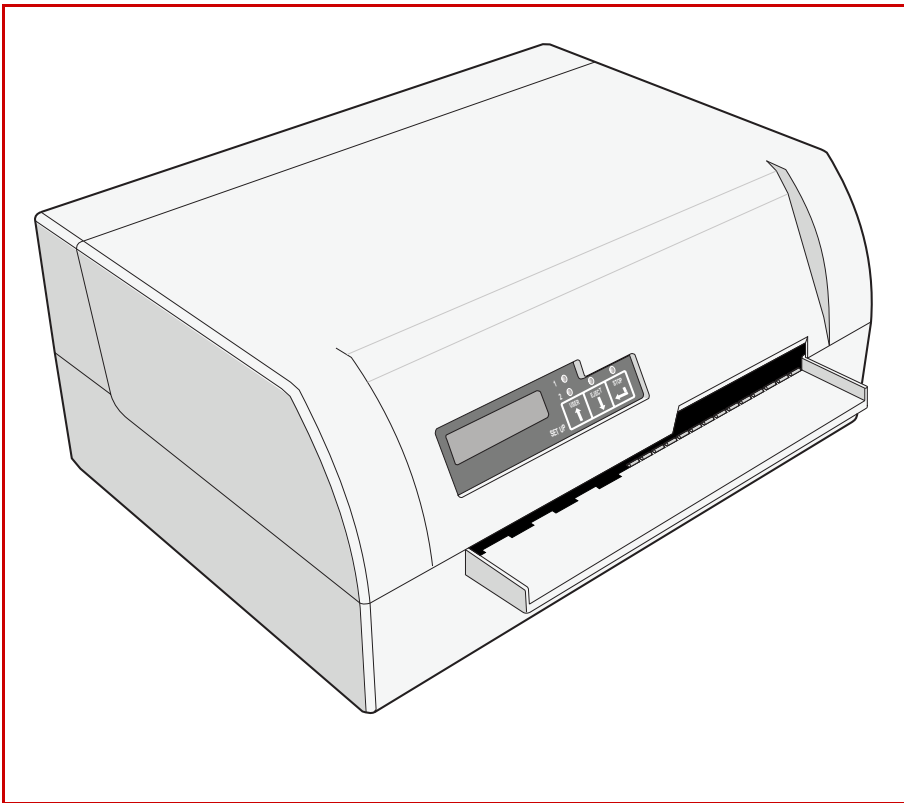


User Guide

Flatbed Printer



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Table of contents

| | |
|--|----|
| Introduction | 1 |
| Printer features | 1 |
| Interfaces | 1 |
| Emulations | 1 |
| Symbols used | 1 |
| About this manual | 2 |
| | |
| 1 Printer at a glance | 3 |
| View from the front | 3 |
| View with cover opened | 3 |
| View from the rear | 4 |
| | |
| 2 Installation | 5 |
| Unpacking the printer | 5 |
| Placing your printer | 6 |
| Checking the printer voltage | 8 |
| Connecting the printer | 8 |
| Switching on the printer | 10 |
| | |
| 3 Printer drivers and firmware | 11 |
| Printer drivers | 11 |
| Installing a printer driver in Windows 95/98 | 11 |
| Installing a printer driver in Windows 2000/XP | 12 |
| Other operating systems | 13 |
| Changing printer settings | 13 |
| Form settings (Windows 2000/NT 4.0/XP) | 14 |
| Loading firmware | 15 |
| Interface | 15 |
| Serial interface | 15 |
| Parallel interface | 15 |
| USB interface (Windows2000/XP) | 15 |
| Downloading firmware to the printer | 16 |

| | | |
|----------|-------------------------------------|----|
| 4 | Control panel | 17 |
| | Display, indicators and keys | 18 |
| | Status indicators | 19 |
| | Status indicator variations | 19 |
| | Ready indicator (STOP LED) | 20 |
| | Paper indicator (EJECT LED) | 21 |
| | User 1 and User 2 indicators | 21 |
| | Key functions during operation | 22 |
| | STOP key | 22 |
| | EJECT key | 22 |
| | USER key | 23 |
| | Key functions when powering on | 24 |
| | STOP key | 24 |
| | EJECT key | 24 |
| | User key | 25 |
| | Key functions in menu mode | 26 |
| | USER key | 26 |
| | EJECT key | 26 |
| | STOP key | 26 |
| 5 | Print media | 27 |
| | Inserting a document | 27 |
| | Inserting a passbook | 28 |
| | Removing media | 31 |
| 6 | Changing the ribbon cassette | 33 |
| | Removing the ribbon cassette | 33 |
| | Inserting the ribbon cassette | 35 |
| 7 | Replacing the print head | 39 |
| | Removing the print head | 39 |
| | Inserting new print head | 42 |
| 8 | Menu | 45 |
| | Programming via the control panel | 45 |
| | Calling up the menu | 46 |

| | |
|--|-----------|
| Menu configurations (User 1/User 2) | 46 |
| Menu handling | 47 |
| Key functions | 47 |
| USER key | 47 |
| EJECT key | 47 |
| STOP key | 48 |
| Setting parameters (principle) | 49 |
| Terminating menu mode | 50 |
| Selecting the LC display language | 51 |
| Printing out the status page | 53 |
| Power on + EJECT key | 53 |
| Print out status page in menu mode | 54 |
| Status page (example) | 56 |
| Menu parameters | 57 |
| Test function | 63 |
| Hex Dump | 63 |
| Activating Hex Dump | 63 |
| Exiting the test mode | 64 |
| Test printout Hex Dump (Example) | 64 |
| 9 Troubleshooting | 65 |
| General print problems | 66 |
| The display remains dark | 66 |
| The display is lit, but the printer does not print | 66 |
| Problems with the paper feed | 67 |
| Problems with the print quality | 68 |
| Print is faulty | 68 |
| Print is too pale | 68 |
| Smudged print | 68 |
| Dots within characters are missing | 68 |
| Prints undefined characters | 68 |
| Error messages and warnings | 69 |
| Unrecoverable errors | 70 |
| Recoverable errors | 71 |
| Print Head Hot Error | 71 |
| Ribbon Cassette Error | 71 |
| Paper Length Error | 71 |
| Framing Error (Serial I/F) | 71 |
| Parity Error (Serial I/F) | 72 |

| | |
|------------------------------------|-----------|
| Overrun Error (Serial I/F) | 72 |
| Cover Open Error | 72 |
| Cover Open Error | 72 |
| Warnings | 73 |
| Data in Buffer | 73 |
| Remove Paper | 73 |
| Clearing paper jams | 74 |
| 10 Care and maintenance | 77 |
| Cleaning the housing | 77 |
| Cleaning the interior | 77 |
| Cleaning the MSR-H magnetic stripe | 78 |
| Transport of the printer | 80 |
| Preparations for transport | 80 |
| Shipping the printer | 80 |
| A Specifications | 81 |
| Printer specifications | 81 |
| Paper specifications | 85 |
| Interface specifications | 87 |
| B Character sets | 89 |
| OCR-A character set | 90 |
| Epson character sets | 91 |
| Italic | 91 |
| Graphic1 | 91 |
| Graphic2 | 92 |
| IBM code pages | 93 |
| Code page 437 | 93 |
| Code page 850 | 93 |
| Code page 860 | 94 |
| Code page 863 | 94 |
| Code page 865 | 95 |
| Code page 851 | 95 |
| Code page 852 | 96 |
| Code page 853 | 96 |

| | |
|--|-----|
| Code page 855 | 97 |
| Code page 857 | 97 |
| Code page 866 | 98 |
| Code page 869 | 98 |
| Code page USSR Gost | 99 |
| Code page 864 | 99 |
| Code page 437G | 100 |
| Code page 920 | 100 |
| Code page 858 | 101 |
| Code page 923 | 101 |
| ISO code pages | 102 |
| ISO 8859-2 | 102 |
| ISO 8859-5 | 102 |
| ISO 8859-7 | 103 |
| ISO 8859-8 | 103 |
| Available code pages and fonts | 104 |
| C Emulations | 107 |
| Escape sequences | 107 |
| What are escape sequences? | 108 |
| Control codes | 108 |
| How are escape sequences used? | 108 |
| List of available control codes | 109 |
| PR2 mode | 109 |
| PR50 mode | 113 |
| IBM mode | 116 |
| Epson mode | 119 |
| D Interfaces | 123 |
| Interface settings for User 1 and User 2 | 123 |
| Parallel interface | 124 |
| Connector assignment | 124 |
| Nibble Mode | 124 |
| ECP mode | 125 |

| | |
|--|-----|
| Serial interface RS232C | 126 |
| Connector assignment | 126 |
| Serial attachment characteristics | 127 |
| Data rates | 127 |
| Supported protocols | 127 |
| Data Transfer | 127 |
| Parity | 127 |
| Handshaking | 128 |
| Ready/Busy | 128 |
| XON/XOFF | 128 |
| Configuring the serial interface of the PC | 129 |
| DOS mode | 129 |
| Windows 95/98/ME | 129 |
| Windows 2000/XP | 129 |
| USB interface | 130 |
| E Consumables and accessories | 131 |
| Consumables | 131 |
| Accessories | 131 |

Introduction

Printer features

This printer is a document printer for printing manually inserted documents as well as passbooks (vertical and horizontal fold passbooks). Manual insertion of the documents is supported by an automatic document alignment.

The printer has a high processing speed and compact design. The 24-needle print head guarantees an excellent print quality.

Different factory installed models can be delivered: MSR (magnetic stripe read/writer), MICR (magnetic ink character reader), scanner and second serial interface.

Interfaces

The basic printer model is provided with three interfaces: serial (RS-232C), parallel (IEEE1284) and USB 2.0 (Full speed). A special printer version has a second serial (RS-232C) interface.

Emulations

As a standard, the printer is delivered with three emulations: EPSON ESC/P, IBM 4722 + PP XL24e, Olivetti PR2e

Symbols used

Important information is highlighted in this manual by two symbols.



CAUTION highlights information which must be observed in order to prevent injuries to the user and damage to the printer.



NOTE highlights general or additional information about a specific topic.

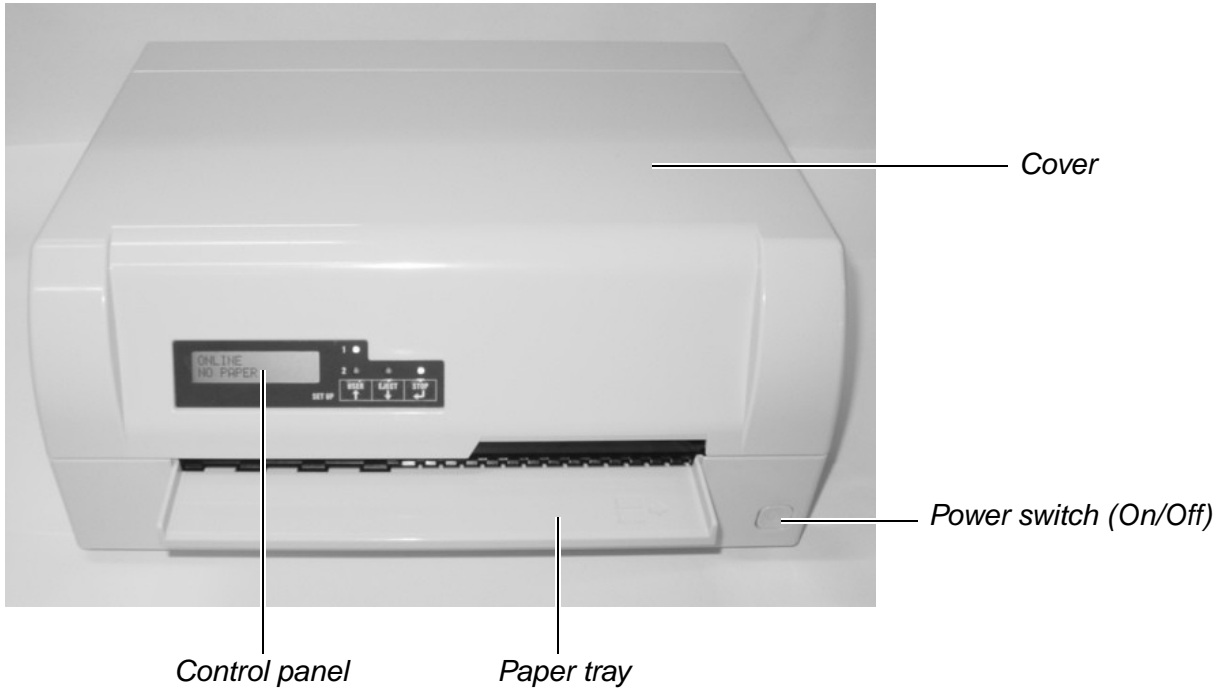
About this manual

The user guide contains a detailed description of the printer, its characteristic features and additional information.

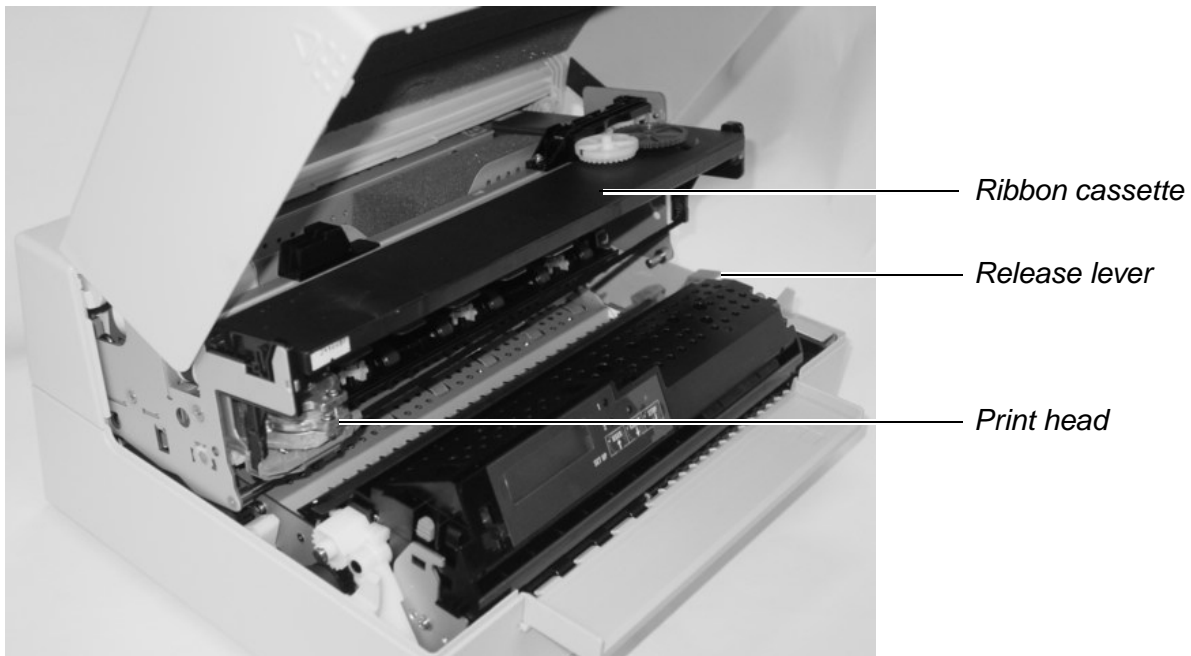
- ▶ Chapter 1 *[Printer at a glance](#)* lists all the parts of the printer.
- ▶ Chapter 2 *[Installation](#)* contains start-up instructions and points to note.
- ▶ Chapter 3 *[Printer drivers and firmware](#)* provides instructions for installing the printer driver.
- ▶ Chapter 4 *[Control panel](#)* explains how to control printer operations.
- ▶ Chapter 5 *[Print media](#)* tells you how to load, transport and eject media.
- ▶ Chapter 6 *[Changing the ribbon cassette](#)* explains how to remove and install a ribbon cassette.
- ▶ Chapter 7 *[Replacing the print head](#)* explains how to remove and install a print head.
- ▶ Chapter 8 *[Menu](#)* contains all the information necessary for controlling the printer via the control panel.
- ▶ Chapter 9 *[Troubleshooting](#)* provides instructions for rectifying faults which do not require the intervention of qualified personnel.
- ▶ Chapter 10 *[Care and maintenance](#)* provides information on the upkeep of the printer and contains important information in case the printer has to be transported.
- ▶ Appendix A *[Specifications](#)* informs you about the technical specifications of your printer and the paper which should be used.
- ▶ Appendix B *[Character sets](#)* lists the available character sets.
- ▶ Appendix C *[Emulations](#)* deals with programming via the interface.
- ▶ Appendix D *[Interfaces](#)* explains the interfaces.
- ▶ Appendix E *[Consumables and accessories](#)*, consumables and accessories contains information about options and accessories you can purchase for your printer.

1 Printer at a glance

View from the front



View with cover opened



View from the rear



Power inlet

Parallel interface

1st Serial interface

2nd Serial interface

USB interface

2 Installation

Unpacking the printer

Place your packaged printer on a solid base.

Make sure that the “Up” symbols point in the correct direction.

Open the packaging, lift the printer out of the cardboard box and remove the re-maining packaging material.

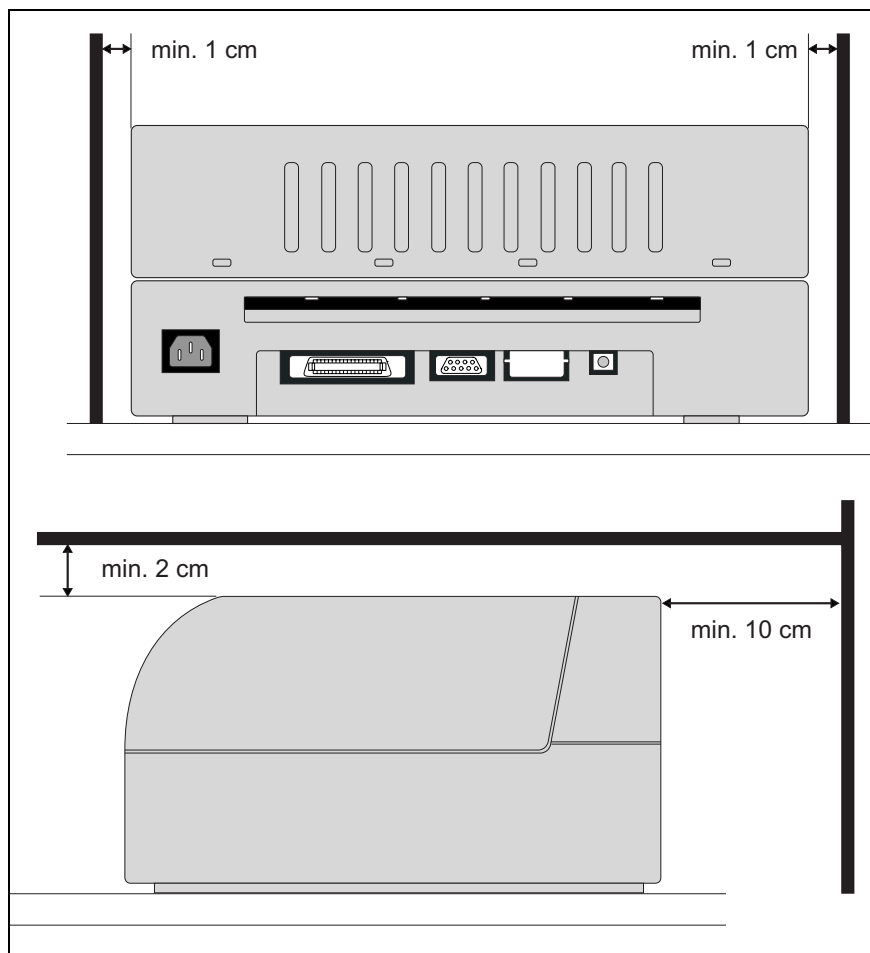
Check the printer for any visible transport damage and missing items. The following items should be included:

- ▶ The Quick start guide (QSG)
- ▶ This CD-ROM (at the back of the Quick start guide)
- ▶ The power cable
- ▶ The ribbon cartridge

If you find any transport damage or if any accessories are missing, please contact your dealer.

Placing your printer

Place the printer on a solid, flat, surface, ensuring that the printer is positioned in such a way that it can not topple, and that there is easy access to the control panel and paper input devices. Also ensure that there is sufficient space for the printed output.



| Location | | Minimum space |
|------------------------------------|----------------------------------|---------------|
| Left and right side of the printer | | 1 cm |
| Top of the printer | | 2 cm |
| Rear of the printer | to ensure sufficient ventilation | 10 cm |
| | to print on a DIN A4 sheet | 12 cm |
| | to print with a built-in MICR | 15 cm |



The power supply cable may be damaged if the paper edges constantly chafe the insulating sheath. The user must always ensure that there is sufficient distance between the power supply cable and the paper.

When selecting the printer location, observe the following additional instructions:



Never place the printer in the vicinity of inflammable gas or explosive substances.

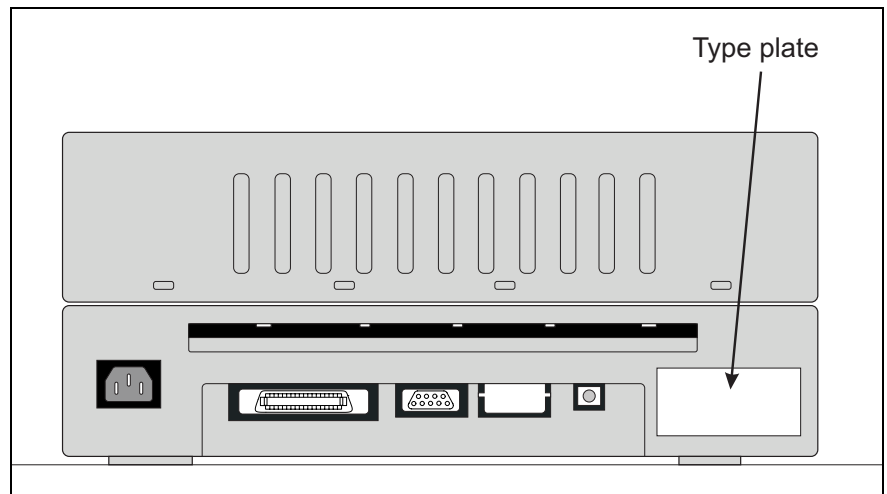
- ▶ Protect the printer from shock, impact and vibration.
- ▶ Be sure to connect the printer to a socket with the correct mains voltage.
- ▶ Do not expose the printer to direct sunlight. If you cannot avoid placing the printer near a window, protect it from the sunlight with a curtain.
- ▶ When connecting the computer with the printer, make sure not to exceed the permitted cable length (see [Interface specifications](#), page 87).
- ▶ Ensure sufficient distance between the printer and any heating radiators.
- ▶ Avoid exposing the printer to extreme temperature or air humidity fluctuations. Above all take care to avoid the influence of dust.
- ▶ Always disconnect the system from the mains before opening the device to perform maintenance work or remedy errors.
- ▶ It is recommended to install the printer in a place which is acoustically isolated from the workplace because of the noise it may produce.

Checking the printer voltage

Make sure that the device has been set to the correct voltage (e.g. 230 V in Europe, 120 V in the USA). To do this, check the type plate above the power inlet at the back of the printer. Contact your dealer if the setting is incorrect.



Never switch on the printer if the voltage setting is incorrect, since this may result in severe damage.



Connecting the printer



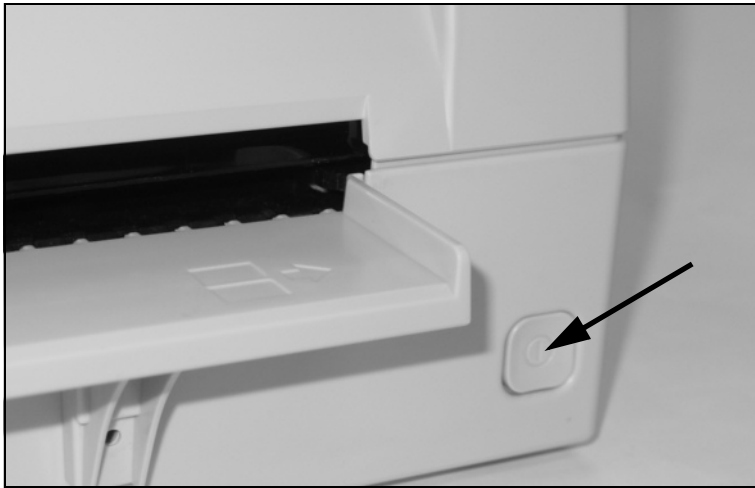
Connect the power cable to the power inlet of the printer. Connect the power cable plug to a mains socket.



Make sure that the printer and the computer are switched off and connect the data cable between the printer and the computer, in this example a 36-pin centronics parallel cable.

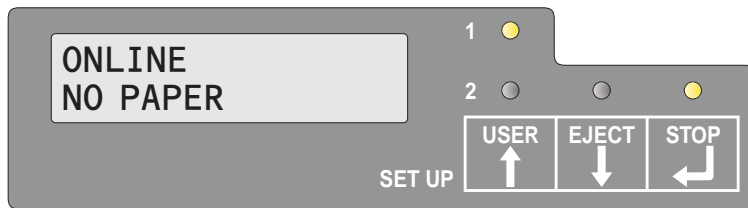
Switching on the printer

Before switching the printer on, make sure that it is connected correctly and that you have followed all the safety and installation instructions (see section [Placing your printer](#), page 6).



Press the power which is located at the front bottom right of the printer switch for switching on the printer.

The printer initializes.



When the initialization is completed, the Ready indicator and the USER 1 indicator lights up. The message **ONLINE NO PAPER** appears on the LCD. The printer is in the online status and ready to accept data from the system. You can now insert a document or a passbook.

3 Printer drivers and firmware

Printer drivers

You need to install a printer driver so that the printer can process the data from your application programs.

An original driver offers the best conditions for optimal printing results. All available printer drivers can be found on the CD-ROM enclosed with the printer, as well as on our [Internet site](#), from which you can also download updated versions as necessary.

The use of any Windows printer driver from the CD-ROM requires that the printer is set to Epson emulation (see [Menu parameters](#), page 57 and chapter [Emulations](#), page 107).

Installing a printer driver in Windows 95/98

To install the printer driver, proceed as follows.

1. Insert the supplied online CD-ROM in the CD-ROM drive.
2. Click on the **Start** button in the Windows taskbar.
3. Move the mouse to **Settings** and click on **Printer** to open the printer folder.
4. Click on **New Printer**.
5. Click on **Next** in the Printer Installation Wizard.
6. Specify whether you want to operate the printer as a Local Printer or Network Printer by clicking on the relevant option, then press **Next**.



For instructions on installing the printer as a network printer, please consult the documentation supplied with your network operating system and/or printer server, or contact the network administrator.

7. Click on **Disk**, then on **Browse**.
8. Select the CD-ROM drive and open the directory `n:\english\drivers\<printer model>\win9x` (“n” stands for the letter of your PC drive).
9. Open the folder of your printer’s operating system, select the file `oemsetup.inf` and click on **OK**.
10. Select the printer type. Click on **OK**, then on **Next**.

11. Select the port to which your printer is connected, then click on **Next**.
12. If required, edit the name of the default printer and specify whether you wish to use the printer as a default printer by clicking on the relevant option. Then click on **Next**.
13. Specify whether you wish to print out a test page by selecting the relevant option and click on **Finish**. The printer driver will now be installed.

Installing a printer driver in Windows 2000/XP

The online CD-ROM contains printer drivers for the most common Windows applications. To install the printer driver, proceed as follows.

1. Insert the supplied online CD-ROM in the CD-ROM drive.
2. Click on the **Start** button in the Windows taskbar.
3. Click on **Printers and Faxes** to open the printer folder.
4. Click on **File** and **Add Printer** in the menu bar.
5. Click on **Next** In the Printer Installation Wizard.
6. Specify whether you want to operate the printer as a **Local Printer** or **Network Printer** by clicking on the relevant option, then press **Next**.



For instructions on installing the printer as a network printer, please consult the documentation supplied with your network operating system and/or printer server, or contact the network administrator. To install a network printer, you will need Administrator rights.

If you are using the printer locally, you can continue installing the driver in one of two possible ways:

- ▶ Manual installation of printer driver: in this case, continue with Step 7.
 - ▶ Automatic installation of printer driver via Plug & Play function: in this case, continue with Step 12 once the printer installation wizard has determined the printer, port and printer name.
7. Select the port to which your printer is connected, then click on **Next**.
 8. Click on **Data Carrier**, then click on **Browse**.
 9. Select the CD-ROM drive and open the directory **n:\english\drivers\<printer model>\win2000** (“n“ stands for the letter of your PC drive).
 10. Open the folder of your printer’s operating system, select the file **OEMPRINT.inf** and click on **OK**.

- 11.** Select the printer type. Click on **OK**, then on **Next**.
- 12.** If required, edit the name of the default printer and specify whether you wish to use the printer as a default printer by clicking on the relevant option. Then click on **Next**.
- 13.** If you are using the printer as a network printer, you have the option of sharing it with other network users. In this case you must enter an access name which will be displayed to the other network users. Then click on **Next**.
- 14.** Specify whether you wish to print out a test page by selecting the relevant option and click on **Finish**. The printer driver will now be installed.

Other operating systems

The printer can also be used with other operating systems such as Linux or Unix. In this case, set the printer to the EPSON or IBM Proprinter emulation for which default drivers are available in most operating systems.

Changing printer settings

You can make permanent changes to the printer settings using the control panel of the printer (see chapter [Menu](#), page 45). Various printer settings can also be entered in the operating system of your PC, however.

- 1.** Click on the **Start** button in the Windows taskbar.
- 2.** *Windows 95/98:* move the mouse to **Settings** and click on **Printers** to open the printer folder.
Windows 2000/XP: click on **Printers and Faxes** to open the printer folder.
- 3.** Move the mouse pointer to the appropriate printer symbol, press the right mouse key and click on **Properties**.

Details of the settings available in this window can be found in the Windows documentation or help pages.



Settings entered in the printer driver via Windows have priority over settings entered via the printer menu. It is therefore possible that the former may overwrite the latter.

Form settings (Windows 2000/NT 4.0/XP)

In contrast to Windows versions 95/98/ME, in which forms are defined in the printer driver itself, Windows versions 2000/NT 4.0/XP have a central facility for managing form properties and assign one paper feed only.

If you want to set up a form not included in the Windows default settings, proceed as follows.



You will need Administrator rights to define new forms.

1. Click on the Start button in the Windows taskbar.
2. Click on Printers and Faxes to open the printer folder.
3. In the menu bar, click on File and Server Properties.
4. In the window Printer Server Properties, click on Form if necessary.
5. Either select an existing form from the Forms list or activate the option New Form.
6. Enter a form name and the desired values.
7. Click on Save to save the new form.

