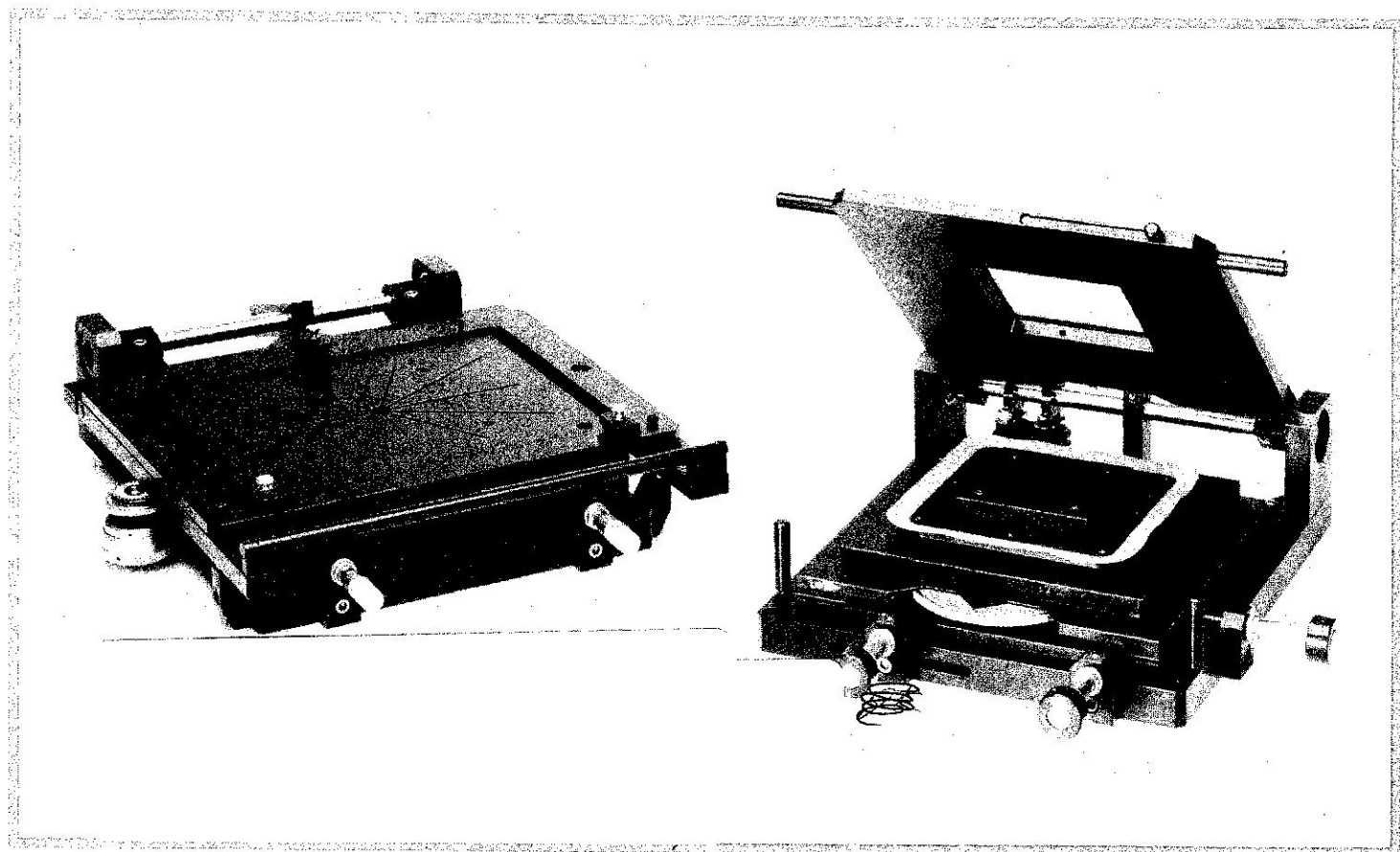




Advanced Exposure Group

Mask Alignment Fixtures

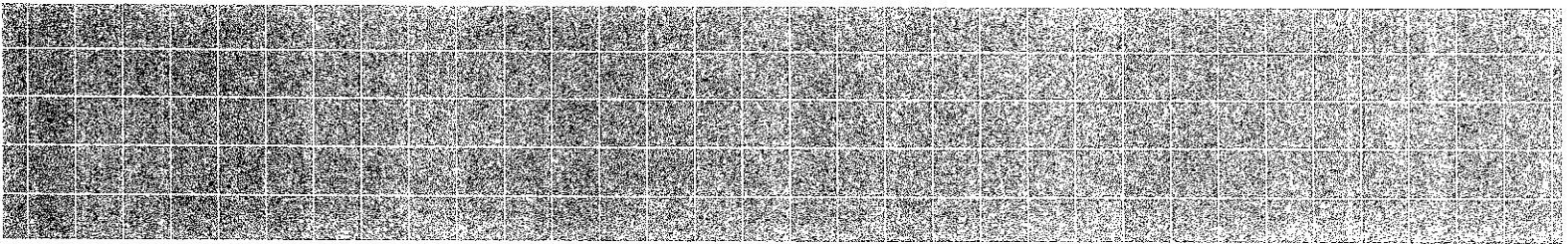
Precision alignment fixtures for
vacuum contact and proximity printing



These highly versatile tools are designed to precisely align substrates and wafers to photomasks for vacuum contact or proximity printing, while providing the maximum flexibility required for research and development applications. Model 83210 alignment fixtures feature interchangeable mask holders that range in size from 2" x 2" to 7" x 7" and substrate holders from 1" x 1" to 6" x 6"; model 83250 proximity printing fixtures offer mask holders from 2" x 2" to 10" x 10" and substrate holders from 1" x 1" to 9" x 9". A unique three step alignment technique allows quick and accurate alignment, and a three pin coarse adjustment system provides for rapid realignment; a vertical (Z) motion control sets the substrate to mask separation, and individual z-motion planarizing controls permit customization to unusual substrate configurations. Monitoring and control of vacuum and purge levels is achieved by means of an in-line vacuum/purge box. Fully compatible with most

commercially available photolithographic exposure systems, Oriel mask alignment fixtures provide an unparalleled combination of precision, flexibility, ease of operation, and low cost for a wide variety of applications including:

- ❑ Thin film hybrids
- ❑ Flat screen displays
- ❑ Power semiconductors
- ❑ Liquid crystal displays
- ❑ Photovoltaic cells
- ❑ Surface acoustic wave devices
- ❑ Microwave hybrids
- ❑ Fine line printed circuit boards



Vacuum contact and proximity printing

Vacuum contact printing is the recommended technique for high-resolution printing applications; when used with a highly collimated, uniform light source, resolution of image features with dimensions of 2 microns or less can be achieved. Proximity (off-contact) printing is intended primarily for applications involving image features larger than 2 mils (50 microns); under certain conditions, however, repeatable and well-defined image features of smaller than 1 mil (25 microns) can be printed with this technique. The most significant benefit of proximity printing is the elimination of mask wear.

