BRAILLO 650 SW2.1

User's Guide

BRAILLO ●

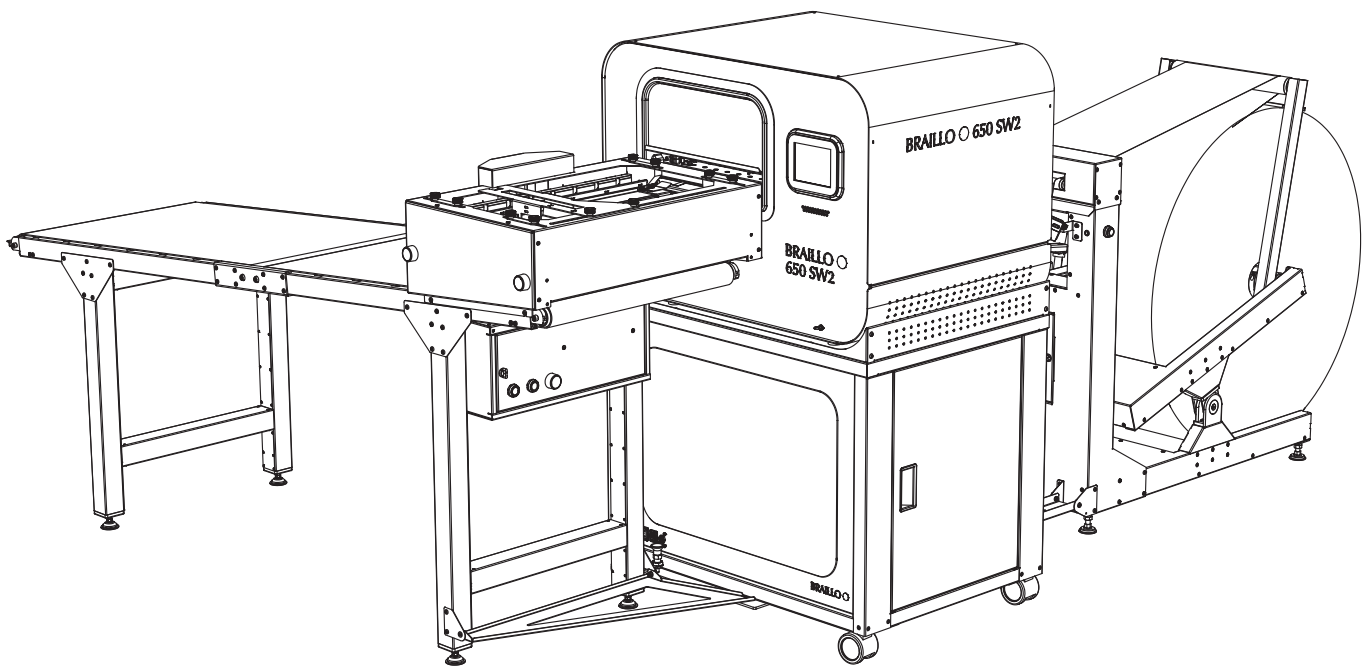# BRAILLO 🔴

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

TABLE OF CONTENTS

1.   PRINTER BASIC

Thank you for your purchase of the Braillo 650 SW2.1. Please read this manual carefully before installing and operating this printer.

Key features
- Prints interpoint, both sides of the sheet are printed simultaneously
- Specially designed to print 4 pages/sheet (like e.g. newspapers, magazines)
- Prints 650 characters per second
- 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.
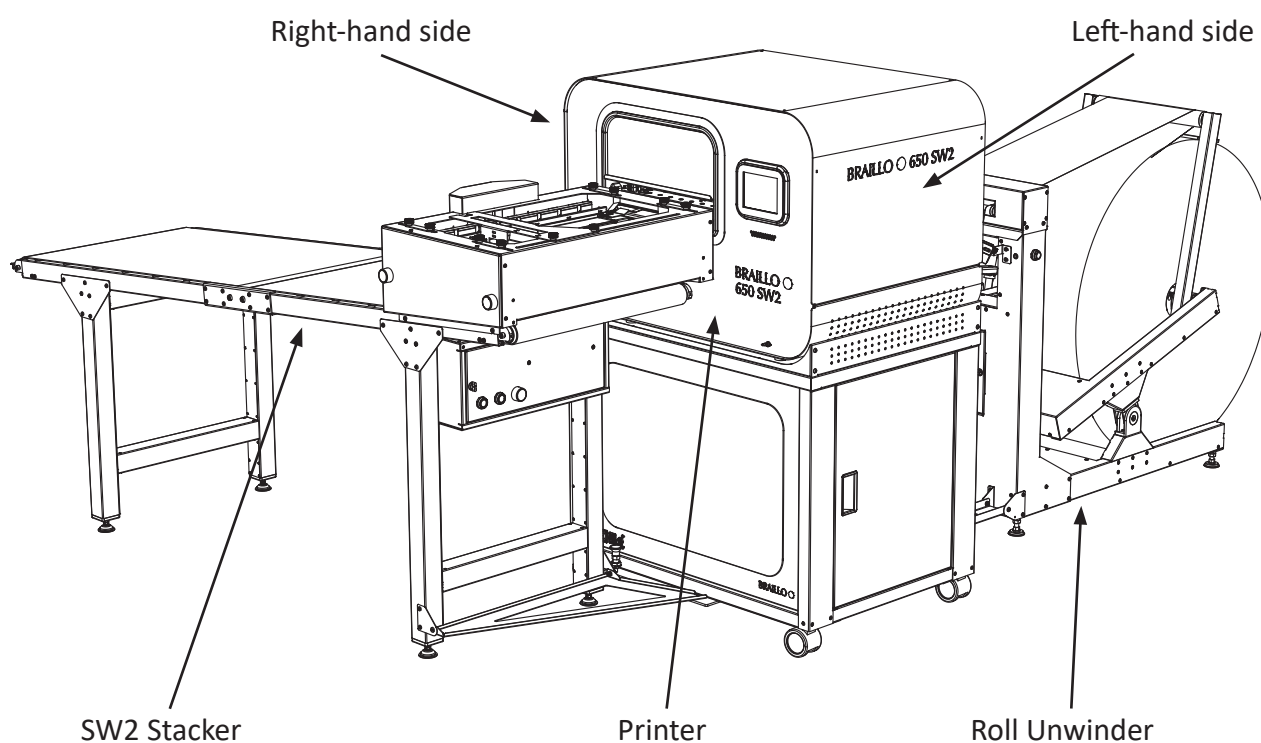
Paper travel, schematic view
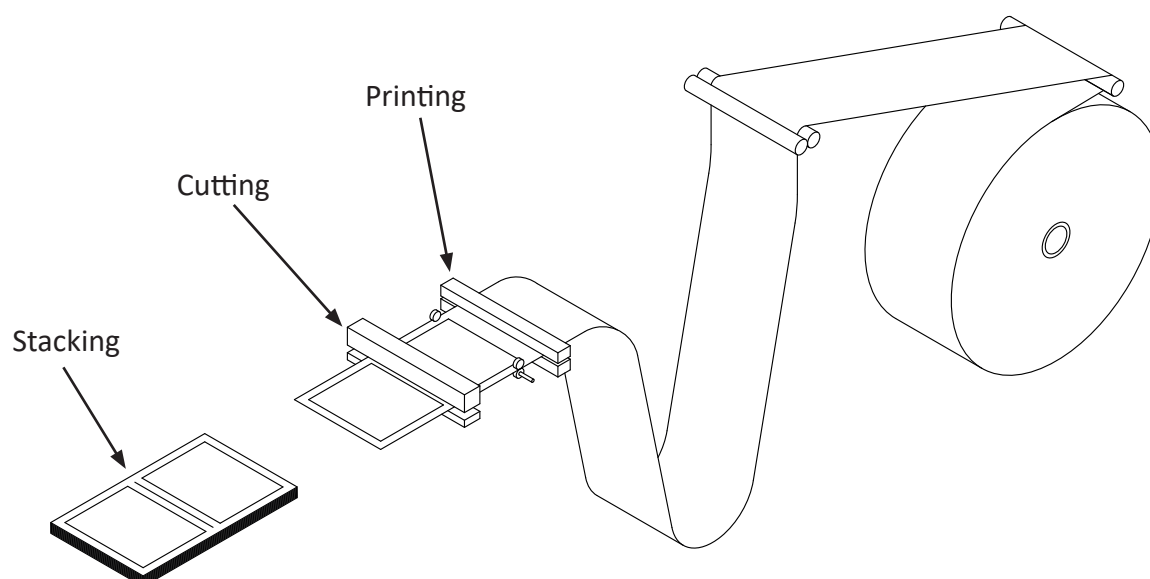
2.   INSTALLATION

Space:
The minimum space required for the Braillo 650 SW2.1 is approximately 4.8 m x 3.0 m (16 x 10 feet).
It is required at least 1.5 m free space behind the Roll unwinder so that the paper roll can be replaced.

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.

Viewed from above

2.592 m

3.336 m
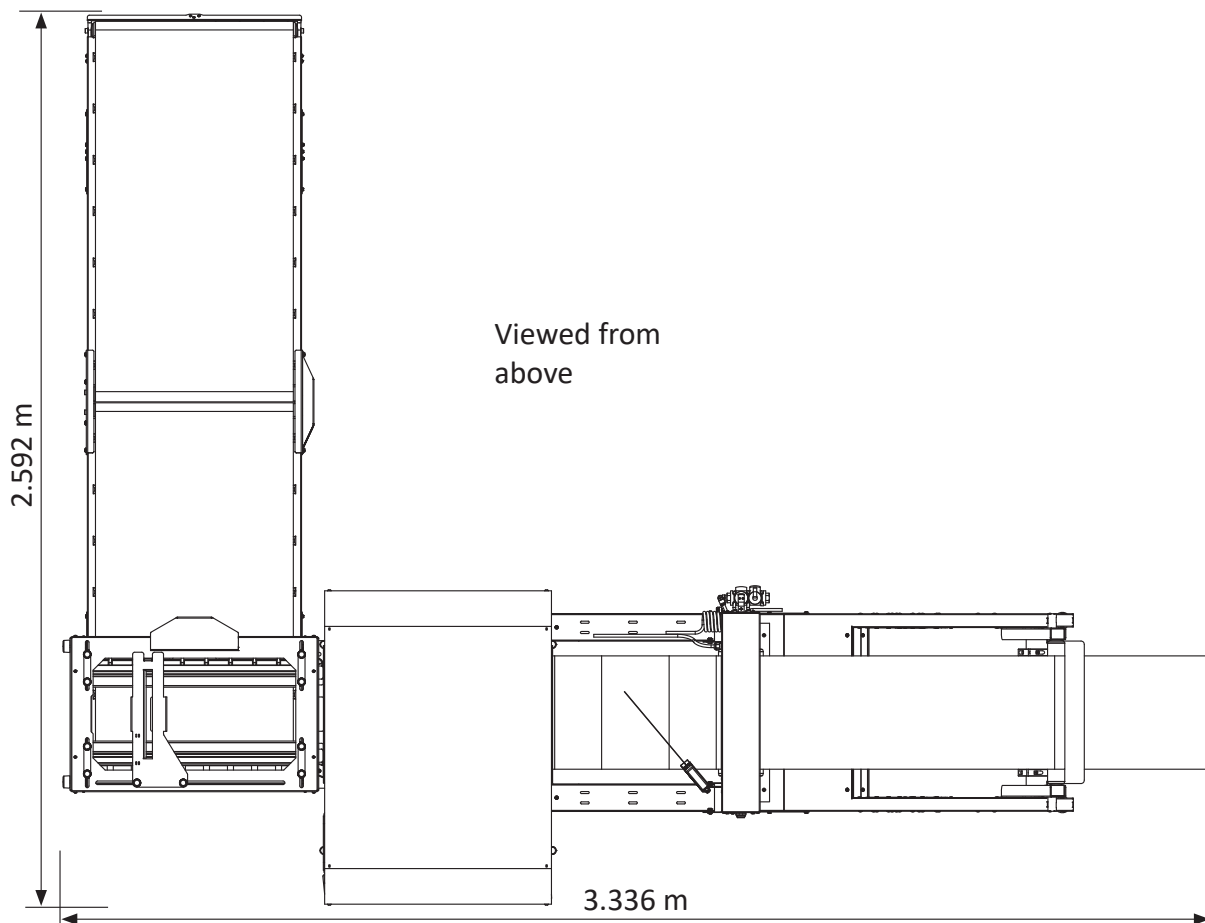
2.1   Unpacking

Unpacking and installation can be done by the user.
Any kind of lifting of the printer must always be done from the base 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.
The total shipment consists of three pallets, make sure that the following items are enclosed.

Together with the printer:
- Power cable for the printer
- Data cable, USB
- Data cable, ethernet
- User's guide
- Tool kit for service and maintenance
- Test and packing list

Together with the Roll Unwinder
- Roll with paper sample
- Friction bar with correction roll
- Guides for the friction bar
- Shaft for the paper roll
- Compressor

The SW2 Stacker:
- 2 pcs. conveyor belts
- Front leg
- Rear leg
- Stacking unit

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 boxes are stored for possible later use.

2.2   Add the wheels to the printer

Place the wheels under the printer, one in each corner. This can be done simplest by carefully sliding the printer on the pallet so three of the corners comes outside the pallet. Fasten the wheels. Then slide the printer so the last corner comes outside the pallet. Fasten the last wheel.
Make sure you are at least two persons while doing this!

Note! Do not lay the printer on the side to mount the wheels!

Remove the wooden studs from the packaging so the surface is clean like this
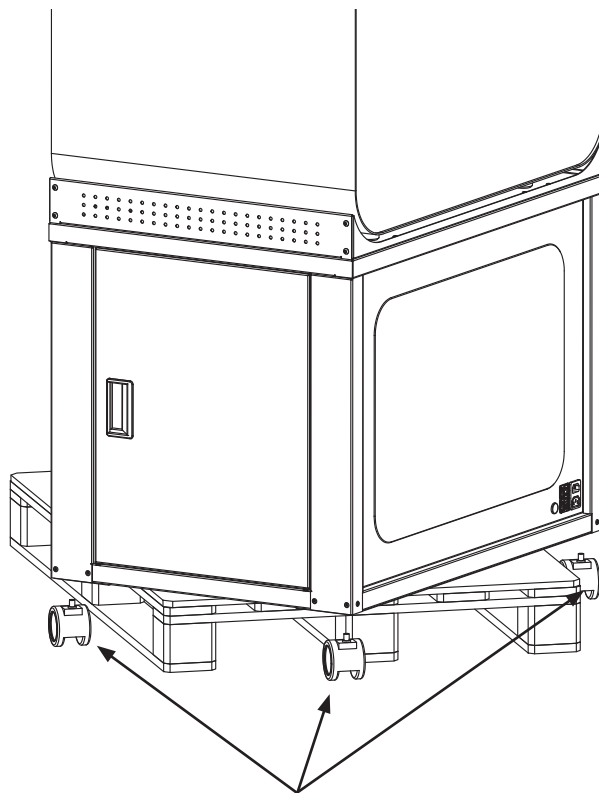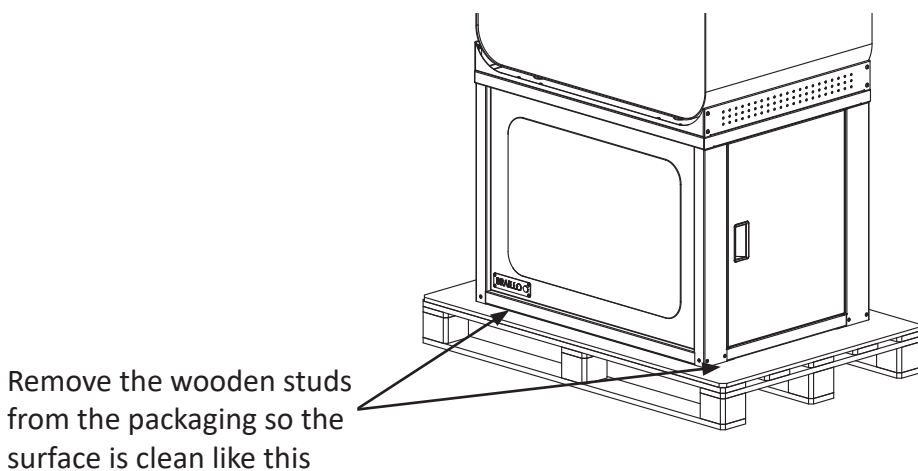
Slide the printer so three of the corners comes out from the pallet like shown above.
Add the wheels on the three available corners.
Then slide the printer carefully so the last corner comes outside the pallet.
Add the last wheel.
Lift the printer carefully down to the floor.

2.3   Add the connection plates under the printer

Place the connection plates under the printer as shown in the figure below.

Note! Do not lay the printer on the side to mount the plates!

SW2 Stacker side
(Paper output side)

Roll Unwinder side
(Paper input side)
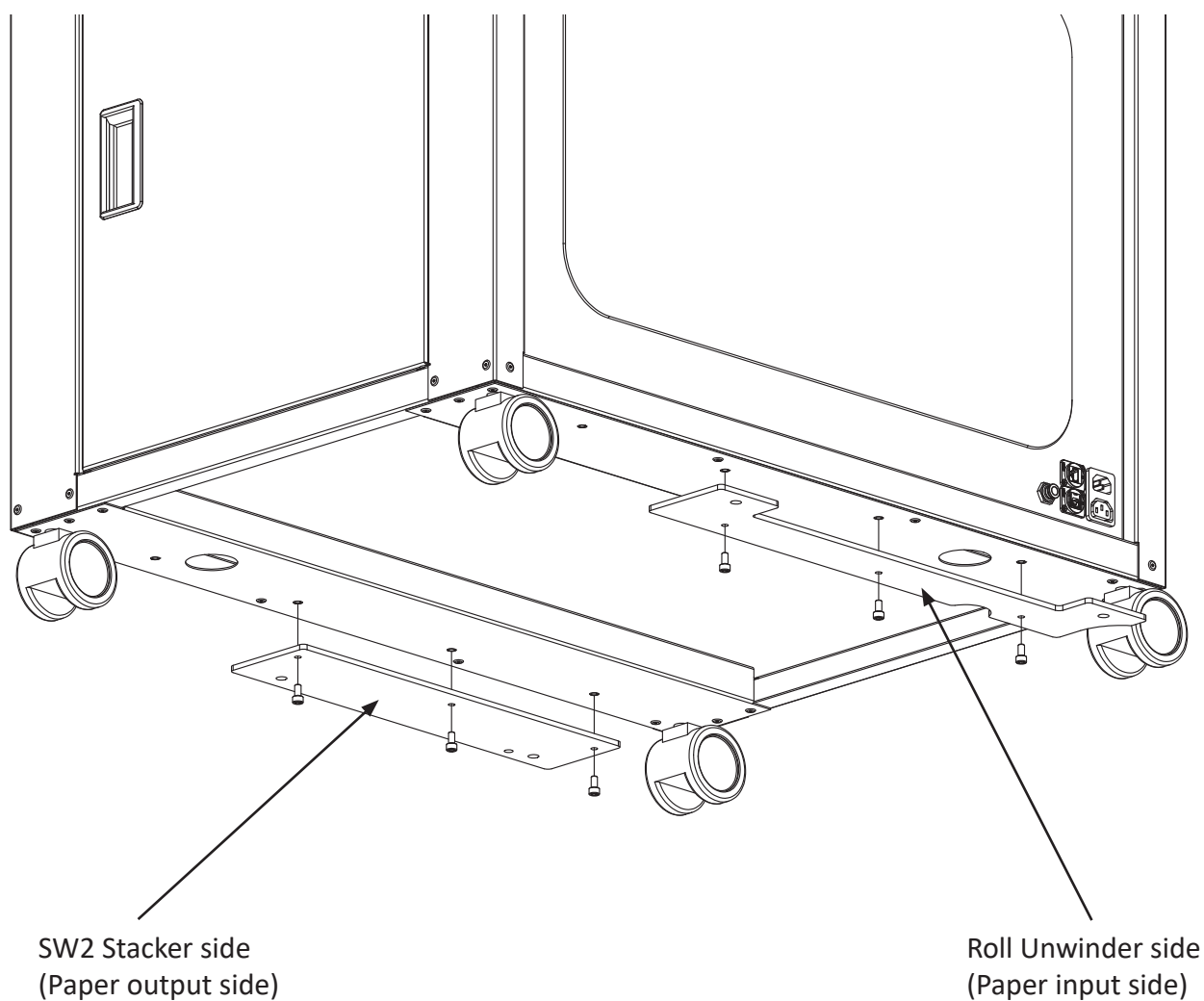
2.4   Assemble the Roll Unwinder

Fasten the laser paper sensor, and connect the cable. Then fasten the guides for the friction bar.

Fasten the guides
for the friction bar

Fasten the laser paper sensor
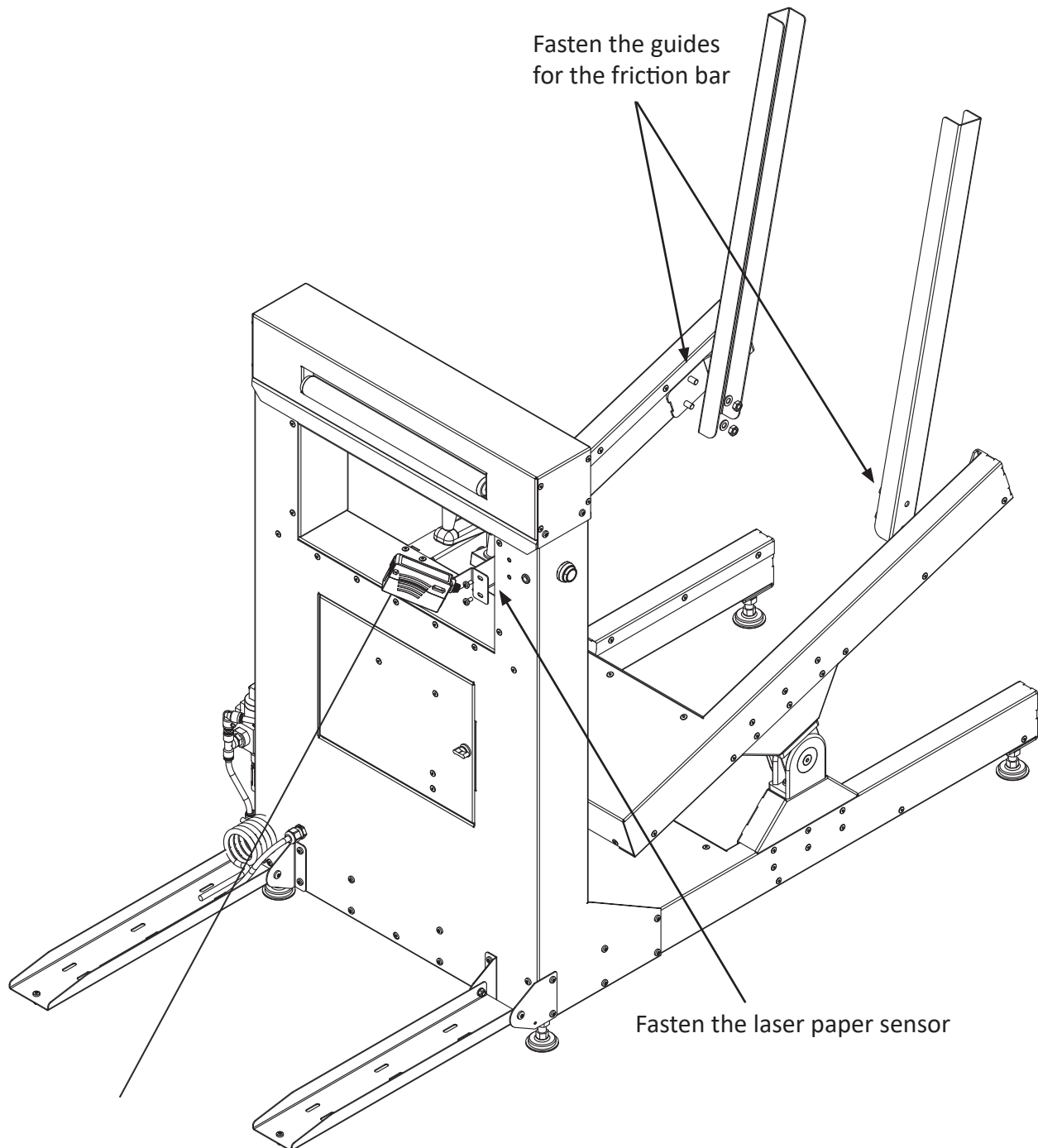
2.5   Assemble the SW2 Stacker

Because of it's size, the SW2 Stacker is disasseblied during shipping.
The assembling is done in four steps:

1. Mount the two conveyor belts together to form one long belt
2. Mount the front and rear leg
3. Lift it up and place it on it's legs and put on the belt motor cable cover
4. Fasten the stacking unit

Step 1. Join the belts
Unscrew the transport latches and place the two belts upside down on a flat, clean surface like shown in the figure below.
Place the end on each belt that has a cable coming out from the roll towards each other.
Fasten the latches, on the cable side, pull the connectors/cables through the latch before putting the screws in.

Front end

Motor cables

Full belt sensor

Fastening holes for
the stacking unit

Latch for the cable side

Fasten the latch with the 4 inner screws

Fasten the latch with 8 screws

Latch for non-cable side
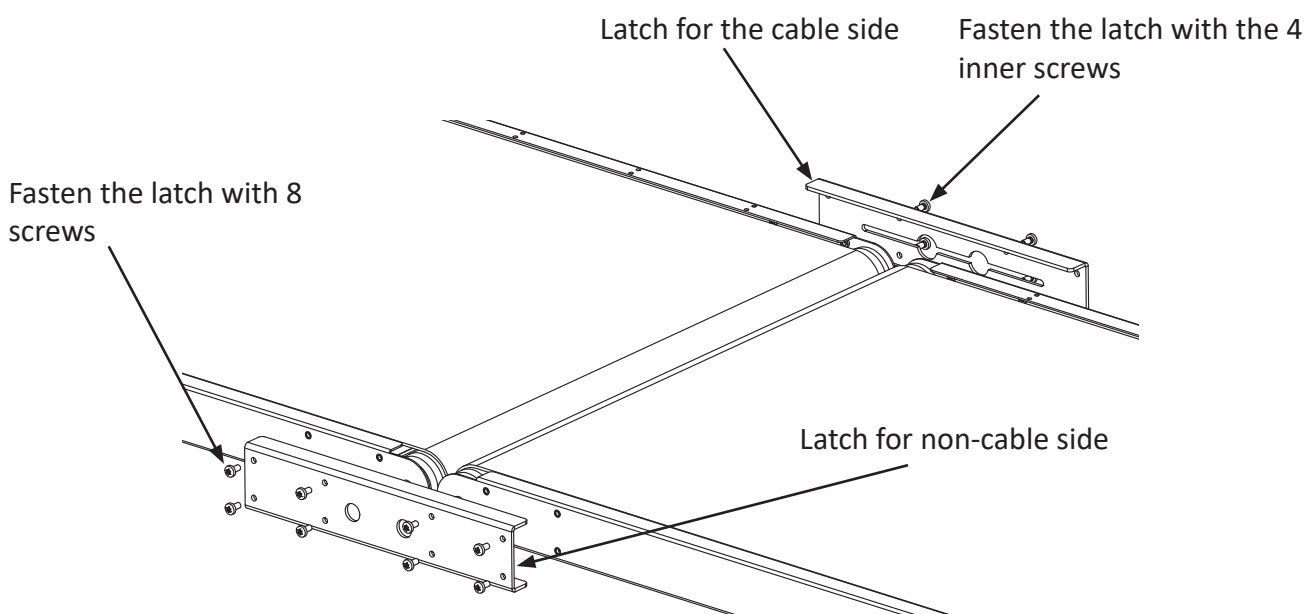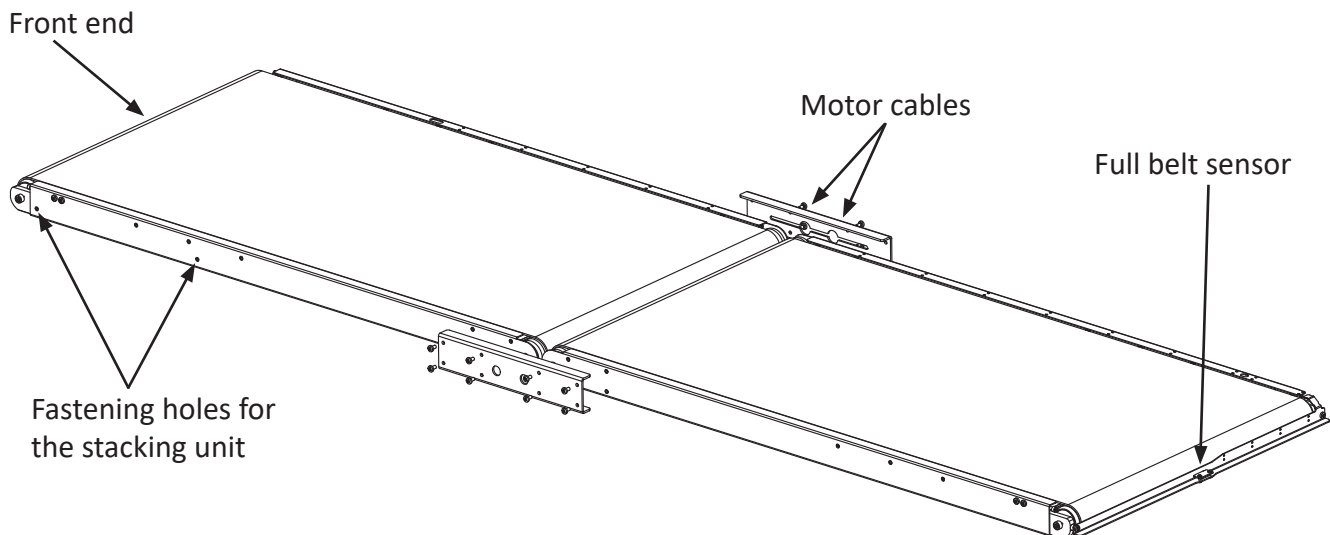
Step 2. Mount the legs.

Fasten the front leg so the door is facing the front end like shown in the figure below. When fastening the rear leg, make sure it is leaning the same way as the front leg.

Front end
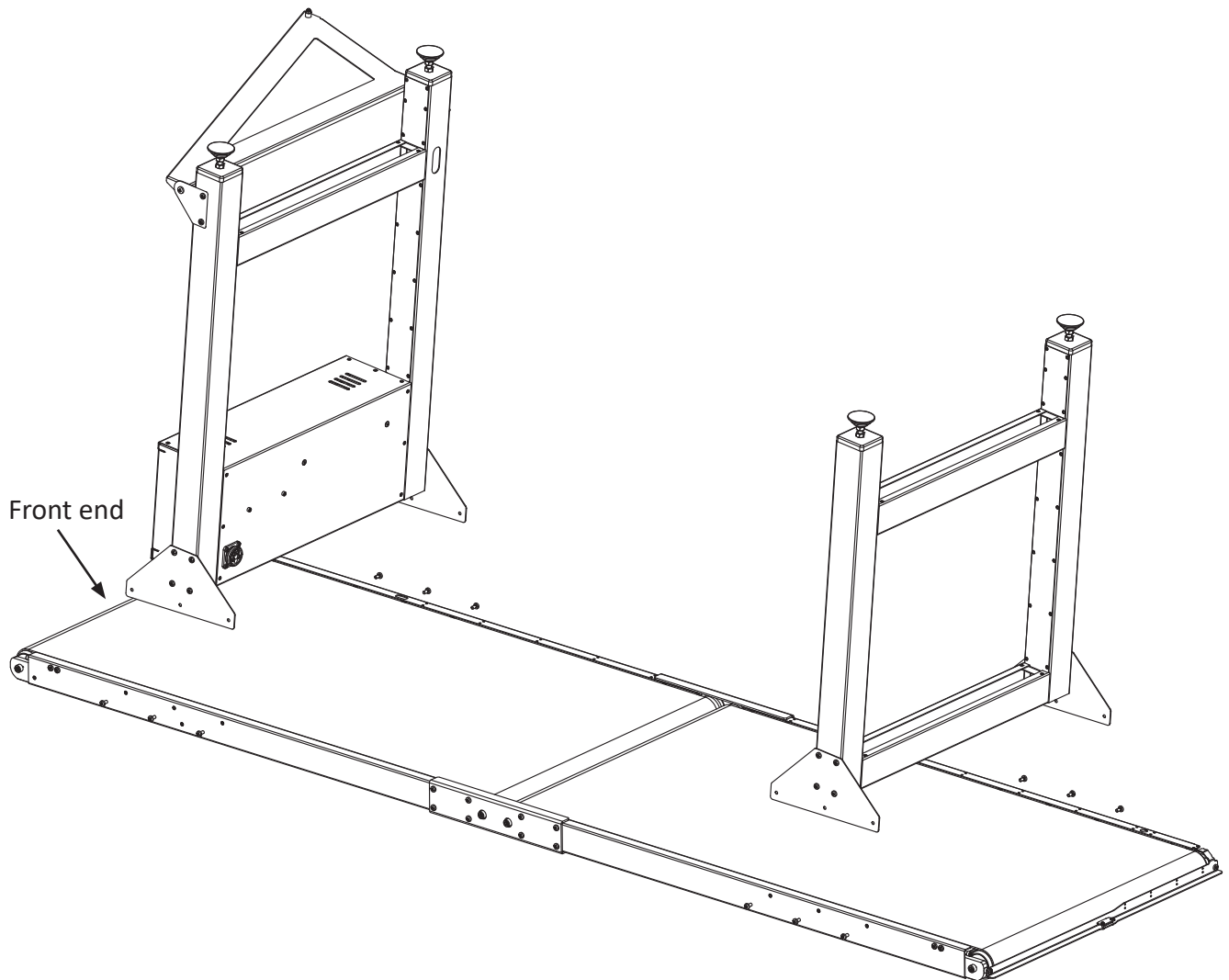
Step 3. Add the belt motor cable cover.

Lift the conveyor belt carefully up, turn it over and place it on it's legs.
Connect the cables in the junction between the two belts and fasten the belt motor cable cover like shown in the figure below.

Note! All the excessive cables must be layed so they will not be damaged by the screws or cover!
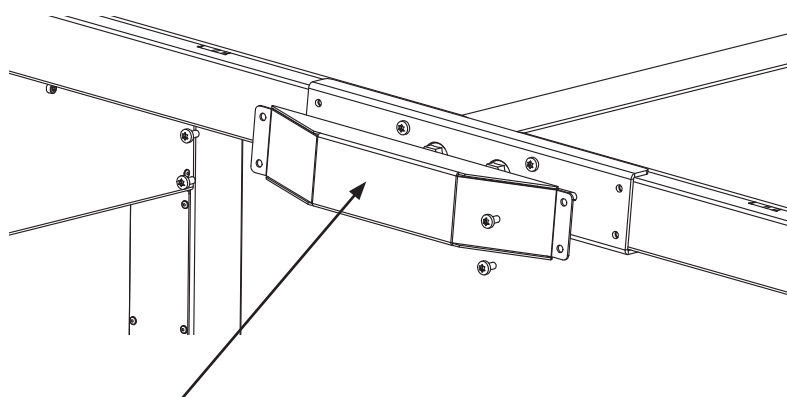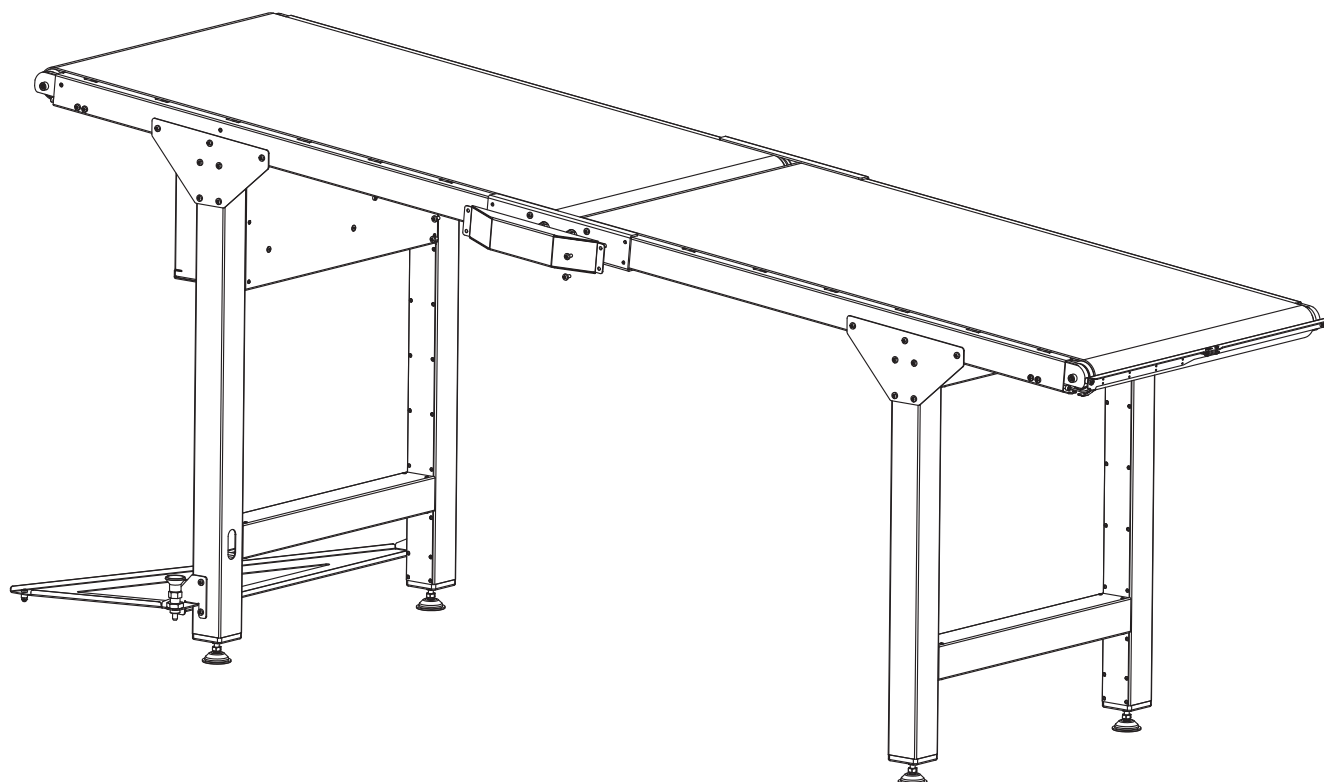
Belt motor cable cover

Step 4. Add the stacking unit.

Place the stacking unit at the front end of the conveyor belt, as shown in the figure below. Thighten the four screws.

Connect the compressed air connector and the electrical connectors.

Plug in the electrical connectors

Plug in the compressed air connector
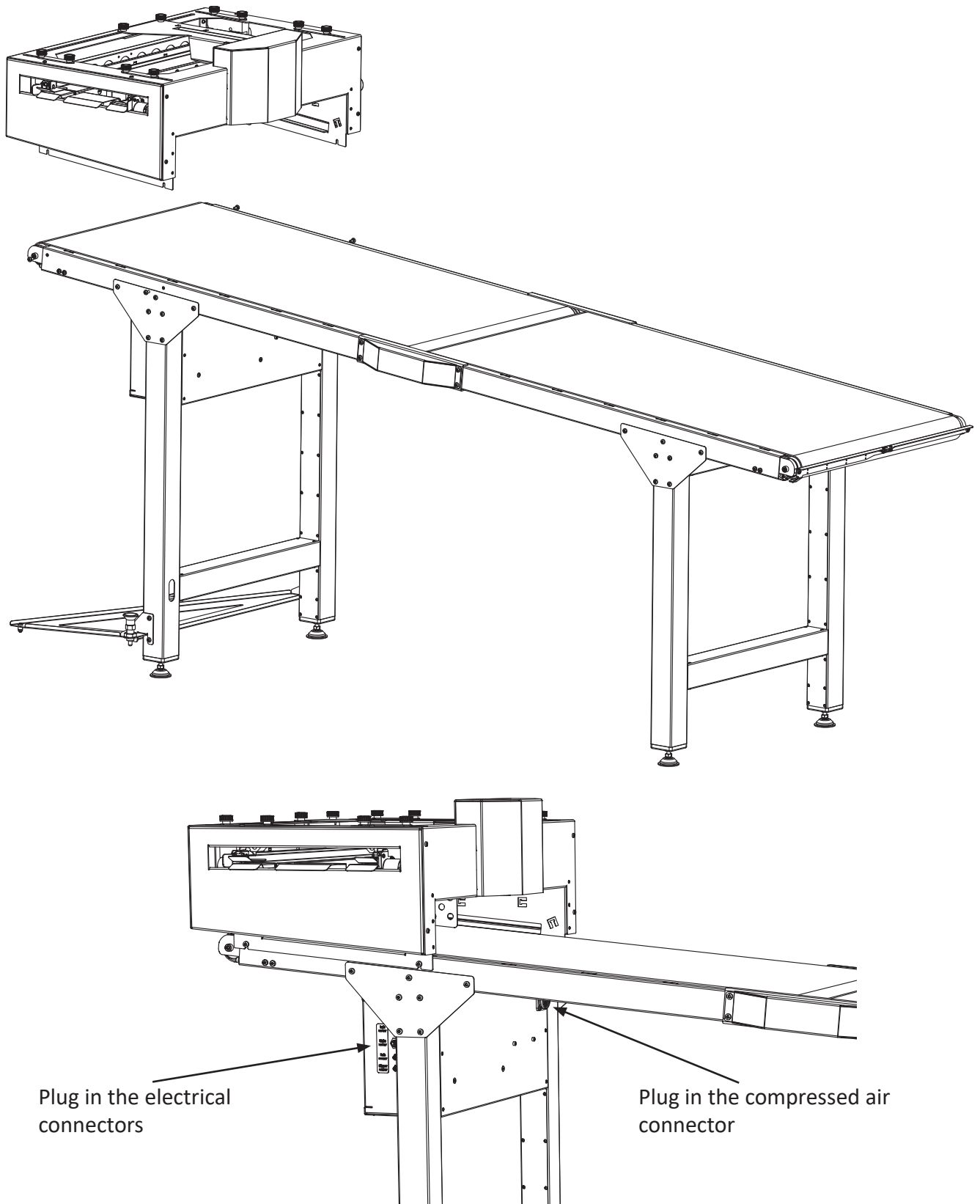
2.6   Place the units

To position the SW2 Stacker and the Roll Unwinder correctly in relation to the printer, there are guides on the stacker and RU that will fit into holes on the printer. See figures below and on next page.
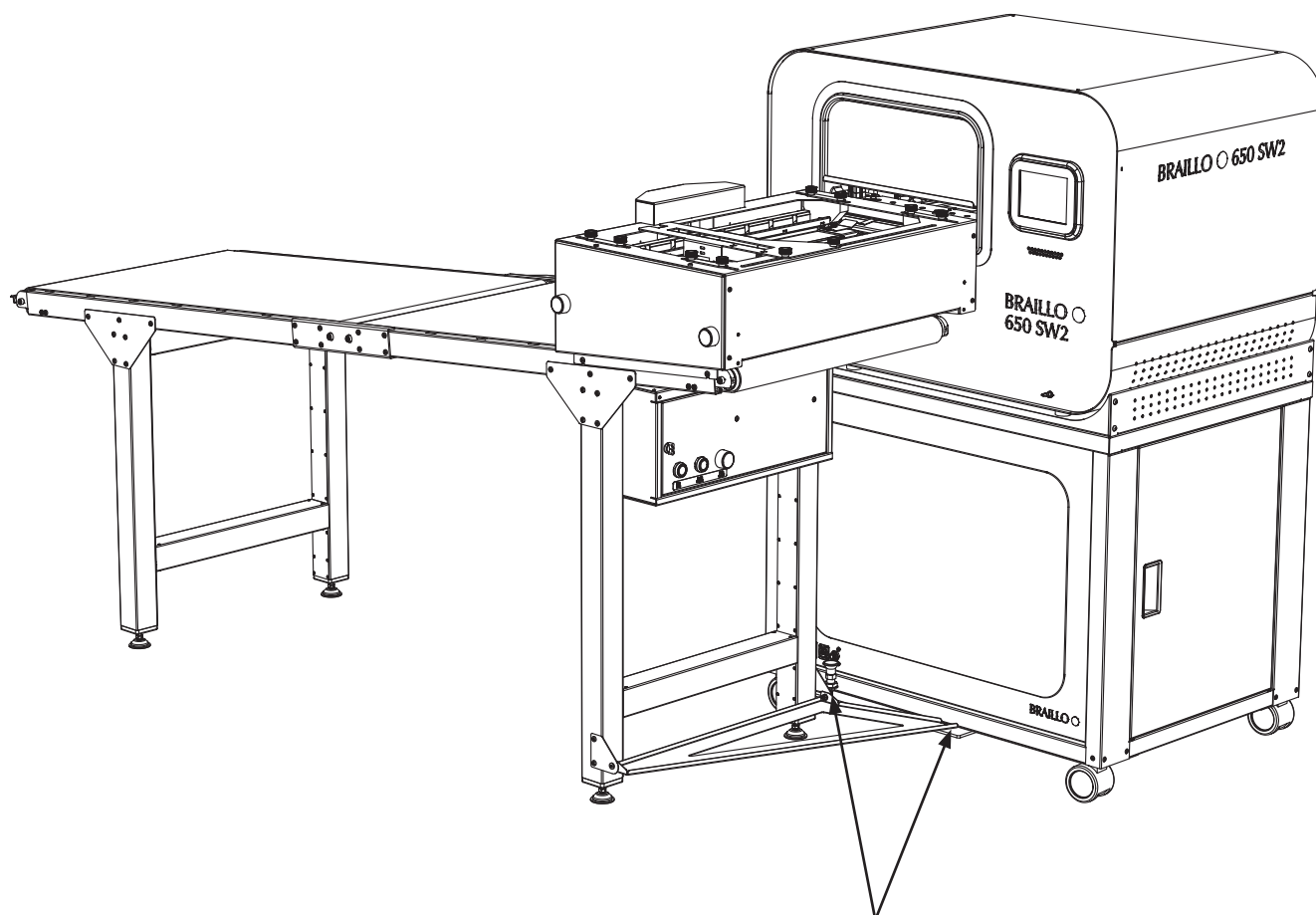
Place the SW2 Stacker so the guiding pins will fit into the holes in the plate on the printer
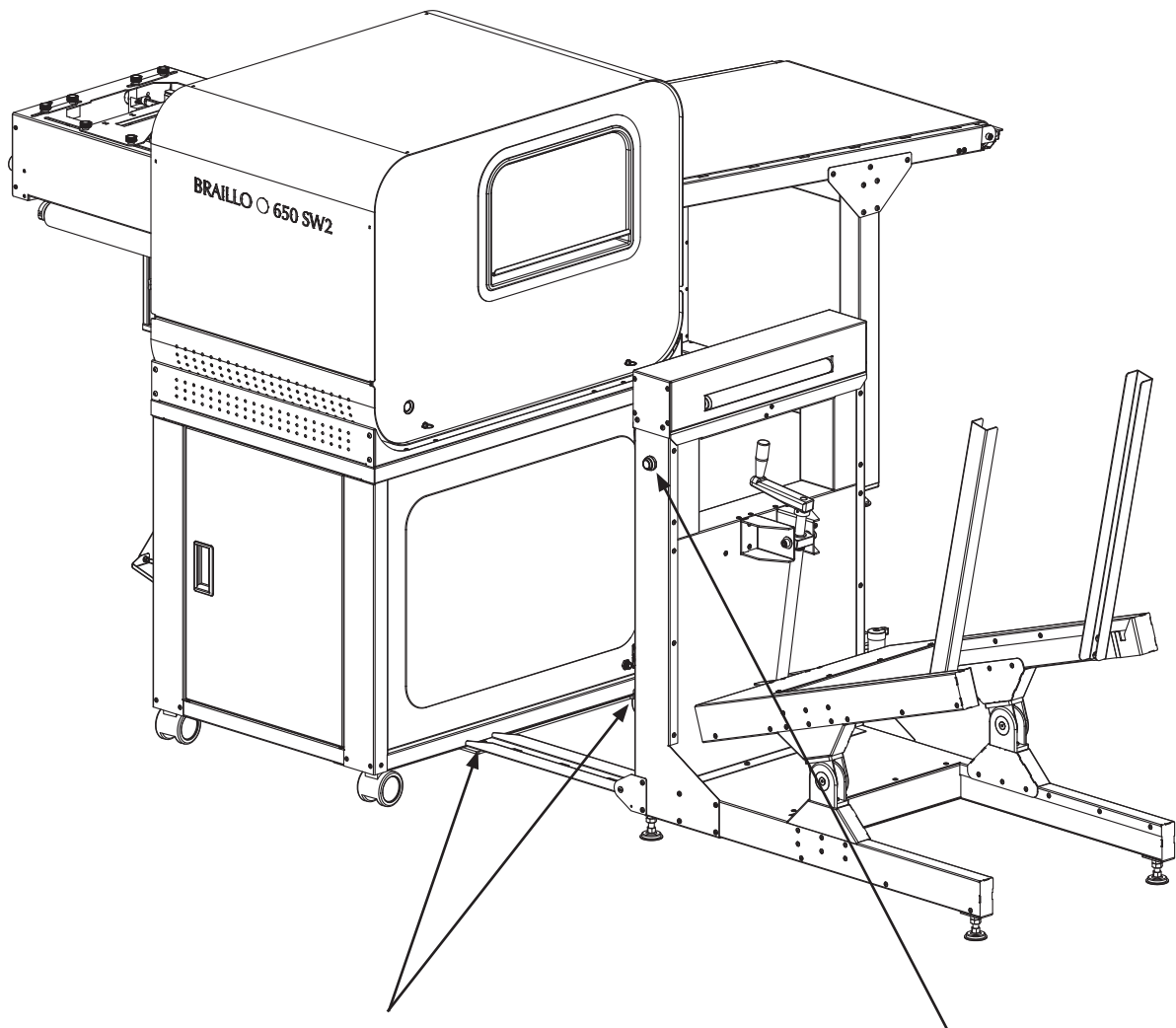
Place the Roll Unwinder so the guiding pins will fit into the holes in the plate on the printer

The Power switch can be left on, as the printer will also control the power to the Roll Unwinder

2.7   Connect the units together

Plug the power cable from the RU into the corresponding outlet on the printer.
Put the compressed air tube into the fitting on the printer.

