DYNO INTERFACE

Interface for the integration of real driving simulation on propulsion system test benches with CarMaker, TruckMaker or MotorcycleMaker
**Dyno Interface: Real driving simulation on the test bench**

The Dyno Interface integrates our real-time capable vehicle simulation environments CarMaker, TruckMaker and MotorcycleMaker into your test bench. The interface featuring a tool box allows for the use of real driving simulation including models of the vehicle, driver, road, traffic and surroundings on test benches of all leading manufacturers and established automation systems. The Dyno Interface ensures safe test bench operation at all times. With a synchronized real-time coupling of simulation environment and test bench, a high-performance closed-loop integration of the real systems to be tested is achieved.

**Overview**

- Real driving simulation on the test bench including models of the vehicle, driver, traffic, road and environment for the reproduction of real driving scenarios
- Closed-loop integration of real systems into the virtual environment
- Available for engine/electric motor, transmission, powertrain and chassis dynamometers

**Applications**

- Propulsion concept studies
- Powertrain calibration and validation
- System integration tests
- Analysis of advanced driver assistance systems

**Evaluation of:**

- Real Driving Emissions (RDE)
- Real-world consumption/range
- Driving performance and vehicle dynamics
- Exhaust gas aftertreatment
- On-board diagnostics (OBD)
- Acoustics and drive comfort (NVH)
- Thermal management/HVAC system

**Available variants:**

<table>
<thead>
<tr>
<th>Engine/ electric motor dynamometer</th>
<th>Transmission dynamometer</th>
<th>Powertrain dynamometer (2WD/4WD)</th>
<th>Chassis dynamometer</th>
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</thead>
<tbody>
<tr>
<td>Engine</td>
<td>real</td>
<td>emulated</td>
<td>real or emulated</td>
</tr>
<tr>
<td>Electric motor</td>
<td>real</td>
<td>emulated</td>
<td>real</td>
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<tr>
<td>Transmission</td>
<td>simulated</td>
<td>real</td>
<td>real</td>
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<tr>
<td>Drivetrain</td>
<td>simulated</td>
<td>simulated</td>
<td>real</td>
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<tr>
<td>HV battery</td>
<td>simulated</td>
<td>simulated</td>
<td>real or emulated</td>
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<tr>
<td>Wheels/tires</td>
<td>simulated</td>
<td>simulated</td>
<td>simulated</td>
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<tr>
<td>Vehicle</td>
<td>simulated</td>
<td>simulated</td>
<td>real or emulated</td>
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<tr>
<td>Road/environment</td>
<td>simulated</td>
<td>simulated</td>
<td>simulated</td>
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<tr>
<td>Driver</td>
<td>simulated</td>
<td>simulated</td>
<td>real or emulated</td>
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</table>
Features

- Consideration of all real driving resistances in the vehicle model
- Synchronized data handling of simulation and measurement data
- Integrated safety concept with watchdog monitoring and error handling
- Support for different bus systems such as EtherCAT, CAN or UDP
- User-friendly interface tailor-made for test bench operation
- Integration on existing and new test benches of various manufacturers (AVL, FEV/ D2T, Horiba, Kratzer Automation, KS Engineers, OPVengineering, ONO SOKKI and many more)

Advantages

- System evaluation under realistic driving conditions
- High flexibility (vehicle, road, driver) in addition to full reproducibility of real driving scenarios
- Usability of existing test bench measurement equipment in real driving operating conditions
- Option of virtual electrification of propulsion systems on the engine test bench
- Maximum utilization of test bench operating time thanks to test automation
- Continuous use throughout the entire development process due to office PC compatibility of the simulation environment
SOLUTIONS FOR VIRTUAL TEST DRIVING

As an innovation driver for virtual test driving, the company is a leading global provider of software and hardware products for the automotive and supplier industry. With the areas Simulation Software, Real-time Hardware, Test Systems and Engineering Services, IPG Automotive supports its customers in creating innovations and improving their development process efficiently. The simulation solutions CarMaker, TruckMaker, and MotorcycleMaker, as open integration and test platforms, facilitate great savings in time and cost for customers, in a continuous development process of Model-, Software- and Hardware-in-the-Loop, all the way to the Vehicle-in-the-Loop method. The application ranges from the general vehicle dynamics simulation, developing and testing of chassis control systems, as well as interconnected systems such as chassis, powertrain, and steering in full electric and hybrid vehicles.

Another strength of IPG Automotive is the development of future-oriented solutions for the integration and testing of advanced driver assistance systems.