

# LAPMASTER®

## MODEL 36

### AIR BEARING OPTICAL POLISHING MACHINE



- This machine is designed primarily for the production of high quality plano-optics, such as proof flats, etalons, prisms, filters, windows and ring laser gyroscope blanks.
- It has a unique feature in its use of a dynamic air bearing which supports the rotating mass of the pitch lap and its backing plate, drive being through a circumferential belt.
- The virtual elimination of vibration, together with a recirculation water system to control pitch temperature, lead to dramatically improved performance.
- It can typically produce flatness within  $\lambda/20$  (He) over surfaces up to 300mm diameter, and surface texture well below  $10\text{\AA}$ RMS.

#### FEATURES AND TECHNICAL SPECIFICATIONS

##### OPTICAL PITCH LAP

- Outside diameter 914 mm. (36ins)
- Central recess diameter 254 mm.
- Approx depth of pitch 64 mm.
- In any polishing machine of this type the pitch polishing plate is the heart of the system. To produce consistently high quality results, the selection of raw materials, melting, casting and machining must be carried out with meticulous care and control. Lapmaster performs this work in-house, and has many years experience in this field. The resin based pitches Lapmaster produces are used today by the vast majority of the optical industry.
- A full plate refacing service, as well as the supply of raw material is offered.

The pitch is characterised by its hardness, and is normally specified by the Twyman penetration test, in thousands of an inch.

The most popular pitch, used for hard glass optics, is approximately 22 thousandths of an inch.
- The cast pitch plate is faced to remove surface irregularities and bubbles, and an appropriate groove pattern (normally concentric) is cut.
- These operations use a special accessory—the pitch trimming bar. This is fitted with a tool holder retaining a special pitch cutting tool, which can be driven across the lap surface.
- The cutting tool can be finely adjusted vertically to control the depth of cut. Normally the grooves are spaced about 15 mm apart, though other patterns can be cut on request, as can diamond or square cross-hatch grooves.
- The pitch is retained externally by an aluminium band fitted to the periphery of the plate, and internally a stack of micarta rings is used.
- The pitch lap rotates at around 4 to 6 r.p.m. for polishing, but its variable speed capability allows running at 25 r.p.m. for the pitch facing operation.



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### FEATURES AND TECHNICAL SPECIFICATIONS

- Drive Motor  
460 V 3ph 60Hz  
2.3kW 1500 r.p.m.  
Precision balanced.

#### PITCH LAP CONDITIONING.

- The pitch lap shape is controlled by a conditioning weight or tool faced with a number of glass discs, and running on the pitch lap in the third workstation at the rear of the machine. The weight is positively driven driven by a frictional system to ensure continuous rotation.
- The lateral position of the weight, which can be finely adjusted by means of weight plates, which locate in a recess on the weight itself.
- The weight can be lifted clear of the pitch surface by means of a screw hoist, when the machine is not running.

#### TEMPERATURE CONTROL.

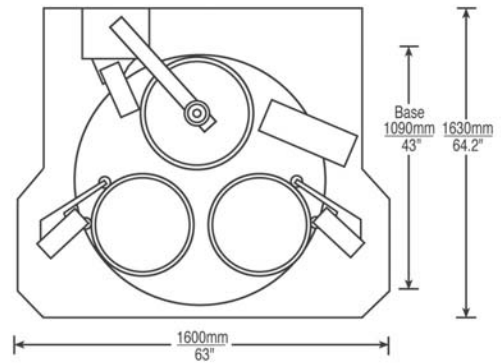
- A freestanding unit, consisting of a pump, heater, air cooled chiller and thermostat, permits constant temperature water to be recirculated through cavities in the backing plate of the pitch lap. The water is plumbed via a rotary union to permit plate rotation, and is fitted with a visible flow indicator. This feature minimises start up time, for machines not in continuous use.

#### SUPPLY OF FLUID TO LAP

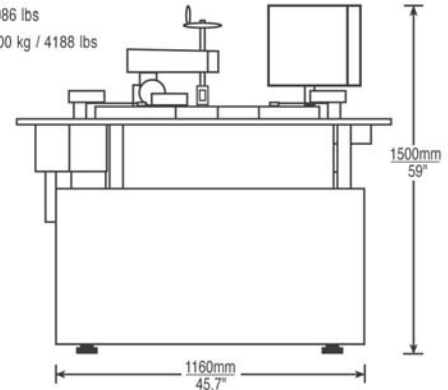
- Polishing compound, usually of the cerium oxide type is fed once or twice during the working day.
- Deionised water from a 3 litre reservoir is continuously fed to the lap plate surface by an adjustable peristaltic pump.

#### WORKHOLDER RINGS

- These are manufactured of cast aluminium, faced with chamfered glass "feet", bonded into a machined recess with wax.
- Outside diameter 350mm.
- Inside diameter 300mm.
- Tufnol workholder  
Insert diameter 307 mm. Thickness 1.5 mm.
- Unblocked or irregular shaped pieces are located in appropriate cut-outs in the workholder. The workholder rests on a machined shoulder on the ID of the workholder ring, to prevent it touching the lap. Loading can then be applied to the parts using individual weights, if required.



Weight: 1400 kg / 3086 lbs  
Shipping Weight: 1900 kg / 4188 lbs



#### POSITIVE AND ECCENTRIC DRIVE SYSTEM

- The positive drive system is fitted with a one way clutch so that drive is only applied to the workholder ring by friction via the O-rings on the roller bar bearing, should the ring cog or stall. This can occur with offset pieces or an unbalanced load in a ring.
- Geared Motor 22W  
220V 50Hz  
Ratio 100:1  
Output 15 r.p.m.
- The eccentric drive system can be adjusted for amplitude by means of a cam, and is also variable speed (thyristor DC control system).
- Geared Motor 10W  
220V DC  
Ratio: 197:1  
Output 0 to 10 r.p.m.  
Linear speed of yoke 0 to 16.6mm/s
- Machines can be supplied to suit other voltages and frequencies, details on request.



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Lapmaster has a policy of continued development and the specifications outlined above are subject to change without notice.