



Work Instruction	Doc. Revision	02
AXI V810 S2EX X-RAY FILTER CAP ON-FIELD INSTALLATION WI	Effective Date	1 Mar 2018

This procedure is applicable to below models:

V810 STD	<input type="checkbox"/>	S1	<input type="checkbox"/>	S2
V810 XXL	<input type="checkbox"/>	S1	<input type="checkbox"/>	S2
V810 S2EX	<input checked="" type="checkbox"/>			
V810 Mini	<input type="checkbox"/>			

REVISION HISTORY

Rev	Effective Date	Description	Doc Originator
00	1 Oct 2016	First Release	Chua ZY & Tan LK
01	1 Jan 2017	Description & format changing	Tan Liang Kai
02	1 Mar 2018	Include filter height adjustment procedure	Tan Liang Kai

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X-Ray Filter Cap

X-Ray Filter Cap Installation

** Caution: All steps in this part **MUST** perform with Inner Barrier “Open” status.

1. Open V810 GUI > Services > Subsystem Status and Control > Digital IO tab > click on “Initialize”.
2. Toggle & ensure inner barrier is in “Open” status as shown in Figure 1.

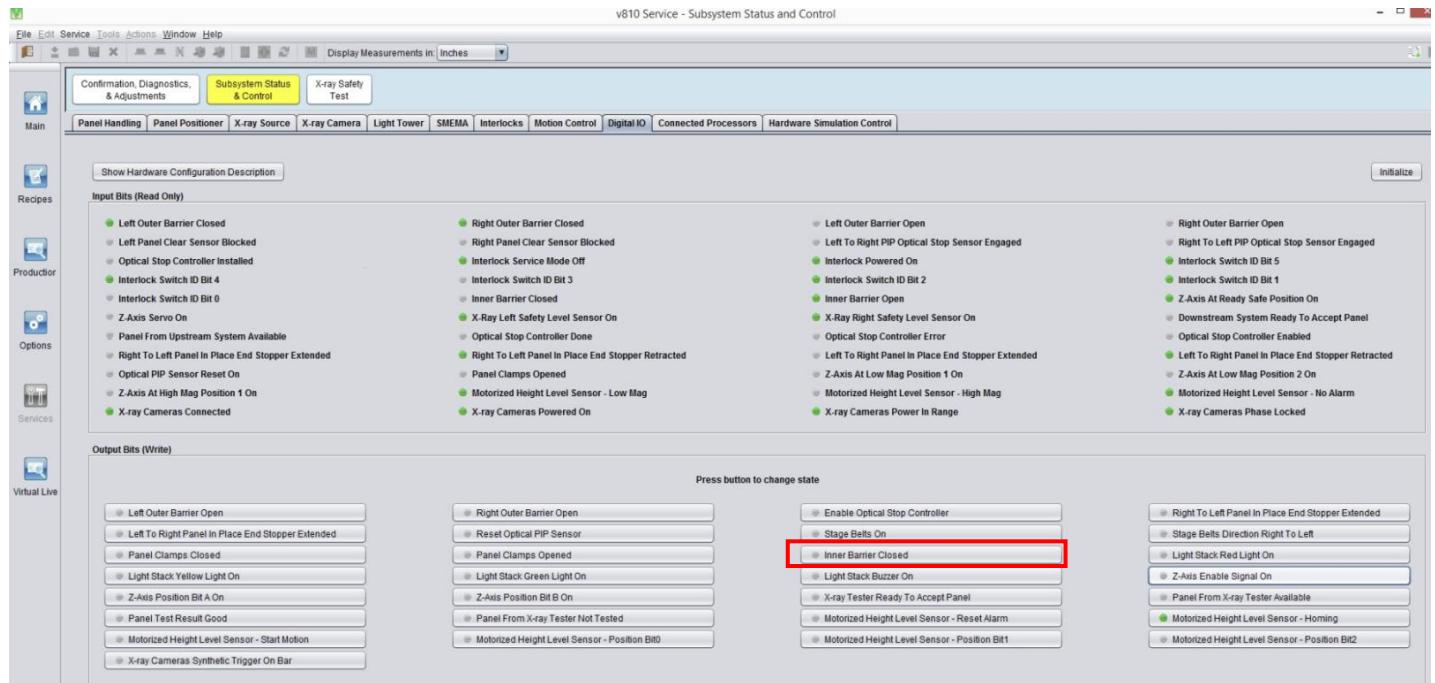


Figure 1 Inner barrier opening

3. Click on “Z-axis position Bit A On” & “Z-axis position Bit B On” to lower down X-Ray tube to high mag position as shown in Figure 2.

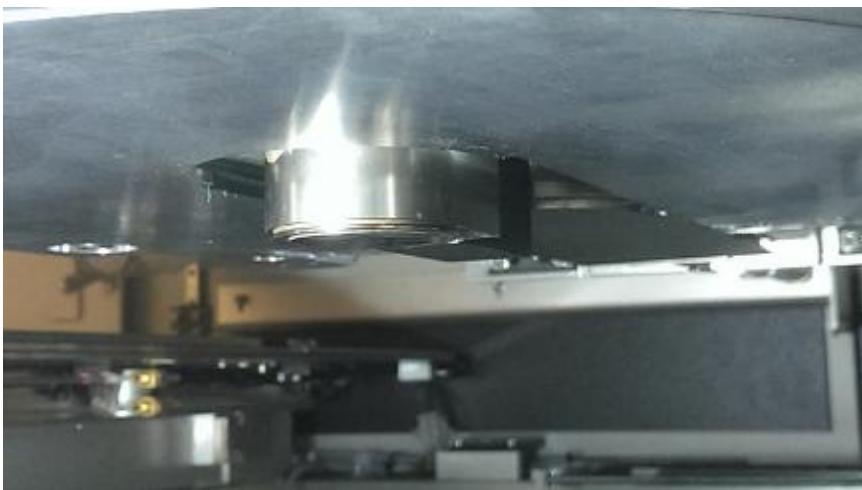


Figure 2 X-ray tube in High mag position

4. Assemble 4LAHW-051 (X-Ray Filter Cap) & 2 x button head cap screws (M3x6) as shown in Figure 3.

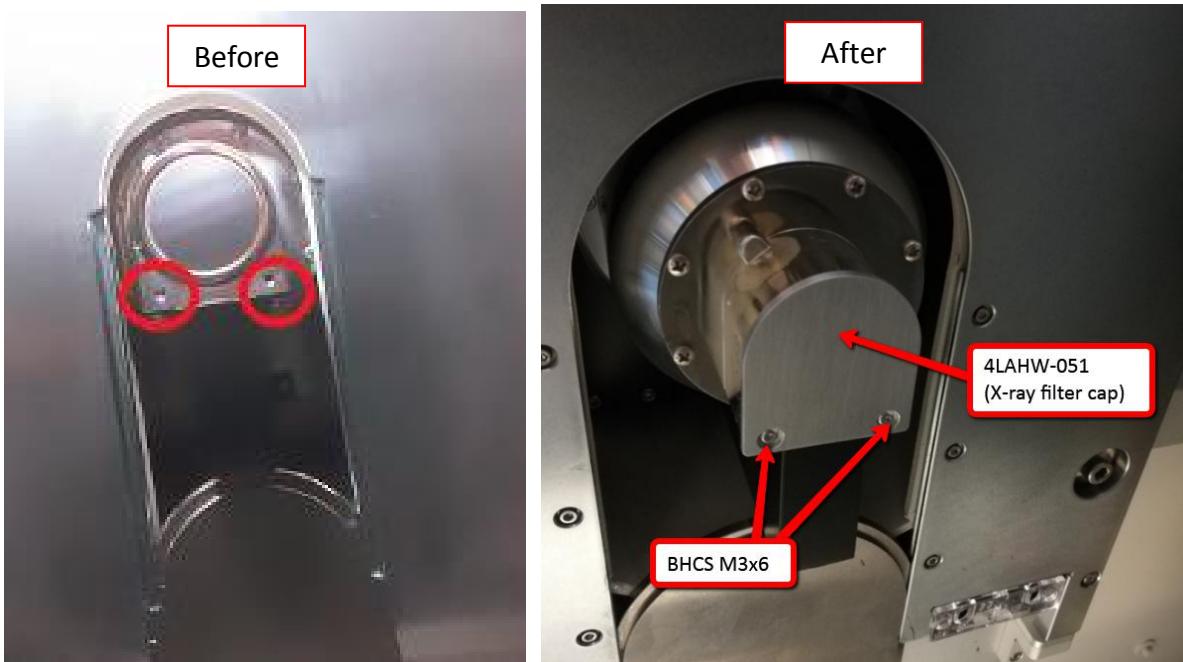


Figure 3 X-ray tube bottom view (before & after filter cap installation)

Safe Position Sensor Adjustment

1. Plug USB 2.0 A to Micro-B Cable (P/N, 2560-0024) to Atom PC as shown in Figure 4.



Figure 4 Atom PC

2. At DIO tab, ensure Inner barrier input bit is “Open” status & Z-Axis Servo On is “Disable” status. If not, manually toggle output bit as shown in Figure 5.

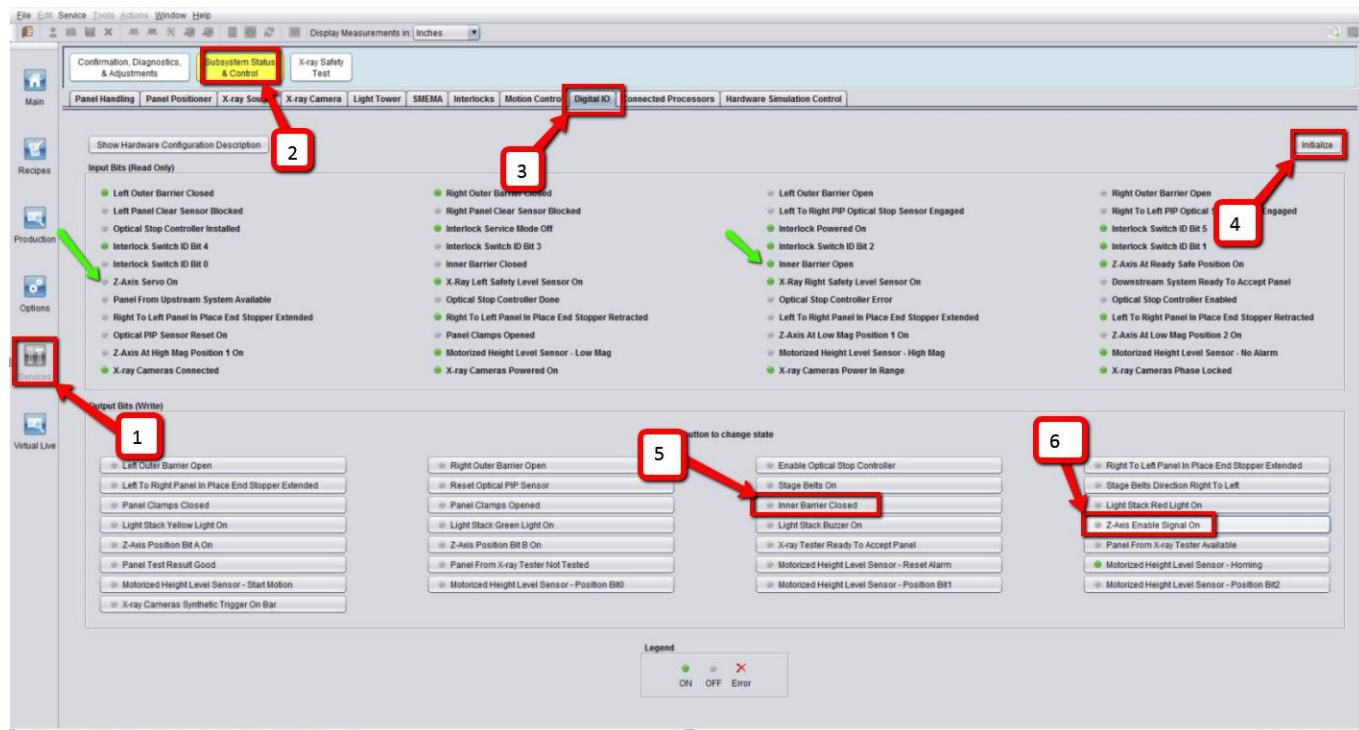


Figure 5 Digital IO

3. Open remote desktop connection & remote to Atom PC as shown in Table 1.

IP address	192.168.128.70
User	Administrator
Password	Please!

Table 1 Atom PC user name & password

4. Open “ClearPath MSP Software” & ensure motor status is showing “Disable” as shown in Figure 6.

If not, back to DIO tab & toggle “Z-Axis Enable Signal On” output bit.

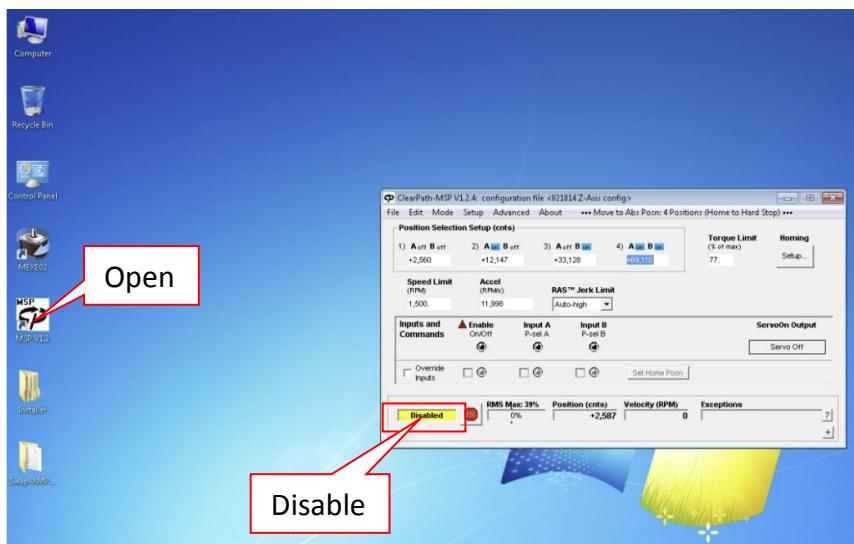


Figure 6 ClearPath MSP Software

5. Go to path “C:\Users\Administrator\Desktop\Motor Config Files\Z-Axis” & back-up origin folder.

Remark: Should be containing 1 file as default manufacture configure.

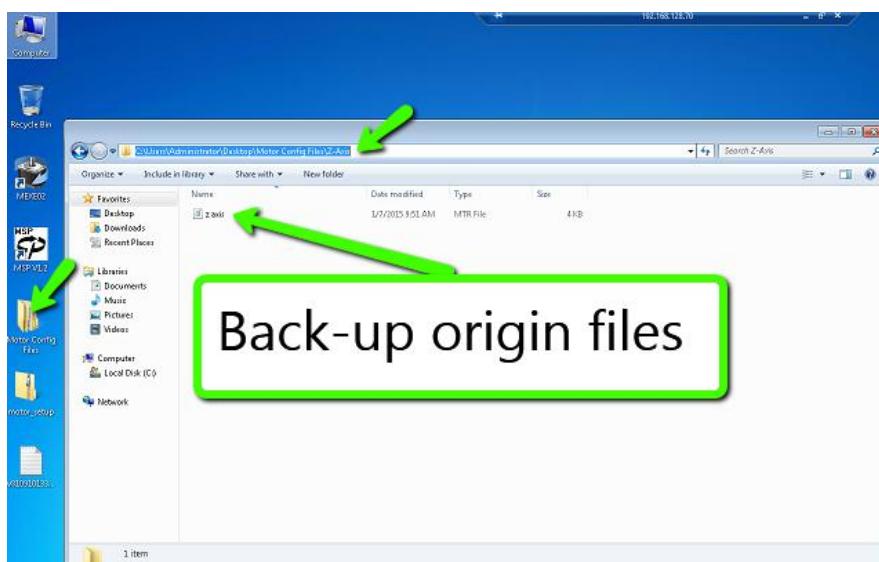


Figure 7 Z-axis motor file folder

6. Browses to path “C:\Users\Administrator\Desktop\Motor Config Files\Z-Axis” & open config file as shown in Figure 8 & 9.

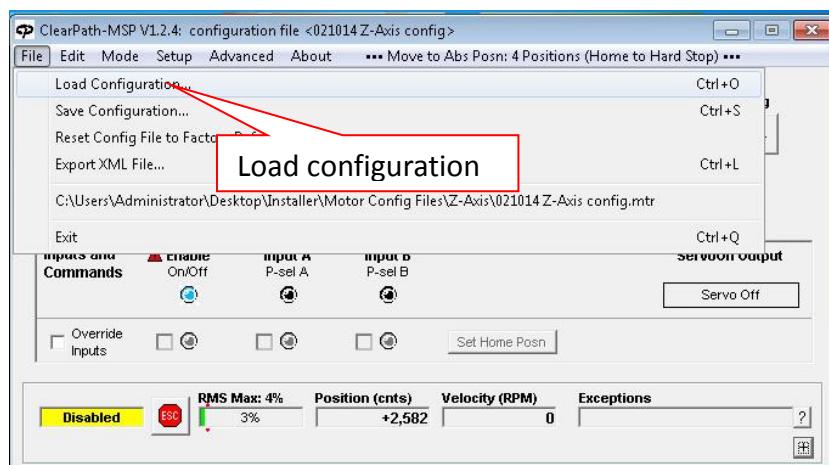


Figure 8 ClearPath MSP Software

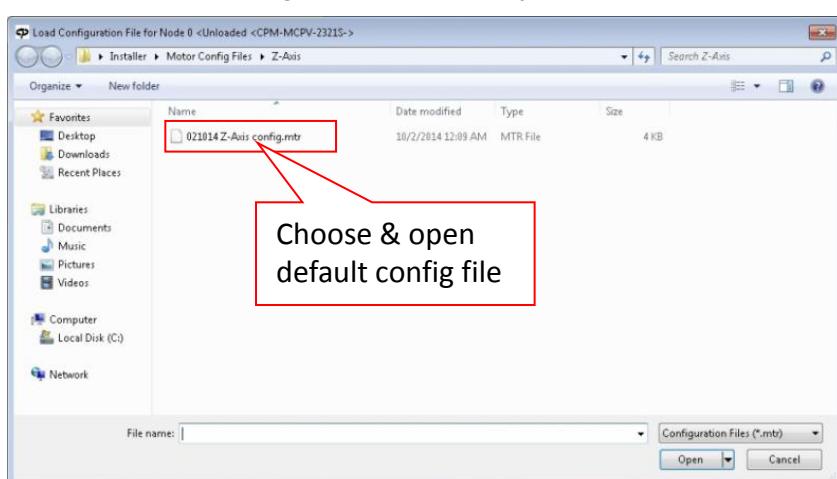


Figure 9 Z-axis motor config

7. Once configuration is loaded, Z height threshold will automatic update as shown in Figure 10.

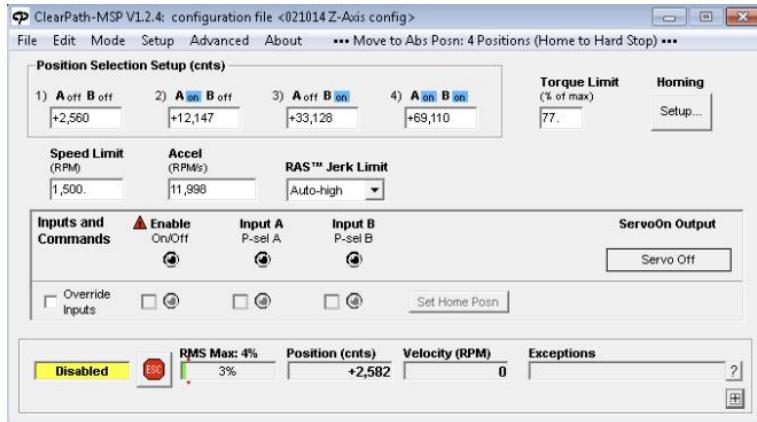


Figure 10 Clear Path MSP Software

8. Check on “Override Inputs” & “Enable” as shown in Figure 11.

Remark: Once completed, motor status will display as “SW Enabled”.

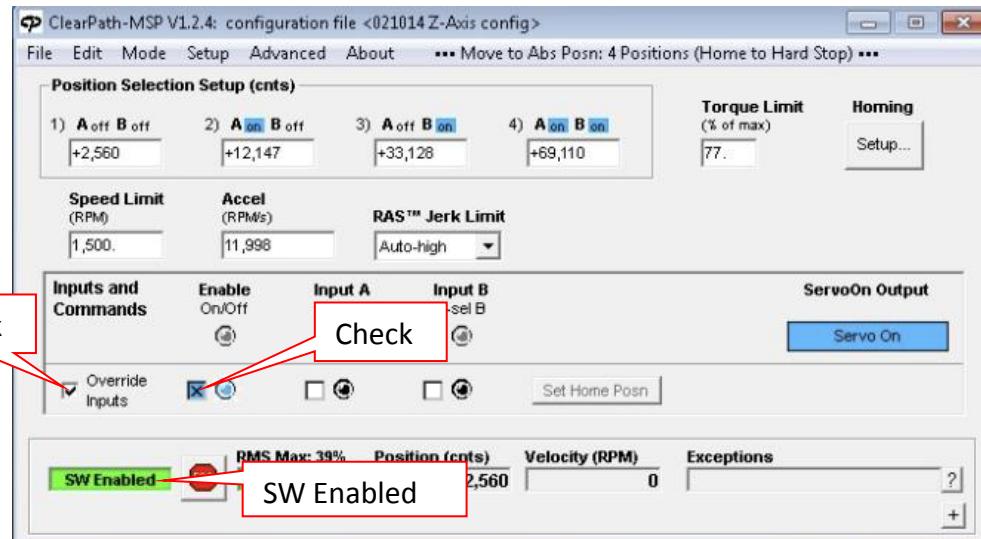


Figure 11 Clear Path MSP Software

9. Change current motor counts of A off B off from +2560 to +500 & click “Enter” to update the counts.

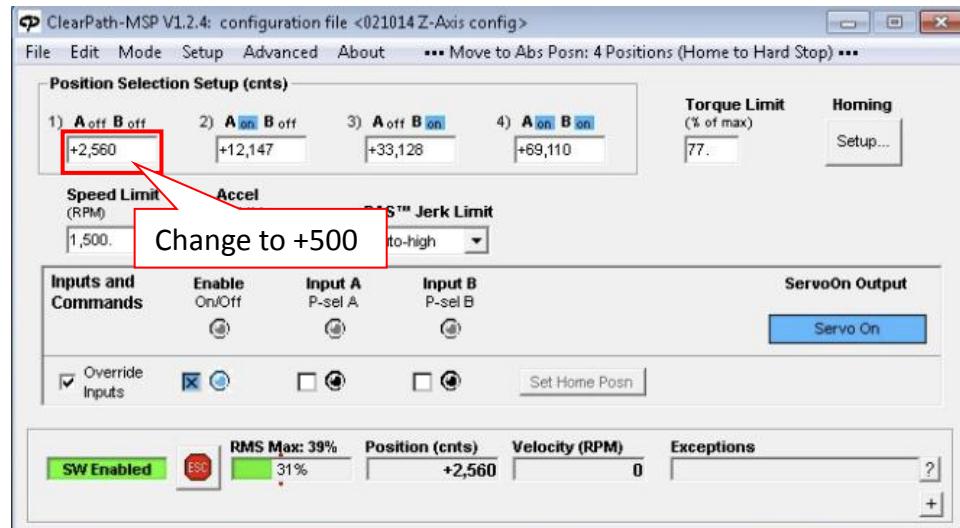


Figure 12 Clear Path MSP Software

10. Back to DIO I/O tab, ensure “Z-Axis at Safe Position On” turn to Green as shown in Figure 13. If no, proceed step 11 or else proceed with step 17 directly.

