

## Laboratory Test Stand for Electric Hybrid Drives



### General Points/Description

The test stand is based on our tried-and-trusted system concept with active load machine. This results in the following advantages compared to a system with passive load machine (e.g. eddy current or hysteresis brake):

Genuine 4-quadrant operation, specimen drives and brakes in both directions of rotation

Rated torque from zero speed

Active speed adjustment zero torque in order to determine the idling speed (synchronous operation)

Drives for measuring electromotive force (e.g. synchronous, BLDC motors)

Concentricity at low speeds for measuring blocking, detent torque determination as an option.

Reduced mass acceleration through inherent acceleration of the load machine.

In the case of actual value feedback for torque control, the unit can be controlled to zero torque or constant torque independently of the speed or when n-controlled specimens are used.

# Manufacturing Application Note

No.: A352-016e-08.2006 / Proj.: 531459/532279

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## Mechanical Components

- Base frame
- Base frame brake side, base frame specimen side
- Sub-frame drive motor, specimen retaining bracket
- Drive and load machine
- Torque sensor Type 4510B... (0125 DF/500 N·m/50 N·m)
- Protective cover, hinged with lock monitoring
- Coupling with clamping hub
- Half-shells, thermally insulated
- Spacer bolts, thermally decoupled
- Temperature cabinet (from Vötsch)
- Blocking gear (for blocking the drive train when calibrating 500 N·m)
- Calibrating equipment, range up to 500 N·m
- Beam, mount for retaining bracket
- Coupling with clamping bushing
- Vibration reducer

## General Points

### Laboratory test stand with computer-supported measurement logging for electric motors (hybrid)

The test stand acquires mechanical and electrical variables, allowing the characteristics of the specimens to be established with speed-regulated and torque-regulated power-controlled load machine including recording of a characteristic curve. Complete measuring modules control the load procedure for recording of characteristic curve and manual test.

### Specimen types

- PSM (permanently energized synchronous machines)
- ASM (asynchronous machines)
- SRM (switched reluctance machines)

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## Technical Data

### Drive and load machine (brake capacity, torque and speed)

Motor water-cooled with coolant supply temperature of 25 °C, 15 litres/minute.  
With 2nd shaft end for torque calibration using blocking gear.

Rated voltage: 500 V  
Rated power: 115 kW  
Rated speed: 2 545 min<sup>-1</sup>  
Rated torque 400 N·m

### Overload:

Torque: 500 N·m

### Field suppression:

Power: 70 kW  
Max. speed: 10 000 min<sup>-1</sup>

## Torque Sensor

### Introduction:

The special design of the **Torque Measuring Flange Type 4510B...** (model 0125/0225 DF) makes it excellently suitable for test stand technology.

It can be used for test stands for combustion engines, gears, roller and wheel loads, to mention just a few examples.

### General points:

The rotor of the torque measuring flange is fixed directly to the shaft using a clamping set. The stator ring is then pushed over the rotor and held in place by a stand.

The connecting element is screwed to the measuring side of the rotor without an intermediate flange being necessary. The measuring flange is fitted.

### Torque Measuring Flange Type 4510B... (model 0225 DF):

Type 4510B..., 500/50 N·m  
Rated torque: 500 N·m  
Range switchover through serial interface  
Measuring range 2: 50 N·m  
Speed range: 10 000 min<sup>-1</sup>

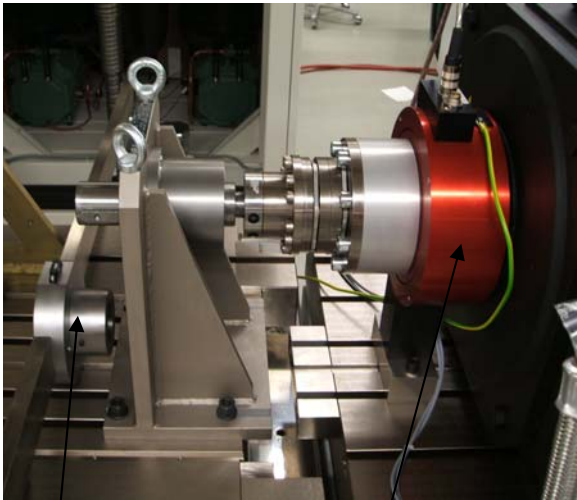
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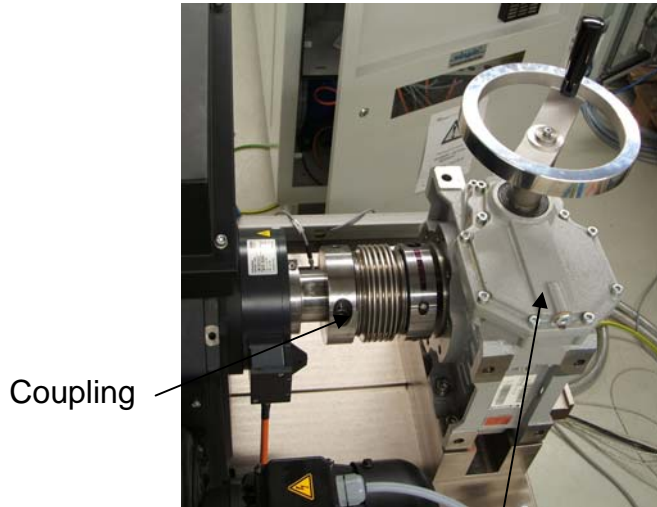
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## Further Photos