You can now assign this form to the paper feeds of your printer (see [Changing printer settings](#), page 13).



The form cannot be assigned if its dimensions exceed the permissible paper sizes of the specified paper feed.

Loading firmware

The most current version of the firmware can be downloaded from our [Internet site](#). Make sure that the download consists of the following files:

- ▶ Standard Model PB Flash V1.00.exe: the memory writer (flash)
- ▶ BL_XXXX.IPL: Bootblock of the printer
- ▶ FWXXXX.mfw: Main firmware of the printer
- ▶ PBCGXXXX.BIN: Character generator (EU/US)

Interface

You can use the serial, the parallel or the USB interface to download the firmware to the printer.

Serial interface

Make sure that the serial interface is selected in the printers menu for User 1 and that the settings for Baudrate and Protocol on printer and PC are identical.

Parallel interface

Make sure that the serial interface is selected in the printers menu for User 1, that in the PCs BIOS the parallel port is set to ECP and that the parallel cable meets the IEEE1284 standard.

USB interface (Windows2000/XP)

Make sure that the serial interface is selected in the printers menu for User 1, that a printer driver has been installed and the printer is defined as default printer.

Downloading firmware to the printer

To load new firmware to the printer, proceed as follows.

1. Browse to the folder where the firmware files are stored.
2. Double-click the **Standard Model PB Flash V1.00.exe** file.
3. On the **Memory Writer** screen select the interface (in our example serial port).
4. Make sure that the settings for port, baudrate, parity bit and stop bit are correct.
5. Select **MAIN FIRMWARE** from **Download Type**.
6. Click **Browse** and select the BL_XXXX.IPL file.
7. Click **FLASH NOW**; the download process starts.
When the download process is finished, the printer performs an initialization
8. Repeat step 5 to 7 for the FWXXX.mfw file and the PBCGXXXX.BIN file.

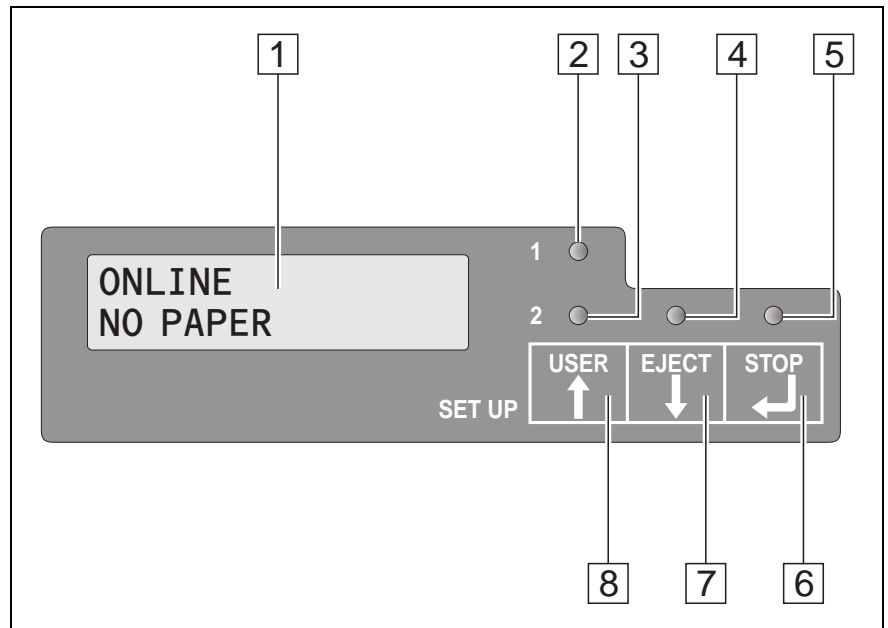
4 Control panel

The control panel keys are used for controlling your work with the printer. The control panel is located on the front right side of your printer and consists of a two-line LC display with 2 x 16 digits, three keys for controlling the printer functions and four LED indicators displaying the status of the printer.

The functions of the keys depend on the printer's current mode (status). There are three basic modes.

- ▶ The Online mode is the printer's normal operating mode. Data from your computer can be received and printed.
- ▶ In the Offline (STOP) mode the link between printer and computer is interrupted, i.e. no data can be received and printed.
- ▶ In the Menu mode printer settings (line spacing, size of the interface buffer etc.) can be altered and saved permanently.

Display, indicators and keys



- 1.** LCD display: Displays the internal printer status, operating instructions and error messages.
- 2.** User 1 LED: Lights up if User 1 is active (see below).
- 3.** User 2 LED: Lights up if User 2 is active (see below).
- 4.** Paper LED: Displays if paper is inserted or not; on = paper is inserted, off = no paper inserted, blinking = indicates that data are sent to the printer.
- 5.** Ready LED: Displays if printer is offline or online; on = online, off = offline.
- 6.** STOP key: Sets the printer to Online/Offline mode (see also Ready LED)
- 7.** EJECT key: Ejects inserted paper (see also Paper LED).
- 8.** USER key: Toggles between User 1 and User 2 (see also User 1 LED and User 2 LED).

Status indicators

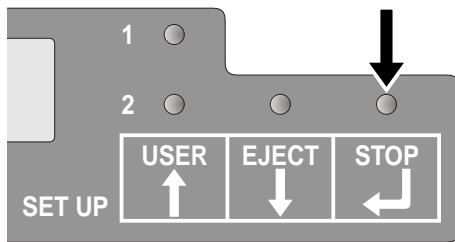
Status indicator variations

The following section describes which functions the various statuses of the indicators on the control panel have when the printer is switched on.

| Stop | Eject | User 1 | User 2 | LCD | Meaning |
|--------|--------|--------|--------|-----------------|---|
| off | on | — | — | STOP PAPER | Stop, paper loaded |
| off | off | — | — | STOP NO PAPER | Stop, no paper loaded |
| off | blinks | — | — | LOAD PAPER | Stop, paper required (if data + Print Start command are transferred from Host)* |
| on | on | — | — | ONLINE PAPER | Online, paper loaded |
| on | off | — | — | ONLINE NO PAPER | Online, no paper loaded |
| on | blinks | — | — | LOAD PAPER | Online, paper required (if data + Print Start command are transferred from Host)* |
| blinks | blinks | — | — | xxxxx xxxxx | Error, cause of error is displayed on the LCD |
| — | — | on | off | | Printer is being used by user 1 |
| — | — | off | on | | Printer is being used by user 2 |

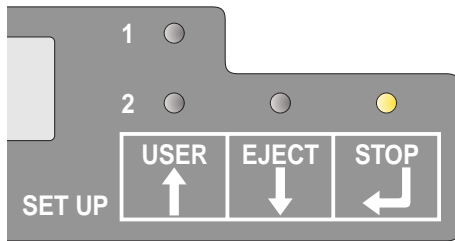
* for EPSON/IBM emulation only

Ready indicator (STOP LED)



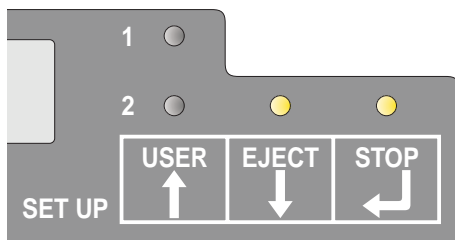
Ready indicator (STOP LED) does not light up:

- ▶ The printer is in the stop status (Offline) and disabled for receiving data from the system.



Ready indicator (STOP LED) lights up:

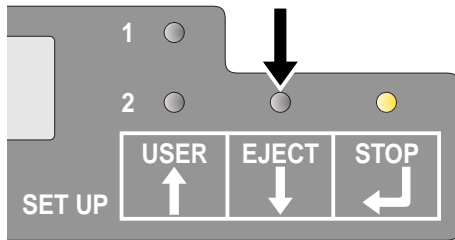
- ▶ The printer is switched on and in the online status. It is ready to receive data from the system.



Ready (STOP LED) and Paper indicators (EJECT LED) blink:

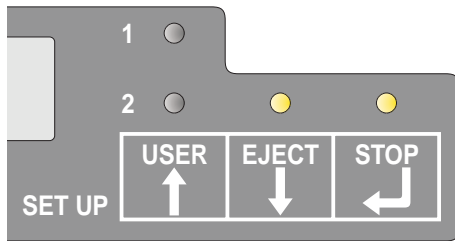
- ▶ The printer is not ready. A device error has occurred. Any data transferred from the system is deleted. The cause of the error is indicated on the LCD.

Paper indicator (EJECT LED)



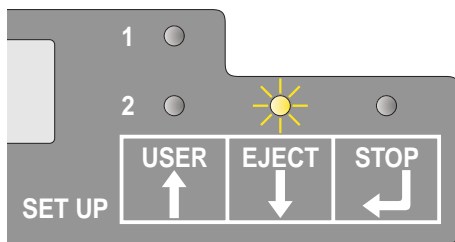
Paper indicator (EJECT LED) does not light up:

- ▶ No paper is inserted in the printer.



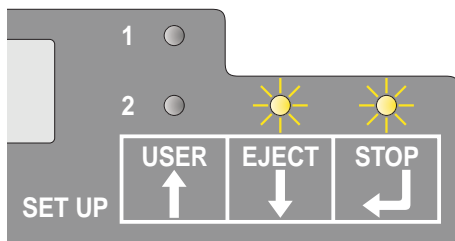
Paper indicator (EJECT LED) lights up:

- ▶ Paper is inserted in the printer.



Paper indicator (EJECT LED) blinks:

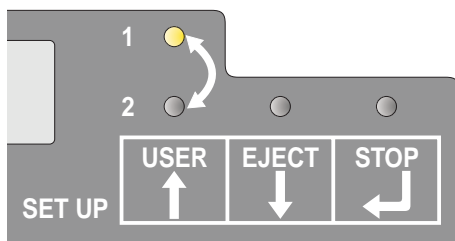
- ▶ Paper required: The system has transferred data to the printer but there is no document or passbook inserted into the document support.



Ready (STOP LED) and Paper (EJECT LED) indicators blink:

- ▶ The printer is not ready. A device error has occurred. Any data transferred from the system is deleted. The cause of the error is indicated on the LCD. If paper is loaded, it will be ejected.

User 1 and User 2 indicators

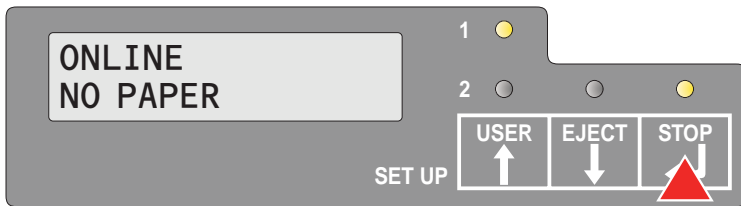


The User 1 or User 2 indicator lights up:

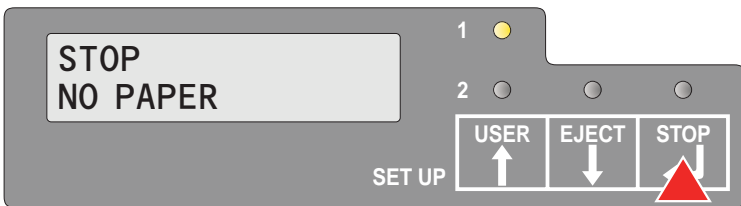
- ▶ User 1 or User 2 is active.

Key functions during operation

STOP key

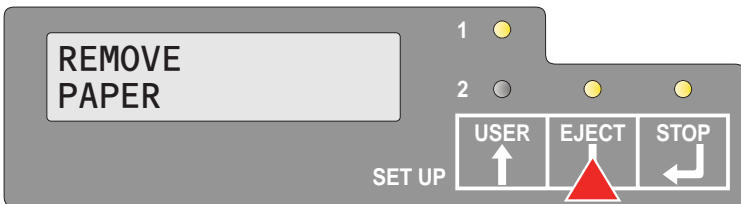


When the Ready indicator lights up, you can switch the printer from online to offline by pressing the **STOP** key. The printer can receive data.

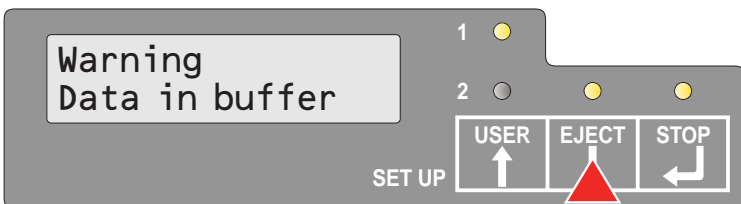


When the Ready indicator is off, you can switch the printer from offline to online by pressing the **STOP** key. The printer cannot receive data.

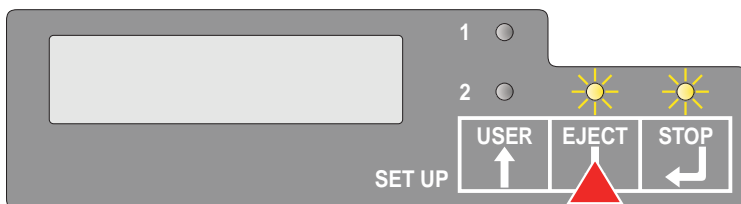
EJECT key



If paper is loaded when the printer is online (Ready and Paper indicator lights up), by pressing the EJECT key, the document will be ejected, the LCD displays **REMOVE PAPER**.



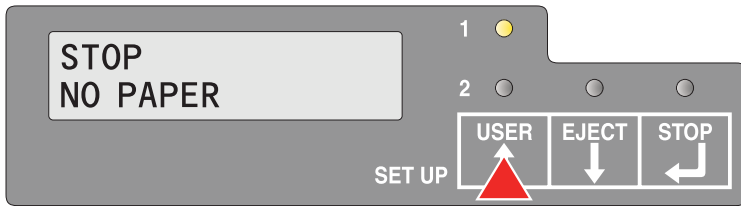
When both Ready and Paper indicator light up and there are data in the printer buffer, by pressing the EJECT key, the LCD displays **WARNING DATA IN BUFFER** (for a few seconds).



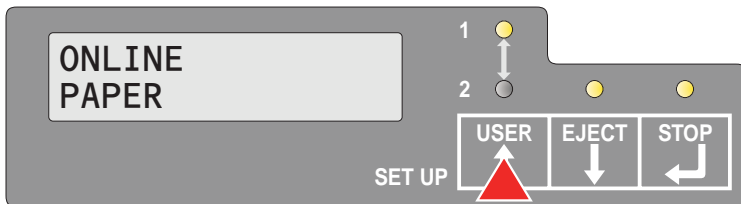
When the Ready and Paper indicators blink, an error has occurred. Annotate the displayed message in the LCD display. By pressing the EJECT key, paper will be ejected if loaded.

If the error message doesn't disappear after pressing EJECT key, power the printer off and on again. If the error persists, contact your customer support.

USER key



When there is data in the printer and the Ready indicator is off (Offline status), you can delete the data in the printer by pressing the USER key. Any inserted document is ejected and user changes (User 1 to User 2 or User 2 to User 1).



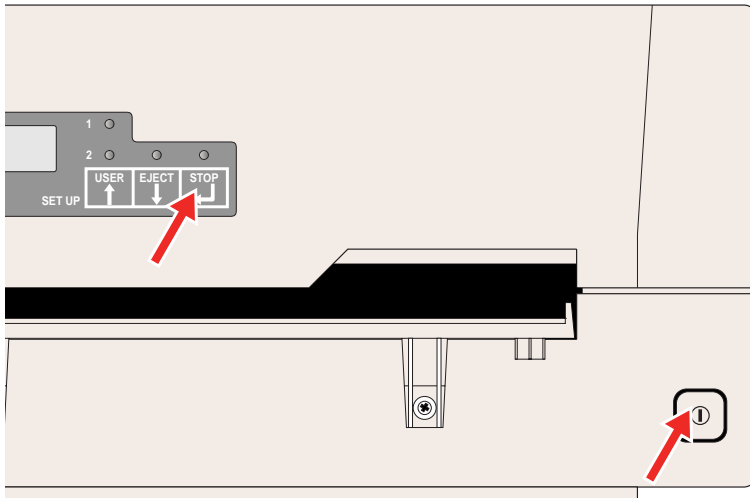
When you press the USER key in online state with paper loaded and no data exist, the User will switch back to a different user (User 1 to User 2 or User 2 to User 1), paper will be ejected and printer will go offline. Press the STOP key to go online.



If the LCD displays **Warning Data in Buffer** when you press the USER key during online state (data in printer) do not press any keys. The message will disappear after 1 second and the printout will be performed.

Key functions when powering on

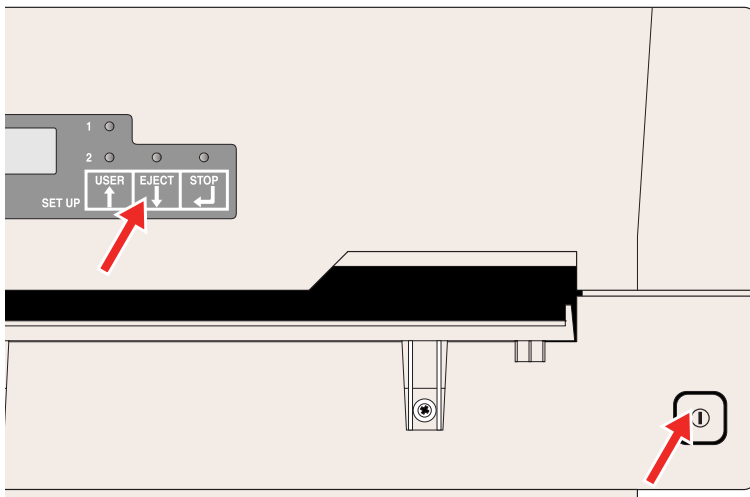
STOP key



By pressing the ON/OFF key and the STOP key at the same time, you will activate the “Hex dump”. Keep the STOP key pressed until **Hex Dump NO PAPER** appears on the LCD display.

Refer to the section [Hex Dump](#), page 63, for a description of how to activate/deactivate and perform the test printout.

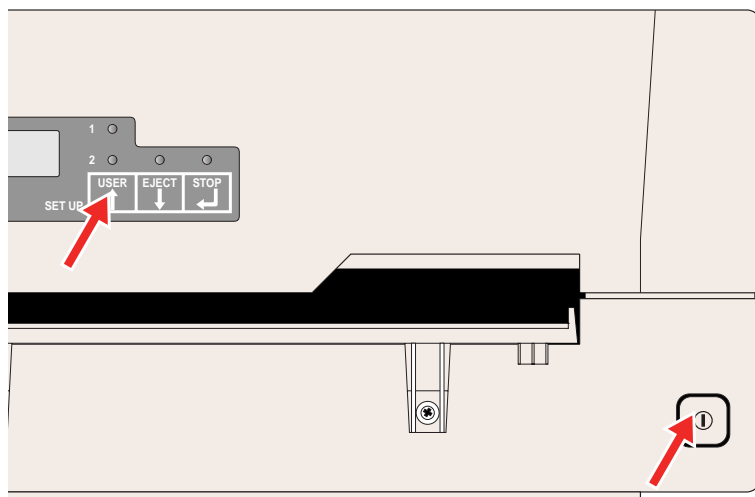
EJECT key



By pressing the ON/OFF key and the EJECT key at the same time, you will activate the printout of all current parameter settings (status page). Keep the EJECT key pressed until **Print StatusPage Load Paper** appears on the LCD display.

Refer to the section [Printing out the status page](#), page 53, for further details on the status page.

User key



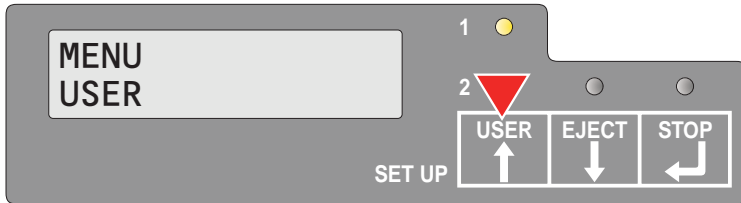
By pressing the ON/OFF key and the USER key at the same time, you will enter the menu mode. Keep the USER key pressed until **MENU USER** appears on the LCD display.

Refer to the section [Menu parameters](#), page 57, for further details on the menu mode.

Key functions in menu mode

After entering the menu mode the keys of the control panel have the following functions.

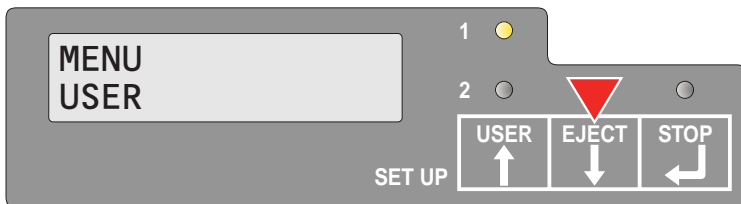
USER key



Use the USER key to return to the previous parameter group or parameter on the same menu level.

It is also used to change parameter settings. For further details refer to the section [Menu handling](#), page 47.

EJECT key

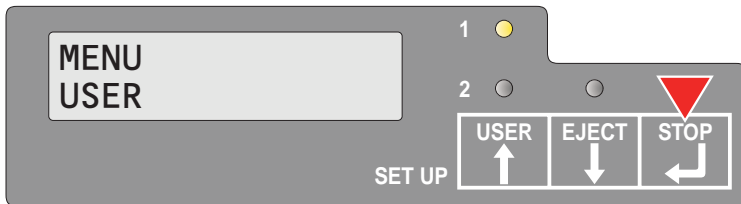


Use the EJECT key to select the next parameter group or parameter on the same menu level.

It is also used to change parameter settings. For further details refer to the section [Menu handling](#), page 47.

STOP key

In menu mode the STOP key has the following functions:



The STOP key is used, to select the next menu level (e.g. **MENU USER** > **Default Set User 1**), to open a parameter item for changing and to confirm changed parameter items.

For further details refer to the section [Menu handling](#), page 47.



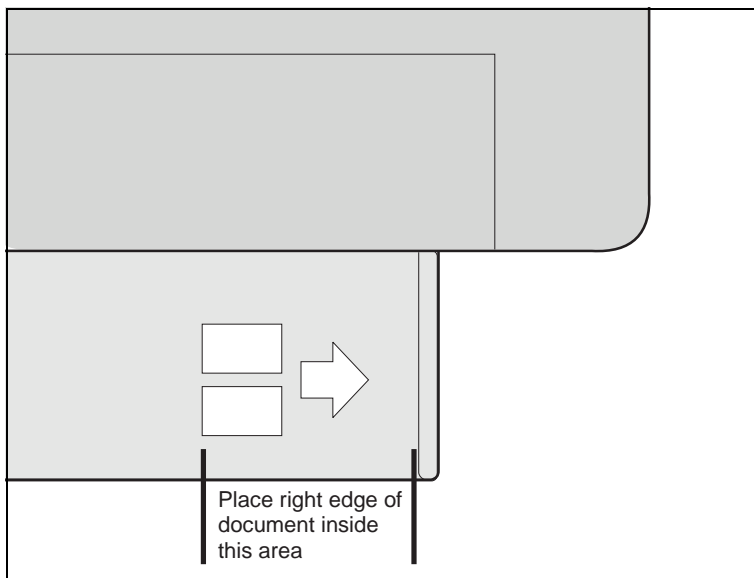
5 Print media

Inserting a document

Before inserting a document make sure that the printer is switched on and the the message **ONLINE NO PAPER** is displayed in the LCD (see [Switching on the printer](#), page 10).



Insert the document in such a way that the right paper edge is positioned inside the area between the left side of the symbol and the right edge of the document support, so that the document alignment can grasp it securely. This is especially important for documents that are narrower than a DIN A4 sheet.



Then push the document towards the stop into the document chute.

When the document is drawn in, the message **ONLINE PAPER** appears in the LCD.

When printing is completed, the document is transported out of the printer and released for removal. The message **ONLINE NO PAPER** appears on the LCD again.

Inserting a passbook

Before processing a new vertical-fold or horizontal-fold passbook, you should eliminate the stiffness of the fold by proceeding as follows.



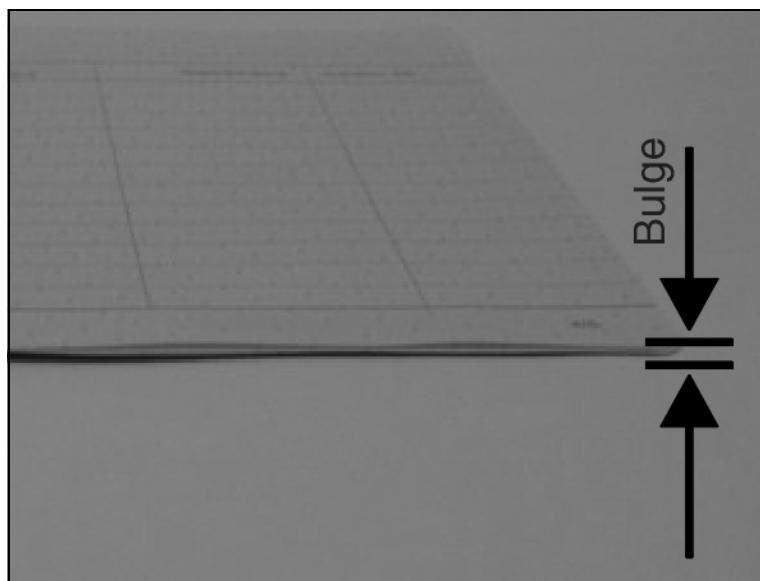
Open the passbook on the page that you want to print. Bend the fold backwards extremely hard.



Stroke along the fold of the passbook with both thumbs and index fingers and slightly bent the passbook outwards. If you want to print a new passbook, repeat this procedure several times.



If the passbook has a magnetic stripe, take care not to crease it.



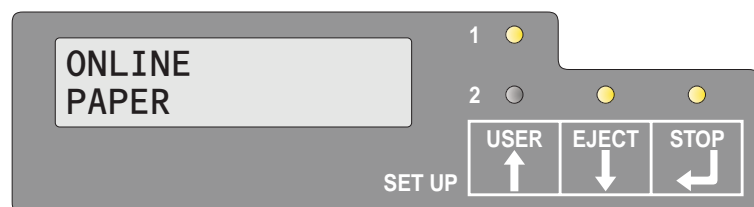
The bulge of the opened passbook should be as flat as possible to avoid malfunctions when the passbook is drawn into the printer.



Place the passbook on the right-hand side of the document support with the page to be printed facing up. Press the fold down while you push the passbook into the document chute towards the stop. Keep pushing it in until it is automatically pulled into the correct print position.



If the automatic document alignment cannot properly grasp stiff or bent passbooks, you should place the passbook manually at the stop at the right-hand side of the document support and insert it.



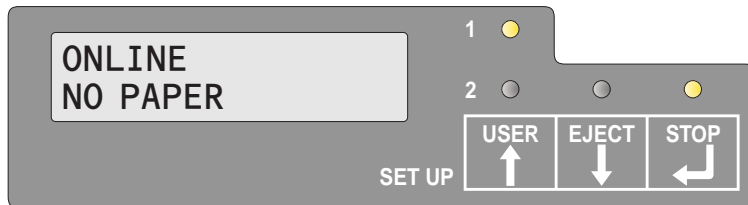
When the passbook is inserted, the message **ONLINE PAPER** is displayed on the LCD.



Do not use passbooks that do not correspond to the specifications listed in the section “Paper specifications”. Otherwise the passbooks and the print head may be damaged.



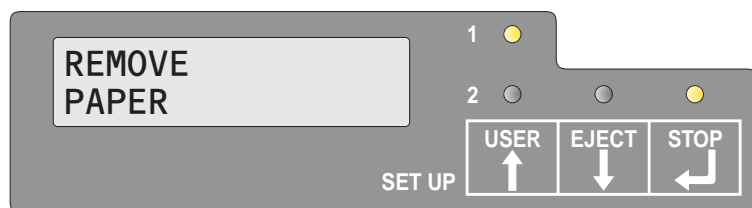
When the passbook is printed, it is automatically transported out of the printer and released for removal. If the passbook will not be transported automatically out of the printer you can eject it by pressing the EJECT key.



The message **ONLINE NO PAPER** appears on the LCD again.

Removing media

If you want to remove an inserted media (cut sheet or passbook) press the EJECT key. The media is transported out of the document chute and in the LCD display appears the message:



You can now remove the media from the paper tray.



If a paper jam occurs please refer to the section [Clearing paper jams](#), page 74.

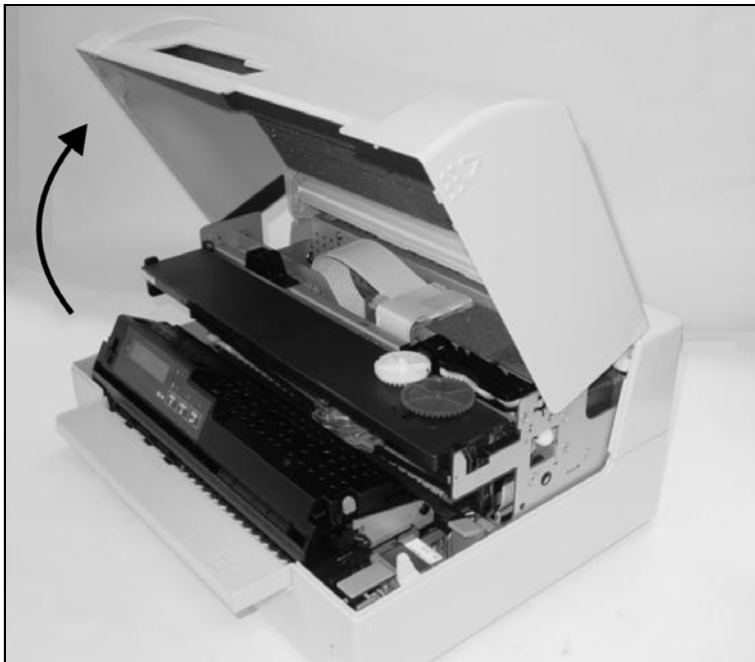
6 Changing the ribbon cassette

Make sure that the printer is switched off before replacing the ribbon cassette.

