

MS/TF/TS SERIES

Forming/Surface Grinder



AMADA MACHINE TOOLS AMERICA, INC.

MSG3

CNC High Precision Forming Grinder



Vertical Feed System

- The column has a symmetrical structure to minimize thermal deformation and is covered with the heat-insulating materials for protection against changes in temperature and other environmental factors.
- The full-closed loop feedback system with the linear scale of 0.05μm resolution is available (standard for MEISTER G3, optional for others)

Wheel Spindle

- The 2.2kW spindle motor and inverter is standard for all models.
- The spindle cooling system with oil cooler ($\pm 0.1^{\circ}\text{C}$) is available. (standard for MEISTER G3, optional for others)

Table

- The table slide ways are composed of "V-V" slideways for the high straightness. Servo-valve controlled traverse drive system with teaching function.

Bed

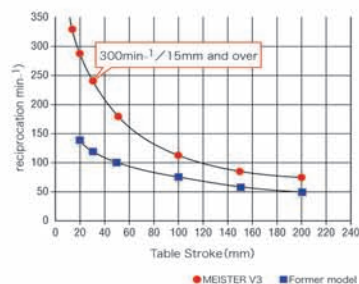
- The layout of the bed is optimized by jack bolt position & ribs for stability. Its' construction supports high-speed table reciprocation.

New Model Control/Operation Panel

- The space-saving control panel with AMADA MACHINE TOOLS original software can improve the machining efficiency.

Marvelous Rapid-Reciprocation Table

MEISTER series support a reciprocation speed 2 to 3 times as fast as any former model, the machining efficiency can be greatly improved.



MEISTER Series' Provisions To Prevent Thermal Deformation

The hydraulic unit is isolated from the main body and the hydraulic oil temperature is maintained at $\pm 0.1^{\circ}\text{C}$ by the built-in oil temperature controller.



- The hydraulic unit with oil cooler

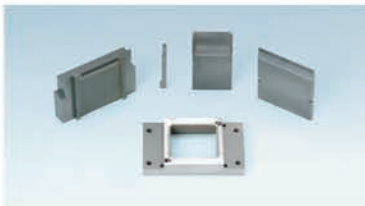
CNC Precision Forming Grinder



MSV3

- X,Y axis CNC control
- Table stroke: 500 x 200mm
- Table traverse way: hollow roller
- 2.2kW spindle motor (with inverter)
- Servo-valve controlled traverse drive system with teaching function

Sample



Manual Forming Grinder

TF M1

- Table stroke : 500 x 200mm
- Table traverse way: hollow roller
- 1.5kW spindle motor
- Vertical pulse-feed (with vertical scale counter)

TF H1

- Table stroke : 500x200mm
- Table traverse way: hollow roller
- 1.5kW spindle motor (with inverter)
- High speed reciprocation table (servo-valve control)
- Vertical pulse-feed (with vertical, cross-feed scale counter)
- Cross feed reversal position teaching function



TS D1/D3

Non-Hydraulic Oil Machine that is Kind to the Environment



Column

- Efficient high-rigidity column structure by structural analysis obtains high straightness.

Wheel Spindle

- Newly-designed $\phi 100$ high-rigidity spindle with quill is available for high-efficiency grinding.

Table

- Ball screw drive for newly-designed non-overhanging type V-V sliding surface structure table realizes high-precision operation in both high and low speed. Non-hydraulic system is used to reduce the effects on the environment.

Bed

- Adequate rib layout and high-rigidity bed structure with low center of gravity are derived by design based on structural analysis.

Front Side Operation

- Axis movement can be controlled from the front side of the machine; easy operation for column type is obtained.

New Model Control/Operation Panel

- The space-saving control panel with AMADA MACHINE TOOLS original software can improve the machining efficiency.

