

Rho 312R / Rho 512R

Service Manual – Print head 12M 2C S

(for print head version with 400 dpi part nr. LJ3022400)

Edition 15.12.2014

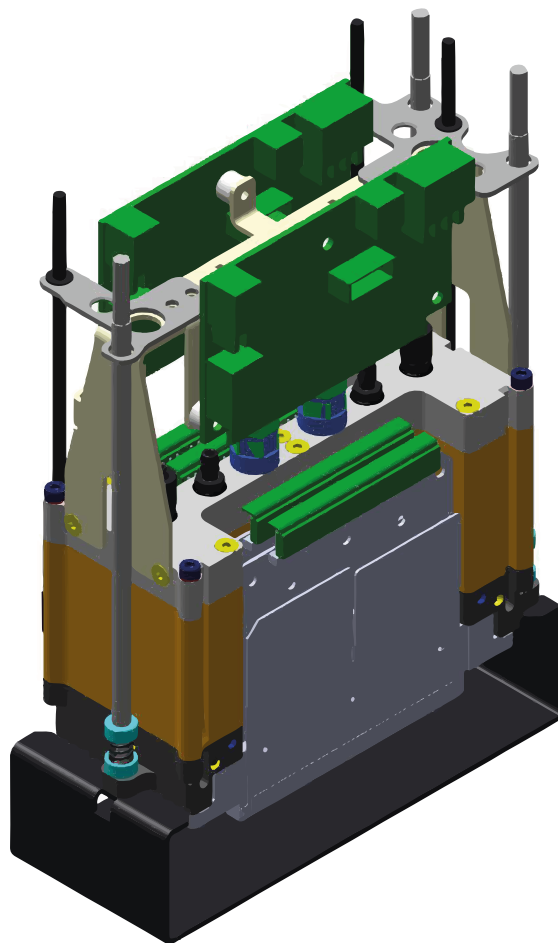


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1 About this document

- ▶ Make sure that this document is accessible at all times.
- ▶ Insert all supplements received from Durst Phototechnik AG into this document.
- ▶ Read and comply with this document and all other documents in the service documentation.

1.1 Purpose and target group

This document is part of the service documentation and contains information about how to replace the print head modules.

This information applies to printers of the Rho 512R / Rho 312R range of Durst Phototechnik AG and should be referred to by the following personnel:





- Durst Phototechnik AG Service Engineers (Service Engineer DV)
- General service technicians (Service Technician GV)
- Customer's technicians trained on site (In-house Technician)

1.2 Revisions

| Edition of the document | What is new? |
|-------------------------|---|
| 15.09.2014 | Draft |
| 15.12.2014 | New Testpattern for mechanical adjustment |

Tab. 1: Revision index

1.3 Symbols and markers

| Symbol | Meaning |
|--|---|
| ✓ | Pre-requirement for an action |
| ▶ | Request for a single-step action |
| 1. | Step within a request for a multi-step action |
| ↪ | Result of an action sequence |
|  | Note for easier or safer work |
| → | Cross-reference |
|  DANGER! | Immediately dangerous situation, where disregard of safety measures will lead to death or serious injury. |
|  WARNING! | Potentially dangerous situation, where disregard of safety measures may lead to death or serious injury. |
|  CAUTION! | Potentially dangerous situation, where disregard of safety measures may lead to minor injury. |
| NOTE! | Potentially dangerous situation, where disregard of safety measures may lead to damage to property. |

Tab. 2: Symbols and markers

1.3.1 Structure of warnings

Warnings are structured as follows (shown here as an example: the warning level "WARNING"):

 **WARNING! Type and source of the hazard**

Consequences of the hazard.

- ▷ Measures for avoiding the hazard.
- ▶ Read the warning and comply with it.

2 Materials and tools required

| Designation | Specification | Order number |
|--|----------------------------|--------------|
| Plug for ink tubes (print head side) | FTLLP-6 black | 1472683 |
| Cap for valve block | MTLLP-6 black | 1472676 |
| Head locking wrench for print head module | Hexagon nut driver, 4.0 mm | ZW27136 |
| Head adjustment wrench for print head module | Hexagon nut driver, 3.0 mm | ZW27135 |

Tab. 3: Materials and tools required

3 Description of the print head module

3.1 Position of the fixing and adjustment screws

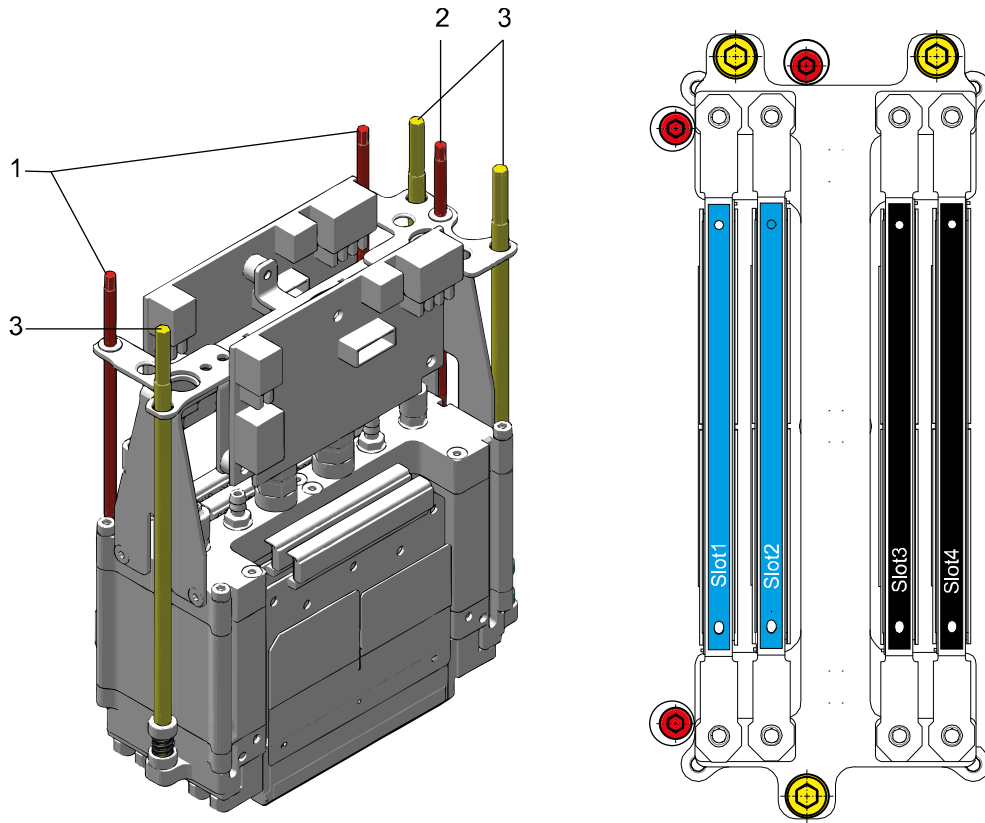


Fig. 1: Position of the adjustment and fixing screws

- 1 Adjustment screws (X rotation)
- 2 Adjustment screw (Y direction)
- 3 Fixing screws

3.2 Slot arrangement

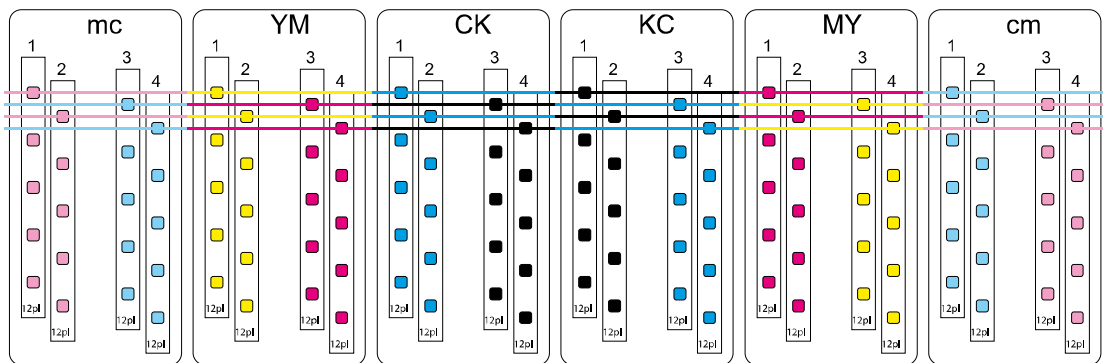


Fig. 2: Slot arrangement

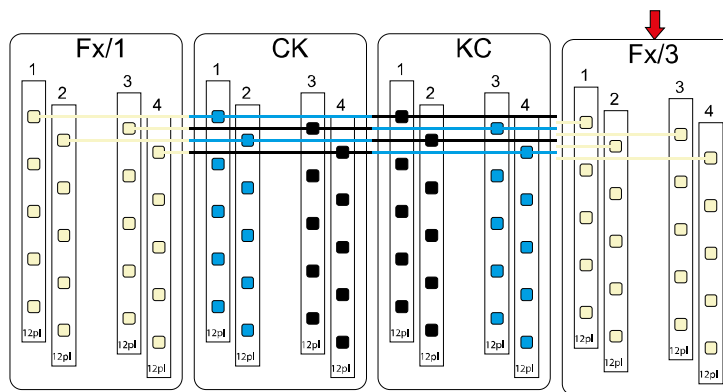


Fig. 3: Slot arrangement of white print heads

3.3 Arrangement of the print heads

i Depending on the exact configuration of the printer, the arrangement of the print heads can be seen on the circuit diagram (→ circuit diagram).

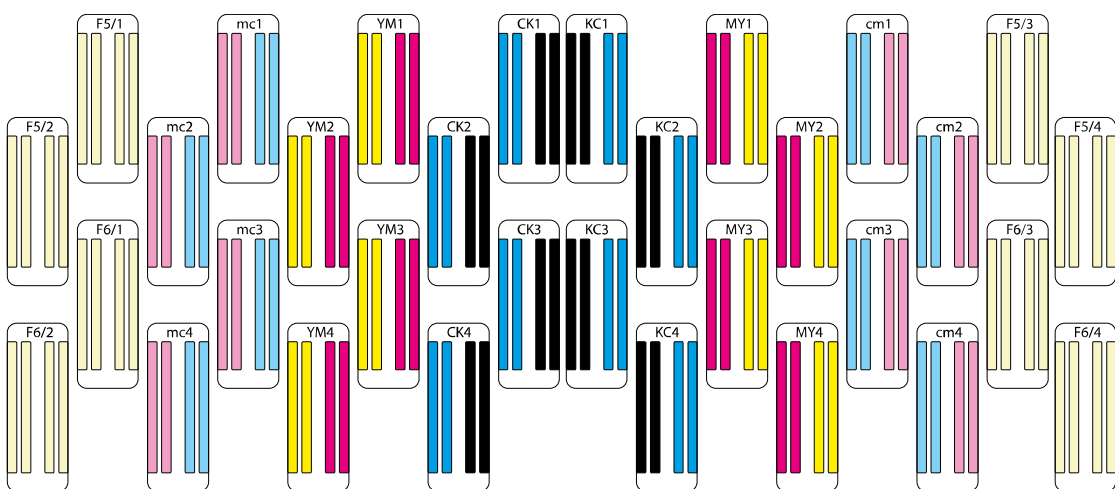


Fig. 4: Arrangement of the print heads for CMYKcm + white (example)

4 Replacing the print head module

WARNING! Contact with inks!