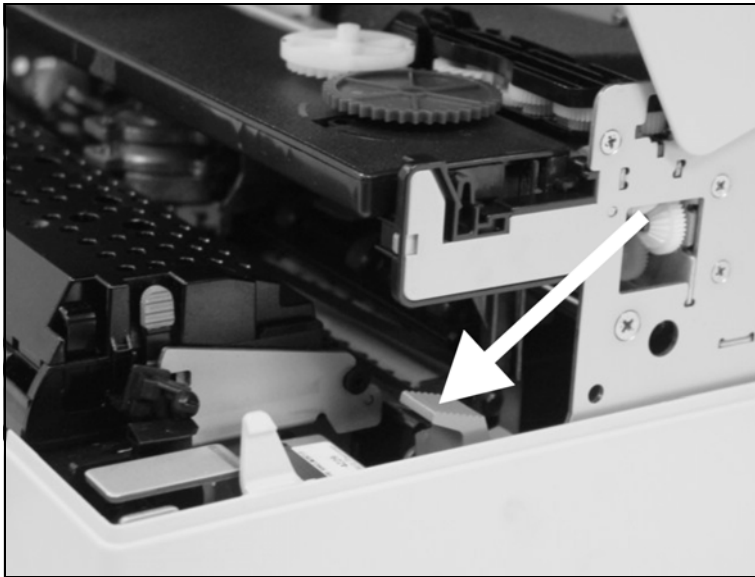


The print head may be hot if the printer has been printing for a long time. Wait until it cools down and you are no longer in danger of being burnt.

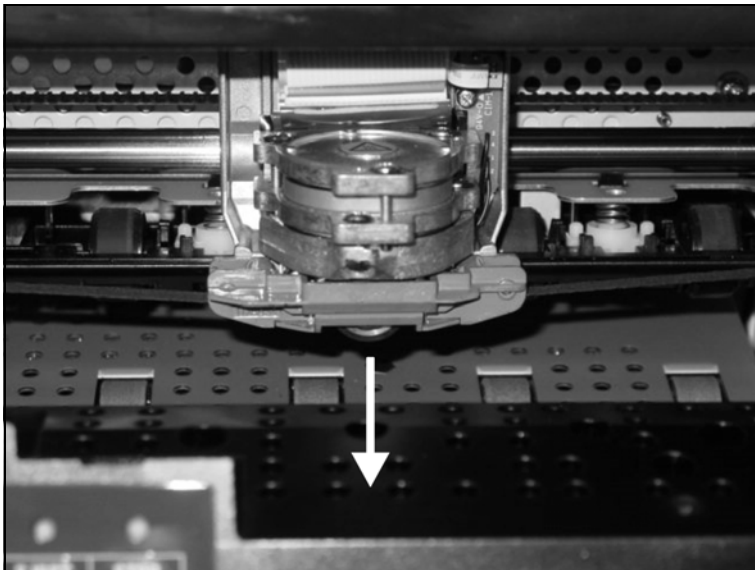
Removing the ribbon cassette



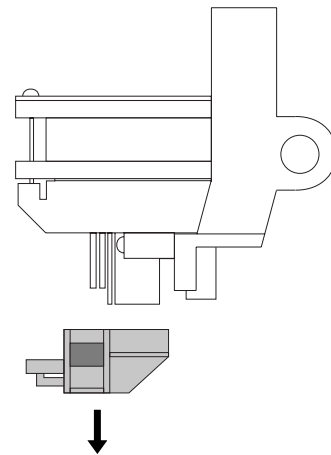
Open the cover by grasping it at the right and left-hand side and swing it upward until it clicks into position.



Press the green release lever for the printing mechanism. This swings the printing mechanism backwards.



Remove the colored ribbon guide from the print head by pulling it downwards.



Raise the front end of the ribbon cassette on both sides. Take the ribbon cassette out of the printer.



Ensure proper disposal of used ribbon cassettes in accordance with the applicable national laws and regulations.

Inserting the ribbon cassette

Take the new ribbon cassette from the packaging and lift the ribbon guide from the cassette.

Remove the transportation lock which fixes the ribbon guide to the cassette.



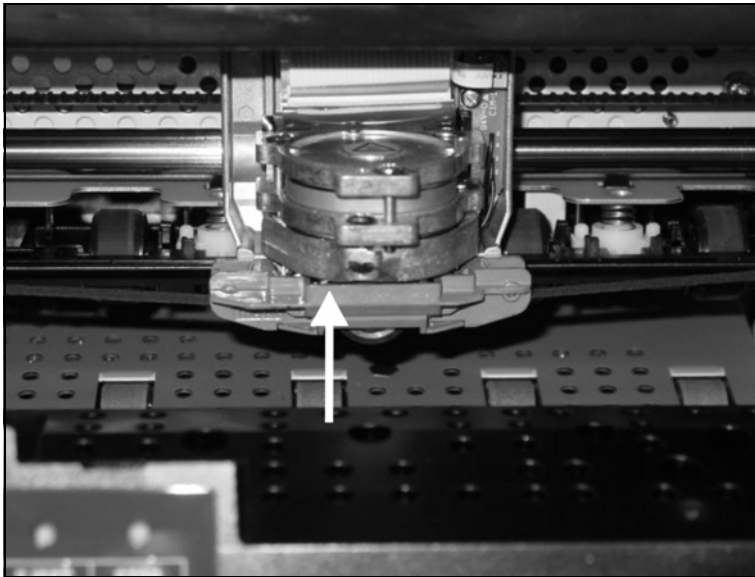
Insert the new ribbon cassette by hooking it into the rear slots of its mountings first.



Push the front of the cassette into its mounting so that it clicks into position.

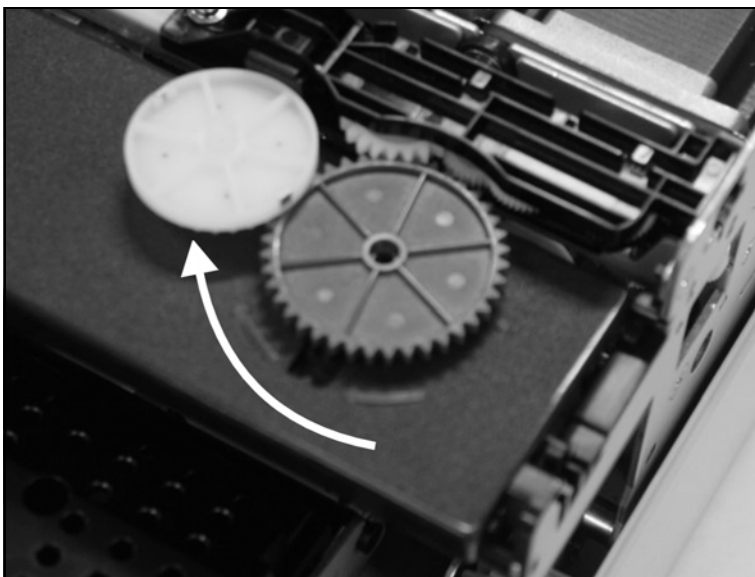
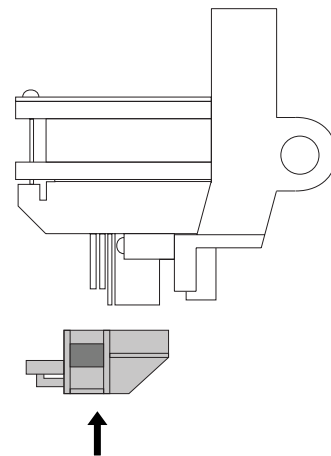


Please do not press the center of the ribbon cassette as this will deform the ribbon cassette and will cause operation problem.



Pull the ribbon guide under the print head. Tighten the ribbon by turning the tension gear in the direction of the arrow (see image below).

Press the ribbon guide onto the print head from underneath until you hear it click into place.



Check if the ribbon is transported correctly by turning the tension gear in the direction of the arrow.



Close the main frame by pressing the colored section in the middle of the frame as shown and ensure both left and right hand sides of the frames are fully latched.

Close the cover. The printer is now ready to operate and to be switched on again.



We recommend to check the printer's operation after replacing the ribbon cassette by performing a printout of the parameter settings (see section [Printing out the status page](#), page 53).

7 Replacing the print head

As the print head has a very long lifetime, it is under normal circumstances hardly ever necessary to replace it.

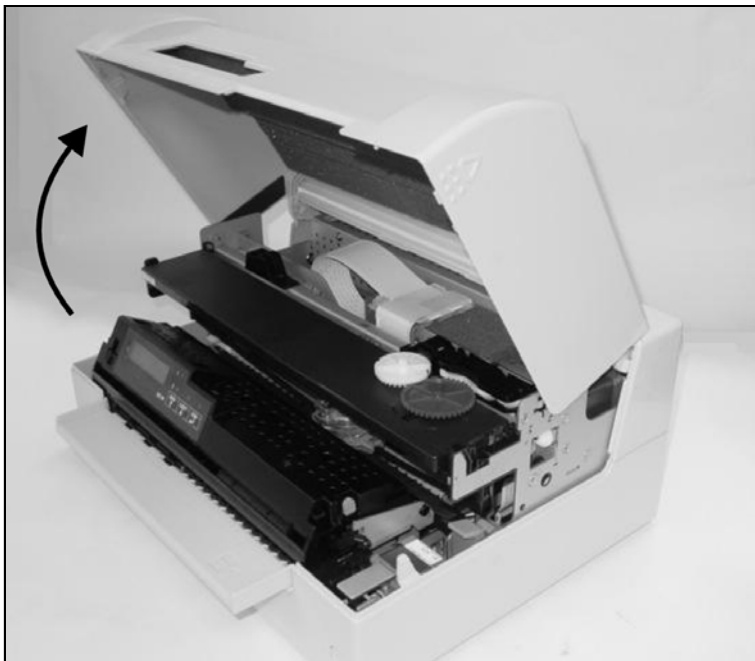


Always take care not to print over the edge or on a fold or perforation, as this can damage the needles of the print head. Damage of the needles will lead to a bad print image.

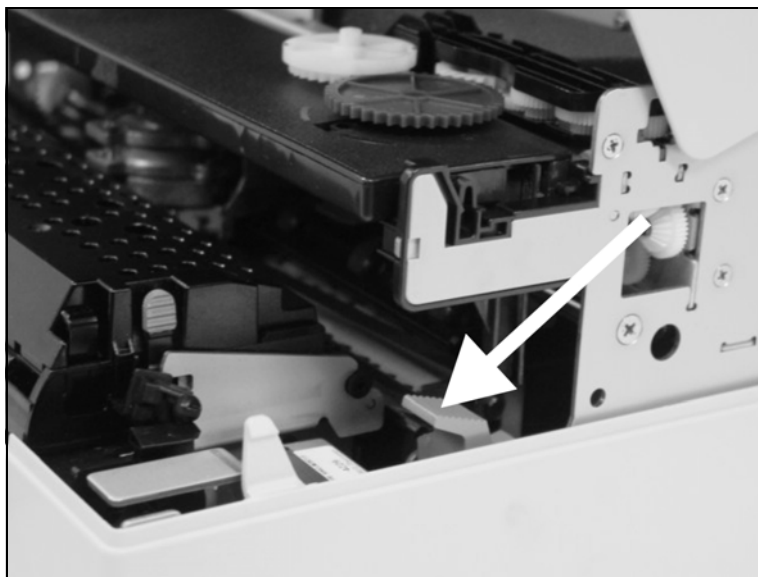
Should the print head be defective, you can replace it. Proceed as described below.

Be sure to switch the printer off before you replace the print head.

Removing the print head



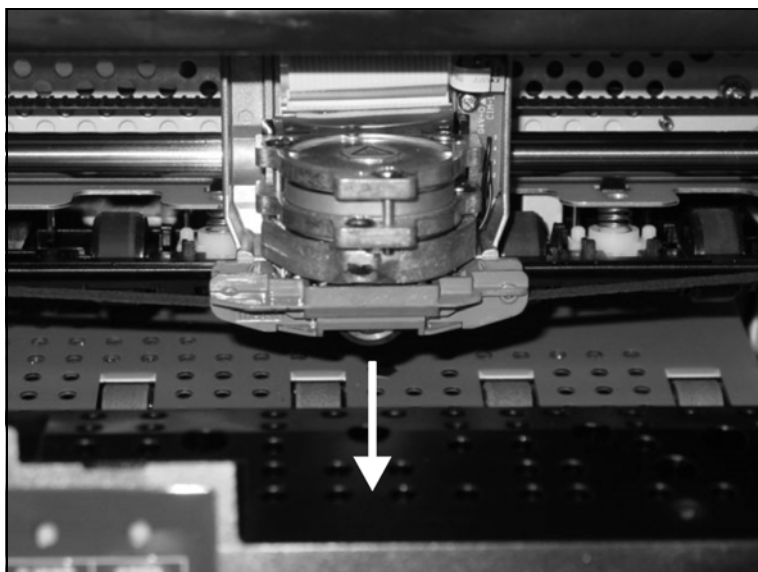
Open the cover by grasping it at the right and left-hand side and swing it upward until it clicks into position.



Press the green release lever for the printing mechanism. This swings the printing mechanism backwards.

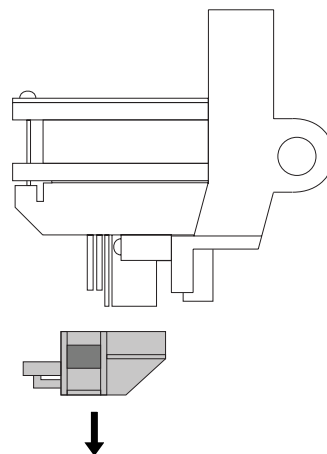


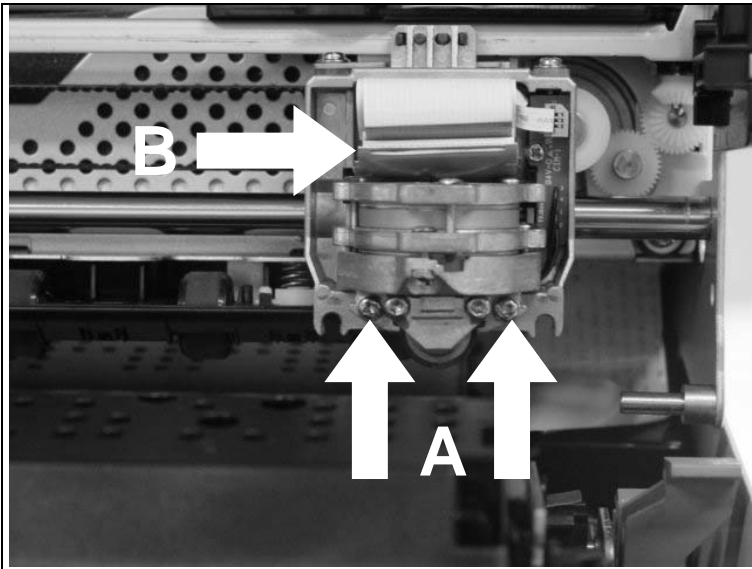
If the printer has been printing for a long time, the print head can be hot. Wait until it has cooled down so that you are no longer in danger of being burnt.



Push the print head to center position to make enough room to remove the ribbon guide from the print head.

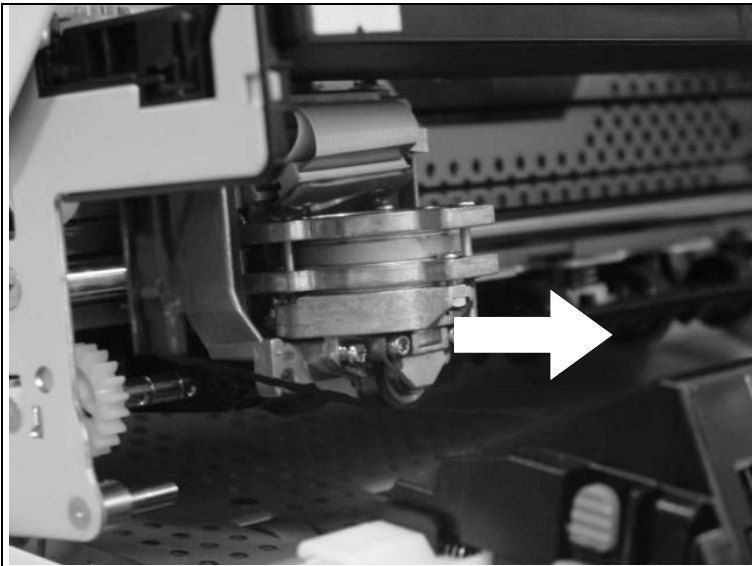
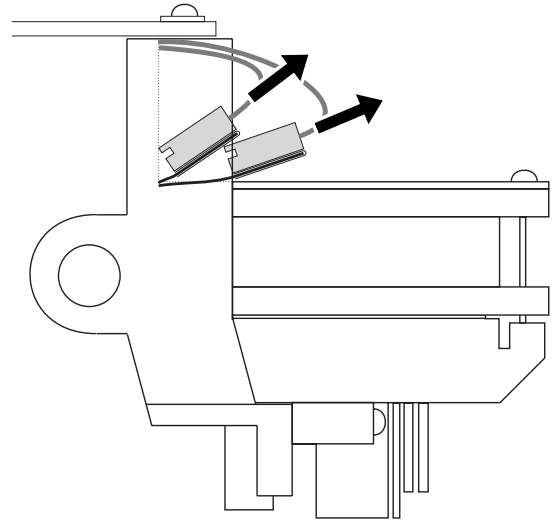
Remove the colored ribbon guide from the print head by pulling it downwards.





Remove the two screws **A** from the print head.

Unlock the connectors of the two flexible cables **B** and disconnect the two flexible cables from the print head.

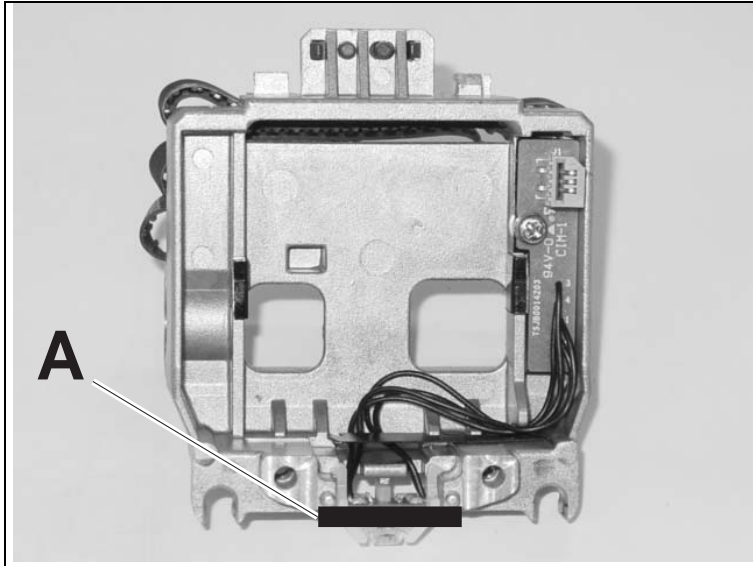


Now you can remove the print head from its mounting by pulling it forward.



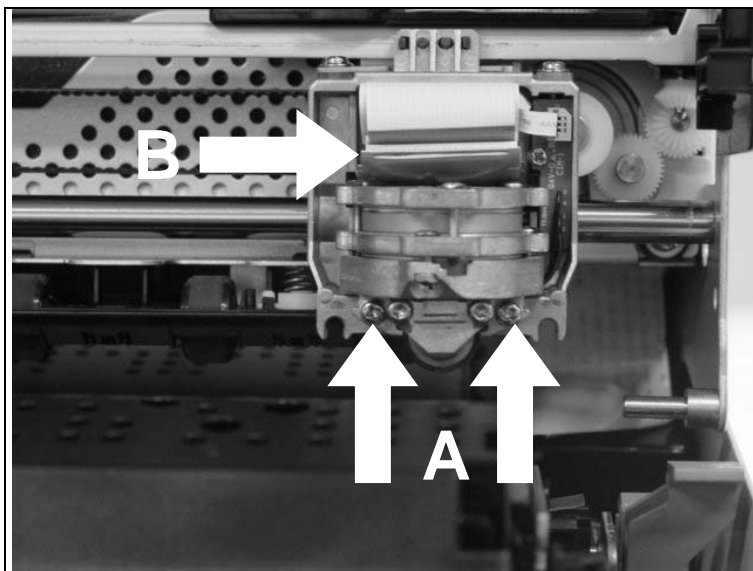
Ensure proper disposal of the print head in accordance with the applicable national laws and regulations.

Inserting new print head



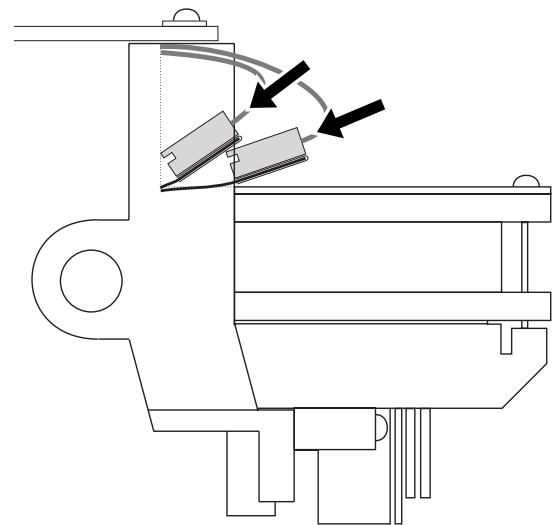
Push the print head straight down into the mounting.

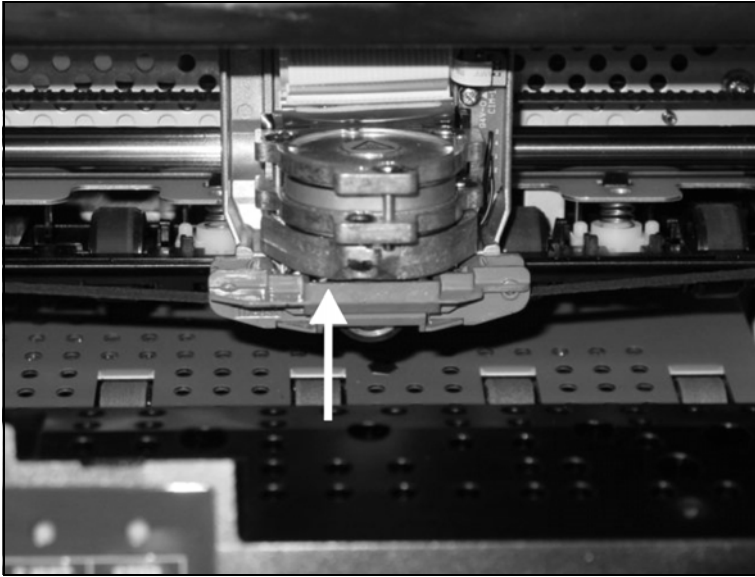
Set the print head onto the center of area **A**.



Fasten the two screws **A**.

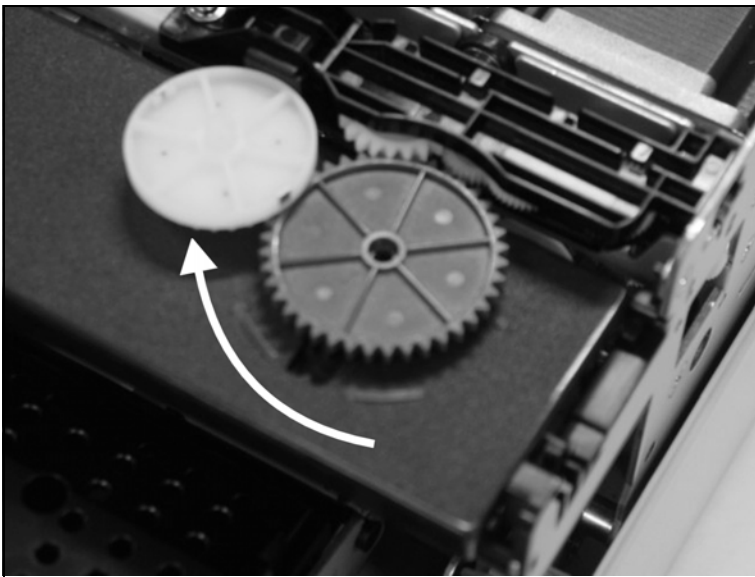
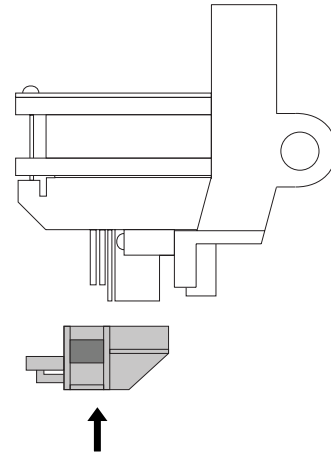
Connect the flexible cables **B** to each connector and lock the connectors.





Pull the ribbon guide under the print head. Tighten the ribbon by turning the tension gear in the direction of the arrow (see image below).

Press the ribbon guide onto the print head from underneath until you hear it click into place.



Check if the ribbon is transported correctly by turning the tension gear in the direction of the arrow.



Close the main frame by pressing the colored section in the middle of the frame as shown and ensure both left and right hand sides of the frames are fully latched.

Close the cover. The printer is now ready to operate and to be switched on again.



We recommend to check the printer's operation after replacing the ribbon cassette by performing a printout of the parameter settings (see section [Printing out the status page](#), page 53).

8 Menu

Programming via the control panel

Apart from being able to control your printer via the applications software you use, you can also program the printer directly. There are two programming options you can use:

- ▶ Programming via the control panel.
- ▶ Programming via the interface using Escape sequences or control codes.

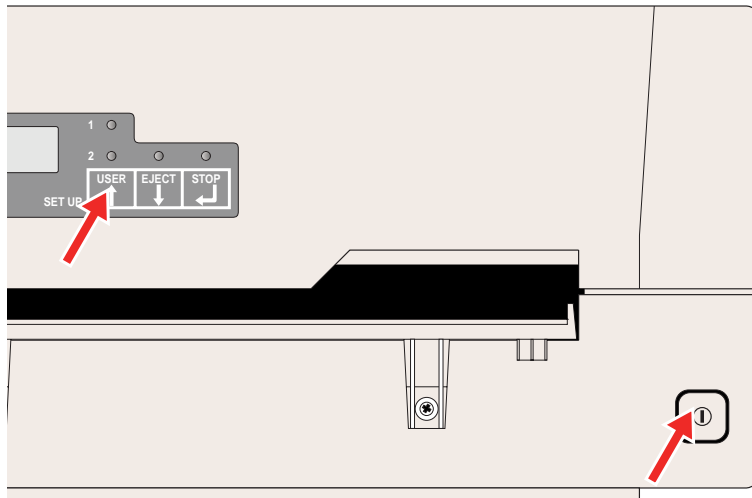
Settings made by escape sequences have priority over settings made in menu mode; therefore they will override these. Information on Escape sequences can be found in Appendix C, [Emulations](#), page 107

Programming via the interface gives you far greater freedom for designing your printed pages, however, it is also a more sophisticated method and requires some experience with programming languages and printer control systems.

All programming via the interface is lost after you turn off the printer, whereas the programming carried out using the control panel, is saved and stored even after you turn off the printer.

Calling up the menu

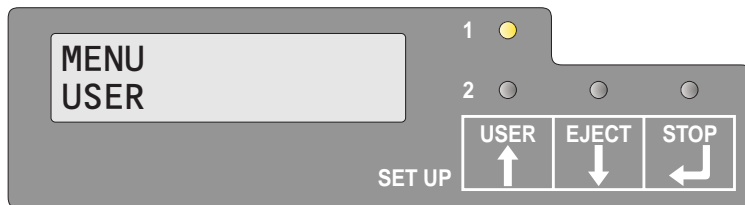
You can access the menu in the following way:



Make sure that the printer is switched off.

Hold the USER key pressed and power on the printer by pressing the ON/OFF key.

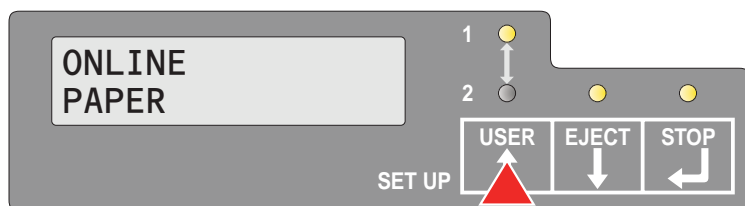
The printer initializes and in the LCD display appears the message:



Menu configurations (User 1/User 2)

Every printer is shipped with factory default settings. Basic settings such as emulation, character pitch, form length etc., which many applications make use of, are set. At the end of this chapter you will find a menu printout (status page) ([Status page \(example\)](#), page 56) which shows you the printer's default settings.

Your printer allows you to set and use two independent menu configurations (User 1 and User 2). If one of your applications for example requires an IBM printer while another program works better with an EPSON printer, you can set an IBM emulation configuration with the desired settings, and set the second configuration as an EPSON emulation.



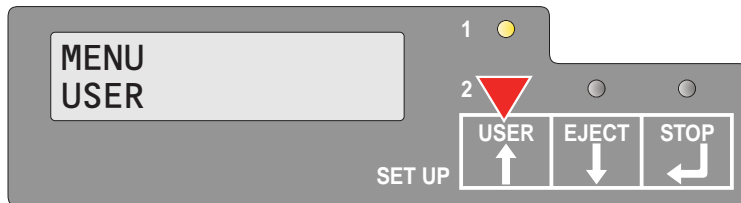
The USER key allows you to change from User 1 to User 2 and vice versa during operation.

Menu handling

Key functions

You can navigate in the current menu using the three keys of the control panel.

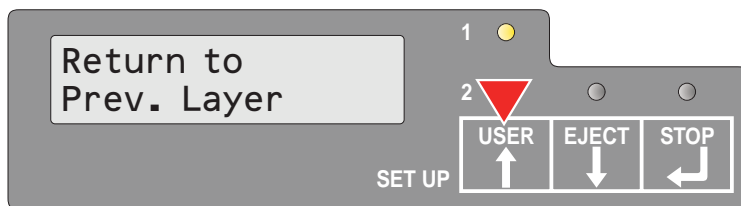
USER key



Press the USER key to return to the previous parameter group or parameter on the same menu level.

The USER key is also used to change parameter settings. (see also [STOP key](#), page 48).

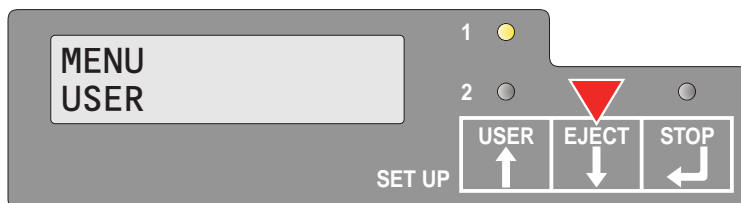
If this key is pressed when the first parameter group or parameter of the respective menu level is active, the following message appears on the LCD display:



Pressing the USER key again will open the last parameter group or parameter of the same menu level.

By pressing the STOP key you will return to the previous menu layer (see also [STOP key](#), page 48).

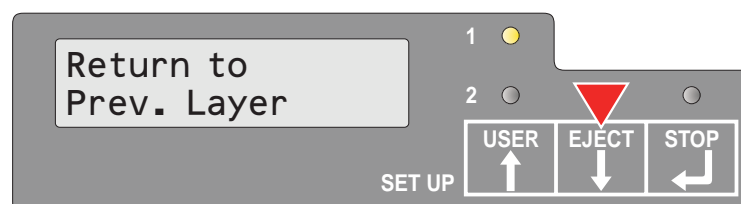
EJECT key



Press the EJECT key to select the next parameter group or parameter on the same menu level.

