2 IMC Studio

IMC Studio is an intuitive software implemented in the field of test and measurement process. The software is used for data acquisition, live-monitoring and test stand automation.

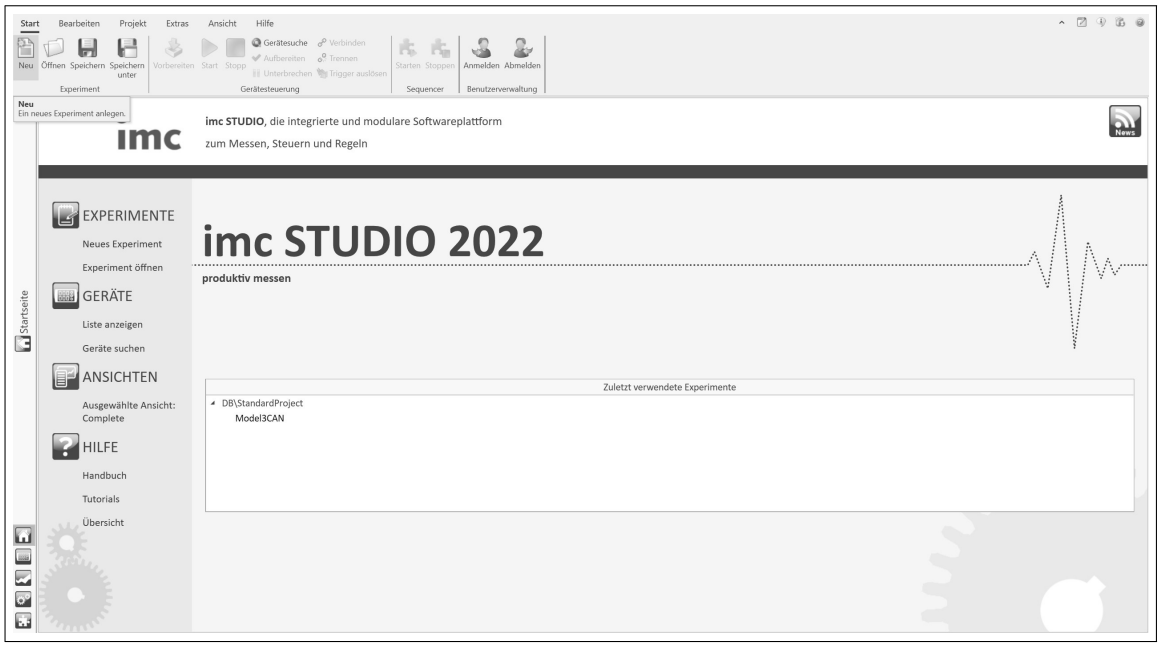


Figure 2: IMC Studio Welcome Screen

Steps

(Note: The Steps from 2 to 12 is relevant to create a new Project. You can go to step 7 if you want to collect data for other Signals not included in the Lab tasks.)

!!A Project called „LAB“ is already created for the data acquisition so you can directly jump to step no. 17 for this lab!!

1. Start the Software IMC Studio
2. In the Homepage you can create a new Project „Neues Experiment“.
3. Name the Experiment to the respective Lab.
4. The IMC-measurementsystem „imc_CRFX_2000GP“ has been already connected and ready to use.
5. The device can be accessed via „Liste anzeigen“ under Geräte.
6. Selected the configured device.
7. Go to „Konfiguration“ and start the CAN Assistant.
8. Choose „Knoten 1“ and goto „Datei“ and import the .dbc file. Choose the CAN Messages from the list which are relevant to the lab excercise.

9. Add the Messages to IMC Studio using the double arrow and select „Übernehmen“.
10. Change the „Baudrate“ to 500Kbit/s and close the CAN assistant.