Push the compressed air
tube into the fitting

Plug the power cable from the
RU here
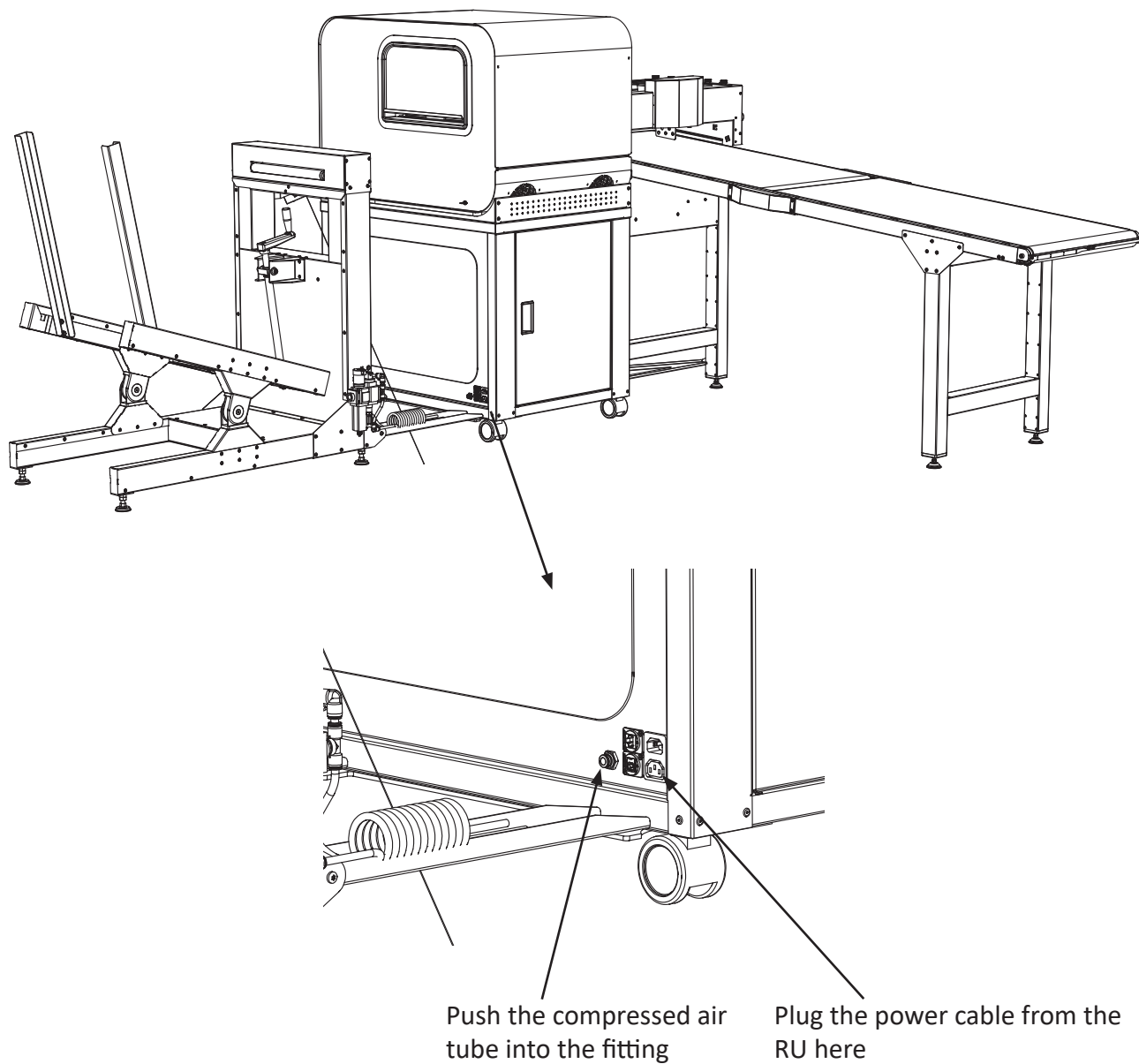
On the SW2 Stacker. plug in:
- Compressed air supply tube
- Communication cable
- Power cable
- Compressed air connector

Compressed air
connector

Power
cable

Communication
cable

Compressed air
supply
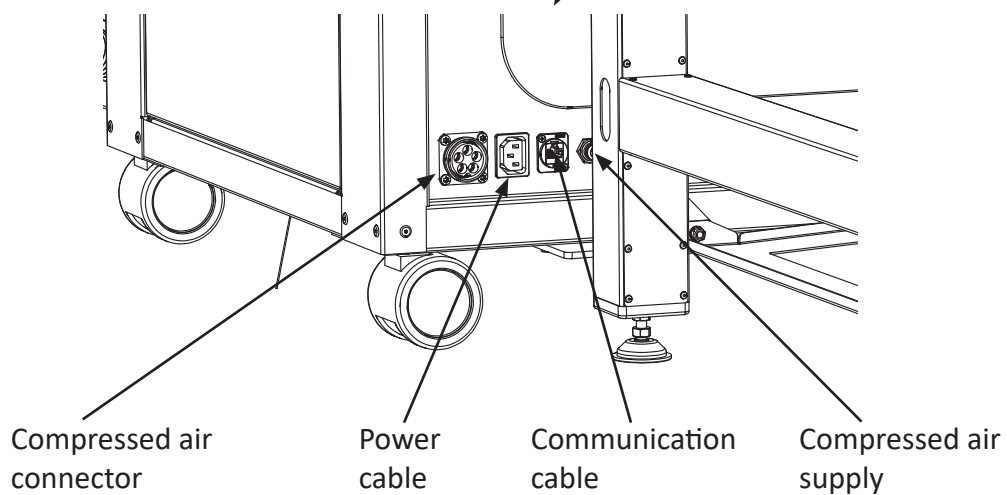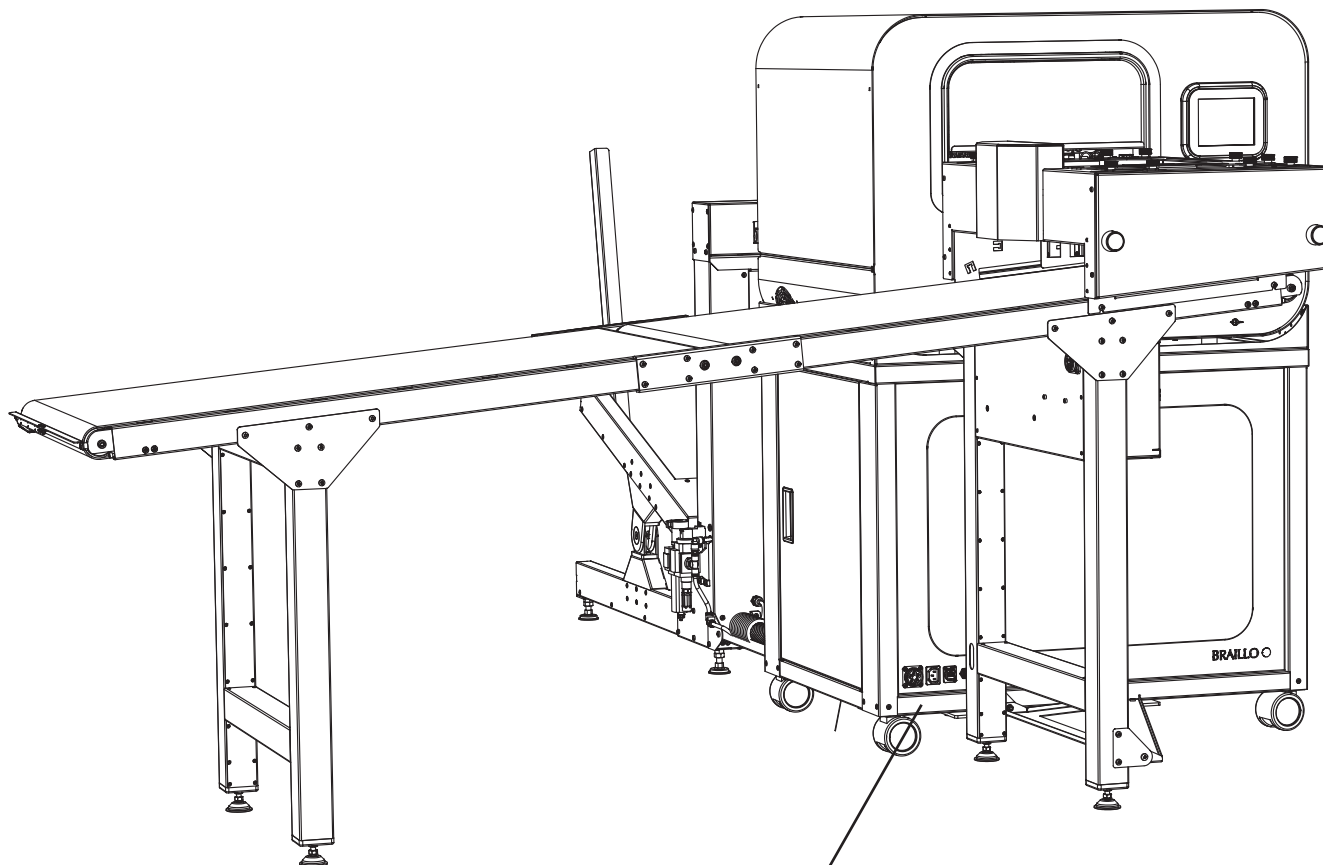
2.8   Connect the printer to the mains and computer

Plug the mains cable into the inlet as shown in the figure below.

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!

The connection to the computer can be done in three ways, either by Ethernet, USB, or WLAN.

For USB and Ethernet, the connections are placed on the side of the printer together with the power inlet.
The ethernet input is a regular RJ45 connector, and the USB input is a regular USB type B 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 COM-PUTER' on page 28.

Ethernet connection RJ45

Mains inlet

USB connection type B
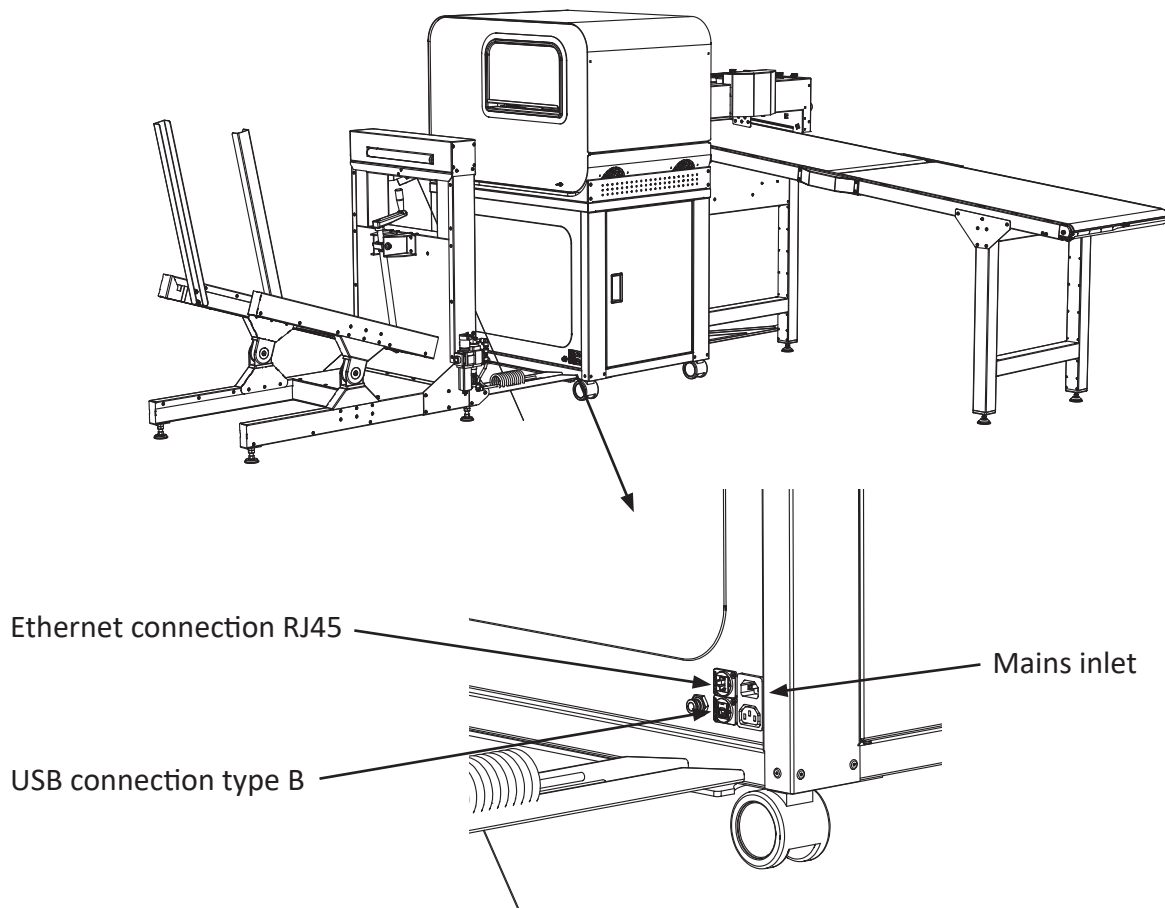
2.9   Compressed air

This equipment requires clean, compressed air, minimum 7.0 bar @ 100 l/min., and max. temperature 50° C to the regulator to function. To make this compressed air, you will need to use some sort of compressor. No matter what kind of compressor is chosen, there are some important things to remember.

⚠ **First, please read the enclosed instruction manual for the compressor!**

There are many different compressor types on the market, and this chapter will not deal with a particular compressor, but will discuss the topic more in general. Please see the figure below for an example, but refer to your compressor manual for the specific information.

Normally a compressor have two pressure gauges and a pressure regulator fitted. The first gauge is measuring the tank pressure (before the regulator) and the second gauge is measuring the output pressure (after the regulator). The pressure at the compressor outlet must be adjusted to approx. seven bar. This can be controlled at the output pressure gauge.

To have long and trouble free operation, the air must be filtered and free from oil and water. When air is compressed in a compressor, the air temperature is rising. So the air entering the tank will be hot. When the air is cooling down, the humidity in the air will condensate inside the tank. So the warmer and more humid the air entering the compressor is, the more water condensates inside the tank. The compressor is lubricated with oil and small amounts of oil may also get into the tank.

⚠ **This means that the tank must be drained for oil and water on a regular basis.**

If the air is supplied from the smaller types of compressors delivered from Braillo Norway AS, it is required to keep the compressor in a similar environment as described for the printer itself. (Temperature 15 - 30°C (60 - 86°F) and rel. humidity 40 - 60%).

Basic elements on a compressor:
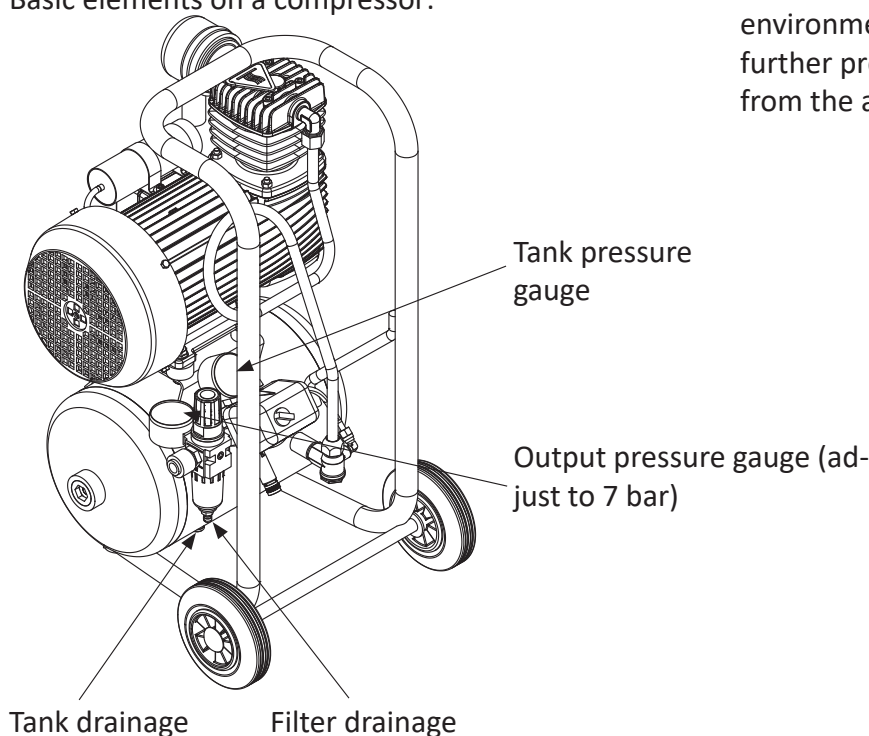
If the compressor is placed in a more harsh environment, it might be necessary to take further precautions to remove oil and water from the air.

Tank pressure gauge

Output pressure gauge (adjust to 7 bar)

Tank drainage   Filter drainage

Filtering and drainage

To stop oil and water from getting into the printer, there are filters and drainage units in the line.
Some of this filters need to be drained, and some is automatically drained.
How often the manual draining has to be done depends on many things e.g. the temperature and humidity in the environment around the compressor and the workload on the compressor. The more the compressor runs, the hotter it will be and therefore it will produce more oil and water. So the best way is to learn from experience in the different situations.

There is an additional filter/drainage/regulator on the Roll Unwinder. This one has automatic drainage, so it will empty itself whenever it is something to drain.

When the compressor is starting, the tank pressure is zero (or very low). The pressure will then start to raise slowly. Because of this slow increase, the drainage valve might leak out the pressure.
To solve this problem, a ball valve is fitted on the pipe nearby the compressor. This ball valve must be closed until the compressor has filled it's tank. Then open the ball valve and the drainage valve will be closed.

When the compressor is empty:

1. Close the ball valve.
2. Turn on the compressor.
3. Wait for the pressure to reach about 6 bar.
4. Open the ball valve.
5. Ready.

Regulator   Release valve

From compressor   To printer and stacker

The gauge must read 6,0 bar!   Water drainage
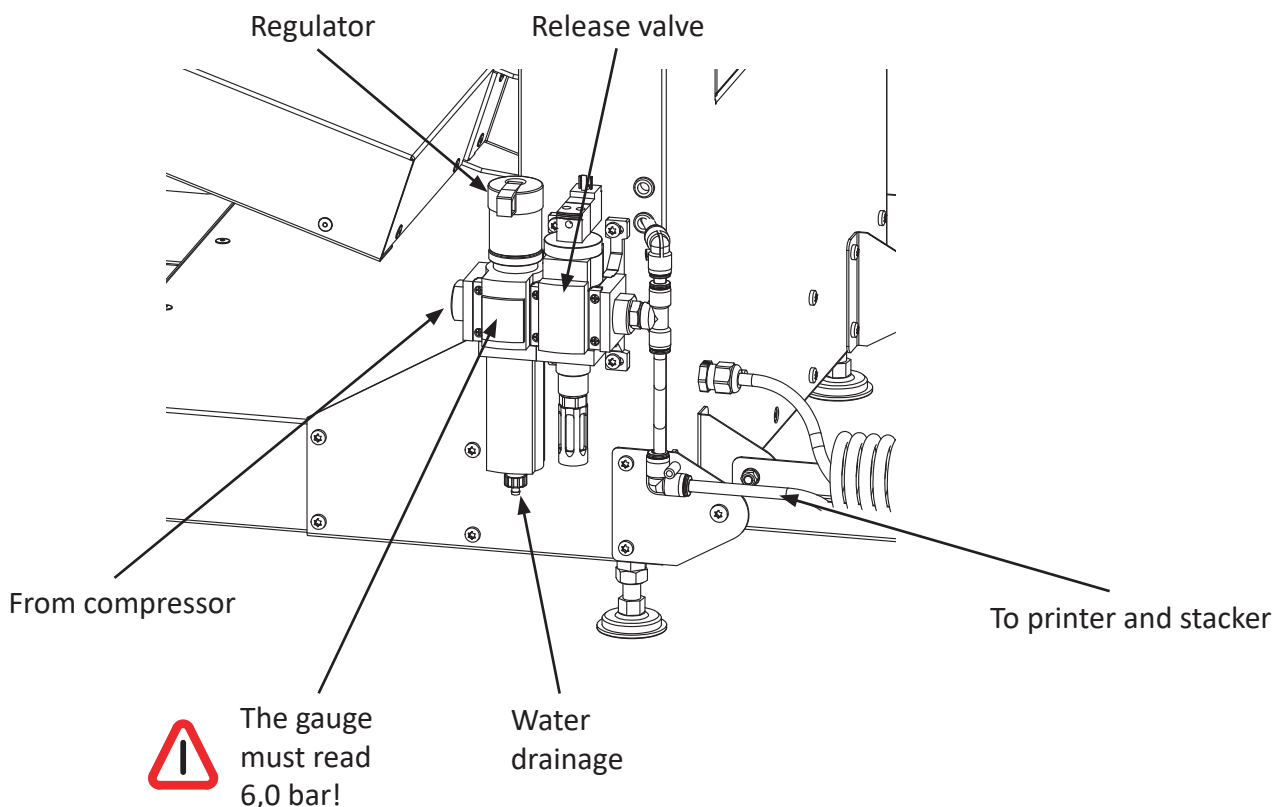
2.10   Place the paper roll

Put the shaft in the center of the roll, and ensure that the shaft is approximately in the centre sideways. Fasten the shaft. The roll must be placed so the paper end is pointing away from the printer at the top of the roll. (See figure).
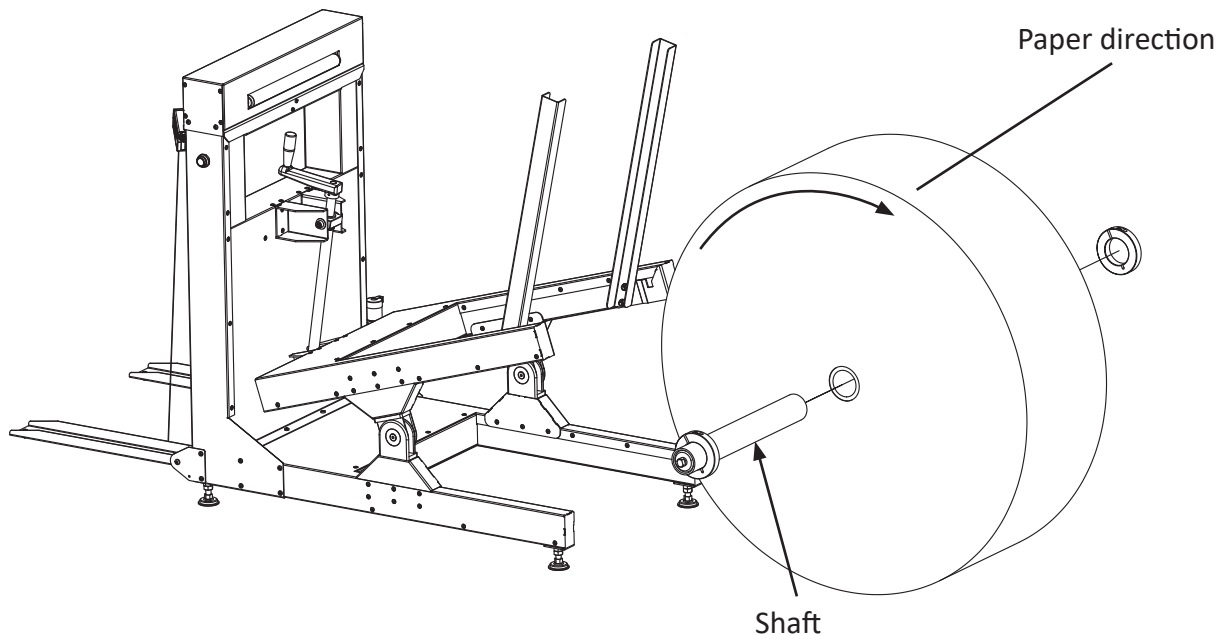
Use the crank to lower the two arms so it is lower than the shaft in the paper roll.
Then roll the paper roll carefully in between the two arms.
When the shaft ends are correctly aligned above the notches, use the crank to raise the arms and lift the paper roll off the floor.
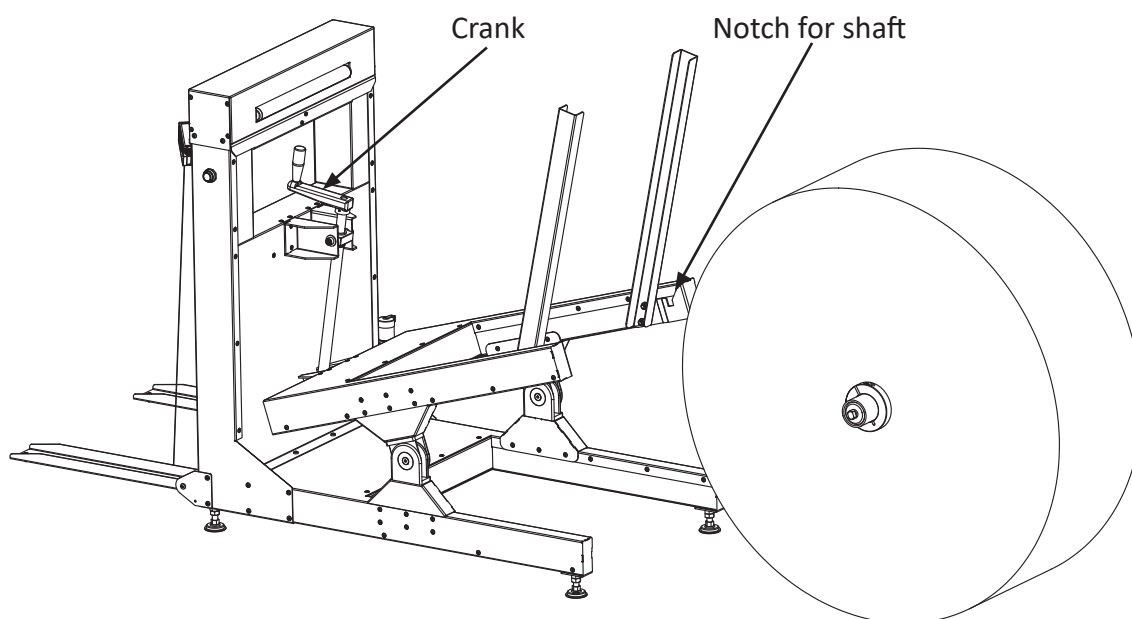
When the roll is lifted above the floor, place the friction bar between the guides, so it rests on top of the roll.

Friction bar
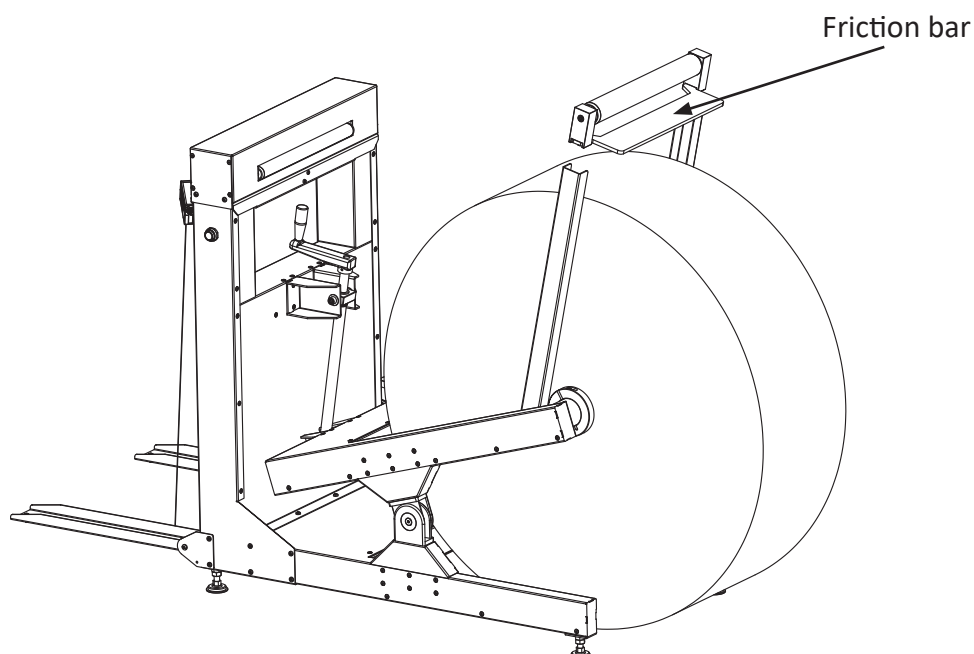
Thread the paper end in under the correction roll and then over it and towards the printer.

Remove and throw away the first rounds of paper on the paper roll to get rid of e.g. sand, dust and dirt after rolling the paper roll on the floor.

Paper direction
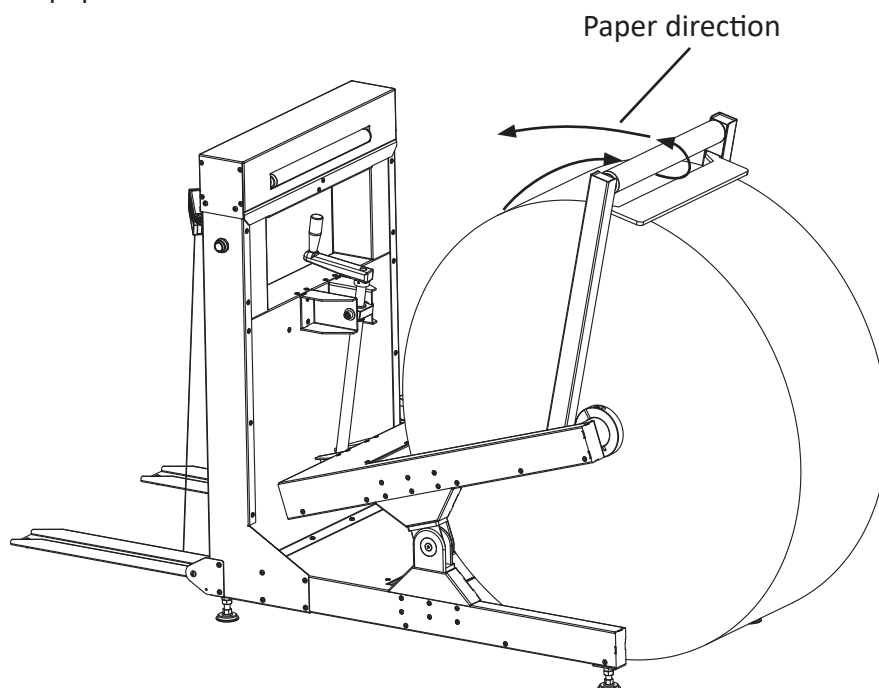
2.11   Power on

The On/Off switch is placed on the printer, 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 printer cover. These switches will disable the possibility to run the printer if the side plates are removed.

The paper feed unit will move a little back and forth to find the home position. 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 4 'OPERATING THE PRINTER' on page 39 carefully.

On/Off switch
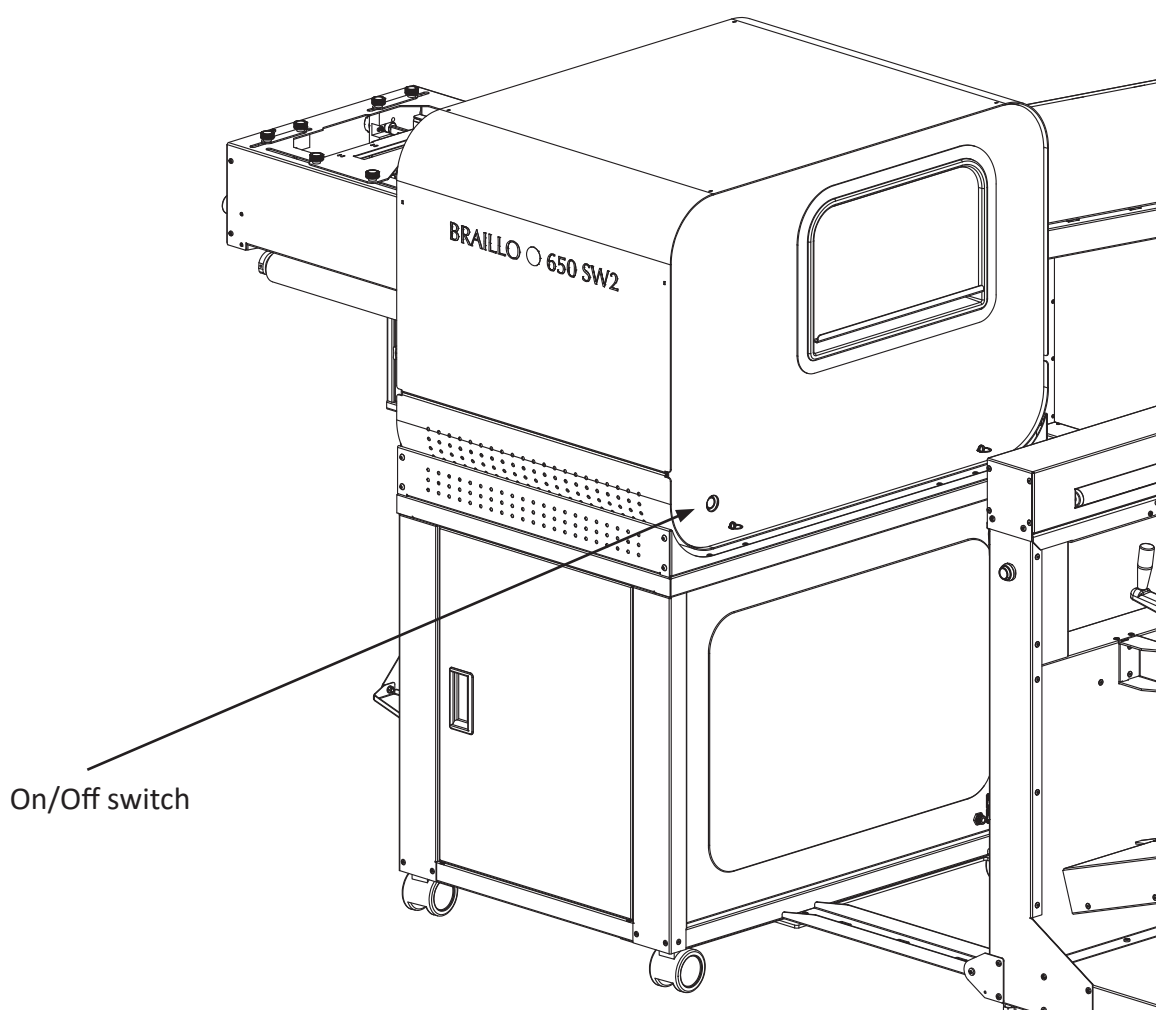
3. SETTING UP THE COMPUTER

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 58 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:
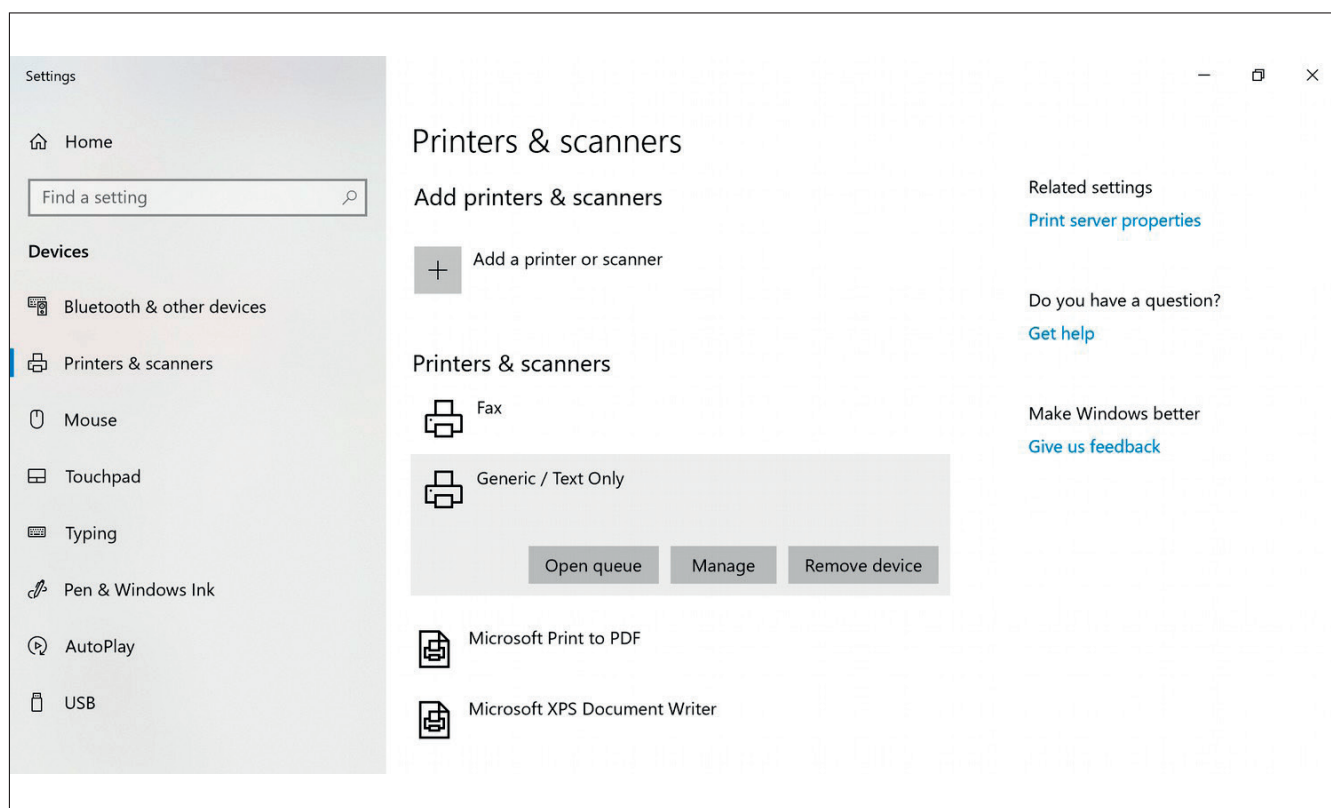
Select it and click 'Manage', then 'Printer properties'.
Here you can change the printer Name and Location to your liking, for example
'Braillo <model number>'
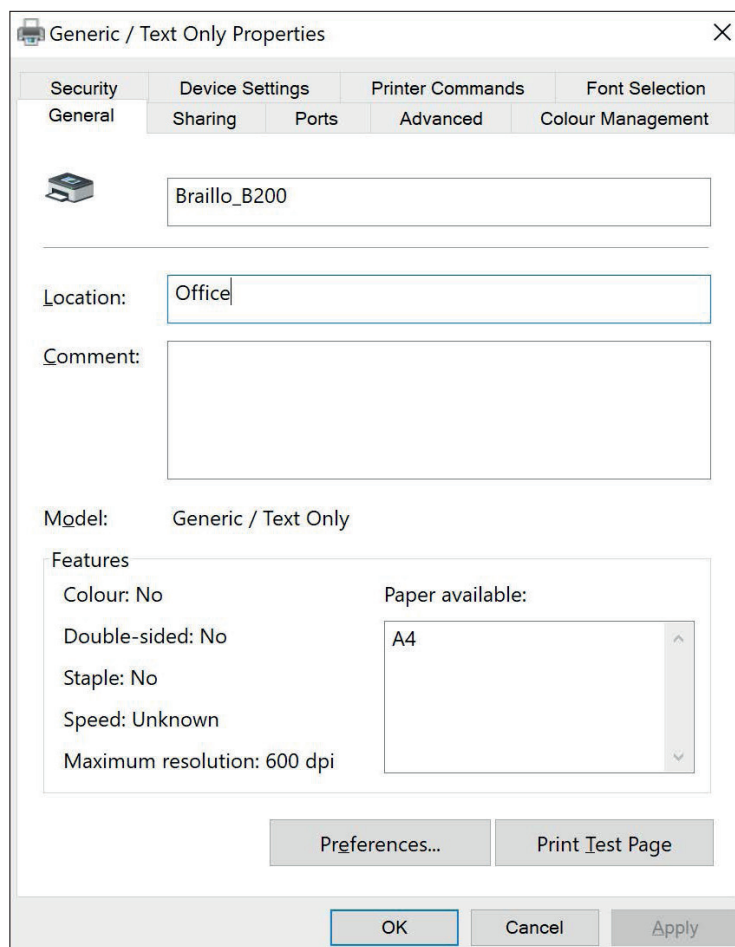
Click 'OK' and your printer is now configured and ready to use.

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 AS 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'
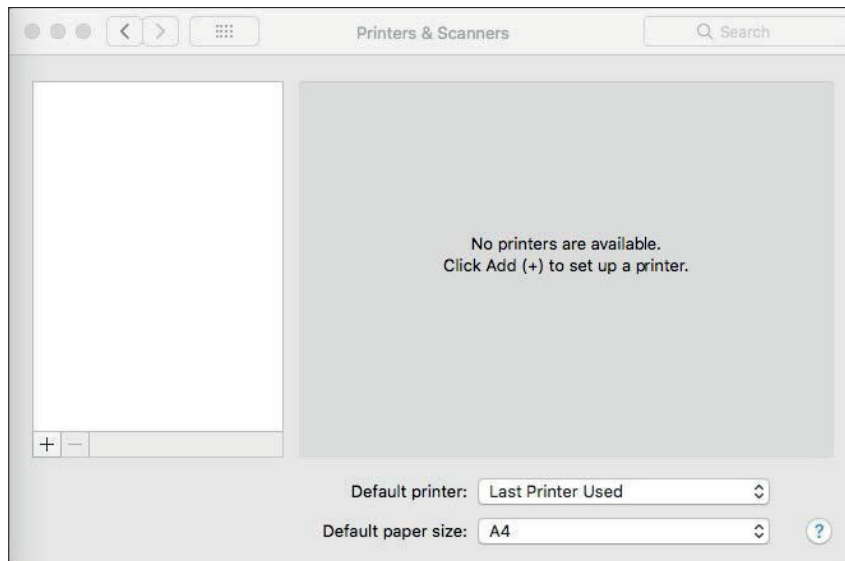
3. Click the plus sign (+) button to add new printer
4. In the new dialogue select the 'Generic_/_Text_Only' USB printer (under Default tab)
5. The Mac OS will try to auto identify the printer, but will not succeed. This is expected.
6. In the 'Use' drop-down menu choose 'Other' and select the provided 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'
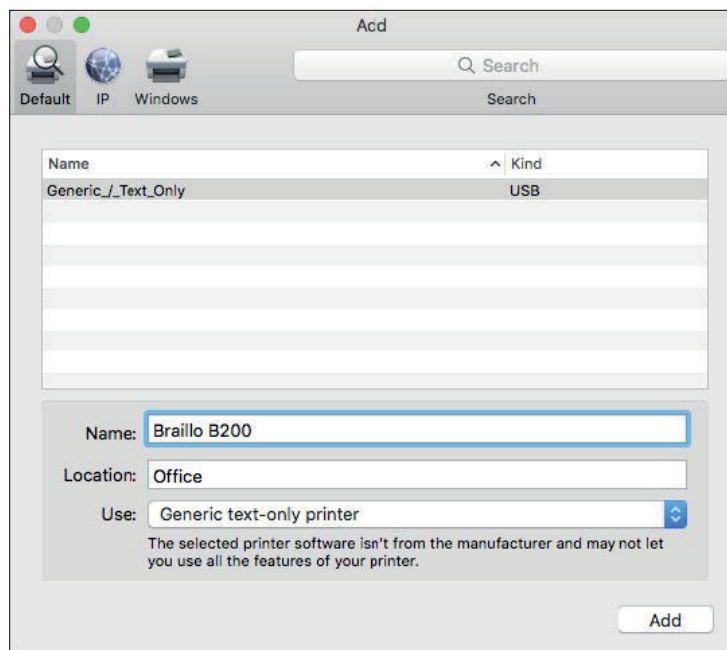
10. Your printer is now configured and ready to use

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
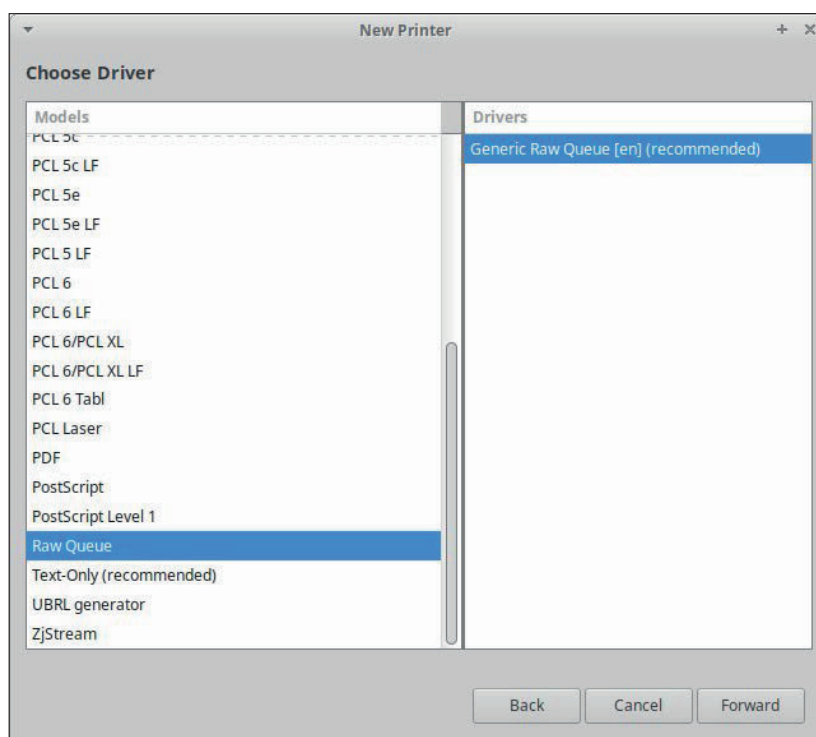
4.   If you can choose any settings for the new printer, just leave everything as default
5.   Give the printer a identifiable Name and Location, for example 'Braillo_<model number>'
6.   Your new printer is now configured and ready to use

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
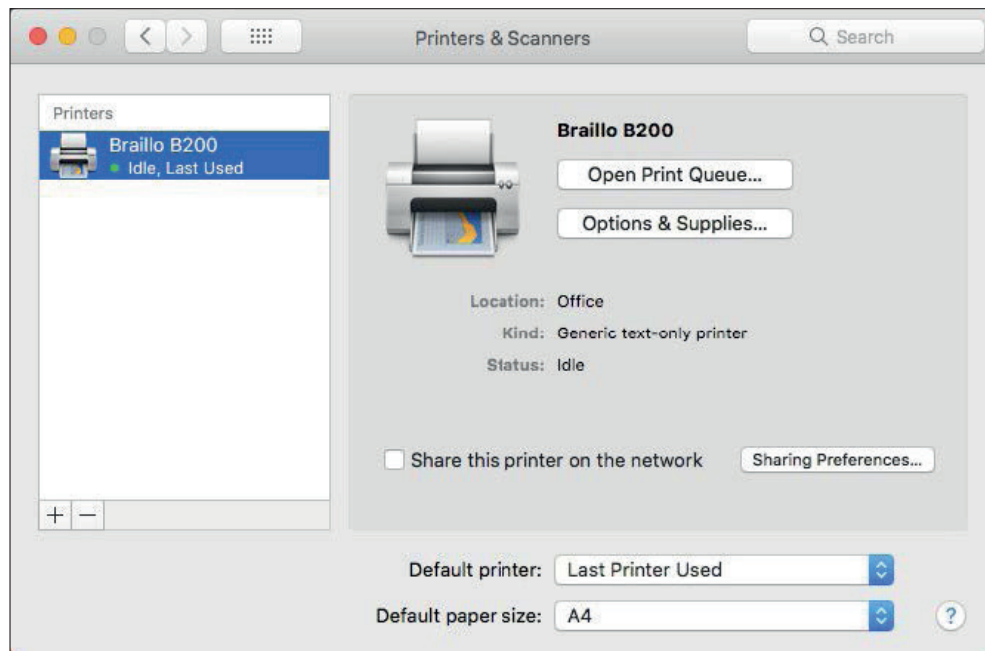
Before starting, make sure the printer is powered on and connected to the network.
You will need the printer's IP address which can be found in menu *Main Menu - Warning - Service/ diagnostic - Status / Software upgrade.*
See 'Status / Software upgrade:' on page 56 for more information.

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

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✕

← 🖨 Add Printer

Find a printer by other options

○ <u>M</u>y printer is a little older. Help me find it.

◉ <u>S</u>elect a shared printer by name

    | http://10.101.5.18:631/printers/Braillo | B<u>r</u>owse...

    Example: \\computername\printername or
    http://computername/printers/printername/.printer

○ Add a printer using a TCP/<u>I</u>P address or hostname

○ Add a <u>B</u>luetooth, wireless or network discoverable printer

○ Add a <u>l</u>ocal printer or network printer with manual settings

                                                                                                                                             | <u>N</u>ext | | Cancel |

6. Click 'Next'
7. In the driver selection dialogue select 'Generic' and 'Generic / Text Only'
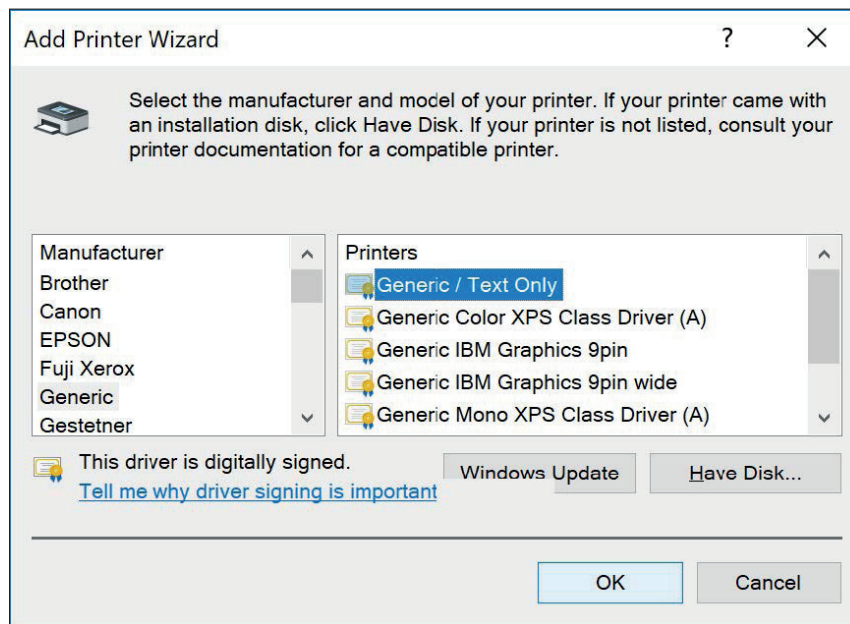
8. Click 'OK'
9. Click 'Next' and 'Finish' to close the dialogue
10. Your printer is now configured and ready to use

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 AS 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!
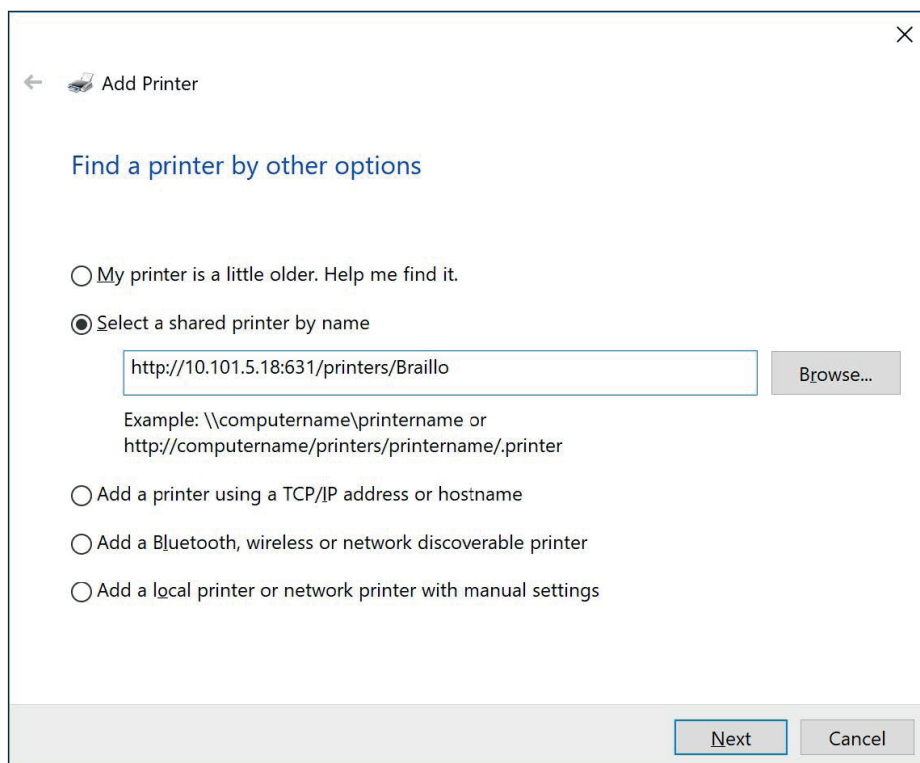
Before starting, make sure the printer is powered on and connected to the network.
You will need the printer's IP address which can be found in menu *Main Menu - Warning - Service/diagnostic - Status / Software upgrade.*
See 'Status / Software upgrade:' on page 56 for more information.

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>'
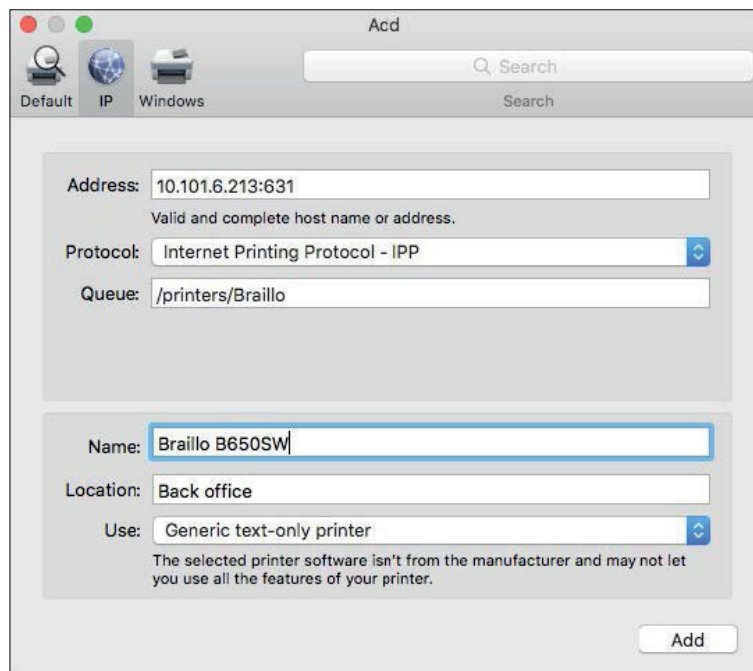
8. Click 'Add'
9. Your printer is now configured and ready to use

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 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 through a standard web page.

To enter the WLAN configuration mode, navigate to:
Main Menu - Printer setup - Network configuration - Conf. WLAN.
See section ‘- Wireless configuration’ on page 60 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:
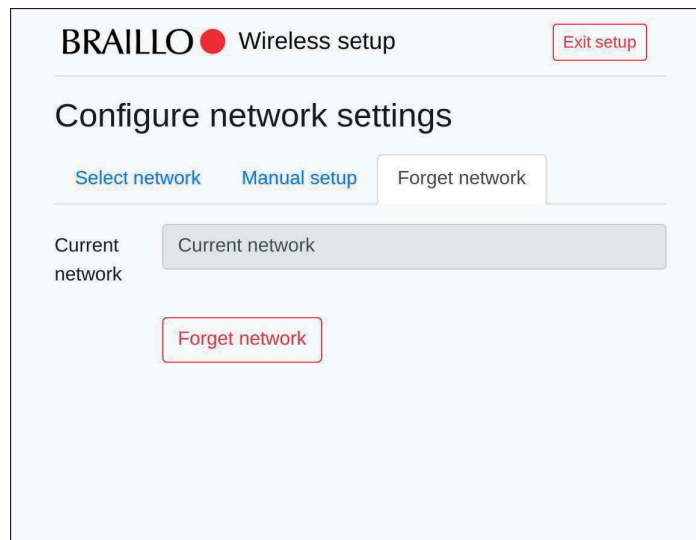1. Follow step 1 and 2 above
2. Click the 'Manual setup' tab
3. Enter the SSID, choose security and enter the password (if needed)

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.
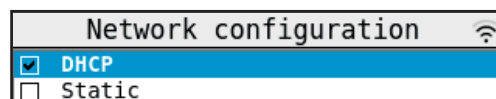
Note! If the printer behaves unexpectedly after being in Wireless network configuration mode, please try restarting the printer.

4.   OPERATING THE PRINTER

The figure below is a schematic drawing on how the paper travels through the machine.
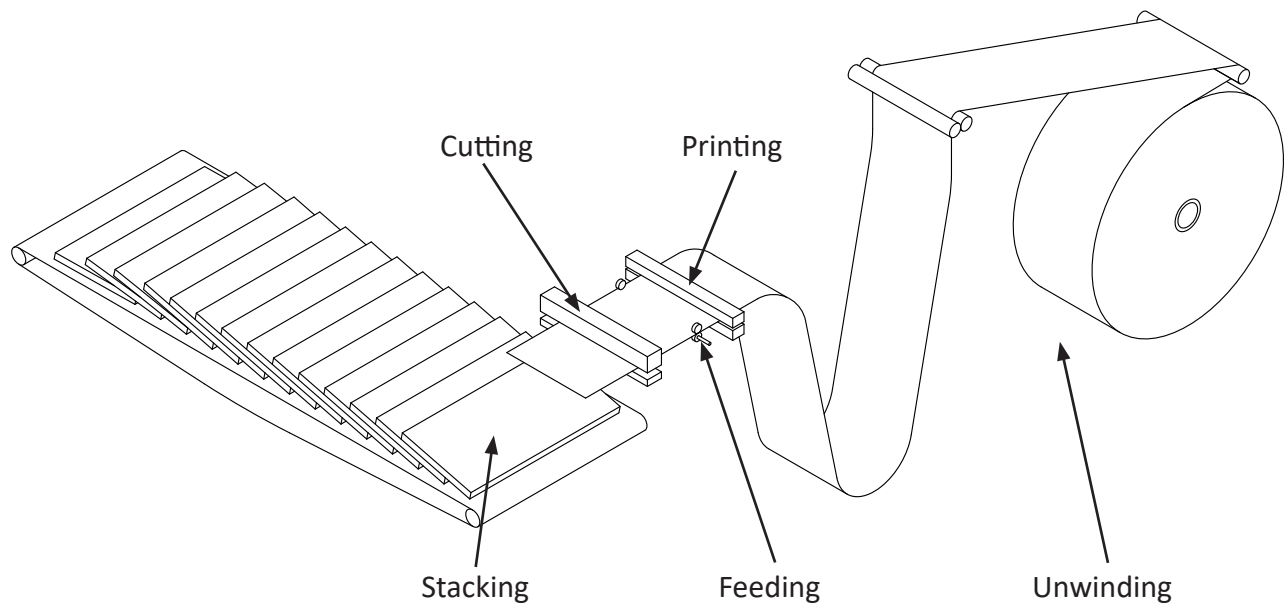
4.1   Adjust to paper width

All these adjustments are dependent on the paper roll width, so it can be wise to use a paper sample to set the width.

