



FINEPLACER®

femto 2

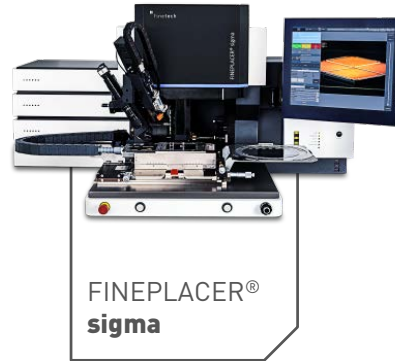
Product Presentation

Sub-Micron Product Range

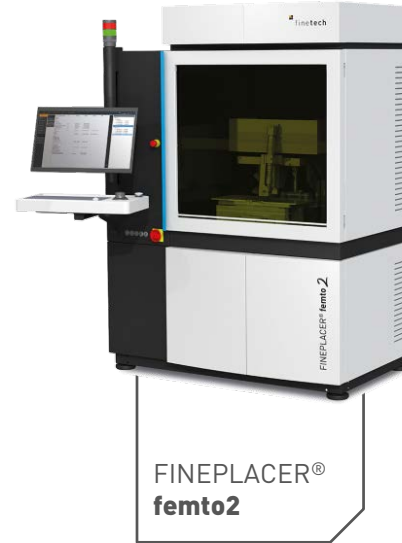
FINEPLACER® femto 2
Product Presentation



FINEPLACER®
lambda2



FINEPLACER®
sigma



FINEPLACER®
femto2



Manual



Semi Automatic



Automatic

Automation in Micro Assembly

FINEPLACER® femto 2
Product Presentation



FINEPLACER®
femto 2

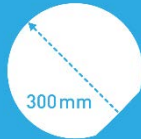
Operation



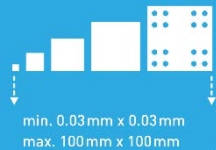
Accuracy



Wafer Support



Component



Force



Product Benefits

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Product Presentation



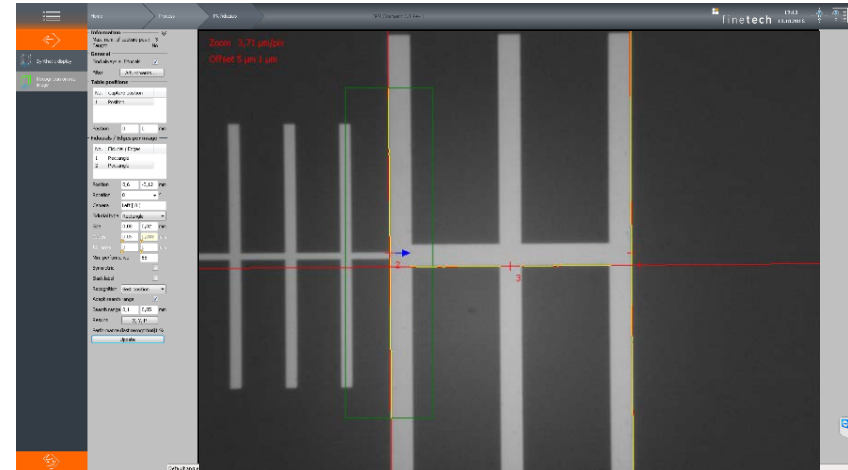
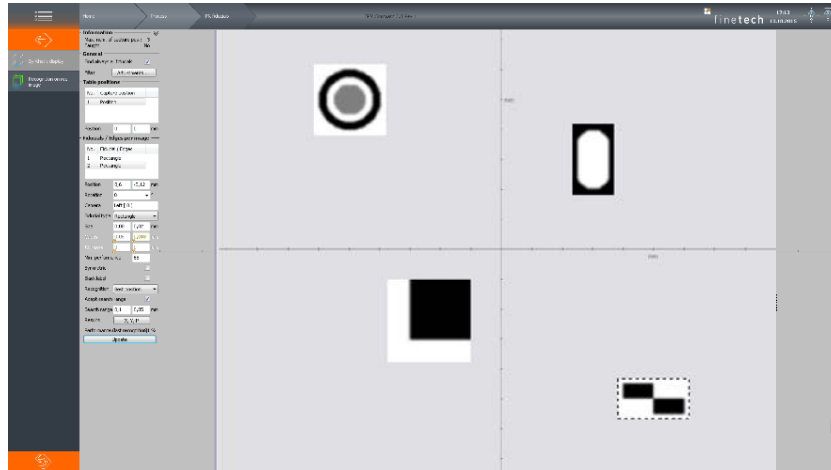
- **Highest placement accuracy up to 0.3 μm @ 3 Sigma**
- Outstanding process reproducibility
- Integrated Process Management (IPM)
- Application flexibility by modular system architecture
- Easy process transfer
- Manual to fully automated processes

