

# Engineered Solutions

# Air Gaging on Gear Housings

## Measurement Task

- Diameter measurement
- Set of 12 air gages to measure different dimensional features on gearbox housings

## The Solution

Applying the different plugs different diameters can be measured. Applying air gaging technology the system is very robust and the measurement results are very reliable even applied straight at the shop floor. High-precision measurements can be carried out by personnel not trained in metrology.

The software-based user guidance guides the operator through the various measuring tasks.



Automation:	manual
Main application:	gearbox
Reference No:	12



# Taper Measurement based on Air-Technology

## Measurement Task

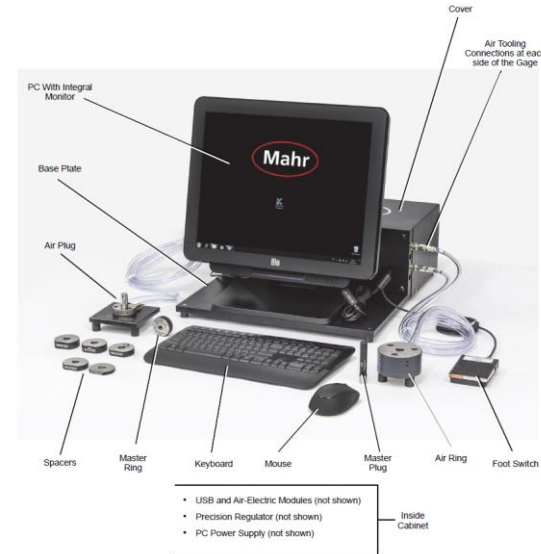
- High precision diameter measurement
- Taper measurement
- Medical prosthetic components, especially hip-components

## The Solution

The measuring unit uses special taper tooling that enable the measurement of diameters and tapers of medical prosthetic components. The workpiece must be inserted into the measuring ring. Then the measurement is performed automatically.

The pneumatic measuring system is based on a standard two-nozzle measuring system with low magnification for high-precision measurement.

The measuring unit is characterized by a very compact design. Applying air technology a quite sensitive measuring task comes down to a simple measuring method.



Automation:	manual
Main application:	medical; machine tool
Reference No:	13



# Measurement of Gear Tooth Alignment

## Measurement Task

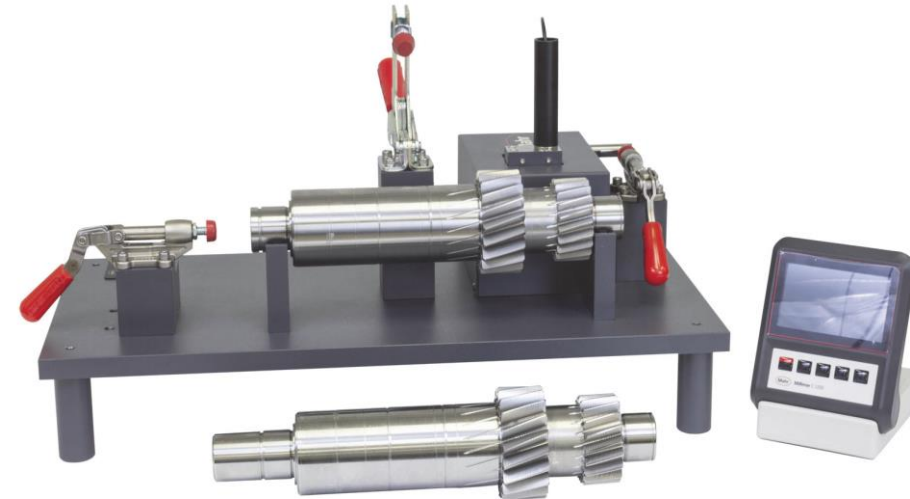
- Measurement of gear tooth alignment / true position of shaft, in relation to specific Datum
- Contact points are set for specific location on the part
- 0.076 mm true position WRT Datum A-B-C and reference face C, along the AB axis

