EBS®
Ink-Jet Systeme

INDUSTRIAL INK-JET PRINTERS
BOLTMARK®-SERIES

EBS-6500

EBS-6800

EBS-7200

BASIC MANUAL

VERSION: 20140417#2.2

www.ebs-inkjet.com

TABLE OF CONTENTS

Dear User,

This edition of the document includes most of the changes introduced to the EBS printers with software version up to 32_0A and the descriptions contained therein correspond to the printers that are equipped with this software version.

The product delivered to you corresponds to your specific order, and it may happen that the options and functionality of your printing system differ from some descriptions or illustrations. As we need to keep pace with new technological advancement and wish to meet individual requirements of our clients, we reserve the right to introduce changes in the design and construction as and when necessary. Therefore, claims cannot be made regarding differences to data, illustrations or descriptions contained in this manual. Should your printer be equipped with options or software that are not illustrated or described in this manual or should you have additional queries after having read the manual, please contact any EBS Ink Jet Systeme representative office for more information.

The manufacturer shall not be liable for any damages to the printer resulting from failure to follow the instructions or from consequences of editorial or publishing errors contained in this manual.

The application and use of the products are beyond our control and are the full responsibility of the user.

1. General Information

The BOLTMARK® series consists of the following INK-JET printer models:

- EBS-6500 - the low investment printer for common applications.
- EBS-6800 - the all-round model printer with full printing options.
- EBS-7200 - the new standard in high-speed marking solutions.

The table below shows a comparison of the primary parameters of the BOLTMARK®-series models mentioned above.

Tab. 1.1

		EBS-6500	EBS-6800	EBS-7200
Maximum height of vertical row (H_{max})	**MINI** / **16** dots	●	●	●
	MIDI / **25** dots	◑	◑	◑
	MAXI / **32** dots	○	◑	◑
Examples of matrices (The matrices listed are available for the EBS-6500 **MIDI** printers as well as EBS-6800 and EBS-7200 **MAXI** printers)	One **5x5** line	●	●	●
	Two **5x5** lines	●	●	●
	Three **5x5** lines	●	●	●
	Four **5x5** lines	◑	◑	◑
	Five **5x5** lines	○	◑	◑
	One **7x5** line	●	●	●
	Two **7x5** lines	●	●	●
	Three **7x5** lines	◑	◑	◑
	Four **7x5** lines	○	◑	◑
	One **9x5** line	●	●	●
	Two **9x5** lines	◑	◑	◑
	Three **9x5** lines	○	◑	◑
	One **11x7** line	●	●	●
	Two **11x7** lines	◑	◑	◑
	One **14x9** line	●	●	●
	Two **14x9** lines	○	◑	◑
	One **16x10** line	●	●	●
	One **21x15** line	◑	◑	◑
	One **25x15** line	◑	◑	◑
	One **32x18** line	○	◑	◑
Bar codes available	**1D** codes	⊘	●	●
	2D code (Data Matrix)	◑	●	●
Type of iModule®	to run over **4000** hours (18 months)	●	◑	◑
	to run over **6000** hours (18 months)	◑	●	◑
	to run over **8000** hours (18 months)	◑	◑	●
Print height [mm]		**1.4 - 12**	**1.4 - 12**	**1.2 - 9**
Distance between the head and product [mm]		**0 - 30**	**0 - 30**	**0 - 15**

The symbols used in the above given table have the following meanings:

● - YES (available) ○ - NO (unavailable) ◑ - available as an option

⊘ - YES (available as standard but with limitations)

The complete information on the printer's features; installation, configuration and operation is contained in *The BOLTMARK®-series Printer User's Manual.* This document contains only the basic information on how to start and stop the BOLTMARK®-series printer, enter a text to be printed, print the text, exchange a (solvent or ink) bottle, replace iModule® as and when necessary, and keep the head clean.

2. Printer Elements

The major components of the BOLTMARK®-series printer are shown in ***Fig. 2.1***.

❶ - bottle of solvent (white stopper)
❷ - bottle of ink (black stopper)
❸ - master switch
❹ - print head
❺ - operation panel
❻ - photo-detector
❼ - iModule®

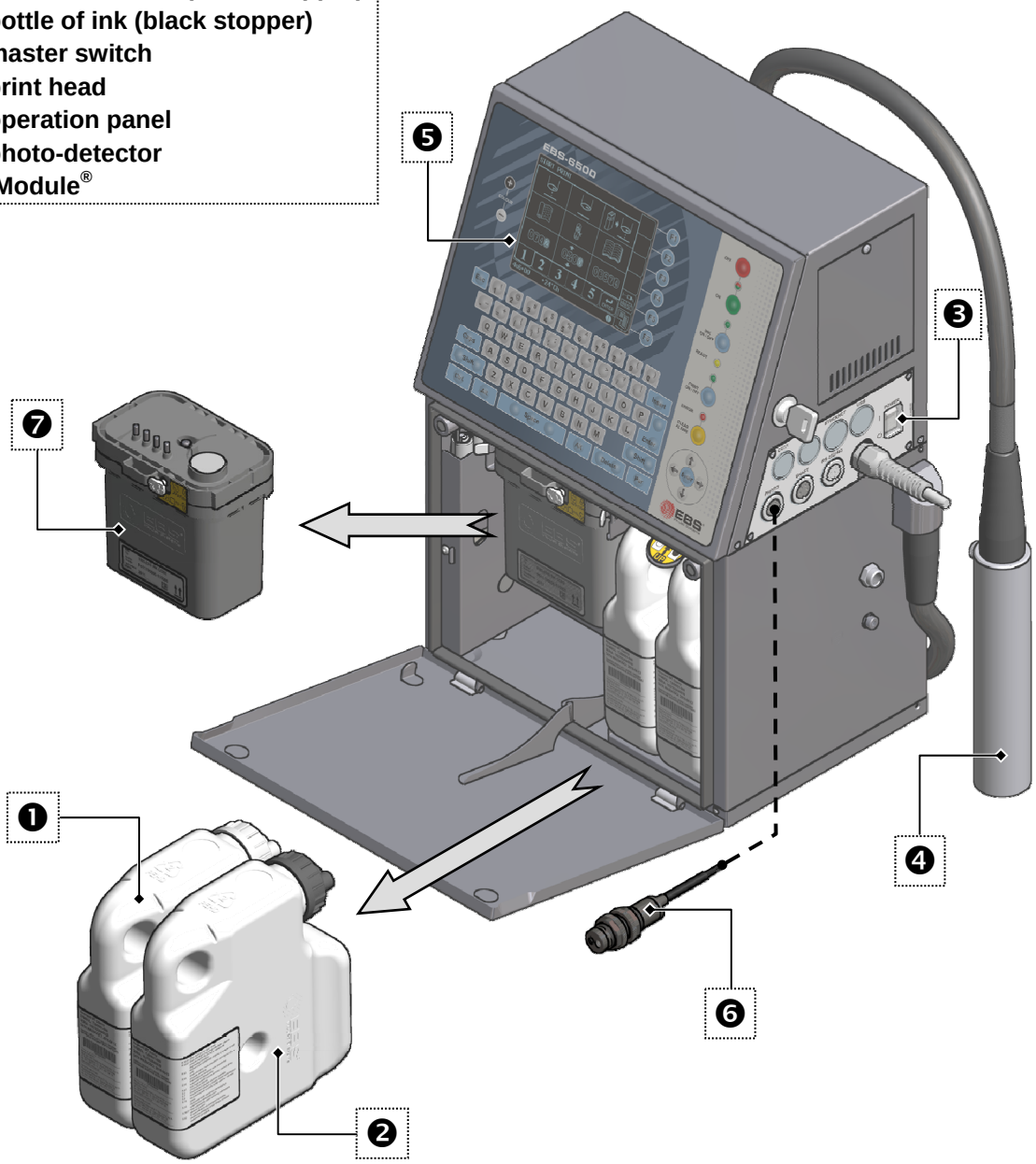


Fig. 2.1

In addition, the printing system may contain many other sub-assemblies such as a shaft-encoder, assembly stands, an additional external signaling device and many others. For more details refer to section *Installation of the Printer* in *The BOLTMARK®-series Printer User's Manual.*

3. Safety Requirements

NOTE:

- The printer should be operated by trained staff. It is recommended that operation of the device is supervised.
- Place a fire extinguisher suitable for both electrical and chemical fires in the vicinity of the printer.
- Do not print in areas where there is a risk of explosion.
- Do not print on objects whose temperature exceeds 100°C at the time of printing.
- Do not use open fire or spark-generating devices in the area where the printer works.
- Plug in the printer to the mains socket that is wired to earth.
- Adjustments to the electrical part of the system and he head should be performed when power supply is disconnected.
- Do not point the head outlet to persons or animals during printing.

- Wear protective clothes while performing operations to the ink system.
- Air contaminated with solvent should be removed to the outside of the building via an unobstructed duct.
- Do not use plastic vessels for washing because of the risk of static electricity. Metal vessels are recommended.
- Do not leave ink, solvent or wash-up in open vessels.
- Before you approach highly flammable liquids remove static electricity by touching an earthed, metal object (*e.g.* the earthed printer housing).
- Only EBS-approved agents may operate the printer otherwise guarantee claims are not valid!!

