HEULE +
PRECISION TOOLS

ONEOPERATION

BSF
Back Spot Facer
Instruction Book

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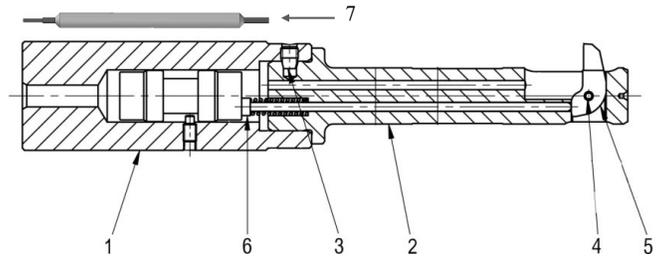
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SWISS MADE

BSF 2012

Tool Description

Position	Description
1	Shank
2	Blade Housing
3	Clamping Screw
4	Split Pin
5	Blade
6	Piston Pin
7	Assembly Pin

BSF (Back Spot Facer) is an economical backwards counter boring tool. It allows the machining of spot faces and counter bores, for example for screw heads, without turning the work piece over. This means that the machining is made from the same side as the bore is drilled. It is also easy to machine spot faces or counter bores between the forks of yokes. The BSF is specifically designed for CNC machining and immediately ready for operation.

The BSF tool functions without anti-rotation device, change of spindle or contact mechanism. The blade expands by activating the spindle on an initial speed. It pops out by centrifugal force of its own weight. The blade retracts by coolant pressure.

Special focus was made in the development stage for optimal cutting performance and chip removal. The tool and the blade have special coolant pipes and chip guiding geometries that continuously flushes the blade window and the blade itself with coolant. This keeps the whole sections clean and allows for optimal chip removal performance.

The tool is a simplistic design but very robust. The carbide blades are coated depending on the application. Changing the blade is easily executed with included assembly pin.
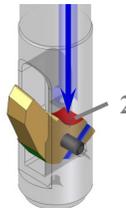

Range of Use (Guideline Only)

Bore diameter	min ø6, max ø20
Counter bore diameter	max 2.3xd
Counter bore depth	none
Working length	max 5xd
Counter bore tolerance	Diameter ±0.1
	Parallelism ±0.05
Material	Up to 800N/mm^2

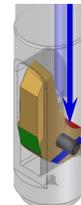# Function
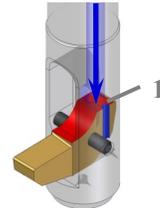
Turn through coolant on. The Piston is forced up making contact with the thrust face (1) of the back of the insert. The blade is forced to retract.

The thrust face (1) is turning away while the blade is retracting and the piston pin is pushed along the blade curve (2).

The piston pin keeps the blade in the retracted position and the tool may be moved in the axial direction (Z-axis). No spindle rotation.
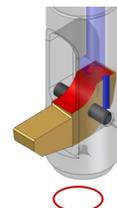
To activate the blade, turn through coolant off and start the spindle. Centrifugal force will bring the blade out. The blade expands immediately after turning on the spindle with desired spindle speed.
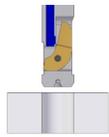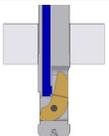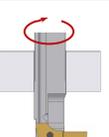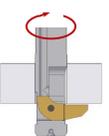
Machine Requirements

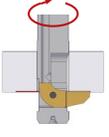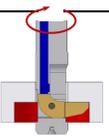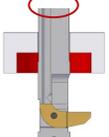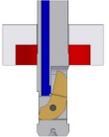| Machine	Tool Holder cylindrical or weldon
	Tool Holder without coolant pressure loss (recommended)
	CNC controlled axis and spindle
	Activation Speed min 2,000 - 5,000RPM
Coolant	Internal coolant through spindle, min 300PSI (25bar)
	Programmable Coolant supply on/off
	Clean, filtered coolant water
	Coolant type water-in-oil emulsion (recommended)
Tool Holder for Work Piece	It is important to discharge the chips out of the work piece clamping system. The flush mechanism of the BSF can be used for support. Use a Peck Cycle feed while machining long chipping material to receive short chips.

