



TYPHOON[®]HSM
HIGH SPEED MACHINING SPINDLE TJS-HPC



■ **Product Overview**

HPC line of robust, compact high-speed spindles powered by high pressure coolant supply system of the machine tool up to 70 bar, for machining applications using small diameter cutting tools.

The HPC design enables application of the **TyphoonHSM** technology to machine tools with high pressure coolant (HPC) flow, and with limited rotational velocity. In addition, it is also able to utilize the increased flow of HPC to provide higher power, making it suitable for increased-load machining operations compared to other **TyphoonHSM** models.



■ **Product Features**

- Robust, compact high-speed spindles for increased rotational velocity on machine tools with HPC
- Reliable spindle mount with three bearings
- Secure shaft lock mechanism
- High power output – up to 1.5 Kw
- Rotational velocity output: 25000 to 45000 RPM
- Ideal for finishing / semi-finishing applications using small diameter cutting tools

Operating Data	Model: <i>TyphoonHSM TJS-HPC</i>
Operating range of coolant pressure [bar]:	40 - 70
Operating range of coolant flow rate [l/min]:	16 - 22
Rotational spindle speed [rpm]*:	25000 - 45000
Optimum cutting tool diameter [mm]:	Drilling: 0.5 - 3.0
	Milling: 1.0 - 4.0
Maximum tool shank diameter [mm]	7

Notes:

- Rotational spindle speed is based on coolant pressure and flow rate.
- Coolant pressure is measured from the spindle inlet.

■ **Advantages**

Due to the design features, **TyphoonHSM TJS-HPC** spindles ensure the following advantages:

- Rotational speed range meets most required values
- Bearing system design minimizes risk of overload and fluid penetration to considerably increase spindle reliability, resulting in significantly improved tool life

Machine Tool Requirements

High Pressure + High Speed

TyphoonHSM spindles introduce high speed capabilities for both new machines with built-in high pressure coolant systems and existing machines upgraded with a high pressure coolant pump.

The number of machines with high pressure coolant systems is growing in the market, due to the fact that they enable more efficient machining processes and better results.

Smart manufacturers are becoming aware of the need for high-pressure coolant delivery to increase efficiency of CNC machine tools, especially in difficult-to-machine materials.

The HSM HPC Spindle system uses the machine's existing coolant or cutting fluid supply as a pressurized energy source (40 to 70 bars), rotating the spindle turbine in the range up to 45000 RPMs.

The spindle features a compact, robust, patented design, engineered for operation with high pressure coolant pumps. Max power output 1.5 Kw up to 45000 RPMs*. It is ideal for finishing / semi-finishing applications using small diameter cutting tools.

* RPMs are based on pressure coolant stability and flow rate. The obtained RPMs depend on the output efficiency which is influenced by the inducted coolant pressure, fluid density and flow rate.

Machine tool requirements for using **TyphoonHSM** TJS-HPC spindles:

1. Coolant flow through the machine spindle
2. Min. coolant pressure at the spindle outlet: 40 bar.
3. Max. coolant pressure at the spindle outlet: 70 bar.
4. Min. flow rate: 16 l/min
5. Minimum coolant filtration level: 100 µm.



Special Features

Rotational speed monitoring and display

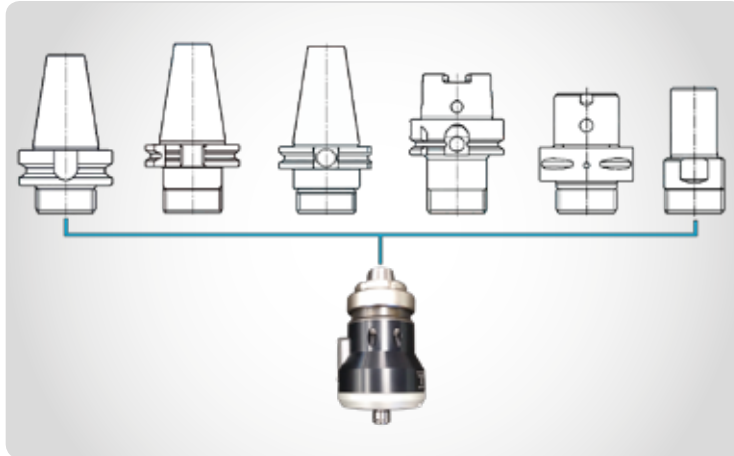
- **TyphoonHSM** spindles are equipped with a real-time, wireless speed display system, cutting tool rotational speed monitor, programmable spindle parameters, and warning/alarm alerts during spindle operation.
- 2.4 GHz radio frequency transmission
- Speed monitoring range of up to 10 meters
- Externally powered display can read multiple **TyphoonHSM** TJS-HPC spindles mounted on the machine.