## The Solution

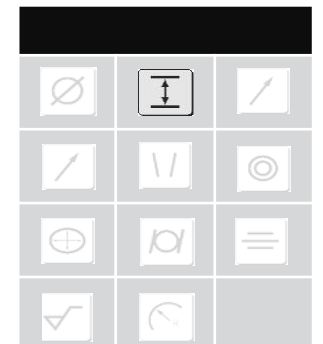
Bench fixture, with a small footprint, designed with V-mounts, two part clamps, measuring gage head lock, and amplifier readout. The workpiece will be loaded on V-blocks and is afterwards fixed by a holder utilized by a lever. Applying a second lever the workpiece will be fixed precisely into the V-blocks. The clamp is used to hold the part securely for the measurement but without affecting the measurement adversely or distort the part. The pantograph assembly insures that the measurements are accurate and repeatable with even applied gaging force.

The gage includes a precision fixture using one inductive probe and a C 1200 amplifier readout.

Optionally, there is a layout available with adjustable clamping system for the different part length.



Automation:	manual
Main application:	gear
Reference No:	14



# Measuring Device for Car Conrod

## Measurement Task

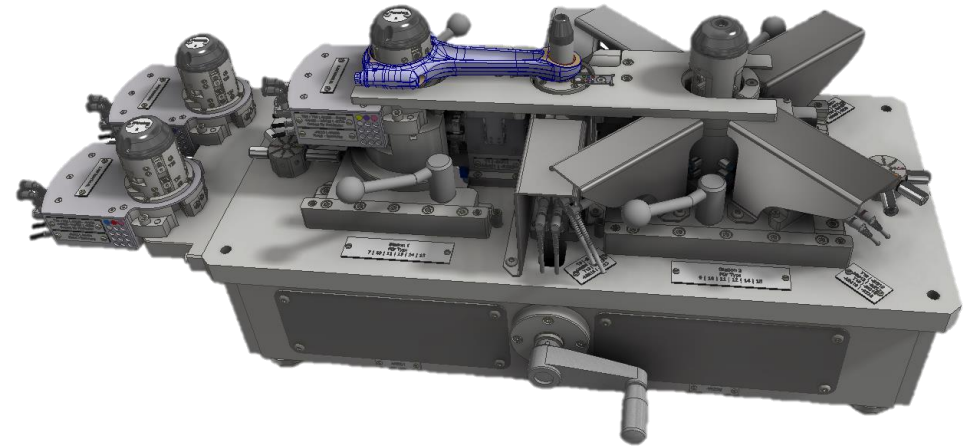
- Measurement diameter of large and small eye
- Distance between small and large eye
- Measurement of conrod twist and bend

## The Solution

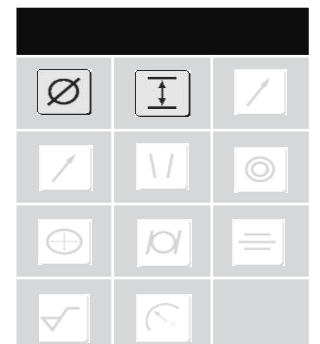
This measuring station is designed for manual workpiece loading. By operating a hand lever, the conrod is first fixed in a reproducible position. In the same movement of the lever, the measuring elements are then applied in a second process. Then the measurement is carried out. By actuating the lever again, the measuring elements are moved back into the protective position and the conrod is released.

The device can be quickly and easily converted to different conrod types.

The measuring station can be operated by workshop personnel directly in the production.



