FT190 II

USER MANUAL

OEM

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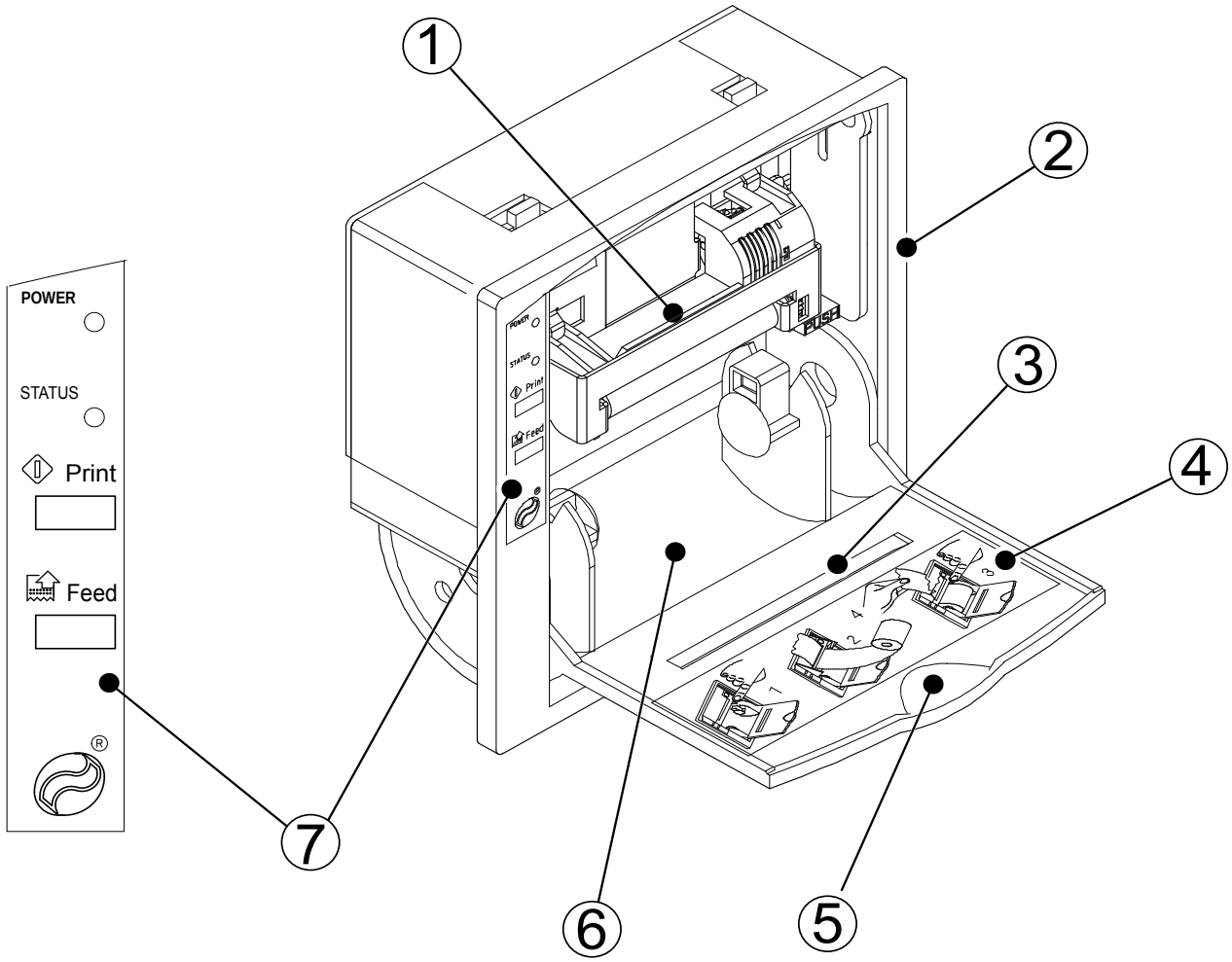
PRINTER COMPONENTS

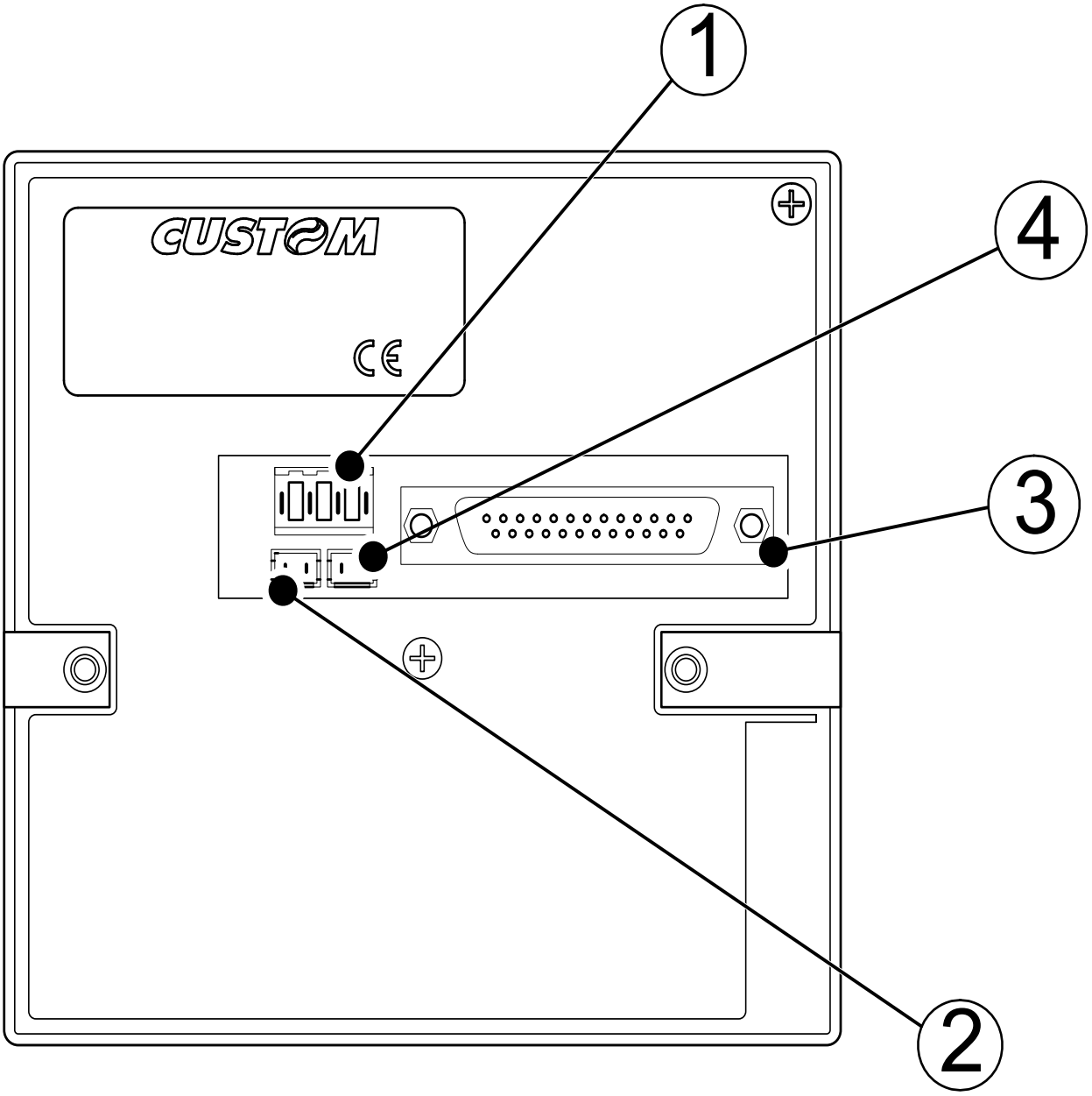
A. FT190 II - Front external view

1- Printing mechanism
2- Case
3- Paper output
4- Paper loading label
5- Front panel
6- Paper roll compartment
7- Control panel



B. FT190 II - Rear external view

1- Power supply connector
2- Paper winder connector
3- Interface connector
4- External “Print” key connector



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1.1 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.
Appendix: Contains a description of printer accessories and spare parts.