Input Bits (Read Only)			
Left Outer Barrier Closed	Right Outer Barrier Closed	Left Outer Barrier Open	Right Outer Barrier Open
Left Panel Clear Sensor Blocked	Right Panel Clear Sensor Blocked	Left To Right PIP Optical Stop Sensor Engaged	Right To Left PIP Optical Stop Sensor Engaged
Optical Stop Controller Installed	Interlock Service Mode Off	Interlock Powered On	Interlock Switch ID Bit 5
Interlock Switch ID Bit 4	Interlock Switch ID Bit 3	Interlock Switch ID Bit 2	Interlock Switch ID Bit 1
Interlock Switch ID Bit 0	Inner Barrier Closed	Inner Barrier Open	Z-Axis At Ready Safe Position On
Z-Axis Servo On	X-Ray Left Safety Level Sensor On	X-Ray Right Safety Level Sensor On	Downstream System Ready To Accept Panel
Panel From Upstream System Available	Optical Stop Controller Done	Optical Stop Controller Error	Optical Stop Controller Enabled
Right To Left Panel In Place End Stopper Extended	Right To Left Panel In Place End Stopper Retracted	Left To Right Panel In Place End Stopper Extended	Left To Right Panel In Place End Stopper Retracted
Optical PIP Sensor Reset On	Panel Clamps Opened	Z-Axis At Low Mag Position 1 On	Z-Axis At Low Mag Position 2 On
Z-Axis At High Mag Position 1 On	Motorized Height Level Sensor - Low Mag	Motorized Height Level Sensor - High Mag	Motorized Height Level Sensor - No Alarm
X-ray Cameras Connected	X-ray Cameras Powered On	X-ray Cameras Power In Range	X-ray Cameras Phase Locked

Figure 13 Digital IO

11. If sensor need re-adjust, remove 2 x screws & open right outer barrier as shown in Figure 14.

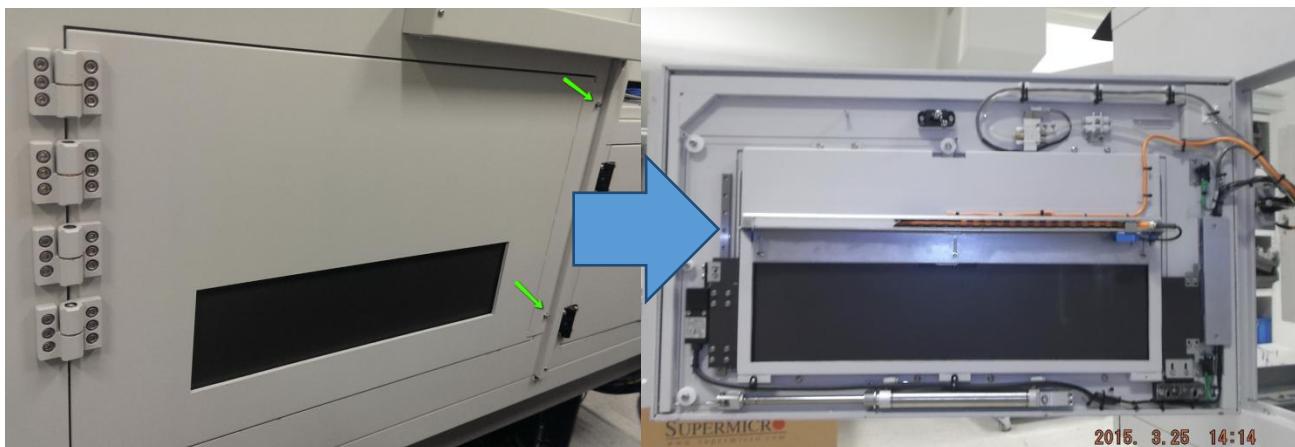


Figure 14 Right outer barrier

12. Remove 6 x M7 screws & U-COLUMN WINDOW ASSEMBLY (P/N, 4JAHW-A049) as shown in Figure 15.

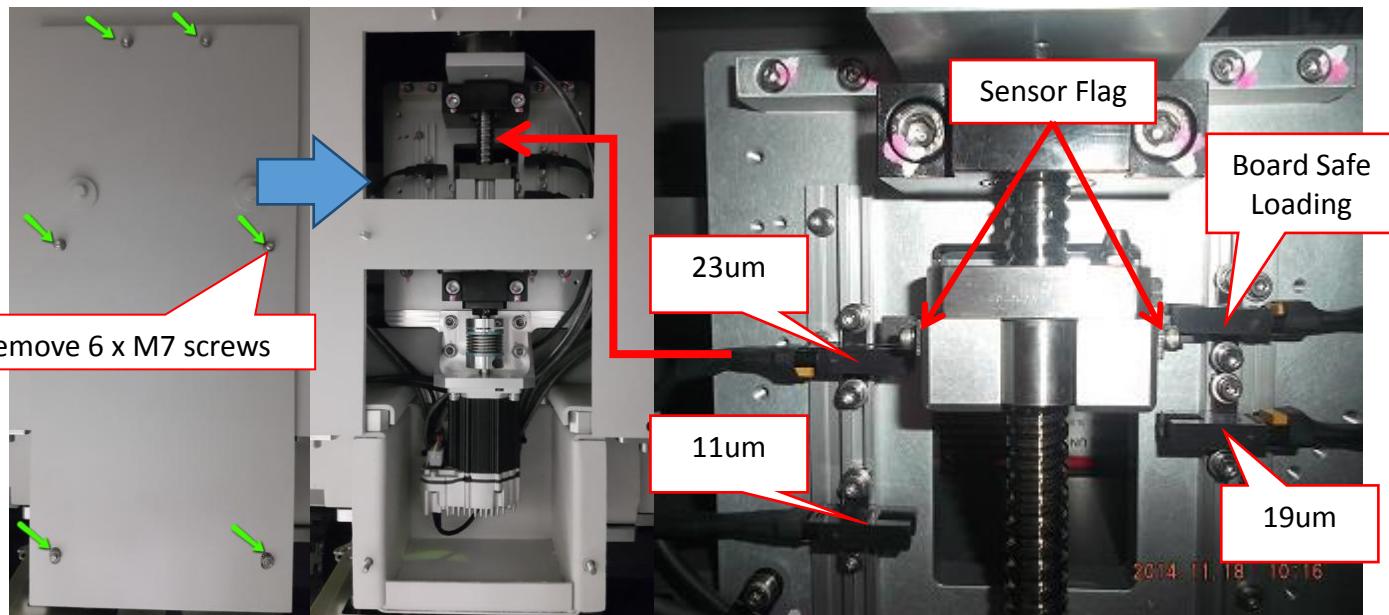


Figure 15 Z-axis position sensor

13. Loosen 2 x screws & re-position board safe loading sensor as shown in Figure 16. Adjust sensor until Red LED is on (camera flag should cover by sensor) & tighten 2 x screws.

Remark: The position of board safe loading position sensor (with filter cap) should be approximately 2 mm higher than its original position (without filter cap).

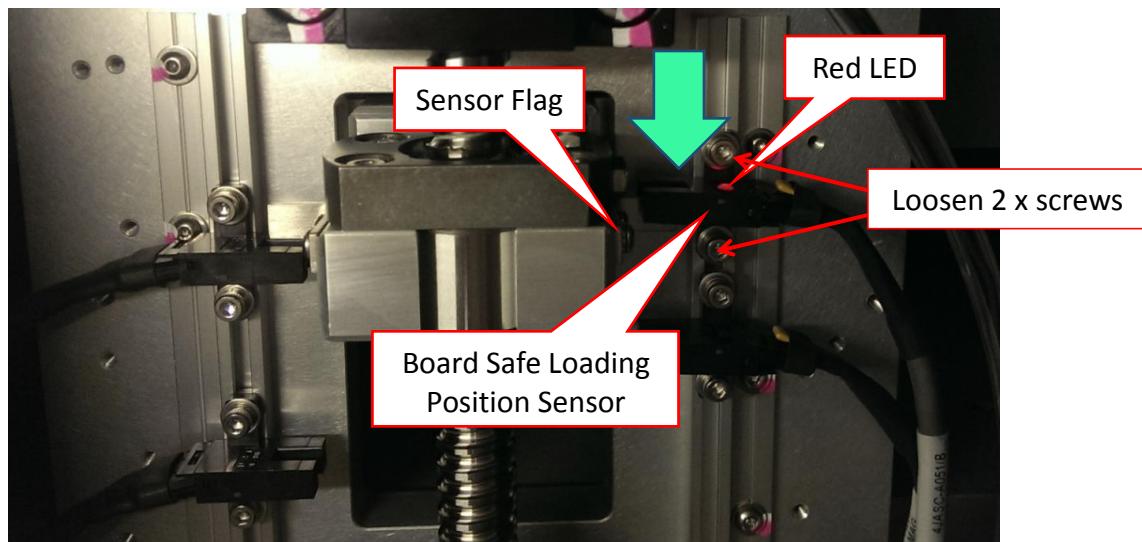


Figure 16 Safe position sensor adjustment

14. Back to DIO tab & ensure “Z-Axis at Safe Position On” turn to **Green**.

15. Uncheck all input as shown in Figure 16.

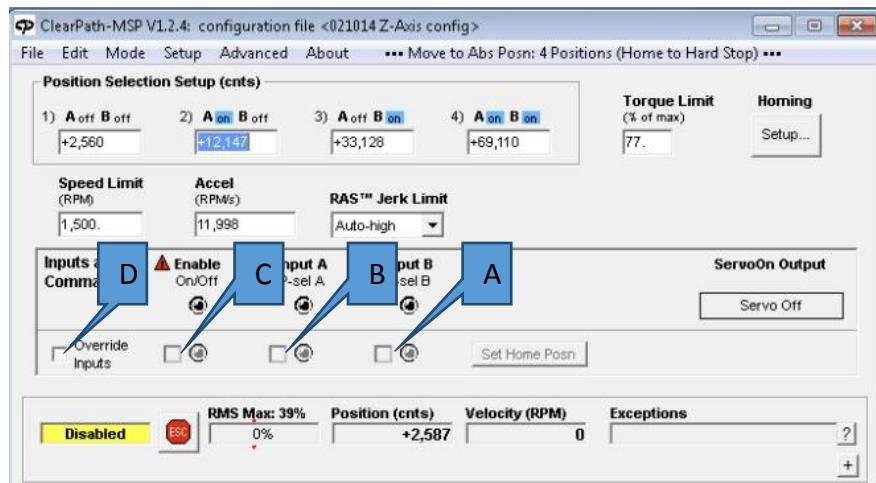


Figure 17 Clear Path MSP Software

16. Back to DIO tab, toggle “Z-Axis Enable Signal On” output bit.

Remark: Ensure “Z-Axis Servo On” and “Z-Axis Ready Safe Position On” are showing Green.

17. At DIO tab, manually toggle bits below and ensure all Z-axis position sensor is trigger correctly.

Position	I/O Bit
	Safe Board Loading Position Input <input checked="" type="checkbox"/> Z-Axis Position Bit A On <input checked="" type="checkbox"/> Z-Axis Position Bit B On Output <input checked="" type="checkbox"/> Z-Axis At Ready Safe Position On
	23um Resolution Input <input checked="" type="checkbox"/> Z-Axis Position Bit A On <input checked="" type="checkbox"/> Z-Axis Position Bit B On Output <input checked="" type="checkbox"/> Z-Axis At Low Mag Position 1 On
	19um Resolution Input <input checked="" type="checkbox"/> Z-Axis Position Bit A On <input checked="" type="checkbox"/> Z-Axis Position Bit B On Output <input checked="" type="checkbox"/> Z-Axis At Low Mag Position 2 On
	11um Resolution Input <input checked="" type="checkbox"/> Z-Axis Position Bit A On <input checked="" type="checkbox"/> Z-Axis Position Bit B On Output <input checked="" type="checkbox"/> Z-Axis At High Mag Position 1 On

Figure 18 Z-axis position

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18. Close right outer barrier.
19. Change setting to 23um (Low Mag) & restart GUI as shown in Figure 19.

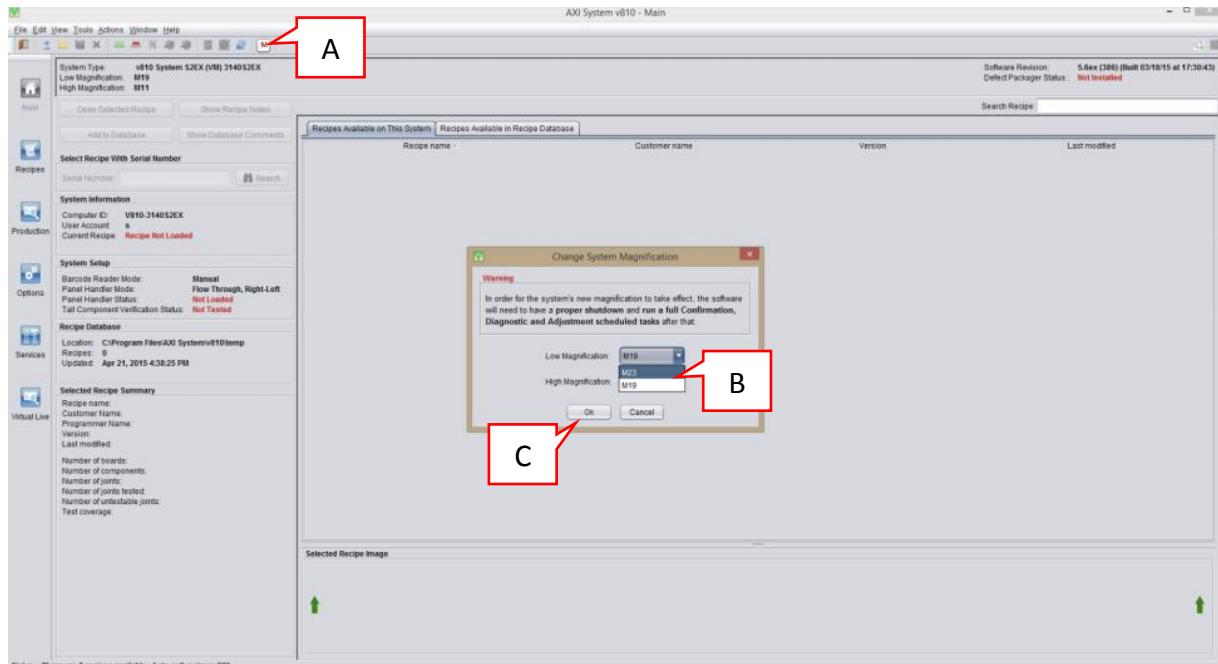


Figure 19 Magnification adjustment

20. Turn on x-ray source & run one loop CD&A as shown in Figure 20.

Services → Confirmation, Diagnostic and Adjustment → Scheduled Tasks → Run 1 loop

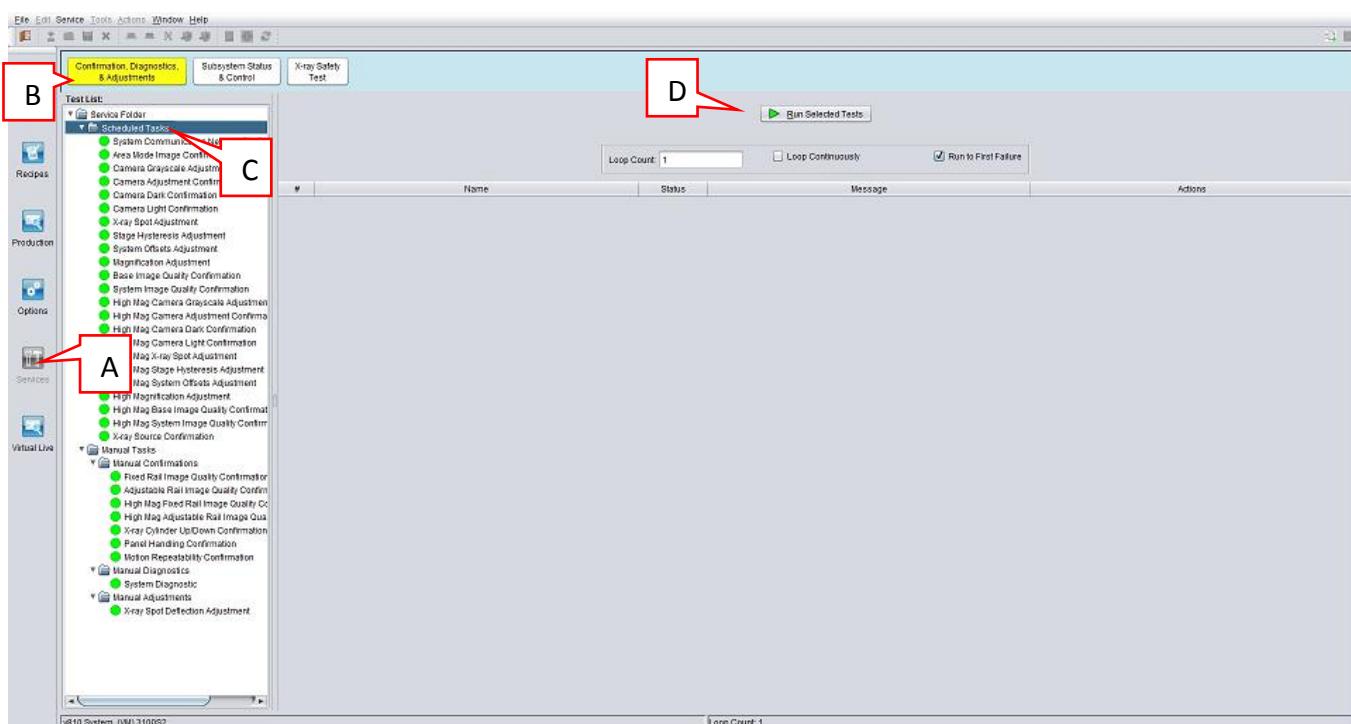


Figure 20 CD&A

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21. Go to path "C:\Program Files\AXI System\v810\<Rev>\log\calib\Magnification". Open & check the latest low magnification factor at the updated log files value with sort by modify date.

