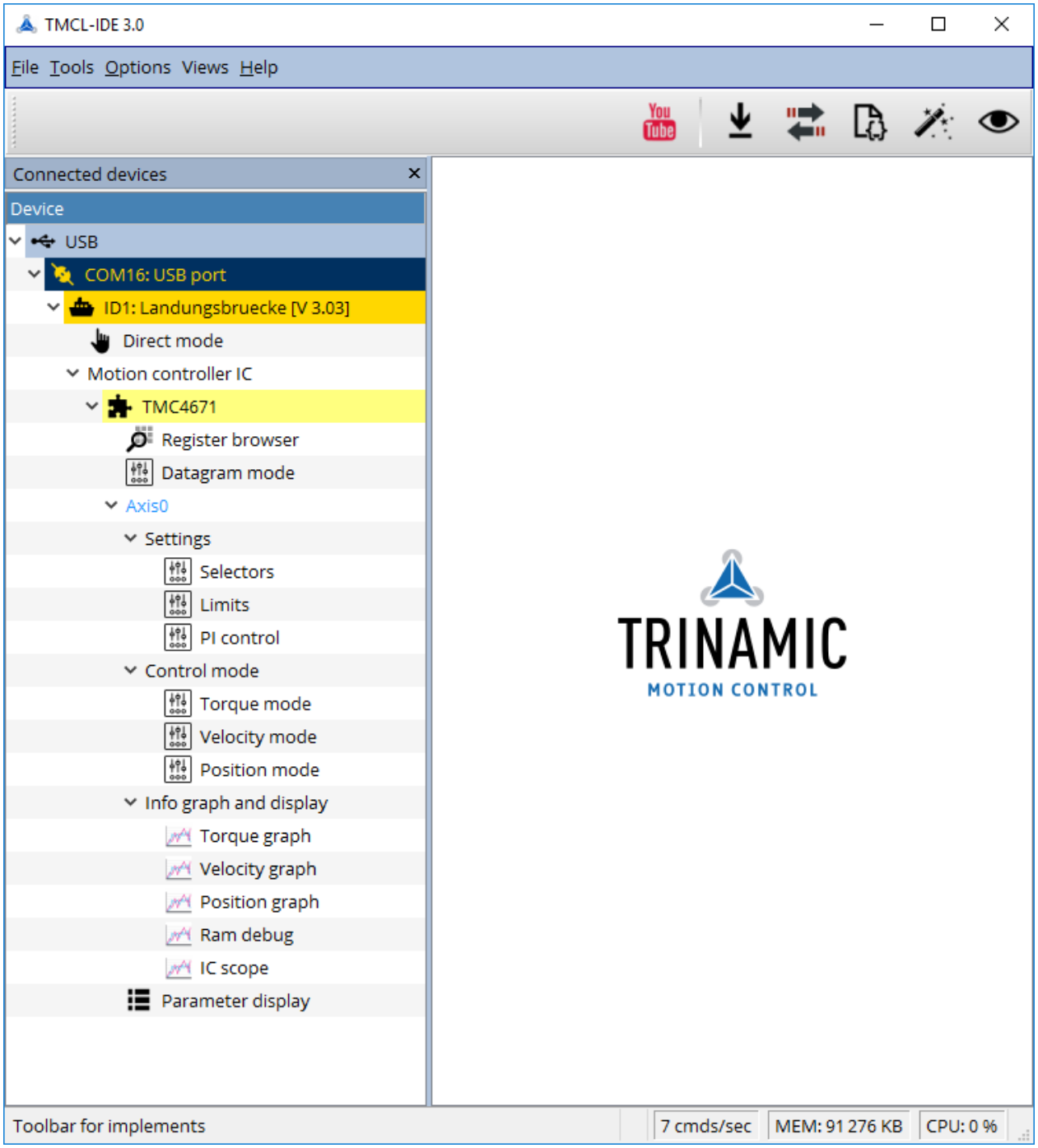
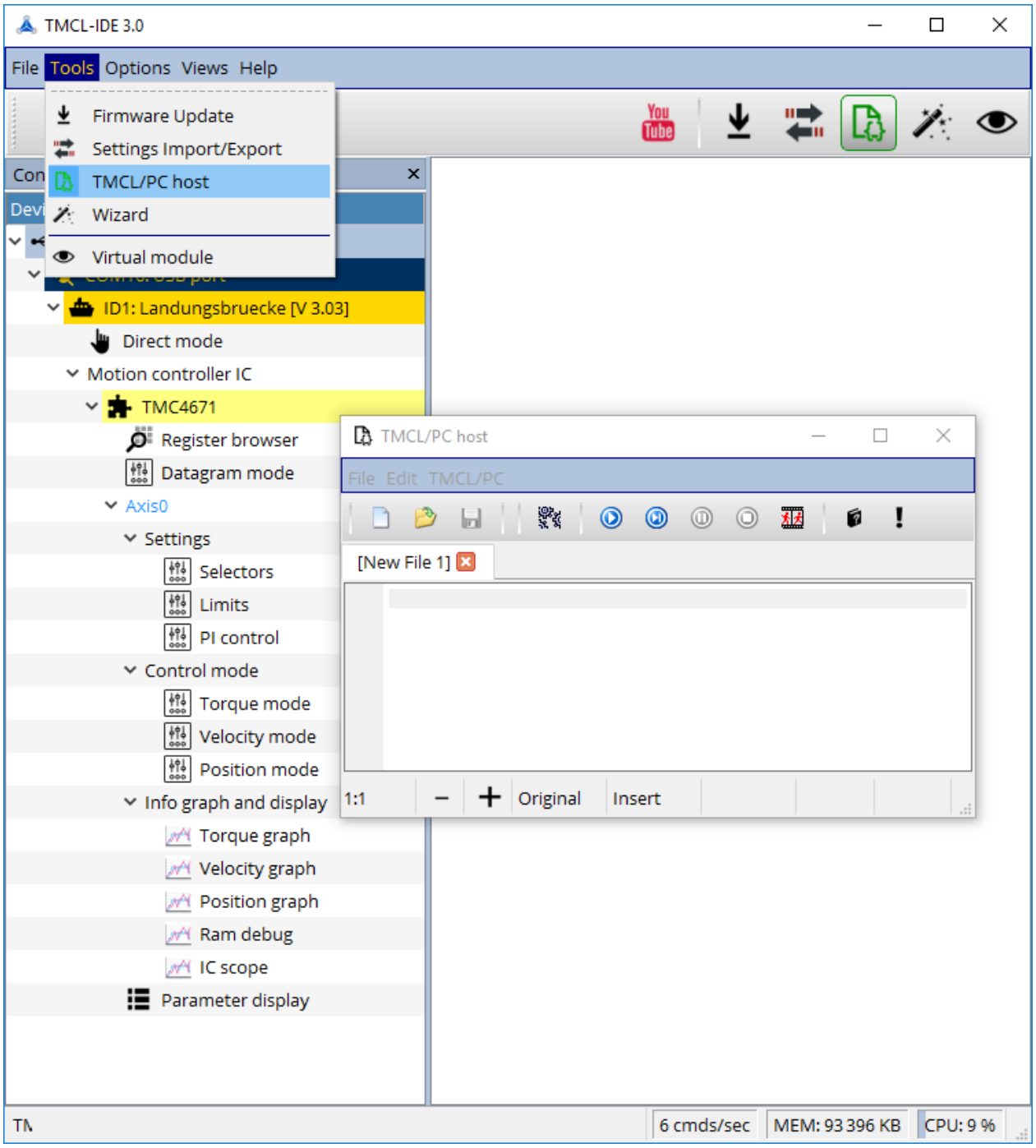
How-to configure your BLDC motor with encoder and/or hall signals for the TMC4671 and store the parameters into the TMCL PC/HOST tool to load the parameters after power cycling

