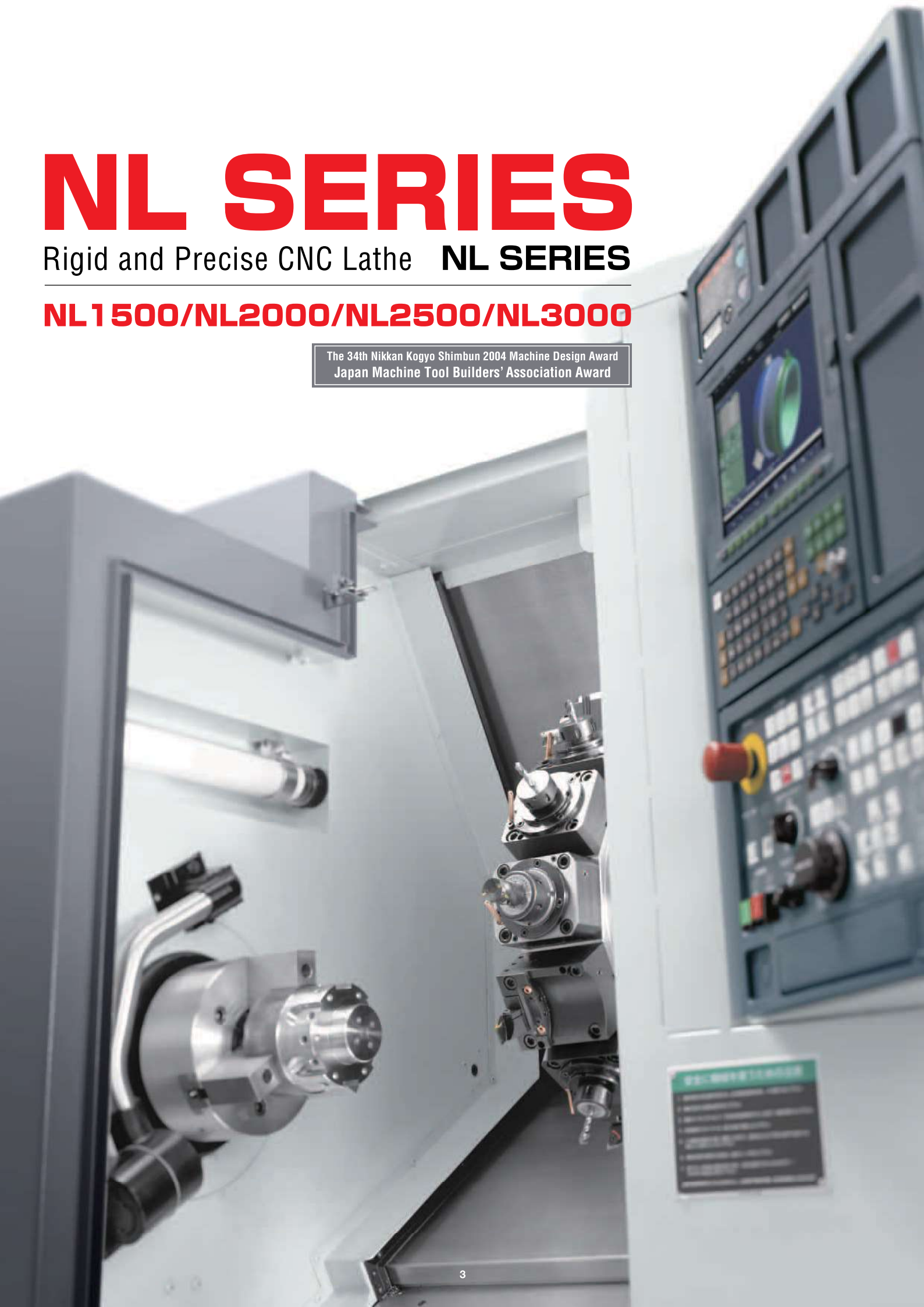


NL SERIES

Rigid and Precise CNC Lathe **NL SERIES**

NL1500/NL2000/NL2500/NL3000

The 34th Nikkan Kogyo Shimbun 2004 Machine Design Award
Japan Machine Tool Builders' Association Award



Machine specifications (NL2000)

Item			NL2000/500	NL2000MC/500	NL2000Y/500	NL2000S/500	NL2000SMC/500	NL2000SY/500
Capacity	Swing over bed	mm (in.)	923.8 (36.4) <interference with front cover 579.8 (22.8)>					
	Swing over cross slide	mm (in.)	755 (29.7)					
	Max. turning diameter	mm (in.)	356 (14.0) [278 (10.9) <20-station turret head>]					
	Standard turning diameter	mm (in.)	275 (10.8) [192.6 (7.5) <20-station turret head>]					
	Max. turning length	mm (in.)	510 (20.0)					
	Bar work capacity	mm (in.)	65 (2.5)					
Travel	X-axis travel	mm (in.)	260 (10.2)					
	Z-axis travel	mm (in.)	590 (23.2) [580 (22.8) <20-station turret head>]					
	Y-axis travel	mm (in.)	—		100 <±50> (3.9 <±2.0>)	—		100 <±50> (3.9 <±2.0>)
	Headstock 2 travel <B-axis>	mm (in.)	—			624 (24.6)		
Spindle	Max. spindle speed	min ⁻¹	5,000			Headstock 1: 5,000 Headstock 2: 6,000 [5,000]		
	Type of spindle nose		JIS A2-6			Headstock 1: JIS A2-6 Headstock 2: JIS A2-5 [JIS A2-6 <5,000 min ⁻¹ >]		
	Through-spindle hole diameter	mm (in.)	73 (2.9)			Headstock 1: 73 (2.9) Headstock 2: 43 (1.7) [73 (2.9) <5,000 min ⁻¹ >]		
	Min. spindle indexing angle		—	0.001°		—	0.001°	
	Spindle bearing inner diameter	mm (in.)	120 (4.7)			Headstock 1: 120 (4.7) Headstock 2: 85 (3.3) [120 (4.7) <5,000 min ⁻¹ >]		
	Number of tool stations		12 [10] [16] [20]					
Turret	Shank height for square tool	mm (in.)	25 (1)					
	Shank diameter for boring bar	mm (in.)	Max. 50 (2) [32 (1¼) <double boring holder>]			Headstock 1: Max. 50 (2) [32 (1¼) <double boring holder>] Headstock 2: Max. 32 (1¼)		
	Tool shank diameter for rotary tool	mm (in.)	—	26 (1.0)		—	26 (1.0)	
	Turret indexing time	s	0.2 [0.25 <20-station turret head>]	0.25		0.2 [0.25 <20-station turret head>]	0.25	
	Max. rotary tool spindle speed	min ⁻¹	—	6,000		—	6,000	
	Feedrate	Rapid traverse rate mm/min (ipm)	X, Z: 30,000 (1,181.1) Tailstock: 7,000 (275.6)	X, Z: 30,000 (1,181.1) Tailstock: 7,000 (275.6) C: 400 min ⁻¹	X, Z: 30,000 (1,181.1) Y: 10,000 (393.7) Tailstock: 7,000 (275.6) C: 400 min ⁻¹	X, Z, B: 30,000 (1,181.1)	X, Z, B: 30,000 (1,181.1) C: 400 min ⁻¹	X, Z, B: 30,000 (1,181.1) Y: 10,000 (393.7) C: 400 min ⁻¹
Tailstock	Tailstock travel	mm (in.)	564 (22.2)			—		
	Tailstock spindle diameter	mm (in.)	80 (3.1)			—		
	Taper hole of tailstock spindle		Live center <MT4> [Built-in center <MT3>]			—		
Motor	Spindle drive motor <50%ED/30 min/cont>	kW (HP)	15/15/11 (20/20/15) [18.5/18.5/18.5/15 (24.7/24.7/24.7/20) <25%ED/50%ED/30 min/cont>]			Headstock 1: 15/15/11 (20/20/15) [18.5/18.5/18.5/15 (24.7/24.7/24.7/20) <25%ED/50%ED/30 min/cont>] Headstock 2: 11/7.5 (15/10) <25%ED/cont>		
	Rotary tool spindle drive motor <3 min/5 min/cont>	kW (HP)	—	5.5/5.5/3.7 (7.5/7.5/5)		—	5.5/5.5/3.7 (7.5/7.5/5)	
	Feed motor	kW (HP)	X: 2.0 (2.7) Z: 3.5 (4.7)		X, Y: 2.0 (2.7) Z: 3.5 (4.7)	X, B: 2.0 (2.7) Z: 3.5 (4.7)		X, Y, B: 2.0 (2.7) Z: 3.5 (4.7)
Power sources	Electrical power supply <for the standard specifications>	kVA	20.3	24.0	31.3	31.3		35.7
	Compressed air supply	MPa (psi), L/min (gpm)	— (a compressed air supply may be needed, depending on options and peripheral equipment)			0.5 (72.5), 100 (26.4) <ANR>		
Tank capacity	Coolant tank capacity	L (gal.)	235 (62.0)					
Machine size	Machine height <from floor>	mm (in.)	2,120 (83.5)					
	Floor space <width×depth>	mm (in.)	2,695×1,922 (106.1×75.7)			2,695×2,000 (106.1×78.7)		
	Mass of machine	kg (lb.)	5,400 (11,880)	5,500 (12,100)	5,700 (12,540)	5,500 (12,100)	5,600 (12,320)	5,800 (12,760)

