



**HQ**

**Mortsel**

# **How to Calibrate**

**:Anapurna Mw**

## Document History

Review Date	Document Version	Changes
March 15, 2010	Version 1.2	

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## 2 Related Documents

- ⇒ The :Anapurna M<sub>w</sub> Operator Manual
- ⇒ How to Shut down / Start-Up the :Anapurna M<sub>w</sub>
- ⇒ How to Maintain the :Anapurna M<sub>w</sub>
- ⇒ How to Handle the Media on the :Anapurna M<sub>w</sub>
- ⇒ How to use the Wasatch Soft RIP on the :Anapurna M<sub>w</sub>

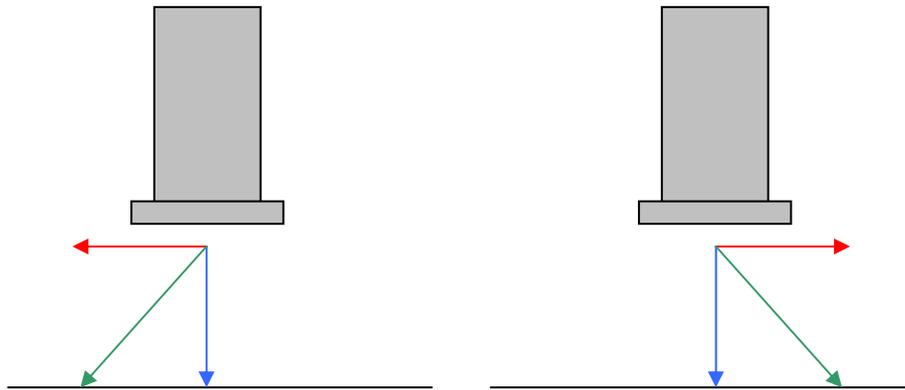
### 3 Why Calibrating the engine

#### 3.1 Description of the ink jet principle

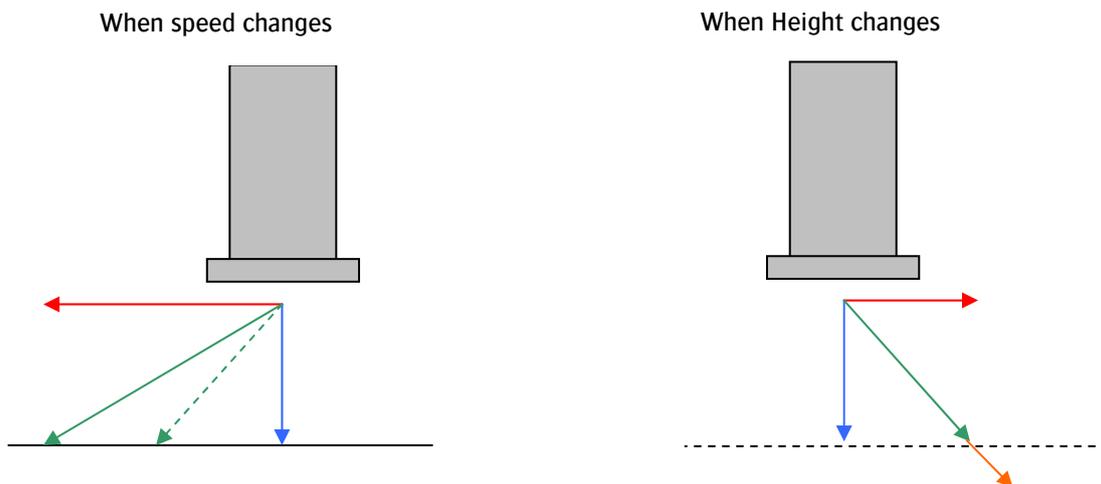
##### 3.1.1 Conceptual Parameters involved

⇒ Conceptual factors that determine the dot placement.

- The vertical force determined by the pulse given on the nozzle and the distance between the head and the media (Head Gap)
- The horizontal force determined by the shuttle movement.(Speed)



⇒ Variable Parameters that influence the jet of the drop.



⇒ The alignments must be verified and corrected.

- Each time the Head Gap distance has been changed
- When the Carriage Speed has been changed.

### 3.1.2 Non Conceptual Parameters

Other parameters that might require a different Head Gap which can influence the dot placement.

