BRAILLO 450 S2.1

User's Guide

BRAILLO ●

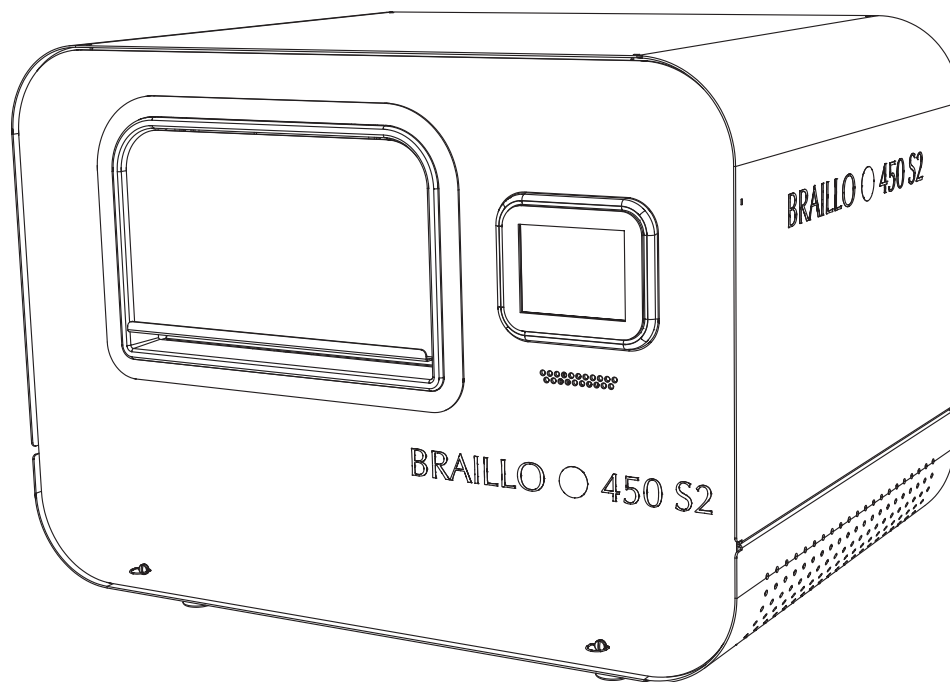# BRAILLO ●

Dear Valued Customer,

Thank you for purchasing a Braillo Braille embosser and placing your trust in our company and products.

I know that the purchase of a production Braille embosser is a big one, and we are proud that you have chosen us. You have joined a close community that includes the largest and most important Braille production centers in the world.

Since 1980, Braillo has manufactured the finest Braille embossers available, many of which are still being used today. We provide a comprehensive warranty up to 4 years, which is unmatched in this industry. For further peace of mind, your Braillo is upgradeable, meaning that as technology changes, your embosser will have the ability to change with it. Our goal is to manufacture a Braille embosser that when properly maintained by following the instructions in this manual, will not only last decades, but will also produce Braille that is recognized as the highest quality available.

We rely on a close cooperation with our customers and we encourage your suggestions for improvements. Please take a moment to register your embosser so we can provide a lifetime of technical support, updates and special prices.

Again, thank you for giving us this opportunity to serve you.

Best regards,

Patrick N. Nunnelly
Managing Director

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1.   PRINTER BASIC

Thank you for your purchase of the Braillo 450 S2.1. Please read this manual carefully before installing and operating this printer.

Key features
•   Prints interpoint, both sides of the sheet are printed simultaneously
•   Prints 450 characters per second
•   Prints 1350 pages per hour (on a 12-inch sheet)
•   Self-test system that checks the magnets continuously during printing
•   Reliable, sturdy construction
•   Safety switches will turn the printer off if someone accidentally opens the cover while printing

Maximizing the operational life of your Braillo printer
Many 30-year-old Braillo printers are still in daily operation – a testament to their quality. To maximize the life of your Braillo printer, we strongly recommend using the correct tools, which come with your printer; as well as following the correct procedures, which we prescribe in the manual and reinforce in our training courses.

Additionally, just as the wrong wrench can ruin a nut, using poor quality Braille paper can ruin the printer's pins, print shoes and moveable parts by causing them to wear out prematurely. Failures due to user negligence of this nature, just as repairs carried out by untrained personnel, may compromise your warranty rights.

Braillo recommends using our specialized Braille paper and having your printer serviced by certified technicians who have successfully completed our training course.

More information regarding our training courses can be found on our website:

http://braillo.com/braillo-services/
http://braillo.com/event-registration/

More information on our Braille paper can be found on our websites:

http://braillo.com/braille-paper/
http://braillepaper.com/

Printer overview

Please see the figure below:

Note that the right-hand and left-hand side are referred to as if you were standing behind the printer facing the opening where the paper is inserted into the printer.
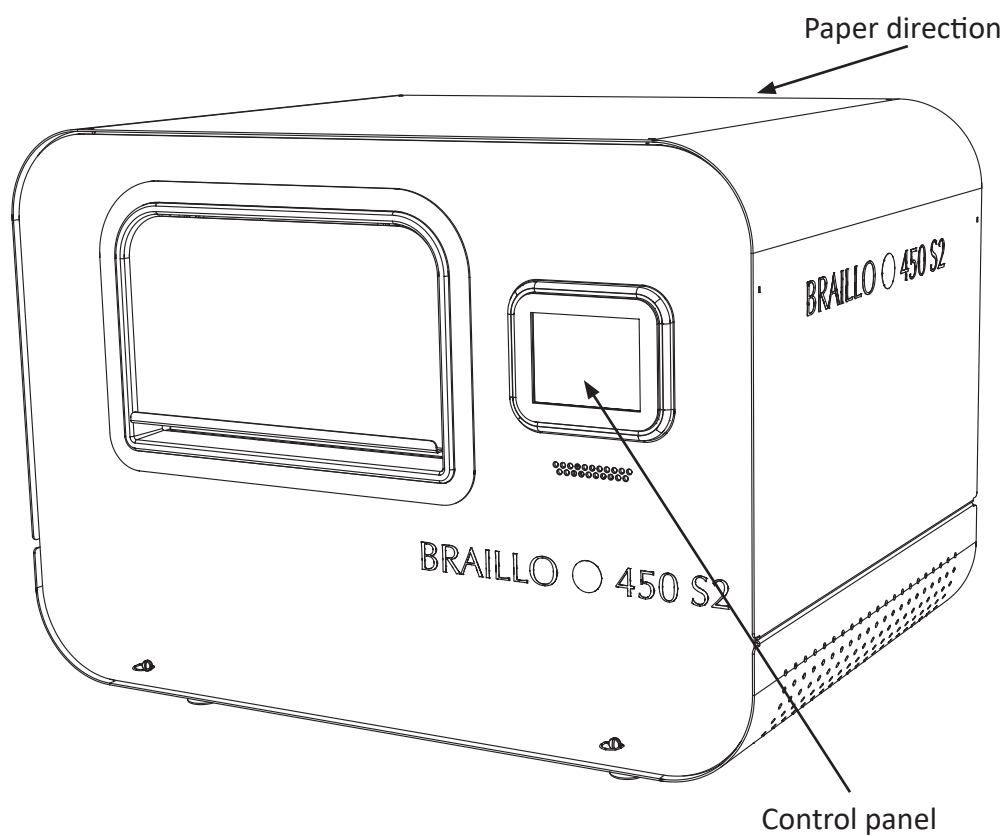
2. INSTALLATION

Table:
The printer should be placed on a sturdy table. Please note that this printer weighs 107 kg.

Space:
The minimum space required for the Braillo 450 S2.1 is approximately 1.25m x 1.5m (4 x 5 feet). However, it will be more space required both behind and around the printer so that one can easily replace the boxes of paper and perform regular maintenance without moving the printer.

Environment:
Braillo printers are made to operate continuously and to be reliable for many years. However, sensitive electronic and mechanical parts require a suitable installation environment to ensure long and trouble-free operation. Temperature should be between 15° - 30° C (60° - 86° F), and relative humidity between 40 and 60%.
Maintain a clean environment because dust may clog the printer - especially when combined with high humidity! Too low humidity should also be avoided to prevent electrostatic problems.
Some paper qualities may generate excessive paper dust. This should be removed with a vacuum cleaner and a damp cloth. (About every 50,000 sheets).

Electrical:
Single phase 230 volt (+/- 10%), 50/60 Hz, circuit breakers should be min. 6 amps.

Be sure to consult your distributor/supplier for further details concerning the installation site.
Failure to meet the installation requirements may relieve the supplier of any warranty responsibilities.
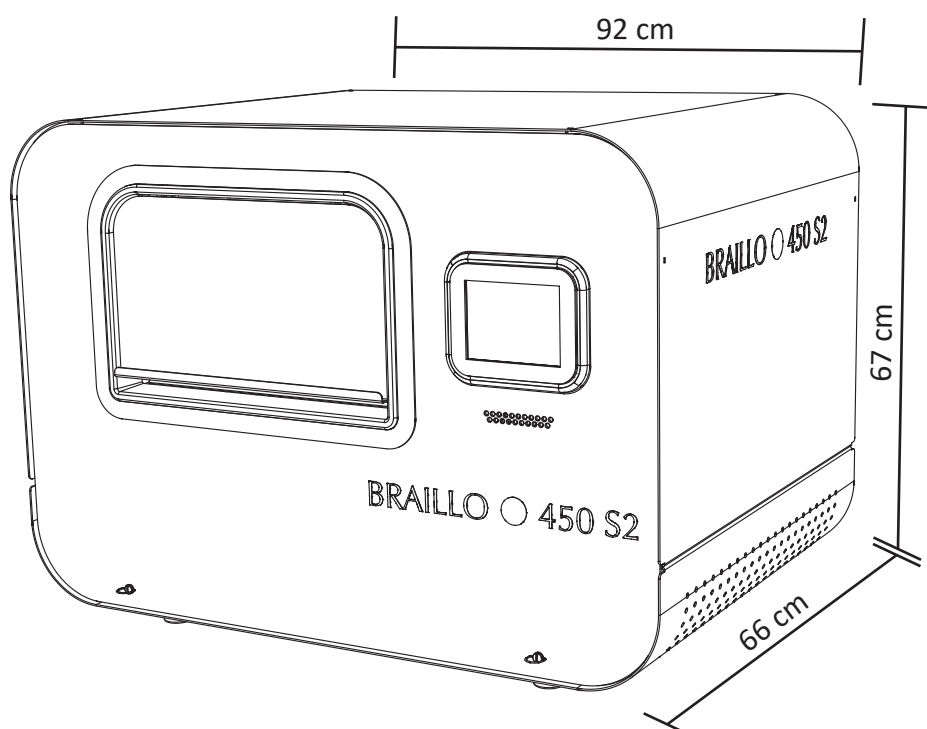
2.1   Unpacking

Unpacking and installation can be done by the user.
Any kind of lifting of the printer must always be done from the base at the bottom of the printer, and should be done with extreme care.

Make sure that your Braillo printer has not been damaged in transport. Check if the packing is damaged; If so, it is possible that the printer has also been damaged or scratched. If any damages are found, please contact your distributor or Braillo Norway AS immediately.

Also check that the printer is accompanied with the following items:

• Power cable for the printer
• Data cable, USB
• Data cable, ethernet (shielded)
• A small stack of paper
• User's guide
• Tool kit for service and maintenance
• Test and packing list

If any of these items are missing, please contact your distributor or Braillo Norway AS.

⚠ Important !

It is very important that the printer's specified voltage value, 230V, +/- 10%, corresponds with the local mains power supply available.

If the plug on the mains power cable is to be replaced, note that the yellow/green wire is the grounding (earthing) wire.

⚠ **THE PRINTER MUST ALWAYS BE CONNECTED TO GROUND!**

After the printer is unpacked, we advice that the transport box is stored for possible later use.

2.2   The Braillo S2 Stand option

The B450 S2.1 can optionally be delivered with the Braillo S2 Stand.
If that is the case, you have to add the wheels under the Stand.
Place the wheels under the printer, one in each corner. This can be done simplest by carefully sliding the printer on the pallet so just one corner comes outside the pallet. Fasten the wheel. Then slide the printer so the next corner comes outside the pallet etc. Make sure you are at least two persons while doing this!

Note! Do not lay the printer on the side to mount the wheels!
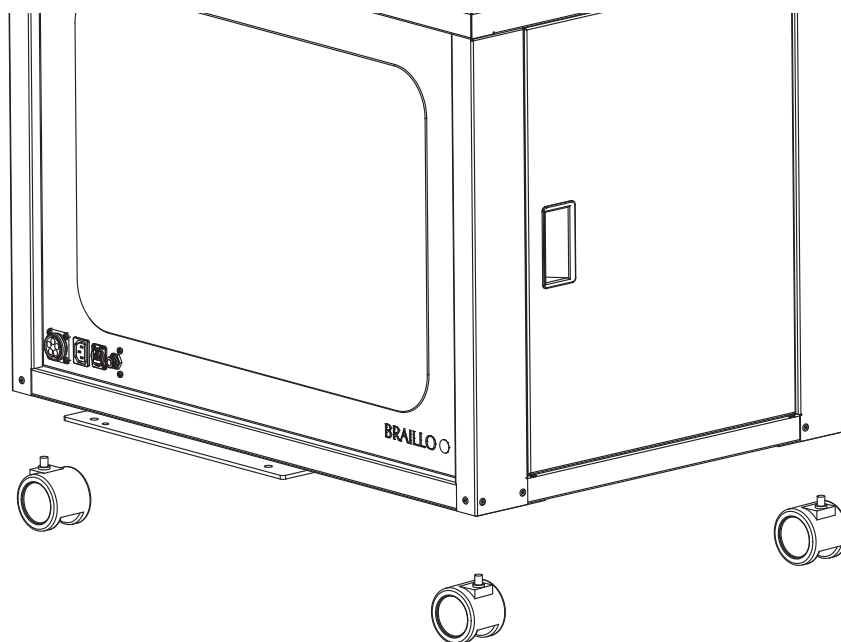
2.3   Removal of the side panels

The side panels can be removed by turning the quarter revolution fasteners counter-clockwise.
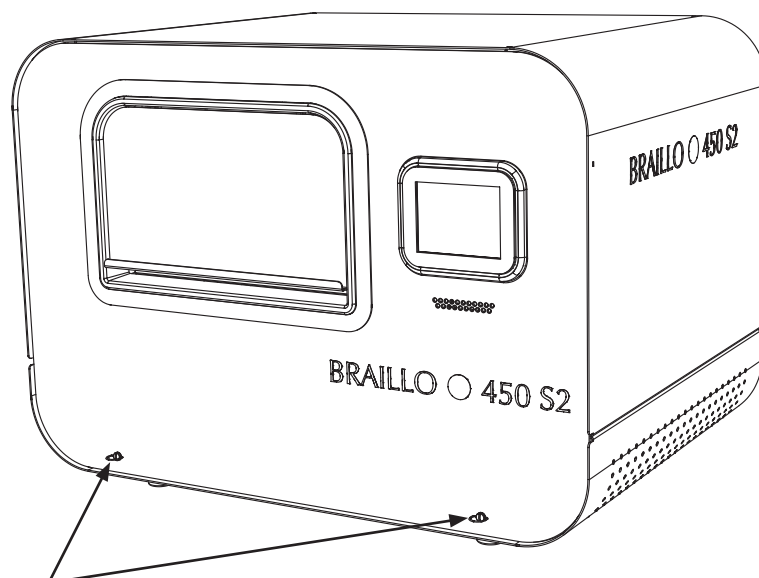
Turn counter-clockwise
1/4 of a revolution
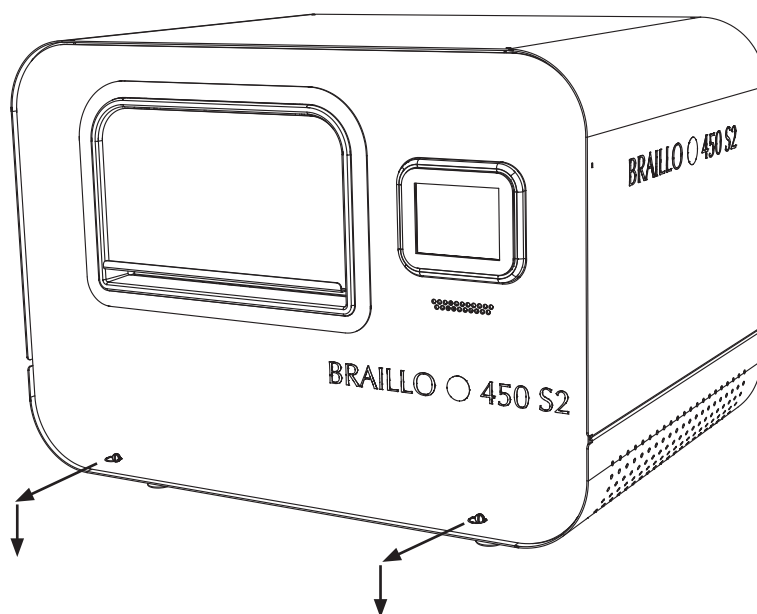
Pull the panel out, then a
little down

2.4   Removal of the top

If you are going to do maintenance, it can be more convenient to remove the top. Remove both side panels as described in section 2.3 'Removal of the side panels' on page 12. Loose the four bolts one revolution, then slide the top a little towards the operator panel side. Then lift it straight up.

Loosen the four bolts
one revolution

Slide the top a little
towards the display side,
then lift it straight up
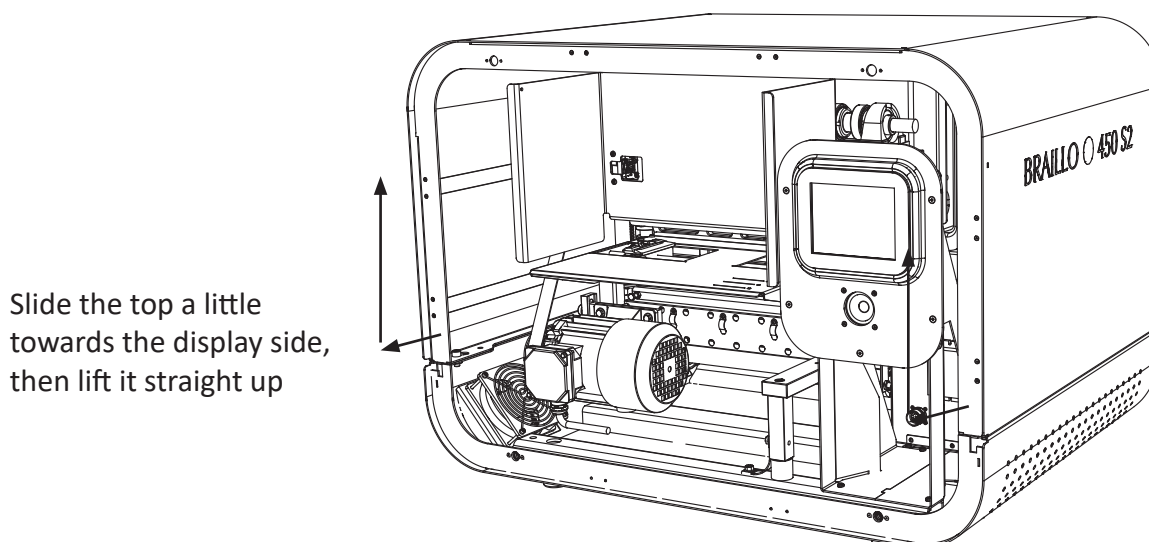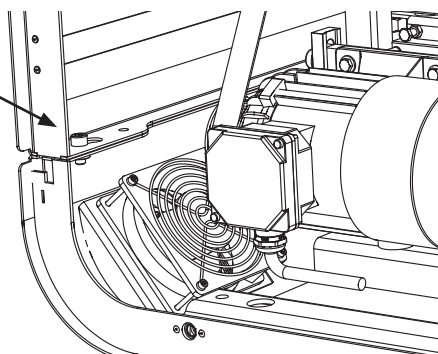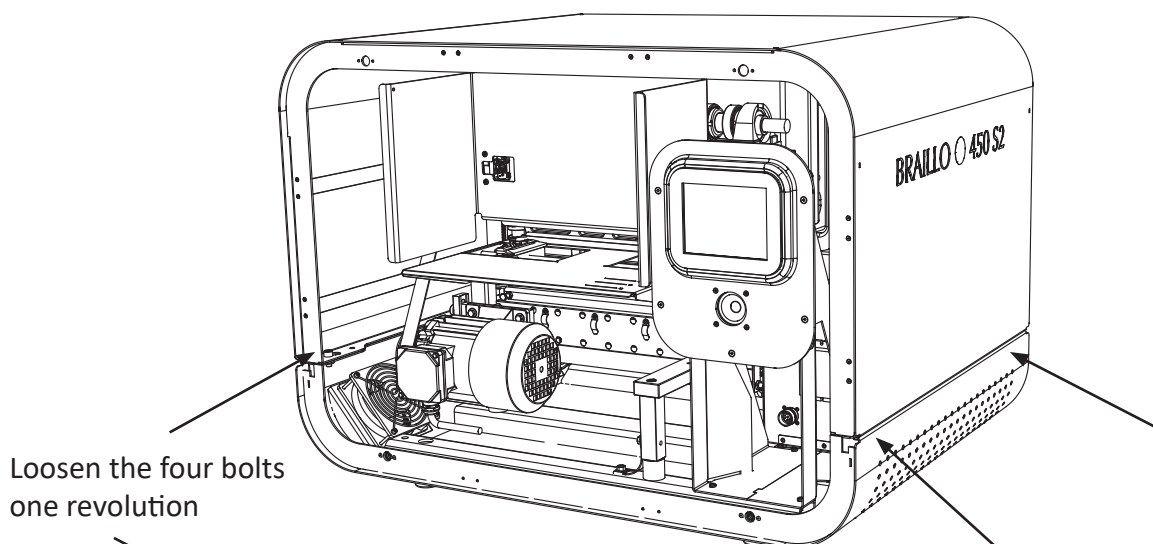
2.5　Connecting the printer to the mains

The connection for the mains inlet is placed on the electric unit inside the printer.
It can be reached by removing the side panel on the opposite side from the operator panel.
Put the mains cable through the oval opening in the bottom plate just below the inlet on the electric unit.

Connect the enclosed mains power cable to the Mains inlet.
Note! If the plug on the mains power cable is to be replaced with one that is compatible with the local electric contact points, observe that the yellow/green wire is the grounding (earthing) wire. Also make sure that you are connecting to 230 volts!

THE PRINTER'S MAINS CABLE MUST ALWAYS BE CONNECTED TO GROUND!

Safety switch

Mains inlet

Fans outlet

Power switch
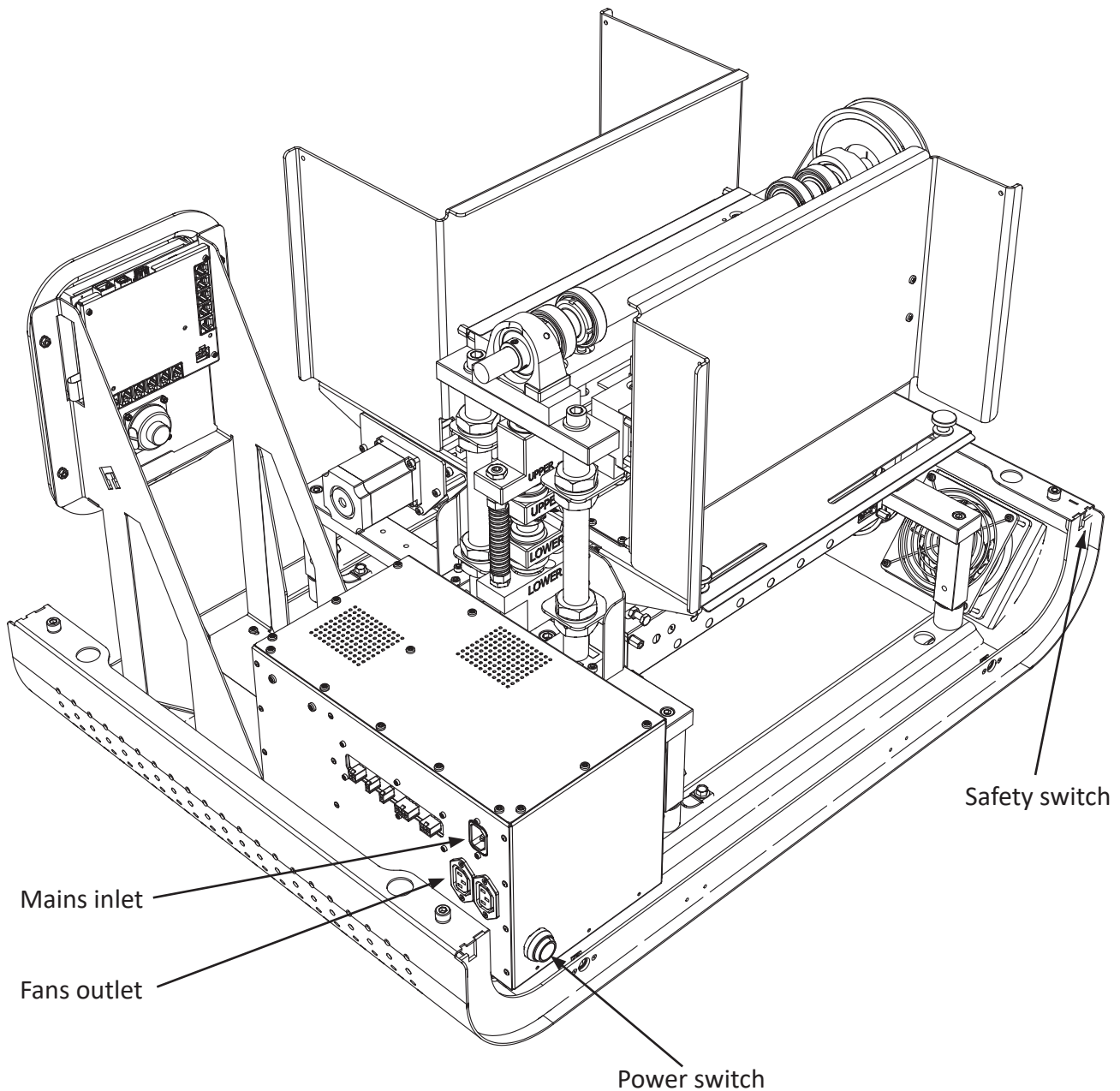
2.6   Connecting the printer to the computer

This can be done in three ways, either by Ethernet, USB, or WLAN.

For USB and Ethernet, the cables are connected to the operator panel inside the printer and comes out through the oval opening in the bottom plate just below the electric unit.
The ethernet cable has a regular RJ45 connector, and the USB cable has a regular USB type A connector.
The WLAN is transmitting/receiving via a small antenna placed close to the operator panel.

If you connect to the computer with cable, there is no need to select between USB or Ethernet. The printer will connect to the input who receives data first. Meaning, if data comes on the ethernet, the USB will not be operative before the ethernet have finished the transmission.

For instruction on how to install the printer on your computer, see chapter 3 'SETTING UP THE COMPUTER' on page 18.

USB type A

Ethernet
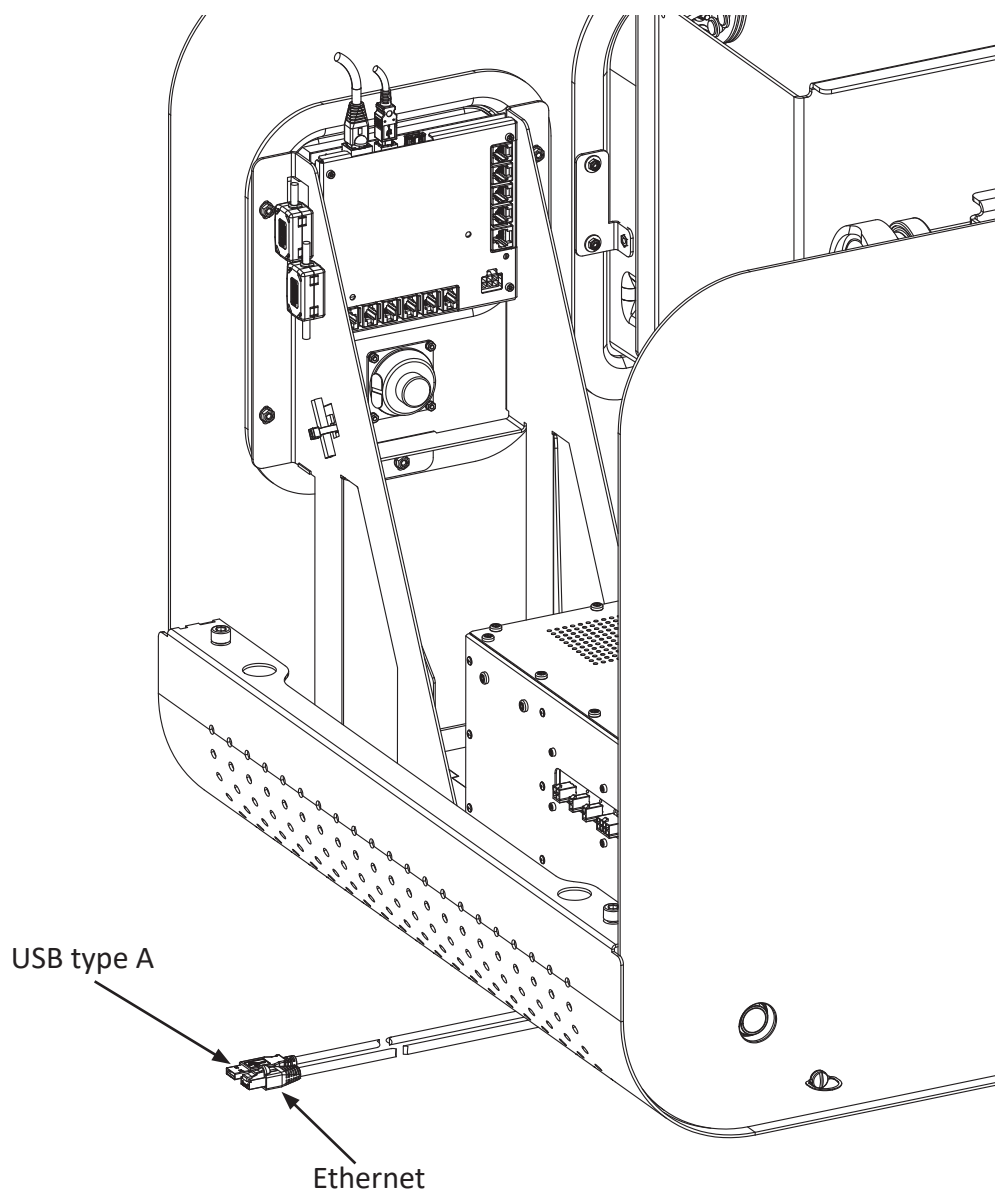
2.7   Connecting the printer when mounted on the S2 Stand

The B450 S2.1 can optionally be delivered with the Braillo S2 Stand.
In that case, the connections to the printer is done on the outside of the stand.
See the figures below:

Ethernet

USB

Mains inlet

Not in use
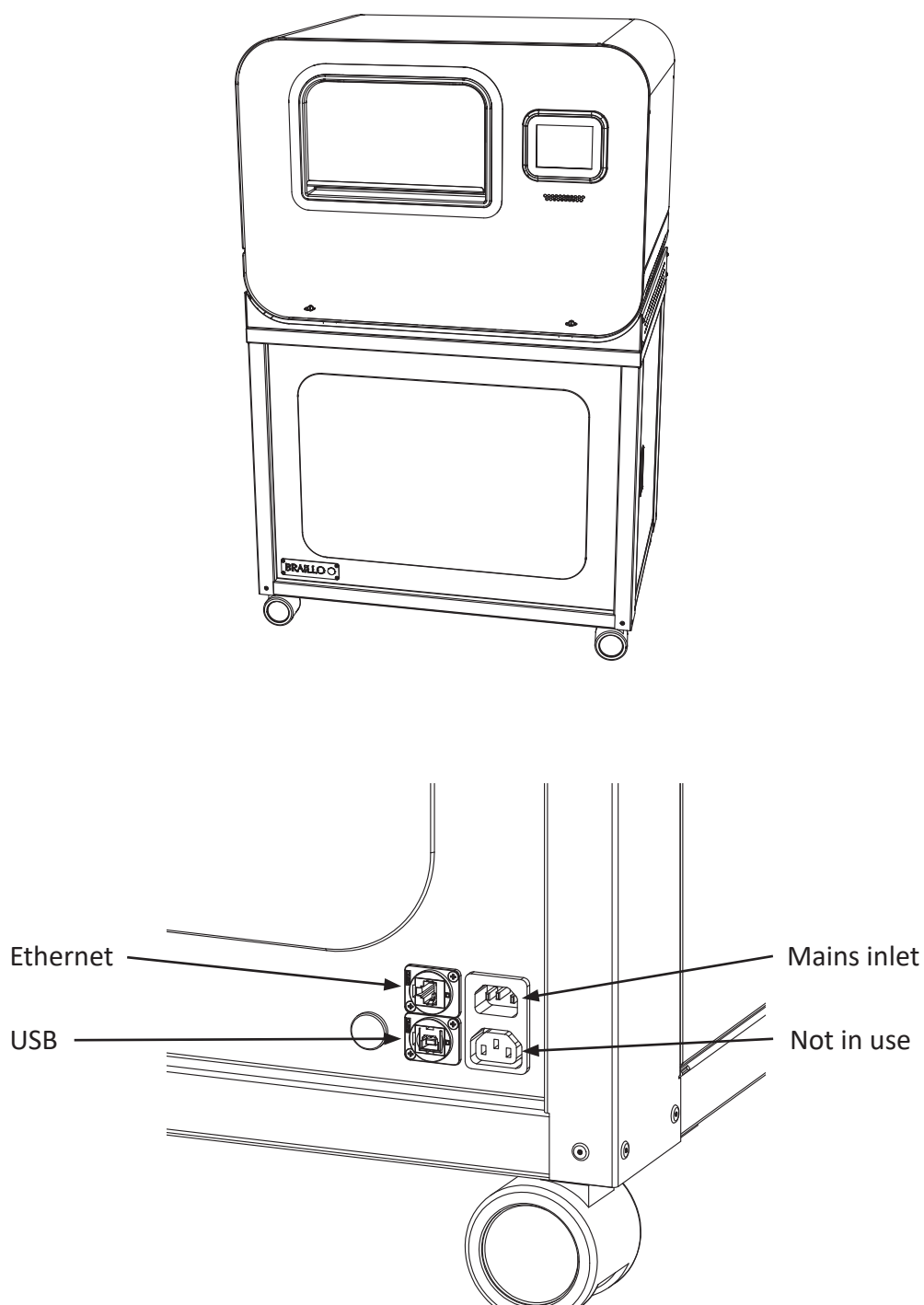
2.8   Power on

The On/Off switch is placed behind the back panel, and can be reached through an opening in the panel. When the mains cable has been connected, and the power has been switched on, the printer will do it's start up sequence. The display will stay black for a moment, then it will show a progress bar for the start up sequence. When it's done, the display will show "Welcome, press the accept button to continue". Press the button and the display will change to "Ready to emboss".

⚠️ For safety reasons, there are mechanical switches on the cover. These switches will disable the possibility to run the printer if the side plates are removed.

Then the paper feed tractor will move a little back and forth to position the paper correctly. If there is no paper inserted, the printer will start an alarm, and the display reads "Printer halted - Out of paper". This is normal, and the sound can be silenced by pressing the mute button.

Note that the printer will go into sleep mode when it has been inactive for 15 minutes. If that happens, the printer will wake up if you touch the operating panel or send a file from the computer. It is also possible to manually put it in sleep mode by entering the main menu, and select the "Enter sleep mode" choice.

The printer is now ready. Before continuing, please read chapter carefully.

On/Off switch
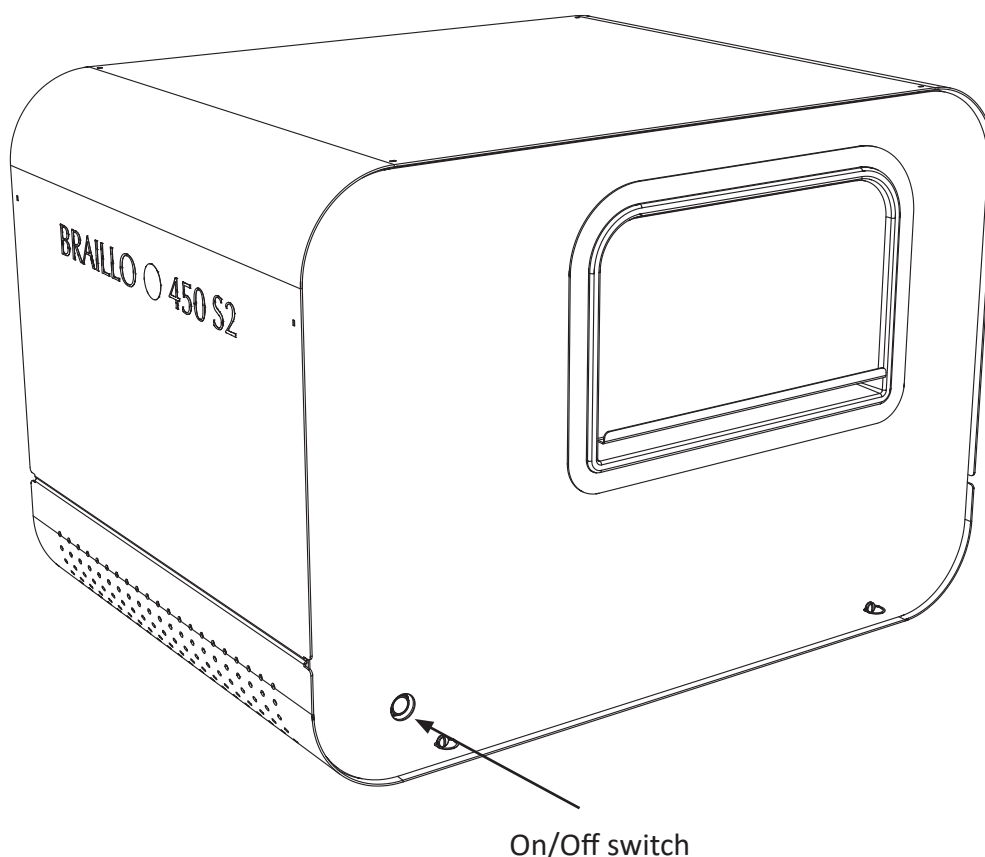
3.   SETTING UP THE COMPUTER

Note! When connecting multiple Braillo printers with USB to the same computer, all printers MUST have unique ID's configured.

See 'Printer ID:' on page 41 for more information on how to set the printer ID.

3.1   USB on Windows

Make sure the printer is powered on and connected to the Windows computer via an USB device cable (Type A to Type B).

(Windows should automatically identify the printer and find the correct driver for it, but if it doesn't, you need to manually add the printer and find the 'Generic Text only' printer driver.)

The printer then shows up as 'Generic / Text Only' like shown in the screen shot below:
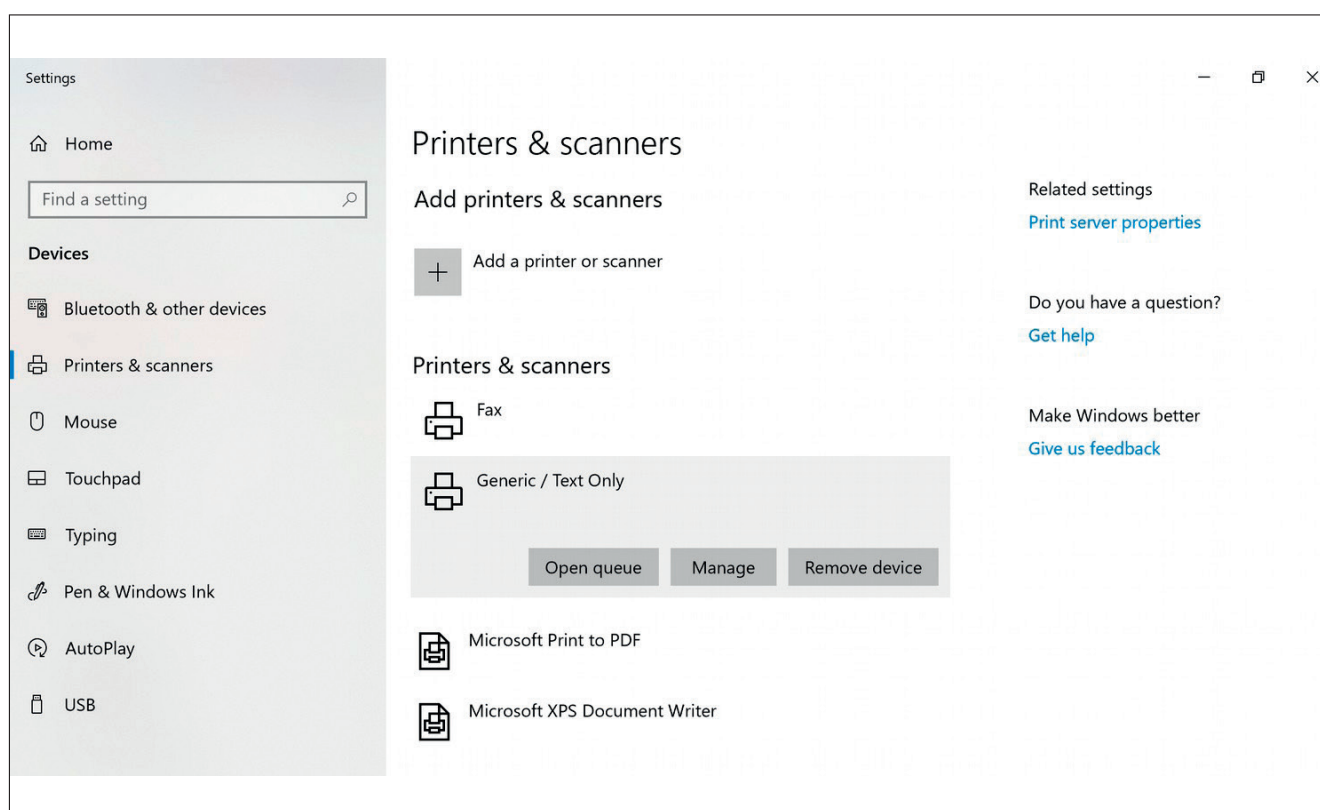
Select it and click 'Manage', then 'Printer properties'
Here you can change the printer Name and Location to your liking, for example
'Braillo <model number>'
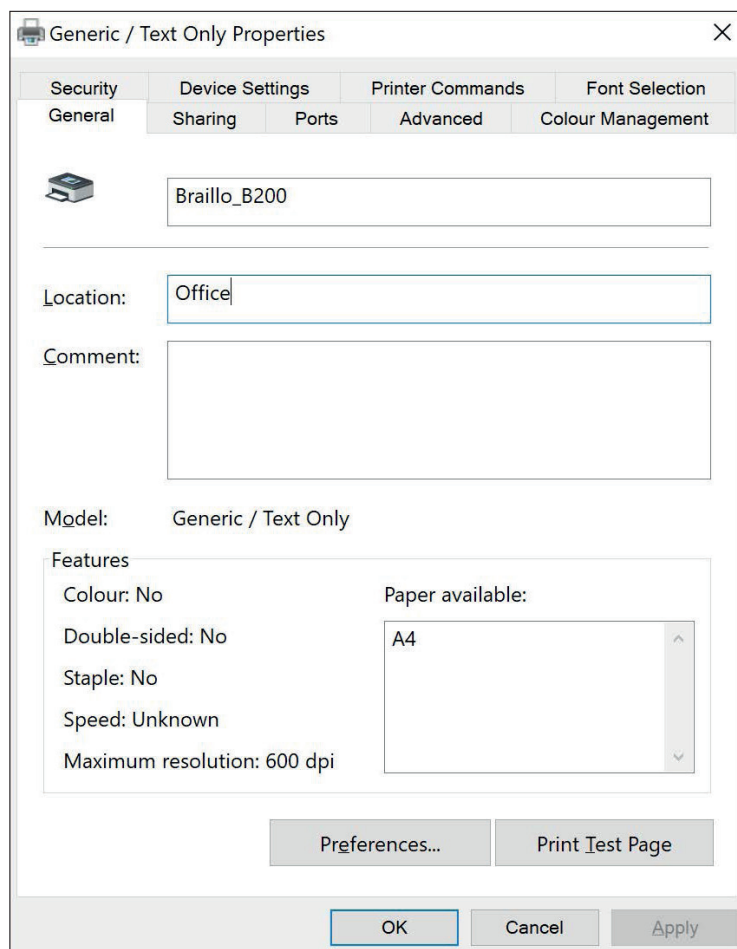
Click 'OK' and your printer is now configured and ready to use.