In the case of accident...

➥ When ink or solvent spills occur, the spilled fluid should be wiped with a piece of absorbent material and then removed in compliance with fire and health and safety at work (HSE) regulations.
➥ If the clothing has been splashed, remove it as soon as possible.
➥ Should the eyes or skin get irritated:

EYES need to be rinsed with running water for at least 15 minutes, then you should see an eye specialist,
SKIN needs to be washed with water and soap.

4. Operating the Printer

Before starting the printing system ensure that the appropriate operating conditions are satisfied, paying special attention to the following:

- power supply: **100 - 240V, 50/60Hz (AC)**,
- free access to the printer, upright position of the printer on a table or EBS rack, suitable position of the photo-detector and print head to ensure that objects are labeled properly.

4.1. Switching the Printer On

Every BOLTMARK®-series printer is equipped with a power supply with a stand-by circuit. There are two different power switches. One main switch for standby and one switch for turning the printer on.

The double-pole master switch ❸ (see *Fig. 2.1*), which separates two power wires electrically from the mains; it is located on the right-hand side of the printer next to the mains cord. After the master switch has been turned on, the printer triggers to the stand-by mode - the red LED on the operation panel ❺ (see ***Fig. 2.1***) between the ON and OFF keys comes on.

If all the connections are made properly (and the master switch is switched on), just press the ON button on the operation panel. This will initiate the printer starting procedure. While the procedure is being followed, the green LED above the INK ON/OFF key on the operation panel flashes, indicating the start of the ink flow to the head. The procedure is finished when the yellow **READY** LED on the operation panel starts glowing. This means that the head is ready for printing. A detailed description of the starting procedure is contained in *The BOLTMARK®-series Printer User's Manual.*

NOTE:
While the printer start-up procedure is being followed, the iModule® transport valve must be open. An attempt to start the printer while the transport valve is closed causes the following message to be displayed:

VACUUM DOESN'T INCREASE,
Check iModule

transport protection. If that happens, you should clear the alarm with the CLEAR ALARM key, open the iModule® transport valve and start the procedure for initiating the flow of ink in the head (with the **INK ON** command in the **SERVICE** menu).

4.2. Operation Panel

The operation panel enables the printer operator to control and monitor printer operation, and start specific procedures as and when necessary. It is also used for performing such basic operations as turning the print mode on or off, locating faults, clearing alarms, etc. For more details refer to chapter: Operating the Printer in *The BOLTMARK®-series Printer User's Manual.*

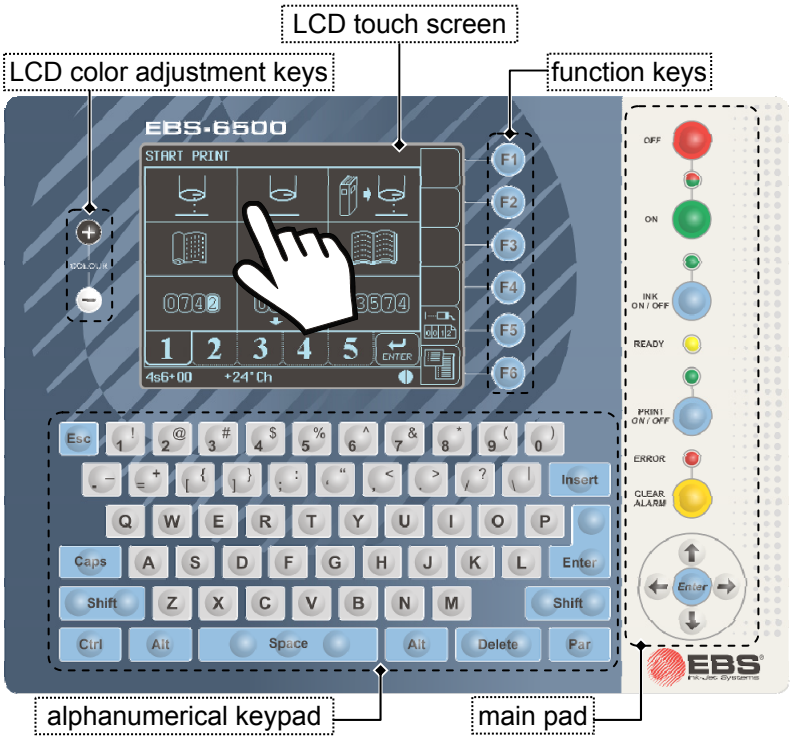


Fig. 4.2.1

4.3. Control MENU

4.3.1. Choosing the Type of Menu

The printer can be operated via a text menu or a graphic menu, according to the user's preferences. Irrespective of the menu chosen, commands are executed in the same way and both keypad and touch panel can be used to operate the printer. In the text menu, all commands are available, including service commands to which access is secured with a password. The graphic menu offers access only to selected commands which are indispensable for operating the printer. These are shown as icons.

When the printer is started for the first time, the graphic menu is displayed. In order to move to the text menu choose the  icon in the function icon window or the corresponding function key F6 (which is indispensable especially when the touch panel is not calibrated). When the text menu is chosen, it remains active each time the printer is started.

In order to move back to the graphic menu, choose the **GRAPHIC MENU** item at the highest level of the text menu.

4.3.2. Graphic Menu

If the printer is operated via the graphic menu, the screen is divided into five sections called windows.

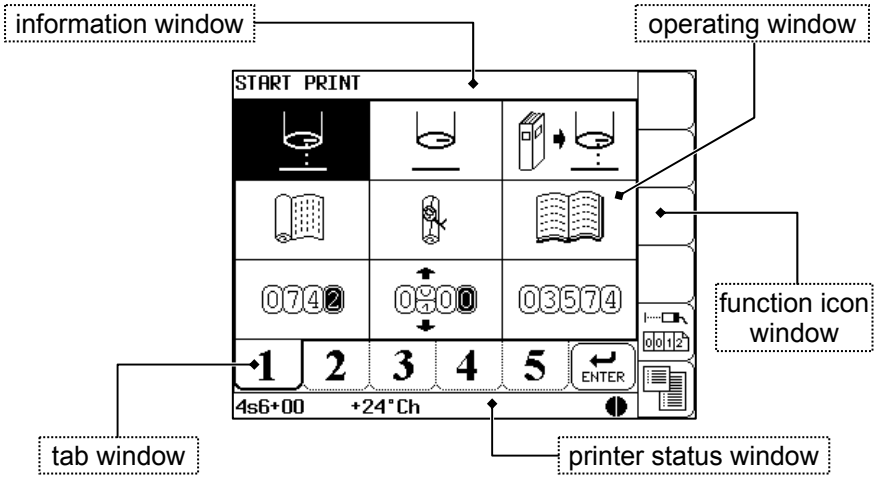


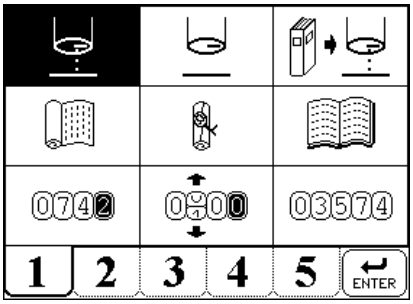
Fig. 4.3.2.1

The windows are designed for the following:

- **Tab window** - the icons of the graphic menu are grouped thematically and each group is marked with a tab. The tab window is designed for easy tab selection. Each tab selected gives access to the corresponding operating window.
- **Operating window** – contains the icons designed for operating the printer via touch panel. The icons of one thematic group are displayed at a given moment. Changing the group can be done by selecting a different tab in the tab window.
- **Information window** – this window shows the name of a text menu function. The icon selected is displayed as a negative image, and the function name (in the user-selected language) appears in the information window. In order to execute the function, the selection should be confirmed with the ENTER icon on the tab bar. Such a navigation arrangement helps protect against accidental execution of a dangerous operation.
- **Printer status window** - contains information about the head status in various operating modes (***p*** for printing, ***s*** for stop, ***c*** stands for removed head cover, ***v*** for special service mode), the ***ToF*** setting (*i.e.* the time over which an ink drop flies through the head), which describes the physical properties of the ink drop, quality of phasing and also a graphical indicator of how long the iModule® can still be in use - a more detailed description is given in section ***5.2 Replacing iModule®***.
- **Function icon window** - contains a set of function icons, which at the same time, describe the function keys located on the operator's panel.

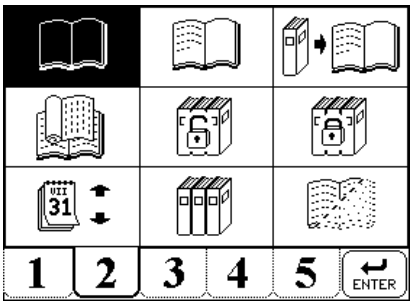
The graphic menu icons are grouped in the following way:

- Tab 1:



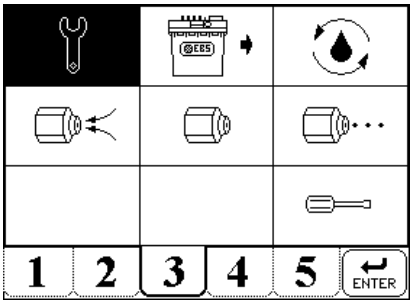
Printing handling functions (successively):
- **START PRINT**,
- **STOP PRINTING**,
- **EDIT & PRINT CURRENT TEXT**,
- **PRINTING PARAMETERS**,
- **SAVE CURRENT PARAM.**,
- **DISPLAY PRINTED TEXT**,
- **SHIFT COUNTER**,
- **SET SHIFT COUNTER**,
- **GLOBAL COUNTER**.