1.2 EXPLANATORY 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.

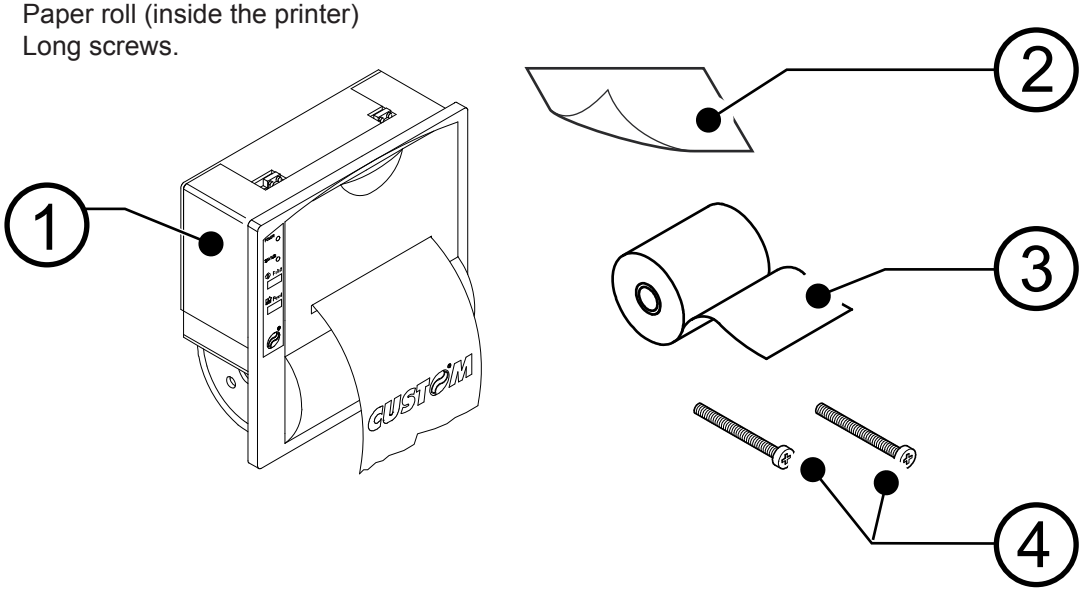
1.3 GENERAL SAFETY INFORMATION

- 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.
- Position the printer in such a way as to ensure that the cables connected to it will not be damaged.
- Use the type of electrical power supply indicated on the printer label. If in doubt, contact your retailer.
- 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.

1.4 UNPACKING THE PRINTER

Remove the printer from the carton, taking care not to damage the packing materials which should be retained for future shipping/moving. Make sure all components listed below are present and not damaged. If any part is missing and/or damaged, contact customer service.

1. Printer
2. Installation instructions
3. Paper roll (inside the printer)
4. Long screws.



(Fig.1)

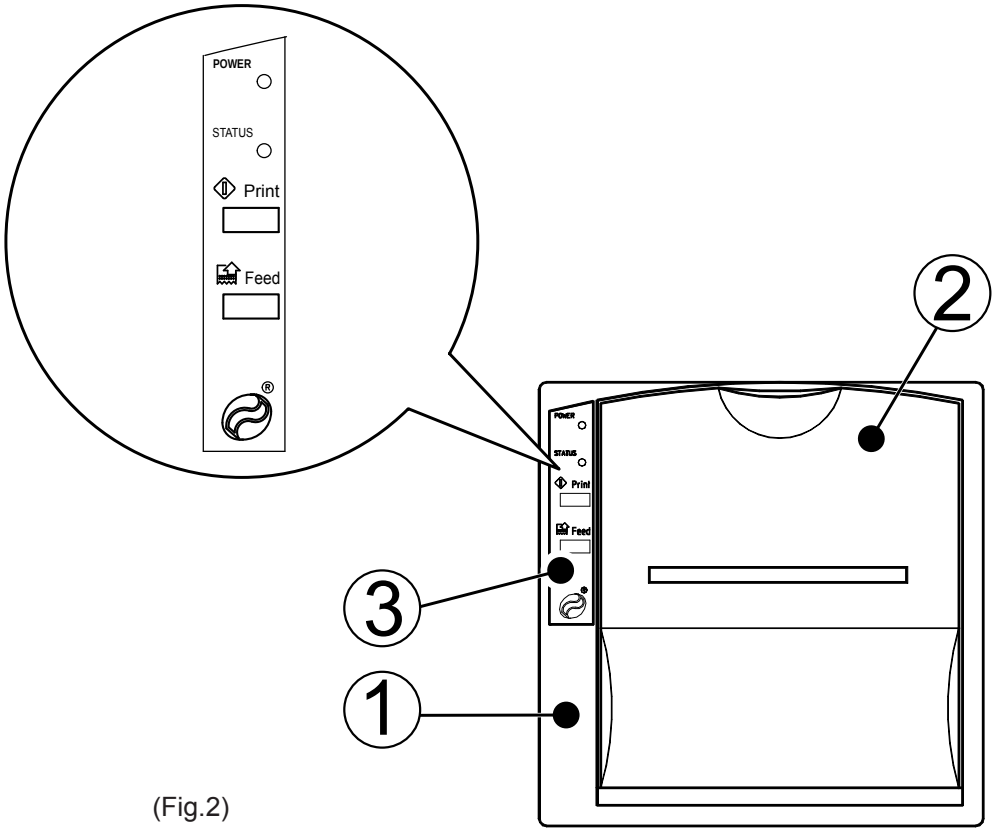
N.B.
Before using the long screws, read the note to paragraph 4.2.

1.5 PRINTER FEATURES

The FT190II is a printer which, in addition to having an innovative design, guarantees high performance and is reliable and user-friendly.
For these reasons, it is 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. Typical fields of application are: weighing systems, receipts (not for tax purposes) as well as for security, controlling and diagnostics purposes.
It has a 200 dpi thermal print mechanism and uses 57.5mm paper rolls. It can print 24 or 40 characters per line according to the selection made at the setup stage or through a software command.
The FT190II printer is so compact and lightweight that it can be installed extremely easily on any type of equipment. It is supplied with two interfaces: an RS232 serial and Centronics parallel interface. To select one or the other interface, some jumpers must be moved. The reception buffer is 1Kbytes. It can also be equipped with a Real Time Clock.

1.6 PRINTER DESCRIPTION

The FT190II printer has an ABS casing (1) with a front cover (2) which opens to allow access to the paper roll and print head. The control panel is located on the front (3) and has a PRINT key, a FEED key and two LEDs: Power and Status.



(Fig.2)

- PRINT key — When pressed, in serial causes the “$0D” control character to be transmitted if enabled during printer setup. In parallel to the PRINT key is the J6 connector which can be used to connect to an external key (fig.1.1).
- 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.
- The POWER LED — Indicates that the printer is receiving a digital power supply.
- The STATUS LED — When flashing, signals that the paper is finished. When lit steadily, it signals the presence of an error (head power supply too high or too low or head temperature too high).

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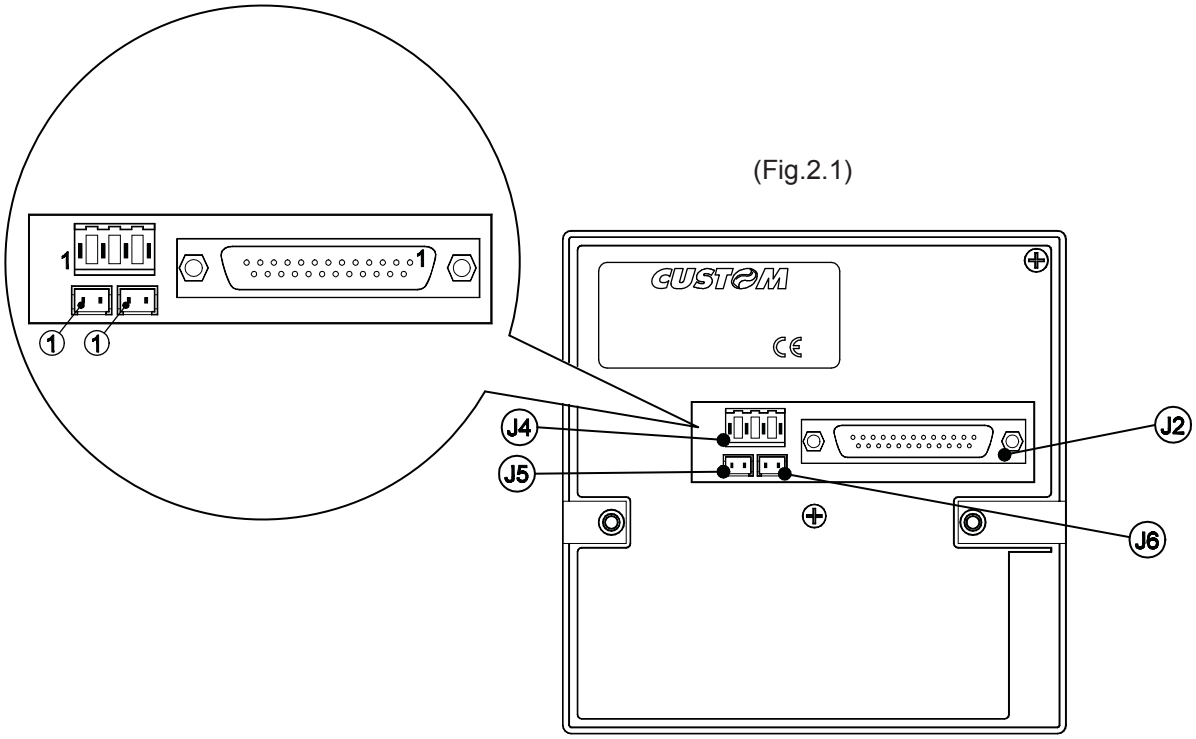
2.1 CONNECTIONS



(Fig.2.1)

2.1.1 Power supply

The printer is equipped with a standard 4-pin male AMPMODU1-type connector (J4) for the power supply (see Fig. 2.1). The signals on the connector pins are as follows:

WARNING:
Respect the polarity of the power supply.

