



EBS[®]
Ink-Jet Systeme

EBS-230

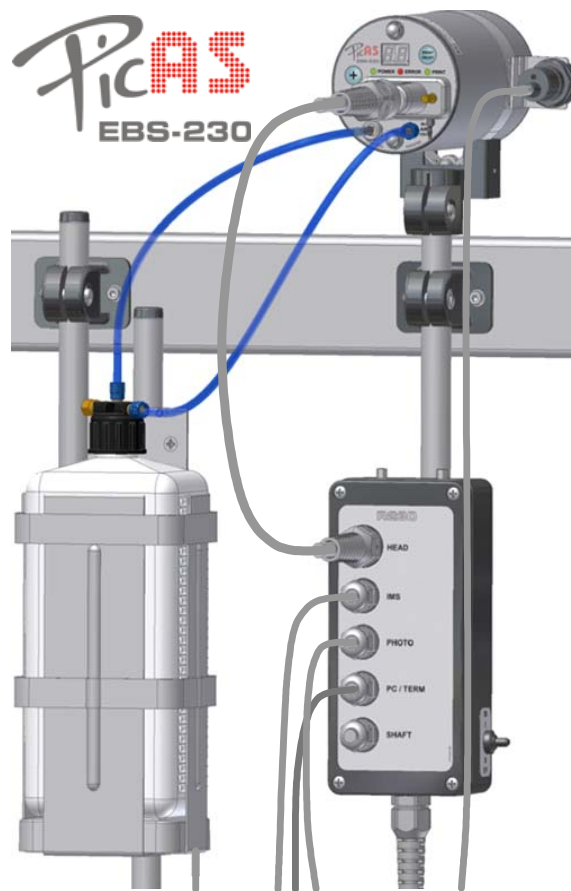
USER'S MANUAL

INDUSTRIAL INK-JET PRINTER

EBS-230

USER'S MANUAL

VERSION: 20080512#1.0

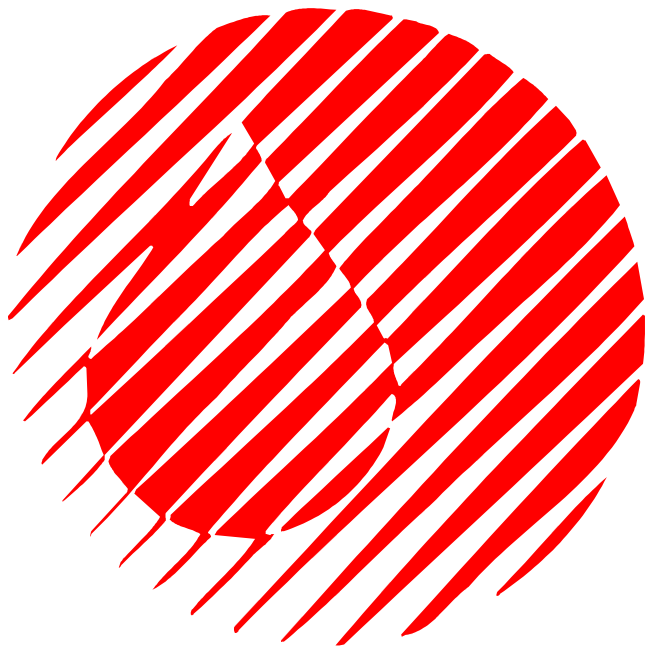


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These instructions apply to **EBS-230** printers with the control program version 1.5.134. In order to check the version of your program view the **About** menu.

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**Dear Users of EBS Ink-Jet Systems equipment,
Please read this manual necessarily in order to get full information about the
operation of your device.**

Disclaimer:

- *We shall bear no responsibility for damage to the device if it is operated improperly, i.e., inconsistently with this manual.*
- *As we wish to keep pace with permanently progressing technological development and individual requirements of our clients, we need to reserve the right to change the form, make and technical solutions of our devices. Therefore no data, illustrations or descriptions of this manual shall form any grounds for claims.*
- *We spare no effort to ensure that this manual is reliable, includes all modifications and is free from errors. However, the drawing up and publication process is complex and an error can occur in spite of our endeavours and wishes. We shall bear no responsibility for the consequences of editorial and printing errors in this manual.*

If your device contains a particular piece of equipment or needs performing an operation that have not been illustrated or described in this manual, or if you have queries on reading this manual, please contact any EBS Ink-Jet Systems agent for additional information.

1. General Information

NOTE:

There are warning and information signs on the right or left hand-side margins of some pages to attract the user's attention to messages that are provided next to them. They are the following signs:



Information signs indicating:

- that the actions described therein should be taken carefully,
- additional, printer-specific option and features, which are not described anywhere else,
- untypical behaviour 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. It requires the user to follow closely instructions given therein.

1.1. Application

EBS-230 is a family of inexpensive and easy to operate industrial **INK JET** printers that are designed for labelling in a non-contact way, various objects moving on a factory conveyor. The printer provides clear and firm labels on such materials as:

- paper and cardboard,
- (porous) plastics,
- fabric,
- leather and leather-like products,
- wood and wood-like products,
- (porous) ceramic products,
- metal surfaces of any type, etc.

The printer is characterized by the following qualities:

- Small size with a printer independent from the device controller. Therefore the printer can be installed directly in front of object to be printed on, often in difficult to reach places.
- It is not necessary to connect the printer to the controller (a computer or **T200** terminal).
- It can be fixed in any position.
- It can be equipped with a 7 or 16-nozzle print head.
- It can print with coloured and surface-specific inks, with one ink type to be used for a given printer.
- It can print variable data such as the current date, the end of the guarantee period (service life, period of storage, etc.) of the object labelled, time, numbering in ascending or descending orders (counters).
- The text to be printed and printing parameters can easily be entered and changed with connection to a selected PC computer with Windows® operating system (see **Minimum Recommended Hardware Requirements** on 61 page) or optionally with a **T200** terminal. Connection to PC or **T200** terminal is via a cable – see chapter **2.5 Printer Communication with Controller – PC or T200 Terminal**.
- Labelled objects are recognized by a photo-detector.
- When a speed indicator (a rotation and pulse converter) is attached, prints can be produced on objects moving at a varying speed.
- The printer's operation is fully automated, so are status indications and call-for-service messages.
- Bottles of ink are fully controlled and only bottles applicable for compatible EBS printer types are accepted.
- The printer can be used uninterruptedly for 24 hours a day.

1.2. Principle of Operation

Every label consists of a number of droplet-wide vertical rows. Within the print head, nozzles are positioned vertically at regular intervals in order to print labels of the maximum height. Each nozzle is equipped with an electromagnet-controlled valve. Labels are made by jetting ink droplets at pressure when the valves open. Pressure is generated in the printer through the use of a built-in microcompressor. Objects to be labelled move in front of the printer while vertical rows are printed one by one until the entire label is complete.

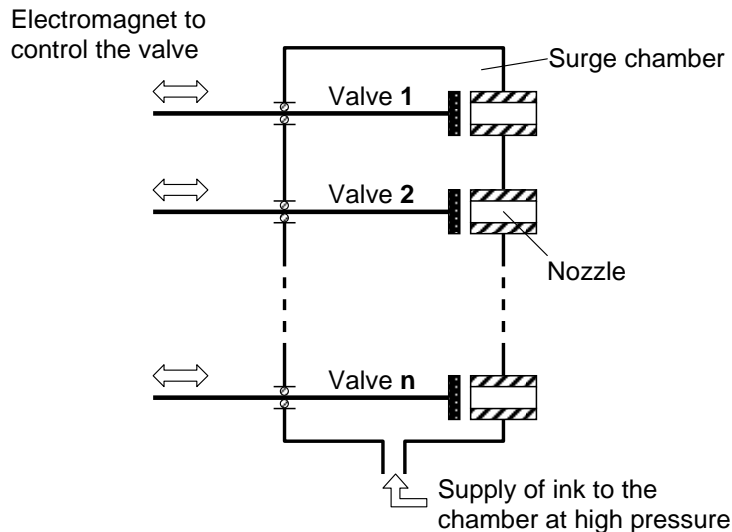


Fig. 1.2.1

1.3. Environmental Protection

The **EBS-230** printing system is not subject to Directive **2002/96/EC** of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE). However, following the European Community's generally accepted policy on environmental protection, we recommend that after the **EBS-230** printing system has been put out of service, it should be separated from municipal waste and processed in an environmentally friendly way according to the applicable local regulations.



1.4. Conformity Marking

The **EBS-230** printing system has been subjected to conformity assessment procedure which resulted in the issue of Declaration of Conformity. This forms the basis for the statement that the **EBS-230** printer and the manufacturer's accessories to which this Declaration also relates are in compliance with the requirements of the following European Community Directives:

2006/95/EEC, 89/336/EEC, 91/263/EEC, 92/31/EEC, 93/68/EEC

and that they meet the following norms that are harmonised with the above Directives

EN 61000-6-2:2001, EN 61000-6-4:2001, EN 60950-1:2001

if the printer and the accessories are installed and used following the manufacturer's instructions.

On this basis, the following marking has been placed on the **EBS-230** printer and **R230** cable distributor since 2007:



2. Installing the Printer

2.1. Safety and Installation Requirements

All efforts have been put into designing this printer carefully and making it safe and reliable. However, the safe operation of the device is conditioned by the user's awareness of, and obedience to the following safety rules and precautions.

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



1. **A fire extinguisher designed to extinguish electrical equipment and flammable solvent fires must be placed within easy reach of the unit.**
2. **The unit must not be operated in rooms where an explosion hazard exists.**
3. **No overprints can be made on products whose temperature exceeds 100°C at the time of printing.**
4. **No open fire or spark producing devices are allowed in the area where the unit operates.**
5. **The outlet of the head must not be directed towards persons, animals or random objects during printing in order to avoid splashing anybody or anything with ink.**
6. **All activities** related to the washing and cleaning of the print heads, ink-system, changing of ink bottle or any other elements of the system **must be performed in protective clothing.** Take care to avoid contact with ink. **It is especially important to protect the eyes when performing these activities.** Protective eye-wear is recommended.
7. **Complete washing and cleaning of dirty print heads and other elements must be performed while the device is switched off. Synthetic containers should not be used** as they generate static electricity. Metal containers are recommended.
8. **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.
9. **Dangerous mains voltage is applied to the R230 cable distributor, therefore care should be taken to perform manipulations in the system cabling after power supply has been switched off. Remove the outlet plug of the distributor from the outlet socket before you open the distributor casing.**

**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 have been 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 object that is connected to earth (for example, to metal parts of the factory conveyor).

In case of accident...



- When ink or solvent spill, the spilled fluid should be wiped out with a piece of absorbent material and then removed in compliance with fire and health and safety at work (HSE) regulations.
- If the clothing has been splashed, remove it as soon as possible.

- ➔ Should the eyes or skin get irritated:
- EYES** rinse the eyes with running water for at least 15 minutes, then see your oculist,
 - SKIN** wash the skin with water and soap.

2.2. Power Supply Requirements

Power Supply

The **R230** cable distributor has a power pack with the following parameters:

Power supply (power pack integrated with R230 cable distributor)	IN: 100-240 V~, 50-60 Hz / 0,66-0,34 A OUT: 24V---, max. 1A
Maximum power consumption	0.58A for 7-nozzle printer, 0.91A for 16-nozzle printer.

NOTE:

- **Take care while connecting a computer to the printing system** (see section 2.5). **Perform the following operations to ensure safe connection:**
 - a) **Before connecting the **R230** distributor cable to the computer disconnect power supply from the printer with the distributor power-switch and wait a few seconds.**
 - b) **Connect the cable marked as PC/TERM to the computer and secure the male connector against slipping out with attached lock screws.**
 - c) **Switch on power supply of the printer with the distributor power-switch.**

ABSOLUTE EQUIPOTENTIALITY (equal potentials) OF THE PRINTER HOUSING AND THE COMPUTER TO BE CONNECTED TO THE PRINTER is the prerequisite for safe connection and proper operation (communication). Ideally, the metal printer housing should be connected to earth at the same point where the outlet socket (neutral) to which the computer is connected is. The efficiency of earthing should meet the requirements of the applicable standards. The objective is to eliminate damage to electronic ports of the computer and printer while connecting or disconnecting an interface cable to or from them.

- **The printer and the computer must not be plugged into sockets of different ground potentials.**
- If the power network does not meet standard requirements, appropriate line-interference filters or special interference-free connectors should be installed. This applies in particular to the systems to/from which high loads, especially lagging ones, are connected/disconnected.



2.3. Installing the Printer

2.3.1. Standard and Optional Elements of the Printer

Some elements may not be part of a typical delivery or other elements which are not specified below may be included, depending on your order.

The following elements are delivered most frequently as part of a typical system:

- **EBS-230** printer 1 unit
- Ink system with IMS module 1 unit

- **R230** cable distributor 1 unit
- USB adapter 1 unit
- Photo-detector 1 unit
- Printer mounting, tube mounting and clamps 1 unit
- CD with utility software, operating instructions and user-support files (instructions, advice, help in electronic form) 1 disc

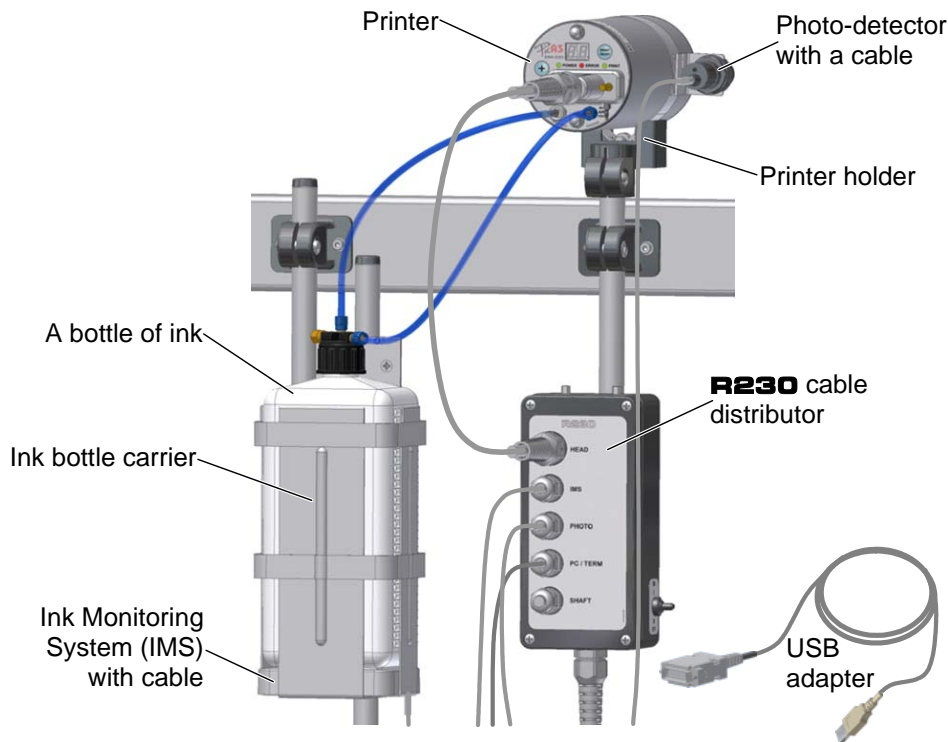


Fig. 2.3.1.1. Elements of the **EBS-230** Printing System.

Other elements to be delivered with the order as part of the system or separately:

- A shaft-encoder, an indicator of the conveyor travel speed.
- **T200** terminal with printer service program in place of PC computer.
- A movable platform with a cable for making prints manually.

2.3.2. Preparatory Steps

When switching on device for work the first time, or after transport, install it according to the requirements below. For this purpose, perform the following activities:

1. Remove all elements of system from the packaging.
2. Choose a location for printer installation free of vibration, shock, dust, smoke and dirt as well as intense or inflammable vapours and gases.



NOTE: The following mechanical and environmental conditions should be met:

Environmental conditions: operating temperature from +5°C to +40°C,
relative humidity up to 95% without condensation.

Mechanical conditions: max. vibration of 1g at the maximum frequency of 10Hz,
max. shocks of 1g over the maximum of 2 ms.

3. Fix printer mounting in location where objects are to be printed.



NOTE: If the conveyor vibrates too much, fix print mounting on stable stand or wall, not in contact with the conveyor.

4. Fix printer to horizontal or vertical mounting depending on needs.
5. Fix photo-detector to grip attached to printer mounting or to other place appropriate to the object to be labelled.
6. Mount the distance holder on the main side of printer, in the opening, and on the side from which the object to be labelled will move.

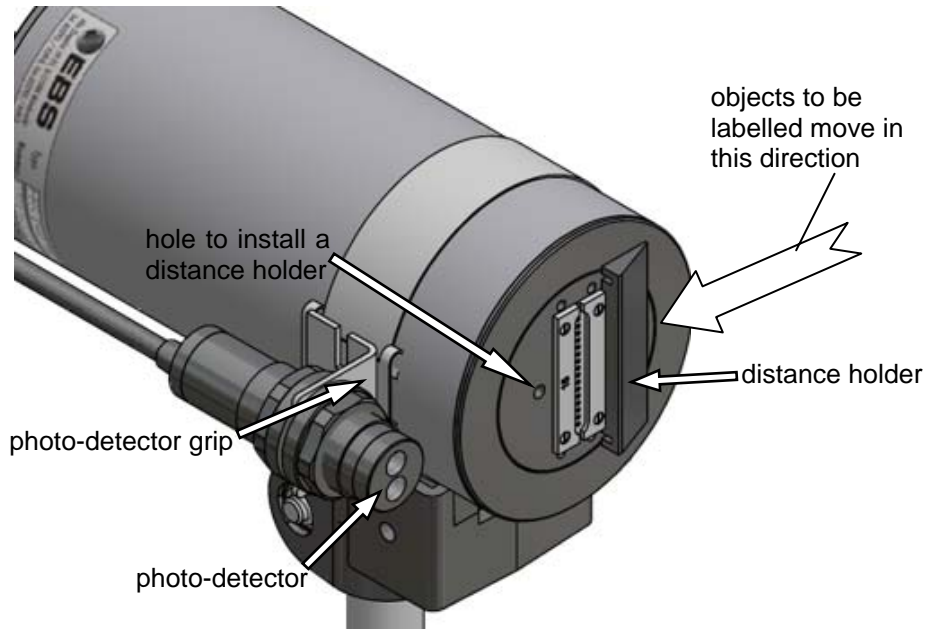


Fig. 2.3.2.1. Fixing elements of printer to standard mounting

2.3.3. Connections

All electrical and pneumatic connections are situated on the back side of the printer.

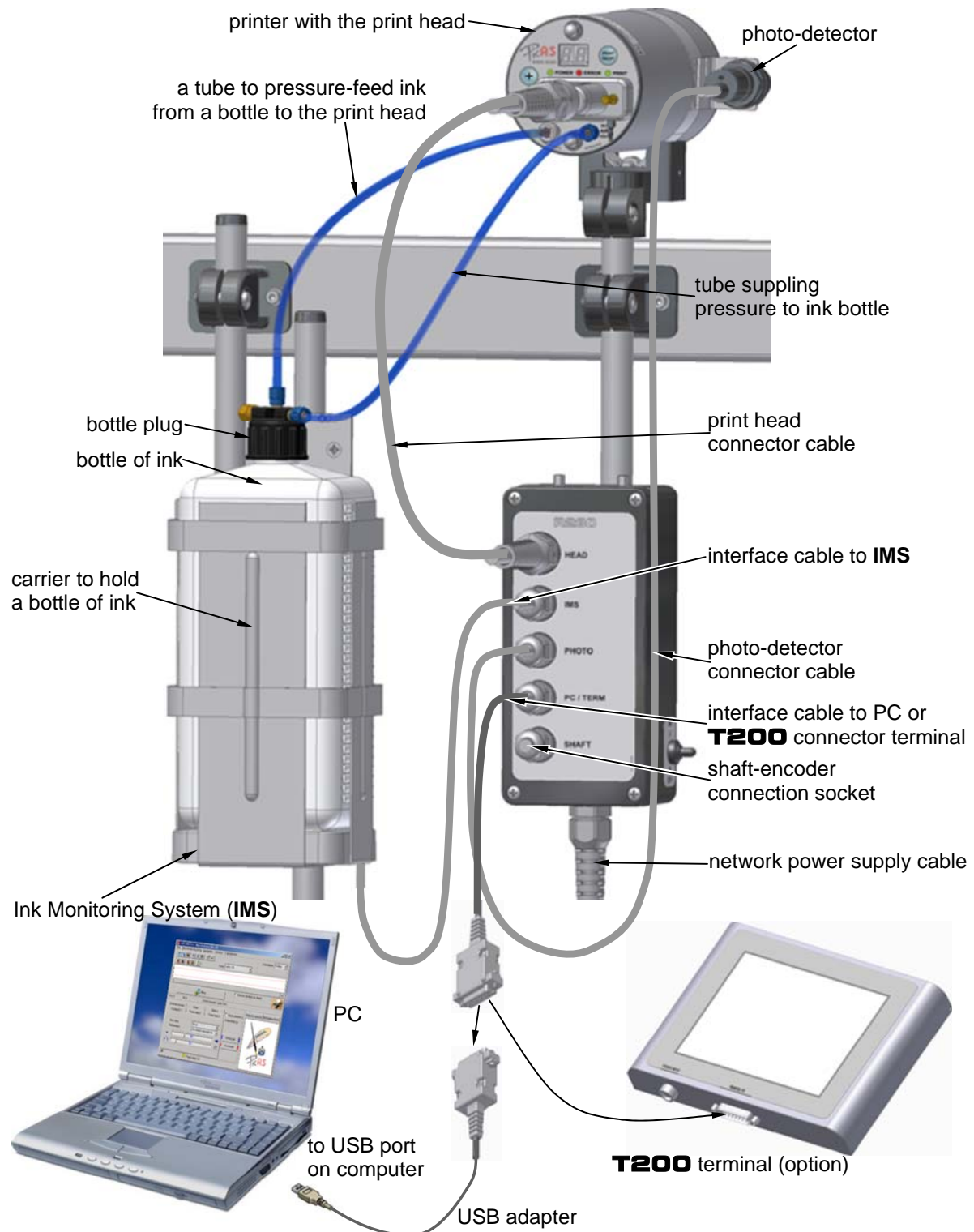


Fig. 2.3.3.1. Connecting the **EBS-230** printer at its workplace.

