

PRODUCT NEWS

PN-U-004

TYPE EXSAP/MSX

 **DIJET®**

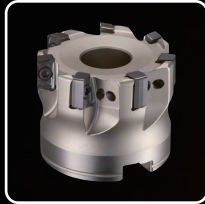
EXTREME SAP

For high efficient & precision shoulder milling.

- Modular type ϕ 5/8"~ ϕ 1-1/2" (ϕ 16mm~ ϕ 40mm)
- End mill type ϕ 5/8"~ ϕ 1-1/2" (ϕ 16mm~ ϕ 40mm)
- Face mill type ϕ 2.0"~ ϕ 6.0" (ϕ 40mm~ ϕ 125mm)



Extreme SAP



Facemill type



Modular head type



Endmill type

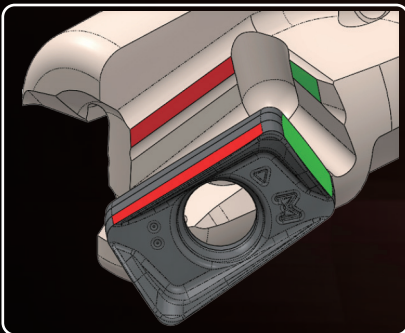
Various line up

EXSAP/MSX are capable of a variety of applications such as face milling, slotting and plunging.

Due to the arc-geometry on the peripheral cutting edge, the cusp height can be smaller even in case of large ap.



Achieves high efficient & high precision machining for side walls.



Strong clamping system

Due to the unique clamping system that holds the insert in place, it's possible to achieve high efficient machining in roughing applications.

3D Chipbreaker

High precision G class periphery ground

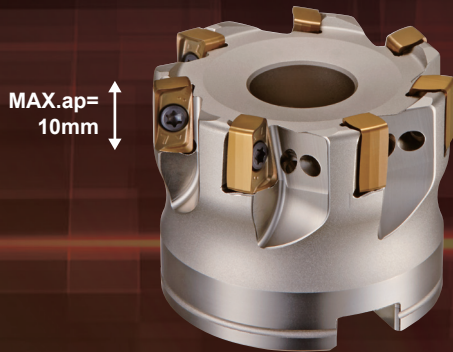
Capable of semi-finishing



Double Sided!

EXSAP-11 type

NEW



Superior cutting performance with multi blades and small insert.
Achieves high efficiency and high-speed machining.

Accuracy of tool diameter with master insert 0~0.0004".
Achieves higher precision on semi-finishing processes.



GRADE
JC8050
JC8118

PM breaker for general steel

Optimal breaker for mold steel &
High hardened steel less than 50HRC



GRADE
JC7550
JC7518

SL breaker for hard-to-cut materials

Optimal breaker for
Titanium alloy and Inconel

EXSAP-17 type



Max. depth of cut (ap)=15mm is possible

Able to process from roughing to semi-finishing even when machining with a large ap.

High rigidity inserts

Achieves high precision machining even when using large ap due to the insert thickness.



GRADE
JC8050
JC8118

PM breaker for general steel

Optimal breaker for Mold steel and
High hardened steel less than 50HRC

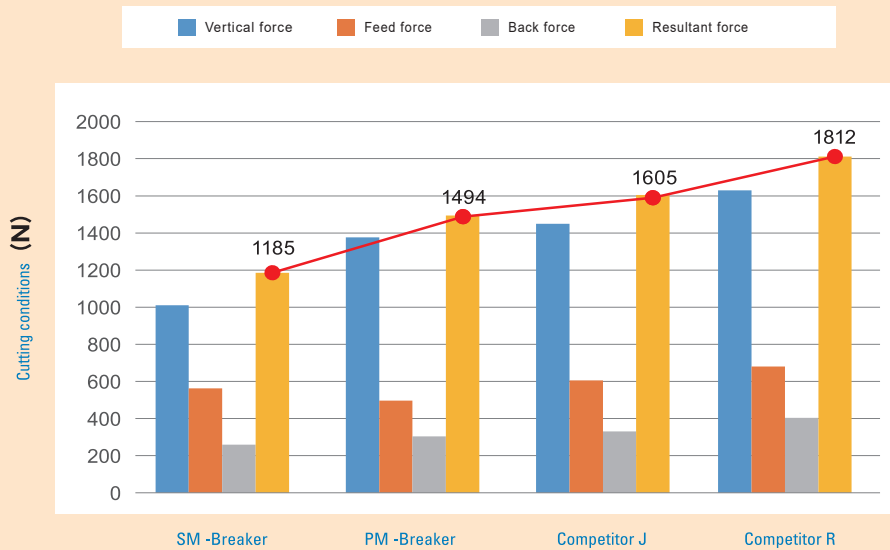
Application

ISO	P				M				K				S				H				
	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30	S01	S10	S20	S30	H01	H10	H20
Applicable range	JC8118				JC8118				JC8118				JC8118								
	JC8050				JC8050																
	JC7518				JC7518								JC7518			JC7518					
	JC7550				JC7550											JC7550					

Cutting performance

EXSAP-11 type

Cutting force comparison



Material: Ti-6AL-4V

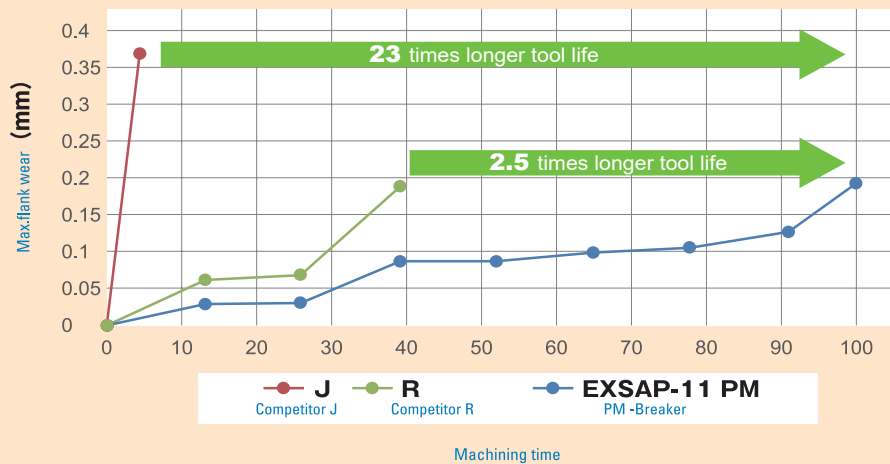
● Tool diameter: $\varnothing 16\text{mm}$

● Cutting conditions:
 $V_c=60\text{m/min}$, $f_z=0.1\text{mm/t}$,
 $a_p=5\text{mm}$, $a_e=1\text{mm}$

Test by one insert:
 DOWN CUT,
 Air blow

SL chip breaker has 35% lower cutting force compared to R company. Even the PM chip breaker has a lower cutting force than other companies.

Tool life comparison (For roughing)



Material: P21

● Tool diameter: $\varnothing 50\text{mm}$

● Cutting conditions:
 $V_c=120\text{m/min}$, $f_z=0.15\text{mm/t}$,
 $a_p=2\text{mm}$, $a_e=35\text{mm}$

Test by one insert:
 DOWN CUT,
 Air blow

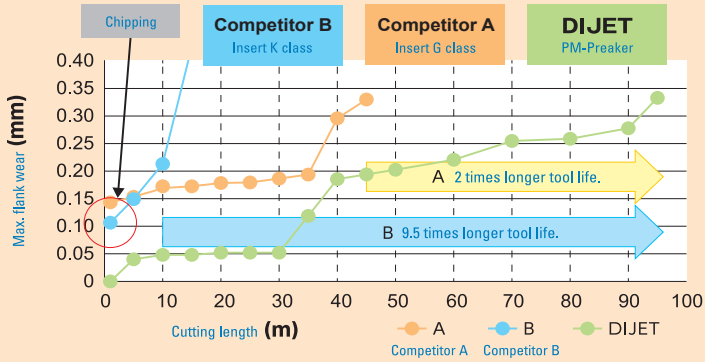
EXSAP achieves stable machining due to the small initial wear and the low cutting force.

