MSR 5000
PERFORMANCE
MEETS
PRECISION

made by MAHA
made
in
Germany

MAHA

MAHA SINGLE ROLLER DYNAMOMETERS

- From the single-axle dynamometer to the high-tech single roller four-wheel performance dynamometer
- Precise measurement technology and reliable, reproducible measurement results
- Sturdy and safe design
- Compatible with previous MSR 500 and LPS 3000 foundations
- For performance measurement, load simulation and driving cycles
- Eddy current brake + electric machine – simulation of real road conditions

Electric machine for four-wheel synchronisation: Tracking acceleration of the non-driven axle

30 kW, 1.5 m/s² up to 200 km/h
30 kW, 1.0 m/s² up to 240 km/h

All drive concepts can be tested


Ni/Cr coating of the rollers for better grip

Eddy current brake for performance measurement and load simulation:
7000 N max. tractive force per axle with 1 brake
Max. expansion stage with 4 brakes per dynamometer
Boost function incl. temperature monitoring of the brake especially for performance measurements on electric vehicles
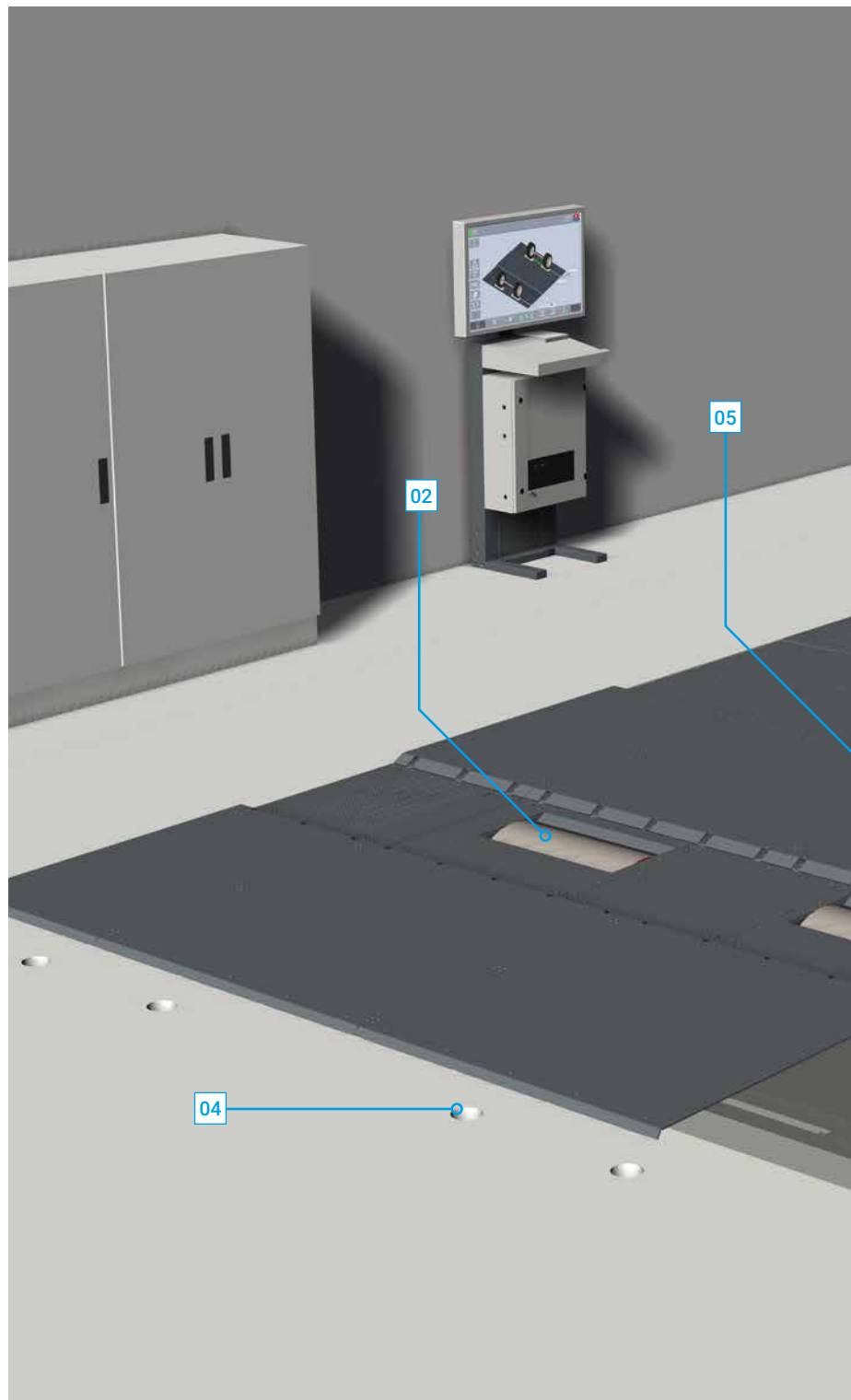