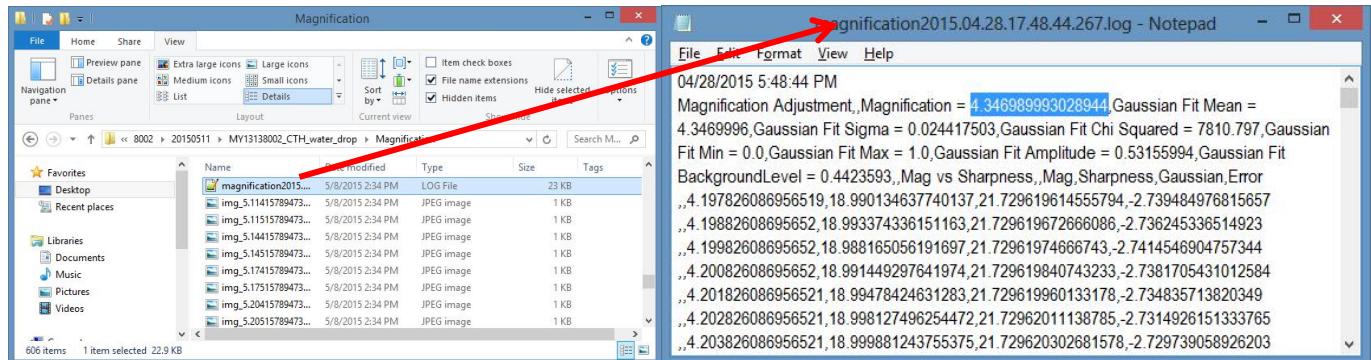


Figure 21 Magnification checking

22. Magnification value for respective spec are as following:

** Filter cap installation will not affects magnification except the safe load position.

23um = 4.33 ~ 4.35

19um = 5.24 ~ 5.26

11um = 9.07 ~ 9.09

23. Save fine-tuned ClearPath motor config file as shown in Figure 22.

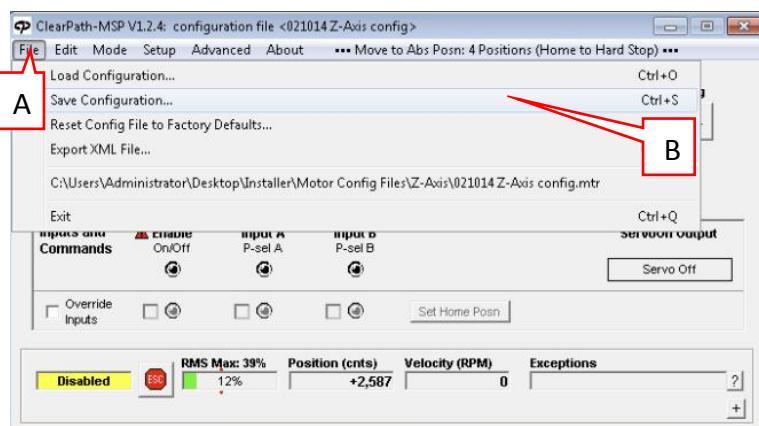


Figure 22 Fine-tuned z-axis motor config

20. Assemble U-COLUMN WINDOW ASSEMBLY (P/N, 4JAHW-A049).

21. Run 5 loops CD&A (23um and 11um /19um and 11um) for each magnification.

Filter Height Sensor Module Modification

** This modification procedure is applicable for left & right side filter height sensor module.

Filter Laser Head Bracket Removal

1. Open front access doors.
2. Remove 4 x screws (M4X10) & both filter height sensors cover as shown in the Figure 23.

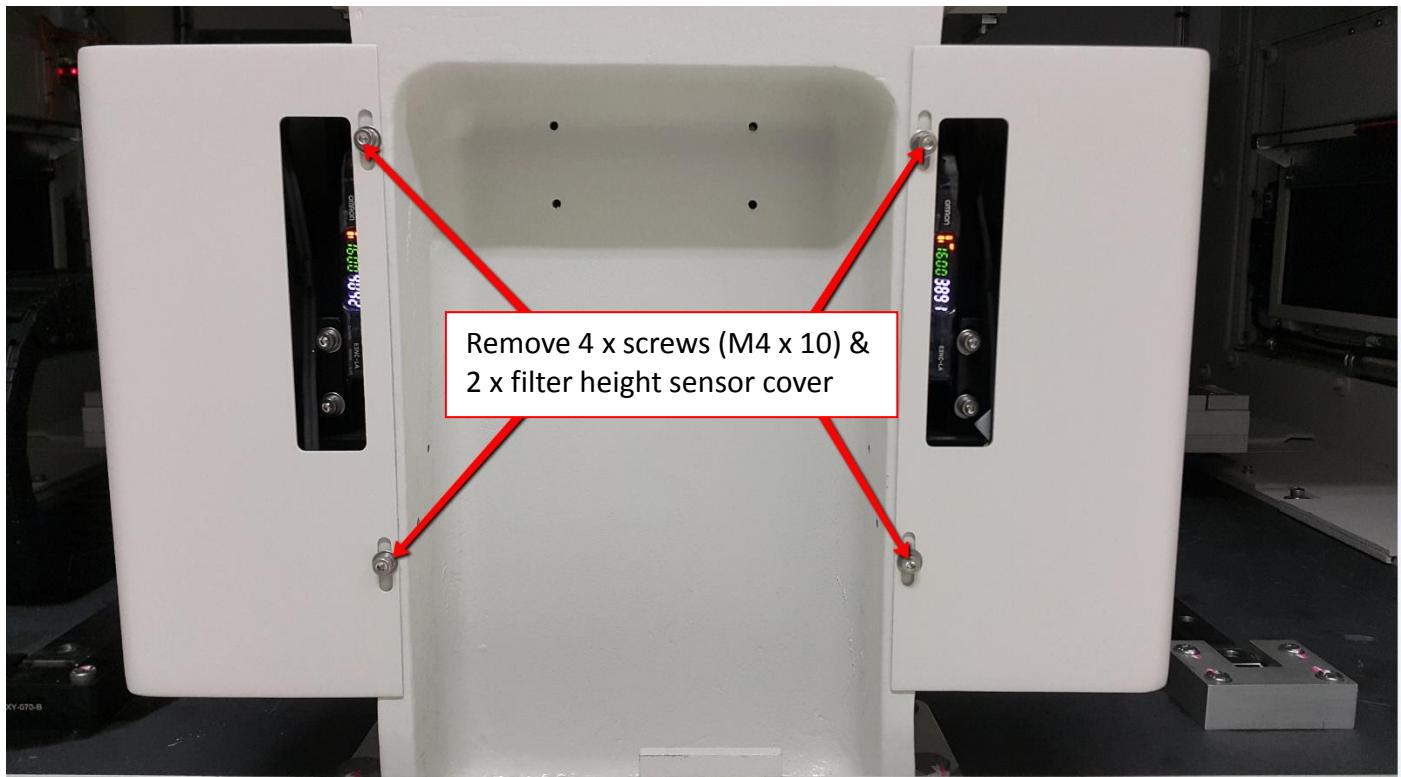


Figure 23 Filter height sensor

3. Identify left & right filter height sensor as shown in Figure 24.

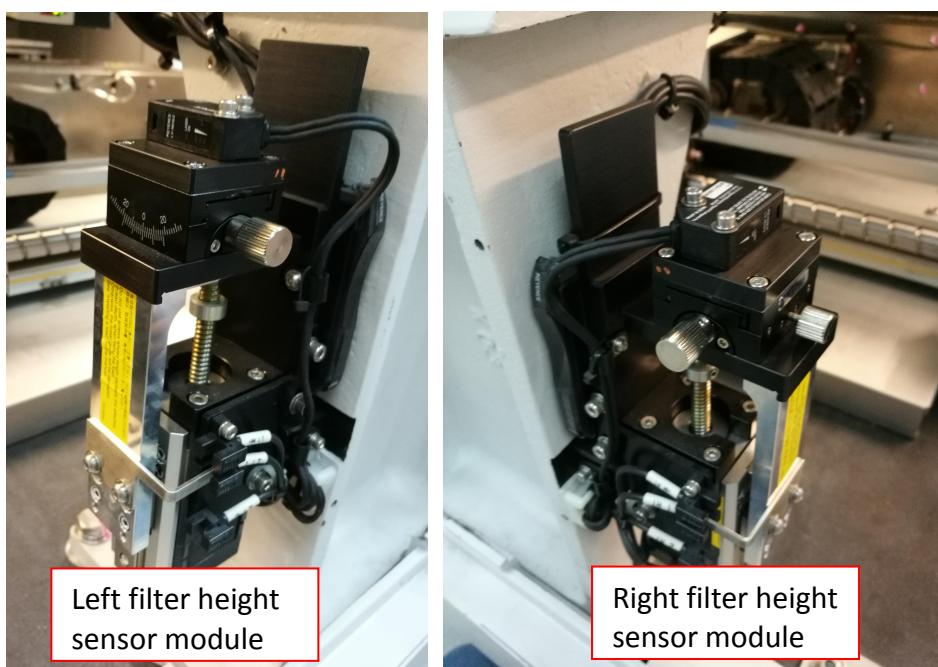


Figure 24 Filter height sensor module

4. Remove 2 x screw (SHCS M3 x 20) & laser sensor head as shown in Figure 25.

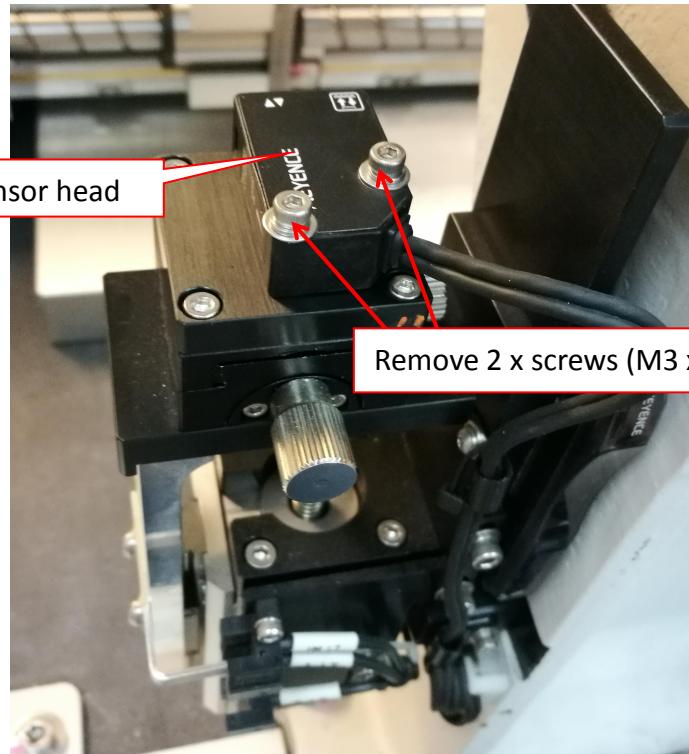


Figure 25 Laser head removal

5. Remove 4 x screws (SHSC M3 x 10) & filter laser head bracket (P/N, 4LASS-292) as shown in Figure 26.

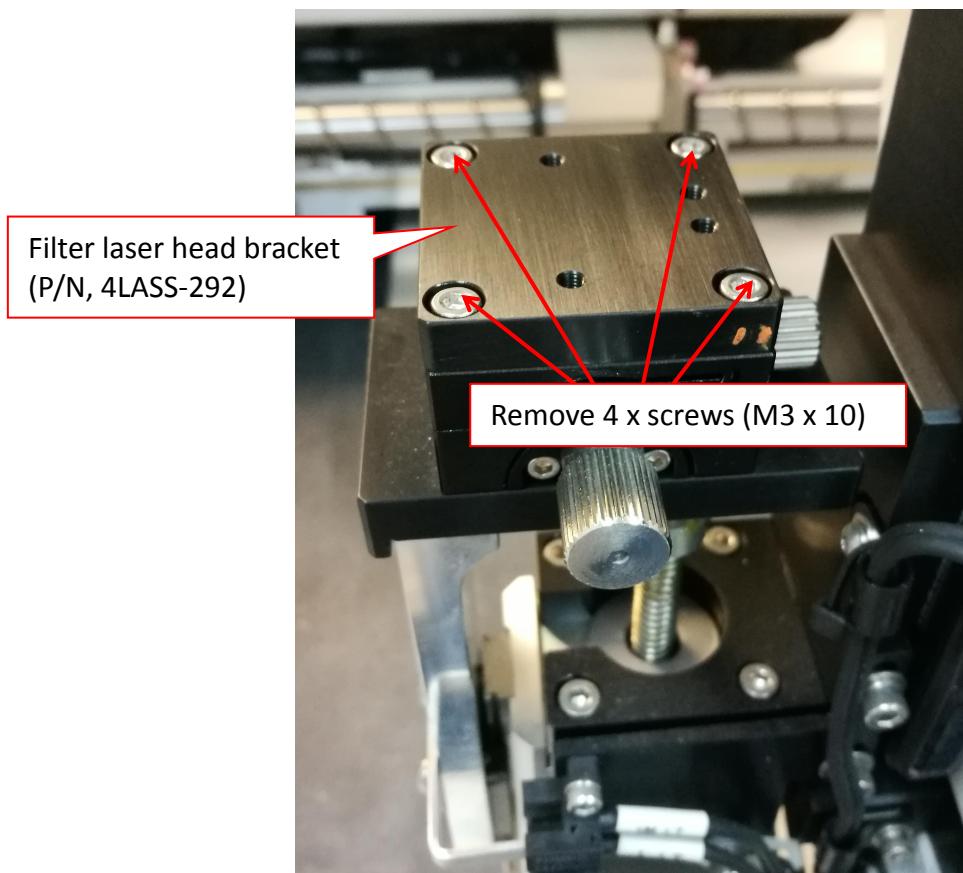


Figure 26 Filter laser head bracket removal

Filter Laser Sensor Head Bracket Replacement

1. Assemble new filter laser head bracket (P/N, 4JASSM-N334-A) & tighten 4 x screws (SHC M3x8) as shown in Figure 27.

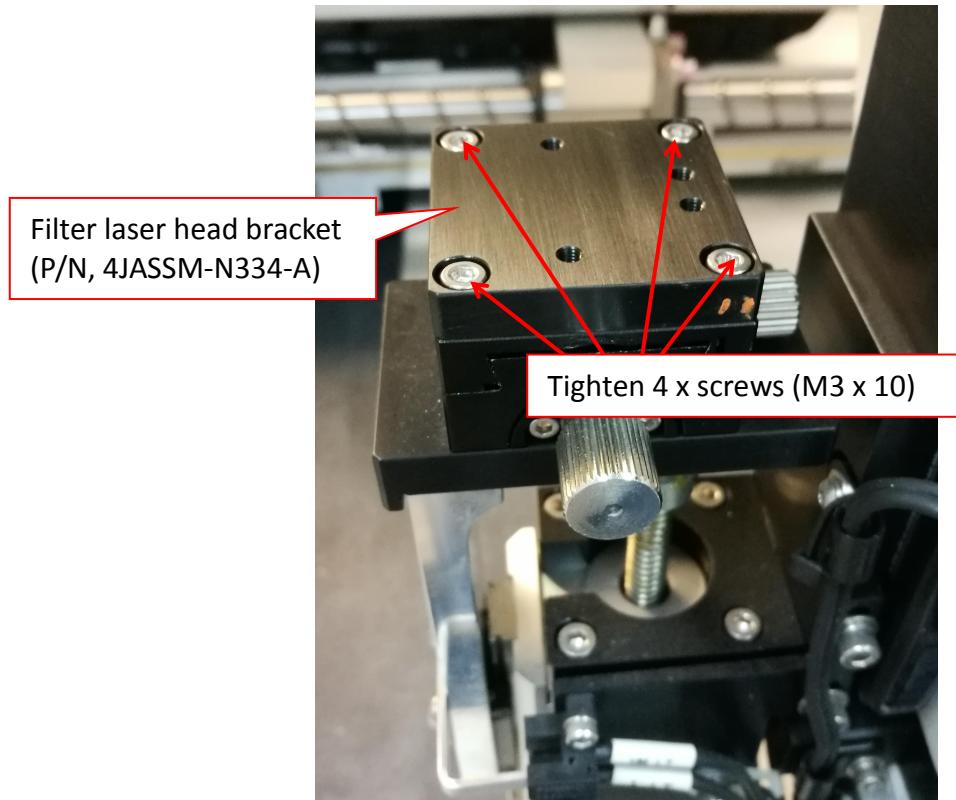


Figure 27 New filter sensor head bracket assembly

2. Assemble laser head & tighten 2 x screws (SHCS M3 x 20) as shown in Figure 28.

Remark: Ensure laser spot is locate at center of reflector as shown in Figure 29.

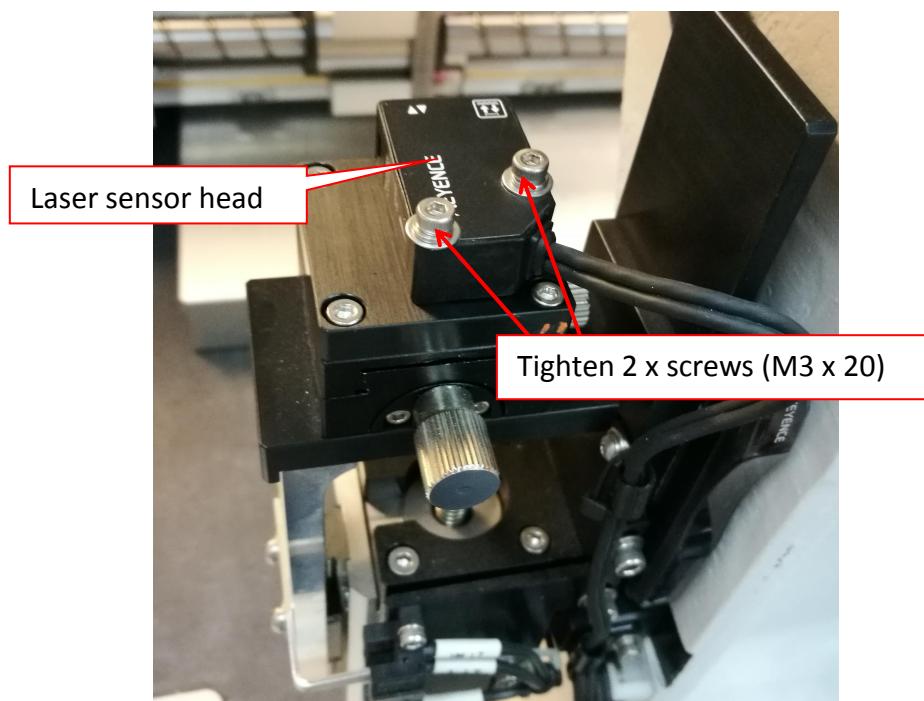


Figure 28 Laser head assembly

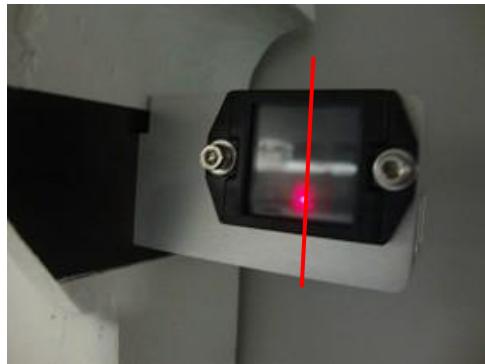


Figure 29 Laser spot on filter height reflector

3. Perform filter laser sensor head bracket replacement (4LASS-292 to 4JASSM-N334-A) for right side filter height sensor module.
4. Prepare filter height calibration jig (P/N, 4JACMM-N046-00) & perform filter height adjustment.

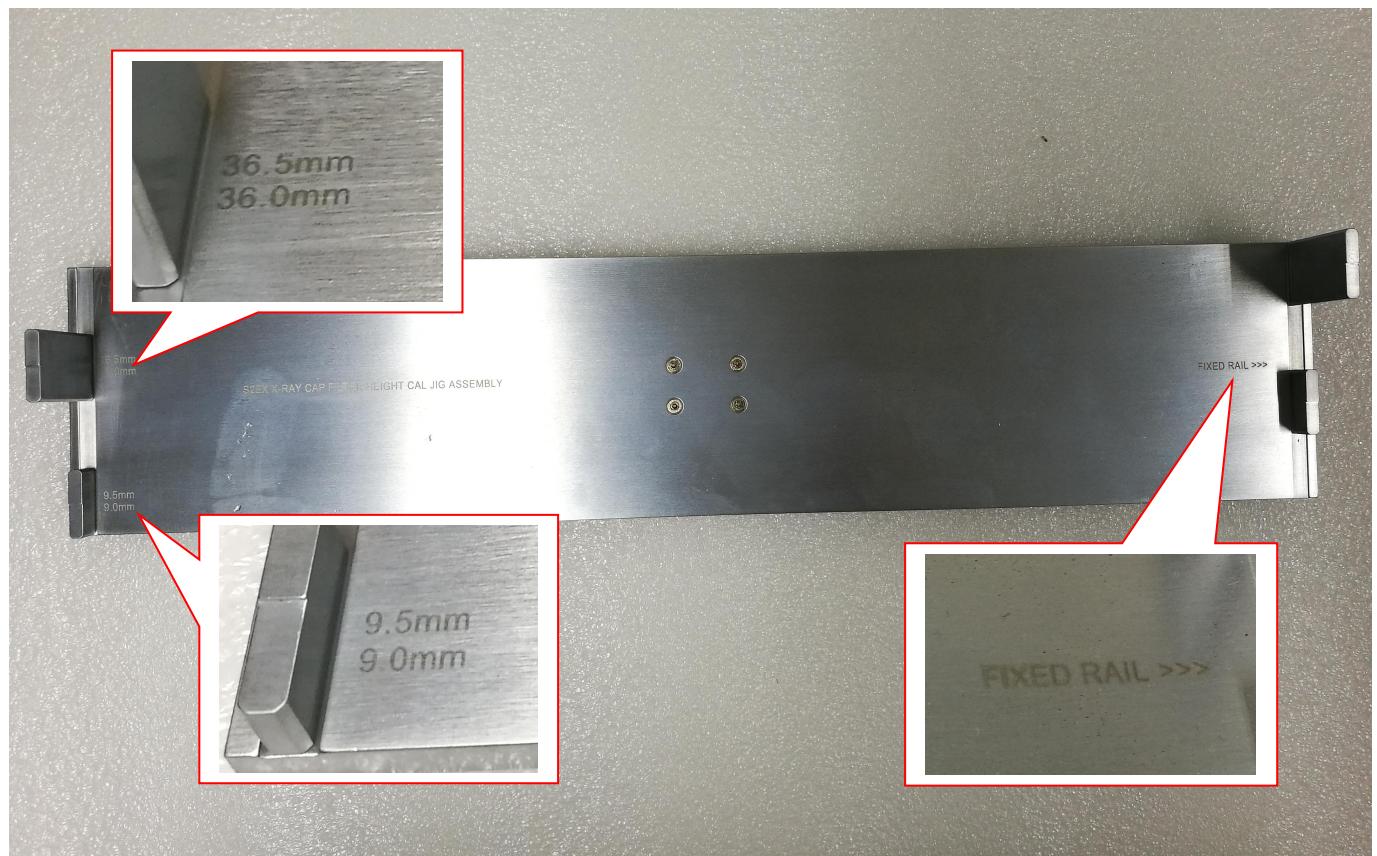


Figure 30 Filter height jig

Filter Height Adjustment

1. Prepare Communication Cable USB To Driver (P/N: 2530-0002).



Figure 31 Communication Cable USB To Driver

2. Connect one end to Atom PC USB Slot and another end to 2670-0046, Driver Stepper Linear Motion, NEMA 17 of Right Filter Height Sensor.

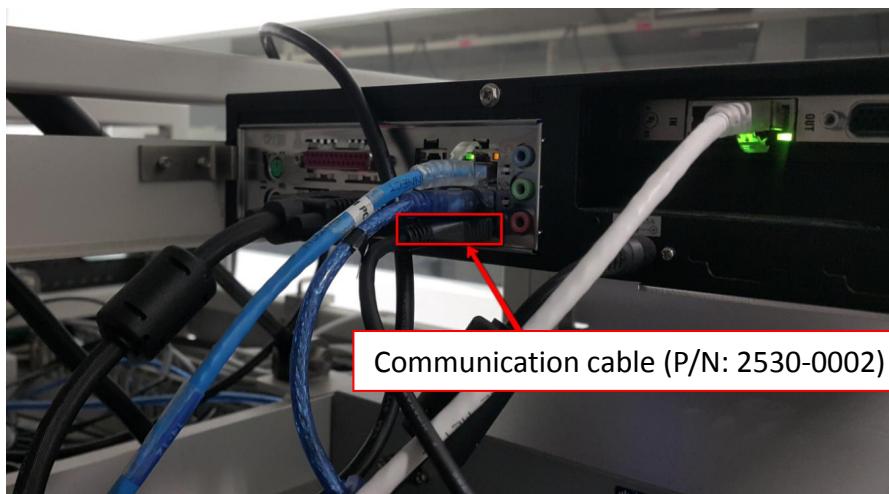


Figure 32 Communication Cable USB to Driver

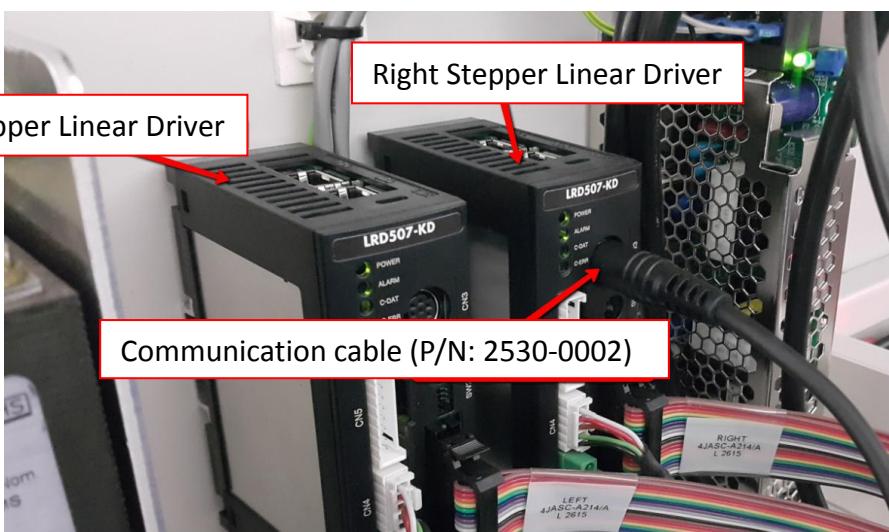


Figure 33 Right Stepper Linear Motion

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3. Once the cable is connected as shown in the Step (2), a Green LED should turn on. If the LED does not turn on, reseat USB Cable at Atom PC until the Green LED turn on.

