



For more information

Multifunctional milling cutter with center cutting edge

**DOM<sup>ULTI</sup>REC**

Tungaloy Report No. 548S2-G

## Multifunctional cutters with center cutting capability now expanding the tool diameter range



## Multifunctional tool from flat bottom hole drilling to profiling — now expanding the tool diameter range

### Insert lineup

Smallest in the market\*



<b>Tool dia. DC (mm)</b>	<b>New</b> ø12, ø13	ø16, ø17	ø20, ø21	ø25, ø26	<b>New</b> ø32, ø33	<b>New</b> ø40
<b>APMX (mm)</b>	5	7	9	11	14.5	18
<b>Insert size</b>	06	08	10	12	16	19

\* As of October 2023.

### Applications capabilities with DoMultiRec



Face milling



Shoulder milling



Shoulder milling (with R)



Slotting



Slotting (with R)



Side milling



Pocketing



Ramping



Profiling



Plunging



Hole enlarging

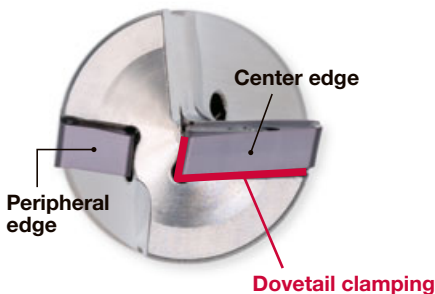


Drilling

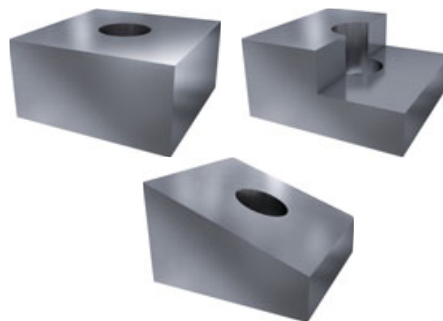


Counterboring

### DoMultiRec Solution



Thick insert design and dovetail interlocking for maximum tool reliability



Drilling on irregular surfaces made easy



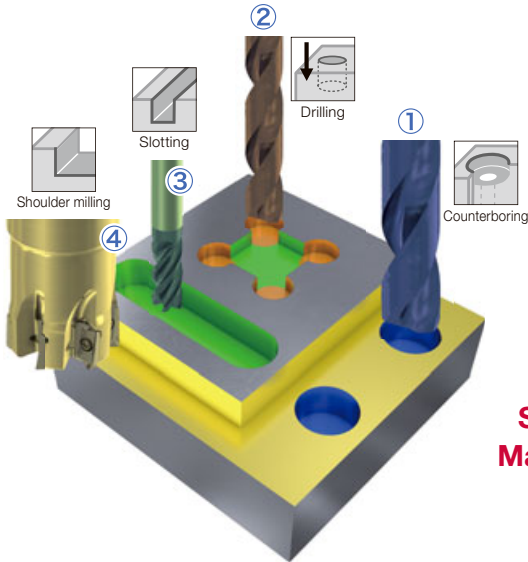
Able to feed in all directions

# Productivity improvement examples using DoMultiRec

## Case 1 Reduced costs by combining multiple processes

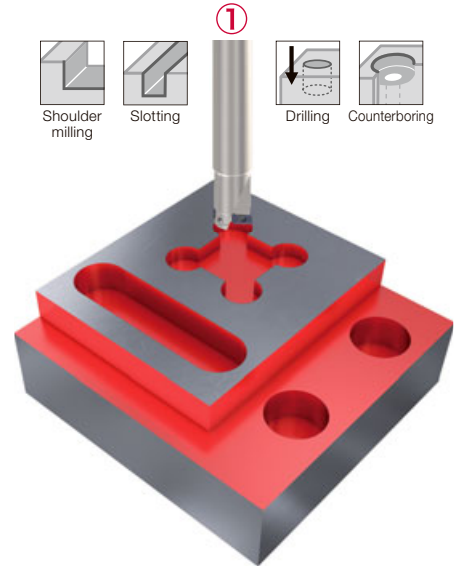
### Conventional operations

Requires 4 different tools



### DoMultiRec operation

Requires just 1 tool for all four processes

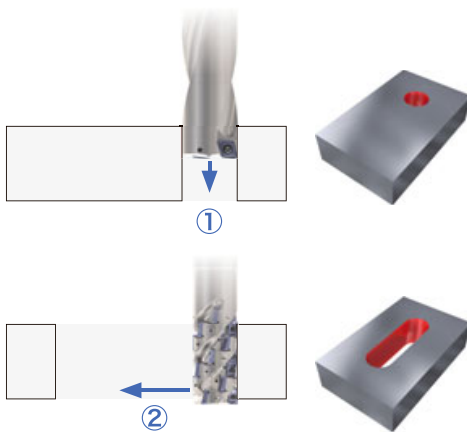


**Reduced tool cost,  
Simplified processes,  
Maximize ATC utilization**

## Case 2 Improved efficiency due to combining multiple processes

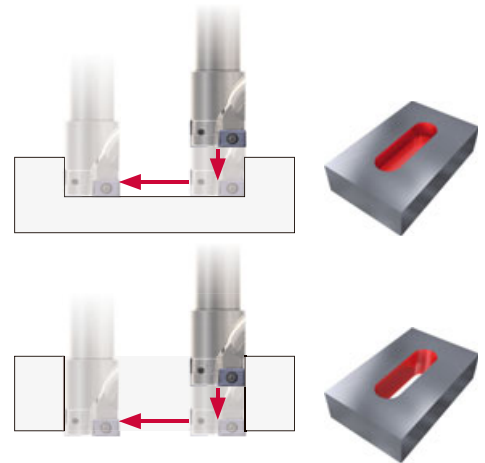
