

MEMO

subject
Brewer micrometer positions

reference
SPO/150710-01/AHO

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to
EC

from
Arjan Hoogendoorn

INTRODUCTION

EC has asked for some firmware updates. The most important update was the way the micrometer resets are done. Multi board Brewers use the Bulk head opto sensor while single board Brewers use the opto sensor near the spherical mirror. The bulkhead sensor is more reliable.

In this SB firmware version, only the micrometer reset has been changed to the bulkhead. The 302.2 nm Hg test is used. Using another hg line will give a different origin.

When the new firmware is used, it is important to use the correct configuration. There are three constants that need to be changed. The motor origin, max pos and min pos have to be obtained by the operator; these numbers are italic in the table below.

MOTOR.REF.PLAY[MICROMETER.1]=-100
MOTOR.RESET.POS[MICROMETER.1]=-1440

MOTOR.REF.PLAY[MICROMETER.2]=-100
MOTOR.RESET.POS[MICROMETER.2]=-1440

MOTOR.ORIGIN[MICROMETER.1]=-7015
MOTOR.INITIAL[MICROMETER.1]=284
MOTOR.MAX.POS[MICROMETER.1]=910
MOTOR.MIN.POS[MICROMETER.1]=-9590

MOTOR.ORIGIN[MICROMETER.2]=-6727
MOTOR.INITIAL[MICROMETER.2]=284
MOTOR.MAX.POS[MICROMETER.2]=1198
MOTOR.MIN.POS[MICROMETER.2]=-9302

PROCEDURE:

Upload the new firmware, reload the Brewer configuration and upload the cfg_um.cfg file afterwards (use the firmware uploading guide if necessary). Type save and go to loadmode and cosmacmode. Quit the brewcmd program. Open brewer.bat software. Go to teletype

Finding the hp line

Type b,2 <enter>

Type m,1,0 <enter>

Type m,9,-1 <enter>

Type m,10,-1 <enter>

Type r,2,2,5:o <enter>

Now, you have to move the bottom micrometer so that both gratings are set to “measure” the same wavelength. This is done by pressing m,9,STEPNUMBER <enter> and then do a measurement with r,2,2,5:o <enter>

Example:

Type m,9,150 <enter>

Type r,2,2,5:o <enter>

Use steps of 150 until the number of counts increase. Use smaller steps to find the peak in intensity.

Hint

The Brewer processes negative and positive step numbers in a different way. Positive step numbers, i.e. m,9,150 , will mean that the motor will move to step 150 forwards compared to step zero (position after last fr, or hp/hg test). Using negative numbers, i.e. m,9,-150 , will mean that the motor will go 150 steps backwards and that its new position will be seen as the new zero.

It cannot be said whether a forwards or a backwards scan is needed. Try scanning forwards first, if there is no success when step number 1050 is reached, go to step 0, and then start scanning in the backwards direction.

Finding the hg line

Once the hp line has been found, it is time to scan for the hg line. The approach is similar but now both micrometers have to be moved simultaneous.

Type b,1 <enter>

Type m,9,-1 <enter>

Type m,10,-1 <enter>

Type r,0,5,5:o <enter>

The micrometers should be set to the mercury wavelength. This is done by pressing m,9,STEPNUMBER <enter> , and m,10,STEPNUMBER <enter> then do a measurement with r,0,5,5:o <enter>

Example:

Type m,9,150 <enter>

Type m,10,150 <enter>

Type r,0,5,5:o <enter>

Watch the counts for slit 4 and slit 0. Slit 4 should be big while slit 1 should be higher than the other slits but much smaller than slit 4. Use steps of 150 until the number of counts increase. Once the counts on both slits increase, exit teletype by pressing home.

Type `pd hphg`

After a successful hp and hg test, go back to teletype.

Setting the motor origin values

The motor origin values are set. Use the values from the `motor.zero.pos`.

Type `?motor.zero.pos[9]`

Answer : -7056

Type `!motor.origin[9] -7056`

Type `?motor.zero.pos[10]`

Answer : -6856

Type `!motor.origin[10] -6856`

Write down these values. Do a reset for both micrometers:

Type `I,9 <enter>`

Type `I,10 <enter>`

Finding the motor.max.pos values

The motor has a limit in the configuration that prevents the motor from jamming. In the present configuration from the `cfg_um.cfg` file, the limits are set to values higher than the actual value. The correct values need to be determined. This is done by moving the micrometer in small steps until it jams.

Move the micrometer to step number 7000

Example:

`M,9,7000 <enter>`

Now move the micrometer in steps of 25 until you hear that the micrometer is jamming. Write down this step number. For correct movement of the micrometer, there should be at least 8000 steps between the origin and the position where it jams. The correct number can be obtained using this formula:

$\text{Max pos} = \text{Step number} - 50 + \text{motor origin}$

The max pos number will be around 1000 steps Enter this number like this (1234 is an example value):

`!motor.max.pos[9] 1234`

This is done for both micrometers. Reset the micrometers afterwards:

Type I,9 <enter>

Type I,10<enter>

Finding the motor.min.pos values

The motor minimum position is found in a similar way as the maximum position. Since using a negative commands will give make the motor move a certain amount of steps relative to present position. The motor.zero.pos constant will change after this movement. To define the min pos:

M,9,-2000 <enter>

M,9,-25 <enter>

M,9,-25 <enter>

ECT

Now move the micrometer in steps of -25 until you hear that the micrometer is jamming. You should find the zero position:

?motor.zero.pos[9]

Answer: -10121

For correct movement of the micrometer, there should be at least 2200 steps between the origin and the position where it jams. The correct number number is the zero position plus 100 steps. For the example value of -10121, the minimum position can be entered as followed:

!motor.min.pos[9] -10021

The min pos number will be around -10000 steps Enter this number like this (-10021 is an example value).

Do this for both micrometers. Save the configuration once this has been done:

Save<enter>

Exit teletype by pressing home.

TEST IF THE CONSTANTS ARE CORRECT:

There is an easy way to find out if the constants are correct.

Type pdfruxfhrphguxhphghp

The discrepancies of the second fr should be zero, and the second hp and hg test should not mention that the micrometer is moved.