Automation:	manual
Main application:	conrod
Reference No:	24



# Diamar nk - Universal Measuring Unit for Shop Floor

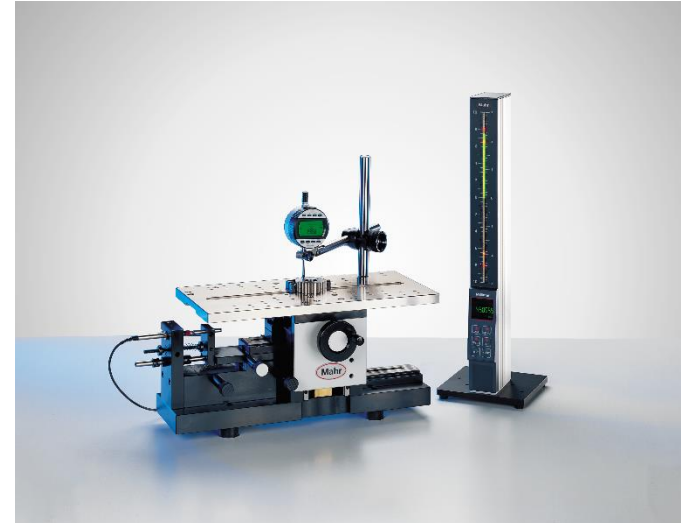
## Measurement Task

- Outside and inner diameters
- Testing the dimension over balls on internal and external gears
- Heights

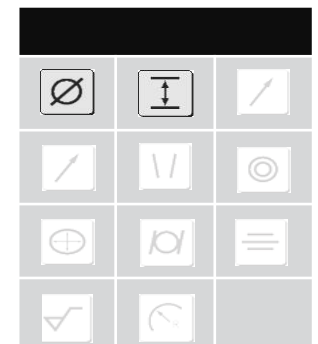
## The Solution

- Base with table top 350 mm x 180 mm (13.78 in x 7.09 in) and location holes for mounting accessories
- 1 mounting device for holding the fixed probe arm
- 1 spring-loaded retraction unit for holding the moveable probe arm
- Retraction range 25 mm (.9843 in), can be limited
- 1 probe holder/dial indicator holder
- 1 height adjustment facility for the table top, adjustment range 50 mm (1.969 in)

Part-specific accessories, such as stop rail, support plate, locating pin, measuring systems, etc., are available on request. Suitable evaluation units are all Millimar instruments with probes, also indicators and test indicators.



Automation:	manual
Main application:	gear, ring
Reference No:	54



# Diamar 280 - Universal Measuring Unit for Shop Floor

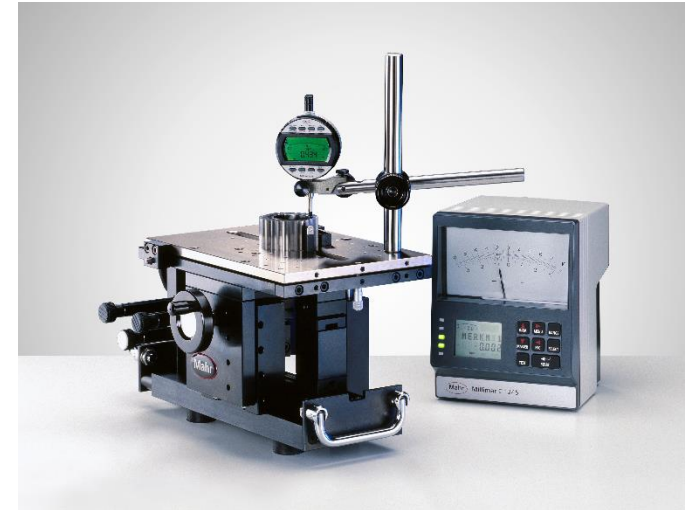
## Measurement Task

- Outside and inner diameters
- Testing the dimension over balls on internal and external gears
- Heights

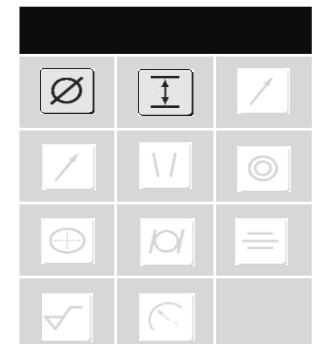
## The Solution

- Base with table top 255 mm x 180 mm (10 in x 7.1 in) and location holes for mounting accessories
- 1 mounting device for holding the fixed probe arm
- 1 spring-loaded retraction unit for holding the moveable probe arm
- Retraction range 20 mm (.8 in), can be limited at will
- 1 probe holder/dial indicator holder
- 1 height adjustment facility for the table top, adjustment range 45 mm (1.77 in)
- Adjustable inclination of the table

Part-specific accessories, such as stop rail, support plate, locating pin, measuring systems, etc., are available on request. Suitable evaluation units are all Millimar instruments with probes, also indicators and test indicators.