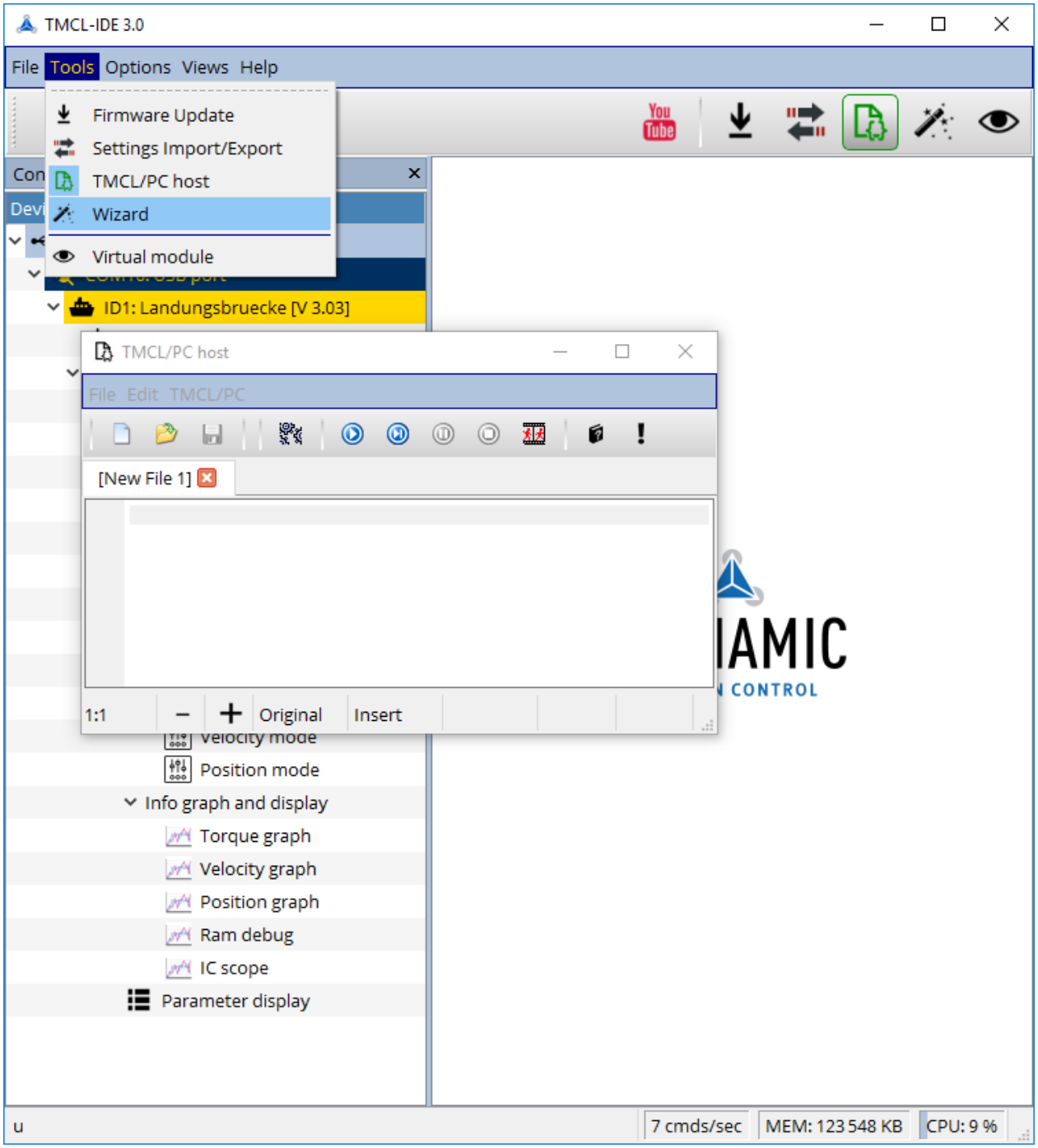
1. Connect everything
2. Connect power supply connector
3. Turn power on
4. Open TMCL IDE



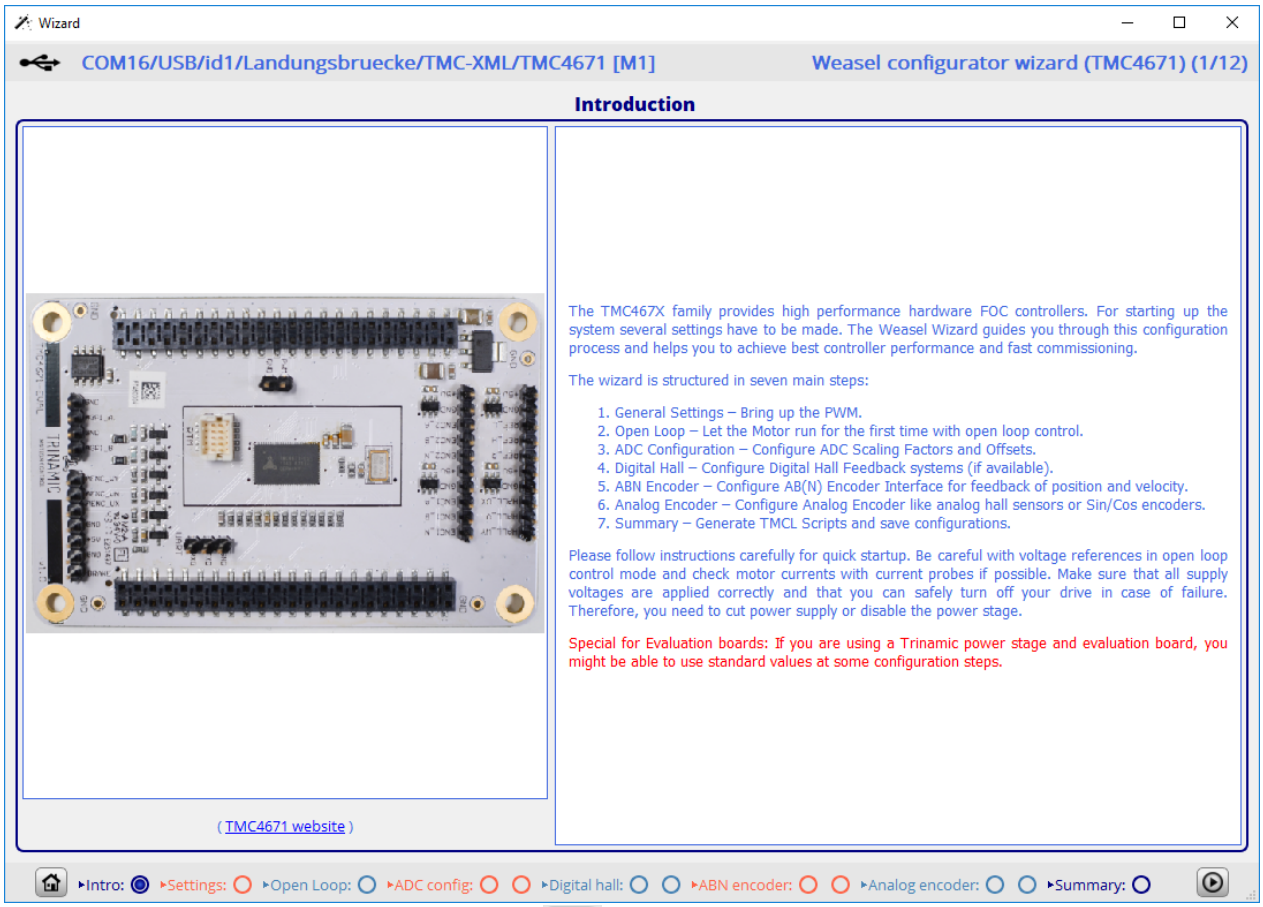
5. Connect USB
6. Open menu → Tools → TMCL PC/HOST



