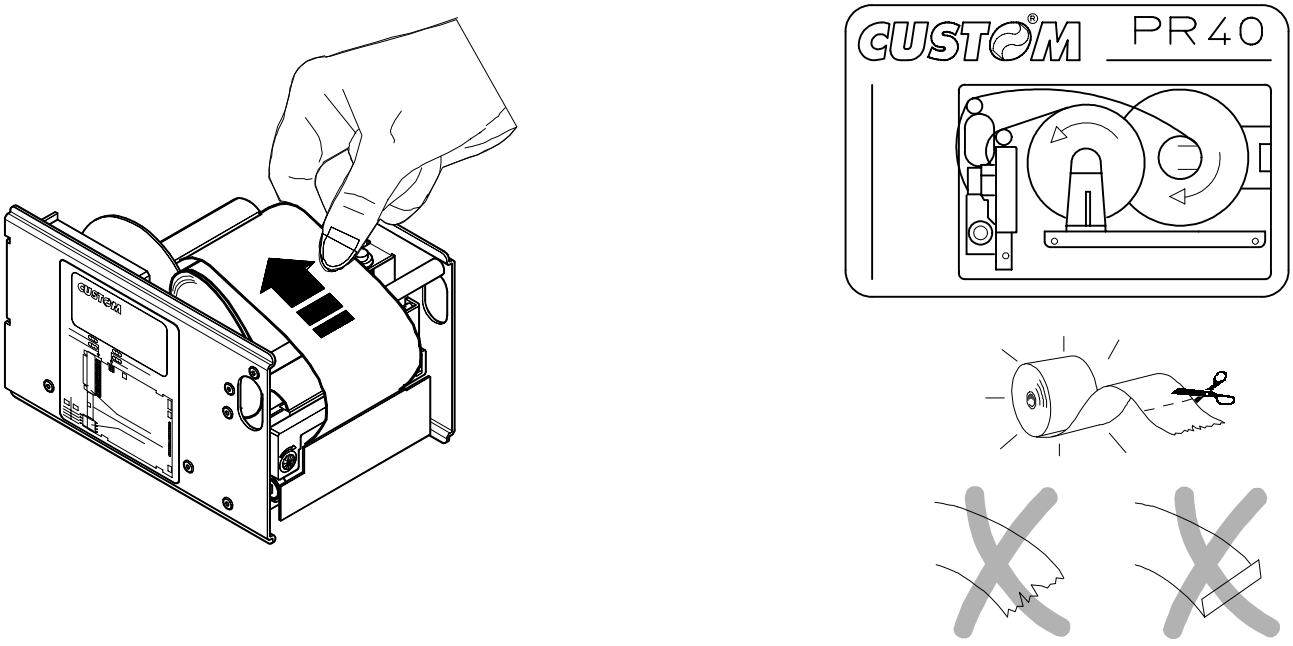
1.5.1 Changing the paper roll

To change the paper roll, proceed as follows:

1) Position the paper roll on the support tabs (1) so that it rotates in the right direction, as shown in the figure;
2) Insert the end of the paper in the slit in the print mechanism (2) making it pass underneath the roller (3);
3) Press the "FEED" key so that the paper feeds forward a few centimetres;
4) Insert the end of the paper in the slit in the paper winder, then press the "FEED" key to forward feed the paper a few centimetres.



(Fig.1.3)

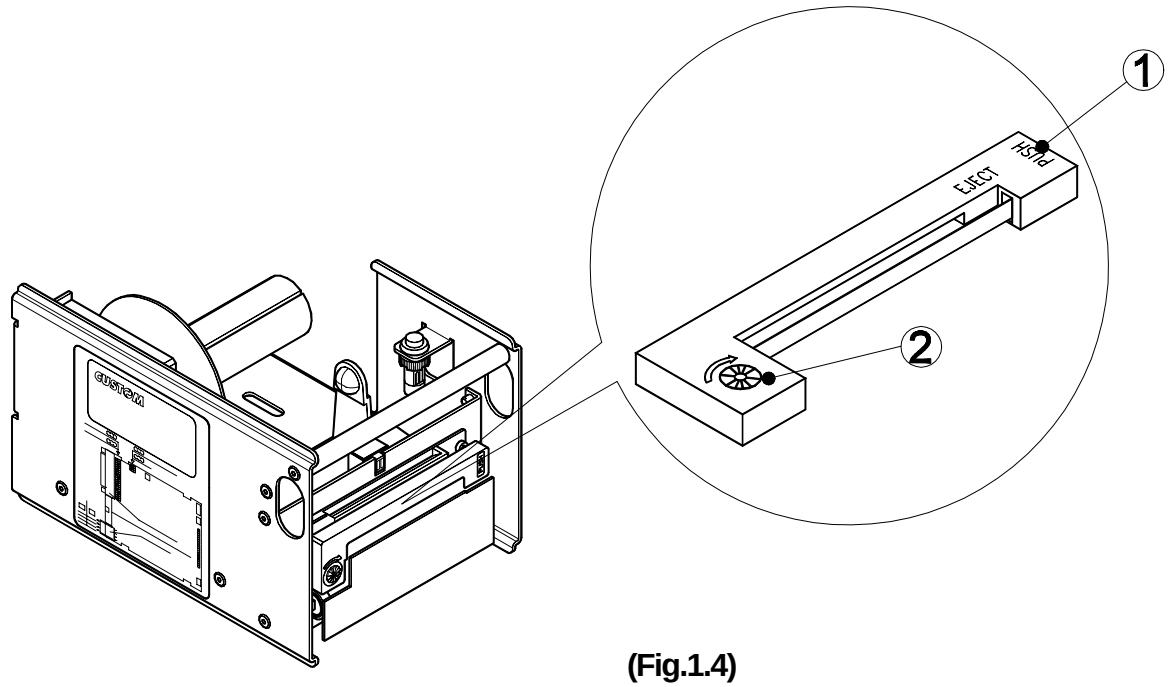


WARNING

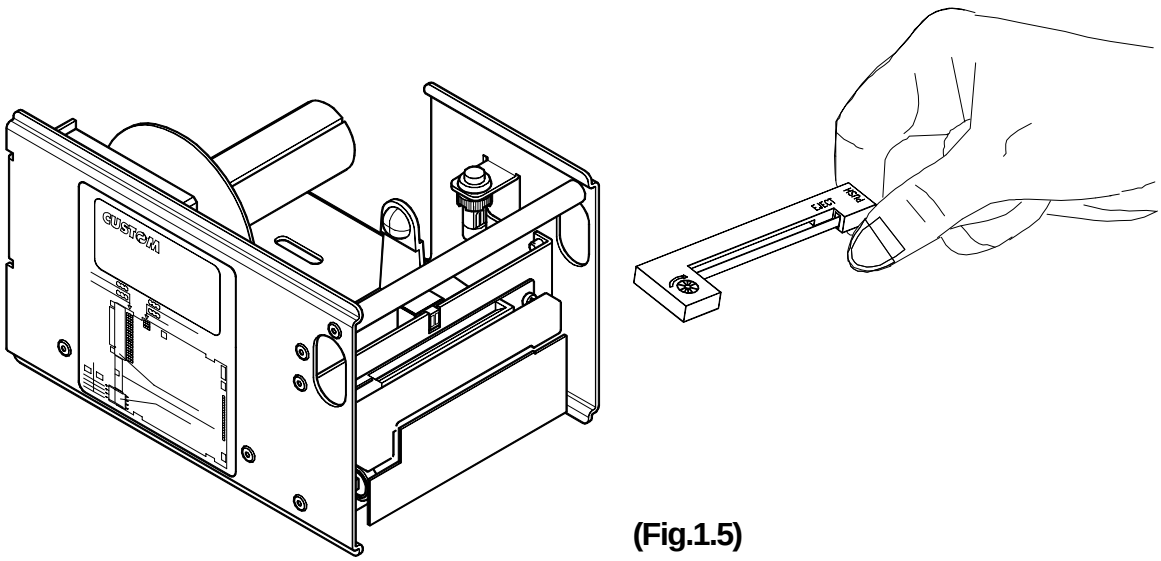
Before inserting the paper, ensure that it is cut evenly