DIJET (PM) PM-Breaker	J Competitor J	R Competitor R
$R_a=0.24\mu\text{m}$	$R_a=0.27\mu\text{m}$	$R_a=0.49\mu\text{m}$
$R_z=1.41\mu\text{m}$	$R_z=1.71\mu\text{m}$	$R_z=3.03\mu\text{m}$

PM chip breaker controls any rubbing and allows both the R_a and R_z to create a beautiful finish.

EXSAP-17 type

Tool life comparison (for roughing)



Material: P20

● Tool diameter: Ø50mm

● Insert grade: JC8118

● Cutting conditions:
Vc=150m/min, fz=0.3mm/t,
ap=15mm, ae=3mm

Test by one insert:
UP & DOWN CUT,
Air blow

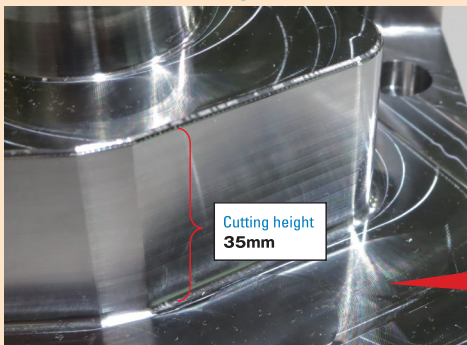
● Insert conditions

Cutting length	10m	30m	40m	60m	95m
A Competitor A					
B Competitor B					
DIJET					

Achieves stable roughing!

Surface finish comparison (for semi-finishing)

● **Shoulder milling**



Deflection (vertical wall) (height: 30mm)	Feed Direction	Feed Direction
6 μm	0.47 μm	2.92 μm

Possible for high precision machining at Ra < 1.6 μm (like original) level!

Material: P20

● Tool diameter: Ø25mm

● Insert grade: JC8050

● Cutting conditions:
Vc=250m/min, fz=0.15mm/t,
ap=3mm, ae=0.2mm

Test by two insert:
DOWN CUT,
Air blow

● **Face milling**



Good surface finish!

Material: P20

● Tool diameter: Ø50mm

● Insert grade: JC8050

● Cutting conditions:
Vc=180m/min, fz=0.1mm/t,
ap=3mm, ae=35mm

Test by one insert:
DOWN CUT,
Air blow

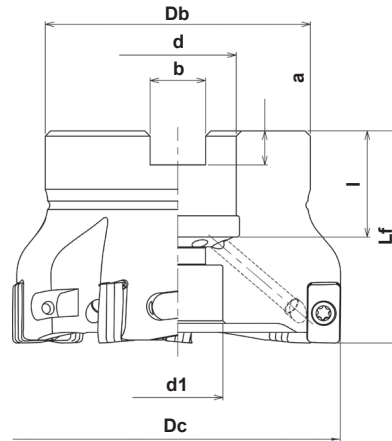


Extreme SAP

INCH

METRIC

Face Mill EXSAP-11 type



Specifications - Inch

CATALOG NUMBER	STK	DIMENSIONS								INSERT	Q	PARTS	
		Dc	Lf	Db	d	d1	a	b	l			Screw	Wrench
EXSAP-5200R-11-075	•	2.00	1.575	1.85	.750	.63	.196	.318	.75	ZNGU1105**ZER-**	5	TSW-307H	T-10
EXSAP-7200R-11-075	•	2.00	1.575	1.85	.750	.63	.196	.318	.75		7		
EXSAP-7250R-11-100	•	2.50	1.75	1.96	1.00	.787	.236	.374	.75		7		
EXSAP-8300R-11-100	•	3.00	1.75	2.21	1.00	.787	.236	.374	.75		8		

Note: All cutters supplied without inserts, wrench, & moly.

Specifications - Metric

CATALOG NUMBER	STK	DIMENSIONS								ARBOR BOLT	Q	INSERT & PARTS
		Dc	Lf	Db	d	d1	a	b	l			
EXSAP-6040R-11-16	⊙	40	40	35	16	14	5.6	8.4	18		6	ZNGU1105**ZER-** TSW-307H T-10
EXSAP-7050R-11-22	•	50	40	47	22	16.5	6.3	10.4	20		7	
EXSAP-7052R-11-22	⊙	52	40	47	22	16.5	6.3	10.4	20		7	
EXSAP-7063R-11-22	•	63	40	50	22	17	6.3	10.4	20		7	
EXSAP-7063R-11-27	•	63	50	50	27	20	7	12.4	22	M12x1.75x30*	7	
EXSAP-8080R-11-27	⊙	80	50	56	27	20	7	12.4	22	M12x1.75x30*	7	

⊙ - delivery may be longer

Note: All cutters supplied without inserts, wrench, & moly.

NOTE: Arbor bolt included with cutters marked with * under arbor bolt column.

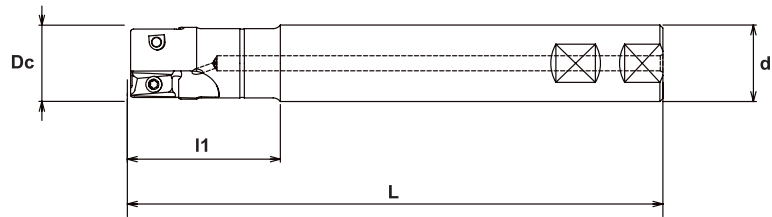
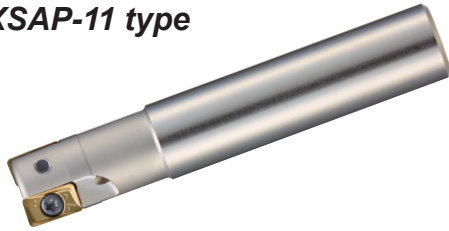


INCH

METRIC

Extreme SAP

End Mill EXSAP-11 type



Specifications - Inch

CATALOG NUMBER	STK	DIMENSIONS				FIG.	INSERT	Q	PARTS	
		Dc	L	l1	d				Screw	Wrench
EXSAP-2062-11-2.0-S062NP	•	.625	5.00	2.00	.625	1	ZNGU1105**ZER-**	2	TSW-307H	T-10
EXSAP-2062-11-3.0-S062NP	•	.625	6.25	3.00	.625	1		2		
EXSAP-3075-11-2.0-S075NP	•	.750	5.00	2.00	.750	1		3		
EXSAP-3075-11-3.0-S075NP	•	.750	6.25	3.00	.750	1		3		
EXSAP-3100-11-2.0-S100NP	•	1.00	7.00	2.00	1.00	1		3		
EXSAP-3100-11-3.0-S100NP	•	1.00	8.00	3.00	1.00	1		3		
EXSAP-4125-11-3.0-S125NP	•	1.25	8.00	3.00	1.25	1		4		
EXSAP-5150-11-3.0-S125NP	•	1.50	8.00	3.00	1.25	2		5		

Note: All cutters supplied without inserts, wrench, & moly.



Fig. 1

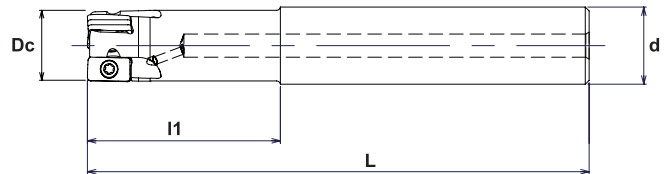
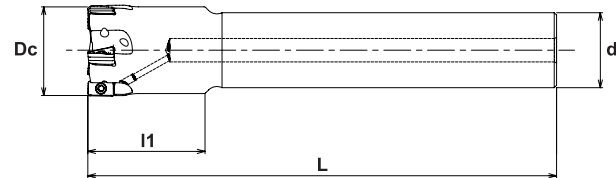


Fig. 2



Specifications - Metric

CATALOG NUMBER	STK	DIMENSIONS				FIG.	INSERT	Q	PARTS	
		Dc	L	l1	d				Screw	Wrench
EXSAP-2016-11-30-S16	•	16	90	30	16	1	ZNGU1105**ZER-**	2	TSW-307H	T-10
EXSAP-2016-11-50-S16	•	16	110	50	16	1		2		
EXSAP-3020-11-50-S20	•	20	130	50	20	1		3		
EXSAP-3020-11-80-S20	•	20	160	80	20	1		3		
EXSAP-3025-11-60-S25	•	25	140	60	25	1		3		
EXSAP-3025-11-100-S25	•	25	180	100	25	1		3		
EXSAP-4030-11-70-S32	•	30	150	70	32	1		4		
EXSAP-4030-11-120-S32	•	30	200	120	32	1		4		
EXSAP-4032-11-70-S32	•	32	150	70	32	1		4		
EXSAP-4032-11-120-S32	•	32	200	120	32	1		4		
EXSAP-5040-11-50-S32	•	40	150	50	32	2		5		
EXSAP-5040-11-50L-S32	•	40	200	50	32	2		5		

Note: All cutters supplied without inserts, wrench, & moly.

