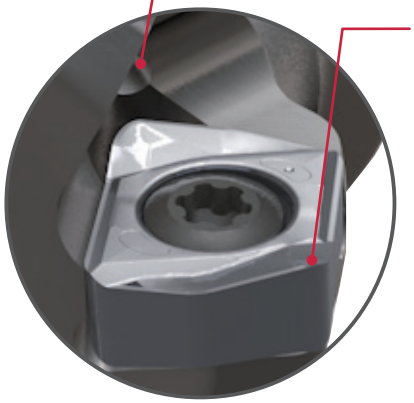
DOFEED

Innovative high-feed cutters!

DoFeed offers outstanding productivity thanks to its close-pitch insert orientation and light cutting geometry. The rich lineup is suitable for a wide variety of applicaions.

Outstanding productivity

Excellent chip evacuation prevents chip packing

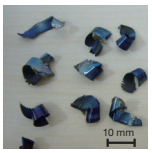


Optimized coolant jet delivery effectively removes chip and prevent it from re-cutting

Large inclination forms ideal chips and controls the chips flow

DOFEED

Good
Curl consistently at ideal length



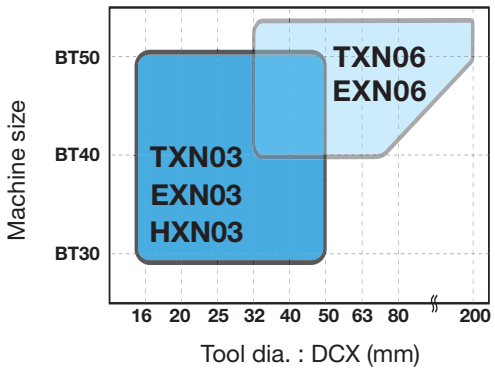
Competitor
Poor
Crushed or unstable

Steel	
Cutter	: TXN06R050M22.0E05
Insert	: LNMU06X5ZER-MJ
Grade	: AH725
Workpiece material	: Carbon steels (S55C / C55)
Cutting speed	: *Vc* =180 m/min
Feed per tooth	: *fz* = 1.8 mm/t
Depth of cut	: *ap* =1.0 mm
Coolant	: Dry
Machine	: Vertical M/C, BT50

Rich lineup of cutter bodies from ø16 to ø200 mm

Insert	Bore type	Shank type	Modular type
LN*U03  Max. ap = 1.0 mm	**TXN03** (DCX = 40 - 50 mm) 	**EXN03** (DCX = 16 - 40 mm) 	**HXN03** (DCX = 16 - 40 mm) 
LN*U06  Max. ap = 1.5 mm	**TXN06** (DCX = 50 - 200 mm) 	**EXN06** (DCX = 32 - 40 mm) 	

Applicable area

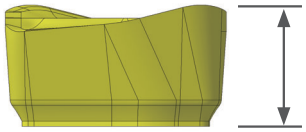


Reference pages: H026 - H035

TUNGFORCE FEED

Small-diameter high feed milling cutter with impressive machining efficiency and reliability

Built to perform at higher machining conditions



Thick insert corner
Max 10 % thicker
than competitors'

Strong insert corner for high feed operations

- Thick insert corner is designed to withstand fracturing force

Robust and easy-to-handle insert screws

- M2 screws reduce screw neck shears under high cutting forces. A larger screw enhances insert's fixation and easy handling.

TUNGFORCE FEED (M2)

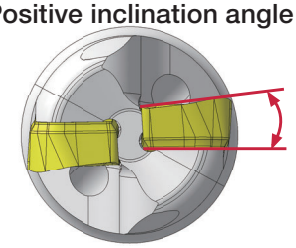
Competitor (M1.8)

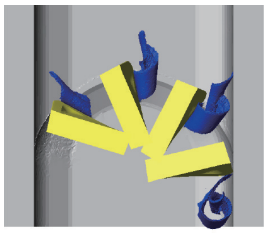
Proper chip formation assures a reliable machining process

Positive inclination angle of the insert promotes smooth chip evacuation

- The positive cutting edge position contributes to a controlled chip formation and easy chip evacuation when machining next to shoulder and slotting operation.

Positive inclination angle





Proper chip control eliminates recuts and premature insert failure

Chip formation

TUNGFORCE FEED

Ideal curled chips

Competitor

Crushed chips

P Steel

Cutter	: EXLS02M010C10.0LF20R02
Insert	: LSMT0202ZER-HM AH3225
Workpiece material	: S55C
Cutting speed	: *Vc* = 200 m/min
Application	: Slotting
Depth of cut	: *ap* = 0.5 mm × 20 passes
Coolant	: Dry
Machine	: Vertical M/C, BT40

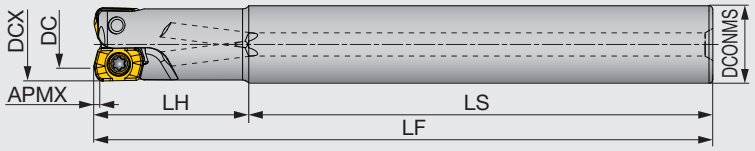
Reference pages: H022 - H025

TUNGFORCE FEED

EXLS

High feed endmill, shank type

GAMP = +4°, GAMF = -21° ~ -17°



Designation	APMX	DCX	CICT	DC	DCONMS	LS	LH	LF	WT (kg)	Air hole	Insert
EXLS02M008C08.0LH16R01	0.5	8	1	4.29	8	59	16	75	0.02	With	LSMT02...
EXLS02M008C08.0LH30R01	0.5	8	1	4.29	8	59	31	90	0.03	With	LSMT02...
EXLS02M010C10.0LH20R02	0.5	10	2	6.28	10	60	20	80	0.04	With	LSMT02...
EXLS02M010C10.0LH40R02	0.5	10	2	6.28	10	60	40	100	0.05	With	LSMT02...
EXLS02M010C08.0LH20R02	0.5	10	2	6.28	8	60	20	80	0.03	With	LSMT02...
EXLS02M012C12.0LH50R02	0.5	12	2	8.31	12	60	50	110	0.08	With	LSMT02...
EXLS02M012C12.0LH20R03	0.5	12	3	8.31	12	60	20	80	0.06	With	LSMT02...
EXLS02M012C10.0LH20R03	0.5	12	3	8.31	10	60	20	80	0.04	With	LSMT02...
EXLS02M016C16.0LH50R03	0.5	16	3	12.31	16	70	50	120	0.17	With	LSMT02...
EXLS02M016C16.0LH30R05	0.5	16	5	12.31	16	70	30	100	0.14	With	LSMT02...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EXLS02M...	CSPB-2H	M-1000	IP-6DB

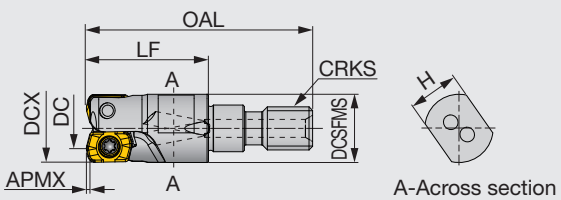
*Recommended clamping torque (N·m):CSPB-2H=0.7

TUNGFORCE FEED

HXLS

High feed endmill, shank type

GAMP = +4°, GAMF = -21° ~ -17°



Designation	APMX	DCX	CICT	DC	OAL	LF	H	DCSFMS	CRKS	WT (kg)	Air hole	Insert
HXLS02M008M06R01	0.5	8	1	4.29	33.5	19	7	9.5	M6	0.01	With	LSMT02...
HXLS02M010M06R02	0.5	10	2	6.28	31.5	17	7	9.5	M6	0.01	With	LSMT02...
HXLS02M012M06R02	0.5	12	2	8.31	31.5	17	7	10	M6	0.01	With	LSMT02...
HXLS02M012M06R03	0.5	12	3	8.31	31.5	17	7	10	M6	0.01	With	LSMT02...
HXLS02M016M08R03	0.5	16	3	12.31	40	23	10	13	M8	0.03	With	LSMT02...
HXLS02M016M08R05	0.5	16	5	12.31	40	23	10	13	M8	0.03	With	LSMT02...

SPARE PARTS

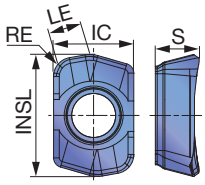
Designation	Clamping screw	Lubricant	Wrench
HXLS02M...	CSPB-2H	M-1000	IP-6DB

*Recommended clamping torque (N·m):CSPB-2H=0.7

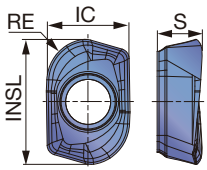
Reference pages: Inserts → H023, Standard cutting conditions → H024 - H025, TungFlex → H210

INSERT

LSMT-HM (High feed)



LSMT-MM (Radius)



		Coated	
P	Steel	★	☆
M	Stainless	★	
K	Cast iron	☆	★
N	Non-ferrous		
S	Superalloys	☆	★
H	Hard materials		★

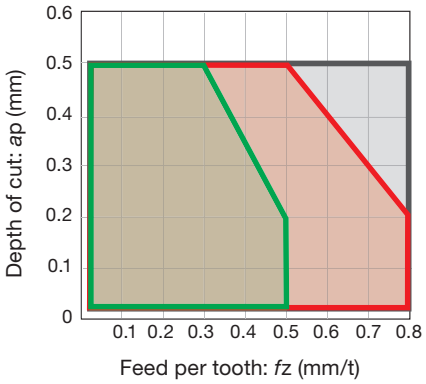
★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH3225	Coated AH8015	LE	INSL	IC	S
LSMT0202ZER-HM	1	0.5	●	●	1.7	6.4	4.2	2.3
LSMT0202R2-MM	2	2.0	●	●	-	6.4	4.3	2.3

●: Line up

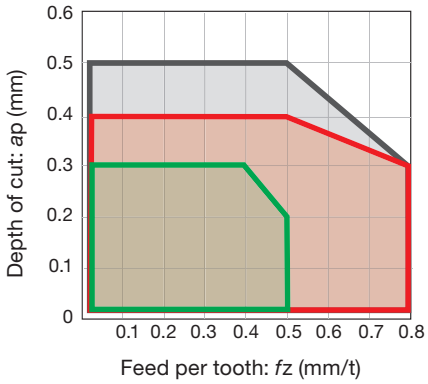
APPLICATION

LSMT02-HM



- For standard shanks in ≤ 3xD
- For long-neck shanks in ≥ 4xD
- For modular head shanks in ≥ 7xD

LSMT02-MM



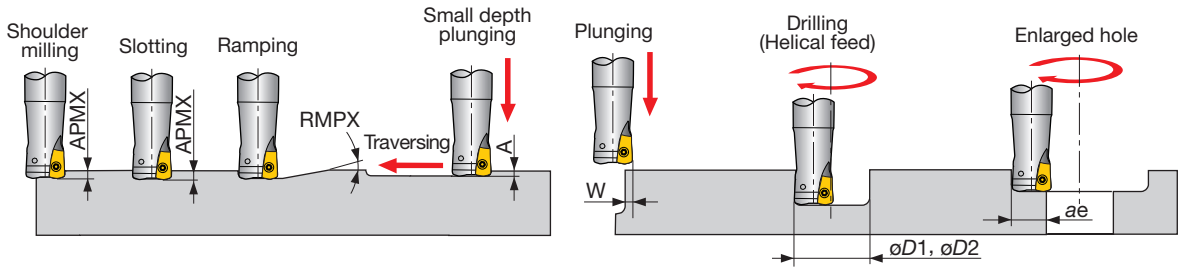
- For standard shanks in ≤ 3xD
- For long-neck shanks in ≥ 4xD
- For modular head shanks in ≥ 7xD

* When the DOC is 0.5 mm or more, the feed less than 0.15 mm/t is recommended.

STANDARD CUTTING CONDITIONS

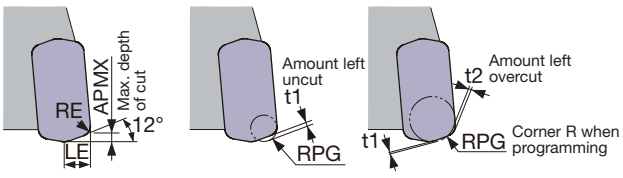
ISO	Workpiece materials		Hardness	Priority	Grades	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels S45C, S55C, etc. C45, C55, etc.		- 300HB	First choice	AH3225	100 - 300	0.2 - 0.8
			- 300HB	Wear resistance	AH8015	100 - 300	0.2 - 0.8
	Alloy steels SCM440, etc. 42CrMo4, etc.		- 300HB	First choice	AH3225	100 - 300	0.2 - 0.8
			- 300HB	Wear resistance	AH8015	100 - 300	0.2 - 0.8
	Prehardened steels NAK80, PX5, etc.		30 - 40HRC	First choice	AH8015	100 - 200	0.2 - 0.5
			30 - 40HRC	Fracture resistance	AH3225	100 - 200	0.2 - 0.5
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.		- 200HB	First choice	AH3225	100 - 150	0.2 - 0.5
K	Gray cast irons FC250, FC300, etc. 250, 300, etc.		150 - 250HB	First choice	AH8015	100 - 300	0.2 - 0.8
			150 - 250HB	Fracture resistance	AH3225	100 - 300	0.2 - 0.8
	Ductile cast irons FCD600, etc. 600-3, etc.		150 - 250HB	First choice	AH8015	80 - 200	0.2 - 0.8
			150 - 250HB	Fracture resistance	AH3225	80 - 200	0.2 - 0.8
S	Titanium alloy Ti-6Al-4V, etc		- 40HRC	First choice	AH3225	30 - 60	0.1 - 0.3
			- 40HRC	Wear resistance	AH8015	30 - 60	0.1 - 0.3
	Heat resistance alloy Inconel, Hastelloy, etc.		- 40HRC	First choice	AH8015	20 - 50	0.1 - 0.3
			- 40HRC	Fracture resistance	AH3225	20 - 50	0.1 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	AH8015	80 - 150	0.1 - 0.5
		SKD11, etc. X153CrMoV12, etc.	50~60HRC	First choice	AH8015	50 - 70	0.1 - 0.3

APPLICATION RANGE



Designation	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging depth A	Max. cutting width in plunging W	Min. machining *øD1*	Max. machining *øD2*	Max. cutting width in enlarged hole ae
E/HXLS02M008…	8	0.5	4°	0.2	2	10	15	5.9
E/HXLS02M010…	10	0.5	3.3°	0.2	2	14	19	7.9
E/HXLS02M012…	12	0.5	2°	0.2	2	18	23	9.9
E/HXLS02M016…	16	0.5	1.3°	0.2	2	26	31	13.9

Tool geometry on programming



LSMT02...-HM

Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0 *Recommend	0.162	0
1.5	0.07	0.14
2	0	0.34

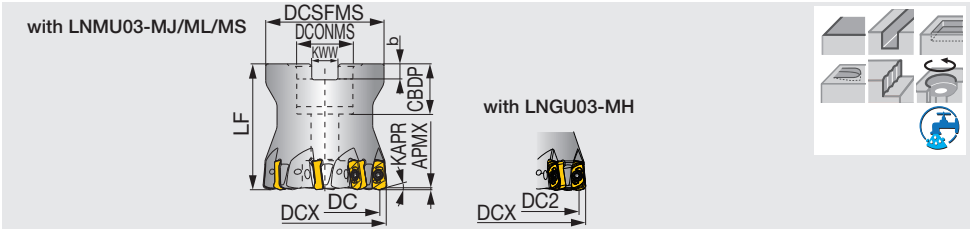
Tool dia.: ø*D*c (mm), Number of revolutions: *n* (min-1), Feed speed: *V*f (mm/min), Max. depth of cut: *a*p = 0.5 mm, Number of teeth: CICT

ø8, CICT = 1		ø10, CICT = 2		ø12			ø16		
n	*V*f	*n*	*V*f	*n*	*V*f		*n*	*V*f	
					CICT = 2	CICT = 3		CICT = 3	CICT = 5
7960	3980	6370	6370	5310	5310	7970	3980	5970	9950
				*V*c = 200 m/min, *f*z = 0.5 mm/t					
7960	3980	6370	6370	5310	5310	7970	3980	5970	9950
				*V*c = 200 m/min, *f*z = 0.5 mm/t					
5970	2390	4780	3820	3980	3180	4780	2990	3590	5980
				*V*c = 150 m/min, *f*z = 0.4 mm/t					
4780	1910	3820	3060	3190	2550	3830	2390	2870	4780
				*V*c = 120 m/min, *f*z = 0.4 mm/t					
7960	3980	6370	6370	5310	5310	7970	3980	5970	9950
				*V*c = 200 m/min, *f*z = 0.5 mm/t					
5970	2990	4780	4780	3980	3980	5970	2990	4490	7480
				*V*c = 150 m/min, *f*z = 0.5 mm/t					
1590	320	1270	510	1060	420	640	800	480	800
				*V*c = 40 m/min, *f*z = 0.2 mm/t					
1190	240	1000	400	800	320	480	600	360	600
				*V*c = 30 m/min, *f*z = 0.2 mm/t					
4780	1430	3820	2290	3190	1910	2870	2390	2150	3590
				*V*c = 120 m/min, *f*z = 0.3 mm/t					
2390	480	1910	760	1590	640	950	1190	710	1190
				*V*c = 60 m/min, *f*z = 0.2 mm/t					

DOFEED
TXN03

High feed mill, for 4-corner double sided inserts

GAMP = +6°,GAMF = +12° ~ 13°



Designation	APMX	DCX	CICT	DC	DC2	DCSFMS	DCONMS	CBDP	LF	b	KWW	KAPR	WT(kg)	Air hole	Insert
TXN03R040M16.0E05	1	40	5	33.6	33.6	35	16	18	40	5.6	8.4	17°	0.2	With	LN*U03...
TXN03R040M16.0E06	1	40	6	33.6	33.6	35	16	18	40	5.6	8.4	17°	0.2	With	LN*U03...
TXN03R050M22.0E05	1	50	5	43.6	43.6	47	22	20	50	6.3	10.4	17°	0.5	With	LN*U03...
TXN03R050M22.0E08	1	50	8	43.6	43.6	47	22	20	50	6.3	10.4	17°	0.5	With	LN*U03...
TXN03R050M22.2-08	1	50	8	43.6	43.6	47	22.225	20	50	5	8	17°	0.5	With	LN*U03...

