

Insert for ultra-precision automatic Swiss lathe machining
(medium cutting to finishing)

MS Chip Breaker

(+Auto Tools KHP Coolant)

KORLOY
TECH-NEWS



- Highly precise grinding technology realizes sharp cutting edge and reduced cutting heat increases tool life and surface finish.
- Chip breaker designed for good chip flow ensures chip control even in cutting conditions with poor chip evacuation.

Insert for ultra-precision automatic Swiss lathe machining (medium cutting to finishing)

MS Chip Breaker

As industries keep being advanced, the demand for unmanned automatic lathe and machining hard-to-cut materials for small sized precise components have been increasing. Especially, pure titanium (Grade 3 and 4) and titanium alloy (Ti-6Al-4V) used for high precision parts such as implant are having poor machinability due to high cutting heat and welding which requires high precision and good surface finish.

KORLOY newly launched a chip breaker, ultra-precision MS for Auto Tools realizing high machinability in ultra-precision components such as implants made of hard-to-cut materials machining.

The **MS chip breaker** applied special 3D structured design to enhance chip evacuation function per variation of cutting depth and implemented high precise grinding process to actualize detailed nose R shape with sharp edge. With these, it could minimize cutting heat and built up edge occurrence while machining titanium.

It also prevents micro chipping by adapting ultra-fine substrate which equalized refined structure. Special surface treatment added PVD also ensures excellent surface roughness and enhanced tool life with high hardness and great anti-oxidation.

Besides, tight tolerance and deviation management in producing inserts for minimizing dimension deviations of corners and products provide convenience to users as it allows to users not to concern about tool offset in changing insert corners.

The MS chip breaker would provide the best solution to customers in necessity to precisely machine hard-to-cut materials with combination of premium level management in design, manufacturing, and quality, and grades matching like PC8100 and PC5300 having high hardness and thermal resistance.



Improved chip control

- Excellent chip cutting and evacuation due to three-dimensional shaped design

Better surface finish

- Mirror-liked finished cutting edge through special surface treatment

Longer tool life

- Ultra-fine substrate and high hardness coating
- Reduced cutting heat due to sharp cutting edge

High precise tool deviations

- Minimized dimension deviations for each insert corners and items

Code system

【Insert】

V	C	G	T	11	03	01	M	F	N	-	MS
Insert shape	Relief angle	Tolerance	Cross section type	Cutting edge length, diameter of inscribed circle	Height of cutting edge	Nose radius (Nose R)	Nose R tolerance M: Minus	Edge preparation F: Sharp	Hand		Chip breaker

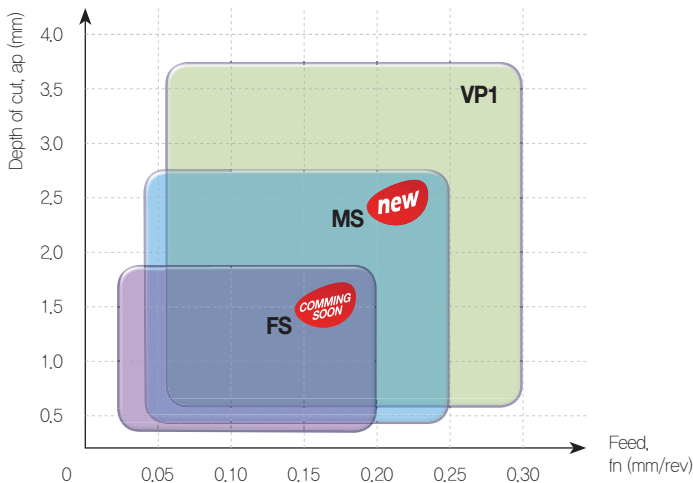
Insert tolerance

(mm)

Type	Designation	d (Inscribed circle)	t (Height of cutting edge)	m (m size)	r (Nose R)	Geometries
High precision	VCGT110301-MS	±0.025	±0.04	±0.025	±0.02	
Ultra-precision	VCGT110301M FN -MS	±0.02	±0.02	±0.02	±0.01	

※ Ultra-precision insert with tight tolerance and deviation management is recommended in high precision and low deviation machining.

