

# MD90

**NEW**

**High efficiency and premium quality aluminium machining**

Improved machining efficiency with fine pitch cutter

Excellent machining quality with unique PCD inserts

Lightweight design compatible with BT30

Custom-designed options also available



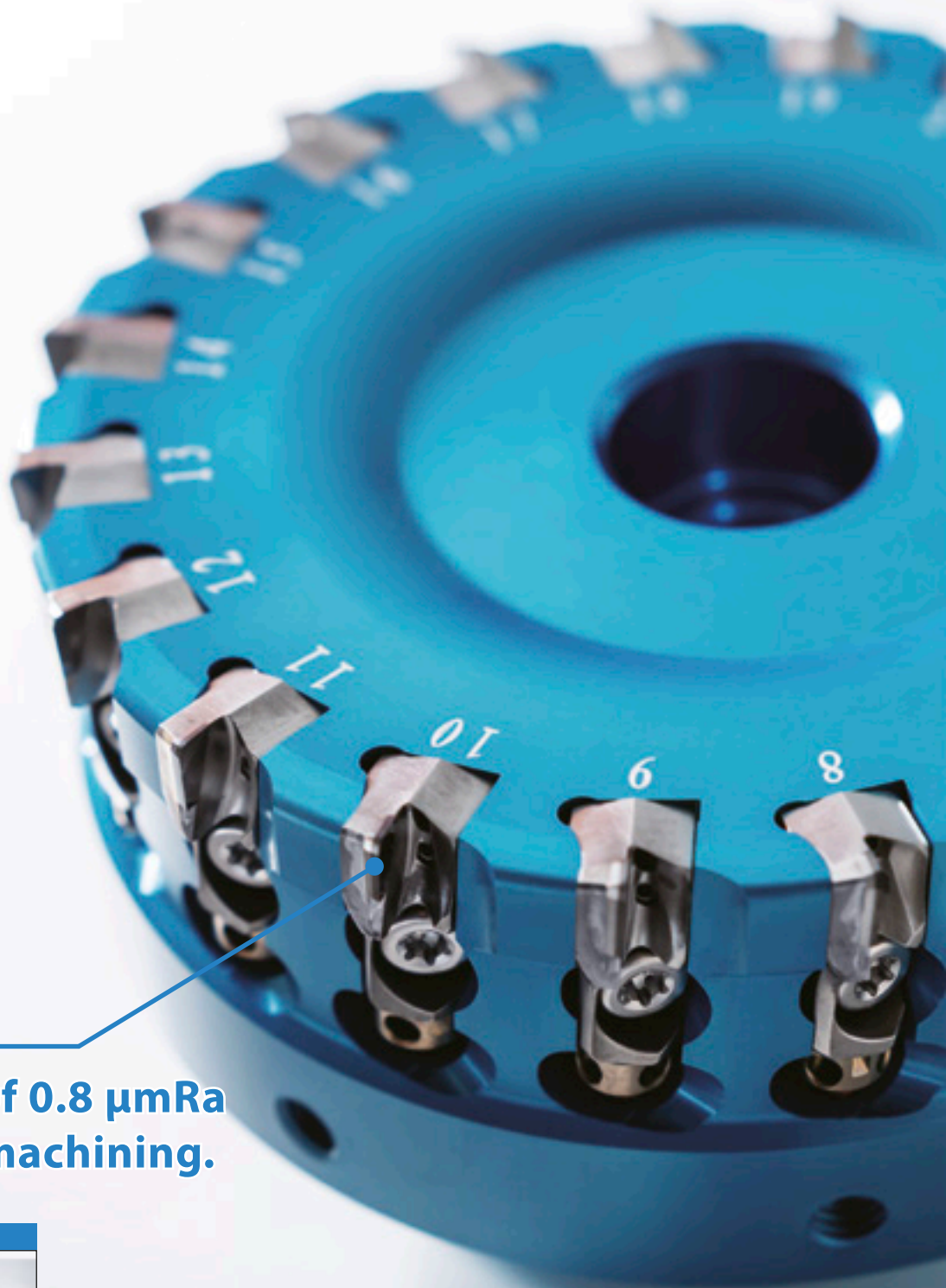
**KEEPS YOU  
AHEAD**



Super fine pitch cutter for aluminium machining

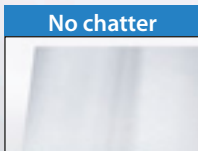
# MD90

Improved machining efficiency of aluminium parts with super fine pitch specifications. Unique design provides high quality and high precision results with long tool life.



