



High Speed Motor Spindle For Gun Drilling Machine

Business Case

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High Speed Motor Spindles for Gun Drilling Machines

Summary

Application: High speed spindle for gun drilling with high coolant input pressure.

Solution provided: customized spindle with speed of 24,000 rpm, vibration of 1.2mm/s, 5 μ m of runout, 80 bar of adjusted coolant pressure.

Results:

- ✓ High speed spindle with manual tool interface of HSK32C
- ✓ GMN Bearing lubricated with grease
- ✓ Rotary Joint (Thru Tool Coolant)
- ✓ Induction motor with rating speed of 24,000 rpm

The Challenge

Our client was looking for a spindle for gun drilling application for small hole drilling. Due to the precision and speed required, the spindle needed to provide 1) high torque, 2) minimum vibration, 3) sufficient coolant flow.

The biggest challenge was in coolant pressure requirement. Client's request was to provide a rotary union with maximum input pressure of 180 bar, in order to assure sufficient coolant flow supplied to the tool during gun drilling. We had to resolve this constraint, while performing due diligence to assure that the client's machine will be operated in optimal conditions.



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The Solution

Our priority was to come to a mutual agreement on the specifications of the spindle, especially the coolant pressure requirement. The client's opinion was that coolant input pressure must be high enough to provide 180 bar of coolant output pressure.

In order to resolve this, we analogized the coolant system to a syringe. Output pressure is always significantly higher than the input pressure. Thus, 180 bar of input pressure will not only be a huge surplus, but it also will be straining to the tool & adjacent parts to neutralize the excess pressure, leading to shorter tool life and machine wear.

In addition to the technical and analogical feedback provided, we also prepared two options for the client to decide & proceed with:

First option was to internally discuss and trust our expertise in spindles, and move forward with our customized spindles with adjusted coolant pressure and options to add flanges to further ensure higher stability.



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The Solution

Second option was to customize the spindle with outsourced parts, including a new rotary union, clamp and a flange to suffice the input pressure of 180 bar while minimizing vibration.

As a result, the client agreed with our suggestion, and chose our optimal design with a lower input pressure of 80 bar.

SW100-2455-H32CT-F



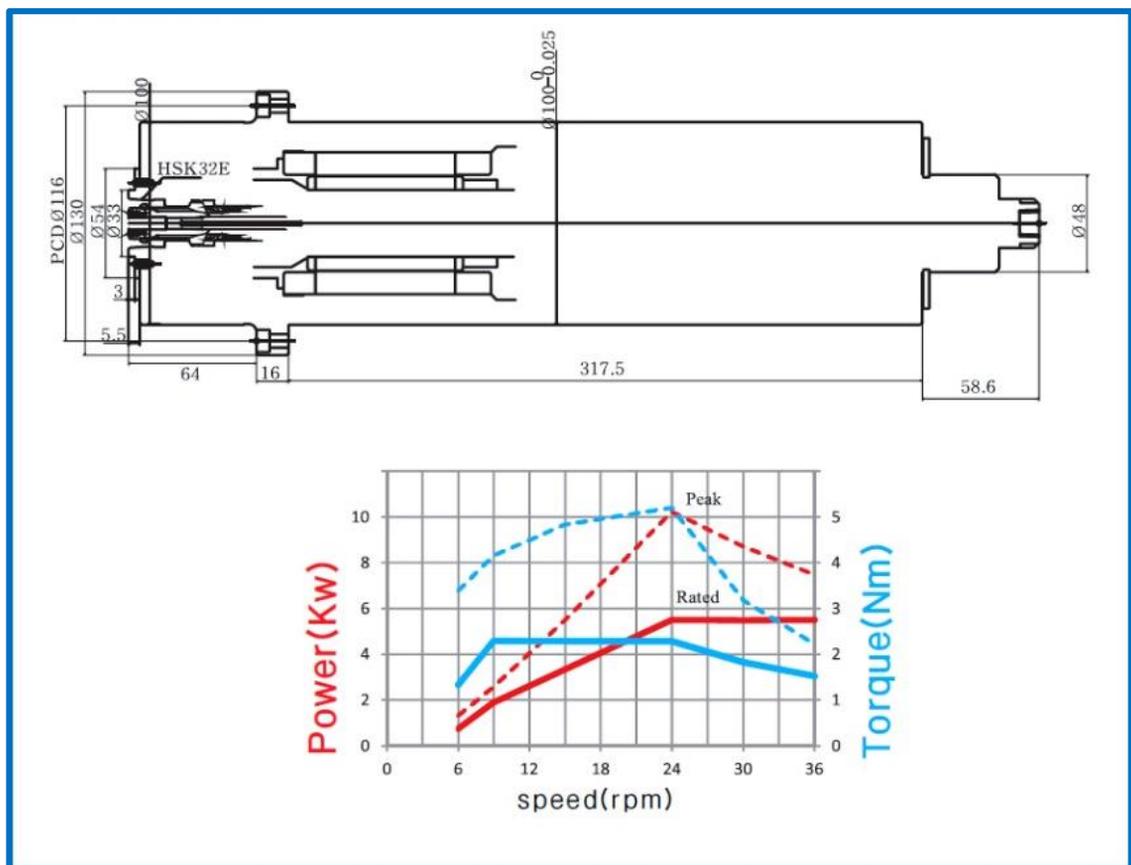
Diameter	100Ø
Maximum Power	5.5Kw
Maximum Speed	24,000rpm
Torque	4.62Nm
Rated Voltage	3Ø 380V
Lubrication	Oil (3,000Kcal)
Runout	5µmat 60mm
Vibration	1.2mm/s



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Key Benefits:

- Significant improvement in tool life with adjusted input coolant pressure.
- Spindle with high-precision parts to ensure reliable performance.
- Continuous discussion on design and operation improvements.





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The Result

In order to accommodate with the client's requirements, we met with the client and figured out a customized, optimal solution for the best interest of the client's long-term operations.

As a result, the client's gun drilling operations were never interrupted by unexpected spindle replacement due to spindle break or misalignment. We delivered an optimized design with adjusted coolant pressure for their small hole drilling application.

About Us

LPR Global is a team of expertise committed to devising sustainable and customized solutions to our clients extensively and expeditiously. Our core value stands to establish long-term partnerships with our clients, and we believe it begins with dedication and due diligence.

With decades of experience in designing and building custom spindles, we can meet a wide range of speed, power and torque requirements, while offering flexible options for housing styles, tool interfaces, and bearing lubrication systems.



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