3 step alignment technique

The exceptional ease of use that typifies Oriel mask alignment fixtures is perhaps best exemplified by the innovative 1-2-3 alignment system, which achieves quick and precise mask to substrate alignment by eliminating unnecessary micrometer interaction. Substrate alignment typically involves the aligning of three fiducial marks; the Oriel 1-2-3 alignment system provides one micrometer adjustment for each of these marks. The position of two of the three micrometers is adjustable, and by sliding each micrometer to a position perpendicular to its respective fiducial mark, the effectiveness of each adjustment is enhanced to the point that alignment is normally achieved with just three adjustments.

Planarizing substrate to photomask

The substrate stage of an Oriel mask alignment fixture rests upon three threaded vertical-adjustment controls that are connected together by a belt. Two of the three controls are able to function independently by means of a clutch in order to obtain optimal planarization of the substrate. All Oriel mask alignment fixtures are initially planarized prior to shipment.

Substrate holders

The interchangeable inserts of Oriel model 83210 mask alignment fixtures can accommodate substrates from 1 x 1 inches (25.4 x 25.4 mm) up to 6 x 6 inches (152 x 152 mm), and model 83250 proximity printing fixtures are capable of handling substrates as large as 9 x 9 inches (228 x 228 mm); other sizes are available upon request. Substrate thicknesses can range up to 0.240 (6 mm). Vacuum pressure holds the substrate firmly in position against three hardened steel coarse-alignment pins in order to prevent misalignment during the alignment and exposure cycles.