[] Option JIS: Japanese Industrial Standard

● Bar work capacity: depending on the chuck/cylinder used and its restrictions, it may not be possible to reach full bar work capacity.

● Max. spindle speed: depending on restrictions imposed by the workpiece clamping device, fixture and tool used, it may not be possible to rotate at the maximum spindle speed.

● ANR: ANR refers to a standard atmospheric state; i. e., temperature at 20 °C (68 °F), absolute pressure at 101.3 kPa (14.7 psi) and relative humidity at 65%.

● Power sources, machine size: the actual values may differ from those specified in the catalogue, depending on the optional features and peripheral equipment.

I94029A04



Rigid & Precise
NL SERIES

Variations

We want everyone to use the new standard in CNC lathes. Mori Seiki's NL Series has machines in four classes for different workpiece sizes and six types to best match the level of the customer's machining and process integration. With a total of 36 variations, you are bound to find one right for you.

36
variations
in all



NL1500MC/500

NL1500

2-axis turning	MC	Y	S	SMC	SY
Distance between centers	↔500↔				
Standard chuck size <headstock 1/headstock 2>	⑥ inches / ⑥ inches				
Bar work capacity	52 mm (2.0 in.) [34 mm (1.3 in.) <8,000 min ⁻¹ >]				
Number of tool stations	12 [16] [20] tools				
Travel <X-/Z-axis>	260/590 mm (10.2/23.2 in.)				
Travel <Y-axis>	100 <±50> mm (3.9 <±2.0> in.)				

[] Option



NL2000SMC/500

NL2000

2-axis turning	MC	Y	S	SMC	SY
Distance between centers	↔500↔				
Standard chuck size <headstock 1/headstock 2>	⑧ inches / ⑥ inches				
Bar work capacity	65 mm (2.5 in.)				
Number of tool stations	12 [10] [16] [20] tools				
Travel <X-/Z-axis>	260/590 mm (10.2/23.2 in.)				
Travel <Y-axis>	100 <±50> mm (3.9 <±2.0> in.)				

[] Option

● Bar work capacity: depending on the chuck/cylinder used and its restrictions, it may not be possible to reach full bar work capacity. ● The photo shows the machine equipped with options.

Y-axis specifications

Y SY

We also independently developed a powerful platform for maximizing performance in the Y-axis specifications. This has achieved rigidity between the spindle and the tool tip that exceeds that of conventional two-axis lathes.

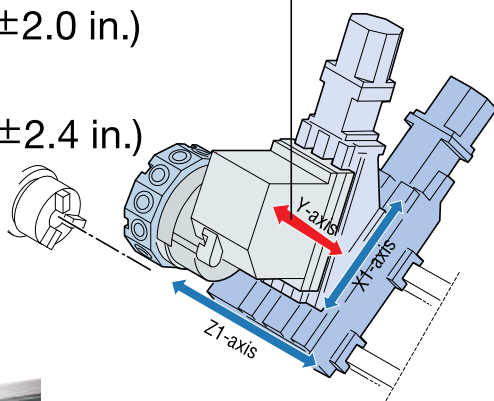
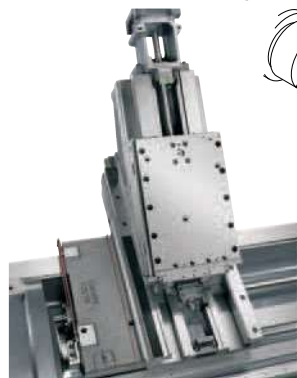
Y-axis travel

NL1500/NL2000/NL2500

±50 mm (±2.0 in.)

NL3000

±60 mm (±2.4 in.)

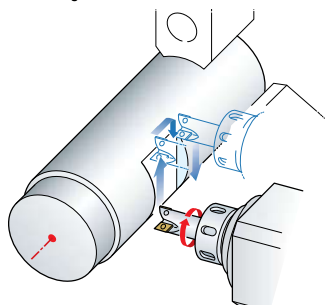


Linking the X-axis and a virtual axis creates the Y-axis movement. The axis unit has been downsized to lower machine height.

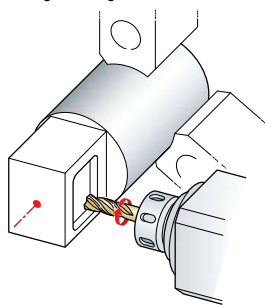


Bar machining with Y-axis control

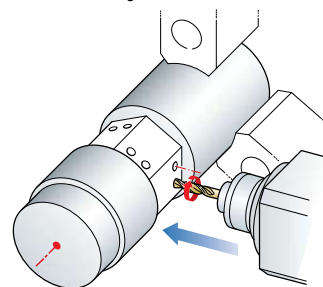
Side milling



Off-center grooving

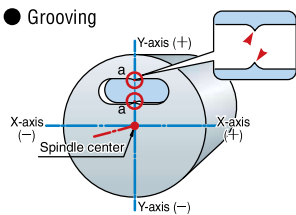


Off-center drilling

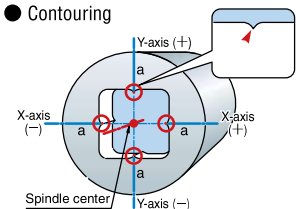


Comparison between polar coordinate interpolation and Y-axis control

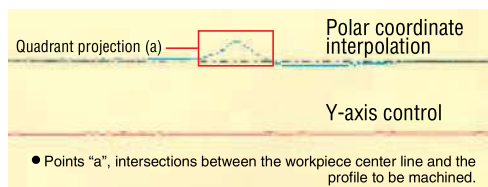
Grooving



Contouring



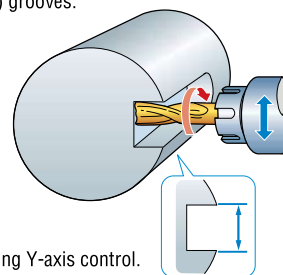
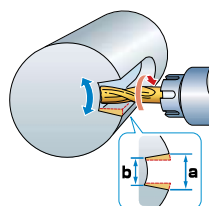
On a conventional turning center, polar coordinate interpolation is used for tool motion control during grooving and contouring, as illustrated in the left figure. In this control mode, however, the X-axis travel direction is reversed at points "a", the intersections between the workpiece center line and the profile to be machined. This reversal changes cutting conditions and subsequently effects profile accuracy. Machining with Y-axis control, on the other hand, is free of such changes and ensures a high level of profile accuracy.