1.5.2 Replacing the ink ribbon

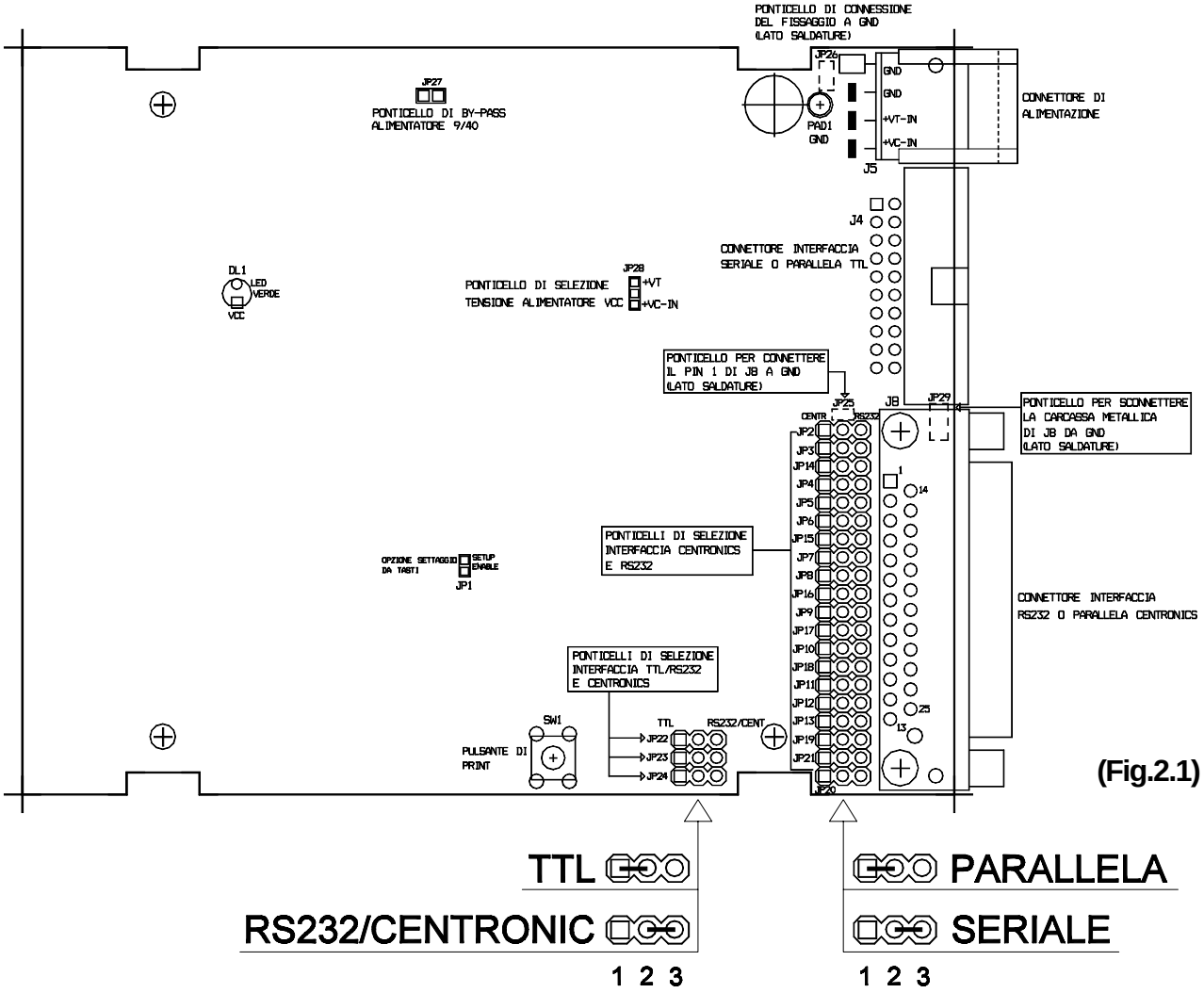
1) Remove the used cartridge by pressing at the point marked PUSH (1), as shown in the figure;
2) Fit the new ribbon, ensuring that it is correctly positioned;
3) Tighten the ribbon by rotating the knurled knob (2) in the direction indicated by the arrow; then re-close the door.



(Fig.1.4)



(Fig.1.5)



(Fig.2.1)

The selection of the TTL serial, RS232 serial, TTL parallel or CENTRONICS interface is made by creating combinations between the 20-contact strip and the 3-contact strip:
the positions of the strips for the selection of the various types of interface are listed in the table below.

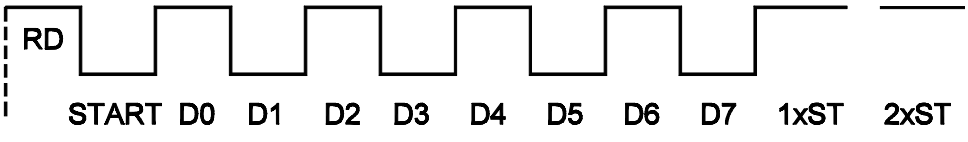
STRIP	TTL SERIAL	TTL PARALLEL	RS232 SERIAL	CENTRONIC PARALLEL
20 PIN	EITHER	EITHER	2 - 3	1 - 2
3 PIN	1 - 2	1 - 2	2 - 3	2 - 3
PIN 17 J4	0 (GND)	1 (Vcc)	EITHER	EITHER

(Tab.2.1)

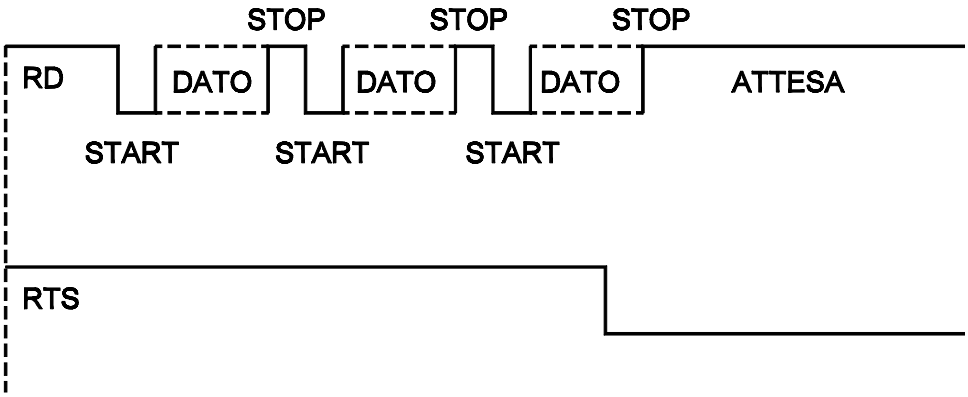
2.1 TTL SERIAL

The connection is made through connector J4.
In the serial protocol, the signals which distinguish the communication are TD, RD, and RTS if the RTS/CTS protocol has been selected while, if the XON/XOFF protocol has been selected, the signals are TD and RD.

