



**MICRO90 Jet**

**SWISS TYPE JET**

**NPA - APRIL 2021**



## **HSM JET MICRO 90**

### **SMALL & FAST**

# **IDEALLY TOOL FOR DRILLING IN DIFFICULT TO REACH PLACES**

Offering speeds from **35,000 to 50,000 rpm** while the main machine spindle remains idle.  
Ideal for a wide range of semi-finishing and finishing applications using small cutting tools  
such as **milling, drilling, thread-milling, engraving, chamfering and deburring.**

Coolant delivered **DIRECTLY** to the cutting edge  
No deflection or vibration

The Colibri Jet technology provides the holder OEM with a simple and competitive holder solution in comparison with complex mechanical gear or electric motor spindles.



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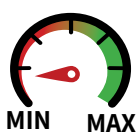
## HIGHLIGHTS

Colibri Spindles is the **world leader in HPC driven spindles** and one of the few global producers of **high precision Semiconductor spindles**. Colibri developed the [range of powerful JET spindles](#) as an internal development initiative to find practical solutions to high speed machining needs in its production facility in Israel. Colibri Jets use **Industry 4.0** technology to provide [real-time display monitoring](#) of performance.

The MICRO 90 Jet Spindle, with a solid shell of titanium and assembled from only six parts is build for powerful, accurate work in small and difficult to reach spaces. Offering speeds from 35,000 to 45,000 rpm while the main machine spindle remains idle. Ideal for a wide range of semi-finishing and finishing applications using small cutting tools such as milling, drilling, thread-milling, engraving, chamfering and deburring.



## CHALLENGES



Maximum live tool speeds of 6000 – 8000 RPM are too low for HSM on turning machines.



Machining at maximum speed is limited for short periods, as excessive usage results in spindle overheating and long term damage.



Separate high speed milling or turning processes require large capital investment, increased overhead, and wasted resources on additional setup.

## OPPORTUNITIES



Cost effective addition of unlimited, non-stop HSM capabilities to existing machines – 35,000 to 50,000 RPM.

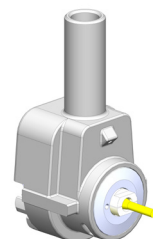


Natural integration that does not require capital investment, additional setup or changing the machine infrastructure.



Integration using machines static holders provide live tooling capabilities to static pockets.

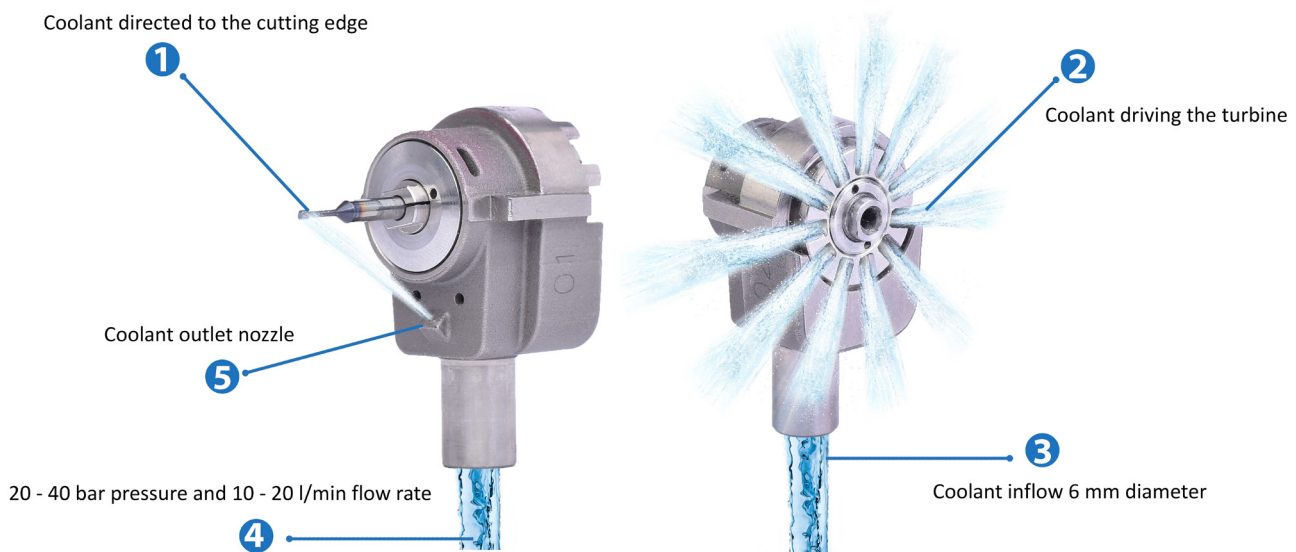
**Coolant delivered DIRECTLY to the cutting edge**  
**No deflection or vibration**





