

# Engine Technology

## Overview brochure

Fully functional engine and drivetrain systems with original vehicle components for practical diagnostics, electrical measurements and systematic troubleshooting. Depending on the training objective, we create training rigs with gasoline and diesel engines as well as modern mild-hybrid and full-hybrid drivetrains from various vehicle manufacturers.



### Gasoline

Naturally aspirated and turbocharged gasoline engines

### Diesel

Common rail / Exhaust aftertreatment

### Mild Hybrid

Combustion engine and electric assistance

### Full Hybrid

Combustion and electric drivetrains in one system network



**ITEM NO. 000G9194**

## **BMW 2.0 HPI B48 functional engine**

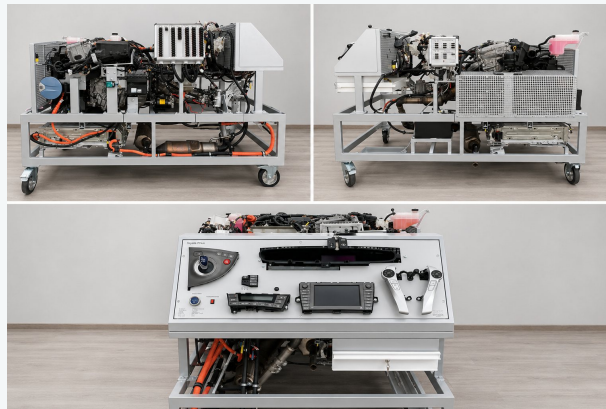
Fully functional BMW B48 four-cylinder gasoline direct-injection engine with Valvetronic and TwinPower Turbo.

The engine is installed in operating condition with all components required for operation on a stable mobile training frame.

A specially designed instrument console provides the necessary displays and controls in a clear layout for training use.

- 2.0 liters 4-cylinder BMW B48
- Valvetronic Variable valve timing
- Original BMW B48 4-cylinder engine
- Valvetronic
- Direct injection Modern engine management
- OBD 16-pin diagnostic interface
- Gasoline direct injection
- TwinPower Turbo

The freely accessible setup combines conventional engine mechanics with modern electronic engine control and standard workshop vehicle diagnostics.



**ITEM NO. SM009380**

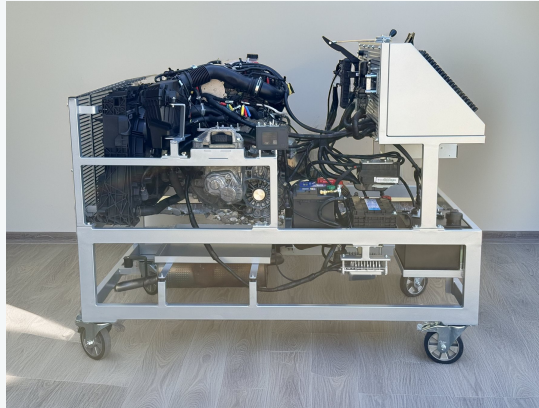
## Toyota Prius 3 Hybrid engine training rig

Fully functional engine training rig based on a Toyota Prius III with automatic transmission, high-voltage battery and all key components of the Hybrid Synergy Drive.

The setup has an active vehicle identification number and realistically reproduces the original vehicle system with instruments, controls, immobilizer, wiring harness and diagnostic interface.

- Full Hybrid Hybrid Synergy Drive
- 30 faults Lockable fault simulation
- Toyota Prius III drivetrain system
- Combustion engine
- High voltage Original HV battery
- Breakout box Measurement access to the hybrid system
- Hybrid Synergy Drive
- Electric drive components

Rotating and hot components are protected against accidental contact. The entire setup is mounted on a stable frame with four load-bearing lockable swivel casters.



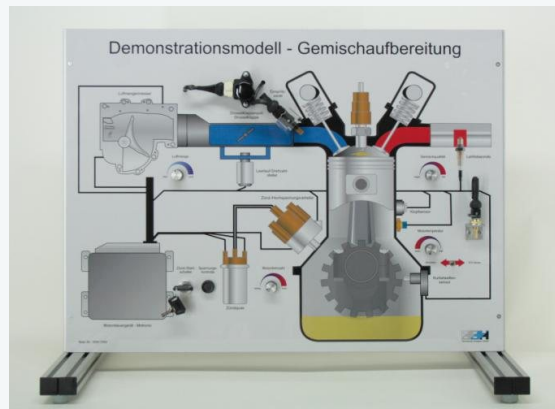
**ITEM NO. 000G9140 / 48-VOLT MILD HYBRID**

**Original vehicle drivetrain with 12- and 48-volt systems**

The training rig combines the original 1.0-liter EcoBoost engine with the components of the 48-volt mild-hybrid system.

The interaction of the combustion engine, electric assistance, energy storage and different voltage levels can be examined directly on the real system.

- 1.0 L EcoBoost Original Ford combustion engine
- Measurement technology Accessible measurement points
- Engine management
- 12-volt vehicle electrical system
- 48 volts Mild-hybrid electrical system
- Diagnostics Fault simulation and vehicle diagnostics
- 48-Volt Electrical System
- Electric assistance



**ITEM NO. 0000 3340 / GASOLINE MIXTURE PREPARATION**

**Clearly demonstrate sensors, actuators and fuel metering**

The analogue model teaches and demonstrates the basic principles of electronically controlled mixture preparation. It shows how the air-flow signal, engine temperature, load condition and lambda-sensor voltage influence mixture composition.

By varying engine speed, engine load, engine temperature, air flow and lambda-sensor voltage, students can follow fuel metering, idle-speed control and overrun fuel cut-off. An integrated PC measurement interface records the operating values of the injection system.

The accompanying PC software displays measured values graphically as an oscilloscope or line recorder and numerically, while explaining the functions of the individual components.

- approx. 600 x 600 x 460 mm Dimensions
- PC measurement interface Graphical and numerical measurement display
- Air-flow-dependent fuel metering
- Lambda-sensor voltage
- approx. 10 kg Weight
- Original components Injection valve and engine-temperature sensor
- Influence of engine temperature
- Engine load and engine speed