CNC Precision Surface Grinder



TS A3

- Table stroke : 600 x 250mm
- Table traverse way : double-V turcuit
- 3.7kW wheel spindle motor (with Inverter)
- X,Y axis CNC control
- Servo-valve controlled traverse drive system with teach function

Precision Surface Grinder

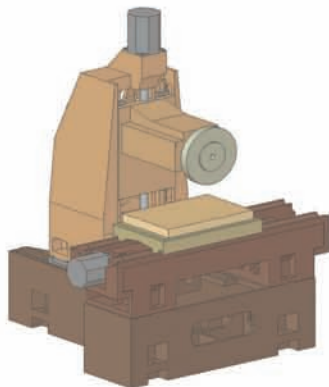


TS A1

- Table stroke : 600 x 250mm
- Table traverse way : double-V turcuit
- 3.7kW wheel spindle motor (with Inverter)
- Servo-valve controlled traverse drive
- Vertical pulse feeding (Digital read out for vertical feed, scale controlled for cross feed)
- Cross feed reversal position teaching

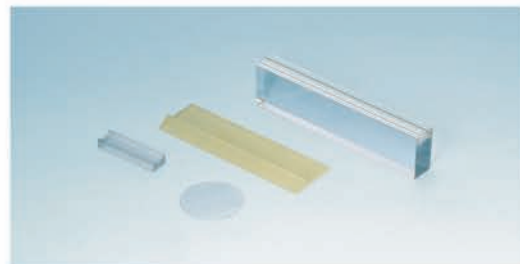
Structure analysis

AMADA MACHINE TOOLS Original isolated 3-sliding way column TS D3/D1



Optimized design by structure analysis enables minimum floor space

Sample



Numerical Intelligent Controller – Original Software Supporting High Precision Grinding

Program-Free Easy Operation

The software is can cycle driven, so you don't need to know the complicated NC programming

model

G: MS G3
V: MSV3
A: TS A3
D: TS D3

Grinding cycles

Pattern grinding (Optional : G,V,A,D)



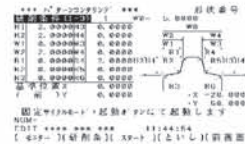
Complex form grinding by combining 5 grinding patterns. Plunge cut and traverse cut are selectable in each pattern to provide the best process.

Multi-work grinding (Optional : G,V,A,D)



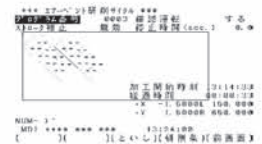
Several workpieces arranged on chuck can be continuously ground. Up to 5 types of grinding data can be invoked.

Pattern contouring (Optional : G,V)



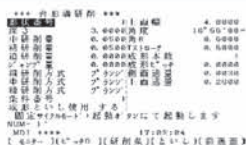
Grinding of various forms by entering necessary dimensions for basic figure graphics on the screen.

Air-vent grinding (Optional: G)



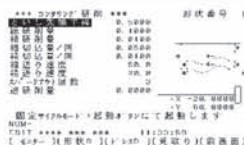
For several slots provided on a plate, grinding is performed with table left-right positioning. To use this cycle, special data should be previously created using air-vent cycle of WAPS-WIN and invoked for operation. (WAPS-WIN is necessary)

Trapezoid groove grinding (Optional : G,V)



For multiple trapezoidal slot grinding. Once slot size and pitch data are set, wheel forming and slot grinding are automatically performed. Plunge cut, traverse cut and contouring can be combined for coarse, medium and fine grinding phases.

Contouring grinding (Optional: G,V)



Form grinding is performed after entering figure data of a given particular form. Rough grinding by plunge cut is also practical. The created data can be stored in NC program area.

Table position setting (Standard : G,V,A,D)

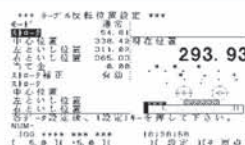
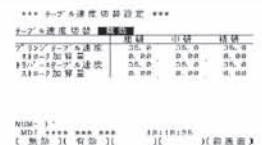


Table reverse positions are set on LCD screen by using table stroke teaching button with reference to chucked work. Shift function is also provided to shorten table reciprocation stroke according to infeed picks.

