

Next Generation TURN-MILL – Complete Machining. Redefined.

In an era of skilled labor shortages, rising quality requirements, and increasing cost pressure, reducing intersections has become a decisive competitive factor. The next generation of NILES-SIMMONS TURN-MILL was developed to manufacture complex workpieces as completely as possible in a single machine, in one setup, and without manual intervention. For maximum productivity, process reliability, and cost efficiency – Engineered for Your Peace of Mind.

The NSH Group and its NILES-SIMMONS brand are taking complete machining of complex workpieces with horizontal, modular turn-mill machining centers to the next level and introducing numerous new modules, options, and configuration possibilities with the next TURN-MILL generation.

Historically, NILES-SIMMONS stands for a long tradition of premium horizontal turning machines with precision “Made in Germany.” Building on this heritage, the company was among the first in the market to develop multifunctional horizontal turn-mill machining centers distinguished by modular architecture and integration of multiple technologies into one machine. Through decades of engineering, technology, software development, and practical experience, the “Closed Door Machining” concept has been continuously refined: complete machining of a workpiece in a single setup without manual intervention.

By integrating turning, milling, drilling, deep-hole drilling, tapping, gear milling, and grinding into one machine, the need for multiple dedicated machines is eliminated. This reduces process time, simplifies production workflows, and sustainably improves efficiency.

The proven multifunctional machining centers have now been advanced to the next stage of development. The next generation of the NILES-SIMMONS TURN-MILL series comprises six machine sizes, ranging from sizes N20 MC to the N60 MC, and has been extensively enhanced in terms of available machining lengths, workpiece capacities, module configurations, and software options. This enables the machine to be tailored even more precisely to specific workpiece geometries, material requirements, and individual manufacturing processes.

Series Upgrade | Bigger. Stronger. More Precise.

The NILES-SIMMONS TURN-MILL platform is engineered to machine workpieces up to 9.5 m (31 ft) in length, with swing diameters up to 1.5 m (59 in.) and workpiece weights of up to 15 metric tons. A carefully matched portfolio of direct-drive and geared-drive systems, combined with spindle configurations ranging from A8 to A20, delivers exceptional versatility across a wide range of applications. Whether performing high-performance roughing with maximum material removal

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rates or ultra-precise finishing operations approaching grinding quality, every configuration is designed to maximize performance.

Outstanding productivity, flexibility, and long-term reliability—combined with application-specific machine configurations tailored to each customer's manufacturing requirements—are the hallmarks of the NILES-SIMMONS TURN-MILL series. Built on uncompromising machine tool engineering, this new generation combines a rigid machine platform with perfectly integrated machining modules, advanced software solutions, and intelligent automation concepts to create a highly capable and future-ready manufacturing system.

Beyond comprehensive turning and milling capabilities—from TRAORI-supported 5-axis machining to power skiving—the new generation also integrates specialized manufacturing technologies directly into the machine. These include fir-tree slot machining, helical gear machining, and advanced U-axis or angle-head machining for demanding internal contours, slot milling, and cross-hole drilling. Optional roller burnishing and grinding units deliver outstanding surface finishes without requiring secondary operations on separate machines. Sensor-based process monitoring, seamlessly integrated with NILES-SIMMONS' proprietary software platform, provides maximum transparency, enhanced process control, and machining reliability. As a result, even the most complex workpiece geometries and contours can be produced economically, consistently, and without manual intervention. The result is exceptional manufacturing flexibility, maximum process reliability, and significantly increased productivity.

A key advantage is the high degree of modularity enabling each machine to be configured precisely for the customer's application and optimized for a wide variety of workpiece types and geometries.

In addition to the machine's core universal turn-mill unit, a second independent machining slide, modular tool magazines, clamping and measuring systems, and additional machining units can be configured to fit individual manufacturing requirements.

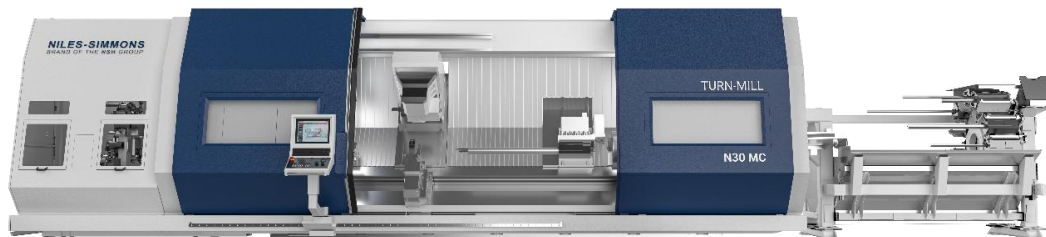


Figure 1 – NILES-SIMMONS Next Generation TURN-MILL with boring-bar slide and boring-bar magazine for complex internal machining

Shaft Parts and Large Crankshafts | Heavy-Duty Performance

A primary application area for horizontal NILES-SIMMONS TURN-MILL machining centers is the production of shaft-type components, including large crankshafts, camshafts, and similar workpieces used in the energy, automotive, construction equipment, and general machinery and mechanical engineering industries. These components are found in applications ranging from generators and large-scale industrial equipment to safety and cooling systems, as well as marine propulsion and heavy-duty engine systems. Manufacturing such critical components demands the highest levels of precision, productivity, and process reliability.

