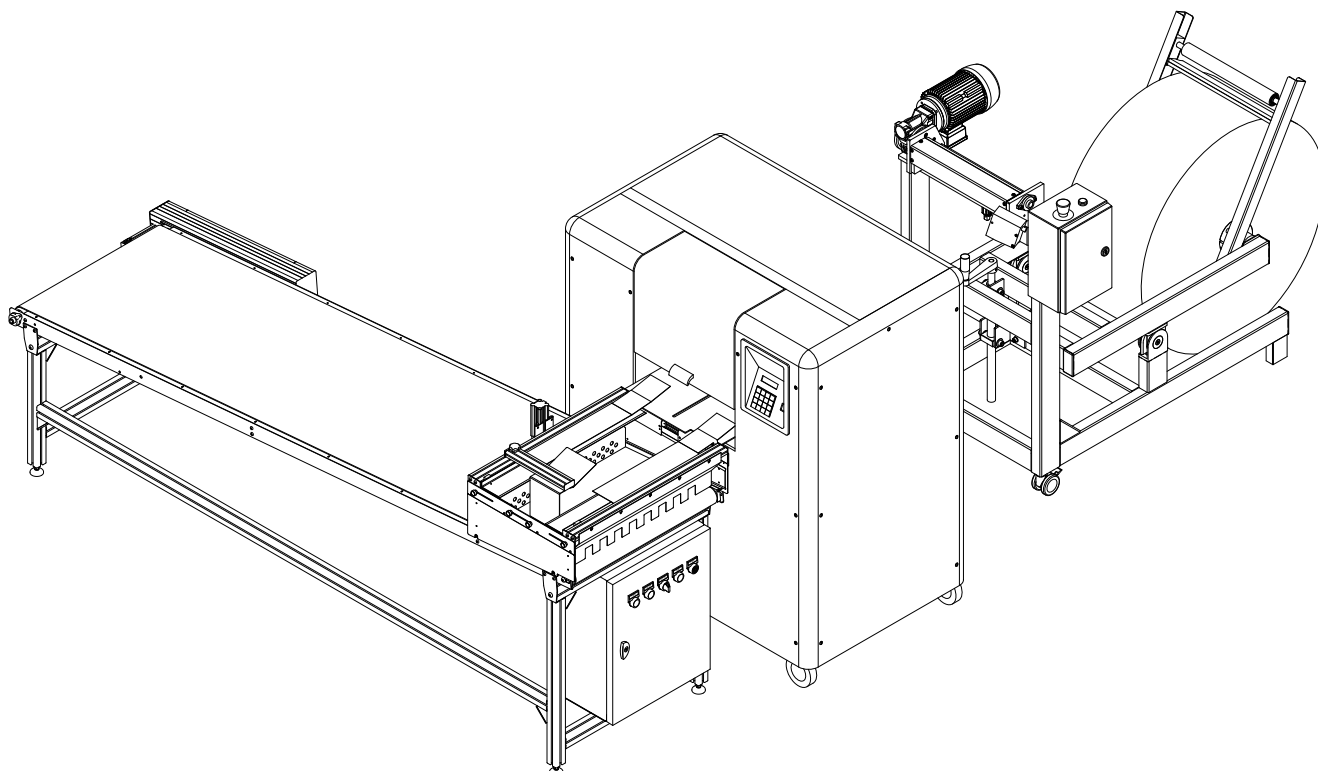


BRAILLO 440 SW

Series 1



User's Guide

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1. PRINTER BASIC

Thank you for your purchase of a Braillo 440 SW series 1. Please read this manual carefully before installing and operating this printer.

Features

Prints interpoint, both sides of the page are printed simultaneously.

Specially designed to print 4 pages/sheet (like e.g. newspapers, magazines).

Prints 440 characters/second.

The printed volumes will lay on a conveyor belt, separated and ready for binding.

Self-test system that checks the magnets continuously during printing.

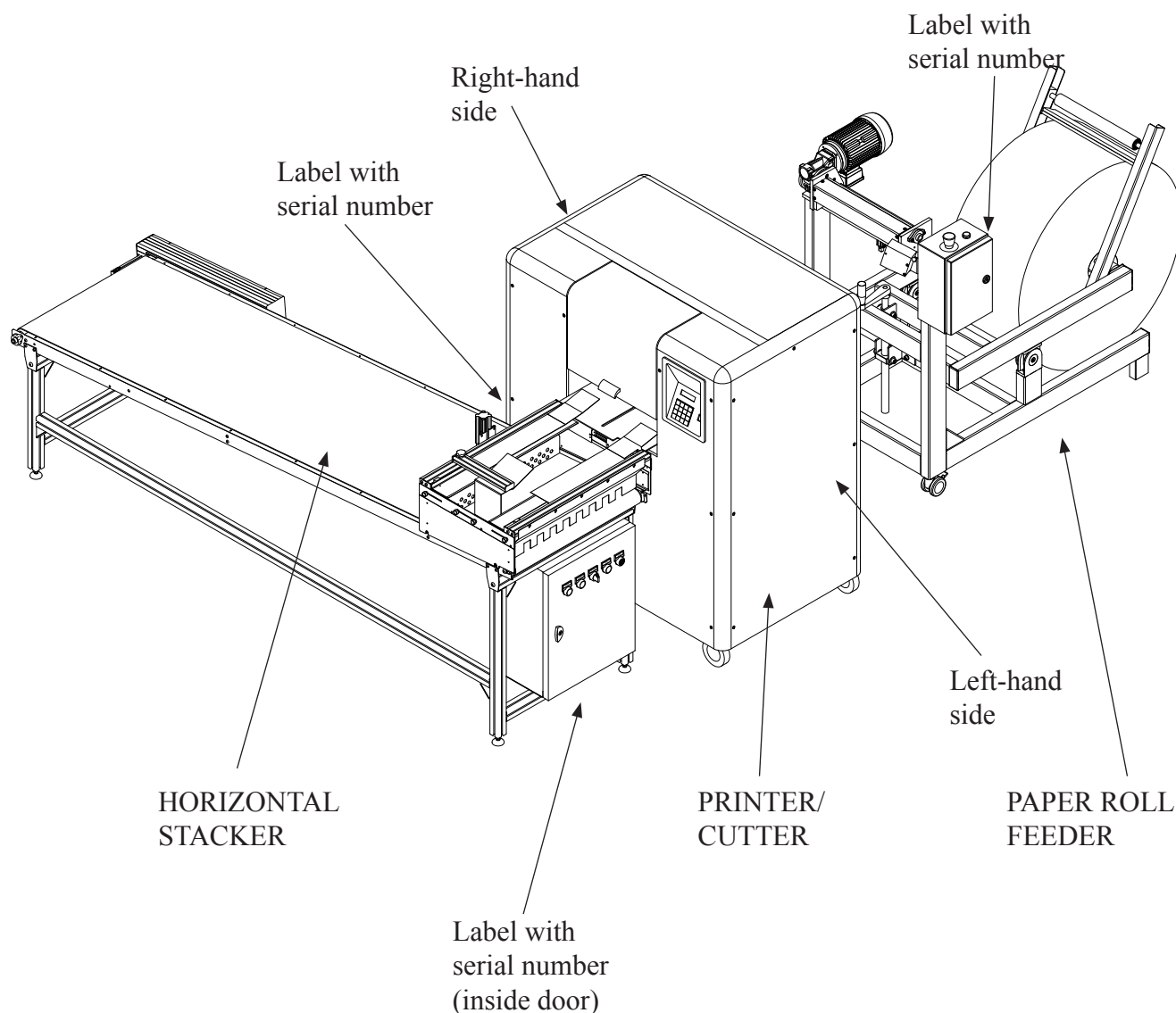
Reliable, sturdy construction.

Safety switches that will turn off the printer if somebody accidentally opens the cover.

Printer overview

Please see the figure below:

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



2. INSTALLATION

Space:

The minimum space required for the Braillo 440 SW is approximately **4.7m X 3.0m** (16 X 10 feet). It is required at least 1.5m free space behind the paper roll feeder (so that the paper roll can be replaced).

Distance to the computer:

Serial communication: Up to 25 metres (cable length) from the computer without special transmission precautions.

Parallel communication: Up to 7 metres (cable length) from the computer without special transmission precautions.

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 with high humidity. Too low humidity should also be avoided to prevent electrostatic problems.

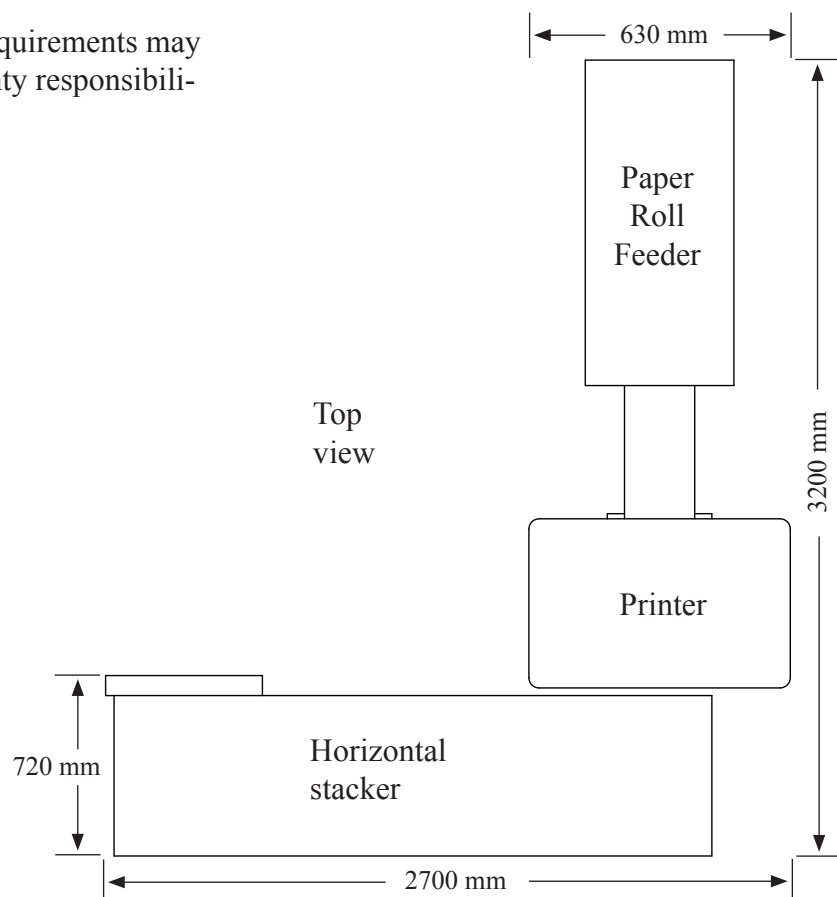
Some paper qualities may generate excessive paper dust. This should be removed with a vacuum cleaner and a damp cloth. (About every 50,000 Sheets).

Electrical:

Single phase 230 volt (+/- 10%), 50/60 hertz, circuit breakers should be about 10 amperes.

Be sure to consult your distributor/supplier for further details concerning the installation site.

Failure to meet the installation requirements may relieve the supplier of any warranty responsibilities.



2.1 Unpacking

Unpacking and installation can be done by the user.

After unpacking the printer, the cover must be removed before lifting the printer. See chapter 2.2 “Removal of Cover”.

Any kind of lifting of the printer must always be done from the baseboard at the bottom of the printer, or from the steel frame, and should be done with extreme care.

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

Also check that the shipment contains the following items:

- 1 Printer
 - 1 Power cable for the printer
 - 2 Data cables (serial and parallel)
 - 1 Serial adapter (9-25 pin)
 - 1 User's guide B440 SW
 - 1 Tool kit for service and maintenance
 - 1 Test and packing list
 - 1 Plate with paper pusher
- 1 Paper roll feeder
 - 1 Friction bar / correction roll
 - 1 Shaft, for the paper roll
 - 1 Paper sample
 - 1 Compressor (optional)
- 1 Horizontal paper stacker
 - 1 Flipper
 - 1 Paper cutter

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.

After the items are unpacked, make sure that the transport boxes is kept for eventually later use.

2.2 Removal of cover

See figures below and on the next pages.

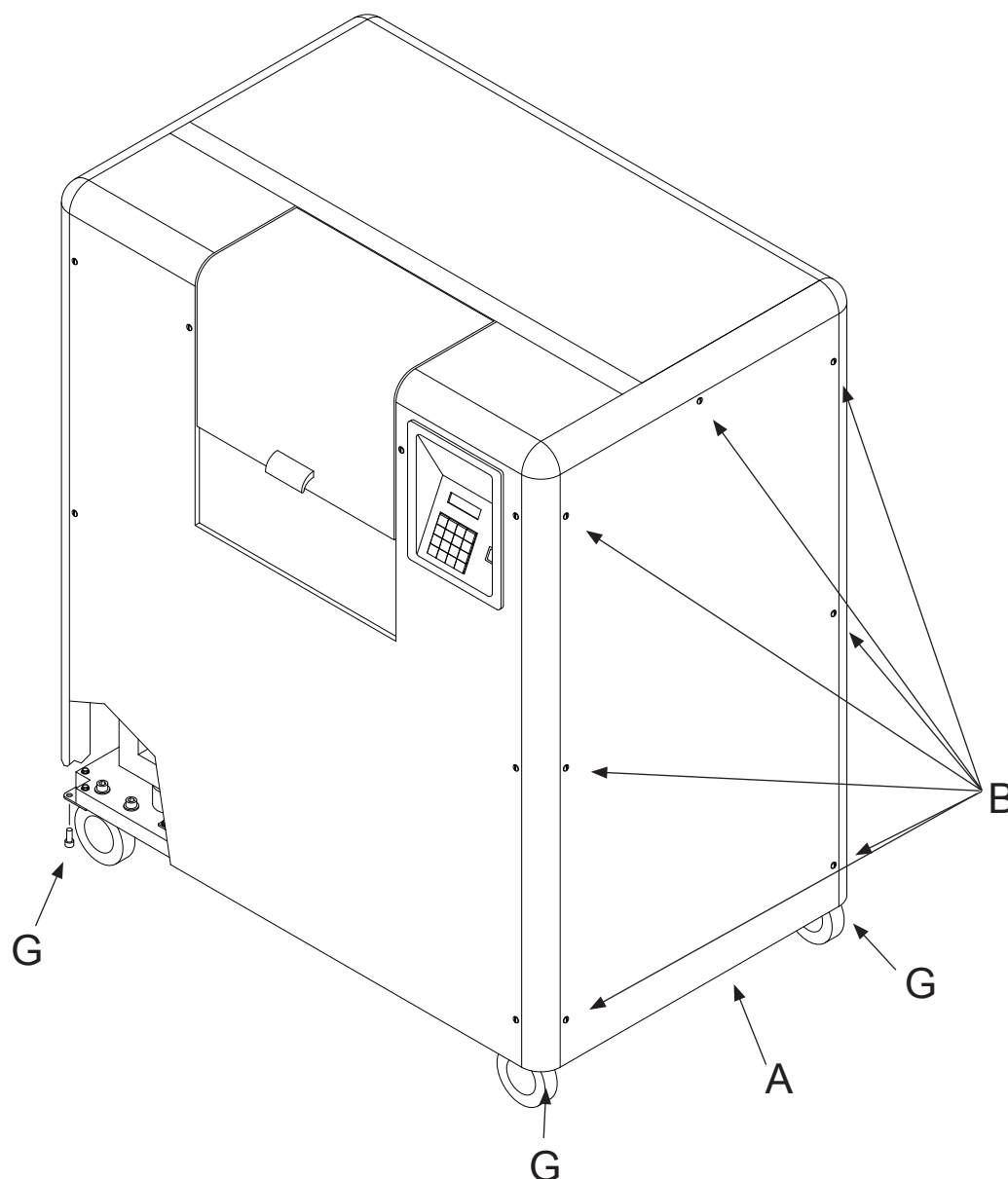
The cover is constructed of a aluminium frame which is fastened with four screws (G) under the baseboard of the printer, there are one screw in each corner. Onto this frame the sides, front and back panels are fastened. Some of these panels can be taken off for a better access e.g. for smaller repairs or to connect to the electrical unit.

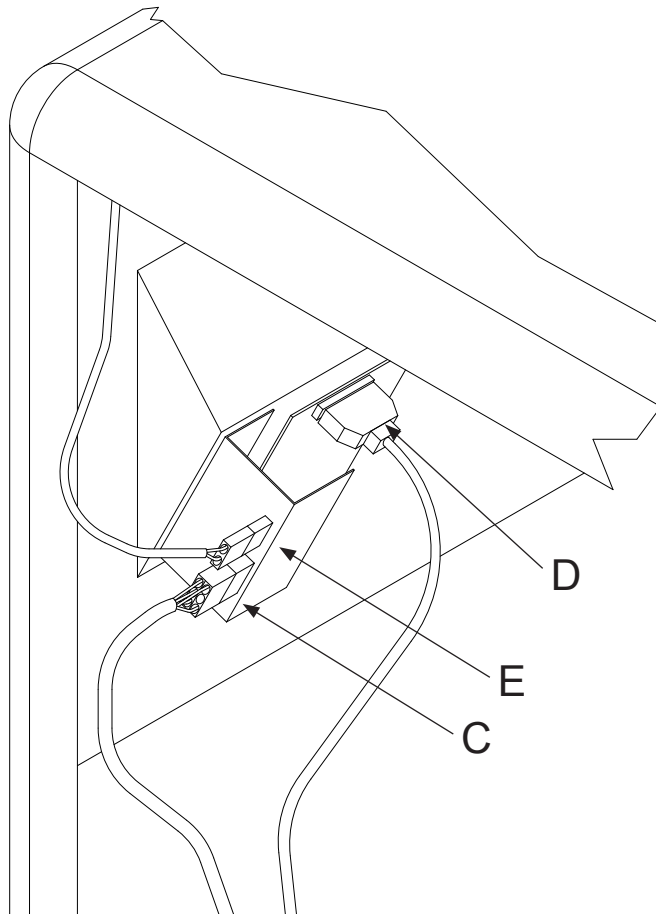
However, if the printer is going to be lifted or moved, and the printers own wheels cannot be used, the cover must be taken off completely.

It can be done like this:

Disconnect the mains.

Open the panel (A) by turning the seven screws (B) 1/4 of a revolution - use a coin or a screwdriver. Pull out the panel. Place it aside.



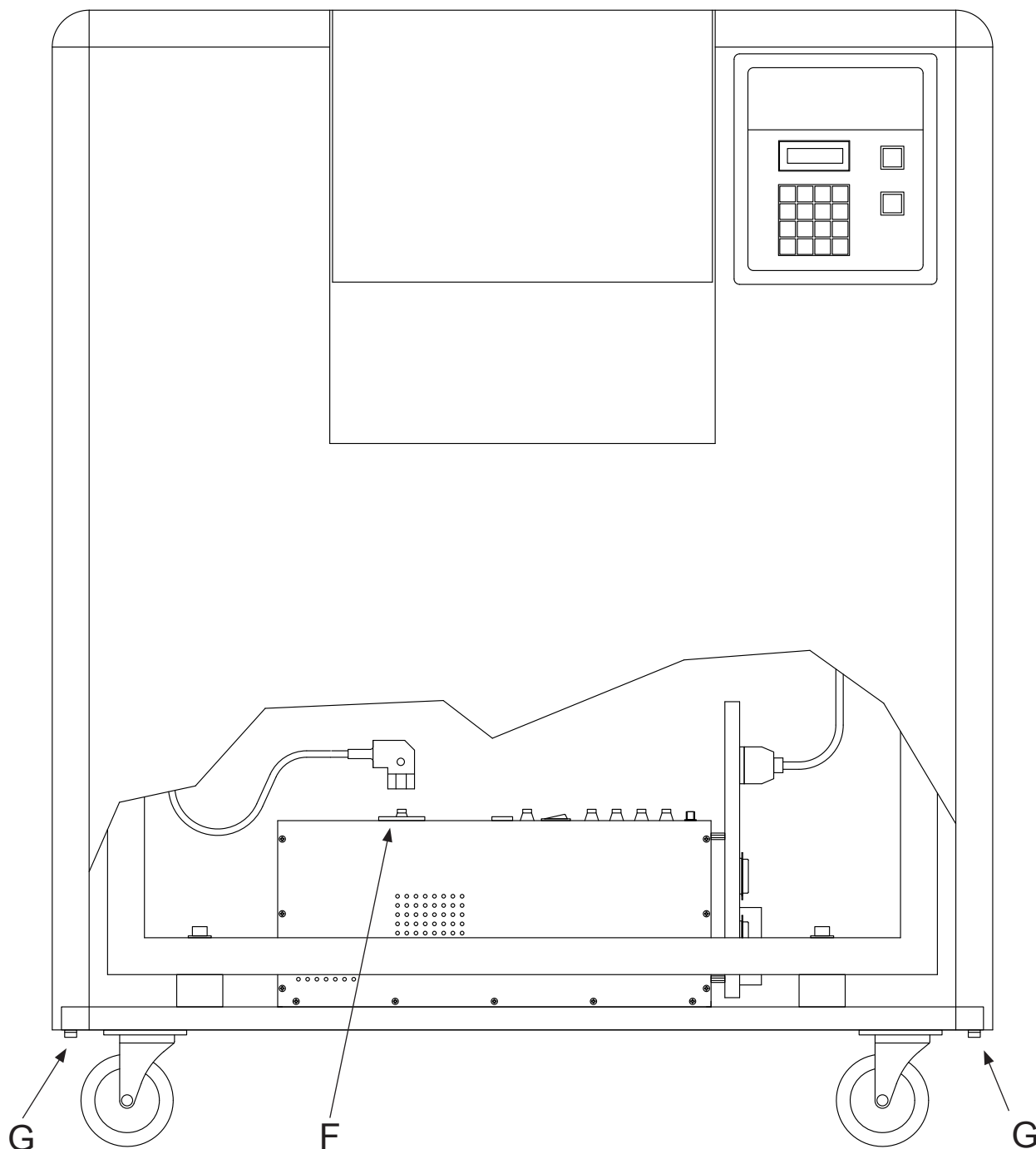


Disconnect the cables to the on/off switch (C) , operating panel (D) and safety switches (E). Note that these cables is to be disconnected at the end on the back of the operator panel.

Then disconnect the cable to the fan (F). The cable to the fan is to be disconnected on the electrical unit.

Then unscrew the four screws (G) (use a 6 mm allen key) and lift the cover upwards very carefully. The printer can now be moved to the desired location.

Please observe that it is possible to lock the wheels to secure the printer when it is positioned.



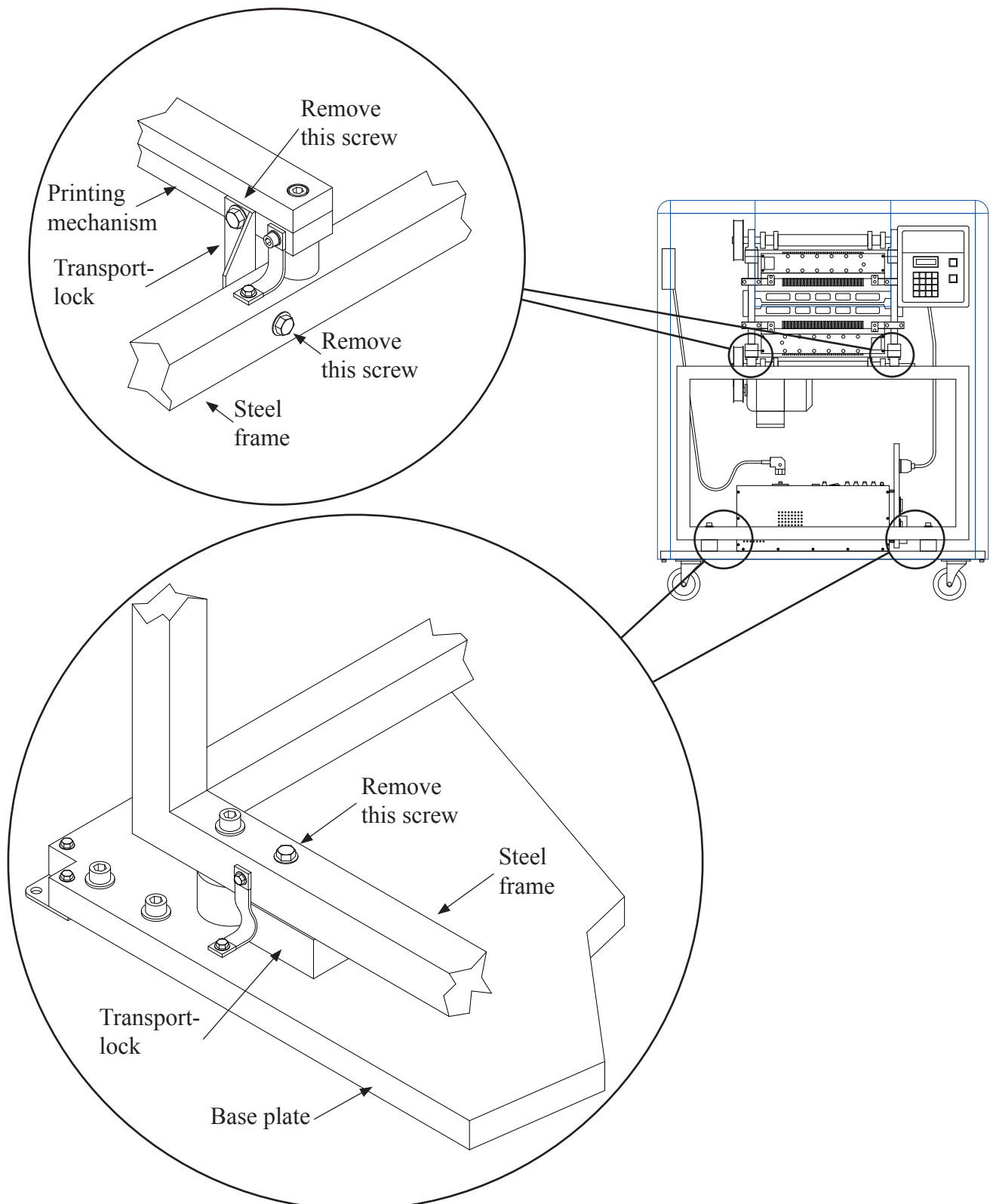
2.3 Removal of transport-locks.



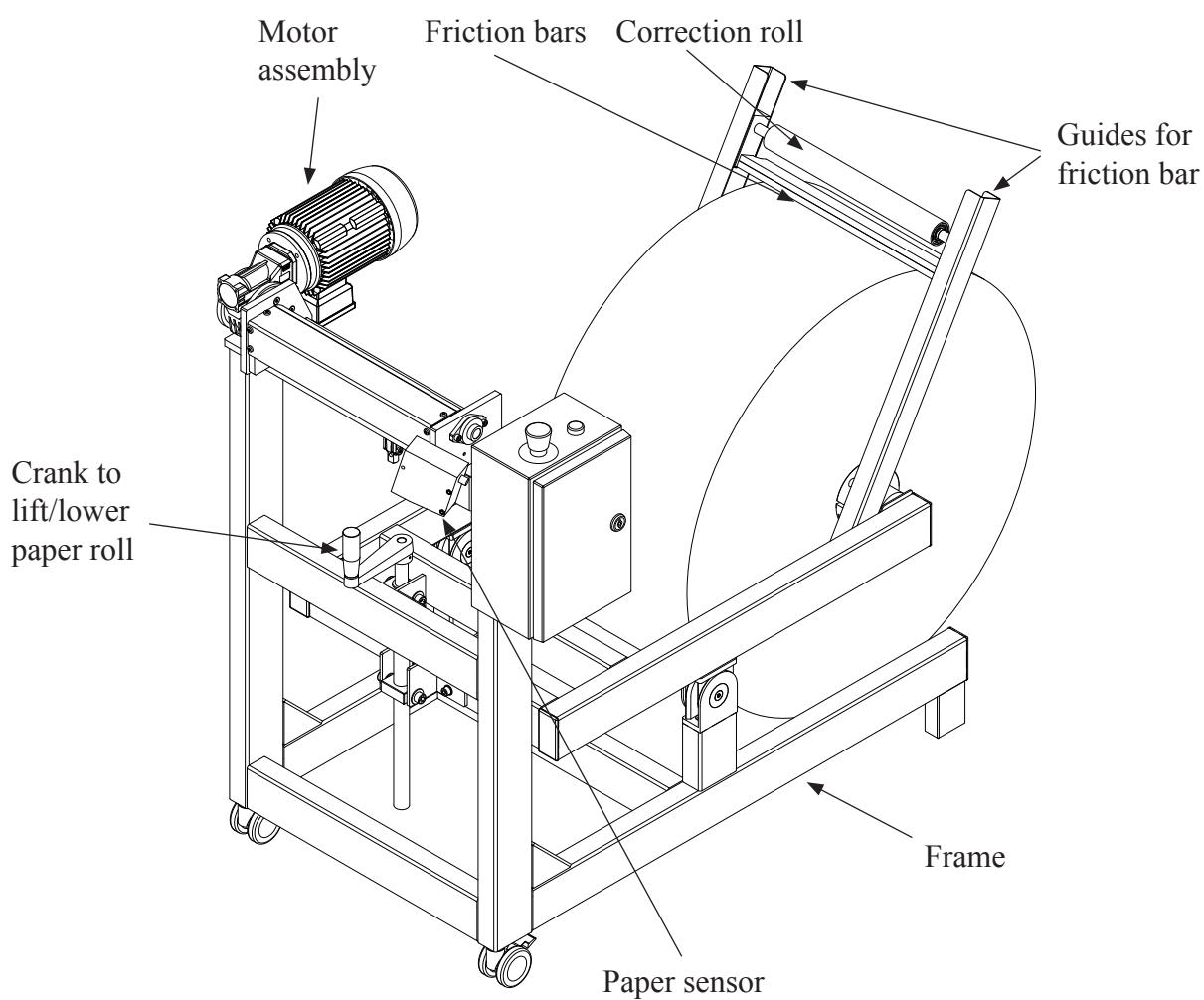
This printer has eight transport-locks. All eight must be removed before starting the printer!

There are four between the base plate and the steel frame, and four between the steel frame and the printing mechanism.

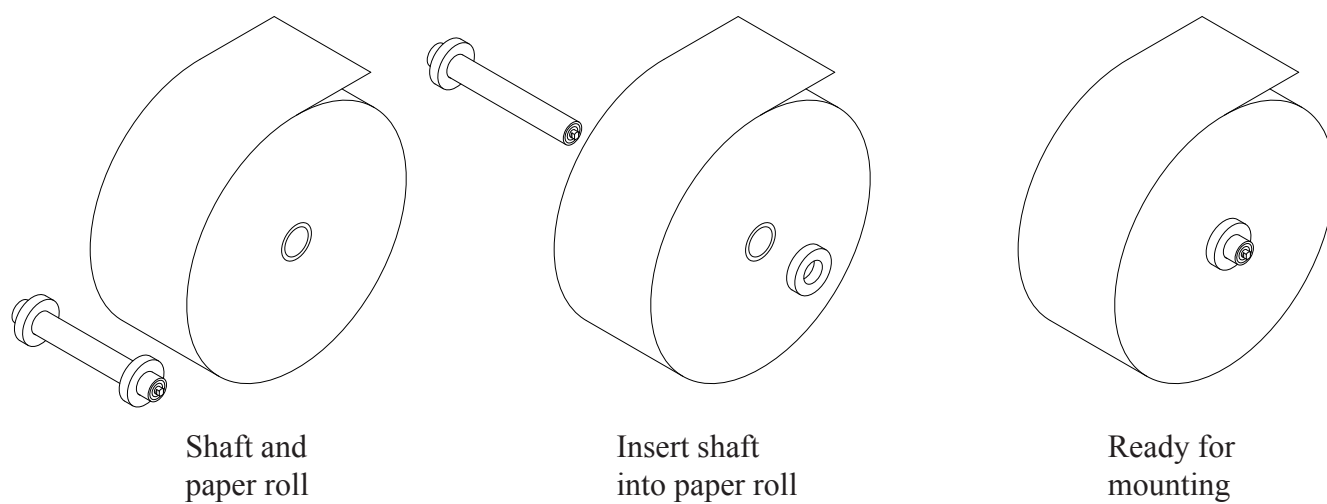
Please see figures below:



2.4 Paper roll feeder



Placing the paper roll

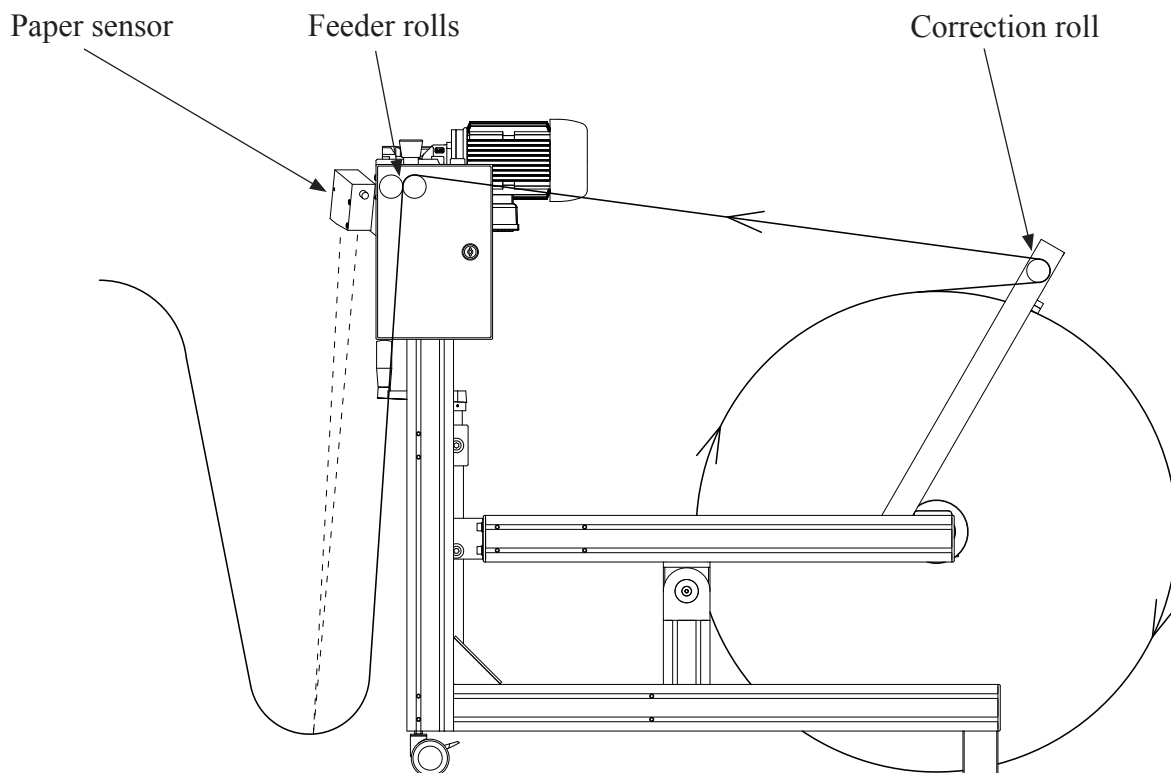


Put the shaft in the center of the roll, and ensure that the shaft is approximately in the centre sideways. Fasten the shaft. The roll must be placed so that the paper is rolled off at the top. (See figure).

Place the paper roll with the shaft already fastened just behind the Paper Roll Feeder. Lift off the correction roll with the friction bars and place aside. Use the crank to lower the roll lift until the lift is below the shaft in the roll. Move the roll forward, make sure that the shaft is situated just above the notches, while turning the crank to raise the roll lift. Turn the crank until the roll is lifted above the floor. Put the correction roll with the friction bars on top of the paper roll like on the figure below. Remove and throw away the first revolution of paper on the paper roll (to get rid of e.g. sand, dust and dirt after rolling the paper roll on the floor).

The paper line must go in between the friction bars and the correction roll. Ensure that the friction bars is resting on top of the roll.

Now the paper must go through the feeder rolls. If turned on, the motor will feed some paper, and the paper can be inserted into the printer.



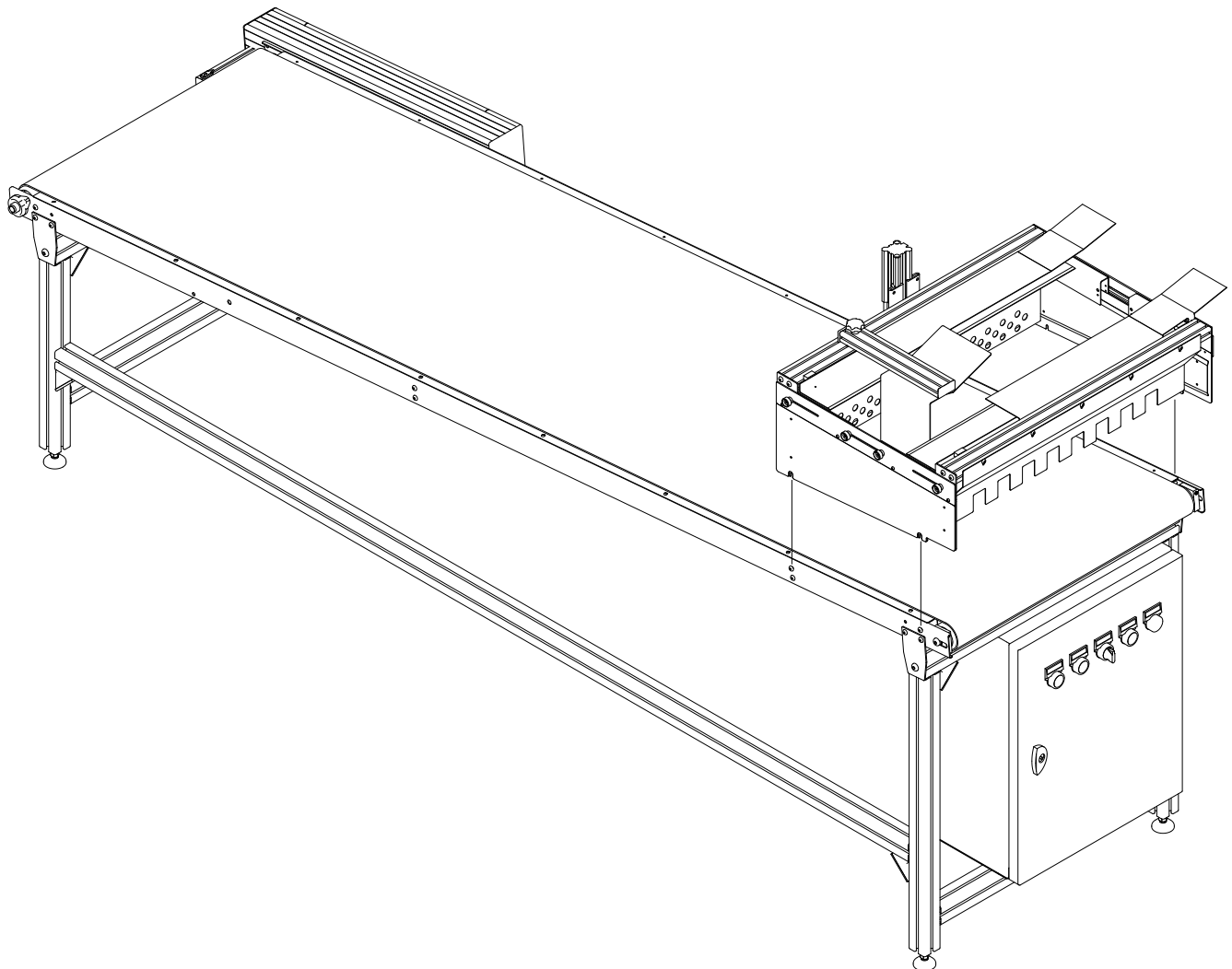
The paper sensor is a laser distance sensor, and is using an invisible laser beam to check the distance to the paper.

If the distance is long (the paper is close to the floor) the feeding speed is slow (or it will stop completely) and if the distance is short, the feeding speed is high. This will ensure that there is a constant slack of paper between the Paper Roll Feeder and the printer.

The paper is clamped between the feeder rolls with a press air cylinder. After a short periode of stand still, the pressure on the feeder rolls will be released. This is done to prevent deformation of the paper.

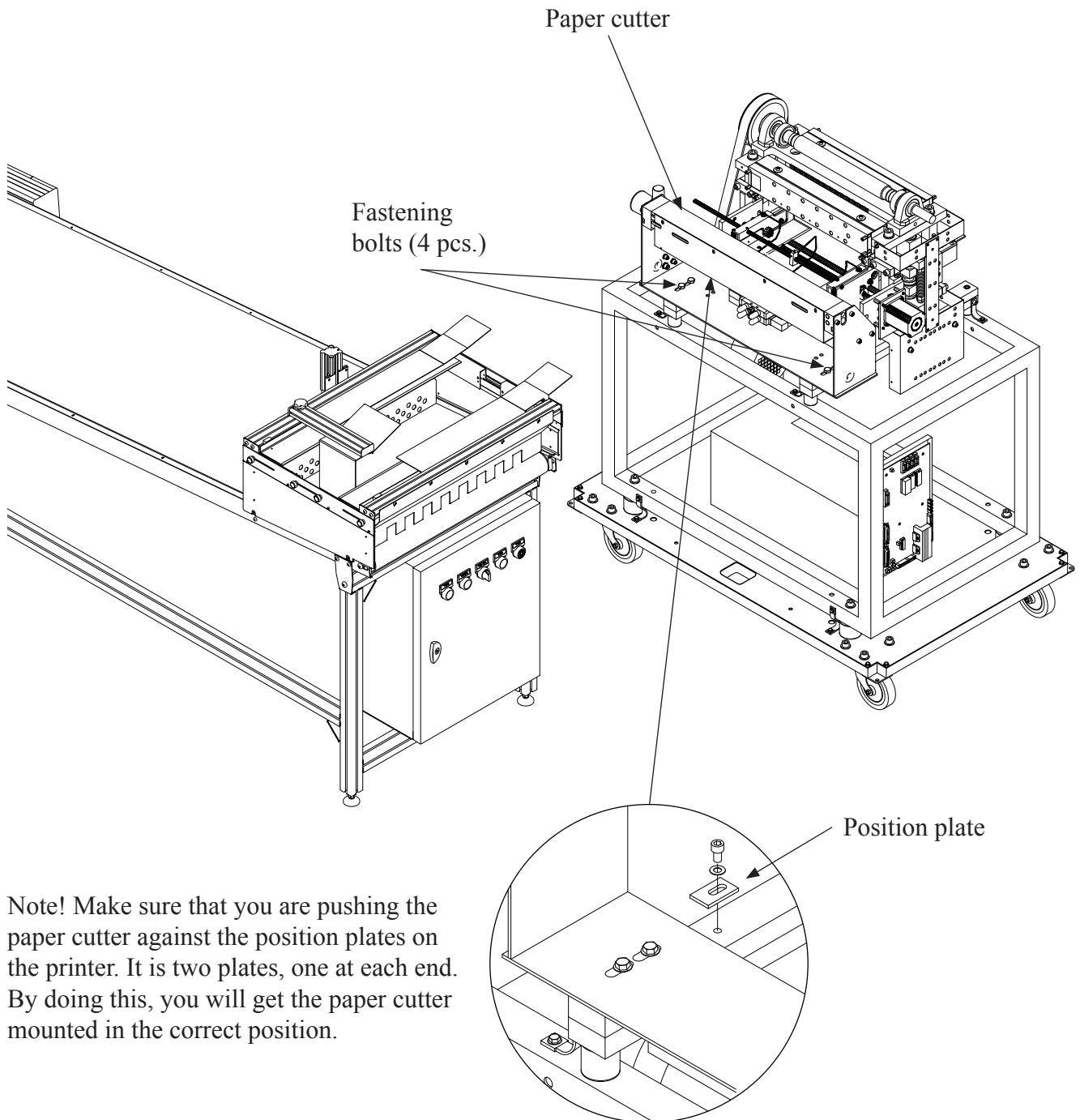
2.5 Horizontal stacker, assembly.

The stacking unit is placed under the conveyor belt during transport, with all the cables and air pipes in place. Move the stacking unit up on top like on the figure below, and fasten it with the four screws.



Paper cutter, assembly.

The paper cutter is placed under the conveyor belt during transport, with all the cables and air pipes in place. Put the paper cutter up onto the printer like on the figure below.

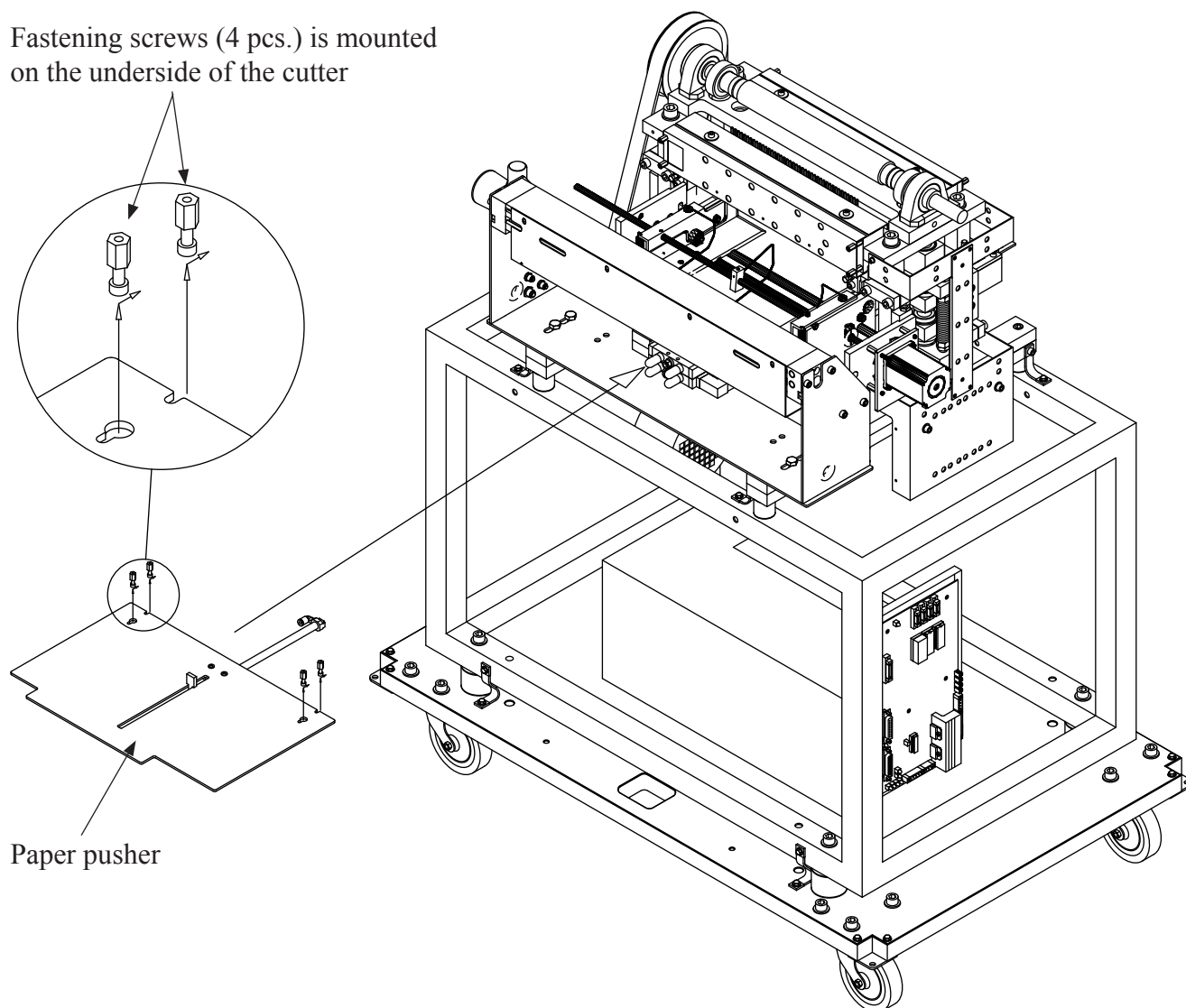


Note! Make sure that you are pushing the paper cutter against the position plates on the printer. It is two plates, one at each end. By doing this, you will get the paper cutter mounted in the correct position.

Paper pusher, assembly.

The paper pusher is placed inside the printer during transport, with the air pipes mounted. The screws and spacers is mounted on the underside of the cutter. Fasten the paper pusher like on the figure below. Connect the pipes to the side plate on the cutter. The pipes are marked, and the marking should correspond with the label.

Fastening screws (4 pcs.) is mounted on the underside of the cutter

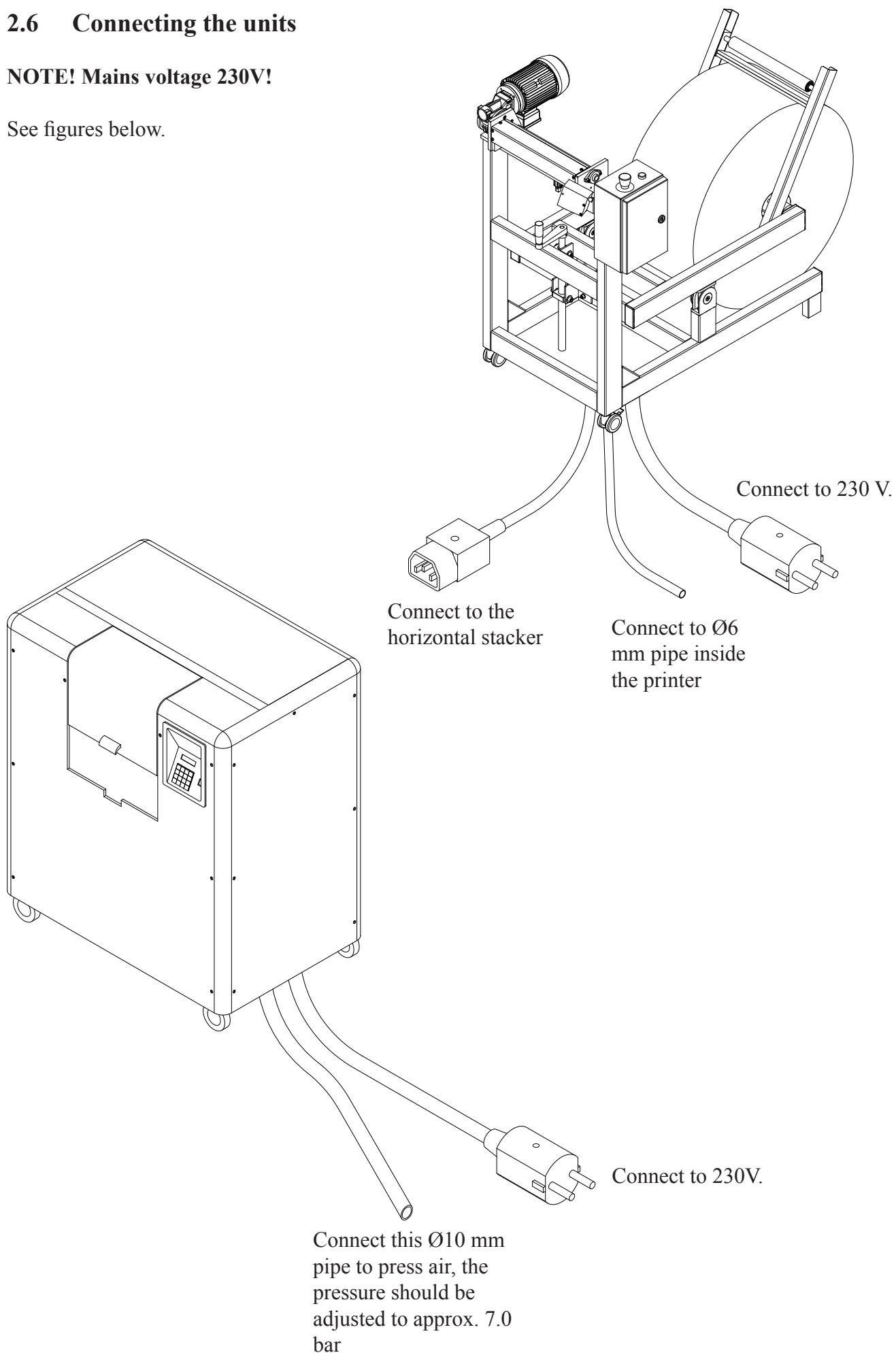


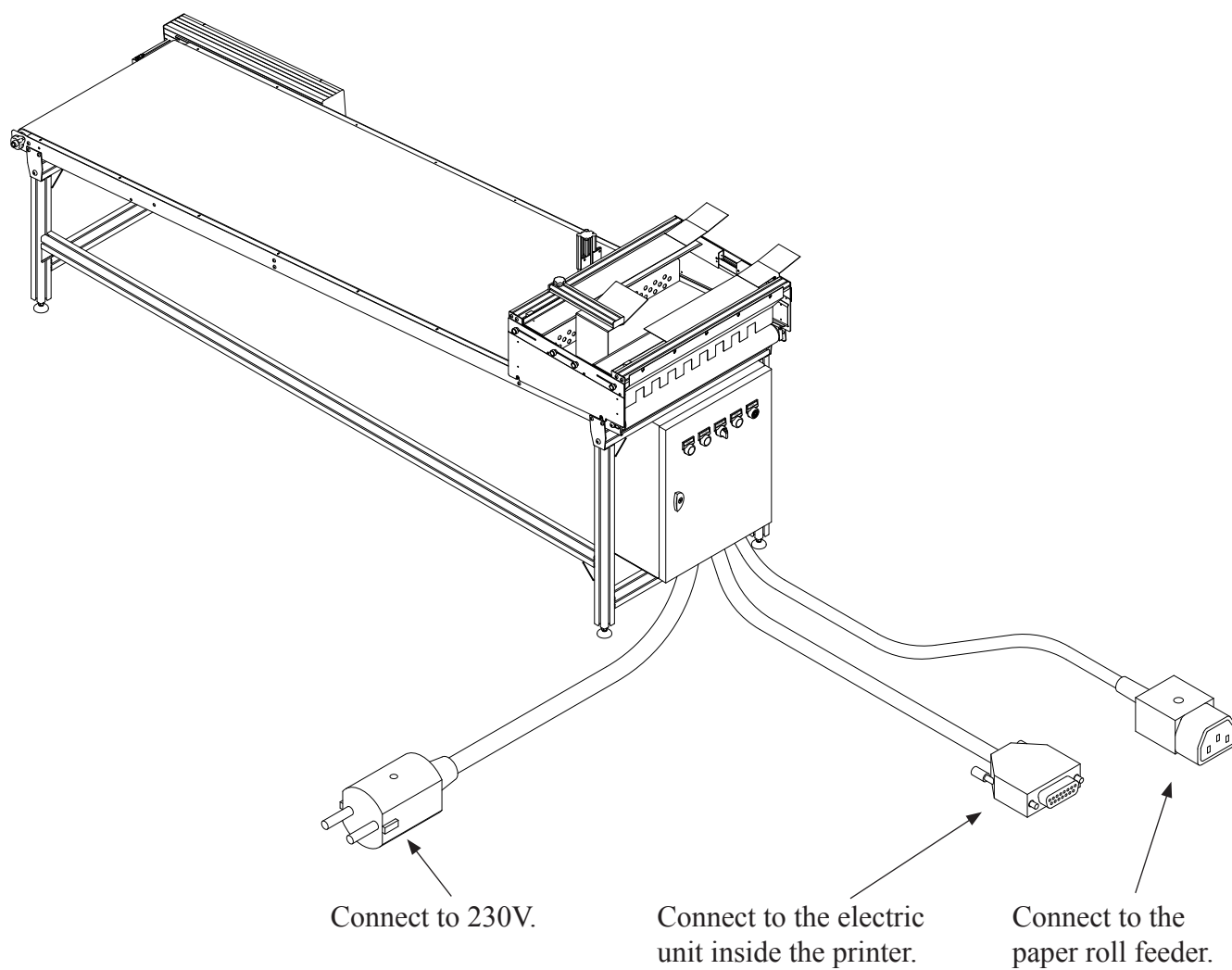
Paper pusher

2.6 Connecting the units

NOTE! Mains voltage 230V!