Circumferential grooving on a turning center with Y-axis control

Milling without Y-axis control

It is hard to match the width of outer (a) and inner (b) grooves.



Milling on the NL Series

Groove width can be matched using Y-axis control.

Headstock 2 S SMC SY

Choose from S-type, which allows both-face continuous machining, SMC-type which offers consistent machining from turning to secondary machining and back face machining thanks to its combination of headstock 2 and rotary tools, and SY-type, which achieves superior multi-axis machining with the additional Y-axis.

Maximum headstock 2 torque

NL SERIES

77.8 N·m (57.4 ft·lbf) <25%ED>



Digital tailstock 2-axis turning MC Y Not including NL3000/2000, NL3000/3000

The NL Series comes standard with a new feature – a highly rigid digital tailstock driven by a servo motor. This drastically reduces setup time. (New standard feature does not apply to S, SMC and SY types.)



■ Fewer steps requiring operation of the tailstock

The operator is freed from the hassle of having to lock the tailstock when changing to a workpiece of a different length, connecting it to the turret, etc.

■ Operating time reduced

With the conventional hydraulic system, changing the tailstock spindle settings was inconvenient, so there was a limit to how much operating time could be reduced. A digital tailstock with variable feed speed control allows separate speeds to be set for approach and engagement, reducing the operating time of the tailstock spindle by over 20%.

■ Variable pressure control using program instructions

With a hydraulic tailstock spindle, thrust is controlled indirectly using a hydraulic pressure meter, so if you use different machine models, you will get different thrusts even if the same pressure is set. With a digital tailstock, however, the thrust is measured directly, so the workpiece engagement is done accurately, raising machining precision.

■ Simple operation using MAPPS III

Approach position, retract position, re-chucking and more can be done simply and easily from the MAPPS III screen. Besides being able to handle a variety of different workpiece types, it can also work with M-code thrust selection as a standard feature.



Tailstock control screen

- The NL3000 with a distance between centers of 2000 type, 3000 type is equipped with a programmable tailstock (carriage direct-coupled) as standard.

Setup time

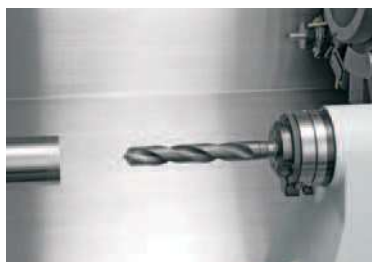
Reduced by over **50%**

Tailstock spindle operating time

Reduced by over **20%**

■ More applications

With a servomotor for positioning, the digital tailstock has outstanding functionality. It can also be used for certain types of machining (e.g., drilling, boring) of the center of the workpiece end face.



Machining using the tailstock drill (option)

Peripheral equipment

Gantry-type loader system

OP

We have achieved completely automated start-to-finish machining using only one machine, from material supply to discharging the completed workpiece.
This is a high-speed mass production system that reduces non-cutting time.

Loader travel speed (travel)

NL1500/NL2000 **NL2500/NL3000**
200 m/min **120** m/min
(656.2 fpm) (393.7 fpm)



NL1500 with Gantry Loader

Item			NL1500/NL2000	NL2500	NL3000
Loader type			LG-05 <machine travel type>		LG-10 <machine travel type>
Gantry-type loader	Max. travel speed	X-axis <hand up/down>	180 m/min (590.6 fpm)		90 m/min (295.3 fpm)
		Z-axis <loader unit left/right>	200 m/min (656.2 fpm)		120 m/min (393.7 fpm)
Loader hand	Model		Parallel hands (Back end hands <please contact Mori Seiki>)		Parallel hands
	Max. transfer weight		5 kg (11 lb.)×2		10 kg (22 lb.)×2
	Applicable workpiece diameter		20—150 mm (0.8—5.9 in.)		30—250 mm (1.2—9.8 in.)
	Applicable workpiece length		10—120 mm (0.4—4.7 in.)		20—150 mm (0.8—5.9 in.)
Workstocker	Number of pallet tables		14 (20, 26 <please contact Mori Seiki>)		10 (20 <please contact Mori Seiki>)
	Max. workpiece weight		35 kg (77 lb.)/pallet		75 kg (165 lb.)/pallet
	Max. workpiece stacked height		470 mm (18.5 in.)		
	Applicable workpiece diameter		20—150 mm (0.8—5.9 in.)		30—200 mm (1.2—7.8 in.)

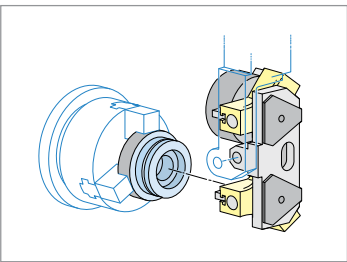
● Depending on the shape of the workpiece, it may not be possible to machine with standard specifications. For details contact Mori Seiki.

Loader hand

A close confirmation switch comes as a standard feature, thus improving the reliability of the work chucking.

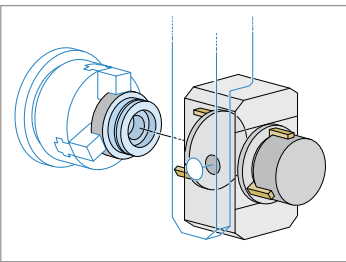


Parallel hands



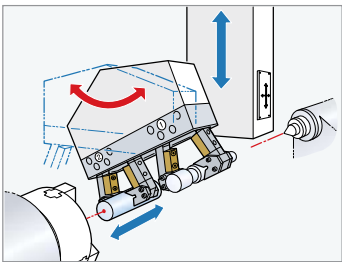
Back end hands

<please contact Mori Seiki>



Hand for shaft workpieces

<please contact Mori Seiki>

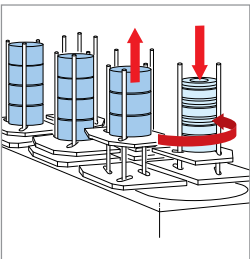


Workstocker

A ball caster wheel conveyor is used because it does not cause many chip problems.

