



4-WAY DOUBLE SIDED LAPPING & POLISHING MACHINES

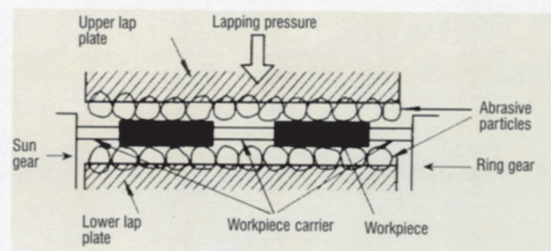
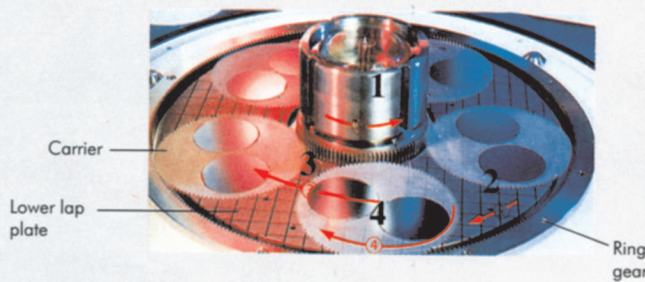


SPEEDFAM (INDIA) PVT. LTD.

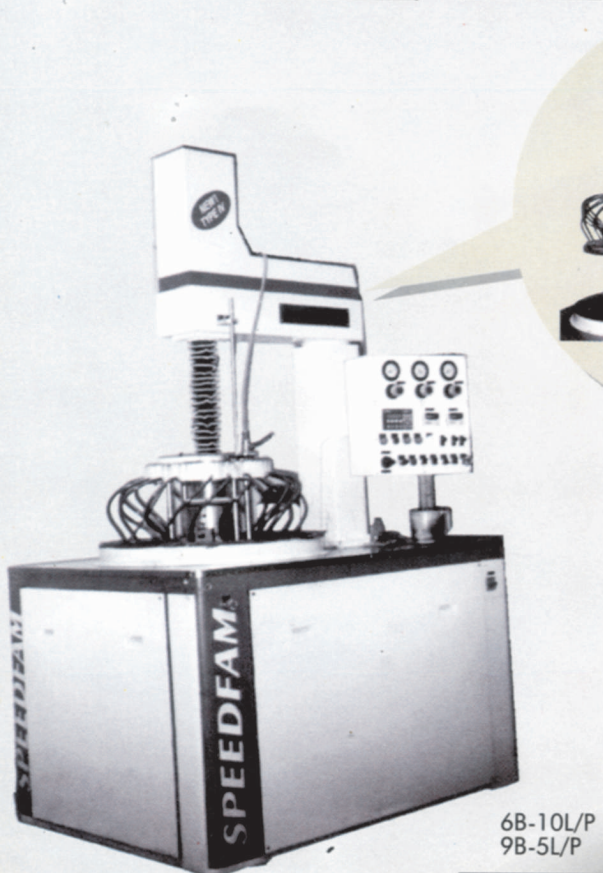
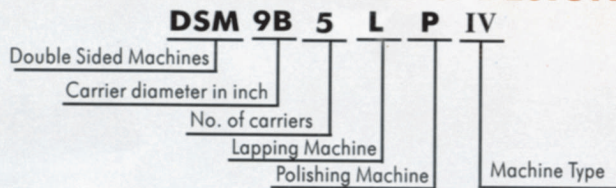
4-WAY DOUBLE SIDED LAPPING & POLISHING MACHINES

The key to the quality, speed and versatility of SPEEDFAM's Double-sided Machine involves a principle known as the 4-way Motion. Utility of the 4-Way Motion reduces machining time, surpassing the 2-Way Motion and 3-Way Motion capabilities of other double-sided machines. Here is how 4-way motion is achieved. Parts are captured in a manner that allows them to conform to varying aspects of the 4-way system including:

- ⇒ Rotational speed and direction of the lower and upper plates in relation to the carriers (1 and 2).
- ⇒ Rotational/Orbital motion of the carrier in relation to the speeds and directions of the lower and upper plates.(3)
- ⇒ Axial spin motion of the carrier in relation to the speeds and directions of the lower and upper plates (4)



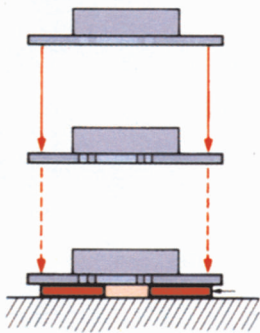
DSM NOMENCLATURE & DESIGN



FOR PARALLELISM, SURFACE FINISH & THICKNESS TOLERANCES.