It is recommended to start with the paper feeder unit nearest to the main belt (the right-hand one when looking in the direction the paper travels), because this will also determine the top margin on the sheet.

The adjustment should be done in this order:
1.   Move the feeder unit nearest to the main belt to the desired position (note the top margin).
2.   Adjust the other feeder unit so the distance between them is equal to the paper width.
3.   Put the paper into the printer, and align the guides on the input tray.
4.   Adjust the width on the stacker, add a couple of millimeters on each side.
5.   Adjust the end stop to fit with the sheet length.

See figures on the following pages.

The numbers are indicating in which order the adjustments should be done.
(The printer cover and the protection covers are removed in the figure to get a better view, but this adjustments can be done with the covers on).

End stop   Stacker   Feeder   Input guides

5   4   1   2   3
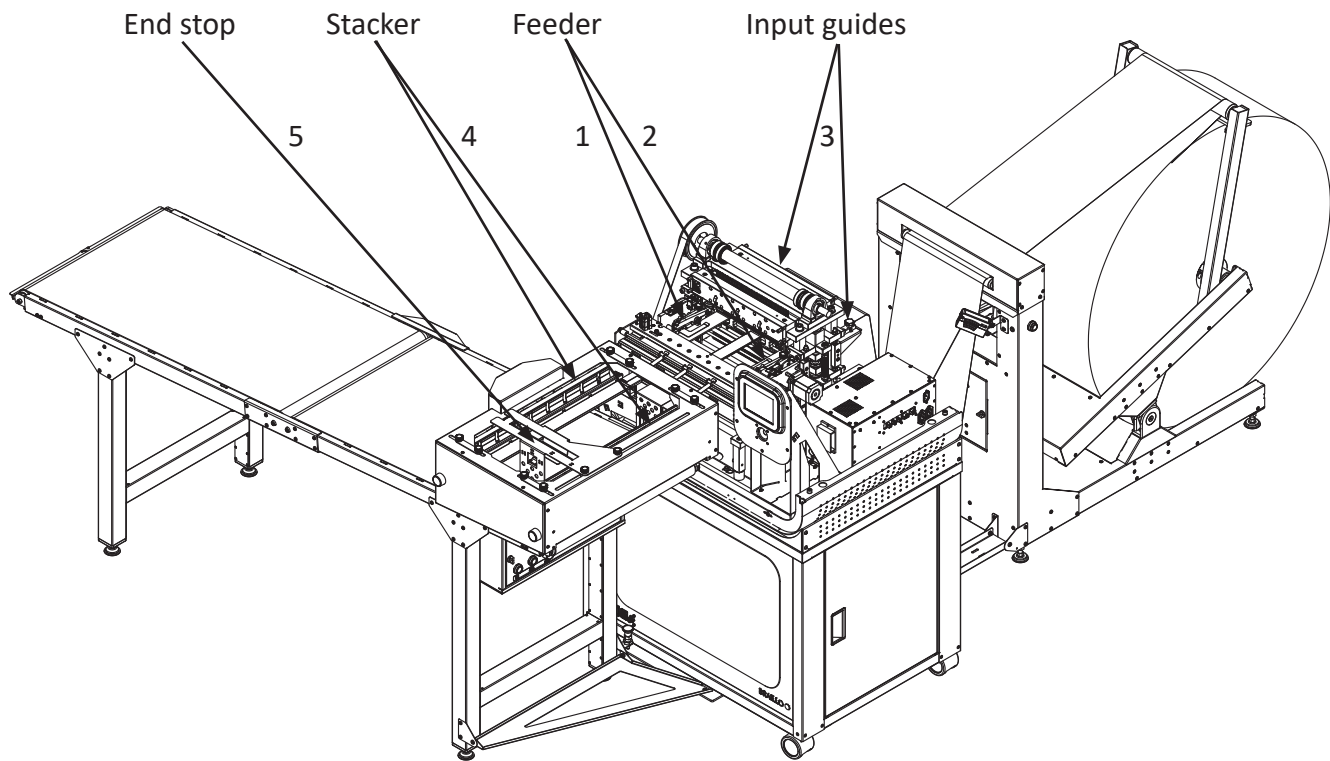
Paper feeder, adjust width

Loosen the knobs and the bolts (without taking the knobs or bolts out).
The two feeder units can now be moved sideways. Note that the unit on the side nearest to the main belt will also determine the top margin. Use a paper sample to find the correct distance between the two units. The paper sample should fit exactly in between the two units. Fix the units by tightening the knobs and the bolts.

Adjust to sheet width

Loosen the knobs and the bolts
and slide it sideways to the
desired position
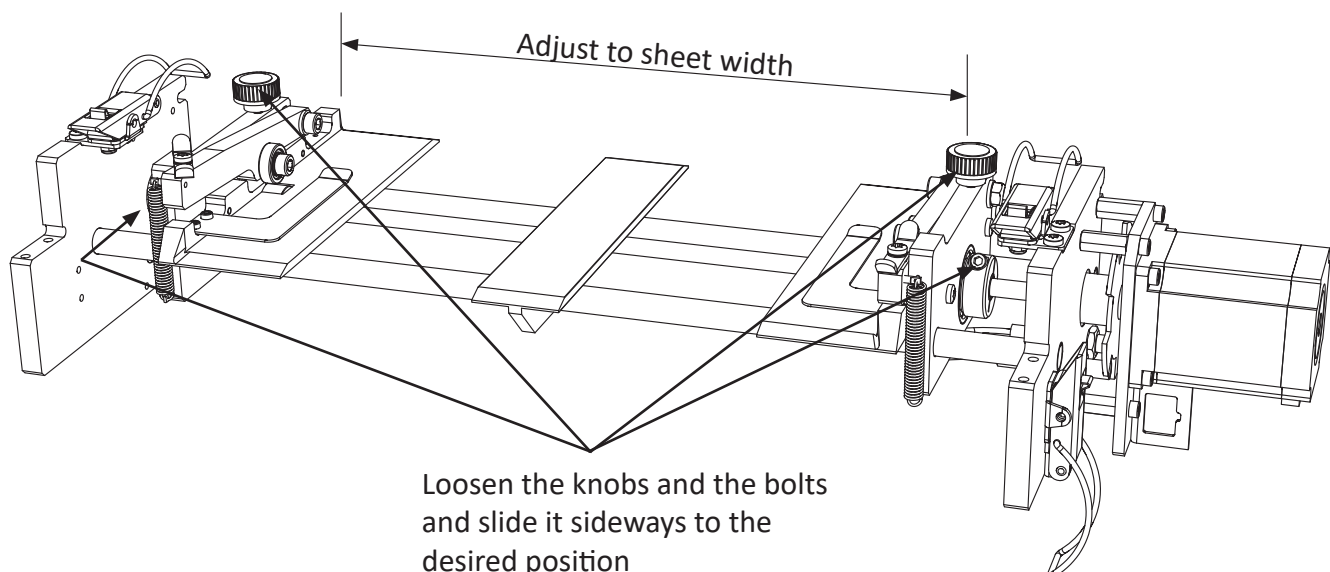
Input guides, adjust width

Before you adjust these two guides, take the paper from the Roll Unwinder and put the paper through the printer, and place it accurately into the already adjusted paper feeder.
Make sure that the paper is aligned correctly and goes straight through the printer.
Then adjust the guides against the edges on the paper, this will keep the paper correct positioned and aligned during printing.

Adjust to sheet width
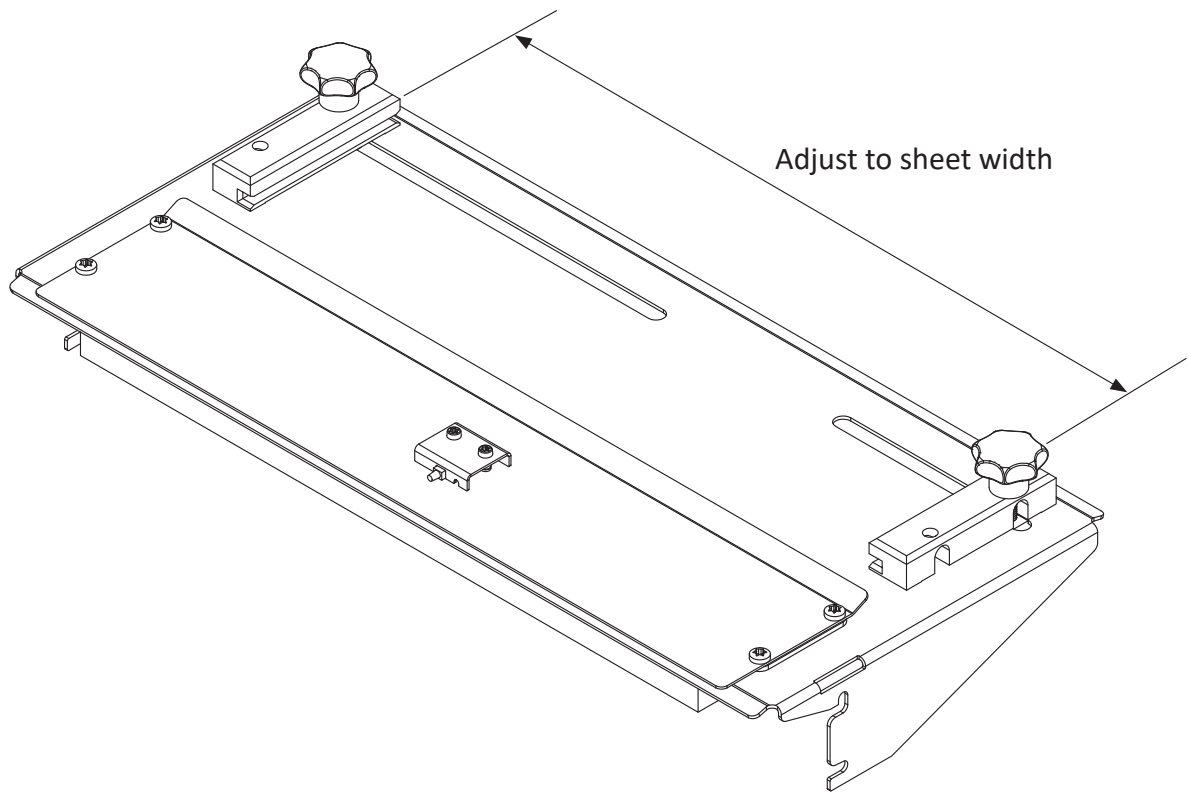
Stacker, adjust width and end stop

When adjusting the position of the trap doors, make sure that they are aligned with the paper coming out from the printer. Loosen the four knobs on the top, and then turn the knob at the end to move the trap door units sideways. The end stop can be adjusted by loosening the two knobs and push it back and forth.

Adjust to paper width + e.g. 2 mm

1. Loosen these four knobs

2. Adjust with this knob

Adjust to sheet length
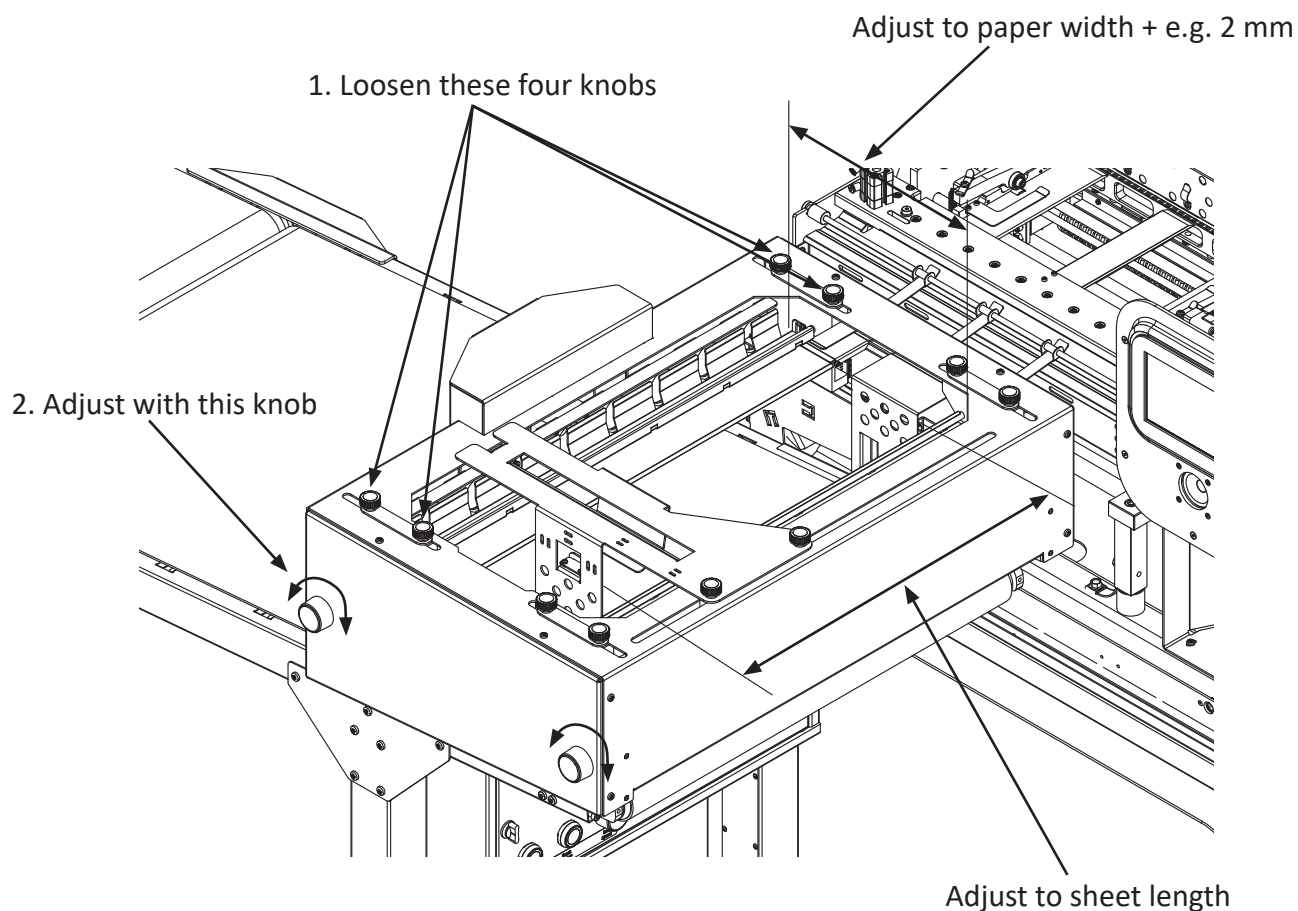
4.2 Printing with B 650 SW

This printer is printing interpoint. It also print the text sideways on the paper. This way of printing is creating some confusion regarding the different terms used to describe the sheet of paper. Please see the figures below for the terms Braillo are using.

The printer can print in two different modes. These modes are called "2-page" and "4-page".
The name "2-page" is telling us that the number of pages on each sheet of paper is two. (One page on each side of the paper).

In "4-page" mode, the printer will print four pages on each sheet of paper. (Two at each side of the paper). By doing this, it is possible to put the sheets in a stable and stitch and fold in the middle. This way of printing makes it easy to produce e.g. a newspaper or magazine in braille.

2-page mode:
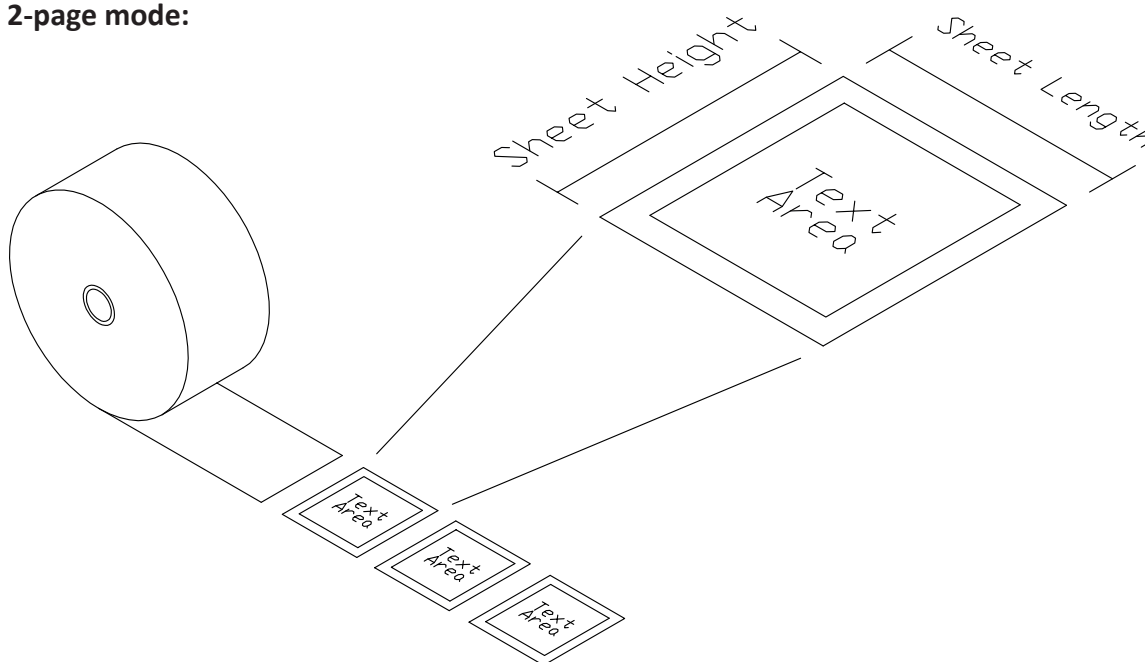
4-page mode:
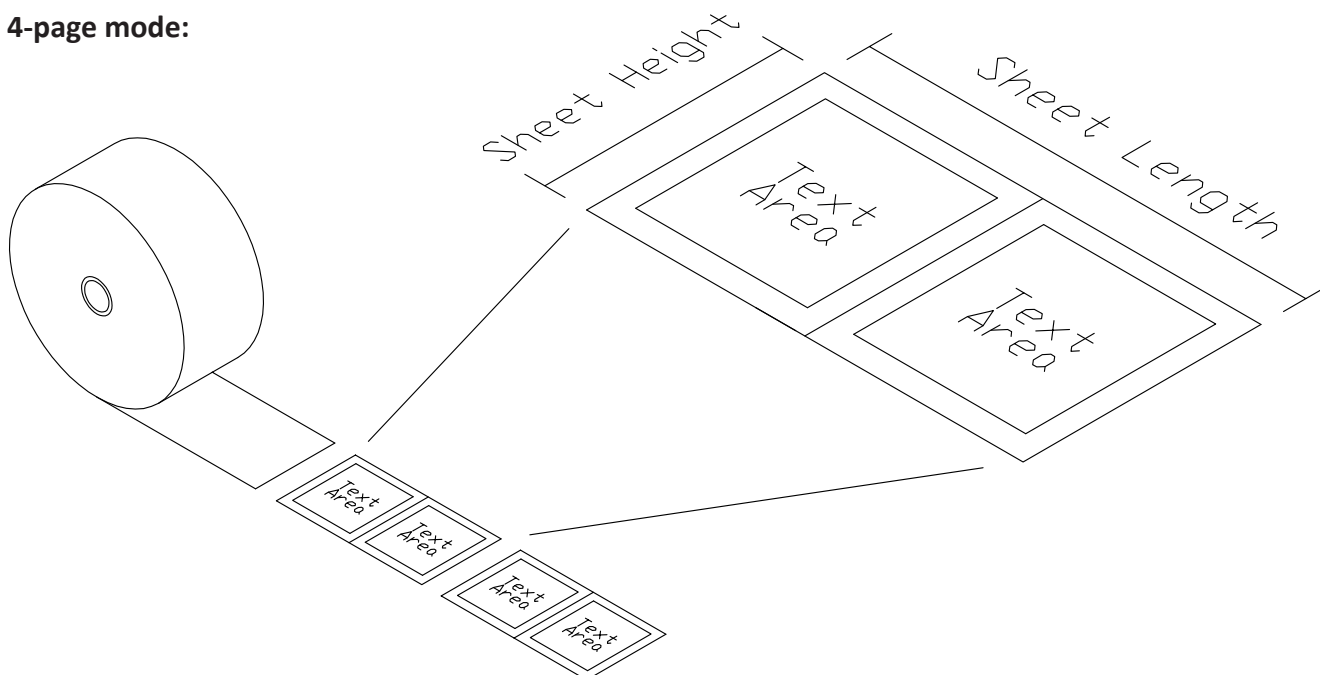
The sheet in 2-page mode:

Please see the figure below.
The "Sheet length" is not a length you can set directly, but it will be a result of the margins and line length settings.

Sheet length = Margin 1 + Line length + Margin 2
Sheet height = Paper roll width
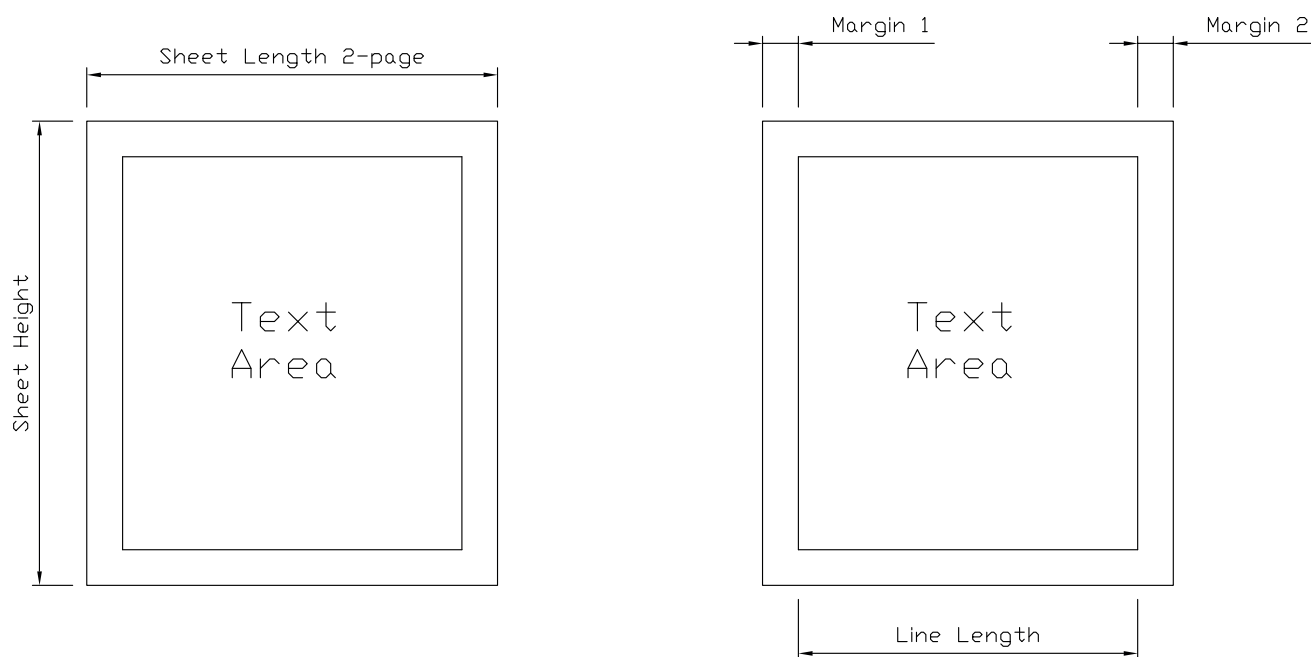
The sheet in 4-page mode:

Please see the figure below.
The "Sheet length" is not a length you can set directly, but it will be a result of the margins and line length settings.

Sheet length = (Margin 1 + Line length + Margin 2) + (Margin 2 + Line length + Margin 1)
Sheet height = Paper roll width
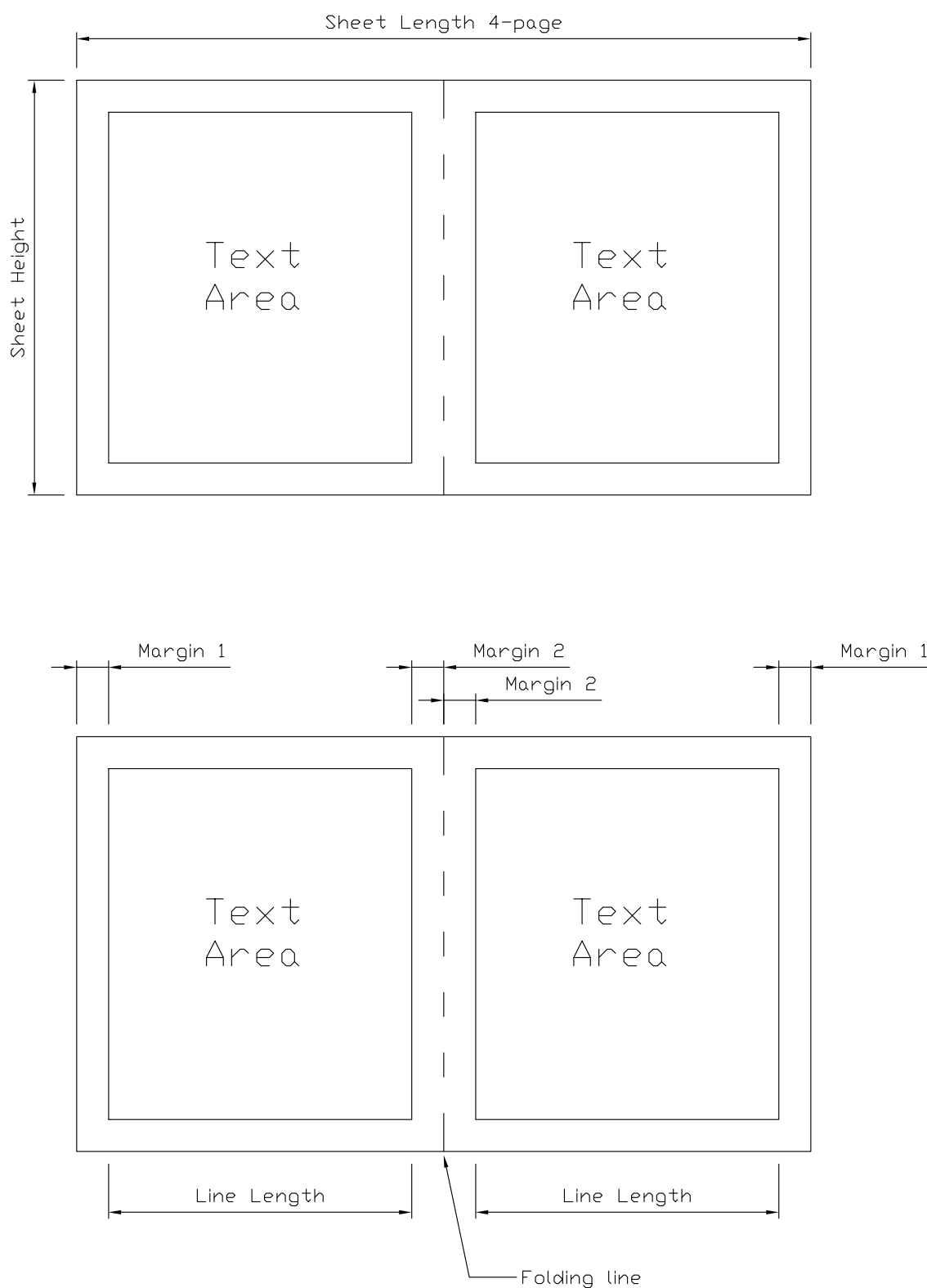
Printing in 4-page mode:

The number of pages sent to the printer in 4-page mode, has to be a number that is possible to divide by four. E.g. a document that contains 7 pages of text, must have one empty page added to get a total of eight pages.

And those eight pages will fit on two sheets (8 pages divided by 4 = 2 sheets).

Next, the text has to be sent to the printer in the following sequence:
Page 1, 2, 7, 8, 3, 4, 5 and 6.

This formatting is normally done with computer software.

To be able to move the belt between each copy of a document, the printer also needs a command that will tell how many sheets the document contains. This command is an escape-sequence that must be sent to the printer in the beginning of the document. This is done by sending the ASCII value no 27, then the letter P, and then the number of sheets.
E.g. in the example above, the command would look like this: escP02

(There are software on the market that will do this formatting automatic).

Here are some physical measurements to consider when adjusting the different settings :

Max paper height: 330 mm (13.0 inch)   (This is the same as the width of the paper roll).
Max paper length: 584 mm (23.0 inch)
Max no. of characters per. line: 44 char.
Margins are adjustable from 12.7 mm (0.5 inch) to 50.8 mm (2.0 inch) in 2.54 mm (0.1 inch) step.

4.3   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:
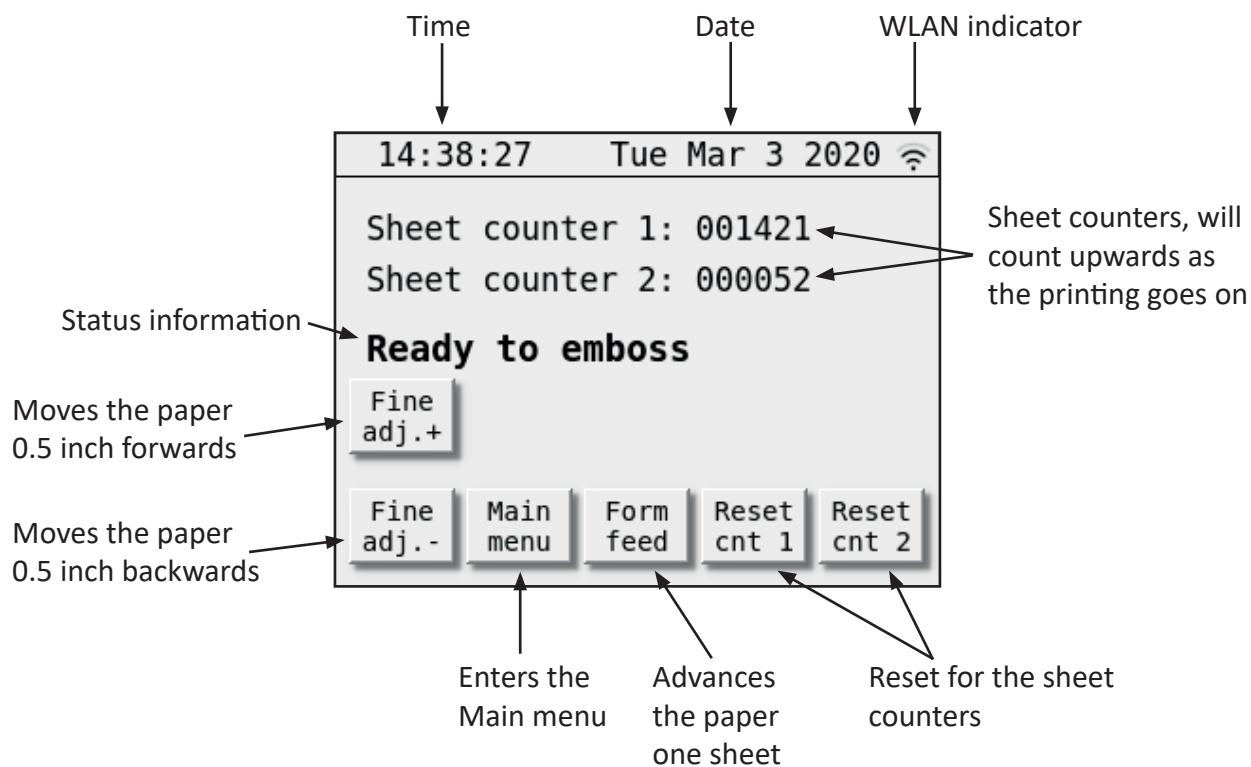
Navigating in the menus.

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

Select this to
enter sleep
mode

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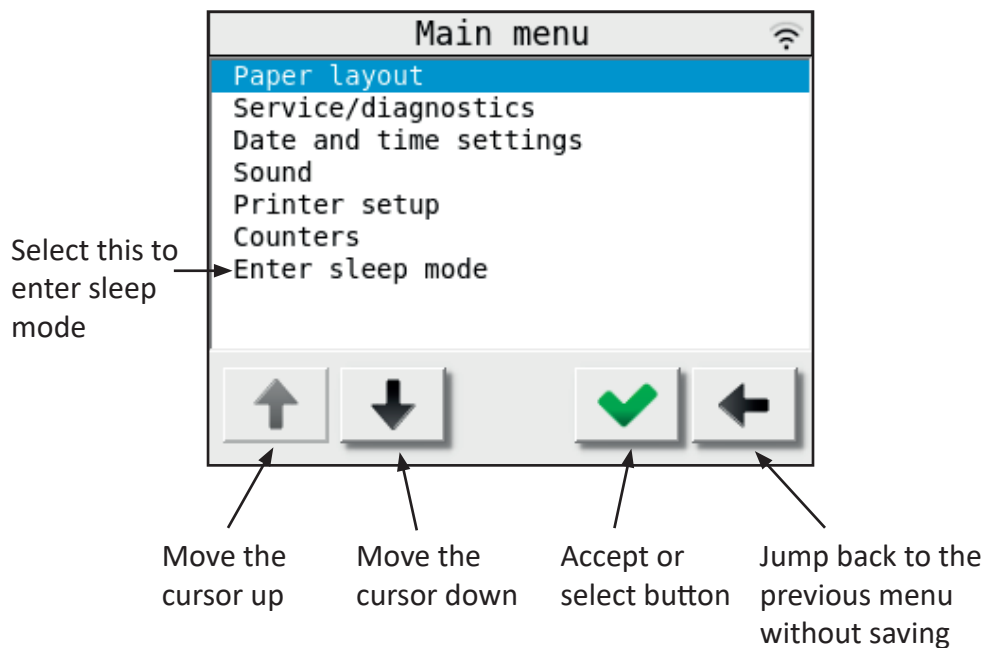
To change a variable setting.

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

Increase the
value

Decrease
the value

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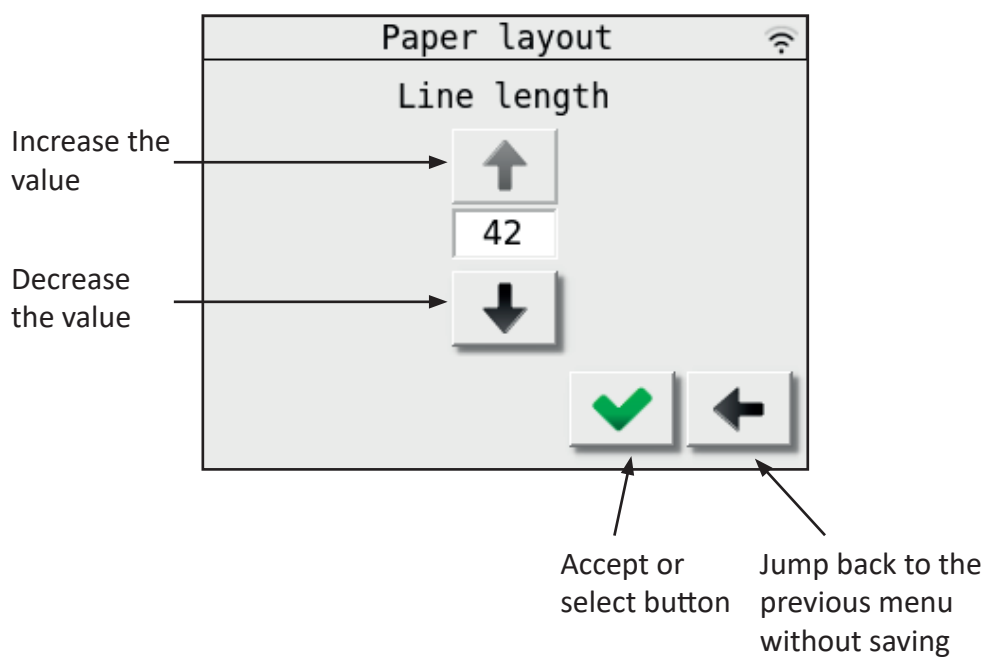
To change a setting with just two alternatives.

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
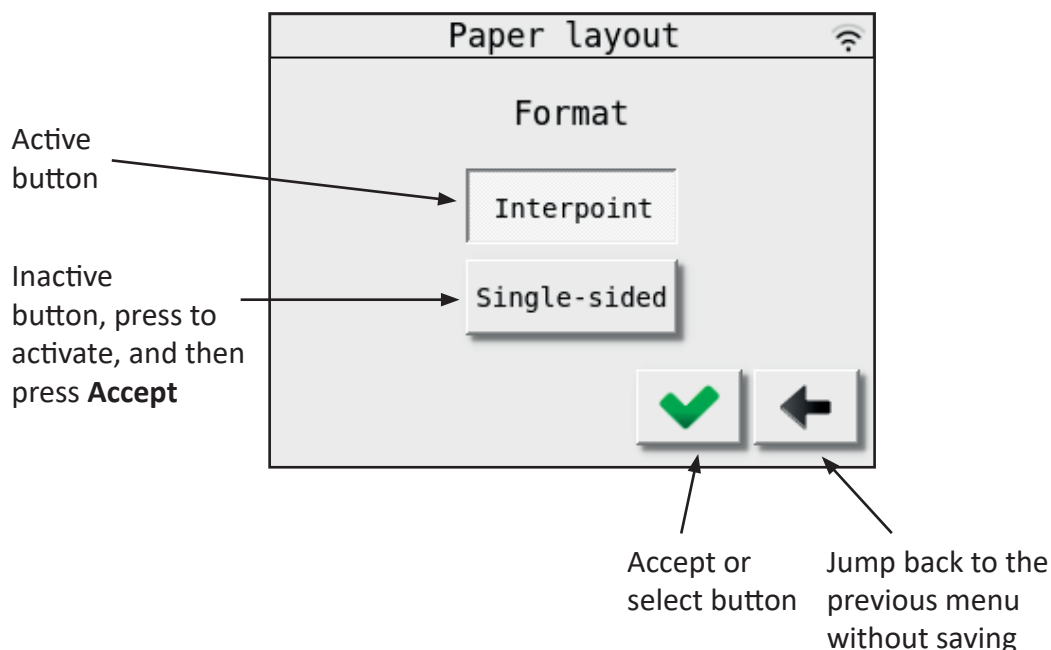
Select printer model.

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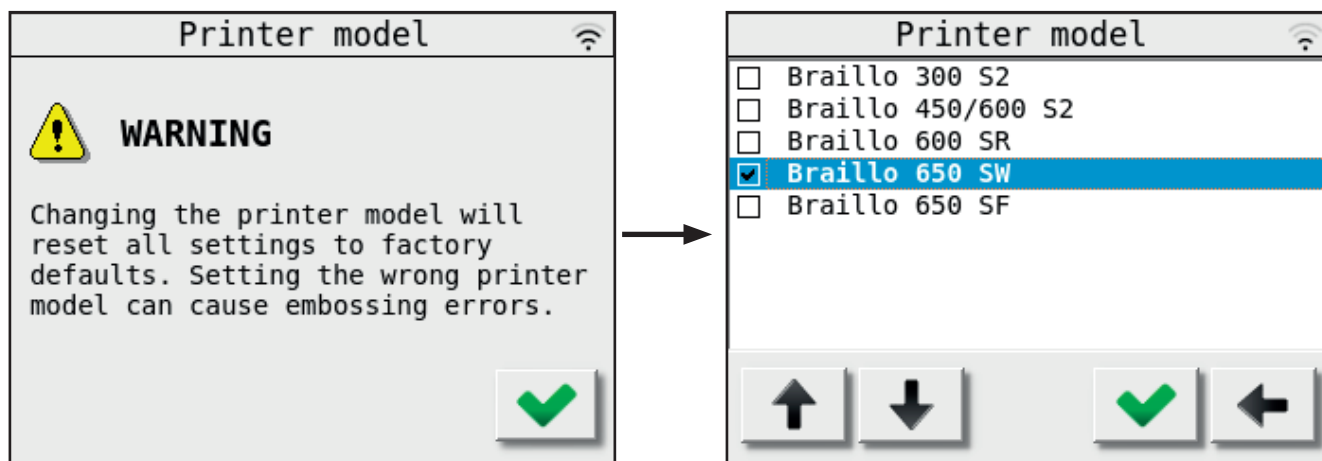
Note!

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.
Copy 1 / 1 means there will be just one copy.

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.

```
14:30:44      Thu Mar 19 2020

Sheet counter 1: 000421
Sheet counter 2: 000637

Embossing ...

    Sheet        1  /       5
    Copy         1  /       1

 Pause                  Reset   Reset
                        cnt 1   cnt 2
```

Pause the print job

```
14:30:44      Thu Mar 19 2020

Sheet counter 1: 000430
Sheet counter 2: 000646

Paused

    Sheet        5  /       5
    Copy         1  /       1

 Cont.          Reset   Reset   Reset
                        cnt 1   cnt 2
```

Continue the print job   Cancel the rest of the print job

4.4   Main menu
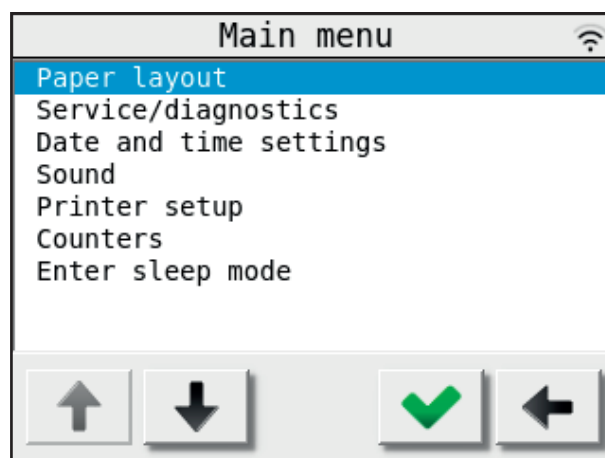
The Main menu options:

      Settings for the braille output layout on paper
      Choices for test print patterns, view the log, checking status etc.
      Settings for date and time
      Settings for the sound
      Choose printer model, ASCII tables etc.
      Find the total of how many hours/sheets the printer has been running
Enter sleep mode
      Will put the printer directly into sleep mode

4.5 Paper layout menu

Main Menu - Paper Layout

Paper layout	⌖
Sheet width	4-page
Line length	36 char
Page margin 1	0.8 inch
Page margin 2	1.2 inch
Format	Interpoint
Foldline	On
Cell Spec	Marburg
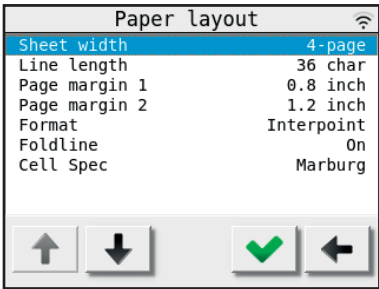
Sheet width:

Main Menu - Paper Layout - Sheet width
Selects between 2-page and 4-page format.

Paper layout	⌖
Sheet width	
4-page	
2-page	
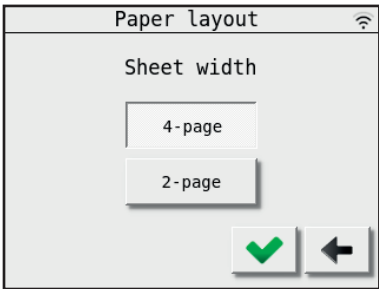
Line length:

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 44 characters.

Paper layout	⌖
Line length	
42	
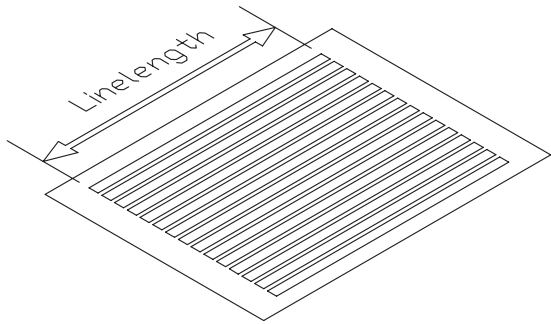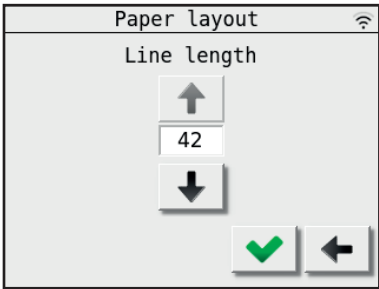
Page margin 1 and 2:

Main Menu - Paper Layout - Page margin 1/2

The margins are adjustable from 12.7 mm (0.5 inch) to 50.8 mm (2.0 inch), in 2.54 mm (0.1 inch) increments.

There are two different margins, Margin 1 and Margin 2.

Note that the value on Margin 1 will affect both the "outer" margins, and the value on Margin 2 will affect both the "inner" margins.
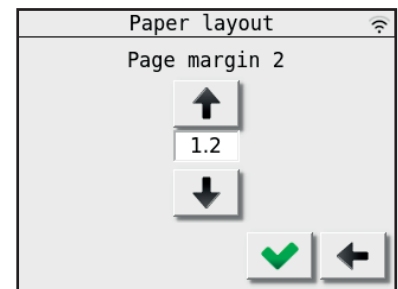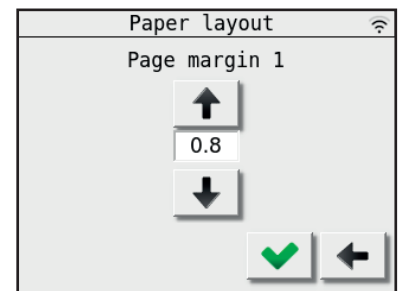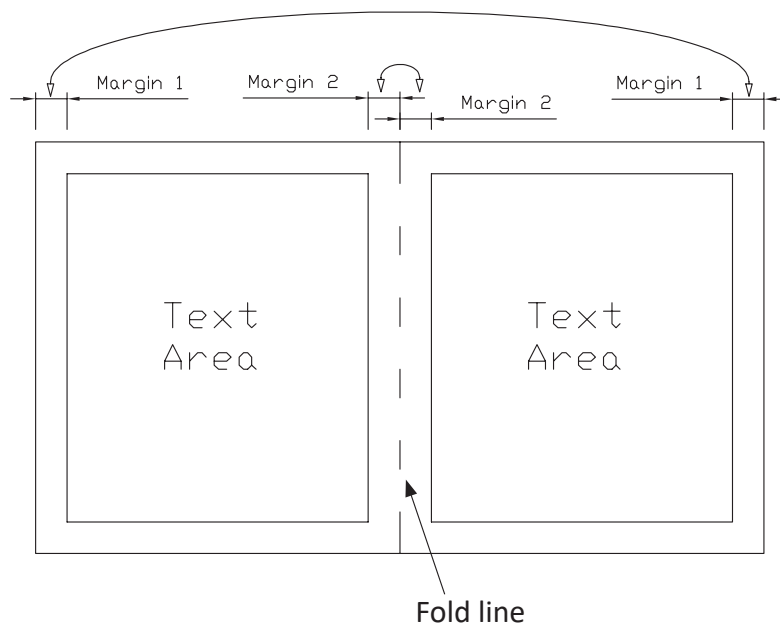
Fold line

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).
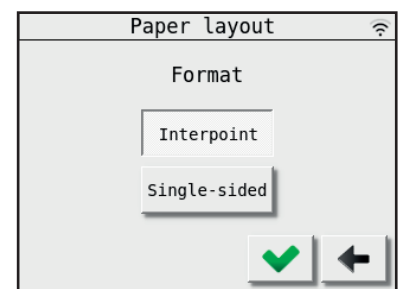
Fold line:

Main Menu - Paper Layout - Fold line

Turn on or off a row of dots in the middle of the four-page sheet. This makes it easier to fold the sheet.
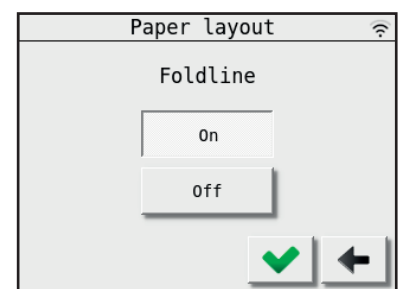
Cell spec:

Main Menu - Paper Layout - Cell spec

Here you can choose between the Marburg medium standard or the US NLS standard Braille cell spacing.
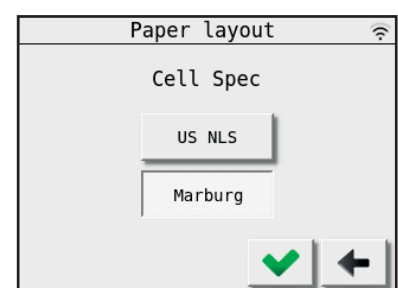
4.6　Service/diagnostic menu

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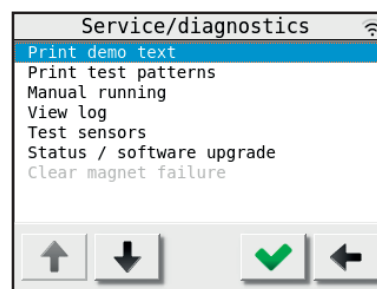
Print Test Pattern:
Main Menu - Warning - Service/diagnostic - Warning - Print Test Pattern

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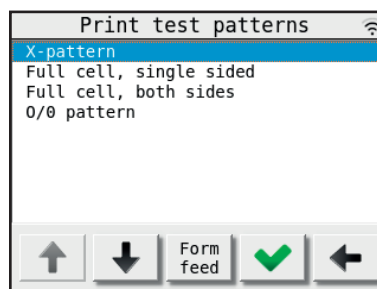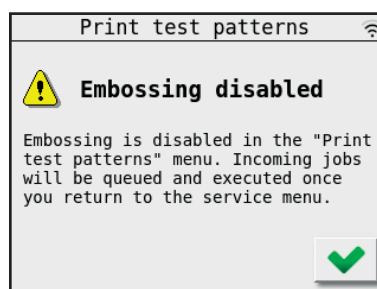
Manual running:
Main Menu - Warning - Service/diagnostic - Warning -
Manual running

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.

- Send cutting pulse
Sends one cutting pulse to the paper cutter

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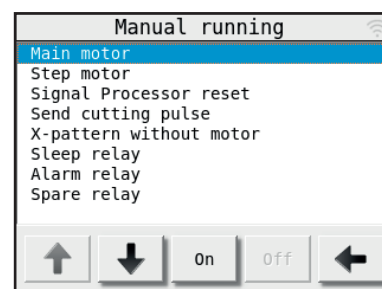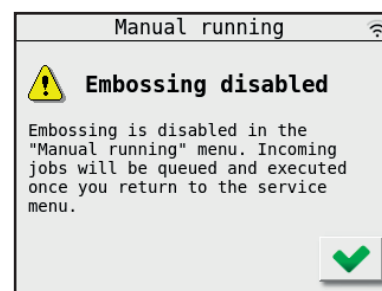
View Log:
Main Menu - Warning - Service/diagnostic - Warning - View Log

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.
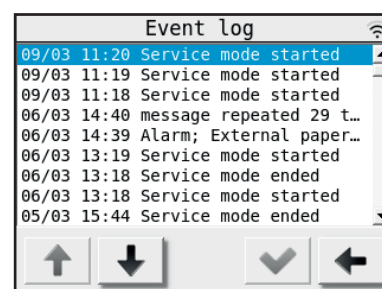
If the **Accept** button is shown in green, it is also possible to view some
more details about this particular event by pressing the **Accept** button.
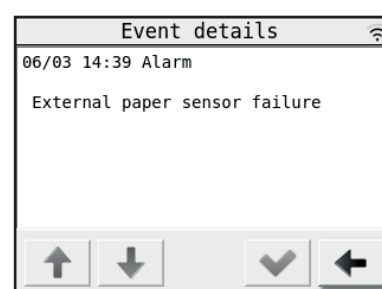
Test Sensors:

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.
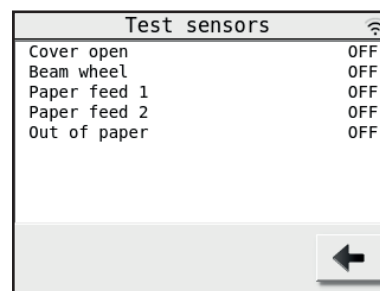
- Cover open	Safety switches on the panels on the printer.
- Beam wheel	Sensor fitted on the lower shaft on the printer.
- Paper feed 1	Sensor 1 on the paper feed tractor.
- Paper feed 2	Sensor 2 on the paper feed tractor.
- Out of paper	Sensor to check if there is paper in the printer.

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 AS 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 5.27 'Main board - connections' on page 114 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.
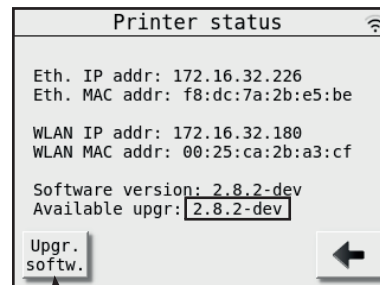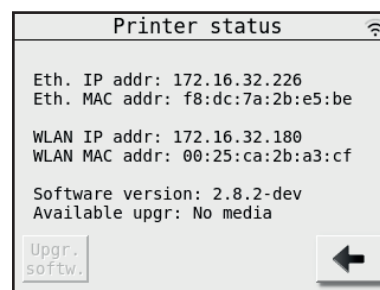
Upgrade software button

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.
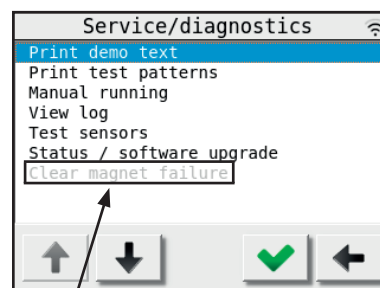
The Clear magnet failure choice

4.7   Date and time menu

Main Menu - Date and time
Used to change the date and time setting.
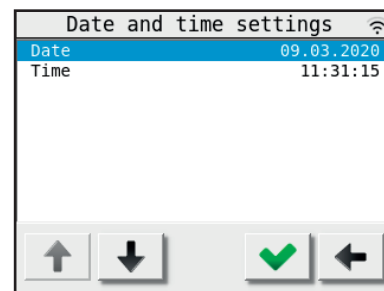
Date

Main Menu - Date and time - Date
Used to change the date.
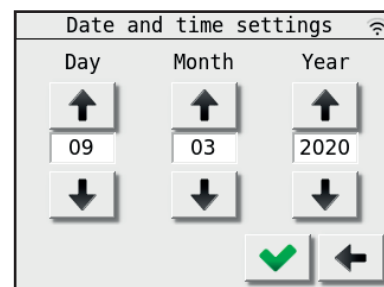
Time

Main Menu - Date and time - Time
Used to change the time.
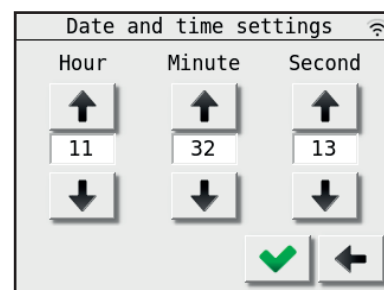
4.8   Sound menu

Main Menu - Sound

Volume

Main Menu - Sound - Volume
Volume setting for beep and speech.
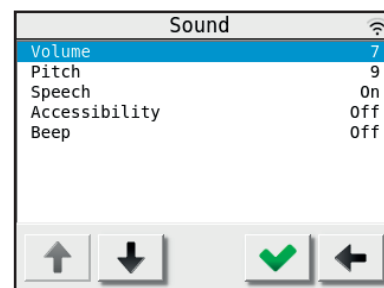
Pitch

Main Menu - Sound - Pitch
Sets the pitch level for the beep.