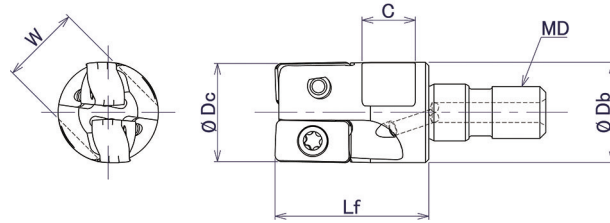


Extreme SAP

INCH

METRIC

Modular Heads / Inserts-11 MSX-11 type



Specifications - Inch

CATALOG NUMBER	STK	DIMENSIONS						HEAD TORQUE LBS/FFT	INSERT	Q	PARTS	
		ØDc	Lf	ØDb	MD	C	W				Screw	Wrench
MSX-2062-11-M8	•	.625	.906	.590	M8	.315	.472	11.8	ZNGU1105**ZER**	2	TSW-307H	T-10
MSX-3075-11-M10	•	.750	1.18	.708	M10	.354	.551	11.8		3		
MSX-3100-11-M12	•	1.00	1.38	.866	M12	.433	.748	14.7		3		
MSX-4125-11-M16	•	1.25	1.69	1.14	M16	.472	.866	18.4		4		
MSX-5150-11-M16	•	1.50	1.69	1.14	M16	.472	.866	18.4		5		

Note: All cutters supplied without inserts, wrench, & moly.

Specifications - Metric

CATALOG NUMBER	STK	DIMENSIONS						HEAD TORQUE Nm	INSERT	Q	PARTS	
		ØDc	Lf	ØDb	MD	C	W				Screw	Wrench
MSX-2016-11-M8	•	16	23	15	M8	8	12	16	ZNGU1105**ZER**	2	TSW-307H	T-10
MSX-3020-11-M10	•	20	30	18	M10	9	14	16		3		
MSX-3025-11-M12	•	25	35	22	M12	11	19	20		3		
MSX-4030-11-M16	•	30	43	29	M16	12	22	25		4		
MSX-4032-11-M16	•	32	43	29	M16	12	22	25		4		
MSX-5040-11-M16	•	40	43	29	M16	12	22	25		5		

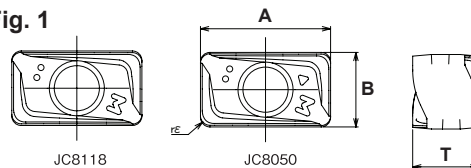
Note: All cutters supplied without inserts, wrench, & moly.

INSERTS-11

Fig. 1



Fig. 1



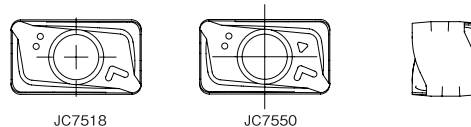
JC8118

JC8050

Fig. 2



Fig. 2



JC7518

JC7550

CATALOG NUMBER	TOLERANCE	DIMENSIONS (mm)				FIG.	PVD COATED			
		A	B	T	rε		JC8118	JC8050	JC7518	JC7550
ZNGU110504ZER-PM	G	11	6.3	5.6	0.4	1	⊙	⊙		
ZNGU110508ZER-PM					0.8	1	•	•		
ZNGU110516ZER-PM					1.6	1	⊙	⊙		
ZNGU110504ZER-SL					0.4	2			⊙	⊙
ZNGU110508ZER-SL					0.8	2			•	•
ZNGU110516ZER-SL					1.6	2			⊙	⊙

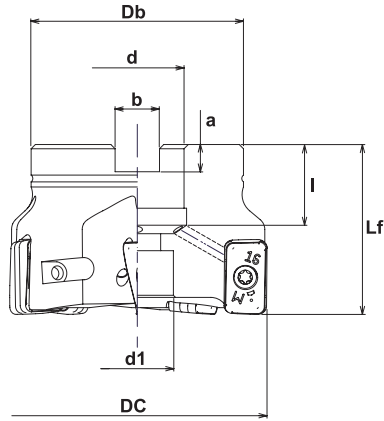


INCH

METRIC

Extreme SAP

Face Mill EXSAP-17 type



Specifications - Inch

CATALOG NUMBER	STK	DIMENSIONS								INSERT	Q	PARTS	
		Dc	Lf	Db	d	d1	a	b	l			Screw	Wrench
EXSAP-4200R-075	•	2.00	1.575	1.85	.750	.63	.196	.319	.750	ZNGU1709**ZER**	4	TSW-410H	A-15T
EXSAP-5200R-075	•	2.00	1.575	1.85	.750	.63	.196	.319	.750		5		
EXSAP-5250R-100	•	2.50	1.77	1.96	1.00	.787	.236	.374	.750		5		
EXSAP-7300R-100	•	3.00	1.75	2.21	1.00	.787	.236	.374	.750		7		
EXSAP-8400R-150	•	4.00	2.25	3.78	1.50	1.18	.394	.626	1.00		8		
EXSAP-9600R-150*	•	6.00	2.25	3.94	1.50	2.36	.394	.626	1.41		9		

*Not coolant thru

Note: All cutters supplied without inserts, wrench, & moly.

Specifications - Metric

CATALOG NUMBER	STK	DIMENSIONS								ARBOR BOLT	Q	INSERT & PARTS
		Dc	Lf	Db	d	d1	a	b	l			
EXSAP-4050R-22	•	50	40	47	22	17	6.3	10.4	20		4	ZNGU1709**ZER** TSW-410H A-15T
EXSAP-5050R-22	•	50	40	47	22	17	6.3	10.4	20		5	
EXSAP-5052R-22	⊙	52	40	47	22	17	6.3	10.4	20		5	
EXSAP-5063R-22	•	63	40	50	22	17	6.3	10.4	20		5	
EXSAP-7080R	•	80	50	56	25.4	20	6	9.5	24	M12x1.75x30*	7	
EXSAP-7080R-27	•	80	50	56	27	20	7	12.4	22	M12x1.75x30*	7	
EXSAP-7100R	•	100	63	85	31.75	26	8	12.7	32	M16x2x35*	7	
EXSAP-7100R-32	•	100	50	85	32	26	8	14.4	25	M16x2x25*	7	
EXSAP-8125R	•	125	70	100	38.1	32	10	15.9	38	M20x2.5x40*	8	
EXSAP-8125R-40	•	125	63	100	40	32	9	16.4	32	M20x2.5x40*	8	

⊙ - delivery may be longer

Note: All cutters supplied without inserts, wrench, & moly.

NOTE: 1. Arbor bolt included on cutters marked with * under arbor bolt column.
2. Body must be modified to 2mm radius or 1.5mm chamfer when using insert with 3.0mm corner radius.



