DMG MORI CO., LTD.
Global Head Quarter: 2-3-23 Shiomi, Koto-ku,
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Press Release

September 20th, 2023

Highest static / dynamic / volumetric accuracy with INH 63 / INH 80
- the 5-axis horizontal machining innovation by DMG MORI

DMG MORI CO., LTD. (hereinafter “DMG MORI") has developed the high-accuracy 5-axis horizontal machining centers INH 63 / INH 80 to realize sustainability through stable precision and maximum productivity. The INH series combines technology and know-how from three sources: from the high-precision machines of Swiss manufacturer DIXI MACHINES which DMG MORI governed from 2006 to 2016; from DMG MORI Germany and their long experience with 5-axis machining; and from Japan where critical components are manufactured in-house. The result is a degree of reliability never seen before.

Machining Transformation (MX) has the objective of answering the needs for higher accuracy and productivity and realizing a sustainable society. In other words, MX utilizes Digital Transformation (DX) to promote Process Integration and Automation, and finally Green Transformation (GX)[*1].

The newly developed INH 63 / INH 80 realize customers’ MX by incorporating three features through original DMG MORI technology: Precision, Productivity and Flexibility. Changes in machine posture are prevented through sophisticated control of thermal compensation, and the in-house-made linear guideways together with SmartSCALE on all axes as standard guarantee static accuracy of the highest level. In addition, the application of twin ball screws on all axes and a slant-column structure reduce vibration and improve machine rigidity. Also, the 400V specification (standard in Europe) and powerMASTER spindle enable heavy-duty cutting as well as high-speed processing with maximum rigidity to support customers’ process integration.

The INH series can be introduced to existing horizontal machining center production lines to enhance automation systems and handle a large variety of workpieces at once. With the large-capacity tool magazine for max. 363-tools[*2], the automated tool stocker CTS for up to 4,000 tools[*2], and the new energy-saving & space-saving vertical large-capacity coolant tank *zero-sludge***COOLANT** *pro*, customers can run their production continuously and unmanned.

Operation is made as intuitive as never before with the new operation panel ERGO*line* X with CELOS X to realize even complex programming through easy guidance, while Technology Cycles and CELOS DYNAMIC*post* connect machine and CAD/CAM for DX of your production. The INH 63 / INH 80 reduce

power consumption and CO_2 emissions to support green production, process integration, automation and DX for a sustainable production environment.

Please have a look at our video and catalog for more information. *3

- Video : https://www.dmgmori.co.jp/en/movie_library/movie/id=6780
- Catalog : https://www.dmgmori.co.jp/en/download/catalog/detail/id=6811

■Features

① High accuracy and high rigidity

+ Symmetrical structure with **twin ball screws on all axes** to stabilize the moving units and suppress vibration
+ High positioning accuracy over a long period of time with the standard **SmartSCALE from Magnescale, a magnetic scale with full closed-loop control**
+ High rigidity due to the symmetrical structure and **slanted column**
+ **Three-point support structure** to minimize the effects of ground geometry and machine deterioration
+ Mechanical structure optimized by FEM (Finite Element Analysis) simulation
+ Reliable cooling of ball screws and other heat sources to suppress thermal displacement and changes in machine posture

② **High rigidity spindle powerMASTER**

+ Cutting capability increased by 65%*4
+ Standard max. spindle torque of 808 Nm and spindle output of 85/40 kW
+ 400 V specification to enable both heavy cutting to high-speed machining
+ 3-year spindle warranty for reliable, long-term use

③ Improved Operability

+ Large window for improved visibility during machining
+ **New operation panel ERGOline X with CELOS X**: Ergonomic design for intuitive operation
  - Large touch screen for high visibility and intuitive operation
  - Stress-free operation with powerful CPU, large memory, high security, stable communication and connectivity
  - HYBRID BAR switches display to show necessary information for each situation, preventing human error and improving operability
  - SMARTkey for easy access rights management based on operator experience and skills

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+ Tool magazine operation panel with touch screen
  - Intuitive operation even with gloves: search, call, and register tools
  - Filter function to detect abnormal tools in need of maintenance
+ Hydraulic and pneumatic equipment grouped together for easy access
+ Chip conveyor with variable chip outlet height