■ Built-in and Direct Mounting System to CNC Spindle

The TJS-HPC Spindle mounting adaptation options:

- ER32 collet chuck with a special tightening nut, suitable for all standard toolholders with an ER32 adaptation.
- Integral options for other adaptations are available upon request.



TJS-HPC Spindle with mounting adaptation options
(for illustration purposes only)

■ Shaft Locking for Tool Clamping

The shaft lock mechanism provides a simple, easy way to change the cutting tool on the TJS-HPC spindle.

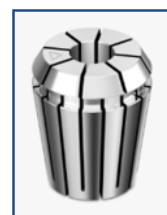


■ Operating Tips

1. When operating the **TyphoonHSM TJS HPC** spindles, monitoring rotational speed is critical. A correctly set rotational speed ensures optimal machining conditions and avoids damaging the spindle.
2. Cutting speed depends on workpiece material and its hardness, the shape of a machined surface, a machining strategy and cutting tool geometry. Refer to cutting tool manufacturer's documentation.
3. Dramatic fluctuations of the rotational speed (rpm) operation can indicate problems such as an inadequate coolant pressure or a broken cutting tool.

Using Precision ER11 Collets

When using ER11 spring collets, it is recommended to use only high quality precise collets that are engineered for maximum accuracy and tool life.



Max. collet runout
(TIR) - 5 µm

Strategic Advantages

Cutting Tools:

- Small cutting tools (dia. 0.5 – 4.0 mm)
- Small cutting tools at high speeds enable precision while reducing tool wear

Applications

- Milling, drilling, thread milling, engraving, chamfering, deburring, fine radial grinding
- Operation: Finishing and semi-finishing operations

Flexibilities:

- CNC machines: milling centers / turning / turn mills / tap mills
- Suitable for most adaptor types + lathe turret mounting

Economical Advantages

- Upgrades existing CNC machine to a high speed milling (HSM) performer at a fraction of the cost of dedicated high speed machines
- Boosts productivity - shortens production time and cuts costs
- Quick ROI
- Simple and easy to integrate - no pre-installation or external feed lines
- Compact – no size restriction due to added parts or power feeds, fits ATC or turret
- Cuts utility costs such as compressed air and electricity
- Uses the machine's own coolant as a pressurized power source

Industrial Sectors

Serves important industries worldwide:

- Die and mold
- Medical
- Energy
- Automotive
- Aerospace
- 3D printing
- General industry



Keeping the main spindle stationary

When the HPC Spindle is mounted on the machine, the CNC machine spindle should be stationary, except for tool checks.

To avoid CNC machine spindle rotation during the HPC Spindle operation, use the correct M code to lock spindle orientation, e.g. "M19" code locks the spindle in a defined angle position.

Machine Tool Requirements

- Coolant flow through the main CNC machine spindle.
- Minimum coolant pressure at main machine spindle outlet: 40 bar.
- Maximum coolant pressure at main machine spindle outlet: 70 bar.
- Moderate flow rate of 16 - 22 L/min.
- Use with water-based emulsion or cutting oil; viscosity up to 20 (Cp)
- Minimum coolant filtration level: 100 µm.
- Active mist collector.
- With emulsion coolant, use an anti-foaming agent additive suitable for emulsion to prevent foaming.
- With oil coolant, high pressure increases the amount of oil fume
 - Use appropriate means of fire protection and extinguishing.
 - Use anti-dissolution additive suitable for the oil.

Example for Cutting Data

Application	Material	Cutting Tool Diameter [mm]	Z [no. teeth]	ap Depth of Cut [mm]	ae Width of Cut [mm]	RPM	fz per tooth [mm]
Milling Full Slot	Aluminum SI 9% 30 HB	End Mill Ø 2.0	2	1.0	2.0	40000	0.03
Milling Shoulder	H13 (40-42Hrc)	End mill Ø 3.0	2	0.8	0.8	35000	0.03
	St 52-3 (A 36)	End mill Ø 2.0	2	0.5	0.1	40000	0.01

"10% Rule"