Extreme SAP

INCH

METRIC

End Mills EXSAP-17 type



Fig. 1

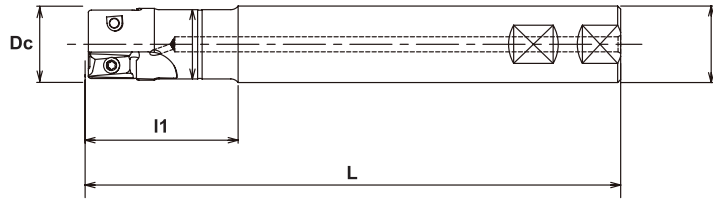
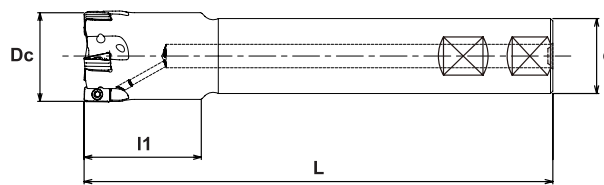


Fig. 2

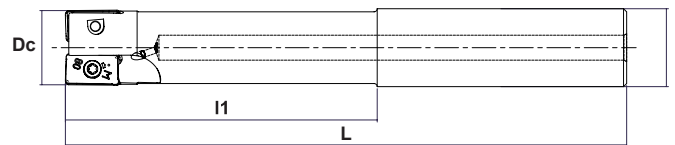


Specifications - Inch

CATALOG NUMBER	STK	DIMENSIONS				FIG.	INSERT	Q	PARTS	
		Dc	L	l1	d				Screw	Wrench
EXSAP-2100-2.0-S100LG	•	1.00	7.00	2.00	1.00	1	ZNGU1709**ZER-**	2	TSW-410H	T-15
EXSAP-2100-3.0-S100LG	•	1.00	8.00	3.00	1.00	1		2		
EXSAP-3125-3.0-S125LG	•	1.25	5.50	3.00	1.25	1		3		
EXSAP-3125-4.75-S125LG	•	1.25	8.00	4.75	1.25	1		3		
EXSAP-4150-3.0-S125LG	•	1.50	5.50	3.00	1.25	2		4		
EXSAP-4150-4.75-S125LG	•	1.50	8.00	4.75	1.25	2		4		

Note: Body must be modified to 2mm radius or 1.5mm chamfer when using insert with 3.0mm corner radius.

Note: All cutters supplied without inserts, wrench, & moly.



Specifications - Metric

CATALOG NUMBER	STK	DIMENSIONS				INSERT	Q	PARTS	
		Dc	L	l1	d			Screw	Wrench
EXSAP-2025-60-S25	•	25	140	60	25	ZNGU1709**ZER-**	2	TSW-410H	T-15
EXSAP-2025-100-S25	•	25	180	100	25		2		
EXSAP-2032-70-S32	•	32	150	70	32		2		
EXSAP-2032-120-S32	•	32	200	120	32		2		
EXSAP-3032-70-S32		32	150	70	32		3		
EXSAP-3032-120-S32	•	32	200	120	32		3		

Note: Body must be modified to 2mm radius or 1.5mm chamfer when using insert with 3.0mm corner radius.

Note: All cutters supplied without inserts, wrench, & moly.

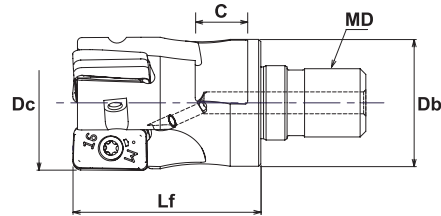
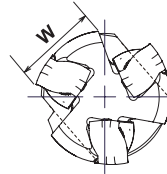


INCH

METRIC

Extreme SAP

Modular Heads/Inserts-17 MSX-17 type



Specifications - Inch

CATALOG NUMBER	STK	DIMENSIONS						HEAD TORQUE LBS/FFT	INSERT	Q	PARTS	
		ØDc	Lf	ØDb	MD	C	W				Screw	Wrench
MSX-2100-M12	•	1.00	1.38	.905	M12	.433	.748	14.7	ZNGU1709**ZER-**	2	TSW-410H	T-15
MSX-2125-M16	•	1.25	1.69	1.14	M16	.472	.866	18.4		2		
MSX-3125-M16	•	1.25	1.69	1.14	M16	.472	.866	18.4		3		
MSX-4150-M16	•	1.50	1.69	1.14	M16	.472	.866	18.4		4		

Note: Body must be modified to 2mm radius or 1.5mm chamfer when using insert with 3.0mm corner radius.

Note: All cutters supplied without inserts, wrench, & moly.

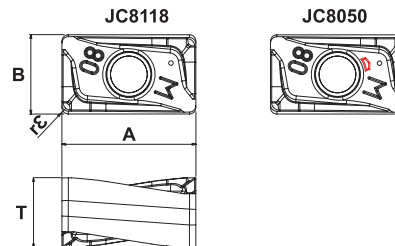
Specifications - Metric

CATALOG NUMBER	STK	DIMENSIONS						HEAD TORQUE Nm	INSERT	Q	PARTS	
		ØDc	Lf	ØDb	MD	C	W				Screw	Wrench
MSX-2025-M12	•	25	35	22	M12	11	19	20	ZNGU1709**ZER-**	2	TSW-410H	T-15
MSX-2026-M12	•	26	35	22	M12	11	19	20		2		
MSX-2028-M12	•	28	35	22	M12	11	19	20		2		
MSX-2030-M16	•	30	43	29	M16	12	22	25		2		
MSX-2032-M16	•	32	43	29	M16	12	22	25		2		
MSX-3032-M16	•	32	43	29	M16	12	22	25		3		
MSX-3033-M16	•	33	43	29	M16	12	22	25		3		
MSX-3035-M16	•	35	43	29	M16	12	22	25		3		
MSX-4040-M16	•	40	43	29	M16	12	22	25		4		

Note: Body must be modified to 2mm radius or 1.5mm chamfer when using insert with 3.0mm corner radius.

Note: All cutters supplied without inserts, wrench, & moly.

INSERTS-17



CATALOG NUMBER	TOLERANCE	DIMENSIONS (mm)				PVD COATED	
		A	B	T	rE	JC8118	JC8050
ZNGU170904ZER-PM	G	16.9	10	8.8	0.4	•	•
ZNGU170908ZER-PM					0.8	•	•
ZNGU170916ZER-PM					1.6	•	•
ZNGU170920ZER-PM					2	•	•
ZNGU170930ZER-PM					3	•	•

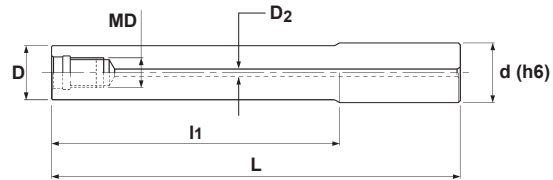
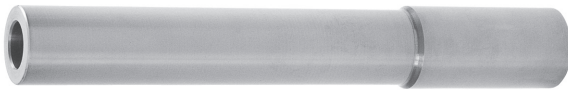
Modular Head Holders

INCH

MODULAR HEAD HOLDERS

MSN Type

Solid Carbide with Coolant Thru



Specifications

CATALOG NUMBER	STK	DIMENSIONS					
		D	l1	L	d	MD	D2
MSN-M6-0.5-S050C	•	.452	.500	2.50	.500	M6	.118
MSN-M6-1.0-S050C	•	.452	1.00	3.15	.500	M6	.118
MSN-M6-2.0-S050C	•	.452	2.00	3.93	.500	M6	.118
MSN-M6-3.0-S050C	•	.452	3.00	5.12	.500	M6	.118
MSN-M8-0.5-S062C	•	.591	.500	3.50	.625	M8	.157
MSN-M8-1.0-S062C	•	.591	1.00	4.00	.625	M8	.157
MSN-M8-2.0-S062C	•	.591	2.00	5.00	.625	M8	.157
MSN-M8-4.0-S062C	•	.591	4.00	7.00	.625	M8	.157
MSN-M8-6.0-S062C	•	.591	6.00	9.00	.625	M8	.157
MSN-M10-0.5-S075C	•	.728	.500	3.50	.750	M10	.157
MSN-M10-1.0-S075C	•	.728	1.00	4.00	.750	M10	.157
MSN-M10-2.0-S075C	•	.728	2.00	5.00	.750	M10	.157
MSN-M10-3.0-S075C	•	.728	3.00	6.00	.750	M10	.157
MSN-M10-4.0-S075C	•	.728	4.00	7.00	.750	M10	.157
MSN-M10-5.0-S075C	•	.728	5.00	8.00	.750	M10	.157
MSN-M10-6.0-S075C	•	.728	6.00	9.00	.750	M10	.157
MSN-M12-0.5-S100C	•	.945	.500	3.50	1.00	M12	.236
MSN-M12-1.0-S100C	•	.945	1.00	4.00	1.00	M12	.236
MSN-M12-2.0-S100C	•	.945	2.00	5.00	1.00	M12	.236
MSN-M12-3.0-S100C	•	.945	3.00	6.00	1.00	M12	.236
MSN-M12-4.0-S100C	•	.945	4.00	7.00	1.00	M12	.236
MSN-M12-5.0-S100C	•	.945	5.00	8.00	1.00	M12	.236
MSN-M12-6.0-S100C	•	.945	6.00	9.00	1.00	M12	.236
MSN-M12-8.0-S100C	•	.945	8.00	11.00	1.00	M12	.236
MSN-M16-0.5-S125C	•	1.14	.500	3.50	1.25	M16	.315
MSN-M16-1.0-S125C	•	1.14	1.00	4.00	1.25	M16	.315
MSN-M16-2.0-S125C	•	1.14	2.00	5.00	1.25	M16	.315
MSN-M16-4.0-S125C	•	1.14	4.00	7.00	1.25	M16	.315
MSN-M16-6.0-S125C	•	1.14	6.00	9.00	1.25	M16	.315
MSN-M16-8.0-S125C	•	1.14	8.00	11.00	1.25	M16	.315