Speech

Main Menu - Sound - Speech
Toggles Speech on or off.
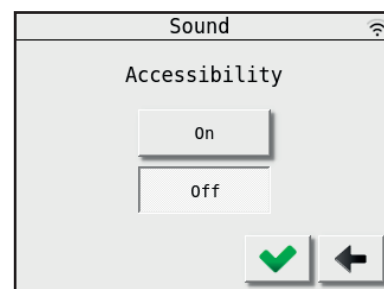
Accessibility

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.
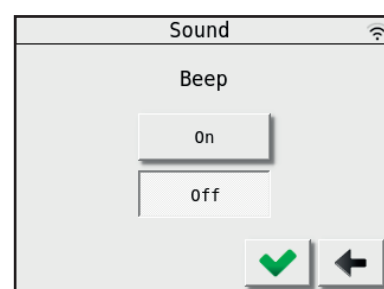
4.9 Printer setup menu

Main Menu - Printer setup

In this menu the basic settings regarding the printer is set.
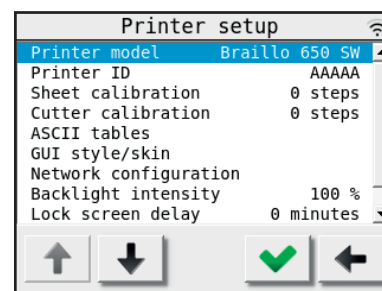
Printer model:
Main Menu - Printer setup - Warning - Printer model

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

Braillo Norway AS 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 the main board in the printer for some reason has been replaced, you have to make sure that the correct printer model is selected here.
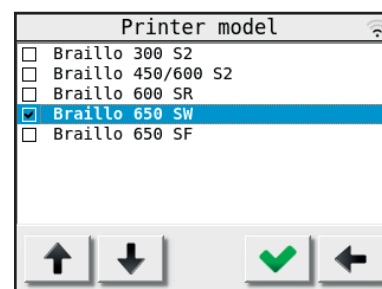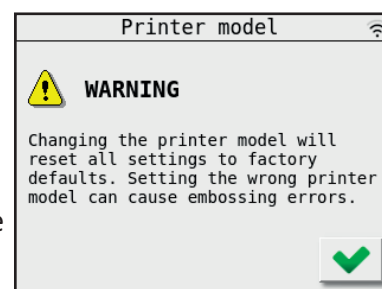
Printer ID:
Main Menu - Printer setup - Printer ID
The printer has a function to make it possible to identify which printer has printed a particular Braille book. It is done by sending a command along with the Braille book that tells the printer to print it's identification. On this setting you can set 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.
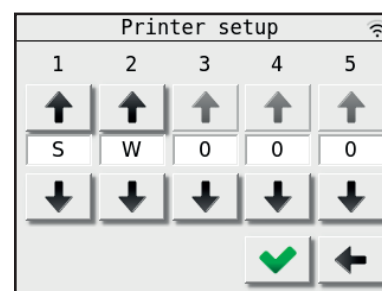
Sheet calibration:

Main Menu - Printer Setup - Sheet calibration

This is a function that makes it possible to make small adjustments on the width of the sheet. There is a value that can be set from -10 to +10. If the value is 0, there is no correction.

Negative numbers will give you a narrower sheet.

Positive numbers will give you a wider sheet.
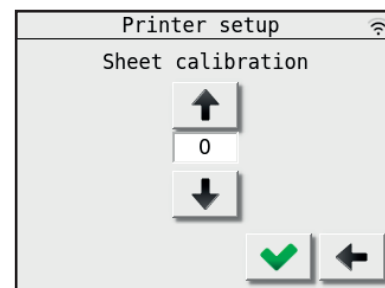
Cutter calibration:

Main Menu - Printer Setup - Cutter calibration

This function adjusts the position of the cut related to the printed pages. The paper sheet length stays the same.

The value can be set from -16 to +16.

Positive numbers gives a wider left and a narrower right margin on the sheet. Negative numbers gives a narrower left and a wider right margin on the sheet.
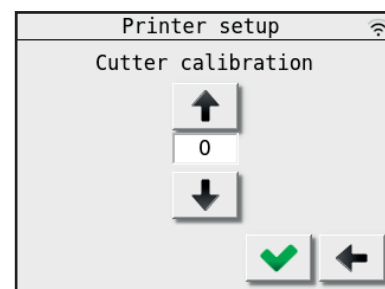
See for more information.

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.
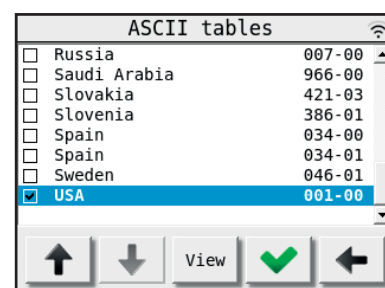
It is also possible to view the translation between characters and dots in the different ASCII tables by pressing the "View" button.

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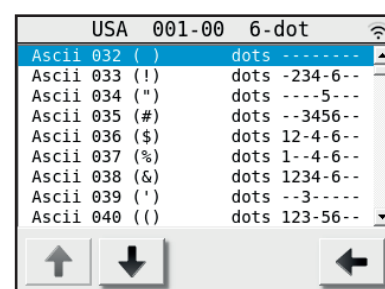
GUI style/skin:

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.
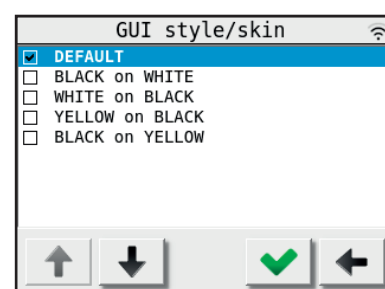
Network configuration:
Main Menu - Printer setup - Network configuration
This menu choice gives you the possibility to choose between:
- **Regular DHCP IP address (default setting)**
- **Static IP address**
Note with static IP you have to set all the three network parameters manually, and all three has to be set.

```
Network configuration    📶
☑ DHCP
☐ Static
     IP address
     Netmask
     Gateway


   ⬆    ⬇   Conf.  ✔  ←
              WLAN
```
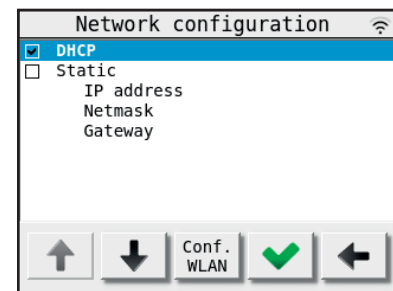
The three different settings for the static IP is set using the buttons as shown in the figure to the right. Type the numbers into the first text cell, then tap the next cell to move to it. When all four numbers are set, press the green **Accept** button to go back to the Network configuration menu.

```
Network configuration
[    ] . [    ] . [    ] . [    ]
   7       8       9      DEL
   4       5       6
   1       2       3
       0           .      CLR

            ✔   ←
```
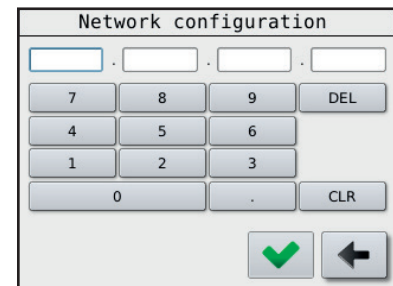
- **Wireless configuration**
To start the set up for connecting to a WLAN network, press the button 'Conf. WLAN'.
Now the printer will start to transmit on a temporary WLAN network with the SSID and password shown in the display.
Note that the password changes every time, so if you have to do this more than once, remember to always use the latest password.

See 3.7 'Wireless network (WLAN)' on page 36 for more information.

```
Network configuration    📶
ℹ  Wireless Configuration

Connect to configuration network:
SSID: Braillo-2BA3CF
Password: Tall-Provable

Then open this URL in a browser:
http://192.168.45.1/

                          ←
```

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

```
Printer setup           📶
     Backlight intensity
            ⬆
          [ 100 ]
            ⬇
            ✔   ←
```
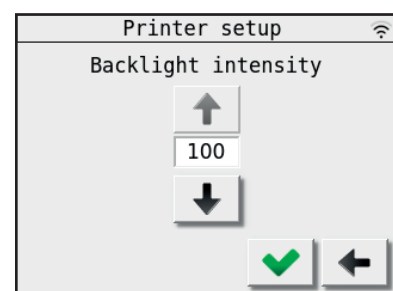
Lock screen delay:

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.
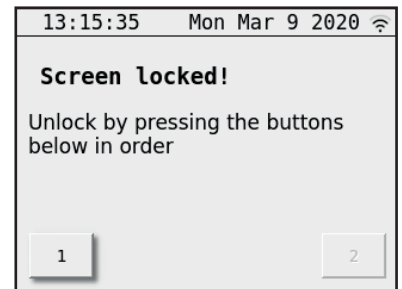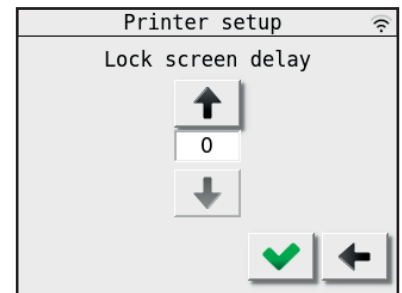
4.10   Counters menu

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).
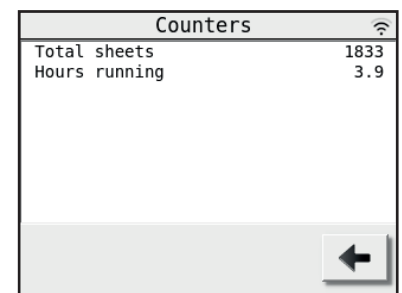
4.11 Display messages

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
```
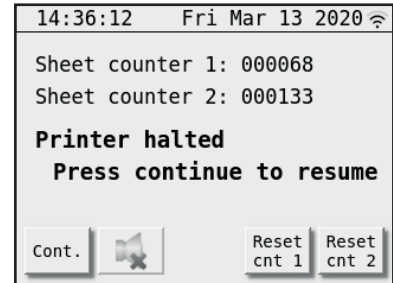
- Out of paper
The printer has run out of paper and is waiting for paper.
When paper is detected, the display will change to "Press continue to resume".

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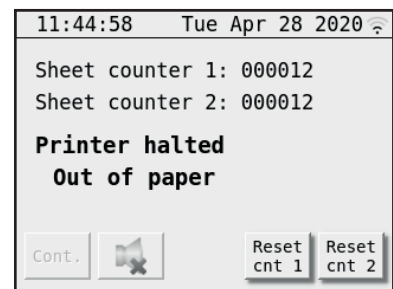
- Printer cover open
This occurs when one or more panels on the printer cover are open.
When the side panels are put back in place, the display will change to "Press continue to resume".

```
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
```
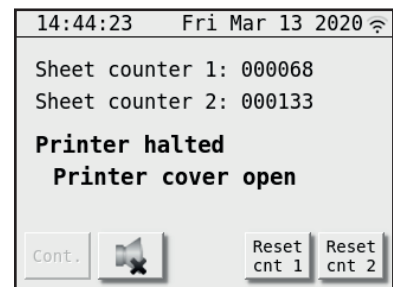
- Stacker is full
The stacker belt is full, and the sheets must be removed.
When the sheets are removed, the display will change to "Press continue to resume".

```
14:42:44    Fri Mar 13 2020 🛜

Sheet counter 1: 000068
Sheet counter 2: 000133

Printer halted
  Stacker is Full


Cont.  🔇              Reset  Reset
                      cnt 1  cnt 2
```
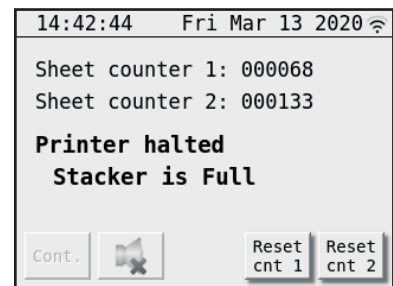
- At paper sensor
The sheet has not been detected at the paper sensor in the stacking unit within a certain time after the sheet was cutted. This could be caused by e.g. a paper jam. Correct the problem and push a sheet under the paper sensor, and display will change to "Press continue to resume".

```
14:34:37    Fri Mar 13 2020 🛜

Sheet counter 1: 000068
Sheet counter 2: 000133

Printer halted
  At Paper Sensor


Cont.  🔇              Reset  Reset
                      cnt 1  cnt 2
```
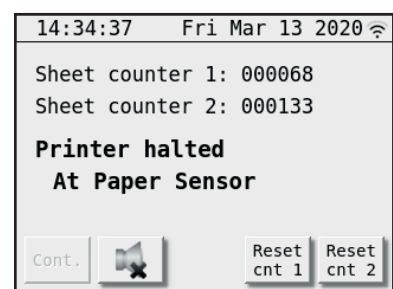
4.12 Unrecoverable errors:

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)

```
12:01:52    Tue Apr 28 2020 
Sheet counter 1: 000020     🧲
SINCE FAILURE  : 000000   ↘ ↙
General failure
  Magnet rack failure

  🔇                    Reset
```
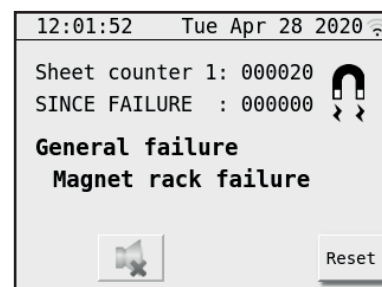
When trying to print after a defect magnet is found and replaced, the display will still show the magnet symbol in the top right hand corner. This is because you have to reset the magnet failure.
To reset the magnet failure, you have to select the menu choice **Clear magnet failure**. See 'Clear magnet failure:' on page 56 for more info.
(Main Menu - Warning - Service/diagnostic - Clear magnet failure)

```
12:06:12    Tue Apr 28 2020 
Sheet counter 1: 000021     🧲
SINCE FAILURE  : 000001   ↘ ↙
Ready to emboss
Fine
adj.+
Fine   Main   Form   Reset  Reset
adj.-  menu   feed   cnt 1  cnt 2
```
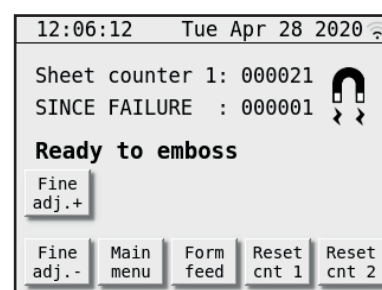
If the display shows "General failure, Magnet rack failure" without the magnet symbol in the top right corner, it means that there has been detected error(s) in e.g. the data transmission between the main board and the magnet racks, or it could be a broken fuse for the power to one magnet rack.

```
14:29:40    Fri Mar 13 2020 
Sheet counter 1: 000065
Sheet counter 2: 000130
General failure
  Magnet rack failure

  🔇                    Reset
```
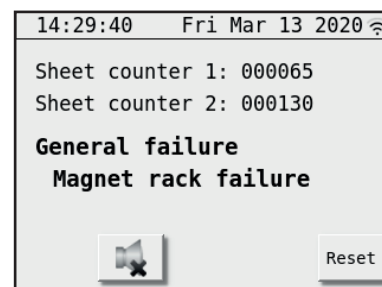
- Illegal ESC sequence
The printer has received an ESC sequence that it doesn't recognize, it is placed in wrong location on the page or contains invalid parameters. Press OK to continue.

```
16:24:47    Mon Oct 30 2017
Sheet counter 1: 001393
Sheet counter 2: 000020
Job canceled
  Illegal ESC. sequence

  🔇                    OK
```
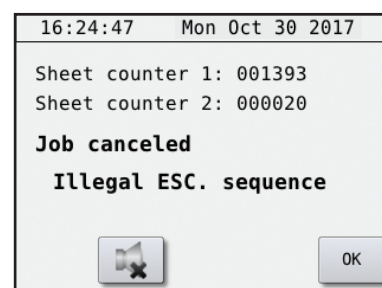
- Beam wheel failure

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
```
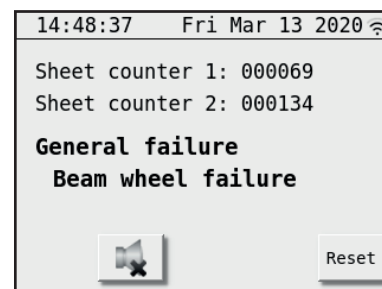
- Page self adj. failure

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
```
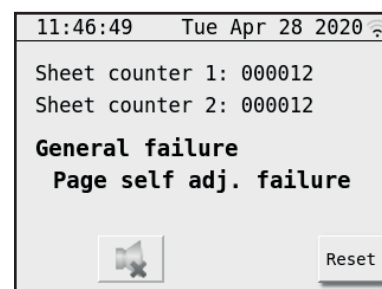
- Paper feed failure

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
```
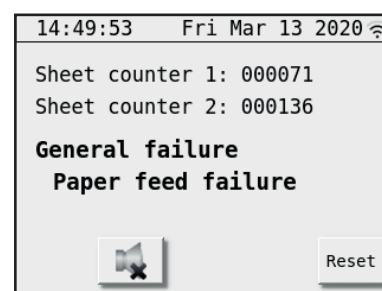
4.13   Overview of the menu structure.
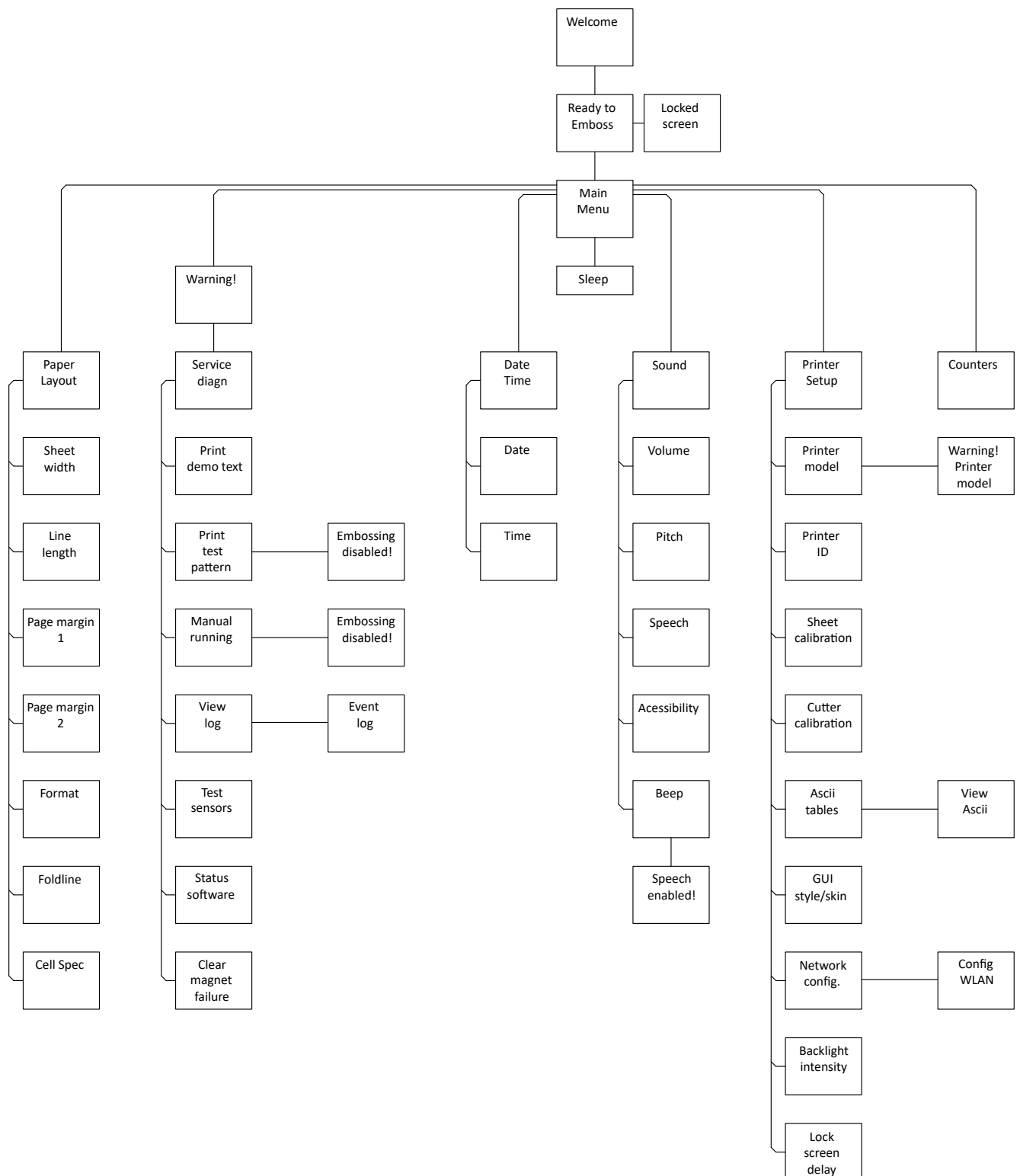
4.14 Test Print

The test print program is designed to ensure that the 180 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.
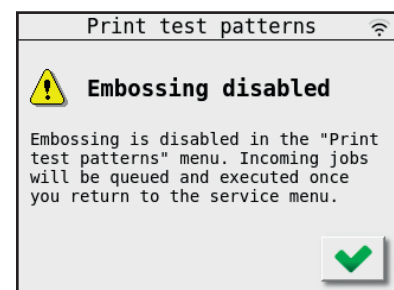
- X pattern
Will print dots in a x pattern across the sheet,
useful when searching for missing dots.

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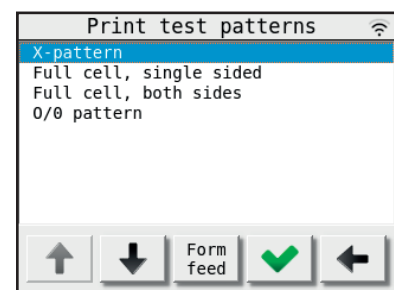
- O/Ø pattern
Prints a test pattern made of dot 1,3,5 and 2,4,6, single-sided, useful when searching for extra dots.

Section 5.3 'Printing principle' on page 71 illustrates how the printing mechanisms are placed.

Instruction for troubleshooting will be illustrated by examples in section 5.4 'Troubleshooting, incorrect Braille' on page 77.

4.15   Operating the SW2 Stacker

Run belt   Reset stacker   Belt speed
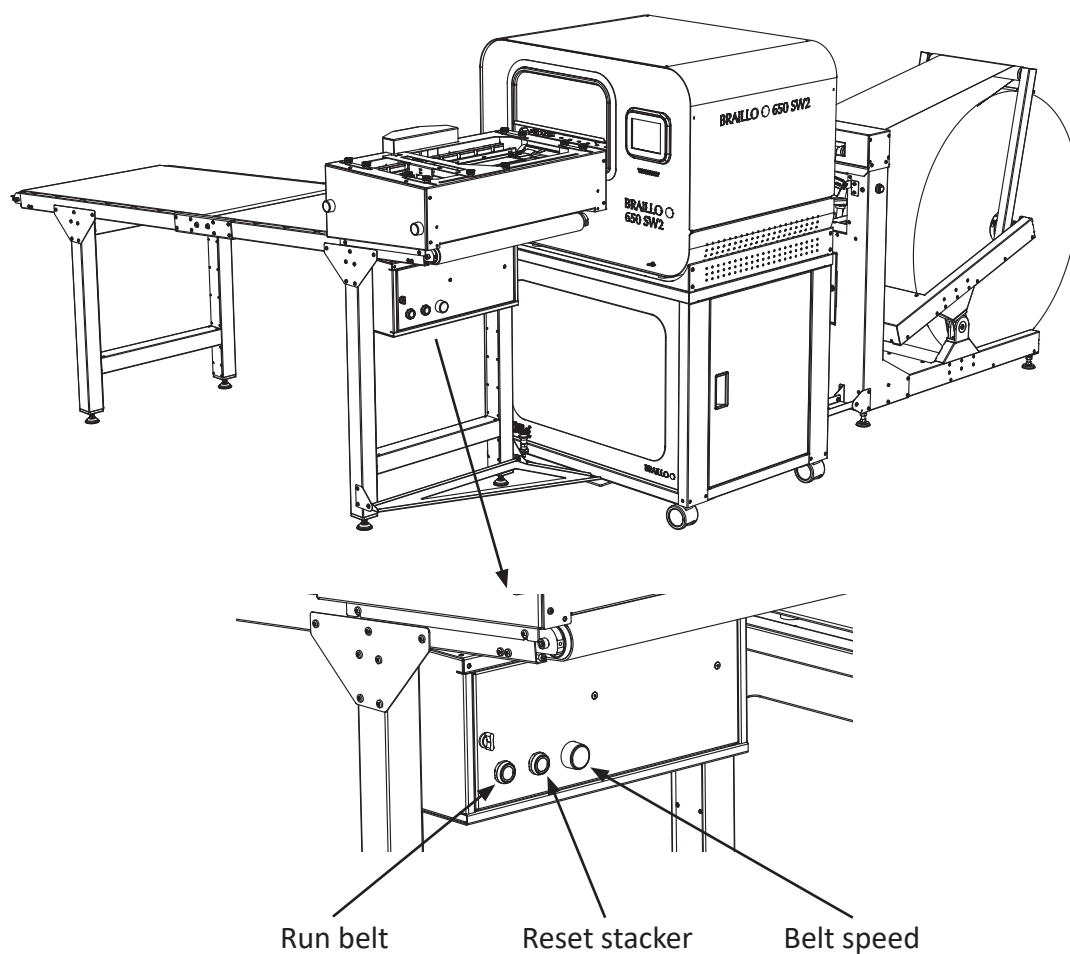
- Run belt
Used to manually move the conveyor belt. Useful to move printed material out from the stacking unit.

- Reset stacker
When pushing this switch, the stacker control unit will start from the beginning of it's program and cycle through the program once.

- Belt speed
The speed on the conveyor belt can be adjusted here. The conveyor belt speed will be directly proportional to the distance between each pile of printed sheets.

4.16 Cutter calibration

The cutter calibration is adjusting the position of the cut related to the printed text on the sheet. Measure from the edge till the center of the printed text (or the fold line).
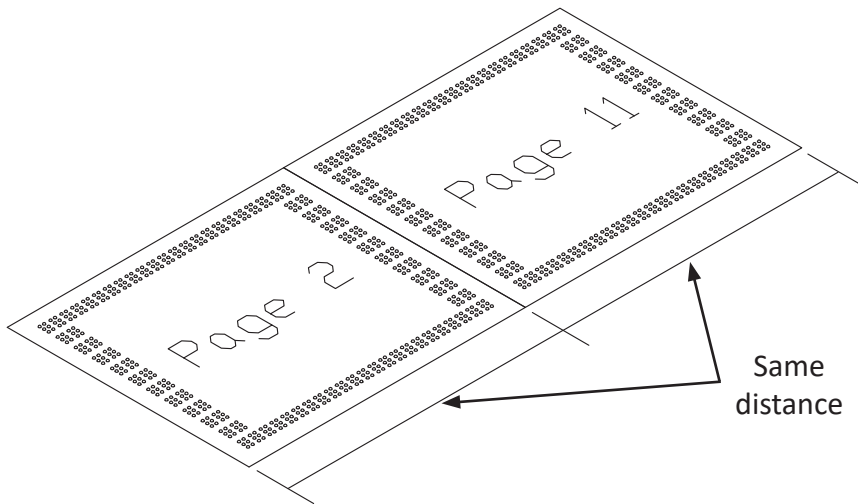
If the cutter calibration is correctly adjusted, the cut should be placed on the sheet like shown in the figure to the left.
The distance from the cut to the fold line will be the same on both sides of the cut.
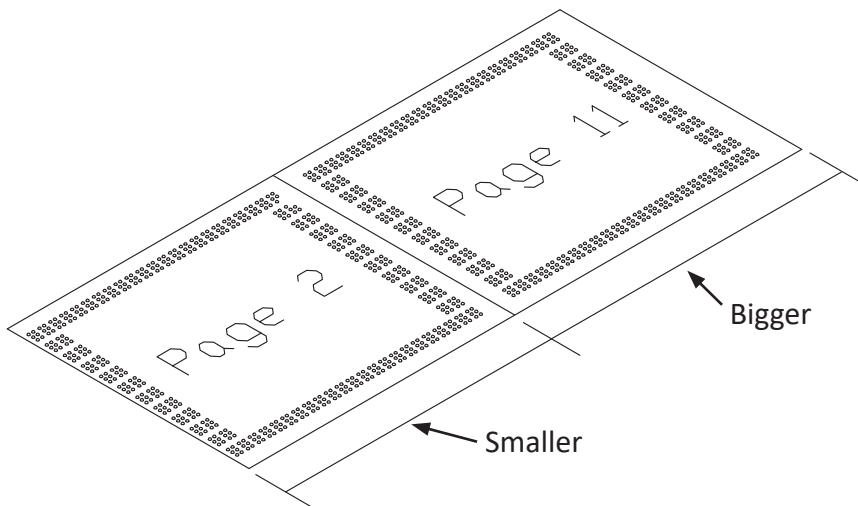
If the cutter calibration is adjusted too high, the cut will be placed nearer to the printed text on the starting edge of the paper.

In this case, decrease the value on the cutter calibration.
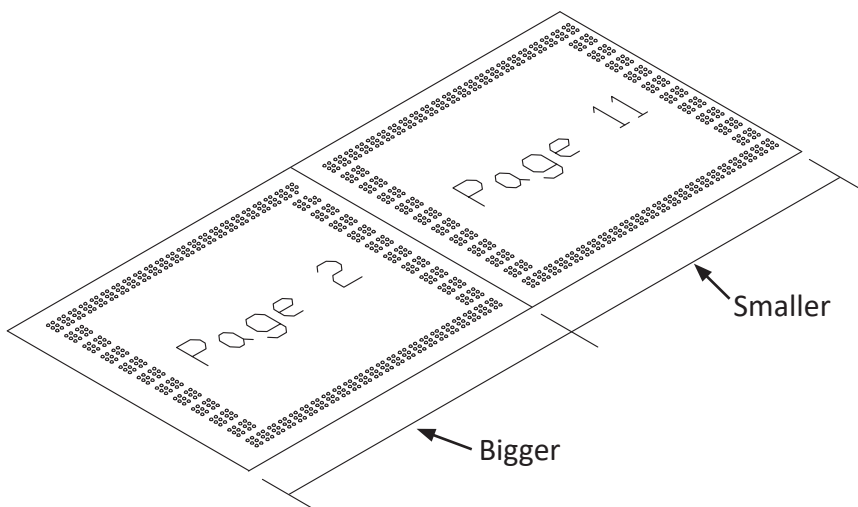
If the cutter calibration is adjusted too low, the cut will be placed further away from the printed text on the starting edge of the paper.

In this case, increase the value on the cutter calibration.

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 5.2 'Removal of the printer top' on page 70 on how to do this.

5.1 Removal of the printer side panels

The printer 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
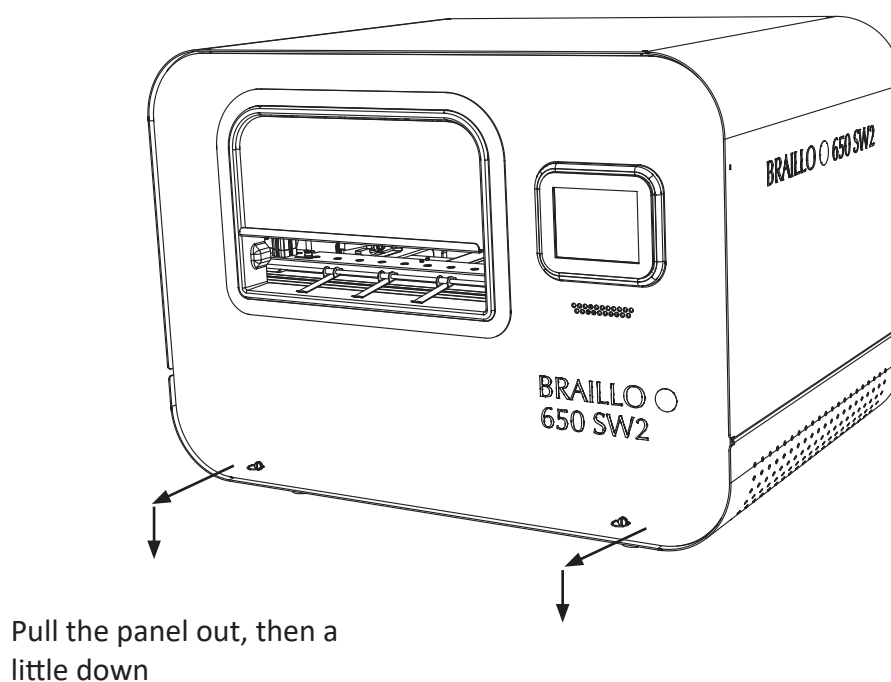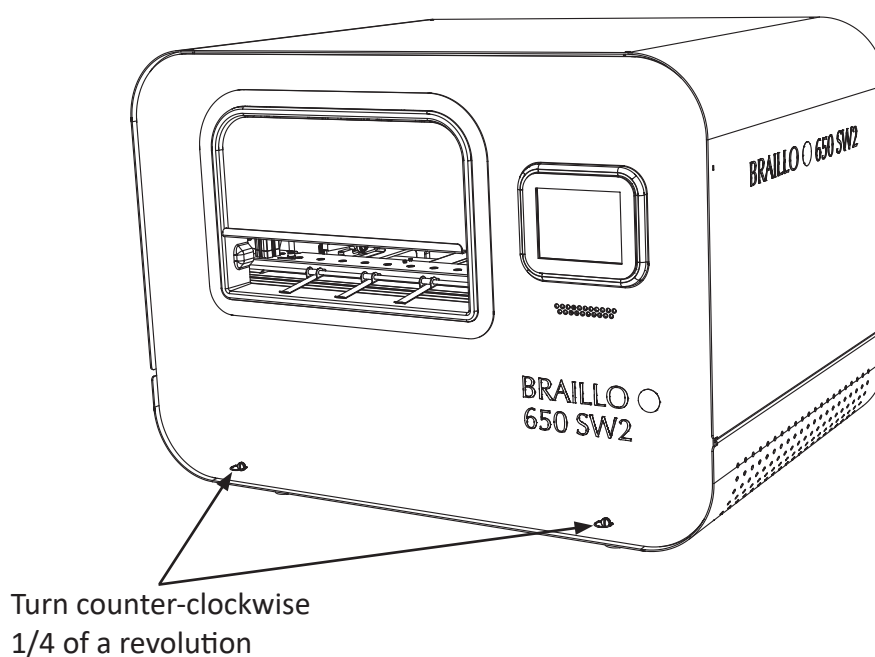
5.2   Removal of the printer top

If you are going to do maintenance, it can be more convenient to remove the top. Remove both side panels as described in section 5.1 'Removal of the printer side panels' on page 69. 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
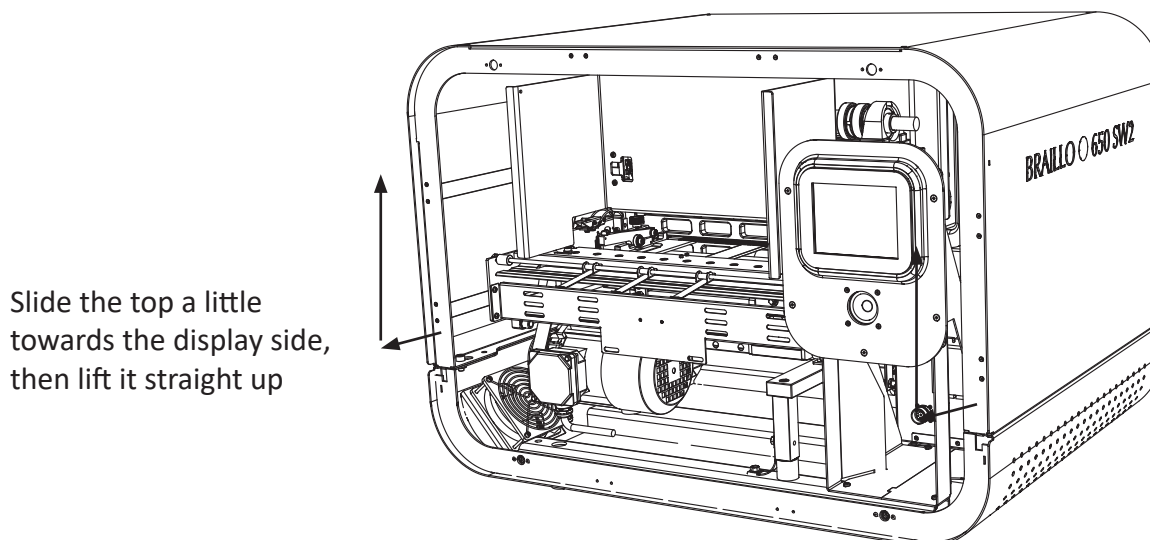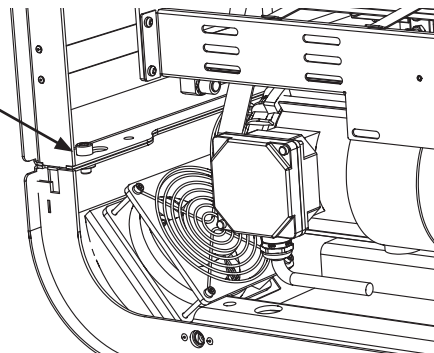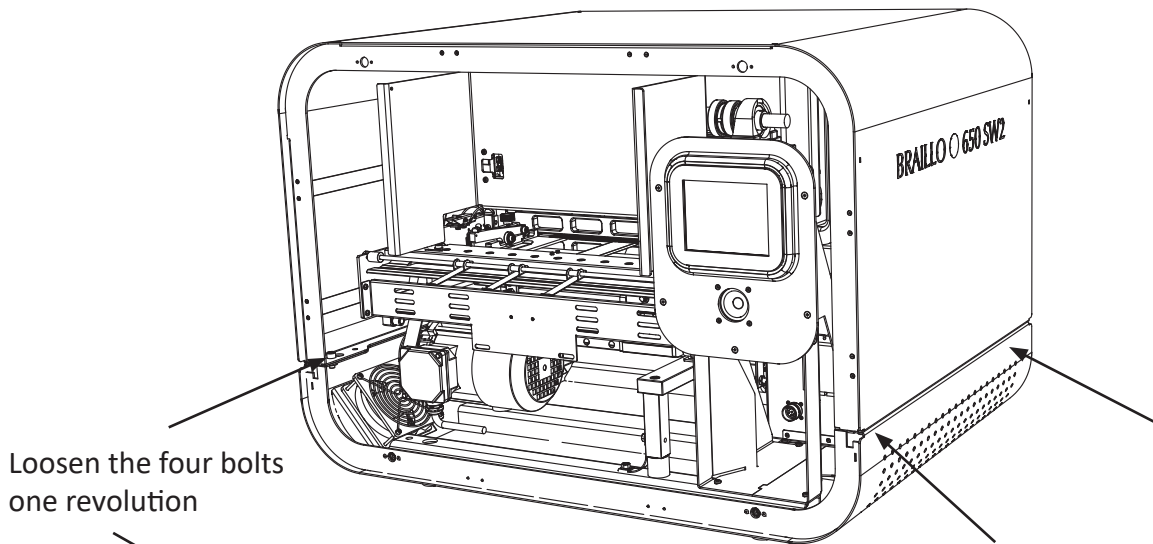
5.3   Printing principle

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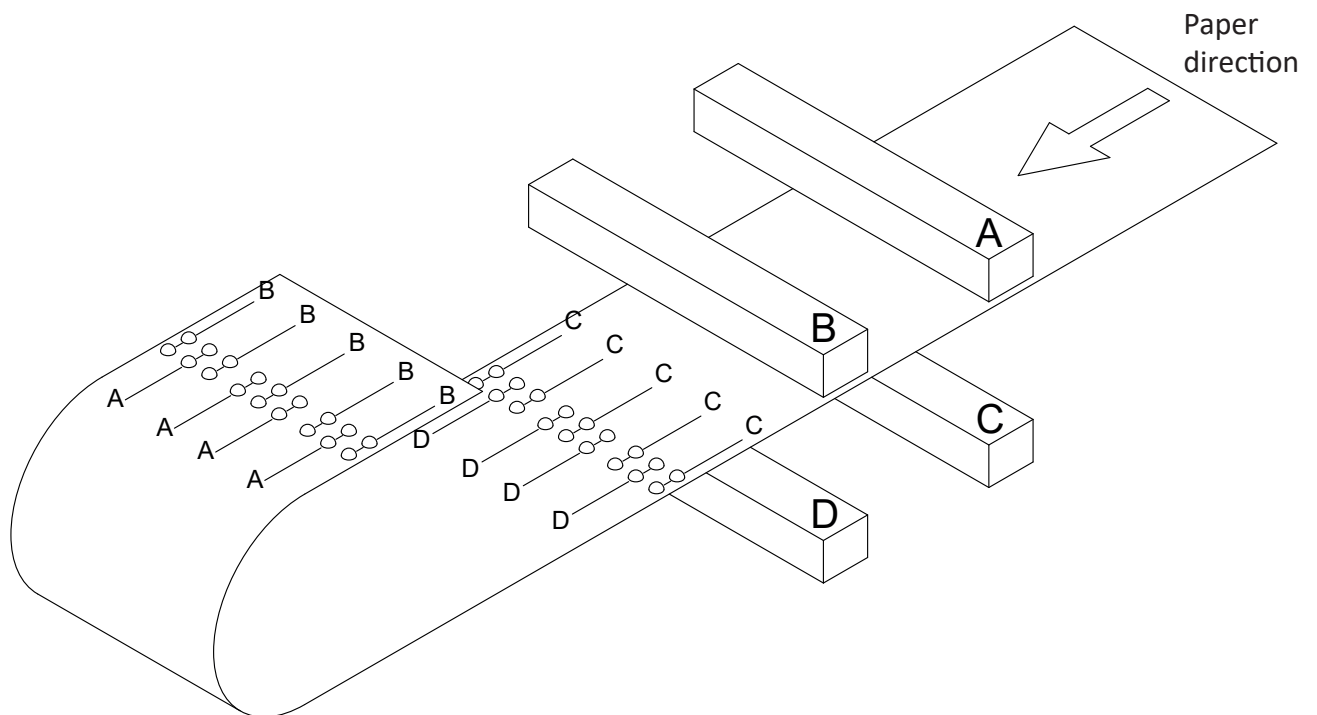
The figure below is a "theoretical" figure showing the parts inside the printing mechanism. The printer has been "sliced" to show more detailed of how it is constructed.
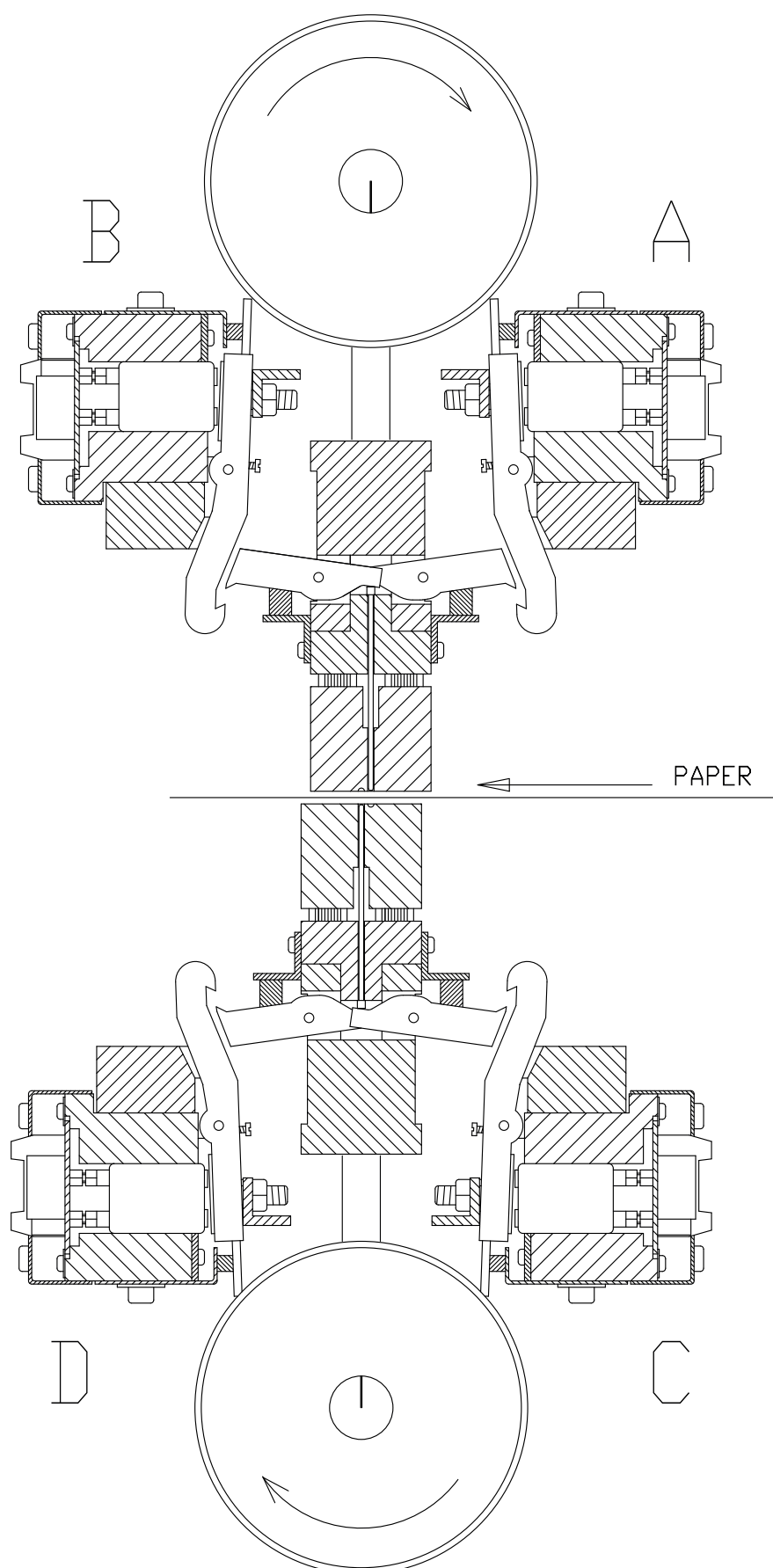
Please see the figure on the previous page.

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 two times to form a complete column of characters.

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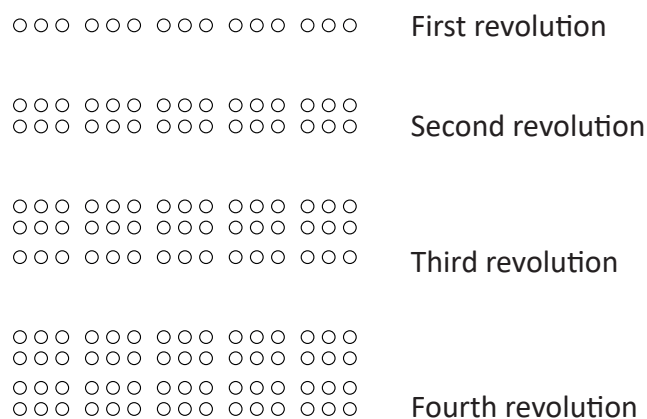
To be able to print interpoint (where both sides of paper are printed simultaneously), the back page is offset a little to the right and a little down to fit in between the dots on the front page.

Please see figure below:
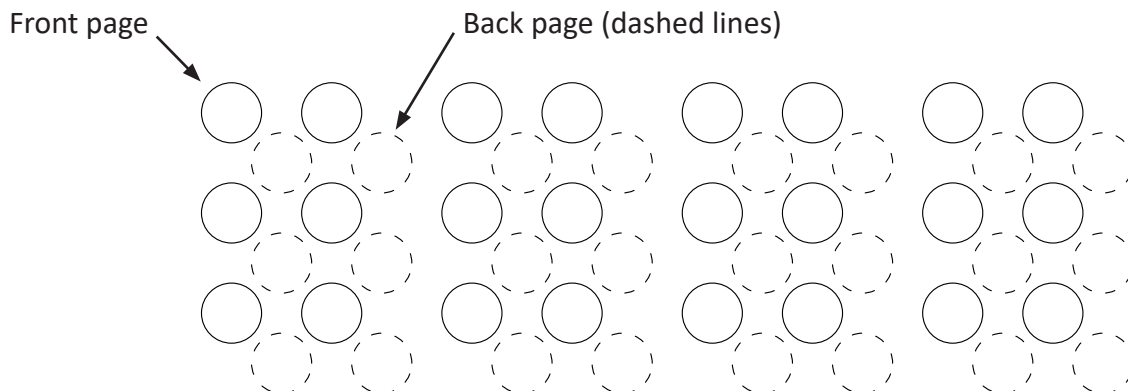
The drawing on this page is meant to help to understand the basic principle of how the dots are printed. Please also see the drawings on the next page.

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 45 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.
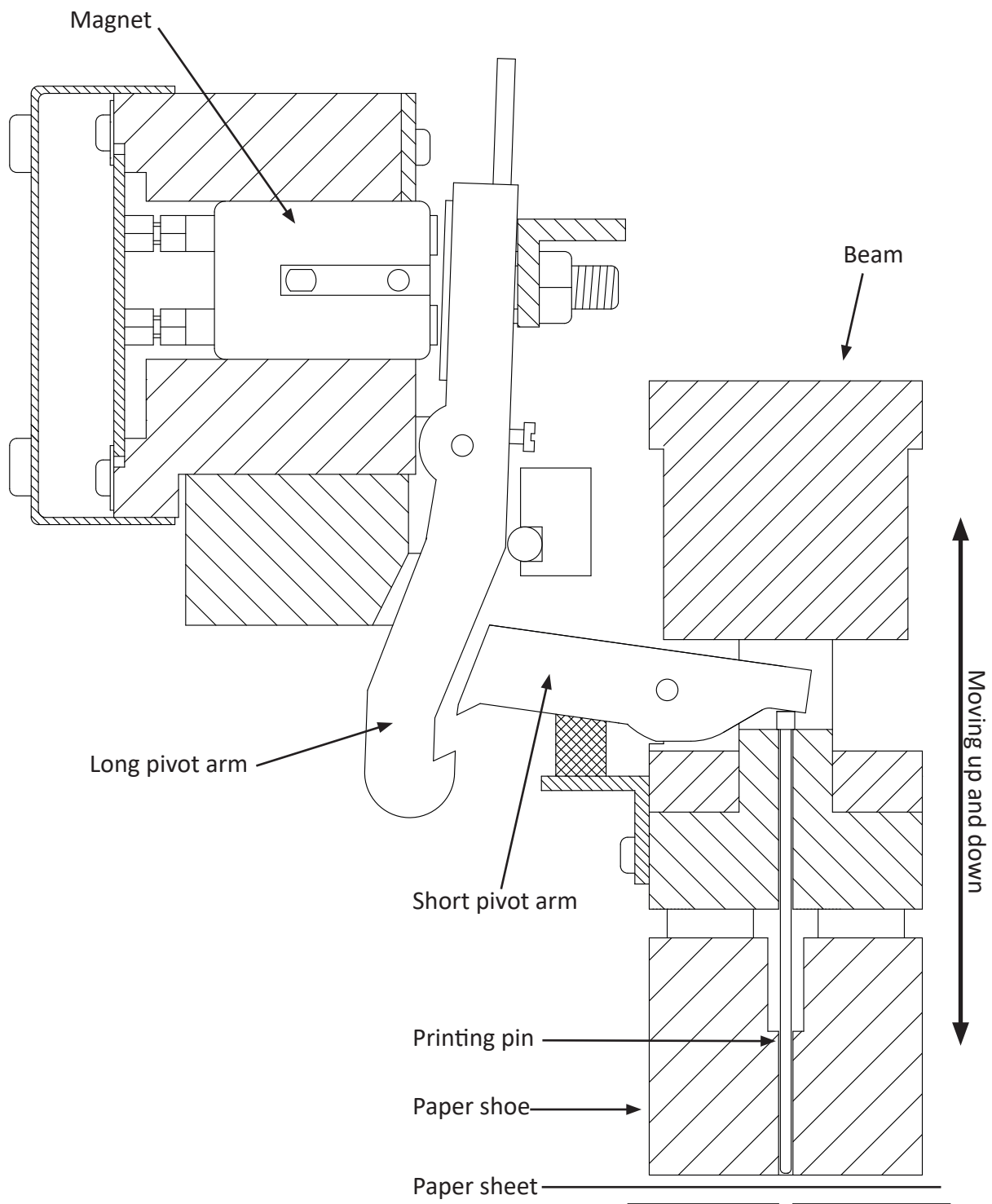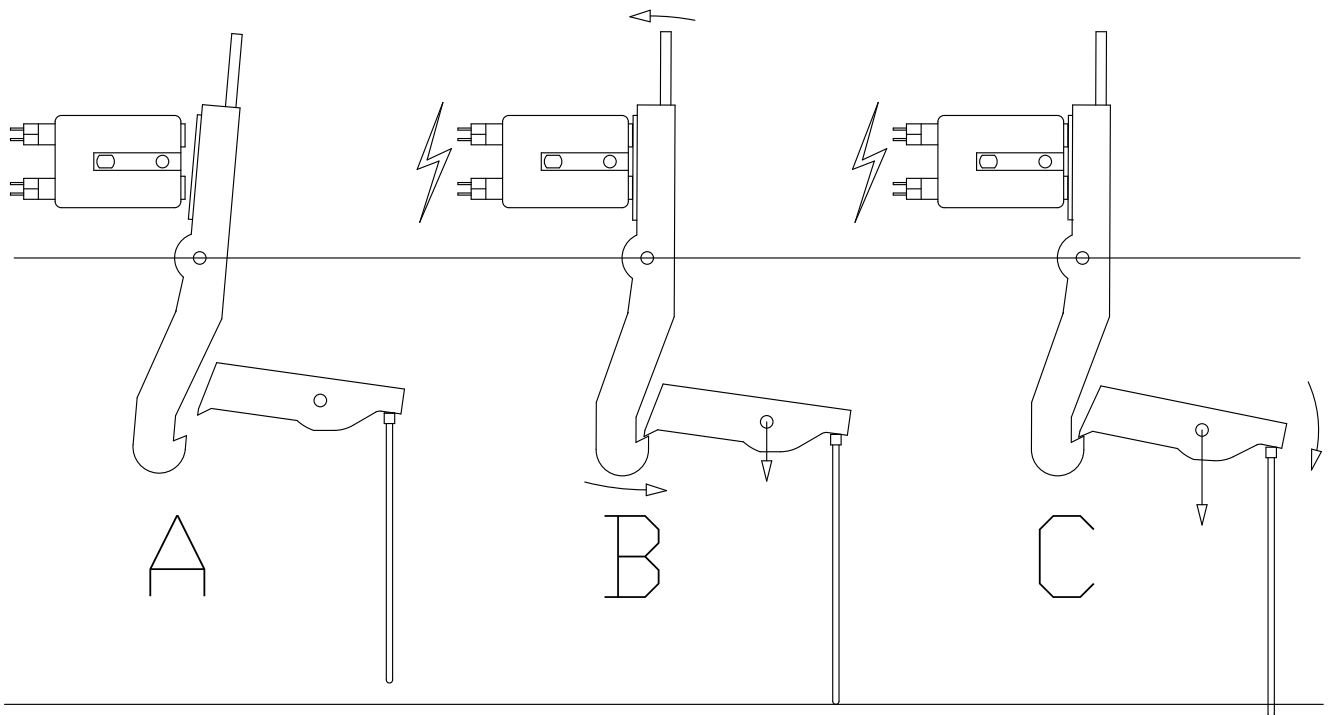
Figure A
Shows the position on the pivot arm when the printer is not printing, and the magnet is not engaged.