MAHA's MSR single-roller performance and function dynamometer is designed for use in vehicle workshops, motorsports, universities, schools and testing organisations. This dynamometer makes it easy to perform measurements on vehicles with high engine power or tests with a long test duration. The use of electric machines to drive the rollers in combination with powerful eddy current brakes enables perfect synchronous running of the front and rear axles on the four-wheel MSR. This means that a wide range of vehicles with four-wheel drive systems, but also single-axle driven vehicles, can be tested accurately and effectively. For vehicles driven by a single axle the non-driven axle can be run at the same speed as the drive axle using the electric motor of the dynamometer. Furthermore, the dynamometer is also suited for testing hybrid and electric vehicles thanks to the individual control of the axles.
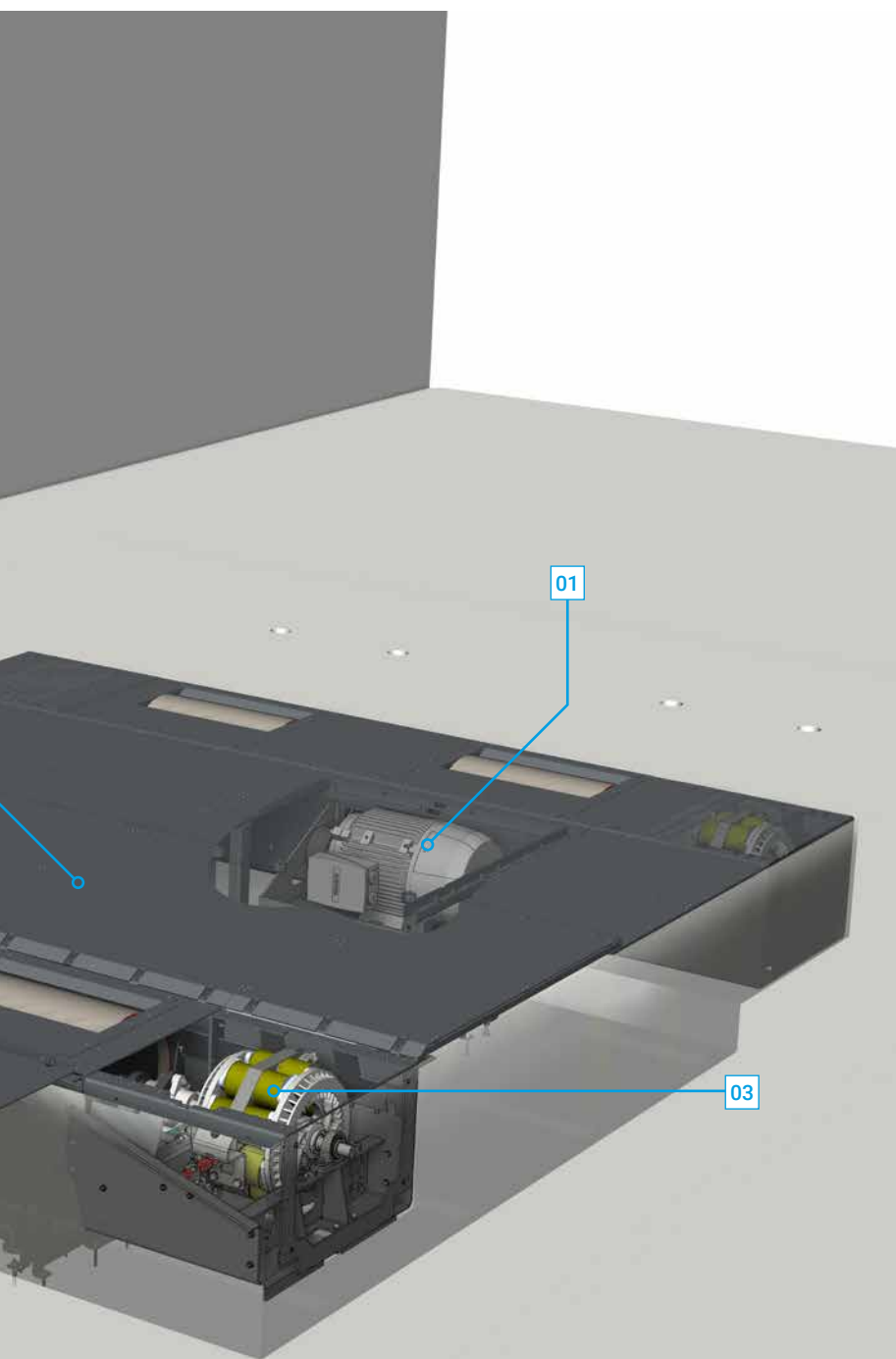
Vehicle restraint for maximum safety during operation
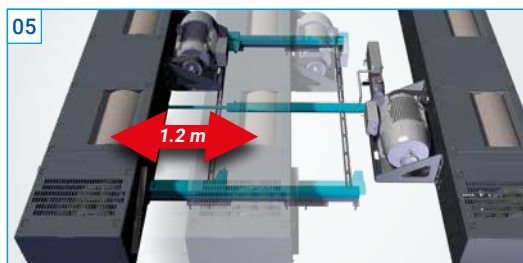
Hydraulic roller set displacement
2.2 m – 3.4 m stepless adjustable wheelbase.
Thanks to optimised electric machine positioning, it can be installed in all existing dynamometer foundations without any adjustments necessary.

