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Down-cut and Left-Hand-Spiral Routers can be quoted upon request.

Series 2300

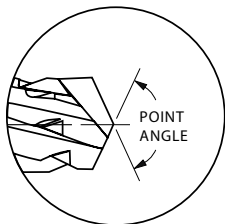
Universal PCB Router with Chipbreaker



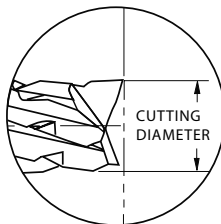
Application and Competitive Advantages of Series 2300 PCB Routers

- Ideal routers for general routing applications with external and internal cuts.
- Precision ground and made from premium carbide for longest tool life.
- High strength geometry is designed for increased wear resistance under high heat - achieving maximum productivity.
- Chipbreaker design enables a superior panel edge and surface finish.
- Router geometry is up-cut, right hand spiral.

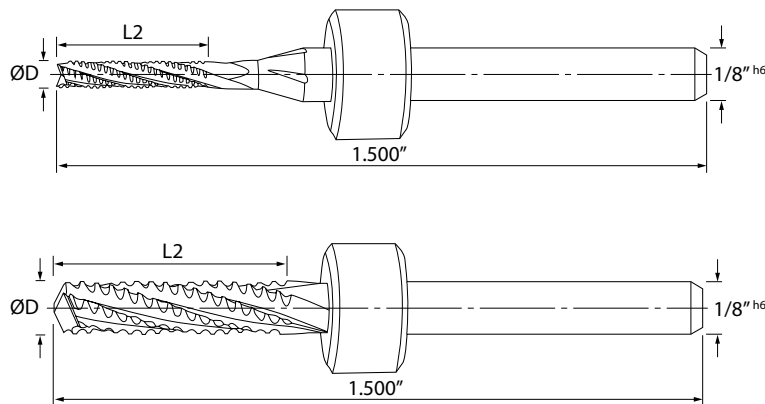
End Style



Drill Point



Fish Tail



DRILLS

END MILLS

ROUTERS

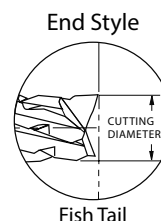
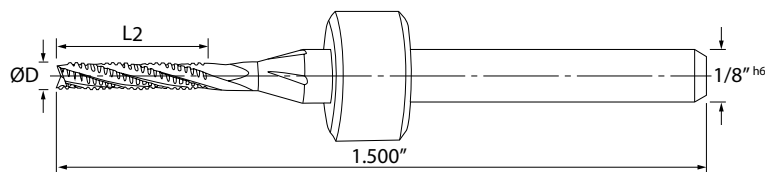
SCORING / ENGRAVING /
COUNTERSINKS

Series 2300

Universal PCB Router with Chipbreaker - Fish Tail
Up-cut, right hand spiral

Diameter Range

0.0315" ~ 0.1250" | 0.80mm ~ 3.00mm



Standard Flute Length

Part Number	Cutting Diameter ØD	Decimal Inch ØD	Dimensions				
			Length of Cut (in) L2	Length of Cut (mm) L2	End Style	Tolerance ØD (in)	Tolerance ØD (mm)
2300.0315.197	0.80mm	0.0315	0.197	5.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0354.197	0.90mm	0.0354	0.197	5.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0394.256	1.00mm	0.0394	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
2300.0472.256	1.20mm	0.0472	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
2300.0500.256	0.0500"	0.0500	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
2300.0512.256	1.30mm	0.0512	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
2300.0551.256	1.40mm	0.0551	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
2300.0591.315	1.50mm	0.0591	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0630.315	1.60mm	0.0630	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0669.315	1.70mm	0.0669	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0709.315	1.80mm	0.0709	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0748.315	1.90mm	0.0748	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0787.315	2.00mm	0.0787	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0787.394	2.00mm	0.0787	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0827.394	2.10mm	0.0827	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0945.394	2.40mm	0.0945	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.0984.394	2.50mm	0.0984	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.1004.394	2.55mm	0.1004	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.1181.394	3.00mm	0.1181	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
2300.1250.472	1/8"	0.1250	0.472	12.00	Fish Tail	+0/-0.0010	+0/-0.025



Series 2300

Chipbreaker style updraft router designed for superior edge finish on external and internal cuts.