3.2   USB on Apple Mac

Note! A postscript printer driver (PPD) file is crucial in the following steps.

Without it, the local Apple computer will be unable to successfully communicate with the printer. The PPD file has been modified to work correctly with an Apple computer so any modifications to this file before set up might cause unexpected or erroneous results.
Contact Braillo Norway or your distributor to get the 'braillo.ppd' file.

The PPD file must be copied onto the Apple machine prior to performing the printer setup!

Make sure the printer is powered on and connected to the Apple computer via an USB device cable (Type A to Type B).

1. Open 'System Preferences'
2. Go to 'Printers & Scanners'
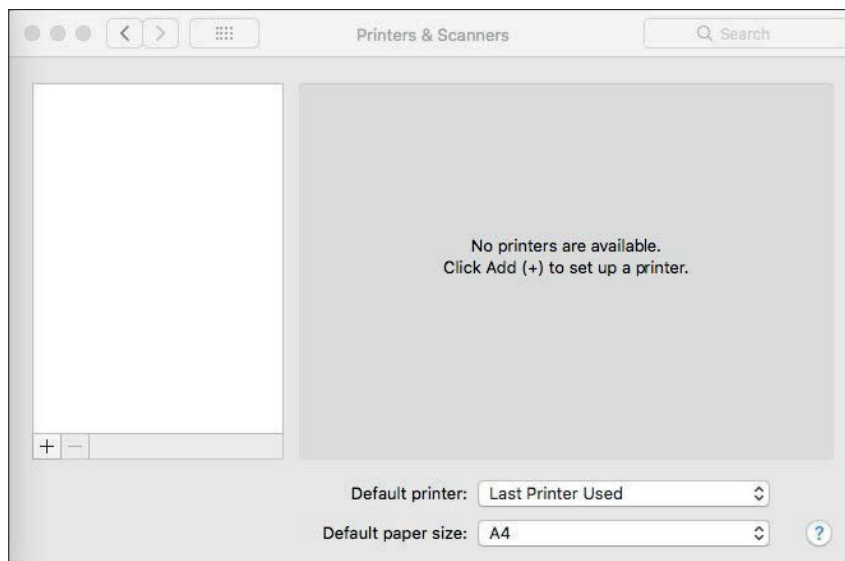
3. Click the plus sign (+) button to add new printer
4. In the new dialogue select the 'Generic_/_Text_Only' USB printer (under Default tab)
5. The Mac OS will try to auto identify the printer, but will not succeed. This is expected.
6. In the 'Use' drop-down menu choose 'Other' and select the provided PPD file
7. Verify that the 'Use' field now says 'Generic text-only printer'
8. You can also modify the Name and Location fields to your liking, e.g. 'Braillo <model number>'
9. Click 'Add'
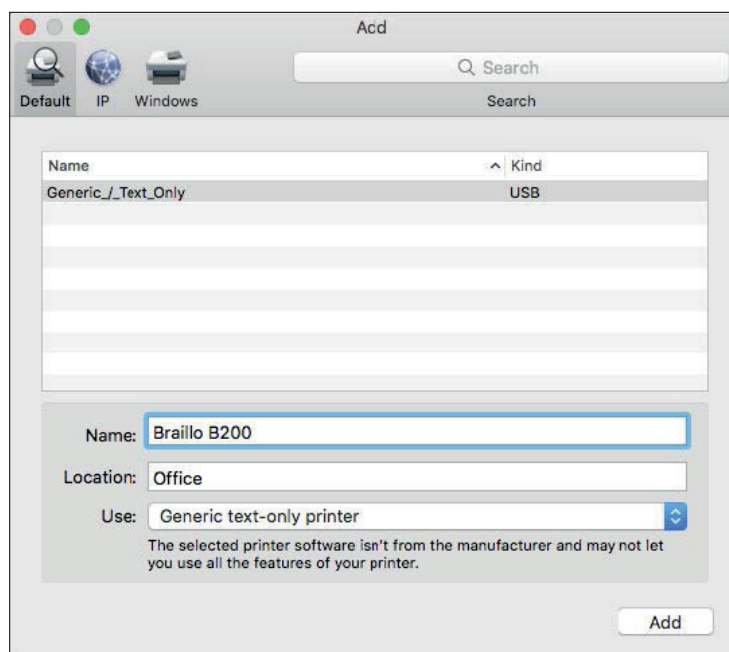
10. Your printer is now configured and ready to use
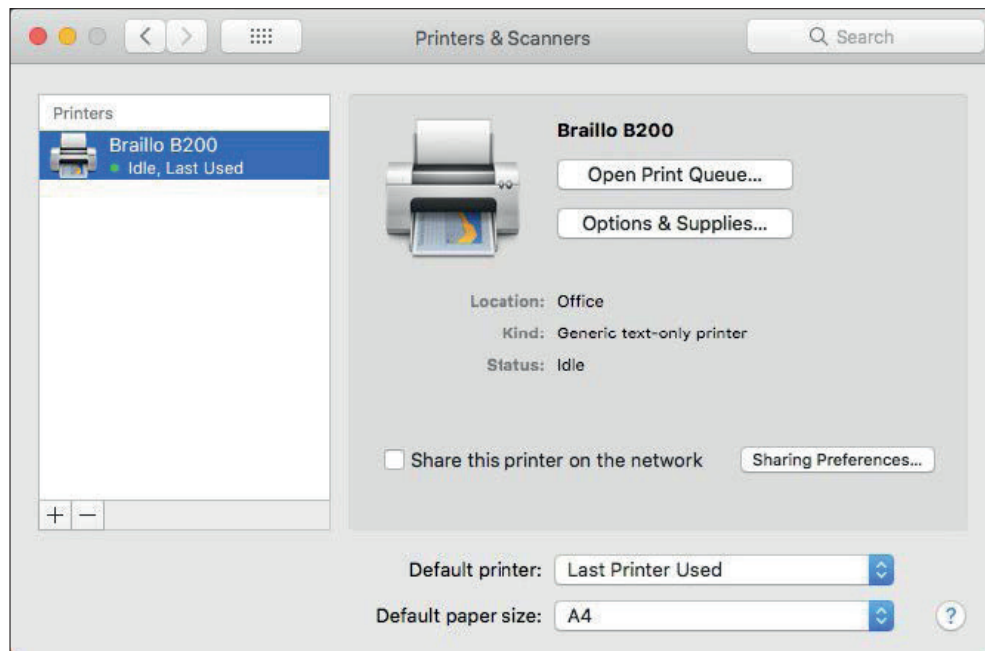
3.3   USB on Linux

Linux distributions can use one of many different graphical interfaces. Due to this the following guide is kept as generic as possible, and you might need to consult your distribution's help.

Make sure the printer is powered on and connected to the Linux computer via an USB device cable (Type A to Type B).
1. Find your distro's Control Panel and find the dialogue to add a printer
2. The printer should show up as USB printer named 'Generic_/_Text_Only (<serial number>)'
3. Select it and choose 'Generic' - 'Generic Raw Queue' as the printer driver
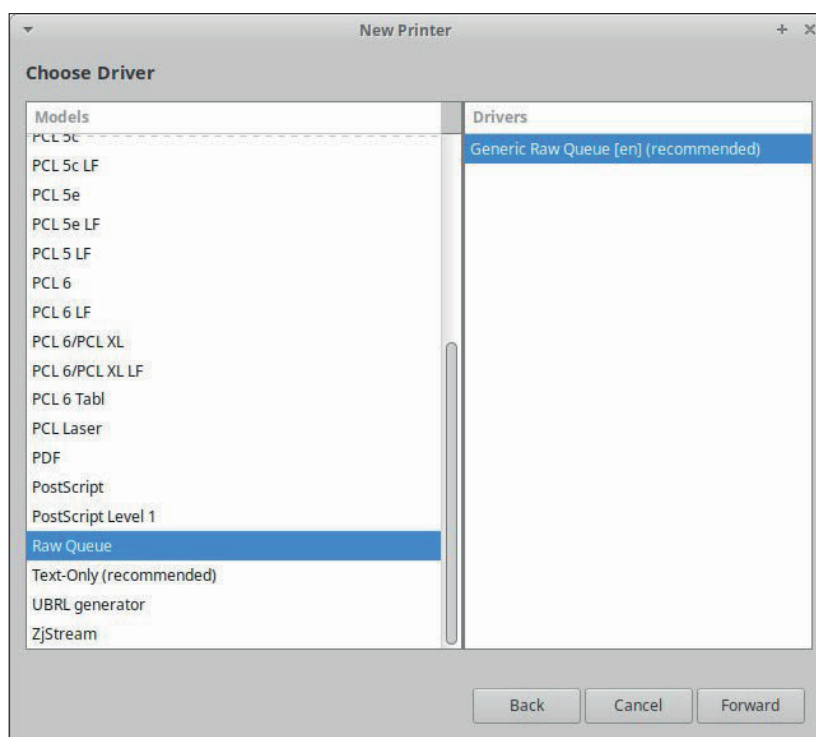
4. If you can choose any settings for the new printer, just leave everything as default
5. Give the printer a identifiable Name and Location, for example 'Braillo_<model number>'
6. Your new printer is now configured and ready to use

Note!
If you use the default 'Generic Text-only printer' driver for USB printing on Linux you might run into issues where the driver will strip certain control characters and just print the text. It could also refuse to print certain documents which contain more than just printable text characters.
Also make note that this driver will add margins around the text by default, which might interfere with the document formatting. The recommended driver on Linux is 'Generic Raw Queue' or similar raw forwarding driver.

3.4   Ethernet on Windows

Before starting, make sure the printer is powered on and connected to the network.
You will need the printer's IP address which can be found in menu *Main Menu - Warning - Service/ diagnostic - Status / Software upgrade.*
See 'Status / Software upgrade:' on page 39 for more information.

1. Open 'Printers & Scanners' settings. (Via the Windows menu or via Settings - Devices)
2. Click 'Add a printer or scanner'
3. After Windows has scanned, click 'The printer that I want isn't listed'
4. In the 'Add Printer' dialogue select 'Select a shared printer by name'
5. Enter the following in the field: http://<IP-address>:631/printers/Braillo
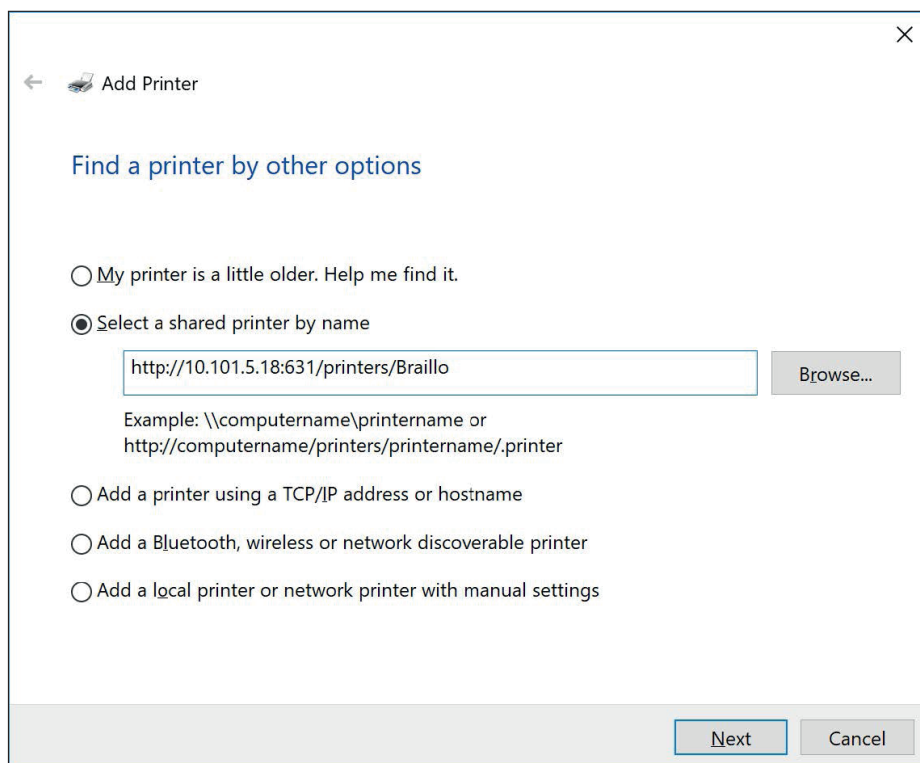
6. Click 'Next'
7. In the driver selection dialogue select 'Generic' and 'Generic / Text Only'
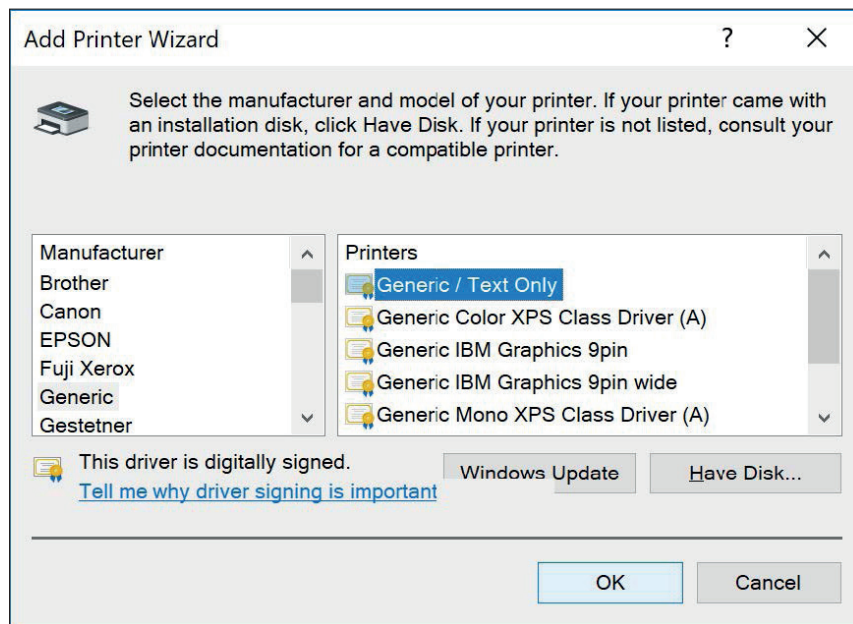
8. Click 'OK'
9. Click 'Next' and 'Finish' to close the dialogue
10. Your printer is now configured and ready to use

Note!
If you print a file with Notepad or another text editor, chances are high that the editor will try to format the text before sending it to the printer. If you have a preformatted file created for the Braillo printer containing control characters, it might not end up printing like it should. To print a file verbatim on Windows, you could share the printer in the Windows network ('Sharing' under Printer properties), and use the following command in a Command-line prompt:
copy /b <filename.txt> \\<Name-of-computer\<name-of-shared-printer>

3.5   Ethernet on Apple Mac

Note! A postscript printer driver (PPD) file is crucial in the following steps.
Without it, the local Apple computer will be unable to successfully communicate with the printer. The PPD file has been modified to work correctly with an Apple computer so any modifications to this file before set up might cause unexpected or erroneous results.
Contact Braillo Norway or your distributor to get the 'braillo.ppd' file.

The PPD file must be copied onto the Apple machine prior to performing the printer setup!

Before starting, make sure the printer is powered on and connected to the network.
You will need the printer's IP address which can be found in menu *Main Menu - Warning - Service/ diagnostic - Status / Software upgrade.*
See for more information.

1. Open 'System Preferences'
2. Go to 'Printers & Scanners'
3. Click the plus sign (+) button to add new printer
4. In the new dialogue click the 'IP' tab
5. Fill in:
    Address: '<IP-address>:631'
    Protocol: IPP
    Queue: '/printers/Braillo'
6. In the 'Use' drop-down menu choose 'Other' and select the provided PPD file
7. Verify that the 'Use' field now says 'Generic text-only printer'
    You can also modify the Name and Location fields to your liking,
    for example 'Braillo <model number>'
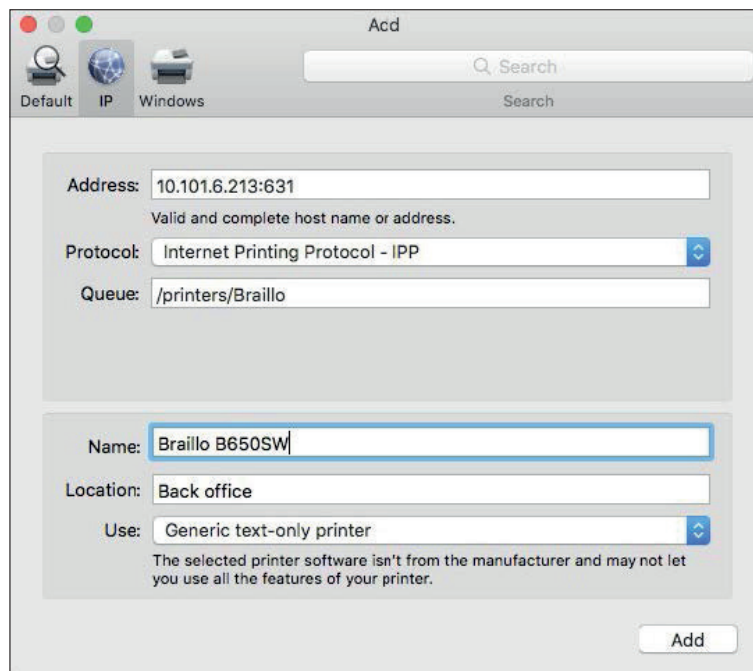
8. Click 'Add'
9. Your printer is now configured and ready to use

If you want to configure the network printing another way the full connection string is:
ipp://<IP-address>:631/printers/Braillo

Test the communication:

To test if the Apple machine is successfully communicating with the Braillo Printer, you first need the exact name of the Braillo printer, it can be found by using 'lpstat -t'.

Next, create or select a file that can be used for printing. Open a Terminal and use the 'lpr' command to send the file to the printer, like this:

lpr -P <Braillo_Name> <file_to_print>

In this command, -P means destination or which printer to use. <Braillo_Name> is the exact name of the Braillo printer identified above, and <file_to_print> is the file to be printed, with path relative to the Terminal current directory.

3.6   Ethernet on Linux

Before starting, make sure the printer is powered on and connected to the network.

You will need the printer's IP address which can be found in menu *Main Menu - Warning - Service/ diagnostic - Status / Software upgrade.*

See 'Status / Software upgrade:' on page 39 for more information.

The printer broadcasts itself using dnssd/bonjour. If you only have one Braillo printer on your network you can use this if your computer detects it. If you have multiple Braillo printers it is better to add them by their IP address to be sure you are configuring the correct one.

1. Find your distro's Control Panel and find the dialogue to add a printer
2. Select 'Internet Printing Protocol (ipp)'
3. Use the network URI: 'ipp://<IP-address>:631/printers/Braillo'
4. Give the printer a identifiable Name and Location, for example 'Braillo_<model number>'
5. Your printer is now configured and ready to use

Test the communication:

To test if the Linux computer is successfully communicating with the Braillo Printer, the 'lpr' command can be used. Create or select a file that can be used for printing and enter the following command in a terminal: lpr -P <Braillo_Name> <file_to_print>

Where -P means destination, <Braillo_Name> being that destination name, and <file_to_print> being a text file or file that is compatible with the Braillo Printer.

The exact device name of the Braillo printer can be found by using 'lpstat -t'.

3.7 Wireless network (WLAN)

The configuring of the wireless network connection is handled through a special configuration mode where the printer creates a temporary Access Point. When connected to this AP the rest of the configuration is handled trough a standard web page.

To enter the WLAN configuration mode, navigate to:
Main Menu - Printer setup - Network configuration - Conf. WLAN.
See section for more information.

A screen now shows up with the credentials needed to log on to the temporary configuration access point. The network name (SSID) is unique for this printer, but the password is generated and will differ every time you start configuration mode.

Leave the printer in this state while you continue the configuration.

Using a laptop, tablet, smart phone or other Wireless enabled unit with a web browser:
1. Connect to the temporary Access Point using the credentials in the printer display
2. Open a web browser and navigate to http://192.168.45.1/
   Some devices will detect the need to 'sign-in' or 'authorization needed'. Clicking this notification will lead you to the same web page.

3. In the 'Wireless network' drop-down menu, select the name of the wireless network to use
4. Enter the password in the 'Password' field
5. Click the 'Save network' button

6. Click the 'Activate & exit setup' button

If your wireless network is not discovered by the printer you can also configure it manually:
1. Follow step 1 and 2 above
2. Click the 'Manual setup' tab
3. Enter the SSID, choose security and enter the password (if needed)

4. Click the 'Save network' button
5. Click 'Activate & exit setup' button

To remove an already configured wireless network without activating a new:
1. Follow step 1 and 2 in the start of this section
2. Click the 'Forget network' tab
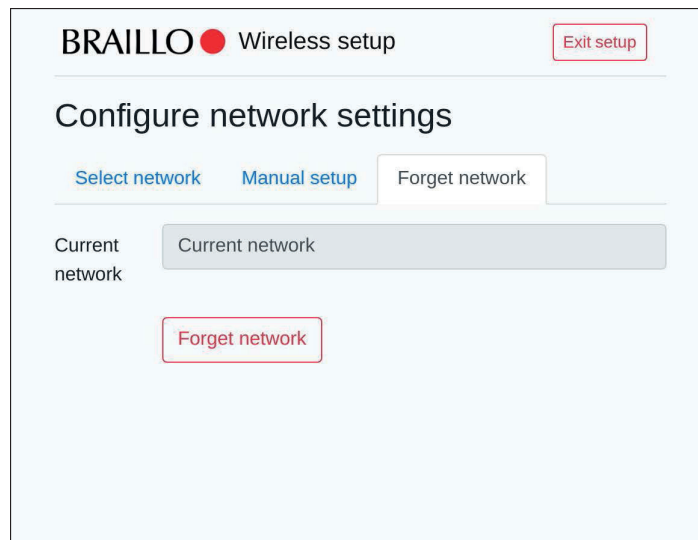
3. Click the 'Forget network' button
4. Click the 'Activate & exit setup' button

After clicking the 'Activate & exit setup' button, you will get a confirmation message and the configuration mode shuts down and the printer returns to normal with the new configuration.

To exit the WLAN configuration mode:
To exit configuration mode you need to either:
• Save and activate a new configuration
• Click the 'Exit setup' button on configuration web page
• Click the 'Back' button in the printer display

When the configuration server shuts down the printer returns to normal operation.

If a new wireless configuration was activated you can see the connection status and signal strength in the top right corner of the printer display.
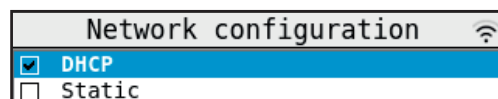
Note! If the printer behaves unexpectedly after being in Wireless network configuration mode, please try restarting the printer.

4. OPERATING THE PRINTER

4.1 Inserting paper

Paper should be inserted into the printer in the following manner:

1. Place a box of paper at the back of the printer. (Opposite side from the operating panel).
2. Insert the paper between the two paper guides, and then through the slit in the paper guide. Insert about the length of one sheet. Go to the front of the printer.
3. The tractors might have to be adjusted sideways to fit to the paper width in use. This is done by opening a little lever on the outer side of the tractors, then move the tractors so it will fit to the paper width, then close the lever again.
4. Lock the paper into the tractor-feed. By using the FINE ADJUST button, adjust the paper with respect to the starting mark (notch) corresponding to the chosen sheet length. (See figure below).
5. Go to the back of the printer, and adjust the two paper guides carefully close to the edge of the paper. This is to ensure that the paper will go straight through the printer.

The printer is now ready to start printing.

⚠️ Note! If the printer has run out of paper during a print job, perform step 2 to 5, without resetting the printer. Press the "Continue" button, and the printer will continue from the place where it ran out of paper without losing any text.
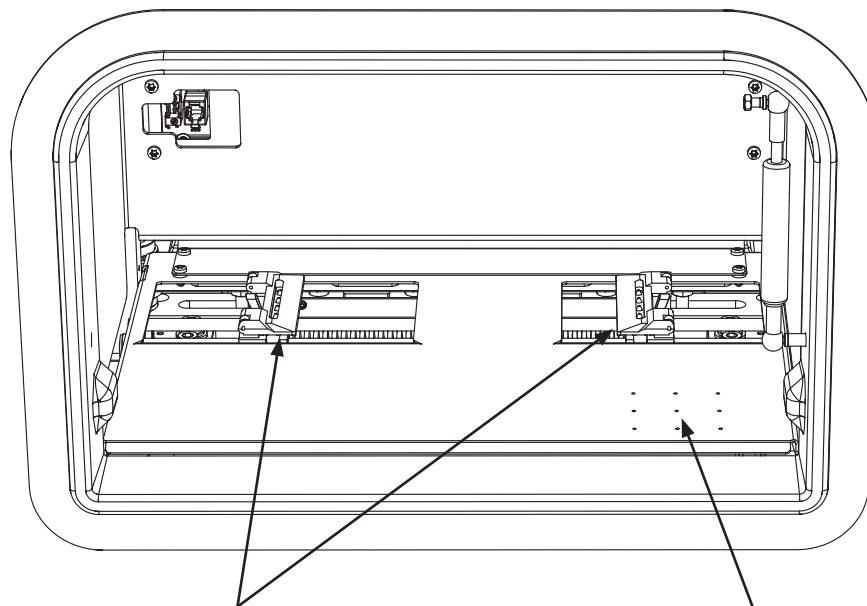
Adjust the tractors sideways to correspond with the paper width in use, and so that the margins are suitable

Use the marking that corresponds to the sheet length in use

4.2   Basic operating panel functions

When the printer is powered up, you have to press the **Accept** button to make the printer ready.
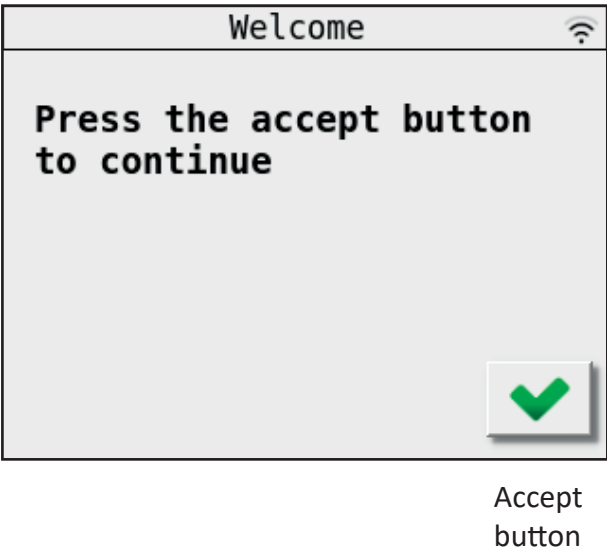
Accept
button

After pressing **Accept** the window below appears. Please see the explanation on the figure below:

Time   Date   WLAN indicator

Status information

Moves the paper
0.5 inch forwards

Moves the paper
0.5 inch backwards

Sheet counters, will
count upwards as
the printing goes on

Enters the
Main menu

Advances
the paper
one sheet

Reset for the sheet
counters
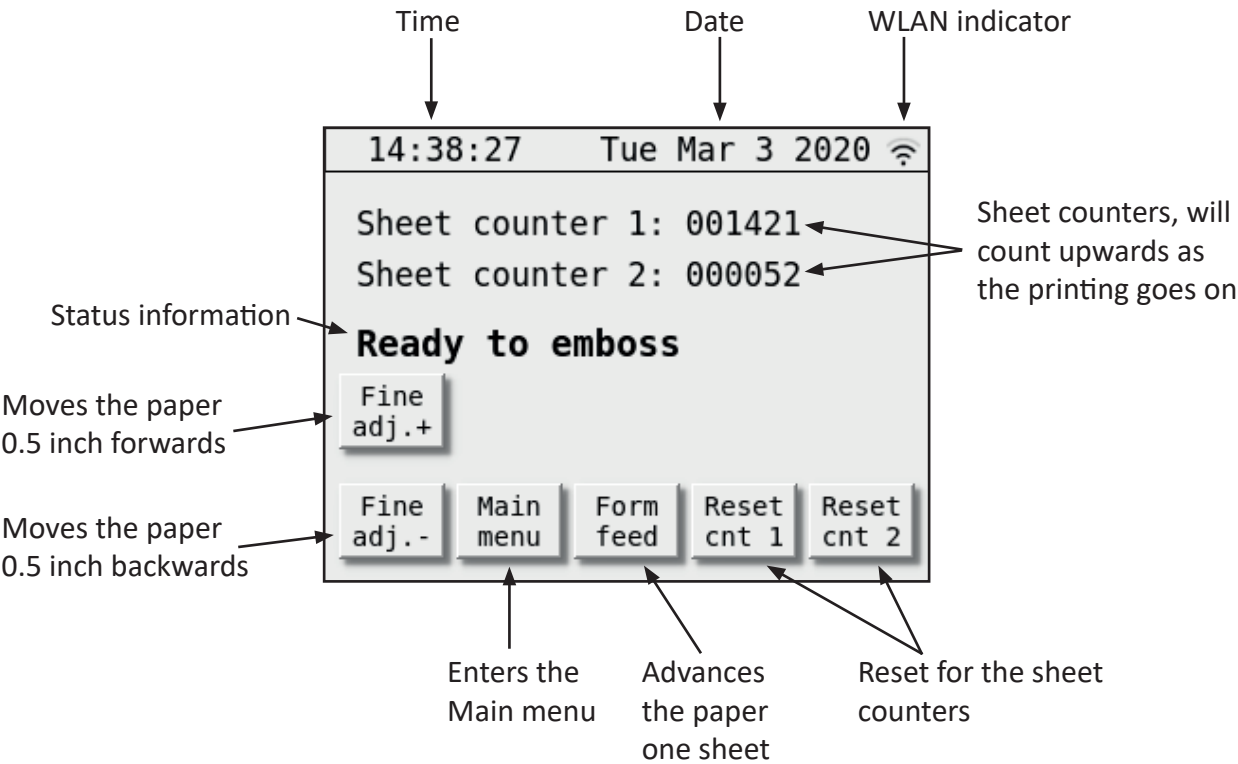
Navigating in the menus.

Move the cursor to the desired sub menu, and then press the Accept button.

Select this to enter sleep mode

Move the cursor up   Move the cursor down   Accept or select button   Jump back to the previous menu without saving
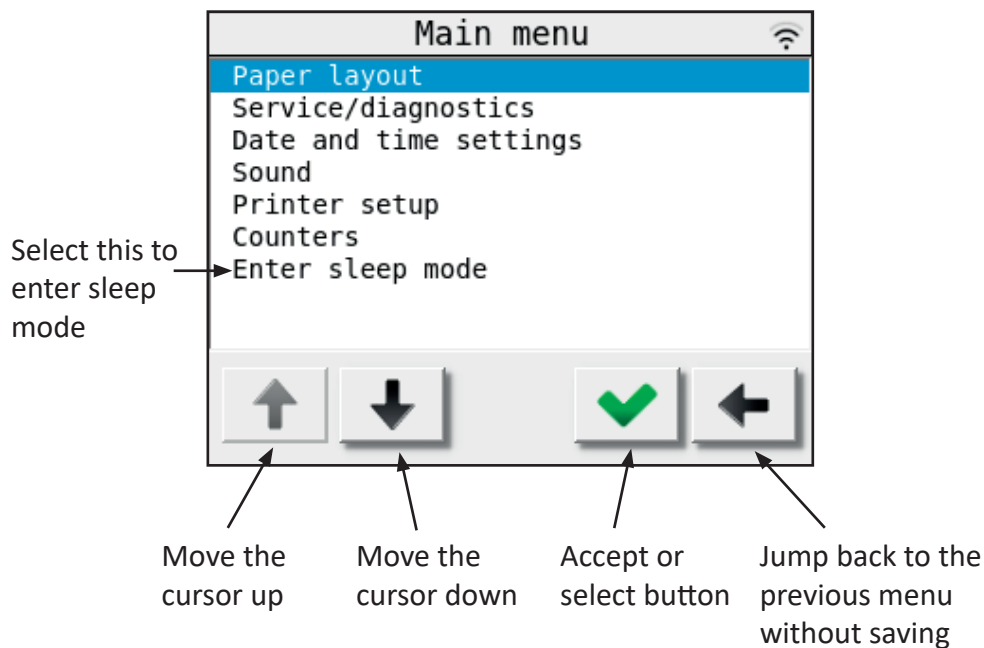
To change a variable setting.

If a setting can have more than two values, the display will look like below.

Increase the value

Decrease the value

Accept or select button   Jump back to the previous menu without saving
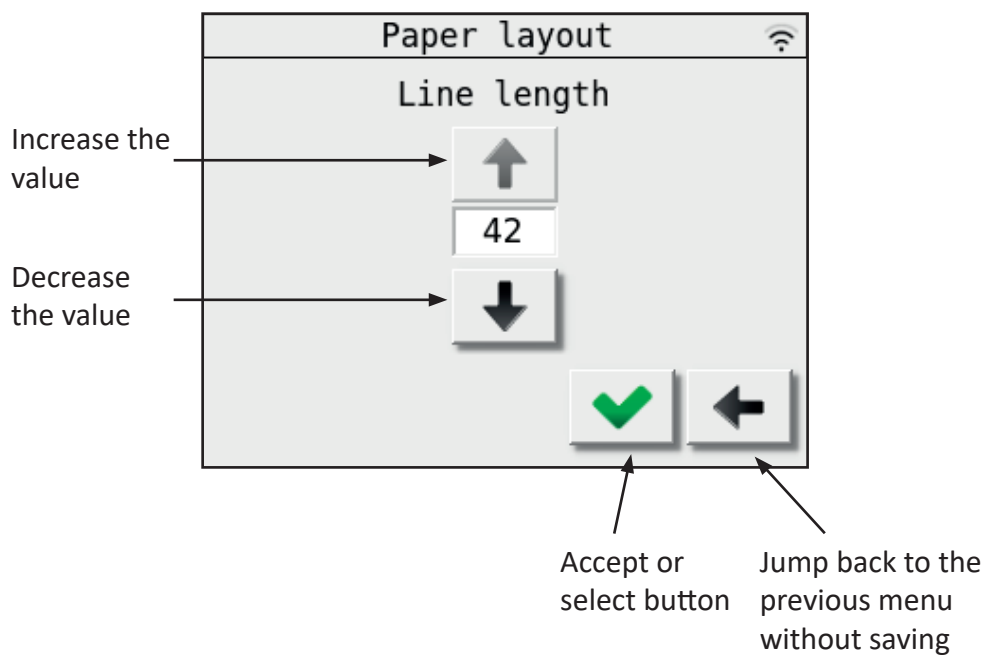
To change a setting with just two alternatives.

If a setting can have just two alternatives, the display will look similar to this.

Active button

Inactive button, press to activate, and then press **Accept**

Accept or select button

Jump back to the previous menu without saving
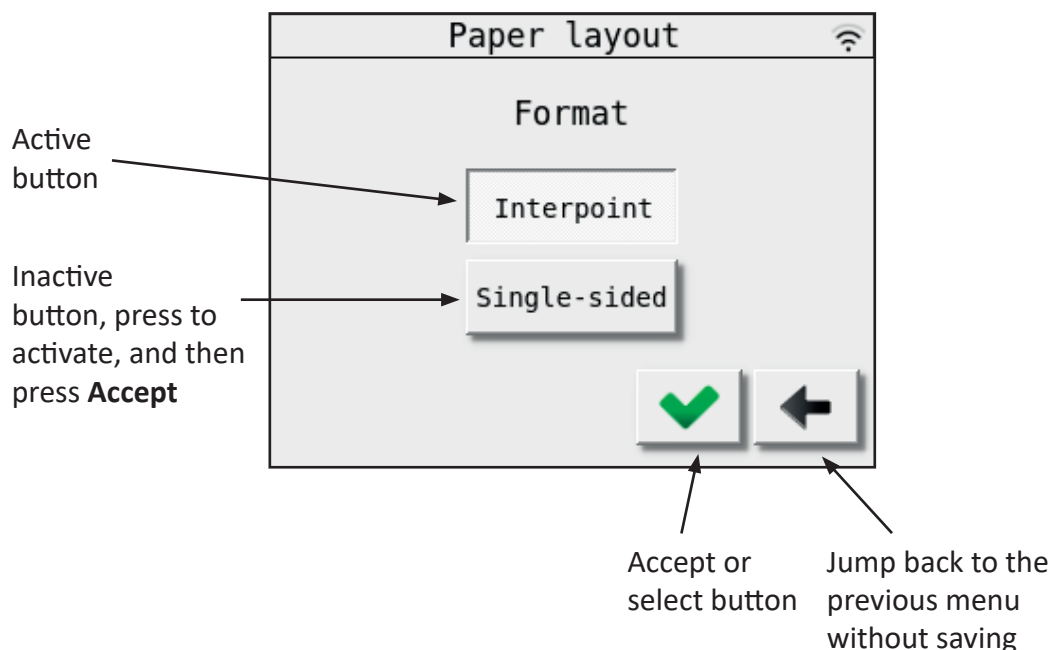
Select printer model

The printer model is always set correctly when the printer is shipped, but if for some reason the main board has to be replaced, you have to select the correct printer model.
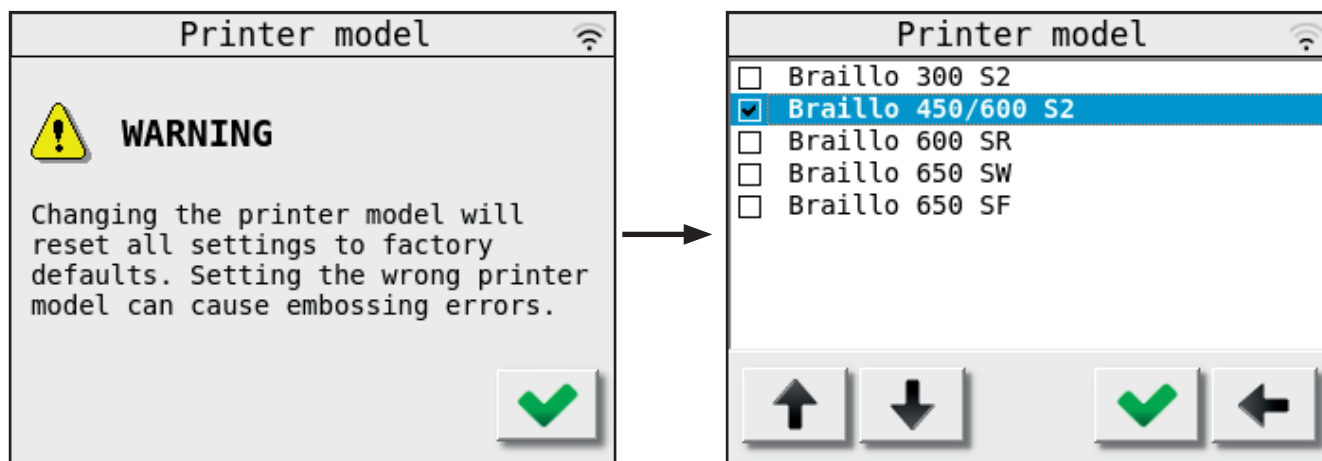
Note!

The settings set by the operator panel are the default values. However, when sending a text file from the computer, some parameters for this specific job is sent along with the file. The parameters that comes with the file will be active during the print job. When the job is finished, the settings will return to the default settings again.

Operator panel during printing.

Please see the figure below:
Embossing Sheet 1 / 5 means that the printer is now printing sheet 1 of a print job with 5 sheets in total.

If you would like to pause a print job, press the **Pause** button. When the printer is paused, the button will change to **Continue**. Press **Continue** to continue with the printing. If you would like to cancel the rest of the print job, press **Reset**. The printer will then position the paper correctly for the next print job.

```
12:07:47      Tue Apr 28 2020 🛜

Sheet counter 1: 000022
Sheet counter 2: 000022

Embossing ...

   Sheet        1 /          1

  ┌───────┐              ┌──────┐┌──────┐
  │ Pause │              │Reset ││Reset │
  └───────┘              │cnt 1 ││cnt 2 │
                         └──────┘└──────┘
```

Pause the print job.

```
12:08:40      Tue Apr 28 2020 🛜

Sheet counter 1: 000022
Sheet counter 2: 000022

Paused

   Sheet        1 /          1

  ┌───────┐        ┌──────┐┌──────┐┌──────┐
  │ Cont. │        │Reset ││Reset ││Reset │
  └───────┘        └──────┘│cnt 1 ││cnt 2 │
                           └──────┘└──────┘
```
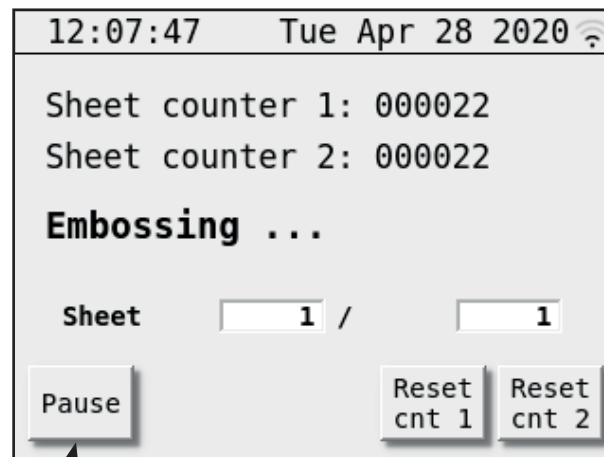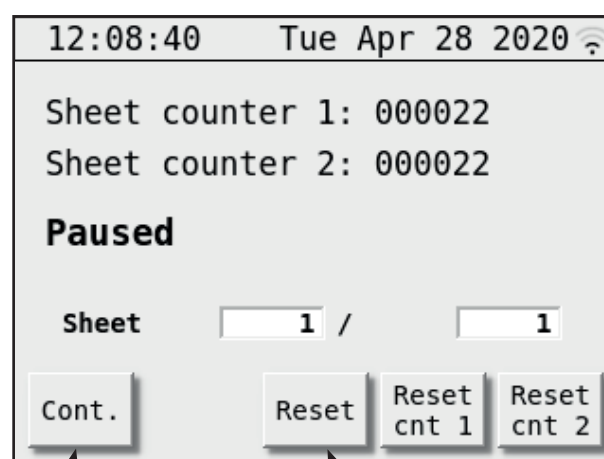
Continue the print job.   Cancel the rest of the print job.