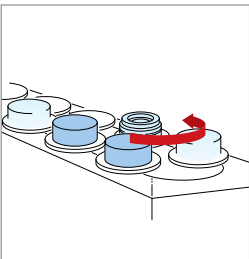


Rotary workstocker



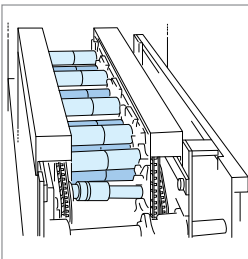
Flat workstocker

<please contact Mori Seiki>



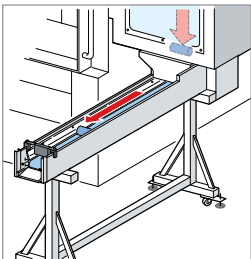
Workstocker for shaft workpieces

<please contact Mori Seiki>



Belt conveyor

<please contact Mori Seiki>



Peripheral equipment



Workpiece unloader* (built-in type) OP

We have further developed the previous parts catcher so that it can now be customized more easily by the end user. Both spindles handle workpieces up to double the previous length.



- Applicable workpiece diameter
NL SERIES
80 mm (3.1 in.)
- Applicable workpiece length
NL SERIES
200 mm (7.8 in.)
- Max. transfer weight
NL 1500/NL2000/NL2500
3.0 kg (6.6 lb.)
- NL3000**
4.0 kg (8.8 lb.)



- Workpiece bucket
The capacity of the bucket has been doubled for more convenient automation.

* Standard for S, SMC and SY types.
(Not including gantry loader specifications)



Bar feeder system OP

Complete bar machining is possible on a single machine when coupled with a workpiece unloader. You won't need a work loader/unloader or turnover unit.

Bar work capacity

NL 1500	NL2000	NL2500	NL3000
φ 52 mm (φ 2.0 in.)	φ 65 mm (φ 2.5 in.)	φ 80 mm (φ 3.1 in.)	φ 90 mm (φ 3.5 in.)

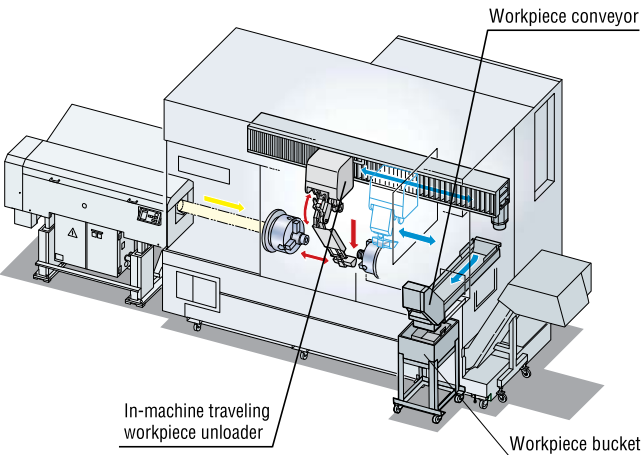
Recommended accessories for bar feeder specification

- Bar feeder
- Multi counter
- Signal tower
- Guide bushing
- Work stopper

● Bar work capacity: depending on the chuck/cylinder used and its restrictions, it may not be possible to reach full bar work capacity.

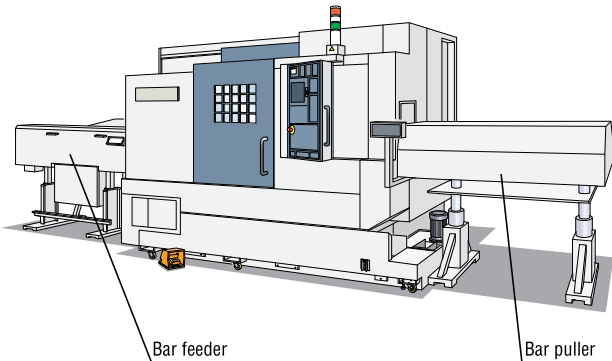
In-machine traveling workpiece unloader system OP

Operate unmanned when equipped with the workpiece conveyor.
With the S-type, receive workpieces from either the No. 1 or No. 2 spindles.



Bar puller system OP

Automatically discharge the machined piece from the No. 2 spindle, making it easier to automate machining of bar workpieces and making this system ideal for long workpieces that cannot be handled by a workpiece unloader.

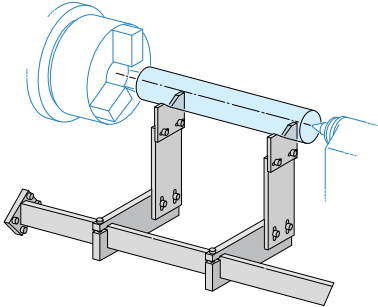


Workpiece rest

OP

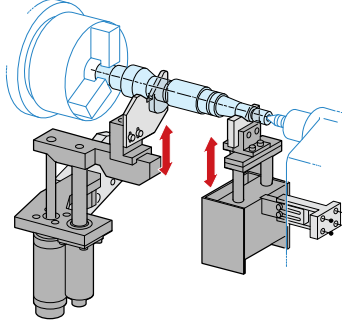
Fixed type

This temporary workpiece rest helps reliably carry out workpiece chucking in a short period.



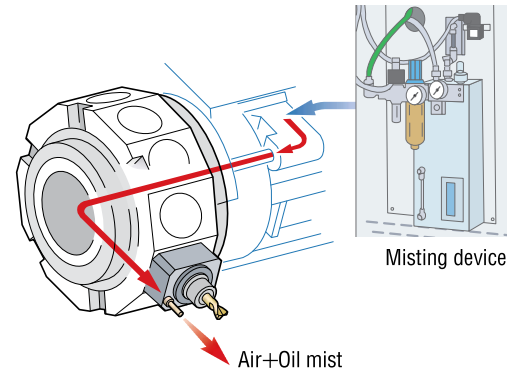
Withdrawal type

Interference and accumulation of chips during machining is prevented by withdrawing the workpiece retainer.



Semi-dry unit

OP



Manual type in-machine tool presetter

Perform tool measurement more efficiently, thereby improving setup.



Coolant cooling unit (separate type)

OP

The coolant temperature rises because of heat generated by machining. Circulating the coolant also raises the temperature. Increases in the oil temperature have a major effect on thermal displacement in the machine and the dimensional accuracy of the workpiece. This unit prevents the coolant from heating. **When using oil-based coolant**, the oil temperature can become extremely high even with the standard coolant pump, so we strongly recommend this unit.



When using oil-based coolant, please be sure to consult with your Mori Seiki representative.

- While this unit is not the only way to completely control the temperature of the coolant, it makes a major contribution to preventing increases in the oil temperature.

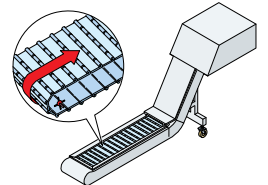
Chip conveyor

OP

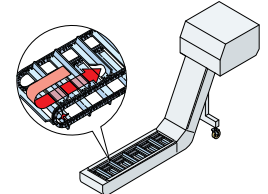
A chip conveyor that efficiently disposes of chips. Choose the specifications right for you.



Hinge type



Scraper type



- Hinge type chip conveyor comes standard on NL3000/2000, NL3000/3000.
- Chip conveyors are available in various types for handling chips of different shape and material. For details contact Mori Seiki.

Others

OP



Oil mist collector



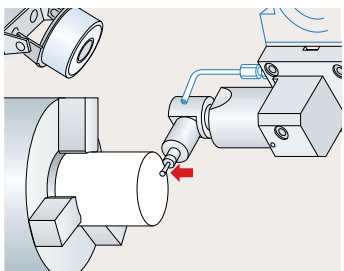
Oil skimmer



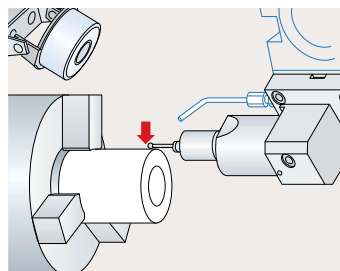
Collet chuck



Super high-pressure coolant unit



In-machine workpiece measuring system



Hydraulic steady rest



Coolant float switch

- The colors and configurations shown in the photographs or illustrations may differ from those of the actual product.