7. Open the Wizard

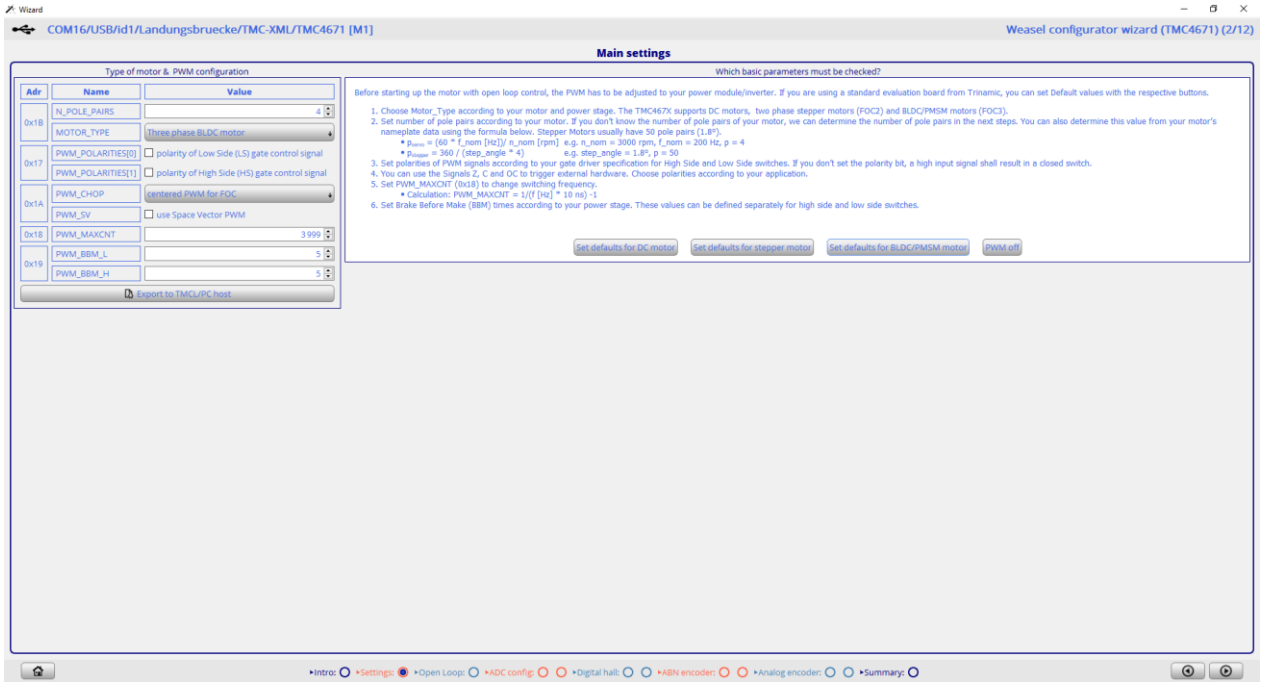


8. Click on Weasel configurator wizard

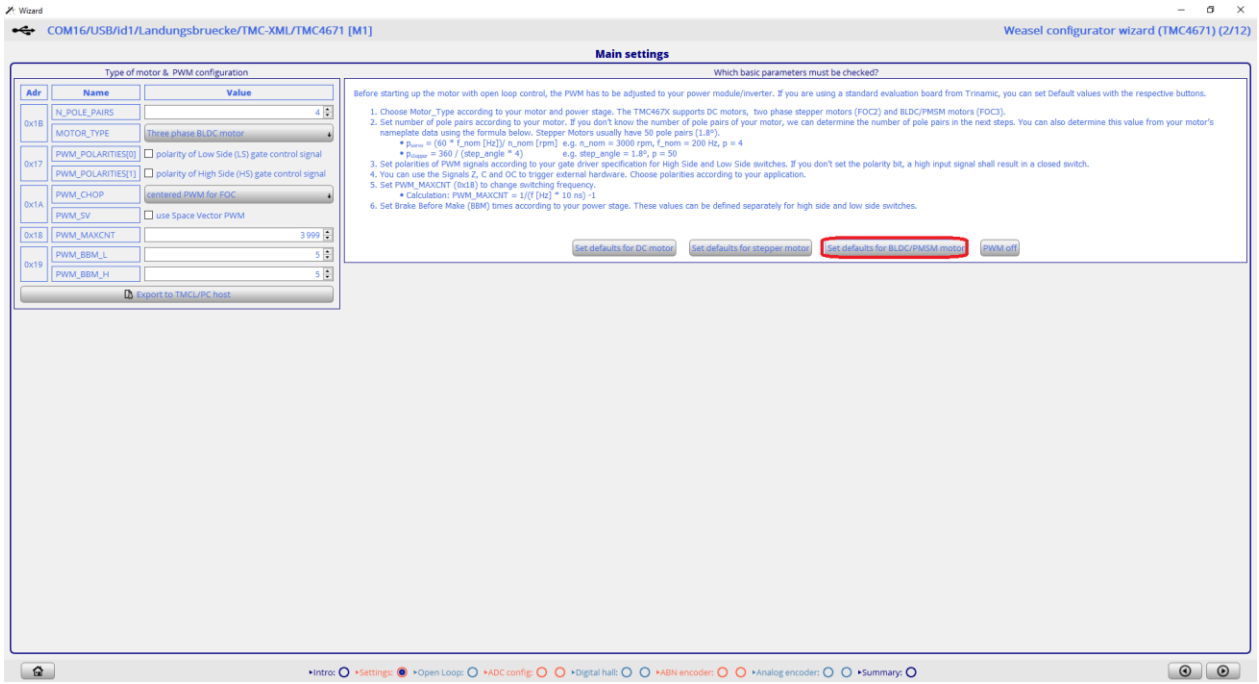


9. On the bottom right you'll find a small arrow  that will step through all the different configuration pages. The Wizard first steps you through the main settings, driving the motor on open loop mode to e.g. estimate motor pole counts, to configure your ADC signals, digital hall signals, ABN encoder signals, analog encoder signals and will end with a summary.