Suitable for:

- FR-4
- Polyimides
- Teflon / PTFE
- High copper content laminates
- High speed laminates



Part Numbers above include rings set at 0.800" - For Ringless Part Number, replace series "" with "-" (XXX-XXXX.XXXX)
Additional diameters and special ring colors available upon request.



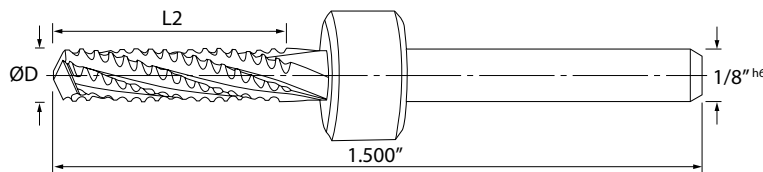
For recommended cutting conditions please visit: www.kyoceraprecisiontools.com/pcb/speeds-feeds or
Review starting recommendations on **Page 79**

Series 2300

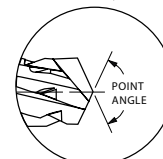
Universal PCB Router with Chipbreaker - Drill Point
Up-cut, right hand spiral

Diameter Range

0.0197" ~ 0.1250" | 0.50mm ~ 2.40mm



End Style



Drill Point

Standard Flute Length

Part Number	Cutting Diameter ØD	Decimal Inch ØD	Dimensions				
			Length of Cut (in) L2	Length of Cut (mm) L2	End Style	Tolerance ØD (in)	Tolerance ØD (mm)
2300.0197.118D	0.50mm	0.0197	0.118	3.00	Drill Point	+0/-0.0010	+0/-0.025
2300.0315.197D	0.80mm	0.0315	0.197	5.00	Drill Point	+0/-0.0010	+0/-0.025
2300.0354.256D	0.90mm	0.0354	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
2300.0394.256D	1.00mm	0.0394	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
2300.0472.256D	1.20mm	0.0472	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
2300.0500.256D	0.0500"	0.0500	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
2300.0512.256D	1.30mm	0.0512	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
2300.0551.256D	1.40mm	0.0551	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
2300.0630.256D	1.60mm	0.0630	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
2300.0630.315D	1.60mm	0.0630	0.315	8.00	Drill Point	+0/-0.0010	+0/-0.025
2300.0787.394D	2.00mm	0.0787	0.394	10.00	Drill Point	+0/-0.0010	+0/-0.025
2300.0945.394D	2.40mm	0.0945	0.394	10.00	Drill Point	+0/-0.0010	+0/-0.025
2300.1250.472D	1/8"	0.1250	0.472	12.00	Drill Point	+0/-0.0010	+0/-0.025

Series 2300

Chipbreaker style updraft router designed for superior edge finish on external and internal cuts.

Suitable for:

- FR-4
- Polyimides
- Teflon / PTFE
- High copper content laminates
- High speed laminates



Part Numbers above include rings set at 0.800" - For Ringless Part Number, replace series " " with "-" (XXX-XXXX.XXXX)
Additional diameters and special ring colors available upon request.



For recommended cutting conditions please visit: www.kyoceraprecisiontools.com/pcb/speeds-feeds or
Review starting recommendations on **Page 79**

DRILLS

END MILLS

ROUTERS

SCORING / ENGRAVING /
COUNTERSINKS

Series 4100

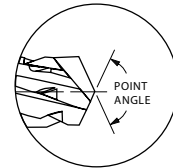
High Efficiency Cross Cut Router



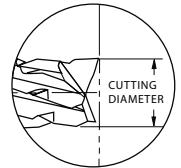
Application and Competitive Advantages of Series 4100 PCB Routers

- Unique geometry combines the advantages of a chipbreaker design with a diamond-cut flute geometry.
- Geometry features a high-strength design for maximum tool life and efficient cutting action with superior panel edge quality.
- Router geometry is up-cut, right hand spiral.