Application range



Machining	Chip breaker	ap (mm)	fn (mm/rev)
Medium cutting (for toughness)	VP1	0.2 - 4.0	0.05 - 0.30
Medium cutting (for surface roughness)	MS	0.1 - 3.0	0.03 - 0.25
Finishing	FS	0.1 - 3.0	0.10 - 0.20

MS Chip breaker **new**



For medium cutting (for surface roughness)

- 1st recommended chip breaker
- Surface roughness in medium cutting range

VP1 Chip breaker



For medium cutting (for reinforced cutting edge)

- 2nd recommended chip breaker for medium cutting
- For strength of cutting edge in medium cutting

FS Chip breaker **COMING SOON**



For finishing (for surface roughness)

- 1st recommended chip breaker for chip control
- Better surface roughness, surface finish and chip control

Features

MS Chip breaker

- Sharp cutting edge with welding resistance reducing the cutting heat is necessary for machining hard-to-cut materials.
- Chip evacuation is increased in low to high feed cutting conditions.

Sharp cutting edge

- Decreased cutting heat
- Minimized welding



Flank surface grinding

- G grade of periphery grinding
- Precise grinding

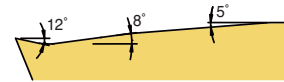


[MS]



[Competitor]

2-level angle back area



- Improved chip curl and chip control in low feed cutting range
- Better chip evacuation in high feed cutting range
- Reduced cutting resistance
- Protected cutting edge without chip blockage

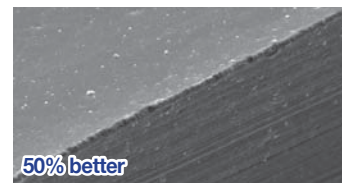
Precise nose R shape



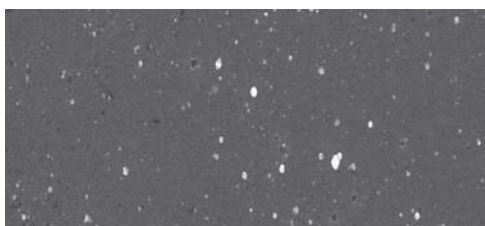
Sharp cutting edge



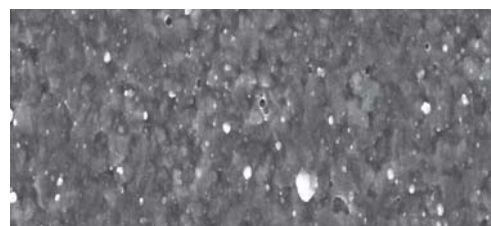
Improved surface finish



Special coating surface treatment technology



[Auto Tools]



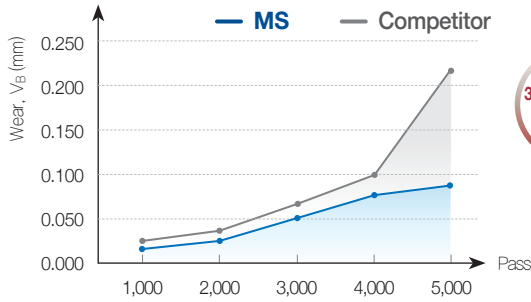
[General tool]

► Precise nose R, sharp cutting edge and better surface finish realize high productivity and decrease dimension deviation.

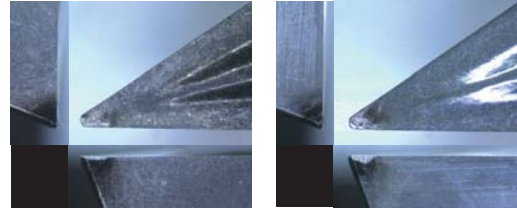
Performance evaluation

Wear resistance

- **Workpiece** Pure titanium (5832-2)
- **Cutting conditions** n (rpm) = 3,500, f_n (mm/rev) = 0.03, a_p (mm) = 0.5, wet
- **Tool** Insert VCGT1203008FN-MS (PC8110) Holder SVJCR1212-X12A



30% improved wear resistance



[MS]

[Competitor]

► Ultra-fine substrate and high hardness coating ensure stable tool life.

