

REAR AXLE HYPOID GEAR TEST RIG

Technical description

1) Mechanical set-up

This 'back-to-back' test rig utilizes the power loop principle, also known as four-square configuration. The rig consists of two Hypoid gear boxes (Test- and transmission hypoid gear box) connected by two shafts with a spurgear box which closes the power loop.

The hypoid test gear box and the hypoid transmission gear box are designed as one removable gearbox which can be changed easily and very quick.

One shaft has a hydraulic load clutch for the application of the torque. The hydraulic load clutch including hydraulic system is connected to the control unit of the test rig, so that the load can be changed automatically by the computer of the control system.

The test rig is powered by an electric motor with variable speed control.

The test rig is a programmable load-spectra test rig for endurance tests.

The hypoid test gear box can be operated with dip or with spray lubrication.

The lubrication of the two test gearboxes is carried out by a spray lubrication system, which serves both test gear boxes with the lubricant oil.

Speed, inlet lubricant temperature for both gearboxes and the torque can be programmed, so that the test rig can be used to run load-spectra. It is also possible to run with fixed parameters.

The Oil conditioning consists off controlled heating at spray mode and cooling in the range from 20 °C ... 140 °C and oil-filtration. The oil flow is variable in the range from 0 ... 10 Litres/min. The colling and filtration of the oil for the spur-transmission gearbox is carried out by a separate lubrication unit.

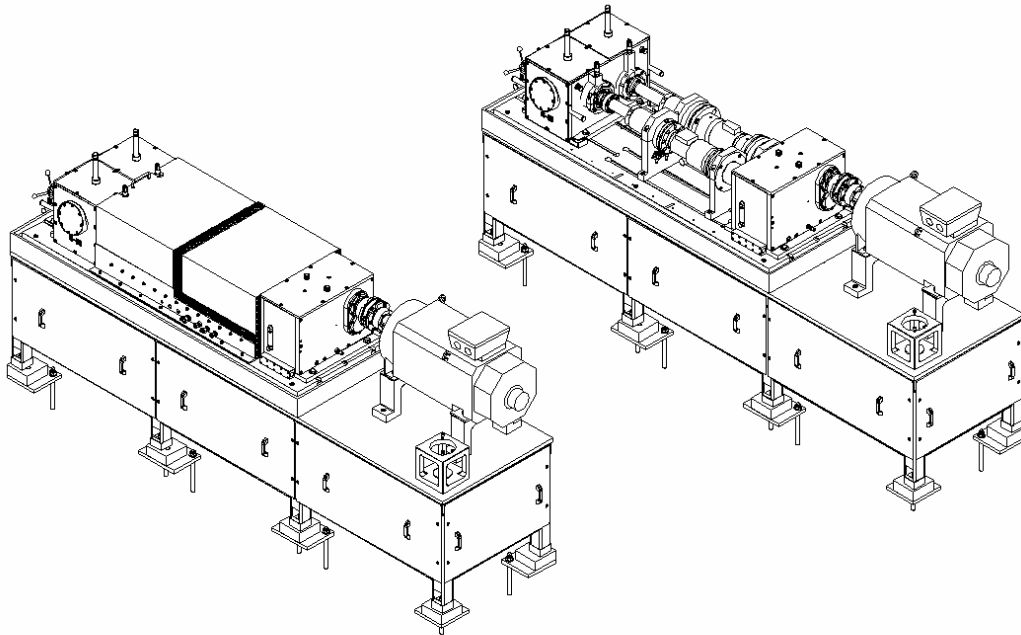
The data acquisition is carried out by an industrial PC and the corresponding HBM-Modules. The following parameters are recorded and can be archived:

- Speed
- Torque
- Oil sump temperature in the hypoid test gear box (Dip Lubrication)
- Spray inlet temperature at the hypoid test gear box (Spray Lubrication)

