



LAPMASTER®

HAMAI

# LSP SERIES

ULTRA-PRECISION DOUBLE-SIDED  
FLAT LAPPING/POLISHING MACHINES

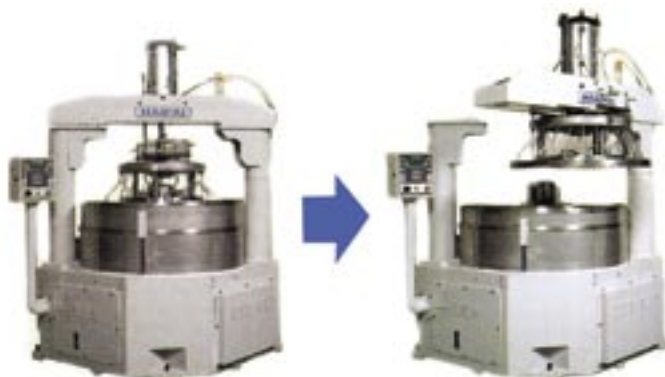
# LSP FEATURES

## PRECISION DOUBLE SIDED FLAT LAPPING/POLISHING MACHINES



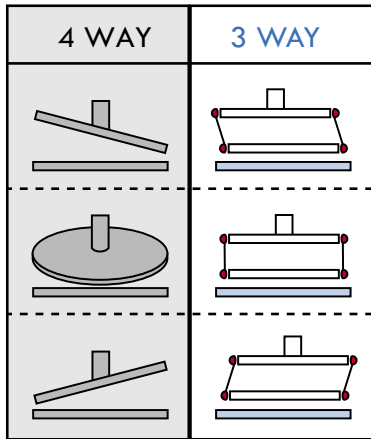
- The Lapmaster-Hamai LSP Series is a line of ultra-precision planetary double sided lapping and polishing machines. These machines incorporate a multitude of innovative features and benefits designed to yield precise and repeatable results at an economical price. Excellent results are obtained when using this equipment to process a wide range of materials and components including glass, ceramics, crystals, semiconductors, and ferrous materials
- The LSP series has been designed and built to meet to strict quality standards with rugged, heavy duty construction featuring a cast iron machine base, corrosion resistant wetted components, precision ground and hardened drive gears, and robust solid state electrical and pneumatic controls. These robust features combine to yield extremely low maintenance requirements and a very long service life while minimizing unproductive down time.
- Machine operation is controlled through a graphical interface to a programmable controller. The custom designed software prompts the operator for specific operating parameters and stores up to 8 different lapping and polishing routines containing up to 20 different process steps which can be recalled for later use. The work carriers are gear driven or pin driven (depending on model) for smooth action while processing fragile parts. Plate and carrier speeds and acceleration are precisely controlled through AC frequency inverters for gentle machine cycle start and end steps, and equal or differential stock removal from both sides of the work pieces depending upon the process requirements. The outer gear drops below the plate for the facilitation of machine loading and unloading. The top plate down pressure is continuously monitored and adjusted through the control system to maintain a consistent and repeatable process.
- The LSP series is available in a wide variety of configurations including two, three, and four way motion design, depending upon the application and customer's preference. Additionally, Lapmaster-Hamai offers the largest selection of equipment in the industry capable of processing parts as small as 1/8" in diameter up to 72" in diameter to meet virtually any double sided lapping and polishing requirement imaginable.

## LSP DETAILED FEATURES



The entire upper plate assembly is supported by a heavy duty fabricated steel bridge. The bridge cross member suspending the head assembly can be swung out of the way to facilitate lapping plate and/or polishing pad replacement.

