

# MITSUBI SEIKI

## HIGH PRECISION THREAD GRINDERS



### NC EXTERNAL THREAD GRINDERS

**GSN-300**

**GSE-100**

**GSE-320**

**GSE-50**

**GSE-200**

### NC INTERNAL THREAD GRINDER

**GSN-180iS**

### POWER STEERING GRINDING MACHINE

EXTERNAL: **GSS-200**

INTERNAL: **GSI-120**

### LEAD SCREW MEASURING MACHINE

**LMS-1500N**

**LMS-3000N**

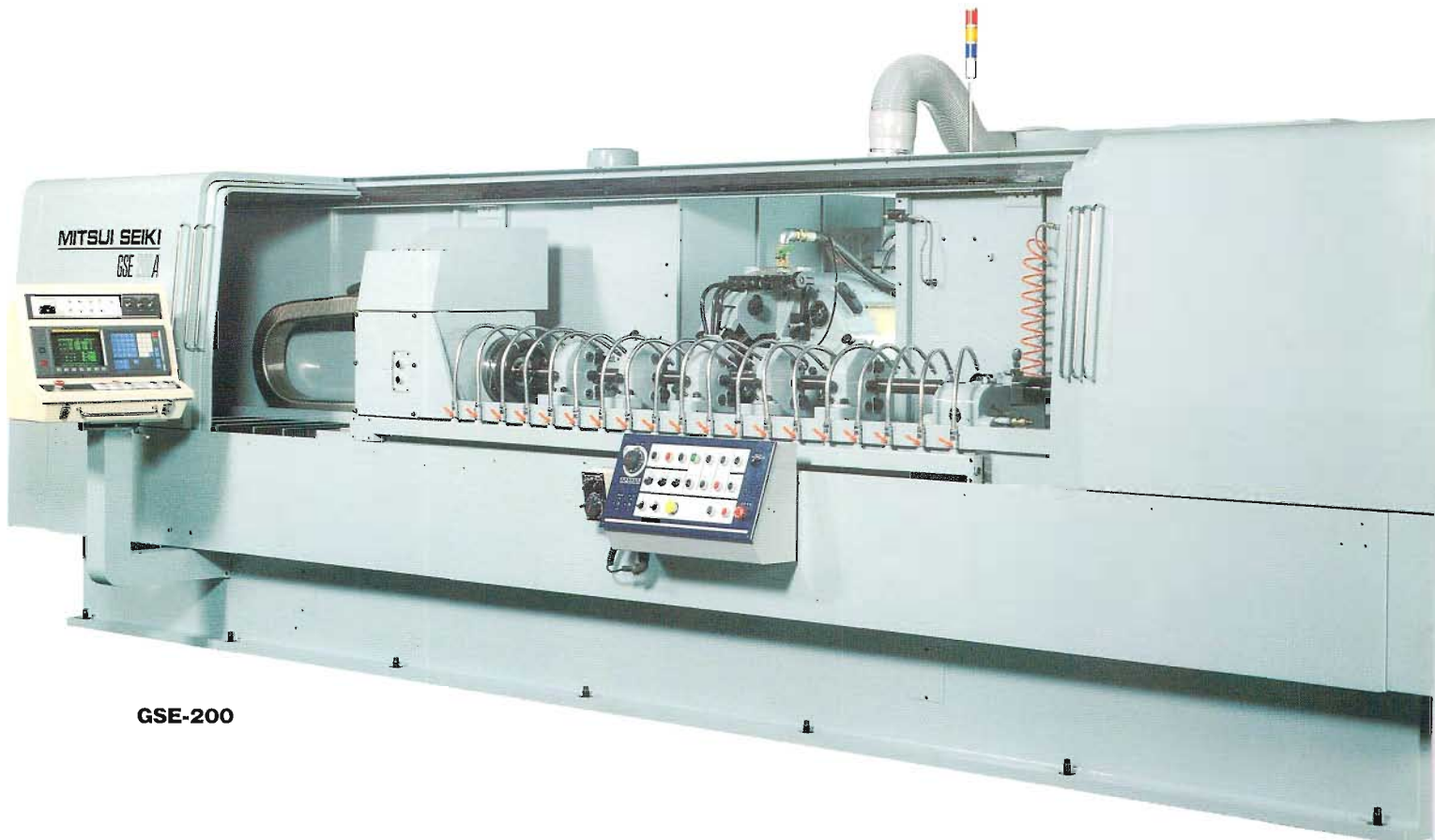


**MITSUBI SEIKI KOGYO CO., LTD.**

# NC EXTERNAL THREAD GRINDERS GSN-300, GSE-50, 100, 200, 320

## ADVANTAGES

1. CNC control provides significant improvements in machine setup and maintenance. The data such as table strokes, work spindle speeds, leads and number of index are easily entered by MDI.
2. CNC control makes it possible to grind threads with special leads, creating unlimited possibilities of grinding any pitch thread. Any desired number of threads on a multi-start screw is ground with standard equipment. Automatic index can be performed using servo motor for work spindle rotation. Any number of threads on a multi-start screw can be entered by MDI.
3. Backlash in the work spindle drive mechanism is set accurately at machine assembly and no further adjustment is required for grinding any lead of thread.
4. The wide range of work spindle speeds are available from 0.1 to 100 rpm (to 80 rpm for GSE-320), and the low speed range is conveniently used for inspection of finished threads on the machine.
5. Mini, pre-settable amount of table travel and positioning is 0.001 mm (0.0001 inch).
6. For grinding long threads, the table retracts rapidly without rotating the workpiece to prevent the generation of heat due to friction between the work and the steadyrest and work spindle mechanism also.
