

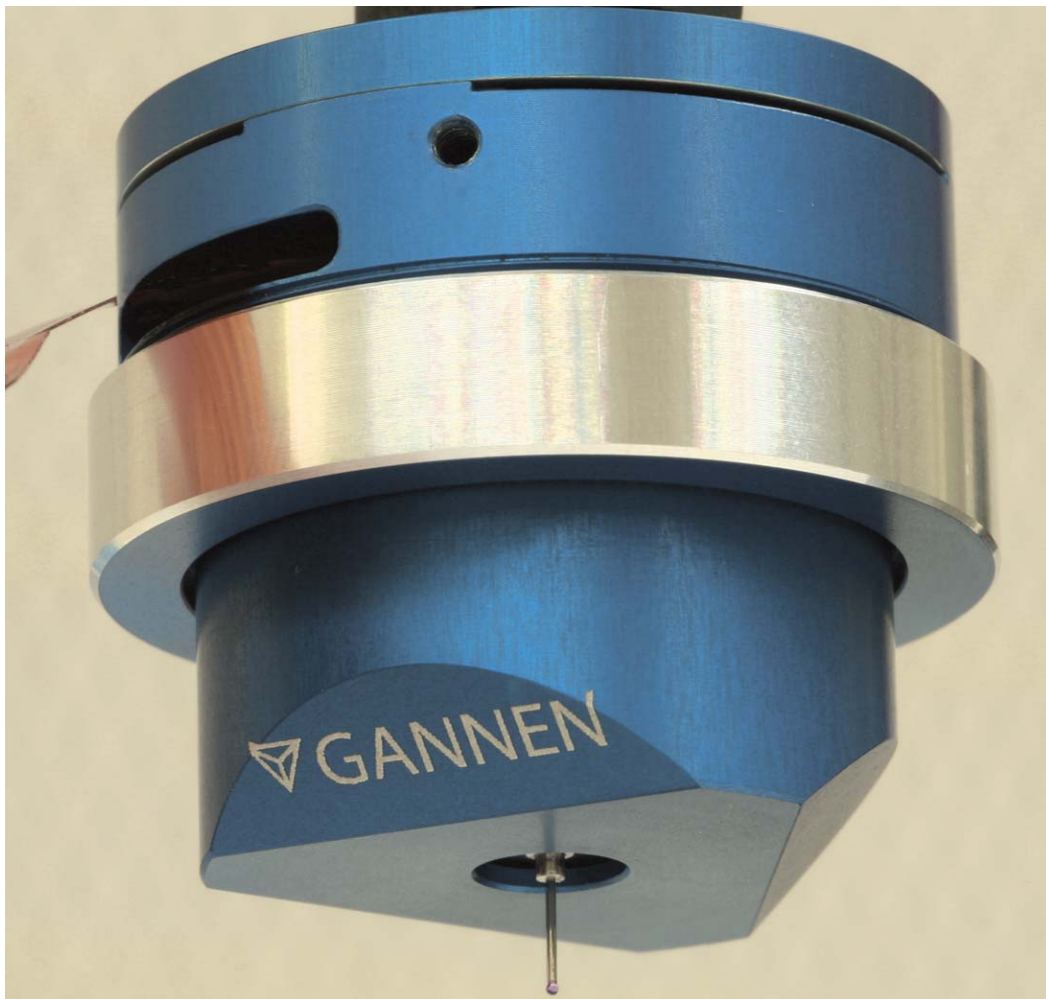
 **XPRESS**

Precision Engineering at your fingertips

# **GANNEN**

## **Ultra precision**

### **3D tactile probe**



## Measuring MEMS with nanometer uncertainty

### ▼ Tactile scanning

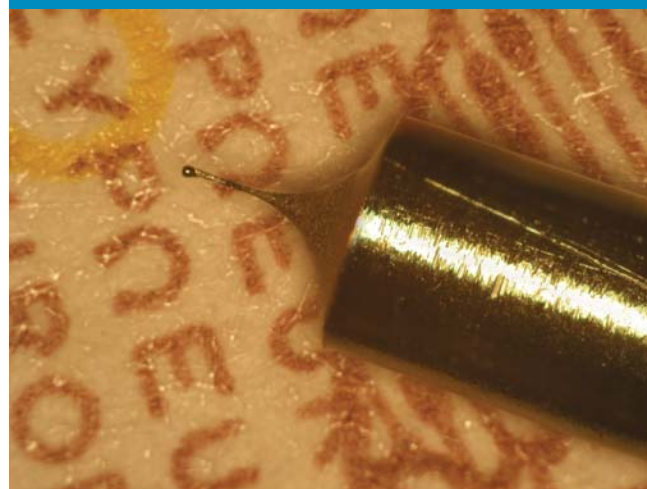
The basis of the 3D Gannen probe is a silicon chip with integrated piezo resistive elements. One point probing and scanning is possible with an ultra low uncertainty. The mass and stiffness are very small, thus enabling high speed measurements on small features, including microsystems, without damaging the components.

### ▼ Characteristics

- ▶ High repeatability, down to 7 nm 1D.
- ▶ High speed probing without damaging your components:
  - ▶ Probe mass less than 40 mg
  - ▶ Probe stiffness down to 10 N/m

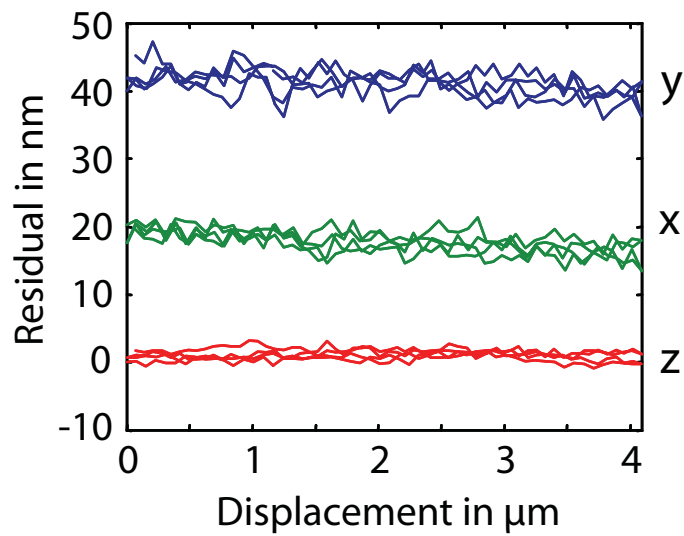


Sapphire tips for the probe are available for diameters of 120  $\mu\text{m}$  and up. Custom tips can be manufactured down to 50  $\mu\text{m}$ , here shown on a 10 euro note.



The righthand graph shows the calibration results of the GANNEN probe, as measured using the laser interferometer setup discussed below. The residuals show a standard deviation of around 3 nm for all directions. Results for x and y are shifted by 20 and 40 nm respectively to improve readability.

# Technical data



The plane mirror differential laser setup is calibrated to have a 1D uncertainty less than 5 nm.

## ▼ Specifications

Tactile 3D probe for both scanning and single point measurements

Probe mass	< 50 mg
Stiffness	> 10 N/m
Tip diameter	50-500 μm

## ▼ Dimensions

Housing	∅ 30 mm
Chip edges	20 mm
Stylus length	4 mm and up

## ▼ Uncertainty

3D sensor uncertainty*	14 nm
Deviations due to sphere	45 nm
Temperature deviations	< 10 nm ( $\Delta T < 0,1$ K)
Deviations due to material deformation	< 10 nm
Other deviations	< 10 nm
Combined uncertainty	50 nm

\* Measured in the range of 0-10 μm with a planar differential laser interferometer setup (see lefthand picture).

The data presented in this sheet is with reservation, future developments may influence specifications and design.



# **XPRESS Precision Engineering:**

## **Metrology, optics and precision machine design**

Xtreme Precision Sensors (XPRESS) strives to be the top manufacturer (OEM) of high accuracy 3D probes for dimensional metrology.

The underlying technology of the GANNEN probe series is developed at the Precision Engineering section by prof. Schellekens at the Eindhoven University of Technology in two consecutive Ph.D. projects.

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