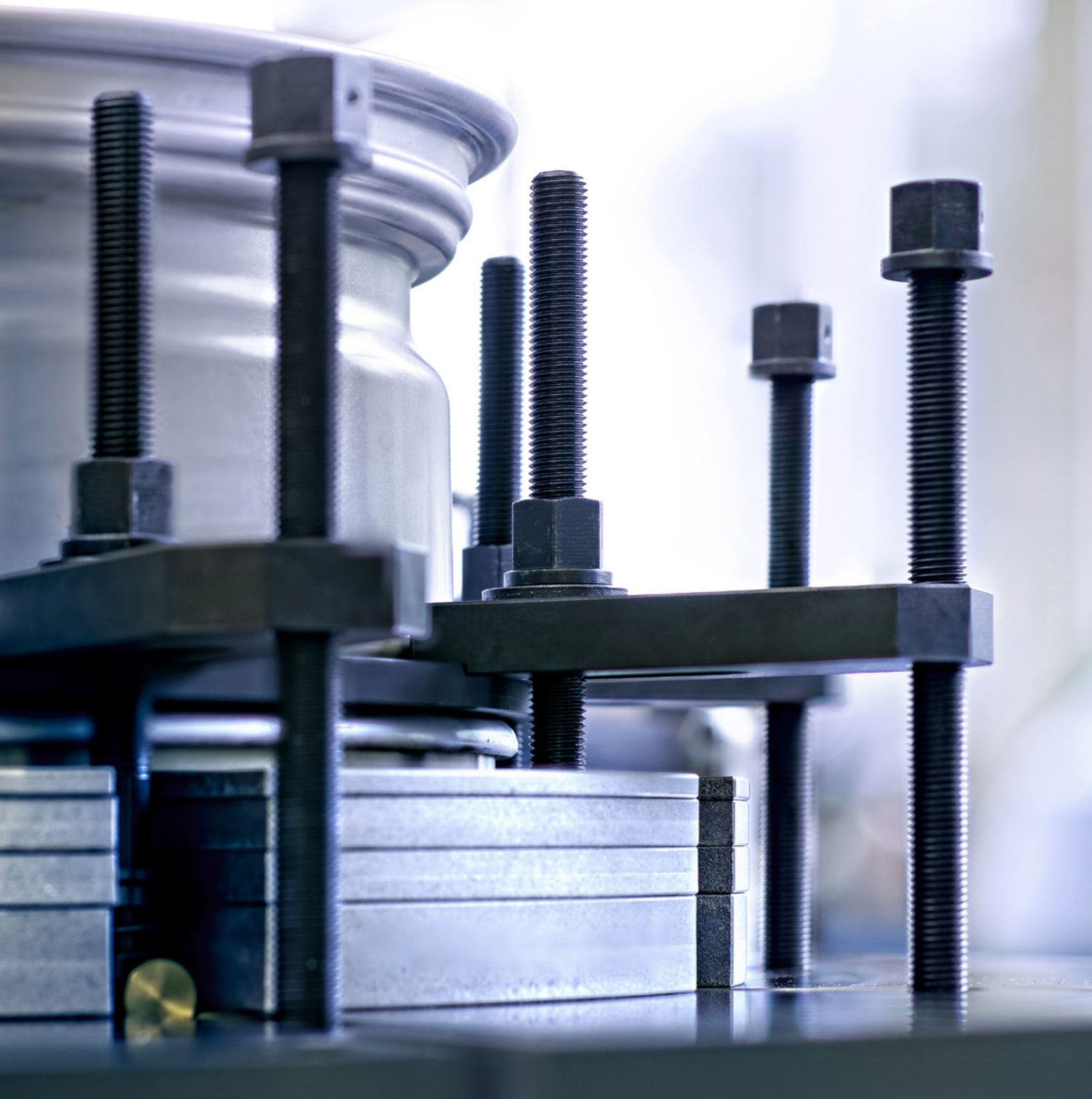


# BUP

Cornering fatigue test



The cornering fatigue test serves for the continuous quality control of vehicle wheels.