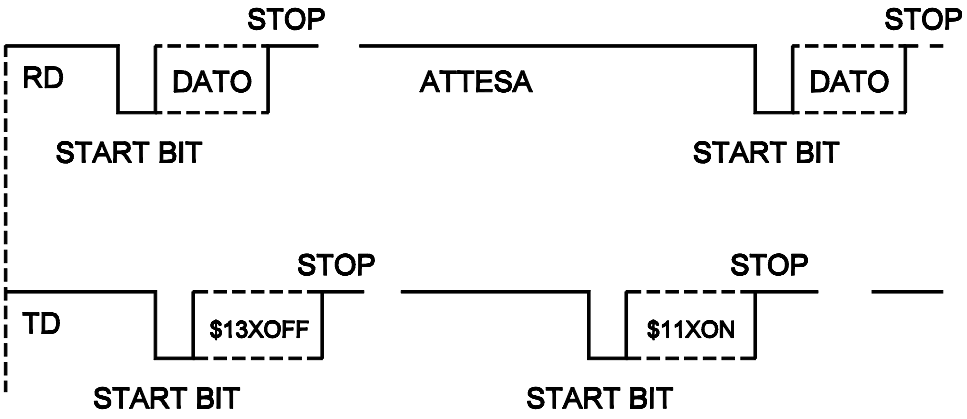
Transmission format



RTS/CTS protocol



XON/XOFF protocol



(Fig.2.2)

The pin patter of the J4 connector is as follows

PIN	SIGNAL	DIRECT-ION	DESCRIPTION
1	+VT	-	
2	+VT	-	
3	Vdc	-	
4	Vdc	-	
5	GND	-	
6	GND	-	
7	TD	OUT	Serial transmission
8	D6	IN	See parameter selection
9	D5	IN	See parameter selection
10	D4	IN	See parameter selection
11	D3	IN	See parameter selection
12	D2	IN	See parameter selection
13	D1	IN	See parameter selection
14	D0	IN	See parameter selection
15	D7	IN	See parameter selection
16	RESET	IN	Active low resets the printer
17	CONNECT TO GND	IN	
18	RTS	OUT	if high (1) printer receiving data, if low (0) buffer full
19	FEED KEY	IN	Paper forward feed, active at low level
20	RX	IN	Serial reception

(Tab.2.2)

Pin 17 must be connected to GND in order to select serial.

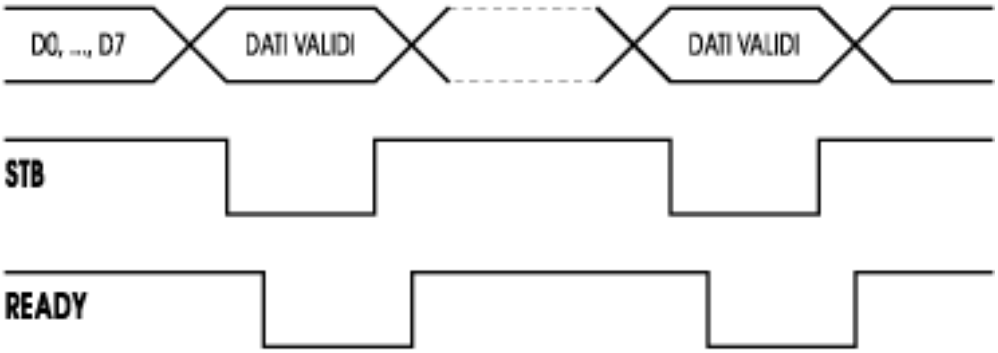
.

2.2 TTL PARALLEL

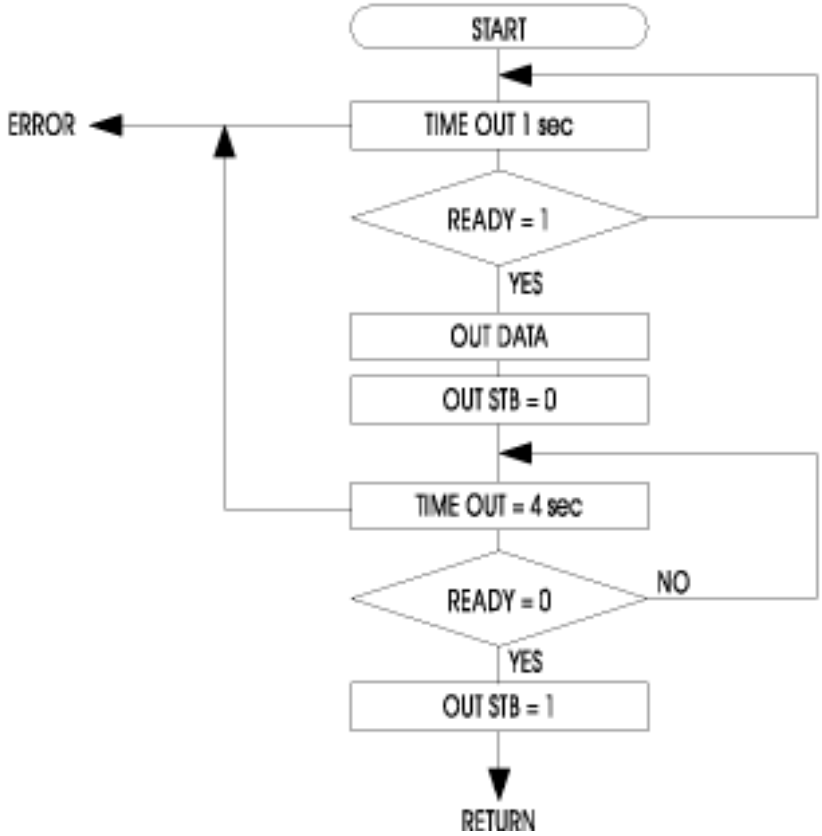
The connection is made through connector J4.
In the parallel communication the signals which can be used are:

1) 7 or 8 bit data buses;
2) STROBE signal indicating the validity of the data;
3) READY signal indicating that the printer is ready to receive data.

Transmission format



Flow diagram



(Fig.2.3)

The pin pattern of connector J4 is the following

PIN	SIGNAL	DIRECT-ION	DESCRIPTION
1	+VT	-	
2	+VT	-	
3	Vdc	-	
4	Vdc	-	
5	GND	-	
6	GND	-	
7	DO NOT CONNECT	-	
8	D6	IN	Data transmitted to printer
9	D5	IN	Data transmitted to printer
10	D4	IN	Data transmitted to printer
11	D3	IN	Data transmitted to printer
12	D2	IN	Data transmitted to printer
13	D1	IN	Data transmitted to printer
14	D0	IN	Data transmitted to printer
15	D7(*)	IN	Data transmitted to printer
16	RESET	IN	Active low resets printer
17	CONNECT TO Vdc	IN	
18	READY	OUT	if high (1) printer receiving data, if low (0) buffer full
19	FEED KEY	IN	Paper forward feed, active at low level
20	STROBE	IN	

(Tab.2.3)

PPin 17 must be connected to Vcc in order to select parallel.
(*) The signal D7 is not taken into consideration of the programming of the parallel port is 7 bit. In order to configure the PR24/40 with the extended character set,the parallel interface must be 8-bit programmed.

2.3 RS232 SERIAL

The printer has a RS232 serial interface and is connected by means of a 25-pin female rectangular connector (J8).
In the following table, the signals present on the connector are listed. The pins not connected are:

PIN	SIGNAL	DIRECTION	DESCRIPTION
2 - 7	GND	-	Signal ground
2	TXD	OUT	Data transmission in RS232
3	RXD	IN	Data reception in RS232
4	DTR	OUT	Printer ON(active at high level)
20	RTS	OUT	Available to receive data (active at high level)

(Tab.2.4)

2.4 CENTRONICS PARALLEL

LThe printer has a Centronics parallel interface and is connected by means of a 25-pin female rectangular connector (J8).
In the parallel communication the signals which can be used are:

1) 7 or 8 bit data buses;
2) STROBE signal indicating the validity of the data;
3) the BUSY signal which indicates that the printer is ready to receive data;
4) the ACK signal for data reading acknowledgement.