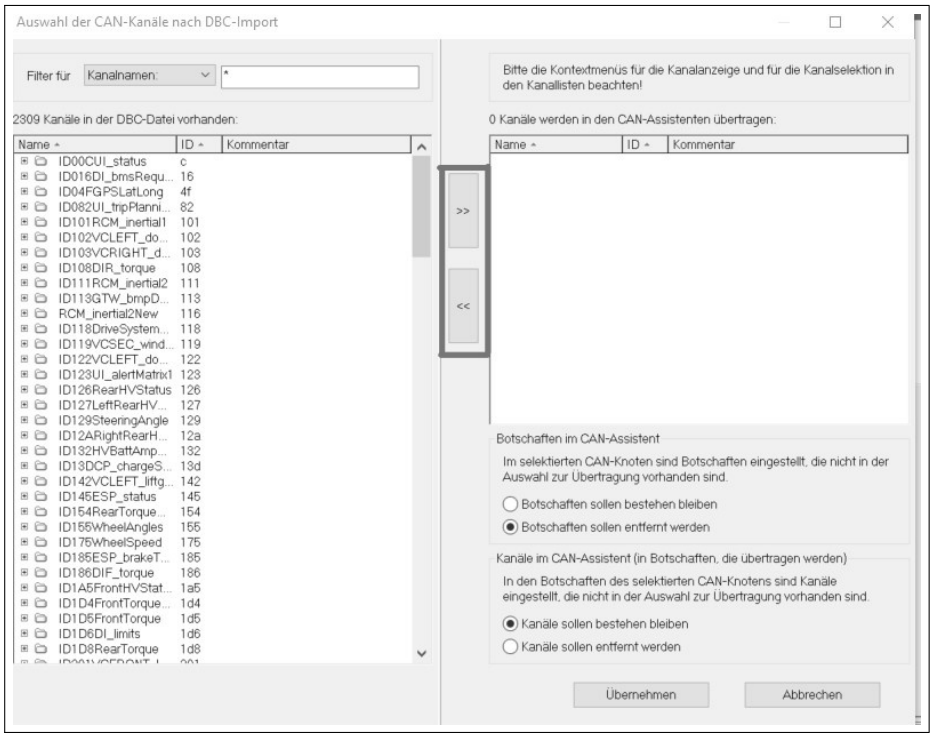


Figure 3: CAN Assistant Window

11. Go to Panels  . Under „Current Measurements“ ⇒Feldbus:Analoge Eingänge“, you will find all the Signals that were imported to the Software.
12. IMC Studio provides a CANVAS which can be used to design different Panels to check the real time data from CAN.
13. Go to „Design“ option in Menu. The Software provides the options to add new panels with different layouts or simply use the right mouse button to access the various options.

