

NEW! Dynamometer for E-Bikes According to new EPAC/EMC standard

Maturo GmbH designed the new state-of-the-art dynamometer for testing E-Bikes according to new Standard EN 15194:2009 for EPACs (Electrically Power Assisted Cycles).

The market for E-Bikes has changed drastically with the implementation of the new standard in year 2009.

Pedelecs (all motorised bicycles) have to fulfil from now on the same EMC test requirements as ca, motorcycles and mopeds according to new safety standard EN 15194 EPAC.



Features:

- Three independently selectable drive units for front-/rear- and pedal-powered drive
- Speed up to 50 km/h, driving power up to 580 W
- Accurate readout and calculation of speed, torque, engine rating and level of efficiency
- Measurement of electromagnetic radiation with load of $75\% \pm 10\%$ according to CISPR 12
- Measurement of electromagnetic immunity with condition 90% of assistance speed

Information presented enclosed is subject to change as product enhancements are made regularly. Pictures included are for illustration purposes only and do not represent all possible configurations.

Brief description

The dynamometer for E-Bike allows the testing and inspection of bicycles with electromotive drive support (EPAC) in respect to the electromagnetic compatibility.

An EPAC (electrically power assisted cycles – EPAC Bicycles) remains a “bicycle“ without the necessity of a road traffic-legal approval, if:

- the motor-driven support speed does not exceed 25 km/h
- the motor-driven support is only activated, if there is also the pedal force / pedal movement activated
- the motor output is maximum 250 W
- the possible mode of a “starting support” does not exceed a maximum of 6 km/h, also at the mode without pedal movement

The vehicle is liable to the European permission requirements for the road traffic (directives 2002/24/EG and 97/24/EG), if one of the above criteria is exceeding.