- Tab 2:



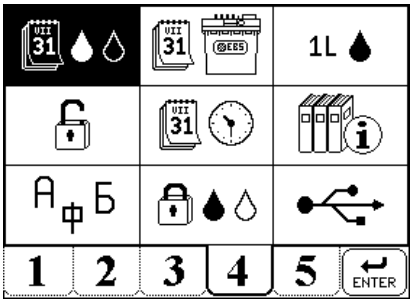
Text file handling functions (successively):
- **CREATE NEW TEXT**,
- **TEXT EDITION**,
- **COPY & EDIT**,
- **LINK PARAMETERS**,
- **CREATE/CHANGE PASS**,
- **ACTIVATE PASSWORD**,
- **UNIV.DATE REG. CONFIGURATION**,
- **READ LIBRARY**,
- **DELETE TEXT**.

- Tab 3:



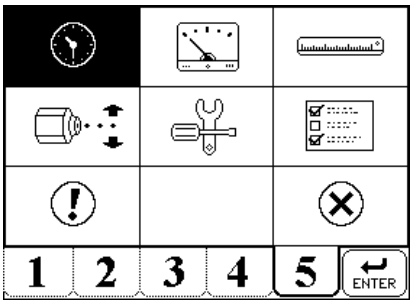
Service functions (successively):
- **SERVICE**,
- **iMODULE REPLACEMENT**,
- **CIRCULATE INK**,
- **CLEAN NOZZLE**,
- **FAST OFF**,
- **INK ON**,
- not used,
- not used,
- **INK SYSTEM SERVICE**.

- Tab 4:



Ink Monitoring System handling functions (successively):
- **OPERATING TIME** – applies to bottles,
- **OPERATING TIME** – applies to iModule®,
- **No. OF TXT/1l**,
- **UNLOCK PROTECTION**,
- **TIME AND DATE**,
- **LIBRARY INFO**,
- **LANGUAGE**,
- **REMOVE PROTECT TIME**,
- **LIBRARY MANAGER**.

- Tab 5:



The other functions (successively):
- **ACTIVITY TIME**,
- **HV VALUE,PHOTO,SHAFT state**,
- **CONVEYOR MEASUREMENTS**,
- **SET INK STREAM**,
- **ADJUSTMENTS**,
- **OPTIONS**,
- **READ ERRORS REPORT**,
- not used,
- **CLEAR MEMORY**.

4.3.3. Text Menu

If the text menu is used, the screen is divided into five areas called windows - as is the case with the graphic menu.

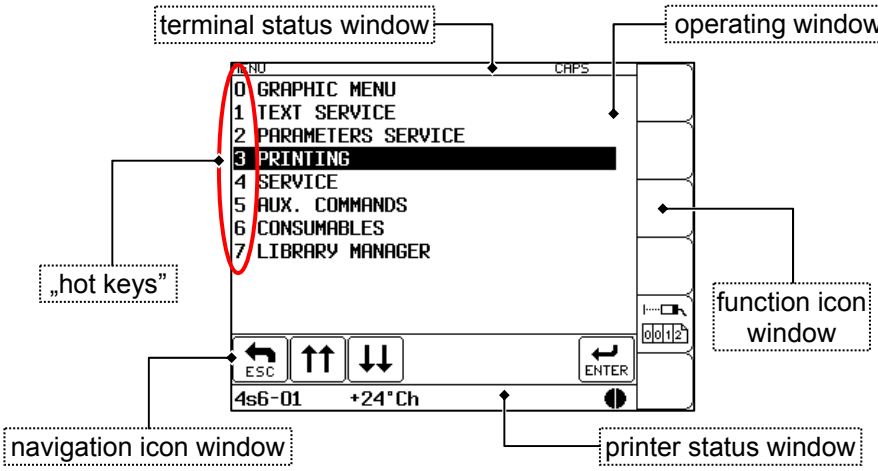


Fig. 4.3.3.1

The windows are designed for the following:

- **Terminal status window** – contains information on the current terminal settings; for example, it indicates the graphic cursor co-ordinates (while editing graphics), whether the CAPS key (to switch between block/small letters) or the SHIFT or CTRL button is pressed or not, which character input mode (**INS**ert or **OveR**write) is used, etc.
- **Operating window** – is the main window of the display which shows the service **MENU**, parameters and messages, for editing text files, etc.
- **Navigation icon window** - contains a set of keys to facilitate your movement along the **MENU** tree and for modification of the parameter settings.
- **Printer status window** - contains information about the head status in the printer's various operating modes (***p*** for print, ***s*** for stop, ***c*** stands for removed head cover, ***v*** for service mode), the ***ToF*** setting (*i.e.* the time over which an ink drop flies through the head), which describes the physical properties of the ink drop, quality of phasing and also a graphical indicator of how long the iModule® can still be in use - a more detailed description is given in section ***5.2 Replacing iModule®***.
- **Function icon window** – contains a set of function icons, which at the same time, describe the function keys located on the operator's panel.

The text menu has a multi-level tree structure. Commands are executed directly at the lowest level. No action is initiated by moving from one menu branch to another. Only the execution of a command initiates an action such as starting the printing, moving to a word processor, changing parameters, etc.

The first character (a digit or a letter) of every MENU item corresponds to the so called **hot key** (see ***Fig. 4.3.3.1***). When this key is pressed on the keypad, the cursor bar is positioned on the required item.

The following keys (on the alphanumerical keypad or the LCD touch screen icons) are used to move within the MENU tree:

Keys/Icons	Function
⇧	To move the cursor one menu item upwards.
⇩	To move the cursor one menu item downwards.
SHIFT ⇦ (SHIFT ⇧)	To move the cursor to the first item.
SHIFT ⇨ (SHIFT ⇩)	To move the cursor to the last item.
⇈	To move the cursor one menu screen upwards (PAGE UP).
⇊	To move the cursor one menu screen downwards (PAGE DOWN).
ENTER or ENTER	To move one level downwards (to the next MENU branch) or to confirm the selected command for execution.
ESC or ESC	To move one level upwards or cancel the selected command. If you press the ESC icon several times, you are always moved back to the main MENU level.

NOTE:

After a command has been confirmed with the ENTER icon, you may not be able to cancel it. Some commands are executed immediately.

4.4. Opening and Editing a New File

Both simple and more complex texts can be printed with EBS printers. They can contain; time markers, the date, expiry dates (via the so-called variable fields). Barcodes (also 2D[1] Data Matrix codes) and graphics (either built-in or created by the user with a graphics processor) can be printed. In addition, so-called *text profiles* have been introduced in order to simplify the editing of a text, the adjustment of a text to a required configuration and also the optimization of print quality and speed. For more details refer to *The* BOLTMARK®-series *Printer User's Manual.*

Example of how to input a text containing an expiry date and the actual time)

NOTE:

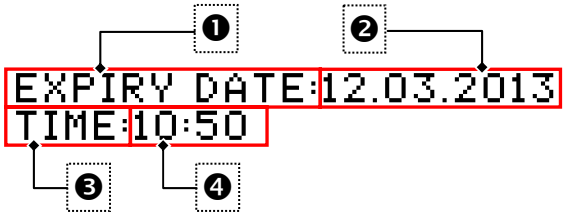
- The expiry date and time, which are shown on the illustrations in the following example depend on the actual settings for date and time in the printer.
- Every aspect of the printer operation procedure is described in the following example.
- The profile chosen for the below given (**2 lines x 7 dots**) text is the optimal profile in that case, but the text can also be created based on general application profiles (for more details refer to *The* BOLTMARK®-series *Printer User's Manual*).

[1] Only in the EBS-6800 and EBS-7200 printers, as standard (see ***Tab. 1.1***).

The following text should be printed:

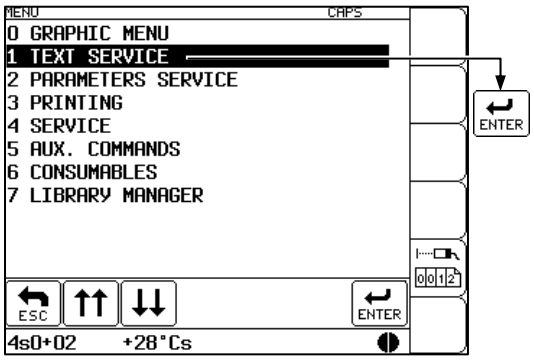
EXPIRY DATE:12.03.2013
TIME:10:50

The text file consists of four subfiles:

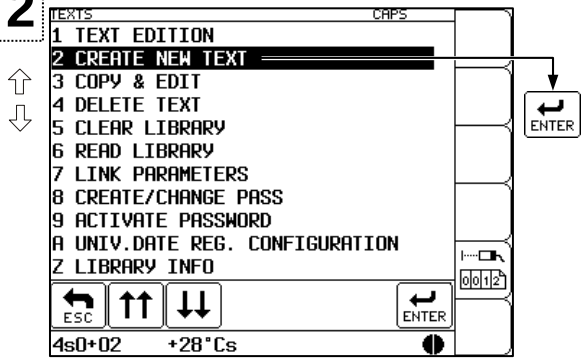


Two of them (❶ and ❸ in the figure on the left) are regular **Text** type subfiles, while the other two (❷ and ❹ in the figure on the left) are also **Text** type subfiles but their contents are updated automatically via variable fields. Subfile ❷ contains the expiry date (which is formed by adding a specific offset to the current date – the **Date+offs.** variable field), while subfile ❹ contains the current time (the **Time** variable field). The entire text will be printed in Latin 7x5 (every character will be 7 dots high and 5 dots wide).