**High quality**

**Surface finish of 0.8  $\mu\text{mRa}$  or less. Stable machining.**



Vc = 2,500 m/min. (n = 8,000 min-1), ap x ae = 0.2 x 75 mm, fz = 0.08 mm/t (Vf = 12,800 mm/min.)  
Wet ADC12 BT50 Ø100 (20 inserts) (Internal evaluation)

# Engineered to perfection

A new generation of super fine pitch cutters combine multiple aspects of Kyoceras leading milling technology.

Machine aluminium with higher speeds and higher quality with PCD inserts.

## High efficiency

### Capable of $V_f \geq 24,000$ mm/min.

High-efficiency machining achieved with an ultra-fine pitch design.

Custom designed options allow for further efficiency improvements.

#### Machining efficiency comparison (Internal evaluation)

**MD90**  
18 inserts (Custom designs)

**$V_f = 26,800$  mm/min.**

Competitor A  
14 inserts

**$V_f = 21,000$  mm/min.**

Efficiency  
↑  
1.2x

$V_c = 2,500$  m/min. ( $n = 10,000$  min-1),  $a_p \times a_e = 0.2 \times 53$  mm,  $f_z = 0.15$  mm/t Wet ADC12 BT30 Ø80 mm

## Lightweight

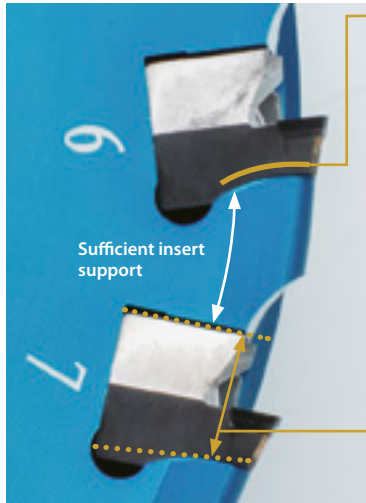
### Compatible with BT30

Offering lightweight aluminium body sizes from Ø80 mm.

Largest cutter diameter of Ø125 mm weighs less than 1.5 kg.



## High efficiency The shape of the cutter maintains super fine pitch specifications

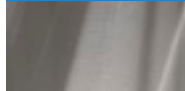


### Curved contact surface

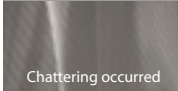
Maximized pitch maintains multiple inserts and rigidity.  
Reduces chattering by dispersing stress.

#### Chatter resistance comparison (Internal evaluation)

##### MD90 (16 inserts)



##### Competitor A (14 inserts)



$V_c = 3,000 \text{ m/min.}$ ,  $a_p \times a_e = 0.2 \times 70 \text{ mm}$   
 $f_z = 0.07 \text{ mm/t}$  Wet ADC12 Ø80 (Prototype)

### Scatter prevention

Firm insert hold

### Ultra fine pitch with lightweight design

Largest cutter diameter of Ø125 mm weighs less than 1.5kg.

Compatible with BT30.

Cutting diameter	No. of inserts	Weight (kg)	Body
Ø40	6	0.26	Steel
Ø50	10	0.37	
Ø63	14	0.62	
Ø80	16	0.6	Aluminium
Ø100	20	0.96	
Ø125	24	1.48	