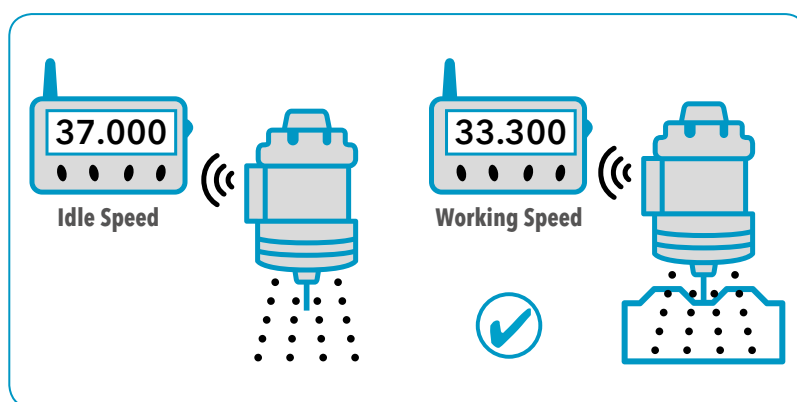
To maximize **TyphoonHSM** TJS-HPC spindle tool life we recommend following the "10% rule":

The working rotational speed (rpm) should drop by up to 10% of the rotational speed (rpm), which is registered at 'idle speed'.

Keeping this rule ensures reducing axial and radial load on the internal mechanism.

To register idle rotational speed:

1. Install the **TyphoonHSM** spindle carrying a cutting tool into the machine.
2. Start the spindle rotation by turning on the fluid supply at required pressure and find the idle RPM speed by reading the display monitor of the spindle.






Example illustrating "10% rule"

General Instructions for Storage

The **TyphoonHSM** spindles do not require specific periodic maintenance; however the following instructions should be followed before storing a spindle:

1. Clean the spindle by air blowing for 10-15 seconds.
2. Max. air pressure for cleaning is 2 bar (30 psi). The rotational speed during cleaning must not exceed 60000 rpm.
3. After cleaning, disconnect the spindle from the display device.
4. Place the spindle in its original packaging box and store it in the appropriate place.

Case Contents

Spindle Case Contents	Display Case Contents
	
<ul style="list-style-type: none"> • Nut ER11 GHS • Wrench ER11 SMS • Shaft Lock Flat Key • Allen key - Hexagonal 2.0 mm • Battery - Lithium metal non-rechargeable, CR2 type 	<p>For Europe:</p> <ul style="list-style-type: none"> • TSD - wireless RPM display • AC/DC 5V power supply
 <p>Shaft lock flat key and wrench</p>	

Warranty

*** New Warranty Policy

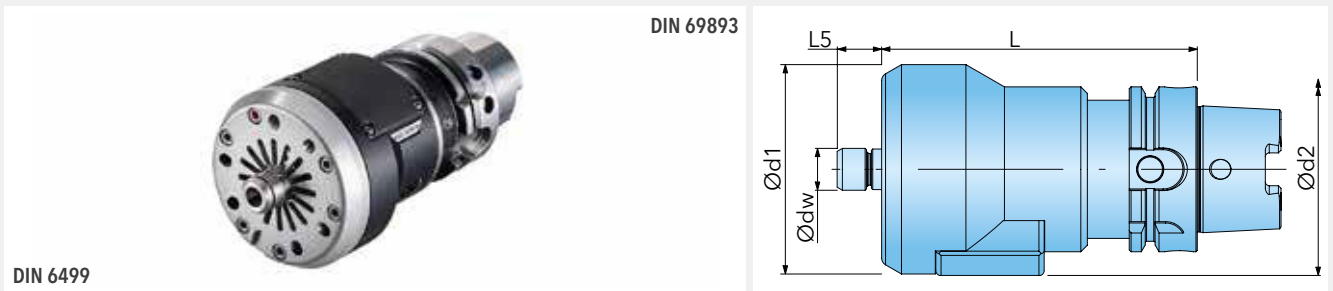
Warranty policy for new **TyphoonHSM TJS HPC** spindles:


At least 300 hours of use or 12 months from the date of invoice, whichever comes first.

Warranty policy for repaired / refurbished **TyphoonHSM TJS HPC** spindles:

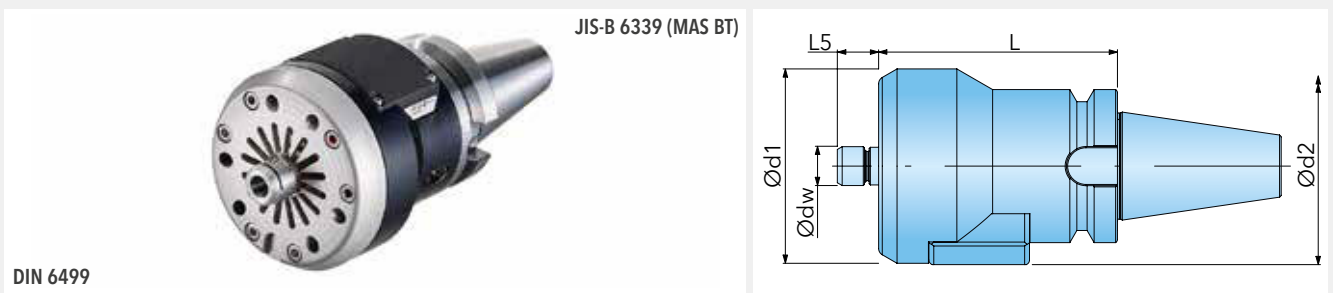
At least 200 hours of use or 6 months from the date of invoice, whichever comes first.