Chip control and surface finish

- **Workpiece** X5CrNi18-9
- **Cutting conditions** n (rpm) = 4,000, f_n (mm/rev) = 0.03, a_p (mm) = 0.1, 0.3, 0.5, wet
- **Tool** Insert VCGT120302FN-MS (PC5300) Holder SVJCR1212-X12A



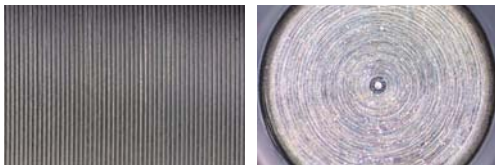
[MS]

Good chip control



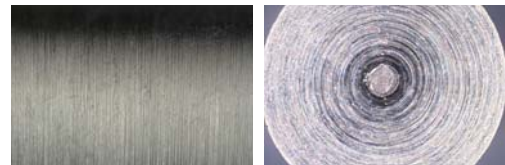
[Competitor]

► Three-dimensional shaped design of chip breaker increases chip evacuation.



[MS]

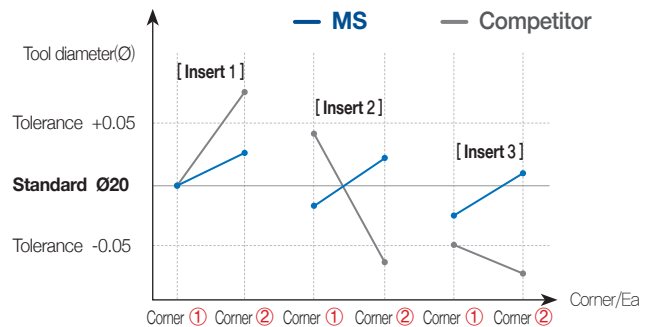
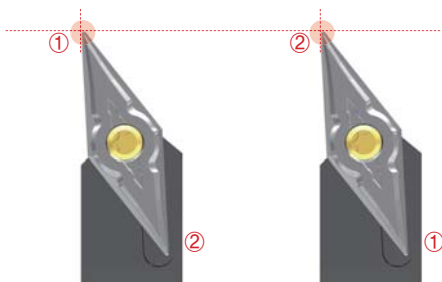
Good surface finish



[Competitor]

► Sharp and mirror-like finished cutting edge improves surface finish.

Dimension precision

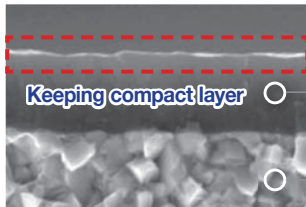


► Changing tool offset in switching insert corners and items is not necessary using MS chip breaker due to tight dimension deviation management.

The comparison of chip breaker

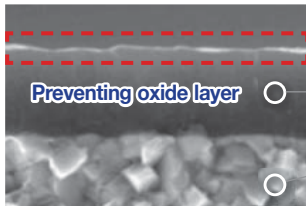
Category	Application	KORLOY	Competitor A	Competitor B	Competitor C	Competitor D	Competitor E	Competitor F
Chip breaker	Medium cutting (for surface finish)	MS <small>new</small>	GF	LS	01	FC	MN4	FN-None
	Medium cutting (for toughness)	VP1	GQ	LS	-	SC	MN4	FN-None
	Finishing	FS <small>COMING SOON</small>	SK	SMG	JS	SI	FN2	-
Grade	General cutting	PC5300	PR1125	VP15TF	SH725	AC1030U	WSM20	D60
	S10	PC8110	PR915	VP10RT	SH730	AC510U	WSM10	D20

Grade features



PC5300

- Coating layer with oxidation resistance and high hardness at high temperature
- Good oxidation resistance in steel, cast iron, stainless steel and HRSA machining
- Applying ultra-fine high toughness substrate and surface treatment technology on coating layer
- Improved welding and chipping resistance



