



MD90

COMPLETE METALWORKING SOLUTIONS
(800) 991-4225 www.ahbinc.com
ISO Certified customerservice@ahbinc.com

Super Fine Pitch Cutter for Aluminum Machining



Premium Quality, High-Speed Aluminum Machining

Improved machining efficiency with fine pitch cutter

Excellent machining quality with unique PCD inserts

Lightweight design compatible with BT30

Custom-designed options available



Super Fine Pitch Cutter for Aluminum Machining

MD90

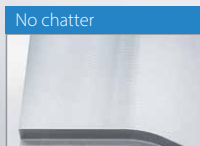
Improved machining efficiency of aluminum parts with super fine pitch specifications

Unique design provides high quality and high precision results with long tool life



Premium Quality Finish

Capable of $0.8 \mu\text{mRa}$ finish or less
Stable machining



$V_c = 8,200 \text{ sfm}$ ($n = 8,000 \text{ rpm}$), D.O.C. $\times a_e = 0.008 \times 2.953$, $f_z = 0.003 \text{ ipt}$ ($V_f = 500 \text{ ipm}$) Wet ADC12 BT50 $\phi 100\text{mm}$ (20 flute)
(Internal Evaluation)

Engineered to perfection

A new generation of super fine pitch cutters combine multiple aspects of Kyocera's leading milling technology
Machine aluminum with higher speeds and higher quality with PCD inserts

High Efficiency Machining

Capable of $V_f \geq 945$ ipm

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 Flute (Custom Design)

$V_f = 1,055$ ipm

Competitor A
14 Flute

$V_f = 825$ ipm

Efficiency



1.2x

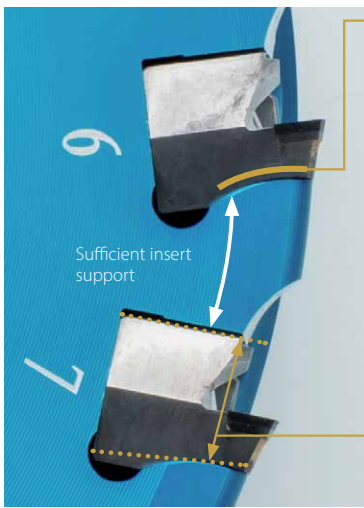
$V_c = 8,200$ sfm ($n = 10,000$ rpm), $D.O.C \times a_e = 0.008 \times 2.087"$, $f_z = 0.006$ ipt Wet ADC12 BT30 $\phi 80$ mm

Lightweight Body

Compatible with BT30

Offering lightweight aluminum body sizes from $\phi 80$ mm
Largest cutter diameter of $\phi 125$ mm weighs less than 1.5 kg

High Efficiency Cutter design engineered with ultra-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 Flute)



Competitor A (14 Flute)



$V_c = 9,840 \text{ sfm}$, D.O.C. $\times a_e = 0.008" \times 2.756"$
 $f_z = 0.003 \text{ ipt}$ Wet ADC12 $\phi 80\text{mm}$ (Prototype)

Scatter Prevention

Firm insert hold

Ultra-Fine Pitch with Lightweight Design

Largest cutter diameter of $\phi 125\text{mm}$ weighs less than 1.5 kg

Compatible with BT30

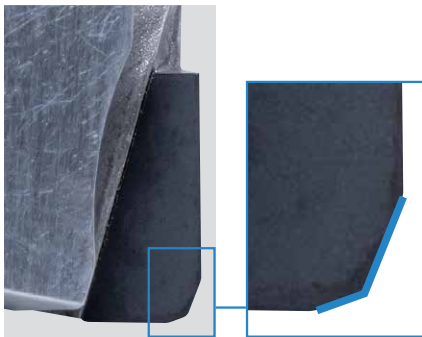
Cutting Dia.	No. of Inserts	Weight (kg)	Body
$\phi 2.000"$	10	0.37	Steel
$\phi 2.500"$	14	0.62	
$\phi 40\text{mm}$	6	0.26	
$\phi 50\text{mm}$	10	0.37	
$\phi 63\text{mm}$	14	0.62	Aluminum
$\phi 80\text{mm}$	16	0.6	
$\phi 100\text{mm}$	20	0.97	
$\phi 125\text{mm}$	24	1.49	