SPARE PARTS

Designation	Clamping screw	Lubricant	Shell locking bolt	Wrench
TXN03R04...	CSPB-2.5	M-1000	CM8X30H	IP-8D
TXN03R05...	CSPB-2.5	M-1000	CM10X30H	IP-8D

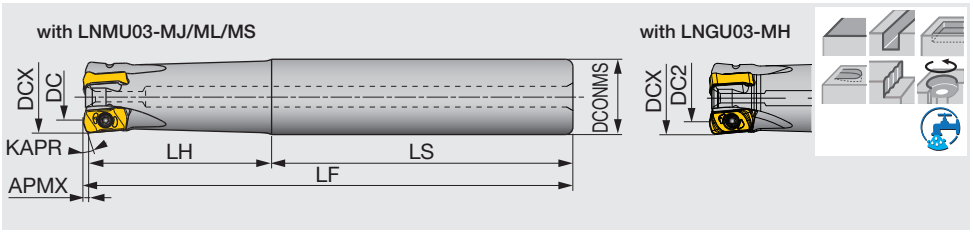
*Recommended clamping torque (N·m):CSPB-2.5=1.3

Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

DOFEED
EXN03

High feed endmill, shank type, with center through coolant hole, for 4-corner double sided inserts

GAMP = +6°, GAMF = +5° ~ +11°



Designation	APMX	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	WT(kg)	Air hole	Insert
EXN03R016M16.0-02	1	16	2	9.6	9.8	16	100	30	70	15°	0.2	With	LN*U03...
EXN03R016M16.0-02L	1	16	2	9.6	9.8	16	150	50	100	15°	0.2	With	LN*U03...
EXN03R018M16.0-02	1	18	2	11.5	11.7	16	100	30	70	17°	0.2	With	LN*U03...
EXN03R018M16.0-02L	1	18	2	11.5	11.7	16	150	25	125	17°	0.2	With	LN*U03...
EXN03R020M20.0-03	1	20	3	13.5	13.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R020M20.0-03L	1	20	3	13.5	13.6	20	160	80	80	17°	0.3	With	LN*U03...
EXN03R020M20.0-04	1	20	4	13.5	13.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R022M20.0-03	1	22	3	15.5	15.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R022M20.0-03L	1	22	3	15.5	15.6	20	160	30	130	17°	0.4	With	LN*U03...
EXN03R022M20.0-04	1	22	4	15.5	15.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R025M25.0-04	1	25	4	18.5	18.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R025M25.0-04L	1	25	4	18.5	18.6	25	180	100	80	17°	0.6	With	LN*U03...
EXN03R025M25.0-05	1	25	5	18.5	18.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R028M25.0-04	1	28	4	21.5	21.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R028M25.0-04L	1	28	4	21.5	21.6	25	180	35	145	17°	0.7	With	LN*U03...
EXN03R028M25.0-05	1	28	5	21.5	21.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R030M32.0-04	1	30	4	23.5	23.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R030M32.0-04L	1	30	4	23.5	23.6	32	200	120	80	17°	0.9	With	LN*U03...
EXN03R030M32.0-05	1	30	5	23.5	23.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R032M32.0-05	1	32	5	25.5	25.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R032M32.0-05L	1	32	5	25.5	25.6	32	200	120	80	17°	1.1	With	LN*U03...
EXN03R032M32.0-06	1	32	6	25.5	25.6	32	150	70	80	17°	0.9	With	LN*U03...
EXN03R035M32.0-05	1	35	5	28.5	28.6	32	150	35	115	17°	0.9	With	LN*U03...
EXN03R035M32.0-05L	1	35	5	28.5	28.6	32	200	35	165	17°	1.2	With	LN*U03...
EXN03R035M32.0-06	1	35	6	28.5	28.6	32	150	35	115	17°	0.9	With	LN*U03...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

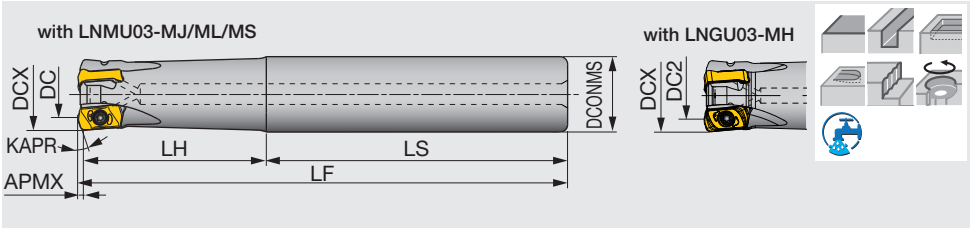
*Recommended clamping torque (N·m):CSPB-2.5=1.3

Reference pages: Inserts → H029, Standard cutting conditions → H030 - H031

DOFEED
EXN03-C

High feed endmill, shank type, with coolant directly to the tool tips, for 4-corner double sided inserts

GAMP = +6°,GAMF = +5° ~ +11°



Designation	APMX	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	WT(kg)	Air hole	Insert
EXN03R016M16.0-02-C	1	16	2	9.6	9.8	16	100	30	70	15°	0.2	With	LN*U03...
EXN03R016M16.0-02L-C	1	16	2	9.6	9.8	16	150	50	100	15°	0.2	With	LN*U03...
EXN03R020M20.0-03-C	1	20	3	13.5	13.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R020M20.0-03L-C	1	20	3	13.5	13.6	20	160	80	80	17°	0.3	With	LN*U03...
EXN03R020M20.0-04-C	1	20	4	13.5	13.6	20	130	50	80	17°	0.3	With	LN*U03...
EXN03R025M25.0-04-C	1	25	4	18.5	18.6	25	140	60	80	17°	0.5	With	LN*U03...
EXN03R025M25.0-04L-C	1	25	4	18.5	18.6	25	180	100	80	17°	0.6	With	LN*U03...
EXN03R025M25.0-05-C	1	25	5	18.5	18.6	25	130	60	80	17°	0.5	With	LN*U03...
EXN03R032M32.0-05-C	1	32	5	25.5	25.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R032M32.0-05L-C	1	32	5	25.5	25.6	32	200	120	80	17°	1.1	With	LN*U03...
EXN03R032M32.0-06-C	1	32	6	25.5	25.6	32	150	70	80	17°	0.8	With	LN*U03...
EXN03R040M32.0-06-C	1	40	6	33.6	33.7	32	150	45	105	17°	1	With	LN*U03...
EXN03R040M32.0-06L-C	1	40	6	33.6	33.7	32	220	45	175	17°	1.4	With	LN*U03...

SPARE PARTS



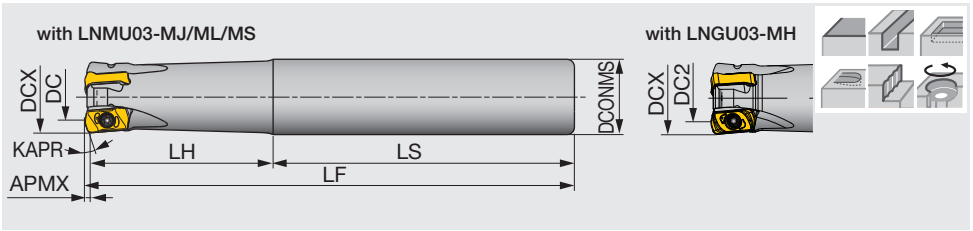
Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N·m):CSPB-2.5=1.3

DOFEED
EXN03-N

High feed endmill (Eco), shank type, for double sided inserts

GAMP = +6°, GAMF = +5° ~ +11°



Designation	APMX	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	WT(kg)	Air hole	Insert
EXN03R016M16.0-02N	1	16	2	9.6	9.8	16	100	30	70	15°	0.2	Without	LN*U03...
EXN03R020M20.0-03N	1	20	3	13.5	13.6	20	130	50	80	17°	0.3	Without	LN*U03...
EXN03R025M25.0-04N	1	25	4	18.5	18.6	25	140	60	80	17°	0.5	Without	LN*U03...
EXN03R032M32.0-05N	1	32	5	25.5	25.6	32	150	70	80	17°	0.8	Without	LN*U03...

SPARE PARTS



Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

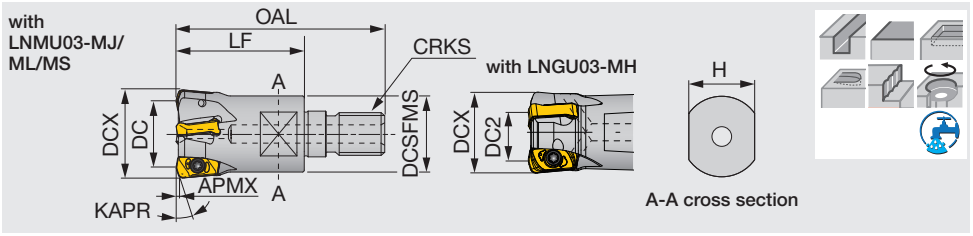
*Recommended clamping torque (N·m):CSPB-2.5=1.3

Reference pages: Inserts → H029, Standard cutting conditions → H030 - H031

DOFEED
HXN03

High feed endmill, modular type, with center through coolant hole (TungFlex)

GAMP= +6°,GAMF= +5° ~ +11°



Designation	APMX	DCX	CICT	DC	DC2	OAL	LF	H	DCSFMS	KAPR	CRKS	WT(kg)	Air hole	Insert
HXN03R016MM08-02	1	16	2	9.6	9.8	42	25	10	12.8	15°	M8	0.03	With	LN*U03...
HXN03R018MM08-02	1	18	2	11.5	11.7	42	25	10	14.5	17°	M8	0.04	With	LN*U03...
HXN03R020MM10-03	1	20	3	13.5	13.6	49	30	15	17.8	17°	M10	0.06	With	LN*U03...
HXN03R020MM10-04	1	20	4	13.5	13.6	49	30	15	17.8	17°	M10	0.06	With	LN*U03...
HXN03R022MM10-03	1	22	3	15.5	15.6	49	30	15	17.8	17°	M10	0.06	With	LN*U03...
HXN03R022MM10-04	1	22	4	15.5	15.6	49	30	15	17.8	17°	M10	0.07	With	LN*U03...
HXN03R025MM12-04	1	25	4	18.5	18.6	57	35	17	20.8	17°	M12	0.1	With	LN*U03...
HXN03R025MM12-05	1	25	5	18.5	18.6	57	35	17	20.8	17°	M12	0.11	With	LN*U03...
HXN03R028MM12-04	1	28	4	21.5	21.6	57	35	17	23	17°	M12	0.12	With	LN*U03...
HXN03R028MM12-05	1	28	5	21.5	21.6	57	35	17	23	17°	M12	0.12	With	LN*U03...
HXN03R030MM16-04	1	30	4	23.5	23.6	63	40	22	28.8	17°	M16	0.19	With	LN*U03...
HXN03R030MM16-05	1	30	5	23.5	23.6	63	40	22	28.8	17°	M16	0.2	With	LN*U03...
HXN03R032MM16-05	1	32	5	25.5	25.6	63	40	22	28.8	17°	M16	0.2	With	LN*U03...
HXN03R032MM16-06	1	32	6	25.5	25.6	63	40	22	28.8	17°	M16	0.21	With	LN*U03...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS



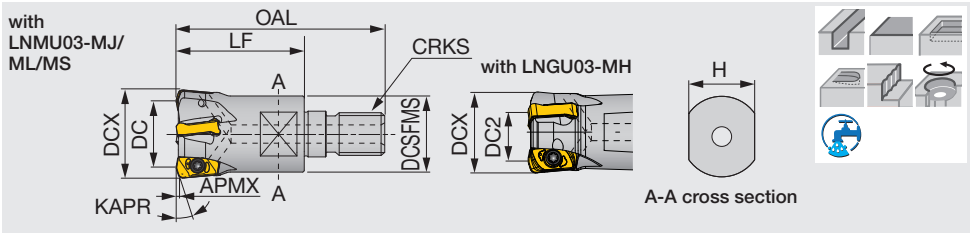
Designation	Clamping screw	Lubricant	Wrench
HXN03...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N·m):CSPB-2.5=1.3

DOFEED
HXN03-C

High feed endmill, modular type, with coolant directly to the tool tips (TungFlex)

GAMP= +6°,GAMF= +5° ~ +11°



Designation	APMX	DCX	CICT	DC	DC2	OAL	LF	H	DCSFMS	KAPR	CRKS	WT(kg)	Air hole	Insert
HXN03R016MM08-02-C	1	16	2	9.6	9.8	42	25	10	12.8	15°	M8	0.03	With	LN*U03...
HXN03R020MM10-03-C	1	20	3	13.5	13.6	49	30	15	17.8	17°	M10	0.06	With	LN*U03...
HXN03R020MM10-04-C	1	20	4	13.5	13.6	49	30	15	17.8	17°	M10	0.06	With	LN*U03...
HXN03R025MM12-04-C	1	25	4	18.5	18.6	57	35	17	20.8	17°	M12	0.1	With	LN*U03...
HXN03R025MM12-05-C	1	25	5	18.5	18.6	57	35	17	20.8	17°	M12	0.1	With	LN*U03...
HXN03R032MM16-05-C	1	32	5	25.5	25.6	63	40	22	28.8	17°	M16	0.2	With	LN*U03...
HXN03R032MM16-06-C	1	32	6	25.5	25.6	63	40	22	28.8	17°	M16	0.2	With	LN*U03...
HXN03R040MM16-06-C	1	40	6	33.6	33.7	63	40	22	28.8	17°	M16	0.27	With	LN*U03...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS



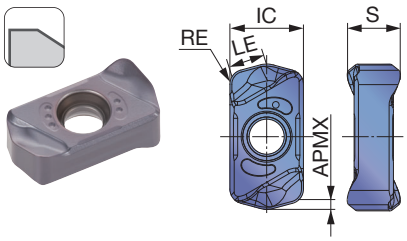
Designation	Clamping screw	Lubricant	Wrench
HXN03...	CSPB-2.5	M-1000	IP-8D

*Recommended clamping torque (N·m):CSPB-2.5=1.3

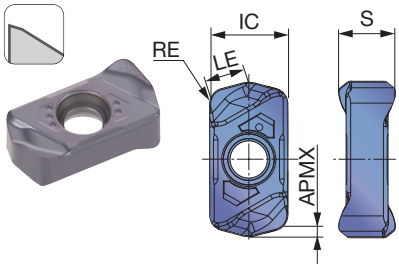
Reference pages: Inserts → **H029**, Standard cutting conditions → **H030 - H031**, TungFlex → **H210**

INSERT

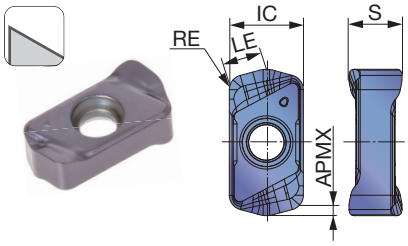
LNMU03-MJ (General purpose)



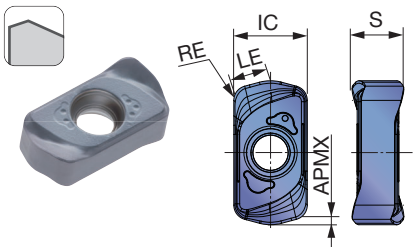
LNMU03-ML (Low cutting force)



LNMU03-MS (For stainless steel)



LNGU03-MH (Reinforced cutting edge)



		AH130	AH725	AH3035	AH8015	AH8005
P	Steel		☆	★	☆	
M	Stainless	★		☆		
K	Cast iron		★		☆	
N	Non-ferrous					
S	Superalloys	★	☆			
H	Hard materials		☆		★	★

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated					LE	IC	S
			AH130	AH725	AH3035	AH8015	AH8005			
LNMU0303ZER-MJ	1.2	1	●	●	●	●		3.2	6	4.3
LNMU0303ZER-ML	1.2	1	●	●	●	●		3.2	6	4.3
LNMU0303ZER-MS	1.2	1	●					3.2	6	4.3
LNGU0303ZER-MH	1.2	1				●	●	3.2	6	4.3

●: Line up

STANDARD CUTTING CONDITIONS TXN03/EXN03/HXN03

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool dia.: DCX (mm) ø16 ~ ø22	ø25 ~ ø50	Plunging	ø16, CICT = 2 *n*	ø16, CICT = 2 *Vf*	ø18, CICT = 2 *n*	ø18, CICT = 2 *Vf*	ø20 *n*	ø20 *Vf* CICT = 3	ø20 *Vf* CICT = 4
P	Carbon steels S45C, S55C, etc. C45, C55, etc.	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 -1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
			Wear resistance	AH8015	MJ					*Vc* = 200 m/min, *fz* = 0.8 mm/t						
	Alloy steels SCM440, SCr415, etc. 42CrMo4, 17Cr3, etc.	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 -1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
			Wear resistance	AH8015	MJ					*Vc* = 200 m/min, *fz* = 0.8 mm/t						
	Prehardened steels NAK80, PX5, etc.	30 ~ 40HRC	First choice	AH3035	ML	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
										Vc = 150 m/min, *fz* = 0.7 mm/t						
		30 ~ 40HRC	Fracture resistance	AH3035	MJ	100 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	4,770	2,650	4,240	2,390	5,740	7,650
										Vc = 150 m/min, *fz* = 0.8 mm/t						
		30 ~ 40HRC	Wear resistance	AH8015	ML	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
										Vc = 150 m/min, *fz* = 0.7 mm/t						
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-10, X5CrNiMo17-12-2, etc.	~ 200HB	First choice	AH130	MS	80 - 150	0.3 - 0.8	0.3 - 0.8	0.1	2,390	2,390	2,120	2,120	1,910	2,860	3,820
			Wear resistance	AH3035	ML											
			Fracture resistance	AH3035	MJ					*Vc* = 120 m/min, *fz* = 0.5 mm/t						
	Martensitic stainless steel and precipitation hardening stainless steel X20Cr13, X5CrNiCuNb16-4 ,etc.	~ 40HRC	First choice	AH3035	MJ	80 - 120	0.1 - 0.3	0.1 - 0.3	0.1	1,990	800	1,770	710	1590	950	1,270
										Vc = 100 m/min, *fz* = 0.2 mm/t						
			Fracture resistance	AH8015	MH		0.1 - 0.5	0.1 - 0.5	0.1	1,990	1,190	1,770	1,060	1590	1,430	1,910
										Vc = 100 m/min, *fz* = 0.3 mm/t						
K	Gray cast irons FC250, FC300, etc. GG25, GGG30, etc.	150 ~ 250HB	First choice	AH725	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
		150 ~ 250HB	Wear resistance	AH8015	MJ	100 - 300	0.5 - 0.7	0.5 - 1.0	0.1	3,980	4,780	3,540	4,250	3,180	5,720	7,630
										Vc = 200 m/min, *fz* = 0.6 mm/t						
	Ductile cast irons FCD400, etc. GGG40, etc.	150 ~ 250HB	First choice	AH725	MJ	80 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	4,770	2,650	4,240	2,390	5,740	7,650
			Wear resistance	AH8015	MJ					*Vc* = 150 m/min, *fz* = 0.8 mm/t						
S	Titanium alloy Ti-6Al-4V, etc.	~ 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.3 - 0.7	0.08	800	640	710	570	640	770	1,020
			Fracture resistance	AH130	MJ					*Vc* = 40 m/min, *fz* = 0.4 mm/t						
	Heat-resistance alloy Inconel, Hasteroy, etc.	~ 40HRC	First choice	AH725	ML	20 - 50	0.1 - 0.3	0.1 - 0.3	0.05	600	240	530	210	480	290	380
			Fracture resistance	AH725	MJ					*Vc* = 30 m/min, *fz* = 0.2 mm/t						
H	Hot mold steel SKD61, etc. X40CrMoV5-1, etc.	40 ~ 55HRC	First choice	AH8015	MH	80 - 150	0.1 - 0.5	0.1 - 0.5	0.05	2,390	1,430	2,120	1,270	1,910	1,720	2,290
			Low resistance	AH8015	MJ					*Vc* = 120 m/min, *fz* = 0.3 mm/t						
	Hot mold steel of D.T.C materials DAC**, DH**, DIEVER, etc.	40 ~ 55HRC	First choice	AH8015	MJ	50-100	0.1 - 0.3	0.1 - 0.3	0.05	1,590	640	1,420	570	1,270	760	1,020
			Fracture resistance	AH8015	MH					*Vc* = 80 m/min, *fz* = 0.2mm/t						
	Cold mold steel SKD11, etc. X153CrMoV12, etc.	55~ 60HRC	First choice	AH8005	MH	50 - 70	0.05 - 0.2	0.03 - 0.1	0.03	1,190	290	1,060	250	950	340	450
										Vc = 60 m/min, *fz* = 0.12 mm/t						
		55 ~ 60HRC	Fracture resistance	AH8015	MH	50 - 70	0.03 - 0.1	0.05 - 0.2	0.03	1,190	150	1,060	130	950	170	230
										Vc = 60 m/min, *fz* = 0.06 mm/t						

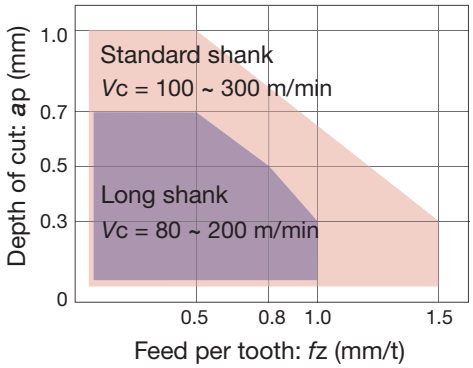
- When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area.

- Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.

Cautionary points in use

The use of a standard or long shank

When using a long shank, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.

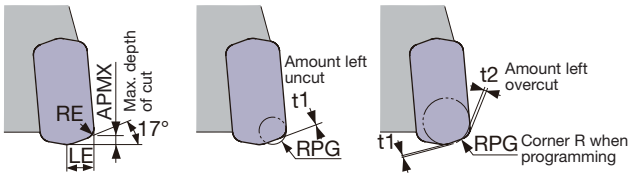


Tool dia.: DCX = ø16 ~ 35 mm
Workpeice: S55C / C55 (200HB)

L/D ratio of overhang
Standard shank: L/D ≤ 3
Long shank: L/D = 4

Tool geometry on programming

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as R = 1.5 mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t1) and overcut (t2).



LNMU03-MJ/ML

Max. depth of cut APMX (mm)	Corner radius RE	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0	1.2	3.0	1.0	0.6	-
1.0	1.2	3.0	1.5	0.5	-
1.0	1.2	3.0	2.0	0.25	0.08
1.0	1.2	3.0	2.5	0.14	0.26

LNGU03-MH

Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0	1.2	3.0	1.0	0.45	-
1.0	1.2	3.0	1.5	0.35	-
1.0	1.2	3.0	2.0	0.2	0.1
1.0	1.2	3.0	2.5	0.08	0.29

Each value in table is calculated theoretically at the maximum condition.

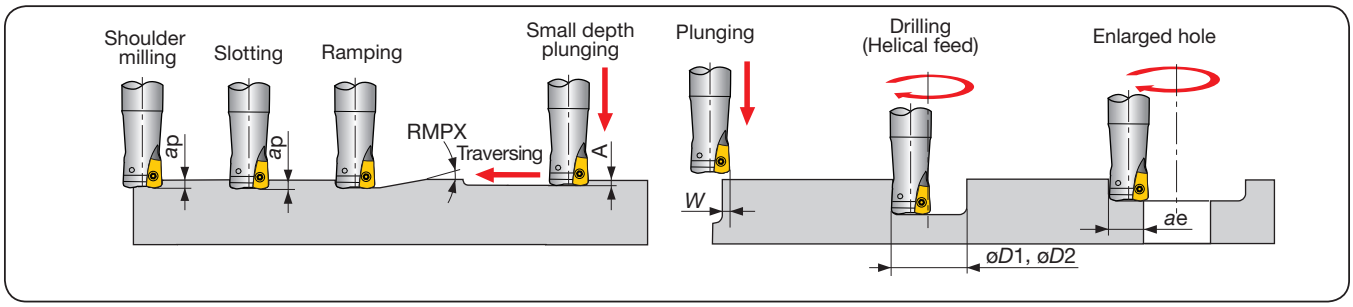
Tool dia.: ø*D*c (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *V*f (mm/min), Max. depth of cut: *a*p = 1.0 mm

ø22			ø25			ø28			ø30			ø32			ø35			ø40			ø50		
n	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f		*n*	*V*f	
	CICT=3	CICT=4		CICT=4	CICT=5		CICT=4	CICT=5		CICT=4	CICT=5		CICT=5	CICT=6		CICT=5	CICT=6		CICT=5	CICT=6		CICT=5	CICT=8
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1.0 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1.0 mm/t																							
2,170	4,560	6,080	1,910	5,350	6,690	1,710	4,790	5,990	1,590	4,450	5,570	1,490	5,220	6,260	1,360	4,760	5,710	1,190	4,170	5,000	950	3,330	5,320
Vc = 150 m/min, *fz* = 0.7 mm/t																							
2,170	5,210	6,940	1,910	7,640	9,550	1,710	6,840	8,550	1,590	6,360	7,950	1,490	7,450	8,940	1,360	6,800	8,160	1,190	5,950	7,140	950	4,750	7,600
Vc = 150 m/min, *fz* = 1.0 mm/t																							
2,170	4,560	6,080	1,910	5,350	6,690	1,710	4,790	5,990	1,590	4,450	5,570	1,490	5,220	6,260	1,360	4,760	5,710	1,190	4,170	5,000	950	3,330	5,320
Vc = 150 m/min, *fz* = 0.7 mm/t																							
3,180	4,770	6,360	1,530	3,060	3,820	1,360	2,720	3,400	1,270	2,540	3,180	1,190	2,980	3,570	1,090	2,720	3,270	960	2.400	2,880	760	1.900	2,280
Vc = 120 m/min, *fz* = 0.5 mm/t																							
1,450	870	1,160	1,270	1,020	1,270	1,140	910	1,140	1,060	850	1,060	1,000	1,000	1,200	910	910	1,090	800	800	960	640	640	1,020
Vc = 100 m/min, *fz* = 0.2 mm/t																							
1,450	1,300	1,740	1,270	1,520	1,910	1,140	1.370	1,710	1,060	1,270	1,590	1,000	1,500	1,800	910	1,370	1,640	800	1,200	1,440	640	960	1,530
Vc = 100 m/min, *fz* = 0.3 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1.0 mm/t																							
2,890	5,200	6,940	2,550	6,110	7,640	2,270	5,460	6,820	2,120	6,780	8,480	1,990	7,960	9,550	1,820	7,280	8,740	1,590	6,360	7,630	1,270	5,080	8,130
Vc = 200 m/min, *fz* = 0.8 mm/t																							
2,170	5,210	6,940	1,910	6,110	7,640	1,710	5,460	6,820	1,590	6,360	7,950	1,490	7,450	8,940	1,360	6,800	8,160	1,190	5,950	7,140	950	4,750	5,700
Vc = 150 m/min, *fz* = 1.0 mm/t																							
580	700	930	510	820	1,020	450	730	910	420	840	1,050	400	1,000	1,200	360	900	1,080	320	800	960	250	630	1,000
Vc = 40 m/min, *fz* = 0.5 mm/t																							
430	260	340	380	230	290	340	200	260	320	260	320	300	300	360	270	270	320	240	240	290	190	190	300
Vc = 30 m/min, *fz* = 0.2 mm/t																							
1,740	1,570	2,090	1,530	1,840	2,300	1,360	1,630	2,040	1,270	1,520	1,910	1,190	1,790	2,140	1,090	1,640	1,960	950	1,430	1,710	760	1,140	1,820
Vc = 120 m/min, *fz* = 0.3 mm/t																							
1,160	700	930	1,020	820	1,020	910	730	910	850	680	850	800	800	960	730	730	880	640	640	770	510	510	820
Vc = 80 m/min, *fz* = 0.2mm/t																							
870	310	420	760	300	380	680	270	340	640	260	320	600	300	360	550	230	340	480	240	280	380	200	300
Vc = 60 m/min, *fz* = 0.1 mm/t																							
870	160	210	760	150	190	680	140	170	640	130	160	600	150	180	550	120	170	480	120	140	380	100	150
Vc = 60 m/min, *fz* = 0.06 mm/t																							

- The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

- Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

Applications



Designation	Tool dia. DCX	Max. depth of cut APMX	Max. ramping angle RMPX		Max. plunging depth A	Max. cutting width in plunging *W*		Min.machinable hole dia. ø*D*1		Max.machinable hole dia. ø*D*2	Max. cutting width in enlarged hole *ae*
			MJ/ML/MS	MH		MJ/ML/MS	MH	MJ/ML/MS	MH		
E/HXN03R016M...	ø16	1	2.1°	1.7°	0.3	3.5	3	22	23	30	12.5
E/HXN03R018M...	ø18	1	1.7°	1.6°	0.3	3.5	3	26	27	34	14.5
E/HXN03R020M...	ø20	1	1.4°	1.3°	0.3	3.5	3	30	31	38	16.5
E/HXN03R022M...	ø22	1	1.2°	1.1°	0.3	3.5	3	34	35	42	18.5
E/HXN03R025M...	ø25	1	1.0°	0.9°	0.3	3.5	3	40	41	48	21.5
E/HXN03R028M...	ø28	1	0.8°	0.8°	0.3	3.5	3	46	46	54	24.5
E/HXN03R030M...	ø30	1	0.7°	0.7°	0.3	3.5	3	50	50	58	26.5
E/HXN03R032M...	ø32	1	0.7°	0.7°	0.3	3.5	3	54	54	62	28.5
EXN03R035M...	ø35	1	0.6°	0.6°	0.3	3.5	3	60	60	68	31.5
E/H/TXN03R040M...	ø40	1	0.5°	0.5°	0.3	3.5	3	70	70	78	36.5
TXN03R050M...	ø50	1	0.4°	0.4°	0.3	3.5	3	90	90	98	46.5

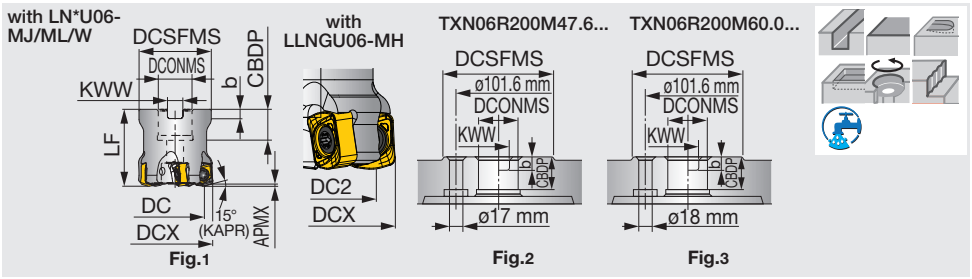
· For DCX above ø33 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut.

DOFEED

TXN06

High feed mill, for 4-corner double sided inserts

GAMP = +10°, GAMF = +2° ~ +6°



Designation	APMX	DCX	CICT	DC	DC2	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert	Fig.
TXN06R050M22.0E04	1.5	50	4	37.6	36.9	47	50	22	20	10.4	6.3	0.4	With	LN*U06...	1
TXN06R050M22.0E05	1.5	50	5	37.6	36.9	47	50	22	20	10.4	6.3	0.4	With	LN*U06...	1
TXN06R050M22.2-04	1.5	50	4	37.6	36.9	47	50	22.225	20	8	5	0.4	With	LN*U06...	1
TXN06R050M22.2-05	1.5	50	5	37.6	36.9	47	50	22.225	20	8	5	0.4	With	LN*U06...	1
TXN06R052M22.0E04	1.5	52	4	39.6	38.9	49	50	22	20	10.4	6.3	0.5	With	LN*U06...	1
TXN06R052M22.0E05	1.5	52	5	39.6	38.9	49	50	22	20	10.4	6.3	0.5	With	LN*U06...	1
TXN06R063M22.0E04	1.5	63	4	50.6	49.8	59	50	22	20	10.4	6.3	0.8	With	LN*U06...	1
TXN06R063M22.0E06	1.5	63	6	50.6	49.8	59	50	22	20	10.4	6.3	0.8	With	LN*U06...	1
TXN06R063M22.2-04	1.5	63	4	50.6	49.8	59	50	22.225	20	8	5	0.8	With	LN*U06...	1
TXN06R063M22.2-06	1.5	63	6	50.6	49.8	59	50	22.225	20	8	5	0.8	With	LN*U06...	1
TXN06R066M27.0E04	1.5	66	4	53.6	52.8	63	50	27	22	12.4	7	0.8	With	LN*U06...	1
TXN06R066M27.0E06	1.5	66	6	53.6	52.8	63	50	27	22	12.4	7	0.8	With	LN*U06...	1
TXN06R080M27.0E05	1.5	80	5	67.6	66.8	76	63	27	22	12.4	7	1.6	With	LN*U06...	1
TXN06R080M27.0EE05	1.5	80	5	67.6	66.8	60	63	27	22	12.4	7	1.2	With	LN*U06...	1
TXN06R080M27.0E08	1.5	80	8	67.6	66.8	76	63	27	22	12.4	7	1.6	With	LN*U06...	1
TXN06R080M27.0EE08	1.5	80	8	67.6	66.8	60	63	27	22	12.4	7	1.2	With	LN*U06...	1
TXN06R080M31.7-05	1.5	80	5	67.6	66.8	76	63	31.75	32	12.7	8	1.6	With	LN*U06...	1
TXN06R080M31.7-08	1.5	80	8	67.6	66.8	76	63	31.75	32	12.7	8	1.6	With	LN*U06...	1
TXN06R100M31.7-06	1.5	100	6	87.6	86.8	96	63	31.75	32	12.7	8	2.2	With	LN*U06...	1
TXN06R100M32.0E06	1.5	100	6	87.6	86.8	96	63	32	25	14.4	8	2.2	With	LN*U06...	1
TXN06R125M38.1-08	1.5	125	8	112.6	111.8	100	63	38.1	43	15.9	10	3	With	LN*U06...	1
TXN06R125M40.0E08	1.5	125	8	112.6	111.8	100	63	40	37	16.4	9	3	With	LN*U06...	1
TXN06R160M40.0E10	1.5	160	10	147.6	146.8	100	63	40	37	16.4	9	5	With	LN*U06...	1
TXN06R160M50.8-10	1.5	160	10	147.6	146.8	100	63	50.8	46	19	11	4.6	With	LN*U06...	1
TXN06R200M47.6-12	1.5	200	12	187.6	186.8	130	63	47.625	38	25.4	14	7.7	Without	LN*U06...	2
TXN06R200M60.0E12	1.5	200	12	187.6	186.8	130	63	60	38	25.7	14	7.2	Without	LN*U06...	3

Approach angle

10°-20° 45° 70° 85° 88° 90° Others

SPARE PARTS






Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TXN06R050M22.0...	CSPB-5	H-TB2W	M-1000	-	FSHM10-40H	BLDIP20/S7
TXN06R050M22.2-04	CSPB-5	H-TB2W	M-1000	-	CM10-30H	BLDIP20/S7
TXN06R050M22.2-05, TXN06R052M22.0...	CSPB-5	H-TB2W	M-1000	-	FSHM10-40H	BLDIP20/S7
TXN06R063M...	CSPB-5	H-TB2W	M-1000	-	CM10X30H	BLDIP20/S7
TXN06R066,080M27.0...	CSPB-5	H-TB2W	M-1000	-	CM12X30H	BLDIP20/S7
TXN06R080,100M31.7...	CSPB-5	H-TB2W	M-1000	-	CM16X40H	BLDIP20/S7
TXN06R125M...	CSPB-5	H-TB2W	M-1000	TMBA-M20H	-	BLDIP20/S7
TXN06R160M40.0...	CSPB-5	H-TB2W	M-1000	TMBA-M20H	-	BLDIP20/M7
TXN06R160M50.8...	CSPB-5	H-TB2W	M-1000	TMBA-M24H	-	BLDIP20/M7
TXN06R200M...	CSPB-5	H-TB2W	M-1000	-	-	BLDIP20/M7

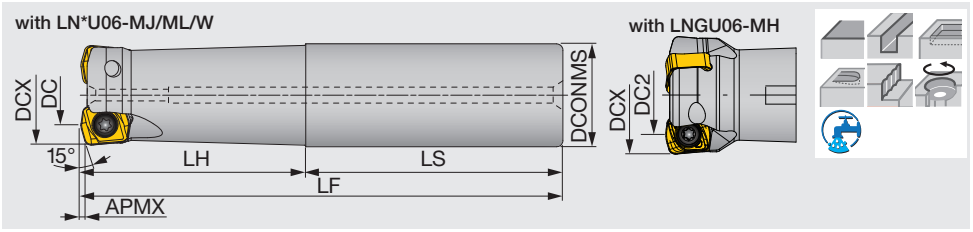
*Recommended clamping torque (N·m) : CSPB-5=5

Reference pages: Inserts → H033, Standard cutting conditions → H034 - H035

EXN06

High feed endmill, shank type, for 4-corner double sided inserts

GAMP=+10°,GAMF= -2°~+6°



Designation	APMX	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	WT(kg)	Air hole	Insert
EXN06R032M32.0-02	1.5	32	2	19.7	19.1	32	150	70	80	0.8	With	LN*U06...
EXN06R032M32.0-02L	1.5	32	2	19.7	19.1	32	200	120	80	1.1	With	LN*U06...
EXN06R035M32.0-02	1.5	35	2	22.7	22	32	150	45	105	0.9	With	LN*U06...
EXN06R035M32.0-02L	1.5	35	2	22.7	22	32	200	45	155	1.2	With	LN*U06...
EXN06R040M32.0-03	1.5	40	3	27.7	27	32	150	45	105	0.9	With	LN*U06...
EXN06R040M32.0-03L	1.5	40	3	27.7	27	32	220	45	175	1.3	With	LN*U06...