# BUP

## Cornering fatigue test

**The cornering fatigue test is a core part of the technical release process for alloy wheel prototypes. It is also used for the regular checking of vehicle wheels.**

The test parameters are determined by the applicable legal regulations as well as by the required wheel loads of the wheel to be tested. Alpine Metal Tech's

BUP can also cover tests and special requirements from automotive manufacturers, wheel manufacturers, and testing organizations (e.g., TÜV). The test serves as a continuous measurement of material quality and the mechanical CNC machining process. As vehicle wheels are safety-related components of automobiles, they must undergo a continuous inspection process throughout their entire production lifetime.

## YOUR ADVANTAGES

### » Certified test machine manufacturer

The MAKRA cornering fatigue test machines are accepted and certified directly at Alpine Metal Tech by the renowned German automobile manufacturers (BMW, Audi, Daimler, Volkswagen, Porsche etc.).

### » Testing software

The integrated test programs include special shutdown conditions in accordance with manufacturers' specifications, as well as the option for calibration according to DAkkS guidelines. They incorporate the shutdown criteria prescribed by TÜV and legislators for aluminum, magnesium, and steel wheels.

### » State-of-the-art software architecture

The software is compatible with Windows 11 and can connect to databases (optional).

### » High flexibility

Nominal diameters from 10" to 38"; rim width from 3" to 26"; larger rim widths possible with special flanges.

### » HMI

Intuitive software with a user interface that can be set to the local language.

### » MAKRA quick-clamping system

The quick-clamping system enables time-saving and easy wheel changes.

### » Exhaust system

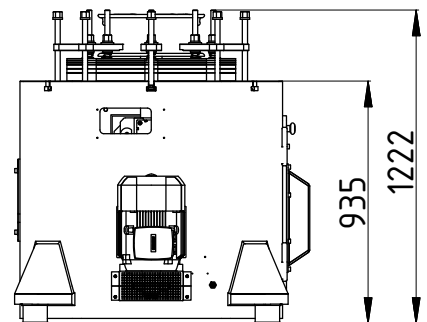
An exhaust system for testing carbon wheels is available as an option.

# BUP760

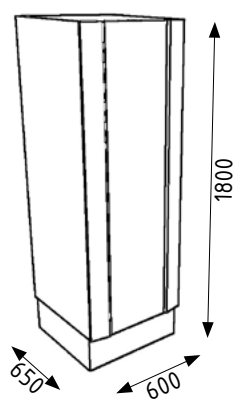
Cornering fatigue test for passenger cars



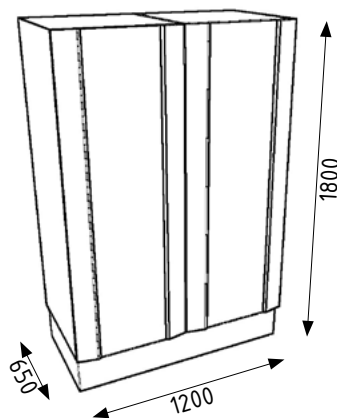
Alpine Metal Tech's cornering fatigue test machines apply force using a centrifugal weight. Various machine types are available to accommodate a wide range of wheel loads. The control processor evaluates the test results. Test data required for documentation can be transmitted via networks or printed out. The machines are designed with an ergonomic working height and durable construction. Digital drive technology ensures low noise emission.