10. Main settings page (The starting point)

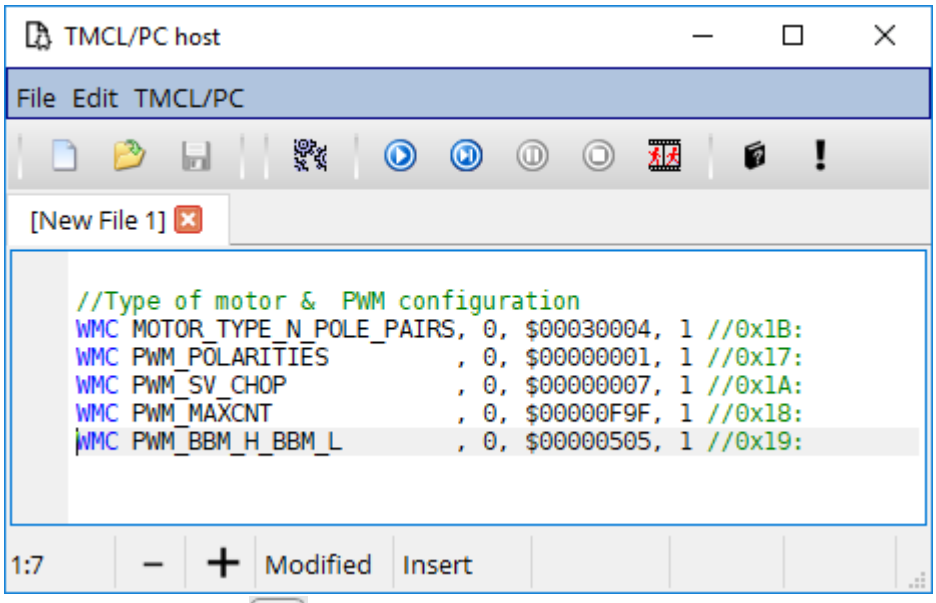


11. At this page you can simply click on the **Set defaults for BLDC/PMSM motor** button

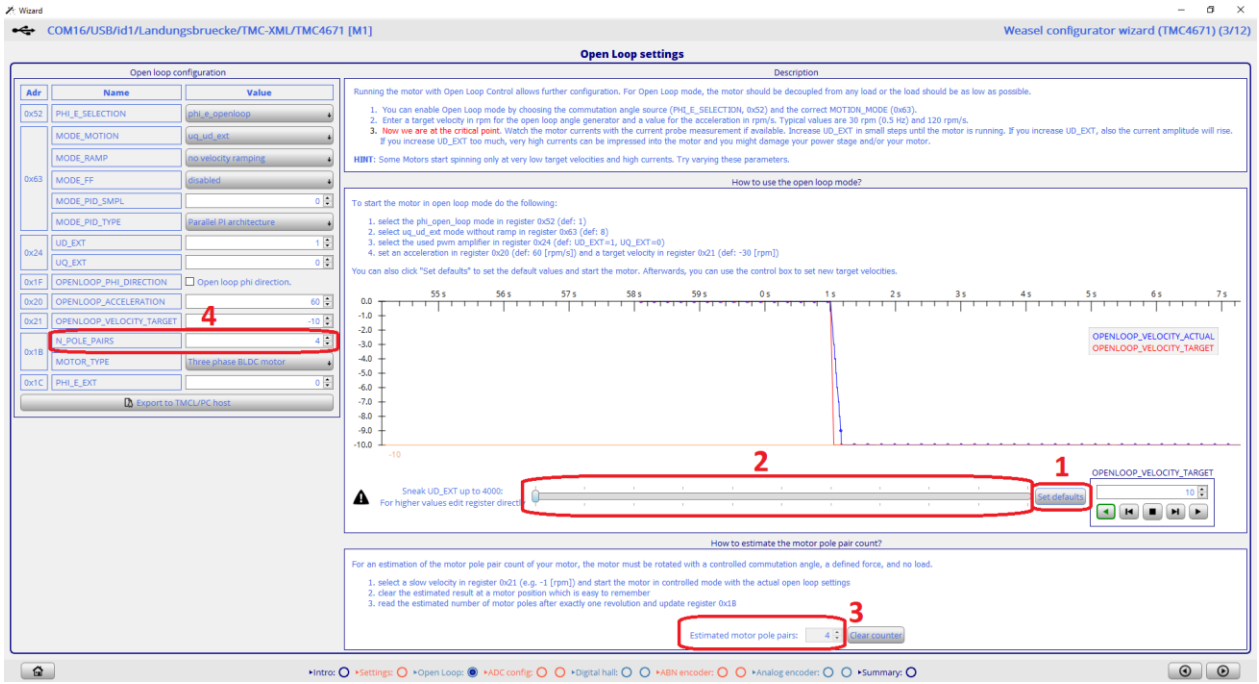


12. Click on 

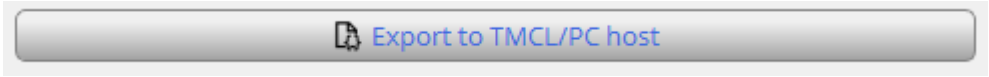
13. This will list the parameters in the TMCL/PC host which allows to load those values when power cycling or having another session at another time.

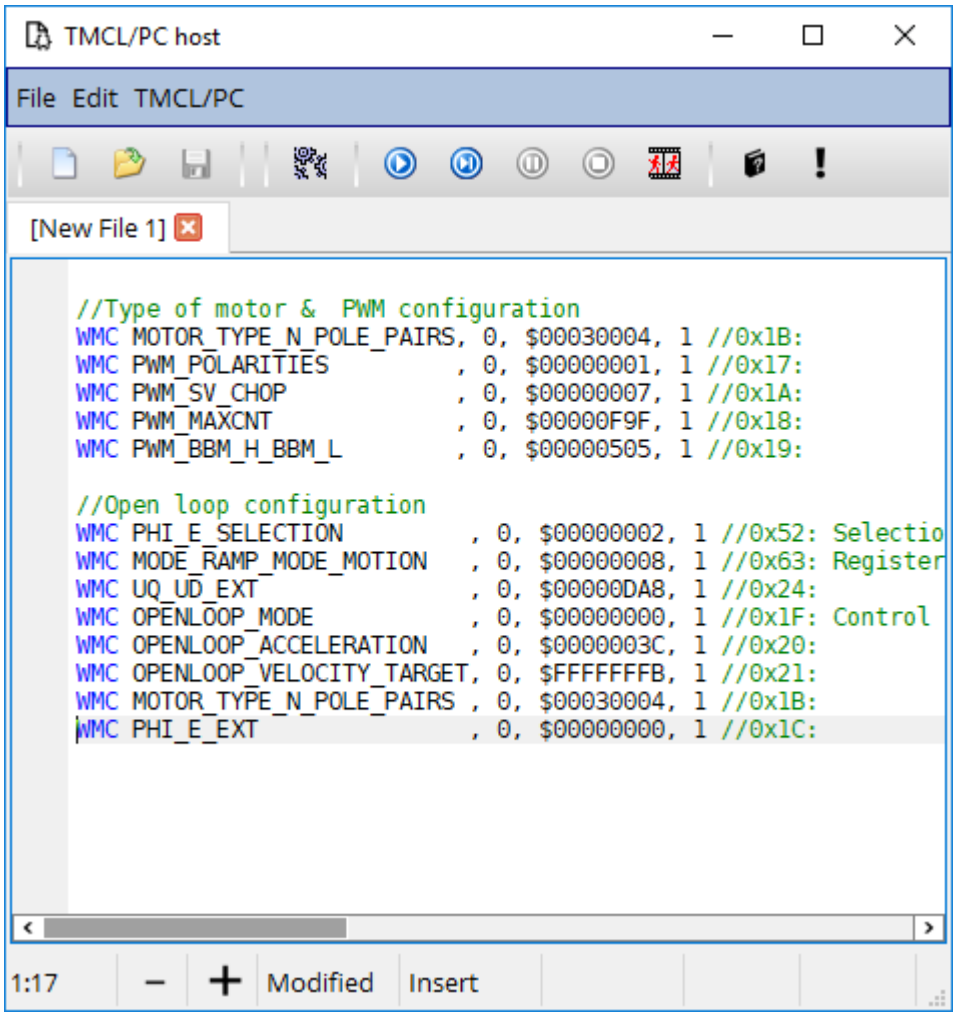


14. Continue by clicking 
15. On the next page Open Loop settings you can simply click on **1 Set defaults** and afterwards use the **2 slider** to increase the PWM of the open loop voltage controlled mode UD_EXT.
WARNING: Increase UD_EXT carefully to avoid motor damage. If possible measure the motor current otherwise increase the slider in small steps until the motor starts turning with a smooth velocity, e.g. 10rpm.



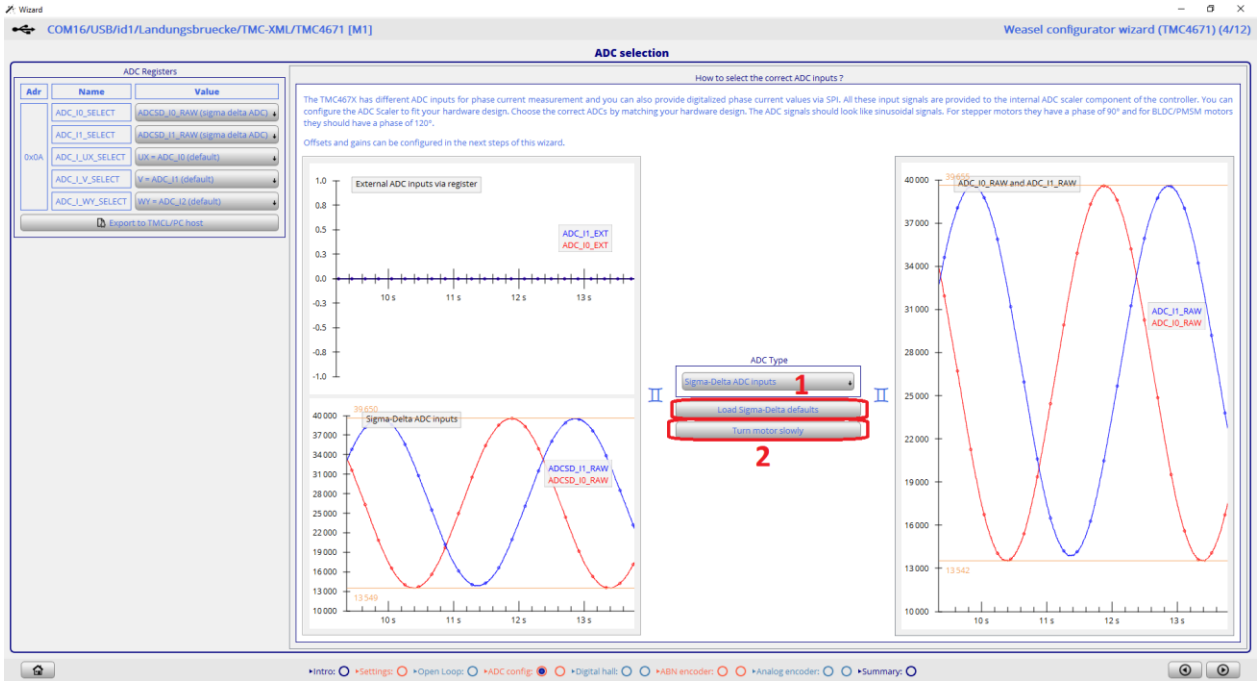
16. As soon as the motor is tuning smoothly you can countercheck the motor pole count by resetting the counter and turn the motor for one revolution. The estimated motor pole pair count can be read in the edit box on the bottom **3**. If it differs from the set N_POLE_PAIR settings on the left **4** please change it there.