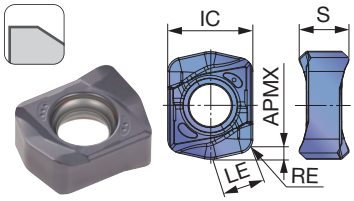
SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EXN06	CSPB-5	M-1000	IP-20D

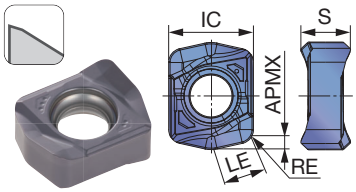
*Recommended clamping torque (N·m):CSPB-5=5

INSERT

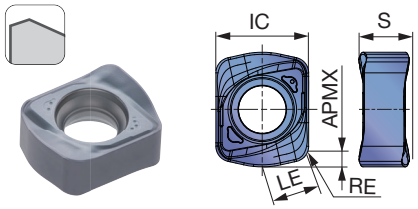
LNMU06-MJ



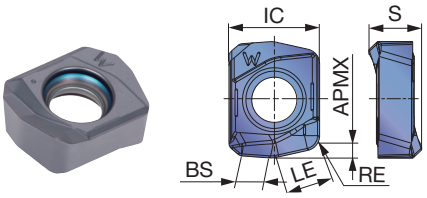
LNMU06-ML



LNGU06-MH



LNGU06-W (2 corners)



P	Steel			☆	★	☆		
M	Stainless		★		☆			
K	Cast iron	★		☆		☆		
N	Non-ferrous							
S	Superalloys		★	☆				
H	Hard materials			☆		★	★	

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated						LE	IC	S	BS
			AH120	AH130	AH725	AH3035	AH8015	AH8005				
LNMU06X5ZER-MJ	2	1.5	●	●	●	●	●		6	12	7	-
LNMU06X5ZER-ML	2	1.5	●	●	●	●	●		6	12	7	-
LNGU06X5ZER-MH	2	1.5					●	●	6	12	7	-
LNGU06X5ZER-W	2	1.5			●				6	12	7	3.6

●: Line up

Reference pages: Standard cutting conditions → H034 - H035

STANDARD CUTTING CONDITIONS TXN06 / EXN06

ISO	Workpiece material	Hardness	Priority	Grades	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t) Tool dia: DCX (mm) ø32 ~ ø200	Feed when plunging *fz* (mm/t)	ø32, CICT = 2 *n*	ø32, CICT = 2 *Vf*	ø35, CICT = 2 *n*	ø35, CICT = 2 *Vf*	ø40, CICT = 3 *n*	ø40, CICT = 3 *Vf*
P	Carbon steels S45C, S55C etc. C45, C55, etc.	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
			Wear resistance	AH8015	MJ				*Vc* = 200 m/min, *fz* = 1.0 mm/t					
	Alloy steels SCM440, SCr415 etc. 42CrMo4, 17Cr3, etc.	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
			Wear resistance	AH8015	MJ				*Vc* = 200 m/min, *fz* = 1.0 mm/t					
	Prehardened steels NAK80, PX5, etc.	30 ~ 40HRC	First choice	AH3035	ML	100 - 200	0.5 - 1.0	0.15	1,490	2,380	1,360	2,180	1,190	2,860
									Vc = 150 m/min, *fz* = 0.8 mm/t					
		30 ~ 40HRC	Fracture resistance	AH3035	MJ	100 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
									Vc = 150 m/min, *fz* = 1.0 mm/t					
		30 ~ 40HRC	Wear resistance	AH8015	ML	100 - 200	0.5 - 1.0	0.15	1,490	2,380	1,360	2,180	1,190	2,860
									Vc = 150 m/min, *fz* = 0.8 mm/t					
M	Stainless steels SUS304, SUS316, etc. X5CrNi18-10, etc. X5CrNiMo17-12-2, etc.	~ 200HB	First choice	AH3035	ML	100 - 150	0.3 - 0.8	0.1	1,190	1,430	1,090	1,310	950	1,710
			Fracture resistance	AH3035	MJ				*Vc* = 120 m/min, *fz* = 0.6 mm/t					
K	Gray cast irons FC250, FC300, etc. GG25, GGG30, etc.	150 ~ 250HB	First choice	AH120	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
			Wear resistance	AH8015	MJ				*Vc* = 200 m/min, *fz* = 1.0 mm/t					
		150 ~ 250HB	First choice	AH120	MJ	80 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
			Wear resistance	AH8015	MJ				*Vc* = 150 m/min, *fz* = 1.0 mm/t					
S	Titanium alloy Ti-6Al-4V, etc.	~ 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.08	400	400	360	360	320	480
			Fracture resistance	AH130	MJ				*Vc* = 40 m/min, *fz* = 0.5 mm/t					
	Heat-resistance alloy Inconel, Hasteroy, etc.	~ 40HRC	First choice	AH725	ML	20 - 50	0.1 - 0.3	0.05	300	120	270	110	240	140
			Fracture resistance	AH725	MJ				*Vc* = 30 m/min, *fz* = 0.2 mm/t					
H	Hot mold steel SKD61, etc. X40CrMoV5-1, etc.	40 ~ 55HRC	First choice	AH8015	MH	80 - 150	0.1 - 0.5	0.05	1,190	710	1,090	650	950	850
			Low resistance	AH8015	MJ				*Vc* = 120 m/min, *fz* = 0.3mm/t					
	Hot mold steel of D.T.C materials DAC**, DH**, DIEVER, etc	40 ~ 55HRC	First choice	AH8015	MJ	50-100	0.1 - 0.3	0.05	800	320	730	290	640	380
			Fracture resistance	AH8015	MH				*Vc* = 80 m/min, *fz* = 0.2mm/t					
	Cold mold steel SKD11, etc. X153CrMoV12, etc.	55 ~ 65HRC	First choice	AH8005	MH	50 - 70	0.05 - 0.2	0.03	600	120	550	110	480	140
									Vc = 60 m/min, *fz* = 0.1 mm/t					
		55 ~ 65HRC	Fracture resistance	AH8015	MH	50 - 70	0.03 - 0.1	0.03	600	60	550	55	480	70
									Vc = 60 m/min, *fz* = 0.05 mm/t					

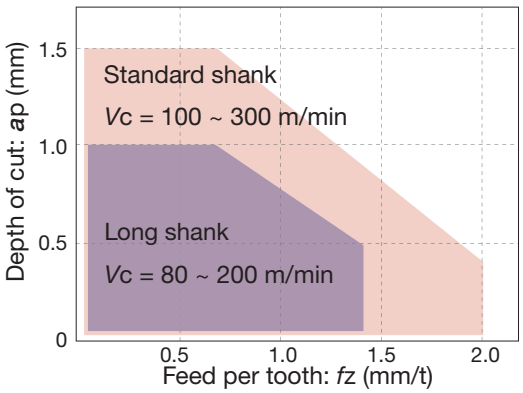
· The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

· Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

Cautionary points in use

The use of a standard or long shank

When using a long shank, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.

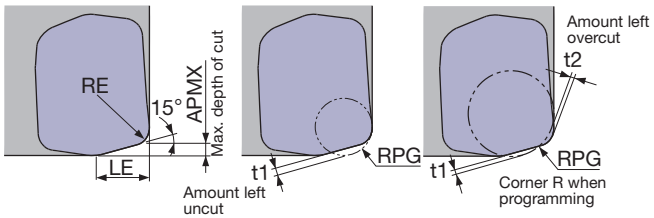


Tool dia.: DCX = ø32 ~ 40 mm
Workpiece: S55C / C55 (200HB)

L/D ratio of overhang
Standard shank: L/D ≤ 3
Long shank: L/D = 4

Tool geometry on programming

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as R = 3.0 mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t1) and overcut (t2).



LNMU06-MJ/ML

Max. depth of cut APMX (mm)	Corner radius RE	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.5	2.0	6.0	2.0	1.0	-
			3.0	0.77	-
			4.0	0.54	0.26

LNGU06-MH

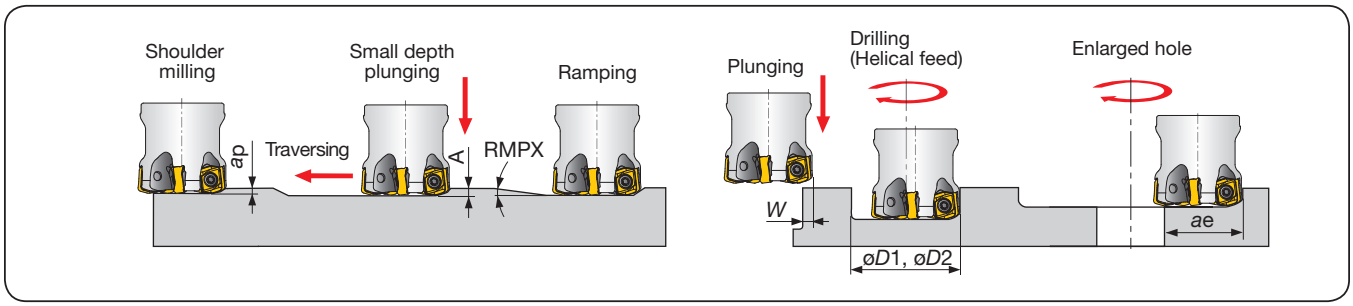
Max. depth of cut APMX (mm)	Corner radius RE	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.5	2.0	6.0	2.0	0.9	-
			3.0	0.66	-
			4.0	0.41	0.26

Each value in table is calculated theoretically at the maximum condition.

Tool dia: DCX (mm), Number of revolution: *n* (min-1), Feed speed: *Vf* (mm/min), Max. depth of cut: *ap*=1.5mm, Number of teeth: CICT

ø50			ø63			ø80			ø100, CICT = 6		ø125, CICT = 8		ø160, CICT = 10		ø200, CICT = 12	
n	*Vf*		*n*	*Vf*		*n*	*Vf*		*n*	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*
	CICT = 4	CICT = 5		CICT = 4	CICT = 6		CICT = 5	CICT = 8								
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
							Vc = 200 m/min, *fz* = 1.0 mm/t									
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
							Vc = 200 m/min, *fz* = 1.0 mm/t									
950	3,040	3,800	760	2,430	3,650	600	2,400	3,840	480	2,290	380	2,450	300	2,390	240	2,290
							Vc = 150 m/min, *fz* = 0.8 mm/t									
950	3,800	4,750	760	3,040	4,560	600	3,000	4,800	480	2,880	380	3,040	300	3,000	240	2,880
							Vc = 150 m/min, *fz* = 1.0 mm/t									
950	3,040	3,800	760	2,430	3,650	600	2,400	3,840	480	2,290	380	2,450	300	2,390	240	2,290
							Vc = 150 m/min, *fz* = 0.8 mm/t									
760	1,820	2,280	610	1,470	2,200	480	1,440	2,300	380	1,380	310	1,470	240	1,430	190	1,380
							Vc = 120 m/min, *fz* = 0.6 mm/t									
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
							Vc = 200 m/min, *fz* = 1.0 mm/t									
950	3,800	4,750	760	3,040	4,560	600	3,000	4,800	480	2,870	380	3,060	300	2,990	240	2,870
							Vc = 150 m/min, *fz* = 1.0 mm/t									
250	500	630	200	400	600	160	400	640	130	380	100	410	80	400	60	380
							Vc = 40 m/min, *fz* = 0.5 mm/t									
190	150	190	150	120	180	120	120	190	100	120	80	120	60	120	50	120
							Vc = 30 m/min, *fz* = 0.2 mm/t									
760	910	1,140	610	730	1,100	480	720	1,150	380	680	310	740	240	720	190	680
							Vc = 120 m/min, *fz* = 0.3mm/t									
510	410	510	400	320	480	320	320	510	250	300	200	320	160	320	130	310
							Vc = 80 m/min, *fz* = 0.2mm/t									
380	150	190	300	120	180	240	120	190	190	110	150	120	120	120	100	120
							Vc = 60 m/min, *fz* = 0.1 mm/t									
380	75	95	300	60	90	240	60	95	190	55	150	60	120	60	100	60
							Vc = 60 m/min, *fz* = 0.05 mm/t									

Applications



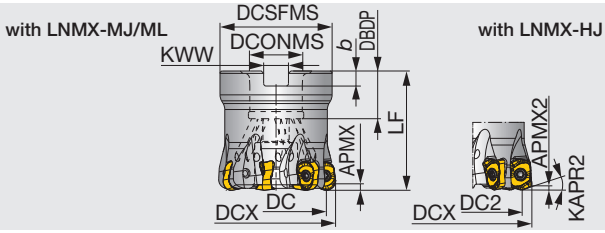
Designation	Tool dia. DCX	Max. depth of cut APMX	Max. ramping angle RMPX		Max. plunging depth A		Max. cutting width in plunging *W*	Min.machinable hole dia. *øD1*	Max.machinable hole dia. *øD2*	Max. cutting width in enlarged hole *ae*
			MJ/ML	MH	MJ/ML	MH				
EXN06R032M...	ø32	1.5	2°	1.4°	0.5	0.4	6	47	59	25
EXN06R035M...	ø35	1.5	1.7°	1.1°	0.5	0.4	6	53	65	28
EXN06R040M...	ø40	1.5	1.3°	0.8°	0.5	0.4	6	63	75	33
TXN06R050M...	ø50	1.5	0.9°	0.7°	0.5	0.4	6	83	95	43
TXN06R052M...	ø52	1.5	0.8°	0.6°	0.5	0.4	6	87	99	45
TXN06R063M...	ø63	1.5	0.6°	0.5°	0.5	0.4	6	109	121	56
TXN06R066M...	ø66	1.5	0.5°	0.5°	0.5	0.4	6	115	127	59
TXN06R080M...	ø80	1.5	0.5°	0.3°	0.5	0.4	6	143	155	73
TXN06R100M...	ø100	1.5	0.34°	0.25°	0.5	0.4	6	183	195	93
TXN06R125M...	ø120	1.5	0.26°	0.2°	0.5	0.4	6	233	245	118
TXN06R160M...	ø160	1.5	0.2°	0.15°	0.5	0.4	6	303	315	153
TXN06R200M...	ø200	1.5	0.15°	0.11°	0.5	0.4	6	383	395	193

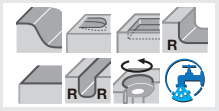
· For DCX above 100 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut.

DO TWIST BALL
TXLN

Radius mill, for 4-corner double sided inserts

GAMP= +3°, GAMF= -13°





Designation	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TXLN04M040B16.0R06	4	1.3	40	6	32.2	31.6	20	35	40	16	18	8.4	5.6	0.21	With	LNMX04...
TXLN04M042B16.0R06	4	1.3	42	6	34.2	33.6	20	35	40	16	18	8.4	5.6	0.21	With	LNMX04...
TXLN04M050B22.0R07	4	1.3	50	7	42.2	41.6	20	47	50	22	20	10.4	6.3	0.45	With	LNMX04...
TXLN04M052B22.0R07	4	1.3	52	7	44.2	43.6	20	47	50	22	20	10.4	6.3	0.47	With	LNMX04...
TXLN04M063B22.0R07	4	1.3	63	7	55.2	54.6	20	59	50	22	20	10.4	6.3	0.76	With	LNMX04...
TXLN05M040B16.0R05	5	-	40	5	29.8	-	-	35	40	16	18	8.4	5.6	0.26	With	LNMX05...
TXLN05M050B22.0R06	5	-	50	6	39.8	-	-	47	50	22	20	10.4	6.3	0.50	With	LNMX05...
TXLN06M050B22.0R05	6	2	50	5	37.6	37.3	25	47	50	22	20	10.4	6.3	0.50	With	LNMX06...
TXLN06M052B22.0R05	6	2	52	5	39.6	39.3	25	49	50	22	20	10.4	6.3	0.55	With	LNMX06...
TXLN06M063B22.0R06	6	2	63	6	50.6	50.3	25	59	50	22	20	10.4	6.3	0.82	With	LNMX06...

Approach angle

10°-20° 45° 70° 85° 88° 90° Others

SPARE PARTS



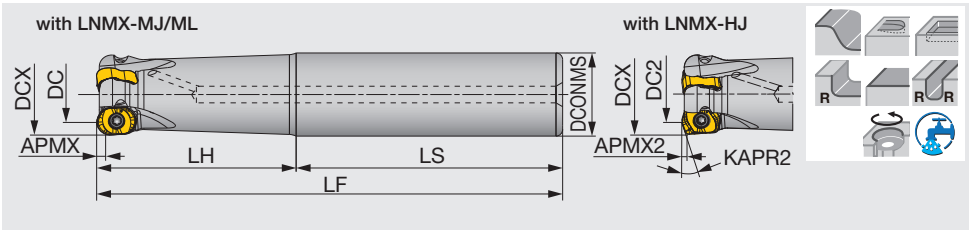

Designation	Clamping screw	Torx bit	Grip	Shell locking bolt
TXLN04M04*B16.0R06	CSPD-3	BLD IP10/S7	SW6-SD	FSHM8-30H
TXLN04M05*B22.0R07	CSPD-3	BLD IP10/S7	SW6-SD	CM10X30H
TXLN04M063B22.0R07	CSPD-3	BLD IP10/S7	SW6-SD	CM10X30H
TXLN05M040B16.0R05	CSPB-4S	BLDIP15/S7	H-TB2W	FSHM8-30H
TXLN05M050B22.0R06	CSPB-4S	BLDIP15/S7	H-TB2W	CM10X30H
TXLN06M050B22.0R05	CSPB-5	BLDIP20/S7	H-TB2W	FSHM10-40H
TXLN06M052B22.0R05	CSPB-5	BLDIP20/S7	H-TB2W	CM10X30H
TXLN06M063B22.0R06	CSPB-5	BLDIP20/S7	H-TB2W	CM10X30H

*Recommended clamping torque (N·m): CSPD-3=2.5, CSPB-4S=3.5, CSPB-5=5

Reference pages: Inserts → H038, Standard cutting conditions → H039 - H041

Radius endmill, shank type, for 4-corner double sided inserts

GAMP= +3°, GAMF= -12° ~ -14°



Designation	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EXLN04M020C20.0R02	4	1.3	20	2	12.2	11.6	20°	20	80	50	130	0.28	With	LNMX04...
EXLN04M025C25.0R03	4	1.3	25	3	17.2	16.6	20°	25	80	60	140	0.46	With	LNMX04...
EXLN04M032C32.0R04	4	1.3	32	4	24.2	23.6	20°	32	80	70	150	0.83	With	LNMX04...
EXLN04M032C32.0R05	4	1.3	32	5	24.2	23.6	20°	32	80	70	150	0.83	With	LNMX04...
EXLN05M025C25.0R02	5	-	25	2	15	-	-	25	90	60	150	0.54	With	LNMX05..
EXLN05M032C32.0R04	5	-	32	4	21.9	-	-	32	80	70	150	0.87	With	LNMX05..
EXLN06M032C32.0R02	6	2	32	2	19.6	19.3	25°	32	80	70	150	0.90	With	LNMX06..
EXLN06M040C32.0R04	6	2	40	4	27.6	27.3	25°	32	100	50	150	0.95	With	LNMX06..

SPARE PARTS




Designation	Clamping screw	Mono block wrench	Torx bit	Grip
EXLN04...	CSPD-3	IP-10D	-	-
EXLN05...	CSPB-4S	-	BLDIP15/S7	H-TB2W
EXLN06...	CSPB-5	-	BLDIP20/S7	H-TB2W

*Recommended clamping torque (N·m): CSPD-3=2.5, CSPB-4S=3.5, CSPB-5=5

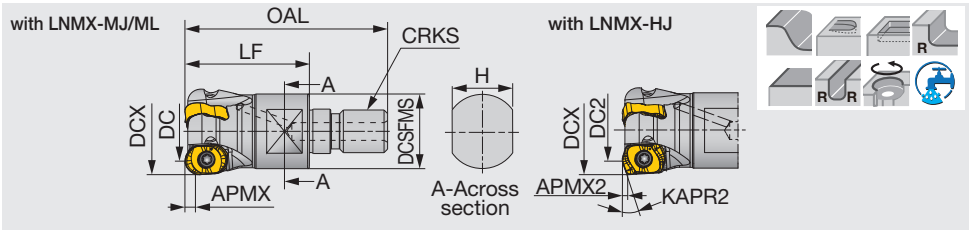
Reference pages: Inserts → H038, Standard cutting conditions → H039 - H041

DO TWIST BALL

HXLN04-M

Radius endmill, modular type, for 4-corner double sided inserts (TungFlex)

GAMP= +3°, GAMF= -12° ~ -14°



Designation	APMX	APMX2	DCX	CICT	DC	DC2	KAPR2	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HXLN04M020M10R02	4	1.3	20	2	12.2	11.6	20°	49	30	15	18	M10	0.07	With	LNMX04...
HXLN04M025M12R03	4	1.3	25	3	17.2	16.6	20°	57	35	17	21	M12	0.16	With	LNMX04...
HXLN04M032M16R04	4	1.3	32	4	24.2	23.6	20°	63	40	22	29	M16	0.20	With	LNMX04...
HXLN05M025M12R02	5	-	25	2	15	-	-	57	35	17	21	M12	0.10	With	LNMX05...
HXLN05M032M16R04	5	-	32	4	21.9	-	-	63	40	22	28.8	M16	0.20	With	LNMX05...
HXLN06M032M16R02	6	2	32	2	19.6	19.3	25°	63	40	22	28.8	M16	0.24	With	LNMX06...

Please see the page **H210** for TungFlex modular shank.