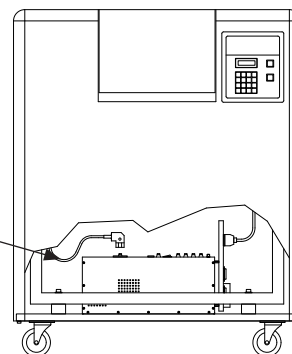
See figures below.





2.7 Connecting the printer to the mains and computer.

The connections are inside the printer, on the electric unit.



Connecting to the mains

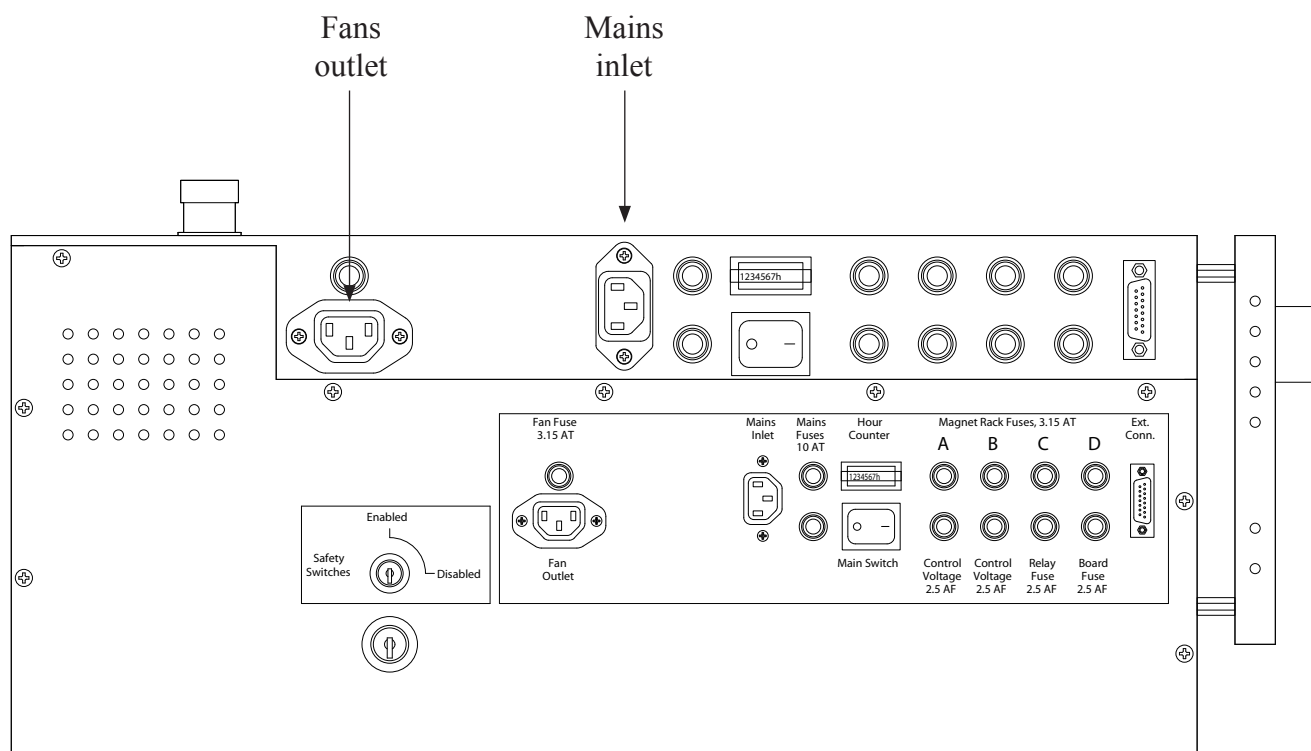
See the figure below, this is a top view of the electrical unit.

Connect the enclosed mains power cable to the Mains inlet.

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



THE PRINTER MUST ALWAYS BE CONNECTED TO GROUND!



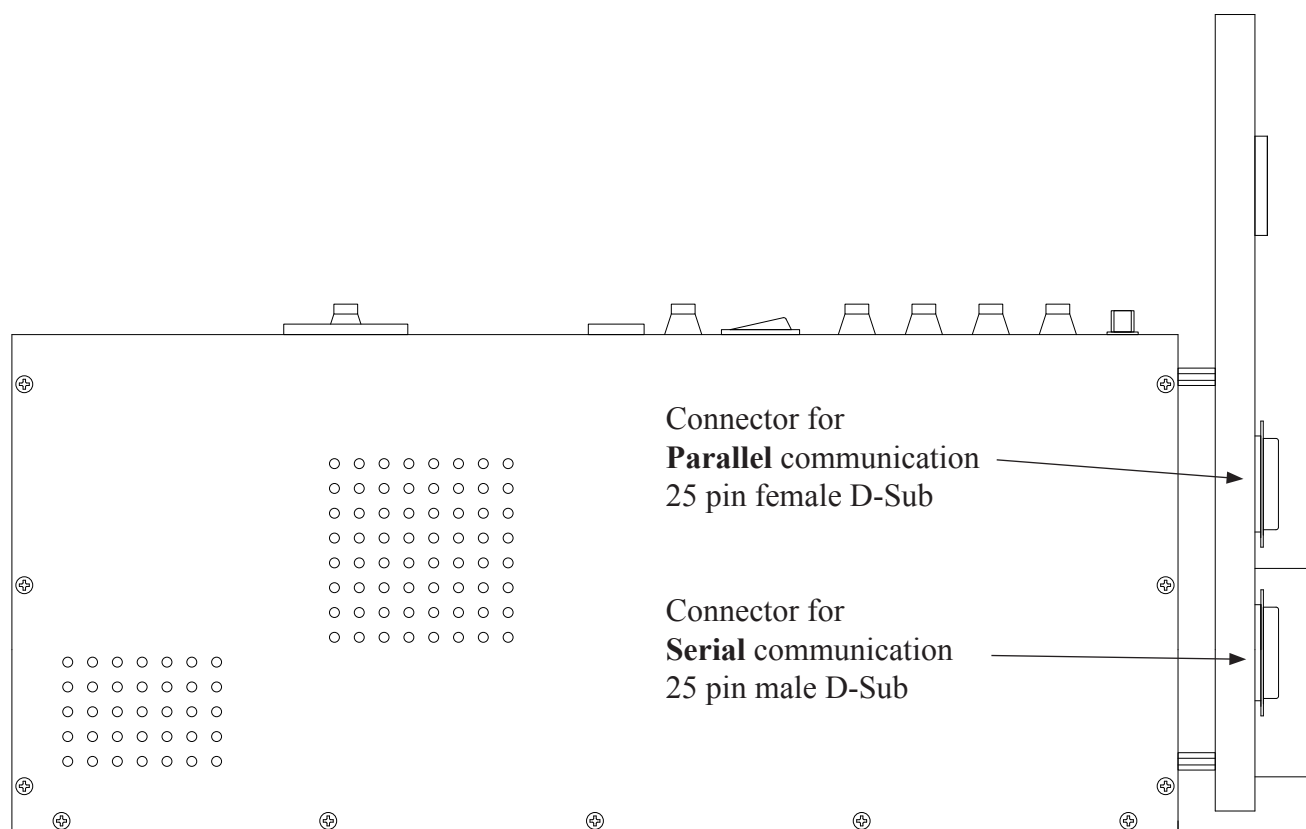
Connecting to the computer

This can be done in two ways, either parallel or serial.

The serial communication uses the RS 232 interface and the parallel communication uses the Centronics interface. Both connectors are of the 25 pin D-Sub type.

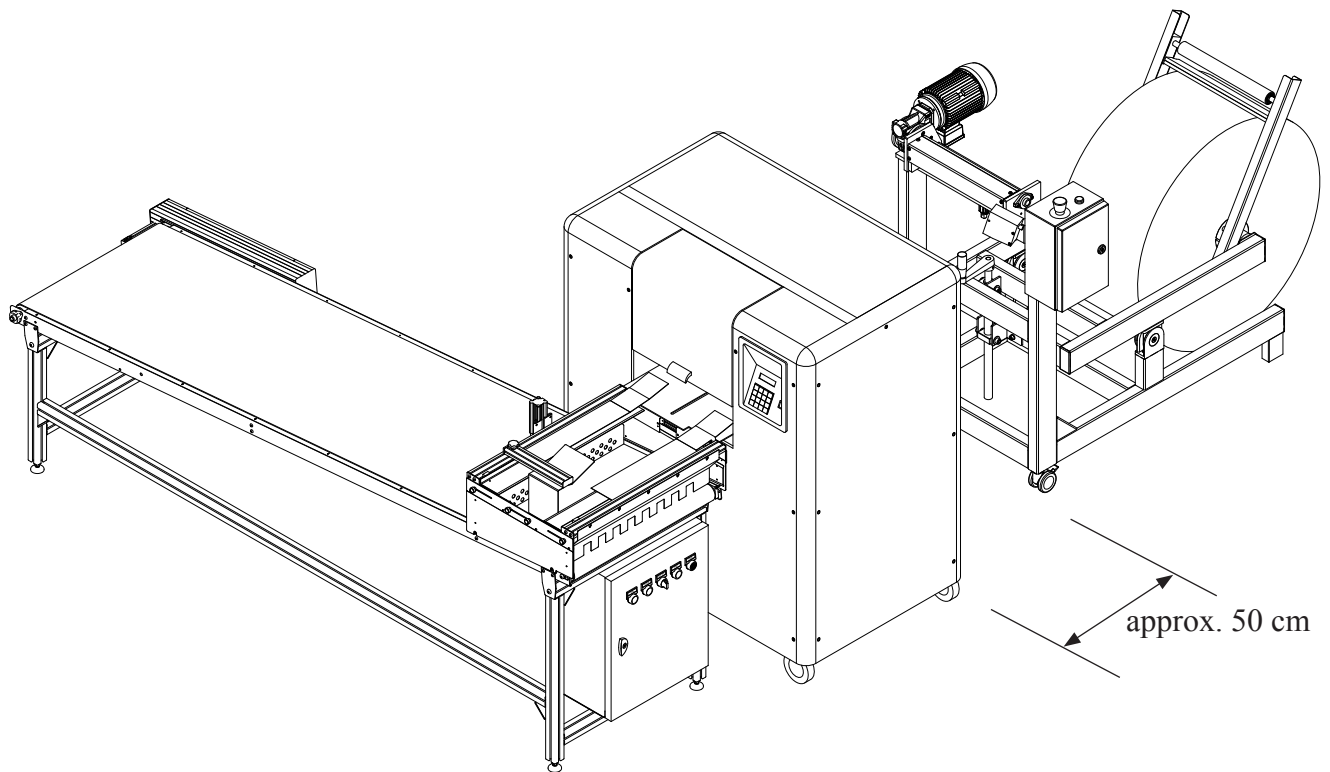
Note that if the serial communication is to be used, the settings for the serial port has to be checked both on the printer and on the computer. To adjust the settings on the printer, please see chapter 3.1 “Operator panel function”.

See figure below, this is a side view of the electrical unit.

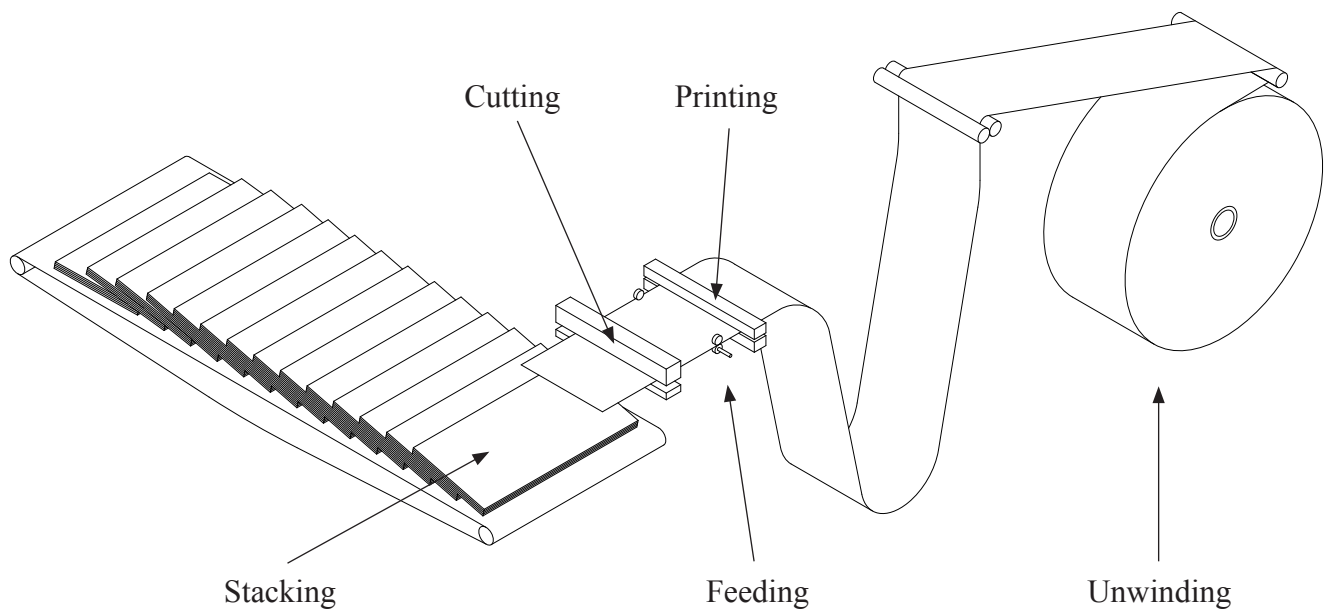


Placing the units.

The units should be placed as seen on the figure below:



How the paper travels through the machine.



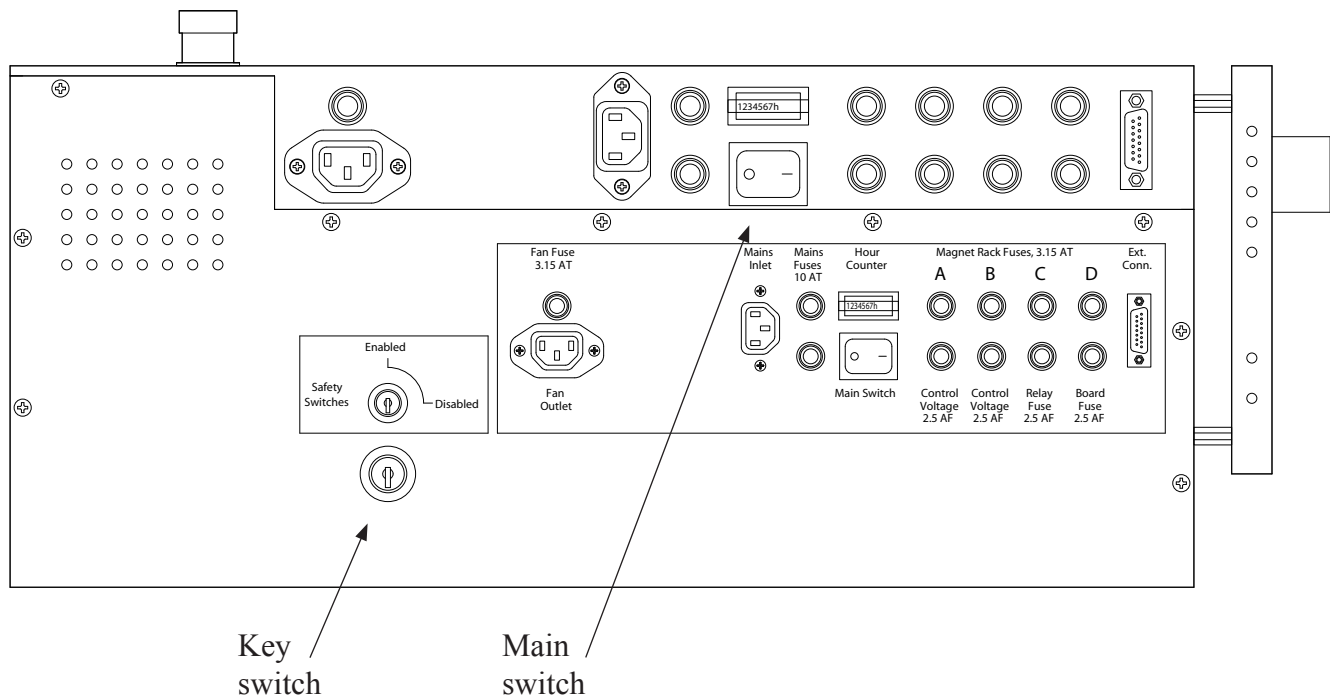
2.8 Turn on the printer

After the mains cable and the serial/parallel cable has been connected, the printer can be turned on.



For safety reasons, there are switches on each side panel on the cover. These switches will turn the printer off if somebody is removing the side panels.

However, when doing service and maintenance it is possible to bypass these safety switches. It is done with the key switch on the electric unit. See figure below:



If this key switch is turned to:

- “Disabled” The safety switches and the On/Off switch is bypassed and the printer will stay on independent of the On/Off switches. The Main switch can be used to turn the printer on and off during **service and maintenance**.
- “Enabled” This is the **normal position**. Now all four side panels has to be in place and the printer is turned on and off with the On/Off switches.

Turn on the main switch. It will now be illuminated. This switch can normally be on all the time. Put the side panels on the cover back on.

Press the green “on” switch beside the operator panel. The switch will become illuminated, and there will be background lights in the display.

Then the printer will do a little “start-up procedure” (the paper feed will move a little back and forth). If there is no paper inserted, the printer will start to “beep”, and the display reads “Printer Out of paper”. This is normal, and the noise can be silenced by pressing the button marked “Reset Alarm”.

The printer is now ready.

2.9 Adjust to paper width, inserting paper

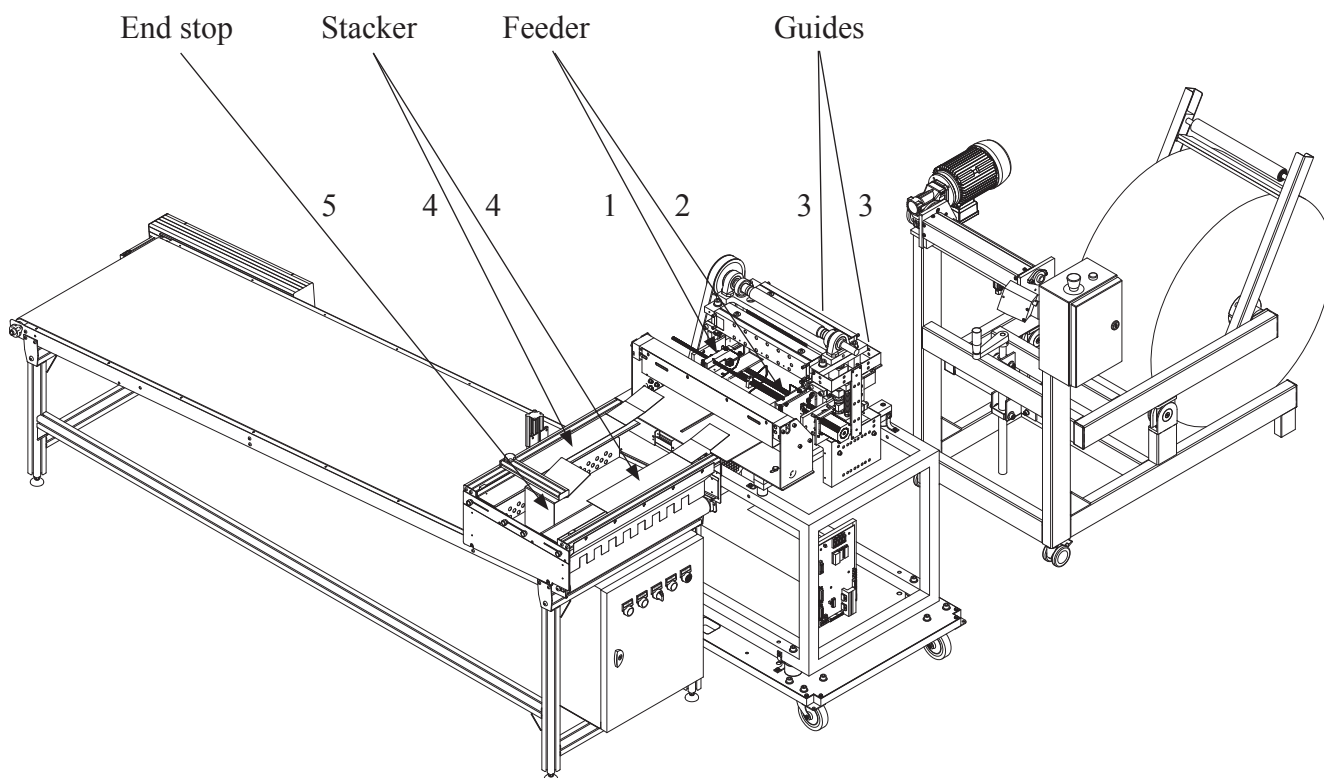
All this adjustments is depending on the width on the paper roll. It is recommended to start with the paper feeder unit nearest to the main belt, because this will also determine the top margin on the sheet.

The adjustment should be done is 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 it with the guides.
4. Adjust the width on the stacker.
5. Adjust the end stop.

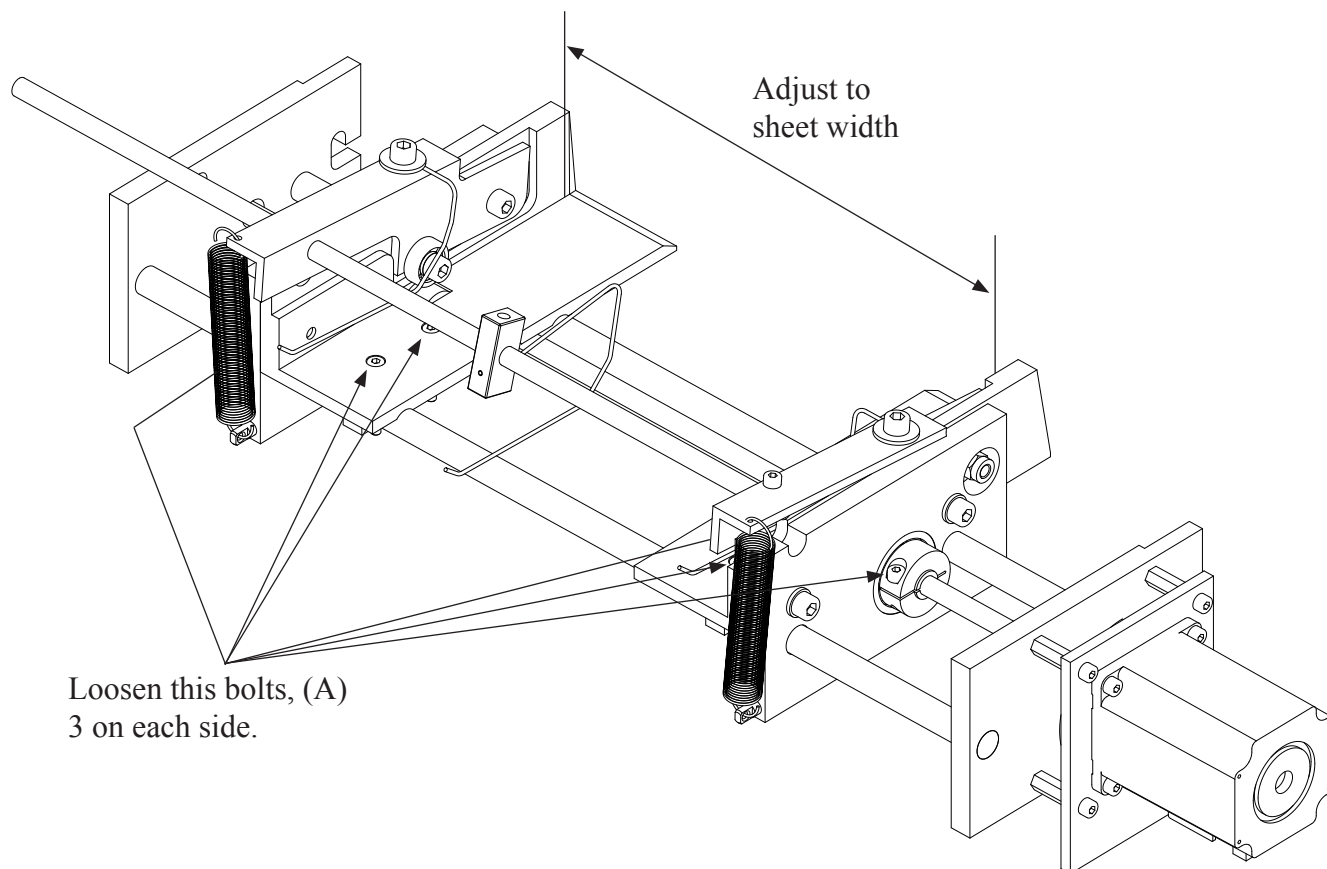
Please see the figures on the following pages.

The numbers are indicating in which order the adjustments should be done.



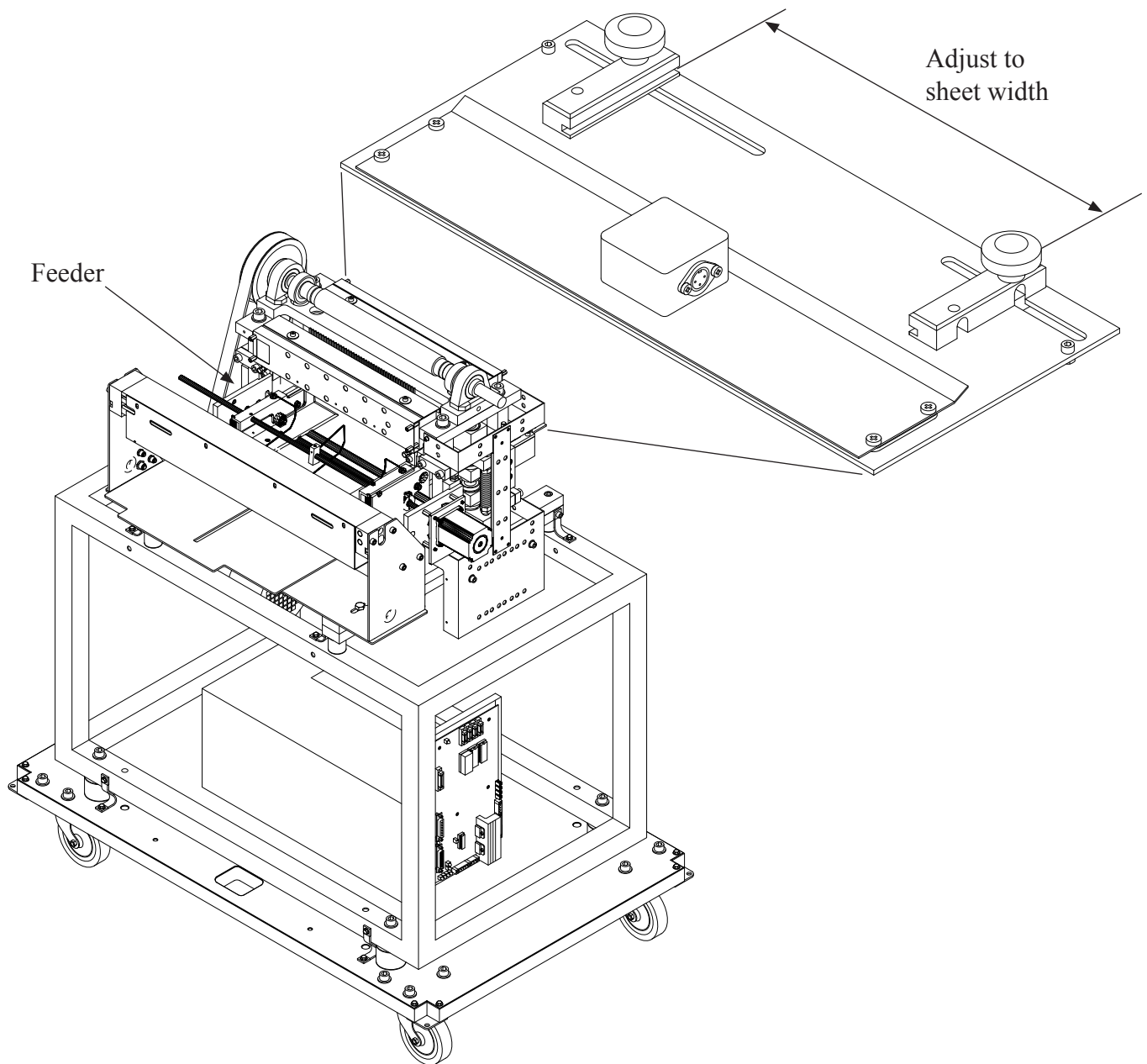
Paper feeder, adjust width.

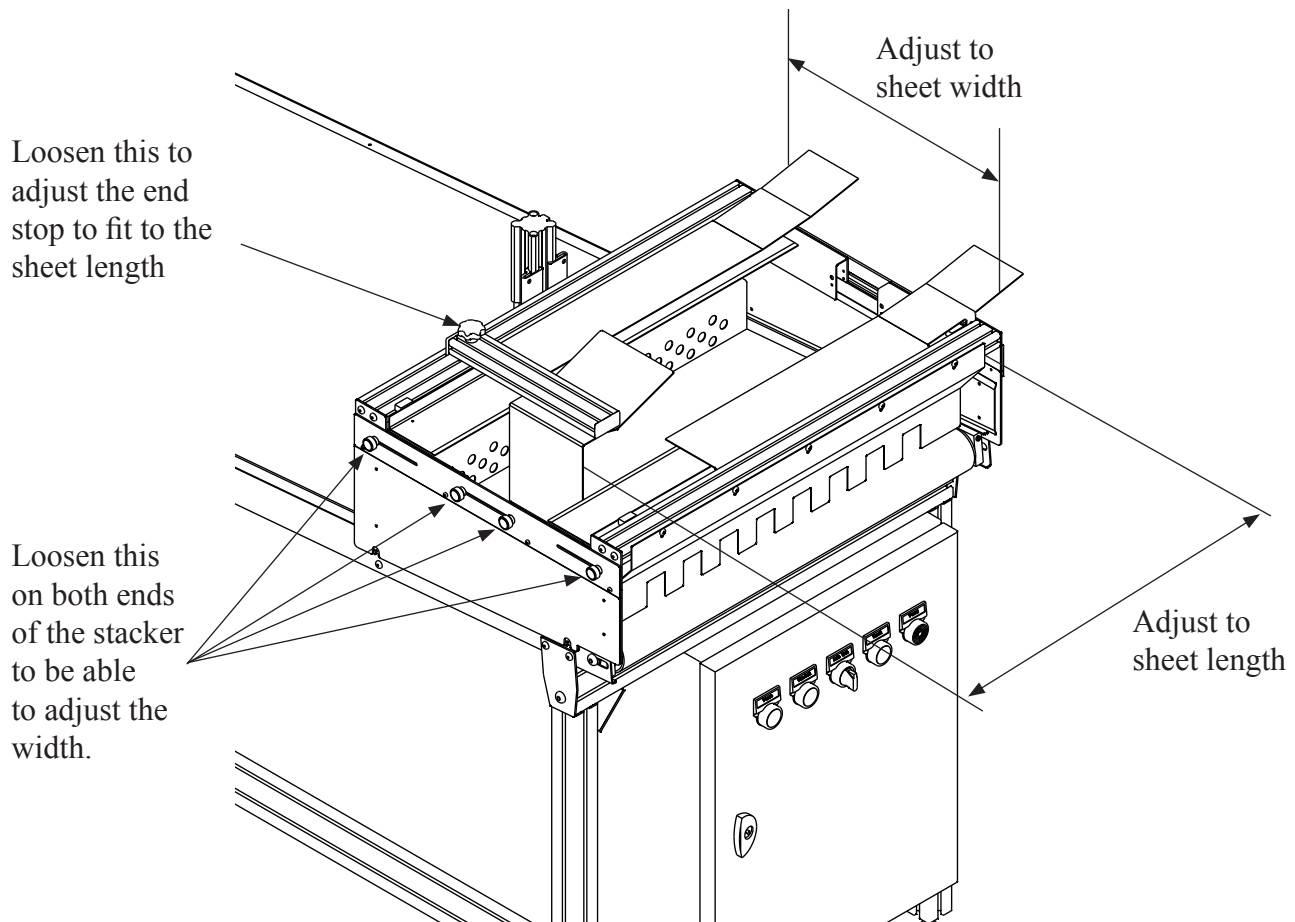
Loosen the bolts (A) without taking the bolts out. The two units can now be moved sideways. Note that the unit on the side nearest to the main belt will also determine the top margin. Use a paper sample to find the correct position for the two units. The paper sample should fit exactly in between the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



Guides on the paper input side.

Before you adjust these two guides, you should do the following: Place the paper into the already adjusted feeder, make sure that the paper is aligned correctly. Now adjust the guides against the edges on the paper, this will keep the paper correct positioned and aligned during printing.



Width on stacker and end stop.

Now, after the printer is adjusted, you should take the paper from the Paper Roll Feeder and insert the paper into the slit in the input paper guide. Insert enough so you can reach the paper on the opposite side of the printer. Go to the output side, move the paper forward until it reaches the paper driving wheels. At the same time, push the Fine Adjust button, and the paper will move forward 0.5" for each push. Repeat this until the paper can be seen under the paper cutter's press bar.

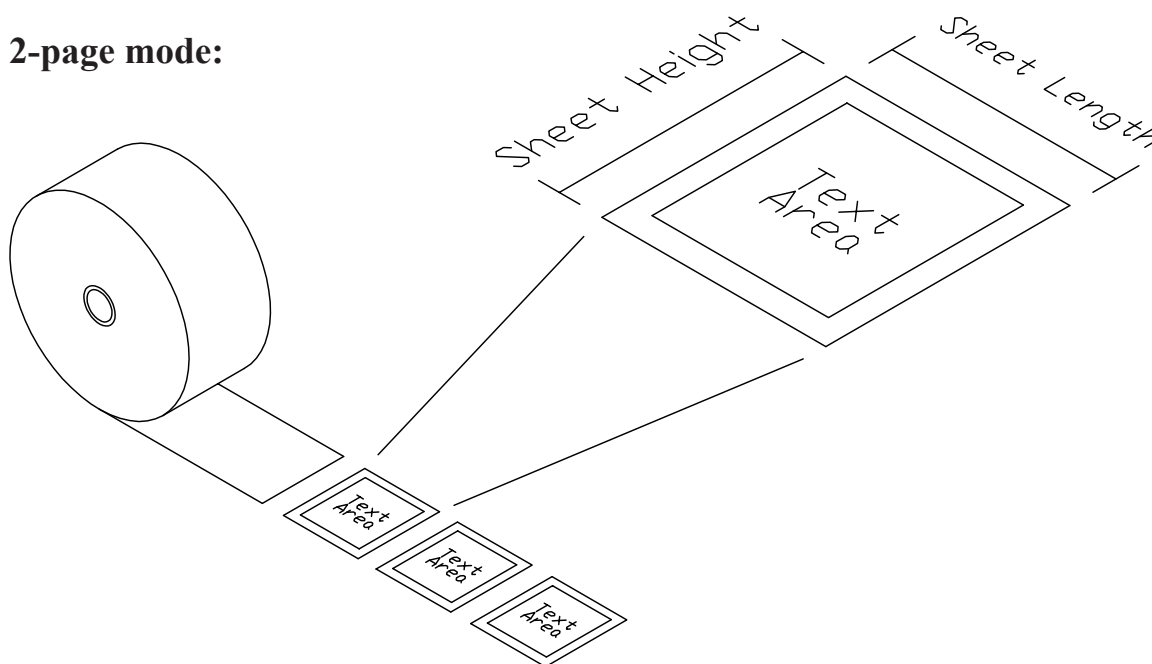
2.10 Printing with B440 SW.

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 to find the description on the terms Braillo are using.

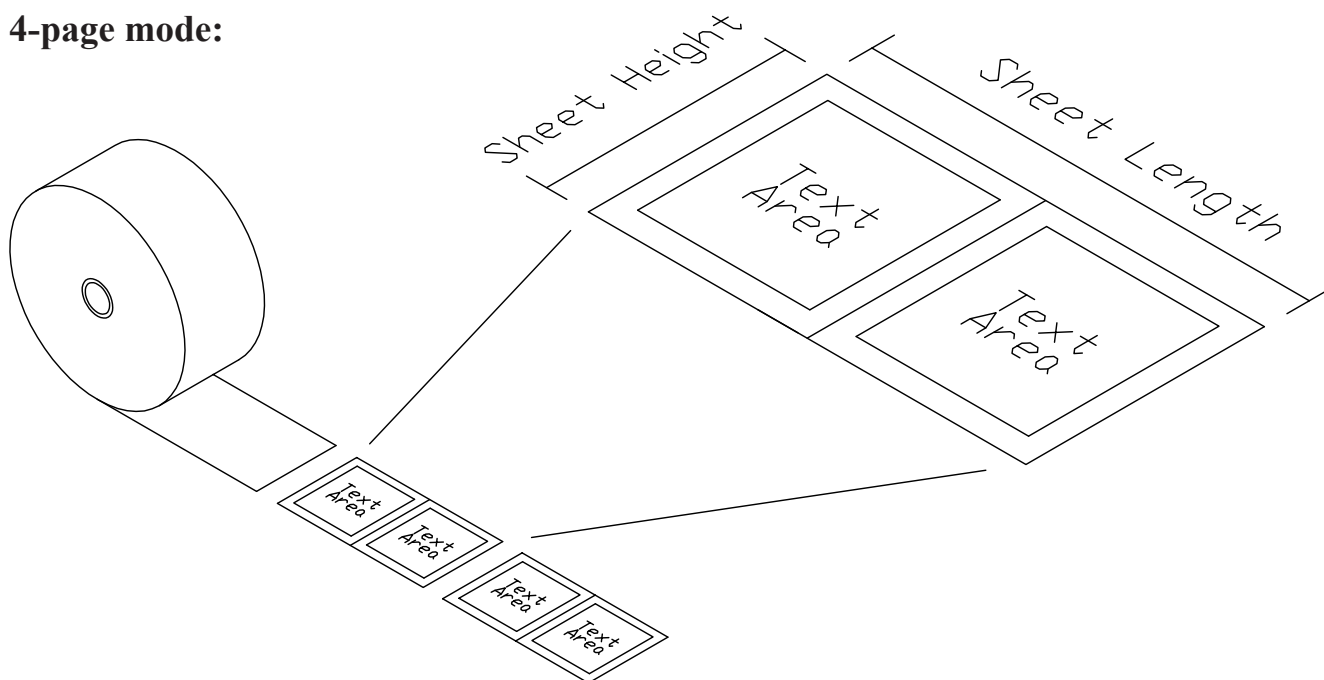
The printer can also print in two different modes. These modes are called “2-page” and “4-page”. The name “2-page” is telling us that the number of pages on each sheet of paper is two. (One page on each side of the paper).

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, then 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:



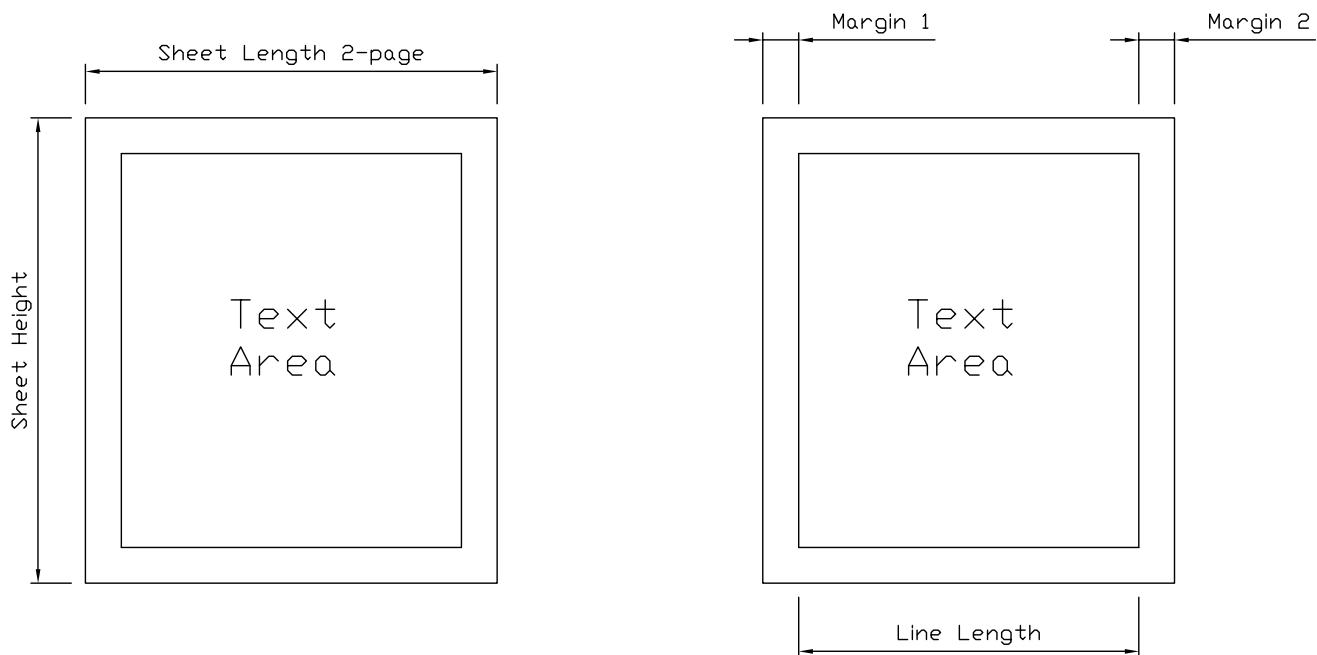
The sheet in 2-page mode:

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



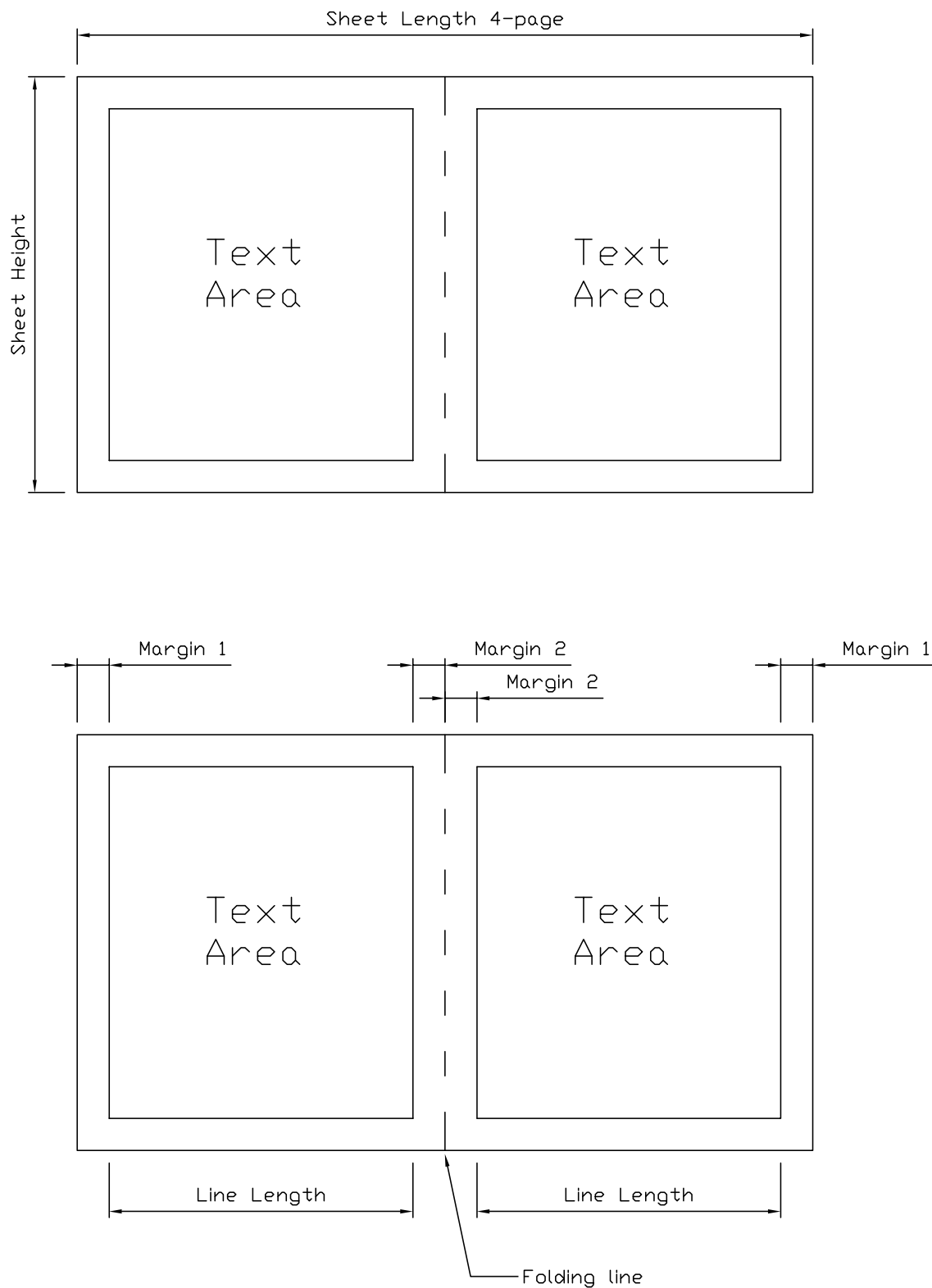
The sheet in 4-page mode:

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.

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 is 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.

2.11 Compressed air

This equipment requires clean, compressed air to function. To make this compressed air, we 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.

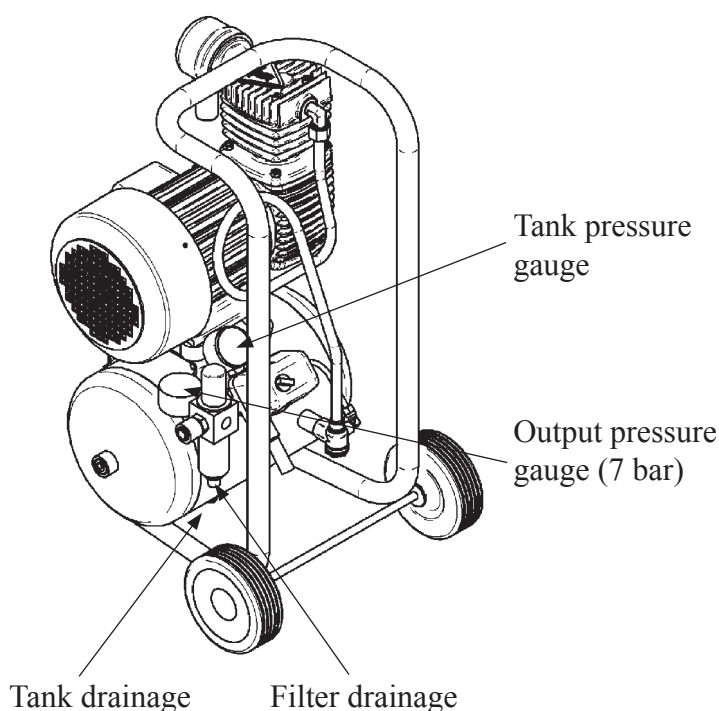
To have long and trouble free operation, the air must be filtered and free from oil and water. When air is compressed in a compressor, the air temperature is rising. So the air entering the tank will be hot. When the air is cooling down, the humidity in the air will condensate inside the tank. So the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

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



Filtering and drainage.

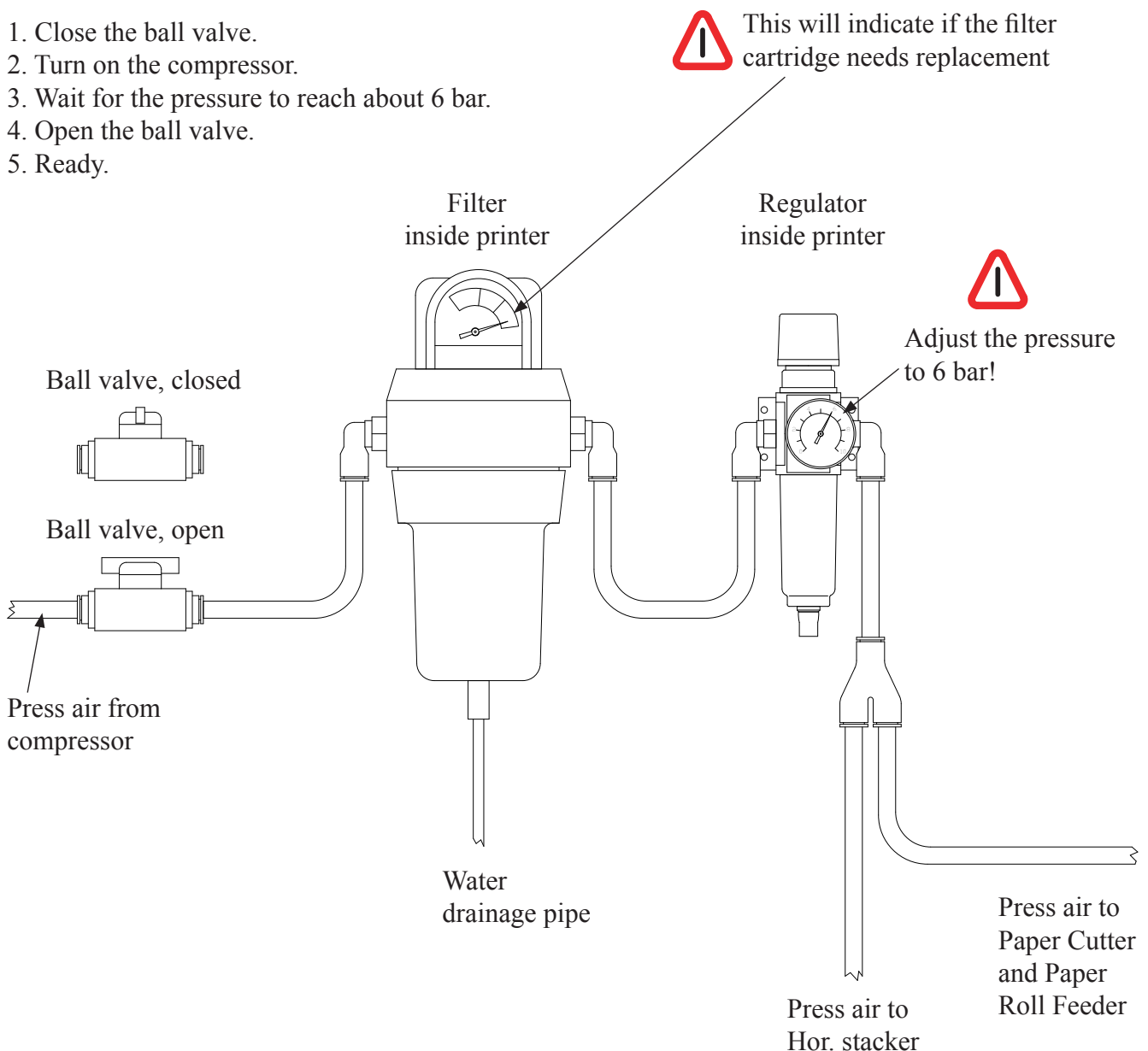
To stop oil and water from getting into the printer, there are filters and drainage units in the line. Some of this filters need to be drained, and some is automatically drained. How often the manual draining has to be done depends on many things e.g. the temperature and humidity in the environment around 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 inside the printer. 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.

