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Press Release

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Offering Machining Capability of Large Lathe and Accuracy of Small Lathe

Mori Seiki Co., Ltd. will begin taking orders for the NLX4000, a large lathe for machining large workpieces. The machine has made its world debut as one of the high-rigidity, high-accuracy CNC lathes of the NLX series at JIMTOF2012 which had been held from November 1 to 6, 2012.

The NLX4000 is the largest high-rigidity CNC lathe of all the NLX series models with the largest through spindle hole diameter and widest slideways in its class. The machine with a robust structure is capable of conducting heavy-duty cutting of large workpieces using the high-output spindle (standard) with a maximum output of 37 kW and the high-torque rotary tool spindle (option) with a maximum torque of 100 N･m. The NLX4000 inherits the NLX series' concept for achieving high-precision machining by employing the technology that circulates coolant inside castings. The machine is a completely new, large CNC lathe that offers machining capability of large lathes and accuracy of small lathes.

We would like to highlight the features of the NLX4000 focusing on viewpoints of (1) High accuracy, (2) High rigidity, (3) "Mature" and "evolved" BMT, (4) Improved operability, (5) Extensive specification variations, (6) Energy saving, (7) MAPPS IV and (8) Compliance with safety standards.

(1) High Accuracy

The NLX4000 employs the Mori Seiki's original thermal displacement control method realized with various technologies including the one that circulates coolant inside castings. The machine uses a large coolant tank with a capacity of 708 liters to stabilize coolant temperature that has an impact on machining accuracy. Therefore, thermal displacement is reduced to less than one third compared with the conventional machines. Periodic error compensation (patent-pending) is conducted to position the C-axis, which contributes to halving the positioning error compared with the conventional machine. The NLX4000 enables machining capability of large lathes and achieves high-accuracy machining of small lathes.

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(2) High-Rigidity

The NLX4000 equipped with slideways for all axes ensures high-rigidity and high damping performance to endure cutting reaction force at the time of machining large workpieces, by increasing the slideway width by up to 50%. The machine employs a large spindle bearing with an inner diameter of φ200 mm, ensuring thickness and rigidity. The high-rigidity machine structure and spindle maximize the high-output spindle capability with a maximum output of 37 kW and a maximum spindle speed of 2,000 min^{-1} (Type A) and 1,500 min^{-1} (Type B).

(3) "Mature" and "evolved" BMT

Our original BMT (Built-in Motor Turret) has been further "evolved," achieving a maximum rotational speed of 10,000 min^{-1}. Despite the substantial increase in speed from the 6,000 min^{-1} on conventional model, it takes a mere 0.45 seconds to accelerate up to 10,000 min^{-1}. In addition, the "maturity" resulting from delivery of over 12,000 units has made it possible to reduce vibration in the turret to less than one third and the turret temperature rise to less than one tenth of those of a gear-driven turret, enabling a significant improvement in terms of accuracy as well. The high torque milling specification (a maximum torque of 100 Nm) is offered as an option, which enables the CNC lathe to perform heavy-duty cutting as powerfully as a machining center with a No. 40 taper spindle. The BMT is the best turret in its class, allowing the use of M30 taps and drastically improving the cutting removal rate.

(4) Improved operability

The NLX4000 has a robust construction to enable high-efficiency machining of large workpieces, and the ratio of machining capacity to installation area is the largest in its class. While achieving a compact body, the machine responds to machining of large diameter workpieces using a large work envelop equivalent to or larger than the size of conventional models. The slant bed with a tilt angle of 45° contributes not only to improving chip disposal but also to reducing the distance between the spindle center and the door opening to 367 mm. The NLX4000 machine structure with a wide work envelop and improved accessibility is one of the outstanding features for lathes of the same class which require attaching and removing of large diameter workpieces.

(5) Extensive specification variations

Two types of models are available: The type A with a 15-inch chuck size and through spindle hole diameter of 145 mm and the type B with a 18-inch chuck size and through spindle hole diameter of 185 mm. Each model offers the MC type (with the milling function) and the Y type with the Y-axis travel of ±60 mm (the MC type and the Y-axis function), enabling machining that combines turning and milling capabilities.

(6) Energy Saving

The machine features a green design that considers reducing the environmental burden and running costs. The NLX4000 achieves approximately 40% reduction in power consumption during standby by employing LEDs and reviewing the motor structure and power saving functions. Besides, the newly incorporated function that stops lubricating oil supply during standby has reduced the consumption of lubricating oil by 40% or more.

(7) MAPPS IV

The NLX4000 uses the MAPPS IV high-performance operating system for its operation panel. Designed to offer outstanding ease of use and flexibility, the MAPPS IV features the customizable main screen and easy-to-use key arrangement. And its conversational programming function enables users to perform complex machining with minimal key input, offering much simplified programming and operation. Additionally, the new NLX series comes with a variety of options. The 3D interference checking function, which prevents collisions inside the machine, ensures the world's best protection against interference even during complex machining that uses the C-axis, Y-axis or Spindle 2. There are also other options for threading and hobbing, providing powerful support for many lathe users.

(8) Compliance with safety standards

The NLX4000 complies with safety standards all over the world, including IEC Standards, UL Standards and JIS Standards.

Type	High-rigidity, high-accuracy CNC lathe	
Model name	NLX4000/750	Type A (MC type, Y type) Type B (MC type, Y type)
Market	Oil and gas-related, construction and agricultural machineries, hydraulic and pneumatic equipment, etc.	

■Main Specifications

Item		NLX4000AMC/750	NLX4000AY/750	NLX4000BMC/750	NLX4000BY/750
Max. turning diameter	(mm)	600	500	600	500
Max. turning length	(mm)	746		721	
Bar work capacity	(mm)	117		164	
Axis travel (X/Z/Y)	(mm)	365/875/-	315/875/±60	365/875/-	315/875/±60
Rapid traverse rate (X/Z/Y)	(m/min)	30/30/-	30/30/10	30/30/-	30/30/10
Max. spindle speed (Spindle 1)	(min^{-1})	2,000		1,500	
Spindle 1 drive motor	(kW)	37/30 (30 min./cont.)			
Number of tool stations on the turret		10 [12]			
Max. rotary tool spindle speed	(min^{-1})	10,000 [4,000]*			
Rotary tool spindle drive motor	(kW)	5.5/5.5/3.7 (3 min./5 min./cont.)			
Rotary tool spindle torque	(N·m)	40 (3 min.) [100 (4 min.)]*			
Floor space (including chip conveyor)	(mm)	4,106×2,071		4,530×2,071	

[ ] Option

* High-torque milling specification

Photo 1. NLX4000AY/750

Photo 2. Heavy-duty cutting with the high-torque milling spindle