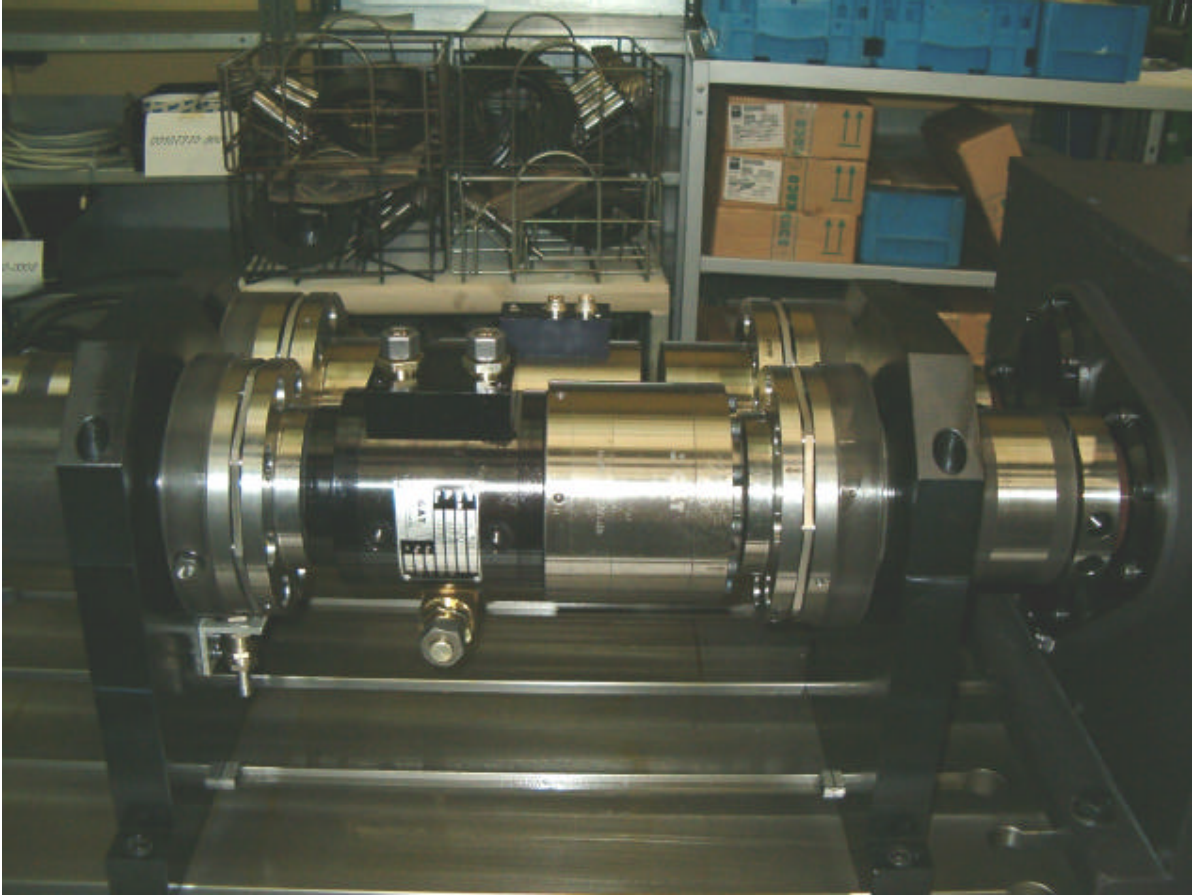
The visualisation of the data is carried out using the Strama-MPS visualisation software.