The EJECT key is also used to change parameter settings. (see also [STOP key](#), page 48).

If this key is pressed when the last parameter group or parameter of the respective menu level is active, the following message appears on the LCD display:

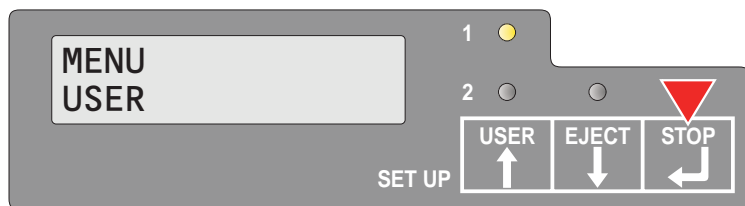


Pressing the EJECT key again will open the first parameter group or parameter of the same menu level.

By pressing the STOP key you will return to the previous menu layer (see also [STOP key](#), page 48).

STOP key

In menu mode the STOP key has the following functions:



If pressed in a main menu level the next menu level is opened (e.g. **MENU USER > Default Set User 1**).



If pressed when a changeable parameter item is on the display, an asterisk appears on the display; you can change this item now by pressing the USER or the EJECT key.



If pressed after you have changed a parameter item the new value is confirmed, on the LCD display appears the message **Accepted** after the changed parameter item.

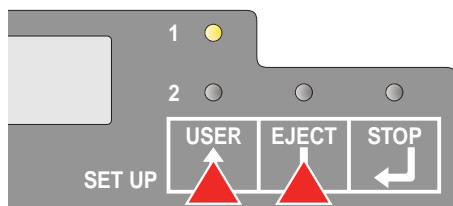
Setting parameters (principle)

Before you begin setting the parameters, you should check which parameters your system requires. Furthermore it is recommended to print out the status page which contains the actual valid parameter values (see [Printing out the status page](#), page 53).

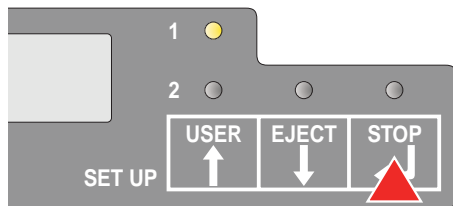
The start values, which are activated after switching on or after error correction, are determined using the adjustable printer parameters. In many cases these parameters are overwritten by means of a system application.

Changed parameter settings are stored when the settings menu is quit and retain their values even when the printer is switched off.

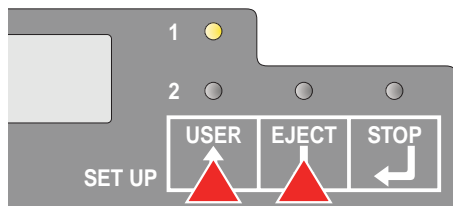
Make sure that the printer is in menu mode (see section [Calling up the menu](#), page 46).



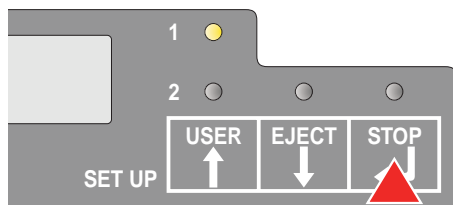
Press the EJECT key to select next main menu or press the USER key to select a previous main menu.



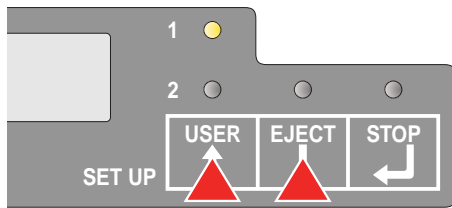
Press the STOP key to enter to the Parameter select mode. The LCD displays the respective parameter and MENU.



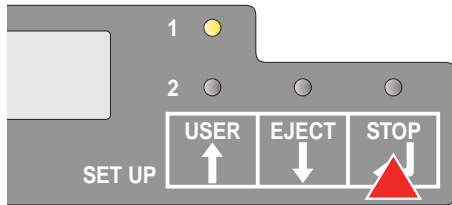
Press the EJECT key to select a next parameter or press the USER key to select a previous parameter.



Press the STOP key to enter the MENU setting mode.

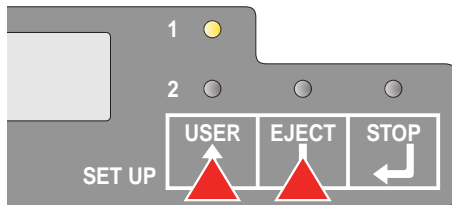


Press the EJECT key to select a next parameter value or press the USER key to select a previous parameter value.

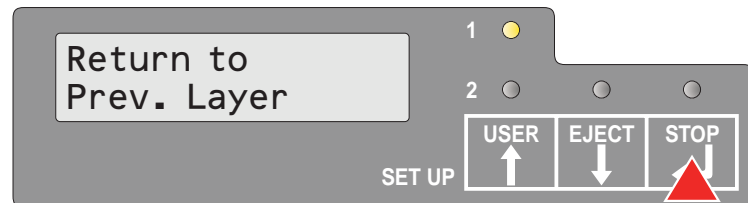


Press STOP key to save a parameter value. In the second line of the LCD display the message **Accepted** appears. Press STOP key again to confirm the setting.

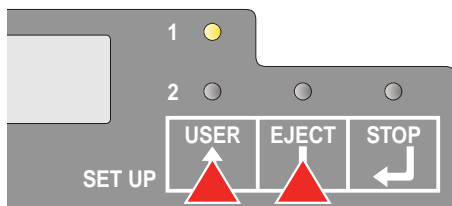
Terminating menu mode



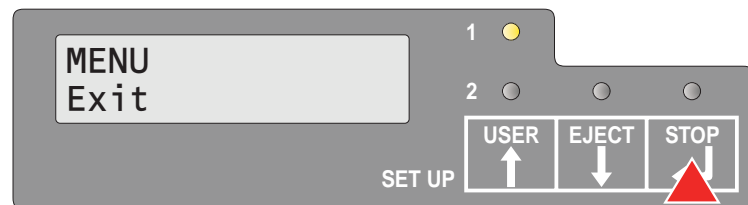
Press the EJECT key or the USER key until in the LCD display appears the message:



Press the STOP key.



Press the EJECT key or the USER key until in the LCD display appears the message:



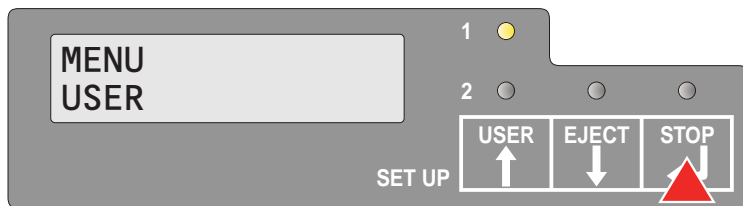
Press the STOP key. Menu mode is terminated and the printer initializes.

Selecting the LC display language

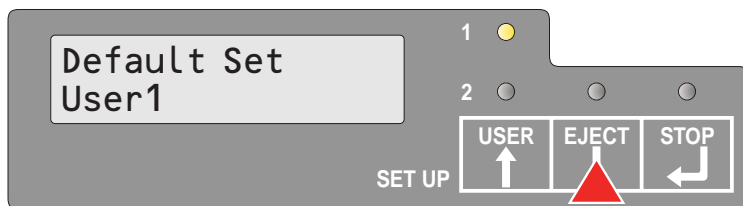
This section describes how to make settings in the menu, using the selection of the national language as an example.

This example shows how to change from the English language to the German language. The same procedure applies to the other languages (French, Italian and Spanish).

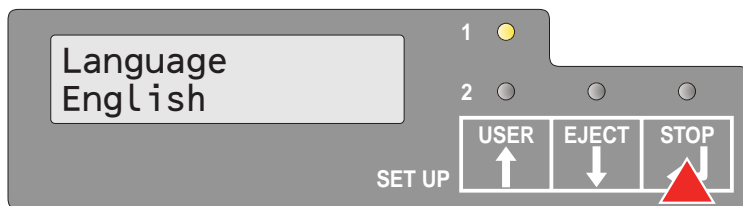
Make sure that the printer is in menu mode (see section [Calling up the menu](#), page 46).



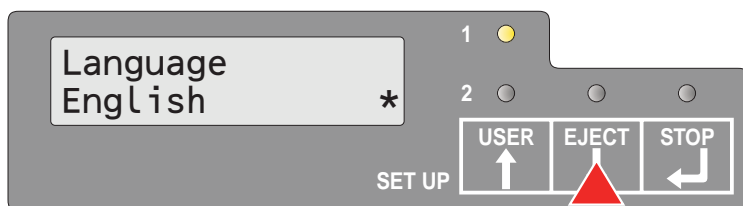
Press the STOP key.



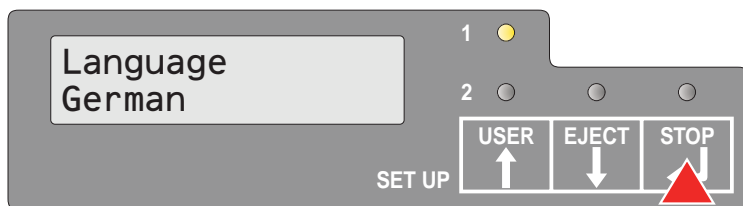
Press the EJECT key several times, until in the LCD display appears:



Press the STOP key. An asterisk appears in the display.



Press the EJECT key.

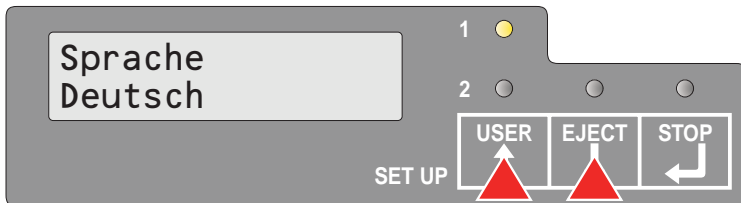


Press the STOP key.

In the LCD display appears:

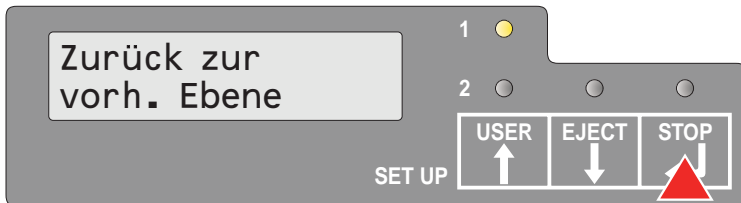


Press the STOP key to confirm the selection.



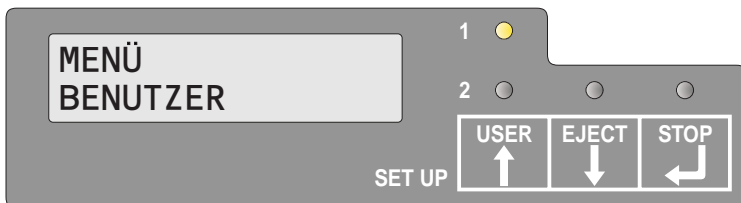
If you want to change other parameter items in this menu level, use the USER or EJECT key to navigate to the respective item.

If you want to navigate to the previous menu level, press the USER key several times until the message **Zurück zur vorh. Ebene (Return to Prev. Layer)** appears in the LCD display.

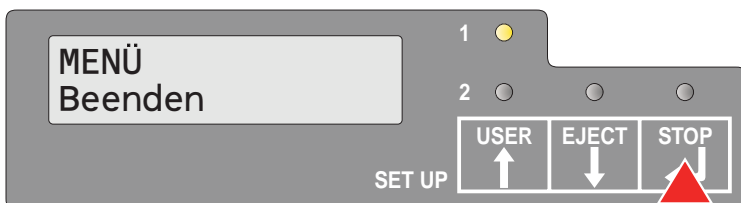


Press the STOP key.

In the LCD display appears:



Press the USER key.



Press the STOP key. Menu mode is terminated and the printer initializes.

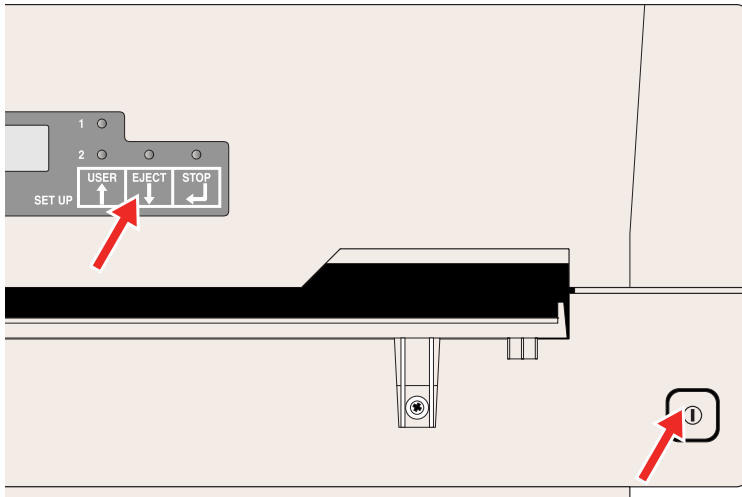
Printing out the status page

The printer has a function that allows you to print out the current parameter settings.

There are two ways to print out the parameter settings.

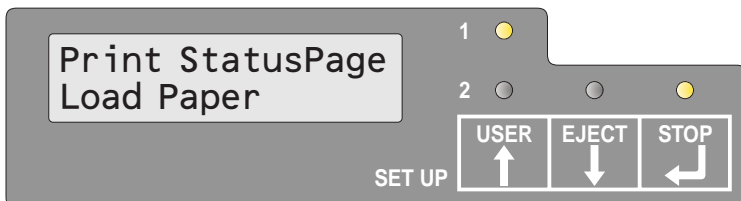
- ▶ Power on + EJECT key
- ▶ Selection of “Test Print Status Page” in menu mode

Power on + EJECT key

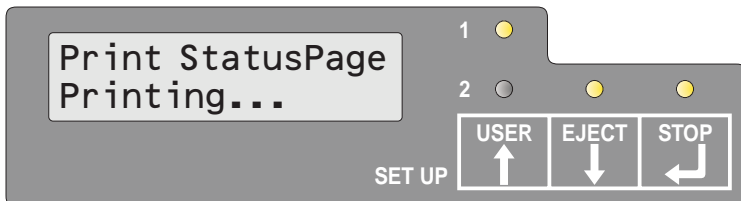


Power the printer off.

Press and hold the EJECT key while switching on the printer.

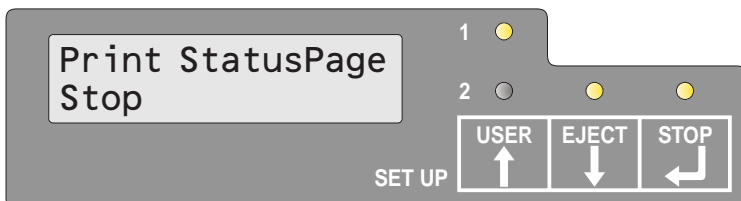


The LCD displays **Print StatusPage Load Paper**. Release the EJECT key.



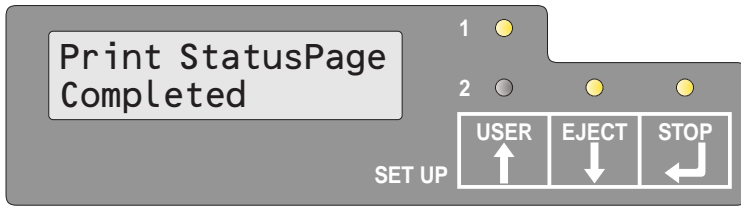
Insert the paper in the printer. The LCD displays **Print StatusPage Printing...** and the printout of the status page is carried out.

The paper will be ejected once printing is complete.



While printing, you can use the STOP key to pause the printing and LCD will display **Print StatusPage Stop**. You can resume the printing by pressing the STOP key again.

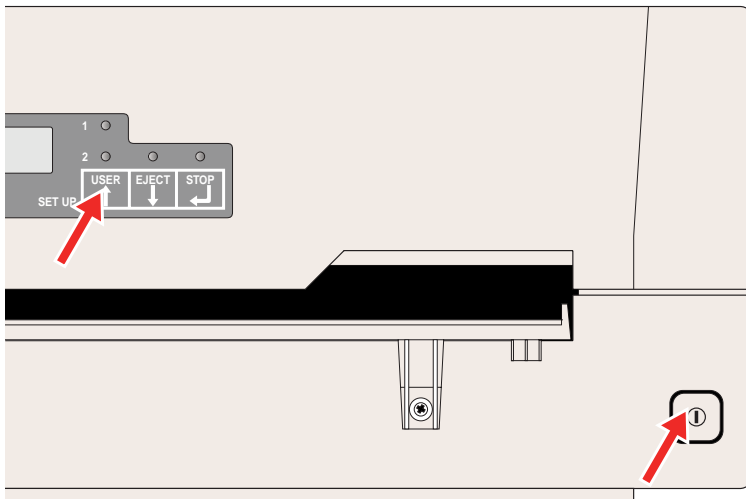
If EJECT key is pressed in the Pause state, paper will be ejected and a reset will be performed.



When the test printout is aborted or completed, LCD will display **Print StatusPage Completed**.

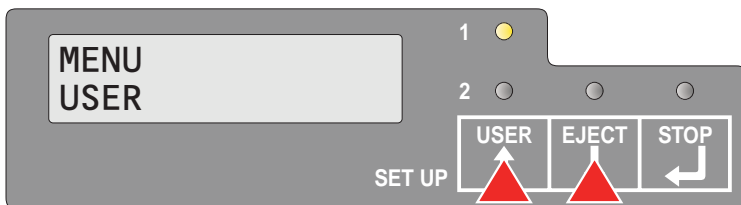
The Print setting mode will be ended automatically and a Power ON reset will be performed.

Print out status page in menu mode



Power the printer off.

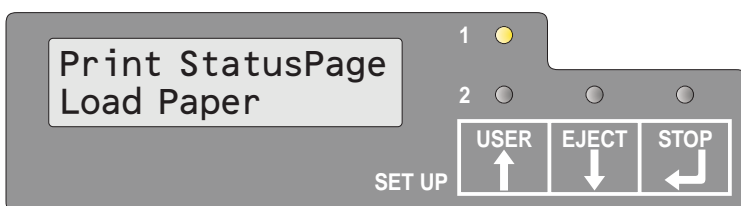
Press and hold the USER key while switching on the printer.



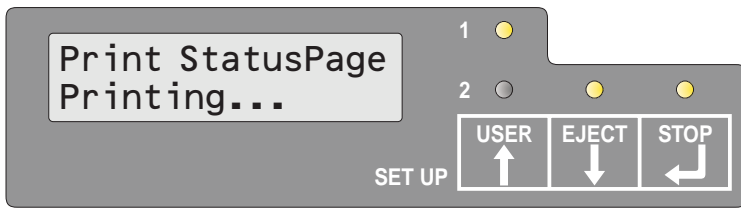
Press the EJECT or USER key twice. The following message appears in the LCD display:



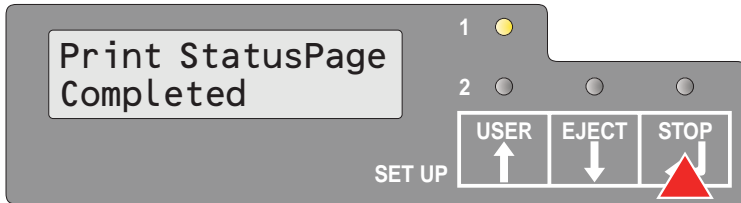
Press the STOP key.



Insert the paper in the printer. The LCD displays **Print StatusPage Printing...** and the printout of the status page is carried out.



The paper will be ejected once printing is complete.



When the test printout is aborted or completed, LCD will display **Print StatusPage Completed**.

Press the STOP key to return to menu mode.

Status page (example)

| | | | |
|------------------|-----------|----------------------------------|--------------------------|
| Firmware Version | : FW_0101 | Serial No. | 0000000000 |
| CG Version | : CG_0101 | SCS No. | 00 |
| IPL Version | : BL_0101 | Character Counter (Permanent) | 0000000869 0000000869 |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

All Current Setting List

USER

| | | |
|-------------|---------|-------|
| Select User | User1 | |
| Change User | User1 | |
| Language | English | |
| | User1 | User2 |

CHARACTER

| | | |
|-----------------|-------|-------|
| Character Pitch | 10CPI | 10CPI |
| Font | Draft | Draft |
| Code page | 437 | 437 |

PAPER FORMAT

| | | |
|------------------|----------|------|
| Line space | 1/6 | 1/6 |
| Form length | 68 Lines | |
| Top of form pos. | 10 | 0 |
| Bottom edge | 0/60 | |
| Line length | 80 | 90 |
| Left edge | 0 | 0 |
| Reference edge | Left | Left |

CONTROL

| | | |
|----------------|------------|------------|
| Media | Cut Sheet | Cut Sheet |
| Cut sheet mode | Single-ply | Single-ply |
| Speed | Auto | Auto |
| Low noise | Off | Off |

DATA

| | | |
|---------|----------|----------|
| CR Code | CR=CR | |
| LF Code | LF=CR+LF | LF=CR+LF |
| Zero | Normal | Normal |

INTERFACE

| | | |
|-----------|------------|------------|
| Type | RS232_1 | RS232_1 |
| Baud rate | 9600 | 9600 |
| Data bits | 8 | 8 |
| Stop bits | 1 | 1 |
| Parity | None | None |
| Protocol | Ready/Busy | Ready/Busy |
| CTS | Valid | Valid |

EMULATION

| | | |
|----------------|-------|----------|
| Emulation type | Epson | Olivetti |
|----------------|-------|----------|

Epson

| | | |
|-----------------|----------|----------|
| Country | US-ASCII | US-ASCII |
| Character Table | Graphic1 | Graphic1 |

IBM

| | | |
|---------------|------|------|
| Character set | Set1 | Set1 |
| AGM mode | Off | Off |
| IBM 4722 | Off | Off |

Olivetti

| | | |
|-----------------|-------|-------|
| Sub Emulation | PR2 | PR2 |
| Vertical resol. | 1/240 | 1/240 |

Select Options

| | | |
|---------|-----|--|
| RS232_2 | Off | |
| MSR-H | Off | |
| MICR | Off | |
| Scanner | Off | |
| MSR-V | Off | |

Menu parameters

The following section introduces and explains all the possible menu settings. The default setting is marked by an asterisk (*)

| Parameter group | Parameter | Possible settings | Description |
|-------------------|-----------------|---|--|
| MENU USER | Default Set | Off * All User 1 User 2 | All sets all parameters to the default settings. User 1 sets all parameters of User 1 to the default settings. User 2 sets all parameters of User 2 to the default settings. |
| | Coyp User | User1 to User2 * User2 to User1 | Copies the settings of User 1 to User 2 and vice versa. |
| | Select User | User1 * User2 | Defines if User 1 or User 2 is loaded after powering on the printer. |
| | Change User | User1 * User2 | Defines if the parameter settings of User 1 or of User 2 are changed. |
| | Language | English * German French Spanish Italian | Selects the display language. |
| MENU CHARACTER | Character Pitch | 10 CPI * 12 CPI 15 CPI 17 CPI 20 CPI 24 CPI Proportional | Sets the characters per inch (character pitch). The higher the parameter the smaller the character spacing. If Proportional is selected, only the actually required space for the character width is used. |
| | Font | Draft * Courier Roman Sans Serif Script Bold Gothic Prestige Elite Orator OCR-A OCR-B | This parameter selects the character style permanently. |

1) Only in Epson and IBM emulation

2) Only if MSR-H is installed

3) Only for printer model with second serial interface

| Parameter group | Parameter | Possible settings | Description |
|--|---------------------------|---|---|
| | Code Page | 437*, 850, 860, 863, 865, 851, 852, 853, 855, 857, 866, 869, USSR Gost, 864, 437G, 920, 858, 923 ISO 8859-2 East Europe, ISO 8859-5 Cyrillic, ISO 8859-7 Greece, ISO 8859-8 Hebrew 1250 Windows Latin2, 1251 Windows Cyrillic, 1252 Windows Latin1, 1253 Windows Greek, 1254 Windows Latin5, 1255 Windows Hebrew, 1256 Windows Arabic, 1257 Windows Baltic Rim | Selects the character set. These character sets can be used according to the selected emulation. The character sets are not necessarily available for all fonts; see also Available code pages and fonts, page 104 . |
| MENU PAPER FORMAT | Line space | 1/6 1/5 | * Sets the line density in lines per inch. 1/6 = 6 lines per inch |
| | Form length ¹⁾ | 6 Lines 68 Lines 90 Lines A4 | * Sets the form length either via line formats or the standard format A4. Please note that the adjustment in lines depends on the selected LPI. For example 6 LPI at a selected line number of 90 lines results in a formlength of 15 inches (90 lines/[6lines/inch]) = 15 inches). |
| | Top of form pos. | 0/60 10/60 30/60 60/60 | * Sets the position of the first printing line. The factory setting for the first printing position is 10/60" (4,23 mm). This is equivalent to the second line from the top. |
| | Bottom edge ¹⁾ | 0/60 30/60 | * Sets the position of the last printing line. |
| | Line length | 80 90 94 | * (Epson/IBM) * (Olivetti) Sets the line length; unit is number of characters at a character density of 10 cpi. |
| | Left edge | 0 10 | * Sets the left margin; unit is number of characters at a character density of 10 cpi. |
| <p>1) Only in Epson and IBM emulation 2) Only if MSR-H is installed 3) Only for printer model with second serial interface</p> | | | |

| Parameter group | Parameter | Possible settings | Description |
|---|------------------------------|--|---|
| | Reference edge | Left Right | * Sets the horizontal leading edge. Left: the left edge of the character matrix is aligned to the the left edge of the document. Right: the right edge of the character matrix is aligned to the right edge of the document. |
| MENU CONTROL | Media | Cut Sheet H. Binding V. Binding | * Specifies the media type. Select H. Binding if you want to print passbooks with horizontal binding, V. Binding for passbooks with vertical binding. Cut Sheet: 400 cps max H. Binding: 300 cps max V. Binding: OPEN |
| | Cut sheet mode | Single-ply Multi-ply (2-3) Multi-ply (4-5) | * Sets the respective value for printing on cut sheets. This ensures that single or copy paper produces optimum results |
| | Speed | Auto Normal High | * Auto: depends on the settings of MEDIA Normal: 300 cps High: 400 cps |
| | Low noise | Off On | * Switches the low noise function on and off. |
| | MSR-H Standard ²⁾ | IBM * (Olivetti) DIN/ISO * (Epson) ANSI | Selects the MSR-H (magnetic stripe reader) standards. |
| MSR-H Duplicate ²⁾ | Off On | * Selects if the MSR block will be duplicated or not. | |
| MENU DATA | CR Code | CR=CR CR=CR+LF | * Defines the action prompted by a carriage return. CR=CR: carriage return only CR=CR+LF: carriage return and a line feed. |
| | LF Code | LF=LF LF=CR+LF | * Defines the action prompted by a line feed. LF=LF: line feed only LF=CR+LF: carriage return and line feed. |
| | Zero | Normal Slashed | * Selects if normal zero (0) or the slashed zero (Ø) is printed. |
| 1) Only in Epson and IBM emulation 2) Only if MSR-H is installed 3) Only for printer model with second serial interface | | | |

| Parameter group | Parameter | Possible settings | Description | |
|---|--|---|--|--|
| MENU INTERFACES | Type | RS232_1 Parallel USB RS232_2 ³⁾ | Selects the interface. Printer can be configured either for serial, parallel or USB connection. Two interfaces can be used at the same time, one assigned to User 1 and one to User 2. | |
| | <i>If RS232_1 is selected</i> | | | |
| | Baud rate | 4800 9600 19200 38400 | * | Selects the data transmission rate (baud rate) (baud = bit per second). |
| | Data bits | 7 8 | * | Selects the number of data bits per data byte. |
| | Stop bits | 1 2 | * | Selects if one or two stop bits are used per data byte. |
| | Parity | Even Odd None | * | The parity test for received data bytes can be selected. None causes transmission in both directions without parity bit. If Even or Odd is selected, the bytes are checked if they have even or odd parity. |
| | Protocol | Ready/Busy Xon/Xoff | * | Selects the type of protocol, i.e. a certain set of rules and procedures for ensuring error-free data exchanges between computer and printer. Details of the available protocols can be found in the section Serial attachment characteristics , page 127. |
| | CTS | Valid Invalid | * | Sets the signal CTS (C lear T o S end) on or off. |
| | <i>If Parallel is selected</i> | | | |
| | Parallel Bidir | On Off | * | Sets the bidirectional data transfer (IEEE1284): if set to on ECP is supported, if off Nibble mode only is supported. |
| | <i>If RS232_2 is selected³⁾</i> | | | |
| | Baud rate 2 | 4800 9600 19200 38400 | * | Selects the data transmission rate (baud rate) (baud = bit per second). |
| | Data bits 2 | 7 8 | * | Selects the number of data bits per data byte. |
| | Stop bits 2 | 1 2 | * | Selects if one or two stop bits are used per data byte. |
| 1) Only in Epson and IBM emulation 2) Only if MSR-H is installed 3) Only for printer model with second serial interface | | | | |

| Parameter group | Parameter | Possible settings | Description |
|---|-----------------|---|--|
| MENU INTERFACES | Parity 2 | Even Odd None * | The parity test for received data bytes can be selected. None causes transmission in both directions without parity bit. If Even or Odd is selected, the bytes are checked if they have even or odd parity. |
| | Protocol 2 | Ready/Busy Xon/Xoff * | Selects the type of protocol, i.e. a certain set of rules and procedures for ensuring error-free data exchanges between computer and printer. Details of the available protocols can be found in the section Supported protocols , page 127. |
| | CTS 2 | Valid Invalid * | Sets the signal CTS (C lear T o S end) on or off. |
| MENU EMULATION | Emulation type | Epson * (User 1) IBM Olivetti * (User 2) | Selects the emulation for the printer. For further details refer to chapter Emulations , page 107 |
| MENU Epson | Country | US-ASCII * France Germany Great Britain Denmark 1 Sweden Italy Spain 1 Japan Norway Denmark 2 Spain 2 Latin America | Selects the national character set in Epson emulation. The character sets are not necessarily available for all fonts; see also section Available code pages and fonts , page 104. |
| | Character Table | Italic Graphic1 Graphic2 * | Only available for Epson emulation. Either the Epson character set Italics or the IBM graphics character set 1 or 2 can be activated in the code range from hex. A0 to hex. FE. |
| MENU IBM | Character set | Set1 Set2 * | Selects the character set with standard characters or extended characters in IBM emulation. |
| | AGM mode | Off On * | Activates or deactivates the AGM (A lternative G raphics M ode) mode in IBM emulation. |
| | IBM 4722 | Off On * | Activates or deactivates the IBM 4722 emulation. This emulation need specific protocols and drivers according to the IBM 4722 printer. |
| 1) Only in Epson and IBM emulation 2) Only if MSR-H is installed 3) Only for printer model with second serial interface | | | |

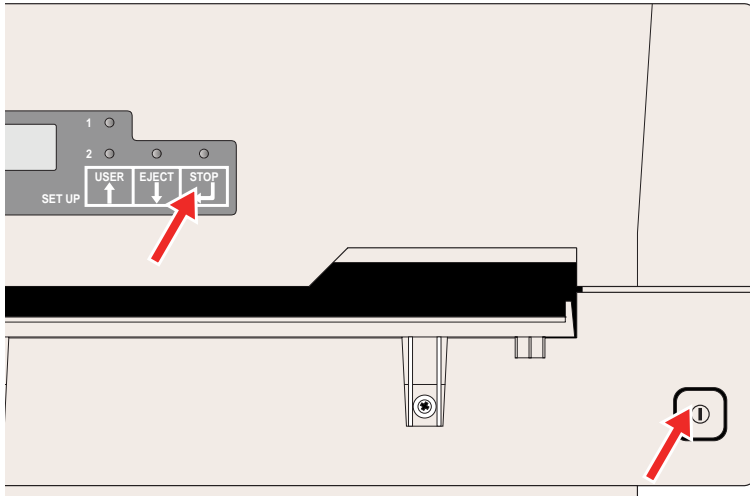
| Parameter group | Parameter | Possible settings | Description |
|---|-----------------|-------------------|---|
| MENU Olivetti | Sub Emulation | PR2 * PR50 | Selects the Olivetti sub emulation. |
| | Vertical resol. | 1/240 * 1/216 | Selects the vertical resolution (line spacing) |
| MENU Print StatusPage | — | — | Prints out a list of alle current parameter settings. |
| MENU Exit | — | — | Terminates the menu mode. |
| 1) Only in Epson and IBM emulation 2) Only if MSR-H is installed 3) Only for printer model with second serial interface | | | |

Test function

Hex Dump

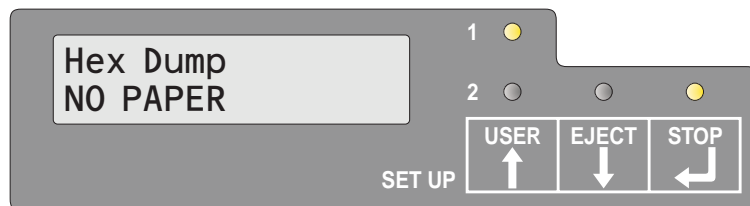
With the interface test (Hex-Dump/H-Dump) you can test data transmission from the computer to the printer. During this test, the data from the computer is printed out in two columns. The text in the left column is printed in hexadecimal format and in the right column in ASCII format.