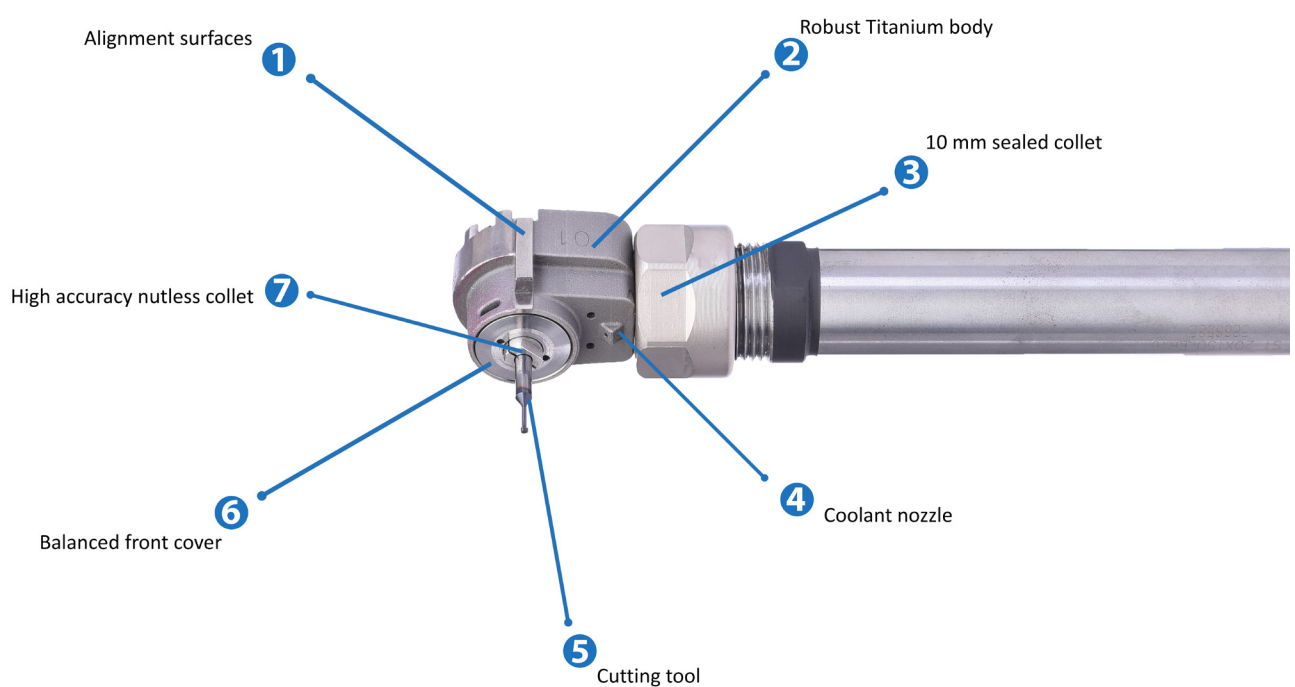
## COOLANT FLOW

### MICRO 90 Coolant Flow



## FEATURES

### Example of clamping with ER16





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## CLAMPING & COOLANT

High-speed clamping includes simplified "nutless" collet improves dynamic balancing with pointed flow towards the cutting edge. One minute simple tool change with no setup, with low runout.