PC8110

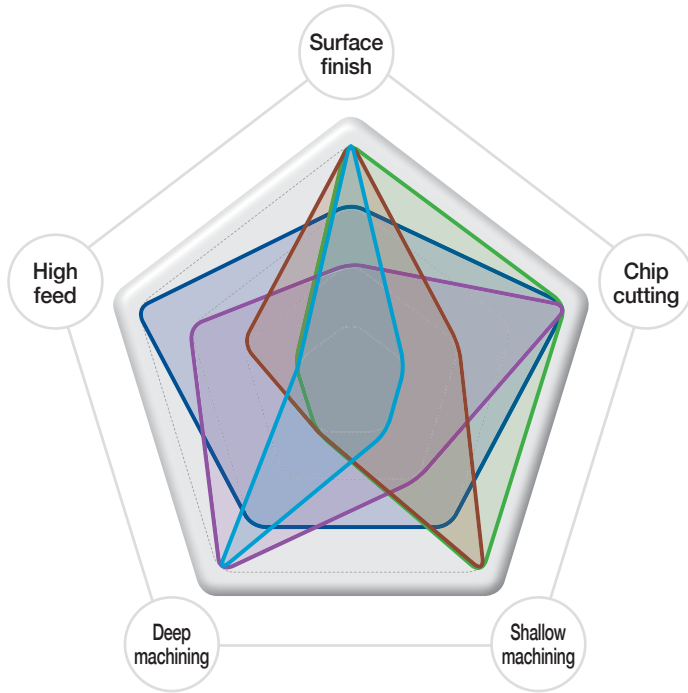
- Coating layer with good surface finish, high hardness at high temperature and oxidation resistance reduces wear at high temperature.
- Controlling ultra-fine microstructure regularly ensures stable machinability, high chipping and wear resistance.

Grades and recommended cutting conditions

Workpiece	Grade	Recommended cutting conditions (m/min)					
		50	100	200	300	600	
P Steel	PC8110		80	200			
	PC5300		60	160			
M Stainless steel	PC8110		80	130			
	PC5300		80	160			
K Cast iron	PC8110		100	180			
	PC5300		90	160			
N Non-ferrous metal	H05			150		600	
	PC8110			150		600	
S HRSA	H05	35	65				
	PC8110	35	65				
	PC5300	25	55				

Auto Tools chip breaker selection guide

— MS — VP1 — FS — KM — KF



MS **new**



- For medium cutting (For surface finish)
- Preventing welding in Titanium machining
- Improving chip evacuation in high feed machining
- Protecting cutting edge from structure without chip blockage

VP1



- For medium cutting (For reinforced cutting edge)
- Preventing chipping due to reinforced cutting edge in machining general alloy steel and stainless steel

FS **COMING SOON**



- For finishing (For surface finish)
- Inducing soft cutting by depth of cut
- Increasing surface finish due to three-dimensional cutting edge design
- Available in various machining ranges from optimal chip breaker shape

KM



- For finishing and medium cutting
- Longer tool life and increased machinability from improved chip flow
- Deep machining due to deep and wide groove

KF



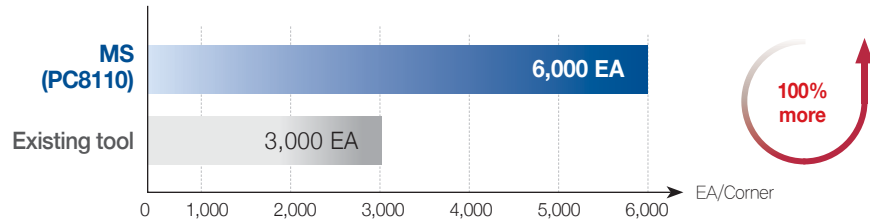
- For finishing
- Low cutting load from sharp cutting edge
- Reduced resistance of chip evacuation in high speed machining
- Good surface finish

ISO	Chip breaker	Surface finish	Chip cutting	Shallow machining	Deep machining	High feed
M class	MS new	★★★	★★★★	★★★	★★★	★★★★
	VP1	★★	★★★★	★★	★★★★	★★★
	FS COMING SOON	★★★★	★★★★	★★★★	★	★
Ground class	KM	★★★★	★	★	★★★★	★
	KF	★★★★	★★	★★★★	★	★★

Application examples

Pure titanium (5832-2)