Figure 4: Panel Window

14. Activate the „Design Modus“. Select the visualization methods for the display.

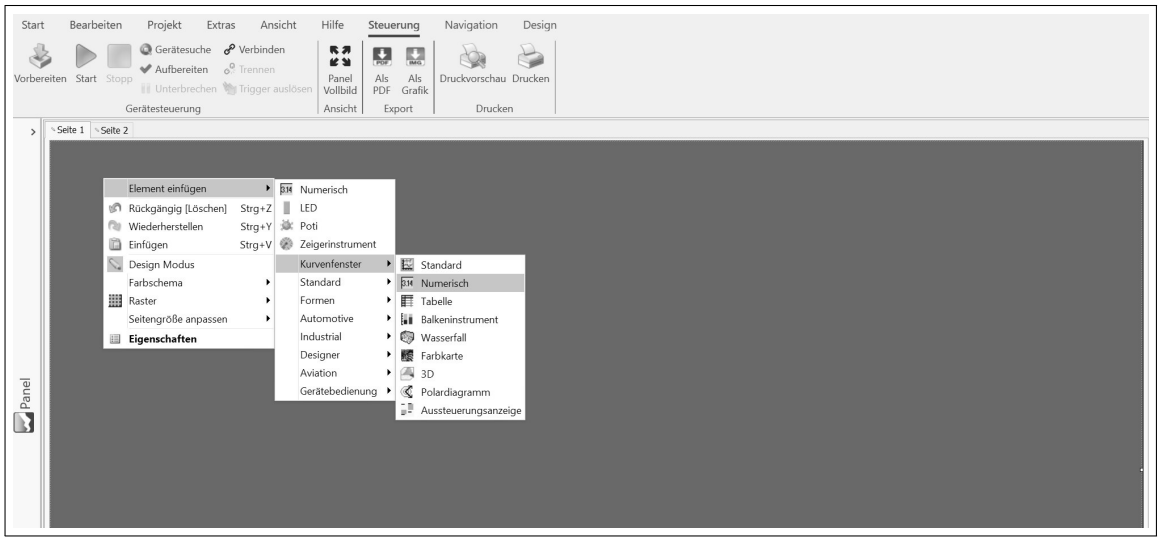


Figure 5: Design mode to add visualization elements

15. Select the „Letzter Wert als Zahl“ and now add the Signals to be measured using drag and drop from the „Feldbus: Analoge Eingänge“. You can add more windows for different measurements.