5V VERSION

PIN	SIGNAL	NOTES
1	GND	Ground signal
2	GND	Ground signal
3	+ VT: da 4.5 Vdc a 7 Vdc	(Head power supply)
4	+ VCC: 5 Vdc ± 7%	(Logic power supply)

(Tab. 2.1)

9-40V VERSION

PIN	SIGNAL	NOTES
1	GND	Ground signal
2	GND	Ground signal
3	from 9 Vdc to 40 Vdc	(Head power supply)
4	N.C.	Not connected

(Tab. 2.2)

2.1.2 Paper winder

Connector J5 (fig.2.1) is used to feed the external paper winder. The position and function of the signals are given below in Table 2.3.

PIN	SIGNAL
1	MOTOR +
2	MOTOR -

(Tab. 2.3)

2.1.3 External Print key

An external print key may be connected to connector J6 (fig. 2.1). The polarity and function of the signals are given in Table 2.4.

PIN	SIGNAL
1	PRINT
2	GND

(Tab. 2.4)

2.2 CONFIGURATION

The FT190II enables the configuration of the printer default parameters.This procedure is enabled by holding down the PRINT and FEED keys while switching on, with the jumper JP2 (Fig. 3.1) present on the printer card open. 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. The parameters affected during configuration are:

- **Number of columns:** 24 Columns (16x24) [D], 40 Columns (9x24).
- **Print direction:** Normal or Reverse [D].
- **Character dimension:** Small[D], double width, double height, expanded.
- **Character set:** Font1 [D] or Font2.
- **Automatic feed:** CR disabled or CR enabled[D].
- **Autofeed [(1)]:** attivato [D] o disattivato.
- **Velocità/Consumo:** Low[D], Medium, High.
- **Selection of the red intensity [(2)]:** 0, 1, 2, 3, 4, 5 [D], 6, 7.

If present serial interface :
- **Baud Rate:** 19200, 9600 [D], 4800, 2400, 1200, 600, 300.
- **Protocol:** 8, N, 1[D] (8 bit, parity none, 1 Stop bit)
  8, E, 1 (8 bit, parity even, 1 Stop bit)
  8, O, 1 (8 bit, parity odd, 1 Stop bit)
  7, N, 2 (7 bit, parity none, 2 Stop bit)
  7, E, 1 (7 bit, parity even, 1 Stop bit)
  7, O, 1 (7 bit, parity odd, 1 Stop bit)
- **Flow control:** CTS, RTS, XON, XOFF [D].
- **PRINT key setting:** Null PRINT key, Enables $0D character transmission on pressing PRINT key[D].

If present parallel interface :
- **Length of data:** 7 [D], 8 bits/car.
- **Reception buffer dimension:** 1K byte[D] , 24 byte.

If present RTCK (*real time clock*):
- **Real Time Clock setting:** Enable RTCK [D], Disable RTCK.
- **Printing seconds setting:** Enable seconds, Disable seconds[D].

General note: The parameters marked with the symbol [D] represent the default values.
Note[(1)]: If the function is enabled when the printer receives a characters number equal to the line buffer the next character will place on the left margin in a new line.
Note[(2)]: Using two-colour thermal paper is possible to set different red tonality.

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

2.3 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 and the printing of the complete ASCII character set.

2.4 HEXADECIMAL DUMP

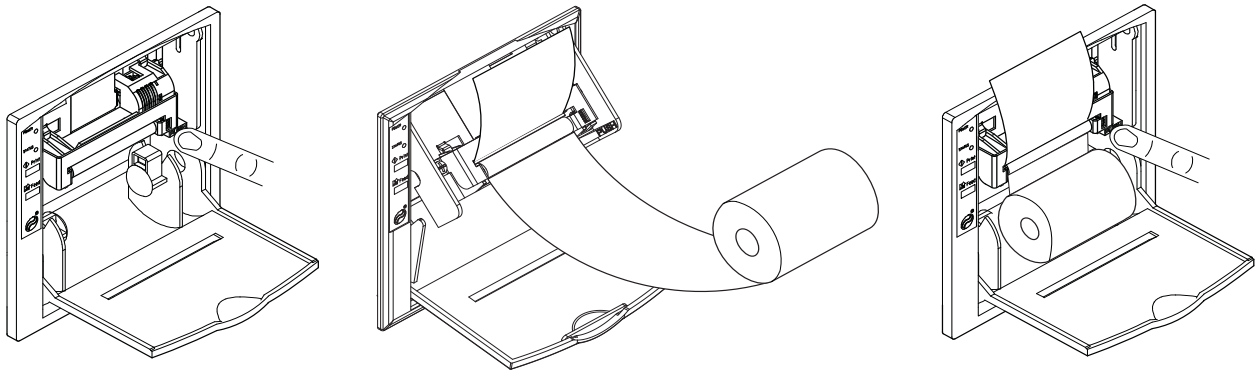
If the PRINT key is held down during switching on, the printer enters Hexadecimal Dump mode. This function is used for the diagnostics of characters received in serial or parallel. In fact, these are printed in hexademical code together with the corresponding ASCII code.

2.5 MAINTENANCE

2.5.1 Changing the paper roll

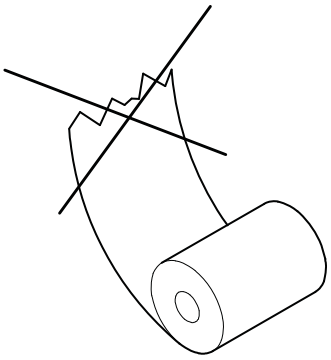
To change the paper roll, proceed as follows:

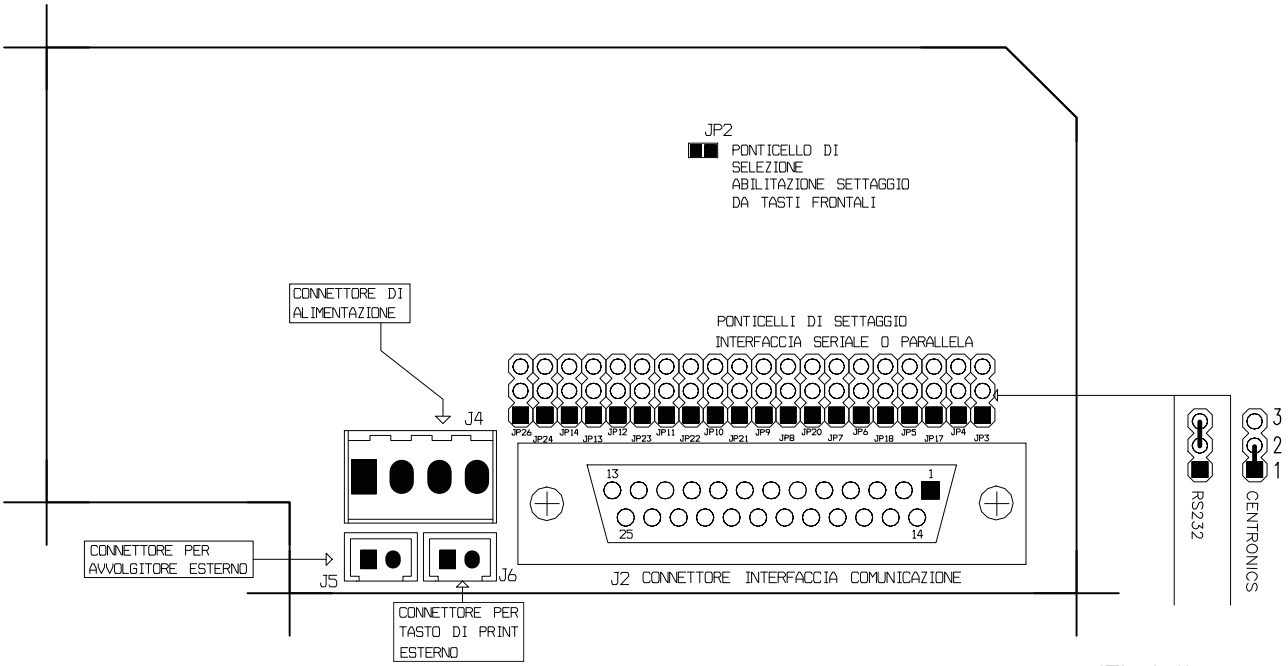
1. Open the printer cover and press down the swinging support of the print mechanism at the point marked PUSH;
2. Insert the end of the paper roll in the slit of the print mechanism and position the paper roll so that it rotates in the right direction, as shown in the figure;
3. The paper is automatically pulled by the roller for 3 or 4 centimetres;
4. Tear off the paper and re-close the cover.