Automation:	manual
Main application:	gear, bearing, rings
Reference No:	55



# KMR - Gear Measuring Device Using Dimension Over Balls

## Measurement Task

For the measurement of diameters and concentricity in the manufacturing environment

- Dimensional testing of gears
- Dimension over balls, measurement of diameter and run-outs - repeatability: +/- 0.001 mm
- Allows for immediate reaction to and identification of faulty parts

## The Solution

Workpiece is located in the center of the device. When workpiece is setup on the right hand side a probe will be moved manually operated by a lever to measurement position.

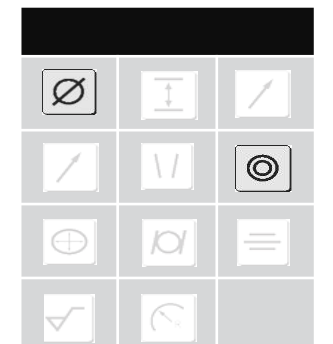
The actual measurement can be triggered by the computer applied or by foot-switch.

Measurement evaluation can be done by products out of the Millimar programm suitable for operation with two probes.

- The flexible design of the measuring device enables a quick changeover to other types of workpieces
- 6 versions of the KMR gage enable the choice of the best possible configuration for the measurement
- Design is suitable for measurement directly at the processing machine



Automation:	manual
Main application:	gear
Reference No:	56





# KMW - Modularized Shaft Measuring Device

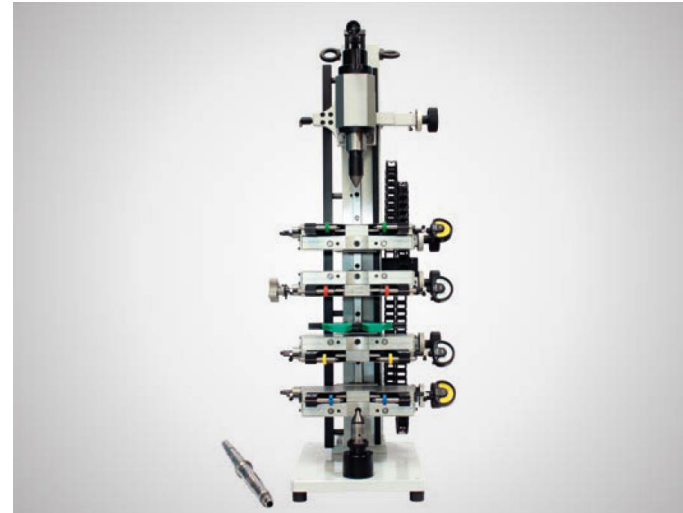
## Measurement Task

- Measurement of diameter and runout in production environment
- Dimensional testing of shafts
- Using dimension over balls, measurement of diameter and runouts repeatability: +/- 0.001 mm
- Allows immediate reaction and identification of faulty parts

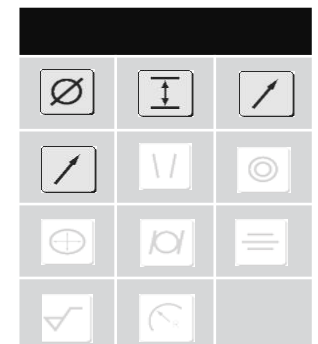
## The Solution

The workpiece is clamped with centering tips. Optionally, the probes can be applied pneumatically to protect the tips from wear. Then the measurement takes place. The measurement results can be displayed by reading out the dial gauges or, if probes are used, on an evaluation computer.

The fixture is suitable for use directly in production. The modular design of the fixture allows quick and easy changeover to other workpiece types and measuring tasks. Workpieces up to max. Ø 120 mm and a length of 600 mm can be measured. Other dimensions are available on request.