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

Main Belt

Operator panel

Cutter

Electric unit

Main Motor

Magnet rack D

Main board

Magnet rack A

Magnet rack C

On/Off switch
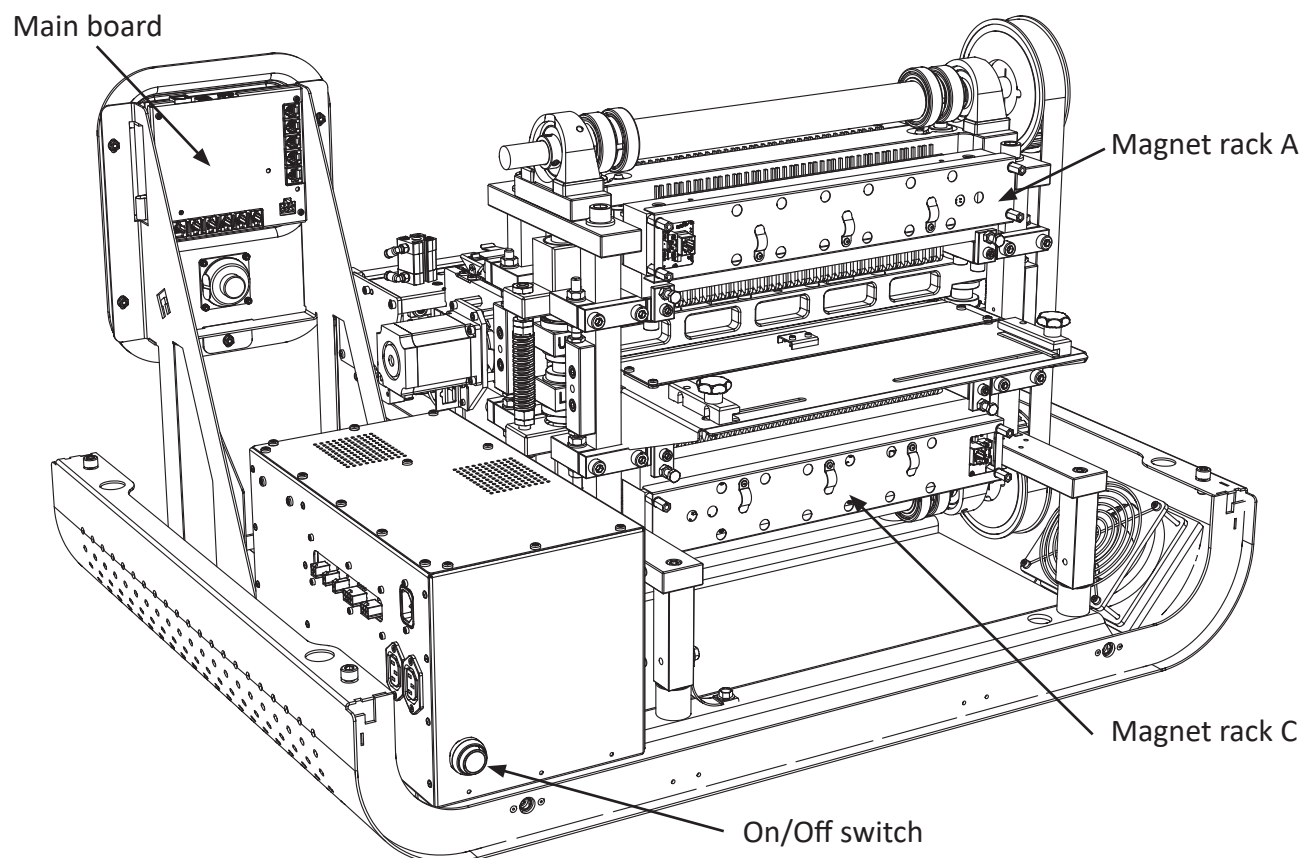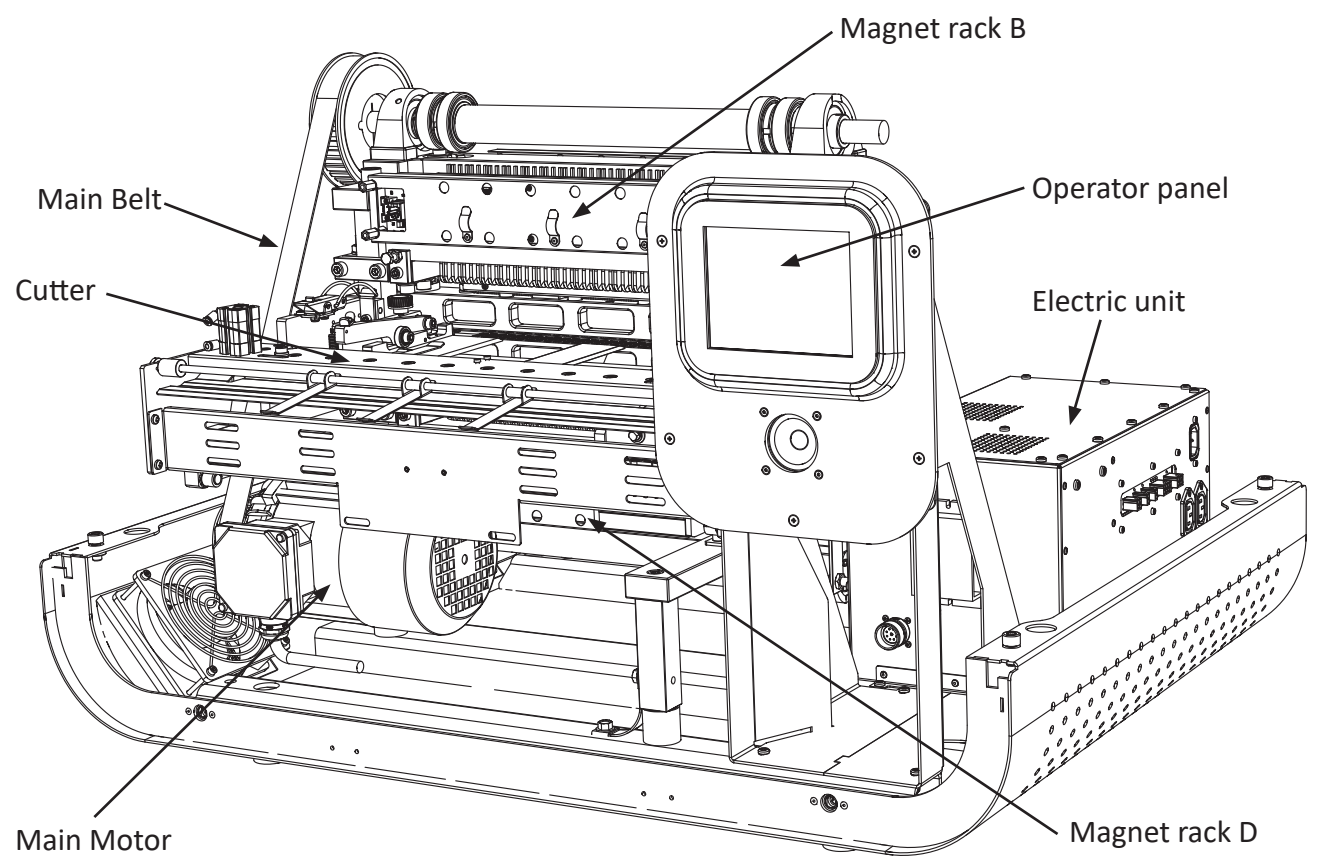
5.4 Troubleshooting, incorrect Braille

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 45 printing mechanisms. There are totally 180 printing mechanisms to choose from when the error search begins. See section 'Which magnet makes what dot?' on page 78 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 5.8 'Magnet rack - cleaning' on page 88, and section 5.28 'Maintenance' on page 115.

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 'Which magnet makes what dot?' on page 78.

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.

Which magnet makes what dot?

Please take some time to examine the figures below and on the next page. It is very important that you know how the magnets are arranged to be able to understand how this printer works.

The letters and numbers on the figures is indicating the following:
The letters A, B, C and D are the names of the magnet racks. The number following the letter is the particular magnets number in that particular magnet rack.
(Note that the magnet numbers are always counted from the end where the connectors are fitted. Don't mix this with character/line/column number).

Paper direction

Magnet rack A and B are placed above the paper, and print dots that will appear on the underside of the paper.

Magnet rack C and D are placed under the paper, and print dots that will appear on the top side of the paper.
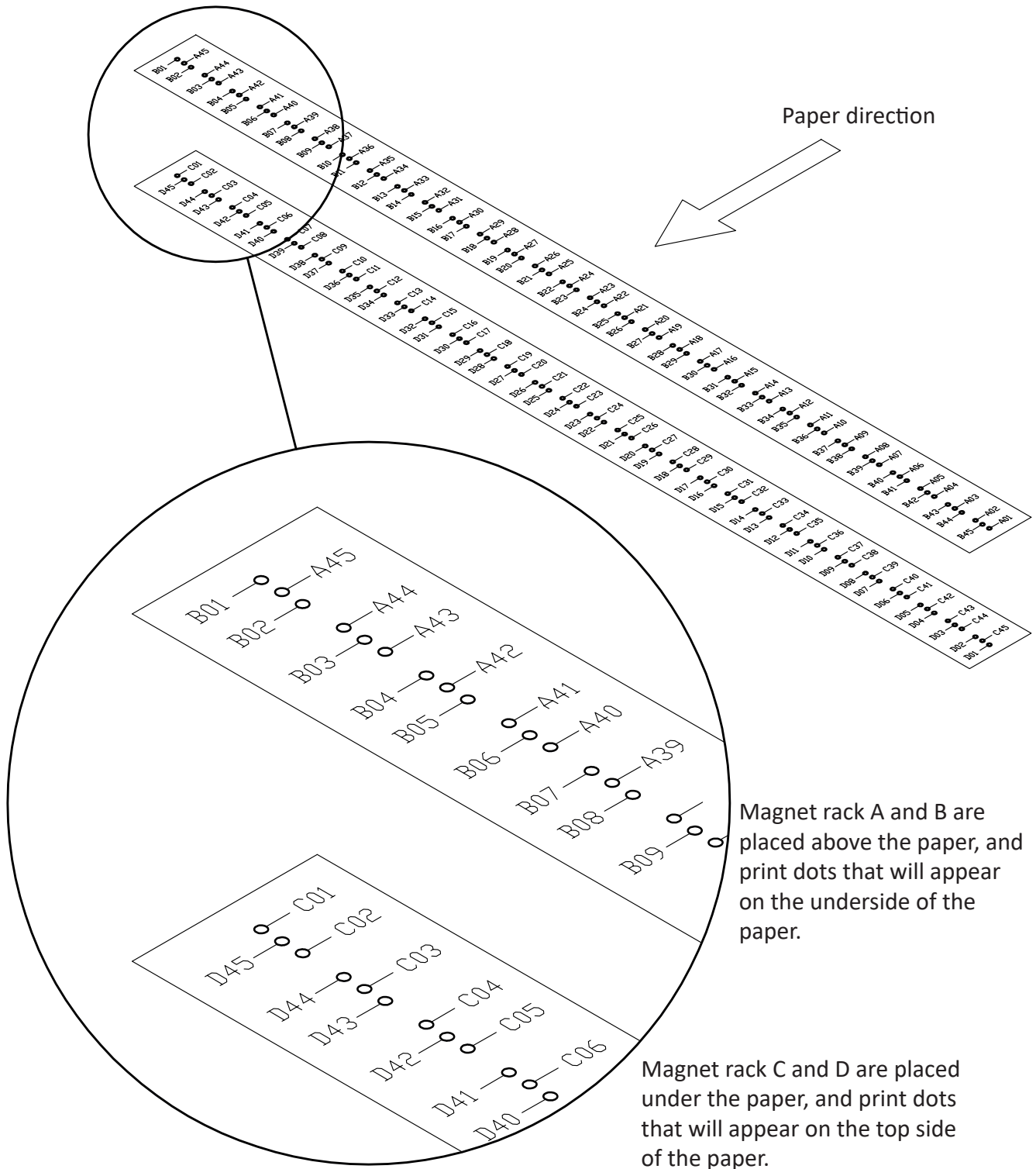
The letter "P" means page. The figure shows a sheet of paper printed in "4-page mode".
The two circles is showing which magnet that has made the different dots. Line no. one will be in the upper left corner when facing the page.
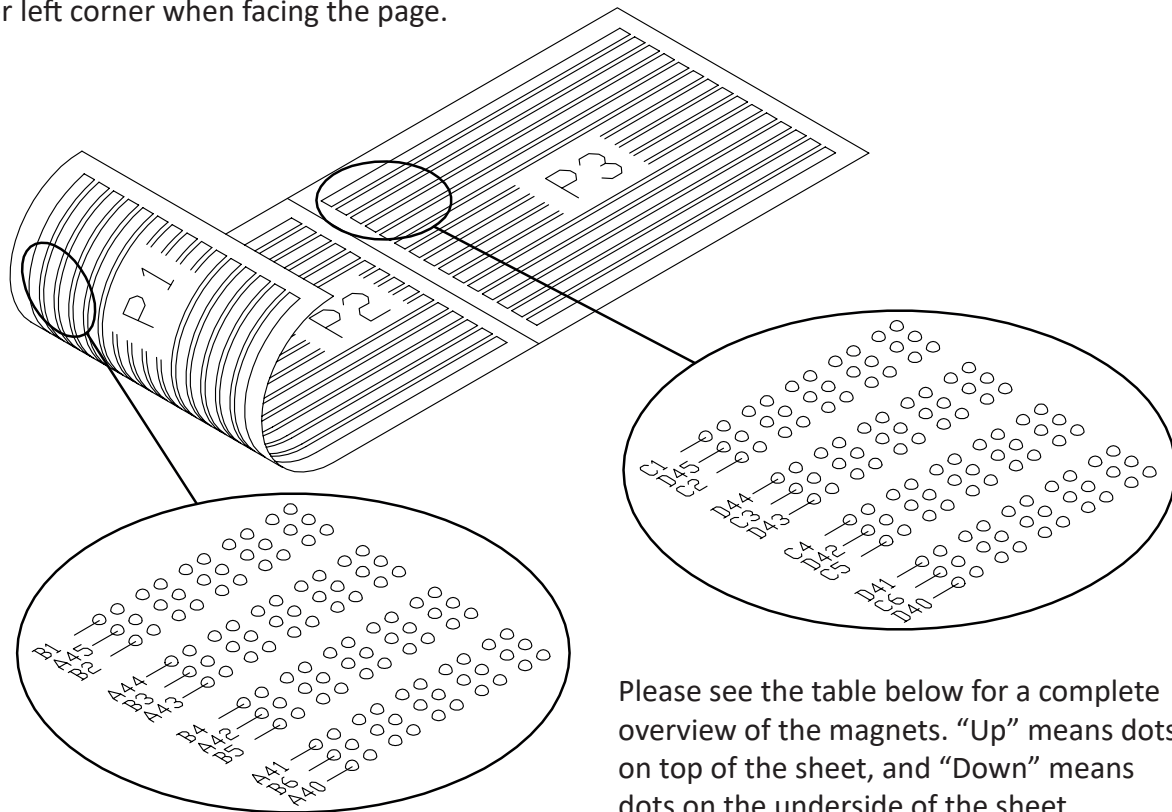
Please see the table below for a complete overview of the magnets. "Up" means dots on top of the sheet, and "Down" means dots on the underside of the sheet.

Line no.	Dot no.	Up	Down	Line no.	Dot no.	Up	Down	Line no.	Dot no.	Up	Down
1	1	C01	B01	11	1	C16	B16	21	1	C31	B31
	2	D45	A45		2	D30	A30		2	D15	A15
	3	C02	B02		3	C17	B17		3	C32	B32
2	1	D44	A44	12	1	D29	A29	22	1	D14	A14
	2	C03	B03		2	C18	B18		2	C33	B33
	3	D43	A43		3	D28	A28		3	D13	A13
3	1	C04	B04	13	1	C19	B19	23	1	C34	B34
	2	D42	A42		2	D27	A27		2	D12	A12
	3	C05	B05		3	C20	B20		3	C35	B35
4	1	D41	A41	14	1	D26	A26	24	1	D11	A11
	2	C06	B06		2	C21	B21		2	C36	B36
	3	D40	A40		3	D25	A25		3	D10	A10
5	1	C07	B07	15	1	C22	B22	25	1	C37	B37
	2	D39	A39		2	D24	A24		2	D09	A09
	3	C08	B08		3	C23	B23		3	C38	B38
6	1	D38	A38	16	1	D23	A23	26	1	D08	A08
	2	C09	B09		2	C24	B24		2	C39	B39
	3	D37	A37		3	D22	A22		3	D07	A07
7	1	C10	B10	17	1	C25	B25	27	1	C40	B40
	2	D36	A36		2	D21	A21		2	D06	A06
	3	C11	B11		3	C26	B26		3	C41	B41
8	1	D35	A35	18	1	D20	A20	28	1	D05	A05
	2	C12	B12		2	C27	B27		2	C42	B42
	3	D34	A34		3	D19	A19		3	D04	A04
9	1	C13	B13	19	1	C28	B28	29	1	C43	B43
	2	D33	A33		2	D18	A18		2	D03	A03
	3	C14	B14		3	C29	B29		3	C44	B44
10	1	D32	A32	20	1	D17	A17	30	1	D02	A02
	2	C15	B15		2	C30	B30		2	C45	B45
	3	D31	A31		3	D16	A16		3	D01	A01

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 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
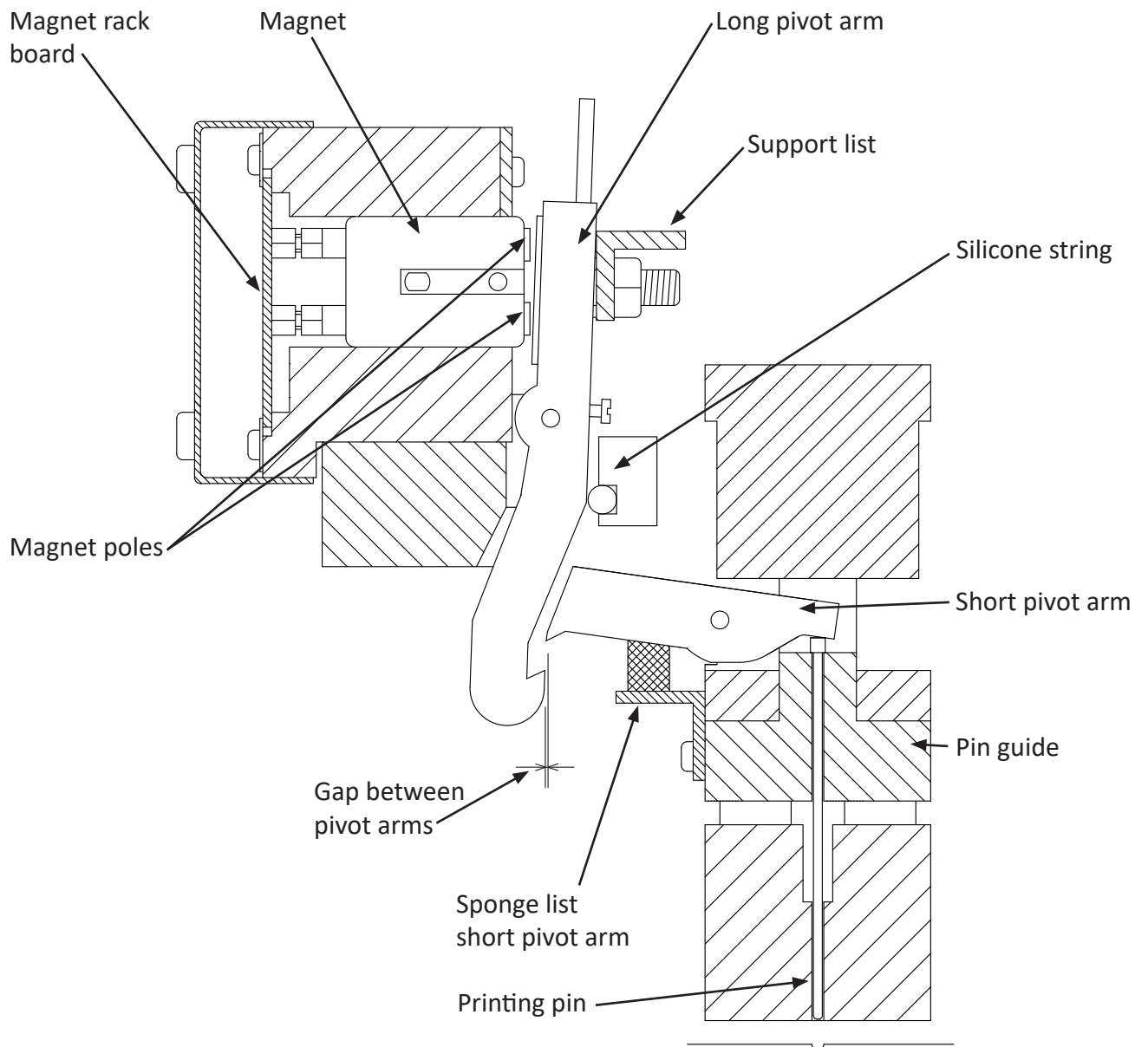
5.5   Magnet rack - removal

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 space.
See section 5.19 'Paper feed and cutter assembly - removing' on page 105
and section 5.22 'Input paper guide - removing' on page 108 for descriptions on how to remove them.
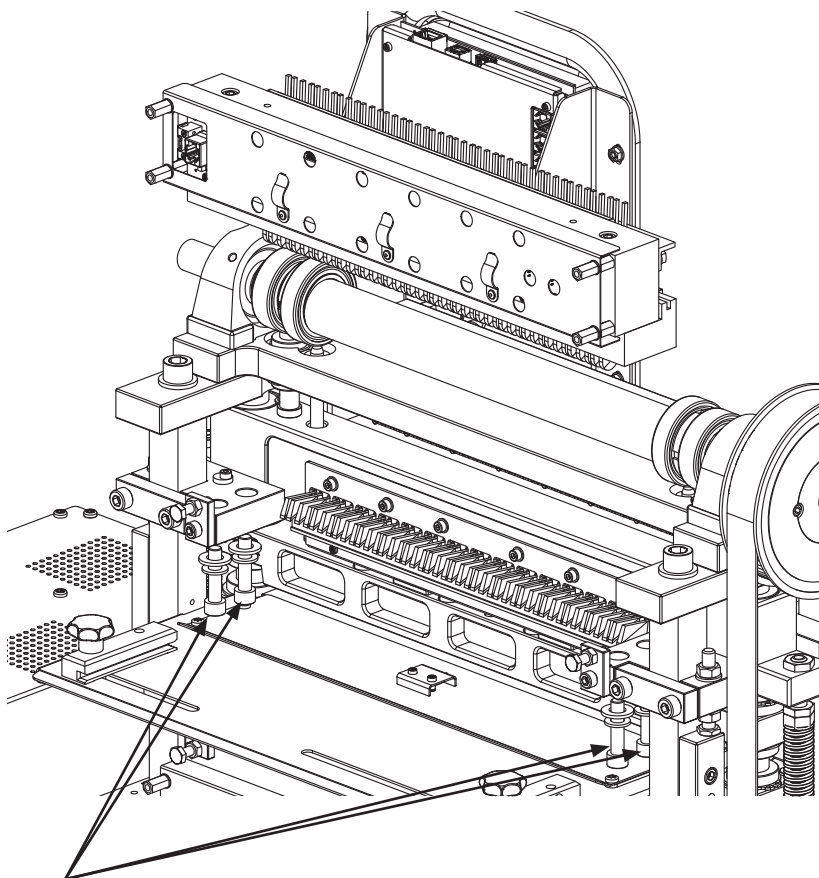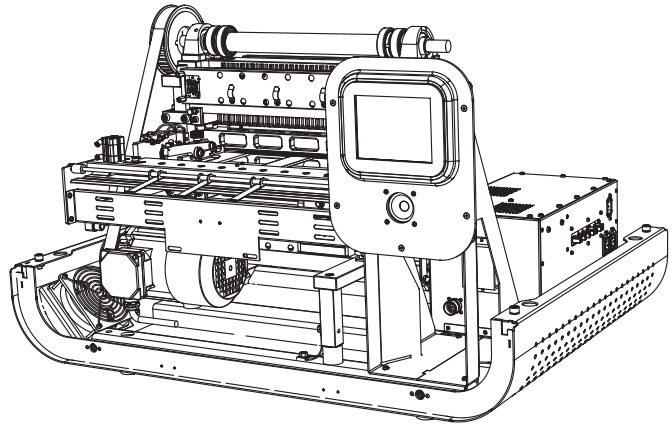
Unscrew the four bolts

5.6   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.
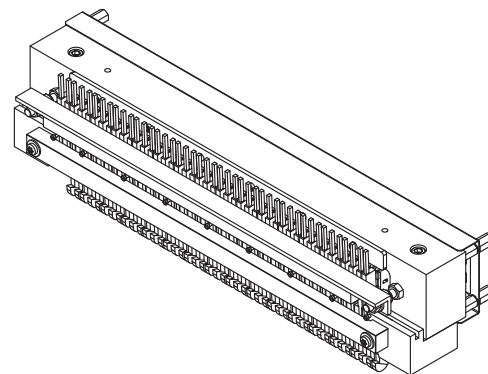
Take the magnet rack out of the printer like described in section .
Next, follow the instructions below.

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

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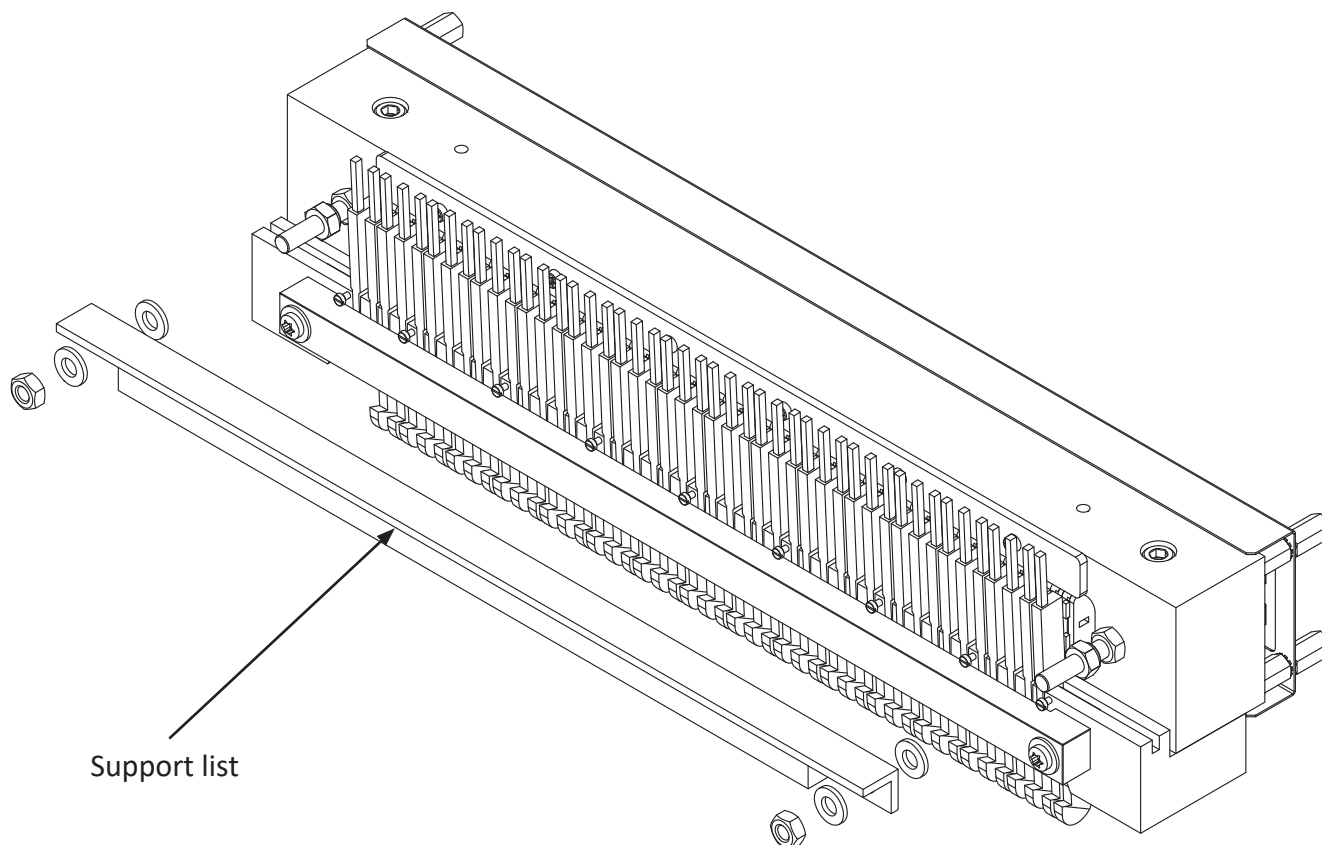
Step 2.   Remove the two screws on the silicone string holder, and then remove the holder.

Silicone string holder
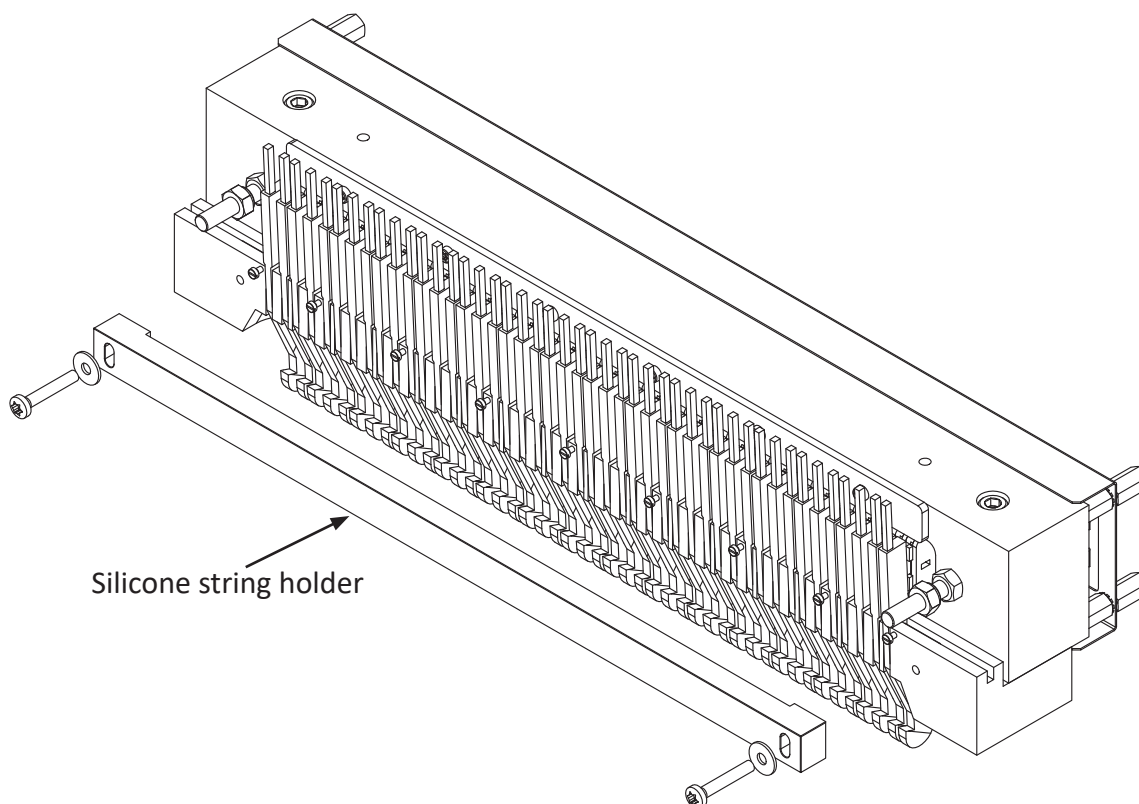
Step 3.   Remove the two bolts holding the pivot arm fastener and then carefully remove the pivot arm fastener. The magnet rack is now disassembled.

Pivot arm fastener
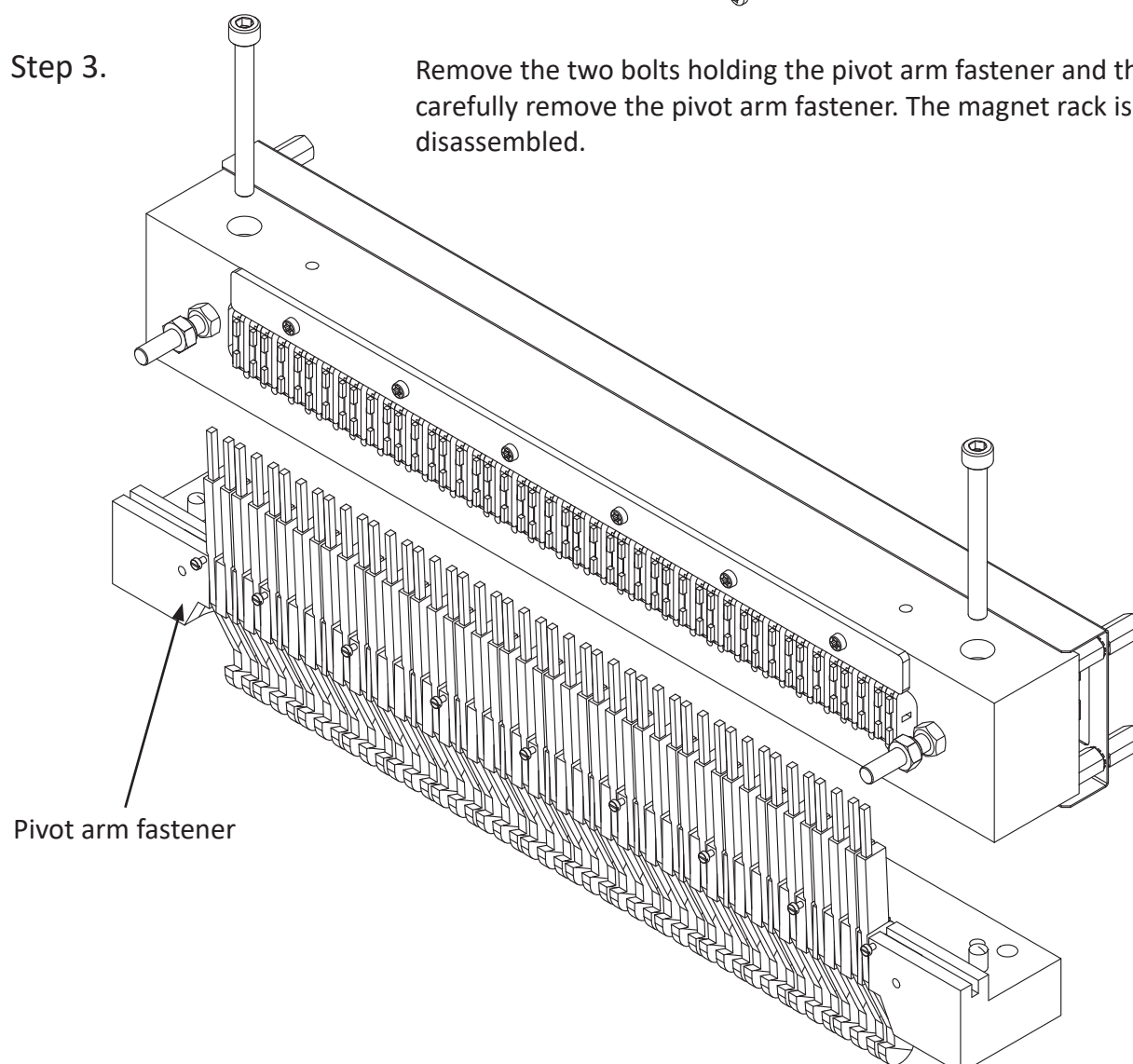
5.7   Magnet - replacement

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 5.6 'Magnet rack - disassembly, step by step' on page 83.
Next, follow the instructions below.

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

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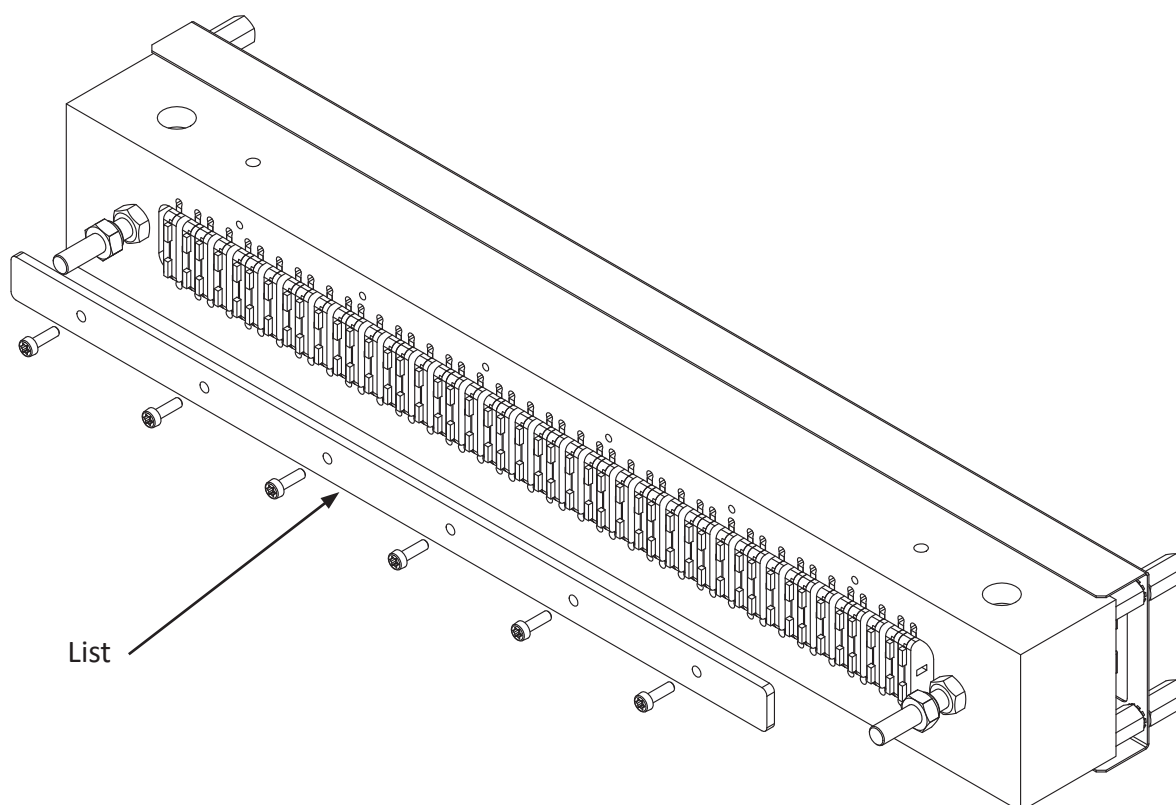
Step 2.   Pull out the defect magnet with, e.g. a narrow needle nose pliers.
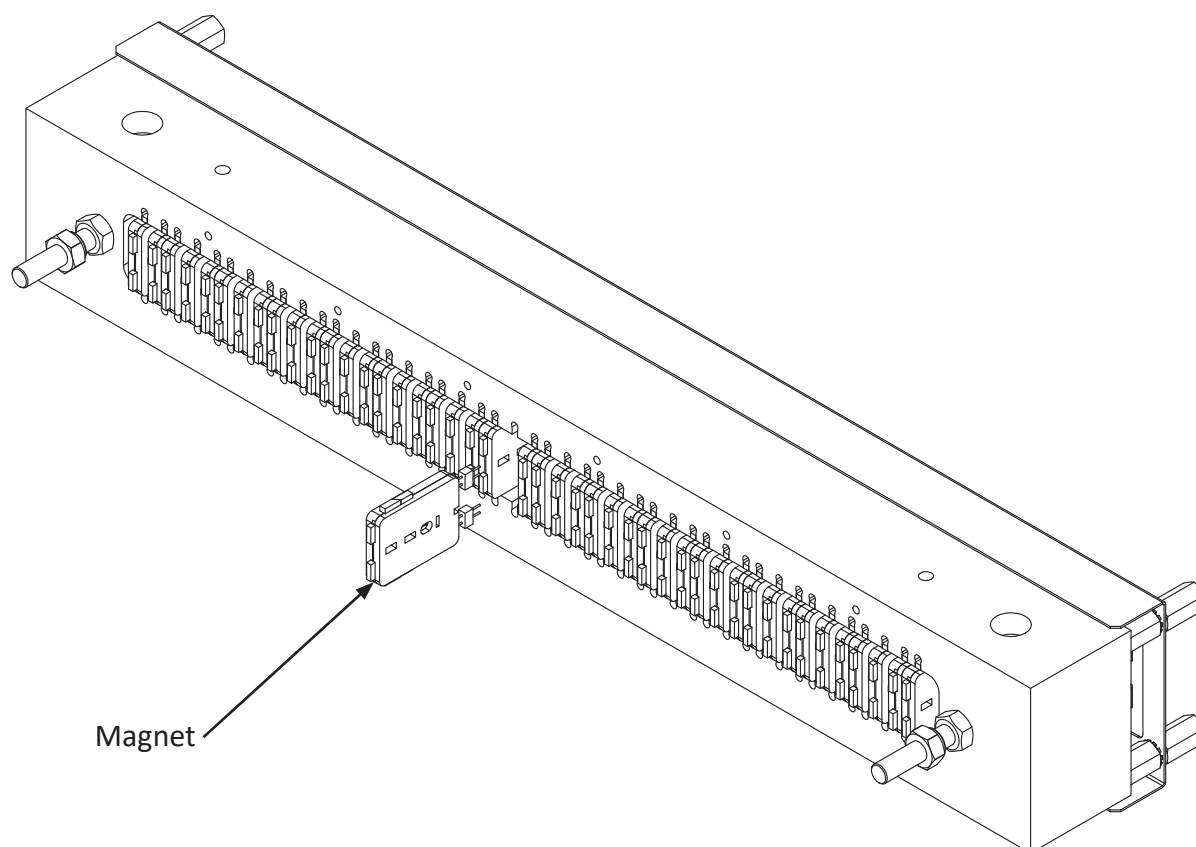
Magnet

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.
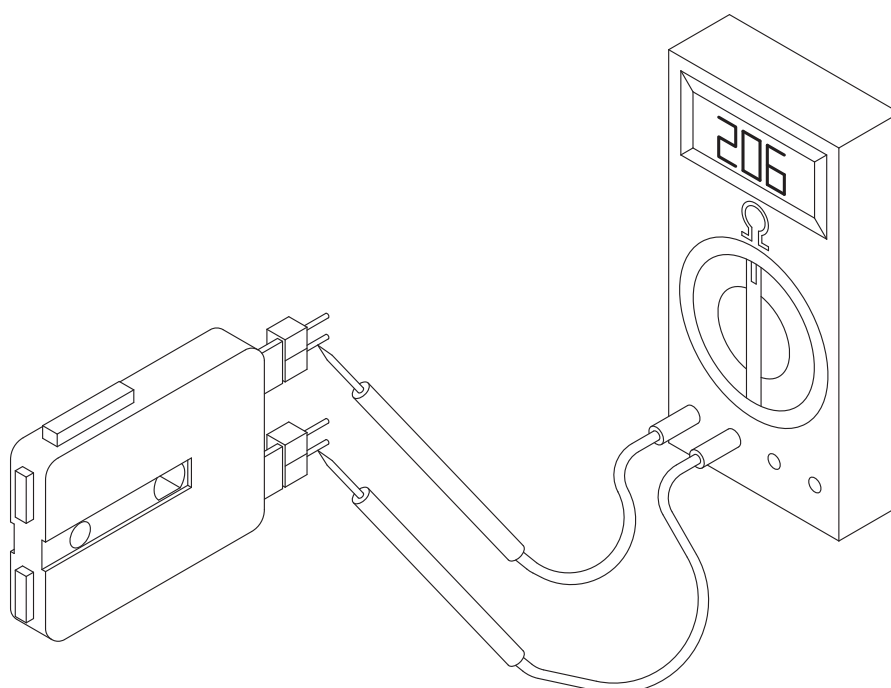
Step 4.   Replace the defective magnet with a new magnet. Note the spikes on one of the sides on the magnet. These spikes must be oriented the same direction as the rest of the spikes in the magnet rack.

Note the direction on these spikes
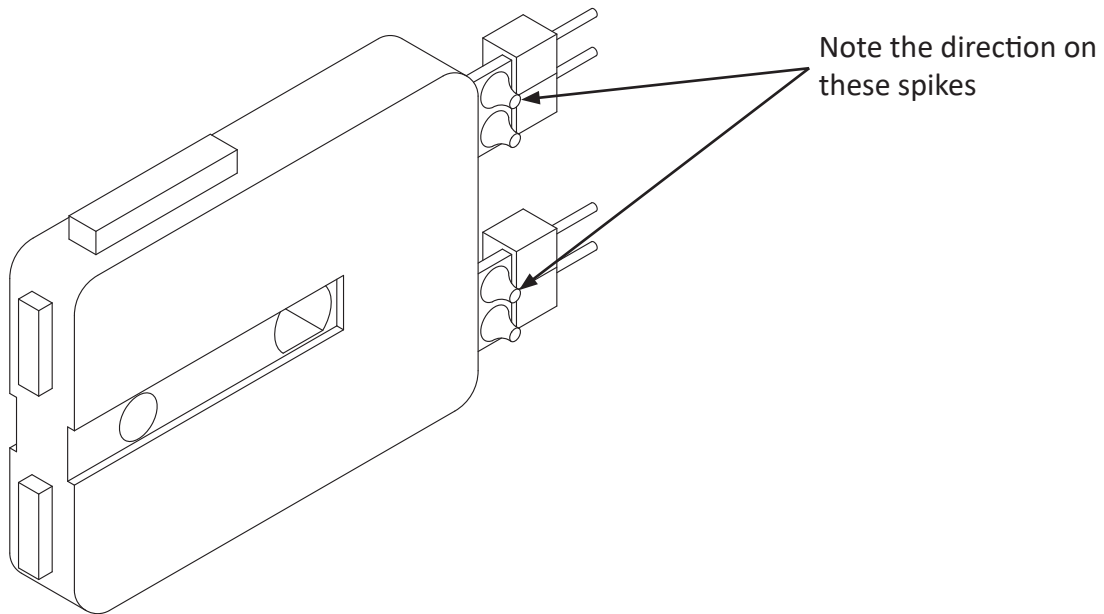
5.8 Magnet rack - cleaning

Remove the magnet rack as described in section 5.5 'Magnet rack - removal' on page 82.
Then disassemble the magnet rack as described in section 5.6 'Magnet rack - disassembly, step by step' on page 83.