Features

FINEPLACER® femto 2
Product Presentation



- Automated pattern recognition, alignment and bonding



Features

FINEPLACER® femto 2
Product Presentation



- Automated pattern recognition, alignment and bonding
- FPXvision™ for ultra high alignment accuracy
- Unique combination of UHD resolution and a very large object field

multiple magnifiers
zoom in every position
alignment accuracy
< 0.1 μm



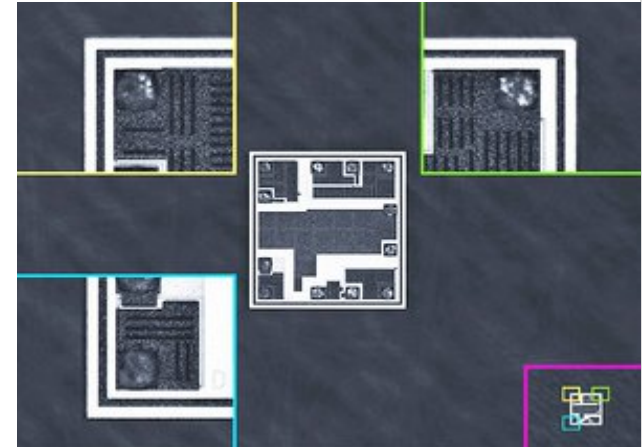
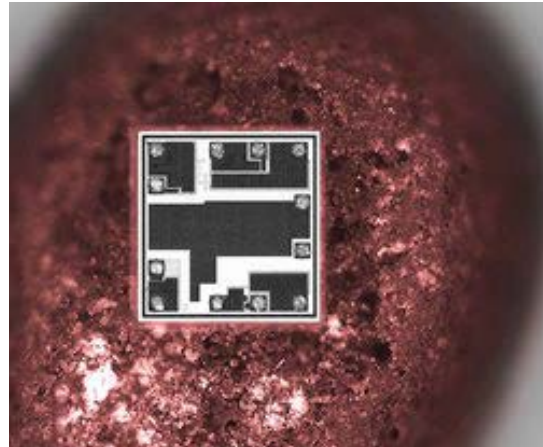
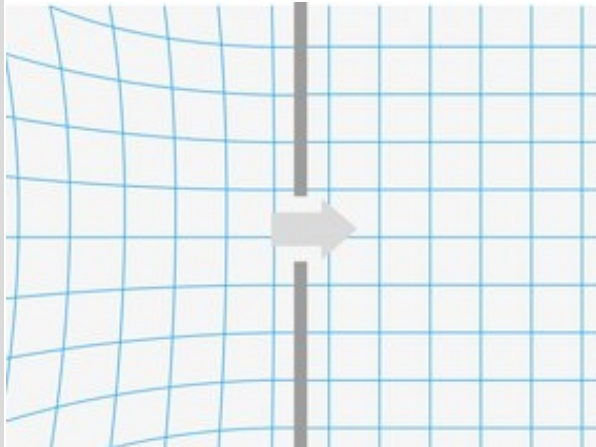
Field Of View
3800 μm x 2700 μm
resolution
1.00 μm /pixel