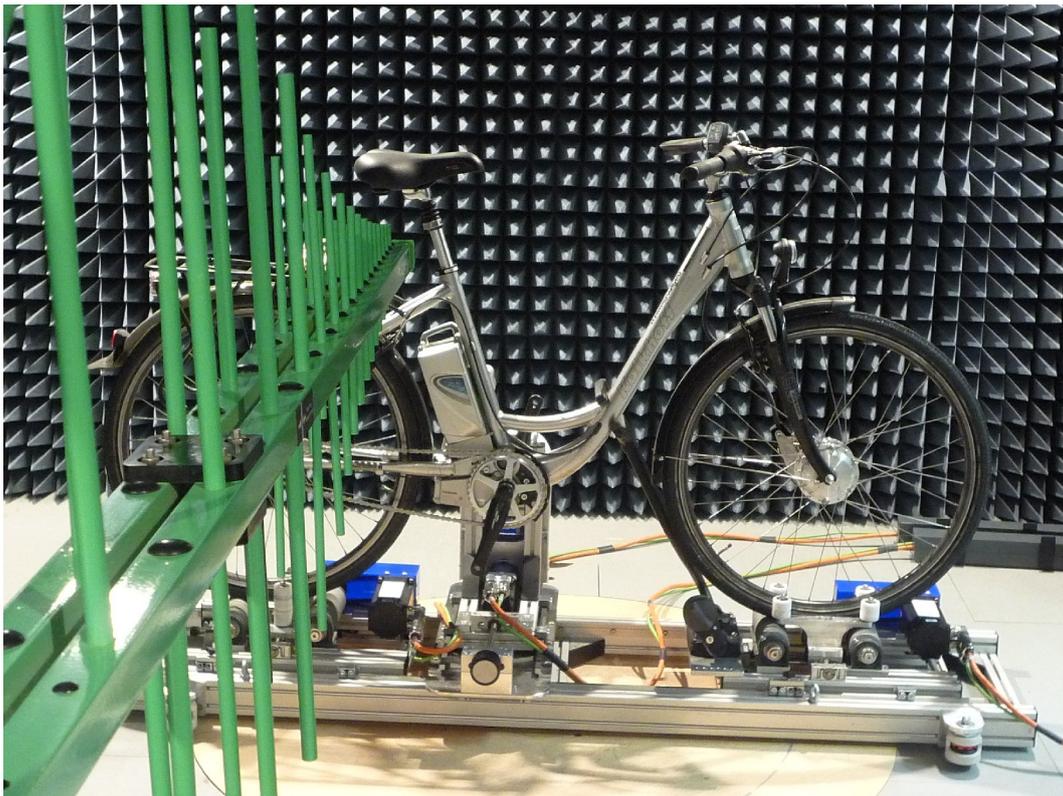


Fig.: E-Bike Dynamometer in the field at SLG Prüf- und Zertifizierungs GmbH

The dynamometer was developed and tested in close co-operation with:



**SLG Prüf- und
Zertifizierungs GmbH**

Technical Requirements

The technical requirements are described in the standard EN 15194:2009 and also include the EMI requirements to EPAC's at attachment C as follows:

- Measurement of the electromagnetic radiation with load according to CISPR 12
- Testing of the electromagnetic immunity to HF-field (according to ISO 11451-1/-2) in the operation mode "standstill", without pedal movement at standstill with 0 km/h
- Testing of the electromagnetic immunity in mode "during operation" with movement of the motor at movement or pedal force
- Testing of the electromagnetic immunity in mode "starting support" for vehicles which this option.

The dynamometer itself must be interference-resistant up to field strength of 30 V/m for all operation modes above. No high frequency interference must be created by the dynamometer, which could affect the test result.

The dynamometer is portable for use in anechoic chambers. The system itself does not create any major influence of the test results, except due to the construction.

The new E-Bike dynamometer allows the input of a target speed for the tyres as well as the readout of the speed for each tyre. This function can be selected for each individual drive – front wheel drive, pedal drive and rear wheel drive.

An additional feature of the system is the input of torque for the simulation of uphill and downhill drives.

A third drive unit, with adaptation to the foot pedal of the EPAC, can be used for simulations of the pedal movement if required. This pedal movement is evaluated as an indication of the rotating movement at many E-Bikes.

The compliance of a constant speed, also by the influence of high frequent emission, is the main criteria for the test of the electromagnetic immunity. At the operation mode "standstill", the E-Bike must not be activated; the speed therefore must remain a "0" km/h.

The Controller NCD of the dynamometer has an output function of a scalable value for the voltage. This function enables the automation of the test sequence in the EMI laboratory, where the possible reactions or speed fluctuations are recorded as a function of the test frequency.

Features of the system:

- Adjustment of the wheelbase
- Adjustments to the tyre width / wheel rim
- Calibration to the tyre diameter
- Adaptation to the foot pedal at removed pedal arm
- Velocity control
- Torque Control
- Fastening device for the E-Bike to the dynamometer
- Movable by integrated casters

Operation by Controller NCD

For the operation for the E-Bike Dynamometer the new developed Controller **NCD** is used. The Controller NCD is capable for the operation of up to 8 devices with multiple axis of motion.



Figure: NCD with option "tip-up handle"

Technical Data

Data interfaces	IEEE 488.2 (GPIB-Bus) and Ethernet
Transmission	Fibre optic cable (up to 2000 m distance)
Transfer rate	Real time 100 Mbit/s (fast Ethernet)
Display	5.7" TFT Touch screen-Display

Brief description of NCD

- **User-friendly, time-saving function keys**
The function keys F1 to F10 allows the implementation of individual, customer-specific sequence programs for user-friendly, times-saving handling and operation. The individual programs can be stored and accessed by one function key.
- **USB interface**
Updates easily implemented by USB stick
Possibility to plug in a computer mouse and keyboard
- **Easy operation with touch panel**
Fast and reliable operability based on touch panel technology
The layout of touch screen display can easily be modified to customers' request
- **Output of measured quantities**
The Controller has an analogue output of measured quantities function for the external documentation.