Dynamometer operation from the vehicle via a tablet that complies with the Machinery Directive – ideal for daily operation

THE SOFTWARE
PERFORMANCE MEASUREMENT COMBUSTION ENGINE / ELECTRIC CAR


Vehicle data selection: specification of vehicle with electric motor or combustion engine possible

- Drive axle selection
- Tablet connection
- Active warnings (incl. archive)
- Lambda sensor
- OBD port
- Cooling fan
- Parking brake
- "Controlled deceleration" mode of the dynamometer

Automatic mass determination necessary for all vehicle types, as the real value per axle is unknown

- Only possible for electric drive on the roller set
- Extremely accurate and separate mass determination for front and rear axle
- Extremely precise performance measurement possible
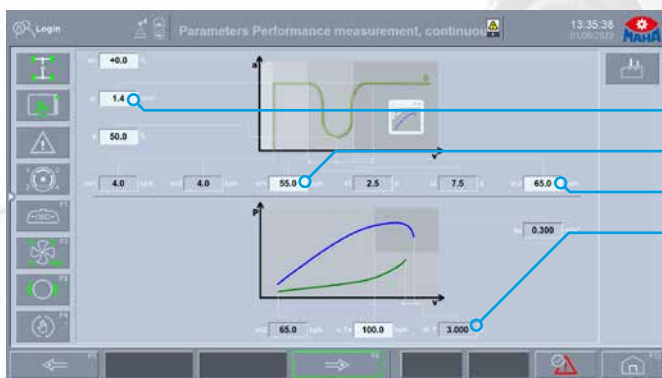
Special settings for adaptation of the dynamometer to the individual vehicle

— Acceleration

— Controller start speed

— Start speed of the performance measurement

— Trigger for recording the drag power

**User-friendly and clearly presented selection of rotational speed measurement**

— Possible rotational speed sources:
  - Optical (laser light barrier); 2 inputs for separate detection of wheel rotational speeds
  - OBD
  - Driving test

The maximum engine power of the vehicle is determined in the Performance Measurement operating mode. As the evaluation on a current electric vehicle shows, the MSR also equips you for future electric vehicles. The menu-guided procedure leaves nothing to be desired by the operator, allowing reproducible measurements to be performed with ease.