### Conventional operations

- ① Drilling
- ② Slot opening using roughing cutter



### DoMultiRec operation

Drilling + Slotting



**Reduced machining time,  
Minimized setup time,  
Simplified machine  
programming**

① **Indexable drill**  
 ø40 mm, CICT = 2  
 Cutting speed :  $V_c = 100$  m/min  
 Feed per revolution :  $f = 0.1$  mm/rev

② **Roughing cutter**  
 ø32 mm, CICT = 4  
 Cutting speed :  $V_c = 50$  m/min  
 Feed per tooth :  $f_z = 0.06$  mm/t

**Machining time: 3.2 min.**  
 (①+②)

**DOMULTI  
REC**  
 ø40 mm, CICT = 2

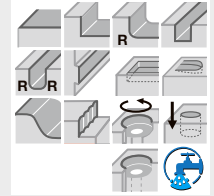
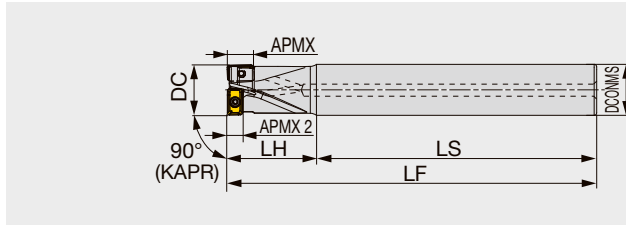
Cutting speed :  $V_c = 200$  m/min  
 Feed per tooth :  $f_z = 0.08$  mm/t

**Machining time: 2.2 min.**

## EVLX06/16/19

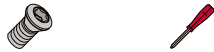
Multi-functional square shoulder milling cutter, with screwed-on inserts and center cutting edge

GAMP: Center insert  $-2.6^\circ \sim -4.4^\circ$ , Peripheral insert  $+6.1^\circ \sim +7.1^\circ$   
 GAMF: Center insert  $+0.2^\circ \sim +1.3^\circ$ , Peripheral insert  $-15.7^\circ \sim -15^\circ$



Designation	APMX	APMX 2	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EVLX06M012C12.0R02	5	2.8	12	2	12	60	20	80	0.06	With	LXMU06...
EVLX06M012C12.0R02L	5	2.8	12	2	12	85	35	120	0.09	With	LXMU06...
EVLX06M013C12.0R02L	5	2.8	13	2	12	95	25	120	0.09	With	LXMU06...
EVLX16M032C32.0R02	14.5	7	32	2	32	100	50	150	0.83	With	LXMU16...
EVLX16M032C32.0R02L	14.5	7	32	2	32	165	90	255	1.45	With	LXMU16...
EVLX16M033C32.0R02L	14.5	7	33	2	32	205	50	255	1.5	With	LXMU16...
EVLX19M040C32.0R02	18	10	40	2	32	100	55	155	1.03	With	LXMU19...
EVLX19M040C32.0R02L	18	10	40	2	32	200	55	255	1.6	With	LXMU19...

