OPERATING CONDITIONS FOR THE HSM JET SPINDLE

The manufacturer's limited warranty states that its spindles are to be free from defects in material, design and workmanship under normal and proper use. We have outlined below the appropriate operating conditions for the Jet Spindle models: TJS-20K, TJS-30K, TJS-40K, TJS-GJET.

Following these guidelines will ensure proper functionality of the Spindle and should yield optimum machining results. See Spindle Warranty at: https://ssl.ingersoll-imc.com/resources/pdf/BUS-067-1_Typhoon_Warranty.pdf/

The Jet Spindle is designed for Finishing and Semi-finishing operations using a max. cutting tool diameter of 4.0mm (5/32").

CNC MACHINE PREREQUISITES

1. Coolant flow through the main CNC machine spindle.
2. Min. coolant pressure, at main spindle outlet: 20 bar (290 psi).
3. Max. coolant pressure, at main spindle outlet: 40 bar (580 psi).
4. Minimum flow rate: 12 L/min (3.17 Gal/min.).
5. Coolant filtration level: Max. 100 µm.

Subjecting the Jet Spindle to incorrect cutting conditions, may result in damage to the Spindle, the tool, the work-piece or the machine.

The Jet Spindle is an auxiliary spindle speed increaser and is not to be used as a replacement for the CNC main machine spindle.

Do not allow main spindle to rotate during Jet Spindle operation.

1. When the Jet Spindle is mounted on the machine, the CNC machine spindle must be locked in a stationary position.
2. Use the correct software M-code to lock: M19 code locks spindle at a defined angle.

NOTE: Some CNC machines do not enable main spindle locking. Check with the manufacturer.

Follow the 10% Rule:

As the cutting tool enters the workpiece, RPMs will be reduced due to load.
The Jet Spindle RPM value when working should not drop more than 10% of the RPM value registered at 'idle speed'.

TO REGISTER IDLE SPEED:

1. Mount the Jet Spindle on the machine with cutting tool installed.
2. Turn on fluid pressure and note RPMs on the display monitor.

EXAMPLE: Improper conditions
Jet Spindle: TJS 30K-HSK-A63
Aplication: Milling/Slotting
Material: DIN ST 52-3
Cutting tool: End Mill Ø2.0 mm (Ø.079")
No. of teeth: Z = 2
Cutting conditions: **Ae** – cutting width = 2.0mm (.079"), **Ap** – depth of cut = 0.5mm (.02"), **fz** = 0.012mm/tooth (.0005" /tooth), **Vc** = 250m/min (820 SFM)
N – Idle: 40,000 RPM
RPM during machining: 30,000 RPM spindle overload!

In the EXAMPLE, following the 10% rule would mean that RPMs during machining should be a minimum of 36,000 RPM, however RPMs are only 30,000. Therefore load on the tool should be reduced by decreasing the cutting parameters; depth of cut (ap) and feed (Fz) should be lessened.

CUTTING CONDITIONS:

1. Monitoring RPMs during Jet Spindle operation is critical, to ensure optimum machining conditions and to aviod damage.
2. Cutting speed may be influenced by material hardness, workpiece topography and/or cutting tool geometry. Refer to cutting tool manufacturer's documentation.
3. Dramatic fluctuations of RPMS during Jet Spindle operation can indicate problems such as inadequate coolant pressure or a broken cutting tool.

Typhoon
HSM Jet Spindles

Jet Spindle Operating Guidelines

Application	Material	Cutting Tool Dia.		Z (Teeth)	Ap - Depth of Cut		Ae - Width of Cut		RPM	Fz per tooth	
		mm	inch		mm	inch	mm	inch		mm	inch
Milling Full Slot	SAE 4340 (24-25HRC)	End Mill Ø 1.0	End Mill Ø .040	2	0.1	.004	1.0	0.040	25,000	0.04	.0015
	SAE 4340 (42-45HRC)	End Mill Ø 2.0	End Mill Ø .080	2	0.1	.004	2.0	0.080	25,000	0.007	.0003
	SAE 4340 (24-25HRC)	End Mill Ø 2.0	End Mill Ø .080	2	0.1	.004	2.0	0.080	25,000	0.02	.0008
	SAE 4340 (24-25HRC)	End Mill Ø 2.0	End Mill Ø .080	2	0.1	.004	2.0	0.080	25,000	0.02	.0008
	SAE 4340 (24-25HRC)	End Mill Ø 3.0	End Mill Ø .120	4	0.1	.004	3.0	0.120	25,000	0.002	.00008
	316L 130-136 HB	End Mill Ø 1.0	End Mill Ø .040	2	0.1	.004	1.0	0.040	25,000	0.03	.0001
	316L 130-136 HB	End Mill Ø 2.0	End Mill Ø .080	2	0.1	.004	2.0	0.080	25,000	0.02	.0008
	316L 130-136 HB	End Mill Ø 3.0	End Mill Ø .120	4	0.1	.004	3.0	0.120	25,000	0.005	.0002
	Aluminum SI 9% 30 HB	End Mill Ø 1.0	End Mill Ø .040	3	0.1	.004	1.0	0.040	25,000	0.07	.0027
	Aluminum SI 9% 30 HB	End Mill Ø 2.0	End Mill Ø .080	2	0.3	.012	2.0	0.080	40,000	0.01	.0004
	Aluminum SI 9% 30 HB	End Mill Ø 3.0	End Mill Ø .120	3	0.2	.008	3.0	0.120	25,000	0.01	.0004
Milling Shoulder	H13 (40-42Hrc)	End mill Ø 1.5	End mill Ø .059	2	1.0	.04	0.3	.012	35,000	0.008	.0003
	St 52-3 (A 36)	End mill Ø 1.0	End mill Ø .040	2	0.5	.020	0.1	.004	40,000	0.005	.0002
	SAE 4340 (24-25HRC)	Ball nose Ø 1.0	Ball nose Ø .040	2	0.5	.020	0.03	.0012	25,000	0.03	.0012
	SAE 4340 (24-25HRC)	Ball nose Ø 3.0	Ball nose Ø .120	2	1.5	.059	0.05	.002	25,000	0.07	.0027
	316L 130-136 HB	Ball nose Ø 3.0	Ball nose Ø .120	2	1.5	.059	0.05	.002	25,000	0.04	.0015
	Aluminum SI 9% 30 HB	Ball nose Ø 1.0	Ball nose Ø .040	3	0.5	.020	0.06	.0024	25,000	0.2	.008
	Aluminum SI 9% 30 HB	Ball nose Ø 3.0	Ball nose Ø .120	3	1.5	.059	0.05	.002	25,000	0.3	.012

JET SPINDLE STORAGE:

The HSM Jet Spindle is free from periodic maintenance, however before storage it is recommended to:

1. Clean the HSM Jet Spindle by air blowing for 10-15 seconds.
2. Max. air pressure for cleaning (2 bar / 30 psi) – DO NOT EXCEED 50,000 RPM
3. Disconnect the HSM Jet Spindle from the display device.
4. Place the HSM Jet Spindle back in its case.

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