

# ZWARP

BIAXIAL WHEEL TEST MACHINE



**MAKRA**  
ALPINE METAL TECH

en

# ZWARP

## BIAXIAL WHEEL TEST MACHINE

**The biaxial wheel test machine called ZWARP, is used for fatigue tests or life tests of disc wheels. The wheel is running inside a drum and is applied to with radial- and lateral forces as well as tilt angle force.**

At the biaxial test the wheels are rolled on a standardized axis arrangement on an inner drum. The forces (radial, tangential and lateral) actually occurring can be simulated by the corresponding axis arrangement and thrust rings on the test system. The respective load spectra are set by the automotive industry and of relevant test specifications

(such as AK-LH-08) and scaled to the respective application. The measurement and evaluation of the test results is done according to the patented method of Schwendemann.

## Your advantages

### ▶ CERTIFIED TEST EQUIPMENT SUPPLIER

The test machine from MAKRA are accepted and certified by all german car manufacturer (BMW, AUDI, Daimler, Volkswagen, Porsche, ...)

### ▶ SAFETY DEVICES FOR THE TYRE / WHEEL

Monitoring of travelled distance, inner rim flange monitoring (laser sensor), measurement and monitoring of tyre compression, limit value monitoring (force, angle, pressure, and temperatures), tyre pressure monitoring (optional), tyre temperature monitoring (optional)

### ▶ CALIBRATION

Calibration device allows an independent calibrating in short time

### ▶ WHEEL DAMAGE CONTROL

In case of a wheel damage during the test, the machine will stop immediately

### ▶ OPERATION

Intuitive software with real time display

### ▶ TELEMETRY

For wireless data transfer of the wheel data

### ▶ USER-FRIENDLY WHEEL CHANGE POSITION

Due to the compact design of the test bench and the arrangement of the axis a very easily accessible wheel change result

### ▶ ELECTROMECHANIC DRIVES

The use of electromechanical drives results in cost advantages through lower energy consumption compared to hydraulic systems. Additionally there is no leakage in long term perspective.



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### PROTECTIVE COVER

Tunnel-shaped protective cover over the drum and the test unit for protection against parts and tire rubber abrasion in the test room