7. Lead control can be done easily and accurately by just entering the amount of lead compensation into the CNC control.
8. Lead compensation (non-linear compensation) can be programmed in 0.001 mm (0.0001 inch) increments, and this mechanism improves the original feed accuracy of the MITSUI's High Precision Master Lead Screw (ball screw).
9. Screws having more than one lead such as dual lead worms, are ground in one cycle.





**GSN-300**



**GSE-50**



**GSE-100**



**GSE-320**

**MACHINE SPECIFICATION**

Items		Unit	GSN-300	GSE-50	GSE-100	GSE-200	GSE-320
NC	Work spindle rotation and table travel	Axes	Simultaneous 2				
	Automatic wheel infeed	Axis	1				
Capacity	Swing over table	mm dia. (inch)	270 (10.6)	480 (18.9)			
	Max. work length between centers	mm (inch)	450 (17.7)	750	1250	2250 (86.6)	3650 (143.7)
	Max. thread length ground	mm (inch)	300 (11.8)	500 (19.7)	1000 (39.4)	2000 (78.7)	3200 (126.0)
	Max. table stroke	mm (inch)	360 (14.17)	600 (23.6)	1150 (44.4)	2150 (88.8)	3300 (129.9)
	Max. ext. dia. of work ground	mm (inch)	80 (3.1)	200 (7.3)			
	Max. leads obtainable	mm (inch)	60 (2.3)	600 (23.6)			
Wheel spindle	Grinding wheel size (O.D×W×I.D)	mm dia. (inch)	355×10 – 32×152.4 (13.9×0.4 to 1.2×6)	510×10 – 50×228.6 (20×0.4 to 2×9)			
	Grinding wheel surface speeds	m/min. (Feet/min.)	2000 (6560), 2700 (8858)	2100 (6890), 2700 (8858)			
	Max. lead angles	deg.	±30	±45			
Tank capacity	Lubricant tank	ℓ	30	50			85
	Coolant tank	ℓ	380	600			800
Height from floor to work center		mm (inch)	1050 (41.3)	1100			
Machine height		mm (inch)	1600 (63.0)	2025			
Space occupied (W×D) Approx.		mm (inch)	2900×3250 (114×128)	4100×3615	4700×3615	6800×3615	9810×3615
Net weight of machine (with standard accessories) Approx.		kg	4500	9500	11000	13000	18500