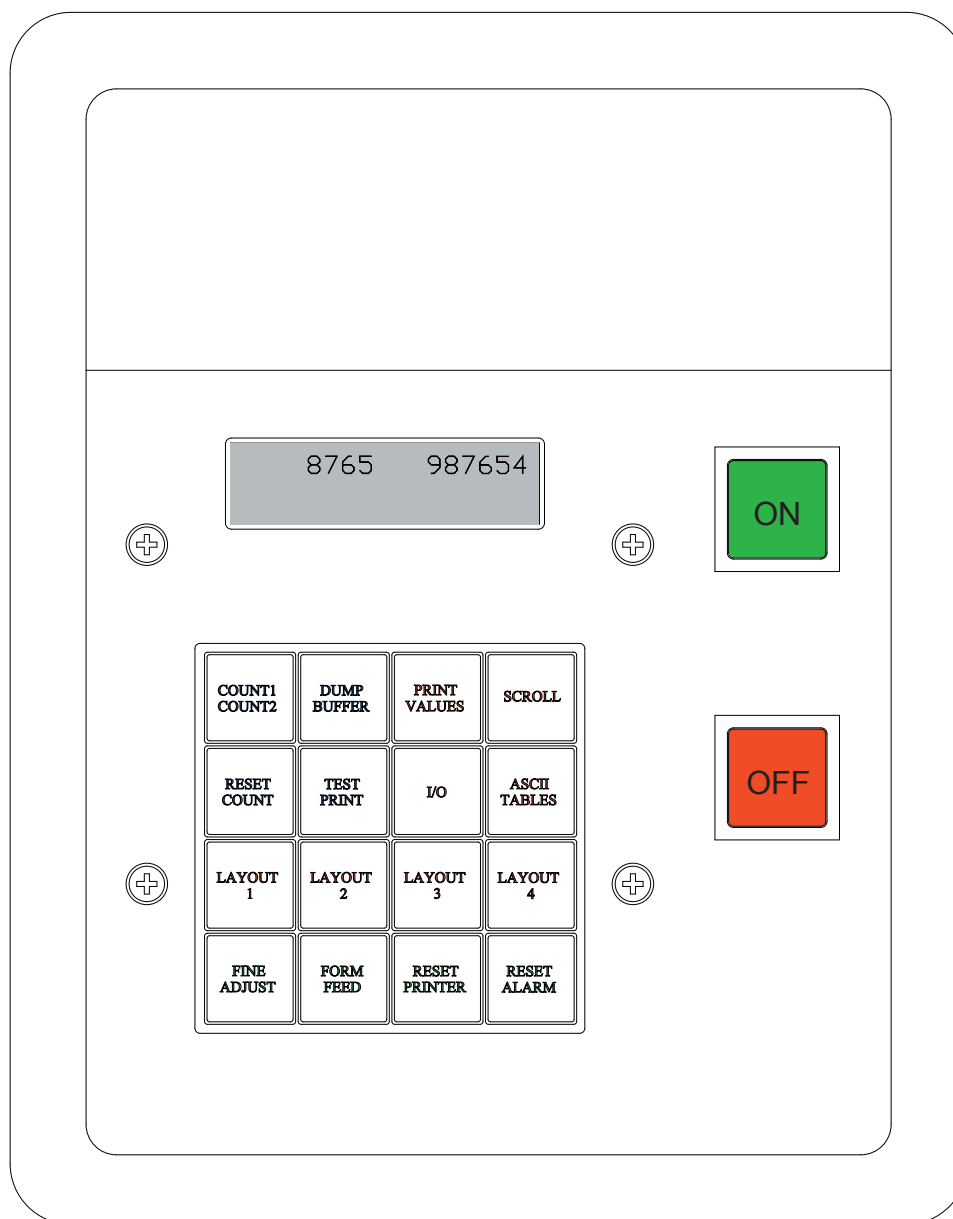
When the compressor is empty:

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.



3. OPERATING THE PRINTER

3.1 Operating panel functions



The green switch marked “ON” will turn the printer on, and the red switch marked “OFF” will turn the printer off.

There are three sheet counters. The one at the right-hand side of the display shows the total number of printed sheets and cannot be reset. The function can be compared with the total mileage counter found on a car.

The remaining two counters - Count1 and Count2, are displayed one-at-a-time on the left-hand side of the display and can be reset. The function can be compared with the trip counter found on a car.

If a problem has occurred, an audio alarm will beep and a message in the display will show what has happened.

Operating Panel functions

COUNT1 / COUNT2

Selects which sheet (not pages!) counter that is viewed on the left hand side in the display. Selects between counter 1 and 2. When this button is in the outer (released) position, counter 1 is displayed, and when the button is in (depressed), counter 2 is displayed.

DUMP BUFFER

During normal double sided printing, a volume of text of less than two pages will not be printed. This is because the printer is waiting for a full two page print job. By pushing DUMP BUFFER, the text remaining in the buffer will be printed.

PRINT VALUES

Prints the current values of the LAYOUT, I/O and ASCII-TABLES.
See chapter 3.2 “Print Values”.

SCROLL

Scrolls through the menus activated by:
I/O, ASCII-TABLES, LAYOUT 1, LAYOUT 2, LAYOUT 3 or LAYOUT 4 buttons.

RESET COUNT

Resets the sheet counter selected by COUNT1/COUNT2.

TEST PRINT

This button has two functions: Test Print and Ready/Continue.

Test Print:

1st push down:

Prints a X-pattern on both sides of the sheet. Useful when searching for missing dots.

2nd push down:

Prints full cells and empty lines, together with the ASCII-table on both sides of the sheet.
Useful for testing the printing pressure adjustments, and to see how the paper tolerates tightly grouped dots. (The paper might get a little “deformed” on this test).

3rd push down:

Prints full cells and empty lines, together with the ASCII-table single-sided. Useful for testing the printing pressure adjustments.

4th push down:

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

5th push down:

As 1st push down etc.

Ready/Continue:

When the printer runs out of paper, the message PAPER OUT is shown on the display. Insert new paper, and push TEST PRINT in and out, and the printer will continue printing the last print job.

Do not use RESET PRINTER as this will clear the print job from the printer’s memory!

I/O - Input/Output

Selects between serial and parallel port, and sets the data transmission values for the serial port.

1st push down: Displays which port is active.

To select serial or parallel port, the button must be depressed and then released. Now, while the display still shows the active port, press SCROLL to select the other port.

If the serial port is active, a 2nd push down will make it possible to use SCROLL to adjust the settings for the serial port.

ASCII-TABLES

This button selects which 6 dot ASCII-table to be active for braille conversion and it displays the 6 dot ASCII-table currently active.

1st push down:

Displays the active ASCII-table, number and country for the 6 dot mode.

To select from the 8 resident ASCII-tables in the Printer, the following procedure should be used:

Push the ASCII-tables button, release it, then push it once again and hold. Now it is possible to change the active ASCII-tables with the SCROLL button. ASCII-table number one will be displayed first. (If there has been a ASCII-tables loaded from the computer, it will be displayed first). If SCROLL is released, and pressed again, ASCII-table no. two will be displayed. This continues until no. eight is reached, whereafter it will start at number one again.



Note! Scrolling through the resident ASCII-tables will clear any user table that has been downloaded from the computer. If this table is to be activated again, it must be reloaded from the computer.

Using the “LAYOUT” menu buttons.

With help of the menu buttons (LAYOUT 1, LAYOUT 2, LAYOUT 3 and LAYOUT 4) the current values can be changed.

The first push of a menu button shows which setting is currently active - its current value.

If these settings are correct, wait a few seconds for the time to expire, or press the RESET PRINTER button and the setting will remain.

If you would like to change one of the settings, push the button several times, until the desired function is shown on the display, then hold it down. By using SCROLL, the complete menu for the function can be reviewed in the display. When the correct value is shown, release the button and either wait for the time out, or use RESET PRINTER.



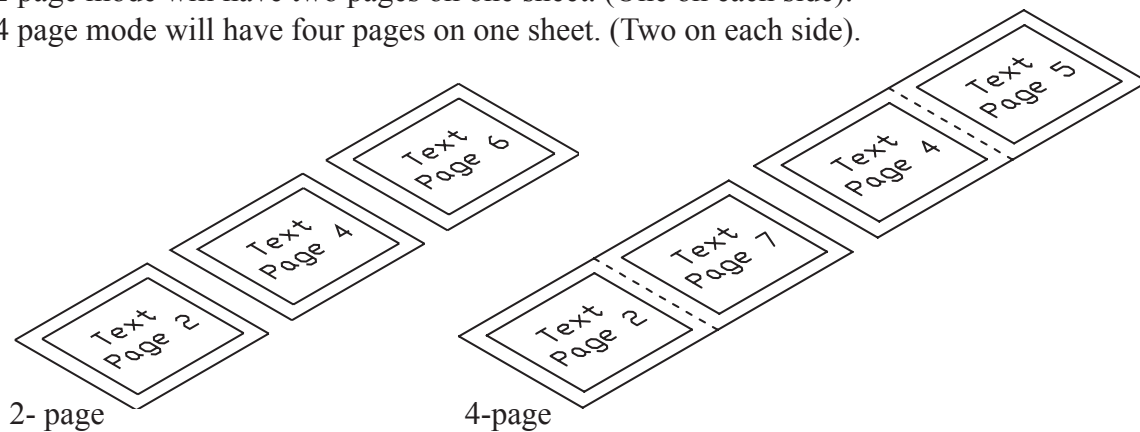
Note! The Current Values are saved in the battery-backup memory, and they will remain even if the power is turned off.

LAYOUT 1

Selects 2/4 page mode and line length. Use SCROLL to choose each setting.

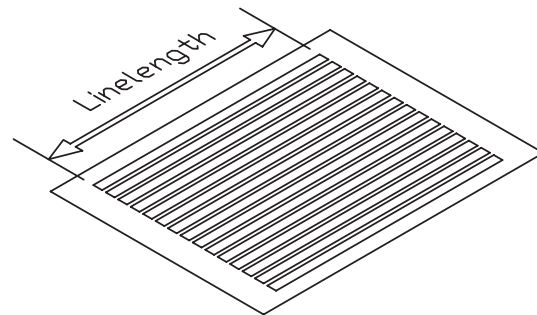
2 page mode will have two pages on one sheet. (One on each side).

4 page mode will have four pages on one sheet. (Two on each side).



Line length:

The line length is the maximum number of characters that you would like to have.



LAYOUT 2

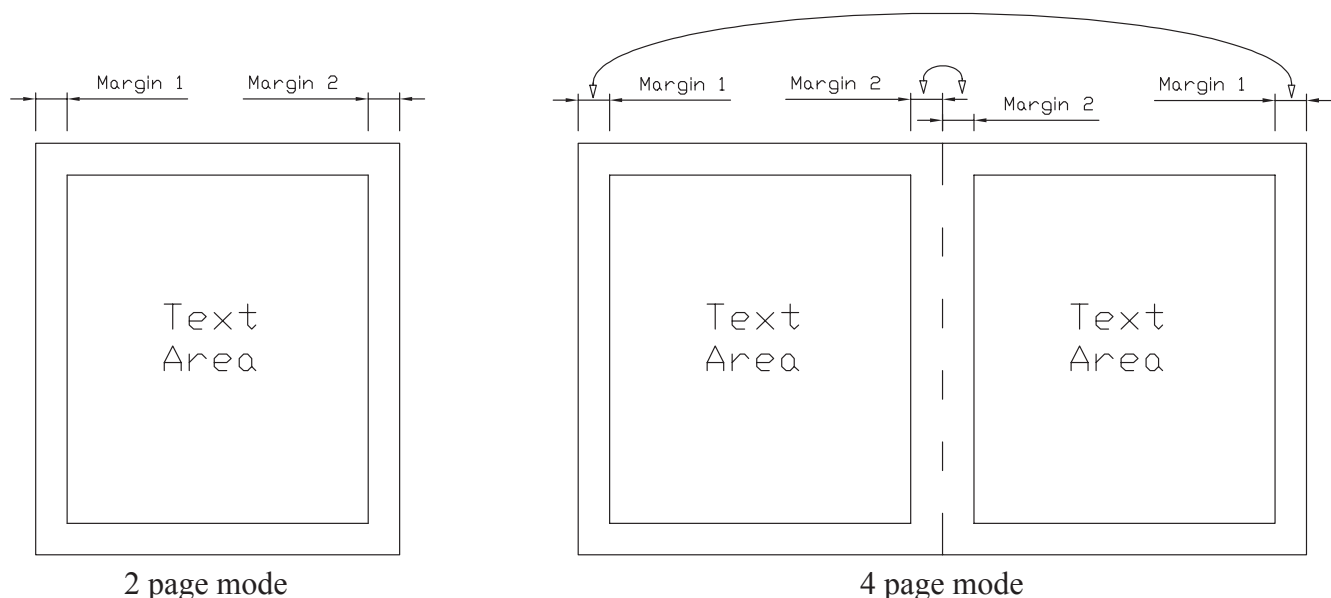
Selects size on margins. Use SCROLL to choose new settings.

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) steps.

It is two different margins, margin 1 and margin 2.

When printing in two page mode, margin 1 is the same as the left margin, and margin 2 is the same as the right margin.

However, when printing in 4 page mode, the function is a little different. Please see figures below:



Note when printing in 4 page mode, the value on margin 1 will affect both the “outer” margins. And the value on margin 2 will affect both the “inner” margins.

LAYOUT 3

Selects 1 page up/down and singlesided/interpoint braille. Use SCROLL to choose new settings.

1 page up/down: Makes it possible to select if page 1 should appear on the top or on the under-side of the sheet. To get the sheets stacked in correct order on the stacker, this must be set to 1 page down.

Singlesided/interpoint: Will toggle between singlesided and interpoint braille. If you select singlesided, the printer will print only on one side of the sheet. If you select interpoint, the printer will print braille on both side of the sheet.

LAYOUT 4

Selects fold line on/off and sheet calibration. Use SCROLL to choose new settings.

Fold line on/off:

When printing in 4 page mode, it is possible to print a row of dots in the middle of the sheet. This makes it easier to fold the sheet.

Sheet calibration:

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 number will give you a wider sheet.

FINE ADJUST

Positioning the paper.

Each push down moves the paper forward a distance equal to 0.5”.

FORM FEED

Advances the paper to the next sheet.

RESET PRINTER

Resets the CPU unit and clears the buffer.

Must always be used if an error occurs (Printer Error in the display).

RESET ALARM

For alarms, the audio alarm can be reset (e.g. Printer Alarm, Out of Paper).

For errors (Printer Error in the display), however, the RESET PRINTER must be used.

3.2 Print Values

This function gives a printout of the settings which is currently active in the printer; It also gives information about the 8 ASCII-tables in the printer.

When Print Values is used, the line length setting must be at least 36 characters. If not, this message will appear in the display:

**NB! Line Length
Minimum 36 Char**

To be able to print the current values, change the line length to min. 36 characters.

Print Values might look like this:

```

BRAILLO NORWAY
VERSION 000.02
CURRENT VALUES

COMMUNICATION      = SERIAL
BAUD RATE          = 9600
PARITY             = NO
DATA BIT           = 8
STOP BIT           = 1

SHEET WIDTH        = 4-PAGE
LINE LENGTH        = 37

MARGIN 1           = 1.0"
MARGIN 2           = 1.0"

PAGE 1             = DOWN
PRINT MODE         = INTERP

FOLD LINE          = ON

SHEET COUNTER      = 87654321

ASCII TABLE
NO 2 =             ENGLAND      6 DOT 044.00
                   ENGLAND      8 DOT 044.00

```

“Sheet counter” shows the number of printed sheets (Not pages!). This is the same counter as on the right-hand side of the display. “ASCII table” shows which ASCII-table is active.

The remaining information in the Print Values printout tells which ASCII-tables are available in the EPROM, and might look like the list below.

BRAILLO NORWAY

ASCII TABLES IN PROM

NO 1 =	DENMARK	6 DOT 045.00
	DENMARK	8 DOT 045.00
NO 2 =	ENGLAND	6 DOT 044.00
	ENGLAND	8 DOT 044.00
NO 3 =	GERMANY	6 DOT 049.03
	GERMANY	8 DOT 049.03
NO 4 =	GERMANY	6 DOT 049.04
	GERMANY	8 DOT 049.04
NO 5 =	ICELAND	6 DOT 354.00
	ICELAND	8 DOT 354.00
NO 6 =	ITALY	6 DOT 036.02
	ITALY	8 DOT 036.02
NO 7 =	NORWAY	6 DOT 047.03
	NORWAY	8 DOT 047.03
NO 8 =	SWEDEN	6 DOT 046.01
	SWEDEN	8 DOT 046.01

All the 8 tables are resident in the printer. The table which is active is shown under the “ASCII table” section of the printout. To select another table (among the 8), refer to chapter 3.1 “Operating panel functions”.

Note: This is just an example. The ASCII-tables listed will be dependent upon the combinations which are included in the printer. Some common combinations are listed below:

EURO 1 931203			EURO 2 931203			EURO 3 930106		
1	045.00	Denmark	1	032.00	Belgium	1	043.00	Austria
2	044.00	England	2	044.00	England	2	042.00	Czech/Slovakia
3	049.03	Germany	3	033.00	France	3	044.00	England
4	049.04	Germany	4	049.03	Germany	4	049.03	Germany
5	354.00	Island	5	049.04	Germany	5	049.04	Germany
6	039.02	Italy	6	039.02	Italy	6	030.00	Greece
7	047.03	Norway	7	047.03	Norway	7	036.00	Hungary
8	046.01	Sweden	8	041.00	Switzerland	8	047.03	Norway

AMERICA 931203			ASIA1 930118			ASIA2 941025		
1	055.00	Brazil	1	033.01	France	1	033.01	France
2	033.01	France	2	049.04	Germany	2	049.04	Germany
3	049.04	Germany	3	081.00	Japan	3	098.00	Iran
4	039.02	Italy	4	965.01	Kuwait	4	965.01	Kuwait
5	047.03	Norway	5	060.01	Malaysia	5	060.01	Malaysia
6	351.10	Portugal	6	047.03	Norway	6	047.03	Norway
7	034.00	Spain	7	966.00	Saudi Arabia	7	966.00	Saudi Arabia
8	001.00	USA	8	001.00	USA	8	001.00	USA

3.3 Messages/Error Messages

The text in the display can be divided into three groups; Messages, Alarms and Error Messages. With Messages, the Printer operates normally. With some Alarms, the Printer can be operated to a certain degree, while other Alarms are like Error Messages, in that the Printer cannot be operated, and RESET PRINTER must be used.

The audio alarm (BEEP) is sounded for both alarms and error messages.

Messages:

1.

**Printer
BUFFER empty**

When DUMP BUFFER is used, and the input buffer is empty, the message “BUFFER empty” is shown on the display. The Printer is then ready to begin a new print job. Note: If there is text remaining in the buffer and “Dump Buffer” is not used, the text will appear at the beginning of the next print job.
2.

**NB! Line Length
Minimum 36 Char**

When PRINT VALUES is used, and the line length is set to less than 36 characters, this message will appear on the display. To print the current values, first set the line length to 36 characters or more.
3.

**Mag. Rack A 45
03E -05-09-14**

If there is detected one or more defect magnet(s) -when the printer is turned on, -when pressing reset, -or while the printer is running, this message will appear on the display. For more information - see chapter 3.5 “Selftest on magnets”.
4.

Mag. Rack A 45

If there was detected some problems with the magnets during printing, and the problem is intermittent, this message will appear in the display. For more information - see chapter 3.5 “Selftest on magnets”.
5.

**Cut/Stack
Ready**

This message indicates that there has been a problem in the paper cutter or stacker, but the problem is now solved.
The printer is ready to continue the print job.
To continue, push the test print button in and out.
6.

**Cut/Stack
Paused**

This message tells that someone has been pressing the pause button on the stacker unit. The printer will just wait until the test print button is pressed in and out.

Alarms:

1.

**Printer
Out of Paper**

When the printer runs out of paper, the audio alarm is sounded, and the printer stops at the end of the next page. To continue printing, press RESET ALARM and then TEST PRINT after the new paper has been inserted. For information, see TEST PRINT - Ready/Continue, in chapter 3.1 “Operating panel functions”.

If the alarm is sounded when there still is paper in the machine, this may have been caused by one of the following:

- A. Paper dust in the paper out sensor.
- B. The paper guide which the paper out sensor is attached to might be bent or damaged, so the distance from the sensor to the paper is too big to detect the paper.
- C. The sensor is not connected.
- D. Defect sensor.

If one of these problems occurs, clean the sensor, make sure that it's connected to the main board, and check that the sensor is not more than 4 mm from the paper surface.

The following alarms are usually caused by a problem with the handshake in the data communication between the computer and the printer. It will be necessary to press RESET printer after these.

The text which remains in the buffer during these alarms can be printed by using DUMP BUFFER.

However, during these alarms one must check the transmission parameters for both the printer and the computer, and also possibly the software in use. If any changes are made on the printer, one will have to RESET PRINTER to register these changes.

2.

**Printer
Buffer Overflow**

This alarm indicates that the computer has not registered that the input buffer in the printer is full, and continues to send data which causes the buffer to overflow.

The text which remains in the buffer can be printed by using DUMP BUFFER.

If this alarm occurs, check the transmission parameters for both the printer and the computer, and also possibly the software in use.

3.

**Printer Alarm
Overrun/Framing**

Error in at least one of the following transmission parameters: Baud rate, no. of data bits and / or no. of stop bits. If this alarm occurs, check the transmission parameters for both the printer and the computer, and also possibly the software in use.

4.

**Printer Alarm
Parity**

Error in the parity check in serial communication. If this alarm occurs, check the transmission parameters for both the Printer and the computer, and also possibly the software in use.
5.

**Printer Alarm
ESC-Sequences**

Some irregularities have been detected when receiving escape-sequences. If this alarm occurs, check the transmission parameters for both the Printer and the computer, and also possibly the software in use. If the escape-sequences are sent by a batch-file or are integrated in the text-file, be sure that the correct ASCII-value combinations are used.
6.

**Cut/Stack Alarm
At Paper Sensor**

The stacker has detected some problem at the paper sensor. It could be that the paper is not present at the sensor after cutting, or that the sensor is blocked when it is not supposed to.
7.

**Cut/Stack Alarm
Stacker is full**

The transport belt on the stacker is full of paper.

On error messages, the printer cannot be operated, and RESET PRINTER must be used.

1.

**Printer Error
General Failure**

If the main motor starts, but for some reason stops, this message appears in the display, together with the audio alarm. The reason might be:

 - A. Bad connection in the motor wires or a problem inside the electrical unit (frequency converter).
 - B. The belt on the Printer breaks during printing. Check the belt, and replace if needed.
 - C. The sensor on the main sensor wheel might be defect, or have loose connector.
2.

**Printer Error
Start Motor**

If the main motor does not start, this error message is shown in the display. The reason might be:

 - A. The motor is not connected. Check that the cable to the motor is connected.
 - B. The belt is broken or out of place.
 - C. Defect frequency converter.
 - D. System error.
3.

**Printer Error
Stop Motor**

The main motor does not stop. The reason might be:

 - A. Defect electrical unit.
 - B. System error.
4.

**Printer Error
Paper Feed**

Disagreement between the paper feed assembly (the paper) and the program system.
The reason might be:

 - A. The paper is stuck, and the paper feed motor has slipped. Free the paper jam, push RESET PRINTER.
 - B. The sensors on the paper feed might be defect, or have loose connectors.
 - C. System error.
5.

**Cut/Stack Error
At Paper Cutter**

The cutter does not function properly, it could be that it is missing press air, or defect sensors.
6.

**Cut/Stack Error
AMKutt-Routine**

Problems on the cutter/stacker unit.

3.4 Test Print

The test print program is designed to ensure that the 180 printing mechanisms functions properly.

This printer will do a electrical 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.

See also TEST PRINT in chapter 3.1 "Operating panel functions".

The test print consists of four different patterns. A X-pattern, some full cell lines, empty cell lines, the complete ASCII-table and a pattern consisting of a character with dot 1,3,5 combined with a character with dot 2,4,6.

How to use the test print:

The test print button on the operating panel is used to start and to switch between the different test patterns. To switch to the next test pattern, you must release the button, wait for the paper to stop moving, and then press the button again. When you have reached test pattern number four, it will start on number one again.

If you do not release the test print button, the printer will continue to run the test pattern without stopping. This can be useful for troubleshooting.

If you do release the test print button, the printer will continue printing until the paper is positioned correctly for the next print job.

- 1st test pattern:

Prints an "X"-pattern on both sides of the sheet which shows each pin from each magnet rack printing on a separate line. Useful when searching for missing dots.

- 2nd test pattern:

Prints full cells and empty lines, together with the ASCII-table on both sides of the sheet. Useful for testing the printing pressure adjustments, and to see how the paper can take heavy printing.

- 3rd test pattern:

Prints full cells and empty lines, together with the ASCII-table single-sided. Useful for testing the printing pressure adjustments.

- 4th test pattern:

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

The chapter 4.1 "Printing principle" illustrates how the printing mechanisms are placed.

Instruction for troubleshooting will be illustrated by examples in chapter 4.2 "Troubleshooting, incorrect braille".

3.5 Self-test on magnets.

This printer has 180 electrically activated magnets. Because of the tremendous workload and their sensitive nature, these magnets may fail sometimes. It is difficult to see if a row of dots suddenly is missing. Because of this there is integrated a self-diagnostic system that check the magnets continuously during printing.

The system checks the magnets by measuring the internal resistance in the coil.

The system will behave a little different if a defective magnet is detected, on power-on/reset or during printing.

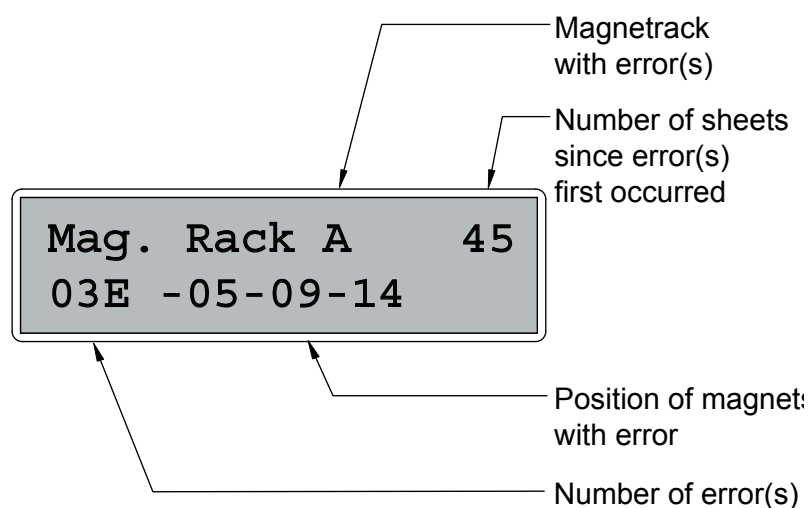
Please observe that the numbering of the magnets in a magnet rack, always starts at “one” at the end where the connections are. (It does not refer to dot number, character number or column number!).

On power-on or reset:

If a magnet is defective when the power is turned on (or reset), the printer will give an audio alarm, and all the magnets will start to go on and off at a certain frequency. The frequency will vary depending on the number of defect magnets. (Slower frequency for more problems).

To be able to run the printer with a defective magnet(s), you can bypass the magnet-test by pressing the “Fine adjust” button on the control panel.

The display will indicate where the problem is located (what magnet rack), how many defective magnets, and position of the magnet(s) on that rack. See the example:



During printing:

If a defective magnet is detected during printing, the printer will not stop. Instead it will give an audio alarm, and display a message like the one in the example below.

You can also see from the way the information is displayed, if this magnet is constantly defective, or if the problem is intermittent. There will be information in the bottom line in the display as long as the problem is present.

The sheet counter will show how many sheets that have been printed since the problem first occurred.

If the problem disappears, the information on the bottom line will also disappear.

Constant defect magnet:

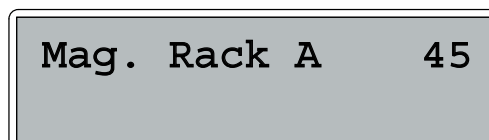
When the magnet(s) is constant defective, the display will indicate where the problem is located, the number of sheets since the problem first occurred, how many defective magnets, and the exact position of the magnet in the magnet rack.

When the printer stops, the information in the display will remain until you press “Reset printer”. If the defective magnet has not been replaced, the printer will proceed as described in the “On power-on or reset” section.

Intermittent problem:

The bottom line in the display will only be displayed as long as the problem is present. If the problem disappears, the information on the bottom line also disappears.

See the figure below:



However, the printer will still remember where the problem was, and the information can be displayed after the printer has stopped. Do not use “Reset printer”, this will clear the information from the printer's memory! Stop the printer by stopping the text sent from the computer and wait for it to finish.

When the printer stops, the display will not show the bottom line, but by pressing the “Fine Adjust” button on the control panel, the information will appear on the bottom line in the display.

4. SERVICE AND MAINTENANCE

When doing service or maintenance, the cover must be taken off. Some procedures covered in this chapter might be done simply by removing for example a side panel. But we recommend for “bigger operations” to remove the cover completely. Please see chapter 2.2 “Removal of cover” on how to do this.

When the cover is removed, the operator panel is also removed. To be able to run tests and so on, you can place the front panel beside the printer so that you are able to connect the cables to the operator panel. Or you can unscrew the panel from the cover and keep it nearby the printer. Please observe that the operator panel is an electrical board, and **MUST NEVER BE PLACED ON A CONDUCTIVE SURFACE!** If there is a short circuit on the board, it might damage the board.

For an explanation regarding how to turn this printer on without having the cover on, please see chapter 2.8 “Turn on the printer”

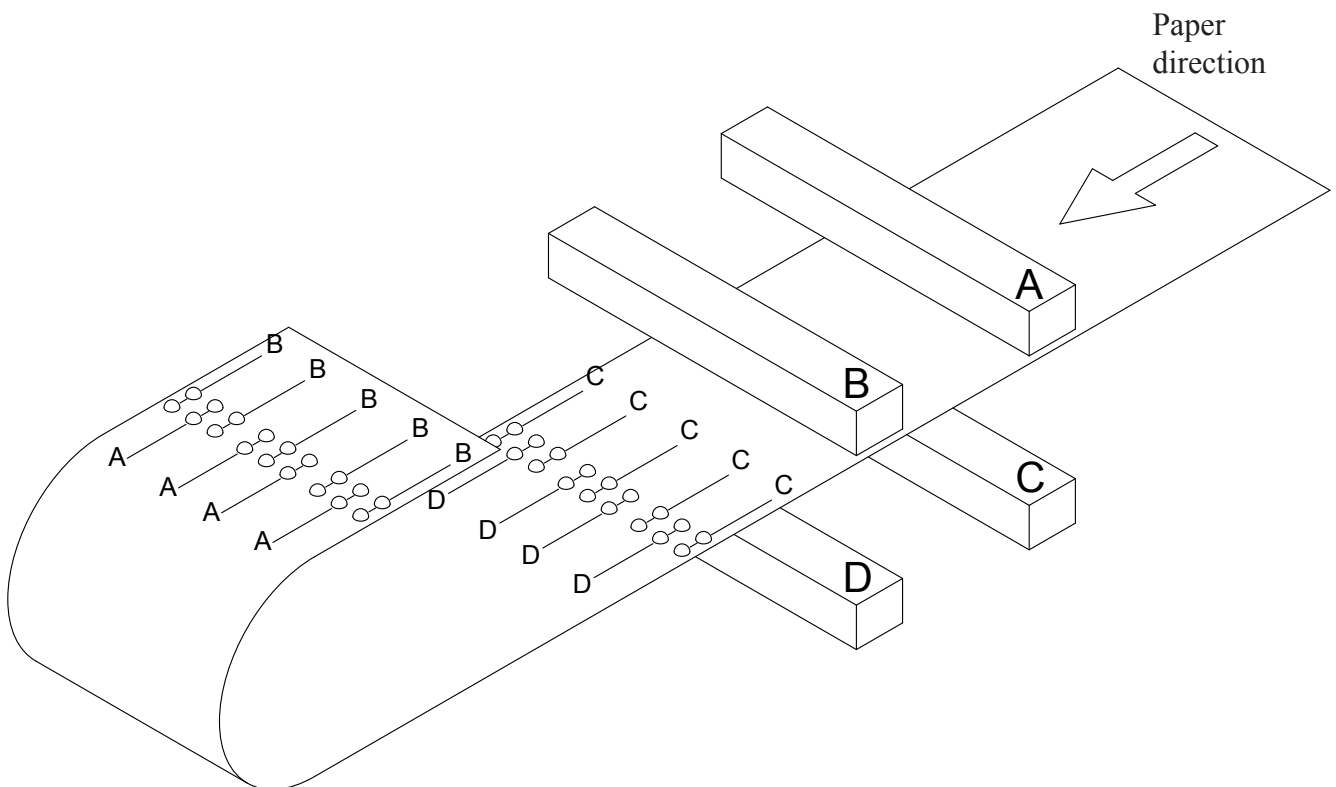
4.1 Printing principle

The figure below is a very simplified version of the printing mechanisms in this printer.

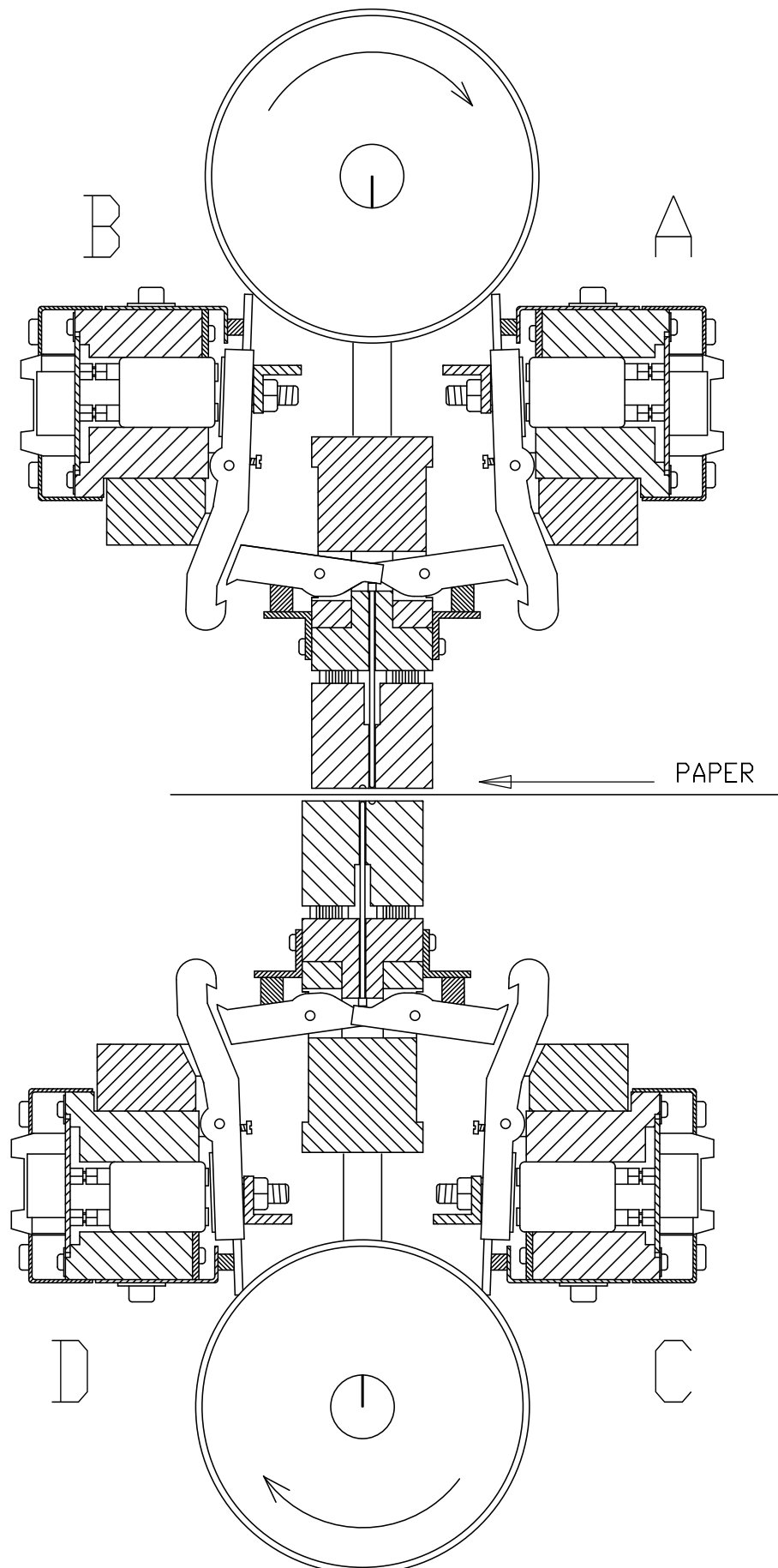
The four “bars” across the paper indicates the magnet racks.

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 crossection 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 papershoes 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:

○○○ ○○○ ○○○ ○○○ ○○○ First revolution

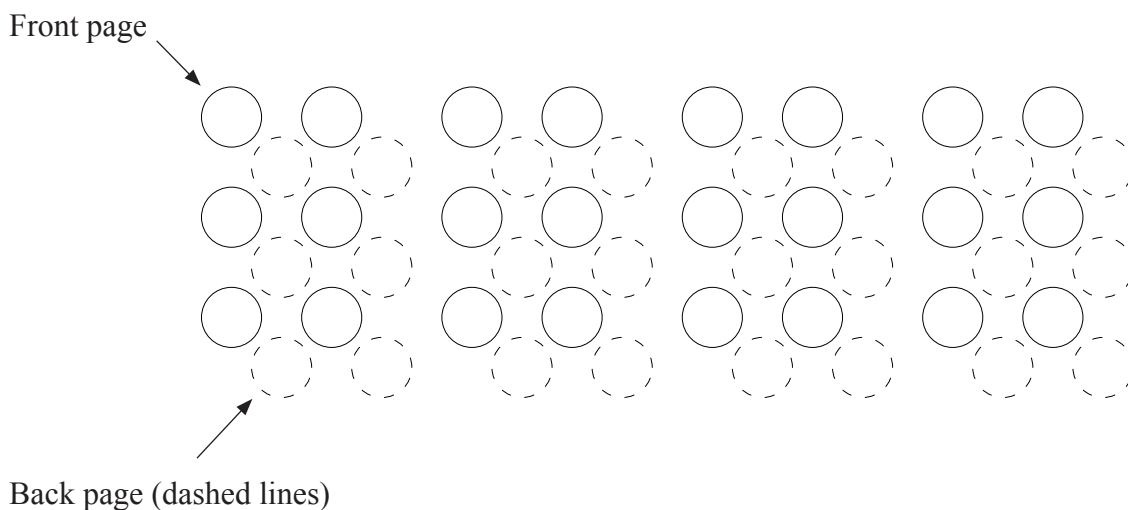

 Second revolution


 Third revolution


 Fourth revolution

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

Please see figure below:



The drawing on this page is to help to understand the basic principle of how the dots are printed.

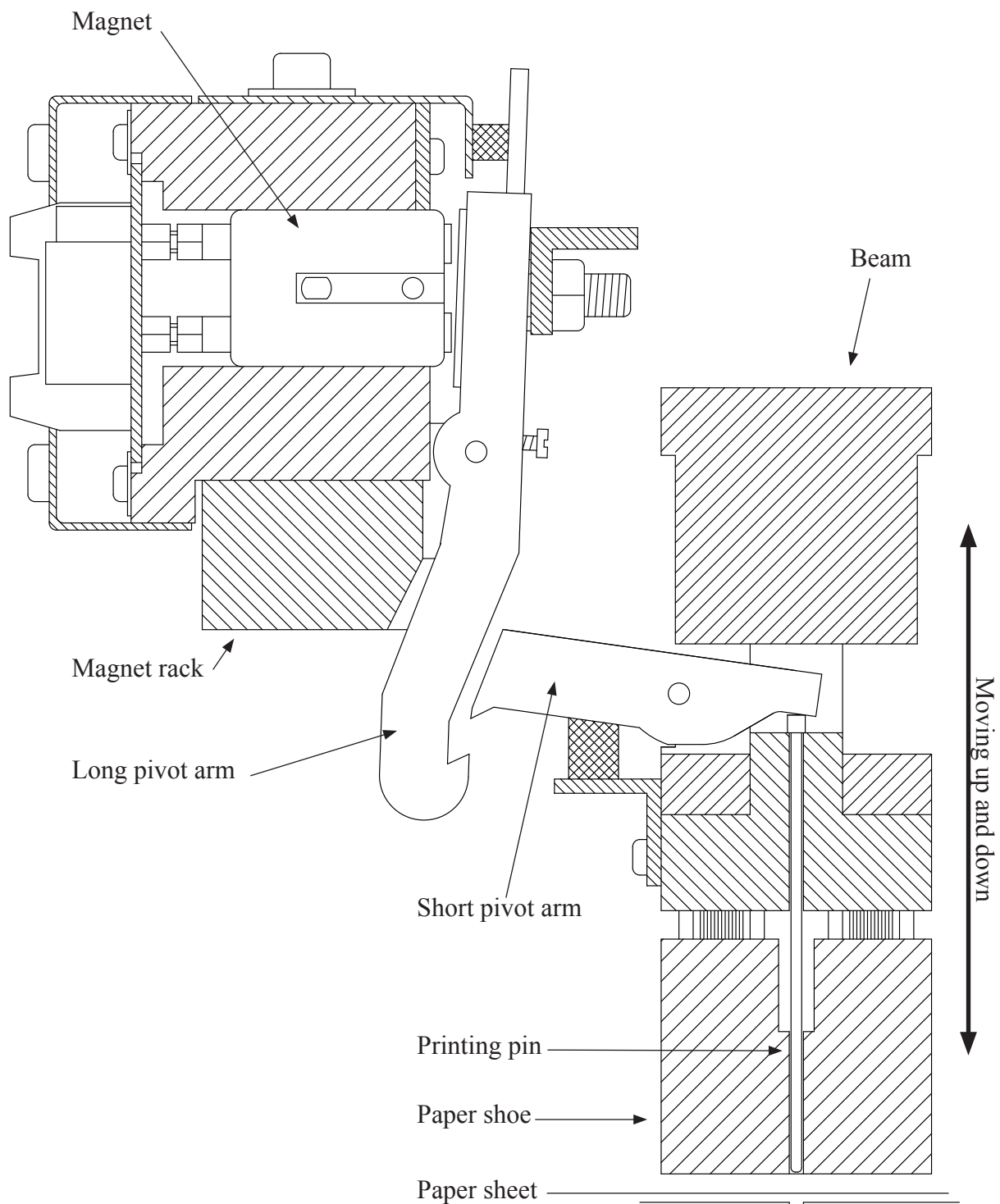
Please also see the drawings on the next page.

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 do not move, but the beams and the papershoes 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.



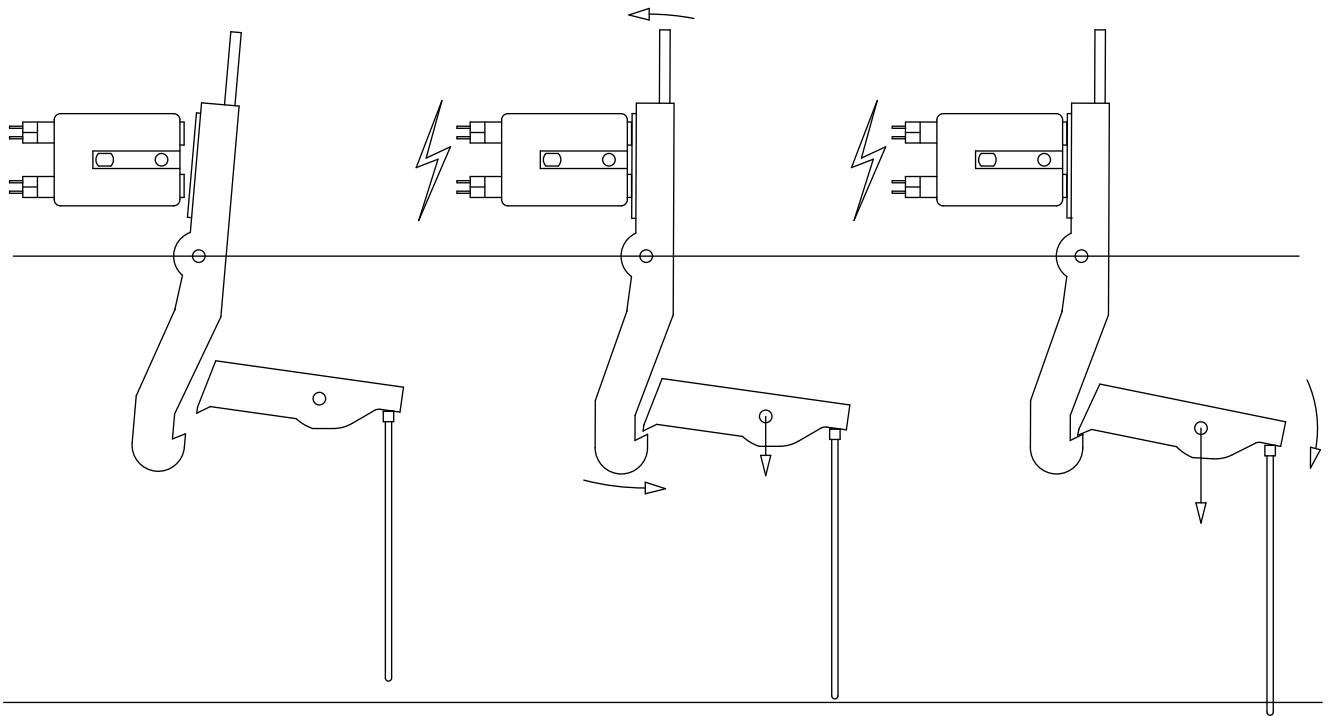
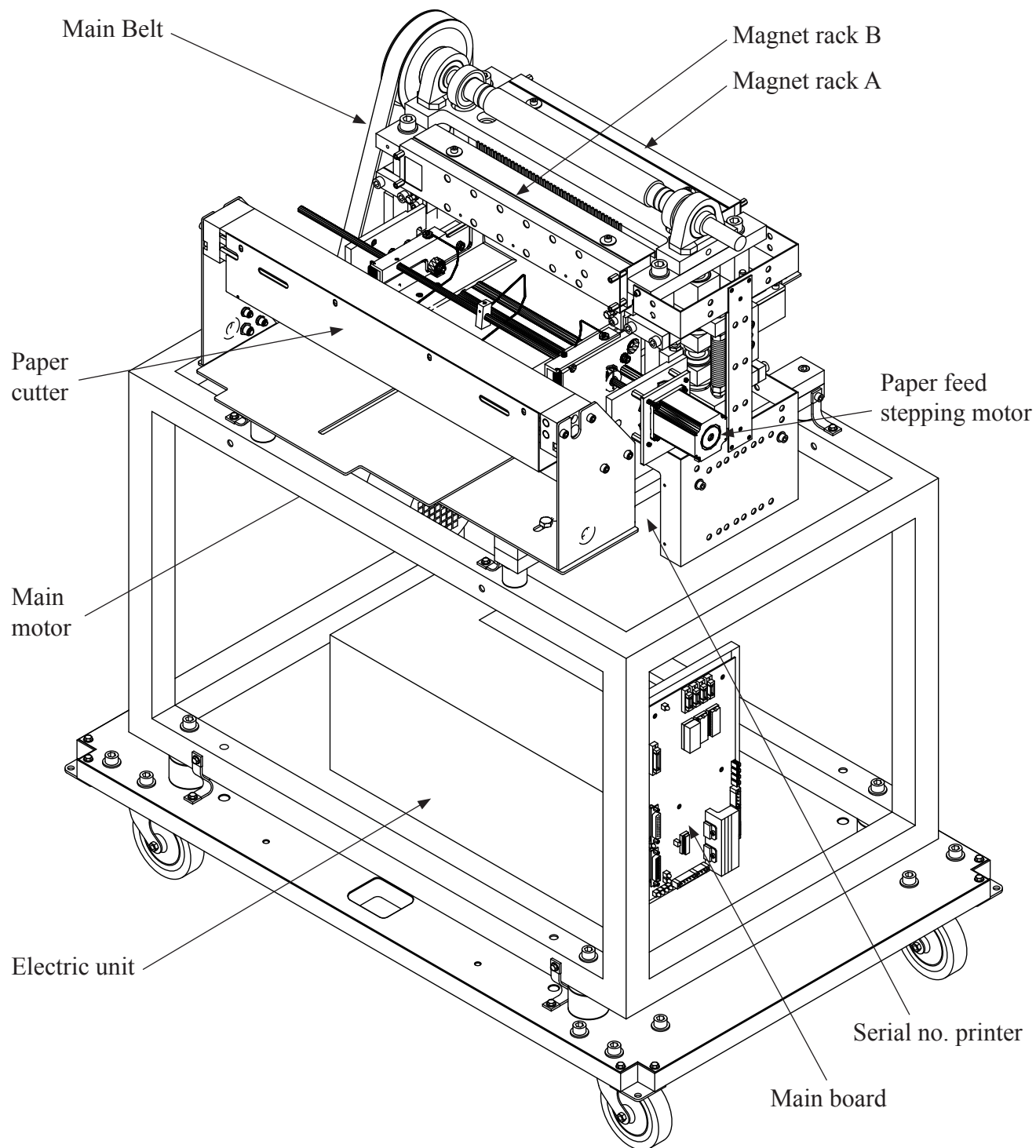


Figure A
Shows the position on the pivot arm when the printer is not printing, and the magnet is not engaged.

Figure B
Now the magnet is engaged, and the long pivot arm has been drawn 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 catches the short pivot arm. When the short pivot arm moves further down, the printing pin will be forced down into the paper and make a dot.

General overview printer



4.2 Troubleshooting, incorrect braille.

Lets say that through proofreading, errors have been found in some of the characters in the printed text. The first thing to do is:

Check the characters in the text-file in your 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.

On earlier models of Braillo printers, this could be caused by either a electrical problem or a mechanical problem. But on this model of printer, there is integrated a self-diagnostic system that is checking the magnets continuously during printing, and this will trigger an alarm if it detects some electrical problems with the magnets. So, the missing dots found here are probably caused by some faulty mechanical parts or it could be 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 chapter 4.1, "Printing principle".

If the printer has been printing a lot (a lot could be either a year, or it could be 1000 printing hours, depending on what comes first) when this happens, it could be that the printer just needs regular maintenance. See chapter 4.6 "Magnet rack, cleaning", and chapter 4.18 "Maintenance".

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(s) is causing the trouble.

If there is missing dot(s), use the X-pattern to detect which magnet rack(s) 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 in chapter 4.1 "Printing principle".

There are several methods to make experiments to confirm that you have found the correct magnet rack(s). One good method is to disconnect the rest of the magnet racks, and see if the printer still have problems.

To determine if a problem is electrical or mechanical.

See if the suspected pivot arm is moving like the rest of the pivot arms on the magnet rack. If it does move, but still does not make dots, then it is probably a mechanical problem. If it does not move and it is possible to pull the suspected long pivot arm with your finger during embossing and the dots appear. Then it most likely is caused by some problems in the electric circuits.

If one magnet rack is missing all the dots all the time, it could be because of a blown fuse. On the back of the magnet racks there is a red light that is indicating that the magnet rack has power. If this light is dark, check the fuse for the magnet rack.

See chapter 6.2 "Electric unit overview" for more details.