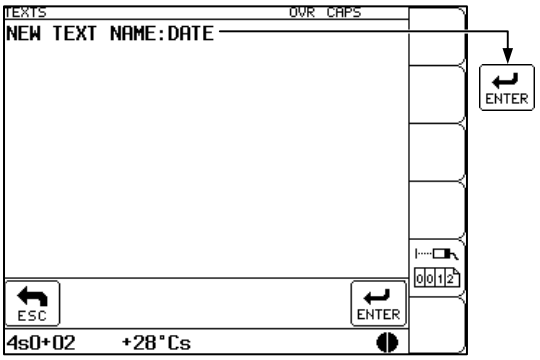
1 **Main menu**



2 **Text service menu**

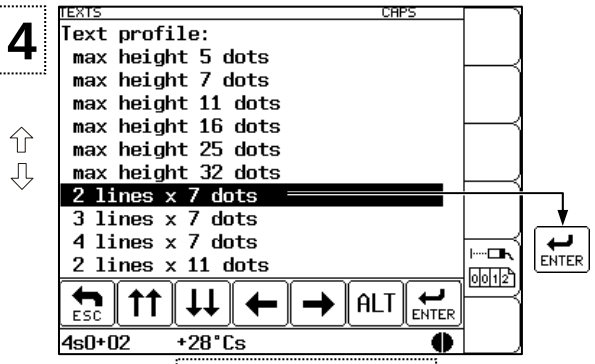


3



Type in the text name (up to 8 characters - block or small letters, digits characters excluding ***. , / \ ; : * ? " < > | [ ] { } = +****), e.g.* ***DATE****.*

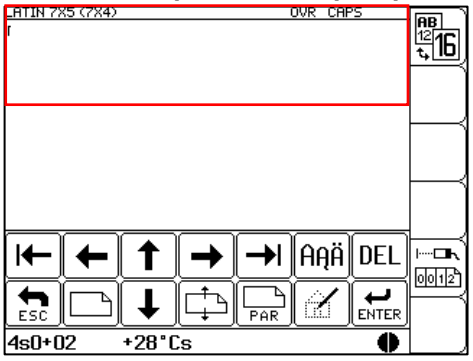
4

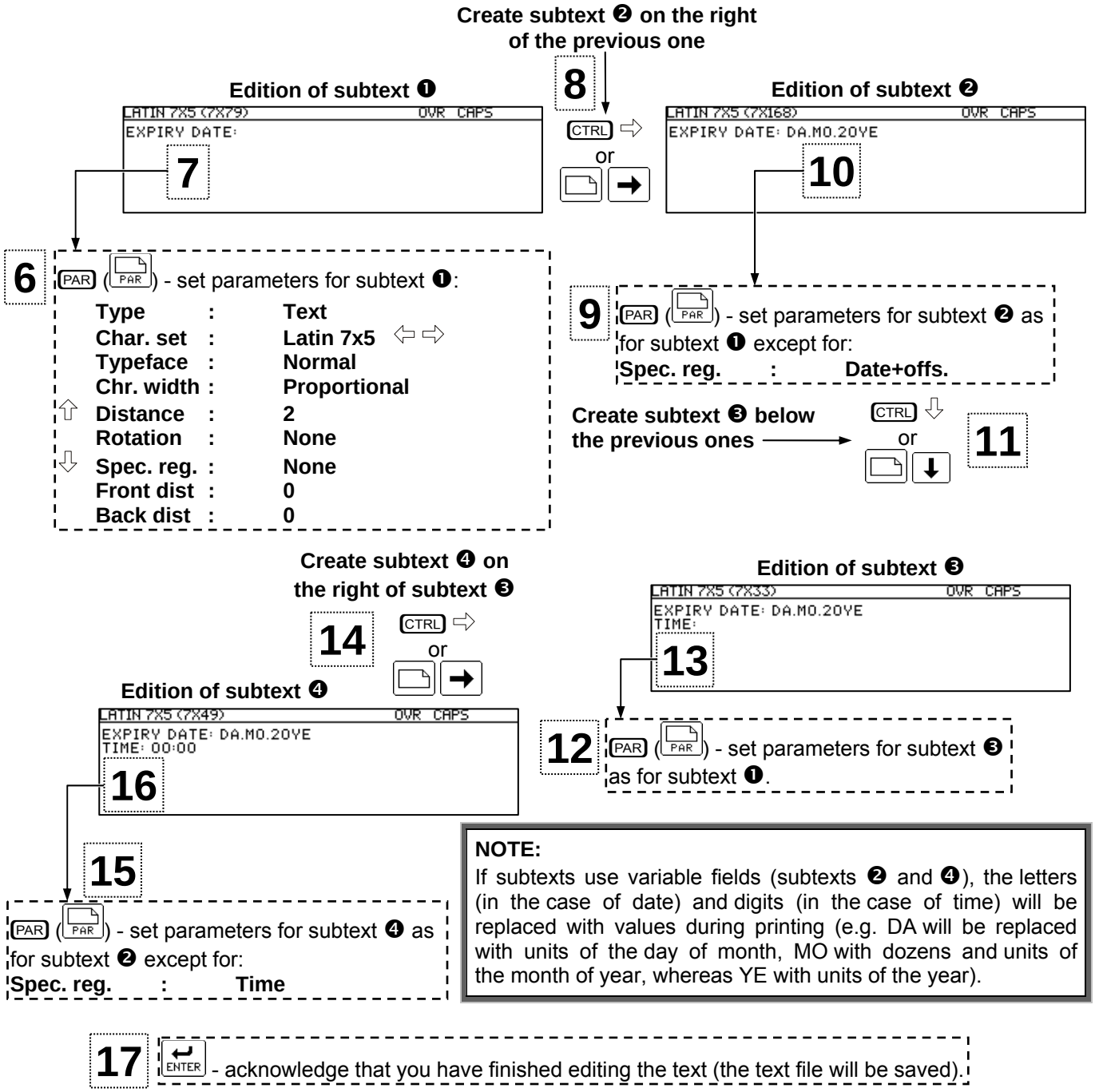


Choose a text profile

Word processor – new window (contains 1 space)

5





NOTE:
If subtexts use variable fields (subtexts ❷ and ❹), the letters (in the case of date) and digits (in the case of time) will be replaced with values during printing (e.g. DA will be replaced with units of the day of month, MO with dozens and units of the month of year, whereas YE with units of the year).

17 ENTER - acknowledge that you have finished editing the text (the text file will be saved).

The above example contains only some of the options that can be used to edit text files. Other useful functions are:

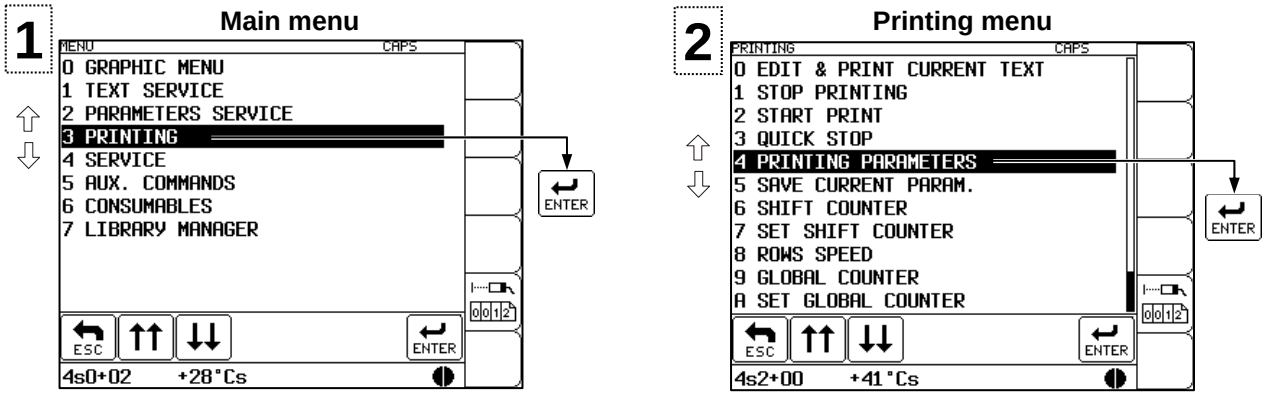
Keys/Icons	Function
F1 or	The information on the current profile of the text being processed and the possibility of changing the profile as well.
SHIFT (⇦) or ( )	To move the cursor to the first or to the last character in an ASCII subfile.
SHIFT (⇩) or ( )	To move the entire subfile by one pixel (dot) upwards or downwards (or move the subfile to the previous/following line).
INS	To switch between two character insertion modes: **INS**ert/**OvE**rwrite.
DEL or DEL	To delete a character at the cursor position in a subfile.
CTRL DEL	To delete the entire subfile.
	Graphic editor (available only when **Type** = **Graphic**).
ALT or	National characters.