To meet these requirements, NILES-SIMMONS TURN-MILL machines can be configured in the MCM version for shaft machining. In addition to the universal turn-mill unit, this configuration features a high-performance external milling unit mounted on a second independent machining slide. Delivering up to 10,000 Nm of torque, it enables exceptional cutting rates for demanding heavy-duty roughing applications. The combination of the universal turn-mill unit with the powerful milling wheel sets new benchmarks in efficiency, productivity, and machining flexibility. It delivers outstanding material removal performance during rough machining and has proven itself in numerous industrial applications as a robust and highly productive solution.

Alternatively, the MCT configuration adds an upper or lower tool turret equipped with up to 12 tool stations for both static and live tooling. This provides an efficient solution for end-face machining, drilling, tapping, and similar secondary operations. The turret configuration reduces tool change times while allowing for a more compact machine footprint in applications that require a smaller tool inventory without the need for a second tool magazine.

To further optimize the machining process, the machine can be equipped with a programmable tailstock, a wide range of clamping solutions, and up to four steady-rest slides, each capable of carrying two steady rests. An optional hydrostatic workpiece support system provides completely contact-free support, eliminating friction and vibration while preventing scratches or machining marks. Together, these features enable highly flexible process design and consistently superior surface finishes, even on long, heavy, and demanding shaft-type workpieces.



Figure 2 – TURN-MILL with hydrostatic support for excellence in shaft machining

Tube- and Housing-Type Components | High-Strength Transparency

Tubular and housing-type components represent another key application for horizontal NILES-SIMMONS TURN-MILL machining centers. These workpieces are commonly found in the aerospace, heavy equipment, energy, and construction machinery industries, where complex internal features and demanding material properties require exceptional machining capability.

For these applications, NILES-SIMMONS TURN-MILL machines can be equipped not only with the universal turn-mill unit mounted on the main spindle side, but also with a dedicated boring-bar machining slide positioned on the tailstock or counter-spindle side for complete internal machining.

Depending on the specific machining requirements, the system accommodates boring bars up to 2.4 m (7.9 ft) in length, including driven boring bars, static boring bars with or without programmable cutting-edge adjustment, measuring probes, sensor-equipped vibration-damped boring bars, and cassette systems with integrated drive and chuck functions. All tools are automatically exchanged into the machining area via an integrated boring-bar changer. For specialized applications, tool lengths of up to 3 m (9.8 ft) are also available.

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To maximize productivity during extended machining cycles, the machine can be configured with a boring-bar magazine providing storage for up to 16 boring-bar cassettes. These long tools—with length-to-diameter ratios of up to 14:1 and weights of up to 150 kg (330 lb)—can be operated with high-pressure coolant systems delivering pressures up to 300 bar (4,350 psi) and flow rates of up to 250 L/min (66 gal/min). The temperature-controlled coolant supply can be regulated by either pressure or flow rate, ensuring optimum cutting conditions throughout the machining process. This configuration is particularly well suited for deep-hole drilling and the reliable machining of high-strength materials. Combined with the exceptional structural rigidity of the TURN-MILL platform and its proven vibration-damping system, stable, low-vibration machining is maintained even with extreme tool overhangs.

Another key feature is the optional Automatic Tool Change (ATC) system for boring-bar applications. Using the machine's standard tool changer, additional Capto® or HSK interface tools can be automatically transferred from two left-side chain magazines, each accommodating up to 96 tools, into the boring bar positioned on the right side of the machine. This ensures that the appropriate cutting tool is always available automatically for each machining operation while also enabling fully automatic in-machine tool measurement.

For the internal machining of high-value, tight-tolerance components manufactured from demanding materials such as titanium, Inconel®, and other high-strength alloys, where heat generation, tool wear, and vibration present significant machining challenges, NILES-SIMMONS offers the option of integrating Sandvik Silent Tools™ Plus with the latest-generation embedded electronics together with CoroPlus® Connected process monitoring software. Through a proprietary PLC interface developed exclusively by NILES-SIMMONS, these intelligent tooling systems are fully integrated into the machine control platform. This unique level of integration provides complete process transparency, maximum operational reliability, and comprehensive control throughout the entire machining cycle. Real-time monitoring, visualization, and automatic process correction directly at the cutting edge allow the machine to respond instantly to changes in critical machining parameters such as cutting forces, vibration, tool deflection, and temperature. This establishes a new benchmark in intelligent process monitoring, enabling manufacturers to consistently achieve the highest standards of quality, reliability, and productivity while minimizing the risk of tool failure, workpiece damage, or scrap.