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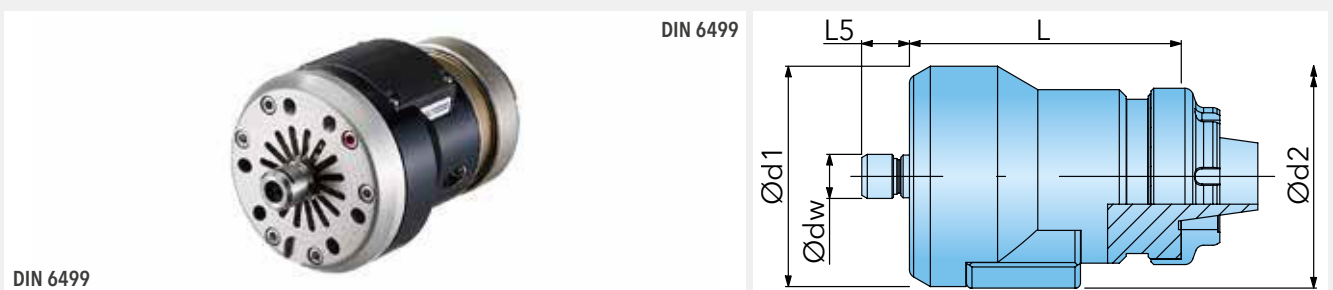
Designation	D max.	dw	d1	d2	L	L5	HSK-A	
TJS HSK A63R HPC	3,5	ER11	80	81	121	17	63	2,0


TYPHOON[®]HSM HIGH SPEED SPINDLE TJS HPC BT



Designation	D max.	dw	d1	d2	L	L5	BT	
TJS BT40R HPC	3,5	ER11	80	81	98	17	40	1,9

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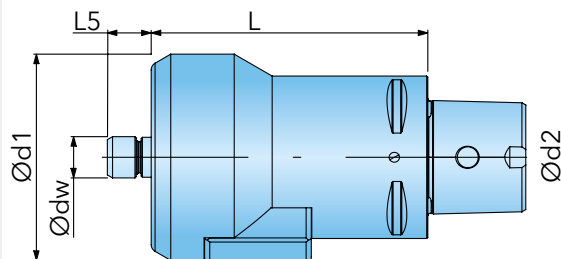


Designation	D max.	dw	d1	d2	L	L5	ER	
TJS ER32R HPC	3,5	ER11	80	81	99	17	32	1,7

TYPHOON[®]HSM HIGH SPEED SPINDLE TJS HPC C6



ISO 26623-1



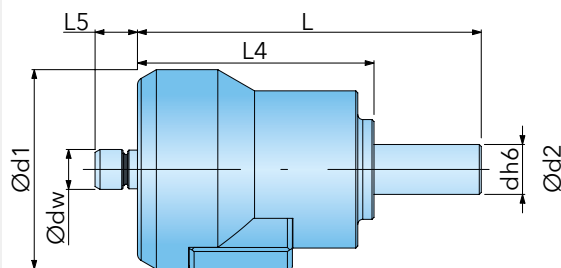
DIN 6499

Artikel-Nr.	D max.	dw	d1	d2	L	L5	PSK	kg
TJS HPC C6	3,5	ER11	80	81	107	17	6	2,0

TYPHOON[®]HSM HIGH SPEED SPINDLE TJS HPC ST20



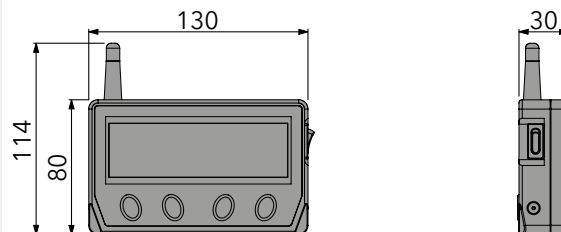
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DIN 6499

Designation	D max.	dh6	dw	d1	d2	L	L4	L5	kg
TJS HPC ST20	3,5	20	ER11	80	81	138	95	17	1,5

TYPHOON[®]HSM TJS TSD DISPLAY



Designation	Holder	kg
TJS TSD DISPLAY	TJS -*	1,000
speed display for Typhoon high speed spindles		

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