METRIC

Modular Head Holders

MODULAR HEAD HOLDERS

MSN Type

Solid Carbide with Coolant Thru



Fig. 1

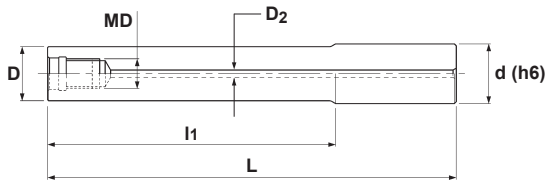
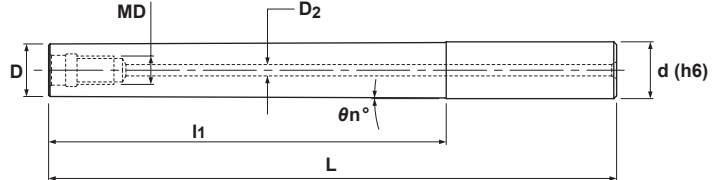


Fig. 2



Specifications

CATALOG NUMBER	STK	DIMENSIONS							FIG.
		D	l1	L	d	θn°	MD	D2	
MSN-M6-12-S10C	•	9.7	12	60	10	-	M6	3	1
MSN-M6-30-S10C	•	9.7	30	80	10	-	M6	3	1
MSN-M6-50-S10C	•	9.7	50	100	10	-	M6	3	1
MSN-M6-80-S10C	•	9.7	80	130	10	-	M6	3	1
MSN-M6-15-S12C	•	11.5	15	60	12	-	M6	3	1
MSN-M6-30-S12C	•	11.5	30	80	12	-	M6	3	1
MSN-M6-35T-S12C	•	9.5	35	92	12	3°	M6	3	2
MSN-M6-50-S12C	•	11.5	50	100	12	-	M6	3	1
MSN-M6-57T-S12C	•	9.5	57	114	12	2°	M6	3	2
MSN-M6-65T-S16C	•	11.2	65	125	16	3°30'	M6	3	2
MSN-M6-80-S12C	•	11.5	80	130	12	-	M6	3	1
MSN-M6-15-S16C	•	13.5	15	60	16	-	M6	3	1
MSN-M6-30-S16C	•	13.5	30	80	16	-	M6	3	1
MSN-M6-50-S16C	•	13.5	50	100	16	-	M6	3	1
MSN-M6-80-S16C	•	13.5	80	130	16	-	M6	3	1
MSN-M8-20-S16C	•	15.5	20	75	16	-	M8	4	1
MSN-M8-40-S16C	•	15.5	40	95	16	-	M8	4	1
MSN-M8-40T-S20C	•	14.5	40	100	20	7°	M8	4	2
MSN-M8-77T-S20C	•	14.5	77	143	20	3°30'	M8	4	2
MSN-M8-80-S16C	•	15.5	80	135	16	-	M8	4	1
MSN-M8-120-S16C	•	15.5	120	175	16	-	M8	4	1
MSN-M8-152-S16C	•	15.5	152	207	16	-	M8	4	1
MSN-M10-20-S20C	•	19.5	20	80	20	-	M10	6	1
MSN-M10-40-S20C	•	19.5	40	100	20	-	M10	4	1
MSN-M10-40T-S20C	•	18.5	40	100	20	0°43'	M10	4	2
MSN-M10-70-S20C	•	19.5	70	130	20	-	M10	4	1
MSN-M10-85T-S25C	•	18.5	85	161	25	4°	M10	4	2
MSN-M10-90-S20C	•	19.5	90	150	20	-	M10	4	1
MSN-M10-90T-S20C	•	18.5	90	150	20	0°19'	M10	4	2
MSN-M10-140-S20C	•	19.5	140	200	20	-	M10	4	1
MSN-M10-140T-S20C	•	18.5	140	200	20	0°12'	M10	4	2
MSN-M10-160-S20C	•	19.5	160	220	20	-	M10	4	1
MSN-M10-210-S20C	•	19.5	210	270	20	-	M10	4	1

Modular Head Holders

METRIC

MODULAR HEAD HOLDERS

MSN Type

Solid Carbide with Coolant Thru



Fig. 1

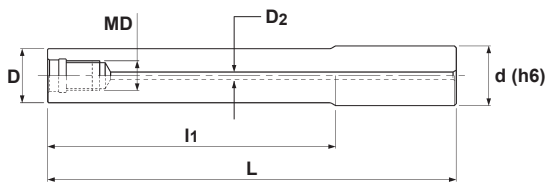
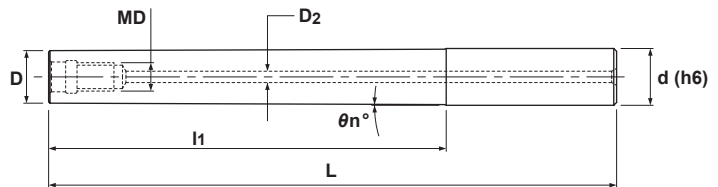


Fig. 2



Specifications

CATALOG NUMBER	STK	DIMENSIONS							FIG.
		D	I1	L	d	θn°	MD	D2	
MSN-M12-25-S25C	•	24	25	90	25	-	M12	6	1
MSN-M12-55-S25C	•	24	55	120	25	-	M12	6	1
MSN-M12-100T-S32C	•	23.5	100	180	32	4°	M12	6	2
MSN-M12-105-S25C	•	24	105	170	25	-	M12	6	1
MSN-M12-135-S25C	•	24	135	215	25	-	M12	6	1
MSN-M12-155-S25C	•	24	155	220	25	-	M12	6	1
MSN-M12-200-S25C	•	24	200	265	25	-	M12	6	1
MSN-M16-25-S32C	•	29	25	90	32	-	M16	8	1
MSN-M16-55-S32C	•	29	55	120	32	-	M16	8	1
MSN-M16-77-S32C	•	29	77	157	32	-	M16	8	1
MSN-M16-97-S32C	•	29	97	177	32	-	M16	8	1
MSN-M16-105-S32C	•	29	105	170	32	-	M16	8	1
MSN-M16-117T-S32C	•	29	117	197	32	1°15'	M16	8	2
MSN-M16-127-S32C	•	29	127	207	32	-	M16	8	1
MSN-M16-127T-S32C	•	29	127	207	32	1°	M16	8	2
MSN-M16-155-S32C	•	29	155	220	32	-	M16	8	1
MSN-M16-177-S32C	•	29	177	257	32	-	M16	8	1
MSN-M16-177T-S32C	•	29	177	257	32	0°45'	M16	8	2
MSN-M16-195-S32C	•	29	195	260	32	-	M16	8	1
MSN-M16-197T-S32C	•	29	197	277	32	0°45'	M16	8	2
MSN-M16-225-S32C	•	29	225	290	32	-	M16	8	1
MSN-M16-245-S32C	•	29	245	310	32	-	M16	8	1
MSN-M16-295-S32C	•	29	295	360	32	-	M16	8	1