Table stroke/speed change-over function (Optional : G,V,A,D)



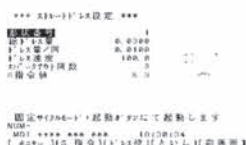
The function can automatically change table stroke and speed by coarse, medium and fine grinding of plunge and traverse grinding.

Other option

- Tie-bar grinding (Optional: G,V)
- Hydraulic creep-feed grinding (Optional : G,V,A)

Dressing cycle

Straight dressing (Optional : G,V,A,D)



Dressing of wheel periphery by table mount dresser or high-speed wafer dresser. In-machining dressing and cut-in dressing are practical.

Pattern dressing (Optional: G,V)



Form dressing of wheel using simplified profile, CNC profile or high-speed wafer dresser. Using various patterns, wheel form is defined by the entry of necessary dimensions for basic figures.

Profile dressing (Optional: G,V)



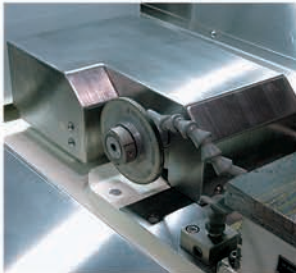
Dressing of wheel in any form using simplified profile, CNC profile or high-speed wafer dresser (round-flat). Rough dressing is practical. Desired wheel figure data can be stored in NC program area.

Other option

- Overhead dressing (Optional : G,V,A,D)
- Slotting wheel dressing (Optional : G,V,A,D)

Fixtures Enabling a Wide Range of Processing and Various Dressing Systems

High-precision single rotary dresser • High-precision twin rotary dresser



● High-precision single rotary dresser

High-efficient dressing can be achieved by this dresser rotating at max. 3000min-1. It can be used for coarse dressing as well as for finish dressing of simple forms.

● High-precision twin rotary dresser

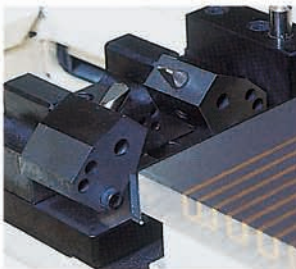
This dresser can accommodate 2 diamond rolls. One can be used for coarse and the other for fine dressing. Dresser width and form can also be changed to widen the scope of form dressing. The dresser spindle is supported on both sides for increased rigidity. It can also accommodate formed diamond rolls for wheel forming in plunge cut direction.

CNC profile dresser

The built-in servomotor swivels the dresser during wheel forming. By the simultaneous 3-axis control with the machine's X and Y, the dresser angle can be kept constant for normal line control. This makes it possible to dress a wheel with only one point of the dresser, providing high-precision profiles.

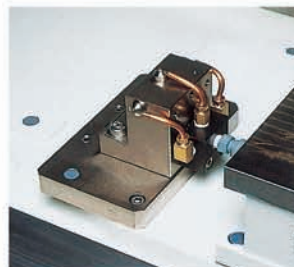


Simplified profile dresser



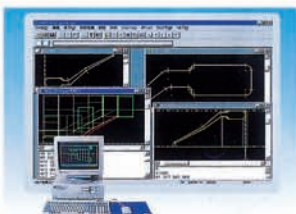
2 forming diamond tools are fitted. Wheel form dressing is performed at a fixed dresser angle with relative ease.

Table mount 3-way dresser



Used to dress the wheel periphery and side surfaces. It automatically performs in-cycle dressing of the wheel periphery.

WAPS-WIN Automatic Programming System



This software application for Windows PC is based on our know-how of form grinding. It can capture the CAD data (DXF, BMI, CL data) and create the CNC programs and other grinding data.

The data output for plotting of the work and wheel figure checking charts is a standard feature. It interfaces with RS-232C and can be used on a LAN.

If your PC has a card slot, the WAPS data can be put out to the machine from only one memory card.

Automatic measuring device (Touch sensor)



After grinding to the specified dimensions during automatic canned cycle operation, this device measures the finished work and reference block, compares the results, and automatically performs follow grinding for correction if the work size is out of tolerance. Tolerance for the pass/fail criteria can be set arbitrarily. As the machine's Y-axis is used for measurement, the measuring resolution of this device becomes 0.05μm.

