

Enabling Technologies

Solutions for Medical Technology and Lab Automation

SLAS 2018 | San Diego Convention Center, Booth 1646

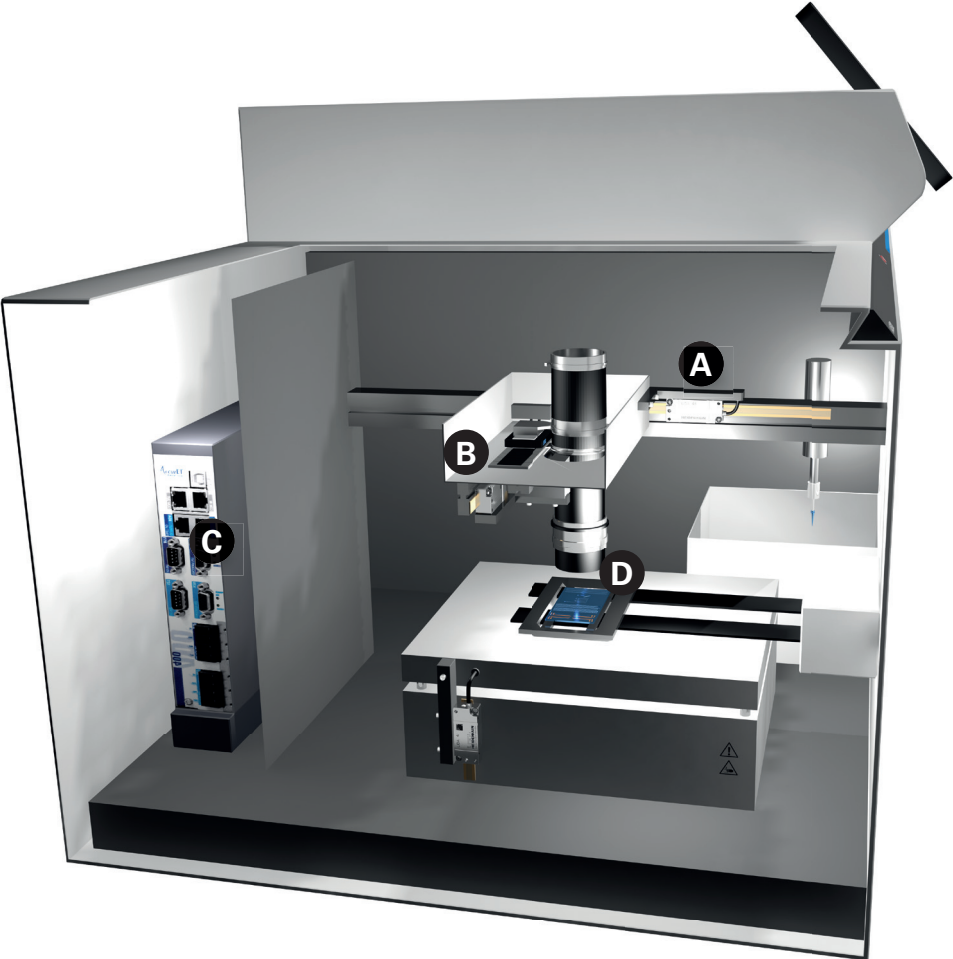
HEIDENHAIN

ETEL

IMT

Enabling Technologies

High throughput and exceptional accuracy in sample analysis are essential characteristics of modern lab machines. Technologies from HEIDENHAIN, ETEL, and IMT contribute significantly to achieving these objectives and provide higher productivity as well as faster, more reliable processes.



A**HEIDENHAIN: Linear encoders**

- Optical scanning principle
- Precise and robust graduations
- Scalable to the needs of the application

B**ETEL: Linear motors**

- Exceptional performance
- Simple integration
- Patented cogging-free motion

C**ETEL: Motion control**

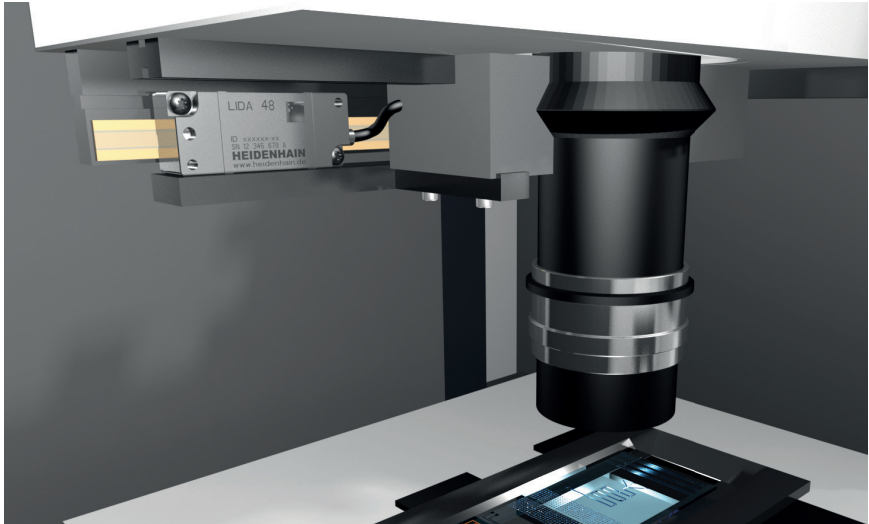
- Motion system optimized for the application
- Point-to-point motion
- Scanning motion