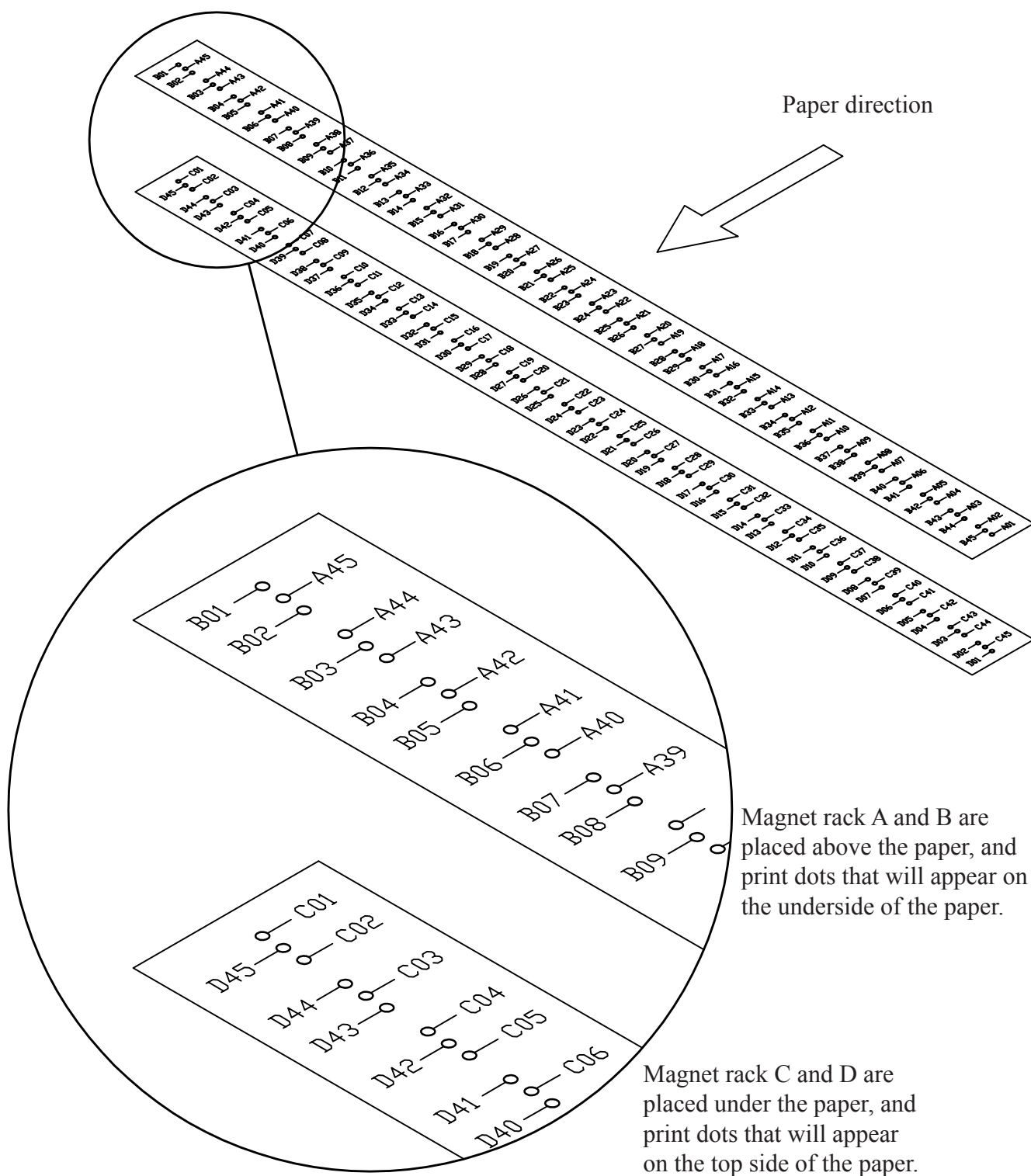
Which magnet makes what dot?

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.

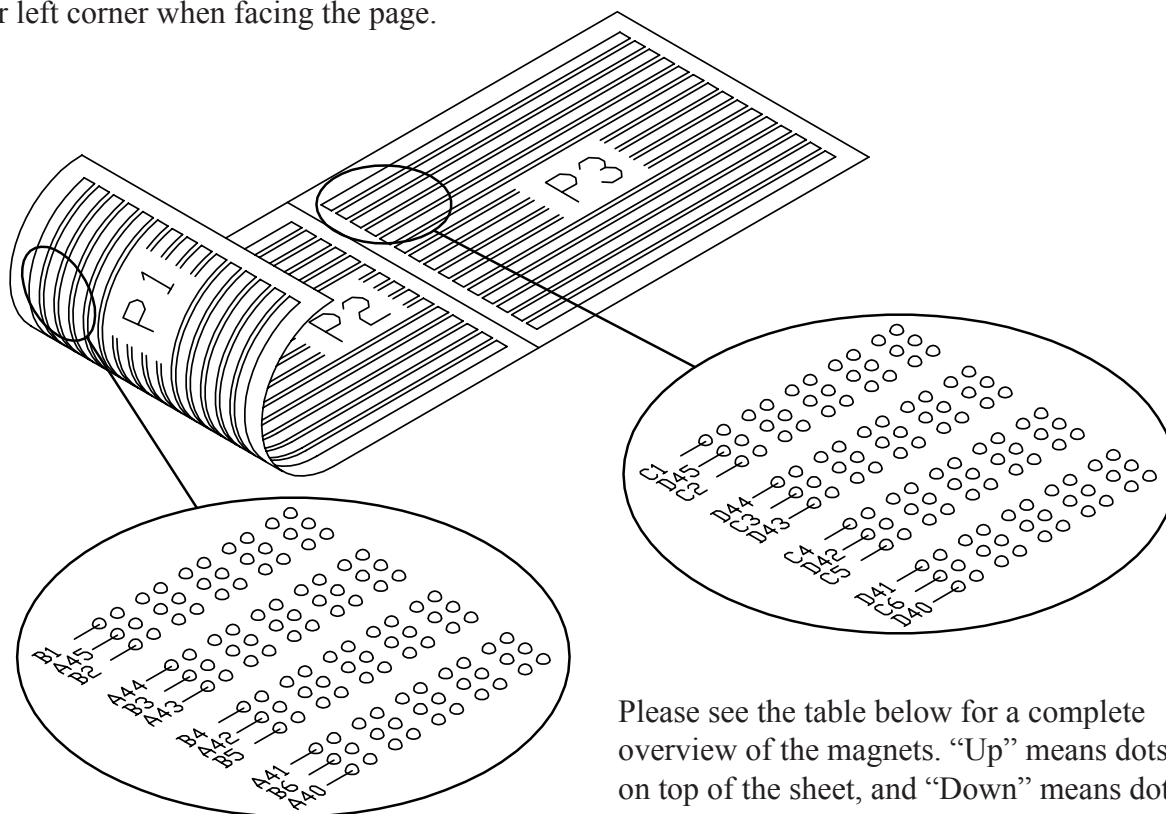
The letters and numbers on the figures is indicating the following:

The letter A, B, C and D is the name on the magnet rack. 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).



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

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

1. The sponge list is not pressing enough against the long pivot arm.
2. The gap between the two pivot arms are 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.

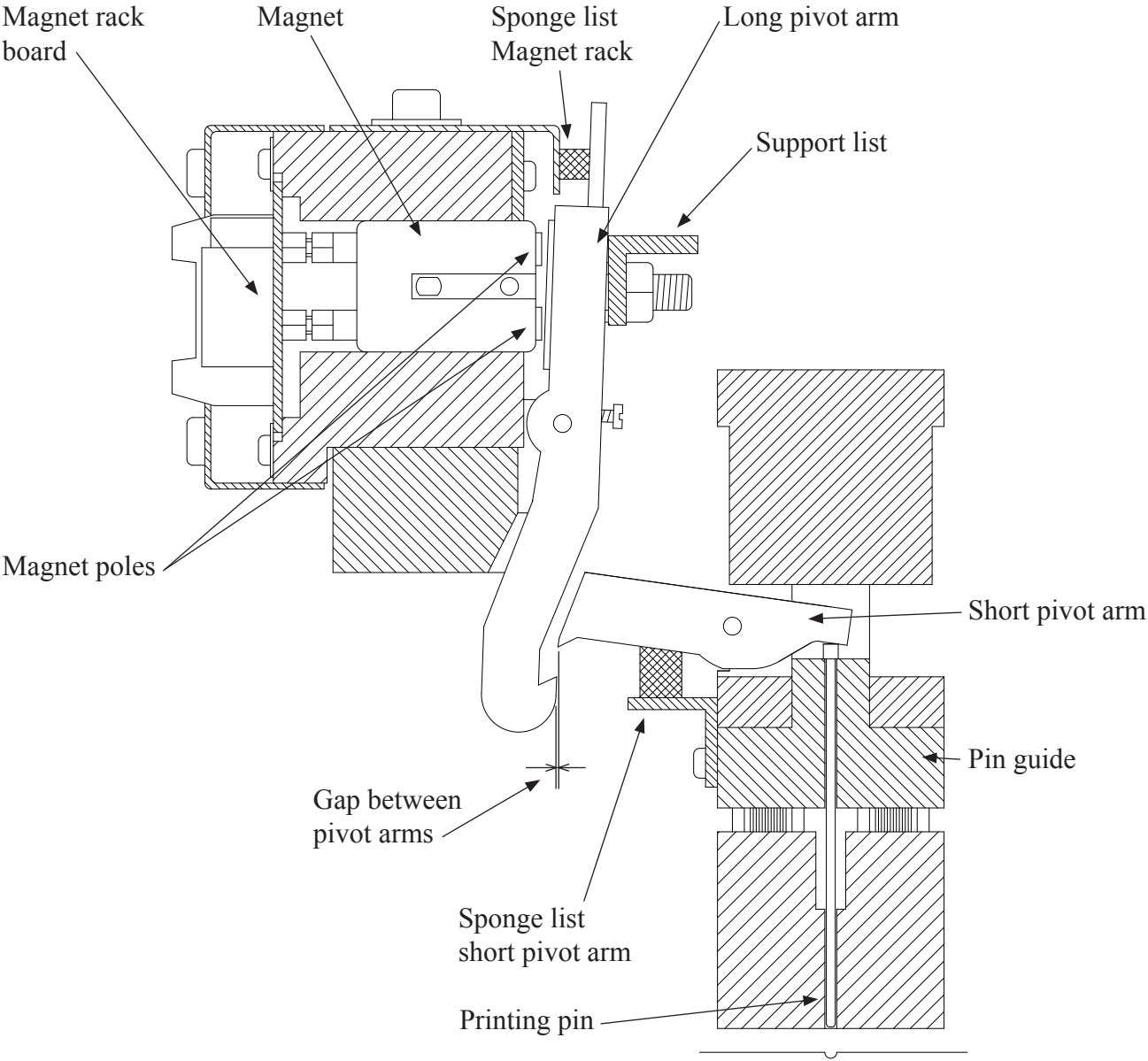
Control:

To be sure that you have found the right mechanism after the troubleshooting, you can do the following test: Carefully pull the suspected long pivot arm against the magnet with your finger.

Note! Please be careful to avoid all other moving parts with you hair, clothes and the rest of your body!

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!) on 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 across the page.



4.3 Magnet rack, removal

Please see figures below:

Magnet racks A and C (the two on the side the paper goes into the printer) are quite easy to reach, but to remove magnet rack B and D, it is often best to first remove the paper cutter (see figure to the right) and the paper feeder.

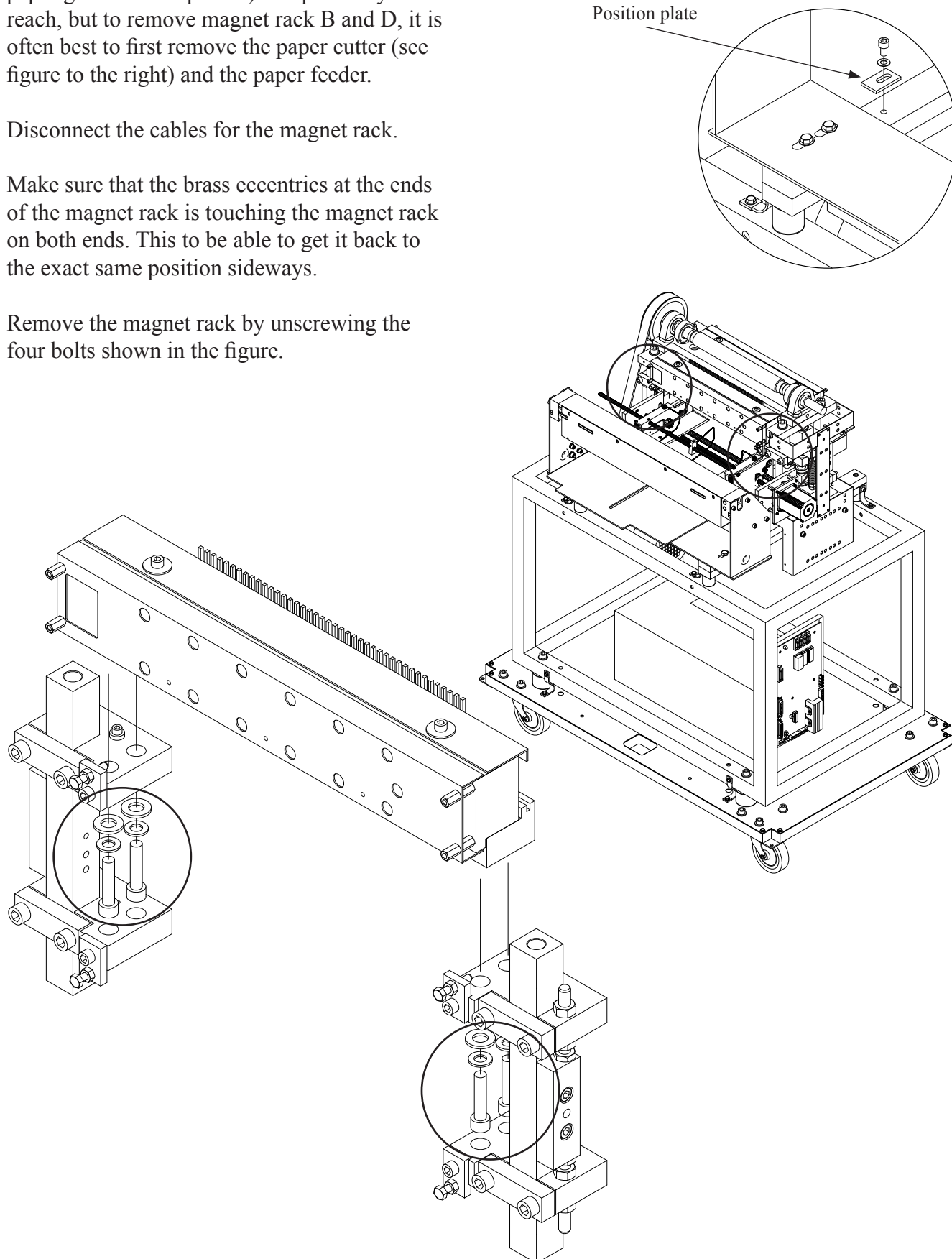
Disconnect the cables for the magnet rack.

Make sure that the brass eccentrics at the ends of the magnet rack is touching the magnet rack on both ends. This to be able to get it back to the exact same position sideways.

Remove the magnet rack by unscrewing the four bolts shown in the figure.

Note! Before removing the cutter, make sure that the position on the cutter can be re-established by use of the position plates at the back of the cutter. Do this at both sides.

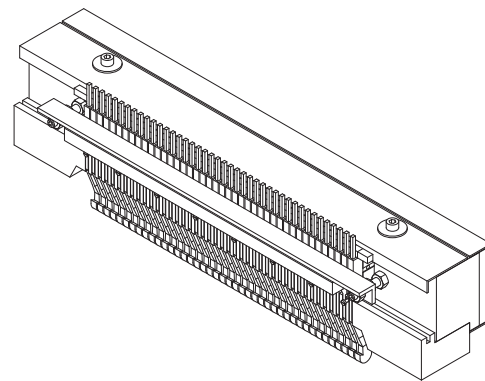
Position plate



4.4 Magnet rack, disassembly, step by step.

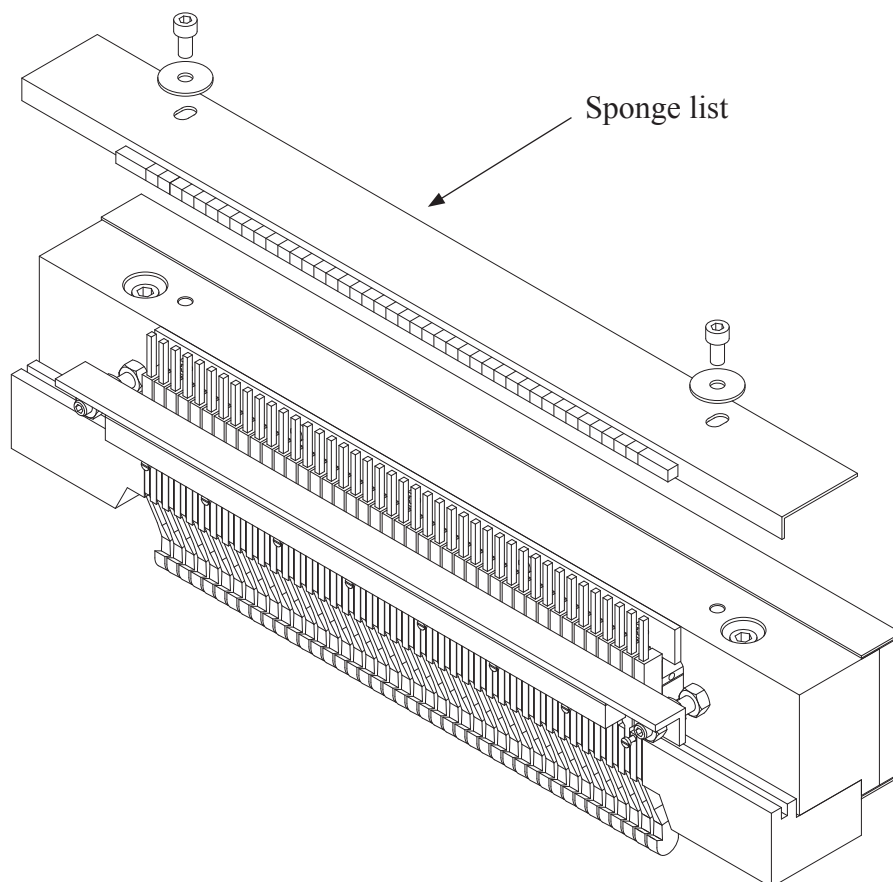
There are two main reasons for disassembling the magnet rack. It could be to replace some parts, i.e. a defect magnet, a worn pivot arm, or it could be for regular maintenance.

The magnet racks can be considered as the parts 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.

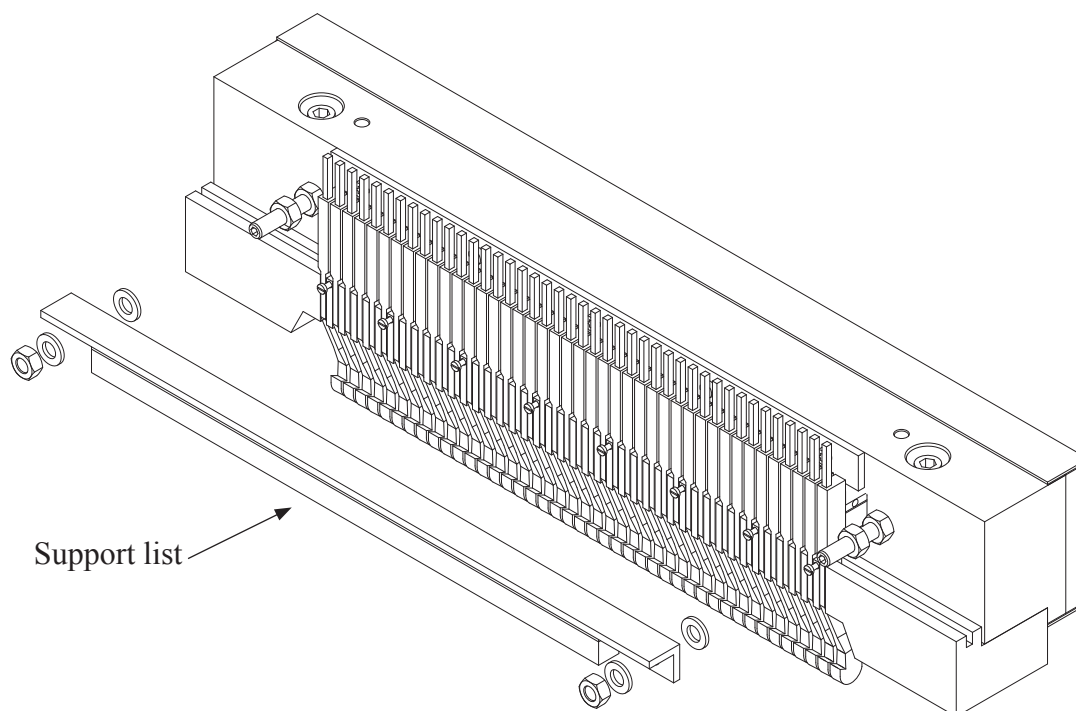


Take the magnet rack out of the printer like described in chapter 4.3 “Magnet rack, removal”. Next, follow the instructions below.

Step 1. Remove the two bolts holding the sponge list, and then remove the sponge list.



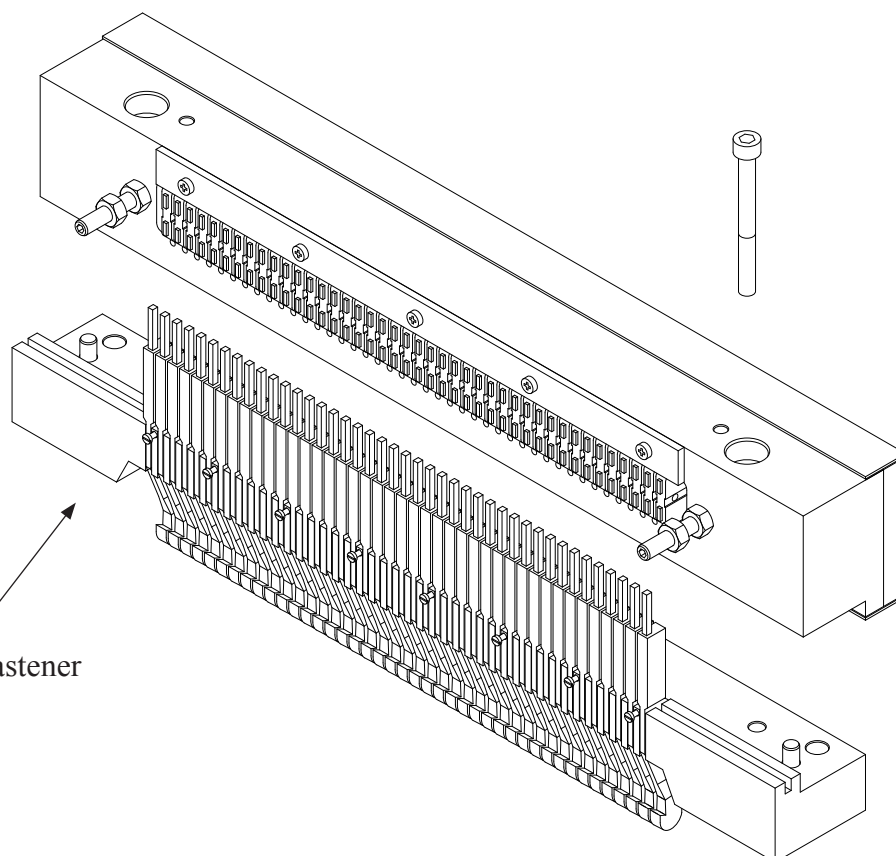
Step 2. Remove the two nuts holding the support list, and then remove the support list.



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.

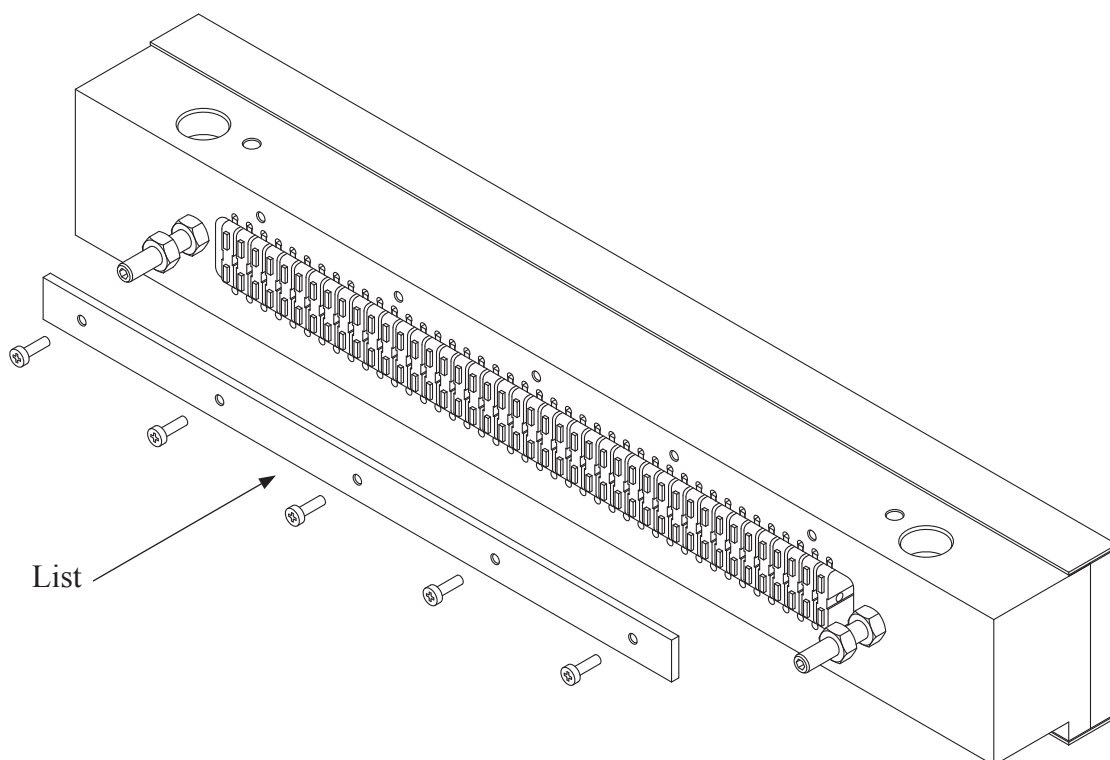


4.5 Magnet, replacement

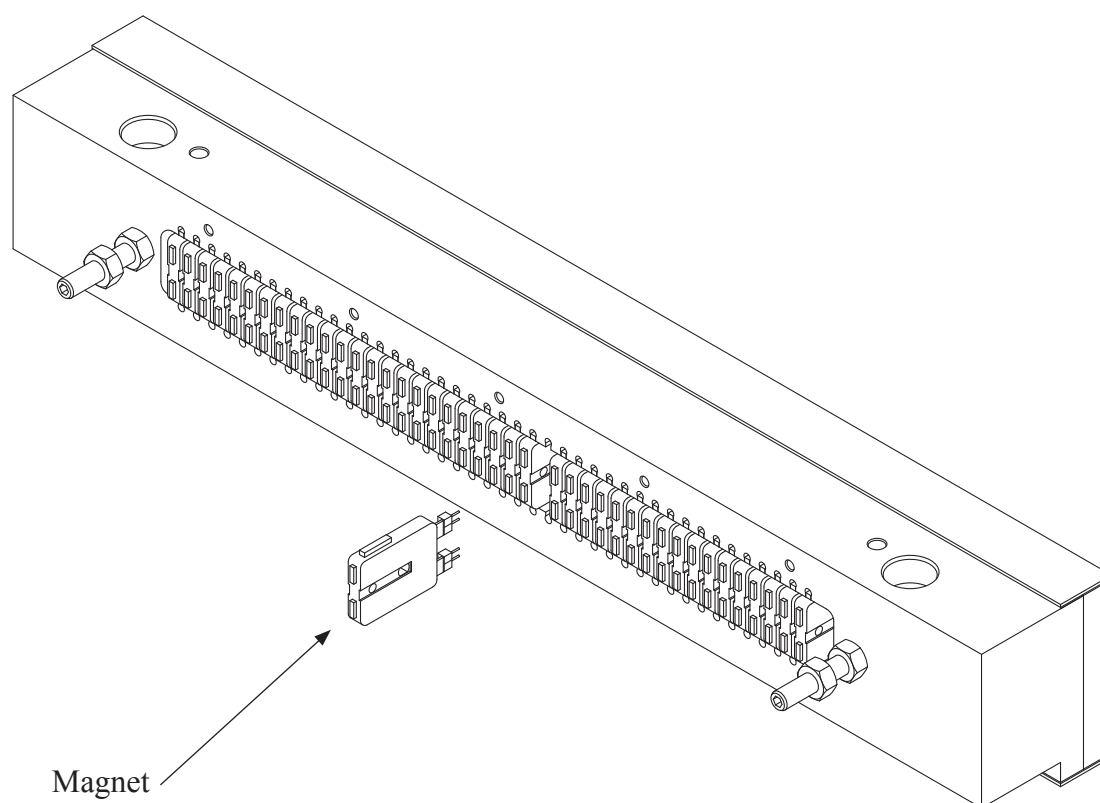
Please observe that the numbering on the magnets in a magnet rack, always starts at “one” at the end where the connections are. (It does not refer to dot number, character number or column number!).

Disassemble the magnet rack like described in chapter 4.4 “Magnet rack disassembly, step by step”. Next, follow the instructions below.

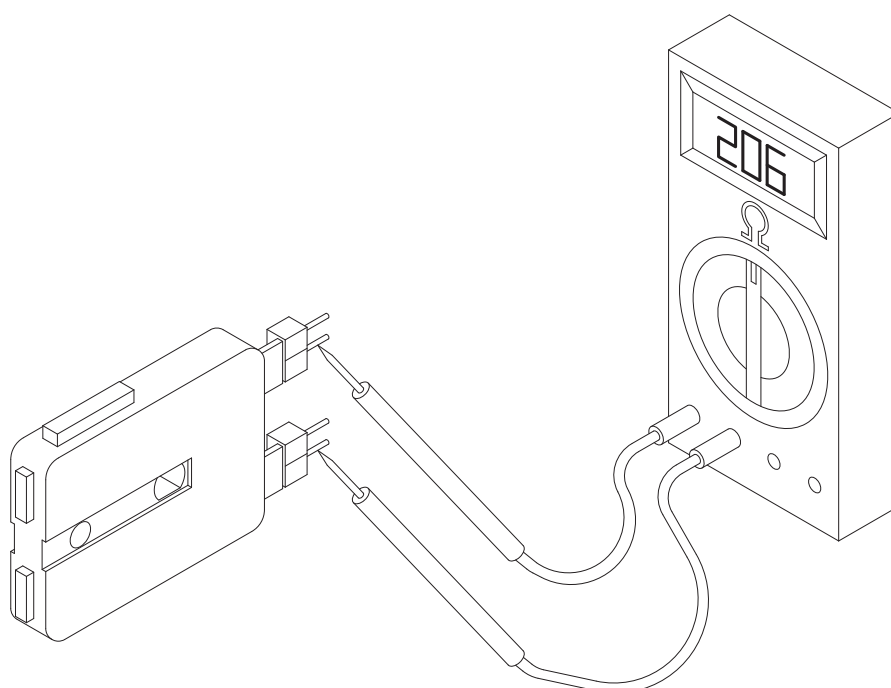
Step 1. Remove the screws holding the list, and the list.



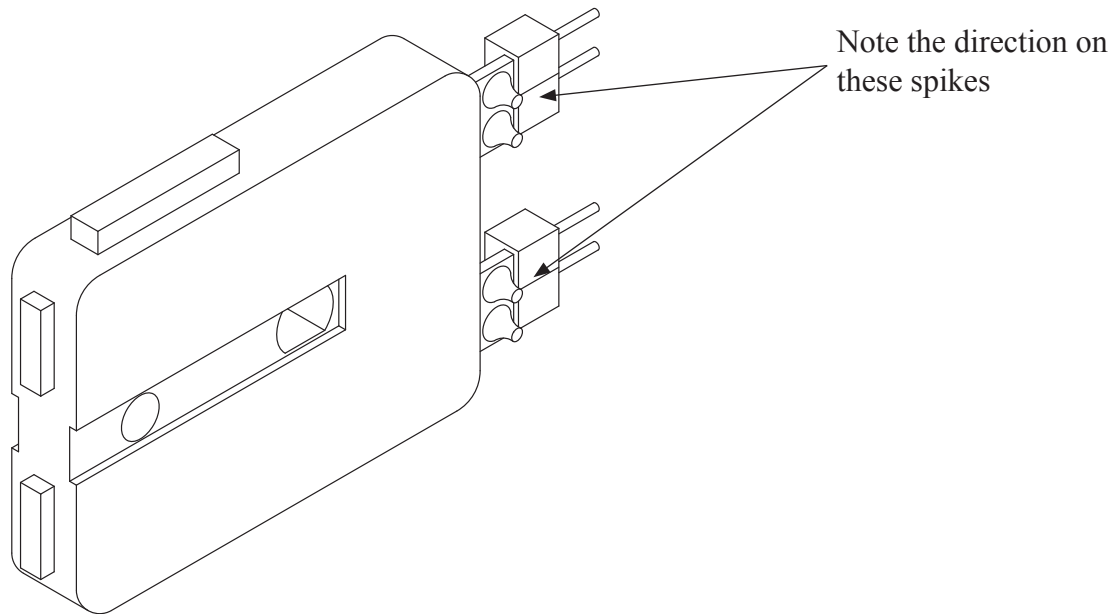
Step 2. Pull out the defect magnet with, e.g. a narrow pair of “needle nose” pliers.



Step 3. Check the magnets internal resistance if you have an ohm-meter available. The resistance should be from 185 ohm up to 240 ohm. Any value outside this range indicates a defective magnet.



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



4.6 Magnet rack, cleaning

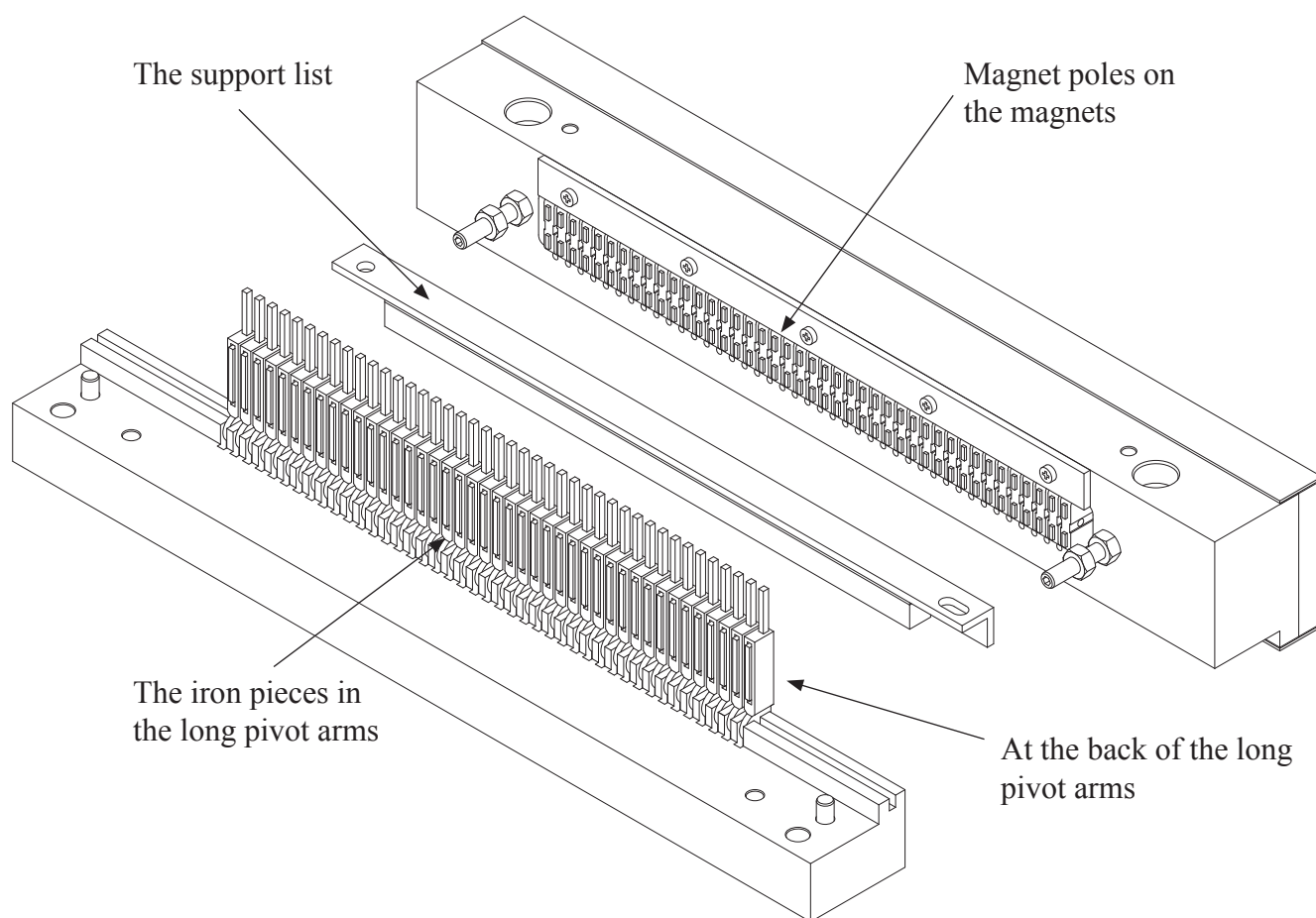
Remove the magnet rack as described in chapter 4.3 “Magnet rack, removal”.

Then disassemble the magnet rack as described in chapter 4.4 “Magnet rack disassembly, step by step”.

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



Note! Do not ever oil, grease or lubricate any of the moving parts on a magnet rack!
This will only attract paper dust.



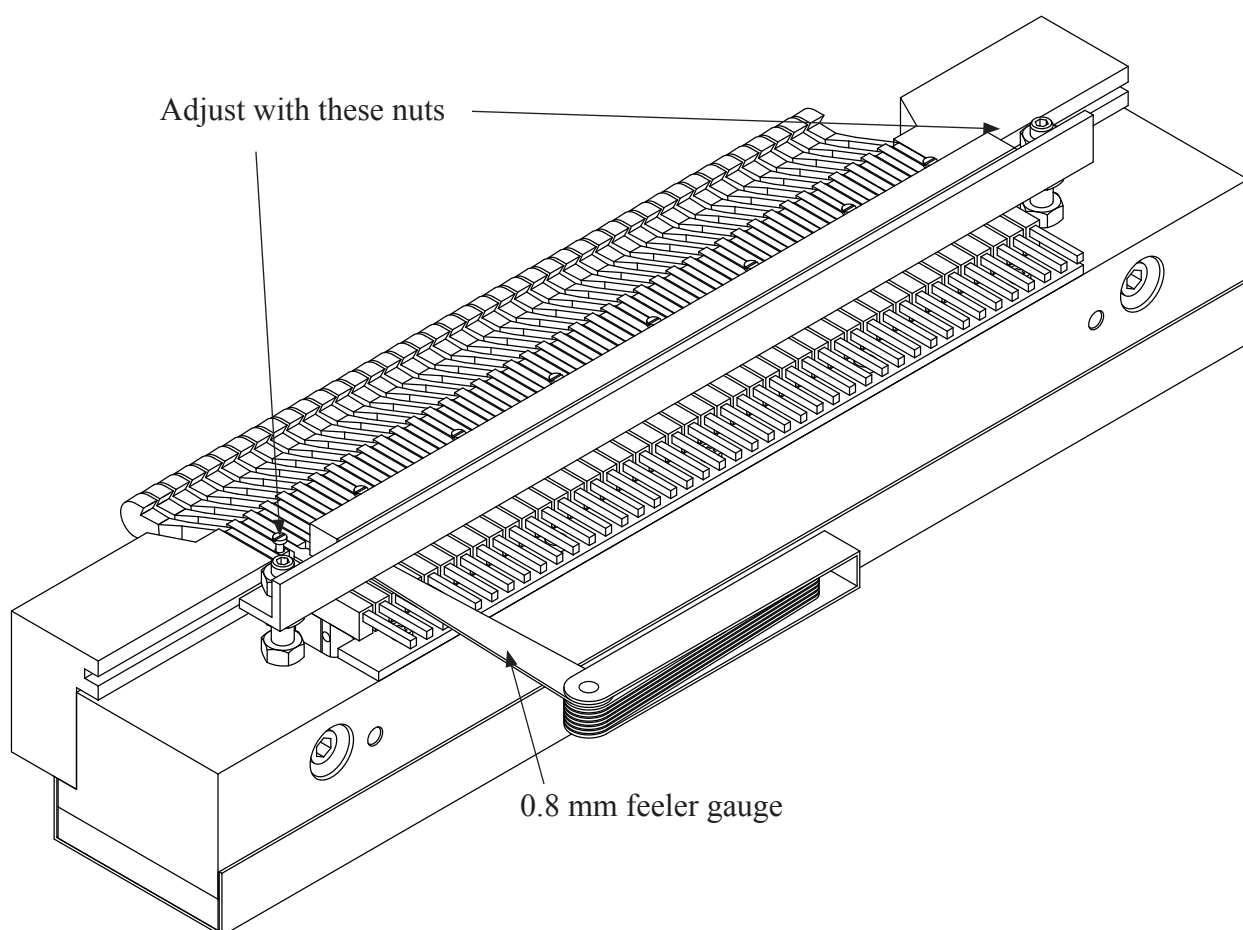
4.7 Magnet rack, adjustment

Before replacing the magnet rack in the printer, two adjustments must be checked.

The first one 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.

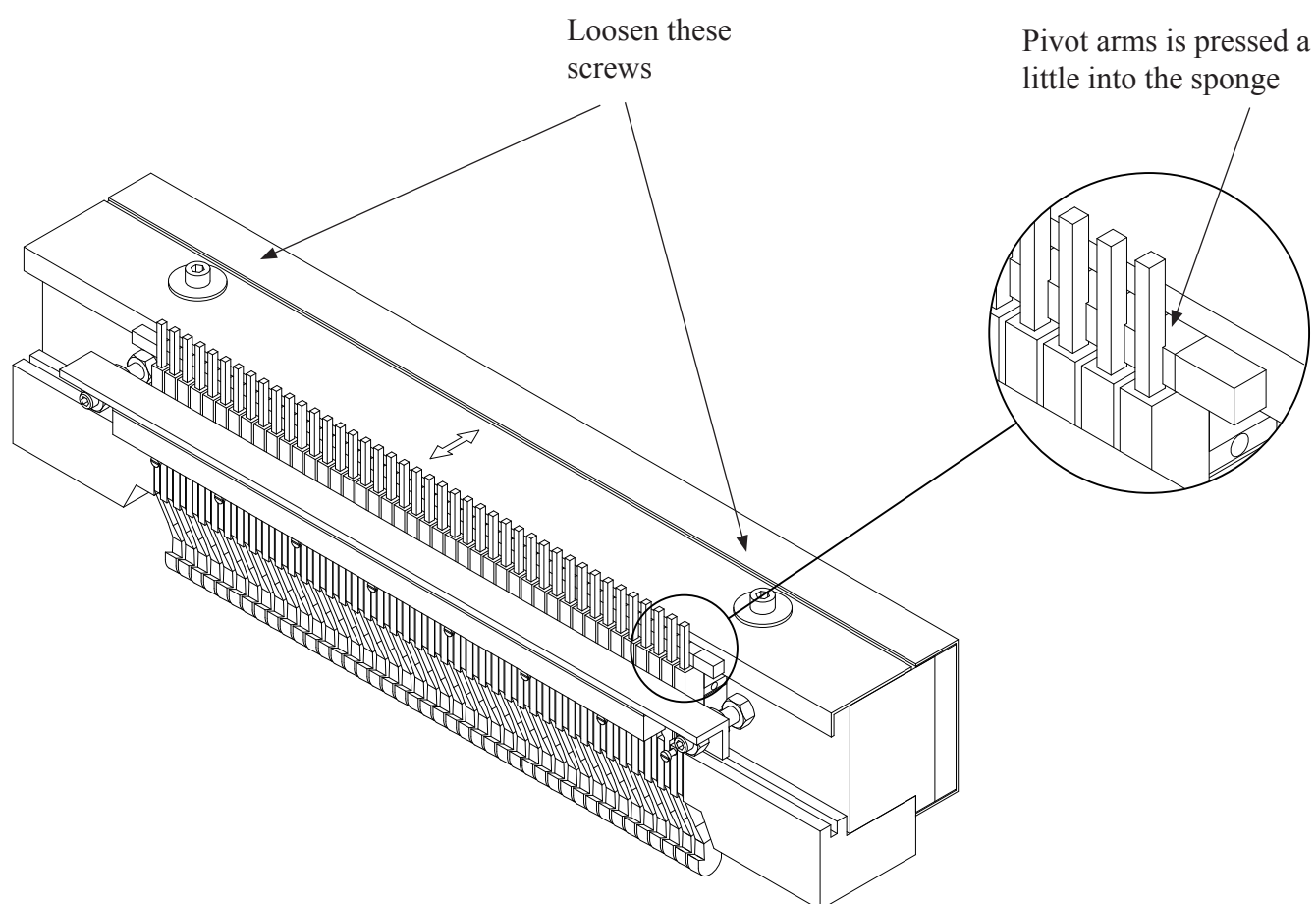
If the 0.8 mm feeler gauge goes in, and the 0.9 mm feeler gauge does not, consider the adjustment OK. Make sure that the nuts are tight when you are done!

Please see figure below:



The second adjustment is the pressure the sponge list exerts against the pivot arms. The sponge list works as a return spring for the pivot arms. The correct adjustment is when the sponge list is slightly pressing against the pivot arms, but the pivot arms can still move freely.

Please see figure below:



4.8 Magnet rack, refitting and adjusting

Please see figure below:

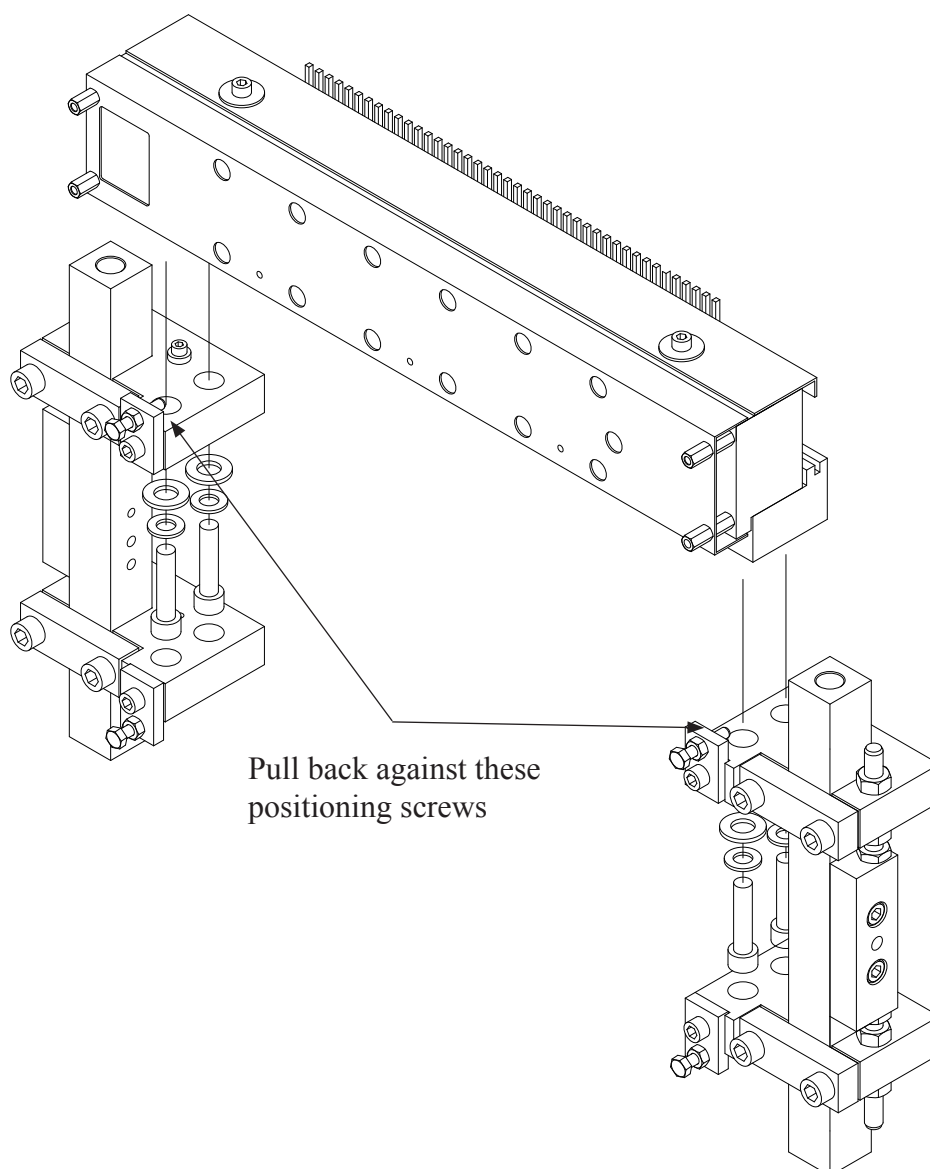
Before putting the magnet rack back on the printer, make sure that the magnet rack itself is adjusted as described in the previous chapter.

When replacing 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 exactly the same position as before it was taken off the printer.

See next chapter regarding correct adjustment of the magnet racks.

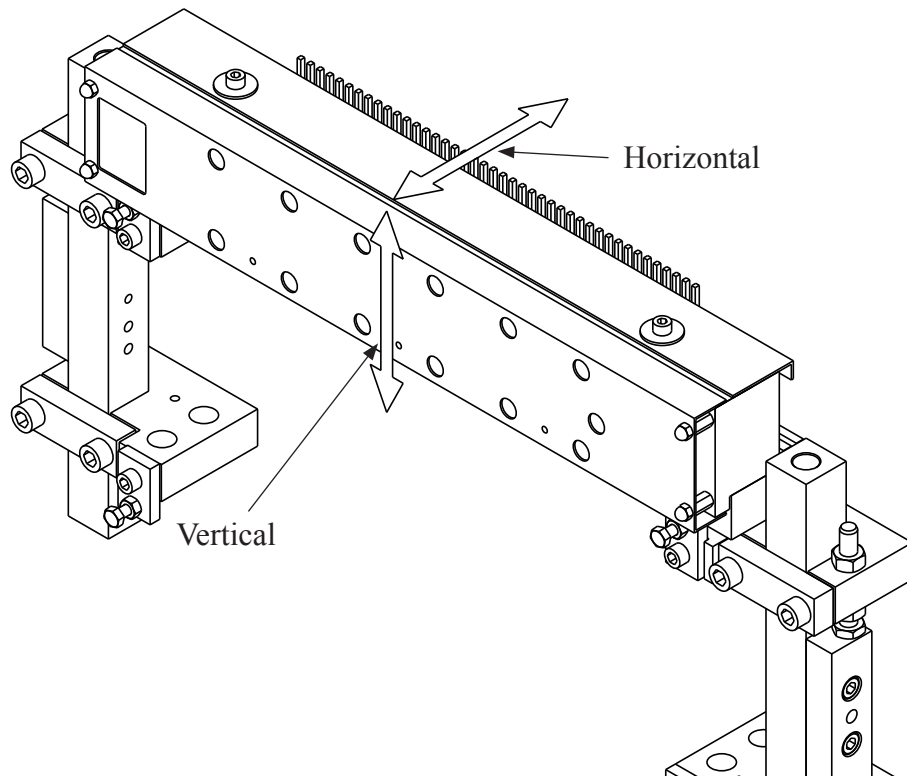
Note! All explanations refer to one magnet rack, but these adjustments must be done on all four magnet racks.



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.

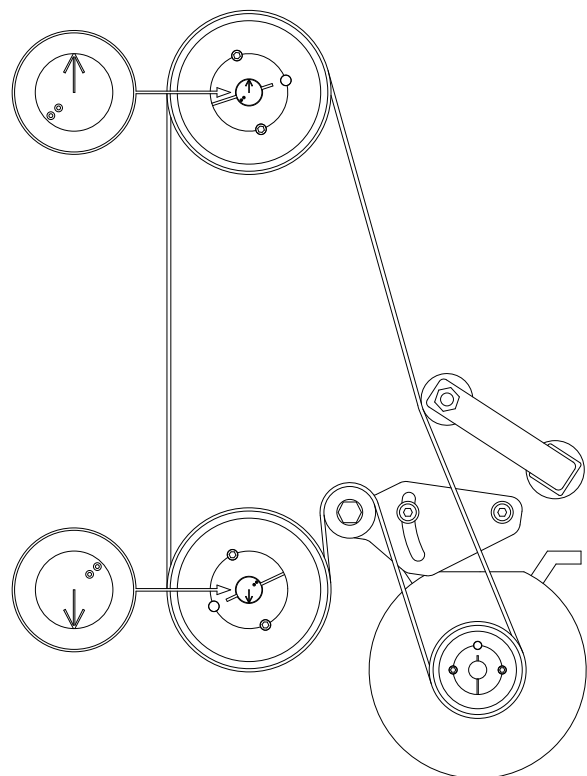
Then the vertical adjustment is done. This adjustment will affect the pressure the pivot arms put on the printing pins. This directly affects the shape of the printed dots.