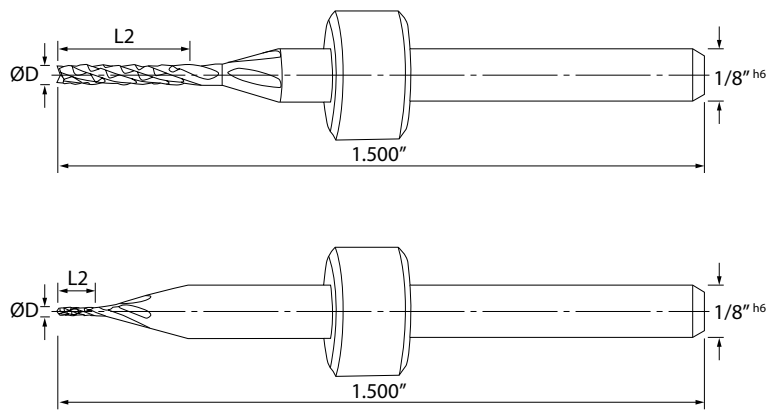
End Style



Drill Point



Fish Tail



Testing Parameters	
Material :	High Tg
Thickness :	0.177"
Diameter :	0.0630"

Distance to Debris			Distance to Breakage		
Design	Distance (inches)		Design	Distance (inches)	
	Mean	StdDev		Mean	StdDev
Standard	560	80	Standard	2,119	1,554
Series 4100	2,453	184	Series 4100	3,757	342
p-value:	0.000		p-value:	0.030	

Age of Tool at 25% Debris (Inches)	
4100	~2400
Standard	~500

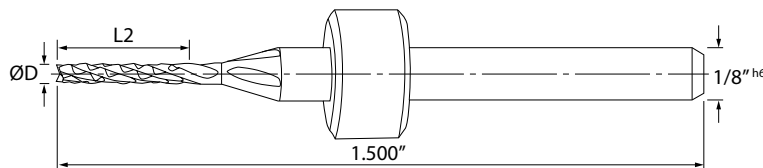
Age of Tool at Breakage (Inches)	
4100	~3800
Standard	~3200

Series 4100

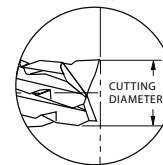
High Efficiency Cross Cut Router - Fish Tail
Up-cut, right hand spiral

Diameter Range

0.0197" ~ 0.1250" | 0.50mm ~ 2.60mm



End Style



Fish Tail

Standard & Extended Flute Length

Part Number	Cutting Diameter ØD	Decimal Inch ØD	Dimensions				
			Length of Cut (in) L2	Length of Cut (mm) L2	End Style	Tolerance ØD (in)	Tolerance ØD (mm)
4100.0197.079	0.50mm	0.0197	0.079	2.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0236.118	0.60mm	0.0236	0.118	3.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0236.157	0.60mm	0.0236	0.157	4.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0276.177	0.70mm	0.0276	0.177	4.50	Fish Tail	+0/-0.0010	+0/-0.025
4100.0315.197	0.80mm	0.0315	0.197	5.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0315.256	0.80mm	0.0315	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
4100.0354.197	0.90mm	0.0354	0.197	5.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0354.256	0.90mm	0.0354	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
4100.0394.197	1.00mm	0.0394	0.197	5.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0394.256	1.00mm	0.0394	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
4100.0394.276	1.00mm	0.0394	0.276	7.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0433.256	1.10mm	0.0433	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
4100.0472.276	1.20mm	0.0472	0.276	7.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0500.276	1.27mm	0.0500	0.276	7.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0512.276	1.30mm	0.0512	0.276	7.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0551.256	1.40mm	0.0551	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
4100.0591.315	1.50mm	0.0591	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0630.256	1.60mm	0.0630	0.256	6.50	Fish Tail	+0/-0.0010	+0/-0.025
4100.0630.315	1.60mm	0.0630	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0669.315	1.70mm	0.0669	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0709.315	1.80mm	0.0709	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0748.315	1.90mm	0.0748	0.315	8.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0787.394	2.00mm	0.0787	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0945.394	2.40mm	0.0945	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.0984.394	2.50mm	0.0984	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.1004.394	2.55mm	0.1004	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.1024.394	2.60mm	0.1024	0.394	10.00	Fish Tail	+0/-0.0010	+0/-0.025
4100.1250.472	1/8"	0.1250	0.472	12.00	Fish Tail	+0/-0.0010	+0/-0.025

Series 4100

Diamond cut style updraft router designed for high productivity routing.