4.3   Main menu

```
┌─────────────────────────────────────┐
│         Main menu          ⌃•)       │
├─────────────────────────────────────┤
│ Paper layout                         │
│ Service/diagnostics                  │
│ Date and time settings               │
│ Sound                                │
│ Printer setup                        │
│ Counters                             │
│ Enter sleep mode                     │
│                                      │
│  ┌────┐ ┌────┐      ┌────┐ ┌────┐    │
│  │ ⬆ │ │ ⬇ │      │ ✔ │ │ ⬅ │    │
│  └────┘ └────┘      └────┘ └────┘    │
└─────────────────────────────────────┘
```
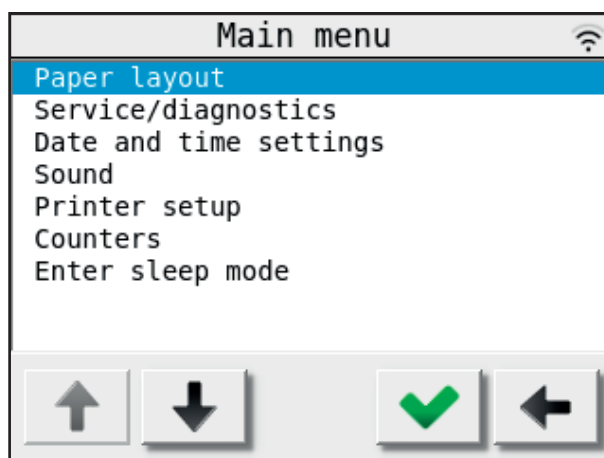
The Main menu options:

4.4 'Paper layout menu' on page 35
> Settings for the braille output layout on paper

4.5 'Service/diagnostic menu' on page 37
> Choices for test print patterns, view the log, checking status etc.

4.6 'Date and time menu' on page 40
> Settings for date and time

4.7 'Sound menu' on page 40
> Settings for the sound

4.8 'Printer setup menu' on page 41
> Choose printer model, ASCII tables etc.

4.9 'Counters menu' on page 44
> Find the total of how many hours/sheets the printer has been running

Enter sleep mode
> Will put the printer directly into sleep mode

4.4   Paper layout menu

Main Menu - Paper Layout
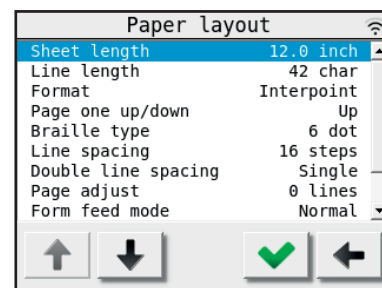
Sheet length:

Main Menu - Paper Layout - Sheet Length
The sheet length is the length of the sheet in inches.
The range is from 4 to 14 inches.
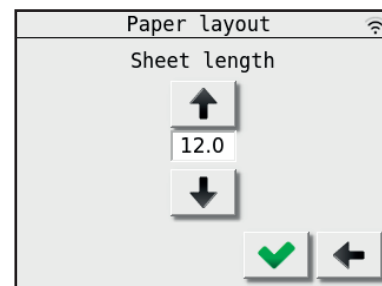
Line length:

Main Menu - Paper Layout - Line Length
The line length is the maximum number of characters that you can have on a single Braille line. The range is from 10 to 42 characters.
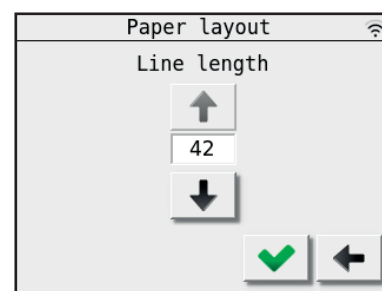
Format:

Main Menu - Paper Layout - Format
Selects between interpoint (dots on both sides of the sheet) and single-sided (dots on just one side of the sheet).
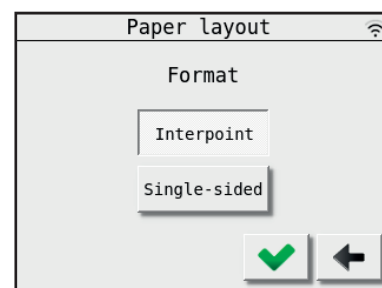
Layout:

Main Menu - Paper Layout - Layout
Selects between Normal and Z-fold mode. Normal means that the Braille is organized on the sheet like this:
Sheet no. 1 contains page no. 1 and 2,
Sheet no. 2 contains page no. 3 and 4, and so on.
Z-fold is like this:
Sheet no. 1 contains page no. 1 and 2,
Sheet no. 2 contains page no. 3 and 4, but upside down
Sheet no. 3 contains page no. 5 and 6,
Sheet no. 4 contains page no. 7 and 8, but upside down
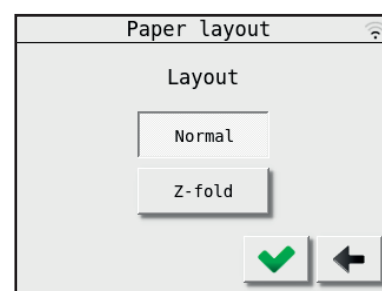
Page one up/down:

Main Menu - Paper Layout - Page one up/down
Selects if page one is on the top or underside of the sheet.
The rest of the pages will also adjust accordingly.
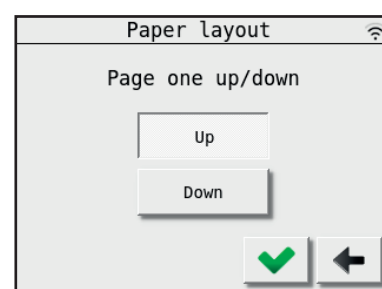
Braille type:

Main Menu - Paper Layout - Braille type

Selects between 6 and 8 dot mode.
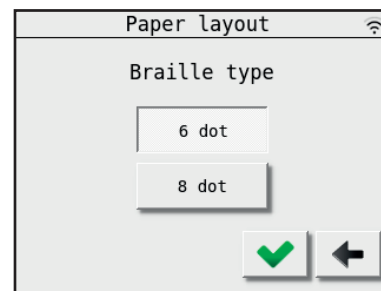
Line spacing:

Main Menu - Paper Layout - Line spacing

Selects the Line spacing. The range is from 0 to 16.
16 steps are the standard line spacing (5.08 mm or 0.2"), 8 is the setting for making dots continuously down the sheet (line spacing is 2.54 mm or 0.1"). Note that if the setting is less than 7, and there is text on each line, the dots might get damaged in the printing process. Normal setting is 16 steps.
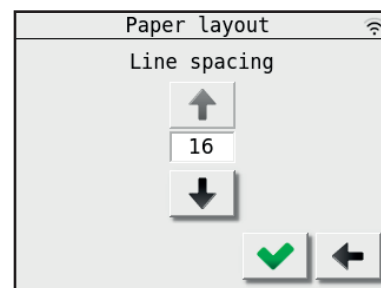
Double line spacing:

Main Menu - Paper Layout - Double line spacing

The function "Single or Double line spacing" will double the given line spacing. If, e.g. the current line spacing is 13 steps (4.1275 mm), selecting Double line spacing will increase it to 26 steps (8.2550 mm). Normal setting is Single line spacing.
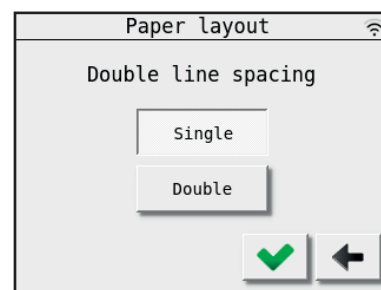
Page adjust:

Main Menu - Paper Layout - Page adjust

This setting will decrease the number of lines on each page from 0 to 9. If the maximum number of lines could be 29, and the setting 4 is selected, the resulting number of lines will be 25. This function will keep the top margin constant and only the bottom margin will vary. The normal setting is 0.
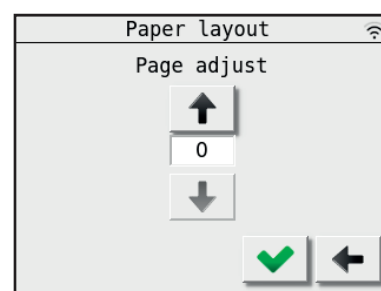
Form feed mode:

Main Menu - Paper Layout - Form feed mode

Selects between 'Normal Form feed' or 'No Form feed'.
Normal Form feed mode: The printer will position the paper for every page, giving regular top and bottom margins.
No Form feed mode: The printer will print continuously without any page breaks or top/bottom margins.
Normal setting is Normal Form Feed.
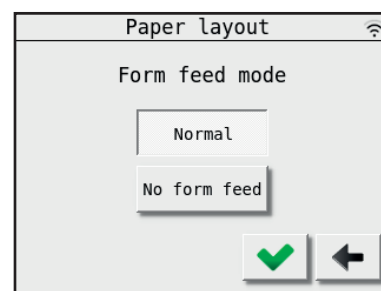
Page margin:

Main Menu - Paper Layout - Page margin

The "Page Margin" function will adjust the page margin in steps from 0 to 20. The standard setting is 8, (8 = normal).
One margin step is equal to 0.6350 mm. It will "push" the text downwards the sheet (like a top margin). If the text reaches the bottom, (meaning that there will not be enough space on this page for the last line), this line will wrap over to the next page.
The normal setting is 8 steps.
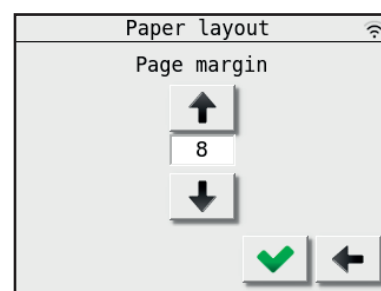
4.5 Service/diagnostic menu

Main Menu - Warning - Service/diagnostic

When entering this menu choice, a warning window will appear.
The purpose of this warning is make the user aware that the safety switches on the cover are now disabled. This is done to make it possible to run smaller tests during service.

⚠️ Please be aware of rotating parts to prevent injuries!
The printer may be unexpectedly started by other users!

Print demo text:
Main Menu - Warning - Service/diagnostic - Warning - Print demo text

Prints a short demo text on approx. one sheet of paper.

Print Test Pattern:
Main Menu - Warning - Service/diagnostic - Warning -
Print Test Pattern

When entering this menu choice, a warning window will appear.
This is to make the user aware that print jobs from the computer will not be printed as long as you are in this sub-menu.

- X pattern.
Will print dots in a x pattern across the sheet,
useful when searching for missing dots.

- Full cell, single sided.
Prints all six dots on all characters on one side of the sheet,
useful for dot quality tests.

- Full cell, both sides.
Prints all six dots on all characters on both sides of the sheet,
useful for testing the paper quality.

- O/Ø pattern.
Prints a test pattern made of dot 1,3,5 and 2,4,6, single-sided, useful when searching for extra dots.
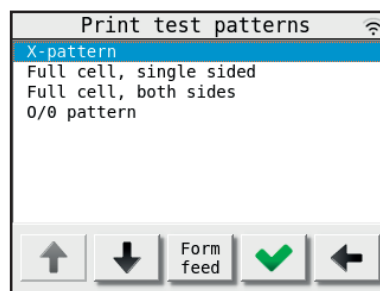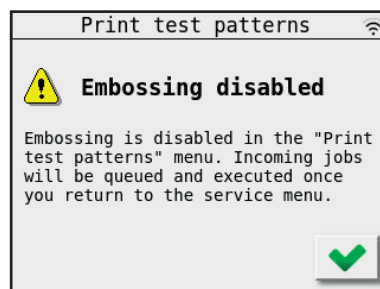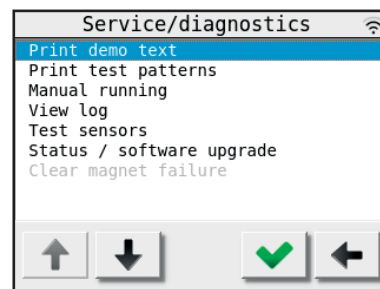
Manual running:

Main Menu - Warning - Service/diagnostic - Warning -
Manual running

When entering this menu choice, a warning window will appear.
This is to make the user aware that print jobs from the computer will
not be printed as long as you are in this sub-menu.

The function of this menu choice is to activate different
functions manually for troubleshooting purposes.

- Main motor
Use this to manually start and stop the main motor.

- Step motor
Will run the stepping motor forward approximately one sheet.

- Signal processor reset
Resets the Signal processor.

- X pattern without motor
Will activate one and one magnet on the magnet racks.

- Sleep relay
Turn the Sleep relay on or off.

- Alarm relay
Turn the Alarm relay on or off.

- Spare relay
Turn the Spare relay on or off.
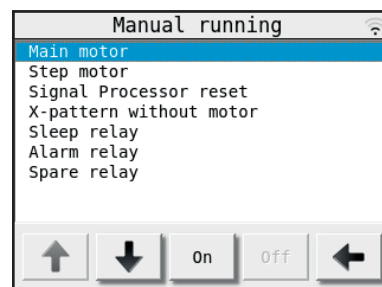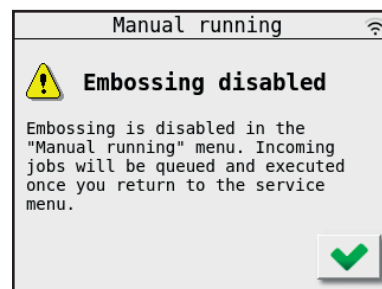
View Log:

Main Menu - Warning - Service/diagnostic - Warning - View Log

The printer remembers the different events that has happened and
will store them in a log. This log can be viewed in a list like the figure to
the right. If a message is repeated several times, the display will show a
line with the text "last message repeated x times".
Use the up and down arrow to scroll the list.
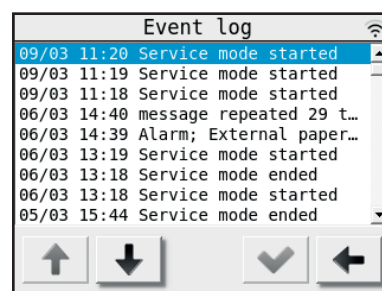
If the **Accept** button is shown in green, it is also possible to view some
more details about this particular event by pressing the **Accept** button.
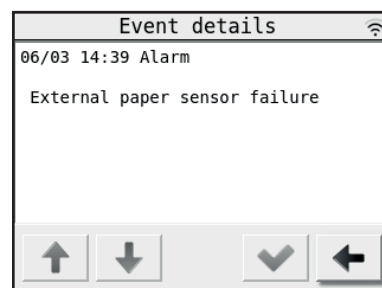
Test Sensors:
Main Menu - Warning - Service/diagnostic - Test sensors

This is a function made for troubleshooting the sensors on the printer.
The "ON" or "OFF" is indicating the current status of the sensor.
To find out if a sensor is OK, the sensor can be switched on and off physically, and the text in the display will change between "ON" and "OFF" accordingly if the sensor is functioning.
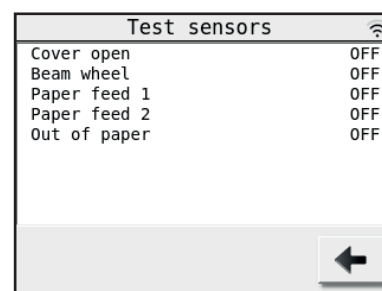
- Cover open	Safety switches on the panels on the printer.
- Beam wheel	Sensor fitted on the lower shaft on the printer.
- Paper feed 1	Sensor 1 on the paper feed tractor.
- Paper feed 2	Sensor 2 on the paper feed tractor.
- Out of paper	Sensor to check if there is paper in the printer.

Status / Software upgrade:
Main Menu - Warning - Service/diagnostic - Status / Software upgrade
Will show the printers current IP addresses, the MAC addresses and the current software version. (Eth. = Ethernet)

- Software update:
It is possible to update the printers internal software. You will need a file with the newer software version, which you can get from Braillo Norway or a Braillo distributor.
The file must then be copied to a USB memory stick.
Place the memory stick in the USB type A connector on the main board. See section 7.4 'Main board - connections' on page 101 for info about where to find it.
The printer will only look for other available software versions when the 'Status/Software upgrade' window is opened, so if the upgrade doesn't appear in the display, go one step back to the Service menu and then back into the 'Status/Software upgrade' window.
Now the new software version will appear at 'Available upgr:', and the 'Upgr. softw.' button will be active. Press the button to upgrade.
The printer will go through an updating sequence, and do a regular booting when it is finished.
All settings and counters will be kept and used with the new software version.
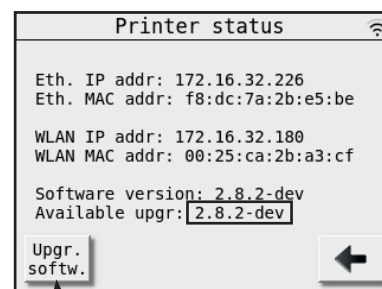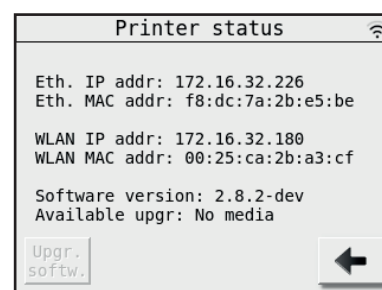
Upgrade software button

Clear magnet failure:
Main Menu - Warning - Service/diagnostic - Clear magnet failure

This menu choice is normally not active, but if there has been detected a faulty magnet during printing, a magnet symbol will be shown in the 'Ready to emboss' window. Now the 'Clear magnet failure' becomes active in the Service/diagnostics menu and the magnet failure can be reset.
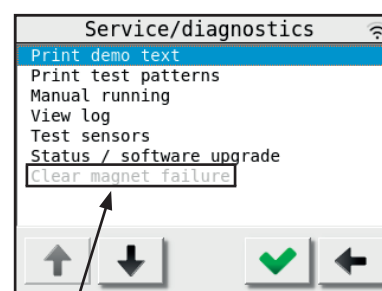
The Clear magnet failure choice

4.6   Date and time menu

Main Menu - Date and time
Used to change the date and time setting
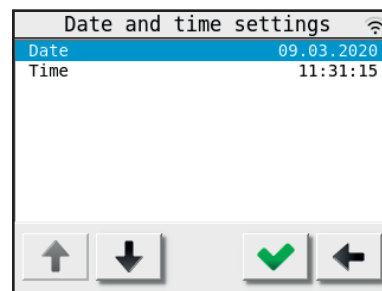
Date
Main Menu - Date and time - Date
Used to change the date.
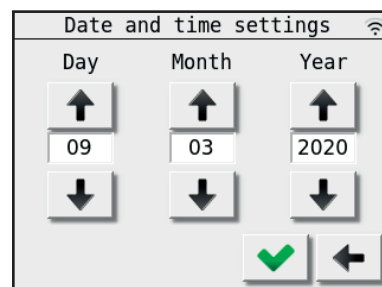
Time
Main Menu - Date and time - Time
Used to change the time.
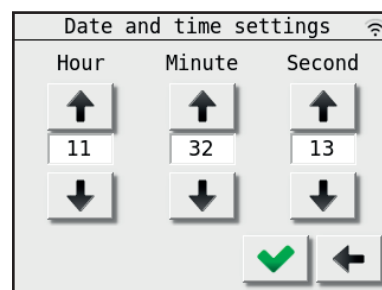
4.7   Sound menu

Main Menu - Sound

Volume
Main Menu - Sound - Volume
Volume setting for beep and speech.
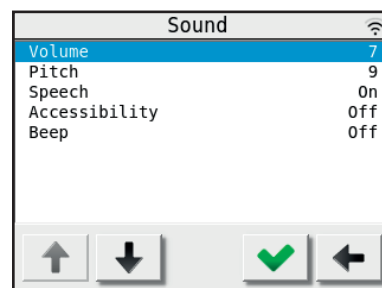
Pitch
Main Menu - Sound - Pitch
Sets the pitch level for the beep.

Speech
Main Menu - Sound - Speech
Toggles Speech on or off.
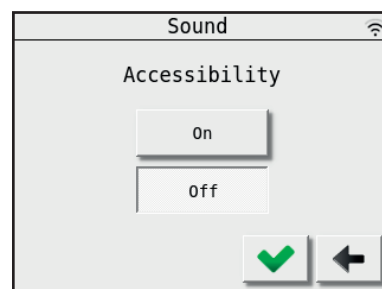
Accessibility
Main Menu - Sound - Accessibility
Toggles Accessibility on or off.
If this is set to on, pressing a button will result in the button's
function being read out by Speech.
The next press will then activate the button.

Beep
Main Menu - Sound - Beep
Toggles Beep on or off.
If on, the printer will sound a short beep when a button is pressed.
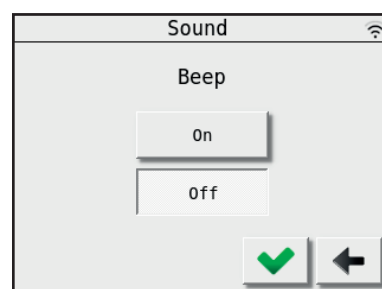
4.8   Printer setup menu

Main Menu - Printer setup

In this menu the basic settings regarding the printer is set.
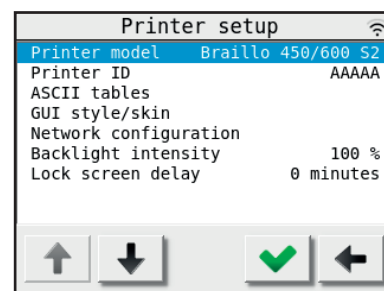
Printer model:

Main Menu - Printer setup - Warning - Printer model

When entering this menu choice, a warning window will appear.

Braillo Norway has a number of different printer models that can use the same electronics. But the different printer models have different settings and different functions. This menu choice is where you select the specific printer model. The software will then be adapted to the printer in use.

This setting is fixed at the factory, and should under normal conditions never need to be changed.
However, if for some reason the main board in the printer has been replaced, you have to make sure that the correct printer model is selected here.
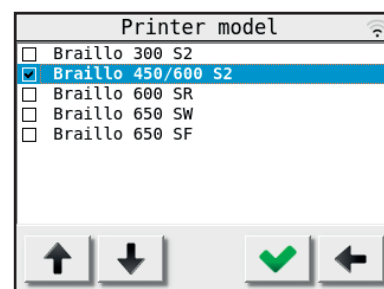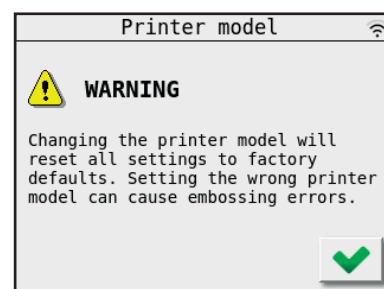
Printer ID:

Main Menu - Printer setup - Printer ID

The printer has a function to make it possible to identify which printer has printed a particular Braille book. It is done by sending a command along with the Braille book that tells the printer to print it's identification. On this setting you can set a 5 character code or name that identifies this particular printer.

Also when more than one printer is connected with USB to the same computer, the Printer ID MUST be set. This must be done to give the connected printers unique ID's in the computer.
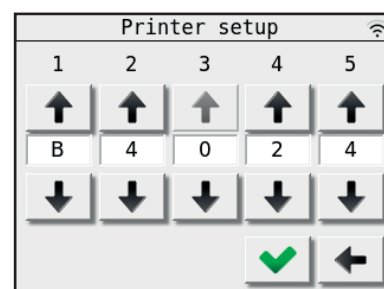
ASCII tables:

Main Menu - Printer setup - ASCII tables

An ASCII table is the same as a character set. When the printer receives a character from the computer, it goes to an ASCII table to find out which dot pattern is corresponding to this character.

This printer has a number of ASCII tables, and they are listed like shown in the figure to the right. To select another table, use the up or down arrow and press the green **Accept** button. Now this has become the current table.
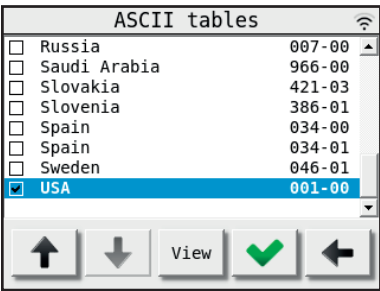
It is also possible to view the translation between characters and dots in the different ASCII tables by pressing the "View" button.

Then a list like shown on the right will appear. Use the up and down arrows to scroll the list.
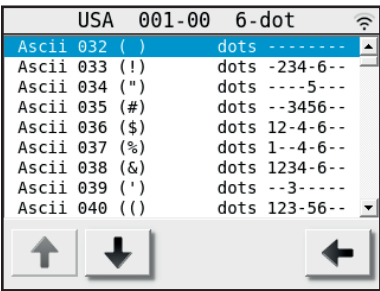
GUI style/skin:

Main Menu - Printer setup - GUI style/skin

If any users of this printer has low vision and/or find it a bit difficult to read the operator panel, it is possible to change the background and text colours to get better contrast.
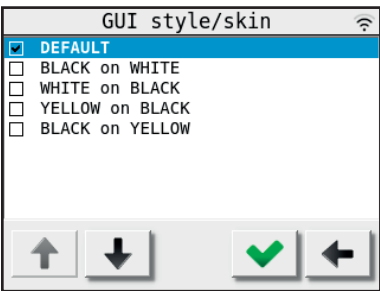
Network configuration:
Main Menu - Printer setup - Network configuration
This menu choice gives you the possibility to choose between:
- **Regular DHCP IP address (default setting)**
- **Static IP address**
Note with static IP you have to set all the three network parameters manually, and all three has to be set.
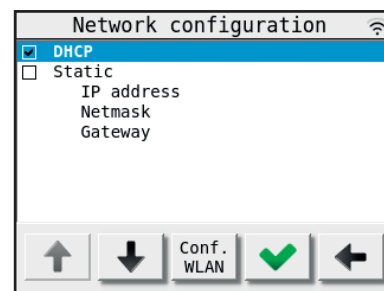
The three different settings for the static IP is set using the buttons as shown in the figure to the right. Type the numbers into the first text cell, then tap the next cell to move to it. When all four numbers are set, press the green **Accept** button to go back to the Network configuration menu.
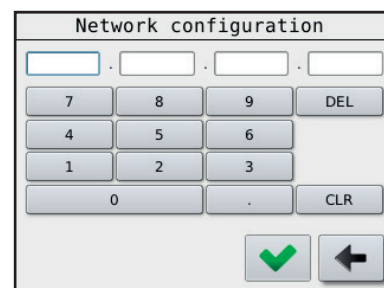
- **Wireless configuration**
To start the set up for connecting to a WLAN network, press the button 'Conf. WLAN'.
Now the printer will start to transmit on a temporary WLAN network with the SSID and password shown in the display.
Note that the password changes every time, so if you have to do this more than once, remember to always use the latest password.

See for more information.

Backlight intensity:
Main Menu - Printer setup - Backlight intensity
Setting for the backlight intensity on the display.
Can be set from 15 to 100 %.
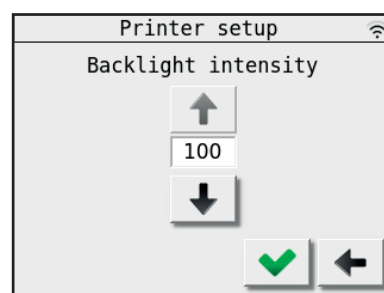
Lock screen delay:

Main Menu - Printer setup - Lock screen delay

Setting the delay in minutes after the operator panel has been used before the screen get locked. 0 is screen lock off.

The Lock screen function is to avoid that buttons are accidental pressed.

To unlock the locked screen, press first button 1, then button 2.
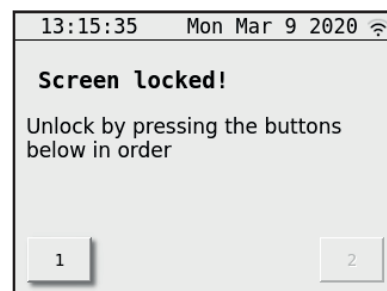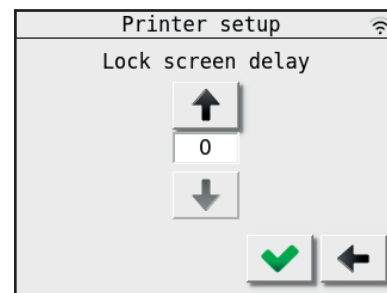
4.9 Counters menu

Main Menu - Counters

Will show two different counters, the first one will show the total number of sheets printed. The second shows the total number of hours the main motor has been running.
(The time the printer has actually printed).
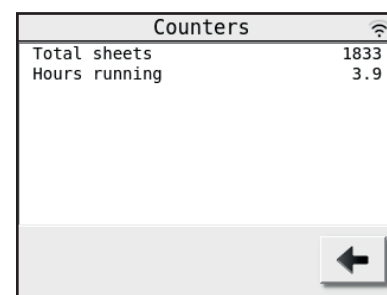
4.10   Display messages

When there is a problem, the display will show what has happened e.g. "Printer halted, Printer cover open". And it will stay like that until the error is fixed. Then the display will change to "Printer halted, Press continue to resume". By pressing **Continue** the printer will resume the printing from where it was before the error.

- Press continue to resume

```
14:36:12    Fri Mar 13 2020 ⌢

Sheet counter 1: 000068
Sheet counter 2: 000133

Printer halted
  Press continue to resume


Cont.   ▦✗              Reset Reset
                        cnt 1 cnt 2
```
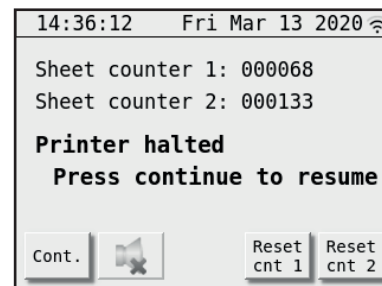
- Out of paper
The printer has run out of paper and is waiting for paper.
When paper is detected, the display will change to "Press continue to resume".

```
11:44:58    Tue Apr 28 2020 ⌢

Sheet counter 1: 000012
Sheet counter 2: 000012

Printer halted
  Out of paper


Cont.   ▦✗              Reset Reset
                        cnt 1 cnt 2
```
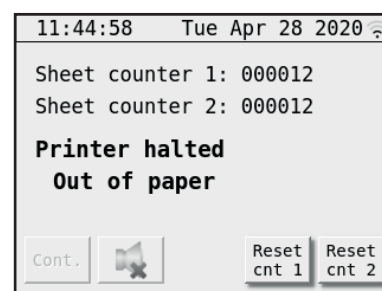
- Printer cover open
This occurs when one or more panels on the printer cover are open.
When the side panels are put back in place, the display will change to "Press continue to resume".

```
14:44:23    Fri Mar 13 2020 ⌢

Sheet counter 1: 000068
Sheet counter 2: 000133

Printer halted
  Printer cover open


Cont.   ▦✗              Reset Reset
                        cnt 1 cnt 2
```
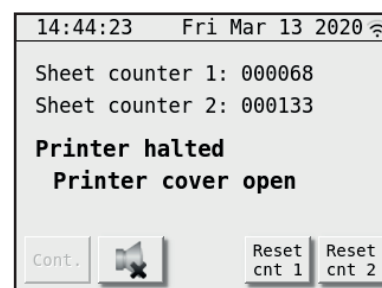
4.11 Unrecoverable errors:

When there is an unrecoverable error, the display will show what has happened e. g. "General failure, Beam wheel failure". When this kind of errors occurs, the printer must be reset or switched off and then switched back on again.
The job currently being printed has to be sent once more from the computer. The different unrecoverable errors are:

- Magnet failure
A defect magnet has been detected during printing. The display will say "General failure, Magnet rack failure" and the magnet symbol will appear in the upper right hand corner of the display. The printer will stop. Check the log for the details.
(Main Menu - Warning - Service/diagnostic - Warning - View Log)
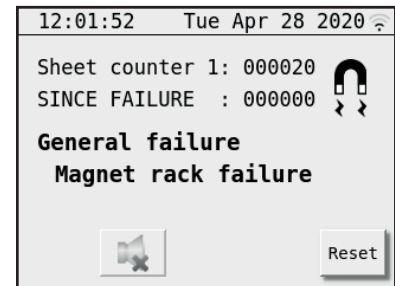
When trying to print after a defect magnet is found and replaced, the display will still show the magnet symbol in the top right hand corner. This is because you have to reset the magnet failure.
To reset the magnet failure, you have to select the menu choice **Clear magnet failure**. See "Clear magnet failure:" on page 39 for more info.
(Main Menu - Warning - Service/diagnostic - Clear magnet failure)
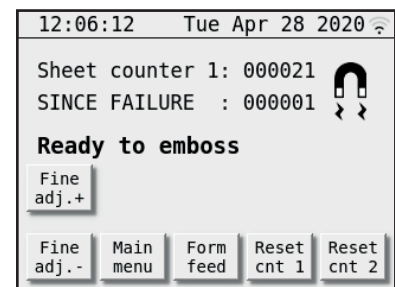
If the display shows "General failure, Magnet rack failure" without the magnet symbol in the top right corner, it means that there has been detected error(s) in e.g. the data transmission between the main board and the magnet racks, or it could be a broken fuse for the power to one magnet rack.
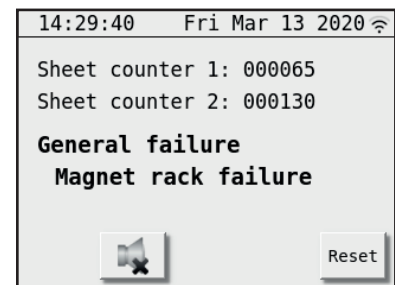
- Illegal ESC sequence
The printer has received an ESC sequence that it doesn't recognize, it is placed in wrong location on the page, or contains invalid parameters.
Press OK to continue.
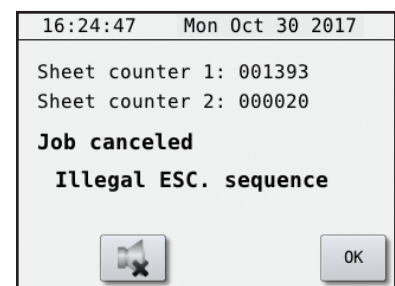
- Beam wheel failure

This means that the pulses from the Beam wheel sensor is not registered in the electronics. This can be caused by e.g. defect sensor, disconnected sensor, broken main belt, or defect main motor. If you can hear the main motor start, it is probably something wrong with the sensor. But if you cannot hear the motor start, it is probably something wrong with the main motor. Press Reset to continue. The sensor can be tested manually on
Main Menu - Warning - Service/diagnostic - Test Sensors.

```
14:48:37    Fri Mar 13 2020

Sheet counter 1: 000069
Sheet counter 2: 000134

General failure
  Beam wheel failure


                    Reset
```
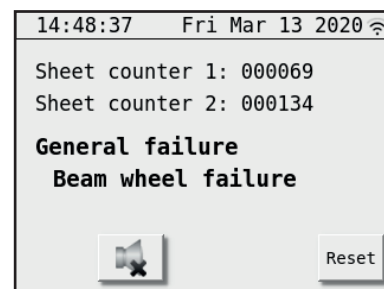
- Page self adj. failure

The printer has detected position problems with the paper feeding on e.g. power up or resetting. Could be caused by e.g. a defect/disconnected sensor or stepping motor. The sensors can be tested manually on *Main Menu - Warning - Service/diagnostic - Test Sensors.*
Please check the log for the details.
(Main Menu - Warning - Service/diagnostic - Warning - View Log)

```
11:46:49    Tue Apr 28 2020

Sheet counter 1: 000012
Sheet counter 2: 000012

General failure
  Page self adj. failure


                    Reset
```
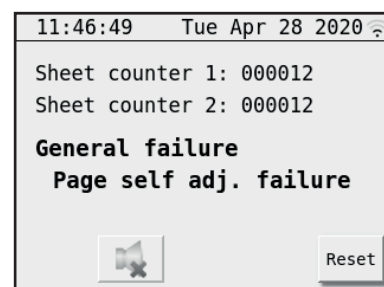
- Paper feed failure

During printing, the printer has detected that the paper position is not where the electronics is expecting it to be. This may be caused by e.g. the paper is stuck so the stepping motor is slipping, stepping motor is disconnected or defect, or one of the two paper feed sensors are disconnected or defect. Press Reset to continue.
The sensors can be tested manually on
Main Menu - Warning - Service/diagnostic - Test Sensors.

```
14:49:53    Fri Mar 13 2020

Sheet counter 1: 000071
Sheet counter 2: 000136

General failure
  Paper feed failure


                    Reset
```
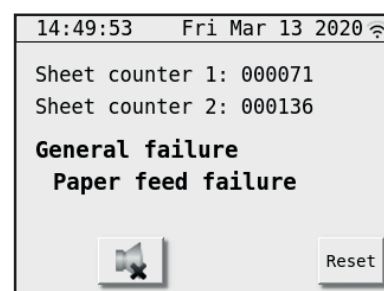
4.12 Overview of the menu structure.

```
                                          Welcome

                                          Ready to        Locked
                                          Emboss          screen

                                          Main
                                          Menu

              Warning!                     Sleep

  Paper         Service        Date Time    Sound       Printer      Counters
  Layout        diagn                                   Setup

  Sheet         Print          Date         Volume      Printer      Warning!
  length        demo text                               model        Printer model

  Line          Print test     Time         Pitch       Printer
  length        pattern        Embossing                 ID
                               disabled!

  Format        Manual         Embossing    Speech       Ascii       View
                running        disabled!                 tables      Ascii

  Layout        View           Event        Acessibility GUI
                log            log                        style/skin

  Page one      Test                        Beep         Network     Config.
  up/down       sensors                                  config.     WLAN

  Braille       Status                      Speech       Backlight
  type 6/8      software                    enabled!

  Line          Clear                                    Lock
  spacing       magnet                                   screen
                failure                                  delay

  Double
  line spac

  Page
  adjust

  Form feed
  mode

  Page
  margin
```

4.13 Test Print

The test print program is designed to ensure that the 168 printing mechanisms functions properly.

This printer will do an electronic test on all of it's printing mechanisms continuously during printing. However, this electrical test will not tell if something is wrong mechanically, and therefore it is recommended to print a few pages of test print before beginning the day's production.
By doing so, it's quite easy to see if all printing mechanisms are functioning mechanically.

This printer has both single-sided and double-sided (interpoint) test print patterns.
The test print consists of four different patterns. See the description below:
How to use the test print:

Print Test Pattern:

Main Menu - Warning - Service/Diagnostic - Warning - Print Test Pattern

When entering this menu choice, a warning window will appear.
This is to make the user aware that print jobs from the computer will not be printed as long as you are in this sub-menu.

- X pattern
Will print dots in a x pattern across the sheet,
useful when searching for missing dots.

- Full cell, single sided
Prints all six dots on all characters on one side of the sheet,
useful for dot quality tests.

- Full cell, both sides
Prints all six dots on all characters on both sides of the sheet,
useful for testing how the paper quality can take heavy printing.

- O/Ø pattern
Prints a test pattern made of dot 1,3,5 and 2,4,6, single-sided, useful when searching for extra dots.

Section 5.1 'Printing principle' on page 50 illustrates how the printing mechanisms are placed.

Instruction for troubleshooting will be illustrated by examples in section 5.2 'Troubleshooting, incorrect Braille' on page 56.
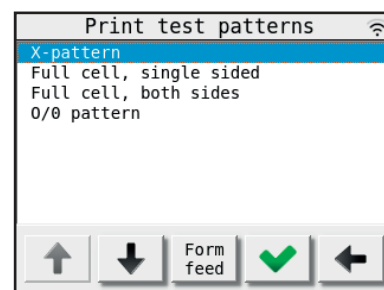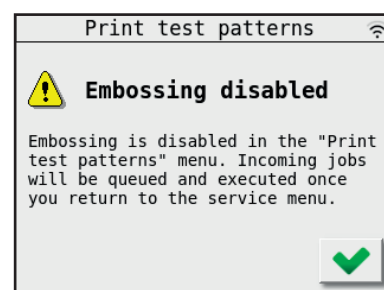
5. SERVICE AND MAINTENANCE

When doing some lighter service or maintenance tasks, it can be enough to remove the side plates on the cover. But for bigger operations we recommend to also remove the top cover. Please see section 2.4 'Removal of the top' on page 13 on how to do this.