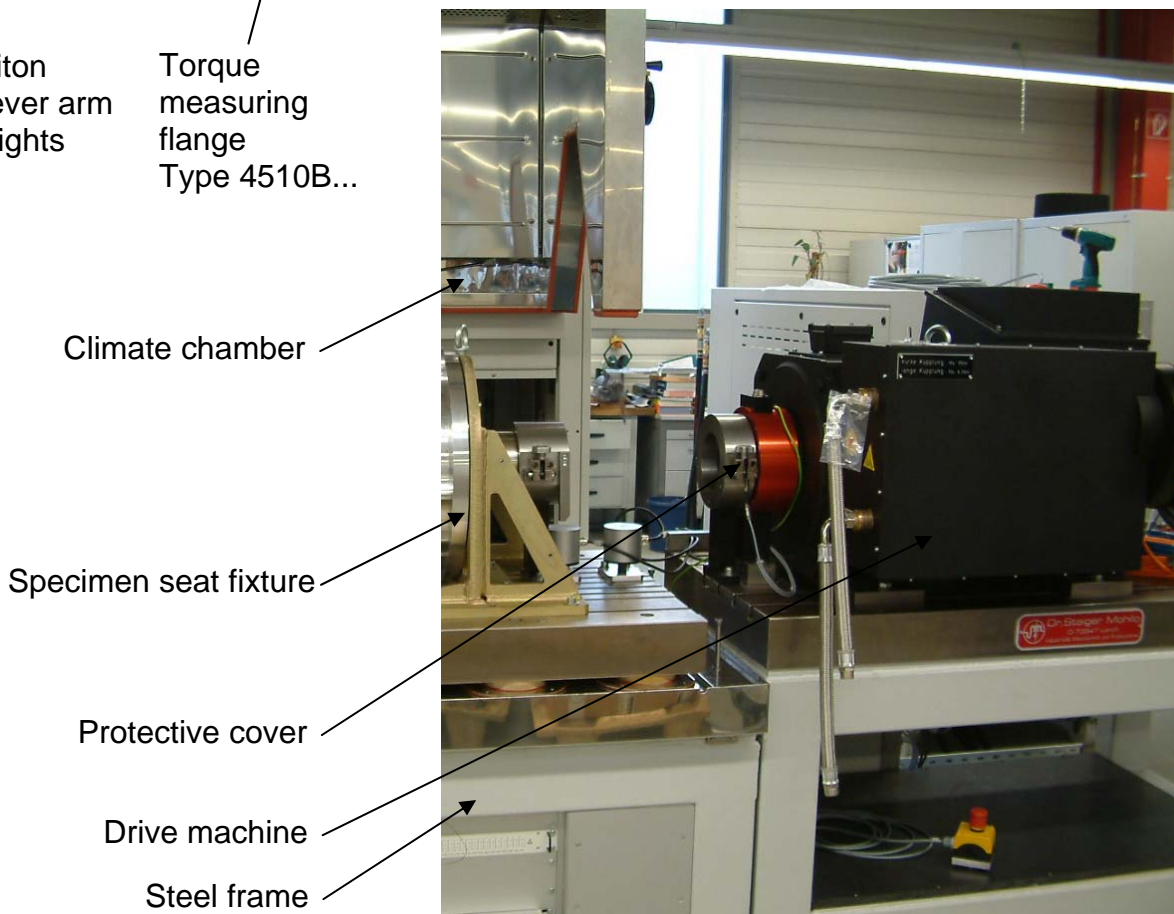
Calibraton  
using lever arm  
and weights

Torque  
measuring  
flange  
Type 4510B...



Coupling

Blocking device



Climate chamber

Specimen seat fixture

Protective cover

Drive machine

Steel frame

**Customer Name:** not disclosed

**Sales Engineer:** not disclosed

**Number:** A352-016e-08.2006\_Kom\_531459\_532279

**Integrator:** KSM

**Customer Location:** not disclosed

**Country or Region:** not disclosed

**Kistler Application Code:** 352

**Date of Application:** 2006