### SPARE PARTS



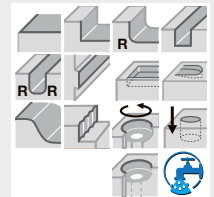
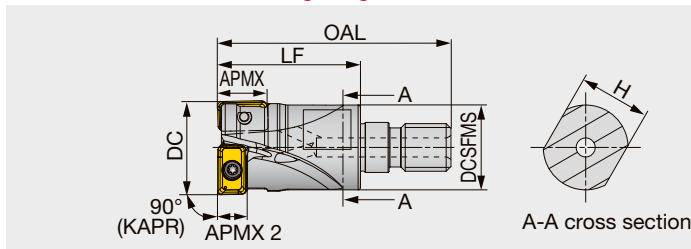
Designation	Clamping screw	Wrench
EVLX06...	CSPB-1.8FL4.3	IP-6DB
EVLX16...	CSTB-4L090	T-15D
EVLX19...	CSTB-5	T-20D

Recommended clamping torque: CSPB-1.8FL4.3 = 0.5 N·m, CSTB-4L090 = 3.5 N·m, CSTB-5 = 5 N·m

## HVLX06/16/19-M

Multi-functional square shoulder modular milling cutter (TungFlex), with screwed-on inserts and center cutting edge

GAMP: Center insert  $-2.6^\circ \sim -4.4^\circ$ , Peripheral insert  $+6.1^\circ \sim +7.1^\circ$   
 GAMF: Center insert  $+0.2^\circ \sim +1.3^\circ$ , Peripheral insert  $-15.7^\circ \sim -15^\circ$



Designation	APMX	APMX 2	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HVLX06M012M06R02	5	2.8	12	2	34.5	20	7	10	M6	0.02	With	LXMU06...
HVLX06M013M06R02	5	2.8	13	2	34.5	20	7	10	M6	0.02	With	LXMU06...
HVLX16M032M16R02	14.5	7	32	2	63	40	22	28.8	M16	0.21	With	LXMU16...
HVLX16M033M16R02	14.5	7	33	2	63	40	22	28.8	M16	0.21	With	LXMU16...

### SPARE PARTS

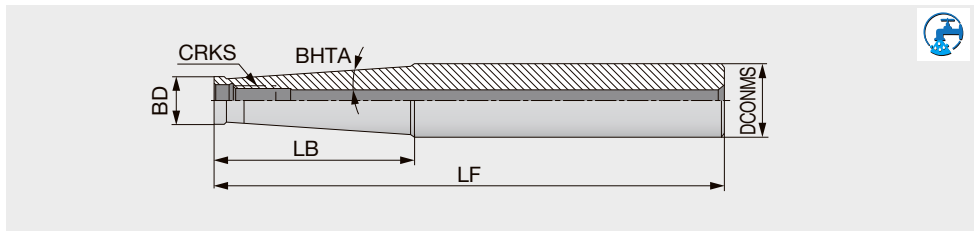


Designation	Clamping screw	Wrench
HVLX06...	CSPB-1.8FL4.3	IP-6DB
HVLX16...	CSTB-4L090	T-15D