# NC INTERNAL THREAD GRINDER GSN-180iS

## FEATURES

1. The desired leads, spindle speed and grinding stroke are easily selected by means of entering data into CNC control by MDI. It makes significant improvement in preparation for next operation.
2. Lead compensation is made by entering correction data into CNC control by MDI.
3. Backlash in the work spindle drive mechanism is set accurately at machine assembly and not further adjustment is required for grinding any lead of thread.
4. Automatic index can be performed using servo motor for work spindle rotation. Any number of threads on a multi-start screw can be entered by MDI.
5. By offsetting leads at center of ball screw nut, it is possible to grind integral nut which permit preload by single nut same as that given by double nuts.
6. When grinding small pitch screw, CNC control offers the additional advantage to move table from its home position to grinding start point without work spindle rotation. Thus actual grinding time is greatly shorten.
7. Taper grinding is also available using 3 axes simultaneous control function.

## FUNCTIONS AND MECHANISM

### ● Work Spindle Drive

Work spindle rotation is driven by AC servo motor mounted on the table and a wide range of spindle speeds covering 0.1 to 100 rpm is available steplessly. Furthermore spindle speed override of 0 to 200% is provided to ensure spindle speed change without stopping spindle rotation.

### ● Workpiece Lead

Workpiece lead is easily selected in 0.001 mm increment by entering data into CNC control by MDI. Lead correction is easily and accurately done also any entering data into CNC control by MDI.

### ● Lead Pickup Device

This device matches pre-cut thread grooves with the grinding wheel, permitting the table to traverse without rotating or the work spindle to rotate without table traverse.

### ● Backlash Compensation Device

The device operates to compensate backlash of spindle gear train at each stroke end of table traverse by NC control.

The grinding wheel passed always same points. This means grinding is made at

both ends of workpiece, permitting reciprocating grinding with improved efficiency.

### ● Wheel head

Automatic wheel in-feed is controlled by AC servo motor and can be steplessly in 0.001 mm dia. (0.0001 inch) increment by MDI.

Minimum wheel in-feed setting is 0.001 mm (0.0001 inch) on dia. and max. total of in-feed is 9.9999 inch) on dia.

There are 5 groups of wheel-in-feed. 3 groups of wheel-in-feed are used for rough grinding 1 group for finish grinding and 1 for spark out.

Furthermore the separate right and left end in-feed are selectable and it enables the operator to select most suitable grinding condition by MD.

Thus optima in-feed setting for a particular application minimize grinding time and increase grinding accuracy.