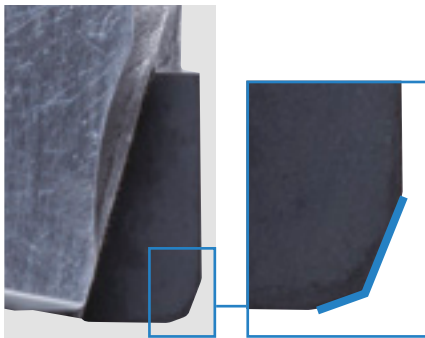
Metric bore diameter

## High quality High machined surface quality, high precision and long tool life

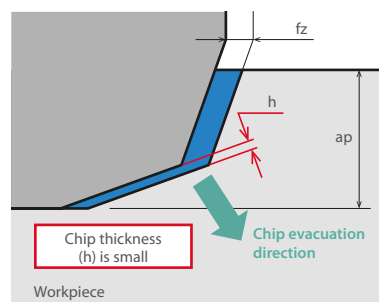
### Suppresses burr formation

#### Double-edge (Standard type)

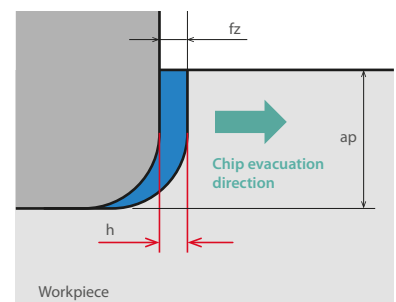
Controls the chip evacuation direction and suppresses distortion caused by chip separation.



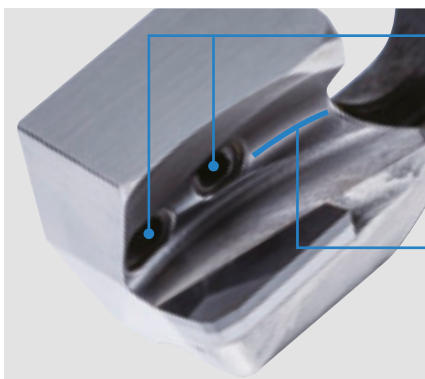
#### Double-edge



#### Corner R



### Achieves stable machining



#### Double coolant holes

Effective cooling of cutting edge and workpiece to achieve superior surface finishes.

Suppresses chip biting and insert defects.

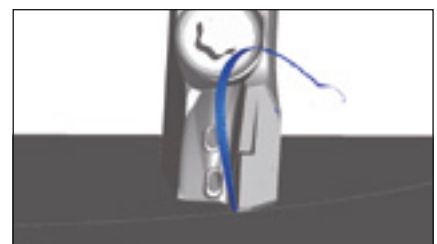
#### Streamlined chip pocket

Good chip control protects cutter body.

Stable cutter balance delivers high-precision machining and longer tool life.

#### Chip evacuation simulation

Evacuate chips along the pocket.



Image

## Performance

Achieve high-efficiency and high-quality machining with ultra-fine pitch specifications



### BT30

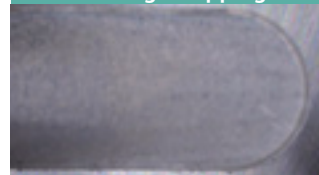
Ø80 - 16 inserts

$V_f = 9,500$  mm/min.

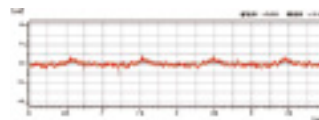
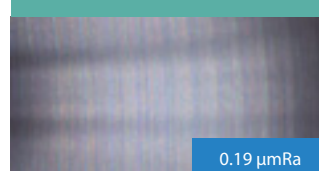
$n = 9,900$  min<sup>-1</sup> ( $V_c = 2,500$  m/min.)  
 $V_f = 9,500$  mm/min. ( $f_z = 0.06$  mm/t)  
 $a_p \times a_e = 0.3 \times 50$  mm  
 ADC12 Wet Ø80  
 MD90-080RA-T16CSF  
 LNGX1807PDFR-G (KPD01A)  
 (Internal evaluation)

### Surface finish evaluation

Suppresses burr formation and edge chipping



Excellent surface finish



### Machining efficiency comparison (Internal evaluation)

MD90  
(16 inserts)

$V_f = 9,500$  mm/min.