- ⇒ Media  
Heat sensitive media might require a different Head Gap because of the heat dissipation or Media deformation
- ⇒ Environmental factors  
Humidity and statically charging of the media

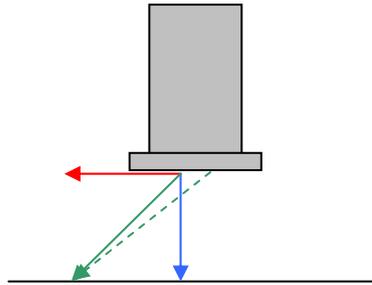
When Head Gap needs to be adjusted, always check Horizontal and bi-directional behavior and adjust if necessary.

Also the UV settings might need to be modified

## 3.2 Adjustments to make

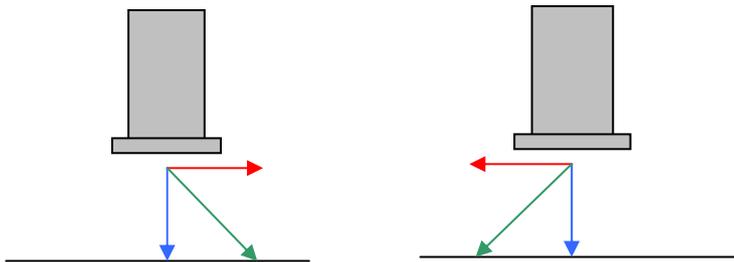
### 3.2.1 Horizontal Adjust (F4).

The horizontal head-to-head calibration is a software correction to adjust firing in order to align the nozzle rows of each head referring to the Black head.

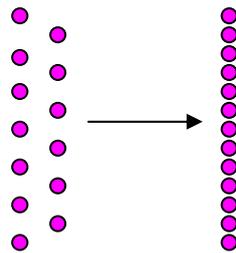


### 3.2.2 Bi-directional Adjust.

The bi-direction calibration is a software correction to adjust the firing time in order to align the dots when printing bi-directional.



Bi-directional calibration will align the dots that are fired in both directions.



Bi-Dir Correction

## 4 Calibration of the Engine

### 4.1 Head Gap Procedure.

Head Gap needs to be performed each time new media from different thickness is placed on the engine.

- ⇒ Make sure the system is in an operational state.
- ⇒ Take the media needed for your job and place it underneath the **red marks (dots)** on the rail that indicate the calibration area.
- ⇒ Switch on the vacuum
- ⇒ On the operator panel press [CALIB] to enter the calibration menu

```

== CALIBRATION ==
F1>FEED ADJUST                HOR/DIR ADJUST<F4
F2> CARRIAGE RELEASE          WHITE REF. <F5
F3> FACTORY SETTING          HEAD GAP <F6
  
```

- ⇒ Press [F6] HEAD GAP

```

== HEAD GAP SETTING ==
Gap Set [1,3 mm]  REF [4.5]      UP / DOWN Key
Head Move : right / left Key
NEXT : ENTER Key                REFERENCE <F6
  
```

- ⇒ Default Head Gap is set to 1.3 mm.  
(This is defined by design as the optimal setting to be used for most of the substrates. In case of heat sensitive media or media that is not 100% flat, the Head Gap height can be modified by the operator.)  
To change this value
  - Press Up / Down arrow to increase or decrease the head gap  
Never go ABOVE 2.5 mm and BELOW 1 mm
- ⇒ Pressing the “Left” arrow will lift the shuttle and moves it already to the left.
- ⇒ Press the “Left” arrow again till the shuttle is in the calibration area(Red Dots)
- ⇒ Press [ENTER]  
The Head Gap sensor will drop and the shuttle will level down till the Head gap sensor is activated. (This is the Reference value set by the technician)
- ⇒ Press [Enter]  
The shuttle will level down to the Head gap value (default = 1.3 mm)
- ⇒ Press [ENTER]  
The shuttle will return to its home position.
- ⇒ Press [ESC] to return to the main menu
- ⇒ At installation time, the system has been calibrated to be used with the standard Head Gap of 1.3 mm.  
**If the Head Gap value has been changed, Perform Horizontal and bi-directional adjust again.**



Tip: All the related changes can be saved in up to 10 custom Parameter sets.

## 4.2 Head Nozzle Alignment

### 4.2.1 Horizontal Adjust [F4]

The horizontal head-to-head calibration is a tool to align the colored print heads in reference to the black head. It is a software parameter that controls the timing of the firing of the heads.

Every print head is an assembly of two nozzle rows which are steered separately. Every nozzle row has its own timing. The test chart is made up of different blocks, containing three lines for every nozzle row. For every color, 21 blocks are printed with different firing timings, going from -2 0 to +20 in steps of 2.