STANDARD FEATURES

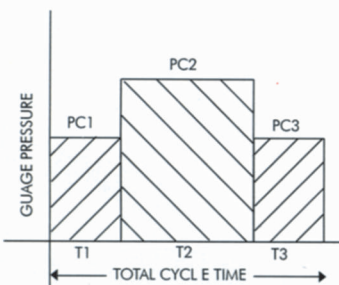
PRESSURE CONTROL SYSTEM



Applying the proper down-pressures to a workpiece at various stages of the machining cycle is critical to producing precision work. Speedfam's Pressure Control System ensures that the upper plate is carefully lowered on to the workpiece surface. The machining process is normally initially sequenced for low pressure to remove major thickness variation and flatness deviations, then "ramped-up" to remove the

balance of workpiece material. The DSM Pressure Control System is capable of very sensitive responses, making it easy to adjust even slight changes in the down-force vectors. This allows machining of a wide variety of part thicknesses and materials cracking and chipping of thin & fragile materials is virtually eliminated. The speed and down-force vector of the upper plate which initially contact the workpiece can affect the cycle performance and finished parameters. That's why variable speed/flow controls are standard equipment on all Speedfam DSM systems. Down-force vector speed may be adjusted and locked to suit the needs of a specific application. Stop Mode

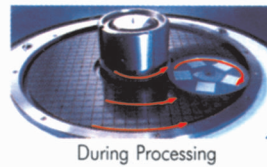
automatically returns pressure segment at the end of a cycle. In this system three pressure settings are provided. PC1 which is the initial pressure, is normally low pressure and works for a small time just to take care of high spots on the components or any other irregularity in thickness variation & flatness deviation. PC2 is the process pressure



which acts evenly on all components during cycle time and helps to remove equal material from all components. PC3 which is final pressure, acts at the end of the cycle for short time to improve the surface finish of component as well as to control thickness spread. Switch over from PC1-PC2-PC3 is automatic and connected to individual cycle timers which are preset by the operator.

The pressures for PC1, PC2 & PC3 can be preset depending upon process requirement and material of the component. The option of presetting PC2 (working pressure) or DW (dead weight) is standard.

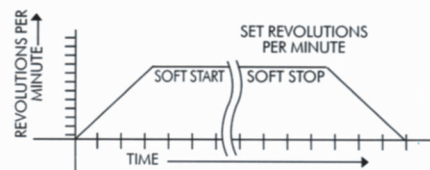
PLATE FLATNESS CONTROL



The flatness of the upper and lower plate surfaces is the most critical machine tolerance held, since it affects thickness variation, individual parallelism and flatness of the workpieces and down time of machine. Speedfam's DSM in-process Plate Flatness Control maintains precision flatness without incurring excessive machine or operator "down-time".

Automatic forward /reverse multi-motor system changes the carrier axial spin direction/speed to correct any "out-of-flat" condition.

VARIABLE SPEED CONTROL WITH SOFT START/STOP MECHANISM



Speedfam's Double Sided Machines are equipped with variable speed drive system. It helps operator to set the correct

speed of plates and carriers (governed by sun gear and/or ring gear rpm) required for the process. The top plate, bottom plate, rotate at different speeds to each other. The soft start/soft stop mechanism prevents the cracking and chipping of the work pieces that tend to occur at the start or finishing of processing operation & eliminate residual stresses that may have developed during process. Separate drive is provided to sun gear to facilitate its independent rotation in both direction. This enables optimisation of process parameters.

RING GEAR AND SUN GEAR ELEVATIONS

Speedfam's DSM features, motorised raising and lowering mechanism of the ring gear & sun gear which greatly simplifies unloading of workpieces especially thin & fragile. This also facilitates utilisation of full thickness of gears which complements its optimum utility.