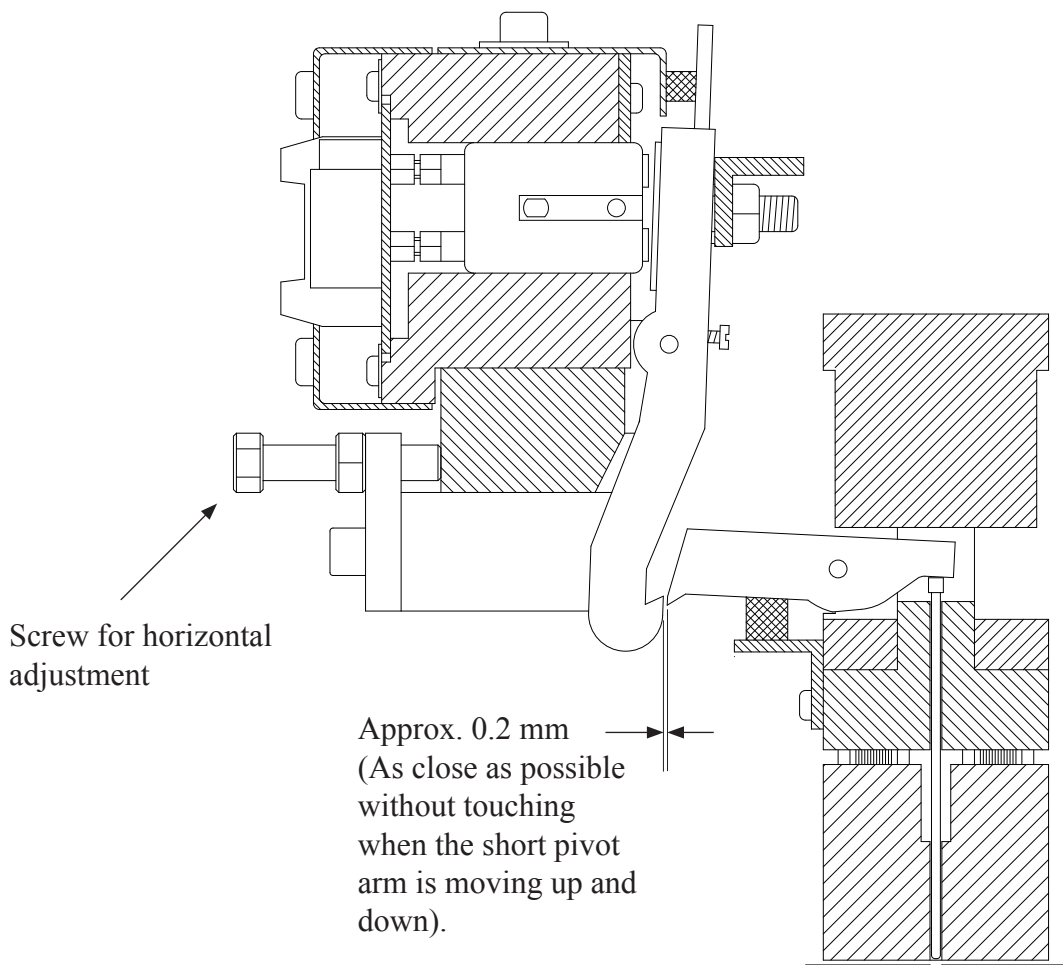
To be able to adjust the magnet rack correctly, it is necessary to put the printer in “printing position”.

This is done by rotating the main belt by hand until the arrows at the ends of the shaft are pointing in the opposite direction of each other.

It is possible to get the mechanism to balance in this place, 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 approx. positioned like in the figure below:



The gap between the long and the short pivot arm should be approx. 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:

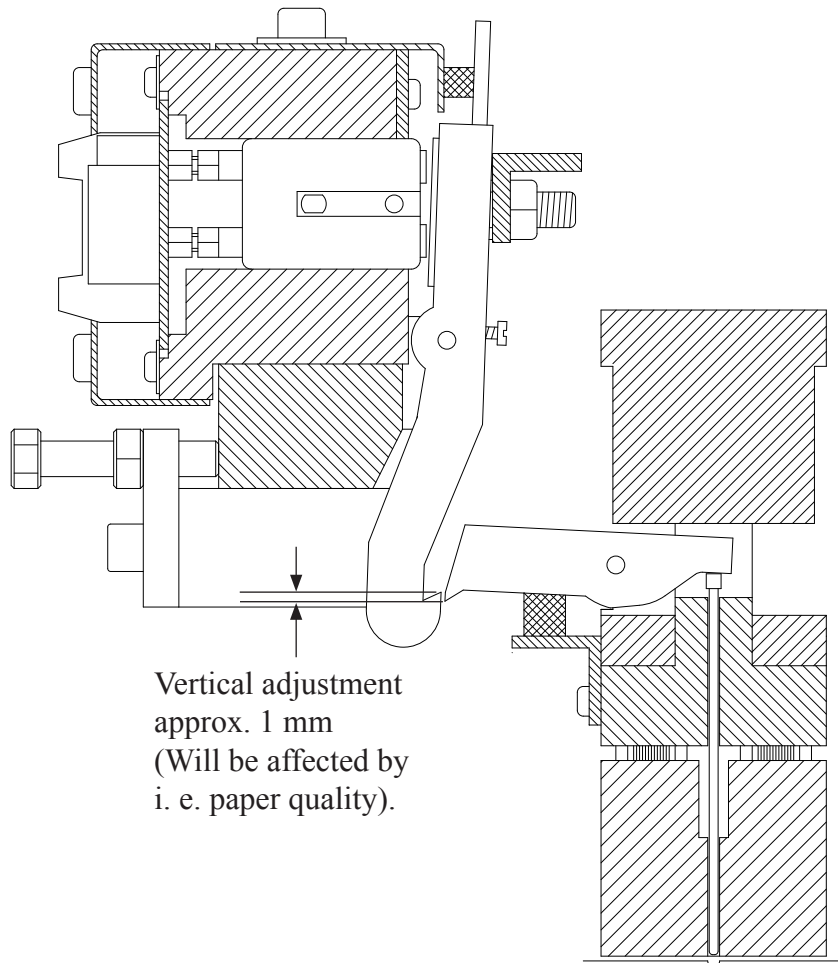
Observe that the screw for horizontal adjustment will not pull the magnet rack outwards, they will only push inward.

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.



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

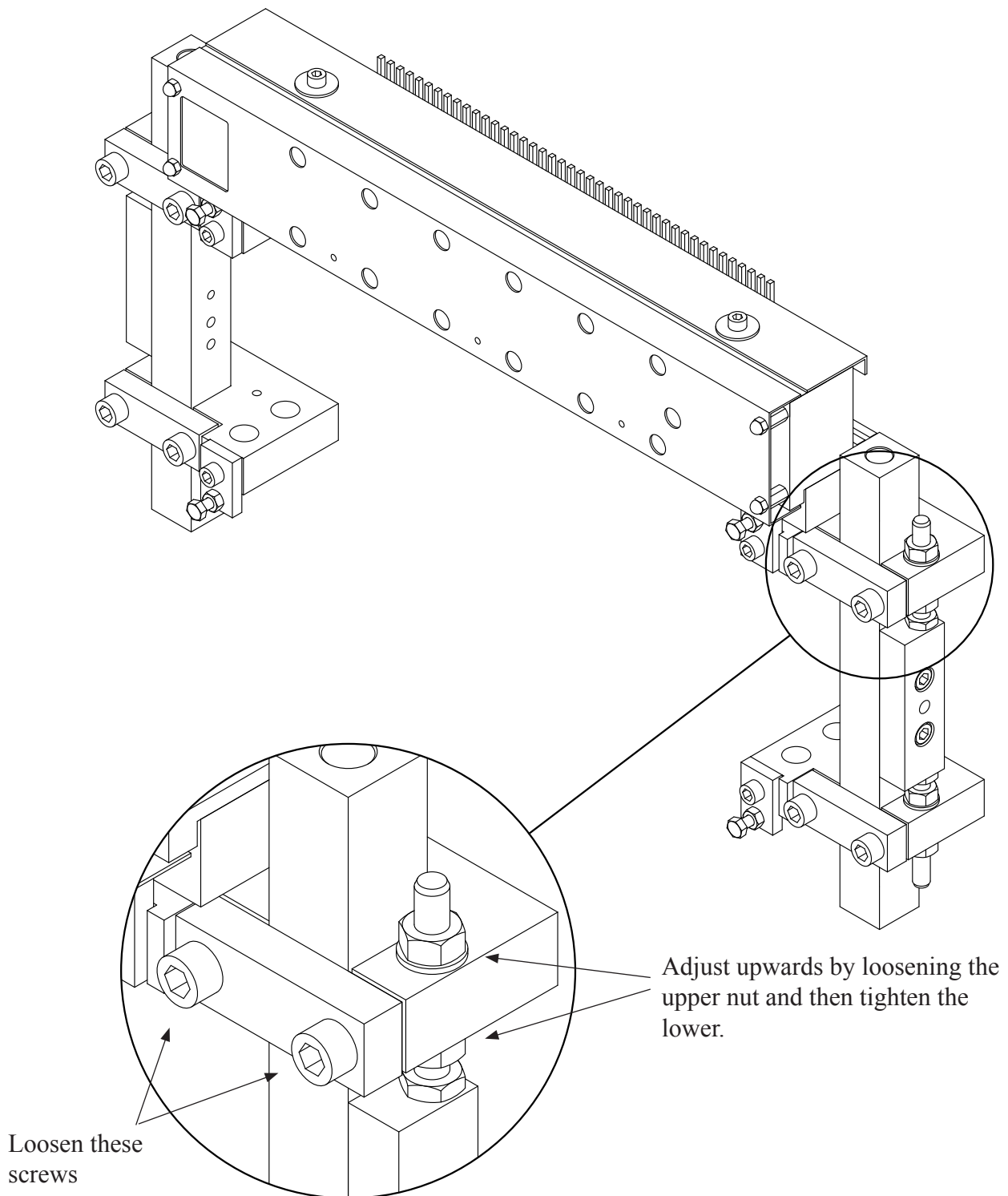
The amount of pressure needed depend on several things. The first (and most important) is the paper quality. The second, is the personal pretences of dot quality.

So the best way to find the correct level of vertical adjustment, is to first decrease the pressure so the dots will be very faded and weak.

Then readjust the pressure up in small steps until the dot quality is satisfactory. By doing this you can make sure that you are running the printer with just enough pressure to make good dots, but not so much pressure that the printer will be worn/damaged.

From our experience we have found that the vertical adjustment should be approx. 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:

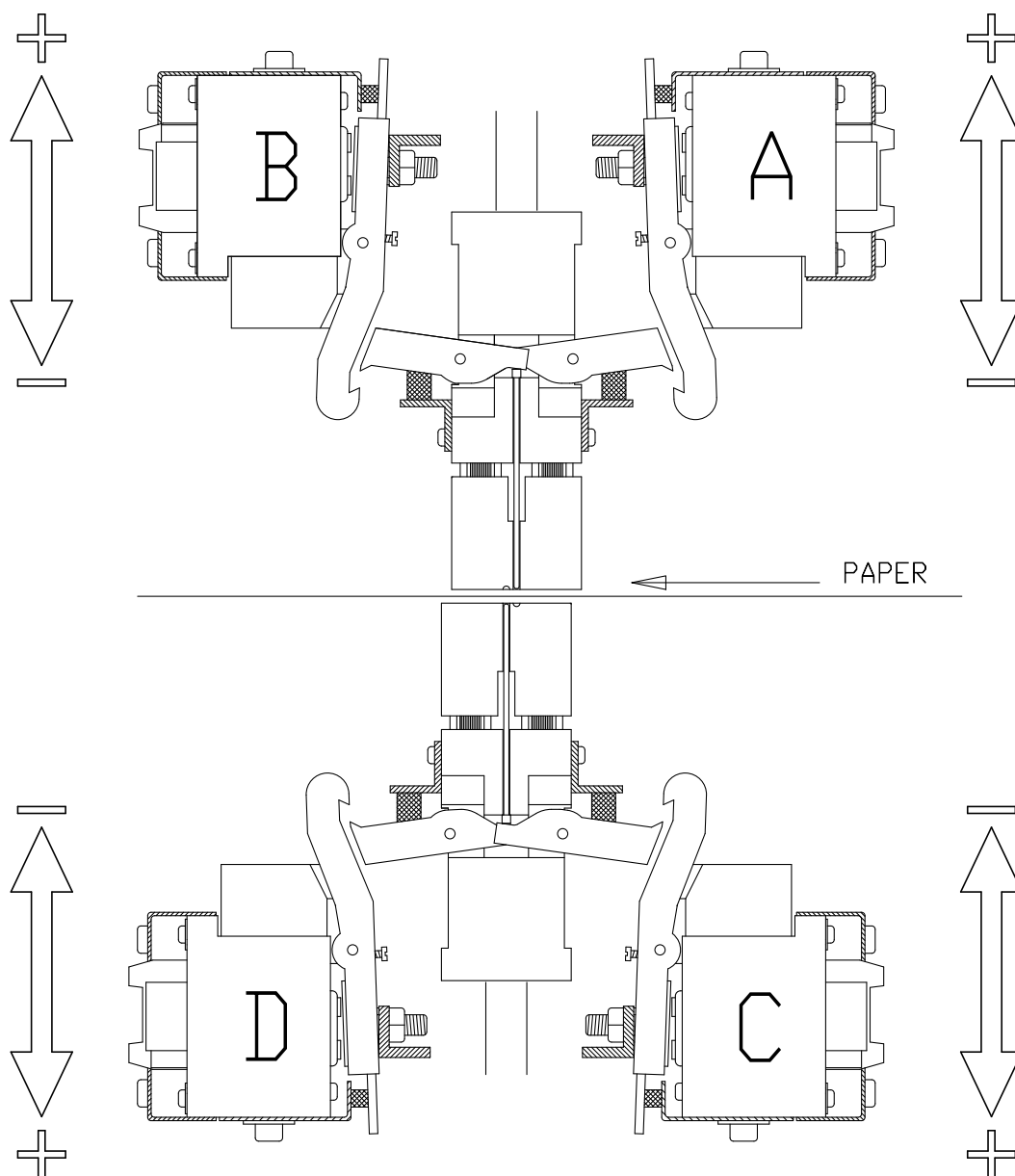


Note! Adjust in small steps, **only 1/4 of a revolution at a time**. Then test the braille quality.



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).



4.9 Beam and Paper shoes, overview

Please see the figures below:

Upper Beam

Beam and paper shoe
assembled

Upper Paper shoe

Compression
springs (red)

Plastic shims

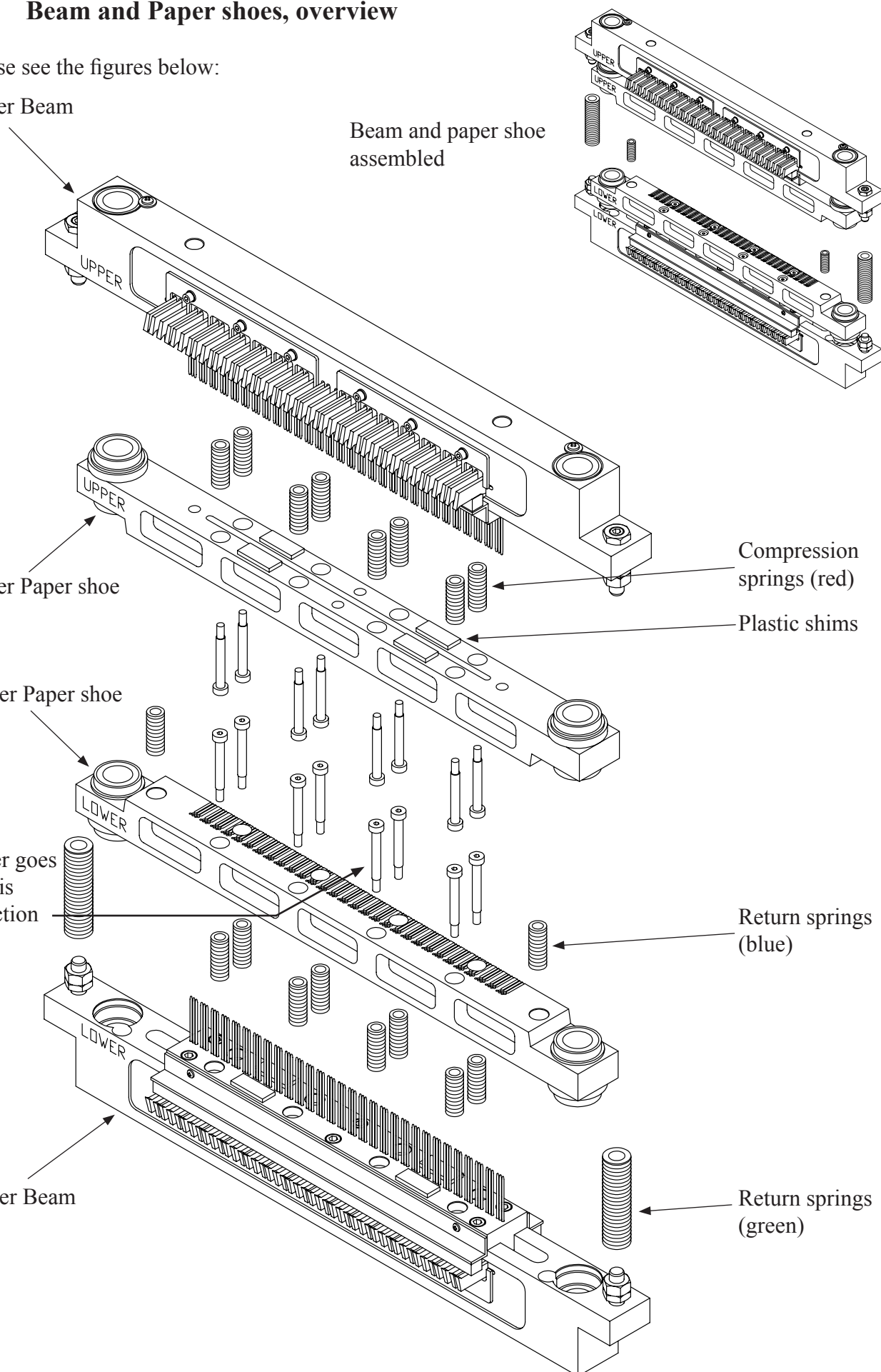
Lower Paper shoe

Paper goes
in this
direction

Return springs
(blue)

Lower Beam

Return springs
(green)

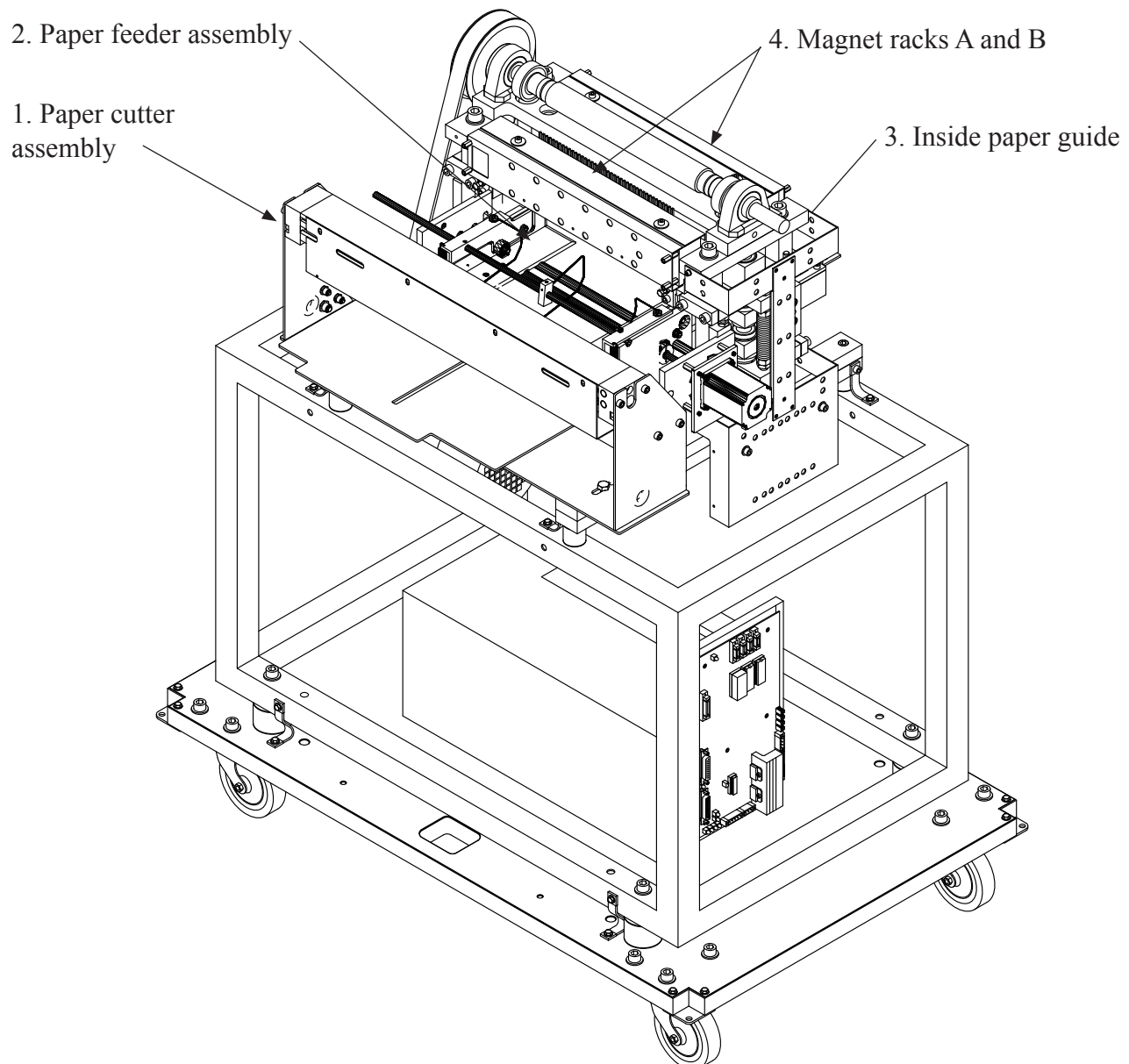
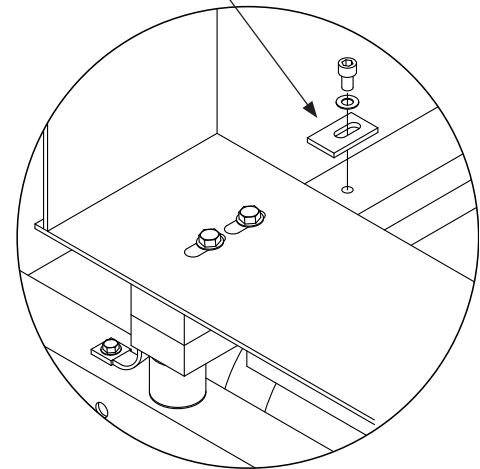


4.10 Beam and Paper shoes, removal and refitting

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

1. Before removing the paper cutter:
Make sure that the position on the cutter can be re-established by use of the position plates at the back of the cutter. Do this at both sides.
Remove the paper cutter assembly
2. Remove the paper feeder assembly
3. Remove the inside paper guide
4. Remove magnet rack A and B
5. Remove the belt
6. Remove the top frame

Position plate

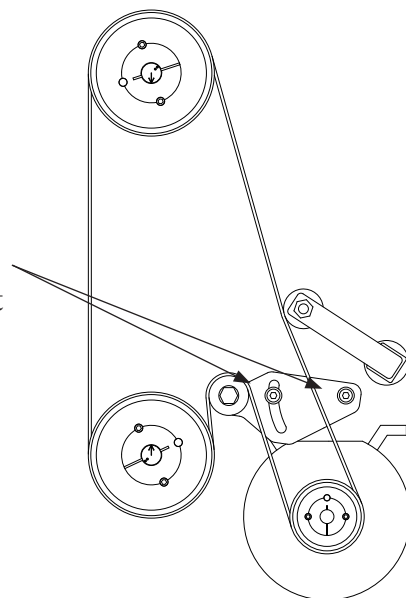


Beam and paper shoes, removal and refitting (continued)

5. Remove the belt.

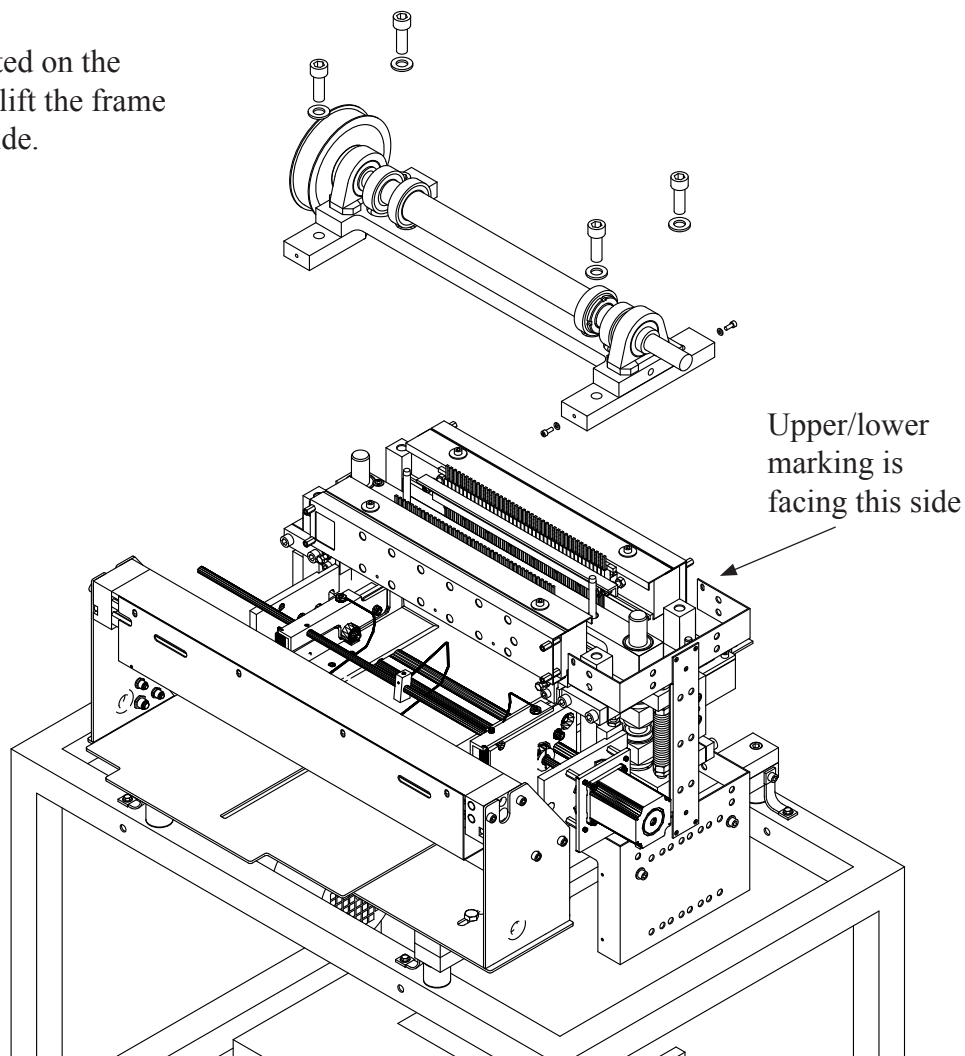
This is done by loosening the belt tensioner's screws. When this is done, the belt can be lifted off the upper cogwheel. Please see figure to the right.

Loosen these two screws to take off the belt



6. Remove the top frame.

Unscrew the bolts as indicated on the figure to the right, and then lift the frame carefully upwards. Place aside.

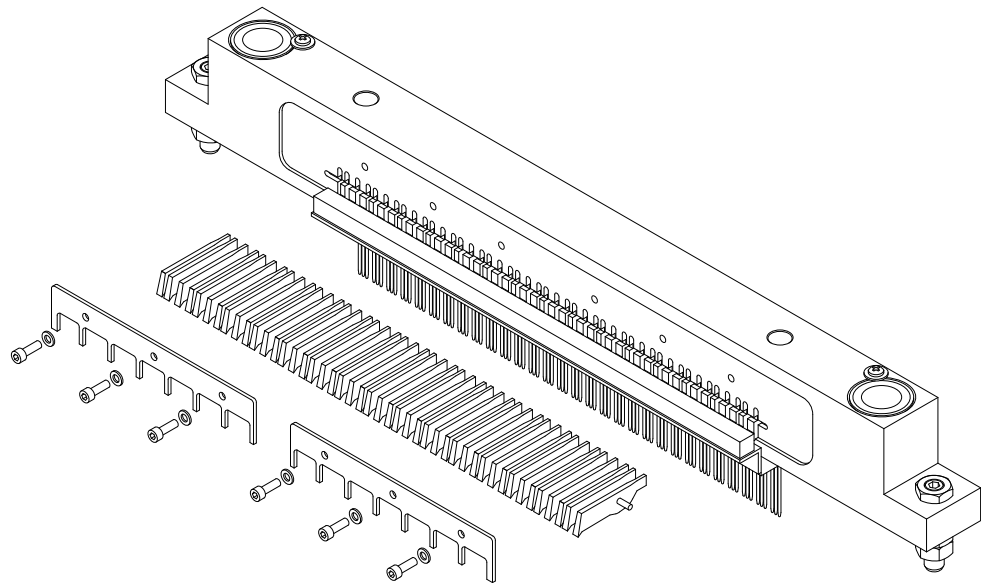


7. Now the beams and paper shoes can be lifted carefully upwards.
Assembly is done in the reverse order.

4.11 Beam, replacement of short pivot arm

Please see the figures below:

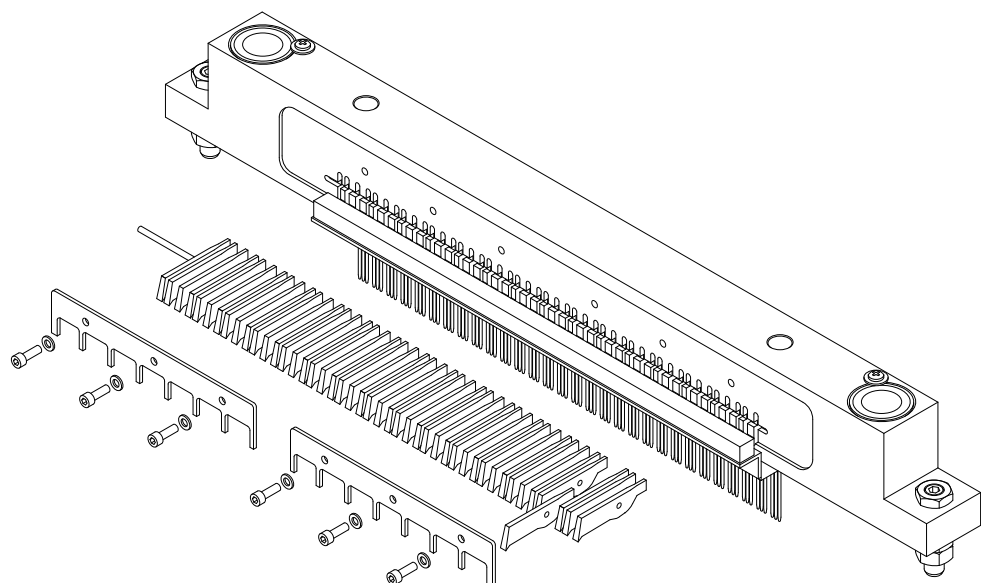
1. Remove the six screws as indicated on the figure. Pull out the short pivot arms, there are 45 pcs. on each side.



2. Pull out the shaft, and replace the short pivot arm(s).

Assembly is done in reverse order.

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



4.12 Beam, replacement of printing pin

Please see the figures below:

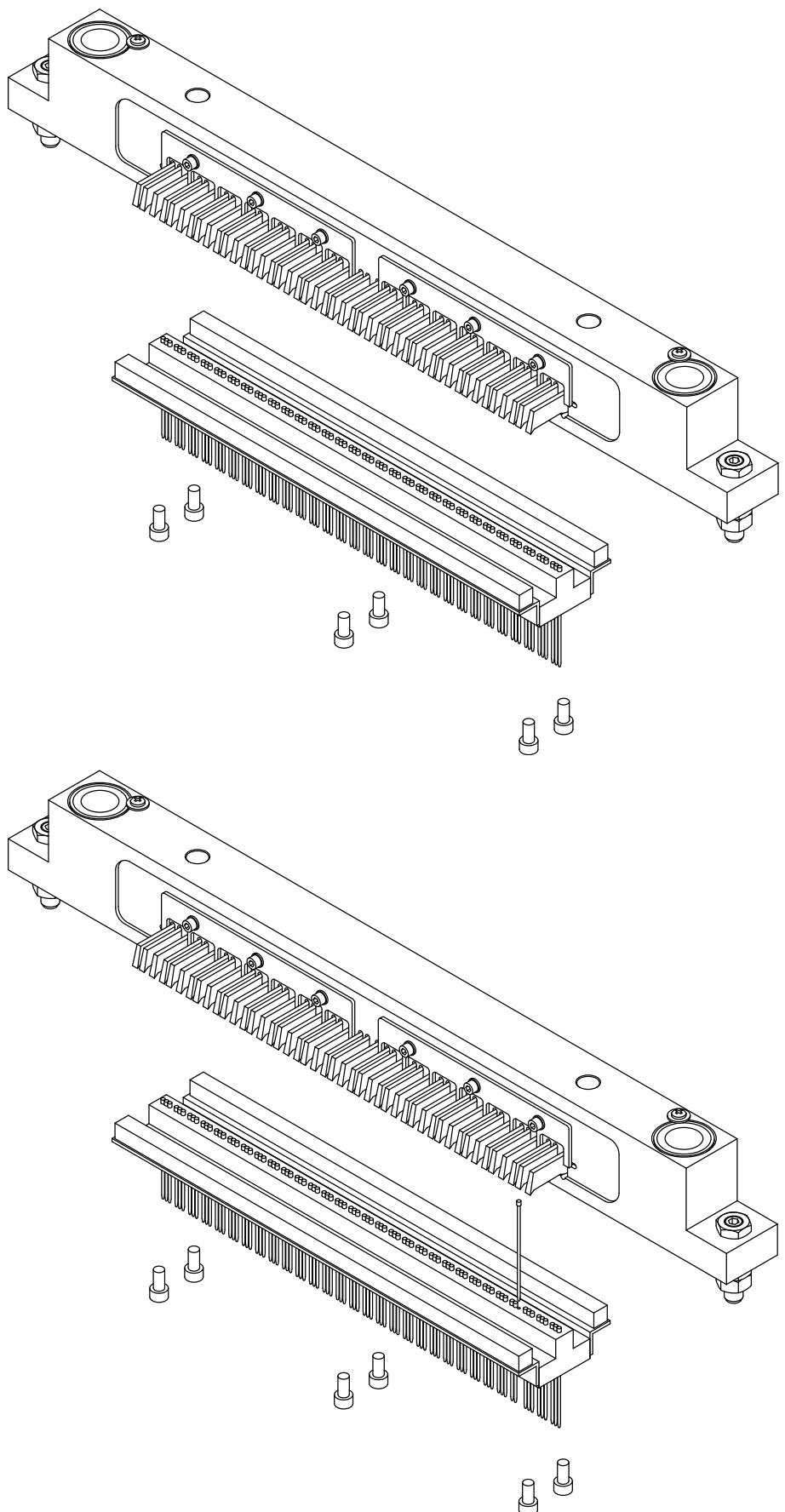
Remove the six screws as indicated in the figure.

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.



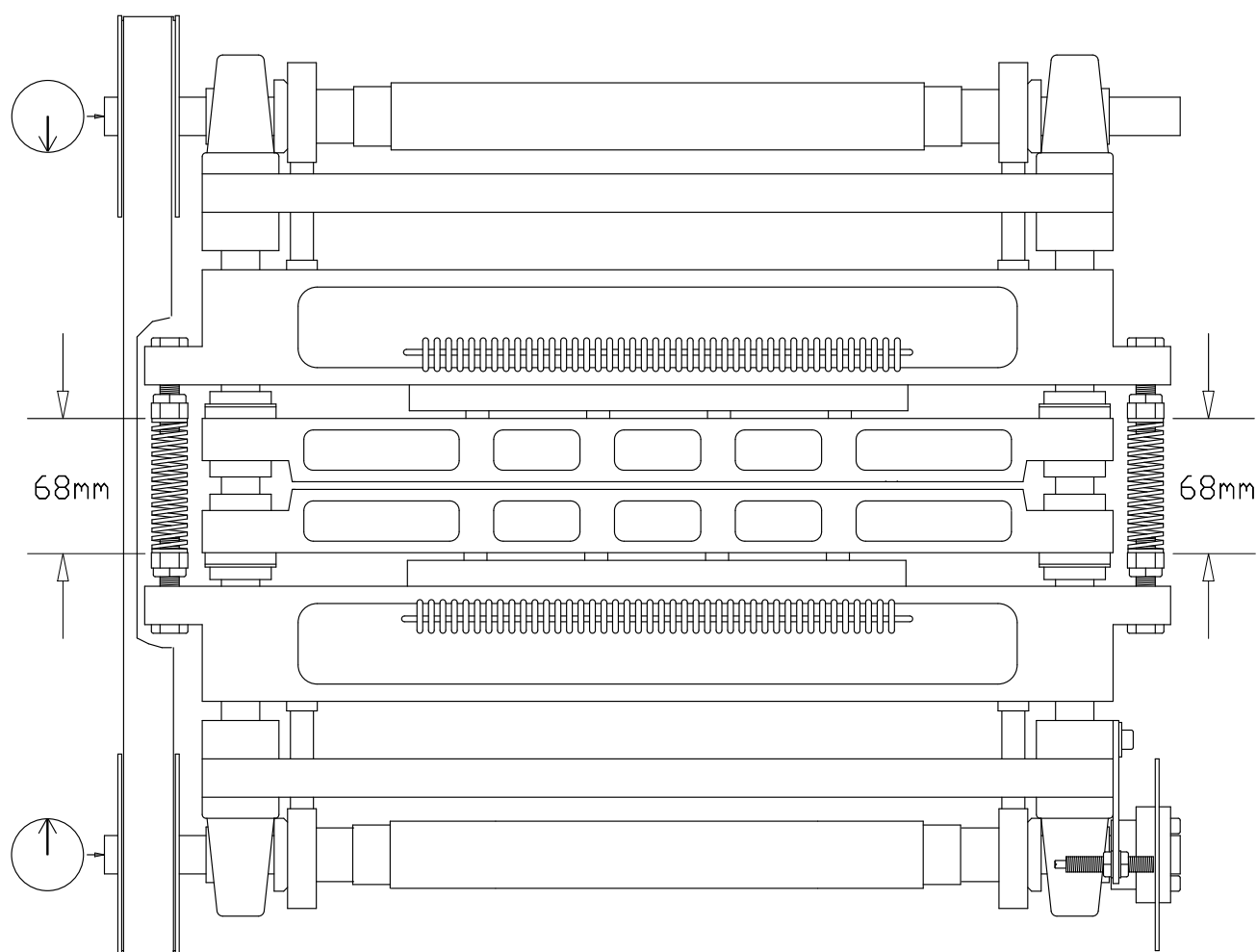
4.13 Return spring adjustment

Before performing this adjustment, make sure that the shafts are turned to the correct position. See the marks at the end of the shafts, the arrows must point directly towards each other, like in the figure below.

Then the springs can be adjusted to the correct length, i.e. 68 mm.



Note! It is critically that the length on these two return springs is 68 mm !

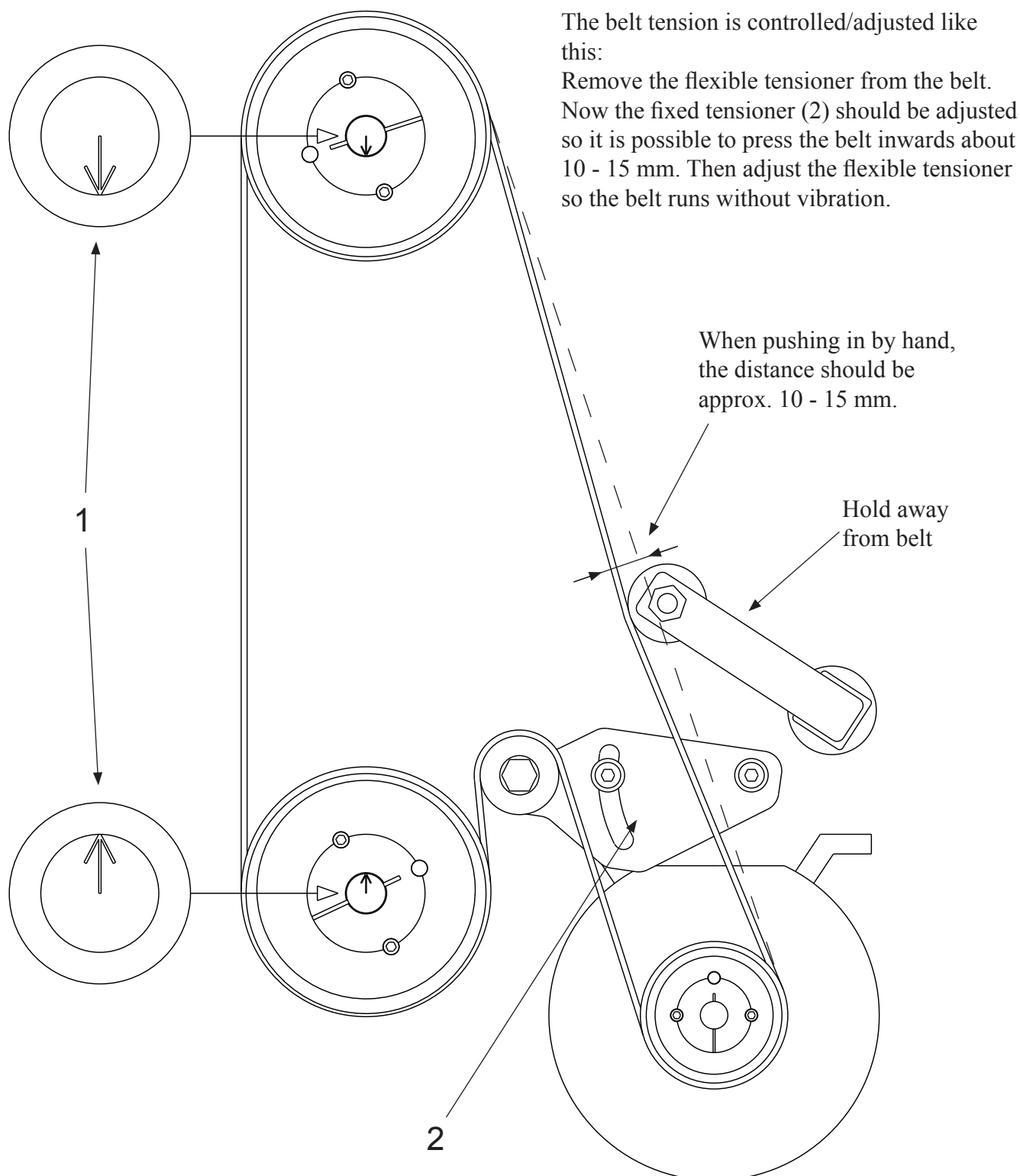


4.14 Eccentrics adjustment, belt tension

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

Put the belt back on, tighten it with the belt tensioner (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 tensioner (2) again, and then lift the belt up from the big wheel and move it a notch on the wheel. Then tighten the belt.



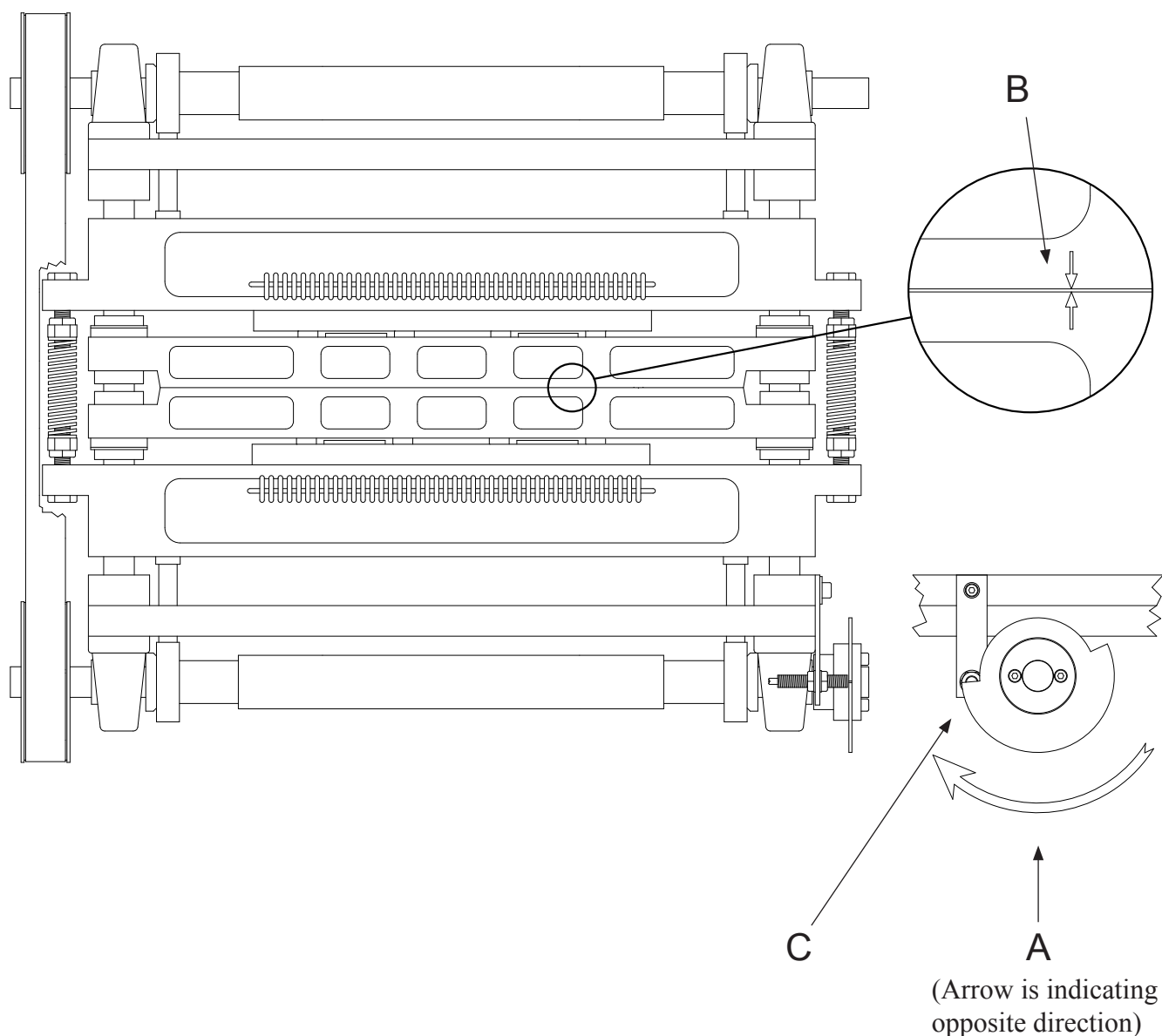
4.15 Main sensor wheel, adjustment

The main sensor wheel is placed on the lower shaft, on the opposite end from the belt. Turn the belt in the **opposite** direction of normal rotation (see (A) on the figure below), until the papershoes just meet (see (B) on the figure below). Do not press !

The edge on the timing wheel should now be placed exactly like position (C) in the figure below.

If the edge is not in it's correct position, it must be adjusted.

Keep the shafts in this position while loosen the two screws holding the timing wheel. Turn the timing wheel until the edge on the wheel is placed in the middle of inductive sensor. Then fasten the two screws again.

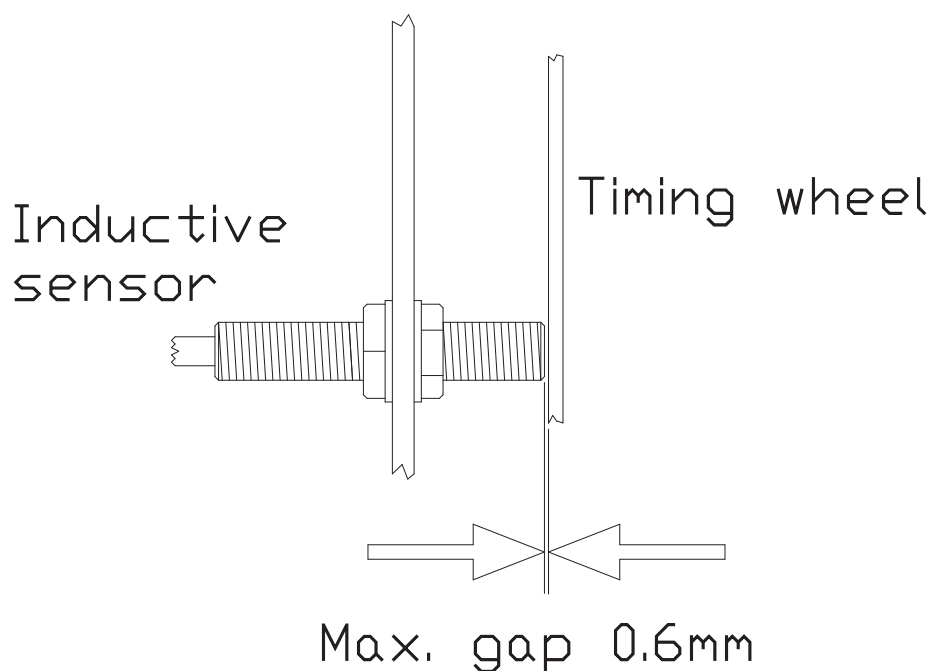


4.16 Inductive sensors, adjustment

This printer uses inductive sensors in three places. One for the main timing wheel on the lower shaft, and two are controlling the movement of 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. The light comes out through some transparent plastic around the cable. 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. See figure below.



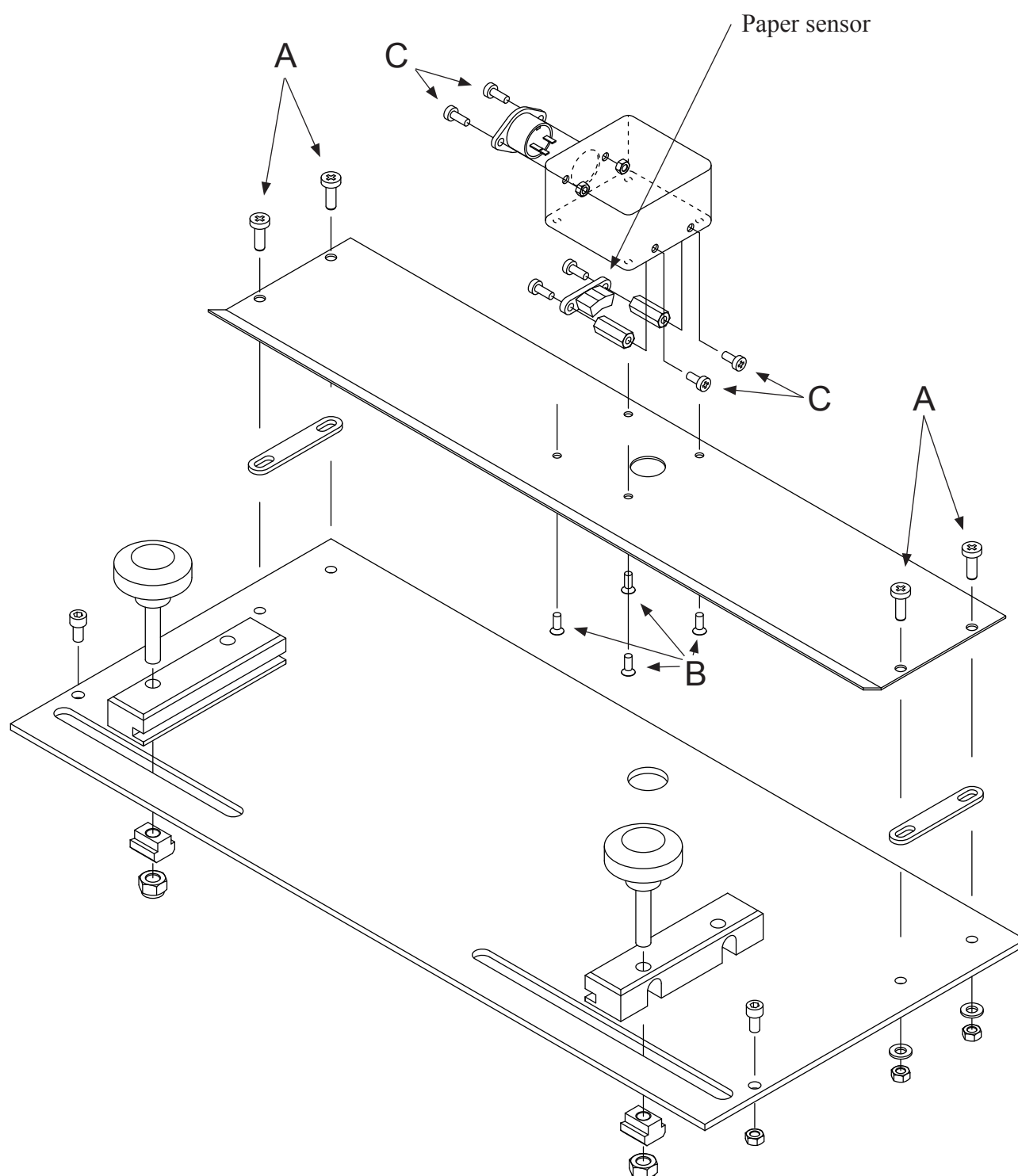
4.17 Paper sensor, replacing

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 functions like this: A little infrared lamp is sending light downward. If there is paper present, the light will be reflected back, and detected by a photo transistor. If the sensor is defective, it must be replaced. It can be done like this:

Take the paper guide out of the printer. Unscrew first the screws (A), then (B) and then (C). Now the sensor is loose. The assembly is done in reverse order.