Connecting the printer to the ink system

The ink system for the printer is built of the following components (see **Fig. 2.3.3.1**):

- A carrier to hold a bottle of ink and grips to fix the carrier up.
- An Ink Monitoring System (**IMS** in short).
- Pressure pipes of polyethylene for supplying ink and compressed air.
- A bottle of ink (with the capacity of 1 litre – the use of higher capacity bottles may result in microcompressor malfunction).
- A cap to be screwed onto the bottle; it contains:
 - a tube with an ink filter at one end,
 - tube adaptors,
 - retaining nuts to secure the tubes on the adaptors.

To connect the ink system to the printer perform the following activities:

- a). Screw polyethylene tube into the cap of ink bottle.
- b). Secure the tube to the cap to prevent dislodging by screwing down the blue plug.
- c). Connect the tube projecting vertically from the non-return valve of the ink bottle cap by screwing into the input connector (marked **INK**) on the printer.
- d). Connect the polyethylene tube projecting horizontally from the bottle cap and connect the tube to the output compressor valve of the printer (marked **AIR OUT**) while securing it against dislodging by screwing in the blue plug.

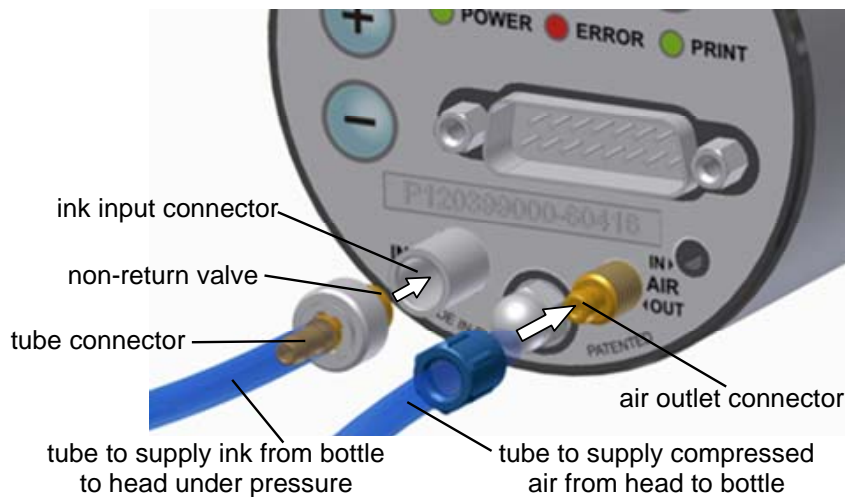


Fig. 2.3.3.2

Electrical and Interface Connections

Read notes given in section **Power Supply** in order to get familiar with safety requirements - see frame **NOTE** on page 9.



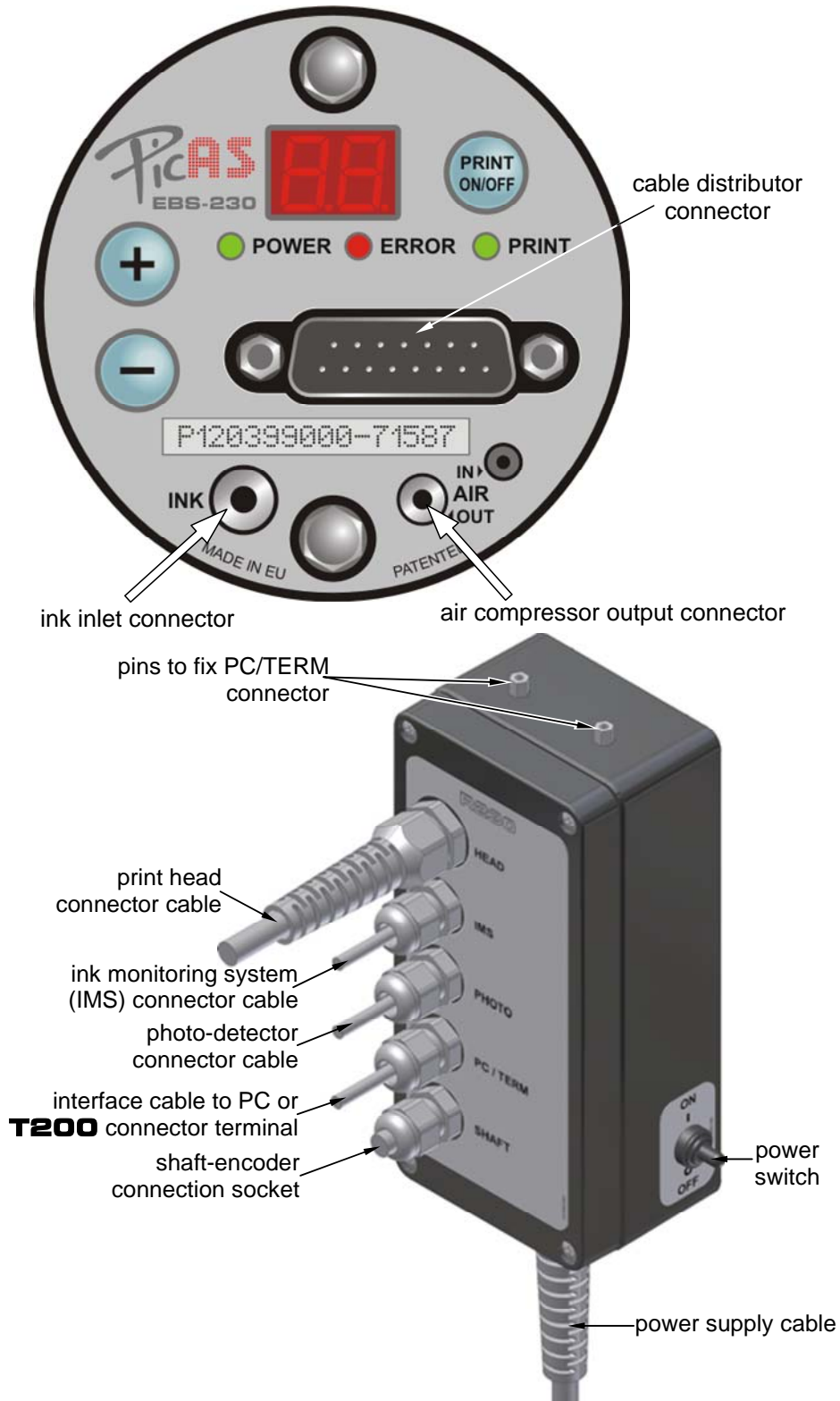


Fig. 2.3.3.3. Connection sockets on the printer's operation panel as well as **R230** cable distributor connector cable.

2.4. Switching the Printer On/Off

Switching the printer on/off can be only be done by switching on/off the power switch located on the **R230** cable distributor housing – see [Fig. 2.3.3.3](#). If the printer has been switched on properly, the **POWER** lamp emits green light continuously.

On switching the power supply off, protect the print head by following the steps specified below:

- open the drain valve which is next to the ink bottle cap. Thanks to that the ink pressure drops to zero. Then close the drain valve to protect ink solvent from evaporating,
- rinse the plate and the nozzles with solvent.



2.5. Printer Communication with Controller – PC or T200 Terminal

A PC (stationary or portable) with Windows® 98SE / ME / NT / 2000 / XP / Vista®, or **T200** terminal is vital to controlling the **EBS-230** printer and the program servicing the **EBS-230** printer – (see [Minimum Recommended Hardware Requirements](#) on page 61). With the help of these devices you may send texts for printing to the printer, save or read the printing parameters, print configurations and initiate or halt the printing process, etc. The **EBS-230** communicates with computer or **T200** via a cable.

Line Connection to Computer

The printer is generally connected to the computer via the **R230** cable distributor (marked **PC/TERM**) which links to the computer through a USB adapter to a USB port (or optionally through a RS-232 adapter to a serial port). The adapter requires installation of controllers, therefore during the first start-up, the controller initialisation program disc must be inserted into the disc drive. The installation disc is not required for further connections. Installation of a controller adapter must precede installation of the printer control program.

Read notes given in section [Power Supply](#) in order to get familiar with safety requirements - see frame [NOTE](#) on page 9.

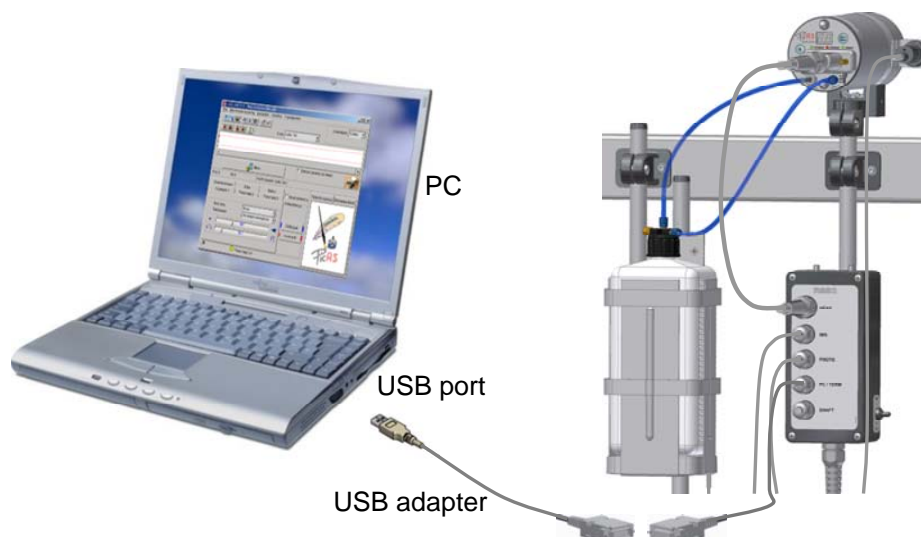


Fig. 2.5.1. Connecting the computer using cable method.

Line Connection to *T200* Terminal (optional)

Optionally, where connecting the printer to a computer is impossible or problematic, the **T200** terminal may be used. Detailed information on the **T200** terminal may be found in a separate document ***T200 TERMINAL User's manual***.



Fig. 2.5.2. Connecting the **T200** terminal using cable method.

3. Operating the Printer

3.1. Operation Panel

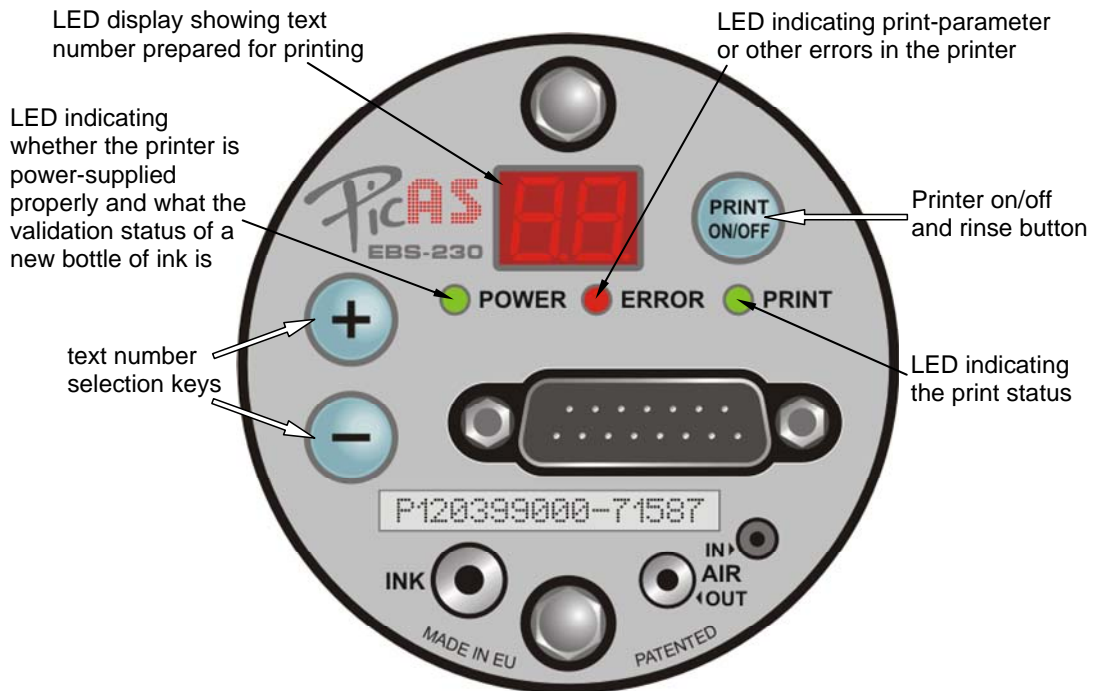


Fig. 3.1.1. Elements of printer panel.

The operation of the **PRINT ON/OFF** button:

- When the button is pressed shortly, the printer is triggered between the **stop** state and **print** state. The **print** state is indicated by light emitted by the **PRINT** lamp. With use of the controller program you can configure the finishing of the printing assignment by pressing the **PRINT ON/OFF** – see chapter **Stopping Printing**.
- When the button is pressed and held down for some time, the rinsing of the print head of the printer starts. All nozzles open at the same time in order to increase the flow rate. The function of rinsing is used to remove obstacles, if any, from slightly choked nozzles or to rinse the print head with wash-up.

If the **ERROR** lamp lights up after the **PRINT ON/OFF** button has been pressed, this is an indication that print parameters stored in the printer memory are incorrect and cannot be used to print a text. In order to clear the error, load all print parameters and a text to be printed to the printer memory from the computer with the use of **EBS-230** printer control program or with the **T200** terminal.



3.2. Quick start: Printing a Ready-to-use Text from the Printer Memory

If the printer is delivered with text and parameters for printing loaded into the memory – controller devices (computer or **T200** terminal) are not necessary. In order to start printing, follow the steps given below:

1. Install the printer – see chapter **2 Installing the Printer**.
2. Attach a photo-detector and shaft-encoder, if needed.
3. Unseal a new bottle of ink, screw it into the bottle cap and place it in the carrier resting the bottom on the **IMS** module.
4. Switch the printer on, wait about 10 seconds until the bottle of ink is validated and then press the **PRINT ON/OFF** button.
5. Make objects to be labelled travel in front of the printer.

If the text to be printed and print parameters are to be modified, use a PC and **EBS-230** printer control program or the **T200** terminal.

3.3. Operating the Printer with Control Program

3.3.1. User Interface for Printer Control Program

Below there are the control program window and panels as they look like soon after the program has been started.

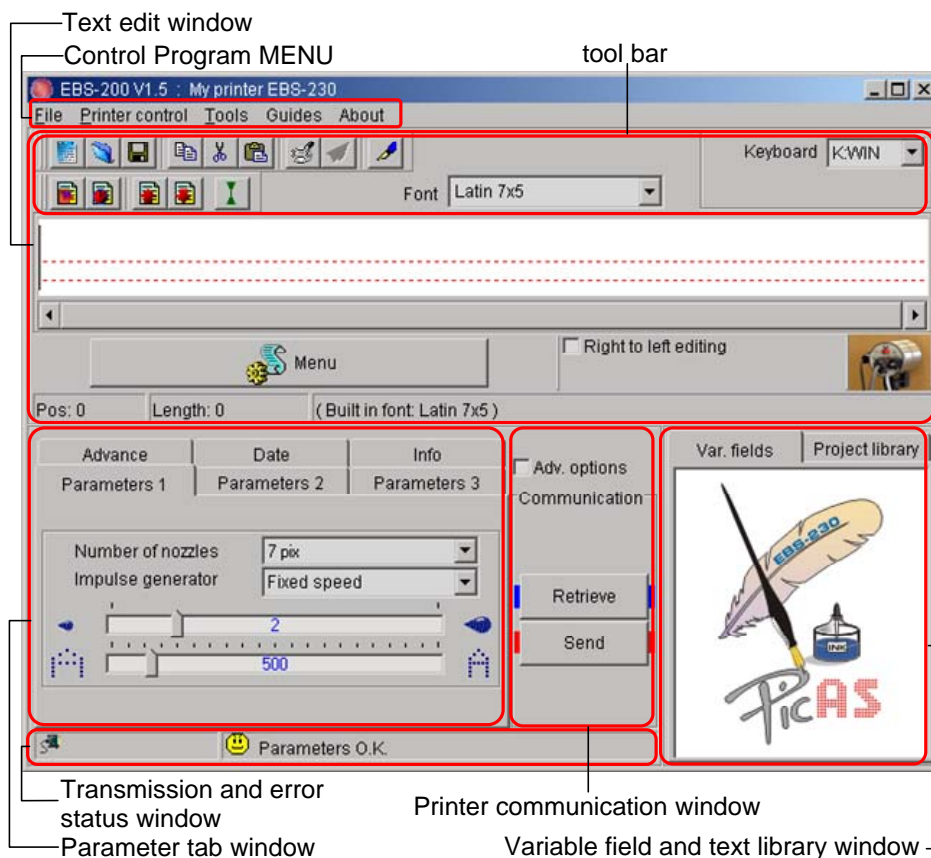


Fig. 3.3.1.1. Main window of the control program.

3.3.2. Setting up Initial Connection for Printer Control Program on Computer

- The first step in setting up the connection of the program to the printer is establishing the printer connection via a computer port. The serial port on the computer to which the printer is connected (**Com ports enumerating**) is indicated in the **Tools** menu, the **Preferences** submenu, via the **Autodetect** option, as standard. In such a case the program detects the port list automatically. Another option is to assign the COM port list to be searched by the program. For example, if you select item 2 from the drop-down list, then the program searches ports COM1 and COM2, but if you select item 5, then ports 1, 2, 3, 4 and 5 are searched, etc.

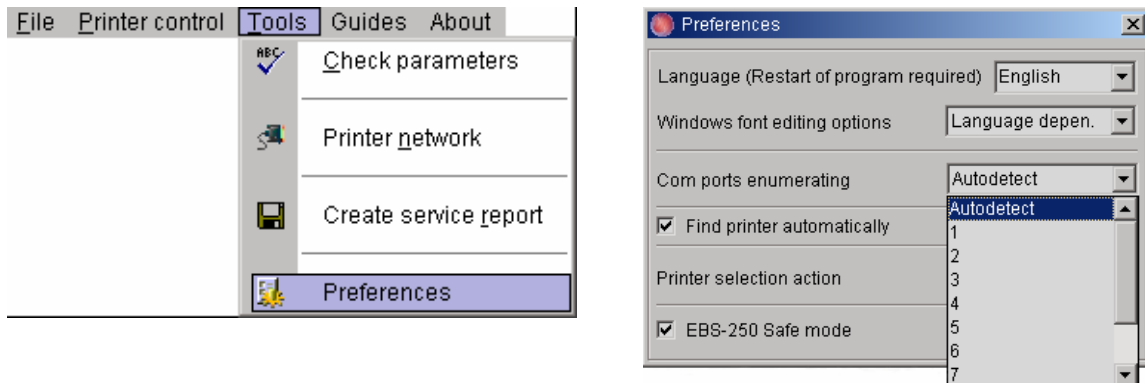


Fig. 3.3.2.1

- Check for proper communication between the computer and the printer by clicking the **Retrieve** or **Send** in the printer control program. If the serial port number is wrong or the printer is improperly connected to the computer, then an attempt to establish communication results in transmission errors – see **Fig. 3.3.2.2**.

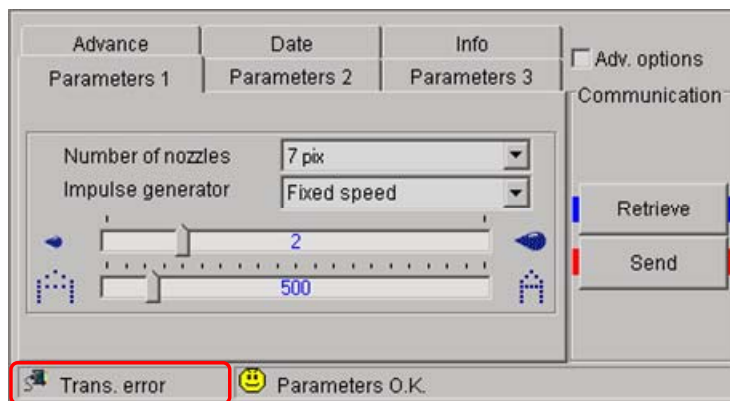


Fig. 3.3.2.2

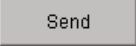

- If the serial port number is chosen properly and the printer is properly connected to the computer, the message **O.K.** is displayed after the communication has been established.