# LSP DETAILED FEATURES-CONTINUED



## 3-WAY SYSTEM

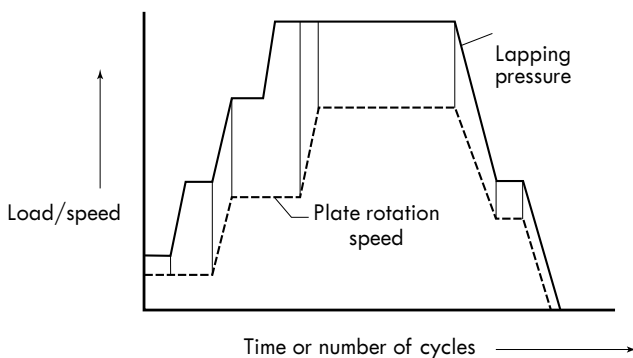
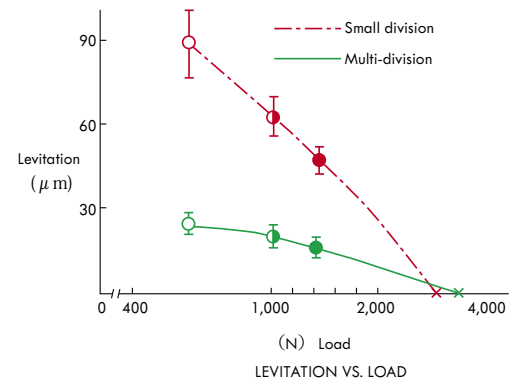
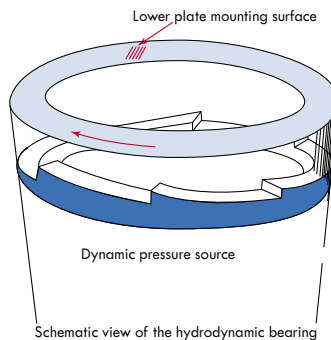
The 3-way system allows excellent load tracking and uniform load from the upper plate, by making it stationary and suspending it from an endless wire system. The wire-suspension system allows the top plate to slide in parallel with the lower table allowing no deviation in the load distribution in a batch. The suspension wires also absorb micro vibration, enabling constant lapping/polishing of work pieces in a natural stress-free state.



WIRE SUSPENSION SYSTEM

## HYDRODYNAMIC PLAIN BEARING

The lower plate rotates on a special hydrodynamic plain bearing. The bearing components are separated by a thin film of oil, which allows a high loading capacity, is maintenance free, and virtually eliminates wear. The unique design also drastically reduces vibration associated with standard ball and tapered roller bearings, ensuring improved processing accuracy and efficiency.

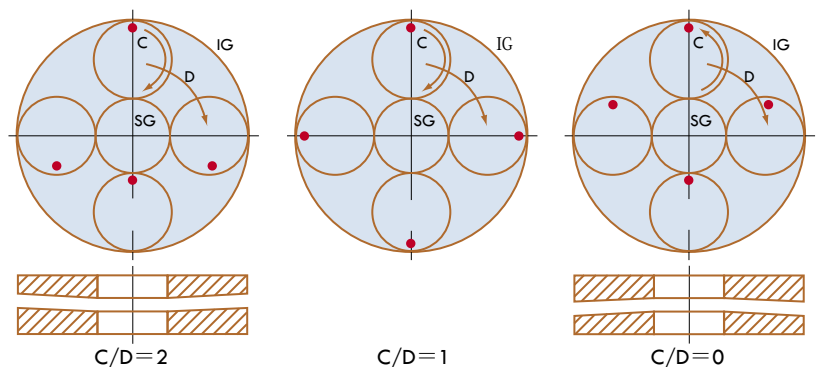


## PLATE ROTATION SPEED AND LAPPING PRESSURE MULTI-STEP CONTROL SYSTEM

Controls the lapping pressure and lower plate rotation speed simultaneously in multi-steps, thereby removing the stress induced by pre-processing and preventing cracks and chippings of hard and brittle materials.

## AUTOMATIC PLATE FLATTENING

Programmable reversing of carrier axial spin direction keeps plates flat during production. Controlling axial spin constantly corrects any out of flat condition, virtually eliminating unproductive plate dressing cycles.



Ratio of carrier rotation to revolution

# STANDARD SPECIFICATIONS AND OPTIONS

## STANDARD FEATURES

- Vibration absorbent cast iron machine base
- Programmable process controller with graphical user interface.
- Pneumatic top plate control with precise in-process monitoring.
- Bottom plate hydrodynamic plain bearing system.
- In-process lap plate flattening.
- Two, three or four independently controlled lapping/polishing plate and carrier drives.
- Abrasive slurry distribution system with propeller type agitator, variable speed pump.
- Retractable ring gear for loading and unloading.
- Adjustable sun gear
- Corrosion-resistant wetted parts and hardware.
- Anti-vibration mounting and leveling pads.
- Bridge type upper plate support with swivel arm for easy changing out of polishing pads and lapping plates

## STANDARD TOOLING / ACCESSORIES

- Two cast iron cross hatched lap plates or two aluminum solid polishing plates
- Set of four, serrated, cast iron dressing gears - lapping configuration (diamond pellet coated on one side - polishing configuration)
- One starter set of six blank, gear type work carriers.
- Operating and maintenance manual.