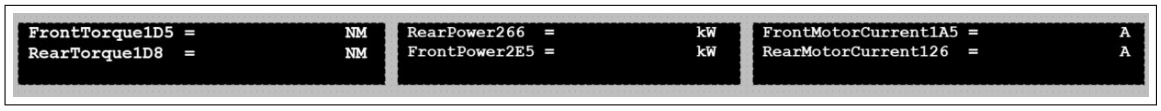


Figure 6: Display showing the values in real-time

16. You can change type of Display.
    Goto to black field: Right mouse click ⇒ Konfiguration ⇒ Darstellung.

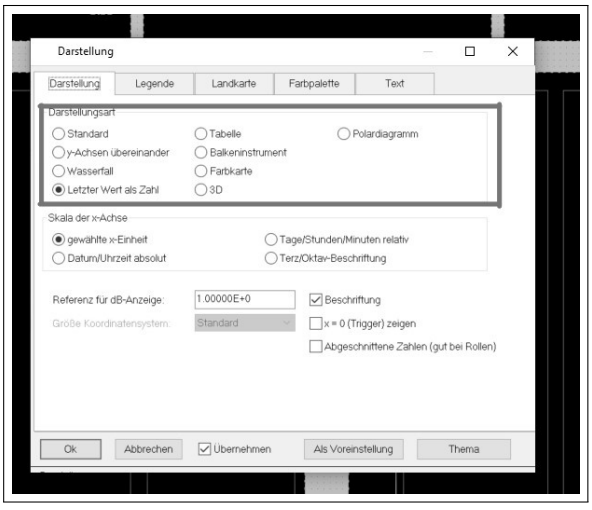


Figure 7: Different visualization options

Screenshots of Dashboard

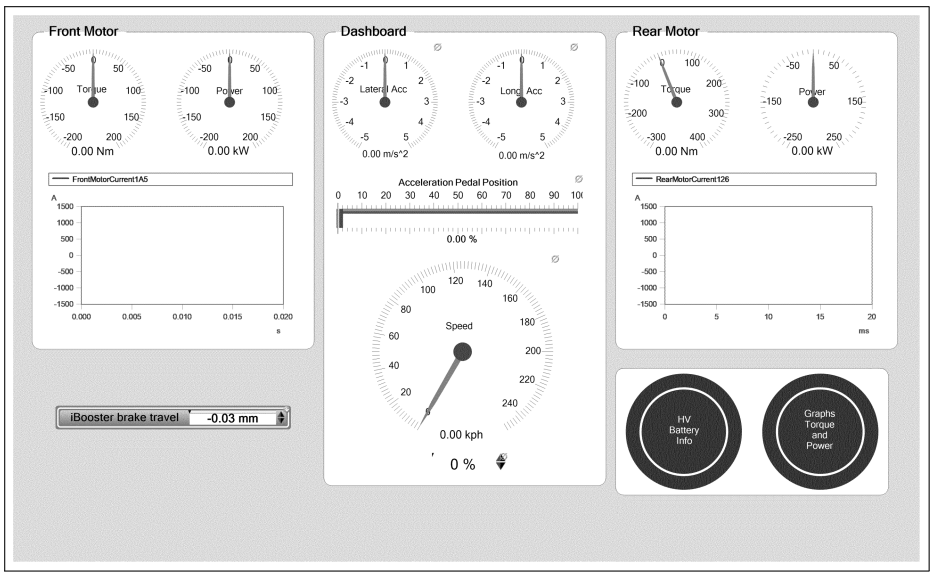


Figure 8: Dashboard

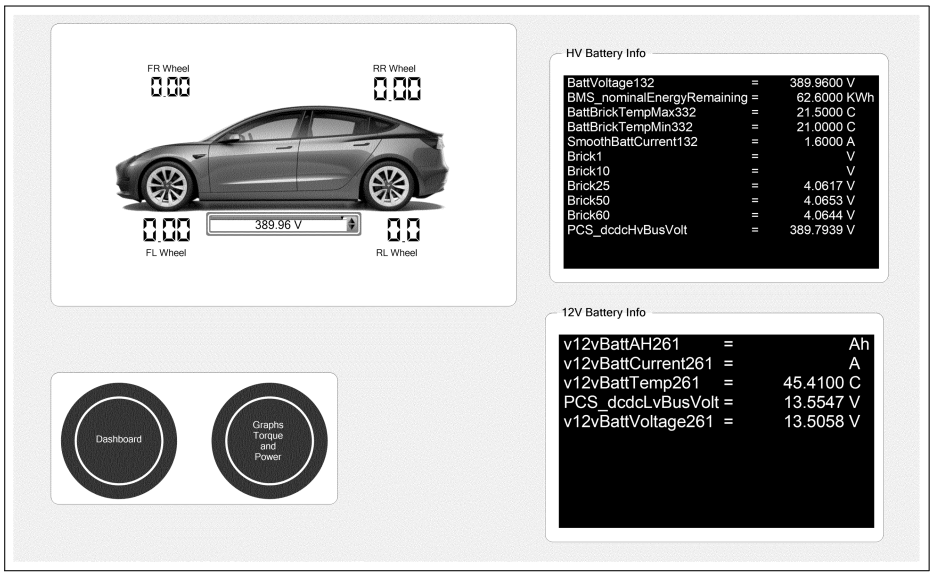


Figure 9: Dashboard HV System

The figure (8) provides a overview of the **Powertrain** of vehicle. It shows the real time values for torque, power, speed. The second figure (9) illustrates a panel that provides the overview of the high voltage battery pack and also the 12V low voltage battery system.

Using the buttons you can jump between the panels during the measurement.

17. After everything is ready connect the Lab PC to IMC device using the Ethernet Port. Go to the „Geräte“ and connect the device via Software and check if the connection is successful. It can be checked under the **Setup** window.