(Fig.2.2)

WARNING
Make sure the paper edge is straight before inserting it in the machine.





(Fig.3.1)

The selection of the RS232 or CENTRONICS interface is made through the 20-contact strip:
When the strip is placed in position 1-2 (fig.3.1) the standard CENTRONICS interface is selected; when placed in position 2-3 the RS232 interface is selected.

3.1 RS232 SERIAL

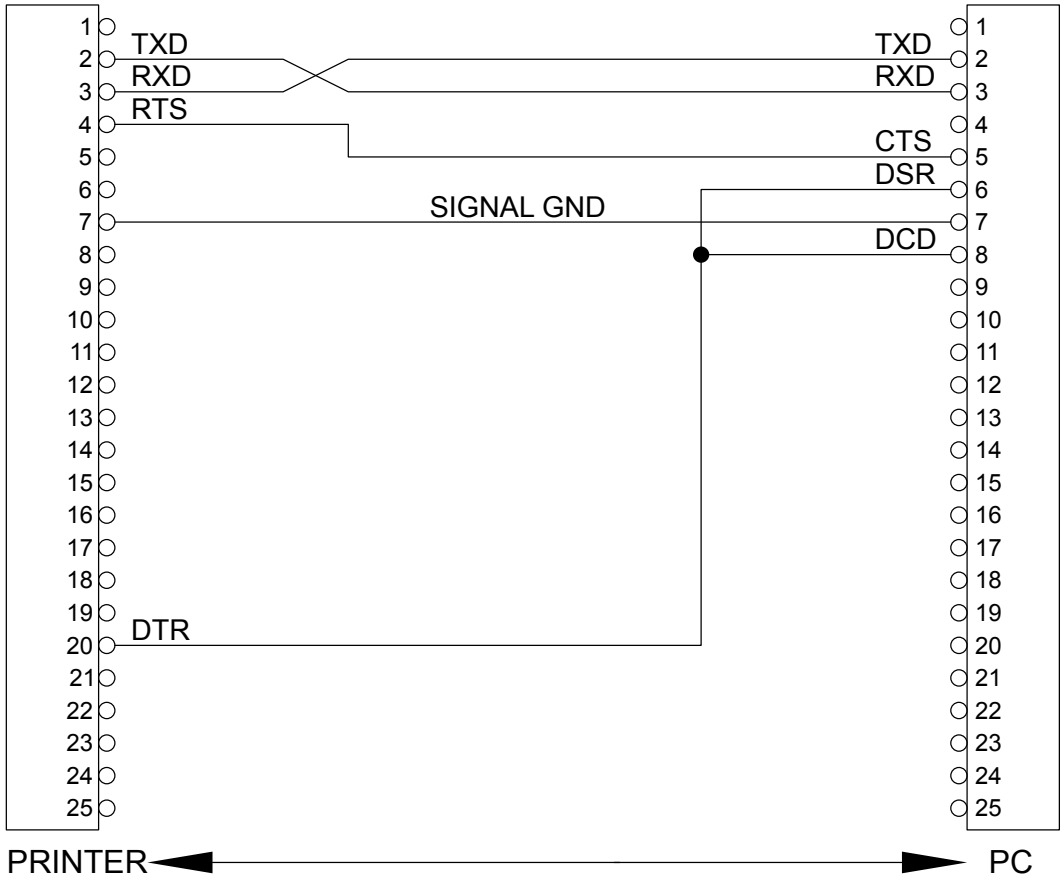
The printer has an RS232 serial interface and is connected using a 25-pin female connector. The communication signals used for serial protocol are TXD, RXD and RTS if the RTS/CTS protocol was selected or TXD and RXD if the XON/XOF protocol was selected. Given below are the signals present on the connector:

PIN	SIGNAL	DIRECTION	DESCRIPTION
1	N.C.	-	Not connected
2	TXD	Output	Data transmission
3	RXD	Input	Data reception
4	RTS	Output	Same as DTR signal
7	SG	-	Groung signal
20	DTR	Output	When the DTR/DSR command is selected, this signal indicates when the printer is busy. SPACE indicates that the printer is ready to receive data and MARK that the printer is busy.
23	GND	-	Ground
24	GND	-	Ground
25	GND	-	Ground

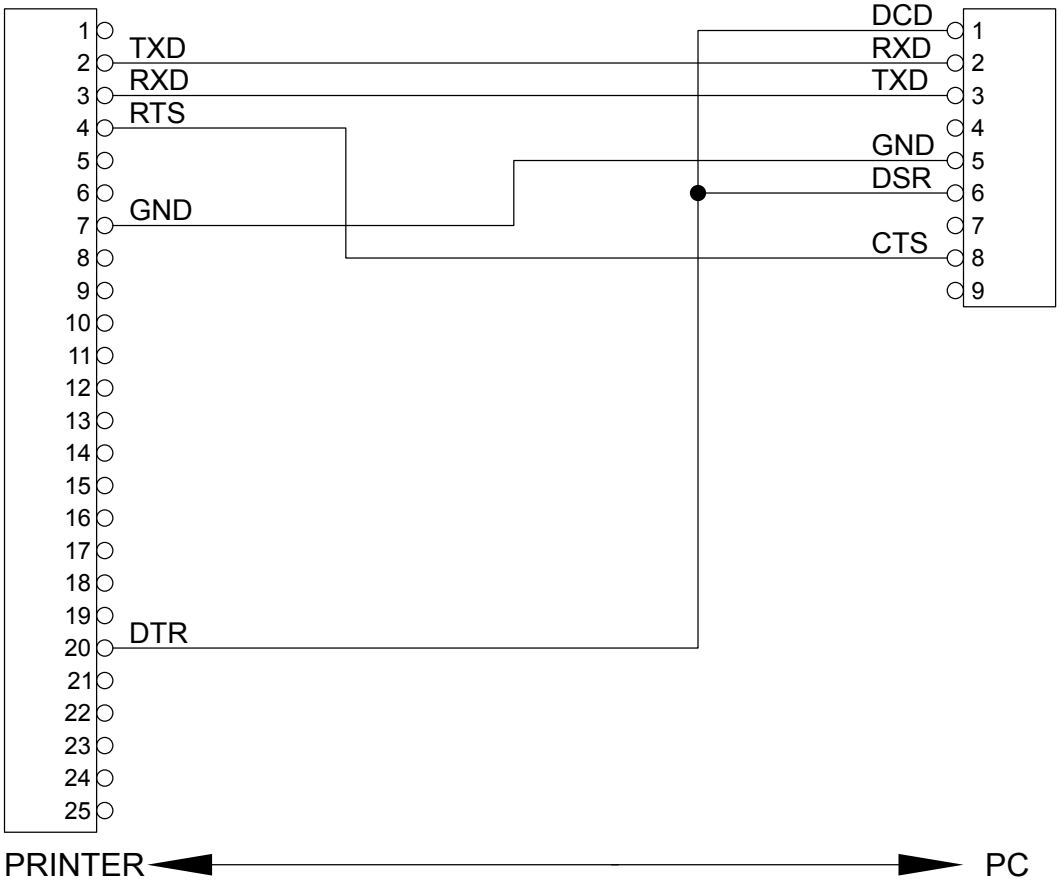
(Tab. 3.1)

The diagrams below give sample connections between the printer and Personal Computer using a 25- and 9-pin female connector.

(Fig.3.2)



(Fig.3.3)



3.2 CENTRONICS PARALLEL

The printer has a Centronics parallel interface and is connected using a 25-pin female connector. The following signals can be used for parallel communication:

1. 7 or 8 bit data bus;
2. STROBE signal that indicates data validity;
3. BUSY signal that indicates if printer is available to receive data;
4. ACK signal for data read confirmation.

Given below are the signals present on the connector:

PIN	SIGNAL	DIRECTION
1	Strobe	Input
2	Data bit 0	Input
3	Data bit 1	Input
4	Data bit 2	Input
5	Data bit 3	Input
6	Data bit 4	Input
7	Data bit 5	Input
8	Data bit 6	Input
9	Data bit 7	Input
10	ACK	Output
11	BUSY	Output
12	PAPER END	Output
13	HIGHT	Output
14	N.C.	-
15	FALT	Output
16	RESET	Input
17-25	GND	-

(Tab. 3.2)

3.3 CALENDAR CLOCK (optional)

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

N.B.
For the real time clock control characters, please refer to the description of the printer command sets in chapter 4.

