CUSTOMIZED MEASURING INSTRUMENTS IN MODULAR SYSTEMS
The advantages of this modular system—quick, easy handling, individual setting options and intelligent combinations with different components—offer the user both cost benefits as well as numerous possible applications.

This testing apparatus is equipped for extensive measurements for all turning and milling parts. The product range includes systems for measurement of different diameters, heights, hole sizes, distances, concentricity and a new multi-function measuring table.

The devices may be customized as per individual specifications on request.

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PLEASE NOTE

All assemblies and modules are delivered by default without measuring equipment.

Upon request, the assemblies can be also equipped with measuring clock or incremental push buttons.

Storage cases can be supplied on request.

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BEISPIELFOTO
The modular measurement technology always consists of hard-anodized aluminium basic profile with steel side parts and different accessories in order to perform a first simple measurement.

The modular system of M-TEC offers the right solution for almost every application. It can also be used with all latest measuring clocks and electronic sensors with a clamping shaft of φ 8mm. You can also use micrometer gauge for radial run-out measurement in boreholes.

The measurement of diameters, run-out, heights, holes, distances and roundness by arranging different intelligent components, guarantee cost savings and above all, simple and precise measurement processes.

The construction of a measuring device is composed of a basic profile with combinable modules together, which can be adjusted quickly and easily (the modules can be installed with just one tool).

The devices are calibrated with a gauge and are at all times in the workshop (on the machine) to support the worker in giving immediate proof of the quality of his products.

You can make several measurements with one measuring device in smallest possible place, thus saving valuable space on the machine.

A gain of affordable production safety directly in the manufacturing, results in fewer complaints and employee satisfaction.

The modular measurement technology always consists of hard-anodized aluminium basic profile with steel side parts and different accessories in order to perform a first simple measurement.

Supplements for different modules are available:

- Centering points
- Measuring clock holder
- Measuring bracket L-Profile
- Measuring bracket U-Profile
- Angle bracket
- Brass coating to prevent damage on the test piece
EXAMPLE: 5 MEASURING OPERATIONS IN ONE WORKPLACE

1. MEASURE UPPER GROOVE

2. MEASURE TOP DIAMETER

3. MEASURE INTERMEDIATE GROOVE

4./5. MEASURE HEIGHT AND LOWER GROOVE
**THE MODULES**

**MD - 2000-0** Basic profile of hard-anodized aluminium 80X40 with Steel side parts | smoothly inclinable (360°) | Working range 250mm

**MD - 2000-1** Basic profile of hard-anodized aluminium 80X40 with Steel side parts | smoothly inclinable (360°) | Working range 500mm

**MD - 2000-2** Basic profile of hard-anodized aluminium 80X40 with Steel side parts | smoothly inclinable (360°) | Working range 1000mm

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**MD - 2010-0** Basic profile in steel
Basic profile in polished steel with steel side parts/ smoothly inclinable (360°)/ Working range 250mm

Can be mounted on
Basic profile MD-2000
Smoothly adjustable on a bracket

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**MD - 3000-0** Column profiles in aluminium | Column height 250mm with Universal swivel arm (MD-3010-0) in aluminium with clamping lever

**MD - 3000-1** Column profiles in aluminium | Column height 250mm with Universal swivel arm (MD-3010-1) in steel with clamping lever

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**MD - 3010-0** in aluminium/ MD-3010-1 Universal swivel arm in steel
Universal swivel arm optional in aluminium/ steel/ stepless swivelling, can be used as a stopper for measuring gauge holder
MD - 3014 Angle bracket with 360° rotary measuring instrument
(without measuring clock)
Angular bracket completely optional in aluminium/steel
Use: Partial stopper in conjunction with measuring bolt and measuring gauge | Application on page 27

MD - 3020-0 in aluminium | MD-3020-1 in steel | Angular bracket in steel
Angular bracket completely optional in aluminium/steel
Use: Partial stopper in conjunction with measuring bolt and measuring gauge | Application on page 27
MD - 5041-0 centering linear guides in aluminium
Linear device | continuous clamping of the moving slider, also vertically applicable | for usage description see page 27

