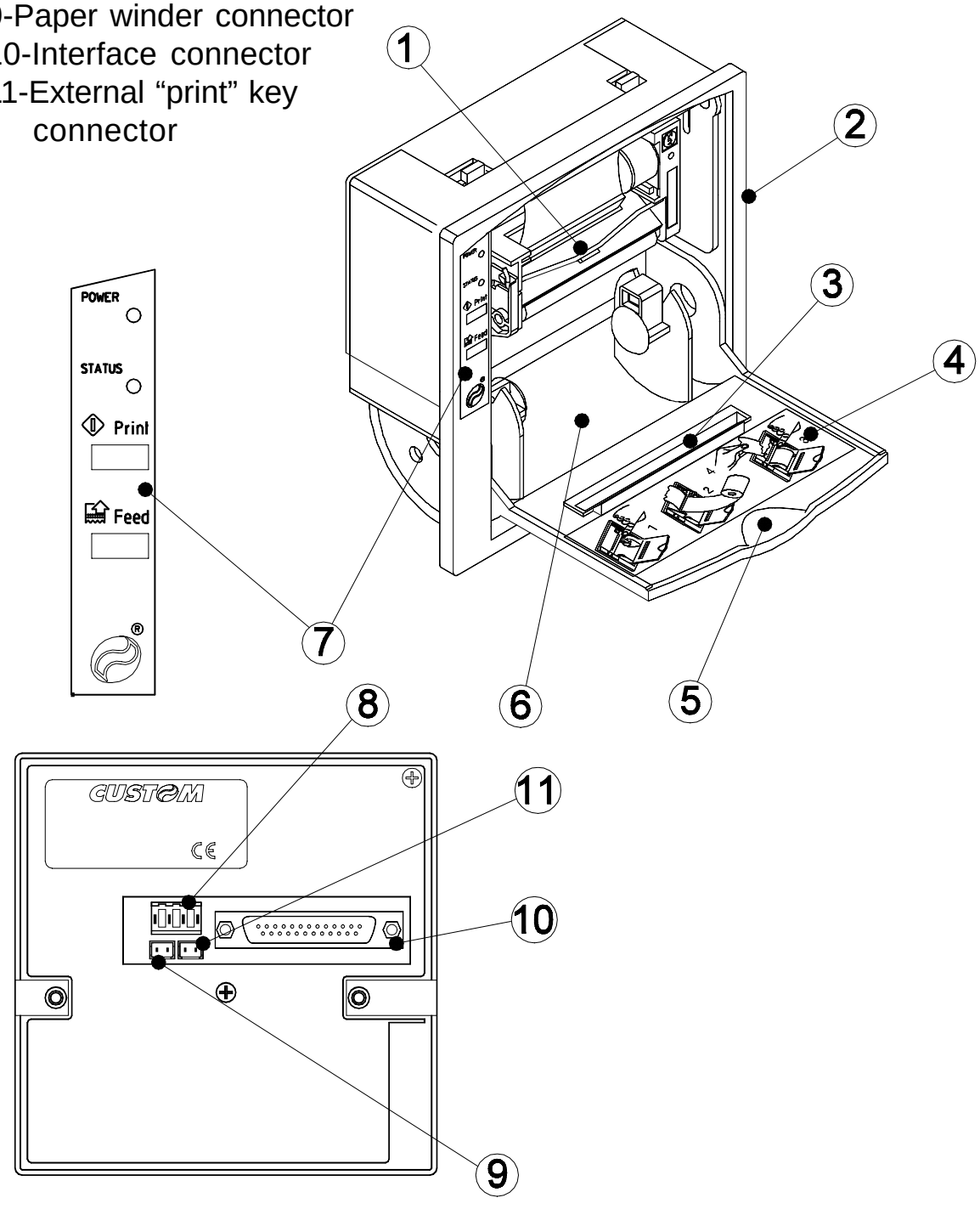
Thermal panel printer with PT1000 thermal probe

FT190HACCP

User's manual

Printer components

1-Print mechanism
2-Case
3-Paper outfeed
4-Paper loading label
5-Front panel
6-Paper roll compartment
7-Control panel
8-Feed connector
9-Paper winder connector
10-Interface connector
11-External “print” key connector



COD. DOME - FT190HACCP REV.1.00

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"CE" Declaration of Conformity

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

N°: DC0433699

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

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

Declares that the product:

Product name: Panel printer with thermal print mechanism

Type name: FT190

Model: FT190-HACCP

is in conformity with the following directives:

Electromagnetic compatibility directives EEC/89/336; EEC/92/31; EEC/93/68

In accordance with the following standards:

EN 55022 Class B	Limits and methods of measurement of radio disturbance characteristics of information technology equipment	1995
EN 50082-1	Electromagnetic compatibility - General immunity standard. Part 2: Industrial environments.	1992
EN 61000-4-2	Electrostatic discharge requirements 4KV contact discharge, 8KV air discharge	1995
EN 61000-4-4	Fast electrical transient/burst requirements. DC mains 0.5KV	1995
ENV 50140	Radiated radio-frequency electromagnetic fields. Immunity tests. 3V/m, 80MHz-1000MHz, 80% 1KHz AM	1993

September 1999

INTRODUCTION

1. INSTALLATION AND USE

2. INTERFACES

3. PRINTER FUNCTIONS

4. TECHNICAL SPECIFICATIONS

5. CHARACTER SETS

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.