Activating Hex Dump

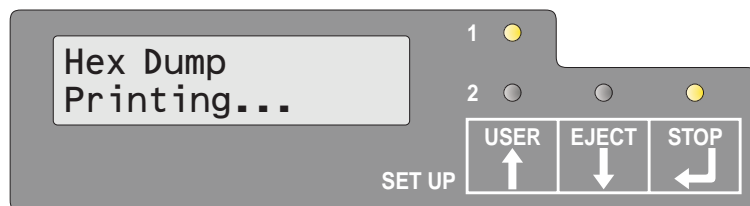


Switch the printer off.

Keep the STOP key pressed and power the printer on by pressing the ON/OFF key. Keep the STOP key pressed until **Hex Dump NO PAPER** appears on the LCD display.



Insert a sheet of paper. The sheet is drawn in. Send now the test file from your PC to the printer.

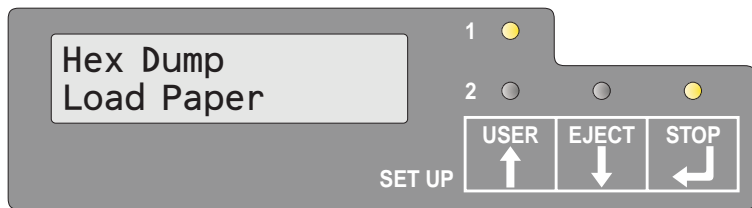


The message **Hex Dump Printing...** is displayed and the printout is carried out.

USER and SELECT key are invalid during printing is performed.

After printing is done, press the STOP key to print all remaining data of the line buffer.

You can use the STOP key to interrupt the test printout.



If the printer receives data and there is no paper in the printer, the message will be changed to **Hex Dump Load Paper**.

Exiting the test mode

You can exit the test mode only by switching the printer off.

Test printout Hex Dump (Example)

| Address | Hex data | ASCII |
|---------|----------------------------------|------------------|
| 0000 | 00 01 02 03 04 05....0C 0D 0E 0F | |
| 0010 | 10 11 12 13 14 15....1C 1D 1E 1F | |
| 0020 | 20 21 22 23 24 25....2C 2D 2E 2F | !"#\$%&'()*+,-./ |
| 0030 | 30 31 32 33 34 35....3C 3D 3E 3F | 0123456789:;<=>? |
| 0040 | 40 41 42 43 44 45....4C 4D 4E 4F | @ABCDEFGHIJKLMNO |
| 0050 | 50 51 52 53 54 55....5C 5D 5E 5F | PQRSTUVWXYZ[\]^_ |
| | . | |
| | . | |
| | . | |
| | . | |
| | . | |
| | . | |
| | . | |
| | . | |
| | . | |

9 Troubleshooting

Many of the faults and problems which may occur while using the printer are minor problems which you can solve yourself. The following chapter should help you to distinguish between a simple operating error and a major malfunction.


This chapter provides information on the rectification of faults without the assistance of specially trained personnel. Follow the advice and tips in this chapter if your printer is not working correctly.

Important notes on the care and maintenance of your printer can be found at the chapter.



Repairs should only be performed by authorised service personnel.

General print problems

| Problem | Corrective action |
|---|---|
| <p>The display remains dark The printer is switched on, but nothing happens (nothing is displayed, no noise).</p> | <p>Switch off the printer and proceed as follows:</p> <ol style="list-style-type: none"> 1. Check that the power plug is correctly connected to the socket on the printer. 2. Check that the power plug is seated properly in the wall socket. 3. Switch on the printer again. If the printer is now connected correctly, the printer initializes and text is shown on the display. <p>If these steps do not eliminate the fault:</p> <ul style="list-style-type: none"> ▶ Replace the power cord and repeat step 3. ▶ Check that power flows at the socket e.g. using a desk lamp, if necessary use a different socket and repeat step 3. ▶ Contact your dealer if the printer cannot be powered up. <p> Do not attempt to open the printer. You might suffer an electric shock.</p> |
| <p>The display is lit, but the printer does not print</p> | <ol style="list-style-type: none"> 1. Check that the printer is Online. If the displays shows Stop, then press the key Online. Try to print again. 2. Check the connection from the printer to the computer (interface cable): <ul style="list-style-type: none"> ▶ Check that the interface cable is properly connected to the computer and to the printer. ▶ Check that it is the correct interface cable for your printer. Information on the interface is located in the section Connecting the printer, page 8, and in chapter Interfaces, page 123. ▶ Check that the printer is properly adapted to the computer (configured). Refer to section The control panel (page 29). Check the parameter set in the menu under INTERFACES, page 60, and if necessary correct it. 3. Check whether the printer is working properly. To do this, print out a copy of the menu; see Printing out the status page, page 53. 4. Check that the top cover is closed. 5. Check that paper is inserted and loaded. Refer to the chapter Print media, page 27. |

| Problem | Corrective action |
|--|---|
| Problems with the paper feed The paper is not fed in | <ol style="list-style-type: none"><li data-bbox="619 249 1465 350">1. Check that the correct media type is selected in the menu, if necessary select the correct media type. See section Media, page 59.<li data-bbox="619 370 1465 512">2. Check if the right edge of the document is positioned inside the area between the left side of the symbol and the right edge of the document support. See section Inserting a document, page 27.<li data-bbox="619 532 1465 600">3. Make sure that the paper meets the values of the paper specifications. See section Paper specifications, page 85. |

Problems with the print quality

| Problem | Corrective action |
|------------------------------------|--|
| Print is faulty | The inserted document is too thick. Use a document with the correct thickness. Refer to the section Paper specifications , page 85 and the chapter Print media , page 27. |
| Print is too pale | The ribbon is used up or the ribbon cassette is not correctly fitted. Refer to the chapter Changing the ribbon cassette , page 33. |
| Smudged print | The ribbon is damaged (e.g. frayed). Change the ribbon as described in the chapter Changing the ribbon cassette , page 33. |
| Dots within characters are missing | <ol style="list-style-type: none"> 1. Check whether the ribbon is damaged. To do so check the ribbon cassettes functionality by turning the green tension gear in direction of the arrow on the cassette; check if the ribbon itself is torn or has holes etc. If necessary replace the ribbon cassette; see the chapter Changing the ribbon cassette, page 33. 2. Check whether the print head is damaged. To do so print out a status page (see Printing out the status page, page 53) and check if under the lines representing the software versions all 24 lines are present. Every line represents one of the 24 needles of the print head. If not so, replace the print head; see the chapter Replacing the print head, page 39. <div data-bbox="657 1064 1469 1360" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <pre> Firmware Version : FW_0101 Serial No. 0000000000 CG Version : CG_0101 SCS No. 00 IPL Version : BL_0101 Character Counter 0000000869 (Permanent) 0000000869 ----- 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 All Current Setting List USER Select User User1 Change User User1 Language English CHARACTER Character Pitch 10CPI User1 User2 Font Draft Draft Draft </pre> </div> <p>i We recommend to use genuine ribbon cassettes only. In case of a damaged print head, please contact your dealer.</p> |
| Prints undefined characters | <ol style="list-style-type: none"> 1. Check that the interface plug is correctly connected to the computer and to the printer. 2. Check that the proper emulation and the correct character set (country, CG table or character set) is selected in the menu; see section Emulation type, page 61, Epson, page 61, IBM, page 61 and Olivetti, page 62. 3. Check the length of the interface cable; see the chapter Interfaces, page 123. |

Error messages and warnings

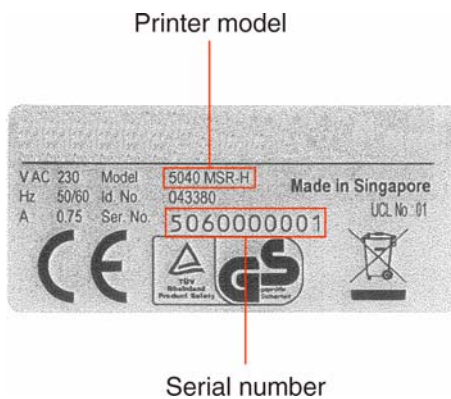
Malfunctions are differentiated as warnings and errors. For a warning a message only appears on the LCD briefly.

As soon as the control logic of the printer detects an error, it aborts the printout and the Ready and the Paper indicators on the control panel starts to blink. An error message is issued on the LCD. The cause of this malfunction and the possible troubleshooting actions are listed in the following table.

Press the STOP key or close the cover after eliminating the problem. The message **STOP NO PAPER** appears on the LCD. When you press the STOP key again, the printer is switched to Online. The Ready indicator lights up and the message **ONLINE NO PAPER** appear on the LCD. The printer is ready to accept data from the system.



If our suggestions on the next pages are not sufficient to eliminate the problem, you should call the Customer Service. When you inform the Customer Service you must specify the Serial number and the model type of the printer. Hold a status page with the current parameter settings in readiness.



You can read this on the type plate on the rear of the printer. The serial number is also printed out with the status page (top right).

All the functions of the printer are controlled by the system via the interface. You can check the printer functions by printing the current listings of setups.

Unrecoverable errors

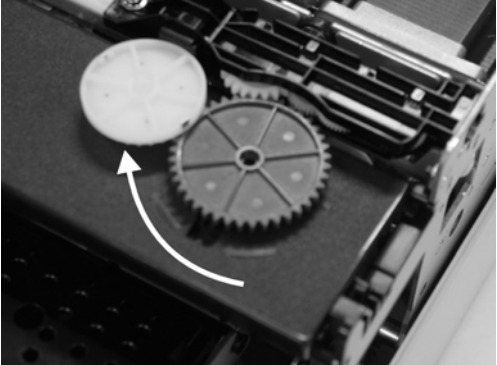
The following errors are unrecoverable by the user. If displayed in the LCD display, power the printer off and on again.

- ▶ CAM Error
- ▶ Carrier Error
- ▶ RAM Error
- ▶ ROM Error
- ▶ EPROM Error
- ▶ CG Error
- ▶ MSR-H Error
- ▶ Key Scan Error



If the error message appears again after you have repeatedly powered the printer off and on, contact your dealer or customer service.

Recoverable errors

| Message | Condition | Corrective action |
|-----------------------------------|--|---|
| Print Head Hot Error | The print head is too hot | <ul style="list-style-type: none"> ▶ Power the printer off, open the cover and wait a few minutes. Then power the printer on again. |
| Ribbon Cassette Error | Either the ribbon cassette is not installed correctly, the function of the ribbon cassette is not correct or you are using a ribbon cassette of another manufacturer. | <ul style="list-style-type: none"> ▶ Check if the ribbon cassette is installed correctly (see section Changing the ribbon cassette, page 33). ▶ Check the function of the ribbon cassette. To do this, turn the green tension gear of the ribbon cassette in the direction of the arrow. Check if the ribbon itself will be moved  <ul style="list-style-type: none"> ▶ Only use original ribbon cassettes of the manufacturer. |
| Paper Length Error | <p>Epson/IBM emulation: When print is going across the bottom edge of a paper.</p> <p>Olivetti emulation: when print will exceed the selected page length. (In case of Epson/IBM emulation paper will be ejected, if print exceeds the page length.)</p> | <ul style="list-style-type: none"> ▶ When Reset Error Command or General Reset Command (PR2) is received, if there is no paper in the printer, the error is canceled, and it is in a online state. ▶ If STOP Key is pressed, if there is no paper in the printer, it is in a of-line (STOP) state, and the error is canceled. |
| Framing Error (Serial I/F) | The Stop bit is not detected by the serial interface. “?” is printed instead of the received data until the error is canceled. | <ul style="list-style-type: none"> ▶ If STOP key is pressed, the error is canceled and the printer is in offline (STOP) state. ▶ Make the Data bit and Stop bit of PC and printer compatible. |

| Message | Condition | Corrective action |
|--|--|--|
| <p>Parity Error (Serial I/F)</p> | <p>The setting of Parity of the Host PC differs from the Parity setting of the serial interface of the printer. “?” is printed instead of the received data until the error is canceled.</p> | <ul style="list-style-type: none"> ▶ If STOP key is pressed, the error is canceled and the printer is in offline (STOP) state. ▶ Make the Parity settings of Host PC and printer compatible. |
| <p>Overrun Error (Serial I/F)</p> | <p>The data sent by the serial interface exceed the currently prepared Overrun Buffer. “?” is printed instead of the received data until the error is canceled.</p> | <ul style="list-style-type: none"> ▶ If STOP key is pressed, the error is canceled and the printer is in offline (STOP) state. ▶ Check the protocol and/or the handshake of the serial connection. |
| <p>Cover Open Error</p> | <p>Olivetti emulation: the printer receives printing data, printing start, bit image or vertical position change command while the cover is open.</p> | <ul style="list-style-type: none"> ▶ When Reset Error Command or General Reset Command (PR2) is received, if the cover is closed, the error is canceled, and it is in a online state. ▶ If STOP Key is pressed, if the cover is closed, the printer is in a offline (STOP) state, and the error is canceled. |
| <p>Cover Open Error</p> | <p>Epson/IBM emulation: The cover open sensor has detected that the cover is open. If cover open state is detected while printing, the print out of data will stop after the processing of data under edit is completed. The LCD display will change to Cover Open after printing stops. If paper is at TOF position, printing will not be performed and the paper will be ejected. During cover open state inserted paper will not be loaded into the printer.</p> | <ul style="list-style-type: none"> ▶ If the cover is closed, the printer is shifted to online state. ▶ If the cover is opened during other errors (e.g. Paper Jam Error, Paper Length Error) occur, the LCD message will not be changed. However, if the cover is closed in that error state, those errors will be canceled. |

Warnings

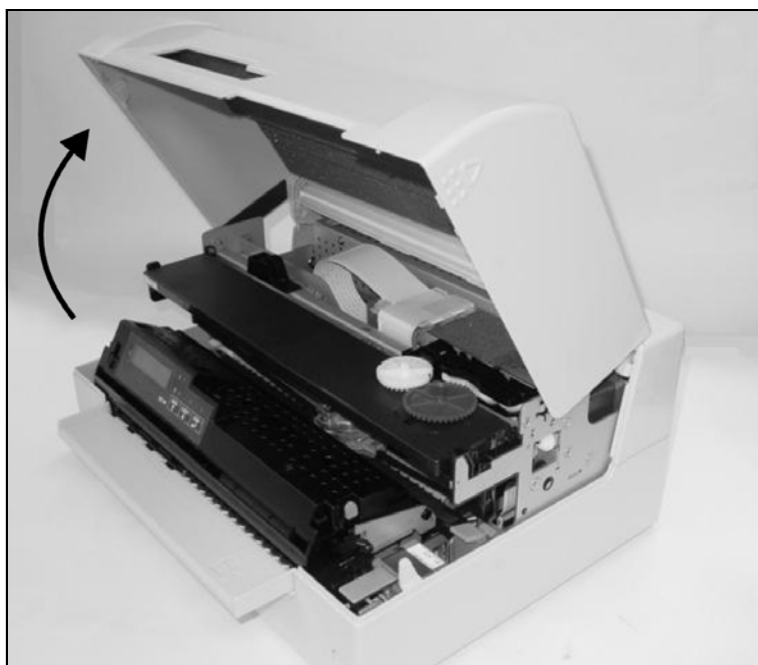
| Message | Condition | Corrective action |
|----------------|--|--|
| Data in Buffer | USER or EJECT key is pressed in online state and there are data in the print buffer. | ▶ When the above-mentioned condition occurs, LCD Message is displayed "Warning Data in buffer" for 3 second and it returns to the original state. Therefore, the function of pressed key is not performed. |
| Remove Paper | The paper detection sensor detects a paper after paper ejection was performed. | ▶ When the ejected paper will be removed, the message disappears. |

Clearing paper jams

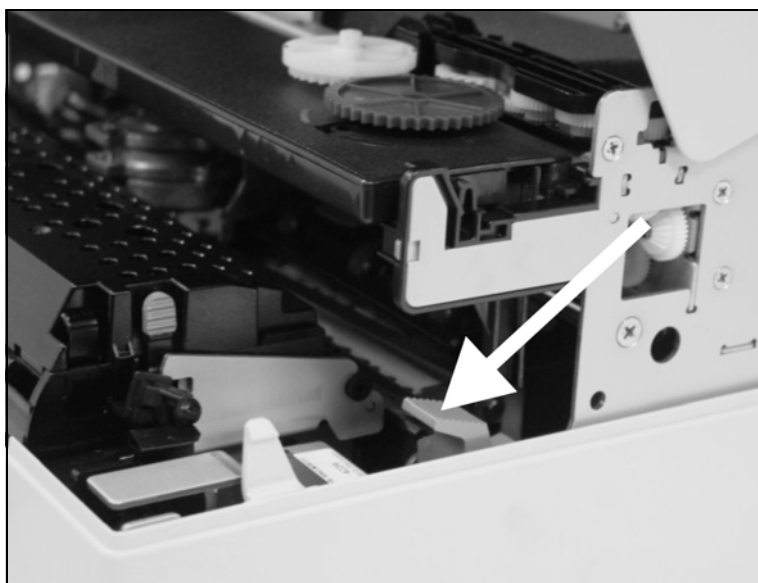
If a document which was fed into the printer is not automatically ejected or ejected after pressing the EJECT key on the control panel after its processing, a paper jam has occurred inside the printer and is displayed in the LCD display. The paper jam must be cleared manually.



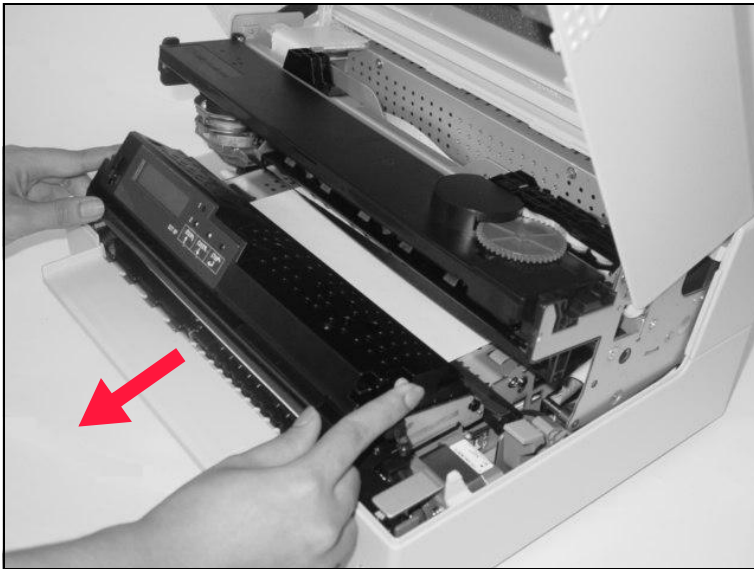
The print head may be hot if the printer has been printing for a long time. Wait until it has cooled down so that you are not in danger of being burnt.



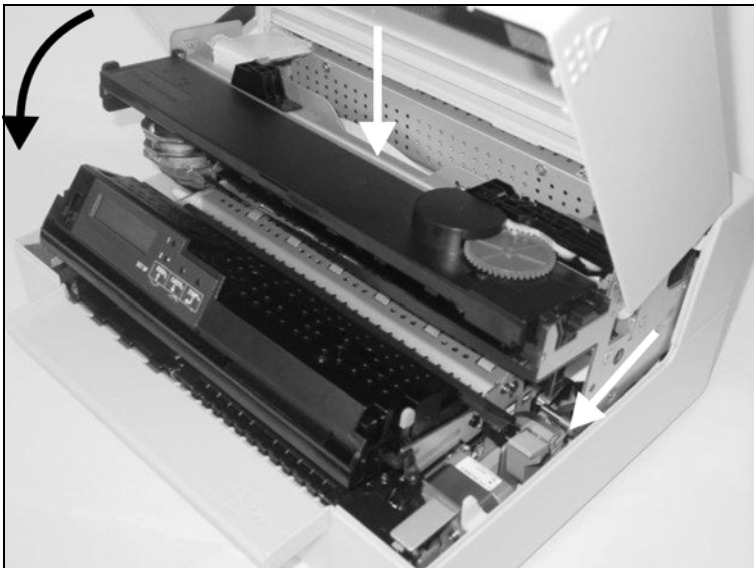
Open the cover by grasping it at the right and left-hand side and swing it upwards until it clicks into position.



Press the green release lever for the printing mechanism. This swings the printing mechanism backwards.



Press the two green release levers on both sides of the panel and lift the panel up. Then remove the jammed paper by pulling it in direction of the arrow out of the printer.



Close the main frame by pressing the colored section in the middle of the frame as shown by the white arrow and ensure both left and right hand sides of the frames are fully latched.

Close the cover. The printer is now ready to operate and to be switched on again.



We recommend to check the printer's operation by performing a printout of the parameter settings (see section [Printing out the status page](#), page 53).

10 Care and maintenance

The printer is designed to operate with minimal maintenance. It is advisable to clean the inside of the printer from time to time with a vacuum cleaner.



Before cleaning, turn off the printer, wait 5 to 10 seconds and disconnect the power cable.

Do not oil or grease the printer, especially the sliderails and shafts.

Cleaning the housing

Clean the printer housing with mild detergent (use a dishwashing agent, if necessary, or a plastic cleaning agent) and a soft lint-free cloth.

Take care not to pour any liquid into the ventilation slots of the housing.



Do not use abrasive cleaners. Never use solvents or alcohol.

Cleaning the interior

Switch the printer off before you start cleaning the interior and pull the mains plug for your own safety.

Proceed as follows to remove any paper dust that has accumulated in the printer:

1. Open the printer and remove the ribbon cassette (see the section [Removing the ribbon cassette](#), page 33).
2. Push the print head completely aside so that the area below can also be cleaned.
3. Use a special vacuum cleaner, which is also used for cleaning optical equipment, or a soft brush to remove the paper dust.

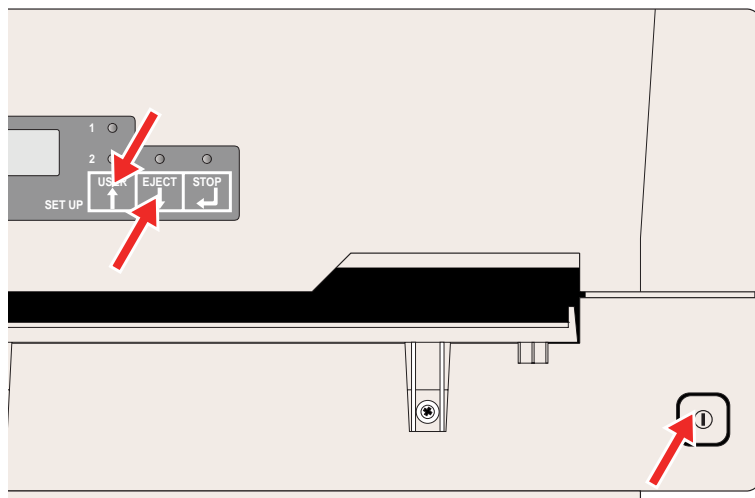


Never use any chemical liquids to clean the platen or the rollers.

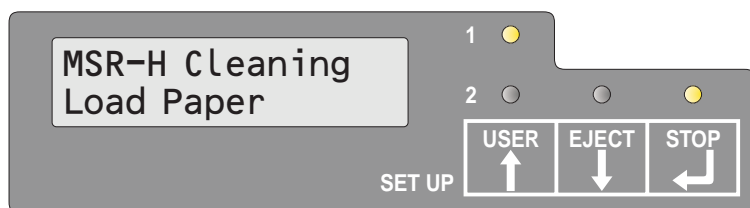
4. Re-insert the ribbon cassette after completing the cleaning and close the printer (see the section [Inserting the ribbon cassette](#), page 35).
5. Connect the printer by inserting the power plug into the wall outlet.

Cleaning the MSR-H magnetic stripe

If your printer has an MSR magnetic stripe reader, the MSR read/write head can be cleaned with a special cleaning sheet as follows.



Press the USER and EJECT key and keep the key pressed while switching on the printer.

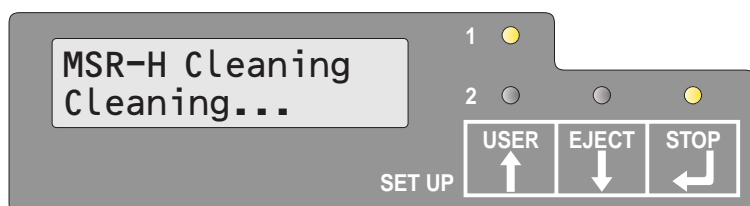


The message **MSR-H Cleaning Load paper** appears on the LCD display.

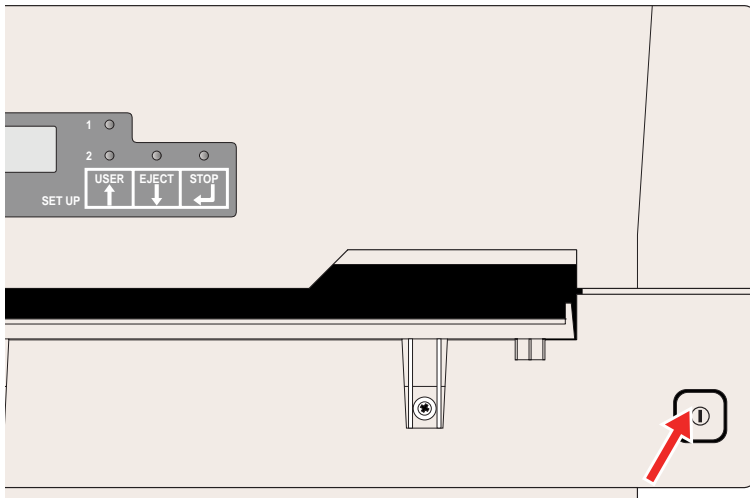


Insert the special MSR-H cleaning sheet at the right side of the printer.

The cleaning routine starts at once.



The message **MSR-H Cleaning Cleaning...** appears on the LCD.



Switch the printer off and on again in order to set the printer in the normal operating mode.



The cleaning sheet can be used several times.

Transport of the printer

Preparations for transport

If you intend to transport the printer over a short distance only, ensure that it has been switched off correctly.



Never remove the mains plug when you can still hear mechanical noise.

Make sure that the printer is transported horizontally. Don't tilt the printer nor put it upside down. Keep the packaging for future transport.

Shipping the printer

When shipping the printer, the printer and its accessories must be properly packed. If your carton or packing material is lost, contact your dealer or service representative.



Properly packing the printer requires all the original packing materials.

1. Turn off the power switches of the printer and the host computer. Disconnect the power cord from the printer.
2. Disconnect the interface cable.
3. Remove the ribbon cassette (refer to section [Removing the ribbon cassette](#), page 33).
4. Pack the printer and accessories in the shipping carton (refer to section [Unpacking the printer](#), page 5).