MD - 4025-0 in 2 mm Stainless steel and aluminium support for 2-40 mm diameter prism holder
Use: To test the concentricity of components with different diameters (Center of the test specimens is always the same)

SCHEDULED RUN-OUT MEASUREMENT FROM TWO SIDES | Please see page 27 for description
DIAMETER AND RUN-OUT MEASUREMENT WITH ELECTRONIC SENSORS

MD - 4000-0 Aluminium centering tip (fixed)
Use: To measure the test piece between points for acceptance of roundness and concentricity/centering tip Ø 8mm

MD - 4010-0 Aluminium spring suspended centering tip
Use: To measure the test piece between points for acceptance of roundness and concentricity
11

Use: Measuring acceptance of large and heavy test pieces with center distance less than Ø 125mm. Continuously adjustable contact pressure. Centering tips in special sizes possible

SCHEMATIC ASSEMBLY OF TAILSTOCK MD-4015 WITH SUPPORT KM-4015-6 ON BASE PROFILE MD-2000-0 FOR TWO HEIGHTS (60MM AND 100MM)

MD-4015-0 in Gray cast iron/ Tailstock with fixed centering tip Ø 16mm
Use: Measuring acceptance of large and heavy test pieces with center distance less than Ø 125mm. Continuously adjustable contact pressure. Centering tips in special sizes possible

MD-4016 in Gray cast iron/ Tailstock spring supported
Use: Measuring acceptance of large and heavy test pieces with center distance less than Ø 125mm. Continuously adjustable contact pressure. Centering tips in special sizes possible
Use: To measure diameter and radial run-out

MD - 5000-0 in aluminium/ MD-5000-1 in steel | Measuring clamp U-profile for Ø 6-50mm

Use: To measure diameter and radial run-out of larger sizes

MD - 5000-2 in steel | Measuring clamp U-profile for Ø 50-100mm
Use: To measure concentricity errors below 135° for e.g. determination of polygonal or tension error

MD - 5010-0 in aluminium | MD-5010-1 in steel | Measuring clamp L-profile
Use: Several diameter and groove measurements in one spindle/ for usage description please see page 24 - 26

ADJUSTMENT OF PENDULUM HOLDER MD-5020-1

1 | PIVOT POINT OF THE HOLDER
2 | ADJUSTING SCREW WITH COMPRESSION SPRING FOR ADJUSTMENT OF THE PRESSING FORCE
3 | MOUNTING AND CLAMPING OF THE PENDULUM HOLDER FOR HEIGHT ADJUSTMENT
MULTI-POSITION MEASUREMENT OF ONE SPINDLE WITH 5 DIAMETERS AND THE TOTAL LENGTH
RADIAL RUN-OUT MEASUREMENT OF A TEST PIECE

For diameters between Ø 1-40 mm

MD - 4031-0 Concentricity measuring device with O-Ring mounted bearing
Continuously adjustable clamping bracket with run-out accuracy 0.003 mm

MD - 4020 in aluminium | MD - 4020-1 auxiliary support in steel
**MD - 5030-0 in aluminium | MD - 5030-1 Gap gauge in steel**

- Hub: 60mm

**MD - 5040-0 Inside measuring gauge**

- Use: To measure inner diameter or run-out in drillings

**MD - 5050-0 hardened steel/ Drill measuring gauge with exchangeable gauge slides for diameter and concentricity measurement**

- Drill inspection (3 point measurement with 120° alignment) or (2 point measurement with 180° alignment)

**MD - 7012 | sliding guides Ø 35-45 (without measuring clock)**

- Use: For setting up reaming inside a machine, magnetic gauges are almost exclusively used, with mechanical or electronic measuring clock.
To measure horizontally several diameters in one operation. Several gap gauges can be arranged one above the other.

The measuring device consists of a measuring table MD-6000-1 and can be equipped with different gap gauges MD-5035 sizes 1 to 3.