## ELECTRICAL SERVICES

- 3 phase, 50/60 Hz, 200/220 volts
- Single phase, 60 Hz, 110 volt controls & slurry system



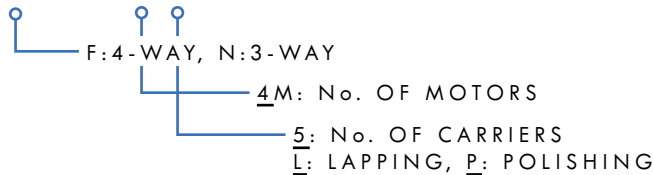
## AVAILABLE OPTIONS

- Automatic thickness control. (Linear transducer-type contact probe, non-contact eddy current probe, or ALC frequency system)
- Rinse at end of cycle. Including dual drain tanks and autoswitch
- Custom lapping or polishing plate materials and configurations.
- 316 Stainless Steel wetted components.
- Automatic work carrier loading/unloading systems
- Magazine-type handling system for conditioning gears (LSP 16 size and up)
- Hand shower
- Set of five (5) steps for easy access to machine working envelope (LSP 16 size and up)
- Foot operating plate jog switch
- Two, three or four way motion configurations available
- Patented upper plate wire suspension system for 3 way models

# SPECIFICATIONS

## SMALL-SIZED LAPPING/POLISHING MACHINES

MODEL / ITEM		WORK MAX.DIA. mm	WORK MIN.THICK mm	NO. OF CARRIERS	CARRIER SPEC.	UPPER PLATE OD-ID mm	L PLATE SPEED MIN -1	NO. OF MOTORS	MACHINE SIZE W-D-H mm	MACHINE WEIGHT kgf
3BN/F	1M8L 1M8P	φ43	0.030	8	DP12×Z32	Lapping plate 263.4×176.8×20 polishing plate 266.4×173.8×20	2 - 20 5 - 45	1M	490×490 ×1,865	200
3BN/F	2M8L 2M8P							2M	800×1,000 ×1,665	550
3BN	3M8L 3M8P							3M	800×1,030 ×1,965	600
4BN/F	1M5L 1M5P	φ70	0.040	5	M2×Z50 ×α14.5	Lapping plate 263.0×117.0×20 polishing plate 263.0×117.0×20	2 - 20 5 - 45	1M	490×490 ×1,865	200
4BN/F	2M5L 2M5P							2M	800×1,000 ×1,665	550
4BN	3M5L 3M5P							3M	800×1,030 ×1,965	600
5BN/F	1M8L 1M8P	φ80	0.045	5	DP12×Z50	Lapping plate 288.6×113.6×20 polishing plate 290.1×112.1×20	2 - 20 5 - 45	1M	550×550 ×1,865	300
5BN/F	2M8L 2M8P							2M	800×1,000 ×1,665	600
5BN	3M8L 3M8P							3M	800×1,030 ×1,965	650
6BN/F	1M5L 1M5P	φ105	0.050	5	DP12×Z66	Lapping plate 361.7×171.7×24 polishing plate 378.2×155.2×24	2 - 20 5 - 45	1M	550×550 ×1,865	300
6BN/F	2M5L 2M5P							2M	800×1,000 ×1,665	600
6BN	3M5L 3M5P							3M	800×1,030 ×1,965	650
9BN/F	2M5L 2M5P	φ180	0.070	5	DP12×Z108	Lapping plate 612.6×208.6×35 polishing plate 612.6×208.6×35	4 - 30 5 - 45	2M	1,420×1,130 ×2,590	1,400
9BN	3M5L 3M5P							3M		1,500
9BF	4M5L 4M5P							4M		1,500
9BN/F-6B	2M10L 2M10P	φ105	0.050	10	DP12×Z66	Lapping plate 615.5×383.5×35 polishing plate 619.5×379.5×35	4 - 30 5 - 45	2M	1,420×1,130 ×2,590	1,400
9BN-6B	3M10L 3M10P							3M		1,500
9BF-6B	4M10L 4M10P							4M		1,500
9BN/F-10B	2M5L 2M5P	φ200	0.090	5	DP12×Z120	Lapping plate 680.7×250.7×35 polishing plate 695.7×235.7×35	4 - 30 5 - 45	2M	1,420×1,130 ×2,590	1,400
9BN-10B	3M5L 3M5P							3M		1,500
9BF-10B	4M5L 4M5P							4M		1,500