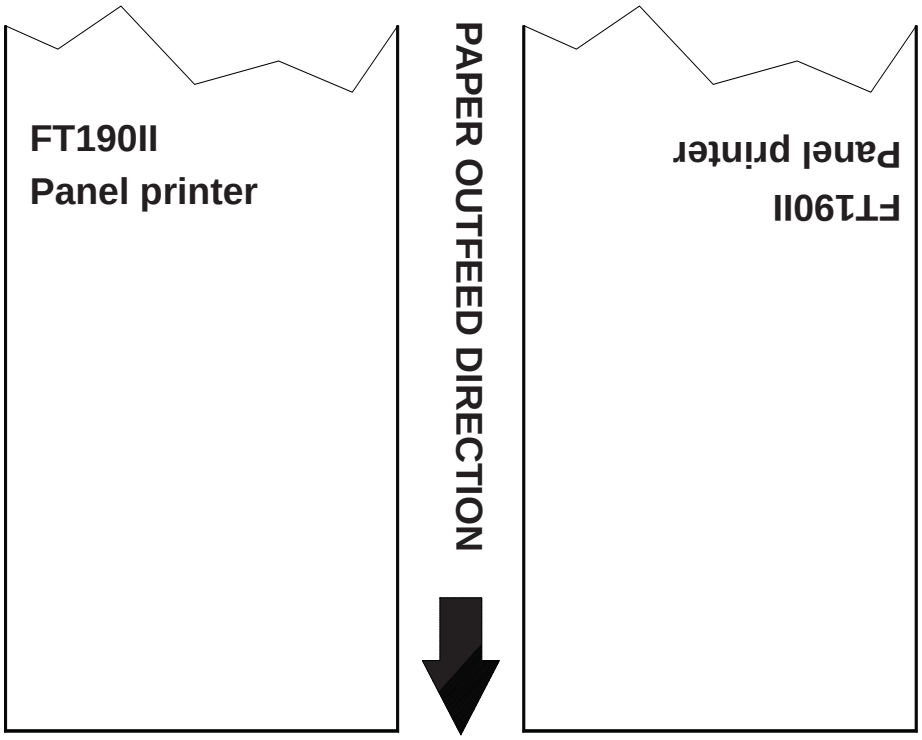
3.3.1 Adjusting the clock through the keypad

The time and date can be adjusted using the PRINT and FEED keys on the printer's front panel. 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.

4.1 PRINT DIRECTION

The printer has two printing directions wich can be selected by means of the control characters: normal and reverse.



(Fig.4.1)

4.2 COMMAND DESCRIPTIONS

The command table lists all the commands for the management of the 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 to receive any kind of response, as this interface is mono-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 DESCRIPTION TABLE

(Tab.4.1)

HEX Com.	ASCII Com.	Description
$00		Prints in small characters
$01		Prints in double width
$02		Prints in double height
$03		Expanded printing
$04		Restore small character printing
$0A	LF	Forward feeds one line
(n) $0B	(n) VT	Forward feeds (n) line
$0D	CR	Print line buffer
$0F		Sets CRLF mode
$11		Graphic mode
$12		Print time and date
$13		Sets time and date
$14		Transmits time and date in serial
$17		Prints 1st programmable character
$18		Prints 2nd programmable character
$19		Prints 3rd programmable character
$1A		Prints 4th programmable character
$1C		Prints 5th programmable character
$1D		Prints 6th programmable character
$1E		Prints 7th programmable character
$1F		Prints 8th programmable character
$1B $40	ESC @	Resets the printer
$1B $41	ESC A	Executes [n] dots line feed
$1B $44	ESC D	Enter date in print buffer
$1B $4E	ESC N	Sets normal mode printing
$1B $52	ESC R	Sets reverse mode printing
$1B $53	ESC S	Enables printing of seconds
$1B $54	ESC T	Enter time in print buffer
$1B $55	ESC U	Enter date (mm :dd :yy) in print buffer
$1B $58	ESC X	Prints in red
$1B $78	ESC x	Prints in black
$1B $42	ESC B	Sets character font 1
$1B $62	ESC b	Sets character font 2

HEX Com.	ASCII Com.	Description
$1B $49	ESC I	Selects 24 columns
$1B $69	ESC i	Selects 40 columns
(aa) $1B $72	(aa) ESC r	Reads data at an address (aa)
(aadd) $1B $77	(aadd) ESC w	Write data (dd) in an address (aa)
(dd) $1B $47	(dd) ESC G	Write value (dd) in option register
(dd) $1B $4B	(dd) ESC K	Write value (dd) in option register 1
(dd) $1B $4D	(dd) ESC M	Write value (dd) in print mode
$1B $70	ESC p	Transmits option register in serial
$1B $6B	ESC k	Transmits option register 1 in serial
$1B $6D	ESC m	Transmits print mode in serial
$1B $73	ESC s	Transmits next character in serial
(dd) $1B $61	(dd) ESC a	Selects number of dot spaces
$1B $4A	ESC J (n)	Load programmable character
$1B $57	ESC W	Prints graphic line of 200 dpi
$1B $63	ESC c	Management of bar code printing
$1B $51	ESC Q	Enables underlining
$1B $71	ESC q	Disables underlining

A more detailed description of the single commands can be found below.

4.2.1 Command description preliminary remark

The first heading line (grey colour) is reported the hexadecimal command value. The next fields give all the information useful to use the command.

[Name] Command title
[Format] ASCII, hexadecimal and decimal command value.
[Range] Limits of the values the command and its variables can take
[Description] Description of command function
[Notes] Additional information about command use and settings.
[Default] Default value of the command and its variables.
[Reference] Pertaining commands related to described command.
[Example]

LEGEND

$ 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.

$00

[Name]	**Small character printing**	
[Format]	ASCII	{ }
	Hex	00
	Decimal	0
[Range]		
[Description]	The printer prints in small characters (normal).	
[Notes]	• The commands $00 - $09 do not cancel the print buffer • The commands which modify the direction of the characters are only active at the beginning of the line	
[Default]	Setting in option register by means of front keys.	
[Reference]	$01, $02, $03, $04	
[Example]		

$01

[Name]	**Double width printing**	
[Format]	ASCII	{ }
	Hex	01
	Decimal	1
[Range]		
[Description]	The printer prints in double width format	
[Notes]	• The commands $00 - $09 do not cancel the print buffer • The commands which modify the direction of the characters are only active at the beginning of the line	
[Default]	Setting in option register by means of front keys.	
[Reference]	$00, $02, $03, $04	
[Example]		

$02

[Name]	**Double height printing**	
[Format]	ASCII	{ }
	Hex	02
	Decimal	2
[Range]		
[Description]	The printer prints in double height format.	
[Notes]	• The commands $00 - $09 do not cancel the print buffer • The commands which modify the direction of the characters are only active at the beginning of the line	
[Default]	Setting in option register by means of front keys.	
[Reference]	$00, $01, $03, $04	
[Example]		

$03

[Name]	**Expanded printing**	
[Format]	ASCII	{ }
	Hex	03
	Decimal	3
[Range]		
[Description]	The printer prints in expanded character mode.	
[Notes]	• The commands $00-$09 do not cancel the print buffer • the commands which modify the dimensions of the characters are only active at the beginning of the line	
[Default]	Impostazione nell'option register tramite i tasti frontali	
[Reference]	$00, $01, $02, $04	
[Example]		

$04

[Name] **Restore small character printing**

[Format] ASCII { }
Hex 04
Decimal 4

[Range]

[Description] The printer resumes printing with small characters.

[Notes] • The commands $00-$09 do not cancel the print buffer
• The commands which modify the dimensions of the characters are only active at the beginning of the line

[Default] Setting in the option register by means of the front keys.

[Reference] $00, $01, $02, $03

[Example]

$0A

[Name] **Forward feeds one line**

[Format] ASCII LF
Hex 0A
Decimal 10

[Range]

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

[Notes] • This command brings about the printing of the contents of the line buffer.

[Default]

[Reference] $0B

[Example]

(n) $0B

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

[Format] ASCII n VT
Hex n 0B
Decimal n 11

[Range] 0 ≤ n ≤ 9

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

[Notes] • When n=0 the command is ignored.
• This command clears the line buffer.

[Default]

[Reference] $0A

[Example]

$0D

[Name] **Print the line buffer**

[Format] ASCII CR
Hex 0D
Decimal 13

[Range]

[Description] This command prints the line buffer.

