EBS®
Ink-Jet Systeme

INDUSTRIAL INK-JET PRINTERS
BOLTMARK®-SERIES

EBS-6500
EBS-6800
EBS-7200
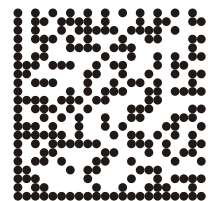
USER'S MANUAL

EBS Ink Jet Systeme GmbH

Alte Ziegelei 19-25,   D-51588 Nümbrecht

☎   +49 (0)2293 / 939-0
Fax   +49 (0)2293 / 939-3

www.ebs-inkjet.com

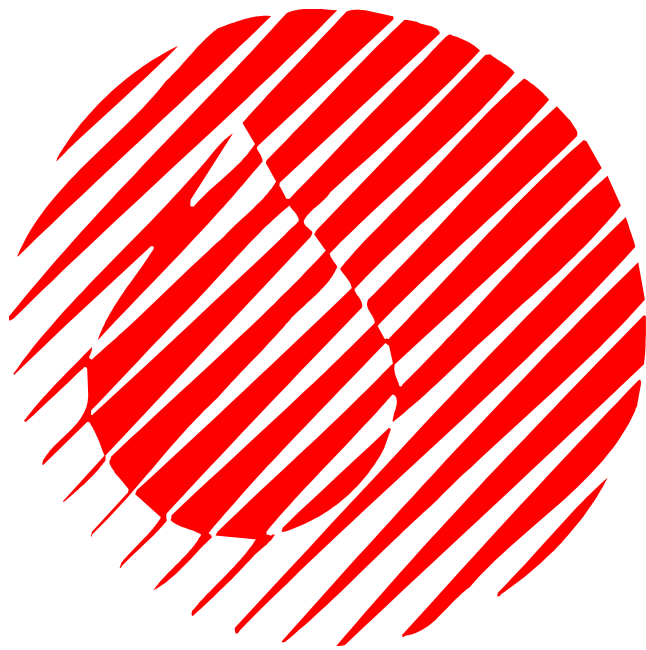# TABLE OF CONTENTS

Dear User,

This Manual contains very useful information on how to operate your Ink-Jet Printer. Please read this Manual carefully.

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

NOTE:

Please pay particular attention to the following warning signs contained in this Manual:

Information signs indicating:

- that care is needed with this particular action,
- additional, printer-specific options and features,
- untypical behavior of the unit,
- other hints.

A warning not to take the action that might have a critical impact on the proper operation of the unit or user's safety. It requires the user to follow closely the instructions given therein.

The sign informing that the installation or a service operation can be performed by the user who does not need to be qualified for servicing EBS equipment.

The sign informing that the installation or a service operation should be performed by the user who is qualified for servicing EBS equipment.

The Manufacturer reserves the right to introduce changes not described in this manual.
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.

1.1.   BOLTMARK®-series Printers

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. 1.1.1

		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	○	◐	◐
Print rate	Standard	●	●	○
	Fast	○	○	●
Maximum number of text files in library	100	●	○	○
	1024	○	●	●
	2000	○	◐	◐
Length of head cable	3m	●	●	●
	4m	○	◐	◐
	6m	○	◐	◐
Type of head	Straight	●	●	●
	Angle 90°	○	◐	◐
Bar codes available	**1D** codes	⊘	●	●
	2D code (Data Matrix)	◐	●	●
Interfaces	RS-232	●	●	●
	Second RS-232	○	◐	◐
	RS-485	○	◐	◐
	USB	●	●	●
	Ethernet	○	◐	●
Remote control	**iEBScom** (one printer)	◐	◐	◐
	iEBScom (a network of printers)	○	◐	◐
Options	External code switch	○	◐	◐
	Signaling device	◐	◐	◐
	Transponder stop	◐	◐	◐
Type of iModule®	to run over **4000** hours (18 months)	●	◐	◐
	to run over **6000** hours (18 months)	◐	◐	◐
	to run over **8000** hours (18 months)	◐	◐	●

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)

1.2. Application

The BOLTMARK®-series printer is a non-contact ink-jet printer designed for putting prints on objects of various types, for example, on a factory conveyor. The printer provides clear and firm over-prints on materials such as:

- paper and cardboard,
- plastics,
- fabric,
- leather and leatherette,
- wood and wood-like products,
- glass and ceramic products,
- metal surfaces of any type, etc.

Short description of the printer:
➥ The unit is equipped with one print head of small outer dimensions.
➥ The head produces print heights varying between:
  – **1.4** and **12 mm** (EBS-6800, EBS-6500),
  – **1.2** and **9 mm** (EBS-7200),
➥ The head can be set at any position.
➥ The head is connected with the controller via a **3 m** long flexible cord as standard (the EBS-6800 and EBS-7200 models are also available with **4** or **6 m** long cords).
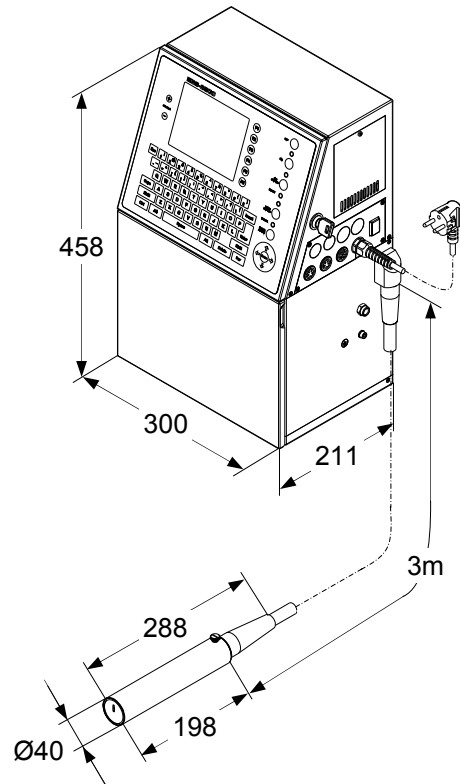
Fig. 1.2.1

➥ Printing capabilities:
- texts composed of small and capital letters out of various matrices, also printed in boldface or rotated,
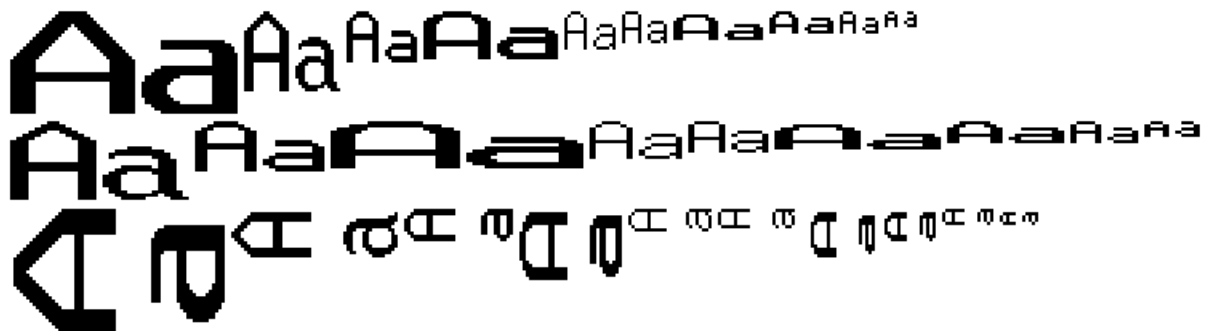
- the **EBS-6800** and **EBS-7200 MAXI** printers (making up to 32-dot high printouts) can print a maximum of four text lines (with a minimum 1-dot line spacing 7x5 matrix) or five text lines (with a minimum 1-dot line spacing 5x5 matrix),

4 lines (7x5)
```
1-INK-JET
2-EBS-6800
3-INK-JET
4-EBS-6800
```
5 lines (5x5)
```
1-INK-JET
2-EBS-6800
3-INK-JET
4-EBS-6800
5-INK-JET
```

- the **EBS-6500 MIDI** printers (making up to 25-dot high printouts) can print a maximum of three rows of text (with a minimum 1-dot line spacing 7x5 matrix) or four text lines (with a minimum 1-dot line spacing 5x5 matrix),

3 lines (7x5)
```
1-INK-JET
2-EBS-6500
3-INK-JET
```
4 lines (5x5)
```
1-INK-JET
2-EBS-6500
3-INK-JET
4-EBS-6500
```

- text profiles, to enable the user to simplify preparation of texts, adjust the word processor to a required text configuration, obtain the optimum quality of prints and as high a printing speed as possible,
- diacritical national characters,
- graphics – a built-in set of ready-to-use graphic symbols and an editor tool-kit for creating user-defined graphics,
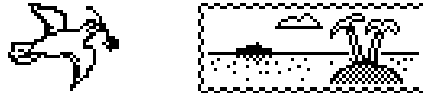
- bar codes of various kinds, printed in a regular way or in reverse, with or without a numerical caption; an option of introducing on-going changes to the digital contents of the code (a bar code as an incremental or decremental counter, code contents taken from another text via the **Text content** special register or the data taken from a special channel) and optional, two-dimensional **ECC200**[1] codes (also with the potential for dynamic modifications of code content with the application of the **Text content** special register or the data taken from a special channel),

- variable data - such as the current date, warranty expiry date, current time, ascending and descending numbering (counters), any type of data which is transferred from a PC or external device (via an optional special channel), as required and arranged by the user.

➡ Texts to be printed can be input or modified easily via a built-in terminal, an external code switch or a PC (via the RS-232C or USB interface, optionally via RS-485 or Ethernet[2]).
➡ An optional **PC** can be connected in order to:
- control operation of one printer via the **iEBScom** program and the RS-232 interface,
- allow a number of **EBS** printers of various types, linked together into a network, to be controlled from one computer via the **iEBScom**[3] program and the RS-485 or Ethernet interface.
➡ Objects to be labeled are detected by a photo-detector.
➡ Fully automatic operation of the printer with status indication and instructions for performing service operations.
➡ Full monitoring of ink and solvent bottles. For this reason, bottles designed for different, incompatible types of **EBS** printer will not be accepted.

---

[1] Only in the **EBS-6800** and **EBS-7200** printers, as standard (see **Tab. 1.1.1** in section **1.1 BOLTMARK®-series Printers**).
[2] Optional interfaces available for the **EBS-6800** and **EBS-7200** printers only (see **Tab. 1.1.1** in section **1.1 BOLTMARK®-series Printers**).
[3] This does not apply to the **EBS-6500** printers (see **Tab. 1.1.1** in section **1.1 BOLTMARK®-series Printers**).

➡ The extent of wear of the iModule® is fully monitored - so that the module can be replaced at the right time, ensuring invariably high quality of prints and minimizing faults.
➡ The unit can operate continuously more than 24 hours a day.

1.3. Principle of Operation

Printing with continuous ink jet printers (CIJ printers).
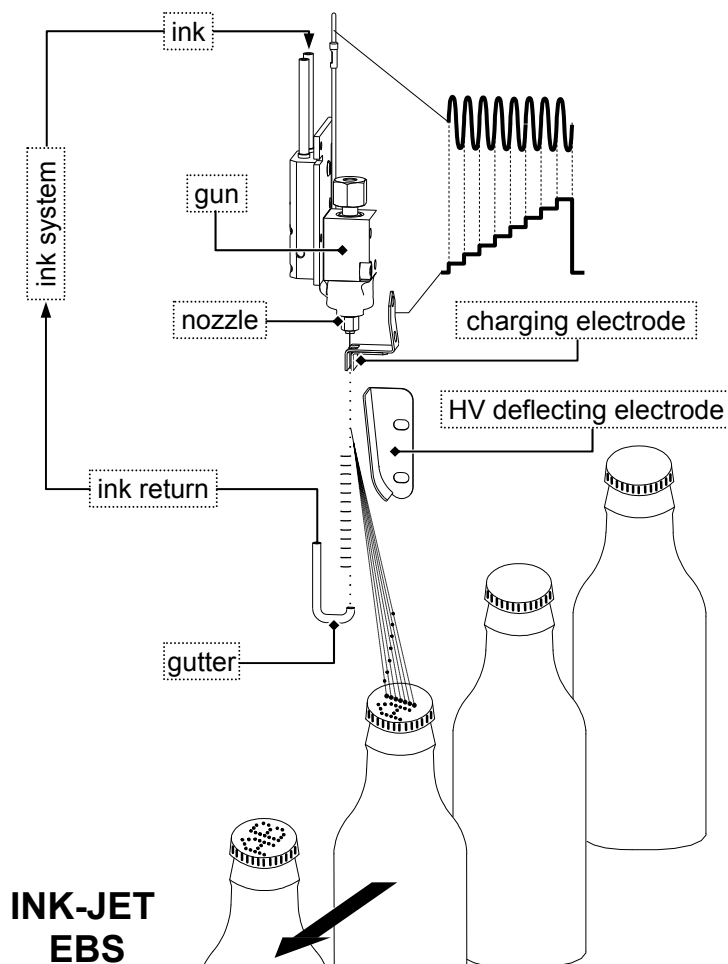
Overprints are produced in the following way:

• A continuous ink jet is broken into droplets.
• Then the droplets are charged and deflected in an electric field.
• Every print consists of drop-wide vertical rows.
• The droplets are deflected on the vertical plane. Every droplet within a row is broken off the continuous jet, then charged and deflected while passing under a high-voltage electrode.
• Objects to be labeled move in front of the print head and vertical rows are printed one by one to complete the entire label.
• Uncharged droplets fall into a gutter and from there they are sucked back and returned to the ink system.

This method of printing applies to all **CIJ** printers.

Fig. 1.3.1 Labeling with *Continuous Ink-Jet* printers

Every BOLTMARK®-series printer incorporates many unique solutions, including those protected by patents. Therefore it is in the top league of units of this type in the world.

2. Installing the Printer

2.1. Safety Requirements

All efforts have been put into designing this printer carefully and making it safe and reliable. However, the safe operation of the device depends on the user's awareness of, and compliance with the following safety rules and precautions.

The printer should be operated by trained staff. It is recommended that operation of the device is supervised.

1. **Place a fire extinguisher suitable for both electrical and chemical fires in the vicinity of the printer.**

2. **Do not print in areas where there is a risk of explosion.**

3. **Do not print on objects whose temperature exceeds 100°C at the time of printing.**

4. **Do not use open fire or spark-generating devices in the area where the printer works.**

5. **Power supply cord must be connected to a socket where an earthed pin is used**. The efficiency of earth should comply with the applicable standards. Additionally, in some cases **the printer-housing earth terminal needs to be connected** appropriately (according to the instructions given in section *2.3.6 Connections*).

6. **As high voltage occurs in the printer, make sure that all manipulations in the electrical part of the system and inside the head are performed after power has been switched off.**

7. **The outlet of the head must not be directed towards persons, animals or objects during printing in order to avoid splashing anybody or anything with ink**.

8. **Protective clothes** and possibly protective glasses **need to be worn** by persons performing **any work** on the ink system.

9. **Do not use plastic vessels for washing** because of the risk of static electricity. Metal vessels are recommended.

10. Air contaminated with solvent **should be removed to the outside of the building via an unobstructed duct.**

11. **No ink, solvent or wash-up** (or waste fluid remaining after the head has been washed) **should be left in open vessels** as these inflammable fluids may ignite from accidental sources of fire.

WARNING:
Static electricity collected by people (on their plastic clothes or in their hair, for example) may spark-over to ink or wash-up vessels when they are left open. **The ink and wash-up are inflammable and may ignite!** Therefore, before you approach the open vessels containing inflammable fluids, discharge static electricity by touching the metal printer housing or another metal object that is connected to earth.
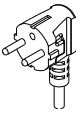
In case of accident

➥ When ink or solvent spills occur, the spilled fluid should be wiped with a piece of absorbent material and then disposed of in compliance with fire, and health and safety at work 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.

2.2. Power Supply Requirements

Mains Requirements

		Standard	Option
	Supply voltage	100-240V (AC)	90-350V (DC)
	Mains frequency	50/60Hz	DC

⚠️

NOTE:
- The mains electricity must meet the requirements of the applicable standards. Otherwise measures need to be taken or devices used to ensure that the proper power is applied to the printer.
- **The mains socket should be equipped with a protective pin properly connected to earth. The efficiency of the earth needs to comply with the applicable standards.**

2.3. Installing the Printer

2.3.1. Standard and Optional Accessories

As a variety of configurations of the BOLTMARK®-series printers are available, the set of accessories installed by the user depends on the specific user application. Typical printer accessories include:

1. Elements and units which are needed for printing in every configuration.
2. Additional and supportive elements and units which are needed for a given configuration to satisfy user requirements.

List of the accessories that are used most frequently in various printer configurations:
1. Printer (control cabinet and the head).
2. Complete head holder.
3. Photo detector, an optical sensor.
4. Shaft-encoder, a conveyor's travel-speed indicator.
5. Bottle of ink.
6. Bottle of solvent.
7. Bottle of wash-up.
8. Wash-up spray.
9. Filters:
    a). Ink filter in the head.
    b). Air filter element for electronics compartment ventilation system.
10. iModule® (available in three versions: for **4000**, **6000** and **8000** run hours – see section ***6.1.2 Replacing iModule®***).
11. RS232 interface cable to PC.
12. Original rack for EBS CIJ printers.
13. Holder for labeling immovable objects manually.
14. Additional external alarm device.
15. Additional external alarm device with conveyor control and stop indication.
16. External code switch (serial or parallel).
17. Movable platform with a cable for making overprints manually.

In addition, a variety of special service tools are available, such as:
1. Open end spanner to unscrew nozzles (flat wrench, 4 mm – Part No. **8430023**).
2. Service microscope to adjust ink jet parameters in the head (Part No. **P930051**).
3. Service tool: a template for adjusting the HV electrode position (Part No. **P580190**).
4. Service tool: a template for adjusting the distance between the gutter and nozzle (Part No. **P860016**).

5. Return tube replacement tool (Part No. **P561683**).
6. Service tool – an adapter for connecting a bottle of solvent to ink connection (Part No. **P511772**).
7. Protection (Part No. **P581158**) for bottles and iModule® while they are in transit.
8. Clips (Part No. **P511812**) for closing the gutter while the negative pressure circuit is subjected to a leak proof test.

> **NOTE:**
> • The above list is a recommendation of accessories only.
> • The list of accessories may vary from country to country.

2.3.2. Preparatory Steps

In order to prepare a new or transported printer for operation, you should perform the following operations:

➡ Place the unit in a room that is free from vibration, shocks, dust, smoke, soil, aggressive or inflammable vapors and gases.

NOTE: The room shall meet the following requirements:
Environmental conditions: operating temperature from +5°C to +40°C, relative humidity up to 90% without condensation.
Mechanical requirements: max. vibration 1g at the max. frequency of 10 Hz, max. shocks of 1g over the maximum of 2 ms.

➡ Ensure that free and easy access to the unit is provided.
➡ Place the printer on a 0.7 to 1.1 m high horizontal table or an original rack for EBS **CIJ** printers for convenience.
➡ Ensure free flow of air through the electronics compartment. (The distance between the left side of the printer where the air outlet is situated and the nearest obstacle, must be at least **1cm**.)
➡ Check for mechanical damages to the unit, head and connecting hose, which might have been caused during carriage.
➡ **Immobilize the head cable**. The head cable is not designed for dynamic operation.
➡ Make sure that the head cable runs correctly. **The minimum bent radius along the entire cable length is R_{min} = 150 mm.** Particular attention should be paid to the interface area between the cable and the head.

> **NOTE:**
> **The failure to meet the above requirements concerning the head cable may lead to a cable damage that is not covered by the warranty!**

➡ Secure the print head holder in a convenient position.
➡ Secure the print head in the holder in any required position.
➡ Install the photo detector in clamps fixed to the head holder or in any other place which would be most suitable for the object under print.

head holder

photo detector holder

head axis

37 mm

2xM5
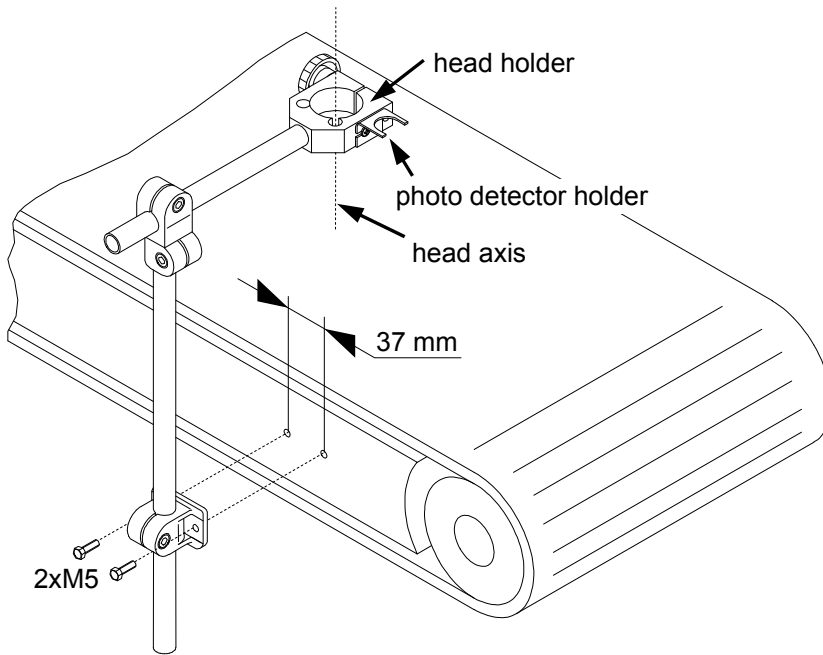
Fig. 2.3.2.1
Fixing the standard head
holder to a conveyor

> **NOTE:**
> If conveyor vibration is too strong, it would be better to fasten the head holder on a stable rack or on a wall, provided that the rack and the wall are not in contact with the conveyor.

2.3.3. Removing Transport Protections

When the printer and the iModule® are to be transported, they are protected so that no liquids contained therein are spilled. Therefore some connections within the ink system are detached and secured. Follow the steps given below in order to remove transport protections and prepare the printer for operation:

1. Remove the stoppers protecting the bottle and iModule® connections during carriage (see the drawing on the right).
2. Install bottles of ink and solvent (see subsection *2.3.4 Connecting Bottle of Ink and Solvent*).
3. Install the iModule® (see subsection *2.3.5 Connecting the iModule®*).
4. Start the printer.

latch for bottles

iModule® slideway

iModule® transport security stoppers

transport security stoppers for bottles
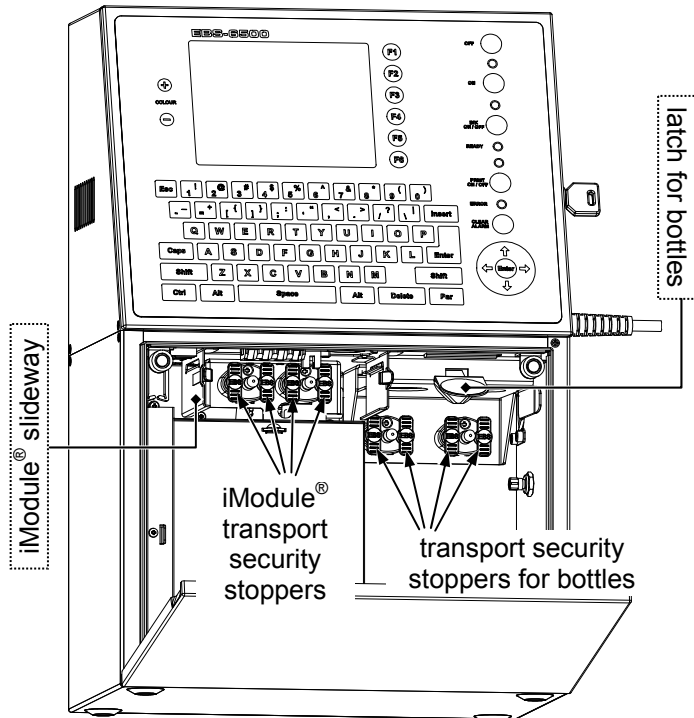
Fig. 2.3.3.1

2.3.4. Connecting Bottle of Ink and Solvent

In the BOLTMARK®-series printers, a bottle of ink/solvent constitutes an integral subassembly consisting of the bottle, a stopper (complete with connections and a suction tube equipped with a filter) and a transponder. In order to install a bottle of ink/solvent in the printer you need to lift the press stud that fixes the bottle (see *Fig. 2.3.3.1*), and then insert the bottle to the limit so that the press stud rests in the bottle groove. Following the information given on the latch, a bottle of solvent should be connected to the white connection on the left, whereas a bottle of ink - to the black on the right.

> **NOTE:**
> - Make sure that the original EBS ink and solvent are contained in the bottles. A possible mistake may result in damage to ink contained in the unit's ink system (due to a change to the chemical structure of ink) and cause many serious problems.
> - Avoid **misplacing the bottles of ink and solvent or placing the bottle of solvent where the bottle of ink should be**.
> - **Different types of ink must not be mixed. Do not add to the bottle any ink whose shelf life has expired.**

2.3.5. Connecting the iModule®

The iModule® is a basic subassembly of the BOLTMARK®-series printer's ink system. It contains components that influence, to a significant extent, influence the reliability of printer operation and also on print quality. In order to ensure that it is not damaged during carriage, the iModule® is transported separately and all liquids are emptied out of it. Also its transport safety valve is closed. Follow the below given steps to connect the iModule® to the printer:

1. Remove stoppers from the iModule® connections (see subsection *2.3.3 Removing Transport Protections*).
2. Place the iModule® in the printer by inserting it along the slideways (see *Fig. 2.3.3.1*) to the limit. When the iModule® reaches its proper position, the latches make a characteristic sound - a "click".

iModule® installing direction

transport valve

latch for iModule®

iModule® slideway
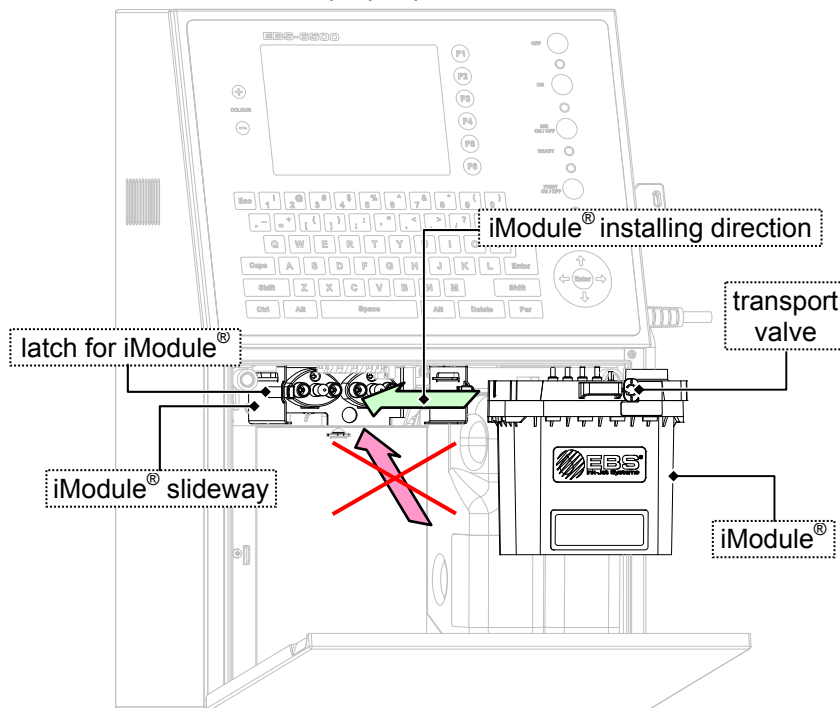
iModule®

Fig. 2.3.5.1

3. Make sure that the transport-safety valve of the iModule® is open; if it is not, open it. You open the valve by pulling it out and turning by 90 degrees (see the drawing below).

transport valve

transport valve open: **in horizontal position and protruding**

transport valve closed: **in vertical position and pushed in**
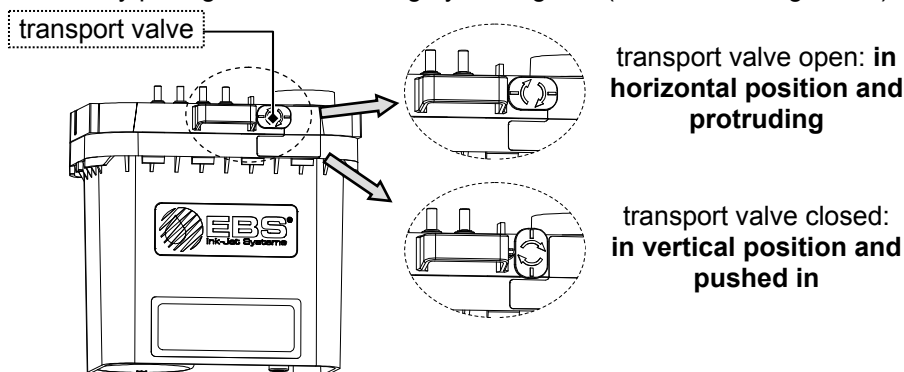
Fig. 2.3.5.2

⚠ **NOTE:**
The iModule® whose expiry date is exceeded must not be installed in the printer. The expiry date can be viewed with the **OPERATING TIME** command (the **Shelf life** item) in the menu **CONSUMABLES/ iMODULE INFORMATION**. An attempt to install the module that is past its expiry date ends in the message: **iModule shelf life expired**.

2.3.6. Connections

After putting the printer in place and removing transport protections make the connections that are shown in the figure below, following the order indicated by the numbers ❶, ❷, ❸, ❹, ❺, ❻.

mains plug ❷

photo detector socket ❸

shaft-encoder socket ❹

special-channel interface socket ❺

waste-air pipe connector ❻
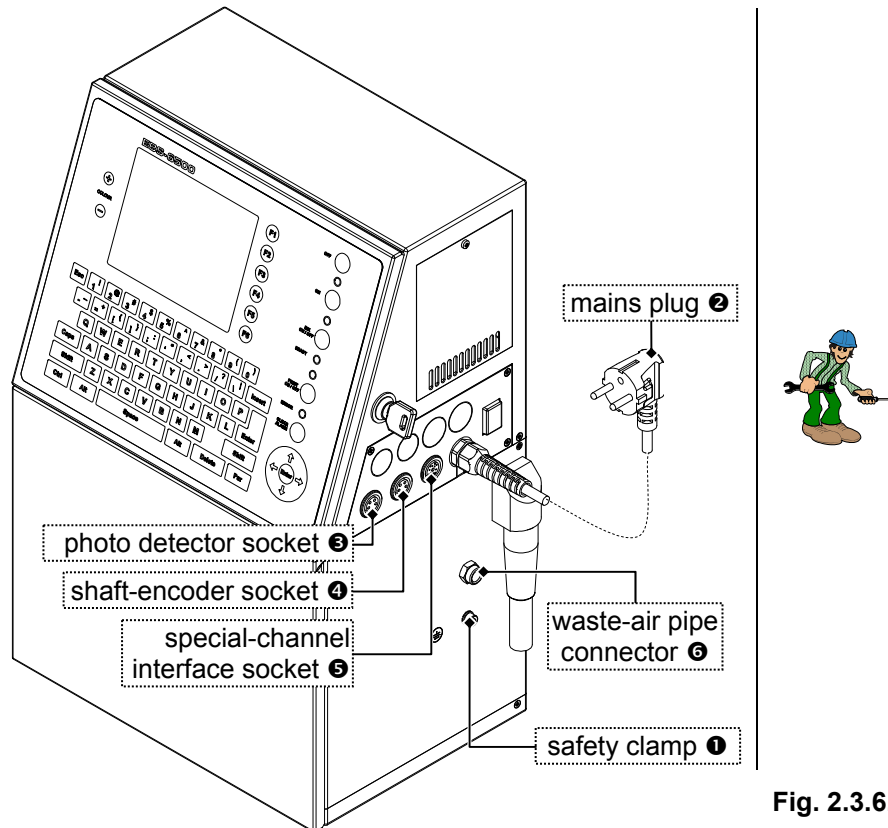
safety clamp ❶

Fig. 2.3.6.1

❶ Install a safety clamp. Connect the printer housing to an earth bar with the application of a #4 hex (Allen) key. **The resistance between the printer earth terminal and factory conveyor and also between the printer earth terminal and mains plug earth contact** (when the plug is detached from the mains) **must not be greater than 0.1 Ω.**

❷ Connect mains plug to a socket equipped with an earth pin.

❸ Connect a photo-detector.

❹ Connect a shaft-encoder.

❺ Connect a special channel connector (if such a channel is to be used) for a PC, a barcode reader, etc. to a serial port.

❻ Attach waste-air pipe connector.

3.   Starting the Printer

The following key descriptions are used throughout the manual:

- The green **ON** key is marked with **ON** .

- The red **OFF** key is marked with **OFF** .

- The yellow **CLR. ALARM** key is marked with **CLEAR ALARM** .
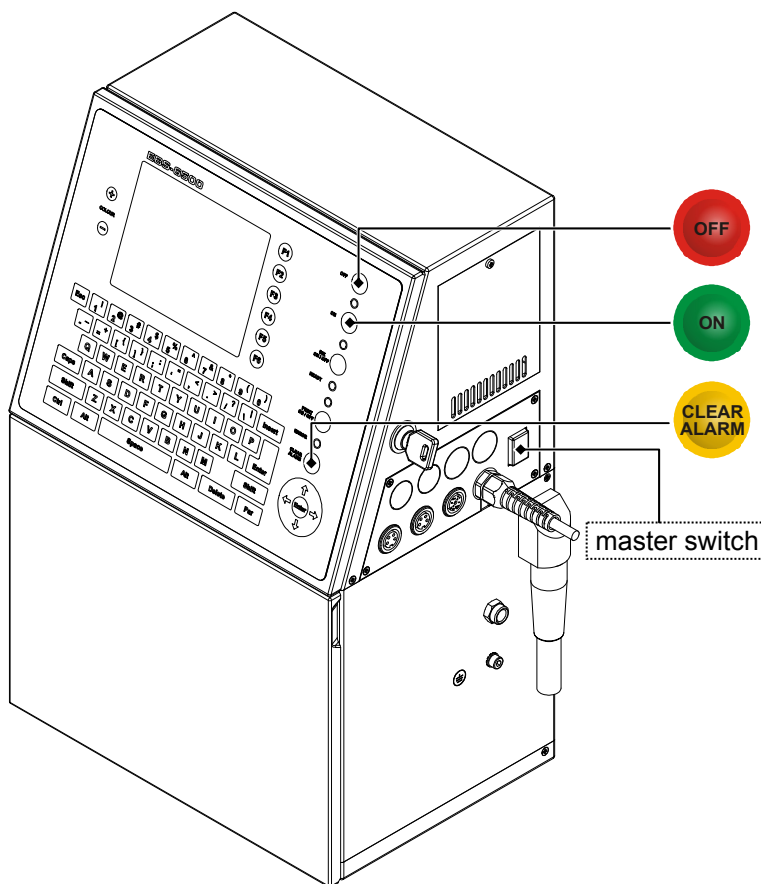
Fig. 3.1

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.

1. **The double-pole master switch, 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 and the red LED between the **ON** and **OFF** keys comes on.

2. The electronic power switch (the **ON** , **OFF** and **CLEAR ALARM** keys on the external panel) is designed to turn the printer on and off by changing the printer's mode from the stand-by mode (the LED emits red light) to the operation mode (the LED emits green light) and vice versa. The keys should normally be used to switch the unit on and off.
If it needs to be separated electrically from the mains, the unit should be turned off, as described in section *3.2 Switching the Printer Off* and then the master switch should be turned off.

> **NOTE:**
> The description below relates to the printer in its stand-by mode, i.e. with its main switch in the **"1"** **(ON)** position.

3.1. Switching the Printer On

If all the connections are made properly, just press the **ON** button (on the external panel) - see *Fig. 3.1*.

> **NOTE:**
> While the printer start-up procedure is being followed, <u>the iModule® transport valve must be open</u>. 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** (see *7.3.6 Vacuum Circuit Failures*). If that happens, you should clear the alarm with the **CLEAR ALARM** key, <u>open the iModule® transport valve</u> and start the procedure for initiating the flow of ink in the head (with the **INK ON** command in the **SERVICE** menu).

Then, the starting procedure is initiated. It consists of the following steps:
1. Power voltage is applied and electronic cards are tested.
2. The high voltage module is set to the value that is already stored in memory.
3. The gutter circuit is checked to make sure that it is unobstructed.
4. The nozzle is rinsed with solvent.
5. Filtering of the ink in the system for a short time.
6. Solvent is sucked.
7. Ink starts flowing in the head and the printer waits until ink parameters stabilize. Afterwards, the automatic process of breaking the ink jet into droplets starts, initiating the phasing procedure and measurement of time of flight of the ink in the head (and indirectly viscosity of ink in the ink system). The procedure for starting the flow of ink in the head is signaled with the blinking green LED above the **INK ON/OFF** key on the operation panel.
8. Pressure correction of the time of flight (the *ToF* correction).

If the head does not work after the printer has been turned on, the turning on should be followed by the **FAST OFF** command from the **SERVICE** submenu. The above mentioned starting procedure is then suspended. Use the **INK ON** command to activate the head.

> **NOTE:**
> • The printer starting procedure described above can vary slightly depending on the version of the software installed on the printer.
> • The consecutive historic times at which the printer was switched on are available in report format via the **STANDBY LOG** command in the **AUX. COMMANDS** menu.

During the starting procedure the **READY** LED on the operation panel indicates the following:
➡ no light - ink is supplied to the head and ink parameters stabilize,
➡ flashing – the ink breaking process stabilizes,
➡ steady light – the head is ready for printing. The **START PRINT** command can be selected.

During the entire starting procedure both the parameters and text files can be selected and modified. If the **START PRINT** command is selected before the **READY** LED starts glowing, the command is not executed (the message **UNIT NOT ACTIVE** or **ToF correction not ready** is displayed instead). Some errors may also delay the readiness of the unit for operation by about 2 to 3 minutes. Check for error indications on the terminal or the inner panel.

3.1.1. Starting the Printer for the First Time

The printer starting procedure described in section **3.1 Switching the Printer On** applies to the printers that have already been started before. While the printer is being started for the first time after it has been installed in its workplace, it may behave slightly differently and additional, iModule® and bottle-related messages may appear on the display.

After new bottles have been detected by the printer the following message is displayed:
CODE VERIFYING:
WAIT 10 SECONDS PLEASE
Press ENTER...
and then (if the bottles installed are correct):
BOTTLE ACCEPTED.

The following message is displayed after a new iModule® has been detected by the printer:
CODE VERIFYING:
WAIT 10 SECONDS PLEASE
Press ENTER...

If the iModule® is correct, the following message is displayed after the ENTER icon has been pressed:
iModule replaced
Operating time: **hhhh:mm**
Expiry date: **dd.mm.yy**   } Information about the iModule® installed
Shelf life: **dd.mm.yy**
C=0
Do you really want to install it?
(Y,N)?

After the "**Y**" key (or the ENTER icon) has been pressed, the printer starts filling the iModule®, which is signaled with the following message:
Filling iModule...
Transport protection
must be open !!
Please wait.
Press ENTER...

> **NOTE:**
> The following requirements must be satisfied while the iModule® fill procedure is followed:
> - The iModule® valve that is used while the iModule® is in transit must be open – check for the valve position and open it, if need be,
> - The ink level in the bottle must be a minimum of 3 cm high - such an amount of ink is enough to fill the iModule®.

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 *stop* state (the yellow **READY** LED emits light continuously) you can start printing.

The ending of the procedure for installing a new iModule is signaled with the following message:
iModule
iModule accepted
Press ENTER...

After the ENTER icon has been pressed the printer starts regular operation.

> **NOTE:**
> - The printer where no iModule® is installed **must not** be started!
> - If the **iModule not detected !!** message is displayed immediately after the printer has been started, that means that the iModule® has not been installed correctly (see subsection **7.3.13 No iModule®**). A correct iModule® should be installed.
> - While the iModule® filling procedure is being followed and also during normal operation of the printer <u>the transport-safety valve must be open</u>.
> - A new iModule® can be filled only when bottles of ink and solvent are installed in the printer, and the level of ink in the ink bottle is a minimum of **3cm** high.

3.2. 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 including additional rinsing of valve **V3** – a precise description is given in section **8.2 Transporting the Printer**,
➡ switching off together with thickening of ink.

> **NOTE:**
> - The time (given as a number of hours) over which the printer was off just before it is switched on can be viewed with the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu (item *PrOFF*).
> - The consecutive historic times at which the printer was switched off are available in report format via the **STANDBY LOG** command in the **AUX. COMMANDS** menu.

3.2.1. Switching the Printer Off in Regular Mode

In order to switch the printer off in **the regular mode** you just need to press the **OFF** key (see **Fig. 3.1**) on the external 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 counted down in the status window, and the green LED above the **INK ON/OFF** key on the operation panel starts blinking thus signaling the stopping of the flow of ink in the head.

The following processes are involved when the printer is switched off in the regular mode:
➡ Ink is drawn from the ink pipes.
➡ The pipes, gun, nozzle and gutter are rinsed.

> **NOTE:**
> - If the printer is switched off in the regular mode too often, ink becomes excessively diluted and this fact is reported in the following messages:
>   **INK CAN BECOME EXCESSIVELY**
>   **DILUTED IF POWER SUPPLY**
>   **IS SWITCHED OFF TOO OFTEN !!**   or
>   **INK WILL BE TOO THIN DUE**
>   **TO RINSING**.
> - If you need to switch the unit off for a short time (up to about 1 hour) to perform a service or another operation, switch it off in the service mode - see subsection **3.2.2 Switching the Printer Off in Emergency and Service Modes**.
> - If the printer needs to be switched off for a longer time (over 1 week), it should be switched off in accordance with the instructions given in **8.1 Storing the Printer**.

3.2.2. Switching the Printer Off in Emergency and Service Modes

In order to switch the printer off in the **emergency mode**, press the **OFF** key and while holding it down press and release the **CLEAR ALARM** key (see *Fig. 3.1*). Or alternatively, you can cut off the supply of electricity to the printer with the master switch. 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). In such a case the warning message **PRINTER WAS OFF DUE TO VOLT. DROP** is displayed on the terminal after the printer has been switched on.

> **NOTE:**
> On switching the printer off in the emergency mode, do not leave it in the off state for longer than about 1 hour. The head may be splashed with ink which may dry. Therefore sprinkle the nozzle with solvent before you switch the printer off.

You can switch the printer off **in the service mode** in the same way, as you proceed in 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 (see the note below). 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 and the ink system from getting overfilled.

> **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.
> - If you switch on the unit that has been switched off in the service or emergency modes, the following warning message is displayed on the terminal:
>   **THE HEAD WAS NOT FLUSHED**
>   **BEFORE SWITCHING THE PRINTER OFF.**

4. Operating the Printer

4.1. Operation Panel

The operation panel (such a panel for the **EBS-6500** printer is shown on the right) 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.
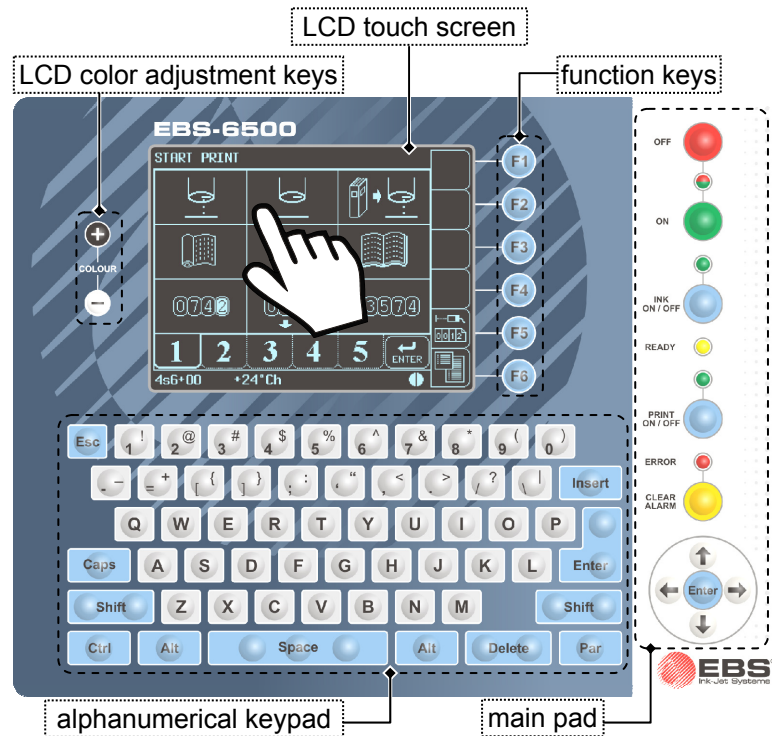
Fig. 4.1.1

The main pad contains the following elements:

➡ Keys.

- the green **ON** key, to switch the printer on,

- the red **OFF** key, to switch the printer off,

- the yellow **CLR. ALARM** key, to clear alarms,

- the blue **PRINT ON/OFF** key, to start and stop printing.

- the blue **INK ON/OFF** key, to start and stop the flow of ink inside the head.

➡ LEDs:

- the red/green LED between the **ON** and **OFF** keys - to indicate the printer's on or off state.

- the red **ERROR** LED above the **CLEAR ALARM** key - to indicate the alarm state,

- the green LED above the **PRINT ON/OFF** key - to indicate that the printer is or is not in the *print* mode,

- the yellow **READY** LED - to indicate that the head is ready for printing.

- the green LED above the **INK ON/OFF** key - is designed to signal the flow of ink in the print head (continuous light is emitted) or to signal that the procedure for starting/stopping the flow of ink/solvent to the head is in progress (flashing light is emitted).

The LCD display is equipped with a touch panel. The screen is divided into several areas called windows. The division varies depending on whether the text or graphic menu has been chosen for operating the screen. Irrespective of the type of menu chosen, both the touch panel and the alphanumerical keypad can be used.

> **NOTE:**
> If the touch panel does not work or malfunctions, it may have not been calibrated correctly. In order to calibrate it choose the **TOUCHSCREEN CALIBRATION** item from the **AUX. COMMANDS** menu. A bluntly tipped tool should be used for calibration.

Alphanumerical keypad

It is available in various language versions (see section *10 Layout of Cyrillic Characters on the Printer's Terminal Keypad* and *11 Layout of Arabic Characters on the Printer's Terminal Keypad*).

Special function keys

F1 , F2 , F3 , F4 (to display the name of a text being printed, in the status window), F5 (to switch among text files while they are being printed with the application of an emulated code switch) , F6 (to switch from the graphic menu to the text menu).