Risk to health if inks are allowed to come into contact with skin or eyes or if inks are breathed in.


- ▷ Wear safety gloves.
- ▷ Wear safety glasses.
- ▷ Avoid allowing the ink to come into contact with skin or eyes.

NOTE! Improper installation and de-installation!

Damage to the print head modules.

- ▷ Do not touch the circuit board contacts.
- ▷ Do not touch the nozzle plate.
- ▷ Do not kink the ink tubes.

4.1 Before replacing a print head module

 Before replacing a print head module, print a test pattern. This provides documentation of the condition of the nozzles.

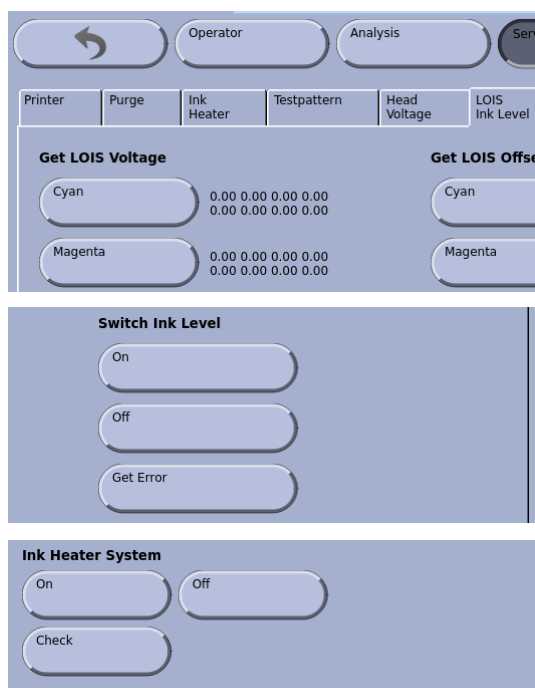
- ▷ Printing a density compensation test

4.2 Disassembling the old print head module

- ✓ Have the necessary tools to hand:
 - Covers:
 - Plugs for ink tubes
 - Caps for valve block
 - Head locking wrench for print head module


4.2.1 Preparing for disassembly of the print head module

- ✓ Ink heating must be switched on.
 - ✓ The print heads must be up to working temperature.
 - ✓ The print heads must be filled with ink.
1. Select the **Ink Heating** tab.
 2. Check the temperature of the print heads.
The print heads must have reached working temperature.




3. Select the **LOIS Ink Level** tab.
4. Check the ink level in the print heads.
The print heads must be filled with ink.
5. Switch off the Ink Level Control.
6. Select the **Printer** tab.
7. Switch off the Ink Heating.

4.2.2 Disassembling the print head module

 As soon as there is no vacuum in the meniscus tube, ink will flow out of the print heads.

1. At the parking position, line the purge tray with paper.
2. Detach all cables from the print head module.
3. Undo the fixing screws.
4. Carefully pull the ink tubes off the printer valve block.
5. Fit plugs or caps to seal off the ink tubes at the print head end and printer end.

 When pulling off the meniscus tube, make sure that the vacuum is maintained until the seal has been made, for instance by pressing the meniscus tube.

6. Pull the meniscus tube off the printer and seal the print head end.
7. Seal the meniscus tube at the printer end.
8. Carefully lift the print head module off the print carriage.
9. Carefully pull the legible stickers off the ink tubes and off the print head module, and affix them to the new print head module.
10. Use the old print head module as reference to cut the ink lines of the new print head.

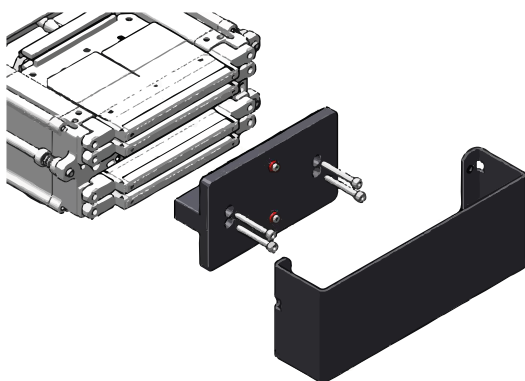
4.3 Preparing the old print head for the dispatch

- i** Print head modules must be filled with ink when sent to Durst Service.
If a nozzle plate is broken or the print head module is leaking, the print head module must be empty when sent to Durst Service.

NOTE! Lumps can result when different inks are mixed together!

Damage of the print head and the slots

- ▷ The ventilation screw on the underside of the capping plate must be closed.
- ✓ Have the necessary materials to hand:
 - Capping plate (included in the scope of supply of a new or refurbished print head module)



1. Attach the capping plate to the print head module.
2. Make sure that the capping plate is fitted squarely and cleanly.
3. Make sure that the ventilation screws on the underside of the capping plate are closed.

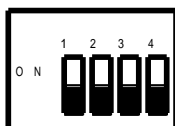
4. Fill in the Print Head Change Form.
5. Send the old print head to Durst Service, enclosing the following data in a package protected against ink:
 - Test pattern printed using the old print head module
 - Test pattern printed using the new print head module
 - Print Head Change Form

- i** The Print Head Change Form is supplied with the new print head module.

4.4 Fitting the new print head

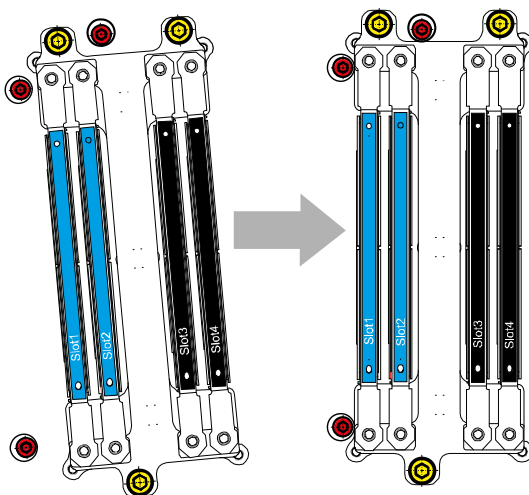
4.4.1 Preparing the new print head

1. Remove the transport protection from the new print head module.
2. Cut the ink tubes to an appropriate length.
3. Identify the ink tubes and print head module with stickers taken from the old print head module.



4. Refer to the circuit diagram or the old print head module for the DIP switch settings.
5. Set the DIP switch on the new print head module to those settings.

4.4.2 Fitting the print head module



1. Carefully insert the print head module into the printing plate and push it into the installation position. The print head module will perceptibly click into place.
2. Move the print head module to the extreme top left corner.
3. Tighten the fixing screws
4. Slacken all the fixing screws a few turns.
5. Connect all cables to the print head.
6. Connect the ink tubes.
7. Connect the meniscus tube.

4.5 Commissioning the print head module

4.5.1 Empty the print head module

1. Select the **LOIS Ink Level** tab.
2. Switch off the Ink Level Control.
3. Select the **Printer** tab.
4. Switch on the ink heating.
5. Select the **Ink Heating** tab.
6. Check the temperature of the print heads.
Wait until the print heads are up to working temperature and until the working temperature is stable.
7. Pull out the light trap.
8. Move the print carriage until the new print head module is above the purge tray.

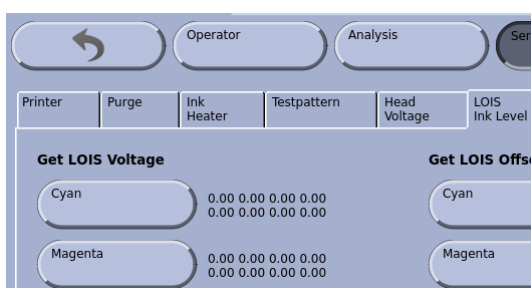
i The meniscus tubes for several print head modules are suspended from one meniscus valve. Except where print head modules are to be drained, all meniscus tubes suspended from the same meniscus valve must be sealed or clamped.

9. Select the **Pumps / Valves** tab.

10. Open the relevant meniscus valve.
11. Open the purge valve (**Purge Ambient Valve**).
Ink is driven out of the print head module under pressure, and flows via the purge tray into the collection container.
12. Wait at least 5 min until the print head module is completely drained.
13. Close the purge valve.
14. Close the meniscus valve.
15. Connect the sealed or clamped meniscus tubes again.

4.5.2 Calculating the LOIS offset (Low On Ink Sensor)

- ✓ The print head module must be drained
- ✓ The Ink Level Control is switched off
- ✓ The print heads must be up to working temperature (±0,1 °C)



1. Select the **LOIS Ink Level** tab → **Get Lois Voltage**
2. Readout the LOIS voltage values by pressing **Check all**

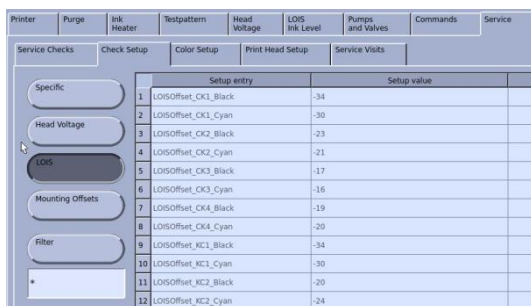
3. Determine the LOIS offset by using following calculation:

LOIS offset = LOIS voltage x 100 + 20 – ITV (ink temperature value)

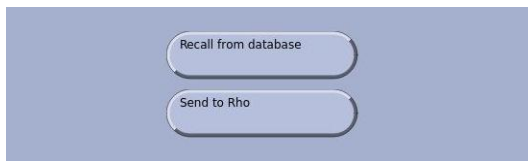
ITV (ink temperature values):

- 51°C → ITV = 314 → standard setting for Rho 512R and Rho 312R
- 50°C → ITV = 320
- 47°C → ITV = 338
- 42°C → ITV = 368

NOTE! The white print heads are running at a nominal temperature of 53°C. For LOIS offset adjustment they need to be set to a temperature of 51°C and set back to 53°C after finishing the adjustment.