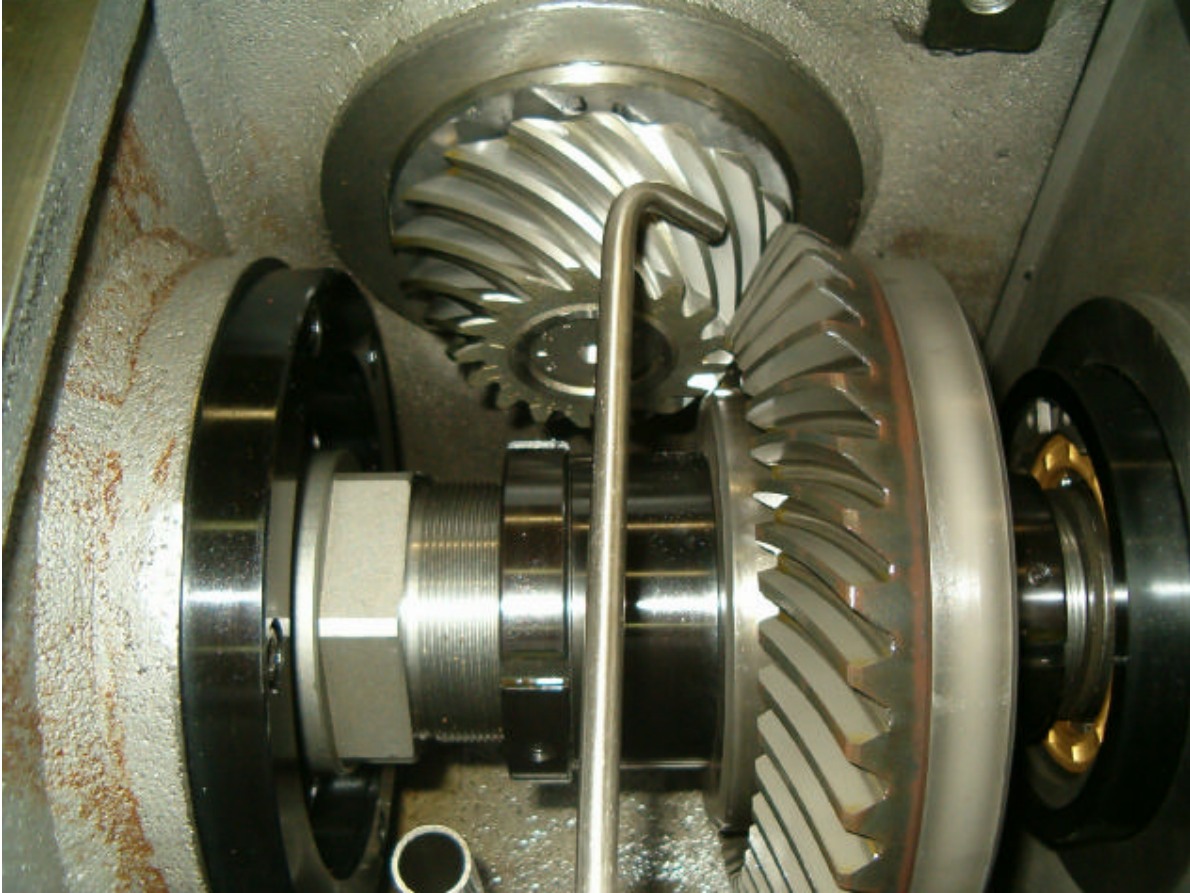
Included is also the noise reduction cell as shown under point 2)

