OPERATING CONDITIONS FOR THE MICRO 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.

TYPHOON MICRO™

The Typhoon MICRO spindle is designed for accurate work in finishing and semi-finishing applications with small and difficult to reach spaces using a max cutting tool diameter of 0.125".Following these guidelines will ensure proper functionality of the Typhoon spindle and should yield optimum machining results.

Spindle Requirements:

1. Continuous flow coolant through the main machine spindle
2. Coolant pressure at main spindle outlet:
   - Minimum 290 psi (20 bar)
   - Maximum 580 psi (40 bar)
3. Minimum coolant inlet diameter: 0.1575" (4 mm)
4. Coolant flow rate: 2.6-5.3 gal/min (10-20 l/min)
5. Coolant filtration: 100µm (10µm is recommended when using electroplated grinding tools)
6. Active mist collector
7. Ensure water-based emulsion or cutting oil viscosity are up to 20 cP
8. When using emulsion coolant, use an anti-foaming agent additive suitable for emulsion
9. When using oil-based coolant, high pressure increases oil fumes:
   - Use appropriate means of fire protection
   - Use anti-dissolution additive suitable for oil

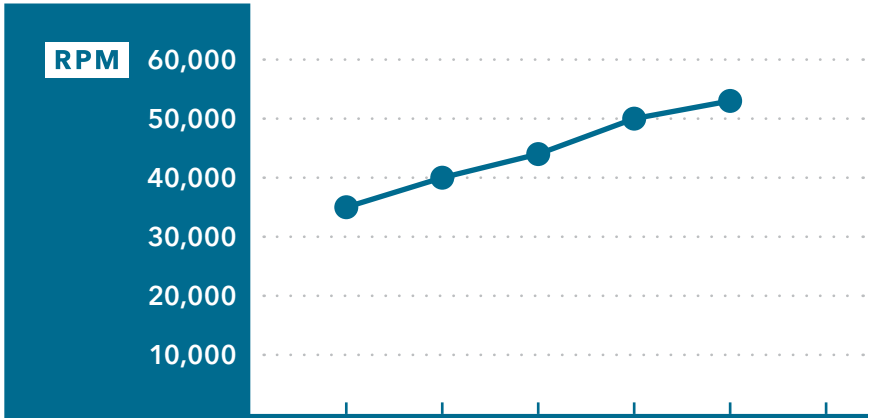
Subjecting the Typhoon MICRO to incorrect cutting conditions may result in damage to the Typhoon, the cutting tool, the workpiece or the machine.

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

Do not allow the machine spindle to rotate during Typhoon MICRO spindle operation.

1. When the Typhoon MICRO spindle is mounted in the machine, the machine spindle must be locked in a stationary position.
2. Use the correct software M-code to lock : M-19 locks spindle at a defined angle. NOTE: Some machines do not enable main spindle locking, check with the machine manufacturer.

PRESSURE VS SPEED:



PSI	290	365	435	510	580
BAR	20	25	30	35	40
Idle Speed RPM	35,000	40,000	44,000	50,000	53,000

CUTTING CONDITIONS:

- Monitoring RPM during Typhoon MICRO spindle operation is critical to ensure optimum machining conditions and to avoid damage.
- Cutting speed may be influenced by material hardness, work-piece topography, and/or cutting tool geometry. Refer to cutting tool manufacturer's documentation.
- Dramatic fluctuations of RPM during Typhoon MICRO spindle operation can indicate problems such as inadequate coolant pressure or a broken tool.

APPLICATION LIMITS:

Milling

Slotting - up to 0.0394" (1 mm) and ap=0.0020" (0.05 mm)

Shouldering - up to D=0.0397" (1 mm), ae=0.0039" (0.1 mm), and ap=0.0039" (0.1 mm)

Thread Milling

Max. M3 thread

Drilling

Max. drill diameter = 0.0787" (2 mm)

Deburring

Max. tool diameter = 0.0787" (2 mm)
Can use 45° to 60° end mill

Engraving

Max. tool diameter = 0.125" (3 mm)
Max. ap = 0.0098" (0.25 mm)

Member IMC Group
Ingersoll Cutting Tools

RECOMMENDED CUTTING CONDITIONS

Shoulder Milling

Cutting Tool Ø 2 (.078")

BAR	Idle Speed RPM	Working Speed RPM	Material	SAE 1.2316	
			Hardness	35 HRC	
			Data	mm	inch
20	38,800	35,260	ap	4	0.157
			ae	0.1	0.004
			feed	750	30
30	45,300	41,300	ap	4	0.157
			ae	0.1	0.004
			feed	1,000	39
40	52,965	51,200	ap	4	0.157
			ae	0.1	0.004
			feed	1,000	39

Shoulder Milling

Cutting Tool Ø 2 (.078")

BAR	Idle Speed RPM	Working Speed RPM	Material	Al-Si 9%	
			Hardness	55HB	
			Data	mm	inch
20	38,800	35,260	ap	4	0.157
			ae	0.1	0.004
			feed	1,500	59
30	45,300	41,300	ap	4	0.157
			ae	0.1	0.004
			feed	2,000	79
40	52,965	51,200	ap	4	0.157
			ae	0.1	0.004
			feed	2,000	79

