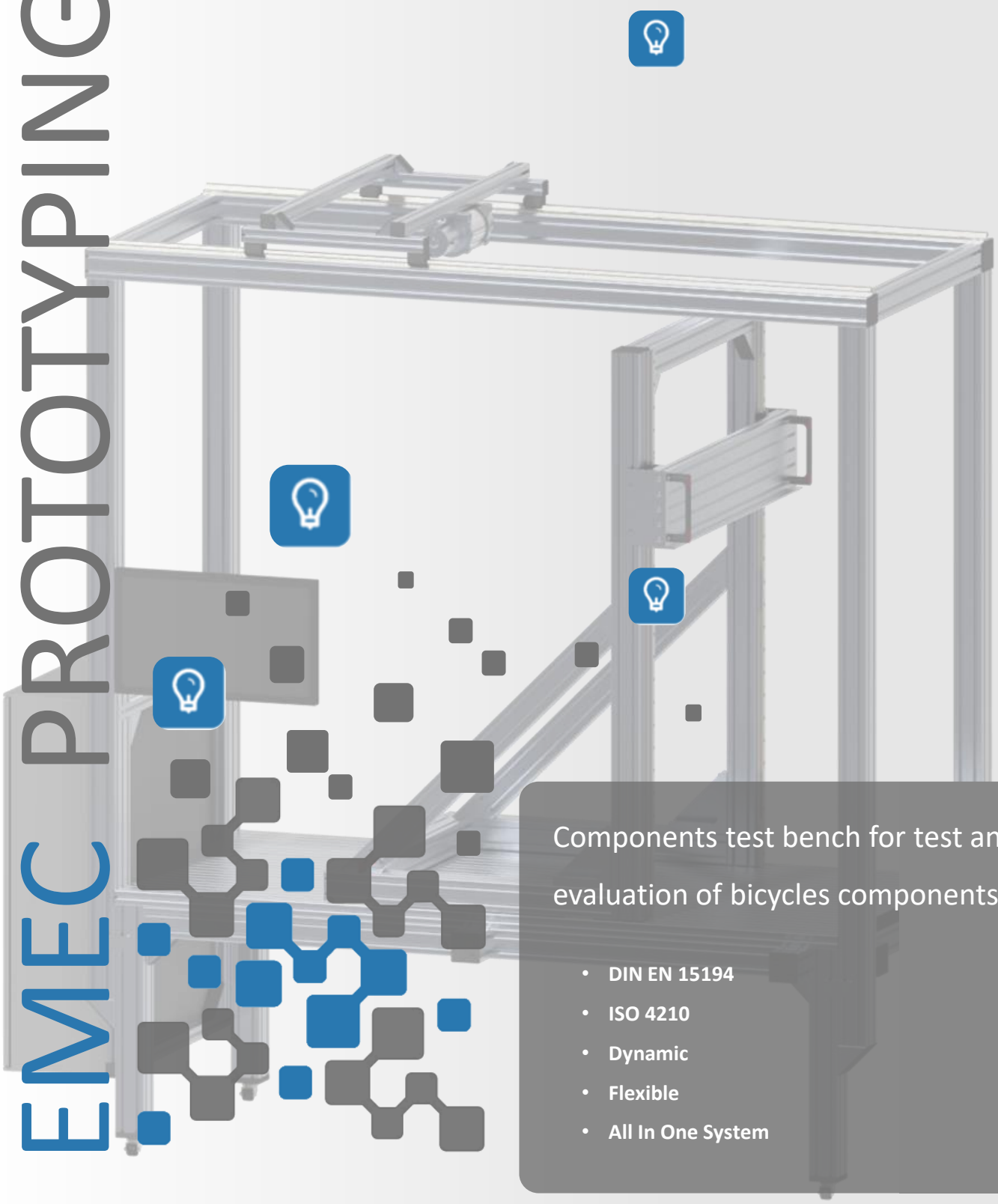
01

EMEC PROTOTYPING

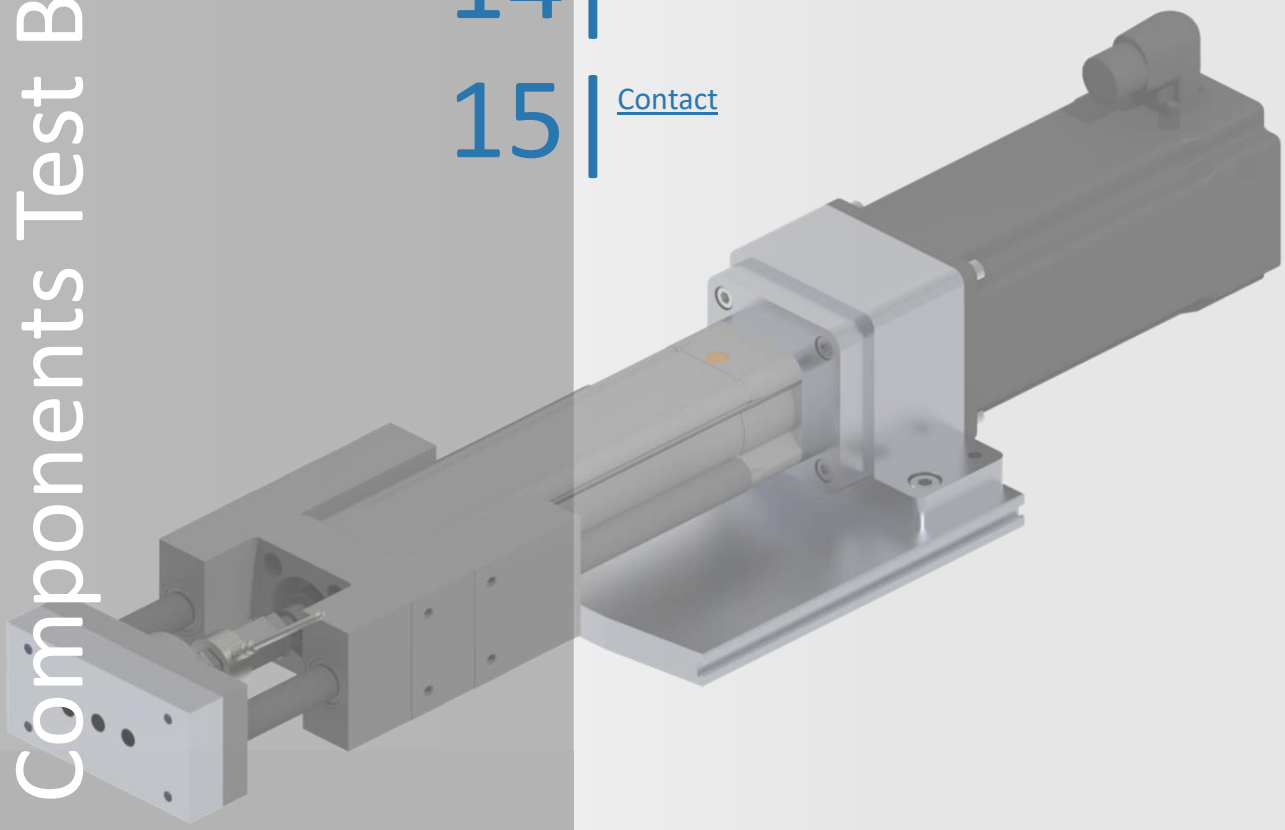


Components test bench for test and evaluation of bicycles components

- **DIN EN 15194**
- **ISO 4210**
- **Dynamic**
- **Flexible**
- **All In One System**

Content

Components Test Bench



Introduction

The design of components for bicycles and pedelecs is not only about appearance and weight, but also about safety. The tests for proving safety are described in detail in the various standards. The EMEC Prototyping component test bench combines all these tests in a single machine. Thanks to our clever design and the large number of available adapters, we achieve maximum flexibility with minimum space requirements.