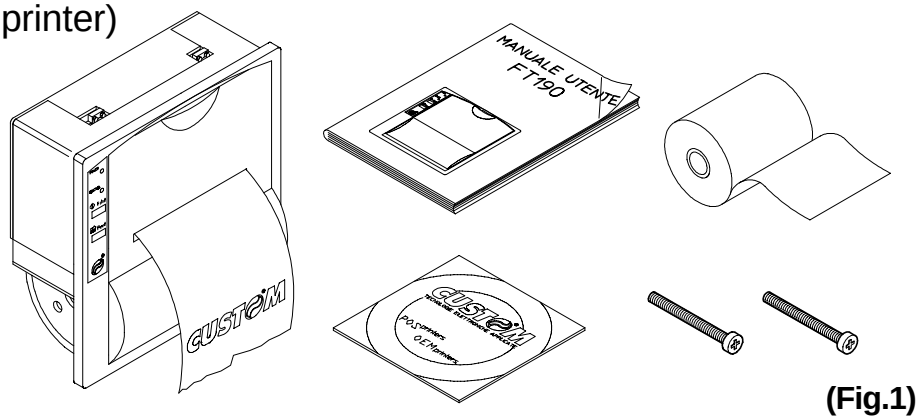
- Use the type of electricity supply marked on the printer label. In the event of uncertainty, contact the seller.
- Position the printer in such a way as to ensure that the cables connected to it will not be damaged.
- Ensure that the maximum absorbed current of the printer does not exceed the maximum 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 (inside the printer)
Long screws



(Fig.1)

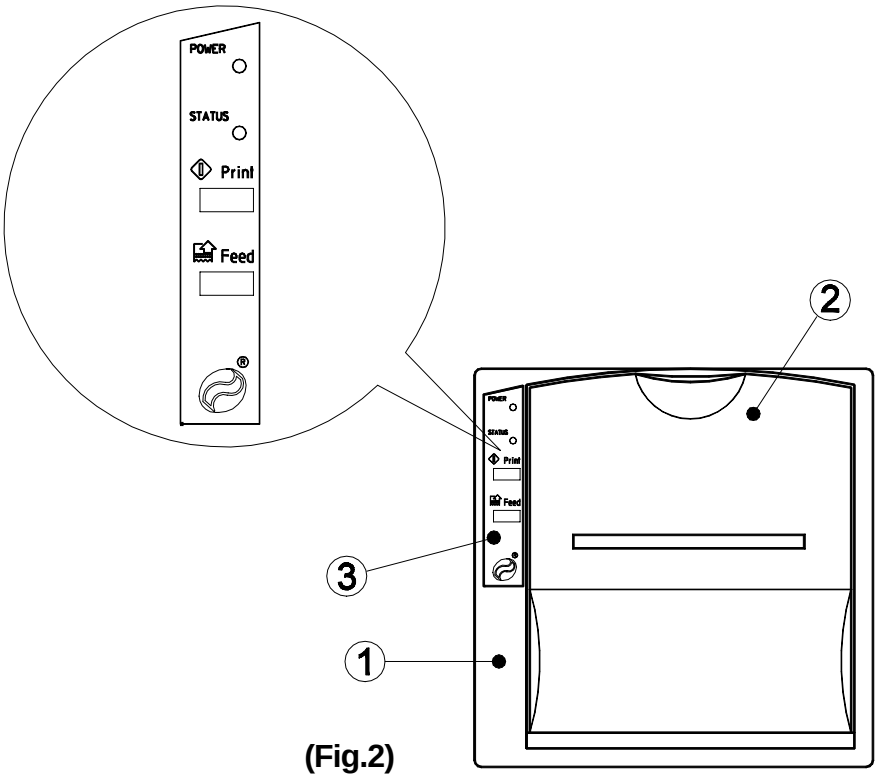
N.B.
Before using the long screws, read the note to paragraph 4.2.

GENERAL FEATURES

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 FT190HACCP 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.

DESCRIPTION OF THE PRINTER

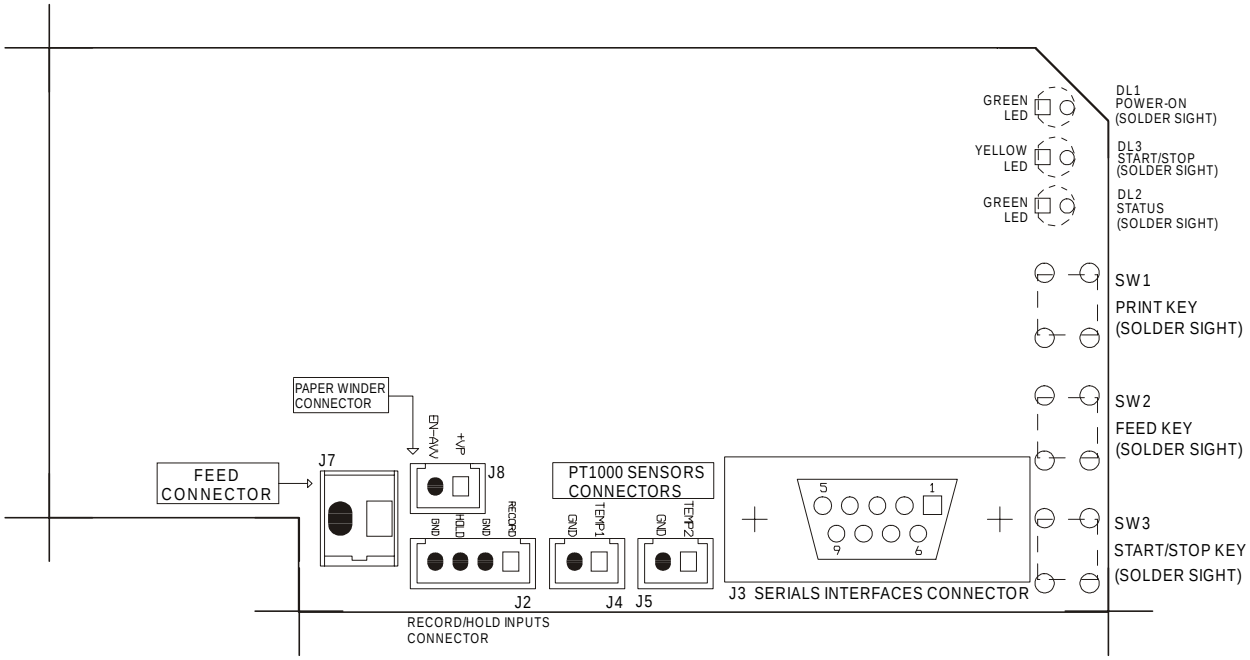
The FT190HACCP printer has an ABS casing (1) with a front cover (2) which opens to allow access to the paper roll and print head.
The control panel is located on the front (3) and has a PRINT key, a FEED key and START/STOP and three LEDs: Power, Status and START/STOP.