Standard & optional features (NL1500/NL2000)

		NL1500						NL2000					
		2-axis turning	MC	Y	S	SMC	SY	2-axis turning	MC	Y	S	SMC	SY
Spindle													
	Headstock 1	6,000 min ⁻¹ : 11/11/7.5 kW (15/15/10 HP) <50%ED/30 min/cont>	●	●	●	●	●	×	×	×	×	×	×
		6,000 min ⁻¹ : 15/15/11 kW (20/20/15 HP) <50%ED/30 min/cont>	○	○	○	○	○	×	×	×	×	×	×
		8,000 min ⁻¹ : 11/7.5 kW (15/10 HP) <25%ED/cont>*	○	○	○	○	○	×	×	×	×	×	×
		5,000 min ⁻¹ : 15/15/11 kW (20/20/15 HP) <50%ED/30 min/cont>	×	×	×	×	×	●	●	●	●	●	●
Headstock 2		5,000 min ⁻¹ : 18.5/18.5/18.5/15 kW (24.7/24.7/24.7/20 HP) <25%ED/50%ED/30 min/cont>	×	×	×	×	×	○	○	○	○	○	○
		6,000 min ⁻¹ : 11/7.5 kW (15/10 HP) <25%ED/cont>	×	×	×	●	●	×	×	×	●	●	●
		8,000 min ⁻¹ : 11/7.5 kW (15/10 HP) <25%ED/cont> (headstock 1 side is also 8,000 min ⁻¹)	×	×	×	○	○	×	×	×	×	×	×
		5,000 min ⁻¹ : 11/7.5 kW (15/10 HP) <25%ED/cont>	×	×	×	×	×	×	×	×	○	○	○

* Through-spindle hole diameter: 43 mm (1.7 in.).

Turret													
12-station turret head, bolt-tightened		●	●	●	●	●	●	●	●	●	●	●	●
10-station turret head, bolt-tightened		×	×	×	×	×	×	○	○	○	○	○	○
12-station turret head, bolt-tightened	SL compatible	○	○	○	○	○	○	○	○	○	○	○	○
10-station turret head, bolt-tightened	SL compatible	×	×	×	×	×	×	○	○	○	○	○	○
20-station turret head, bolt-tightened	NZ compatible	○	○	○	○	○	○	○	○	○	○	○	○
12-station turret head, quick-change VDI	Including outer circumference	○	○	○	○	○	○	○	○	○	○	○	○
10-station turret head, quick-change VDI	Including outer circumference	×	×	×	×	×	×	○	○	○	○	○	○
16-station turret head, quick-change VDI	Including outer circumference*1	○	○	○	○	○	○	○	○	○	○	○	○
12-station turret head, quick-change VDI	Face type	○	×	×	×	×	×	○	×	×	×	×	×
10-station turret head, quick-change VDI	Face type	×	×	×	×	×	×	○	×	×	○*2	×	×
Max. rotary tool spindle speed	6,000 min ⁻¹ : 5.5/5.5/3.7 kW (7.5/7.5/5 HP) <3 min/5 min/cont>	×	●	●	×	●	●	×	●	●	×	●	●
Tool holders		●	●	●	●	●	●	●	●	●	●	●	●
Rotary tool holders		×	○	○	×	○	○	×	○	○	×	○	○
Capto-compatible holder		○	○	○	○	○	○	○	○	○	○	○	○
Overhang of O.D. cutting rotary tool	50 mm (2.0 in.)	×	●	●	×	●	●	×	●	●	×	●	●
	100 mm (3.9 in.)*3	×	○	○	×	○	○	×	○	○	×	○	○
		<Y-axis travel is limited for the Y and SY types>											

*1 Tools used: ø 30 mm (ø 1.2 in.) VDI holder (for ZT1000Y). *2 Headstock 1 only. *3 Does not apply when using 20-station turret specifications.

Workpiece holding device													
Hydraulic chuck (headstock 1)	6 inches	○	○	○	○	○	○	×	×	×	×	×	×
	8 inches	○	○	○	○	○	○	○	○	○	○	○	○
	10 inches	×	×	×	×	×	×	○	○	○	○	○	○
Hydraulic chuck (headstock 2)	6 inches	×	×	×	○	○	○	×	×	×	○	○	○
	8 inches	×	×	×	○	○	○	×	×	×	○	○	○
Hydraulic steady rest (SLU-1Z)	Bolt-tightening	○	○	○	×	×	×	○	○	○	×	×	×
Hydraulic steady rest (SLUA-1Z)	Bolt-tightening	○	○	○	×	×	×	○	○	○	×	×	×
Hydraulic steady rest (SLU-2Z)	Bolt-tightening	○	○	○	×	×	×	○	○	○	×	×	×
Hydraulic steady rest (SLUA-2Z)	Bolt-tightening	○	○	○	×	×	×	○	○	○	×	×	×
Hydraulic steady rest	Interface	○	○	○	×	×	×	○	○	○	×	×	×
Steady rest	Bolt-tightening	○	○	○	×	×	×	○	○	○	×	×	×

Tailstock/tailstock spindle													
Tailstock spindle live center*1	MT-4	●	●	●	×	×	×	●	●	●	×	×	×
Tailstock spindle built-in center*2	MT-3	○	○	○	×	×	×	○	○	○	×	×	×
Drilling with the tailstock <only applicable for live center specification>		○	○	○	×	×	×	○	○	○	×	×	×
No tailstock		○	○	○	×	×	×	○	○	○	×	×	×
Headstock 2 tailstock		×	×	×	○	○	○	×	×	×	○	○	○

*1 The center is optional. *2 The center is standard.

Measurement													
Manual type in-machine tool presetter (headstock 1)	Pivoting type	●	●	●	●	●	●	●	●	●	●	●	●
Manual type in-machine tool presetter (headstock 2)	Removable	×	×	×	●	●	●	×	×	×	●	●	●
Automatic in-machine tool presetter (headstock 1)	Pivoting type	○	○	○	○	○	○	○	○	○	○	○	○
In-machine workpiece measuring system (inner and outer diameter measurement) <certain workpiece shapes cannot be measured>		○	○	○	○	○	○	○	○	○	○	○	○
In-machine workpiece measuring system	Headstock 2	×	×	×	○	○	○	×	×	×	○	○	○

Improved accuracy													
Direct scale feedback	X-axis	○	○	○	○	○	○	○	○	○	○	○	○
	Y-axis	×	×	○	×	×	○	×	×	○	×	×	○
	Z-axis	○	○	○	○	○	○	○	○	○	○	○	○

Coolant													
Through-spindle coolant system	Headstock 1	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Headstock 2	×	×	×	☆	☆	☆	×	×	×	☆	☆	☆