5.1 Printing principle

The figure below is a very simplified version of the printing mechanism in this printer. The four bars across the paper indicates the magnet racks. The magnet racks are named from A to D.
Magnet rack A and B make dots on the side of the paper facing down, and magnet rack C and D makes the dots on the side facing up. The table below shows which printing mechanism made which dot.
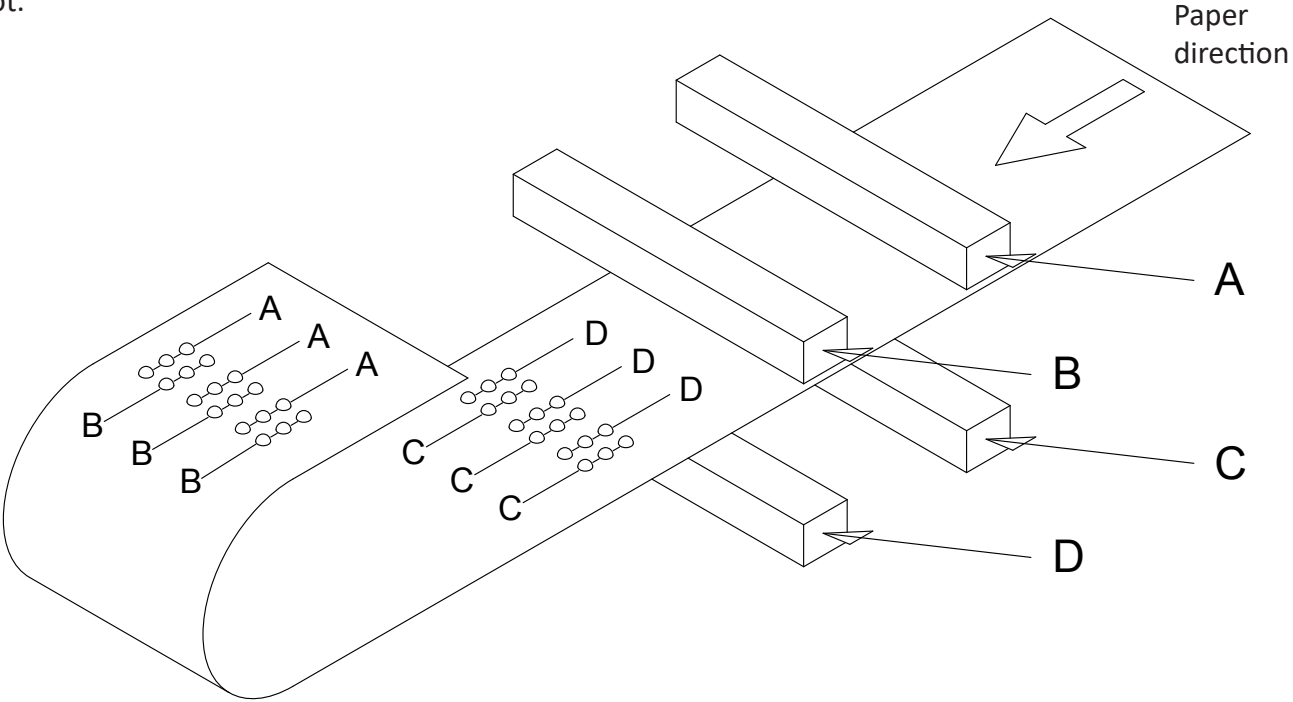
Dots on the upper side			Dots on the lower side		
Char no.	Dots	Magnet rack	Char no.	Dots	Magnet rack
1	1, 2, 3	C 42	1	1, 2, 3	A 42
	4, 5, 6	D 1		4, 5, 6	B 1
2	1, 2, 3	C 41	2	1, 2, 3	A 41
	4, 5, 6	D 2		4, 5, 6	B 2
3	1, 2, 3	C 40	3	1, 2, 3	A 40
	4, 5, 6	D 3		4, 5, 6	B 3
--	--	--	--	--	--
40	1, 2, 3	C 3	40	1, 2, 3	A 3
	4, 5, 6	D 40		4, 5, 6	B 40
41	1, 2, 3	C 2	41	1, 2, 3	A 2
	4, 5, 6	D 41		4, 5, 6	B 41
42	1, 2, 3	C 1	42	1, 2, 3	A 1
	4, 5, 6	D 42		4, 5, 6	B 42

The figure below is a "theoretical" figure showing the parts inside the printing mechanism. The printer has been "sliced" to show more detailed of how it is constructed.
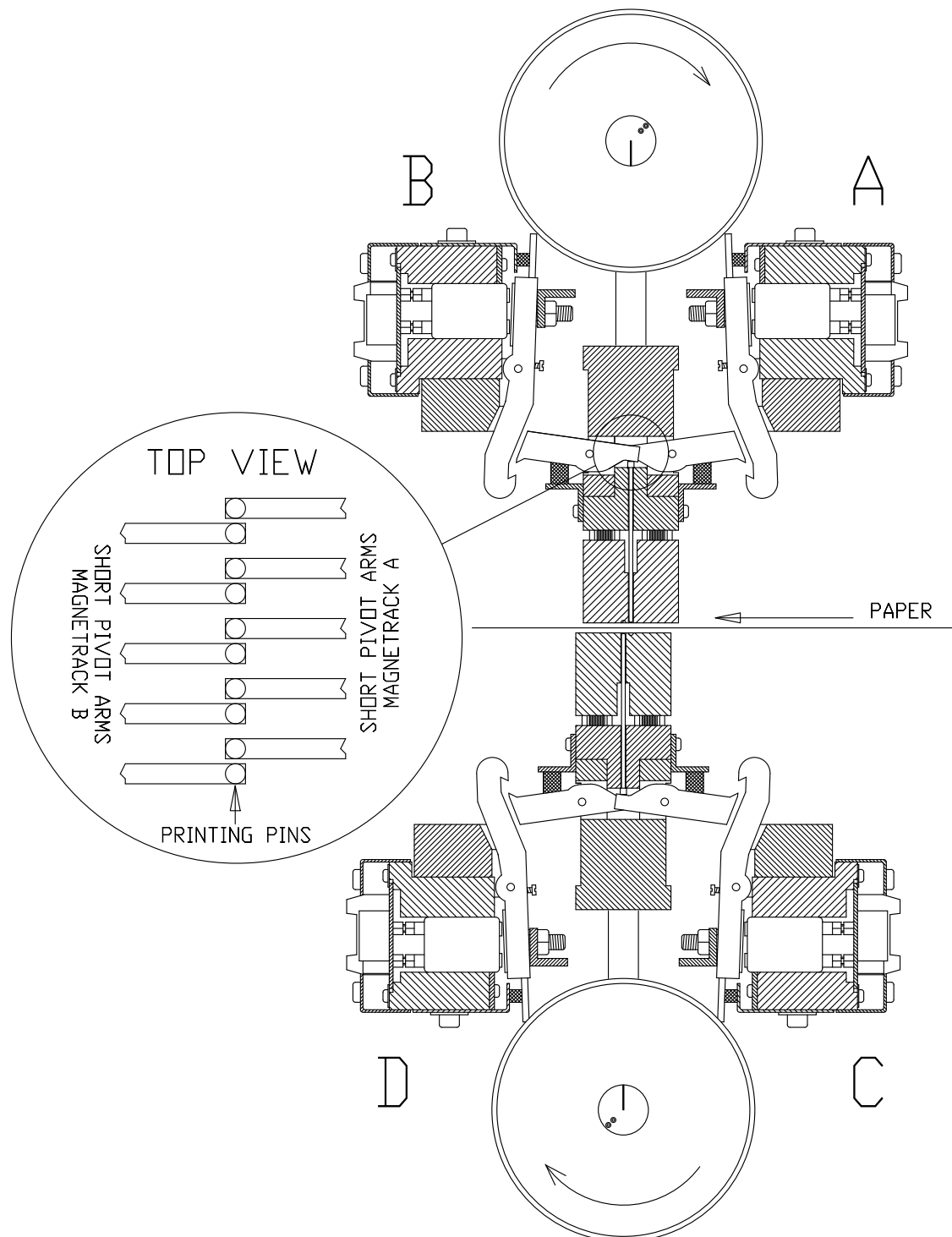
Please see the figure on the previous page.

The two shafts, one at the top and one at the bottom, are rotating synchronized. On each shaft there are eccentrics that are moving the beams and paper shoes up and down. This movement is used both to hold the paper and to make the dots. A row of dots is printed for each revolution of the shafts. The shafts must rotate three times to form a complete row of characters.

Please see figure below:

First revolution

Second revolution

Third revolution
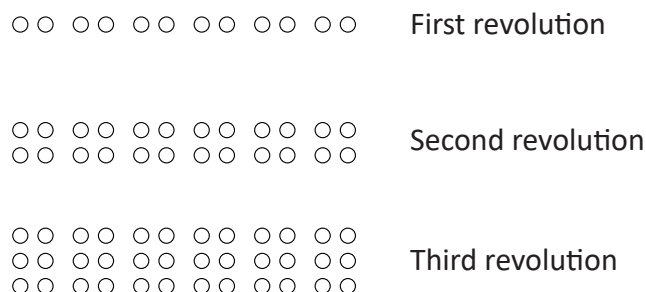
To be able to print interpoint (where both sides of paper are printed simultaneously), the back page is offset a little to the right and a little down to fit in between the dots on the front page.

Please see figure below:

Front page   Back page (dashed lines)
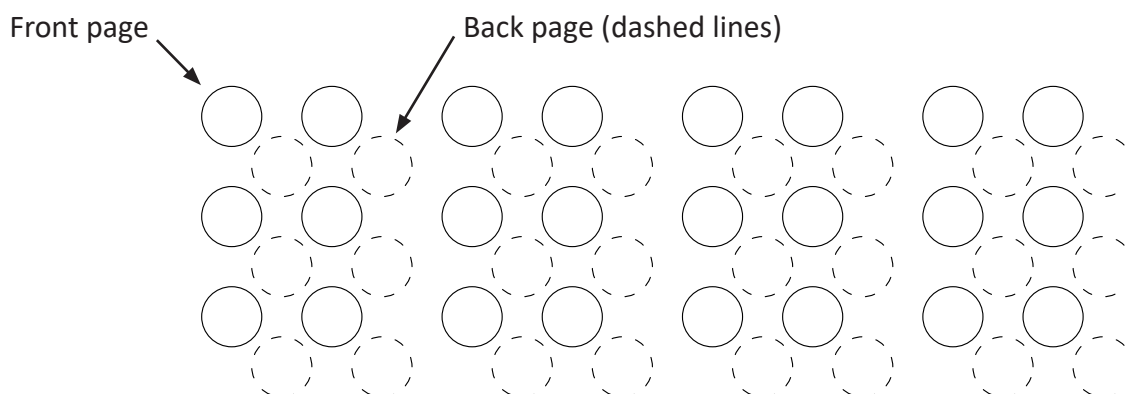
Dimensions on the 6 and 8 dot Braille cell, measured in mm.
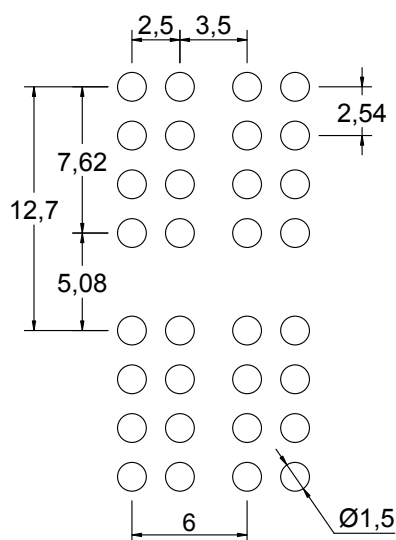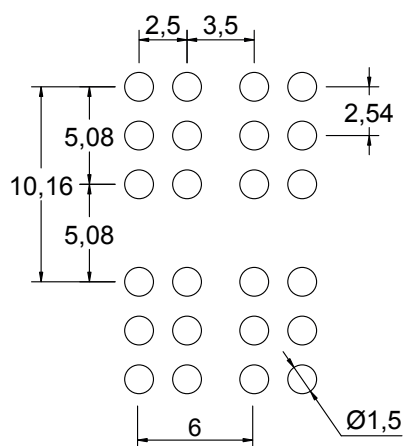
The drawing on this page is meant to help to understand the basic principle of how the dots are printed. Please also see the drawings on the next page.

The parts in the upper left of this drawing is one of the magnet racks. The parts in the lower right, are the beam and paper shoes. The magnet racks itself do not move, but the beams and the paper shoes are moving up and down for every revolution of the eccentric shafts.

Inside each magnet rack there are 42 electrical magnets. The magnets are controlling the long pivot arms.

When a dot is going to be printed, the magnet is engaged, and the long pivot arm will be drawn against the magnet poles.

At the same time, the beam and the paper shoe will start to move downwards, and the short pivot arm will catch the hook of the long pivot arm. The beam will continue to travel downwards, and will force the printing pin into the paper.
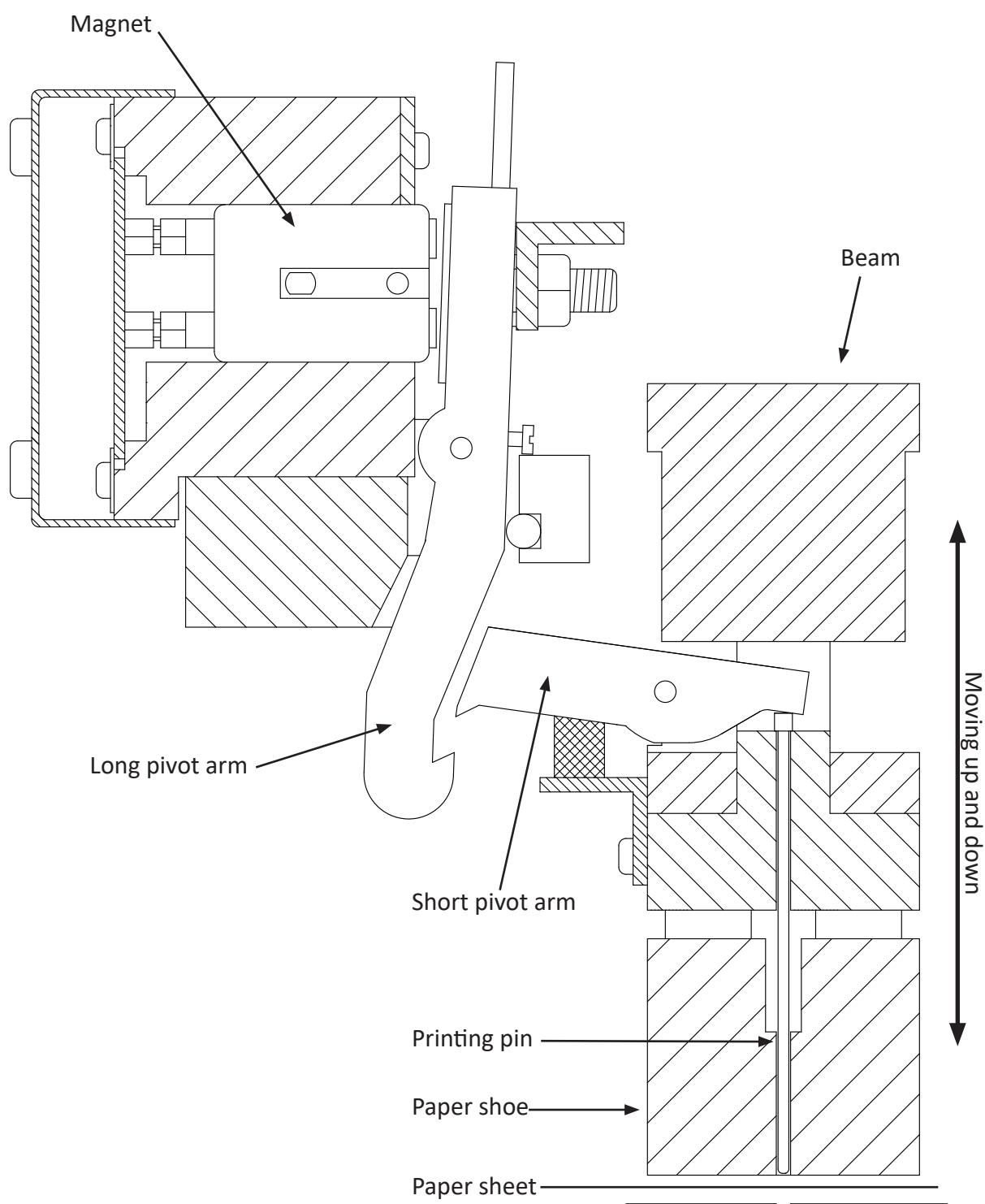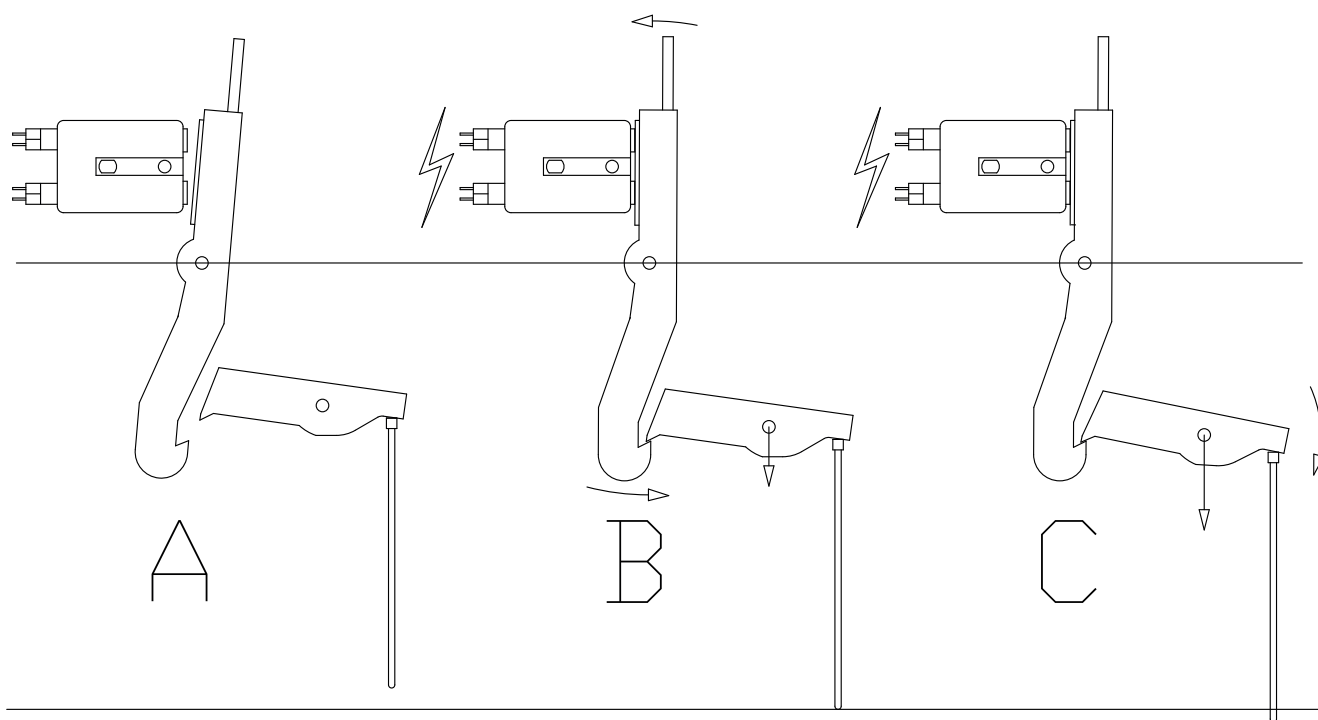
Figure A
Shows the position on the pivot arm when the printer is not printing, and the magnet is not engaged.

Figure B
Now the magnet is engaged, and the long pivot arm has been pulled against the magnet. The short pivot arm is moving down towards the hook on the long pivot arm.

Figure C
The long pivot arm's hook catch the short pivot arm. As the short pivot arm moves further down, the printing pin will be forced down into the paper and make the dot.

General overview

(Protection covers are removed)

Magnet rack B

Operator panel

Electric unit

Main Belt

Main Motor

Magnet rack D

Main board

Magnet rack A

Magnet rack C

On/Off switch
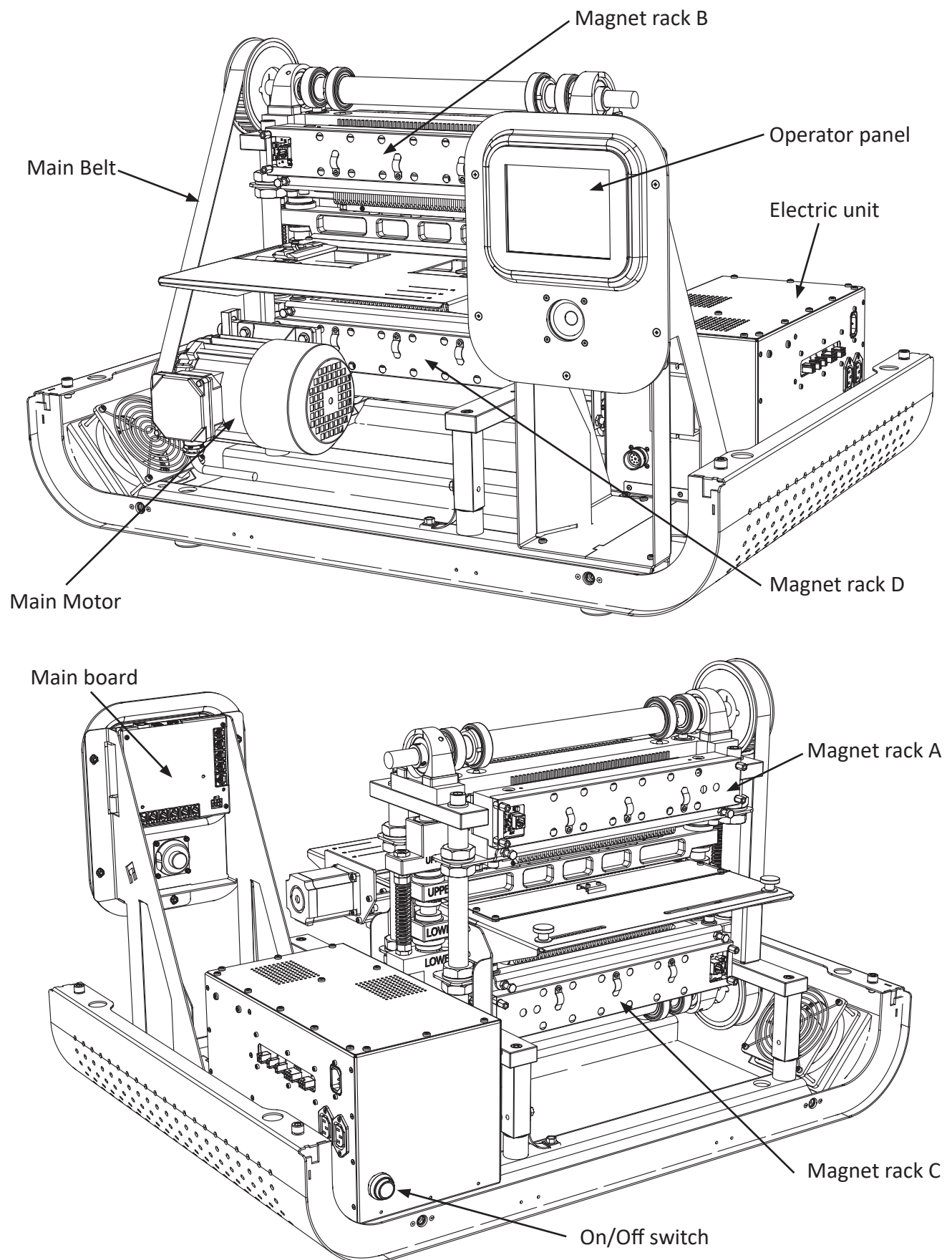
5.2   Troubleshooting, incorrect Braille

If any errors have been found in some of the characters in the printed text during proofreading, the first thing to do is:
Check the characters in the text-file in the computer to find out if the error could come from the text-file and not from the printer.
If your text-file is OK, the problem is caused by the printer.

The errors could be caused by either an electrical or a mechanical problem. On the electrical side, there is integrated a self-diagnostic system that is continuously checking the magnets during printing, and will trig an alarm if it detects some electrical problems with the magnets.
So, if no alarm is trigged, the errors found are most likely caused by some faulty mechanical parts or maybe dirt clogging the moving mechanisms.

Inside the printer there are four identical magnet racks, named from A to D. Each magnet rack contains 42 printing mechanisms. There are totally 168 printing mechanisms to choose from when the error search begins. See section 5.1 'Printing principle' on page 50 for more information.

If the printer has been printing a lot (a lot could be after a year, or after 1000 printing hours, depending on what comes first) errors in the characters could occur. If this happens, it could just be that the printer needs regular maintenance. See section 5.6 'Magnet rack - cleaning' on page 65, and section 5.22 'Maintenance' on page 87.

As a start, you should run the built-in Test Print. Depending on what kind of errors you have, you should use different tests.
The essential thing at this stage is to find which magnet rack is causing the trouble.

If there is missing dot(s), use the X-pattern to detect which magnet rack is missing the dot(s).

If there are too many dots, use the full cell lines, or the test pattern on test print no. 4, and the extra dot(s) will appear in the space between the lines.

However, the best test is ordinary text, if a proofreader is available. To locate the faulty magnet rack(s), see figures and the table in section 5.1 'Printing principle' on page 50.

To confirm that you have found the correct magnet rack, you can test the magnet racks with the function 'X pattern without motor' found in the 'Manual running' menu (*Main Menu - Warning - Service/ diagnostic - Warning - Manual running).* This function will run the magnets one by one sequentially without running the rest of the printer mechanism.

If a pivot arm does not move properly like the other pivot arms, it could e.g. be that the pivot arm is clogged, or that the silicone string is pushing to hard. If the suspected pivot arm is moving like the rest of the pivot arms, the problem might be within the short pivot arm/printing pin mechanism or with the position of the magnet rack itself.

To verify that you have found the correct pivot arm/magnet mechanism, it is possible to manually pull the long pivot arm against the magnet with your finger while the printer is embossing.
A column of dots will then appear, and if the column is situated exactly on the same position as the error was in the first place, you have found the correct one.

Possible reasons for errors:

See figures on the next page.

If a dot from a certain printing pin is missing regularly, the reason might be one of the following:

1. Defect magnet (The self-diagnostic system should find this one first).
2. Broken short pivot arm.
3. The long pivot arm cannot move because of dirt.
4. The printing pin is stuck because of dirt, causing the short pivot arm to miss the long pivot arm.
5. Errors in the magnet rack board.

If dots from several printing pins are missing now and then, the reason might be one of the following:

1. The silicone string is pushing too hard on the long pivot arm.
2. The gap between the two pivot arms is too large.
3. The support list has become sticky on the side against the long pivot arms, and the long pivot arm does not move properly.
4. The sponge list on the short pivot arm is so worn/compressed so that it will not give enough tension on the pivot arm.

If there are too many dots on the paper, the reason might be one of the following:

1. The silicone string is not pressing enough against the long pivot arm.
2. The gap between the two pivot arms is too small.
3. The magnet poles have become sticky, and this causes the pivot arms to stick to the magnet.
4. The long pivot arm does not move properly.

Control:
To be sure that you have found the right mechanism after the troubleshooting, you can do the following test: Pull carefully the suspected long pivot arm against the magnet with your finger.
Note! Please be careful to avoid getting in contact (e.g. clothes, hair, beard, jewellery or any part of the body) with any other moving parts of the printer to prevent personal injuries!

At the same time, run a test print. The mechanism with the finger on, will make a column of dots downwards the sheet until you take the finger away. By doing this you can see if this column of dots is situated on the same place (and same side!) of the sheet as the error is.

Observe that the same printing mechanism (magnet, long pivot arm, short pivot arm and printing pin) makes all the dots in a column downwards the page.

Magnet rack board

Magnet

Long pivot arm

Support list

Silicone string

Magnet poles

Short pivot arm

Pin guide

Gap between pivot arms

Sponge list short pivot arm

Printing pin
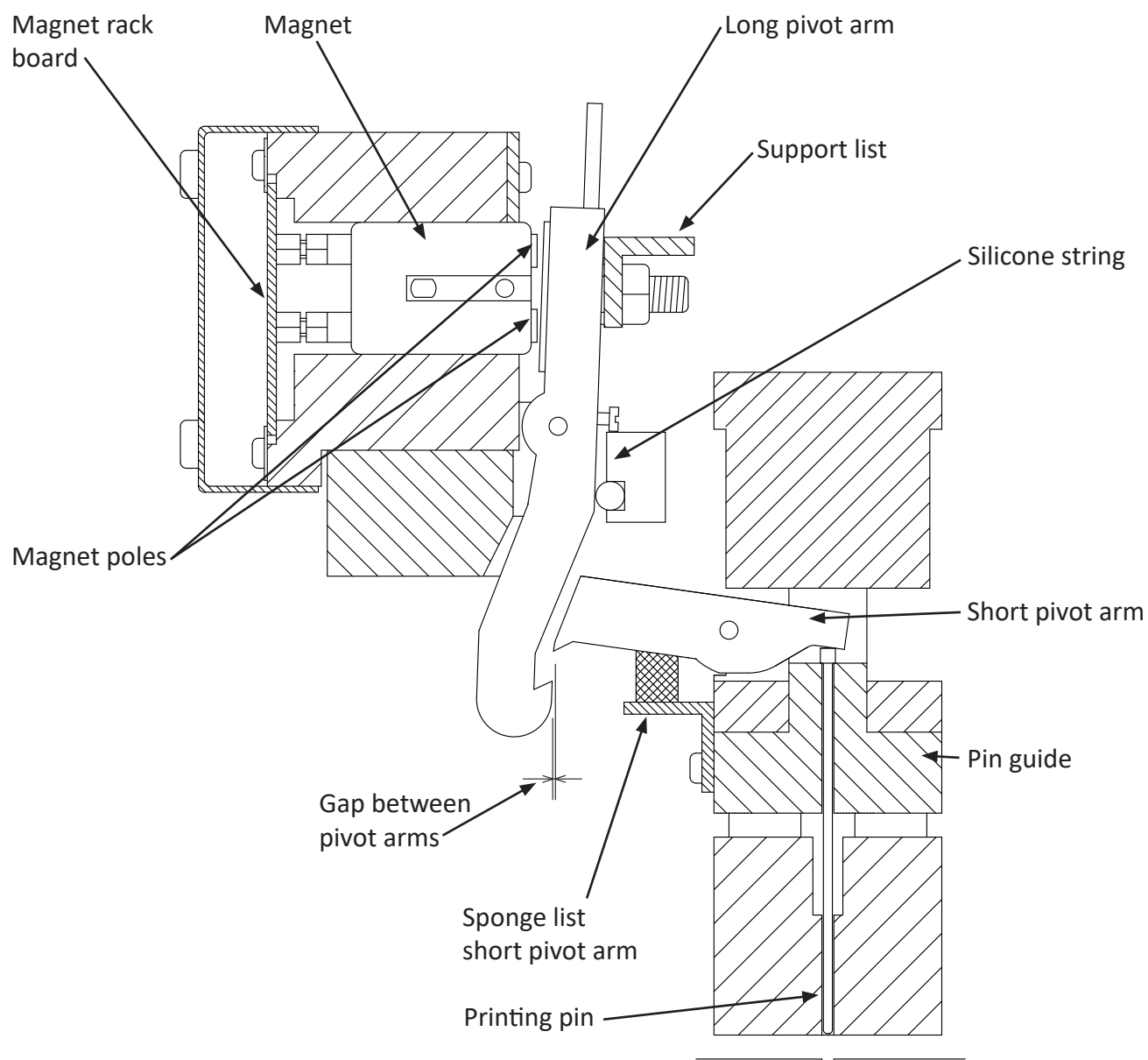
5.3 Magnet rack - removal

Please see figure below:

Disconnect the two cables for the magnet rack. Remove the magnet rack by unscrewing the four screws like shown in the figure.

It can be convenient to remove the input paper guide and the paper feed tractor first to get more room.
See section and section for descriptions on how to remove them.
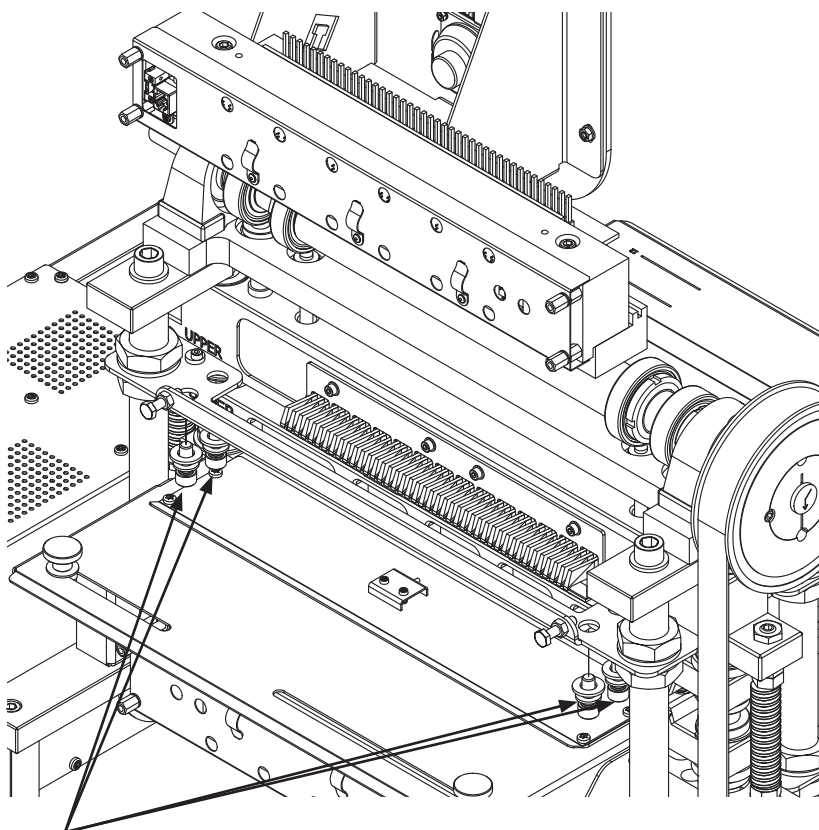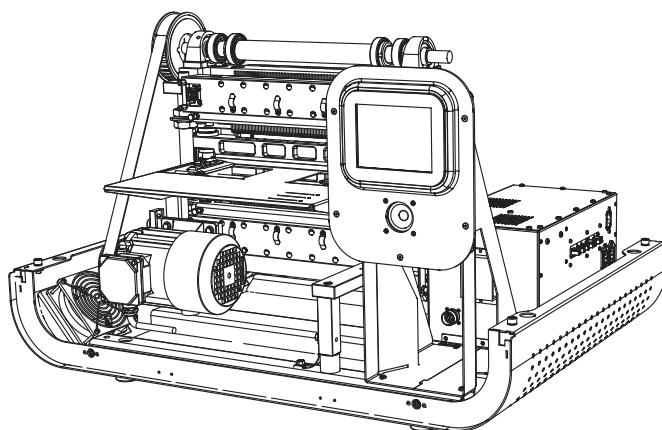
Unscrew the four bolts

5.4   Magnet rack - disassembly, step by step

There are two main reasons for disassembling the magnet rack. It could be to replace some parts, i.e. defect magnet or worn pivot arm, or it could be for regular maintenance.

The magnet racks can be considered as the part of the printer that will have the greatest influence on the dot quality, so it is very important to know how to deal with them.
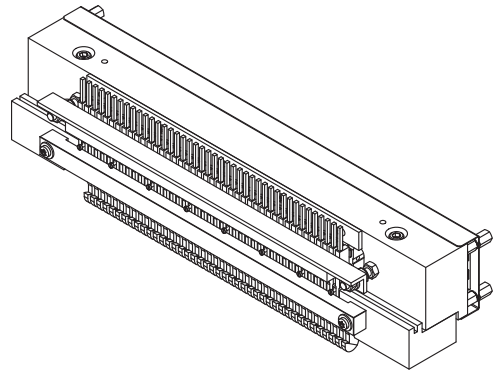
Take the magnet rack out of the printer like described in section .
Next, follow the instructions below.

Step 1.   Remove the two nuts holding the support list, and then remove the support list.

Support list
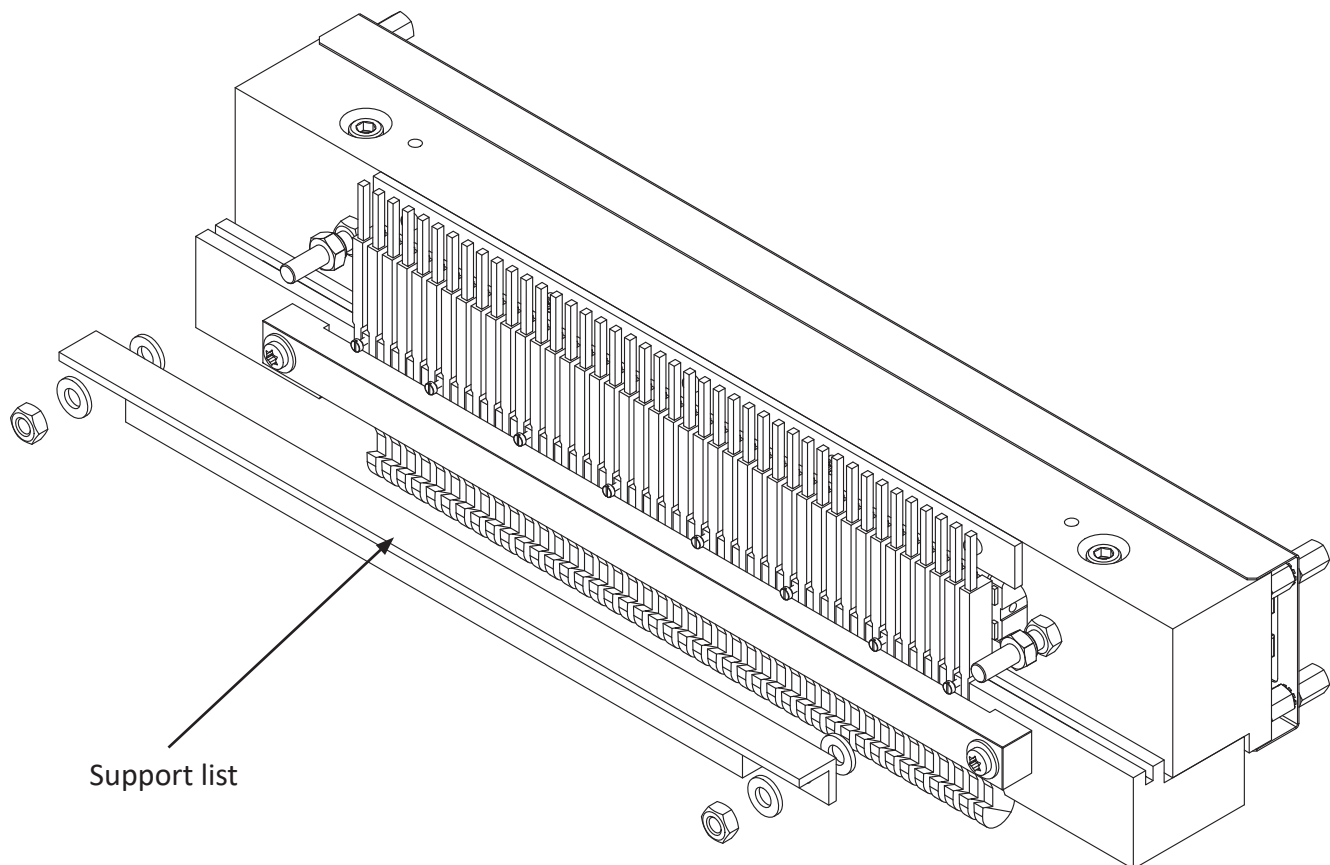
Step 2.   Remove the two screws on the silicone string holder, and then remove the holder.

Silicone string holder
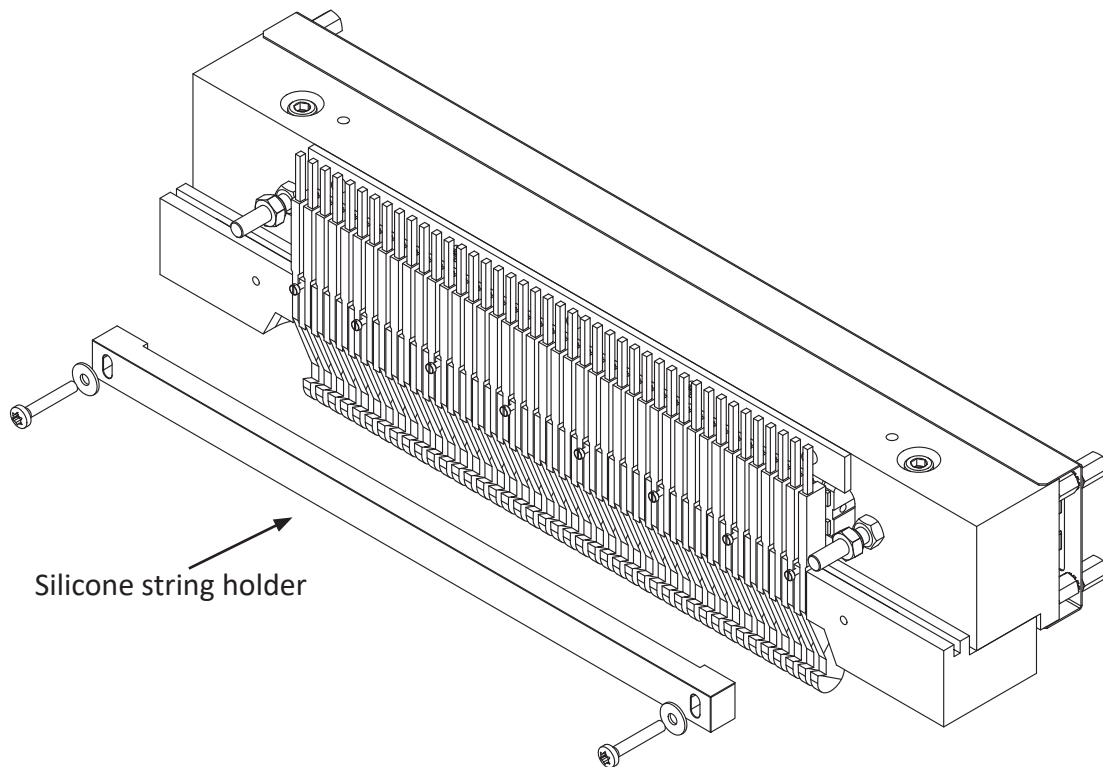
Step 3.

Remove the two bolts holding the pivot arm fastener and then carefully remove the pivot arm fastener. The magnet rack is now disassembled.

Pivot arm fastener
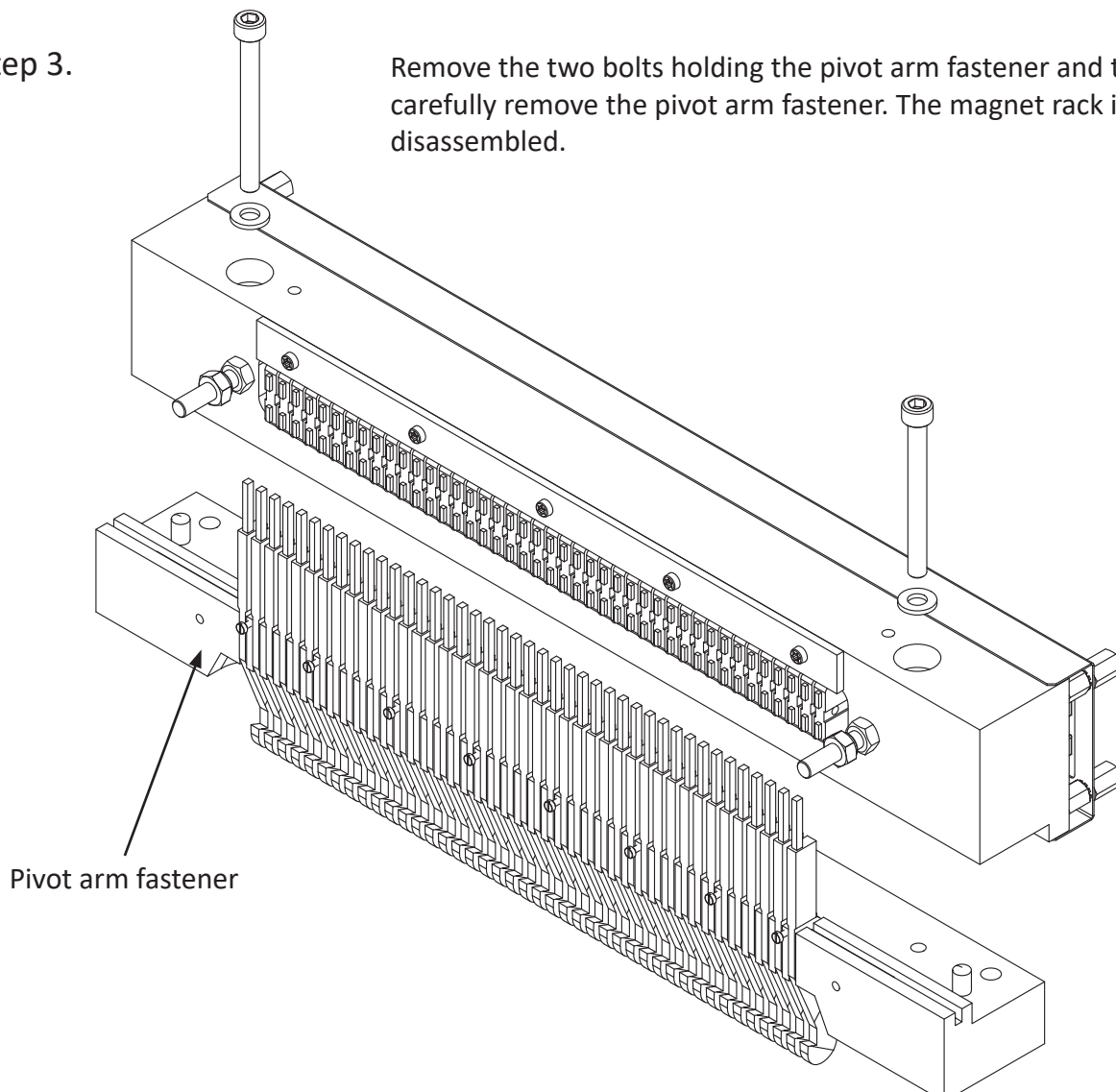
5.5   Magnet - replacement

Please observe that the numbering on the magnets in a magnet rack, always starts at "one" at the end where the connections are. (It does not refer to dot number, character number or column number!).