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
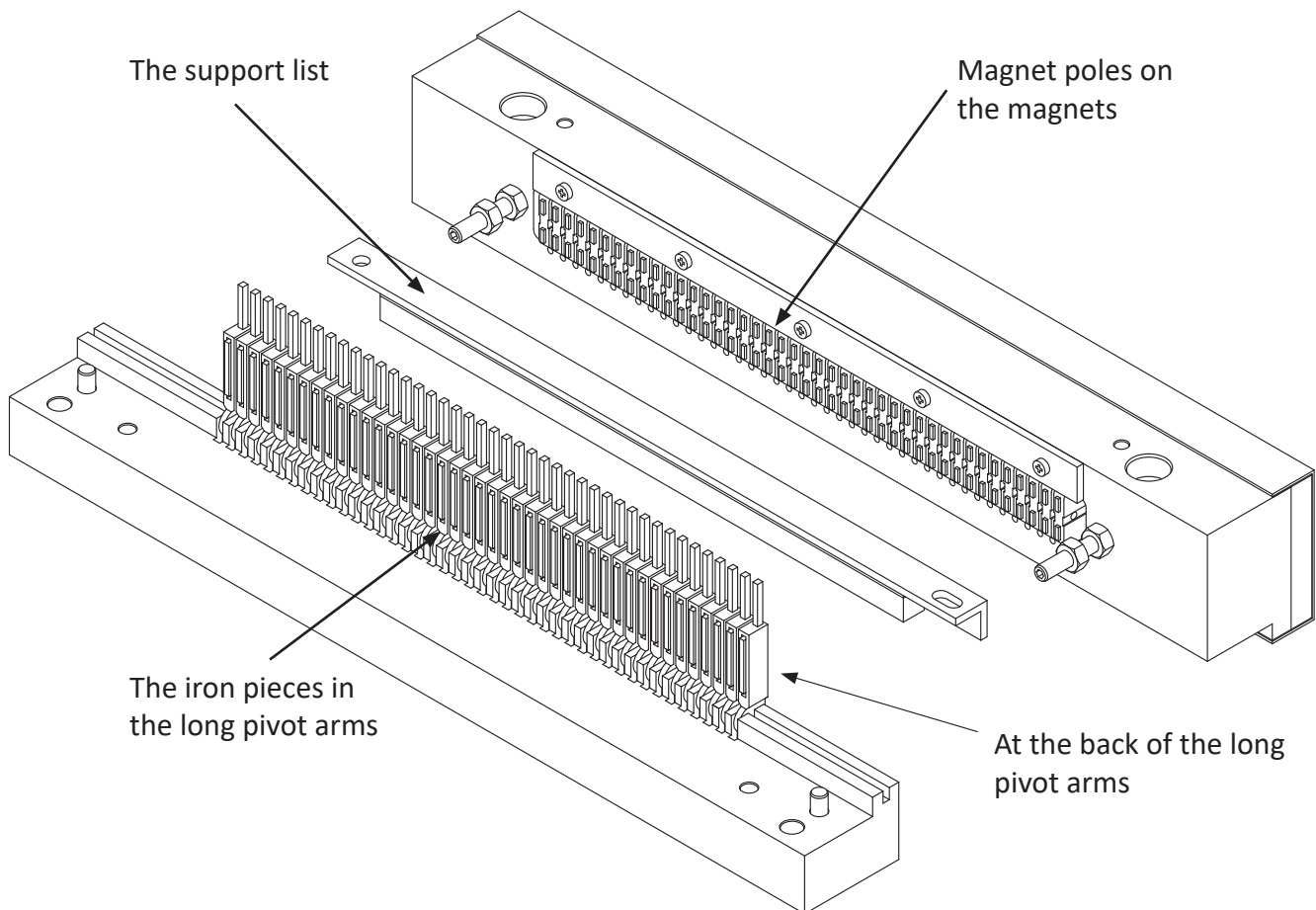
5.9   Magnet rack - adjustment

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
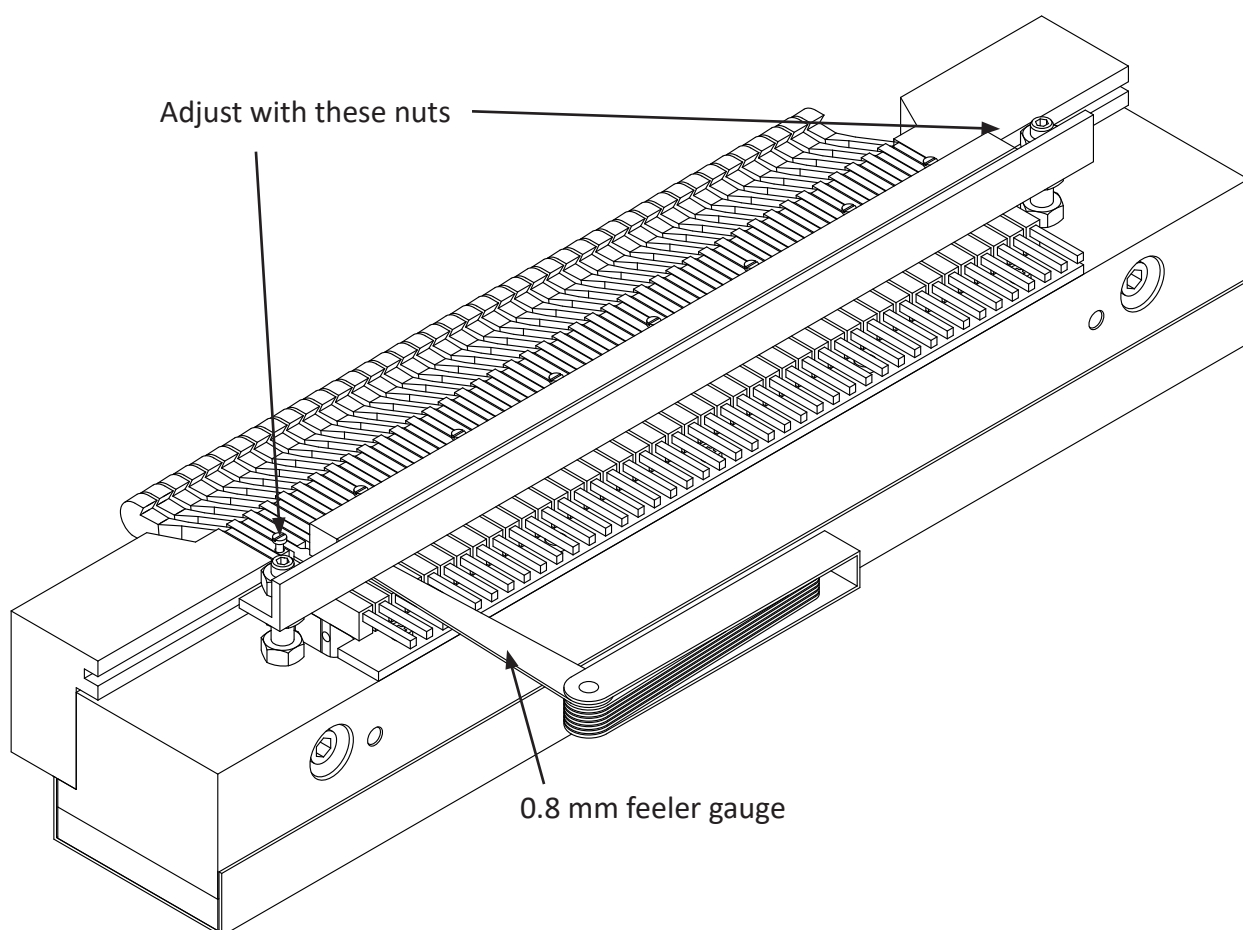
5.10   Magnet rack - refitting and adjusting

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.
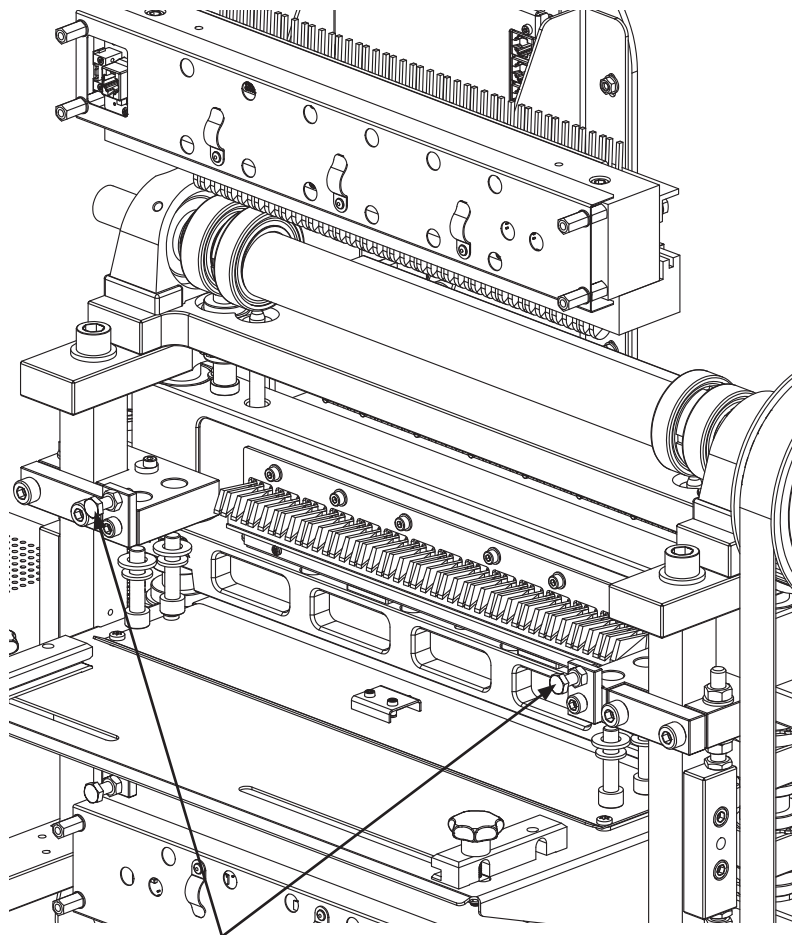
Pull back against these positioning
screws on both ends

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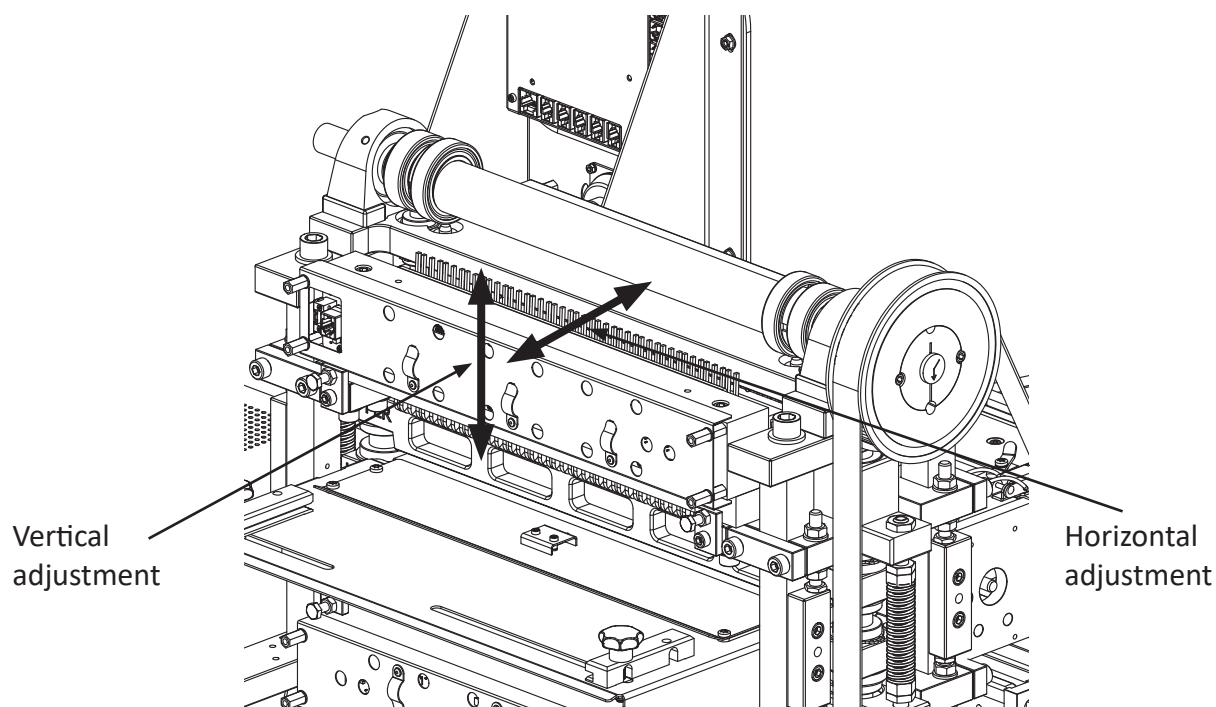
To be able to adjust the magnet rack correctly, it is necessary to put the printer in "printing position".
This is done by rotating the main belt by hand until the arrows at the ends of the shaft are pointing exactly 180 degrees away from each other.
It is possible to get the mechanism to balance in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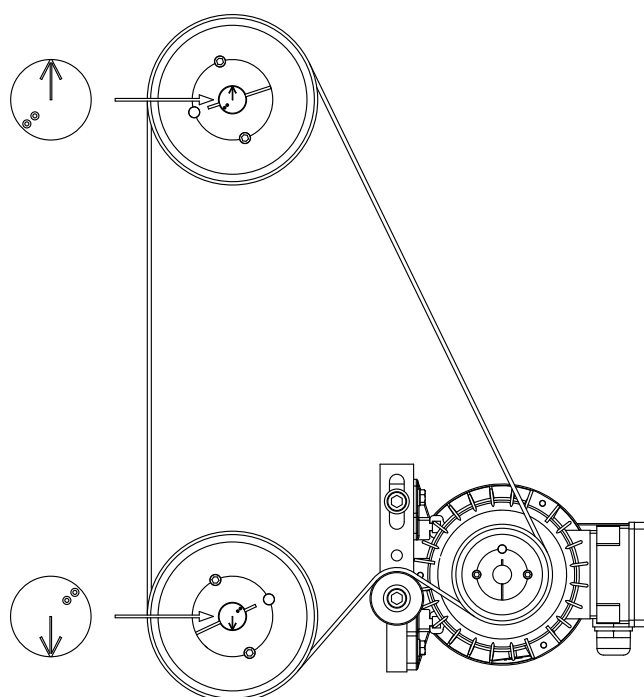
When the arrows at the end of the shafts are pointing in the opposite direction of each other, the short pivot arms will be approximately positioned like in the figure below:

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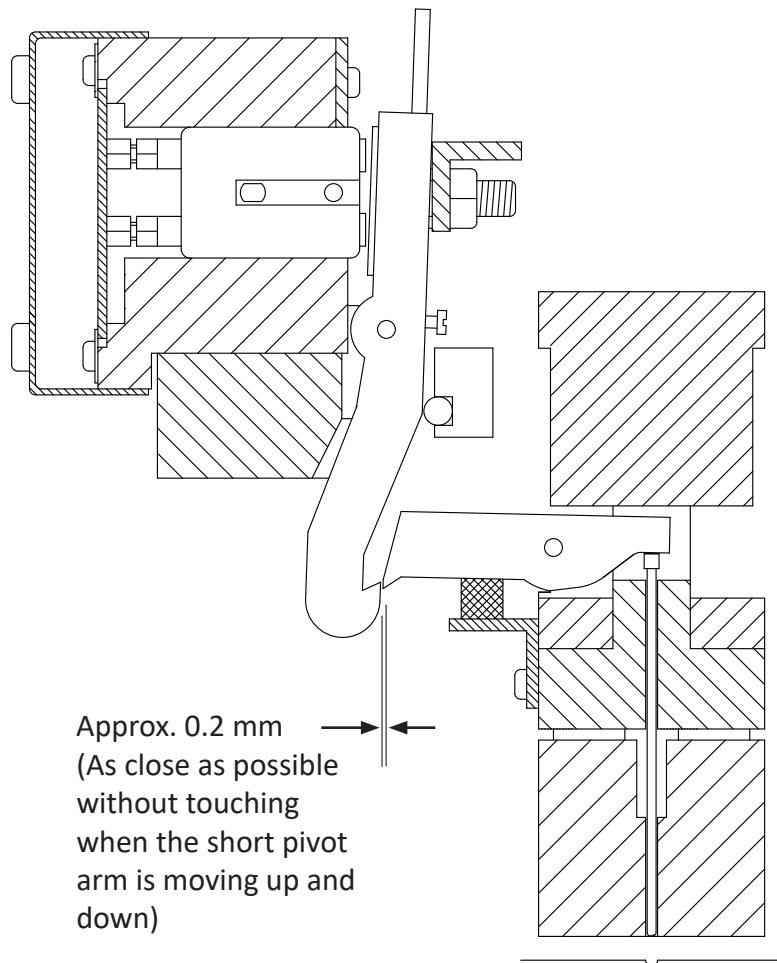
The gap between the long and the short pivot arm should be approximately 0.2 mm.
When adjusting this, make sure that the gap is even for all the pivot arms and the same on both ends of the magnet rack.

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)
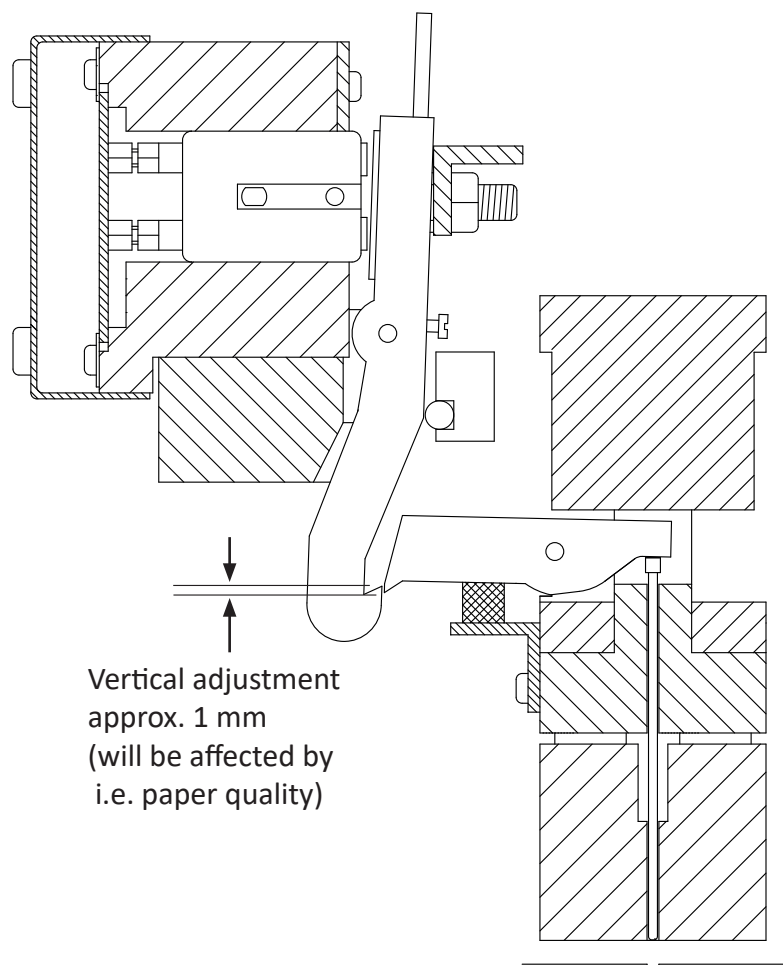
The vertical adjustment of the magnet rack sets the pressure of the printing pins when making dots.

The amount of pressure needed depends on several things. The first (and most important) is the paper quality. The second, is the personal preference of the 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:
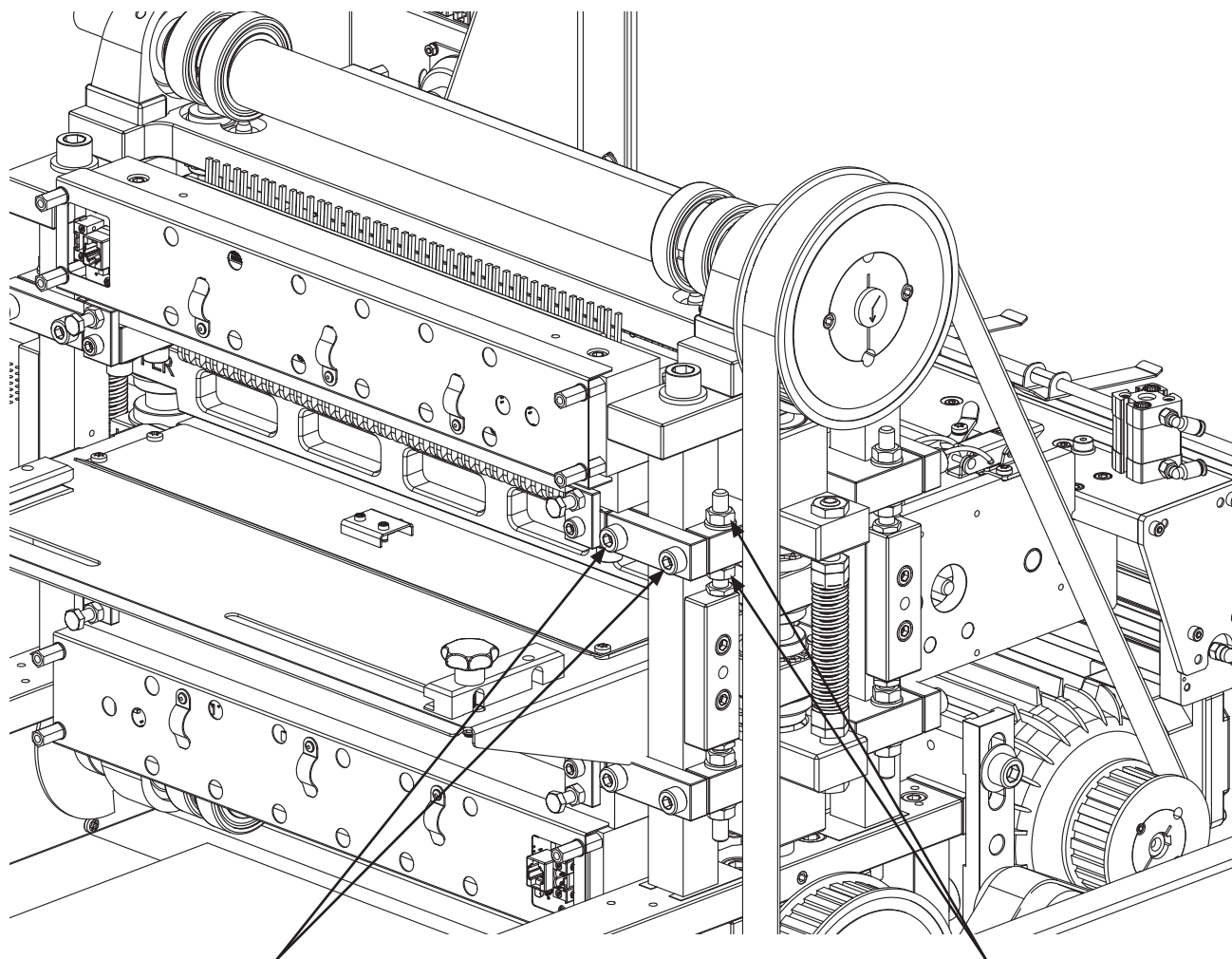
First, loosen these two screws

Then 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).
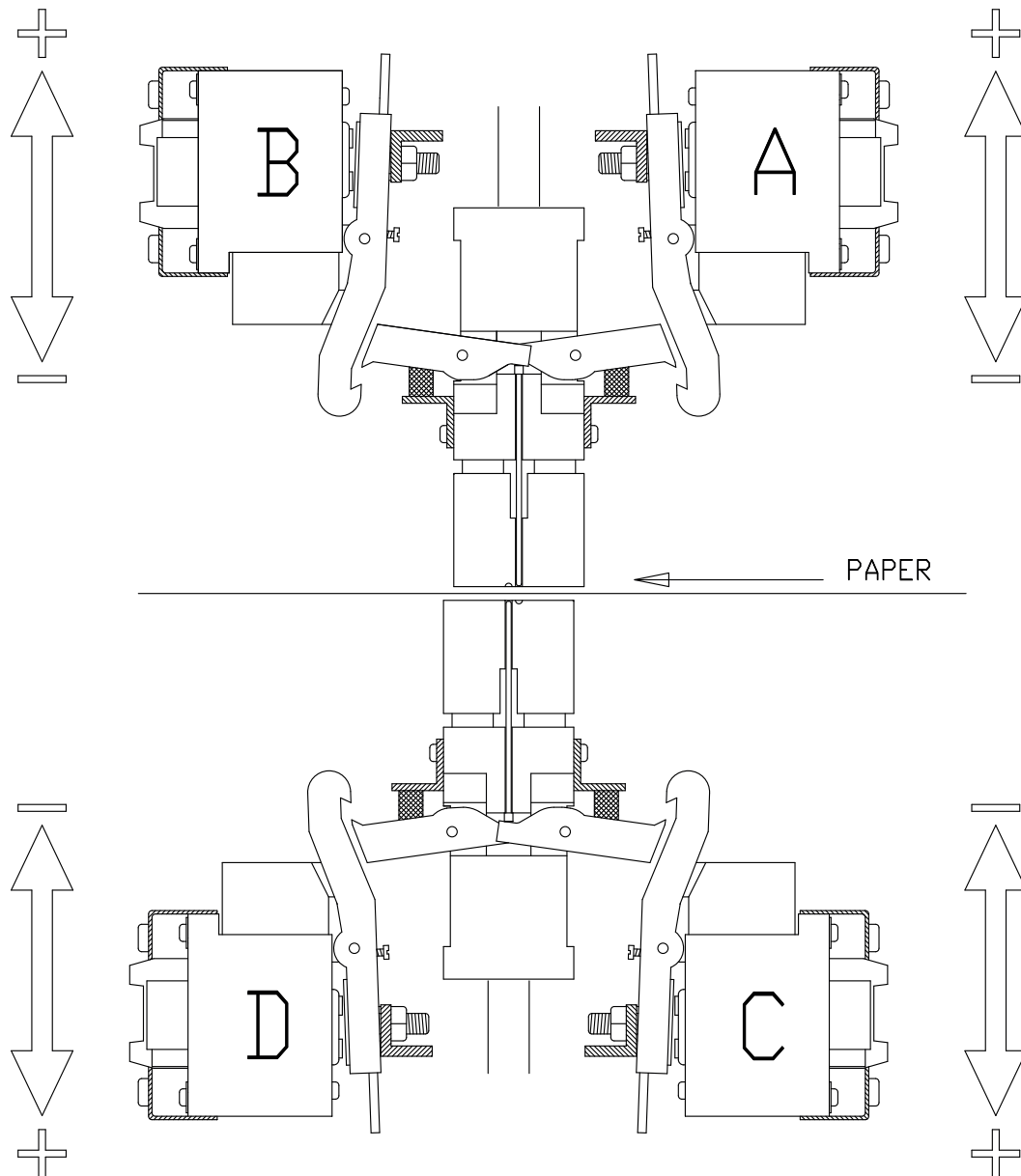
5.11   Beam and Paper shoes - overview

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)
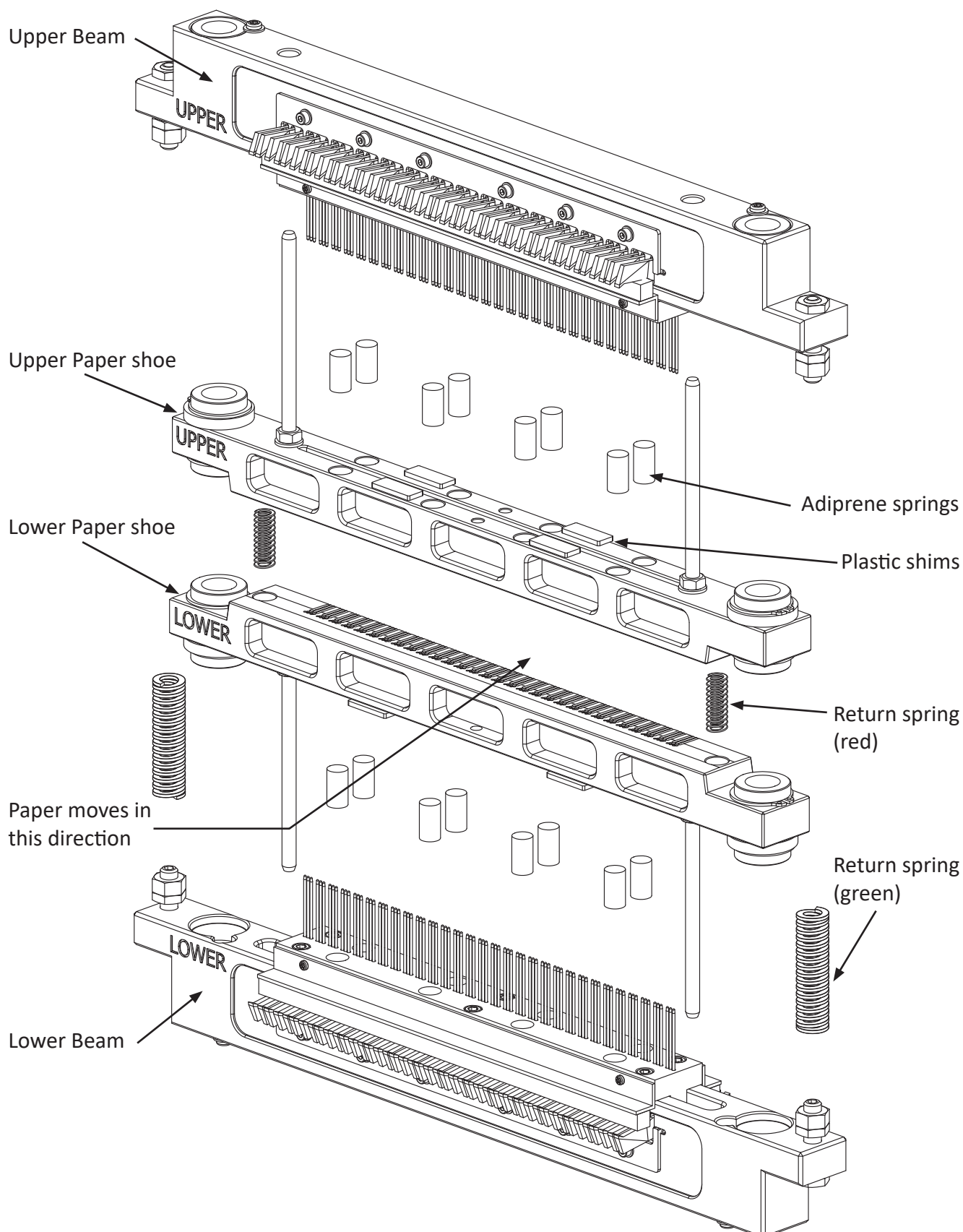
5.12 Beam and Paper shoes - removal and refitting

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
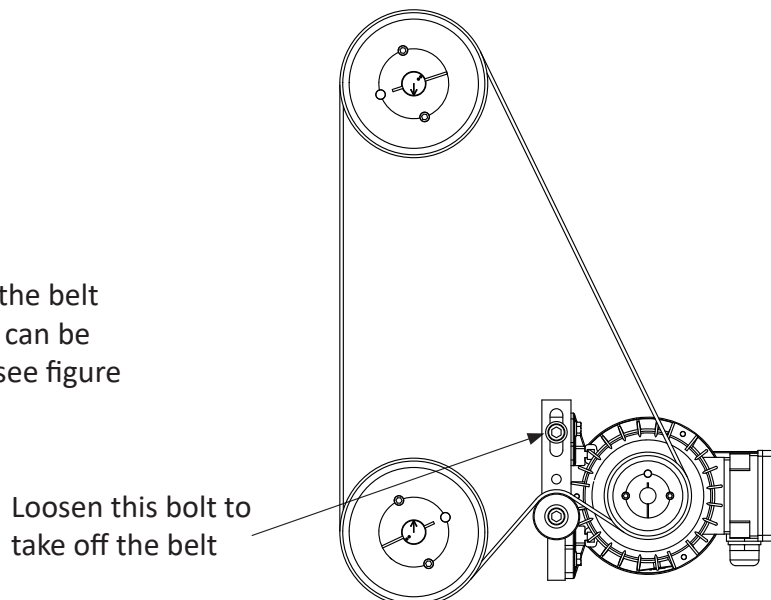
2. Remove inside paper guide

See 5.22 'Input paper guide - removing' on page 108 for information on how to remove the inside paper guide.

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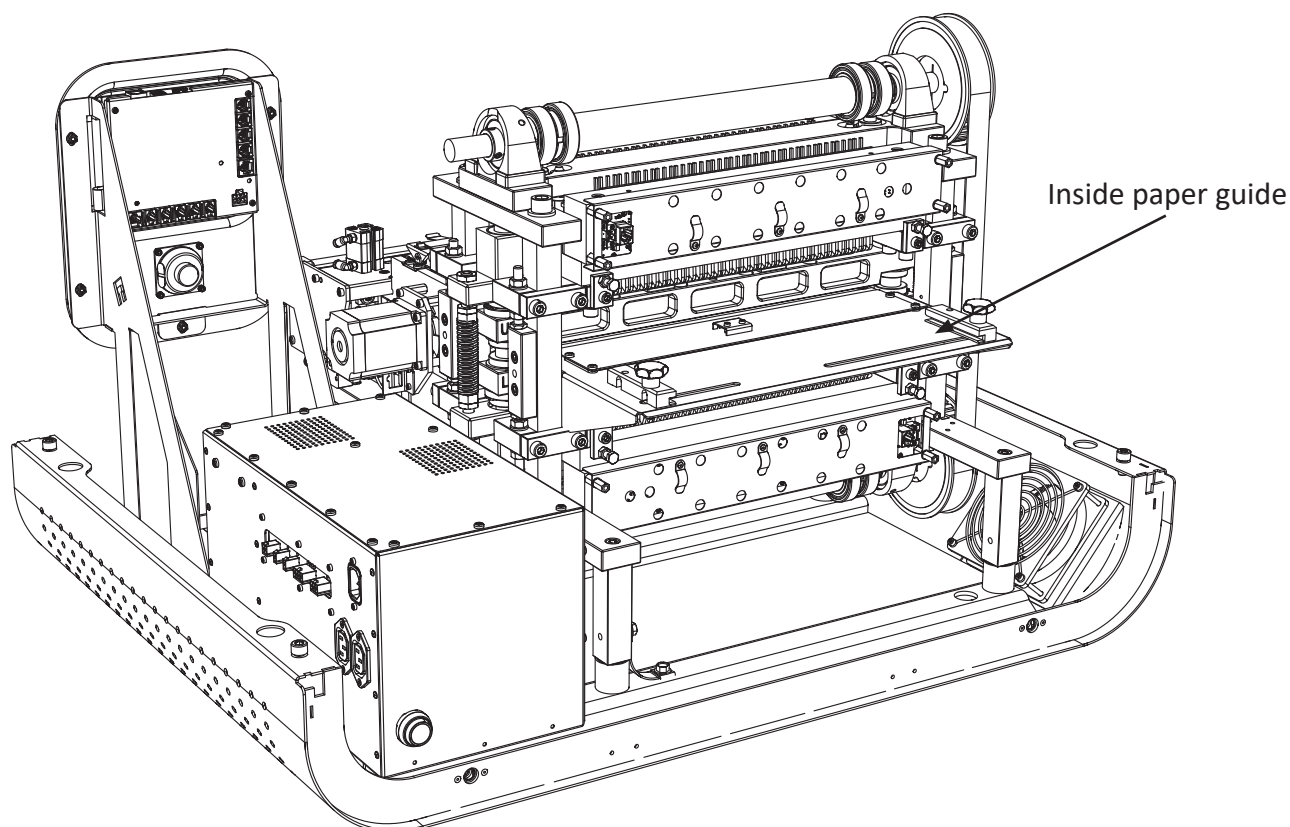
Beam and paper shoes - removal and refitting (continued)

3. Remove the paper feed and cutter

on how to remove the paper feed and cutter.

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

Top frame bolts

Magnet rack A

Magnet rack B

Paper feed and cutter
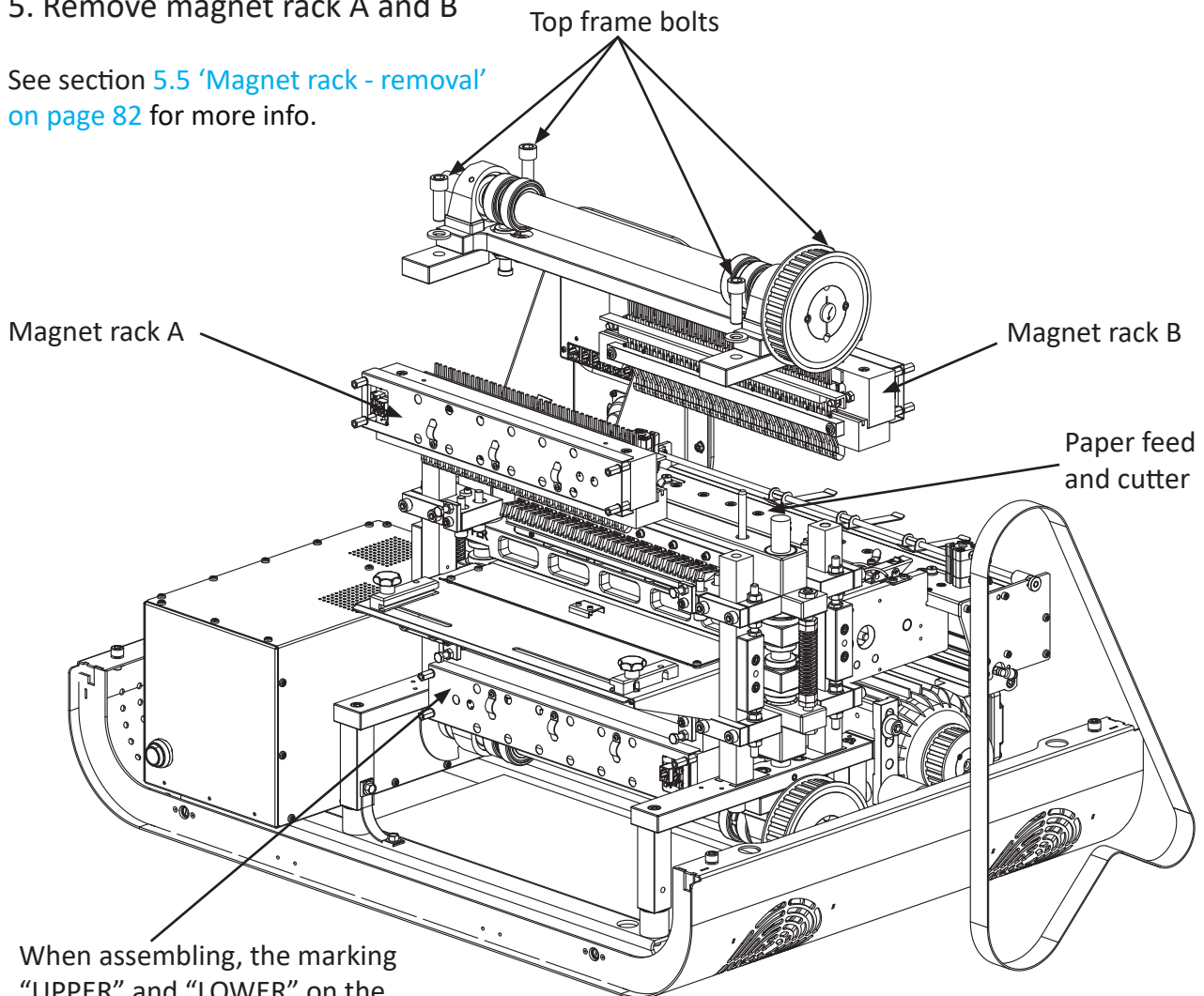
When assembling, the marking "UPPER" and "LOWER" on the paper shoes and beams, must be facing this side

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.

5.13   Beam - replacement of short pivot arm

See the figures below:

Remove the six screws as indicated in the figure. Pull out the short pivot arms, there are 45 pcs. on each side.
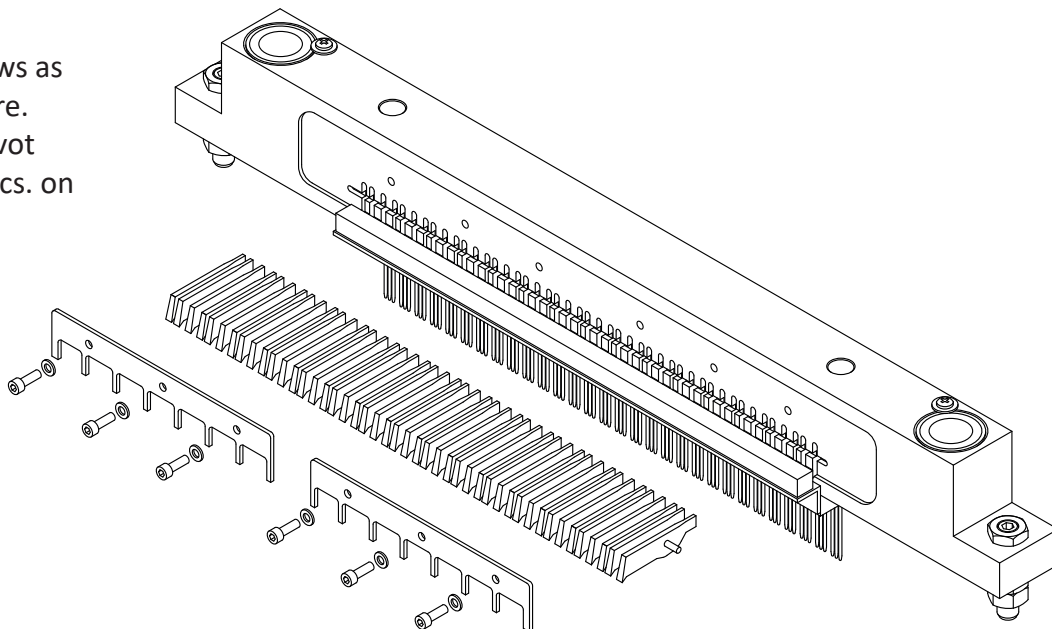
Pull out the shaft, and replace the short pivot arm(s).

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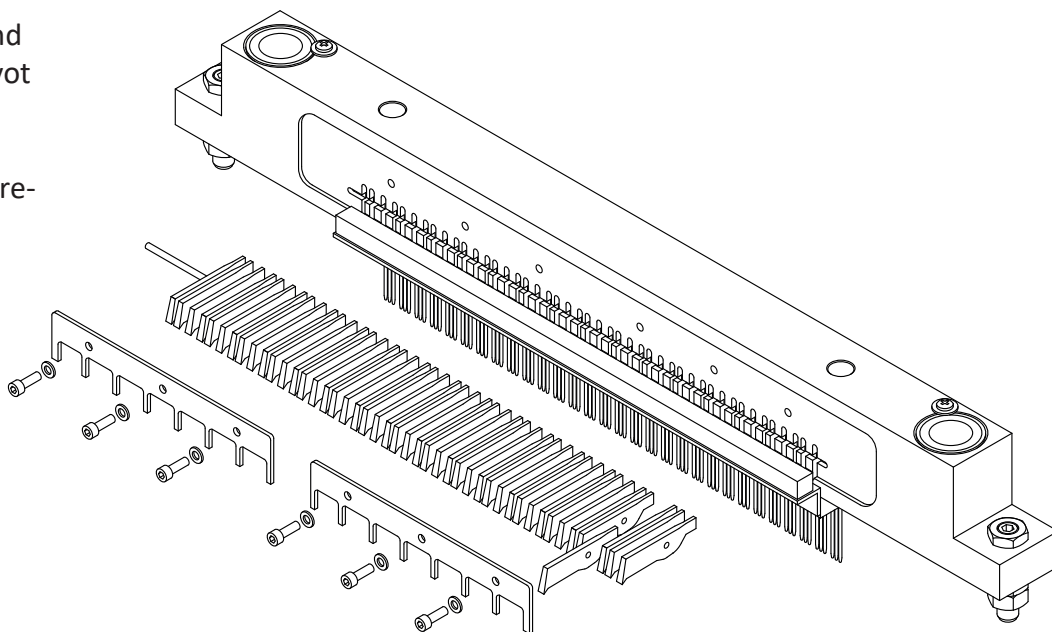
Note! When putting the short pivot arms back into the beam, be sure that the printing pins are hanging vertically like in the figure. This is to make room for the short pivot arm.

5.14 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!!
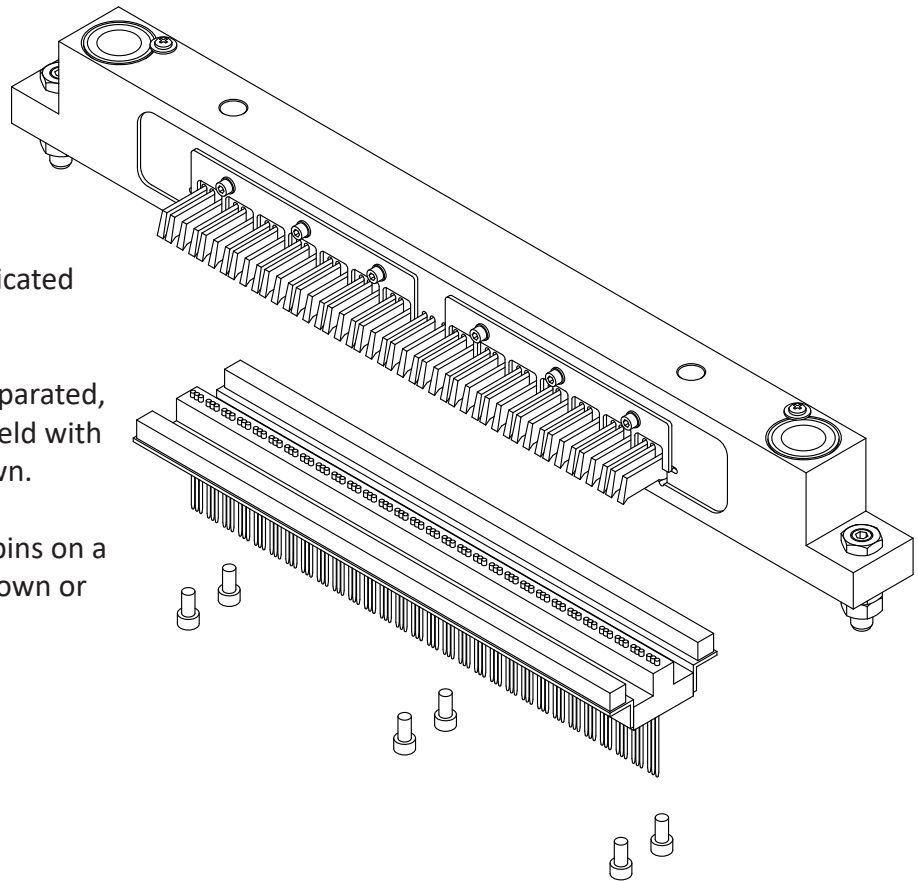
Now the defect printing pin can be replaced.

Assembly is done in reverse order.
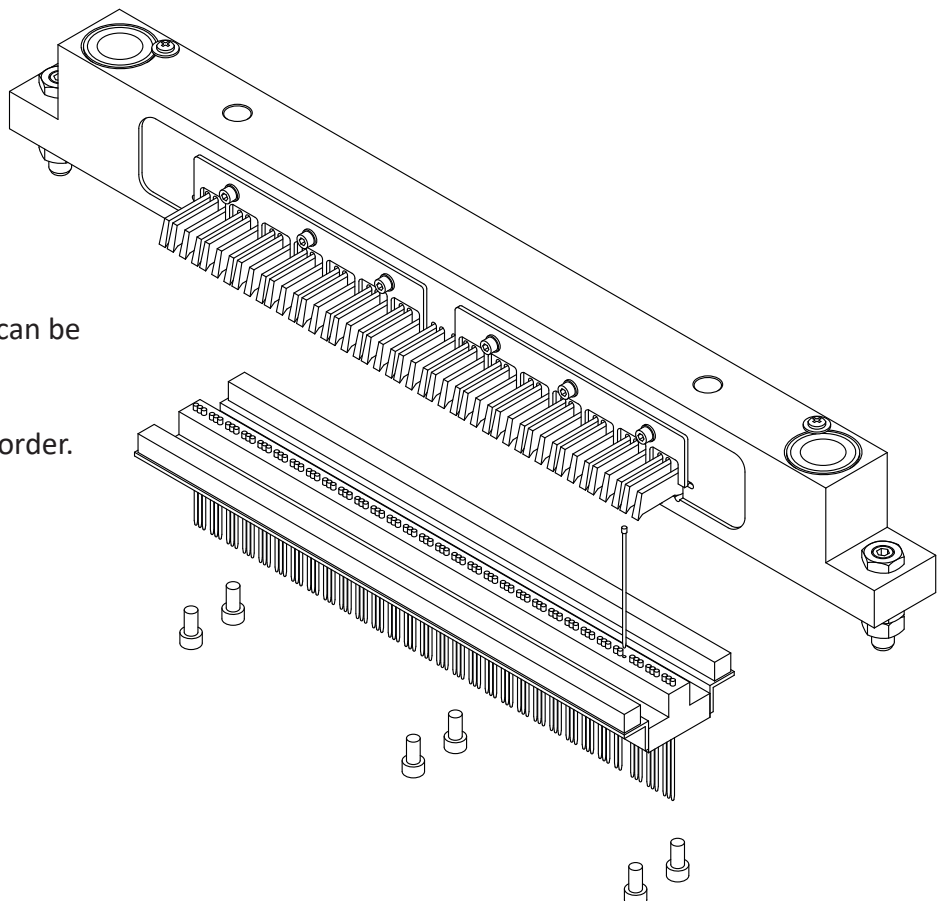
5.15 Return spring adjustment

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!

68mm   68mm
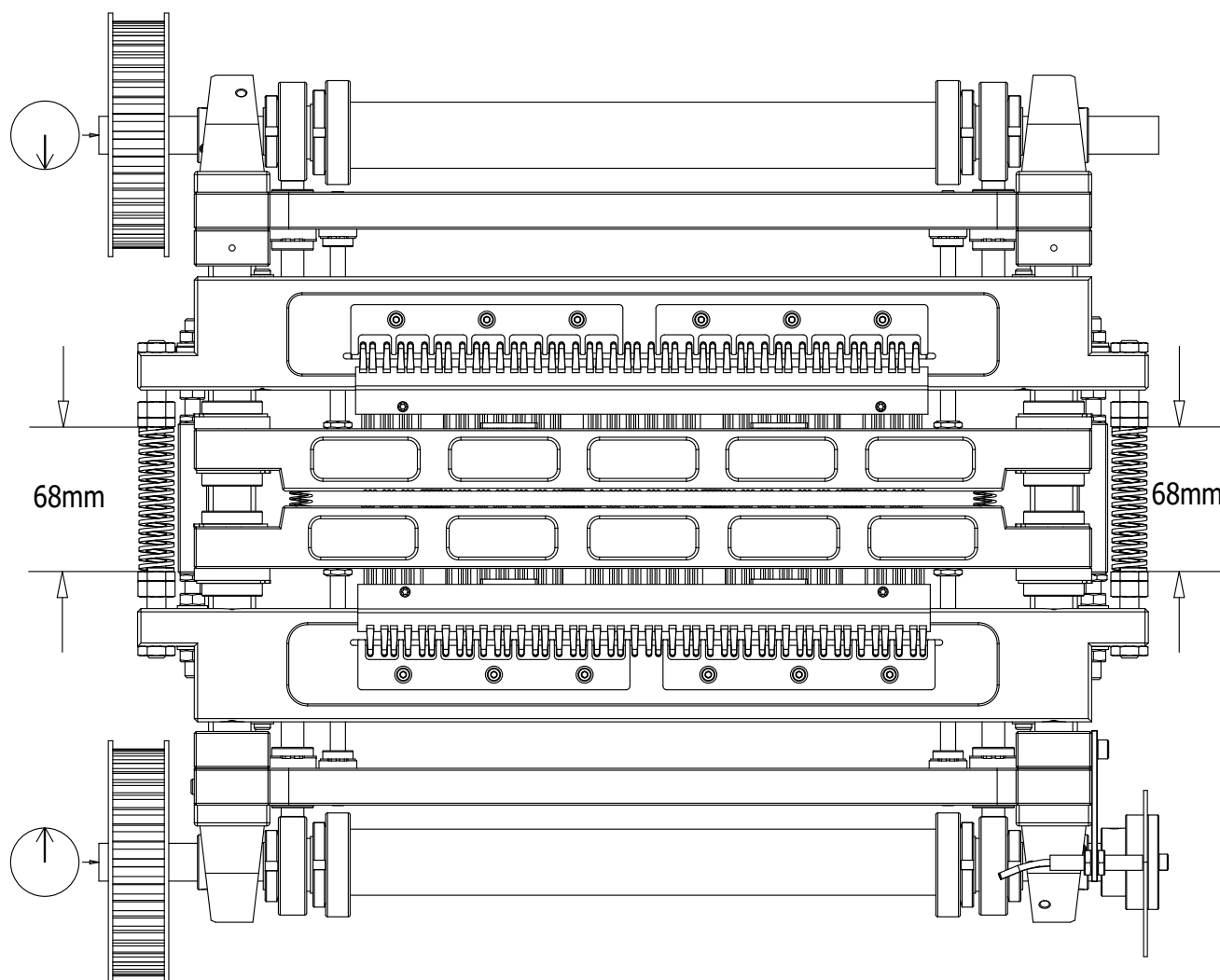
5.16 Eccentrics adjustment, belt tension

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
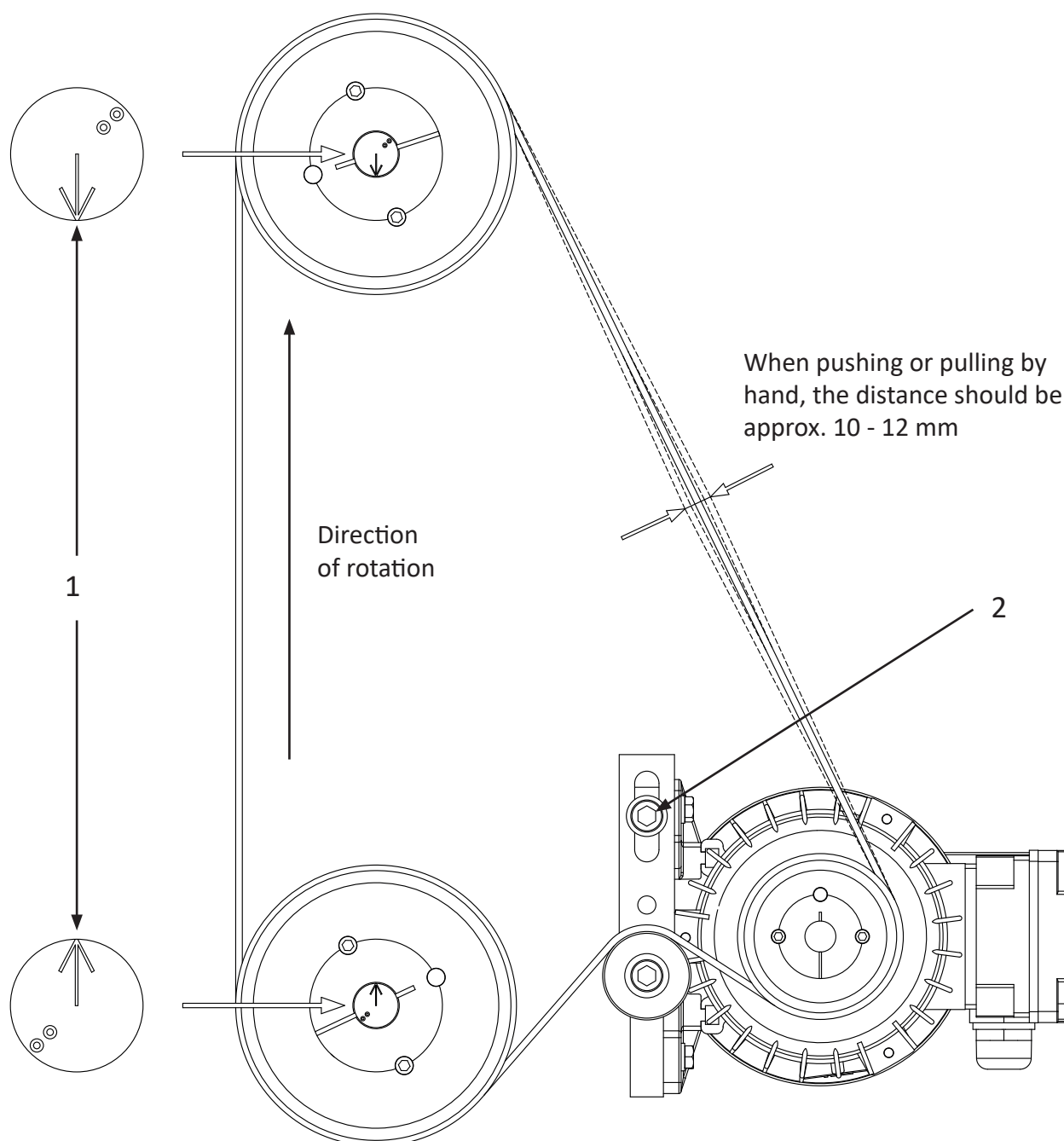
5.17   Paper shoes - adjustment

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!
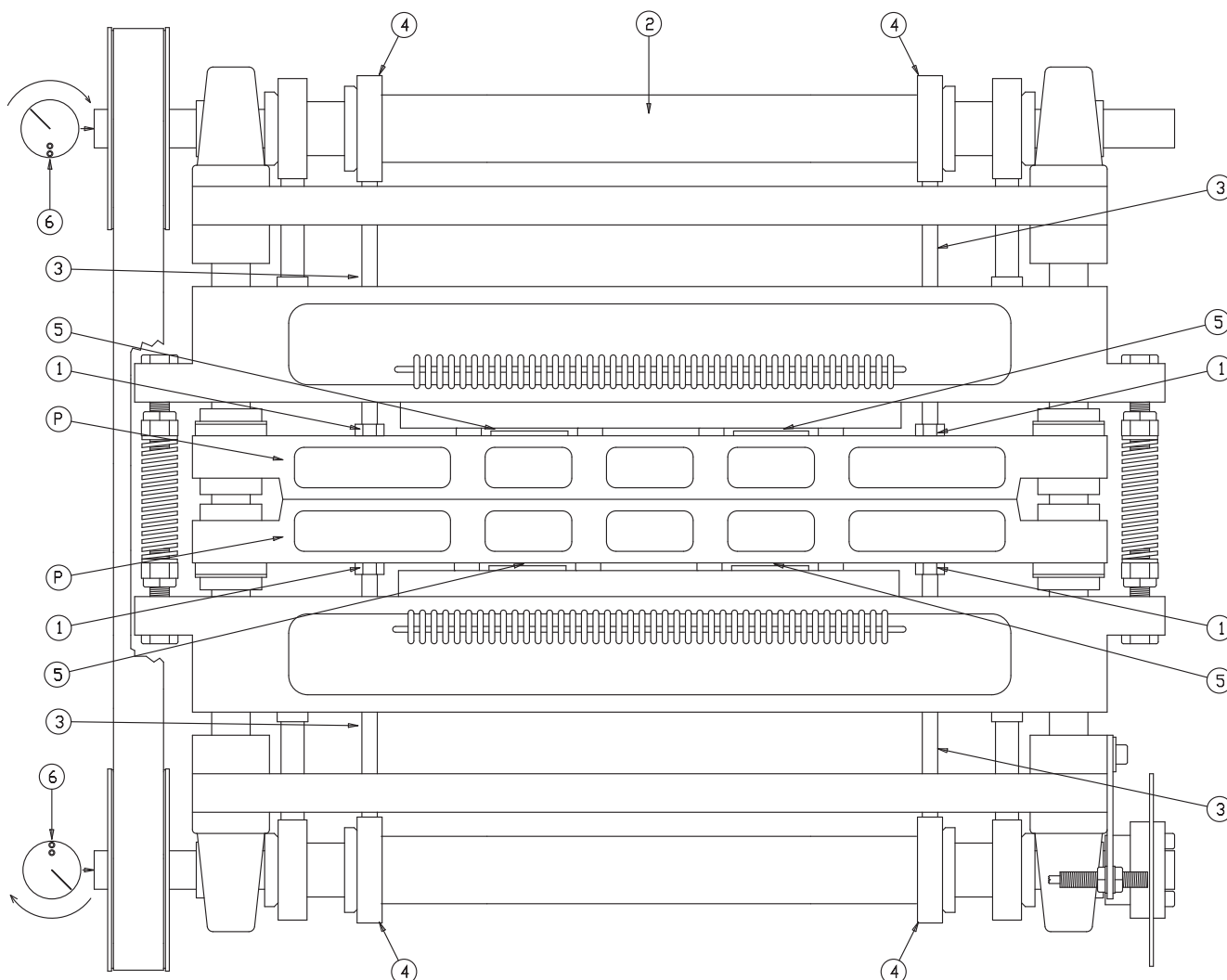
5.18 Main sensor wheel - adjustment

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
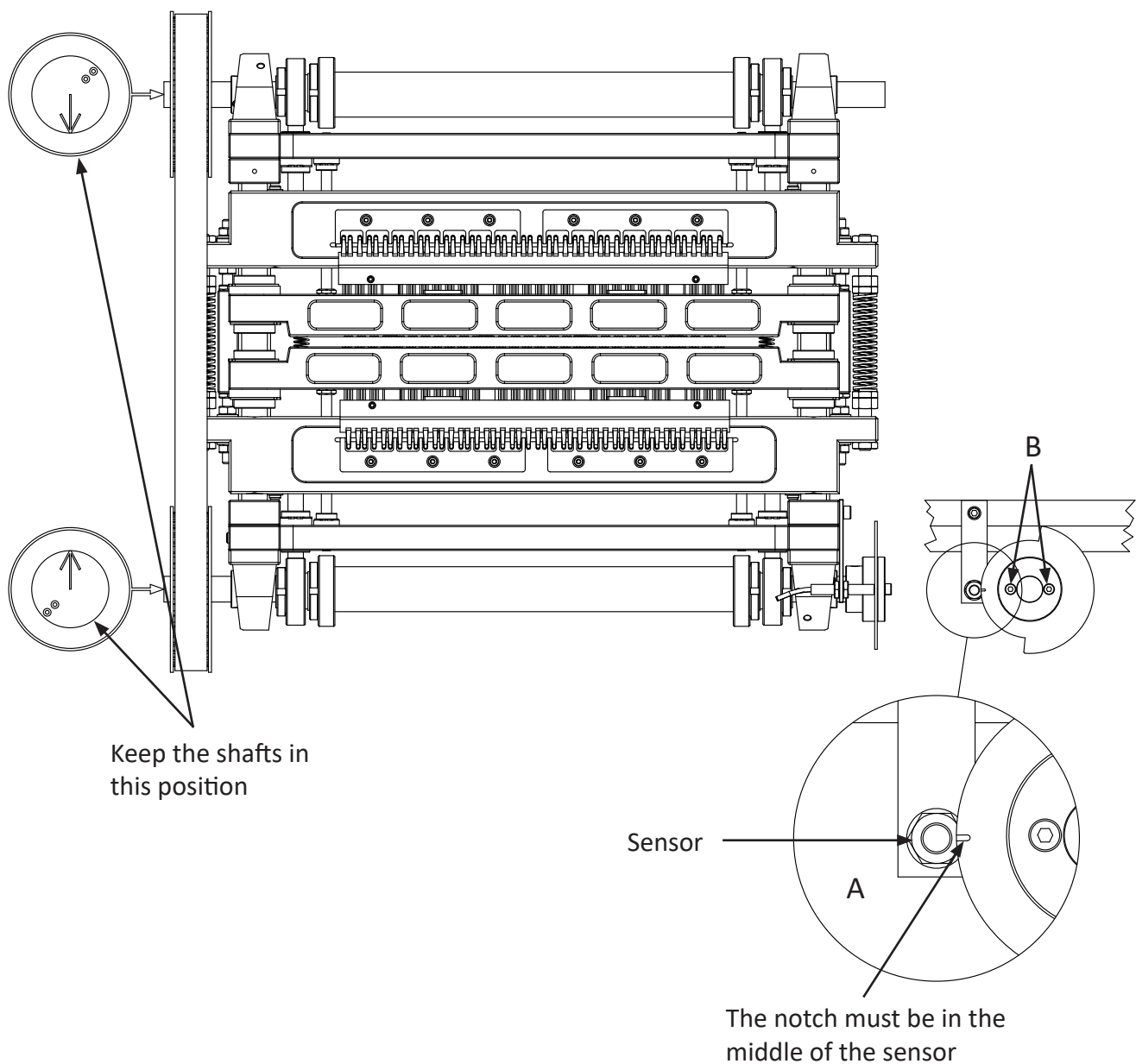
5.19 Paper feed and cutter assembly - removing

To remove the paper feed and cutter assembly, disconnect the stepping motor cable connector near the stepping motor. The sensors must be disconnected from the board.
Disconnect the compressed air tubes connected to the cutter.
The paper feed and cutter assembly can then be removed by opening the three quick release latches.
Then lift the assembly carefully up and out.