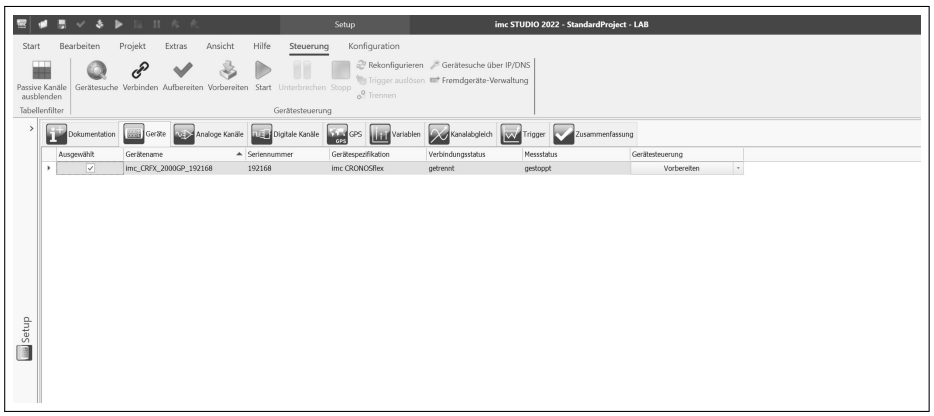


Figure 10: Device connection status

18. You can then start your measurements under the „Steuerung“ tab.

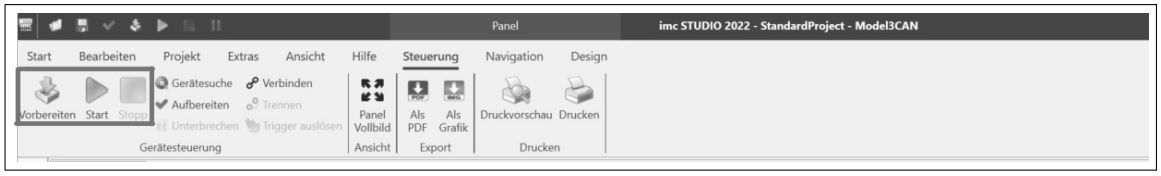


Figure 11: Starting data acquisition

19. Every single measurement is saved in ist own folder with the date and the timestamp.

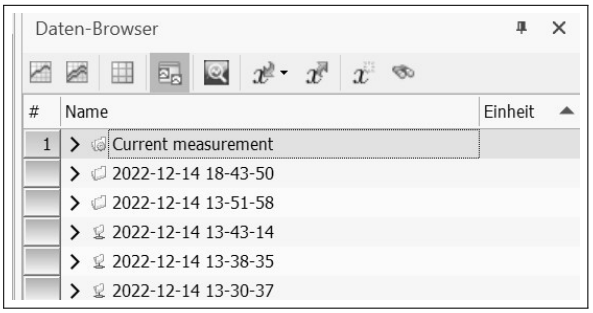


Figure 12: Data saved after each measurement

Note: In order to view the real time reading in the dashboard it is important to always select the current measurement folder in Daten Browser option.

3 IMC Famos

IMC FAMOS (Fast Analysis and Monitoring of Signals) is a graphical data analysis program that is used in the fields of image analysis, evaluation and visualization of measurement results. This software can import wide variety of file format. The raw data collected by the IMC Studio can be combined,labelled and processed.