Features

FINEPLACER® femto 2
Product Presentation



- Automated pattern recognition, alignment and bonding
- FPXvision™ for ultra high alignment accuracy
- Unique combination of UHD resolution and a very large object field
- Sophisticated calibration algorithms enable undistorted images

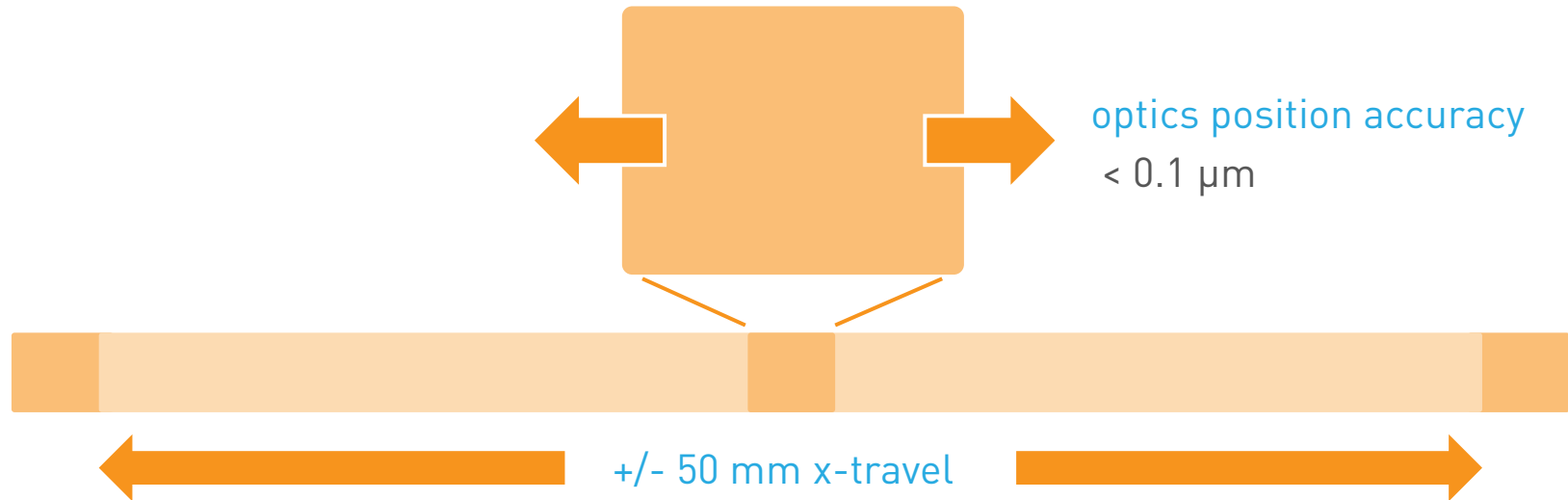


Features

FINEPLACER® femto 2
Product Presentation



- Automated pattern recognition, alignment and bonding
- Automatic FOV extension



Features

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Product Presentation



- **Automated pattern recognition, alignment and bonding**
- Automatic field extension and zoom
- FPXvision™ Overlay vision alignment system
- Integrated Process Management (IPM)
- Adaptive process library
- Live process observation camera