Efficiency



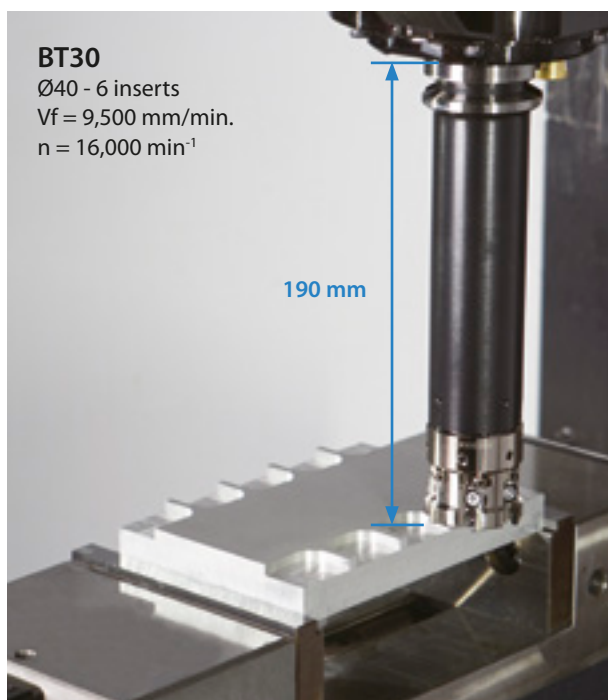
Competitor A  
(14 inserts)

$V_f = 8,300$  mm/min.

Since the MD90 has a high number of cutting edges, table feed ( $V_f$ ) can be improved. Efficiency can be improved while maintaining the same machining quality as competitor.

## Performance

Achieves stable machining even with a long overhang



### BT30

Ø40 - 6 inserts

$V_f = 9,500$  mm/min.

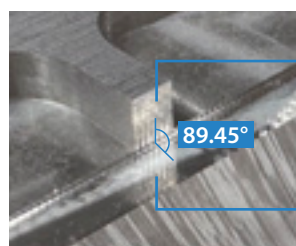
$n = 16,000$  min<sup>-1</sup>

190 mm

$n = 16,000$  min<sup>-1</sup> ( $V_c = 2,000$  m/min.)  
 $V_f = 9,500$  mm/min. ( $f_z = 0.1$  mm/t)  
 $a_p \times a_e = 5 \times 5$  mm ADC12 Wet Ø40 (6 inserts)  
 MD90-040RS-T6CMSF  
 LNGX180704PDFR-RR (KPD01A)  
 (Internal evaluation)



### Surface finish evaluation



Wall surface: 0.32µmRa



Bottom: 0.18µmRa



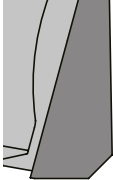
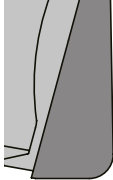
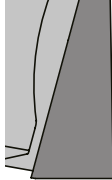
## Custom designs

### For various machining applications

We can make your custom design needs a reality across a variety of applications.

Please contact our sales representatives for details.

#### Examples

Cutting diameter	Ø20 ~ Ø350		
No. of inserts	Depends on cutting diameter		
Cutting edge shape	Corner chamfer 	Corner R 	Sharp corner 



CG Image

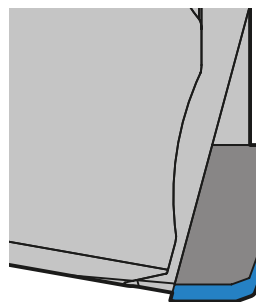
## Regrinding

### Standard amount of regrinding

Front face only : 0.1 mm (up to 5 times).  
 Entire circumference : 0.1 mm (up to 3 times).

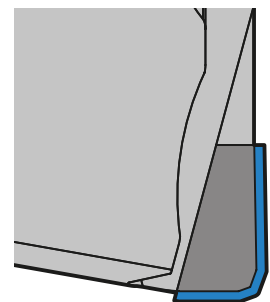
The above is for reference only.  
 Please contact our sales representatives for details.

