LOGITECH
Materials Technologists & Engineers

WSB2 Wafer Substrate Bonding Unit

- Automated process cycle minimizes operator input
- Excellent wafer to support disc parallelism
- Touch button control of bonding parameters
- Bubble free bond
- 4” (102mm) or 6” (152mm) wafer capacity
- Single or multiple wafer capacity

Introduction

Bonding techniques for processing thin and fragile II-VI and III-V semiconductor wafers such as silicon, GaAs and InP require delicate handling procedures. Laboratories bonding such materials need to maintain the highest quality of sample yield and minimise breakage of these expensive materials in the wafer preparation process.

The Logitech Wafer Substrate Bonding Unit has been designed to meet such stringent requirements. Available as single-station or a three-station unit, this highly automated machine incorporates both vacuum and pressure bonding facilities. It allows the operator to mount and bond up to three part or whole wafers up to a diameter of either 4” (102mm) or 6” (152mm) prior to further processing. The system produces consistently high standards of wafer to support disc parallelism, irrespective of whether one large wafer or a number of smaller wafers of differing thickness are being mounted and bonded. Touch button control of the process display on the machine’s front panel allows all process parameters to be accurately controlled. This includes a programmable bonding temperature and vacuum to produce the required environment for a specific sample type.

Operation

The elimination of cleavage of ultra-thin wafers, repeatability of bond thickness and production of excellent dimensional accuracy are achieved through precise control of the flexible diaphragm within the bonding chambers of the Wafer Substrate Bonding Unit. The diaphragm ensures that the wafer is pressed into the wax layer in a controlled manner providing a uniform, parallel cushion to protect the wafer and its devices. The unit has been designed to ensure that the sample and device architecture do not come in contact with the support disc.

Using a series of screen options, accessed by soft keys from the process data display, the operator can programme the unit to bond samples over a wide range of temperatures and applied load. The pressure bonding facility built into the Wafer Substrate Bonding Unit is designed to achieve the best possible results using vacuum and positive pressure.

Each of the vacuum/pressure chambers accepts support discs of up to 4” or 6” diameter, depending upon the model being used, and up to 8mm thick. Once samples have been placed within one or all of the vacuum/pressure chambers the control system increases the vacuum and increases the temperature to the previously programmed values.

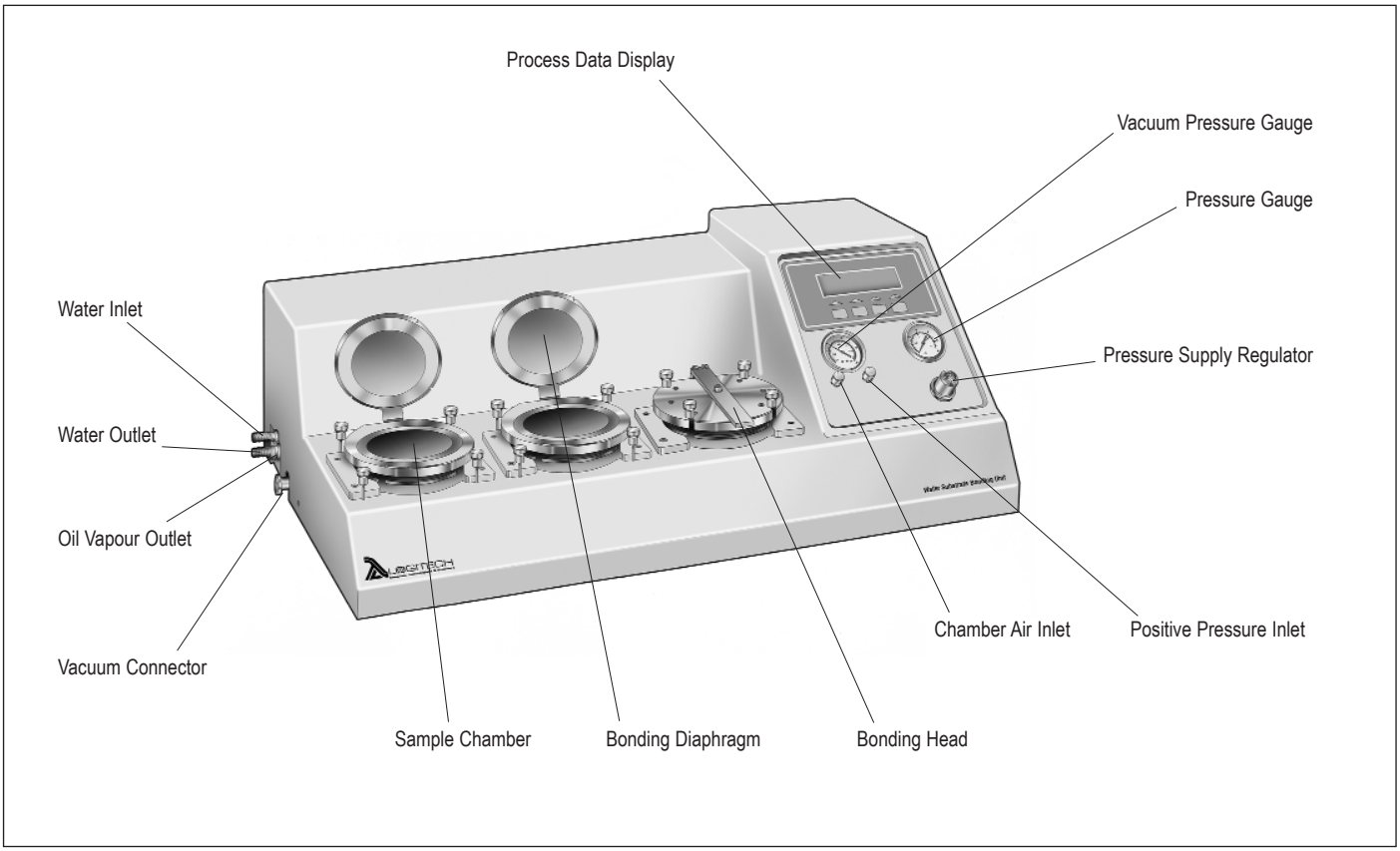
The machine then proceeds to a “soak” stage where temperatures are allowed to equalise across the substrate and sample and wax outgassing take place.

