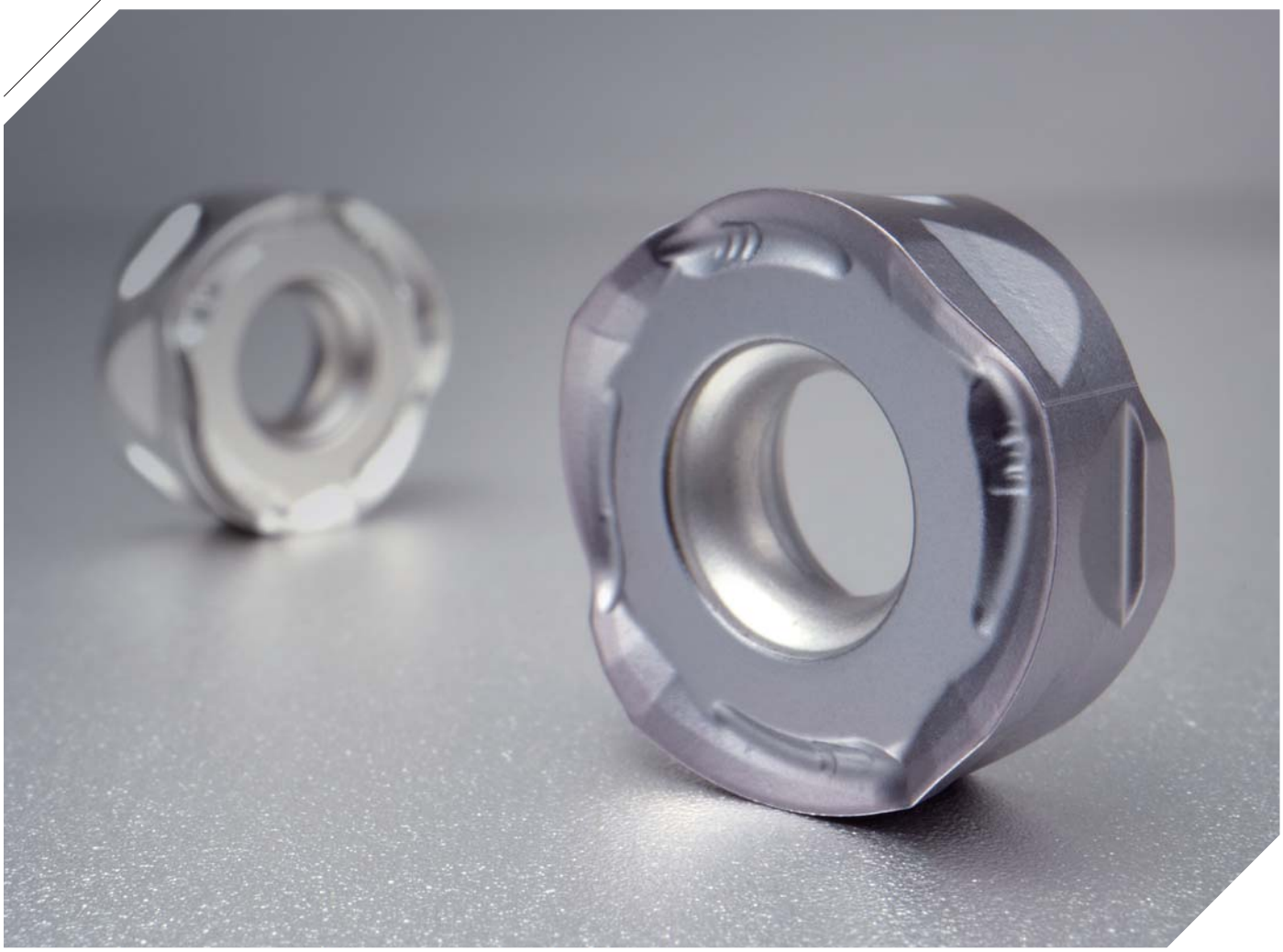
KORLOY
TECH-NEWS

RMR

Double-sided round milling tool with 8 corners

- The exclusive structure preventing rotation ensures stable machining.
- Double-sided round tool with 8 corners realizes cost efficiency.



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Double-sided round milling tool with 8 corners

RMR

KORLOY has released RMR, the most efficient 8-corner double-sided round milling tool for the machining market, including mold and aerospace industries.