Recommended clamping torque: CSPB-1.8FL4.3 = 0.5 N·m, CSTB-4L090 = 3.5 N·m

## SM

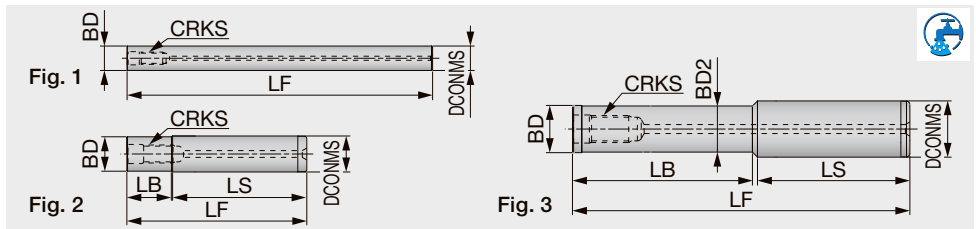
### Steel modular shank



Designation	CRKS	DCONMS	LF	LB	BD	BHTA	Shank type
SM06-L60C10	M6	10	60	20	9.7	0°	Cylindrical
SM06-L105-C12	M6	12	105	60	9.7	1.2°	Cylindrical
SM06-L125-C16	M6	16	125	60	9.7	3.3°	Cylindrical
SM16-L95-C32	M16	32	95	35	29	1.7°	Cylindrical
SM16-L230-C32	M16	32	230	50	29	1.8°	Cylindrical

## SM-C-H

### Carbide modular shank



Designation	CRKS	DCONMS	LF	LB	LS	BD	BD2	Fig.
SM06-L100-C10-C-H	M6	10	100	-	-	10	-	1
SM06-L150-C10-C-H	M6	10	150	-	-	10	-	1
SM06-L100-C12-C-H	M6	12	100	-	-	12	-	1
SM06-L150-C12-C-H	M6	12	150	-	-	12	-	1
SM16-L100-40-C32-C-H	M16	32	100	40	58.5	29	-	2
SM16-L150-80-C32-C-H	M16	32	150	80	68.5	29	-	2
SM16-L200-100-C32-C-H	M16	32	200	100	98.5	29	-	2
SM16-L200-140-C32-C-H	M16	32	200	140	58.5	29	-	2
SM16-L250-130-C32-C-H	M16	32	250	130	118.5	29	-	2
SM16-L250-180-C32-C-H	M16	32	250	180	68.5	29	-	2
SM16-L300-180-C32-C-H	M16	32	300	180	118.5	29	-	2
SM16-L300-230-C32-C-H	M16	32	300	230	68.5	29	-	2
SM16-L350-230-C32-C-H	M16	32	350	230	118.5	29	-	2
SM16-L350-280-C32-C-H	M16	32	350	280	68.5	29	-	2

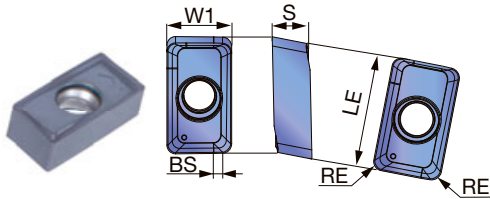
For more modular products.

e-catalog



## INSERT

### LXMU-MM



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

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated		LE	W1	S	BS
			AH3225	AH8015				
LXMU060204PER-MM	0.4	5	●	●	6	3.9	2.32	0.6
LXMU160504PER-MM	0.4	15	●	●	15.7	9.4	5.22	1.6
LXMU160508PER-MM	0.8	15	●	●	15.7	9.4	5.27	1.2
LXMU190608PER-MM	0.8	18	●	●	19	12.5	6.82	1.2