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

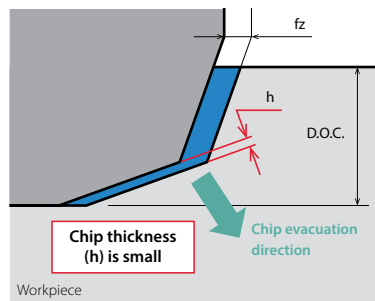
Suppresses Burr Formation

Double-Edge (Standard Type)

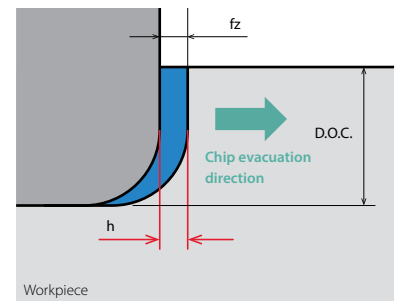
Controls the chip evacuation direction and suppresses distortion caused by chip separation



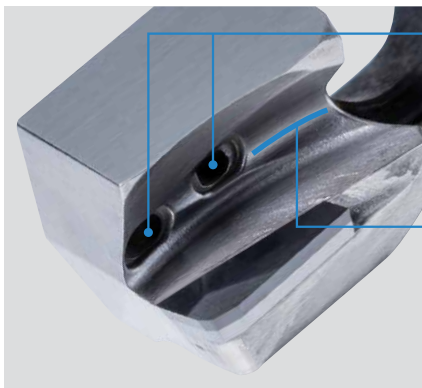
Double-Edge



Corner R



Stable Machining



Double Coolant Holes

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

Suppresses chip biting and surface defects

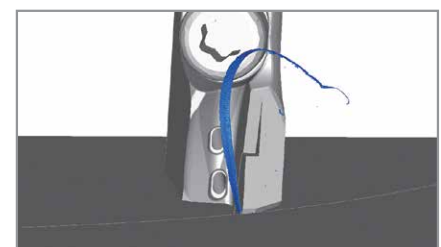
Streamlined Chip Pocket

Good chip control protects cutter body

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

Chip Evacuation Simulation

Evacuates chips along the pocket



Performance

High-efficiency and high-quality machining performance with ultra-fine pitch specifications



BT30

ø80mm - 16 Flute
Vf = 375 ipm

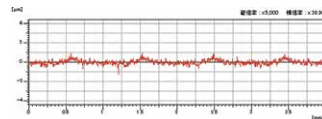
n = 9,900 rpm (Vc = 8,200 sfm)
Vf = 375 ipm (fz = 0.0024 ipt)
D.O.C. x ae = 0.012" x 1.969"
ADC12 Wet ø50mm
MD90-080RA-T16CSF
LNGX1807PDFR-G (KPD01A)
(Internal Evaluation)

Surface Finish Evaluation

Suppresses Burr Formation
and Edge Chipping



Excellent Surface Finish



Machining Efficiency Comparison (Internal Evaluation)

MD90
(16 Flute)