RMR is a tool with double-sided 8-corner that enhances cost-effectiveness compared to single-sided tools. It features a unique anti-rotation structure with improved stability, reducing the risk of unexpected breakage and chipping, resulting in a longer tool life.

In addition, with its compact C/B and helix-shaped cutting edge, RMR exhibits excellent cutting performance even in high feed cutting operations. The optimized angle design between the minor cutting edge and workpiece provides superior surface finish.

With its distinctive shape and various grade management capabilities, RMR excels in mold machining. In particular, for UPC/UNC grades, it demonstrates excellent tool life in machining tough materials such as aerospace components by applying the Ultra coating technology with high hardness and lubricity properties.

» High cost efficiency
- Maximum 8 corners are usable due to applying double-sided structure.

» Good surface finish
- The optimal minor cutting edge ensures good surface finish.

» Stable tool life
- The exclusive structure preventing rotation ensures stable machining.

» Excellent performance
- Chip breaker for good surface finish and helix cutting edge realizes excellent cutting performance.

Code system

Cutter type

RMR C M 063 R - 22 - 5 - RN12

- **RMR** — Rich Mill Round
- **C** — Type: C: Cutter
- **M** — Arbor: M: Metric, A: Inch, None: Asia
- **063** — Machining dia.: 050: Ø50 mm
- **R** — Oil hole & Hand: R: With oil hole, Right-handed; NR: Without oil hole, Right-handed
- **22** — Internal dia.: 22: Ø22 mm
- **5** — No. of tooth: 5: 5 Teeth
- **RN12** — Available insert: RN12: RNMX12

Shank type

RMR S 040 R - 3 W 32 - 110 - RN12

- **RMR** — Rich Mill Round
- **S** — Type: S: Shank
- **040** — Machining dia.: 040: Ø40 mm
- **R** — Oil hole & Hand: R: With oil hole, Right-handed; NR: Without oil hole, Right-handed
- **3** — No. of tooth: 3: 3 Teeth
- **W** — Shank type: W: Weldon, C: Cylinder
- **32** — Shank dia.: 32: Ø32 mm
- **110** — Overall length: 110: 110 mm
- **RN12** — Available insert: RN12: RNMX12

Recommended grade and cutting edge

Type	Recommended insert and grade for different workpieces							
	P		M		K		S	
	C/B	Grade	C/B	Grade	C/B	Grade	C/B	Grade
1st	 MM	 PC3700	 ML	 PC9540	 MM	 PC6510	 ML	 UNC840
2nd	 MM	 PC5300	 MM	 PC9540	 MM	 PC5300	 ML	 UPC845

Recommended cutting conditions

Workpiece				Specific cutting force (N/mm²)	Brinell hardness (HB)	Wear resistance ← → Toughness						ML/MM
						Grade	C/B		Grade	C/B		
ISO	Workpiece materials	ISO	AISI			PC3700	ML	MM	PC5300	ML	MM	
						vc (m/min)	fz (mm/t)	fz (mm/t)	vc (m/min)	fz (mm/t)	fz (mm/t)	ap (mm)
P	Non-ferrous alloy steel Mn < 1.65	C25	1025	1500	125	100	0.5	0.5	80	0.5	0.5	
						180	**0.3**	**0.3**	**140**	**0.3**	**0.3**	
						250	0.1	0.1	200	0.1	0.1	
		C45	1045	1700	190	80	0.5	0.5	80	0.5	0.5	
						180	**0.3**	**0.3**	**140**	**0.3**	**0.3**	1 ~ 3
						250	0.1	0.1	200	0.1	0.1	
	Low alloy steel ≤ 5%	42CrMo4	4140	1700	175	80	0.5	0.5	80	0.5	0.5	
						160	**0.3**	**0.3**	**120**	**0.3**	**0.3**	
						230	0.1	0.1	190	0.1	0.1	
	High alloy steel > 5%	X40CrMoV5-1	D2 H13	1950	200	120	0.7	0.7	100	0.7	0.7	
						140	**0.5**	**0.5**	**120**	**0.5**	**0.5**	1
						280	0.3	0.3	210	0.3	0.3	