④ Measures against “3 evils of machining” *5

+ Energy-saving & space-saving **large-capacity vertical coolant tank** *zero-sludge***COOLANT** *pro*
  - Use the difference in specific gravity to separate sludge and oil for efficient coolant collection, longer use of coolant, and significant reduction in manual maintenance
  - Pump controlled by inverter according to the programmed flow rate: power consumption reduced by up to 57%*6.
+ Coolant flow rate of up to 400 L/min for efficient and reliable chip cleaning in the machining area
  - Cleaning coolant flows along and washes the internal cover; coolant from motor-driven nozzles flushes out accumulated chips
  - Fewer cleaning cycles required, shorter total lead time
  - AI detects chips and accordingly performs cleaning, preventing troubles induced by chips*2
+ ***zero*FOG***2 for efficient mist collection during machining
  - Built into the machine, no dedicated floor space required
  - Collects 99.97% or more particles as fine as 0.3 µm
  - Primary filter automatically cleans the filter, preventing clogging and greatly reducing filter maintenance

⑤ Long continuous and unmanned operation

+ A variety of high-quality automation and robot systems available with short lead times
  - LPP (Linear Pallet Pool) system*2
    Customizable and scalable system (even compatible with muti-level pallet racks) to maximize productivity and operation rate
  - CPP (Compact Pallet Pool) system*2
    8 packages available depending on the number of pallets required
  - MATRIS*2
    Revolutionary robot system that requires no programming or operating expertise
  - LPS 4th Generation*2
    Software for controlling automation systems, including production planning and management, tool management system control, etc.

+ Compatible with 4-axis horizontal machining centers
  Using the same pallets as NHX / NH horizontal machining centers, the INH 63 / INH 80 can be integrated into your existing production lines and advance automation
+ Space-saving, large-capacity tool magazine
  Wheel-type magazine for up to 363 tools[*2] with a 27.4% reduced footprint[*7]
  Smooth tool setup with the standard magazine operational panel
+ CTS (Central Tool Storage) for up to 4,000 tools,[*2] ideal for automating tool handling in high-mix production
  Transfer robots loading and unloading tools from tool storages to machine tool magazines
  Tool information centrally managed, enabling tool transfer in coordination with machining

⑥ Accelerating DX

+ Various digital solutions to support customers
  - CAD/CAM[*2]
    To enable efficient programming of complex workpieces, DMG MORI offers the best CAD/CAM products for each customer (online purchase also available).
  - CELOS DYNAMICpost[*2]
    Post-processor, cutting simulation, and cutting force optimization in one software package
    Cycle time and cutting force simulation for speedy and accurate programming
  - DMG MORI MESSENGER[*2]
    Real-time shop floor visualization for process improvement.
  - DMG MORI GATEWAY[*2]
    One-stop support for setting up a factory network to connect both DMG MORI and third-party products and peripherals
  - *my* DMG MORI
    Web-based platform for exchanging repair and maintenance information between customers and DMG MORI, enabling early machine recovery

⑦ Sustainability

+ CO_2 and power consumption reduced through process integration, automation, and DX
  - Achieved SBT certification[*8] for our efforts to reduce CO_2 emissions throughout the supply chain
  - Power consumption and CO_2 emissions per workpiece reduced by 33%[*9] by shortening machining lead times through process integration, automation, and DX

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DMG MORI will continue to deliver highly functional, reliable, and investment-worthy products to meet the diverse needs of customers.

Product name	5-axis horizontal machining center “INH 63/ 80”
Target industries	Aerospace, Semiconductor, Medical, Industrial Machinery, EV, Die & Mold, etc.
Release date	September 2023

*1 We define GX (Green Transformation) as a lean and clean production in terms of people, resources, energy, factory space, and time.
*2 Option
*3 The catalogs are available only for the web members. Once you sign up for a free membership, you will have access to limited content.
*4 Comparison with our previous model. The data shown may not be obtained depending on the cutting or environmental conditions.
*5 Chips, coolant, and mist. They often prevent stable and continuous machine operation and contaminate the factory environment.
*6 When using power-saving coolant mode
*7 Comparison with a conventional rack magazine of 7.4 m^2 with a storage capacity of 180 tools.
*8 Science Based Targets. A greenhouse gas reduction target for companies over the next 5-15 years, consistent with the Paris Agreement, which aims to limit the global temperature increase to close to 1.5°C or well below 2°C above pre-industrial levels.
*9 When machining a cylinder head using four 4-axis horizontal machining centers (7 processes) or two INH 80 machines (2 processes). The data shown may not be obtained depending on the conditions. CO_2 emissions are calculated using a basic emission factor of 0.000457 (t-CO_2/kWh).

