PR HOFFMAN
AMTECH GROUP

PR-2 SERIES

PR-2 Series
Double-sided Planetary
Lapping and Polishing Machine

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PR-2 Series

Planetary Lapping & Polishing Machine

The P.R. Hoffman PR-2 Series lapping and polishing machine is a small table top machine designed for finishing a variety of small parts with excellent results. It is ideal for research and development applications where small quantities of parts are common. The pieces to be processed are placed in carriers (work holders) which are driven in a planetary motion between two stationary plates. The planetary action simultaneously removes equal amounts of material from both sides of the pieces. The PR-2 Series planetary lapping and polishing machine can be modified to meet your processing requirements by the addition of a wide variety of optional accessories.

GENERAL DESCRIPTION

Configuration:	32 Tooth No. of Carriers: 5 Part Circle: 2.1" [53mm]] Root Diameter: 2.5" [64mm]
Plate Dimensions:	Outside Diameter: 6.9" [175mm] Inside Diameter: 3.5" [90mm] Track Width: 1.7" [43mm] Top Plate Thickness: 0.375" [9.5mm]
Min. Work Thickness:	0.003" [75 microns]
Top Plate Weight:	3.5 pounds [1.6Kg]
Weights:	Basic Machine: 96 pounds [44 Kg] (approx.) Shipping Weight: 175 pounds [80 Kg] (approx.)
Machine Dimensions:	Diameter: 12" [31cm] Height: 16" [41cm]
Standard Electrical Utility:	115 VAC, 60 Hz, Single Phase, Standard 15 Amp Wall Outlet 220 VAC, 50 Hz, Single Phase, Standard 15 Amp Wall Outlet

STANDARD EQUIPMENT

Model:

The PR-2 Series is available in a 32 tooth carrier (work holder) configuration. The carrier size corresponds to the size of the part being processed. The small PR-2 carrier size is optimum for thin and small parts.

Machine Drive:

The ring gear and center gear are driven by a 1/17 HP [40 watt] variable speed permanent magnet DC motor acting through a mechanical transmission. The PR-2 Series drive components provide a smooth speed ramp for soft starting of fragile parts. An overrunning clutch provides for a soft stop at the end of a cycle and allows the operator to manually rotate the ring and center gears.

Lap Plates:

The standard PR-2 machine is equipped with smooth cast iron lap plates. Each plate has a steel ring pressed into the ID and onto the OD. These rings, set slightly below the plate surface, prevent thin carriers from flexing under load. The rings on the top plate also protect the operator from the gear teeth when the machine is running.

The top plate floats freely on the parts and is restrained from rotating by a dogging arm that pivots down and engages two posts on the plate. A post and hanger is included for storing the top plate when not in use.

The bottom plate height is adjustable relative to the ring and center gears, which allows the wear from the carrier teeth to be distributed across the entire face of the gear teeth for maximum ring and center gear life.

Controls:

The lap selector switch activates the lap cycle, including timer, automatic digital sizing gauge (option) and slurry delivery system (optional). The slurry system turns off at the end of a cycle, thus saving abrasive. The main drive is controlled by a master speed control knob. An emergency stop push-button deactivates all functions. A digital timer, showing time in 0.1 minute increments to a maximum of 99.9 minutes, can be used to turn the machine off at a preset time. A selector switch allows the machine to be run under manual control, time control or gauge control.

OPTIONAL EQUIPMENT

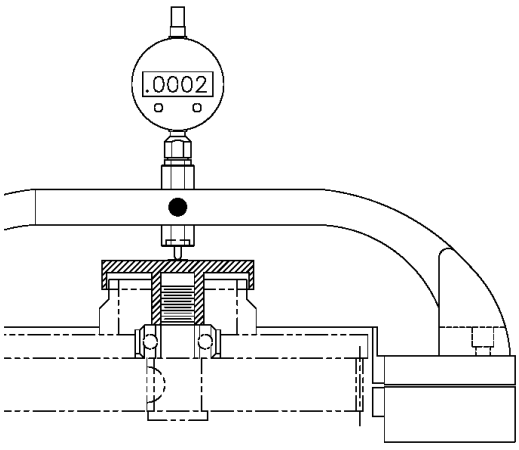
Digital Sizing Control:

The digital gauge sizing device is controlled by a Windows® PC and integrated touch screen. This device approximates the thickness of the parts being processed by direct measurement of the distance between the plates. The digital gauge probe is mounted on the top lapping plate, and makes contact with a tungsten-carbide anvil mounted on the machine center shaft. The gauge can be adjusted to account for slurry fluid boundary layer and for plate wear. It is recommended that the optional automatic abrasive distribution system be used with the digital gauge to insure that a consistent fluid boundary is maintained.

The operator presets the amount of material to be removed on the touch screen control in inches, microns or millimeters. The gauge device then shuts the machine off when this amount of material is removed. Typically, this gauge can be used to process parts to tolerances of +/-0.0002" [5 microns] or better.

A “crash” setpoint allows the sizing control to automatically sense a "crash" and terminate the polishing cycle. This crash detection function also prevents the machine from running in the event that the parts are not loaded properly into the carriers.

Thickness Measuring Gauge:

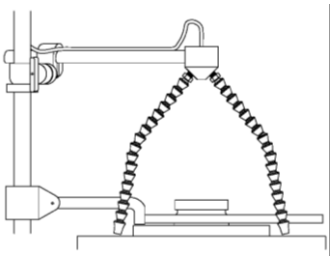


This digital indicator mounts directly to the top plate of a PR-2 machine. The thickness of the parts is approximated by direct measurement of the distance between the plates. This design provides a lower cost alternative to an automatic digital sizing system where automatic setpoint controls are not needed.

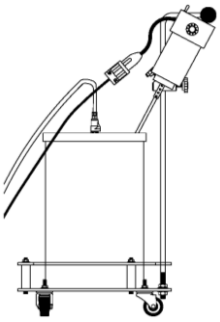
It allows the operator to determine when target is reached without having to stop to measure.

It also provides the operator a tool to help prevent “crashes” caused by incorrect loading of carriers and parts.

Abrasive Distribution System:



Abrasive slurry is supplied from a 5 gallon [18 liter] polyethylene container. This container is mounted on a wheeled hand cart, which allows the operator to mix remotely. A high quality DC variable speed mixer allows agitation to be adjusted precisely. A peristaltic pump powered by a variable speed high quality DC motor supplies slurry to the slurry divider block which evenly distributes abrasive to four slurry hole locations on the top plate. The divider block swings out of the way for removing the top plate and loading access. A drip pan is included. The pumping system and tank assembly can be purchased separately. An alternate 1 gallon [4 liter] stationary bench top mixer stand is also available (please contact factory for details).



Special Lapping Plates:

Lapping plates can be provided in a variety of materials and configurations to meet your processing requirements. Popular variations include cross-hatched or radial serrations to improve total thickness variation on parts, diamond pellets and ductile Martensite iron fine-grain lapping plates for scratch-free lapping of parts using fine 3 – 9 micron particle size slurry.

Stainless Steel Plate Option for Polishing or Fixed Abrasive Lapping:

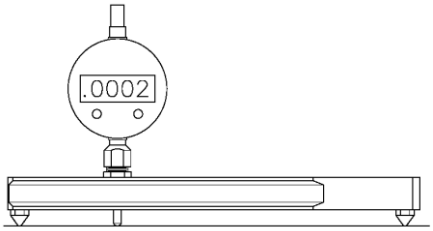
Top and bottom stainless steel polishing plates are recommended for processes such as polishing or fixed abrasive lapping, when fluids are used that are not compatible with cast iron. Available in standard or wide track width.

Stainless Steel Gear Option for Polishing or Fixed Abrasive Lapping:

Stainless steel center and ring gears are recommended for processes such as polishing or fixed abrasive lapping, when fluids are used that are not compatible with cast iron.