(Fig.2)

- PRINT key. It often can be used in the parameters setting procedure.
- FEED key. When this is pressed, the paper feeds forward manually. If this key is pressed briefly the date and time of day is printed.
- START/STOP key. It can be used in the printer mode 2 or 3.
- 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).
- The START/STOP LED can be used in the printer mode 2 or 3.

1.1 CONNECTIONS



(Fig.1.1)

1.1.1 Power supply

The FT190HACCP printer is equipped with a standard 2-pin male AMPMODU1-type connector (J7). In alternating current the supply is identified in the 9-33V Ac range while in direct current the range is 11-47 Vdc.

1.1.2 Paper winder

Connector J8 (fig.1.1) is used to feed the external paper winder. The position and function of the signals are given below in Table 1.1.

Pin	Signal
1	MOTOR +
2	MOTOR -

(Tab.1.1)

1.2 CONFIGURATION

The FT190HACCP 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 JP1 (Fig. 2.1) 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:

- 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 or 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 made are saved on the EEPROM (non volatile memory).

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 and the printing of the complete ASCII character set.

1.4 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.

1.5 MAINTENANCE

1.5.1 Changing the paper roll

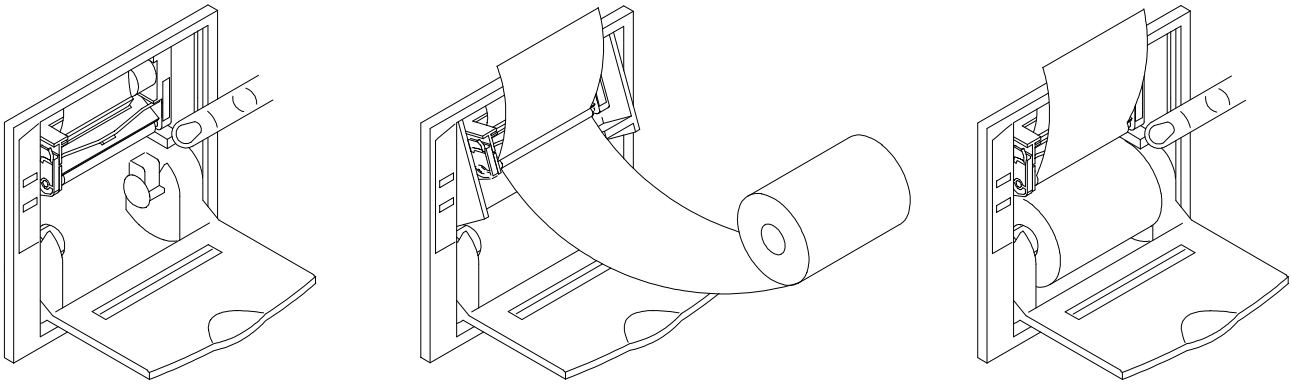
To change the paper roll, proceed as follows:

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;

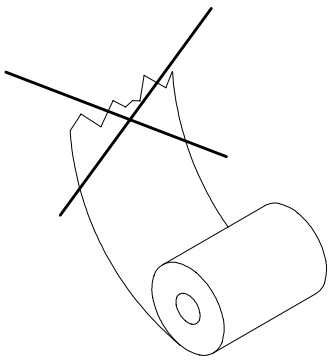
3) The paper is automatically pulled by the roller for 3 or 4 centimetres;

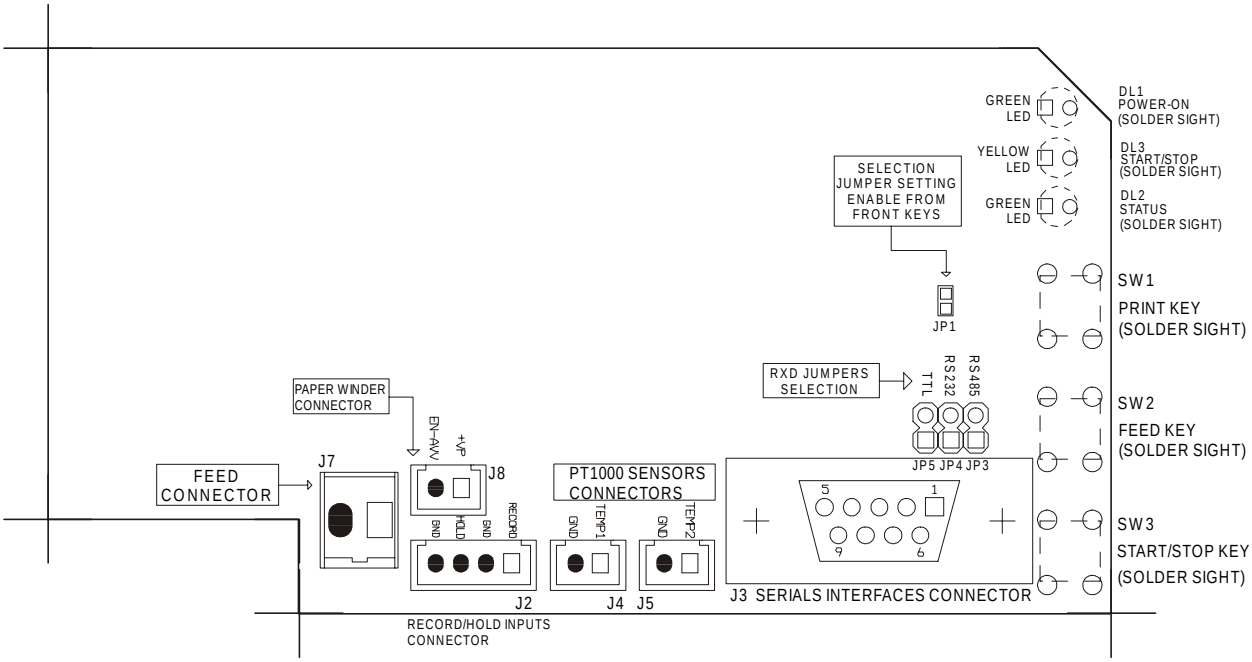
4) Tear off the paper and re-close the cover.