Benefits

Fully automatic, user independent process

Outstanding placement accuracy

High bonding force

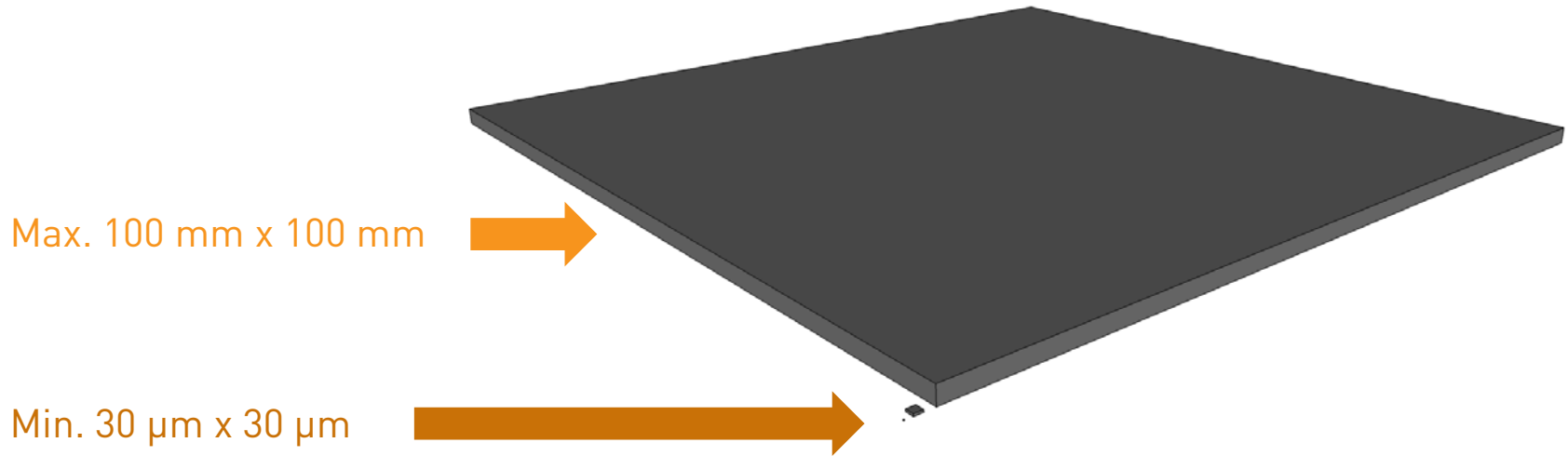
Chip and substrate heating

Process gas support

ROI savings - one machine for all applications

Benefits

- Large and small components = one system

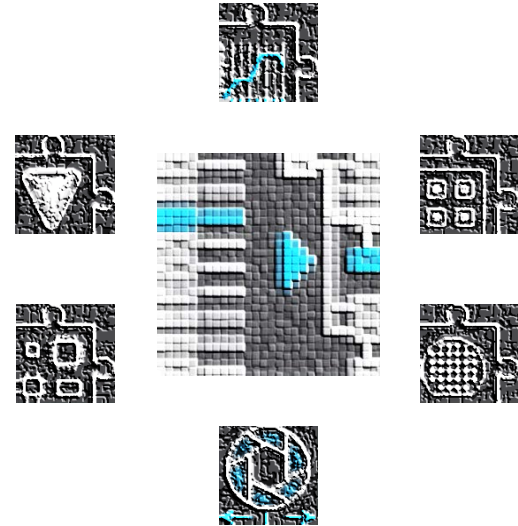


Software

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Product Presentation



- **IPM - Integrated Process Management**
- Instant operation without adjustments
- Synchronized control of all process related parameters
- Fast and easy process development
- Immediate visual feedback reduces process development time
- Integrated process documentation





Technical Spec

Placement accuracy: 0.5 μm @ 3 sigma

Component size (min): 0.03 mm x 0.03 mm

Component size (max): 100 mm x 100 mm

Field of view (min): 3.8 mm x 2.7 mm

Optical field extension in x: 100 mm





Technical Spec

Working area (max): 660 mm x 150 mm

X/Y-accuracy: 0.1 μm

Z-travel / accuracy: 10 mm / 0.2 μm

Theta travel / accuracy: $\pm 9^\circ$ / 0.2 m°

Bonding force range: 0.05 to 1000 N

Heating temperature (max): 450°C

Applications

FINEPLACER® femto 2
Product Presentation



1 Single Laser /
Laser bar bonding

2 Wafer Level Packaging
(C2W, TSV)

3 LED, VCSEL, PD
bonding

4 Micro optics
assembly

5 MEMS / MOEMS
packaging

6 Sensor packaging

Application Keywords

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Product Presentation



1 3D Packaging

**2 Silicon Photonics,
Opto-Electronics**

**3 Chip on Glass,
Chip on Flex**

**4 Flip chip
(face down)**

**5 Precise die attach
(face up)**

Modular System

FINEPLACER® femto 2
Product Presentation



- **femto base machine** consists of:
 - » pick & place arm
 - » x, y, z and theta table
 - » working area with vacuum support
 - » bonding forces up to 40 N
 - » FPXvision™ vision system
 - » software IPM Command