17. Click on 

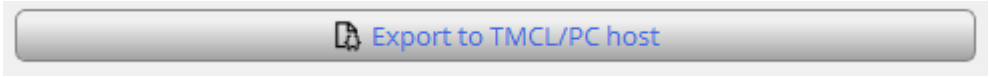


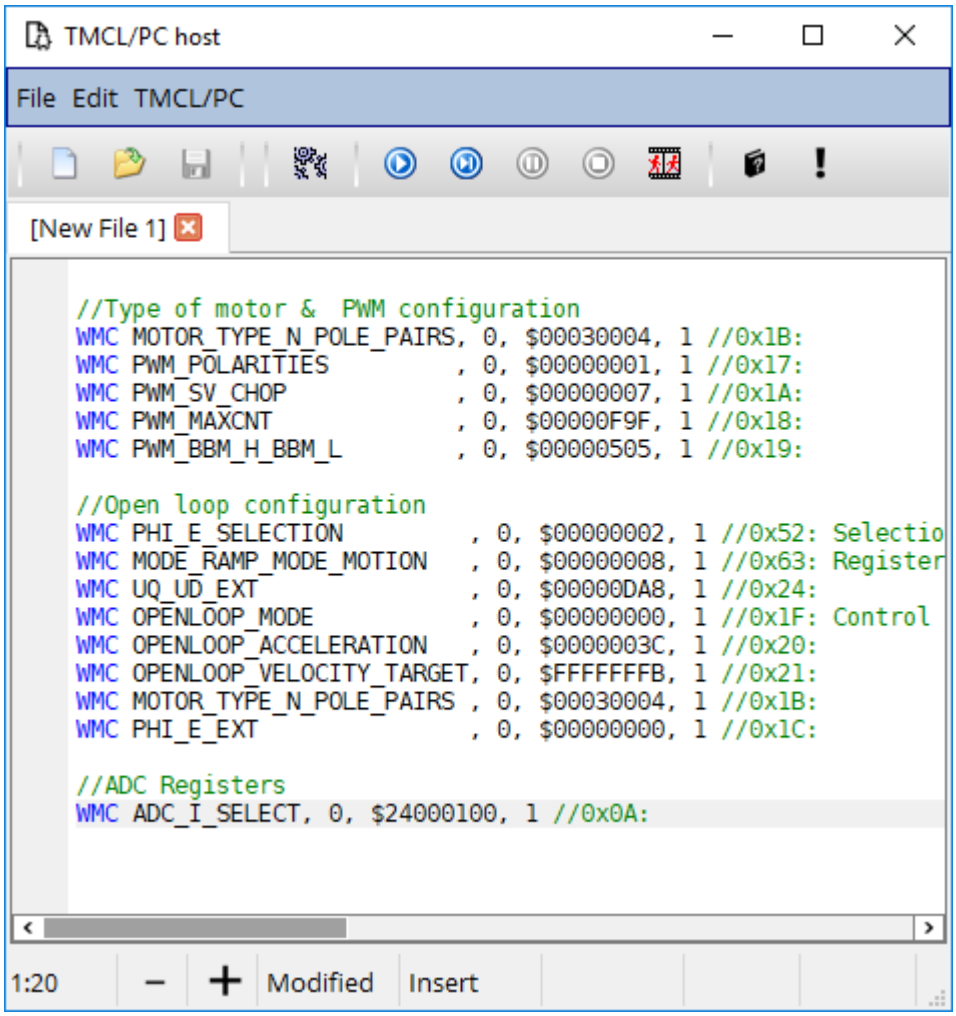
18. Continue by clicking 

19. **ADC selection** page



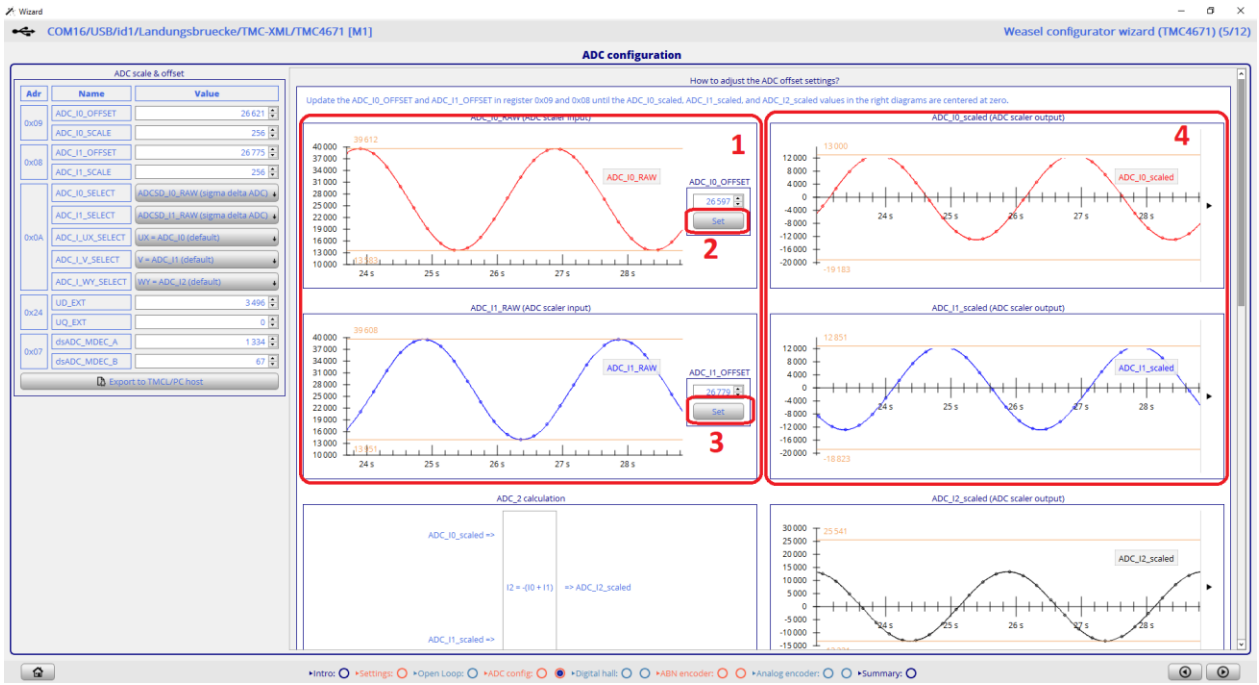
20. You can click on Load Sigma-Delta defaults button **1** and afterwards the Turn motor slowly button **2**.