3.3.3. Saving Text Files and Parameters in the Printer Memory

A text to be printed, print parameters and other printer parameters are stored in the printer memory. The **EBS-230** printer is equipped with three types of memory:

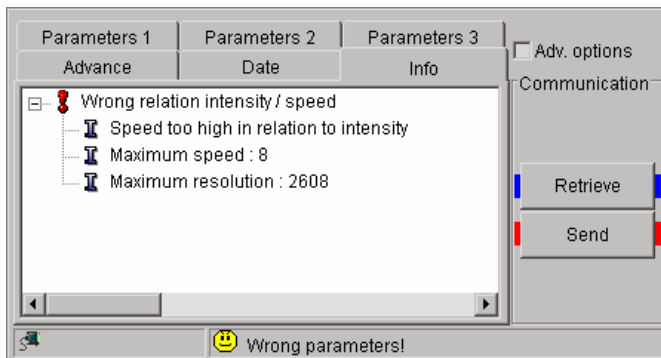
- A non-volatile programmable read-only-memory, which retains data even when the printer is switched off. It stores a text, print parameters and configuration of the printer. Data is saved in the memory by clicking the **Save** button (which is available after the **Adv. options** box has been ticked) on the communication panel of the control program window. Data are transferred from the volatile working memory – see further below - to the non-volatile read only memory.

2. A non-volatile clock memory, which retains data when the printer is switched off as it is battery supported. It stores data generated by real-time clock and can store values of some variable fields such as non-volatile counters.
3. A volatile working memory, which loses data stored in it when the printer is switched off. It is used by the printer to fetch data to be printed on an ongoing basis. Each time the printer is switched on, data are transferred from the non-volatile read-only memory to the volatile working memory. The function enables the user to start printing a text that has previously been stored in the non-volatile memory without the need for a computer.

If a text or print parameters are modified while the printer is on, always download the modified data to the printer before printing starts. In order to transfer data to the volatile working memory click the  button on the communication panel of the control program. If the data is also to be used when the printer is switched on again at a later time, it needs to be saved in the non-volatile read-only memory by clicking the  button (which is available after the **Adv. options** box has been ticked).

3.3.4. Checking Printer Parameters

The printer parameters are checked for correct settings automatically. In the event improper parameter settings are made, the **Wrong parameters!** message appears.



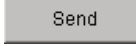

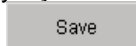
If you want to check the cause of the error, send the parameters to the printer by pressing the  key, or use the **Check parameters** function available in the **Tools** menu. An explanatory message is displayed in the **Info** tab sheet.






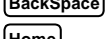


Fig. 3.3.4.1

The parameters can then be transferred to the printer volatile memory by clicking the  button and then to the non-volatile read-only memory by clicking the  button (which is available after the **Adv. options** box has been ticked), if they should be retained after the printer has been switched off. See also section **3.3.3 Saving Text Files and Parameters in the Printer Memory**.

3.3.5. Creating and Editing Texts

Texts are written in the text edit window. To write a text, place the cursor in the edition line and enter the text characters with the computer keyboard.

Standard text editing is done with the mouse and keyboard, as with other Windows® applications:

-  to move the cursor horizontally to the right,
-  to move the cursor horizontally to the left,
-  to move the cursor horizontally to the right and highlight the text,
-  to move the cursor horizontally to the left and highlight the text,
-  to delete one character to the right of the cursor,
-  to delete one character to the left of the cursor,
-  to move the cursor to the beginning of the text,
-  to move the cursor to the end of the text.

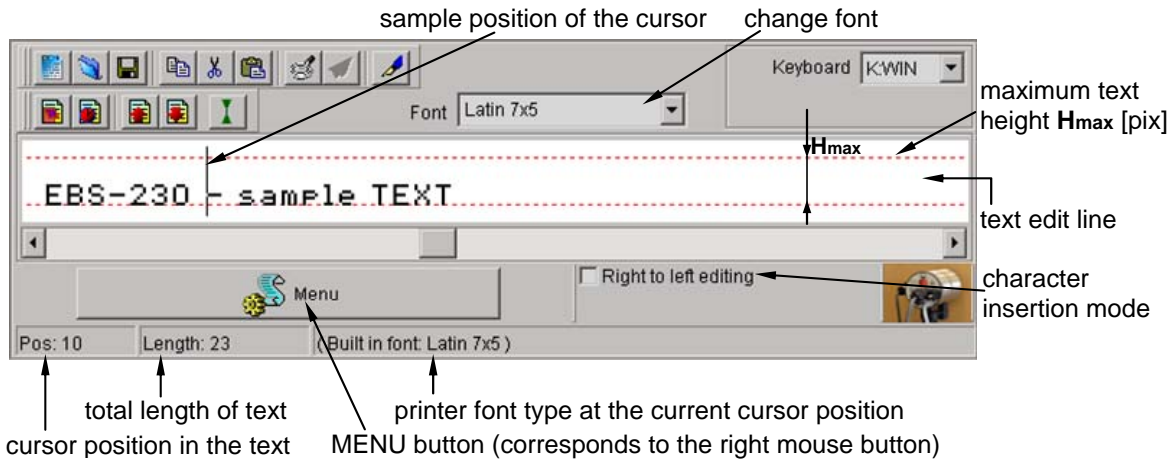



Fig. 3.3.5.1. Text edit window – entering characters

Using and Changing Built-in Fonts of the Printer

The program uses built-in fonts as standard. In order to change the font type and size at any point of the text, follow the steps below:

1. Position the cursor in the text edit line exactly where another font is to be inserted.
2. Holding the cursor on the text edit line, press the right mouse button (or the MENU button) and select **Font** from the menu displayed. Then select the font type you need from the list displayed, e.g. **Latin 16x10**. You can also do that using the pull-down list called **Font** on the tool bar of the text edit window (see figure Fig. 3.3.1.1). The printer fonts are at the top of the list and marked with the symbol .
3. Move the cursor to another position and insert another font-change marker.

If only one font-change marker ▲ has been inserted, all characters from the marker position to the end of the text are displayed (printed) with the use of the replaced font.

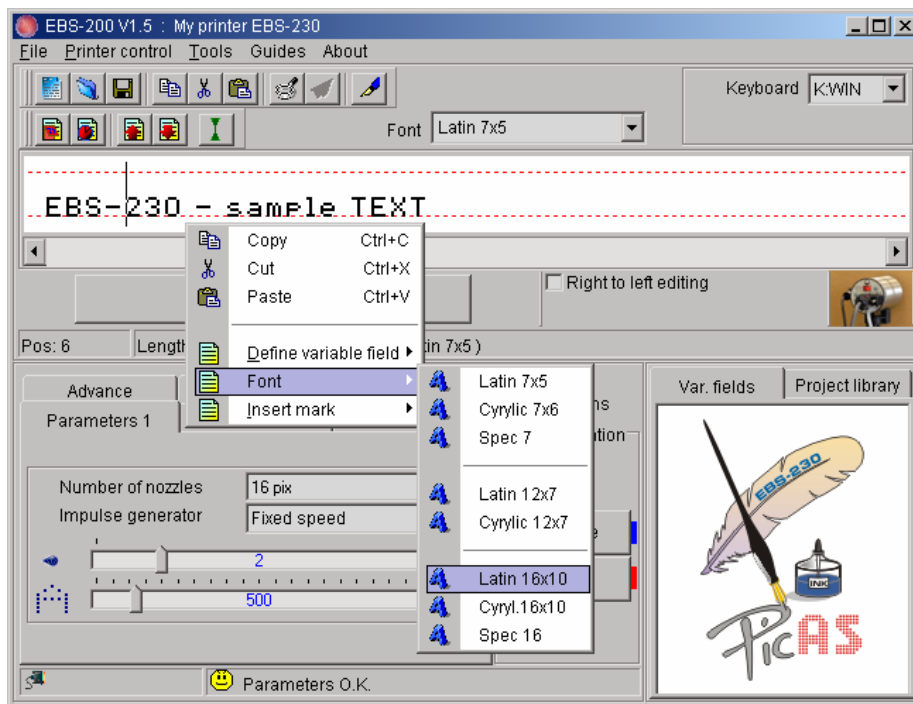


Fig. 3.3.5.2

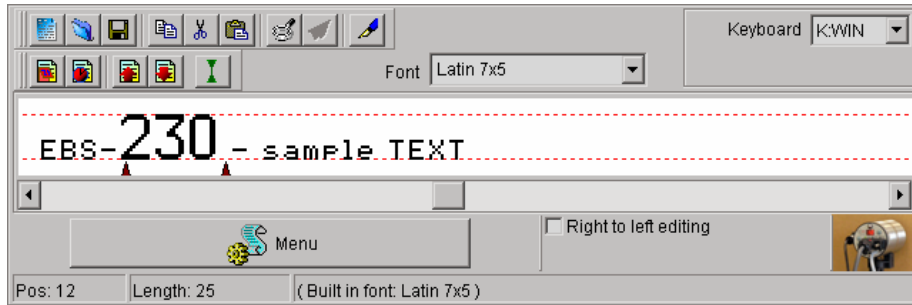


Fig. 3.3.5.3.

A font-change marker is stored in the text as a non-printing code and it increases the length of the text by one. In order to delete a marker, place the cursor in front of it and press the **Delete** key or alternatively place the cursor behind it and press the **BackSpace** key - see the indicator of the cursor position within the text. If a font-change marker ▲ is deleted, then characters following the deleted marker have the same attributes as the text in front of the deleted marker had.



NOTE: To change the font to a font with more vertical pixels (amount of dots) you need to adjust (increase) the setting of the **Number of nozzles** parameter.

Using and Changing Windows® Fonts

You can also use Windows® fonts to create texts in your printer.

1. Move to the **Font** list and replace built-in font with one of fonts installed in your Windows®. You can change the font **Size** and the keyboard "language" in Windows®. While increasing the text height do not exceed **H_{max} [pix]** line because otherwise the excessive top part of the text will be cut off.

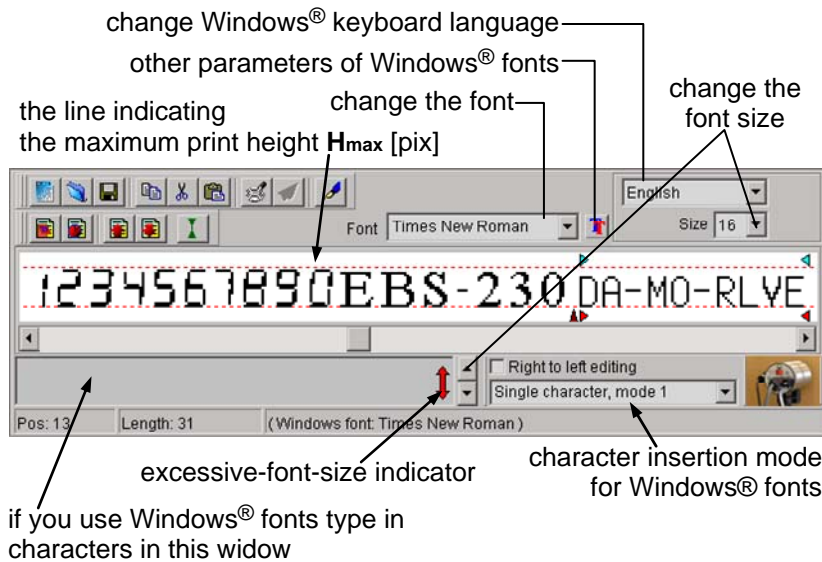
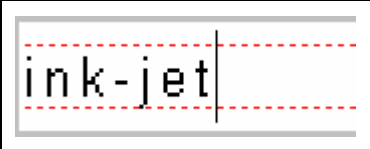
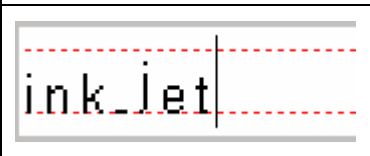
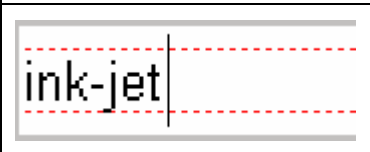


Fig. 3.3.5.4.

2. Move the cursor to the position where you want to start a text and type in the text. You can change the font at any time.
3. There are three character insertion modes you can use: **Single character, mode 1**, **Single character, mode 2**, **Multi character**. Each of them matches Windows® font characters with the capabilities of your printer in a different way according to the font type, language and character insertion mode (the **Right to left editing** parameter).

	<p>Single character, mode 1 – the text is centred between the text edit lines.</p>
	<p>Single character, mode 2 – all characters are aligned to the lower text edit line.</p>
	<p>Multi character – is used to enter the characters whose appearance varies depending on whether single characters or character groups (words), such as Arabic characters, are used.</p>

NOTE: The number of characters to be input with the use of the Windows fonts is limited – it depends on the font type and size.



Cutting and Pasting Text Using Windows® Clipboard

A text fragment can be marked e.g. for copying.

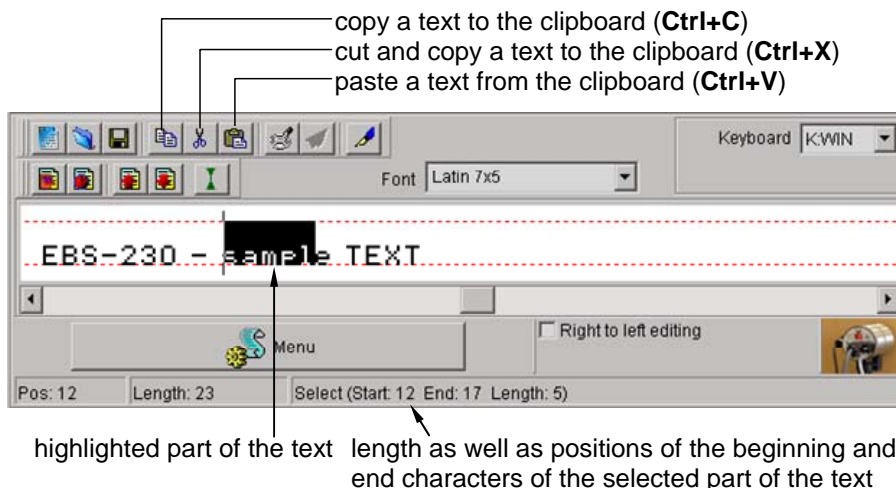





Fig. 3.3.5.5.

The highlighted text can be copied to the Windows® clipboard by clicking the  button (the shortcut of **Ctrl+C**) or cut out and copied to the clipboard by clicking the  button (the shortcut of **Ctrl+X**).

The text stored in the Windows® clipboard can be pasted back onto the text edit line by clicking the  button (the shortcut of **Ctrl+V**). The method can be used for moving texts from other Windows® applications to the text edit line in the control-program window and then to the printer (you can change the font of the text pasted, however the new font needs to be one of the printer built-in fonts only).

NOTE: If variable fields are defined within a text and the text is copied to the Windows clipboard and then pasted back, the information on the definition is lost. In other words, variable field markers are not copied. However, monospaced text and font change markers can be copied and pasted.



Changing Proportional Spacing and Monospacing

Proportional fonts are used to insert texts as standard. This means that each letter takes a space proportional to the character width. For example, a letter **W** takes more space than a letter **I**.

The spacing between proportional (monospaced) characters is set with the **Character spacing (Selective char. spacing)** parameter from **Parameters 2**. The view of a sample text after the spacing between characters has been changed is shown in the picture below:

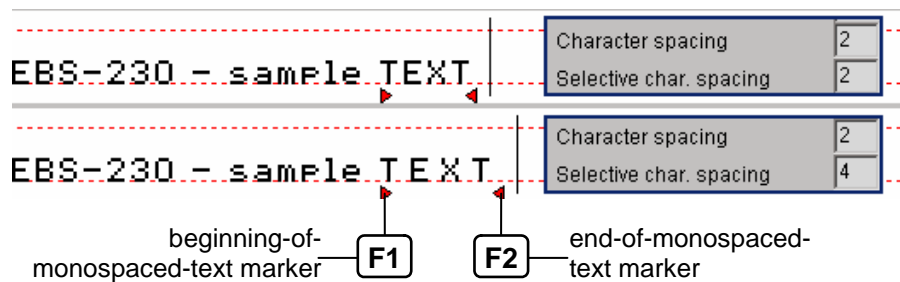


Fig. 3.3.5.6.

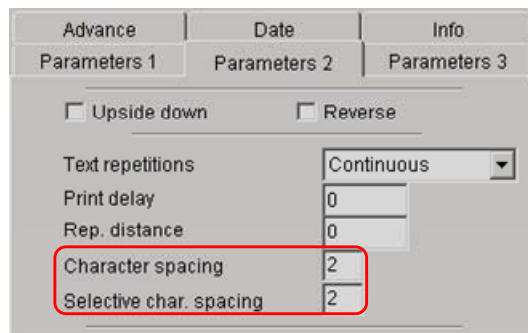



Fig. 3.3.5.7.



When monospaced fonts are used, the character width does not depend on the character. In other words, each character has the same width. The beginning of a monospaced piece of text is marked with the **F1** key and the end of a monospaced piece of text is marked with the **F2** key from your computer keyboard. The part of the text marked as monospaced is placed between red markers, for example **TEXT**. If the beginning marker only is placed, all characters following the marker till the end of the text are monospaced. A number of monospaced groups of characters can be inserted into one text.

The beginning-of-monospaced-text marker (or the end-of-monospaced-text marker) is stored in the text as a non-printing code and it increases the length of the text by one. In order to delete a marker, place the cursor in front of it and press the **Delete** key or alternatively place the cursor behind it and press the **BackSpace** key - see the indicator of the cursor position within the text. If the marker (or) is deleted, then characters following the deleted marker have the same attributes as the text in front of the deleted marker had.

Print Preview

On creating a text to be printed with the use of variable fields you can check for proper operation of the counters using the print preview option.

Use the  key to preview a print and initiate variable fields.

The  key is used to preview successive prints; it is available after the  key has been pressed once.

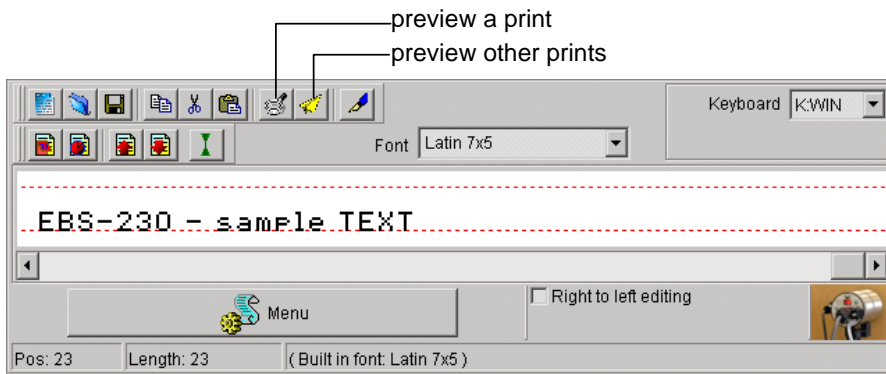


Fig. 3.3.5.8.

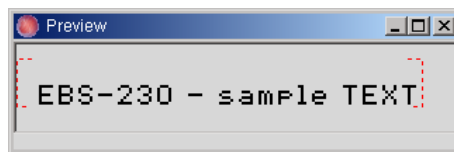


Fig. 3.3.5.9.

3.3.6. Creating and Editing Texts Containing Variable Fields

Variable fields are a specific type of subtext, whose contents are updated each time a label is printed. The contents of variable fields are impacted by such events as a change of date, a change of time, an activation of the photo-detector or other.

NOTE: Only the printer built-in fonts can be used to print variable fields; no Windows® fonts can be used.



Date and Time

In order to synchronize the date and time of your printer with those of your computer move to the **Date**

tab and click the  and  keys successively.

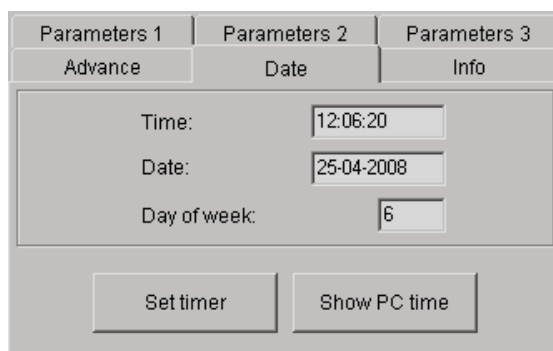




Fig. 3.3.6.1.

You can set a different date or time in your printer by setting them in the **Date** tab and transferring to

the printer with the  key.

In order to insert the date (time) field that is updated automatically, follow the steps below:

1. In the text edit line position the cursor in the place where you want the date (time) to be displayed.
2. While holding the cursor on the text edit line press the right mouse button (or the MENU button) and select the command **Define variable field** from the menu displayed. Then select **Insert date (Insert time)** in the list displayed. You can also do that using the  () key on the tool bar of text edit window.