CHS collet type.

COOLANT OUTLETS from the turbine outlet and pointed nozzle towards the cutting edge.



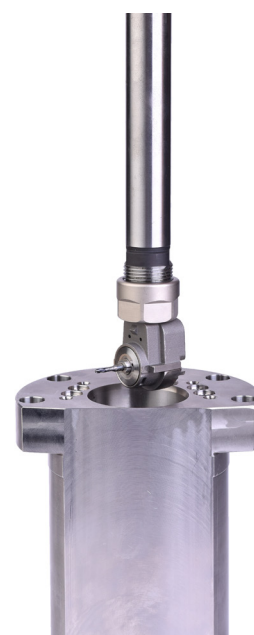
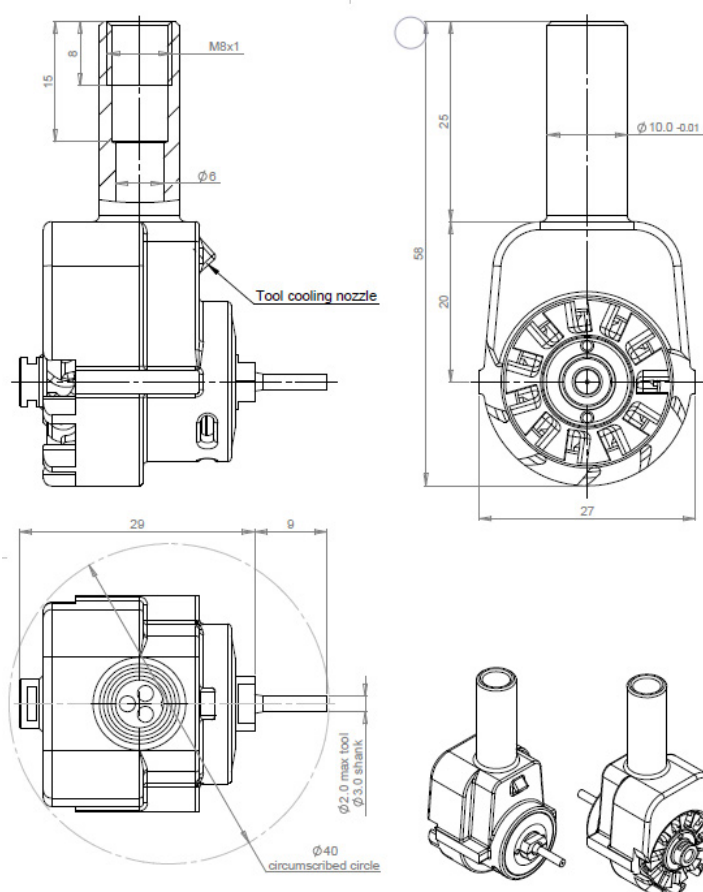
## FEATURES

The Micro product range supports milling and turning machines, with the biggest advantages found in (1) **turning machines** because of the massive speed increase and conversion of static holders to live holders; (2) **angular holders** because of simple and cheap production of angle holders as they do not require gears; and (3) **smaller machines** where optimizing space is a prerogative.

All Micro products have identical integration options and dimensions allowing for efficient management of inventory and service.