Suitable for:

- FR-4
- Polyimides
- Teflon / PTFE
- High copper content laminates
- High speed laminates



Part Numbers above include rings set at 0.800" - For Ringless Part Number, replace series " " with "-" (XXX-XXXX.XXXX)
Additional diameters and special ring colors available upon request.



For recommended cutting conditions please visit: www.kyoceraprecisiontools.com/pcb/speeds-feeds or
Review starting recommendations on **Page 79**

DRILLS

END MILLS

ROUTERS

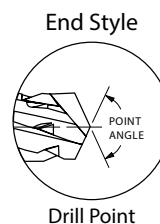
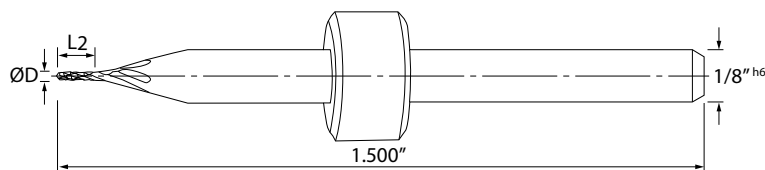
SCORING / ENGRAVING /
COUNTERSINKS

Series 4100

High Efficiency Cross Cut Router - Drill Point
Up-cut, right hand spiral

Diameter Range

0.0315" ~ 0.1250" | 0.80mm ~ 2.55mm



Standard Flute Length

Part Number	Cutting Diameter ØD	Decimal Inch ØD	Dimensions				
			Length of Cut (in) L2	Length of Cut (mm) L2	End Style	Tolerance ØD (in)	Tolerance ØD (mm)
4100.0315.197D	0.80mm	0.0315	0.197	5.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0354.197D	0.90mm	0.0354	0.197	5.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0394.256D	1.00mm	0.0394	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
4100.0472.276D	1.20mm	0.0472	0.276	7.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0500.276D	1.27mm	0.0500	0.276	7.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0625.315D	1/16"	0.0625	0.315	8.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0709.315D	1.80mm	0.0709	0.315	8.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0748.315D	1.90mm	0.0748	0.315	8.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0787.315D	2.00mm	0.0787	0.315	8.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0906.394D	2.30mm	0.0906	0.394	10.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0938.394D	3/32"	0.0938	0.394	10.00	Drill Point	+0/-0.0010	+0/-0.025
4100.0984.394D	2.50mm	0.0984	0.394	10.00	Drill Point	+0/-0.0010	+0/-0.025
4100.1004.394D	2.55mm	0.1004	0.394	10.00	Drill Point	+0/-0.0010	+0/-0.025
4100.1250.472D	1/8"	0.1250	0.472	12.00	Drill Point	+0/-0.0010	+0/-0.025



Series 4100

Diamond cut style updraft router designed for high productivity routing.

Suitable for:

- FR-4
- Polyimides
- Teflon / PTFE
- High copper content laminates
- High speed laminates



Part Numbers above include rings set at 0.800" - For Ringless Part Number, replace series "" with "-" (XXX-XXXX.XXXX)
Additional diameters and special ring colors available upon request.