A Specifications

Printer specifications

| | | |
|------------------------------------|--|-----|
| Printer system | Serial impact matrix printer Printhead with 24 needles Diameter 0.22 mm | |
| Print speed | | |
| Draft (High Speed) | CPI | CPS |
| | 10 | 400 |
| | 12 | 480 |
| | 15 | 600 |
| | 16.6 | 400 |
| | 17.1 | 342 |
| | 20 | 400 |
| Draft (Normal) | CPI | CPS |
| | 10 | 300 |
| | 12 | 360 |
| | 15 | 400 |
| | 16.6 | 200 |
| | 17.1 | 228 |
| | 20 | 266 |
| Letter Quality (High Speed) | CPI | CPS |
| | 10 | 133 |
| | 12 | 160 |
| | 15 | 200 |
| | 16.6 | 200 |
| | 17.1 | 228 |
| | 20 | 266 |
| Letter Quality (Normal) | CPI | CPS |
| | 10 | 100 |
| | 12 | 120 |
| | 15 | 150 |
| | 16.6 | 150 |
| | 17.1 | 171 |
| | 20 | 171 |
| Tab speed | 6 IPS (Inches Per Second) | |
| Print width | 94 characters/line at 10 cpi 112 characters/line at 12 cpi 141 characters/line at 15 cpi | |

| | |
|--|---|
| Character pitch | 10, 12, 15, 17.1, 20 and 24 (16.6 only for PR2) |
| Fonts | <p>Draft Draft LQ Roman Sans Serif Courier Bold Prestige Script Orator Orator-S Gothic OCR-A¹⁾ OCR-B</p> <p>1) If OCR-A font is selected, the code page will automatically select DIN as code page.</p> |
| Emulations | Epson ESC/P IBM 4722 (including Proprinter XL24E) Olivetti PR2E |
| Resolution | Horizontal 120 to 360 dpi Vertical 180 dpi |
| Print attributes in all character pitches | Emphasized Super/Subscript Italic Double-strike Double-width Double-height Underline Overscore Scoring |
| Line spacing | Optional in microsteps n/60 inches n = 0 to 127 n/180 inches n = 0 to 255 n/360 inches n = 0 to 255 |
| Nominal voltage | 120 V ± 10%, 230 V ± 10% |
| Line frequency | 50/60 Hz ± 3% |
| Network form | For use in power distribution systems with neutral and protective earth conductors (TN) |

| | |
|--|--|
| Rated current intake | Operation (maximum): US: 1.30 A; EU: 0.59 A Standby: US: 0.11 A; EU: 0.072 A |
| Apparent power consumption | Operation (maximum): US: 89.7 VA; EU: 93.6 VA Standby: US: 88.8 VA; EU: 11.4 VA |
| True output | Operation (maximum): US: 70.0 W; EU: 73.0 W Standby US: 6.9 W; EU: 8.9 W |
| Noise Sound output level Sound pressure level | $L_{WA,d}$: 7.1 dB in operation L_{pAm} : 55 dB in operation |
| Paper feed | Friction feed |
| MTBF (Mean Time Between Failures) | 10,000 power on hours at 25% DC (duty cycle) |
| Dimensions | Height: 168 mm, Width: 378 mm, Depth: 280 mm |
| Weight | Standard = 9,10 kg, MSR-H = 9,95 kg |
| Service life Print head Ribbon | 300 million dots/pin (normal copy mode) 10 million characters in ANK DRAFT10 cpi |
| Environmental conditions | |
| Operation | |
| Temperature | +10° to +35°C |
| Rel. humidity | 15 to 75% |
| Climate | IEC/EN 60721-3-3, class 3K2 |
| Storage | |
| Temperature | -5° to +45°C |
| Rel. humidity | 5 to 95% |
| Climate | IEC/EN 60721-3-1, class 1K3 |
| Transport | |
| Temperature | -20° to +60°C |
| Rel. humidity | 5 to 95% |
| Climate | IEC/EN 60721-3-2, class 2K2 |

| | |
|------------------|---|
| Approvals | DIN EN 60 950 / VDE 0805, TUV (EN 60950) / Certified CE Mark, UL 60950 3rd Edition / C-UL (CSA C22.2 No 60950-00) new reversion, IEC 60950-1, EN 55022 :1998 (Class B), EN 55024 :1998, FCC PT 15B : 2000 (Class B), EN61000-3-2 :2000, EN61000-3-3: 1995 |
|------------------|---|

Paper specifications

| Single and multi-copy sheet | | |
|---|---|--|
| Paper width | 70 to 240 mm | |
| Paper length | 70 to 500 mm | |
| Paper weight | Single sheet: Multi sheet: | 60 to 160 g/m ² 80 to 260 g/m ² |
| Paper thickness | Single sheet: Multi sheet: | 0.08 to 0.5 mm 0.08 to 0.5 mm |
| Number of copies | Original + four copies (Copy mode) | |
| Passbook | | |
| Paper width | Open book | 105 to 235 mm (Horizontal stitch type) 105 to 235 mm (Vertical stitch type) |
| Paper length | Open book | 140 to 210 mm (Horizontal stitch type) 125 to 210 mm (Vertical stitch type) |
| Corner radius | 0 to 10 mm | |
| Cover thickness | 0.2 to 0.5 mm | |
| Passbook thickness | 2.0 mm max. (one cover + inner page) | |
| Thickness difference | 1.4 mm max. | |
| Paper weight | 75 to 120 g/m ² | |
| Book condition | Recommend to be flattened carefully before insertion. | |
| Cheques for the magnetic ink reader | | |
| The magnetic ink reader (MICR) processes cheques that have a printing zone with magnetizable ink. | | |
| Document width | 76 to 102 mm | |
| Document length | 152 to 210 mm | |

| | |
|--------------------------|--|
| Multi-copy sheets | Sets of forms may be used only if the top edge is bound. The binding edge should be as soft as possible. A wavy binding edge may hamper the smooth feeding of these sets. Multi-part forms have to be inserted with the glued top facing down. Multi-part forms should be tested for suitability. |
| Paper quality | <p>Light pulp paper of medium fine quality, paper bearing the quality mark SM Post and photocopy paper are suitable for use.</p> <p>Unsuitable are: satin-finisch or coated papers, imitation art papers, and embossed papers.</p> <p>Since paper as natural material reacts strongly to environmental influences (e.g. humidity, temperature), the place of storage should be selected carefully. We recommend that this kind of paper should be tested extensively before larger quantities are acquired.</p> <p>Should papers with a dark reverse side be used, these should also be tested for their functionality.</p> <p>Please pay attention to the use of infrared reflecting colors, when acquiring these papers.</p> |
| Passbooks | <p>Passbooks shall be free of any metallic parts such as staples or metal clips.</p> <p>Adhesion of any form of stamps or seals is prohibited, as the reliability will be impaired.</p> <p>Passbooks should not have any pages of a smaller size than the cover pages.</p> <p>Passbooks should have no tears, creases, folds or loose stitched.</p> <p>Level the pages before use at the time when you open a folded passbook. Warp of pages will degrade the reliability.</p> <p>When you open a folded passbook, curve forms where the pages are bound in the center of the passbook. If the curved part is too large, such passbooks may be not used.</p> |

Interface specifications

| | |
|--|---|
| Parallel interface | bidirectional |
| Type of data transmission | 8-bit parallel interface (Centronics compatible) IEEE-1284; Nibble mode |
| Transmission rate | Max. 30 KHz |
| Signal status | Low: 0,0 V to +0,4 V High: +2,4 V to +5,0 V |
| Connection cable | Material: AWG 28 at least Length: up to 2,0 m Twisted-pair cable with double-shield, acc. IEEE Std 1284 – 1294 |
| Voltage supply of external devices on pin 18 | U = +5 V \pm 10% I = 0,5 A _{max} |
| Interface connections | Printer side: Amphenol 57-40360, 36-pin (or compatible) Cable side: Amphenol 57-30360, 25-pin (or compatible) |
| Capacity of data buffer | 32 KB max. |
| Serial interface | RS232C interface |
| Synchronization | Asynchronous |
| Transmission rate | 600 bauds to 38 400 bauds |
| Signal status | OFF = Mark = log.1 = -3 V to -15 V ON = Space = log. 0 = +3 V to +15 V |
| Connection cable | Length up to 15 m |
| Interface connections | ITT Cannon connector, series DB-9 S |
| Transmission protocol | XON/XOFF, READY/BUSY |
| Capacity of data buffer | 32 KB max. |
| USB interface | USB 2.0 Full mode (12 MHz) |

B Character sets

This chapter shows the character sets and contains a list of all available character sets which can be selected via control panel or by escape sequences.

The following example shows you how to find the hexadecimal value for a character from the symbol set tables.

| hex | 0 | 1 | 2 | 3 | 4 |
|-----|----------|----|----------|---------|---------|
| dec | | | | | |
| 0 | NUL 0 | 16 | SP 32 | 0 48 | @ 64 |
| 1 | 1 | 17 | ! 33 | 1 49 | A 65 |
| 2 | 2 | 18 | " 34 | 2 50 | B 66 |
| 3 | 3 | 19 | # 35 | 3 51 | C 67 |

ASCII „B“ = hex.42 = dez 66

OCR-A character set

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | 0 | ? | P | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 1 | | | ! | 1 | A | Q | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 2 | | | " | 2 | B | R | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 3 | | | # | 3 | C | S | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 4 | | | \$ | 4 | D | T | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 5 | | | % | 5 | E | U | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 6 | | | & | 6 | F | V | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 7 | | | ' | 7 | G | W | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 8 | | | (| 8 | H | X | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| 9 | | |) | 9 | I | Y | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| A | | | * | : | J | Z | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| B | | | + | ; | K | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| C | | | , | = | L | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| D | | | - | = | M | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |
| E | | | . | ^ | N | ? | ? | - | ? | ? | ? | ? | ? | ? | ? | ? |
| F | | | / | ? | O | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? |

Epson character sets

Italic

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|-----|-----|----|---|---|---|---|-----|-----|-----|----|---|---|---|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | NUL | | 0 | @ | P | ` | p | |
| 1 | | DC1 | ! | 1 | A | Q | a | q | | DC1 | / | / | A | Q | a | q |
| 2 | | DC2 | * | 2 | B | R | b | r | | DC2 | * | 2 | B | R | b | r |
| 3 | | DC3 | # | 3 | C | S | c | s | | DC3 | # | 3 | C | S | c | s |
| 4 | | DC4 | \$ | 4 | D | T | d | t | | DC4 | \$ | 4 | D | T | d | t |
| 5 | | | % | 5 | E | U | e | u | | | % | 5 | E | U | e | u |
| 6 | | | & | 6 | F | V | f | v | | | & | 6 | F | V | f | v |
| 7 | BEL | | ' | 7 | G | W | g | w | BEL | | ' | 7 | G | W | g | w |
| 8 | BS | CAN | (| 8 | H | X | h | x | BS | CAN | (| 8 | H | X | h | x |
| 9 | HT | EM |) | 9 | I | Y | i | y | HT | EM |) | 9 | I | Y | i | y |
| A | LF | | * | : | J | Z | j | z | LF | | * | : | J | Z | j | z |
| B | VT | ESC | + | ; | K | [| k | { | VT | ESC | + | ; | K | [| k | { |
| C | FF | | , | < | L | \ | l | | FF | | , | < | L | \ | l | |
| D | CR | | - | = | M |] | m | } | CR | | - | = | M |] | m | } |
| E | SO | | . | > | N | ^ | n | ~ | SO | | . | > | N | ^ | n | ~ |
| F | SI | | / | ? | O | _ | o | DEL | SI | | / | ? | O | _ | o | |

Graphic1

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|-----|-----|----|---|---|---|---|-----|---|---|---|---|---|----|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | Ç | É | á | | Ł | ll | α | ≡ |
| 1 | | DC1 | ! | 1 | A | Q | a | q | ü | æ | í | | ł | ł | β | ± |
| 2 | | DC2 | * | 2 | B | R | b | r | é | Æ | ó | | ł | π | Γ | ≥ |
| 3 | | DC3 | # | 3 | C | S | c | s | â | ô | ú | | ł | ll | π | ≤ |
| 4 | | DC4 | \$ | 4 | D | T | d | t | ä | ö | ñ | | - | ł | Σ | ∫ |
| 5 | | | % | 5 | E | U | e | u | à | ò | Ñ | | + | F | σ | J |
| 6 | | | & | 6 | F | V | f | v | â | ó | ë | | ł | π | μ | ÷ |
| 7 | BEL | | ' | 7 | G | W | g | w | ç | ù | ø | | ł | ł | τ | ≈ |
| 8 | BS | CAN | (| 8 | H | X | h | x | ê | ÿ | ł | ł | ł | ł | φ | ° |
| 9 | HT | EM |) | 9 | I | Y | i | y | ë | Ö | - | | ł | J | θ | • |
| A | LF | | * | : | J | Z | j | z | è | Û | - | | ł | Γ | Ω | • |
| B | VT | ESC | + | ; | K | [| k | { | ï | φ | ½ | | ł | ł | δ | √ |
| C | FF | FS | , | < | L | \ | l | | ı | £ | ¼ | | ł | ł | ∞ | ° |
| D | CR | | - | = | M |] | m | } | ı | ¥ | i | | = | ł | φ | ² |
| E | SO | | . | > | N | ^ | n | ~ | Ä | Ŕ | « | J | | ł | ε | • |
| F | SI | | / | ? | O | _ | o | DEL | Å | f | * | ł | ł | ł | ∩ | |

Graphic2

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|-----|-----|----|---|---|---|---|-----|-----|-----|---|----|----|----|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | NUL | | á | | L | ll | α | ≡ |
| 1 | | DC1 | ! | 1 | A | Q | a | q | | DC1 | í | | ↓ | π | β | ± |
| 2 | | DC2 | " | 2 | B | R | b | r | | DC2 | ó | | T | π | Γ | ≥ |
| 3 | | DC3 | # | 3 | C | S | c | s | | DC3 | ú | | † | ll | π | ≤ |
| 4 | | DC4 | \$ | 4 | D | T | d | t | | DC4 | ñ | † | - | ε | Σ | ∫ |
| 5 | | | % | 5 | E | U | e | u | | | Ñ | † | † | F | σ | J |
| 6 | | | & | 6 | F | V | f | v | | | ñ | | † | π | μ | ÷ |
| 7 | BEL | | ' | 7 | G | W | g | w | BEL | | ø | ñ | | | τ | ≈ |
| 8 | BS | CAN | (| 8 | H | X | h | x | BS | CAN | ¿ | ¶ | ll | † | φ | ° |
| 9 | HT | EM |) | 9 | I | Y | i | y | HT | EM | ~ | | ¶ | J | θ | • |
| A | LF | | * | : | J | Z | j | z | LF | | ~ | | ll | Γ | Ω | • |
| B | VT | ESC | + | ; | K | [| k | { | VT | ESC | ½ | ¶ | ¶ | ■ | δ | √ |
| C | FF | FS | , | < | L | \ | l | | FF | FS | ¼ | ll | | ■ | ∞ | ∞ |
| D | CR | | - | = | M |] | m | } | CR | | i | ll | = | | φ | ² |
| E | SO | | . | > | N | ^ | n | ~ | SO | | « | J | ll | | ε | • |
| F | SI | | / | ? | O | _ | o | DEL | SI | | » | ¶ | ± | ■ | ∩ | |

IBM code pages

Code page 437

| | | | | | | | | | | | | | | | |
|----------|----|-----|-----|---|---|-----|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 NUL | | | 0 @ | P | ` | p | Ç | É | á | á | ⋮ | L | ⊥ | α | ≡ |
| 1 DC1 | ! | 1 A | Q | a | q | ü | æ | í | í | ⋮ | ⊥ | ⊥ | ⊥ | β | ± |
| 2 DC2 | " | 2 B | R | b | r | é | Æ | ó | ó | ⋮ | ⊥ | ⊥ | ⊥ | Γ | ≥ |
| 3 DC3 | # | 3 C | S | c | s | â | ô | ú | ú | ⋮ | ⊥ | ⊥ | ⊥ | π | ≤ |
| 4 DC4 | \$ | 4 D | T | d | t | ã | ö | ñ | ñ | ⋮ | ⊥ | ⊥ | ⊥ | Σ | ∫ |
| 5 | % | 5 E | U | e | u | à | ò | Ñ | Ñ | ⋮ | ⊥ | ⊥ | ⊥ | σ | ∫ |
| 6 | & | 6 F | V | f | v | â | û | ë | ë | ⋮ | ⊥ | ⊥ | ⊥ | μ | ÷ |
| 7 BEL | ' | 7 G | W | g | w | ç | ù | ö | ö | ⋮ | ⊥ | ⊥ | ⊥ | τ | ≈ |
| 8 BS CAN | (| 8 H | X | h | x | ê | ÿ | í | í | ⋮ | ⊥ | ⊥ | ⊥ | φ | ° |
| 9 HT EM |) | 9 I | Y | i | y | ë | Û | ŀ | ŀ | ⋮ | ⊥ | ⊥ | ⊥ | θ | • |
| A LF | * | : | J | Z | j | z | è | Û | ŀ | ⋮ | ⊥ | ⊥ | ⊥ | Ω | · |
| B VT ESC | + | ; | K | [| k | { | ï | ø | ½ | ⋮ | ⊥ | ⊥ | ⊥ | ∞ | √ |
| C FF FS | , | < | L | \ | l | | î | £ | ¼ | ⋮ | ⊥ | ⊥ | ⊥ | ∞ | n |
| D CR | - | = | M |] | m | } | ì | ¥ | i | ⋮ | ⊥ | ⊥ | ⊥ | ∞ | ² |
| E SO | . | > | N | ^ | n | ~ | Ä | ŀ | « | ⋮ | ⊥ | ⊥ | ⊥ | ∞ | ² |
| F SI | / | ? | O | _ | o | DEL | Å | f | » | ⋮ | ⊥ | ⊥ | ⊥ | ∞ | ² |

Code page 850

| | | | | | | | | | | | | | | | |
|----------|----|-----|-----|---|---|-----|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 NUL | | | 0 @ | P | ` | p | Ç | É | á | á | ⋮ | L | ø | Ó | - |
| 1 DC1 | ! | 1 A | Q | a | q | ü | æ | í | í | ⋮ | ⊥ | ⊥ | Ð | β | ± |
| 2 DC2 | " | 2 B | R | b | r | é | Æ | ó | ó | ⋮ | ⊥ | ⊥ | Ê | Ó | = |
| 3 DC3 | # | 3 C | S | c | s | â | ô | ú | ú | ⋮ | ⊥ | ⊥ | Ë | Ò | ¼ |
| 4 DC4 | \$ | 4 D | T | d | t | ã | ö | ñ | ñ | ⋮ | ⊥ | ⊥ | Ë | ó | ½ |
| 5 | % | 5 E | U | e | u | à | ò | Ñ | Ñ | ⋮ | ⊥ | ⊥ | Ë | Ö | § |
| 6 | & | 6 F | V | f | v | â | û | ë | ë | ⋮ | ⊥ | ⊥ | Ë | μ | ÷ |
| 7 BEL | ' | 7 G | W | g | w | ç | ù | ö | ö | ⋮ | ⊥ | ⊥ | Ë | þ | ¸ |
| 8 BS CAN | (| 8 H | X | h | x | ê | ÿ | í | í | ⋮ | ⊥ | ⊥ | Ë | þ | ° |
| 9 HT EM |) | 9 I | Y | i | y | ë | Û | ŀ | ŀ | ⋮ | ⊥ | ⊥ | Ë | Ú | ´ |
| A LF | * | : | J | Z | j | z | è | Û | ŀ | ⋮ | ⊥ | ⊥ | Ë | Û | · |
| B VT ESC | + | ; | K | [| k | { | ï | ø | ½ | ⋮ | ⊥ | ⊥ | Ë | Û | ¸ |
| C FF FS | , | < | L | \ | l | | î | £ | ¼ | ⋮ | ⊥ | ⊥ | Ë | Û | ¸ |
| D CR | - | = | M |] | m | } | ì | Ø | i | ⋮ | ⊥ | ⊥ | Ë | Û | ¸ |
| E SO | . | > | N | ^ | n | ~ | Ä | x | « | ⋮ | ⊥ | ⊥ | Ë | Û | ¸ |
| F SI | / | ? | O | _ | o | DEL | Å | f | » | ⋮ | ⊥ | ⊥ | Ë | Û | ¸ |

Code page 860

| | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | 0 | @ | P | ` | p | Ç | É | Á | ⋮ | L | ⊥ | α | ≡ |
| 1 | DC1 | ! | 1 | A | Q | a | q | ü | À | í | ⋮ | ⊥ | ⊥ | β | ± |
| 2 | DC2 | " | 2 | B | R | b | r | é | Ê | ó | ⋮ | ⊥ | ⊥ | Γ | ≥ |
| 3 | DC3 | # | 3 | C | S | c | s | â | ô | ú | ⋮ | ⊥ | ⊥ | π | ≤ |
| 4 | DC4 | \$ | 4 | D | T | d | t | ã | ø | ñ | ⋮ | ⊥ | ⊥ | Σ | ∫ |
| 5 | | % | 5 | E | U | e | u | à | ò | Ñ | ⋮ | ⊥ | ⊥ | σ | ∫ |
| 6 | | & | 6 | F | V | f | v | Á | Û | ª | ⋮ | ⊥ | ⊥ | μ | ÷ |
| 7 | BEL | ' | 7 | G | W | g | w | ç | ù | º | ⋮ | ⊥ | ⊥ | τ | ≈ |
| 8 | BS CAN | (| 8 | H | X | h | x | ê | ì | ó | ⋮ | ⊥ | ⊥ | φ | ° |
| 9 | HT EM |) | 9 | I | Y | i | y | ê | Ï | Ô | ⋮ | ⊥ | ⊥ | θ | • |
| A | LF | * | : | J | Z | j | z | è | Û | ¬ | ⋮ | ⊥ | ⊥ | Ω | · |
| B | VT ESC | + | ; | K | [| k | { | í | ¢ | ¼ | ⋮ | ⊥ | ⊥ | δ | √ |
| C | FF FS | , | < | L | \ | l | | ô | £ | ½ | ⋮ | ⊥ | ⊥ | ø | ² |
| D | CR | - | = | M |] | m | } | ì | Û | ı | ⋮ | ⊥ | ⊥ | φ | ² |
| E | SO | . | > | N | ^ | n | ~ | Ã | Œ | « | ⋮ | ⊥ | ⊥ | ε | ■ |
| F | SI | / | ? | O | _ | o | DEL | Â | Ó | » | ⋮ | ⊥ | ⊥ | ∩ | |

Code page 863

| | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | 0 | @ | P | ` | p | Ç | É | ı | ⋮ | L | ⊥ | α | ≡ |
| 1 | DC1 | ! | 1 | A | Q | a | q | ü | Ê | ´ | ⋮ | ⊥ | ⊥ | β | ± |
| 2 | DC2 | " | 2 | B | R | b | r | é | Ê | ó | ⋮ | ⊥ | ⊥ | Γ | ≥ |
| 3 | DC3 | # | 3 | C | S | c | s | â | ô | ú | ⋮ | ⊥ | ⊥ | π | ≤ |
| 4 | DC4 | \$ | 4 | D | T | d | t | Ã | Ë | ” | ⋮ | ⊥ | ⊥ | Σ | ∫ |
| 5 | | % | 5 | E | U | e | u | à | Ï | ” | ⋮ | ⊥ | ⊥ | σ | ∫ |
| 6 | | & | 6 | F | V | f | v | Ä | Û | ” | ⋮ | ⊥ | ⊥ | μ | ÷ |
| 7 | BEL | ' | 7 | G | W | g | w | ç | ù | ¬ | ⋮ | ⊥ | ⊥ | τ | ≈ |
| 8 | BS CAN | (| 8 | H | X | h | x | ê | ı | ı | ⋮ | ⊥ | ⊥ | φ | ° |
| 9 | HT EM |) | 9 | I | Y | i | y | ë | Ï | ¬ | ⋮ | ⊥ | ⊥ | θ | • |
| A | LF | * | : | J | Z | j | z | è | Û | ¬ | ⋮ | ⊥ | ⊥ | Ω | · |
| B | VT ESC | + | ; | K | [| k | { | ï | ¢ | ¼ | ⋮ | ⊥ | ⊥ | δ | √ |
| C | FF FS | , | < | L | \ | l | | î | £ | ½ | ⋮ | ⊥ | ⊥ | ø | ² |
| D | CR | - | = | M |] | m | } | ı | Û | ı | ⋮ | ⊥ | ⊥ | φ | ² |
| E | SO | . | > | N | ^ | n | ~ | À | Œ | « | ⋮ | ⊥ | ⊥ | ε | ■ |
| F | SI | / | ? | O | _ | o | DEL | § | f | » | ⋮ | ⊥ | ⊥ | ∩ | |

Code page 865

| | | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | | 0 | @ | P | ` | p | Ç | É | á | ␣ | ␣ | ␣ | ␣ | ␣ |
| 1 | DC1 | ! | 1 | A | Q | a | q | ū | æ | í | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 2 | DC2 | " | 2 | B | R | b | r | é | Æ | ó | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 3 | DC3 | # | 3 | C | S | c | s | â | ô | ú | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 4 | DC4 | \$ | 4 | D | T | d | t | ä | ö | ñ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 5 | | % | 5 | E | U | e | u | à | ò | Ñ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 6 | | & | 6 | F | V | f | v | â | û | æ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 7 | BEL | ' | 7 | G | W | g | w | ç | ù | ø | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 8 | BS CAN | (| 8 | H | X | h | x | ê | ÿ | ï | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 9 | HT EM |) | 9 | I | Y | i | y | ë | ÿ | ÿ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| A | LF | * | : | J | Z | j | z | è | Û | Û | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| B | VT ESC | + | ; | K | [| k | { | ï | ø | ½ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| C | FF FS | , | < | L | \ | l | | í | £ | ¼ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| D | CR | - | = | M |] | m | } | ì | Ø | í | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| E | SO | . | > | N | ^ | n | ~ | Ã | Þ | « | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| F | SI | / | ? | O | _ | o | DEL | À | ƒ | » | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |

Code page 851

| | | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | | 0 | @ | P | ` | p | Ç | İ | ı | ␣ | ␣ | ␣ | ␣ | ␣ |
| 1 | DC1 | ! | 1 | A | Q | a | q | ü | | ı | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 2 | DC2 | " | 2 | B | R | b | r | é | Ø | ó | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 3 | DC3 | # | 3 | C | S | c | s | â | ô | ú | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 4 | DC4 | \$ | 4 | D | T | d | t | ä | ö | Å | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 5 | | % | 5 | E | U | e | u | à | Y | B | K | ␣ | ␣ | ␣ | ␣ | ␣ |
| 6 | | & | 6 | F | V | f | v | Å | û | Γ | Λ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 7 | BEL | ' | 7 | G | W | g | w | ç | ù | Δ | M | ␣ | ␣ | ␣ | ␣ | ␣ |
| 8 | BS CAN | (| 8 | H | X | h | x | ê | Ω | E | N | ␣ | ␣ | ␣ | ␣ | ␣ |
| 9 | HT EM |) | 9 | I | Y | i | y | ë | Ö | Z | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| A | LF | * | : | J | Z | j | z | è | Û | H | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| B | VT ESC | + | ; | K | [| k | { | ï | á | ½ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| C | FF FS | , | < | L | \ | l | | í | £ | ⊖ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| D | CR | - | = | M |] | m | } | E | é | ı | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| E | SO | . | > | N | ^ | n | ~ | Ã | ı | « | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| F | SI | / | ? | O | _ | o | DEL | H | ı | » | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |

Code page 852

| | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | 0 | @ | P | ` | p | Ç | É | á | ı | Ł | ł | Ó | - |
| 1 | DC1 | ! | 1 | A | Q | a | q | ü | Í | í | ı | ł | Đ | Đ | " |
| 2 | DC2 | " | 2 | B | R | b | r | é | í | ó | ı | ł | Ď | Ō | ' |
| 3 | DC3 | # | 3 | C | S | c | s | â | ô | ú | ı | ł | Ě | Ń | ~ |
| 4 | DC4 | \$ | 4 | D | T | d | t | ä | ö | Å | ı | ł | đ | ń | ^ |
| 5 | | % | 5 | E | U | e | u | û | Û | ą | ı | ł | Ń | ñ | § |
| 6 | | & | 6 | F | V | f | v | č | ı | ž | ı | ł | Ā | š | ÷ |
| 7 | BEL | ' | 7 | G | W | g | w | ç | š | ž | ı | ł | Ě | ı | ı |
| 8 | BS CAN | (| 8 | H | X | h | x | ı | š | ę | ı | ł | Ě | ı | ı |
| 9 | HT EM |) | 9 | I | Y | i | y | ë | Ō | ę | ı | ł | ı | ó | ı |
| A | LF | * | : | J | Z | j | z | ó | Ū | ę | ı | ł | ı | ı | ı |
| B | VT ESC | + | ; | K | [| k | { | ó | Ť | ž | ı | ł | ı | ı | ı |
| C | FF FS | , | < | L | \ | l | | ı | ı | č | ı | ł | ı | ı | ı |
| D | CR | - | = | M |] | m | } | ž | Ł | š | ı | ł | ı | ı | ı |
| E | SO | . | > | N | ^ | n | ~ | Ā | x | « | ı | ł | ı | ı | ı |
| F | SI | / | ? | O | _ | o | DEL | Č | č | » | ı | ł | ı | ı | ı |

Code page 853

| | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | 0 | @ | P | ` | p | Ç | É | á | ı | Ł | | Ó | - |
| 1 | DC1 | ! | 1 | A | Q | a | q | ü | é | í | ı | ł | | Ó | ı |
| 2 | DC2 | " | 2 | B | R | b | r | é | ı | ó | ı | ł | Ě | Ō | ı |
| 3 | DC3 | # | 3 | C | S | c | s | â | ô | ú | ı | ł | Ě | Ō | ı |
| 4 | DC4 | \$ | 4 | D | T | d | t | ä | ö | ñ | ı | ł | Ě | Ō | ı |
| 5 | | % | 5 | E | U | e | u | à | ò | Ñ | ı | ł | ı | ı | ı |
| 6 | | & | 6 | F | V | f | v | č | ı | Ō | ı | ł | ı | ı | ı |
| 7 | BEL | ' | 7 | G | W | g | w | ç | ı | ğ | ı | ł | ı | ı | ı |
| 8 | BS CAN | (| 8 | H | X | h | x | ı | ı | Ĥ | ı | ł | ı | ı | ı |
| 9 | HT EM |) | 9 | I | Y | i | y | ë | Ō | ı | ł | ł | ı | ı | ı |
| A | LF | * | : | J | Z | j | z | è | Ū | ı | ł | ł | ı | ı | ı |
| B | VT ESC | + | ; | K | [| k | { | ı | Ě | ı | ł | ł | ı | ı | ı |
| C | FF FS | , | < | L | \ | l | | ı | ı | ę | ı | ł | ı | ı | ı |
| D | CR | - | = | M |] | m | } | ı | Ō | š | ı | ł | ı | ı | ı |
| E | SO | . | > | N | ^ | n | ~ | Ā | x | « | ı | ł | ı | ı | ı |
| F | SI | / | ? | O | _ | o | DEL | Č | č | ı | ı | ł | ı | ı | ı |