●: Standard features ○: Option ☆: Please contact Mori Seiki ✕: Not available

		NL1500						NL2000					
Chip disposal		2-axis turning	MC	Y	S	SMC	SY	2-axis turning	MC	Y	S	SMC	SY
Chip conveyor	Right disposal (hinge type)	○	○	○	○	○	○	○	○	○	○	○	○
	Rear disposal (hinge type)	○	○	○	○	○	○	○	○	○	○	○	○
	Right disposal (scraper type)	○	○	○	○	○	○	○	○	○	○	○	○
	Rear disposal (scraper type)	○	○	○	○	○	○	○	○	○	○	○	○
	Right disposal (magnet scraper type)	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Rear disposal (magnet scraper type)	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Right disposal (spiral type)	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Rear disposal (spiral type)	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Right disposal (hinge type+drum filter)	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Right disposal (hinge type <for aluminum>)	○	○	○	○	○	○	○	○	○	○	○	○
	Rear disposal (hinge type <for aluminum>)	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Right disposal (interface)	●	●	●	●	●	●	●	●	●	●	●	●
	Rear disposal (interface)	○	○	○	○	○	○	○	○	○	○	○	○
Air blow system	Tool tip	○	○	○	○	○	○	○	○	○	○	○	○
	Chuck (headstock 1)	○	○	○	○	○	○	○	○	○	○	○	○
	Chuck (headstock 2)	✕	✕	✕	●	●	●	✕	✕	✕	●	●	●
	Tailstock spindle	○	○	○	✕	✕	✕	○	○	○	✕	✕	✕
Through-spindle air blow system	Headstock 1	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
	Headstock 2	✕	✕	✕	●	●	●	✕	✕	✕	●	●	●
Oil mist collector I/F (duct only)	φ 100 mm (φ 3.9 in.)	○	○	○	○	○	○	○	○	○	○	○	○
	φ 125 mm (φ 4.9 in.)	○	○	○	○	○	○	○	○	○	○	○	○
	φ 150 mm (φ 5.9 in.)	○	○	○	○	○	○	○	○	○	○	○	○

Automatic operation support

Gantry-type loader	LG-05	○	○	○	○	○	○	○	○	○	○	○	○
Workstocker	14 stations	○	○	○	○	○	○	○	○	○	○	○	○
	20 stations	○	○	○	○	○	○	○	○	○	○	○	○
	26 stations	○	○	○	○	○	○	○	○	○	○	○	○
Workpiece unloader		○	○	○	●*1	●*1	●*1	○	○	○	●*1	●*1	●*1
	In-machine traveling type	○	○	○	○	○	○	○	○	○	○	○	○
Workpiece conveyor		○	○	○	○	○	○	○	○	○	○	○	○
Workpiece push-out equipment (headstock 2)		✕	✕	✕	●	●	●	✕	✕	✕	●	●	●
	Cylinder type	✕	✕	✕	☆	☆	☆	✕	✕	✕	○*2	○*2	○*2
Loader	Interface	○	○	○	○	○	○	○	○	○	○	○	○
Robot	Interface	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆
Bar feeder	Interface	○	○	○	○	○	○	○	○	○	○	○	○
Workpiece rest		○	○	○	○	○	○	○	○	○	○	○	○
Pull-out finger		○	○	○	○	○	○	○	○	○	○	○	○
Turret-mounted workpiece-pusher	φ 53 mm (φ 2.0 in.)	○	○	○	○	○	○	○	○	○	○	○	○
Guide bushing		○	○	○	○	○	○	○	○	○	○	○	○

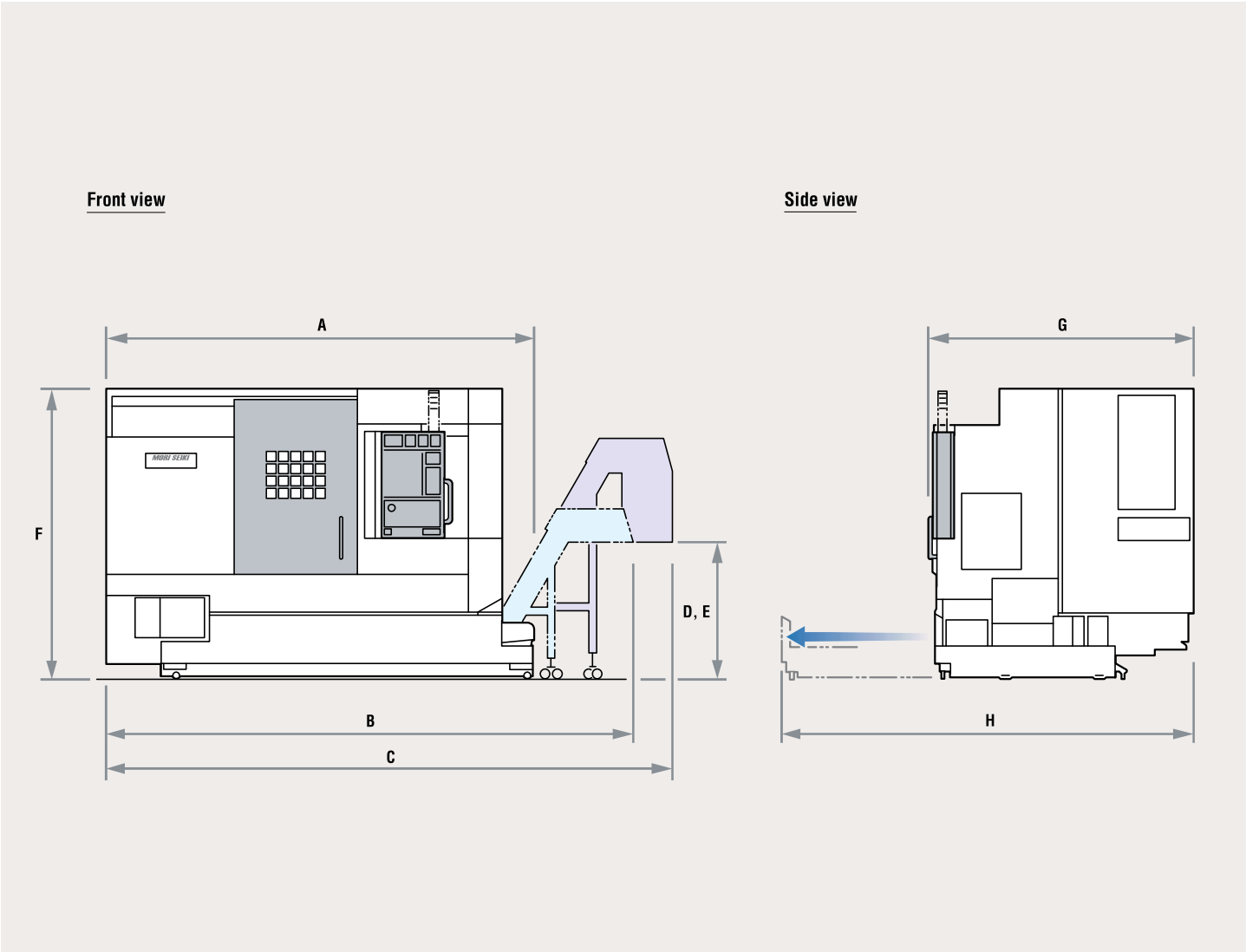
*1 Not including gantry loader specifications. *2 For spindle through hole dia. 73 mm (2.9 in.) specifications only. Consultation is required for other specifications.

Safety features

Low air pressure detecting switch		✕	✕	✕	●	●	●	✕	✕	✕	●	●	●
Dry anchor		○	○	○	○	○	○	○	○	○	○	○	○
Raised machine height <not applicable when the right disposal type chip conveyor is selected>	100 mm (3.9 in.)	○	○	○	○	○	○	○	○	○	○	○	○

- The details given above and the specifications are subject to change without notice.
- Specifications, accessories, safety device and function are available upon request.
- Some options are not available in particular regions. For details contact Mori Seiki.