Between the colored lines of the different nozzle rows, black lines are printed. Choose the value per color and per nozzle row (e.g. LM1 & LM ), where the black and colored lines are perfectly aligned.

- ⇒ Make sure the system is operational state.
- ⇒ Take the media needed for your job and place it underneath the **red marks (dots)** on the rail that indicate the calibration area.
- ⇒ In Parameter Menu, set the Left margin position according to the calibration position (red marks).
- ⇒ Switch on the vacuum
- ⇒ Perform a Head Gap if the material has been changed
- ⇒ On the operator panel press [ESC] to put the engine "Offline"
- ⇒ On the operator panel press [CALIB]

```

== CALIBRATION ==
F1>FEED ADJUST                HOR/DIR ADJUST<F4
F2> CARRIAGE RELEASE          WHITE REF. <F5
F3> FACTORY SETTING          HEAD GAP <F6
  
```

- ⇒ Press [F4] HOR/DIR Adjust.

```

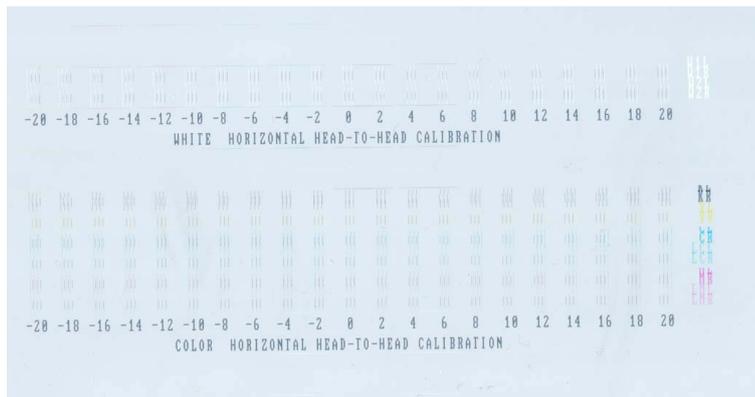
== CALIBRATION ==
F2> HORIZONTAL                DIRECTION <F5
  
```

- ⇒ Press [F2 ] to select the "Horizontal Calibration"

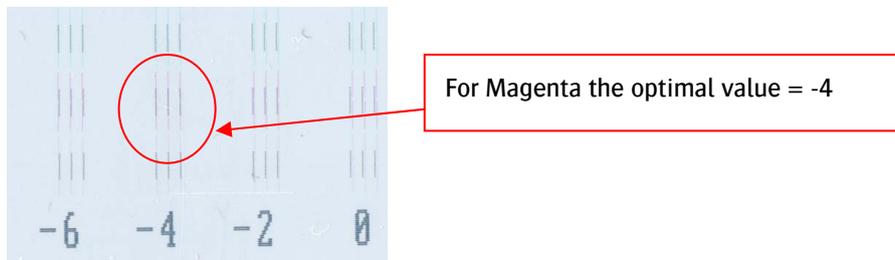
```

== HORIZONTAL CALIBRATION ==
F2> PRINT                      CLEAR < F5
L: K =0    C = - 1    M = - 3    Y = - 6    IC = - 8    IM = - 5
R: K =0    C = - 1    M = - 3    Y = - 6    IC = - 8    IM = - 5
  
```

- ⇒ Press [F2 ] to print the “Horizontal Calibration Test Chart”



- ⇒ Use a magnifier glass (8x) to interpret the test chart.
- ⇒ For each separate color, 2 sets of 3 vertical lines will be printed under each other for the left and right nozzle row with reference to the corresponding Black nozzle row. Write down the value that corresponds with the best alignment.



- ⇒ Enter the new horizontal values for each color.
- ⇒ Use the Left / Right arrow to move between the colors. When pressing Right arrow when cursor is at Light Magenta, the settings for the white heads will be shown on a next screen.
- ⇒ Use the Up/Down arrow to modify the values.
- ⇒ [F5 ] Clear will reset all values to “ 0”
- ⇒ Press [ENTER] to accept the changes.

## 4.2.2 Directional Adjust

The bi-direction calibration chart is a tool to correct the firing time from the shuttle when it prints bi-directional. Because of the head gap and the speed of the shuttle, ink drops will be fired with a different angle if the shuttle goes from left to right or from right to left (firing time delay).

Like in the horizontal head-to-head calibration, blocks of three lines are printed per color and per nozzle row. This chart is printed bi-directional and only the block with the correct setting will show three lines. In all the other blocks and values, you will see 6 lines per color and per firing row. 3 lines are printed from left to right, 3 lines are printed from right to left.

