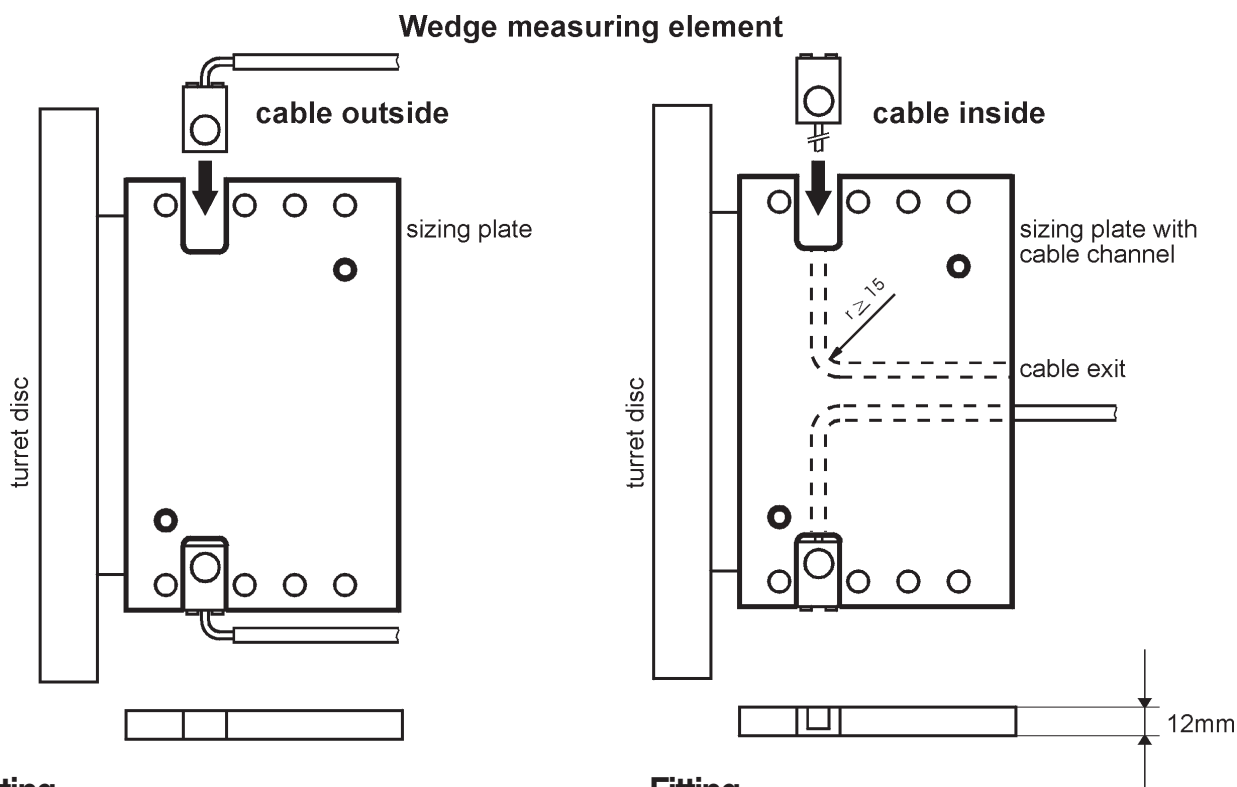


# Flexible Measuring Plate, FMP

Distance plate + wedge measuring element(s) = flexible measuring plate (FMP)



## Fitting

- Fit turret with sizing plate
- Insert 1 or 2 wedge measuring elements
- Tighten wedge measuring elements in place
- Finished

## Fitting

- Fit turret with sizing plate
- Thread in cable for measuring element(s)
- Insert measuring element(s)
- Tighten wedge measuring elements in place
- Finished

## Applications:

The flexible measuring plate (FMP) measures quasistatic and dynamic forces between the structures of machine component or fixtures on the force bypass principle. It is suitable for applications where forces have to be measured without reducing the stiffness of a machine or fixture. A very common application is to fit a flexible measuring plate between the tool turret and the machine slide on a lathe for tool or process monitoring. But the flexible measuring plate (FMP) is also highly suitable for indirect 1D or 3D force measurement between the structures of other machine components or fixtures.