Color scheme switch keys

To switch among display color schemes (to be chosen out of a dozen or so predefined color schemes).

4.2. Inner Panel

The inner panel is used to indicate the condition of inner assemblies of the printer, errors, alarms and failures. The condition, errors, alarms and failures are indicated with a number of LEDs (two rows of light-emitting diodes) located on the printer's main electronics card, that is available after the upper door has been opened (see *Fig. 4.2.1*).

error and status LEDs emitting red light

indication LEDs emitting green light
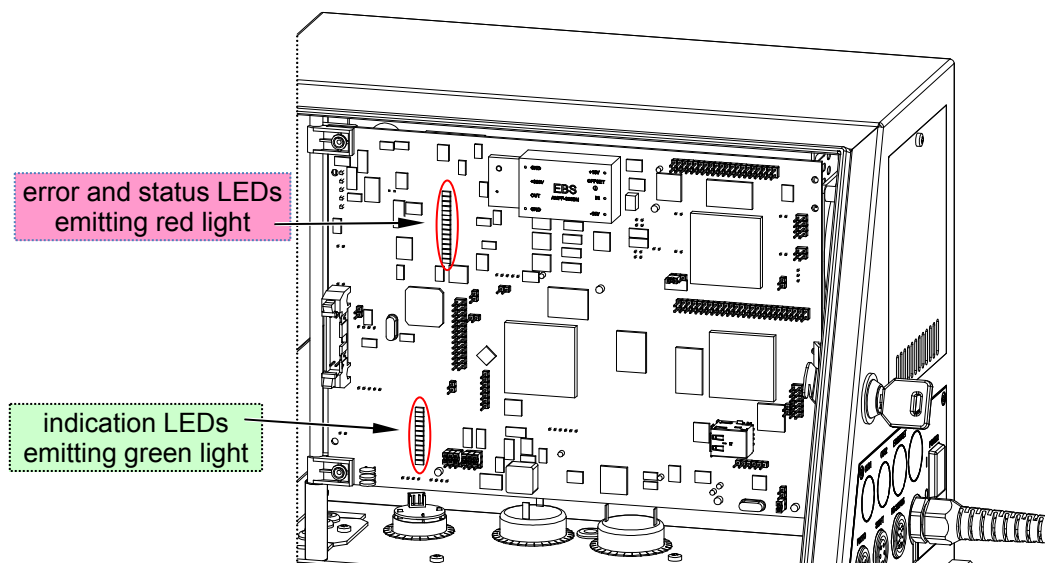
Fig. 4.2.1 Location of inner panel signal LEDs

Error and status LEDs	
Name	**Description**
300V_ERR	**+300V** switching on/off error or the voltage setting falls out of the permissible range,
STAB_ERR	pressure stabilizer is choked (an error occurred while the ink system was being depressurized),

Error and status LEDs	
Name	**Description**
PRESS_ER	ink pressure circuit error in the ink system (pressure sensor damaged, no pressure sensor, ink pump TIME-OUT, maximum pressure of ink exceeded, ink pressure drop),
FAN_ERR	incorrect operation of fans that should cool the electronics compartment (a fan is damaged or jammed),
PH_ERR	phasing error in the head,
VAC_ERR	vacuum circuit error in the ink system (vacuum sensor damaged, no vacuum sensor, a problem with draining ink out of gutter, gutter circuit obstructed),
PUMP_ERR	the LED designed for future use,
INK_LACK	no ink in the bottle or an error in the ink bottle transponder,
SOL_LACK	no solvent in the bottle or an error in the solvent bottle transponder,
HV_ON	It signals two states of the printer: • the LED emits steady light - high voltage has been applied to the head, • the LED flickers - HV failure or the failure to keep the voltage at the required level,
READY	It signals three states of the printer: • no light – the head is not ready for printing, the flow of ink can be turned on, • the LED flickers – the flow of ink to the head is turned on, the process of breaking ink into droplets stabilizes, • the LED flickers - HV failure or the failure to keep the voltage at the required level,

OVERFLOW	the indicator of the upper ink level in the iModule® - the iModule® is permanently overflowed – a failure,	
BOTTOM	low ink level indicator in the iModule®; it signals two states: • the LED emits light continuously – the indicator shows that the level of ink in the iModule® is low (ink, solvent are taken), • the LED emits flashing light – the iModule® is completely empty (e.g. a new, empty iModule® has been inserted),	if both of the LEDs glow at the same time, it means that there is no iModule®,
+VIS_SOL	It signals two states of the printer: • the LED emits light continuously – the system is refilled with solvent – the temperature-independent viscosity of ink, which is represented by the *ToF(intake)* parameter (available via the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu), is greater than the nominal value, • the LED emits flashing light – the *ToF(intake)* parameter value is not stabilized and fluctuates around the nominal value – the system is made up with solvent only,	If the indicator lamps flash alternately, that means that no viscosity measurements are taken – the system is made up with solvent only.
-VIS_INK	the system is refilled with ink – the temperature-independent viscosity of ink, which is represented by the *ToF(intake)* parameter (available via the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu) is smaller than the nominal value.	

Tab. 4.2.1

Indication LEDs	
Name	**Description**
ALARM	the indication that an alarm is generated (a duplication of the **ERROR** LED on the main pad of the external panel),
POW_ON	the LED indicates that a power signal has been applied to keep the printer's power supply in the on state,
VAC_PUMP	the indication that the vacuum pump is turned on,
INK_PUMP	the indication that the ink pressure pump is turned on,
V8	to indicate that solenoid valve **V8** is turned on - solvent flow to the head is enabled,
V6	to indicate that solenoid valve **V6** is turned on - ink is supplied to the solvent pump under pressure to rinse the head with solvent (after valve **V8** has been activated),
V5	to indicate that solenoid valve **V5** is activated - negative pressure is generated in the solvent pump to ensure that solvent is drawn from solvent bottle,
V4	to indicate that solenoid valve **V4** is activated to refill solvent from bottle,
V3	to indicate that solenoid valve **V3** is activated to refill ink from bottle,
V1	to indicate that solenoid valve **V1** is turned on to draw ink from the head,
V0	to indicate that solenoid valve **V0** is turned on to supply ink to the head.

Tab. 4.2.2

NOTE:
Valve **V2** is not represented by any of the inner-panel indication LEDs. It is controlled with the negated control signal for the valve **V0**; that means it is in the on position whenever the valve **V0** is in the off position.

4.3. 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 has not been 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.

4.4. Graphic Menu

If the printer is operated via the graphic menu, the screen is divided into five sections called windows.
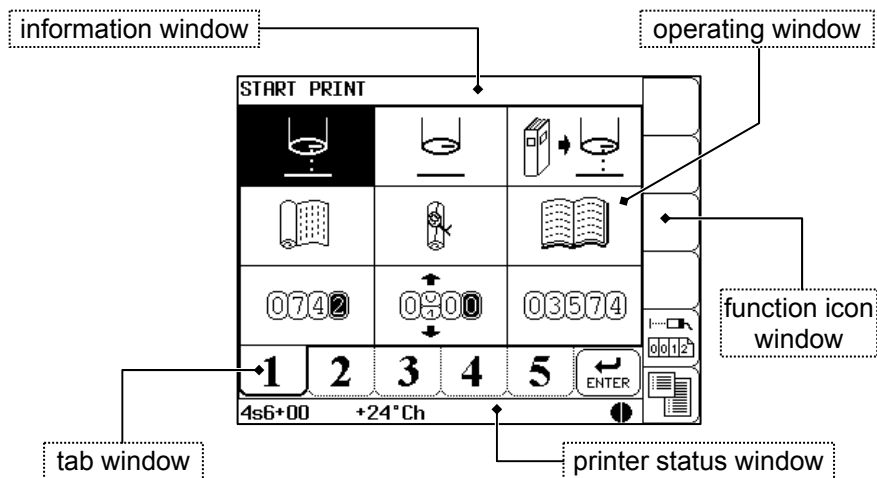
Fig. 4.4.1

Application of the graphic menu windows:

- **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 key 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 *4.11 Print Head Status*.
- **Function icon window** – it 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 same way:
- Tab 1:
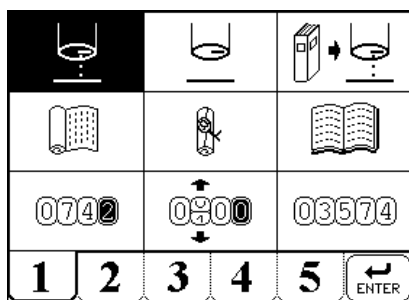
Printing handling functions (successively):
  ➢ **START PRINT**,
  ➢ **STOP PRINTING**,
  ➢ **EDIT & PRINT CURRENT TEXT**,
  ➢ **PRINTING PARAMETERS**,
  ➢ **SAVE CURRENT PARAM.**,
  ➢ **DISPLAY PRINTED TEXT**,
  ➢ **SHIFT COUNTER**,
  ➢ **SET SHIFT COUNTER**.
  ➢ **GLOBAL COUNTER**.

- Tab 2
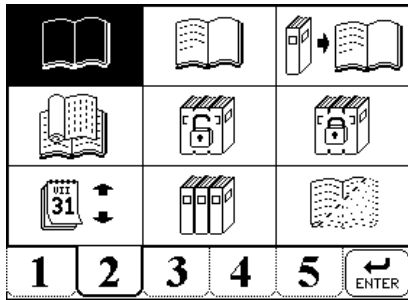
Text file handling functions (successively):
- ➢ **CREATE NEW TEXT**,
- ➢ **TEXT EDITION**,
- ➢ **COPY & EDIT**,
- ➢ **LINK PARAMETERS**,
- ➢ **CREATE/CHANGE PASS**,
- ➢ **ACTIVATE PASSWORD**,
- ➢ **UNIV.DATE REG. CONFIGURATION**,
- ➢ **READ LIBRARY**.
- ➢ **DELETE TEXT**.

- Tab 3
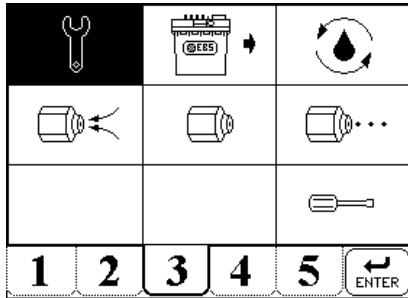
Service functions (successively):
- ➢ **SERVICE**,
- ➢ **iMODULE REPLACEMENT**,
- ➢ **CIRCULATE INK**,
- ➢ **CLEAN NOZZLE**,
- ➢ **FAST OFF**,
- ➢ **INK ON**,
- ➢ not used,
- ➢ not used,
- ➢ **INK SYSTEM SERVICE**.

- Tab 4
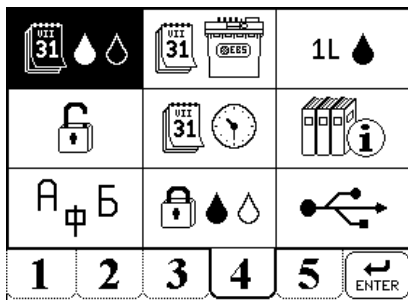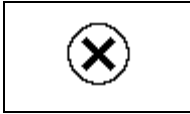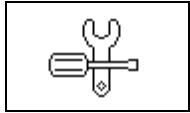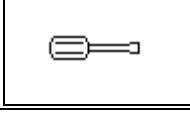
Ink Monitoring System handling functions (successively):
- ➢ **OPERATING TIME** – applies to bottles,
- ➢ **OPERATING TIME** – applies to iModule®,
- ➢ **No. OF TXT/1I**,
- ➢ **UNLOCK PROTECTION**,
- ➢ **TIME AND DATE**,
- ➢ **LIBRARY INFO**,
- ➢ **LANGUAGE**,
- ➢ **REMOVE PROTECT TIME**,
- ➢ **LIBRARY MANAGER**.

- Tab 5
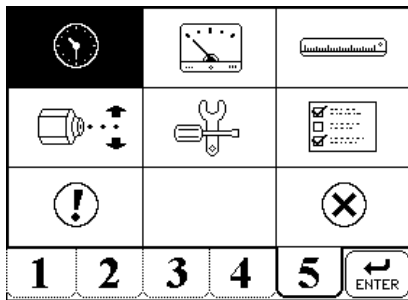
The other functions (successively):
- ➢ **ACTIVITY TIME**,
- ➢ **HV VALUE,PHOTO,SHAFT state**,
- ➢ **CONVEYOR MEASUREMENTS**,
- ➢ **SET INK STREAM**,
- ➢ **ADJUSTMENTS**,
- ➢ **OPTIONS**,
- ➢ **READ ERRORS REPORT**,
- ➢ not used,
- ➢ **CLEAR MEMORY**.

Most of the functions available in the graphic menu are described in section *4.5 Text Menu* as they are also available in the text menu. Operation of the functions is similar irrespective of the type of menu a user uses. Several functions available in the graphic menu are available in the text menu only after the service password has been given. Therefore access to them via the graphic menu is also preceded by the request that the password be given. They are the following functions:

Menu item		Icon in graphic menu
CLEAR MEMORY	⟷	⊗
This is a service command to be used by qualified service staff only. It is designed for erasing memory in certain emergency situations. The execution of this operation is dangerous as it causes loss of text files and printer settings.		
ADJUSTMENTS	⟷	🔧
This is a service command to be used by qualified service staff only. It enables the staff to perform certain advanced adjustments. A more detailed description is given in the *BOLTMARK®-series Printers Service Manual*.		
CIRCULATE INK	⟷	🔄
This is a service command to be used by qualified service staff only. A more detailed description is given in the *BOLTMARK®-series Printers Service Manual*.		
INK SYSTEM SERVICE	⟷	🪛
This command ensures access to additional service commands to be used by qualified service staff only for handling the ink system.		

Tab. 4.4.1

4.5. 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.
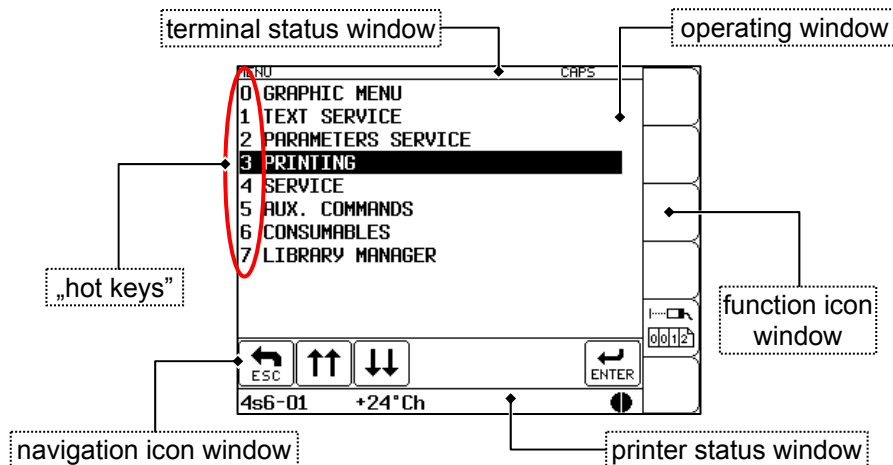
Fig. 4.5.1

The windows are designed for the following:

- **Terminal status window** – it 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 icons 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 *4.11 Print Head Status*.
- **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 first character (a digit or letter) in each MENU option is a **hot key** (see *Fig. 4.5.1*). When this key is pressed, the cursor bar is immediately positioned on the selected option.

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

Key/Icon	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 the selection of a command has been confirmed with the ⌜↵ENTER⌟ icon, it is not always possible to cancel the command. Some commands are executed immediately.

4.6. Menu Structure

MAIN MENU

- 0 GRAPHIC MENU
- 1 TEXT SERVICE → ❶
- 2 PARAMETERS SERVICE → ❷
- 3 PRINTING → ❸
- 4 SERVICE → ❹
- 5 AUX. COMMANDS → ❺
- 6 CONSUMABLES → ❻
- 7 LIBRARY MANAGER

Fig. 4.6.1

---

1   TEXT SERVICE

PASSWORD*

*- a password is active only when it has been set and enabled by the user. For more information see section *4.10 Using the Password*.

❶ (*Fig. 4.6.1*)

- 1 TEXT EDITION
- 2 CREATE NEW TEXT
- 3 COPY & EDIT
- 4 DELETE TEXT
- 5 CLEAR LIBRARY
- 6 READ LIBRARY
- 7 LINK PARAMETERS
- 8 CREATE/CHANGE PASS
- 9 ACTIVATE PASSWORD
- A UNIV.DATE REG. CONFIGURATION
- Z LIBRARY INFO

Fig. 4.6.2

---

2 PARAMETERS SERVICE

PASSWORD*

*- a password is active only when it has been set and enabled by the user. For more information see section *4.10 Using the Password*.

❷ (*Fig. 4.6.1*)

- 1 EDIT PARAM. BLOCK
- 2 CREATE NEW BLOCK
- 3 COPY & EDIT BLOCK
- 4 DELETE PARAM. BLOCK
- 5 CLEAR PARAM.LIBRARY
- 6 READ LIBRARY

Fig. 4.6.3

3 PRINTING → PASSWORD* ❸ (*Fig. 4.6.1*)

0 EDIT & PRINT CURRENT TEXT

1 STOP PRINTING

2 START PRINT

3 QUICK STOP

4 PRINTING PARAMETERS

5 SAVE CURRENT PARAM.

6 SHIFT COUNTER

7 SET SHIFT COUNTER

8 ROWS SPEED

9 GLOBAL COUNTER

A SET GLOBAL COUNTER

C PRINT SWITCH

D DISPLAY PRINTED TEXT

G PRINT & TXT CHANGE

* - a password is active only when it has been set and enabled by the user. For more information see section *4.10 Using the Password*.

Fig. 4.6.4

4 SERVICE ❹ (*Fig. 4.6.1*)

1 SERVICE

2 CLEAN NOZZLE

3 V0 OFF

4 V0 ON

5 FAST OFF

6 INK ON

7 INK OFF

8 SOLVENT

9 SET INK STREAM

A STROBOSCOPE

B HV VALUE,PHOTO,SHAFT state

C SERVICE COMMANDS → ①

D OTHERS → SERVICE PASSWORD

Fig. 4.6.5

4 SERVICE

C SERVICE COMMANDS

❹ (*Fig. 4.6.1*) ➡ ① (*Fig. 4.6.5*)

| 0 DISP. NEXT SERVICE VISIT DATE |
| 1 CONVEYOR MEASUREMENTS |
| 4 SWITCH OFF WITH V3 WASH |
| 5 iMODULE REPLACEMENT |
| 6 THICKEN THE INK & SWITCH OFF |

Fig. 4.6.6

5 AUX. COMMANDS

❺ (*Fig. 4.6.1*)

| 1 OPTIONS |
| 2 DISPLAY ERRORS |
| 3 CLEAR ERRORS |
| 4 READ ERRORS REPORT |
| 5 TIME AND DATE |
| 6 ACTIVITY TIME |
| 7 LANGUAGE |
| 8 UNLOCK PROTECTION |
| A DANGER - MANUFACTURER USE ONLY |
| B SOFTWARE OPTIONS |
| C TOUCHSCREEN CALIBRATION |
| E STANDBY LOG |

Fig. 4.6.7

6 CONSUMABLES

❻ (*Fig. 4.6.1*)

| 1 BOTTLE INFORMATION | ➝ ② |
| 2 iMODULE INFORMATION | ➝ ③ |
| 3 IMS VERSION |

Fig. 4.6.8

6 CONSUMABLES

1 BOTTLE INFORMATION

❻ (*Fig. 4.6.1*) ➡ ② (*Fig. 4.6.8*)

| 1 OPERATING TIME |
| 2 REMOVE PROTECT TIME |
| 3 PRINTER/INK/SOLV. TYPE |
| 5 No. OF TXT/1I |
| 6 DIAGNOSTICS |

Fig. 4.6.9

```
┌─────────────────────────────┐
│    6 CONSUMABLES            │
└─────────────────────────────┘
            │
            ▼
┌─────────────────────────────┐
│  2  iMODULE INFORMATION     │      ❻ (Fig. 4.6.1)  ⇨  ③ (Fig. 4.6.8)
└─────────────────────────────┘
            │
            │         ┌────────────────────────────────┐        Fig. 4.6.10
            ├────────▶│  1 OPERATING TIME              │
            │         └────────────────────────────────┘
            │         ┌────────────────────────────────┐
            ├────────▶│  2 REMOVE PROTECT TIME        │
            │         └────────────────────────────────┘
            │         ┌────────────────────────────────┐
            ├────────▶│  3 iMODULE TYPE               │
            │         └────────────────────────────────┘
            │         ┌────────────────────────────────┐
            └────────▶│  6 DIAGNOSTICS                │
                      └────────────────────────────────┘
```

4.6.1.   Text Files

All commands related to the handling of text files to be printed are contained in the **TEXT SERVICE** menu branch. Most of them can be easily identified with icons, which are available in the graphic menu (see section **4.4 Graphic Menu**). The following commands are used for handling text files:

➢ commands directly related to the handling of text files to be printed (they are described successively in this paragraph),

➢ commands related to the handling of passwords (they are described in section **4.10 Using the Password**),

➢ commands designed for advanced users; they include:

**UNIV.DATE REG. CONFIGURATI
ON**   ⟺
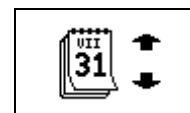
This command is designed for coding date and time components, a work shift number, etc. with any characters. The characters used for coding special register components are described in **4.7.3 Using Special Registers** (**Universal Date and Time**).

LIBRARY INFO   ⟺

A diagnostic command to be used exclusively by qualified service staff.

NOTE:
If the **TEXT SERVICE** submenu is protected by a user-defined password, the user is prompted to give the password before the submenu is displayed. For details on using a user password in the printer, see section **4.10 Using the Password**.

Each of the text files stored in printer memory has its name consisting of up to 8 characters. This name can contain capital and small letters of the alphabet, digits and some other characters except for spaces, full stops and characters such as **, / \ ; : * ? " < > | [ ] { } = +**. Each of the text files in the library can have the "read only" attribute set (a "+" character before the text file name in the library) in order to protect it against getting deleted or modified by an unauthorized person. You can move among the library text files using arrow keys (⇨ ⇦ ⇩ ⇧), and also a combination of the SHIFT ⇦ (or SHIFT ⇧) keys to set the cursor on the first text file in the library and of the SHIFT ⇨ (or SHIFT ⇩) keys to set the cursor on the last text file in the library. A text file can be chosen from the library via a touch panel.

Creating and Editing a New Text File

CREATE NEW TEXT
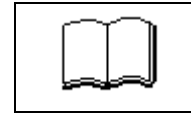
Follow the below given steps to create a new text file:

1. Select the **CREATE NEW TEXT** command from the **TEXT SERVICE** menu.
2. Assign an up to 8-character name to the text file making sure that no prohibited characters are used (see subsection *4.6.1 Text Files*).

   If the file name exists in the library, the file appears on the terminal display and can be edited.
3. Choose a text profile (see section *4.7.1 Text Profiles*). If you are not sure what text profile is most suitable, choose the highest of the *general application profiles* available for a given printer.
4. Create file content with the application of the word processor (see section *4.7 Word Processor*). The text file can be simple or complex (see subsection *4.7.2 Types of Subfiles*). It can also contain variable fields (see subsection *4.7.3 Using Special Registers*) or graphics (see section *4.8 Graphics Processor*). You can also modify the basic parameters of your text file (with the 🗎 icon) and with the 🗎 icon you can change text profile (see section *4.7.1 Text Profiles*) while the text is being edited.
5. After the edition has been completed, confirm or cancel all modifications.

> **NOTE:**
> If the text contained in a file does not meet your profile requirements (such failure to meet can occur only when the profile is changed while you are editing the text), the file cannot be saved in printer memory. Ensure that the text meets the profile requirements or choose the right profile (see section *4.7.1 Text Profiles*).

Editing an Existing Text File

TEXT EDITION
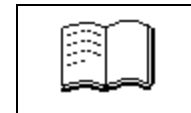
Follow the below given steps to edit an existing text file:

1. Select the **TEXT EDITION** command from the **TEXT SERVICE** menu.
2. Choose a text file you wish to edit.

   If no text files are defined in the library, the **NO TEXTS IN LIBRARY** message is displayed when the command is chosen.
3. Modify the text file content with the word processor (see section *4.7 Word Processor*). You can also modify the basic parameters of your text file (with the 🗎 icon) and with the 🗎 icon you can change text profile (see section *4.7.1 Text Profiles*).
4. After the edition has been completed, confirm or cancel all modifications (no "read only" text file can be edited if the password is not given).

> **NOTE:**
> If the text contained in a file does not meet your profile requirements (such failure to meet can occur only when the profile is changed while you are editing the text), the file cannot be saved in printer memory. Ensure that the text meets the profile requirements or choose the right profile (see section *4.7.1 Text Profiles*).

Copying and Editing a Text File

COPY & EDIT ⟺
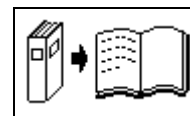
Follow the below given steps to copy an existing text file, edit it and save it under a different name:

1. Select the **COPY & EDIT** command from the **TEXT SERVICE** menu.
2. Choose a text file to be copied.

   If no text files are defined in the library, the **NO TEXTS IN LIBRARY** message is displayed when the command is chosen.
3. Assign an up to 8-character name to the text file making sure that no prohibited characters are used (see subsection *4.6.1 Text Files*). If the new name exists in the library, the following message is displayed: ***TEXT EXISTS***.

   The text profile will be the same as the source text profile. If no profile has ever been assigned to the source text (e.g. the source text file was created with a printer on which earlier software version was installed), then a general-application maximum-height profile will be assigned to a newly created text file (see section *4.7.1 Text Profiles*).
4. Modify the text file content with the word processor (see section *4.7 Word Processor*). You can also modify the basic parameters of your text file (with the 🔲 icon) and with the 🔲 icon you can change text profile (see section *4.7.1 Text Profiles*).
5. After the edition has been completed, confirm or cancel all modifications.

> **NOTE:**
> If the text contained in a file does not meet your profile requirements (such failure to meet can occur only when the profile is changed while you are editing the text), the file cannot be saved in printer memory. Ensure that the text meets the profile requirements or choose the right profile (see section *4.7.1 Text Profiles*).

Deleting a Text File

DELETE TEXT ⟺

Follow the below given steps to delete a text file from the library:

1. Select the **DELETE TEXT** command from the **TEXT SERVICE** menu.
2. Choose a text file to be deleted.

   If no text files are defined in the library, the **NO TEXTS IN LIBRARY** message is displayed when the command is chosen.
3. Confirm that the text file is to be deleted from the text file library or cancel the operation (no "read only" text file can be deleted if the password is not given).

> **NOTE:** Once deleted the file cannot be restored.

Deleting the File Library

CLEAR LIBRARY ⟺ no icon is available in the graphic menu

Follow the below given steps to delete all the text files stored in the library:

1. Select the **CLEAR LIBRARY** command from the **TEXT SERVICE** menu.

   If no text files are defined in the library, the **NO TEXTS IN LIBRARY** message is displayed when the command is chosen.
2. Confirm that all the text files are to be deleted from the text file library or cancel the operation (no "read only" text files can be deleted if the password is not given).

NOTE:	Once deleted the files cannot be restored.

Accessing the File Library

READ LIBRARY   ⟷
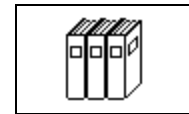
The content of the text file library can be viewed with the **READ LIBRARY** command from the **TEXT SERVICE** menu. This command enables all the text files contained in the library to be displayed together with the parameter blocks attached to them (see the paragraph entitled *Linking a Text File with a Parameter Block*). With the **READ LIBRARY** command you can also detach the parameter block from a selected text file (with the ⌊ALT⌋ icon) and modify the setting of the "**read only**" attribute (see the paragraph entitled *Assigning/Removing the „Read Only" Attribute*).

Assigning/Removing the „Read Only" Attribute
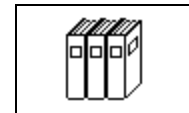
READ LIBRARY   ⟷

Follow the below given steps to assign/remove the "read only" attribute to/from a library text file:

1. Select the **READ LIBRARY** command from the **TEXT SERVICE** menu.
2. Use the appropriate keys/icons (see below) to assign/remove the "**read only**" attribute to/from a selected text file or all the text files contained in the library.

   The keys/icons to be used:

   ⌊SPACE⌋ or 🔓 – to assign/remove the **read only** attribute to/from a selected text file,

   ⌊INS⌋ or 🔒 - to assign the **read only** attribute to every text file in the library,

   ⌊DEL⌋ or 🔓 - to remove the **read only** attribute from every text file in the library.
3. Confirm that you wish to execute the operation (no "read only" attribute can be assigned or removed if the password is not given).

Linking a Text File with a Parameter Block

LINK PARAMETERS   ⟷

Certain print parameters need to be set during printing (see the paragraph entitled *Modifying Print Parameters* in section *4.6.3*). When you change the text to be printed (e.g. as the line of products to be labeled changes), the parameters need to be adjusted accordingly. Therefore it would be advisable to have a tool that might enable you to do the following:
➢ Store print parameters for a given text file.
➢ Link the parameters stored with the text file to be printed.
➢ Set all parameters for the text file automatically just before printing, after the print command has been selected.

A solution to meet the above requirements is offered by EBS printers. Every text file (that is stored in the library) can be linked with a parameter block and such a pair can be stored in the file library. To do this, follow the procedure given below:

1. Select the **LINK PARAMETERS** command from the **TEXT SERVICE** menu.

   If no text files or parameter blocks are defined in the library, the **NO TEXTS IN LIBRARY** or **NO PARAM. BLOCKS IN LIBRARY** message is displayed when the command is chosen.
2. When the text file library is displayed, choose the right text file from it.

3. When the parameter block library is displayed, choose the right parameter block from it.

4. Confirm that the linking operation is to be executed.

Text files and parameter blocks linked to them can be viewed and separated from each other with the **READ LIBRARY** command from the **TEXT SERVICE** menu (see the paragraph entitled ***Accessing the File Library*** in section ***4.6.1***).

4.6.2. Using Print-Parameter Blocks

Specific print parameters can be defined during printing (see the paragraph entitled ***Modifying Print Parameters*** in section ***4.6.3***) and these have a direct impact on the appearance of a text being printed. They are so called **current parameters**. It happens frequently that print parameters need to be modified when a text to be printed changes. To avoid modifying them each time a text changes, you can use the option of saving ready-to-use parameter blocks in printer memory and also assigning a saved parameter block to a defined text (see the paragraph entitled ***Linking a Text File with a Parameter Block*** in section ***4.6.1***). The parameter blocks stored in printer memory can also be edited and deleted, which has no impact on the current parameters of a text being printed.

All the parameter block-related operations are available from the **PARAMETERS SERVICE** menu branch.

> **⚠**
>
> **NOTE:**
> If the **PARAMETERS SERVICE** menu option is protected with a user password, you are prompted to type in the password before this option is displayed. For details on how to use the user password see section ***4.10 Using the Password***.

Each of the parameter blocks stored in printer memory has its name consisting of up to 8 characters. This name can contain capital and small letters of the alphabet, digits and some other characters except for spaces, full stops and characters such as **, / \ ; : * ? " < > | [ ] { } = +**. Each of the parameter blocks stored in the library can have the "read only" attribute set (a "+" character before the parameter block name in the library) in order to protect it against getting deleted or modified by an unauthorized person. You can move among the parameter blocks in the library using arrow keys (⇨ ⇦ ⇩ ⇧), and also a combination of the SHIFT ⇦ (or SHIFT ⇧) keys to set the cursor on the first block in the library and of the SHIFT ⇨ (or SHIFT ⇩) keys to set the cursor on the last block in the library. A parameter block can be chosen from the library via a touch panel.

Creating and Editing a New Parameter Block

        CREATE NEW BLOCK   ⟵⟶   no icon is available in the graphic menu

Follow the below given steps to create a new parameter block:

1. Select the **CREATE NEW BLOCK** command from the **PARAMETERS SERVICE** menu.

2. Assign an up to 8--character name to the block making sure that no prohibited characters are used (see subsection ***4.6.2 Using Print-Parameter Blocks***).

If the block name already exists in the library, the parameters are displayed on the terminal and can be edited.

3. Set print parameters (a description of the parameters is given in the paragraph entitled ***Modifying Print Parameters*** in section ***4.6.3***).

4. After the edition has been completed, confirm or cancel all modifications.

Another method for creating a new parameter block is to save the current print parameters (see the paragraph entitled ***Saving Current Parameters in a Block*** in section ***4.6.3***).

Each of the print parameter blocks stored in the library can be assigned to a text file so that the right parameters (saved in a block) are used for printing a given text. A parameter block is linked with a text file with the **LINK PARAMETERS** command from the **TEXT SERVICE** menu. The parameter block can be detached from a text file with the **READ LIBRARY** command from the **TEXT SERVICE** menu.

Editing Existing Blocks of Parameters

EDIT PARAM. BLOCK   ⟵⟶   no icon is available in the graphic menu

Follow the below given steps to edit an existing parameter block:

1. Select the **EDIT PARAM. BLOCK** command from the **PARAMETERS SERVICE** menu.

If no parameter blocks are defined in the library, the **NO PARAM. BLOCKS IN LIBRARY** message is displayed when the command is chosen.

2. Choose a block to be edited.

3. Modify print parameters (a description of the parameters is given in the paragraph entitled *Modifying Print Parameters* in section *4.6.3*).

4. After the edition has been completed, confirm or cancel all modifications (no "read only" block can be edited if the password is not given).

> **NOTE:**
> No edition or modification of a parameter block has direct impact on the current settings – see paragraph *4.6.2 Using Print-Parameter Blocks*.

(!)

Copying and Editing Blocks of Parameters

EDIT PARAM. BLOCK   ⟵⟶   no icon is available in the graphic menu

Follow the below given steps to copy an existing parameter block, edit it and save it under a different name:

1. Select the **COPY & EDIT BLOCK** command from the **PARAMETERS SERVICE** menu.

2. Choose a block to be copied.

If no parameter blocks are defined in the library, the **NO PARAM. BLOCKS IN LIBRARY** message is displayed when the command is chosen.

3. Assign an up to 8-character name to the block making sure that no prohibited characters are used (see subsection *4.6.2 Using Print-Parameter Blocks*). If the newly typed in block name already exists in the library, the **BLOCK NAME EXISTS** message is displayed.

4. Set the print parameters that meet your requirements.

5. After the edition has been completed, confirm or cancel all modifications.

Deleting a Block of Parameters

DELETE PARAM. BLOCK   ⟵⟶   no icon is available in the graphic menu

Follow the below given steps to delete a parameter block from the library:

1. Select the **DELETE PARAM. BLOCK** command from the **PARAMETERS SERVICE** menu.

2. Choose a block to be deleted.

If no parameter blocks are defined in the library, the **NO PARAM. BLOCKS IN LIBRARY** message is displayed when the command is chosen.

3. Confirm that the parameter block is to be deleted from the library (no "read only" block can be deleted if the password is not given). If the block being deleted is linked to a text file, the link will also be deleted.

> **NOTE:**   Once deleted the block cannot be restored.

(!)

Deleting the Parameter-Block Library

CLEAR PARAM.LIBRARY   ⟵⟶   no icon is available in the graphic menu

Follow the below given steps to delete all the parameter blocks stored in the library:

1. Select the **CLEAR PARAM.LIBRARY** command from the **PARAMETERS SERVICE** menu.

If no parameter blocks are defined in the library, the **NO PARAM. BLOCKS IN LIBRARY** message is displayed when the command is chosen.

2. Confirm that all the parameter blocks are to be deleted from the block library (no "read only" blocks can be deleted if the password is not given).

> **NOTE:**   Once deleted the blocks cannot be restored.

Accessing the Parameter Block Library

READ LIBRARY   no icon is available in the graphic menu

The content of the parameter block library can be viewed with the **READ LIBRARY** command from the **PARAMETERS SERVICE** menu. If no parameter blocks are defined in the library, the **NO PARAM. BLOCKS IN LIBRARY** message is displayed when the command is chosen.
This command enables all the parameter blocks contained in the library to be displayed. It can also be used for modifying the setting of the "**read only**" attribute (see the paragraph entitled *Assigning/Removing the „Read Only" Attribute*).

Assigning/Removing the „Read Only" Attribute

READ LIBRARY   no icon is available in the graphic menu

Follow the below given steps to assign/remove the "read only" attribute to/from a parameter block in the library:

1. Select the **READ LIBRARY** command in the **PARAMETERS SERVICE** menu.

2. Use the appropriate keys/icons (see below) to assign/remove the "**read only**" attribute to/from a selected block or the blocks stored in the library.

The keys/icons to be used:

[SPACE] or [🔓] – to assign/remove the **read only** attribute to/from a selected block,

[INS] or [🔒] - to assign the **read only** attribute to every block in the library,

[DEL] or [🔓] - to remove the **read only** attribute from every block in the library.

3. Confirm that you wish to execute the operation (no "read only" attribute can be assigned or removed if the password is not given).

4.6.3.   Printing

All start/stop printing operations and text file-related functions are available from the **PRINTING** menu branch. Most of them can be easily identified with icons, which are available in the graphic menu (see section *4.4 Graphic Menu*).

Starting Printing

[PRINT ON/OFF] | **START PRINT**
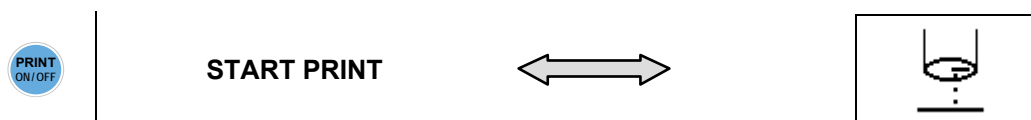
Follow the below given steps to start printing:

1. Select the **START PRINT** command from the **PRINTING** menu.

2. Type in the name of a text file you wish to print or choose a text file from the library (with the [ALT] icon). If the printer is ready for printing (in the *stop* mode) and the print parameters have been set correctly (see the paragraph entitled *Modifying Print Parameters*) printing starts automatically.

High voltage is applied (the green LED above the [PRINT ON/OFF] key on the main plate of the external panel and the red *HV_ON* LED on the inner panel start glowing) and printing starts. The printer moves to the *print* state.

Printing can also be started with the **PRINT ON/OFF** key on the unit keypad, however only <u>the text file printed recently</u> can be printed.

NOTE:
The following messages can be displayed after the **START PRINT** command has been chosen:

- **Head cover removed** – it means that an attempt has been made to start printing while no head cover is installed. The head cover should be installed and the command repeated.
- **UNIT NOT ACTIVE** or **ToF correction not ready** – it means that the initial heating up process has not been completed (after the unit has been switched on) or that the unit waits for the stabilization of ink parameters (after an error has occurred). Then wait until the **READY** LED stops blinking and repeat the **START PRINT** command.
- **CHANNEL ACTIVE** – it means that the unit is in the *print* mode. Then stop printing (with the **STOP PRINTING** or **QUICK STOP** commands) and repeat the **START PRINT** command.
- **TEXT NAME DOES NOT EXIST** – it means that no text file a given name exists in the text file library, however if no text files are defined in the library and the command is chosen, the **NO TEXTS IN LIBRARY** message is displayed).
- **TEXT TOO HIGH** – it means that you have tried to print a text whose maximum height (in dots) is greater than the height of the highest vertical row that the printer is able to print (**MINI** version – **16** dots, **MIDI** version – **25** dots, **MAXI** version – **32** dots).
- **PRINT SPEED TOO HIGH** – it means that the setting of the print rate is too large or the setting of the distance between prints is too small for a given print rate.
- **Increase PRINT.PARAM. Height or**
  decrease PRINT.PARAM. Speed or
  decrease text height [dots]. – it means that a wrong combination of the **Height** and **Speed** parameters has been chosen or the text height (the **Height (pix)** printing parameter) is too big. The list of permissible combinations of the above mentioned parameters is given in *Tab. 4.12.6.1* (for the EBS-6500/EBS-6800 printers) and *Tab. 4.12.6.2* (for the EBS-7200 printers).

Stopping Printing

STOP PRINTING   ⟷

PRINT ON/OFF | **QUICK STOP**   ⟷   no icon is available in the graphic menu
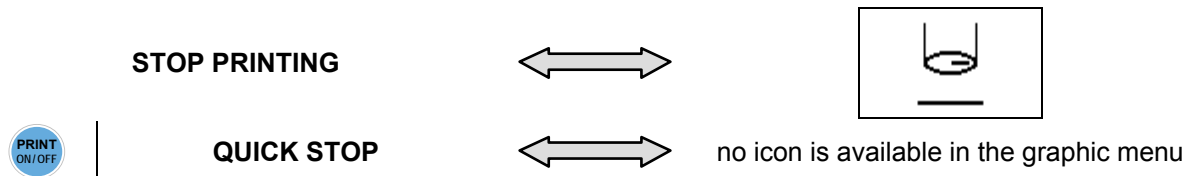
Follow the below given steps to stop printing:

1. Select the **STOP PRINTING** or **QUICK STOP** command from the **PRINTING** menu.
2. If the **QUICK STOP** command is chosen, printing is halted immediately, whereas if the **STOP PRINTING** command is chosen, printing is not halted until the current print is finished.

Printing can also be halted with the **PRINT ON/OFF** key situated on the printer panel, with the key implementing the **QUICK STOP** command.

High voltage is cut off when printing stops. The green LED above the **PRINT ON/OFF** key on the main plate of the external panel and the red *HV_ON* LED on the inner panel go out. The printer moves to the *stop* state.

Suspending Printing, Editing Text and Resuming Printing

EDIT & PRINT CURRENT TEXT

⟵⟶
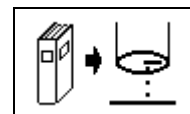
While defining the contents and parameters of a text file to be printed and while defining printing parameters for this text file you frequently need to perform the following sequence of operations:

- suspending printing,
- editing the text file whose printing has just been stopped,
- resuming the printing.

The text you are printing can be edited without the need for stopping printing. You can just use a new command, **EDIT & PRINT CURRENT TEXT**, while you are still in the **PRINTING** menu.

Access to this function depends on the settings of the user password. A precise description of user access rights is given is section *4.10 Using the Password*.

Modifying Print Parameters

PRINTING PARAMETERS

⟵⟶

With EBS printers you can make overprints on objects with a wide range of shapes and sizes. The objects can be moved in their normal position or "upside down", automatically or manually, in front of the print head at various speeds and in any direction (left or right). The character height, width, thickness, number of repetitions and many other print parameters can be modified to fit your print requirements.

The printer uses so called **current parameters** for printing. Unlike the library-stored blocks of parameters (see subsection *4.6.2 Using Print-Parameter Blocks*), the current parameters have direct impact on the result of printing.

The current parameters (further called "the parameters" hereafter) can be modified in the following way:

➥ Before selecting the **START PRINT** command (in the *stop* or *cover* mode) you can modify all parameters which are available for the **PRINTING PARAMETERS** command in the **PRINTING** submenu. The file to be printed cannot be linked with any parameter block.

➥ During printing (on selecting the **START PRINT** command in the *print* mode) you can modify the major part of the parameters (but not all of them), which are available via the **PRINTING PARAMETERS** command.

➥ No modification to printing parameters is advisable if the printer is not in any of the above mentioned modes (and, for example, it is following the starting procedure - in *restart* mode). If that is the case, the checking for correct settings of the **Height**, **Speed**, **Height (pix)** parameters is disabled (see *Tab. 4.6.3.1*) and the following message: **UNIT NOT ACTIVE** or **ToF correction not ready** can be displayed in the printer status window.

After a text file together with a parameter block associated with it have been selected with the **START PRINT** command, print parameters are set with the settings available in the selected block. Such parameters can be modified during printing.

> **NOTE:**
> If a block of parameters is attached to a text file (the **Linked param.** parameter), then while a new text file is becoming active (the **Active text** parameter), the parameters of the attached block are downloaded. In such a case, when the printer is not in the *print* state, any modification of a parameter causes the modification of the current parameter setting only. Therefore, if printing starts after any parameter has been modified, the original parameters are downloaded from the block of parameters once again. Modifications of parameters are effective only when they are saved in the block of parameters (linked to the text file) before printing is initiated.
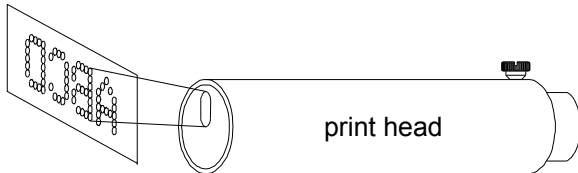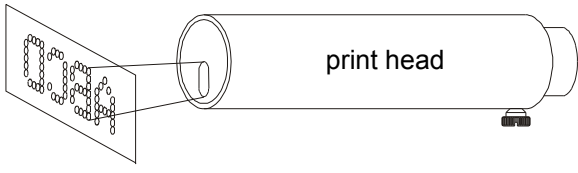
Follow the below given steps to set print parameters:

1. Select the **PRINTING PARAMETERS** command from the **PRINTING** menu.

2. Set the print parameters to meet your requirements. *Tab. 4.6.3.1* contains a list of print parameters and descriptions of these parameters.
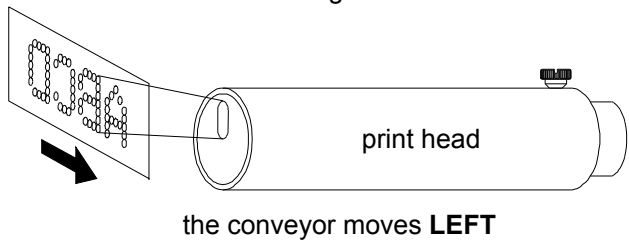
Parameter	Range of settings	Default setting	M[4]
Active text			NO
The parameter shows the name of a text file that is active (i.e. has recently been, or is currently, printed). If a block of parameters is linked to a text file, the block name is shown with the parameter called **Linked param.** (see below), and as soon as the execution of the command starts, the parameters of the attached block are downloaded. The height (a number of dots) of the active text is displayed with the **Height (pix)** parameter (see below). While the printer is not printing, you can choose another text file from the library using the left and right arrows (⇦ and ⇨) or the `ALT` icon. Any exchange of the active text file is immediately followed by checking up whether the combination of the **Height** and **Speed** parameters and the height of the active text (the **Height (pix)** printing parameter) is correct. If it is incorrect, a fragment of the below given 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, choose another printing parameter and press the `ALT` icon. Owing to this mechanism you can rectify a wrong setting of the parameter and start printing.			
Linked param.			NO
The parameter displays the name of a block of parameters linked to the active text (see above). If no block of parameters is attached to the active text, then the **Linked param.** parameter shows no name.			
Height (pix)			NO
The parameter displays the height of the active text (see above) expressed as a number of dots. **NOTE:** Not all combinations of the **Height** and **Speed** parameters and the text height (the **Height (pix)** printing parameter) are allowed. (The allowed combinations are given in *Tab. 4.12.6.1* and *Tab. 4.12.6.2* in section *4.12.6 Maximum Print Rate vs. Resolution*). If it is incorrect, a fragment of the below given message is displayed in the printer status window: **Increase PRINT.PARAM. Height or decrease PRINT.PARAM. Speed or decrease text height [dots].** Press the `ALT` icon to get the entire message displayed.			