Disassemble the magnet rack like described in section 5.4 'Magnet rack - disassembly, step by step' on page 60.
Next, follow the instructions below.

Step 1.   Remove the five screws holding the list, and the list.

List
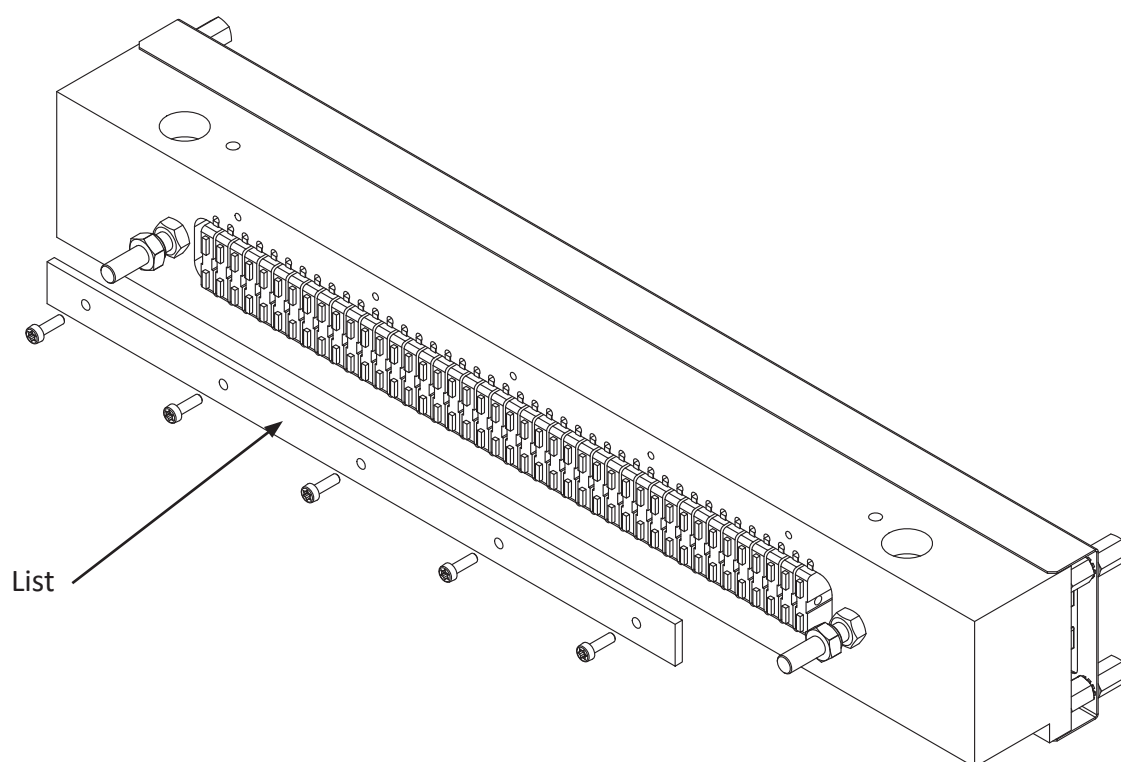
Step 2.   Pull out the defect magnet with, e.g. a narrow needle nose pliers.
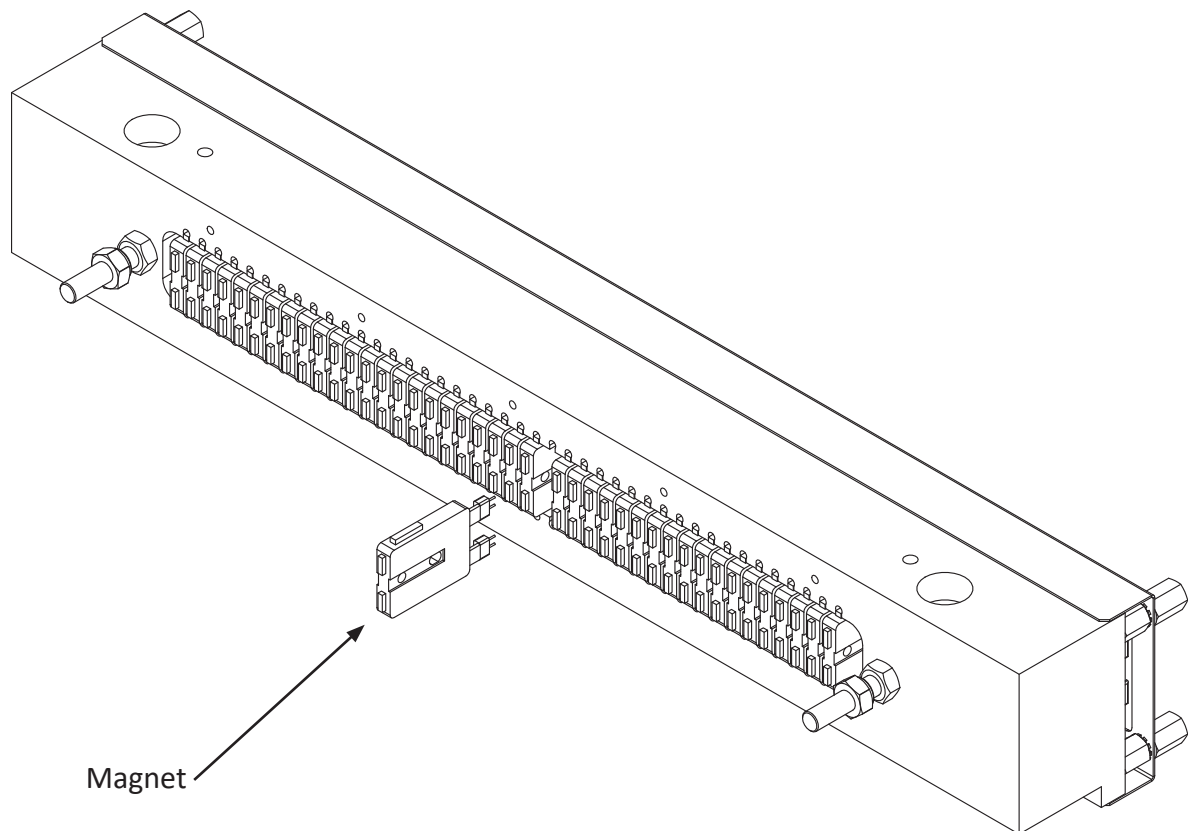
Magnet

Step 3.   Check the magnets internal resistance if you have an ohm-meter available. The resistance should be from 185 ohm to 240 ohm. Any value outside this range indicates a defect magnet.
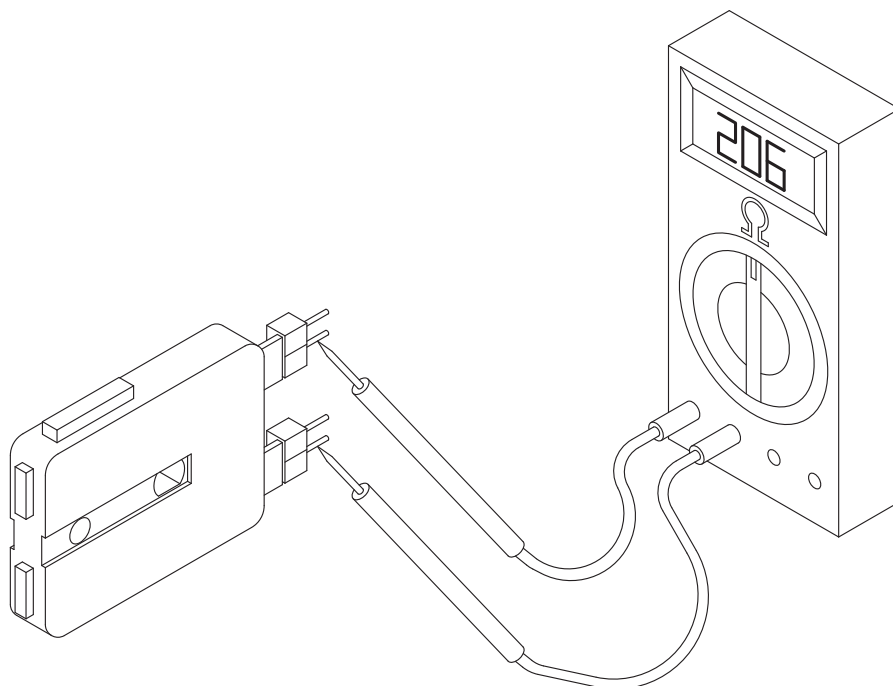
Step 4.   Replace the defective magnet with a new magnet. Note the spikes on one of the sides on the magnet. These spikes must be oriented the same direction as the rest of the spikes in the magnet rack.

Note the direction on these spikes
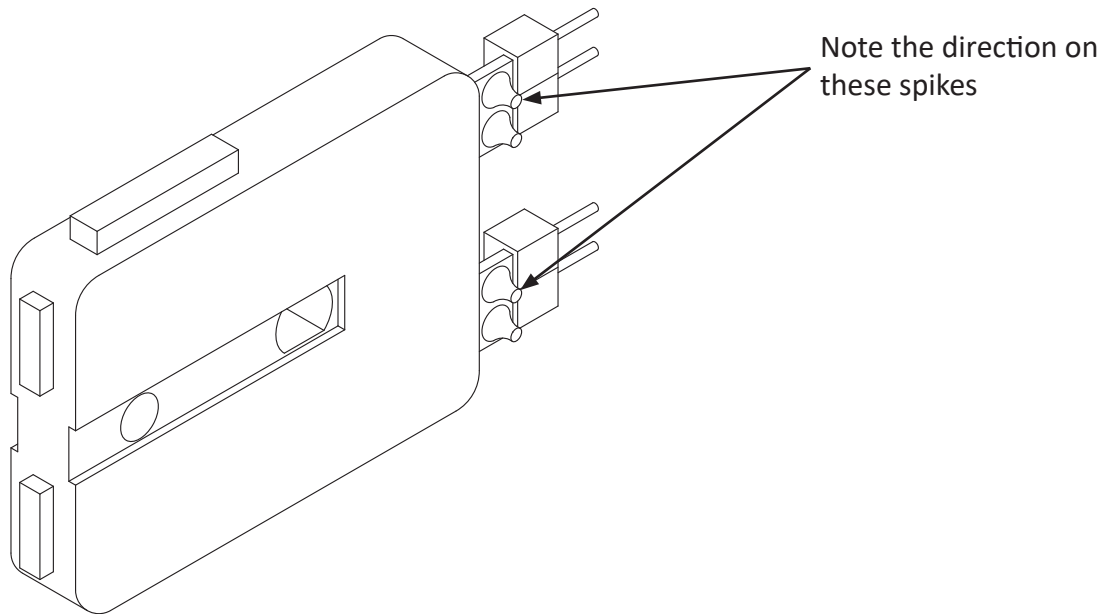
5.6 Magnet rack - cleaning

Remove the magnet rack as described in section 5.3 'Magnet rack - removal' on page 59.
Then disassemble the magnet rack as described in section 5.4 'Magnet rack - disassembly, step by step' on page 60.

Now use a damp cloth moistened with cleaning alcohol to wipe off the surfaces as described in the figure below:

⚠ Note! Never oil, grease or lubricate any of the moving parts on a magnet rack!
This will only attract paper dust and cause clogging.

The support list

Magnet poles on the magnets

The iron pieces in the long pivot arms

At the back of the long pivot arms
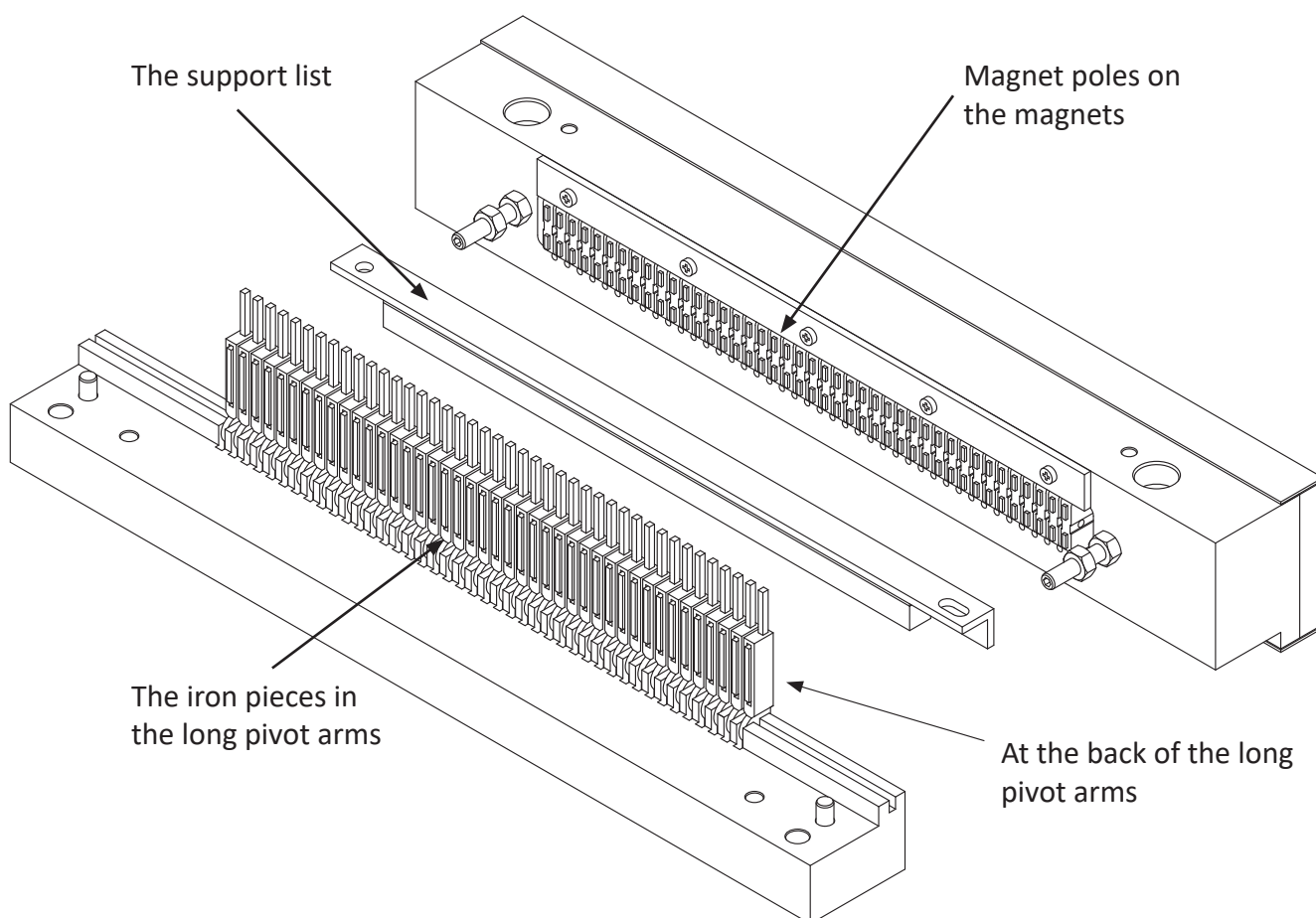
5.7   Magnet Rack - adjustment

Before placing the magnet rack in the printer, two adjustments must be checked.
The first is the distance between the support list and the pivot arms. This is the travelling distance for the pivot arm. And it should be adjusted to about 0.8 mm using a feeler gauge. Adjust the nuts on both ends of the magnet rack.
If the 0.8 mm feeler gauge goes half way in, and the 0.9 mm feeler gauge does not go in at all, consider the adjustment OK.
Make sure that the nuts are tight when you are done!

Adjust with these nuts

0.8 mm feeler gauge
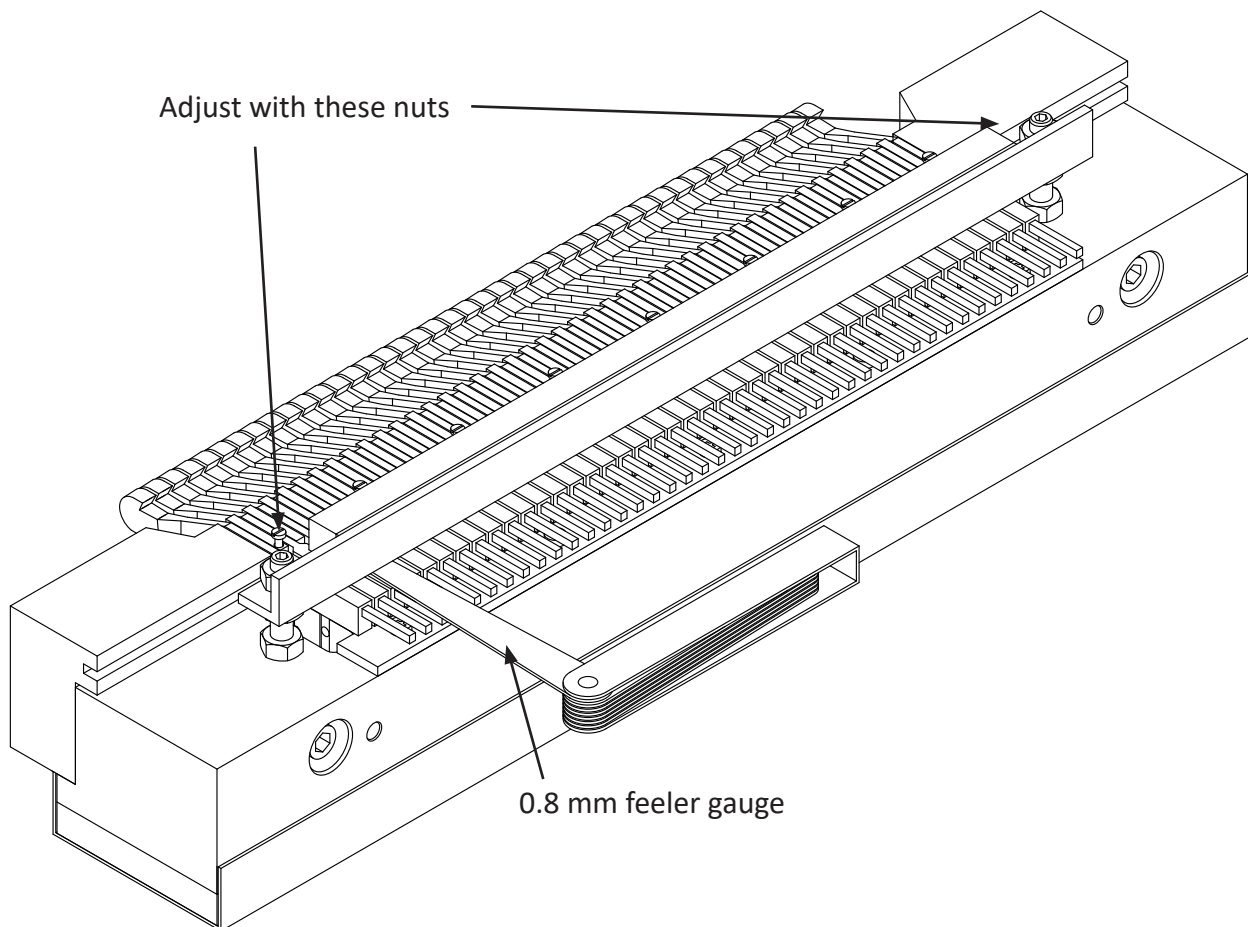
5.8   Magnet rack - refitting and adjusting

Before putting the magnet rack back on the printer, make sure that the magnet rack itself is adjusted as described in the previous section.

When placing the magnet rack in the printer:
Put in the four fastening screws, but do not tighten them. Slide the magnet rack horizontally away from the printer, so that the magnet rack is touching the horizontal adjustment screws. This will ensure that the magnet rack is in the exact same position as before it was taken off the printer.

See next section regarding correct adjustment of the magnet racks.

⚠ Note! All explanations refer to one magnet rack, but these adjustments must be done on all four magnet racks.
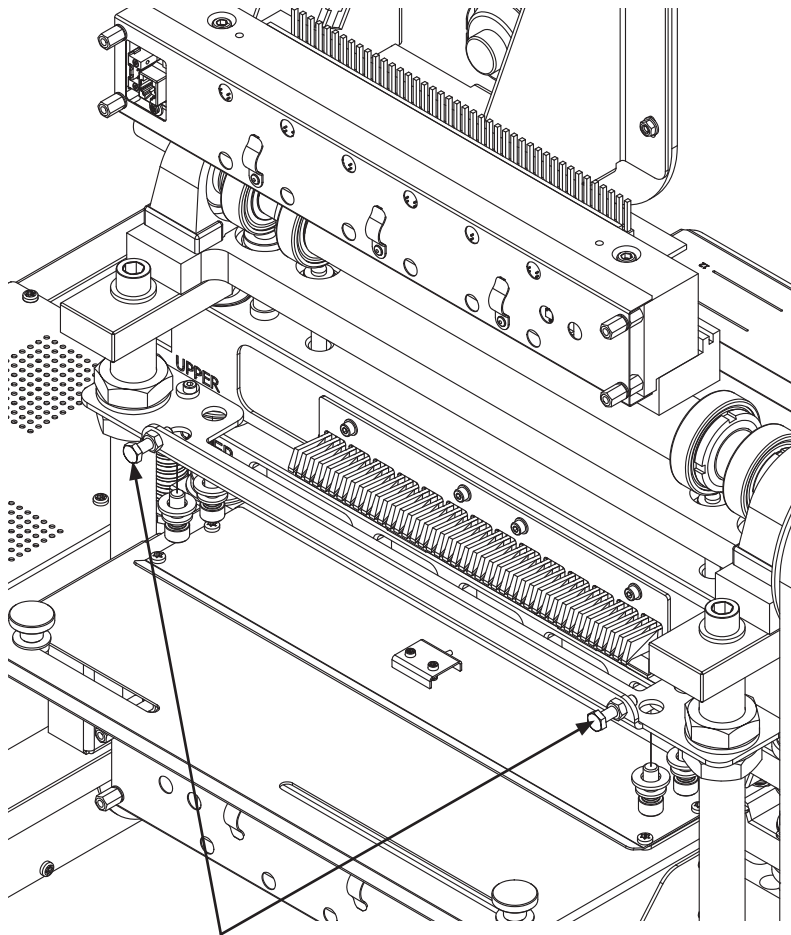
Pull back against these positioning
screws on both ends

The magnet rack must be adjusted in two directions, horizontal and vertical.
The horizontal adjustment is done first. This adjustment positions the magnet rack correctly in relation to the short pivot arms. If the printer prints too many or too few dots, the horizontal adjustment could be the problem.

Then the vertical adjustment is done. This adjustment will affect the pressure the pivot arms put on the printing pins. This directly affects the shape of the printed dots.

Vertical
adjustment

Horizontal
adjustment
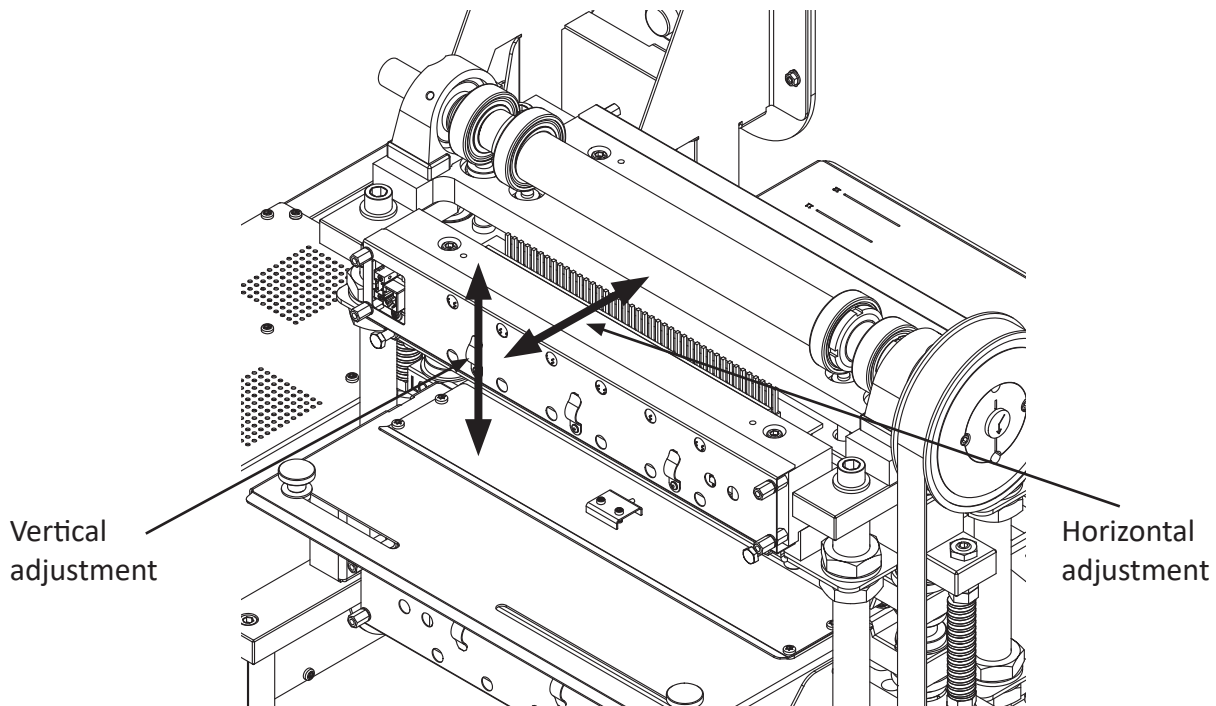
To be able to adjust the magnet rack correctly, it is necessary to put the printer in "printing position".
This is done by rotating the main belt by hand until the arrows at the ends of the shaft are pointing exactly 180 degrees away from each other.
It is possible to get the mechanism to balance in this position, but you can also lock the shafts with e.g. a self locking wrench (vice-grip pliers).
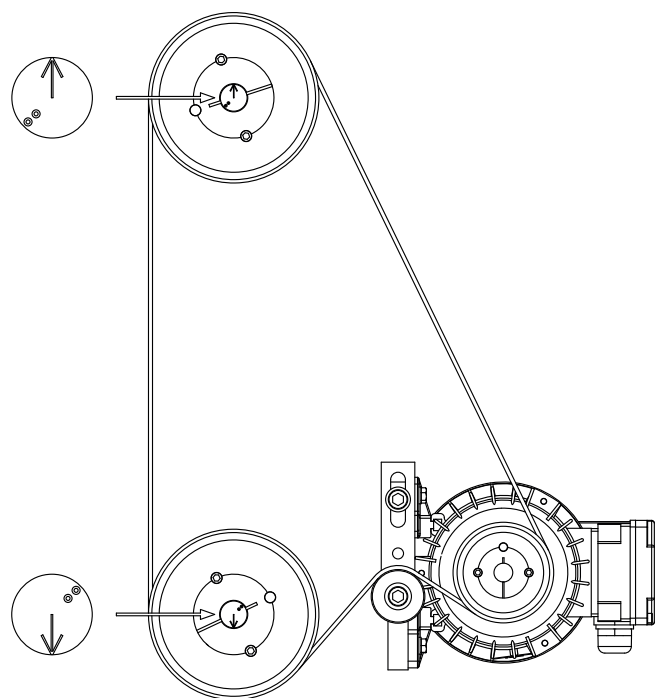
When the arrows at the end of the shafts are pointing in the opposite direction of each other, the short pivot arms will be approximately positioned like in the figure below:

Approx. 0.2 mm
(As close as possible without touching when the short pivot arm is moving up and down).
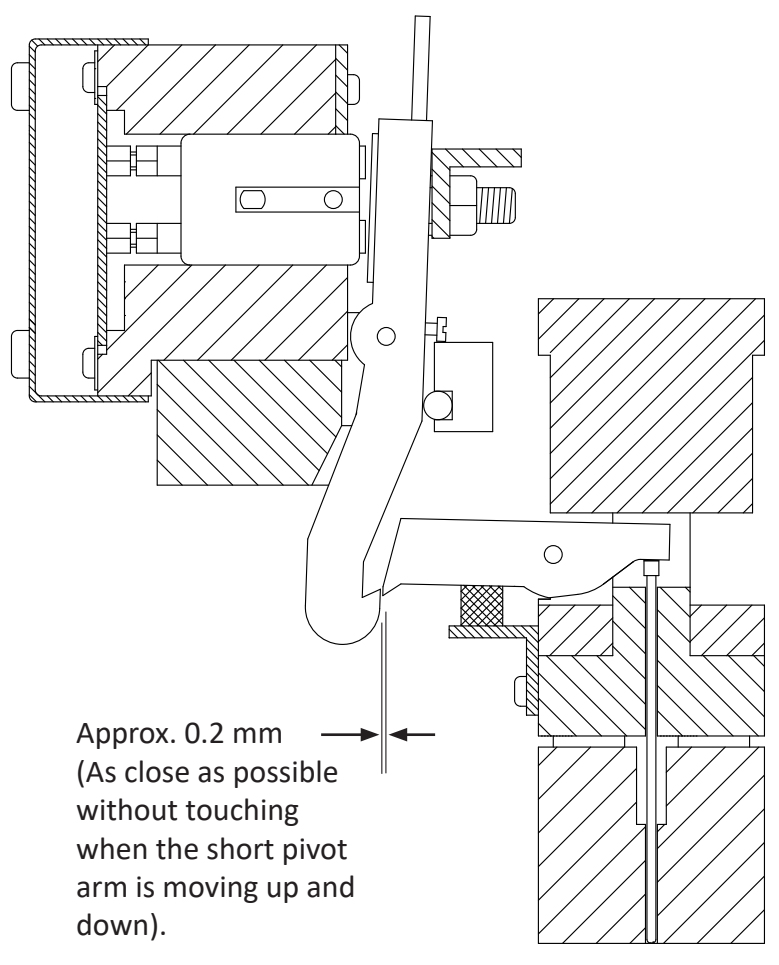
The gap between the long and the short pivot arm should be approximately 0.2 mm.
When adjusting this, make sure that the gap is even for all the pivot arms and the same on both ends of the magnet rack.

How to adjust:
Observe that the screw for horizontal adjustment will not pull the magnet rack outwards, they will only push inward.
So the best way of doing this, is to loosen the four fastening bolts holding the magnet rack. Then unscrew the horizontal adjustment screw a little. Now slide the magnet rack outward from the printer, so it touches the horizontal adjustment screws again. Then tighten the four fastening screws just a little so the magnet rack is held firmly in place, but is still able to move. Use the horizontal adjustment screw to move the magnet rack closer to the printer. If this is done in small steps, it is possible to watch the gap getting smaller, and the trick is to stop just before the long pivot arm is touching the short pivot arm.
When the position is correct, tighten the four fastening bolts.

Next is vertical adjustment.
Note! The printer must be in the "printing position" when checking this distance.

Vertical adjustment
approx. 1 mm
(will be affected by
 i.e. paper quality).
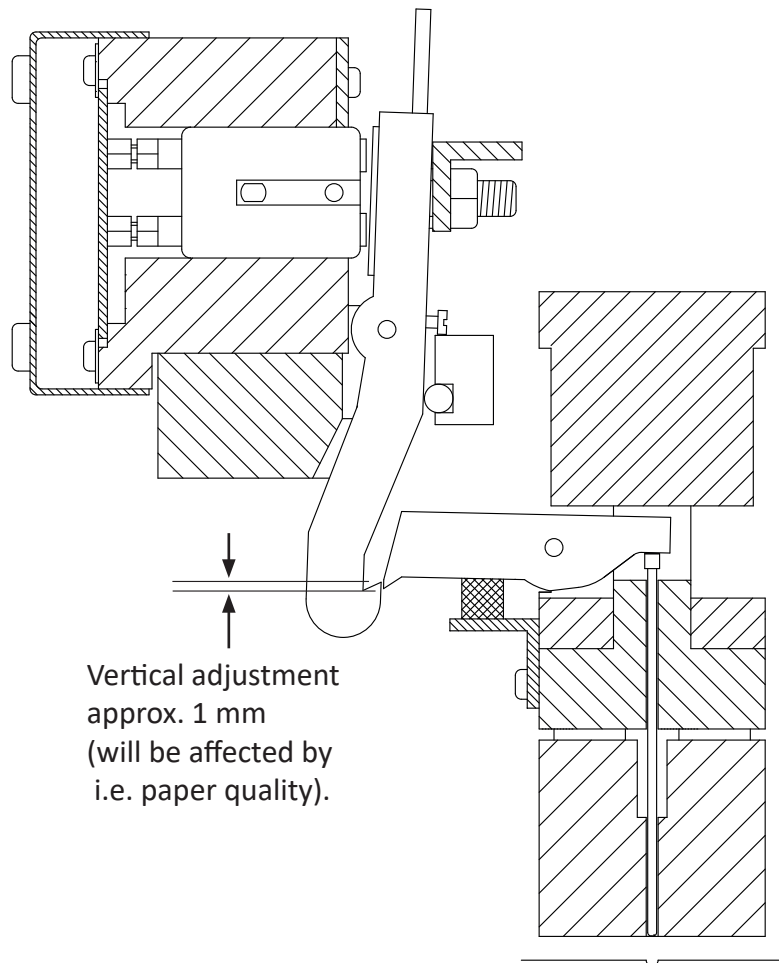
The vertical adjustment of the magnet rack sets the pressure of the printing pins when making dots.

The amount of pressure needed depend on several things. The first (and most important) is the paper quality. The second, is the personal preference the of dot quality.

So the best way to find the correct level of vertical adjustment, is to first decrease the pressure so the dots will be very faded and weak.
Then readjust the pressure up in small steps until the dot quality is satisfactory. By doing this you can make sure that you are running the printer with just enough pressure to make good dots, but not so much pressure that the printer will be worn/damaged.

From our experience we have found that the vertical adjustment should be approximately 1 mm, but if the Braille dots are too weak, you may adjust the magnet rack tighter in small steps (increase the 1 mm distance).

Please see figure on next page:
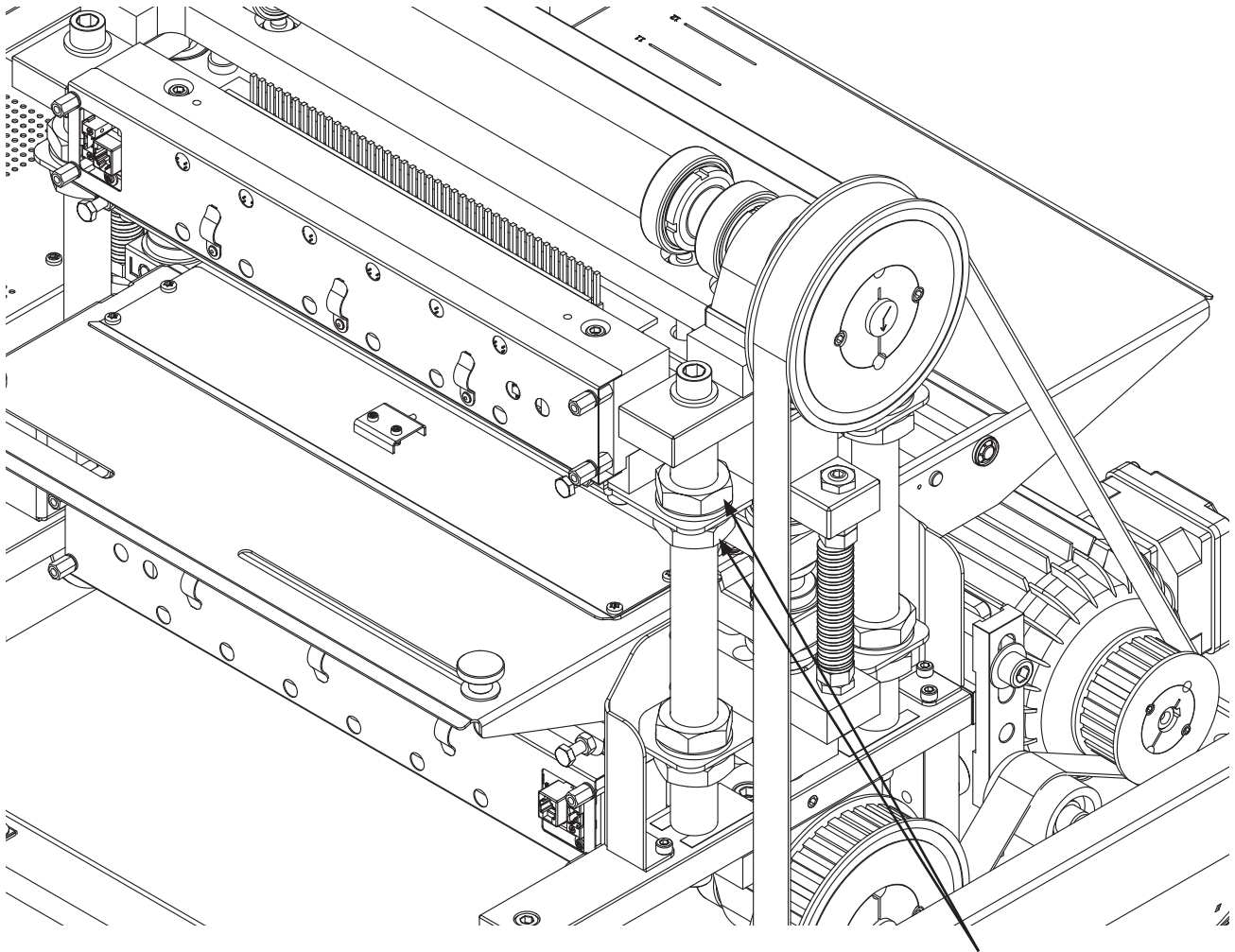
Adjust upwards by loosening the upper nut and then tighten the lower.
Do this on both ends, so the magnet rack stays levelled.

⚠ Note!　Adjust in small steps, only 1/4 of a revolution at a time. Then test the Braille quality.

⚠ Note! When adjusting the magnet racks vertically, observe that magnet rack A and B must be moved upwards to increase the pressure, and magnet rack C and D must be moved downwards to increase the pressure.
(Moving away from the paper increases pressure).
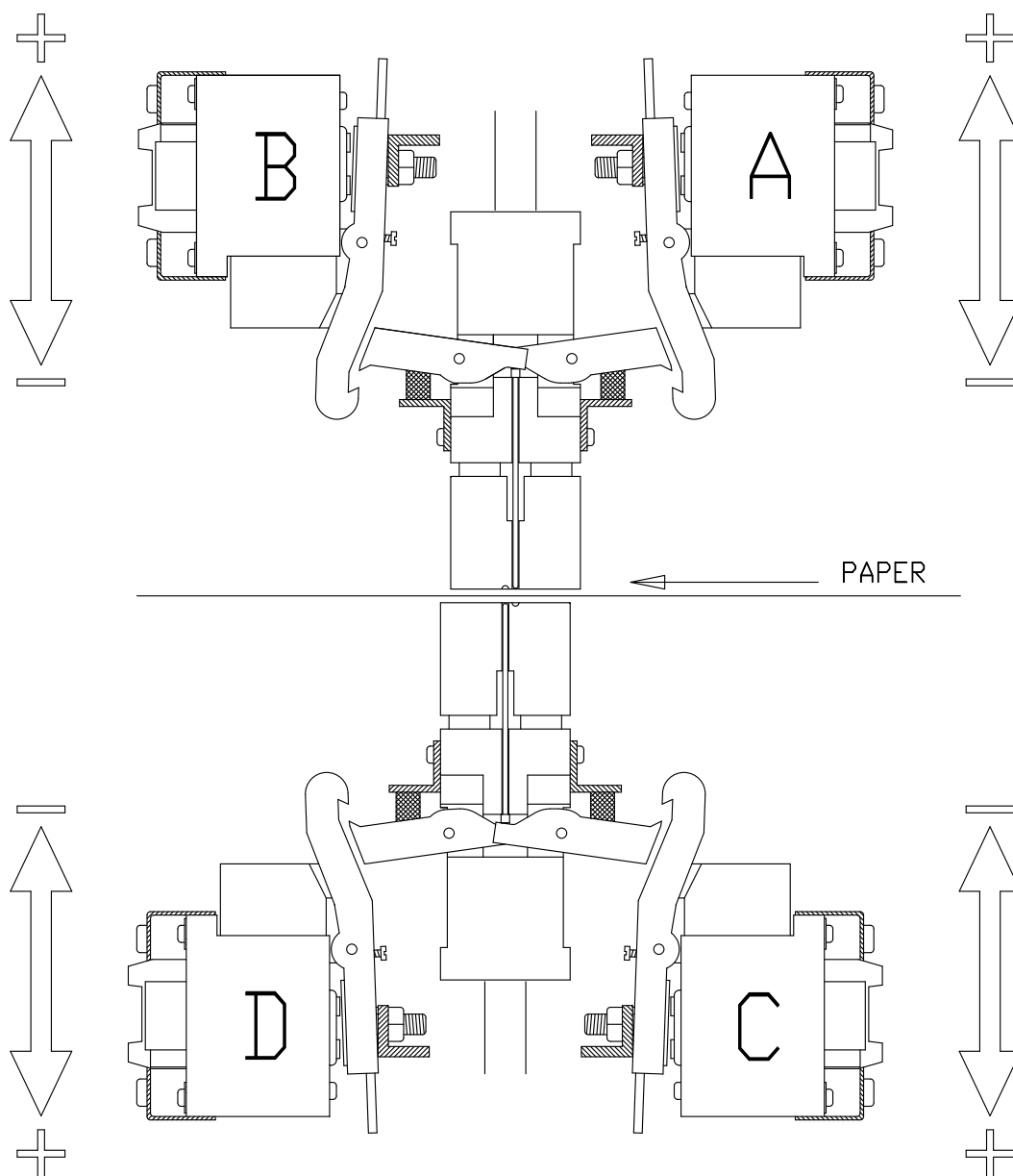
PAPER

5.9 Beam and Paper shoes - overview

Please see the figures below:

Upper Beam

Upper Paper shoe

Lower Paper shoe

Paper moves in this direction

Lower Beam

Adiprene springs

Plastic shims

Return spring (red)

Return spring (green)
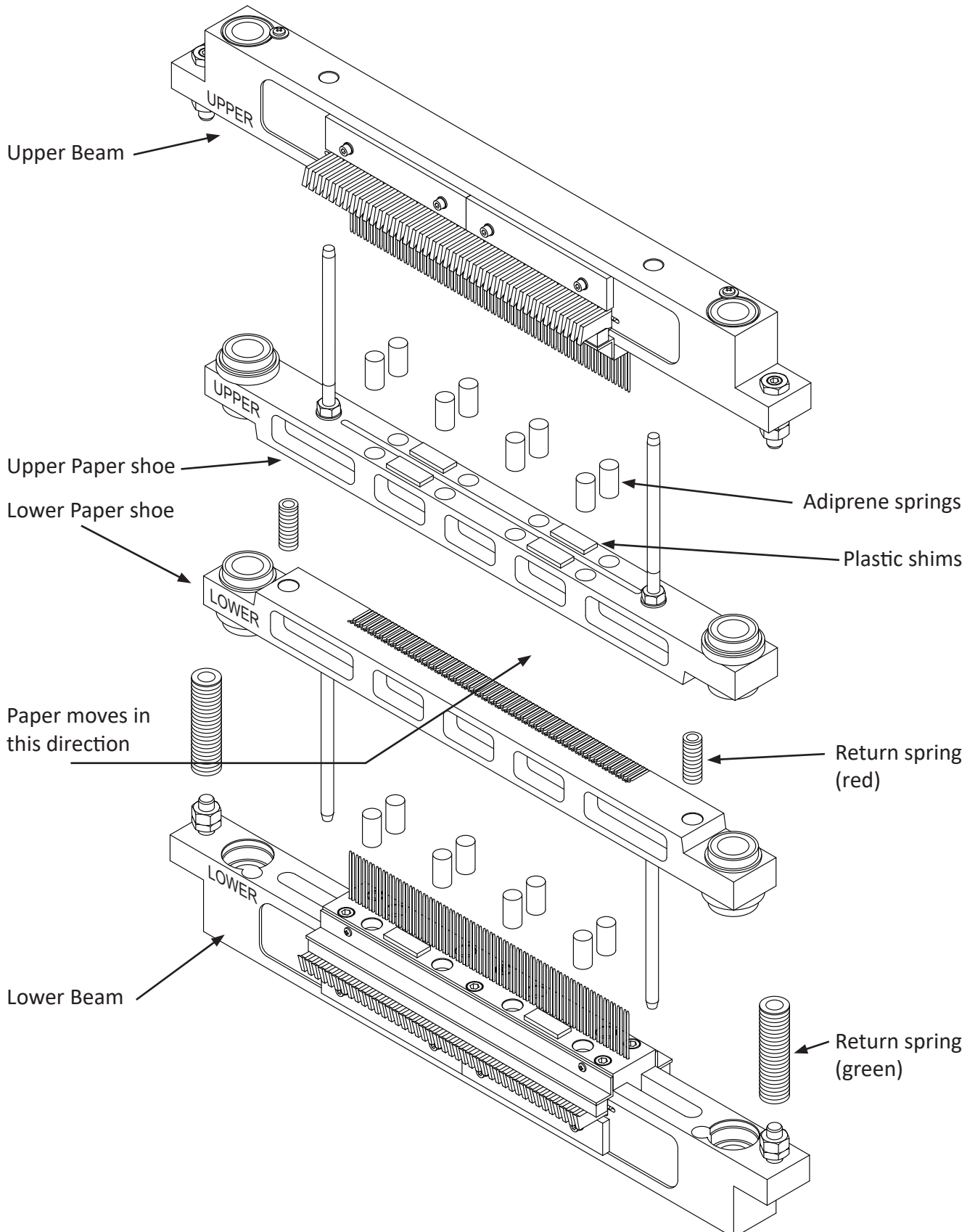
5.10   Beam and Paper shoes - removal and refitting

To remove the beam and paper shoes, some other parts must be removed first. It must be done in this order:

1. Remove the belt
2. Remove the inside paper guide
3. Remove the paper feed tractor
4. Remove the top frame
5. Remove magnet rack A and B

1. Remove the belt

This is done by loosening the bolt for the belt tensioner. When this is done, the belt can be lifted off the upper cogwheel. Please see figure to the right.

