How to select internal turning tools

Explanation of internal turning tools detailed table

● Listed according to clamping types.

Approach angle of tools

Tools type
The first 4 letters in the type description stands for tool shape and applicatio.

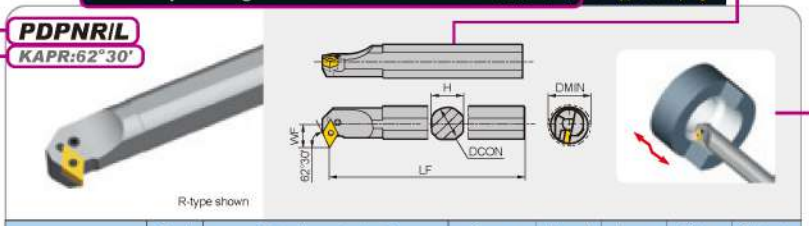
Insert type

Specification chart

Application chart
The arrow shows suitable applications such as internal turning, profiling and end turning, etc.

Corresponding tool holders of insert DN□□ P-type clamping

PDPNR/L
KAPR:62°30'



R-type shown

Type	Stock		Basic dimensions(mm)					Screw	Wrench	Lever	Shim	Shim pin
	R	L	DMIN	DCON	H	LF	WF					
S32T-PDPNR/L15-3	▲	▲	40	32	30	300	22	LEM8×21	WH30L	L4	D15AP	SP4
S40U-PDPNR/L15-3	▲	▲	50	40	38	350	27					
S32T-PDPNR/L15	△	△	40	32	30	300	22	LEM8×21	WH30L	L4B	D15AP	SP4
S40U-PDPNR/L15	△	△	50	40	38	350	27					

▲Stock available △Make-to-order

Applicable inserts

Application	For finishing	For semi-finishing	For roughing	For heavy machining	For cast iron machining
Inserts shape	XF A60	XM A63	DR Double-side A65	HDR A66	TC A66
	DF A60	PM A62	DR Single-side A65		Without chipbreaker A67
	SF A60	DM A63	ER Double-side A65		
	EF A61	EM A64	ER Single-side A66		
	ADF A61	EG A64	SNR Double-side A66		
	NF A61	NM A64	LR Single-side A65		
	NGF A62				
Tool holder type □□-PDPNR/L15-3	DN□□1504□□	DN□□1504□□	DN□□1504□□		DN□□1504□□
Tool holder type □□-PDPNR/L15	DN□□1506□□	DN□□1506□□	DN□□1506□□	DN□□1506□□	DN□□1506□□

Tool holders with oil hole

Products specification
Including product description, stock (left and right hand), basic dimensions and applicable spare parts.

Applicable inserts
Including applications of inserts, reference page, insert shape and corresponding tool holders.

TURNING A

Internal turning tools

Internal turning tools overview A191

Internal turning tools code key A192-A193

Detailed table of internal turning tools A194-A221

Internal turning tool holders by P-type clamping A194-A199

Internal turning tool holders by S-type clamping A200-A215

Damping internal turning tool holders and their features A216-A221

Internal turning tools

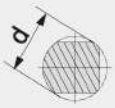
Name	Feature	62°30′	75°	90°	91°	93°	93°	93°	95°	107°30′
										
P-type internal turning tools	• The minimum machining diameter is 20mm. • Applicable inserts are economic negative inserts. • Hole clamping	PDPN  A195	PSKN  A197	PTFN  A198			PDUN  A196		PCLN  A194	
									PWLN  A199	
S-type internal turning tools	• The minimum machining diameter is 10mm. • Applicable inserts are 5°, 7° and 11° positive inserts. • Screw clamping.		SSKC  A204	SCFC  A214	STFC  A205	STUP  A213	SDUC  A202	SDZC  A203		SDQC  A201
							SDUP  A212		SCLC  A200	SDQP  A211
							SVUC  A207		SVQB  A215	 A208
							SVUB  A209		SCLP  A210	SVQC  A206
Damping internal turning tools	• The minimum diameter can be machined is 12mm. • Applicable inserts are 7°, 11°positive inserts. • Good Performance on reducing shake.					STUP  A220	SDUP  A219		SCLP  A217	SDQP  A218
							SVUC  A221			SVQC  A221

Internal turning tools code key

Type of tool holder

Code	Type
A	Steel tool holder with oil-hole
C	Cemented carbide tool holder
E	Cemented carbide tool holder with oil hole
S	Steel tool holder
X	Special inserts applied