Full control over all relevant parameters during performance measurement

Additional values can be freely selected via different display types during performance measurement

Active drag power measurement

Display available in each screen for the speed of both axles

Power distribution of both axles is always in view

Sidebar for quick access and overview of further dynamometer functions
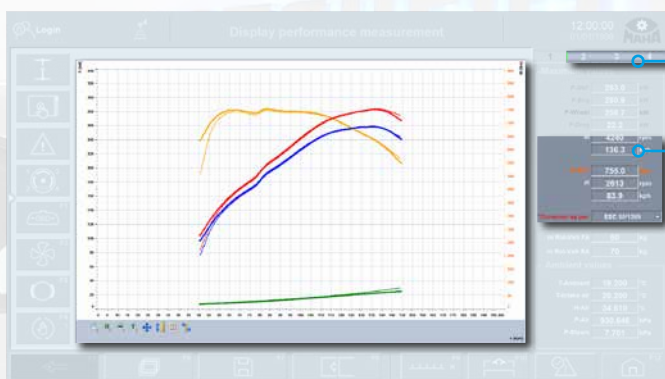
Easy-to-read result screen

Best reproducibility with successive measurements. Up to 3 background measurements can be loaded for comparison.

Additional values (up to 6 channels) can be imported via:

· OBD
· Ambient data
· Analogue inputs
· Lambda sensor

LOAD SIMULATION
OPERATING MODE

The Load Simulation operating mode is excellent for tuning work on the vehicle. The load simulation menu allows the user to preselect different load conditions, which can enable targeted engine diagnostics or allow the climbing performance of a vehicle to be determined. Depending on the requirements, various load conditions can be simulated, such as a constant tractive force, constant speed, constant rotational speed or driving simulation.

Oil temperature of the vehicle
via temperature sensor

Setting of target values
depending on the load
simulation type
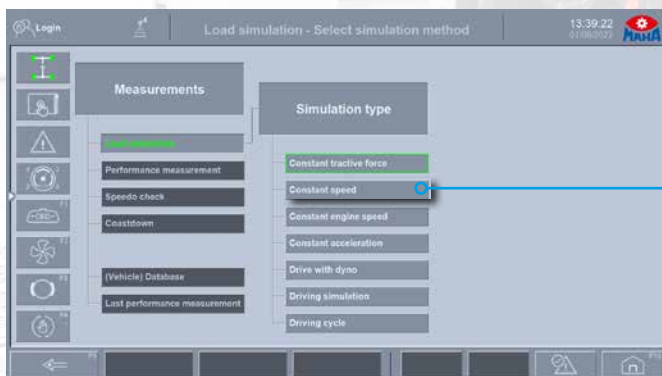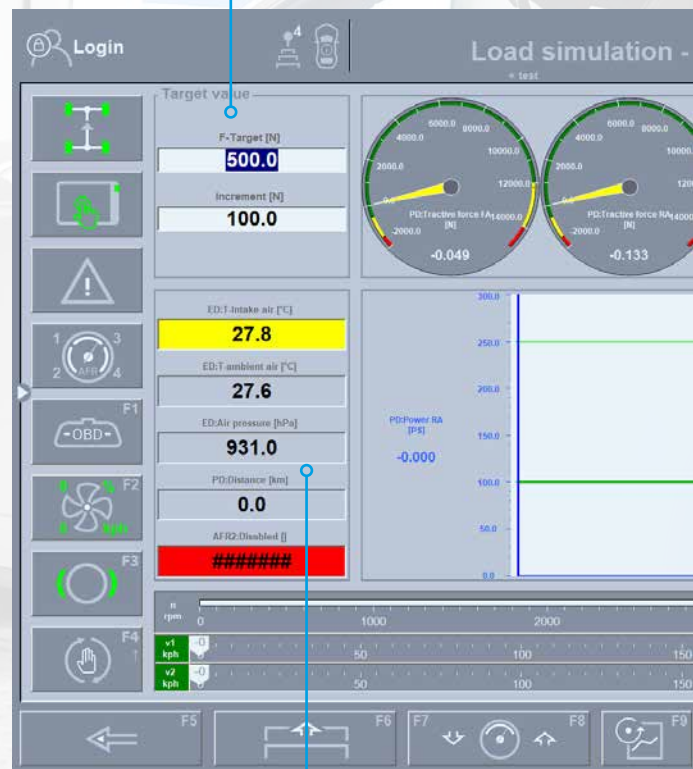
Monitoring of ambient data:
– Intake air temperature
– Relative humidity
– Ambient temperature