Loosen this bolt to take off the belt
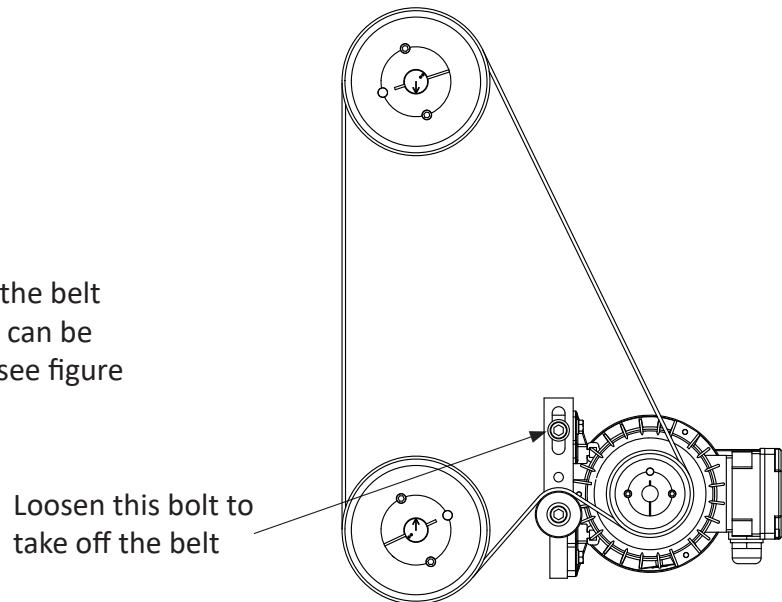
2. Remove inside paper guide

See for information on how to remove the inside paper guide.

Inside paper guide
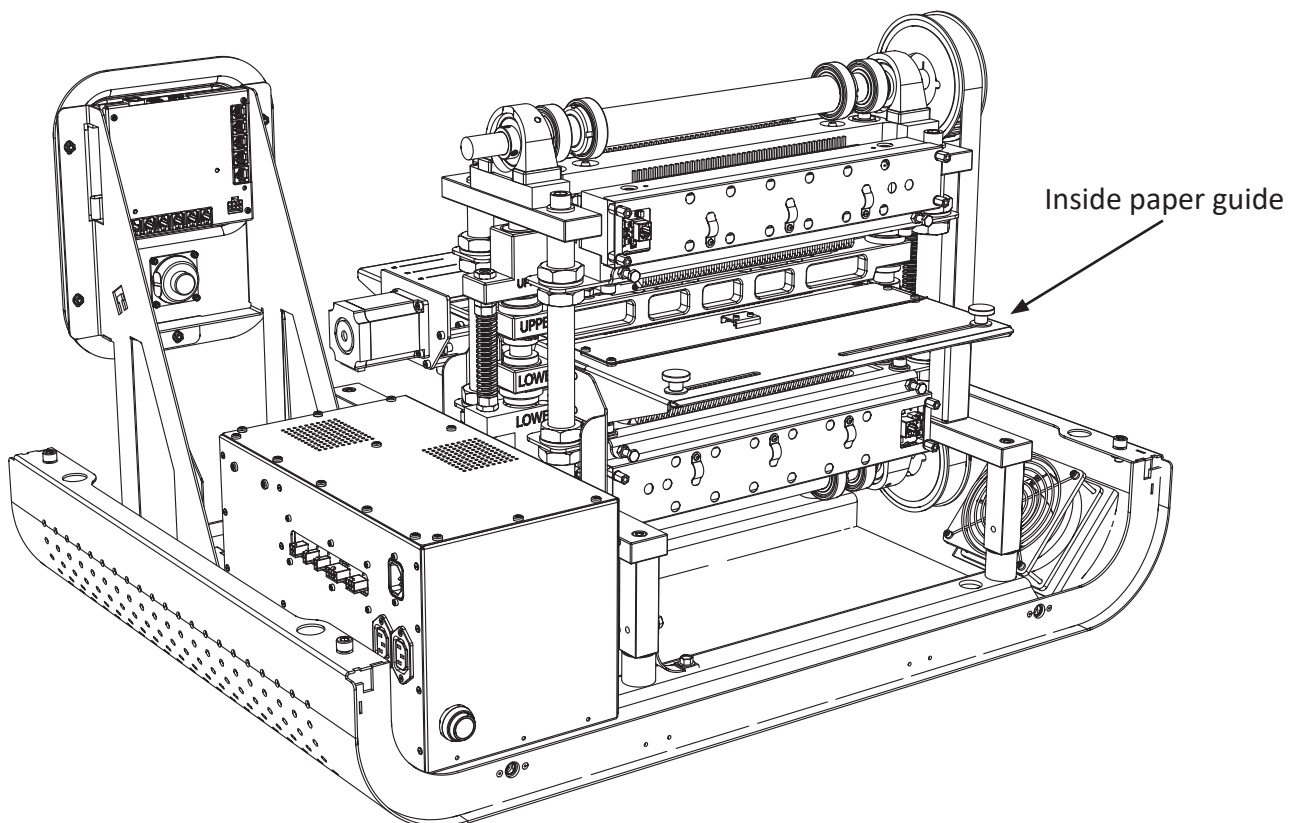
Beam and paper shoes - removal and refitting (continued)

3. Remove the paper feed tractor

Please see section for a description on how to remove the tractor.

4. Remove the top frame

Unscrew the bolts as indicated on the figure below, and then lift the frame carefully upwards and place it aside.

5. Remove magnet rack A and B

See section for more info.

Top frame bolts

Magnet rack A

Magnet rack B

Paper feed tractor

When assembling, the marking "UPPER" and "LOWER" on the paper shoes and beams, must be facing this side.
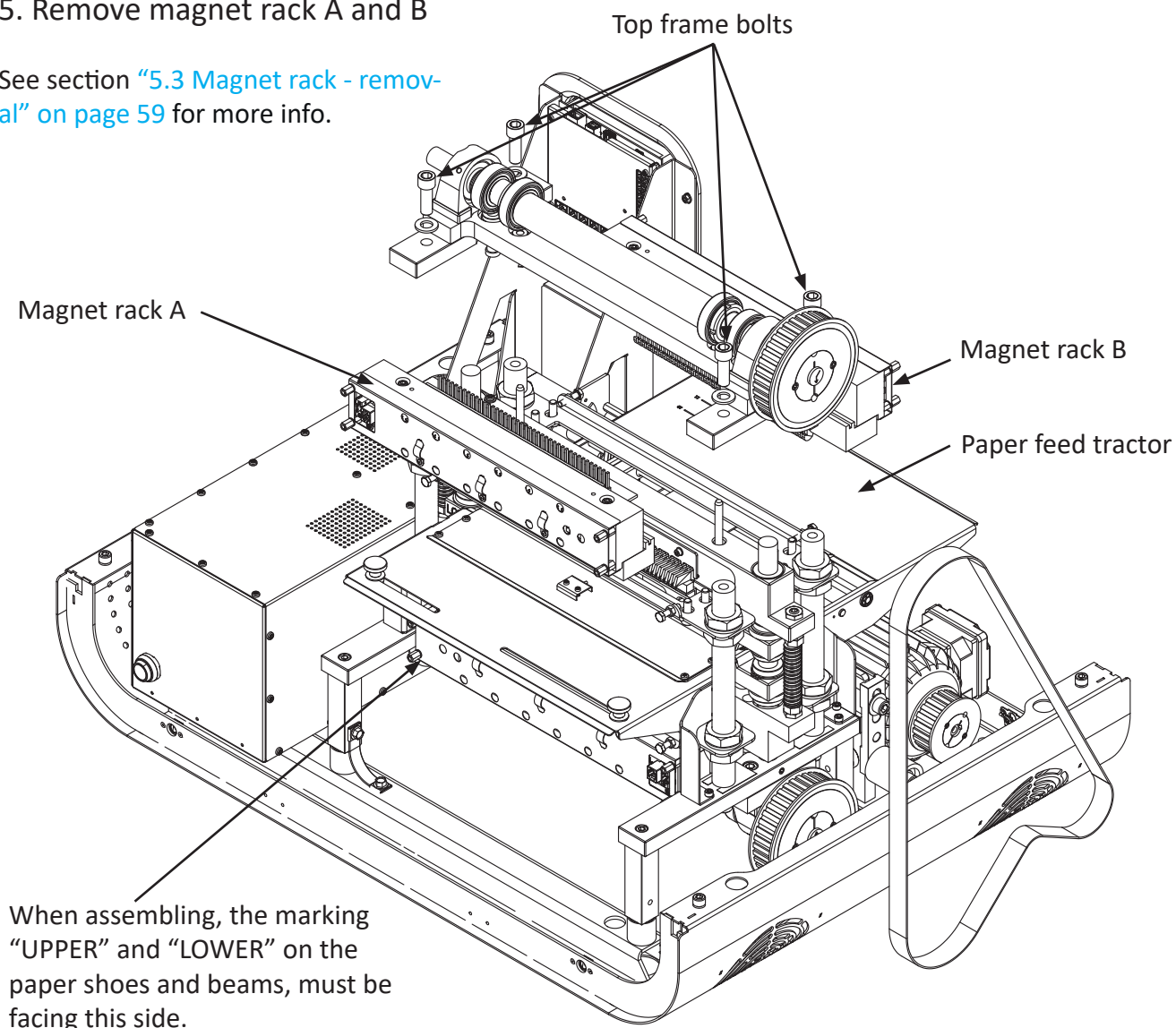
Now the paper shoes and beams can be lifted carefully upwards.
Assembly is done in the reverse order. Please note that the marking "UPPER" and "LOWER" on the paper shoes and beams should be turned to the side where the paper enters the printer.

5.11 Beam - replacement of short pivot arm

See the figures below:

1. Remove the four screws as indicated in the figure. Pull out the short pivot arms, there are 42 pcs. on each side.
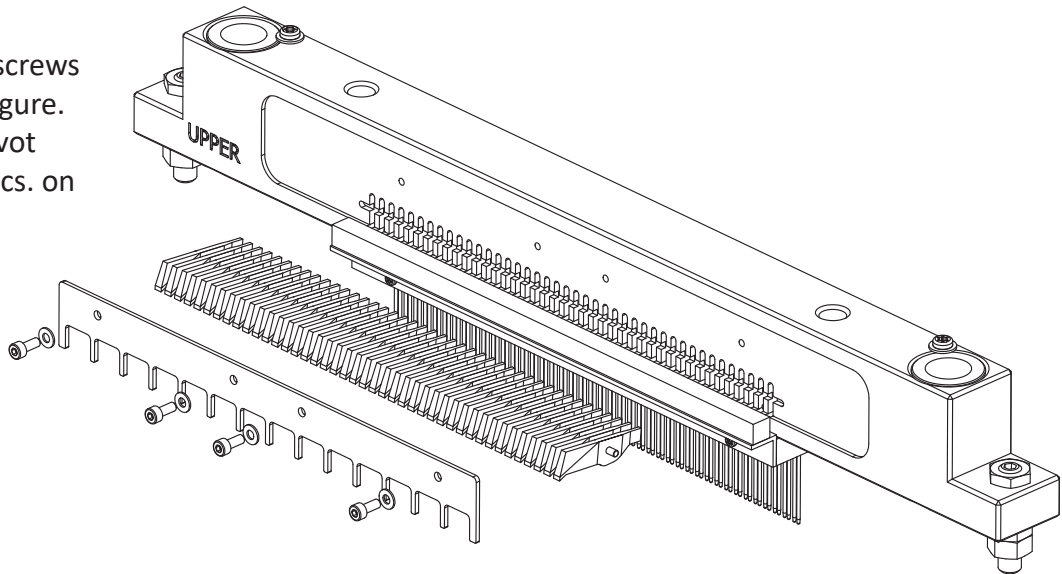
2. Pull out the shaft, and replace the short pivot arm(s).

Assembly is done in reverse order.
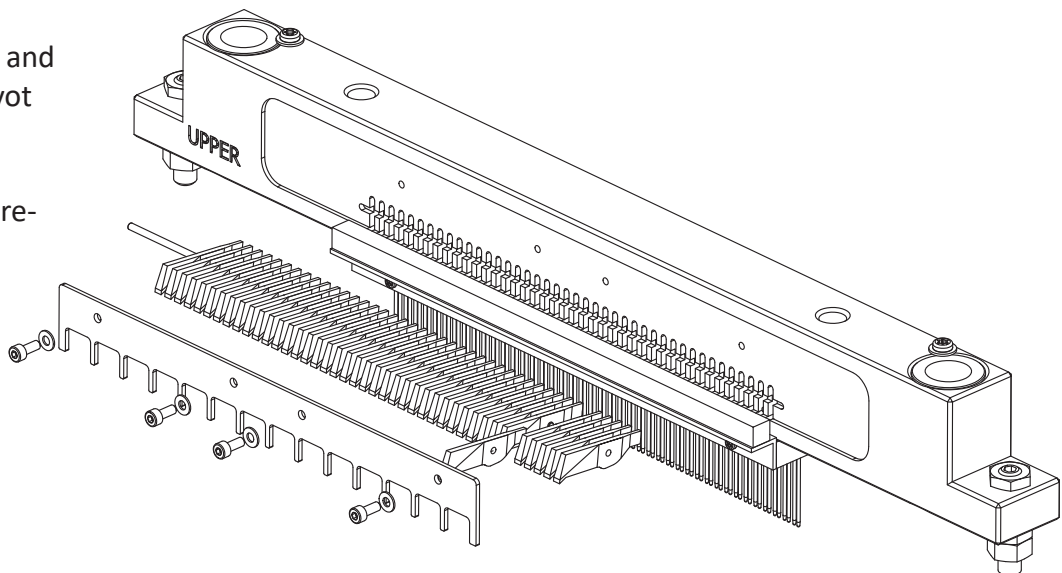
Note! When putting the short pivot arms back into the beam, be sure that the printing pins are hanging vertically like in the figure. This is to make room for the short pivot arm.

5.12   Beam - replacement of printing pin

See the figures below:
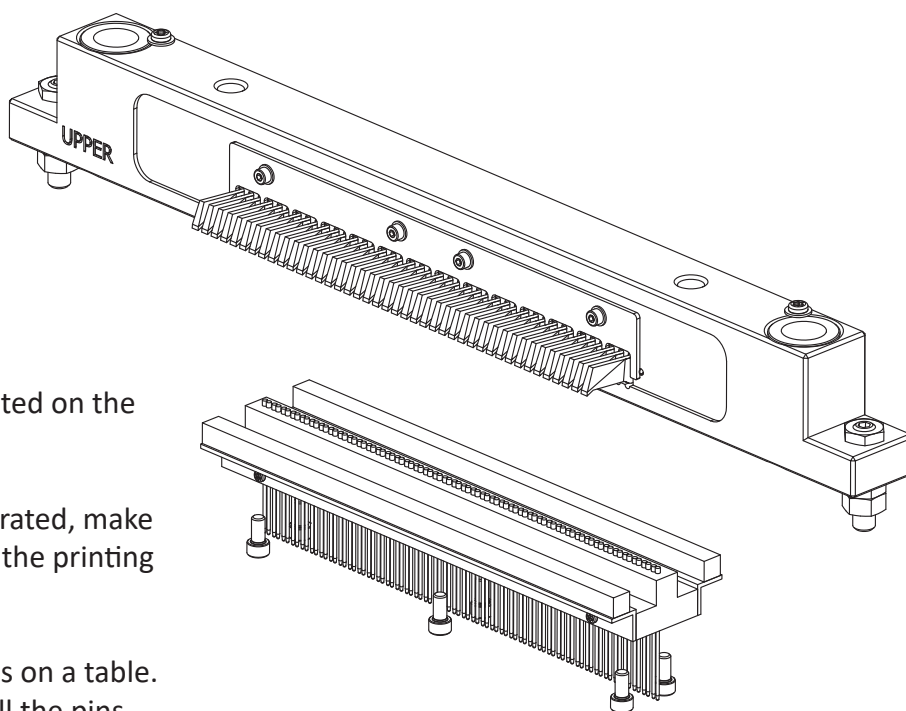
Remove the six screws as indicated on the figure.

Note! Before the parts are separated, make sure that the beam is held with the printing pins hanging down.

Place the pin guide with the pins on a table. Do not turn it upside down or all the pins will fall out!!
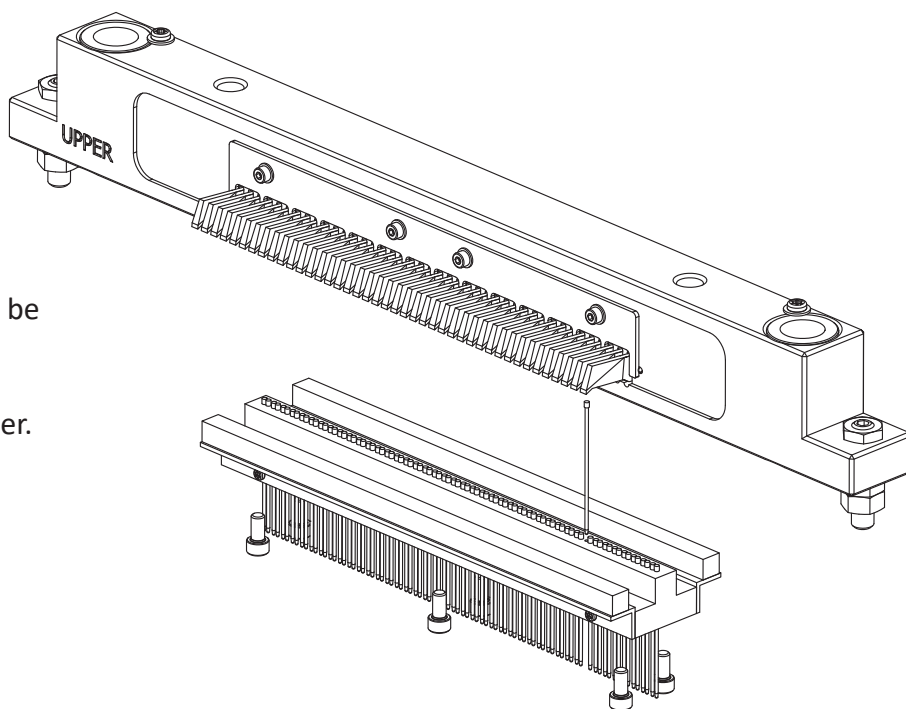
Now the defect printing pin can be replaced.

Assembly is done in reverse order.

5.13   Return spring adjustment

Before performing this adjustment, make sure that the shafts are turned to the correct position.
See the marks at the end of the shafts, the arrows must point directly towards each other, like in the figure below.
Then the springs can be adjusted to the correct length, i.e. 68 mm.

⚠️   Note! It is critically that the length of these two return springs are 68 mm!
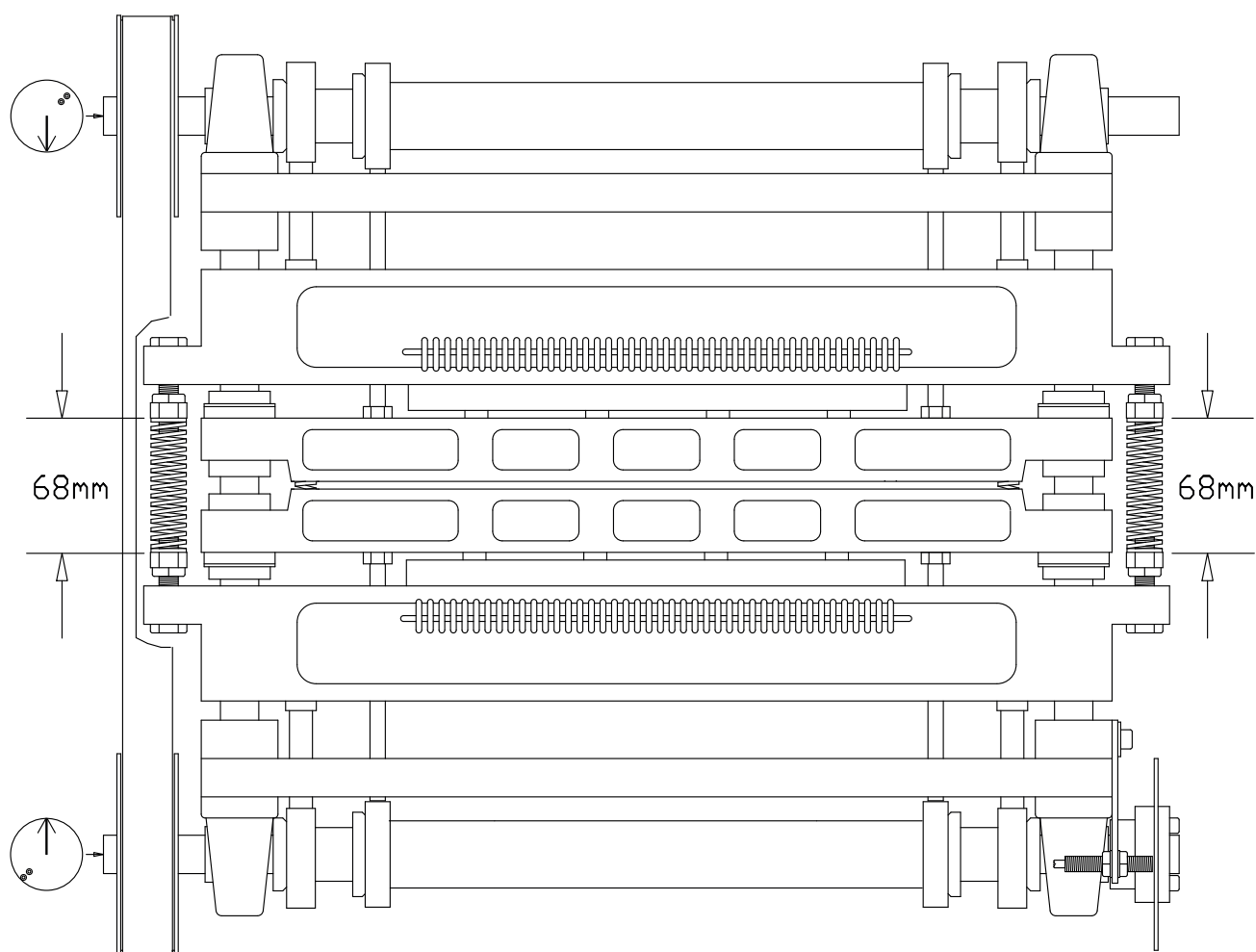
5.14   Eccentrics adjustment, belt tension

After removing the belt, it is necessary to align the eccentrics.

Put the belt back on, tighten it with the belt tightening wheel (2), and check that the arrows at the end of the shafts (1) are pointing towards each other. See figure below.

If the marks are not aligned like in the figure, it might be necessary to move the belt a notch or two on one of the wheels. This is done by loosening the belt tightening wheel (2) again, and then lift the belt up from the big wheel and move it a notch on the wheel. Then tighten the belt.

When pushing or pulling by hand, the distance should be approx. 10 - 12 mm

Direction
of rotation

1

2
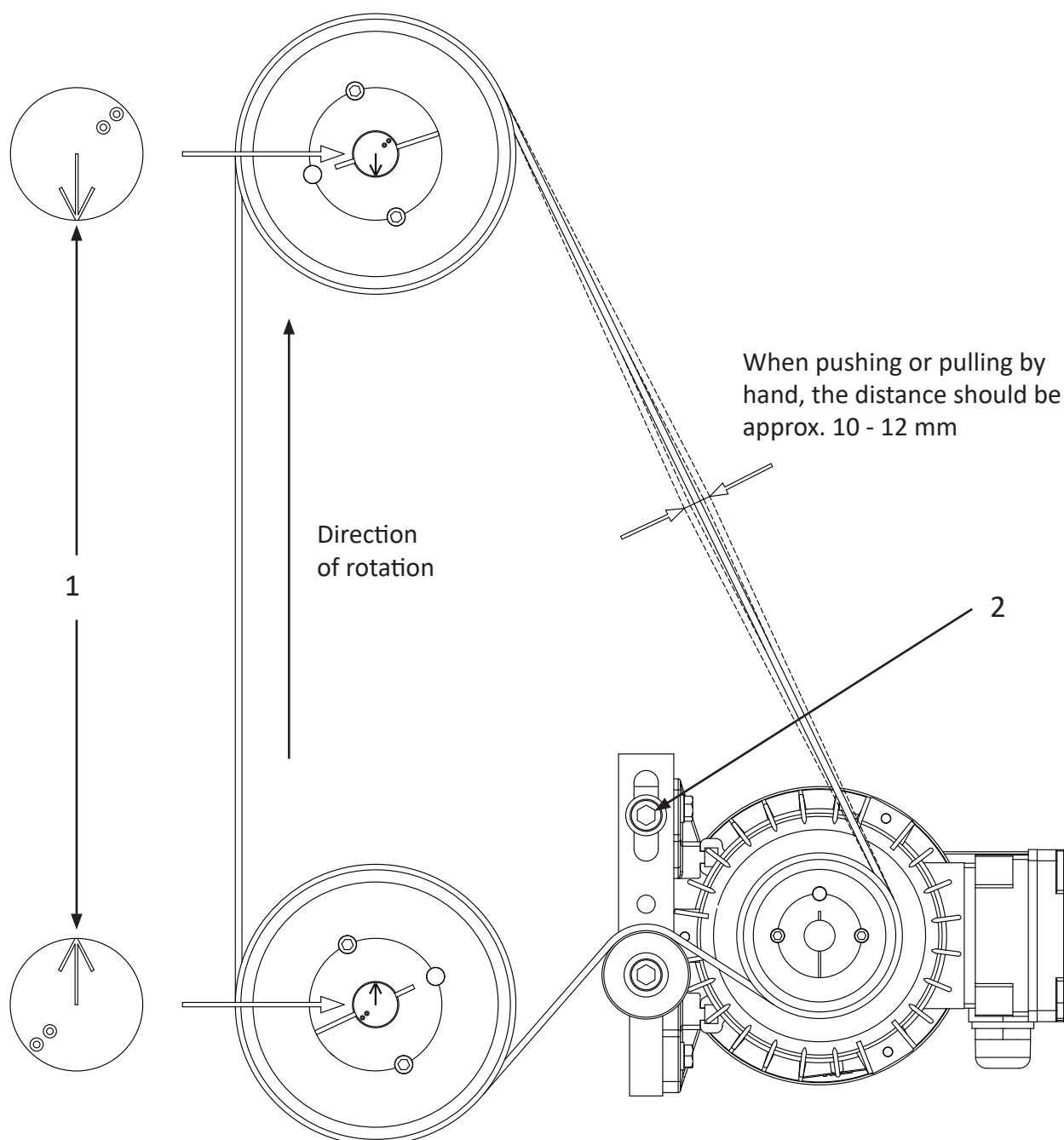
5.15   Paper shoes - adjustment

Place a sheet of paper between the paper shoes (P).
Turn the belt so the two points (6) at the end of the shafts (2) are pointing towards each other as shown in the figure below.

Lock the shafts in this position with a vice-grip, e.g. at the end of the shaft (2).
Loosen the locking nuts (1), adjust the push rods (3) by turning them. Adjust the push rods against the inner eccentric bearing (4) until the paper shoes (P) have a light pressure on the paper.
Check that the gap (5) between the press plates and the beam above, is equal on both upper and lower units.
Secure the push rods (3) with the locking nuts (1).

Make sure that the shafts can rotate freely by turning the belt by hand.

⚠️ Note! The function of the bearings (4), is to reduce the noise the printer makes while running. It is a common misunderstanding that you can increase the pressure on the paper shoes by adjusting these push rods. This does not have any influence on the dot quality!
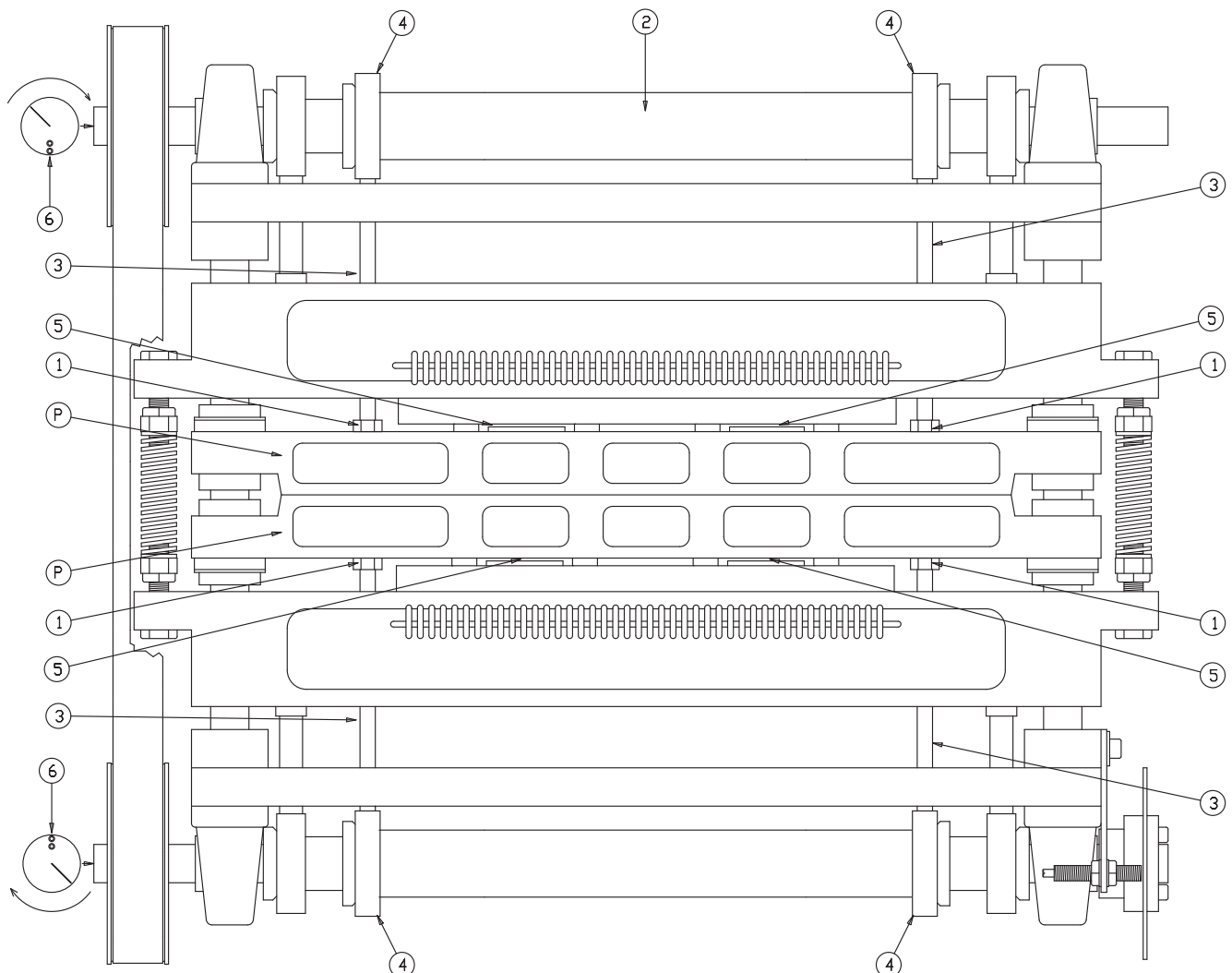
5.16 Main sensor wheel - adjustment

The main sensor wheel is placed on the lower shaft, on the opposite end from the belt.
The shafts must be in the position indicated to the left in the figure below.
The timing wheel should now be placed exactly like position (A) in the figure below, i.e. the mark in the middle of the opening in the wheel is placed just opposite the sensor.

If the timing wheel is not in it's correct position, it must be adjusted.
Keep the shafts in this position while loosen the screws (B) holding the timing wheel. Turn the timing wheel until the inductive sensor is placed just opposite the mark in the middle of the opening in wheel. Then fasten the screws again.

Keep the shafts in
this position

B

Sensor

A

The notch must be in the
middle of the sensor
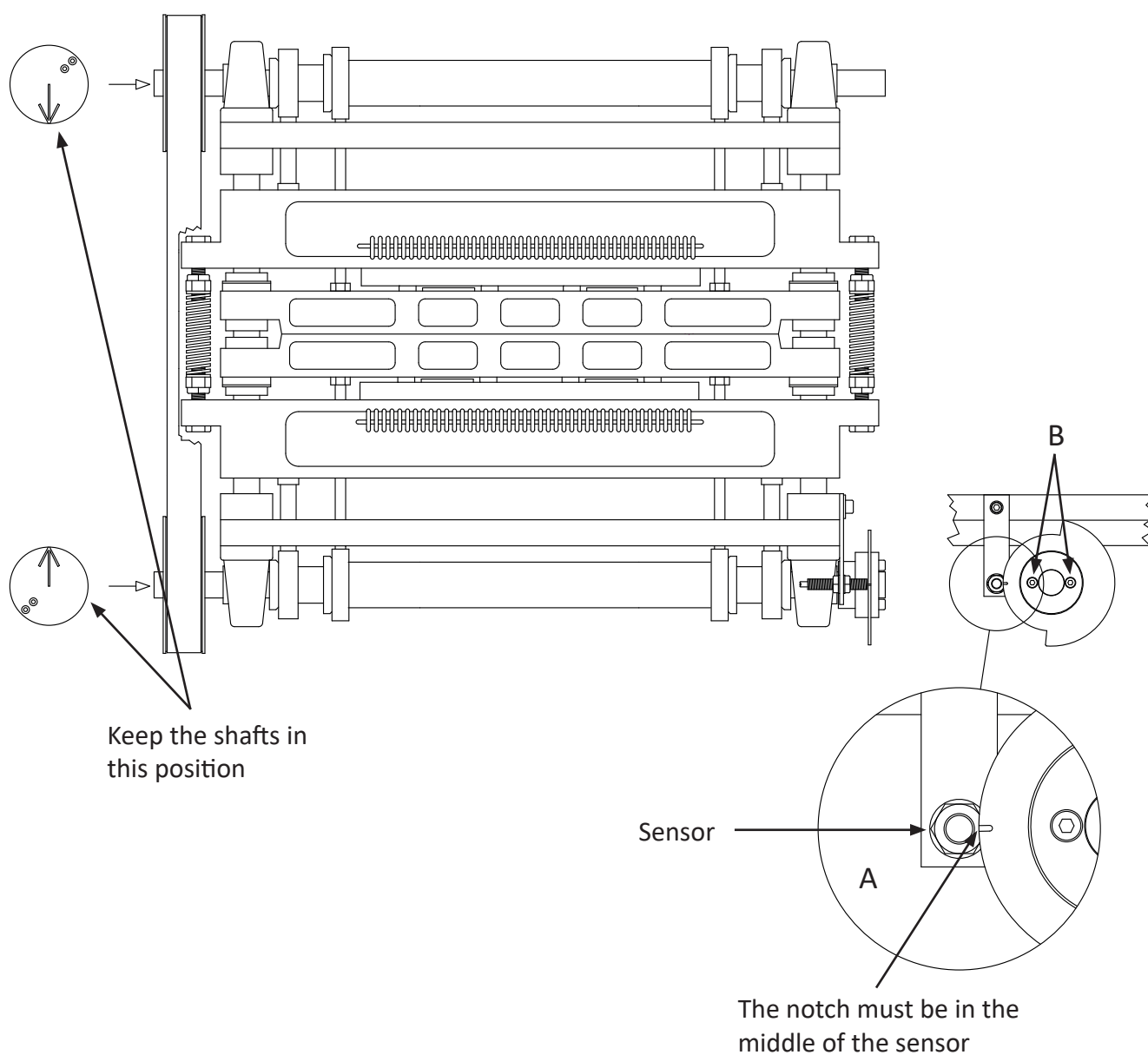
5.17   Paper feed assembly - removing

To remove the paper feed assembly, disconnect the stepping motor cable connector near the stepping motor. The sensors must be disconnected from the board.
The paper feed assembly can then be removed by loosening four nuts. There is no need to remove the nuts completely, just loosen them, and then lift the assembly up and pull out.
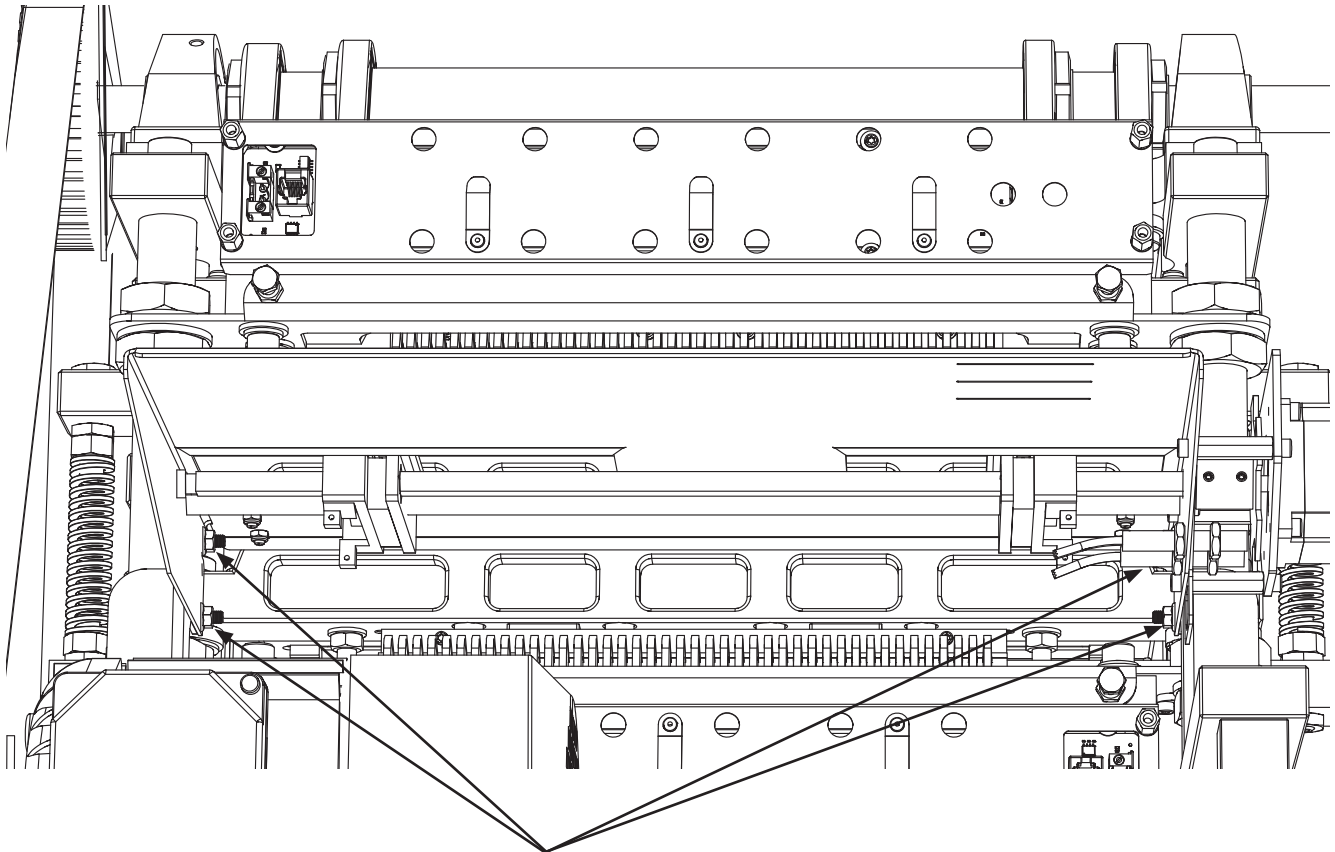
Loosen these four nuts

5.18   Paper feed assembly - adjustment

If for some reason the paper feed mechanism has been disassembled it could be that the paper will not stop correctly by the marks on the paper guide.
Therefore, it is necessary to adjust the relation between the paper parking position and where the stepping motor is parking.