---

[4] Can the parameter be modified during printing (the *print* mode)?

Parameter	Range of settings	Default setting	M[4]
Height	**SMALL**, **MIDDLE**, **LARGE**	**LARGE**	NO

The parameter defines the height of overprints. When the distance from the print head to an object is constant, labels of three different heights can be printed. The print height setting applies to the entire text, no matter how the text has been created in the word processor and what its contents are.

NOTE:

➢ The print height can be adjusted continuously by changing the distance between the print head and an object. With this type of adjustment you need to take into account the risk to get lower quality overprints over greater distances.

➢ Not all combinations of the **Height** and **Speed** parameters and the text height (the **Height (pix)** printing parameter) are allowed. (The allowed combinations are given in ***Tab. 4.12.6.1*** and ***Tab. 4.12.6.2*** in section ***4.12.6 Maximum Print Rate vs. Resolution***). If it is incorrect, a fragment of the below given message is displayed in the printer status window:

Increase PRINT.PARAM. Height or
decrease PRINT.PARAM. Speed or
decrease text height [dots].

Press the ALT icon to get the entire message displayed.

Parameter	Range of settings	Default setting	M
Speed	**SLOW**, **MIDDLE**, **FAST**	**SLOW**	NO

The parameter defines the maximum print rate at which an overprint is made. According to the setting of the **Speed** parameter, different sequences of dots are used for printing.

NOTE:

Not all combinations of the **Height** and **Speed** parameters and the text height (the **Height (pix)** printing parameter) are allowed. (The allowed combinations are given in ***Tab. 4.12.6.1*** and ***Tab. 4.12.6.2*** in section ***4.12.6 Maximum Print Rate vs. Resolution***). If it is incorrect, a fragment of the below given message is displayed in the printer status window:

Increase PRINT.PARAM. Height or
decrease PRINT.PARAM. Speed or
decrease text height [dots].

Press the ALT key to get the entire message displayed.

Parameter	Range of settings	Default setting	M
Generator	**GEN**, **SHAFT**	**GEN**	NO

The print rate is controlled by an internal generator or a shaft-encoder. The internal generator (or shaft-encoder) determines the timing of printing of vertical rows. The **Generator** parameter is used to select the source of timing pulses - see also section ***4.12 Adjusting Print Rate***.

Parameter	Range of settings	Default setting	M
Resol. dot/cm	1, 2, 3, ... , 100	30	YES

The parameter affects the print rate. It defines the resolution (number of dots/centimeter) at which a text is to be printed. In other words, the visual effect of a change in the **Resol. dot/cm** parameter is a change in the width of characters and the length of the entire overprint - see also section ***4.12 Adjusting Print Rate***.

Parameter	Range of settings	Default setting	M
Cnv spd m/min	0,1 ; 0,2 ; ... ; 2500	10,0	YES

In order to produce clear overprints, match the rate at which vertical rows are printed with the speed at which objects travel in front of the print head. The matching is ensured by setting the **Cnv spd m/min** print parameter to the conveyor travel speed (number of meters/minute).

The travel speed can be measured with the **CONVEYOR MEASUREMENTS** service command - see also the paragraph entitled ***Monitoring Print Rate*** and section ***4.12 Adjusting Print Rate***.

Parameter	Range of settings	Default setting	M[4]
Enc const p/m	50, 51, 52, ... , 300000	10000	YES

The shaft-encoder, a travel speed indicator, is mechanically coupled with the conveyor and generates timing pulses for printing vertical rows. The number of timing pulses depends on the type of encoder and mechanical transmission gear between the encoder and the conveyor. The **Enc const p/m** print parameter defines the number of pulses generated by the encoder while objects are moving over a unit distance (1 meter). The quantity can be measured with the **CONVEYOR MEASUREMENTS** service command - see also the paragraph entitled *Monitoring Print Rate* and section *4.12 Adjusting Print Rate*.

NOTE:

Boundary limits are defined for the **Resol. dot/cm** and **Cnv spd m/min** print parameters. Current settings of the parameters are monitored by the control program and can be limited by the settings of other print parameters and the actual row height (of 7, 16, 25 or 32[5] dots). The parameter is automatically protected against the setting of too high a print rate. Therefore some settings may not be accepted.

Vert. direct.	**STANDARD**, **REVERSE**	**STANDARD**	YES

The parameter defines how a text should be printed in the vertical direction: normally or "up-side down". In most applications it is recommended that the standard mode of printing (**Vert. direct.=STANDARD**) be used. The reverse mode should be used only when there is the need for placing a label in the lower part of an object (near the conveyor belt) and the print made in the standard mode would be placed too high.

STANDARD printing in the vertical direction   **REVERSE** printing in the vertical direction

Space	0.0 ; 0.1 ; ... ; 6553.5 mm	2.0 mm	YES

The parameter defines the distance given in millimeters (or inches), from the point where the photo detector has been activated to the point where printing of a text file should start. During printing the distance is measured off properly provided that the settings of the **Cnv spd m/min** parameter (for **Generator=GEN**) and the **Enc const p/m** parameter (for **Generator=SHAFT**) correspond to real measurements taken at the print place. It enables a user to adjust the print position in relation to the edge of the object to be labeled.

Text rpt.	1, 2, 3, ... , 65534, **CONTIN.**	1	YES

The parameter defines how many times the overprint is to be made after the photo detector has been activated, from the point where the overprint begins. It is used to print a text file on an object many times. For continuous objects such as cables, hoses or pipes you can set continual printing. The distance between consecutive overprints is defined with the **Rpt.dist.** parameter - see below.

NOTE:

If the distance between labels is set to 0 (zero) with the **Rpt.dist.** parameter, then the number of repetitions (the **Text rpt.** parameter) is limited to 6 (even if the setting of the **Text rpt.** parameter is greater than 6).

---

[5] This does not apply to the EBS-6500 printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).

Parameter	Range of settings	Default setting	M^4
Rpt.dist.	0.0 ;0.1 ; ... , 6553.5 mm	30.0 mm	YES

The parameter defines the distance given in millimeters (or inches) <u>between the beginnings of texts</u> when they are printed repeatedly (**Text rpt.**>1). During printing the distance is measured off properly provided that the settings of the **Cnv spd m/min** parameter (for **Generator=GEN**) and the **Enc const p/m** parameter (for **Generator=SHAFT**) correspond to real measurements taken at the print place.

NOTE:
- If the distance set with the **Rpt.dist.** parameter is smaller than the text length, the overprints are separated with four blank vertical rows.
- If the distance set with the **Rpt.dist.** parameter is 0 (zero), the overprints boarder each other, but the number of repetitions (**Text rpt.**) is limited to 6 (even if the setting for the **Text rpt.** parameter is greater than 6).

Conv. direct.	**LEFT**,**RIGHT**	**LEFT**	YES

The parameter defines in which direction, left or right, objects move in front of the print head. With this setting, the printer makes overprints in the horizontal direction to ensure the overprints are clearly visible. The direction is defined when looking from the head.

print head

the conveyor moves **LEFT**

Offset	0, 1, 2, 3, ... , 9999	1	YES

The parameter defines the number of days to be added to the current date in order to calculate the so-called expiry date. The expiry date is set with the **Date+offs.** special register where the **Offset** parameter is used - see also subsection *4.7.3 Using Special Registers*.

Offset2	0, 1, 2, 3, ... , 9999	1	YES

The parameter defines the number of days to be added to the current date in order to calculate the so-called expiry date. The expiry date is set with the **Date+offs.2** special register where the **Offset2** parameter is used - see also subsection *4.7.3 Using Special Registers*.

Counter delta	1, 2, 3, ... , 9	1	YES

The parameter is a number added to an incremental counter or subtracted from a decremental counter. The incremental or decremental counters are special registers where the **Counter delta** parameter is used - see also subsection *4.7.3 Using Special Registers*.

Row repetit.	1, 2, 3, ... , 10	1	NO

The parameter defines how many times each vertical row should be printed to get the overprint. It applies to the entire text file, no matter how the file has been created, what its contents are and how many times individual text files are to be repeated. An increased number of rows is useful, for example, when overprints are made on porous, highly absorbing surfaces as it increases print intensity.

NOTE:
An increase in the number of vertical rows to be printed causes the width of the entire print to increase. If you wish to maintain the previous width of your print and keep the object's feed rate unchanged, then each time you set the **Row repetit.** parameter at a higher value you should increase the print rate, i.e. the setting of the **Cnv spd m/min** parameter, or increase the setting of the **Resol. dot/cm** parameter.

Parameter	Range of settings	Default setting	M⁴
Mode	**NORMAL**, **TEST**	**NORMAL**	NO
The print rate is timed by an internal generator or a shaft-encoder as standard. The internal generator (or shaft-encoder) determines the timing of the printing of vertical rows. When the print rate reaches its high level, the quality of print lowers. The reason for the lower quality is that the print control system needs to react to pulses coming from the internal generator (shaft-encoder) and to synchronize with them. If the pulse processing system is turned off, the print control system switches to timing by itself in the optimal (in this case - the fastest) way.			
If the **Mode** parameter is set to **TEST**, the print control system ensures that the prints are made at the maximum possible rate. Note that the internal generator or shaft-encoder are turned off, and if the travel speed changes, the print width may vary.			
NOTE: • If the **Speed** parameter is set to **FAST** and the adjustment of frequency of the internal generator (or transmission of the shaft-encoder) are not sufficient to obtain proper and visible overprints, the printing can still be sped up by setting the print-rate mode to **TEST**. • When the print rate is set to its maximum (the **Mode** parameter is set to **TEST**), the internal generator and shaft-encoder have no effect on the print rate. • The setting of the **Mode** parameter can be modified only after the service password has been given.			

Tab. 4.6.3.1

3. Confirm the modified parameters with the [ENTER ↵] icon.

> **NOTE:**
> As soon as the modified printing parameters are confirmed they can immediately be saved as a block in the block library. The suggested name of the block of parameters is the same as the name of the text file that the print parameters apply to. When the block is saved, it can be linked to a text - see the paragraph entitled ***Linking a Text File with a Parameter Block*** in section ***4.6.1***.

(!)

Saving Current Parameters in a Block

SAVE CURRENT PARAM.   ⟺
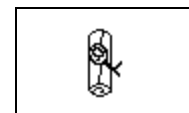
You can modify some print parameters during printing to customize them to your needs. The modified parameters can be input to the block library with their names and saved in the printer memory. Follow the below given steps to do that:

1. Select the **SAVE CURRENT PARAM.** command from the **PRINTING** menu.

2. Assign an appropriate (up to 8-character) name to your block making sure that no prohibited characters are used (see subsection ***4.6.2 Using Print-Parameter Blocks***). If the newly assigned name already exists in the library, the **BLOCK NAME EXISTS** message is displayed together with the question whether the existing block should be overwritten or not.

3. Confirm that you wish to save the block (or overwrite the existent one) or cancel the operation.

Access to this function depends on the user password settings. A precise description of user access rights is given is section ***4.10 Using the Password***.

> **NOTE:**
> The current printing parameters can be saved in a block also immediately after they have been edited (see the paragraph entitled ***Modifying Print Parameters***).

(!)

Monitoring Counting

SHIFT COUNTER

SET SHIFT COUNTER

GLOBAL COUNTER

SET GLOBAL COUNTER   no icon is available in the graphic menu

The printer can count the objects it labels. Each time the photo detector is activated, the object counter is incremented by 1. The counter can be reset or set to any initial setting at any time.

Two separate object counters are available in the printer.

A shift counter, which can be viewed at any time, but can be protected with a user password against unauthorized modifications. Any modification (in particular resetting to zero) does not affect the global counter. The following commands relate to the handling of the shift counter:
  - ➢ **SHIFT COUNTER** - to view the shift counter,
  - ➢ **SET SHIFT COUNTER** – to modify the shift counter (or to clear the counter by setting it to "0"). Access to this function depends on the user password settings. A precise description of user access rights is given is section *4.10 Using the Password*.

A global counter, which can be protected with a user password against unauthorized access or modifications Any modification (in particular resetting to zero) does not affect the shift counter. The following commands relate to the handling of the global counter:
  - ➢ **GLOBAL COUNTER** - to view the global counter. Access to this function depends on the user password settings. A precise description of user access rights is given is section *4.10 Using the Password*.
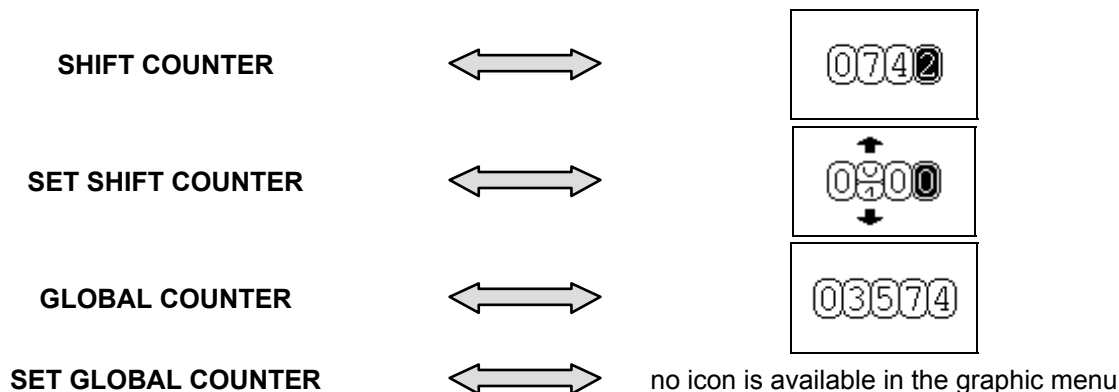 - ➢ **SET GLOBAL COUNTER** – to modify the global counter (or to clear the counter by setting it to "0"). Access to this function depends on the user password settings. A precise description of user access rights is given is section *4.10 Using the Password*.

Monitoring Print Rate

ROWS SPEED   no icon is available in the graphic menu

The print rate is regulated by an internal generator or shaft-encoder. The internal generator (or shaft-encoder) determines the timing of printing of vertical rows. The timing rate or print rate can be measured - see also section *4.12 Adjusting Print Rate*.

If you wish to define the print rate, choose the **ROWS SPEED** command from the **PRINTING** menu. The display shows the print rate determined by the internal generator or shaft-encoder, according to the setting of the **Generator** parameter in the **PRINTING PARAMETERS** command.

If the **Generator** print parameter is set to **GEN**, the print rate depends on the **Resol. dot/cm** and **Cnv spd m/min** print parameters. If the **Generator** print parameter is set to **SHAFT**, the print rate depends only on the rotational speed of the shaft-encoder axle.

Printing with the Use of a Code Switch

PRINT SWITCH   no icon is available in the graphic menu

In order to exchange a text while it is being printed use the following procedure as standard: select the **STOP PRINTING** command, then the **START PRINT** command and type in the name of a file to be printed.

If you need to replace text files frequently, you can use a special feature has been developed for **EBS** series printers to exchange text files easily and quickly. This feature is a Code Switch. The device is offered in two versions, standard and optional:

(1). *The standard Code Switch* consists of a code switch emulated by the printer's terminal. It is started with the [icon] icon or the corresponding key **F5**. Enter a four-character text-file name via the keypad and press the [ENTER] icon at the moment when you wish to exchange the file.

(2). *The optional Code Switch*[6] consists of an external unit manufactured by **EBS**. It is plugged into a female connector on the printer housing and equipped with a simple keypad and a display. The unit offers many additional functions apart from the basic functions of a typical Code Switch.

In both of the above versions, the switch code should be initialized with the **PRINT SWITCH** command. More information about printing with the use of a Code Switch is given in a separate document.

> **NOTE:**
> When the **PRINT SWITCH** command is used, messages similar to those following the **START PRINT** command can be displayed – see the paragraph entitled *Starting Printing*.

(!)

Viewing Files on Terminal Display

DISPLAY PRINTED TEXT ⟷

Follow the below given steps to view, on the display, the text file currently printed:

1. Select the **DISPLAY PRINTED TEXT** command from the **PRINTING** menu.

2. If the printer is in the *print* state, the text currently printed is displayed. Otherwise the command is not executed.

Exchanging Text While Printing
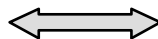
PRINT & TXT CHANGE ⟷ no icon is available in the graphic menu

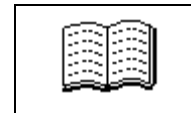With the **EBS** printers you can print automatically up to 10 successive appropriate named text files without stopping and starting printing before every new text. This type of printing is called text-exchange printing.

Before starting text-exchange printing, you need to prepare text files in the library properly. The name of each of the text files must consist of a fixed part (of up to 3 characters, *e.g.* **TXT** or **A**) and an index (starting from digit **1**) – see examples below.

When texts are prepared according to the above rules, you can start printing. To this purpose follow the steps given below:

1. Choose the **PRINT & TXT CHANGE** command from the **PRINTING** menu. The **Texts No. (1-10)** prompt is displayed.

2. Give the number of texts (up to 10) to be printed. This number can be equal to the number of text files prepared (10 in the first example, 4 in the second) or smaller (in such a case only the given number of texts is printed and the other text files are ignored). When you give the number of texts and confirm, the **Short text name (3ch)** message is displayed.

3. Give the fixed (3-character) part of the text file names (TXT in the first example, A in the second).

From that moment printing starts. Each successive text is printed after a photo-detector signal is received, equal to the numbers of times set in the **Text rpt.** print parameter is (see the paragraph entitled *Modifying Print Parameters*). When the last text is printed out, printing continues from the first text.

---

[6] This does not apply to the **EBS-6500** printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).

Examples

Below there are examples of text sequences, which can be used for text-change printing:

➢ *Example 1*: **TXT1**, **TXT2**, **TXT3**, **TXT4**, **TXT5**, **TXT6**, **TXT7**, **TXT8**, **TXT9**, **TXT0** – 10 successive text files (the fixed part of the name is **TXT**),

➢ *Example 2*: **A1**, **A2**, **A3**, **A4** – 4 successive text files (the fixed part is **A**).

Parameters for text-exchange printing:

Text rpt. (a print parameter):   **2**,

Texts No. (1-10):   **6**,

Short text name (3ch): **TXT**.

After the **PRINT & TXT CHANGE** command has been chosen, the following texts are printed (following successive signals from the photo-detector): TXT1, TXT1, TXT2, TXT2, TXT3, TXT3, TXT4, TXT4, TXT5, TXT5, TXT6, TXT6, TXT1, TXT1, TXT2, TXT2, etc.

> **NOTE:**
> - If there are no text files in the library or the text file names are incorrect, the **PRINT & TXT CHANGE** command is followed by the **TEXT NAME DOES NOT EXIST** message. Appropriate text files should be created.
> - If the indices of successive text files are incorrect, the **TXT CHANGE ERROR** message appear during printing. Text files should be added.
> - When the **PRINT & TXT CHANGE** command is used, messages similar to those following the **START PRINT** command can be displayed - see the paragraph entitled ***Starting Printing***.
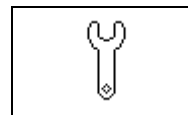
4.6.4.   Service commands

The **SERVICE** menu branch contains the commands that are needed for maintaining the unit. They mostly concern servicing the ink system and the head.

Service Mode

SERVICE   ⬅➡

To switch the printer to a special service mode (the ***service*** mode), where any phasing error is ignored. This mode enables service operations to be carried out within the head and it is marked with a letter "v" in the status window (see section ***4.11 Print Head Status***). In addition, the correction of the time of flight with pressure (the ***ToF*** correction) is turned off in the service mode.

The **STOP PRINTING** command (in the **PRINTING** menu) makes the printer exit the ***service*** mode and enables the indication of alarms if a phasing error occurs.

Drawing Ink/Solvent

CLEAN NOZZLE   ⬅➡
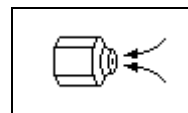
This command is used to clean the nozzle by drawing ink from the nozzle and the gun (for about 2 seconds). Then the system returns to its previous condition. The green LED indicator **V1** on

the inner panel emits light during the operation, and the green LED above the 🔵**INK ON/OFF** key on the operation panel blinks. The **CLEAN NOZZLE** command should be used, if the ink jet fails to reach the gutter after the ink flow has been enabled or if the nozzle has clogged during operation. After the command has been executed, the printer switches to the ***restart*** mode for about 1 minute (see section ***4.11 Print Head Status***).

> **NOTE:**
> The command is not executed during printing.

Closing and Opening Ink Valve

The **V0** valve enables/disables ink to flow towards the head. The valve open and close commands are used to clean the nozzle (see subsection *6.1.4 Cleaning the Nozzle*) or ink filter in the head (see section *6.1.5 Replacing Ink Filter in the Head*). The commands do not cause ink to be drawn from the nozzle and the gun and therefore any impurities gathered on the ink filter or in the nozzle are not sucked back.

Closing the V0 Valve

V0 OFF ⟷ no icon is available in the graphic menu

This valve can also be closed with the [INK ON/OFF] terminal key but in such a case a short suction of ink from the gun takes place after the valve has been closed. While the flow of ink in the head is being stopped, the green LED above the [INK ON/OFF] key on the operation panel blinks.

When the flow of ink is stopped, the following warning message is displayed:
IN 15 MIN. THE INK STREAM
HAS TO BE ON !! and it is accompanied by short audible signals.

The objective is to warn the printer operator that the **V0** valve has been closed. If the **V0** valve remains closed for too long, the gun may dry up and the nozzle may get clogged or even the entire ink system may dry up. If the flow of ink is not turned on during the indicated period, the frequency of audible signals becomes higher and another warning message is displayed:
OPEN V0 OR THE PRINTER
WILL BE SWITCHED OFF IN 1 MIN !!

The warning message can be cleared only by opening the **V0** valve. If this message is ignored, the printer switches off automatically and <u>the head is not rinsed</u>.

Opening the V0 Valve

V0 ON ⟷ no icon is available in the graphic menu

This command is used exclusively for service purposes, and it follows the **V0 OFF** command. After the **V0 ON** command has been executed, the printer remains in the *restart* mode for about 1 minute (see section *4.11 Print Head Status*). This valve can also be opened with the [INK ON/OFF] terminal key.

While the flow of ink in the head is being started, the green LED above the [INK ON/OFF] key on the operation panel blinks.

> **NOTE:**
> The **V0 OFF** and **V0 ON** commands are ignored during printing.

Turning Head off Quickly

FAST OFF ⟷
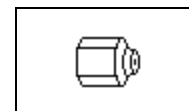
This command is used for quick-turning off the head without rinsing. It is effective when the ink or solvent flow inside the head is turned on. The command causes ink/solvent to be drawn from the nozzle and the gun (for about 2 seconds) and the **V0** ink valve or the **V6, V8** solvent valves are closed and the ink pressure in the ink system is released. While the command is being executed, the green LED above the [INK ON/OFF] key on the operation panel blinks. After the command has been executed, the printer switches to the *restart* mode (see section *4.11 Print Head Status*).

This command can be applied in the following situations:

- when the head stops working after the printer has been turned on (before ink is supplied to the head); the command should be used immediately after the printer has been turned on,
- in order to suppress temporarily (for a few minutes) the flow of ink or solvent to the head (to perform a service operation, for example).

> **NOTE:**
> - The command can be executed safely many times with no risk of thinning the ink.
> - The command is ignored during printing.
> - The execution of the **FAST OFF** command involves the same messages as the execution of the **V0 OFF** command.

Turning Ink Flow on

INK ON
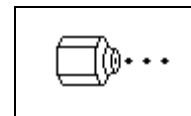
The command enables ink to flow in the head after one of the following commands: **FAST OFF**, **INK OFF**, **SOLVENT**. While the command is being executed, the green LED above the [INK ON/OFF] key on the operation panel blinks. After the command has been executed, the printer switches to the *restart* mode for about 2 minutes (see section *4.11 Print Head Status*).

> **NOTE:**
> The command is ignored during printing.

Turning Head off

INK OFF   no icon is available in the graphic menu

This command is used to turn the head off completely. The complete turning off consists of giving the pipes, gun and nozzles a thorough rinse (as during the switch off procedure) and of isolating the head from the ink system and electronic printing system and of the reduction of pressure in the ink system. While command is being executed, the green LED above the [INK ON/OFF] key on the operation panel blinks. After the command has been executed the printer switches to the *restart* mode (see section *4.11 Print Head Status*).

> **NOTE:**
> - If the flow of solvent is turned on, the command operates in a simplified way, as the **FAST OFF** command does.
> - The **INK OFF** command must not be executed many times over a short period. Otherwise the ink is thinned excessively. The command should not be executed more frequently than every 2 working hours.
> - The command is ignored during printing.

Turning Flow of Solvent On

SOLVENT   no icon is available in the graphic menu

The command enables solvent to flow to the head. When it is executed, the green **V6** LED, and after the appropriate pressure has been set - also LED **V8,** on the inner panel start glowing, and also the green LED above the [INK ON/OFF] key on the operation panel blinks. The following commands can be executed when the flow of solvent to the head is enabled: **CLEAN NOZZLE**, **FAST OFF** (this applies to solvent), **INK ON** (to stop solvent flowing and start ink flowing). After the command has been executed the printer switches to the *restart* mode (see section *4.11 Print Head Status*).

> **NOTE:**
> • The command is ignored during printing.
> • In order not to let the printer's ink system overflow or ink in the system dilute excessively, the time for execution of the command is limited to about 20 seconds.

Adjusting Ink Jet Path

SET INK STREAM
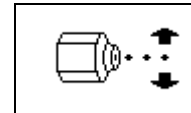
The command is used for adjusting the flow of ink in the gutter. This is a service command to be carried out by trained staff only. A precise description is given in subsection *6.2.2 Adjusting Ink Jet Path*.

Synchronization of a Stroboscope

STROBOSCOPE   no icon is available in the graphic menu

This is a stroboscope handling menu. The stroboscope can be switched over so that it flashes at a drop break frequency (to ensure so-called dot-based synchronization) or at a row print frequency (to ensure so-called row-based synchronization). The description of how to connect a microscope equipped with a stroboscope to the printer is given in subsection *6.2.1 Connecting Stroboscope*.

Monitoring the Printer's Basic Parameters

HV VALUE,PHOTO,SHAFT state
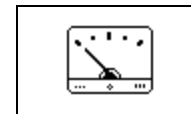
The following printer operation conditions can be reviewed:
➢ Value of high voltage ("**HV**") (it is different than 0.00 only during printing),
➢ State of the photo detector,
➢ State of the shaft-encoder,
➢ Pressure ("**p**") of ink in the ink system,
➢ Value of the negative pressure (vacuum "**v**") in the ink system,
➢ Marker ("**ac**") confirming that the head position correction procedure has been followed,
➢ time (given as a number of hours) over which the printer was off just before it is switched on ("**PrOFF**"),
➢ Information on the correction of the time of flight ("**ToF(intake)**", "**ToF(p100%)**"),
➢ Information on temperatures in the electronic compartment ("**Ts**") and in the head ("**Th**").

This is a service command designed for diagnosing certain damages which result in a poor print quality and high voltage errors.

Viewing Routine Inspection Date

**SERVICE COMMANDS/
DISP. NEXT SERVICE VISIT DATE**   no icon is available in the graphic menu

This command is used for viewing information on the next routine inspection. When the routine inspection date passes, a message of reminder is displayed each time the printer is switched on.

Defining Conveyor Travel Speed

**SERVICE COMMANDS/
CONVEYOR MEASUREMENTS**
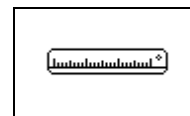
The command is designed for measuring the conveyor travel speed and the number of pulses generated by the shaft-encoder.

In order to measure how fast a conveyor travels you need to place two objects on the conveyor at a distance of <u>one meter</u> (**1m**) from each other and let them move in front of a photo-detector while the **CONVEYOR MEASUREMENTS** command is active.

The results of measurements of the following parameters are displayed on the terminal:
➥ Travel speed (a number of meters/minute [**m/min**]) at which objects move in front of the print head. The figure can be utilized directly or used to determine the setting for the **Cnv spd m/min** print parameter.
➥ Number of pulses generated by the external encoder per distance unit (pulses/ meter, **p/m**). It is called the encoder constant. The figure can be utilized directly or used to determine the setting for the **Enc const p/m** print parameter.

> **NOTE:**
> - In order to determine the encoder constant properly, the **Generator** print parameter needs to be set to **SHAFT** and the encoder axle needs to rotate while a measurement is taken.
> - If the **Generator** print parameter is set to **GEN**, the encoder constant is 0 (zero).
> - Objects can be placed on the conveyor at smaller or greater a distance than 1 m. Then the figure displayed on the terminal needs to be divided by a multiple of 1 meter. For example, if the distance between the objects is 0.2 m, then the resulting encoder constant is five times greater than that indicated on the terminal.

Switching the Printer off and Rinsing Valve V3

**SERVICE COMMANDS/
SWITCH OFF WITH V3 WASH**   no icon is available in the graphic menu

This command initiates the procedure for switching the printer off complete with additional rinsing of valve **V3**. It is used to prepare the printer for carriage – a precise description is given in section **8.2 Transporting the Printer.**

Replacing the iModule®

**SERVICE COMMANDS/
iMODULE REPLACEMENT**

This command initiates the procedure replacing an iModule® – a precise description is given in sub-section **6.1.2 Replacing iModule®.**

Switching the Printer off and Ink Thickening

**SERVICE COMMANDS/
THICKEN THE INK & SWITCH OFF**   no icon is available in the graphic menu

A special printer-switching off mode mostly designed for printers where ethanol-based ink is used. It can also be used with printers where other types of ink are used each time when the viscosity of the ink in the ink system is too low.

> **NOTE:**
> Switching off and ink thickening at the same time may take much longer than switching off in regular mode (even 1 hour).

Other Commands

OTHERS ⟵⟶ no icon is available in the graphic menu

This command offers access - after the service password has been given - to an extended list of service commands.

4.6.5.   Auxiliary Commands

The other commands that are not directly related to the handling of text files and parameter blocks, printing, printer maintenance or the servicing of the Ink Monitoring System are collected in the **AUX. COMMANDS** menu. Most of such auxiliary commands are described in this section. Except for them, the **AUX. COMMANDS** menu branch contains the **DANGER - MANUFACTURER USE ONLY** and **SOFTWARE OPTIONS** commands, which are service or diagnostic/service commands to be used by trained staff only.

Viewing System Information

OPTIONS ⟵⟶
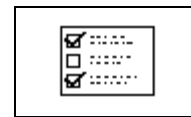
This command is designed for viewing information on the printer, its parameters and control program versions.

Accessing Alarm Messages

DISPLAY ERRORS ⟵⟶ no icon is available in the graphic menu

This command is designed for displaying successive error messages except for those deleted with the **CLEAR ALARM** key or the **CLEAR ERRORS** command. Successive messages are displayed with the **ENTER** icon.

Clearing Alarms

CLEAR ALARM | **CLEAR ERRORS** ⟵⟶ no icon is available in the graphic menu

This command is designed for clearing error alerts, *i.e.* messages and audible and light signals.

The command should not be executed until the reason for an alert is assessed. The **CLEAR ALARM** key on the printer panel is equivalent to this command.

Accessing Error Reports

READ ERRORS REPORT ⟵⟶
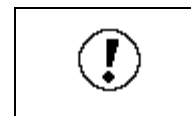
This is a service command designed for displaying history (report) of errors that are signaled with an alarm as well as the types, the time and the number of occurrences of such errors. A precise description of an error report is given in a separate document.

Telling the Current Time and Date

TIME AND DATE

This command is designed for telling the current date and time by the printer's real time clock. These parameters can be modified with the **SET TIME AND DATE** command from the **SERVICE** menu (after the service password has been given). Please note however that the date must not be turned back as otherwise the possibility of switching the printer on is disabled.

Viewing Printer Run Time

ACTIVITY TIME

This command is designed for viewing the total printer run time and the time that remains till the end of a time limit, if any, assigned to the printer.

Selecting a Language

LANGUAGE
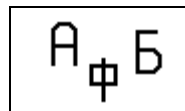
This command is designed for choosing a language in which the control MENU and all messages are to be displayed.

If you have selected a language that you do not understand, you can set the printer back to the **ENGLISH** language by pressing the following key sequence on the terminal: (ESC)(ESC)(ESC)(ESC)(ESC) **5** (ENTER) **7** (ENTER), then select the language you require and confirm the selection.

Releasing Protections

UNLOCK PROTECTION

This command is designed for releasing printer protections such as a time limit assigned to the user by a distributor or the manufacturer, or for enabling the printer in the event the user forgot the password that they used to secure certain MENU branches. In order to release a protection you should contact your distributor and tell them the code obtained with the command (and also the type of protection to be released). The return code obtained from the distributor should be input in the command window but you <u>must not exit the command</u>. Otherwise the code becomes invalid. After ten unsuccessful attempts the **Switch the PRINTER off and on** message is displayed and the protection remains active. If the correct code is input, the **OK** message is displayed and the protection is released.

Touch Screen Calibration

TOUCHSCREEN CALIBRATION   no icon is available in the graphic menu

This is a service command designed for calibrating a touch panel. It should be used in the situation when the touch panel does not work or malfunctions. A bluntly tipped tool should be used to calibrate the panel by pressing the points that appear successively on the screen.

Printer switching on/off report

| STANDBY LOG | ⬅➡ | no icon is available in the graphic menu |

The report containing the date and the time of ten latest switching-off and switching-on events for the printer. With the command you can also get the information about whether the printer has been switched off in regular mode (no additional signaling) or not ("**Z**" – switching off due to a power failure, "**P**" – switching off without rinsing).

4.6.6. Consumables

transponders
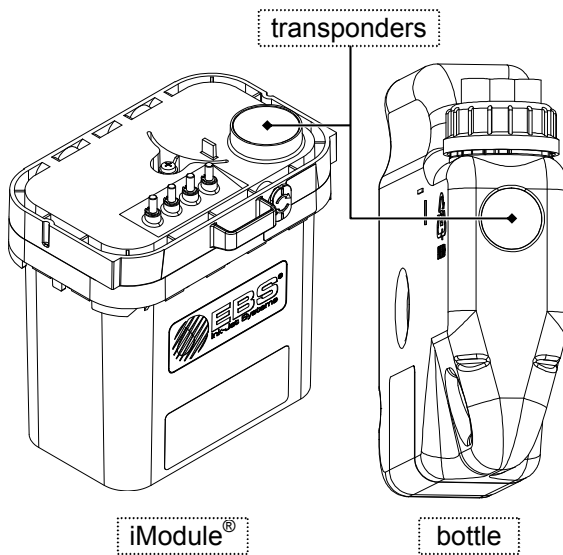
iModule®   bottle

Fig. 4.6.6.1

Bottles of ink or solvent and iModule® are equipped with transponders (an electronic circuit where bottle identification data is stored and can be accessed with no need for wire contact). The information is scanned from the transponder with a built-in **I**nk **M**onitoring **S**ystem (the abbreviation **IMS** will be used hereinafter) that uses three aerials.

The **I**nk **M**onitoring **S**ystem ensures that:
1) The bottles and the iModule® are identified explicitly.
2) The printer is checked for appropriate ink (solvent) and iModule®. It prevents the application by mistake of ink (solvent) that is different from that originally used in the printer's ink system. The type and service life of the consumable are checked.
3) Ink, solvent and iModule® distribution and monitoring are improved as the information is coded and validated electronically in every transponder.

The **CONSUMABLES** menu contains the commands that relate to the handling of the Ink Monitoring System, including the obtaining of information about ink and solvent bottles installed in the printer and about the iModule® installed. The commands are divided into the following groups:
➢ information about the bottles that are installed in the printer - in the **BOTTLE INFORMATION** menu,
➢ information about the iModule® installed in the printer – in the **iMODULE INFORMATION** menu,
➢ information about the Ink Monitoring System – the **IMS VERSION** command.

Information about Bottles

This menu contains information about the bottles that are installed in the printer. It consists of the following commands:

| OPERATING TIME | ⬅➡ | 📅⬛◇ |

The command enables a user to view the following parameters:
➢ **INK: Expiry date** – the date by which the ink can be used. If the ink is past the expiry date, an alarm sounds. Printing is disabled from the moment when the alarm occurs to the moment when the bottle is replaced. Successful verification requires that the current date be set correctly in the printer.
➢ **SOLVENT: Operating time** – the time remaining to the end of the limit that is put on a given bottle of solvent. If the limit is exceeded, the printer behaves as if the solvent in the bottle was used up.

For a given bottle of solvent, the **OPERATING TIME** command can show additional information that impacts on the consumption of solvent, such as:
- the information on the temperature at which the bottle currently installed is used (**Tav** – the average temperature, **Lo** – the lowest temperature, **Hi** – the highest temperature),
- the information on the temperature at which the bottle installed previously was used (**Tav** – the average temperature, **Lo** – the lowest temperature, **Hi** – the highest temperature),
- how long the bottled installed previously was in use (**LastSol**).

> **NOTE:**
> - **After the date has been set back, all bottles are ignored**! No validation or printing can be resumed until the proper date is set in the printer.
> - Do not set the date ahead because any subsequent attempt to set the proper date will be recognized as setting back with the above mentioned consequences.

REMOVE PROTECT TIME

A service function (protected by a password), which removes the protection time setting put on bottles (solvent and ink are not subject to control).

PRINTER/INK/SOLV. TYPE   no icon is available in the graphic menu

This is a diagnostic command designed for gaining information about the bottles that are subject to testing and verification by the Ink Monitoring System.

No. OF TXT/1l
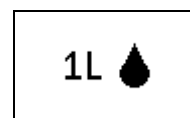
This command is designed for viewing an estimated number of (current) texts that can be printed with the application of 1 liter of ink. The printer must be in the *print* state while this command is being executed. It should be noted that the print parameters of impact on ink consumption, such as **Char. set**, **Typeface**, **Row repetit.** should be set correctly.

DIAGNOSTICS   no icon is available in the graphic menu

This a service command designed for displaying data on the quality of transponders (the information on the results of verification of either of the bottle transponders is displayed on an on-going basis).

Information about iModule®

This menu contains information on the iModule® installed in the printer. It consists of the following commands:
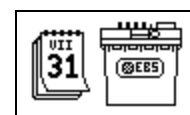
OPERATING TIME

The command enables a user to view the following parameters:
➢ **Operating time** – the number of hours a given iModule® is designed to run from its installation in the printer to the end of the limit put on the module. Before the time limit expires the module must be replaced (see subsection *6.1.2 Replacing iModule®*). Otherwise an alarm occurs (the **iModule run time expired** message is displayed) and printing is disabled. The information about the need to replace the iModule® appears on the printer display after 90% of the time limit put on the module has expired (but not later than 300 h before the end of the limit) and it is repeated at regular intervals.
The iModules® whose run time limit is **4000** hours, **6000** hours or **8000** hours are available.
➢ **Expiry date** – the expiry date for the printer's iModule®. Before the expiry date expires the module must be replaced (see subsection *6.1.2 Replacing iModule®*). Otherwise an alarm occurs (the **iModule validity date expired** message is displayed) and printing is disabled. Successful

verification requires that the current date be set correctly in the printer. The information about the need to replace the iModule® appears on the printer display a month before the expiry date comes and it is repeated at regular intervals.

As standard, every iModule® is valid for **18 months** from installation in a printer.

➢ **Shelf life** – the use-by date for the printer's iModule®. A new iModule® must be installed in the printer before it is past its use-by date. Otherwise an alarm occurs (the **iModule shelf life expired** message is displayed) if an attempt to install such a module is made.

The command also gives the information on how many times the module has been removed from the printer (item **"C"**).

NOTE:
- **When the date is set back, the iModule® is ignored!** The module cannot be monitored and printing started until the correct date is set in the printer.
- The date must not be set forward as resetting it to the correct date at a later time will be considered as setting it back, with all the consequences described above.

| **REMOVE PROTECT TIME** | ⟵⟶ | no icon is available in the graphic menu |

A service function (protected by a password), which removes the protection time setting put on the iModule® (the iModule® transponder is not subject to control).

| **iMODULE TYPE** | ⟵⟶ | no icon is available in the graphic menu |

This is a diagnostic command designed for gaining iModule® information that is subject to testing and verification by the Ink Monitoring System.

| **DIAGNOSTICS** | ⟵⟶ | no icon is available in the graphic menu |

This is a service function designed for displaying data on the quality of the iModule® transponder (the information on the results of verification of the transponder is displayed on an on-going basis).

Information about Ink Monitoring System

| **IMS VERSION** | ⟵⟶ | no icon is available in the graphic menu |

This command is designed for viewing the version of the program the Ink Monitoring System is equipped with.

4.7. Word Processor
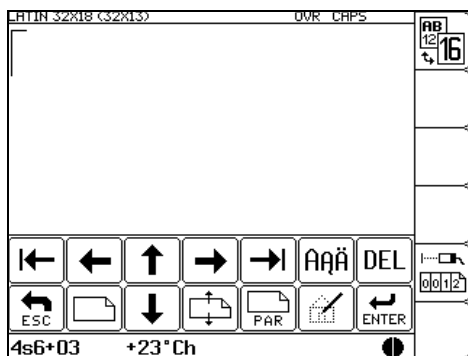
A word processor is an indispensable tool for creating a new text file or editing an existing file. It can be activated by the following commands:
➢ **CREATE NEW TEXT**,
➢ **TEXT EDITION**,
➢ **COPY & EDIT** and also
➢ **EDIT & PRINT CURRENT TEXT**.

The processor enables the user to create/edit **simple** text files (such as **a string of ASCII characters**, **graphics**, a **bar code**, **another text file called by name**) and **complex** files (consisting of several simple or complex text files).

Key	Icon	Function
⇦ ⇨ ⇧ ⇩	← → ↑ ↓	To navigate within a given subfile or between subfiles.

Key	Icon	Function
SHIFT ⟸⟹	⏮ ⏭	To move the cursor to the first or to the last character in an ASCII subfile.

NOTE:
A touch panel can also be used to set the cursor in the right position within a text being edited. You just need to indicate any place (in any subtext) and the cursor sets in the right position at once.

Key	Icon	Function
SHIFT ⇧⇩	↑ ↓	To move the entire subfile by one dot upwards or downwards (allowing for the limitations imposed by the text profile chosen – see section **4.7.1 Text Profiles**).
CTRL ⟸⟹⇧⇩	← → ↑ ↓	To create a new subfile in a given position in relation to the current subfile (allowing for the limitations imposed by the text profile chosen – see section **4.7.1 Text Profiles**).
INS	not available	To switch between two character insertion modes: INSert/OveRwrite.
DEL	DEL	To delete a character at the cursor position in a subfile (if the subfile is of the *ASCII character string* type). The key/icon can also be used to delete a *bar code*, *graphics* or *text name*-type subtext but the use of subtexts of such types requires an additional confirmation.
ALT	AĄÄ	To switch between national characters on the keypad. The selection is indicated in the terminal status window, for example:

German characters
indication: **K:GER**

ä	a
ö	o
ß	s
ü	u
Ä	A
Ö	O
ß	S
Ü	U

Polish characters
indication: **K:POL**

ąĄ	aA
ćĆ	cC
ęĘ	eE
łŁ	lL
ńŃ	nN
óÓ	oO
śŚ	sS
żŻ	zZ
źŹ	xX

Key	Icon	Function
PAR	PAR	To edit (modify) parameters of a subfile and to change the subfile type. A description of the text parameters is given in subsection **4.7.2 Types of Subfiles**.
CTRL **DEL**	not available	To delete the entire subfile (irrespective of the type of subfile).
CTRL **ENTER**	✎	To edit a graphics subfile (by opening the graphics processor).
ESC	↰ ESC	To cancel modifications made to a current text.
ENTER	↵ ENTER	To indicate the end of editing (save the file in the library).
F1	AB12↕16	The information on the current profile of the text being processed and the possibility of changing the profile as well. – see section **4.7.1 Text Profiles**.
CTRL **Q**	not available	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.

Tab. 4.7.1

Notes on Creating Text Files with Word Processor

While a text file is being created/edited with the word processor, attention should be paid not only to the height of characters used, but also to the position of the text in the processor window (and thereby in the reach of a character generator matrix). **Fig. 4.7.1** shows the relationship between the position of a text in the processor window and a character generator used for printing.

Text ❶, 5 dots in height, is placed in the highest possible position. You can see that it falls into the reach of a 5-dot high character generator and a generator of characters of that height will be chosen for printing (that can be seen in the printer status window as **05pix** during printing). This is the optimal choice for the given text as it ensures the best quality at the maximum print rate. If the text is shifted downwards, it extends beyond the reach of a 5-dot high character generator and another generator needs to be chosen - depending on the position of the text. Text ❷ will be printed with a 7-dot high character generator (**07pix** will be displayed in the printer status window), whereas text ❸ - with a generator of characters as much as 32 dots in height (**32pix** will be displayed in the printer status window). In the case of the two last texts, any print rate limitations result from the limitations of the character generator chosen (see **Tab. 4.12.6.1** and **Tab. 4.12.6.2**).