For recommended cutting conditions please visit: www.kyoceraprecisiontools.com/pcb/speeds-feeds or
Review starting recommendations on **Page 79**

Series 2350 / 2390

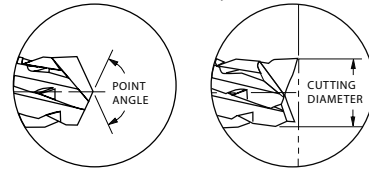
High Performance Fracture Reducing and Flash Routers



Application and Competitive Advantages of Series 2350 & 2390 PCB Routers

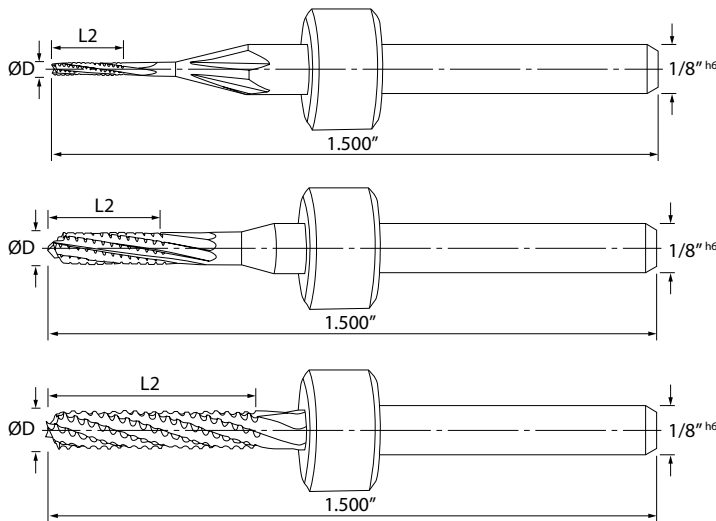
- Reduces edge fracturing by 70% to 94% in comparison to conventional routers by reducing cutting forces and chatter.
- Eliminates entry material. Minimizes panel scrap-rate and improves surface finish with superior edge quality.
- High precision updraft routing geometry featuring a fish-tail and drill-point end style.
- **Series 2350:** Low- to medium-stack panels.
- **Series 2390:** High-stack panels.
- Router geometry is up-cut, right hand spiral.

End Style



Drill Point

Fish Tail



Testing Parameters

Material :	Polyimide
Board Thickness :	0.063"
Diameter :	1.60mm

2350 Series

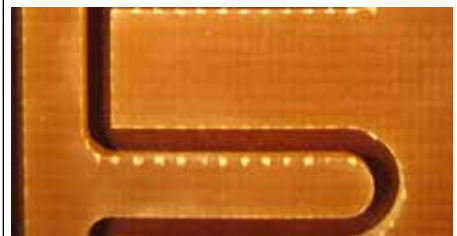
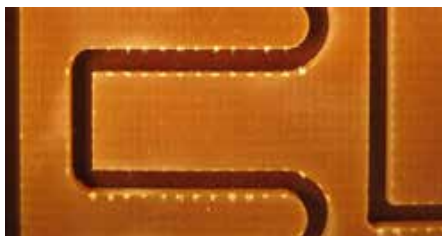
Minimal to no fracturing

Standard Chipbreaker

Notable fracturing

Standard Diamond Cut

Elevated fracturing



DRILLS

END MILLS

ROUTERS

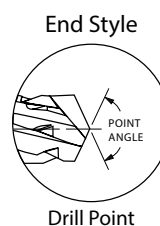
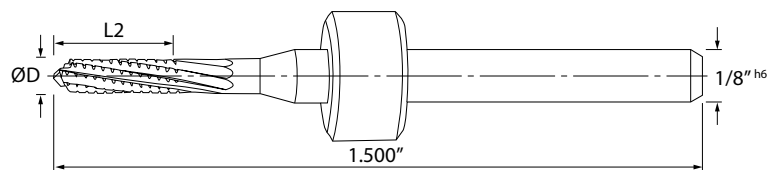
SCORING / ENGRAVING /
COUNTERSINKS

Series 2350

High Performance Fracture Reducing Routers
Up-cut, right hand spiral

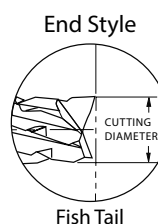
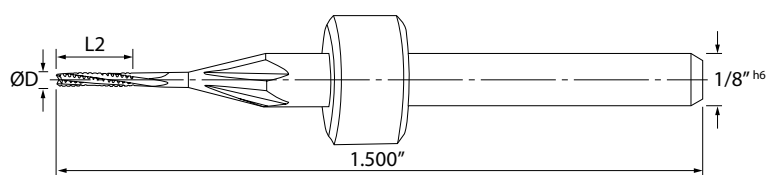
Diameter Range