21. Click on 

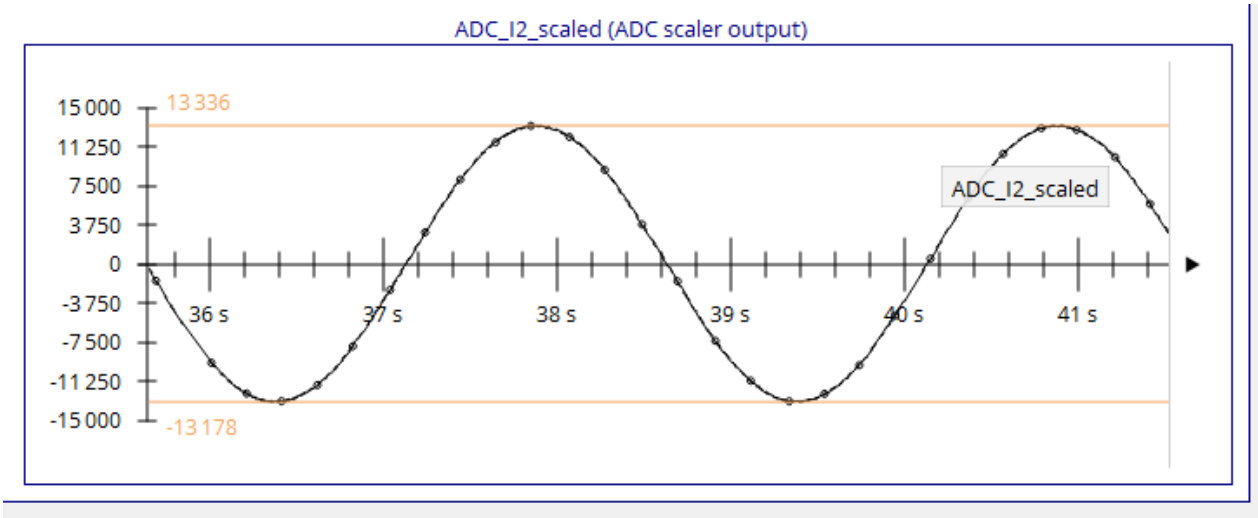


22. Continue by clicking 

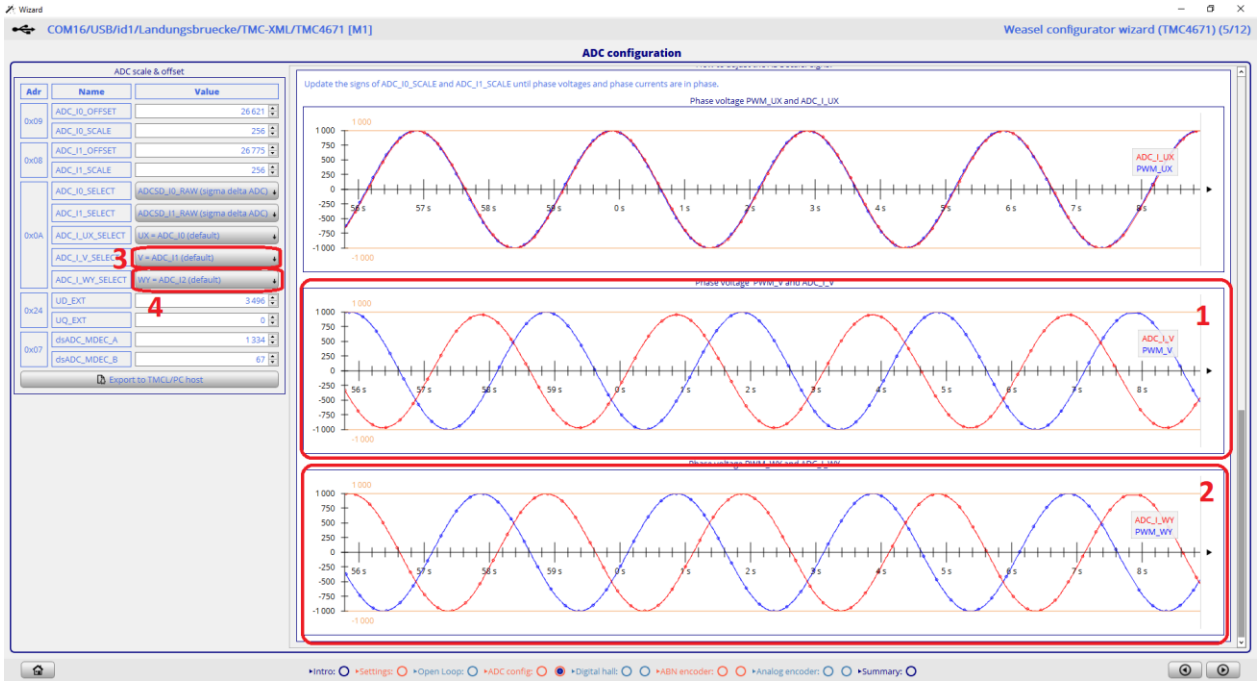
23. **ADC configuration** page



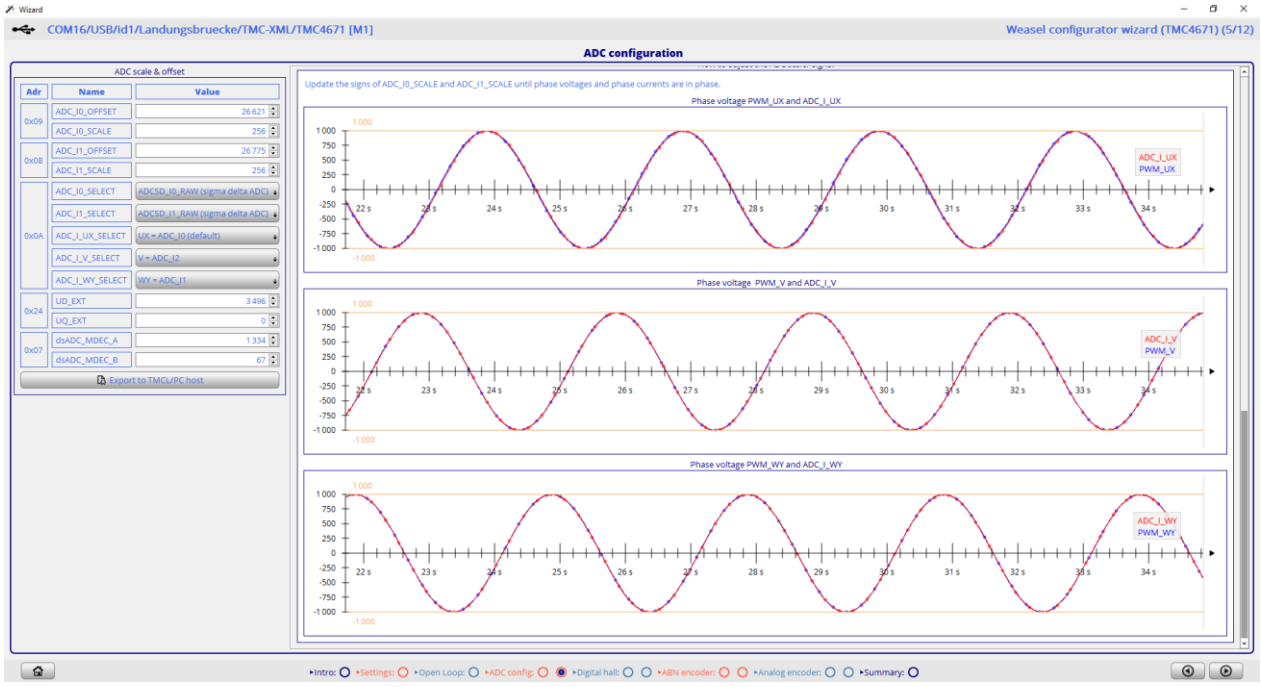
24. Let the motor run until you have some data collected on the left graphs **1** that show the raw values of the ADC.
25. Now you can click on the **Set** button **2** and **3** to automatically compensate the offset (amplitude).
26. On the right side **4** you'll see the corrected ADC scaler values.
27. When scrolling down you'll see the ADC_I2_scaled output value that is being calculated with ADC_I0_sclaed and ADC_I1_scaled.



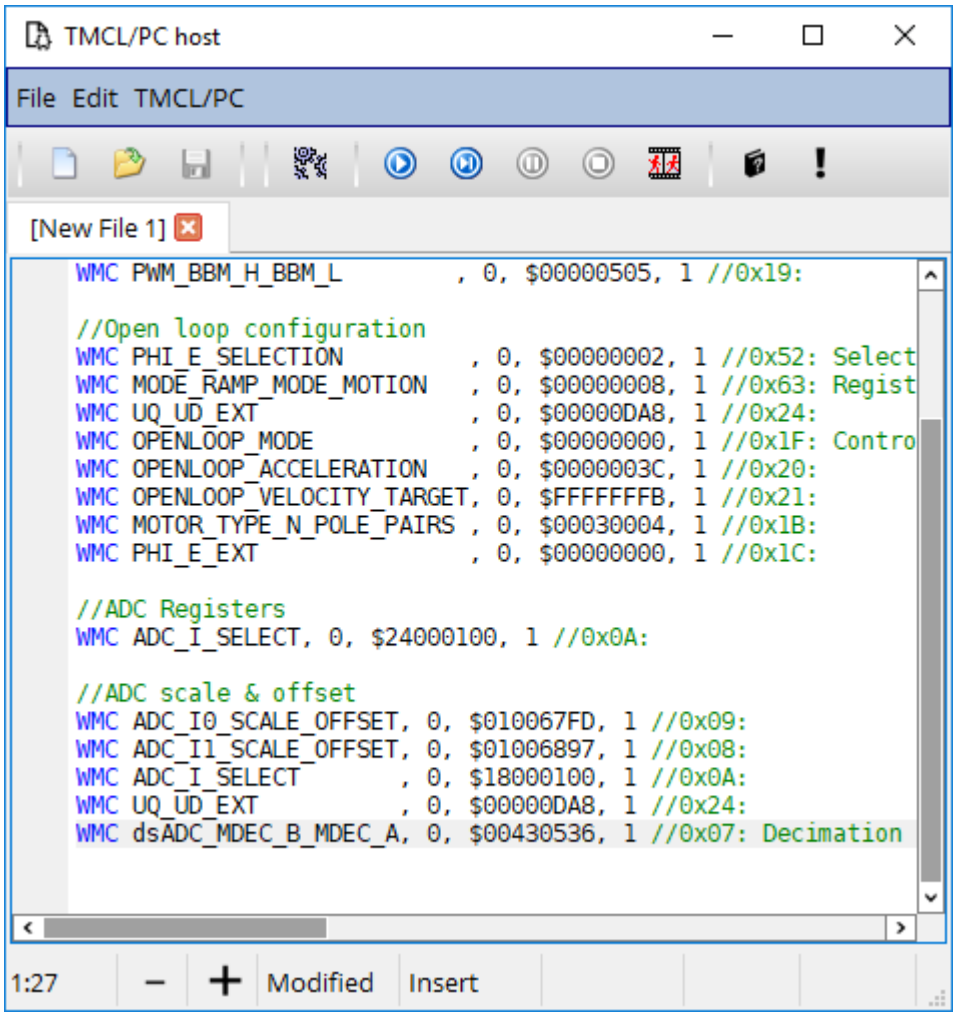
28. Now please check on the bottom of the page that the PWM and ADC_I values are in phase. In this example PWM_V and ADC_I_V **1** and PWM_WY and PWM_I_WY **2** are not in phase.