Keys/Icons	Function
CTRL Q	To switch between alternative display modes for spaces. Spaces can be displayed as ⌈ (by default) or as blanks. Spaces are always printed as blanks no matter which display mode is active.

4.5. Setting Print Parameters

Before the text prepared in section ***4.4*** is printed, all the required print parameters need to be set. The parameters determine the print rate, the location of the print on objects to be labeled, the direction in which the object moves in front of the print head, the date offset (to set expiry date), etc.

Set the print parameters in the following way:



Active text	:	**DATE**	Name of active text.
Linked param.	:		Name of parameter block linked to the active text.
Height (pix)	:	**16**	Height of the active text, given as a number of dots.
Height	:	**LARGE**	Print height.
Speed	:	**SLOW**	Maximum print speed.
Generator	:	**GEN/SHAFT**	The source of timing signals: the internal generator or shaft-encoder.
Resol. dot/cm	:	**20**	Character resolution (recommended for a given combination of the **Height**, **Speed** and **Height (pix)** parameters).
Cnv spd m/min	:	**10.0**	The speed at which an object moves in front of the print head if the internal generator is used for timing (**Generator = GEN**).
Enc const p/m	:	**10000**	The number of pulses generated by the shaft-encoder over the distance of 1 meter. Print rate must suit the conveyor travel speed (**Generator = SHAFT**).
Vert. direct.	:	**STANDARD**	Printing in the vertical direction. Prints can be made normally or upside down.
Space	:	**2.0 mm**	The distance from the point where the photo-detector has been activated to the point where printing of a text file starts.
Text rpt.	:	**1**	Number of printing text repetitions.
Rpt.dist.	:	**30.0 mm**	The distance between the beginnings of texts (if **Text rpt.** > 1).
Conv. direct.	:	**LEFT**	The direction (left or right) conveyor moves in front of the print head.
Offset	:	**100**	An offset (number of days) from the current date to the expiry date.
Offset2	:	**1**	An offset (number of days) from the current date to the expiry date.
Counter delta	:	**1**	Incremental/decremental counter increment/decrement. The parameter is used by the **Up counter** and **Down count.** variable fields.
Row repetit.	:	**1**	The number specifying how many times every vertical row will be printed.
Mode	:	**NORMAL**	Selection of max print speed mode. The parameter can only be modified after the service password has been given.

You can choose a parameter to be modified by means of the touch panel (the screen can be scrolled with the ⇈, ⇊ icons) or the ⇧ ⇩ keys. Parameter settings are changed with the ← → icons or by typing in a setting via the keyboard (this applies to numerical parameters) and confirming with the ENTER icon. For the **Active text** parameter You can also choose the text file from the library using the ALT icon.

In the example referred to above, only the Offset parameter needs modifying. The default settings can be used for the other parameters.

Soon after the editing of printing parameters has been finished (acknowledged with the ENTER icon) the parameters can be saved together as a block. The assigned name of the parameter block is the same as the name of the active text file.

NOTE:

- Not all combinations of the **Height** and **Speed** parameters and the matrix height given as a number of dots (the **Height (pix)** printing parameter) are available. Should an unavailable combination be chosen, a fragment of the following message is displayed in the printer status window:
  Increase PRINT.PARAM. Height or
  decrease PRINT.PARAM. Speed or
  decrease text height [dots].. In order to get the entire message displayed press the ALT icon.
- If the **Generator** parameter is set to **GEN**, the printer will make prints regardless of whether an object moves in front of the print head or not. If the object remains still, the text will be jetted onto one place giving a vertical line only. While testing the printer where an internal generator is used for timing, it is advisable to set the **Text rpt.** parameter to a higher value.
  If the **Generator** parameter is set to **SHAFT**, the head will make prints only when a shaft-encoder is connected and its axle rotates (for more details on this optional device refer to section *Adjusting the Print Rate* in *The BOLTMARK®-series Printer User's Manual*). If this is the case, there may be the need (especially during trials) to complete printing the current text by turning the shaft-encoder axle manually.

4.6. Printing

4.6.1. Starting Printing

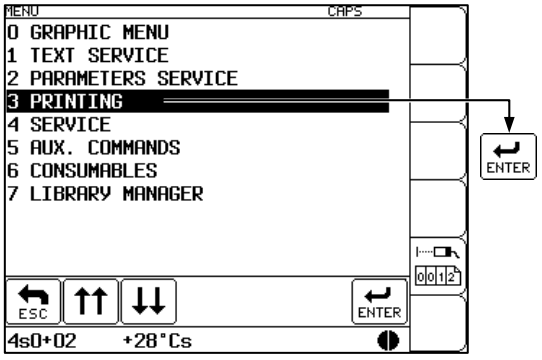
Printing can be initiated in two parallel, independent ways:

- With the **START PRINT** command selected on the terminal (description on the figures below).
- With the PRINT ON / OFF key on the operation-panel function pad. When the key is pressed, the active text is printed. The key can be used no matter where the cursor is positioned within the control menu (for example, you can start printing while editing a text file).

In order to print the text file called **DATE** prepared in the example in section ***4.4*** follow the step given below:

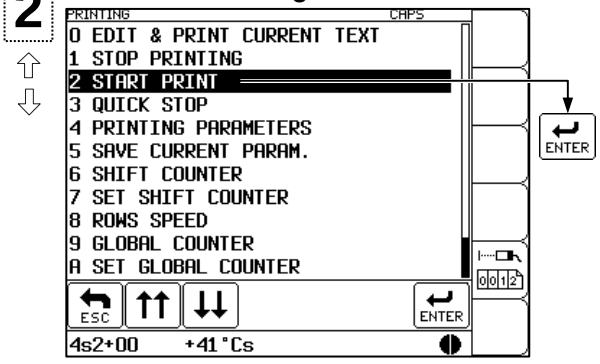
1

Main menu

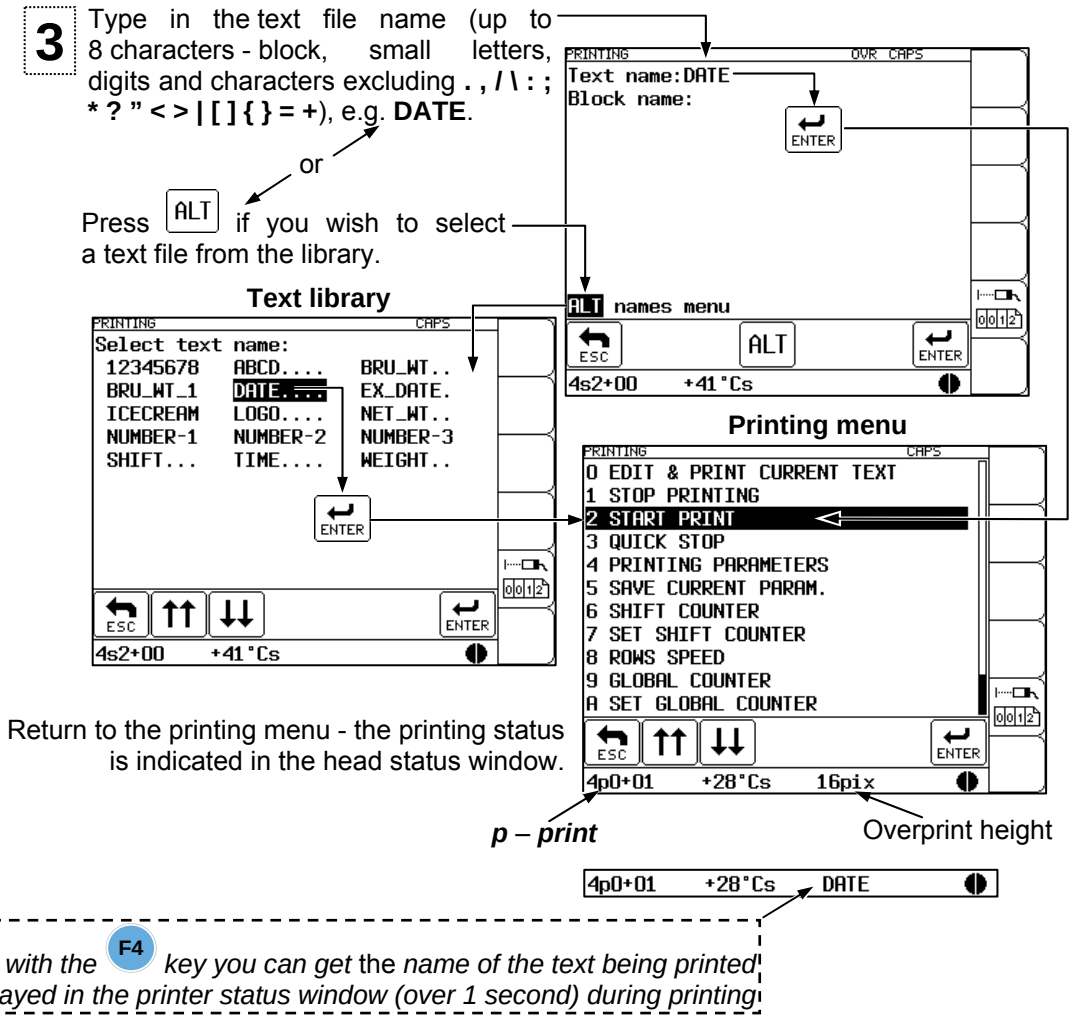


2

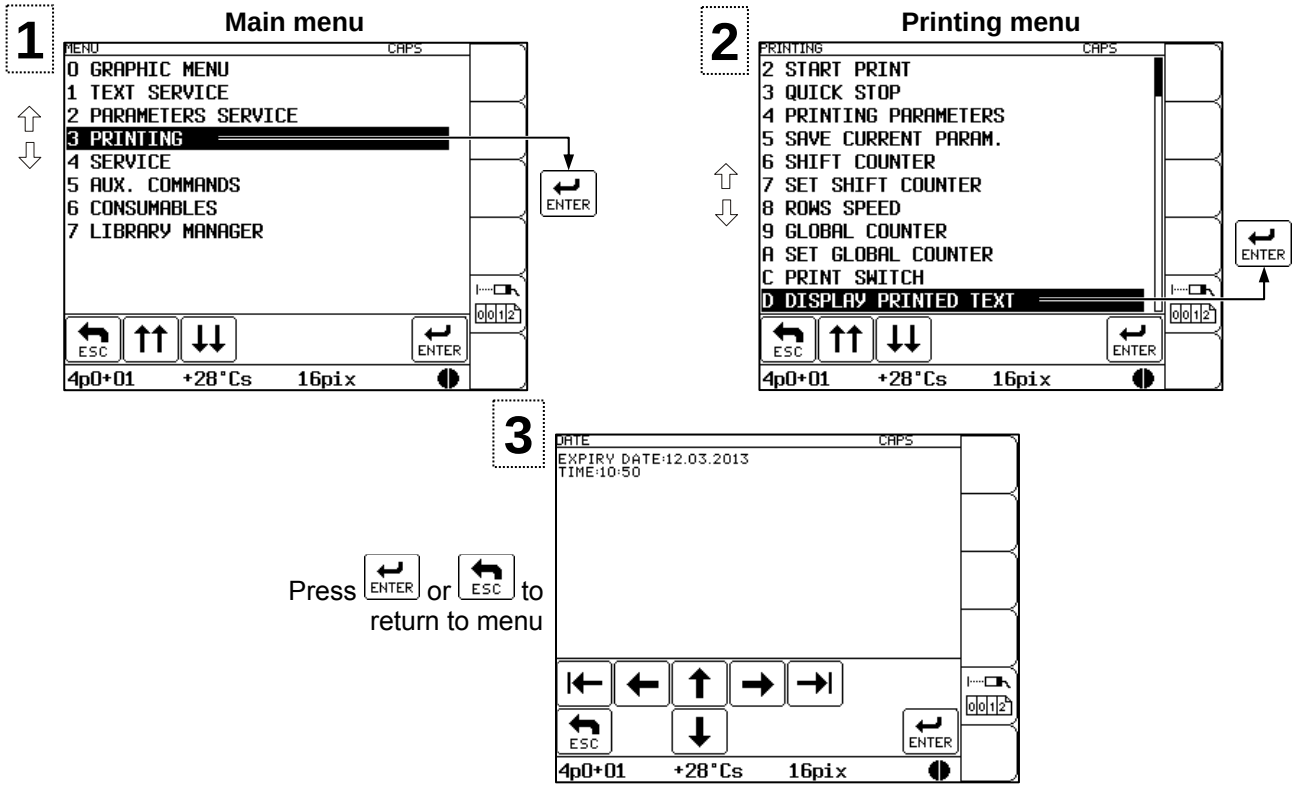
Printing menu



NOTE:
Printing can be initiated only and exclusively when the head cover is installed. An attempt to start printing when no cover is installed causes the **Head cover removed** message to be displayed and makes printing impossible.



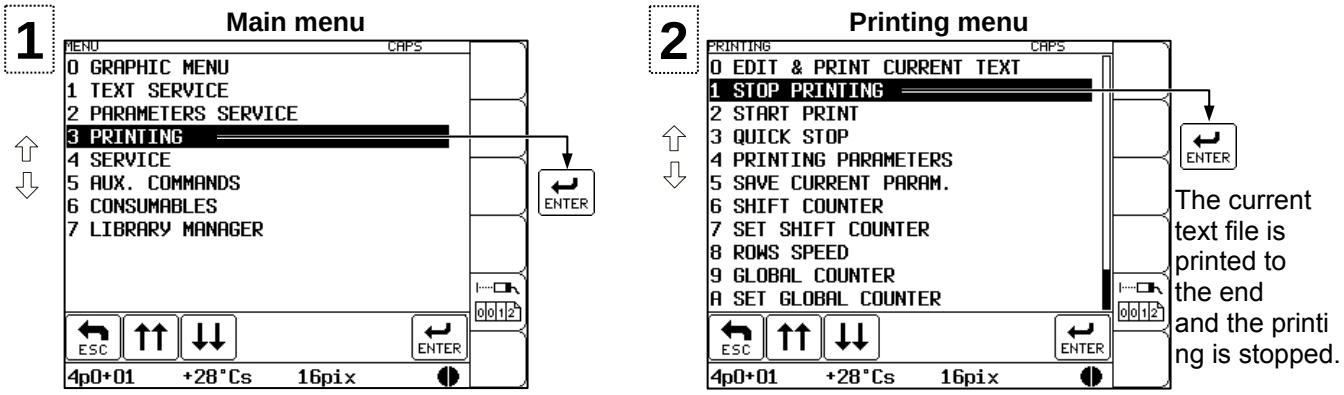
4.6.2. Viewing a File to be Printed on the Terminal Display



4.6.3. Stopping Printing

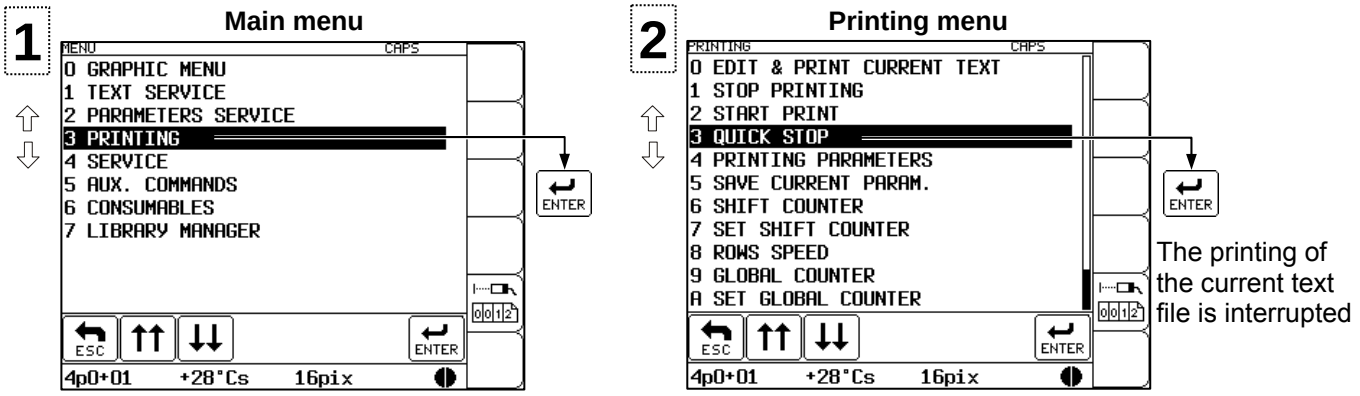
Printing can be terminated in three ways:

- With the **STOP PRINTING** command.



The current text file is printed to the end and the printing is stopped.

- With the **QUICK STOP** command.



The printing of the current text file is interrupted

- With the PRINT ON / OFF key on the operation-panel function pad (when the key is pressed, the **QUICK STOP** command is executed). This key can be used no matter where the cursor is positioned within the control menu (for example, you can stop the printing while editing a sub file).

4.7. Switching the Printer Off

There are several modes of switching the printer off:

- regular mode (to switch the printer off for a period of up to 1 week),
- emergency mode (for no longer than a 1-hour period),
- service mode (for no longer than a 1-hour period),
- switching off in the regular mode with additional rinsing of valve **V3** – a precise description is given in *The BOLTMARK®-series Printer User's Manual.*

Switching the printer off in the regular mode - press the OFF key on the operation panel and wait a few minutes for the printer to turn off. Then the LED between the ON and OFF keys changes color from green to red. The **SWITCHING THE PRINTER OFF .....** message is displayed on the terminal and the time remaining until the end of the switching off procedure is displayed in the status window. Also the green LED above the INK ON / OFF key on the operation panel flashes indicating that the flow of ink to and in the head is being stopped.