Quick release latches
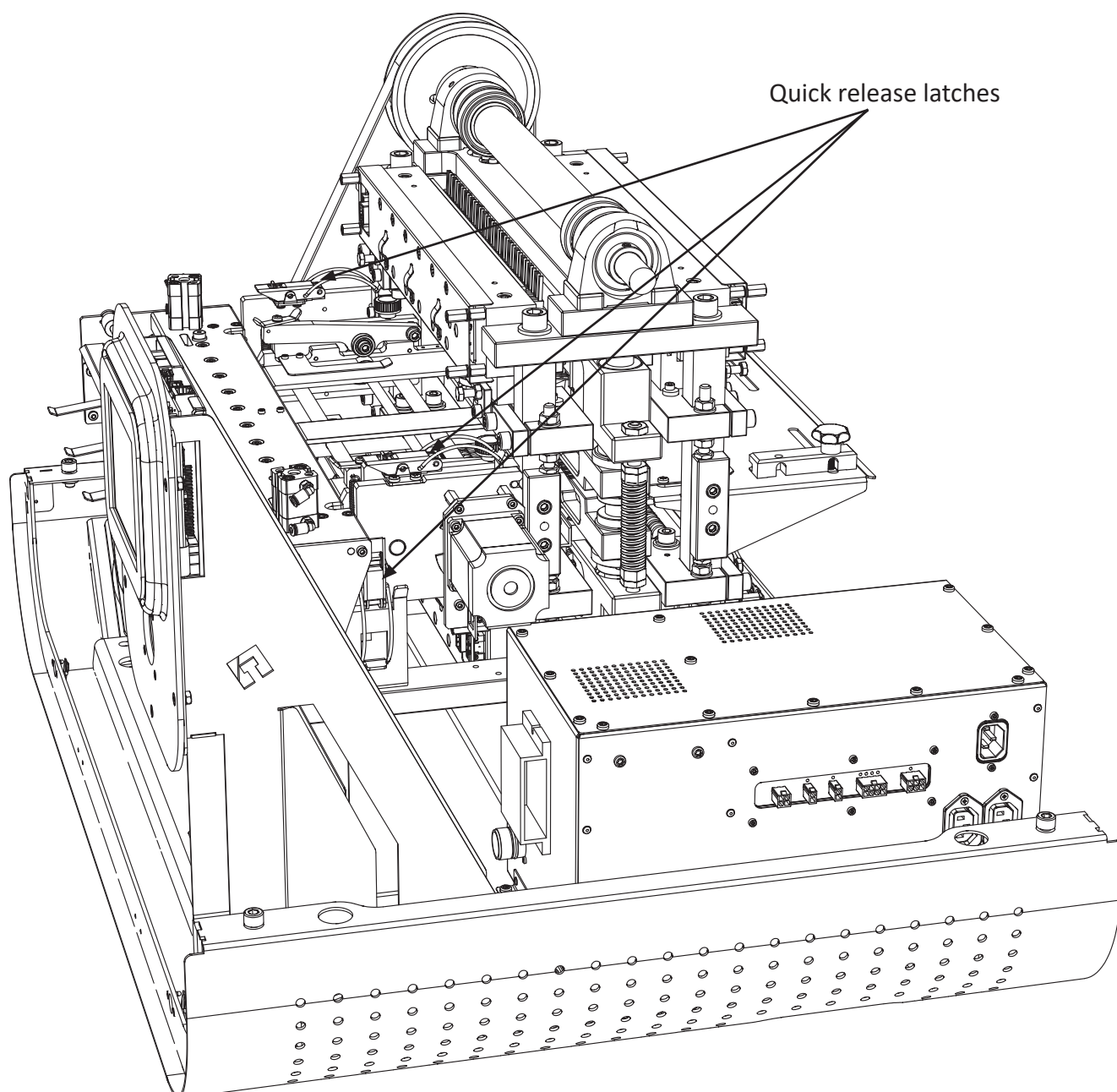
5.20 Paper cutter - alignment

If the fixed blade on the cutter has been removed, it needs to be adjusted when putting it back. If the fixed blade is not aligned with the roll blade, the cutted edges on the paper might get a little torn instead of a clean cut. Often this could be a problem when the roll blade is going in one direction, but ok when going the oposite way.

To adjust the alignment, loose all the ten fastening screws a little, then adjust the fixed blade back or forth with the eccentric adjustment bolts.
It is possible to see the cutting edge on the fixed blade through the inspection opening.

Eccentric adjustment   Fastening screws   Eccentric adjustment

Inspection openings
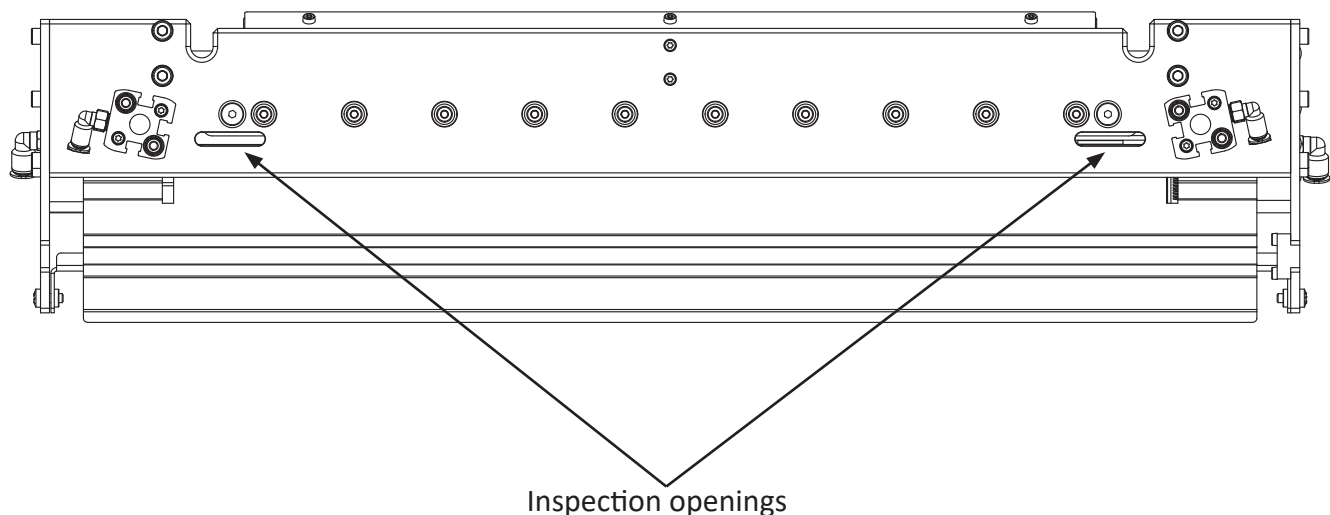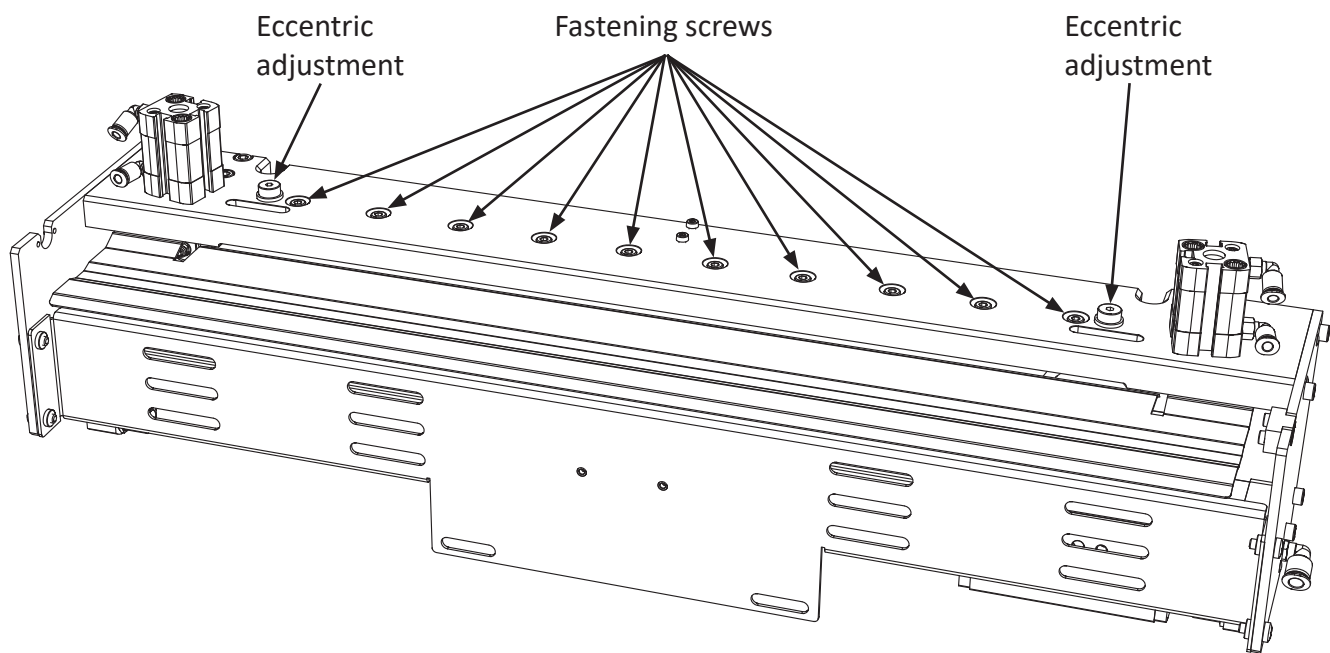
5.21   Inductive sensors - adjustment

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.
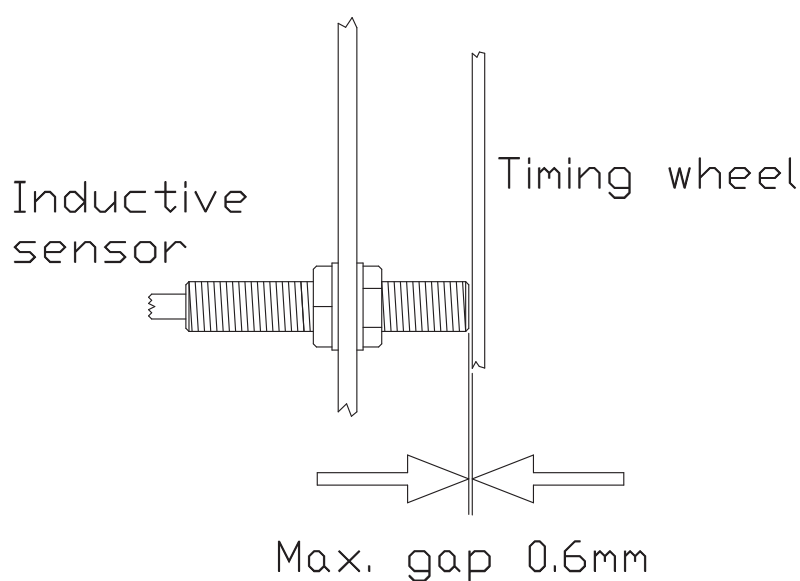
5.22   Input paper guide - removing

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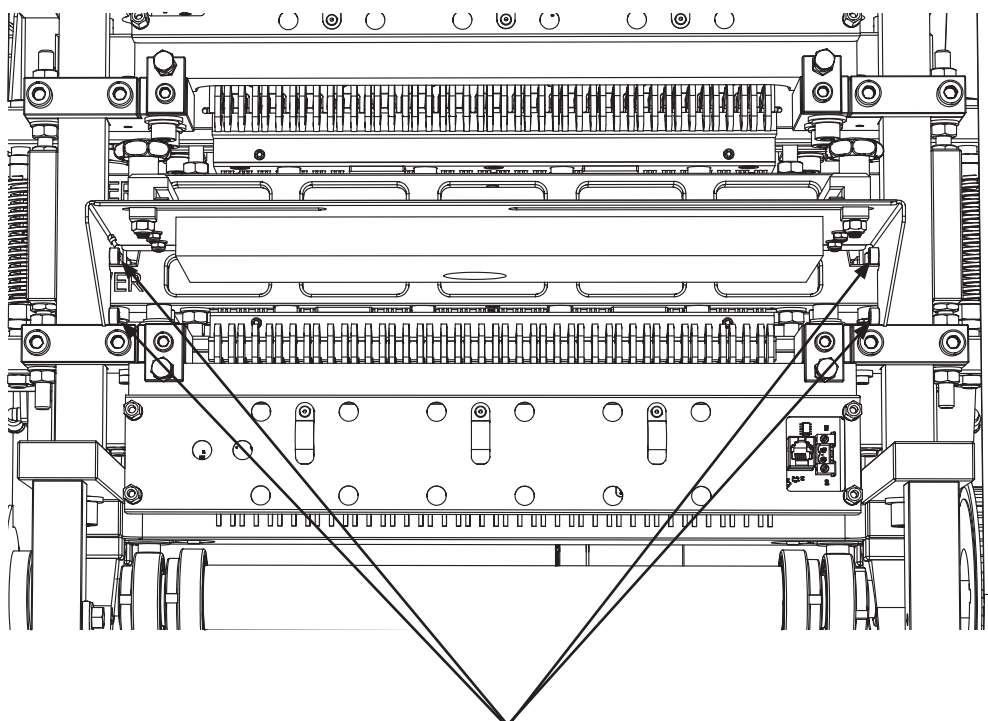
Loosen these four bolts

5.23   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 which is sending light down-wards, and 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).
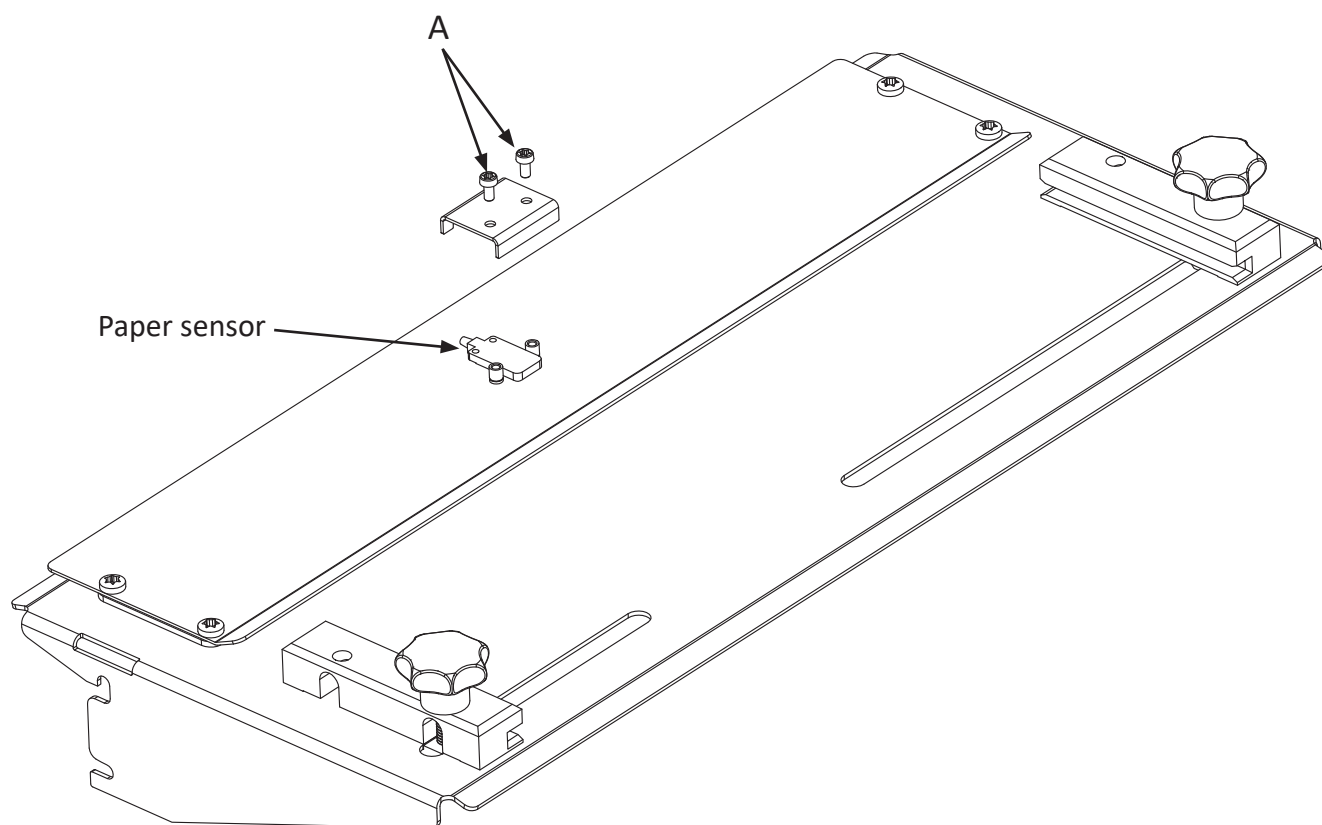
5.24   Electric unit - overview

The electric unit contains connections, fuses and power supply.

⚠️ Note! Disconnect the mains when working on this unit!

Alarm output

24V Spare output

24V Step motor driver

24V Magnet racks

24V Main board

Mains inlet

Fans outlet

External equipment outlet

On/off switch
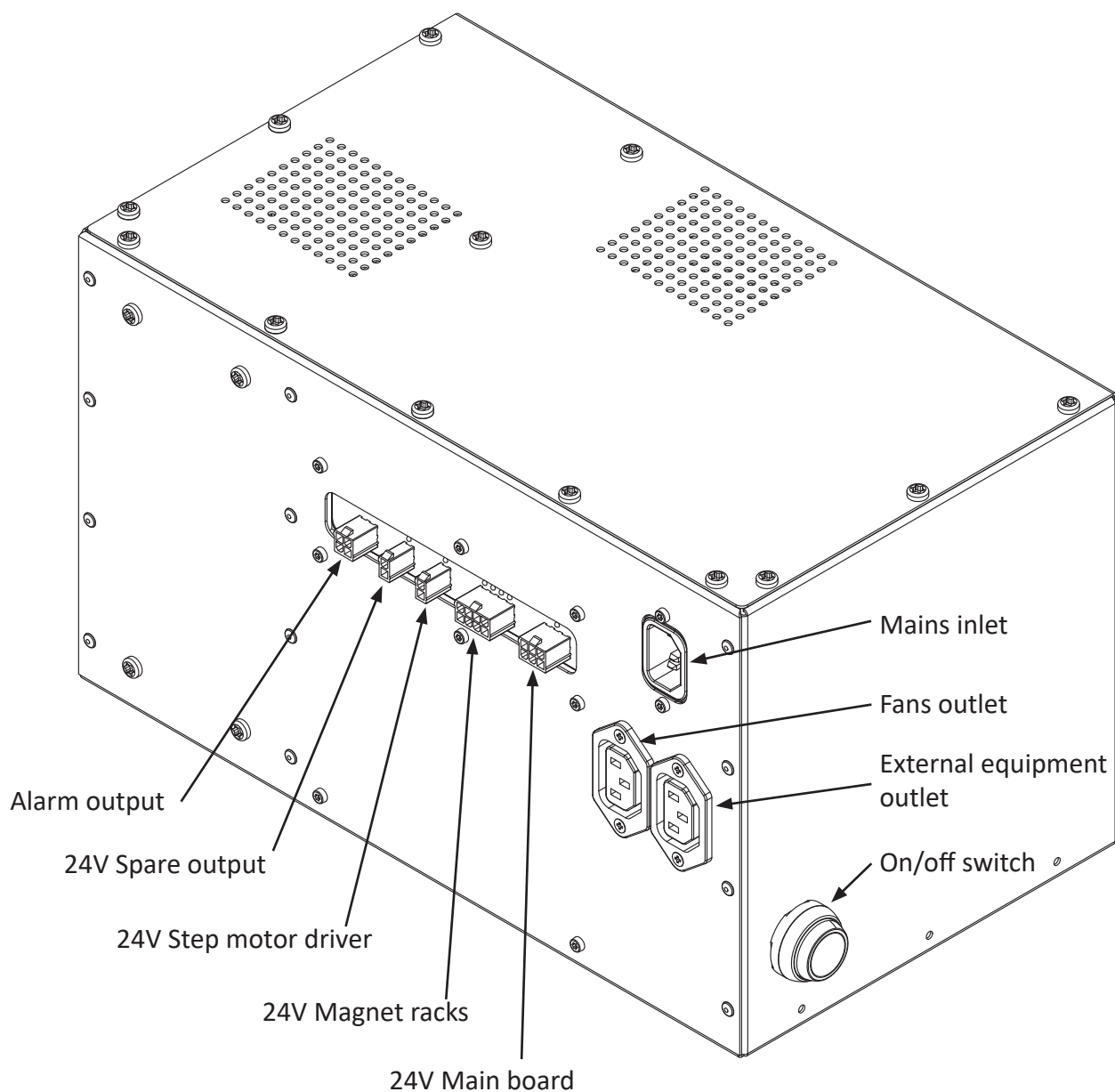
5.25 Electric unit - replace fuses

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

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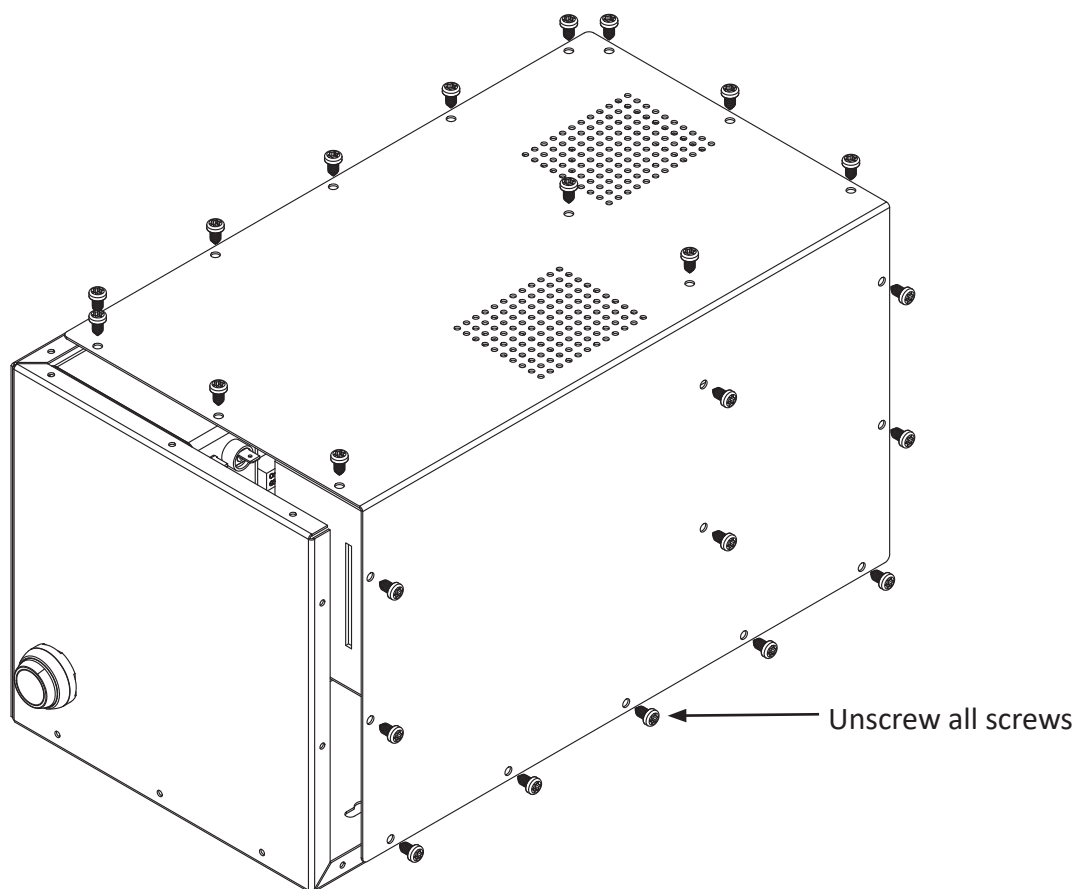
To get more room to inspect and replace the fuses, it is best to move the power supply a little out of the way. This can be done without disconnection the wires. See figure below:
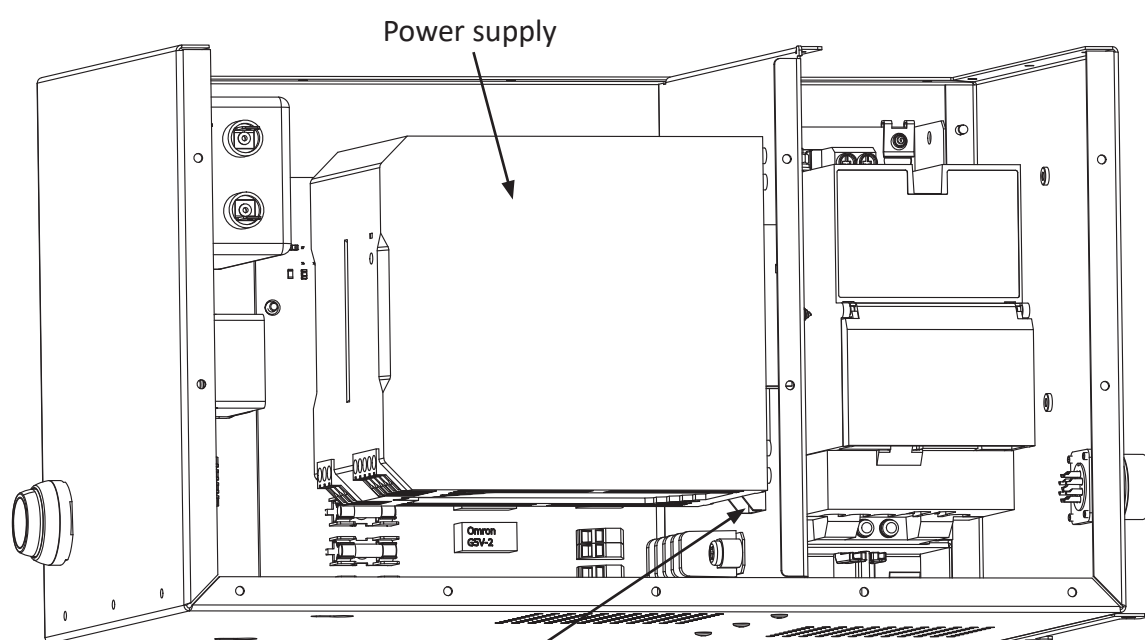
Power supply

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

The fuses.

Note that the two mains fuses are 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
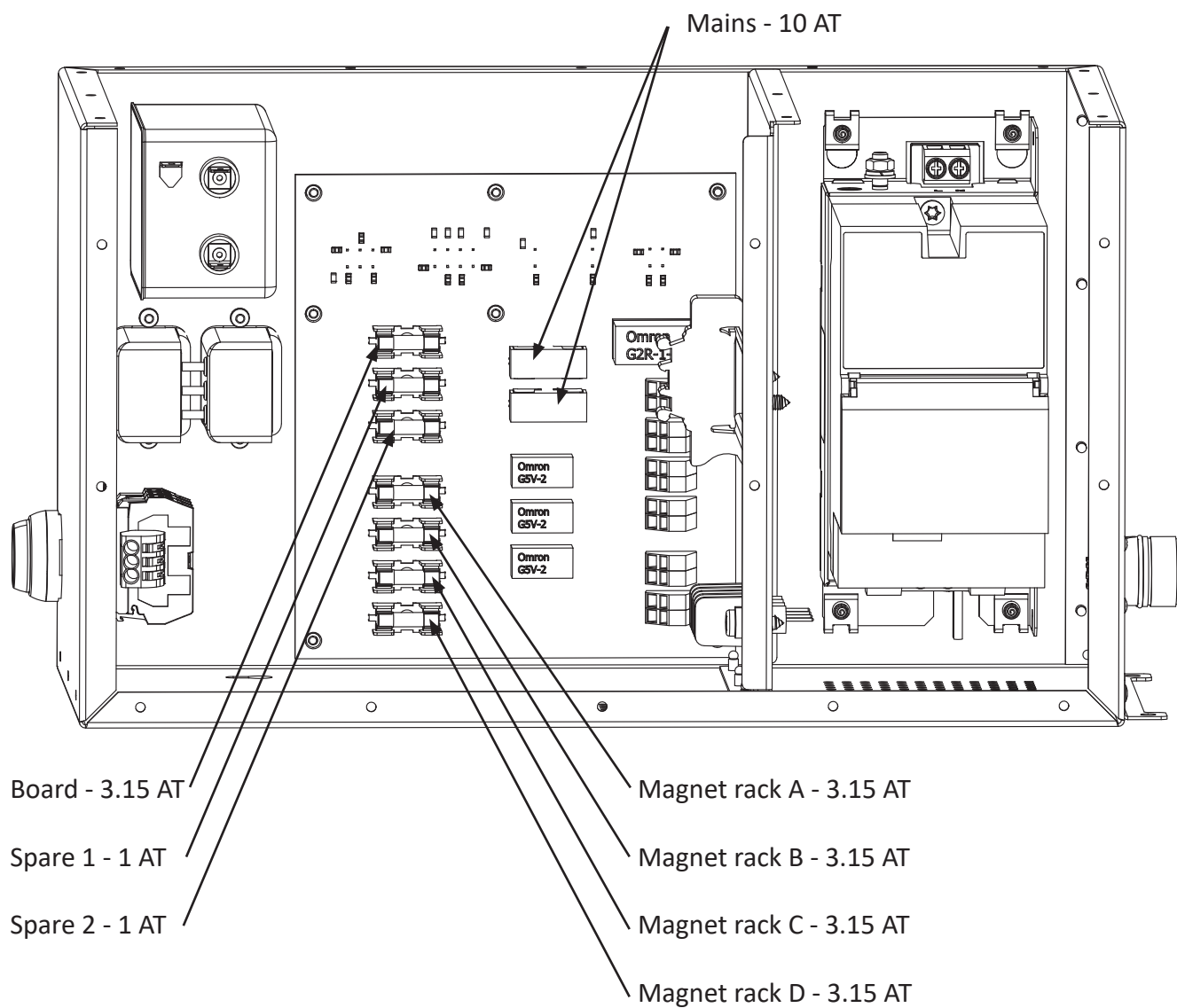
5.26   Step motor driver Dip switches

The step motor driver is configured with the dip switches that is placed on the side of the driver.
Switch no. 1 is lowest and switch no. 8 is at the top.
The switches are 'On' when the lever is pushed in towards the Electrical Unit.

The default Dip switch settings are:

Switch 8	Off
Switch 7	On
Switch 6	Off
Switch 5	Off
Switch 4	On
Switch 3	On
Switch 2	On
Switch 1	On

Step motor driver   Dip switches
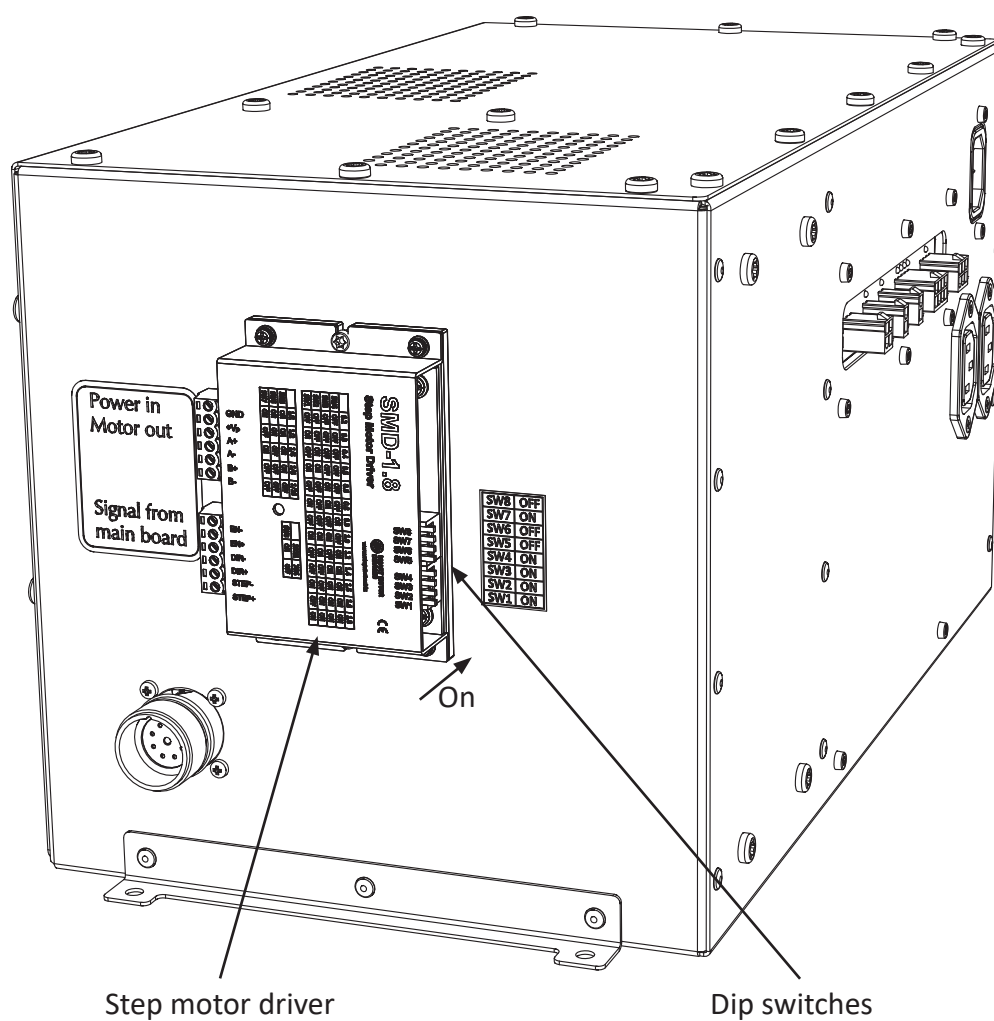
5.27 Main board - connections

The main board is placed just behind the operator panel
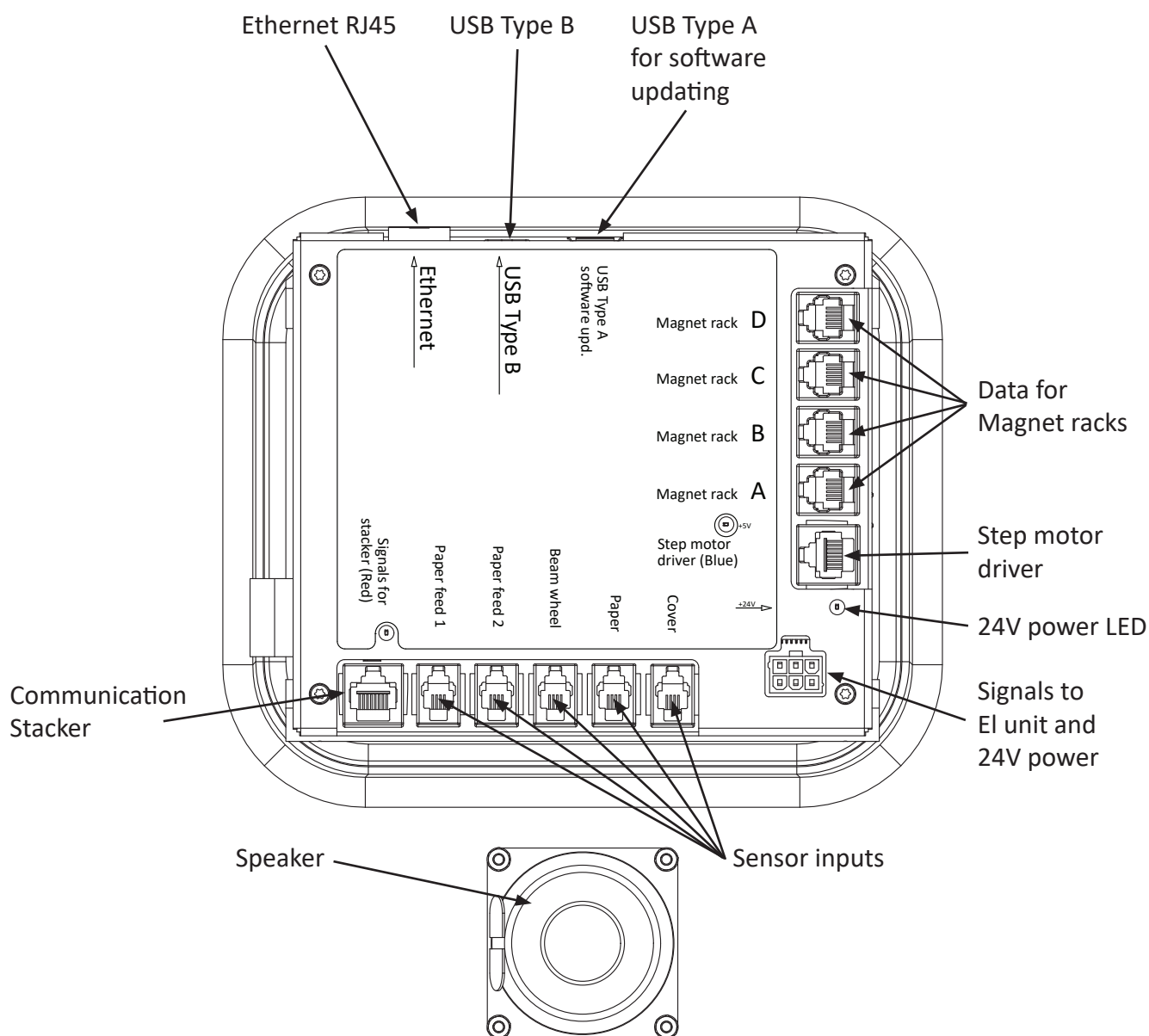
5.28 Maintenance

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 "Grease" on the figure below. (These are the only locations in the printer grease may be applied!).
Use a universal grease with molybdensulfid.
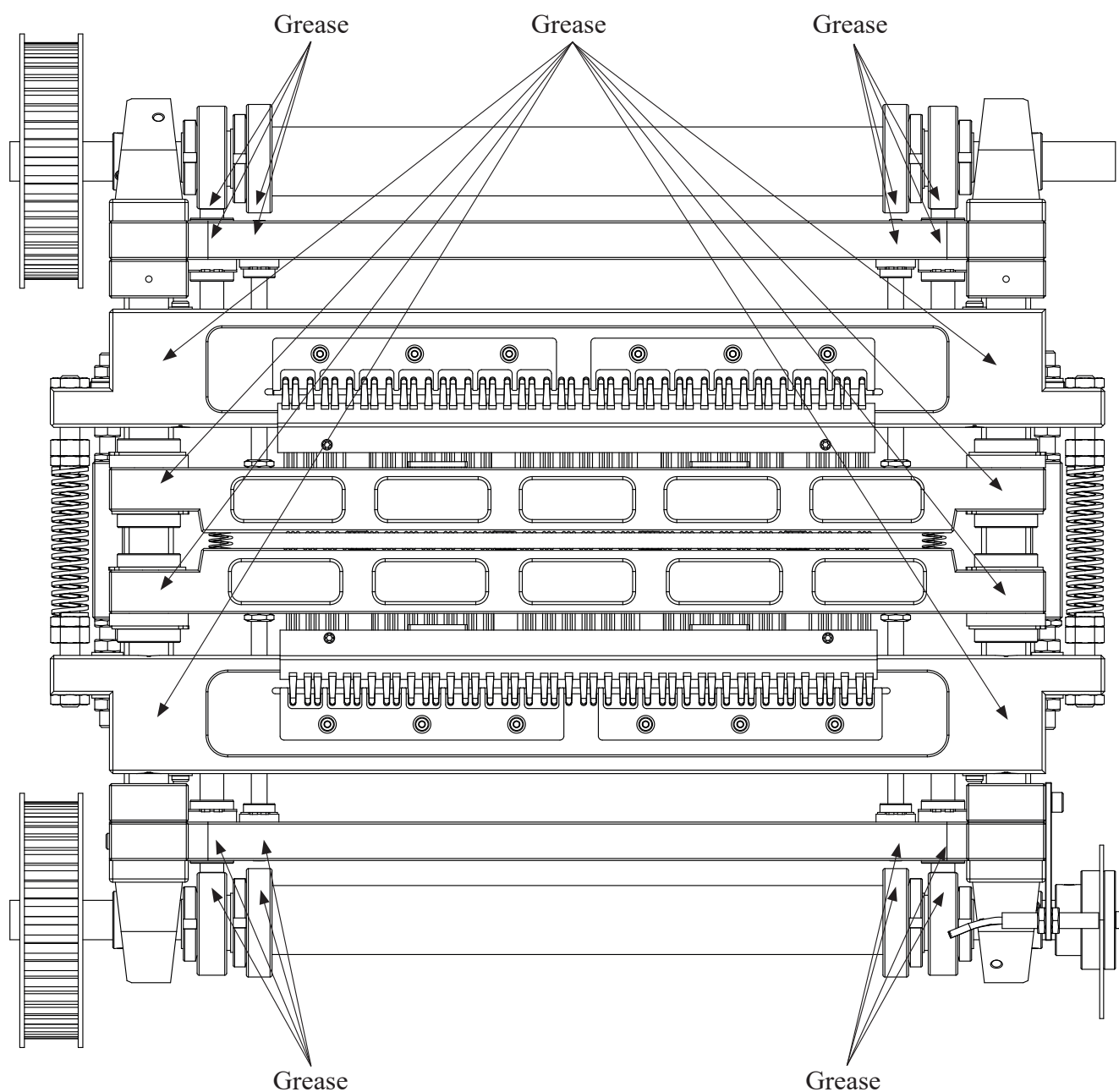
6.   PARTS - EXPLODED VIEWS

6.1   Magnet rack
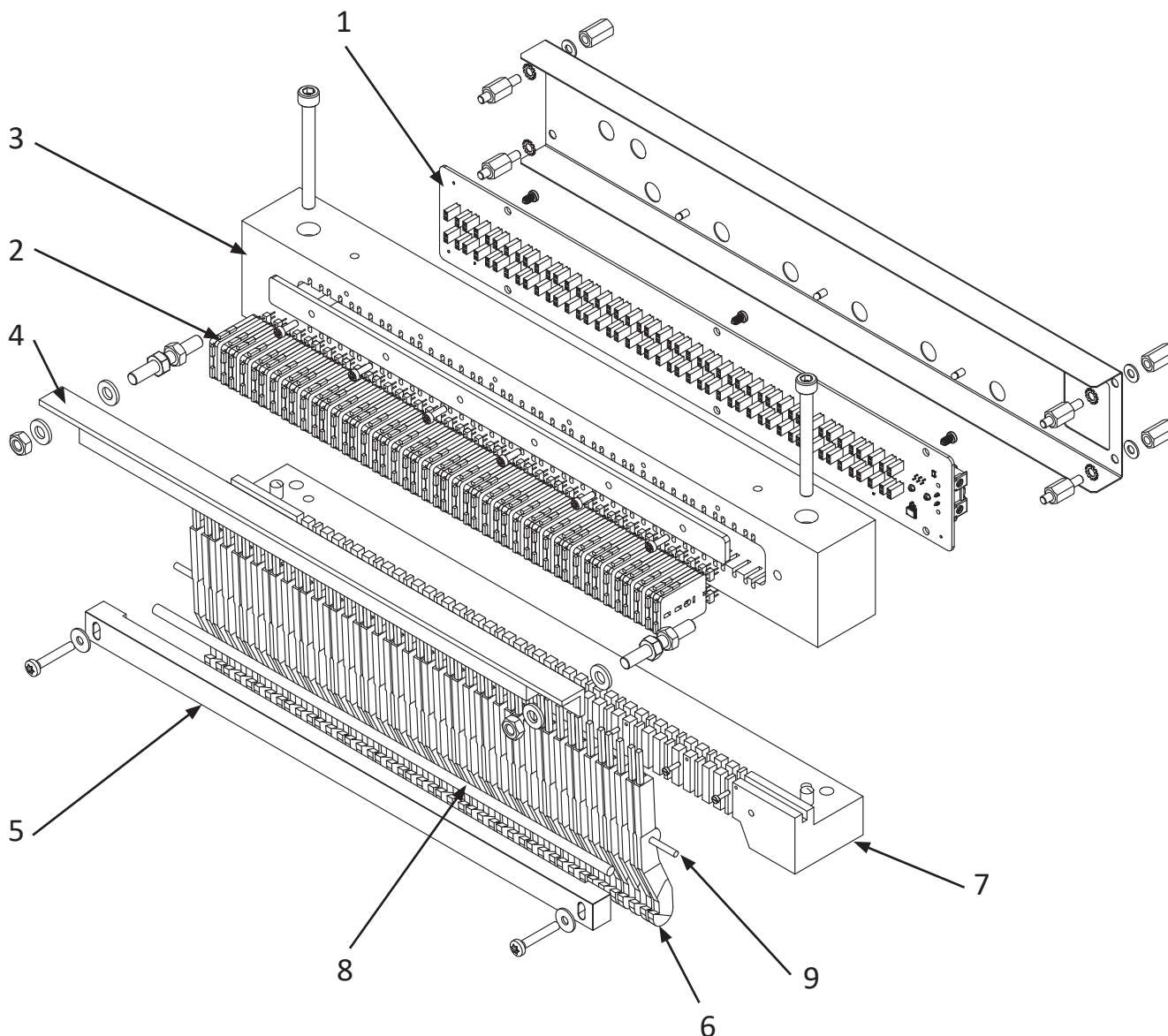
SW985-40893, Magnet rack 45 2.1 assembly

Pos.	Part no.	Name	Quantity per. rack
1	60-60373	Magnet rack board 45 2.1	1
2	B3985-30191	Magnet	45
3	SW985-40882	Magnet rack	1
4	SW985-40886	Support list, magnet rack	1
5	SW985-40891	Silicone string holder SW	1
6	B3985-40690	Pivot arm, long, green	45
7	SW985-40881	Guide list, magnet rack	1
8	B3985-40675	Silicone string ø5x320 White	1
9	SW985-40815	Shaft, long pivot arm, ø3x309	1
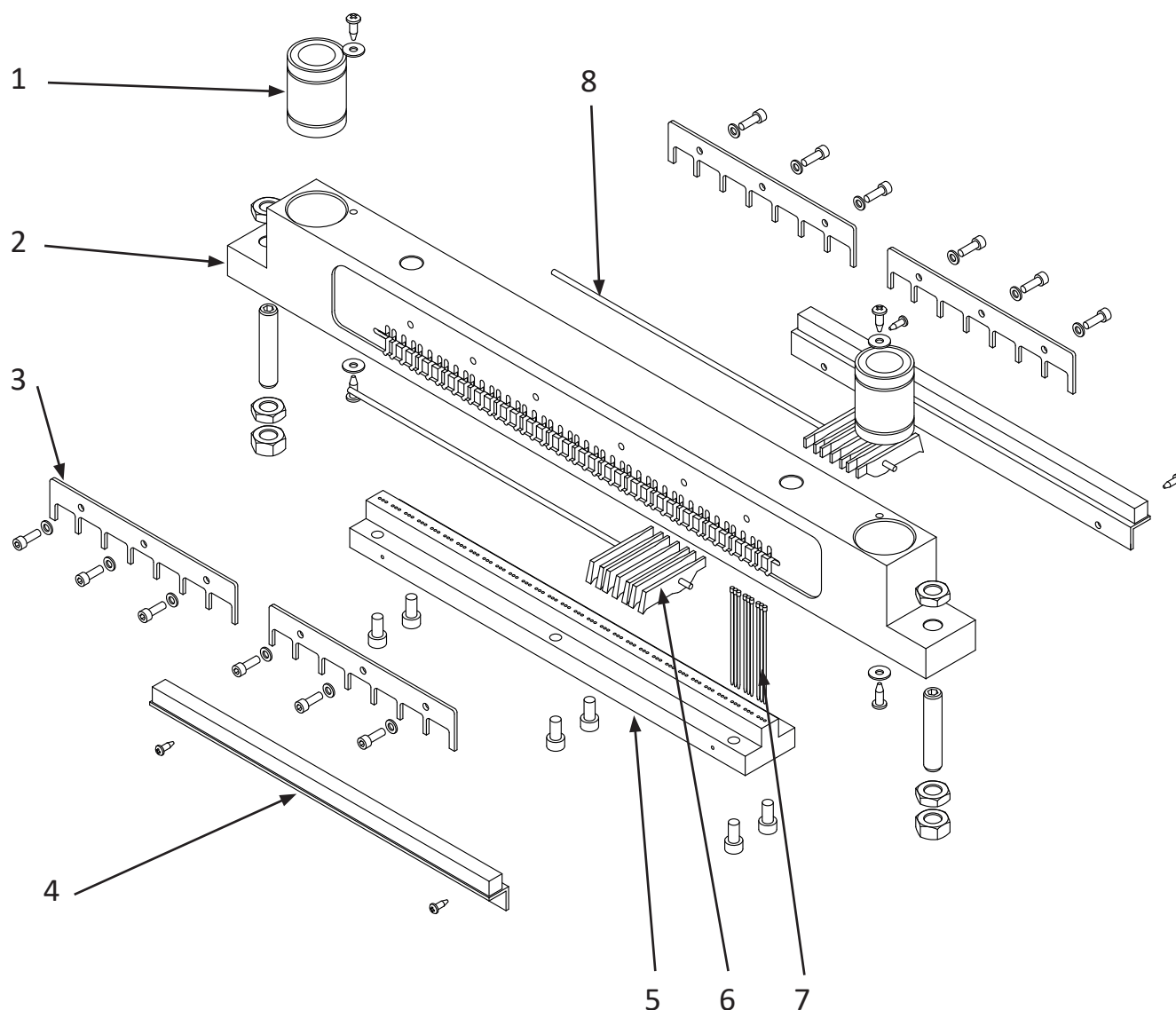
6.2   Beam

SW985-40819, Beam upper assembly
SW985-40810, Beam lower assembly

Pos.	Part no.	Name	Quantity per. beam
1	MA500-50001	Stroke ball bearing Ø20	2
2	SW985-40811	Beam, upper	1
2	SW985-40812	Beam, lower	1
3	SW985-40813	Fastener for short pivot arm shaft	2
4	SW985-40817	Sponge list for short pivot arm	2
5	60-65628	Pin guide	1
6	B3985-4016E	Short pivot arm, green	90
7	B3985-40150	Printing pin, length = 64.5 mm	90
8	SW985-40815	Shaft, short pivot arm ø3x309	2