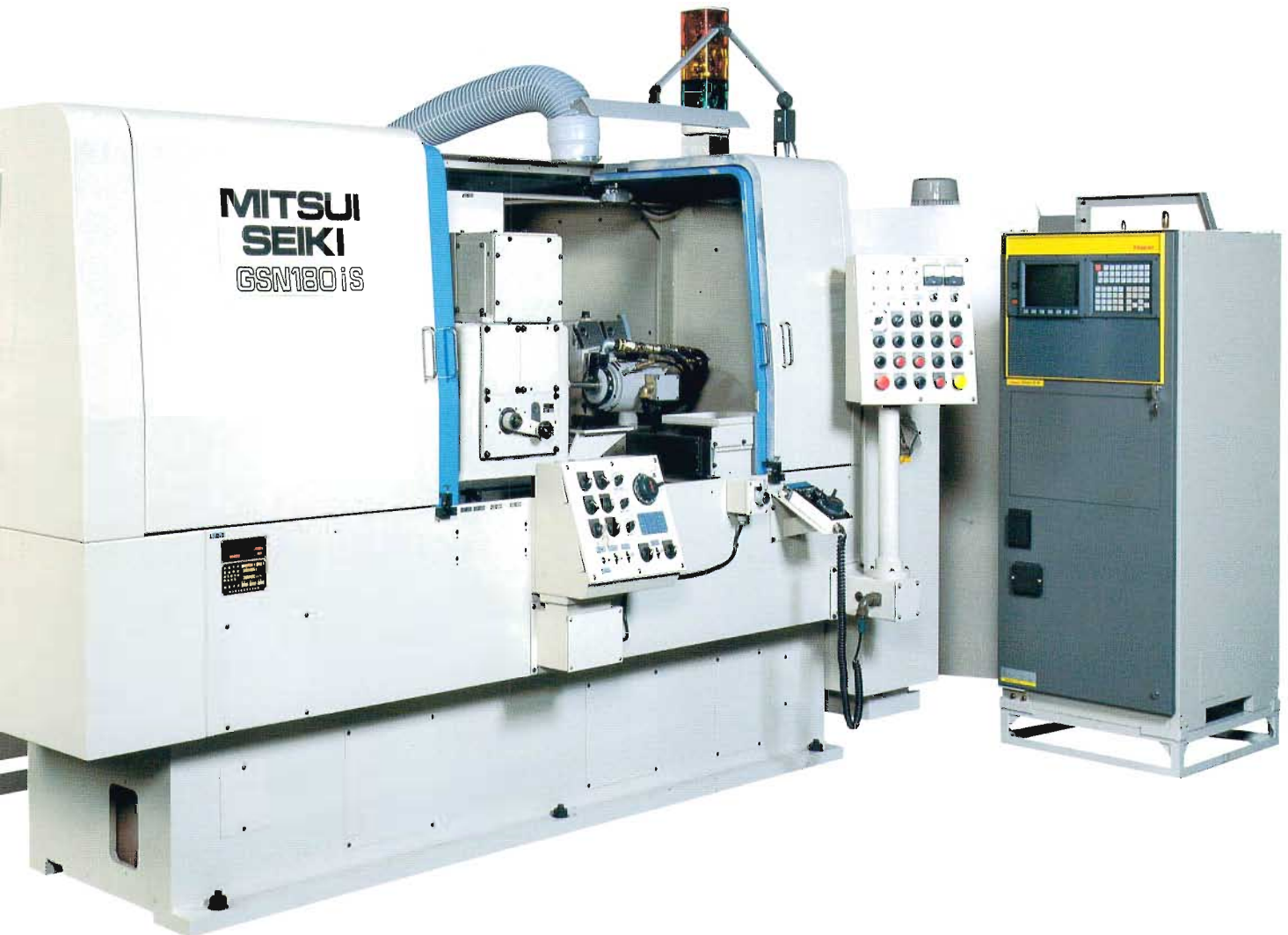
### ● Grinding Wheel Dressor

Various grinding Wheel dressers are available to grind many kind of screws such as ball screw, triangular threads, trapezoidal threads, rolled planetary dies, thread dies and etc.