Loosen the paper feed shaft by unscrewing the two left-hand screws (A) on the sensor wheel.
Note!   Do not loosen the screws for the stepping motor shaft.
Put a sheet of paper into the tractors on the paper feed.
Now the tractor feed shaft can be turned forward or backward until the paper is in the desired position.

Tighten the screws (A) again.
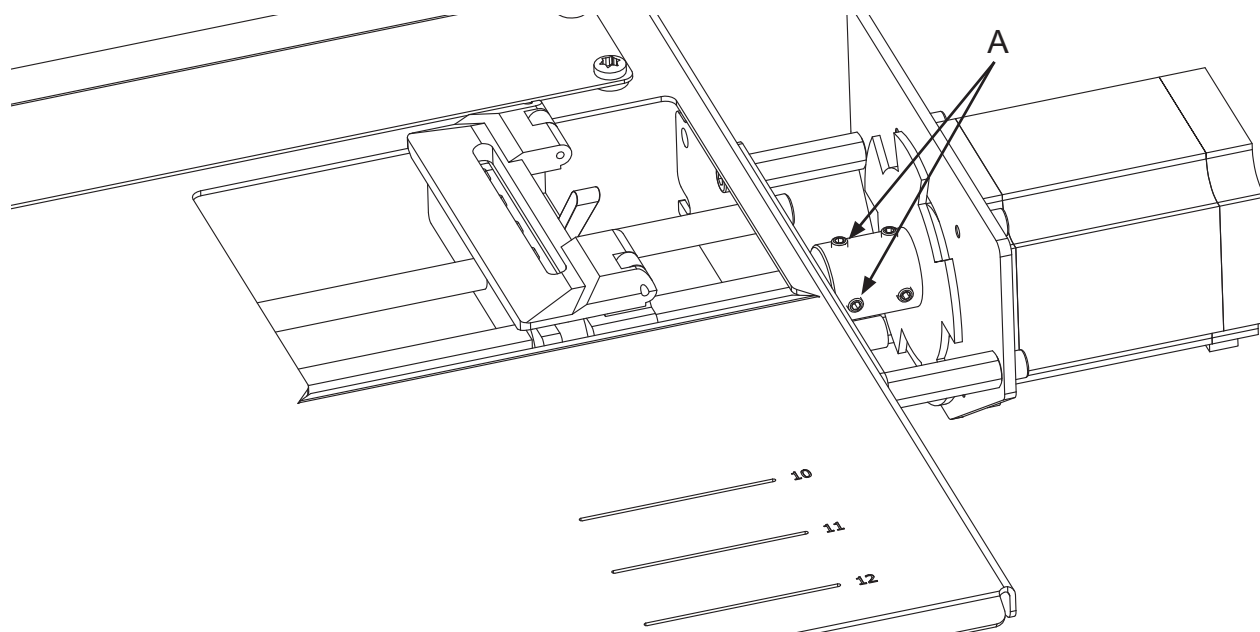
5.19 Inductive sensors - adjustment

This printer uses inductive sensors in three places. One for the main timing wheel on the lower shaft, and two are controlling the movement on the paper feed mechanism.

It is possible to check if the inductive sensors are functioning by looking at the rear end where the cable enters the sensor. Inside the sensor is a little LED lamp that will be lit if a magnetic object is in front of the sensor. So by having the power turned on, and at the same time turning the shafts, the light should go on and off.

When replacing/adjusting the sensors, the gap between the timing wheel and the sensors can be maximum 0.6 mm. Check this for the whole revolution of the timing See figure below.
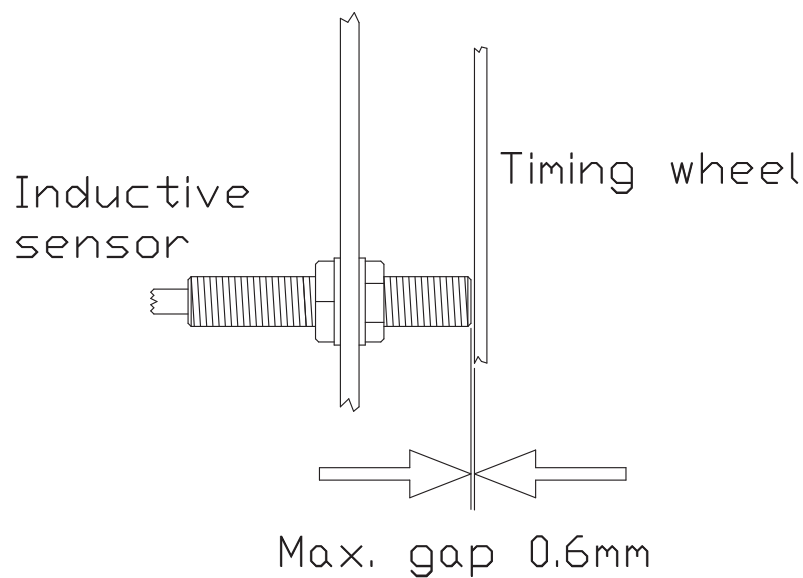
5.20 Input paper guide - removing

To remove the Input paper guide, you must loosen the four nuts like shown in the figure below.
There is no need to remove the nuts completely, just loosen them, and then lift the assembly up and
pull out.
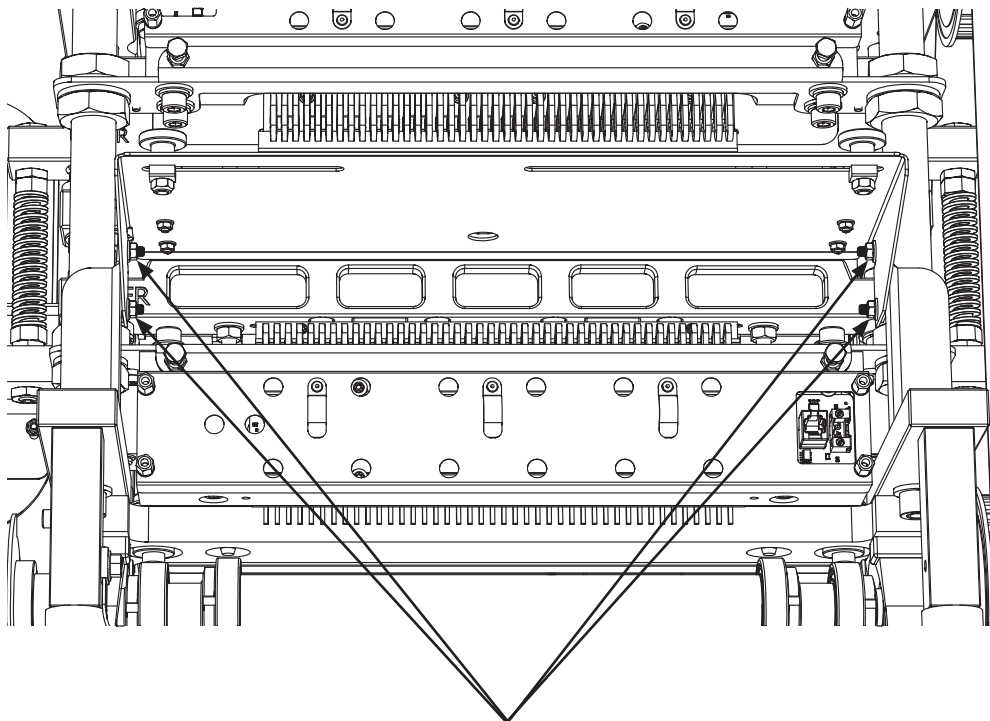
Loosen these four nuts

5.21   Paper sensor - replacing

This printer has a sensor to detect if paper is present in the printer.

This sensor is situated on the paper guide where the paper enters the printer.
The sensor is an infrared reflective type, and it works by an infrared lamp is sending light downward,
if there is paper present, the light will be reflected back and detected by a photo transistor.
If the sensor needs to be replaced, it can be done like this:
Take the paper guide out of the printer. Unscrew the screws (A).

A

Paper sensor
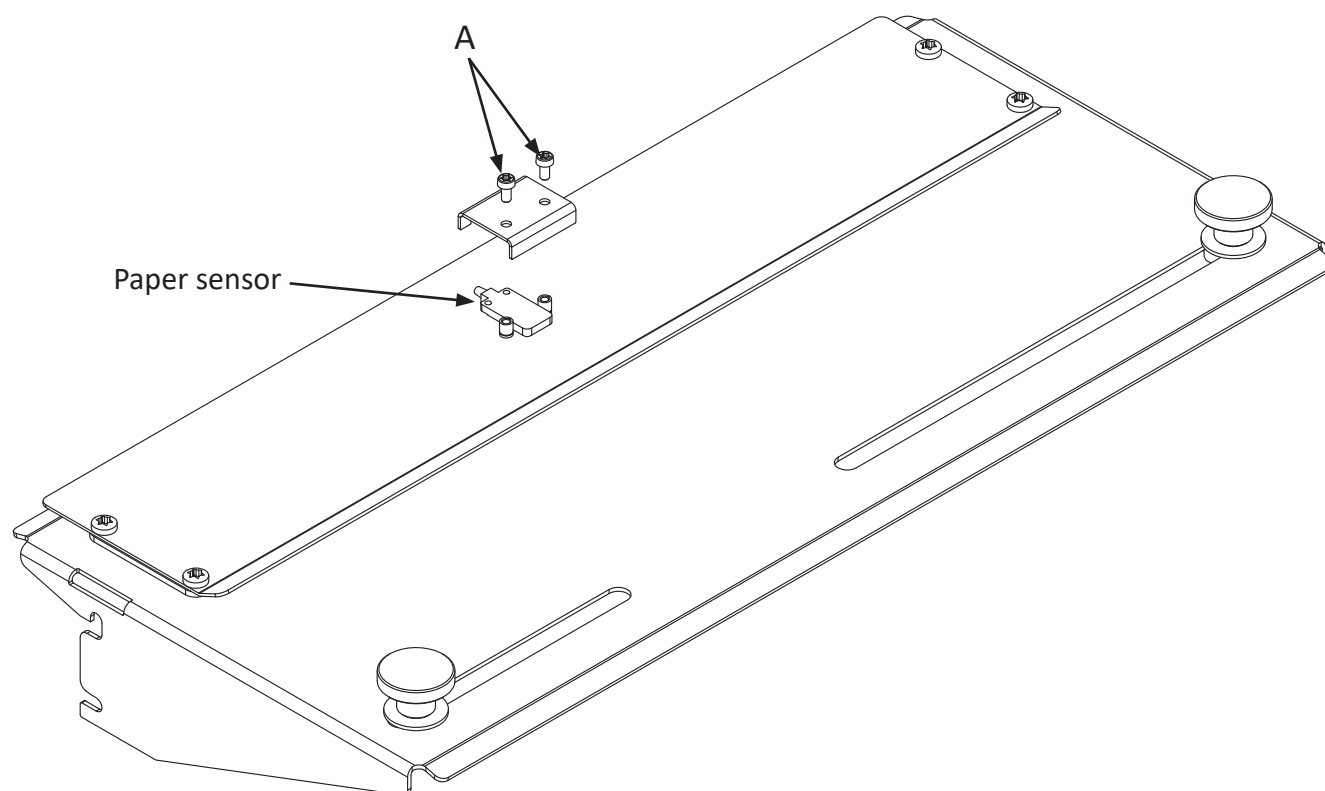
5.22   Maintenance

Weekly (without taking the cover off).

Does the printer print correct Braille?
How is the Braille dot quality?
Check for any damages on the outside of the cover.
Is the operator panel functioning?
Do the fans work? Are the fans clean?
If there is a lot of dust from the paper on the paper guides, use a vacuum cleaner.

Every 250 hours or six months.

All of the weekly maintenance.
Is the printer mechanism, electric unit, base plate and so on clean? Use a vacuum cleaner to remove the dust.
Check the main belt for wear, tear, cracks and check the tension.
Check the tractor belts for wear, tear, and cracks. Be sure to check the small spikes of the tractor belts very carefully.
Clean the magnet racks.
Check the silicone string for the long pivot arms on all four magnet racks, the silicone string should be able to keep the long pivot arms pressed against the support list.
When putting the magnet racks back in, check all the magnet rack adjustments.
Check if the printing pins move freely, and if not, clean the printing pin guide.

Every 500 hours or twelve months.

All of the 250 hours or six months maintenance.
Check all four sponges for the short pivot arms, the sponge should be able to keep the short pivot arm pressed all to the end of its travelling distance.
Check the wear on the push rod (12 x 56). This can be measured with a caliper, and the length must be between 55.90 and 56.00 mm.
Check if the paper shoes are worn. The printer should be able to give good Braille dot quality, but if not, worn paper shoes could be the reason.
Check the length on the printing pin. This can be measured with a caliper, and the length must be between 64.40 and 64.50 mm.
Lubricate all the stroke ball bearings, using a universal grease with molybdensulfid.
Lubrication should be done as shown in the figure on the next page.

Lubrication

This should be done every 1000 running hours, or approximately once a year.
Lubricate all items marked "1" on the figure below. (These are the only locations in the printer grease may be applied!).
Use a universal grease with molybdensulfid.
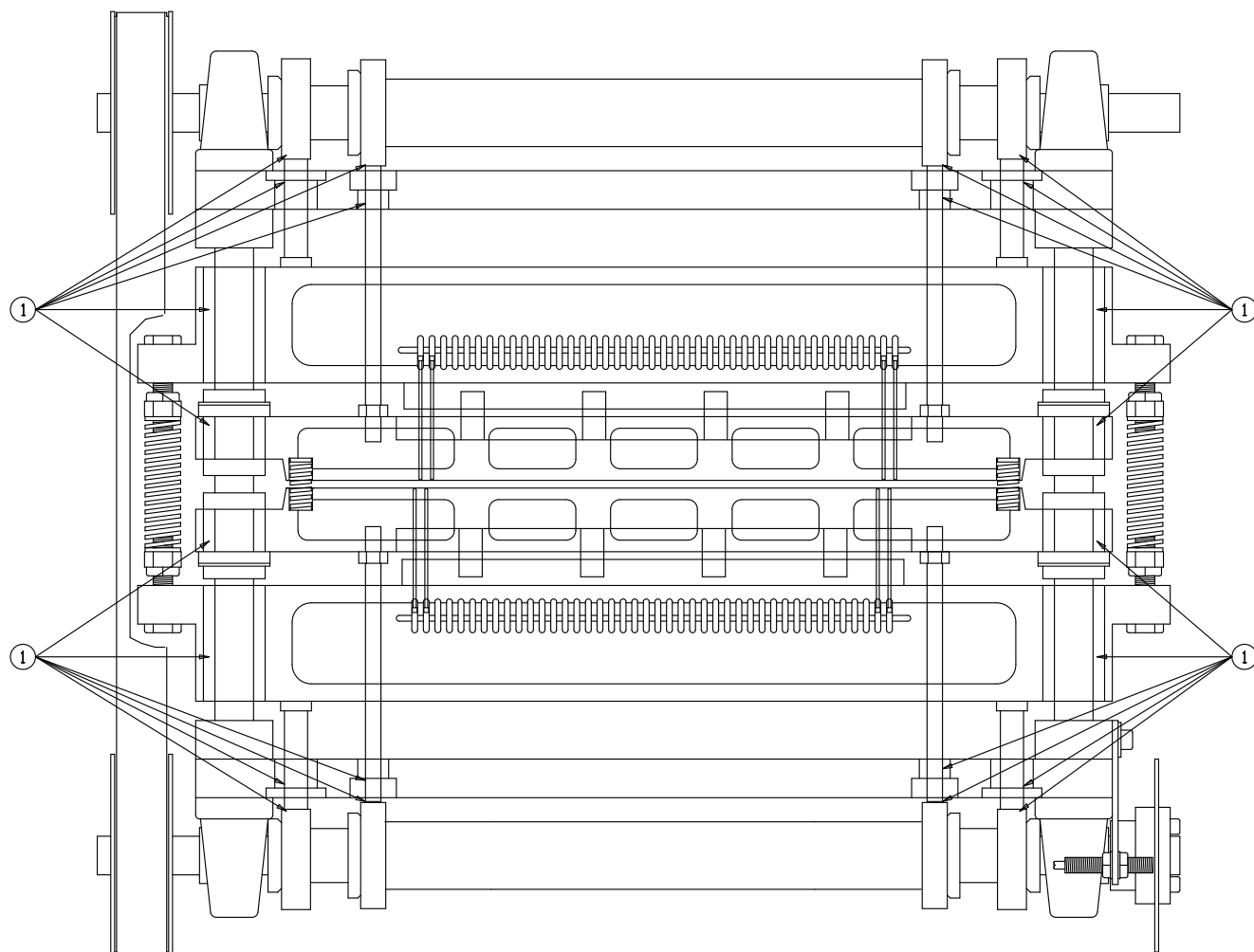
6. PARTS - EXPLODED VIEWS

6.1 Magnet rack
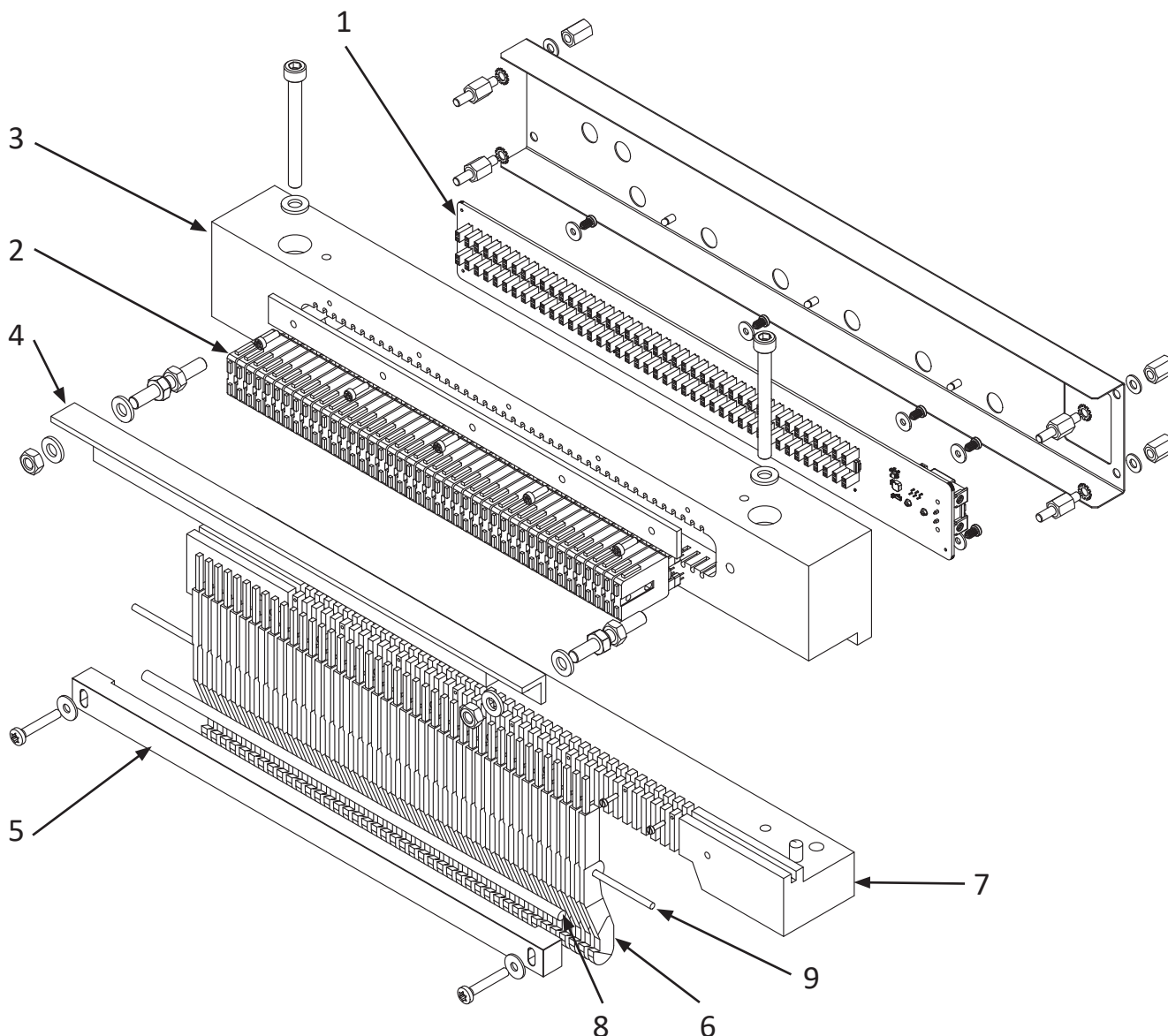
B3985-00310, Magnet rack assembly

Pos.	Part no.	Name	Quantity per. rack
1	10-60372	Magnet rack board 42 2.1	1
2	B3985-30191	Magnet	42
3	B3985-4029C	Magnet rack	1
4	B3985-40660	Support list, magnet rack	1
5	B3985-40892	Silicone string holder Std	1
6	B3985-40690	Pivot arm, long, green	42
7	B3985-4109E	Guide list, magnet rack	1
8	MA512-30009	Silicone cell string ø5	0.265 m
9	SW985-40815	Shaft, long pivot arm, ø3x309	1

6.2   Beam
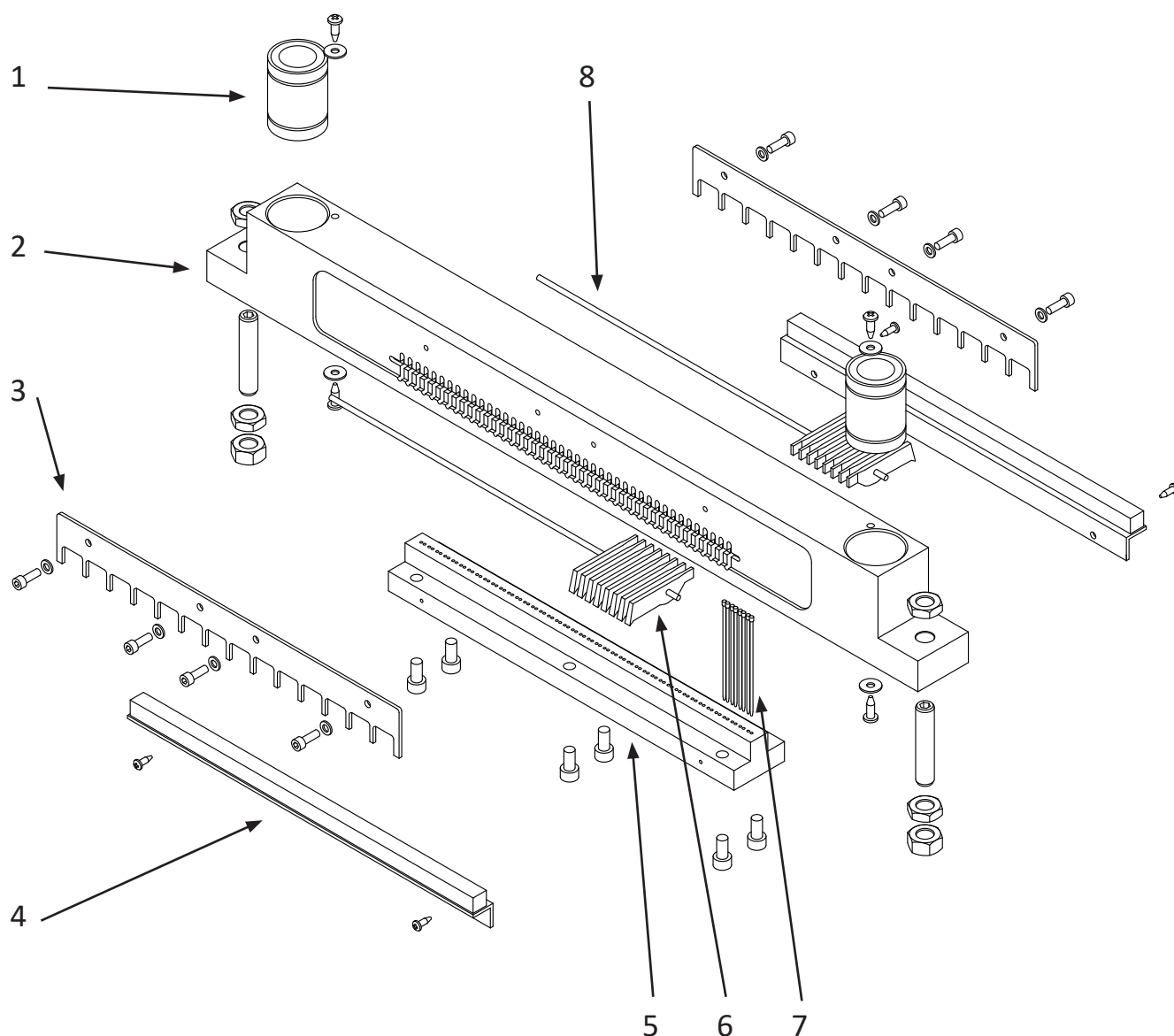
B3985-40101, Beam upper assembly
B3985-40091, Beam lower assembly

Pos.	Part no.	Name	Quantity per. beam
1	MA500-50001	Stroke ball bearing Ø20	2
2	B3985-40100	Beam, upper	1
2	B3985-40090	Beam, lower	1
3	B3985-40102	Fastener for short pivot arm shaft	2
4	B3985-40670	Sponge list for short pivot arm	2
5	B3985-4011C	Pin guide	1
6	B3985-4016E	Short pivot arm, green	84
7	B3985-40150	Printing pin, length = 64.5 mm	84
8	B3985-40490	Shaft, short pivot arm ø3x260	2

6.3 Paper shoe
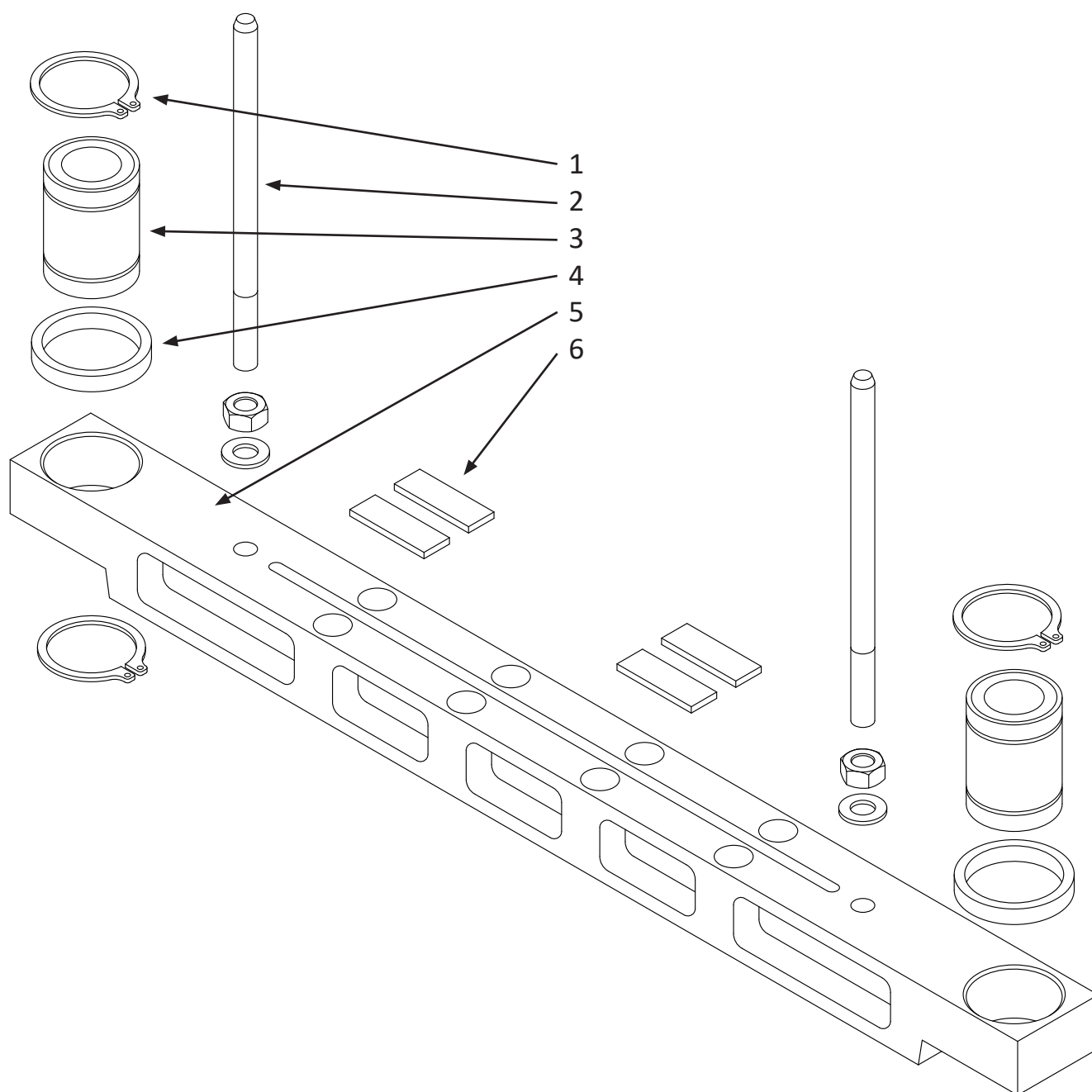
B3985-40952, Paper shoe, upper assembly
B3985-40942, Paper shoe, lower assembly

Pos.	Part no.	Name	Quantity per. shoe
1	MA510-10003	Retaining ring	4
2	B3985-40720	Adjustment screw (push rod) Ø8x140	2
3	MA500-50001	Stroke ball bearing Ø20	2
4	B3985-40913	Spacer	2
5	B3985-4095C	Paper shoe upper	1
5	B3985-4094C	Paper shoe lower	1
6	B3985-40722	Plastic shims	4

6.4 Paper feed
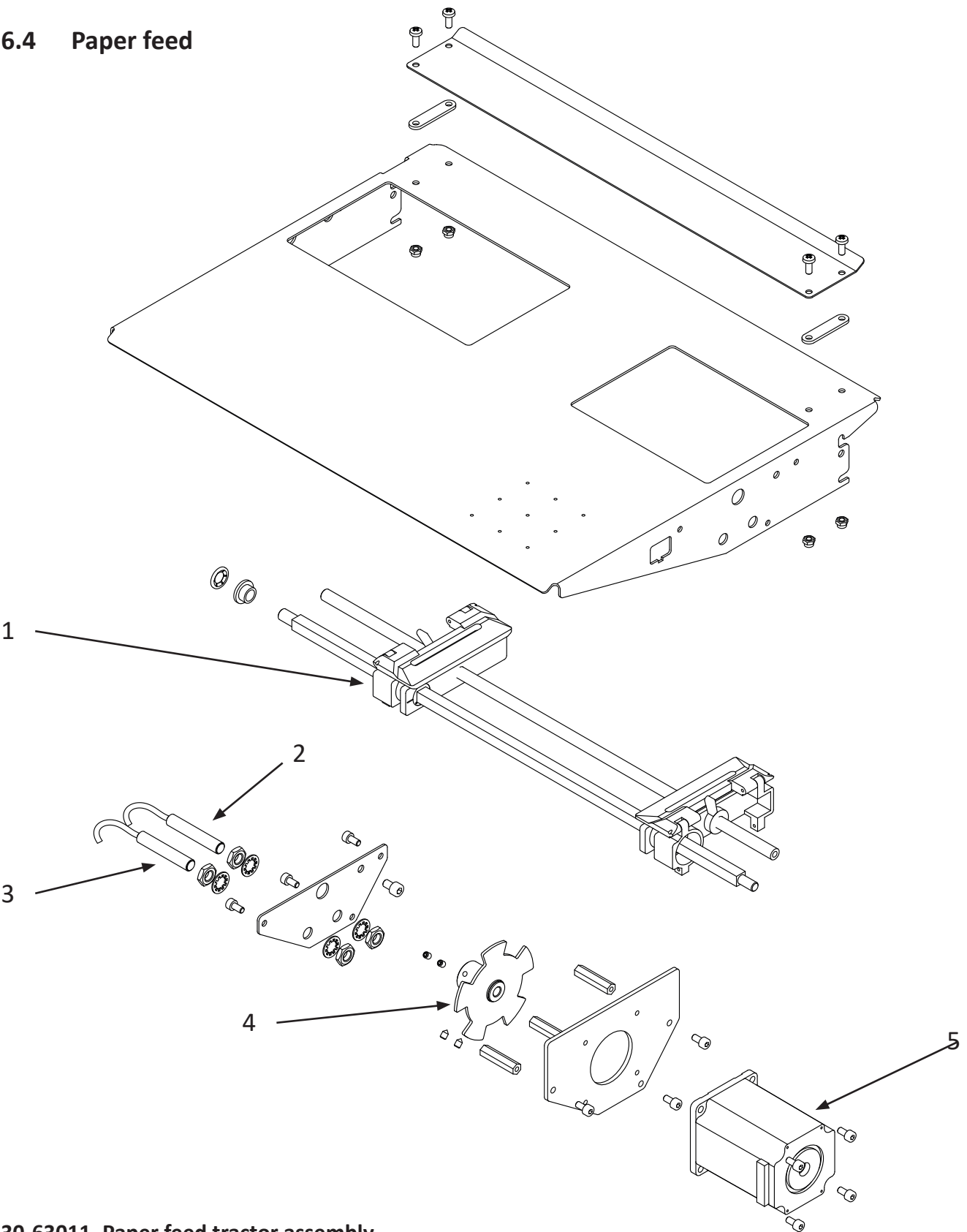
30-63011, Paper feed tractor assembly

Pos.	Part no.	Name	Quantity
1	MA540-20400	Paper feed tractors (a pair with left and right)	1
2	10-61966	Paper feed sensor no. 1	1
3	10-61967	Paper feed sensor no. 2	1
4	B3975-30854	Timing wheel with hub	1
5	EA185-00025	Stepper motor	1

6.5 Shafts, belt

To get the cog wheel off the shaft

Unscrew the two screws.

Place one of the screws in the third hole, and screw it inwards until the wheel is loose.

Direction of rotation
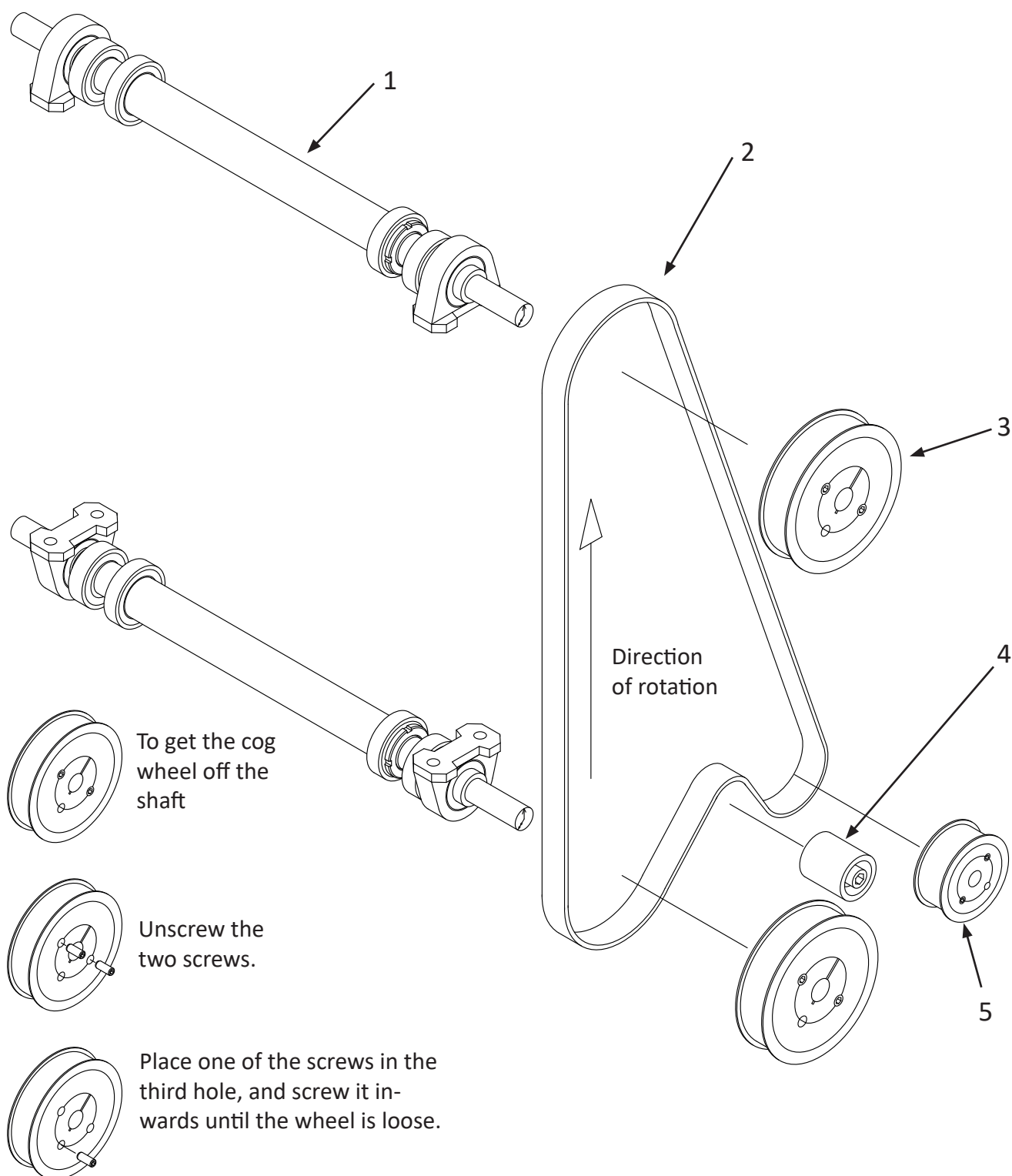
Parts shaft, belt

Pos.	Part no.	Name	Quantity
1	B3985-40050	Shaft, complete with bearings	2
2	MA505-20003	Belt 540 L	1
3	MA505-10004	Cog wheel 40 L 100	2
4	MA505-40001	Belt tensioner	1
5	MA505-20008	Cog wheel 22 L 100	1

Shaft, exploded view
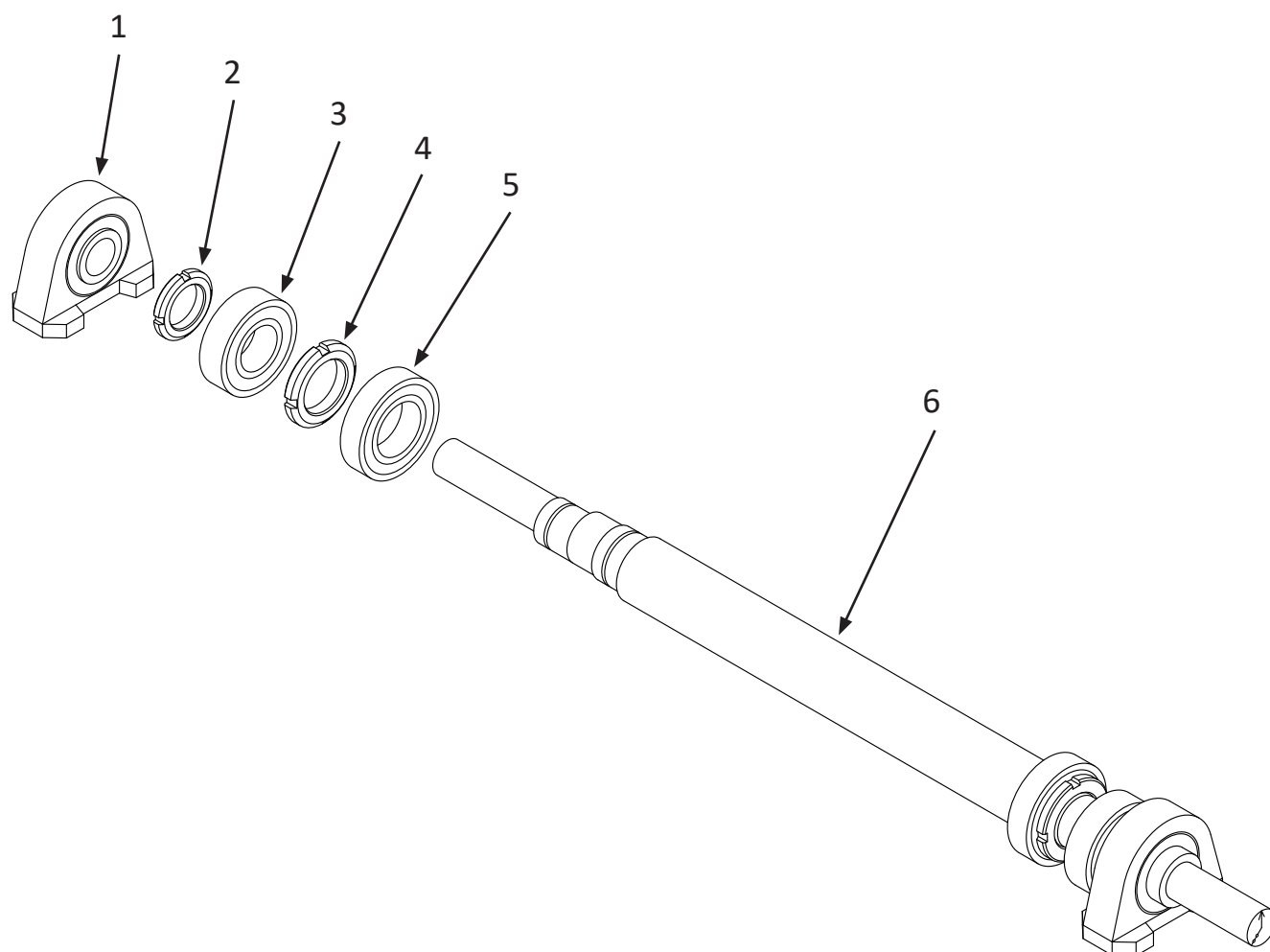
B3985-40050, Shaft assembly

Pos.	Part no.	Name	Quantity per. shaft
1	MA500-20002	Main bearing with housing (not part of B3985-40050)	2
2	MA443-30001	Nut KM5	2
3	MA500-10002	Bearing outer eccentric 6205 2Z	2
4	MA443-30002	Nut KM6	2
5	MA500-10001	Bearing inner eccentric 6006 2Z	2
6	B3985-4005C	Main shaft	1