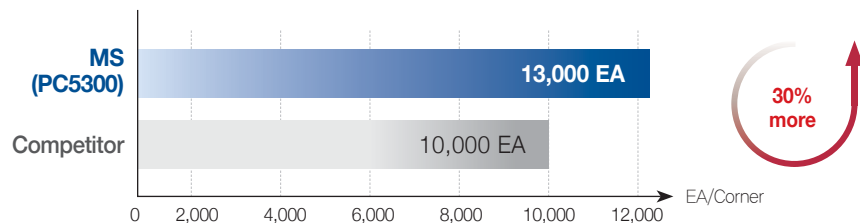
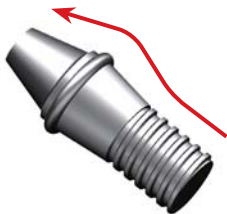
- **Workpiece use** Plate
- **Cutting conditions** n (rpm) = 4,000, f_n (mm/rev) = 0.01, a_p (mm) = 1.0, wet
- **Tools** Insert VCGT120302FN-MS (PC8110) Holder SVJCR1212-X12A



- Sharp cutting edge and mirror-like coating prevent cutting heat and welding.
- Ultra-fine substrate prevents micro chipping and coating layer with high hardness at high temperature and good oxidation resistance increases tool life.

Titanium alloy (5832-3)

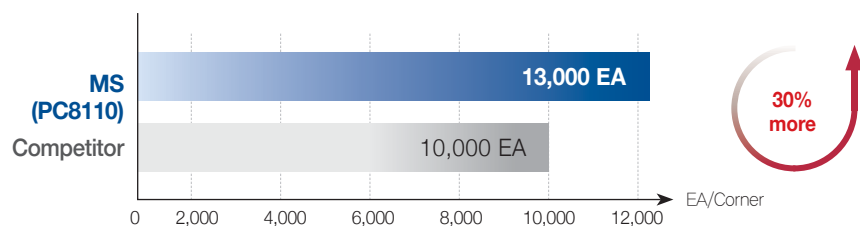
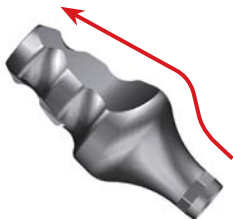
- **Workpiece use** Fixture (Implant)
- **Cutting conditions** n (rpm) = 5,000, f_n (mm/rev) = 0.03, a_p (mm) = 0.5, wet
- **Tools** Insert VCGT120301FN-MS (PC5300) Insert SVJCR1212-X12A



- Sharp cutting edge and mirror-like coating prevent cutting heat and welding.
- Ultra-fine substrate prevents micro chipping and coating layer with high hardness at high temperature and good oxidation resistance increases tool life.

Titanium alloy (5832-3)

- **Workpiece use** Abutment (Implant)
- **Cutting conditions** n (rpm) = 5,000, f_n (mm/rev) = 0.05, a_p (mm) = 0.1, wet
- **Tools** Insert VCGT1203008FN-MS (PC8110) Insert SVJCR1212-X12A



- Sharp cutting edge and mirror-like coating prevent cutting heat and welding.
- Ultra-fine substrate prevents micro chipping and coating layer with high hardness at high temperature and good oxidation resistance increases tool life.

