

Press Release

July 9, 2019

Release of NLX 6000 Large Precision Turning Center with 1000 mm Distance Between Centers Ideal for Large-diameter Shafts

DMG MORI CO., LTD. (hereinafter called “DMG MORI”) begins taking orders for the NLX 6000 | 1000, a high-rigidity, high-precision NLX 6000 series turning center with a distance between centers of 1000 mm, on July 9 (Tue). The NLX 6000 | 1000 is available with three through-spindle hole variations to cater to machining of a diverse range of workpieces. The model is especially suitable for machining large components, including large construction machinery parts, large-diameter shafts like oil well pipes for the energy industry, aircraft engines, rocket components and parts for semiconductors.

The NLX 6000 | 1000 will be exhibited for the first time in Japan at the IGA INNOVATION DAYS 2019 to be held from July 9 (Tue).

The NLX 6000 | 1000 offers three spindle types with through-spindle hole diameters of 185 mm, 285 mm and 375 mm, with each available as milling specification and Y-axis specification for a total of six variations in the lineup. Making most of its large-diameter spindle and wide machining area, the machine handles large-diameter shafts with a maximum turning diameter of 920 mm and maximum turning length of 1,000 mm. It also employs various functions and features for heavy-duty cutting of difficult-to-cut materials, such as a high-rigidity bed and thermal displacement control mechanism, to deliver high-speed, high-precision machining of large-diameter shafts.

The followings are detailed features of the NLX 6000 | 1000 in terms of (1) High rigidity (2) Milling (3) Spindle (4) High precision (5) Chip disposal solutions and (6) Usability and maintenance.

(1) High rigidity

- Robust construction for supporting heavy-duty cutting of difficult-to-cut materials was realized by torsional rigidity simulations and FEM analysis to achieve powerful machining of ultra-heavy workpieces
- Slideways on the X-, Y- and Z- axis for higher vibration damping performance and dynamic rigidity
- Z-axis with an approx. 1.5-times wider slideway design than conventional models
- X-axis with an approx. 1.3-times bigger large-diameter ball screws than conventional models for high feed rigidity

(2) Milling

- The 12-station BMT (Built-in Motor Turret)
- Minimizes heat generation and vibrations for higher milling accuracy than turrets of conventional models
- Milling capability as good as or better than that of a machining center with a No. 40 taper spindle + Max. rotary tool spindle torque: 117 Nm for standard specification, 140 Nm (10% ED) for

high-torque specification

(3) Large-diameter spindle

- Large-diameter spindle with beltless drive motor
 - + Through-spindle hole diameter 185 mm: max. spindle speed 1,600 min⁻¹, spindle torque* 7,021/5,329 Nm
 - + Through-spindle hole diameter 285 mm: max. spindle speed 1,000 min⁻¹, spindle torque* 12,069/9,160 Nm
 - + Through-spindle hole diameter 375 mm: max. spindle speed 500 min⁻¹, main spindle torque* 12,082/9,170 Nm

* 30 min/continuous

- High-precision encoder from Magnescale Co., Ltd. for higher C-axis positioning accuracy

(4) High precision

- Oil jacket cooling around the main spindle motor and built-in motor suppresses thermal displacement that can significantly affect machining accuracy
- Cooling system for heat sources near the headstock and Z-axis ball nuts helps to maintain reliable machining even over long hours
- ABS magnetic linear scale from Magnescale Co., Ltd. available as an option
 - + Full closed loop control for high-precision positioning

(5) Chip disposal solutions

- Zero Sludge Coolant Tank (option)
 - + High-performance cyclone filter for high-efficiency collection of sludge in the coolant tank
 - + Preventing clogging of pipes and coolant nozzles as well as drops in pump performance drastically reduces the amount of sludge buildup in the coolant tank, resulting in significantly less cleaning work
 - + Continuous use of clean coolant allows for longer coolant replacement cycle
- Chip flush coolant (option)
 - + Chip flush coolant installed at the base of the tailstock facilitates smooth chip flushing
- Above-the-chuck coolant system (option)
 - + Coolant supplied from above the chuck removes chips and suppresses heat generation during machining

(6) Usability and maintenance

- With the quick-change system, self-centering steady rest (option) significantly improves replacement work
 - + Replacement work that used to take approx. 8 hours can now be achieved in approx. 0.5 hours
- Opening and closing of the fixed steady rest (option), which used to require a crane, can now be done by hand, significantly improving replacement work
- A wide 1,280 mm door opening improves efficiency of setups
- The cover above the chuck features a pocket to accommodate tool overhang, preventing interference

DMG MORI will continue to provide products that are reliable, highly-functional and worthy of investment to meet each and every customer's needs.

Product name	High-rigidity High-precision Tuning Center
Model name	NLX 6000 1000
Applicable industries/markets	- The construction machinery, shipping, petroleum and energy industries - Aircraft engines, rocket components, semiconductor parts, etc.
Planned production volume	10 units/month

■ Main specifications

Item	Milling specification	Y-axis specification
Through-spindle hole diameter (mm)	185/285/375	
Travel (mm)	X: 485 Z: 1,150	X: 485 Y: 200 (±100) Z: 1,150
Maximum turning diameter (mm)	920	
Maximum turning length (mm)	1,000	
Bar work capacity*1 (mm)	116	
Rapid traverse rate (m/min)	X: 20 Z: 24	X: 20 Y: 10 Z: 24
Max. spindle speed (Through-spindle hole diameter 185/285/375 mm) (min ⁻¹)	1,600/1,000/500	
Max. rotary tool spindle speed (min ⁻¹)	8,000	
Number of tool stations (tools)	12	
Spindle drive motor (kW)	45/37 (30 min/cont.)	
Floor space (width x depth) (mm)	5,969 x 3,284*2	

*1: For through-spindle hole diameter 185/285 mm only. The bar work capacity may be restricted depending on the chuck/cylinder used.

*2: Includes chip conveyor. Does not include swivel radius of operation panel.



NLX 6000 | 1000 external view



Application example: construction machinery part (industrial machinery)

Workpiece size: $\phi 500 \times 300$ mm



Application example: low-pressure turbine disc (aerospace)

Workpiece size: $\phi 780$ mm



Application example: oil well pipe (oil, gas)
Workpiece size: $\phi 340$ mm