Individually adjustable display of all vehicle and dynamometer relevant values
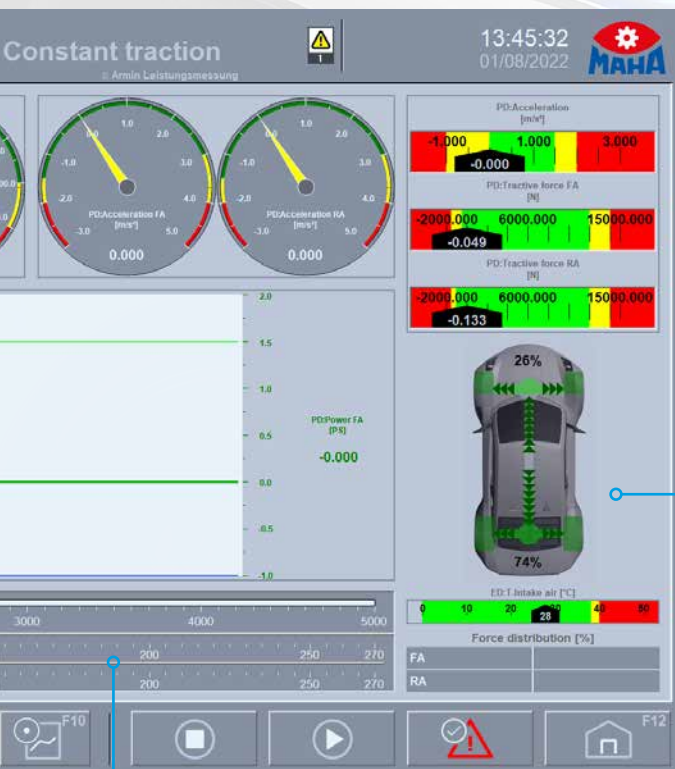
Power distribution on front/rear axle. Display and monitoring of the eddy current brake engagement or assistance by the electric machine for dynamometer synchronisation

Rotational speed of both axles

LOAD ADJUSTMENT
OPERATING MODE

The Load Adjustment operating mode can be used to deter-mine the dynamometer coefficients according to ECE / SA J2264 standards. Depending on the selected method, the vehicle is accelerated to the target speed and the coasting test is initiated. The dynamometer is then braked accord-ing to the preset simulation model. This determines the values that make an exact driving simulation "as on the road" possible.
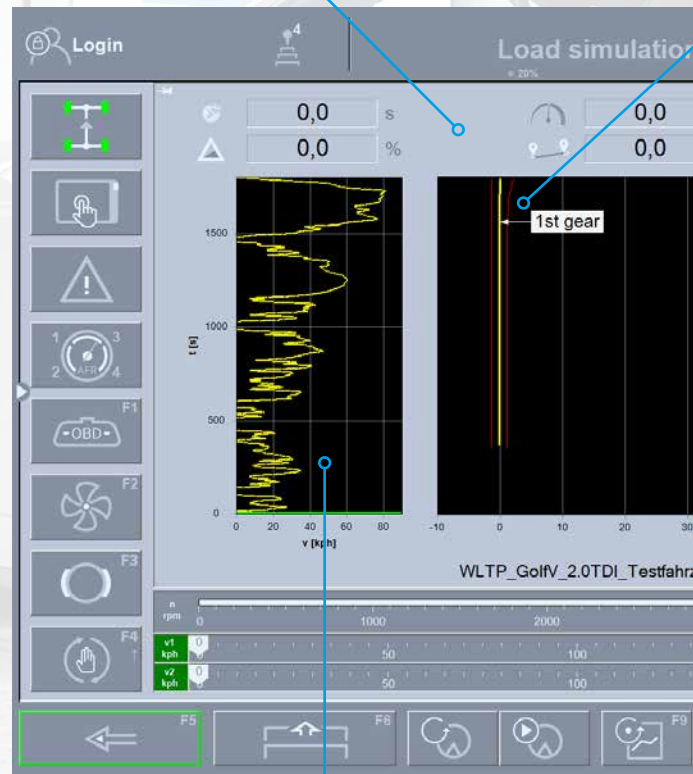
DRIVING CYCLE
OPERATING MODE

In the Driving Cycle operating mode, it is possible to retrace a speed profile with defined time and speed curves on the dynamometer. Dynamometer coefficients can be deter-mined in the load adjustment. This transfers the vehicle's road coefficients to the dynamometer allowing an exact simulation of a road journey. The exact evaluation of the vehicle in driving mode with a self-selected or standard-ised driving profile is also possible and can be performed very accurately. Electric machine assisted simulation of the vehicle mass, unique in this segment.