(Fig.1.2)

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





(Fig.2.1)

The selection of the RS232, RS485 or TTL interface is made through the following jumpers : to select the RS485 interface using JP3, to select the RS232 interface using JP4 and to select the TTL interface using JP5.
The signals on the connector pin are as follows :

PIN	SIGNAL	DIRECTION	DESCRIPTION
1	RXD-TTL	IN	Data transmission at TTL level
2	TXD-RS232	OUT	Data transmission at RS232 level
3	RXD-RS232	IN	Data reception at RS232 level
4	DO+ RS485	Bidirectional	RS485 signal
5	GND	-	Ground signal
6	DO- RS485	Bidirectional	RS485 signal
7	TXD-TTL	OUT	Data transmission at TTL level
8	RTS-RS232	OUT	RTS at RS232 level
9	RTS-TTL	OUT	RTS at TTL level

(Tab 2.1)

2.2 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, described as follows.

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

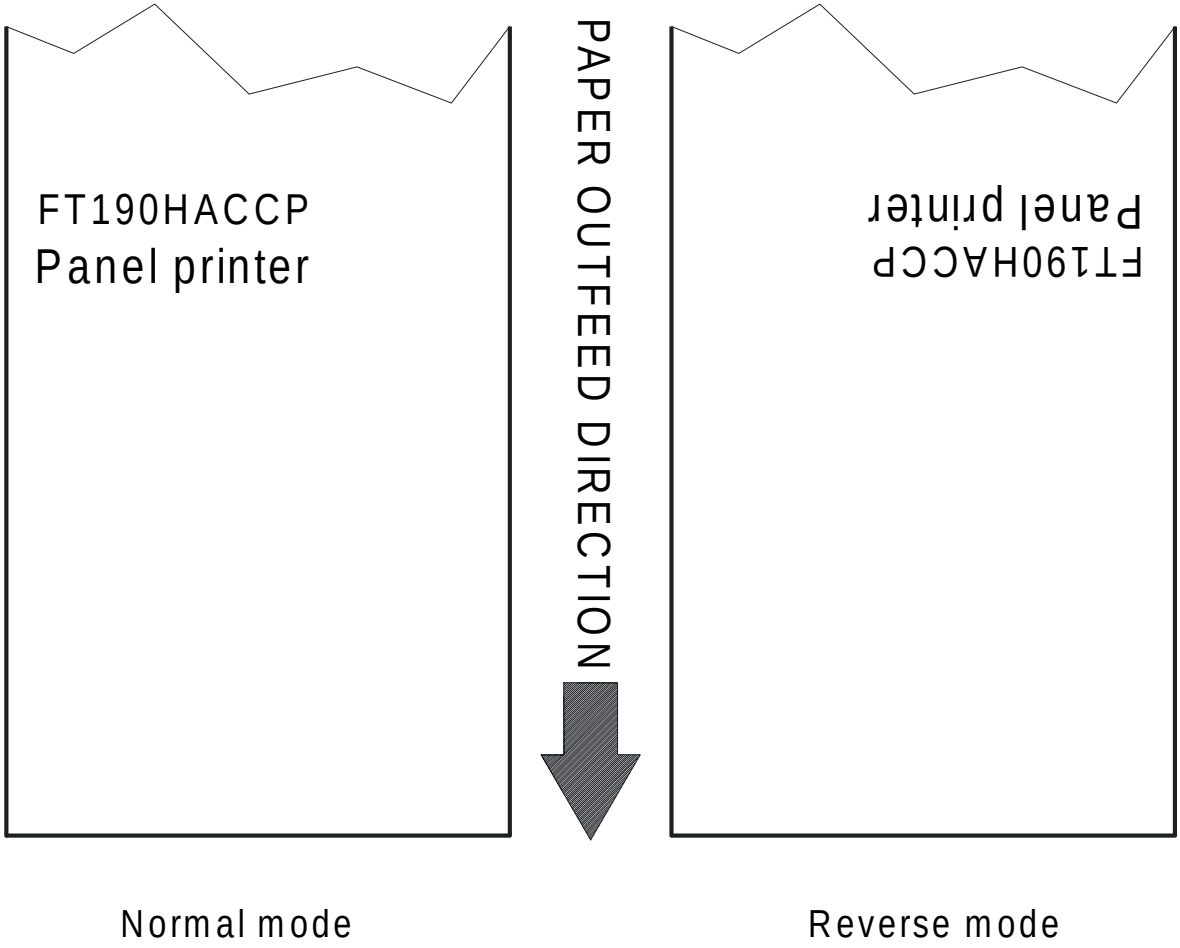
2.2.1 Adjusting the clock through the keypad

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.

3.1 PRINT DIRECTION

The FT190HACCP printer has two printing directions which can be selected by means of the control characters:
normal and reverse.



(Fig.3.1)

3.2 CONTROL CHARACTERS

The command table lists all the commands for the management of the FT190HACCP 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.