6.6   Top and bottom frame
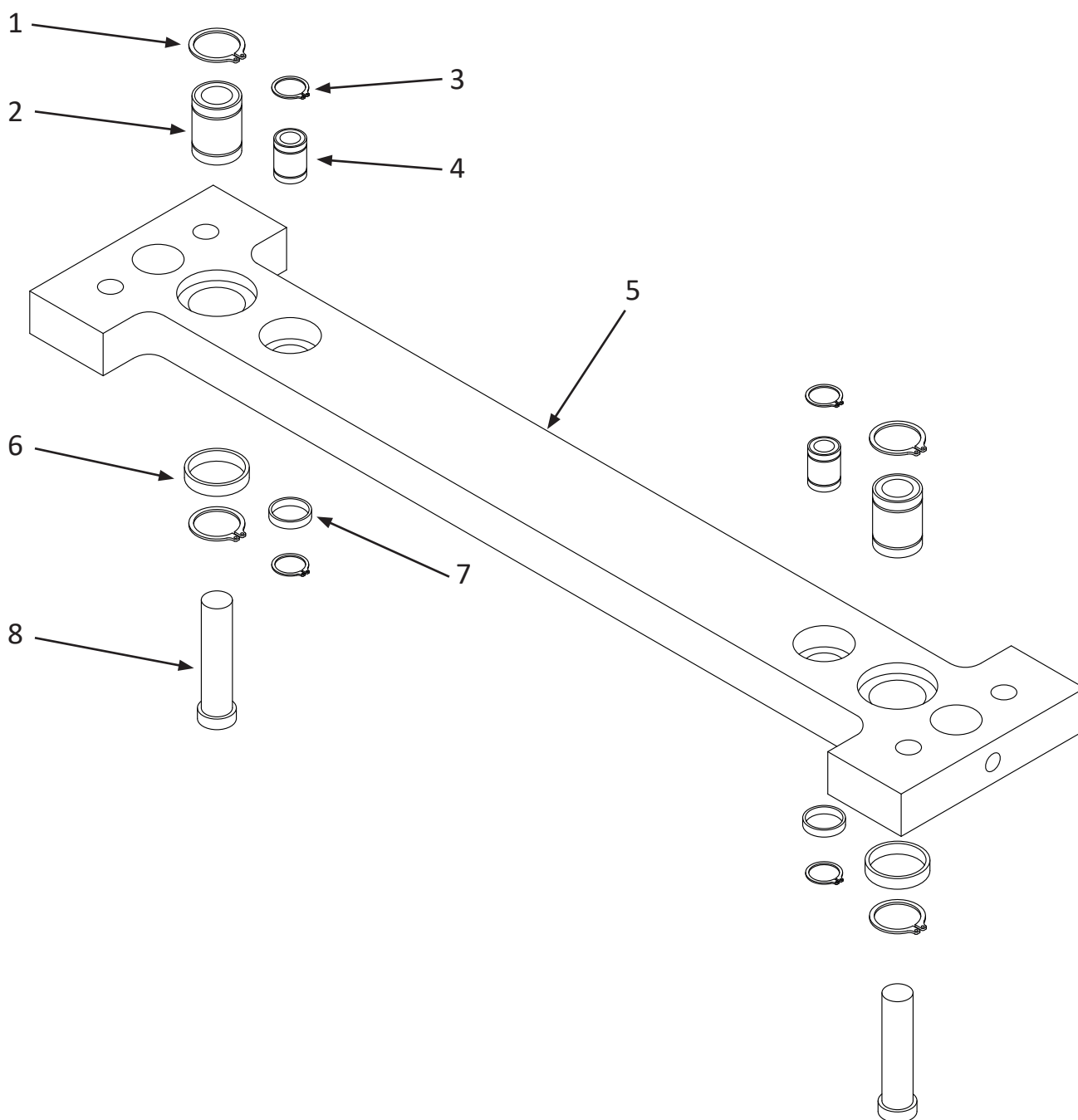
B3990-00050, Top and bottom frame assembly

Pos.	Part no.	Name	Quantity per. frame
1	MA510-10002	Locking ring Ø22	4
2	MA500-50002	Stroke ball bearing Ø12	2
3	MA510-10001	Locking ring Ø16	4
4	MA500-50003	Stroke ball bearing Ø8	2
5	B3985-42000	Frame	1
6	B3985-40912	Spacer Ø22	2
7	B3985-40911	Spacer Ø16	2
8	10-60032	Push rod ceramic Ø12x56 (not part of B3990-00050)	2

Frame, complete
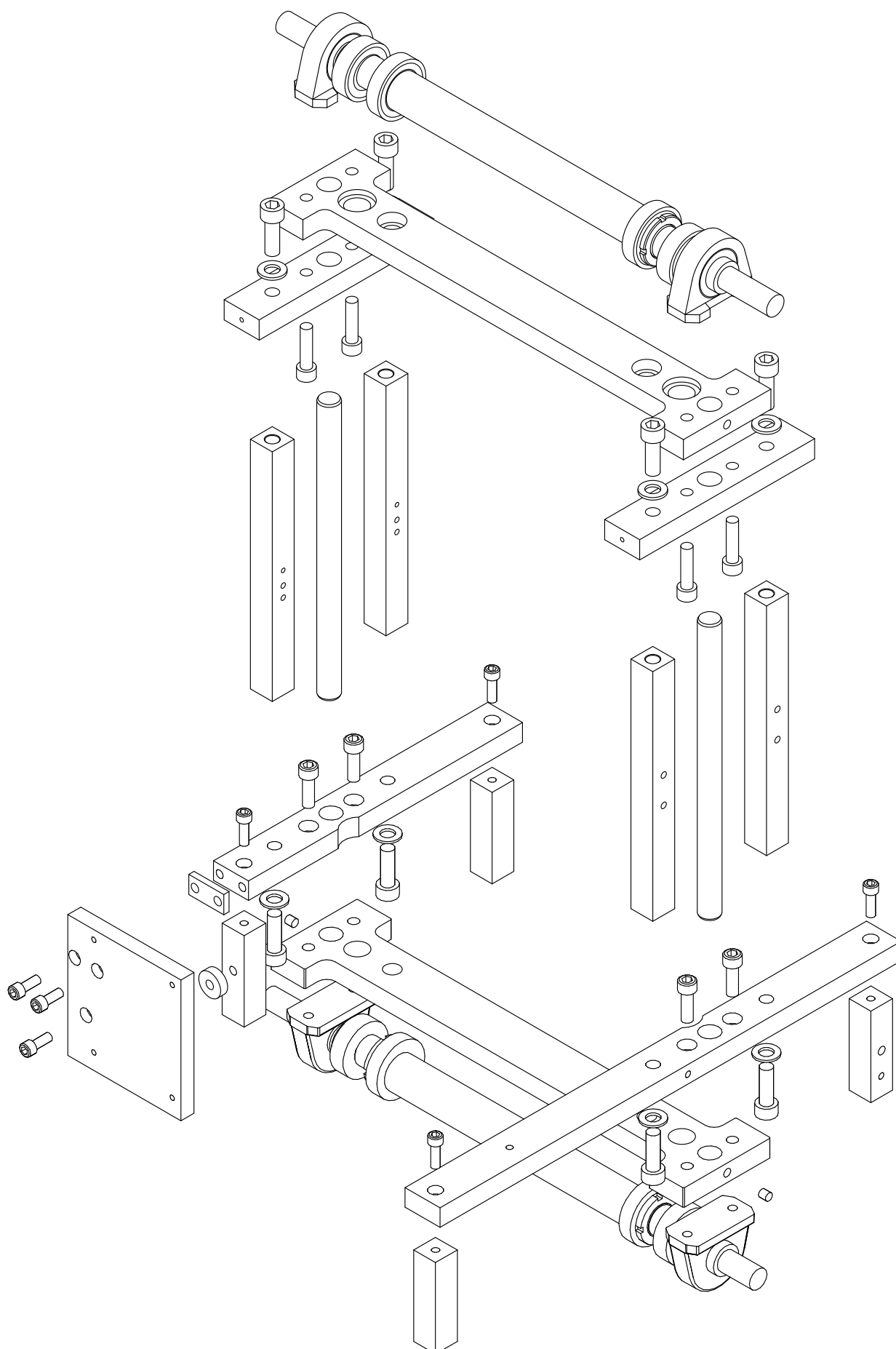
7. TECHNICAL SPECIFICATIONS

7.1 Technical specifications

Format:

Characters per line:	10-42 char.
Sheet length:	4-14 inches
Sheet width:	140-330 mm
Page layout:	Normal/Z-fold
Page 1:	Up/down
Printing type:	Single sided/interpoint
Line spacing:	Adjustable, from 0.3175 mm to 10.16 mm. Standard is 5.08 mm
Dot:	6/8
Page length:	No form feed/normal/normal-1 to -9 lines
Braille cell:	Standard medium 6 or 8 dot.
Paper weight:	120 - 180 g/m², recommended 150 g/m²

Printing speed: 450 characters per second or a maximum of 1350 printed pages per hour (based on a 12 inch sheet).

Electrical:

Voltage:	Single phase 230V (+/- 10 %), 50/60 Hz
Current:	Approx. 3 A max.
Power:	Approx. 600 W max.
Fuse in printer:	10 AT
Leakage current:	3.9 mA

Communication with the computer:
USB
Ethernet
WLAN

Environment:

Temperatures:	15-30 C (60-86 F)
Rel. Humidity:	40-60%

Measurements:		Patents:	
Height:	670 mm	Norway	no. 140335
Width:	660 mm	Great Britain	no. 2040231
Length:	920 mm	USA	no. 4261663
Weight:	107 kg	Germany	no. DE 2850780 C22

7.2   Electric unit - overview

The electric unit contains connections, fuses and power supply.

⚠️ Note! Disconnect the mains when working on this unit!
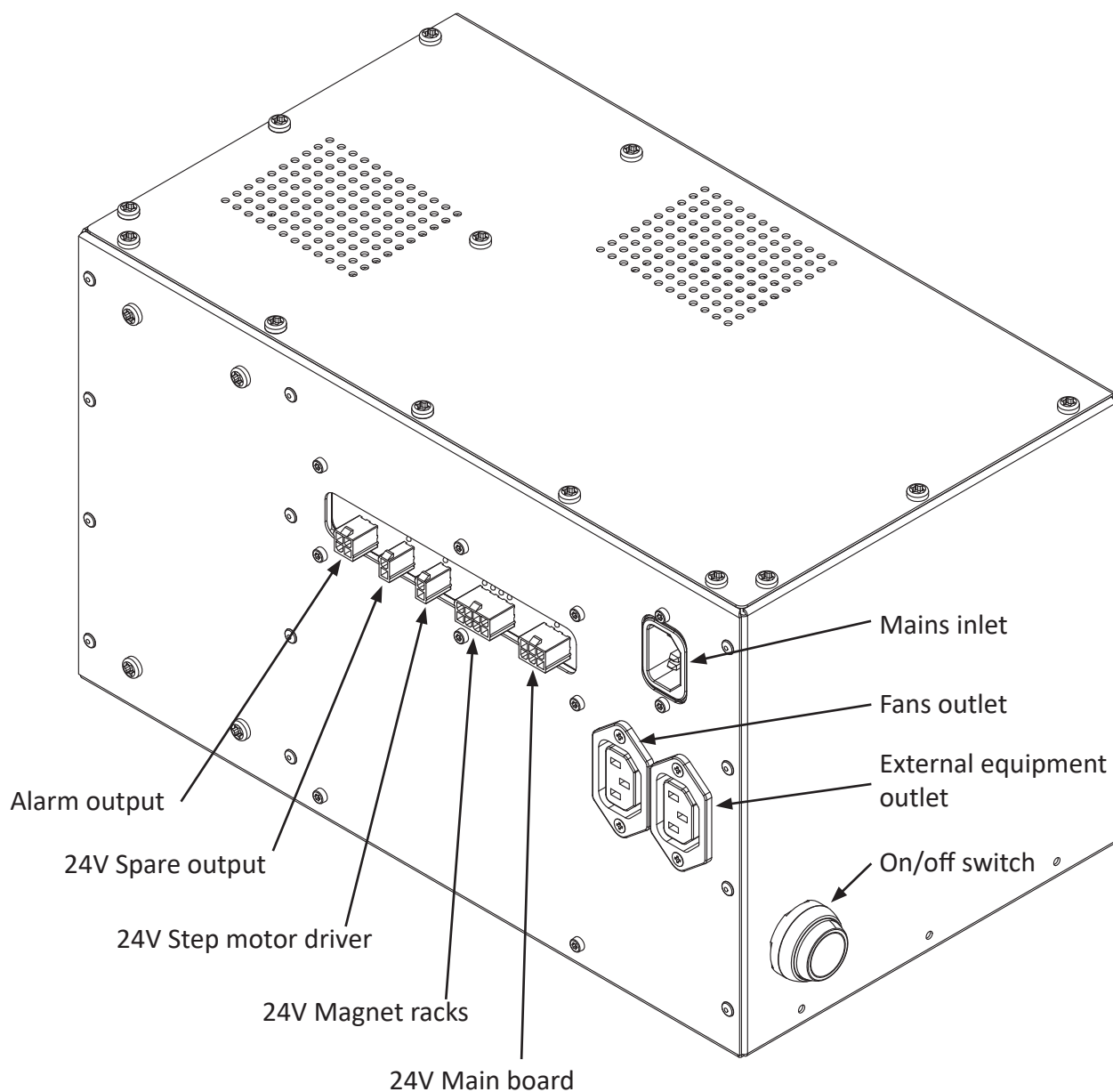
7.3   How to replace fuses

The fuses are placed on a PCB inside the electric unit. See figures below for how to open the box. Remember to disconnect the mains cable first!

Unscrew all screws
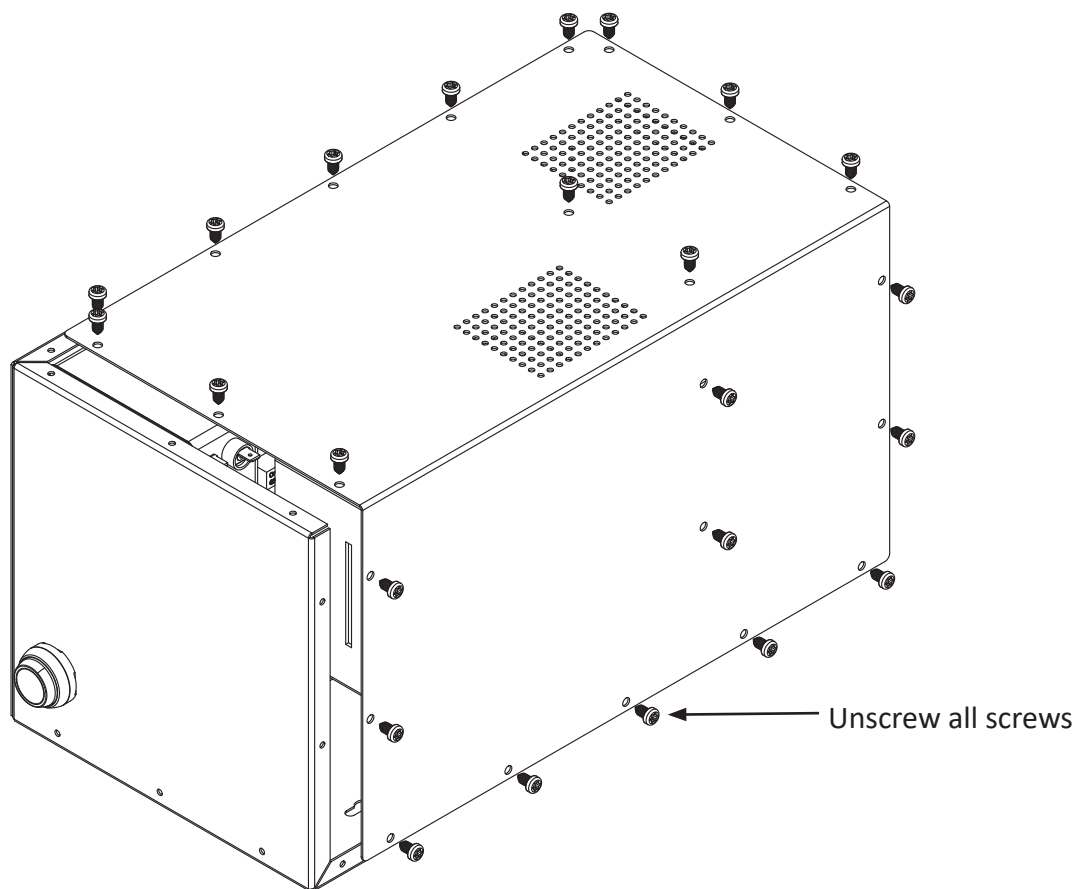
To get more room to inspect and replace the fuses, it is best to move the power supply a little out of the way. This can be done without disconnection the wires. See figure below:
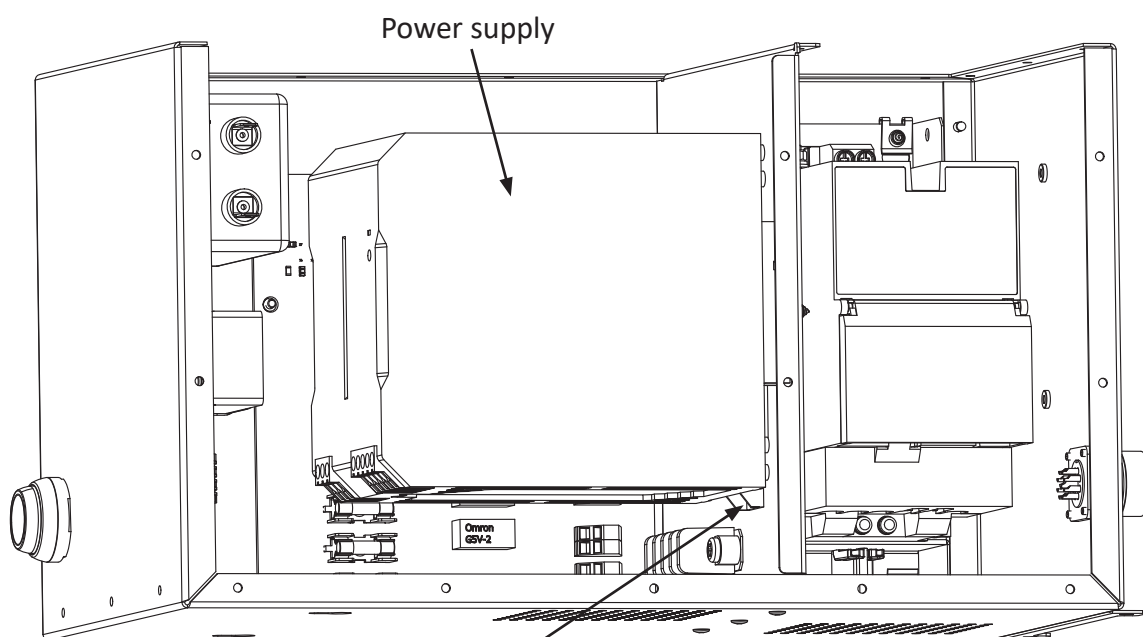
Power supply

To release the power supply, place a screw driver here and pull the latch downwards

The fuses.

Note that the two mains fuses is placed under transparent lids. All the fuses are 5 x 20 mm and can be of glass or ceramic type.

Mains - 10 AT

Board - 3.15 AT

Spare 1 - 1 AT

Spare 2 - 1 AT

Magnet rack A - 3.15 AT

Magnet rack B - 3.15 AT

Magnet rack C - 3.15 AT

Magnet rack D - 3.15 AT
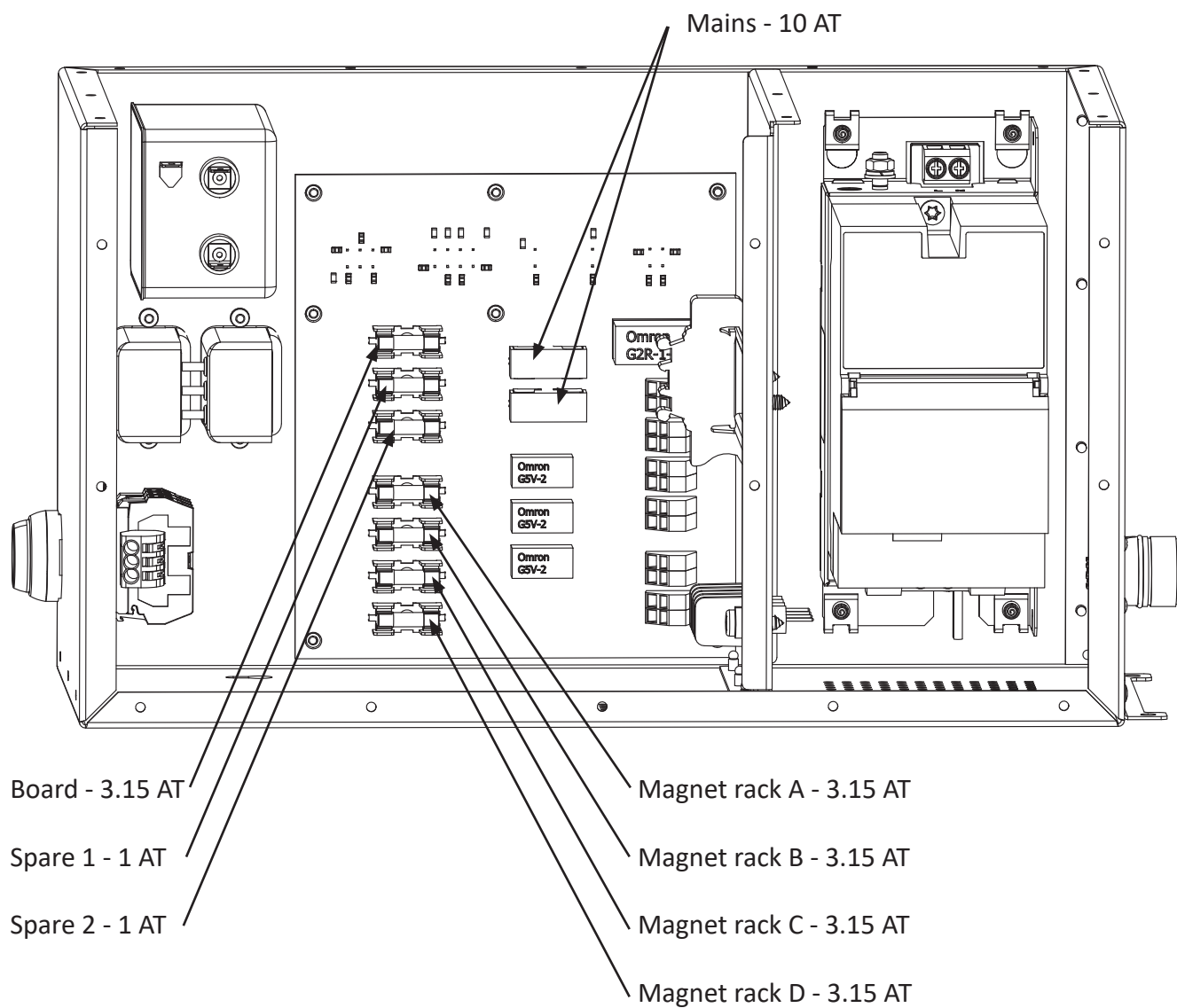
7.4 Main board - connections

The main board is placed just behind the operator panel
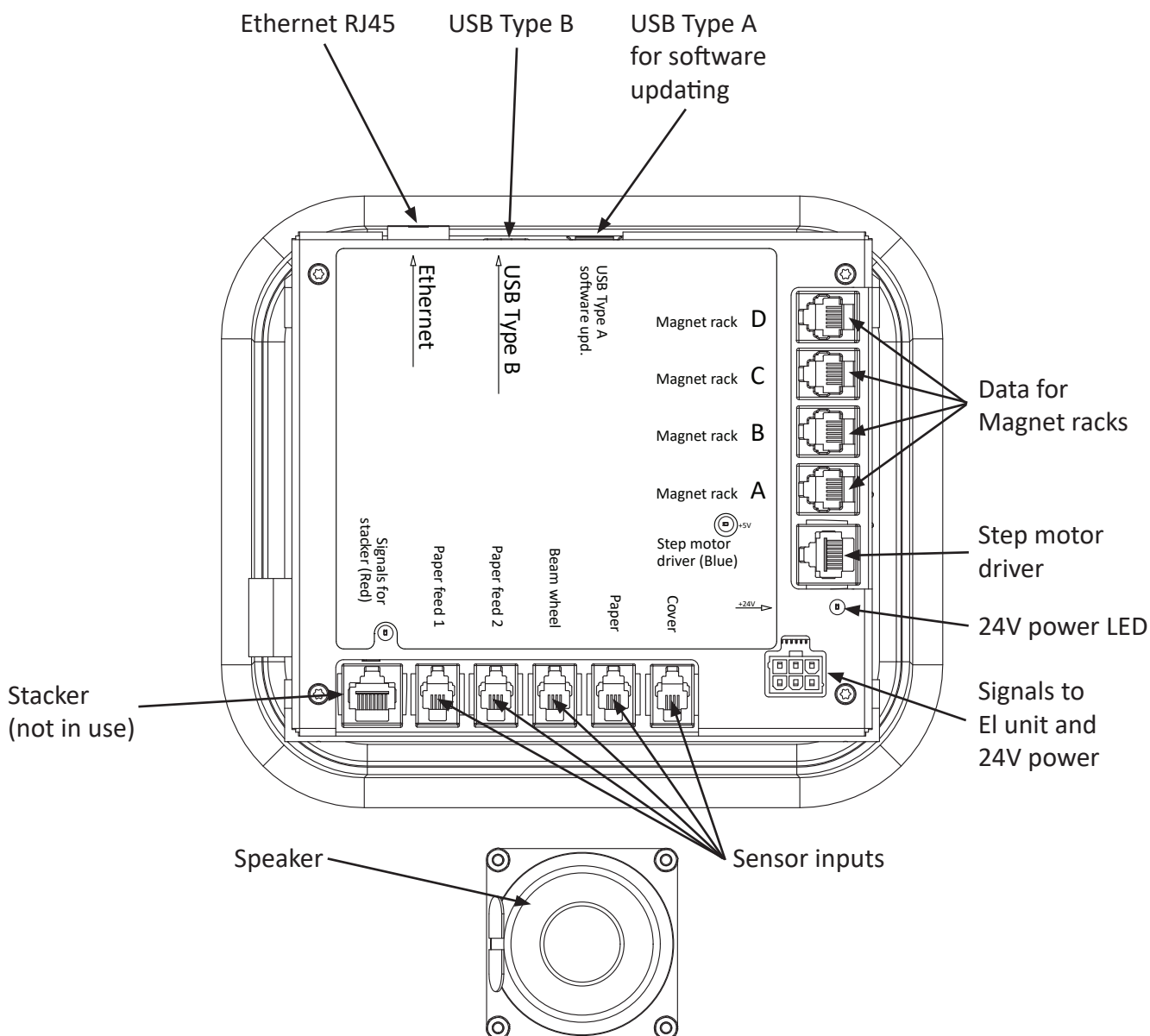
7.5   Escape-sequences

What is an escape-sequence?

An escape-sequence is the name for a code which is sent to the printer from the computer to change the parameters which control the way the printer works. All parameters that can be set via the operator panel, can also be changed with escape-sequences.

This makes it possible to have different codes (read; escape-sequences) stored in a document.
So, when the document is sent to the printer, these codes are sent first and the printer sets itself in the correct mode and format automatically.

⚠ Note! When the printer receives an escape-sequence, it will have first priority. This means, regardless of the setting made before and regardless what the operator panel dictates, the most recent escape-sequence will take precedence.

⚠ Note! Escape-sequences should be placed at the very beginning of the first page on the sheet, (e.g. page 1, 3, 5, 7 ...). However, a software form feed can be placed wherever needed. (If there is a command on the other pages, it will be skipped).

All page formatting which is done on the front page will also format the back of the same sheet. It is for example not possible to have 8 dot Braille on the front page and 6 dot on the back page. It is possible to mix 6 and 8 dot Braille however, as long as it is done on two different sheets.

An overview of the different escape-sequences:

ESC A nn	- Sheet length.	nn can be from 08 to 28 (4 to 14 inches).
ESC B nn	- Line length.	nn can be from 10 to 42 characters.
ESC C n	- Print format.	n can be 0 or 1, single-sided (0) or interpoint (1).
ESC H n	- Page layout.	n can be 0 or 1, normal (0) or Z-fold printing (1).
ESC I n	- Page 1 up/down.	n can be 0 or 1, up (0) or down (1).
ESC J n	- 6 / 8 dot Braille.	n can be 0 or 1, 6 (0) or 8 (1) dot Braille.
ESC M nn	- Line spacing.	nn can be from 0 to 16 step.
ESC N n	- Line single/double.	n can be 0 or 1, single (0) or double line spacing (1).
ESC R n	- Page adjust.	n can be from 0 to 9 lines.
ESC S n	- Form feed mode.	n can be 0 or 1, no form feed (0) or normal form feed (1).
ESC T nn	- Page margin.	nn can be from 0 to 20 step.
ESC 0	- Soft reset	
ESC 1	- Soft form feed	
ESC 4	- Print Printer ID	

⚠️ Note! The escape-sequences will be executed immediately if the printer is not running. However, if the printer is running, the escape-sequences will keep their place in the document, and will be executed when this particular page is printed. Also keep in mind that any page formatting command must be kept on the front page of a sheet. Then the command will affect both the front and back page, i.e. one sheet. If there are page formatting commands on the back page of a sheet, these commands will be skipped.

Please see the following explanations on how to combine different values to get the different escape-sequences.

Sheet length:
ESC A nn   - Sheet length.
nn can be from 4 to 14 inches.

nn can be a number from 8 to 28, corresponding to the length of the sheet in inches times two. (A 12 inch sheet will have the number 24).

Inches	ASCII	HEX
04.0	027 065 048 056	1B 41 30 38
04.5	027 065 048 057	1B 41 30 39
05.0	027 065 049 048	1B 41 31 30
05.5	027 065 049 049	1B 41 31 31
06.0	027 065 049 050	1B 41 31 32
06.5	027 065 049 051	1B 41 31 33
07.0	027 065 049 052	1B 41 31 34
07.5	027 065 049 053	1B 41 31 35
08.0	027 065 049 054	1B 41 31 36
08.5	027 065 049 055	1B 41 31 37
09.0	027 065 049 056	1B 41 31 38
09.5	027 065 049 057	1B 41 31 39
10.0	027 065 050 048	1B 41 32 30
10.5	027 065 050 049	1B 41 32 31
11.0	027 065 050 050	1B 41 32 32
11.5	027 065 050 051	1B 41 32 33
12.0	027 065 050 052	1B 41 32 34
12.5	027 065 050 053	1B 41 32 35
13.0	027 065 050 054	1B 41 32 36
13.5	027 065 050 055	1B 41 32 37
14.0	027 065 050 056	1B 41 32 38

Default is 12 inches.

Line length:
ESC B nn   - Line length.
nn can be from 10 to 42 characters.

Char	ASCII	HEX
10	027 066 049 048	1B 42 31 30
11	027 066 049 049	1B 42 31 31
12	027 066 049 050	1B 42 31 32
13	027 066 049 051	1B 42 31 33
14	027 066 049 052	1B 42 31 34
15	027 066 049 053	1B 42 31 35
16	027 066 049 054	1B 42 31 36
17	027 066 049 055	1B 42 31 37
18	027 066 049 056	1B 42 31 38
19	027 066 049 057	1B 42 31 39
20	027 066 050 048	1B 42 32 30
21	027 066 050 049	1B 42 32 31
22	027 066 050 050	1B 42 32 32
23	027 066 050 051	1B 42 32 33
24	027 066 050 052	1B 42 32 34
25	027 066 050 053	1B 42 32 35
26	027 066 050 054	1B 42 32 36
27	027 066 050 055	1B 42 32 37
28	027 066 050 056	1B 42 32 38
29	027 066 050 057	1B 42 32 39
30	027 066 051 048	1B 42 33 30
31	027 066 051 049	1B 42 33 31
32	027 066 051 050	1B 42 33 32
33	027 066 051 051	1B 42 33 33
34	027 066 051 052	1B 42 33 34
35	027 066 051 053	1B 42 33 35
36	027 066 051 054	1B 42 33 36
37	027 066 051 055	1B 42 33 37
38	027 066 051 056	1B 42 33 38
39	027 066 051 057	1B 42 33 39
40	027 066 052 048	1B 42 34 30
41	027 066 052 049	1B 42 34 31
42	027 066 052 050	1B 42 34 32

Default is 42 characters per. line.

Print Format:

ESC C n 　　　- Print Format.

n can be 0 (single-sided) or 1 (interpoint).

Print Format	ASCII	HEX
Single-sided	027 067 048	1B 43 30
Double-sided	027 067 049	1B 43 31

Default is Double-sided.

Page layout:

ESC H n 　　　- Page Layout.

n can be 0 (normal) or 1 (Z-fold printing).

Page Layout	ASCII	HEX
Normal	027 072 048	1B 48 30
Z-fold	027 072 049	1B 48 31

Default is Normal Page Layout.

Page 1 up or down:

ESC I n 　　　- Page 1 up/down.

n can be 0 (up) or 1 (down).

Page 1	ASCII	HEX
Up	027 073 048	1B 49 30
Down	027 073 049	1B 49 31

Default is Page 1 Up.

6 / 8 dot Braille:

ESC J n 　　　- 6 / 8 dot Braille.

n can be 0 (6) or 1 (8 dot Braille).

Braille	ASCII	HEX
6 dot	027 074 048	1B 4A 30
8 dot	027 074 049	1B 4A 31

Default is 6 dot Braille.

Line spacing:

ESC M nn 　　　- Line Spacing.

nn can be from 0 to 16 step.

Step	mm	ASCII	HEX
0	0.0000	027 077 048 048	1B 4D 30 30
1	0.3175	027 077 048 049	1B 4D 30 31
2	0.6350	027 077 048 050	1B 4D 30 32
3	0.9525	027 077 048 051	1B 4D 30 33
4	1.2700	027 077 048 052	1B 4D 30 34
5	1.5875	027 077 048 053	1B 4D 30 35
6	1.9050	027 077 048 054	1B 4D 30 36
7	2.2225	027 077 048 055	1B 4D 30 37
8	2.5400	027 077 048 056	1B 4D 30 38
9	2.8575	027 077 048 057	1B 4D 30 39
10	3.1750	027 077 049 048	1B 4D 31 30
11	3.4925	027 077 049 049	1B 4D 31 31
12	3.8100	027 077 049 050	1B 4D 31 32
13	4.1275	027 077 049 051	1B 4D 31 33
14	4.4450	027 077 049 052	1B 4D 31 34
15	4.7625	027 077 049 053	1B 4D 31 35
16	5.0800	027 077 049 054	1B 4D 31 36

16 steps are the standard line spacing (5.08 mm or 0.2"), 8 is the setting for making dots continuously down the sheet (line spacing is 2.54 mm or 0.1"). Note that if the setting is less than 7, and there is text on each line, the dots might get damaged in the printing process.

Default is 16 steps.

Single / Double Line Spacing:

ESC N n 　　　- Line Single/Double.

n can be 0 (single) or 1 (double) line spacing

Line Spacing	ASCII	HEX
Single	027 078 048	1B 4E 30
Double	027 078 049	1B 4E 31

The function "Single or Double line spacing" will double the given line spacing. If, e.g. the current line spacing is 13 steps (4.1275 mm), selecting Double line spacing will increase it to 26 steps (8.2550 mm).

Default is Single Line Spacing.

Page Adjust:

ESC R n   - Page adjust.
n can be from 0 to 9 lines.

Please keep in mind that there is a difference in the terms "page length" and "sheet length". By page length we mean the number of lines of text to be printed on a page, and by sheet length we mean the physical size of a sheet of paper in inches.
The number of lines which can be printed on a page, is dependent on whether 6 or 8 dot Braille is used, whether what kind of line spacing is in use, and whether page length is set for Maximum, Maximum-1 or up to -9.

Omitted Lines	ASCII	HEX
0	027 082 048	1B 52 30
1	027 082 049	1B 52 31
2	027 082 050	1B 52 32
3	027 082 051	1B 52 33
4	027 082 052	1B 52 34
5	027 082 053	1B 52 35
6	027 082 054	1B 52 36
7	027 082 055	1B 52 37
8	027 082 056	1B 52 38
9	027 082 057	1B 52 39

This setting will decrease the number of lines on each page from 1 to 9, (depending on the selected number). If, the maximum number of lines could be 29, and the setting "Max-4" is selected, the resulting number of lines will be 25. On interpoint, this function will center the text vertically on the page and keep the top and bottom margin approximately equal. On single sided, it will keep the top margin constant and only the bottom margin will vary.

Default is Maximum number of lines per page.

Form Feed Mode:

ESC S n - Form Feed Mode.
n can be 0 (no form feed) or 1 (normal form feed)

Form Feed Mode	ASCII	HEX
No Form Feed	027 083 048	1B 53 30
Normal Form Feed	027 083 049	1B 53 31

Default is Normal Form Feed.

Page Margin:

ESC T nn   - Page margin.
nn can be from 0 to 20 step.

Step	mm	ASCII	HEX
0	0.0000	027 084 048 048	1B 54 30 30
1	0.6350	027 084 048 049	1B 54 30 31
2	1.2700	027 084 048 050	1B 54 30 32
3	1.9050	027 084 048 051	1B 54 30 33
4	2.5400	027 084 048 052	1B 54 30 34
5	3.1750	027 084 048 053	1B 54 30 35
6	3.8100	027 084 048 054	1B 54 30 36
7	4.4450	027 084 048 055	1B 54 30 37
8	5.0800	027 084 048 056	1B 54 30 38
9	5.7150	027 084 048 057	1B 54 30 39
10	6.3500	027 084 049 048	1B 54 31 30
11	6.9850	027 084 049 049	1B 54 31 31
12	7.6200	027 084 049 050	1B 54 31 32
13	8.2550	027 084 049 051	1B 54 31 33
14	8.8900	027 084 049 052	1B 54 31 34
15	9.5250	027 084 049 053	1B 54 31 35
16	10.160	027 084 049 054	1B 54 31 36
17	10.795	027 084 049 055	1B 54 31 37
18	11.430	027 084 049 056	1B 54 31 38
19	12.065	027 084 049 057	1B 54 31 39
20	12.700	027 084 050 048	1B 54 32 30

The "Page Margin" function will adjust the page margin in steps from 0 to 20. The standard setting is 8, (8 = normal). The page margin will give different effect when used on single-sided, compared with double-sided. On double-sided printing, one step is equal to 0.6350 mm, and the text will be centered vertically on the page. If, e.g. a page margin on 6 steps is selected, the printer will print closer to the edges of the paper, and if a page margin on 20 steps is selected, it will give a larger page margin. This will affect both top and bottom margins, i.e. page margin.
On single-sided printing, however, the page margin will actually work as a top margin. (Note! The page layout must be set to normal). One step is equal to 0.6350 mm. It will "push" the text downwards the sheet. If the text reaches the bottom, (meaning that there will not be enough space on this page for the last line), this line will wrap over to the next page.

Default is 8 steps.

Software Reset:

ESC 0   - Soft Reset

This command is used to reset the printer. It is used from the computer and has the same effect as pushing the key RESET PRINTER. Software Reset should be used with care: If the printer has not finished printing, the rest of the text in the buffer will be lost, and a new paper position will be assumed by the printer. Because of this, the command is only to be used after a software form feed has been executed, and the printer has stopped completely.

	ASCII	HEX
Software Reset	027 048	1B 30

Software Form Feed:

ESC 1   - Soft Form Feed

This command is to be used after all text in one volume has been transmitted to the printer. If text corresponding to less than two pages, or text with an odd number of pages is received, and not followed by FF on the last page, the printer will wait for more text or FF. This means that the last page may be stuck in the printer. This is due to the double-sided printing of the printer. This command makes the printer to start printing the rest of the text. After this the paper position will be the same as it had when this volume of text was started. Then page no. 1 on the next volume will start out correctly. There will always be at least one blank sheet of paper between the volumes of text when finishing each volume with a Software Form Feed.

	ASCII	HEX
Software Form Feed	027 049	1B 31

Print Printer ID:

ESC 4   - Adding the Printer ID

When you have several Braille printers producing the same Braille material, it is not always easy to later figure out what printer made which book. It is therefore possible to add a printer ID to the last line on a sheet. There is no matter where the escape-sequence is placed on the page, the ID will always be printed on the last line. Meaning, if you send this escape-sequence on the last page of every print job, you will get the printer ID printed on the last line on the last page.

The Printer ID is a 5 digit code that has to be set in the menu choice: *Main menu - Printer Setup - Printer ID*. See figure below:
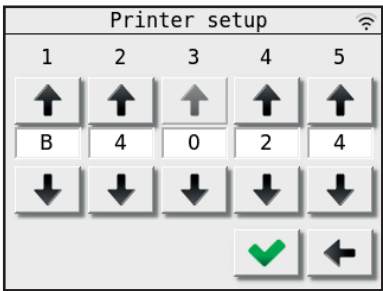
7.6   Warranty

This product left the factory in a good working condition in accordance with the technical specifications and carries a warranty of 3 years on parts valid from the date of delivery from Braillo Norway A/S.

Braillo will offer an additional 1 year to the standard warranty by using Braillo/American Thermoform (ATC) braille paper with your embosser. The use of poor quality braille paper often causes excessive wear and tear on an embosser, which causes parts to fail prematurely. Using Braillo/ATC's specially formulated braille paper will help ensure these risks are minimized.

This brings the total warranty to 4 years, or up to 10,700 hours. This amounts to up to 20.8 million braille pages.

The warranty includes:
- Replacement of defect part(s)
- Shipping cost for the replaced part(s)

The warranty excludes:
- On-site part replacement (labour, travelling and living expenses for a service engineer)
- Shipping costs for sending the faulty unit back to Braillo Norway A/S (see below).
- Altered product (except as authorized by Braillo Norway A/S) or product not installed or maintained in accordance with Braillo Norway's instructions.
- Customs and duties
- Incidents involving Force Major (for example flooding, earth quake etc. damaging the product).

Should a replacement part be required, please send an email to service@braillo.com with the following information:

- What part is defect? Add picture(s) to describe the part if you are not sure on the correct part number or name.
- What is the problem? Describe so detailed and accurate as possible.
- The printer model and serial number
- The hour and sheet counter
- Contact person with email and phone number

When Braillo receives your email, we will get back to you and the parts will be shipped as soon as possible.

What to do with the defective part(s):

If a communication has been made to our service department, and an approval has been given, it will not be necessary to return the part(s) to Braillo Norway A/S. In all other cases, the part(s) must be returned to Braillo Norway A/S as soon as possible. If the part(s) has/have not been received by Braillo Norway A/S within 2 months from the date of issuing the "Warranty request form", this is no longer regarded as a warranty matter and an invoice will be issued and sent.

7.7 Legal notices

Liability disclaimer

Braillo Norway AS reserves the right to make changes without further notice to the product to improve reliability, function or design. Braillo Norway AS does not assume any liability arising out of use of the product described herein.

All information contained in this document represents information on the product at the time of publication. Braillo Norway AS reserves the right to make corrections, enhancements and other changes to this document without notice. While Braillo Norway AS has used reasonable care in preparing the information included in this document, it may contain technical or other inaccuracies, omissions and typographical errors. Please contact us should you find something that you feel needs correction or explanation.

RoHS and REACH statement

Braillo Norway AS products meet the requirements of Directive 2011/65/EU of the European Parliament and of the Council on the Restriction of Hazardous Substances (RoHS 2) and the requirements of the REACH regulation (EC 1907/2006) on Registration, Evaluation, Authorization and Restriction of Chemicals.

Copyright notice

7.8   Address and phone number

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