Flatness Gauge:

The lap plate flatness measuring gauge is available with a digital indicator, protective case and granite flat. The flatness gauge allows the operator to monitor and maintain optimum plate flatness. This option is recommended with the first machine purchase.



Top Plate Drive:

This system is useful when lapping very thin or fragile material by reducing carrier drag and carrier damage. The stationary dogging arm is replaced with a drive bar linked to a special dust cap with drive lugs. The top plate is specially grooved and drilled to distribute the slurry.

Note: Top Plate Drive is not compatible with the Digital Sizing Gauge option.

Water Sprayer:

Convenient water spray gun for part and machine wash down. The high-quality spray gun has precise spray control, and is made of Teflon®, which is compatible with de-ionized water. The flow rate is limited by a flow regulator that is installed in the plumbing system.

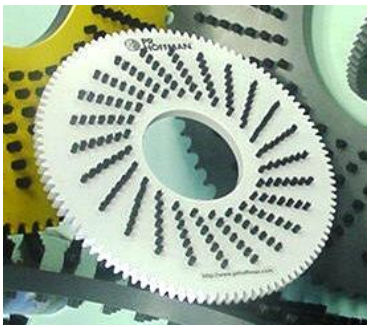
Note: The water sprayer system is included with the Abrasive Distribution System option.

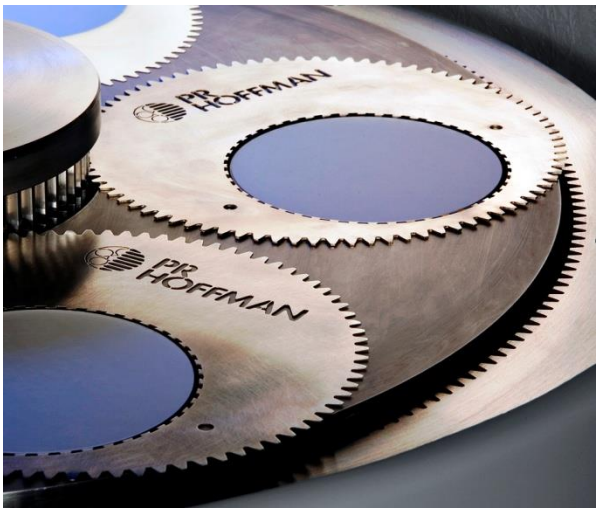
Conditioning Gears:

One set of rigid, bronze dressing gears, used to remove irregularities on the surface of the lapping plates, such as scratches or rust deposits, is recommended with each machine. A set commonly includes (5) gears.

Brush Carriers for Polishing Pads:

Brush carriers with scrubbing bristles are used with a water flush to clean and restore glazed polishing pads. Brush carriers are commonly used in sets of 5:





Carriers (Workholders):

Carriers are stocked in spring steel, phenolic, Lamitex™, PVC, Lexan®, and rigid vinyl with thickness' from 0.002" to one inch. Workholes of any size and shape are available. Other materials are available on request.

(Example of Model 1500 Carrier)

Warranty:

All processing machines are warranted by Seller to be free from defects in materials and workmanship for a period of one year after the date of shipment by Seller. Seller's warranty of processing machines covers parts only, does not cover labor, and does not cover any machine which has been abused, misused or negligently operated or maintained. If Buyer notifies Seller in writing within ten days after discovery of a defect during the warranty period only, and if such defect appears in Seller's sole judgment to be a defect in material and workmanship attributable to Seller, Seller will make such repair or replacement to correct such defects as Seller in its sole judgment shall deem appropriate. The above warranties supersede all warranties of merchantability or fitness for a particular purpose.

There are no warranties, express or implied, which extend beyond the warranties contained herein. The foregoing remedy shall be Buyer's sole and exclusive remedy against Seller. Broken or faulty parts must be returned to P.R. Hoffman for inspection and new or repaired parts will be returned.