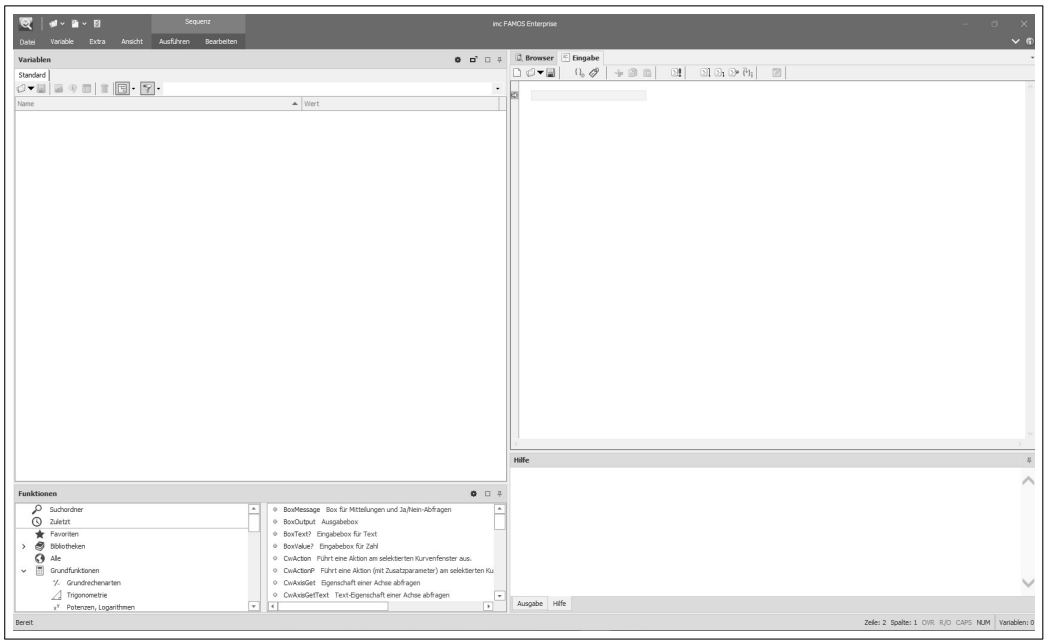


Figure 13: Home screen of IMC FAMOS

1. Goto Datei⇒Daten. Go to to the PATH where the data are saved.
2. Import the raw measurements collected by IMC Studio. You can use drag and drop method to import individual signals directly from measurement folder to the FAMOS.
3. Every measured data can be visualized as Graph.

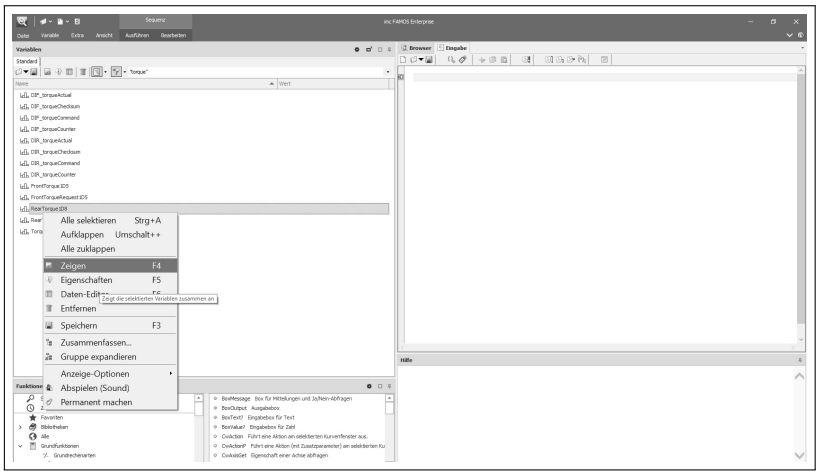


Figure 14: Option to show the raw data

4. Graphical pop-up window will then appear with the Measurement curves , related axes and the legend. More data can be added to same window using drag and drop method. The software also provides functionality to change the axes limits, thickness of the curves and also a intuitive method to measure every data point. Like in the example you can measure the data point on „y1“ using the left mouse button and „y2“ using right mouse button.