(Tab.3.1) **COMMAND TABLE**

ASCII Com.	HEX Com.	Description
	$00	Prints in small characters
	$01	Prints in double width
	$02	Prints in double height
	$03	Expanded printing
	$04	Restores small character printing
	$0A	Forward feeds one line
	(n) $0B	Forward feeds (n) line
	$0D	Prints line buffer
	$0F	Sets CRLF mode
	$11	Graphic mode
	$12	Prints 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

ASCII Com.	HEX Com.	Description
	$1E	Prints 7th programmable character
	$1F	Prints 8th programmable character
ESC R	$1B $52	Sets reverse mode printing
ESC N	$1B $4E	Sets normal mode printing
ESC @	$1B $40	Resets the printer
ESC D	$1B $44	Enters date in print buffer
ESC T	$1B $54	Enters time in print buffer
ESC U	$1B $55	Enters date (mm:dd:yy) in print buffer
ESC S	$1B $53	Enables printing of seconds
ESC X	$1B $58	Prints in red
ESC x	$1B $78	Prints in black
ESC B	$1B $42	Sets character font 1
ESC b	$1B $62	Sets character font 2
ESC I	$1B $49	Selects 24 columns
ESC i	$1B $69	Selects 40 columns
(aa) ESC r	(aa) $1B $72	Reads data at an address (aa)
(aadd) ESC w	(aadd) $1B $77	Writes data (dd) in an address (aa)
(dd) ESC G	(dd) $1B $47	Writes value (dd) in option register
(dd) ESC K	(dd) $1B $4B	Writes value (dd) in option register 1
(dd) ESC M	(dd) $1B $4D	Writes value (dd) in print mode
ESC p	$1B $70	Transmits option register in serial
ESC k	$1B $6B	Transmits option register 1 in serial
ESC m	$1B $6D	Transmits print mode in serial
ESC s	$1B $73	Transmits next character in serial
(dd) ESC a	$1B $61	Selects number of dot spaces
ESC J (n)	$1B $4A	Loads programmable character
ESC W	$1B $57	Prints graphic line of 200 dpi
ESC c	$1B $63	Management of bar code printing
ESC Q	$1B $51	Enables underlining
ESC q	$1B $71	Disables underlining
ESC $80 (m) (n)	$1B $80	Commands for the HACCP management

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

00H

[Name]	**Small character printing**	
[Format]	ASCII	-
	Hex	00
	Decimal	0
[Description]	The printer prints in small characters (normal)	
[Notes]	• The commands 00H - 09H 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]	**01H, 02H, 03H, 04H**	
[Example]		

01H

[Name]	**Double width printing**	
[Format]	ASCII	-
	Hex	01
	Decimal	1
[Description]	The printer prints in double width format	
[Notes]	• The commands 00H - 09H 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]	**00H, 02H, 03H, 04H**	
[Example]		

02H

[Name]	**Double height printing**	
[Format]	ASCII	-
	Hex	02
	Decimal	2
[Description]	The printer prints in double height format	
[Notes]	• The commands 00H - 09H 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] **00H, 01H, 03H, 04H**
[Example]

03H

[Name] **Expanded printing**
[Format] ASCII -
Hex 03
Decimal 3
[Description] The printer prints in expanded character mode
[Notes] • commands 00H-09H 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] **00H, 01H, 02H, 04H**
[Example]

04H

[Name] **Restore small character printing**
[Format] ASCII -
Hex 04
Decimal 4
[Description] The printer resumes printing with small characters
[Notes] • commands 00H-09H 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] **00H, 01H, 02H, 03H**
[Example]

0AH

[Name] **Forward feeds one line**
[Format] ASCII -
Hex 0A
Decimal 10
[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] **0BH**
[Example]

(n) 0BH

[Name] **Forward feeds (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 clears the line buffer
[Default]
[Reference] **0AH**
[Example] To forward feed fast, 5 lines at a time:
$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 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] **0FH**
[Example]

0FH

[Name] **Set CRLF mode**
[Format] ASCII -
Hex 0F
Decimal 15
[Description] Inhibits the command $0D maintaining enabled only the command $0A for printing

[Notes]
- To disable this option, reset the printer
- 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] **0DH**

[Example]

11H

[Name] **Graphic mode**

[Format]

ASCII	-
Hex	11
Decimal	17

[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 blocks of 6 dots each.

[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 è	**2nd byte è**	**3rd byte è**
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 time and date**

[Format] ASCII -

Hex 12

Decimal 18

[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] **13H, 14H**

[Example]

13H

[Name] **Set 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 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] **12H, 14H**

[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

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 11 ASCII: character format: hours/minutes/day/month/year + (CR) $0D		
[Notes]			
[Default]			
[Reference]	**12H, 13H**		
[Example]			

17H,...1FH

[Name]	**Print 1st (...8th) programmable character**		
[Format]	ASCII	-	
	Hex	17, ...1F	
	Decimal	23, ...31	
[Description]	This command prints the corresponding programmable character.		
[Note]			
[Default]	BIT MAP contained in flash		
[Reference]	**17H, 18H, 19H, 1AH, 1CH, 1DH, 1EH, 1FH**		
[Example]			

ESC R

[Name]	**Set reverse mode printing**		
[Format]	ASCII	ESC	R
	Hex	1B	52
	Decimal	27	82
[Description]	Selects printing in reverse mode: the receipt feeds out of hte printer with the printing in normal mode running from left to right		

[Notes]
[Default] Setting in option register by means of front keys
[Reference] **ESC N**
[Example]

ESC N

[Name] **Set normal mode printing**

[Format]

ASCII	ESC	N
Hex	1B	4E
Decimal	27	78

[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] **ESC R**
[Example]

ESC @

[Name] **Resets the printer**

[Format]

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

[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

ESC D

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

[Format]

ASCII	ESC	D
Hex	1B	44
Decimal	27	68

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

[Format]

ASCII	ESC	T
Hex	1B	54
Decimal	27	84

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

[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

ESC U

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

[Format]