29. By switching the ADC_I_V_SELECT value to ADC_I2 **3** and ADC_I_WY_SELECT to ADC_I1 **4** we can fix that mismatch. We mainly set the right ADC value to the right phase.

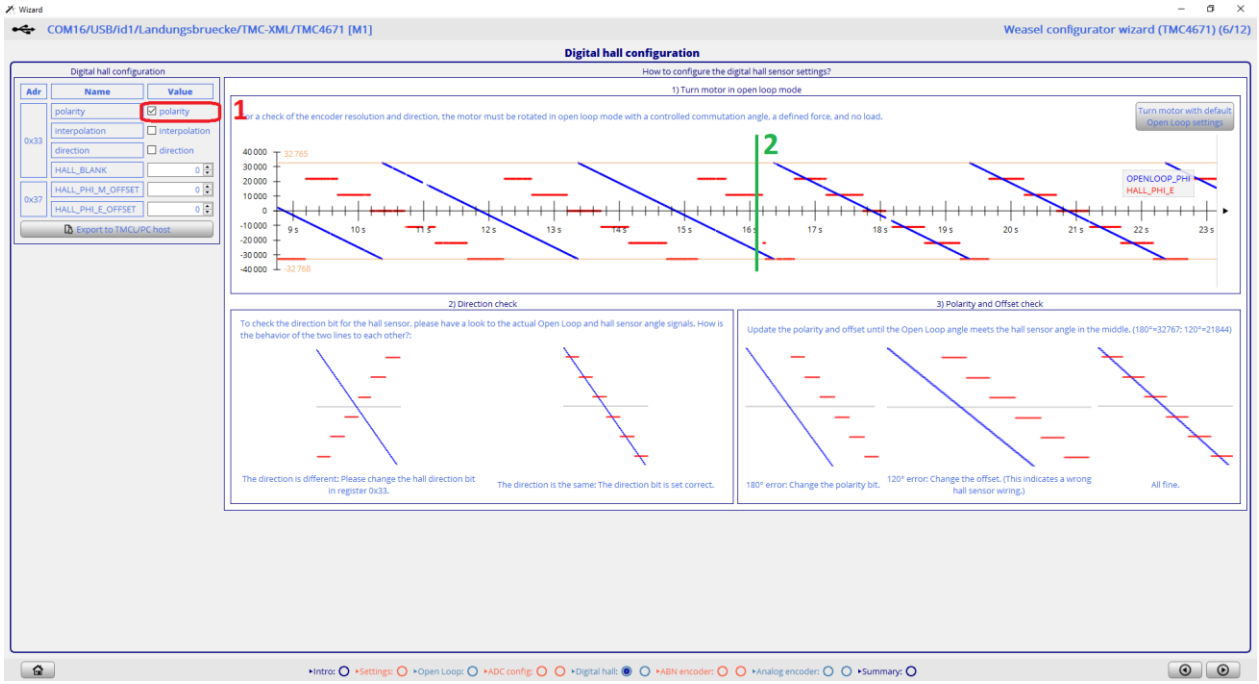


30. Click on 

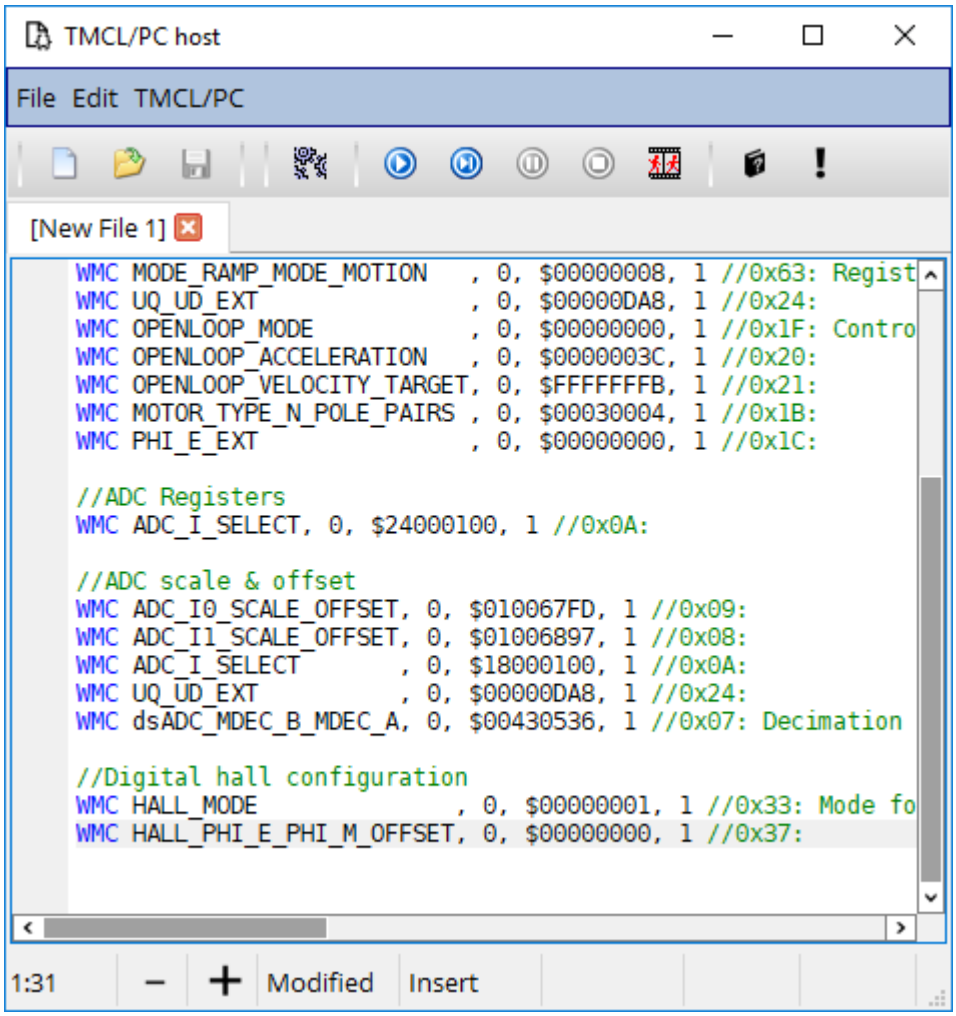


31. Continue by clicking 
32. **Digital hall configuration** page

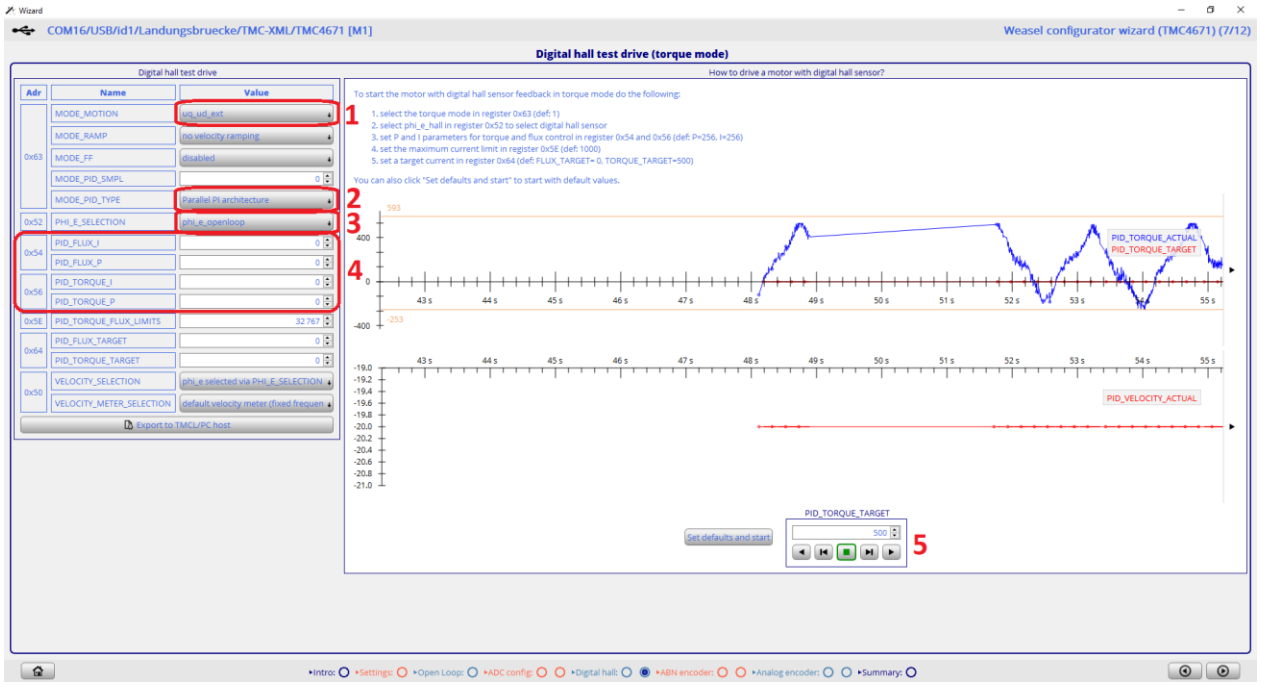
33. In this window you just need to follow the instructions. In our example the polarity **1** needs to be set to have the hall signals match. You can see the effect of toggling the polarity bit at **2**



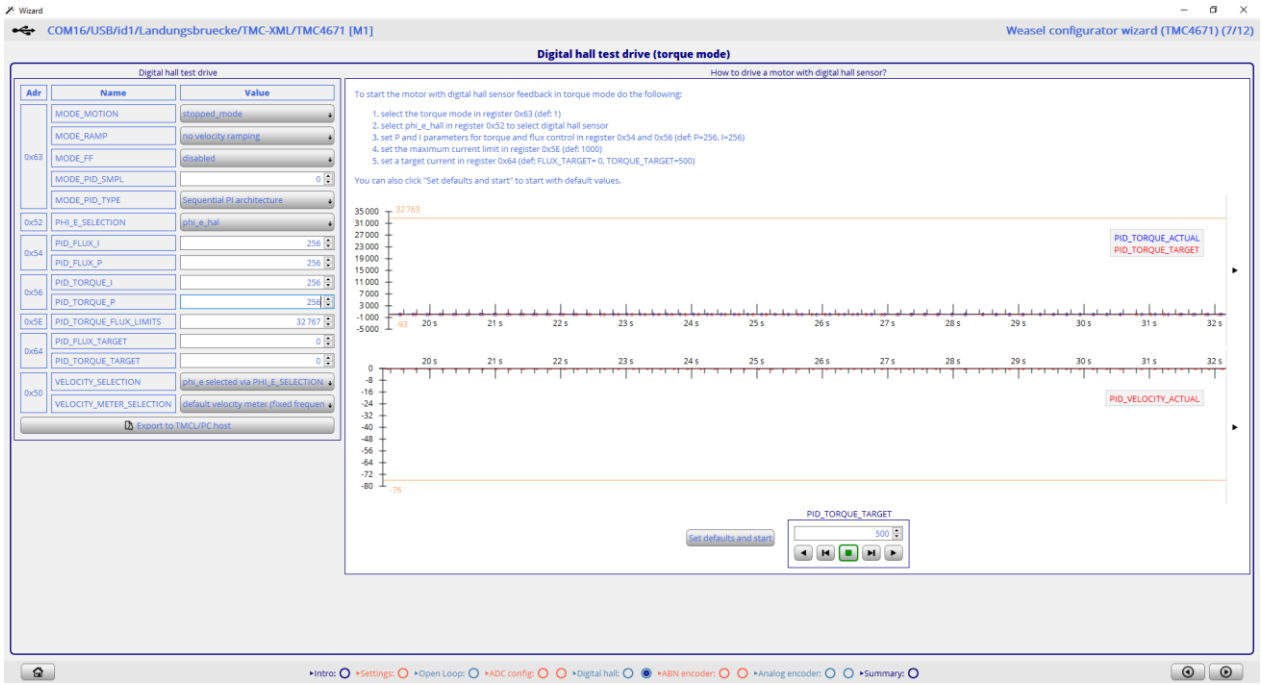