Recommended cutting conditions

Workpiece				Specific cutting force (N/mm^2)	Brinell hardness (HB)	Grade	C/B	ML
ISO	Workpiece materials	ISO	AISI			PC9540	ML	
						vc (m/min)	fz (mm/t)	ap (mm)
M	Ferritic/ martensitic	X6CrAl13 X6Cr17	405 430	1800	200	120	0.3	1 ~ 3
						160	**0.15**	
						200	0.05	
		X12CrS13 X6CrMo17-1	416 434	2850	330	100	0.3	
						140	**0.15**	
						180	0.05	
		X12Cr13	403 410	2350	330	100	0.3	
						140	**0.15**	
						180	0.05	
	Austenitic	X5CrNI18-9, X2CrNI18-9 X5CrNiMo17-12-2 XCrNiMo17-12-3	304 316	2000	180	90	0.3	
						120	**0.15**	
						150	0.05	
	Austenitic-ferritic (Duplex)	-	S31803 S32750	2450	260	60	0.3	
						90	**0.15**	
						120	0.1	

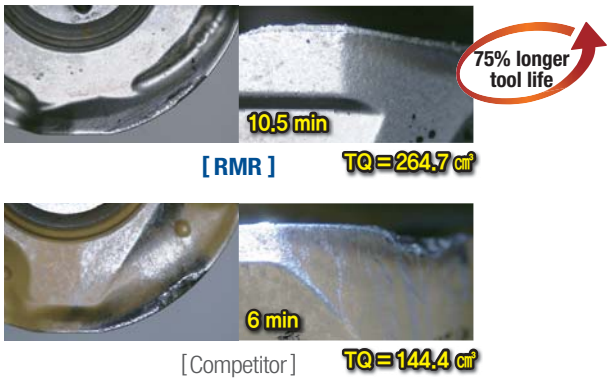
Workpiece				Specific cutting force (N/mm^2)	Brinell hardness (HB)	Wear resistance ⟷ Toughness						ML/MM
						Grade	C/B		Grade	C/B		
ISO	Workpiece materials	ISO	AISI			PC6510	ML	MM	PC5300	ML	MM	
						vc (m/min)	fz (mm/t)	fz (mm/t)	vc (m/min)	fz (mm/t)	fz (mm/t)	ap (mm)
K	Gray cast iron	200	No 30 B	900	180	140	0.25	0.3	120	0.25	0.3	1 ~ 3
						180	**0.2**	**0.2**	**160**	**0.2**	**0.2**	
						230	0.1	0.1	200	0.1	0.1	
	Nodular graphite cast iron	500-7	80-55-06	870	155	120	0.25	0.3	110	0.25	0.3	
						160	**0.2**	**0.2**	**145**	**0.2**	**0.2**	
						200	0.1	0.1	180	0.1	0.1	

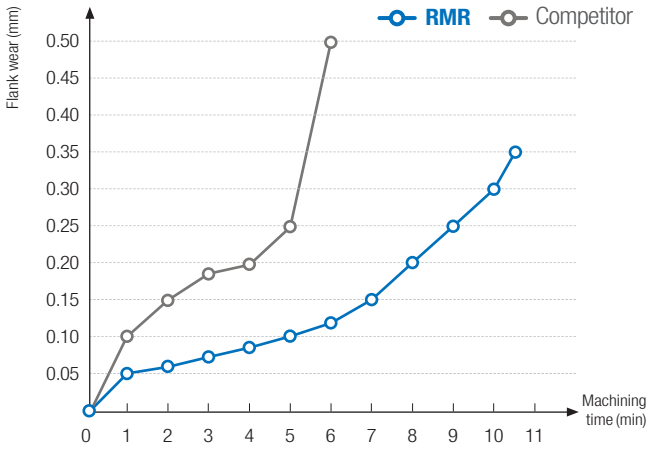
Workpiece				Specific cutting force (N/mm^2)	Brinell hardness (HB)	Wear resistance ⟷ Toughness				ML
						Grade	C/B	Grade	C/B	
ISO	Workpiece materials	ISO	AISI			UNC840	ML	UPC845	ML	
						vc (m/min)	fz (mm/t)	vc (m/min)	fz (mm/t)	ap (mm)
S	Nickel base	15156-3	Inconel625	2650	250	30	0.4	25	0.4	1 ~ 3
						45	**0.2**	**40**	**0.2**	
						60	0.05	55	0.1	
		9723	Inconel718	3000	320	25	0.4	20	0.4	
						40	**0.2**	**35**	**0.2**	
						55	0.05	50	0.1	
	Cobalt based alloy	Stellite	Stellite	3000 ~ 3100	300 ~ 320	30	0.4	20	0.4	
						45	**0.2**	**35**	**0.2**	
						60	0.05	50	0.1	
	Cobalt based alloy	5832-11	Ti-6Al-4V	1400	320	30	0.4	20	0.4	
						50	**0.2**	**40**	**0.2**	
						70	0.05	60	0.1	