Modular System

FINEPLACER® femto 2
Product Presentation



- **Technological modules available:**

- » substrate heater
- » force module
- » tool tip changer
- » die flip module
- » UV curing module
- » formic acid module
- » LASER assisted bonding

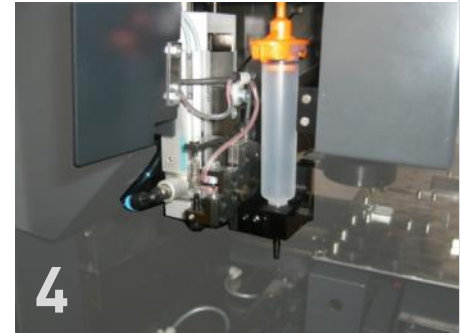
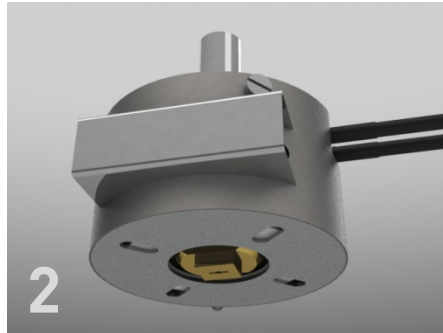
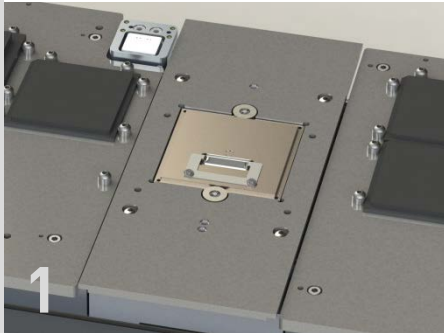
- » chip heater
- » substrate handler
- » ultrasonic module
- » process gas module
- » dispenser support
- » die ejecting module

Modular System

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Product Presentation



- Most common modules:
 1. substrate heater
 2. chip heater
 3. process gas module
 4. dispenser support



Modular System

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Product Presentation

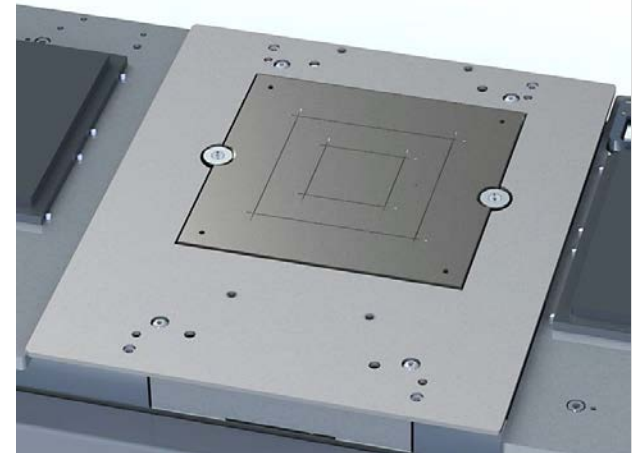


- **substrate supports:**

unheated = vacuum support and clamping area

heated = standby or process temperature by module:

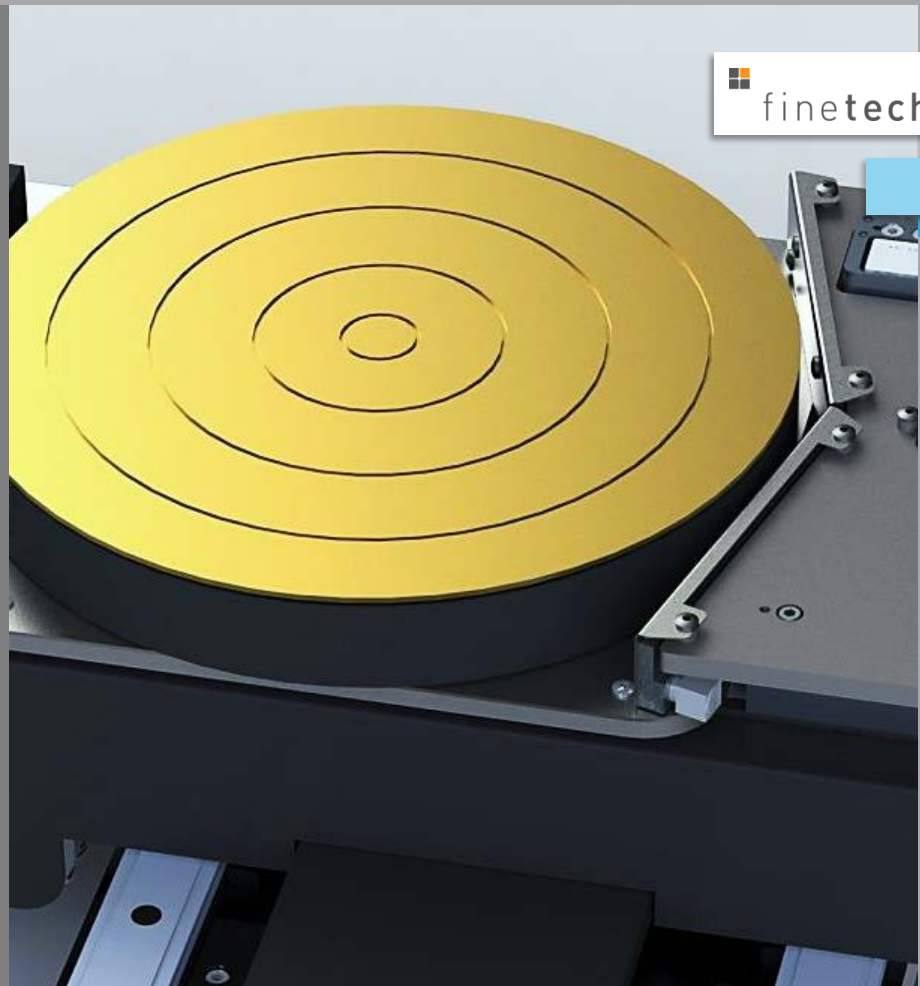
- » small substrates = fast heating plate (12 x 12 mm²)
- » medium substrates = heating plate (50 x 50 mm²)
- » large substrates = heating plate (100 x 100 mm²)
- » wafers from 6" to 12" = heated wafer chuck





Modular System

- **wafer heater:**
 - » enlarged bottom heating
 - » chuck for 6" to 12" wafers
 - » 6", 8" and 12" version
 - » flat precision surface with vacuum support channels
 - » room temp. to 300°C all over the surface (active heating / cooling)
 - » optional wafer rotation



Modular System

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Product Presentation



- **chip heater:**
 - » **direct heating of components**
 - » 80 W and 160 W heaters (FB3C)
 - » 300 W heaters (FB6C)
 - » self aligning gimbal function
 - » integrated inert gas support