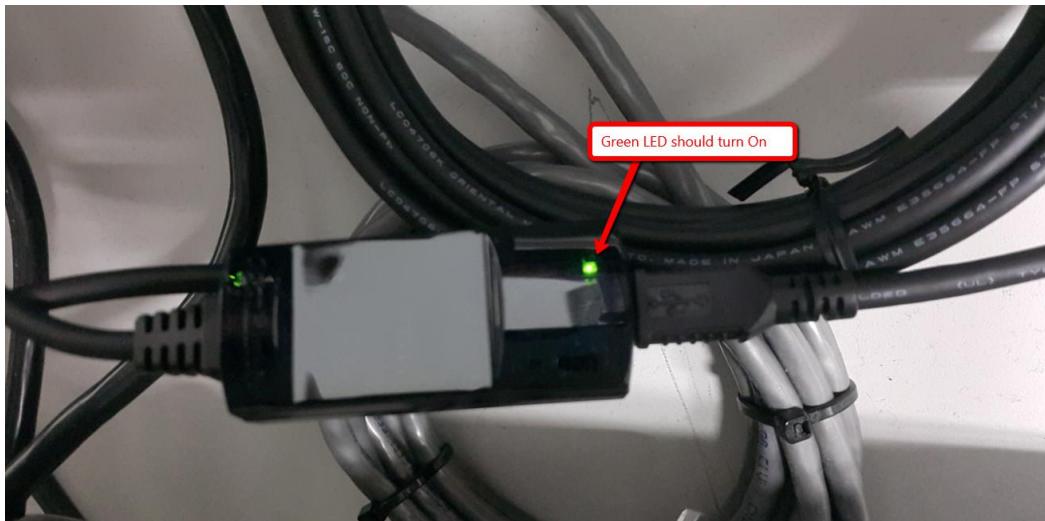


Figure 34 Communication cable

4. Go to “Panel Handling” and click “Initialize”.
5. Then choose “Display Measurement to Inches”.
6. Then click “Load Panel”.
7. Enter Width and Length of the panel as 19 inch.
8. Click “Load”.

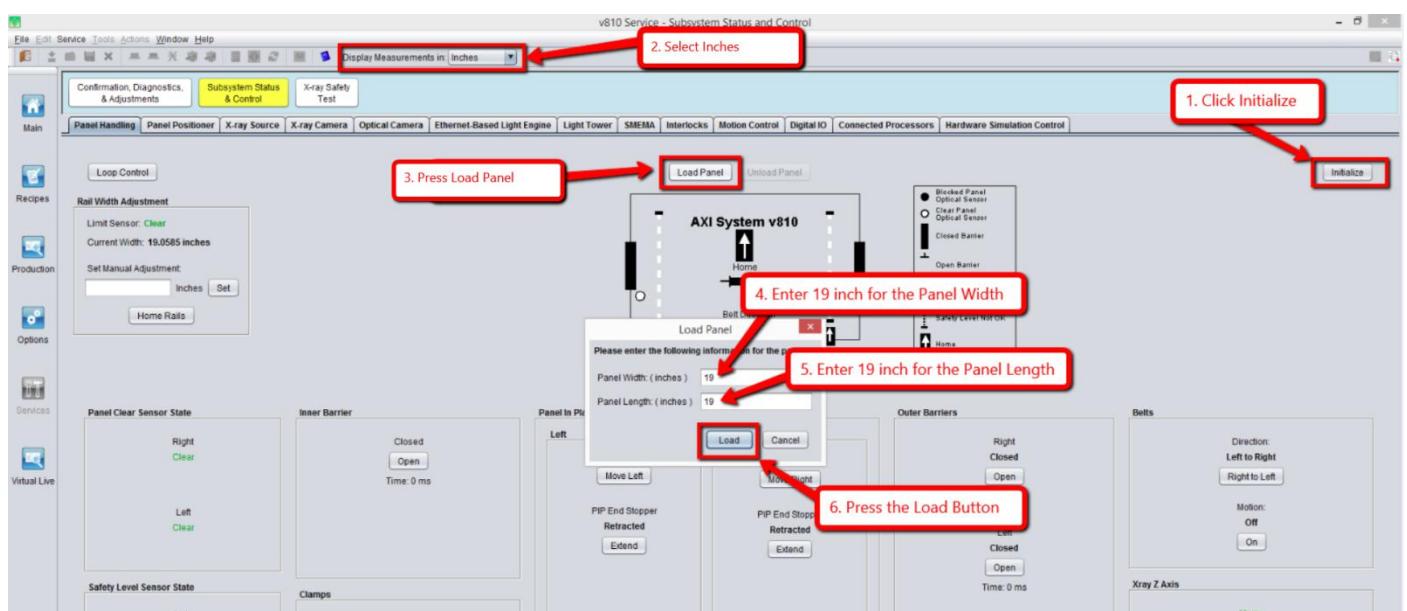


Figure 35 Panel Handling

9. Once outer barriers open, click “Cancel” button to close the outer barrier.

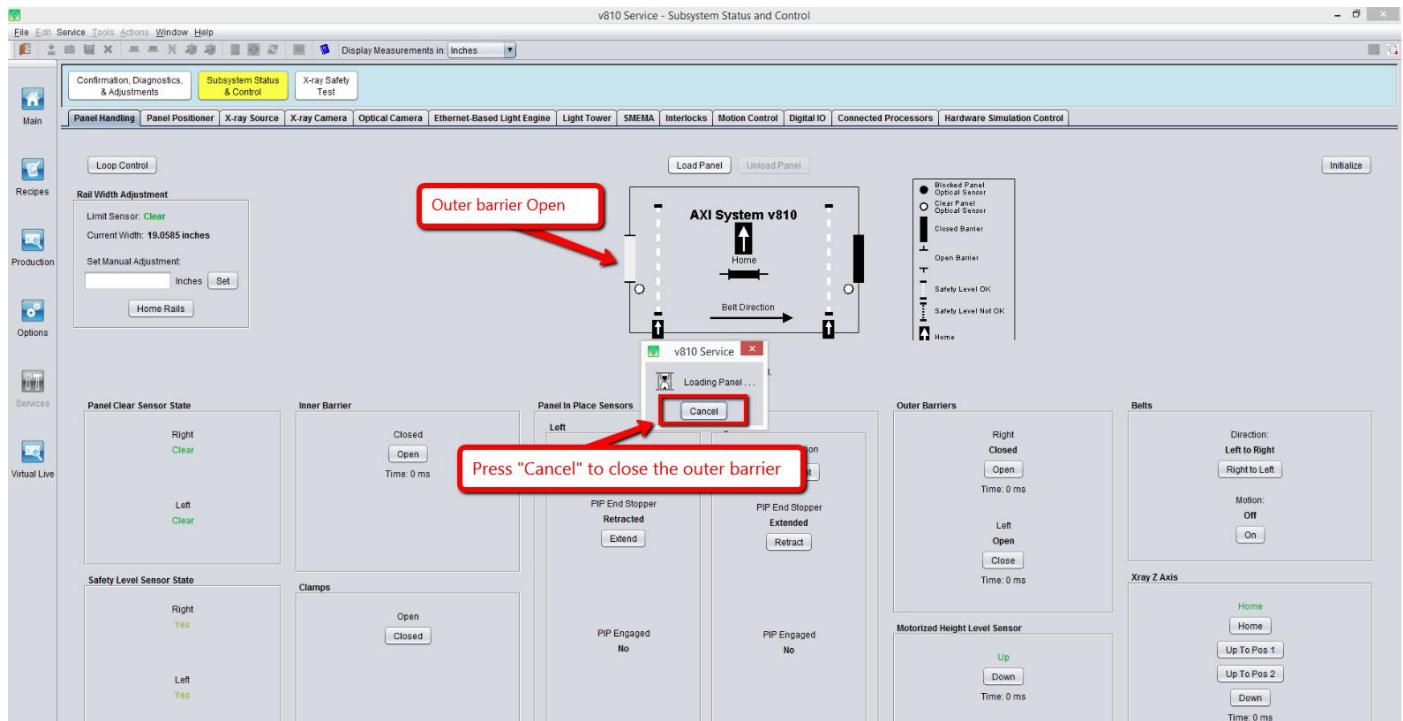


Figure 36 Outer barrier open

5. Prepare filter height calibration jig (P/N, 4JACMM-N046-00).

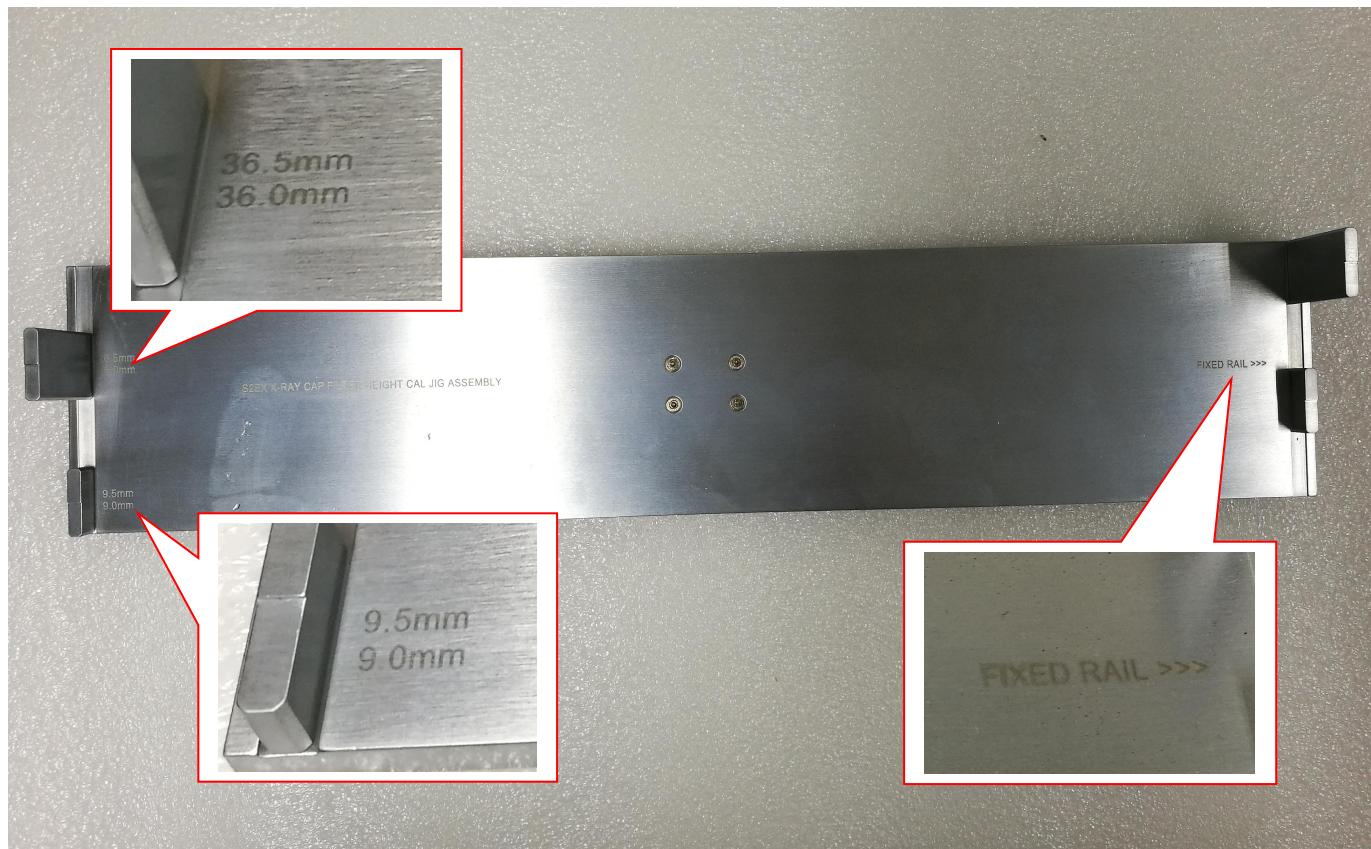


Figure 37 Filter Height Jig

10. Open Right Outer Barrier and ensure clamper is open.
11. Place 4JACMM-N046-00 at Right Outer Barrier Side > Align it parallel with 4th Emitter & Receiver > Close the clamper.

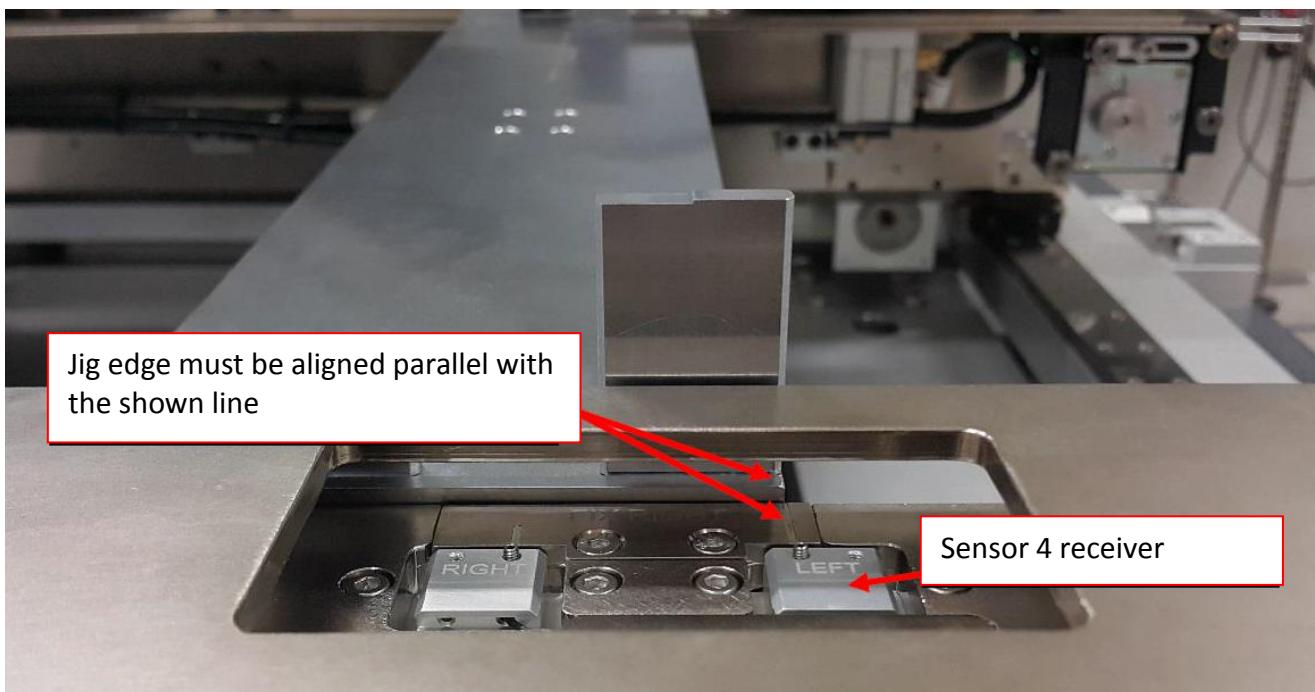


Figure 38 Var Mag Filter Jig Assembly

12. Open side access door and ensure that Right Filter Height Reflector Bracket is aligned parallel.

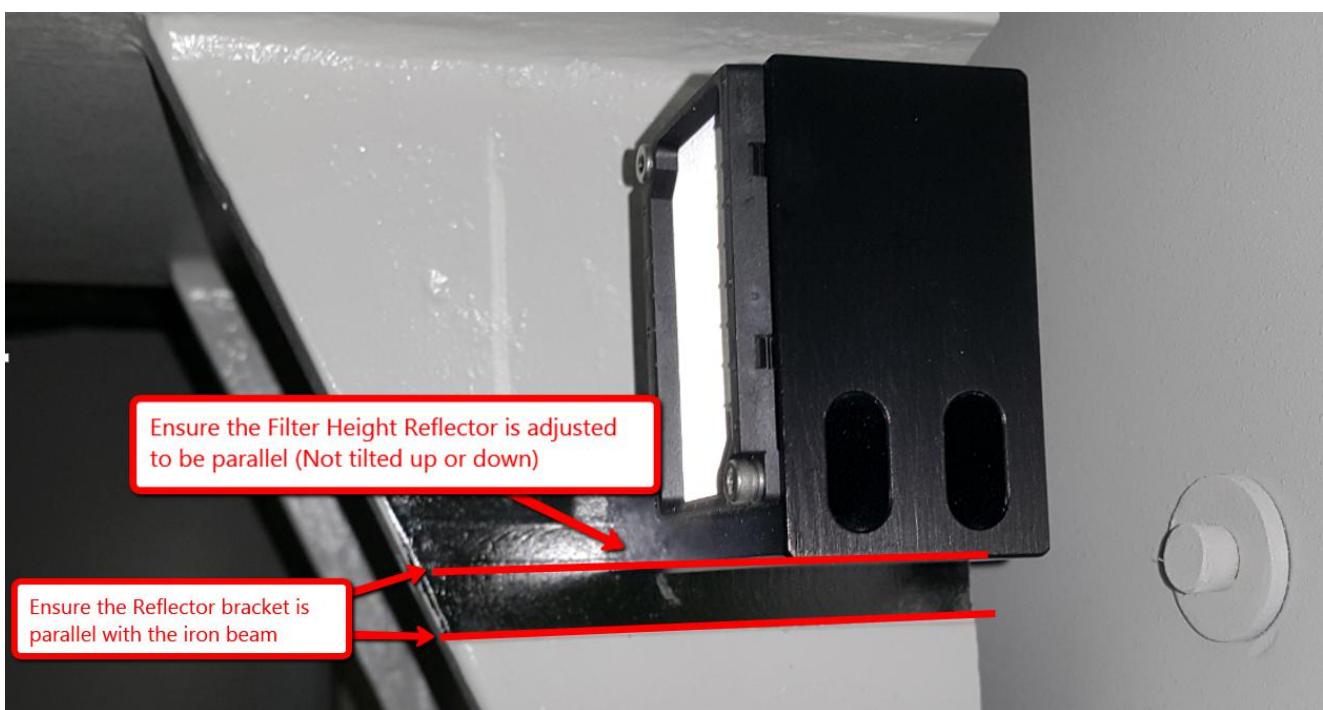


Figure 39 Filter Height Bracket

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13. Remote desktop to the Atom PC using the following credentials.

- a) Computer name : 192.168.128.70
- b) Username : Administrator
- c) Password : Please!