D**IMT: Microfluidics**

- Microfluidic chips and flow cells for tomorrow's biotechnology
- Glass components; nanopatterns and optical thin films
- Exact dosage of extremely small volumes

Motion control

Precise motion control enables significant improvements in speed and system throughput while avoiding standstill and slow travel.



HEIDENHAIN: Linear encoders

As part of the control loop, linear encoders have a decisive influence on position accuracy and on smooth motion control.

- Accuracy down to the nanometer level
- Measuring step of just a few picometers
- Variety of interfaces allows for easy implementation

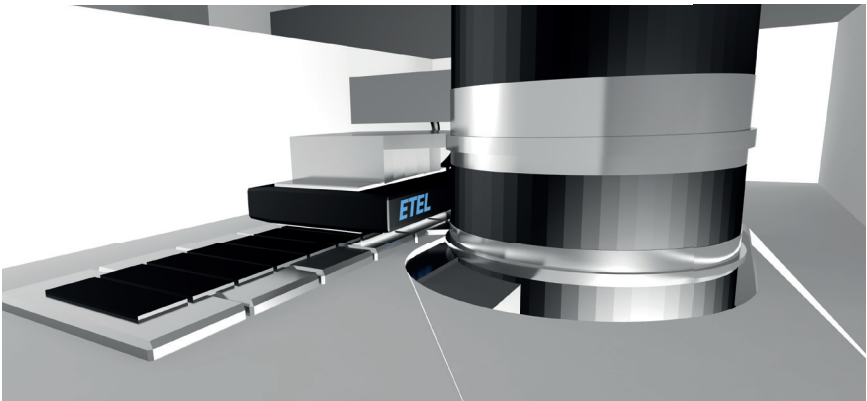


ETEL: Motion control

- Scalable solutions, ranging from components such as motors and electronics all the way to complete motion systems
- Intelligent motion strategies
- Distributed architecture can handle multiple axes simultaneously

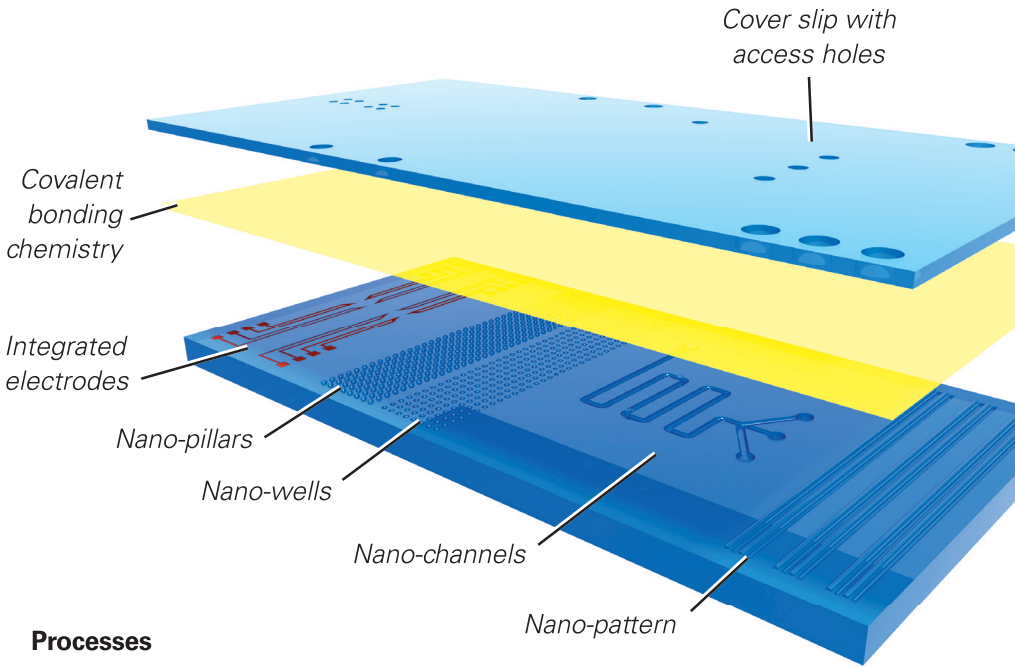
ETEL: Linear motors

- High acceleration
- Patented cogging-free motion
- Exceptional thermal efficiency