Machine size



mm (in.)								
Machine type		Width			Chip conveyor disposal height		Depth	
		Machine only	Including chip conveyor	Including chip conveyor <EN Standards>	Standard	EN Standards	Machine only	Including space to remove coolant tank
		A	B	C	D	E	G	H
NL1500	Without sub-spindle	2,695 (106.1)	3,388 (133.4)	3,688 (145.2)	1,005 (39.6)		1,922 (75.7)	3,150 (124.0)
	With sub-spindle						2,000 (78.7)	
NL2000	Without sub-spindle						1,922 (75.7)	
	With sub-spindle						2,000 (78.7)	
NL2500/700	Without sub-spindle	3,100 (122.0)	3,805 (149.8)	4,105 (161.6)			1,922 (75.7)	
	With sub-spindle						2,000 (78.7)	
NL2500/1250		4,329 (170.4)	5,039 (198.4)	5,339 (210.2)	1,000 (39.4)		2,143 (84.4)	3,325 (130.9)
NL3000/700		3,410 (134.3)	4,092 (161.1)	4,392 (172.9)	1,055 (41.5)		2,089 (82.2)	3,432 (135.1)
NL3000/1250		4,522 (178.0)	5,184 (204.1)	5,484 (215.9)			2,291 (90.2)	3,464 (136.4)
NL3000/2000		—	7,080 (278.7) <chip conveyors are standard>	7,417 (292.0) <chip conveyors are standard>	1,020 (40.2)	1,042 (41.0)	2,587 (101.9)	4,494 (176.9)
NL3000/3000		—	8,147 (320.7) <chip conveyors are standard>	8,484 (334.0) <chip conveyors are standard>				

A New High-Performance Operating System

MAPPS III for CNC Lathes



10.4-inch operation panel

The CPU's processing power has been improved, with many functions which dramatically reduce the time for programming and setup. The 3rd generation NC unit MAPPS III is designed for productivity. A new interface connecting person and machine.

Improved hardware specs

Equipped with a USB interface

- Data can be transferred easily between the machine and your PC.
(For the USB memory, please use Mori Seiki specified products. We cannot guarantee correct operations with other peripheral equipment such as USB hard disks)

A large MAPPS user memory area*

- We have prepared an area which is separate from the NC memory, where programs can be stored in MAPPS.

Standard

50 MB

<tape memory length equivalent to
127,000 m (416,687 ft)>

500 MB OP

Card DNC operation

- Select the program needed from within the user memory area and use it for DNC operation for the NC unit.
(Macro programs such as GOTO, IF and WHILE cannot be used in DNC operating programs)
- Programs in the user memory area can be edited, copied, deleted and renamed.
(Programs up to 10 MB can be edited on the spot)

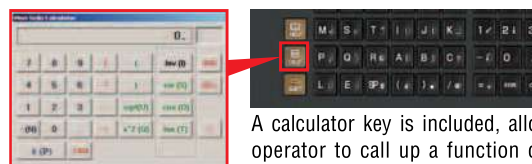
* Programs can be transferred between the user memory area and an external device such as an NC memory, an RS-232-C connection, a card interface or the MORI-SERVER.

Programs that call sub-programs stored in the user memory area using M98/G65 must be stored in the NC memory.

- Card DNC operation transfer speed: the maximum feed speed is 7 m/min for a program with 25-character blocks at a pitch of 1 mm.
(These are not absolute values, and feedrate may occasionally deteriorate)

● Please see the product catalog for details. ● The photo shown may differ from actual machine.
MAPPS: Mori Advanced Programming Production System

A handy calculator function



A calculator key is included, allowing the operator to call up a function calculator from any screen.

Network

MORI-SERVER Standard feature

A network-enabled data management system for high-speed transfer of data between computer and machine.

MORI-NET Global Edition OP

Mori Seiki's MORI-NET Global Edition is a customer support service using the Internet.

Faster creation of programs

Conversational automatic programming

Machining menu

The milling function has been greatly enhanced. A drilling and milling menu equal to that of a machining center is included.



Main menu		Groove menu	
Machining patterns	7	Machining patterns	13
Screw menu		Turning hole menu	
Machining patterns	4	Machining patterns	3
Drilling menu		Milling operation menu	
Machining patterns	5	Machining patterns	6
Hole position patterns	10	Shape patterns	35
Hand-over menu		Supplemental process menu	
Machining patterns	2	Machining patterns	8

Island shapes, open pockets OP



Up to 127 islands can be defined.



Definition of open areas eliminates tool paths with no machining allowance, making it possible to create optimum paths.

List display function



You can create conversational data without switching screens.



Conversational direct operation function and conversational direct drawing function



Conversational data entered based on the drawings can be used to perform a drawing check (direct drawing) and to carry out direct operation, all without creating an NC program. After entry of the conversational data, the data can immediately be used for operation, reducing the setup time.

Faster creation of programs

Program editing function

1 Creating programs G code editing function

Extended editing

A large number of sub-menus is available.

- Search • Replace • Top • End • Select • Copy • Cut • Paste
- Insert row • Insert sequence No.
- Edit two programs simultaneously (background editing)

Rapid registration

Full programs and portions of programs that are used frequently can be registered and later pasted into other programs with a single operation.



Register

Insert

Editing line number display, Undo/Redo function

This allows for mistakes to be corrected when creating a program.

- Displays line number being edited
- Edited line numbers are displayed in red
- Actions can be undone any number of times (up to 400 kB)
- Batch replaces can also be undone or redone in a single step

Comparison of editing times

We made a comparison of the time needed to copy, cut and paste 100 blocks, 1 block 5-word program.

Copy buffer
 Previous model: 4 kB
MAPPS III : 10 kB

	Copy	Cut
Previous model	7.5 sec.	11 sec.
MAPPS III	1.5 sec.	2.5 sec.

Help

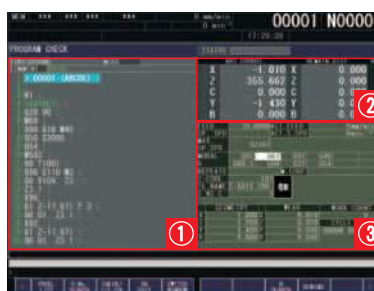
When you get stuck, the G code guidance and PLC message details function are useful.

2 Program check

Simultaneous 3-way split display

Three different screens can be displayed at once.

The screens can be switched easily using the soft keys.



- ① Program
- ② Coordinate display
- ③ Tool info

Synchronized drawing



Simulations which are synchronized with actual machining can be made in the program check screen.

3 Program management



Group management

Programs can be managed in groups for easier searching.

Status display

The status of the program - No Editing, Foreground and Background - is displayed.

Sorting

Data can be sorted according to different criteria.

- By number • By size • By comment

Custom display

Choose which information you want displayed.

- Size • Comment • Display/hide group

Faster setup

Tool list



Tools used by the selected program are displayed as a list along side simulated images of the workpiece shape, giving operators important data in a quick-to-grasp visual format.

Simple soft jaw forming function



The setup-saving function automatically handles everything from rough machining to finishing, simply by entering the required dimensions for soft jaw forming and the cutting conditions on the screen.

Current tool offset



Operators can display only the tools used in the current program. Work offsets can also be displayed.

Tool offset



The tool types and guidance drawings can be set for clear display. The settings can be adjusted to enter and display the tool shape and wear correction at the same time.