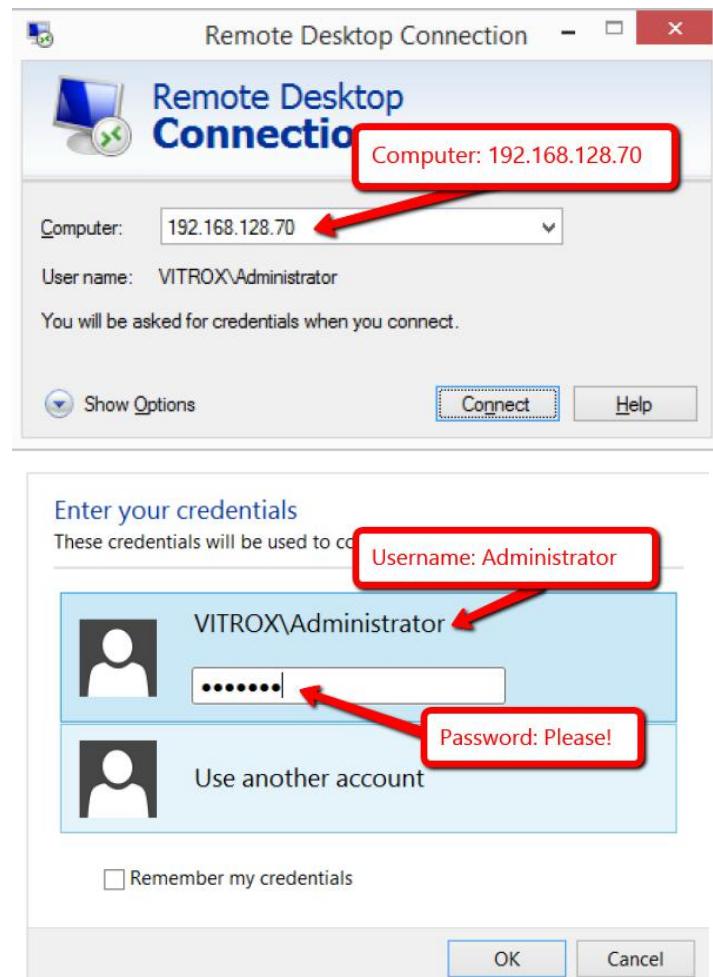


Figure 40 Remote Desktop

14. Open MEXE02 software.

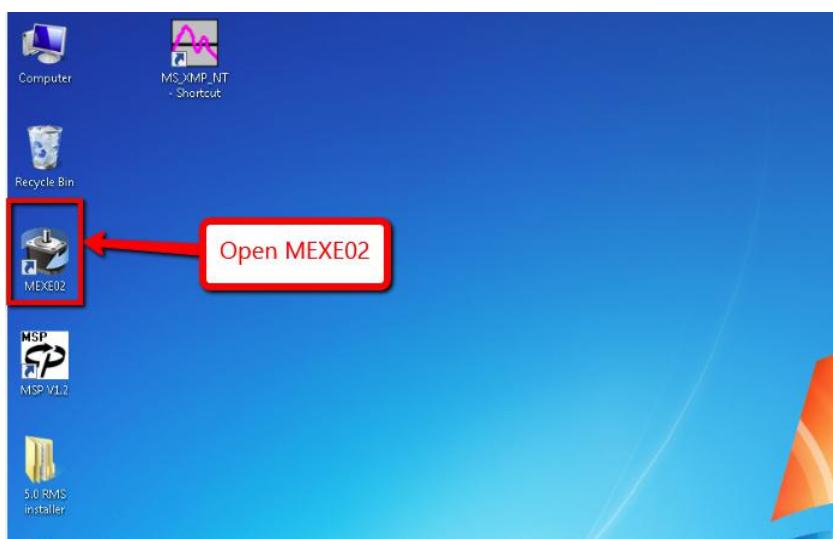


Figure 41 MEXE02 software

15. Go to communication tab > Select “Setting of the communication” > Select “COM_:Oriental Motor / Virtual COM Port”.

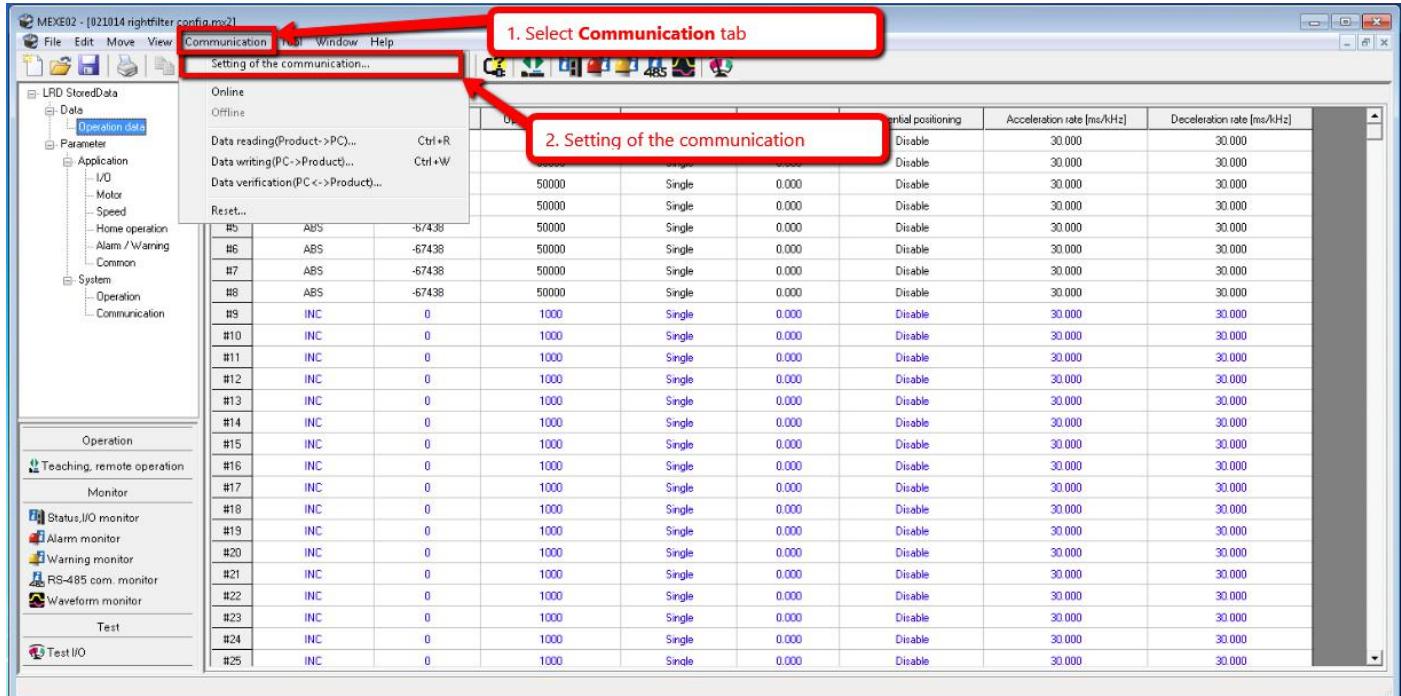


Figure 42 Setting of the communication

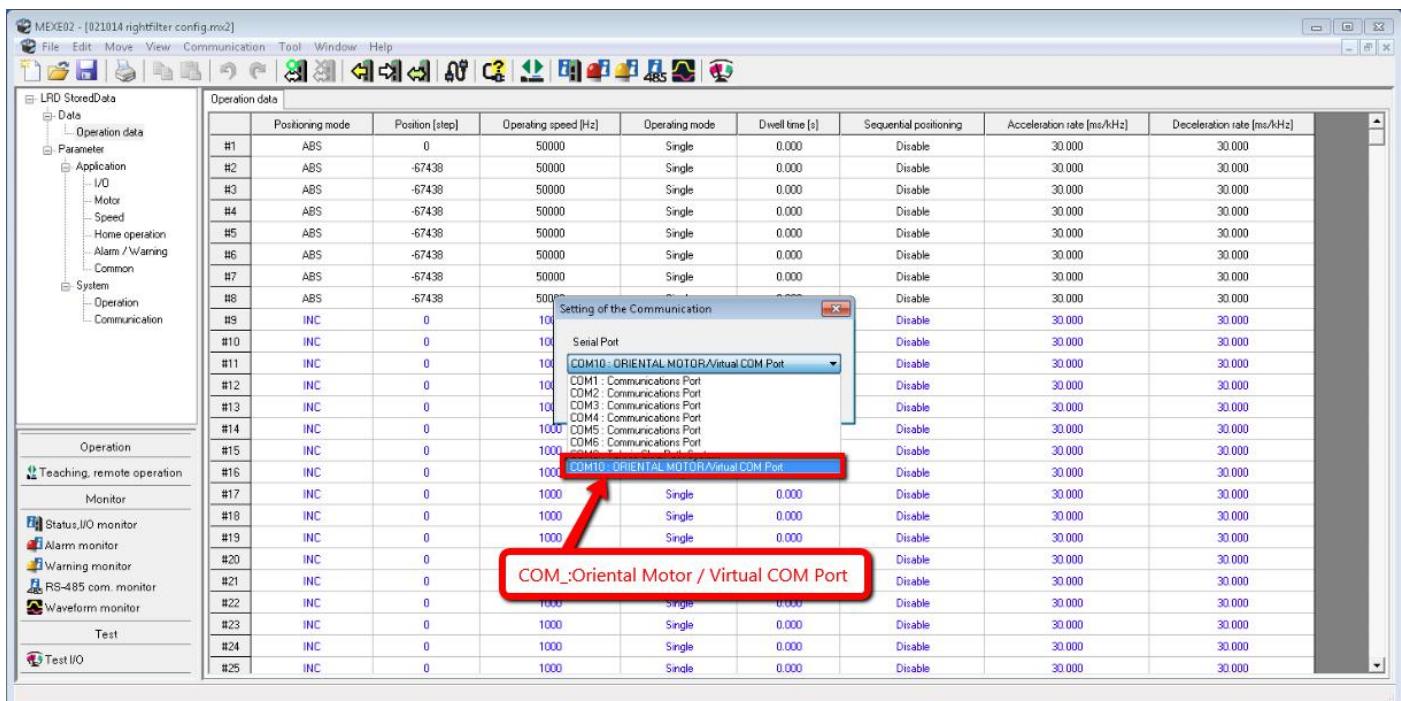


Figure 43 Setting of the Communication

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16. Click “Open”.



Figure 44 MEXE02 Software interface

17. Select the file “021014 right filter config.mx2”.

Remarks: The files will be provided by Vitrox AXI SNS Hardware Team.

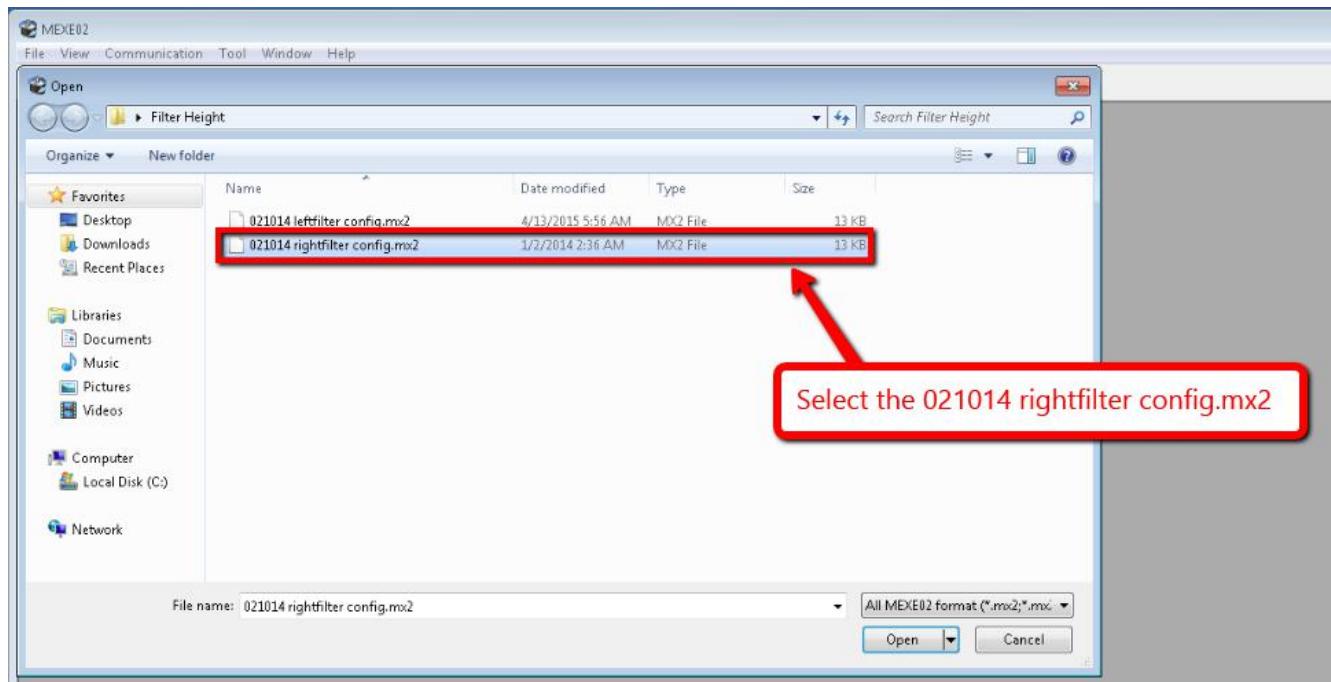


Figure 45 MEXE02 Software Interface

18. Select “Teaching, remote operation” > Check “Start the teaching remote operation” > Click “Yes”.

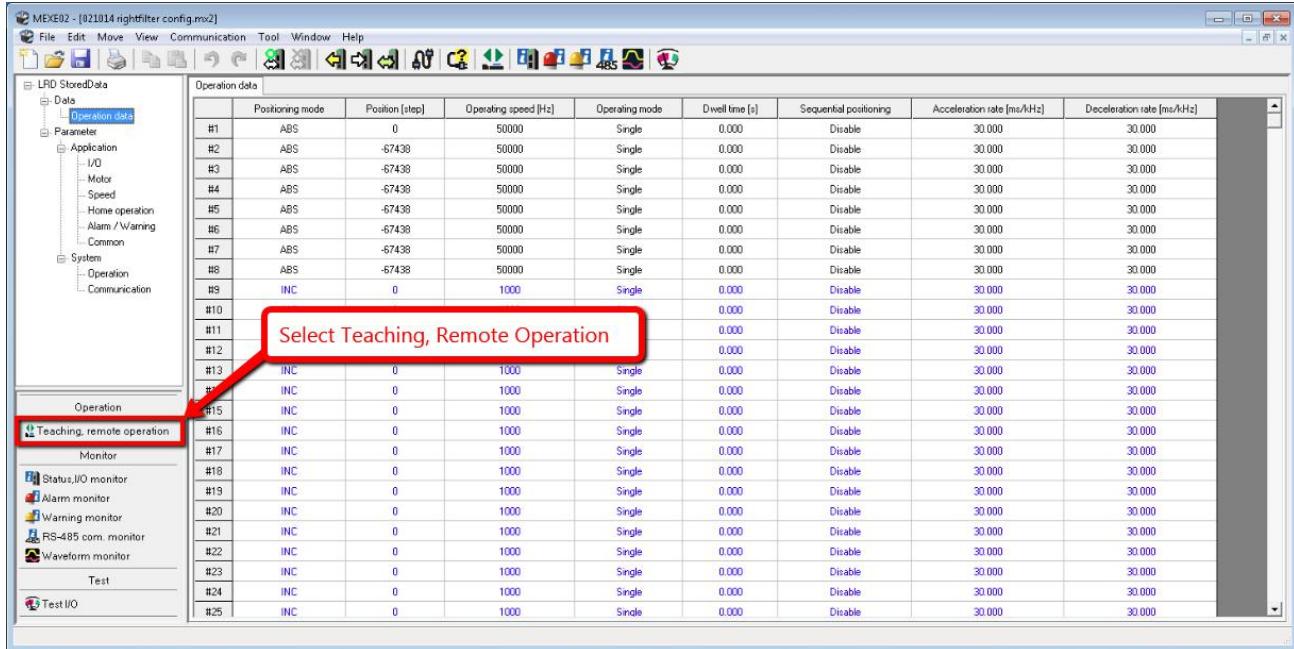


Figure 46 Teaching mode

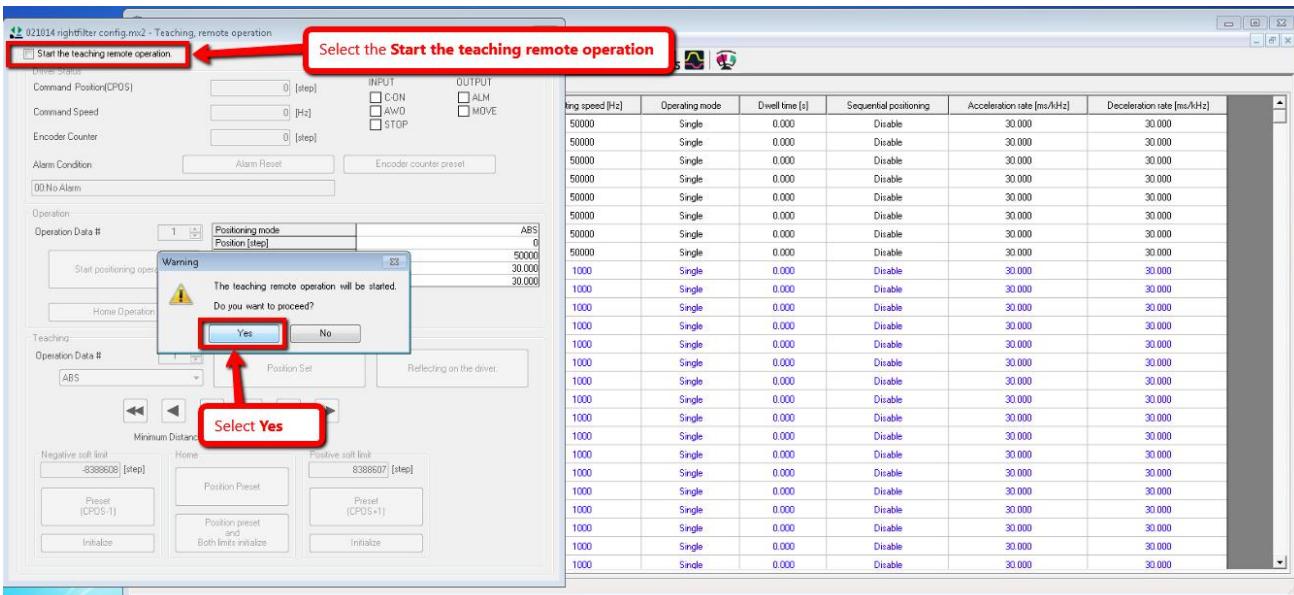


Figure 47 Start the teaching remote operation

19. Select “Writing all data (PC->Product)” > Click “OK” > Wait until it finish writing the data into the Right Oriental motor driver.

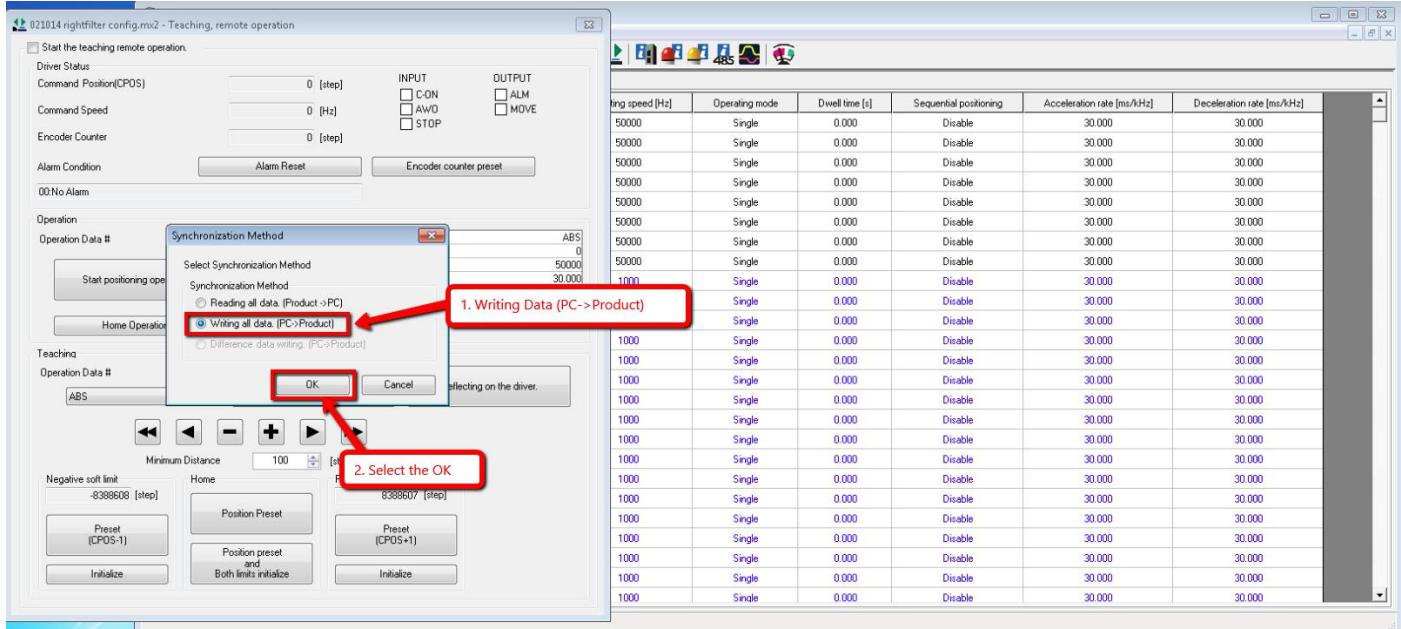


Figure 48 Writing Process

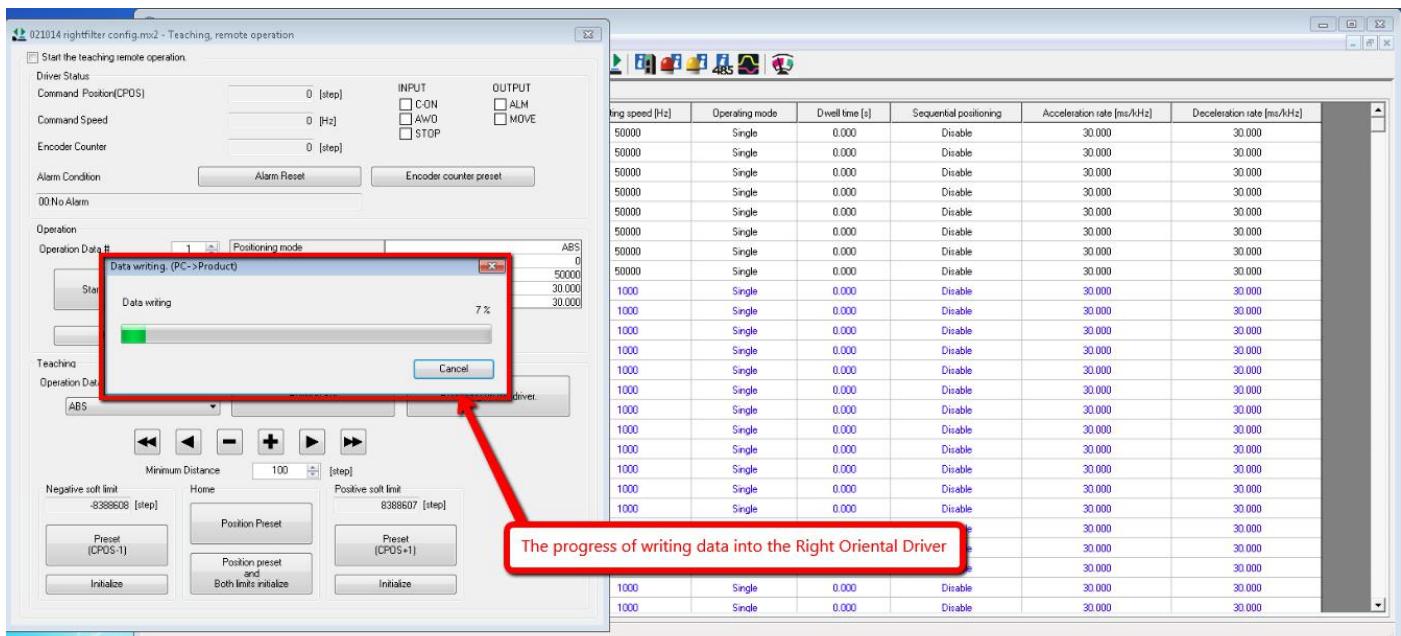


Figure 49 Uploading Process

20. Press “Home Operation” button > Click “OK”.

Remarks: Physically Right filter height sensor will move to the default homing position.