4. Select the **Service** tab → **Check Setup** → **LOIS**
5. Press **Edit** button
6. Enter the calculated values and press the **Save** button
7. Switch back to the **LOIS ink level** tab



8. Press **Recall from database**

9. Press **Send to Rho**

10. Select the **LOIS Ink Level** tab.

11. Switch on the Ink Level Control.

The print heads are filled with ink.



As a rule, the LOIS offset is set individually for each print head module.

If the LOIS offset is to be calculated for all print head modules (for instance when commissioning a new printer).

4.5.3 Close the print head module commissioning

✓ Medium is loaded

✓ All print heads are operational

1. Select the **Purge** tab.

2. Perform 2 long purges with the exchanged print head module (without cleaning the nozzle plate).

3. Perform a long purge with all colors (with cleaning the nozzle plate).

4. Print a few images to check that all the nozzles are operational.

5 Mechanically aligning the print heads

5.1 Instructions for working with test patterns

- ▶ Before printing test patterns, print for some time in normal mode.
- ▶ Make sure that the printer is warmed up properly.
- ▶ Make sure that all the nozzles are printing.
- ▶ Select a HMD of 2.5 mm.

i In order to ensure good quality, the HMD for the test patterns must be 2.5 mm.

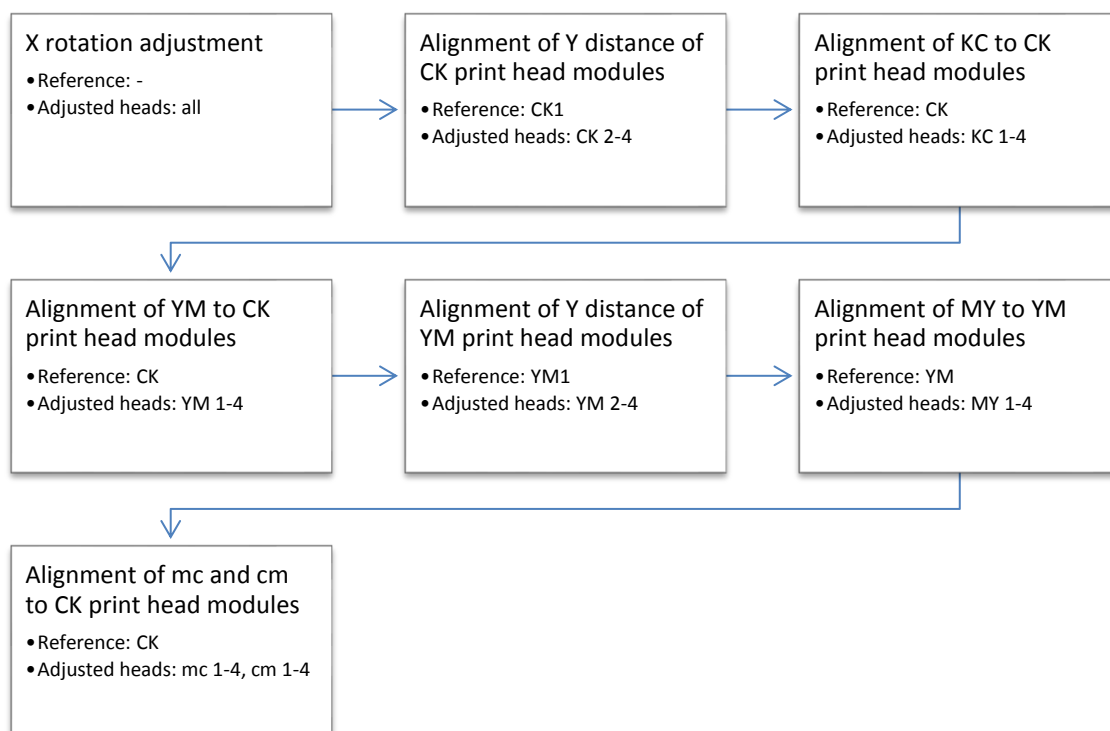
- ▶ Print all the test patterns on paper.

i Recommended paper:
Blueback paper, white, 115–150 g/m²

i 512 pixels are equivalent to the length of a slot (65 mm).

i The dimensions and proportions of the test patterns shown in this service document differ from the test patterns used in practice. The illustrations serve only to give an idea of the test patterns and their evaluation.

5.2 Sequence of mechanical print head alignment



5.3 Adjusting the rotation of the print head modules

i All the print head modules can be aligned in a single operation.
 Alignment of the print head modules to each another is not necessary in this operation.

Printing the test pattern

1. Select the **Testpattern** tab.
2. Check and if necessary adjust the following settings:

| Area | Settings |
|-------------------------|--|
| Colors | All |
| Print Quality Mode | Test pattern Mode |
| Test pattern | RhoP12_XRotation_CMYK.tif |
| Heads | All |
| Options | High Resolution Unidirectional Return in park position Encoder compensation Binary Mode (800dpi) |
| Media Advance in Pixels | 0 |
| Number of repeats | 1 |
| Patternmask | 0xAA |

Tab. 4: X rotation test pattern settings

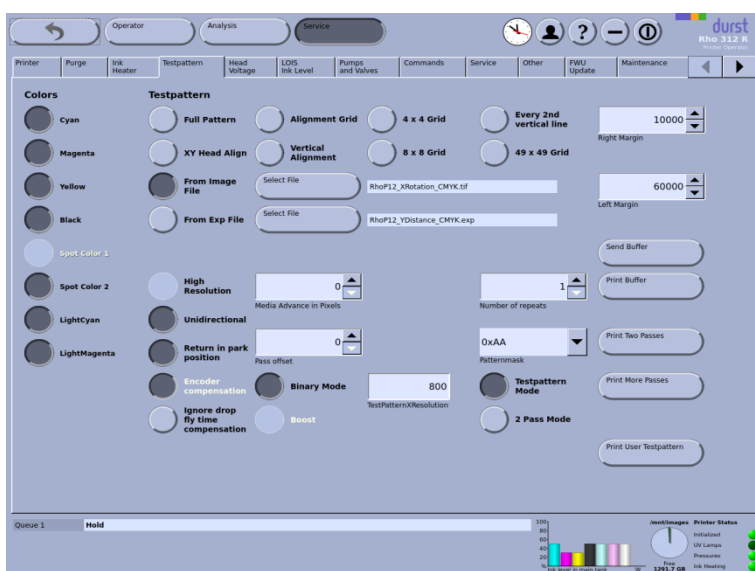


Fig. 5: X Rotation test pattern settings

3. Press the **Print Buffer** button.

Evaluating the test pattern

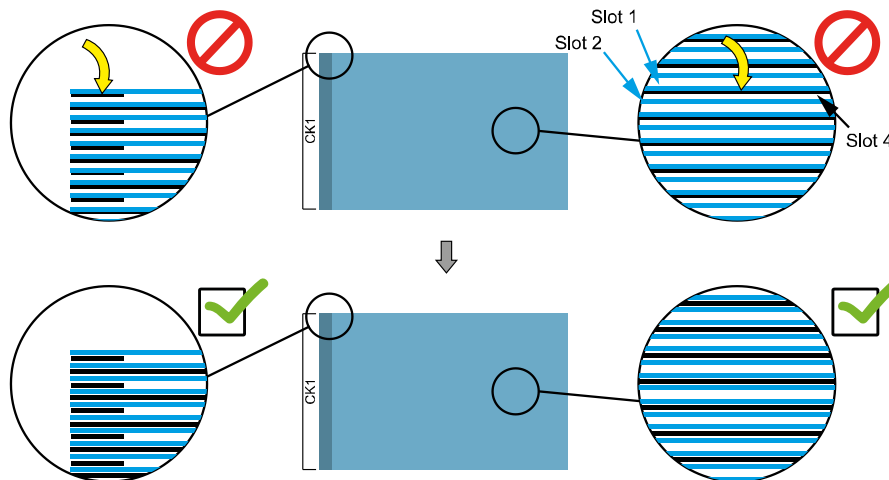


Fig. 6: Evaluating the test pattern X rotation (example)

Optimum setting

the cyan lines must be in the middle of the black lines.

Aligning the print head module

- ✓ Have the necessary tools to hand:
 - Head locking wrench for print head module
 - Head adjustment wrench for print head module

i Method of operation of the adjustment screw (X rotation)

Clockwise rotation moves the print head module away from the adjustment screw.

Counterclockwise rotation moves the print head module towards the adjustment screw, but not automatically. The print head module must be pushed carefully by hand in this direction.

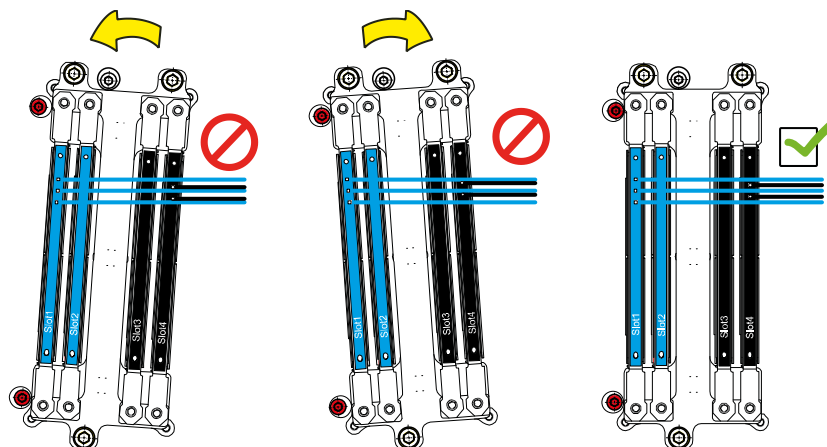


Fig. 7: Aligning the rotation of the print head modules

1. Align the print head module with the adjustment screws for X rotation (do steps of ¼ to ½ of a turn).
2. Print the test pattern and evaluate it.
3. Repeat the procedure if necessary until the print head module is correctly aligned.

5.4 Aligning the Y distance between the CK print head modules

i The CK print head modules are the reference for all the other colors. Therefore the first step is to align these to each other row by row.

- ▷ Perform these operations with the utmost care.
- ▷ First align print head module CK2 to CK1.
- ▷ Repeat the procedure for all other CK print head modules (CK3 to CK2, CK4 to CK3).

✓ The rotation of all print heads is adjusted.