ASCII	ESC	U
Hex	1B	55
Decimal	27	85

[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] **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]	**Enables printing of seconds**		
[Format]	ASCII	ESC	S
	Hex	1B	53
	Decimal	27	83
[Description	Enables the printing of the seconds when the time of day is requested through command ESC T		
[Notes]			
[Default]	Setting in option register by means of front keys		
[Reference]	**ESC T**		
[Example			

ESC X

[Name]	**Prints in red**		
[Format]	ASCII	ESC	X
	Hex	1B	58
	Decimal	27	78
[Description]	After receiving this command the printer prepares itself to print in red		
[Notes]			

ESC x

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

ESC B

[Name]	**Sets font 1**		
[Format]	ASCII	ESC	B
	Hex	1B	42
	Decimal	27	66
[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]	**ESC b**		
[Example]			

ESC b

[Name]	**Sets font 2**		
[Format]	ASCII	ESC	b
	Hex	1B	62
	Decimal	27	98
[Description]	Selects the second character font		
[Note]	•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]	**ESC B**		
[Example]			

ESC I

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

ESC i

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

(aa) ESC r

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

(aadd) ESC w

[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

[Description] Save 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 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] **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 characters which 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 bits in parallel reception	8	7
bit3: printing of seconds	disabled	enabled
bit4: CR ($0D)	enabled	disabled
bit5: reception parameter selection	hardware (dipswitch)	software
bit6: font selection	font 1	font 2
bit7: reception buffer	1Kbyte	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] **ESC K**

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

(dd) ESC K

[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

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

(dd)	bit=0	bit=1
bit0: number of columns	24 columns	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] **ESC G**

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

(dd) ESC M

[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

[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] ESC m

[Example] For double height printing, 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] Transmit the option register byte on the serial port

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

[Default]

[Reference] **ESC G, ESC K, ESC k**

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

ESC k

[Name] **Transmits the second configuration register in serial**

[Format]

ASCII	ESC	k
Hex	1B	6B
Decimal	27	107

[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] **ESC K**

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

ESC m

[Name]	**Transmits 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 printer is using the parallel protocol, nothing with be transmitted		
[Default]	Setting in the option register by means of the front keys		
[Reference]	**ESC B**		
[Example]	The response is on two bytes. E.g. if you receive: $30, $32 it means that printing is in double height mode		

ESC s

[Name]	**Transmits the next character in serial**		
[Format]	ASCII	ESC	s
	Hex	1B	73
	Decimal	27	115
[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) ESC a

[Name]	**Selects the number of dot spaces**			
[Format]	ASCII	(dd)	ESC	a
	Hex	(dd)	1B	61
	Decimal	(dd)	27	97
[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]

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 character number,i.e. between 1and 8. The bit map 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]

[Default] The 8 characters available on switching on are loaded with a bit map contained in the printer's flash. To modify these bit maps, a firmware upgrade is required.

[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

ESC W

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

[Format]

ASCII	ESC	W	
HEX	1B	57	
Decimal	27	87	

[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]

ESC c

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

[Format]

ASCII	ESC	c	[code] [height] [position] [options] [length] [data]
Hex	1B	63	
Decimal	27	99	

[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]

ESC Q

[Name]	**Enable underlined printing**		
[Format]	ASCII	ESC	Q
	Hex	1B	51
	Decimal	27	81
[Description]	After this command has been received, the characters are printed underlined		
[Note]			
[Default]			
[Reference]	**ESC q**		
[Example]			

ESC q

[Name]	**Disables underlined printing**		
[Format]	ASCII	ESC	q
	Hex	1B	71
	Decimal	27	113
[Description]	Annuls underlined printing		
[Notes]			
[Default]			
[Reference]	**ESC Q**		
[Example]			

ESC $80 1 (n)

[Name] **Set print mode**

[Format]

ASCII	ESC	$80	1	(n)
Hex	1B	$80	$31	(n)
Decimal	27	128	49	(n)

[Description] Changes the print mode

(n) is an ASCII number, between 0 and 2, corresponding to the print mode.

[Notes] Values not within the range are interpreted as 0.

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 2 (n)

[Name] **Set language for messages**

[Format]

ASCII	ESC	$80	2	(n)
Hex	1B	$80	$32	(n)
Decimal	27	128	50	(n)

[Description] Selects the language used for printing the messages.

(n) is an ASCII number between 0 and 4, corresponding to:

0=Italian

1=English

2=German

3=French

4=Spanish

[Notes] Values not within the range are interpreted as 0.

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 3 (n)

[Name] **Enable or disable second probe PT1000**

[Format]

ASCII	ESC	$80	3	(n)
Hex	1B	$80	$33	(n)
Decimal	27	128	51	(n)

[Description] (n) is an ASCII number between 0 and 1
0=Second probe disabled
1=Second probe enabled

[Notes]

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 4 (n)

[Name] **Enable Start/Stop key or external input**

[Format]

ASCII	ESC	$80	4	(n)
Hex	1B	$80	$34	(n)
Decimal	27	128	52	(n)

[Description] (n) is an ASCII number between 0 and 1
0=Start/Stop key
1=RECORD external input

[Notes]

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 5 (n)

[Name] **Select unit of measure for temperature**

[Format]

ASCII	ESC	$80	5	(n)
Hex	1B	$80	$35	(n)
Decimal	27	128	53	(n)

[Description] (n) is an ASCII number between 0 and 1
0=degrees Centigrade
1=degrees Farenheit

[Notes]

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 6 (n)

[Name] **Set Timer**

[Format]

ASCII	ESC	$80	6	(n)
Hex	1B	$80	$36	(n)
Decimal	27	128	54	(n)

[Description] (n) is an ASCII number consisting of 5 characters representing the seconds of the timer.