In the following table, the signals present on the connector are listed:

PIN	SIGNAL	DIRECT-ION	DESCRIPTION
1	Strobe	IN	A low level impulse indicates that the data is ready to be read
2	Data bit 0	IN	Data transmitted to printer
3	Data bit 1	IN	
4	Data bit 2	IN	
5	Data bit 3	IN	
6	Data bit 4	IN	
7	Data bit 5	IN	
8	Data bit 6	IN	
9	Data bit 7	IN	
10	ACK	OUT	A low level impulse indicates that the printer is ready to receive more data
11	BUSY	OUT	If high, the printer cannot receive
12	PAPER END	OUT	Always to GND
13	SELECT	OUT	Connection to Vdc with R of 10 KΩ
16	RESET	IN	Initializes the printer
17-25	GND	-	

(Tab.2.5)

2.5 PARAMETER SELECTION

D0, ..., D7 (inputs): data buses. In the parallel configuration, these correspond to the printer input data bus (the high level indicates binary digit 1). In serial communication these are used to determine the communication speed and transmission protocol: by default serial parameter selection is carried out during printer setup (see paragraph 1.2). Normally, the data bus is on logical level 1: to obtain logical level 0, shortcircuit to ground (GND).

The serial baud rate is settable as shown in the table below:

D0	D1	D2	BAUD
0	0	1	300
1	0	1	600
1	1	1	1200
0	1	1	2400
0	0	0	4800
1	0	0	9600

(Tab.2.6)

All other combinations select the speed at 1200 baud.

D3 = 1: flag type transmission protocol. When the print buffer is full, the printer sends a low level on the RTS signal, which interrupts transmission; when the buffer is able to receive more data, the level of the RTS signal changes to 1.
D3 = 0: XON/XOFF type transmission protocol. When the print buffer is full, the printer sends a XON $13 (DC3) command, which interrupts transmission; when the buffer is able to receive more data, the command XON $11 (DC1) signal is transmitted.

D5, D6, D7: the selection of these bits causes configuration in serial with the transmission format listed in the table below:

D7	D6	D5	Format
1	1	1	8 non parity bits and 1 stop bit
0	1	1	8 EVEN parity bits 1 stop bit
0	1	0	8 ODD parity bits and 1 stop bit
1	1	0	7 non parity bits and 1 stop bit
1	0	1	7 EVEN parity bits and 1 stop bit
1	0	0	7 ODD parity bits and 1 stop bit

(Tab.2.7)

Remember that in order to configure the printer in serial mode, the signal S-EN must be shortcircuited to ground on connector J1.

RESET (input): reset card controller, active at low level. The reset initializes the printer parameters, with the following effects:
the line buffer and print buffer are erased;
the print format is selected according to programming;
the S-EN pin of J1 is read for serial or parallel configuration;
the autotest is printed, on pressing the PRINT key;
the functioning of any optional cards is checked.

READY/RTS (output): in the parallel configuration the high level indicates that the printer is ready to receive data. A low level indicates that the printer is on standby (bus Y). In serial communication if the CTS/RTS protocol is enabled, the high logic state (1) indicates that the printer is ready to receive data; the low logic state (0) indicates that the print buffer is full and cannot accept data. If the XON/XOFF serial protocol is activated, the signal is always high.

FEED (input and output): paper feed key, active at low level. This signal is in parallel with respect to the contacts of the FEED key on the front of the printer.

STB/RD (input): in the parallel configuration, a low level indicates to the printer that there is valid data on the data buses (D0, ..., D7). In the serial configuration, it corresponds to the data reception pin.

TP (input and output): PRINT key, active at low level. This signal is in parallel with respect to the contacts of the PRINT key on the front of the printer.

2.6 REAL TIME CLOCK (option)

The Real Time Clock is available as an option.
Printing and adjustment of the clock are managed by a series of control characters, described as follows.

N.B.
For the real time clock control characters, please refer to description of the printer command sets in chapter 3.

2.6.1 Adjusting the clock through the key pad

The time and date can be adjusted using the PRINT and FEED keys on the printer. To set, proceed as follows:

- While holding down the FEED key, press the PRINT key. The printer will print the time and date with an arrow indicating the digit to be modified;
- Each time the PRINT key is pressed, the digit marked by the arrow will Increase and an updated version will be printed;
- To proceed to modify another digit, press the FEED key again. Each time the printer will print the updated time and date, highlighting with an arrow the currently selected digit;
- To terminate the setting procedure, press PRINT and FEED at the same time, or scroll all the parameters.

2.6.2 Hour counter

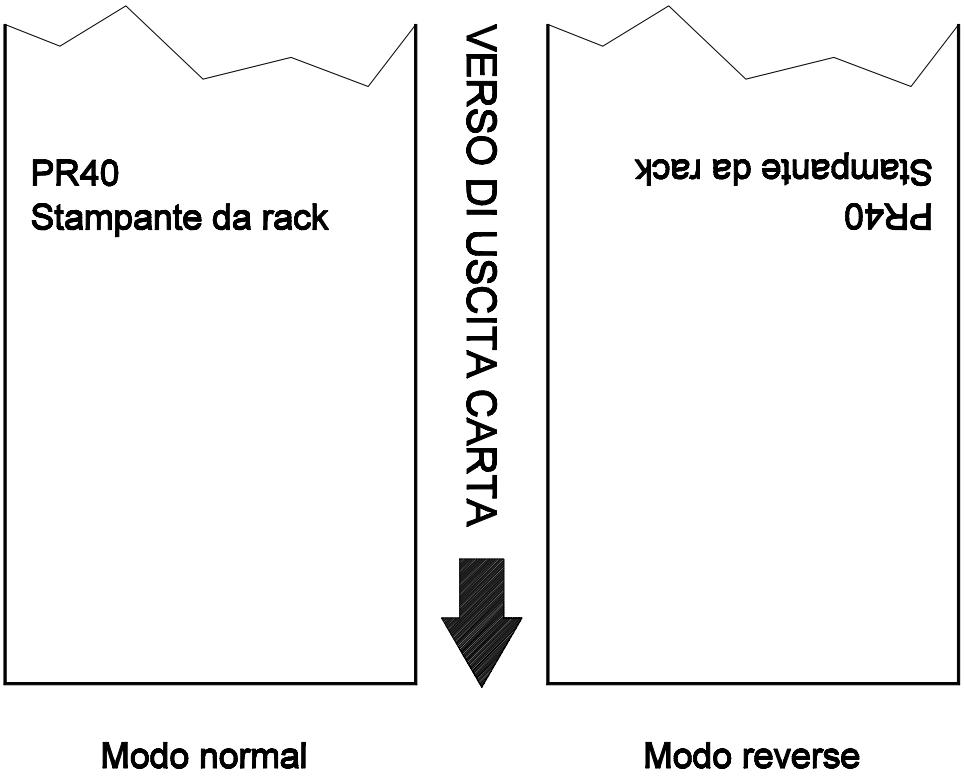
Incorporated in the Real Time Clock this function stores the total operating hours of the printer.
It is managed by three control characters (only if the Real Time Clock is installed):

ESC O Transmits total operating hours in serial.
ESC o Inserts the total operating hours in the line buffer, enabling it to be printed inside any string whatsoever.

For further information on the control characters that manage the Real Time Clock, please consult chapter 3.

3.1 PRINT DIRECTION

The PR24/40 printer has two printing directions which can be selected by means of control characters:
normal and reverse.



(Fig.3.1)

The basic character matrix is 6 x 10 dots. The characters can be printed in various formats. The following table shows the dimensions of the various formats of characters according to the printer model , 24- or 40 column.

	Character dimensions (L x H mm)	
Print formats	**24 columns**	**40 columns**
Normal	1.7 x 2.6	1.1 x 2.6
Double height	1.7 x 5.2	1.1 x 5.2
Double width	3.4 x 2.6	2.2 x 2.6
Expanded	3.4 x 5.2	2.2 x 5.2

For further details on the selection of print modes, see later in this chapter.