[Notes] • If the line buffer is empty, the command is ignored.
• If the CRLF option is set, this command is ignored and printing can only be ordered through the command $0A.

[Default]

[Reference] $0F

[Example]

$0F

[Name] **Set CRLF mode**

[Format] ASCII { }
Hex 0F
Decimal 15

[Range]

[Description] Inhibits the command $0D maintaining enabled only the command $0A for printing.

[Notes] • This command clears the line buffer
• On switching on the default value is in the Option Register.

[Default] Setting in the option register by means of the front keys

[Reference] $0D

[Example]

$11

[Name] **Graphic mode**

[Format] ASCII { }
Hex 11
Decimal 17

[Range]

[Description] Enables graphic mode: a line in 24 column mode corresponds to 144 horizontal dots divided into 24 blocks of 6 dots each; a line in 40 column mode corresponds to 240 horizontal dots divided into 40.

[Notes] • To obtain graphic printing, enter the command $11 at the beginning of each line. The format of the byte in graphic configuration is:

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

where :
X is not used (0 is recommended);
R must be fixed at level 1;
P1 ÷ P6 are the graphic dot data (1 prints, 0 does not print). The P6 bit of the string of dots transmitted is printed on the left and the others follow from left to right (P5, P4, P3, P2,P1) as shown:

1st byte -->	2nd byte -->	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.

$12

[Name] **Print time and date**

[Format] ASCII { }
Hex 12
Decimal 18

[Range]

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

[Notes] • The command resets the line.

[Default]

[Reference] $13, $14

[Example]

$13

[Name] **Set time and date**

[Format] ASCII { }
Hex 13
Decimal 19

[Range]

[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 am/pm clock. In the first case, transmit the 10 ASCII characters representing the time and the date followed by $13 and in the second case transmit the 10 ASCII characters representing the time and the 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] $12, $14

[Example] • To set the time 12:45 on 19-01-93, transmit:

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, transmit:

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

$14

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

[Format] ASCII { }
Hex 14
Decimal 20

[Range]

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

[Notes]

[Default]

[Reference] $12, $13

[Example]

$17,...$1F

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

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

[Range]

[Description] This command prints the corresponding programmable character.

[Notes]

[Default] BITMAP contained in flash

[Reference] $17, $18, $19, $1A, $1C, $1D, $1E, $1F

[Example]

$1B $40

[Name] **Resets the printer**

[Format]

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

[Range]

[Description] Cancels all the data in the print buffer and resets the printer mode, restoring the mode which was enabled at the moment of switching on.

[Notes]
- Same as hardware reset.
- After the command has been transmitted, 1.5 seconds elapse before the printer is enabled

[Default]

[Reference]

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

$1B $41

[Name] **Executes [n] dots line feed**

[Format]

ASCII	ESC	A	nH	nL
Hex	1B	41	nH	nL
Decimal	27	65	nH	nL

[Range]

[Description] Executes [n] dots line feed

[Notes]

[Default]

[Reference]

[Example]

$1B $44

[Name] **Enters the date in the print buffer**

[Format]

ASCII	ESC	D
Hex	1B	44
Decimal	27	68

[Range]

[Description] Enters in the buffer the date of the calender clock installed inside the printer, in the following format: dd - mm -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] $1B $54, $1B $55

[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

$1B $4E

[Name] **Set normal mode printing**

[Format]

ASCII	ESC	N
Hex	1B	4E
Decimal	27	78

[Range]

[Description] Select normal mode printing:the receipt feeds out of the printer with the printing upside down running from right to left.

[Notes]

[Default] Setting in option register by means of front keys

[Reference] $1B $52

[Example]

$1B $52

[Name] **Set reverse mode printing**

[Format]

ASCII	ESC	R
Hex	1B	52
Decimal	27	82

[Range]

[Description] Selects printing in reverse mode: the receipt feeds out of the printer with the printing in normal mode running from left to right.

[Notes]

[Default] Setting in option register by means of front keys

[Reference] $1B $4E

[Example]

$1B $53

[Name] **Enables printing of seconds**

[Format]

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

[Range]

[Description] Enables the printing of the seconds when the time of day is requested through command $1B $54.

[Notes]

[Default] Setting in option register by means of front keys

[Reference] $1B $54

[Example]

$1B $54

[Name] **Enters the time in the print buffer**

[Format]

ASCII	ESC	T
Hex	1B	54
Decimal	27	84

[Range]

[Description] Enters in the buffer the time on the calendar clock installed inside the printer, in the following format: hh:mm

[Notes]
- The time is printed 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] $1B $44, $1B $53, $1B $55

[Example]

If you wish to write:	HOUR: 16:45 TEST OK
transmit	HOUR: $1B $54 TEST OK $0D
to print just the date	$1B $54 $0D

$1B $55

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

[Format]

ASCII	ESC	U
Hex	1B	55
Decimal	27	85

[Range]

[Description] Enter in the buffer the date on the calendar clock installed 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] $1B $44, $1B $54
[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

$1B $58

[Name] **Prints in red**
[Format] ASCII ESC X
Hex 1B 58
Decimal 27 88
[Range]
[Description] After receiving this command the printer prepares itself to print in red.
[Notes]
[Default]
[Reference]
[Example]

$1B $78

[Name] **Prints in black**
[Format] ASCII ESC x
Hex 1B 78
Decimal 27 120
[Range]
[Description] After receiving this command the printer prepares itself to print in black.
[Notes]
[Default]
[Reference]
[Example]

$1B $42

[Name] **Sets font 1**
[Format] ASCII ESC B
Hex 1B 42
Decimal 27 66
[Range]
[Description] Selects 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 by means of the front keys
[Reference] $1B $62
[Example]

$1B $62

[Name] **Sets font 2**
[Format] ASCII ESC b
Hex 1B 62
Decimal 27 98
[Range]
[Description] Selects the second character font.
[Notes] • The complete font is printed during the autotest. The font contains cyrillic characters.
[Default] Setting in the option register by means of the front keys
[Reference] $1B $42
[Example]

$1B $49

[Name]	**Select 24 columns**		
[Format]	ASCII	ESC	I
	Hex	1B	49
	Decimal	27	73
[Range]			
[Description]	On receiving this command, the printer enters 24-column per line printing mode		
[Notes]			
[Default]			
[Reference]	$1B $69		
[Example]			

$1B $69

[Name]	**Select 40 columns**		
[Format]	ASCII	ESC	i
	Hex	1B	69
	Decimal	27	105
[Range]			
[Description]	On receiving this command, the printer enters 40-column per line printing mode		
[Notes]			
[Default]			
[Reference]	$1B $49		
[Example]			

(aa) $1B $72

[Name]	**Read data at an address (aa)**				
[Format]	ASCII	aH	aL	ESC	r
	Hex	aH	aL	1B	72
	Decimal	aH	aL	27	114
[Range]					
[Description]	Read 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 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]	$1B $77				
[Example]	To read address $01, transmit in ASCII: $30 $31 $1B $72 If address $01 contains $A5, we will receive: $41 $35				

(aadd) $1B $77

[Name] **Write data (dd) in address (aa)**

[Format]

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

[Range]

[Description] Save datad in addressa 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 ofd expressed in ASCII

[Notes] • There are 256 writable locations (from $00 to $FF); the data maximum is $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] $1B $72

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

(dd) $1B $47

[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

[Range]

[Description] Modify the configuration register.
(dd) are two ascii characters which represent the hexadecimal code for the programming of the register; in the following table is indicated the value of dd send it in a byte format:

BIT	OFF/ON	HEX	Decimal	FUNCTION
0	Off	00	0	setting of real time clock disabled
	On	01	1	setting of real time clock enabled
1	Off	00	0	Print direction normal
	On	02	2	Print direction reverse
2	Off	00	0	number bits in parallel reception 8
	On	04	4	number bits in parallel reception 7
3	Off	00	0	Printing of seconds disabled
	On	08	8	Printing of seconds enabled
4	Off	00	0	CR ($0D) enabled
	On	10	16	CR ($0D) disabled
5	Off	00	0	
	On	20	32	
6	Off	00	0	Selection font 1
	On	40	64	Selection font 2
7	Off	00	0	Reception buffer = 1Kbyte
	On	80	128	Reception buffer = N° columns

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

[Default]

[Reference] $1B $4B

[Example] To send setting byte 00001001 ($09): $30 $39 $1B $47

(dd) $1B $4B

[Name] **Write the value (dd) in the option register 1**

[Format]

ASCII	dH	dL	ESC	K
Hex	dH	dL	1B	4B
Decimal	dH	dL	27	75

[Range]

[Description] Modifies the configuration register.
(dd) are two ASCII characters representing the hexadecimal code for the programming of the register :

BIT	OFF/ON	HEX	Decimal	FUNCTION
0	Off	00	0	Sets 24 columns
	On	01	1	Sets 40 columns

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

[Default]

[Reference] $1B $47

[Example] To send setting byte 00001001 ($09): $30 $39 $1B $47

(dd) $1B $4D

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

[Format]

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

[Range]

[Description] Sets the print mode default parameters:
$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 by means of the front keys

[Reference] $1B $6D

[Example] For double height printing, transmit: $30 $32 $1B $4D

$1B $70

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

[Format]

ASCII	ESC	p
Hex	1B	70
Decimal	27	112

[Range]

[Description] Transmit the option register byte on the serial port.