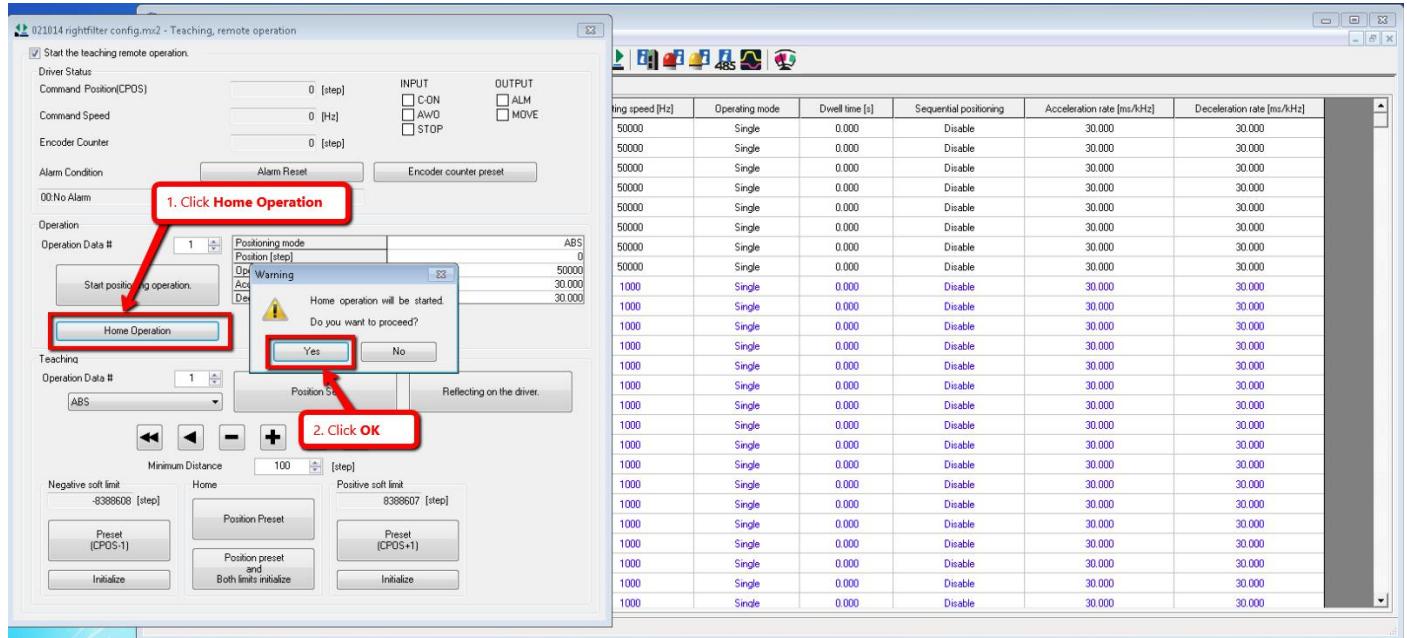


Figure 50 Homing process

21. Remove 4x units SHSC M4X10 and both filter height sensor cover.

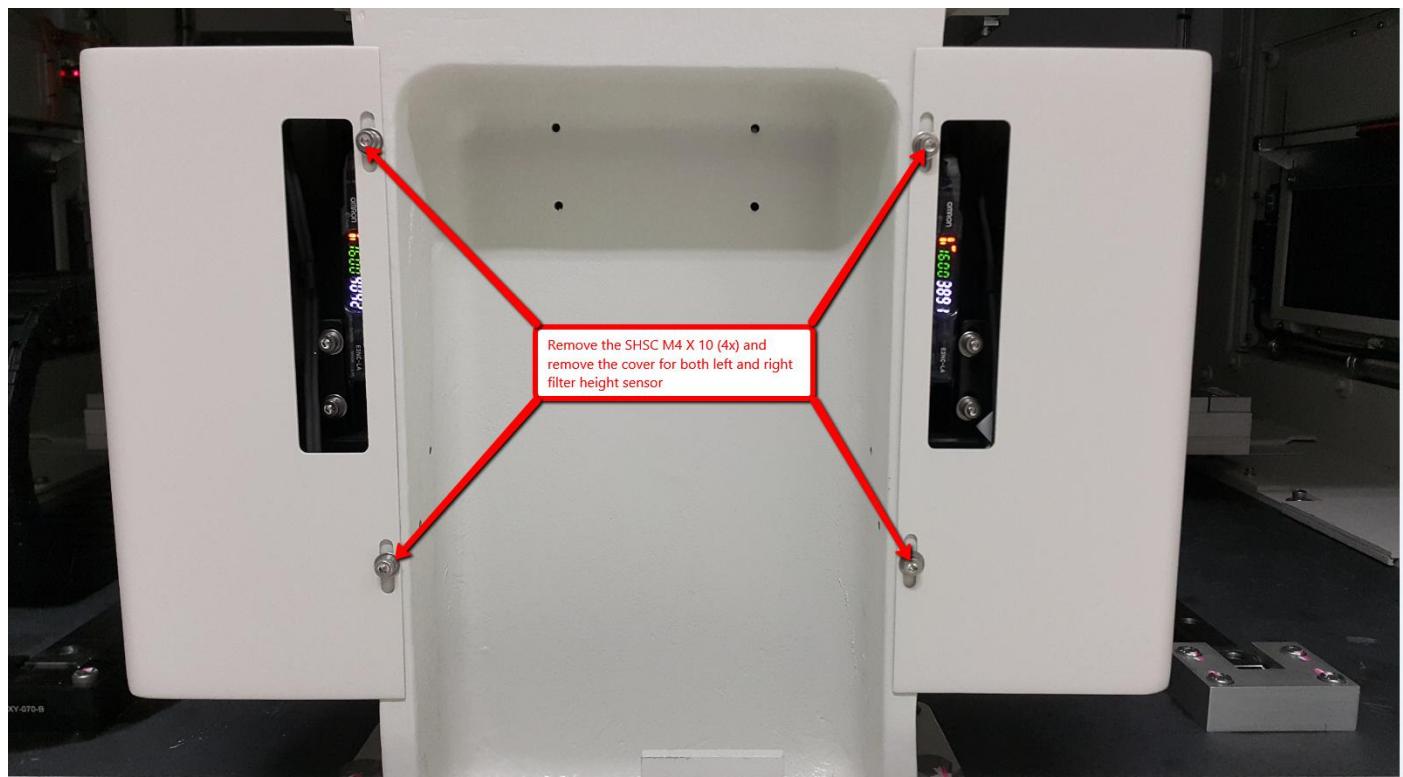


Figure 51 Filter Height Cover

22. Turn coupling slowly until Filter Height Sensor Laser align parallel with the 19µm jig height.

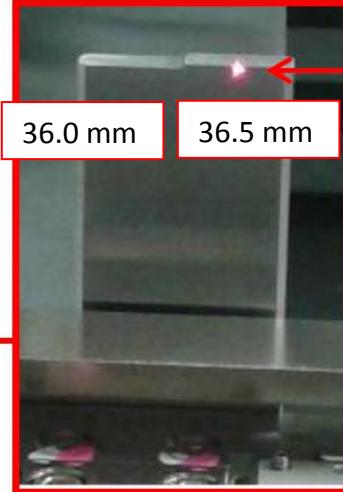
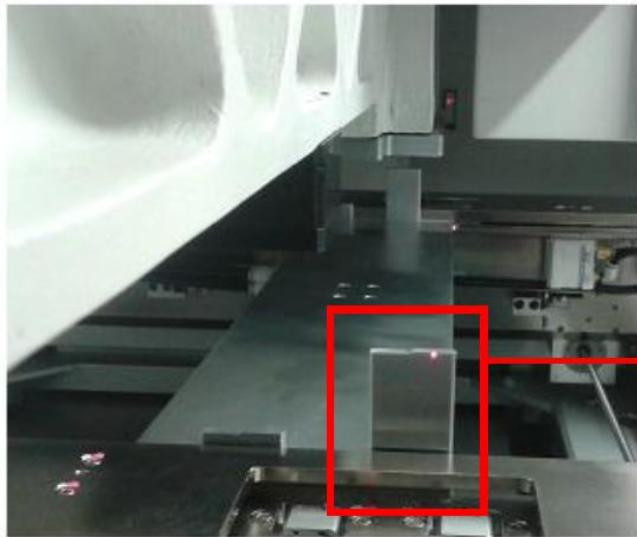


Figure 52 Laser spot

23. Set minimum distance to 100.

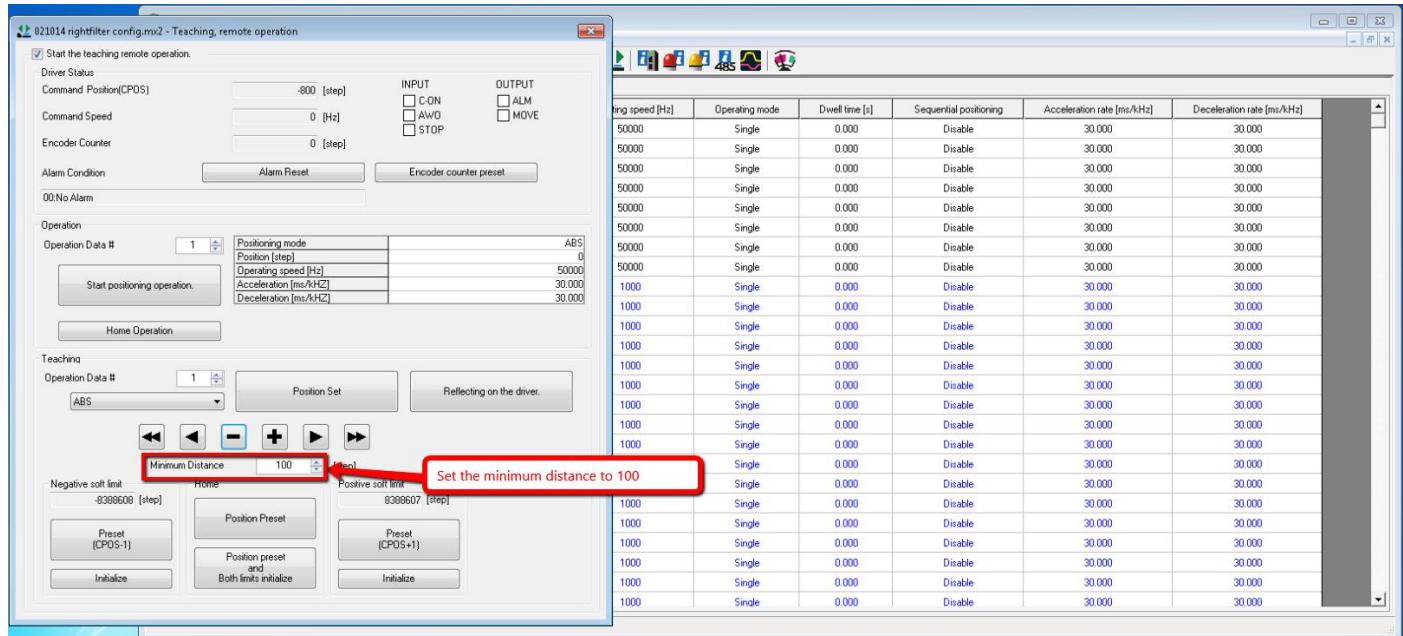


Figure 53 Minimum distance travelled

24. Manually trigger (+) and (-) to move the height of the Filter Height Motor.

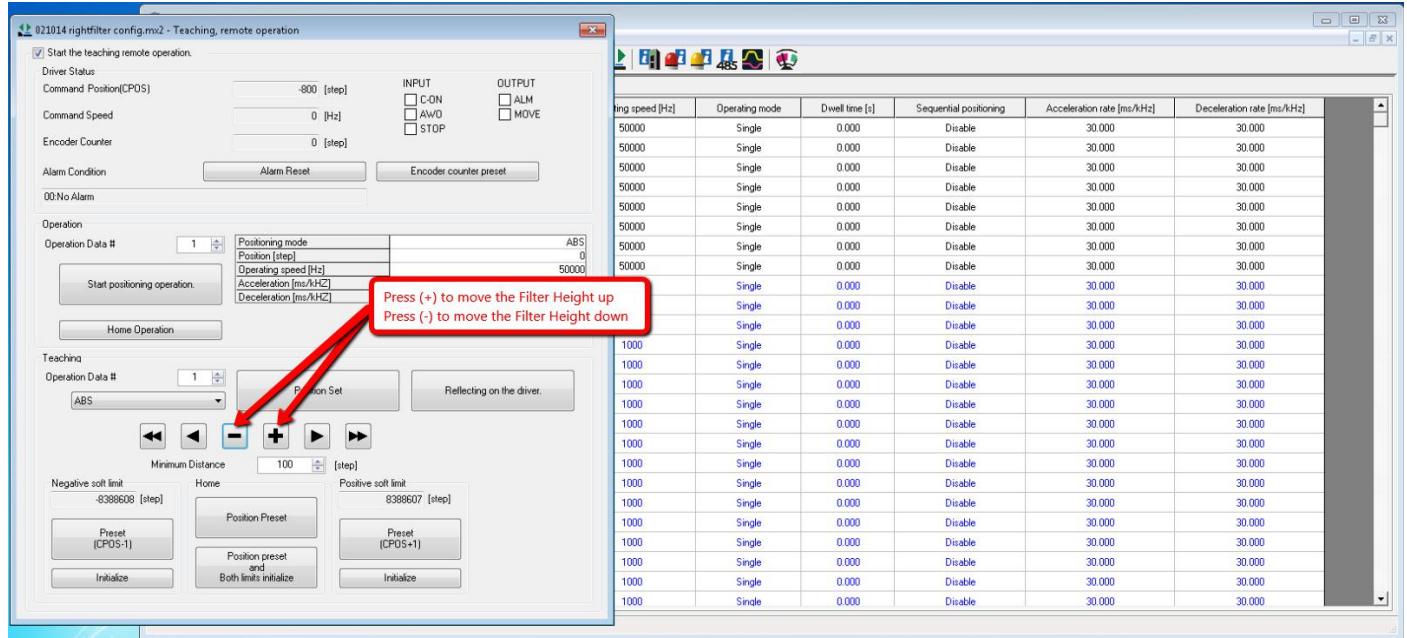


Figure 54 Manually trigger to move the filter height motor up and down

25. Adjust sensor angle up and down manually.

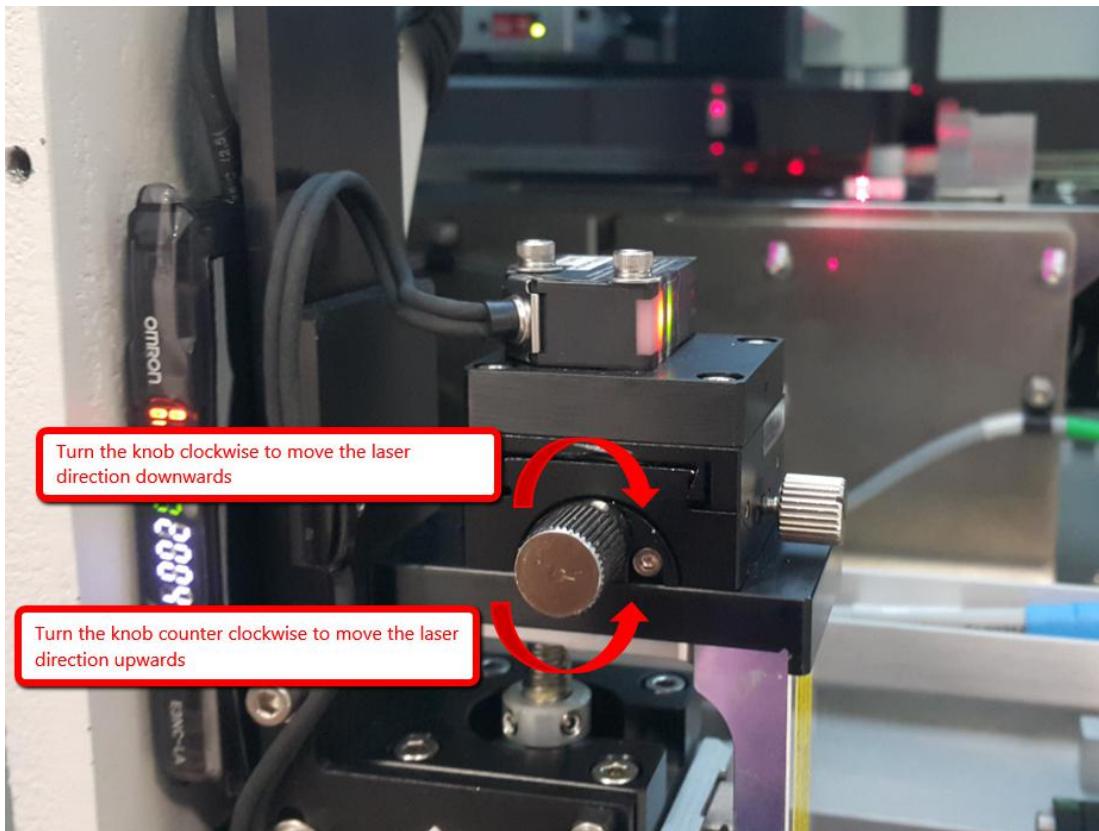


Figure 55 Knob adjustment laser

26. Manually move the stage from fixed rail jig (36.5mm) and to adjustable rail jig (36.5mm)

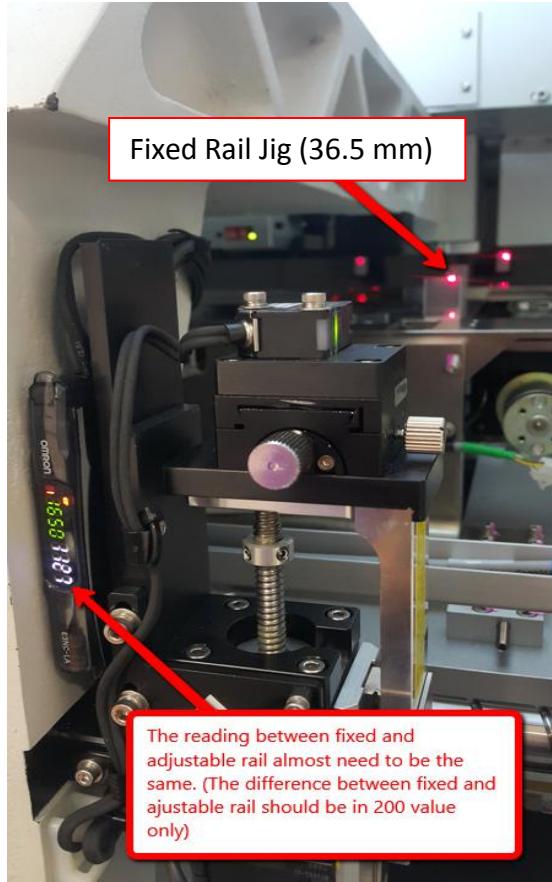


Figure 56 Fixed Rail

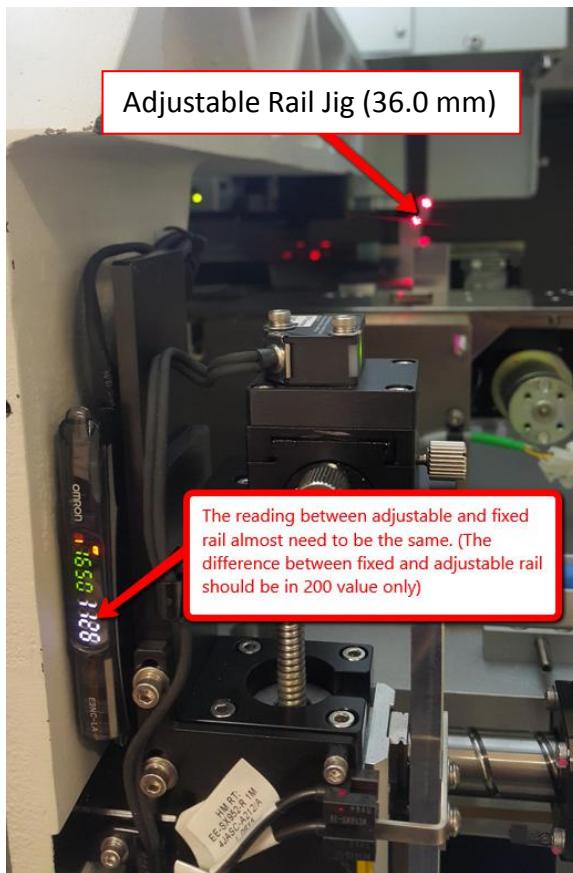


Figure 57 Adjustable Rail

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27. Repeat Step 24 to Step 26 until laser beam is parallel.
28. Turn the knob to lock filter sensor laser beam angle movement.