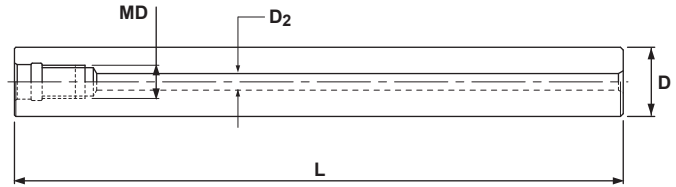
METRIC

Modular Head Holders

MODULAR HEAD HOLDERS

MSN Type - Straight

Solid Carbide with Coolant Thru



Specifications

CATALOG NUMBER	STK	DIMENSIONS			
		D	L	MD	D2
MSN-M6-67S-S9.8C	•	9.8	67	M6	3
MSN-M6-107S-S9.8C	•	9.8	107	M6	3
MSN-M6-82S-S10C	•	10	82	M6	3
MSN-M6-122S-S10C	•	10	122	M6	3
MSN-M6-80S-S11.8C	•	11.8	80	M6	3
MSN-M6-120S-S11.8C	•	11.8	120	M6	3
MSN-M6-90S-S12C	•	12	90	M6	3
MSN-M6-130S-S12C	•	12	130	M6	3
MSN-M8-87S-S14C	•	14	87	M8	3
MSN-M8-137S-S14C	•	14	137	M8	3
MSN-M8-97S-S15C	•	15	97	M8	4
MSN-M8-147S-S15C	•	15	147	M8	4
MSN-M8-197S-S15C	•	15	197	M8	4
MSN-M8-107S-S16C	•	16	107	M8	4
MSN-M8-157S-S16C	•	16	157	M8	4
MSN-M10-130S-S18C	•	18	130	M10	4
MSN-M10-190S-S18C	•	18	190	M10	4
MSN-M10-240S-S18C	•	18	240	M10	4
MSN-M10-130S-S20C	•	20	130	M10	4
MSN-M10-190S-S20C	•	20	190	M10	4
MSN-M10-250S-S20C	•	20	250	M10	4
MSN-M12-185S-S23C	•	23	185	M12	6
MSN-M12-265S-S23C	•	23	265	M12	6
MSN-M12-185S-S24C	•	24	185	M12	6
MSN-M12-265S-S24C	•	24	265	M12	6
MSN-M12-145S-S25C	•	25	145	M12	6
MSN-M12-215S-S25C	•	25	215	M12	6
MSN-M12-285S-S25C	•	25	285	M12	6
MSN-M16-160S-S28C	•	28	160	M16	8
MSN-M16-230S-S28C	•	28	230	M16	8
MSN-M16-310S-S28C	•	28	310	M16	8
MSN-M16-157S-S32C	•	32	157	M16	8
MSN-M16-217S-S32C	•	32	217	M16	8
MSN-M16-287S-S32C	•	32	287	M16	8
MSN-M16-357S-S32C	•	32	357	M16	8

Modular Head Holders

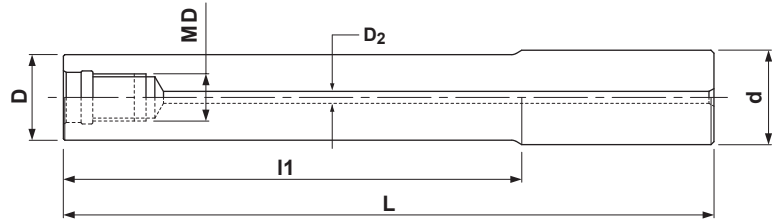
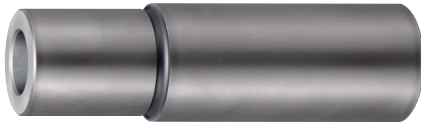
INCH

METRIC

MODULAR HEAD HOLDERS

MGN Type

G-Body with Coolant Thru



Specifications - Inch

CATALOG NUMBER	STK	DIMENSIONS					
		D	l1	L	d	MD	D2
MGN-M6-0.5-S050	•	.452	.500	2.50	.500	M6	.118
MGN-M6-1.0-S050	•	.452	1.00	3.15	.500	M6	.118
MGN-M6-2.0-S050	•	.452	2.00	3.93	.500	M6	.118
MGN-M8-0.5-S062	•	.591	.500	3.50	.625	M8	.157
MGN-M8-1.0-S062	•	.591	1.00	4.00	.625	M8	.157
MGN-M8-2.0-S062	•	.591	2.00	5.00	.625	M8	.157
MGN-M10-0.5-S075	•	.728	.500	3.50	.750	M10	.157
MGN-M10-1.0-S075	•	.728	1.00	4.00	.750	M10	.157
MGN-M10-2.0-S075	•	.728	2.00	5.00	.750	M10	.157
MGN-M12-0.5-S100	•	.945	.500	3.50	1.00	M12	.236
MGN-M12-1.0-S100	•	.945	1.00	4.00	1.00	M12	.236
MGN-M12-2.0-S100	•	.945	2.00	5.00	1.00	M12	.236
MGN-M12-3.0-S100	•	.945	3.00	6.00	1.00	M12	.236
MGN-M16-0.5-S125	•	1.14	.500	3.50	1.25	M16	.315
MGN-M16-1.0-S125	•	1.14	1.00	4.00	1.25	M16	.315
MGN-M16-2.0-S125	•	1.14	2.00	5.00	1.25	M16	.315
MGN-M16-3.0-S125	•	1.14	3.00	6.00	1.25	M16	.315

Specifications - Metric

CATALOG NUMBER	STK	DIMENSIONS					
		D	l1	L	d	MD	D2
MGN-M8-17-S16	•	15.5	17	97	16	M8	4
MGN-M10-30-S20	•	19	30	100	20	M10	4
MGN-M12-35-S25	•	24	35	105	25	M12	4
MGN-M12-85-S25	•	24	85	165	25	M12	4
MGN-M16-37-S32	•	29	37	107	32	M16	6
MGN-M16-77-S32	•	29	77	157	32	M16	6

PROPER MOUNTING OF MODULAR HEADS

■ Cleaning

Remove dirt and chips with air from the connecting thread and face of modular head and MSN/MGN shank holder.

■ Initial Tightening

Tighten by hand until the head and the shank holder faces touch.

■ Final Tightening

Tighten slowly with torque control spanner wrench or DIJET DS type spanner wrench and confirm that there is no gap.

Attention: Final tightening without initial tightening cause connecting thread damage.



Thread	Tightening torque	Spanner size
M6	8N·m	8 ◆
M8	16N·m	10, 12 ◆
M10	16N·m	14, 15
M12	20N·m	17, 19
M16	25N·m	22, 26

Modular heads are supplied without spanner wrench.

In case of choosing torque control spanner wrench, confirm that the wrench size is matched to the dimensions W & C of each modular head. (There are some cases that modifying the thickness of spanner wrench is necessary)

◆ = DIJET stocks DS-8 and DS-12 type spanner wrenches.

SELECTION OF MSN CARBIDE SHANK HOLDER

$$\varnothing D_c - \varnothing D_1 \geq 1\text{mm}$$

When using modular head over $\varnothing 16\text{mm}$, **please select MSN carbide shank which the diameter ($\varnothing D_1$) is 1 mm or smaller than modular head ($\varnothing D_c$).**

Wrong selection can cause damage to the carbide shank.

Coolant or air blow is recommended to remove the chips.



Caution for mounting in shrink fit holder.

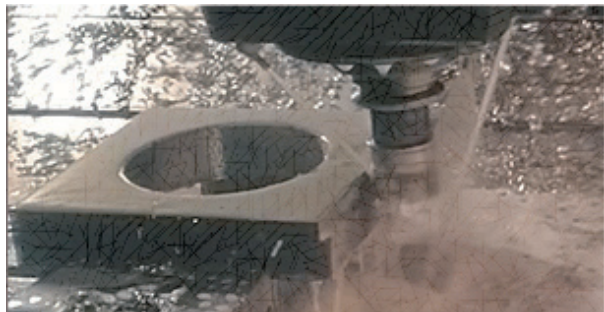
When you use a carbide shank and a modular head on a shrink fit holder, please shrink fit only the carbide shank without mounting the modular head. Mount the modular head on the shank after shrink fit operation is complete.

In case of shrink fit MSN shank + modular head together, it will be difficult to loosen due to heat dissipation.