Photomask holders

Fully interchangeable photomask holders for model 83210 mask alignment fixtures can accommodate masks from 2 x 2 inches (51 x 51 mm) up to 7 x 7 inches (178 x 178 mm), and model 83250 proximity printing fixtures will accept mask sizes up to 10 x 10 inches (255 x 255 mm); other sizes are available upon request. The open-position angle and height of all photomask holders is adjustable and can be set to accommodate individual working environments. The mask is held mechanically against three hardened steel alignment pins. For vacuum contact printing applications, the mask conforms itself to the substrate, permitting very high-resolution images to be attained. Contact pressure can be adjusted to satisfy various vacuum contact requirements. An N₂ purge port is provided for negative resist or other applications that call for the use of an inert gas or positive pressure. Mylar mask holders from 2 x 2 inches (51 x 51 mm) up to 7 x 7 inches (178 x 178 mm) are available upon request.

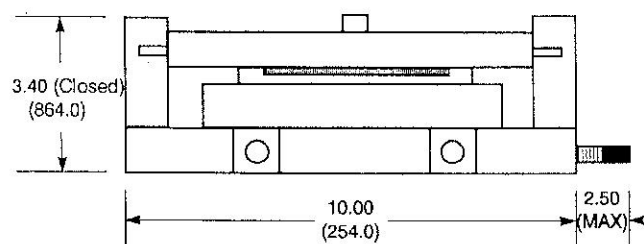
Vertical (Z) motion

The vertical (Z) motion control provides high-resolution positioning of the substrate relative to the mask. The full range of motion covers 0.245 inches (6.2 mm), and proximity spacing can be set for substrates up to 0.240 inches (6 mm).

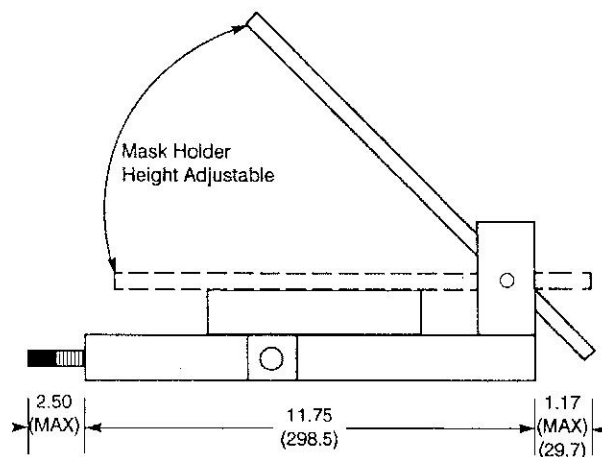
Dimensions

Note: dimensions are in inches (mm)

83210 Mask alignment fixture for vacuum contact or proximity printing applications

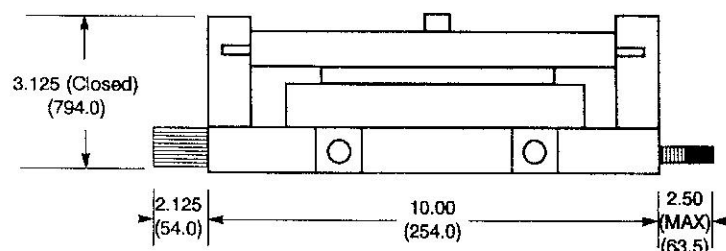


Front View

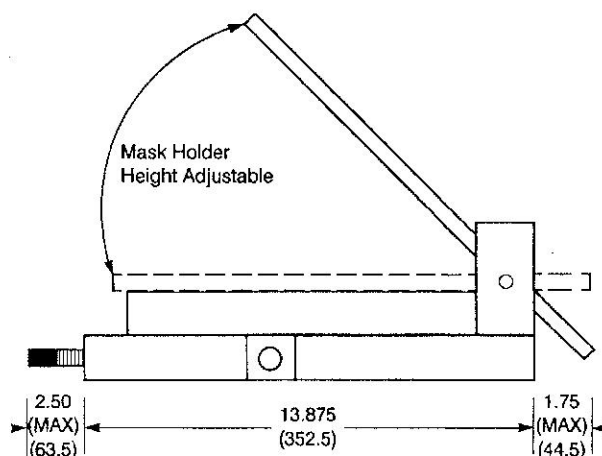


Side View

83250 Mask alignment fixtures for proximity printing applications



Front View



Side View

Optional components

88100-1200 12 inch (304.8 mm) precision slide assembly — provides smooth, precise transport of the alignment fixture between alignment and exposure stations.

88100-2000 23.5 inch (597 mm) precision slide assembly

85030 Vacuum Pump — 115 volts at 6 amperes, 60 Hz.

85031 Vacuum Pump — 208-240 volts at 3 amperes, 50 Hz.