Machine Specification

	Item		Unit	TF		MS		TS			
				M1	H1	V3	G3	A1	A3	D1	D3
Capacity	Table working surface (L x W)		mm	450×150		450×150	550×200	550×200		700×400	
	Max. longitudinal travel		mm	500		500	600	600		780	
	Max. cross travel		mm	200		200	250	250		450	
	Spindle center height from table		mm	500		400		500		500	
	Standard chuck size (L x Wx H)		mm	350×150×70		350×150×100	400×200×100	500×200×70		600×400×100	
Travel	Longitudinal feed		m/min.	—	1~30	1~40※		1~30		1~30	
	Max. No. of reciprocation (15mm stroke)		min. ⁻¹	—	150	300※	250※	150		150	
Saddle	Rapid cross feed (Jog)		m/min.	—		0~400, 500, 1000		0~1000	0~400, 500, 1000	5~3000 (21steps)	0~400, 500, 1000, 2000, 3000
	Handle feed	Per rev.	mm	5		0.01, 0.1, 1.0, 4.0		0.1, 4.0(OP)	0.01, 0.1, 1.0, 4.0	0.01, 0.1, 1.0, 4.0(OP)	0.01, 0.1, 1.0, 10.0
		Per grad.	mm	0.02		0.0001, 0.001, 0.01, 0.04		0.001, 0.04(OP)	0.0001, 0.001, 0.01, 0.04	0.0001, 0.001, 0.01, 0.04(OP)	0.0001, 0.001, 0.01, 0.10
	Minimum input increment		mm	—	Digital Counter0.001	0.0001		—	0.0001	—	0.0001
	Position detection system		μm	—		Glass scale/0.05		—	Glass scale/0.05(OP)	—	Glass scale/0.05(OP)
Wheel head	Rapid wheel head feed (Jog)		mm/min.	100,1000 (2 steps)		100,1000 (2 steps)		100,1000 (2 steps)		100,1000 (2 steps)	
	Handle feed	Per rev.	mm	0.1, 1.0	0.01, 0.1, 1.0, 4.0	0.01, 0.1, 1.0, 4.0		0.01, 0.1, 1.0, 4.0		0.01, 0.1, 1.0, 4.0	
		Per grad.	mm	0.001, 0.01	0.0001, 0.001, 0.01, 0.04	0.0001, 0.001, 0.01, 0.04		0.0001, 0.001, 0.01, 0.04		0.0001, 0.001, 0.01, 0.04	
	Minimum input increment		mm	Manual0.001 Counter 0.001	Manual0.0001 Counter 0.001	0.0001		Manual 0.0001 Counter 0.001	0.0001	Manual 0.0001 Counter 0.001	0.0001
	Position detection system		μm	—		liner scale 0.05(OP)	liner scale 0.05 (standard)	—	liner scale 0.05(OP)	—	liner scale 0.05(OP)
Wheel spindle	Size (O.D x Width x Bore)		mm	φ205×6.4~25×φ31.75		φ205×6.4~25×φ31.75		φ255×6.4~25×φ50.8		φ355×38~50×φ127	
	Wheel spindle speed		min. ⁻¹	3000/3600 (50/60Hz)		500~5000		500~5000		1500/1800 (50/60Hz)	
	Motor requirement		kW-P	1.5~2		2.2~2		3.7~2		3.7~4	
NC control axis			—	Singly 1 axis		Simultaneously 2 axis		Singly 1 axis	Singly 2 axis	Singly 1 axis	Simultaneously 2 axis
Floor space (W x L x H)			mm	1880×1455×2200	1880×1460×2000	1880×1475×1900	2670×2040×1900	2240×1770×2000	2240×1840×2000	2440×2180×2080	2400×2240×2080
Machine net weight			kg	2000	2050	2200	2400	2400		4000	

※The table speed depends on work load on the table.

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