[Notes] • If the printer is using the parallel protocol, nothing with be transmitted

[Default]

[Reference] $1B $47, $1B $4B, $1B $6B

[Example] The response is on two bytes. E.g., if you receive: $30 $39
it means that the default configuration is 00001001

$1B $6B

[Name]	**Transmits the second configuration register in serial**		
[Format]	ASCII	ESC	k
	Hex	1B	6B
	Decimal	27	107
[Range]			
[Description]	Transmits in serial the value of the second configuration register in ASCII format on two characters which represent the hexadecimal value.		
[Notes]	• If the printer is using the parallel protocol, nothing with be transmitted		
[Default]			
[Reference]	$1B $4B		
[Example]	The response is on two bytes. E.g. if you receive: $30 $39 it means that the default register is 00001001		

$1B $6D

[Name]	**Transmits the print mode in serial**		
[Format]	ASCII	ESC	m
	Hex	1B	6D
	Decimal	27	109
[Range]			
[Description]	Transmits the print mode configuration on the serial port.		
[Note]	• If the printer is using the parallel protocol, nothing with be transmitted		
[Default]	Setting in the option register by means of the front keys		
[Reference]	$1B $42		
[Example]	The response is on two bytes. E.g. if you receive: $30 $32 it means that printing is in double height mode		

$1B $73

[Name]	**Transmits the next character in serial**		
[Format]	ASCII	ESC	s
	Hex	1B	73
	Decimal	27	115
[Range]			
[Description]	Transmits the next character it receives on the serial port.		
[Notes]			
[Default]			
[Reference]			
[Example]	If you transmit: ESC s A the last character, A, will not be printed but immediately transmitted on the serial line		

(dd) $1B $61

[Name]	**Selects the number of dot spaces**			
[Format]	ASCII	dd	ESC	a
	Hex	dd	1B	61
	Decimale	dd	27	97
[Range]				
[Description]	(dd) are two ASCII characters which identify a hexadecimal byte and correspond to the number of dot lines between one print line and another			
[Notes]				
[Default]	= 0			
[Reference]				
[Example]				

$1B $4A

[Name] **Load the programmable character**

[Format]

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

[Range]

[Description] (n) corresponds to the character number, i.e. between 1 and 8.
The bitmap that represents the character is contained in the next 10 bytes 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] ● To modify these bit maps, a firmware upgrade is required.

[Default] The 8 characters available on switching on are loaded with a bitmap contained in the printer's flash.

[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

$1B $57

[Name] **Print a graphic line at 200 dpi**

[Format]

ASCII	ESC	W
Hex	1B	57
Decimal	27	87

[Range]

[Description] After receiving this command, the printer waits for 48 bytes which correspond to an entire graphic line. In fact, 48 bytes of 8 bits each correspond to 384 dots per line.

[Notes]

[Default]

[Reference]

[Example]

$1B $63 [code] [height] [position] [options] [length] [data]

[Name] **Management of bar code printing**

[Format]

ASCII	ESC	c
Hex	1B	63
Decimal	27	99

[Range]

[Description]

[ASCII code]	Type of bar code
I	Interleved 2/5
C	Code 39
B	CodaBar
e	EAN8
E	EAN13
[height]	Number of dot lines in 1/8 mm. units.
[position]	Left hand margin, expressed in 1/8 mm. units.

[options]

bit	bit 0		bit 1	
bit0: check digit		is not printed	is printed	
bit3,2: HRI	0=no	1=above	2=below	3=above & below
bit5,4: size	0=normal	1=double	2=triple	3=quadruple

[maximum length]

Interleaved 2/5	= 12 characters
Code 39	= 10 characters
CodaBar	= 10 characters
EAN8	= 8 characters
EAN13	= 13 characters
[data]	Expressed in ASCII

[Notes]

[Default]

[Reference]

[Example]

$1B $51

[Name] **Enable underlined printing**

[Format]

ASCII	ESC	Q
Hex	1B	51
Decimal	27	81

[Range]

[Description] After this command has been received, the characters are printed underlined.

[Notes]

[Default]

[Reference] $1B $71

[Example]

$1B $71

[Name] **Disables underlined printing**

[Format]

ASCII	ESC	q
Hex	1B	71
Decimal	27	113

[Range]

[Description] Annuls underlined printing

[Notes]

[Default]

[Reference] $1B $51

[Example]

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5.1 TECHNICAL SPECIFICATIONS

The main technical features of the printer are listed in Table 5.1.

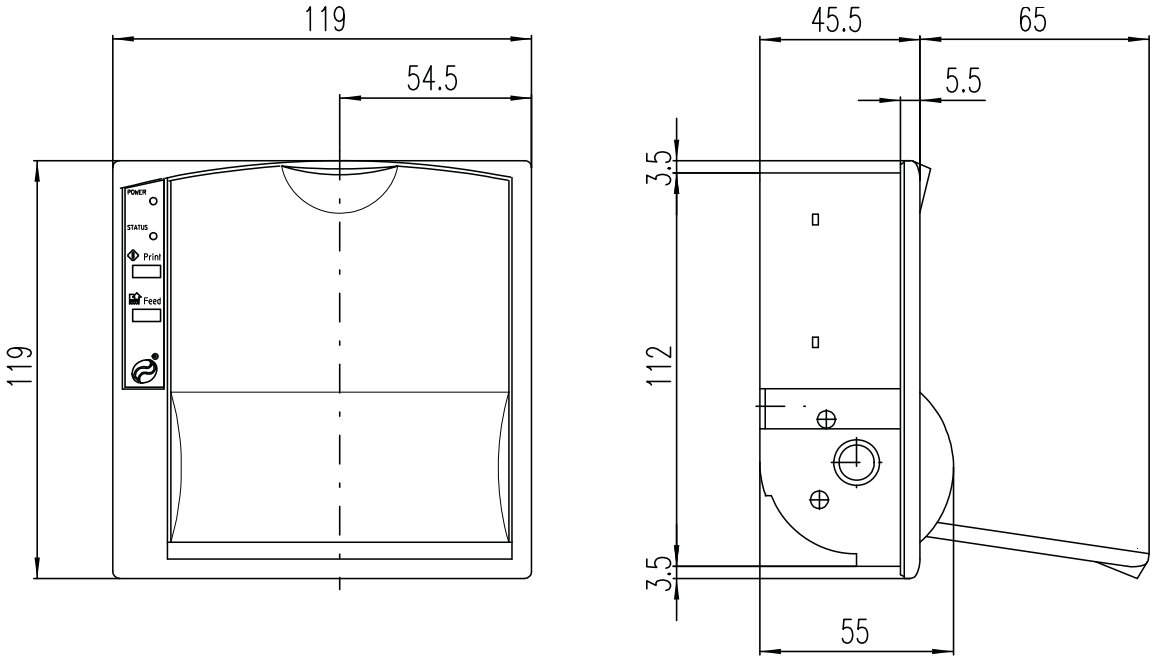
(Tab.5.1)

Columns	**24**	**40**
Character (L x H mm)		
Normal	2x3	1x3
Double height	2x6	1x6
Double width	4x3	2x3
Expanded	4x6	2x6
Graphic dot	0,125 x 0,125	0,125 x 0,125
Custom emulation dots per line	144	240
Print speed (speed/current = normal)		
Lines / sec	30	30
Characters / sec	220	320
Feed (lines / sec)	53	53
Line buffer	24	40
Print buffer	1 Kbyte	
Print method	Thermal dot matrix	
Character matrix	16x24	8x24
Print direction	Normal or reverse	
Character set	Normal and extended	
Paper roll dimension	58 ± 1mm x Ø 50 mm max	
Standard interfaces	RS232 or Centronics	
Power supply	Double or single 5 Vdc ± 10% Single 9-40 Vcc optional	
Absorption (with 5 Volt power supply)		
Selection “Speed/current = NORMAL”		
Average (1)	1,2 A	
Stand by	60 mA	
Environmentals conditions		
Operating temperature	0°C ÷ +50°C	
Operating humidity	20-85% (no condensing)	
Storage temperature / Humidity	-25 °C – +70 °C / 10% - 90%	
Options	Real time clock 9 - 40 Vcc Power supply	

NOTE: (1) Referred to a standard CUSTOM receipt (L=10cm, Density = 12,5% dots on).