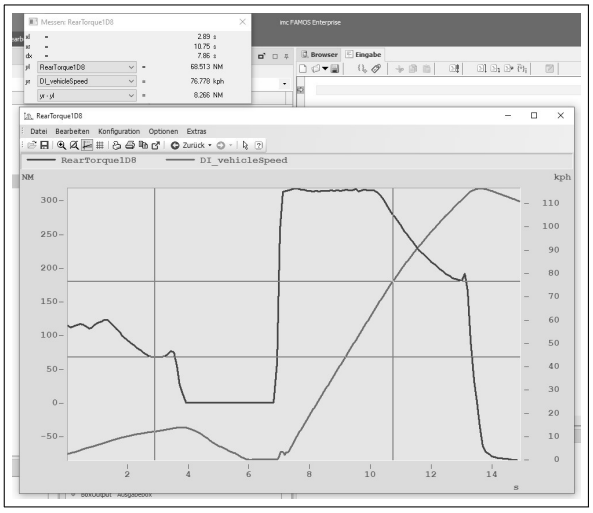
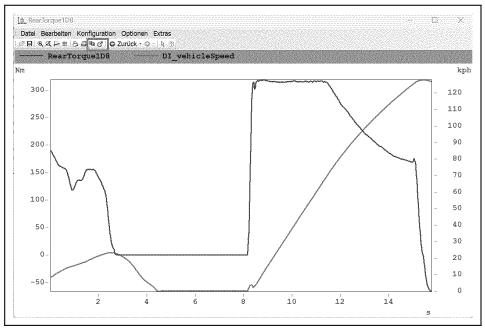
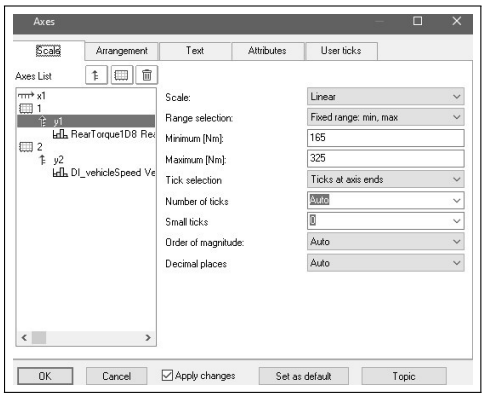


Figure 15: Measurement Window

5. IMC Famos also includes the „Report generator“ which can be used to create reports. Go to „Extra“ ⇒ „Report-Generator“. The Graphs generated can be copied and paste directly on the pages in report generator or Word file.
6. The Data can also be exported in other file formats like .csv file. Goto „Variable“ tab ⇒ “Zusammenspeichern“ or „Einzelnspeichern“ and select the format to be saved. This way Matlab can be used to plot more dynamic graphs.
7. To export the file with only the data that are required. Select all the signals in the **Variable/Standard** window ⇒ „Zusammenspeichern“. And then select **[XLS] LAB-Gemeinsame_ Zeitspalte(*xls)** to export as a EXCEL file.
8. The Graphs can be saved or copied to the clipboard. In order to use the function, select one of the icons in red box in figure (16a). The axis of the graphs can be adjusted. For this double click on axis on graph window or select option Äxesünder ”Configuration tab”. The parameters like the axis limits, magnitude, decimal places can be changed as show in figure.



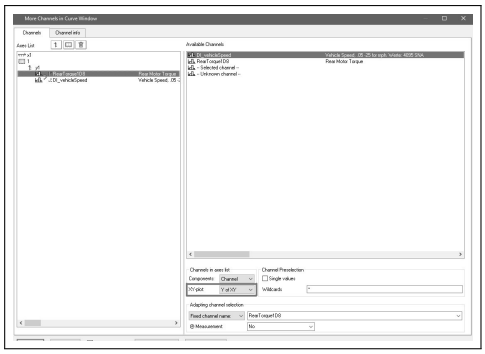
(a) Copy or Save Graphs



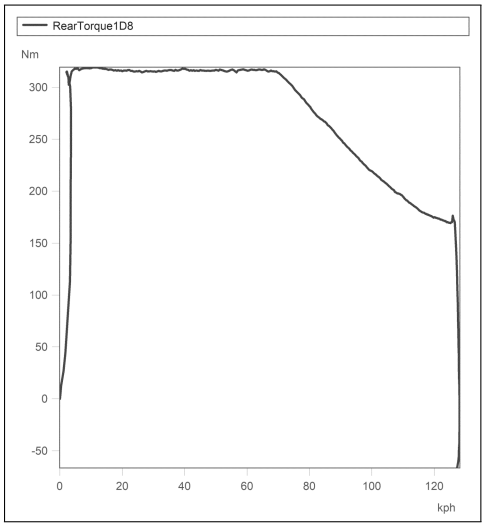
(b) Axes settings

Figure 16: Graph settings

As default software generates Graph with „time in X-axis“. IMC FAMOS provides function to create a XY-Plot. Go to Konfiguration ⇒ Weitere Datensätze in the Graph window. Data can be added to same graph and X, Y axis data can be chosen.