IMT microfluidics

Flexible process offerings that enable microfluidic solutions in glass: design consultancy, prototyping, and scalable manufacturing

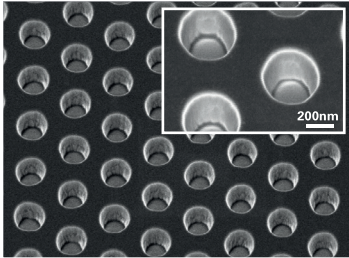


Processes

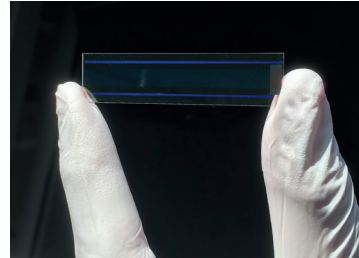
- Nano-scale patterning of glass down to 350 nm
 - Pillars, wells, channels
- Electrode integration
 - Materials: Au, Pt, ITO, Ti
 - Features sizes down to 2 μm
- Biocompatible bonding
- ISO 9001: 2015

Applications

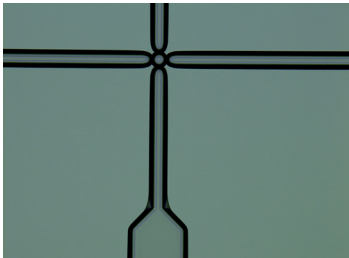
NGS flow cell, organ-on-a-chip, lab-on-a-chip, single-cell analysis, cell enrichment, sample preparation and many more



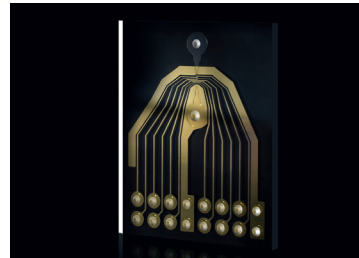
Nanopatterning enabling high-throughput multiplex assays and next generation sequencing



Structured waveguides enabling signal-to-noise reduction



Complex glass structuring enabling multiple-emulsion droplet generation



Electrode integration enabling pathogen detection

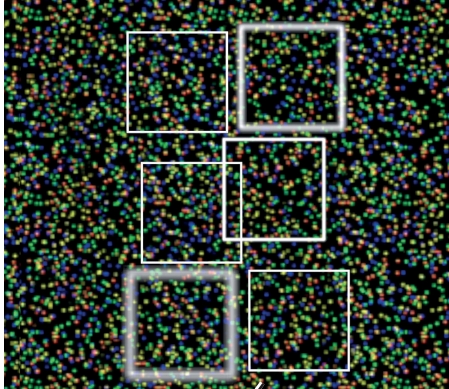
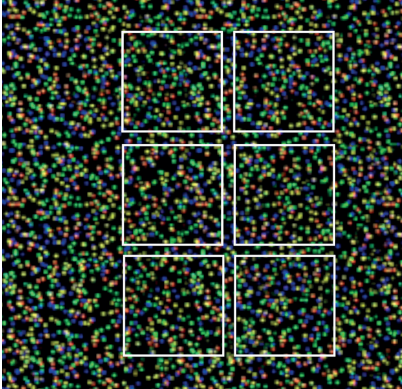
Advantages of microfluidics in glass

- Selection of available glass types
- Bioinert
- Excellent chemical, mechanical, and optical properties
- Outstanding surface properties
- Cost-efficient scaling from prototyping to mass manufacturing

Optical detection system

For the rapid analysis of biomarkers, it is important that movements from one camera position to the next occur at high speed. Within a short period of time, a stable position should be established so that a sharp image can be recorded immediately. Motion technology from HEIDENHAIN supports this process with a short "seek and settle time" and by providing position stability at the focus (Z axis), for example.

*With HEIDENHAIN linear encoder:
position stability for sharp images,
accuracy, high throughput*



*Without linear encoder:
unclear and unstable images*

Sharp images

- Position stability: avoid image jitter with HEIDENHAIN technologies
- Excellent surface properties, low coefficient of thermal expansion (CTE), low auto-fluorescence

Accuracy

- Exact focus position enabled by linear encoder
- Field of view overlapping is avoided