## DESIGN







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## SMALL TOOL INDUSTRIES

Leading Industries for Small Tool Applications

**Automotive**  
Industry



**Connectors**



**Medical**  
Industry



**Bearings**  
Industry



**Aerospace**  
Industry



Secondary Industries for Small Tool Applications

**Locks**



**Clocks**



**Computers**



**Jewelry**



**Hydraulic  
Pneumatic**





OPERATING DATA

JET SPINDLE OPERATING PARAMETERS					MICRO90
HIGH PRESSURE COOLANT (BAR)	20 BAR	40 BAR	Terms of Use		
Min Coolant Supply Diameter [mm]	4		Collect	CHS	
Min flow rate (L/min)	10	20	Runout	3 micron	At leangth of 3D
Rotational spindle speed [RPM]*	35,000	50,000	Warranty	1 year	
Cutter [mm]	P	M	SST	N	S
Drilling	0.1 - 2.0				
Ball-Nose	0.1 - 3.0				
Chamfering	0.1 - 3.0				
Lollipop	0.3 - 3.0				
Milling	0.5 - 3.0				
Deburring	0.1 - 2.0				
Engraving 45 / 60 Degree	0.1 - 3.0				
FILES AVAILABLE FOR DOWNLOAD IN ONLINE CATALOGUE: <a href="https://colibrispindles.com/catalog/">https://colibrispindles.com/catalog/</a>					
<a href="#">Primary View 2D – DXF</a>		<a href="#">Model 3D Detail – STP</a>		<a href="#">Drawing - PDF</a>	

APPLICATION LIMITS

MILLING

- Slotting - up to1.0mm & ap= 0.05D
- Shouldering – up to D=1.0mm, ae=0.1D & ap=0.1D

THREAD MILLING

- Max. M3 thread

DRILLING

- Max drill dia. 2.00mm

DEBURRING

- Max tool dia. 2.00mm
- Can use 45 to 60 degree end-mill

ENGRAVING

- Max tool dia. 3.00mm
- Max Ap 0.25mm

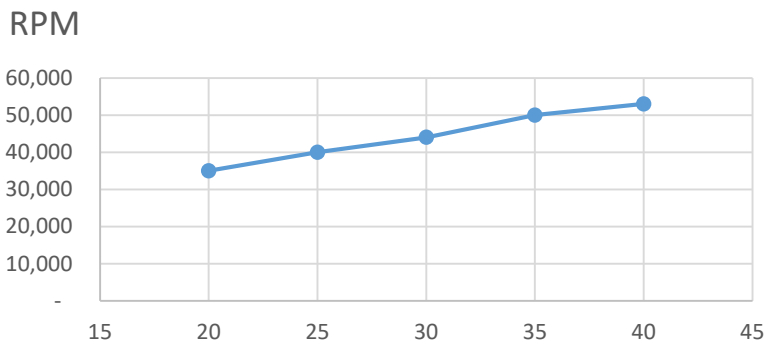


Coolant delivered DIRECTLY to the cutting edge  
No deflection or vibration

The Jet Spindle technology excels not just in power and speed but also precision, with runout of 3 microns.



PRESSURE VS. SPEED



BAR	Idle Speed RPM
20	35,000
25	40,000
30	44,000
35	50,000
40	53,000

SUMMARY AND NEXT STEPS

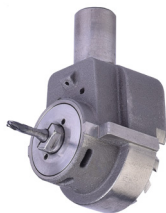
Colibri Spindles, a global leader in **high precision spindles**, now offers [HSM Micro JETs](#), with a **simple generic interface** for easy integration with machine holders.

Colibri Micro JETs are **powered by the machines high pressure coolant** and come with an **CHS** tool interface that can drive tools of up to **3 mm** at rotation speeds of above **50,000 RPM**. The use of machines coolant to drive the spindle provides a **non-stop high speed machining** option.

The Micro design ensures **easy and fast removal for maintenance**. The Micro HSM Jets are ideal for turning and milling holders in limited space within Swiss-Type machines.

If you are an **end user** looking for a solution, feel free to [contact us](#) and we will connect you with one of our partners.

If you are a **MTB** and would like to learn more about our Jet product range and Partner with us [contact us](#), for more details.



Coolant delivered **DIRECTLY** to the cutting edge  
No deflection or vibration

The Jet Spindle technology excels not just in power and speed but also precision, with runout of 3 microns.