SPARE PARTS

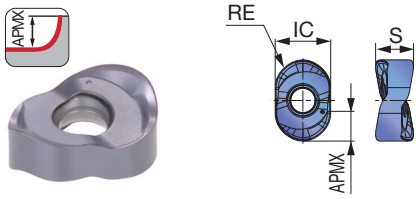
Designation	Clamping screw	Mono block wrench	Torx bit	Grip
HXLN04...	CSPD-3	IP-10D	-	-
HXLN05...	CSPB-4S	-	BLDIP15/S7	H-TB2W
HXLN06...	CSPB-5	-	BLDIP20/S7	H-TB2W

*Recommended clamping torque (N·m): CSPD-3=2.5, CSPB-4S=3.5, CSPB-5=5

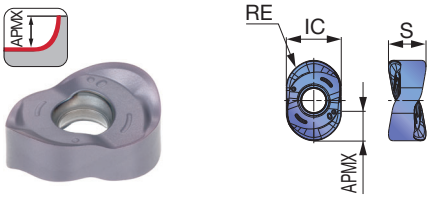
Approach angle
10°-20°
45°
70°
85°
88°
90°
Others

INSERT

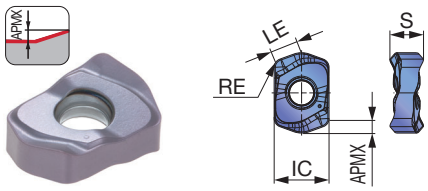
LNMX-MJ



LNMX-ML



LNMX-HJ



P	Steel	☆	★
M	Stainless		★
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys	★	☆
H	Hard materials	★	★

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH120	Coated AH3135	LE	IC	S
LNMX0405R4-MJ	4	4	●	●	-	8.2	5.6
LNMX0405R4-ML	4	4	●	●	-	8.2	5.6
LNMX0405ZER-HJ	1.3	1.3	●	●	4.3	8.2	5
LNMX0506R5-MJ	5	5	●	●	-	10.4	6.1
LNMX0607R6-MJ	6	6	●	●	-	12.6	7.4
LNMX0607ZER-HJ	2	2	●	●	6.7	12.7	7.2

●: Line up

Reference pages: Standard cutting conditions → **H039 - H041**, TungFlex → **H210**

STANDARD CUTTING CONDITIONS

For MJ,ML

ISO	Workpiece material		Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, SS400, etc. C15, C20, etc.		- 200 HB	First choice	AH3135	MJ	100 - 300	0.2 - 0.6
			- 200 HB	Low cutting force	AH3135	ML	100 - 300	0.2 - 0.6
	Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc.		- 300 HB	First choice	AH3135	MJ	100 - 250	0.2 - 0.6
			- 300 HB	Low cutting force	AH3135	ML	100 - 250	0.2 - 0.6
	Prehardened steel NAK80, PX5, etc.		30 - 40 HRC	First choice	AH3135	MJ	100 - 200	0.15 - 0.4
			30 - 40 HRC	Low cutting force	AH3135	ML	100 - 200	0.15 - 0.4
M	Austenitic Stainless steel SUS304, SUS304, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200 HB	First choice	AH3135	MJ	100 - 200	0.2 - 0.6
			- 200 HB	Low cutting force	AH3135	ML	100 - 200	0.2 - 0.6
	Martensitic Stainless steel SUS410, SUS420J1, etc. X12Cr13, X20Cr13, etc.		- 200 HB	First choice	AH3135	ML	100 - 300	0.2 - 0.6
			- 200 HB	Fracture resistance	AH3135	MJ	100 - 300	0.2 - 0.6
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.		150 - 250 HB	First choice	AH120	MJ	100 - 300	0.2 - 0.6
			150 - 250 HB	Low cutting force	AH120	ML	100 - 300	0.2 - 0.6
	Ductile cast iron FCD400, etc. 400-15, 600-3, etc.		150 - 250 HB	First choice	AH120	MJ	80 - 250	0.2 - 0.6
			150 - 250 HB	Low cutting force	AH120	ML	80 - 250	0.2 - 0.6
S	Titanium alloy Ti-6Al-4V, etc.		-	First choice	AH3135	ML	30 - 60	0.15 - 0.6
			-	Fracture resistance	AH3135	MJ	30 - 60	0.15 - 0.6
	Superalloys Inconel718, etc.		-	First choice	AH120	ML	20 - 50	0.05 - 0.3
			-	Fracture resistance	AH120	MJ	20 - 50	0.05 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	MJ	50 - 150	0.1 - 0.3
			40 - 50 HRC	Wear resistance	AH120	MJ	50 - 150	0.1 - 0.3
		SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	50 - 70	0.05 - 0.15

STANDARD CUTTING CONDITIONS

LNMX04-HJ

ISO	Workpiece material		Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, SS400, etc. C15, C20, etc.		- 300HB	First choice	AH3135	HJ	100 - 300	0.5 - 1.3
				Wear resistance	AH120			
	Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc.		- 300HB	First choice	AH3135	HJ	100 - 250	0.5 - 1.3
				Wear resistance	AH120			
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	AH3135	HJ	100 - 200	0.4 - 1
				Wear resistance	AH120			
M	Austenitic Stainless steel SUS304, SUS304, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200HB	First choice	AH3135	HJ	100 - 200	0.3 - 0.9
	Martensitic Stainless steel SUS410, SUS420J1, etc. X12Cr13, X20Cr13, etc.		- 200HB	First choice	AH3135	HJ	100 - 300	0.3 - 0.9
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.		150 - 250HB	First choice	AH120	HJ	100 - 300	0.5 - 1.3
				Fracture resistance	AH3135			
	Ductile cast iron FCD400, etc. 400-15, 600-3, etc.		150 - 250HB	First choice	AH120	HJ	80 - 250	0.5 - 1.3
				Fracture resistance	AH3135			
S	Titanium alloy Ti-6Al-4V, etc.		150 - 250HB	First choice	AH3135	HJ	30 - 60	0.3 - 0.7
	Superalloys Inconel718, etc.		150 - 250HB	First choice	AH120	HJ	20 - 50	0.1 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	AH3135	HJ	50 - 150	0.1 - 0.5
				Wear resistance	AH120			
		SKD11, etc. X153CrMoV12, etc.	50 - 60HRC	First choice	AH120	HJ	50 - 70	0.05 - 0.2

LNMX06-HJ

ISO	Workpiece material		Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel S15C, SS400, etc. C15, C20, etc.		- 300HB	First choice	AH3135	HJ	100 - 300	0.3 - 1.1
				Wear resistance	AH120			
	Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMoS4, etc.		- 300HB	First choice	AH3135	HJ	100 - 250	0.3 - 1.1
				Wear resistance	AH120			
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	AH3135	HJ	100 - 200	0.2 - 0.7
				Wear resistance	AH120			
M	Austenitic Stainless steel SUS304, SUS304, etc. X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200HB	First choice	AH3135	HJ	100 - 200	0.2 - 0.7
	Martensitic Stainless steel SUS410, SUS420J1, etc. X12Cr13, X20Cr13, etc.		- 200HB	First choice	AH3135	HJ	100 - 300	0.2 - 0.7
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.		150 - 250HB	First choice	AH120	HJ	100 - 300	0.3 - 1.1
				Fracture resistance	AH3135			
	Ductile cast iron FCD400, etc. 400-15, 600-3, etc.		150 - 250HB	First choice	AH120	HJ	80 - 250	0.3 - 1.1
				Fracture resistance	AH3135			
S	Titanium alloy Ti-6Al-4V, etc.		150 - 250HB	First choice	AH3135	HJ	30 - 60	0.15 - 0.6
	Superalloys Inconel718, etc.		150 - 250HB	First choice	AH120	HJ	20 - 50	0.05 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	AH3135	HJ	50 - 150	0.1 - 0.3
				Wear resistance	AH120			
		SKD11, etc. X153CrMoV12, etc.	50 - 60HRC	First choice	AH120	HJ	50 - 70	0.05 - 0.15

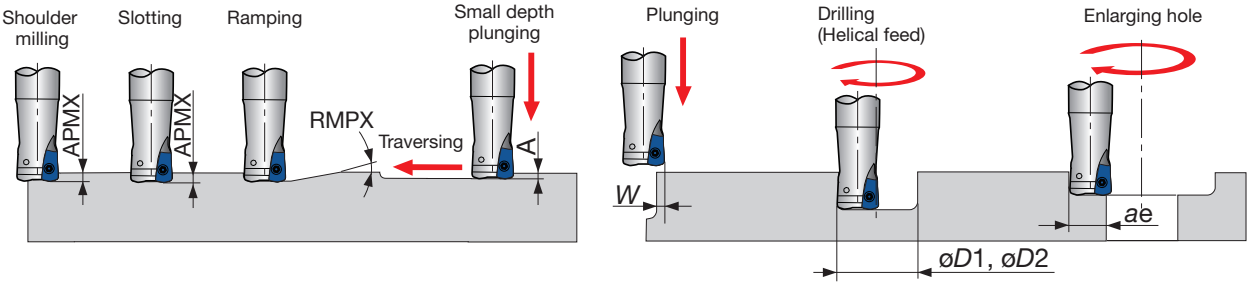
Tool dia: DCX (mm), Number of revolution: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Max. depth of cut: APMX = 1.3 mm, Number of teeth: z

ø20, CICT = 2		ø25, CICT = 3		ø32			ø40, CICT = 6		ø42, CICT = 6		ø50, CICT = 7		ø52, CICT = 7		ø63, CICT = 7	
n	*Vf*	*n*	*Vf*	*n*	*Vf* Coarse pitch (CICT = 4)	*Vf* Close pitch (CICT = 5)	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*
3,180	5,720	2,550	6,890	1,990	7,160	8,960	1,590	8,590	1,520	8,210	1,270	8,000	1,220	7,690	1,010	6,360
Vc = 200 m/min, *fz* = 0.9 mm/t																
2,860	5,150	2,290	6,180	1,790	6,440	8,060	1,430	7,720	1,360	7,340	1,150	7,250	1,100	6,930	910	5,730
Vc = 180 m/min, *fz* = 0.9 mm/t																
2,390	3,350	1,910	4,010	1,490	4,170	5,220	1,190	5,000	1,140	4,790	950	4,660	920	4,510	760	3,720
Vc = 150 m/min, *fz* = 0.7 mm/t																
2,390	2,870	1,910	3,440	1,490	3,580	4,470	1,190	4,280	1,140	4,100	950	3,990	920	3,860	760	3,190
Vc = 150 m/min, *fz* = 0.6 mm/t																
3,180	3,820	2,550	4,590	1,990	4,780	5,970	1,590	5,720	1,520	5,470	1,270	5,330	1,220	5,120	1,010	4,240
Vc = 200 m/min, *fz* = 0.6 mm/t																
3,180	5,720	2,550	6,890	1,990	7,160	8,960	1,590	8,590	1,520	8,210	1,270	8,000	1,220	7,690	1,010	6,360
Vc = 200 m/min, *fz* = 0.9 mm/t																
2,550	4,590	2,040	5,510	1,590	5,720	7,160	1,270	6,860	1,210	6,530	1,020	6,430	980	6,170	810	5,100
Vc = 160 m/min, *fz* = 0.9 mm/t																
720	720	570	860	450	900	1,130	360	1,080	340	1,020	290	1,020	280	980	230	810
Vc = 45 m/min, *fz* = 0.5 mm/t																
480	190	380	230	300	240	300	240	290	230	280	190	270	180	250	150	210
Vc = 30 m/min, *fz* = 0.2 mm/t																
1,590	950	1,270	1,140	990	1,190	1,490	800	1,440	760	1,370	640	1,340	610	1,280	510	1,070
Vc = 100 m/min, *fz* = 0.3 mm/t																
950	240	760	290	600	300	380	480	360	450	340	380	330	370	320	300	260
Vc = 60 m/min, *fz* = 0.12 mm/t																

Tool dia: DCX (mm), Number of revolution: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Max. depth of cut: APMX = 2mm, Number of teeth: z

ø32, CICT = 2		ø40, CICT = 4		ø50, CICT = 5		ø52, CICT = 5		ø63, CICT = 6	
n	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*
1,990	2,790	1,590	4,450	1,270	4,450	1,220	4,270	1,010	4,240
Vc = 200 m/min, *fz* = 0.7 mm/t									
1,790	2,510	1,430	4,000	1,150	4,030	1,100	3,850	910	3,820
Vc = 180 m/min, *fz* = 0.7 mm/t									
1,490	1,340	1,190	2,140	950	2,140	920	2,070	760	2,050
Vc = 150 m/min, *fz* = 0.45 mm/t									
1,490	1,340	1,190	2,140	950	2,140	920	2,070	760	2,050
Vc = 150 m/min, *fz* = 0.45 mm/t									
1,990	1,790	1,590	2,860	1,270	2,860	1,220	2,750	1,010	2,730
Vc = 200 m/min, *fz* = 0.45 mm/t									
1,990	2,790	1,590	4,450	1,270	4,450	1,220	4,270	1,010	4,240
Vc = 200 m/min, *fz* = 0.7 mm/t									
1,590	2,230	1,270	3,560	1,020	3,570	980	3,430	810	3,400
Vc = 160 m/min, *fz* = 0.7 mm/t									
450	320	360	500	290	510	280	490	230	480
Vc = 45 m/min, *fz* = 0.35 mm/t									
300	90	240	140	190	140	180	140	150	140
Vc = 30 m/min, *fz* = 0.15 mm/t									
990	400	800	640	640	640	610	610	510	610
Vc = 100 m/min, *fz* = 0.2 mm/t									
600	120	480	190	380	190	370	190	300	180
Vc = 60 m/min, *fz* = 0.1 mm/t									

MACHINING APPLICATIONS



MJ, ML

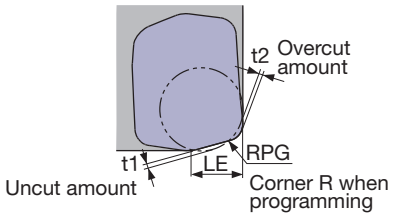
Designation	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging A	Max. cutting width in plunging W	Min. machining dia. øD1	Max. machining dia. øD2	Max. cutting width in enlarging ae
E/HXLN04M020…	20	4	4.5°	0.75	4	28	38	15
E/HXLN04M025…	25	4	2.9°	0.75	4	38	48	20
E/HXLN04M032…	32	4	1.9°	0.75	4	52	62	27
TXLN04M040B16.0R06	40	4	1.2°	0.6	4	68	78	35
TXLN04M042B16.0R06	42	4	1.1°	0.6	4	72	82	37
TXLN04M050B22.0R07	50	4	0.9°	0.6	4	88	98	45
TXLN04M052B22.0R07	52	4	0.8°	0.6	4	92	102	47
TXLN04M063B22.0R07	63	4	0.7°	0.7	4	114	124	58
E/HXLN05M025…	25	5	2.3°	0.5	5	35	48	17
E/HXLN05M032…	32	5	2.1°	0.6	5	48	62	24
TXLN05M040B16.0R05	40	5	2°	1	5	64	78	31
TXLN05M050B22.0R06	50	5	1.3°	1	5	84	98	41
E/HXLN06M032…	32	6	3.7°	1	6	52	62	22
EXLN06M040C32.0R04	40	6	3.4°	1	6	60	78	29
TXLN06M050B22.0R05	50	6	2.8°	1.7	6	79	98	39
TXLN06M052B22.0R05	52	6	2.5°	1.6	6	81	102	41
TXLN06M063B22.0R06	63	6	1.8°	1.6	6	105	124	52

HJ

Designation	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging A	Max. cutting width in plunging W	Min. machining øD1	Max. machining øD2	Max. cutting width in enlarging ae
E/HXLN04M020…	20	1.3	4.9°	0.7	4.1	27	38	15.5
E/HXLN04M025…	25	1.3	3°	0.7	4.1	37	48	20.5
E/HXLN04M032…	32	1.3	2°	0.7	4.1	51	62	27.5
TXLN04M040B16.0R06	40	1.3	1.4°	0.7	4.1	67	78	35.5
TXLN04M042B16.0R06	42	1.3	1.3°	0.7	4.1	71	82	37.5
TXLN04M050B22.0R07	50	1.3	1°	0.7	4.1	87	98	45.5
TXLN04M052B22.0R07	52	1.3	0.9°	0.7	4.1	91	102	47.5
TXLN04M063B22.0R07	63	1.3	0.8°	0.7	4.1	113	124	58.5
E/HXLN06M032…	32	2	5.7°	1.4	6.1	42	62	20
EXLN06M040C32.0R04	40	2	3.8°	1.5	6.1	57	78	28
TXLN06M050B22.0R05	50	2	2.7°	1.6	6.1	77	98	38
TXLN06M052B22.0R05	52	2	2.5°	1.6	6.1	81	102	40
TXLN06M063B22.0R06	63	2	1.8°	1.5	6.1	104	124	51

TOOL GEOMETRY ON PROGRAMMING FOR HIGH FEED

The following table shows the amount left uncut (t1) and overcut (t2).



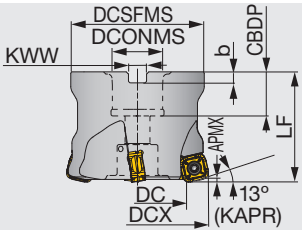
	Max. depth of cut APMX (mm)	LE (mm)	Programmed corner R (mm)	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
LNMX04-HJ	1.3	4.1	R1.5	0.8	0
	1.3	4.1	R2.0	0.65	0
	1.3	4.1	R2.5	0.5	0.05
	1.3	4.1	R3.0	0.36	0.2
LNMX06-HJ	2.0	6.1	R2.0	1.4	-
	2.0	6.1	R3.0	1.1	-
	2.0	6.1	R3.5	0.91	-
	2.0	6.1	R4.0	0.74	0.05
	2.0	6.1	R5.0	0.41	0.35

DOFEEDQUAD

TXQ

High feed face mill

GAMP = +7°, GAMF = -8° ~ -4.5°



Designation	APMX	DCX	CICT	DC	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TXQ12R050M22.0E03	2	50	3	33.8	47	50	22	20	10.4	6.3	0.4	With	SQMU12...
TXQ12R050M22.2-03	2	50	3	33.8	47	50	22.225	20	8	5	0.4	With	SQMU12...
TXQ12R052M22.0E03	2	52	3	35.8	49	50	22	20	10.4	6.3	0.5	With	SQMU12...
TXQ12R063M22.0E04	2	63	4	46.8	59	50	22	20	10.4	6.3	0.8	With	SQMU12...
TXQ12R063M22.2-04	2	63	4	46.8	59	50	22.225	20	8	5	0.8	With	SQMU12...
TXQ12R066M27.0E04	2	66	4	49.8	63	50	27	22	12.4	7	0.9	With	SQMU12...
TXQ12R080M27.0E05	2	80	5	63.8	76	63	27	22	12.4	7	1.6	With	SQMU12...
TXQ12R080M31.7-05	2	80	5	63.8	76	63	31.75	32	12.7	8	1.5	With	SQMU12...
TXQ12R100M31.7-06	2	100	6	83.8	96	63	31.75	32	12.7	8	2.6	With	SQMU12...
TXQ12R100M32.0E06	2	100	6	83.8	96	63	32	25	14.4	8	3	With	SQMU12...
TXQ12R125M38.1-07	2	125	7	108.8	98	63	38.1	44	15.9	10	3.3	With	SQMU12...
TXQ12R125M40.0E07	2	125	7	108.8	98	63	40	32	16.4	9	3.2	With	SQMU12...