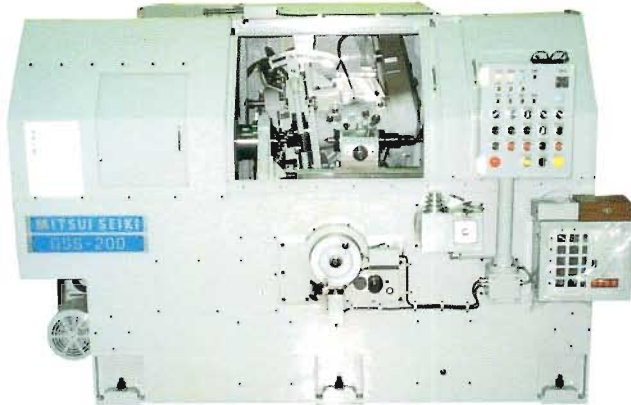
## MACHINE SPECIFICATION

Items		Unit	GSN-180iS	
NC	Work spindle rotation and travel	Axes	Simultaneous 2	
	Automatic wheel infeed	Axis	1	
Capacity	Max. int. dia. of work ground	mm (inch) dia.	20 (0.78) to 200 (7.87)	
	Available chuck size	inch	8 or 10	
	Max. thread length ground	mm (inch)	180 (7.1)	
	Max. leads obtainable	mm (inch)	0.25 (0.01) to 50 (1.97)	
	Max. lead angle	deg.	10° to LH, 9° to RH	
	Wheel spindle speeds	rpm	10000 to 21600 Steplessly (option)	
Wheel spindle head	Grinding wheel size	ext. dia.	mm dia. (inch)	20 (0.78) to 50 (1.95)
		width	mm (inch)	6 (0.23) to 16 (0.63)
	Wheel spindle motor	KW	4.5	
	Manual infeed handwheel (1 rev./1 div.)	mm (inch) dia.	0.3 (0.012)/0.005 (0.0002)	
Automatic infeed (total feed/min. increment)	mm (inch) dia.	9.999/0.001 (9.9999/0.0001)		
Work spindle head	Work spindle speeds	rpm	Max. 100	
	Total stroke	mm (inch)	400 (15.7)	
Height from floor to work center		mm (inch)	1190 (46.8)	
Machine height		mm (inch)	1865 (73.4)	
Space occupied (W×D) Approx.		mm (inch)	4500×4260 (177×167)	
Net weight of machine Approx.		kg	6000	