OPERATIONAL CONDITIONS

RECOMMENDED CUTTING CONDITIONS					
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

RECOMMENDED CUTTING CONDITIONS					
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

RECOMMENDED CUTTING CONDITIONS					
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

RECOMMENDED CUTTING CONDITIONS					
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

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

25	38,800	35,000	ap	0.5	0.02
			ae	0.5	0.02
			Fz	0.016	0.001
			Vf	1200	47

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

RECOMMENDED CUTTING CONDITIONS					
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







OPERATIONAL CONDITIONS

RECOMMENDED CUTTING CONDITIONS					
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

RECOMMENDED CUTTING CONDITIONS					
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

RECOMMENDED CUTTING CONDITIONS					
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

RECOMMENDED CUTTING CONDITIONS					
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

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

25	38,800	35,000	ap	0.5	0.02
			ae	0.5	0.02
			Fz	0.016	0.001
			Vf	1200	47

RECOMMENDED CUTTING CONDITIONS					
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



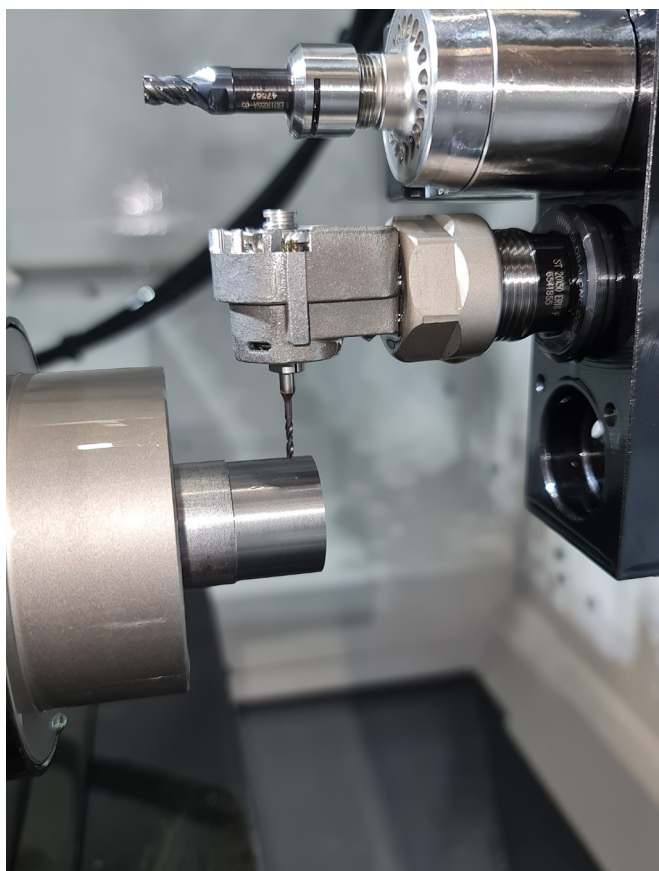
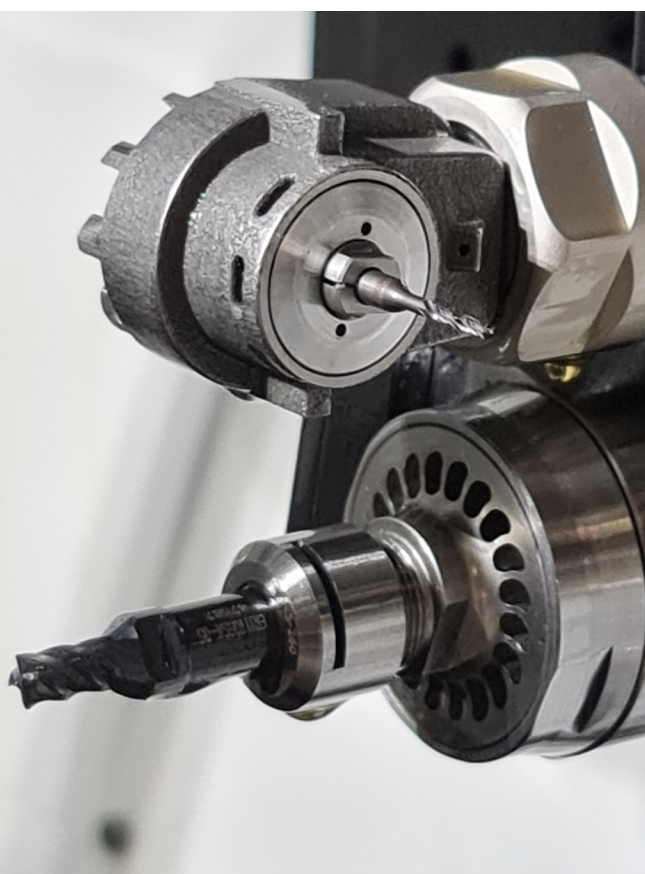
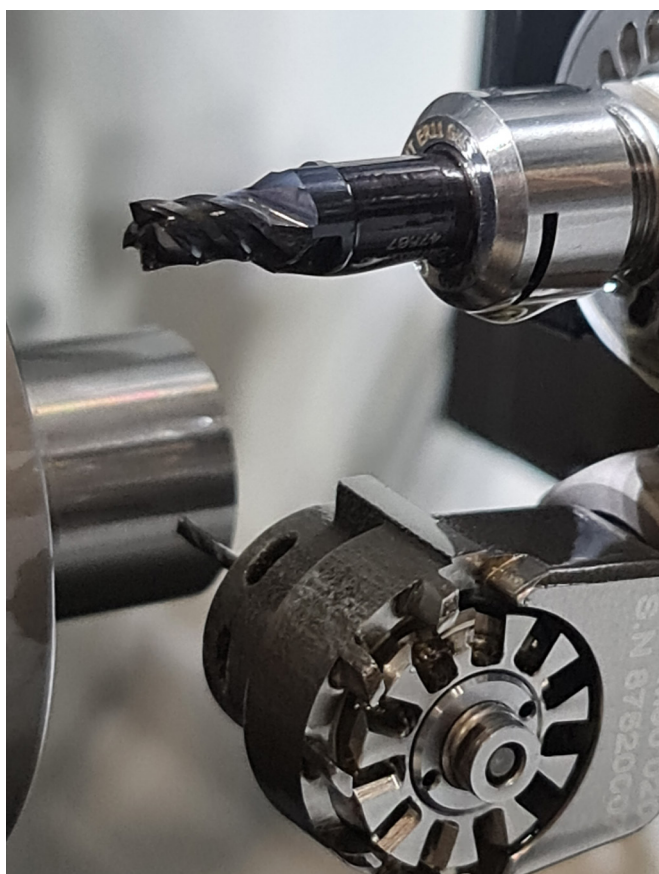