The selection of the appropriate text height and the proper location of a text in the processor window (and thereby in the character generator matrix) need careful attention. Therefore the so called *text profiles* have been introduced to support the user while a text file is created. For more information on text profiles refer to section **4.7.1 Text Profiles**.
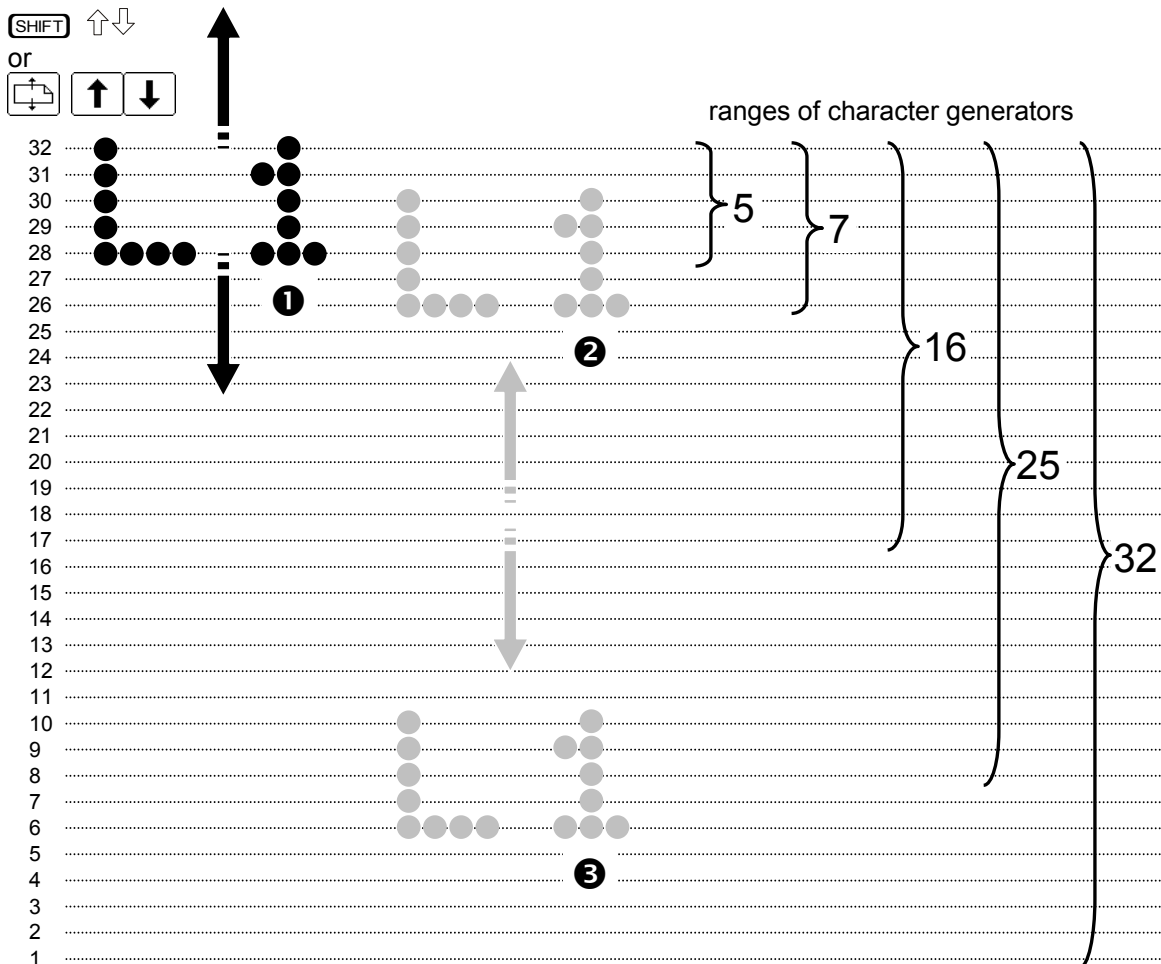
Fig. 4.7.1

4.7.1. Text Profiles

Text profiles[7], which form a vital component of the text processor, play the following roles:
- ➢ Simplify the editing of text files with the text processor,
- ➢ Adjust the processor to the text configuration required,
- ➢ Enable the optimum quality of outprints to be obtained,
- ➢ Enable multi-line texts to be printed at higher printing speeds.

A list of text profiles appears in the working window of the display while a new text file is being created. It is also available when you choose the ▦ icon (or the F1 key) in your text editor (see section **4.7 Word Processor**) where the active profile is additionally highlighted. The following text profiles are available:

- ➢ **max height 5 dots**,
- ➢ **max height 7 dots**,
- ➢ **max height 7 dots**,
- ➢ **max height 11 dots**,
- ➢ **max height 16 dots**,
- ➢ **max height 25 dots**,
- ➢ **max height 32 dots**,

General application profiles - to edit one-line or multi-line texts and also composite texts (i.e. any combination of subfiles, also those with limited heights).

- ➢ **2 lines x 7 dots**,
- ➢ **3 lines x 7 dots**,
- ➢ **4 lines x 7 dots**,
- ➢ **2 lines x 11 dots**.

Multi-line profiles – to edit multi-line texts.

Selection of Appropriate Text Profile

The selection of an appropriate profile for a text to be edited is very important as it results in certain restrictions on text edition and also impacts on the maximum printing speed.

In view of the text-processing conditions, the selection of the highest profile for a given printer from the group of *general application profiles* seems to be most convenient (see section **4.7.1 Text Profiles**). Such a selection enables the user to create one-line, multi-line or composite texts freely. The selection is however not optimal as it does not allow as high as possible printing speeds to be achieved. It is recommended that the profile that mostly suits the text file to be edited be chosen. In particular multi-line profiles are recommended for use.

Example 1

A one-line text consisting of **5** and **7**-dot-high subtexts is created.

Recommended profile ⇨ **max height 7 dots**.

The selection of the above profile results in the following:
- ➢ the fonts available in the processor are not more than 7 dots high,
- ➢ the maximum available height of a graphical image or a barcode is 7 dots,
- ➢ the text can be shifted in the vertical direction only within the one-line area (in this case only a 5-dot text can be shifted as a 7-dot text occupies the entire line span available),
- ➢ no text that is higher than 7 dots can be called (by name).
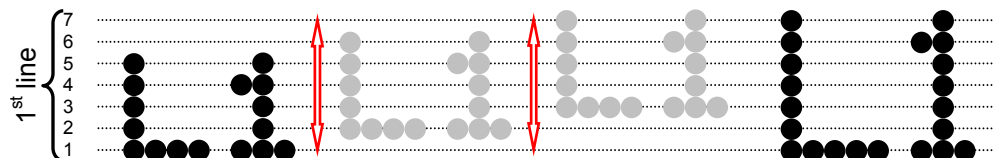
Fig. 4.7.1.1

---

[7] Text profiles are introduced to the printers on which the main control program version **29_0A** is installed.

> **NOTE:**
> If it appears during editing that only 5-dot-high subtexts are used, a change of the profile to **max height 5 dots** is recommended. Owing to that higher printing speeds can be obtained - see the paragraph entitled ***Changing Text Profile***.

(!)

Example 2

A <u>3-line</u> text is created, each line consisting of **5** or **7**-dot-high subtexts.

Recommended profile ⇨ **3 lines x 7 dots**.

The selection of the above profile results in the following:
➢ the fonts available in the processor are <u>not more</u> than 7 dots high,
➢ the maximum available height of a graphical image or a barcode is 7 dots,
➢ the text can be shifted in the vertical direction only within the one-line area (in this case only a 5-dot text can be shifted as a 7-dot text occupies the entire line span available) – an attempt to shift a subtext beyond the line span causes the subtext to be shifted to the previous/next line,
➢ no text that is higher than 7 dots can be called (by name),
➢ none of the prohibited rows (rows numbered 8, 9, 17, 18 – see ***Fig. 4.7.1.2***) can be used.

shifting the subtext within the line span

The subtext is automatically shifted to the following line
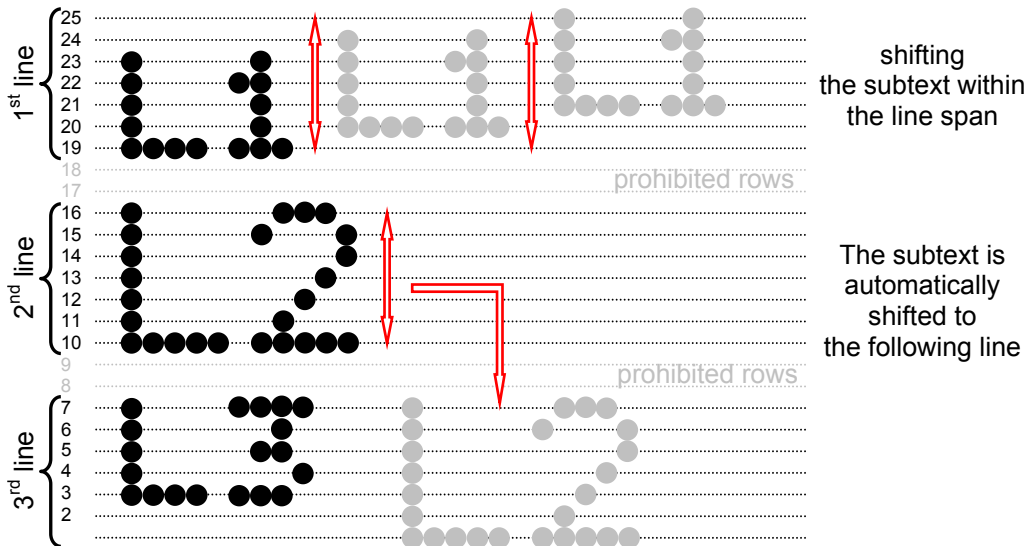
Fig. 4.7.1.2

Example 3

A <u>composite</u> text consisting of one **16**-dot-high subtext (*e.g.* a barcode) and two lines, each containing **5** or **7**-dot-high subtexts is created.

Recommended profile ⇨ **max height 16 dots**.

The selection of the above profile results in the following:
➢ the fonts available in the processor are <u>not more</u> than **16** dots high,
➢ the maximum available height of a graphical image or a barcode is **16** dots,
➢ the text can be shifted in the vertical direction within the span of all 16 lines (in this case the texts that are lower than 16 dots can be shifted as a 16-dot text occupies the entire height available),
➢ no text that is higher than 16 dots can be called (by name).
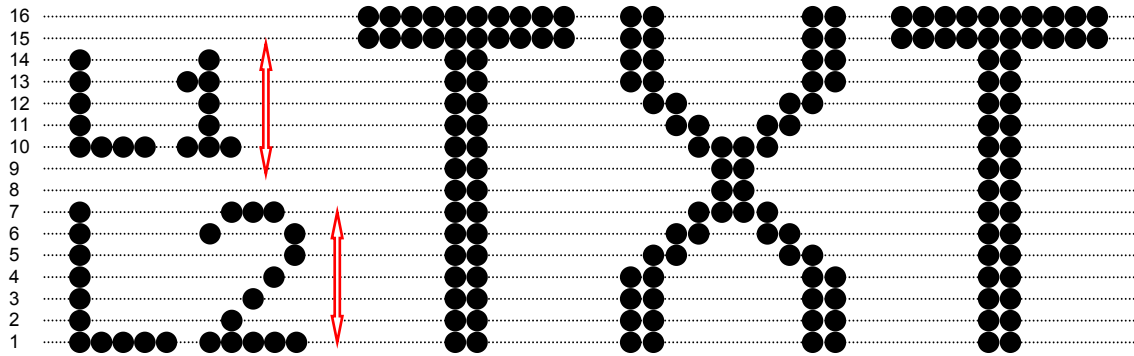
Fig. 4.7.1.3

> **NOTE:**
> ➢ If a multi-line text is to be edited it is recommended that multi-line profiles are used instead of *general application profiles* (although the latter can also be used to edit multi-line texts). The application of multi-line profiles enables the user to make overprints at higher speeds.
> ➢ For more examples of how to use the profiles refer to section *5 Examples of How to Operate the Printer* and the paragraph entitled *Examples of Printouts for Various Modes of Printing* in section *4.12.6 Maximum Print Rate vs. Resolution*.

Changing Text Profile

The selection of a text profile before the text is edited results in the need to observe the profile-related restrictions while editing (see the paragraph entitled *Selection of Appropriate Text Profile*). Therefore there is no option of creating a text that does not meet the requirements of the selected profile. Such a situation can be faced only while a new text is created (with the **CREATE NEW TEXT** command in the **TEXT SERVICE** menu).

While an existing text is edited (with the **TEXT EDITION**, **COPY & EDIT** commands in the **TEXT SERVICE** menu and the **EDIT & PRINT CURRENT TEXT** command in the **PRINTING** menu) there is an option of changing the text profile (the active text profile is displayed by default).

You can use the ⬛ icon (or the **F1** key) in the function icon window to change the profile (see *4.7 Word Processor*). The option involves the risk that the text whose contents met the requirements of the previous profile does not meet the requirements of a newly selected profile. In such a case you need to edit the text so that it meets the profile requirements. Otherwise, every attempt to save the text results in the following message displaying:
**Character generator too high
or incorrect vertical position
of subtext.
Press ENTER...**
when a subtext partly goes beyond the area that is permitted for a given text profile or
**Correct unacceptable
vertical position of subtext.
Press ENTER...**
when a subtext entirely goes beyond the area that is permitted for a given text profile.

> **NOTE:**
> If a subtext entirely goes beyond the profile-permitted area, its parameters cannot be edited. It can only be removed or shifted so that it falls into the permitted area. No text parameters can be modified until the position of the subtext is rectified; if that is done, the profile-related font can be chosen, for example.

Example

This example uses the text (see *Fig. 4.7.1.3*) that was created in *Example 3* in the paragraph *Selection of Appropriate Text Profile*.
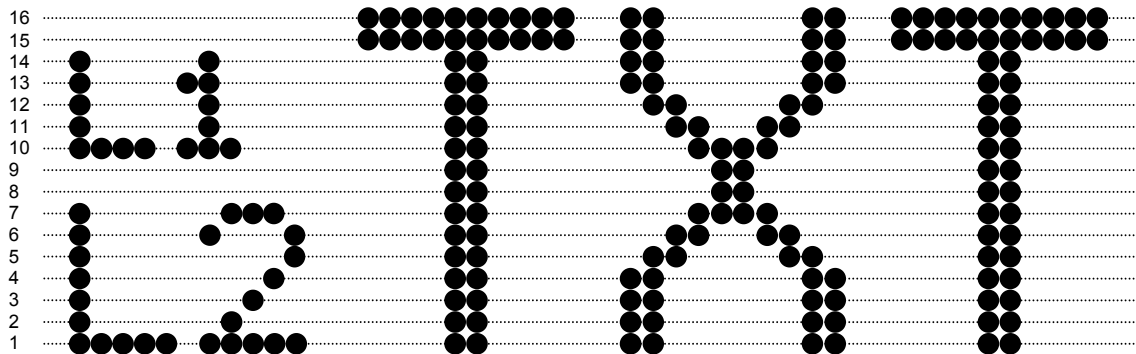
Fig. 4.7.1.4

The text was created with the **max height 16 dots** profile and met that profile's requirements.

After edition, the above mentioned text is to consist of 2 lines, each line containing **5** or **7**-dot-high subtexts.

Recommended change of profile: **max height 16 dots ⇨ 2 lines x 7 dots**.

The selection of the above profile results in the following:
➢ the fonts available in the processor are not more than 7 dots high,
➢ the maximum available height of a graphical image or a barcode is 7 dots,
➢ the text can be shifted in the vertical direction only within the given-line area (in this case only a 5-dot text can be shifted as a 7-dot text occupies the entire line span available) – an attempt to shift a subtext beyond the line span causes the subtext to be shifted to the previous/next line,
➢ no text that is higher than 7 dots can be called (by name),
➢ none of the prohibited rows (rows numbered 8, 9 - see *Fig. 4.7.1.5*) can be used.
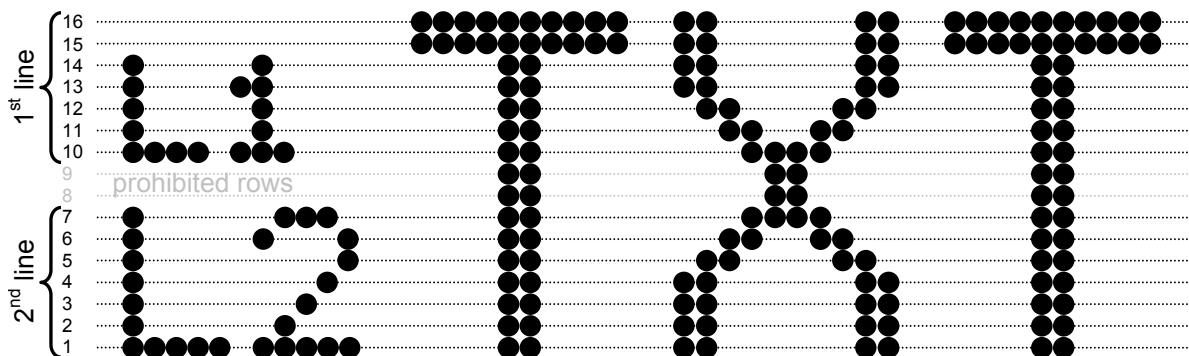
Fig. 4.7.1.5

The text shown in *Fig. 4.7.1.5* does not meet the **2 lines x 7 dots** profile's requirements as:
➢ one of the subtexts (*TXT*) is higher than 7 dots - it should be removed (see *Fig. 4.7.1.7*) or its height should be adjusted (see *Fig. 4.7.1.6*) by selecting one of the available fonts whose height is not greater than 7 dots,
➢ one of the subtexts (*TXT*) is located beyond the restricting lines (in the prohibited row area) – after its height has been modified (that is after one of the fonts with not greater a height than 7 dots has been chosen) it will be automatically shifted to the closest line (see *Fig. 4.7.1.6*).
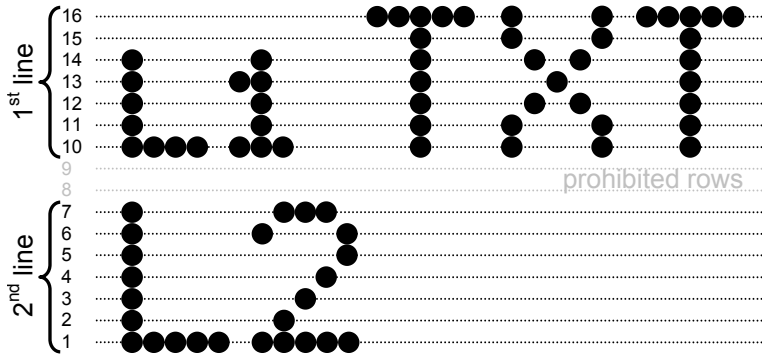
Fig. 4.7.1.6
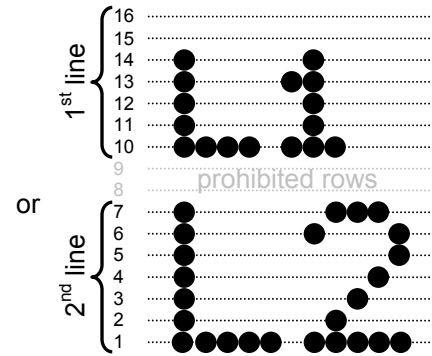
Fig. 4.7.1.7

4.7.2.   Types of Subfiles

Files can be divided into two groups:
➥ **simple text files**,
➥ **complex text files**.

The simple text files include the following types of text:
➥ **a string of ASCII characters**,
➥ **a graphical image**,
➥ **a bar code**
➥ **a subfile** (another text called by its name).

In every case you can create a complex text file from the very beginning or merge text files (hereinafter called **subfiles**) that already exist in the library (merging by name). A file created by merging may be used as part of another file.

While a new text file is being established, the processor sets the type of subfile to **a string of ASCII characters** with a given profile's maximum height by default. In order to change the type of subfile

and other parameters you should press the [PAR] icon. A list of settable parameters varies with the type of subfile chosen.

Subfile Type: Text - ASCII Characters

This type of simple text file (subfile) is a set of alphabetical characters. The standard word processor offers the Latin alphabet as ASCII characters.

The characters are coded with matrices (or character generators), whose examples are given below:

MATRIX (height x width [dots])
EXAMPLE

Latin 5x5
ABCDEFGH1234567abcdef

Latin 7x4
ABCD1234ÄÖßÜÅCEŁNOSZŻØÑäöüąćełńóśżoñ

Latin 7x5
ABCD1234ÄÖßÜÅCEŁNOSZŻØÑäöüąćełńóśżoñ

Latin 9x5
ABCD1234ÄÖßÜÄÇĘŁNOŚŻŻØäöüąćęłńóśżoñ

Latin 9x7
ABCD1234ÄÖßÜÅCEŁNOSZŻØäöÜaćełńóśżoñ

Latin 11x7
ABCD1234ÄÖßÜÅCEŁNOSZŻØäöüącełńóśżoñ

Latin 12x6
ABCD1234ÄÖßÜÄÇĘŁNOSZŻØäöüącęłńóśżoñ

MATRIX (height x width [dots])	
EXAMPLE	📄

Latin 12x7
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØäöüąćęłńóśżøñ

Latin 14x9
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØäöüąćęłńóśżøñ

Latin 16x10
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØÑäöüąćęłńóśżøñ

Latin 16x14
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØäöüąćęłńóśżøñ

Latin 21x15
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØäöüąćęłńóśżøñ

Latin 25x15
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØÑäöüąćęłńóśżøñ

Latin 32x18
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØÑäöüąćęłńóśżøñ

Lat__5x5__
ABCDEFGHIJK1234567890abcdefghijk

Fast Latin 16x9
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØÑäöüąćęłńóśżøñ

Fast Latin 25x15
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØÑäöüąćęłńóśżøñ

Fast Latin 32x18
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØÑäöüąćęłńóśżøñ

Script 32
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØäöüąćęłńóśżøñ

Styl 25x16
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØäöüąćęłńóśżøñ

Styl 32
ABCD1234ÄÖßÜĄĆĘŁŃÓŚŻŹØäöüąćęłńóśżøñ

Arabic EG 7
ه ع ك ل ك ط ض ب ث ش ص ض ٤ ٣ ٢ | ل ك ط ض ه ة ء ص ش س ث ب

Arabic EG 16
ه ع ك ل ك ط ض ب ث ش ص ض ٤ ٣ ٢ | ل ك ط ض ه ة ء ص ش س ث ب

Arab.Dig.7
١٢٣٤٥٦٧٨٩٠

Arab.Dig.9
١٢٣٤٥٦٧٨٩٠

Arab.Dig.16
١٢٣٤٥٦٧٨٩٠

MATRIX (height x width [dots])
EXAMPLE

Arab.Dig.25

١٢٣٤٥٦٧٨٩٠◆

Cyrylic 5x5

ЩГУЦИЯЧИДЛЫФ1234

Cyrylic 7x6

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Cyrylic 9x7

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Cyrylic 12x7

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Cyrylic 12x9

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Cyryl.16x10

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Cyryl.25x19

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Cyrylic 32x24

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Fast Cyrylic 16

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Fast Cyrylic 25

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Fast Cyrylic 32

ЩГУЦИЯЧИДЛЫФ1234йцгшдлыфячи

Spec 7

A B C D E H J M N O P Q T U VW others   ⇦Terminal keys corresponding to the **Spec 7** set of special characters

Spec 16

A B C D E F G H J M N O P Q S T U V W X V \ **others**
⇧Terminal keys corresponding to the **Spec 16** set of special characters⇧

Spec 25

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z \ others
⇧Terminal keys corresponding to the **Spec 25** set of special characters⇧

Fast Spec 16

A B C D E F G H I J K L M N O P **Q R S T U V W X Y Z** \ **others**
⇧Terminal keys corresponding to the **Fast Spec 16** set of special characters⇧

MATRIX (height x width [dots])
EXAMPLE

Fast Spec 25

A   B   C   D   E   F   G   H   I   J   K   L   M   N   O   P   Q   R   S   T   U   V   W   X   Y   Z   \   others
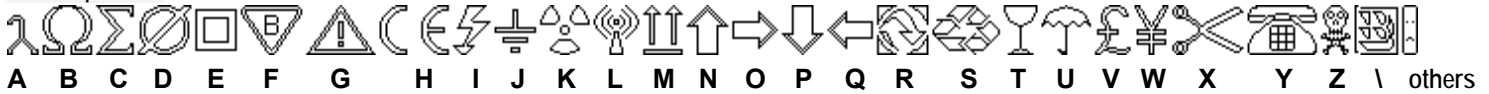
⇧Terminal keys corresponding to the **Fast Spec 25** set of special characters⇧

Tab. 4.7.2.1

When you press the [PAR] icon in the word processor, the parameter menu for a subfile is displayed. The parameters have the following meaning:

Parameter	Description and settings	Default
Type	Subfile Type. Any parameters shown below are typical of a **Text** subfile. sub**Text**, **Graphic**, **Barcode**, **Ins. text**	**Text**
Char. set	Character generators: see the above specified sample character matrices. (the list of character generators available at a given time depends on, among other things, the text profile chosen): **Latin 5x5, Latin 7x4, Latin 7x5, Latin 9x5,** **Latin 9x7, Latin 11x7, Latin 12x6, Latin 12x7,** **Latin 14x9, Latin 16x10, Latin 16x14, Latin 21x15,** **Latin 25x15, Latin 32x18, Fast Latin 16x9,** **Fast Latin 25x15, Fast Latin 32x18** **Lat__5x5__, Styl 25x16, Styl 32, Script 32,** **Cyrylic 32x24, Cyryl.25x19, Cyryl.16x10, Cyrylic 12x9,** **Cyrylic 12x7, Cyrylic 9x7, Cyrylic 7x6, Cyrylic 5x5,** **Fast Cyrylic 16, Fast Cyrylic 25,** **Fast Cyrylic 32, Arab.Dig.25, Arab.Dig.16,** **Arab.Dig.9, Arab.Dig.7, Spec 25, Spec 16,** **Spec 7, Fast Spec 16, Fast Spec 25, China 11,** **China 16.**	as high as possible
Typeface	Texts can be printed boldface or printing of every vertical row can be repeated n times (n=2÷15). **Bold**, **Normal**, **Length *2**, **....** , **Length *15**	**Normal**
Chr. width	The width of every character within a subtext. **Constant**, **Proportional**	**Proportional**
Distance	Distance (a number of dots) between characters in vertical rows. **0**, **1**, **2**, **....** , **15**	**2**
Rotation	Every character within a subfile can be rotated. **None**, **Right**, **Upside down**, **Left**	**None**
Spec. reg.	The so called special register can also be used as a subfile. Its contents can vary during printing - see subsection ***4.7.3***.***Using Special Registers***. **None**, **Up counter**, **Down count.**, **Time**, **Date**, **Spec. chan.**, **Univ.count.**, **Univ. date**, **Date+offs.**, **Date+offs.2**, **Variable Field**	**None**
Front dist	Leading spacing before a subfile, given as a number of vertical rows (dots). **0**, **1**, **2**, **3**, **....** , **5000**	**0**

Parameter	Description and settings	Default
Back dist	Leading spacing after a subfile, given as a number of vertical rows (dots). **0**, **1**, **2**, **3**, **....** , **5000**	**0**

Tab. 4.7.2.2

Subfile Type: Graphics

A **GRAPHICS** subfile is a block of pixels (on the display) or dots (on an overprint) that are set/erased separately. Graphics are created/edited with Graphics Processor (see section *4.8 Graphics Processor*).

When the [PAR] icon is pressed in the word processor, the parameter menu is displayed for your subfile. The parameters have the following meaning.

Parameter	Description and settings	Default
Type	Subfile type. Any parameters shown below are typical of a **Graphics** subfile. **Graphic**, **Barcode**, **Ins. text**, sub**Text**	**Text**
Height	The maximum height (number of dots) of a graphics block equals H_{max}, the maximum height of a printable vertical row for the text profile chosen. **1**, **2**, **3**, **....** , H_{max}	H_{max}
Length	Expected length (number of pixels) of a graphics block. **1**, **2**, **3**, **....** , **32767**	the same as the height setting
Front dist	Blank space (number of vertical rows) before a graphics block. **0**, **1**, **2**, **3**, **....** , **5000**	**0**
Back dist	Blank space (number of vertical rows) after a graphics block. **0**, **1**, **2**, **3**, **....** , **5000**	**0**

Tab. 4.7.2.3

Subfile Type: Bar Code

A **BAR CODE** subfile is a 1- or optionally 2-dimensional[8] (2D) bar-code block. The processor offers an option to create various barcodes defined by the applicable standards.

When the [PAR] icon is pressed in the word processor, parameter menu is displayed for your subfile. The parameters have the following meaning:

Parameter	Description and settings	Default
Type	Subfile type. Any parameters shown below are typical of a **Bar Code** subfile. **Barcode**, **Ins. text**, sub**Text**, **Graphic**	**Text**

---

[8] In the **EBS-6500** printers as an option only (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).

Parameter	Description and settings	Default
Code	Bar code type[9]: **Datalogic**, **Matrix**, **2/5 5 Bars**, **2/5 IATA**, **Interleaved**, **Code 39**, **EAN-8**, **EAN-13**, **UPC-A**, **UPC-A EBS**, **Kod 128**, **EAN-128**, **Kod 128B**, **ITF8**, **ITF14**, **ECC200**.	**Datalogic**
Contents	Information stored in the bar code. It should follow bar-code specific rules. e.g. **500069701766** for the **EAN-13** bar code For the **EAN-8** code you input 7 characters (the 8th one is calculated automatically). For **EAN-13** you input 12 characters (the 13th one is calculated automatically).	No setting
Height	The maximum bar height (a number of dots) for a 1-dimensional bar code equals the maximum height, H_{max}, for the text profile chosen (for a 2-dimensional bar code the **Height** parameter is replaced with the **Sym. size** parameter - see below). **1**, **2**, **3**, **....** , H_{max}	H_{max}
Sym. size	The size of a 2-dimensional code that is being generated (in height x width format). The set of available sizes depends on the vertical-row maximum height, H_{max}, for the text profile chosen (the code height must not be greater than H_{max}). **10x10**, **12x12**, **14x14**, **16x16**, **18x18**, **20x20**, **22x22**, **24x24**, **26x26**, **32x32**, **8x18**, **8x32**, **12x26**, **12x36**, **16x36**, **16x48**	**14x14**
Elongat. X	Defines how many times the printing of a vertical row is repeated. It is used to scale the width of a bar code block. **1**, **2**, **3**, **....** , **16**	**1**
Elongat. Y	It defines how many times a horizontal row of a 2-dimensional code is to be repeated. It can be used for adjusting the height range of a bar code block proportionally. A product of the **Elongat. Y** parameter and the code height (see the description of the **Sym. size** parameter) must not be greater than the vertical-row maximum height, H_{max}, for the text profile chosen. If the setting of the **Elongat. Y** parameter is too high, the **PARAMETER ERROR** message is displayed. **1**, **2**, **3**, **....** , **16**	**1**
Corrector	To adjust the setting of the **Elongat. X** parameter for full rows (for 1-dimensional codes only). It is recommended that the **Corrector** parameter be set if overprints are made on absorptive surfaces, on which rows "blur" and the proportion between full and empty rows is disturbed. The settings are linked with the setting of the **Elongat. X** parameter. **0, -1, -2, -3**	**0**
Spec. reg.	A bar code can be the so called special register, that means a subtext whose contents change dynamically during printing - see subsection *4.7.3.Using Special Registers*. **None**, **Up counter,** **Down count.,** **Spec. chan.,** **Text content**	**None**

---

[9] For the EBS-6500 printers, the list of bar codes available is limited.

Parameter	Description and settings	Default
Text name	If **Spec. reg. = Text content** (see above), you should type in the name of the library text file from which the bar code is to be fetched (the text file name can also be chosen from the library after the ⌐ALT⌐ icon has been pressed). The text file contents can be unchangeable, the text may contain special registers, e.g. counters, and it can also be a complex text. If the text file contents do not meet the bar code requirements, the **Barcode contents error** message is displayed when printing starts, the message is only a warning and it does not interrupt printing. **NOTE:** Although the barcode contents are fetched from another file, the **Contents** parameter (see above) must be filled in as it impacts on the coding algorithm and the barcode length. An attempt to save the text file when the **Contents** parameter is not filled in results in the **PARAMETER ERROR** message displaying.	**Not used**
Front dist	A blank space (a number of vertical rows-dots) before a bar code block. **0**, **1**, **2**, **3**, **....** , **5000**	**0**
Back dist	A blank space (a number of vertical rows-dots) after a bar code block. **0**, **1**, **2**, **3**, **....** , **5000**	**0**
Signature	An indication, whether a 5 or 7 dot-high numerical caption is to be added beneath a given bar code. **5 pix**, **7 pix**, **NO** A numerical caption is added only to a 1-dimensional code and only when the sum of the capture height (the **Signature** parameter), the capture to code distance (the **Sign. dist** parameter) and minimum admissible barcode height (equal to one line) is not greater than the overall code height (the **Height** parameter).	**5 pix**
Sign. dist	A 1 or 2-dot distance can be applied between a 1–dimensional bar code and a caption beneath. **1 pix**, **2 pix**	**1 pix**
Inversion	An indication whether a bar code is to be printed in inverted colors. **YES**, **NO** When a 1-dimensional bar code is printed in inversion, no bars are printed but only spaces are printed instead, and filled-in fields are added before and after the bar code. The inversion is used to print bar codes with white ink on a black background.	**NO**

Parameter	Description and settings	Default
	 The **EAN-13** bar code not in inversion, i.e. **Inversion=NO**. The **EAN-13** bar code in inversion, i.e. **Inversion=YES**. The inversion of a 2-dimentional bar code consists in printing of all bar code dots in inverted colors. **NOTE:** The performance of the inversion operation itself makes the 2D code illegible! The code can be legible when it is surrounded by a frame consisting of "padded" graphic subfiles. The frame thickness should be selected empirically (by reading sample printouts with a bar code reader), but it is important to remember that the sum of the code height and the doubled frame thickness should not exceed the maximum height of vertical rows for a text profile chosen. ① A **2D** code (**Sym. size = 16x16**) without inversion, *i.e.* **Inversion=NO**. ① A **2D** code (**Sym. size = 16x16**) when inversion is applied, *i.e.* **Inversion=YES**. ② A **24x4** padded graphic subfile preceding the 2D code. ③ A **4x16** padded graphic subfile above the 2D code. ④ A **24x4** padded graphic subfile following the 2D code. ⑤ A **4x16** padded graphic subfile under the 2D code.	

Tab. 4.7.2.4

Subfile Type: Text Name

Every file stored with a name in the library can be merged into another file as 'a subfile called by its name'. The TEXT NAME subfile can be a simple or complex subfile. It cannot be edited inside the file it has been merged into. It can only be edited as a separate library file.

> **NOTE:**
> A text file can be merged into another file through calling by name exclusively when the text file to be merged meets the requirements of the profile chosen for the current text file (*e.g.* a text whose height is greater than 7 dots cannot be merged into a **max height 7 dots** profile text). An attempt to merge by name a text that does not meet the profile requirements results in the following message displaying:
> **PARAMETER ERROR**
> **Press ENTER...**

When the [PAR] icon is pressed in the word processor, the parameter menu is displayed for your sub-file. The parameters have the following meaning:

Parameter	Description and settings	Default
Type	Subfile type. Any parameters shown below are typical of a **Ins. text** subfile. **Ins. text**, sub**Text**, **Graphic**, **Barcode**	**Text**
Text name	Define a name of a library-stored file. The file name can also be selected from the library by pressing the [ALT] icon.	No setting
Front dist	A blank space (a number of vertical rows) before a subfile that is called by its name. **0**, **1**, **2**, **3**, **....** , **5000**	**0**
Back dist	A blank space (a number of vertical rows) after a subfile that is called by its name. **0**, **1**, **2**, **3**, **....** , **5000**	**0**

Tab. 4.7.2.5

4.7.3.   Using Special Registers

Special registers are a specific type of **ASCII** subfile (and also a **bar code**) that are updated after each overprint has been made. The register settings can be changed with events such as changing date, changing time, detecting an object by a photo detector, receiving a signal from an external device such as scales.

The **Spec. reg.** parameter indicates whether a given subfile is to be a text file or a special register. You can find it in the parameter menu of the word processor by pressing the [PAR] icon.

⇨

```
Type        : Text
Char. set   : Latin 25x15
Typeface    : Normal
Chr. width  : Proportional
Distance    : 2
Rotation    : None
Spec. reg.  : None
```

The **Spec. reg.** parameter defines the following special registers:

None,	**Up counter**,	**Down count.**,	**Time**,	**Date**,
Univ.count.,	**Univ. date**,	**Date+offs.**,	**Date+offs.2**,	**Spec. chan.**
Variable Field	**Text content**			

> **NOTE:**
> Up to **6** special registers can be used in one complex text file.

Each of them is described in the following section.

Object Counters

The following counters are used to print a consecutive number on every object automatically:
- *an incremental counter*,
- *a decremental counter*.

The counters are timed by a photo detector. An increment (varying from 1 to 9, in ascending or descending order) for both counters is set with the **Counter delta** parameter, which is available in the **PRINTING PARAMETERS** command within the **PRINTING** submenu.
While editing a subfile that is to be used as an object counter, insert into the subfile a number that consists of so many digits that the entire user-requested range is covered. The number is the initial setting of the counter at the same time. The number can be preceded and followed by any characters.

EXAMPLE:

If number 056 has been put into a subfile, then:

- for the incremental counter   after 999 has been reached, the counter is cleared and the counting goes up from zero (056, 057, 058, ... , 999, 000, 001, 002, etc.),
- for the decremental counter   after 000 has been reached, the counter is set to 999 and the counting goes down to zero (056, 055, 054, ... , 000, 999, 998, 997, etc.).

NOTE:

- The *object counter* register is also used to print bar codes. Then the bar codes are printed instead of consecutive numbers and the code corresponds to the consecutive number that is counted by the special register.
- The *incremental counter* special register can also count in the hexadecimal format. On selecting the **Spec. reg.=Up counter** parameter from the subfile parameter menu, press the ⬚ᴾᴬᴿ icon and then change the setting of the **Counter type** parameter from **DEC** (the default setting standing for counting in decimal form) to **HEX**.

Date and Time

The *Time* register is used to print current time in the 24-hour system on objects automatically.

The *Date* register is used to print current date in the leap year system on objects automatically.

The structure of the date and time registers is similar. If you edit a subfile that is to be a time (date) register, follow the rules given below:

- the time (date) register is built of up to 8 meaningful characters (6 digits to be updated and 2 separators),
- when the register is updated, data is input starting from a non-space character until 8 defining characters are inserted or until another space or the end-of-subfile are encountered,
- every third character is treated as a separator; the separator can be any character,
- hours (day), minutes (month), seconds (year) are two-digit numbers and the separator is any non-space character,
- the register can contain less than 8 characters; then the characters are cut off on the right.

EXAMPLE:

Time is coded in the following way:

Hours Separator Minutes Separator Seconds   e.g. **00:00:00** or **13/44/56**.

Hours Separator Minutes   e.g. **00:00** or **13/44**, if seconds are not to be printed.

Hours   e.g. **00** or **13**, if minutes or seconds are not to be printed.

Date is coded in the following way:

Day Separator Month Separator Year   e.g. **00.00.00** or **17/05/13**.

Day Separator Month   e.g. **00.00** or **17/05**, if year is not to be printed.

Day   e.g. **00** or **17**, if month and year are not to be printed.

For more date and time options see the *universal date* register below.

Universal Counter

The universal counter is a special counter to count objects that move in front of the print head. The counter is timed by a standard photo detector. The universal counter consists of two elements:

- *a main counter*,
- *an auxiliary counter*.

The *main counter* is always printed, and in addition, the *auxiliary counter* if required.

The *main counter* setting changes only when the *auxiliary counter* has been overflowed!

Therefore, when you edit a subfile that is to be a universal counter of objects, the subfile should contain the following:

➡ For the main counter and printable auxiliary counter - two numbers (groups of digits) with as many digits as may be needed to cover a user-defined range. The groups must be separated with a separator that is <u>different from digits or space</u>. The separator is always visible during editing but it can be omitted during printing (the **Separ.supp.** parameter). The first group is designed for the main counter, the second for the auxiliary counter.

➡ For the main counter and unprintable auxiliary counter – a number (a group of digits) with as many digits as may be needed to cover a user-defined range. The group is designed for the main counter, whereas the setting of the auxiliary (unprintable) counter is defined by the **Cnt.value 2** parameter - see below.

Operation of the two counters is determined by universal counter parameters. To access the parameters start the word processor and follow the procedure given below:

- position the cursor on the subfile that is a special register and press the ⬚PAR icon on the terminal,
- set **Spec. reg.=Univ.count.**,
- press the ⬚PAR icon on the terminal again. The following universal counter parameters are displayed:

Description	Settings
Mode – see below,	**Standard**, **Special**
0 suppress - Indication whether to hide leading zeros. If the setting is **YES**, the leading zeros are replaced with spaces in both elements, and both elements are moved to the separator.	**YES**, NO
Separ.supp. – whether to omit the separator during printing or not? The separator is always visible during editing but if the setting is **YES**, it is omitted during printing.	**YES**, NO
Print beg.1 – see below,	**CONTINUE**, **BEG.VALUE**, **MIN/MAX**
Beg.value 1 - initial setting [10]*),	0 ÷ 4 294 967 295
Min.value 1 – minimum setting,	0 ÷ 4 294 967 295
Max.value 1 – maximum setting,	0 ÷ 4 294 967 295
Cnt.delta 1 - increment,	0 ÷ 255

it applies to the first element of the universal counter

(*the main counter*)

---

[10] ***)** Both elements of the universal counter can be set to their initial settings in the **Standard** mode only. In the **Special** mode the settings need to be modified by editing a subfile for the universal counter directly.

Description	Settings	
Print beg.2 – see below,	**CONTINUE**, **BEG.VALUE**, **MIN/MAX**	it applies to the second element of the universal counter (***the auxiliary counter***)
Beg.value 2 – initial setting *),	0 ÷ 65 535	
Min.value 2 – minimum setting,	0 ÷ 65 535	
Max.value 2 – maximum setting,	0 ÷ 65 535	
Cnt.delta 2 - increment,	0 ÷ 255	
Cnt.value 2 - current setting of the counter; it is vital for the auxiliary unprintable counter,	0 ÷ 65 535	
Spc.Md.max – the number of photo detector activations for which unchanged settings of the main counter and auxiliary counter (a sub counter of the auxiliary counter for the same overprints) are to be printed,	0 ÷ 65 535	available only for the following universal counter setting **Mode=Special**
Spc.Md.cnt – the setting of the **Spc.Md.max** parameter from which printing is to be resumed,	0 ÷ 65 535	
Pal.countr – the number of packages on a pallet - it defines "jumps" of the main counter for successive pallets, so that consecutive numbering is used while packages are being placed on pallets.	0 ÷ 65 535	

Tab. 4.7.3.1

Two modes of operation set with the **Mode** parameter are available for the universal counter: standard and special.

1). The universal counter with **Mode=Standard**.

The first setting of the universal counter printed after printing has been resumed (i.e. after the **START PRINT** command) depends on two parameters: **Print beg.1** (for the main counter) and **Print beg.2** (for the auxiliary counter). The settings of the parameters have the following meaning:

- **CONTINUE** – a consecutive setting of the universal counter (defined by the settings of other counter parameters) is printed as if printing has not been stopped. This means that the sequence of two commands: **STOP PRINTING** and **START PRINT** does not break the order of numbering, no matter how many times it is repeated,
- **BEG.VALUE** - both elements of the counter are set to figures defined by the **Beg.value 1** and **Beg.value 2** parameters, respectively. The counters count between the minimum and maximum settings. With such settings, printing can be resumed from any state. The feature can be used to label some missing objects,
- **MIN/MAX** - both elements of the counter are set with settings defined by the **Min.value 1** and **Min.value 2** counter parameters.

> **NOTE:**
> - The setting of the (main, auxiliary) counter is incremented, when its minimum setting is smaller than its maximum setting. Otherwise it is decremented.
> - The (main, auxiliary) counter overflows, when its maximum setting is replaced with the minimum setting.
> - Each time you change the type of special register to universal counter, all counter parameters are set to the following initial settings:
> | | |
> |---|---|
> | **Mode=Standard**, | **0 suppress=NO**, |
> | **Separ.supp.=NO**, | **Print beg.1=CONTINUE**, |
> | **Beg.value 1**=1, | **Min.value 1**=1, |
> | **Max.value 1**=4 294 967 295, | **Cnt.delta 1**=1, |
> | **Print beg.2=CONTINUE**, | **Beg.value 2**=1, |
> | **Min.value 2**=1, | **Max.value 2**=1, |
> | **Cnt.delta 2**=1, | **Cnt.value 2**=1. |
> - An overflow of the main or auxiliary counters can additionally be indicated by a change at the output of one of the printer's external ports. The change can optionally be used to control external devices (optionally).

In this mode the **Spc.Md.max**, **Spc.Md.cnt** and **Pal.countr** parameters are not available and cannot be set.

EXAMPLE 1:

Creating a standard pallet counter.

Assumptions: Packages moving on a factory conveyor are stored on a pallet in a single layer. There are 4*5=20 packages in the layer. Packages are placed on the pallet in **A** and **B** order and directions, as shown in the illustration below. The pallets are put one onto the other in 4 layers (**C**) on all shelving in the store. The packages need to be labeled in such a way that the pallet number and consecutive package number on each pallet are printed. When the printing is interrupted and then resumed, the consecutive number should be printed. After 4 pallets (80 packages) have been labeled, the counter should be reset (i.e. set to its minimum setting) and the counting resumed.

Create a subfile in the form of a special register (*a universal counter*) within the text file to be printed onto packages. Type in the following text: **000/000**. Set the following universal counter parameters:

Mode=Standard,	**0 suppress=NO**,	**Separ.supp.=NO**,
Print beg.1=CONTINUE,	**Beg.value 1**=1,	**Min.value 1**=1,
Max.value 1=4,	**Cnt.delta 1**=1,	**Print beg.2=CONTINUE**,
Beg.value 2=1,	**Min.value 2**=1,	**Max.value 2**=20,
Cnt.delta 2=1,	**Cnt.value 2**=1.	

The following labels (together with separators) are printed on packages if the above settings have been made:

001/001, 001/002, ... , 001/020, 002/001, 002/002, ... , 002/020, 003/001, ... , 004/019, 004/020, 001/001, etc.