Choose the correct value for every color and every nozzle row and enter these values into the dir. adjust window.

Make sure that you always check the bi-directional alignment when you change the head gap (for e.g. 1,6 mm instead of 1,3 mm) of the shuttle.

- ⇒ Make sure the system is operational state.
- ⇒ Take the media needed for your job and place it underneath the **red marks (dots)** on the rail that indicate the calibration area.
- ⇒ In Parameter Menu, set the Left margin position according to the calibration position (red marks).
- ⇒ Switch on the vacuum
- ⇒ Perform a Head Gap if the material has been changed
- ⇒ On the operator panel press [ESC] to put the engine "Offline"
- ⇒ On the operator panel press [CALIB]

```

== CALIBRATION ==
F1>FEED ADJUST                HOR/DIR ADJUST<F4
F2> CARRIAGE RELEASE          WHITE REF. <F5
F3> FACTORY SETTING          HEAD GAP <F6
  
```

- ⇒ Press [F4 ] HOR / DIR Adjust

```

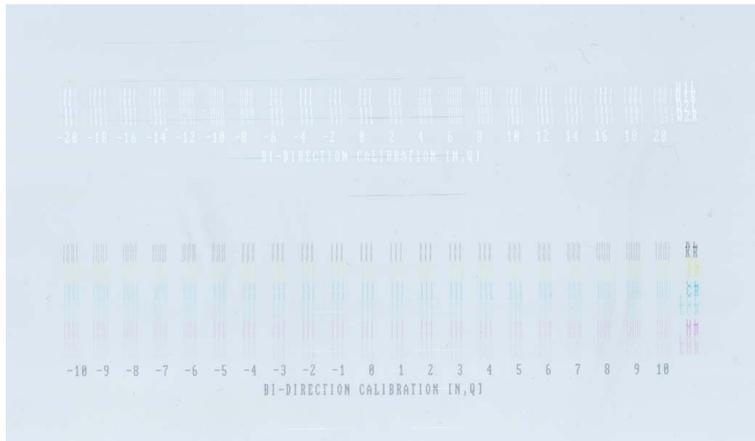
== CALIBRATION ==
F2> HORIZONTAL                DIRECTION <F5
  
```

- ⇒ Press [F5] to select "Direction Calibration"

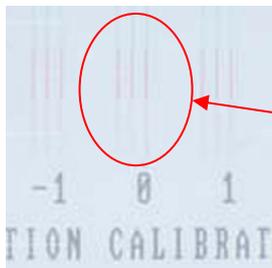
```

== DIRECTION CALIBRATION ==
F2> PRINT                      CLEAR < F5
L: K = 0   C = - 1   M = - 3   Y = - 6   IC = - 8   IM = - 5
R: K = 0   C = - 1   M = - 3   Y = - 6   IC = - 8   IM = - 5
  
```

- ⇒ Press [F2 ] to print the “Direction Calibration Test Chart”



- ⇒ Use a magnifier glass (8 x) to interpret the test chart  
For each separate color, a 2 sets of 3 lines will be printed under each other for the left and right nozzle  
row in the 2 directions  
The lines should align to each other.



For Magenta the optimal value = 0

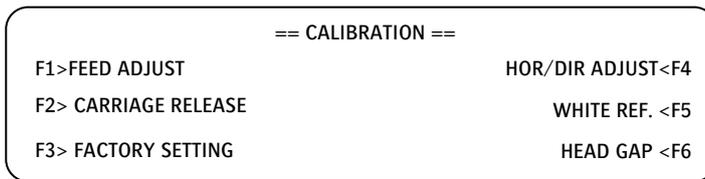
- ⇒ Write down the value that corresponds with the best alignment
- ⇒ Enter the new Directional values for each color.
- Use the Left / Right arrow to move between the colors  
when pressing Right arrow when cursor is at Light Magenta, the settings for the white heads will be shown on a next screen.
  - Use the Up/Down arrow to modify the values.
  - [F5 ] Clear will reset all values to “0”
- ⇒ Press [ENTER] to accept the changes.