Front face only




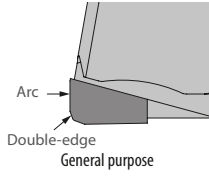
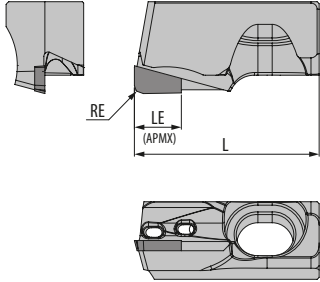
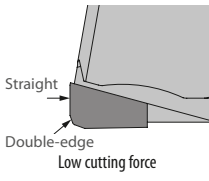

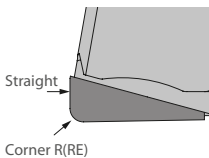
Regrinding part

Entire circumference



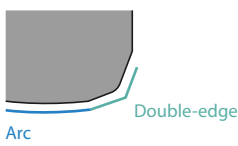
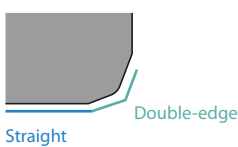
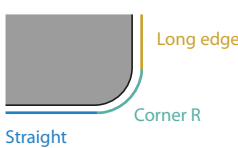
Regrinding part

## Insert

Shape		Description	Dimension (mm)			PCD
			L	RE	LE (APMX)	KPD01A
  Standard	 Arc Double-edge General purpose		18.1	-	4	●
	 Straight Double-edge Low cutting force					LNGX1807PDFR-L
  Long edge	 Straight Corner R(RE)			LNGX180704PDFR-RR	0.4	●
				LNGX180708PDFR-RR	0.8	●

The dimension indicated for LE (APMX) is brand new. Please note that it may change after regrinding.

● : Available

Type	Shape	Features and applications
G		1 <sup>st</sup> recommendation. Suppresses burrs and ensures high-quality surface finish. Achieves longer tool life and stable machining.
L		Low cutting force with straight wiper edge. Provides suitable results even with lower rigidity workpieces or clamping power.
RR		Corner radius (R). Suitable for machining with larger D.O.C and heavy loads.

Polycrystalline diamond

Average particle size: 1 μm

### KPD01A

Achieves both wear resistance and chipping resistance required for machining with ultra-fine pitch tools. Stable, high-efficiency machining is possible.

\*Please refer to page 6 about APMX.

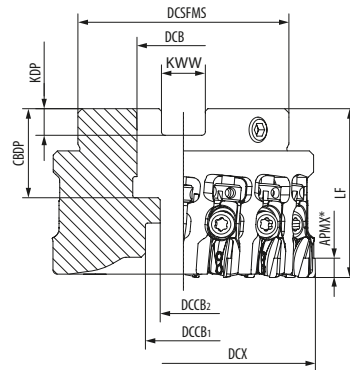


Fig.1

### Toolholder dimensions

Description			Availability	No. of inserts	Dimension (mm)									Rake angle	Coolant hole	Shape	Weight (kg)	Max. revolution (min-1)	Arbor bolt (Attachment)
					DCX	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	A.R.					
Metric Bore Diameter	MD90-	040RS-T6CMSF	●	6	40	38.5	16	13.5	9	40	19	5.6	8.4	+5°	Yes	Fig.1	0.26	25,000	HH8X25H
		050RS-T10CMSF	●	10	50	48.5	22	18	11		21	6.3	10.4				0.37		HH10X30H
		063RS-T14CMSF	●	14	63	50													

#### Maximum number of revolutions

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece.