Figure 58 Filter Height

29. Manually trigger (+) and (-) to move the height of the Filter Height Motor.
- For the 36.5 mm ensure the reading is below 1300
 - For the 36.0 mm ensure the reading is above 1800

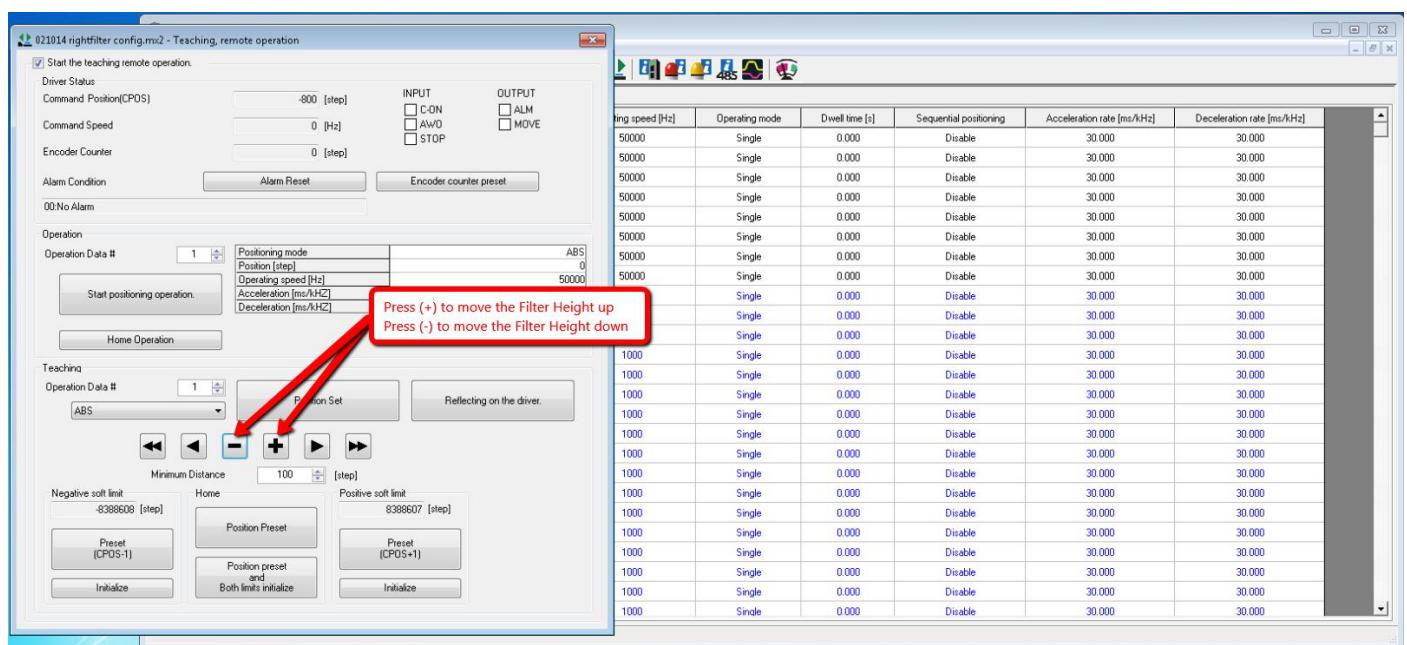
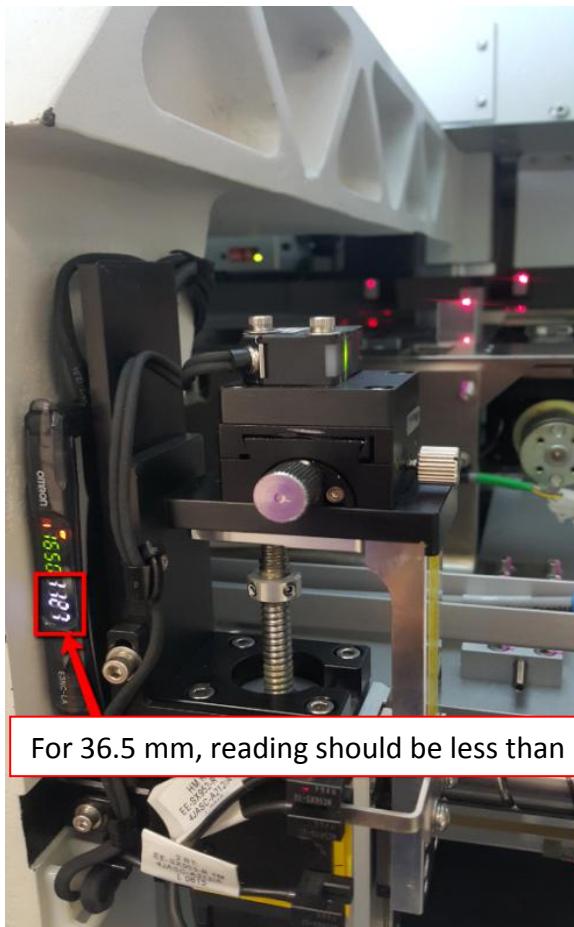
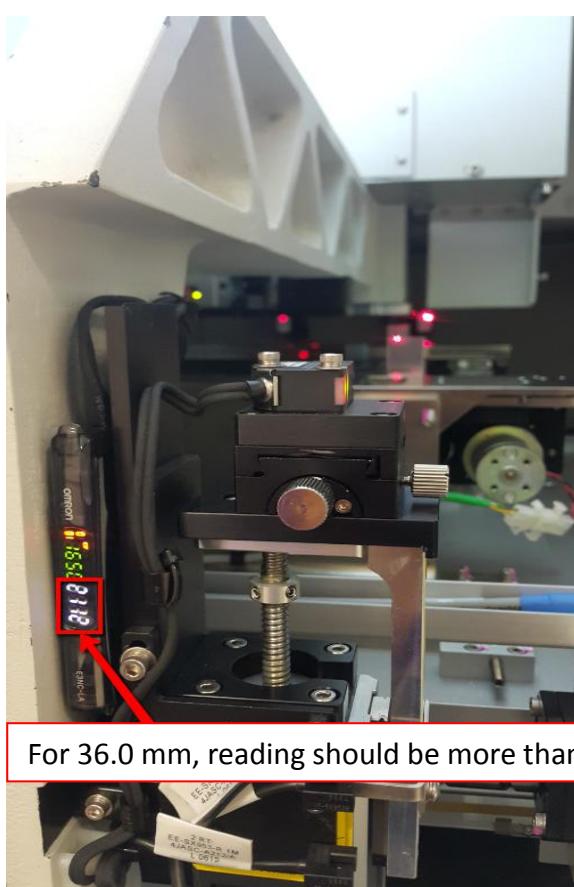


Figure 59 Filter Height Reading



For 36.5 mm, reading should be less than 1300



For 36.0 mm, reading should be more than 1800

Figure 60 Reading for 36.5 mm

30. Once the condition in Step 29 has been fulfilled, note down the value on “Command Value (CPOS)”.

In this example, the value is **-800 [step]**.

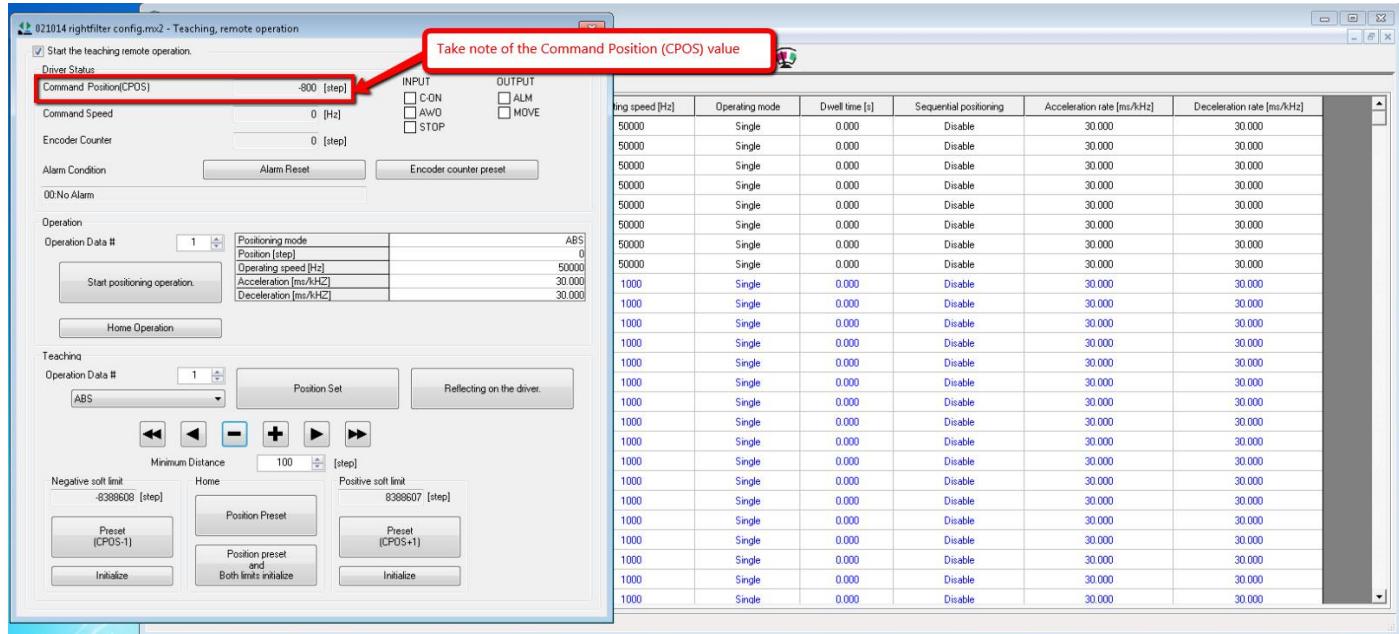


Figure 62 Command Position (CPOS)

31. Close “Teaching, remote operation”.

32. Go to “Home Operation” tab, note down the value on “Backward steps in 2 sensors mode home-seeking [step]”.

In this example, the value is **13082**.

33. Using below formula to calculate the new value as below.

$$13082 - (-800) = 13882$$

a) $13082 = \text{Value on “Backward steps in 2sensor mode home-seeking [step]”}$

b) $-800 = \text{Value on “Command Position (CPOS)”}$

Remarks: The value is different for different machine

Remarks: After homing, the motor will directly offset “Backward steps in 2sensor mode home-seeking [step]”. This implies filter height motor will return to 19um resolution filter height every time homing is done.

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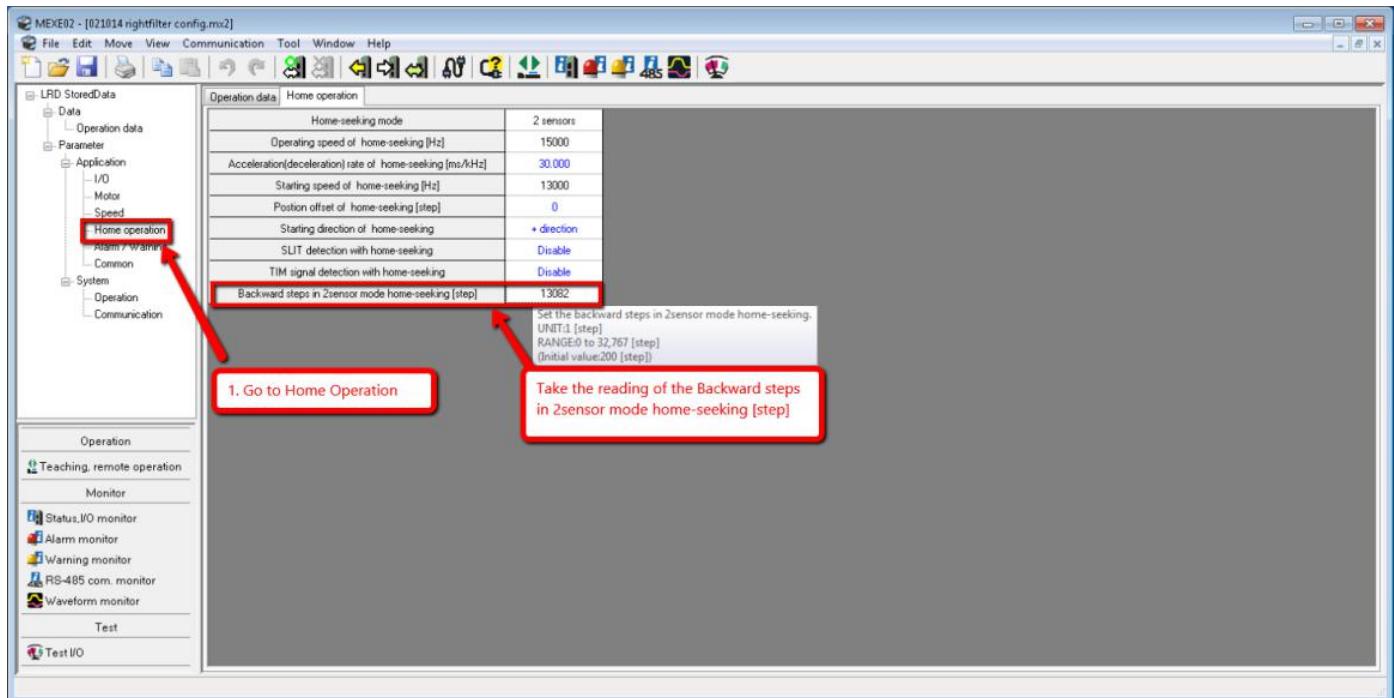


Figure 63 Home Operation

34. Set new calculated value to “Backward steps in 2sensor mode home-seeking [step]”.

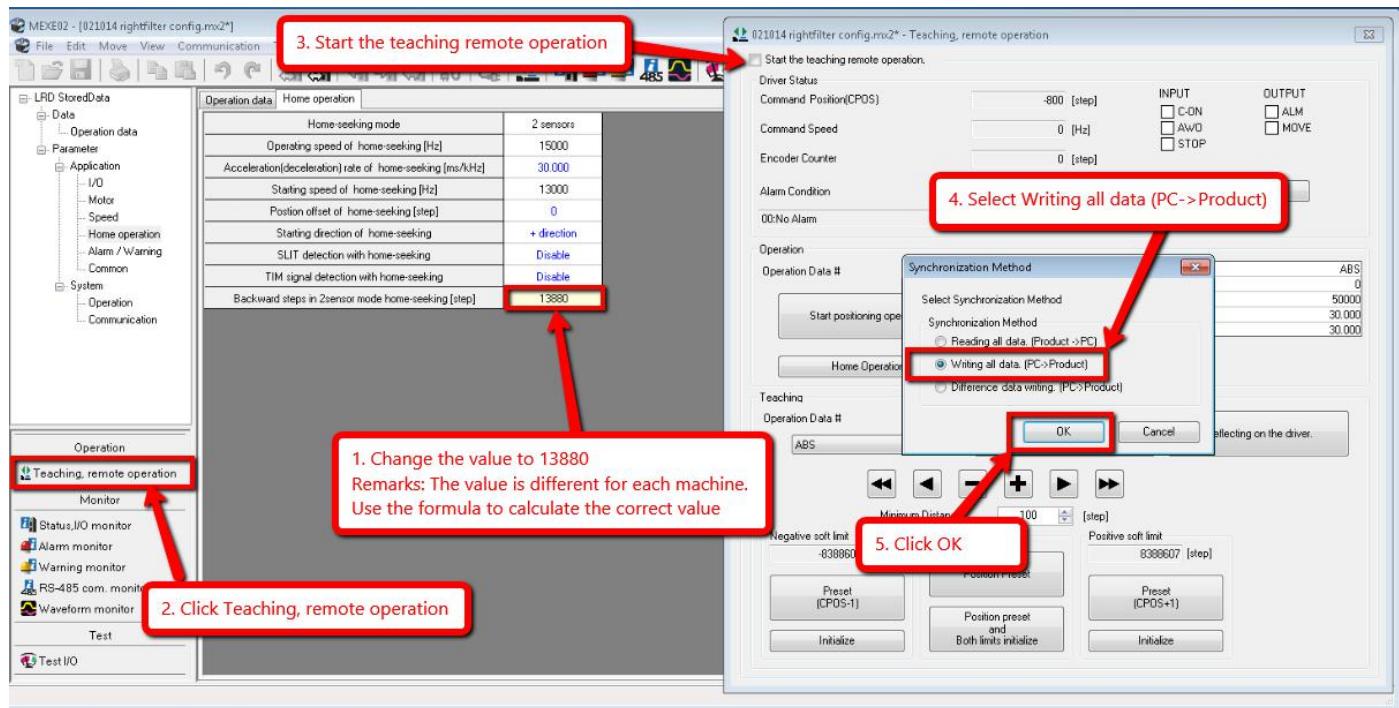


Figure 64 New value for homing

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35. Below is the setting for the 11μm:

- a) Start teaching, remote operation
- b) At Operation column, set “Operation Data #” to 2
- c) At Teaching column, set “Operation Data #” to 2
- d) Click “Start Positioning operation”

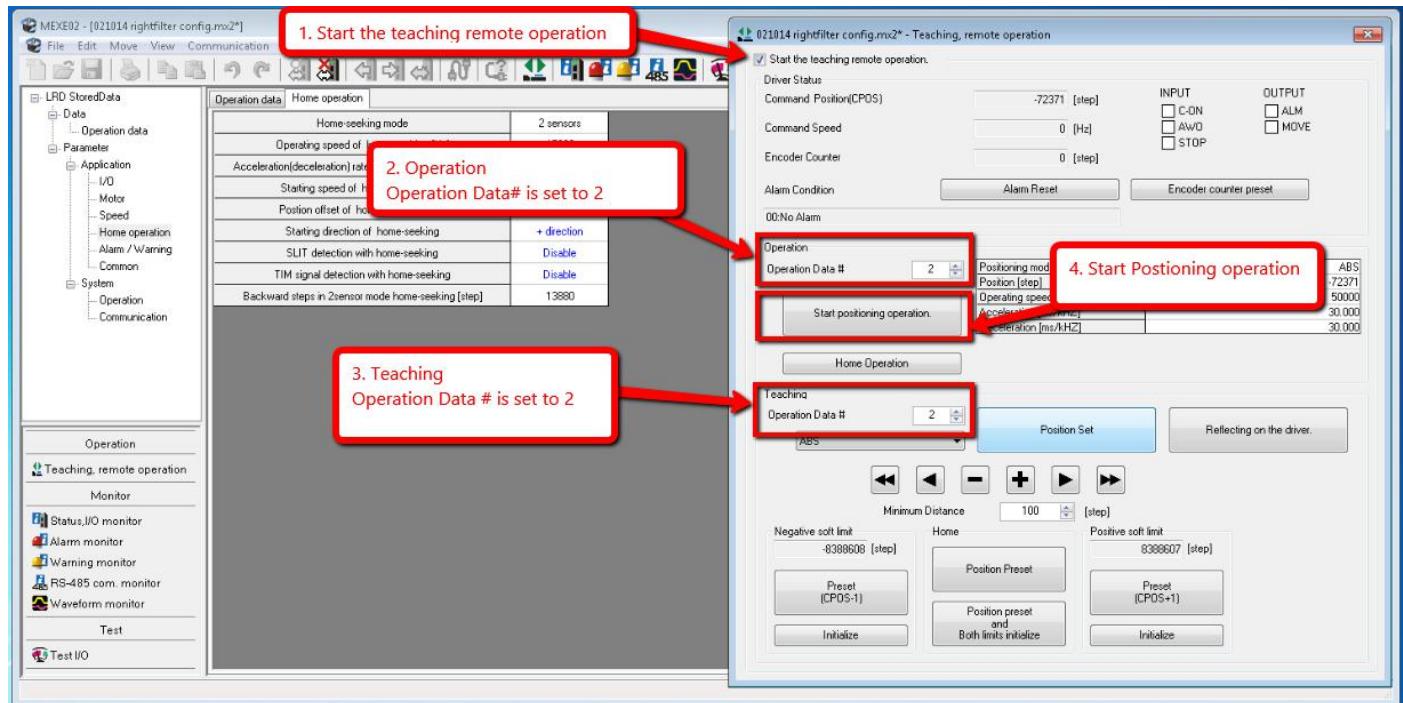


Figure 65 11um Filter Height Setting

36. Turn coupling slowly until Filter Height Sensor Laser align parallel with the 11μm jig height.

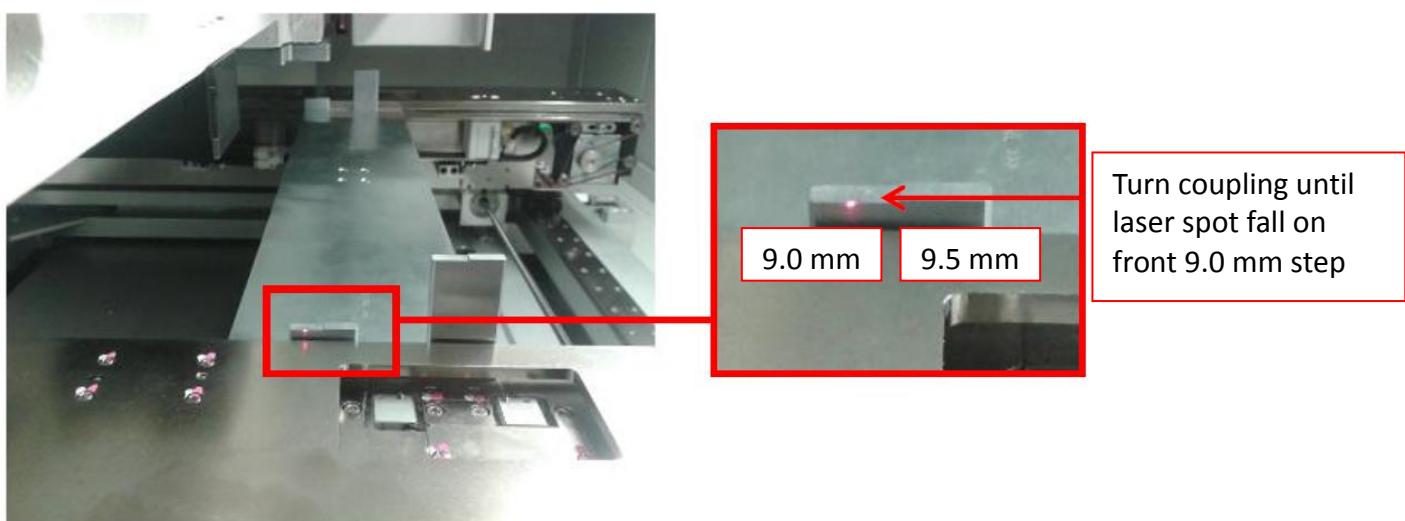


Figure 66 11um Filter Height Sensor

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37. Manually trigger (+) and (-) to move the height of the Filter Height Motor.

