TEM: PHILIPS CM 100 – MANUAL

STARTING THE ELECTRON MICROSCOPE:

1) Push the PANEL DIM to ON position
2) Turn ON the DATA DIM button
3) Push HIGH TENSION ON
4) Rotate FILAMENT button clockwise (4 - 5 times, wait for 3 Min.)
5) Turn SPOT SIZE to 1

PERFORM ALIGNMENT:

6) Check Apertures settings:
   a) CONDENSOR APERTURE: position 3 and IN
   b) OBJECTIVE APERTURE: position 3 and IN
7) Deactivate INTENSE ZOOM -> Highlighting disappears
8) Choose MAGNIFICATION at 2500x
9) Adjust INTENSITY to have a focused beam and check how centered it is.
10) CENTER the beam with buttons X and Y
11) INCREASE MAGNIFICATION and CENTER the beam again
12) COMPARE MAGNIFICATIONS 7400x and 9700x -> the beam should be identical, if necessary, repeat step 10
13) Return to MAGNIFICATION 2500x
14) Turn INTENSITY clockwise to spread the beam, open it until PLATE AUTO METER *(on screen)* indicates 2 seconds (between 1.4 and 4 seconds is ok).
    REMARK: THE CCD *(Charge-coupled Device)* CAMERA IS VERY SENSITIVE - A STRONG ELECTRON BEAM CAN DAMAGE THE CAMERA!
15) Reactivate INTENSE ZOOM -> highlighted
    -> EM is now ready to insert sample

SAMPLE PREPARATION:

16) Open sample holder with the needle
17) Insert grid with ultrathin section layer on top
18) Close sample holder with the needle and check if spring has locked
19) Caution: Never touch sample holder in the first third.

SAMPLE INSERTION:

20) Keep sample holder horizontally
21) Insert sample holder (knob/pin on the bottom side of sample holder at 5 o'clock position) forward to the first stop -> a red light appears on the goniometer
22) Activate ST CRYO HOLDER *(on screen)* -> gets highlighted
23) Confirm with READY *(under the screen)*
24) Wait until red light turns off
25) Turn sample holder counter clockwise until he is sucked. Adjust until he is completely inserted.

STARTING THE PC:

26) Push the Power button
27) SIGN IN: Username / personal password
28) Start (Double-click) : GATAN DIGITAL MICROGRAPH:

CAMERA VIEW *(new Window, upper part)*

a) -> Setup: Search
b) -> Exposure Mode: User
c) -> Exposure (s): 0.1
d) -> Auto Survey: ✓

START VIEW: Click
-> Insert camera? -> YES
Camera Inserted: ✓
-> NEW WINDOW OPENS *(Grid/sample appears)*

CAMERA ACQUIRE *(same window as before but lower part)*

a) -> Setup: Record
b) -> Exposure Mode: User
c) -> Exposure (s): 0.5

ADJUSTMENT OF Z-AXIS:

HAS TO BE DONE WITH EACH NEW SAMPLE!
-> If the Z-Axis is not positioned correctly, a double image is presented, which makes a correct image focusing impossible.

29) Push AUTO *(under the screen)*
30) Push WOBBLER *(left panel)*
31) Adjust the Z-Axis by moving the Z-STICK up or down.
    Correct as long as the two images overlap each other -> only one image is visible.
32) Deactivate WOBBLER
33) Search sample with XY-STICK

IMAGE FOCUSING:

34) Choose desired Magnification
35) Activate WOBBLER
36) Choose the Focus Step by turning FOCUS STEP SIZE knob
    GUIDELINE:
    LOW MAGNIFICATION ---> HIGH FOCUS STEP
    HIGH MAGNIFICATION ---> LOW FOCUS STEP
37) Focus the image by turning the OUTER PART OF THE FOCUS BUTTON
38) Deactivate WOBBLER
    -> No image difference between activated resp. deactivated Wobbler
39) Bring the focused image a little bit in under focus by turning the OUTER PART OF THE FOCUS BUTTON a few clicks counter clockwise.
    -> A PERFECT EM PICTURE IS SLIGHTLY UNDER FOCUSED!

IMAGE CREATING AND SAVING:

40) Click START ACQUIRE
    -> New Window with the picture appears
41) Save the image:
    -> ZMB -> SAVE AS TIFF or DM3 (with the corresponding name/ number) in your folder.

SAMPLE CHANGE:

42) Stop camera:
    STOP VIEW: Click -> live image stops
    Unclick Camera Inserted: ☐ -> camera moves out
43) Pull out sample holder until the first interlock
44) Turn sample holder clockwise to the 2nd interlock
45) Pull straightly and completely out the sample holder by assisting with your second hand.
46) Exchange sample *(see SAMPLE PREPARATION Step 16-19)*

FOR A BREAK:

47) Stop camera:
    STOP VIEW: Click -> live image stops
    Unclick Camera Inserted: ☐ -> camera moves out
48) Increase SPOT SIZE to 11, for a longer break (more than 1 hour) you should do a shutdown of the instrument.

AFTER SESSION: LOGOFF AND SHUTDOWN PC / ELECTRON MICROSCOPE:

49) Stop camera:
    STOP VIEW: Click -> live image stops
    Unclick Camera Inserted: ☐ -> camera moves out
50) Take the sample out and store it in the appropriate archive box.
51) Close sample opening of the sample holder with the lid.
52) LOG OFF on the computer
53) To exit the Electron Microscope the starting process is carried out in reverse order.
54) Increase SPOT SIZE to 11
55) Rotate FILAMENT button counter clockwise (2 - 3 times)
56) Push HIGH TENSION OFF
57) Turn OFF the DATA DIM button
58) Pull the PANEL DIM to OFF position