INH 63

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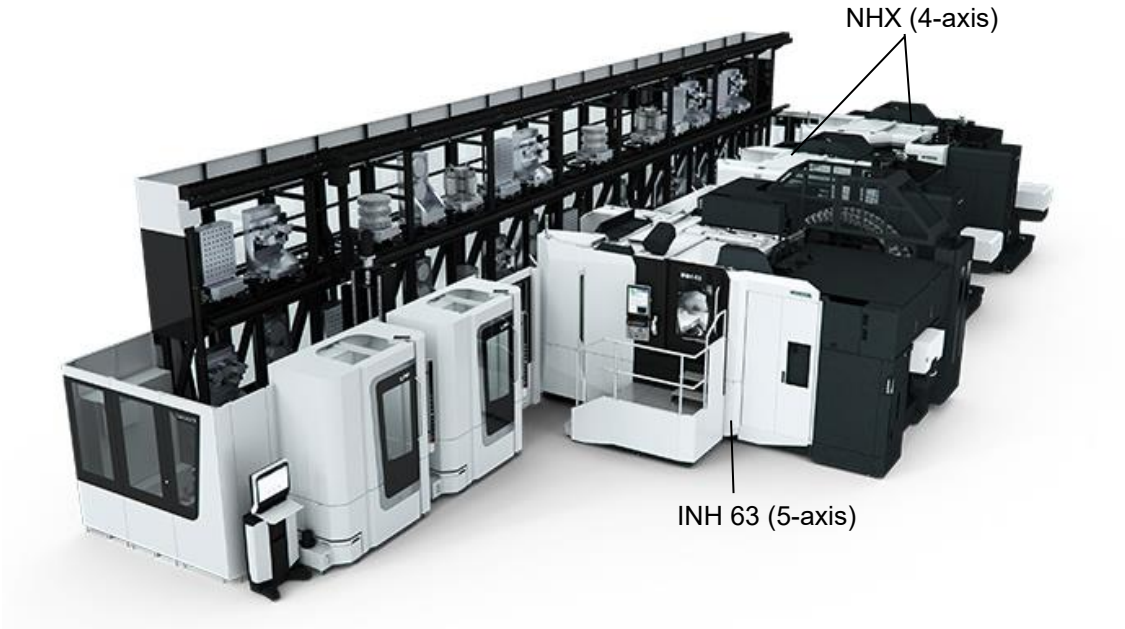
INH 80



Automation system consisted of NHX(4-axis), INH 63(5-axis), and LPP

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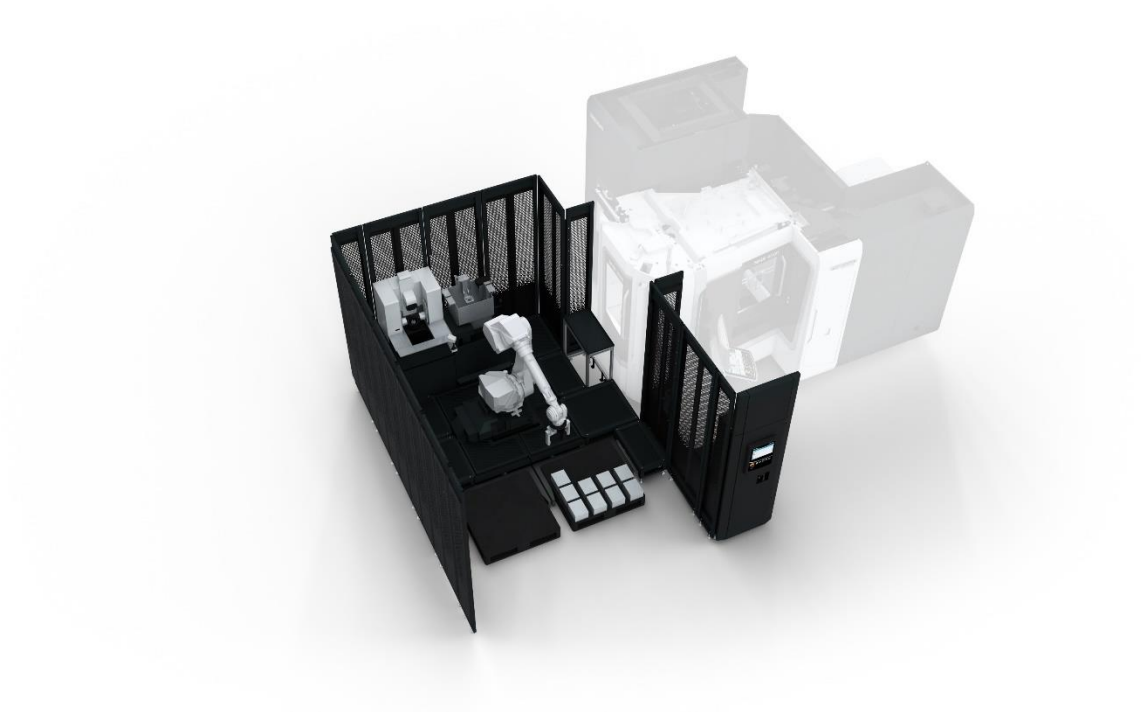

Robot system MATRIS available