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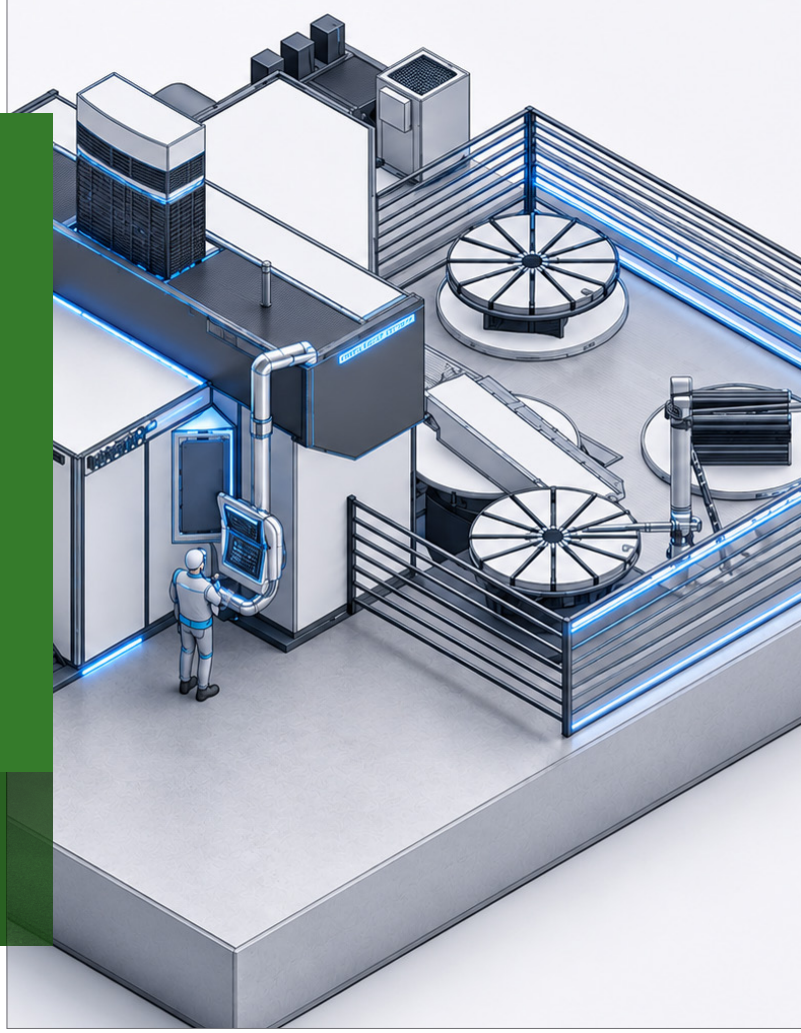
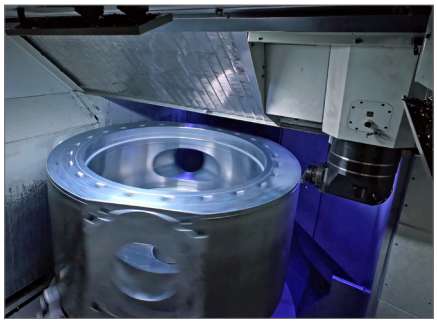
Product Innovations



Scaling up without compromise: UNICOM6000 adapted for larger workpieces

For many manufacturers, a standard multi-task machining centre provides a solid foundation—but not always an exact match for increasingly demanding applications. At Unisign, we do not treat this as a limitation, but as an engineering opportunity: adapting proven platforms like the UNICOM6000 to specific production requirements, without compromising precision, stability, or reliability.



The challenge: increasing component size

A recent example is our collaboration with a German customer. The company required a CNC machining solution capable of handling larger components than previously produced. Their existing UNICOM6000 had already been customized with an increased turning diameter of Ø2.120 mm.

However, ongoing product development introduced new requirements:

- Significantly larger workpieces
- Consistently high tolerances and surface quality
- Full multi-tasking capability (milling, turning, drilling, etc.) in a single setup

The key specification driving the redesign was a maximum turning diameter of Ø2.500 mm—a substantial increase over both the standard configuration (Ø2.000 mm) and the existing machine.

Engineering the solution

Increasing the turning capacity of a multi-tasking CNC machine is not a simple dimensional adjustment. It requires a coordinated redesign of multiple subsystems to maintain rigidity, accuracy, and collision safety. The customized UNICOM6000 features a turning diameter increased to Ø2.500 mm and an extended working envelope (X = 2.450 mm | Y = 1.425 mm | Z = 1.250 mm).

Structural modifications

The increased turning diameter directly impacts the machine's interference

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contour—the safe operating envelope within which all components must move without collision.

Key engineering adaptations include:

- **X-axis extension (+625 mm)**: Initial calculations suggested +500 mm would suffice. However, interference analysis revealed conflicts with the machine column, requiring additional extension to ensure safe operation.
- **Bridge extension**: The main structural beam of the bridge was lengthened to support the increased travel while maintaining stiffness across the larger span.
- **Tool column repositioning (+250 mm)**: Shifting the tool column relative to the pallet centre increases the interference contour radius, enabling machining of larger diameters.
- **Frame and column base extension (+250 mm in X-direction)**: Required to support the repositioned tool column and maintain structural integrity.
- **Head changer column shift (+375 mm)**: Due to pallet movement at 45°, additional clearance was required.

This resulted in a larger-than-expected shift to ensure safe and reliable tool head exchange.

Together, these modifications result in a total X-axis extension of 625 mm.

Maintaining performance standards

A critical requirement was ensuring that increased capacity would not compromise machine performance.
Larger machines are inherently more susceptible to:

- Reduced stiffness
- Increased vibration
- Thermal deformation

To mitigate these risks, the design retains the core strengths of the UNICOM6000 platform:

- High structural rigidity through optimized frame design.
- Precision multi-tasking spindle technology.
- Advanced control integration (Siemens One).
- Proven kinematics and head configurations.

As a result, even at Ø2.500 mm, the machine delivers the same levels of accuracy, repeatability, and surface finish as the standard platform.

Operational benefits

The customized UNICOM6000 provides several direct advantages:

1. Machining larger components in a single setup.
2. Improved process efficiency: Complete machining—from roughing to finishing—within one clamping.
3. Platform continuity: As the customer's second UNICOM6000, the solution builds on an established and trusted platform, resulting in operator familiarity, retained process knowledge and reduced training requirements.

Result: a tailored solution on a proven foundation

This project demonstrates that customization does not require starting from scratch. By utilizing the modular and robust design of the UNICOM6000, Unisign delivered a highly tailored solution while preserving the reliability of a proven machine concept.

The increased turning diameter developed for this machine will now become the new standard for all future UNICOM6000 machines.