Stock items

【Ultra-precision insert】

Inserts	Designation	Coated			Dimensions (mm)					Cutting conditions		Geometries
		PC5300	PC8110	H05	l	d	t	r	d ₁	f _n (mm/rev)	a _p (mm)	
Medium cutting (Ultra-precision)	CCGT 09T301MFN-MS	●	●		9.8	9.525	3.97	<0.1	4.4	0.02-0.12	0.05-1.00	
	09T302MFN-MS	●	●		9.6	9.525	3.97	<0.2	4.4	0.03-0.13	0.07-1.30	
	09T304MFN-MS	●	●		9.2	9.525	3.97	<0.4	4.4	0.05-0.18	0.09-1.30	
Medium cutting (Ultra-precision)	DCGT 11T301MFN-MS	●	●		11.6	9.525	3.97	<0.1	4.4	0.02-0.12	0.05-1.00	
	11T302MFN-MS	●	●		11.6	9.525	3.97	<0.2	4.4	0.03-0.13	0.07-1.30	
	11T304MFN-MS	●	●		11.6	9.525	3.97	<0.4	4.4	0.05-0.18	0.09-1.30	
Medium cutting (Ultra-precision)	VCGT 110301MFN-MS	○	○		11.0	6.35	3.18	<0.1	2.8	0.02-0.12	0.05-1.00	
	110302MFN-MS	○	○		11.0	6.35	3.18	<0.2	2.8	0.03-0.13	0.07-1.30	
	110304MFN-MS	○	○		11.0	6.35	3.18	<0.4	2.8	0.05-0.18	0.09-1.30	
Medium cutting (Ultra-precision)	VCGT 1203008FN-MS	●	●		12.0	7.50	3.00	0.08	2.8	0.01-0.10	0.05-1.10	
	120301FN-MS	●	●		12.0	7.50	3.00	0.10	2.8	0.03-0.13	0.06-1.20	
	120302FN-MS	●	●		12.0	7.50	3.00	0.20	2.8	0.04-0.15	0.08-1.50	
	120304FN-MS	●	●		12.0	7.50	3.00	0.40	2.8	0.06-0.20	0.10-1.50	

● : Stock item ○ : In stock (October, 2020)

【High precision insert】

Inserts	Designation	Coated			Dimensions (mm)					Cutting conditions		Geometries
		PC5300	PC8110	H05	l	d	t	r	d ₁	f _n (mm/rev)	a _p (mm)	
Medium cutting (High precision)	CCGT 09T301-MS	●	●		9.8	9.525	3.97	0.1	4.4	0.02-0.12	0.05-1.00	
	09T302-MS	●	●		9.6	9.525	3.97	0.2	4.4	0.03-0.13	0.07-1.30	
	09T304-MS	●	●		9.2	9.525	3.97	0.4	4.4	0.05-0.18	0.09-1.30	
Medium cutting (High precision)	DCGT 11T301-MS	●	●		11.6	9.525	3.97	0.1	4.4	0.02-0.12	0.05-1.00	
	11T302-MS	●	●		11.6	9.525	3.97	0.2	4.4	0.03-0.13	0.07-1.30	
	11T304-MS	●	●		11.6	9.525	3.97	0.4	4.4	0.05-0.18	0.09-1.30	
Medium cutting (High precision)	VCGT 110301-MS	○	○		11.0	6.35	3.18	0.1	2.8	0.02-0.12	0.05-1.00	
	110302-MS	○	○		11.0	6.35	3.18	0.2	2.8	0.03-0.13	0.07-1.30	
	110304-MS	○	○		11.0	6.35	3.18	0.4	2.8	0.05-0.18	0.09-1.30	

● : Stock item ○ : In stock (October, 2020)

Auto Tools (KHP Coolant)