Printing the test pattern

1. Select the **Test pattern** tab.
2. Check and if necessary adjust the settings for the Y Distance CK test pattern

| Area | Settings |
|-------------------------|--|
| Colors | All |
| Print Quality Mode | Test pattern Mode |
| Test pattern | RhoP12_YDistance_V1_CMYK.exp |
| Heads | All |
| Options | High Resolution Unidirectional Return in park position Encoder compensation Binary Mode (800dpi) |
| Media Advance in Pixels | 0 |
| Number of repeats | 1 |
| Patternmask | 0xAA |

Tab. 5: Y Distance test pattern settings

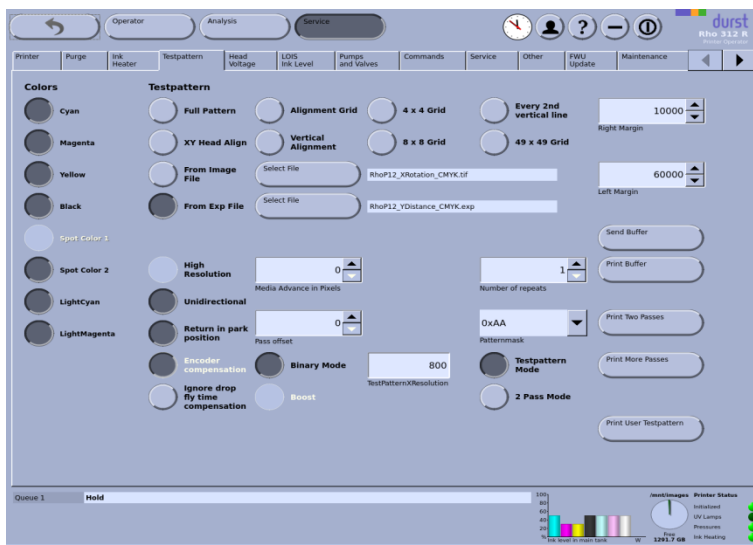
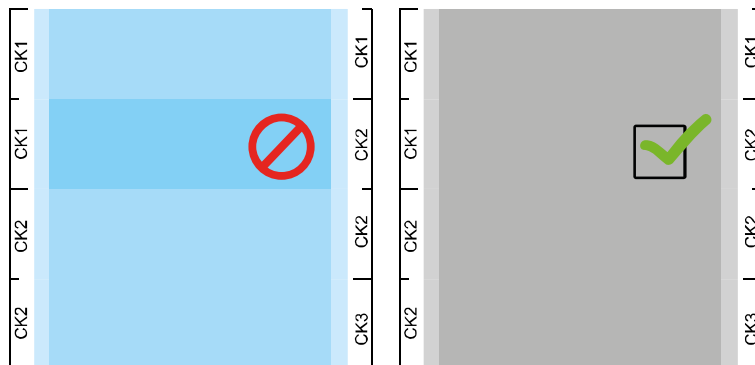


Fig. 8: Y Distance test pattern settings

3. Press the **Print More Passes** button

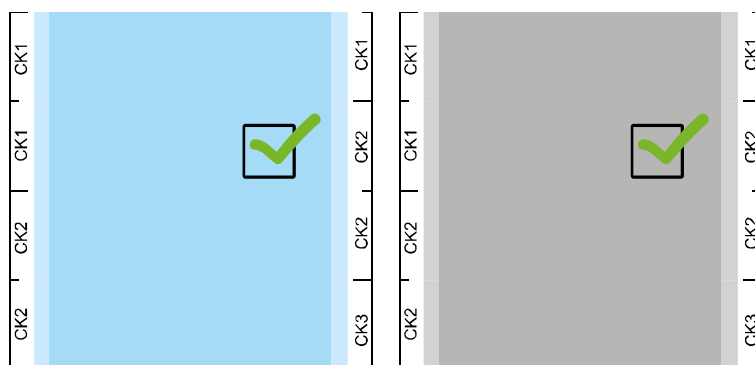
Evaluating the test pattern




Example 1
The rotation of the print head module CK1 or CK2 must be adjusted. (→ Chapter 5.3, p. 17)



Example 2
The Y distance between the print head module CK1 and CK2 must be adjusted.



Example 3
The Y distance between the print head modules CK1 and CK2 is adjusted.

 The cyan pattern is printed with slot 1 of the specific print head. The black pattern is printed with slot 4.

Optimum setting

The density in all fields is uniform throughout. The cyan pattern and the black pattern give the same result.

Example

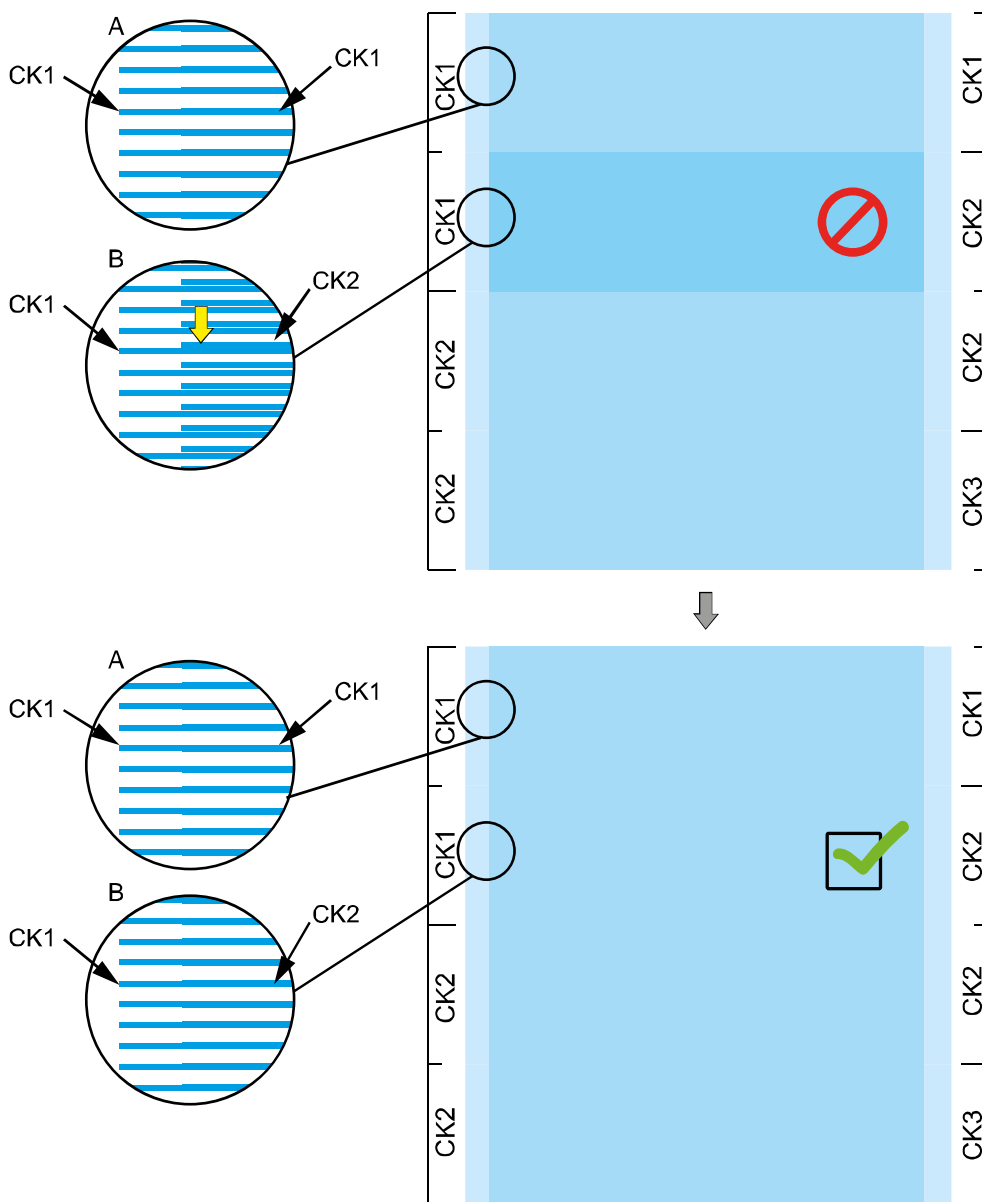


Fig. 9: Evaluating the Y distance CK test pattern (example)

i Reference area (A)
 In area A CK1 is printing on CK1. The density of this area is the reference.

i Adjustable area (B)
 In area B CK2 is printing on CK1. Area B must look equal as area A.

In the example above the Y position of print head CK2 is too high. The print head must be moved down.

Aligning the print head module



Method of operation of the adjustment screw (Y direction)

Clockwise rotation moves the print head module away from the adjustment screw.

Counterclockwise rotation moves the print head module towards the adjustment screw, but not automatically. The print head module must be pushed carefully by hand in this direction.

1. Align the print head module with the adjustment screw for the Y direction (do steps of $\frac{1}{8}$ to $\frac{1}{4}$ of a turn).
2. Print the test pattern and evaluate it.
3. Repeat the procedure if necessary until the print head is correctly aligned.
4. This adjustment must be done Level by Level (CK1 to CK2, CK2 to CK3,...) and carefully as this **will affect the following steps!**
5. Make the layout of the Adjustment area equal to the layout of the Reference area by moving the CK2 head up or down.

5.5 Aligning KC to CK print head modules



All KC print head modules can be aligned in a single operation.

- ✓ The distance between the CK print head modules is adjusted.