- a) For the 9.5 mm ensure the reading is below 1300
- b) For the 9.0 mm ensure the reading is above 1800

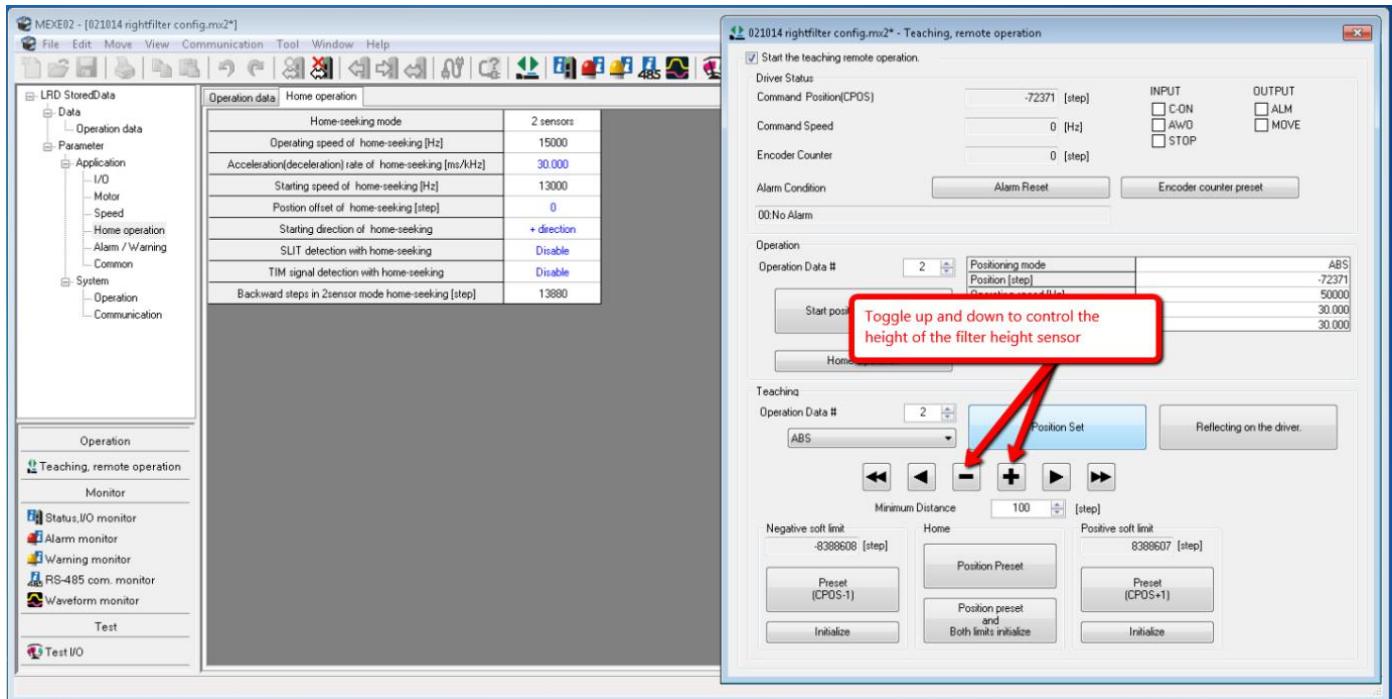


Figure 67 Filter Height Motor

38. Once reading is within spec as mentioned in Step 37, click “Position Set”.

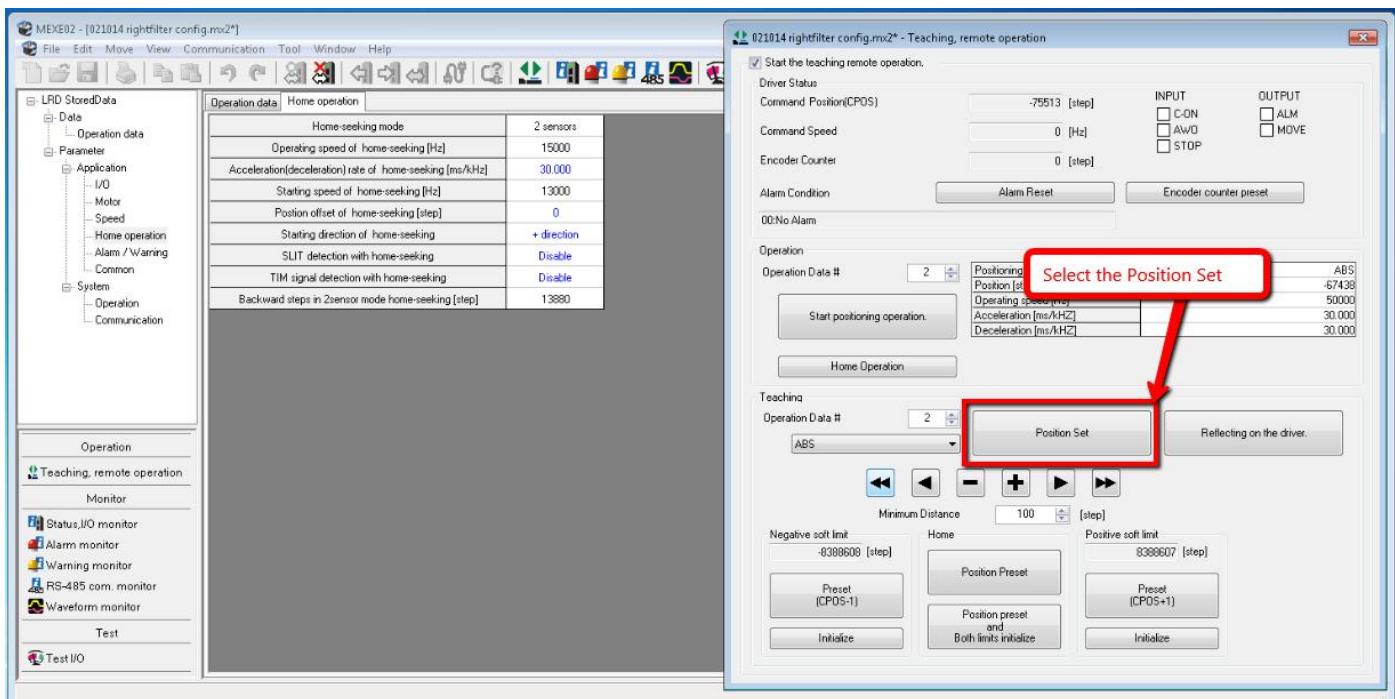


Figure 68 Set Position

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39. Exit Teaching window.

- a) Go to “Home Operation”
- b) Select “Operation Data”
- c) Copy value in “Operation Data #2”

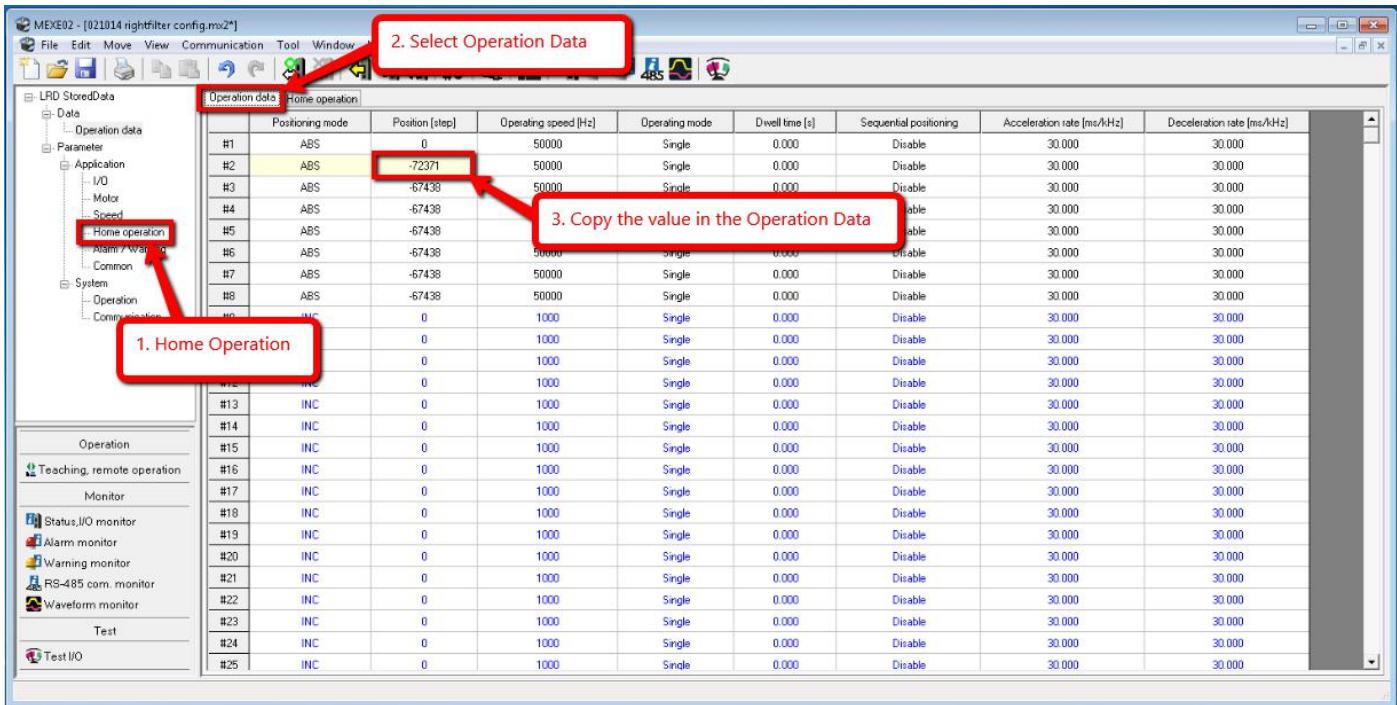


Figure 69 Operation Data

40. Paste the value from Operation Data #2 until Operation Data #8.

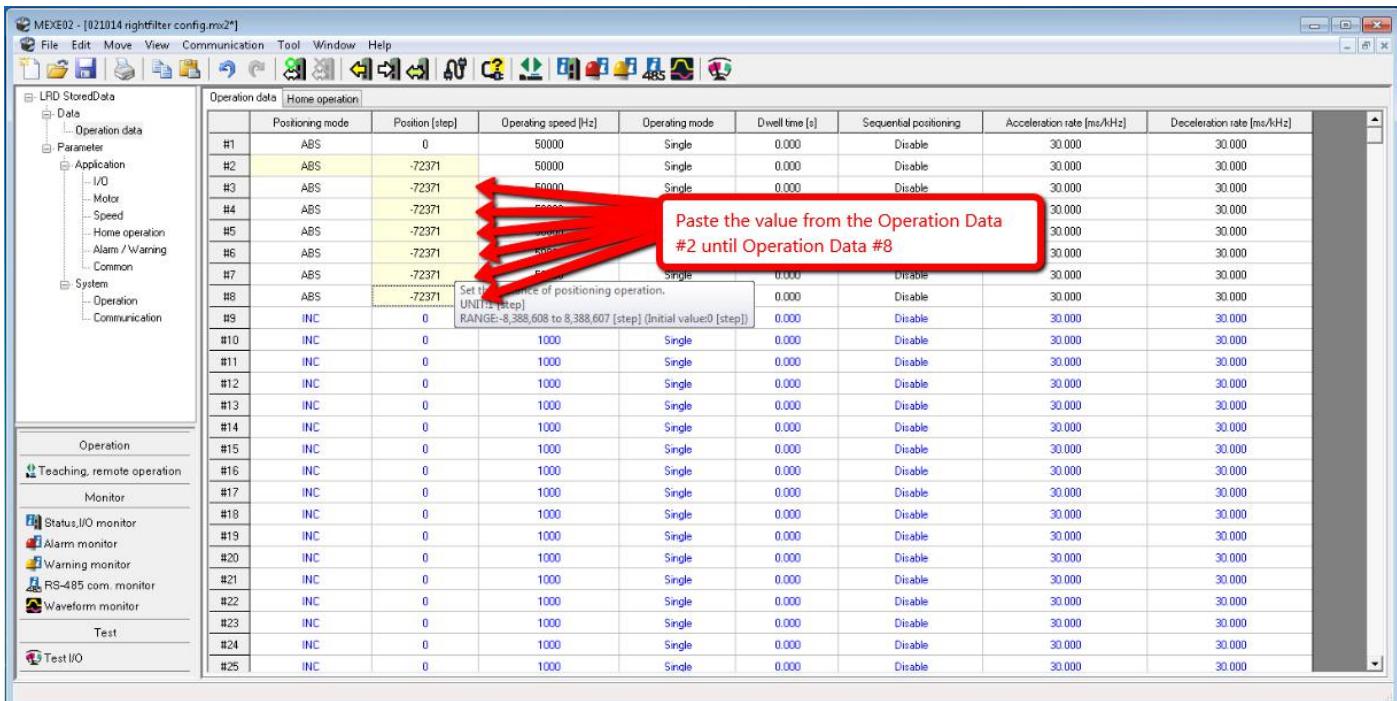


Figure 70 Operation Data

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41. Select “Teaching, remote operation”.

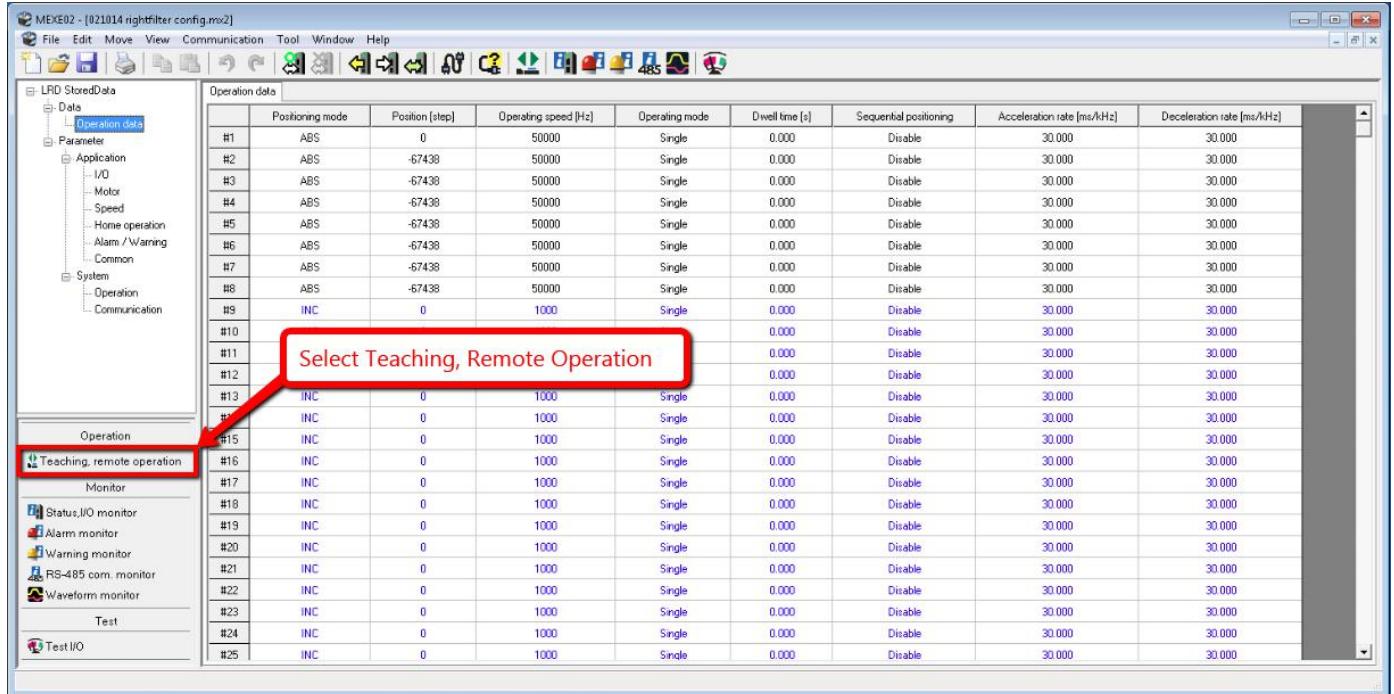


Figure 71 Teaching mode

42. Select “Start the teaching remote operation” > Click “Yes”.

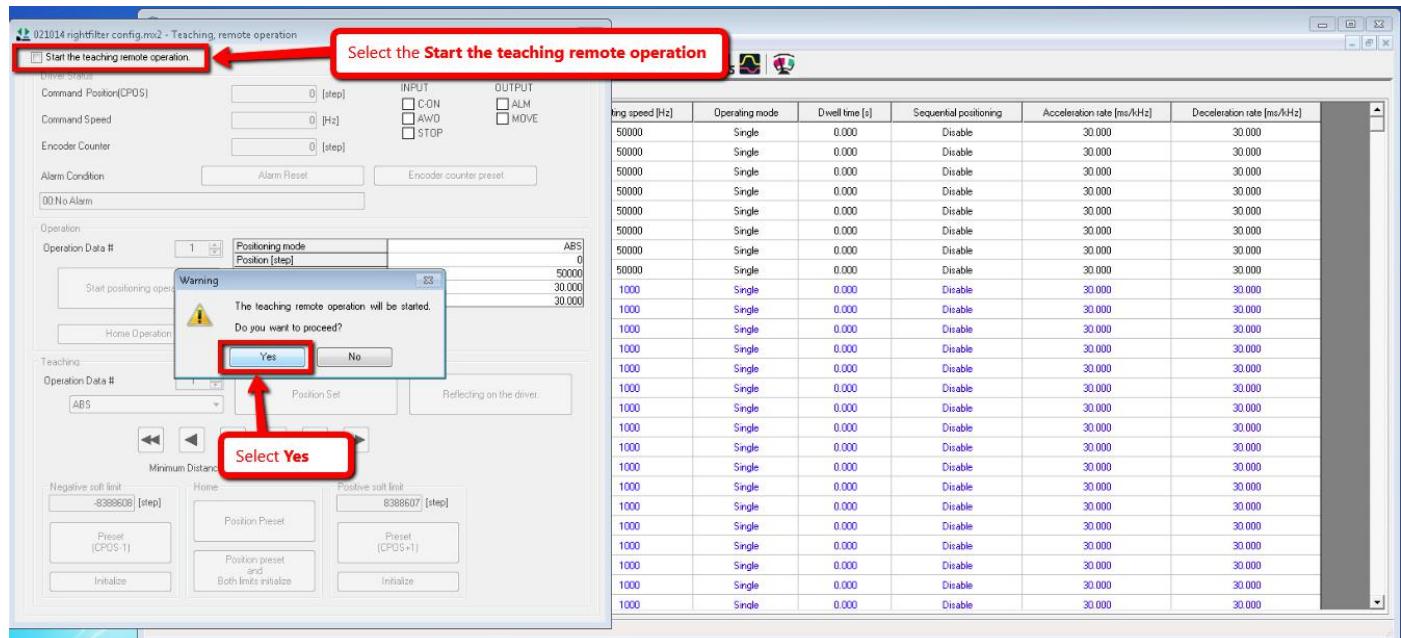


Figure 72 Start the teaching remote operation

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43. Select “Writing all data (PC->Product)” > Click “OK”.

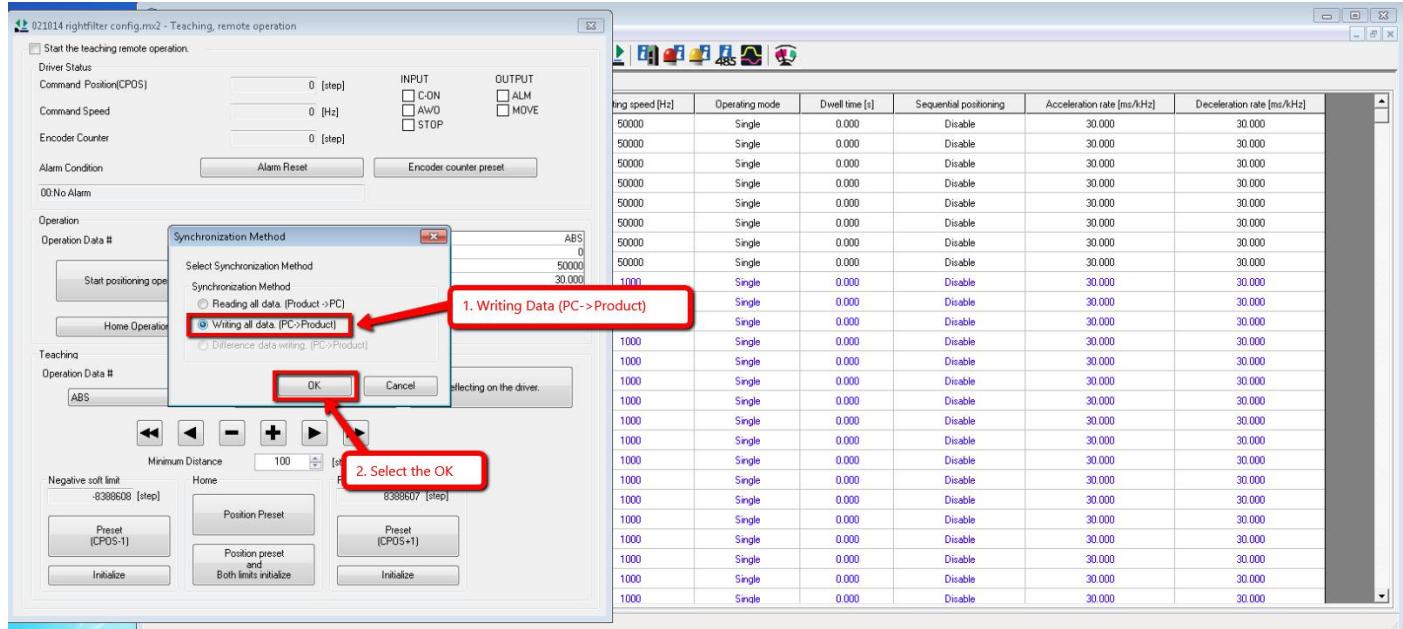


Figure 73 Writing Process

44. Wait until it finish writing the data into the Right Oriental motor driver.

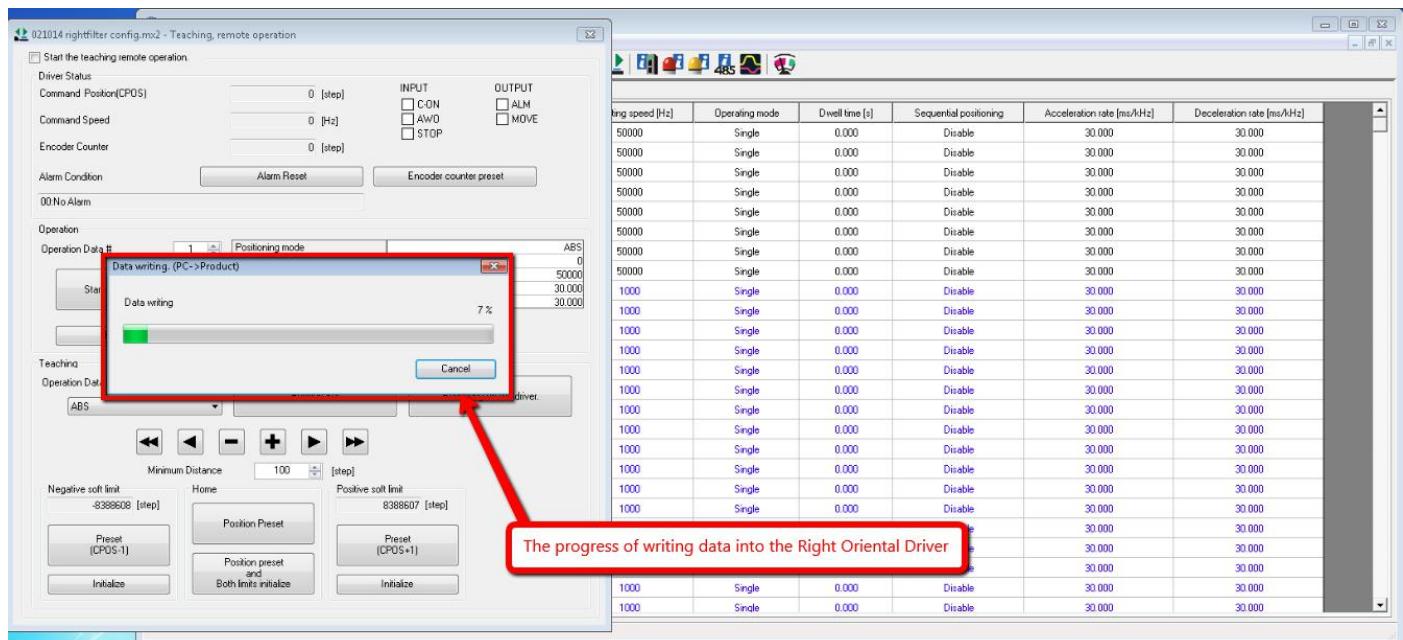


Figure 74 Uploading Process

45. Exit the teaching window. Save the configuration file as the format below.

ddmmmyy_rightfilterconfig.mx2 (eg. 041214_rightfilterconfig.mx2)

Remarks: Do not replace the default configuration files in the folder, there will be total of configuration files in the folder after fine tuning of both FHS modules)

46. Repeat step 1-47 for the Left Filter Height Sensor.

47. Below table is new top clearance for the machine with filter cap.

Magnification	V810 S2EX Top Clearance (Without Filter Cap)	New V810 S2EX Top Clearance (With Filter Cap)
23um	50mm	48mm
19um	38mm	36mm
11um	11mm	9mm

(Board top clearance is calculated from board top surface)

Table 2 Top Clearance