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## MICRO90 - SWISS TYPE







## PREREQUISITES FOR CNC MACHINE

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. Filter element: Max. 100 micron.
6. Active mist collector.
7. With emulsion coolant, use an anti-foaming agent additive suitable for emulsion.
8. With oil based coolant, high pressure increases the amount of oil fumes:
  - a. Use appropriate means of fire protection and fire
  - b. Use anti-dissolution additive suitable for the oil.

## TOOL INSTALLATION

### 1. ASSEMBLY



Assemble CHS Collet and cutting tool.

### 2. SHAFT LOCK



Insert Shaft Lock Wrench below Nut to stop spindle shaft from turning.

### 3. TIGHTEN COLLET



Use Second Wrench to Tighten the Collet.

### 4. ALIGN



Use a dial to align on the grinded straight edge.

### 5. TIGHTEN HOLDER CLAMP



Use Shank clamping wrench to Fasten Nut on the Holder.





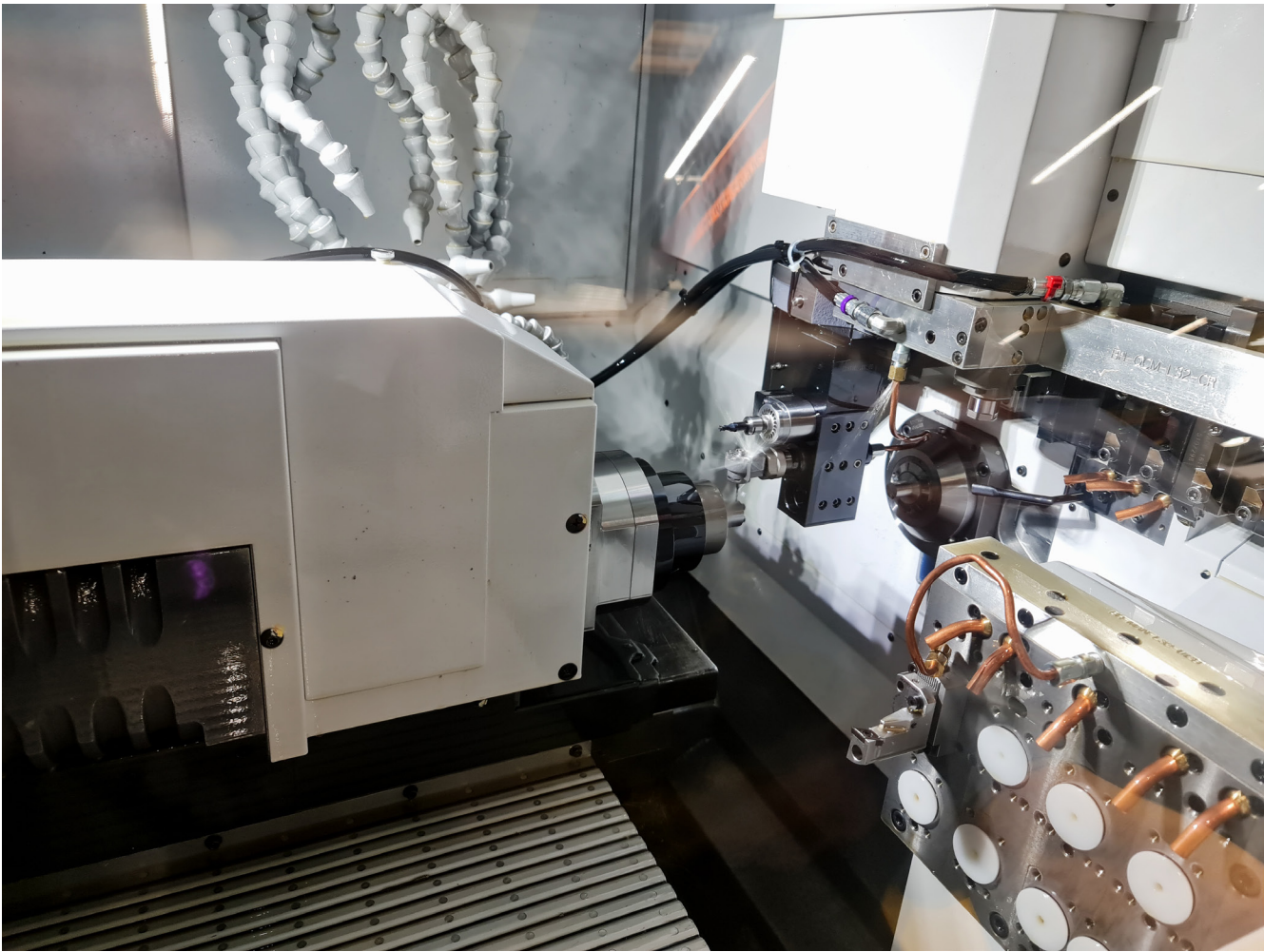
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MICRO90 - NEW CATALOG ITEMS

ITEM	Designation	P/N
	STJ MICRO90	87-155-030
	CHS Collets	
	1.60 mm CHS Collet	AC-011
	2.00 mm CHS Collet	AC-012
	3.00 mm CHS Collet	AC-014
	3.17 mm CHS Collet	AC-015
	SPARE PARTS	
	WRENCH FOR MICRO 90	2430-128







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**PARTNERS**



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