Printing the test pattern

1. Select the **Test pattern** tab.
2. Check and if necessary adjust the settings for the Y Align test pattern

| Area | Settings |
|-------------------------|--|
| Colors | All |
| Print Quality Mode | Test pattern Mode |
| Test pattern | RhoP12p_YAlign_CMYK.tif > for CMYK RhoP12p_YAlign_Spot.tif > for extra colors |
| Heads | All |
| Options | High Resolution Unidirectional Return in park position Encoder compensation Binary Mode (800dpi) |
| Media Advance in Pixels | 0 |
| Number of repeats | 1 |
| Patternmask | 0xAA |

Tab. 6: Y Align test pattern settings

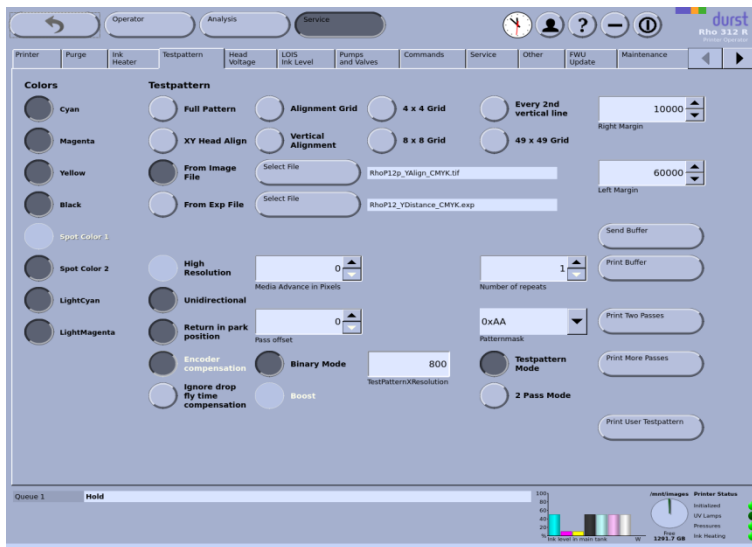
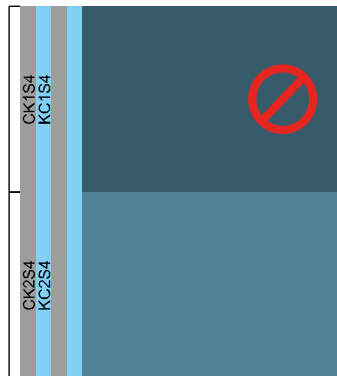
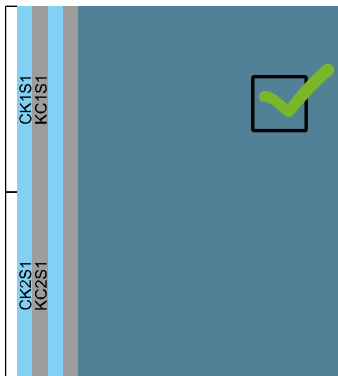


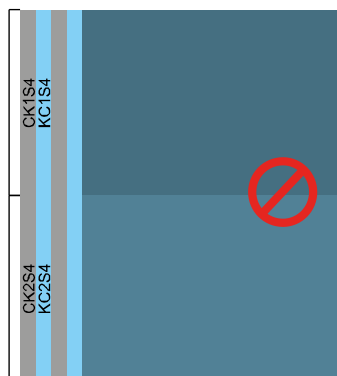
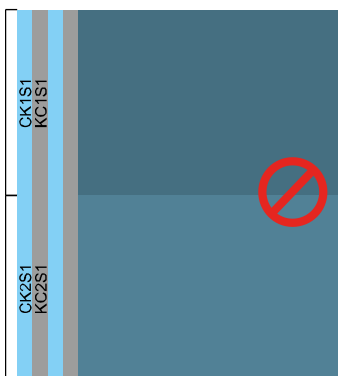
Fig. 10: Settings for KC to CK adjustment

3. Press the **Print Buffer** button

Evaluating the test pattern



Example 1
Rotation of the print head module KC1 must be adjusted



Example 2
Y position of the print head module KC1 or KC2 must be adjusted

i In the left pattern slot 1 of CK and slot 1 of KC are printing on top of each other.
In the right pattern slot 4 of CK and slot 4 of KC are printing on top of each other.

If there is a difference between the left and the right test pattern the rotation of the specific print head must be adjusted (→ Chapter 5.3, p. 17)

If the density in the left and in the right pattern is the same, the Y position of the specific print heads can be adjusted.

Example KC

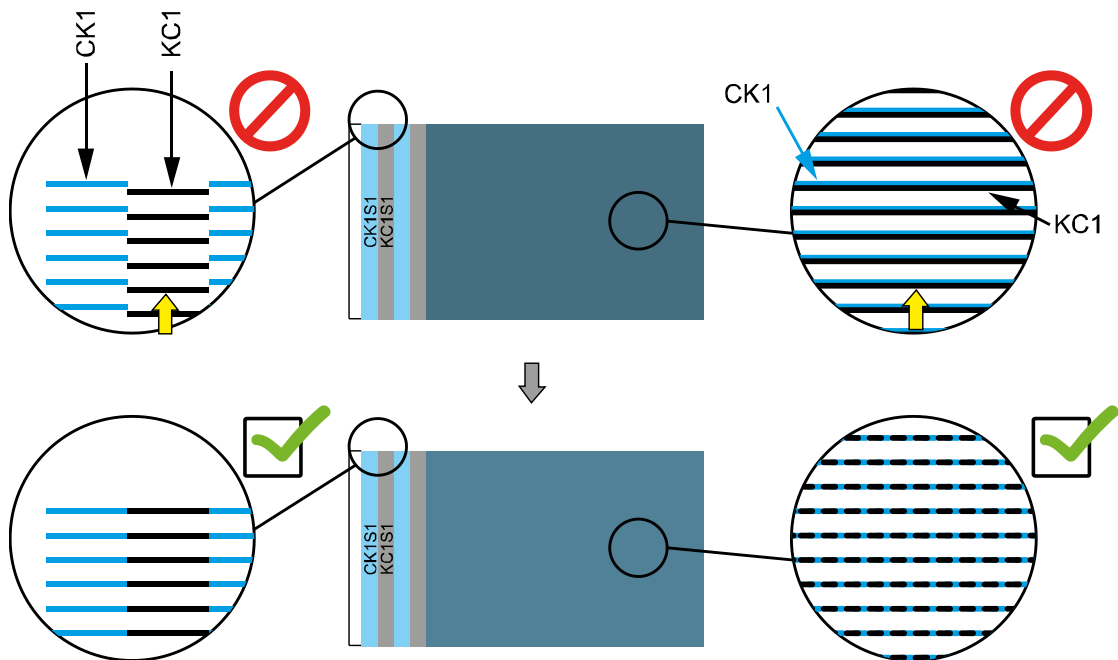


Fig. 11: Evaluating the Y Align test pattern in detail (KC)

The lines printed by KC are slightly low compared to the reference line of CK
The print head module KC must be moved up.


Optimum setting

The first line of CK and KC are at the same height.
The lines of CK and KC are overlapping

Aligning the print head module

(→ Chapter 5.4, p. 22)

5.6 Aligning YM to CK print head modules

 All YM print head modules can be aligned in a single operation.

Printing the test pattern

1. Select the **Test pattern** tab.
2. Check and if necessary adjust the setting for the Y Align test pattern (→ Tab. 6, p. 22)
3. Press the **Expose** button.

Evaluating the test pattern

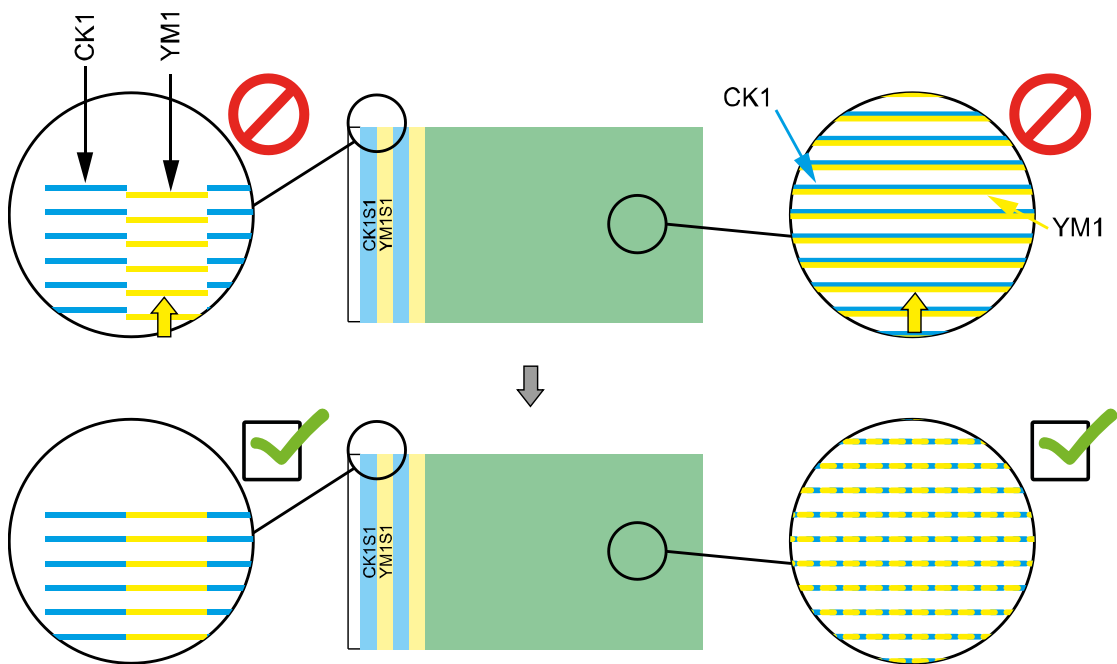


Fig. 12: Evaluating the Y Align test pattern in detail (YM)

Example YM

YM1 is slightly too low compared to CK1. YM1 must be pushed up.

Optimum setting

The first line of CK and YM are at the same height.
The lines of CK and YM are overlapping

Aligning the print head module

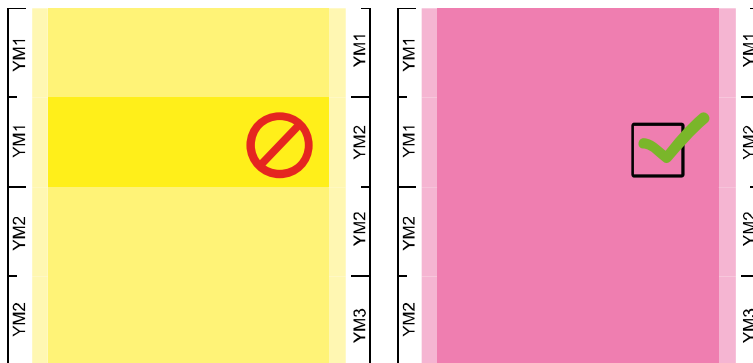
(→ Chapter 5.4, p. 22)

5.7 Aligning the Y distance between the YM print head modules

Printing the test pattern

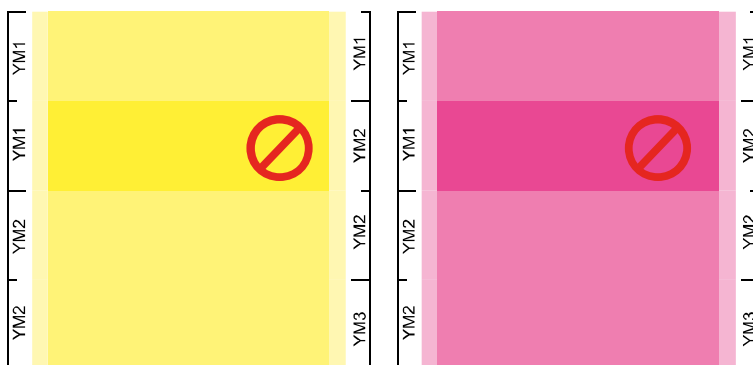
1. Select the **Test pattern** tab.
2. Check and if necessary adjust the settings for the Y Distance YM test pattern (→ Tab.6, p. 22)
3. Press the **Expose** button.