## MEDIUM-SIZED LAPPING/POLISHING MACHINES

MODEL / ITEM		WORK MAX.DIA. mm	WORK MIN.THICK mm	NO. OF CARRIERS	CARRIER SPEC.	UPPER PLATE OD-ID mm	L PLATE SPEED MIN -1	NO. OF MOTORS	MACHINE SIZE W-D-H mm	MACHINE WEIGHT kgf
12BN/F	2M6L 2M6P	φ220	0.2	6	DP12×Z134	Lapping plate 963×451×40	5 - 60	2M	1,625×1,540 ×2,500	3,000
12BN	3M6L 3M6P					3M		3,200		
13BN/F	2M6L 2M6P	φ240	0.2	6	DP12×Z147	Lapping plate 914.4×368.4×40	5 - 60	2M	1,625×1,540 ×2,500	3,000
13BN	3M6L 3M6P					3M		3,200		
15BN/F	2M5L 2M5P	φ310	0.3	5	M3×Z128	Lapping plate 1,022×346×50 polishing plate 1,046×322×50	5 - 60	2M	1,890×1,410 ×3,110	6,000
15BN	3M5L 3M5P							3M		6,500
15BF	4M5L 4M5P							4M		
16BN/F	2M5L 2M5P	φ335	0.3	5	DP12×Z200	Lapping plate 1,127×397×50 polishing plate 1,165×359×50	5 - 60	2M	1,890×1,410 ×3,110	6,000
16BN	3M5L 3M5P							3M		6,500
16BF	4M5L 4M5P							4M		
18BN	3M5L 3M5P	φ390	0.4	5	M3×Z150	Lapping plate 1,221×459×50 polishing plate 1,247×433×50	5 - 60	3M	1,750×2,485 ×2,895	8,000
18BF	4M5L 4M5P							4M		

## LARGE-SIZED LAPPING/POLISHING MACHINES

MODEL / ITEM		WORK MAX.DIA. mm	WORK MIN.THICK mm	NO. OF CARRIERS	CARRIER SPEC.	UPPER PLATE OD-ID mm	L PLATE SPEED MIN -1	NO. OF MOTORS	MACHINE SIZE W-D-H mm	MACHINE WEIGHT kgf
20BN	3M5L 3M5P	φ390	0.5	5	M3×Z170	Lapping plate 1,370×460×50	5 - 60	3M	2,200×2,760 ×2,900	10,000
20BF	4M5L 4M5P					4M				
22BN	3M5L 3M5P	φ470	0.5	5	M3×Z184	Lapping plate 1,458×498×50	5 - 60	3M	2,200×2,760 ×2,900	10,000
22BF	4M5L 4M5P					4M				
24BN	3M5L 3M5P	φ550	0.6	5	M4×Z152	Lapping plate 1,572×572×60	5 - 60	3M	2,200×2,760 ×3,000	12,000
24BF	4M5L 4M5P					4M				
28BN	3M5L 3M5P	φ660	0.7	5	M4×Z178	Lapping plate 1,864×672×60	5 - 60	3M	2,800×3,100 ×3,445	18,000
28BF	4M5L 4M5P					4M				
30BN	3M5L 3M5P	φ700	0.9	5	M4×Z190	Lapping plate 1,992×688×60	5 - 60	3M	3,675×3,370 ×3,690	21,000
30BF	4M5L 4M5P					4M				
32BN	3M5L 3M5P	φ700	0.9	5	M5×Z162	Lapping plate 2,120×740×50	5 - 60	3M	2,740×3,220 ×4,030	24,000
32BF	4M5L 4M5P					4M				
40BN	3M5L 3M5P	φ810	1.1	5	M6×Z170	Lapping plate 2,655×945×70	5 - 40	3M	3,460×3,820 ×4,300	38,000
40BF	4M5L 4M5P					4M				

Larger machines are available upon request.





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