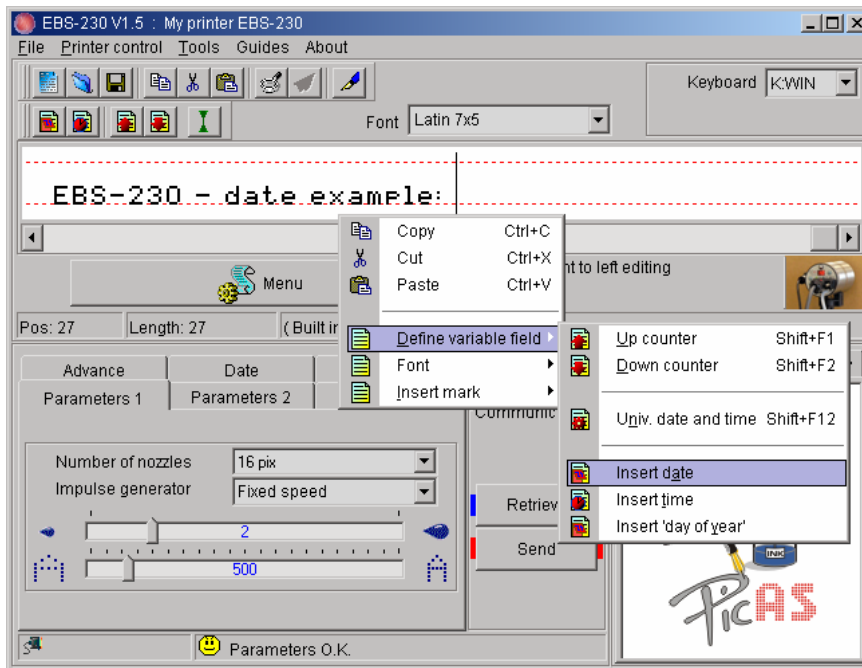


Fig. 3.3.6.2.

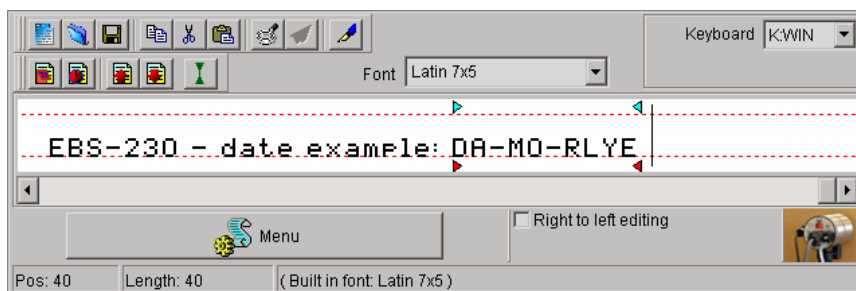


Fig. 3.3.6.3.

3. You can insert a font-change marker on the left or right of the date (time) field.
4. You can change separators inside the date (time) field by replacing the existing separators with different characters. You can also remove proportional-text markers.

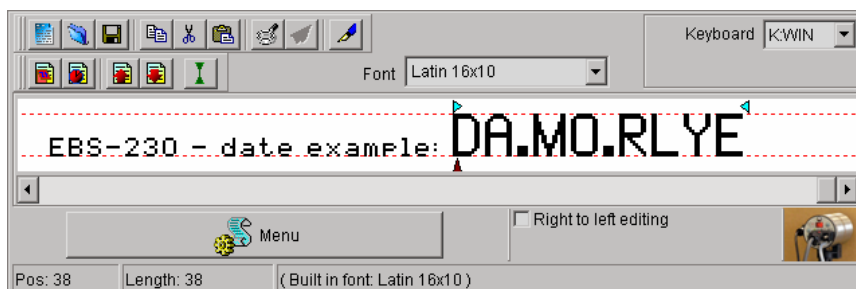


Fig. 3.3.6.4.

5. You can also change other date parameters. Double click the date in the variable field list. You can change the date shift (e.g. by 2 days) in the window displayed.

Universal Date and Time

Various elements of the current date and time can be printed on every object with the use of the special register **Univ. date and time**.

Below, there is a list of characters with which date and time items are coded. Individual elements of the universal-date-and-time field can be preceded, separated or followed by any characters that are different from those specified below or by a space.



- 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,
- R** thousands of year in the current date,
- L** hundreds of year in the current date,
- Y** tens of year in the current date,
- E** units of year in the current date,

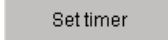
- B** tens of hour in the current time in the 24-hour system,
- C** units of hour in the current time in the 24-hour system,
- I** tens of minute in the current time,
- J** units of minute in the current time,
- T** tens of second in the current time,
- U** units of second in the current time,

- P** hundreds of day number in the year
- Q** tens of day number in the year
- S** units of day number in the year
- N** number of day in the week

The following encoding system is used as standard: 1-Sunday, 2-Monday, 3-Tuesday, ... , 7-Saturday).

The numbering of weekdays can be changed in the following way: on checking the time on your computer (by clicking the  key) or on your printer (by clicking the  key) change the number-of-weekday parameter in the **Day of week** box for the date displayed.

For example, Monday, 21st April 2008 is encoded as the second day of the week as standard. But if you set **1** in the **Day of week** box and save the modified parameters (of time, date and day of week)

to the printer (with the  key), then the following encoding applies: 1-Monday, 2-Tuesday, ... , 7-Sunday. And if you set **5** in the **Day of week** box and save the setting to the printer, then the following encoding applies: 1-Thursday, 2-Friday, 3-Saturday, 4-Sunday, 5-Monday, 6-Tuesday, 7-Wednesday.

Creating the universal-date-and-time field.

1. Type in a text to be printed in the text-edit window.

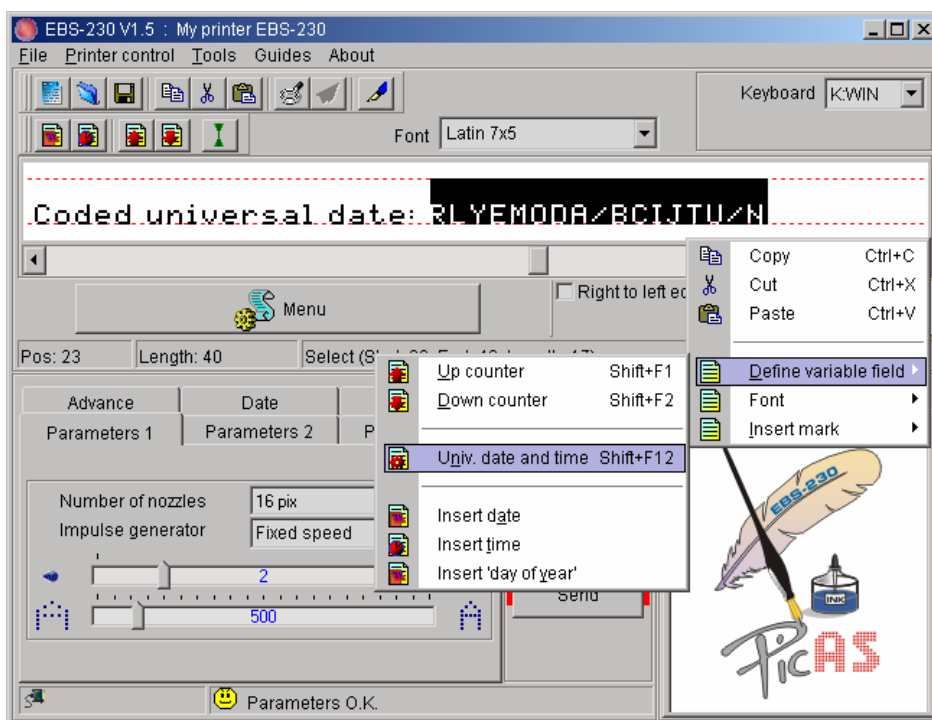


Fig. 3.3.6.5.

- In the text edit line type in characters with which date and time elements are coded – see above. Some elements can be replaced with a text (digits). For example, the first and second digits of the number of the current year can be typed as **20** or coded as **RL**.
- Select the characters of the field with the mouse. While holding the cursor on the text edit line press the right mouse button (or the MENU button) and select the command **Define variable field** in the menu displayed. Then select **Univ. date and time** in the list displayed. The same operation can be performed with the menu shortcut Shift+F12.

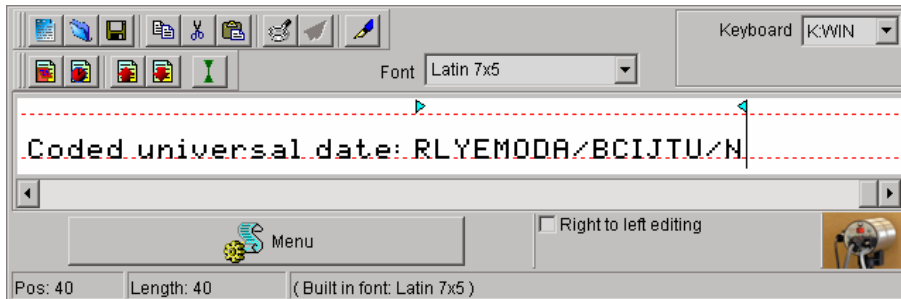


Fig. 3.3.6.6.

- On selecting the print preview option (see *Print Preview*) you can see what the print will look like on 25-04-2008 at 11:08:01 hours or later.

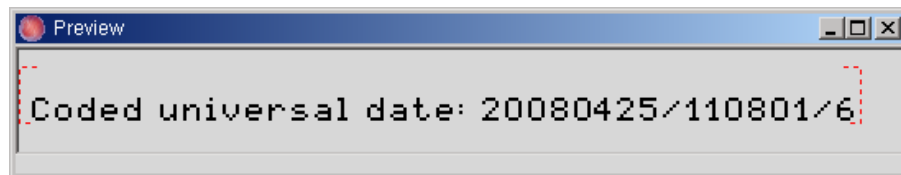


Fig. 3.3.6.7.



NOTES:

If a greater number of special registers is used, the following notation helps the user get hang of types of registers and options:

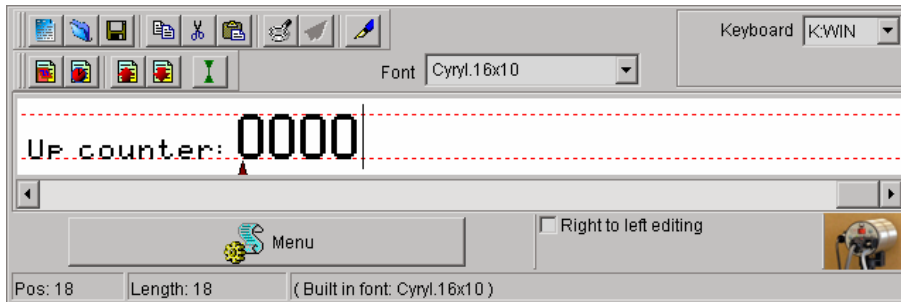
- The range of the register is limited with arrows $\triangleright \triangleleft$ whose colour depends on the type of register.
 - the incremental counter is indicated with blue arrows $\triangleright \triangleleft$,
 - the decremental counter is indicated with green arrows $\triangleleft \triangleright$,
 - the universal-date-and-time field is indicated with turquoise-coloured arrows $\triangleright \triangleleft$,
- If the mouse cursor is placed in the text-edit window within the filed area, the colour of the field in the variable field list changes from black to red.
- If the field is a non-volatile one (and is displayed in blue), the placing of the mouse cursor within the field area changes the colour of the register in the list from blue to pink.

Object Counters

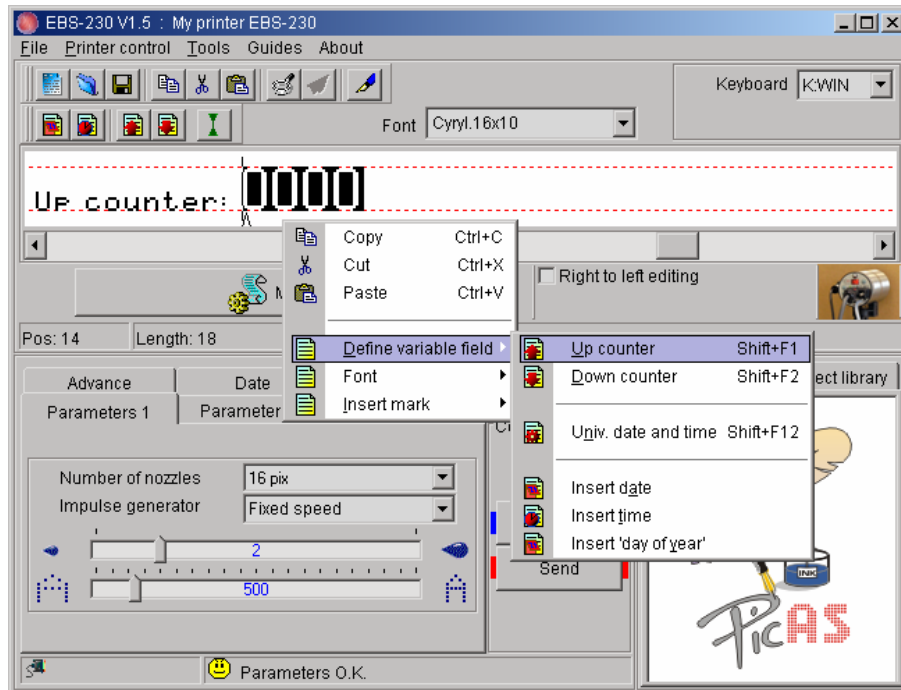
You can print a consecutive number of print on every object being labelled or at a specified interval on long objects with the use of **incremental or decremental counters**.

In order to insert the field of an incremental (decremental) counter to be updated automatically follow the steps below:

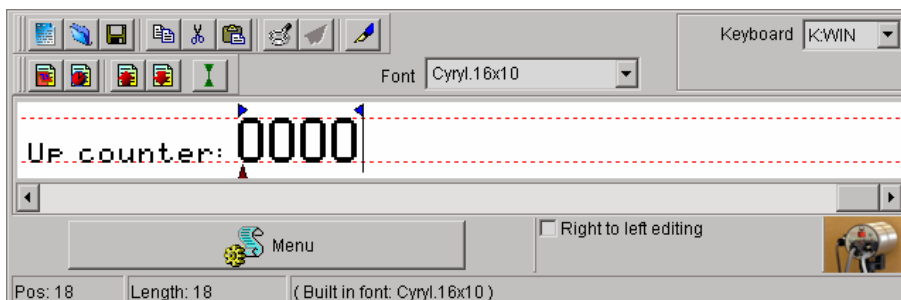
- In the text edit line, position the cursor in the place where you want the counter to be displayed. Insert a font-change or other markers, if required.
- Type in the setting for the counter: the maximum required number of digits, e.g. zeros, if the counter is to start counting from zero. If counting is to start from a specific number, type in the number and add leading zeros to fill in all counter positions.




Fig. 3.3.6.8.

3. Highlight the counter setting with the mouse.


Fig. 3.3.6.9.

4. While holding the cursor on the text edit line press the right mouse button (or the MENU button) and select the command **Define variable field** in the menu displayed. Then select **Up counter** (**Down counter**) in the list displayed. The same operation can be performed with the menu shortcut Shift+F1 (Shift+F2).


Fig. 3.3.6.10.

5. The operation described at points 2, 3 and 4 can be performed by pressing the   key on the tool bar (a 4-digit counter is inserted and you can adjust its length accordingly).
6. You can change other parameters of the counter. Double-click the counter in the variable field list. You can change the increment or select the **Auto save** parameter of the counter.


NOTE: The counter can be volatile or non-volatile. The contents of a volatile counter are lost after the printer has been switched off. With a non-volatile counter the counting can be resumed from its last setting after the printer has been switched on again.



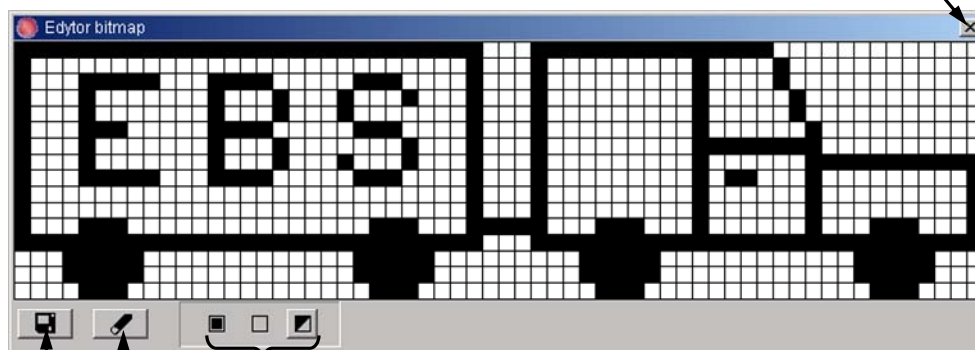
Counter operation is timed by the photo-detector as standard, and each time the photo-detector is activated, the setting of the incremental (decremental) counter is increased (decreased). The only exception is when a text is to be printed iteratively, that is when the print parameter **Text repetitions**>1 or is set to **Continuous**. In such a case the photo-detector does not time every print but a group of prints. The **Refresh var.fields** parameter from the **Parameters 3** tab decides whether every successive repetitive print modifies the contents of the counters or not – see section **Refreshing Variable Fields for Repetitions**. The distance between the beginnings of two consecutive prints produced with repetitive printing is defined with the **Rep. distance** parameter from the **Parameters 2** tab.

3.3.7. Graphics Editor

The graphics (bitmap) editor enables a user to create and edit drawings which can then be inserted into texts to be printed.

The graphics editor can be called up with the  key on the toolbar (see **Fig. 3.3.1.1**).

To exit bitmap editor and go to text editor, with no drawing being saved



To delete drawing being edited

To insert bitmap into text file being edited

To select draw mode

Fig. 3.3.7.1

The window where graphics can be created/edited consists of dots and enables a user to generate graphics with a maximum height of 16 dots and length of 60 dots.

3.3.8. Using a few Special Registers in a Text

A number of special registers can be created in a text. The registers can be of the same type, for example, incremental counters only, or of various types.

How to create several variable fields – incremental counter, decremental counter, universal date as a date and universal date as a time:

1. In the text edit window, type in a text to be printed remembering to enter the appropriate character groups to the specific fields.
2. Create variable fields and set parameters (proportional or monospacing, volatile or non-volatile) for them. If all fields are defined properly, the following control-program window is displayed:

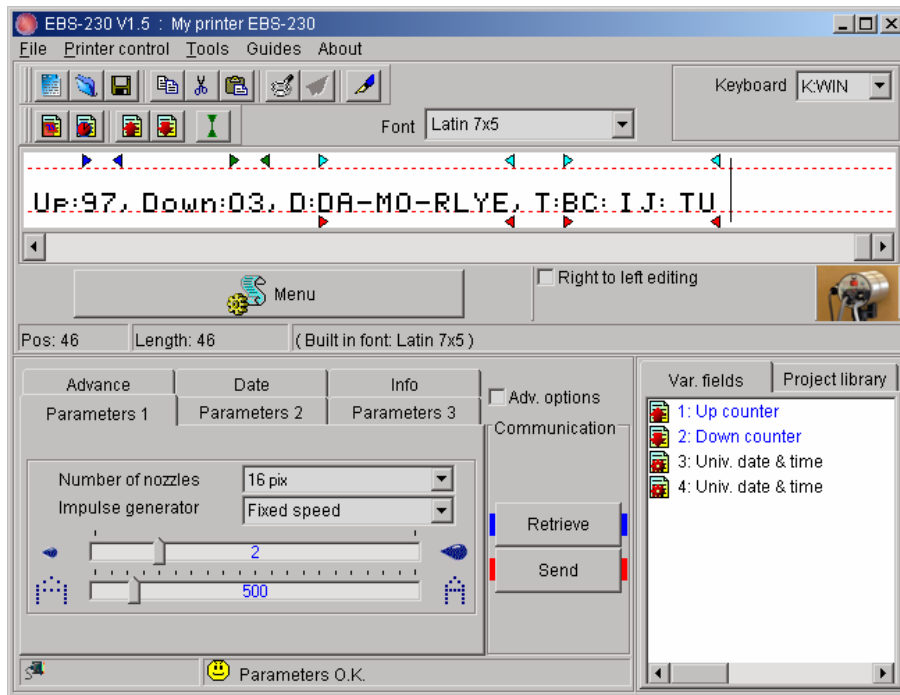




Fig. 3.3.8.1.

3. Check the operation of the variable fields with the print-preview function by clicking the  button. The print preview window shows what the text will look like after printing. If the text to be printed has been defined as above, the printing of the following texts starts on 21.04.2008 at 12:10 hours following 5 successive pulses (simulated with the  button) from the photo-detector.