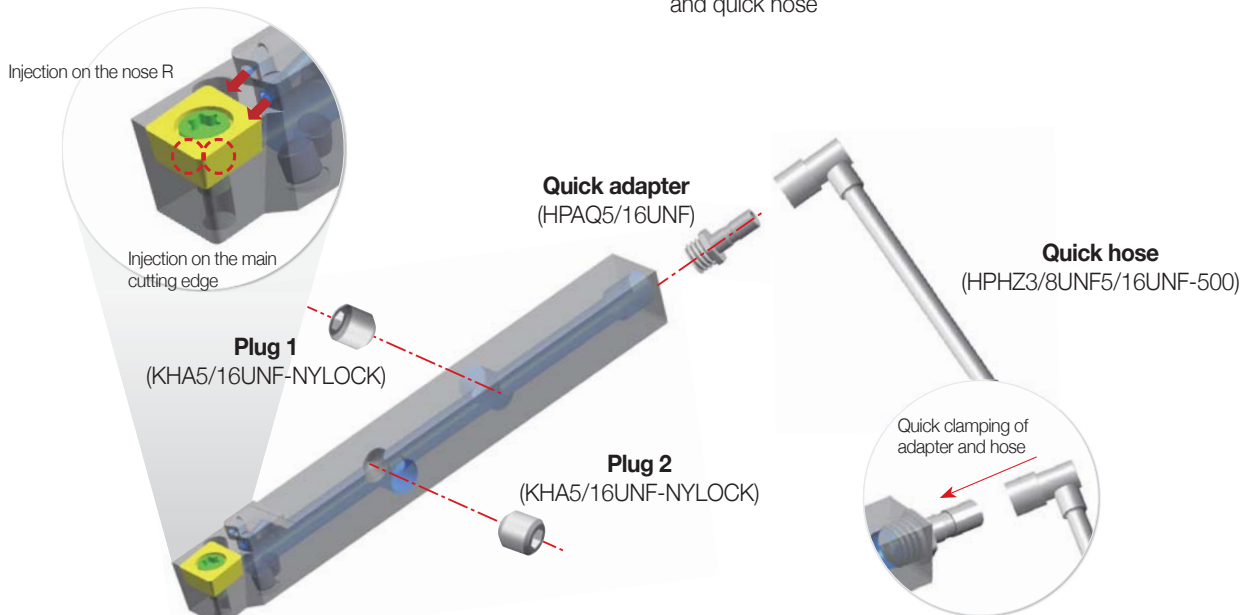
Code system

【Holder】

S	C	L	C	R/L	12	12	-	X	09	A	-	KHP
Clamping method of insert S: Screw on system	Holder style L: 95° J: 93°			Hand R: Right L: Left	Width of shank 12 mm				Length of insert cutting 07, 09, 11, 12	KORLOY High Pressure coolant		
	Insert shape C: C type D: D type V: V type		Clearance angle of insert L: 7°		Height of shank 12 mm		Length of holder X: 120 mm		Auto Tools			




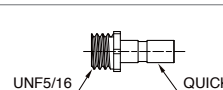
Features

- Coolant holder for high productivity in automatic lathe machining
- Increased cooling and chip control due to concentrated injection on the main cutting edge and nose R with injecting coolant through 2 holes
- Turning solution for high productivity and better chip control in Titanium machining
- Increased chip control from 2 coolant holes with different injecting angles
- Convenience due to quick clamping of quick hose adapter and quick hose

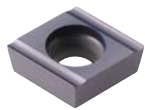


※ Quick adapter and Quick hose are sold separately

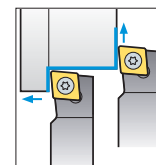
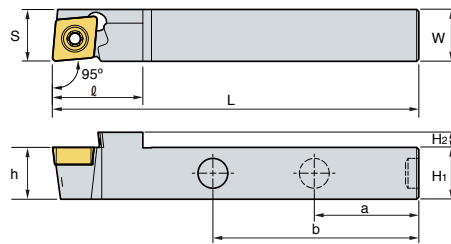
Parts

	Shape	Geometries	Length	Q clamping dimensions	S clamping dimensions
Quick to straight	HPHZ5/16UNF3/8UNF-500 	 UNF3/8 Q S QUICK	500 mm	UNF5/16	-
Quick adapter	HPAQ5/16UNF 	 UNF5/16 QUICK	18.5 mm	UNF5/16	

SCLCR/L



CC□T



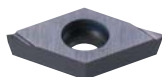
95°

R type insert
(mm)

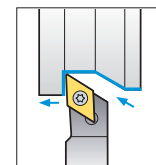
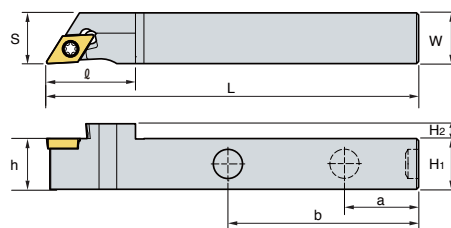
Designation	Stock		H ₁	H ₂	W	L	S	h	ℓ	a	b	Insert	Screw	Plug	Wrench
	R	L													
SCLCR/L 1212-X09A-KHP	●	●	12	3.5	12	120	12	12	21	40	70	CC□T09T3□□	FTKA0410	KHA0404-NYLOCK	TW15P