[Notes] Min=00000, Max=65535

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 7 (n)

[Name] **Enable or disable the time and date comparison function.**

[Format]

ASCII	ESC	$80	7	(n)
Hex	1B	$80	$37	(n)
Decimal	27	128	55	(n)

[Description] (n) is an ASCII number between 0 and 1
0=to disable the comparison
1=to enable the comparison

[Notes]

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 8 (n)

[Name] **Programme the time and date of comparison**

[Format]

ASCII	ESC	$80	8	(n)
Hex	1B	$80	$38	(n)
Decimal	27	128	56	(n)

[Description] (n) represents the time and date in ASCII used for comparison with the printer's Real Time clock in mode 1. It consists of 10 characters, arranged in the following pattern:YY MM DD HH MM

[Notes]

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 9 (n)

[Name] **Select temperature reading resolution**

[Format]

ASCII	ESC	$80	9	(n)
Hex	1B	$80	$39	(n)
Decimal	27	128	57	(n)

[Description] (n) is an ASCII number between 0 and 1
0=0.1°C resolution
1=1°C resolution

[Notes]

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 : (n)

[Name] **Set probe 1 temperature offset**

[Format]

ASCII	ESC	$80	:	(n)
Hex	1B	$80	$3A	(n)
Decimal	27	128	58	(n)

[Description] (n) is an ASCII number consisting of 3 characters which represent the offset in tenths of a degree. The data sent is managed in bytes with a sign. Therefore, from 0 to 127 the value is positive, and from 128 to 255 the value is negative.

[Notes] Min=000, Max=255

[Default] Programmed from setup

[Reference]

[Example]

ESC $80 ; (n)

[Name] **Set probe 2 temperature offset**

[Format]

ASCII	ESC	$80	;	(n)
Hex	1B	$80	$3B	(n)
Decimal	27	128	59	(n)

[Description] (n) is an ASCII number consisting of 3 characters which represent the offset in tenths of a degree. The data sent is managed in bytes with a sign. Therefore, from 0 to 127 the value is positive, and from 128 to 255 the value is negative.

[Notes] Min=000, Max=255

[Default] Programmed from setup

[Example]

ESC $80 <

[Name] **Transmit the temperature of probe 1**

[Format]

ASCII	ESC	$80	<	
Hex	1B	$80	$3C	
Decimal	27	128	60	

[Description] The printer transmits the current temperature of probe 1. The string consists of 8 ASCII characters and maintains the previously set format (unit of measure and resolution)

[Notes]

[Default]

[Reference]

[Example]

ESC $80 =

[Name]	**Transmit the temperature of probe 2**			
[Format]	ASCII	ESC	$80	=
	Hex	1B	$80	$3D
	Decimal	27	128	61
[Description]	The printer transmits the current temperature of probe 2. The string consists of 8 ASCII characters and maintains the previously set format (unit of measure and resolution)			
[Notes]				
[Default]				
[Reference]				
[Example]				

MODE 1:

The printer behaves like an ordinary printer with serial interface (TTL/232/485). When the printer address is set at a number other than 0, the RS485 protocol is enabled. In this case, the protocol will be addressable and transmission from host to printer will take place as follows :

STX N° COMMANDS or DATA to be PRINTED

where :

STX $0E hex

N° PRINTER NUMBER, which can vary from 1 to 64.

WARNING ! Bit 6 (hex 40) must always be set ! !

Therefore, printer N°1 will be $41, N°10 will be $4A etc.

(N = (printer number in hex 1 - 3F) OR $40)

COMMANDS AND DATA as regards the set of control and print characters, refer to the previously described commands. The string ends with $0D or when it has reached 24, the maximum possible number of characters.

It is advisable always to enter the character $0D at the end of the string, as this ensures that all the data received will be printed.

Example 1

STX N° **123456789012345678901 23$0D**

In example 1, the code $0D brings about the printing of the string. Failure to print this character would keep the string just received in the line buffer, i.e. it would not be printed but reception would remain enabled.

In response the printer :

STX N° STATUS

where :

STX $0E hex

N° NUMBER OF PRINTER that can vary between 1 and 63.

STATUS Response to the string where :

ACK (hex $06) the printer has received the data successfully

BUSY (hex $08) the printer has received the data successfully but there is not sufficient space for storing more data. From now on, therefore, the status register must be requested of the printer, to enable the latter to free storage space and reply with ACK.

MODE 2:

The printer operates in Stand Alone mode and, when switched on, nothing happens. There are two ways of activating an acquisition cycle: (setup) or the start/stop key. To start the acquisition cycle, press the start/stop key and the relevant LED flashes slowly. To terminate the sequence, press the key again; the LED will flash rapidly for 5 seconds. If pressed again before these 5 seconds have elapsed, the cycle will stop or the on / off status be given by the clean contact input (Record).

When the cycle has started, the printer prints a set heading (5 languages in setup I,GB,D,F,ES). The heading is:

```
*** HACCP REPORT ***
Date            {current date}
Time of day  { current time }
Appliance.....
Load No .....
Product.....
Operator Name.....
.....

START     T1 (°C or °F)  T2 (°C or °F
```

Subsequently, it prints the first line with {current time} T1 T2 with the relative temperature of the two probes, and prints according to a programmable timer rate. Everything proceeds until the STOP cycle. When this starts, it prints:

```
STOP        {Time1}    {Time2}

Time of da      { current time }
Date            { current date }

Approved.....  .....

  *** END OF HACCP REPORT **
```

Example of complete ticket :

```
          *** HACCP REPORT ***
Date            26-11-98
Time of da      12:24
Appliance .....  .....
Load No.....  .....
Product.....  .....
Operator Name.....
.....  .....

START     T1 -10.7     T2  -12.3
12:34     T1 -11.8     T2  -13.0
12:34     T1 -11.9     T2  -13.1
12:34     T1 -11.9     T2  -14.7
12:34     T1 -12.2     T2  -14.6
12:34     T1 -12.4     T2  -14.9
STOP      T1  -12,6     T2  -15.1

Time of da      12:40
Date            26-11-98

Approved.....  .....

  *** END OF HACCP REPORT ***
```

When the date/time comparison function is enabled, and if it matches the current date/time, the printer prints an end heading plus a start heading.