4.18 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.

Are the operator panel and display functioning and are power lamps illuminated?

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.

Drain the compressor tank and filter regulator.

Every 500 hours or six months.

Everything 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.

Clean the magnet racks.

Check the sponges for the long pivot arms on the four magnet racks, the sponge 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 1000 hours or twelve months.

Everything of the 500 hours or six months maintenance.

Check the 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 tear and wear on the piston (12 x 56). This can be measured with a calliper, and the length must be between 55.90 to 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 papershoes could be the reason.

Check the length on the printing pin. This can be measured with a calliper, and the length must be between 64.50 to 64.40 mm.

Check the sharpness on the knives on the paper cutter. Replace if necessary.

Lubricate all the stroke ball bearings, using a universal grease with molybdensulfid.

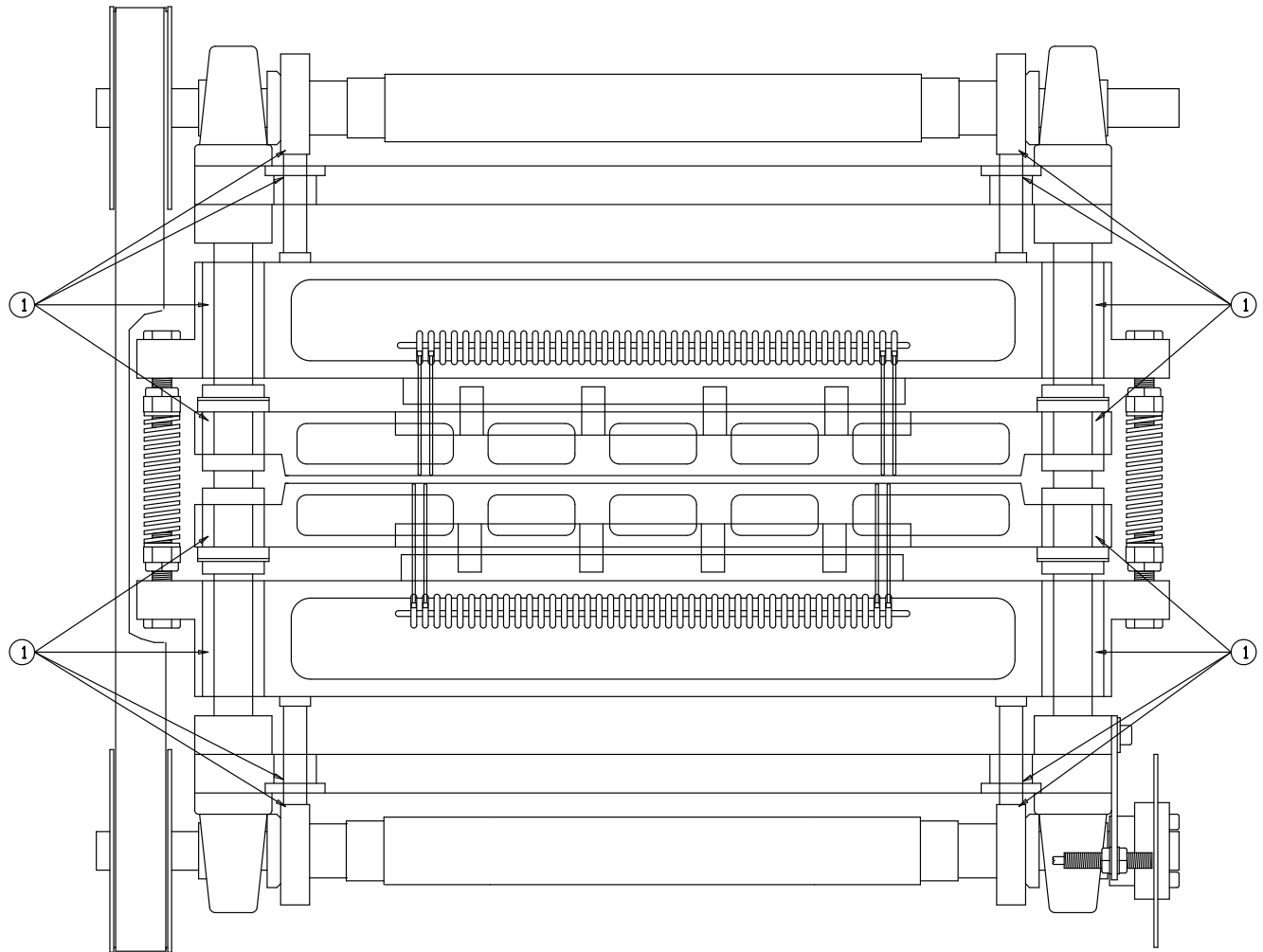
Lubrication should be done as described in figure on the next page.

Lubrication

This should be done every 1000 running hours, or approx. once a year.

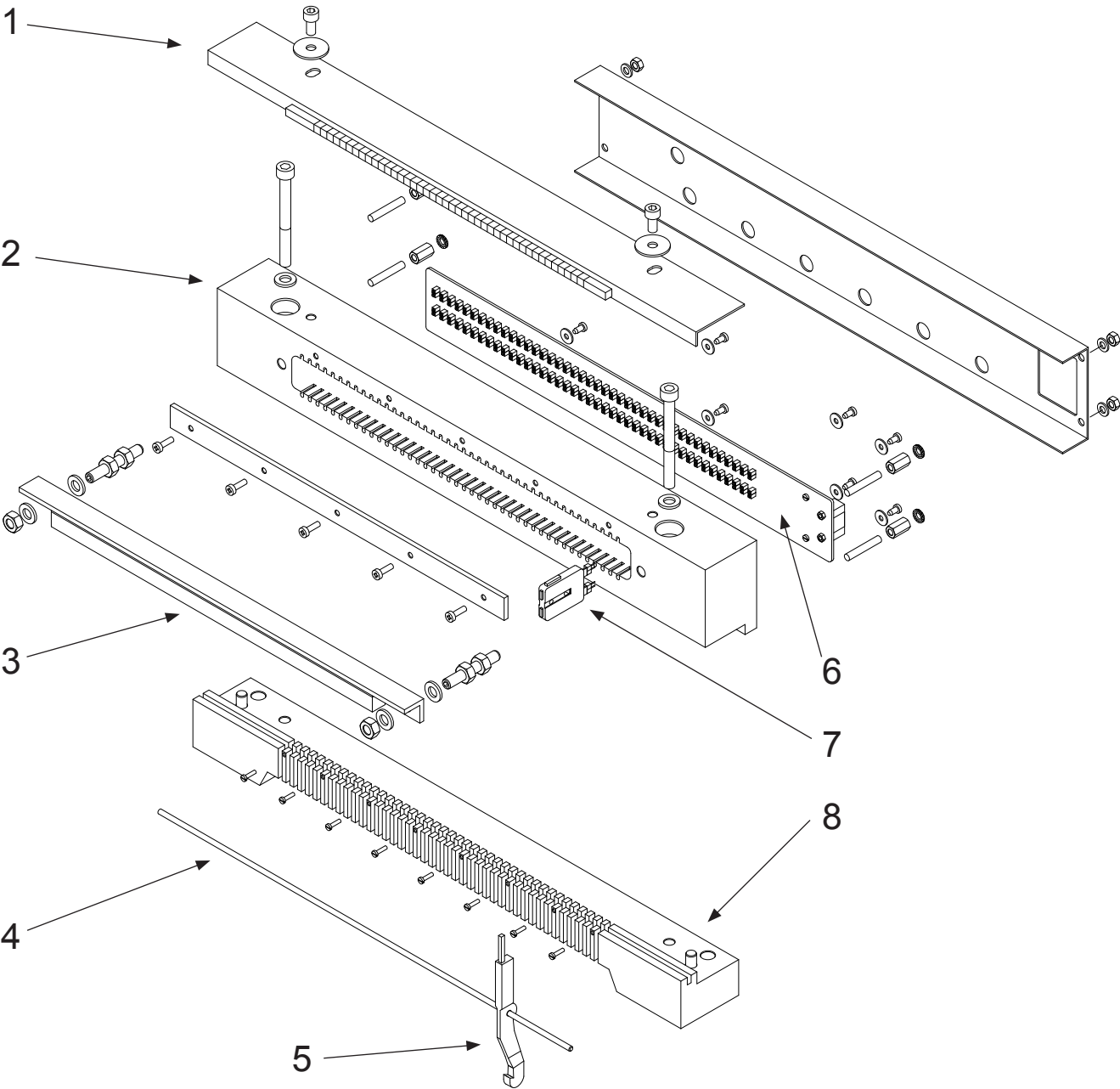
Lubricate all items marked “1” on the figure below. (These are the only locations in the printer grease may be applied!).

Use a universal grease with molybdensulfid.



5. PARTS - EXPLODED VIEWS

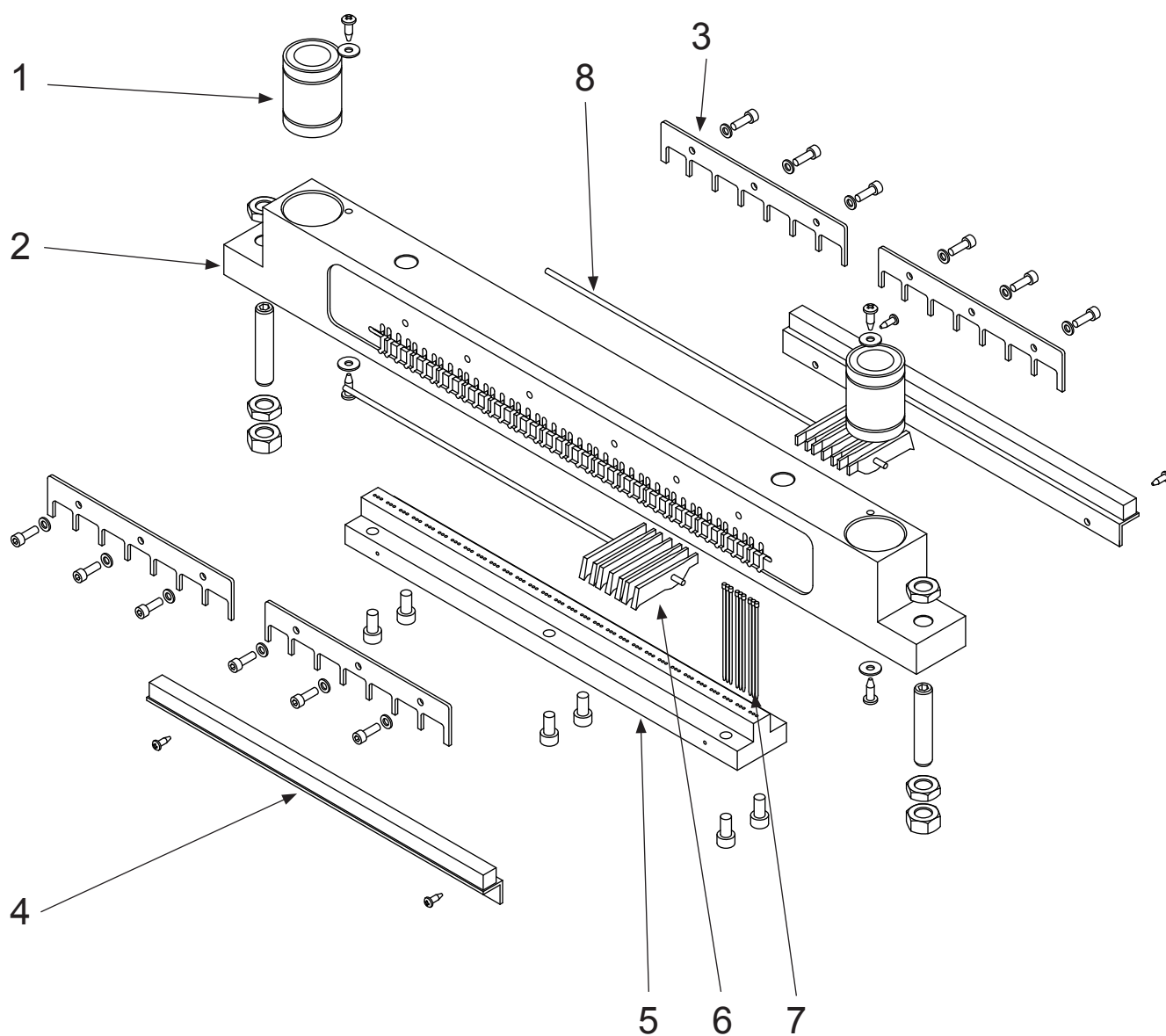
5.1 Magnet rack



Parts magnet rack

Pos.	Name	Quantity per. rack
1	Sponge list, magnet rack	1
2	Magnet rack	1
3	Support list, magnet rack	1
4	Shaft, long pivot arm.....	1
5	Pivot arm, long.....	45
6	Electronic board, magnet rack	1
7	Magnet	45
8	Guide list, magnet rack	1

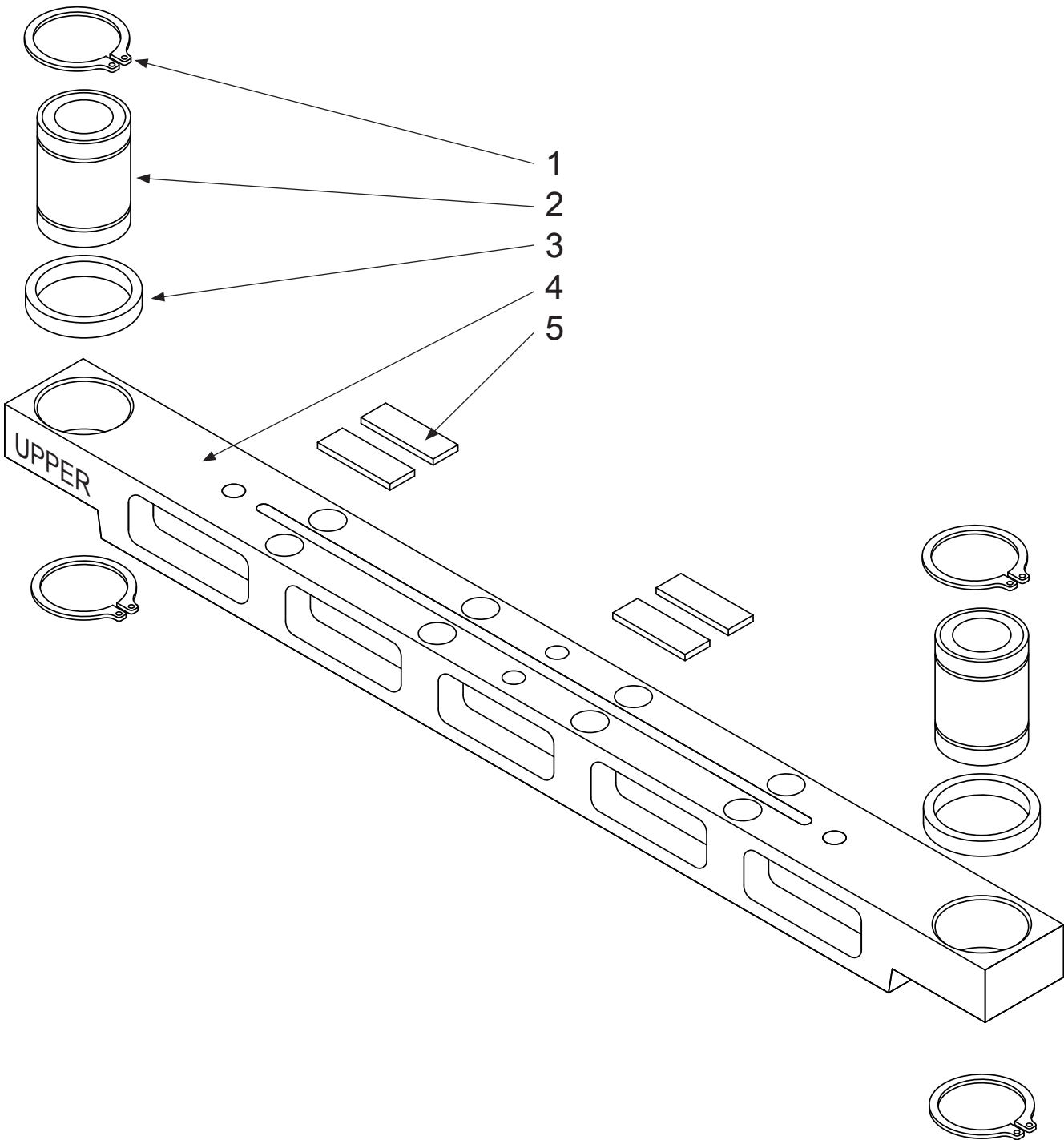
5.2 Beam



Parts beam (upper or lower)

Pos.	Name	Quantity per. beam
1	Stroke ball bearing Ø20	2
2	Beam, (upper or lower)	1
3	Fastener for shaft short pivot arm	4
4	Sponge list for short pivot arm	2
5	Pin guide	1
6	Short pivot arm	90
7	Printing pin	90
8	Shaft, short pivot arm Ø3x305	2

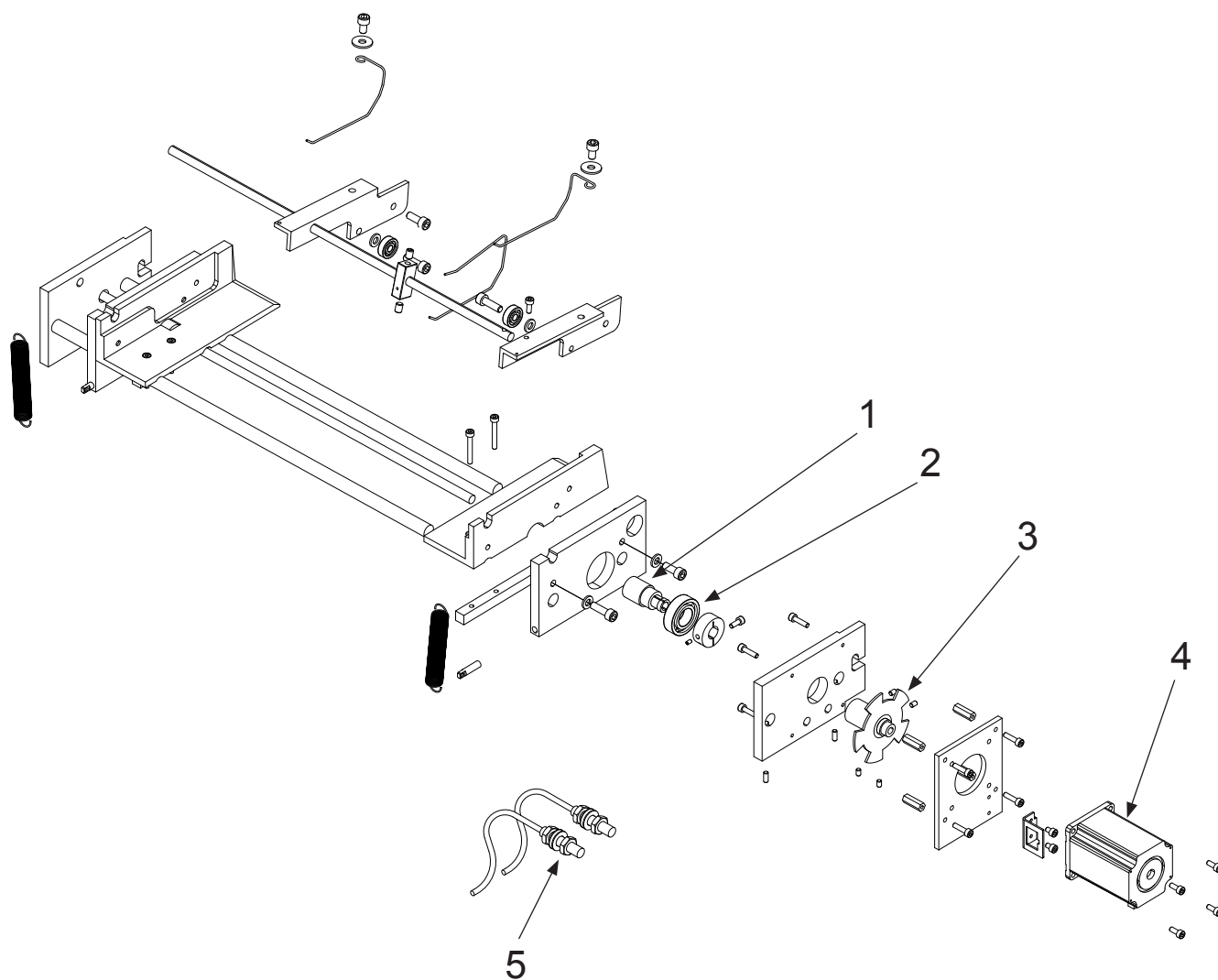
5.3 Paper shoe



Parts paper shoe (upper or lower)

Pos.	Name	Quantity per. shoe
1	Retaining ring	4
2	Stroke ball bearing Ø20	2
3	Spacer	2
4	Paper shoe (upper or lower)	1
5	Plastic shims	4

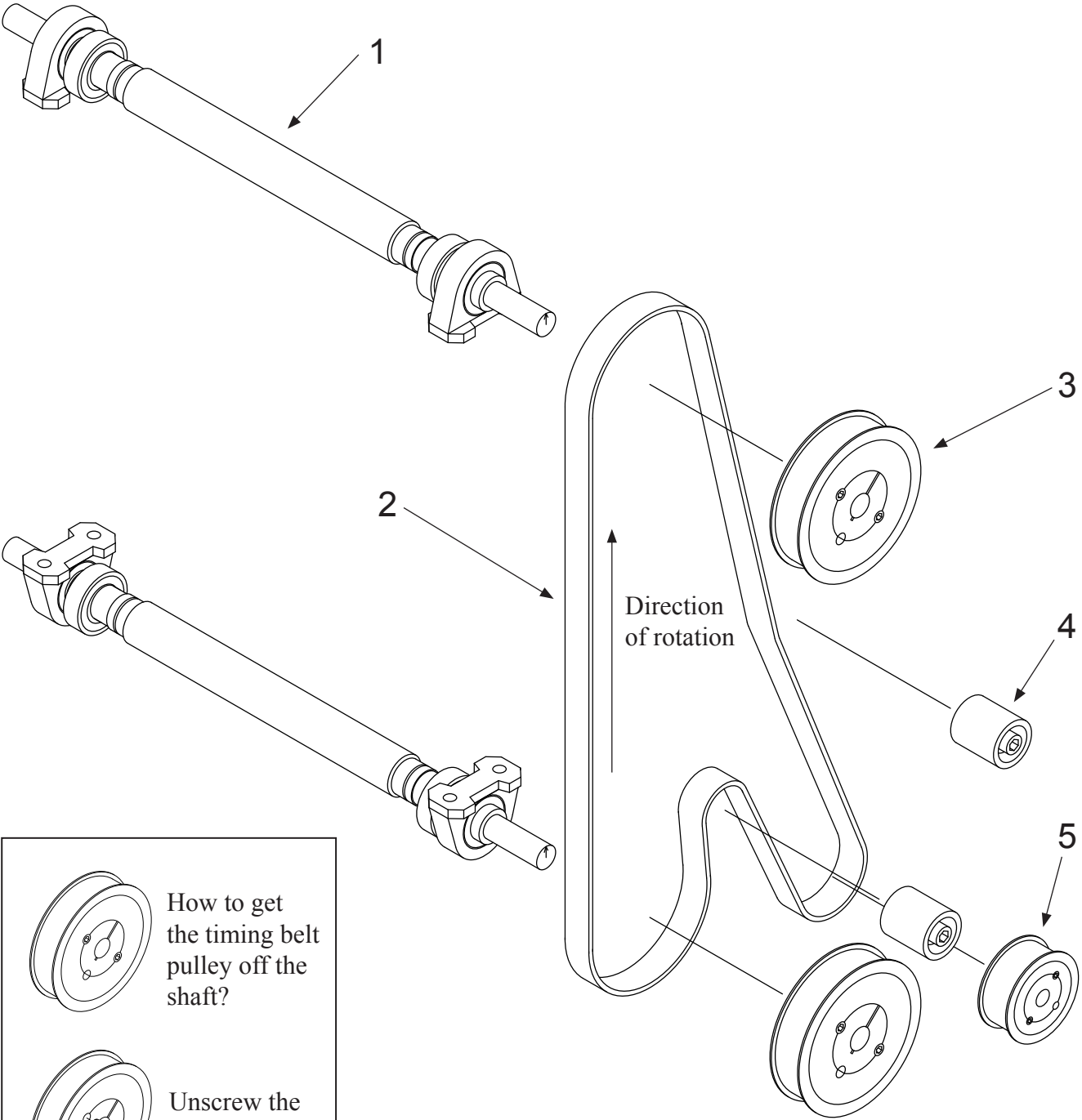
5.4 Paper feeder

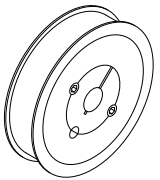


Parts paper feeder

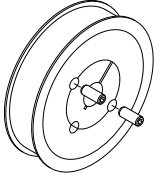
Pos.	Name	Quantity
1	Pulling wheel	2
2	Bearing 6003 2Z	2
3	Timing wheel	1
4	Stepping motor	1
5	Inductive sensor (no. 5 and 6).....	2

5.5 Shafts, belt

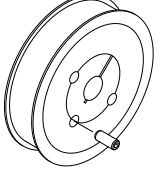




How to get the timing belt pulley off the shaft?



Unscrew the two screws.

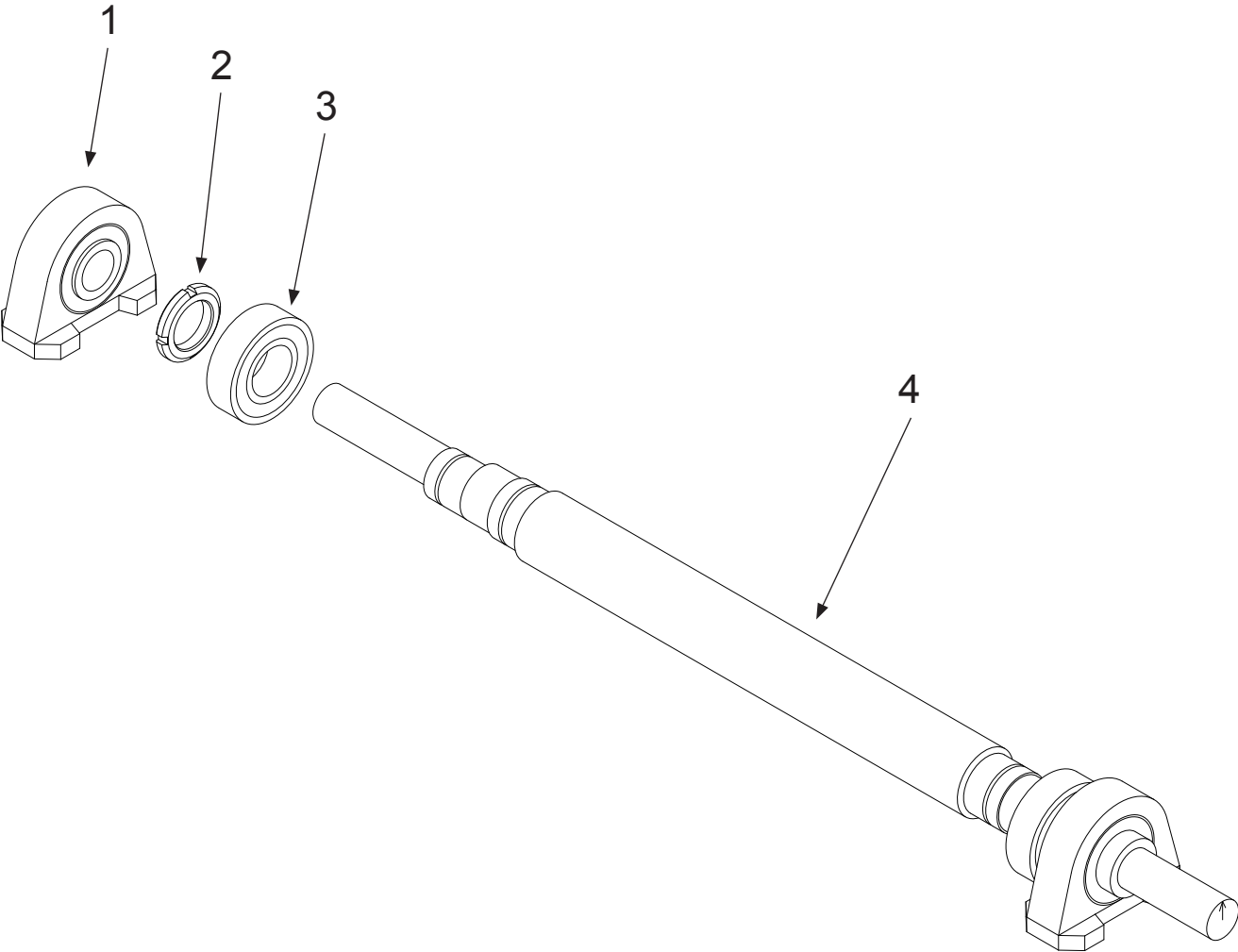


Place one of the screws in the third hole, and screw it inwards until the wheel is loose.

Parts shaft, belt

Pos.	Name	Quantity
1	Shaft	2
2	Belt 640 L.....	1
3	Timing belt pulley 40 L 100.....	2
4	Belt tensioner	2
5	Timing belt pulley 22 L 100.....	1

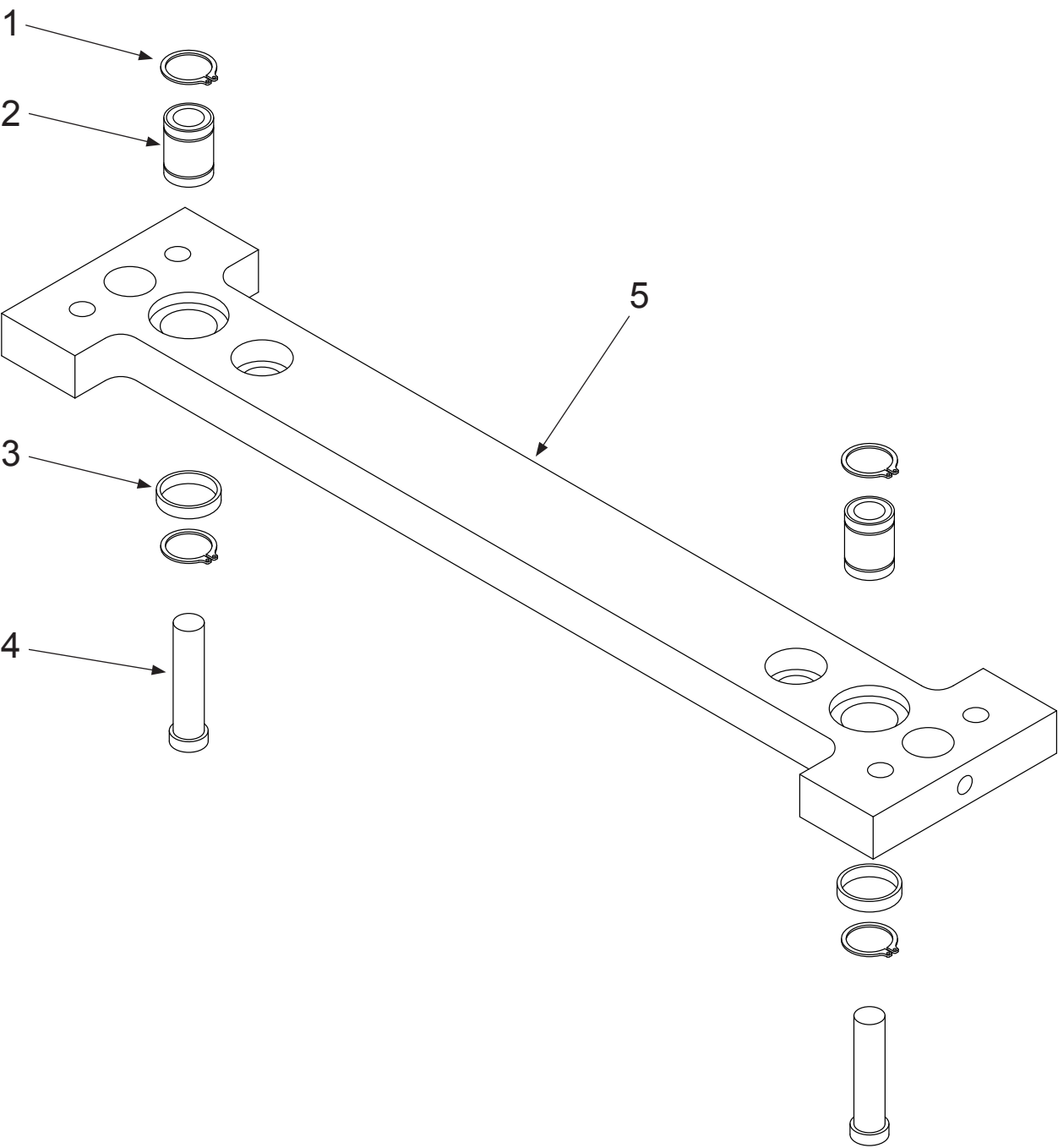
Shaft, exploded view



Parts shaft, exploded

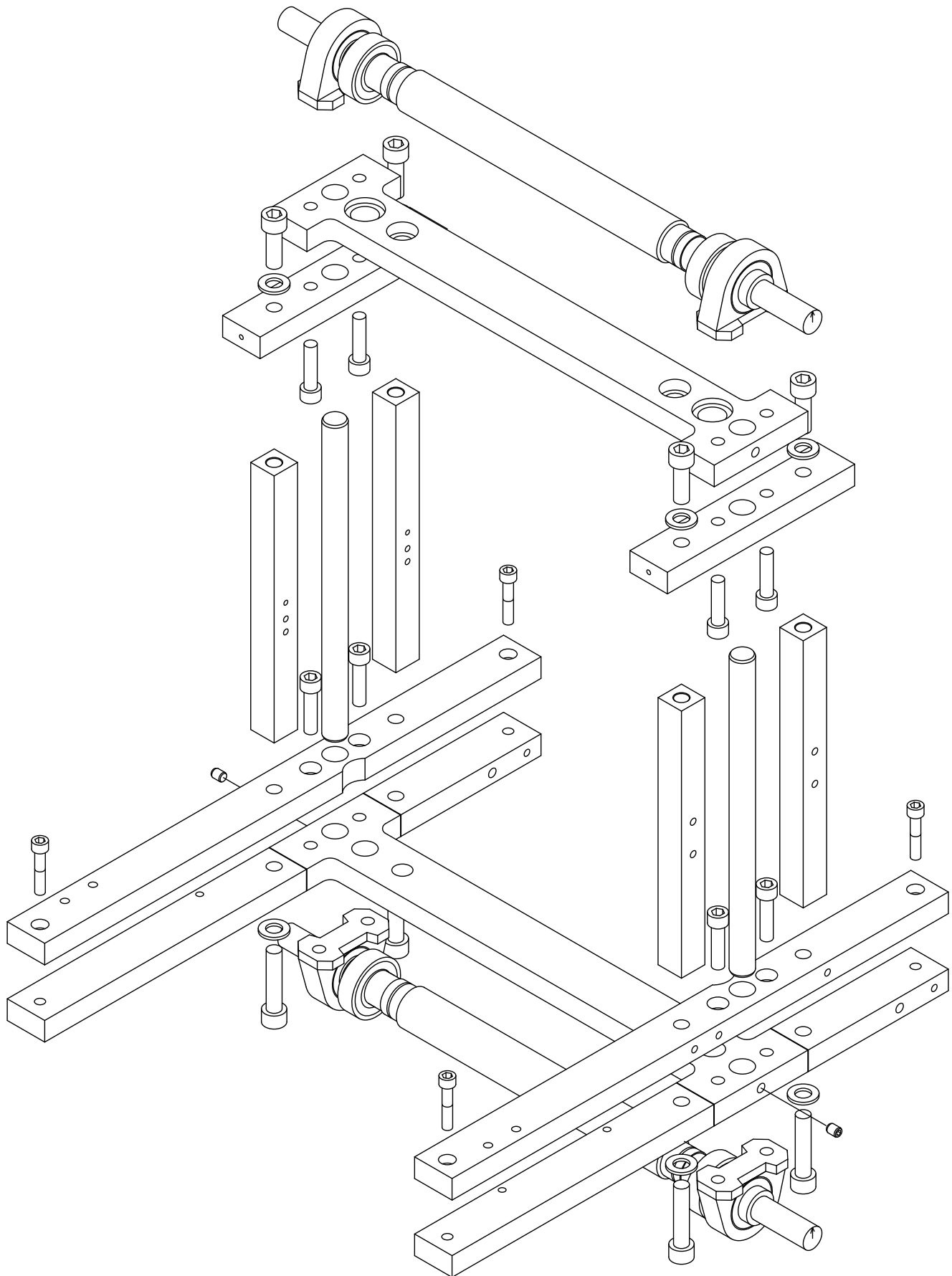
Pos.	Name	Quantity per. shaft
1	Main bearing with housing	2
2	Nut KM5	2
3	Bearing outer eccentric 6205 2Z.....	2
4	Shaft	1

5.6 Top and bottom frame, exploded view

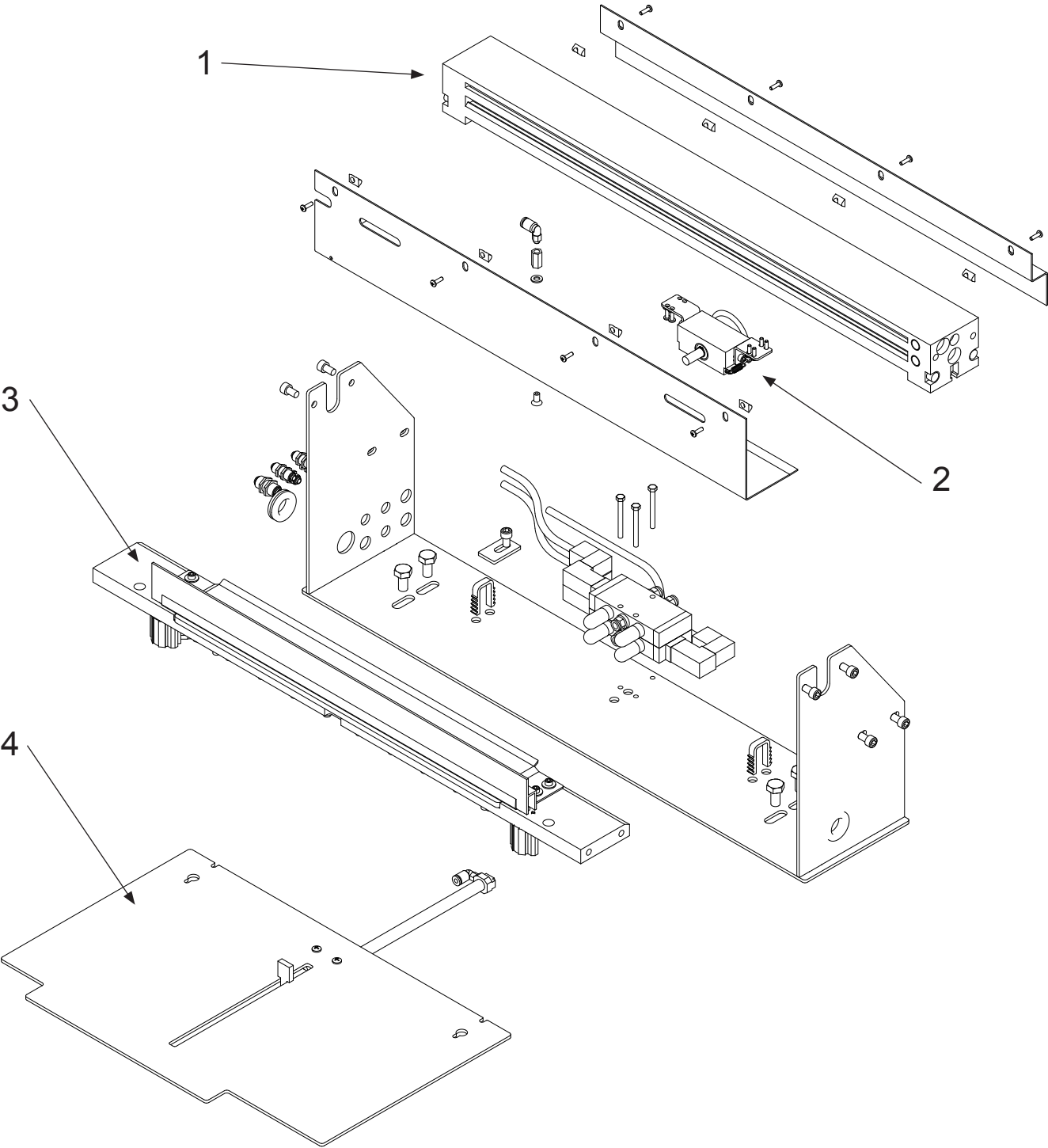


Parts top and bottom frame, exploded

Pos.	Name	Quantity per. frame
1	Locking ring Ø22	4
2	Stroke ball bearing Ø12	2
3	Spacer Ø22	2
4	Push rod Ø12X56	2
5	Frame	1

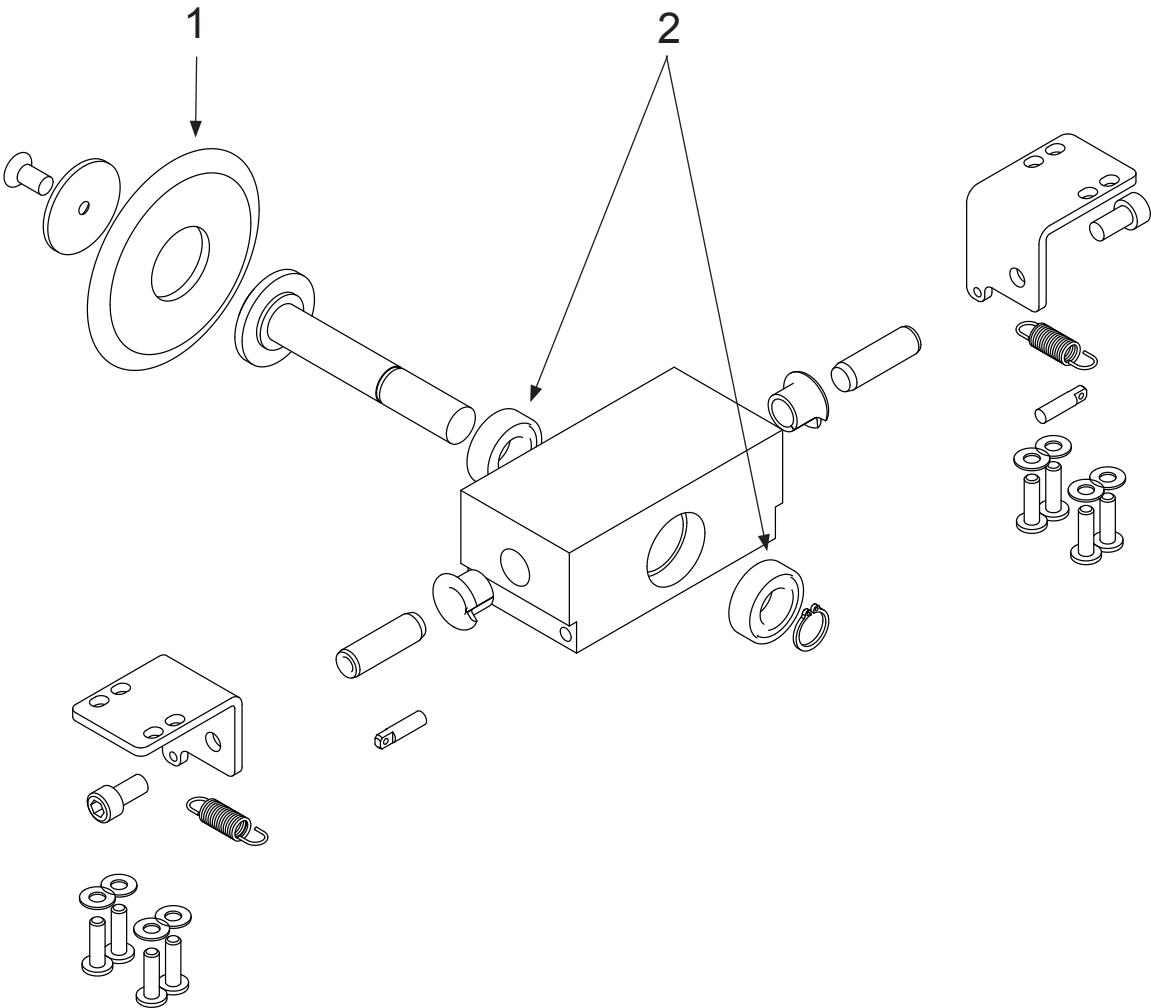
Frame, exploded view

5.7 Paper cutter, exploded views, part 1 of 4



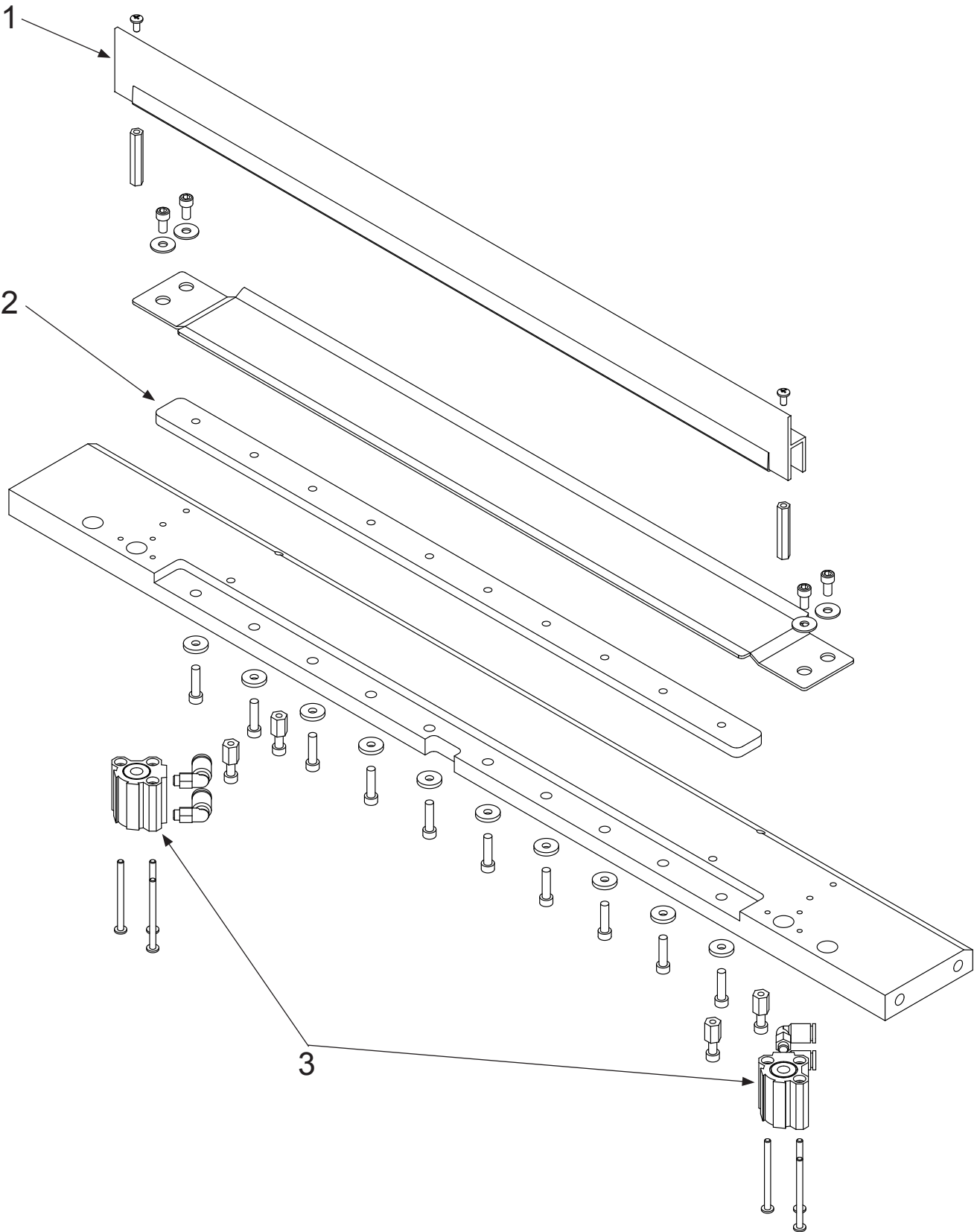
Pos	Name	Quantity
1	Cylinder	1
2	Roller blade assembly	1
3	Paper holder	1
4	Paper pusher	1

Paper cutter, exploded views, part 2 of 4, roller blade assembly



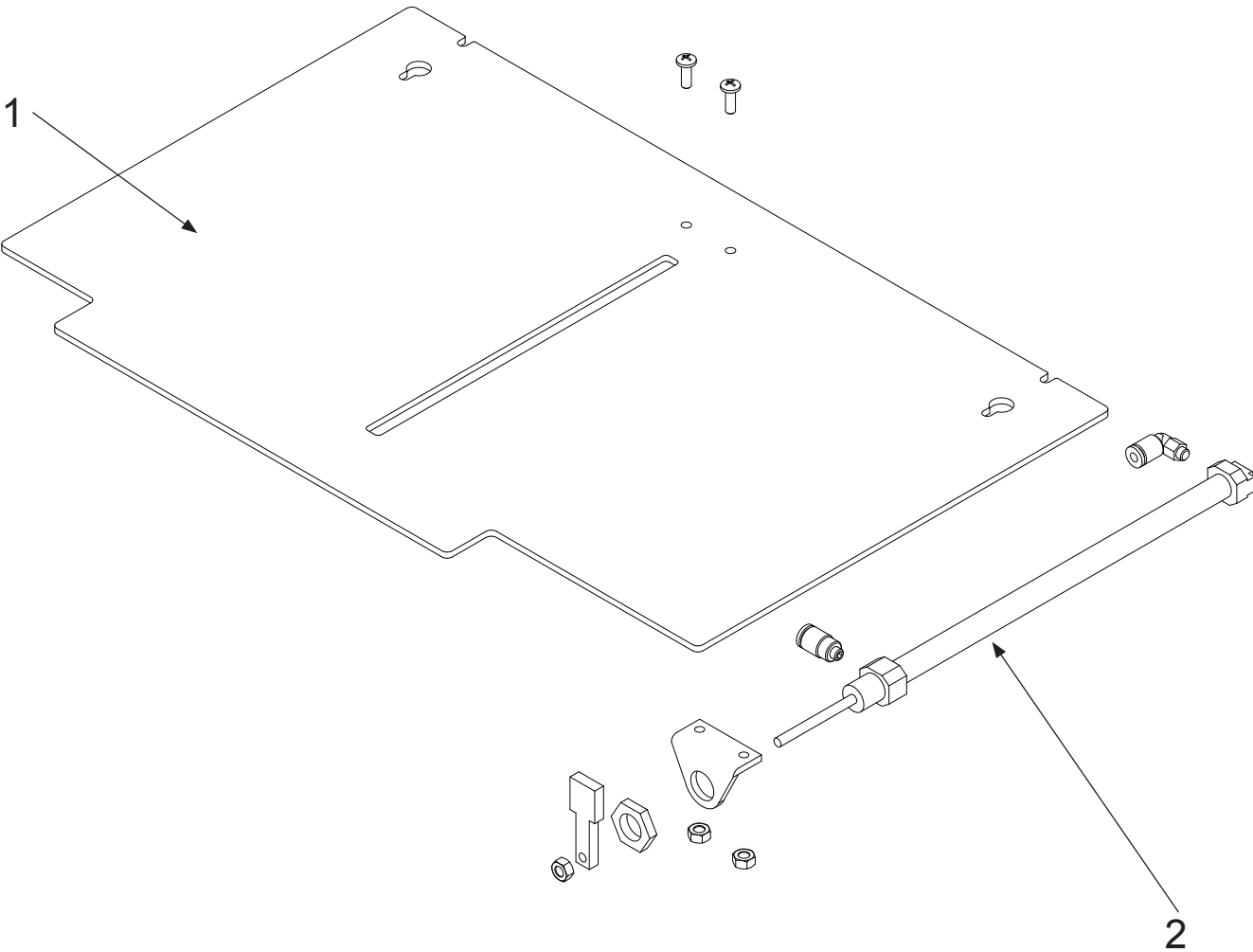
Pos	Name	Quantity
1	Roller blade	1
2	Bearing 688 2Z	2

Paper cutter, exploded view, part 3 of 4, paper holder



Pos	Name	Quantity
1	Paper holder	1
2	Blade fixed	1
3	Paper holder cylinders	2

Paper cutter, exploded view, part 4 of 4, paper pusher



Pos	Name	Quantity
1	Paper pusher plate	1
2	Paper pusher cylinder	1

6. TECHNICAL SPECIFICATIONS

6.1 Technical specifications

Format:

Paper roll:	Max. diameter 1100 mm (43 inches) Inner core diameter min. 70 mm, max. 84 mm
Paper (roll) width:	Min. 260 mm, max. 330 mm (13 inches)
Line length:	Min. 10, max. 44 characters
Sheet width:	2 pages/sheet - 4 pages/sheet
Page 1:	Up / Down
Printing Mode:	Single / Interpoint
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, see dimensions below
Line spacing:	Fixed 5 mm
Paper Weight:	Min. 120 - max. 180 g/m ² , Recommended 150 g/m ²

Printing Speed:

Characters/sec.:	440 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. 8.5 A max.
Fuse Printer:	10 A
Power:	Approx. 2000 W max.