Vf = 375 ipm

Efficiency



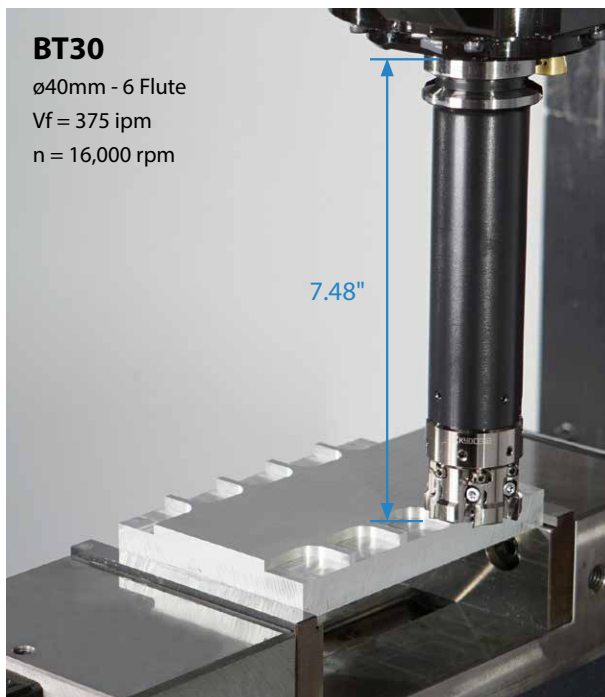
Competitor A
(14 Flute)

Vf = 325 ipm

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

Stability

Stable machining even with a long overhang setup

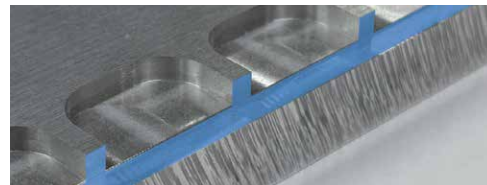


BT30

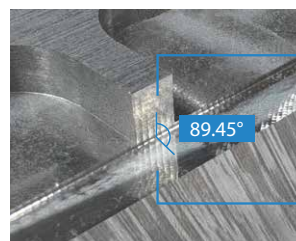
ø40mm - 6 Flute
Vf = 375 ipm
n = 16,000 rpm

7.48"

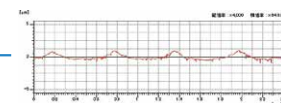
n = 16,000 rpm (Vc = 6,560 sfm)
Vf = 375 ipm (fz = 0.004 ipt)
D.O.C. x ae = 0.197" x 0.197" ADC12 Wet ø1.575" (6 Flutes)
MD90-040RS-T6CMSF
LNGX180704PDFR-RR (KPD01A)
(Internal Evaluation)



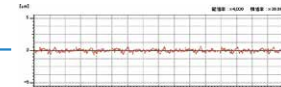
Surface finish evaluation



Wall Surface : 0.32µmRa



Bottom : 0.18µmRa



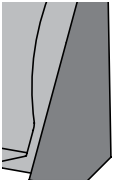
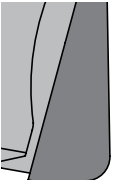
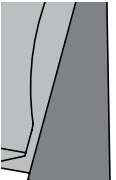
Custom Designs (Made to Order)

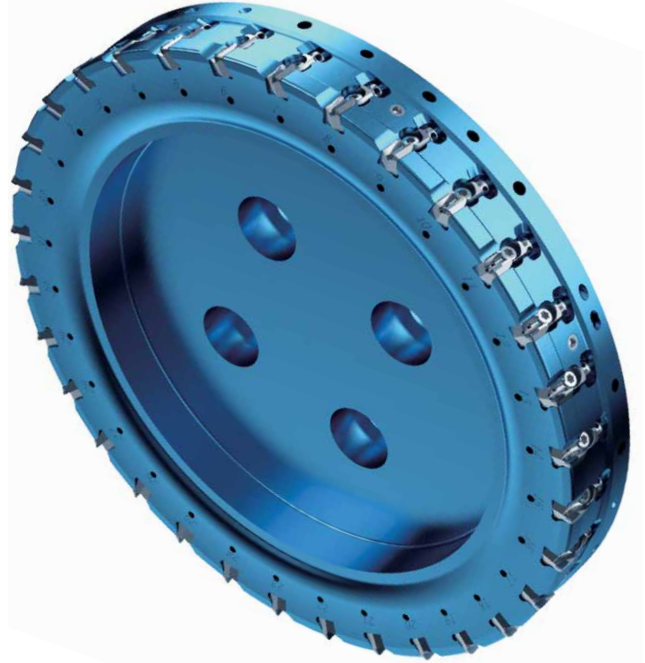
For various machining applications

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

Please contact our sales representatives for details.