Range of Application

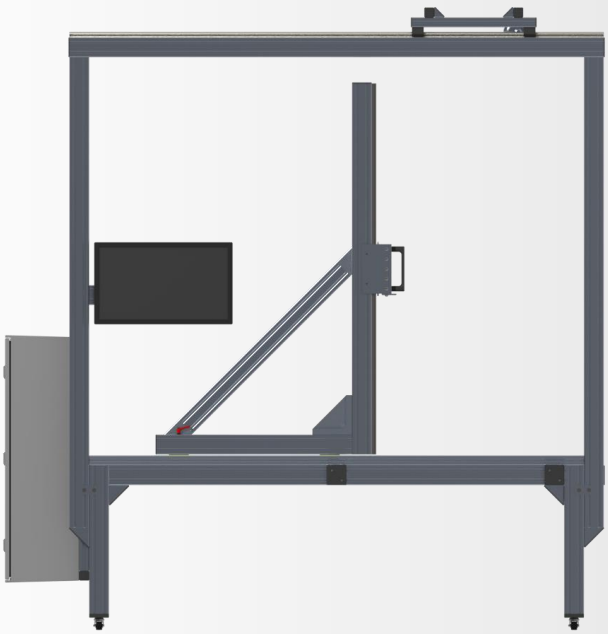
- Component testing according to the following standards:
  - DIN EN 15194
  - DIN EN ISO 4210
  - and DIN EN ISO 8098
  - DIN EN 14872
- User-defined load simulation
- Any type of tension and compression test
- Developmental long-term testing

Technical Design

Hardware

The components test bench has been designed for testing the mechanical load capacity of components of commercially available bicycles according to current standards. The tests are conforming to the standards DIN EN 15194, DIN EN ISO 4210 and DIN EN ISO 8098 as well as DIN EN 14872.
The test bench consists of several basic components: the test table with adjustable test frame, frame with a small electrical chain hoist, two servo motors with electromechanical cylinder, integrated force sensors and the various setups for the material tests. The control cabinet with integrated control computer is located separately or on the test stand.

View: front



View: side right

Dimensions of test bench (max.)	Height:	2.520 mm
	Lenght:	2.160 mm
	Width:	980 mm
Hardware being used	Frame:	item, Kamp & Kötter and much more
	Control Cabinet:	Rittal, Siemens, Block, Phoenix and much more
	Servodrives:	Beckhoff
	Control:	Beckhoff
	Measurement:	Burster

Technical Design

Test Table

Height: 600 to 800 mm
Lenght: 2.000 mm
Width: 980 mm

Components: item

Test Frame

Height: 1500 mm
Lenght: 1.000 mm
Width: 980 mm

Components: item, Kamp & Kötter, …

- Movable in X-Z direction
- Crossbar for mounting the actuators

Chain Hoist

Height: 1700 mm
Lenght: 2.160 mm
Width: 980 mm

- Frame with electrical chain hoist
- Necessery for some tests
- Movable in X-Z direction