> **NOTE:**
> If the numbering of packages is interrupted for some reason during printing, you can stop the printing, reset the **Print beg.1** parameter to **BEG.VALUE**, set both counters to the initial settings with the **Beg.value 1** and **Beg.value 2** parameters and resume the printing.
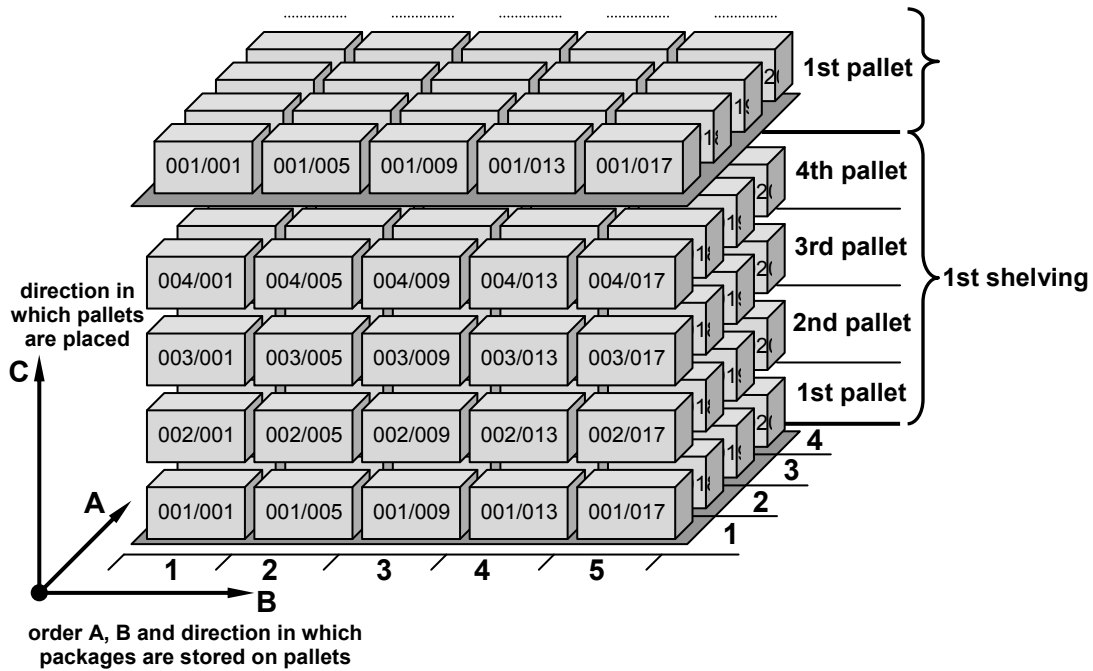
Fig. 4.7.3.1 Operation of a universal counter in Example 1

2). Universal counter with **Mode**=**Special**.

Additional parameters of the universal counter are available in this mode. They are: **Spc.Md.max**, **Spc.Md.cnt** and **Pal.countr** - see the table above. With them, the numbering of products can be automated and fit subsequent packing and storing on pallets or shelves in a hierarchical way. In this mode the other parameters are similar to those used in the **Standard** mode except for the **Beg.value 1** and **Beg.value 2** parameters. These two parameters are not available and therefore cannot be used to set both counters of the universal counter to their initial settings. In the **Special** mode, the initial settings need to be introduced by editing the universal-counter sub-file directly (and inputting 2 groups of digits and a separator).

EXAMPLE 2:

Creating a special counter to allow for peculiarity of product packing in a company.

Assumptions: Small unit packages (products) moving sequentially on a factory conveyor are packed in fours into type **I** packages, then the type **I** packages are put in groups of 64 into boxes (type **II** packages). The type **II** packages are stored on pallets in one layer, with 4*5=20 packages in the layer. The packages are arranged on the pallet in **A**, **B** order and in the direction as shown in the illustration below. The pallets are put one onto the other in 3 layers (**C**) on all shelving in the store. The unit packages need to be labeled in such a way that the type **I** and type **II** packages are clearly identified to find the product. Therefore the type **II** package number (the main counter) and type **I** package number (the auxiliary counter) are printed on each unit package. All products in the type **I** package have the same label (a sub counter of the auxiliary counter). When the printing is interrupted and then resumed, the consecutive number is printed. After products on 3 pallets (4*64*60=15360 packages) have been labeled, the counters need to be reset (i.e. set to their initial settings) and the counting resumed - see the illustration.
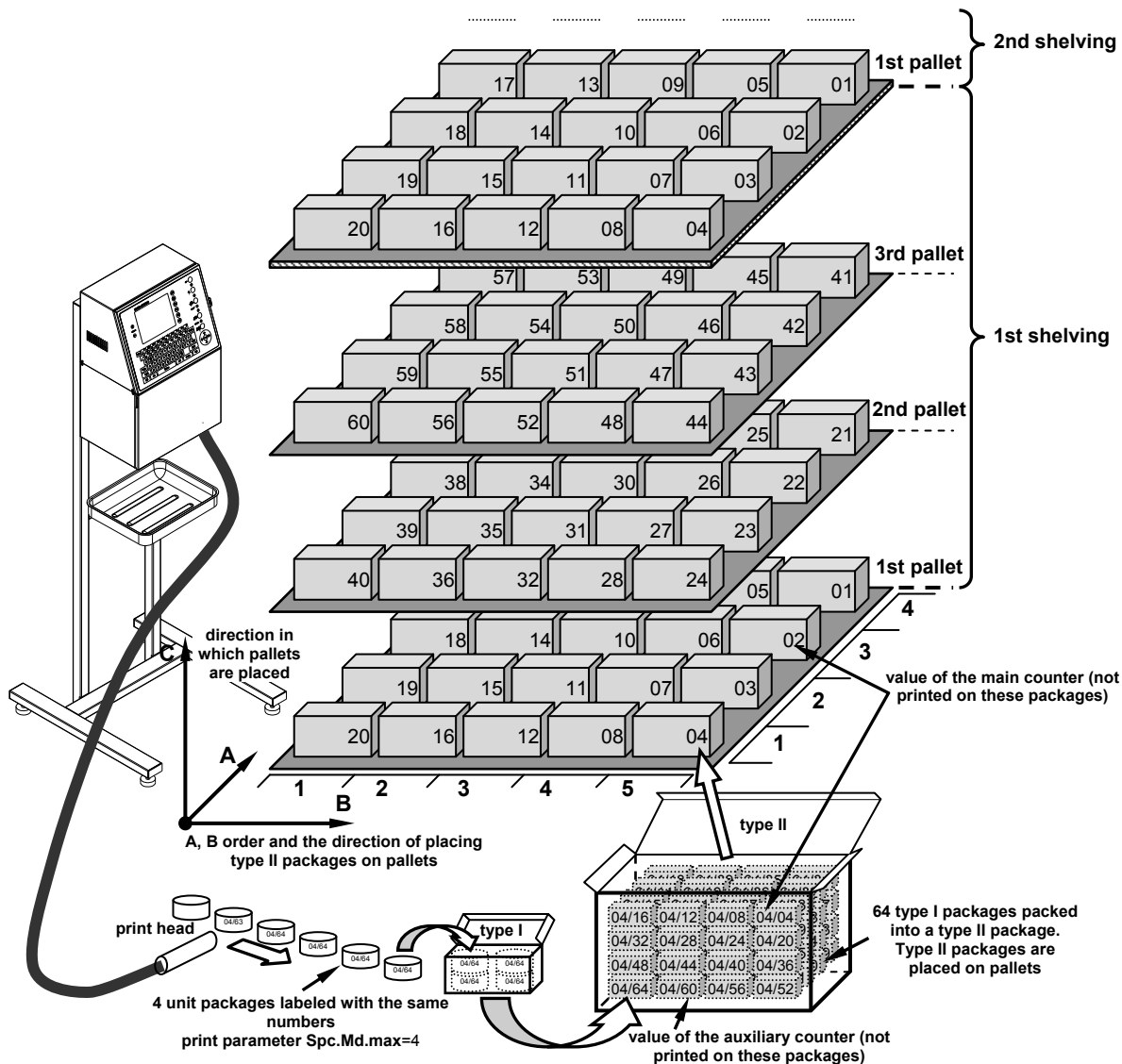
Fig. 4.7.3.2 Operation of a universal counter in Example 2

A subfile needs to be embedded into a text file to be printed on packages. It needs to be a *universal counter* special register. Its contents of **20/64** should be typed in via the keypad. The counter parameters should be set as follows:

Mode=Special,	**0 suppress=NO**, ,	**Separ.supp.=NO**,
Print beg.1=CONTINUE,	**Min.value 1**=1,	**Max.value 1**=60,
Cnt.delta 1=1,	**Print beg.2=CONTINUE**,	**Min.value 2**=64,
Max.value 2=1,	**Cnt.delta 2**=1,	**Cnt.value 2**=1,
Spc.Md.max=4,	**Spc.Md.cnt**=1,	**Pal.countr**=20.

When the above settings are made, the following labels (together with separators) are printed on each of the packages moving on a factory conveyor in front of the print head:

20/64, 20/64, 20/64, 20/64, 20/63, ... , 20/02, 20/01, 20/01, 20/01, 20/01, 19/64, ... , 01/02, 01/01, 01/01, 01/01, 01/01, 40/64, 40/64, 40/64, 40/64, 40/63, ... , 21/02, 21/01, 21/01, 21/01, 21/01, 60/64, 60/64, 60/64, 60/64, 60/63, ... , 41/02, 41/01, 41/01, 41/01, 41/01, **20/64**, etc.

and the counting is resumed ⇧

NOTE:

If the numbering of packages has been interrupted for some reason during printing, you can stop the printing, edit groups of digits within the counter subtext, set a setting to continue the counting at the same point in process with the **Spc.Md.cnt** parameter and resume the printing.

Universal Date and Time

You can use a special register (**Univ. date**) in order to print current date and time (in various formats) on objects automatically.

Below, there is a list of characters that can be used to encode date and time. Elements of the ***universal date*** register can be preceded, separated and followed by any characters different from the specified below.

D   tens of day in the current date,
A   units of day in the current date,
M   tens of month in the current date,
O   units of month in the current date,
Y   tens of year in the current date,
E   units of year in the current date,
B   tens of hours of the current time,
C   units of hours of the current time,
I   tens of minutes of the current time,
J   units of minutes of the current time,
T   tens of seconds of the current time (option),
U   units of seconds of the current time (option),

NOTE: During printing, the above mentioned date and time components (D, A, M, O, Y, E, B, C, I, J, T, U) are replaced with digits (0-9), as standard. It is also possible that an additional way of coding is used and the above mentioned date and time components are replaced with any characters available from the terminal keypad rather than with digits. The assignment is made in the submenu **TEXT SERVICE** ⇨ **UNIV.DATE REG. CONFIGURATION** ⇨ **DIGIT CODING**.

W   tens of week-of-the-year number,
K   units of week-of-the-year number,
a   number of week of the year coded with one character. The assignment is made in the submenus **TEXT SERVICE** ⇨ **UNIV.DATE REG. CONFIGURATION** ⇨ **WEEK CODING (1 CHAR)**.
d   number of day of the month coded with one character. The assignment is made in the submenus **TEXT SERVICE** ⇨ **UNIV.DATE REG. CONFIGURATION** ⇨ **DAY OF THE MONTH CODING (1CH)**.
y   tens of year of the current date by week-of-the-year number (e.g. if week 53 ends on 5th January next year, then 5th January falls within the previous year's week),
e   units of year of the current date by week-of-the-year number,
m   number of month printed with the following encoded letters: **A B C D E F G H L M N P** (corresponding to numbers from 1 to 12, respectively). The assignment can be changed in the submenus **TEXT SERVICE** ⇨ **UNIV.DATE REG. CONFIGURATION** ⇨ **MONTH CODING (1 CHAR)**.
P   hundreds of day-of-the-year number,
Q   tens of day-of-the-year number,
S   units of day-of-the-year number,
N   number of day of the week (1-Monday, 2-Tuesday, ... , 7-Sunday). The assignment can be changed in the submenus **TEXT SERVICE** ⇨ **UNIV.DATE REG. CONFIGURATION** ⇨ **DAY OF THE WEEK CODING (1 CHAR)**.
F   the first letter of the month,
G   the second letter of the month,
H   the third letter of the month,
b   the number (between 0 and 23) of the hour of day of current time coded with a single character. The assignment of any character available via the terminal keypad to each hour of day is made in the submenu **TEXT SERVICE** ⇨ **UNIV.DATE REG. CONFIGURATION** ⇨ **HOUR CODING (1 CHAR)**. The same characters can be assigned to different hours.

Z working shift identifier coded with one character. The shift number can also be coded with roman numerals:

j the first roman numeral of shift number,
k the second roman numeral of shift number,
l the third roman numeral of shift number.

Working shifts identified by numbers **1**, **2** or **3** cover the following time periods as standard:
1st shift - from 6:00 to 14:00, **2**nd shift - from 14:00 to 22:00,
3rd shift - from 22:00 to 6:00, on every day of the week.

A shift identifier can be set for each of up to 8 working shifts (within a 24-hour day), so shift start and finish times for each shift can be set separately on working days (from Monday to Friday) and on the other days (Saturday and Sunday).

In order to change the settings select the item **SHIFT DEFINITION** from the submenu **TEXT SERVICE** ⇨ **UNIV.DATE REG. CONFIGURATION**. A list of additional parameters of the special register *Universal date and time* is displayed for the coding element **Z** of this register, that is for the shift identifier. This is where the following parameters can be modified:

- Any alphanumerical character available on the terminal keypad can be used as identifier.
- The shift start time needs to be specified as the sequence of **hh:mm** (hours**:**minutes). The shift times need to be specified in such a way that the following condition is met: the next shift needs to start later than the previous one.
- If a character **X** is specified instead of a shift start time, it means that a given and subsequent shifts do not exist, and the identifier is printed in accordance with the previous shits' parameter settings.

> **NOTE:**
> - The shift identifiers and start times are global parameters in the printer. This means that every text file in the text-file library that is a *Universal Date and Time* special register and contains the **Z** element of the register uses the same set of shift identifiers and start times.
> - The standard version does not support any update of tens or units of seconds (parts **T** and **U** in the **Univ. date** register). When such an option is supported, the printer processor is engaged frequently (every second) to update the text file and the maximum print rate might be reduced.

EXAMPLE:
When you define a subfile as a **Univ. date** special register and input the following characters (⌷ stands for a space character):

a) **DA.MO.20YE=DA⌷FGH⌷20YE⌷⌷⌷BC:IJ⌷⌷⌷PQS⌷⌷⌷WK⌷⌷⌷N⌷⌷⌷Z**

b) **EYOM/DZAF<PGQH>SC***BIJQ###SPW---NK**

then the following labels are printed on 14.06.2011 at 12:35:50:

a) **14.06.2011=14 JUN 2011 12:35 165 24 2 1**

b) **1160/114J<1U6N>52***1356###512---24**

Expiry Date and Date Resetting

In order to print automatically a future date that is separated by a certain number of days from the current date, you can use special registers **Date+offs.** or **Date+offs.2** (so called expiry date registers). The offset (a number of days added to the current date in order to calculate the expiry date) is defined by parameters **Offset** and **Offset2** in the **PRINTING PARAMETERS** command within the **PRINTING** submenu.

The structure of the **Date+offs.** and **Date+offs.2** registers is similar to that of the **Univ. date** register (see the *Universal date and time* special register). This means that **successive elements of the date need to be coded with the special characters (!)** that are specified in the description of the **Univ. date** special register.

EXAMPLE:

The **Date+offs.** and **Date+offs.2** registers can be coded in the following way:

Day Separator Month Separator Year e.g. **DA.MO.YE** (a separator can be any character that is not used to code the date),

Day Separator Month e.g. **DA.MO**, if year is not to be printed,

Year Separator Month Separator Day e.g. **YE.MO.DA.**

Any combination of coding characters defined for the **Univ. date** special register can be used.

Special Channel Data

The special channel is used to transfer data from peripherals (such as a computer, automatic scales, a bar code reader) to the printer. The data can be printed automatically via a special register called **special channel**.

While editing a subfile that is the special channel register, insert into the subfile as many characters (they can be any characters) as the peripheral may transfer. The purpose is to define <u>the register length</u>. During printing the characters are replaced with special channel data in the following way:

- if the number of characters transmitted from the special channel is smaller than the register length, additional spaces are added on the right side on missing character positions,
- if the number of characters transmitted from the special channel is greater than the register length, the excessive number of characters is cut off on the right side.

EXAMPLE:

The printer is connected with automatic scales and a subfile has been defined as a **Spec. chan.** register. The subfile contains, for example

  e.g. **XXXXXXXXXX** or **1234567890**

When the following data is transferred from the scales successively:
  "**netto: 75g**",
  "**netto: 1250g**",

the subfile is printed as follows:
  netto: 75g the entire text is printed,
  netto: 125 the text is shortened as this register is only 10 characters long.

If there are more **Spec. chan.**-type registers, data should be transmitted to the printer via special channel in an appropriate format. Subsequent pieces of data (that are to form the contents of successive registers) should be separated from each other with the **<TAB>** (09 hex) character and transmission should end with the **<ENTER>** (0D hex) character.

Sample data to be transferred via special channel as **3** *special channel*-type **subfiles** should be arranged in the following format:

ABC	<TAB>	DEF	<TAB>	GHIJ	<ENTER>
piece 1 *contents of register 1*	**(09 hex)** *separator*	**piece 2** *contents of register 2*	**(09 hex)** *separator*	**piece 3** *contents of register 3*	**(0D hex)** *end character*

The data received via special channel are inserted to subsequent subfiles from the left to right, and if subtexts occur one below another, then the subtext at a higher position is updated first. When it receives the end-of-transmission character **<ENTER>**, the printer sends the confirmation character **<ACK>** (06 hex).

The data transmitted via special channel should consist of such a number of pieces that equals to the number of **Spec. chan.**-type special registers contained in the textfile that is being edited. Otherwise,

- if the number of pieces is greater than the number of **Spec. chan.**-type registers used in the textfile, then the excessive pieces until the end character (*i.e.* **<ENTER>**) are ignored,
- if the number of pieces is smaller than the number of **Spec. chan.**-type registers used in the textfile, then the other registers are filled with spaces.

Variable Field

This special register is used in **Text - ASCII Characters**-type subtexts only and it offers a possibility of adding the contents of a given subtext when you start printing.

If a text file contains a **Variable Field**-type subtext, then the **Type text No.1** message is displayed when printing is initiated (with the **START PRINT** command or with the ⬤PRINT key on the operation panel). At this moment you should indicate the text that is to be added as a subtext and confirm with the ⏎ENTER icon. Printing does not start until the text is accepted.

Additional information about the **Variable Field**-type special register:

- If there are more than one **Variable Field**-type registers in a text, then the subtexts should be indicated one by one (the **Type text No.n** messages appear successively) when printing is initiated. The subtexts are added to a text from left to right, and if subtexts are to be printed one below the other, then the subtext located on a higher line position is updated first. Printing does not start until the contents of all the registers are added.
- If **Rpt. Var.Fld. = YES** (the parameter is available in the **SERVICE/ ADJUSTMENTS** menu after the service password has been given), the contents of the subtext need to be typed in again for verification. After the text has been typed in the **Repeat above txt** message is displayed. The contents of the subtexts should be typed in again and the text is not accepted until it is verified successfully. If the verification appears to be unsuccessful, the ****TEXT ERROR**** message is displayed and the text adding procedure starts from the beginning.
- When you start printing a text file containing a **Variable Field** special register, you can abandon the adding of a text. For that purpose you should stop printing with the ⬤PRINT key and then skip the adding of a text/texts with the ⬅ESC icon.
- While editing a subtext that is to be a **Variable Field**-type register, you should built your subtext of such a number of characters (they can be any characters) that corresponds to the length of a text to be typed in later. In this way you set the register length. The maximum length of the register is 63 characters. The characters are swapped for an added text during printing in the following way:
  - If the number of characters in the added text is smaller than the register length declared, spaces are added from the right on the missing character positions,
  - If the number of characters in the added text is greater than the register length declared, the excessive number of characters is cut off on the right.

Text File Contents

The special register is used in **Barcode**-type subfiles only. With it, you can apply any text file from the text-file library as the contents of a bar code (1- or 2[11]-dimensional).

If **Spec. reg. = Text content**, you can use the **Text name** parameter to give the name of a library text-file, from which the contents of a bar code is taken (you can also choose the name of a library text-file by pressing the ALT icon). The text file taken can have invariable data, it can contain special registers, *e.g.* counters, and it can also be a complex text file. If the data contained in the text file does not meet the bar code requirements, the **Barcode contents error** message is displayed while printing is being initiated.

While a **Barcode**-type subfile is edited and its contents are to be taken from another text file, you need to determine the register length by placing an appropriate number of (any) characters in the subfile parameters (the **Contents** parameter). During printing the characters are replaced with the contents of the other text file and they form the contents of the barcode. The data is taken in the following way:

- If the number of characters taken from the other text file is smaller than the register length declared, the text is supplemented with spaces on the right to the register's full length,
- If the number of characters taken from the other text file is greater than the register length declared, the text is truncated on the right and the characters exceeding the register length are cut off,

---
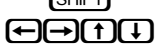
[11] In the EBS-6500 printers as an option only (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).
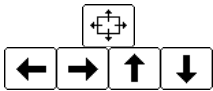
- The correctness of the barcode is analyzed depending on the type of barcode chosen.

4.8. Graphics Processor
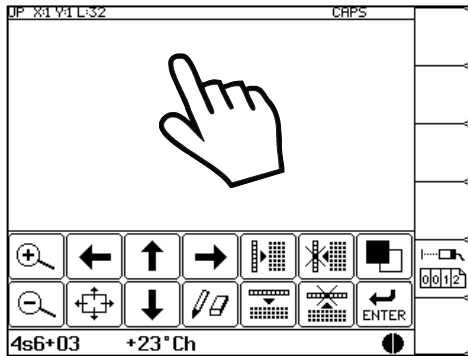
Every **BOLTMARK®**-series printer is equipped with a graphics processor that enables the user to create, and also change, any graphic file at their own discretion. In order to gain access to the processor you need to change the setting of the **Type** parameter to **Graphic**, and then use the ⌊CTRL⌋ ⌊ENTER⌋ keys or the 🖉 icon after a new file has been created (or an existing one edited) - see section **4.7 Word Processor**. It is recommended that the touch panel be used while a graphics processor is running.

Key	Icon	Function
⌊SPACE⌋	not available	To show in inversion (off/on) a point indicated by the cursor.
⌊ALT⌋	🖉	To switch between the processor pen modes: **UP** / **SET** / **CLEAR**. **UP** lift up the pen, **SET** set the pen to the >**write**< mode, **CLEAR** set the pen to the >**erase**< mode. The pen status is displayed in the terminal status window.
I	▣	To invert (enable/disable) every element of a graphic subfile irrespective of the pen mode.
⌊←⌋⌊→⌋⌊↑⌋⌊↓⌋	← → ↑ ↓	To move the cursor right, left, up or down according to the pen mode. If the cursor is moved right, beyond the length limit, new vertical rows are inserted and the subfile length is modified.
⌊SHIFT⌋ ⌊←⌋⌊→⌋	⊢← →⊣	To move the cursor to the first or last character in your subfile.
⌊SHIFT⌋ ⌊←⌋⌊→⌋⌊↑⌋⌊↓⌋	not available	To move the cursor by 8 dots in the direction indicated by arrow.
⌊INS⌋	▶▦	To insert an empty vertical row and move the following rows by one row to the right.
⌊DEL⌋	✕▦	To delete the vertical row where the cursor is and move the rows further on by one dot to the left.
⌊SHIFT⌋ ⌊INS⌋	▦	To insert one blank horizontal row and move the below rows by one dot down (with no change in the subfile height).
⌊SHIFT⌋ ⌊DEL⌋	✕▦	To delete the horizontal row where the cursor is and move the downward rows by one dot up (with no change in the subfile height).
⌊ESC⌋	not available	To cancel modifications and return to the word processor.
⌊ENTER⌋	↵ ENTER	To confirm modifications and return to the word processor.

Key	Icon	Function
+	🔍⊕	To enlarge pixels within your drawing area.
-	🔍⊖	To reduce in size pixels within your drawing area.
not available	⊹ ← → ↑ ↓	To shift the drawing area by a few pixels (the number of pixels depends on how much your drawing area is enlarged) in a given direction.

Tab. 4.8.1

4.9. File Management via USB Interface

Text files and parameter blocks can be easily transferred among devices by means of a portable storage device (such as a Pen Drive) connected to the printer's USB port (see *Fig. 4.9.1*) Portable storage devices can be used for archiving text files and parameter libraries stored in the printer's memory and for adding texts files generated with an external computer program to the printer's library. The above mentioned interface is managed by the **LIBRARY MANAGER** function, which is available at the main level of the text menu and also via an icon from the graphical menu. It is recommended that the USB manager is operated via a touch panel as its operation via a keypad is more difficult and requires that the user is familiar with menu shortcuts.
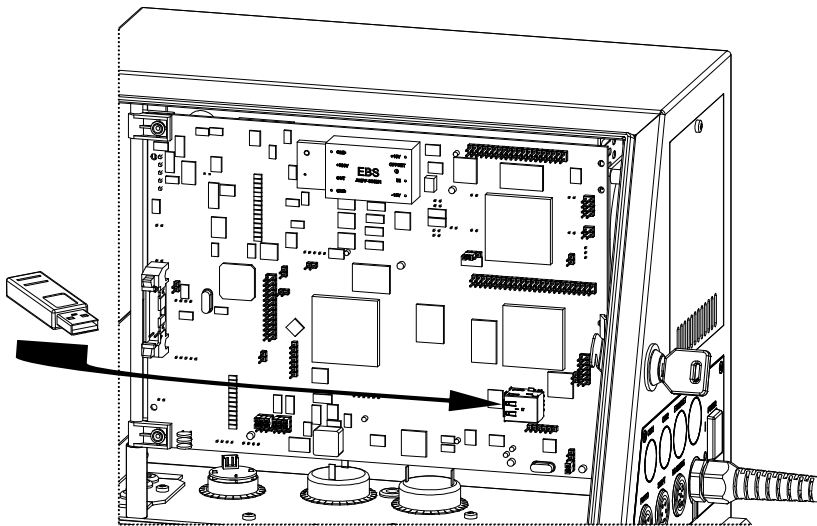

Fig. 4.9.1

the cursor is in the left window section (showing the contents of libraries in printer memory)

text file and parameter block library in printer memory

contents of portable storage device

the cursor is in the right window section (showing the contents of USB drive)

current access path to files on USB drive
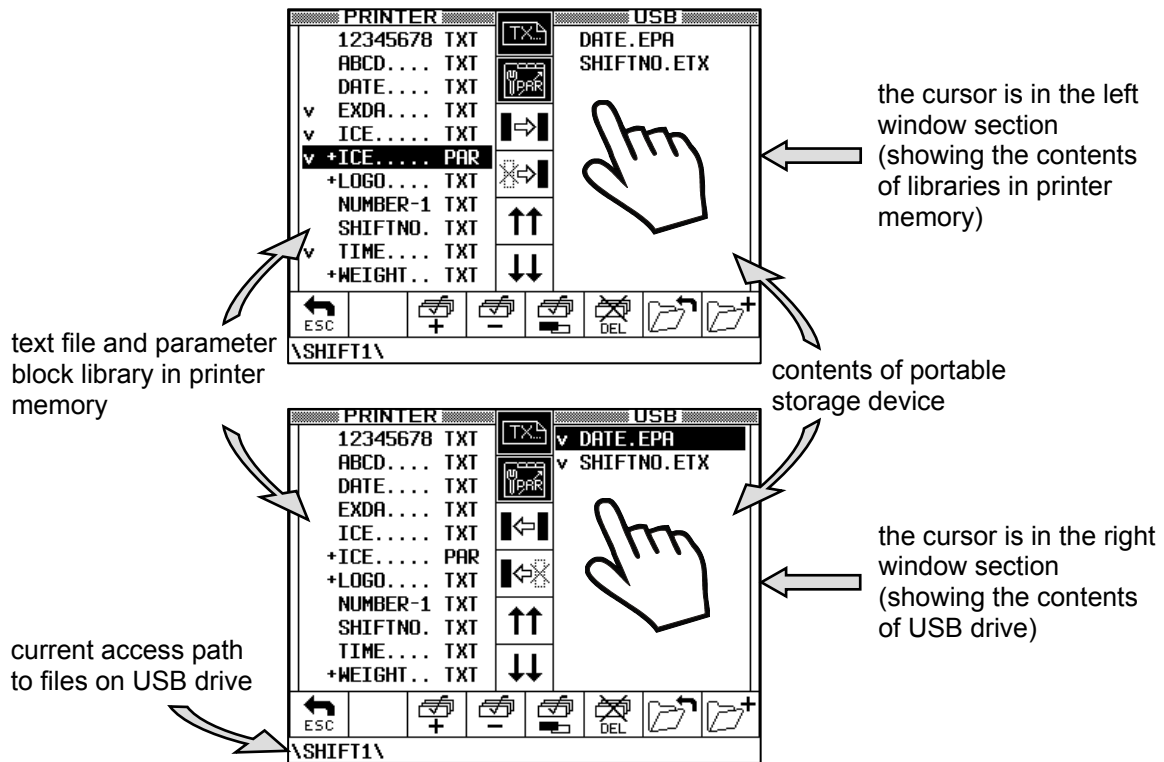
The USB Manager window consists of a few sections:

➢ ***A section where the contents of libraries saved in printer memory are displayed***..
This window section (entitled ***PRINTER***) displays the names of all text files and parameter blocks contained in printer memory. Text files and parameter blocks are differentiated from each other by indications **TXT** and **PAR**, respectively. Using icons, the display mode can be switched over among displaying only text files, only parameter blocks or both of them. Items selected at a given time for copying, transfer or deletion are marked with "**v**". Items to be selected or deselected should be double-clicked. The manager window also displays "**+**" characters, which indicate the text files/parameter blocks with the "read-only" attributes assigned to them. The other operations are performed with the icons that are described in ***Tab. 4.9.1***.

➢ ***A section where the contents of a USB portable storage device are displayed***.
This window section (entitled ***USB***) displays the contents of a portable storage device connected to the printer's USB port. It shows directories and files with extensions ***.EPA** (for parameter blocks) and ***.ETX** (for text files). Files with other extensions are not displayed in the manager. Items selected at a given time for copying, transfer or deletion are marked with "**v**". Items to be selected or deselected should be double-clicked. The other operations are performed with the icons that are described in ***Tab. 4.9.1***.

➢ ***Navigation and management icon bars.***

Icon	Key	Function	Notes
TX	F1	To display text files in manager window sections.	If the two icons are active, then both text files and parameter blocks are displayed.
PAR	F2	To display parameter blocks in manager window sections.	
▎⇨▎	F3	**To copy** selected items (text files, parameter block) from printer memory to a USB device.	The icons are displayed when the cursor is in the manager's left window section, i.e. it shows the contents of libraries in printer memory.
⊠⇨▎	F4	**To move** selected items (text files, parameter blocks) from printer memory to a USB device.	

Icon	Key	Function	Notes
▮⇐▮	F3	**To copy** selected items (text files, parameter blocks) from a USB device to printer memory.	The icons are displayed when the cursor is in the manager's right window section, i.e. it shows the contents of the USB device.
▮⇐▨	F4	**To move** selected items (text files, parameter blocks) from a USB device to printer memory.	
↑↑	F5	To scroll the manager window up one page at a time (PAGE UP).	
↓↓	F6	To scroll the manager window down one page at a time (PAGE DOWN).	
↰ ESC	ESC	To exit the USB manager.	
🗐+	INS	To select all items in the active manager window section.	
🗐−	PAR	To deselect all items in the active manager window section.	
🗐	ALT	To alter selection of all items in the active manager window to the opposite window.	
🗑 DEL	DEL	To delete all selected items in the active window section (the operation needs to be confirmed).	
📁↱	CTRL INS	To move one level upwards in the USB drive directory tree (the function is active irrespective of in which window section the cursor is).	
📁+	CTRL ENTER	To create a directory on USB drive (the directory is created at the current tree level).	

Tab. 4.9.1

➢ **A bar where the current path to USB drive files is shown.**

⚠️

> **NOTE:**
> • No portable storage device must be detached from the printer's USB port while an operation is being performed. Otherwise data may be lost or the device damaged.
> • Occasionally it may happen that the Library Manager ceases responding to the user's commands. When this happens, remove the portable storage device from the printer's port and then insert it back into the port.

4.10. Using the Password

The user can secure access to the following commands that are called ***protected commands*** further on:
➡ all commands in the **TEXT SERVICE** submenu,
➡ all commands in the **PARAMETERS SERVICE** submenu,
➡ commands in the **PRINTING** submenu, such as:
   • **EDIT & PRINT CURRENT TEXT**,
   • **SAVE CURRENT PARAM.**,
   • **SET SHIFT COUNTER**,
   • **GLOBAL COUNTER**,
   • **SET GLOBAL COUNTER**,
➡ the **LIBRARY MANAGER** command.

The objective is to protect text files, parameter blocks and the object counter against accidental or deliberate access by unauthorized persons.

This security feature is implemented by defining a password and enabling the password. Any access to the secured menu commands is possible only after the password has been typed in. When the right

password has been typed in, the commands previously unavailable become available until the password function is enabled again or the printer is turned off. When the password is defined, the password function is enabled automatically after the unit has been switched on.

A user password can be defined, edited as well as deleted with the **CREATE/CHANGE PASS** command from the **TEXT SERVICE** menu. A password can consist of up to 8 characters. When a password is defined, it should be enabled with the **ACTIVATE PASSWORD** command. From that moment the user is prompted to enter the password before they can gain access to protected MENU branches.

NOTE:
- The old password can only be modified (cancelled) when it is defined to protect the **TEXT SERVICE** submenu. Therefore no unauthorized person can modify (cancel) the password.
- If the password has been forgotten, you can contact the Manufacturer (distributor) to cancel the password without entering the **TEXT SERVICE** submenu You can do that with the **UNLOCK PROTECTION** command from the **AUX. COMMANDS** menu.

4.11. Print Head Status

The print head operates in the right way, if the ink jet is properly broken into droplets, the droplets are properly charged and a flow of unused ink droplets falls into the gutter generating the correct measurement phasing signal[12]. Therefore vital parameters are measured within the print head continuously. The settings of these parameters form the so called **print head status** and are shown on the terminal display in the printer status window (see *Fig. 4.5.1*).

The successive items displayed in the status window have the following meaning:

➢ - the quality of phasing - it can vary between 2 and 6 (with 4 being the optimum). Frequent fluctuations of the quantity from the optimum indicate that the unit is tuned improperly. A question mark **?** which may appear at this position from time to time means erroneous measurement of phasing. If the mark is displayed frequently or continuously, this means that the unit is not tuned properly, especially within the head, and it may lead to a phasing error and an alarm.

➢ - a head operation mode. The head can be in one of the following five modes:
- **r** – **(restart)** head operation has been restarted (no phasing, printing disabled, the **READY** LED on the inner panel is off),
- **s** – **(stop)** the head is ready to start printing (phase and time of ink flight (the *ToF* parameter) are measured, the **READY** LED on the inner panel generates steady light),
- **p** – **(print)** the head performs the operation of printing (high voltage is turned on, phase and time of ink flight (the *ToF* parameter) are measured, the **READY** LED and the **HV_ON** LED on the inner and external panel generate steady light),
- **v** – **(service)** the head is in the service mode and enables the user to perform service operations (phase and time of ink flight (the *ToF* parameter) are measured, no alarm is indicated if a phasing error occurs),
- **c** – **(cover)** the head cover is removed (no printing can be initiated; if the cover is removed during printing, the printing is interrupted).

➢ - the number of the best phase determined during the phasing process. It can vary between **0** and **7**. Variations in magnitude every now and again at few-second intervals indicate that ink parameters vary too quickly (and these are allowed only for a short period after the unit has been switched on). Changes by ±1 are normal for this parameter.

---

[12]**Phasing** - automatic process of controlling the charging of ink droplets. The breaking point at which a continuous ink jet breaks into droplets varies slightly with time. Therefore the control system needs to update time relations between the charging and breaking of the ink jet into droplets on an on-going basis.

➢ `4p0+00    +24°Ch   16pix        ◑` - a figure describing the time of ink flight in the head (the *ToF* parameter), which describes the physical properties of the ink drop. The time of flight is used as the basis for calculating viscosity of ink in the ink system. The setting of the *ToF* parameter is given relative to the nominal value to which number **+00** corresponds. Positive numbers mean that the time of flight is greater than the nominal, negative numbers mean that the time of flight is smaller than the nominal. The correct value is +00 and it may vary momentarily **from -02 to +02**. This value means that the ink drop properties are correct. Additionally, this item may contain the characters **>** (**<**) which imply an increase (decrease) in the time of flight above (below) number 99 and this is an emergency condition.

> **NOTE:**
> ➢ Owing to the operation of the so called pressure correction of the time of flight (the *ToF* correction), the status window displays the value after pressure correction, whereas the calculated value of the time of flight (that would have been measured when no pressure correction was applied) can be viewed with the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu - *ToF(p100%)*. This command can also be used to view the time of flight calculated with the application of a temperature factor based on which agents (ink or solvent) are taken from bottles - *ToF(intake)*.
> ➢ When you switch over to the service mode (see paragraph entitled *Service Mode* in section *4.6.4*), the correction of the time of flight with pressure is turned off, which means that the time of flight displayed in the status window equals to *ToF(p100%)* that is made available with the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu.

➢ `4p0+00    +24°Ch   16pix        ◑` - temperature (°C) in the electronics compartment (marked with a letter "s") displayed alternatively with temperature in the head (marked with a letter "h").

➢ `4p0+00    +24°Ch   16pix        ◑` - the type of correction table (5, 7, 16, 25 or 32[13] pix) used for printing the current label (the value is available also as the **Height (pix)** print parameter). Otherwise, the actual height of the label currently printed is displayed. This figure is displayed only when the printer is in the *print* state.

➢ `4p0+00    +24°Ch   16pix        ◑` - a graphical indicator showing (approximately) how long the iModule® can still run or the time to the end of the iModule® expiry date. The table below shows successive graphical symbols indicating the remaining run 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 run 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

---

[13] This does not apply to the EBS-6500 printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).

> **NOTE:**
> - If the **START PRINT** command is selected and the F4 function key is pressed during printing, the name of a text file printed is displayed (for about 1 second) in place of the print height. If the F4 key is pressed several times, the text name is displayed longer.
> - If a printer run-time limit is given to the user (under a separate contract), after which the printer is disabled automatically, the left part of the status window is displayed in inversion (`4p0+01    +28˚Cs    16pix`).
> - If after a transponder error the user is assigned 50 run hours over which no agent or IMS is to be monitored, the right part of the status window is displayed in inversion (`4p0+01    +28˚Cs    16pix`).

The following messages may also occur in the status window:

Per   *phasing error*.

Tge   *time gap error*, indicating too high a printing speed that makes it impossible to measure phasing and the *ToF* parameter or too small a distance (see the **Rpt.dist.** print parameter) between successive labels as for a given print rate.

Der   *drop error*, indicating the failure to apply the optimal breaking voltage.

Ter   *temperature error*, indicating that the head temperature has fluctuated by more than 10°C in the *print* mode. This may result from the improper breaking of ink into droplets and requires printing to be stopped for about 60 seconds (**high voltage to be turned off** with the **STOP PRINTING** or **QUICK STOP** commands) in order to ensure that the droplet break off point is adjusted automatically to a new temperature. If the working temperature fluctuates by more than 15°C in relation to the temperature at which the breaking circuit has been synchronized, adjust the breaking voltage before starting the operation in such conditions, so that the control equipment operates in the entire temperature range. The adjustment should be performed by a service person.

Ovr   *overrun*, the maximum print rate has been exceeded. This indication may appear only when a shaft-encoder is used and it involves a sound signal. The alarm can be cleared with one of the following commands: **START PRINT** (even if it is rejected), **STOP PRINTING**, **QUICK STOP** and **SERVICE** (from the **SERVICE** submenu). It can occur only at the small or medium print rate (the print parameter **Speed** is set to **SLOW** or **MIDDLE**).

4.12. Adjusting Print Rate

The print head is motionless during printing. Overprints are made on objects that move in front of the head. The range of print rates varies according to application. Therefore the printer has been equipped with a feature that enables you to adjust the rate to make clear and legible overprints in every condition. The printing of vertical rows of print is timed with pulses that are generated by two sources:

➡ an internal generator controlled a program installed on the printer,

➡ an external encoder connected to the printer via the appropriate connector to convert rotational speed to pulse frequency.

If you increase or decrease the pulse frequency, you change the print rate.

4.12.1. Internal Generator

The internal generator operates regardless of the rate at which objects travel in front of the print head. That is why it is used with conveyors whose travel rate is specified and stable.

The pulse frequency generated by the internal generator (and thereby the print rate) is influenced by two print parameters (available with the **PRINTING PARAMETERS** command from the **PRINTING** submenu):

➡ The **Cnv spd m/min** parameter adjusts the print rate (expressed as a number of vertical rows) to the conveyor travel speed (m/min). If the setting of the **Cnv spd m/min** parameter does not change and you reduce the travel speed, the density of characters printed increases.

The setting for the **Cnv spd m/min** parameter can be determined by measuring travel speed with the **CONVEYOR MEASUREMENTS** service command (in the **SERVICE/ SERVICE COMMANDS** submenu).

➡ The **Resol. dot/cm** parameter defines image resolution. The resolution is given as a number of dots per centimeters. The visual effect of a change to the parameter is a change in the width of characters (graphic images) and the length of the entire text file.

> **NOTE:**
> Extreme setting ranges are specified for the **Resol. dot/cm** and **Cnv spd m/min** print parameters. The settings are monitored by the control program on an on-going basis and may be limited by the settings of other print parameters and the setting of the print height (5, 7, 16, 25 or 32[14] dots). The system is protected automatically against an excessive print rate setting. Therefore some settings may not be accepted.

Below you can see a sample print "**ABCD**" which differs for various settings of the **Resol. dot/cm** parameter; the travel speed is constant (**NOTE:** in order to make the overprint legible, it is not shown to scale):

Resol. dot/cm:24

Resol. dot/cm:12
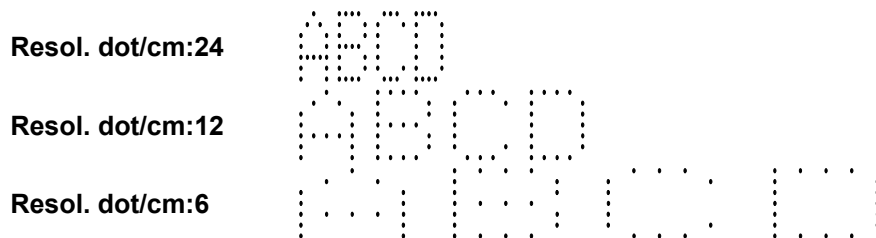
Resol. dot/cm:6

Rough measurements of the timing frequency (print rate) can be taken with the **ROWS SPEED** command from the **PRINTING** submenu. The result of the measurement depends on the settings of the **Speed**, **Generator**, **Resol. dot/cm** and **Cnv spd m/min** print parameters from **PRINTING**.

4.12.2.   Shaft-encoder

The shaft-encoder is an electromechanical indicator of rotary speed. The shaft-encoder axle is coupled mechanically with an object that moves on a factory conveyor, for example. Pulses are generated at the shaft-encoder output. The pulse frequency is proportional to the rotational speed of the axle. The pulses determine the moments at which vertical rows of overprints are to be printed. Therefore the pulse frequency depends on the travel speed, the transmission ratio of a mechanical gear between a moving product, the shaft-encoder's axle and the type of encoder, i.e., the number of pulses per rotation. That is why an external encoder is applied for timing when variable or unstable speed conveyors are used.

---

[14] This does not apply to the EBS-6500 printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).

pulses for slow rotation of the shaft-encoder axle

pulses for fast rotation of the shaft-encoder axle

signal cable
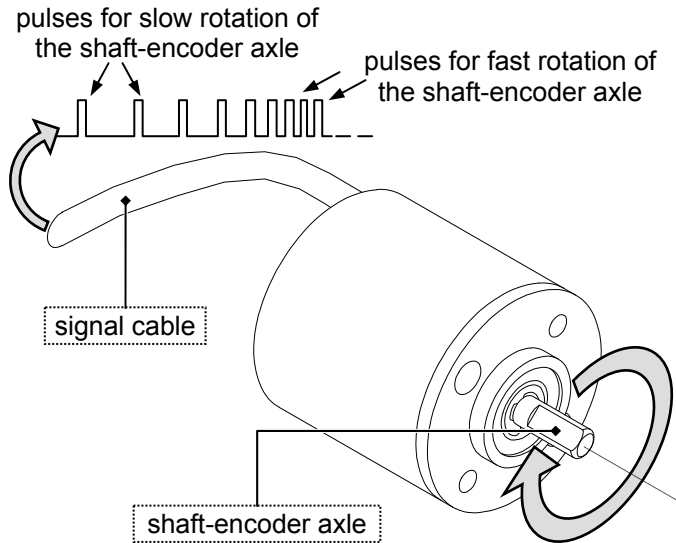
shaft-encoder axle

This manual does not contain any description of the types of mechanical gear to be used to couple mechanically encoders with conveyors. A variety of solutions is available and specific user requirements can fully be met.

Fig. 4.12.2.1 Shaft-encoder

The timing frequency (print rate) is influenced by two print parameters (available with the **PRINTING PARAMETERS** command from the **PRINTING** submenu):

➡ The **Enc const p/m** parameter defines the number of pulses generated by the shaft-encoder while an object covers a distance of **1 m**. If the shaft-encoder is used for timing purposes and the **Enc const p/m** parameter is set to a constant value, no increase or decrease in the conveyor travel speed has any impact on the character width.

The setting for the **Enc const p/m** parameter can be determined by measuring the encoder constant with the **CONVEYOR MEASUREMENTS** service command (in the **SERVICE/ SERVICE COMMANDS** submenu).

➡ The **Resol. dot/cm** parameter defines image resolution. The resolution is expressed as a number of dots per centimeters. The visual effect of a change to the parameter is a change in the width of characters (graphical images) and the length of the entire text file.

Below you can see a sample print "**ABCD**" which looks different for various settings of the **Resol. dot/cm** parameter; the travel speed is constant (**NOTE:** in order to make the overprint legible, it is not shown to scale):

Resol. dot/cm:24

Resol. dot/cm:12

Resol. dot/cm:6
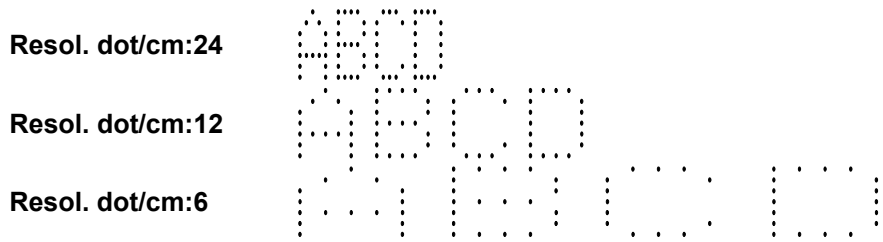
Rough measurements of the timing frequency (Hz) can be taken with the **ROWS SPEED** command from the **PRINTING** submenu. When the settings are displayed with the application of the **ROWS SPEED** command, you can change the rotational speed of the encoder axle (by changing the transmission ratio) and observe the changes on the terminal display. The command can also be used when the system works with an internal generator.