Automation:	manual
Main application:	shaft, gear
Reference No:	57



# RLV - Runout Measuring Device

## Measurement Task

This measuring device is especially suited for run-out measurement on the tooth flank of gears in the production environment.

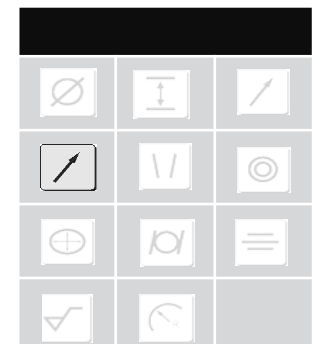
- Dimensional testing of workpieces, gears, run-outs on the tooth flank
- Repeatability +/- 0.001 mm

## The Solution

- Workpiece size: max. Ø 200 mm
- Measuring visualization: measuring computer, Millimar display column, Millimar dial gage
- The ergonomic handling allows operators who are not versed in metrology to provide reliable measuring results
- A individual solution for production in order to measure workpieces directly at the processing machine
- Allows for immediate reaction and identification of faulty parts
- The flexible construction of the measuring device enables quick conversion for other workpiece types (different diameters).



Automation:	manual
Main application:	gear
Reference No:	58



# UKTP - Universal Control Device Transmission Run-Out

## Measurement Task

Dimensional testing of gears. For the measuring of axial and radial run-out as well as lengths in the production environment.

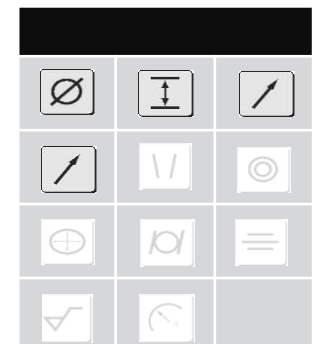
- Axial and radial run-out
- Lengths and heels on gears +/- 0.001 mm

## The Solution

- Workpiece measurement directly at the processing machine
- Allows immediate identification and reaction to faulty parts
- The flexible design of the measuring device enables quick conversion for other workpiece types (different diameters)
- Workpiece size: max. Ø 100 mm
- Measuring visualization: measuring computer, Millimar display column or Millimar dial gage



Automation:	manual
Main application:	gear
Reference No:	59



# WMV - Modularized Shaft Measuring Device

## Measurement Task

- Diameter and length measurement on shafts in the production environment
- Dimensional inspection of workpieces, gears, concentricity in the tooth flank
- Repeatability +/- 0.001 mm

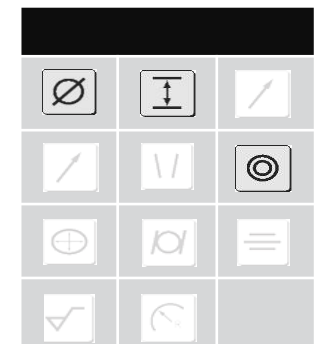
## The Solution

Workpiece is clamped by center-tips. Workpiece can be shifted by pulling to right or left direction into two measuring positions.

- Modularized design of the measuring device enables quick conversion for other work piece types and measurement tasks
- Work piece size: max. Ø 150 x 400 mm
- Measuring visualization: measuring computer, Millimar display column, Millimar dial gage



Automation:	manual
Main application:	shaft, camshaft, gear
Reference No:	60



# Runout and Height Measurement of Wheel Bearing

## Measurement Task

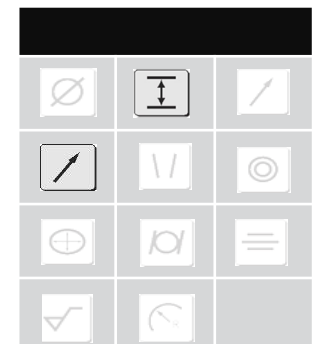
- Workpiece: Wheel bearing assembly including mounted bearing
- Runout of housing in respect to the center axis of assembly
- Height / position of bearing

## The Solution

Workpiece is loaded manually. Clamping occurs by means of toothing of the inner carrier. Measurement head will be pulled down. Probes will be attached automatically and measurement is performed while turning the workpiece manually.