Examples

Cutting Dia.	ø20mm ~ ø350mm		
No. of Inserts	Depends on cutting diameter		
Cutting Edge Shape	Corner chamfer	Corner R	Sharp corner
			



Regrinding

Standard amount of regrinding

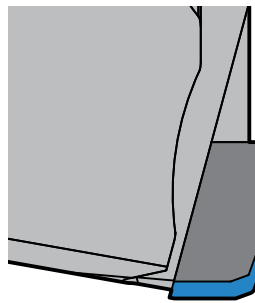
Front face only : 0.004" (up to 5 times)

Entire circumference : 0.004" (up to 3 times)

The above is for reference only.

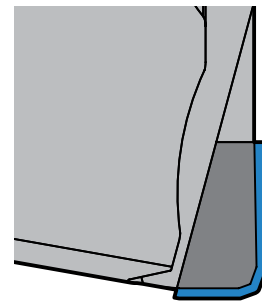
Please contact our sales representatives for details.

Front Face Only



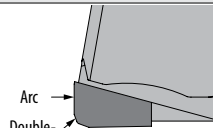
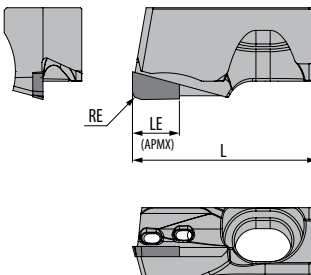
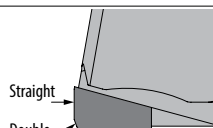
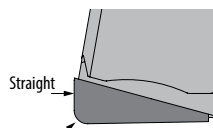
Regrinding Section

Entire Circumference



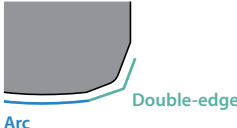
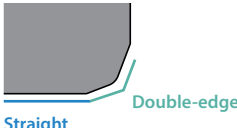
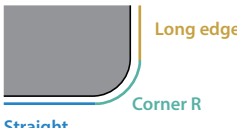
Regrinding Section

Inserts

Shape			Part Number	Dimensions (mm)			PCD
				L	RE	LE (APMX)	KPD01A
 Standard	 Arc Double-edge General Purpose		LNGX1807PDFR-G	18.1	-	4	●
	 Straight Double-edge Low Cutting Force		LNGX1807PDFR-L				●
 Long Edge	 Straight Corner R(RE)		LNGX180704PDFR-RR		0.4	8	●
			LNGX180708PDFR-RR		0.8		●

The dimension indicated for LE (APMX) is for a new insert. Please note that it may change after regrounding.

● : Standard Item

Type	Shape	Features and Applications
G	 Arc Double-edge	1st recommendation Suppresses burrs and ensures high-quality surface finish Achieves longer tool life and stable machining
L	 Straight Double-edge	Low cutting force with straight wiper edge Provides suitable results even with lower rigidity workpieces or clamping power
RR	 Long edge Straight Corner R	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.

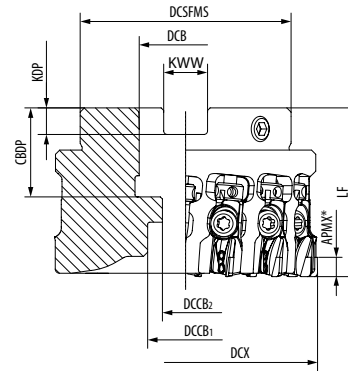


Fig.1

Toolholder Dimensions

Unit	Bore Dia.	Part Number	Std. Item	No. of Inserts	Dimensions (mm)									Rake Angle	Coolant Hole	Fig.	Weight (kg)	Max. RPM	Arbor Bolt (Attachment)
					DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	A.R.					
Inch	Inch Bore Dia.	MD90- 2000RS-T10CSF	●	10	2.000	1.910	0.750	0.669	0.433	1.575	0.750	0.187	0.313	+5°	Yes	1	0.37	25,000	HH3/8-1.25H
		2500RS-T14CSF	●	14	2.500	1.750		0.750									0.62		
mm	Metric Bore Dia.	MD90- 040RS-T6CMSF	●	6	40	38.5	16	13.5	9	40	19	5.6	8.4	+5°	Yes	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											0.62		

Maximum number of revolutions

● : Standard Item

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 chips and parts to scatter even under no load.