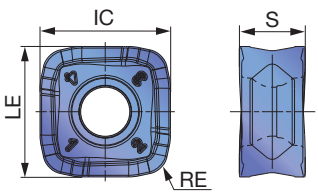
SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TXQ12R050, 052M22.0...	CSPB-4	H-TBS	M-1000	-	FSHM10-40H	BLDIP15/S7
TXQ12R063M...	CSPB-4	H-TBS	M-1000	-	CM10X30H	BLDIP15/S7
TXQ12R066, 080M27.0...	CSPB-4	H-TBS	M-1000	-	CM12X30H	BLDIP15/S7
TXQ12R080, 100M31.7...	CSPB-4	H-TBS	M-1000	-	CM16X40H	BLDIP15/S7
TXQ12R100M32.0E06	CSPB-4	H-TBS	M-1000	-	CM16X40H	BLDIP15/S7
TXQ12R125M...	CSPB-4	H-TBS	M-1000	TMBA-M20H	-	BLDIP15/S7

*Recommended clamping torque (N·m):CSPB-4=3.5

INSERT

SQMU-MJ



P	Steel	☆		★	☆	
M	Stainless		★	☆		
K	Cast iron	★		☆		
N	Non-ferrous					
S	Superalloys	★	☆	★		
H	Hard materials			★		

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH120	Coated AH130	Coated AH725	Coated T3130	LE	S	IC
SQMU1206ZSR-MJ	2	2	●	●	●	●	11.7	6	11.7

●: Line up

Reference pages: Standard cutting conditions → H044 - H045

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grades	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels S45C, etc. C45, etc.	~ 300HB	First choice	AH725	100 - 300	0.5 - 2
			Wear resistance	T3130	100 - 300	0.5 - 2
			Fracture resistance	AH130	100 - 300	0.5 - 2
	Alloy steels SCM440, etc. 42CrMo4, etc.	~ 300HB	First choice	AH725	100 - 200	0.5 - 1.5
			Wear resistance	T3130	100 - 200	0.5 - 1.5
			Fracture resistance	AH130	100 - 200	0.5 - 1.5
	Prehardened steels NAK80, PX5, etc.	30 ~ 40HRC	-	AH725	100 - 200	0.5 - 1
M	Stainless steels SUS304, etc. X5CrNi18-9, etc.	~ 200HB	-	AH130	100 - 150	0.3 - 0.8
K	Gray cast irons FC250, etc. 250, etc.	-	-	AH120	100 - 300	0.5 - 2
	Ductile cast irons FCD600, etc. 600-3, etc.	-	-	AH120	80 - 200	0.5 - 2
S	Titanium alloy Ti-6Al-4V, etc.	~ 40HRC	-	AH725	30 - 60	0.3 - 0.7
H	Hardened steels SKD61, etc. X40CrMoV5-1, etc.	40 ~ 50HRC	-	AH725	80 - 130	0.1 - 0.3
		50 ~ 60HRC	-	AH725	50 - 70	0.03 - 0.07

· Slot or pocket milling is not recommended, since chip re-cutting easily occurs.
· Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.

· Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

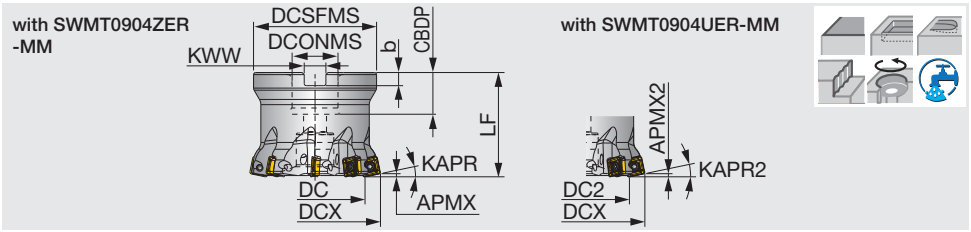
Tool dia: DCX (mm), Number of revolution: *n* (min-1), Feed speed: *Vf* (mm/min), Max. depth of cut: APMX = 2 mm

ø50		ø63		ø80		ø100		ø125	
n	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***
1,270	4,570	1,010	4,850	790	4,740	630	4,540	500	4,200
				Vc = 200 m/min, *fz* = 1.2 mm/t					
950	2,850	750	3,000	590	2,950	470	2,820	380	2,660
				Vc = 150 m/min, *fz* = 1.0 mm/t					
950	2,280	750	2,400	590	2,360	470	2,260	380	2,130
				Vc = 150 m/min, *fz* = 0.8 mm/t					
760	1,140	600	1,200	470	1,180	380	1,140	300	1,050
				Vc = 120 m/min, *fz* = 0.5 mm/t					
1,270	4,570	1,010	4,850	790	4,740	630	4,540	500	4,200
				Vc = 200 m/min, *fz* = 1.2 mm/t					
950	3,420	750	3,600	590	3,540	470	3,380	380	3,190
				Vc = 150 m/min, *fz* = 1.2 mm/t					
250	370	200	400	150	380	120	360	100	350
				Vc = 40 m/min, *fz* = 0.5 mm/t					
630	380	500	400	390	390	310	370	250	350
				Vc = 100 m/min, *fz* = 0.2 mm/t					
380	60	300	60	235	60	190	60	150	50
				Vc = 60 m/min, *fz* = 0.05 mm/t					

MILLQFEED UAD
TXSW09

High feed mill, for 4-corner single sided inserts

GAMP = +3.8°, GAMF = -3.5°



Designation	APMX	APMX2	DCX	CICT	DC	DC2	DCSFMS	DCONMS	CBDP	LF	KWW	b	KAPR	KAPR2	WT(kg)	Air hole	Insert
TXSW09M040B16.0R05	1.5	1	40	5	25	24	38	16	18	40	8	6	12°	7°	0.2	With	SWMT09...
TXSW09M050B22.0R07	1.5	1	50	7	35	34	47	22	20	50	10.4	6.3	12°	7°	0.38	With	SWMT09...

SPARE PARTS

Designation	Clamping screw	Torx bit	Grip	Shell locking bolt	Lubricant
TXSW09...	CSPD-3	BLDIP10/S7	H-TB2W	CM10X30H	M-1000

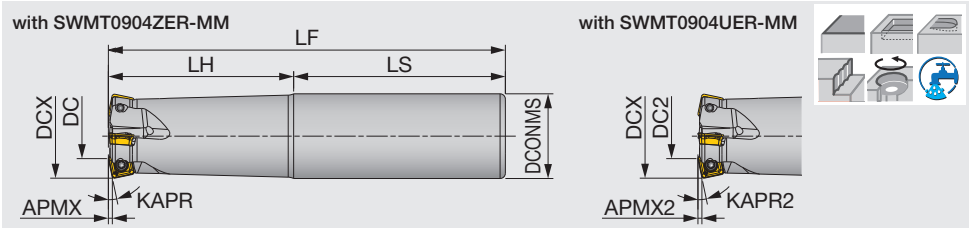
*Recommended clamping torque (N·m): CSPD-3=2.5

MILLQFEED UAD
EXSW09

Approach angle: 10°-20°, 45°, 70°, 85°, 88°, 90°, Others

High feed mill, for 4-corner single sided inserts

GAMP = +3.9°, GAMF = -3.5°



Designation	APMX	APMX2	DCX	CICT	DC	DC2	DCONMS	LF	LH	LS	KAPR	KAPR2	WT(kg)	Air hole	Insert
EXSW09M025C25.0R03	1.5	1.0	25	3	10	9	25	140	60	80	12°	7°	0.45	With	SWMT09...
EXSW09M025C25.0R03L	1.5	1.0	25	3	10	10	25	180	100	80	12°	7°	0.57	With	SWMT09...
EXSW09M032C32.0R04	1.5	1.0	32	4	17	16	32	150	70	80	12°	7°	0.81	With	SWMT09...
EXSW09M032C32.0R04L	1.5	1.0	32	4	17	16	32	200	120	80	12°	7°	1.07	With	SWMT09...

SPARE PARTS

Designation	Clamping screw	Wrench	Lubricant
EXSW09...	CSPD-3	IP-10D	M-1000

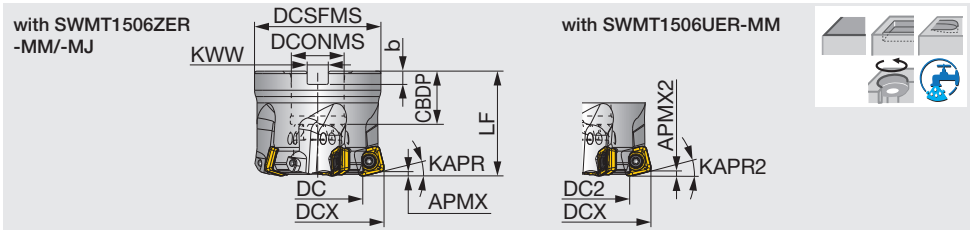
*Recommended clamping torque (N·m): CSPD-3=2.5

Reference pages: Inserts → H047, Standard cutting conditions → H048 - H049

TXSW15

High feed mill, for 4-corner single sided inserts

GAMP = +5°, GAMF = 0°



Designation	APMX	APMX2	DCX	CICT	DC	DC2	DCSFMS	LF	DCONMS	CBDP	KWW	b	KAPR	KAPR2	WT(kg)	Air hole	Insert
TXSW15M050B22.0R03	2.5	2	50	3	24.1	22.2	47	50	22	20	10.4	6.3	14°	10°	0.4	With	SWMT15...
TXSW15M063B22.0R04	2.5	2	63	4	37.1	35.2	59	50	22	20	10.4	6.3	14°	10°	0.66	With	SWMT15...
TXSW15J080B31.7R05	2.5	2	80	5	54.1	52.2	76	63	31.75	32	12.7	8	14°	10°	1.31	With	SWMT15...
TXSW15M080B27.0R05	2.5	2	80	5	54.1	52.2	76	63	27	22	12.4	7	14°	10°	1.41	With	SWMT15...
TXSW15J100B31.7R06	2.5	2	100	6	74.1	72.2	96	63	31.75	32	12.7	8	14°	10°	2.25	With	SWMT15...
TXSW15M100B32.0R06	2.5	2	100	6	74.1	72.2	96	63	32	25	14.4	8	14°	10°	2.26	With	SWMT15...
TXSW15J125B38.1R07	2.5	2	125	7	99.1	97.2	100	63	38.1	43	15.9	10	14°	10°	2.91	With	SWMT15...
TXSW15M125B40.0R07	2.5	2	125	7	99.1	97.2	100	63	40	37	16.4	9	14°	10°	2.83	With	SWMT15...
TXSW15J160B50.8R08	2.5	2	160	8	134.1	132.2	100	63	50.8	46	19	11	14°	10°	3.93	With	SWMT15...
TXSW15M160B40.0R08	2.5	2	160	8	134.1	132.2	100	63	40	37	16.4	9	14°	10°	4.23	With	SWMT15...

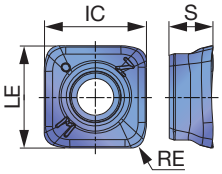
SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Shell locking bolt 3	Torx bit
TXSW15M050B22.0R03	TS50115I	H-TB2W	M-1000	-	-	SRPS118-0273	BT20S
TXSW15M063B22.0R04	TS50115I	H-TB2W	M-1000	-	FSHM10-40H	-	BT20S
TXSW15J080B31.7R05	TS50115I	H-TB2W	M-1000	-	CM16X40H	-	BT20S
TXSW15M080B27.0R05	TS50115I	H-TB2W	M-1000	-	CM12X30H	-	BT20S
TXSW15*100B...	TS50115I	H-TB2W	M-1000	-	CM16X40H	-	BT20S
TXSW15*125B...	TS50115I	H-TB2W	M-1000	TMBA-M20H	-	-	BT20M
TXSW15J160B50.8R08	TS50115I	H-TB2W	M-1000	TMBA-M24H	-	-	BT20M
TXSW15M160B40.0R08	TS50115I	H-TB2W	M-1000	TMBA-M20H	-	-	BT20M

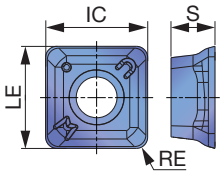
*Recommended clamping torque (N·m): TS50115I=5

INSERT

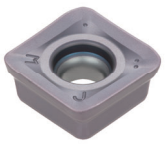
SWMT09/15ZER-MM

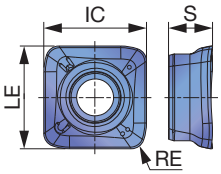


SWMT09/15UER-MM



SWMT15ZER-MJ





P	Steel	☆	★
M	Stainless		★
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys	★	☆
H	Hard materials	★	★

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH120	Coated AH3135	LE	IC	S
SWMT0904ZER-MM	1	1		●	8.605	8.605	4
SWMT0904UER-MM	1	1		●	9.05	9.05	4
SWMT1506ZER-MM	2	2.5	●	●	16.01	16.01	6.8
SWMT1506UER-MM	2	2		●	16.27	16.27	6.8
SWMT1506ZER-MJ	2	2.5	●	●	15.925	15.925	6.8

●: Line up

Reference pages: Standard cutting conditions → H048 - H049

STANDARD CUTTING CONDITIONS

09 type

ISO	Workpiece material		Hardness	Priority	Insert type	Chip-breaker	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steel S45C, S55C, etc., C45, C55, etc.		- 300HB	First choice	ZER	MM	AH3135	100 - 300	0.5 - 1.5
				for wear resistance	UER	MM	AH3135	100 - 300	0.5 - 1.5
	Alloy steel SCM440, etc., 42CrMo4, 17Cr3, etc.		- 300HB	First choice	ZER	MM	AH3135	100 - 200	0.5 - 1.5
				for wear resistance	UER	MM	AH3135	100 - 200	0.5 - 1.5
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	ZER	MM	AH3135	100 - 200	0.5 - 1.2
				for wear resistance	UER	MM	AH3135	100 - 200	0.5 - 1.2
M	Austenitic stainless steel SUS304, X5CrNi18-9, etc.		- 200HB	First choice	UER	MM	AH3135	100 - 150	0.5 - 1.2
				Low cutting load	ZER	MM	AH3135	100 - 150	0.5 - 1.2
	Precipitation hardening stainless steel SUS630, X20CrNiCuNb-16-4, etc.		28HRC - (H1150)	First choice	UER	MM	AH3135	80 - 150	0.3 - 1.2
				Low cutting load	ZER	MM	AH3135	80 - 150	0.3 - 1.2
			40HRC - (H900)	First choice	UER	MM	AH3135	80 - 120	0.3 - 0.8
				Low cutting load	ZER	MM	AH3135	80 - 120	0.3 - 0.8
K	Gray cast iron FC250, FC300, etc. 250, 300, etc., GG25, GG30, etc.		150 - 250HB	First choice	ZER	MM	AH3135	100 - 300	0.5 - 2
	Ductile cast iron FCD600, etc., 600-3, etc., GGG40, etc.		150 - 250HB	First choice	ZER	MM	AH3135	80 - 200	0.5 - 2
S	Titanium alloys Ti-6Al-4V, etc.		- 40HRC	First choice	UER	MM	AH3135	30 - 60	0.3 - 0.7
				Low cutting load	ZER	MM	AH3135	30 - 60	0.3 - 0.7
	Heat-resistance alloys Inconel, Hastelloy, etc.		- 40HRC	First choice	UER	MM	AH3135	20 - 50	0.1 - 0.3
				for wear resistance	ZER	MM	AH3135	20 - 50	0.1 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	ZER	MM	AH3135	80 - 130	0.1 - 0.3

15 type

ISO	Workpiece material		Hardness	Priority	Insert type	Chip-breaker	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steel S45C, S55C, etc. C45, C55, etc.		- 300HB	First choice	ZER	MM	AH3135	100 - 300	0.5 - 1.5
				for wear resistance	ZER	MM	AH120	100 - 300	0.5 - 1.5
				for impact resistance	ZER	MJ	AH3135	100 - 300	0.5 - 2.0
	Alloy steel SCM440, etc. 42CrMo4, 17Cr3, etc.		- 300HB	First choice	ZER	MM	AH3135	100 - 200	0.5 - 1.5
				for wear resistance	ZER	MM	AH120	100 - 200	0.5 - 1.5
				for impact resistance	ZER	MJ	AH3135	100 - 200	0.5 - 2.0
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	ZER	MM	AH3135	100 - 200	0.5 - 1.2
				for wear resistance	ZER	MM	AH120	100 - 200	0.5 - 1.2
				for impact resistance	ZER	MJ	AH3135	100 - 200	0.5 - 1.5
M	Austenitic stainless steel SUS304, X5CrNi18-9, etc.		- 200HB	First choice	UER	MM	AH3135	100 - 150	0.5 - 1.2
				Low cutting load	ZER	MM	AH3135	100 - 150	0.5 - 1.2
	Precipitation hardening stainless steel SUS630, X20CrNiCuNb-16-4, etc.		28HRC - (H1150)	First choice	UER	MM	AH3135	80 - 150	0.3 - 1.2
				Low cutting load	ZER	MM	AH3135	80 - 150	0.3 - 1.2
			40HRC - (H900)	First choice	UER	MM	AH3135	80 - 120	0.3 - 0.8
				Low cutting load	ZER	MM	AH3135	80 - 120	0.3 - 0.8
K	Gray cast iron FC250, FC300, etc. 250, 300, etc. GG25, GG30, etc.		150 - 250HB	First choice	ZER	MJ	AH120	100 - 300	0.5 - 2.0
				for impact resistance	ZER	MJ	AH3135	100 - 300	0.5 - 2.0
				Low cutting load	ZER	MM	AH120	100 - 300	0.5 - 1.5
	Ductile cast iron FCD600, etc. 600-3, etc. GGG40, etc.		150 - 250HB	First choice	ZER	MJ	AH120	80 - 200	0.5 - 2.0
				for impact resistance	ZER	MJ	AH3135	80 - 200	0.5 - 2.0
				Low cutting load	ZER	MM	AH120	80 - 200	0.5 - 1.5
S	Titanium alloys Ti-6Al-4V, etc.		- 40HRC	First choice	UER	MM	AH3135	30 - 60	0.3 - 0.7
				Low cutting load	ZER	MM	AH3135	30 - 60	0.3 - 0.7
				for impact resistance	ZER	MJ	AH3135	30 - 60	0.3 - 0.7
	Heat-resistance alloys Inconel, Hastelloy, etc.		- 40HRC	First choice	UER	MM	AH3135	20 - 50	0.1 - 0.3
				for wear resistance	ZER	MM	AH120	20 - 50	0.1 - 0.3
H	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50HRC	First choice	ZER	MJ	AH3135	80 - 130	0.1 - 0.3
				for wear resistance	ZER	MJ	AH120	80 - 130	0.1 - 0.3
		SKD11, etc. X153CrMoV12, etc.	50 - 60HRC	First choice	ZER	MJ	AH120	50 - 70	0.05 - 0.2

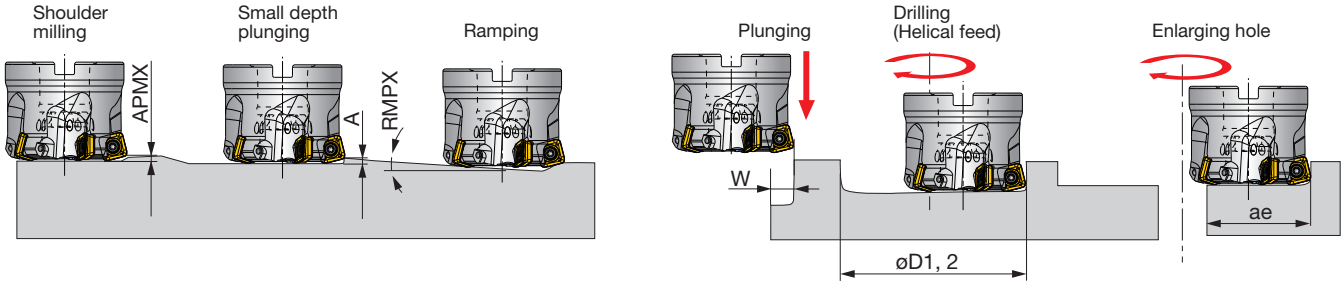
Tool dia.: DC (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Number of inserts: z