Performance evaluation

Aerospace Industry (Wear resistance)

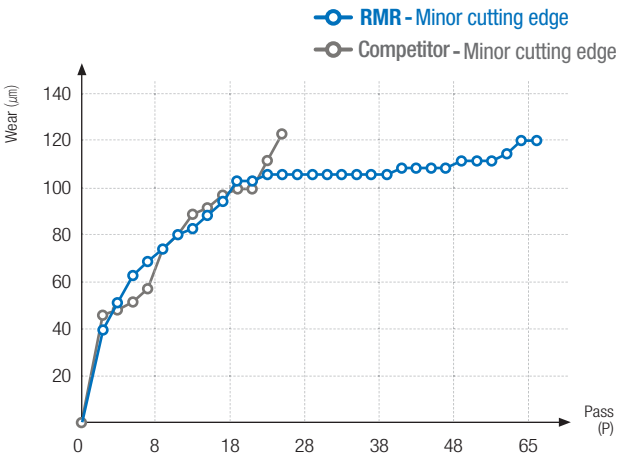
Workpiece	Inconel718
Cutting condition	vc (m/min) = 30, fz (mm/t) = 0.4, ap (mm) = 1.8, wet
Tool	**Insert** RNMX1204M0E-ML (UNC840) **Holder** RMRCM050R-22-5-RN12





Mold Industry (Wear resistance)

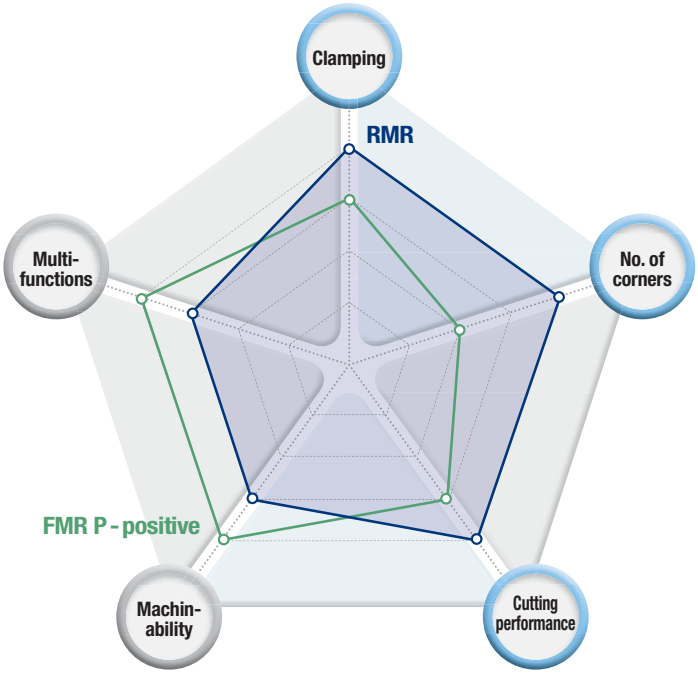
Workpiece	Alloy steel (SCM440, HRC20)
Cutting condition	vc (m/min) = 120, fz (mm/t) = 0.55, ap (mm) = 3, dry
Tool	**Insert** RNMX1204M0S-MM (PC3700) **Holder** RMRCM050R-22-4-RN12



Wear (vc = 120 m/min, fz = 0.55 mm/t, ap = 3 mm)

※ **TQ** : Total Material Removal Amount (㎤)

Tool selection guide



RMR

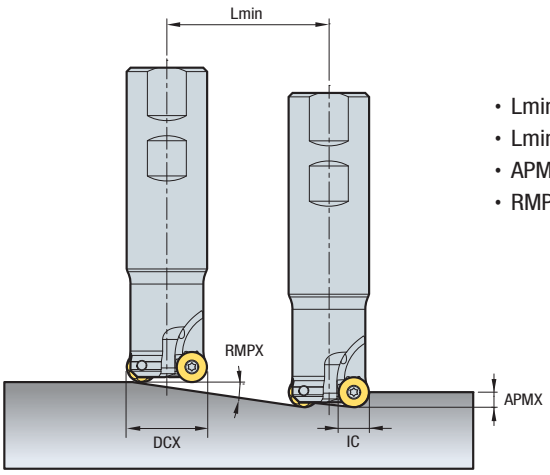
- Excellent clamping force due to preventing rotation with reverse positive angle
- High cost efficiency from double-sided corners (max. 8 corners)
- High cutting performance with an optimal minor edge structure