● : Stock item

SDJCR/L



DC□T



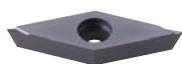
93°

R type insert
(mm)

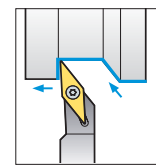
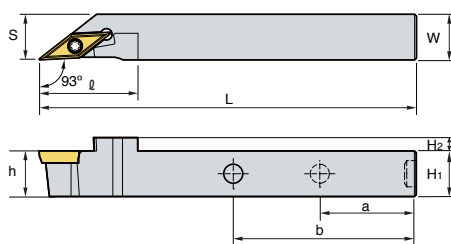
Designation	Stock		H ₁	H ₂	W	L	S	h	ℓ	a	b	Insert	Screw	Plug	Wrench
	R	L													
SDJCR/L 1212-X07A-KHP	●	●	12	3.5	12	120	12	12	21	40	70	DC□T0702□□	FTKA02565	KHA0404-NYLOCK	TW07P
1212-X11A-KHP	●	●	12	3.5	12	120	14	12	29.8	40	70	DC□T11T3□□	FTKA0408	KHA0404-NYLOCK	TW15P

● : Stock item

SVJCR/L



VC□T



93°

R type insert
(mm)

Designation	Stock		H ₁	H ₂	W	L	S	h	ℓ	a	b	Insert	Screw	Plug	Wrench
	R	L													
SVJCR/L 1212-X11A-KHP	●	●	12	3.5	12	120	12	12	26	40	70	VC□T1103□□	FTKA02565	KHA0404-NYLOCK	TW07P
1212-X12A-KHP	●	●	12	3.5	12	120	12	12	26	40	70	VC□□1203□□	FTKA02565	KHA0404-NYLOCK	TW07P

● : Stock item

www.korloy.com



Holystar B/D, 1350, Nambusunhwan-ro, Geumcheon-gu, Seoul, 08536, Korea
Tel : +82-2-522-3181 Fax : +82-2-522-3184, +82-2-3474-4744 Web : www.korloy.com E-mail : sales.khq@korloy.com

KORLOY AMERICA

620 Maple Avenue, Torrance, CA 90503, USA
Tel : +1-310-782-3800 Toll Free : +1-888-711-0001 Fax : +1-310-782-3885
E-mail : sales.kai@korloy.com

KORLOY INDIA

Plot No. 415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, India
Tel : +91-124-4391790 Fax : +91-124-4050032
E-mail : sales.kip@korloy.com

KORLOY TURKEY

Orucreis Mah. Vadi Cad. No: 108 Istanbul Ticaret Sarayi
Kat 5 No: 318 Giyimkent Sitesi-Esenler/Istanbul, Turkey
Tel : +90-212-438-5197 E-mail : sales.ktl@korloy.com

KORLOY RUSSIA

Krasivy Dom office No. 305, Bld. 5, Novovladykinskiy proezd 8, 127106,
Moscow, Russia
Tel : +7-495-280-1458 Fax : +7-495-280-1459 E-mail : sales.krc@korloy.com

KORLOY FACTORY QINGDAO

Ground Dongjing Road 56(B) District Free Trade Zone. Qingdao, China
Tel : +86-532-86959880 Fax : +86-532-86760651
E-mail : pro.ktq@korloy.com

KORLOY EUROPE

Gablونzer Str. 25-27, 61440 Oberursel, Germany
Tel : +49-6171-277-83-0 Fax : +49-6171-277-83-59
E-mail : sales.keg@korloy.com

KORLOY BRASIL

Av. Aruana 280, conj.12, WLC, Alphaville, Barueri,
CEP06460-010, SP, Brasil
Tel : +55-11-4193-3810 E-mail : sales.kbl@korloy.com

KORLOY CHILE

Av. Providencia 1650, Office 1009, 7500027
Providencia-Santiago, Chile
Tel : +56-229-295-490 E-mail : sales.kcs@korloy.com

KORLOY MEXICO

Queretaro, Mexico
E-mail : sales.kml@korloy.com

KORLOY FACTORY INDIA

Plot No. 415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, India
Tel : +91-124-4391790 Fax : +91-124-4050032
E-mail : pro.kim@korloy.com