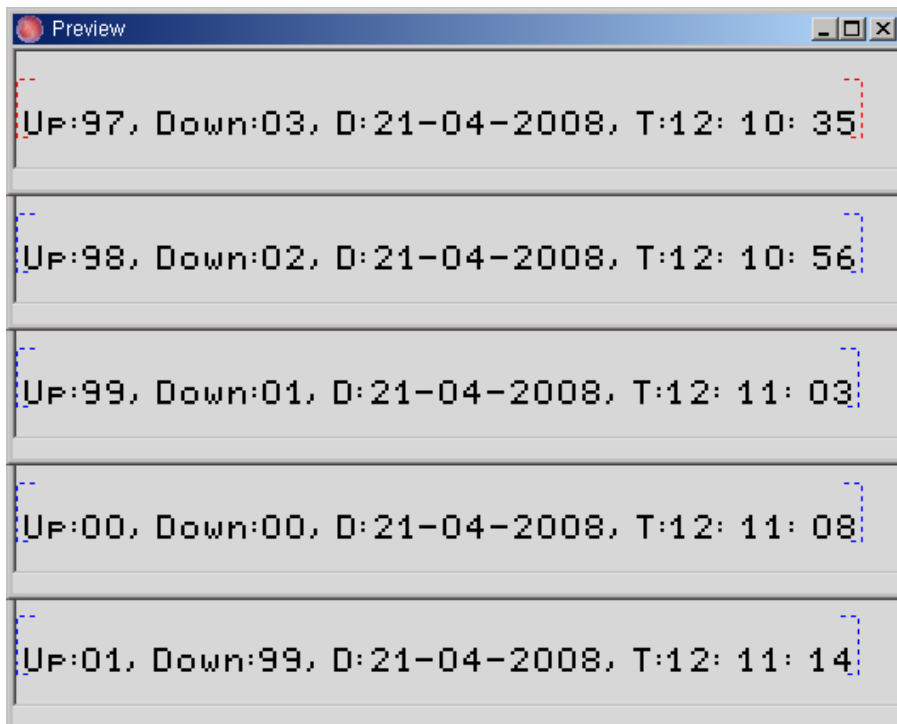


Fig. 3.3.8.2.

3.3.9. Print Parameters

The **EBS-230** printer is a versatile machine specifically designed to print complex text in a non-contact way on objects of a variety of shapes and dimensions. The objects can be moved in front of

the printer automatically on a factory conveyor or manually, at a speed varying widely in range, in any (left or right) direction and in their normal position or up-side down. The way of printing and appearance of prints can be successfully customized with a set of modifiable print parameters such as character width, boldface, number of repetitions and many others.

The following parameters can be modified:

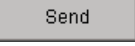
*Number of Nozzles,
Text Height,
Character Resolution,
Intensity of Ink Drops,
Mode of Timing,
Object Travel Speed
Inverting and Reversing a Text,*

*Repeating a Text (Repetition),
Print Delay,
Distance between Text,
Row Repetition,
Buffering Texts while Printing,
Refreshing Variable Fields for Repetitions,*

The printer performs its operation of printing with the use of so called **current parameters**. Unlike parameters stored in the non-volatile memory (see section **3.3.3 Saving Text Files and Parameters in the Printer Memory**), the current parameters have direct impact on the text printed and are stored in the printer volatile memory.

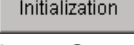
The current parameters (hereinafter referred to as the parameters) can be modified in the following way:

- Every time the printer is switched on, the current parameters are set with settings stored in the non-volatile read-only memory.
- All parameters available in tab sheets on the parameter-block panel of the control program can be modified. Before the printing starts, the modified parameters need to be transferred to the printer

by clicking the  button. Print parameters stored in the non-volatile read-only memory remain unmodified. If the current parameters are modified and replaced in the printer, the parameters stored in the non-volatile read-only memory can always be restored by switching the printer off and then on.

Number of Nozzles

This parameter defines the maximum number of print head nozzles, which simultaneously determines the maximum height, or the number of dots, of a text to be printed - **H_{max}** [pix]. Depending on this quantity, the program allows the use of the full or a limited number of fonts in text editing. To find out

how many nozzles your printer has, press the  key (available after highlighting the **Adv. options** field) in the control program window. On viewing the printer configuration in the **Parameters 1** tab sheet, the program displays the setting of the **Number of nozzles** parameter. At the same time, the program displays a broken line in the text edit line. The broken line indicates the text height, **H_{max}** (see **Fig. 3.3.5.1**). This facilitates the adjustments of fonts to the printing capabilities of your printer.

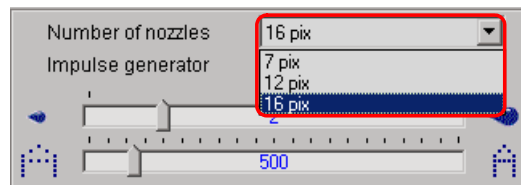


Fig. 3.3.9.1.



NOTE: If you send to the printer and then print a text whose size (in dots) is greater than the value of the **Number of nozzles** parameter received from the printer, then the text will be truncated at the **H_{max}** level.

Text Height

The height of prints can only be changed by turning the printer around its axis which is perpendicular to a labelled object. When the printer is turned, the distance between vertical droplets reduces and thereby the overall height of vertical rows gets smaller.

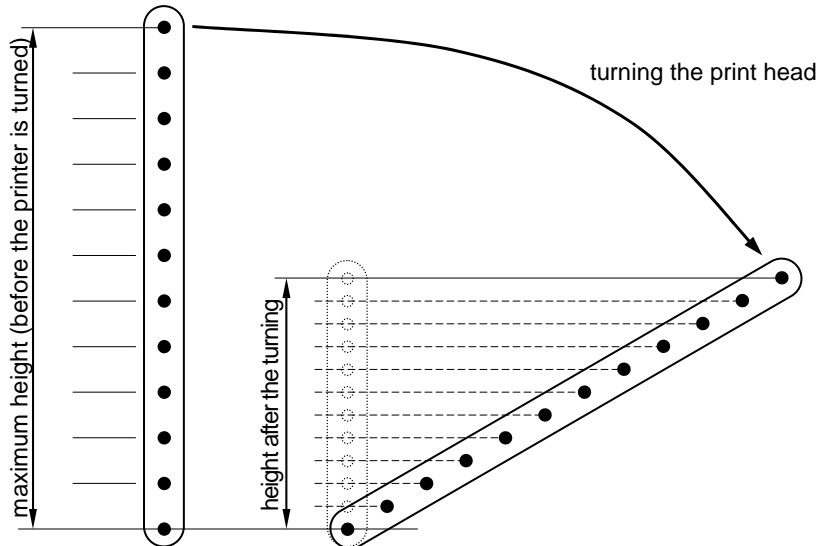


Fig. 3.3.9.2

The machine automatically re-calculates and adjusts time for jetting ink droplets in order to ensure that rows are printed vertically and the proportion of width to height is maintained for every character within the text. Therefore the range of turning angles is limited. A different text height is assigned to every turning angle. The height is given in millimetres and is determined by the print parameter **Text height**. The text height relates to the entire text, no matter how the text has been created in the text processor or what its contents are. The **Text height** parameter is available in the **Parameters 1** tab sheet after the **Adv. options** box has been ticked.

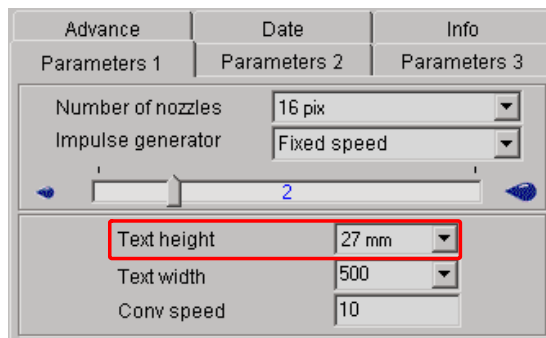


Fig. 3.3.9.3.

**NOTE:**

- If the print height is different from the maximum, the following three parameters are closely interrelated: the turning angle and the print parameters **Text width** and **Conv speed**. Any change to each of them causes rows of text to look slanted left or right. In order to ensure that characters are printed in the vertical direction, follow the steps specified below:
 - at first adjust the turning angle of the print head so that the real print height (the distance from the lowest to the highest dots jetted out of the print head) equals the setting of the print parameter **Text height**;
 - then modify the print parameters **Text width** and **Conv speed** in order to „straighten” up rows of text to be printed.
- In order to check for correct settings of the print parameters use the function **Check parameters** – see section **3.3.4 Checking Printer Parameters**. If any irregularities occur, an analysis of the error report (displayed in the **Info** tab sheet) helps correct the wrong setting of a given print parameter.
- The print height cannot be adjusted in an infinitely variable way by changing the distance between the print head and object to be labelled.
- The final precise height of a text to be printed with the print head turned by a certain angle depends on the following:
 - the diameter of nozzles in the print head,
 - the type of ink,
 - the pressure of ink inside the ink system,
 - the setting of the print parameter **Dot size**,
 - absorptive capacity of the surface on which prints are to be made.

Character Resolution

The parameter decides on visibility of characters of the text printed. It defines resolution of the text. The resolution is given as a number of **rows/metre**. The visual effect of a change in the parameter **Text width** is a change in the width of characters and the length of the entire text.

The settings of the parameter can vary between **5** and **4000** with the increment of **1**.

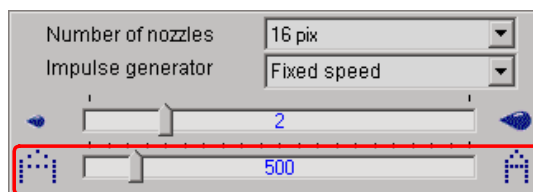


Fig. 3.3.9.4.



NOTE: Values of the print parameter **Text width** are limited not only by the range of settings given above. The current value of the parameter is controlled by the control program and can be affected by settings of other print parameters. The system is automatically protected against an excessively high print rate being set. Therefore it may happen that some settings appear wrong after the correctness of the parameters has been checked – see section **3.3.4 Checking Printer Parameters**.

Intensity of Ink Drops

There is a need for changing the intensity of ink drops during printing. This parameter affects the size (volume) of ink droplets jetted out of the print head. If the intensity increases, the diameter of ink dots and the saturation of the colour in the print also increase.

The settings of the **Dot size** parameter range from **0** to **10** with the interval of **1**.

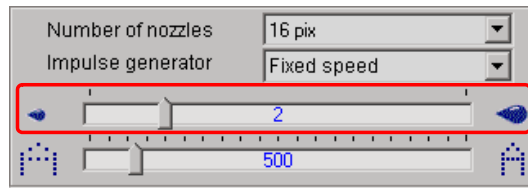


Fig. 3.3.9.5.

NOTE: If the intensity is set to a higher value, ink consumption increases.



Mode of Timing

Timing determines the moments at which vertical rows of text are printed. Timing can be synchronised using:

- a shaft-encoder – by setting the **Impulse generator** parameter to **External**.
- an internal generator – by setting the **Impulse generator** parameter to **Fixed speed**.

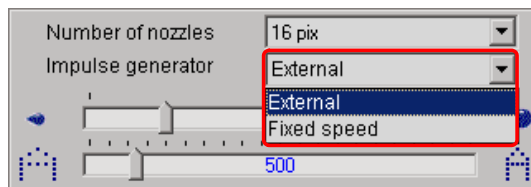


Fig. 3.3.9.6.

NOTE: When printing is timed by an internal generator, the print rate is not synchronised with the printer travel rate.



Object Travel Speed

In order to ensure that labels are clearly visible, the frequency of printing vertical rows needs to match the travel speed at which objects move in front the printer.

This adjustment can be made with the help of the following print parameters:

- **Encoder constant** – type in the number of pulses per meter (ranging from 1000 to 99999) of the built-in encoder, if the **Impulse generator** parameter is set to **External**.

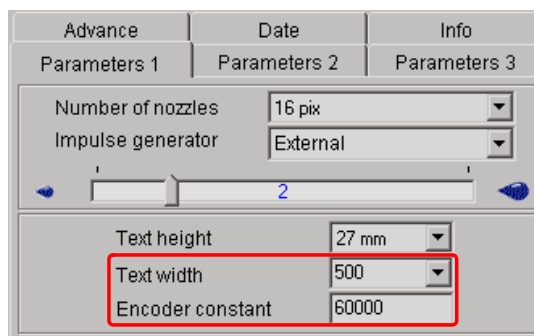


Fig. 3.3.9.7.

- **Conv speed** – type in the printer travel rate expressed as a number of metres per minute (the setting range from 1 to 99999 can be restricted by the program), if the **Impulse generator** parameter is set to **Fixed speed**.

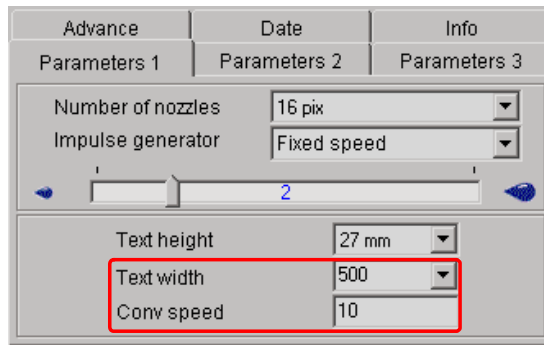


Fig. 3.3.9.8.



NOTE: Values of the print parameter **Conv speed** are limited not only by the range of settings given above. The current value of the parameter is controlled by the control program and can be affected by settings of the other print parameters. The system is automatically protected against an excessively high print rate being set. Therefore it may happen that some settings appear wrong after the correctness of the parameters has been checked – see section **3.3.4 Checking Printer Parameters**.

Changing this parameter has the effect of increasing or decreasing the density of the text printed while the object moves before the printer at a constant speed. This parameter is closely related to the **Text width** parameter.

The parameter is available in the **Parameters 1** tab sheet after the **Adv. options** box has been ticked.

Inverting and Reversing a Text

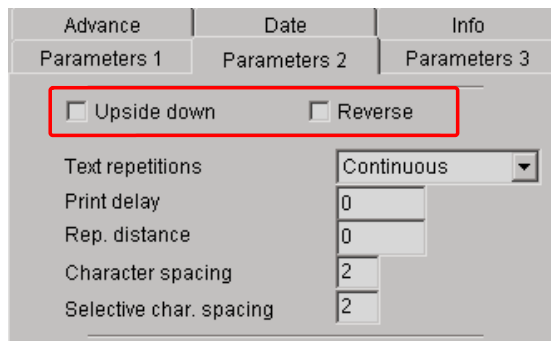


Fig. 3.3.9.9.

The directions are defined as the printer "sees" them.



Fig. 3.3.9.10.

Select the **Upside down** parameter in order to make the print look like it is turned over.



Fig. 3.3.9.11.

Select the **Reverse** parameter in order to print a text horizontally on an object moving from left to right. It can be useful if objects need to be labelled from right to left or if prints are made on transparent planes and the prints need to be clearly visible from the other side.

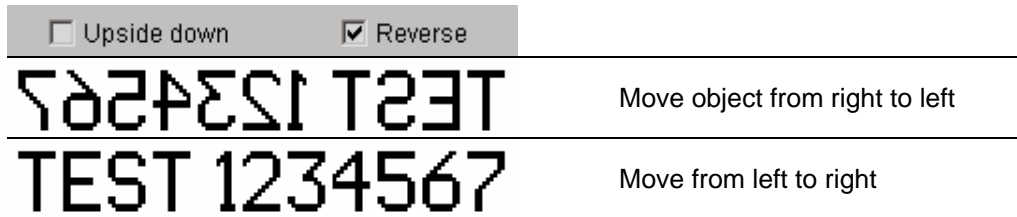


Fig. 3.3.9.12.

The reverse or inverse printing options can also be used to make prints on transparent surfaces and the prints need to be legible from the other side (mirror images in the vertical or horizontal directions). Select the **Upside down** and **Reverse** parameters in order to make proper prints when objects to be labelled are positioned upside down.

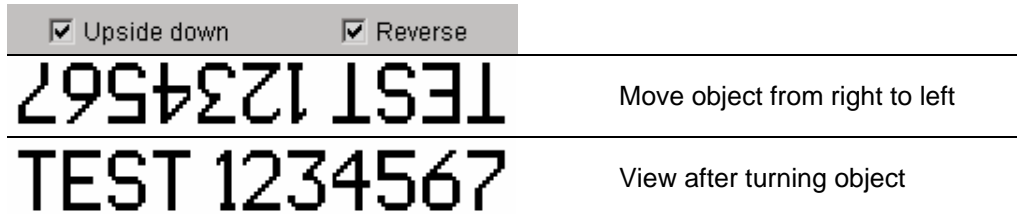


Fig. 3.3.9.13.

Repeating a Text (Repetition)

The parameter determines how many times a text print is to be repeated, after activating the photo-detector in the place where printing should start. You can print a text repeatedly on one object - this is a so called text repetition. For long objects (such as pipes, hoses, cables, strips) you can set the repeated printing parameter to **Continuous**. The interval between texts is set with the **Rep. distance** parameter - see further below.

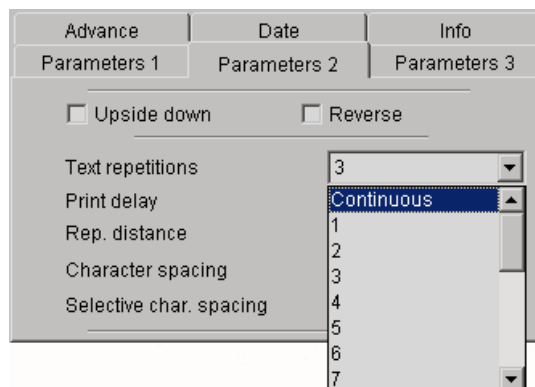


Fig. 3.3.9.14.

Print Delay

The **Print delay** parameter defines the distance between the point at which the photo-detector status changed and the point at which printing should start. The distance is given as a number of empty rows to be timed after printing has been released until real printing starts. With it you can adjust the position of a print in relation to a reference point, for example the edge of an object.

The settings of the **Print delay** parameter range from **0** to **9999** with the increment of **1**.

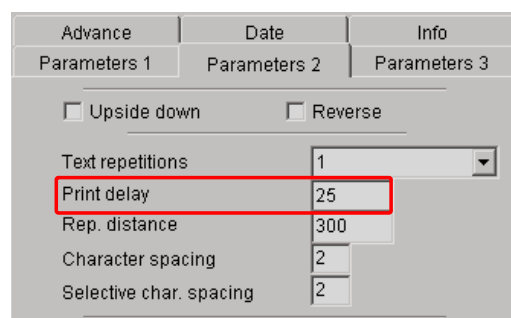


Fig. 3.3.9.15.

Distance between Texts

The **Rep. distance** parameter defines the distance between the beginnings of the texts that are printed repeatedly (**Text repetitions**>1). The distance is specified as a number of vertical rows (timed by a timing system).

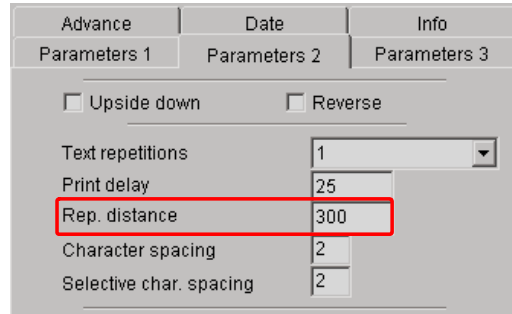


Fig. 3.3.9.16.

Example of printing for **Text repetitions=3**

printing released with the release button

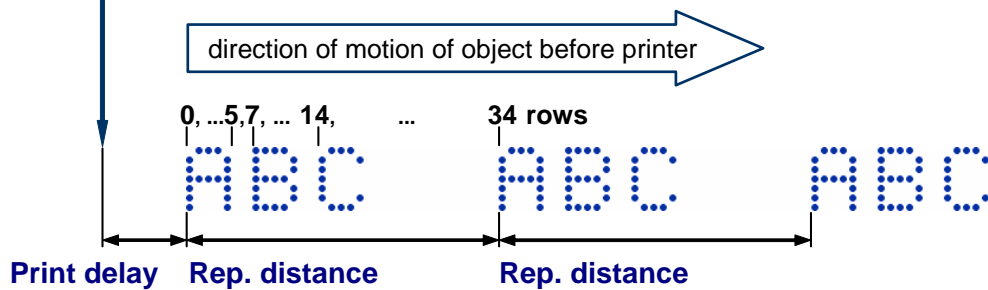


Fig. 3.3.9.17.



NOTE: If the distance set with the **Rep. distance** parameter is smaller than the text length (given as a number of rows), then the texts will be printed one after another.

Row Repetition

The parameter defines how many times printing of each vertical row should be repeated. It applies to the entire text, no matter how the text file has been created in the text editor or what its contents are. It is used for intensifying the prints on porous surfaces, which soak up ink heavily, on which printed characters are poorly visible due to surface granulation, if the characters are built of ink dots of the same sizes).

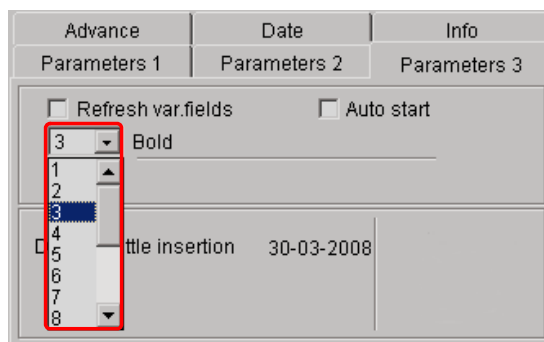


Fig. 3.3.9.18.

