

About Hydraulic Chuck for Lathes

Hydraulic chucks are widely used in machining centers as holders that enable easy tool changes while maintaining high clamping accuracy and clamping force. As demands for higher precision and productivity continue to grow, the use of hydraulic chucks in lathe operations also holds great potential. This installment of the series introduces our hydraulic chuck for CNC lathes.

● Hydraulic Chucks for CNC Lathes ST•M-PHC



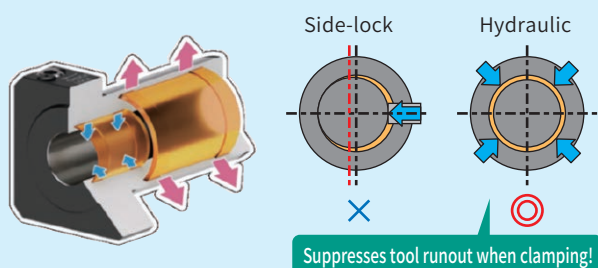
Hydraulic Mechanism

The hydraulic mechanism works by using hydraulic pressure to contract a thin-walled sleeve from the outside, securely clamping the inserted tool. Its operation is simple; the piston is pushed in by tightening a screw, offering excellent ease of use. Since the tool is clamped by uniform hydraulic pressure, it allows any operator to clamp tools easily with high precision and high clamping force. In addition, the internal oil layer helps dampen vibrations, reducing chattering during machining. This enables higher cutting conditions than when clamping a tool with conventional holders, resulting in improved surface quality and increased productivity.

Hydraulic Chucks for Lathes

Hydraulic chucks are widely used in machining centers, but they are rarely used on lathes, mainly due to difficulties such as the need to make a dedicated holder. To address this, a hydraulic chuck for CNC lathes that can be mounted on conventional $\phi 32$ and $\phi 40$ boring holders was developed. A unique feature of this chuck is that the hydraulic mechanism is also used when mounting it onto a boring holder. With side-lock clamping, the clearance causes slight runout. The hydraulic chuck, however, uses a hydraulic mechanism both for mounting onto the boring holder and for clamping the tool, suppressing tool runout relative to the holder's inner diameter.

● Tool clamping system by hydraulic pressure



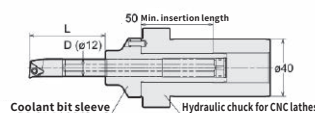
Advantages of Using Hydraulic Chucks

The above-described mechanism of the hydraulic chuck ensures that the clamped tool remains perfectly centered, eliminating a common cause of hole deviation during drilling. With its high clamping accuracy and ability to suppress tool runout and chattering, hydraulic chucks contribute to improved machining quality and extended tool life. Its excellent operability makes tool changes inside the machine easy, ensuring stable chucking accuracy and high tool clamping force regardless of the operator's experience. In addition, as chattering is suppressed, tools can be extended further than with conventional holders during boring operations without compromising machining performance, leading to improved quality and productivity.

An L/D of 4.75 to a surface roughness of 1,048 μm (Ra) achieved!

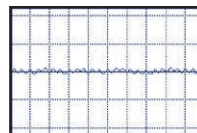
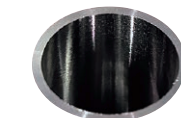
Workpiece material	S45C	Depth of cut	0.5mm
Tool used	$\phi 12$ steel boring bar	Cutting feed	0.1mm/rev
Insert	TPMT110304*	Surface speed	200m/min
Cutting dia.	$\phi 15\text{mm}$	Coolant	Center-through (water soluble)

Hydraulic chuck for CNC lathes with coolant bit sleeve



Cutting Results

Boring bar overhang					
L/D	3.75	4	4.75	5.5	5.75
Judgment	✓	✓	✓	✓*	✗
Ra(μm)	0.972	0.905	1.048	1.306	7.956
Rz(μm)	5.634	5.096	6.608	8.247	42.690
Chattering	None	None	None	Minimal	Observed

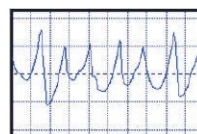
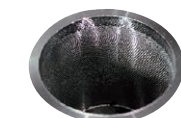


Side-lock holder



Cutting Results

Boring bar overhang					
L/D	3.75	4	4.75	5.5	5.75
Judgment	✓	✗	✗	✗	✗
Ra(μm)	1.007	10.888	—	—	—
Rz(μm)	6.100	66.995	—	—	—
Chattering	None	Observed	—	—	—



This time we introduced a hydraulic chuck for CNC lathes. We hope you consider using this optimal item for improving the quality and productivity of lathe machining.



[Contact]

Sales Affairs

Technical Sales & Cutting 076-274-1402

Scan for TAKAMAZ RYUGI Vol.1 to 24!!