0.0315" ~ 0.0945" | 0.80mm ~ 2.40mm



Standard Flute Length

Part Number	Cutting Diameter ØD	Decimal Inch ØD	Dimensions				
			Length of Cut (in) L2	Length of Cut (mm) L2	End Style	Tolerance ØD (in)	Tolerance ØD (mm)
2350.0315.177D	0.80mm	0.0315	0.177	4.50	Drill Point	+0/-0.0010	+0/-0.025
2350.0394.177D	1.00mm	0.0394	0.177	4.50	Drill Point	+0/-0.0010	+0/-0.025
2350.0492.197D	1.25mm	0.0492	0.197	5.00	Drill Point	+0/-0.0010	+0/-0.025
2350.0630.256D	1.60mm	0.0630	0.256	6.50	Drill Point	+0/-0.0010	+0/-0.025
2350.0787.276D	2.00mm	0.0787	0.276	7.00	Drill Point	+0/-0.0010	+0/-0.025
2350.0945.315D	2.40mm	0.0945	0.315	8.00	Drill Point	+0/-0.0010	+0/-0.025



Standard Flute Length

Part Number	Cutting Diameter ØD	Decimal Inch ØD	Dimensions				
			Length of Cut (in) L2	Length of Cut (mm) L2	End Style	Tolerance ØD (in)	Tolerance ØD (mm)
2350.0472.276	1.20mm	0.0472	0.276	7.00	Fish Tail	+0/-0.0010	+0/-0.025



Part Numbers above include rings set at 0.800" - For Ringless Part Number, replace series "" with "-" (XXX-XXXX.XXXX)
Additional diameters and special ring colors available upon request.



For recommended cutting conditions please visit: www.kyoceraprecisiontools.com/pcb/speeds-feeds or
Review starting recommendations on **Page 79**



Series 2350

Chipbreaker style updraft router designed with a cutting force reduction geometry leading to minimal routed edge fracturing and superior edge finish.

Excellent for:

- Polyimides
- High speed laminates

DRILLS

END MILLS

ROUTERS

SCORING / ENGRAVING /
COUNTERSINKS

Series 2390

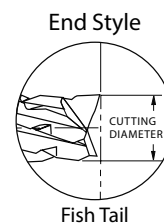
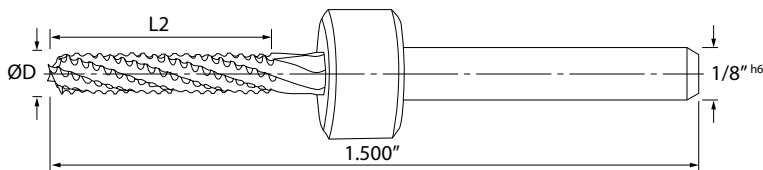
High Performance Flash Routers
Up-cut, right hand spiral

Diameter Range
0.0938" ~ 0.1250"

DRILLS

END MILLS

ROUTERS



Standard & Extended Flute Length

Part Number	Cutting Diameter ØD	Decimal Inch ØD	Dimensions				
			Length of Cut (in) L2	Length of Cut (mm) L2	End Style	Tolerance ØD (in)	Tolerance ØD (mm)
2390.0938.500	3/32"	0.0938	0.495	12.57	Fish Tail	+0/-0.0010	+0/-0.025
2390.1250.590	1/8"	0.1250	0.585	14.86	Fish Tail	+0/-0.0010	+0/-0.025

Series 2390

Chipbreaker style updraft router designed for high stack routing with superior edge finish on external cuts.

Excellent for:

- Flash routing post lamination



Part Numbers above include rings set at 0.800" - For Ringless Part Number, replace series "r" with "-" (XXX-XXXX.XXXX)
Additional diameters and special ring colors available upon request.



