

NoTouch™ End Effectors

Flexible Integration Components

Tru-Si's NoTouch™ robotic end effectors enable automatic handling of flexible ultra thin to rigid full thickness wafers without touching or damaging them. Silicon, GaAs, InP, and other similar material can all be handled using the same end effector. Even extremely uneven surfaces, such as bumped or dirty wafers, are no problem for NoTouch™ end effectors.

The unique, universal design of Tru-Si's end effector allows it to work with both cassettes and a variety of wafer stacking pods from multiple vendors. Sensors are available for automatic detection of wafers in a cassette, cross slotted wafers, wafers in a pod, separators in a pod, and foam in a pod.

Wafers are levitated using multiple gas vortices to provide an evenly distributed lifting force that picks up and holds the wafer flat. Each of the gas vortices produces a mini tornado that creates a low pressure above the wafer. But since air is being blown out of the vortices, the wafer is suspended in equilibrium between the blowing air and the low pressure lifting force.

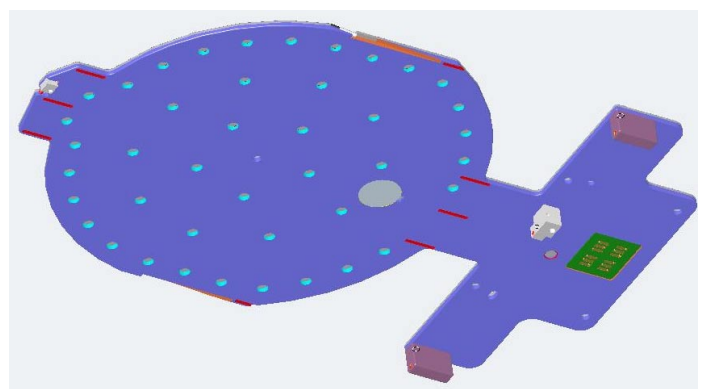
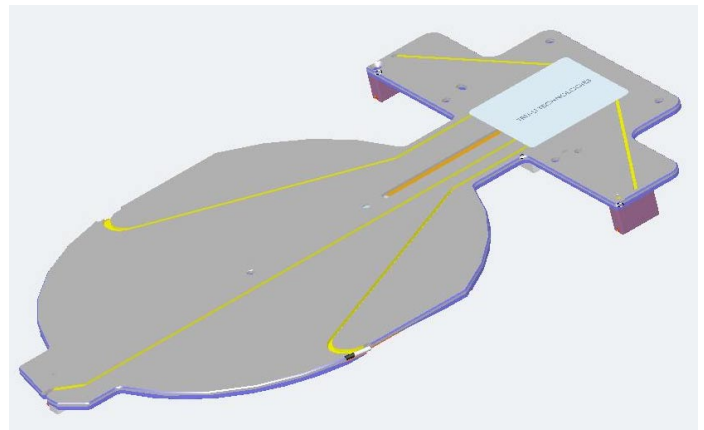
Gas vortices are distributed evenly over the surface of the end effector to apply a uniform holding force over the entire surface of the wafer thus minimizing stress to thin fragile wafers. This distribution also insures that bowed wafers are flattened as they are picked up and then held flat suspended beneath the surface of the end effector.

Small brakes made of peak plastic, the same material used in the manufacture of cassettes, are used to keep the wafer from sliding off or rotating on the end effector. The peak brakes are mounted front and back and only touch the edge of the wafer.

Front side protection of devices or bumps is unnecessary since no physical contact is made between the wafer and NoTouch™ end effector.

Holding gas can be compressed air (CDA), dry nitrogen, or any other inert gas. If the gas is from a compressed source, wafers will be held in place during a power loss.

Tru-Si's NoTouch™ robotic end effectors are available in 100mm, 125mm, 150mm, 200mm and 300 mm sizes.



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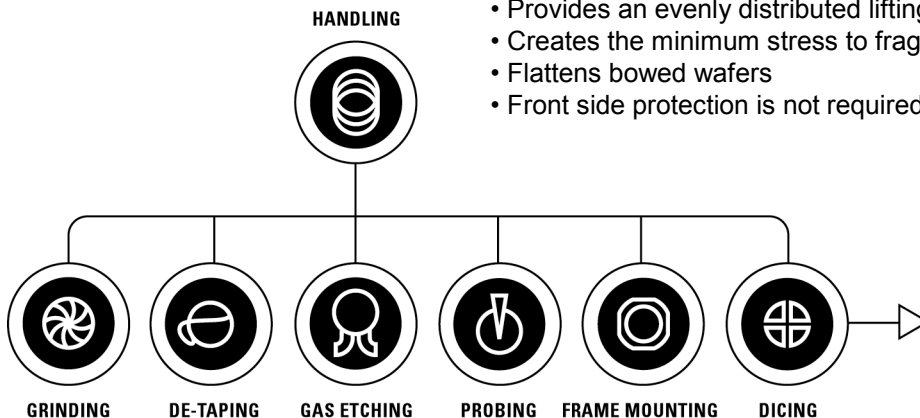
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Specifications

End Effectors:	100 mm	125 mm	150 mm	200 mm	300 mm
Measurements					
length	Factory	Factory	10 in.	11 in.	13 in.
width	Factory	Factory	4.8 in.	6.7 in.	11.0 in.
thickness	Factory	Factory	0.21 in.	0.21 in.	0.25 in.
Gas flow	30 LPM	35 LPM	35 LPM	50 LPM	100 LPM

Tru-Si's NoTouch™ End Effector Advantages

- Handles ultra thin to full thickness wafers
- Handles Silicon, GaAs, InP, and other materials
- Bumped or dirty wafers are no problem
- Universally works in cassettes and wafer stacking pods
- Sensors for wafer, separator, and foam detection
- Provides an evenly distributed lifting force
- Creates the minimum stress to fragile wafers
- Flattens bowed wafers
- Front side protection is not required



Tru-Si's flexible integration scheme allows customers to handle ultra thin wafers in and out of Tru-Si's etching equipment in addition to tools for other process steps in the ultra thin wafer processing flow such as grinding, detaping and film frame mounting.

Tru-Si's NoTouch™ robot end effectors and hand held wands, along with wafer stacking pods available from multiple vendors make flexible integration of advanced wafer thinning operations possible.

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