Evaluating the test pattern



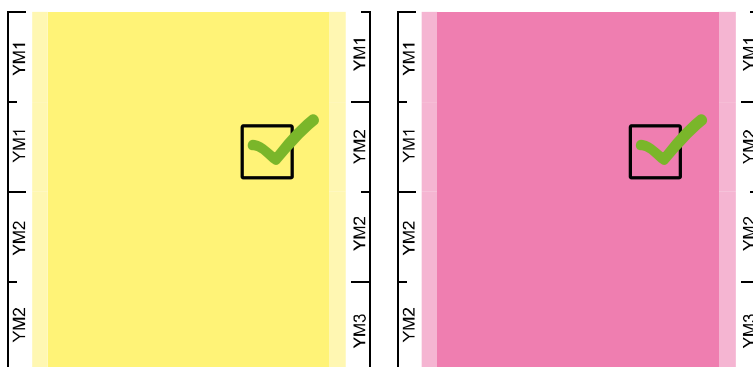
Example 1

The rotation of the print head module YM1 or YM2 must be adjusted. (→ Chapter 5.3, p. 17)




Example 2

The Y distance between the print head module YM1 and YM2 must be adjusted.



Example 3

The Y distance between the print head modules YM1 and YM2 is adjusted.

 The yellow pattern is printed with slot 1 of the specific print head. The magenta pattern is printed with slot 4.

Optimum setting

The density in all fields is uniform throughout. The yellow pattern and the magenta pattern give the same result.

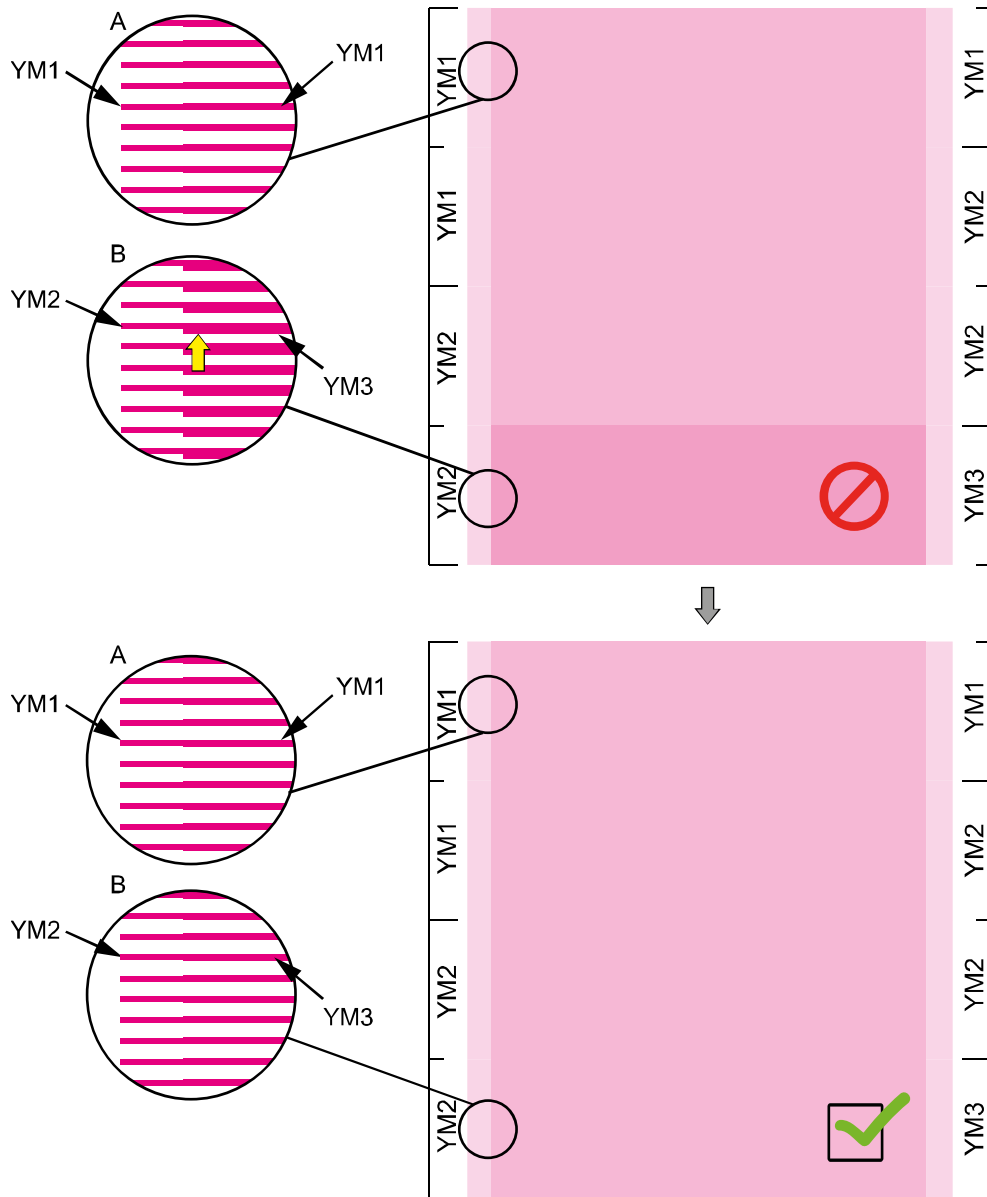
Example

Fig. 13: Evaluating the Y distance YM test pattern (example)

**Reference area (A)**

In area A YM1 is printing on YM1. The density of this area is the reference.

**Adjustable area (B)**


In area B YM3 is printing on YM3. Area B must look equal as area A. The line setup can be adjusted with the Y position of YM3.

In the example above the Y position of print head YM3 is too low. The print head must be moved up.

Aligning the print head module

(→ Chapter 5.4, p. 22)

5.8 Aligning MY to YM print head modules

 All MY print head modules can be aligned in a single operation.

Printing the test pattern

1. Select the **Test pattern** tab.
2. Check and if necessary adjust the setting for the Y Align test pattern (→ Tab. 6, p. 22)
3. Press the **Expose** button.

Evaluating the test pattern

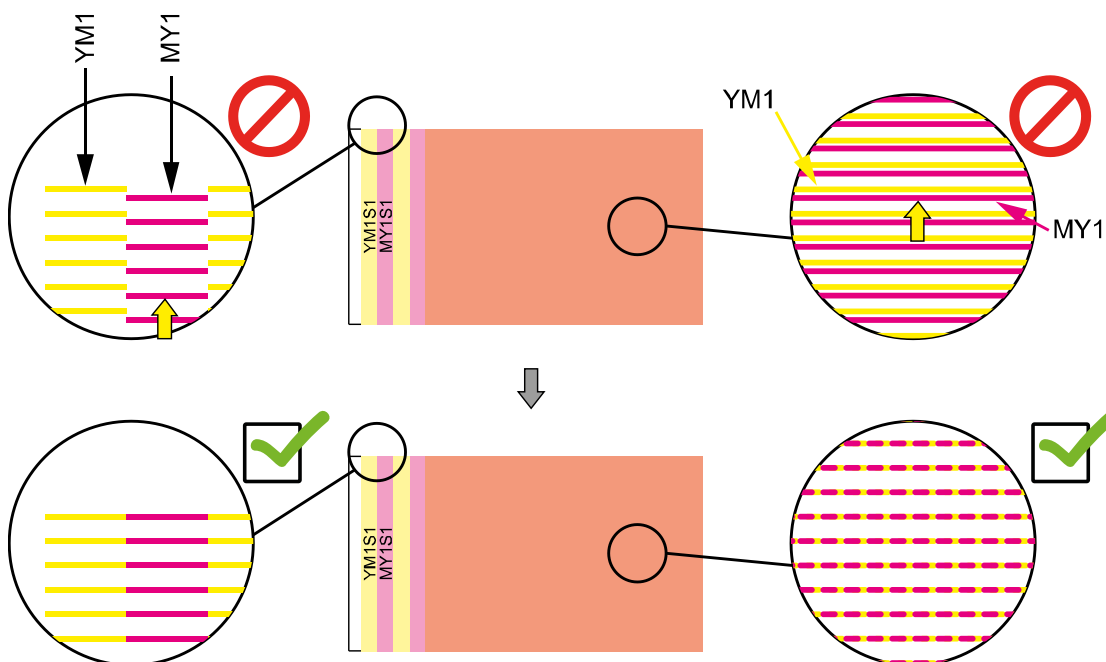


Fig. 14: Evaluating the Y Align test pattern in detail (example MY)

If there is a difference between the left and the right test pattern the rotation of the specific print head must be adjusted (→ Chapter 5.3, p. 17)

If there is a density irregularity visible in both patterns, the Y position of the specific print head must be adjusted.

Example

The lines printed by the MY print head are slightly low compared to the reference line of the YM print head

The print head module MY must be moved up.

Optimum setting


The first line of YM and MY are at the same height.

The lines of YM and MY are overlapping

Aligning the print head module

(→ Chapter 5.4, p. 22)

5.9 Aligning mc/cm to CK print head modules

 All mc and cm print head modules can be aligned in a single operation.

Printing the test pattern

1. Select the **Test pattern** tab.
2. Check and if necessary adjust the setting for the Y Align Spot test pattern, (Tab. 6, p. 22)
3. Press the **Expose** button.