Switching the printer off in the emergency mode - press the OFF key and while holding it down press and release the CLEAR ALARM key. **Or alternatively, you can cut off the supply of electricity to the printer with the master switch ❸ (see *Fig. 2.1*). This type of switching off is allowed only in the event of an evident printer failure, especially when the failure to switch the printer off in the regular mode may cause more extensive or additional damage (such as an ink spill).**

Switching the printer off in the service mode - follow the same procedure as for the emergency mode. The service mode is used to switch the printer off quickly (without rinsing) for a few minutes in order to perform

a service operation. If the unit needs to be switched on and off frequently, then the service mode should only be used in order to prevent ink from getting diluted excessively.

NOTE:
After the unit has been switched off in the emergency or service modes, wash the inner part of the head (especially around the gutter) with solvent.

5. Routine Maintenance

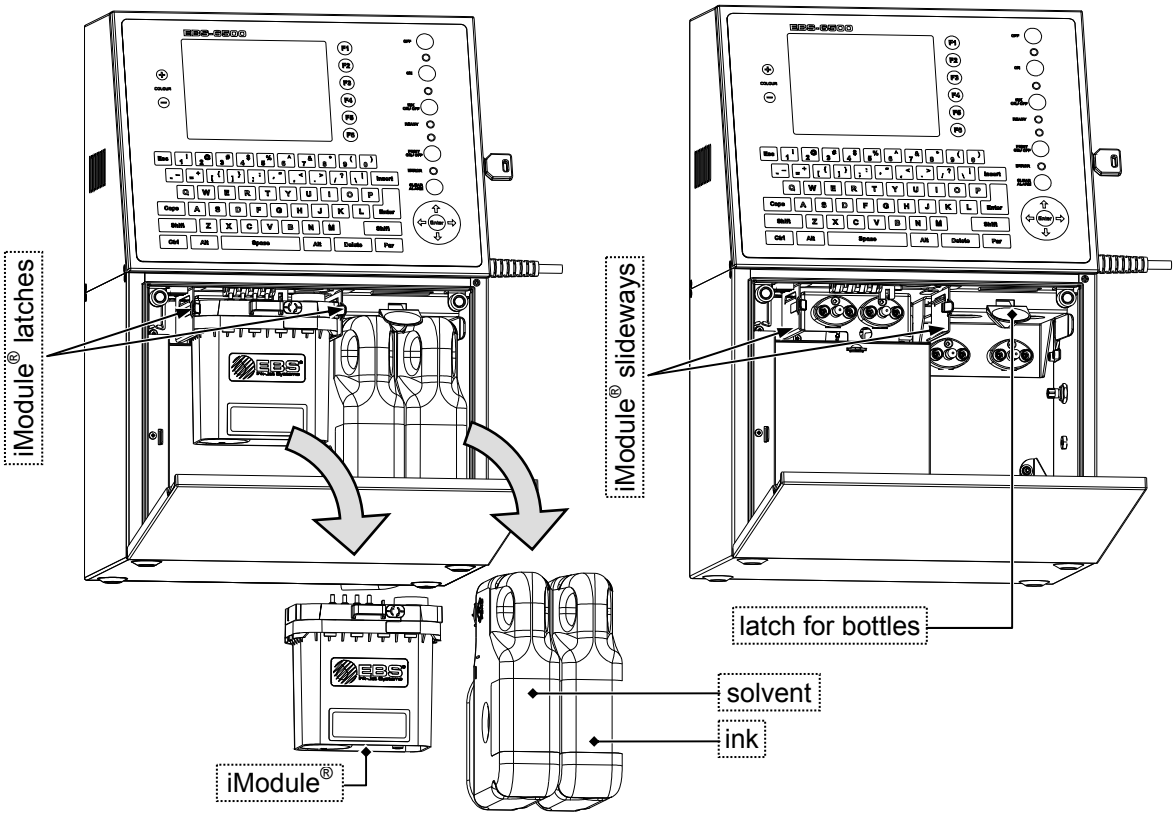


Fig. 5.1

5.1. Replacing Ink/Solvent Bottle

The empty bottle condition is normally indicated with a sound alarm and the following terminal message:

SOLVENT LACK or **INK LACK**

This is the right time to replace the empty bottle with a full one.

This procedure can be performed during printing within 20 minutes after the above message has been displayed (If the indicated period of time elapses, printing will be stopped). It involves the following steps:

1. Lift the latch for bottles (see ***Fig. 5.1***) and remove the empty bottle from which ink (or solvent) has been taken so far; the following message can appear on the terminal:

   SOLVENT:
   NO BOTTLE
   or
   INK:
   NO BOTTLE

2. Lift the latch again, put a new bottle in place of the removed one, following the information given on the latch (insert an ink bottle equipped with a black stopper to the black connection on the right, i.e. a solvent bottle equipped with a white stopper to the white connection on the left - see ***Fig. 2.1***) and press it as much as practically possible making sure that the latch is in the appropriate bottle groove. One or more messages can be displayed. If the bottle is right, i.e. a new one (or in other words, not accepted yet), the following message should appear at first:

   CODE VERIFYING:
   WAIT 10 SECONDS PLEASE

3. If the **BOTTLE ACCEPTED** message is displayed within 10 seconds, this means that the bottle can be used in a given printer.

5.2. Replacing iModule®

iModule® is a basic subassembly of the BOLTMARK®-series printer ink system. It contains component parts on which the reliability of printer operation and also print quality largely depend. For this reason the iModule® must be replaced from time to time so that faultless operation of the printer is ensured. Every iModule® is equipped with a transponder, where the data such as the type of module, its use-by date, the limit of running hours assigned to it and also its expiry date is saved. This information is available in the **CONSUMABLES/ iMODULE INFORMATION** menu and also on the iModule® label.

The iModule® should be replaced periodically before the time limit assigned to it expires or before the iModule® is past its expiry date (both of the settings can be viewed with the **OPERATING TIME** command in the **CONSUMABLES/ iMODULE INFORMATION** menu), otherwise printing is disabled. The level of use of the iModule® is also presented in the printer status window in graphical format. Such a graphical indication shows (approximately) the remaining running time of the iModule® or the time to the end of the iModule® expiry date. The table below shows successive graphical symbols indicating the remaining running times of the iModule® or the time to the end of the iModule® expiry date, whichever comes sooner. The symbols are shown in a negative color.

Symbol									
Remaining running time or time to the end of expiry date [%]	100-88	87-76	75-63	62-51	50-38	37-26	25-13	12-1	<1

The approaching date of replacement of the iModule® is indicated with one of the below given messages:

iModule running time
is below 10%
CALL SERVICE PLEASE

iModule running time expires
in less than 300 hours
CALL SERVICE PLEASE

iModule expires within
1 month
CALL SERVICE PLEASE

- if the printer runs over a limited number of hours and the iModule® expiry date comes before the time limit assigned to the module elapses.

The above-given messages are repeated cyclically (and also each time when the printer is started) until the time limit assigned to the iModule® elapses (or the expiry date elapses) or until the iModule® is replaced with a new one. The message displayed is accompanied by an acoustic signal, which can be turned off with the CLEAR ALARM key.

The iModule® replacement procedure consists of the following steps:

1. Start the printer and wait until it reaches the ***ready*** condition (the yellow **READY** LED starts emitting continuous light).
2. Choose the **iMODULE REPLACEMENT** command from the **SERVICE/ SERVICE COMMANDS** menu. The following message appears on the display:

   iModule replacement procedure.
   ARE YOU SURE (Y,N)?

   (Y=ENTER, N=ESC)

3. After the "**Y**" key or the ENTER icon has been pressed as confirmation, the following message is displayed:

   Prepare a new iModule.
   Make sure that there is minimum
   3cm of ink in the bottle
   ENTER - continue, ESC - abort

   NOTE:
   While the iModule® filling procedure is being followed, the level of ink in the bottle must be 3 cm minimum - such an amount of ink is needed to fill the iModule®.

4. Follow the above request and prepare a new iModule®, make sure that there is a sufficient amount of ink in the bottle, and then confirm your readiness for replacement by pressing the ENTER icon. At that moment

the iModule® replacement procedure starts and it can take up to 20 minutes. The following message is displayed:

iModule replacement procedure
in progress.
iModule is under pressure !!
Do not remove iModule.
Wait for relevant message.

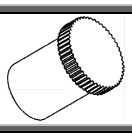
At that time the flow of ink in the head is stopped, the ink filtering procedure takes place for a short time and ink system pressure is reduced (these operations are indicated by the blinking green LED above the INK ON/OFF key on the operation panel). Wait for the following message:

While the printer is running:
- Press transport protection,
- Remove iModule & wait
for next message.

5. Close the transport-safety valve (see ***Fig. 5.2.2***) and then remove iModule® from the printer. In order to pull out the iModule® from the inside of the ink system chamber you need to tilt two fastening latches aside (see ***Fig. 5.1***). A few seconds after this operation the following message is displayed:

Insert iModule & wait
for next message.

NOTE:
The connections of the iModule® removed should be secured against potential leaks with special plugs supplied together with a new Module®.



6. Install a new iModule® in the printer by pushing the module along the slideways to the limit (when the iModule® reaches its proper position, the latches make a characteristic sound – a ”click”). When the module is detected in the printer, the following message is displayed:

A new iModule detected
Operating time **hhhh:mm**
Expiry date **dd.mm.yy**
Shelf life **dd.mm.yy**
C=0
Do you really want to install it?
(Y,N)? and the **BOTTOM** LED on the inner panel starts blinking, which means that the module is empty.