There are 3 versions:
- Size 1 for test pieces Ø up to 66mm
- Size 2 for test pieces Ø up to 146mm
- Size 3 for test pieces Ø up to 246mm

By additionally installing a steel plate beneath the measuring plate and offsetting the measuring column, an extension of the supporting table is possible.

The minimum center distance between two gap gauges must be 20 mm. The distance can be reduced by appropriate measuring insets.
Sum-differential measuring table with 2 electronic measuring sensors

MD-6000-5
Differential measuring table
The workpiece is clamped between 3 rollers and rolled without center. By turning the handwheel, the component is brought into rotation. Run-out test from 1mm to 40 mm is possible. Run-out error 0.003mm Measuring clock mounting hole Ø 8mm

Granite plate made of natural hard rock of the highest quality and hardness. Measuring column can contain any number of adjustable swivel arms. Measurement area can be fully utilized by the adjustable swivel arms. Slightly adjustable in height and side.

Measuring table 200X200mm Measuring column length 250mm or 500 mm (optional in Al or Granite) Measuring clock mounting hole Ø 8mm

Testing of run-out from outside, inside and flat surfaces The workpiece is clamped between 3 rollers and rolled without center. By turning the handwheel, the component is brought into rotation. Run-out test from 1mm to 40 mm is possible.

Run-out error 0.003mm Measuring clock mounting hole Ø 8mm
All components will be delivered with mounting material. For Al, granite and steel variants, see price list.
Position indicator with statistical recordings (max 10000 values) and SPC

Interface of 4 or 8 measuring sensors, programmable for 100 parts, SPC, input and output for automation

If you need larger measuring range or pneumatic versions, please find all related information on www.heidenhain.de

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<th>Device</th>
<th>AT-12xx</th>
<th>ST-12xx</th>
<th>MT-12xx</th>
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<tr>
<td>Accuracy</td>
<td>± 2µm</td>
<td>± 1µm</td>
<td>± 0,2µm</td>
</tr>
<tr>
<td>Measuring range</td>
<td>12mm</td>
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ND - 280
Position indicator

ND - 267
Position indicator with statistical recordings (max 10000 values) and SPC

ND - 2100G (GAGE-CHECK)
Interface of 4 or 8 measuring sensors, programmable for 100 parts, SPC, input and output for automation
ADJUST DIAMETER AND TEST WITH DISPLAY MEASURING DEVICES IN U-BRACKET

With display measuring devices (e.g. measuring clock), naturally Ø of the highest point is determined.
The measurement and adjustment of the master piece is carried out in 3 steps

1. Slide in the test piece

2. Place the test piece on the support plate and slide in on the U-bracket

3. Slide the test piece further in

With this further sliding, the test piece reaches the highest point.
The test piece will have reached the bottom stopper and, when retracted, will show the highest point on the display gauge.

The adjustable brass plate (support) on the measuring brackets U-Profile and LProfile help in pre-positioning and protecting the work piece.
RUN-OUT MEASUREMENT OF A THREADED SHAFT, Ø 3MM AT SUPPORT POINTS
There are 2 variants
from Ø 6-50mm and from Ø 50-100mm

For the correct setting of the U-bracket, please proceed as follows:

The center distance of U-bracket MD-5000 (from Ø 6-50mm) is 60mm

The center distance of U-bracket MD-1-5000 (from Ø 50-100mm) is 100mm

Mounting distance for bottom stopper = Grundabstand – (D/2) - 1mm
e.g. 54mm = 100mm – (90mm / 2) - 1mm

Mounting distance for supporting bolt = Center distance – (D/2)
e.g. 55mm = 100mm – (90mm / 2)
EXAMPLE:
SCHEDULED RUN-OUT MEASUREMENT FROM TWO SIDES

The linear guide is a portable element and serves to support the measuring equipment or other modules for tight installation situations

1 | PLACE THE TEST SPECIMEN AND HOLD IT BETWEEN CENTERING POINTS

2 | ROTATE THE TEST SPECIMEN >360° AND DETERMINE OVERALL RADIAL RUN-OUT