Example mc

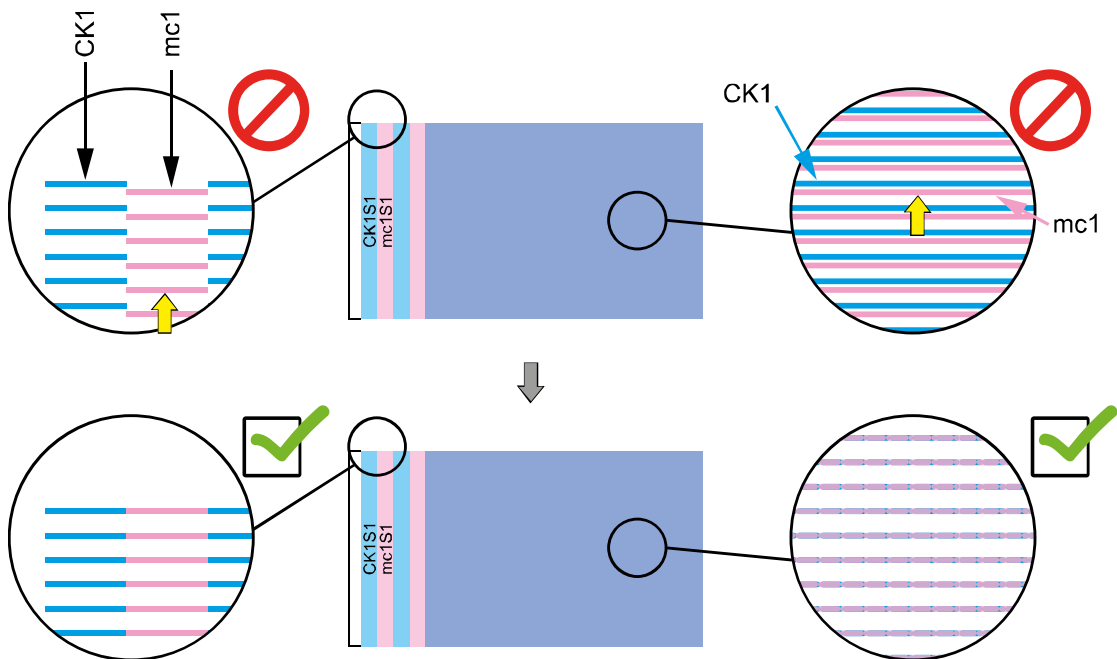


Fig. 15: Evaluating the Y Align test pattern in detail (mc)

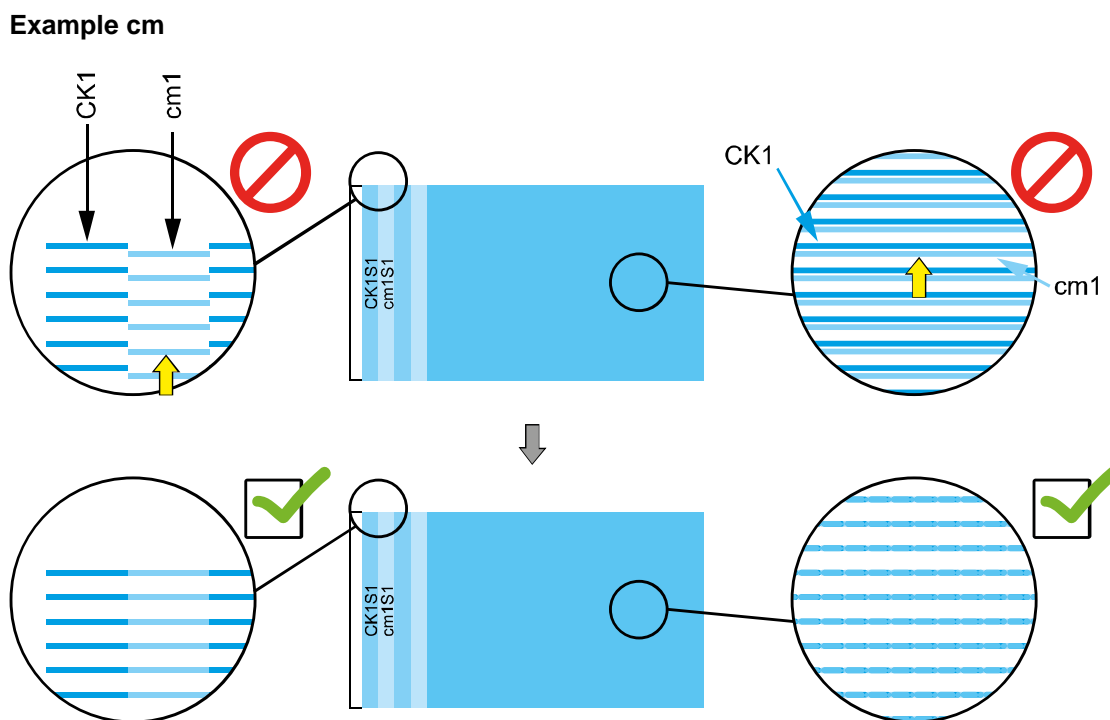


Fig. 16: Evaluating the Y Align test pattern in detail (cm)

The lines printed by the cm print head are slightly low compared to the reference line of the CK print head

The print head module cm must be moved up.

Optimum setting

The first line of CK and cm are at the same height.

The lines of CK and cm are overlapping

Aligning the print head module

(→ Chapter 5.4, p. 22)

5.10 Fixing the print head modules in place

- ✓ All print heads must have been mechanically aligned (→ Chapter 5, p. 16)
- ✓ Tighten the fixing screws on all print head modules.
 - a) Check the Y Distance and the Y Align test pattern again to make sure that the print head modules did not get out of place.
 - b) Readjust a print head module if necessary.

6 Software adjustment

6.1 Head Voltage Adjustment

1. Select the **Test pattern** tab.
2. Check and if necessary adjust the settings for the Head Voltage Adjustment test pattern

| Area | Settings |
|-------------------------|---|
| Colors | C, M, Y, K, c, m |
| Print Quality Mode | 2 Pass Mode |
| Test pattern | Full pattern |
| Heads | One Color, Head 1-4, Slot 1 |
| Options | High Resolution Unidirectional Return in park position Encoder compensation Binary Mode TestPatternXResolutin: 500 |
| Media Advance in Pixels | 1 |
| Number of repeats | 4 |

Tab. 7: Head Voltage test pattern settings

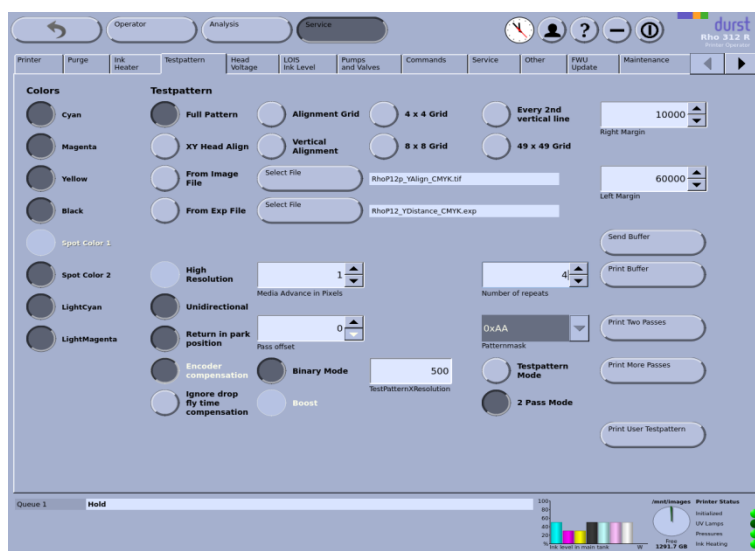
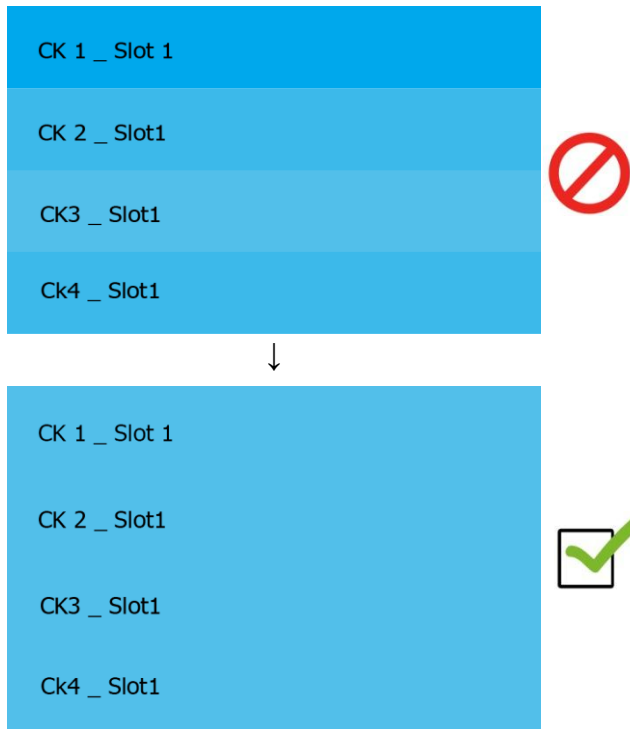


Fig.17: Head Voltage test pattern settings

3. Press the **Print More Passes** button

Example CK



Optimum settings:

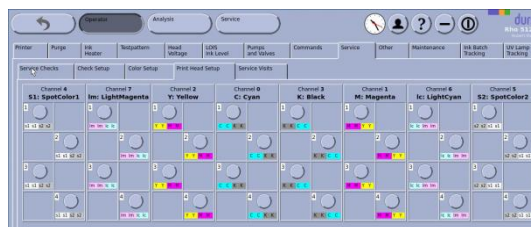
Important is that within one colors slot row the density is even.

i If to increase or decrease the voltage depends on the currently set value (minimum: ~75V; maximum: ~95V) and can be corrected later by applying correct CMS profiles.

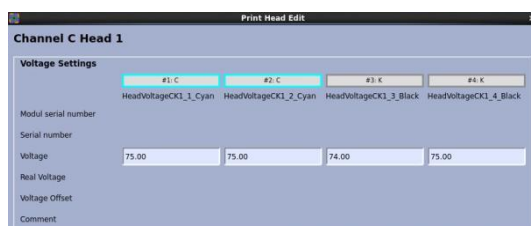
1. In this case decrease voltage CK1S1 e.g. by 3 Volts and increase the voltage for CK3S1 e.g. by 2 Volts.
2. Repeat this step for all colors and all Slots

NOTE! Slot Offset and DFT adjustment has to be rechecked

Inputting the values for density compensation



1. Select the **Service** tab → **Print Head Setup**



2. Open the settings for the head which needs to be adjusted and enter the value into the corresponding window.

3. Press the **OK** button.

6.2 Slot Offset adjustment

i The Rho512R and Rho312R are using three different resolutions 800 x 800dpi, 600 x 400dpi and 500 x 800dpi.

For each of them the Slot Offsets have to be adjusted separately.

NOTE! CK1 Slot 2 is the reference Slot for the whole Slot Offset adjustment. Its value remains at 0 and may not be changed.