As the printer cannot control the frequency of pulses generated by the external encoder, the allowable settings can be exceeded and the overprint deformed - see subsection *7.3.20 Some Vertical Rows of Overprints are Spaced Widely*. In order to avoid such deformation, the timing frequency should be chosen in such a way that the settings offered by the **ROWS SPEED** command do not exceed the maximum print rate. The rate (given in m/min) depends on the font applied and on print parameters such as **Speed**, **Height**, **Resol. dot/cm**. For example, if you wish to print fast (**Speed: FAST**) and produce 7-dot single-row prints, this frequency should be about **8920 Hz** (for the EBS-6500 and EBS-6800 printers) or about **12980 Hz** (for the EBS-7200). For more information refer to *4.12.3 Defining Maximum Print Rate for*

a Given Text File, *4.12.4 Information for Advanced Users* and *4.12.5 Problems with Reaching Maximum Print Rate when Shaft-encoder is Used*.

4.12.3. Defining Maximum Print Rate for a Given Text File

Irrespective of whether the printer works with an internal generator or a shaft-encoder, you should follow the procedure given below in order to define the maximum print rate for a text file with selected fonts (also called generators or character matrices):

1. In the **TEXT SERVICE** submenu, create a text file using the font for which the maximum print rate is to be determined.
2. Use the **PRINTING PARAMETERS** command from the **PRINTING** submenu to set the required print parameters, especially the **Speed**, **Height** and **Resol. dot/cm** parameters and also to set:
    - **Active text**, which is to be set to the name of the text file created in *1* above (after the right text file has been chosen, the setting of **Height (pix)** is made automatically to define the text height as a number of dots),
    - **Mode** to **NORMAL**,
    - **Generator** to **GEN**,
    - **Cnv spd m/min** to a relatively small value (e.g. close to the minimum setting).

> **NOTE:**
> - In order to ensure that the procedure described above operates properly, the printer must be in *stop* mode (see *4.11 Print Head Status*).
> - If the following message is displayed in the printer status widow, after the printing parameters have been set:
>   **Increase PRINT.PARAM. Height or**
>   **decrease PRINT.PARAM. Speed or**
>   **decrease text height [dots].**, you need to adjust the settings of the parameters mentioned in the message until the message disappears.

3. Place the cursor on a setting of the **Cnv spd m/min** parameter.

4. Keep the [➡] icon pressed to increase the setting of the **Cnv spd m/min** parameter until the **PRINT SPEED TOO HIGH** message is displayed in the printer status window. Then gradually reduce the **Cnv spd m/min** setting with the [⬅] icon to make the above mentioned error message disappear. **This is the maximum print rate for the selected font and for the Speed**, **Resol. dot/cm print parameters and for other parameters**.

> **NOTE:**
> - The above procedure can only be applied when timing pulses are generated by an internal generator (not by the shaft-encoder). When the shaft-encoder is used, the print rate cannot be controlled automatically as the control program has no impact on the frequency of pulses generated by the shaft-encoder.
> - In order to determine resolution (number of characters per centimeter or characters per inch) of the overprint, use the following formula:
>
> $$R_{\frac{chr}{cm}} = \frac{\frac{R_{dot}}{cm}}{character\ width + dist.} \qquad R_{\frac{chr}{in}} = \frac{2.54 * \frac{R_{dot}}{cm}}{character\ width + dist.}$$
>
> where:
> **R_{chr/cm}** - resolution defined as a number of characters per centimeter,
>
> $R_{chr/cm}$ - resolution defined as a number of characters per centimeter,
> $R_{chr/in}$ - resolution defined as a number of characters per inch,
> $R_{dot/cm}$ - resolution defined as a number of dots per centimeter; it is the same as the setting of the **Resol. dot/cm** print parameter,
> **character width** - width (number of dots) of a character for a selected font,
> **dist.** - a distance (number of dots) between characters; it is defined by the **Distance** parameter.
>
> For example, if you select **Latin 16x10**, the character width is 10. If **Distance=2** and **Resol. dot/cm=24**, the resolution is **2 characters/cm** or **5,08 characters/inch**.

On determining the maximum print rate for the printer which works with a shaft-encoder, you should stop printing and modify the setting of the **Generator** parameter to **SHAFT**. See also subsection *4.12.4 Information for Advanced Users* and *4.12.5 Problems with Reaching Maximum Print Rate when Shaft-encoder is Used*.

4.12.4. Information for Advanced Users

The printer's maximum rate is limited only by the time that is needed to jet ink drops to print a vertical row. This time depends on the following:

1. Ink-drop generation frequency:
   - For the standard frequency of 62.5 kHz (**EBS-6500**, **EBS-6800**), such drops are generated every 16 µs.
   - For a higher frequency of 91 kHz (**EBS-7200**), ink drops are generated every 11 µs.
2. The number of dots per one vertical row (the dots are always counted as if all of them were printed). The number includes the following:
   - All dots for a given font size (e.g. for the 16x10 font there are 16 dots in one vertical row).
   - All drops which are jetted between the useful dots but always directed to the gutter irrespective of what pattern is printed. This number depends on the correction algorithm chosen, *i.e.* on the selected combination of the **Height**, **Speed** print parameters and the text height given as a number of dots (the **Height (pix)** printing parameter) – the correction algorithms are shown on successive lines in *Tab. 4.12.6.1* and *Tab. 4.12.6.2*.

No printing of another vertical row can start until the printing of the previous row is completed. This means that the time interval at which vertical rows are released for printing cannot be shorter than the printing time referred to above.

The row release interval depends on the conveyor travel speed and the resolution.

The user does not need to determine the period of time after which another vertical row should be printed. Instead it should specify the following natural parameters:

- **When an internal generator is used:** *Resolution*, which is given as a number of dots per centimeter (the **Resol. dot/cm** parameter) and *conveyor travel speed*, which is given as a number of meters per minute (the **Cnv spd m/min** parameter). They are used by the printer to calculate the time interval at which a row release pulse should be generated to start printing another vertical row. If the interval is smaller than the time needed to generate all dots to print a vertical row (see points *1*, *2* above), then the printer indicates an error. If the conveyor starts moving at the speed that is greater than declared, then the print will stretch proportionally.
- **When a shaft-encoder is used:** *Resolution*, which is given as a number of dots per centimeter (the **Resol. dot/cm** parameter) and *encoder constant*, which is given as a number of pulses per meter (the **Enc const p/m** parameter). In this configuration the printer "does not know" when it is likely to receive a row release pulse to start printing another vertical row. If the pulse is generated before the printing of the previous vertical row is completed, it must be ignored. Such a situation occurs only when the maximum print rate is exceeded. And this occurs when greater spaces between some rows appear.

The print rate is defined by the following formula:

$$V = 6*10^5 * \left(R*t\right)^{-1} \left[\frac{m}{\min}\right],$$

where:

R - actual resolution [dots/cm],

t - time between successive vertical rows [µs/dot].

The shortest time between successive vertical rows which can be obtained for a given correction algorithm is calculated as follows:

$$T_{tot} = \frac{60}{100 * r * V_m} [s],$$

where:

r – resolution recommended for a given correction algorithm (taken from **Tab. 4.12.6.1** or **Tab. 4.12.6.2**) [dots/cm],

V_m – maximum print rate for a given correction algorithm (taken from **Tab. 4.12.6.1** or **Tab. 4.12.6.2** for given resolution) [m/min].

From the above, it appears that the maximum print rate for given resolution, **R**, and the total time, **T_tot**, which is needed to print a row, is defined as:

$$V_{max} = \lim_{t \to T_{tot}} 6*10^5 * (R*t)^{-1} \left[\frac{m}{min} \right].$$

The value is the same irrespective of whether an internal generator or a shaft-encoder is used.

When the printer works with an internal generator, it is very easy to reach the maximum print rate because printing is controlled by the printer's computer which uses a common, very accurate, quartz oscillator to generate ink drops and release printing of successive rows. Therefore the two processes are absolutely synchronous and cophasal.

When the printer works with a shaft-encoder, it is much more difficult to reach the maximum print rate because two asynchronous generators need to be used. The first one is a quartz oscillator and the other is the shaft-encoder. In addition the pulses from the shaft-encoder are unstable and in no way are they synchronous with the pulses generated by the oscillator.

If the maximum factory conveyor travel speed is exceeded, when both an internal generator and a shaft-encoder are used, the symptoms are very similar. In either case, when the conveyor travel speed changes, vertical rows become spaced.

4.12.5. Problems with Reaching Maximum Print Rate when Shaft-encoder is Used

The description given below is a case study of the maximum print rate. Please note that when it reaches its maximum conveyor travel speed, the printer switches to operation at that maximum (constant) print rate automatically. **If the rates are smaller than the maximum (with a tolerance specified below) no problems occur**.

1. The encoder constant.

    If the shaft-encoder constant is too small, it will be difficult to reach the set resolution – the real resolution will be rather distant from the setting. The shaft-encoder constant, **S**, is given as a number of pulses generated when the conveyor travels over a distance of one meter. For a given resolution **r** the printer sets the value of the system divider, **D**, which matches the two quantities with each other.
    The divider can be set to integral values only according to the following formula:

$$D = \frac{S}{100 * r} + 0{,}5,$$

where:

S – encoder constant,

r - given resolution.

The real resolution is determined from the following formula:

$$R = \frac{S}{100 * D}.$$

Example.

The shaft-encoder constant **S** is 8820 and resolution **r** is 19.

The divider value **D** is calculated in the following way:

$$D = \frac{S}{100*r} + 0,5 = \frac{8820}{100*19} + 0,5 = 4,64 + 0,5 = 5 \quad \text{(in round figure)}.$$

The real resolution is:

$$R = \frac{S}{100*D} = \frac{8820}{100*5} = 17,64 .$$

If the resolution is **r**=20, 21, 22, 23 and 24, the divider value **D** is always the same (as it is given in round figure) and amounts to **D**=4. This value corresponds to the real resolution of **R**=22.05.

If **r**=20 is chosen out of the above range, the error is:

$$100\% * \left(\frac{22,05}{20} - 1 \right) = 10,25\% .$$

The maximum rate to be obtained corresponds to the resolution of **R**=22.05 and not to the given value of **r**=20. Therefore for T_{tot}=1024 µs the maximum rate is 26.573 m/min. If a better shaft-encoder is used, a higher rate is reached - see the consideration for the shaft-encoder constant of 44000 below.

In order to ensure that the real resolution of a diversified value is obtained in practice for each of the resolutions **r** specified above, you need to choose a better shaft-encoder whose constant is for example 44000.

NOTE:
If the shaft-encoder constant is increased by decreasing the diameter of the roll travelling on the conveyor, the spread of the parameter values is usually greater.

The following values can be obtained for the shaft-encoder constant of **S**=44000:

r	*D*	*R*
20	22	20,00
21	21	20,95
22	20	22,00
23	19	23,16
24	18	24,44

If the shaft-encoder with the constant of **S**=44000 is used, the maximum rate of 29.296 m/min can be obtained for the given resolution of **r**=20 and T_{tot}=1024 µs. This maximum rate is much higher than for the shaft-encoder whose constant is **S**=8820.

The above data shows that it may appear that the real resolution is greater than required and the maximum rate given in meters per minute corresponds to the real resolution and not to a given value. The percentage error U_S increases along with an decrease in the encoder constant.

2. Stability of the conveyor's travel speed.

    Every real installation suffers from conveyor vibration. The actual speed varies, sometimes it is higher and sometimes it is lower. Therefore the real, temporary speed of the conveyor is V(1+/-ΔV). If the maximum print rate is not to be exceeded, it must not be exceeded at any moment of time. It is not enough to measure the average conveyor speed. The higher the vibration (instability) of the travelling conveyor, the lower the maximum achievable conveyor speed. The percentage error is U_t=ΔV*100%.

3. Accuracy of measurement of the shaft-encoder constant and conveyor travel speed.

    Every measurement involves a measuring error which depends on the class of measuring equipment and the experience of the person who takes the measurement. The pooled percentage er-

rors of the measurement are marked as U_p. It may appear that the real print rate is greater than that determined by measurement due to measuring inaccuracy.

4. Spread of the shaft-encoder constant vs. angle of rotation.

While measuring the shaft-encoder constant we measure the average value. The measurement usually consists of counting of (many thousand of) pulses for a number of full shaft-encoder rotations. Whereas the real printer reacts to the distance between successive pulses and not to the average value. Thus the accuracy of the manufacture of the shaft-encoder (the spread between successive pulses) and the spread of the radius of the shaft-encoder roll running along the conveyor make the distance timed by successive shaft-encoder pulses vary. And also the print rate varies even if the conveyor speed is stable as perfectly as possible.

In addition, if the shaft-encoder constant is to be increased (doubled) (which is vital – see point *1* above), the electronic circuitry of the printer will react to both rising and falling edges of shaft-encoder pulses (series **I** in the drawing below) by using them to generate series **J**. If the capacity of pulses generated by the shaft-encoder (measured at the input to the XILINX circuit) differs by 50%, then there is an additional error **Δb** which appears only for odd values of divider **D**.
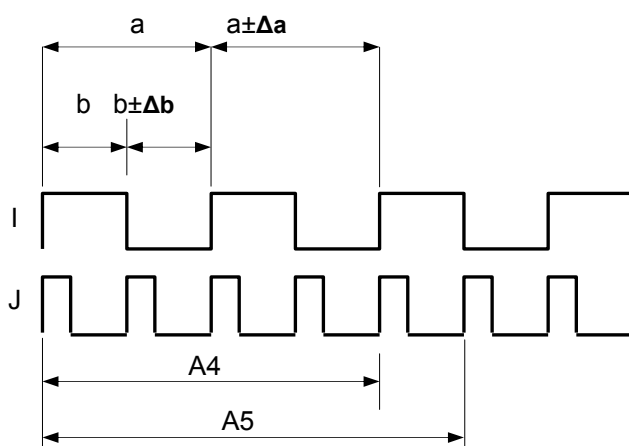
Fig. 4.12.5.1

Thus, if **D**=4 (see point *1* above) the measured distance **A4** (see *Fig. 4.12.5.1*) can be biased with error **Δa**, and for **D**=5, the measured distance **A5** can be biased with error **Δa+Δb**.

The maximum percentage error described in this section is:

$$U_r = \frac{\Delta a + \Delta b}{a} * 100\% \;.$$

The maximum error which may occur under such conditions provided that the above errors are not significant, can be expressed approximately as:

$$U = U_s + U_t + U_p + U_r \;.$$

In the most adverse case, we can obtain the maximum rate that is by **U%** smaller than the theoretical value. The values of the above errors depend on specific installation and can vary extremely for various applications. Therefore every case needs to be considered on an individual basis. For more information on the above you can contact an experienced serviceperson.

4.12.6. Maximum Print Rate vs. Resolution

The below given tables contain the information on the maximum printing speeds vs. selected printing parameters (the speeds are given for the recommended print resolution). The tables also contain the information on print heights obtainable for a given mode when the recommended distances between objects and the print head as well as the recommended high voltage are applied. *Tab. 4.12.6.1* applies to the EBS-6500 and EBS-6800 printers, whereas *Tab. 4.12.6.2* applies to the EBS-7200 printer.

Correction algorithm No.	Printing parameter settings		Print height [number of dots] (the Height (pix) parameter)	Recommended settings			Recommended resolution [dots/cm]	Maximum printing speed (at recommended resolution) [m/min.]
	Speed	Height		Distance between object and the head [mm]	High voltage [kV]	Print height (at recommended settings) [mm]		
	SLOW	LARGE	5	5	2.6	3.5	14	133
2		MIDDLE	5	5	2.6	2.5	20	66
3		SMALL	5	5	2.6	1.6	30	62
4		LARGE	7	5	2.6	5.0	14	95
5		MIDDLE	7	5	2.6	3.6	20	66
6		SMALL	7	5	2.6	2.4	30	44
7		LARGE	11	10	3.2	7.5	14	92
8		MIDDLE	11	10	3.2	5.4	20	49
9		SMALL	11	10	3.2	4.0	26	29
10		LARGE	16 2x7	15	3.2	8.5	20	29
11		MIDDLE	16 2x7	15	3.2	5.6	28	20
12		SMALL	16 2x7	15	3.2	3.7	35	10
13		LARGE	25 2x11	30	3.4	11.5	22	13
14		MIDDLE	25 2x11 3x7	20	3.4	7.8	32	10
15		LARGE	32	30	3.4	12.0	25	6
16		LARGE	3x7	30	3.4	8.0	22	23
17		LARGE	4x7	20	3.4	10.0	30	11
	MIDDLE	LARGE	5	5	2.6	3.5	14	243
19		MIDDLE	5	5	2.6	2.5	20	187
20		SMALL	5	5	2.6	1.4	35	107
21		LARGE	7	5	2.6	5.0	14	191
22		MIDDLE	7	5	2.6	3.6	20	133
23		SMALL	7	5	2.6	2.0	35	76
24		LARGE	11	5	3.2	5.8	18	130
25		MIDDLE	11	5	3.2	4.5	24	71
26		LARGE	16 2x7	10	3.2	7.5	22	53
27		MIDDLE	16 2x7	10	3.2	4.8	32	30
28		LARGE	25 2x11	20	3.4	9.5	26	19
29		LARGE	32	20	3.4	9.5	32	7
30		LARGE	3x7	20	3.4	9.5	26	31
31		LARGE	4x7	15	3.4	9.0	33	13.8
32	FAST	LARGE	5	5	2.6	3.0	17	441 (379)
33		MIDDLE	5	5	2.6	2.4	21	357 (307)
34		SMALL	5	5	2.6	1.4	35	214 (184)
35		LARGE	7	5	2.6	4.5	17	315 (271)
36		MIDDLE	7	5	2.6	3.6	21	255 (219)
37		SMALL	7	5	2.6	2.0	35	153 (131)
38		LARGE	11	5	3.2	5.8	18	189 (162)
39		MIDDLE	11	5	3.2	4.5	24	91 (78)
40		LARGE	16 2x7	10	3.2	7.5	22	85 (73)
41		MIDDLE	16 2x7	10	3.2	4.8	32	43 (37)
42		LARGE	25 2x11	20	3.4	9.5	26	28 (24)
43		LARGE	32	20	3.4	9.5	32	11 (9.5)
44		LARGE	3x7	20	3.4	9.5	26	40 (34)
45		LARGE	4x7	15	3.4	9	33	18 (15.5)

Tab. 4.12.6.1 Summary of print speeds for the EBS-6500/EBS-6800 printers

Correction algorithm No.	Speed	Height	Print height [number of dots] (the Height (pix) parameter)			Distance between object and the head [mm]	High voltage [kV]	Print height (at recommended settings) [mm]	Recommended resolution [dots/cm]	Maximum printing speed (at recommended resolution) [m/min.]
1	SLOW	LARGE	5			2	2.2	2.4	20	136
2		MIDDLE	5			2	2.2	1.8	28	69
3		SMALL	5			2	2.2	1.2	40	68
4		LARGE	7			2	2.2	3.4	21	97
5		MIDDLE	7			2	2.2	2.7	27	72
6		SMALL	7			2	2.2	1.7	40	48
7		LARGE	11			7.5	2.8	6.5	18	104
8		MIDDLE	11			7.5	2.8	4.5	24	59
9		SMALL	11			7.5	2.8	3.4	31	35
10		LARGE	16	2x7		12	2.8	7	24	35
11		MIDDLE	16	2x7		12	2.8	5.0	31	27
12		SMALL	16	2x7		12	2.8	3.3	39	13.1
13		LARGE	25	2x11		15	3.0	8.5	30	14.0
14		MIDDLE	25	2x11	3x7	10	3.0	6	40	11.8
15		LARGE	32			15	3.0	8.5	35	6.2
16		LARGE	3x7			15	3.0	8.5	30	26
17		LARGE	4x7			10	3.0	7	40	11.8
18	MIDDLE	LARGE	5			2	2.2	2.4	20	247
19		MIDDLE	5			2	2.2	1.8	28	194
20		SMALL	5			2	2.2	1.2	40	136
21		LARGE	7			2	2.2	3.4	21	185
22		MIDDLE	7			2	2.2	2.7	27	144
23		SMALL	7			2	2.2	1.7	40	97
24		LARGE	11			5	2.8	4.5	23	148
25		MIDDLE	11			5	2.8	3.4	32	77
26		LARGE	16	2x7		7.5	2.8	6.5	25	68
27		MIDDLE	16	2x7		7.5	2.8	3.9	39	36
28		LARGE	25	2x11		10	3.0	7	35	20
29		LARGE	32			10	3.0	7	40	8.3
30		LARGE	3x7			10	3.0	7	35	37
31		LARGE	4x7			10	3.0	7	40	16.4
32	FAST	LARGE	5			2	2.2	2.4	21	519 (446)
33		MIDDLE	5			2	2.2	1.8	28	389 (334)
34		SMALL	5			2	2.2	1.2	40	272 (233)
35		LARGE	7			2	2.2	3.4	23	338 (290)
36		MIDDLE	7			2	2.2	2.7	28	278 (238)
37		SMALL	7			2	2.2	1.7	40	194 (166)
38		LARGE	11			5	2.8	4.5	23	215 (184)
39		MIDDLE	11			5	2.8	3.4	32	100 (85)
40		LARGE	16	2x7		7.5	2.8	6.5	25	109 (93)
41		MIDDLE	16	2x7		7.5	2.8	3.9	39	51 (43)
42		LARGE	25	2x11		10	3.0	7	35	31 (26)
43		LARGE	32			10	3.0	7	40	12.7 (10.8)
44		LARGE	3x7			10	3.0	7	35	48 (41)
45		LARGE	4x7			10	3.0	7	40	21 (18)

Tab. 4.12.6.2 Summary of print speeds for the EBS-7200 printers

> **NOTE:**
> The recommended object-to-print head distances given in the tables are the maximum figures for a given correction algorithm. If the distance increases, print quality deteriorates clearly. The distance can be reduced, which results in a decreased height of prints but in no deterioration of print quality.

Additional information on printing parameters:

➢ Only those combinations of the **Speed** and **Height** printing parameters and the text height given in "dots" (the **Height (pix)** printing parameter) that are listed in *Tab. 4.12.6.1* and *Tab. 4.12.6.2* are permitted. Should a banned combination be used, an attempt to start printing results in the following error message displaying:
Increase PRINT.PARAM. Height or
decrease PRINT.PARAM. Speed or
decrease text height [dots].
and the settings of the **Speed**, **Height** and **Height (pix)** parameters giving.
While the printing parameters of a given text file are edited, their correctness is checked on an on-going basis.

➢ If **Speed=FAST**, the text prepared for printing must meet the following criteria:
  – No bar codes shall be used,
  – The use of bold face in the text to be printed reduces maximum achievable printing speeds – such speeds are enclosed in parentheses in *Tab. 4.12.6.1* and *Tab. 4.12.6.2*,
  – If there is the need to use characters whose height is greater than 12 dots in any of the subfiles, special fonts must be used. For these fonts the original name is preceded by the prefix "fast" (e.g. Fast Latin 16x9 – see paragraph entitled *Subfile Type: Text - ASCII Characters* in section *4.7.2 Types of Subfiles*).
  If the text to be printed fails to meet the above requirements, an attempt to start printing makes the following message be displayed:
  ERROR, one of the SUBTEXTS
  contains BARCODE
  or IMPROPER FONT
  for Speed=FAST

➢ If a text to be printed contains graphics and **Speed=FAST**, then the print resolution set is not guaranteed for the text piece created by the graphical subtext. In effect the length of the entire print may appear slightly greater that it should be at the given resolution setting. If that is the case, the settings should be chosen experimentally (*e.g.* by reducing conveyor travel speed slightly) so that the print obtained is satisfactory to the user.

A sample print for **Distance=1**
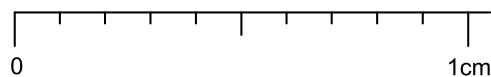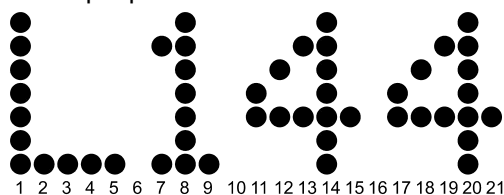
Resol. dot/cm=20

NOTE:

<u>If the conveyor travel speed is constant</u>, the **Speed** print parameter is set and the **Cnv spd m/min** print parameter is adjusted to the conveyor travel speed, bear in mind the following hints:

- In order to get <u>proportional</u> characters (i.e. of the same amounts of dots in the vertical and horizontal directions), you can use only two parameters: the print height (number of units of length, e.g. millimeters) and the horizontal resolution (the **Resol. dot/cm** print parameter).
- The print height can be changed by changing the distance between the product to be labeled and the head and/or the setting of the **Height** print parameter and/or (exceptionally) high voltage. <u>One should however bear in mind the fact that an increase in the object-to-head distance results in visible lowering of the outprint quality.</u>
- Please note that there is a difference between the print height measured in units of length (e.g. mm) and the print height given as a number of dots. If the print height is defined by a number of dots, we take into consideration character matrices, a layout of subtexts within the overprint, dot-route corrections and the related limitations. If the print height is given in length units, we mainly think of the appearance of an overprint.
- If the print height changes, the vertical resolution changes and in order to get proportional characters, you need to modify the **Resol. dot/cm** or **Cnv spd m/min** print parameter.

Examples of Printouts for Various Modes of Printing

Tab. 4.12.6.3 shows examples of printouts obtainable with the **EBS-6800** printer for the given settings of the **Speed** and **Height** print parameters. The travel speed of the factory conveyor is given in the text printed.

Examples of prints obtained at 3 printing speed modes	Speed=**SLOW** Height=LARGE 16-dot prints	Recommended profile: **max height 16 dots** 2 LINES 7X5 SLOW SPEED ECC200 TEST 29 m/min
	Speed=**MIDDLE** Height=LARGE 16-dot prints	Recommended profile: **max height 16 dots** 2 LINES 7X5 MEDIUM SPEED ECC200 TEST 53 m/min
	Speed=**FAST** Height=LARGE 16-dot prints	Recommended profile: **2 lines x 7 dots** 2 LINES 7X5 85 M/MIN HIGH SPEED MODE *(limited height of characters in subfiles to 12 dots or Fast fonts need to be used, no bar codes, the use of bold face reduces the maximum printing speed)*
Examples of the application of bar codes	Speed=**SLOW** Height=LARGE 25-dot prints	Recommended profile: **max height 25 dots** 3 LINES 7X5 SLOW SPEED BARCODE TEST CODE 39
	Speed=**SLOW** Height=LARGE 32-dot prints	Recommended profile: **max height 32 dots** 32 PIX 4 LINES 7X5 SLOW SPEED TEST CODE 39
Examples of texts meeting the fast mode requirements	Speed=**FAST** Height=LARGE 25-dot prints	Recommended profile: **max height 32 dots** 3 LINE 7X5 4 LINES 5X5 HIGH HIGH SPEED SPEED 28 M/MIN TEST *(limited height of characters in subfiles to 12 dots or Fast fonts need to be used, no bar codes, the use of boldface reduces the maximum printing speed, graphics can be used)*
	Speed=**FAST** Height=MIDDLE 16-dot prints	Recommended profile: **max height 16 dots** 2 LINES 5X5 PIX +1LINE 9X7 88m/min *(limited height of characters in subfiles to 12 dots or Fast fonts need to be used, no bar codes, the use of bold face reduces the maximum printing speed)*

Tab. 4.12.6.3

5. Examples of How to Operate the Printer

NOTE:
It has been assumed that the user has become familiar with the manual or has at least read chapter *4 Operating the Printer*.

5.1. How to Print the First Sample Text File

This chapter contains a description of how to prepare the BOLTMARK®-series printer for operation and how to print a simple text file. The example covers instructions on how to install a new machine, switch it on, set major parameters and print a text file that has been input via a terminal.

1) If the printer is installed by the manufacturer or authorized service staff, this section can be omitted. Otherwise **the procedure below needs to be followed to install the printer**:
- ➥ Read section *2.1 Safety Requirements*.
- ➥ Follow the instructions given in section *2.3 Installing the Printer*.

2) **Place the print head in a holder in such a position that nobody or nothing can be splashed with ink accidentally**. Therefore position the head horizontally at first and place a shallow ink dish under it.

> **NOTE:**
> If a sound alarm occurs while the below specified procedure is followed, try to find the reason for the alarm by studying the indications.

3) **Switch the printer on by pressing the green** **ON** **key on the external panel.**

4) **About 3 minutes after switching the printer on check for proper phasing by viewing the head status**. See section *4.11 Print Head Status*.

> **NOTES:**
> - The head status referred to may vary frequently over the first 3 minutes after the unit has been switched on, because ink of varying density flows into the head from supply pipes.
> - If the phasing fails to reach right results within about 3 minutes of switching on, a phasing error occurs.

5) **Use the terminal keypad to create a text file to be printed.**

In the main MENU select the **TEXT SERVICE** item and then the **CREATE NEW TEXT** item.

After the text file name, e.g. **TXT1**, has been specified, a list of text profiles is displayed.

Choose the **max height 7 dots** profile in the list and confirm your choice – see section *4.7.1 Text Profiles*.

The text processor starts running. Now you can use the keypad to input what is to be printed. A description of the processor control keys/icons is given in section *4.7 Word Processor*.

Use terminal keys to type in text ➤COFFEE◄, which is then stored in the printer's memory after it has been confirmed with the ⏎ENTER icon.

6) **Set print parameters.**
All options are normally preset by the manufacturer to meet user requirements. Print parameters are set to their default[15] settings. The only important thing in making overprints is the source of timing pulses: a shaft-encoder (travel speed indicator) or an internal generator. If the head is set to work with the shaft-encoder, it will make overprints only when the shaft-encoder axle rotates.

---

[15]**Default value** - If the printing parameters are edited for the first time, the default settings are initial settings made by the manufacturer, whereas if the parameters were already modified, then the recently made settings are used as the default settings.

If the head is set to work with the internal generator, overprints are made at a fixed rate no matter how fast objects move (even if no objects move). The option can be modified with the **Generator** print parameter and either **GEN**erator or **SHAFT**-encoder can be set.

In the main MENU select the **PRINTING** item, and then the **PRINTING PARAMETERS** item.

The parameters should be set to the following values:

Active text	:	**TXT1**
Linked param.	:	
Height (pix)	:	**7**
Height	:	**LARGE**
Speed	:	**SLOW**
Generator	:	**!!!see above!!!**
Resol. dot/cm	:	**14**[16]**/21**[17]
Cnv spd m/min	:	**10.0**
Enc const p/m	:	**10000**
Vert. direct.	:	**STANDARD**
Space	:	**2.0 mm**
Text rpt.	:	**1**
Rpt.dist.	:	**30.0 mm**
Conv. direct.	:	**LEFT**
Offset	:	**1**
Offset2	:	**1**
Counter delta	:	**1**
Row repetit.	:	**1**
Mode	:	**NORMAL**

choose a text from the library (with the [ALT] or [←] [→] icons)

recommended resolution for correction algorithm No. 4
only for Generator=GEN or
only for Generator=SHAFT.

Confirm the modifications to the parameters without saving them to a block.

7) Start printing the text file TXT1 you have just created.
In the main MENU select the **PRINTING** item, and then the **START PRINT** item.

Printing starts after the name **TXT1** has been typed in and confirmed.

If you want to stop printing, select the **STOP PRINTING** command from the **PRINTING** submenu.

---

[16] For the **EBS-6500** and **EBS-6800** printers (see *Tab. 4.12.6.1*).
[17] For the **EBS-7200** printers (see *Tab. 4.12.6.2*).

NOTES:

➡ The **START PRINT** command is followed by the application of high voltage (the green LED above the ⬤ key on the main pad of the external panel and the red LED **HV_ON** on the inner panel emit steady light) and an overprint is made each time the photo detector is activated. Therefore - if you wish to obtain good quality prints - place an object to be labeled or a sheet of paper in front of the print head at not greater a distance than that recommended for a given correction algorithm For the combination of the text height given as a number of dots and the **Speed** and **Height** printing parameters used in the example above this distance is **5 mm** (for the EBS-6500 and EBS-6800 printers – see algorithm **No. 4** in *Tab. 4.12.6.1*) or **2 mm** (for the EBS-7200 printers – see algorithm **No. 4** in *Tab. 4.12.6.2*). The proper operation of the photo detector is indicated by a red LED indicator at the back of the photo detector. If a product has been detected, the LED goes out. While conducting print tests, cover the photo detector with your hand for a while to release its operation.

➡ After the photo detector has been activated, printing starts. The procedure varies, however, according to the mode of timing:

- If printing is timed by an internal generator, overprints are made no matter whether the product(s) move or not. If the product does not move, a very narrow overprint is made and a single vertical row is printed only (!).
- If printing is timed by a shaft-encoder, overprints are made <u>only when the shaft-encoder axle rotates</u>.

➡ If the width of characters is incorrect, adjust the print rate following the instructions given in section *4.12 Adjusting Print Rate*.

➡ If prints are made too fast, the print quality tends to be poor. You can recognize it easily by discontinuous print as the print rate control system ignores some of the timing pulses. In effect, the character width may get out of proportion. See also section *4.12 Adjusting Print Rate*.

➡ The proper setting of the combination of the following parameters is the precondition for overprints:

- Text height, given as a number of dots (the **Height (pix)** parameter in the printing parameters),
- **Height** and **Speed** in printing parameters.

The permissible combinations of the above mentioned parameters are given in *Tab. 4.12.6.1* and *Tab. 4.12.6.2* in subsection *4.12.6 Maximum Print Rate vs. Resolution*. If a combination chosen is different than those defined in the table and an attempt is made to start printing, the following message is displayed:

Increase PRINT.PARAM. Height or
decrease PRINT.PARAM. Speed or
decrease text height [dots].

and the settings of the following parameters **Speed**, **Height** and **Height (pix)** are given.

➡ If the **STOP PRINTING** command is selected during printing, the current overprint is finished and the operation stops (high voltage is turned off). In the event the shaft-encoder is used, this stage may take longer (especially when a long overprint is made and the shaft-encoder axle stops rotating after the conveyor has been stopped). Some commands may not be accepted then (and the **CHANNEL ACTIVE** message is shown on the terminal display). To speed the process up, move the shaft-encoder axle a little to complete the overprint or interrupt the printing at any time with the **QUICK STOP** command.

5.2. Creating and Printing Various Text Files

NOTE:
The following notation is used in the examples below:

    ☐   represents one space character,

➢text◁   means text-file contents to be input via the terminal keypad.

5.2.1. How to Print the Current Date and Time

Assumption: It is 13th July 2012, 08:01 hours; the overprint should look like as follows:

DATE: 13.07.12
TIME: 08:01

1) Define four **TEXT - ASCII** characters type subfiles, including two subfiles that are special registers *Date* and *Time*. See subsection *4.7.3 Using Special Registers*.
➥ In the main MENU select the **TEXT SERVICE** item and then the **CREATE NEW TEXT** item.
➥ You are prompted to type in a text-file name. Input a name, e.g. **DATI** and confirm.
➥ In the list of text profiles displayed choose the **2 lines x 7 dots** profile and confirm it – see section *4.7.1 Text Profiles*.

Type : **Text** **Char. set** : Latin 7x5 **Typeface** : **Normal** **Chr. width** : **Proportional** **Distance** : **2** **Rotation** : **None** **Spec. reg.** : **None** **Front dist** : 0 **Back dist** : 0	• Set parameters for the first subfile (the [PAR] icon) and confirm. • Input contents for the first subfile: ➤DATE:☐◁. • Press the [ ][→] icons to create a new subfile to the right of the previous one.
Spec. reg. : **Date**	• Set parameters for the second subfile as in the example above, then change the setting for **Spec. reg.** and confirm. • Input contents for the second subfile: ➤00.00.00◁. • Press the [ ][↓] icons to create a new subfile below the two previous ones.
Spec. reg. : **None**	• Set parameters for the third subfile, as in the example above, then change the setting for **Spec. reg.** and confirm. • Input contents for the first subfile: ➤TIME:☐◁. • Press the [ ][→] icons to create a new subfile to the right of the previous one.
Spec. reg. : **Time**	• Set parameters for the second subfile as in the example above, then change the setting for **Spec. reg.** and confirm. • Input contents for the fourth subfile: ➤00:00◁ (hours and minutes only). • Press the [ENTER] icon to record the text file in the library and save it in the memory.

2) Define print parameters following the instructions given in section *5.1 How to Print the First Sample Text File* point *6)*. Change the settings of the following parameters:

Active text : **DATI** **Height (pix)** : **16** **Resol. dot/cm** : **20**[18]**/24**[19]	choose a text from the library (with the [ALT] or [←][→] keys) info parameter, it depends on the text chosen recommended resolution for correction algorithm No. 10

3) Place an object to be labeled or a sheet of paper at not greater distance from the front of the print head than:
  − **15 mm** – for the **EBS-6500** and **EBS-6800** printers (this is the recommended distance given in *Tab. 4.12.6.1* for correction algorithm **No. 10**),

---

[18] For the **EBS-6500** and **EBS-6800** printers (see *Tab. 4.12.6.1*).
[19] For the **EBS-7200** printers (see *Tab. 4.12.6.2*).

⬜ The BOLTMARK®-series Printers User's Manual

🗎 Chapter 5 - Examples of How to Operate the Printer

– **12 mm** – for the EBS-7200 printers (this is the recommended distance given in *Tab. 4.12.6.2* for correction algorithm **No. 10**).

4) Print the text file called **DATI** following the instructions given in section *5.1 How to Print the First Sample Text File* point *7)*.

5.2.2. How to Print Consecutive Numbers

Assumption: A six-digit number is to be printed; there is a product moving in front of the print head, it has been detected by the photo detector as the 5824th in turn; the label should look like as follows, when printed (only the number changes in successive overprints):

<div align="center">

Serial number: 005824

</div>

1) Define two **TEXT - ASCII characters** type subfiles, including one subtext that is the *Up counter* special register (incremental counter). See subsection *4.7.3 Using Special Registers*.

➥ In the main MENU select the **TEXT SERVICE** item and then the **CREATE NEW TEXT** item.

➥ You are prompted to type in a text-file name. Input a name, e.g. **NUMR** and confirm.

➥ In the list of text profiles displayed choose the **max height 25 dots** profile and confirm it - see section *4.7.1 Text Profiles*.

Type : **Text** **Char. set** : **Latin 16x10** **Typeface** : **Bold** **Chr. width** : **Proportional** **Distance** : **2** **Rotation** : **None** **Spec. reg.** : **None** **Front dist** : 0 **Back dist** : 0	• Set parameters for the first subfile (the [PAR] icon) and confirm. • Input contents for the first subfile: ⯈Serial⬜number:⬜⯇. • Using the [icons] lower the subtext to as low a position as possible. • Press the [icons] to create a new subfile to the right of the previous one.
Char. set : Latin 25x15 **Typeface** : **Normal** **Spec. reg.** : **Up counter**	• Set the parameters for the second subfile in the same way as above and modify the **Char. set, Typeface** and **Spec. reg.** parameters and confirm the modification. • Input contents for the second subfile: ⯈000001⯇. • Press the [ENTER] icon to record the text file in the library and save it in the memory.

2) Define print parameters following the instructions given in section *5.1 How to Print the First Sample Text File* point *6)*. Change the settings of the following parameters:

Active text : **NUMR**	choose a text from the library (with the [ALT] or [←] [→] icons)
Height (pix) : **25**	info parameter, it depends on the text chosen
Resol. dot/cm : **22**[20]/**30**[21]	recommended resolution for correction algorithm No. 13

3) Place an object to be labeled or a sheet of paper at not greater distance from the front of the print head than:

– **30 mm** – for the EBS-6500 and EBS-6800 printers (this is the recommended distance given in *Tab. 4.12.6.1* for correction algorithm **No. 13**),

– **15 mm** – for the EBS-7200 printers (this is the recommended distance given in *Tab. 4.12.6.2* for correction algorithm **No. 13**).

4) Print the text file called **NUMR** following the instructions given in section *5.1 How to Print the First Sample Text File* point *7)*.

---

[20] For the EBS-6500 and EBS-6800 printers (see *Tab. 4.12.6.1*).
[21] For the EBS-7200 printers (see *Tab. 4.12.6.2*).

> **NOTE:**
> The serial numbers increase by one: 000001, 000002, 000003, ... , 000025, etc. with every over-print. While editing the second subfile you can set an initial number within the subfile to continue the counting.

5.2.3.   How to Print Expiry Dates

Assumption: the product to be labeled is fit for use for 70 days; if the current date is 13th July 2012, the overprints would look like as follows:

Best before: 21.09.12

1) Define two **TEXT - ASCII characters** type subfiles, including one subtext that is the *Date+offs.* special register. See section *4.7.3 Using Special Registers*.

➡ In the main MENU select the **TEXT SERVICE** item and then the **CREATE NEW TEXT** item.
➡ You are prompted to type in a text-file name. Input a name, e.g. **EXDA** and confirm.
➡ In the list of text profiles displayed choose the **max height 16 dots** profile and confirm - see section *4.7.1 Text Profiles*.

Type	: **Text**
Char. set	: **Latin 7x5**
Typeface	: **Bold**
Chr. width	: **Proportional**
Distance	: **2**
Rotation	: **None**
Spec. reg.	: **None**
Front dist	: 0
Back dist	: 0

- Set parameters for the first subfile (the [PAR] icon) and confirm.
- Input contents for the first subfile:
  ➢Best□before:□◁.
- Using the [⊞][↓] icons lower the subtext to as low a position as possible.
- Press the [▭][→] icons to create a new subfile to the right of the previous one.
- Set the parameters for the second subfile in the same way as above and modify the **Char. set, Typeface** and **Spec. reg.** parameters and confirm the modification.

Char. set	: Latin 16x10
Typeface	: **Normal**
Spec. reg.	: **Date+offs.**

- Input contents for the second subfile: ➢DA.MO.YE◁.
  NOTE:
  The file contains a date coded as **day.month.year**. - see section *4.7.3 Using Special Registers* – the *Universal Date and Time* register.
- Press the [ENTER] icon to record the text file in the library and save it in the memory.

2) Define print parameters following the instructions given in section *5.1 How to Print the First Sample Text File* point *6)*. Change the settings of the following parameters:

Active text	: **EXDA**	choose a text from the library (with the [ALT] or [←][→] icons)
Height (pix)	: **16**	info parameter, it depends on the text chosen
Resol. dot/cm	: **20[22]/24[23]**	recommended resolution for correction algorithm No. 10
Offset	: **70**	

3) Place an object to be labeled or a sheet of paper at not greater distance from the front of the print head than:

– **15 mm** – for the EBS-6500 and EBS-6800 printers (this is the recommended distance given in *Tab. 4.12.6.1* for correction algorithm **No. 10**),
– **12 mm** – for the EBS-7200 printers (this is the recommended distance given in *Tab. 4.12.6.2* for correction algorithm **No. 10**).

---

[22] For the EBS-6500 and EBS-6800 printers (see *Tab. 4.12.6.1*).
[23] For the EBS-7200 printers (see *Tab. 4.12.6.2*).

4) Print the text file called **EXDA** following the instructions given in section *5.1 How to Print the First Sample Text File* point *7)*.

> **NOTE:**
> The current date is increased by 70 days after every overprint has been made and the new date is printed next.

5.2.4.   How to Print Logos

Assumption: the overprint should look like the following:

1) Define a GRAPHICS subfile and make a graphical image – a logo.
➡ In the main MENU select the **TEXT SERVICE** item and then the **CREATE NEW TEXT** item.
➡ You are prompted to type in a text-file name. Input a name, e.g. **LOGO** and confirm.
➡ In the list of text profiles displayed choose the **max height 25 dots** profile and confirm – see section *4.7.1 Text Profiles*.

Type : **Graphic**	• Set parameters for the subfile (the ⬚ icon) and confirm.
Height : 25	• Press the ⬚ icon to move to the graphics processor.
Length : 25	Now create a graphical image using the appropriate function icons that are offered by your graphics processor - see section *4.8 Graphics Processor* and confirm.
Front dist : 5	
Back dist : 5	

> **NOTE:**
> If you find it difficult to design a graphical image on the terminal display, you can make a drawing on a sheet of squared paper, and then copy it to the graphics processor - see *Fig. 5.2.4.1*.

X: →

Y:
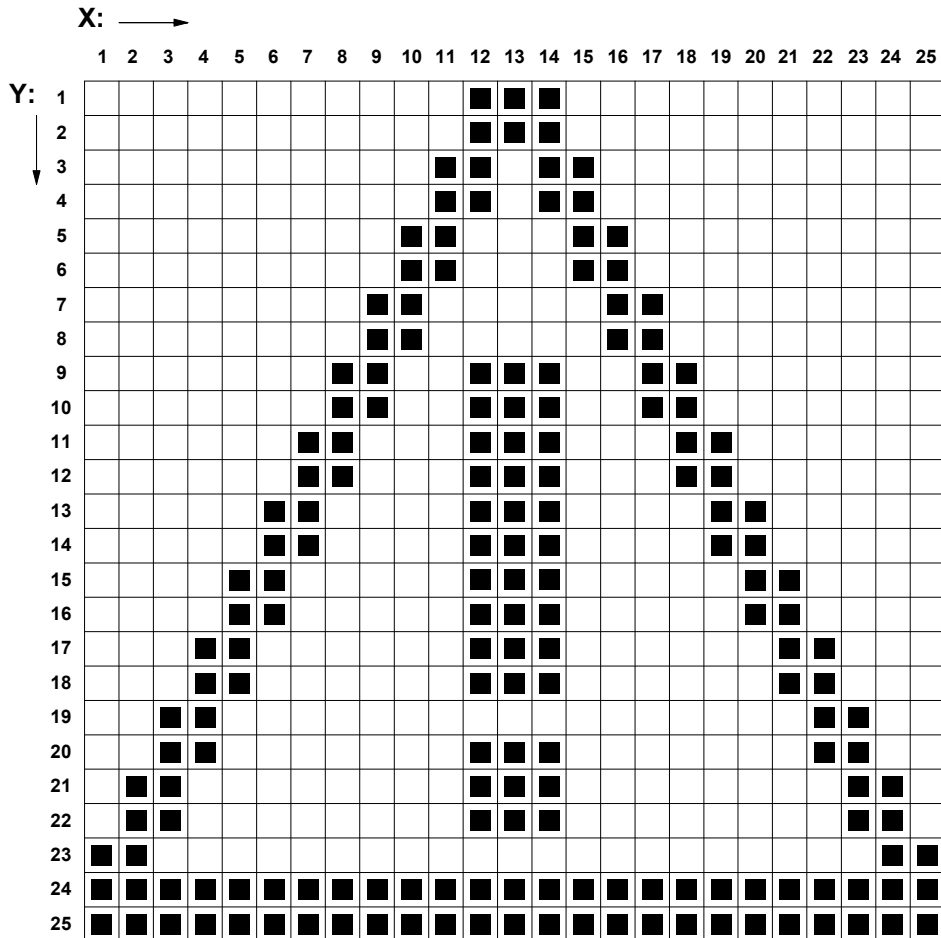
Fig. 5.2.4.1

- If the drawing is acceptable, press the ⏎ ENTER icon in order to record the text file in the library and save it in memory. Otherwise, press the ✎ icon again and go on improving your drawing.