Cycle time, gradient, current speed and track travelled can be read on the display
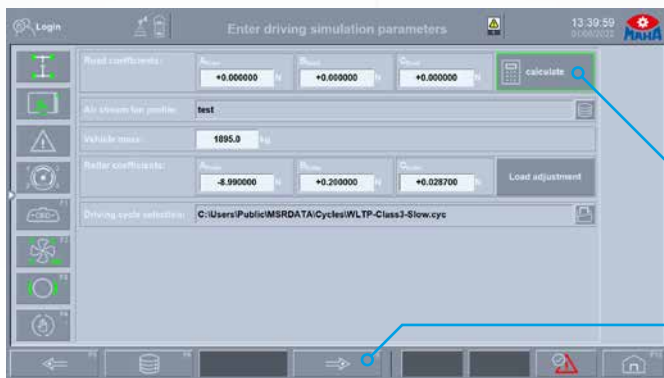
Load adjustment with determination of the dynamometer coefficients. Real values of the vehicle can be used and transferred to the dynamometer
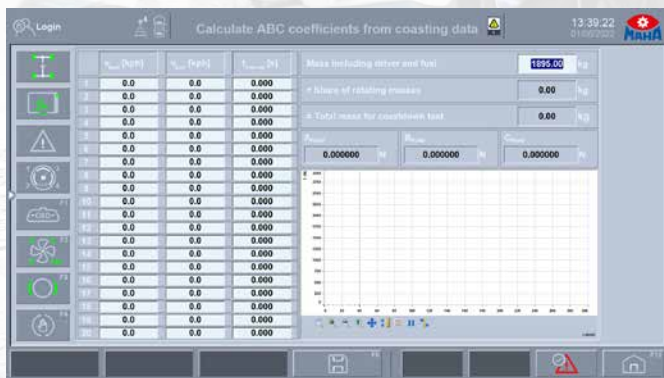
Calculation of the ABC coefficients from the vehicle coasting data on the dynamometer
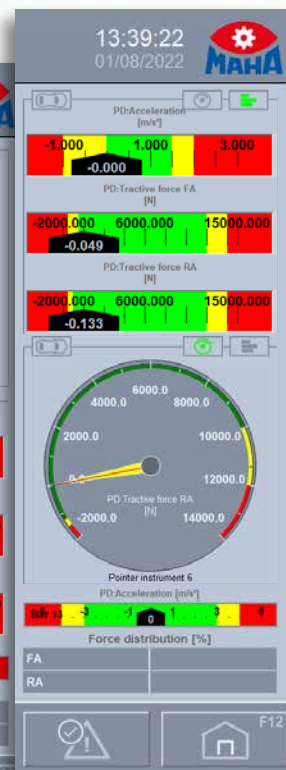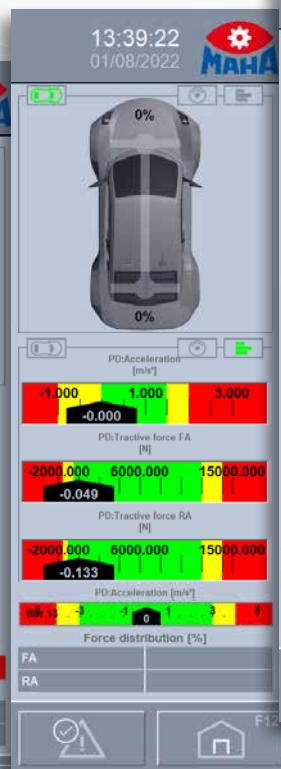
Total cycle profile above speed

Driving cycle

- User-friendly thanks to menu-guided procedure

- Integrated gear cycles, freely configurable individual cycles.