MODE 3:

The first part of mode 3 is identical to that of mode 2, i.e. The printer functions in Stand Alone mode and, when switched on, nothing happens. There are two ways of activating an acquisition cycle:(setup) or the start/stop key. To start the acquisition cycle, press the start/stop key and the relevant LED flashes slowly. To terminate the sequence, press the key again; the LED will flash rapidly for 5 seconds. If pressed again before these 5 seconds have elapsed, the cycle will stop or the on /off status be given by the clean contact input (Record).

When the cycle has started, the printer prints a set heading (5 languages in setup I,GB,D,F,ES). The heading is:

```
*** HACCP REPORT ***
Date            {current date}
Time of da      {current time}
Appliance .....
Operator Name:.....
.....  .....
```

In contrast to mode 2, the printer starts to acquire the temperature data but does not print it. The data read during the entire acquisition period is processed and only the MAXIMUM of the two channels is stored .

Everything proceeds until the STOP cycle. When this starts, the following must be printed:

```
T.Washing     (55÷65°C)  xxxx  °C
T.Rinsing     (75÷90°C)  yyyy  °C

Date          {current date}
Time of da    {current time}

Approved.....  .....

 *** END OF HACCP REPORT **
```

4.1 TECHNICAL SPECIFICATIONS

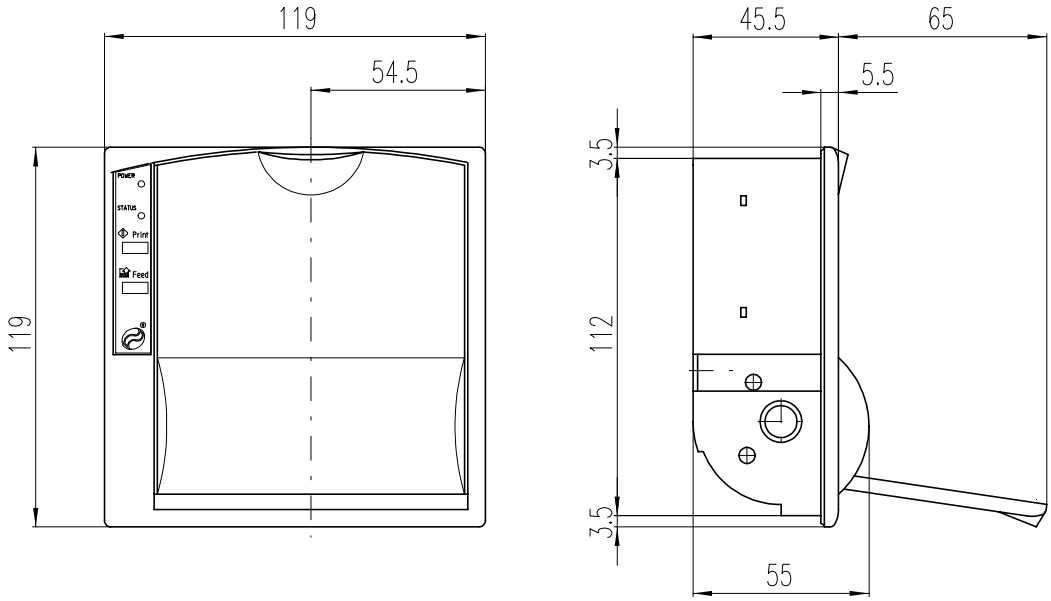
The main technical features of the printer are listed in Table 4.1.

Table 4.1

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 byte	40 byte
Print buffer	1Kbyte	
Print method	Thermal dot matrix	
Character matrix	16 x 24	8x24
Print direction	Normal or reverse	
Character set	Normal and extended	
Paper roll dimensions	58 +/- 1mm x Ø50 mm max	
Standard interfaces	RS232	
Power supply	Single between 9 and 33Vac Single between 11 and 47Vdc	
Absorptions		
Current in stand by	30mA	
Medium current	1A	
Environmentals conditions		
Operating temperature	0°C - 50°C	
Operating humidity	20% - 85% (no condensing)	
Storage temperature / humidity	-25°C - +70°C / 10% - 90%	

4.2 DIMENSIONS

The dimensions of the FT190HACCP 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.

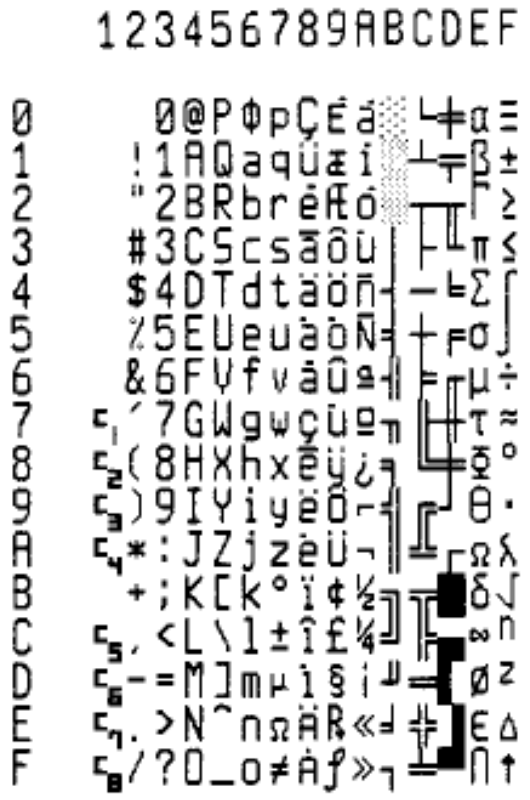


(Fig.4.1)

5.1 CHARACTER SETS

The FT190HACCP 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 1



(Fig.5.1)

FONT 2

(Fig.5.2)