ø25, z=3		ø32, z=4		ø40, z=5		ø50, z=7	
n	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***
2,550	7,650	1,990	7,960	1,590	7,950	1,270	8,890
			Vc = 200 m/min, *fz* = 1.0 mm/t				
1,910	5,730	1,490	5,960	1,190	5,950	960	6,720
			Vc = 150 m/min, *fz* = 1.0 mm/t				
1,910	4,580	1,490	4,770	1,190	4,760	960	5,380
			Vc = 150 m/min, *fz* = 0.8 mm/t				
1,530	3,670	1,190	3,810	960	3,840	760	4,260
			Vc = 120 m/min, *fz* = 0.8 mm/t				
1,530	3,670	1,190	3,810	960	3,840	760	4,260
			Vc = 120 m/min, *fz* = 0.8 mm/t				
1,270	2,290	1,000	2,400	800	2,400	640	2,690
			Vc = 100 m/min, *fz* = 0.6 mm/t				
2,550	9,180	1,990	9,550	1,590	9,540	1,270	10,670
			Vc = 200 m/min, *fz* = 1.2 mm/t				
1,910	6,880	1,490	7,150	1,190	7,140	1,270	10,670
			Vc = 150 m/min, *fz* = 1.2 mm/t				
510	770	400	800	320	800	250	880
			Vc = 40 m/min, *fz* = 0.5 mm/t				
380	230	300	240	240	240	190	270
			Vc = 30 m/min, *fz* = 0.2 mm/t				
1,270	760	1,000	800	800	800	640	900
			Vc = 100 m/min, *fz* = 0.2 mm/t				

Tool dia.: DC (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Number of inserts: z

ø50, z=3		ø63, z=4		ø80, z=5		ø100, z=6		ø125, z=7		ø160, z=8	
n	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***
1,270	3,810	1,010	4,040	800	4,000	640	3,840	510	3,570	400	3,200
					Vc = 200 m/min, *fz* = 1.0 mm/t						
1,270	4,570	1,010	4,850	800	4,800	640	4,610	510	4,280	400	3,840
					Vc = 200 m/min, *fz* = 1.2 mm/t						
960	2,880	760	3,040	600	3,000	480	2,880	380	2,660	300	2,400
					Vc = 150 m/min, *fz* = 1.0 mm/t						
960	3,460	760	3,650	600	3,600	480	3,460	380	3,190	300	2,880
					Vc = 150 m/min, *fz* = 1.2 mm/t						
960	2,300	760	2,430	600	2,400	480	2,300	380	2,130	300	1,920
					Vc = 150 m/min, *fz* = 0.8 mm/t						
960	2,880	760	3,040	600	3,000	480	2,880	380	2,660	300	2,400
					Vc = 150 m/min, *fz* = 1.0 mm/t						
760	1,820	610	1,950	480	1,920	380	1,820	310	1,740	240	1,540
					Vc = 120 m/min, *fz* = 0.8 mm/t						
760	1,820	610	1,950	480	1,920	380	1,820	310	1,740	240	1,540
					Vc = 120 m/min, *fz* = 0.8 mm/t						
640	1,150	510	1,220	400	1,200	320	1,150	250	1,050	200	960
					Vc = 100 m/min, *fz* = 0.6 mm/t						
1,270	4,570	1,010	4,850	800	4,800	640	4,610	510	4,280	400	3,840
					Vc = 200 m/min, *fz* = 1.2 mm/t						
1,270	3,810	1,010	4,040	800	4,000	640	3,840	510	3,570	400	3,200
					Vc = 200 m/min, *fz* = 1.0 mm/t						
960	3,460	760	3,650	600	3,600	480	3,460	380	3,190	300	2,880
					Vc = 150 m/min, *fz* = 1.2 mm/t						
960	2,880	760	3,040	600	3,000	480	2,880	380	2,660	300	2,400
					Vc = 150 m/min, *fz* = 1.0 mm/t						
250	380	200	400	160	400	130	390	100	350	80	320
					Vc = 40 m/min, *fz* = 0.5 mm/t						
200	120	150	120	120	120	100	120	80	110	60	100
					Vc = 30 m/min, *fz* = 0.2 mm/t						
640	380	510	410	400	400	320	380	250	350	200	320
					Vc = 100 m/min, *fz* = 0.2 mm/t						
380	140	300	140	240	140	190	140	150	130	120	120
					Vc = 60 m/min, *fz* = 0.12 mm/t						

APPLICATION RANGE



09 type

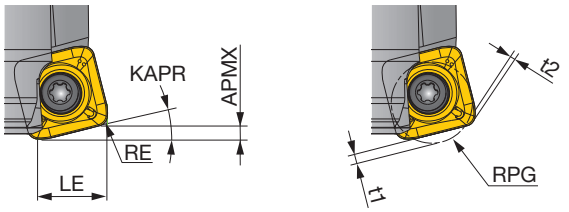
Designation	Tool dia. DCX	Max. depth of cut APMX		Max. plunging depth A	Max. ramping angle RMPX		Max. cutting width in plunging W		Min. machining dia. øD1		Max. machining dia. øD2		Max. cutting width in enlarging ae	
		SWMT 09**ZER	SWMT 09**UER		SWMT 09**ZER	SWMT 09**UER	SWMT 09**ZER	SWMT 09**UER	SWMT 09**ZER	SWMT 09**UER	SWMT 09**ZER	SWMT 09**UER	SWMT 09**ZER	SWMT 09**UER
EXSW09M025...	25	1.5	1	0.3	4.8	6	7	7.5	34	33	47	47	16.5	16
EXSW09M032...	32	1.5	1	0.3	2.7	3.2	7	7.5	48	47	61	61	23.5	23
TXSW09M040...	40	1.5	1	0.3	1.8	2.1	7	7.5	64	63	77	77	31.5	31
TXSW09M050...	50	1.5	1	0.3	1.2	1.4	7	7.5	84	83	97	97	41.5	41

15 type

Approach angle: 10°-20°, 45°, 70°, 85°, 88°, 90°, Others

Designation	Tool dia. DCX	Max. depth of cut APMX		Max. plunging depth A	Max. ramping angle RMPX	Max. cutting width in plunging W		Min. machining dia. øD1	Max. machining dia. øD2	Max. cutting width in enlarging ae	
		SWMT 15**ZER	SWMT 15**UER			SWMT 15**ZER	SWMT 15**UER			SWMT 15**ZER	SWMT 15**UER
TXSW15M050B...	50	2.5	2	0.7	4.8°	12.5	13.5	70	95	36	35
TXSW15M063B...	63	2.5	2	0.7	2.9°	12.5	13.5	96	121	49	48
TXSW15J, M080B...	80	2.5	2	0.7	2°	12.5	13.5	130	155	66	65
TXSW15J, M100B...	100	2.5	2	0.7	1.4°	12.5	13.5	170	195	86	85
TXSW15J, M125B...	125	2.5	2	0.7	1°	12.5	13.5	220	245	111	110
TXSW15J, M160B...	160	2.5	2	0.7	0.7°	12.5	13.5	290	315	146	145

TOOL GEOMETRY FOR PROGRAMMING



09 type

APMX (mm) SWMT 09**ZER	APMX (mm) SWMT 09**UER	Actual corner radius RE (mm)	LE (mm) SWMT 09**ZER	LE (mm) SWMT 09**UER	KAPR SWMT 09**ZER	KAPR SWMT 09**UER	Programmed corner radius RPG	Uncut amount: t1 (mm) SWMT 09**ZER	Uncut amount: t1 (mm) SWMT 09**UER	Overcut amount: t2 (mm) SWMT 09**ZER	Overcut amount: t2 (mm) SWMT 09**UER
1.5	1	1	7.4	7.9	12°	7°	1	1.3	0.81	-	-
1.5	1	1	7.4	7.9	12°	7°	1.5	1.21	0.76	-	-
1.5	1	1	7.4	7.9	12°	7°	2	1.12	0.7	-	0.02
1.5	1	1	7.4	7.9	12°	7°	2.5	1.03	0.65	0.01	0.15
1.5	1	1	7.4	7.9	12°	7°	3	0.94	0.59	0.11	0.33

15 type

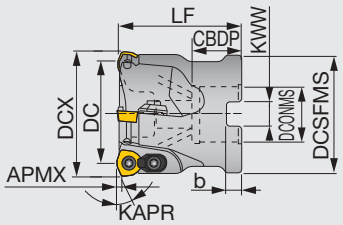
APMX (mm) SWMT 15**ZER	APMX (mm) SWMT 15**UER	Actual corner radius RE (mm)	LE (mm) SWMT 15**ZER	LE (mm) SWMT 15**UER	KAPR SWMT 15**ZER	KAPR SWMT 15**UER	Programmed corner radius RPG	Uncut amount: t1 (mm) SWMT 15**ZER	Uncut amount: t1 (mm) SWMT 15**UER	Overcut amount: t2 (mm) SWMT 15**ZER	Overcut amount: t2 (mm) SWMT 15**UER
2.5	2	2	12.7	13.8	14°	10°	3.5	2.1	1.85	-	-
2.5	2	2	12.7	13.8	14°	10°	4	1.99	1.77	-	-
2.5	2	2	12.7	13.8	14°	10°	4.5	1.88	1.69	-	0.03
2.5	2	2	12.7	13.8	14°	10°	5	1.78	1.61	0.01	0.13

- When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set in SWMT**ZER insert: RPG = 4.5 mm, SWMT**UER insert: RPG = 4 mm. If a larger radius is used, overcutting may occur. The above table shows the uncut (t1) and overcut (t2) amounts for the programmed corner radius.

MILLFEED
TXP05/06/08/09

High feed mill

GAMP = +5°, GAMF = -4° ~ -6°



Designation	APMX	DCX	CICT	DC	DCSFMS	LF	DCONMS	CBDP	KWW	b	KAPR	WT(kg)	Air hole	Insert
TXP05063RB-E	1.5	63	6	55.4	59	50	22	20	10.4	6.3	15	0.8	with	WPM*05...
TXP05080RB-E	1.5	80	7	72.4	76	63	27	22	12.4	7	15	1.7	with	WPM*05...
TXP06050R	1.5	50	4	41.4	47	50	22	20	10	6	20	0.4	without	WPM*06...
TXP06050R2	1.5	50	4	41.4	47	50	22.225	20	8	5	20	0.4	with	WPM*06...
TXP06050RA	1.5	50	4	41.4	47	50	22	20	10	6	20	0.4	with	WPM*06...
TXP06063RB-E	1.5	63	5	54.4	59	50	22	20	10.4	6.3	20	0.7	with	WPM*06...
TXP06080RB-E	1.5	80	6	71.4	76	63	27	22	12.4	7	20	1.6	with	WPM*06...
TXP08050R	1.5	50	3	38.6	47	50	22	19.5	10	6	10	0.4	with	WPMT08...
TXP08050R2	1.5	50	3	38.6	47	50	22.225	19.5	8	5	10	0.4	with	WPMT08...
TXP08050RA	1.5	50	3	38.6	47	50	22	19.5	10	6	10	0.4	with	WPMT08...
TXP08050R-E	1.5	50	3	38.6	47	50	22	20	10.4	6.3	10	0.4	without	WPMT08...
TXP08052R-E	1.5	52	3	40.6	50	50	22	20	10.4	6.3	10	0.5	without	WPMT08...
TXP08063R	1.5	63	4	51.6	59	50	22	20	10	6	10	0.7	with	WPMT08...
TXP08063R2	1.5	63	4	51.6	59	50	22.225	20	8	5	10	0.7	with	WPMT08...
TXP08063RA	1.5	63	4	51.6	59	50	22	20	10	6	10	0.7	with	WPMT08...
TXP08063R-E	1.5	63	4	51.6	59	50	22	20	10.4	6.3	10	0.7	without	WPMT08...
TXP08066R-E	1.5	66	4	54.6	63	50	27	22	12.4	7	10	0.8	without	WPM*06...
TXP08080R	1.5	80	5	68.6	76	63	31.75	32	12.7	8	10	1.4	with	WPMT08...
TXP08080RA	1.5	80	5	68.6	76	63	31.75	32	12.7	8	10	1.4	with	WPMT08...
TXP08080R-E	1.5	80	5	68.6	76	63	27	22	12.4	7	10	1.5	without	WPM*06...
TXP08100R	1.5	100	6	88.6	96	63	31.75	32	12.7	8	10	2.5	with	WPMT08...
TXP08100RA	1.5	100	6	88.6	96	63	31.75	32	12.7	8	10	2.5	with	WPMT08...
TXP08100R-E	1.5	100	6	88.6	96	63	32	25	14.4	8	10	2.5	without	WPM*06...
TXP08125R	1.5	125	7	113.6	80	63	38.1	45	15.9	10	10	3.1	with	WPMT08...
TXP08125R-E	1.5	125	7	113.6	98	63	40	32	16.4	9	10	3.1	without	WPMT08...
TXP08160R	1.5	160	8	148.6	100	63	50.8	46	19	11	10	5.1	with	WPMT08...
TXP09063R	3	63	3	49.4	59	50	22	20	10	6	20	0.6	with	WPMT09...
TXP09063R2	3	63	3	49.4	59	50	22.225	20	8	5	20	0.6	with	WPMT09...
TXP09063R-E	3	63	3	49.4	59	50	22	20	10.4	6.3	20	0.6	without	WPMT09...
TXP09080R	3	80	4	66.4	76	63	31.75	32	12.7	8	20	1.3	with	WPMT09...
TXP09080R-E	3	80	4	66.4	76	63	27	22	12.4	7	20	1.3	without	WPMT09...
TXP09100R	3	100	5	86.4	96	63	31.75	32	12.7	8	20	2.4	with	WPMT09...
TXP09100R-E	3	100	5	86.4	96	63	32	25	14.4	8	20	2.4	without	WPMT09...
TXP09125R	3	125	6	111.4	98	63	38.1	38	15.9	10	20	3.1	with	WPMT09...
TXP09125R-E	3	125	6	111.4	98	63	40	32	16.4	9	20	2.9	without	WPMT09...
TXP09160R	3	160	7	146.4	100	63	50.8	38	19	11	20	4.7	with	WPMT09...

SPARE PARTS

Designation	Clamp set	Clamping screw	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Shell locking bolt 3	Wrench 1	Wrench 2
TXP05063RB-E	CSY-15	CSPB-3.5S	M-1000	-	CM10X30H	-	IP-15D	-
TXP05080RB-E	CSY-15	CSPB-3.5S	M-1000	-	-	CAP-CM12X1.75X30	IP-15D	-
TXP06050R	CSY-15	CSPB-4S	M-1000	-	-	CAP-CM10X1.5X30	IP-15D	-
TXP06050R2, RA	CSY-15	CSPB-4S	M-1000	-	CM10X30H	-	IP-15D	-
TXP06063RB-E	CSY-15	CSPB-4S	M-1000	-	CM10X30H	-	IP-15D	-
TXP06080RB-E	CSY-15	CSPB-4S	M-1000	-	CM12X30H	-	IP-15D	-
TXP08050R	CSX20	CSTB-5	M-1000	-	-	FSHM10-40	-	T-20T
TXP08050R*	CSX20	CSTB-5	M-1000	-	FSHM10-40H	-	-	T-20T
TXP0805*R-E	CSX20	CSTB-5	M-1000	-	-	FSHM10-40	-	T-20T
TXP08063R	CSX20	CSTB-5	M-1000	-	-	CAP-CM10X1.5X30	-	T-20T
TXP08063R2	CSX20	CSTB-5	M-1000	-	CM10X30H	-	-	T-20T
TXP08063RA	CSX20	CSTB-5	M-1000	-	CM10X30H	-	-	T-20T
TXP08063, 066R-E	CSX20	CSTB-5	M-1000	-	-	-	-	T-20T
TXP08080R	CSX20	CSTB-5	M-1000	-	-	CAP-CM16X2.0X40	-	T-20T
TXP08080RA	CSX20	CSTB-5	M-1000	-	CM16X40H	-	-	T-20T
TXP08080R-E	CSX20	CSTB-5	M-1000	-	-	-	-	T-20T
TXP08100R	CSX20	CSTB-5	M-1000	-	-	CAP-CM16X2.0X40	-	T-20T
TXP08100RA	CSX20	CSTB-5	M-1000	-	CM16X40H	-	-	T-20T
TXP08100R-E	CSX20	CSTB-5	M-1000	-	-	-	-	IP-20T
TXP08125R	CSX20	CSTB-5	M-1000	TMBA-M20H	-	-	-	T-20T
TXP08160R	CSX20	CSTB-5	M-1000	TMBA-M24H	-	-	-	T-20T
TXP09063R*	CSY-20	CSPB-5	M-1000	-	CM10X30H	-	-	IP-20T
TXP09063R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09080R	CSY-20	CSPB-5	M-1000	-	CM16X40H	-	-	IP-20T
TXP09080R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09100R	CSY-20	CSPB-5	M-1000	-	CM16X40H	-	-	IP-20T
TXP09100R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09125R	CSY-20	CSPB-5	M-1000	TMBA-M20H	-	-	-	IP-20T
TXP09125R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09160R	CSY-20	CSPB-5	M-1000	TMBA-M24H	-	-	-	IP-20T

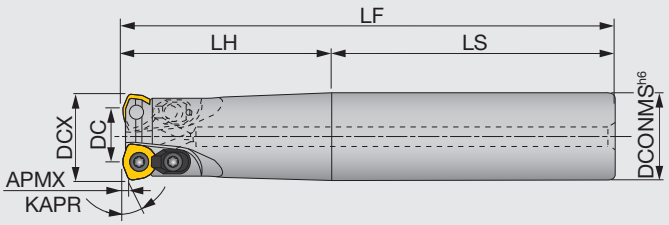
*Recommended clamping torque (N·m) : CSPB-3.5S/CSPB-4S=3.5, CSTB-5/CSPB-5=5

Reference pages: Inserts → H053, Standard cutting conditions → H054 - H055

MILLFEED
EXP05/06/08/09

High feed endmill, shank type

GAMP = +5°, GAMF = -6°



Designation	APMX	DCX	CICT	DC	DCONMS	LF	LH	LS	KAPR	Air hole	Insert	Shank
EXP05020RL	1.5	20	2	12.4	20	180	100	80	15°	with	WPM*05...	Cylindrical
EXP05020RLL	1.5	20	2	12.4	20	250	130	120	15°	with	WPM*05...	Cylindrical
EXP05020RS	1.5	20	2	12.4	20	130	50	80	15°	with	WPM*05...	Cylindrical
EXP05021RL	1.5	21	2	13.4	20	180	100	80	15°	with	WPM*05...	Cylindrical
EXP05021RLL	1.5	21	2	13.4	20	250	50	200	15°	with	WPM*05...	Cylindrical
EXP05021RS	1.5	21	2	13.4	20	130	50	80	15°	with	WPM*05...	Cylindrical
EXP06025RL	1.5	25	2	16.4	25	200	120	80	20°	with	WPM*06...	Cylindrical
EXP06025RLL	1.5	25	2	16.4	25	300	180	120	20°	with	WPM*06...	Cylindrical
EXP06025RS	1.5	25	2	16.4	25	140	60	80	20°	with	WPM*06...	Cylindrical
EXP06026RL	1.5	26	2	17.4	25	200	120	80	20°	with	WPM*06...	Cylindrical
EXP06026RLL	1.5	26	2	17.4	25	300	60	240	20°	with	WPM*06...	Cylindrical
EXP06026RS	1.5	26	2	17.4	25	140	60	80	20°	with	WPM*06...	Cylindrical
EXP06032RL	1.5	32	2	23.4	32	200	120	80	20°	with	WPM*06...	Cylindrical
EXP06032RLB	1.5	32	3	23.4	32	200	120	80	20°	with	WPM*06...	Cylindrical
EXP06032RLL	1.5	32	2	23.4	32	300	180	120	20°	with	WPM*06...	Cylindrical
EXP06032RS	1.5	32	2	23.4	32	150	70	80	20°	with	WPM*06...	Cylindrical
EXP06032RSB	1.5	32	3	23.4	32	150	70	80	20°	with	WPM*06...	Cylindrical
EXP06033RL	1.5	33	2	24.4	32	200	120	80	20°	with	WPM*06...	Cylindrical
EXP06033RLB	1.5	33	3	24.4	32	200	120	80	20°	with	WPM*06...	Cylindrical
EXP06033RLL	1.5	33	2	24.4	32	300	70	230	20°	with	WPM*06...	Cylindrical
EXP06033RS	1.5	33	2	24.4	32	150	70	80	20°	with	WPM*06...	Cylindrical
EXP06033RSB	1.5	33	3	24.4	32	150	70	80	20°	with	WPM*06...	Cylindrical
EXP06040RL	1.5	40	3	31.4	32	250	50	200	20°	with	WPM*06...	Cylindrical
EXP06040RLL	1.5	40	3	31.4	32	300	50	250	20°	with	WPM*06...	Cylindrical
EXP06040RLS42	1.5	40	3	31.4	42	250	50	200	20°	with	WPM*06...	Cylindrical
EXP06040RS	1.5	40	3	31.4	32	150	50	100	20°	with	WPM*06...	Cylindrical
EXP08040RLA	1.5	40	2	28.6	32	250	50	200	10°	with	WPMT08...	Cylindrical
EXP08040RLL	1.5	40	2	28.6	32	300	50	250	10°	with	WPMT08...	Cylindrical
EXP08040RSA	1.5	40	2	28.6	32	150	50	100	10°	with	WPMT08...	Cylindrical
EXP09050RS	3	50	2	36.4	42	150	50	100	20°	with	WPMT09...	Cylindrical
EXP09050RL	3	50	2	36.4	42	250	50	200	20°	with	WPMT09...	Cylindrical