Profile Milling

Cutting Tool Ø 3.0 (.118")

BAR	Idle Speed RPM	Working Speed RPM	Material	S600	
			Hardness	58-60 HRC	
			Data	mm	inch
25	38,800	35,000	ap	0.1	0.004
			ae	0.1	0.004
			Fz	0.0025	0.0001
			Vf	175	6.89

Shoulder Milling

Cutting Tool Ø 3.0 (.118")

BAR	Idle Speed RPM	Working Speed RPM	Material	Steel C40	
			Hardness	30 HRC	
			Data	mm	inch
25	25,300	23,000	ap	0.2	0.008
			ae	0.2	0.008
			Vf	500	20

Slot Milling

Cutting Tool Ø 2 (.078")

BAR	Idle Speed RPM	Working Speed RPM	Material	SAE 1.2316	
			Hardness	35 HRC	
			Data	mm	inch
20	34,500	31,900	ap	0.05	0.002
			ae	2.0	0.079
			feed	500	20
30	42,300	44,000	ap	0.05	0.002
			ae	2.0	0.079
			feed	600	24
40	52,000	50,776	ap	0.05	0.002
			ae	2.0	0.079
			feed	700	28
20	34,600	31,100	ap	0.15	0.006
			ae	2.0	0.079
			feed	400	
30	43,800	40,440	ap	0.15	0.006
			ae	2.0	0.079
			feed	500	20
40	51,800	48,800	ap	0.15	0.006
			ae	2.0	0.079
			feed	600	24

Slot Milling

Cutting Tool Ø 2 (.078")

BAR	Idle Speed RPM	Working Speed RPM	Material	Al-Si 9%	
			Hardness	55HB	
			Data	mm	inch
20	34,500	31,900	ap	0.05	0.002
			ae	2.0	0.079
			feed	2,000	59
30	42,300	44,000	ap	0.05	0.002
			ae	2.0	0.079
			feed	2,000	79
40	52,000	50,776	ap	0.05	0.002
			ae	2.0	0.079
			feed	2,000	79
20	34,600	31,100	ap	0.15	0.006
			ae	2.0	0.08
			feed	1,500	59
30	43,800	40,440	ap	0.15	0.006
			ae	2.0	0.08
			feed	2,000	79
40	51,800	48,800	ap	0.15	0.006
			ae	2.0	0.08
			feed	2,000	79

Slot Milling

Cutting Tool Ø 2 (.078")

BAR	Idle Speed RPM	Working Speed RPM	Material	Al-Si 9%	
			Hardness	55HB	
			Data	mm	inch
20	34,700	31,280	ap	0.1	0.004
			ae	2.0	0.079
			feed	2,000	59
30	44,137	42,080	ap	0.1	0.004
			ae	2.0	0.079
			feed	2,000	79
40	52,000	49,800	ap	0.1	0.004
			ae	2.0	0.079
			feed	2,000	79
25	38,800	35,000	ap	0.5	0.02
			ae	2.0	0.079
			Fz	0.016	0.001
			Vf	1200	47

Slot Milling

Cutting Tool Ø 2 (.078")

BAR	Idle Speed RPM	Working Speed RPM	Material	SAE 1.2316	
			Hardness	35 HRC	
			Data	mm	inch
20	34,700	31,280	ap	0.1	0.004
			ae	2.0	0.079
			feed	450	18
30	44,137	42,080	ap	0.1	0.004
			ae	2.0	0.079
			feed	550	22
40	52,000	49,800	ap	0.1	0.004
			ae	2.0	0.079
			feed	650	26
25	38,800	35,000	ap	0.5	0.02
			ae	2.0	0.079
			Fz	0.016	0.001
			Vf	1200	47

Drilling

Cutting Tool Ø 1.9 (.078")

BAR	Idle Speed RPM	Working Speed RPM	Material	SAE 1.2316	
			Hardness	35 HRC	
			Data	mm	inch
20	35,500	33,500	Step	0.1	0.004
			ae		
			feed	150	1.181
30	43,800	40,440	Step	0.1	0.004
			ae		
			feed	200	2.362
40	51,800	48,800	Step	0.1	0.004
			ae		
			feed	250	3.976

Drilling

Cutting Tool Ø 1.9 (.078")

BAR	Idle Speed RPM	Working Speed RPM	Material	Al-Si 9%	
			Hardness	55HB	
			Data	mm	inch
20	35,500	33,500	ap	0.1	0.004
			ae		
			feed	120	4.724
30	43,800	40,440	ap	0.1	0.004
			ae		
			feed	240	9.448
40	51,800	48,800	ap	0.1	0.004
			ae		
			feed	400	15.748

Drilling

Cutting Tool Ø 2.1 (.083")

BAR	Idle Speed RPM	Working Speed RPM	Material	Al-Si 9%	
			Hardness	55HB	
			Data	mm	inch
25	38,800	35,000	L hole	8	0.315
			Step	0.4	0.016
			Frev	0.007	0.0003
			Vf	200	7.87

Member IMC Group Ingersoll Cutting Tools