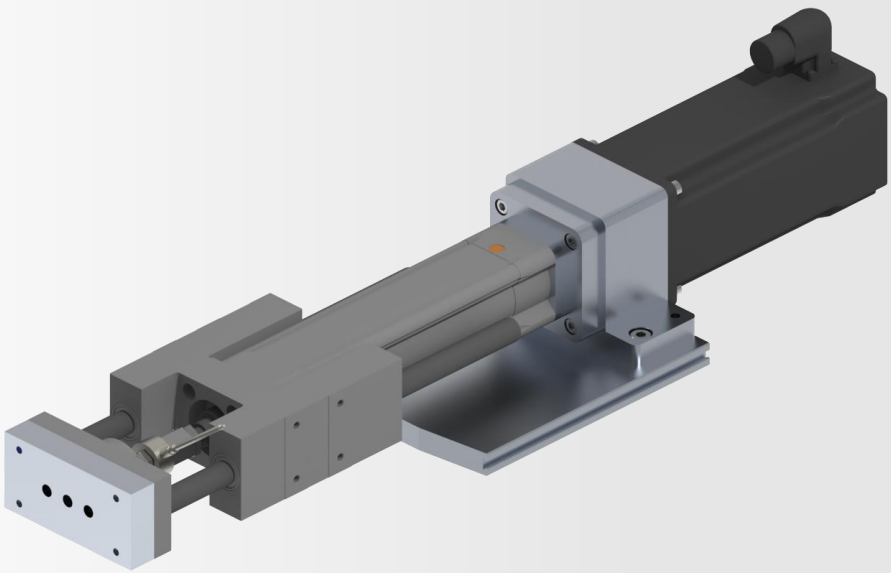
Technical Design

Force Actuator

Max. force:	3.000 Nm per Actuator
Max. speed:	0,8 mps
Rated acceleration:	15 m/s^2
Repeatability:	± 0,01 mm
Reversing clearance:	< 0.03 mm

Servodrive:	Beckhoff
Force Sensor:	Burster
Linear Actuator:	festo

The actuator has a fixture to attach the correct adapter for the tests in just a few simple steps.



Technical Design

Sensorics

Mechanical Measurements

Force Sensor	1x Torque Sensor for the brake unit - Precision of 0,1 % of max. value - Resolution of 16 bit ± 0 to 10 V
Speed Sensor	1x Speed sensor encoder per Servodrive - 2048 increments per rotation - Angle resolution of 0,175 °

View: top

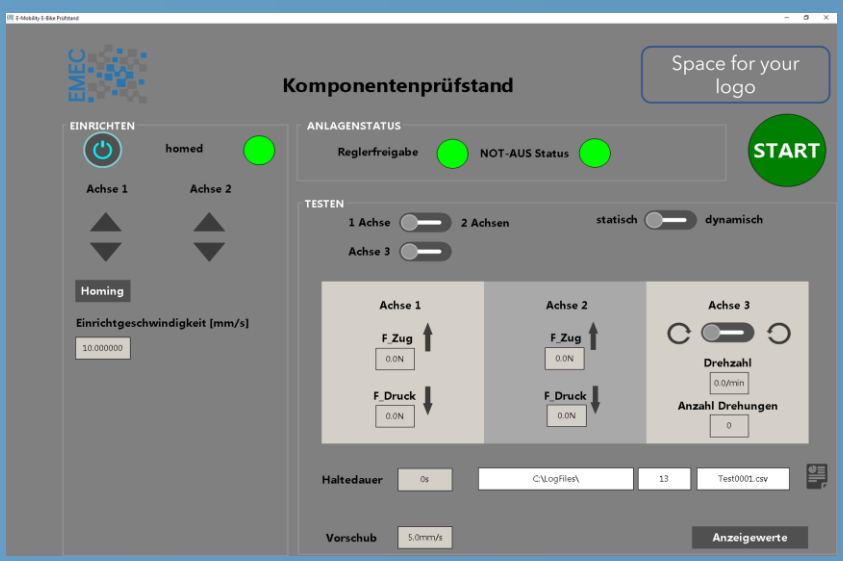
Software

Description	**Test cycles**
Requirement	User-specific adjustment possibilities of all parameters: - Force - Repitions and so on
Analyzation	- Storage of measured data in .csv-files - Display of measurement values in user interface - Free possibility to set up a test procedure

Measured Quantities

Force	[N]
Distance	[mm]
Actuator rotational speed	[rpm]
Feed rate	[mm/s]
Holding time	[s]