Automation:	manual
Main application:	bearing
Reference No:	64



# Diameter Measurement and Misalignment of Diameters

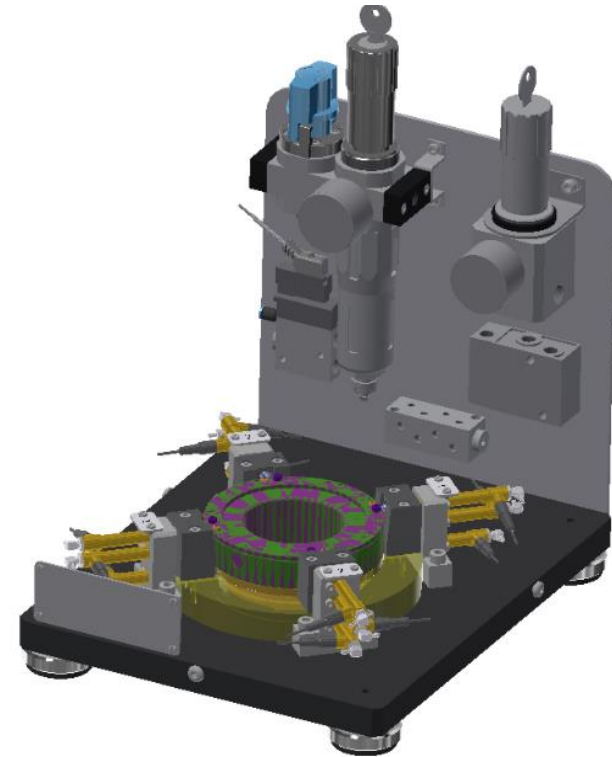
## Measurement Task

- Static measurement of two diameters
- Diameters are measured every 90°
- Misalignment of two related diameters

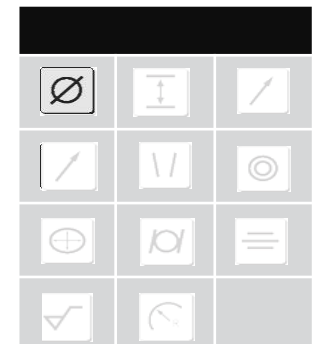
## The Solution

Solution is designed to measure planet-wheel carrier of a gear drive. Part is loaded manually. Afterwards probes are being automatically attached, measurement is performed, probes are being withdrawn and measurement result is displayed together with information that measurement is finalized.

The design fits work-shop surroundings.



Automation:	manual
Main application:	gear
Reference No:	65



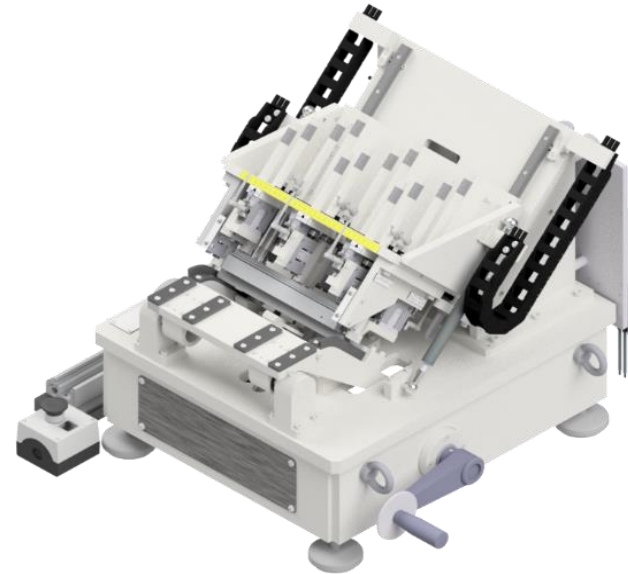
# Measuring of Various Distances on the Housing of Linear Guides

## Measurement Task

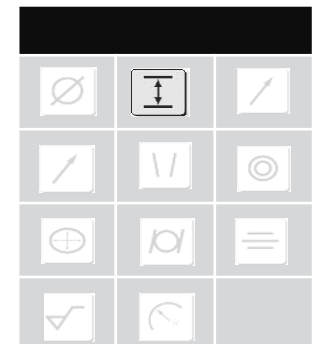
- Measurement of distances after the grinding process
- Height in relation to the base plate
- Is applied at shop floor
- The dimension to be measured has a tolerance of  $\pm 0.01$  mm to  $\pm 0.03$  mm.