Compressed air:

Clean air without oil or water,
min. 7.0 bar @ 60 l/min., max. temperature 50° C.

Communication with the computer:

Parallel on Centronics (25 pin D-sub female), or serial on RS 232 C (25 pin D-sub male). Both are electrical isolated with opto-couplers to prevent noise and ground loops.

Parameters for the serial port:

Baud rate: 150 - 19200, Parity: No / Odd / Even,
Data bit:, 7 / 8, Stop bit: 1 / 2.

Environment:

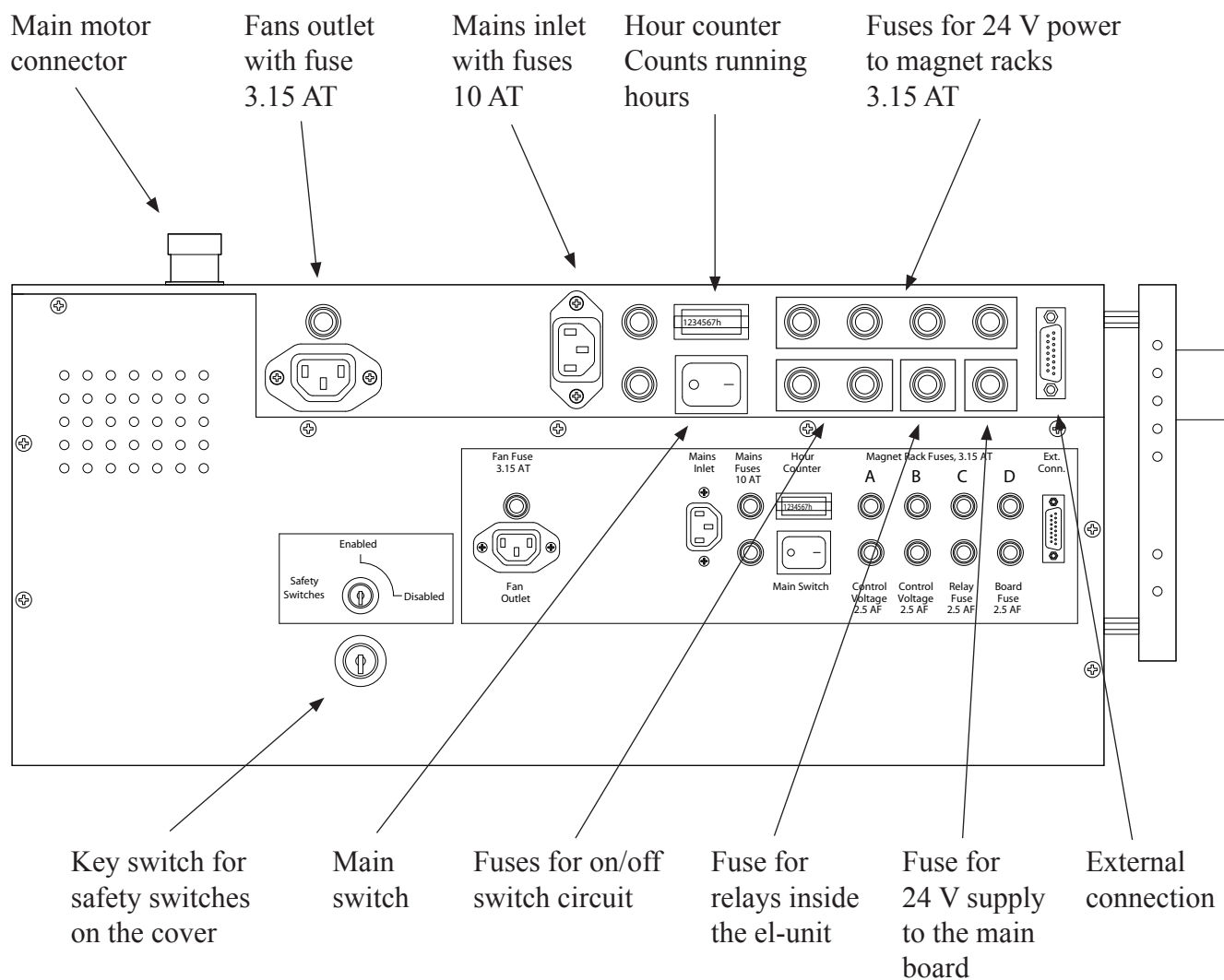
Temperatures:	15° - 30° C (60° - 86° F)
Rel. Humidity:	40 - 60 %

Measurements:

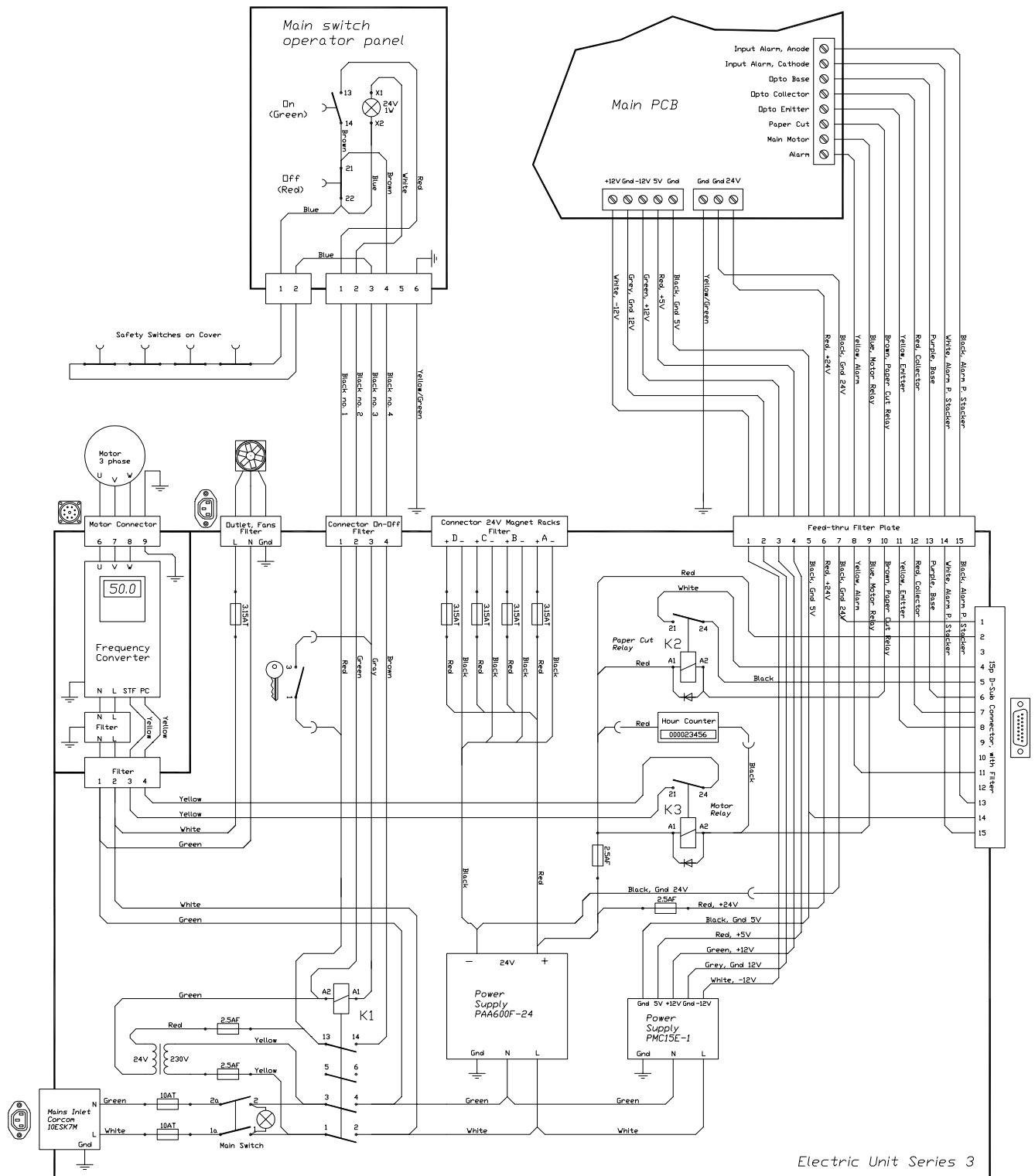
Height:	1430 mm
Width:	2700 mm
Length:	3200 mm
Weight:	385 kilos

6.2 Electric unit, overview

The electric unit is placed on the base plate of the printer, and contains connections, fuses and power supply. All fuses are 5 X 20 mm, and can be of glass or ceramic type.



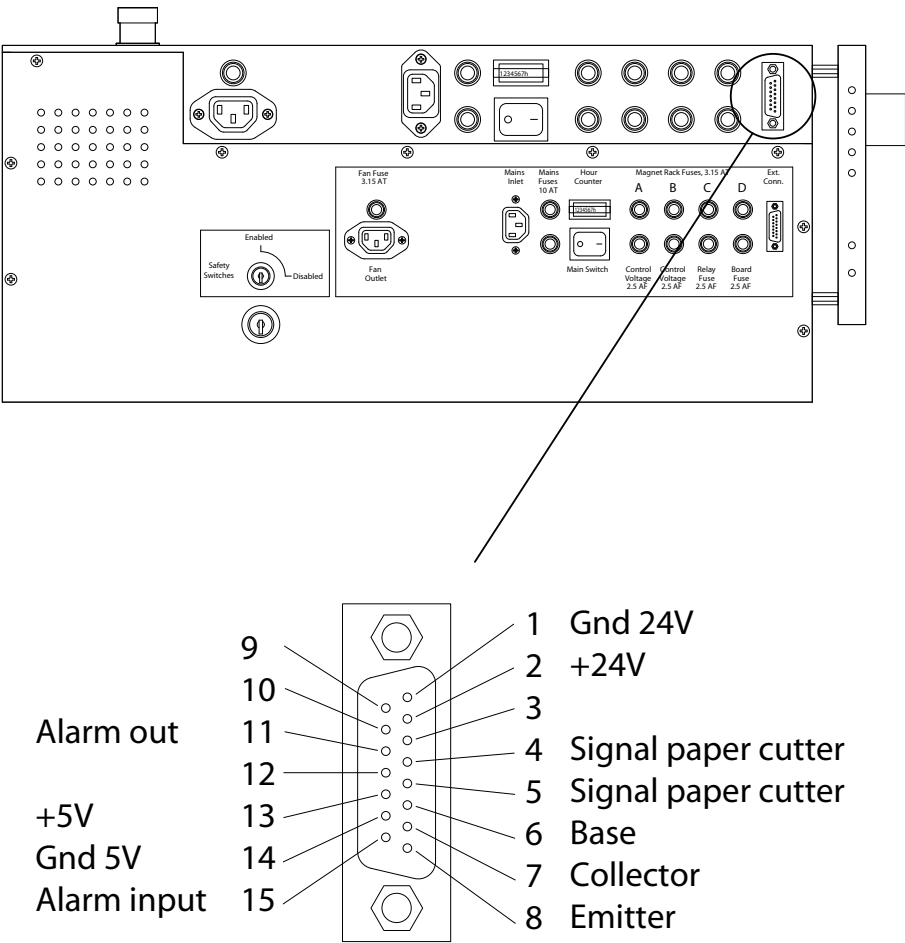
Electric unit, schematics



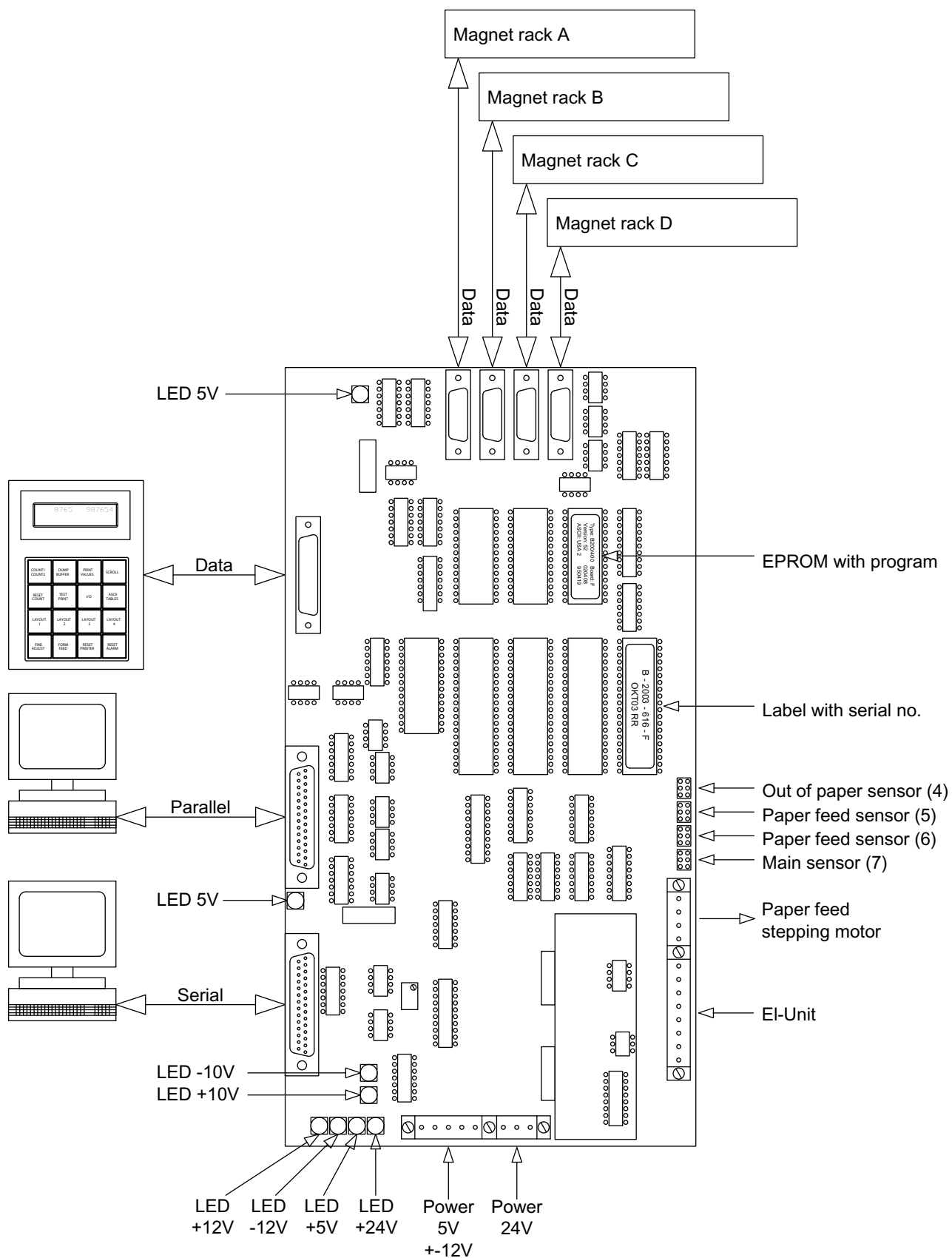
Electric Unit Series 3

6.3 Pin configuration external connection

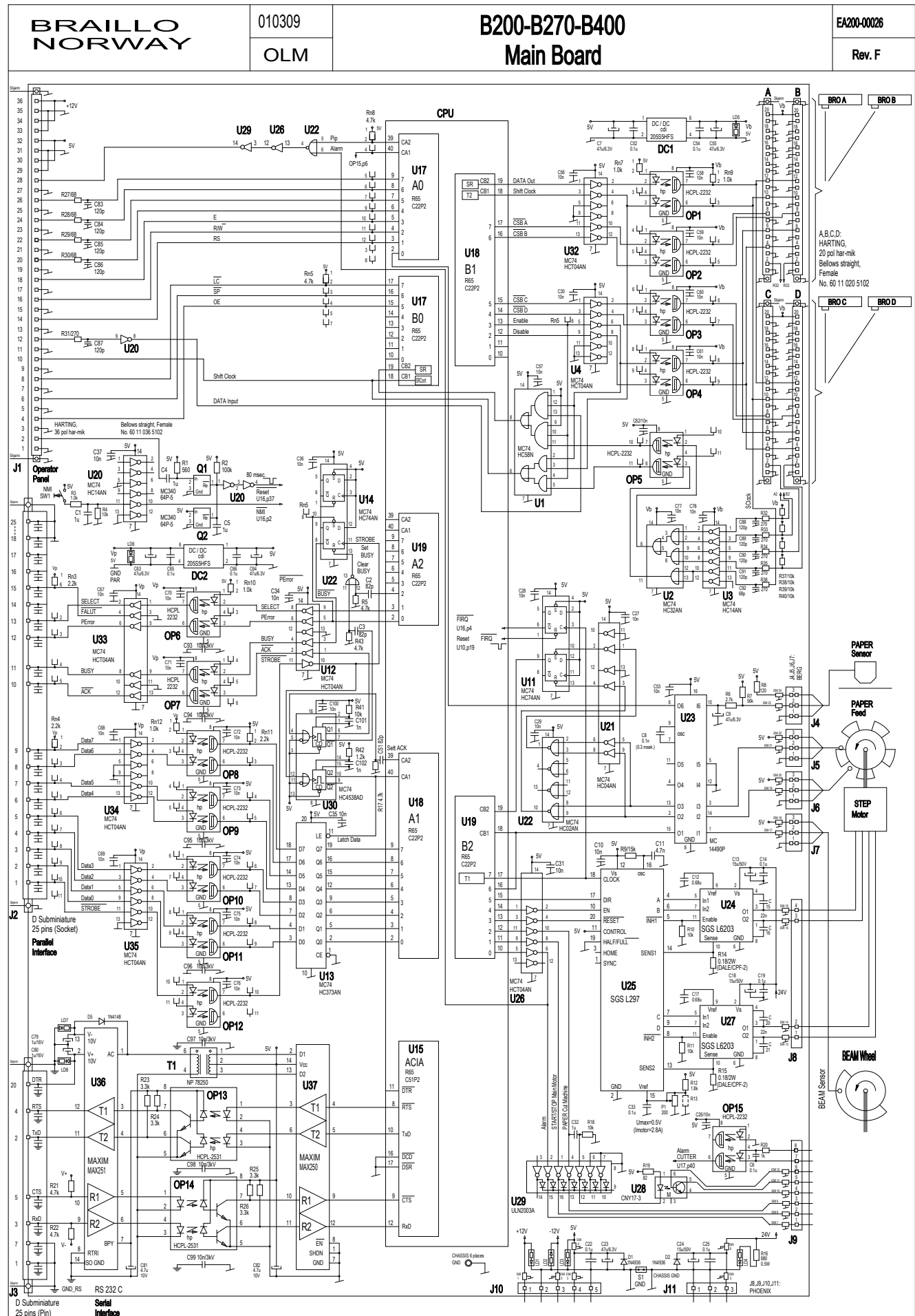
There is a connector on the electric unit that can be used to connect the printer to other paper processing equipment.



6.4 Main board, connections



Main board, schematics



BRILLO
NORWAY

010309

OLM

B200-B270-B400
CPU

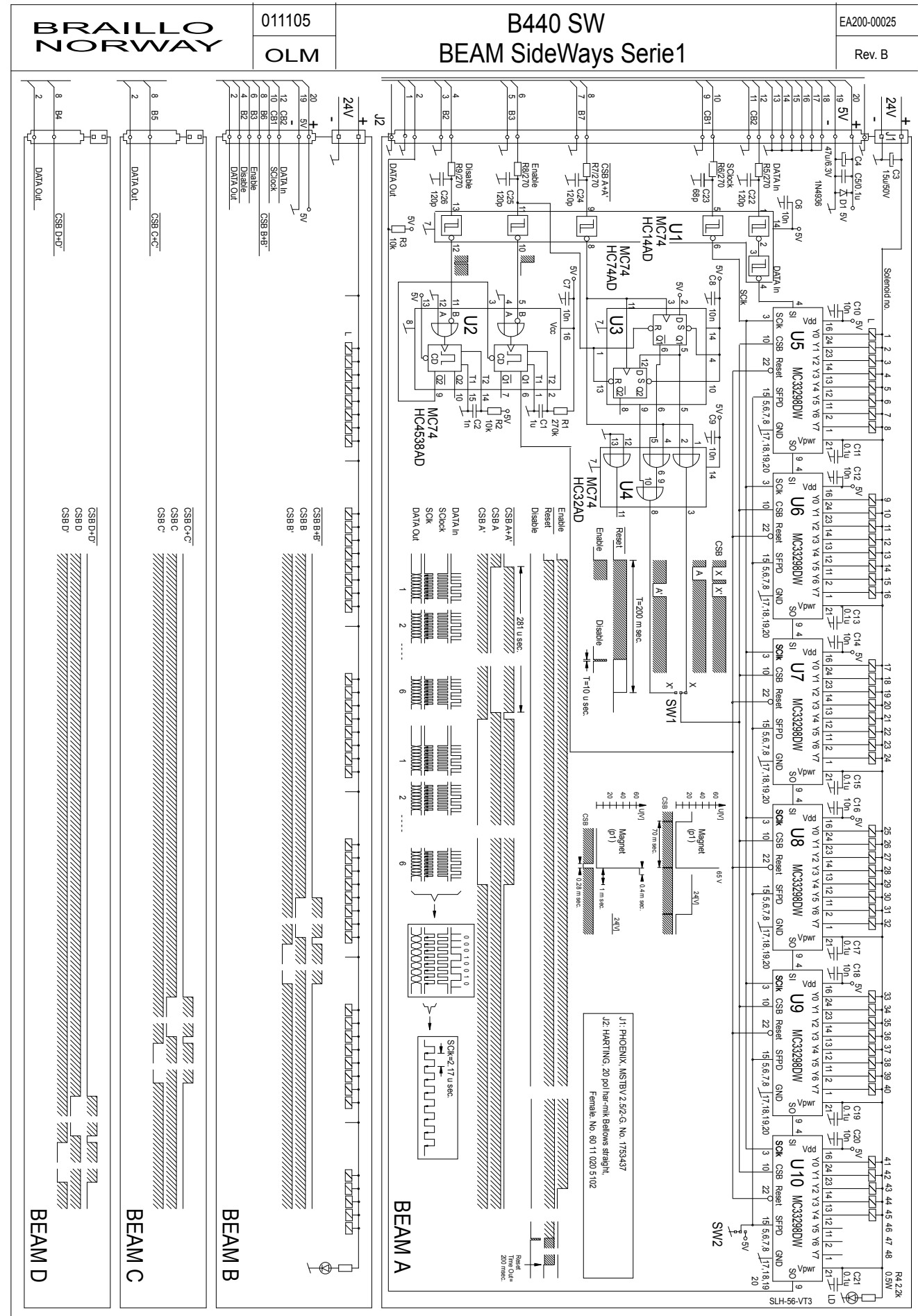
EA200-00026

Rev.F

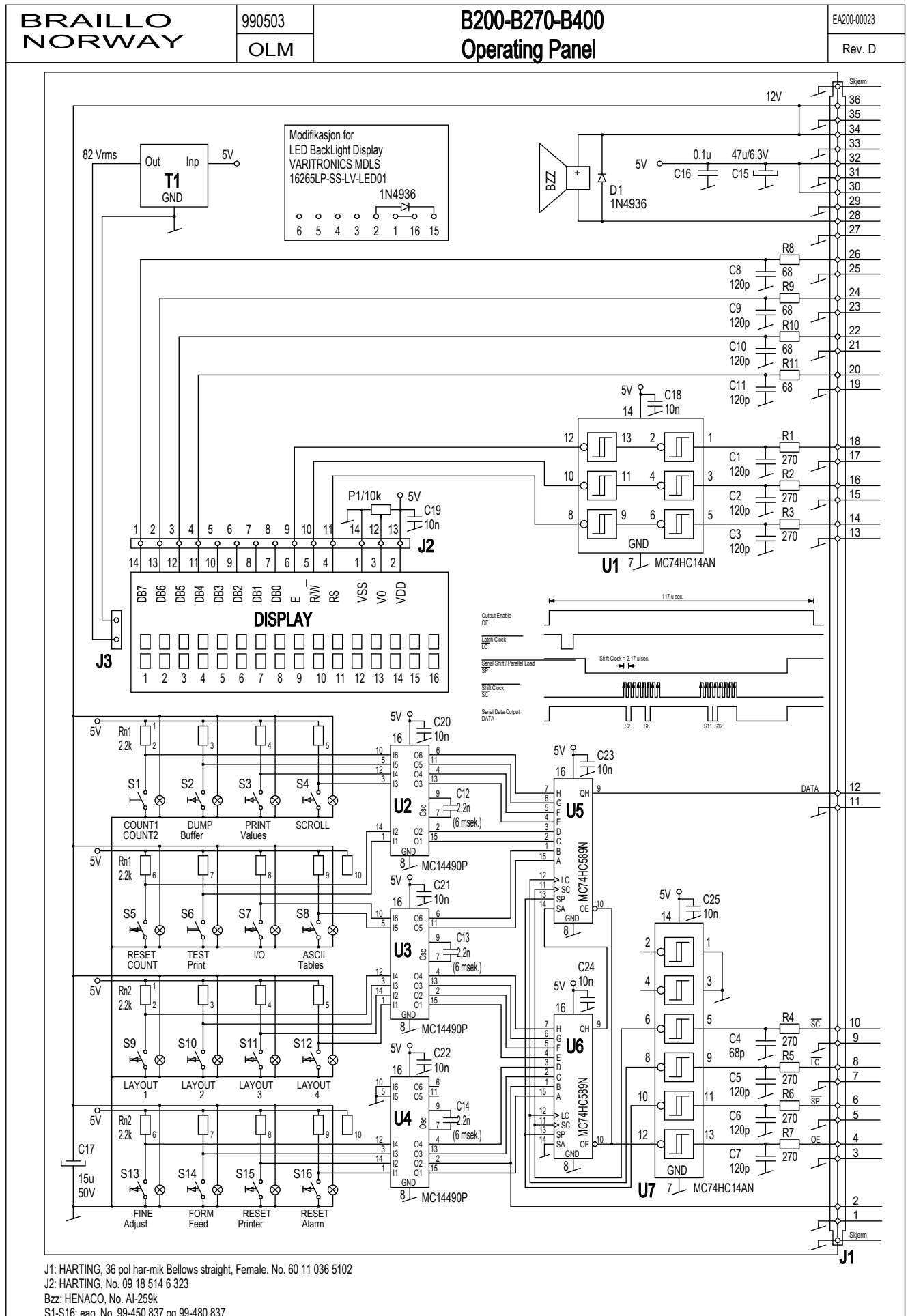
The schematic diagram illustrates the internal architecture of the B200-B270-B400 CPU. Key components and their connections include:

- Power Supply:** 5V and GND rails are distributed across the board. Decoupling capacitors (C45, C46, C47, C48, C49, C50) are placed near the ICs.
- Control Logic:** ICs U1 (PAL), U2 (ACIA), U3 (CS1), U4 (CS2), and U9 (VIA2) manage system control and data flow.
- Memory:** U5 (MC74 HCO3AN) and U7 (DS1225V) provide memory and timing functions.
- Processor:** U16 (MC88B09CP) is the central CPU unit.
- Input/Output:** U6 (MC74 HCO3AN) and U8 (TS5525DPL) handle input and output signals.
- Signal Lines:** Numerous signal lines connect the ICs, including data buses (A0-A15, D0-D7), control signals (RESET, FREQ, FREQ2, FREQ3, FREQ4, FREQ5, FREQ6, FREQ7, FREQ8, FREQ9, FREQ10, FREQ11, FREQ12, FREQ13, FREQ14, FREQ15, FREQ16, FREQ17, FREQ18, FREQ19, FREQ20, FREQ21, FREQ22, FREQ23, FREQ24, FREQ25, FREQ26, FREQ27, FREQ28, FREQ29, FREQ30, FREQ31, FREQ32, FREQ33, FREQ34, FREQ35, FREQ36, FREQ37, FREQ38, FREQ39, FREQ40, FREQ41, FREQ42, FREQ43, FREQ44, FREQ45, FREQ46, FREQ47, FREQ48, FREQ49, FREQ50, FREQ51, FREQ52, FREQ53, FREQ54, FREQ55, FREQ56, FREQ57, FREQ58, FREQ59, FREQ60, FREQ61, FREQ62, FREQ63, FREQ64, FREQ65, FREQ66, FREQ67, FREQ68, FREQ69, FREQ70, FREQ71, FREQ72, FREQ73, FREQ74, FREQ75, FREQ76, FREQ77, FREQ78, FREQ79, FREQ80, FREQ81, FREQ82, FREQ83, FREQ84, FREQ85, FREQ86, FREQ87, FREQ88, FREQ89, FREQ90, FREQ91, FREQ92, FREQ93, FREQ94, FREQ95, FREQ96, FREQ97, FREQ98, FREQ99, FREQ100, FREQ101, FREQ102, FREQ103, FREQ104, FREQ105, FREQ106, FREQ107, FREQ108, FREQ109, FREQ110, 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6.5 Magnet rack board, schematics



6.6 Operator panel, schematics



6.7 Pin configuration serial and parallel port

Data transmission from the computer to the printer can be done in two ways, either serial or parallel. The serial goes through an RS 232 C interface, and the parallel is using a Centronics compatible interface. Both connectors are of the 25 pin D-sub type.

Pin configuration 25 pin male D-sub contact RS 232 C (serial port):

Pin no. 1	FG	Frame Ground	
Pin no. 2	Tx	Transmit data	Output
Pin no. 3	Rx	Receive data	Input
Pin no. 4	RTS	Request to send	Output
Pin no. 5	CTS	Clear to send	Input
Pin no. 6	DSR	Data set ready	Input
Pin no. 7	GND	Signal ground	
Pin no. 8	DCD	Data carrier detect	Input
Pin no. 9	PU	+ 12V (Logic high)	Output
Pin no. 20	DTR	Data terminal ready	Output

The printer is only using pin no. 4 (RTS) as a control signal. When this is set to logic low (from the printer), the computer must stop sending text immediately. Pin no. 2 (Tx) is used to transmit XON/XOFF control signals to the computer. The text sent to the printer is received through pin no. 3 (Rx). All other outputs from the printer are set to logic high.

Wiring diagram for the enclosed serial cable

Standard RS 232 C cable, 25-25 pin:

25 pin female		25 pin female	
1	FG	FG	1
2	TD	RD	3
3	RD	TD	2
4	RTS	CTS, DSR	5,6
5,6	CTS, DSR	RTS	4
7	SG	SG	7
8	DCD	DTR	20
20	DTR	DCD	8

Wiring diagram for the serial cable with 9 pins adaptor:

Standard RS 232 C cable, 9-25 pin:

9 pin female		25 pin female	
1	DCD	DTR	20
2	RD	TD	2
3	TD	RD	3
4	DTR	DCD	8
5	SG	SG	7
6,8	CTS, DSR	RTS	4
7	RTS	CTS, DSR	5,6

Pin configuration 25 pin female D-sub contact (parallel port):

Pin no. 1	Strobe	Input	Active low
Pin no. 2	Data 0	Input	
Pin no. 3	Data 1	Input	
Pin no. 4	Data 2	Input	
Pin no. 5	Data 3	Input	
Pin no. 6	Data 4	Input	
Pin no. 7	Data 5	Input	
Pin no. 8	Data 6	Input	
Pin no. 9	Data 7	Input	
Pin no. 10	Acknowledge	Output	Active low
Pin no. 11	Busy	Output	
Pin no. 12	Paper out	Output	
Pin no. 13	Select	Output	
Pin no. 14	Not in use		
Pin no. 15	Error	Output	
Pin no. 16	Not in use		
Pin no. 17	Frame Ground		
Pin no. 18	Signal Ground		
Pin no. 19	Signal Ground		
Pin no. 20	Signal Ground		
Pin no. 21	Signal Ground		
Pin no. 22	Signal Ground		
Pin no. 23	Signal Ground		
Pin no. 24	Signal Ground		
Pin no. 25	Signal Ground		

6.8 Escape-Sequences

What is an escape-sequence?

An escape-sequence is just a 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, (except those for the data communication, i.e. active port, Baud rate, Data bit, Stop bit, and Parity).

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 (Interpoint).
ESC P nn	- No. of sheets	nn can be from 01 to 99 sheets
ESC 0	- Soft Reset	
ESC 1	- Soft Form Feed	
ESC 3	- ASCII-Table from PC	



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 2	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".

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
Interpoint	027 072 049	1B 48 31

Default is interpoint.

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

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:

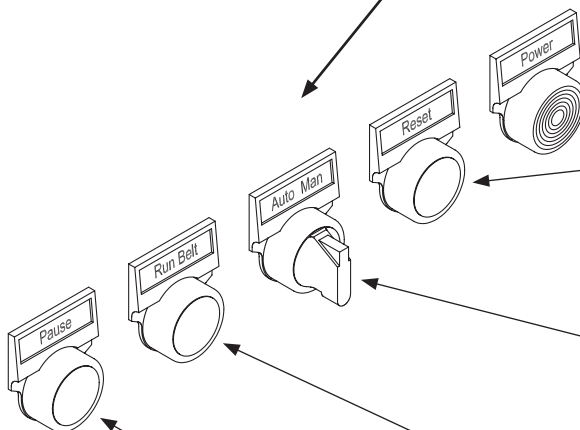
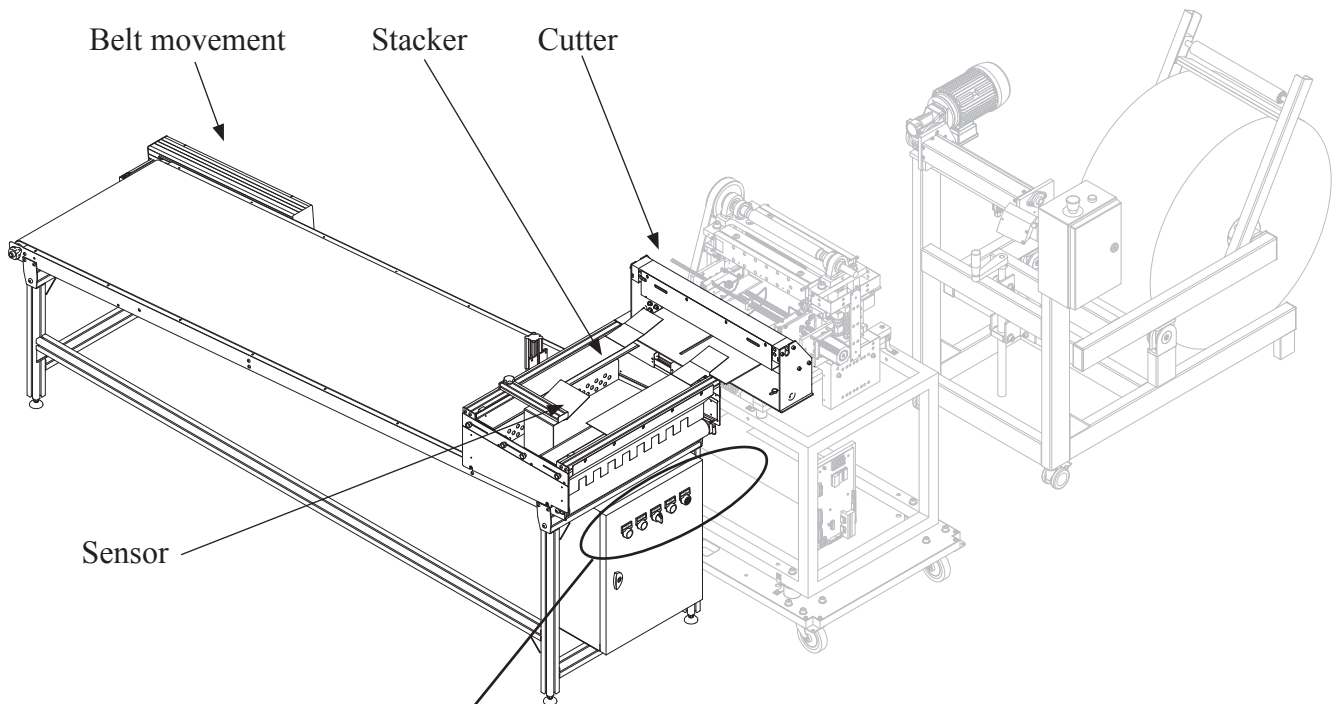
ESC 1 - Soft Form Feed

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

7. PAPER CUTTER AND STACKER

The paper cutter is driven by press air, and is controlled from the control unit on the horizontal stacker. So it is considered to be a part of the horizontal stacker, and not a part of the printer.



Power lamp.

Reset switch.

When pushing this switch, the program will start from the beginning and run one cycle on all cylinders.

Auto Man switch.

In “auto” position, the printer will stop when the conveyor belt is full. In “man” position, the printer will not check the conveyor belt at all.

Run Belt switch.

When pushing this switch, the conveyor belt will move the distance determined by the cylinder sensor.

Pause switch.

When pressing this switch, the printer will stop. To continue the printing, press and release the “test print” button on the printer.

Description of function.

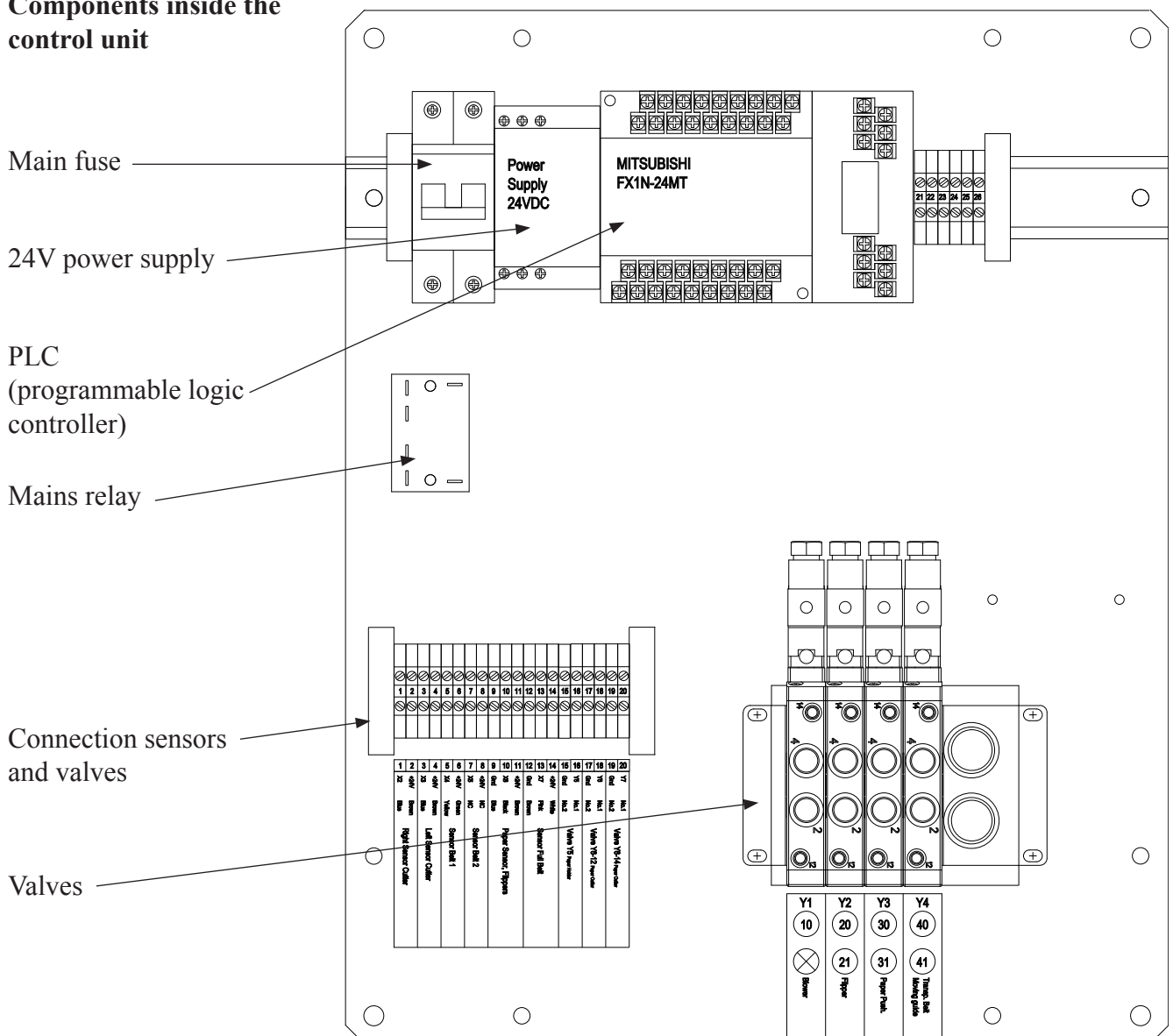
When it's time to cut the paper, the printer sends a signal to the Hor. stack control unit, and the paper holder will lock the paper and keep it steady. The cutter will then cut the sheet.

So the sheet is pushed into the stacker by the paper pusher. When the sheet reaches the end stop, a sensor will detect it and the "trap doors" will open so the sheet will fall down to the conveyor belt. This is repeated until the numbers of sheets per volume is reached, then the conveyor belt will move the stack a distance. Because of this, the different volumes is separated on the conveyor belt.

If the sheet does not arrive at the sensor within a certain time after the sheet is cut, the stacker will send an alarm signal back to the printer, and the printer will stop. The display on the printer will tell what has happened.

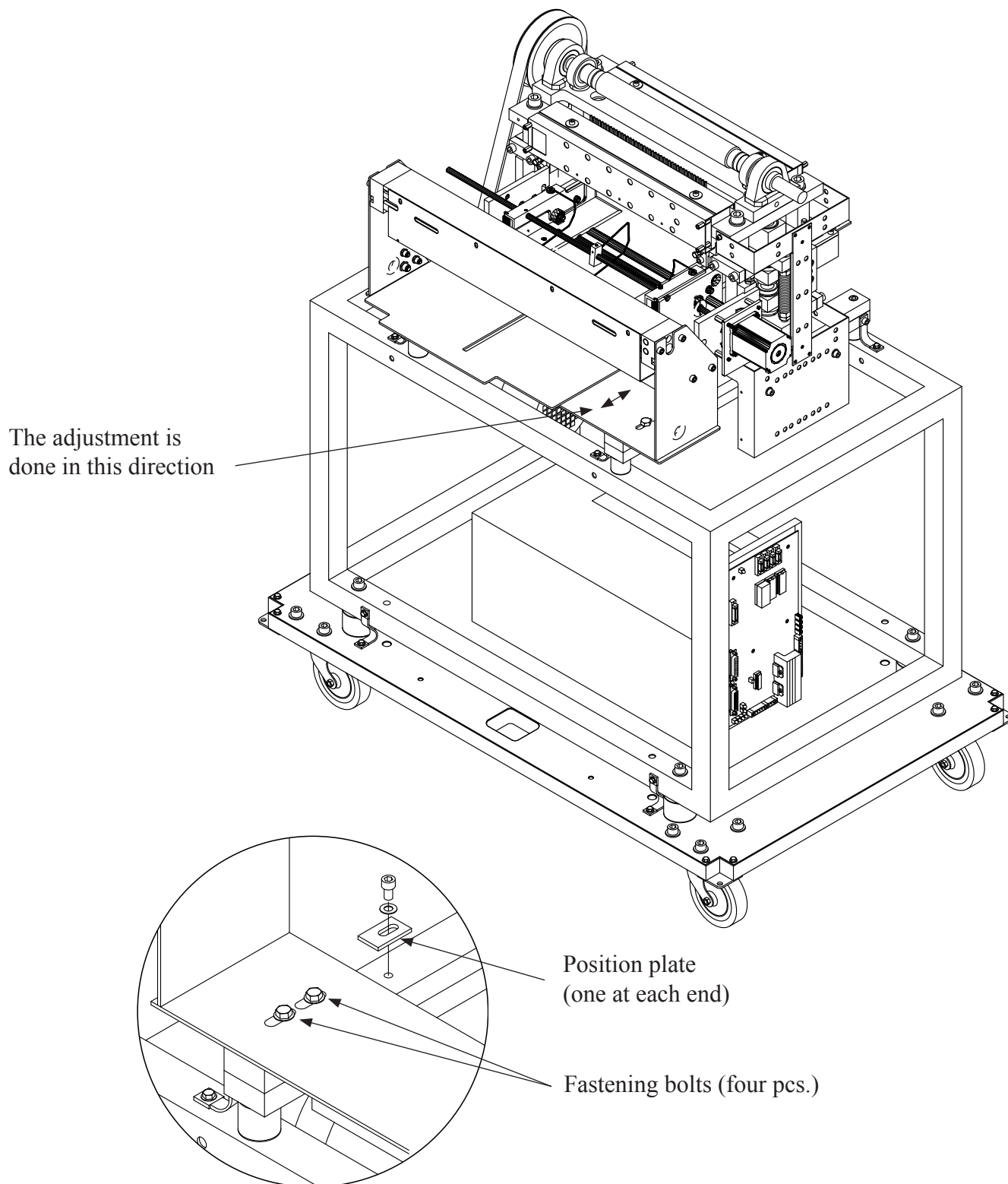
The physical movements on this cutter and stacker is done with help of press air. Electric signals are controlling valves that will open or close for the press air. The air goes trough pipes out to the cylinders.

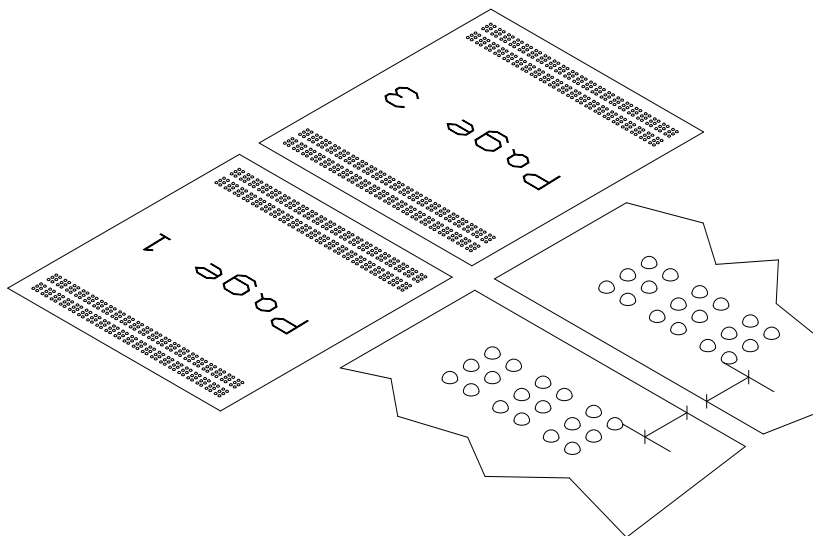
Components inside the control unit



7.1 Paper cutter, adjustment

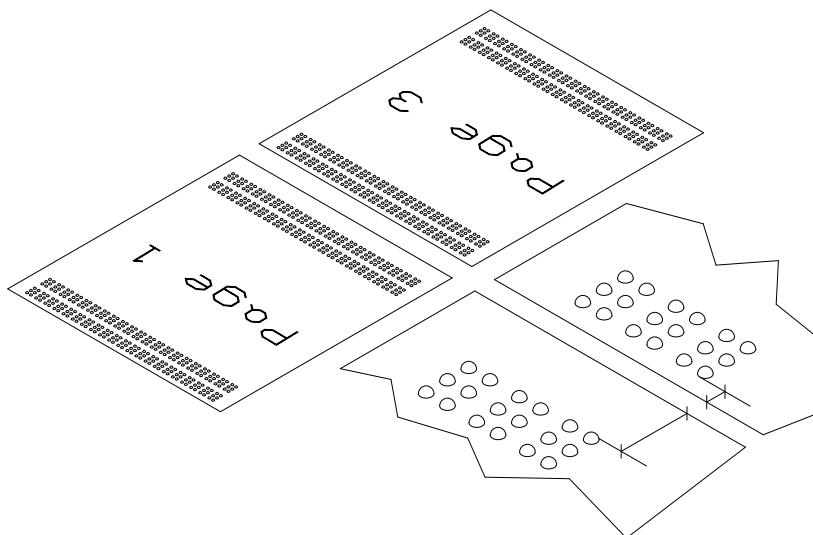
The paper cutter must be adjusted in the in/out direction, to ensure that the top and bottom margins has the correct size. It is done like this: Loosen the four fastening bolts. There is a position plate on both sides that has to be loosened. Move the cutter to the desired position. Fasten the four bolts. Fasten the position plate. Print some sheets to test. See the figures on the next page for the correct adjustment.



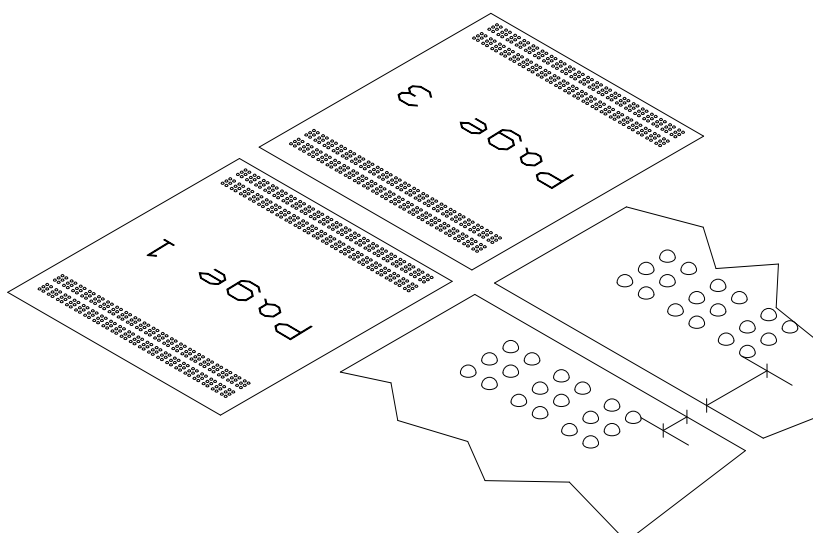


When the paper cutter is correctly adjusted, the bottom margin on page one has approx. the same size as the top margin on page 3. The edge on the sheet is also aligned with the text.

(Note that page two is at the back of page one).