3.2 CONTROL CHARACTERS

The command table lists all the commands for the management of the PR24/40 printer functions. These commands can be transmitted to the printer with both the serial and parallel interfaces; if, however, the parallel interface is being used, the user will not be able any kind of response, as this interface is uni-directional.
The commands can be transmitted to the printer at any moment, but they will only be carried out when the characters previously transmitted have been printed or the commands previously transmitted have been carried out. There are no commands with priority status; all the commands are carried out when the circular buffer is free to do so.

COMMAND TABLE

(Tab.3.1)

ASCII Comm.	HEX Comm.	Description
	$00	Small character printing
	$01	Double width printing
	$02	Double height printing
	$03	Expanded printing
	$04	Restore small character printing
	$0A	Forward feed one line
	(n) $0B	Forward feed (n) lines
	$0D	Print line buffer
	$0F	Set CRLF mode
	$11	Graphic mode
	$12	Print time and date
	$13	Set time and date
	$14	Transmit time and date in serial
	$17	Print 1st programmable character
	$18	Print 2nd programmable character
	$19	Print 3rd programmable character
	$1A	Print 4th programmable character

ASCII Comm.	HEX Comm.	Description
	$1C	Print 5th programmable character
	$1D	Print 6th programmable character
	$1E	Print 7th programmable character
	$1F	Print 8th programmable character
ESC R	$1B $52	Set reverse mode printing
ESC N	$1B $4E	Set normal mode printing
ESC @	$1B $40	Reset the printer
ESC D	$1B $44	Enter date in print buffer
ESC T	$1B $54	Enter time in print buffer
ESC U	$1B $55	Enter date (mm :dd :yy) nin print buffer
ESC S	$1B $53	Enable printing of seconds
ESC B	$1B $42	Set font 1
ESC b	$1B $62	Set font 2
(aa) ESC r	(aa) $1B $72	Read data at an address (aa)
(aadd) ESC w	(aadd) $1B $77	Write data (dd) at an address (aa)
(dd) ESC G	(dd) $1B $47	Write the value (dd) in the option register
(dd) ESC M	(dd) $1B $4D	Write the value (dd) in the print mode
ESC p	$1B $70	Transmit the option register in serial
ESC m	$1B $6D	Transmit the print mode in serial
ESC s	$1B $73	Transmit the next character in serial
(dd) ESC a	$1B $61	Select the number of dot spaces
ESC J (n)	$1B $4A	Load the programmable character

The following pages provide a detailed description of the individual commands.

00H

[Name]	**Small character print**	
[Format]	ASCII	-
	Hex	00
	Decimal	0
[Description]	The printer prints in small(normal) format	
[Notes]	• The commands from 00H to 09H do not erase the print buffer	
	• The commands that modify the direction of the characters are only enabled at the beginning of the line	
[Default]	Setting in the option register using the front keys	
[Reference]	**01H, 02H, 03H, 04H**	
[Example]		

01H

[Name]	**Double width print**	
[Format]	ASCII	-
	Hex	01
	Decimal	1
[Description]	The printer prints in double width format	
[Notes]	• The commands from 00H to 09H do not erase the print buffer	
	• The commands that modify the direction of the characters are only enabled at the beginning of the line	
[Default]	Setting in the option register using the front keys	
[Reference]	**00H, 02H, 03H, 04H**	
[Example]		

02H

[Name]	**Double height print**	
[Format]	ASCII	-
	Hex	02
	Decimal	2
[Description]	The printer prints in double height format	
[Notes]	• The commands from 00H to 09H do not erase the print buffer	

• The commands that modify the direction of the characters are only enabled at the beginning of the line

[Default] Setting in the option register using the front keys

[Reference] **00H, 01H, 03H, 04H**

[Example]

03H

[Name] **Expanded printing**

[Format] ASCII -

Hex 03

Decimal 3

[Description] The printer prints in expanded character mode

[Notes] • The commands from 00H to 09H do not erase the print buffer

• The commands that modify the size of the characters are only enabled at the beginning of the line

[Default] Setting in the option register using the front keys

[Reference] **00H, 01H, 02H, 04H**

[Example]

04H

[Name] **Reset small character print**

[Format] ASCII -

Hex 04

Decimal 4

[Description] The printer resumes printing with small characters

[Notes] • The commands from 00H to 09H do not erase the print buffer

• The commands that modify the size of the characters are only enabled at the beginning of the line

[Default] Setting in the option register using the front keys

[Reference] **00H, 01H, 02H, 03H**

[Example]

0AH

[Name] **Forward feed one line**

[Format] ASCII -
Hex 0A
Decimal 10

[Description] Forward feeds one line equivalent to a line of print

[Notes] • This command prints the contents of the buffer

[Default]

[Reference] **0BH**

[Example]

(n) 0BH

[Name] **Forward feed (n) lines**

[Format] ASCII -
Hex 0B
Decimal 11

[Description] Carries out the number of line feeds specified in n

[Notes] • The number must be ASCII and between 0 and 9 (when n=0 the command is ignored)
• This command erases the line buffer

[Default]

[Reference] **0AH**

[Example] If you wish to forward feed rapidly by 5 lines, simply transmit:
$35 $0B (or 5 and the command $0B)

0DH

[Name] **Print the line buffer**

[Format] ASCII -
Hex 0D
Decimal 13

[Description] This command prints the line buffer

[Notes] • If the buffer is empty, the command is ignored
• If the CRLF option is set, this command is ignored and the printer only prints when the command $0A is transmitted

[Default]
[Reference] **0FH**
[Example]

0FH

[Name] **Set CRLF mode**
[Format] ASCII -
Hex 0F
Decimal 15
[Description] It inhibits the command $0D, maintaining only the command $0A enabled for printing.
[Notes] • To disable this option, reset the printer
• This command erases the line buffer
• When the printer is switched on, the default value is in the Option Register
[Default] Setting in the option register using the front keys
[Reference] **0DH**
[Example]

11H

[Name] **Graphic mode**
[Format] ASCII -
Hex 11
Decimal 17
[Description] Enables graphic mode:
one line in 24 column mode is equivalent to 144 horizontal dots divided into 24 6-dot blocks; one line in 40 column mode is equivalent to 240 horizontal dots divided into 40 6-dot blocks.
[Notes] To print in graphic mode, send the command $11 at the beginning of each line. The byte pattern in the graphic configuration is:

X	**R**	**P6**	**P5**	**P4**	**P3**	**P2**	**P1**
D7	D6	D5	D4	D3	D2	D1	D0

where:
X is not used (we recommend 0);
R must be set at level 1;
P1,.P6 are the data of the graphic dots (1 prints, 0 does not print).

The bit P6 of the string of dots transmitted is printed on the left and the others (P5, P4, P3, P2, P1) follow from left to right as illustrated:

The 1st byte ➔ The 2nd byte ➔ The 3rd byte ➔

P6 P5 P4 P3 P2 P1 P6 P5 P4 P3 P2 P1 P6 P5 P4 P3 P2 P1

[Default]

[Reference]

[Example] To print a line of dots, transmit:
$11, n x $7F (where n is the number of characters per line), $0D.
To print an empty line, transmit:
$11, $40, $0D.

12H

[Name] **Print the time and date**

[Format] ASCII -
Hex 12
Decimal 18

[Description] This prints the time and date in the following format:
hh : mm dd - mm - yy
If the seconds option is enabled, the format will be:
hh : mm : ss dd - mm - yy

[Notes] • This command resets the line

[Default]

[Reference] **13H, 14H**

[Example]

13H

[Name] **Set the time and date**

[Format] ASCII -
Hex 13
Decimal 19

[Description] This command sets the time and date in two possible ways: the first uses the 24-hour clock and the second the 12-hour antemeridian and postmeridian clock. To set the time in the first way, transmit the 10 ASCII characters relative to the time and

date followed by $13. To set the time in the second way, transmit the 10 ASCII characters relative to the time and date preceded by ”A” or ”P” and followed by $13.