Buffering Texts while Printing

Text buffering means that the next texts are prepared for printing in the printer memory after printing has begun until the printer memory is filled. While printing, "written" texts are immediately supplemented in the memory by the next ones. This procedure can be a disturbance in cases where printing is done at low speed or with a large time gap between texts containing time-type variable fields. Because buffering causes several texts, with the same time value, to be opened in the memory. Text buffering is disabled, as standard. To enable it, uncheck the **No buffering** filed in the **Parameters 3** tab sheet of the control program. The parameter is available after the **Adv. options** field has been ticked.

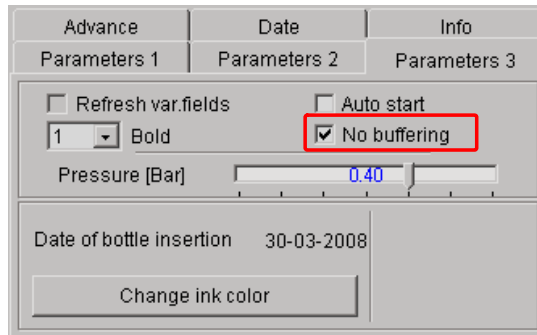


Fig. 3.3.9.19.

Refreshing Variable Fields for Repetitions

A standard printer does not refresh variable fields if a print is to be repeated a number of times (**Text repetitions>1**). This means that the contents of the variable fields are not updated each time the print is made in the repetition mode. The fields are refreshed only after the photo-detector has been activated.

This may not be convenient in certain situations, for example:

- when a text contains a counter-type variable field, as the same setting of the counter is added to every print;

For the incremental counter comprising 4 digits set the **Text repetitions** parameter to **3**.

a) If the **Refresh var.fields** parameter is set to OFF, the following prints can be produced:

Successive activation of photo-detector	The following counter contents are printed:		
1	0000	0000	0000
2	0001	0001	0001
3	0002	0002	0002
---	---	---	---
999	0999	0999	0999

b) If the **Refresh var.fields** parameter is set to ON, the following prints can be produced:

Successive activation of photo-detector	The following counter contents are printed:		
1	0000	0001	0002
2	0003	0004	0005
3	0006	0007	0008
4	0009	0010	0011
---	---	---	---
333	0996	0997	0998
334	0999	1000	1001

- when texts are printed at a low speed or intervals between successive texts containing a time-type variable field are significant. If no refresh option is set, the same time is added to every print.

To always print the actual value of the variable fields, you can prevent them from refreshing during repetition by marking the **Refresh var.fields** field with the mouse in the **Parameters 3** tab sheet of the control program. The field is available only when the setting of the **Text repetitions** parameter to a value greater than 1 is made in advance.

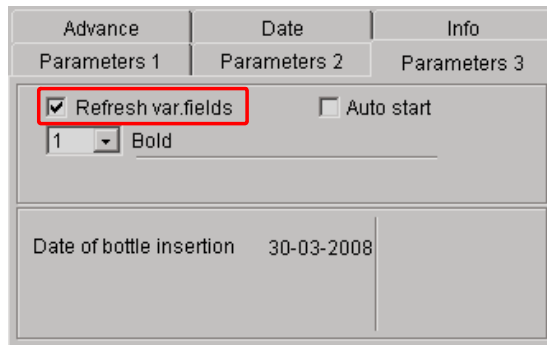


Fig. 3.3.9.20.

3.3.10. Other Printer Parameters

Auto Start

The **Auto start** parameter enables the printer to resume printing automatically after an unexpected interruption, for example due to a power failure. After the operating conditions have been restored, the printer switches on automatically and starts printing the texts that it was printing when its operation was disrupted. The text is printed from the beginning irrespective of where the previous printing was interrupted. An ink bottle with a transponder connected to the ink system is the prerequisite for resumed operation. In order to activate the parameter, tick it in the **Parameters 3** tab sheet.

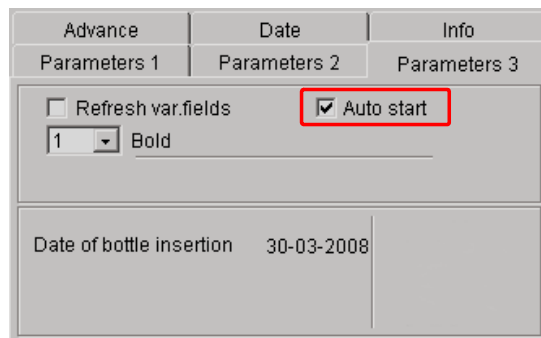


Fig. 3.3.10.1.

Operation of Photo-detector

Printing can be triggered by blocking or unblocking the photo-detector (except when iterative printing is set to **Continuous**). When the photo-detector is shaded, printing is released, as standard. The **Inverse fotocell signal** parameter can be used to trigger the photo-detector release mode to exposed.

The parameter is available in the **Advance** tab sheet after the **Adv. options** box has been ticked.

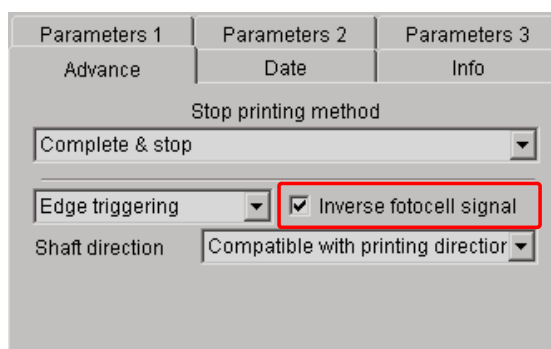


Fig. 3.3.10.2.

Triggering (Initiating) Printing

Triggering (initiating) of printing, depending on the state of the photo-detector, can take place in three ways: through **Edge triggering**, **Level triggering 1** and **Level triggering 2**. The **Triggering** parameter can be used when the setting of the **Text repetitions** parameter ranges from 1 to 20. If **Text repetitions=Continuous**, the printer starts printing after the **PRINT ON/OFF** button has been pressed and continues printing uninterruptedly without checking photo-detector signals.

The below description refers to the configuration of print parameters where text buffering is disabled (the **No buffering** field in the **Parameters 3** tab sheet of the control program is ticked).

- A) If the **Edge triggering** parameter is selected, then printing starts after the **exposed/ shaded** pulse edge (or **shaded/exposed** pulse edge, depending to the photo-detector operation mode described on page 40) has been detected. The printer checks the photo-detector signal after the last print has been made in the iterative printing mode (**Text repetitions=2,...,20**). If a pulse edge is detected, it repeats printing.

Example for **Text repetitions=2**

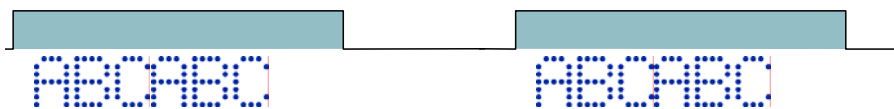


Fig. 3.3.10.3.

Example for **Text repetitions=3**

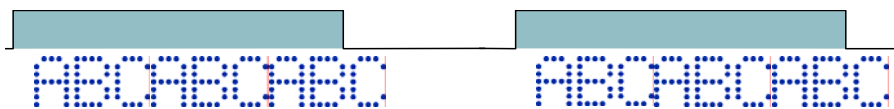


Fig. 3.3.10.4.

- B) If the **Level triggering 1** parameter is selected, then printing starts after the appropriate photo-detector signal level is detected (that means, the photo-detector is **shaded** or **exposed**). The printer checks the photo-detector signal after the last print has been made in the iterative printing mode. If the signal level is the same, the printer repeats printing. The level may change during printing but this does not affect printing – text is printed the set number of times.

Example for **Text repetitions=2**



Fig. 3.3.10.5.

Example for **Text repetitions=3**



Fig. 3.3.10.6.

- C) If the **Level triggering 2** parameter is selected, then printing starts after the appropriate photo-detector signal level is detected. The printer checks the photo-detector signal constantly. If the level has not changed, it prints successive texts. If it has, the printer stops printing. When the signal is restored, the printer resumes printing from the place where the printing was interrupted.

Example for **Text repetitions=2**

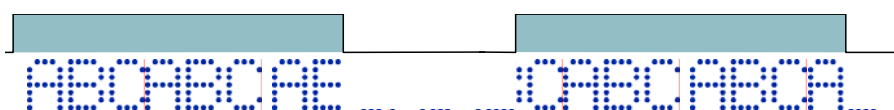


Fig. 3.3.10.7.

The parameter is available in the **Advance** tab sheet after the **Adv. options** box has been ticked.

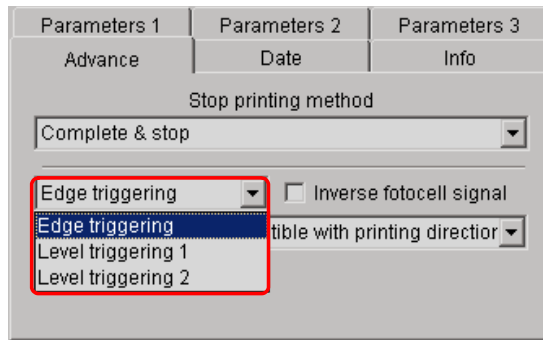


Fig. 3.3.10.8.

Stopping Printing

The **Stop printing method** parameter defines how the printer should terminate its printing job after the **PRINT ON/OFF** button has been pressed. Two ways are available:

- **Complete & stop** – the printer brings the printing job in progress to completion (it finishes printing of the entire text, while the **PRINT** lamp flashes), and then stops,
- **Immediate stop** – the printer stops immediately after the **PRINT ON/OFF** button has been pressed (the text is not printed to the end).

The parameter is available in the **Advance** tab sheet after the **Adv. options** box has been ticked.

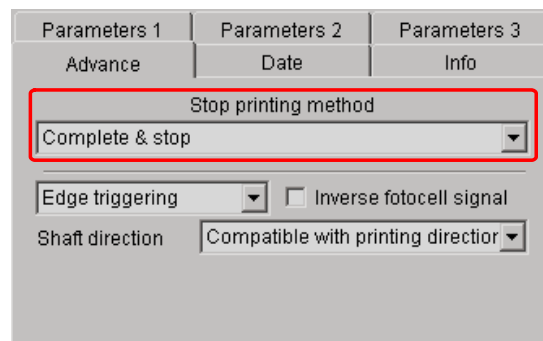


Fig. 3.3.10.9.

Changing Ink Colour

The **Change ink color** option protects the printer against the effects that may occur if a wrong colour ink bottle is connected to the system. The system does not accept the bottle if the ink colour differs from the previous one and the option is not selected. Press the Change-ink-color button before placing a bottle of ink that differs in colour from the previous one into the ink system carrier. The parameter is available in the **Parameters 3** tab sheet after the **Adv. options** box has been ticked.

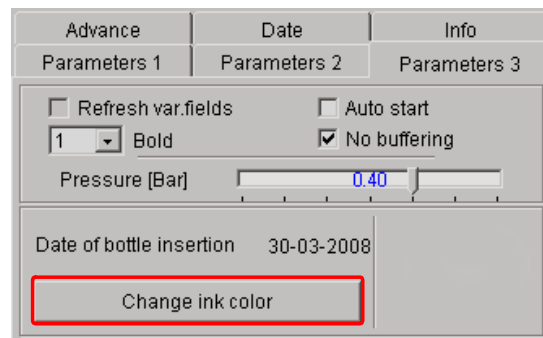


Fig. 3.3.10.10.

Ink Pressure

The **Pressure [Bar]** parameter can adjust the force of the dots jetted onto the assigned surface. For smooth, non-absorptive surfaces, a lower pressure value is recommended, while for porous absorptive surfaces, a higher one.

NOTE: When pressure is set too low, the ink may cool in the print head. If the pressure is set too high irregular ink blotting (satellites) may occur around the label.



The **Pressure [Bar]** parameter accepts a value from **0.2** to **0.5** with the increment of **0.1**. This parameter is available in the **Parameters 3** box after marking the **Adv. options**.

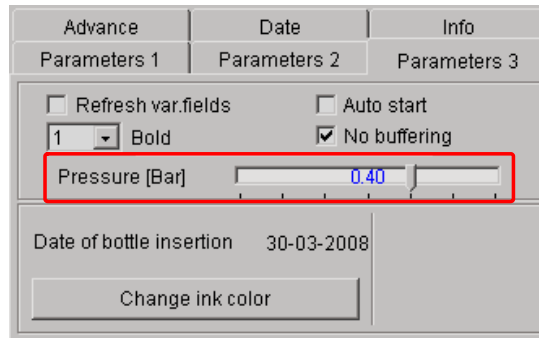


Fig. 3.3.10.11.

3.3.11. Using a Number of Texts

You can store up to 30 projects (texts and parameters) in the printer memory. Each project can contain any of the text elements described previously (such as variable fields, various fonts, etc.).

Creating a Text Library in the Printer

1. In the **Project library** window, type in the name of a first text and confirm the name with the **ENTER** key.

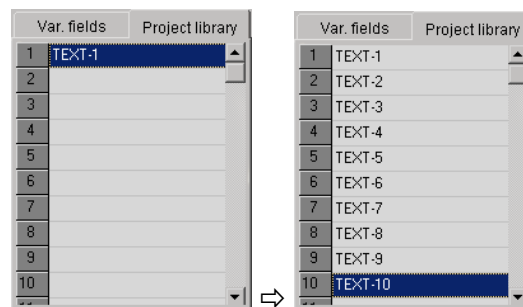


Fig. 3.3.11.1.

2. In the text edit line create a complete text and set print parameters for the text.

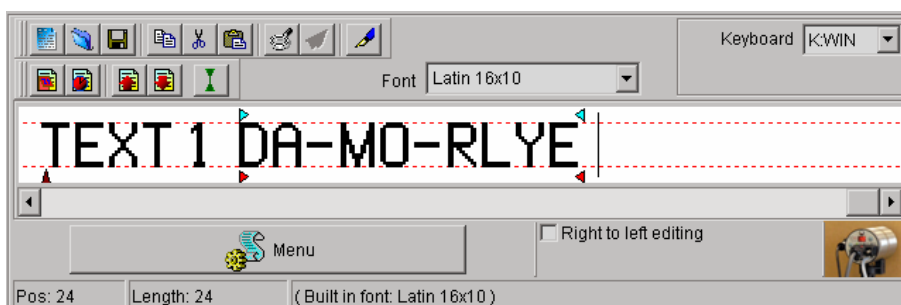

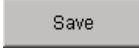


Fig. 3.3.11.2.

3. When the printer is on, click the  key of the printer control program in order to send the text file to the printer, and then click the  key in order to save the text file in the non-volatile memory of the printer.
4. Repeat steps from 1 to 3 in order to program other texts.
You can save a list of text file projects with the command **Copy list to editor** which is available on pressing the right mouse button above the text library window.

Quick Saving/Retrieving Text Files to/from the Text Library

In order to save the entire text library to the printer use the command **Send and save text library**.

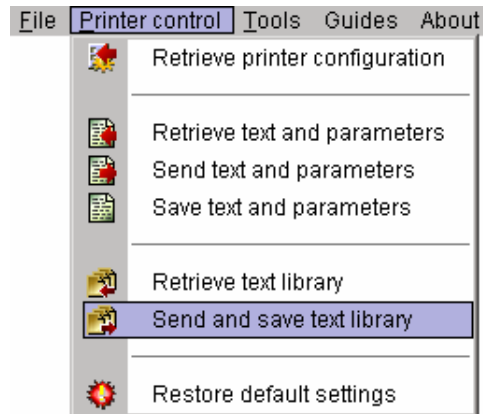




Fig. 3.3.11.3.



Similarly you can retrieve the text library from the printer using the command **Retrieve text library**.





NOTE: The command **Send and save text library** erases all text files contained in the non-volatile memory of the printer.

Printing Text Files from the Library

You can choose (switch) texts stored in the library by pressing the  or  key. You may switch a text regardless of whether the printer is printing (the **PRINT** indicator is lit) or not.

1. Start printing by pressing the **PRINT ON/OFF** button.
2. Print a text.
3. Switch the printer to print another text by pressing the  or  key.
4. Print the successive text.



NOTE: In order to ensure that the printer skips over text files during the text switching operation (to be performed with the  or  key) delete the text name in the library and save such an empty text name in the printer.

Saving the Project Library on a Computer Disc

The project (text and print parameter) library can be saved on a computer disc with the command **Save project library** from the **File** menu.

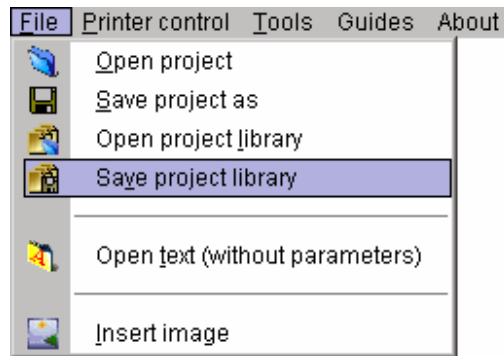


Fig. 3.3.11.4.

Similarly you can open the project library on your computer with the command **Open project library**.

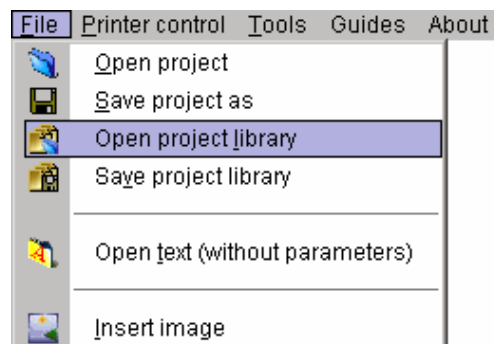


Fig. 3.3.11.5.

You can quick-load the project library from the computer disc to your printer with two successive commands **Open project library** and **Send and save text library**.

3.4. Operating the Printer with **T200** Terminal

The **T200** terminal is a stationary device intended to control the **EBS-230** printer. It allows for replacing a PC computer to serve the printer in places where the use of a PC is impossible or difficult. The terminal allows you to change device parameters, edit texts, send them to the printer as well as initiate and halt printing. Thanks to the application of a touch panel the device can be easily and simply operated, without the use of keys, based on an intuitive graphic interface.

The operation of the printer with the **T200** terminal is described in the document entitled **T200 TERMINAL User's manual**.

3.5. Replacing a Bottle of Ink

3.5.1. General Information

Every bottle of ink is equipped with a transponder (an electronic circuit storing some information which can be read in a wireless way and with no additional power supply). With the information stored in the transponder every bottle is uniquely identified among all other bottles. An Ink Monitoring System (**IMS** in short) built into the printer is designed for reading and validating the transponders. There is an antenna connected to the **IMS** module within the **EBS-230** series printing system. It controls the transponder. The location of the **IMS** antenna is shown in the following figure.

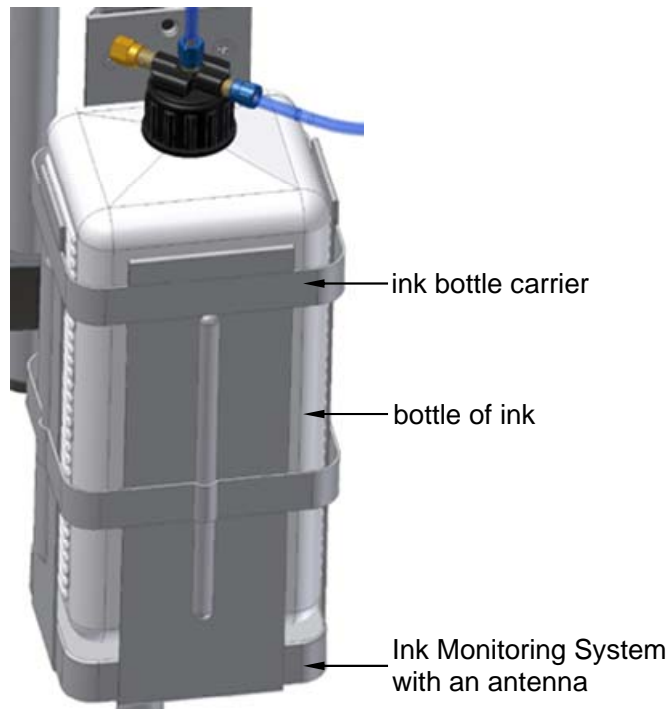


Fig. 3.5.1.1.

The Ink Monitoring System is designed for the following:

- 1) controlling the validity of ink in the ink system. It is intended to prevent using mistakenly ink that is incompatible with the ink originally used in the ink system of the printer. The type of consumable in the bottle and the ink validity period are controlled. This is especially important for the Clients who use a number of EBS printers with various ink types.
- 2) improved distribution and control of ink through the application of electronic coding and the validation of information stored in the transponder.