Cutting Data

EXSAP-11

1. Machining on Super duplex Stainless steel



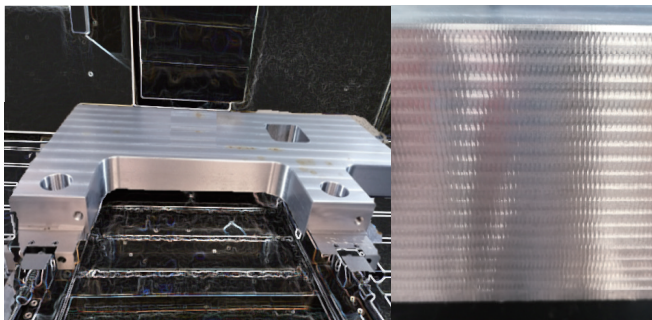
Result

Three parts completed compared to 1 part with conventional products.

Reducing the cutting speed makes it possible to machine 4 parts.

Work	Part Name	Parts	
	Material	Super duplex Stainless steel	
	Hardness	32HRC	
Tool	Tool No.	EXSAP-7050R-11-22	
	Insert No.	ZNGU110508ZER-PM (JC8050)	
Cutting Conditions	Spindle Speed Cutting Speed	n	600 (min-1)
		Vc	95 (m/min)
	Feed Speed	Vt	700 (mm/min)
		fz	0.16 (mm/t)
	ap (mm)		5 (mm)
	ae (mm)		6 (mm)
	Coolant		Water coolant (internal)
	Machine		Vertical MC

2. Machining on Carbon steel

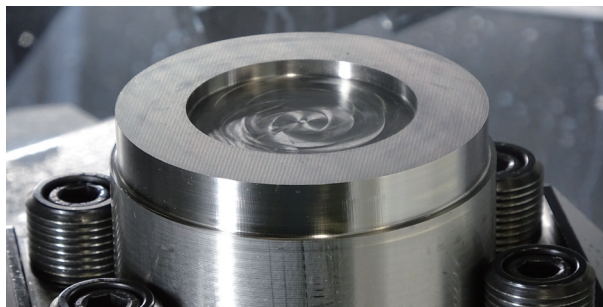


Result

Parts can be machined even under high load conditions, such as ap=10mm and ae=1mm.

Work	Part Name	Plate	
	Material	1045	
	Hardness	200HB	
Tool	Tool No.	EXSAP-7050R-11-22	
	Insert No.	ZNGU110508ZER-PM (JC8050)	
Cutting Conditions	Spindle Speed Cutting Speed	n	900 (min-1)
		Vc	140 (m/min)
	Feed Speed	Vt	1,400 (mm/min)
		fz	0.22 (mm/t)
	ap (mm)		10 (mm)
	ae (mm)		1 (mm)
	Coolant		Air blow (internal)
	Machine		Vertical MC

3. Machining on Ti-alloy



Result

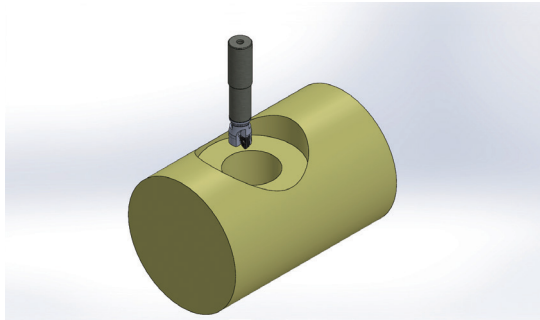
Shoulder milling of hard-to-cut materials shows no welding and a beautiful finish.

After 1 hour of machining the inserts are still able to continue cutting.

Work	Part Name	Test piece	
	Material	Ti-6AL-4V	
	Hardness	-	
Tool	Tool No.	MSX-2016-11-M8	
	Insert No.	ZNGU110508ZER-SL (JC8050)	
Cutting Conditions	Spindle Speed Cutting Speed	n	1,200 (min-1)
		Vc	60 (m/min)
	Feed Speed	Vt	300 (mm/min)
		fz	0.125 (mm/t)
	ap (mm)		3 (mm)
	ae (mm)		1 (mm)
	Coolant		Water coolant (internal)
	Machine		Vertical MC

EXSAP-17

1. Machining on Stainless steel

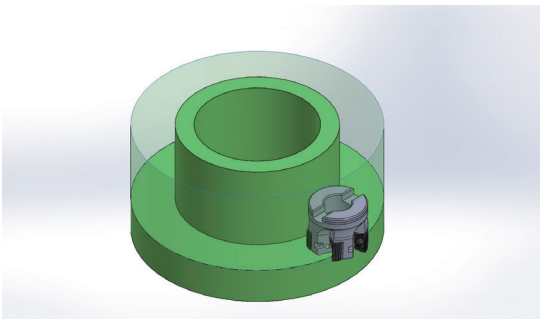


Result

Achieved 4 times longer tool life per corner compared to competitor and our insert has two additional corners.

Work	Part Name	Shaft	
	Material	304 Stainless	
	Hardness	-	
Tool	Tool No.	MSX-2032-M16	
	Insert No.	ZNGU170908ZER-PM (JC8050)	
Cutting Conditions	Spindle Speed Cutting Speed	n	1,230 (min-1)
		Vc	124 (m/min)
	Feed Speed	Vt	490 (mm/min)
		fz	0.2 (mm/t)
	ap (mm)		5.4 (mm)
	ae (mm)		4 (mm)
	Coolant		Oil coolant (external)
	Machine		Vertical MC

2. Machining on Hardened die steel



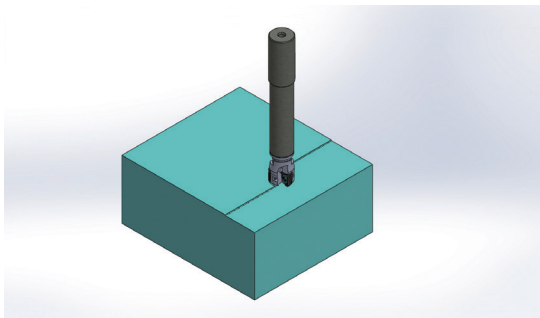
Result

Stable machining, better tool life and more efficient machining compared with conventional tool.

EXSAP insert has 4 corners versus 2 corners of conventional tooling.

Work	Part Name	Forging die	
	Material	H13	
	Hardness	48-52HRC	
Tool	Tool No.	EXSAP-5050R-22	
	Insert No.	ZNGU170908ZER-PM (JC8118)	
Cutting Conditions	Spindle Speed Cutting Speed	n	570 (min-1)
		Vc	90 (m/min)
	Feed Speed	Vt	300 (mm/min)
		fz	0.11 (mm/t)
	ap (mm)		0.5 (mm)
	ae (mm)		35 (mm)
	Coolant		Water coolant (external)
	Machine		Vertical MC

3. Machining on Carbon steel

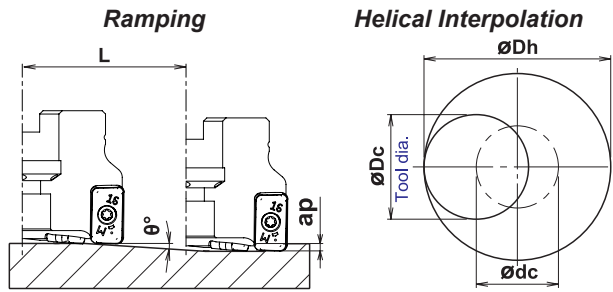


Result

EXSAP can process from roughing to semi-finishing and achieve superior surface roughness.

Work	Part Name	Parts	
	Material	1049	
	Hardness	-	
Tool	Tool No.	MSX-3032-M16	
	Insert No.	ZNGU170908ZER (JC8050)	
Cutting Conditions	Spindle Speed Cutting Speed	n	1,200 (min-1)
		Vc	140 (m/min)
	Feed Speed	Vt	1,200 (mm/min)
		fz	0.29 (mm/t)
	ap (mm)		1.0 (mm)
	ae (mm)		20 (mm)
	Coolant		Water coolant (external)
	Machine		Vertical MC

Recommended Data for Profile Milling with EXSAP-11



- Calculation of tool pass dia.

$$\text{Ødc} = \text{ØDh} - \text{ØDc}$$

Tool pass dia. Bore dia. Tool Dia.