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

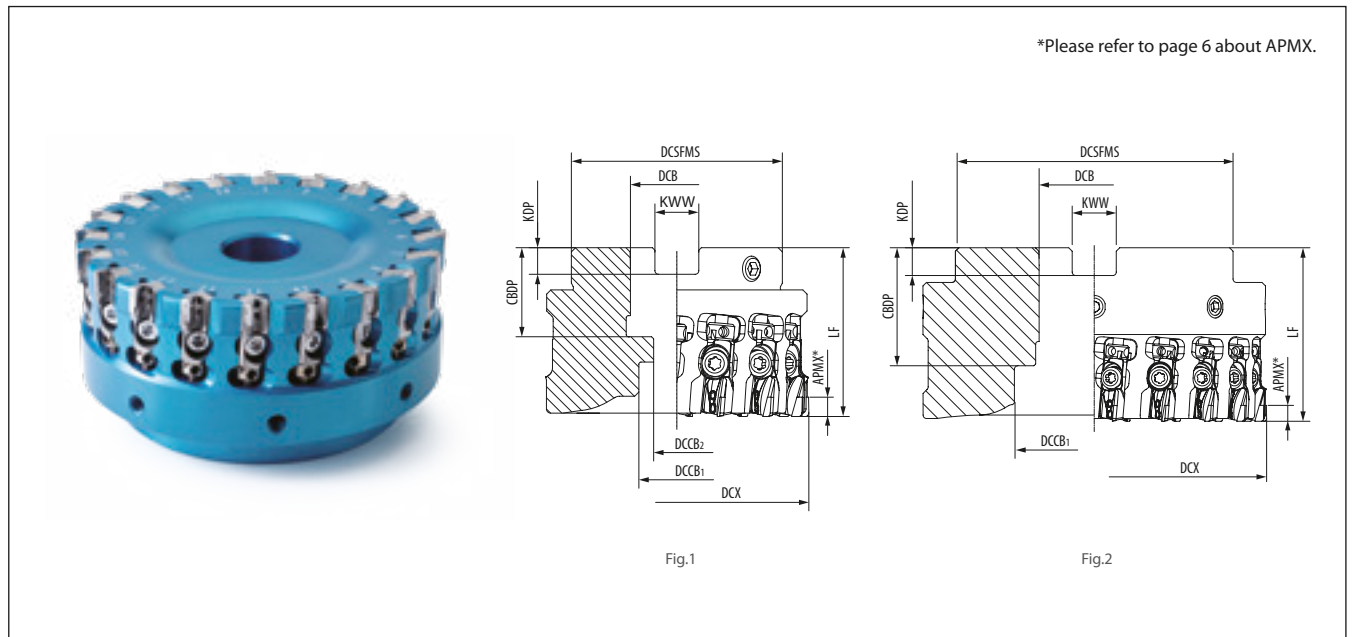
● : Available

### Recommended cutting conditions

Workpiece	Property	Cutting speed Vc (m/min)	Feed fz (mm/t)	Recommended grade
Aluminum alloy	Si ratio 12.5% or below	1,000 - 2,000 - 3,000	0.05 - 0.10 - 0.20	KPD01A
	Si ratio 12.5% or above	400 - 600 - 800	0.05 - 0.10 - 0.20	

Please adjust cutting speed and feed rate according to actual machining conditions taking into account machine and workpiece rigidity  
Do not use the cutter at speeds exceeding the maximum cutting speed limit





### Toolholder dimensions

Description		Availability	No. of Inserts	Dimension (mm)								Rake angle	Coolant hole	Shape	Weight (kg)	Max. Revolution (min <sup>-1</sup> )	Arbor bolt (Attachment)	
				DCX	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW						A.R.
MD90-	080RA-T16CMSF	●	16	80	60	27	20	13	50	24	7	12.4	+5°	Yes	Fig. 1	0.6	20,000	HH12X35H
	100RA-T20C27MSF	●	20	100	32											45		
	100RA-T20CMSF	●				80	27	20	13	24	7	12.4			Fig. 2		0.88	18,000
	125RA-T24C27MSF	●	24	125	40											55	-	
	125RA-T24CMSF	●					Fig. 2	1.31	HF20X53HA									

Custom sizes of Ø125 and above are also available (~ø350).

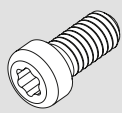
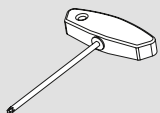
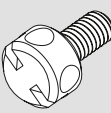
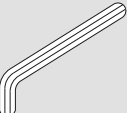
● : Available

### Maximum number of revolutions

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece.