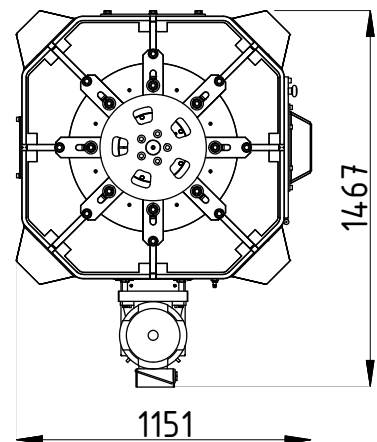
## Control cabinet variants



Slim line



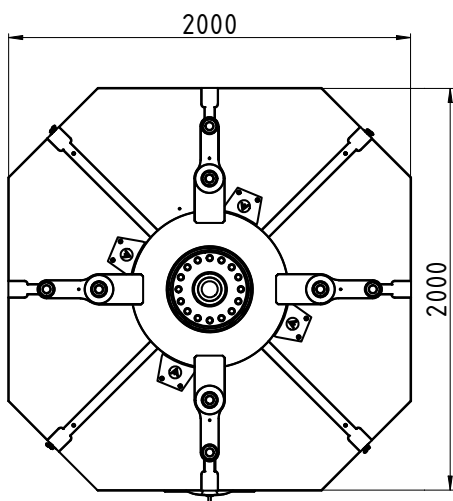
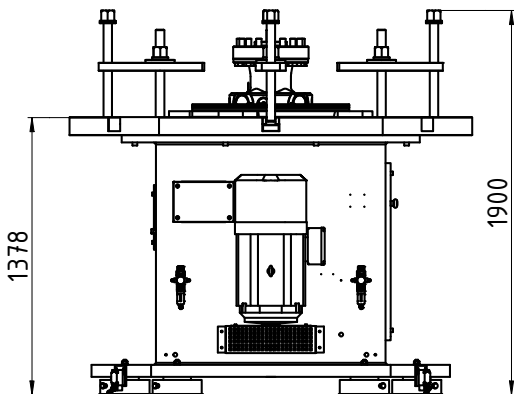
Standard line



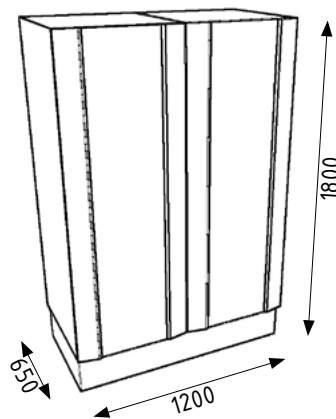
# BUP1000

## Corner fatigue test for trucks

The MAKRA BUP1000 is designed for stationary fatigue testing of truck wheels with a rotating centrifugal weight. The BUP1000 model is designed for maximum ease of use. The size and shape of the clamping table allow for the testing of wheels with a nominal diameter of 14" to 50" and a nominal width of 5" to 26". The bending moment can be steplessly adjusted within the range of 1.5 to 80 kNm.



## Control cabinet variant

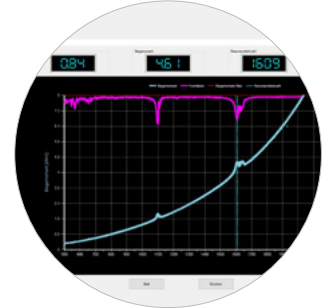


Standard line

# FEATURES

## Resonance curve

The self-resonance of the mounted wheel can be automatically determined using the built-in *Resonance Test* software function. During this process, the resonance behaviour is recorded and analysed across the entire speed range. Based on this data, the appropriate test speed for this component can be derived either automatically (in accordance with OEM specifications) or manually.



## Quick clamping system

The quick-clamping system allows for testing the outer diameter of passenger car wheels ranging from 10 to 28 inches. Because of the way it is mounted, the bending rod is always at the same height as the machine table. This prevents shifts in the center of gravity and changes in the resonance behavior of the test setup.



## Centrifugal force

The bending moment is generated by mounting centrifugal weights at various radii from the center of rotation. A software function within the user program selects and calculates the centrifugal weight and its position based on the desired rotational speed.