Code page 855

| | | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | | 0 | @ | P | ` | p | ђ | љ | а | ␣ | Л | л | Я | - |
| 1 | DC1 | ! | 1 | A | Q | a | q | Ђ | Љ | А | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 2 | DC2 | " | 2 | B | R | b | r | ђ | љ | Б | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 3 | DC3 | # | 3 | C | S | c | s | ѓ | љ | Б | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 4 | DC4 | \$ | 4 | D | T | d | t | ѐ | ћ | Ц | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 5 | | % | 5 | E | U | e | u | Е | Ѣ | Ц | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 6 | | & | 6 | F | V | f | v | ѝ | ѣ | Д | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 7 | BEL | ' | 7 | G | W | g | w | Є | К | Д | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 8 | BS CAN | (| 8 | H | X | h | x | ѕ | љ | Е | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 9 | HT EM |) | 9 | I | Y | i | y | Ѕ | њ | Е | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| A | LF | * | : | J | Z | j | z | і | џ | Ф | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| B | VT ESC | + | ; | K | { | k | { | і | џ | Ф | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| C | FF FS | , | < | L | \ | l | | і | ю | Г | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| D | CR | - | = | M |] | m | } | ї | ю | Г | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| E | SO | . | > | N | ^ | n | ~ | ј | ь | « | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| F | SI | / | ? | O | _ | o | DEL | J | Ь | » | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |

Code page 857

| | | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | | 0 | @ | P | ` | p | Ç | É | á | ␣ | Л | о | ó | - |
| 1 | DC1 | ! | 1 | A | Q | a | q | ü | æ | í | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 2 | DC2 | " | 2 | B | R | b | r | é | Æ | ó | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 3 | DC3 | # | 3 | C | S | c | s | â | ô | ú | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 4 | DC4 | \$ | 4 | D | T | d | t | ā | ō | ñ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 5 | | % | 5 | E | U | e | u | à | ò | Ñ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 6 | | & | 6 | F | V | f | v | â | û | Ō | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 7 | BEL | ' | 7 | G | W | g | w | ç | ù | ğ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 8 | BS CAN | (| 8 | H | X | h | x | ê | ı | ı | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| 9 | HT EM |) | 9 | I | Y | i | y | ë | ö | Ō | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| A | LF | * | : | J | Z | j | z | è | Ū | ı | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| B | VT ESC | + | ; | K | [| k | { | ı | ø | ½ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| C | FF FS | , | < | L | \ | l | | ı | £ | ¼ | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| D | CR | - | = | M |] | m | } | ı | ∅ | ı | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| E | SO | . | > | N | ^ | n | ~ | Ä | § | « | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |
| F | SI | / | ? | O | _ | o | DEL | Ä | § | » | ␣ | ␣ | ␣ | ␣ | ␣ | ␣ |

Code page 866

| | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | 0 | @ | P | ` | р | А | Р | а | Б | С | Л | Д | Е |
| 1 | DC1 | ! | 1 | A | Q | a | q | Б | С | б | Щ | Т | Ш | р | Ё |
| 2 | DC2 | " | 2 | B | R | b | r | В | Т | в | Щ | Т | Щ | с | ё |
| 3 | DC3 | # | 3 | C | S | c | s | Г | У | г | Щ | Т | Щ | т | ё |
| 4 | DC4 | \$ | 4 | D | T | d | t | Д | Ф | д | Щ | Т | Щ | у | ё |
| 5 | | % | 5 | E | U | e | u | Е | Х | е | Щ | Т | Щ | ф | ё |
| 6 | | & | 6 | F | V | f | v | Ж | Ц | ж | Щ | Т | Щ | х | ё |
| 7 | BEL | ' | 7 | G | W | g | w | З | Ч | э | Щ | Т | Щ | ц | ё |
| 8 | BS CAN | (| 8 | H | X | h | x | И | Ш | и | Щ | Т | Щ | ч | ё |
| 9 | HT EM |) | 9 | I | Y | i | y | Й | Щ | й | Щ | Т | Щ | ш | ё |
| A | LF | * | : | J | Z | j | z | К | Ъ | к | Щ | Т | Щ | щ | ё |
| B | VT ESC | + | ; | K | [| k | { | Л | М | л | Щ | Т | Щ | ь | ё |
| C | FF FS | , | < | L | \ | l | | М | Ь | м | Щ | Т | Щ | ы | ё |
| D | CR | - | = | M |] | m | } | Н | Э | н | Щ | Т | Щ | э | ё |
| E | SO | . | > | N | ^ | n | ~ | О | Ю | о | Щ | Т | Щ | ю | ё |
| F | SI | / | ? | O | _ | o | DEL | П | Я | п | Щ | Т | Щ | я | ё |

Code page 869

| | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | 0 | @ | P | ` | р | | Т | İ | Щ | С | Л | Т | Ç |
| 1 | DC1 | ! | 1 | A | Q | a | q | | İ | ı | Щ | С | Л | Т | Ç |
| 2 | DC2 | " | 2 | B | R | b | r | | Đ | ó | Щ | С | Л | Т | Ç |
| 3 | DC3 | # | 3 | C | S | c | s | | | ó | Щ | С | Л | Т | Ç |
| 4 | DC4 | \$ | 4 | D | T | d | t | | | А | Щ | С | Л | Т | Ç |
| 5 | | % | 5 | E | U | e | u | | Y | В | К | Щ | С | Л | Т |
| 6 | | & | 6 | F | V | f | v | А | ÿ | Г | Л | Щ | С | Л | Т |
| 7 | BEL | ' | 7 | G | W | g | w | | ® | Δ | М | Щ | С | Л | Т |
| 8 | BS CAN | (| 8 | H | X | h | x | · | Ω | Е | Н | Щ | С | Л | Т |
| 9 | HT EM |) | 9 | I | Y | i | y | — | ² | Z | Щ | С | Л | Т | Ç |
| A | LF | * | : | J | Z | j | z | | ³ | H | Щ | С | Л | Т | Ç |
| B | VT ESC | + | ; | K | [| k | { | ' | ´ | ½ | Щ | С | Л | Т | Ç |
| C | FF FS | , | < | L | \ | l | | ' | ´ | £ | Щ | С | Л | Т | Ç |
| D | CR | - | = | M |] | m | } | E | é | I | Щ | С | Л | Т | Ç |
| E | SO | . | > | N | ^ | n | ~ | - | ñ | « | Щ | С | Л | Т | Ç |
| F | SI | / | ? | O | _ | o | DEL | Н | í | » | Щ | С | Л | Т | Ç |

Code page USSR Gost

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | ± | ђ | Г | А | Р | а | р | Ё |
| 1 | DC1 | ! | 1 | A | Q | a | q | ± | ђ | Г | Б | С | б | с | ё | |
| 2 | DC2 | " | 2 | B | R | b | r | ± | ђ | Г | В | Т | в | т | / | |
| 3 | DC3 | # | 3 | C | S | c | s | ± | ђ | Г | Л | У | г | у | \ | |
| 4 | DC4 | \$ | 4 | D | T | d | t | ± | ђ | Г | Д | Ф | д | ф | / | |
| 5 | | % | 5 | E | U | e | u | ± | ђ | Г | Е | Х | е | х | \ | |
| 6 | | & | 6 | F | V | f | v | ± | ђ | Г | Ж | Ц | ж | ц | → | |
| 7 | BEL | ' | 7 | G | W | g | w | ± | ђ | Г | З | Ч | з | ч | ← | |
| 8 | BS CAN | (| 8 | H | X | h | x | ± | ђ | Г | И | Ш | и | ш | ↑ | |
| 9 | HT EM |) | 9 | I | Y | i | y | ± | ђ | Г | Й | Щ | й | щ | ↓ | |
| A | LF | * | : | J | Z | j | z | ± | ђ | Г | К | Ъ | к | ъ | ÷ | |
| B | VT ESC | + | ; | K | [| k | { | ± | ђ | Г | Л | Ы | л | ы | ± | |
| C | FF FS | , | < | L | \ | l | | ± | ђ | Г | М | Ь | м | ь | № | |
| D | CR | - | = | M |] | m | } | ± | ђ | Г | Н | Э | н | э | и | |
| E | SO | . | > | N | ^ | n | ~ | ± | ђ | Г | О | Ю | о | ю | ■ | |
| F | SI | / | ? | O | _ | o | DEL | ± | ђ | Г | П | Я | п | я | | |

Code page 864

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | ° | В | . | ё | з | — | ± | |
| 1 | DC1 | ! | 1 | A | Q | a | q | • | ø | — | \ | а | р | ё | з | ± |
| 2 | DC2 | " | 2 | B | R | b | r | • | ø | Г | γ | т | з | ё | з | ± |
| 3 | DC3 | # | 3 | C | S | c | s | √ | ± | £ | γ | т | з | ё | з | ± |
| 4 | DC4 | \$ | 4 | D | T | d | t | ± | ½ | ¤ | з | т | з | ё | з | ± |
| 5 | | % | 5 | E | U | e | u | — | ¼ | £ | о | ж | о | о | £ | |
| 6 | | & | 6 | F | V | f | v | | ≈ | | γ | т | з | ё | з | ± |
| 7 | BEL | ' | 7 | G | W | g | w | ± | « | | γ | т | з | ё | з | ± |
| 8 | BS CAN | (| 8 | H | X | h | x | ± | » | Г | А | Т | з | ё | з | ± |
| 9 | HT EM |) | 9 | I | Y | i | y | ± | » | Г | А | Т | з | ё | з | ± |
| A | LF | * | : | J | Z | j | z | ± | » | Г | А | Т | з | ё | з | ± |
| B | VT ESC | + | ; | K | [| k | { | ± | | Г | А | Т | з | ё | з | ± |
| C | FF FS | , | < | L | \ | l | | ± | Г | А | Т | з | ё | з | ± | |
| D | CR | - | = | M |] | m | } | ± | Г | А | Т | з | ё | з | ± | |
| E | SO | . | > | N | ^ | n | ~ | ± | Г | А | Т | з | ё | з | ± | |
| F | SI | / | ? | O | _ | o | DEL | ± | Г | А | Т | з | ё | з | ± | |

Code page 437G

| | | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | | 0 | @ | P | ` | p | A | P | ı | ı | L | ı | ω | Ω |
| 1 | DC1 | ! | 1 | A | Q | a | q | B | Σ | κ | ı | ı | ı | ı | ά | ± |
| 2 | DC2 | " | 2 | B | R | b | r | Γ | T | λ | ı | ı | ı | ı | é | ≥ |
| 3 | DC3 | # | 3 | C | S | c | s | Δ | Y | μ | ı | ı | ı | ı | ή | ≤ |
| 4 | DC4 | \$ | 4 | D | T | d | t | E | Φ | v | ı | ı | ı | ı | ı | ı |
| 5 | | % | 5 | E | U | e | u | Z | X | ξ | ı | ı | ı | ı | ı | ı |
| 6 | | & | 6 | F | V | f | v | H | Ψ | o | ı | ı | ı | ı | ı | ı |
| 7 | BEL | ' | 7 | G | W | g | w | Θ | Ω | π | ı | ı | ı | ı | ı | ı |
| 8 | BS CAN | (| 8 | H | X | h | x | I | α | ρ | ı | ı | ı | ı | ı | ı |
| 9 | HT EM |) | 9 | I | Y | i | y | K | β | σ | ı | ı | ı | ı | ı | ı |
| A | LF | * | : | J | Z | j | z | Λ | γ | ς | ı | ı | ı | ı | ı | ı |
| B | VT ESC | + | ; | K | [| k | { | M | δ | τ | ı | ı | ı | ı | ı | ı |
| C | FF FS | , | < | L | \ | l | | N | ε | υ | ı | ı | ı | ı | ı | ı |
| D | CR | - | = | M |] | m | } | Ξ | ζ | φ | ı | ı | ı | ı | ı | ı |
| E | SO | . | > | N | ^ | n | ~ | O | η | χ | ı | ı | ı | ı | ı | ı |
| F | SI | / | ? | O | _ | o | DEL | Π | θ | ψ | ı | ı | ı | ı | ı | ı |

Code page 920

| | | | | | | | | | | | | | | | | |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | NUL | | | 0 | @ | P | ` | p | | | | ° | À | Ö | à | ğ |
| 1 | DC1 | ! | 1 | A | Q | a | q | | | | ı | ı | Á | Ñ | á | ñ |
| 2 | DC2 | " | 2 | B | R | b | r | | | | ı | ı | Â | Ò | â | ò |
| 3 | DC3 | # | 3 | C | S | c | s | | | | ı | ı | Ã | Ó | ã | ó |
| 4 | DC4 | \$ | 4 | D | T | d | t | | | | ı | ı | Ä | Ô | ä | ô |
| 5 | | % | 5 | E | U | e | u | | | | ı | ı | Å | Õ | å | õ |
| 6 | | & | 6 | F | V | f | v | | | | ı | ı | Æ | Ö | æ | ö |
| 7 | BEL | ' | 7 | G | W | g | w | | | | ı | ı | Ç | × | ç | ÷ |
| 8 | BS CAN | (| 8 | H | X | h | x | | | | ı | ı | È | Ø | è | ø |
| 9 | HT EM |) | 9 | I | Y | i | y | | | | ı | ı | É | Ù | é | ù |
| A | LF | * | : | J | Z | j | z | | | | ı | ı | Ê | Ú | ê | û |
| B | VT ESC | + | ; | K | [| k | { | | | | ı | ı | Ë | Û | ë | ü |
| C | FF FS | , | < | L | \ | l | | | | | ı | ı | Ì | Ü | ì | ü |
| D | CR | - | = | M |] | m | } | | | | ı | ı | Í | İ | í | ı |
| E | SO | . | > | N | ^ | n | ~ | | | | ı | ı | Î | Ş | î | ş |
| F | SI | / | ? | O | _ | o | DEL | | | | ı | ı | Ï | ß | ï | ÿ |

Code page 858

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|----------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|---|
| 0 NUL | | | | 0 | @ | P | ` | p | Ç | É | á | ⌘ | L | ø | Ó | - |
| 1 DC1 | ! | 1 | A | Q | a | q | ü | æ | í | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ± |
| 2 DC2 | " | 2 | B | R | b | r | é | Æ | ó | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ≡ |
| 3 DC3 | # | 3 | C | S | c | s | â | ô | ú | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ≠ |
| 4 DC4 | \$ | 4 | D | T | d | t | ä | ö | ñ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ¶ |
| 5 | % | 5 | E | U | e | u | à | ò | Ñ | Á | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | § |
| 6 | & | 6 | F | V | f | v | â | û | æ | Á | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ÷ |
| 7 BEL | ' | 7 | G | W | g | w | ç | ù | ø | À | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | , |
| 8 BS CAN | (| 8 | H | X | h | x | ê | ÿ | í | ⊙ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | . |
| 9 HT EM |) | 9 | I | Y | i | y | ë | Û | ⊙ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | " |
| A LF | * | : | J | Z | j | z | è | Ü | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ' |
| B VT ESC | + | ; | K | [| k | { | ï | ø | ½ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | 1 |
| C FF FS | , | < | L | \ | l | | í | £ | ¼ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | 3 |
| D CR | - | = | M |] | m | } | ì | Ø | ì | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | 2 |
| E SO | . | > | N | ^ | n | ~ | Ä | × | « | ¥ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ´ |
| F SI | / | ? | O | _ | o | DEL | Å | f | » | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ⌘ | ˆ |

Code page 923

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|----------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|---|
| 0 NUL | | | | 0 | @ | P | ` | p | | | ° | À | Ð | à | ð | |
| 1 DC1 | ! | 1 | A | Q | a | q | | | | | í | ± | Á | Ñ | á | ñ |
| 2 DC2 | " | 2 | B | R | b | r | | | | | é | ² | Â | Ò | â | ò |
| 3 DC3 | # | 3 | C | S | c | s | | | | | £ | ³ | Ã | Ó | ã | ó |
| 4 DC4 | \$ | 4 | D | T | d | t | | | | | € | Ž | Ä | Ô | ä | ô |
| 5 | % | 5 | E | U | e | u | | | | | ¥ | μ | Å | Ö | å | ö |
| 6 | & | 6 | F | V | f | v | | | | | Š | ¶ | Æ | Ø | æ | ø |
| 7 BEL | ' | 7 | G | W | g | w | | | | | § | . | Ç | × | ç | ÷ |
| 8 BS CAN | (| 8 | H | X | h | x | | | | | š | ž | È | Ø | è | ø |
| 9 HT EM |) | 9 | I | Y | i | y | | | | | ⊙ | ı | É | Ù | é | ù |
| A LF | * | : | J | Z | j | z | | | | | ª | º | Ê | Ú | ê | ú |
| B VT ESC | + | ; | K | [| k | { | | | | | « | » | Ë | Û | ë | û |
| C FF FS | , | < | L | \ | l | | | | | | ¬ | Ⓔ | Ì | Ü | ì | ü |
| D CR | - | = | M |] | m | } | | | | | | œ | Í | Ý | í | ý |
| E SO | . | > | N | ^ | n | ~ | | | | | ⊙ | ÿ | Î | Þ | î | þ |
| F SI | / | ? | O | _ | o | DEL | | | | | — | ı | Ï | Ë | ï | ÿ |

ISO code pages

ISO 8859-2

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | | | A | ° | Á | Đ | í | đ |
| 1 | DC1 | ! | 1 | A | Q | a | q | | | | À | ą | Á | Ń | á | ń |
| 2 | DC2 | " | 2 | B | R | b | r | | | | ˘ | . | Â | Ń | â | ñ |
| 3 | DC3 | # | 3 | C | S | c | s | | | | Ł | ł | Ă | Ó | ă | ó |
| 4 | DC4 | \$ | 4 | D | T | d | t | | | | ł | ˘ | Ä | Ô | ä | ô |
| 5 | | % | 5 | E | U | e | u | | | | Ĺ | ĺ | Ĭ | Ó | í | ô |
| 6 | | & | 6 | F | V | f | v | | | | Š | š | Ć | Ō | ć | ō |
| 7 | BEL | ' | 7 | G | W | g | w | | | | Š | ˘ | Ç | × | ç | ÷ |
| 8 | BS CAN | (| 8 | H | X | h | x | | | | ˘ | . | Č | Ř | č | ř |
| 9 | HT EM |) | 9 | I | Y | i | y | | | | Š | š | É | Ů | é | ů |
| A | LF | * | : | J | Z | j | z | | | | Š | š | Ę | Ú | ę | ú |
| B | VT ESC | + | ; | K | [| k | { | | | | Ť | ť | Ě | Ů | ě | ů |
| C | FF FS | , | < | L | \ | l | | | | | Ž | ž | Ě | Ů | ě | ů |
| D | CR | - | = | M |] | m | } | | | | - | " | Í | Ý | í | ý |
| E | SO | . | > | N | ^ | n | ~ | | | | Ž | ž | Í | Ť | í | ť |
| F | SI | / | ? | O | _ | o | DEL | | | | Ž | ž | Đ | ß | đ | . |

ISO 8859-5

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | | | A | А | Р | а | р | № |
| 1 | DC1 | ! | 1 | A | Q | a | q | | | | Ё | Б | С | б | с | ё |
| 2 | DC2 | " | 2 | B | R | b | r | | | | Ъ | В | Т | в | т | ђ |
| 3 | DC3 | # | 3 | C | S | c | s | | | | Ѓ | Г | У | г | у | ѓ |
| 4 | DC4 | \$ | 4 | D | T | d | t | | | | Є | Д | Ф | д | ф | є |
| 5 | | % | 5 | E | U | e | u | | | | Ѕ | Е | Х | е | х | ѕ |
| 6 | | & | 6 | F | V | f | v | | | | І | Ж | Ц | ж | ц | і |
| 7 | BEL | ' | 7 | G | W | g | w | | | | Ї | З | Ч | з | ч | ї |
| 8 | BS CAN | (| 8 | H | X | h | x | | | | Ј | И | Ш | и | ш | ј |
| 9 | HT EM |) | 9 | I | Y | i | y | | | | Љ | Й | Щ | й | щ | љ |
| A | LF | * | : | J | Z | j | z | | | | Њ | К | Ъ | к | ъ | њ |
| B | VT ESC | + | ; | K | [| k | { | | | | Ѓ | Л | М | л | м | ѓ |
| C | FF FS | , | < | L | \ | l | | | | | Ќ | М | Ь | м | ь | ќ |
| D | CR | - | = | M |] | m | } | | | | - | Н | Э | н | э | ѕ |
| E | SO | . | > | N | ^ | n | ~ | | | | Ў | О | Ю | о | ю | ў |
| F | SI | / | ? | O | _ | o | DEL | | | | Ц | П | Я | п | я | ц |

ISO 8859-7

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | | | | ° | í | Ï | ø | π |
| 1 | DC1 | ! | 1 | A | Q | a | q | | | | ´ | ± | À | Þ | α | ρ |
| 2 | DC2 | " | 2 | B | R | b | r | | | | ¸ | ² | B | | β | ς |
| 3 | DC3 | # | 3 | C | S | c | s | | | | £ | ³ | Γ | Σ | γ | σ |
| 4 | DC4 | \$ | 4 | D | T | d | t | | | | | ´ | Δ | Τ | δ | τ |
| 5 | | % | 5 | E | U | e | u | | | | | ˆ | E | Υ | ε | υ |
| 6 | | & | 6 | F | V | f | v | | | | | À | Z | Φ | ς | φ |
| 7 | BEL | ' | 7 | G | W | g | w | | | | § | · | H | X | η | χ |
| 8 | BS CAN | (| 8 | H | X | h | x | | | | ¨ | È | Θ | Ψ | θ | ψ |
| 9 | HT EM |) | 9 | I | Y | i | y | | | | © | Η | Ι | Ω | ι | ω |
| A | LF | * | : | J | Z | j | z | | | | ı | ı | K | Ï | κ | ı |
| B | VT ESC | + | ; | K | [| k | { | | | | « | » | Λ | Ÿ | λ | ÿ |
| C | FF FS | , | < | L | \ | l | | | | | ¬ | Ɔ | M | ά | μ | ό |
| D | CR | - | = | M |] | m | } | | | | - | ½ | N | έ | ν | έ |
| E | SO | . | > | N | ^ | n | ~ | | | | | ¾ | Ξ | ή | ξ | ώ |
| F | SI | / | ? | O | _ | o | DEL | | | | - | Ω | Ο | ί | ο | |

ISO 8859-8

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|--------|----|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|
| 0 | NUL | | | 0 | @ | P | ` | p | | | | ° | | | κ | ι |
| 1 | DC1 | ! | 1 | A | Q | a | q | | | | | ± | | | κ | ο |
| 2 | DC2 | " | 2 | B | R | b | r | | | | ¢ | ² | | | λ | υ |
| 3 | DC3 | # | 3 | C | S | c | s | | | | £ | ³ | | | τ | η |
| 4 | DC4 | \$ | 4 | D | T | d | t | | | | ¤ | ´ | | | π | θ |
| 5 | | % | 5 | E | U | e | u | | | | ¥ | μ | | | ι | υ |
| 6 | | & | 6 | F | V | f | v | | | | | ¶ | | | ι | υ |
| 7 | BEL | ' | 7 | G | W | g | w | | | | § | · | | | π | φ |
| 8 | BS CAN | (| 8 | H | X | h | x | | | | ¨ | ˆ | | | σ | ι |
| 9 | HT EM |) | 9 | I | Y | i | y | | | | © | ı | | | ı | σ |
| A | LF | * | : | J | Z | j | z | | | | ı | ÷ | | | ı | η |
| B | VT ESC | + | ; | K | [| k | { | | | | « | » | | | ı | |
| C | FF FS | , | < | L | \ | l | | | | | ¬ | ¼ | | | ı | |
| D | CR | - | = | M |] | m | } | | | | - | ½ | | | σ | |
| E | SO | . | > | N | ^ | n | ~ | | | | ® | ¾ | | | σ | |
| F | SI | / | ? | O | _ | o | DEL | | | | - | | | | = | ı |

Available code pages and fonts

The following list includes all the character sets you can select from the control panel or via ESC sequences and specifies the fonts in which they are available.

The printer does not support all code pages in the all fonts. See the Code page Table and Notes.

- ❶ The Roman typeface is selected on these code pages.
- ❷ The OCR-B typeface are available on ASCII character set and a part of character of code page 437, 850, 860, 863, 865 and 858. OCR-B font is able to be printed by Euro Symbol character.
- ❸ OCR-A character set is prior to any code page or nationality.

| Code page/Font | Draft | Roman | Sans Serif | Courier | Bold | Prestige | Script | Orator | Orator-S | Gothic | OCR-A | OCR-B |
|----------------|-------|-------|------------|---------|------|----------|--------|--------|----------|--------|-------|-------|
| PC 437 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❷ |
| PC 850 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❷ |
| PC 860 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❷ |
| PC 863 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❷ |
| PC 865 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❷ |
| PC 852 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❶ |
| PC 853 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❶ |
| PC 857 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❶ |
| PC 437G | ✓ | ✓ | ✓ | ✓ | ✓ | ❶ | ❶ | ❶ | ❶ | ❶ | ❸ | ❶ |
| PC 851 | ✓ | ✓ | ✓ | ✓ | ✓ | ❶ | ❶ | ❶ | ❶ | ❶ | ❸ | ❶ |
| PC 855 | ✓ | ✓ | ✓ | ✓ | ✓ | ❶ | ❶ | ❶ | ❶ | ❶ | ❸ | ❶ |
| PC 866 | ✓ | ✓ | ✓ | ✓ | ✓ | ❶ | ❶ | ❶ | ❶ | ❶ | ❸ | ❶ |
| PC 869 | ✓ | ✓ | ✓ | ✓ | ✓ | ❶ | ❶ | ❶ | ❶ | ❶ | ❸ | ❶ |
| USSR GOST | ✓ | ✓ | ✓ | ✓ | ✓ | ❶ | ❶ | ❶ | ❶ | ❶ | ❸ | ❶ |
| PC 920 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❶ |
| PC 858 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ❸ | ❷ |

| Code page/Font | Draft | Roman | Sans Serif | Courier | Bold | Prestige | Script | Orator | Orator-S | Gothic | OCR-A | OCR-B |
|---------------------|-------|-------|------------|---------|------|----------|--------|--------|----------|--------|-------|-------|
| PC 923 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ③ | ① |
| ISO 8859-1 Latin 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ③ | ① |
| ISO 8859-2 Latin 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ③ | ① |
| ISO 8859-5 Cyrillic | ✓ | ✓ | ✓ | ✓ | ✓ | ① | ① | ① | ① | ① | ③ | ① |
| ISO 8859-7 Greek | ✓ | ✓ | ✓ | ✓ | ✓ | ① | ① | ① | ① | ① | ③ | ① |
| ISO 8859-8 Hebrew | ✓ | ✓ | ① | ① | ① | ① | ① | ① | ① | ① | ③ | ① |

Emulations

When a printer understands the control set written for another printer type, it is said to emulate the other printer. Your printer emulates, i.e. “understands” the Olivetti PR2 in its standard version.

Escape sequences

Escape sequences or control codes tell the printer that the following transmitted code is a printer command and not a printable character. They allow the selection of printer functions or the changing of printer parameters from the computer. By transmitting an escape sequence, you are able to change the previously set configuration of the printer (e.g. character set).

This chapter contains an introduction into the sequences and control codes which are used by your printer.



The settings made by escape sequences have priority over the settings made in menu mode; therefore they override these.

What are escape sequences?

An escape sequence consists of an ESCape control character (ESC = decimal 27 or hexadecimal 1B) followed by one or more characters, which represent commands to the printer. Please note that this escape character has nothing to do with the ESC key on your computer keyboard.

For example, the control character ESC followed by the character “4” tells your printer to print the subsequent text in italics.

Control codes

Control codes give simple instructions to the printer to do a specific function. Unlike escape sequences, control codes do not begin with the ESC control code. Instead, they consist of special single-character non-printing commands (e.g. LF, FF, DC2).

How are escape sequences used?

Escape sequences are transmitted to the printer by your computer software via the printer driver. Experienced users and programmers can also control the printer directly via control sequences, however before you start working with escape sequences and control codes, we recommend that you study the computer software manual.

To enter control codes the Ctrl key and an ASCII character must be pressed simultaneously. For instance, by pressing Ctrl and J a line feed is accomplished (it is required to output the character string on the printer). More information concerning this topic is contained in your computer software manual and the corresponding Programmer's Application Manuals (see [\[\[Querverweis auf Manual auf der CD\]\]](#)).



The selected emulation must correspond to the printer driver of your application program. Settings caused by ESC sequences remain valid, until they are switched off by another control code. All settings are reset to the original menu, when the printer is switched off.

List of available control codes

The following table shows the available sequences in the various emulations.

If you want to know more about control codes, we recommend our Programmer's Application Manual on this CD-ROM. Detailed information on PR2 control codes you find in the original PR2 programmer's manual.