The seamless interaction between machine, tooling, sensors, and software creates a fully integrated machining solution capable of reducing total machining time by up to 30% while increasing cutting rates by up to 20% compared with conventional machining solutions available on the market.



Figure 3 – Internal machining with high-pressure coolant and sensor-supported boring bars.

As an alternative to a dedicated boring-bar slide with its extensive—and inherently space-intensive—tool magazine, NILES-SIMMONS offers the unique HYDRODOCK boring bar module for the internal machining of tubular workpieces. This compact solution combines maximum machining flexibility with a significantly reduced machine footprint.

System boring bars equipped with Capto® or HSK interfaces are automatically loaded from a three-position intermediate magazine located above the main spindle and coupled directly to the universal turn-mill unit via NILES-SIMMONS' proprietary hydromechanical interface. The high-clamping-force connection ensures exceptional rigidity and machining stability. A mechanical self-locking mechanism securely maintains the connection even without continuous hydraulic pressure, providing maximum operational reliability throughout the machining process.

A key advantage of the HYDRODOCK system is its ability to swivel the boring bar 180 degrees, enabling complete machining of the workpiece from either the left- or right-hand side without requiring re-clamping or repositioning. By eliminating additional setup operations, the system significantly reduces non-cutting time, increases process reliability, and improves overall manufacturing efficiency.



Figure 4 – Hydrodock unit with three-position pickup magazine

The built-in pick-up magazine stores boring bars horizontally at a 0-degree B-axis position, placing them in the ideal orientation for machining operations. This configuration ensures efficient tool handling and optimized accessibility within the machining area. In addition, the system can also be equipped with an Automatic Tool Change (ATC) function, enabling automatic loading of system boring bars with tool heads directly from the chain magazine.

The combination of application-oriented, near-workzone boring-bar storage, the integrated **180-degree swivel capability**, and fully automated tool loading via the ATC makes the HYDRODOCK option an exceptionally efficient, flexible, and productive solution for the internal machining of complex and demanding workpieces.

By additionally integrating freely programmable **U-axes** into the universal turn-mill unit, even highly complex geometries—including contoured surfaces, eccentric fits, and advanced freeform features—can be machined economically and with optimized cycle times. This capability is particularly beneficial for large, heavy components such as aircraft engine structures, landing gear components, engine parts, housings, and valve bodies, where precision, flexibility, and process efficiency are critical.

Ring- and Disc-Type Components | Simultaneous Process Reliability

In addition to shaft- and tube-shaped components, horizontal TURN-MILL machining centers are equally designed to produce ring- and disc-shaped workpieces. For these applications, the multitasking machines are equipped as standard with two identical turn-mill units combined with full main and counter spindles, enabling simultaneous machining, integrated workpiece transfer, and complete machining in one setup. The configuration provides identical machining capabilities on both sides of the machine, including independent Y- and B-axis functionality.

When required, part-off operations can also be fully integrated into the machining process. Typical applications include turbine disks, engine rings, discs, and blisks. Manufacturers can significantly reduce non-productive times, increase productivity, and achieve the highest levels of precision and process reliability.