### 4.2.3 Feed Adjust (F1)

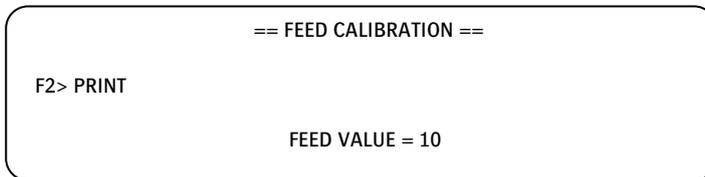
The feed adjust is the parameter which controls the size of each step the conveyor belt will move between different print passes. If this settings are too high, white lines will start to appear between every printing pass. Entering a value that is too less, will make different passes overlap each other. This results in dark lines in your print.

If you want to check the feed adjust, press F1 to enter the feed calibration menu. Select F2 to start the print. In the first pass the printer will print 2x 4 lines of every color. For each pass that follows, a new line will be printed besides one of the first 4. In case that the printed lines are not aligned as one line, you need to adjust the feed value.

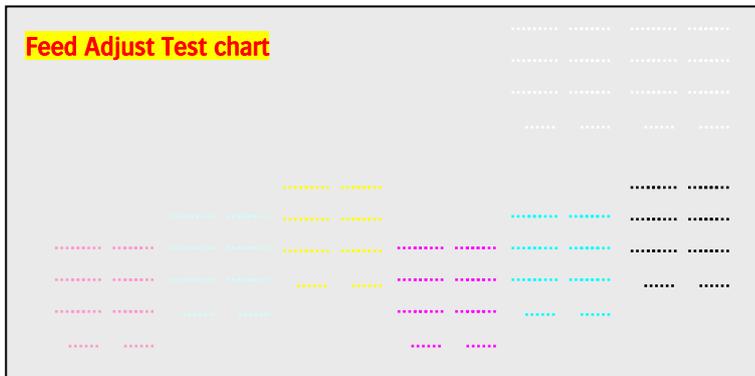
- ⇒ Make sure the system is operational state.
- ⇒ Take the media needed for your job and place it underneath the **red marks (dots)** on the rail that indicate the calibration area.
- ⇒ In Parameter Menu, set the Left margin position according to the calibration position. (red marks).
- ⇒ Switch on the vacuum
- ⇒ Perform a Head Gap if the material has been changed
- ⇒ On the operator panel press [ESC] to put the engine "Offline"
- ⇒ On the operator panel press [CALIB]



- ⇒ Press [F1] FEED Adjust

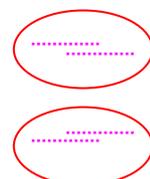


- ⇒ Press [F2] to print the "Feed Test Chart" the print head carriage will move from left to right 4 times.
- ⇒ Use a magnifier glass (8 x) to interpret the test chart For each color the lines should be aligned.



size test chart: 17 x 8 cm

- ⇒ If the left line is printed higher then the right line: decrease the feed value. (- Key)
- ⇒ If the left line is printed lower then the right line: increase the feed value. (+ Key)



- ⇒ Adjust the value and reprint the “Feed Test Chart” till the lines are perfectly aligned range = - 50 to + 50. Each step is approximately 4 micron
- ⇒ Press [ENTER] to accept the changes.

## 5 Saving / Loading Parameter Sets

Depending on the kind of production jobs on multiple media, multiple settings might be required.

The :Anapurna Mw allows to save and recall up to 10 parameter sets.

These sets contain, all the settings like:

- ⇒ Head gap value
- ⇒ Feed adjust
- ⇒ Horizontal - Directional Adjust
- ⇒ Margins
- ⇒ UV lamp settings
- ⇒ Rigid or roll Media

### 5.1 Saving parameter sets.

When all parameters are set and verified for a specific job:

- ⇒ Press [ESC] to go Offline
- ⇒ Select [F6] PARAMETER in the Main Menu

HOST	*** ** P	S7	1600 mm
F1 > PRIME			CLEANING <F4
F2 > PRIME ALL			SYSTEM SET <F5
F3 > HOME COVER			PARAMETER <F6

F1> LOAD	== PARAMETER SET ==	SAVE <F4
CONTROL = HOST	DIRECTION = BI	PASS = Q4
C-SPEED = 7	F-SPEED=1 UNIT = MM	WEEP = 3
MARGIN ( L =100	N-POINT =Y T = 0	R =MAX )

- ⇒ Press [F4] 'SAVE'  
use ARROW UP / DOWN to select a value between 0 and 9 for this parameter set.

### 5.2 Loading a parameter set

- ⇒ Press [ESC] to go Offline
- ⇒ Select [F6] PARAMETER in the Main Menu
- ⇒ Press [F1] 'LOAD'  
use ARROW UP / DOWN to select a value between 0 and 9 to recall the desired Parameter Set