PR2 mode

| Command sequence | Function |
|-------------------------|---|
| Page Layout | |
| ESC Q nnn mmm ESC Z | Define document length |
| ESC J nnn | Define left margin |
| ESC T nnn | Define top of form "TOF" |
| ESC M nnn | Define bottom of form "BOF" |
| ESC & nn | Elementary vertical spacing |
| Print Pitches | |
| ESC < | Print pitch 10 cpi |
| ESC = | Print pitch 12 cpi |
| ESC > | Print pitch 166 cpi |
| ESC a n | Print pitch |
| ESC ? | Proportional spacing |
| Print Attributes | |
| ESC R nnn | Select graphic font |
| ESC 3 | Double width |
| ESC 4 | Cancel double width |
| ESC d | Double height and double width |
| ESC e | Cancel double height and double width |
| ESC ! W 1 | Double height |
| ESC ! W 0 | Cancel double height |
| ESC ! sp nnn | Add columns to the right of the character |
| ESC (| Bold face |
| ESC) | Cancel bold face |
| ESC * n | Underline |
| ESC + | Cancel underline |
| ESC ` n | Superscript - Subscript |
| ESC { | Cancel superscript-subscript |

| Printer Operations | |
|-----------------------------------|--|
| ESC S 5 | Select printer device |
| LF | Line feed forward |
| FF | Form feed (ejection from rear) |
| CR | Carriage return |
| BS | Back Space |
| ESC 7 | Line feed back |
| ESC H nnn | Set absolute horizontal position |
| ESC I nnn | Set relative vertical position |
| ESC L nnn | Set absolute vertical position |
| ESC O | Eject document |
| ESC ^ 0 | Change emulation |
| ESC [nnn | Select character set |
| BEL | Bell |
| DEL | Clear print memory |
| ESC # n | Assign reference for ESC L nnn |
| ESC A nnn | Define offset in elementary steps |
| ESC B nnnn | Define document width in elementary steps |
| ESC ' n | Set up document type |
| ESC / m nnnn | Absolute vertical position in elementary steps |
| ESC - | Measure document length |
| ESC } - | Measure document width |
| ESC S nnnn | Measure document length or width : answer |
| Graphics | |
| ESC 1 p mmmm nnn | 9 pin BIM print |
| ESC 1 P mmmm nnn | 24 pin BIM print |
| ESC 2 | Reset BIM mode |
| ESC X nnn | Set relative horizontal position |
| Downline Loading Characters (DLL) | |
| ESC h 0 n m d0 d1 d2 D1 D2Dm | 9 pin DLL |
| ESC h 0 n m d0 d1 d2 D1 D2Dm | 24 pin DLL |
| ESC : 000 | Copy character generator into user memory |
| ESC m n 0 | Select character generator |

| | |
|---|--|
| Printer Control | |
| ESC Z | Request for primary ID |
| ESC / 7 | Printer ID |
| ESC i | Request for basic machine configuration |
| ESC p x y z k | Printer configuration |
| ESC j | Status request |
| ESC r x | Synchronous basic machine status |
| ESC sp B | Request for Document Status |
| ESC B id m ESC Z | Synchronous Document Status |
| ESC sp b | Request for FW Release ID |
| ESC b idrel1;idver1; ... idreln;idvern ESC Z | FW Release ID |
| ESC sp a | Request for Set-Up configuration |
| ESC a byte1 byte2 byte3 byten ESC Z | Set-Up configuration |
| ESC l | Reset error |
| ESC n | Olivetti controlled selection |
| ESC 0 | General reset |
| ESC U n | Book operator |
| ESC r x | Answer to book operator command |
| ESC | Select automatic operator booking |
| ESC _ | Select manual operator booking |
| ESC ! G n | Select 9 or 24 pin graphics and DLL |
| Magnetic Device Control | |
| ESC j | Passbook magnetic stripe read |
| ESC t datiGS | Data to be recorded on the magnetic stripe |
| ESC \ | Record and verify magnetic stripe |
| ESC } r | MICR magnetic read |
| ESC Y E k1 K2 | Set horizontal magnetic device |
| ESC Y B k1 K2 | Set MICR Magnetic Read |
| Bar Code Print | |
| ESC x mm; hh; zz; n ESC Z | Set Bar Code Print |
| ESC y dati ESC Z | Activate Bar Code Print |
| External paper handling device control | |
| ESC } + | Form position control |
| ESC } L t nnn | Passbook positioning |
| ESC } M nnn | Negative bottom of form |
| ESC } W | Wait for end of print |

| | |
|--------------------------|--------------------------------------|
| ESC } 0 P | Reset form parking |
| ESC s nnnn | Measure form position : answer |
| Image acquisition | |
| ESC } p ... | Image acquisition |
| STX mn ... | Data transmission from image reader. |

PR50 mode

| Command sequence | Function |
|---------------------------|---------------------------------------|
| Page Layout | |
| ESC Q nnn mmm ESC Z | Define document length |
| ESC J nnn | Define left margin |
| ESC T nnn | Define top of form "TOF" |
| ESC M nnn | Define bottom of form "BOF" |
| ESC & nn | Elementary vertical spacing |
| Print Pitches | |
| ESC < | Print pitch 10 cpi |
| ESC = | Print pitch 12 cpi |
| ESC > | Print pitch 166 cpi |
| ESC ? | Proportional spacing |
| Print Attributes | |
| ESC R nnn | Select graphic font |
| ESC 3 | Double width |
| ESC 4 | Cancel double width |
| ESC d | Double height and double width |
| ESC e | Cancel double height and double width |
| ESC (| Bold face |
| ESC) | Cancel bold face |
| ESC * n | Underline |
| ESC + | Cancel underline |
| ESC ` n | Superscript - Subscript |
| ESC { | Cancel superscript-subscript |
| Printer Operations | |
| ESC S 5 | Select printer device |
| LF | Line feed forward |
| FF | Form feed (ejection from rear) |
| CR | Carriage return |
| ESC 7 | Line feed back |
| ESC H nnn | Set absolute horizontal position |
| ESC I nnn | Set relative vertical position |
| ESC L nnn | Set absolute vertical position |
| ESC O | Eject document |

| | |
|--|--|
| ESC ^ 0 | Change emulation |
| ESC [nnn | Select character set |
| BEL | Bell |
| DEL | Clear print memory |
| ESC # n | Assign reference for ESC L nnn |
| ESC A nnn | Define offset in elementary steps |
| ESC B nnnn | Define document width in elementary steps |
| ESC ' n | Set up document type |
| ESC / m nnnn | Absolute vertical position in elementary steps |
| ESC - | Measure document length |
| ESC } - | Measure document width |
| ESC S nnnn | Measure document length or width : answer |
| Graphics | |
| ESC 1 p mmmm nnn | 9 pin BIM print |
| ESC 2 | Reset BIM mode |
| Downline Loading Characters (DLL) | |
| ESC h 0 n m d0 d1 d2 D1 D2Dm | 9 pin DLL |
| ESC : 000 | Copy character generator into user memory |
| ESC m n 0 | Select character generator |
| Printer Control | |
| ESC Z | Request for primary ID |
| ESC // | Printer ID |
| ESC i | Request for basic machine configuration |
| ESC p x y z k | Printer configuration |
| ESC j | Status request |
| ESC r x | Synchronous basic machine status |
| ESC sp B | Request for Document Status |
| ESC I | Reset error |
| ESC n | Olivetti controlled selection |
| ESC 0 | General reset |
| ESC U n | Book operator |
| ESC r x | Answer to book operator command |
| ESC | Select automatic operator booking |
| ESC _ | Select manual operator booking |

| | |
|---|--|
| Magnetic Device Control | |
| ESC] | Passbook magnetic stripe read |
| ESC t datiGS | Data to be recorded on the magnetic stripe |
| ESC \ | Record and verify magnetic stripe |
| ESC } r | MICR magnetic read |
| ESC Y E k1 K2 | Set horizontal magnetic device |
| ESC Y B k1 K2 | Set MICR Magnetic Read |
| External paper handling device control | |
| ESC } + | Form position control |
| ESC } L t nnn | Passbook positioning |
| ESC } M nnn | Negative bottom of form |
| ESC } W | Wait for end of print |
| ESC } 0 P | Reset form parking |
| ESC s nnnn | Measure form position : answer |

IBM mode

| Command sequence | | Function |
|-----------------------------|-------------|-----------------------------------|
| Horizontal position control | | |
| BS | 08H | Backspace |
| HT | 09H | Horizontal tab |
| CR | 0DH | Carriage return |
| ESC BS | 1BH 08H | Backspace |
| ESC HT | 1BH 09H | Horizontal tab |
| ESC CR | 1BH 0DH | Carriage return |
| ESC D | 1BH 44H | Set horizontal tabs |
| ESC X | 1BH 58H | Set horizontal margins |
| ESC d | 1BH 64H | Relative mode inline forward |
| Vertical position control | | |
| LF | 0AH | Line feed |
| VT | 0BH | Vertical tab |
| FF | 0CH | Form feed |
| ESC LF | 1BH 0AH | Line feed |
| ESC VT | 1BH 0BH | Vertical tab |
| ESC FF | 1BH 0CH | Form feed |
| ESC 0 | 1BH 30H | Select 1/8" line spacing |
| ESC 1 | 1BH 31H | Select 7/72" line spacing |
| ESC 2 | 1BH 32H | Start text line spacing |
| ESC 3 | 1BH 33H | Set graphics line spacing |
| ESC 4 | 1BH 34H | Set top of form |
| ESC 5 | 1BH 35H | Automatic line feed |
| ESC A | 1BH 41H | Set text line spacing |
| ESC B | 1BH 42H | Set vertical tabs |
| ESC C | 1BH 43H | Set form length in lines |
| ESC C 0 | 1BH 43H 00H | Set form length in inches |
| ESC J | 1BH 4AH | Graphics variable line spacing |
| ESC N | 1BH 4EH | Set automatic perforation skip |
| ESC O | 1BH 4FH | Cancel automatic perforation skip |
| ESC [\ | 1BH 5BH 5CH | Set vertical units |
| ESC] | 1BH 5DH | Reverse line feed |

| Character attributes | | |
|--|-------------|---|
| SO | 0EH | Double-wide printing by line |
| SI | 0FH | Condensed printing |
| DC2 | 12H | Select 10 cpi |
| DC4 | 14H | Cancel double-wide printing by line |
| ESC SO | 1BH 0EH | Double-wide printing by line |
| ESC SI | 1BH 0FH | Condensed printing |
| ESC DC2 | 1BH 12H | Select 10 cpi |
| ESC DC4 | 1BH 14H | Cancel double-wide printing by line |
| ESC - | 1BH 2DH | Continuous underscore |
| ESC : | 1BH 3AH | Select 12 cpi |
| ESC E | 1BH 45H | Select emphasized mode |
| ESC F | 1BH 45H | Cancel emphasized mode |
| ESC G | 1BH 47H | Select double strike mode |
| ESC H | 1BH 47H | Cancel double strike mode |
| ESC I | 1BH 49H | Select print mode |
| ESC P | 1BH 50H | Proportional space mode |
| ESC S | 1BH 53H | Start subscript or superscript printing |
| ESC T | 1BH 54H | Cancel subscript or superscript printing |
| ESC W | 1BH 57H | Continuous double-wide printing |
| ESC [@ | 1BH 5BH 40H | Set presentation highlight |
| ESC _ | 1BH 5FH | Continuous oversore |
| Download and character code setting | | |
| ESC 6 | 1BH 36H | Select character set 2 |
| ESC 7 | 1BH 37H | Select character set 1 |
| ESC = | 1BH 3DH | Character font image download |
| ESC [T | 1BH 5BH 54H | Set code page |
| ESC \ | 1BH 5CH | Print continuously from all character chart |
| ESC ^ | 1BH 5EH | Print single character from all character chart |
| Bitimage | | |
| ESC K | 1BH 4BH | Normal density bit image graphics |
| ESC L | 1BH 4CH | Dual density bit image graphics |
| ESC Y | 1BH 59H | Dual density bit image graphics |
| ESC Z | 1BH 5AH | High density bit image graphics |
| ESC [g | 1BH 5BH 67H | High resolution graphics |

| Barcode | | |
|----------------------------|-------------|---|
| ESC [f | 1BH 5BH 66H | Setup barcode parameter |
| ESC [p | 1BH 5BH 70H | Set barcode data |
| Others | | |
| BEL | 07H | Beeper |
| DC1 | 11H | Select printer |
| DC3 | 13H | Deselect printer |
| CAN | 18H | Cancel Data |
| ESC BEL | 1BH 07H | Beeper |
| ESC DC1 | 1BH 11H | Select printer |
| ESC DC3 | 1BH 13H | Deselect printer |
| ESC CAN | 1BH 18H | Cancel data |
| ESC Q | 1BH 51H | Deselect printer |
| ESC R | 1BH 52H | Set all tabs to power on settings |
| ESC U | 1BH 55H | Set print direction |
| ESC [K | 1BH 5BH 4BH | Set initial condition |
| ESC j | 1BH 6AH | Stop printing |
| AGM control command | | |
| ESC * | 1BH 2AH | Select Graphics Mode |
| ESC 3 | 1BH 33H | Set graphics line spacing (n/180") |
| ESC A | 1BH 41H | Set text line spacing (n/60") |
| ESC J | 1BH 4AH | Graphics variable line spacing (n/180") |
| 4722 unique command | | |
| ESC [J | 1BH 5BH 4AH | Set single line density |
| ESC [F | 1BH 5BH 46H | Page Presentation Media |
| ESC [c | 1BH 5BH 63H | Message |

Epson mode

| Command sequence | | Function |
|------------------------------------|-------------|--------------------------------------|
| Horizontal position control | | |
| BS | 08H | Backspace |
| HT | 09H | Horizontal Tab |
| CR | 0DH | Carriage Return |
| ESC \$ | 1BH 24H | Set Absolute Print Position |
| ESC D | 1BH 44H | Select Horizontal Tabs |
| ESC Q | 1BH 51H | Set Right Margin |
| ESC \ | 1BH 5CH | Set Relative Print Position |
| ESC a | 1BH 61H | Select Justification |
| ESC I | 1BH 6CH | Set Left Margin |
| Vertical position control | | |
| LF | 0AH | Line Feed |
| VT | 0BH | Vertical Tab |
| FF | 0CH | Form Feed |
| ESC + | 1BH 2BH | Select n/360" Line Spacing |
| ESC / | 1BH 2FH | Select Vertical Tab Channel |
| ESC 0 | 1BH 30H | Select 1/8" Line Spacing |
| ESC 2 | 1BH 32H | Select 1/6" Line Spacing |
| ESC 3 | 1BH 33H | Set Graphics Line Spacing (n/180") |
| ESC A | 1BH 41H | Set n/60" Line Spacing |
| ESC B | 1BH 42H | Set Vertical Tabs |
| ESC C | 1BH 43H | Set Page Length in Lines |
| ESC C 0 | 1BH 43H 00H | Set Page Length in Inches |
| ESC J | 1BH 4AH | Perform n/180-inch Line Feed |
| ESC N | 1BH 4EH | Set Skip Over Perforation |
| ESC O | 1BH 4FH | Cancel Skip Over Perforation |
| ESC b | 1BH 62H | Select Vertical Tabs in Channels |
| ESC j | 1BH 6AH | Perform Reverse n/180-inch Line Feed |
| Character attributes | | |
| SO | 0EH | Double-Wide Printing 1 Line |
| SI | 0FH | Select Condensed Mode |
| DC2 | 12H | Cancel Condensed Mode |

| | | |
|--|-------------|--|
| DC4 | 14H | Cancel Double-Wide Printing 1 Line |
| ESC SO | 1BH 0EH | Double-Wide Printing 1 Line |
| ESC SI | 1BH 0FH | Select Condensed Mode |
| ESC ! | 1BH 21H | Master Select |
| ESC (- | 1BH 28H 2DH | Select Score |
| ESC - | 1BH 2DH | Auto Underscore |
| ESC 4 | 1BH 34H | Select Italic Mode |
| ESC 5 | 1BH 35H | Cancel Italic Mode |
| ESC E | 1BH 45H | Select Emphasized Mode |
| ESC F | 1BH 46H | Cancel Emphasized Mode |
| ESC G | 1BH 47H | Select Double-strike Mode |
| ESC H | 1BH 48H | Cancel Double-strike Mode |
| ESC M | 1BH 4DH | Select 12 cpi |
| ESC P | 1BH 50H | Select 10 cpi |
| ESC S | 1BH 53H | Select Subscript or Superscript Printing |
| ESC T | 1BH 54H | Cancel Subscript or Superscript Printing |
| ESC W | 1BH 57H | Turn Double-wide Mode On/Off |
| ESC g | 1BH 67H | Select 15 cpi |
| ESC k | 1BH 6BH | Select Typestyle Family |
| ESC p | 1BH 70H | Turn Proportional Mode On/Off |
| ESC q | 1BH 71H | Select Character Style |
| ESC w | 1BH 77H | Turn Double-high Mode On/Off |
| ESC x | 1BH 78H | Select Letter Quality or Draft |
| Download and character code setting | | |
| ESC % | 1BH 25H | Select User-defined Set |
| ESC & | 1BH 26H | Define User-Defined Characters |
| ESC 6 | 1BH 36H | Enable Printable Characters |
| ESC 7 | 1BH 37H | Enable Upper Control Codes |
| ESC : | 1BH 3AH | Copy ROM to RAM |
| ESC R | 1BH 52H | Select an International Character Set |
| ESC t | 1BH 74H | Select Character Table |
| ESC (t | 1BH 28H 74H | Assign Character Table |
| Bitimage | | |
| ESC * | 1BH 2AH | Select Graphics Mode |
| ESC ? | 1BH 3FH | Reassign Graphics Mode |

| | | |
|----------------------------|------------------------------|---|
| ESC K | 1BH 4BH | Select Single-density Graphics Mode |
| ESC L | 1BH 4CH | Select Double-density Graphics Mode |
| ESC Y | 1BH 59H | Select High-speed Double-density Graphics Mode |
| ESC Z | 1BH 5AH | Select Quadruple-Density Graphics Mode |
| Others | | |
| BEL | 07H | Beeper |
| DC1 | 11H | Select Printer |
| DC3 | 13H | Deselect Printer |
| CAN | 18H | Cancel Line |
| DEL | 7FH | Delete Character |
| ESC EM | 1BH 19H | Set Auto Sheet Feeder Mode |
| ESC SP | 1BH 20H | Set Inter Character Space |
| ESC # | 1BH 23H | Cancel MSB Control |
| ESC < | 1BH 3CH | Select Unidirectional Mode 1 Line |
| ESC = | 1BH 3DH | Set MSB to 0 |
| ESC > | 1BH 3EH | Set MSB to 1 |
| ESC @ | 1BH 40H | Initialize Printer |
| Additional commands | | |
| ESC U | 1BH 55H | Turn Unidirectional Mode On/Off |
| ESC [n ! p | 1BH 5BH n 21H 70H | Absolute vertical positioning (from the top) |
| ESC [n ! q | 1BH 5BH n 21H 71H | Change between document and journal printing |
| ESC [n # p | 1BH 5BH n 23H 70H | Relative vertical positioning backwards |
| ESC [n " p | 1BH 5BH n 22H 70H | Absolute vertical positioning (from the bottom) |
| ESC [n # q | 1BH 5BH n 23H 71H | Selection of type fonts/ character sets |
| ESC [n \$ p | 1BH 5BH n 24H 70H | Paper feed of the document |
| ESC [n1 .. n5 ! r | 1BH 5BH n1 .. n5 21H 72H | Parameter block MSR |
| ESC [" r | 1BH 5BH 22H 72H | Reading a MSR track |
| ESC [# r STX .. ETX | 1BH 5BH 23H 72H 02H...03H | Writing a MSR track |
| ESC [% r | 1BH 5BH 25H 72H | Deleting a MSR track |
| ESC [n ! t | 1BH 5BH n 21H 74H | Setting control points/initializing the control cycle |
| ESC [" t | 1BH 5BH 22H 74H | Requesting the document width |
| ESC [# t | 1BH 5BH 23H 74H | Document edge detection |
| ESC [n \$ t | 1BH 5BH n 24H 74H | Activating passbook processing |
| ESC [n % t | 1BH 5BH n 25H 74H | Specification of the horizontal leading edge |

| | | |
|---|--|--|
| ESC [n (t | 1BH 5BH n 28H 74H | Mode switch-over for handling end of paper |
| ESC [n) t | 1BH 5BH n 29H 74H | Setting control point II |
| ESC [n * t | 1BH 5BH n 2AH 74H | Dual station control |
| ESC [n , t | 1BH 5BH n 2CH 74H | Increasing the copying power |
| ESC [n ! z | 1BH 5BH n 21H 7AH | Global printer status |
| ESC [" z | 1BH 5BH 22H 7AH | Requesting special printer messages |
| ESC [n ; m " z | 1BH 5BH n m 22H 7AH | Special printer messages |
| ESC [n # z | 1BH 5BH n 23H 7AH | Requesting printing unit parameters |
| ESC [n1 ; ... ; n9 # z | 1BH 5BH n1 .. n9 23H 7AH | Printing unit parameters |
| ESC [m ; h ; z ; n * r STX (data) ETX | 1BH 5B 3XH 3BH 3XH 3XH 3BH 3XH 3XH 3BH 3XH 2AH 72H 02H (data) 03H | Prints barcode according |

D Interfaces

Your printer offers the possibility of operating either via a parallel, a serial or a USB interface. There is a printer model with a second serial interface. This chapter informs you about the interfaces and describes the communication between your computer and the printer.

Interface settings for User 1 and User 2

Your printer allows you to set and use two independent menu configurations for the selection of the interfaces (User 1/User 2).

It is possible, to select different interfaces for User 1 and User 2 (e.g. User 1: serial interface and User 2: parallel interface).

It is also possible to select the same interface for User 1 and User 2. If so, any changes of the interface settings in menu mode (see [Menu, interfaces](#), page 60) for one user will be transferred to the other user.

Parallel interface

The bidirectional parallel interface offers the so called “nibble” mode of the IEEE1284 interface norm. This enables installation in accordance with Windows “Plug & Play”.

The standard parallel interface is able to transfer data at a speed of max. 30,000 bytes per second. When the receiving buffer is full, the data input is blocked until the data buffer is empty. This guarantees data transmission in blocks of 1 KB.

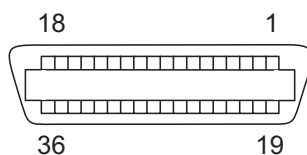
Connector assignment

Nibble Mode

| Pin | Signal | In/Out | Pin | Parallel | In/Out |
|-----|-------------|--------|-----|------------|--------|
| 1 | nSTORBE | In | 19 | Signal GND | |
| 2 | DATA0 | In | 20 | Signal GND | |
| 3 | DATA1 | In | 21 | Signal GND | |
| 4 | DATA2 | In | 22 | Signal GND | |
| 5 | DATA3 | In | 23 | Signal GND | |
| 6 | DATA4 | In | 24 | Signal GND | |
| 7 | DATA5 | In | 25 | Signal GND | |
| 8 | DATA6 | In | 26 | Signal GND | |
| 9 | DATA7 | In | 27 | Signal GND | |
| 10 | nACK | Out | 28 | Signal GND | |
| 11 | BUSY | Out | 29 | Signal GND | |
| 12 | PE | Out | 30 | Signal GND | |
| 13 | SELECT | Out | 31 | nINIT | In |
| 14 | nAUTOFEED | Out | 32 | nERROR | Out |
| 15 | NC | | 33 | Signal GND | |
| 16 | Signal GND | | 34 | NC | |
| 17 | Chassis GND | | 35 | +5V DC | Out |
| 18 | +5V DC | Out | 36 | nSELECT IN | In |

ECP mode

| Pin | Signal | In/Out | Pin | Parallel | In/Out |
|-----|-------------|--------|-----|-----------------|--------|
| 1 | HostClk | In | 19 | Signal GND | |
| 2 | DATA0 | Bi-Di | 20 | Signal GND | |
| 3 | DATA1 | Bi-Di | 21 | Signal GND | |
| 4 | DATA2 | Bi-Di | 22 | Signal GND | |
| 5 | DATA3 | Bi-Di | 23 | Signal GND | |
| 6 | DATA4 | Bi-Di | 24 | Signal GND | |
| 7 | DATA5 | Bi-Di | 25 | Signal GND | |
| 8 | DATA6 | Bi-Di | 26 | Signal GND | |
| 9 | DATA7 | Bi-Di | 27 | Signal GND | |
| 10 | PeriphClk | Out | 28 | Signal GND | |
| 11 | PeriphAck | Out | 29 | Signal GND | |
| 12 | nAckReverse | Out | 30 | Signal GND | |
| 13 | Xflag | Out | 31 | nReverseRequest | In |
| 14 | HostAck | In | 32 | nPeriphRequest | Out |
| 15 | NC | | 33 | Signal GND | |
| 16 | Signal GND | | 34 | NC | |
| 17 | Chassis GND | | 35 | +5V DC | Out |
| 18 | +5V DC | Out | 36 | 1284Active | In |



Transmission length: max. 2,0 m

Serial interface RS232C

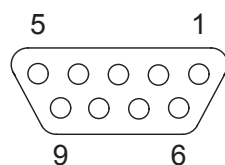
Your printer's serial interface supports the RS232C specification. The signals are received and transmitted by a 9 pin connector.

Use a serial interface cable that meets the requirements of your host PC.

| | |
|-------------------------|---|
| Type | RS232C interface |
| Synchronization | Asynchronous |
| Transmission rate | 300 Baud to 38.400 Baud |
| Signal status | OFF (log. 1) -3 V to -15 V ON (log. 0) +3 V to +15 V |
| Connection cable | up to 15 m length |
| Interface connections | ITT Cannon connector, series DB-9 S |
| Transmission protocol | XON/XOFF, READY/BUSY |
| Capacity of data buffer | 32 KB max. |

Connector assignment

| Pin | Signal | Signal from | Ready/Busy | XON/XOFF |
|-----|------------|-------------|------------|----------|
| 1 | CD | — | — | — |
| 2 | TXD | Printer | Valid | Valid |
| 3 | RXD | PC | Valid | Valid |
| 4 | RTS | Printer | Invalid | Valid |
| 5 | Signal GND | — | Valid | Valid |
| 6 | DTR | Printer | Valid | Valid |
| 7 | DSR | PC | Valid | Valid |
| 8 | CTS | PC | Invalid | Valid |
| 9 | CI | — | — | — |



Transmission length: max. 15 m

Serial attachment characteristics

Data rates

The interface supports the following data rates.

- ▶ 4800 bps
- ▶ 9600 bps
- ▶ 19200 bps
- ▶ 38400 bps

Supported protocols

This interface will also support the following:

- ▶ 7 or 8 Data Bits
- ▶ Even, Odd, None Parity
- ▶ 1 or 2 Stop Bit(s)
- ▶ Ready/Busy or XON/XOFF handshaking

Data Transfer

A data frame consists of a start bit, seven or eight data bits, 0 or 1 parity bit(s) and 1 or 2 stop bit(s). With these combinations, 9, 10, 11 and 12 bit frames are available:



Parity

There are three possible parity settings: Even, Odd, None.

- ▶ When Even parity is specified, the interface expects to receive data frames with even parity and will transmit data with even parity.
- ▶ When Odd parity is specified, the interface expects to receive data frames with odd parity and will transmit data with odd parity.
- ▶ Parity will be checked whenever “Even” or “Odd” parity is selected. If a parity error is detected, “PARITY ERROR” message will be displayed on the LCD. Printer will continue to receive data.
- ▶ When “No” parity is specified, the interface does not expect data frames to include a parity bit, and the interface transmits data without parity bits.

Handshaking

Handshaking in the serial environment is most commonly handled by manipulating the following 4 handshaking lines:

- ▶ RTS (Request to Send)
- ▶ CTS (Clear to Send)
- ▶ DSR (Data Set Ready)
- ▶ DTR (Data Terminal Ready)

Ready/Busy

When Ready/Busy protocol is selected, DTR will be used to pace the data flow from PC. When the serial interface is BUSY (Buffer is full, Printer is out of paper or an error is detected), DTR will be dropped to indicate to PC that Printer cannot receive any more data.

XON/XOFF

When XON/XOFF protocol is selected, Printer indicates to PC that it is busy and not ready to receive any more data by sending an XOFF (DC3 X'13') character. When the serial interface is ready to receive more data, an XON (DC1 X'11') will be transmitted.

Configuring the serial interface of the PC

DOS mode

To use the serial interface of your PC, you must add the following mode commands to the AUTOEXEC.BAT file:

```
mode com1:9600,n,8,1,p  
mode lpt1:= com1:
```

With the first MODE command, you configure the serial interface Com1 of your PC to the printer's factory defaults. The second MODE command redirects the parallel standard output port LPT1 of your PC to Com1.

Transmission rate: 9600 bauds

Parity: none

Data bits: 8

Stop bits: 1

These settings must be modified to use other values.

Windows 95/98/ME

Click on the **Start** button in the Windows taskbar. Move the mouse to **Settings** and click on **Control Panel**. Click on **System**, followed by **Device Manager**. Click on **Ports, COM1** and **Port Settings**.

Bits per second: 9600 bauds

Data bits: 8

Parity: none

Stop bits: 1

These settings must be modified to use other values.

Windows 2000/XP

Click on the **Start** button in the Windows taskbar. Click on **Printers** (Windows 2000) or on **Printers and Faxes** (Windows XP) to open the printer folder. In the menu bar, click on **File** and **Server Properties**. Click on **Ports**, then select **COM1** and click on **Configure**.

Bits per second: 9600 bauds

Data bits: 8

Parity: none

Stop bits: 1

These settings must be modified to use other values.

USB interface

The USB (Universal Serial Bus) interface has the following features:

- ▶ Full compliance with the Universal Serial Bus Specification Revision 2.0 for Full Speed Mode.
- ▶ USB Function Controller with two FIFO-based Endpoints:
 - One bidirectional Control Endpoint 0 (8 bytes)
 - One receive Endpoint 1 (1*64 bytes)
- ▶ The signaling bit rate is 12 Mb/s (Full speed).



Consumables and accessories

Consumables

Only use ribbon cassettes from the manufacturer as products from other manufacturers may damage the print head or the ribbon drive.

| Consumables | Order no. |
|---|-----------|
| Fabric ribbon in recyclable cassettes, color: black | 043 393 |

Accessories

Only use print heads that are approved to prevent damage to your printer.

| Accessories | Order no. |
|-----------------------|-----------|
| Print head 24 needles | 400 805 |

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TALLYGENICOM REPRESENTATIVES

GERMANY

TallyGenicom
Computerdrucker GmbH
Postfach 2969
D-89019 Ulm
Deutschland
Tel.: +49 731 2075 0
Fax: +49 731 2075 100
<http://www.tallygenicom.de>

ITALY

TallyGenicom S.R.L.
Via Borsini 6
I-20094 Corsico (MI)
Italia
Tel.: +39 02 48608 1
Fax: +39 02 48601 141
<http://www.tallygenicom.it>

SPAIN

TallyGenicom SRL
Joaquin Lorenzo 4, Local
28033 Madrid
España
Phone: +34 902 196 183
Fax: +34 913 739 943
<http://www.tallygenicom.es>

SINGAPORE

TallyGenicom Pte. Ltd
63 Hillview Avenue
#08-22, Lam Soon Industrial Building
Singapore 669569
Phone: +65 6760 8833
Fax: +65 6760 1066
<http://www.tallygenicom.com.sg>

U.S.A.

TallyGenicom
4500 Daly Drive, Suite 100
Chantilly, VA 20151
U.S.A.
Phone: +1 703 633 8700
Fax: +1 703 222 7629
<http://www.tallygenicom.com>

UNITED KINGDOM

TallyGenicom Limited
Rutherford Road
Basingstoke, Hampshire
RG24 8PD
England, U.K.
Phone: +44 870 872 2888
Fax: +44 870 872 2889
<http://www.tallygenicom.co.uk>

CANADA

TallyGenicom
125 Traders Boulevard, 9
Mississauga, Ontario L4Z 2E5
Canada
Phone: +1 905 8904646
Fax: +1 905 8904567
<http://www.tallygenicom.com>

MALAYSIA

TallyGenicom Sdn. Bhd.
Wisma KT, Suite 3.02
No 14 Jalan 19/1
46300 Petaling Jaya
Selangor Darul Ehsan
Malaysia
Phone: +3 7625 1988
Fax: +3 7625 2688
<http://www.tallygenicom.com.my>

FRANCE

TallyGenicom S.A.
19 avenue de L'Île Saint Martin
F-92237 Nanterre Cedex
France
Tél.: +33 1 41 30 11 00
Fax: +33 1 41 30 11 10
<http://www.tallygenicom.fr>

AUSTRIA

TallyGenicom Ges.m.b.H.
Eduard-Kittenberger-Gasse 95B
A-1232 Wien
Austria
Tel.: +43 1 863 40 0
Fax: +43 1 863 40 240
<http://www.tallygenicom.co.at>

Russian Federation and C.I.S.

TallyGenicom Representative
Park Place Moscow
Office D-206
Leninsky Prospekt 113/1
117198 Moscow
Russian Federation
Phone: +7 095 956 56 40
Fax: +7 095 956 55 41
<http://www.tallygenicom.ru>