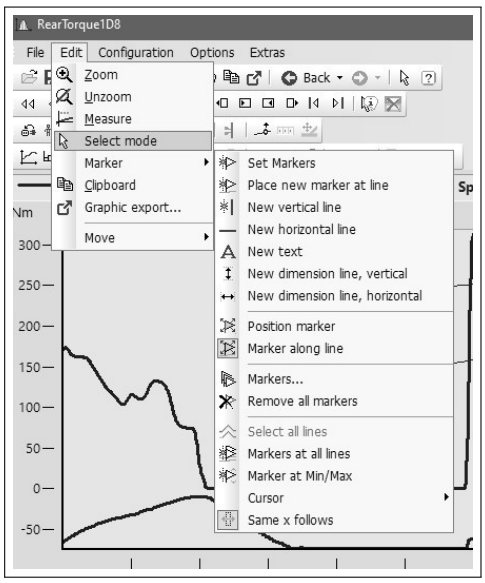
(a) XY-Plot



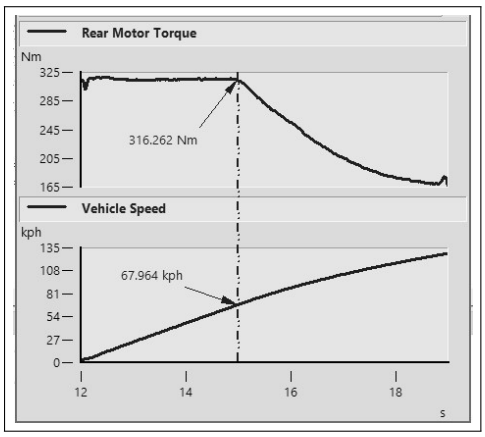
(b) XY-Plot of Torque and Speed

Figure 17: Generating XY Plots

Different markers like vertical lines, horizontal lines, min. and max. value of data can be displayed in the graphical window.
Go to ⇒ Edit ⇒ Marker, select the required marker type and place it on the curve just by clicking on the curve.



(a) Markers



(b) Graph with values

Figure 18: Setting markers

List of Signals with Interpretation

CAN Signal	Interpretation	Unit
RearTorque1D8	Rear Motor Torque	Nm
DIR_ axleSpeed	Rear Axle Speed	RPM
DIR_ torqueActual	Rear Axle Torque	Nm
FrontTorque1D5	Front Motor Torque	Nm
DIF_ axleSpeed	Front Axle Speed	RPM
DIF_ torqueActual	Front Axle Torque	Nm
FrontPower2E5	Front Motor Power	kW
FrontHighVoltage1A5	Front Motor HV	V
FrontMotorCurrent1A5	Front Motor Current	A
RearPower266	Rear motor Power	Nm
RearHighVoltage126	Rear Motor Hv	V
RearMotorCurrent126	Rear Motor Current	A
DI_ vehicleSpeed	Speed	kph
DI_ accelPedalPos	Acc. Pedal Travel	%
SteeringSpeed129	Steering Speed	Deg
SteeringAngle129	Streering Angle	D/s
UI_ SOC	State of Charge	%
v12vBattVoltage261	12V Battery Voltage	V
v12vBattCurrent261	12V Battery Current	A
v12vBattTemp261	12V Battery Temperature	°C
v12vBattAH261	12V Battery Capacity	mAH
CC_ currentLimit	Charge current limit	A
ChargeLinePower264	Charge Line Power	kW
ChargeLineVoltage264	Charge Line Voltage	V
ChargeLineCurrent264	Charge Line Current	A
RCM_ lateralAccel	Lateral Acceleration	m/s^2
RCM_ longitudinalAccel	Longitudinal Acceleration	m/s^2
RCM_ verticalAccel	Vertical Acceleration	m/s^2