User Interface



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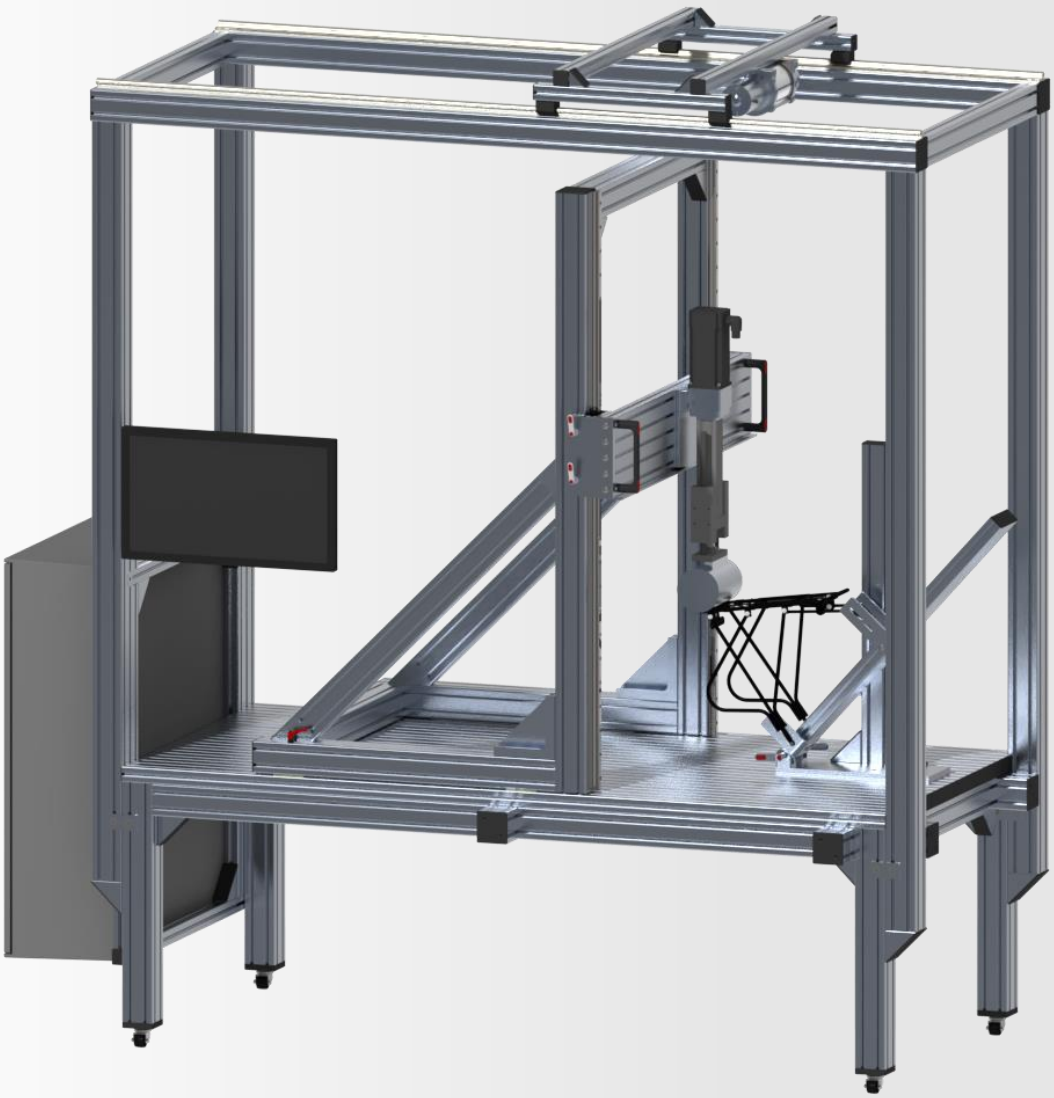
Examples of the setup