- Cycle profile can be selected from database

- Driving coefficients for driving simulation can be stored separately in the database for each vehicle

- Road coefficients can be transferred to the dynamometer

Speed tolerance limits always in view

Individual display: options for monitoring the dynamometer or data relevant to the tested vehicle

Driver display with driver information and gear shifting instructions

INTERFACE BOX

Transfer of additional vehicle values to the dynamometer control system by means of different sensors.

Comes with VESA mount as standard for assembly on wall, stand, support arm, etc.

Analogue input module

Module for current-/voltage-
based sensor technology
(8 channels)

Lambda

- Communication via Wi-Fi
- Exact values, transmitted very quickly
- Recording via load simulation or performance measurement

OBD

- OBD II interface implemented according to standard and WWH OBD GTR
- Free choice of OBD dongle (prerequisite: support of the ELM chip)
- Vehicle-specific PIDs can be queried
- Data about rotational speed, lambda, ignition timing, temperatures, etc. can be provided, recording is vehicle-dependent
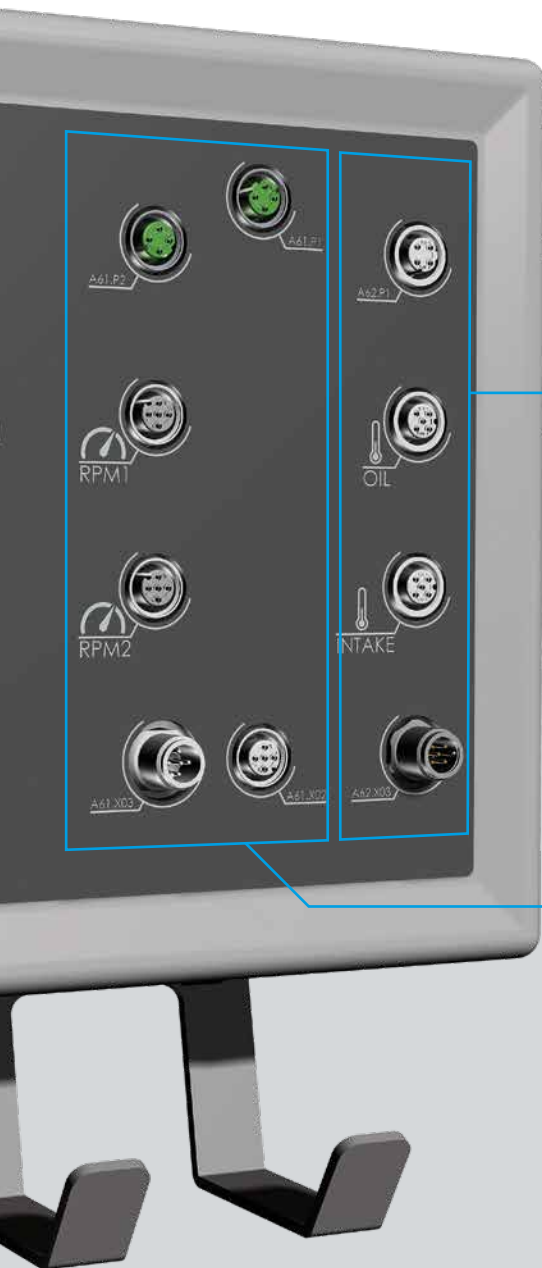
Environmental module

Provides data for extrapolations
(ambient temperature, humidity, air pressure)

Rotational speed module

Rotational speed input for optical sensors

Laser light signal transmitter:

- Rotational speed measurement on the wheel via laser light barrier, quick to install, easy to use
- Precise determination of the wheel rotational speed for separate recording of the front/rear rotational speeds

DYNAMOMETER VARIANTS

	Eddy current brake	Drive power	Electric machine tractive force	Model
SINGLE AXLE				
	1	30 kW	1500 N	MSR 1500 / 1
	2	30 kW	1500 N	MSR 1500 / 2
FOUR-WHEEL				
	2	30 kW*	3000 N	MSR 3000 / 2
	3	30 kW*	3000 N	MSR 3000 / 3
	4	30 kW*	3000 N	MSR 3000 / 4
	4	37 kW*	3600 N	MSR 5000 / 4

*per axle