2) Define print parameters following the instructions given in section *5.1 How to Print the First Sample Text File* point *6)*. Change the settings of the following parameters:

Active text	**: LOGO**	choose a text from the library (with the ALT or ← → icons)
Height (pix)	**: 25**	info parameter, it depends on the text chosen
Resol. dot/cm	**: 22[24]/30[25]**	recommended resolution for correction algorithm No. 13

3) Place an object to be labeled or a sheet of paper at not greater distance from the front of the print head than:
   - **30 mm** – for the EBS-6500 and EBS-6800 printers (this is the recommended distance given in *Tab. 4.12.6.1* for correction algorithm **No. 13**),
   - **15 mm** – for the EBS-7200 printers (this is the recommended distance given in *Tab. 4.12.6.2* for correction algorithm **No. 13**).

4) Print the text file called **LOGO** following the instructions given in section *5.1 How to Print the First Sample Text File* point *7)*.

---

[24] For the EBS-6500 and EBS-6800 printers (see *Tab. 4.12.6.1*).
[25] For the EBS-7200 printers (see *Tab. 4.12.6.2*).

5.2.5. How to Print a Bar Code

Assumption: an EAN-13 bar code should be printed on products; the overprint should look like as follows:

5 007463 006216

1) Define a **BAR CODE** type subfile and specify a numerical value to form the bar code.
   ➥ In the main MENU select the **TEXT SERVICE** item and then the **CREATE NEW TEXT** item.
   ➥ You are prompted to type in a text-file name. Input a name, e.g. **BARC,** and confirm.
   ➥ In the list of text profiles displayed choose the **max height 25 dots** profile and confirm - see section ***4.7.1 Text Profiles***.

Type	**: Barcode**
Code	**: EAN-13**
Contents	**: 5007463006216**
Height	**: 25**
Elongat. X	**: 1**
Elongat. Y	**: Not used**
Corrector	**: 0**
Spec. reg.	**: None**
Text name	**: Not used**
Front dist	**: 0**
Back dist	**: 0**
Signature	**: 7 pix**
Sign. dist	**: 1 pix**
Inversion	**: NO**

- Set subfile parameters (the ▢PAR icon), input the numerical value of the bar code (only 12 characters, the 13th character is calculated automatically) and confirm.

  If the bar code is acceptable, press the ↵ENTER icon in order to record the text file in the library and save it in memory. Otherwise, press the ▢PAR icon again and go on with modifying the bar code and subfile parameters.

2) Define print parameters following the instructions given in section ***5.1 How to Print the First Sample Text File*** point ***6)***. Change the settings of the following parameters:

Active text	**: BARC**	choose a text from the library (with the ▢ALT or ←→ icons)
Height (pix)	**: 25**	info parameter, it depends on the text chosen
Resol. dot/cm	**: 22²⁶/30²⁷**	recommended resolution for correction algorithm No. 13

3) Place an object to be labeled or a sheet of paper at not greater distance from the front of the print head than:
   – **30 mm** – for the EBS-6500 and EBS-6800 printers (this is the recommended distance given in ***Tab. 4.12.6.1*** for correction algorithm **No. 13**),
   – **15 mm** – for the EBS-7200 printers (this is the recommended distance given in ***Tab. 4.12.6.2*** for correction algorithm **No. 13**).
4) Print the text file called **BARC** following the instructions given in section ***5.1 How to Print the First Sample Text File*** point ***7)***.

5.2.6. How to Print a Complex Text File

Assumption: it is 13th July 2012 08:01 hours; the text should look like as follows, when printed:

1) A complex file of this type can be created in three ways (!):
   a). create each of the subfiles of your complex file separately and save them with their own names, then start a new file and link all subfiles into it by their names,
   b). create a text file and define all subfiles within it,
   c). use a mixed method to create a text file in which some subfiles are defined and the other are linked by their names.

---

²⁶ For the EBS-6500 and EBS-6800 printers (see ***Tab. 4.12.6.1***).
²⁷ For the EBS-7200 printers (see ***Tab. 4.12.6.2***).

The mixed method is used in the example. The text files called **DATI** and **LOGO** have already been defined in the sections above and are used in this example (the text files need to be created in advance to illustrate the methodology properly).

Define two **TEXT - ASCII characters** type subfiles, link the graphical image called **LOGO** by its name, create three other **TEXT - ASCII characters** type subfiles and link the text file called **DATI** where special registers are used.

➡ In the main MENU select the **TEXT SERVICE** item and then the **CREATE NEW TEXT** item.

➡ You are prompted to type in a text-file name. Input a name, e.g. **ABCD,** and confirm.

➡ In the list of text profiles displayed choose the **max height 25 dots** profile and confirm – see section *4.7.1 Text Profiles*.

Type : **Text**	• Set parameters for the first subfile (the ⬚PAR icon) and confirm.
Char. set : **Latin 16x10**	• Input contents for the first subfile:
Typeface : **Normal**	➤EBS☐Ink☐Jet☐Systeme☐GmbH◁.
Chr. width : **Proportional**	• Press the ⬚ ⬇ icons to create a new subfile below
Distance : 2	the previous one.
Rotation : **None**	
Spec. reg. : **None**	
Front dist : 0	
Back dist : 0	

Char. set : Latin 7x5	• Set parameters for the second subfile as in the example above, then change the setting for **Char. set** and confirm.
	• Input contents for the second subfile:
	➤Alte☐Ziegelei☐19-25,☐D-51588☐Nümbrecht◁.
	• Press the ⬚ ➡ icons to create the third subfile to the right of the previous one.

Type : **Ins. text**	• Set parameters for the third subfile and confirm.
Text name : LOGO	**NOTE:**
Front dist : 0	The text file called **LOGO** has been defined in section
Back dist : 0	*5.2.4 How to Print Logos*.
	• Press the ⬚ ➡ icons to create the fourth subfile to the right of the previous one.

Type : **Text**	• Set parameters for the fourth subfile and confirm.
Char. set : Latin 7x5	• Input contents for the fourth subfile:
Typeface : **Normal**	➤German☐manufacturer☐of◁.
Chr. width : **Proportional**	
Distance : 2	
Rotation : **None**	
Spec. reg. : **None**	
Front dist : 0	
Back dist : 0	

Typeface : **Length *2**	• Press the ⬚ ⬇ icons to create the fifth subfile below the previous one and set the same parameters as for the fourth subfile, re-setting the **Typeface** parameter.
	• Input contents for the fifth subfile:
	➤INK-JET◁.

```
┌─────────────────────────────────┐
│  Typeface    :  Normal          │
└─────────────────────────────────┘
```

- Press the [ ] [↓] icons to create the sixth subfile below the previous one and set the same parameters as for the fifth subfile but re-set the **Typeface** parameter and confirm the selection.
- Input contents for the sixth subfile: ➤printers◄.
- Press the [ ] [→] icons to create the last seventh subfile to the right of the previous one.

```
┌─────────────────────────────────┐
│  Type        :  Ins. text       │
│  Text name   :  DATI            │
│  Front dist  :  0               │
│  Back dist   :  0               │
└─────────────────────────────────┘
```

- Set parameters for the seventh subfile and confirm.
  NOTE:
  The text file called **DATI** has been defined in section *5.2.1 How to Print the Current Date and Time*.

2) Define print parameters following the instructions given in section *5.1 How to Print the First Sample Text File* point *6)*. Change the settings of the following parameters:

```
┌─────────────────────────────────────┐
│  Active text      :  ABCD           │
│  Height (pix)     :  25             │
│  Resol. dot/cm    :  22²⁸/30²⁹       │
└─────────────────────────────────────┘
```
choose a text from the library (with the [ALT] or [←] [→] icons)
info parameter, it depends on the text chosen
recommended resolution for correction algorithm No. 13

3) Place an object to be labeled or a sheet of paper at not greater distance from the front of the print head than:
  – **30 mm** – for the EBS-6500 and EBS-6800 printers (this is the recommended distance given in *Tab. 4.12.6.1* for correction algorithm **No. 13**),
  – **15 mm** – for the EBS-7200 printers (this is the recommended distance given in *Tab. 4.12.6.2* for correction algorithm **No. 13**).

4) Print the text file called **ABCD** following the instructions given in section *5.1 How to Print the First Sample Text File* point *7)*.

---

[28] For the EBS-6500 and EBS-6800 printers (see *Tab. 4.12.6.1*).
[29] For the EBS-7200 printers (see *Tab. 4.12.6.2*).

6. Service and Maintenance

6.1. Routine Maintenance

Before starting maintenance operations, read section *2.1 Safety Requirements*.

The maintenance provided by the user consists of, among other things, periodical inspections and service operations to keep the unit in good working order. Some maintenance operations need to be done every day while others after specified periods of time.

Daily maintenance:
➥ Check for the proper level of ink and solvent in the bottles and prepare new bottles to replace those about to finish, if necessary.
➥ After switching the unit on, check for correct adjustments within the head by monitoring the indications on the terminal according to section *6.2 Checking Adjustments*.

Routine maintenance:
➥ Check periodically (**after several switching off operations or preferably every day**) whether the inside of the head is clean and possibly remove ink impurities from the gutter, nozzle and from the surface of the electrodes with a solvent spray or a gentle brush.

print head

waste solvent metal vessel

spray
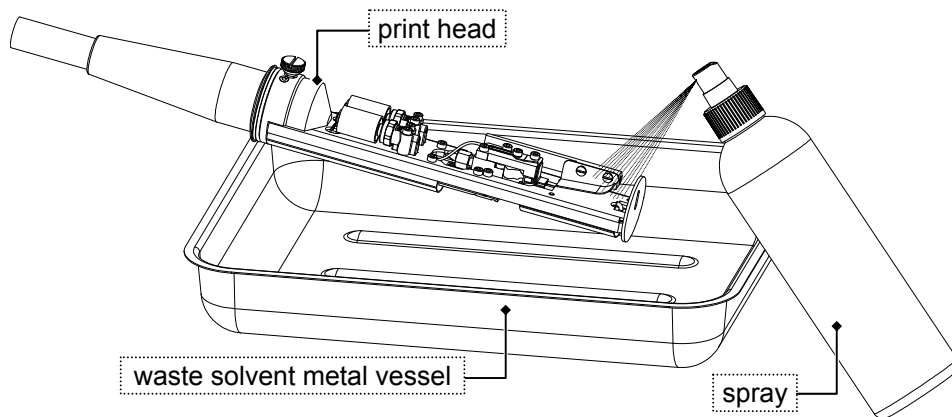
Fig. 6.1.1

➥ Replace the following every **manufacturer/distributor-defined** number of printer run hours (the number of run hours remaining to the end of the limit can be viewed with the **OPERATING TIME** command in the **CONSUMABLES/ iMODULE INFORMATION** menu – the **Operating time** item):
  • iModule® – see subsection *6.1.2 Replacing iModule®*,
  • Air filter inside the electronics compartment – see subsection *6.1.6 Replacing Air Filter Element in Electronics Compartment Ventilation System*.

If the printed runs over a limited number of hours, the iModule® expiry date can be the parameter determining the need for performing the above given maintenance operations; the expiry date can be viewed with the **OPERATING TIME** command (the **Expiry date** item) in the **CONSUMABLES/ iMODULE INFORMATION** menu (see the paragraph entitled *Information about iModule®* in section *4.6.6*).

In addition, if the printer runs in a heavily polluted environment, the ink filter in the head may need to be replaced (see *6.1.5 Replacing Ink Filter in the Head*) and the filter element in the electronics compartment may need to be replaced more frequently. Signs of the need to replace the above mentioned filters are described in subsections *7.3.14 Dirty Ink Filter in the Head* and *7.3.15 Too high Temperature in Electronics Compartment*.

➥ **Every 5000-6000 hours** of device service or once a year - ink contained in the ink system needs replacing due to its natural degradation. The operation should be done by a qualified person or serviceman. The examples given below can be seen as evidence that the ink has lost its properties and is no longer suitable for service:

- A poor quality overprint is produced although all possible adjustments have been made in relation to the operation of the head. You can observe specific symptoms, such as the precipitation of ink drops out of the overprint, distortion of linearity in the horizontal direction or distortion of characters, especially in the upper part of the overprint. You can also face periodical or frequent phasing errors, quick fluctuations of time of ink flight (the *ToF* parameter) in a wide range of values and the clogging of the ink filter in the head.

- Old ink must have been added to the ink system or because the ink lost its properties due to improper storage or similar reasons.

- Foreign matter (such as water, oil, solvents, dust or fine particles) has gotten inside the ink system and may change physical and chemical properties of the ink. The substances can get through the drawing duct inside the head.

➥ If the unit is to be out of use for a longer time, switch it off, open the head and wash the inside part of the head using a spray or possibly a gentle brush.

NOTE:

The unit needs to be switched off in the regular mode except for emergency situations. But in untypical situations non-standard procedures should be adopted. For example:

- If the unit has been shut down in the emergency mode (due to a temporary power failure) and is not to be used for a longer period of time, it should be switched first on and then off in the regular mode (to get the tubing rinsed). Any dry ink should be removed from the inside of the head.

- If the emergency shut down was followed by less than 1 hour of idleness, the printer can be switched on and used with no need for examining the head.

NOTE:

- **Sharp tools or improper liquid may lead to head damage when they are used for cleaning out and washing the head. This damage is not be covered by the guarantee!**
- **The unit may only be supplied with ink, solvent and cleaning liquid provided by the manufacturer of the printer!**
- **Different types of ink must not be mixed!**

THE FAILURE TO MEET THE ABOVE REQUIREMENTS RELEASES THE MANUFACTURER FROM ITS GUARANTEE OBLIGATIONS.

6.1.1.   Replacing Ink/Solvent Bottle
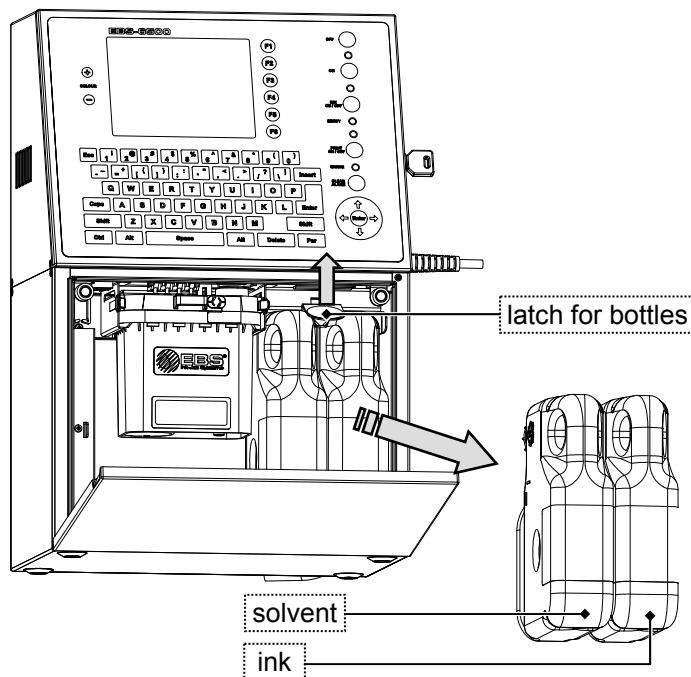
Fig. 6.1.1.1

The empty bottle condition is normally indicated with a sound alarm (and possibly a light signal) 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. 6.1.1.1*) and remove the empty bottle from which ink (or solvent) has been taken so far; the following message can appear on the terminal:

    SOLVENT: **INK:**
    NO BOTTLE   or   **NO BOTTLE**

2. Lift the latch again, put a new bottle in place of the removed one (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) 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

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

> **NOTE:**
>
> - The empty bottle alarm <u>cannot be cleared</u> with the clear alarm [CLEAR ALARM] key. The alarm is cleared automatically only after the empty bottle has been replaced with a new one and the new bottle has been approved by **IMS**.
> - If no new bottle has been approved within 20 minutes since the empty bottle alarm was signaled, the printing ceases and the following message is displayed:
>   **REPLENISHMENT ERROR** (see subsection *7.3.10 Failure of Drawing from a Bottle*).
>   Replace the bottle with a new one and clear the alarm with the clear alarm key.
> - Do not remove the bottle while it is being validated by the system (about 10 seconds).
> - Every bottle can be used only in the printer where it has been approved by **IMS**. The approved bottles must not be moved to other printers or used to refill other bottles. The bottle approved should remain in the printer until the ink is consumed.

6.1.2. Replacing iModule®
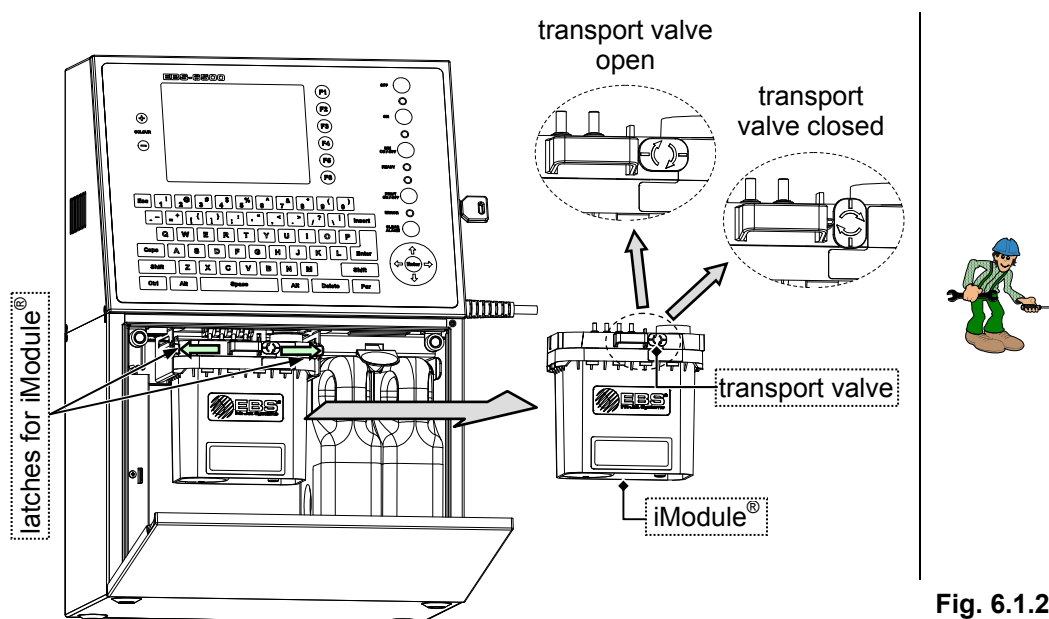
Fig. 6.1.2.1

iModule® is a basic subassembly of the ink system of the **BOLTMARK**®-series printer. 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[30] assigned to it and also its expiry date is saved. This information is available in the **CONSUMABLES/ iMODULE INFORMATION** menu. (see the paragraph entitled *Information about iModule®* in section *4.6.6*) 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 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

---

[30] iModules® whose run hour limits are **4000** hours, **6000** hours or **8000** hours are available. Once they are installed in the printer all the modules can be used for **18 months**.

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 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 iModule® replacement procedure consists of the following steps:

1. Start the printer and wait until it reaches the *stop* state (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 followed, the level of ink in the bottle must be a minimum of 3 cm high - such an amount of ink is indispensable for filling the iModule®.

4. Follow the above request, prepare a new iModule®, make sure that the ink bottle contains a sufficient amount of ink 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. 6.1.2.1*) 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. 6.1.2.1*). 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®.
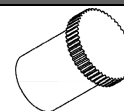
6. Install a <u>new</u> iModule® in the printer by pushing the module along the slideways to the limit (when the iModule® reaches its proper position, the latches make a characteristic sound – a "click"). When the module is detected in the printer, the following message is displayed:

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

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. 6.1.2.1**). When the operation is completed, confirm it with the [ENTER] icon.

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 **stop** 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, time of ink flight in the head (the **ToF** parameter) can exceed the permissible range (see section **4.11 Print Head Status**) 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.

➢ When the iModule® replacement procedure is finished, the printer switches to ***service*** mode (see section ***4.11 Print Head Status***).

➢ If the iModule® replacement procedure is interrupted (*e.g.* due to a power failure), it will re-continue after restart.

➢ 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.

NOTE:
An iModule® can be used only in the printer in which it has been correctly approved by **IMS**. No module approved in a printer can be moved to other printers.

(!)

6.1.3.   Removing the Head Cover

To gain access to inner parts of the head, remove the head from the holder and remove the cover. The operation involves the following steps:

1. Screw out clamping screw ❶ from the head cover – the screw cannot be screwed out completely, it can only be loosened to its limit.

2. Pull out the print head from its cover carefully ❷ in the direction shown in ***Fig. 6.1.3.1***.
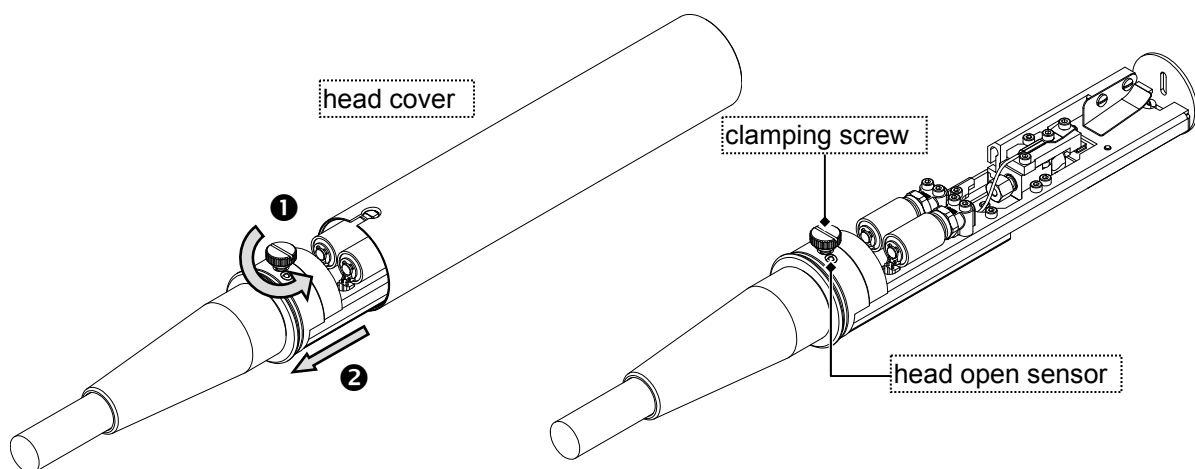
Fig. 6.1.3.1

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. 6.1.3.1***). When the cover is removed, printing is suspended automatically and the printer moves to the ***cover*** mode (see section ***4.11 Print Head Status***). Printing cannot be restarted until the cover is re-installed.

(!)

6.1.4. Cleaning the Nozzle

Follow the below given steps in order to clean the nozzle:
1. Remove the head cover – see section *6.1.3 Removing the Head Cover*
2. Select the **V0 OFF** command from the **SERVICE** submenu in order to stop the flow of ink towards the head (while the flow of ink is being stopped, the green LED above the **INK ON/OFF** key on the operation panel blinks).
3. Loosen two screws ❶ that fix the insulator of the charging electrode - see *Fig. 6.1.4.1*.
4. Turn the charging electrode ❷ in the direction shown in *Fig. 6.1.4.1*.
5. Unscrew the nozzle ❸ carefully.
6. Wash the nozzle with solvent thoroughly.
7. Blow the nozzle with compressed uncontaminated air in the opposite direction to the ink flow.
8. With the nozzle unscrewed, select the **V0 ON** command from the **SERVICE** submenu in order to let the ink flow to the head (while the flow of ink is being started, the green LED above the **INK ON/OFF** key on the operation panel blinks). Ink along with impurities starts flowing out of the gun. Let a few milliliters of ink flow out and select the **V0 OFF** command.
9. Screw the nozzle on the gun until the first perceptible resistance is met, taking care that external impurities do not get into the nozzle.

> **NOTE:**
> **If the nozzle is screwed too tight, the nozzle itself or the gun may get damaged, especially the ruby tip of the nozzle which may crack.**

10. Fasten the insulator of the charging electrode with screws.
11. Select the **V0 ON** command to make ink flow to the head.
    Now the ink jet is aligned and the printer will be phased properly in about 30 seconds.
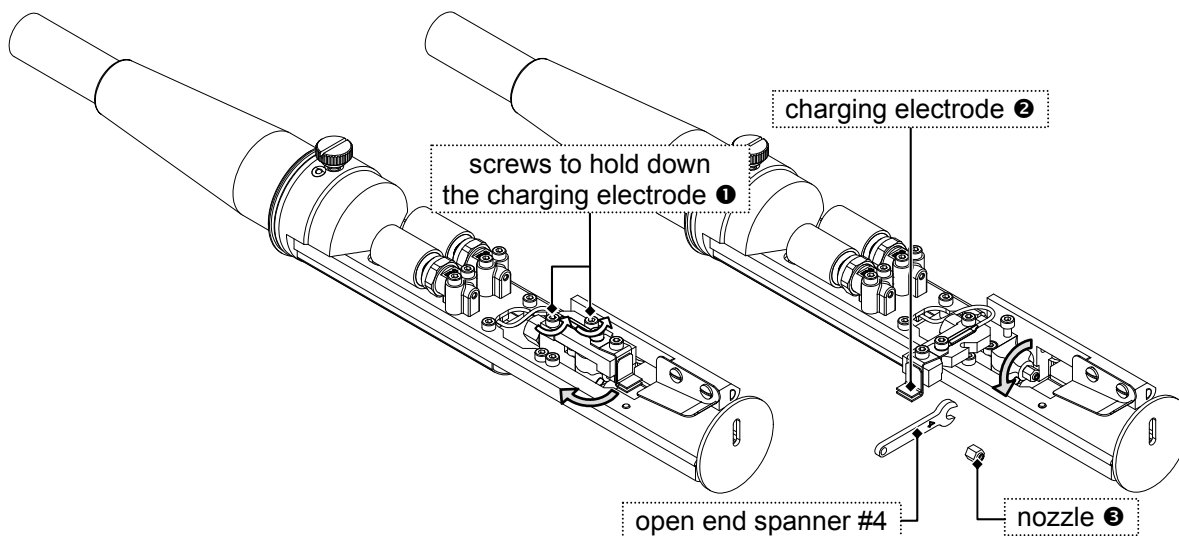
Fig. 6.1.4.1

6.1.5. Replacing Ink Filter in the Head

The ink filter in the head should be replaced by qualified service staff during periodic service of the printer. If the printer runs in a polluted (dusty) environment, a need for getting the filter replaced by the user may occur. Signs of dirty filters are described in subsection *7.3.14 Dirty Ink Filter in the Head*.

Replace (clean out) the ink filter in the head gun by following the steps below - see *Fig. 6.1.5.1*):

1. Place the print head in a slops vessel (a shallow box).
2. Wait until impurities deposit on the filter and select the **V0 OFF** command from the **SERVICE** submenu in order to stop the flow of ink to the head; the stoppage of the flow of ink is signaled with the blinking green LED above the [INK ON/OFF] key on the operation panel.
3. Remove the head cover – see section *6.1.3 Removing the Head Cover*.
4. Unscrew the nozzle and wash it with solvent (a description of how to clean the nozzle is given in subsection *6.1.4 Cleaning the Nozzle*).
5. Use a #8 flat wrench to unscrew ink filter cover ❶, which is in the rear part of the gun.
6. Replace ink filter ❷ with a new one making sure that it is inserted in the right direction, or possibly rinse the existing one well.
7. Screw in the cover together with the new filter into the gun.
8. Choose the **V0 ON** command from the **SERVICE** menu (or press the [INK ON/OFF] key on the outer panel) in order to make ink flow to the head (the flow is signaled with the blinking green LED above the [INK ON/OFF] key on the operation panel).
9. When a small amount of ink bleeds from the gun, stop the flow of ink in the head again (with the **V0 OFF** command or the [INK ON/OFF] key on the outer panel).
10. Install the nozzle.
11. Choose the **V0 ON** command (or press the [INK ON/OFF] key on the outer panel) in order to make ink flow to the head.
12. Install the head cover making sure that the clamping screw as screwed home.

ink filter ❷

gun filter holder ❶

IN   OUT
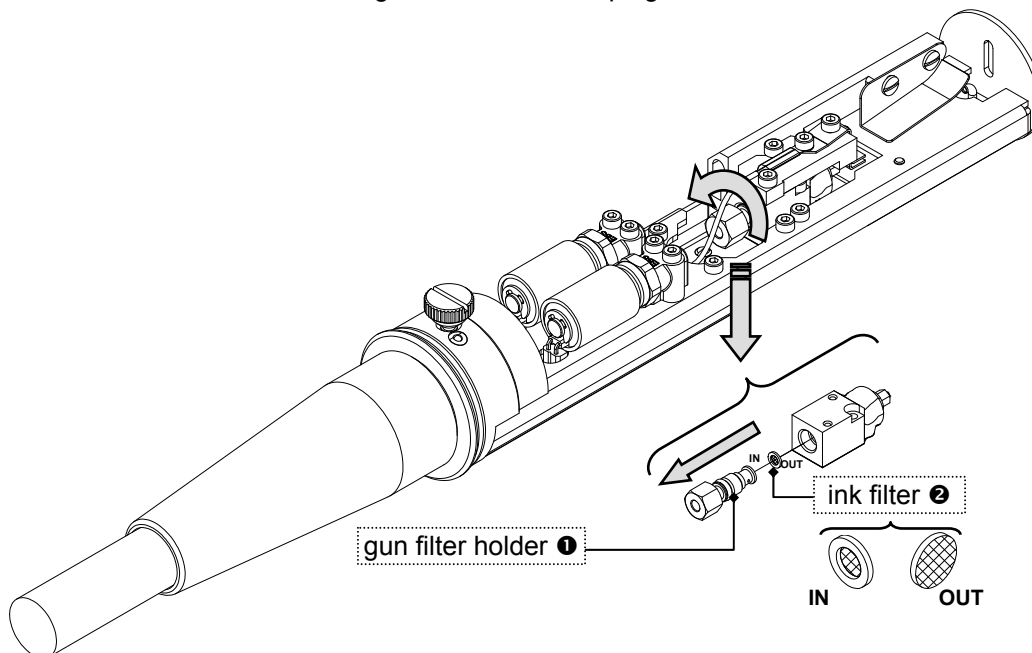
Fig. 6.1.5.1

NOTE:
If the nozzle chocks after ink filter in the head has been replaced, it should be cleaned - see subsection *6.1.4 Cleaning the Nozzle*.

6.1.6. Replacing Air Filter Element in Electronics Compartment Ventilation System

The filter element contained in the electronics compartment should be replaced while the iModule® it being replaced. If the printer runs in a heavily polluted environment, it may need to be replaced

more frequently. Signs of dirty filters are described in subsection *7.3.15 Too high Temperature in Electronics Compartment*.

The electronics compartment filter element can be replaced when the printer is both, on or off. To that purpose follow the below given steps:

1. With a cross-head screwdriver unscrew the screw ❶ that secures cover ❷ of filter element ❸ - the screw cannot be unscrewed completely but it may only be loosened so that the cover can be opened.
2. Open the filter element cover in the direction shown in *Fig. 6.1.6.1*.
3. Replace the filter element with a new one – <u>the element must be installed in the right direction</u> and this direction is shown in *Fig. 6.1.6.1* the filter inlet points to the outside of the printer, the filter outlet - to the inside).
4. Close the cover of the filter element.

filter element ❸

screw ❶

cover ❷

inlet

outlet
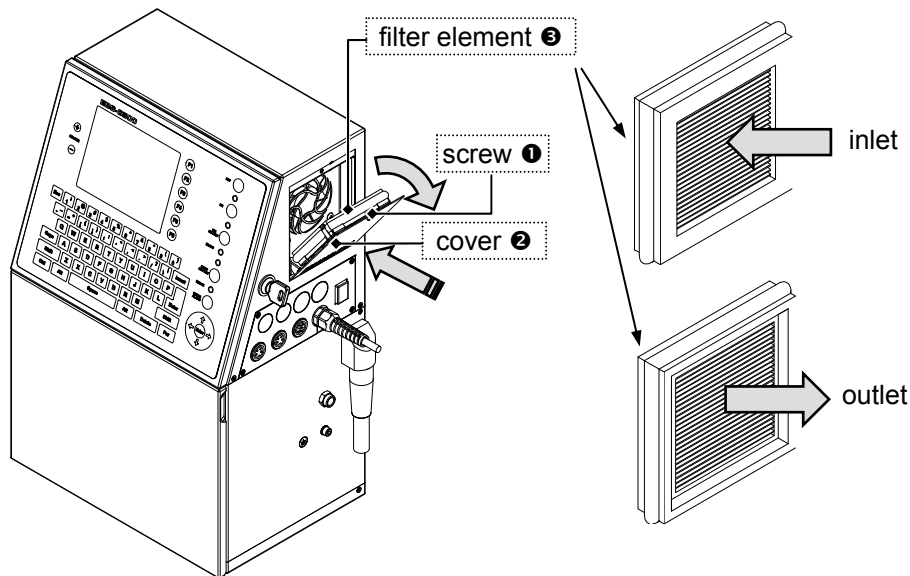
Fig. 6.1.6.1

6.2. Checking Adjustments

A user can make sure whether proper adjustments have been made within the head by checking on the terminal display the **head status** which is updated on an on-going basis. The meaning of the status items is described in section *4.11 Print Head Status*.

If the phasing signal decays or deteriorates after high voltage has been applied, check if the ink jet finds its way into the gutter with the required accuracy - see subsection *6.2.2 Adjusting Ink Jet Path*. If the ink jet fails to fall into the gutter, use the **CLEAN NOZZLE** command, several times if necessary, and check whether the nozzle is clear or not.

> **NOTE:**
> When the gutter is soiled with ink, the phasing signal is interrupted !

6.2.1. Connecting Stroboscope
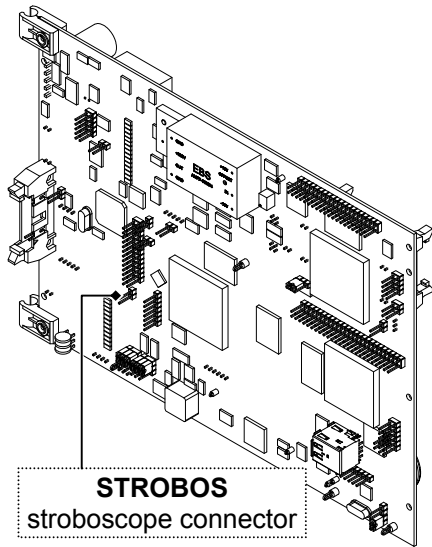
Before any adjustment operations are performed within the head, it is required that the head be fixed in the microscope holder and the stroboscope LED, designed for the lightening of an ink jet, be connected correctly.

Connect the microscope stroboscope to connector **STROBOS** on **RKM** board (see the drawing on the left). On connecting make sure that the stroboscope operates correctly. If it does not, turn over the plug inserted in the **STROBOS** connector. Reverse connection causes no damage to the stroboscope or the RKM board. The stroboscope LED can flicker at the jet break frequency or at the row print frequency (the process is called synchronization). In order to set the mode of synchronization, go to **SERVICE/ STROBOSCOPE** menu and re-set the parameter **Stroboscope**: **DROPS**/ **ROWS** – see the paragraph entitled *Synchronization of a Stroboscope* in section *4.6.4*.

STROBOS stroboscope connector

Fig. 6.2.1.1

6.2.2. Adjusting Ink Jet Path

The operation of adjusting the ink jet in the gutter consists of two stages:
➢ preliminary adjustment of the ink jet in the vertical and horizontal directions,
➢ precise adjustment of the ink jet in the vertical direction (the direction of printing) with the **SET INK STREAM** command.

Preliminary adjustment of ink jet in the gutter in the horizontal direction

Follow the below given steps to pre-adjust the path of the ink jet in the gutter in the horizontal direction:
1. Remove the head cover – see section *6.1.3 Removing the Head Cover*.
2. With an adjustment tool ❶ change the gun position on the horizontal plane gently so that the ink jet falls into the center of the gutter.

adjustment tool ❶

adjust in the horizontal direction
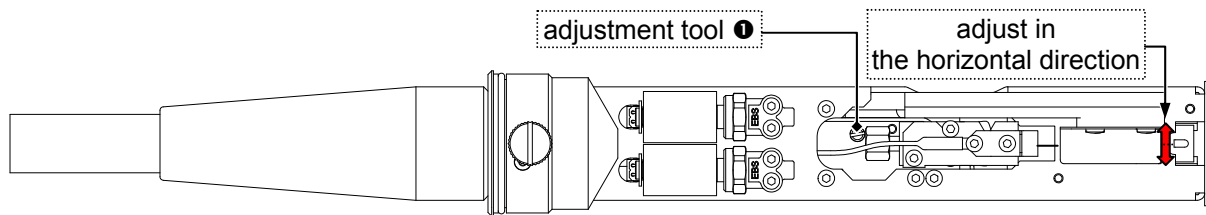
Fig. 6.2.2.1

Preliminary adjustment of ink jet in the gutter in the vertical direction

Follow the below given steps to pre-adjust the position of the ink jet in the gutter in the vertical direction:
1. Change position of the gun on the vertical plane with adjustment screws **S1** and **S2** (see *Fig. 6.2.2.2*) so that the ink jet hits the suction gutter close to the gutter top edge.
2. On completing the adjustment screw home the **S1** and **S2** screws, then check whether the jet path is correct and repeat the procedure, if need be.
3. For final adjustment of the ink jet position in the vertical direction follow the procedure described in the next paragraph.

adjust in the vertical direction

S1, **S2** – adjustment screws

S1   **S2**
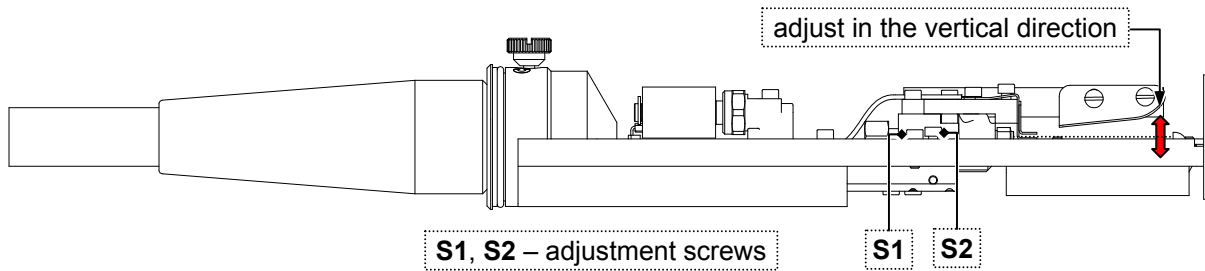
Fig. 6.2.2.2

Precise adjustment of ink jet in the gutter in the vertical direction

The vertical position of ink jet in the gutter can be adjusted with screws **S1** and **S2**. The two screws are designed for blocking very firmly the gun in the desired position!

> **NOTE:**
> • It is recommended that the ink jet path in the gutter in the vertical direction be adjusted each time the following parameters or components are modified or replaced: high voltage, font, height and speed amplitudes, nozzle, gutter and gun heights or when gun suspension components are replaced or when the position of head components needs adjusting.
> • Dangerous voltages occur in the head while the **SET INK STREAM** command is being executed. Therefore be extremely careful and do not touch any electrodes! The head cover sensor is ignored while this command is being executed.

The procedure for adjusting the ink jet path in the vertical direction with the **SET INK STREAM** command is as follows:

1. Switch the printer on and wash the head (especially the gutter) carefully.
2. Wait until the **READY** LED on the operation panel lights on.
3. Create a text file (preferably for each of the maximum heights of 7, 16, 25 or 32[31] dots) and set print parameters with the **PRINTING PARAMETERS** command.
4. Select the **START PRINT** command to print the previously created text file, and then select the **QUICK STOP** command. The objective of this operation is to make the print parameter settings effective before the **SET INK STREAM** command is selected.
The head cover must be installed while printing parameters are modified and an overprint is made. For successive operations the cover should be removed (see section *6.1.3 Removing the Head Cover*).
5. Place the head in the microscope holder and make sure that the stroboscope LED is connected (see subsection *6.2.1 Connecting Stroboscope*) to observe the ink jet falling down into the gutter.
6. Cover the head outlet with a paper tissue as ink starts flowing out of the head after the command has been executed.
7. Select the **SET INK STREAM** command. The following message is displayed on the terminal:
Did you PRINT preliminarily?
(Y,N)?
(Y=ENTER, N=ESC).
Type in:

Y (or ⏎ ENTER)   to confirm, if the print parameter settings are effective – see par. *4*,

N (or ⬅ ESC)   to cancel if the print parameter settings are not effective.
If the operation is confirmed, ink starts flowing out of the head. This takes about 15 seconds, and the following messages are displayed on the terminal:
key ESC - abort
key ENTER - repeat
key PAR - rows/drops
other keys - change delay

Press the ⬅ ESC icon (or the ESC key) to interrupt execution of the **SET INK STREAM** command.

---

[31] This does not apply to the EBS-6500 printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).

Press the [ENTER] icon (or the ENTER key) to resume execution of the command after it has been stopped automatically for a short time.

The [PAR] icon (or the PAR key) switches over synchronization of a stroboscope (the LED flashes at a drop break frequency or at the row print frequency).

Use any keys apart from the above mentioned ones in order to change the position of drops in relation to the gutter in the horizontal direction while the command is being executed.
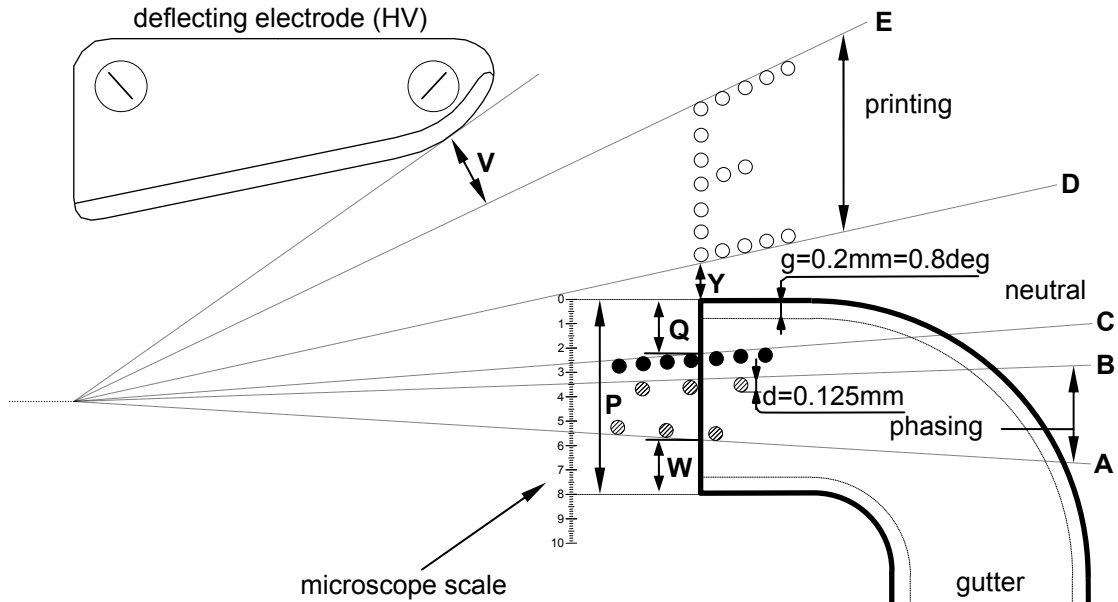
Fig. 6.2.2.3

8. Five ink jets **A**, **B**, **C**, **D**, **E** (see *Fig. 6.2.2.3*) can be observed with a microscope (gray dots). Adjust the position of the gutter (with screws **S1** and **S2**) so that the margins **Q**, **W**, **Y**, **V** meet the conditions given in *Tab. 6.2.2.1*:

Tab. 6.2.2.1	EBS-6500/EBS-6800	EBS-7200
Q	≥ **1,8 deg** (preferably **2,5 deg**)	= **1,8 deg**
W	≥ **1,8 deg**	≥ **1,8 deg**
Y	≥1 deg	≥ **1,5 deg**
V	≥1 deg	≥ **1,8 deg**

In *Tab. 6.2.2.1* **1deg = 0.25 mm** means one division on the scale of a microscope. The jet adjustment should start with a proper setting of the margin **Q** and then you should make sure that the other margins meet the conditions given in *Tab. 6.2.2.1*.

9. Press the [ESC] terminal icon to terminate execution of the **SET INK STREAM** command.
10. Wait several dozen seconds until phasing stabilizes.

11. Press the [ENTER] icon to repeat the **SET INK STREAM** command, and make sure that the above set margin requirements are met for other phases determined automatically and that no ink drops adhere to the inside or outside of the gutter.

12. Press the [ESC] terminal icon to terminate execution of the **SET INK STREAM** command.
13. Check the ink jet path in the gutter in the horizontal direction: the jet should hit the center of the gutter.

7.   Handling Errors

7.1.   Error Signals

The errors and warnings that may appear in the printer are signaled in a few ways:
➢ with messages in the working window on the display,
➢ with the red **ERROR** LED above the [CLEAR ALARM] key,
➢ with the appropriate signaling LED on the inner panel – see section *4.2 Inner Panel*,
➢ with an audible signal generated by a built-in buzzer,
➢ optionally an external alarm indicator can be used and appropriate actions can be taken (e.g. stopping of a factory conveyor).

7.2.   Clearing Alarms
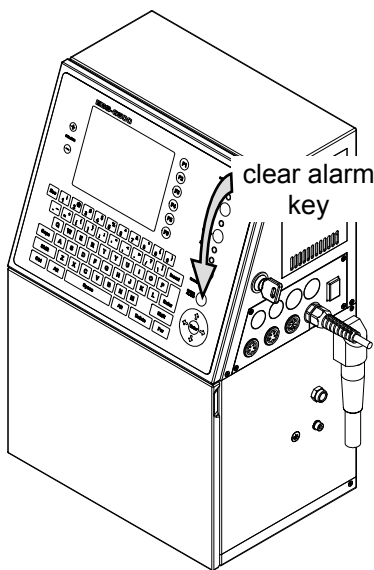
Alarms are cleared by pressing the [CLEAR ALARM] key (on the main pad of the external panel) or by selecting the **CLEAR ERRORS** command from the **AUX. COMMANDS** submenu.

NOTE:
No alarm should be cleared until a reason for it is identified.