**NOTES:**

- Do not replenish an empty bottle with ink, as the **IMS** module will recognize the bottle consumed soon anyway. There is a limit of ink droplets to be produced with every new bottle of ink. When the limit is exceeded, the bottle is recognized empty even if it is not. All ink droplets are counted and the result is used to estimate the ink consumption. If the above mentioned limit is exceeded, the printer shows symptoms of the lack of ink in the bottle and awaits the replacement of the bottle with a new one. If the printer fails to detect a new bottle of ink, no printing can be initiated with the **PRINT ON/OFF** button, and if the printer is in the *print* state, the current printing is also disabled after a while. **During the normal operation of the printer, the bottle is always emptied before the limit is exceeded.**
- Do not remove the bottle while validation is in progress (for about 10 seconds).
- Every bottle can only be used in the printer, in which it has been successfully validated by **IMS**. The bottle validated in a printer must not be moved to another printer and the contents of the bottle must not be added to other bottles. The validated bottle should remain in the printer until its contents are consumed.
- In order to ensure that the validation is successful, the current date needs to be set in the printer properly. **No printing is possible after the date has been set back.**
- When the date is set back, all bottles are ignored! No other bottle can be validated or printing resumed until the proper date has been set in the printer.
- Do not set the date ahead because when you decide to set the proper date, the operation will be recognized as setting back with all the consequences described above.

3.5.2. Installing a New Bottle of Ink (or Replacing the Empty One)

NOTE:

- Please note that only the recommended type of ink should be used. Any supply of improper ink must be avoided or otherwise the head might get damaged. In consequence a lot of problems may arise, from significant deterioration of the quality of printing to a malfunction of the ink system and the print head and the need for a major repair of the printer.
- Various types of ink must not be mixed or ink whose usability period has been exceeded must not be added.



In order to install or replace a bottle of ink, follow the below specified steps:

- Switch the printer off.
- Open the drain valve which is next to the ink bottle cap. Therefore the ink pressure drops to zero. Then close the drain valve.
- Unscrew the cap on the used bottle by turning its lower part while holding the upper part with plug, connected to polyethylene tubes, in place. Check that the lower end of the tube is connected to the ink filter. If it is dirty it needs to be rinsed with wash-up.

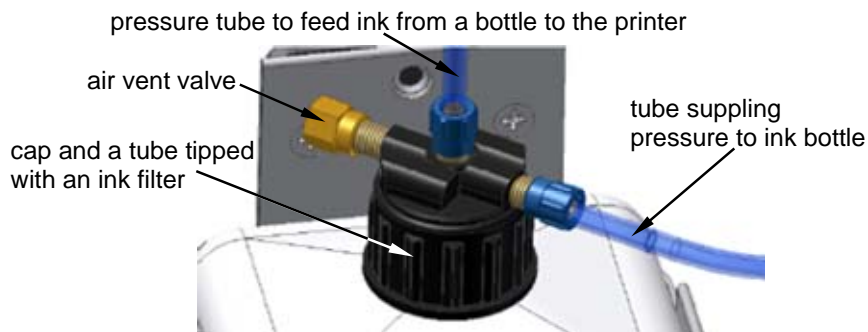


Fig. 3.5.2.1.

- Unscrew the cap off a new bottle.
- Place the new bottle of ink in the carrier.
- Insert the filter-tipped tube into the bottle and screw on the plug.
- Switch the printer on. The new bottle is validated after the transponder has been verified (within about 10 seconds).

The states of indication lamps during the validation of a new bottle are as follow:

- The sensing and verification of a transponder are indicated with the green lamp **POWER** flickering uniformly (at 0.5 Hz) for about 10 seconds.
- The validation of the bottle is indicated with the green lamps **POWER** and **PRINT** flickering quickly in turns for about 1 second and then only by the lamp **POWER** which should emit continuous light.

- If validation of a bottle is unsuccessful, the red lamp **ERROR** flickers. On clicking the button in the control program window, the user can view the **Info** tab sheet and identify the cause of the error, see Fig. 3.5.2.2..

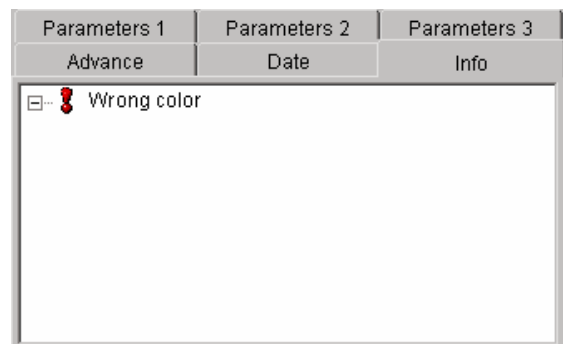


Fig. 3.5.2.2.

4. Servicing the Printer

4.1. Routine Maintenance

Before starting maintenance, get acquainted with section **2.1 Safety and Installation Requirements**.

User-performed maintenance consists in, amongst other things, periodic inspections and service operations to keep the machine in good working order. Some operations need to be performed daily while others every specified period of time.

Daily maintenance:

- Check the level of ink in the bottle. If the bottle is empty, replace it - see section **3.5.2 Installing a New Bottle of Ink (or Replacing the Empty One)**.
- It is recommended that each time the printer is switched off, the front part of the print head, especially the nozzles and photo-detector are washed in order to remove any remaining ink. Use a sprayer with cleaning fluid (wash-up).

Routine maintenance:

- **Every 1000 hours** of operation – check that the ink filter on the bottle is clean.
- **Every 12 months** of operation – check the transmissibility of the ink filter on the bottle and the printer's air filter.
- If the printer is not to be used for a longer time (over 2 weeks), secure the printer as described in section **5.1 Storing the Printer**.

NOTE!



- ☞ **The use of sharp tools or improper fluid (wash-up) to clean and wash the print head may result in damage which is not covered by the warranty!**
- ☞ **While washing the panel and connections with wash-up, cover the air inlet (AIR IN). The failure to make sure that the air inlet is covered may result in damage to electronic circuitry inside the print head.**
- ☞ **Ink and cleaning fluid (wash-up) can only be used, if supplied by the printer Manufacturer!**



- ☞ **Different ink types must not be mixed!**

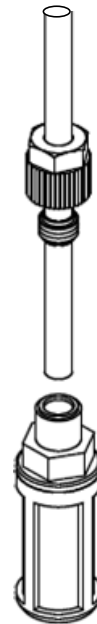
IF THE ABOVE REQUIREMENTS ARE NOT MET, THE MANUFACTURER SHALL BE RELEASED FROM ITS WARRANTY OBLIGATIONS.

4.1.1. Changing the ink filter in the bottle

The following steps describe how to replace the filter:

- a). Stop printing with the **PRINT ON/OFF** key and switch off the printer with the **R230** distributor power switch.
- b). Switch off the pressure by opening the air drain valve on the side of the ink bottle cap. Close the valve when the pressure drops to zero.
- c). Remove the cap from the bottle by turning its lower part and keeping in place the upper part with ferrules that the polyethylene tubes are connected to.
- d). Remove the cap from the bottle by removing the suction pipe with filter. When you remove the filter from the bottle make sure it is not shaken, which could cause the impurities collected on the filter to drop down.
- e). Securing the filter with a 14 mm flat wrench, unscrew the security screw cap using an 11 mm flat wrench.
- f). Slide down the filter basket from the suction pipe. The security bush and the screw cap remain on the suction pipe.
- g). Replace the old filter with the new one in such a way that the end of the suction pipe is positioned at the bottom of the filter basket, and then secure it with the screw cap.
- h). Place the suction pipe with the filter in the bottle and tighten the cap.

Switch on the printer with the **R230** distributor power switch and start printing again with the **PRINT ON/OFF** key.



4.1.2. Replacing the air filter in the printer

To replace the air filter proceed as follows:

- a). Remove the printer cover according to the steps described in [4.3.9 Removing the Housing \(Cover\) from the Printer](#) on page 57.
- b). Remove the filter from the clamp (see [Fig. 4.1.2.1](#)),
- c). Replace the old filter with a new one so that it is protected against sliding off by the clamp,
- d). Put back the printer cover performing the stages of the procedure described in [4.3.9](#) in reverse order.

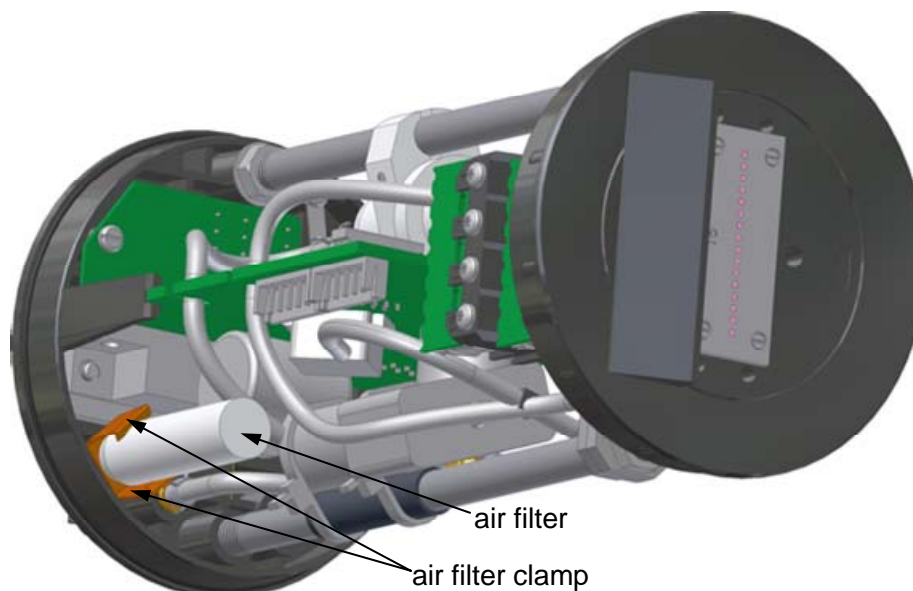


Fig. 4.1.2.1.

4.2. Removing Air from the Ink System

Transport, manipulations to the ink system or other reasons may result in accumulation of air within the print head. In consequence, ink droplets are not jetted from some or all nozzles.

In order to remove air from the print head, follow the instructions below:

- a). Turn the nozzle outlets towards a waste-ink dish (that is used to wash the printer, for example).
- b). Press and hold down the **PRINT ON/OFF** button on the operation panel on the back wall of the printer housing. This opens all electromagnets within the head to pressure-release air bubbles and ink.
- c). Continue the air removal process until a regular and continuous ink jet starts flowing out of each nozzle.
- d). Release the **PRINT ON/OFF** button.



NOTE: The frequent and lengthy use of the rinse function increases ink consumption.

4.3. When Problems Arise while Operating or Servicing the Printer


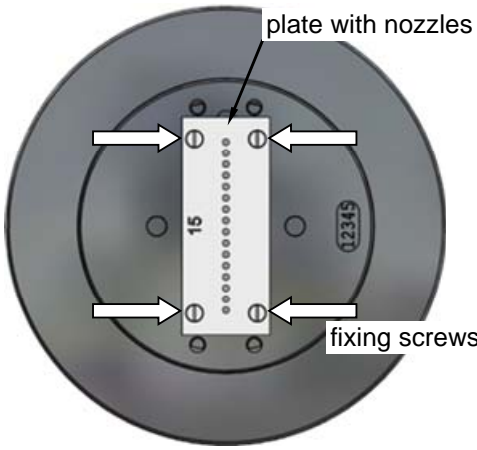

4.3.1. No labels are printed after the print command has been accepted

PROBLEM	REMEDY
<p>No text is printed after the printer has been switched on and the printing started with the PRINT ON/OFF button (the diode PRINT has started emitting green light).</p>	<ul style="list-style-type: none"> • Check whether components of the ink system are properly connected and make sure that there is some ink in the bottle. • Check for proper settings of the print parameters. If Impulse generator=External, check whether the shaft-encoder axle rotates. If Text repetitions is not set to Continuous, check whether the photo-detector detects moving objects. • Check for proper settings of other parameters.

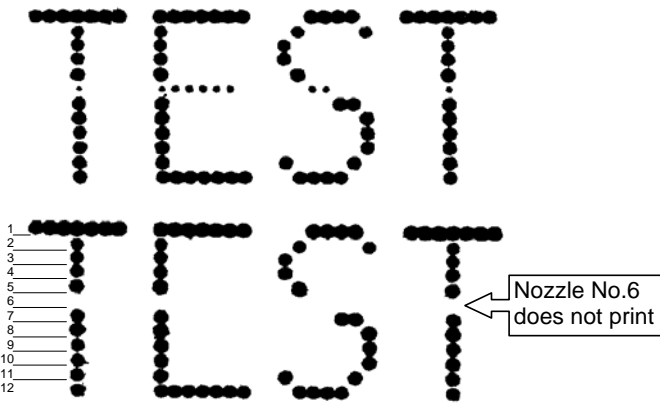
4.3.2. Choked nozzles in the print head



NOTE: The following procedure should be performed by trained staff authorized to service EBS printers.

PROBLEM	REMEDY
<p>A nozzle is choked. An attempt to remove obstacles from it by rinsing does not help. (The rinsing is started by pressing and holding down the PRINT ON/OFF button on the back wall of the printer housing).</p>	<div style="text-align: center;">  </div> <p style="text-align: right;">Fig. 4.3.2.1.</p> <p>Follow the instructions below:</p> <ul style="list-style-type: none"> • Open the drain valve which is next to the ink bottle cap. Therefore the ink pressure drops to zero. Then close the drain valve to protect ink solvent from evaporating. • Remove the distance holder for packages from the front part of the printer.
	<ul style="list-style-type: none"> • Unscrew four screws that fix the nozzle plate and remove the plate carefully. <div style="text-align: center;">  </div> <p style="text-align: right;">Fig. 4.3.2.2.</p> <ul style="list-style-type: none"> • Wash the shock absorbers found beneath the plate (only in 16-nozzle heads). • If possible, wash the plate and the nozzles with wash-up in an ultrasonic bath. • If the ultrasonic bath cannot be applied, leave the plate with the nozzles in a wash-up bath for about 10 minutes. • Dry the plate with compressed air. • Clear the choked nozzles with tungsten wire carefully from the back to the front (Use the tungsten wire supplied by the Manufacturer only !!!). • Moisten the plate with wash-up on installing a gasket. • Fasten the nozzle plate with screws taking care not to damage rubber gaskets or shutters. • Install the distance holder. • Switch the printer on and remove air from the ink system - see para 4.2 Removing Air from the Ink System.
	<p>NOTE: The above operations need to be performed under strictly clean conditions. Do not leave any foreign objects in the chamber behind the plate. If the plate is fastened improperly, the nozzles may get damaged (ruby tips may break).</p>

4.3.3. Some dots are much smaller than others or missing on the print

PROBLEM	REMEDY
<p>All dots jetted out of a particular nozzle (a horizontal line) are much smaller than others or are missing.</p>	 <p>Fig. 4.3.3.1</p> <p>Such a problem occurs when the solenoid valve corresponding to the nozzle is out of order. Try to adjust the electromagnet in the valve following the procedure below.</p>

Adjusting Valve Electromagnets in the Print Head



NOTE: The following procedure should be performed by trained staff authorized to service EBS printers.

1. Remove the printer housing – see section [4.3.9 Removing the Housing \(Cover\) from the Printer](#).
2. Hold up the uncovered printer (a special service holder available from the Manufacturer can be used). Place adsorbent cloth and a dish for waste ink behind the printer.
3. Connect the printer to the mains while pressing the **PRINT ON/OFF** button at the same time and hold the button down until three diodes: **POWER**, **ERROR**, **PRINT** start emitting light simultaneously. The printer switches to the *service* mode. In this mode valves can be adjusted.

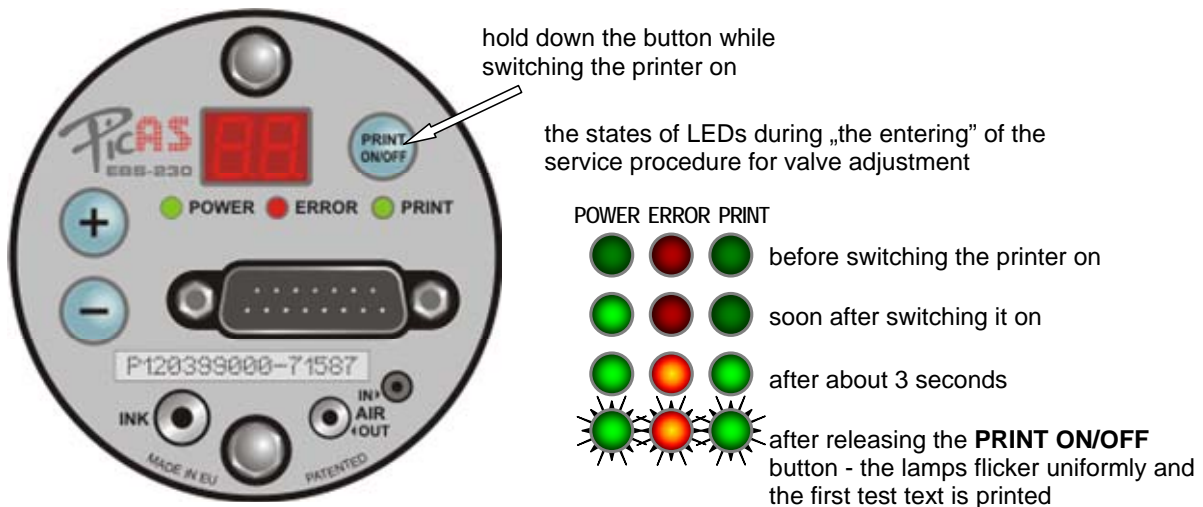
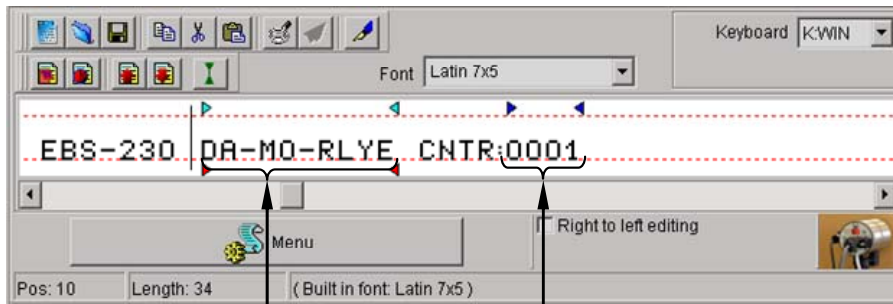


Fig. 4.3.3.2. Initiating a service procedure for adjusting printer valves.

4. The printer prints various combinations in a loop-like sequence; in order to move from one combination to the other press the **PRINT ON/OFF** button. The following sequence is used:
 - a). the first test text, whose contents are shown below:



time-type special register incremental counter-type special register

Fig. 4.3.3.3.