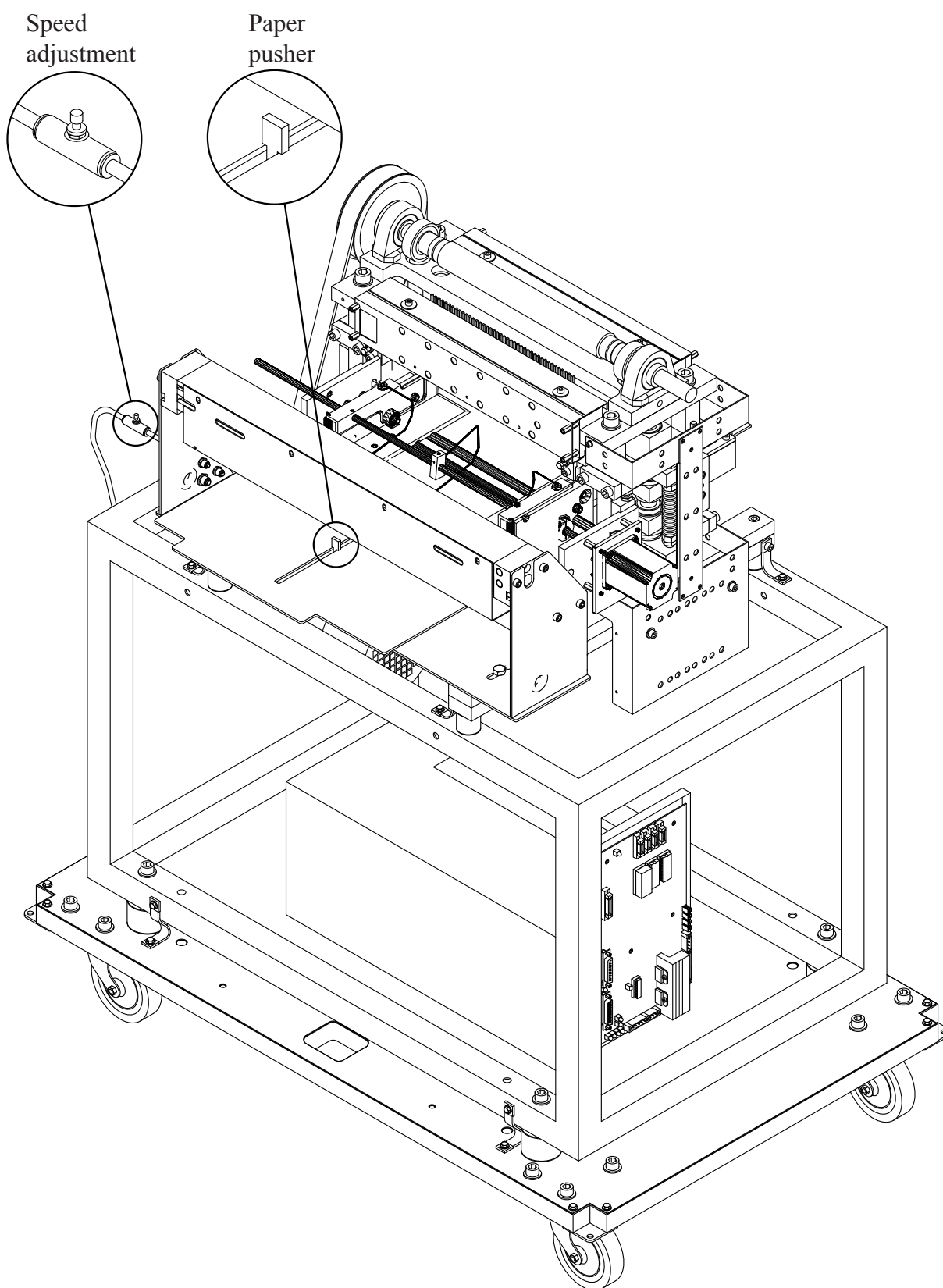
If the paper cutter is too close to the printer, the bottom margin on page one is bigger than the top margin on page three.



If the paper cutter is moved too far out from the printer, the bottom margin on page one will be narrower than the top margin on page 3.

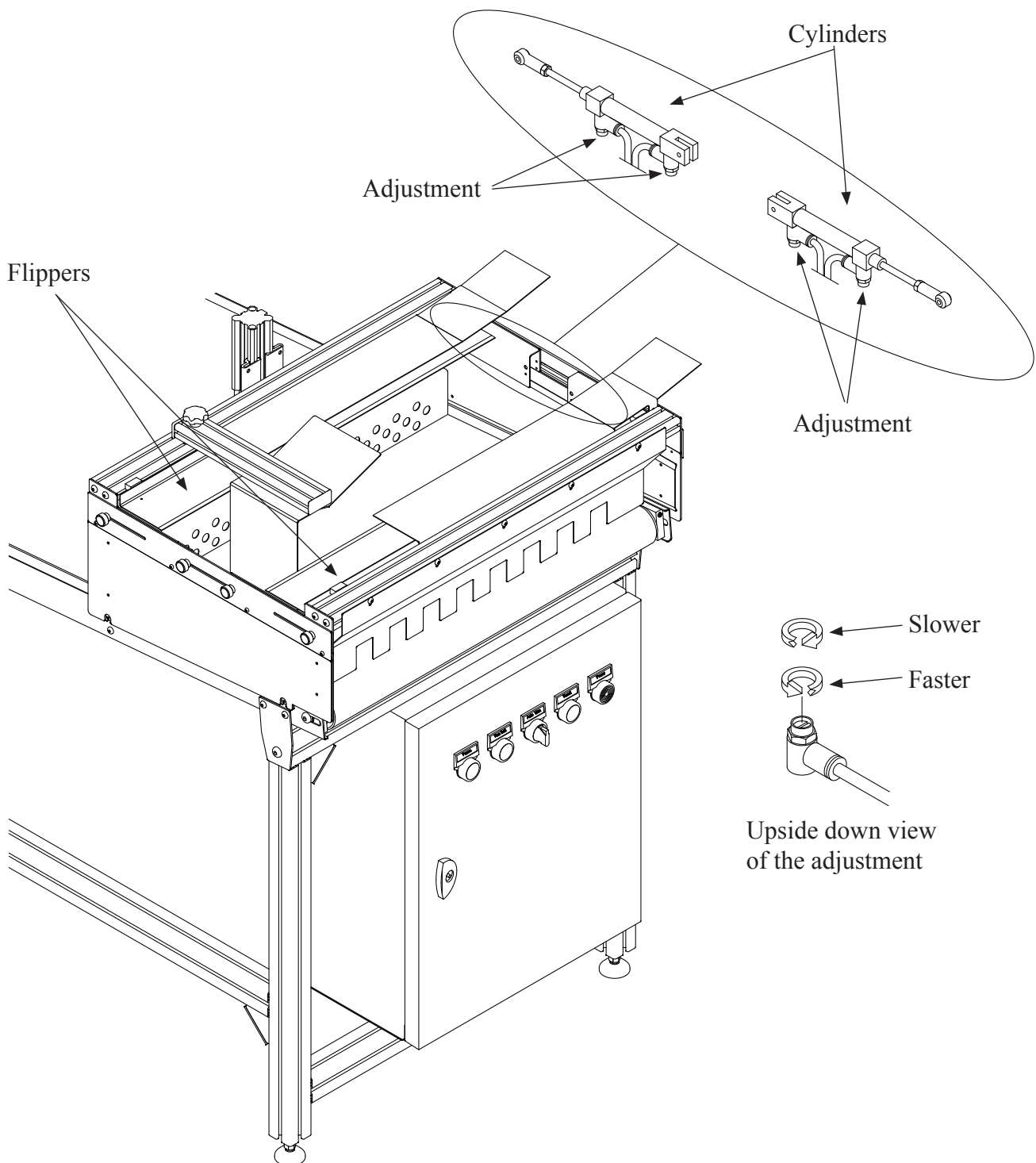
7.2 Paper pusher, adjustment

The speed of the paper pusher might need some adjustment because different paper quality and paper size will have different behaviour when the sheet is ejected from the cutter.



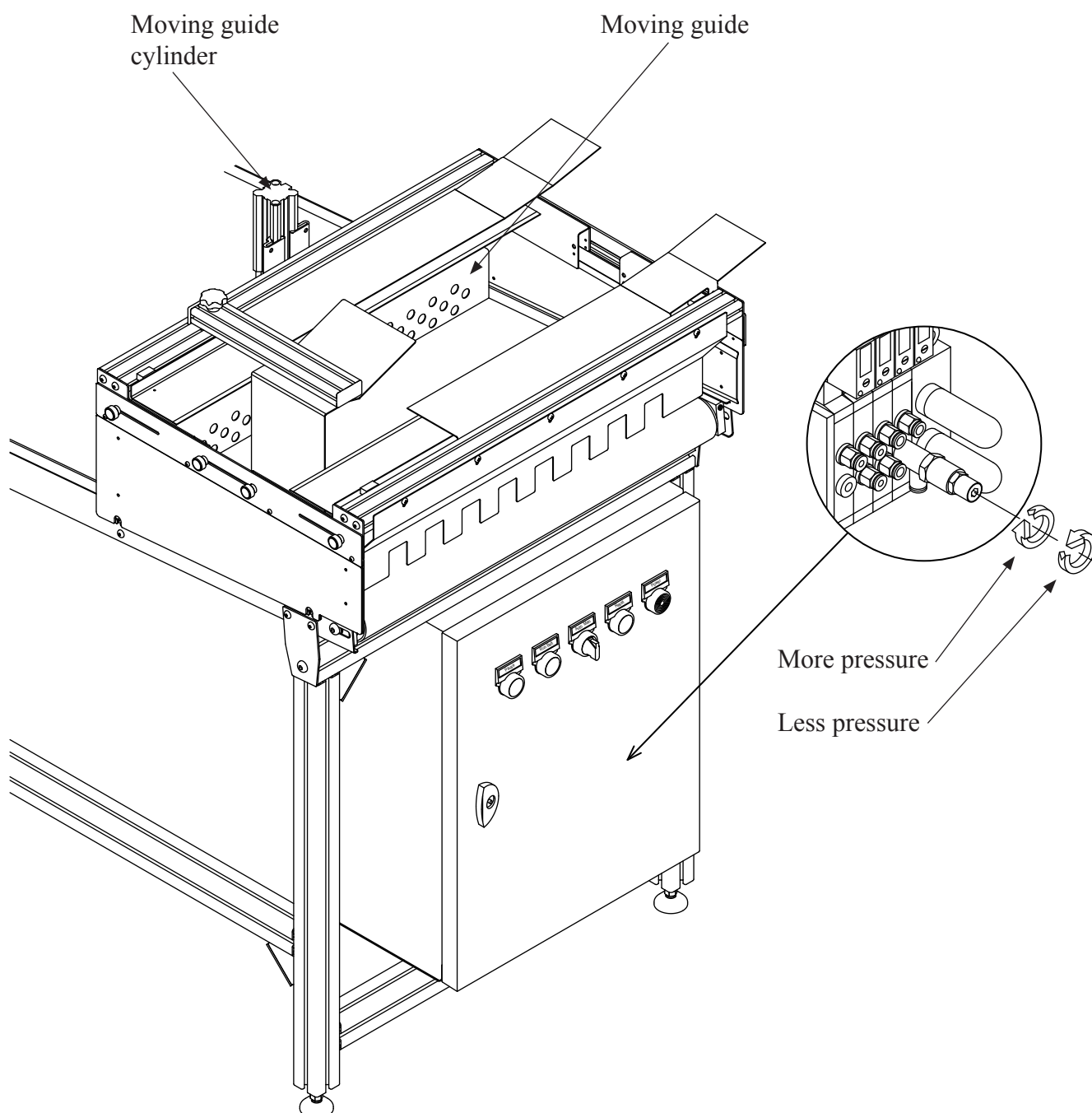
7.3 Flipper, adjustment

It is possible to adjust the moving speed on the flippers. The adjustment is done where the pipes are entering the cylinders. To make this adjustment, we recommend you to loosen the stacking unit from the conveyor belt, and turn it upside down. Then the cylinders can be seen in the area indicated on the figure below.

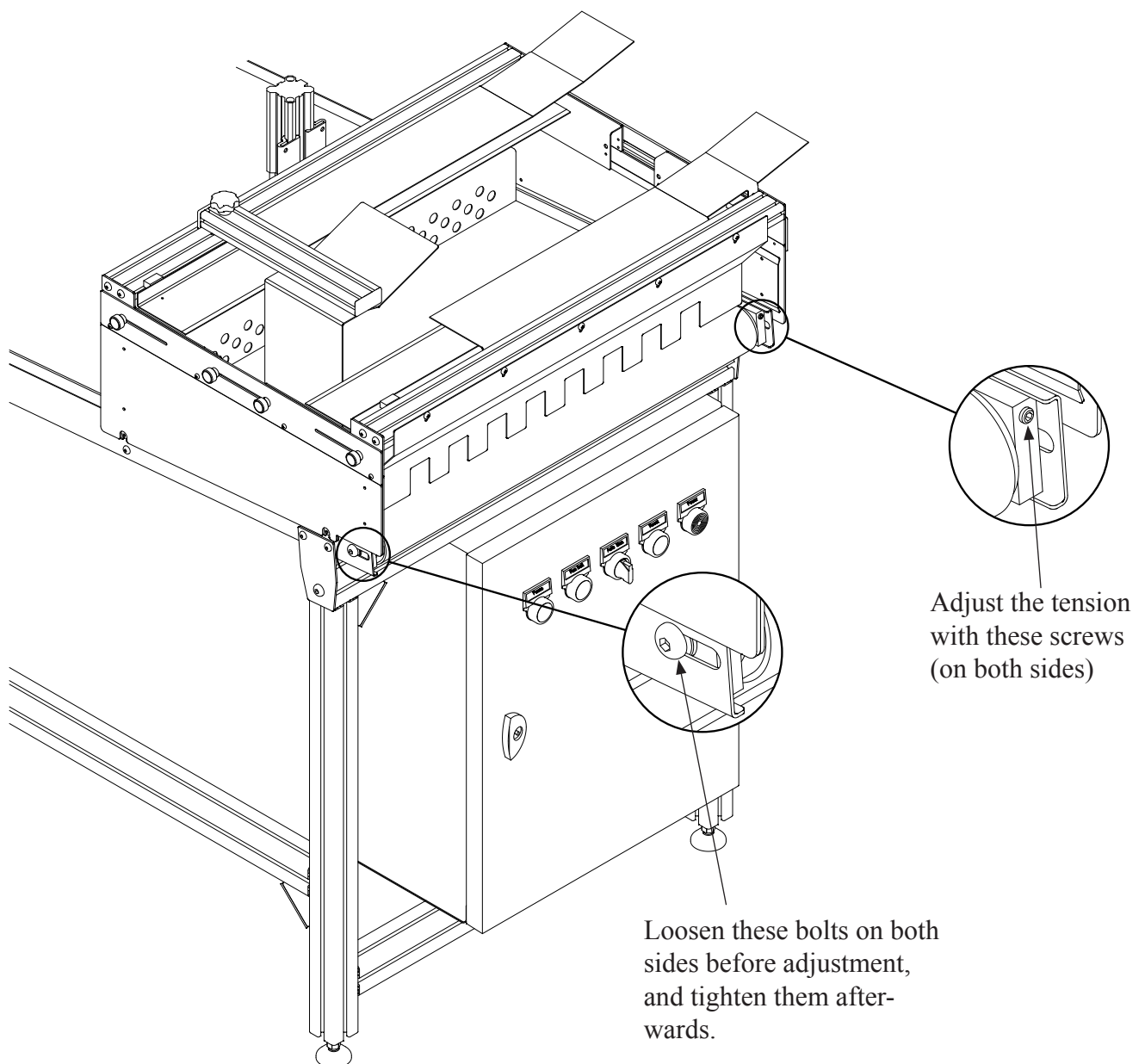


7.4 Moving guide, adjustment

With this adjustment it is possible to change the force the moving guide is pressing down onto the pile of paper laying on the conveyor belt. It is approx. correct force when you are able to lift the guide easily by hand while the air pressure is on.



7.5 Conveyor belt tension, adjustment

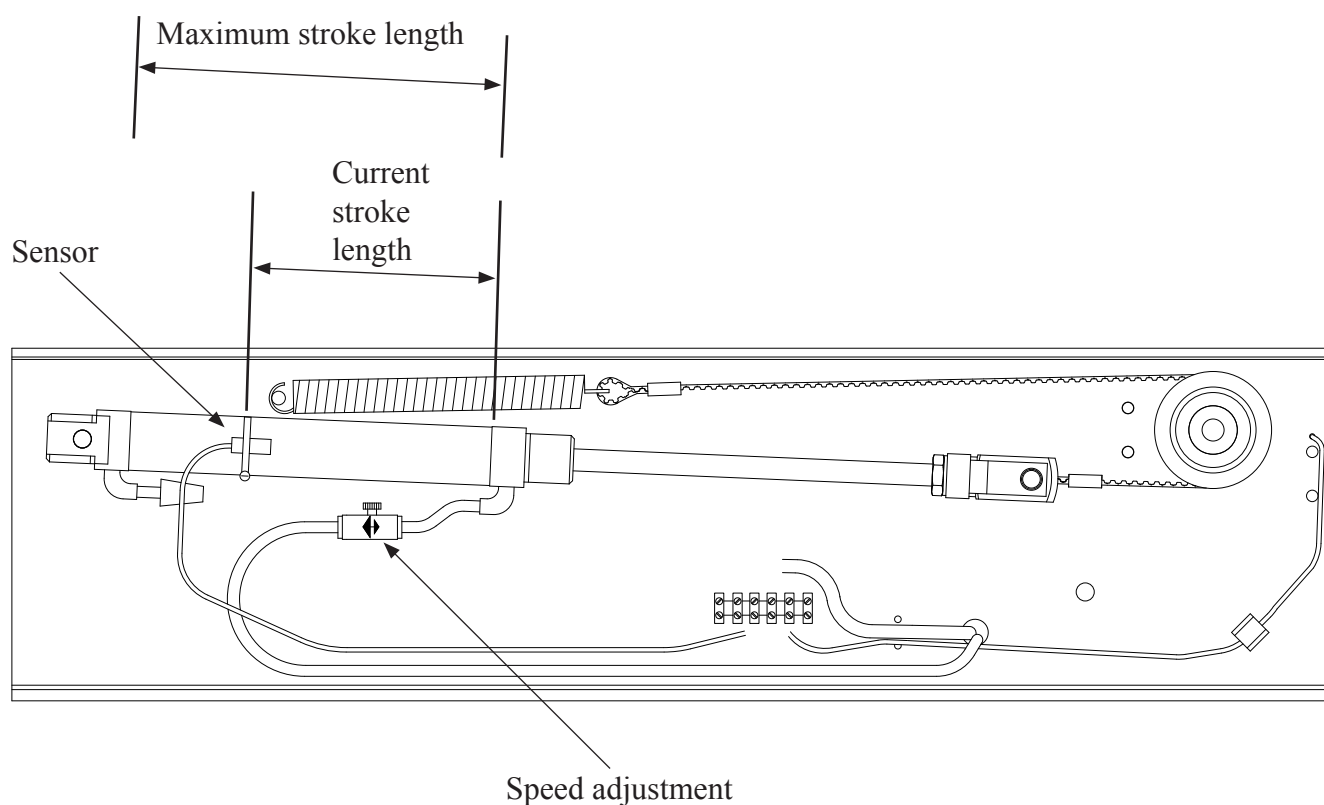


7.6 Moving distance conveyor belt, adjustment

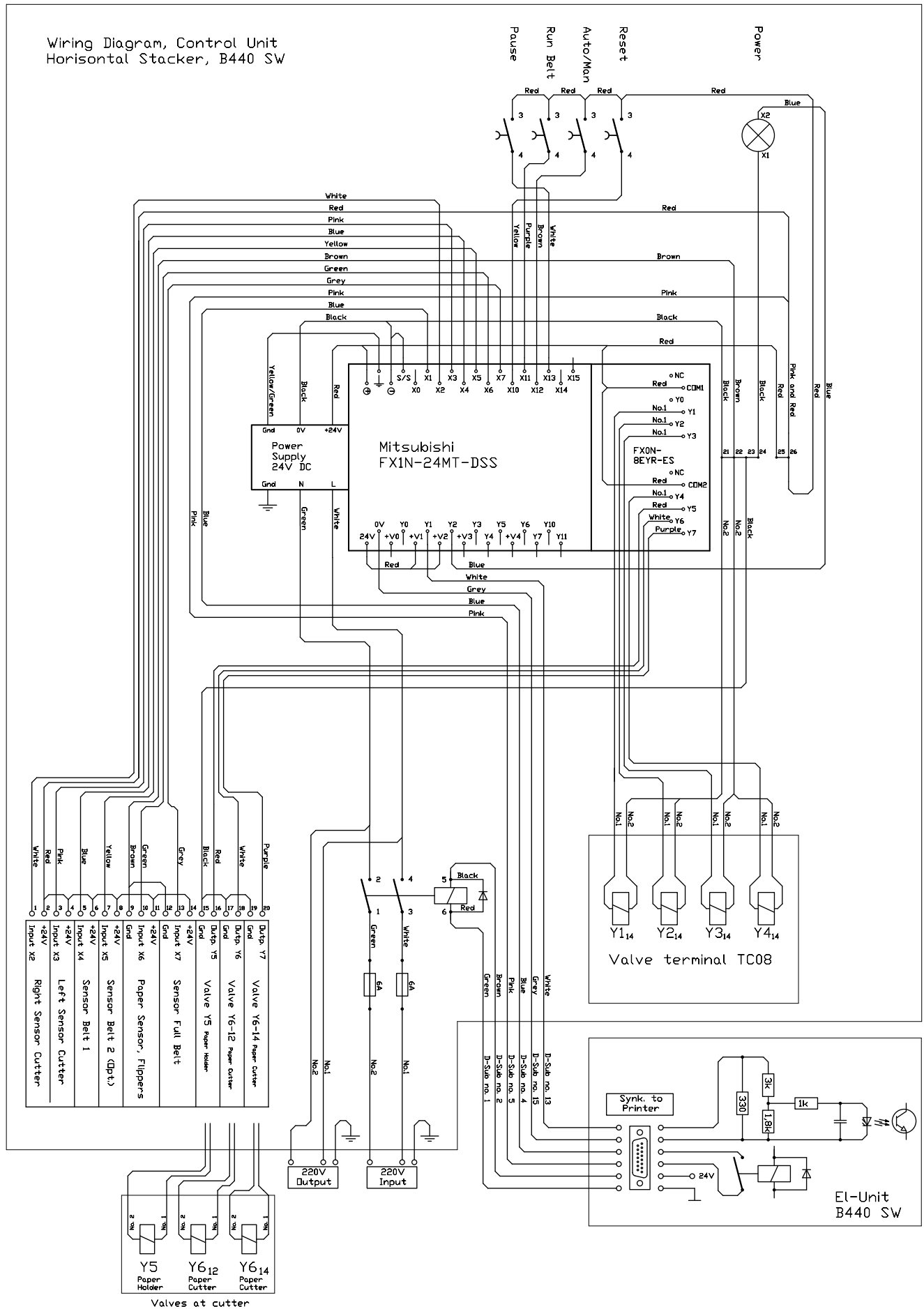
The distance the conveyor belt will move between each volume is adjustable. The adjustment is done inside the little box at the end of the conveyor belt.

The mechanism works like this: The movement on the belt is coming from a press air cylinder. The stroke length on the cylinder is determined by the position of the sensor. So by moving this sensor back and forth you can set the stroke length on the cylinder, and hereby the movement on the belt.

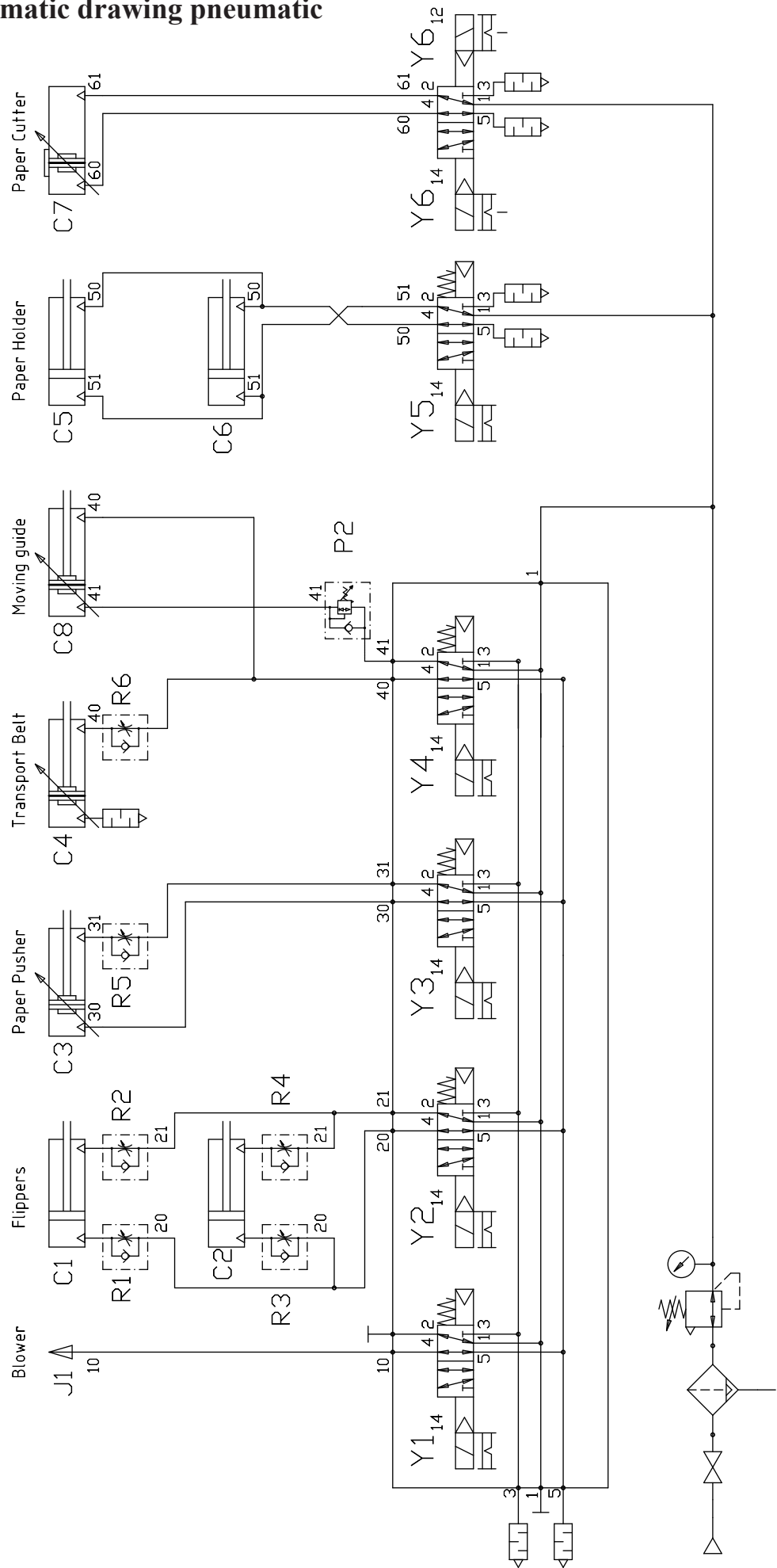
There is also a possibility to adjust the speed on the movement with the speed controller.



7.7 Schematic drawing, electrical



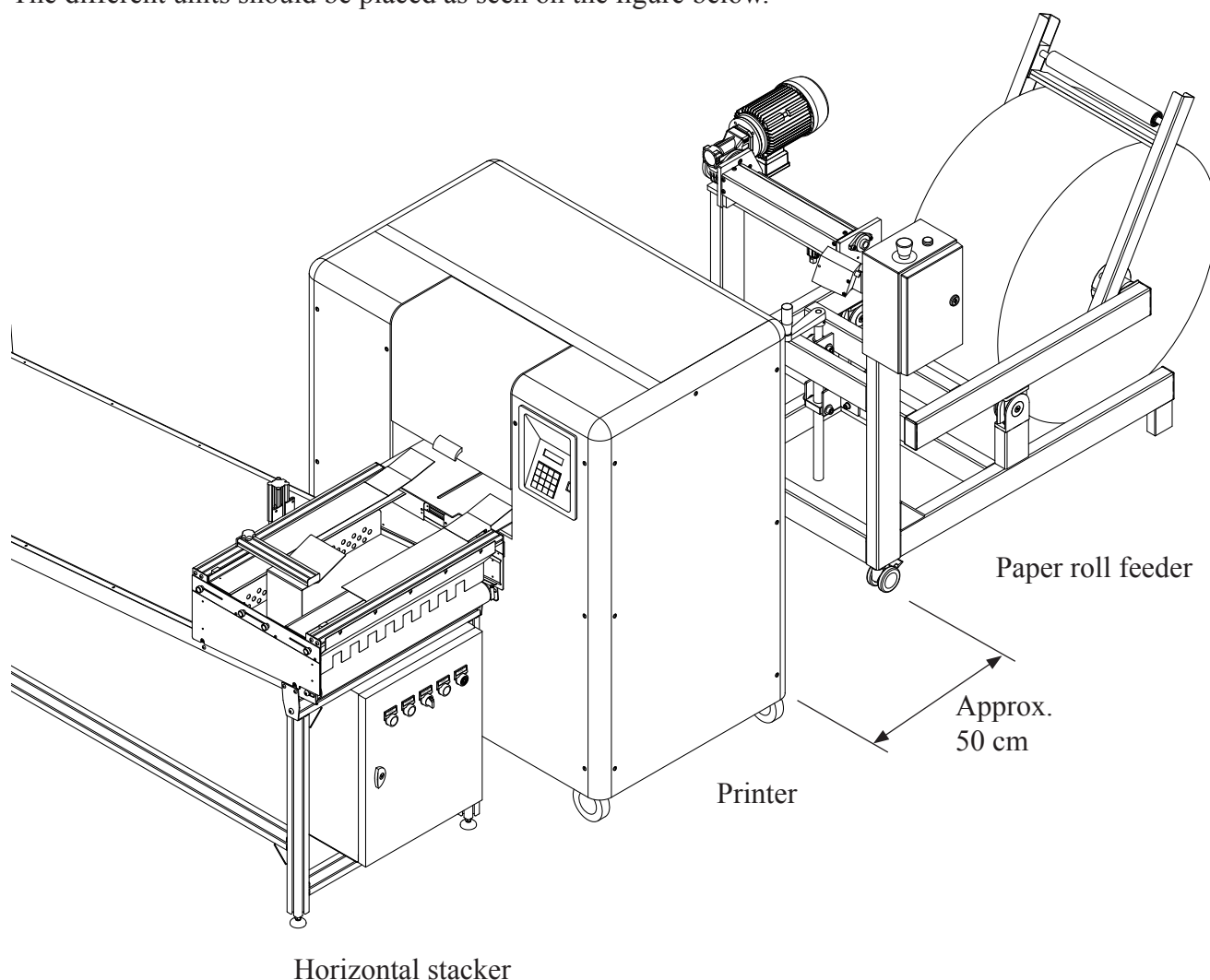
7.8 Schematic drawing pneumatic



8. PAPER ROLL FEEDER

8.1 Setting up, connections

The different units should be placed as seen on the figure below.



The Paper Roll Feeder may be considered as an independent unit, even though it is switched on and off with the main switch on the Printer.

The Paper Roll Feeder is also supplied with press air. The press air is used to keep the paper clamped between the two feeder rolls. It is a timer inside that will release this pressure on the rolls after a certain period of time. This is done to prevent the paper from being deformed around the feeder rolls.

8.2 Operating

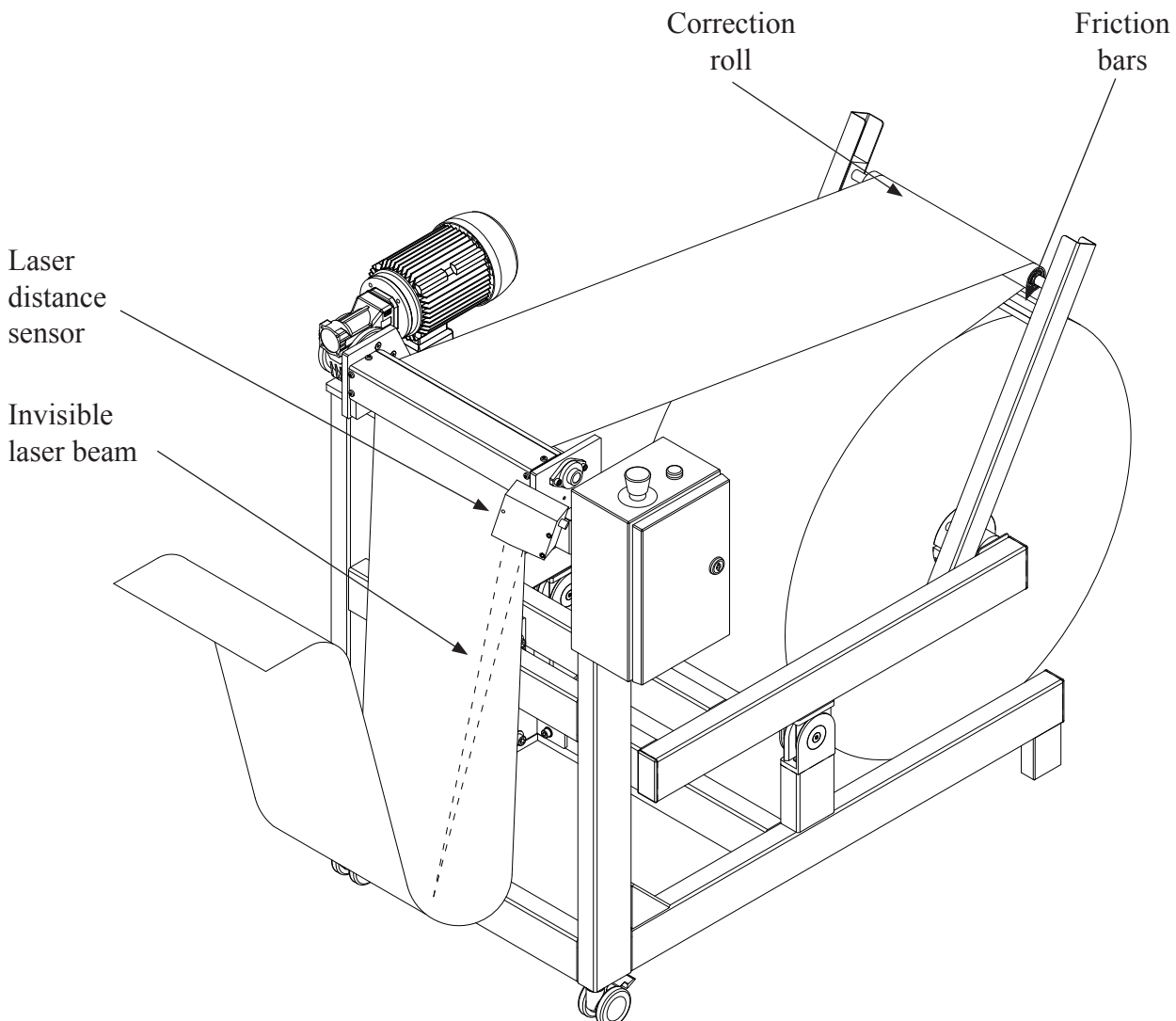
To operate the Paper Roll Feeder, the main switch on the Printer must be in the “on” position and the emergency switch must be in released (upper) position.

When turned on, the green power lamp will light up and depending on the paper position, the feeder motor may start. The paper feeding is controlled by a laser distance sensor and this will always keep a “slack” in the paper between the Paper Roll Feeder and the Printer. The Paper Roll Feeder will automatically feed paper when needed. The paper is feed with a speed depending on the distance from the sensor to the paper. Long distance = low speed, short distance = high speed.

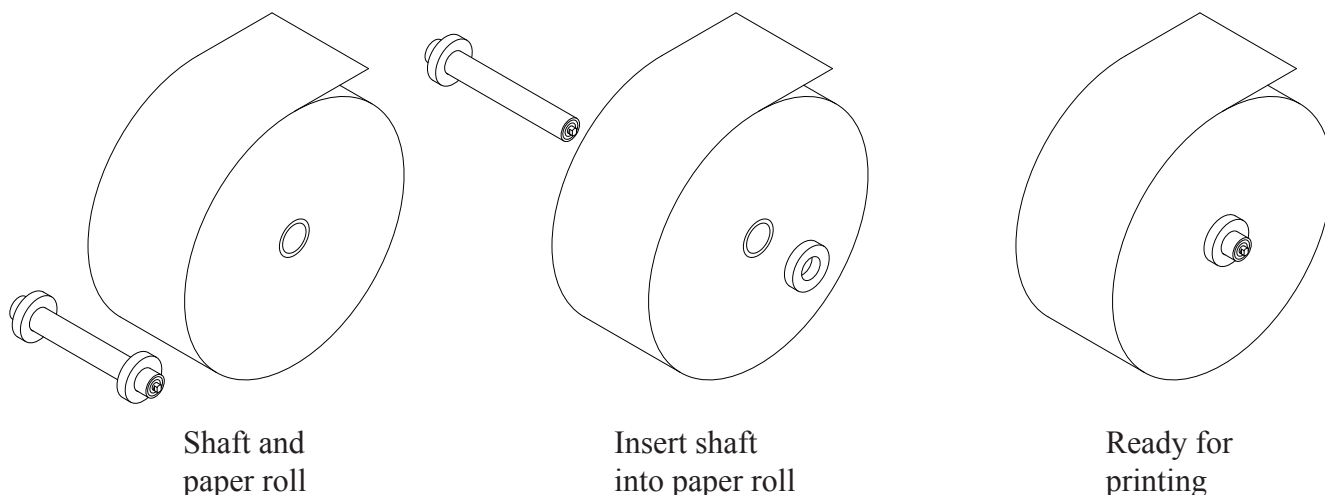
If the emergency stop is activated (pushed down), it has to be reset. The resetting is done by turning the knob like the arrows illustrate, until the knob “pops up” again.



Note! If any work is to be done near or at the feeder rolls, be sure to disconnect the power and the press air to prevent injuries.



8.3 Replacement of the paper roll

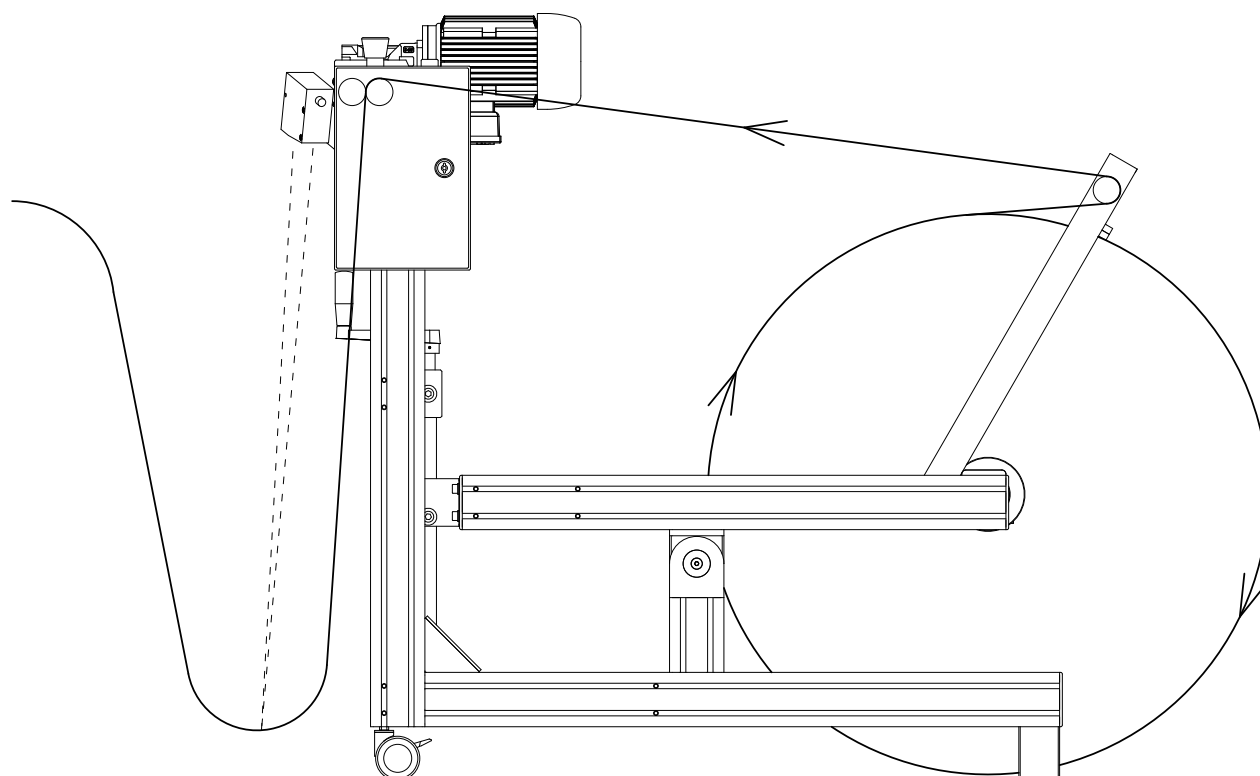


Put the shaft in the center of the roll, and ensure that the shaft is approximately in the centre sideways. Fasten the shaft. The roll must be placed so that the paper is rolled off at the top. (See figure).

Place the paper roll with the shaft already fastened just behind the Paper Roll Feeder. Lift off the correction roll with the friction bars and place aside. Use the crank to lower the roll lift until the lift is below the shaft in the roll. Move the roll forward, make sure that the shaft is situated just above the notches, while turning the crank to raise the roll lift. Turn the crank until the roll is lifted above the floor. Put the correction roll with the friction bars on top of the paper roll like on the figure below. Remove and throw away the first revolution of paper on the paper roll (to get rid of e.g. sand, dust and dirt after rolling the paper roll on the floor).

The paper line must go in between the friction bars and the correction roll. Ensure that the friction bars is resting on top of the roll.

Now the paper must go through the feeder rolls. If turned on, the motor will feed some paper, and the paper can be inserted into the printer.



8.4 Service and maintenance

Troubleshooting Paper Roll Feeder

The Paper Roll Feeder may be considered as an independent unit, even though it is switched on and off with the main switch on the Printer.

If the Paper Roll Feeder motor does not start, please check the following:

Is the green power lamp illuminated ?

If no; Is the main switch on the Printer turned on ?
Is the Paper Roll Feeder connected to the Printer ?
Is the Emergency Switch pressed down ?

If yes; Is the mains cable to the Paper Roll Feeder connected to an outlet with power ?
Is the paper positioned nearby the floor, so it is actually in correct position ?
Do also note that if the laser distance sensor is not finding anything between 20 cm and 80 cm from the sensors front, the motor will not start. Try to hold a piece of paper in front of the sensor, approx. 30 - 40 cm away. Now the motor should start.

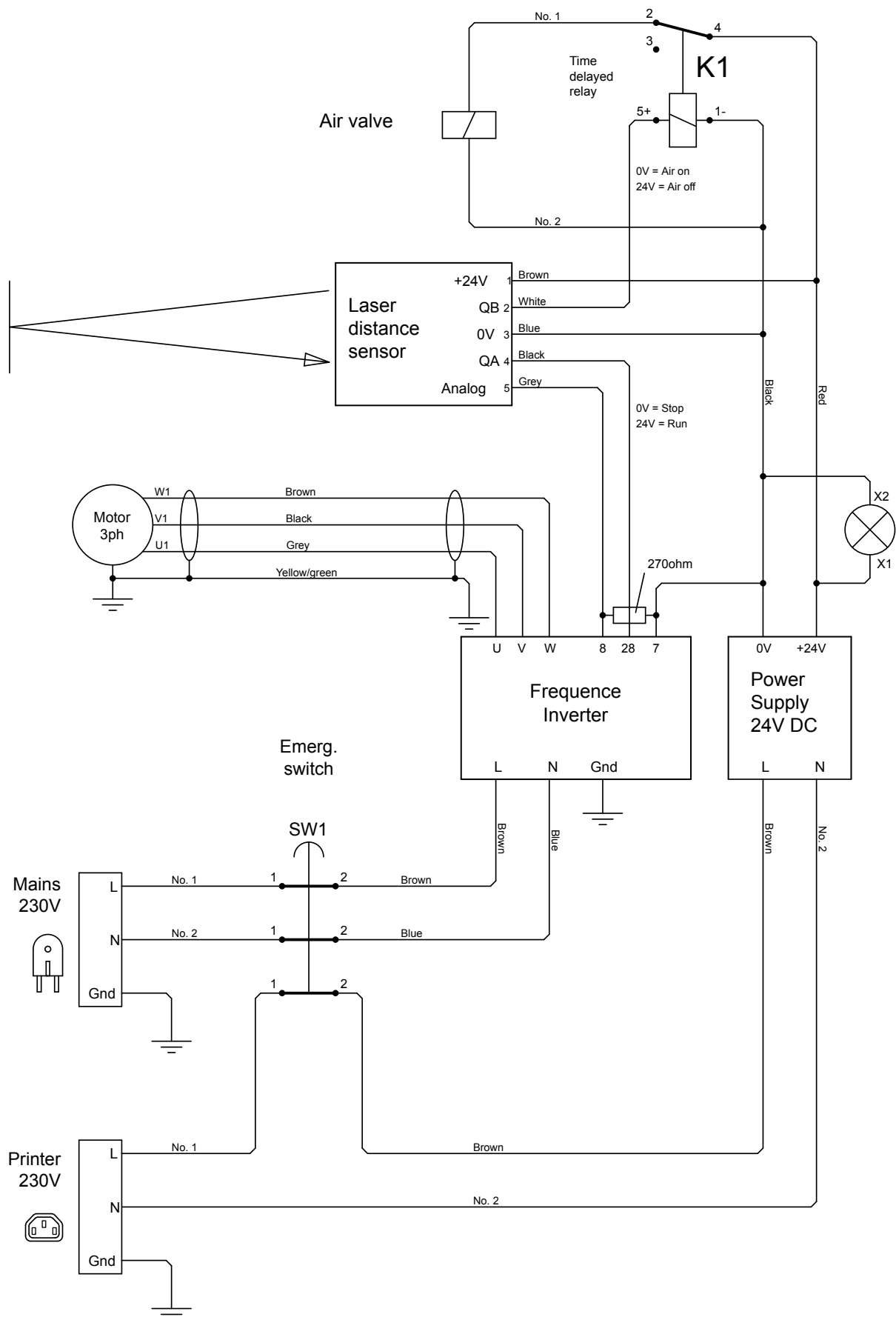
If the motor starts, but the paper is not moving, check the press air supply. The paper Roll Feeder requires press air to function.

Maintenance Paper Roll Feeder

The Paper Roll Feeder will not need much maintenance. The bearings are of a sealed type and will not need any lubrication.

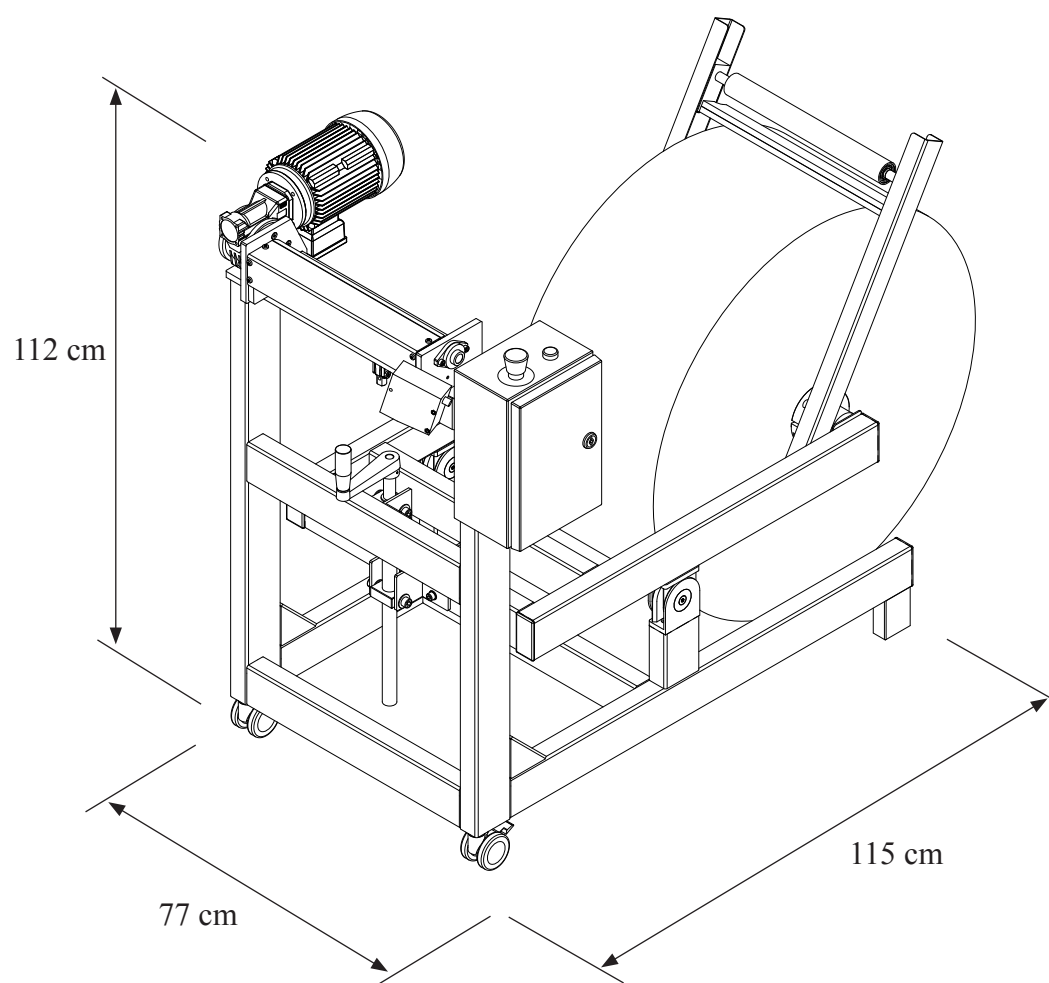
The most important thing is to ensure that the rolls are clean and undamaged. Keep especially an eye on the rubber roll. The rolls may be cleaned with a cloth moisturized with alcohol.

8.5 Schematic drawing electrical



8.6 Measurements

All measurements in centimetres.



9. GENERAL INFORMATION

9.1 Declaration of conformity

Manufacturer :

Braillo Norway as
P.O.Box 93 N-7501
Norway

The manufacturer hereby declares that **Braillo 440 series I** from serial no: **SW-001** produced year **2002**:

Is designed and produced in accordance with the in accordance with the requirement of the Council Directive of 14th June 1989, on the approximation of the laws of the Member States relating to machinery as implemented in Norway by Arbeidstilsynets Bekjentgjørelse nr.694 of 7th August 1992 and conforms to the essential health and safety requirements as referred to in Article 3.

The following Standards were applied:

89/392/EØF

91/368/EØF

93/68/EØF

The manufacturer further declares that the machine is designed and produced in accordance with the Council Directive of 19th. February 1973 (73/23/EEC) on the approximation of the laws of the Member States relating to equipment used within certain voltage limits (The low Voltage Directive). The CE marking is applied from year 1999.

The following Standards were applied:

73/23/EØF

The manufacturer declares that the machine is designed for use in Office Environment and Light Industry and that it is designed and produced to comply with the Council Directive of 3rd.May 1989 (89/336/EEC) on the approximation of the laws of the member States relating to Electromagnetic Compatibility.

The following Harmonized Standards has been applied:

EN50081-1 1992

EN55022B

EN50082-1 1992

IEC-801-4 1989

Signed: Stjørdal, 2 January 2002 on behalf of Braillo Norway AS

Managing director
Title

Kjell Egil Sæves
Name


Signature

9.2 Warranty

This product left the factory in a good working condition in accordance with the technical specifications and carries a warranty of 2 years on parts valid from the date of delivery from Braillo Norway A/S.

The warranty includes:

- Replacement of defect part(s)
- Shipping cost for the replaced part(s)

The warranty excludes:

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

Should a replacement part be required, please do the following:

Send us a "Warranty request form". Please refer to the next page to see the actual form. The form can also be found on the enclosed CD-ROM. After completing the form, please return it to Braillo Norway A/S by e-mail, fax or regular mail. When received, the parts will be shipped as soon as possible.

What to do with the defective part(s):

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

Warranty request form

(Only one printer/part per document)

Customer name:		Date:
Contact person:		
Phone number:	Fax number:	E-mail address:
Printer type:		Printer number:
Part name:		Part number:

Reason for return:

Comments:

Return to: Braillo Norway A/S Wesselveg 1 7500 Stjørdal Norway	Phone number: +47 74 84 04 40 Fax number: +47 74 84 04 41 E-mail: service@braillo.no
--	--

If this document is not returned within two weeks of origination
 We will assume that it is not required and it will be cancelled.

Internal use only:	
Garanti?	
Kunde belastes	
Kommentarer på reparasjon	

9.3 Addresses and phone numbers

Web: www.braillo.com

Administration/Sales department Braillo Norway AS:

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Mail: P.O.Box 447
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Norway
Phone: +47 33 00 28 70
Telefax: +47 33 00 28 71
e-mail: braillo@braillo.no

Service Braillo Norway AS:

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Telefax: +47 74 84 04 41
e-mail: service@braillo.no