

Press Release

November 5th, 2024

Process Integration with “Gear Production+” for full gear processing on 5-axis & mill-turn machines

DMG MORI CO., LTD. (hereinafter referred to as “DMG MORI”) is now offering Gear Production+ to integrate gear processing functions into general 5-axis and mill-turn centers, starting with a gear grinding unit for DMG MORI machines.

Gears are an essential part of our everyday lives with a wide range of applications from electric vehicles, airplanes, robots, railways, ships, to wind turbines. Recently, the growing need for green products has created high demand for high-precision gears capable of efficient energy transmission. While these gears can only be produced with the highest precision and efficiency, conventional gear production relies on multiple machines for turning and milling of the gear face and outer diameter, before using gear shapers, hobbing machines, and other special equipment, which is hardly efficient.

As a solution, DMG MORI is offering Gear Production+ to integrate gear machining functions into general 5-axis machines and mill-turn centers. As a first step, we have developed a gear grinding unit and installed it on our 5-axis vertical machining center NMV 5000 DCG. When combined with Technology Cycles (e.g. gearSKIVING), this allows for a variety of processes from turning and milling to gear roughing and finishing of external gears up to ϕ 400 mm and internal gears up to ϕ 120-430 mm, 2-6 mm gear modules, and various shapes including splines and keys.

The gear grinding unit is fixed by a dedicated clamping mechanism for excellent dynamics and stability, while the unit itself is automatically mounted on the spindle when in use and stored away in a dedicated in-machine stocker when unused. Its tooth alignment function automatically detects the gear phase during roughing, and its accuracy of tooth profile, tooth trace, pitch error, and tooth groove runout for 2.5 mm module-type internal spur gears has been certified as ISO Rank 4.*1

With Gear Production+, gear machining can finally be integrated into a single machine to realize high-precision processes with shorter cycle time. In the past, the production of internal spur gears used a turning center, machining center, and dedicated gear machine and took 32 minutes per gear. Now, Gear Production+ by NMV 5000 DCG realizes the full process in just 17 minutes, so approx. 47% shorter than before.*1 Furthermore, together with our workpiece handling systems MATRIS or MATRIS Light, gear machining can be automated, too. DMG MORI will continue to expand Gear Production+ to support high-

productivity gear machining.

Gear Production⁺ by NMV 5000 DCG will be on display at JIMTOF 2024 at Tokyo Big Sight from November 5-10, Tuesday to Sunday.

■Main features

- ① Integration of various gear processes for various industries on 1 machine
 - Gear grinding unit automatically mounted from stocker to the spindle for turning and milling to gear roughing and grinding on a single machine
 - For external gears up to ϕ 400 mm, internal gears up to ϕ 120-430 mm, 2-6 mm gear modules, and various shapes including splines and keys

- ② For efficient production of high-precision gears
 - Avoid mounting errors by integration on 1 machine without setup changes
 - Gear grinding unit with excellent dynamic characteristics thanks to structural analysis-based design
 - Tooth alignment function for automatic gear phase detection during roughing to minimize the grinding allowance and reduce grinding paths during finishing for shorter cycle time
 - ISO Rank 4 certified (for 2.5 mm module-type internal spur gears)^{*1}
 - Boost your productivity even further with DMG MORI automation systems

DMG MORI will continue to address customer needs with highly functional and reliable product releases worth your investment.

Product	Gear Production ⁺ by NMV 5000 DCG
Target industries	Machine tool, EV, aircraft, robot, railway, ship, etc.

^{*1} Actual data. Results may vary depending on process conditions.

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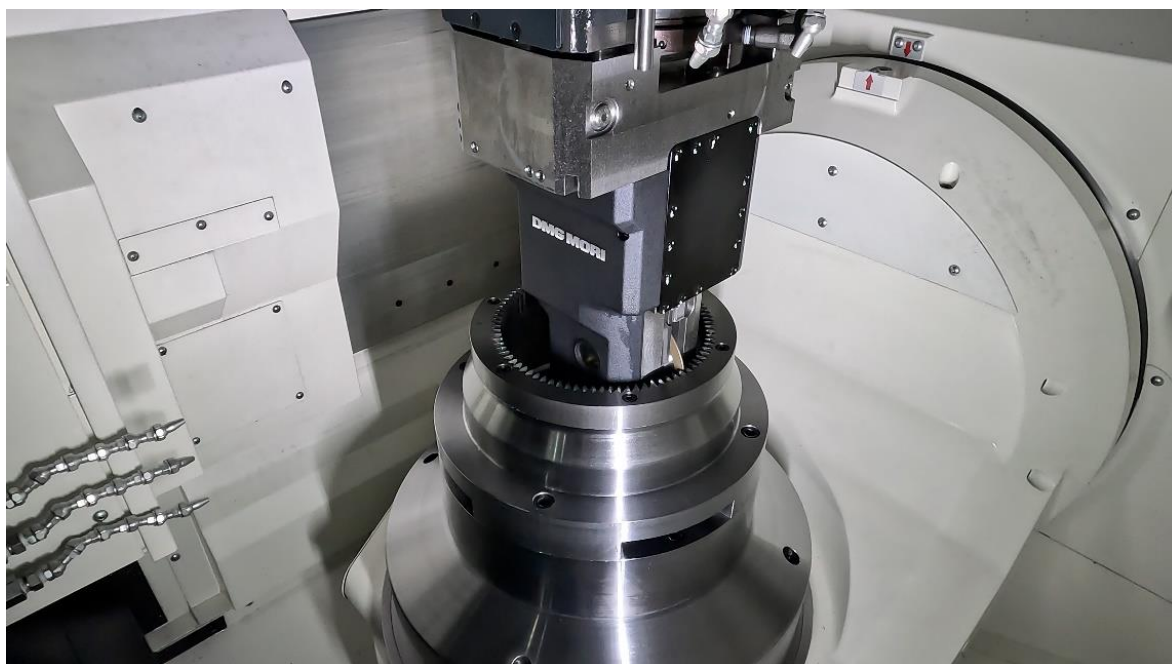
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Gear Production+ by NMV 5000 DCG (outside view)



Gear grinding unit



Gear Production* by NMV 5000 DCG (inside view)

Internal spur gear



Outer diameter	Internal diameter P.C.D.	Face width	Hole	Module	Number of teeth	Material
φ 210 mm (8.3 in.)	165 mm (6.4 in.) <Internal gear>	30 mm (1.2 in.)	Taphole M10 × 6	3 mm (0.12 in.)	55	FCD400



Example workpieces and integrated processes