FMR P - positive

- Multi-functions by applying one sided shape
- Low cutting resistance due to positive setting

Tool	Clamping	No. of corners	Cutting performance	Machinability	Multi-functions
RMR	★★★★	★★★★	★★★★	★★★	★★★
FMR P-positive	★★★	★★	★★★	★★★★	★★★★

Ramping Max Rake Angle α°



- Lmin = APMX/tan (RMPX) (mm)
- Lmin : Min. length of ramping
- APMX : Depth of cut
- RMPX : Max. ramping angle

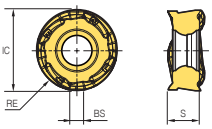
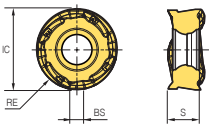
(mm)

Seaction	Min. Cutting Dia	Circle of insert	Tool dia. DCX	Ramping Angle (Max) RMPX	Cutting length (Lmin)				
					APMX = 1	APMX = 1.5	APMX = 2	APMX = 2.5	APMX = 3
RNMX12	32	12	32	1.2	48	72	95	119	143
	40	12	40	1	57	86	115	143	172
	50	12	50	0.8	71	107	143	179	214
	63	12	63	0.64	89	134	179	224	268
	80	12	80	0.52	111	166	221	276	332
	100	12	100	0.42	136	205	273	341	409
	125	12	125	0.34	169	253	338	422	507

- When ramping and helical milling, table feed, vf (mm/min) should be lower than 70% of the recommended cutting conditions.
- When helical milling, Max. pitch, DHmax should be lower than max. depth of cut, ap.
- When ramping, the depth of cut should be lower than max. depth of cut, ap.

Insert

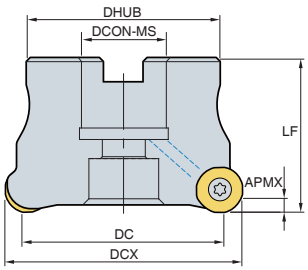
(mm)

Insert	Designation	Application grade						IC	BS	RE	S	Geometrie
		PC6510	PC3700	PC5300	PC9540	UNC840	UPC845					
	**RNMX** 1204M0E-ML				●	●	●	12.0	2.0	6.0	4.75	
	**RNMX** 1204M0E-MM	●	●	●				12.0	2.0	6.0	4.75	

● : Stock item

RMRC(M)-RN12

• AR: -7°
• RR: -15° ~ -1°



(mm)

	Designation	Stock		DCX	DC	APMX	DHUB	DCON-MS	LF	kg	MIID
RMRCM	050R-22-5-RN12	●	5	50	40.4	3.5	42	22	40	0.28	RNMX12
	050R-22-6-RN12	●	6	50	40.4	3.5	42	22	40	0.29	
	063R-22-6-RN12	●	6	63	53.4	3.5	42	22	40	0.45	
	063R-22-7-RN12	●	7	63	53.4	3.5	42	22	40	0.46	
	080R-27-6-RN12	●	6	80	70.4	3.5	60	27	50	0.83	
	080R-27-8-RN12	●	8	80	70.4	3.5	60	27	50	0.82	
	100R-32-7-RN12	●	7	100	90.4	3.5	70	32	63	1.67	
	100R-32-9-RN12	●	9	100	90.4	3.5	70	32	63	1.67	
	125R-40-10-RN12	●	10	125	115.4	3.5	90	40	63	2.82	
	125R-40-12-RN12	●	12	125	115.4	3.5	90	40	63	2.83	
RMRC	080R-25.4-6-RN12	●	6	80	70.4	3.5	60	25.4	50	0.85	
	080R-25.4-8-RN12	●	8	80	70.4	3.5	60	25.4	50	0.85	
	100R-31.75-7-RN12	●	7	100	90.4	3.5	70	31.75	63	1.71	
	100R-31.75-9-RN12	●	9	100	90.4	3.5	70	31.75	63	1.71	
	125R-38.1-10-RN12	●	10	125	115.4	3.5	90	38.1	63	2.88	
	125R-38.1-12-RN12	●	12	125	115.4	3.5	90	38.1	63	2.88	