AUTO SPIN OFF

In this the top plate is raised slightly up at the end of the cycle just before it comes to halt. This reduces sticking of parts to the top plate and avoid damage to the next batch.

APPLICATIONS

METALS

- Precision Computer Mechanical Drive Components
- Precision Spacers/ Washers • Gauging Blocks / Slip Gauges
- Fuel Injector Components • Hydraulic Pump Parts • Slitter Knives
- Compressor Valve Plates • Cutting Inserts • Piston Rings • Bearing Races

GLASS

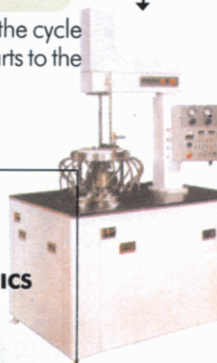
- LCD Glass • Optical Filters
- Optical Flats • Mirrors • Watch Glass • Quartz Crystals.

CERAMIC

- Water Pump Seals • Precision I.C. Assemblies
- Substrates • Thread Guides • Chemical Seals

SEMICONDUCTOR, ELECTRICAL & ELECTRONICS

- Si Wafers • GGG • GaAs Wafers
- Lightening Arrestors • Electrical Contacts



SAFETY FEATURES

The pneumatic pressure cylinder is equipped with facility to lock the top plate at its top position incase of power or pneumatic supply failure.

Emergency stop switches are provided at three places on machine body.

All machine doors are fixed on machine body by screws and hence can not be removed easily. The MMI with MIMIC is provided for fault detection (optional if PLC is provided).

ABRASIVE RECIRCULATING SLURRY SYSTEM

Speedfam Abrasive Recirculating slurry system keeps the abrasive and vehicle mixture in homogeneous condition all the time to ensure optimum usage of abrasive particles in cutting process. This also helps to reduce consumable cost as it extends more output when compared to non-recirculating type system. The stirrer motor in the system provides contineous stirring during processing and between the two cycles. ON delay timer on the machine actuates the slurry pump and slurry is fed on the plate before it starts rotating. This avoids the dry



running and damage to the parts.

OPTIONAL FEATURES

- Linear pressure control. • Antifall ring • Automatic lapping control (for quartz lapping only) • Stainless steel specifications
- PLC control • Automatic thickness control.

FLATNESS MEASURING INSTRUMENTS



CHECK-LITE



OPTICAL FLATS



CHECK FLAT



POLISH FLAT

For preparation and checking of flatness on the lapped/polished components.

DOUBLE SIDED MACHINES (DSM-TYPE IV)

Description	4B-6L/P	5B-8L/P	5B-6L/P	6B-10L/P	9B-5L/P	12B-6L/P	15B-5L/P	16B-5L/P	18B-4L/P
Lap Plate OD (mm)	297/308	380/388	380/388	636/646	630/636	850/869	1022/1046	1114 / 1144	1110 / 1160
Lap Plate Thk (mm)	18	20	20	30	30	40	50	50	50
Lap Plate RPM (Bottom)	10 ~ 100	10 ~ 100	10 ~ 100	10 ~ 50	10 ~ 50	10 ~ 60	10 ~ 60	10 ~ 60	10 ~ 60
No. of Carriers	6	8	6	10	5	6	5	5	4
Max Part Dia (mm)	75	80	100	115	205	260	360	400	440
Min / Max Part Thk (mm)	0.08 / 20	0.10 / 20	0.10 / 20	0.10 / 40	0.15 / 40	0.35 / 50	0.35 / 50	0.50 / 50	0.50 / 50
Main Motor HP	1.0 / 1.0	1.0 / 1.0	1.0 / 1.0	3.0 / 5.0	3.0 / 5.0	7.5 / 10	10/10	15 / 20	15 / 20
Machine Dimension (mm)	1075 x 960 x 1770	1075 x 960 x 1770	1075 x 960 x 1770	1460 x 1120 x 2300	1460 x 1120 x 2300	1900 x 1340 x 2585	2000 x 1400 x 2660	2250 x 1530 x 2710	2250 x 1530 x 2710
Machine Weight (in kg) (Approx)	600	600	600	1700	1750	3750	4000	4800	5000

* Specifications are subject to change without notice



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A subsidiary of Speedfam Co. Ltd., Japan

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