For recommended cutting conditions please visit: www.kyoceraprecisiontools.com/pcb/speeds-feeds or
Review starting recommendations on **Page 79**

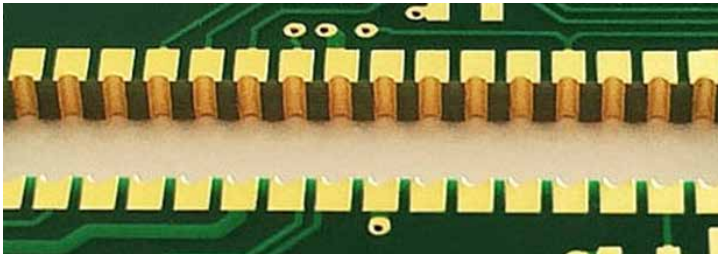
Series 1300

Gold Tab Premium Edge Routers

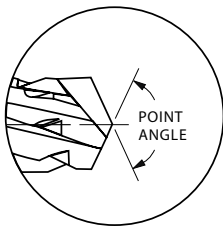


Application and Competitive Advantages of Series 1300 PCB Routers

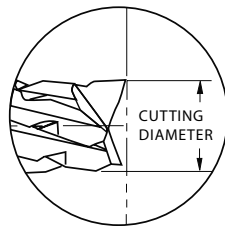
- Ideal routers for machining gold tab connectors and plated solder features.
- Precision ground and made from premium carbide for longest tool life.
- The special multi flute geometry enables routing with clean tab edges.
- Router geometry is up-cut, right hand spiral.



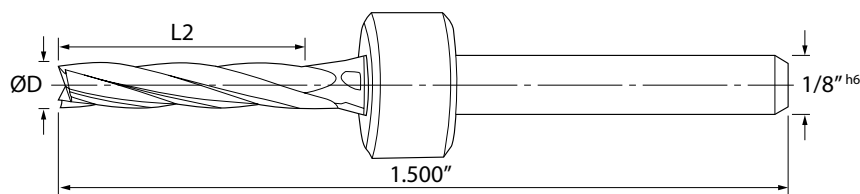
End Style



Drill Point



Fish Tail



DRILLS

END MILLS

ROUTERS

SCORING / ENGRAVING /
COUNTERSINKS

Series 1300

Gold Tab Premium Edge Routers
Up-cut, right hand spiral

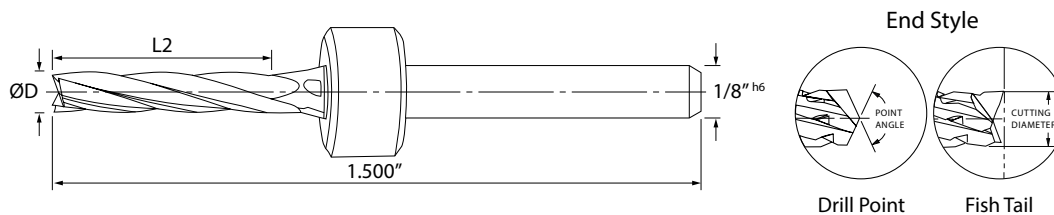
Diameter Range

0.0630" ~ 0.0945" | 1.60mm ~ 2.40mm

DRILLS

END MILLS

ROUTERS



Standard Flute Length

Part Number	Cutting Diameter ØD	Decimal Inch ØD	Dimensions				
			Length of Cut (in) L2	Length of Cut (mm) L2	End Style	Tolerance ØD (in)	Tolerance ØD (mm)
1300.0630.310	1.60mm	0.0630	0.310	7.87	Drill Point	+0/-0.0010	+0/-0.025
1300.0945.395	2.40mm	0.0945	0.395	10.03	Fish Tail	+0/-0.0010	+0/-0.025

Series 1300

Multiple flute cutter designed for routing printed circuit board gold tab connectors and plated solder features.

Excellent for:

- Gold
- Aluminum



Part Numbers above include rings set at 0.800" - For Ringless Part Number, replace series " " with "-" (XXX-XXXX.XXXX)
Additional diameters and special ring colors available upon request.



For recommended cutting conditions please visit: www.kyoceraprecisiontools.com/pcb/speeds-feeds or
Review starting recommendations on **Page 79**