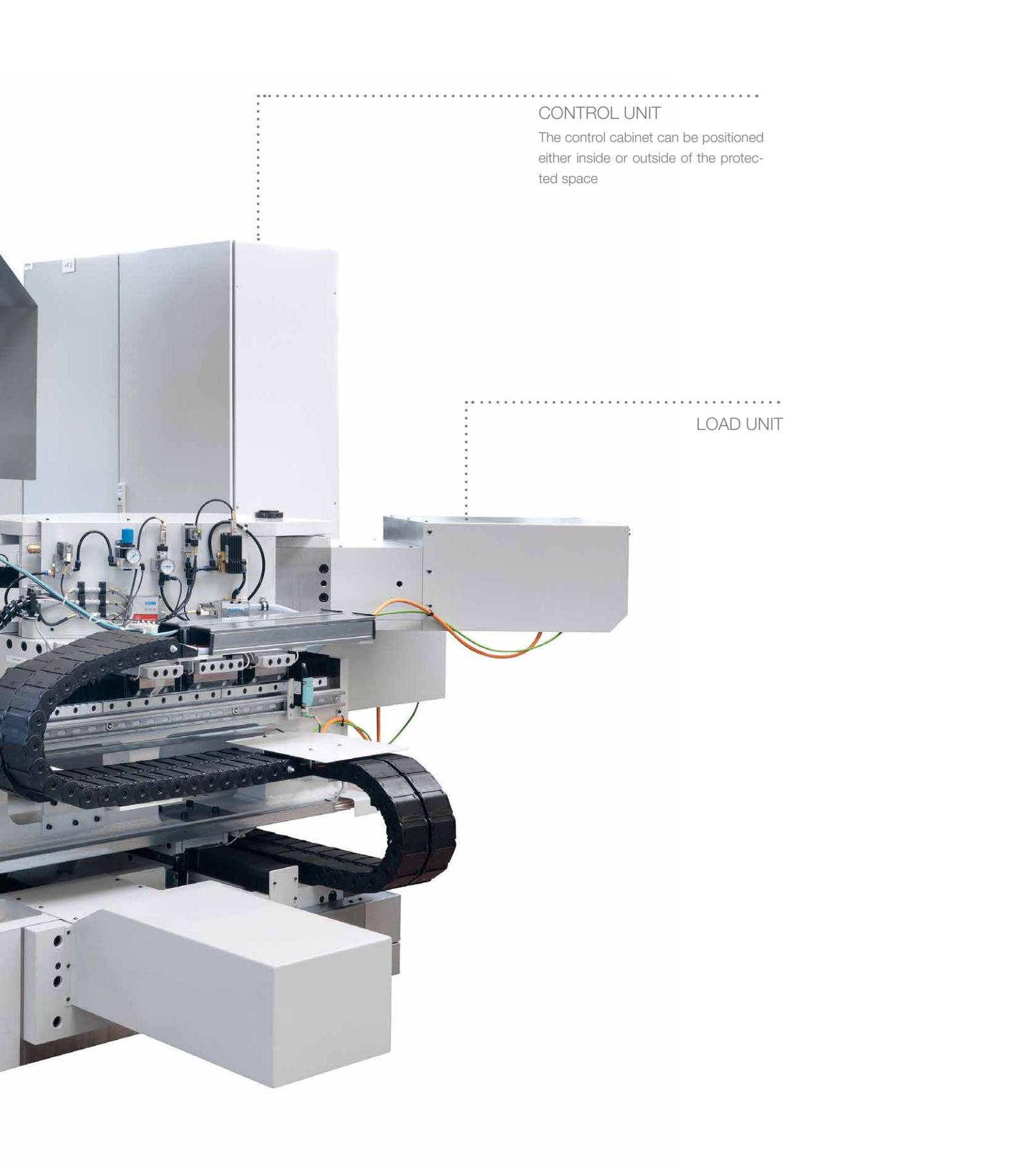


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### DRUM WITH TRUST RINGS

The test bench is equipped with 2 drums  
D = 1000 mm / D = 820 mm . Other drum  
diameters (on request) are possible

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### CONTROL UNIT

The control cabinet can be positioned either inside or outside of the protected space

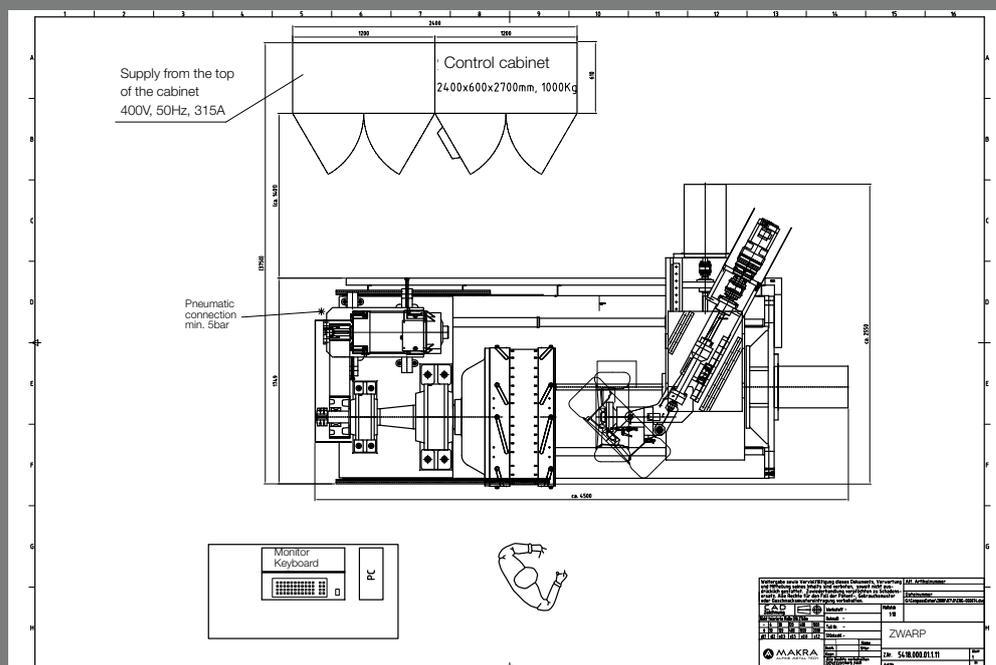
### LOAD UNIT

ZWARP

# ZWARP

## TECHNICAL DATA

Main drive	89 kW
Force axial/horizontal	50 kN
Force tilt angle	100 kN
Max. tilt angle	± 25°
Drum diameter	to 1250 mm
Drum width	500 mm
Max. tyre width	400 mm
Wheel size	13-24" (other sizes on request)
Speed	till 180 km/h
Control	Software Diadem
Test specification	§30 StvO, SAEJ2562, AK-LH08
Machine type	ZWARP, Type B und C
Control method	according Schwendemann
Size	4500 x 2550





### CALIBRATION DEVICE

Mobile precision load cell unit with auxiliary device for fixing on the wheel shaft. The forces in the x and y direction are directly measured by the load cell unit which is pushed radially or axially to the drum. The angular force is calculated using the method of Schwendemann.



### TYPRE PRESSURE MONITORING

Wheel pressure monitor with free adjustable limit for safe stop and message via the visualization interface. The possibility of a pressure relief before release access door is provided



### DRUM

The adjustment of the thrust rings is realized with fixed, removable spacer bolts. Other adjustment or special customer requirements on request (option)



### INNER FLANGE MONITORING

These and other protective devices ensure the safety of your specialised personnel



### TEMPERATURE MEASUREMENT

Monitoring the tire temperature using an infrared - sensor. Limit value monitoring with a variably adjustable limit value for switching off the station and feedback on the software



### ADJUSTMENT DEVICE FOR THE THRUST RINGS

Outer adjustment rings at the drum body with a clamping screw, by means of which the thrust rings are displaced by a lever. On the outside of the drum a scale for the centering is applied



### TELEMETRY

8-canal telemetry with long distance sender. 300 Hz each canal, 8 selective programmable canals for DMS measurements, integrated akku supply



### MAIN DRIVE

The drum will be driven with AC-motor, which is built horizontal on test machine. A belt drive with V-belt will be used. A device for re-stressing of belt is supposed. The test speed will be regulated with frequency converter and close loop control



### PRE-DAMAGE DEVICE

Integrated pre-damage device with electrical protection and control extension for pre-damage according specification

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