SPARE PARTS

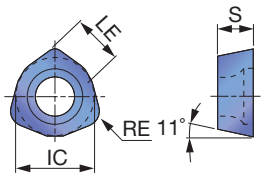
Designation	Clamp set	Clamping screw	Lubricant	Wrench 1	Wrench 2
EXP050...	-	CSPB-3.5S	M-1000	IP-15D	-
EXP060...	CSY-15	CSPB-4S	M-1000	IP-15D	-
EXP080...	CSX20	CSTB-5	M-1000	-	T-20T
EXP090...	CSY-20	CSPB-5	M-1000	-	IP-20T

*Recommended clamping torque (N·m): CSPB-3.5S/CSPB-4S=3.5, CSTB-5/CSPB-5=5

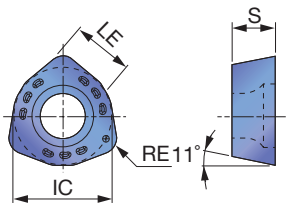
Reference pages: Inserts → H053, Standard cutting conditions → H054 - H055

INSERT

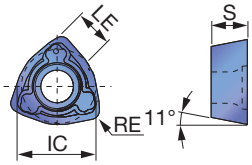
WPMW05/06



WPMT08/09



WPMT05/06/08/09-ML



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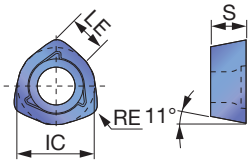

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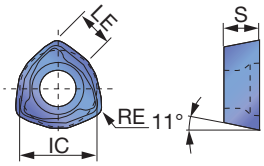


P	Steel	☆				☆	★					
M	Stainless		★	☆			★					
K	Cast iron	★										
N	Non-ferrous											
S	Superalloys	★	☆									
H	Hard materials				★							

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated							LE	IC	S
			AH120	AH130	AH140	AH730	T3130	AH3135				
WPMW05H315ZPR	1.5	1.5	●		●		●	●		5	7.94	3.5
WPMT05H315ZPR-ML	1.5	1.5	●		●		●	●		5	7.94	3.5
WPMT05H315ZPR-MH	1.5	1.5	●		●			●		5	7.94	3.5
WPMT05H315ZPR-DML	1.5	1.5				●				5	7.94	3.5
WPMW06X415ZPR	1.5	1.5	●		●		●	●		6	9.525	4.2
WPMT06X415ZPR-ML	1.5	1.5	●	●	●		●	●		6	9.525	4.2
WPMT06X415ZPR-MH	1.5	1.5	●		●			●		6	9.525	4.2
WPMT06X415ZPR-DML	1.5	1.5				●				6	9.525	4.2
WPMT080615ZSR	1.5	1.5	●	●	●		●	●		8	12.87	6.35
WPMT080615ZPR-ML	1.5	1.5	●	●	●		●	●		8	12.87	6.35
WPMT080615ZSR-MH	1.5	1.5	●		●			●		8	12.87	6.35
WPMT080615ZPR-DML	1.5	1.5				●				8	12.87	6.35
WPMT090725ZSR	2.5	3	●		●		●	●		9	15	7
WPMT090725ZPR-ML	2.5	3	●	●	●		●	●		9	15	7
WPMT090725ZSR-MH	2.5	3	●	●	●			●		9	15	7
WPMT090725ZPR-DML	2.5	3				●				9	15	7

●: Line up

Reference pages: Standard cutting conditions → H054 - H055

STANDARD CUTTING CONDITIONS

05·06 type

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	ø20, 21 (CICT = 2)	ø25, 26 (CICT = 2)	ø32, 33 (CICT = 2, 3)	ø40 (CICT = 3)	ø50 (CICT = 4)	ø63 (CICT = 5, 6)
P	Carbon Steels S50C, etc. C50, etc. < 300HB	AH3135	100 ~ 250	0.5 ~ 2	*Vc* = 150 m/min, *fz* = 0.8 mm/t *ap* =1 mm, *ae* = 1×DCX mm	*Vc* = 150 m/min, *fz* = 1 mm/t *ap* = 1 mm, *ae* = 1×DCX mm				
					When plunging in small depth: *fz* = 0.2 mm/t					
	Alloy steels SCM440, etc. 42CrMo4etc, etc. < 300 HB	AH3135	100 ~ 200	0.5 ~ 2	*Vc* = 130 m/min, *fz* = 0.8 mm/t *ap* = 1 mm, *ae* = 1×DCX mm	*Vc* = 130 m/min, *fz* = 1 mm/t *ap* = 1 mm, *ae* = 1×DCX mm				
					When plunging in small depth: *fz* = 0.2 mm/t					
	Prehardened steels NAK80, PX5, X96CrMoV12, etc. 30 ~ 40HRC	AH3135	80 ~ 150	0.5 ~ 1	*Vc* = 100 m/min, *fz* = 0.5 mm/t *ap* = 1 mm, *ae* = 1×DCX mm	*Vc* = 100 m/min, *fz* = 0.5 mm/t *ap* = 1 mm, *ae* = 1×DCX mm				
					When plunging in small depth: *fz* = 0.1 mm/t					
M	Stainless steels SUS304, etc. X5CrNi18 9, etc.	AH130 (AH3135)	100 ~ 200	0.5 ~ 2	*Vc* = 130 m/min, *fz* = 0.8 mm/t *ap* = 1 mm, *ae* = 1×DCX mm	*Vc* = 130 m/min, *fz* = 1 mm/t *ap* = 1 mm, *ae* = 1×DCX mm				
					When plunging in small depth: *fz* = 0.2 mm/t					
K	Cast irons FC250, etc. 250, etc.	AH120	100 ~ 250	0.8 ~ 2.5	*Vc* = 150 m/min, *fz* = 1 mm/t *ap* = 1 mm, *ae* = 1×DCX mm	*Vc* = 180 m/min, *fz* = 1.5 mm/t *ap* = 1 mm, *ae* = 1×DCX mm				
					When plunging in small depth: *fz* = 0.2 mm/t					
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.3 ~ 0.7	*Vc* = 50 m/min, *fz* = 0.5 mm/t, *ap* = 0.7 mm, *ae* = 0.5×DCX mm					
					When plunging in small depth: *fz* = 0.1 mm/t					
	Heat-resistant alloys Inconel 718, etc.	AH120	10 ~ 40	0.1 ~ 0.3	*Vc* = 30 m/min, *fz* = 0.2 mm/t, *ap* = 0.7 mm, *ae* = 0.5×DCX mm					
					When plunging in small depth: *fz* = 0.1 mm/t					
H	Hard materials SKD11, etc. X153CrMoV12, etc. 40 ~ 50HRC	AH730	50 ~ 80	0.5 ~ 1	*Vc* = 70 m/min, *fz* = 0.7 mm/t, *ap* = 0.7 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.1 mm/t					

08 type

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	ø40 (CICT = 2)	ø50 (CICT = 3)	ø63 (CICT = 4)	ø80 (CICT = 5)	ø100 (CICT = 6)	ø125 (CICT = 7)	ø160 (CICT = 8)
P	Carbon Steels S50C, etc. C50, etc. < 300HB	AH3135	100 ~ 250	0.5 ~ 2	*Vc* = 180 m/min, *fz* = 1 mm/t *ap* = 1 mm, *ae* = 40 mm	*Vc* = 200 m/min, *fz* = 1.5 mm/t *ap* = 1 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.2 mm/t						
	Alloy steels SCM440, etc. 42CrMo4etc, etc. < 300 HB	AH3135	100 ~ 200	0.5 ~ 2	*Vc* = 130 m/min, *fz* = 1 mm/t *ap* = 1 mm, *ae* = 40 mm	*Vc* = 150 m/min, *fz* = 1.5 mm/t *ap* = 1 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.2 mm/t						
	Prehardened steels NAK80, PX5, X96CrMoV12, etc. 30 ~ 40HRC	AH3135	80 ~ 150	0.5 ~ 1	*Vc* = 100 m/min, *fz* = 0.5 mm/t *ap* = 1 mm, *ae* = 40 mm	*Vc* = 120 m/min, *fz* = 0.8 mm/t *ap* = 1 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.1 mm/t						
M	Stainless steels SUS304, etc. X5CrNi18 9, etc.	AH130 (AH3135)	100 ~ 200	0.5 ~ 2	*Vc* = 130 m/min, *fz* = 1 mm/t *ap* = 1 mm, *ae* = 40 mm	*Vc* = 150 m/min, *fz* = 1.5 mm/t *ap* = 1 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.2 mm/t						
K	Cast irons FC250, etc. 250, etc.	AH120	150 ~ 250	0.8 ~ 2.5	*Vc* = 180 m/min, *fz* = 1.5 mm/t *ap* = 1 mm, *ae* = 40 mm	*Vc* = 200 m/min, *fz* = 2 mm/t *ap* = 1 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.2 mm/t						
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.3 ~ 0.7	*Vc* = 50 m/min, *fz* = 0.5 mm/t, *ap* = 0.7 mm, *ae* = 0.5×DCX mm						
					When plunging in small depth: *fz* = 0.1 mm/t						
	Heat-resistant alloys Inconel 718, etc.	AH120	10 ~ 40	0.1 ~ 0.3	*Vc* = 30 m/min, *fz* = 0.2 mm/t, *ap* = 0.7 mm, *ae* = 0.5×DCX mm						
					When plunging in small depth: *fz* = 0.1 mm/t						
H	Hard materials SKD11, etc. X153CrMoV12, etc. 40 ~ 50HRC	AH730	50 ~ 80	0.5 ~ 1	*Vc* = 70 m/min, *fz* = 0.7 mm/t, *ap* = 0.7 mm, *ae* = 1×DCX mm						
					When plunging in small depth: *fz* = 0.1 mm/t						

Note: • The above values of cutting speed show the standard speed when overhang length of tool is below 3D. The cutting speed and the feed rate should be set at the lower limit values when overhang length of tool exceeds 3D.
• Thick and heavy chips are discharged by these TAC mills. Use internal air supply or air-blowing in order to prevent tool failure.

STANDARD CUTTING CONDITIONS

09 type

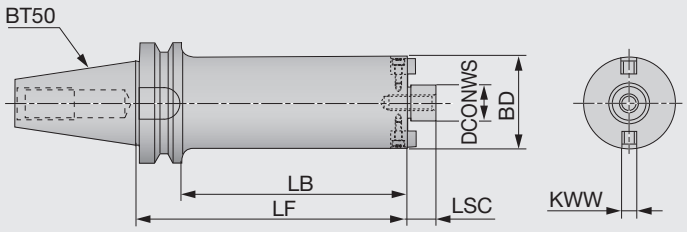
ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	ø50 (CICT = 2)	ø63 (CICT = 3)	ø80 (CICT = 4)	ø100 (CICT = 5)	ø125 (CICT = 6)	ø160 (CICT = 7)
P	Carbon Steels S50C, etc. C50, etc. < 300HB	AH3135	100 ~ 250	0.5 ~ 2	*Vc* = 200 m/min, *fz* = 1.5 mm/t, *ap* = 2 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.2 mm/t					
	Alloy steels SCM440, etc. 42CrMo4etc, etc. < 300 HB	AH3135	100 ~ 200	0.5 ~ 2	*Vc* = 150 m/min, *fz* = 1.5 mm/t, *ap* = 2 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.2 mm/t					
	Prehardened steels NAK80, PX5, X96CrMoV12, etc. 30 ~ 40HRC	AH3135	80 ~ 150	0.5 ~ 1	*Vc* = 120 m/min, *fz* = 0.8 mm/t, *ap* = 2 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.1 mm/t					
M	Stainless steels SUS304, etc. X5CrNi18 9, etc.	AH130 (AH3135)	100 ~ 200	0.5 ~ 2	*Vc* = 150 m/min, *fz* = 1.5 mm/t, *ap* = 2 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.2 mm/t					
K	Cast irons FC250, etc. 250, etc.	AH120	150 ~ 250	0.8 ~ 2.5	*Vc* = 200 m/min, *fz* = 2 mm/t, *ap* = 2 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.2 mm/t					
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.3 ~ 0.7	*Vc* = 50 m/min, *fz* = 0.5 mm/t, *ap* = 1.5 mm, *ae* = 0.5×DCX mm					
					When plunging in small depth: *fz* = 0.1 mm/t					
	Heat-resistant alloys Inconel 718, etc.	AH120	10 ~ 40	0.1 ~ 0.3	*Vc* = 30 m/min, *fz* = 0.2 mm/t, *ap* = 1 mm, *ae* = 0.5×DCX mm					
					When plunging in small depth: *fz* = 0.1 mm/t					
H	Hard materials SKD11, etc. X153CrMoV12, etc. 40 ~ 50HRC	AH730	60 ~ 100	0.5 ~ 1	*Vc* = 70 m/min, *fz* = 0.7 mm/t, *ap* = 0.7 mm, *ae* = 1×DCX mm					
					When plunging in small depth: *fz* = 0.1 mm/t					

Notes : The cutting speed and feed should be set to 70 to 80 % of the value shown in the above table when overhang length of tool exceeds 3D.

MILLFEED

BT50-FMC/FMA

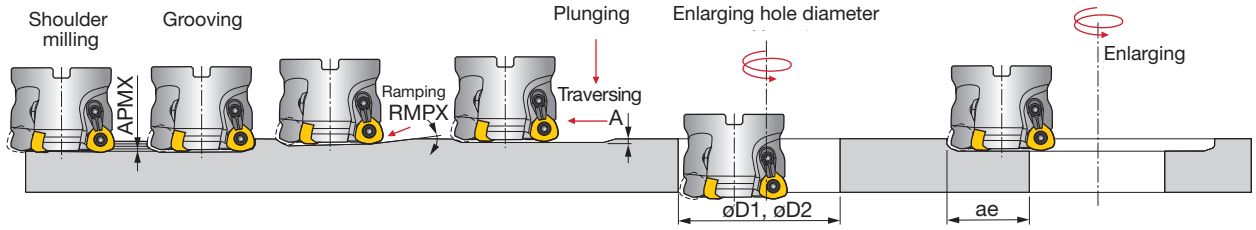
Arbor for TXP mill



*without air hole

Designation	LF	LB	BD	DCONWS	LSC	KWW	WT(kg)	Applicable mill
BT50-FMC22-138-47	138	100	47	22	18	10	5.2	TXP06050R... TXP08050R...
BT50-FMC22-188-47	188	150	47	22	18	10	5.9	
BT50-FMC22-243-47	243	205	47	22	18	10	6.5	
BT50-FMC22-293-47	293	255	47	22	18	10	7.2	
BT50-FMC22-178-59	178	140	59	22	18	10	6.8	TXP08063R... TXP09063R...
BT50-FMC22-238-59	238	200	59	22	18	10	8	
BT50-FMC22-308-59	308	270	59	22	18	10	9.5	
BT50-FMC22-373-59	373	335	59	22	18	10	10.9	
BT50-FMA31.75-215-76	215	177	76	31.75	30	12.7	10	TXP08080R... TXP09080R...
BT50-FMA31.75-295-76	295	257	76	31.75	30	12.7	12.9	
BT50-FMA31.75-375-76	375	337	76	31.75	30	12.7	15.8	
BT50-FMA31.75-275-96	275	237	96	31.75	30	12.7	16.8	TXP08100R... TXP09100R...
BT50-FMA31.75-375-96	375	337	96	31.75	30	12.7	23	

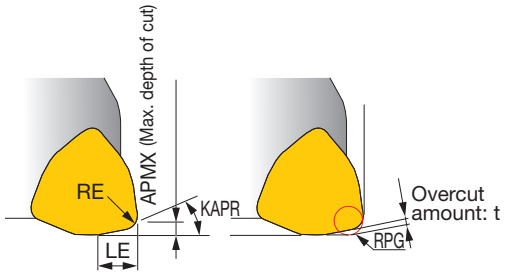
APPLICATION RANGE



Designation	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging depth A	Min. machining hole dia. øD1	Max. machining hole dia. øD2	Max. cutting width in enlarging hole ae
EXP05020...	20	1.5	3°	0.5	30	37	16
EXP05021...	21	1.5	2.5°	0.5	32	39	17
TXP05063RB-E	63	1.5	1°	0.5	116	123	59
TXP05080RB-E	80	1.5	0.5	0.5	150	157	76
E/HXP06025...	25	1.5	5°	1	33	47	20
E/HXP06026...	26	1.5	4.5°	1	35	49	21
E/HXP06032...	32	1.5	3.5°	1	47	61	27
E/HXP06033...	33	1.5	3°	1	49	63	28
E/HXP06040...	40	1.5	2°	1	63	77	35
T/HXP06050...	50	1.5	1.5°	1	83	97	45
TXP06063RB-E	63	1.5	1°	1	109	123	58
TXP06080RB-E	80	1.5	0.5	1	143	157	75
E/HXP08040...	40	1.5	6°	1	53	77	34
T/HXP08050...	50	1.5	4°	1	72	97	44
TXP08052R-E	52	1.5	4°	1	76	101	46
TXP08063...	63	1.5	2.5°	1	98	123	57
TXP08066R-E	66	1.5	2.5	1	104	129	60
TXP08080...	80	1.5	1.5°	1	132	157	74
TXP08100...	100	1.5	1°	1	172	197	94
TXP08125R	125	1.5	0.75°	1	222	247	119
TXP08160R	160	1.5	0.5°	1	292	317	154
E/HXP09050...	50	3	1.5°	0.8	76	97	43
EXP09050RS/L	50	3	1.5	0.8	76	97	43
TXP09063...	63	3	2°	1.5	98	123	56
TXP09080R	80	3	1.5°	1.5	132	157	73
TXP09100R	100	3	1°	1.5	172	197	93
TXP09125R	125	3	0.75°	1.5	222	247	118
TXP09160R	160	3	0.5°	1.5	292	317	153

TOOL GEOMETRY FOR PROGRAMMING

When programming for CAD/CAM, the tool should be assumed to be a radius cutter shown in the table below.
In this case, the amount left as uncut (t) is shown below.



TXP	Max. depth of cut APMX	Corner of insert RE	Cutting edge angle KAPR	LE	t	Corner R when programming RPG
05	1.5	1.5	15°	3.8	0.5	2
06	1.5	1.5	20°	4.3	0.7	2.5
08	1.5	1.5	10°	5.7	0.7	2
09	3	2.5	20°	6.8	1.4	3
09	3	2.5	20°	6.8	1.2	4