Minimizing machine down time

Limit switch guidance function



The status (on/off) of the limit switch can be checked, along with the layout diagram, without having to look at the strong electric diagram, shortening the time it takes to perform maintenance.

Regular maintenance function



The operator can enter and set the inspection items at will. Once a predetermined amount of time has passed, the screen automatically jumps to maintenance items that need attention.

MORI Automatic Programming System for Lathes

MORI-APL OP

Application systems which let you create machining programs easily on your PC.

- Easy operation, simply by entering the product shapes while following the instructions on the screen.
- Its functions, data and operability are fully compatible with the conversational programming system of the MAPPS III operating systems.



Numerical control unit specifications (MSX-850Ⅲ)

●: Standard ○: Option ✕: Not available

Controlled axes

Least input increment	0.001 mm (0.0001 in.)	●
Least command increment	0.001 mm (0.0001 in.)	●
Max. command value	±99,999.999 mm (±9,999.9999 in.)	●
Inch/metric conversion		●
Machine lock		●
Chuck and tailstock barrier	Only works in automatic operation	●
Chamfering on/off		●
Backlash compensation	±9,999 pulses	●
Rapid traverse/cutting feed backlash compensation		●
Stored pitch error compensation		●
Inclined angle offset	Memorized relative position compensation	●
Straightness offset		●
Programming resolution multiplied by 1/10	0.0001 mm (0.00001 in.) <however, the C-axis control is 0.001">	○

Operation

Sequence number collation and stop		●
Dry run		●
Single block		●
Jog feedrate	0—5,000 mm/min (0—197.0 ipm) <20 steps>	●
Manual zero return		●
Manual pulse handle feed	1 unit per control system: ×1, ×10, ×100	●
Program restart		○
Manual handle feed interruption		○

Interpolation functions

Positioning	linear interpolation type positioning is possible	●
Thread cutting/Synchronous feed		●
Multi-start thread cutting		●
Retract during thread cutting cycle		●
Continuous thread cutting		●
Variable lead thread cutting		●
High-speed skip		●
Multi-skip		●
Zero return		●
Zero return check		●
2nd zero return		●
3rd and 4th zero return		●

Feed functions

Rapid traverse rate override	F0/5/10/25/100%	●
Feed per minute		●
Feed per revolution		●
Constant tangential velocity control	Interpolation in cutting feed	●
Cutting feedrate clamp		●
Automatic acceleration/deceleration	Linear type (rapid traverse)/ Exponential function type (cutting feed)	●
Feedrate override	0—200% (10% increments)	●
Override cancel		●

Program input

Optional block skip	1 block	●
Max. command value	±8 digits	●
Program number	4 digits	●
Sequence number	5-digit N code	●
Decimal point programming/ Electrical calculator type decimal point programming	You can change the electrical calculator type decimal point programming by changing a parameter	●
Diameter/radius programming (X-axis)	Standard: diameter	●
Plane selection		●
Rotary axis designation		●
Rotary axis roll-over		●
Coordinate system setting		●
Automatic coordinate system setting		●
Work coordinate system		●
Chamfer, corner R		●
Programmable data input		●
Sub-program call	Up to 8 nestings	●
Custom macro	200 sets (# 100 to # 199, # 500 to # 599)	●
Interruption type custom macro		●
Single repetitive cycle		●
Multiple repetitive cycle		●
Multiple repetitive cycle II	Pocket cutting, zigzag thread cutting	●
Hole machining canned cycle		●
F15 format		●
Command angles of straight lines		●
Program number	8 digits	○
Addition of optional block skip	Soft key type (2—9)	○
Custom macro common variables <in total>	300 variables (# 100 to # 199, # 500 to # 699) 600 variables (# 100 to # 199, # 500 to # 999)	○
Automatic tool nose radius compensation		○
Groove width compensation		○
Manual coordinate system function		○
Tool geometry offset type I		○

Miscellaneous function/Spindle speed function

Miscellaneous function	4-digit M code	●
Auxiliary function lock		●
Multiple miscellaneous function commands	3 commands (this function is standard for the specified M codes)	●
Spindle speed function	5-digit S code	●
Constant surface speed control		●
Spindle speed override	50—150% (10% increments)	●
Spindle orientation (headstock 1)	Without lock function	●
Load monitoring function A		●
Spindle orientation (headstock 1)	With software lock	○
Synchronized tapping	Turning spindle	○

Tool function/Tool offset function

Tool function	4-digit T code	●
Number of tool offsets	80 sets	●
Tool position offset		●
Tool nose radius offset		●
Tool geometry offset/Tool wear offset		●
Tool life management	80 sets	●
7-digit tool offset data	Distance between centers 1250 type and 2000 type only	●
Tool offset measurement direct data input		●
Tool offset measurement direct data input B	In-machine tool presetter	●

Editing

Part program storage	320 m (1,050 ft) <128 kB>	●
Number of stored programs	200 programs	●
Background editing		●
Expanded tape editing function		●
Undo/Redo function		●
Line no. display function		●
	600 m (1,970 ft) <240 kB> + 400 programs	○
Part program storage <in total> + Number of stored programs <in total>	1,280 m (4,200 ft) <512 kB> + 1,000 programs	○
	2,560 m (8,400 ft) <1 MB> + 1,000 programs	○
	5,120 m (16,800 ft) <2 MB> + 1,000 programs	○

Setting and display

Status display		●
Clock function		●
Actual position display		●
Program display	Program name: 48 characters	●
Parameter setting display		●
Self-diagnosis function		●
Alarm display		●
Alarm history display		●
Operator's message history display		●
Operation history display		●
Help function		●
Running time display/Number of parts display		●
Actual feedrate display		●
Display of actual spindle speed and T code		●
Operation panel: display section	10.4-inch TFT color LCD	●
Regular interval maintenance screen		●
Screen clear	It is possible to set on the screen of saving electric power	●

Data input/output

I/O interface	RS-232-C/PCMCIA (type I, II)	●
User memory area 50 MB (for card DNC operation function, for data backup)	Files up to 10 MB in size can be edited	●
Data server		○
External work number search	# 1—# 15	○
DNC operation with memory card		○
User memory area 500 MB (for card DNC operation function, for data backup)	Files up to 10 MB in size can be edited	○

IB5011A05

Application by type

	Item	2-axis turning	MC-type	Y-type	S-type	SMC-type	SY-type
Controlled axes	Controlled axes	X, Z, B, 4	●	X, Z, C, B, 5	●	X, Z, C, Y, B, 6	●
	Simultaneously controllable axes	X, Z	●	X, Z, C	●	X, Z, C, Y	●
	Inclined axis control for arbitrary axis (Y-axis)		✕		●		●
Interpolation functions	Polar coordinate interpolation		✕		●		●
	Cylindrical interpolation		✕		●		●
	Helical interpolation (circular interpolation + linear interpolation <max. 2 axes>)		✕		○		●
	Polygon cutting		✕		○		○
Program input	Absolute (incremental) programming	X (U), Z (W)	●	X (U), Z (W), C (H)	●	X (U), Z (W), C (H), B	●
Miscellaneous function/ Spindle speed function	Spindle orientation (headstock 2) <without lock function>		✕		✕		●
	Spindle orientation (headstock 2) <with software lock>		✕		○		○
	Spindle synchronized control		✕		✕		●
	Multiple-spindle control		✕		●		●
	Synchronized tapping (with rotary tool spindle)		✕		●		●
Tool function/ Tool offset function	Y-axis offset		✕		●		●