●: Stock item

Available inserts

RNMX-ML

RNMX-MM

	Designation	Coated					
		PC6510	PC3700	PC5300	PC9540	UNC840	UPC845
RNMX	1204M0E-ML				●	●	●
	1204M0E-MM	●	●	●			

●: Stock item

Available arbors

	Designation	DCON-MS	NC arbor
RMRCM	050R-22-□-RN12	22	BT□□-FMC22-□□
	063R-22-□-RN12		
	080R-27-□-RN12	27	BT□□-FMC27-□□
	100R-32-□-RN12	32	BT□□-FMC32-□□
	125R-40-□-RN12	40	BT□□-FMC40-□□

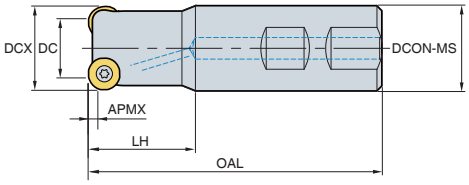
	Designation	DCON-MS	NC arbor
RMRC	080R-25.4-□-RN12	25.4	BT□□-FMC25.4-□□
	100R-31.75-□-RN12	31.75	BT□□-FMC31.75-□□
	125R-38.1-□-RN12	38.1	BT□□-FMC38.1-□□

Parts

Specification	Screw	Wrench
		
Ø50 ~ Ø125	FTNA0411-A	TW15S

RMRS-RN12

• AR : -7°
• RR : -15° ~ -13°



(mm)

	Designation	Stock		DCX	DC	APMX	OAL	LH	DCON-MS	Shank	kg	MIID
RMRS	032R-2W32-110-RN12	●	2	32	22.4	3.5	110	40	32	W	0.56	RNMX12
	032R-3W32-110-RN12	●	3	32	22.4	3.5	110	40	32	W	0.55	
	032R-2C32-200-RN12	●	2	32	22.4	3.5	200	40	32	C	1.09	
	032R-3C32-200-RN12	●	3	32	22.4	3.5	200	40	32	C	1.09	
	040R-3W32-110-RN12	●	3	40	30.4	3.5	110	40	32	W	0.62	
	040R-4W32-110-RN12	●	4	40	30.4	3.5	110	40	32	W	0.62	
	040R-3C32-200-RN12	●	3	40	30.4	3.5	200	40	32	C	1.15	
	040R-4C32-200-RN12	●	4	40	30.4	3.5	200	40	32	C	1.15	
	050R-5W40-120-RN12		5	50	40.4	3.5	120	40	40	W	1.08	
	050R-6W40-120-RN12		6	50	40.4	3.5	120	40	40	W	1.08	
	050R-5C42-300-RN12		5	50	40.4	3.5	300	40	42	C	3.05	
	050R-6C42-300-RN12		6	50	40.4	3.5	300	40	42	C	3.05	
	063R-6W40-130-RN12		6	63	53.4	3.5	130	50	40	W	1.43	
	063R-7W40-130-RN12		7	63	53.4	3.5	130	50	40	W	1.43	
	063R-6C42-300-RN12		6	63	53.4	3.5	300	50	42	C	3.3	
	063R-7C42-300-RN12		7	63	53.4	3.5	300	50	42	C	3.26	

●: Stock item

Available inserts

RNMX-ML

RNMX-MM

	Designation	Coated					
		PC6510	PC3700	PC5300	PC9540	UNC840	UPC845
RNMX	1204M0E-ML				●	●	●
	1204M0E-MM	●	●	●			

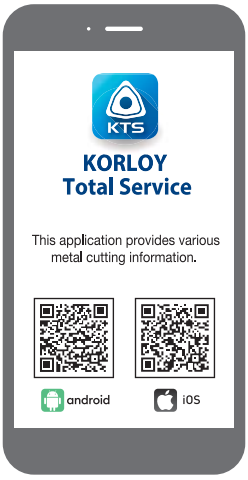
●: Stock item

Parts

Specification	Screw	Wrench
		
Ø32 ~ Ø63	FTNA0411-A	TW15S

⚠ For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threat the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the inserts can be pulled out due to centrifugal force while high speed machining.



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TN90-EM-02 / 20231110