1. Select the **Test pattern** tab.
2. Check and if necessary adjust the settings for the Head Voltage Adjustment test pattern

| Area | Settings |
|-------------------------|--|
| Colors | All |
| Print Quality Mode | Test pattern Mode |
| Test pattern | RhoP12_Offset_W_800.exp, RhoP12_Offset_W_600.exp or RhoP12_Offset_W_500.exp |
| Heads | All |
| Options | High Resolution Ignore drop fly time compensation Binary Mode TestPatternXResolutin: 800 or Binary Mode TestPatternXResolutin: 500 or Greyscale Mode TestPatternXResolutin: 600 |
| Media Advance in Pixels | 0 |
| Number of repeats | 1 |
| Patternmask | 0xAA |

Tab. 8: Head Voltage test pattern settings

3. Press the **Print More Passes** button

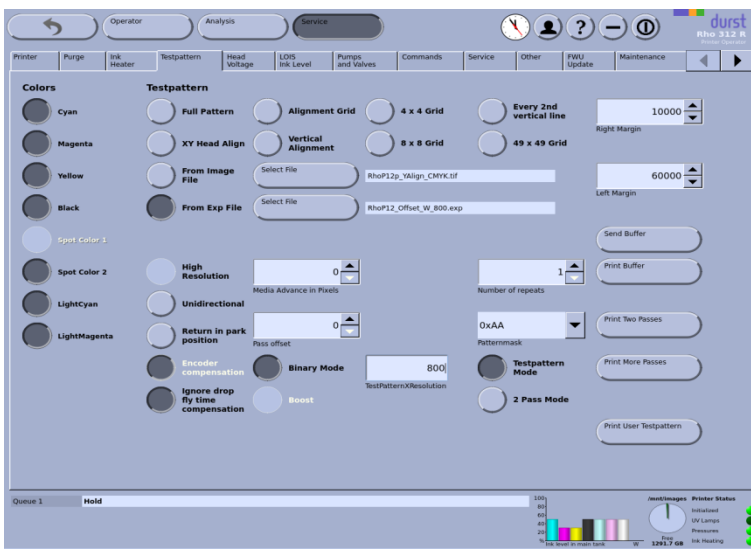


Fig. 18: Slot Offset test pattern settings for 800dpi

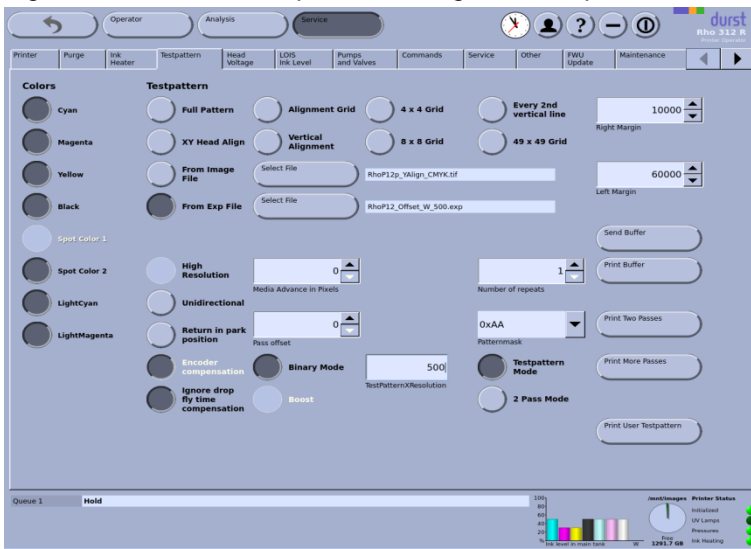


Fig. 19: Slot Offset pattern settings for 500dpi

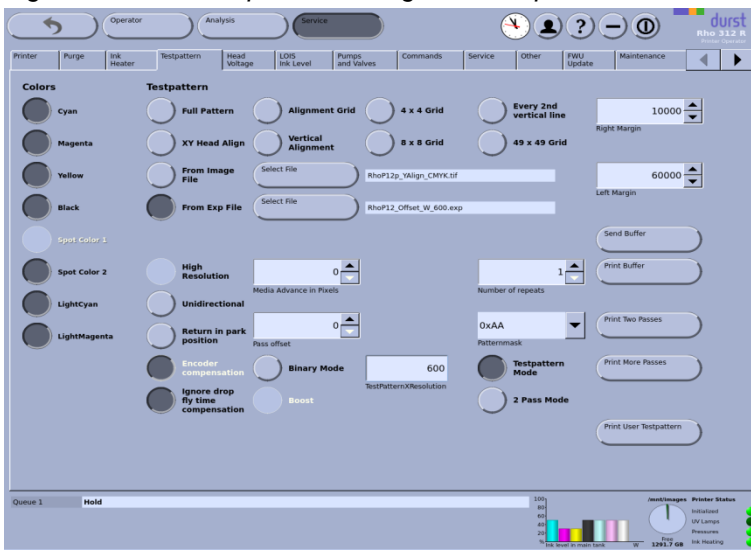


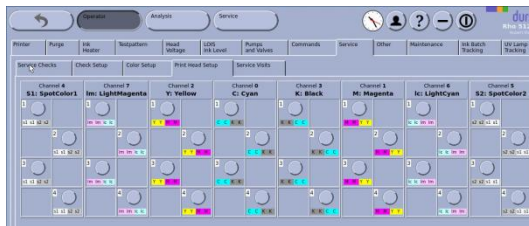
Fig. 20: Slot Offset test pattern settings for 600dpi

Optimum setting

The line of the slot which needs to be adjusted and the line of the reference slot (CK1_S2) have print directly on top of each other at area 0.

1. Look for the area where the two lines are printing directly on top of each other and note the value written at this part.

Inputting the values for density compensation



1. Select the **Service** tab → **Print Head Setup**



2. Open the settings for the head which needs to be adjusted and enter the value into the corresponding window.
3. Press the **OK** button.

NOTE! Use the table **High Resolution Binary Slot Offset** for **RhoP12_Offset_W_800.exp**
High Speed Binary Slot Offset for **RhoP12_Offset_W_500.exp**
Grayscale Slot Offset for **RhoP12_Offset_W_600.exp**.

Example:

The example above shows the Slot offset test print for CK4.

In test chart one CK4_S3 shows a deviation of -6 and CK4_S4 a deviation of -17.

In test chart two CK4_S2 shows a deviation of +11 and CK4-S3 a deviation of +23.

6.3 Drop Fly Time Compensation

- ✓ The head media distance must be correctly set (→ service manual settings)

Printing the test pattern

1. Select the **Media** tab.
2. Set the HMD to the desired value (e. g. 2 mm) and load the medium.
3. Select the **Hotfolder** tab.
4. In **Hotfolder 1**, select the Encoder testimage for the different resolutions:
 - High Resolution (printing at 800x800 dpi)
 - High Speed (printing at 500x800 dpi)
 - Vario Drop (printing at 600x400 dpi)
5. Repeat steps 1-4 for all the head media distances shown in **RhoDFTCDataHMD** (2.0mm, 2.5mm, 3.0mm, 3.5mm)

Evaluating the test pattern

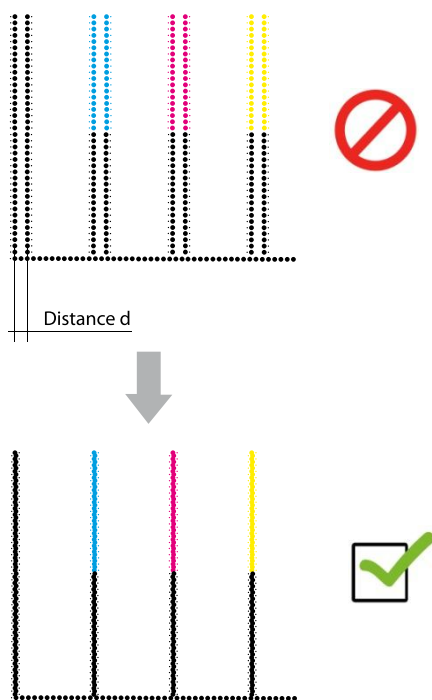


Fig. 22: Evaluating the test pattern for the Drop Fly Time (example)

1. Measure the *Distances d* at all print outs
2. Select **Printer** → **Service** → **Service** → **Specific** and search for the entries:
DFTCDataDistance800x800, **DFTCDataDistance600x400** and
DFTCDataDistance500x800
3. Enter the measured values
4. Save and print again to recheck your settings

Optimum settings:

The vertical lines generate a single line. The text is sharp.



Depending on resolution and head media distance the text and the vertical lines will not always show the same result!

- ▷ Use the text for fine tuning.

6.4 Encoder Calibration

1. Select the **Media** tab.
2. Set the HMD to the desired value (e. g. 2 mm) and load the medium.
3. Select the **Hotfolder** tab.
4. Print the Encoder testimage **High Resolution 800x800 dpi**.

Evaluating the test pattern

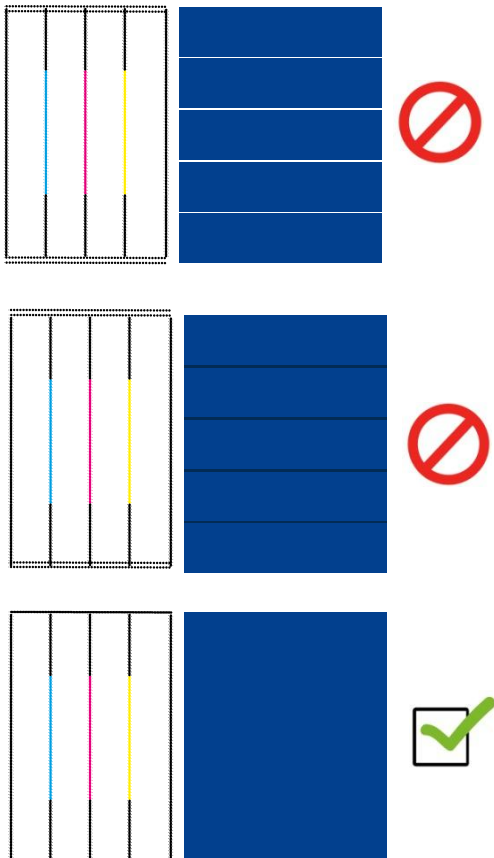


Fig. 23: Evaluating the test pattern for the Encoder Offset (example)

Example 1

Double lines in horizontal direction, white gaps in the color field.
The Encoder Offset Value needs to be decreased.

Example 2

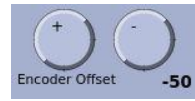
Double lines in horizontal direction, dark overlaps in the color field.
The Encoder Offset value needs to be increased.

Optimum setting


No white gaps or dark overlaps are visible and the horizontal lines generate a single line.

Inputting the Encoder offset values

1. Select the **Queue** tab.
2. Change the Encoder offset values by using the buttons on the right bottom side of the software.



buttons on the right

-  The Encoder offset values are getting automatically saved to the currently used media channel.