[Notes] • It is advisable to transmit the command $0D first, in order to empty the print buffer

[Default]

[Reference] **12H, 14H**

[Example] To set the time 12:45 on 19-01-93, send the following sequence:

1	2	4	5	1	9	0	1	9	3	$13
$31	$32	$34	$35	$31	$39	$30	$31	$39	$33	$13

To set the time A12:45 on 19-01-93 send the following sequence:

A	1	2	4	5	1	9	0	1	9	3	$13
$41	$31	$32	$34	$35	$31	$39	$30	$31	$39	$33	$13

14H

[Name] **Transmit the time and date in serial**

[Format] ASCII -
Hex 14
Decimal 20

[Description] Transmit the time and date on the serial port in the format of 11 ASCII characters: hour/minutes/day/month/year + (CR) $0D

[Notes]

[Default]

[Reference] **12H, 13H**

[Example]

17H,...1FH

[Name] **Print the 1st (...8th) programmable character**

[Format] ASCII -
Hex 17, ...1F
Decimal 23, ...31

[Description] This command causes the printing of the corresponding programmable character.

[Notes]

[Default] BIT MAP contained in flash
[Reference] **17H, 18H, 19H, 1AH, 1CH, 1DH, 1EH, 1FH**
[Example]

ESC R

[Name] **Set the printer in reverse mode**
[Format]

ASCII	ESC	R
Hex	1B	52
Decimal	27	82

[Description] Selects reverse mode printing: the ticket feeds out of the printer with the printing the right way up, running from left to right
[Notes]
[Default] Setting in the option register using the front keys
[Reference] **ESC N**
[Example]

ESC N

[Name] **Set normal mode printing**
[Format]

ASCII	ESC	N
Hex	1B	4E
Decimal	27	78

[Description] Selects normal mode printing: the ticket feeds out of the printer with the printing upside down, running from right to left
[Notes]
[Default] Setting in the option register using the front keys
[Reference] **ESC R**
[Example]

ESC @

[Name] **Reset printer**
[Format]

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

[Description] Erases all the date in the print buffer and resets the printer mode to the one enabled when the printer was switched on

[Notes]
- Same as hardware reset
- Once the command has been transmitted, approx. 1.5 seconds elapse before the printer becomes active again

[Default]

[Reference]

[Example] This can be useful when switching on in order to avoid the transmitting of false characters during initialization by the master device

ESC D

[Name] **Store date in print buffer**

[Format]

ASCII	ESC	D
Hex	1B	44
Decimal	27	68

[Description] Enter in the buffer the date of the real time clock fitted inside the printer: the format is dd - mm - yy.

[Notes]
- The date is printed in 8 characters: if there is not enough room in the print buffer, it will not be printed
- Does not zero-set the line buffer

[Default]

[Reference] **ESC T, ESC U**

[Example] If you wish to write:

DATE: 11-09-93 TEST OK

transmit DATE: $1b $44 TEST OK $0D

to print just the date $1B $44 $0D”

ESC T

[Name] **Store time of day in print buffer**

[Format]

ASCII	ESC	T
Hex	1B	54
Decimal	27	84

[Description] Enter in the buffer the time of the real time clock fitted inside the printer: the format is hh : mm.

[Notes] • The time is printer in 5 characters and if the seconds option is enabled, in 8 characters: if there is not enough space in the buffer, it will not be printed
• It does not zero-set the line buffer

[Default]

[Reference] **ESC D, ESC U, ESC S**

[Example] If you wish to write:
TIME: 16:45 TEST OK
transmit TIME: $1b $54 TEST OK $0D
to print just the date $1B $54 $0D

ESC U

[Name] **Store date (mm-dd-yy) in print buffer**

[Format]

ASCII	ESC	U
Hex	1B	55
Decimal	27	85

[Description] Enter in the buffer the date of the real time clock fitted inside the printer, American style: mm - dd - yy.

[Notes] • The date is printed in 8 characters: if there is not enough space in the buffer, it will not be printed
• It does not zero-set the line buffer

[Default]

[Reference] **ESC D, ESC T**

[Example] If you wish to write:
DATE: 09-11-93 TEST OK
transmit DATE: $1b $55 TEST OK $0D
to print just the date $1B $55 $0D”

ESC S

[Name] **Enable printing of seconds**

[Format]

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

[Description] This enables the printing of seconds when the time is asked through the command ESC T

[Notes]

[Default] Setting in the option register using the front keys
[Reference] **ESC T**
[Example]

ESC B

[Name] **Set font 1**
[Format]

ASCII	ESC	B
Hex	1B	42
Decimal	27	66

[Description] Select the first character font
[Notes] • The complete font is printed during the autotest. Some codes are not standard: $60, $7B, $7C, $7D, $7E, $7F, $8D, $ED, $FA, $FF
[Default] Setting in the option register using the front keys
[Reference] **ESC b**
[Example]

ESC b

[Name] **Set font 2**
[Format]

ASCII	ESC	b
Hex	1B	62
Decimal	27	98

[Description] Select the second character font
[Notes] • The complete font is printed during the autotest. The font contains cyrillic characters
[Default] Setting in the option register using the front keys
[Reference] **ESC B**
[Example]

(aa) ESC r

[Name] **Read a piece of data at an address (aa)**
[Format]

ASCII	aH	aL	ESC	r
Hex	aH	aL	1B	72
Decimal	aH	aL	27	114

[Description] Reads a memory location (EEPROM) at address *a*:
aH is the most significant nibble of *a*expressed in ASCII
aL is the least significant nibble of di *a* expressed in ASCII

[Notes] • There are 256 legible locations (from $00 to $FF)

[Default] The whole memory bank contains the value $20 by default

[Reference] **ESC w**

[Example] To read the address $01, transmit the following in ASCII:
$30 $31 $1B $72
If the address $01 contains $A5, we will receive:
$41 $35

(aadd) ESC w

[Name] **Write a piece of data (dd) in an address (aa)**

[Format]

ASCII	aH	aL	dH	dL	ESC	w
Hex	aH	aL	dH	dL	1B	77
Decimal	aH	aL	dH	dL	27	119

[Description] Saves a piece of data *d*in address *a* in the memory (EEPROM):
aH is the most significant nibble of*a* expressed in ASCII
aL is the least significant nibble of *a*expressed in ASCII
dH is the most significant nibble of *d*expressed in ASCII
dL is the least significant nibble of *d* expressed in ASCII

[Notes] • There are 256 writable locations (from $00 to $FF), the data must be a maximum of $FF (255) and both the addresses and the data must be expressed in ASCII on two bytes

[Default] The whole memory bank contains the value $20 by default

[Reference] **ESC r**

[Example] To save the data $A5 in the address $01, transmit:
$30 $31 $41 $35 $1B $77

(dd) ESC G

[Name] **Write the value (dd) in the option register**

[Format]

ASCII	dH	dL	ESC	G
Hex	dH	dL	1B	47
Decimal	dH	dL	27	71

[Description] Modify the configuration register. (dd) are two ASCII CHARACTERSthat represent the hexadecimal code for the

programming of the register.