After the alarm has been cleared, the error indicators are reset – the indication LEDs go out, the buzzer stops generating sounds and no information on the reason can be obtained after the **DISPLAY ERRORS** has been selected. The only trace of the occurrence of an alarm remains in the error report, which is available with the **READ ERRORS REPORT** command in the **AUX. COMMANDS** menu.

Fig. 7.2.1

7.3.   Most Frequent Problems, Alarms and Signaling

7.3.1.   The printer cannot be started

After the [ON] key (on the external panel) has been pressed, the printer does not turn on. No LED lights. The error can be caused by the following reasons:
• power cable is detached - connect the power cable to the mains,
• no mains voltage - check for the mains voltage,
• master switch on the connection panel (on the right wall of the printer) is turned off - turn the switch to the "**1**" (on) position,

• integrated power module is damaged, some cables in the electronics compartment are not connected. The failure can be removed by a qualified person. Contact a service point.
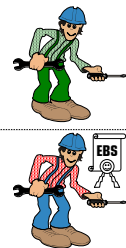
7.3.2. 300V Error or 300V On/Off Error

The 300V setting does not fall into the permissible range (the **+300V ERROR** message) or the 300V converter cannot be switched on/off correctly (the **+300V on/off ERROR** message).

An occurrence of the error is signaled with an audible signal, the appropriate message on the display and also the glowing **300V ERR** LED on the inner panel. The error can be caused by the following reasons:

- damaged **+300 V** converter, damage to **+300 V** circuit in the printer circuitry, damaged electronic board. <u>The failure can be removed by a qualified person</u>. Contact a service point.

7.3.3. Ink Pressure Stabilizer is Clogged

The ink pressure stabilizer is clogged. Depressurization of the ink system is very hindered. It is impossible to keep ink pressure within the right range, either.

An occurrence of the error is signaled with an audible signal, the **BLOCKED PRESSURE STABILIZER !!** message and also the glowing **STAB_ERR** LED on the inner panel. Another type of signaling that can occur in the situation described is the **INK PRESSURE NOT RELEASED** message accompanied by the glowing LED **PRESS_ER**.

<u>The failure can be removed by a qualified person</u>. Contact a service point.

7.3.4. Ink Pressure Circuit Failures

A group of alarms caused by the ink pressure circuit. An occurrence of an alarm from this group is signaled with an audible signal, an appropriate message (which depends on the type of failure) and the glowing LED **PRESS_ER**.

The group of alarms concerning the ink pressure circuit includes:

- ➤ **INK PRESSURE DROP**, **INK PUMP TIME-OUT** - quick drop of ink pressure in the system or ink pressure pump cannot generate the nominal pressure. The current pressure can be viewed with the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu (it is marked with a letter *p*). The error can be caused by the following reasons:

  - damaged iModule® – replace the iModule® (see subsection *6.1.2 Replacing iModule®*),

  - leaks in ink system, the ink pressure pump or pump control is damaged, negative pressure in the ink system is too high, damaged ink pressure sensor, damaged electronic board. <u>The failure can be removed by a qualified person</u>. Contact a service point.
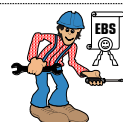
- ➤ **MAX INK PRESSURE EXCEEDED** - maximum allowable ink pressure in the ink system is exceeded temporarily or permanently. The current pressure can be viewed with the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu (it is marked with a letter *p*). The error can be caused by the following reasons:

  - ink pump control circuits are damaged, ink pressure sensor is damaged, the electronic board is damaged, pressure stabilizer is chocked. <u>The failure can be removed by a qualified person</u>. Contact a service point.

- ➤ **INK PRESSURE NOT RELEASED** – a problem with depressurizing of the ink system. The error can be caused by the following reasons:

  - obstructed valve **V5** or **V6**, clogged pressure stabilizer. <u>The failure can be removed by a qualified person</u>. Contact a service point.

➢ **PRESSURE TRANSDUCER ERROR** – no information or wrong (*e.g.* interfered) information on ink pressure levels from ink pressure sensor. The error can be caused by the following reasons:

- ink pressure sensor is damaged, no power supply to the sensor, the electronic board is damaged. <u>The failure can be removed by a qualified person</u>. Contact a service point.

7.3.5.   Phasing Error in Print Head

The circuit for automatic recognition of the proper phase for charging ink drops cannot identify the best phase.

An occurrence of the error is signaled with an audible signal, the **PHASE ERROR** message and also the glowing **PH_ERR** LED on the inner panel.

When a phasing error occurs, the printer stops printing (if it is in the *print* state) and the flow of ink stops as well. Then it restores the flow and tries to find the best phase three more times. Every unsuccessful attempt is followed by the **PHASE ERROR** message. If the alarm is not handled four times, the head is switched off and rinsed. When it is restarted, the following message is displayed:
The printer was switched off
due to 4-th PHASE ERROR.

The error can be caused by the following reasons:

- the nozzle is partially or completely clogged – clean the nozzle (see section *6.1.4 Cleaning the Nozzle*),
- ink drops fail to fall into the gutter (a risk of flooding the head occurs) - adjust the ink jet path (see section *6.2.2 Adjusting Ink Jet Path*),
- the gutter is soiled with liquid ink or a thick layer of dry ink - wash the gutter with solvent; sometimes it may be required to dry the gutter with a jet of air,
- very strong electromagnetic interference in the vicinity of the head - screen the head, i.e. check whether metal screens are installed at the bottom of the head and whether the metal cover of the head is electrically connected with the head cover via a fixing screw; check whether the yellow and green earth wire is well connected to the head cover on one end and to the printer housing (the printer's earth) on the other,
- the hose connecting the head with the printer is subject to vibration or periodical shocks - fix the hose,
- the ink filter in the head is clogged - replace the filter (see section *6.1.5 Replacing Ink Filter in the Head*),
- iModule® is damaged – replace the iModule® (see section *6.1.2 Replacing iModule®*),
- the value of negative pressure in the circuit is too low to ensure the proper ink suction from the gutter – follow the description given in subsection *7.3.6 Vacuum Circuit Failures*,

- unsuitable ink pressure in the system, improper ink viscosity in the ink system (the *ToF* setting is beyond the permissible range - see section *4.11 Print Head Status*), problems with the negative pressure circuit, damage to a breaking, charging or phasing circuit. <u>The failure can be removed by a qualified person</u>. Contact a service point.
- if the phasing error occurs only after high voltage has been applied (i.e. it follows the **START PRINT** command), the reasons may be as follows: the ink jet path is wrongly adjusted in relation to the gutter, the geometry of the head is set wrongly, the head is soiled, the high voltage setting is too high, a high voltage earth fault. <u>The failure can be removed by a qualified person</u>. Contact a service point.

7.3.6.   Vacuum Circuit Failures

A group of alarms concerning a vacuum circuit. An occurrence of an alarm from this group is signaled with an audible signal, an appropriate message (that depends on the type of failure) and the glowing LED **VAC_ERR**.

The group of alarms concerning the vacuum circuit includes:

➤ **WRONG INK SUCTION FROM GUTTER** – a sudden drop of negative pressure in the system or the vacuum pump cannot generate the nominal negative pressure. The message can also be displayed when the vacuum level does not drop <u>during printer operation</u>, which means that the pump has not been activated for too long a time. Problems with the proper reception of ink from the gutter occur, a phasing error can occur (see *7.3.5 Phasing Error*). The current negative pressure can be viewed with the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu (it is marked with a letter *v*). The error can be caused by the following reasons:

- ink drops fail to fall into the gutter (a risk of flooding of the head occurs) - adjust the ink jet path (see *6.2.2 Adjusting Ink Jet Path*),
- an vapor exhaust is choked - clear the exhaust,
- a transport safety valve for the iModule® is closed - open the valve,
- iModule® is damaged – replace the iModule® (see *6.1.2 Replacing iModule®*),

- too low a value of negative pressure set with the **SET INK PRESSURE/VACUUM** command in the **INK SYSTEM SERVICE** submenu of the **SERVICE** menu (the nominal setting is **50%**) – increase the value of negative pressure. You need to know the service password to do that.

> **NOTE:**
> - The higher the negative pressure [%], the higher ink consumption.
> - If the vacuum pump operates properly, then any increase in the negative pressure by more than 70% may result in an ink-pressure-drop error and the **INK PRESSURE DROP** message.

- leaks in the vacuum circuit, the vacuum pump or its control is damaged, return tube or another return circuit element is obstructed, a damaged electronic board. <u>The failure can be removed by a qualified person</u>. Contact a service point.

➤ **GUTTER CIRCUIT CLOGGED** - <u>while the procedure for starting the printer</u> (or ink jet) <u>is followed</u>, the appropriate vacuum pressure is set in the ink system. Then the vacuum pump is switched off and the vacuum level should drop. If it is not like that (or the pressure drops too slowly), the gutter circuit may be obstructed. The error can be caused by the following reasons:

- the printer has been switched off incorrectly (without any rinsing), a return tube or another element of the gutter suction path is choked. <u>The failure can be removed by a qualified person</u>. Contact a service point.

➤ **VACUUM TRANSDUCER ERROR** - no information or wrong (*e.g.* interfered) information on vacuum levels from a vacuum sensor. The error can be caused by the following reasons:

- a vacuum sensor is damaged, no power supply to the sensor, the electronic board is damaged. <u>The failure can be removed by a qualified person</u>. Contact a service point.

➤ **VACUUM DOESN'T INCREASE,**
Check iModule
transport protection – while a jet of ink is being generated, the vacuum pump works but the pressure sensor does not detect any increase in a partial vacuum level. The error can be caused by the following reasons:

- a transport safety valve for the iModule® is closed - open the valve,
- iModule® is damaged – replace the iModule® (see *6.1.2 Replacing iModule®*),

- leak(s) in the partial vacuum circuit, the circuit between the vacuum pump and vacuum sensor is choked, the vacuum sensor is damaged, the vacuum pump is damaged. <u>The failure can be removed by a qualified person</u>. Contact a service point.

7.3.7. No Jet Hits the Gutter

As soon as the flow of ink/solvent in the head is initiated, the jet should hit the gutter and fill it in. This should make the vacuum in the ink system increase. If the jet does not hit the gutter, the vacuum does not rise. The consequential alarm is signaled with an audible signal and the message **STREAM DOESN'T FALL INTO GUTTER**. The alarm can occur due to the following reasons:

- A nozzle is partly or completely clogged – clear the nozzle (see *6.1.4 Cleaning the Nozzle*),
- The ink jet does not hit the gutter (a risk that the head may get flooded) – adjust the jet path (see *6.2.2 Adjusting Ink Jet Path*),
- The ink filter in the head is dirty – replace the filter (see *6.1.5 Replacing Ink Filter in the Head*),

- The valve **V0**, **V1**, an ink tube, the ink filter in the head or any of ink circuit components are obstructed. The failure can be removed by a trained worker only. Contact a service point.

It may also happen that the ink jet stops hitting the gutter during regular operation. This is caused by dirt which may have penetrated into the nozzle. If that is the case, remove the head cover (see *6.1.3 Removing the Head Cover*) and then spray the nozzle with solvent and choose the **CLEAN NOZZLE** command (once or several times) from the **SERVICE** menu. If that does not help, clear the nozzle following the description given in *6.1.4 Cleaning the Nozzle*.

7.3.8. No Ink in the Bottle

No ink can be drawn from the ink bottle. An occurrence of the error is signaled with an audible signal, the **INK LACK** message and also the glowing **INK_LACK** LED on the inner panel.

The error can be caused by the following reasons:

- The ink bottle is empty – replace the bottle with a new, full one (see subsection *6.1.1 Replacing Ink/Solvent Bottle*),
- The expiry date is exceeded or the bottle has been emptied soon before the expiry date (in such a case the following message is displayed: **INK: EMPTY BOTTLE**) – replace the bottle with a proper one.

If no new bottle is validated within 20 minutes of the indication of the error, printing stops and the following message is displayed:
REPLENISHMENT ERROR (see subsection *7.3.10 Failure of Drawing from a Bottle*)**.**

7.3.9. No Solvent in the Bottle

No solvent can be drawn from the solvent bottle. An occurrence of the error is signaled with an audible signal, the **SOLVENT LACK** message and also the glowing **SOLV_LACK** LED on the inner panel.

The error can be caused by the following reasons:

- The solvent bottle is empty - replace the bottle with a new, full one (see subsection *6.1.1 Replacing Ink/Solvent Bottle*),
- The time limit set on bottle is exceeded or the bottle has been emptied soon before the end of the time limit (in such a case the following message is displayed: **SOLVENT: EMPTY BOTTLE**) – replace the bottle with a proper one.

If no new bottle is validated within 20 minutes of the indication of the error, printing stops and the following message is displayed:
REPLENISHMENT ERROR (see section *7.3.10 Failure of Drawing from a Bottle*)**.**

7.3.10. Failure of Drawing from a Bottle

Although a new bottle of ink (or solvent) has been approved, the system has been unable to draw any liquid from the bottle over 20 minutes of the occurrence of signaling. An occurrence of the error is signaled with an audible signal, the **REPLENISHMENT ERROR** message and also the glowing **INK_LACK** (or **SOLV_LACK**) LED on the inner panel. If the printer was in the process of making an overprint, printing is interrupted. The error can be caused by the following reasons:

- the bottle has not been inserted "to the limit" - adjust the position of the bottle,

- leaks in the liquid suction line, damaged parts of the bottle, the air circuit supplying air to the bottle is choked. The failure can be removed by a qualified person. Contact a service point.
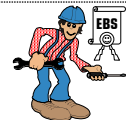
7.3.11. High Voltage Error

The required value of high voltage on the deflecting electrode cannot be set. The error can occur while printing is being started, during printing, while the jet adjustment procedure is being followed as well as while the HV block is being tested immediately after the printer has been switched on.

The occurrence of the error is signaled with an audible signal, the ****HV-ERROR**** message and the flickering **HV_ON** LED on the inner panel. As the error can occur for various reasons, the error message is displayed together with additional information on the type of fault, for example:

➤ **HV is off - HV sensor error** – high voltage is turned off and in spite of that a HV detection signal is generated by converter.
  The alarm can occur for the following reasons:
  - monitoring and control circuits in the HV block can be damaged, the HV converter can be damaged, an electronic board can be damaged, the **+24V** line in the Integrated Multichannel Power Supply can be damaged. The failures can be removed by trained staff only. Contact a service point.

➤ **HV is on - HV sensor error** – high voltage is applied, and in spite of that no HV detection signal is generated by converter.
  The alarm can occur for the following reasons:
  - an earth fault of the deflecting electrode due to a thick layer of ink (**NOTE:** there is a risk that ink within the head may catch fire) – wash the inside of the head with solvent,

  - an earth fault in the HV circuit, monitoring and control circuits in the HV block can be damaged, the HV converter can be damaged, an electronic board can be damaged, the **+24V** line in the Integrated Multichannel Power Supply can be damaged. The failures can be removed by trained staff only. Contact a service point.

➤ **Error - HV not defined** – an attempt to apply high voltage has been made although no HV is set.
  The alarm can occur for the following reasons:
  - the memory cell where the information on high voltage value should be stored is damaged. The failure can be removed by trained staff only. Contact a service point.

➤ **HV adjustment error** – a limit of ineffective steps is exceeded while high voltage is being set or stabilized during printing.
  The error can be caused by the following reasons:
  - an earth fault of the deflecting electrode due to a thick layer of ink (**NOTE:** there is a risk that ink within the head may catch fire) – wash the inside of the head with solvent,

   – an earth fault in the HV circuit, monitoring and control circuits in the HV block can be damaged, the HV converter may be damaged, an electronic board can be damaged, the **+24V** line in the Integrated Multichannel Power Supply can be damaged. <u>The failures can be removed by trained staff only</u>. Contact a service point.

NOTE:
The **HV_ON** LED signals two states of the printer. When it emits continuous light, that means that high voltage is applied to the head (*e.g.* during printing), when it flickers – a failure must have occurred.

7.3.12.   Overflow in iModule®

Momentary or permanent overflow in the iModule®.

An occurrence of the error is signaled with an audible signal, the **iModule Overflow** message and also the glowing **OVERFLOW** LED on the inner panel (in the event of a momentary overflow the LED emits flashing light). The error can be caused by the following reasons:

- improper position of the printer (and the iModule®) – adjust the position of the printer,

- leaky valve **V3** or **V4**, a damaged level sensor in the iModule®, operator error (the printer is switched off in the regular mode too frequently), a damaged electronic board. <u>The failure can be removed by a qualified person</u>. Contact a service point.
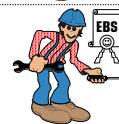
7.3.13.   No iModule®

   An iModule® is a basic subassembly of the ink system of every **BOLTMARK®**-series printer. The printer cannot operate without it. Therefore the iModule® has been equipped with a transponder, and its presence in the printer is monitored with an optical sensor.

> **NOTE:**
> - The iModule® must not be taken out of the printer while the printer is in operation, especially when ink (or solvent) is fed to the head.
> - If the iModule® has been removed from the printer as part of the replacement procedure, a new iModule® should be installed as soon as possible in order to prevent ink system subassemblies from drying.

If no iModule® is within the reach of the optical sensor, an audible signal is heard, the **iModule not detected !!** message is displayed and the **OVERFLOW** and **BOTTOM** LEDs on the inner panel glow. If the iModule® is removed from the printer during the replacement procedure, then short audible signals are heard. The error can be caused by the following reasons:

- the iModule® has slipped out of the optical sensor reach - adjust the position of the module,

- damaged optical sensor, a damaged electronic board. <u>The failure can be removed by a qualified person</u>. Contact a service point.

7.3.14. Dirty Ink Filter in the Head

A dirty filter in the head may cause an ink pressure drop in the gun and the nozzle, which in turn may be the reason for faulty readings of time of ink flight (the *ToF* parameter) in a phasing process. If that is the case, the *ToF* parameter value displayed in the status window increases (see section *4.11 Print Head Status*). The quality of prints may deteriorate. Also a phasing error may occur (see subsection *7.3.5 Phasing Error*). Follow the below given steps to diagnose the problem:

➢ Start the service mode (see the paragraph entitled *Service Mode* in section *4.6.4*) – the correction of the time of flight with pressure is turned off, the *ToF* parameter value displayed in the status window may increase,

➢ Execute the **CLEAN NOZZLE** command (in the **SERVICE** menu) – if the time of flight displayed in the status window drops (even below +00), it means that there is dirt in the filter and that the gun filter should be cleaned or replaced following the description given in section *6.1.5 Replacing Ink Filter in the Head*,

➢ After cleaning/replacement of the ink filter in the head execute the **STOP PRINTING** command in the **PRINTING** menu - in consequence the printer goes to the *stop* mode again (see section *4.11 Print Head Status*) and thereby the pressure correction of the time of flight starts.

The ink filter in the head should be replaced by qualified service staff while the printer is subjected to periodic inspection. If the filter gets dirty too frequently, it means that ink system components are soiled or the ink structure changed.

7.3.15. Too high Temperature in Electronics Compartment

The electronics compartment is cooled with two fans (one is inside the power supply system), which take cooler air from the outside of the compartment through a filter element. The temperature is measured with a sensor located in the power supply system and is displayed in the printer status window (alternatively with head temperature - see section *4.11 Print Head Status*).
If the temperature rises above its maximum, the following message is displayed:
Danger !! Too high temperature in
electronic compartment->check
the fan and change the air filter. The error can be caused by the following reasons:

• the fan is jammed - locate and remove the obstacle,

• an air inlet to, or an outlet from, the printer is obstructed or hindered - ensure a free flow of air through the electronics compartment (the distance from the left wall of the printer, where the air outlet from the electronics compartment is, to an obstacle must be at least 1 cm),

• a filter element in the electronics compartment is very dirty - replace the element (see subsection *6.1.6 Replacing Air Filter Element in Electronics Compartment Ventilation System*),

• the printer temperature during operation is too high - ensure appropriate conditions for printer operation to meet the requirements given in chapter *9 Technical Specifications*,

• a damaged fan, a damaged temperature sensor. The failure can be removed by a qualified person. Contact a service point.

7.3.16. Too High Head Temperature

The temperature measured with a sensor located in the head is displayed in the printer status window (alternatively with the electronics compartment temperature - see section *4.11 Print Head Status*). If the temperature rises above its maximum, the following message is displayed: **HEAD TEMPERATURE TOO HIGH !!** The temperature may cause problems in head operation, including a deterioration in the print quality. The alarm can be caused by too high a temperature of the printer during operation. Ensure appropriate conditions for printer operation to meet the requirements given in chapter *9 Technical Specifications*.

7.3.17. No Flow of Solvent in the Head

No solvent flows out of the nozzle while the head rinsing procedure is being followed (when the printer is switched off in the regular mode or after the **INK OFF** command has been chosen) or after the **SOLVENT** command. The error can be caused by the following reasons:

- empty solvent bottle – replace the bottle (see subsection ***6.1.1 Replacing Ink/Solvent Bottle***),

- damage in the solvent pump circuit. The failure can be removed by a qualified person. Contact a service point.
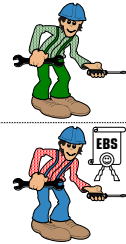
7.3.18. Names of Text Files in the Library are Changed - Battery is Discharged

The memory back-up battery is discharged. If a discharged battery is detected by the program, then after restart the user communication language is switched over to English and the following message is displayed:
BATTERY DISCHARGED !!
- MEMORY DAMAGED !!

The additional effects of battery discharge are:
➢ the printer run time is cleared,
➢ the current date is set to **01.01.00**,
➢ the current time is set to **00:00**,
➢ the expiry date for ink is set to **01.01.00**,
➢ all the text files, print parameters and current system data are destroyed, damaged or at least become suspicious,
➢ the information from the Ink Monitoring System is deleted, which involves the need for insetting new bottles and an iModule®.

The main reason for battery discharge can be improper storing of the printer (see section ***8.1 Storing the Printer***). The contents of memory cells can also be altered by very strong interference.

The failure can be removed by a qualified person. Contact a service point.

7.3.19. Lower Part of Overprint is Missing

The lower part of overprints is not printed (drops of ink which are least deflected *i.e.*, are jetted nearest to the gutter - see ***Fig. 7.3.19.1***). Some irregular drops of ink may be splattered within the overprint outline.
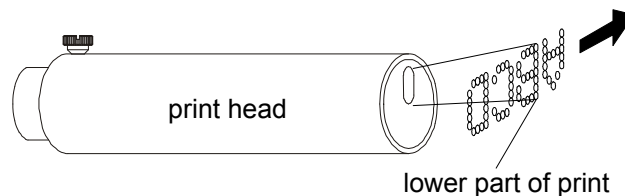

print head

lower part of print

Fig. 7.3.19.1

The lower part of overprints may be truncated due to improper adjustment of the ink jet path in relation to the gutter. Adjust the ink jet path following the procedure described in the paragraph entitled ***6.2.2 Adjusting Ink Jet Path***.
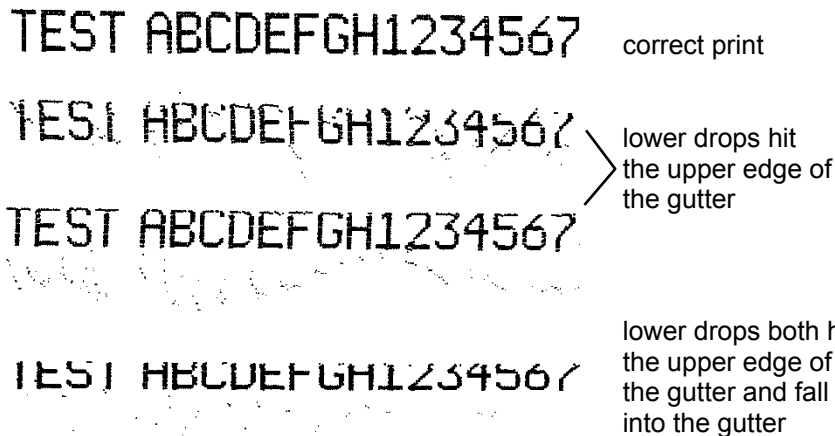
TEST ABCDEFGH1234567   correct print

TEST ABCDEFGH1234567 } lower drops hit
the upper edge of
the gutter

TEST ABCDEFGH1234567

Fig. 7.3.19.2

lower drops both hit
the upper edge of
TEST ABCDEFGH1234567   the gutter and fall
into the gutter

7.3.20.   Some Vertical Rows of Overprints are Spaced Widely

Some vertical rows of overprints are spaced widely. The problem occurs only when an external shaft-encoder is used for timing.
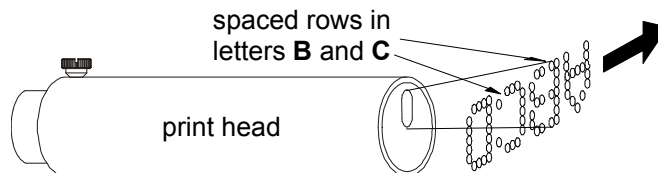
spaced rows in
letters **B** and **C**

print head

Fig. 7.3.20.1

The distortion occurs when the print rate is too high (or more precisely, when the timing frequency is too high). The rectifying procedure involves the following steps:

- Reduce the setting of the **Enc const p/m** or **Resol. dot/cm** parameter with the **PRINTING PARAMETERS** command – see section *4.12 Adjusting Print Rate*.
- If the above does not help, set the **Speed** parameter in the **PRINTING PARAMETERS** submenu to a higher print rate than the current one. For example, if the **Speed** parameter is set to **SLOW**, change its setting to **MIDDLE**.
- If the **Speed** parameter is set to **FAST** and distorted overprints are still produced, you can only reduce the conveyor travel speed or possibly contact the manufacturer for more information.

7.3.21.   Irregular Defects of Print Quality

The prints are made properly but big spots of ink appear here and there within the overprint outline.

The reason for the occurrence of big drops of ink is the leaking nozzle. Leaks may occur on the thread between the nozzle and the gun or, less frequently, at the setting of the ruby in the nozzle holder. The ink leakage flows towards the ink jet, then it is washed away by the jet and thrown out as big ink drops. Replace the nozzle following the recommendations given in subsection *6.1.4 Cleaning the Nozzle*.

7.3.22.   Sloping, Rippled or Jagged Overprints

Overprints produced are sloping, rippled or jagged. The irregularities can be caused by the following reasons:

- The head holder has been fixed to an element that is subject to strong vibration or shocks. The head vibrates or shakes during printing. Fix the head holder to a stable element that is not subject to vibrations or shocks.
- Objects to be labeled move on a conveyor and are subject to strong vibration or shocks. Make sure that the objects are stable in front of the head so that they do not vibrate or shake while they are being labeled.

- damage to high voltage converter in the Integrated Power Supply Module. <u>The failure can be removed by a qualified person</u>. Contact a service point.
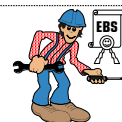
TEST ABCDEFGH1234567
TEST ABCDEFGH1234567
TEST ABCDEFGH1234567

Fig. 7.3.22.1

7.4. Contacting Service Points

The above paragraphs provide instructions on how to rectify some printer inefficiencies. The inefficiencies can often be corrected by the printer user without the need for calling a serviceperson. But in certain situations specialized service intervention is not only desirable, but simply required. Therefore, before the user requests assistance, they should collect some information to facilitate an initial appraisal of the failure. With this information a serviceperson can decide whether a printer inefficiency results from improper operation by the user and, additionally, they can get useful hints to prepare themselves better for the repair.

The following information should be passed to the service point when a failure is being reported:

1. Name, type and number of the printer.
2. Type of failure and the after-effects.
3. Printer condition at the time of failure:
   - the status of the inner panel indicators (which LEDs are glowing),
   - the printer status displayed on the terminal (refer to section *4.11 Print Head Status*),
   - types of possible errors (the **DISPLAY ERRORS** command),
   - the history of errors available with the **READ ERRORS REPORT** command,
   - the current settings of print parameters, that are displayed on the terminal after the **PRINTING PARAMETERS** command has been selected,
   - any additional non-standard options installed in the printer, if any,
   - versions of control programs available with the **OPTIONS** command,
   - the ink, solvent, iModule® and printer parameters that are accessed by the Ink Monitoring System (**IMS**) in the printer.
4. What operations were performed on the printer just before the failure occurred.
5. Kind, type and contents of subfiles of the complete file printed at the time of failure and the print height (7, 16, 25 or 32[32] dots).

The above information shall be reported by telephone or faxed to the service point.

> **NOTE:**
> Contact only authorized service points which are usually associated with your local printer distributor. This will ensure professional and prompt help and assistance in the case of any inefficient operation of your printer.

---

[32] This does not apply to the EBS-6500 printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).

8.   Storage and Carriage

8.1.   Storing the Printer

After the unit has been switched off, the tubes supplying ink to the head and carrying it away from the head need to be emptied. When the unit is switched off in the regular mode the ink gets drawn from the pipes and the pipes are rinsed and filled with solvent. That mode of switching off ensures that the unit is fully efficient when it resumes operation after a break lasting no longer than **about one week**. The inside of the head, especially the nozzle and the gutter are to be kept clean and washed with solvent. Additionally, the data stored in printer memory can be battery backed over about 1 month (this refers to parameters, text files, date and time and other data saved and set up by the user before).

If the unit is to remain idle (in the off state) for a period **longer than one week**, two problems may arise during that period:

➡ the tubing, a valve or any other ink system elements may get dry or blocked, which will hinder the operation of the device when it is finally restarted,

➡ the battery-supplied memory containing user-defined texts and parameters may be cleared (because the battery may discharge) - after about a month.

In order to avoid problems with ink drying in the ink system when the printer is stored for a longer time, the printer should be subject to a prior switching off in one of the modes described below.

Stoppage of up to 1 week	In order to prepare the printer for storage over a period of <u>not longer than 1 week</u> you should switch it off in the regular mode – see subsection ***3.2.1 Switching the Printer Off in Regular Mode***.
Stoppage of up to 1 month	In order to prepare the printer for storage over a period of <u>not longer than 1 month</u> you should switch it off in the regular mode with additional rinsing of valve **V3**, and then prepare it as for carriage - see section ***8.2 Transporting the Printer***.
Stoppage of more than 1 month	In order to prepare the printer for storage over a period of <u>more than 1 month</u> you should empty ink out of the printer, fill the printer with solvent and wash it following the description given on the Service Manual. <u>The procedure can be followed exclusively by a serviceperson trained by a printer distributor.</u>

Tab. 8.1.1

> **NOTE:**
> The time (given as a number of hours) over which the printer had remained off before it was switched on can be viewed with the **HV VALUE,PHOTO,SHAFT state** command in the **SERVICE** menu (item ***PrOFF***).

If the printer is stored for longer a period than 1 month, then in order to avoid the battery being discharged and thereby the text files, parameter blocks and other data stored in printer memory being lost, please remember to connected the printer to the mains and turn on its master switch located on

the printer side wall. When you do that, the red LED between the (ON) and (OFF) keys on the outer panel comes on. This operation should be done **at least once a month and should last about 8 hours**.

Allowable climatic and mechanical exposures in storage:

• storage temperature **from -5 °C to +50 °C**,

• relative humidity **max. 90% without condensation**,

• shocks: **max. 1 g, max. 2 ms**.

8.2. Transporting the Printer

The printer should only be transported in its normal operating position. It should not be tilted, turned "up side down" or shaken up. In order to avoid ink splashing out, the printer needs to be prepared for carriage properly. The below given steps should be followed:

1. Follow the switching off procedure together with washing valve **V3**. To that purpose do the following:
   - Select the **SWITCH OFF WITH V3 WASH** command from the **SERVICE/ SERVICE COMMANDS** submenu. The following message is displayed: **ARE YOU SURE (Y,N)? (Y=ENTER, N=ESC)**
   - When you confirm it with the "**Y**" key (or the ⏎ ENTER icon), the procedure for switching off in regular mode starts and the following message is displayed: **SWITCHING THE PRINTER OFF .....**
   - **Press ENTER...**, and the time [expressed in seconds] remaining to the end of the procedure is counted and displayed in the printer status window.

   ink connector

   adapter

   solvent bottle
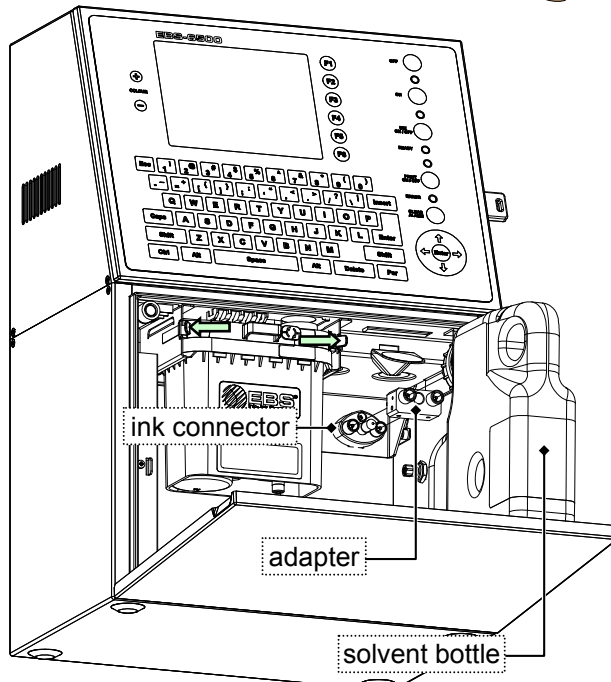
   - Press ⏎ ENTER and wait until the switching off procedure finishes. When the procedure is over, the following message is displayed:**With a use of an adapter plug a solvent bottle in the ink bottle connector. Then press ENTER** The message is accompanied by sound signaling whose objective is to make sure that the operation is performed correctly.
   - By means of an adapter (Part No. **P511772**) connect a solvent bottle to the ink connection (see the drawing above). When the operation is completed, confirm it with the ⏎ ENTER icon.
   - When the rinsing procedure is complete, the printer switches off automatically.
2. Remove the ink and solvent bottles from the printer.
3. While tilting the latches aside remove the iModule® from the printer and close the iModule® transport valve (turn the valve knob by 90 degrees and push it to the limit).
4. Install transport protections to the bottle connections and iModule® connections shown in ***Fig. 2.3.3.1*** (see subsection ***2.3.3 Removing Transport Protections***).
5. Pack the unit carefully to protect it from mechanical damage. The maximum shock to which the unit can be exposed inside the packing is **1g** over a maximum of **2ms**.

⚠

NOTE:
- While the printer (or the iModule®) is transported, the transport-safety valve of the module must always be in the "closed" position (see subsection ***2.3.5 Connecting the iModule®***). Otherwise, the iModule® can get damaged! The transport-safety valve can only be opened after the printer has been positioned in its workplace.
- The procedure described above applies to the case when the transported printer is to be subsequently stored for a longer period than 1 week (but not longer than 1 month). If the printer is planned to be started within 1 week, then instead of switch off and valve **V3** rinse (see step ***1*** of the procedure) the printer can be switched off in regular mode – see ***3.2.1 Switching the Printer Off in Regular Mode***.

9. Technical Specifications

Parameter	EBS-6500/EBS-6800	EBS-7200
Number of Heads	**1**	
Maximum print rate	**Speed=FAST:**	
	1 line 5x5 + 1 space row between characters:	
	2083 cps	**3028 cps**
	2 lines 5x5 + 1 space row between characters:	
	1890 cps	**2748 cps**
	3 lines 5x5 + 1 space row between characters:	
	607 cps	**905 cps**
	4 lines 5x5 + 1 space row between characters:	
	809 cps	**1206 cps**
	5 lines 5x5[33] + 1 space row between characters:	
	489 cps	**706 cps**
	1 line 7x4 + 1 space row between characters:	
	1785 cps	**2592 cps**
	2 lines 7x4 + 1 space row between characters:	
	1247cps	**1817cps**
	3 lines 7x4 + 1 space row between characters:	
	728 cps	**1085 cps**
	4 lines 7x4[34] + 1 space row between characters:	
	792cps	**1120 cps**
	1 line 11x7 + 1 space row between characters:	
	709 cps	**1031cps**
	2 lines 11x7 + 1 space row between characters:	
	304 cps	**453cps**
	1 line 16x9 + 1 space row between characters:	
	312cps	**455 cps**
	1 line 25x15 + 1 space row between characters:	
	76 cps	**114 cps**
	1 line 32x18[35] + 1 space row between characters:	
	31 cps	**45 cps**
Print height	**1.4 to 12 mm**	**1.2 to 9 mm**
Distance between the head and product	**0 to 30 mm**	**0 to 15 mm**
Head cable	**Head cable length:** **3 m as standard** 4 m, 6 m optionally (only for the **EBS-6800** printers)	**Head cable length:** **3 m as standard** 4 m, 6 m optionally
	Minimum bend radius R$_{min}$: **150 mm** The cable is not recommended for dynamic operation (it is advisable that the cable is immobilized in the workplace)	

---

[33] This does not apply to the **EBS-6500** printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).
[34] This does not apply to the **EBS-6500** printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).
[35] This does not apply to the **EBS-6500** printers (see *Tab. 1.1.1* in section *1.1 BOLTMARK®-series Printers*).

Parameter	EBS-6500/EBS-6800	EBS-7200
RAM	**256 kB**	
	text length: any number of characters restricted only by the size of the memory;	
	max. number of text files: **100** – for the **EBS-6500** printers, **1024** (optionally 2020) - for the **EBS-6800** printers.	**max. number of text files:** **1024** (optionally 2020).
Types of print	**single-row:** 5x5 matrix, 7x4 matrix, 7x5 matrix, 9x5 matrix, 9x7 matrix, 11x7 matrix, 12x6 matrix, 12x7 matrix, 14x9 matrix, 16x9 matrix, 16x10 matrix, 16x14 matrix, 21x15 matrix, 25x15 matrix, 32x18 matrix (this does not apply to the **EBS-6500** printers), any combination of the above mentioned matrices, **NOTE:** each matrix can be printed in boldface and every vertical row can be printed from 1 to 15 times; **two-row** **three-row** **four-row** a combination of the above mentioned matrices, allowing for the limitations attributable to **Speed=FAST** and the limits of the maximum height of a vertical row that the printer can print, **user-programmable graphics** The height of a graphical image is limited by the maximum height of a vertical row that the printer can print, **bar codes** Datalogic, Matrix, 2/5 5 Bars, 2/5 IATA, Interleaved, Code 39, EAN-8, EAN-13, UPC-A, UPC-A EBS, Kod 128, EAN-128, Kod 128B, ITF8, ITF14, The list of the bar codes available (out of those mentioned above) depends on the printer model, **2D code** **Data Matrix ECC-200** (in the **EBS-6500** printers as an option only).	
Terminal	**Built-in graphic terminal** equipped with an alphanumerical keypad, a graphic LCD display and touch screen as standard. **Personal Computer** (optional and independent from the built-in terminal): • to control the operation of one printer via the **iEBScom** program, **RS-232C** interface, automatic negotiation of 9600 Bd or 19200 Bd transmission rates (up to 10 m of cable as standard) or **RS-485** interface (optional for longer connections) - this does not apply to the **EBS-6500** printers), • to control a network of **EBS** printers of various types via the **iEBScom** program, **RS-485** interface at the transmission rate of 19200 Bd - this does not apply to the **EBS-6500** printers.	
Extra channel	**V24/RS232C or TTL** (9600 Bd as standard) - this does not apply to the **EBS-6500** printers.	
Conveyor speed converter	**shaft-encoder** - optionally for unstable speed conveyors.	

Parameter	EBS-6500/EBS-6800	EBS-7200

Operating conditions	**non-pigment ink**
	power supply:
	    supply voltage **AC 100÷240V 50/60Hz**,
	    current **0.65 – 0.3 A** – for standard version.
	ambient conditions
	    operating temperature from **+5°C** to **+40°C**;
	    relative humidity up to **90%** without condensation.
	mechanical exposure
	    vibrations **max 1 g**, **max 10 Hz**;
	    shocks **max 1 g**, **max 2 ms**.	

Weight	**about 12.5 kg** without ink and solvent bottles	
Dimensions	**height** **458 mm**, **width** **300 mm**, **depth** **211 mm**.	
Printer functions and qualities ensuring high comfort of operation and service	• automatic start-up and ready state indication, • automatic switching off and washing of the ink system, • automatic control of drop breakpoint, • automatic supervision of ink return, • automatic adjustment of ink pressure and vacuum level in the ink system, • automatic adjustment of ink viscosity/composition, • automatic pressure correction of ink drop properties (the size, the time of flight) to ensure constant conditions of printing, • automatic fault detection and indication of the need for operator intervention (e.g. no ink or solvent detection), • automatic control of external devices (e.g. stopping the conveyor if the need for operator or serviceman intervention occurs), • the printer's design and software are fit to handle a greater number of fonts, special text files and to control a number of printers linked into a network and connected to one PC, • all external (electrical and pneumatic) connections are located on one side of the printer housing allowing placement of the printer in a corner.	

Tab. 9.1

10. Layout of Cyrillic Characters on the Printer's Terminal Keypad

The layout of **Cyrillic characters** on the printer's terminal keypad (such a keypad for the EBS-6500 printer is shown below) is shown in the ***Fig. 10.1*** below. The characters are available after the type of subtext has been set to **Text** in the word processor and the character matrix (the **Char. set** parameter) to that whose name starts with "**Cyril**" or "**Fast Cyril**".

The Cyrillic characters marked on the keypad in blue are available at once. The Cyrillic characters shown in red are available after the (ALT) key has been pressed first. Lower/upper case letters are available according to the position of the (CAPS) and (SHIFT) keys.
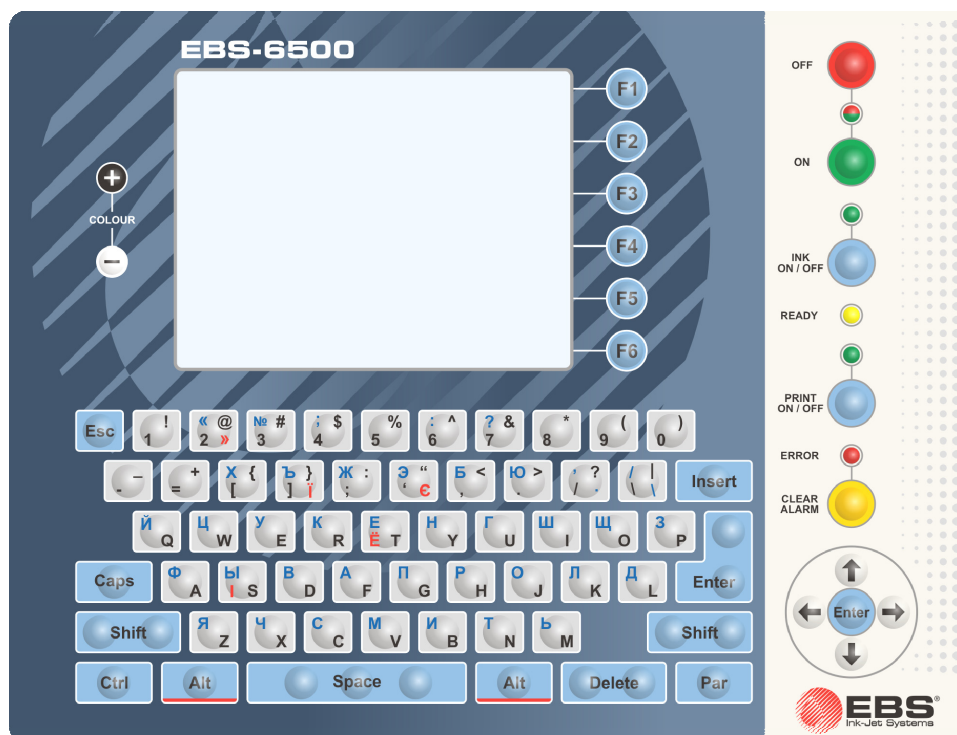

Fig. 10.1

11. Layout of Arabic Characters on the Printer's Terminal Keypad

The layout of **Arabic characters** on the printer's terminal (such a keypad for the EBS-6500 printer is shown below) keypad is shown in the *Fig. 11.1* below. The characters are available after the type of subtext has been set to **Text** in the word processor and the character matrix (the **Char. set** parameter) to that whose name starts with, e.g. "**Arabic**".

Then the Arabic characters that are marked black on the keyboard are available right away. The Arabic characters marked red are available after the SHIFT key has been pressed, whereas the characters marked blue are available after the ALT key has been pressed.

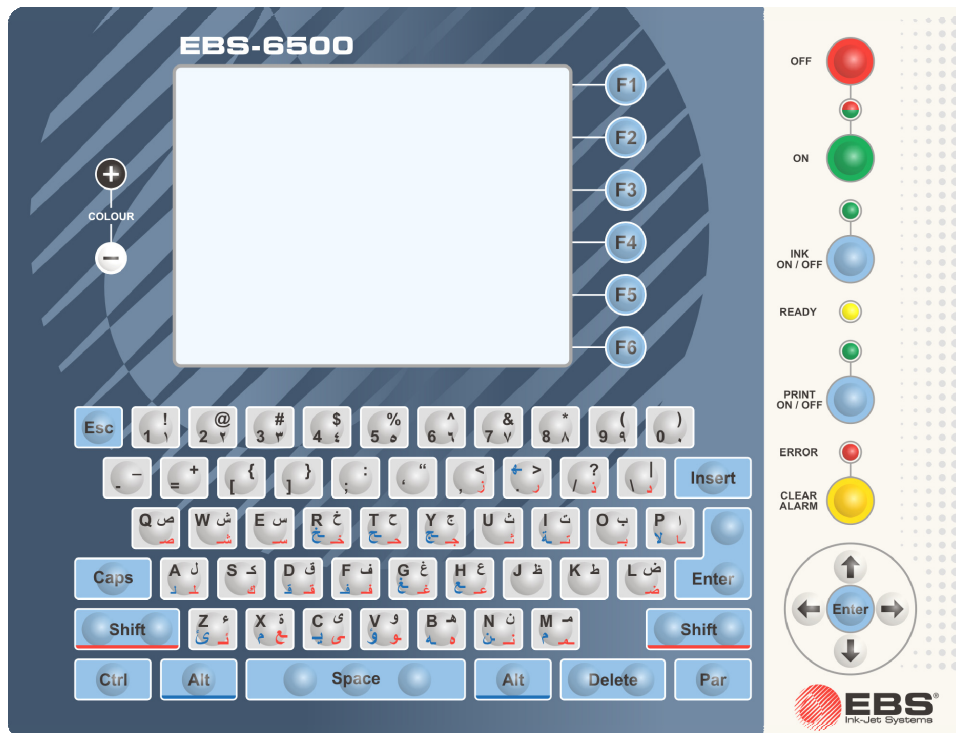**Fig. 11.1**