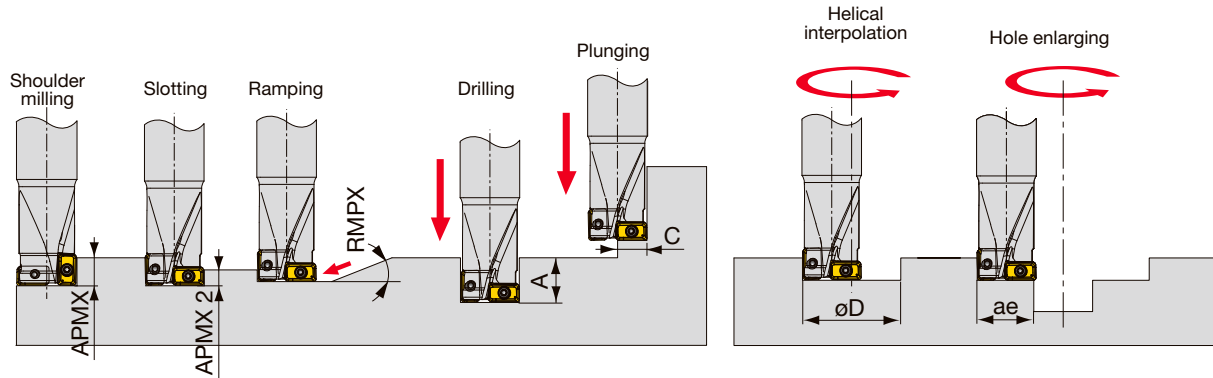
● : Line up

## STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Grades	Cutting speed Vc (m/min)	Drilling (ZEFP = 1)* Feed per revolution f (mm/rev)	Shouldering / Helical interpolation*	
						Feed per tooth fz (mm/t)	
						06	16 / 19
<b>P</b>	Low carbon steel S15C, SS400, etc. C15E4, E275A, etc.	- 200 HB	AH3225	100 - 300	0.03 - 0.08	0.05 - 0.2	0.05 - 0.3
	Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	- 300 HB	AH3225	100 - 250	0.03 - 0.08	0.05 - 0.2	0.05 - 0.3
	Prehardened steel NAK80, PX5, etc.	30 - 40 HRC	AH3225	100 - 200	0.03 - 0.06	0.05 - 0.15	0.05 - 0.25
<b>M</b>	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	-	AH3225	80 - 180	0.03 - 0.08	0.05 - 0.15	0.05 - 0.22
<b>K</b>	Grey cast iron FC250, FC300, etc. 250, 300, etc.	150 - 250 HB	AH8015	100 - 300	0.03 - 0.1	0.05 - 0.2	0.05 - 0.3
	Ductile cast iron FCD400, FCD600, etc. 400-15S, 600-3, etc.	150 - 250 HB	AH8015	100 - 250	0.03 - 0.08	0.05 - 0.15	0.05 - 0.25
<b>S</b>	Titanium alloys Ti-6Al-4V, etc.	-	AH3225	20 - 60	0.03 - 0.06	0.04 - 0.1	0.04 - 0.15
	Superalloys Inconel 718, etc.	-	AH8015	20 - 40	0.03 - 0.06	0.04 - 0.1	0.04 - 0.15
<b>H</b>	Hardened steel	SKD61, etc. X40CrMoV5-1, etc.	40 - 50 HRC	AH8015	50 - 150	0.03 - 0.05	0.04 - 0.1
		SKD11, etc. X153CrMoV12, etc.	50 - 60 HRC	AH8015	40 - 70	0.03 - 0.05	0.04 - 0.1

\*In the following cases, feed as if the cutter has a single effective cutting edge (ZEFP = 1):  
 - Hole making  
 - Helical interpolating for holes with a hole diameter ( $\phi D$ )  $\leq 1.25 \times$  the tool diameter (DC)  
 - The axial D.O.C. exceeds APMX2 (See below for APMX2)

## APPLICATION RANGE



Designation	DC	Max. depth of cut		Max. drilling depth* A	Max. cutting width in plunging C	Max. ramping angle RMPX	Hole diameters (w/ flat bottom) machinable		Hole diameters machinable		Max. cutting width engagement ae
		APMX	APMX 2				øDmin	øDmax	øDmin	øDmax	
E/HVLX06M012...	12	5	2.8	6	6	90°	13	22.75	12	23.75	10
EVLX06M013...	13	5	2.8	6	6.5	90°	15	24.75	13	25.75	11
E/HVLX08M016...	16	7	4	12	8	90°	17	30.75	16	31.75	14
EVLX08M017...	17	7	4	12	8.5	90°	19	32.75	17	33.75	15
E/HVLX10M020...	20	9	4	15	10	90°	22	37.95	20	39.15	18
EVLX10M021...	21	9	4	15	10.5	90°	23.35	39.95	21	40.95	19
E/HVLX12M025...	25	11	6	18.5	12.5	90°	26.65	47.85	25	48.95	23
EVLX12M026...	26	11	6	18.5	13	90°	28.65	49.85	26	50.95	24
E/HVLX16M032...	32	14.5	7	16	16	90°	33.65	61.85	32	62.95	30
EVLX16M033...	33	14.5	7	16	16.5	90°	35.65	63.85	33	64.95	31
EVLX19M040...	40	18	10	20	20	90°	42.55	77.85	40	78.95	38

\*Use pecking or dwelling method when drilling holes deeper than 5 mm.