## The Solution

The workpiece is placed by hand on a measuring table, which lowers the component to three support points with the actuation of the hand crank and brings the measuring slide into measuring position. The measurement is recorded after pressing a "start button". The measuring points are scanned by specially made measuring inserts, which are controlled electro-pneumatically by ME05 measuring units on the guideway of the component. Parts of one size in different lengths can be tested, which are clamped on a carrier plate. The retrofitting or positioning of the three measuring levels is done by hand by loosening and tightening the clamping screws. A scale is integrated on the measuring slide for support.



Automation:	manual
Main application:	0
Reference No:	73



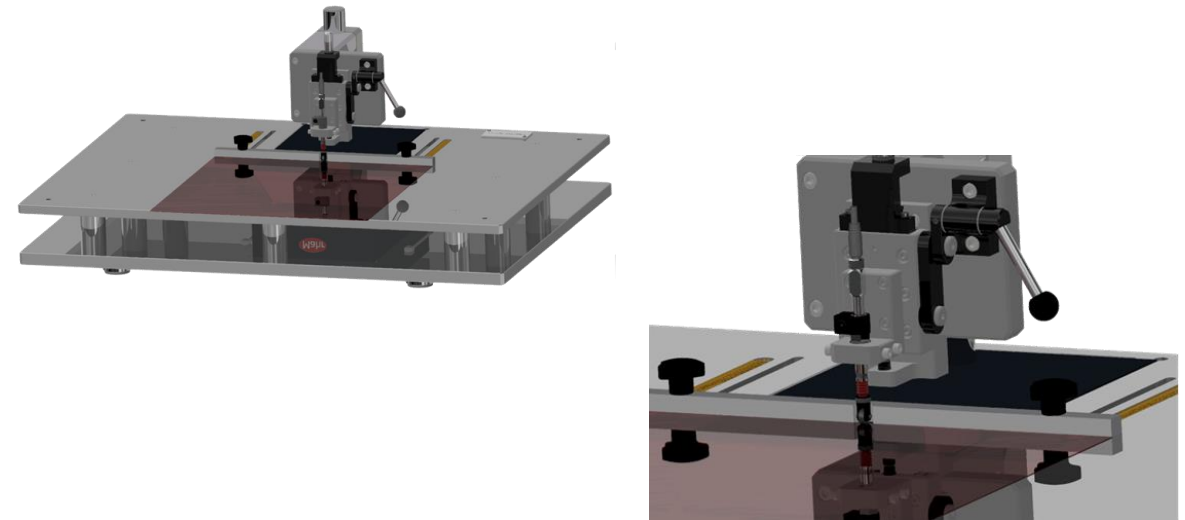
# Measuring Device for Battery Cell Film Thickness

## Measurement Task

- Measurement of film thickness of  $0.245\text{mm} \pm 0.003$
- Dimension of the film is  $360\text{mm} \times 360\text{mm}$

## The Solution

Manual measuring station for measuring various thicknesses of coated foils, which are used, for example, for batteries in electric vehicles. The position for measuring the film thickness can be changed flexibly in just a few simple steps. A measuring probe moves to the workpiece by operating a lever on the measuring head. The measurement of the film is used to test coating on the actual film. In order to achieve the best possible accuracy, measurements are made on a granite slab that is sunk into the device. The measurement data are recorded by the compact length measuring device Millimar C1200.



Automation:	manual
Main application:	battery, e-mobility
Reference No:	78