(dd)	bit=0	bit=1
bit0:setting of real time clock	disabled	enabled
bit1: print direction	normal	reverse
bit2: number of bits in parallel reception	8	7
bit3: printing of seconds	disabled	enabled
bit4: CR ($0D)	enabled	disabled
bit5: selection of reception parameters	hardware	software (dipswitch)
bit6: font selection	font 1	font 2
bit7: reception buffer	1Kbyte	N°columns

[Notes] • The setting is stored in the EEPROM and assumed as default value the next time the printer is switched on

[Default]

[Reference]

[Example] To send the setting byte 00001001 ($09):

$30 $39 $1B $47

(dd) ESC M

[Name] **Write the value (dd) in the print mode**

[Format]

ASCII	dH	dL	ESC	M
Hex	dH	dL	1B	4D
Decimal	dH	dL	27	77

[Description] Sets the default parameters in the print mode:
$00 small character printing
$01 double width printing
$02 double height printing
$03 expanded printing

[Notes] • The setting is stored in the EEPROM

[Default] Setting through the front keys

[Reference] **ESC m**

[Example] To print in double height mode, transmit:

$30 $32 $1B $4D

ESC p

[Name] **Transmit the configuration register in serial**

[Format]

ASCII	ESC	p
Hex	1B	70
Decimal	27	112

[Description] Transmits the option register byte on the serial port

[Notes] • If the parallel protocol is in use, nothing will be transmitted

[Default]

[Reference] **ESC G**

[Example] The response is on two bytes. For example, if you receive:

$30 $39

it means that the default configuration is 00001001

ESC m

[Name] **Transmit the print mode in serial**

[Format]

ASCII	ESC	m
Hex	1B	6D
Decimal	27	109

[Description] Transmits the print mode configuration on the serial port

[Notes] • If the parallel protocol is in use, nothing will be transmitted

[Default] Setting in the option register using the front keys

[Reference] **ESC B**

[Example] The response is on two bytes. For example, if you receive:

$30, $32

it means that double height printing is enabled

ESC s

[Name] **Transmit the next character in serial**

[Format]

ASCII	ESC	s
Hex	1B	73
Decimal	27	115

[Description] Transmits the next character received on the serial port

[Notes]

[Default]

[Reference]

[Example] If you transmit: ESC s A
the last character, A, is not printed, but immediately transmitted on the serial line

(dd) ESC a

[Name] **Select the number of dot spaces**

[Format]

ASCII	(dd)	ESC	a
Hex	(dd)	1B	61
Decimal	(dd)	27	97

[Description] (dd) are two ASCII characters that identify a hexadecimal byte and correspond to the number of dot lines between one line of print and another

[Notes]

[Default] = 0

[Reference]

[Example]

ESC J (n) 10*(d)

[Name] **Load the programmable character**

[Format]

ASCII	ESC	J	(n)
Hex	1B	4A	(n)
Decimal	27	74	(n)

[Description] (n) corresponds to the number of characters which can vary from 1 to 8.
The bit map representing the character is contained in the 10 bytes that follow, expressed in binary code. The formatting of these bytes is as follows:

bit	7	6	5	4	3	2	1	0
	0	1	d	d	d	d	d	d

[Notes]

[Default] The 8 characters present when the printer is switched on are loaded with a bit map contained in the printer flash. Any user who wishes to modify these bit maps must upgrade the firmware.

[Reference]

[Example] If you wish the symbol of the code $1F to be #, transmit ESC J 2 followed by the 10 bytes making up the character:
$1B $4A $32 $52 $52 $52 $7F $52 $52 $7F $52 $52 $52

4.1 TECHNICAL SPECIFICATIONS

Table 4.1 lists the main technical features of the printer.

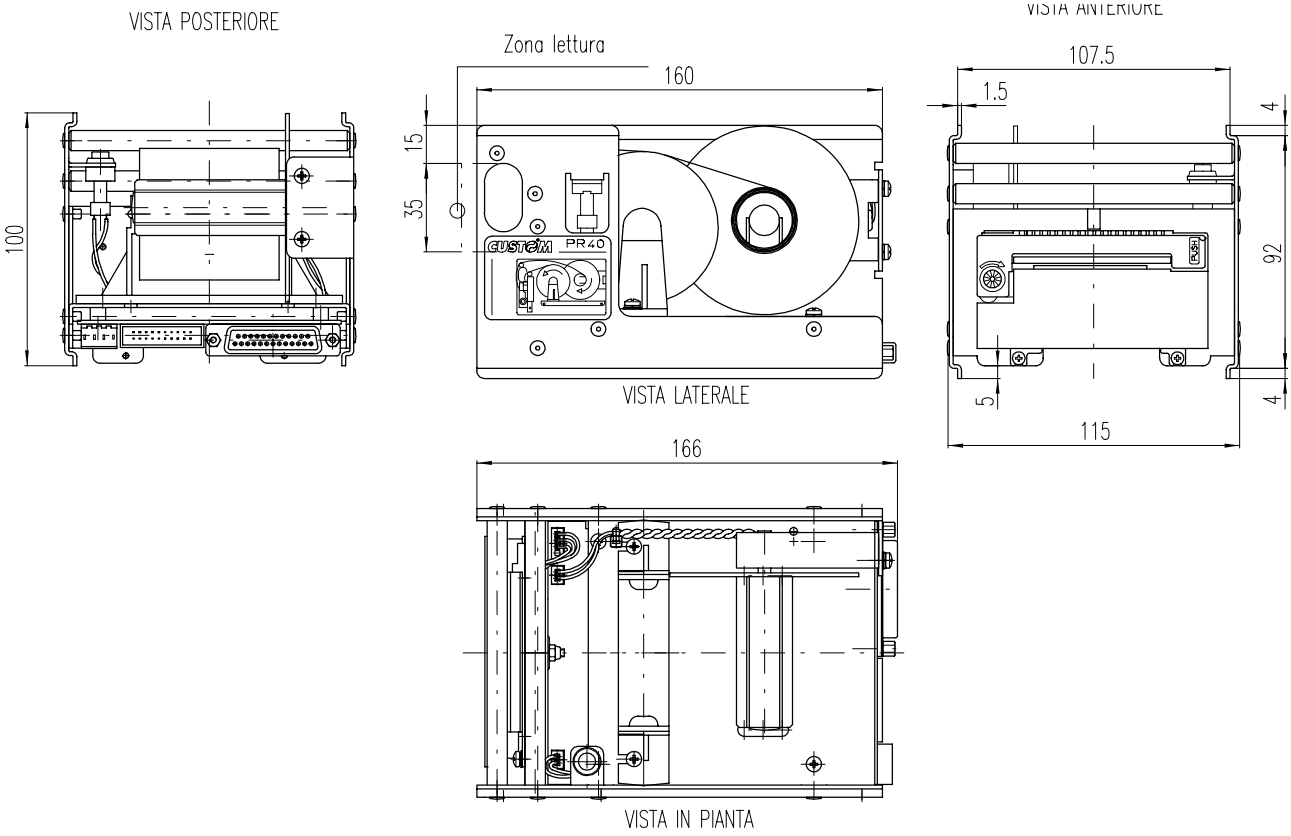
(Tab.4.1)

Columns	**24**	**40**
Character (L x H mm)		
Normal	1.7 x 2.6	1.1 x 2.6
Double width	1.7 x 5.2	1.1 x 5.2
Double height	3.4 x 2.6	2.2 x 2.6
Expanded	3.4 x 5.2	2.2 x 5.2
Graphic dot	0.33 x 0.38	0.19 x 0.38
Custom emulation dots per line	144	240
Print speed		
Lines / sec	2.5	1.5
Characters/ sec	60	60
Feed (lines / sec)	6	3,6
Line buffer	24 bytes	40 bytes
Print buffer	150 bytes	
Print method	Dot matrix impact	
Character matrix	6 x 10 dots	
Print direction	Normal and reverse	
Character set	Normal and extended	
Paper roll dimensions	57.5 +/- 0.5 mm x Ø60 mm max	
Interfaces	TTL serial & parallel TTL, RS232 serial and Centronics parallel	
Power supply	Double and single 5 Vdc ± 10% Single 9 - 40 Vdc optional	

Absorption (with 5 Volt power supply)	
Stand-by	50 mA
Medium when printing	880 mA
Impulsive when printing	3.5 A (600 µSec)
Environmentals conditions	
Operating temperature	0°C - 50°C
Operating humidity	35% - 85%
Storage temperature / humidity	-20°C - +70°C / 10% - 90%
Options	Real Time Clock, 5V, power supply 9/40 V power supply

4.2 DIMENSIONS

The dimensions of the PR24/40 rack printer are shown in the figures below.