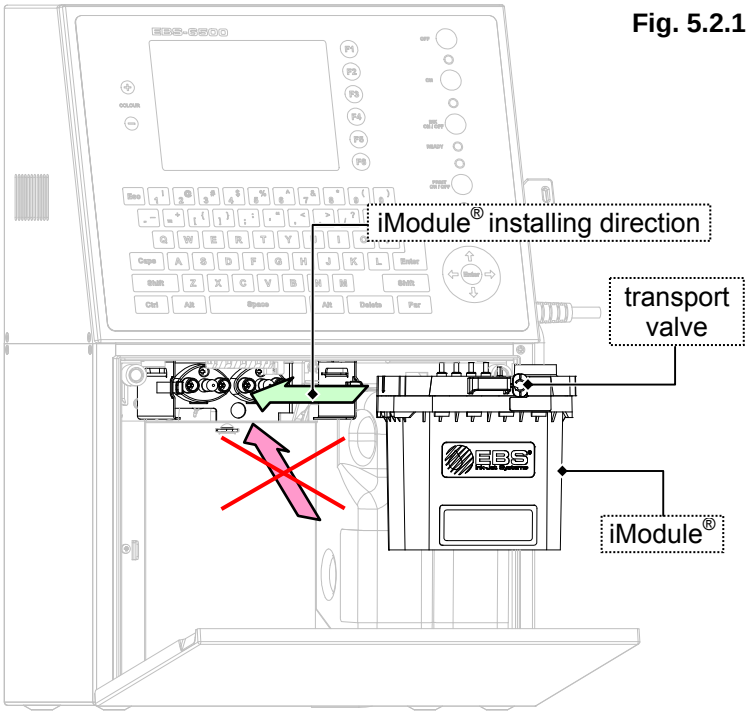


Fig. 5.2.1

7. After the ”**Y**” key or the ENTER icon has been pressed as confirmation, the following message is displayed:

CODE VERIFYING:
WAIT 10 SECONDS PLEASE

and in a few seconds - another one:
Open transport protection,
and then press ENTER.

Follow the above given request (and that on the sticker on the iModule®) and open the transport-safety valve of the iModule® (see ***Fig. 5.2.2***). When the operation is completed, confirm it with the ENTER icon.

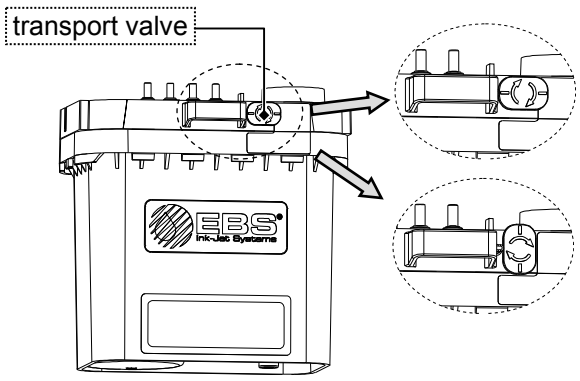


Fig. 5.2.2

8. At that moment the procedure for filling the iModule® starts, which is confirmed with the following message:

Filling iModule...
Transport protection
must be open !!
Please wait.

and with the blinking green LED above the INK ON/OFF key on the operation panel.

9. When the iModule® filling procedure is finished, ink starts jetting (the green LED above the INK ON/OFF key on the operation panel starts blinking), and when the printer reaches the ***ready*** state (the yellow **READY** LED emits light continuously), you can start printing.

The ending of the iModule replacement procedure is indicated with the following message:

iModule replaced & accepted
Press ENTER...

and after it has been confirmed, the following message is displayed:

iModule
iModule accepted
Press ENTER...

Additional information about iModule® replacement:

- All the time while the iModule® replacement procedure is being followed, the message **iModule replacement in progress** is being displayed in the printer status window.
- Any removal of the iModule® from the printer is indicated by short acoustic signals.
- The replacing of the iModule® should take as little time as possible (a new iModule® should be installed immediately the previous one has been removed) to prevent printer subassemblies (mainly switching-over contact pins) from drying up.
- After the new iModule® has been filled with ink, the time of ink flight in the head (displayed in the printer status window) can exceed the permissible range for some time. A short-lived deterioration of print quality can also occur. If the symptoms do not disappear within 1 to 2 hours, contact your service point.
- If an attempt is made to install the iModule® whose use-by date (the **Shelf life** parameter) is exceeded, the **iModule shelf life expired** message is displayed and the module is not accepted. A valid module shall be used.
- If the iModule® replacement procedure is interrupted (*e.g.* due to a power failure), it will re-continue after re-start.
- If the **iModule replacement aborted** message is displayed in the printer status window, this means that the user did not agree to the installation of a new iModule®. In such a case it is impossible to start printing. The iModule® replacement procedure should be restarted and followed to the end.

5.3. Head Maintenance

5.3.1. Removing Head Cover

Before any operations are performed within the print head, remove the head cover first. Follow the steps given below for this purpose:

1. Uninstall the print head from the holder with which it is fixed in place.
2. Screw out clamping screw ❶ from the head cover – the screw cannot be screwed out completely, it can only be loosened to its limit.
3. Pull out the print head from its cover carefully ❷.

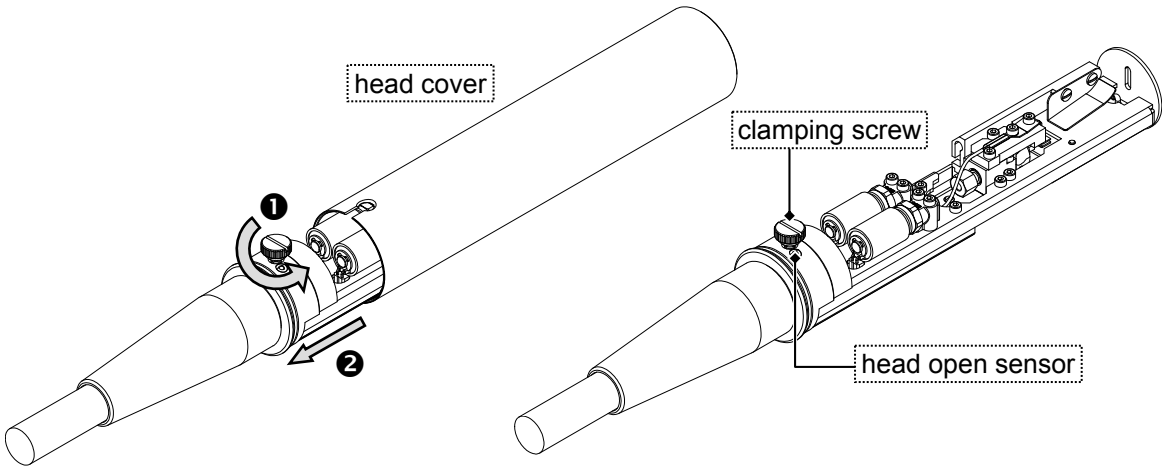


Fig. 5.3.1.1

NOTE:

- Make sure that the clamping screw is screwed home properly when the head cover is being reinstalled as it is designed to serve not only as mechanical fastening but also as an electrical connection between the cover and the printer housing.
- The print head is equipped with a sensor for detecting any removal of the cover (see ***Fig. 5.3.1.1***). When the cover is removed, printing is suspended automatically and the printer moves to the ***cover*** mode. Printing cannot be restarted until the cover is re-installed.

5.3.2. Removing Dirt from Print Head

It is recommended that the inside of the head be checked for cleanness periodically, (preferably every day) during maintenance and then ink deposits, (if present), removed from the electrodes, the nozzle and the gutter with a solvent spray bottle. A compressed air gun or a soft paint brush can also be used.

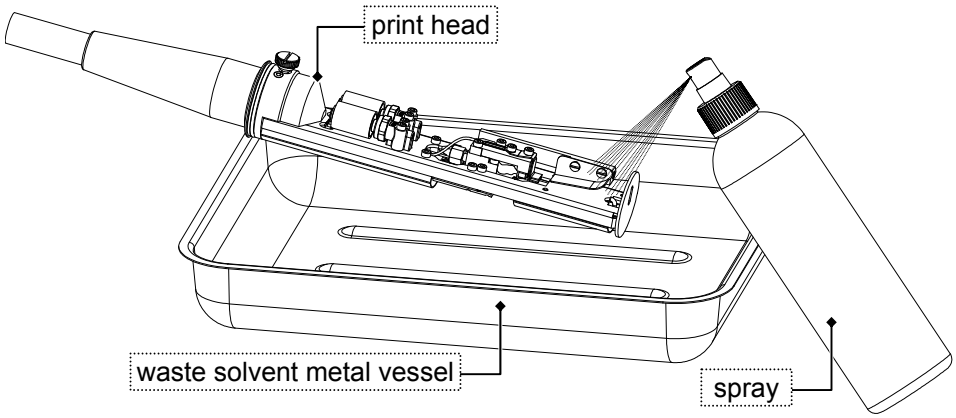


Fig. 5.3.2.1