## Test log

Completed tests are recorded using a configurable logging system. Logging intervals can be adjusted according to customer requirements. The documentation includes information such as the number of load cycles, rotational speed, bending moment, deflection, and any shutdowns that occurred for various reasons (e.g., wheel failure).

Date	Time	LC	#
			2,8L
			4,20
10.12.2025	17:29:58	Test start	
10.12.2025	17:30:14	0	
Calculated limit values:			
Oscillation amplitude upper limit: 2.24 mm (10.0%)			
Bending moment lower limit: 3.88 kNm (5.0%)			
Bending moment upper limit: 4.20 kNm (5.0%)			
RPM lower limit: 1459 min <sup>-1</sup> (10.0%)			
RPM upper limit: 1783 min <sup>-1</sup> (10.0%)			
10.12.2025	17:36:24	10 000	3.997
10.12.2025	17:41:24	20 000	3.997
10.12.2025	17:46:44	30 000	
10.12.2025	17:56:54	40 000	
12.2025	18:01:04	50 000	
2025	18:07:14	60 000	
	18:13:23	70 000	
	18:19:33	80 000	
	18:25:43		

## Tightening torque

The ergonomic working height makes it easy to tighten the wheel bolts with the torque wrench. An optional data connection to BUP software is also available.



## Calibration unit

The machine is calibrated using an optional electronic force measurement device. Fully automatic data transfer from the measuring device to the machine software effectively prevents user errors. There are two methods for machine calibration: the standard method and the DAkkS procedure, which is compliant with DKD-R 3-3.



## Data integration visualization systems

BUK software has an integrated database system that can be used to display the current machine status via a control system, if desired. This allows all current statuses to be displayed collectively on large monitors or visualization screens.



# TECHNICAL DATA

	<b>BUK760 7,5 kNm</b>	<b>BUK760 12 kNm</b>	<b>BUK760 16 kNm</b>	<b>BUK1000 35 kNm</b>	<b>BUK1000 50 kNm</b>	<b>BUK1000 80 kNm</b>
Test bending moment	0.5 – 7.5 kNm	0.5 – 12 kNm	0.5 – 16 kNm	1.5 – 35 kNm	3 – 50 kNm	3 – 80 kNm
Max. bending moment incl. 10% threshold limit	0.5 – 8.25 kNm	0.5 – 13.2 kNm	0.5 – 17.6 kNm	1.5 – 38.5 kNm	3 – 88 kNm	3 – 88 kNm
Length of bending bar incl. wheel supporting flange	760 mm	760 mm	760 mm	1000 mm	1000 mm	1000 mm
Wheel nominal Ø	10" – 28"	10" – 28"	10" – 28"	14" – 38" (max. 50" with special clamping lever)	16" – 38" (max. 50" with special clamping lever)	16" – 38" (max. 50" with special clamping lever)
Rim width	3" – 14" (*)	3" – 14" (*)	3" – 14" (*)	5" – 26" (*)	5" – 26" (*)	5" – 26" (*)
MAKRA quick clamping system Standard	12" – 24"	12" – 24"	12" – 24"	14" – 38"	16" – 38"	16" – 38"
MAKRA quick clamping system optional	16" – 28"	16" – 28"	16" – 28"			
Rotary test	up to 2400 rpm	up to 2400 rpm	up to 2400 rpm	up to 2400 rpm	200 – 1500 rpm (*)	200 – 1500 rpm (*)
Clamping table size	1000 x 1000 mm octagonal	1000 x 1000 mm octagonal	1000 x 1000 mm octagonal	2000 x 2000 mm octagonal	2000 x 2000 mm octagonal	2000 x 2000 mm octagonal
Clamping table height	935 mm	935 mm	935 mm	1550 mm	1550 mm	1550 mm
Total weight	1800 kg	1800 kg	1800 kg	4100 kg	4200 kg	4200 kg
Power AC motor	5.5 kW	5.5 kW	5.5 kW	15 kW	22 kW	22 kW

\*) Additional options available upon request

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