Recommended Cutting Conditions

Workpiece	Property	Cutting Speed Vc (sfm)	Feed fz (ipt)	Recommended Grade
Aluminum Alloy	Si Ratio ≤ 12.5%	3280 - 6,560 - 9,840	0.002 - 0.004 - 0.008	KPD01A
	Si Ratio ≥ 12.5%	1,310 - 1,970 - 2,620	0.002 - 0.004 - 0.008	

Numbers in **Bold** are recommended starting values. 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

*Please refer to page 6 about APMX.

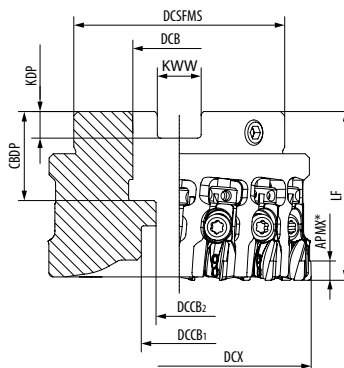


Fig.1

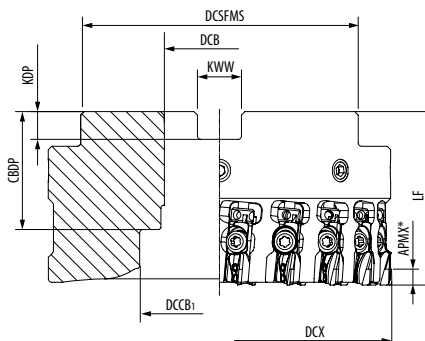


Fig.2

Toolholder Dimensions

Unit	Bore Dia.	Part Number	Std. Item	No. of Inserts	Dimensions (mm)								Rake Angle	Coolant Hole	Fig.	Weight (kg)	Max. RPM	Arbor Bolt (Attachment)	
					DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW						A.R.
mm	Inch Bore Dia.	MD90- 080RA-T16CSF	●	16	80	60	1.000"	20	13	50	1.063"	0.236"	0.375"	+5°	Yes	1	0.6	20,000	HH12X35H
		100RA-T20C254SF	●	20	100	80		1.250"	45		-	1.339"	0.315"			0.500"	0.97	18,000	HF16X40HA
		100RA-T20CSF	●	20	100		1.000"		20	13	55		1.063"			0.236"	0.375"		1
		125RA-T24C254SF	●	24	125	1.500"		55	-	1.496"		0.394"	0.625"			2	1.34	16,000	HF20X53HA
		125RA-T24CSF	●	24	125		1.500"	55	-		1.496"	0.394"	0.625"			2	1.34	16,000	HF20X53HA
	Metric Bore Dia.	MD90- 080RA-T16CMSF	●	16	80	60		27	20	13		50	24	7	12.4	+5°	Yes	1	0.6
		100RA-T20C27MSF	●	20	100	80	32		45	-	30		8	14.4	0.96			18,000	HF16X40HA
		100RA-T20CMSF	●	20	100			27	20	13		55	24	7	12.4				1
		125RA-T24C27MSF	●	24	125	40	55		-	33	9		16.4	2	1.31			16,000	HF20X53HA
		125RA-T24CMSF	●	24	125		40	55	-		33	9	16.4	2	1.31			16,000	HF20X53HA

Custom sizes of ø125mm and above are also available (~ø350mm) (Made to order).