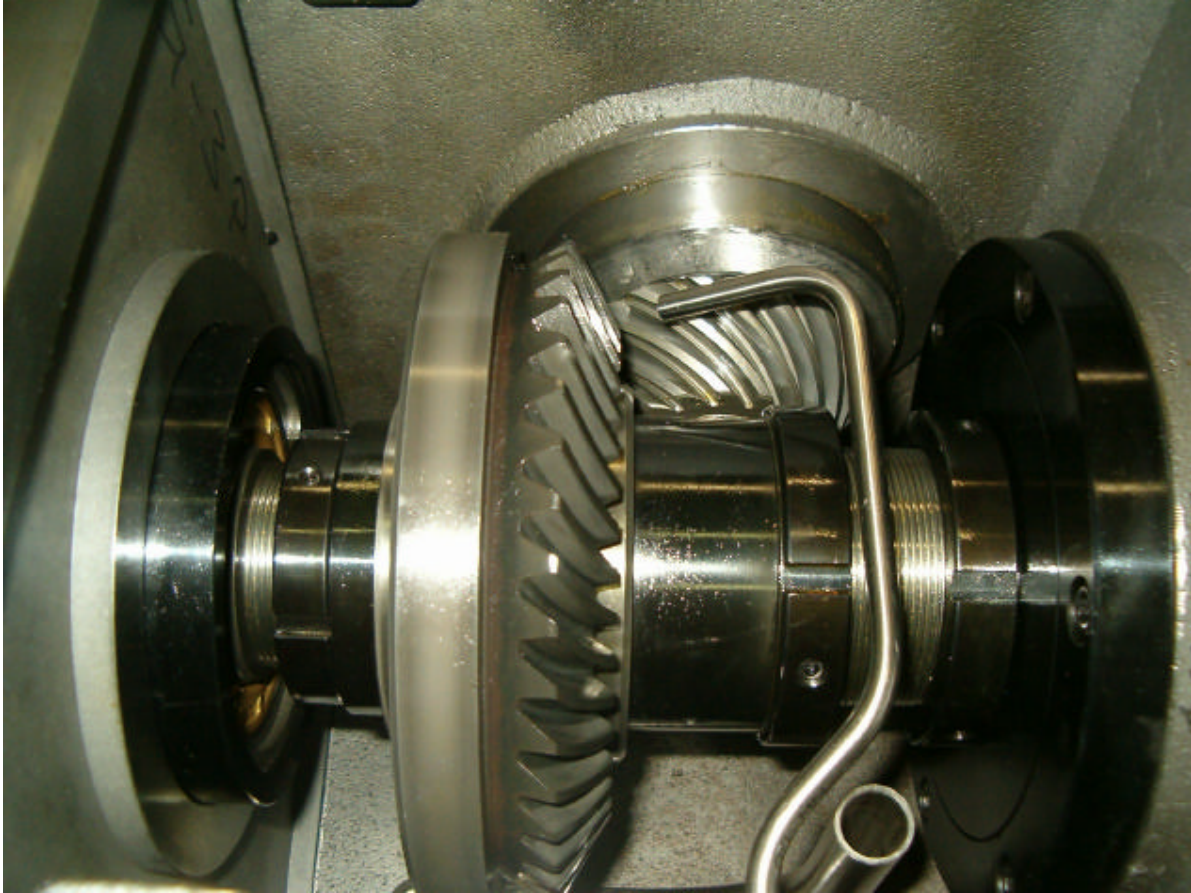
2) Layout of the system

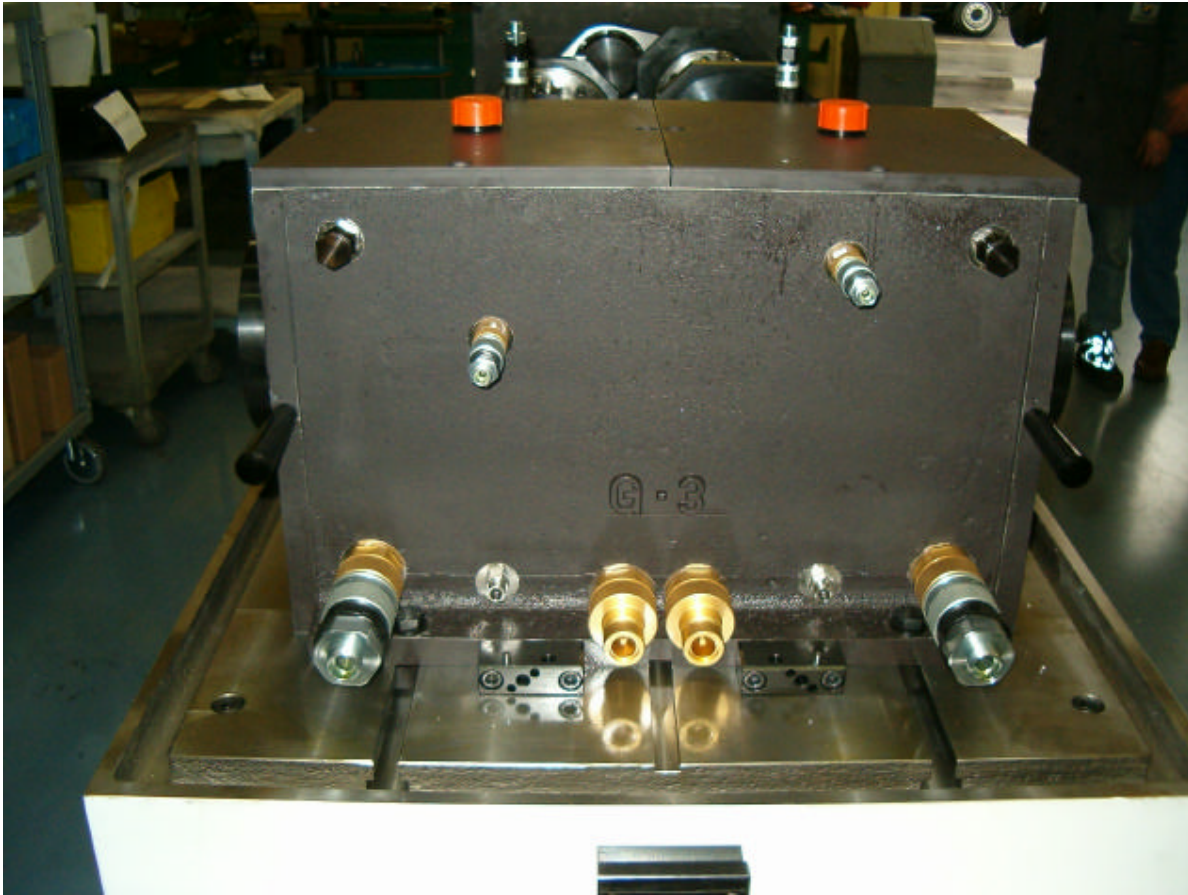












3) Technical data

Basic Test Rig Data

- Torque: ± 2000 Nm
- Speed: max. 6000 rpm
- Power: ca. 400 kW at 2000 rpm and 2000 Nm
- Drive Motor: 51 kW

Hypoid Test Gear Box

- Reference circle \emptyset : > 260 mm
- Axis angle: 90° fixed
- Changing of the axle offset: Hypoid Test- and Transmission Gearbox designed as changig-parts
- Gearing adjustment: Different adjustment pots and slotted nuts
- Bearings: Serial bearings supplied by customer

Hypoid Transmission Gear Box

- Reference circle \emptyset : > 240 mm / 260 mm
- Axis angle / offset: 90° fixed / 30 mm
- Gearing adjustment: Different adjustment pots and slotted nuts
- Bearings: Serial bearings supplied by customer

Spur Gear Transmission Gear Box

- Helical gears with a gear ratio 1:1,5
- Spray lubrication using a sepearte lubrication unit

Shafts, Couplings, Torque application

- Couplings: Standard couplings
- Torque application: Hydraulic load clutch type GAT VMC 1000-100 including separate hydraulic unit
- Shaft safety guard: Moveable safety grid including safety locking system

Torque Measurement

- Torque measureing flange Type: 0325 DF 2000 Dr. Staiger-Mohilo

4) Control Unit

The control unit runs the test rig automatically. The programming of the load-spectra is carried out with the included software.

The data logging and visualization is also carried out by the control unit. The data logging and visualization is custom made by Strama-MPS and can be customized as per customers request. All functions of the test rig, the hydraulic load clutch and the spray lubrication units are controlled by this control unit using a Siemens S7 PLC system.

The visualisazion is in English language.

5) Safety equipment

The safety equipment of the test rig such as Emergency switches, protective grids and locking system corresponds to the European Safety Regulations (CE-Conformity).