DIN EN 15194 4.3.7.5 Frame - Dynamic test with horizontal forces

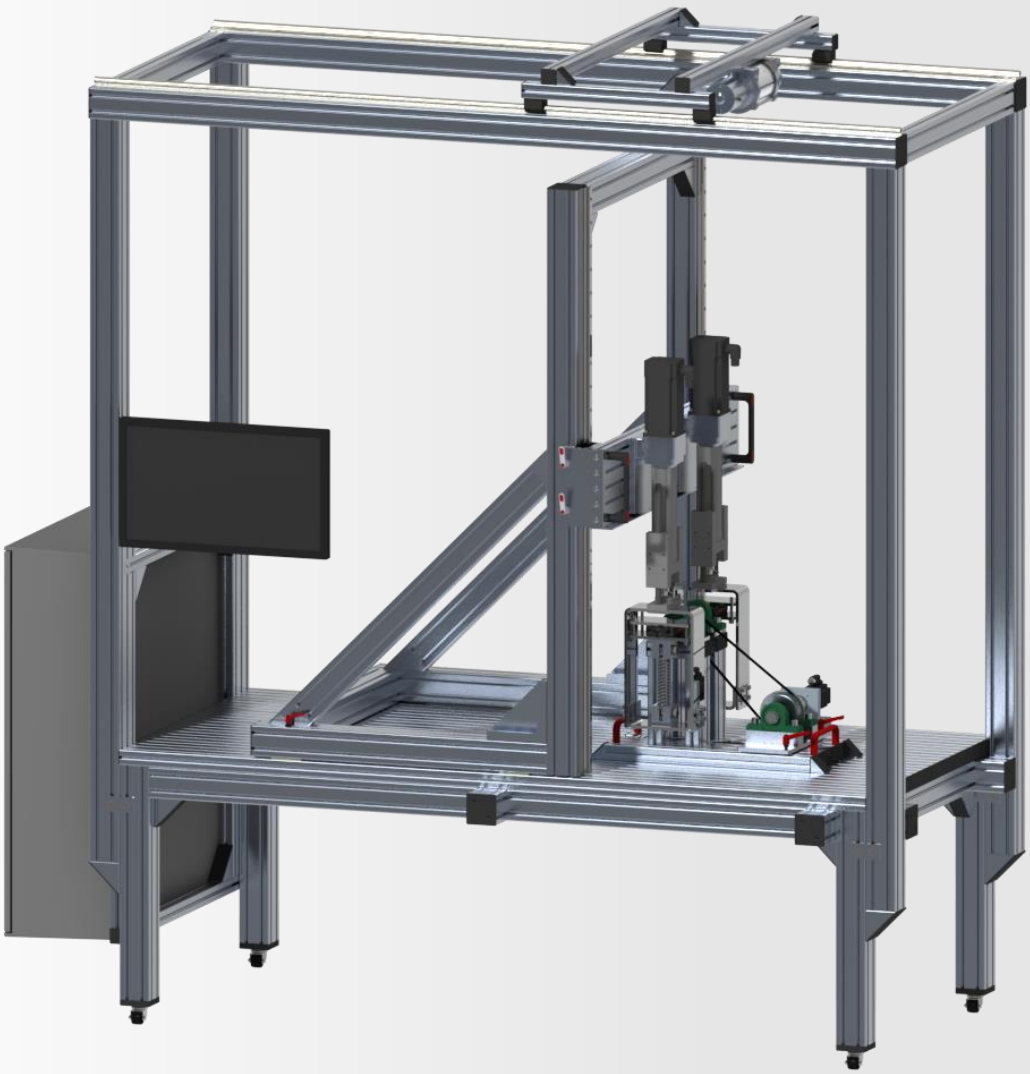
Examples of the setup

DIN EN 15194 4.3.12.5 Pedal - Dynamic load test



Examples of the setup

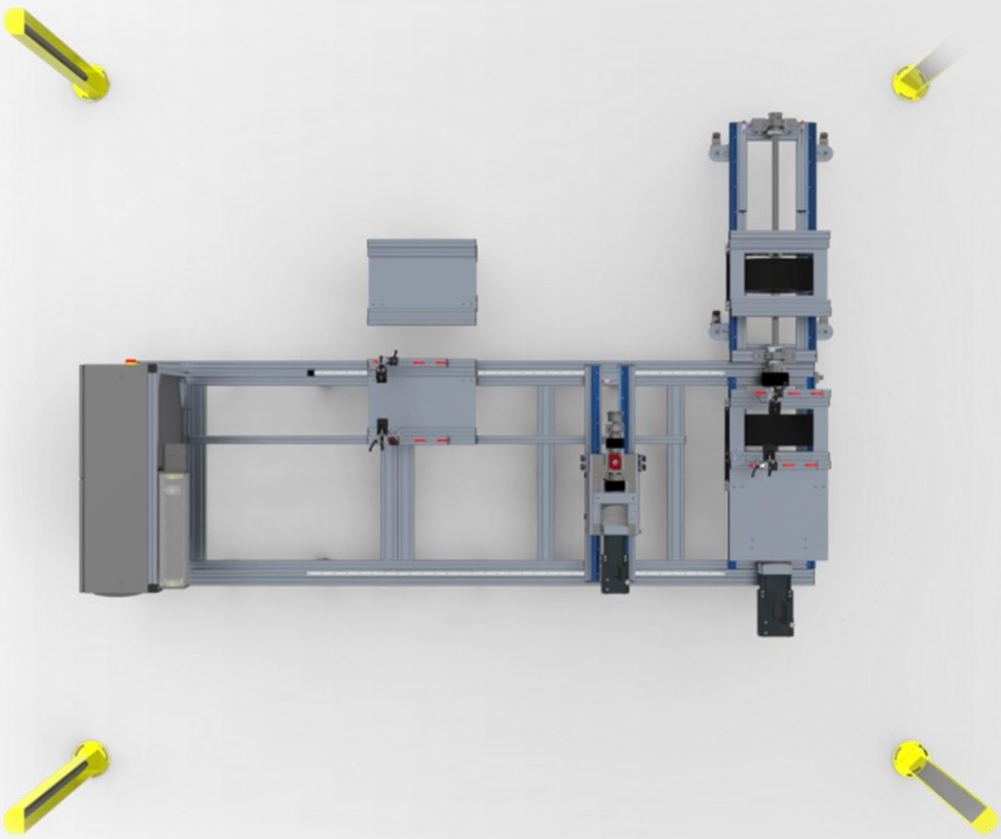
DIN EN 14872 5.7.1 Static load test - vertical load on rack



Additional Add-Ons

General Add-Ons

A.1	Safety Equipment	- Light barrier - Safety fence - Railing - Safety key switch



Additional Add-Ons, Service

Service Add-Ons

D.1	DAkkS Calibration of the Measuremet Equipment	Calibration of the measurement technology according to the “Deutsche Akkreditierstelle” DakkS. All sensor types are possible. - Force sensor
D.2	Service outside warranty	EMEC engineer is working on site
D.3	Support remote	EMEC engineer is working remote on the your test bench and help you to fix problems or makes customer-specific changes to the user interface or software.

More of EMEC Prototyping

Costumer requests

If you have any other requests or suggestions to add to our portfolio, please do not hesitate to contact us. We can respond to most of our customers' wishes and solve your problems concerning the pedelec test.

Updates

- Motor test rig for evaluation of the drive unit
- Roller dynamometer
- EoL test Battery test rig with charge/stop cycles monitoring
- CAN-Bus evaluation as HiL – test rig

Range of Services

- Test bench rental
- Test services in our test lab on our motor test rig and roller dynamometer or components test bench
- EMC-measurement of complete systems with our partner
- Drive benchmark test
- Real test drives for practical testing
- Environmental test systems
- Custom test setups

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