## Advantages as compared to measuring plate with fixed measuring elements

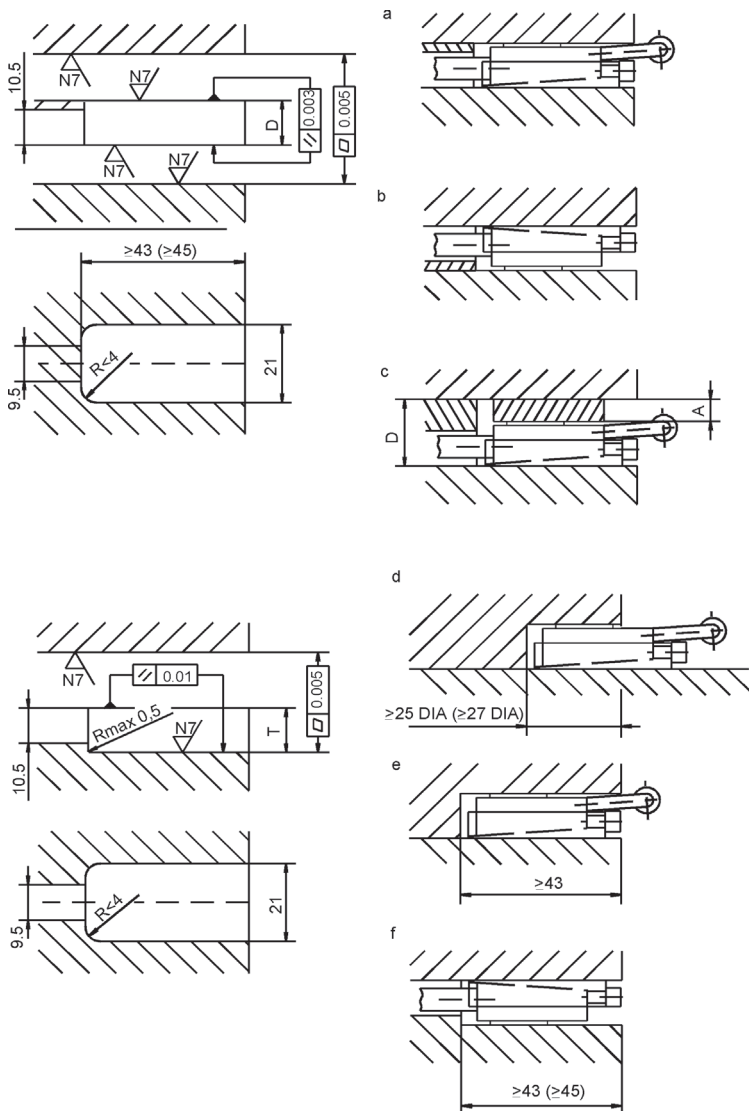
- Plate thickness can be adapted by grinding (0,5 mm)
- Low cost due to in-house work and large production runs
- Very simple preparation of the machine
- Upgrading from 1D to 3D technology whenever required
- Great flexibility for machine manufacturer and user
- Very simple fitting, maintenance-free
- minimum on stockkeeping costs
- As with standard measuring plates: very broad measuring range with very low response level, high signal dynamics with very short response time (0.1 ms) and very high load capacity of wedge measuring elements due to force bypass principle

The FMP concept represents a highly flexible force measurement system for tool turrets and/or toolholders. It can also be used to measure forces in other machine structures. Any shape of distance plate can be used: rectangular, circular, ring-shaped, triangular etc.

All wedge-type measuring elements are 12 mm thick; they are available in various sizes, with 1D and 3D versions for each size. They are oil- and coolant-proof. The normal range of adjustment using the wedge is  $\pm 0.15$  mm. If the wedge measuring element projects to the maximum possible distance beyond the wedg shoe, it becomes -0.35 mm thinner. The maximum change in thickness is therefore 0.5 mm.

## Some Sample Fittings in the Force Bypass

for a size 20 wedge measuring element



### Fitting in sizing plate

**D = 12 ± 0.15 (-0.35) mm to D = 20 mm**

- a) 12 mm fitting, wedge shoe below, cable inside or outside
- b) 12 mm fitting, wedge shoe above, cable inside
- c) as a, but 12 to 20 mm fitting with shim disk  
*Art. No.: 019.222.KMEDS*  
*A = 0.2 to 8.0 mm, interval 0.2 mm*

#### Fitting:

- Fit machine components and distance plate
- slide in measuring element and spacing shim (if required)
- tighten, finished

### Fitting in sizing plate D > 20 or in parting plane with pocket

**T = 12 ± 0.15 (-0,35) mm**

- d) minimum fitting depth, cable outside
- e) normal fitting depth, cable outside
- f) flush fitting, cable inside

#### Fitting:

- Fit machine components
- insert measuring element
- tighten, finished

### Caution!

All dimensions are given in mm. All dimensions given in brackets ( ) are for a measuring element projecting the maximum distance.

Because of the wide wedge adjusting range of 0.3 mm, with extension of 0.5 mm, the distance plate can also be ground to thickness to obtain the correct fit. The distance plate can be of any absolute thickness greater than 12 mm. Standard plates with a thickness of 12,1 mm ± 0.01 are available for all commercial tool turrets. Distance plates can also be fabricated by the customer.

Depending on the level of monitoring required (from simple collision monitoring to complete tool and process monitoring included tool wear monitoring), either 1 or 2 wedge measuring elements in 1D or 3D technology are used. From the viewpoint of the tool, the measuring elements should always be fitted behind and close to the first bolted joint with the slide. This applies equally to disc turrets and to flat bed or rail head turrets. We advise you on the right choice and number of sensors for the selected monitoring unit in our offer. We also offer fitting design, specification of exact fitting positions or calibration of your system.