The system includes also a vibration switch, which shuts off the test rig in the case of pitting or tooth breakage. This vibration switch can be adjusted manually by the customer and protects the rig of damages.

6) Installation, Commissioning and Acceptance Checking

6.1) Pre-Verification and Training at Strama-MPS

The entire system will be assembled, installed and commissioned at Strama-MPS to carry out pre-verification together with the customer.

6.2) Opening Boxes and Installation, Commissioning and Training at customers site

After the equipment arrives at the customer's site the boxes are opened together with our commissioning engineers. After commissioning and training at the customers site the final verification and acceptance certificate will be signed by both parties.

7) Documentation

- Configuration chart (layout)
- Connecting chart
- Item List of the machine
- Electrical wiring diagrams
- Documentation of all supplier parts
- Test protocols
- Declaration of CE-Conformity

8) Warranty

The following warranty applies for the equipment made by Strama-MPS:

- The warranty period is 12 months
- For purchased parts the warranty regulations of the respective manufacturer are binding and he is responsible for the warranty respectively.
- Except from warranty are:
 - Wear parts
 - Damages caused by improper operation
 - Damages due to Force Majeure (Acts of God, disasters etc.)
- Warranty by Strama-MPS is only granted if proper maintenance and cleaning by qualified specialists is provided for the machine.
- The contractor is not liable for loss of production or profit.

9) Quality management system

Strama-MPS is certified according to the following standards:

- DIN EN ISO 9001:2000
- DIN EN ISO 14001:2000
- VDA 6.4 (High Level Standard of the German Automotive Manufacturer)

10) Terms of delivery

Delivery time: 9 .. 12 month

Delivery: Ex works

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