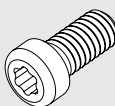
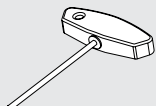
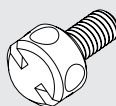
● : Standard Item

Maximum number of revolutions

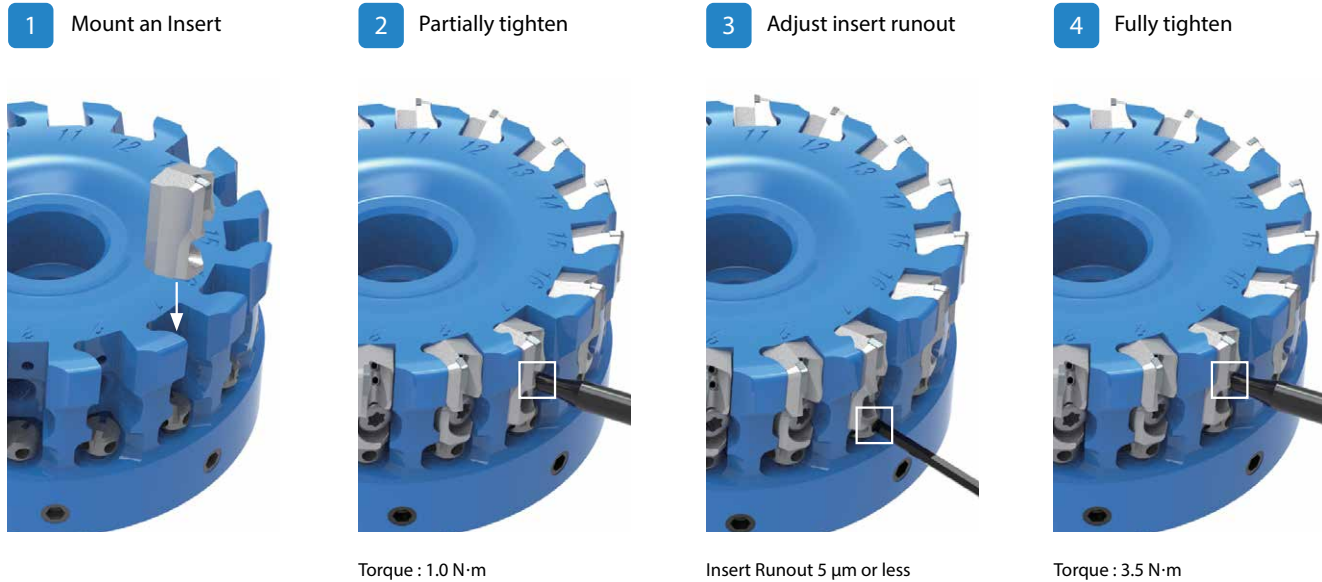
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece.

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

Spare Parts

Clamp Screw	Wrench	Adjustment Screw	Adjustment Wrench
			
BH4X8TR	TTW-15	AJ-3110	LW-2
Torque for insert clamp: 3.5 N.m		-	-

How to Install Inserts



- 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 μ 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's Solutions for EV Parts Machining

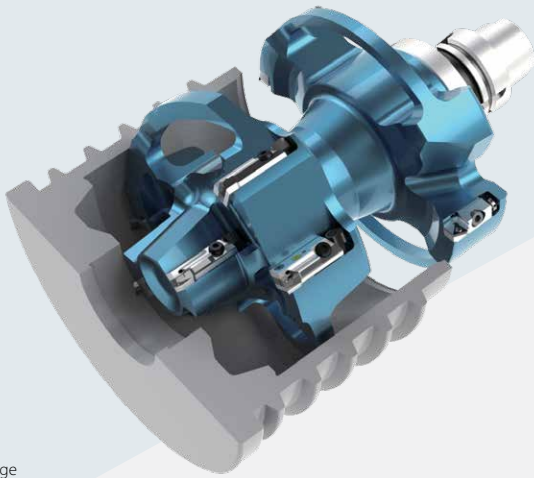


CG Image

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 optimization
- Flutes are optimized for chip flow



KYOCERA Precision Tools

238 Marc Drive
Cuyahoga Falls, OH 44223