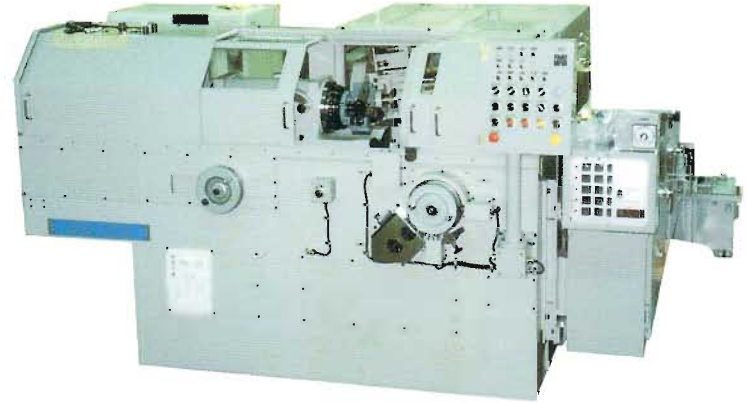


# HIGH PRODUCTION POWER STEERING GRINDERS GSS-200, GSI-120

## Master Lead Screw Type Steering Worm Grinder Model GSS-200



## Steering Nut Grinder Model GSI-120



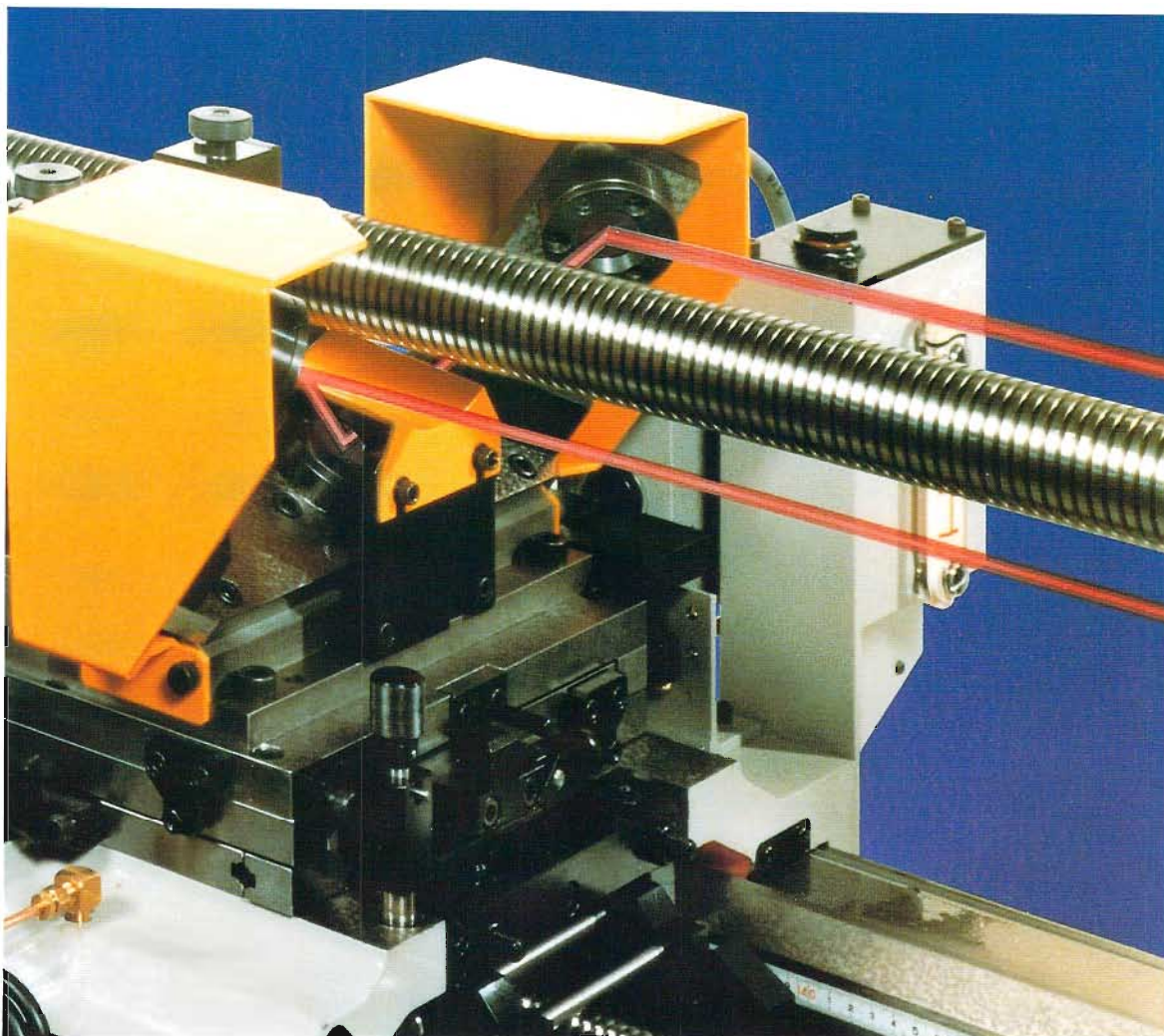
### MACHINE SPECIFICATION

<b>WORK CAPACITY</b>	
Maximum swing over the table	200 $\phi$ mm
Maximum distance between centers	700 mm
Maximum threaded length to be ground	200 mm (300 mm from spindle center)
Maximum diameter to be ground	150 $\phi$ mm
<b>WHEEL SPINDLE</b>	
Grinding wheel size (O.D. $\times$ W. $\times$ I.D.)	455 $\phi$ $\times$ 10 $\times$ 228.6 mm
Number of spindle speeds	5 steps By pulley and belt change
Wheel speed	1,390 – 2,020 rpm
Max peripheral speed	About 2700 M/Min
Max helix angle, right or left	$\pm 20^\circ$
<b>WHEEL HEAD</b>	
Stroke	240 mm
Rapid traverse stroke (hydraulic drive)	75 mm
by hand wheel per one revolution	5 $\phi$ mm, 0.3 3 steps
Manual infeed by micro-collar per one division	0.25 $\phi$ mm
Automatic wheel infeed (by stepping motor)	
Total infeed amount	4 $\phi$ mm
Max infeed amount	0.999 $\phi$ mm
Min infeed amount	0.001 $\phi$ mm
<b>WORK HEAD</b>	
Center taper	Morse taper No.5
Number of speeds	6 steps
Speed	4P 60, 70, 80 rpm 8P 30, 35, 40 rpm
Lead change system	Master lead screw
<b>TAIL STOCK</b>	
Center taper	Morse No.3
Stroke	Max 40 mm
<b>MACHINE DIMENSIONS</b>	
Machine height	1,625 mm
Height from floor to wheel spindle axis	1,055 mm
Floor space	approx. 3,315 $\times$ 4,000 mm
Net weight	approx. 5,000kg