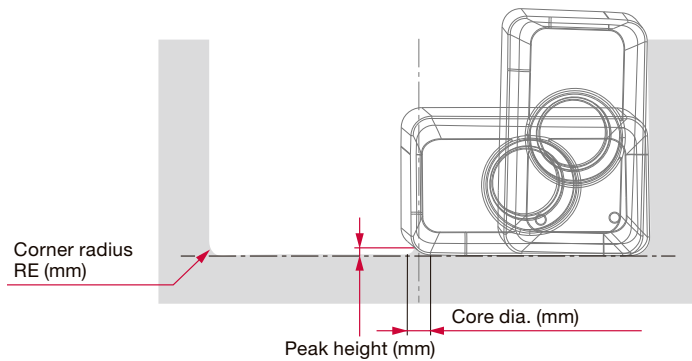
## CAUTION WHEN INSTALLING THE INSERTS

Ensure that the insert is not lifted in the seat and there is no gap between the insert and seat.

For more information

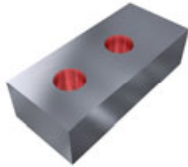

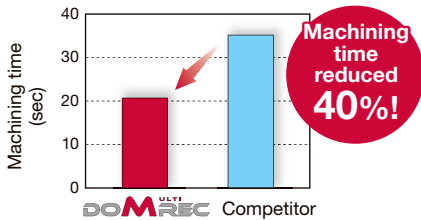
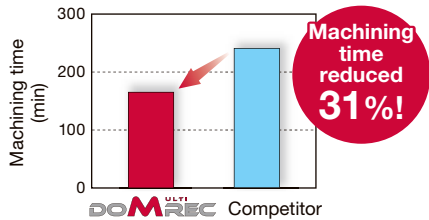


## HOLE BOTTOM PROFILE AFTER DRILLING



DC	D12	D13	D32		D33		D40
Insert	LXMU06...		LXMU16...				LXMU19...
RE (mm)	0.4		0.4	0.8	0.4	0.8	0.4
Peak height (mm)	0.04	0.41	0.19	0.33	0.57	0.95	0.96
Core dia. (mm)	0.37	1.34	0.5	1.13	1.34	2.12	2.29

## PRACTICAL EXAMPLES

Workpiece type	Machine part		Cylinder liner		
Cutter	EVLX06M012C12.0R02L (ø12 mm, CICT = 2)		EVLX19M040C32.0R02L (ø40 mm, CICT = 2)		
Insert	LXMU060204PER-MM		LXMU190608PER-MM		
Grade	AH3225		AH8015		
Workpiece material	S45C/C45		FC250/250		
	Size 06 	<b>P</b>	Size 19 	<b>K</b>	
Cutting conditions	Machining	Drilling	Hole enlarging	Drilling	Shoulder milling
	Cutting speed: $V_c$ (m/min)	98	98	80	80
	Feed per revolution: $f$ (mm/rev)	0.06	-	0.08	-
	Feed per tooth: $f_z$ (mm/t)	-	0.1	-	0.15
	Depth of cut : $a_p$ (mm)	3	3	10	10
	Width of cut : $a_e$ (mm)	-	2.5	-	40
	Coolant	Wet		Dry	
Overhang length (mm)	50		100		
Machine	Horizontal M/C, BT40		Horizontal M/C, BT50		
Results	 <p><b>DoMultiRec enabled a single tool to perform multiple operations, significantly reducing tool cost. Increased cutting data achieved 40% machining time reduction.</b></p>		 <p><b>DoMultiRec enabled a single tool to perform multiple operations, significantly reducing tool cost. Increased cutting data achieved 31% machining time reduction.</b></p>		



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