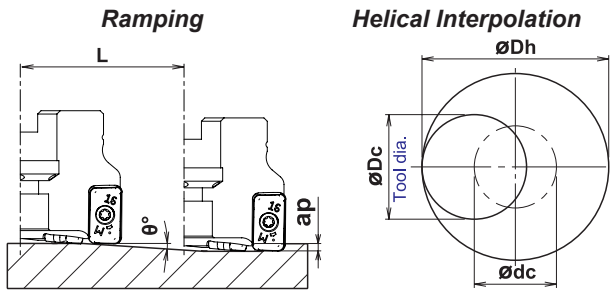
- Depth of cut per one circuit should not exceed max. depth of cut ap.
- Down cutting is recommended. Tool pass rotation should be counterclockwise.

- In case of ramping and helical interpolation, apply 80% or less feed (F) from standard cutting condition table.
- In case of helical interpolation, recommend wet cutting by coolant through the tool.

	Tool Diameter	Effective Cutting Diameter	Max. Depth of Cut: AP	Ramping		Helical Interpolation	
				Max. Ramp Angle	Total Cutting Length at Max. AP: L	Min. Bore Diameter: Dh min	Max. Bore Diameter: Dh max
INCH EXSAP-11	5/8"	.550"	.060"	1°	3.43"	.700"	1.15"
	3/4"	.675"		0.7°	4.91"	.950"	1.40"
	1"	.925"		0.4°	8.59"	1.45"	1.90"
	1-1/4"	1.175"		0.3°	11.46"	1.95"	2.40"
	1-1/2"	1.425"		0.2°	17.19"	2.45"	2.90"
	2"	1.925"		0.15°	22.92"	3.45"	3.90"
	2-1/2"	2.425"		Not Recommended			
	3"	2.925"					
METRIC EXSAP-11	16	14.1	1.5	1°	86	18	29.6
	20	18.1		0.7°	123	26	37.6
	25	23.1		0.4°	215	36	47.6
	30	28.1		0.3°	286	46	57.6
	32	30.1		0.3°	286	50	61.6
	40	38.1		0.2°	430	66	77.6
	50	48.1		0.15°	573	86	97.6
	52	50.1		0.15°	573	90	101.6
	63	61.1		Not Recommended			
	80	78.1					

NOTE: Above calculations are based on 0.8mm (.031") insert corner radius.

Recommended Data for Profile Milling with EXSAP-17



- Calculation of tool pass dia.

$$\text{Tool pass dia.} = \text{Bore dia.} - \text{Tool Dia.}$$

Tool pass dia. Bore dia. Tool Dia.

- Depth of cut per one circuit should not exceed max. depth of cut ap.
- Down cutting is recommended. Tool pass rotation should be counterclockwise.

- In case of ramping and helical interpolation, apply 80% or less feed (F) from standard cutting condition table.
- In case of helical interpolation, recommend wet cutting by coolant through the tool.

	Tool Diameter	Effective Cutting Diameter	Max. Depth of Cut: AP	Ramping		Helical Interpolation	
				Max. Ramp Angle	Total Cutting Length at Max. AP: L	Min. Bore Diameter: Dh min	Max. Bore Diameter: Dh max
INCH EXSAP-17	1"	.85"	.060"	0.7°	4.83"	1.48"	1.85"
	1-¼"	1.10"		0.5°	6.77"	1.98"	2.35"
	1-½"	1.35"		0.4°	8.46"	2.48"	2.85"
	2"	1.85"		0.3°	11.28"	3.48"	3.85"
	2-½"	2.35"		0.2°	16.92"	4.48"	4.85"
	3"	2.85"		0.18°	18.80"	5.48"	5.85"
	4"	3.85"		Not Recommended			
6"	5.85"	Not Recommended					
METRIC EXSAP-17	25	21.5	1.5	0.7°	123	34	46
	26	22.5		0.7°	123	36	48
	28	25.5		0.6°	143	40	52
	30	26.5		0.6°	143	44	56
	32	28.5		0.5°	172	48	60
	33	29.5		0.5°	172	50	62
	35	31.5		0.4°	215	54	66
	40	36.5		0.4°	215	64	76
	50	46.5		0.3°	286	84	96
	52	48.5		0.3°	286	88	100
	63	59.5		0.2°	430	110	122
	80	76.5		0.15°	573	144	156
	100	96.5		Not Recommended			
125	121.5	Not Recommended					

NOTE: Above calculations are based on 1.6mm (.062") insert corner radius.

Recommended Cutting Data for EXSAP-11

Material	Grade	SFM	Parameters	Face Milling		Side Milling	
				Low HP	High HP	Low HP	High HP
Gray Cast Iron	JC8118 JC8050	700	IPT	.007"	.007"	.006"	.007"
			DOC	.060"	.100"	.180"	.270"
			WOC	70%	70%	7%	5%
Nodular Cast Iron	JC8118 JC8050	650	IPT	.007"	.007"	.006"	.007"
			DOC	.060"	.100"	.180"	.270"
			WOC	70%	70%	7%	5%
Carbon Steel	JC8118 JC8050	600	IPT	.007"	.007"	.006"	.007"
			DOC	.060"	.100"	.180"	.270"
			WOC	60%	60%	7%	5%
Low Alloy Steel	JC8118 JC8050	550	IPT	.012"	.012"	.006"	.007"
			DOC	.060"	.100"	.180"	.270"
			WOC	60%	60%	7%	5%
Mold Steel	JC8050 JC8118	500	IPT	.006"	.006"	.005"	.006"
			DOC	.050"	.080"	.180"	.270"
			WOC	60%	60%	7%	5%
Tool & Die Steel (40-50 HRC)	JC8118 JC8050	400	IPT	.005"	.005"	.004"	.005"
			DOC	.030"	.050"	.120"	.180"
			WOC	60%	60%	5%	3%
Hardened Tool Steel (50-60 HRC)	JC8118 JC8050	250	IPT	.004"	.004"	.003"	.004"
			DOC	.040"	.060"	.080"	.120"
			WOC	20%	20%	3%	2%
Stainless Steel	JC8050 JC8118	300	IPT	.007"	.007"	.005"	.006"
			DOC	.060"	.100"	.180"	.270"
			WOC	60%	60%	7%	5%
Titanium	JC8050 JC8118	200	IPT	.005"	.005"	.004"	.005"
			DOC	.050"	.080"	.120"	.180"
			WOC	60%	60%	5%	3%

Recommended Cutting Data for EXSAP-17

Material	Grade	SFM	Parameters	Face Milling		Side Milling	
				Low HP	High HP	Low HP	High HP
Gray Cast Iron	JC8118 JC8050	700	IPT	.012"	.012"	.010"	.012"
			DOC	.150"	.200"	.400"	.600"
			WOC	70%	70%	7%	5%
Nodular Cast Iron	JC8118 JC8050	650	IPT	.012"	.012"	.010"	.012"
			DOC	.150"	.200"	.400"	.600"
			WOC	70%	70%	7%	5%
Carbon Steel	JC8118 JC8050	600	IPT	.012"	.012"	.010"	.012"
			DOC	.120"	.150"	.400"	.600"
			WOC	60%	60%	7%	5%
Low Alloy Steel	JC8118 JC8050	550	IPT	.012"	.012"	.008"	.010"
			DOC	.120"	.150"	.400"	.600"
			WOC	60%	60%	7%	5%
Mold Steel	JC8050 JC8118	500	IPT	.010"	.010"	.010"	.010"
			DOC	.120"	.150"	.400"	.600"
			WOC	60%	60%	7%	5%
Tool & Die Steel (40-50 HRC)	JC8118 JC8050	400	IPT	.010"	.010"	.006"	.008"
			DOC	.100"	.120"	.300"	.500"
			WOC	60%	60%	5%	3%
Hardened Tool Steel (50-60 HRC)	JC8118 JC8050	250	IPT	.005"	.005"	.005"	.006"
			DOC	.040"	.060"	.200"	.300"
			WOC	20%	20%	3%	2%
Stainless Steel	JC8050 JC8118	300	IPT	.008"	.008"	.006"	.008"
			DOC	.120"	.150"	.400"	.600"
			WOC	60%	60%	7%	5%
Titanium	JC8050 JC8118	200	IPT	.005"	.005"	.004"	.005"
			DOC	.100"	.150"	.300"	.500"
			WOC	60%	60%	5%	3%

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