

## Key Features

- Variable sizes possible
- Non-contact flattening and transport of substrates
- Substrate thickness 2.5 mm  $\pm$  0.5 mm
- Air bearing/vacuum chuck
- Nominal air gap 30  $\mu$ m
- Clean room suitable
- Side-by-side placement is possible



## Air Bearing/Vacuum Floating Unit

### Concept and Design

Floating Units are the solution for all processes that require non-contact transportation and precise positioning of flat, fragile objects.

Floating units are used for the structuring process in solar panel production. During the process, the glass substrate hovers above the Floating Unit at a defined distance of a few  $\mu$ m from the carrier plate.

This is achieved through the precise arrangement of pressure nozzles and vacuum nozzles. The requirements for precise positioning could not be met by simply creating an air cushion by pressure nozzles that work against the ambient pressure. Only the interaction of positive and negative pressure makes it possible to position the glass substrates so precisely that they can be moved within the narrow focus of a stationary laser. The repeatability of flatness within defined positions on moving substrates is very high.

The body of the Floating Unit is made of black anodized aluminum.

Side-by-side placement of several Floating Units is possible. Deviating sizes are available on request.

The air gap at the edges can be individually controlled by a separate air supply. It is set to 45  $\mu$ m, while the PV functionality is retained.

### Set-up Procedure

- Connect the Floating Unit (FU) to 4 Tip-Tilt-Units (TTUs), which serve as a leveling unit.
- Set TTUs to the approximate height.
- Position FU on the TTUs.
- Connect to air supply and vacuum.
- Align FU as required using an auxiliary axis system and/or a digital spirit level.
- Continue setting up the 2nd FU:  
Align 2nd FU with reference to 1st FU. Use an auxiliary axis system, a digital spirit level or a steel ruler. For optimum performance, the height offset at the gap between the FUs should be  $< 5 \mu$ m.
- Continue with the setup of additional FUs as described above.

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## Specifications

Mechanical Data	Unit	PA	PV
Dimension (length x width x height)	mm	153 x 300 x 35 <sup>1)</sup>	200 x 432.5 x 50 <sup>1)</sup>
Mass	kg	5.6 <sup>2)</sup>	8.5 <sup>2)</sup>
Substrate thickness	mm		2.5 ± 0.5
Max. acceptable glass flatness	µm	-	70 µm / 200 mm
Nominal air gap	µm	≥100	20 - 30
Flatness of air gap over 100 mm	µm	-	± 5
Flatness of air gap over the entire Floating Unit	µm	-	± 6
Repeatability of air gap with moving glass at any reference point on the PV chuck	µm		± 1
Flatness of chuck surface	µm		< 10
Air supply at PA zone	mbar	50	50
Air supply at PV zone	mbar		1300
Vacuum	mbar g		- 600
Air consumption	Sl/min	15	15
Vacuum consumption	Sl/min		25
Clean room suitability		suitable	suitable
Material		aluminum, black anodized	
MTBF	h	> 20,000	> 20,000

  

Requirements on Air Quality	Value	ISO class
Particle size	≤ 1 µm	DIN ISO 8573-1 - class 2
Pressure dew point	≤ +3 °C	DIN ISO 8573-1 - class 4
Oil content	≤ 0.1 mg/m <sup>3</sup>	DIN ISO 8573-1 - class 2

1) individually configurable in size and format

2) depending on dimension

Subject to technical modifications and typographical errors.

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