### MACHINE SPECIFICATION

<b>WORK CAPACITY</b>	
Maximum diameter of fixture jig for work clamping	260 $\phi$ mm
Minimum diameter to be ground	18 $\phi$ mm
Maximum threaded length to be ground	130 mm
Distance from work spindle end to thread start	375 mm
<b>WHEEL SPINDLE</b>	
Grinding wheel size, outer dia	About 30 $\phi$ 34 $\phi$ 39 $\phi$ mm
Grinding wheel size, width	9 mm
Grinding wheel speed change system	3 steps Pulley & belt change
Grinding wheel speeds (frequency change)	12,500, 15,000, 17,000 rpm
Standard type high frequency motor	15,000, 17,000 rpm
Rigid type high frequency motor	12,500, 15,000
Maximum helix angle	About 10 $^\circ$ , (L & R)
<b>WHEEL HEAD</b>	
Adjusting stroke of wheel head forward travelling position	Max.82.5 mm
Wheel head stroke by hydraulic travel	Max.221 mm
Manual infeed, by handwheel per one revolution	5 $\phi$ & 0.3 $\phi$ mm (2 steps)
by microcollar per one division	0.25 $\phi$ & 0.005 $\phi$ mm
Automatic infeed, total infeed amount	3.2 $\phi$ mm
Minimum infeed	0.002 $\phi$ mm
<b>WORK HEAD</b>	
Hole through work spindle	76 $\phi$ mm
Number of work spindle speeds	5 steps (Belt change)
Work spindle speeds	80 – 160 rpm
Lead change system	Master lead screw
Grinding lead range	0.25 – 25 mm
<b>MACHINE DIMENSION</b>	
Height from floor to wheel spindle axis	1,165 mm
Machine height	1,475 mm
Floor space	3,450 $\times$ 3,970 mm
Net weight	5,000kg

# CNC LEAD SCREW MEASURING MACHINE WITH LASER EQUIPMENT LMS-1500N, 3000N



## MACHINE SPECIFICATION

Item		Unit	LMS-1500N	LMS-3000N
NC control unit	Spindle Rotation	Axis	X	
	Saddle travel	Axis	Y	
Capacity	Max. thread measurable length	mm	1500	3000
	Distance between centers	mm	1800	3500
	Max. thread O.D to be measured	φ mm	70	100
	Max. nut O.D to be measured	φ mm	150	200
	Max. lead to be measured	mm	24	32
	Min. lead to be measured	mm	2	5
Spindle	Spindle end (taper hole)		Jano taper	Jano taper
	Center taper (type, no)		Morse taper	
	Spindle hole dia.	φ mm	65 500mm from end	Through hole 600mm from end
	Spindle speed	At measurement	RPM	10~40
At wobbliness measurement		RPM	0.1~10	
Saddle	Max. travel	mm	1600	3300
	Measuring feeler floating range	mm	Front, back, left, right	
Height from floor to center of workpiece		mm	1000	
Machine height		mm	1500	
Space required (width × length)		mm × mm	5500 × 2010	7300 × 2010
Net weight (with standard equipment)		kgf	3500	5000



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