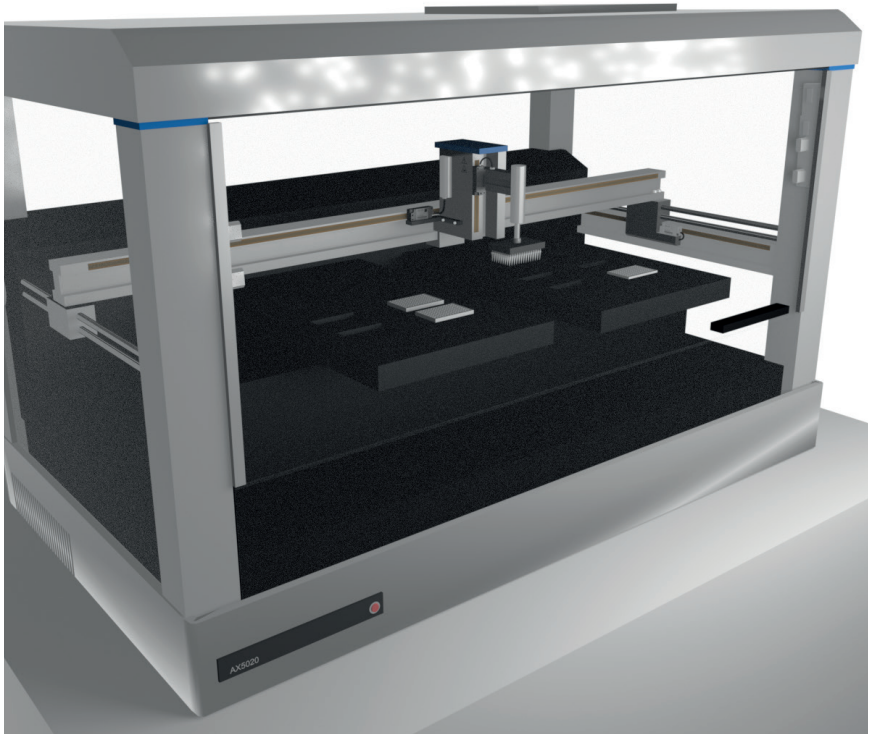
High throughput

- Rapid movement from image to image
- Short seek and settle time

Liquid handler

A modern lab analysis instrument is expected to feature high throughput as well as reliability in the handling of samples.

A system from ETEL, or the use of components from HEIDENHAIN, increases throughput. Smooth motion at high accelerations enables, for example, a high throughput without the formation of drops that cause sample contamination.

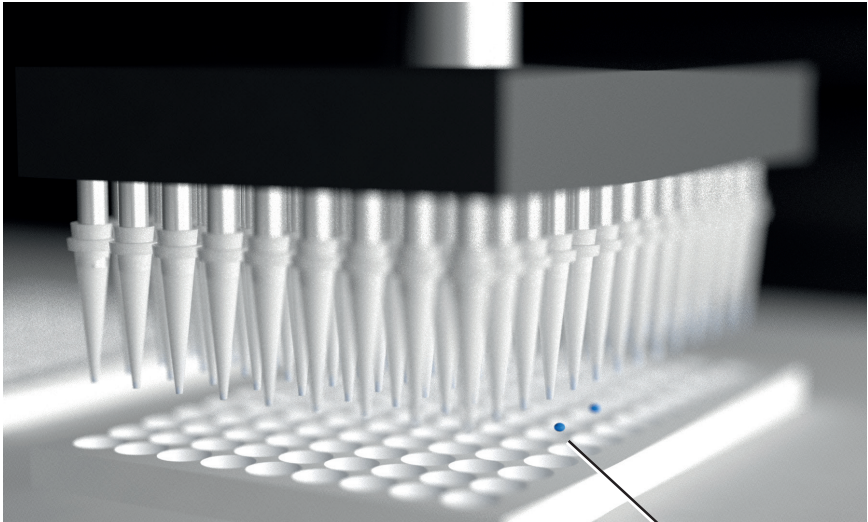


High throughput

- Fast and precise movement between samples
- Closed loop motion technology
- Modern linear motor technology

No spilling

- Optimized motion control
- Low jitter
- Cogging-free linear motor



Spilling may occur when a conventional system is sped up to achieve higher throughput. Vibrations are introduced in such drives, which support spilling of small droplets. With technologies from ETEL and HEIDENHAIN the motion of the instrument is fast and very smooth at the same time. Vibrations are at a very low level and consequently contamination of the instrument by spilling is avoided.

The technology partners

HEIDENHAIN is the specialist for advanced encoder technology

www.heidenhain.com

HEIDENHAIN

ETEL provides high-end motion control systems and components for nanometer precision

www.etel.ch

ETEL

IMT is the expert for precise microfluidics devices on glass

www.imtag.ch

IMT
PRECISION ON GLASS

For project requests please contact

Phone +1 847 - 490 - 0387

Email kkaufenberg@heidenhain.com

Special microsite SLAS: www.heidenhain.us/slas2018

HEIDENHAIN

HEIDENHAIN CORPORATION

333 State Parkway

Schaumburg, IL 60173-5337

Phone +1 847 490-1191

Email info@heidenhain.com

www.heidenhain.us