The following settings are used: **Dot size=1, Text width=500, Conv speed=10,**

- b). the second test text of the contents as above and the parameter **Dot size** set to **0**,
 - c). printing with no nozzle – this is indicated by the quick flickering of all lamps at the same time,
 - d). successive prints made with one nozzle only, from the 1st to the last one; and the parameter **Dot size** set to **7**; the following nozzle is chosen by pressing the **PRINT ON/OFF** button,
 - e). a print made with all nozzles at the same time and the parameter **Dot size** set to **7**,
 - f). return back to combination **a)** in order to repeat the entire sequence.
5. Set the option of printing only with the nozzle whose valve needs adjusting (the nozzle regulation number is on the LED indicator on the print head panel).
6. Fit a TORX-tipped screwdriver number **T6** into the adjusting screw of the nozzle that has previously been chosen in the sequence of various combinations of prints. Turn the screw into its place until ink droplets start flowing out of the nozzle. Electromagnet numbers are engraved on their plastic bodies - see **Fig. 4.3.3.4**.
7. While turning the screwdriver and moving a sheet of paper perpendicularly to the axis of the nozzle at a distance of 10 mm, adjust the size of dots as required. The dot must be round in shape with no satellites or splashes around.
8. Set the printing with another nozzle by pressing the **PRINT ON/OFF** button on the printer panel.
9. Adjust other nozzles by following steps from **5** to **8** to get dots of one size for all nozzles.
10. On adjusting the last nozzle, turn them all on at the same time and while turning the adjusting screws of the nozzles clockwise or counter-clockwise (by the maximum of ¼ of the rotation) shape all dots so that they are all of a similar size.
11. Reduce the intensity of ink droplets to the value of **0 (Dot size=0)** and re-adjust the screws by following steps from **5** to **10**.
12. Switch the printer off and on in order to exit the *service* mode and the valve adjustment procedure.
13. Check what the deflection of ink jets from the axis of the nozzle is. To this end, observe ink jets on a light background with the rinsing operation being performed in the printer at the same time (hold down the **PRINT ON/OFF** button). At the distance of 60÷80 mm from the front of the print head and at the rated ink pressure, the ink jets must be neither deflected from the axis by more than 2 mm on the horizontal and vertical planes nor crossed. If this requirement is not met, clean the nozzles – see section **4.3.2 Choked nozzles in the print head**. If this does not help, replace the nozzle plate and follow the adjustment procedure from step **5** to **12**. Should no positive results be

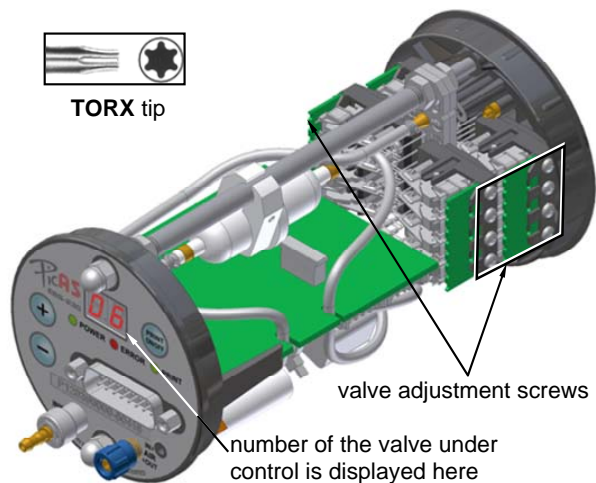
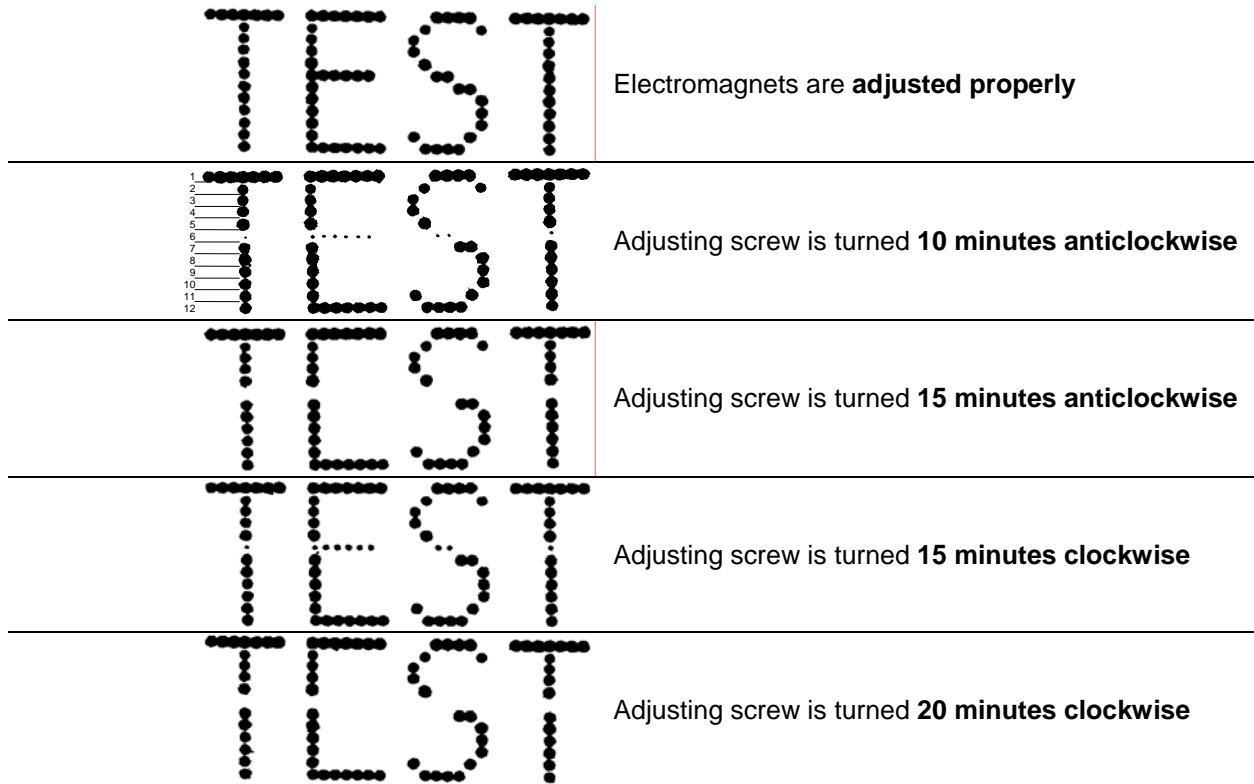


Fig. 4.3.3.4


obtained after the replacement, check for proper installation of flexible connectors and electromagnet units or get the printer repaired.



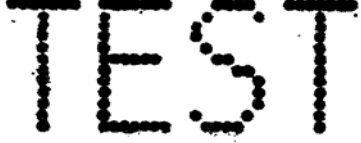

14. After the solenoid valves have been adjusted, re-install the housing and place the printer in the holder in its working position.

Figures below show the prints of a text produced after electromagnets have been adjusted properly and when the valve electromagnet of nozzle No. 6 is out of order. The scope of the disorder is described with the use of the clock-face notion, where one full rotation is 60 minutes.


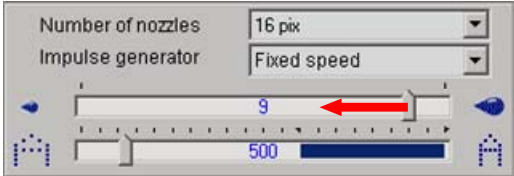
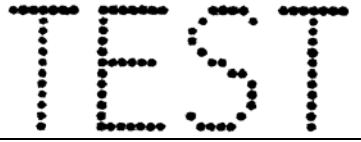
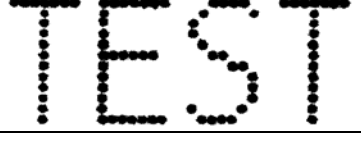


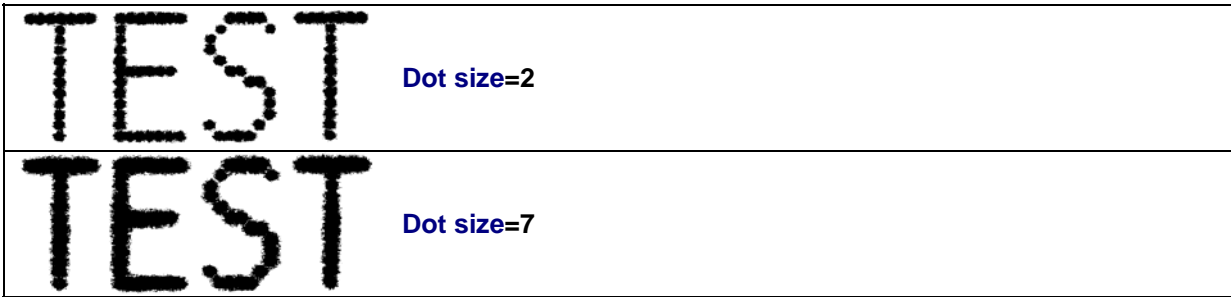
4.3.4. Prints are distorted

PROBLEM	REMEDY
<p>The prints are distorted. There are irregular ink splashes or ink dots overlap each other as shown in the example on the right.</p>	<p>It may happen that when a moving object hits the printer, the printer may get repositioned. An example of a print made with the repositioned printer is shown below:</p>  <p style="text-align: right;">Fig. 4.3.4.1</p> <p>Such prints are made when the distance between the front of the printer and the object is too big. Move the printer to the object plane at the distance of less than 15 mm. If this is impossible, adjust electromagnets within the print head to print over a greater distance – see Adjusting Valve Electromagnets in the Print Head above. Figures below show the print of a text produced at different distances between the front of the printer and the object.</p>


PROBLEM	REMEDY
	The distance between the printer and the object is 6 mm ,
	The distance between the printer and the object is 10 mm ,
	The distance between the printer and the object is 15 mm ,
	The distance between the printer and the object is 20 mm .

4.3.5. Prints look as if printed in bold type and blur


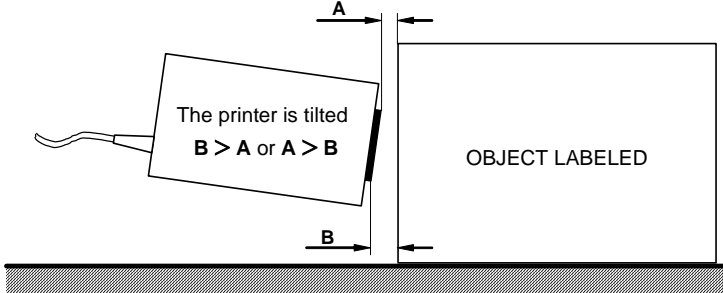
PROBLEM	REMEDY
<p>The print is saturated with ink heavily, droplets of ink mix with each other and the entire label blurs on the object.</p>	<div style="text-align: center;">  <p>Fig. 4.3.5.1</p> </div> <p>Such a print occurs when the value of the Dot size parameter is too high. Reduce the parameter setting by moving the slider leftwards.</p> <div style="text-align: center;">  <p>Fig. 4.3.5.2</p> </div> <p>Figures below show the print of a text for the rated pressure of ink and different settings of the print parameter Dot size.</p>
	Dot size=0
	Dot size=1



4.3.6. Prints are slanted

PROBLEM	REMEDY
<p>The prints are slanted and turned left or right.</p>	<div style="text-align: center;">  <p>Fig. 4.3.6.1</p> </div> <p>Such a print occurs when the printer is turned around its own axis. Re-position the printer by turning it in the printer holder in such a way that all nozzles are located along the vertical line.</p>

4.3.7. Lower (upper) parts of prints are distorted

PROBLEM	REMEDY
<p>The lower (upper) parts of prints are distorted. Irregular splashes of ink occur.</p>	<div style="text-align: center;">  <p>Fig. 4.3.7.1</p> </div> <p>Such a print occurs when the front part of the printer is tilted down (up) and therefore the outlets of lower (upper) nozzles are more distant from the object than the other ones.</p> <div style="text-align: center;">  <p>The printer is tilted $B > A$ or $A > B$</p> <p>OBJECT LABELED</p> </div> <p style="text-align: right;">Fig. 4.3.7.2</p> <p>Level the printer by adjusting the printer holder.</p>

4.3.8. Prints are crooked, wavy and jagged


PROBLEM	REMEDY
<p>The prints are crooked, wavy and jagged.</p> 	<ul style="list-style-type: none"> ➤ The printer holder is fixed to the base that is subject to strong vibration and shocks. The printer shakes during the printing. Fix the printer holder to a stable structure that is not subject to vibration or shocks. ➤ Objects moving on the conveyor are subject to strong vibration or shocks. Adjust the movement of objects in front of the printer so that they do not vibrate or are not subject to shocks while being labelled.

Fig. 4.3.8.1.

4.3.9. Removing the Housing (Cover) from the Printer

In order to remove the cover from the printer, follow the below specified steps:

- a). Stop printing with the **PRINT ON/OFF** key and switch off the printer with the **R230** distributor power switch.
- b). Switch the printer off.
- c). Remove the printer from the printer holder and uninstall the distance holder.
- d). Unscrew two nuts off the bolts at the back of the printer and remove the washers.
- e). Holding the printer cover, press the front part of the printer with your thumb into the inside, until the cover starts slipping off freely.
- f). Slip the cover off the printer so that the guide bars slip out of the tubes.

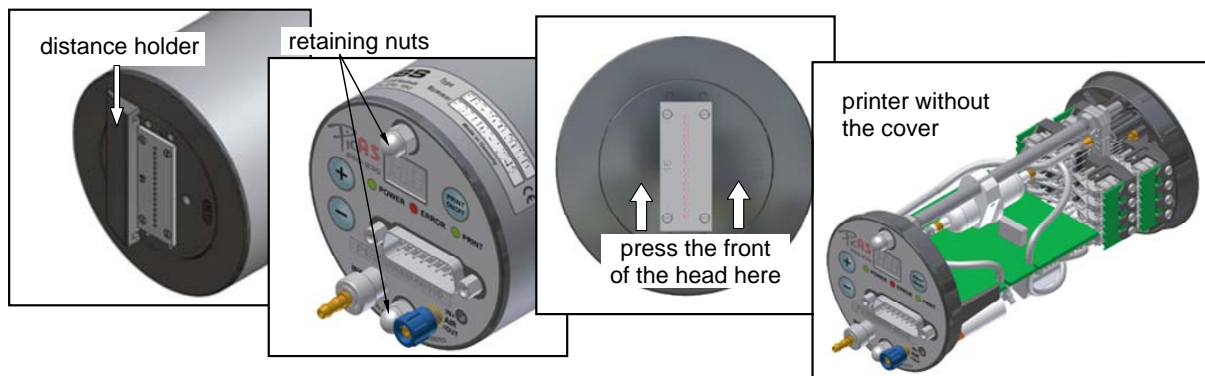


Fig. 4.3.9.1

4.4. How to Contact your Service Representative

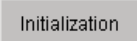

The above paragraphs provide instructions on how to remove some faults of the printer. The faults can be corrected by the user without the need to call a service representative. In certain circumstances, however, an intervention by a service representative is not only desirable but necessary. Therefore before you call your service representative, collect some information to help the service staff to pre-locate the fault. With this information your service representative can agree upon

whether the printer has been operated improperly or some other fault has occurred. It also enables the service staff to prepare the visit to make this as efficient as possible.

When reporting a printer failure, be ready to give the following information:

1. The name and type of the printer.
2. The type of fault and after-effects.
3. The printer status at the time of failure:
 - the state of indication lamps displayed on the printer panel,
 - current settings of print parameters of the text printed – write down the parameters and the printer configuration to a file following the procedure described in section **4.4.1 Generating a Service Report** and transfer the file (a as hardcopy or an electronic mail) to the service representative,
 - if additional, non-standard options are installed, specify the names of the options,
 - the version numbers of the printer hardware and control program – see the note below and section **3.3.9 Print Parameters**,
 - ink data and printer parameters available from the Ink Monitoring System (IMS) – see the note below.
4. What service operations were being performed when the failure occurred.
5. The type print head (7 or 16 nozzles, the inner diameter of the nozzles).
The above information should be reported by telephone, fax or e-mail to your service representative.

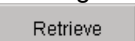
**NOTE:**

- Data on the printer that are shown in some tab sheets of the control program are not available until the read-parameter function has been executed successfully with the  or  button.
- Requests for help should only be addressed an authorized service representative who works closely with the local distributor most frequently. Only authorized service staff are able to offer you professional and prompt assistance whenever you find the operation of the printer unsatisfactory.

4.4.1. Generating a Service Report

The **EBS-230** printer is a machine where many different parameters can be set and the process of printing can be configured in many ways in order to ensure the customer's requirements are satisfied. Should any malfunction or irregularities occur in the printer operation, the user is advised to contact an authorized service representative. The properly prepared set of data on the irregularity or malfunction and conditions in which they occurred can be very helpful for the service staff in facilitating fault location and removal. The data reported enable the service person to restore the print parameters the user used soon before the failure. The data can be stored on the disk of the computer in a file under any name.

In order to create a service-report file follow the below specified steps:

1. Attach the computer to the printer and start running the **EBS-230** control program.
2. View the printer parameters by clicking the  button in the control program window.
3. In the control program menu **Tools** choose the command **Create service report**.
4. Type in the name of a parameter file in the newly displayed window and select the directory where the service-report file is to be saved. Click the **Save** icon.

5. Storage and Transportation

5.1. Storing the Printer

Allowable climatic and mechanical exposure:

- Storage temperature **from -5 °C to +50 °C**,
- Relative humidity of **up to 95% without condensation**,
- Shocks: the **maximum of 1g for the maximum of 2 ms**.

1. Storing data in the printer memory

The time, the date and settings of non-volatile special registers, such as counters and some other parameters, are stored in a separate printer memory. The memory is backed with a battery after the power pack has been switched off. The capacity of the battery is sufficient to store the contents of the memory safely for **about 1 month**. After that time the Manufacturer cannot guarantee that the memory contents are maintained as the battery capacities vary according to the unit. If the printer is not to be used for more than 1 month, switch on the printer with the network switch on the distributor housing for 5 hours to recharge the battery. To preserve the operating parameters of the device it is necessary to change the battery every 4 years.

2. Protecting the ink system of the printer

The ink parts of the printer are filled with ink. If the printer is not protected properly and needs to be stored for a longer time, ink may dry out and choke the nozzles and valves.

If the printer is not to be used for a period of **over 3 weeks** protect it in the following way:

- a). In place of the ink bottle place a bottle of wash-up (matching to the ink) in a similar manner to as when changing the ink bottle – see chapter *Installing a New Bottle of Ink (or Replacing the Empty One)*. The wash-up bottle does not require validation by the printer.
- b). Turn the outlets of the nozzles towards a waste-ink dish.
- c). Start rinsing the ink system of the printer by pressing and holding down the **PRINT ON/OFF** button on the back wall of the printer housing. Continue the rinsing until ink is completely replaced with wash-up. Do not remove the wash-up from the print head and the tubes.
- d). Switch the printer off.
- e). Open the drain valve which is next to the ink (wash-up) bottle cap. Therefore the ink (wash-up) pressure drops to zero.
- f). Unscrew the tube supplying ink (wash-up) from the ink intake valve, together with the non-return valve which prevents ink (wash-up) from pouring out of the tube.
- g). Wash with wash-up the front part of the print head (the plate and the nozzles) and the seat of non-return valve within the connector.

3. Additional protection

The printer to be stored needs to be detached from the mains by removing the distributor outlet plug. Protect the printer against dust, exposure to aggressive vapours and gases and weather conditions. It is advisable to put the printer into a polyethylene bag, remove air from the bag and close the bag tight. Protect the printer against mechanical damage.

NOTE: The printer must not be stored empty (dry). The ink system must be filled with wash-up for storage. The wash-up contains no water and prevents steam condensation, thus protecting printer components from corroding and also the heads of electromagnetic valves from deforming. Only wash-up recommended by the Manufacturer and compatible with the type of ink should be used.



5.2. Transporting the Printer

The printing system should be transported in its regular working position. This applies in particular to the printer itself and the ink system. Avoid any excessive shocks or vibration.

If there is a threat that the entire printer may get tilted or be exposed to excessive shocks or vibration during the transportation, secure the unit in the following way:

1. Detach and remove the printer from its workplace.
2. Remove the bottle of ink and plug it with an original cap to protect the ink from pouring out.
3. Uninstall the printer, dismantle the ink system, distributor and its connection cables.
4. Protect the printer as for storage – see section **5.1 Storing the Printer**.
5. Wrap parts of the printing system (the printer, ink system carrier, bottle carrier and printer fixtures and holders, distributor) with corrugated board or bubble foil.
6. Wind up connecting cables and polyethylene tubes to make a reel of the diameter of about 20 cm and secure with packing tape.
7. Place all secured parts in a cardboard box (the original transportation packing is recommended) and protect them against relocating inside the box. Close the box and protect it from getting open accidentally. Other packing can also be used to protect all parts against mechanical damage. Allowable mechanical shocks inside the packing must not exceed **the maximum of 1g over the maximum of 2 ms**.

6. Technical Specifications

Parameter	Value
Number of nozzles	7 or 16
Nozzle diameter	standard: 150µm, optional: 100 µm, 120µm, 200µm.
Height of prints	No head-turning option available: 11 mm for the 7-nozzle printer , 27 mm for the 16-nozzle printer . Head-turning option available: 6-11 mm for the 7-nozzle printer , 6-27 mm for the 16-nozzle printer .
Working position of the printer	any
Number of vertical rows printed at the same time	1
Number of texts and set of print parameters stored in the printer memory at a time	1 to 30 Texts are loaded to the printer via a PC or T200 terminal.
Maximum number of characters in a text	1300 (includes controller characters for built-in fonts) Number of characters entered from Windows® fonts is limited – depending on the type and size of a font.
Graphics printing (logos, special graphic characters)	Ability to edit and print text and graphic symbols with the application of Windows® fonts (True Type fonts) as well as with a bitmap editor, as standard.
Special characters	National diacritical characters, graphic, warning or transport characters (a collection of characters determined by manufacturer), etc.
Special registers (texts with dynamically changing content based on occurrence of a specific event)	date and time in any format, expiry dates, incremental counter, decremental counter,
Editing texts and print parameters, printer control	<ul style="list-style-type: none"> • with use of a PC <ul style="list-style-type: none"> - Minimum Recommended Hardware Requirements: IBM PC compatible - Pentium 200 or equivalent, 32 MB RAM, min. 50 MB free disc space on HDD, - Windows® 98SE / ME / NT / 2000 / XP / Vista® compatible operating system for text edit and print parameter programs, <p><i>If Windows NT® is running on your PC, the printer communicates with the PC exclusively via an RS-232 interface (not via USB).</i></p> • with use of T200 terminal (optional).
Printing timing	Internal generator or a so called shaft-encoder (for variable speed conveyors)
Power supply (power pack integrated with R230 cable distributor)	IN: 100-240 V~, 50-60 Hz / 0,66-0,34 A OUT: 24V=, max. 1A

Parameter	Value
Power consumption	0.58A for the 7-nozzle printer , 0.91A for the 16-nozzle printer .
Compressed air supply	not required
Operating pressure	from 0.02 MPa to 0.05 MPa (from 0,2 bar to 0,5 bar)
Operating temperature range	from +5 °C to +40 °C
Storage temperature range (long term)	from -10 °C to +45 °C
Humidity	Up to 95% without steam condensation – for temperatures above the dew point (operation in rainfall is possible provided print surface is dry).
Ink	Ink is made on a base of ethanol or water in various colours available from catalogue (incl. white, yellow, blue, green, red and black).
Ink bottle capacity	1 litre – the use of higher capacity bottles may result in microcompressor malfunction
Ink consumption	1 litre of ink per >2 000 000 characters (with 7x5 dot matrix)
Weight	approx. 600 g – printer without mounting and cables, approx. 1000 g – R230 cable distributor with cables and printer accessory system.
Dimensions	diameter: 70 mm , length: 250 mm – printer, height: 250 mm , width: 80 mm , depth: 160 mm – R230 cable distributor housing including cables.