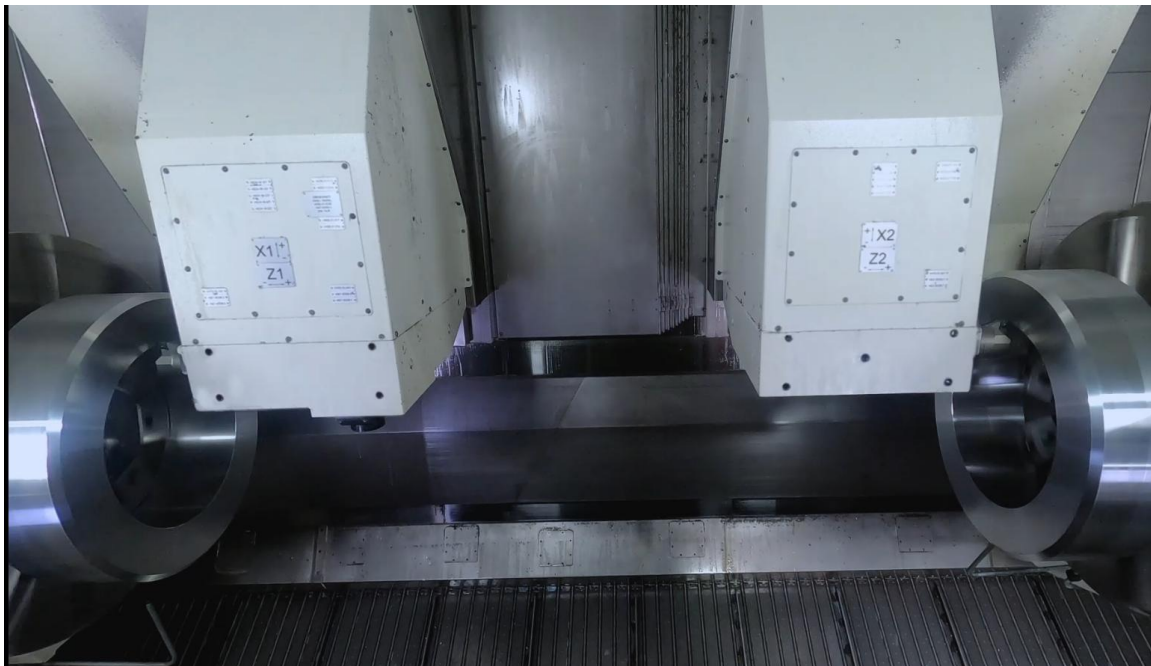


Figure 5 – Closed-door simultaneous machining of engine rings

Engineered for Your Peace of Mind

The next generation NILES-SIMMONS TURN-MILL delivers the right configuration for every workpiece family, the ideal technology for every process, and maximum process reliability.

The high degree of modularity within the TURN-MILL series enables each machine to be precisely configured for a wide range of workpiece geometries—from shafts, large crankshafts, and camshafts to tubular and housing components, as well as rings, discs, and blisks. A comprehensive selection of machining units, tooling systems, boring-bar solutions, turret configurations, milling

units, clamping systems, and automation components can be individually tailored to meet specific production requirements.

The key benefit for manufacturers is uncompromising complete machining from a single source. Turning, milling, drilling, deep-hole drilling, thread cutting, gear machining, grinding, roller burnishing, measurement, and numerous specialized processes are integrated into one machine and performed whenever possible in a single setup. This significantly reduces setup effort, non-cutting time, and potential sources of error while setting up the foundation for economical, repeatable, and highly productive manufacturing.

The modular machine platform is complemented by powerful software and automation solutions. Intelligent process monitoring, sensor-based technologies, adaptive machining strategies, and seamless integration of tooling, measurement, and monitoring systems provide maximum transparency throughout the entire machining process.

Operators gain complete confidence that the machine, tooling, and manufacturing process are working together at peak performance—Engineered for Your Peace of Mind.

Key Benefits at a Glance

- **Maximum modularity** – precisely configured machine solutions tailored to every workpiece family and application requirement.
- **Technology tailored to your needs** – exactly the machining modules and processes required for each individual manufacturing challenge.
- **Complete machining in a single setup** – fewer interfaces, reduced sources of error, higher productivity, and shorter cycle times.
- **Integrated software and process solutions** – full transparency, intelligent monitoring, and complete process control for maximum manufacturing reliability.
- **Proven technology and decades of expertise** – engineering excellence built on generations of experience in horizontal turning and milling machine development.
- **Engineered for Your Peace of Mind** – reliable production results, outstanding cost efficiency, and maximum confidence throughout the entire manufacturing process, combined with excellent operator usability and service-friendly machine design.
- **Built for longevity** – exceptional accuracy, rigidity, and performance stability maintained even after decades of operation.

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About NILES-SIMMONS

NILES-SIMMONS is a renowned brand in the machine tool industry and part of the globally operating NSH Group. We provide customized system solutions for your most demanding machining challenges. Workpiece-specific technology solutions for efficient manufacturing processes form the foundation of your success.

A versatile modular system and flexible machine design provide maximum adaptability to meet a wide range of production requirements. We guarantee the highest levels of reliability, precision, and quality—Made in Germany. Benefit from more than 185 years of experience and secure your competitive advantage through innovative solutions from one of the industry's most respected technology leaders.

About NILES-SIMMONS-HEGENSCHEIDT GmbH

The NILES-SIMMONS-HEGENSCHEIDT Group (NSH Group) focuses its business activities on the research, development, manufacturing, and global distribution of machine tools, with the goal of delivering products that combine outstanding quality, innovation, and energy efficiency.

The NSH Group is among the 30 largest machine tool manufacturers worldwide and serves five key industrial sectors: mechanical engineering, automotive and truck manufacturing, aerospace, railway and metro industries, and tool and mold manufacturing.

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