Programming Example

Examples for Mori Seiki NV 5000, thickness of work piece 10mm

	G0 Z2 M5 M88 G4X1	Advance the tool 2mm in front of the work piece after tool change. Stop the spindle (speed 0). Turn on the internal through coolant. Take 1s dwell time. The blade is now retracted.
	G0Z-27	Rapid feed through the bore to position X while spindle is stopped and internal through coolant is turned on.
	M89 S2000M3 G4X1	Turn off internal through coolant. Turn on the spindle at the initial speed (2-5,000rpm). Take 3-5s dwell time. The blade is now expanded.
	S1000M3 M8 G1Z-17F2000	Reduce the spindle speed to working speed. Turn on external flood coolant. Go with rapid feed 1mm in front of the bore edge.

|		
	G1-Z-16.75F50	With the internal through coolant turned off and only external coolant on, machine the work piece backwards with working speed and working feed until the blade is in full cut for approx. 0.1-0.2mm (no interrupted cut anymore) .
	G1Z-12M88	Option; Turn the internal through coolant on when in full cut. Machine the counter bore backwards to the final dimension while using working speed and working feed.
	M89 G1Z-27F2000	Turn off internal through coolant when reaching the depth of the counter bore. Go out with rapid feed to the position X.
	M9 M5 M88 G4X1	Turn off external flood coolant. Stop the spindle. Turn on internal through coolant. Take 2s dwell time. The blade is now retracted.
	G0Z2 M89	Go with rapid feed out of the work piece while spindle is stopped and internal through coolant is turned on. Go to next hole.
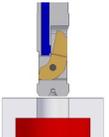
Cutting Data

|	Cutting Speed	Feed Rate
Cast Iron	50-70m/min (160-230 SFM)	0.03mm/rev (0.0012"/rev)
Alloy Steel	30-70m/min (100-230 SFM)	0.02-0.06mm/rev (0.0008-.0025"/rev)
Stainless Steel	15-40m/min (50-130 SFM)	0.02-0.05mm/rev (0.0008-.0020"/rev)
Nickel Alloy	10-20m/min (30-60 SFM)	0.01-0.02mm/rev (0.0008"/rev)
Aluminum	80-90m/min (260-300 SFM)	0.05mm/rev (0.002"/rev)

Blade Change

The assembly pin is added to each tool. The assembly pin has to be used for assembling and disassembling the split pin and the blade. The side with step is used for disassembling the split pin.
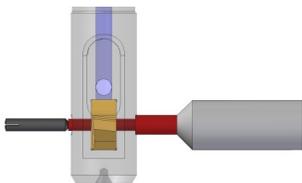
The split pin must be disassembled for removing the blade. Place the assembly pin to the solid part of the split pin. Drive the assembly pin into the pin bore until it strikes against the blade housing. The split pin is now disassembled and the blade can be removed.
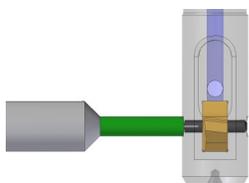
Place the new blade into the blade window. Insert the split pin (solid part in front) into the pin bore. Using the other end, place the assembly pin (without step) onto the split part of the split pin. Drive the assembly pin in until it strikes against the blade housing.

Maintenance

The blade has to expand independently (by its own weight) when turning the tool upside down. Please disassemble the blade if this does not happen. Check the blade and the blade window for obstructions and/or damage.

Check the blade for free movement after prolonged stoppage. It is possible that the blade could be sticking in the blade housing because of dried oil, coolant or other contaminates.

WARNING: Grinding may produce hazardous dust. To avoid adverse effects, use adequate ventilation and read MSDS. Cutting tools may break during use. To avoid injury, use proper safety precautions and protective equipment.

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