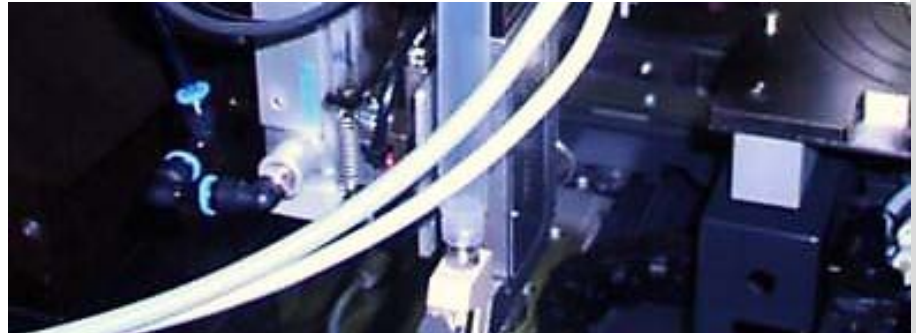


Modular System

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Product Presentation



- **dispenser support:**
 - » **high precision dispensing (adhesives / solder / flux)**
 - » touch down / touch less
 - » dots and dot matrix
 - » lines and shapes (easy programmable)
 - » compatible with:
 - » time / pressure, needle valve, screw and jet dispenser



Modular System

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Product Presentation



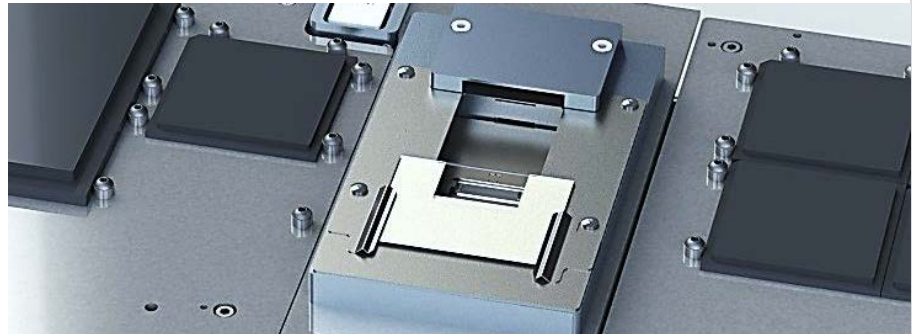
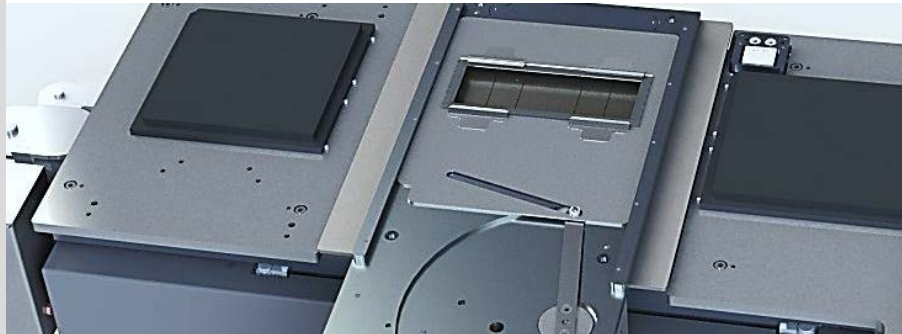
- **substrate handler:**
 - » **pick & place substrates / submounts**
 - » carries second pick up tool
 - » 360 degree rotatable – sort and align in dedicated orientations
 - » touch down detection
 - » example: to transport large

Modular System

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Product Presentation



- **process gas module:**
 - » **avoid oxidation / reduce oxide layers**
 - » gas flow directed to bonding position
 - » unheated and heated gas
 - » small substrates = inert gas chamber
 - » large substrates / wafers = inert gas tool
 - » Nitrogen (N_2) or forming gas (N_2H_2 95/5)



Modular System

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Product Presentation



- **formic acid module:**
 - » **reduction of oxide layers (e.g. Indium)**
 - » formic acid vapor ($\text{CH}_2\text{O}_2 + \text{N}_2$)
 - » safe handling of acid (e.g. refill)
 - » precise flow regulation (l/min)
 - » operator protection by exhaust system



- **pick up tool = interface between FINEPLACER® and application**
 - » **handle the component within process (vacuum, clamping)**
 - » gentle to components (soft material, structured surface)
 - » covers more than one component size / type (no tool exchange needed)
 - » self levelling (to guarantee parallelism)
 - » recognizable by PR