6.3 Paper shoe
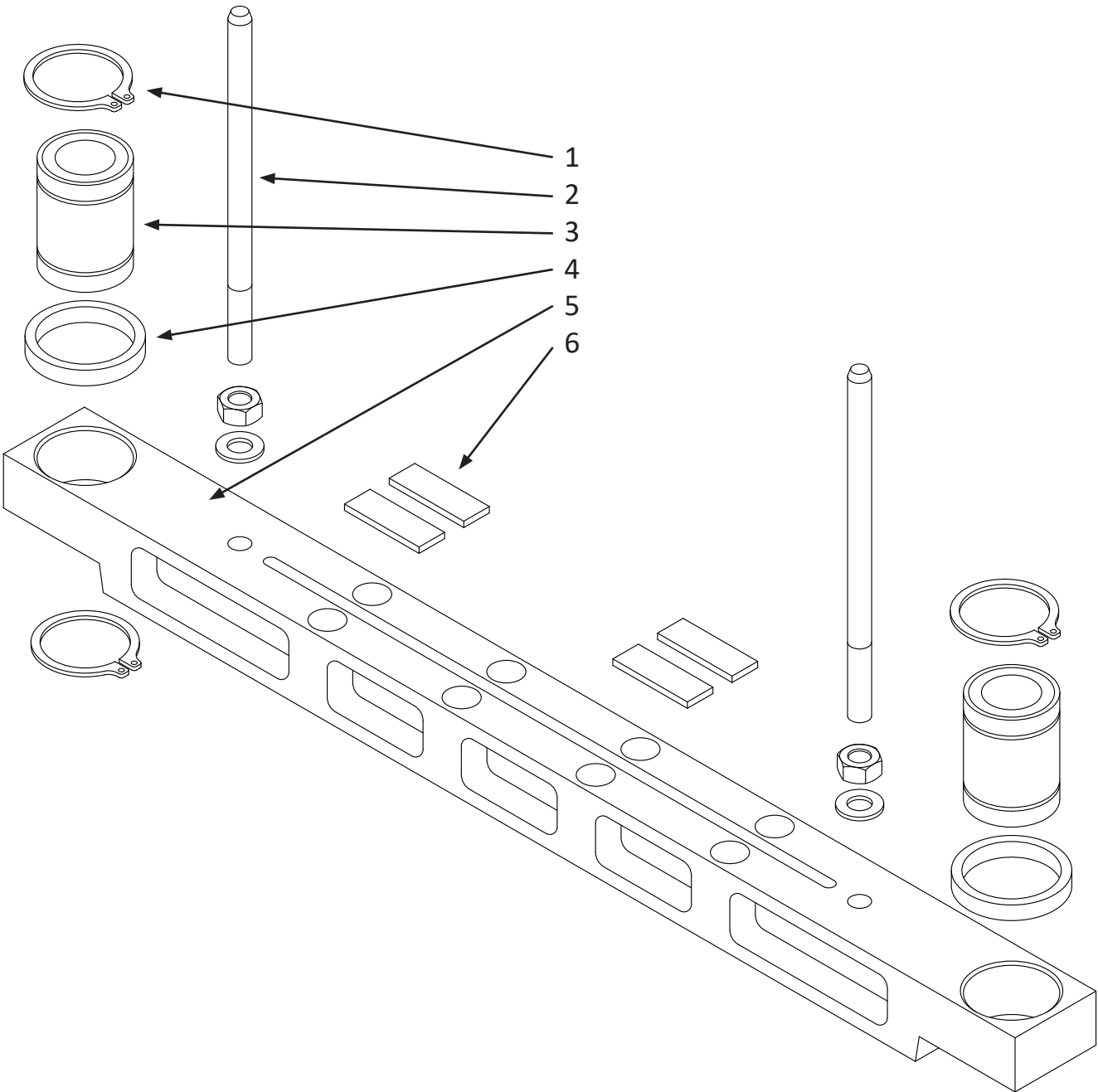
60-65629, Paper shoe, upper assembly
60-65630, Paper shoe, lower assembly
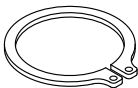
Pos.	Part no.	Name	Quantity per. shoe
1	MA510-10003	Retaining ring	4
2	B3985-40720	Adjustment screw (push rod) Ø8x140	2
3	MA500-50001	Stroke ball bearing Ø20	2
4	B3985-40913	Spacer	2
5	60-65627	Paper shoe upper	1
5	60-65626	Paper shoe lower	1
6	B3985-40722	Plastic shims	4

6.4   Paper feeder
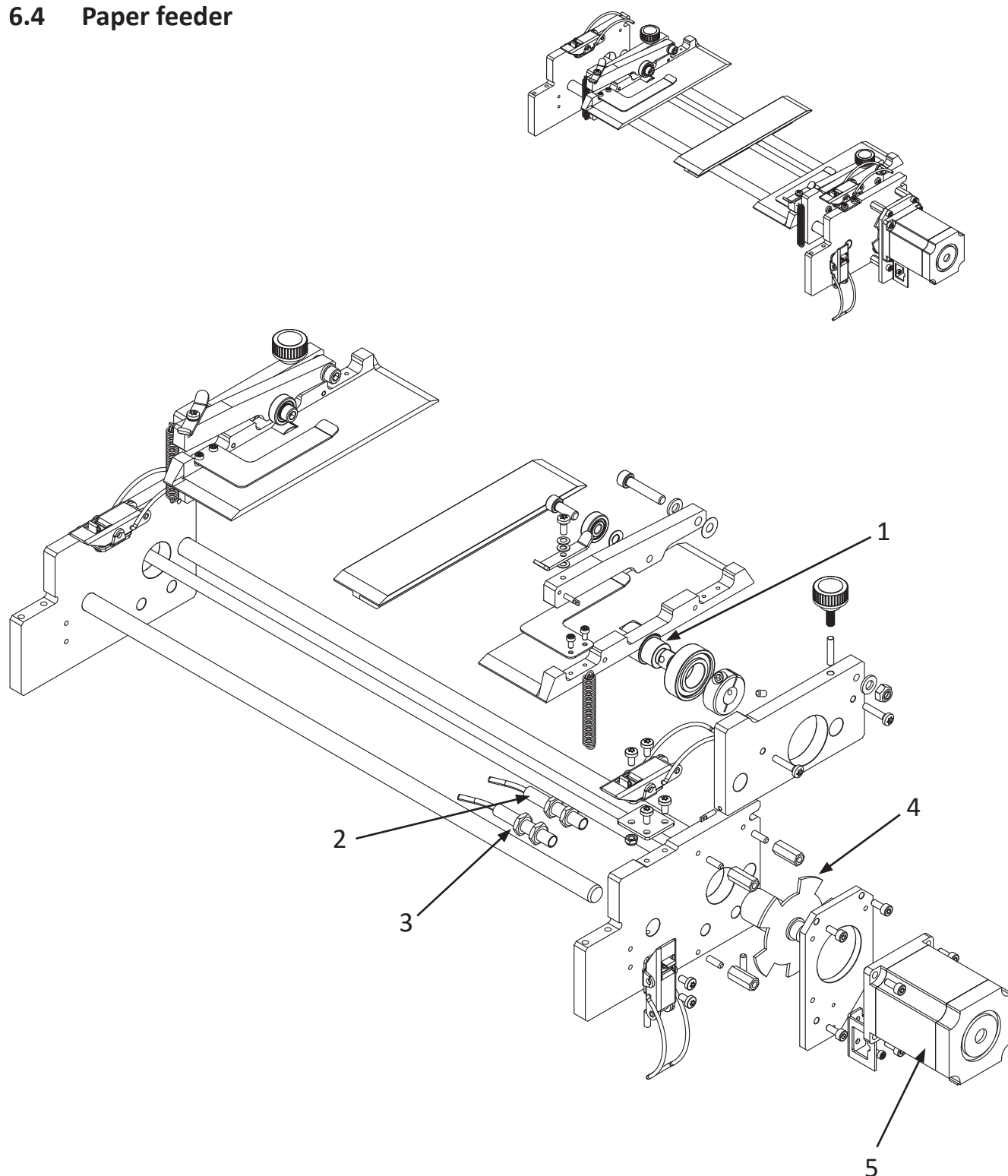
60-51300, Feeder for S2 series, assembly

Pos.	Part no.	Name	Quantity
1	SR975-51004	Pulling wheel	2
2	10-61966	Paper feed sensor no. 1	1
3	10-61967	Paper feed sensor no. 2	1
4	60-51250	Timing wheel with hub	1
5	EA185-00025	Stepper motor	1

6.5   Paper cutter
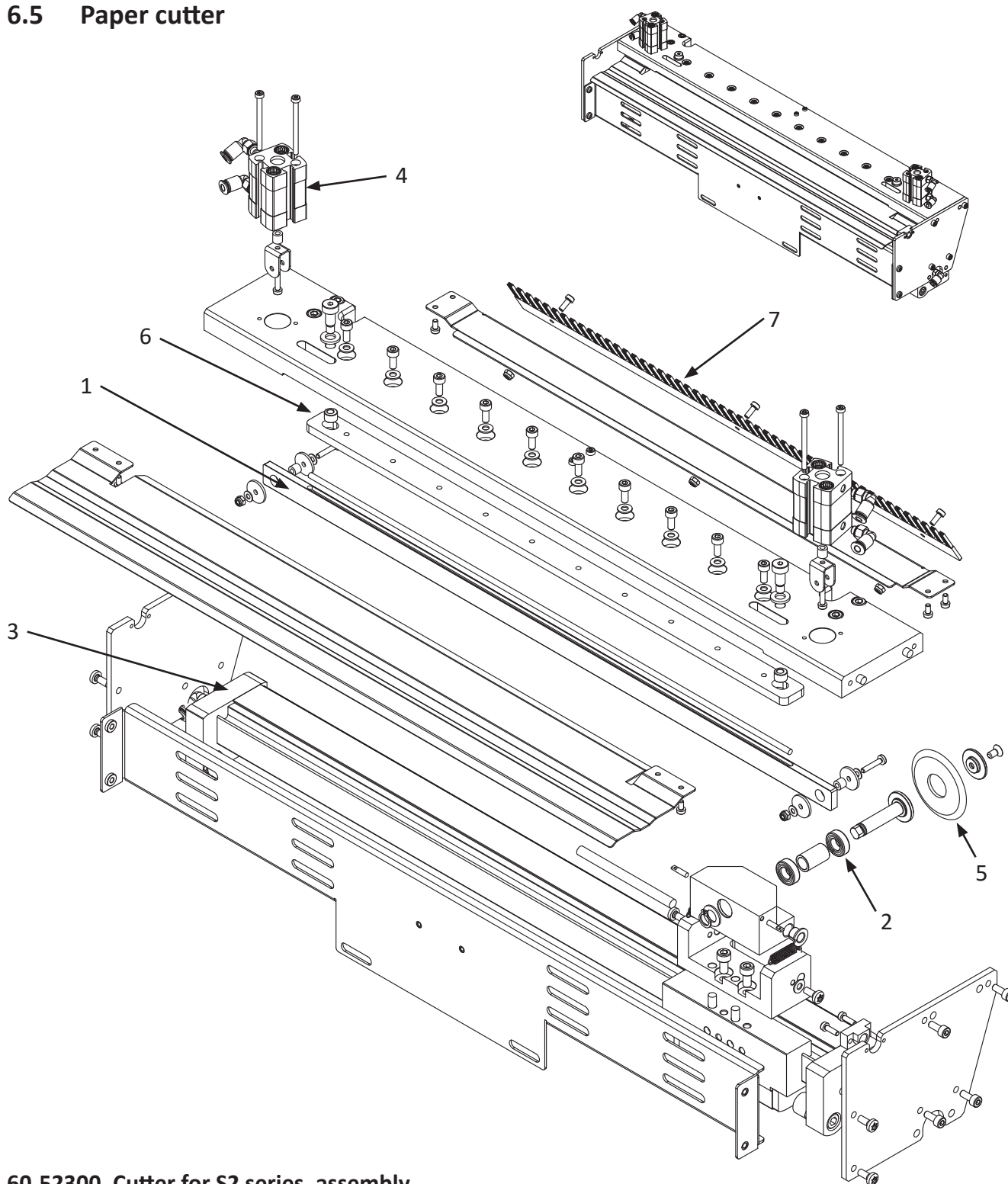
60-52300, Cutter for S2 series, assembly

Pos.	Part no.	Name	Quantity
1	60-52312	Paper clamp	1
2	MA500-10007	Bearing 688 2Z	2
3	MA525-10026	Cutter cylinder	1
4	MA525-10027	Paper clamp cylinder	2
5	MA599-00002	Roller blade	1
6	PK980-52105	Fixed blade	1
7	SR970-52047	Antistatic brush	1

6.6   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 in-wards until the wheel is loose.

Direction of rotation
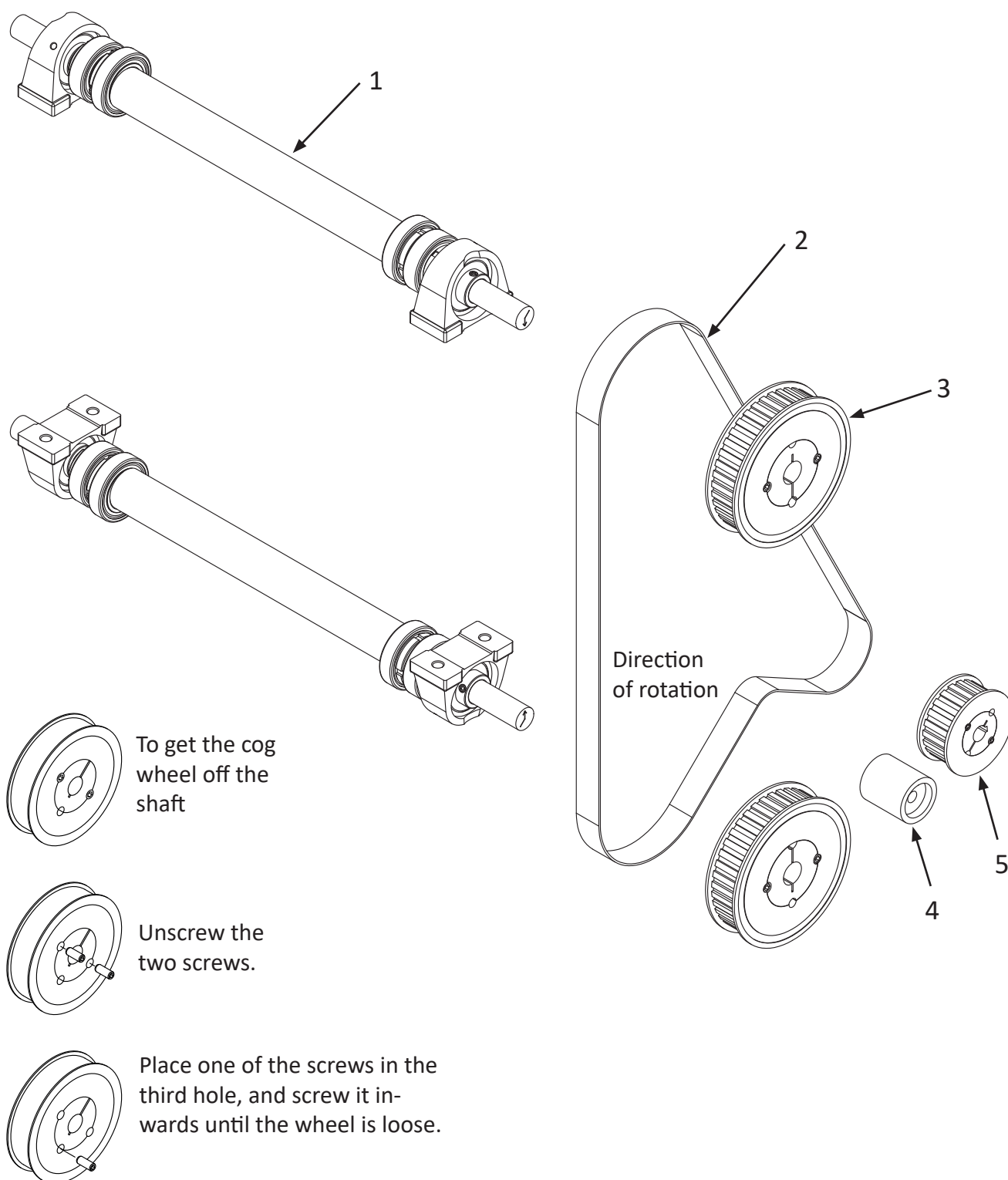
Parts shaft, belt

Pos.	Part no.	Name	Quantity
1	60-65623	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
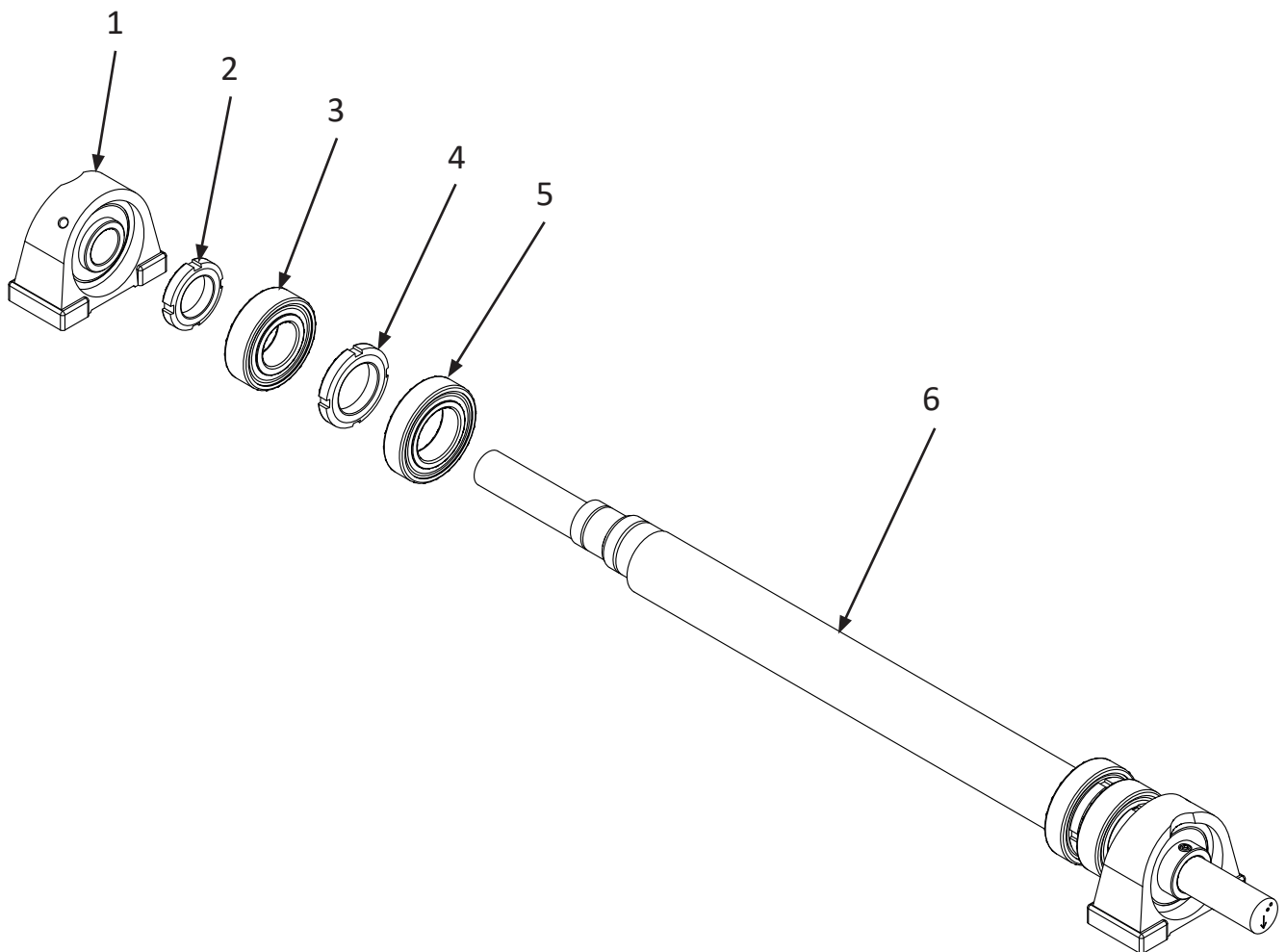
60-65623, Shaft assembly

Pos.	Part no.	Name	Quantity per. shaft
1	MA500-20002	Main bearing with housing (not part of 60-65623)	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	60-65620	Main shaft SW	1

6.7 Top and bottom frame
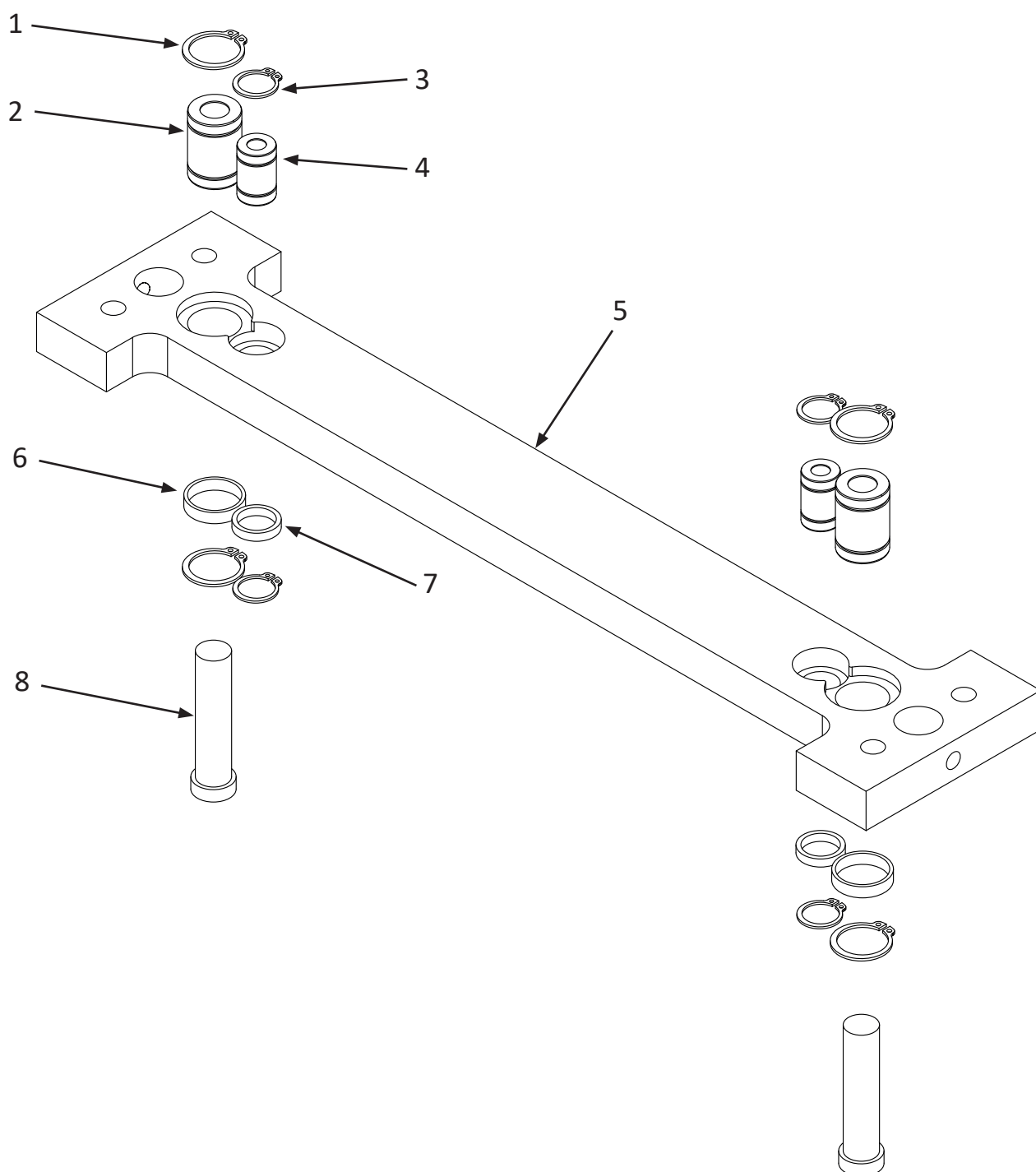
60-65624, Top and bottom frame assembly

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	60-65621	Frame SW	1
6	B3985-40912	Spacer Ø22	2
7	B3985-40911	Spacer Ø16	2
8	10-60032	Push rod ceramic Ø12x56 (not part of 60-65624)	2

Frame, complete
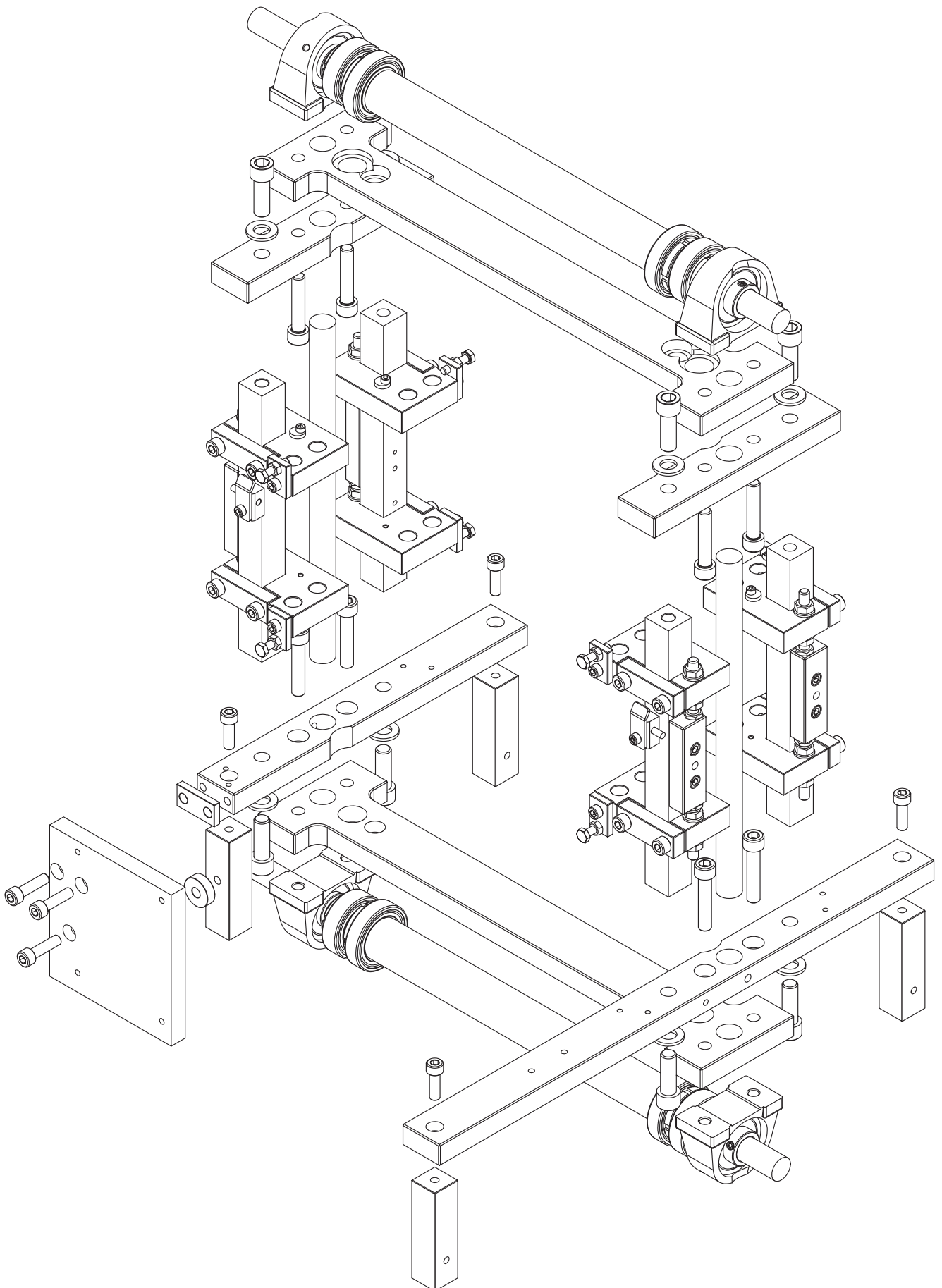
7. SW2 STACKER

The SW2 Stacker will stack the printed sheets in piles, where one pile can be a complete book or magazine. The stacker is also controlling the compressed air that drives the paper cutter inside the printer cabinet.

7.1 Description of function

When the printer is printing a sheet, the sheet will be catched by the rollers on the eject motors. The eject motors, one on each side of the sheet, runs slowly with low torque as long as the printer is printing. When it's time to cut the paper, the printer sends a signal to the SW2 stacker control unit. The paper holder on the cutter locks the paper and the cutter cuts the sheet.
Immediately after the cutting, the eject motors will increase the speed and torque and push the sheet into the stacking unit.
When the sheet is detected by the paper sensor on the paper stop, the trap doors will open and the sheet will fall down onto the conveyor belt.

This is repeated until the wanted numbers of sheets in the volume is reached, then the conveyor belt will move the stack a short distance. The different volumes will then be separated on the conveyor belt.

If the sheet for some reason does not arrive at the paper sensor within a certain time after the sheet is cut, the SW2 stacker will send an alarm signal back to the printer, and the printer will stop.
There is another sensor at the end of the conveyor belt that will detect if the belt is full. This will also stop the printer.
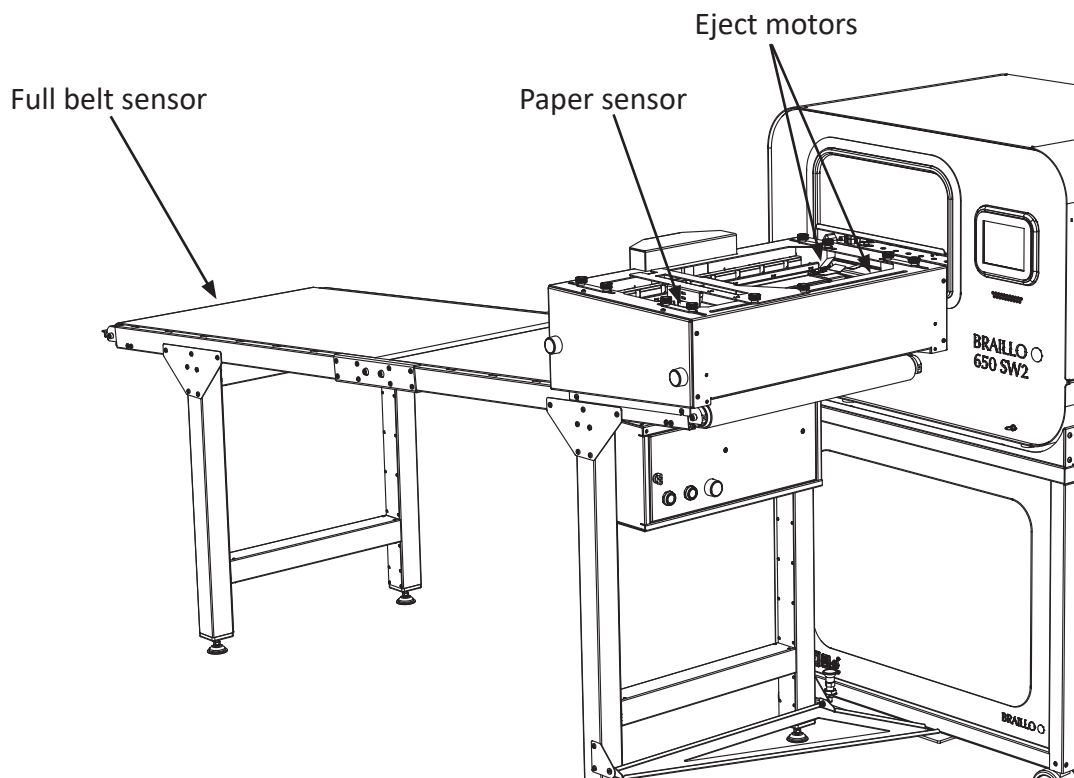
7.2   Eject mechanism adjustment

The eject motors will run with two different speeds, Idle and Eject.
The 'Idle' speed is slow with low torque, and 'Eject' is fast with higher torque.
These two speeds can be individually adjusted on the two potensiometers inside the control cabinet.
Turning clockwise gives higher speed.

Eject
adjustment

Idle
adjustment
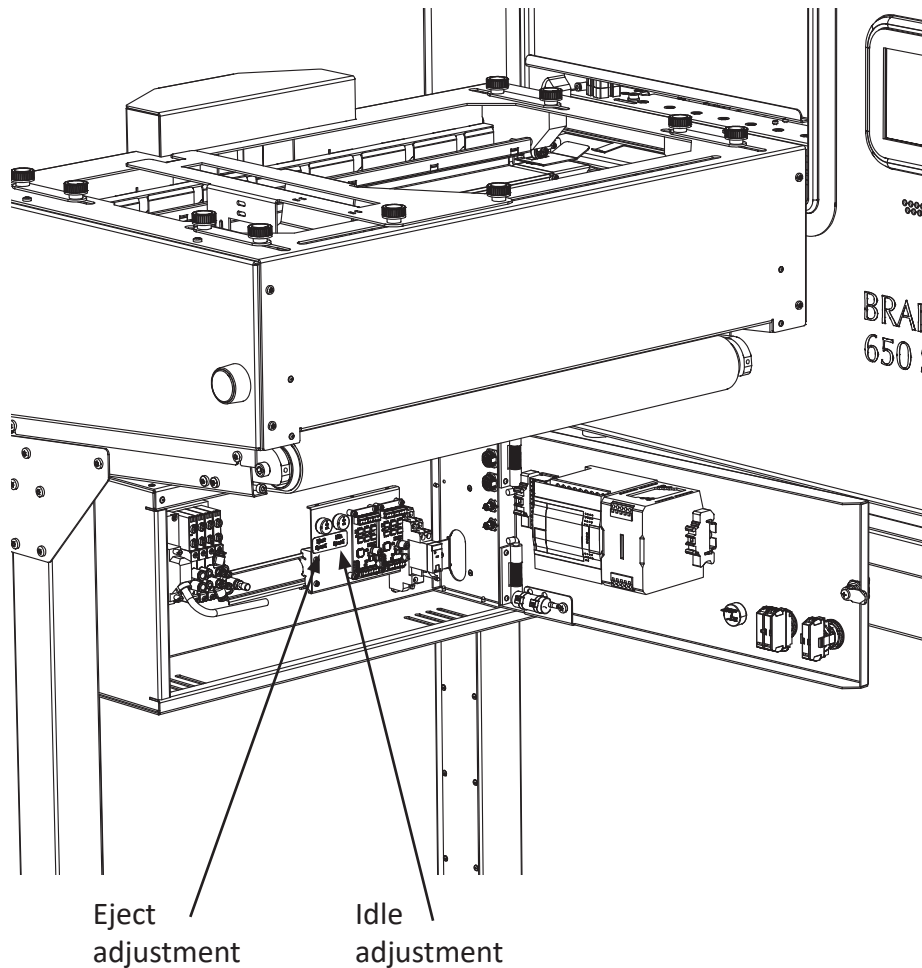
7.3   Trap door, speed adjustment

The speed the trap doors are moving down and up can be adjusted. The adjustment is done inside the SW2 stacker control cabinet, on two speed controllers as shown in the figure below.

Trap door down
speed adjust
Screw inwards for
slower movement

Trap door up
speed adjust
Screw inwards for
slower movement
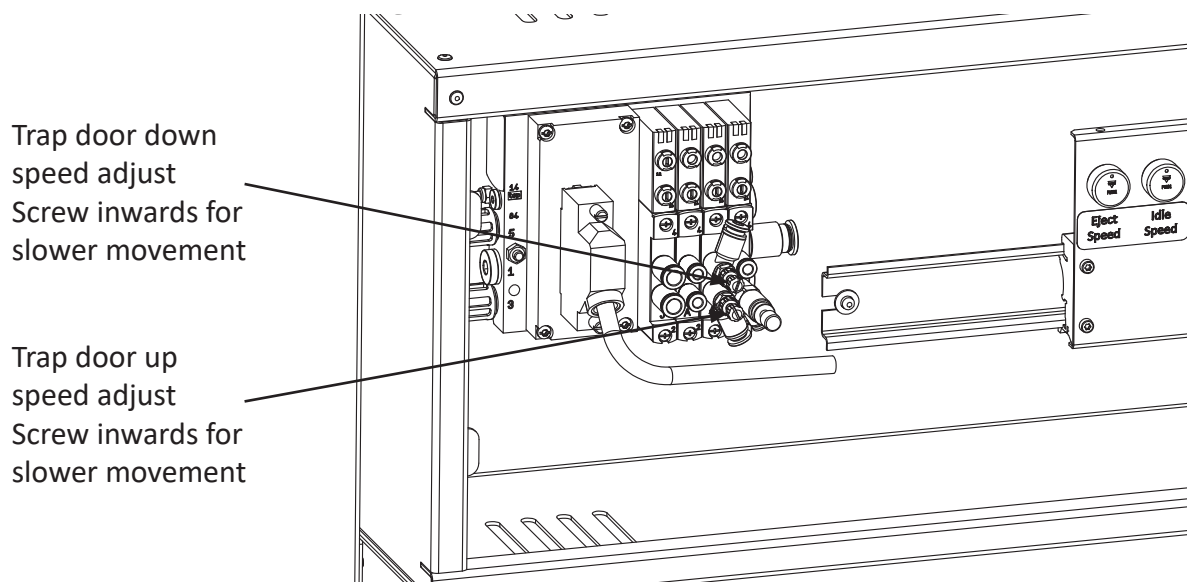
7.4   Moving paper guide, pressure adjustment

The moving paper guide is lifted away from the conveyor belt every time the belt moves. And when several volumes are printed, the moving paper guide will press down on top of the printed braille. The force it is pressing with is adjustable. The adjustment is done inside the SW2 stacker control cabinet, on a pressure regulator as shown in the figure below.
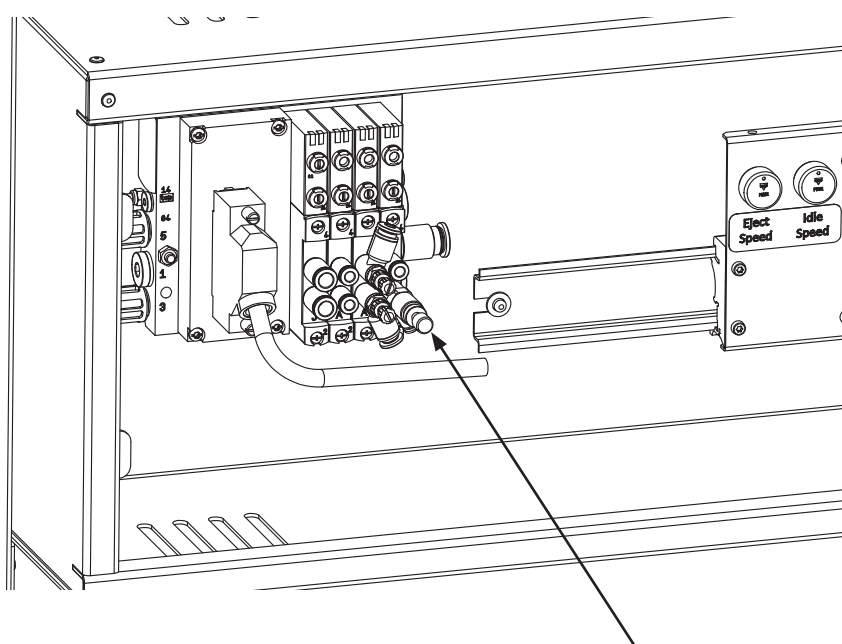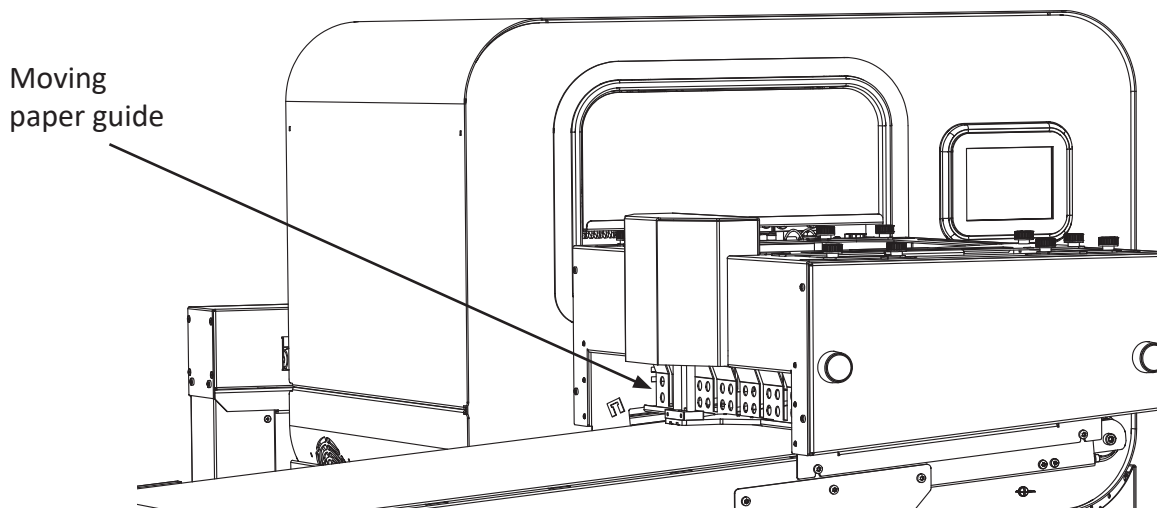
Moving
paper guide

Moving paper guide
pressure regulator
Screw inwards for
more pressure

7.5   Conveyor belt tension adjustment

The conveyor belts tension can be adjusted on the front end for the first belt, and on the rear end for the last belt. The figure below is showing the rear end.
When adjusting, adjust the same distance on both sides to ensure that the belt will stay approx. in the middle of the rolls.
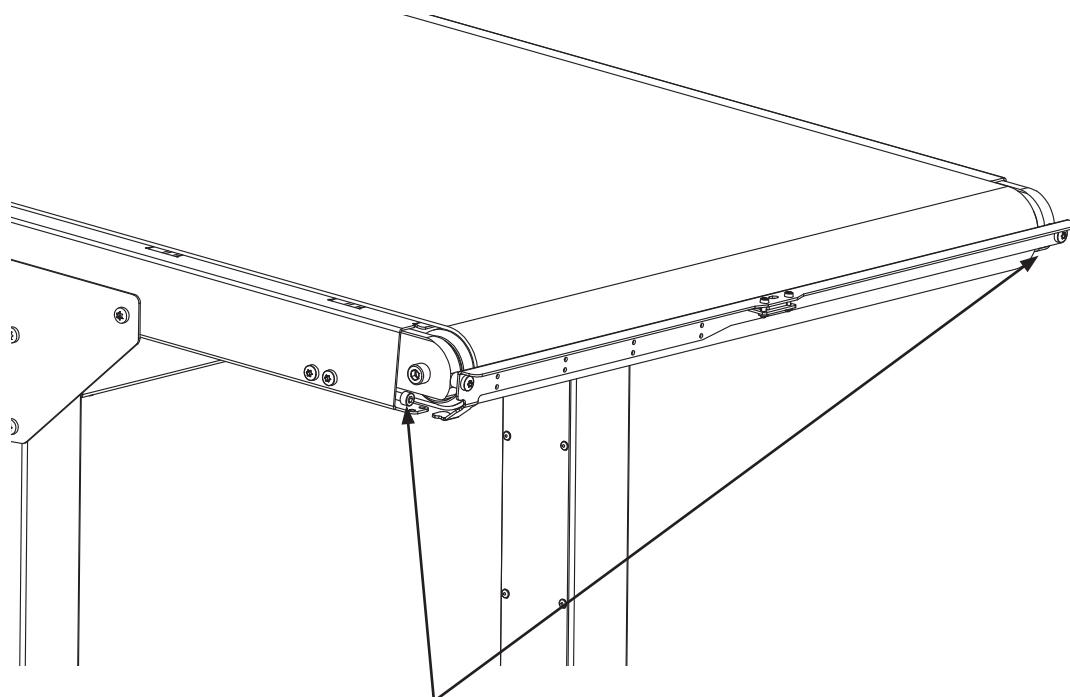
Conveyor belt tension adjustment screw
Screw inwards for more tension

8.   ROLL UNWINDER

8.1   Description of functions

The Roll Unwinder's main function is to automatically supply the printer with the correct amount of paper. This is done using a laser sensor that sences the distance down to the paper. If the distance is getting shorter, the RU will feed paper faster, and if the distance is getting longer it will feed slower. If the printer stops, the paper will also stop completely.

The feeding is done by leading the paper in between two rolls, where one has a built-in motor. The other roll is pressing against the motor roll by a pneumatic cylinder. When the paper feeding stops, the pressure on the pneumatic cylinder is released.

Laser
distance sensor

On/Off switch
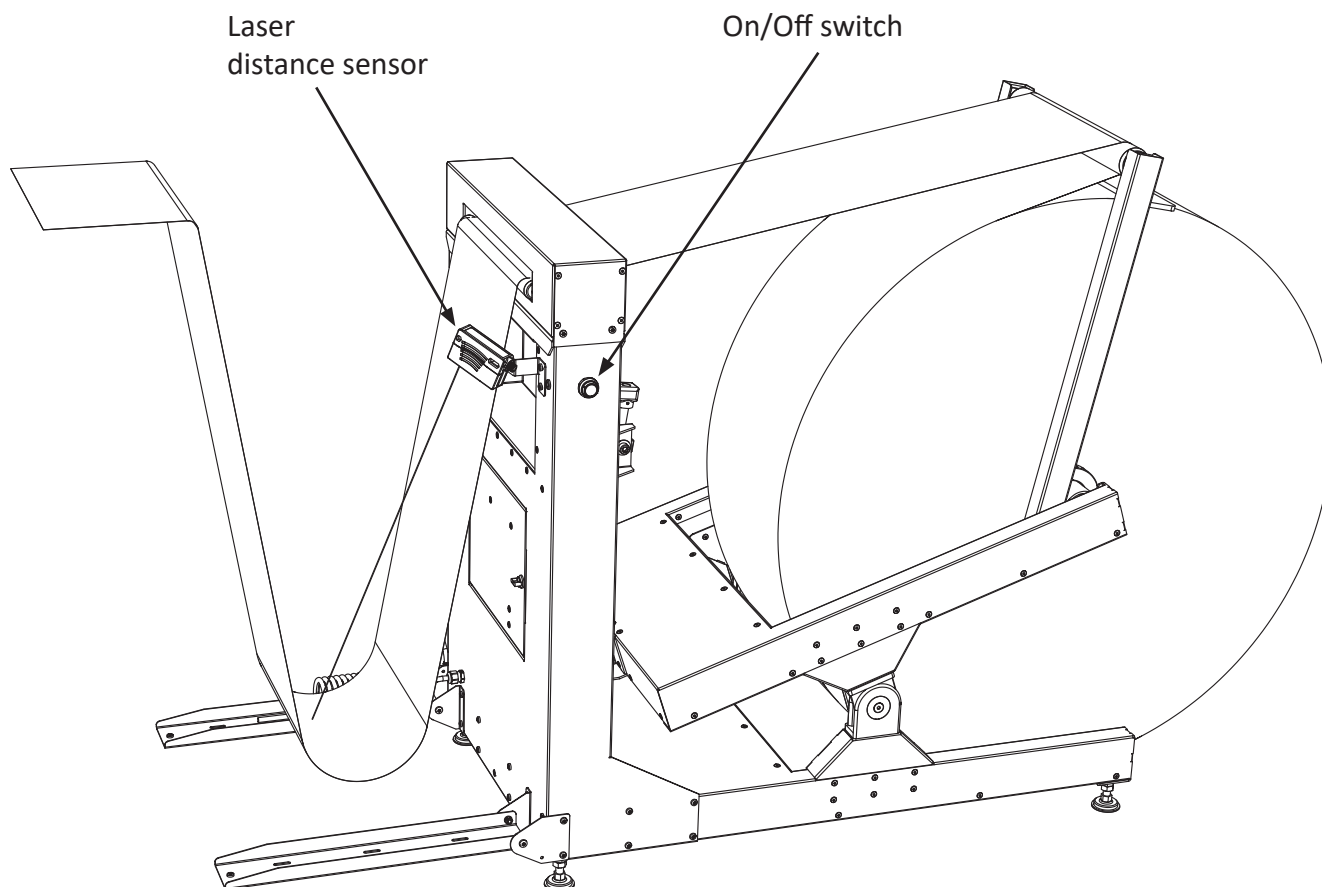
9. TECHNICAL SPECIFICATIONS

9.1 Technical specifications

Format:

Paper roll:	Max. diameter 1100 mm (43 inches)
	Inner core diameter min. 70 mm (2.75 inches), max. 84 mm (3.3 inches)
Paper (roll) width:	Min. 260 mm (10.2 inches), max. 330 mm (13 inches)
Sheet width:	Min. 417 mm (16.4 inches), max. 585 mm (23 inches)
Line length:	Min. 10, max. 44 characters
Printing Mode:	Single/Inter point
Margins:	Inner/Outer min. 12.7, max. 50.8 mm (0.5 - 2 inches)
Page height:	Max. 30 lines per page
Braille cell:	Standard medium 6 dot
Line spacing:	Fixed 5 mm
Paper Weight:	Min. 120 - max. 180 g/m², Recommended 150 g/m²

Printing Speed:

Characters/sec.:	650 char/sec.
Pages/hour:	No. of pages per hour is dependent on page format

Electrical:

Voltage:	Single phase 230 V (+/- 10 %), 50/60 Hz
Current:	Approx. 4.3 A max.
Power:	Approx. 1000 W max.
Fuse in printer:	10 AT
Leakage current:	4.6 mA

Compressed air:
Clean air without oil or water,
min. 7.0 bar @ 100 l/min., max. temperature 50° C.

Communication with the computer:
USB
Ethernet
WLAN

Environment:

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

Measurements:

Height:	1420 mm
Width:	2590 mm
Length:	3340 mm
Weight:	313 kilos

9.2 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.

An overview of the different escape-sequences:

ESC A n	- Sheet Width.	n can be 0 (2-page mode) or 1 (4-page mode).
ESC B nn	- Line length.	nn can be from 10 to 44 characters.
ESC D nn	- Margin 1.	nn can be from 0.5" to 2.0"
ESC E nn	- Margin 2.	nn can be from 0.5" to 2.0"
ESC G n	- Page 1 up or down	n can be 0 (Page 1 up) or 1 (Page 1 down).
ESC H n	- Print format	n can be 0 (Single sided) or 1 (Inter point).
ESC P nn	- No. of sheets	nn can be from 01 to 99 sheets
ESC 0	- Soft Reset	
ESC 1	- Soft Form Feed	
ESC 4	- Adding the printer ID at the last line on the sheet	

⚠️ 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 Width:

ESC A n 　　　- Sheet width.

n can be 0 or 1, 2-page mode (0) or 4-page mode (1).

Page mode	ASCII	HEX
2-page	027 065 048	1B 41 30
4-page	027 065 049	1B 41 31

Default is 4-page.

Line length:

ESC B nn 　　　- Line length.

nn can be from 10 to 44 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
43	027 066 052 051	1B 42 34 33
44	027 066 052 052	1B 42 34 34

Default is 42 characters per. line.

Margin 1:

ESC D 　nn 　　- Margin 1.

nn can be from 0.5" to 2.0"

Margin 1	ASCII	HEX
0.5"	027 068 048 053	1B 44 30 35
0.6"	027 068 048 054	1B 44 30 36
0.7"	027 068 048 055	1B 44 30 37
0.8"	027 068 048 056	1B 44 30 38
0.9"	027 068 048 057	1B 44 30 39
1.0"	027 068 049 048	1B 44 31 30
1.1"	027 068 049 049	1B 44 31 31
1.2"	027 068 049 050	1B 44 31 32
1.3"	027 068 049 051	1B 44 31 33
1.4"	027 068 049 052	1B 44 31 34
1.5"	027 068 049 053	1B 44 31 35
1.6"	027 068 049 054	1B 44 31 36
1.7"	027 068 049 055	1B 44 31 37
1.8"	027 068 049 056	1B 44 31 38
1.9"	027 068 049 057	1B 44 31 39
2.0"	027 068 050 048	1B 44 32 30

Default is 1.0".

Margin 2:
ESC E   nn   - Margin 2.
nn can be from 0.5" to 2.0"

Margin 1	ASCII	HEX
0.5"	027 069 048 053	1B 45 30 35
0.6"	027 069 048 054	1B 45 30 36
0.7"	027 069 048 055	1B 45 30 37
0.8"	027 069 048 056	1B 45 30 38
0.9"	027 069 048 057	1B 45 30 39
1.0"	027 069 049 048	1B 45 31 30
1.1"	027 069 049 049	1B 45 31 31
1.2"	027 069 049 050	1B 45 31 32
1.3"	027 069 049 051	1B 45 31 33
1.4"	027 069 049 052	1B 45 31 34
1.5"	027 069 049 053	1B 45 31 35
1.6"	027 069 049 054	1B 45 31 36
1.7"	027 069 049 055	1B 45 31 37
1.8"	027 069 049 056	1B 45 31 38
1.9"	027 069 049 057	1B 45 31 39
2.0"	027 069 050 048	1B 45 32 30

Default is 1.0".

Number of sheets:
ESC P nn   - Number of sheets
nn can be 01 to 99 sheets.

Sheets	ASCII	HEX
01	027 080 048 049	1B 50 30 31
02	027 080 048 050	1B 50 30 32
03	027 080 048 051	1B 50 30 33
04	027 080 048 052	1B 50 30 34
05	027 080 048 053	1B 50 30 35
06	027 080 048 054	1B 50 30 36
07	027 080 048 055	1B 50 30 37
08	027 080 048 056	1B 50 30 38
09	027 080 048 057	1B 50 30 39
10	027 080 049 048	1B 50 31 30
11	027 080 049 049	1B 50 31 31
12	027 080 049 050	1B 50 31 32
13	027 080 049 051	1B 50 31 33
14	027 080 049 052	1B 50 31 34
15	027 080 049 053	1B 50 31 35
16	027 080 049 054	1B 50 31 36
17	027 080 049 055	1B 50 31 37
18	027 080 049 056	1B 50 31 38
19	027 080 049 057	1B 50 31 39
20	027 080 050 048	1B 50 32 30

Page 1 up or down:
ESC G n   - Page 1 up/down.
n can be 0 (up) or 1 (down).

Page 1	ASCII	HEX
Up	027 071 048	1B 47 30
Down	027 071 049	1B 47 31

Default is Page 1 Up.

Print Format:
ESC H n   - Print Format.
n can be 0 (single-sided) or 1 (interpoint).

Print Format	ASCII	HEX
Single-sided	027 072 048	1B 48 30
Double-sided	027 072 049	1B 48 31

Default is Double-sided.

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:
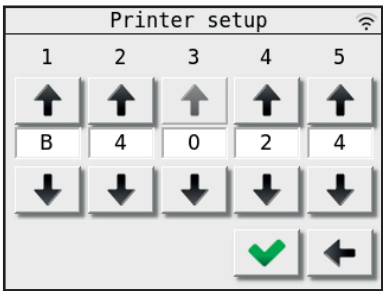
9.3 Warranty

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 AS.

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 AS (see below).
- Altered product (except as authorized by Braillo Norway AS) 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 AS. In all other cases, the part(s) must be returned to Braillo Norway AS as soon as possible. If the part(s) has/have not been received by Braillo Norway AS 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.

9.4 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

9.5   Address and phone number

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