34. Click on 



35. Continue by clicking 
36. **Digital hall test drive (torque mode)** window

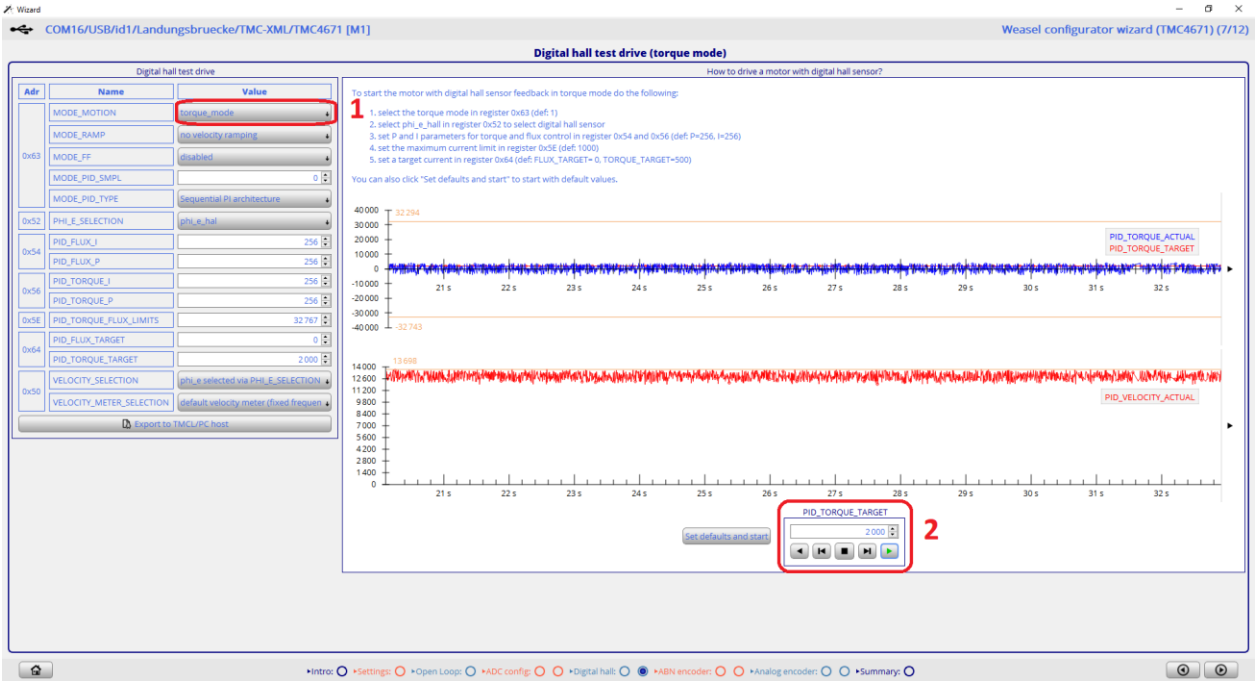


37. Please go in stopped mode **1**, select the sequential PI architecture **2**, select phi_e_hal at **3** and put default PI parameters into **4**



38. Now you can switch MODE_MOTION **1** to torque mode and start by clicking the “play” button **2**. Note: If the motor does not start turning, increase the current to e.g. 1000 or 2000. But be

careful.



39. **Encoder configuration** window

    TBD

40. When finished and on the last page you get a summary of the register settings of the TMC4671
41.