This time may be pre-set for between 1 and 59 minutes. Subsequently, the air at atmospheric pressure is allowed into the upper chamber, causing the diaphragm to press down on the sample. After the sample has been subjected to this precision bonding for a further pre-set time of between 1 to 59 minutes, the machine enters a cooling cycle, producing a high quality bonded wafer.

Where atmospheric pressure is insufficient to produce the required bond, additional pressure can be applied to the diaphragm so that the wafer is pressed on to the wax with greater force.

The bonding process - evacuation of the wafer chamber, heating, pressure bonding and cooling - can be completed automatically by the machin in 45 minutes, depending upon the bond temperature.

Technical Data



Specifications:

Maximum support disc size:

Diameter:	108mm (4.25") or 159mm (6.25") depending upon model
Thickness:	8mm (0.31")
Maximum capacity:	1* or 3*** wafers

Overall dimensions:	**4" (102mm) version**	**6" (152mm) version**
Height:	350mm (13.78")	350mm (13.78")***
Depth:	580mm (22.83")	580mm (22.83")***
Length:	520mm (20.47")* 960mm (37.80")***	1200mm (47.24")***
Weight:	31kg (69lbs)* 57kg (126lbs)***	117kg (258lbs)***
Power requirements:	0.72kW* (240V) 0.66kW* (110V) 1.4kW*** (240V) 1.44kW*** (110V)	3.12kW (240V)***
Water supply requirements:	Mains pressure cold water	Mains pressure cold water
Pressurised air (optional):	Regulated to 2bar +/-0.2bar maximum	Regulated to 2bar +/-0.2bar maximum

Please note that this unit requires connection to a water supply.

*** refers to three station unit

* refers to single station unit

Ordering Data:

Cat. No.	**Description**
1WSB1	Single station Wafer Substrate Bonding Unit with pump (220V, 50Hz)
1WSB2	As above but 110V, 60Hz
1WSB7	Single station Wafer Substrate Bonding Unit for 6" substrates with pump (220V, 50Hz)
1WSB8	As above but 110V, 60Hz
1WBT1	Three station Wafer Substrate Bonding Unit with pump (220V, 50Hz)
1WBT2	As above but 110V, 50/60Hz
1WBT5	Three station Wafer Substrate Bonding Unit for 6" substrates with pump (220V, 50Hz)

Optional Equipment

1WCS10	WCS10 Wax Layer Coating System (220V, 50Hz)
1WCS11	As above but 110V, 50/60Hz

Certificate No. FM12025

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