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

### Spare parts

Clamp screw	Wrench	Adjust screw	Adjust wrench
			
BH4X8TR	TTW-15	AJ-3110	LW-2
Torque for insert clamp 3.5 N.m		-	-

## How to install inserts

### 1 Mount an insert



### 2 Partially tighten



Torque: 1.0 N.m

### 3 Adjust insert run-out



Insert run-out 5  $\mu$ m or less

### 4 Fully tighten



Torque: 3.5 N.m

### 1 Mount inserts into all pockets

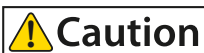
### 2 Partially tighten the clamp screw (Recommended torque 1.0 N.m)

### 3 Turn the screw with the wrench to adjust and make sure that all screw heights are within 5 $\mu$ m of each other (Recommended)

### 4 Fully tighten the clamp screw with tightening torque 3.5 N.m

## Precautions

### While in use



#### Caution

Please use within recommended cutting conditions.

Do not run the cutter at revolutions exceeding the printed maximum revolution limit of the cutter body.

Inserts or parts may scatter due to the centrifugal force and cutting load.

Confirm the total weight of the cutter and the arbor is within the machine's acceptable range.

Please do not use under the following conditions:

- When cutter is not fully loaded with inserts
- If the body and/or clamp is damaged
- If a clamp or clamp screw is removed
- If inserts that have different regrind amounts are mounted.

Please wear protective equipment such as protective glove when changing inserts or adjusting edge fluctuation.

Injury can occur when touching the cutting edge.

### Dynamic balance

Balance adjustment on the cutter is completed before shipping.

Balance adjustment has been made with special high precision inserts to be ISO balance grade (ISO1940/1) G2.5.

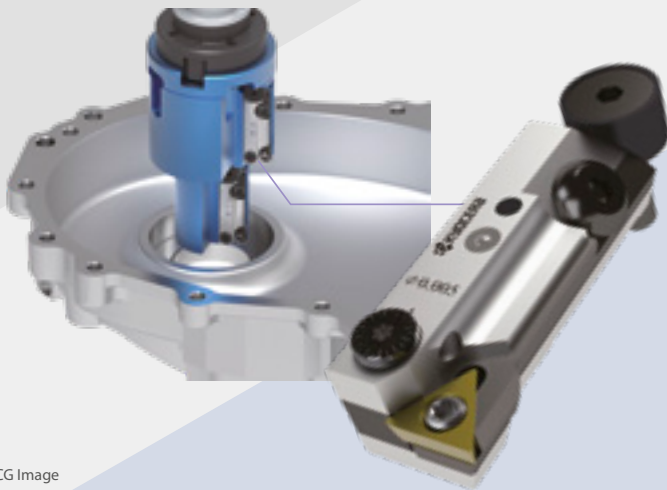
Recommended cutting conditions at max. revolution.

Do not operate the balance adjustment screw at the outer periphery of cutter.

This could lead to improper dynamic balance.



## Kyocera solutions for EV parts machining

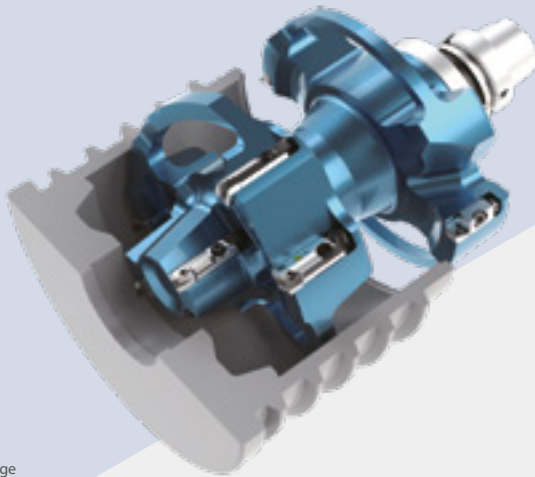


CG Image

### High-rigidity fine-tuning unit K-Bore

New adjustable cartridge design.

- Simple, high-precision, fine-tuning system
- Smooth operation
- Rectangular cartridge for higher rigidity.



CG Image

### High efficiency finishing bore cutter

Machining motor cases and motor housings with high precision and efficiency

- Multi-flute, high-efficiency design
- Weight reduction through body design optimisation
- Flutes are optimized for chip flow.

WE KNOW IT'S ALL ABOUT UNDERSTANDING REAL LIFE TO  
ENGINEER THE RIGHT SOLUTION, THAT...

***KEEPS YOU  
AHEAD***



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