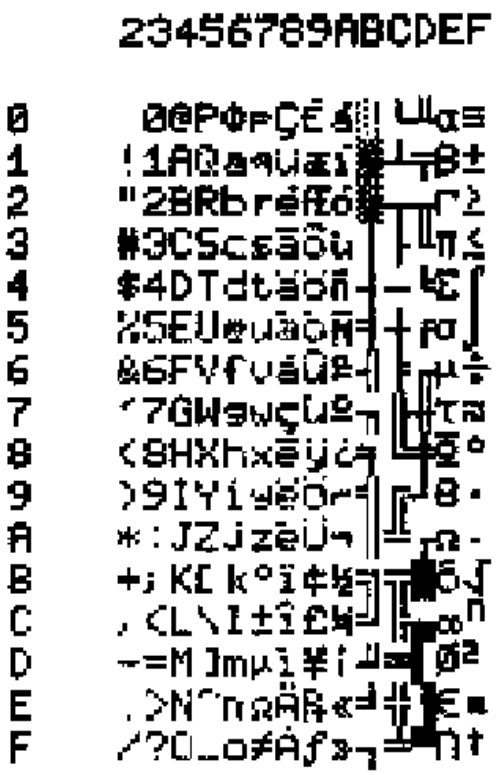


(Fig.4.1)

5.1 CHARACTER SETS

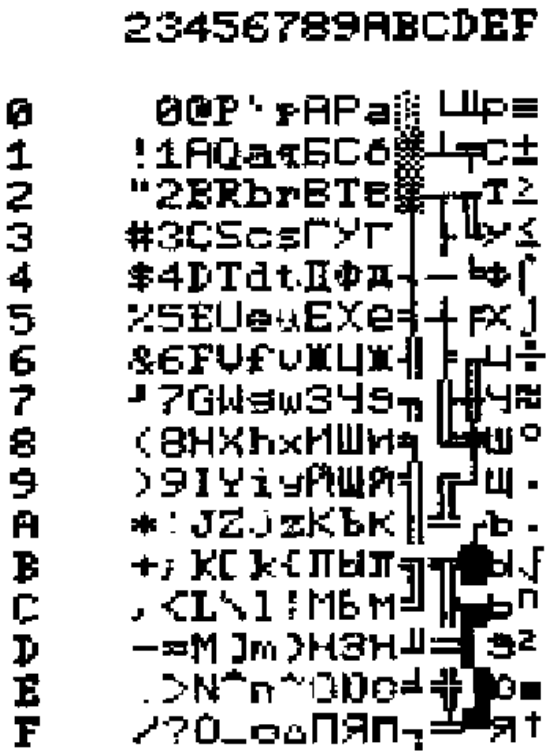
The PR24/40 printer has two characters sets, each containing 224 characters (font 1 and font 2), which can be called up through the programming (paragraph 1.2) or through the control characters (paragraph 3.2).

FONT



(Fig.5.1)

FONT 2



(Fig.5.2)

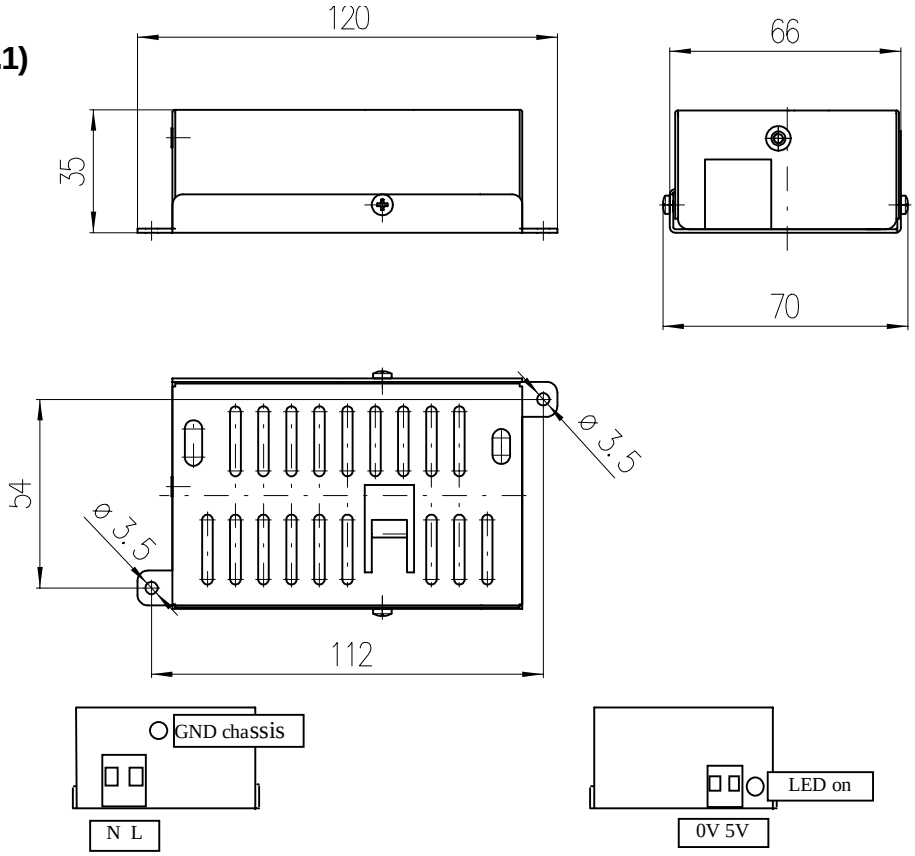
A.1 ACCESSORIES

A.1.1 Power supply

The following figure shows the power supply, manufactured by Custom Engineering, that can be used to operate the PR24/40 printer.
The power supply is available in 3 different models:

- PSM05 for the version fed at 5V
- PSM12 and PSM24 for the version fed at 9 - 40 V

(Fig.A.1)



(Tab.A.1)

Input specifications PSM05		
Input voltage		100 Vac to 240 Vac
Input frequency		50 Hz to 60 Hz
Putput specifications PSM05		
Output voltage		5 V
Output current	Minimum	0 A
	Maximum	3,6 A
	Peak	5 A(1)
	Short Circuit	6 A(2)

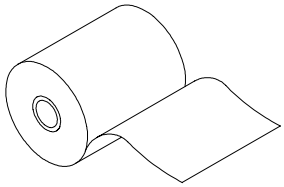
Output specifications PSM12 (for option 9 - 40 Vdc)		
Output voltage		12 V
Output current	Minimum	0 A
	Maximum	4 A
	Peak	6 A
	Short Circuit	6 A

Output specifications PSM24 (for option 9 - 40 Vdc)		
Output voltage		24 V
Output current	Minimum	0 A
	Maximum	2 A
	Peak	3,5 A
	Short Circuit	6 A

A.2 SPARE PARTS

(Tab.A.2)

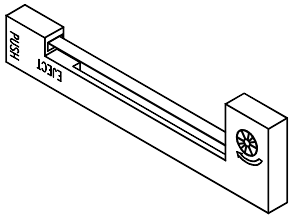
RCN57X50	Normal paper roll			
	Quantity recommended for number of appliances purchased			
N° appliances	<10	<50	<100	>100
Quantity recommended	5	30	60	90



(Fig.A.2)

(Tab.A.3)

ERC09 INK	Ink ribbon			
	Quantity recommended for n° of appliances purchased			
N° appliances	<10	<50	<100	>100
Quantity recommended	5	30	60	90



(Fig.A.3)