5.2 DIMENSIONS

The dimensions of the panel printer are shown in the figure below. With the screws fitted in the printer, the maximum thickness of the panel is 5 mm; using the two additional screws provided, the printer can be mounted on panels with a maximum thickness of 15 mm. For even thicker panels, use longer M3 screws.

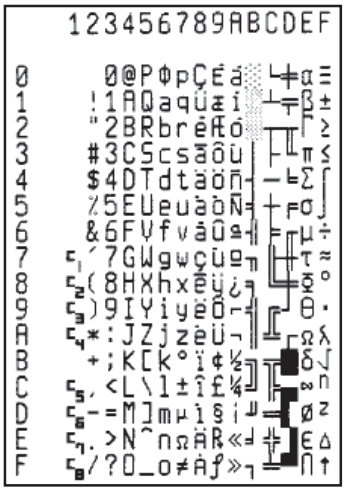


(Fig.5.1)

6.1 CHARACTER SETS

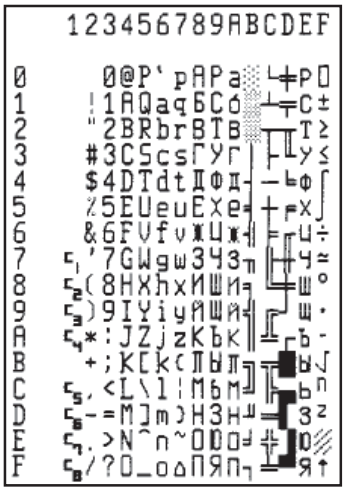
The printer has two characters sets, each containing 224 characters (font 1 and font 2), which can be called up through the programming (paragraph 2.2) or through the control characters (paragraph 4.2).

FONT 1



(Fig.6.1)

FONT 2



(Fig.6.2)

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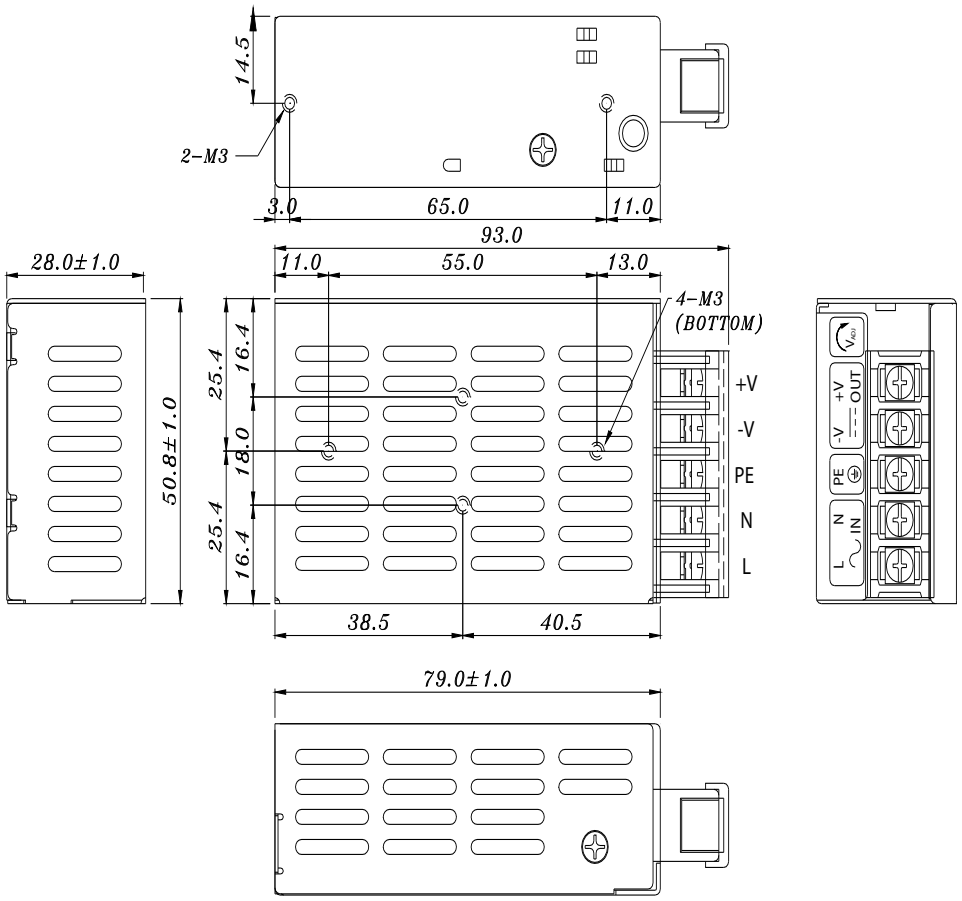
A.1 ACCESSORIES

A.1.1 Power Supply

The following figure illustrates the power supply provided by Custom to be used for printer operation. The power supply is available in 3 models:

- PPSPS-025-05 for the 5V version
- PPSPS-025-12 and PPSPS-025-24 for the 9-40V version.



(Fig. A.1)

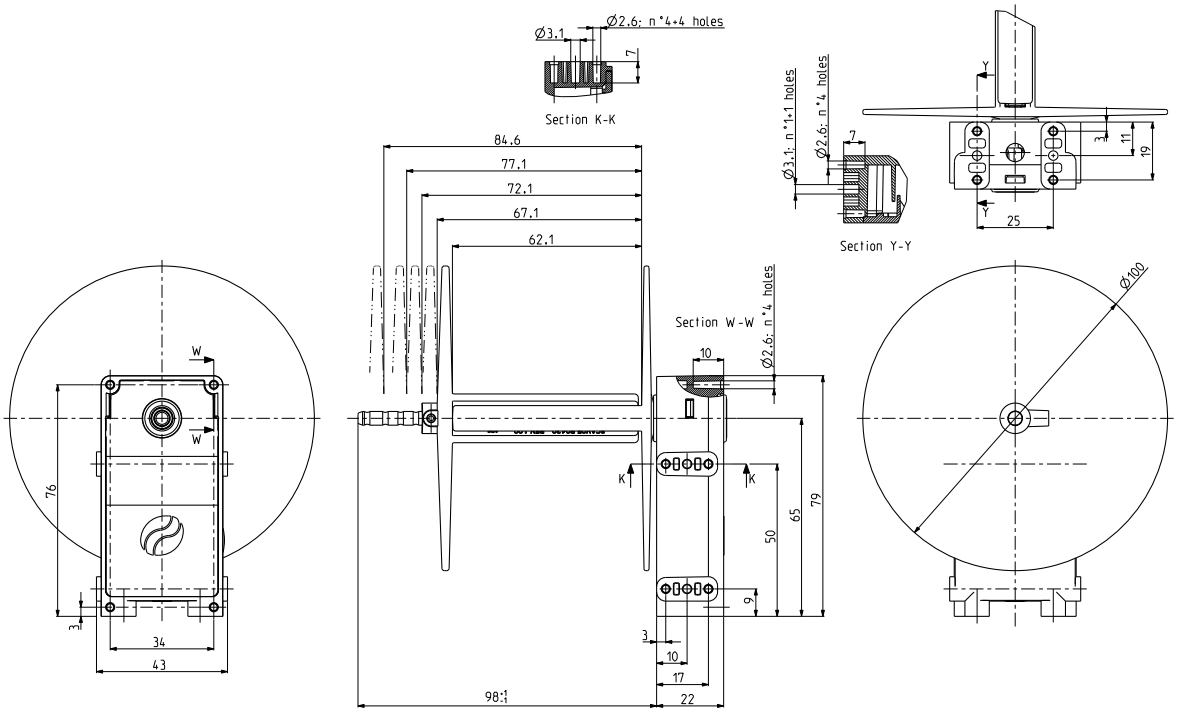
(Tab. A.1)

Input specifications		
Input voltage	85Vac to 264 Vac	
Input frequency	47 Hz to 63 Hz	
PPSPS-025-05 Output specifications		
Output voltage		5 V
Output current	Maximum	5.0 A
PPSPS-025-12 Output specifications (for 9-40 VDC version)		
Output voltage		12 V
Output current	Maximum	2.1 A
PPSPS-025-24 Output specifications (for 9-40 VDC version)		
Output voltage		24 V
Output current	Maximum	1.1 A

A.1.2 Paper winder

The AV05 model paper winder can be connected to the printer at the J5 connector.

(Fig. A.2)



A.2 SPARE PARTS

A.2.1 Supplies

RCT57X50
57mm Thermal paper roll core 13mm Ø 50

Blank page

Part Number : DOME-FT190II Rev. 1.01

M . U . R . S . T .
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Research Scientific
T e c h n o l o g y
Authorized laboratory
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