Diameter of tool holder



Code	Diameter
08	08
10	10
16	16
20	20
25	25
32	32
40	40
50	50

Length of tool holder

Code	Length
H	100
K	125
M	150
N	160
Q	180
R	200
S	250
T	300
U	350
V	400

Clamping system

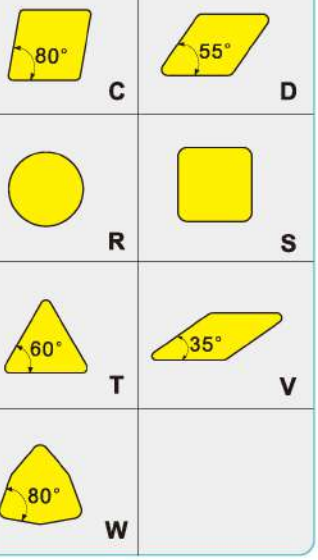
P-Hole clamping

M-Top and hole clamping

S-Screw on

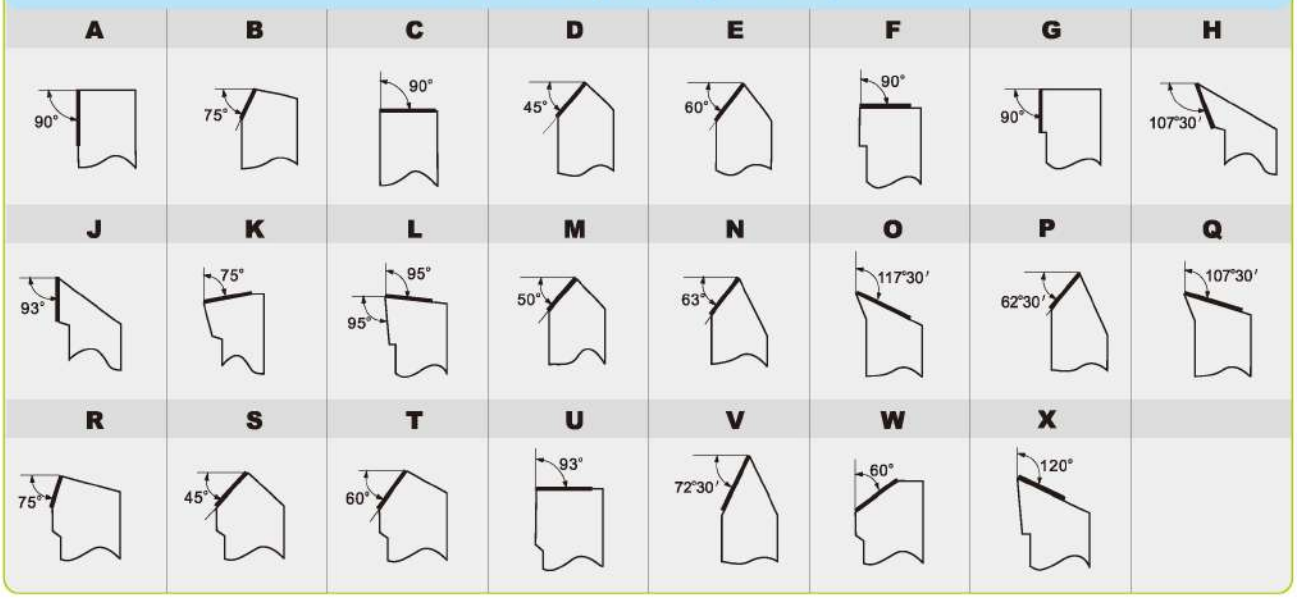
C-Top clamping

Inserts shape



S 16 R - S D U

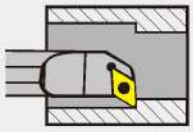
Tool holder style and approach angle



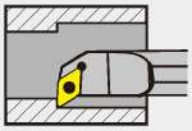
Clearance angle of insert

5°	B
7°	C
15°	D
20°	E
0°	N
11°	P

Cutting direction



L - Left hand



R - Right hand

Manufacture option

D	Increase offset f size+1.0mm
E	Increase offset f size+2.0mm
R	Round shank
W	Wedge clamping
X	Back boring

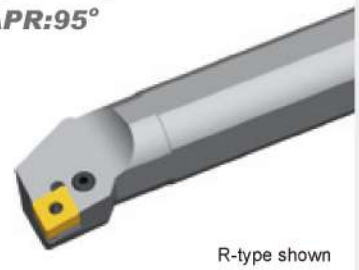
C R 07 ■

Length of cutting edge

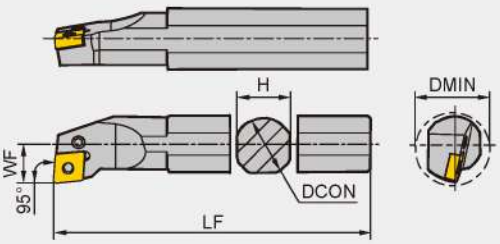
Inserts shape	C	D	R	S	T	V	W
							
Inscribed circle	Length of cutting edge(mm)						
5.556	---	---	---	---	09	---	---
6.350	06	07	---	---	11	---	---
9.525	09	11	09	09	16	16	06
12.700	12	15	12	12	22	22	08
15.875	16	19	15	15	27	---	---
19.050	19	---	19	19	33	---	---
25.400	25	---	25	25	44	---	---

Corresponding tool holders of insert CN□□ P-type clamping

PCLNR/L
KAPR:95°



R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Lever	Shim	Shim pin
	R	L	DMIN	DCON	H	LF	WF					
S16Q-PCLNR/L09	△	△	20	16	15	180	11	LEM5×9B	WT09P	L3C	---	---
S20R-PCLNR/L09	△	△	25	20	18	200	13	LEM5×9B				
S25S-PCLNR/L09	△	△	32	25	23	250	17	LEM5×9B				
S25S-PCLNR/L12	△	△	32	25	23	250	17	LEM6×13.4A	WH25L	L4A	---	---
S32T-PCLNR/L12	▲	▲	44	32	30	300	22	LEM8×21	WH30L	L4	C12APB	SP4
S40U-PCLNR/L12	▲	▲	54	40	38	350	27					
S50V-PCLNR/L12	▲	▲	63	50	47	400	35					
S50V-PCLNR/L16	△	△	63	50	48	400	31	LEM8×25	WH30L	L5	C16AP	SP5
S50S-PCLNR/L19	△	△	63	50	47	250	35	LEM10×27	WH40L	L6	C19AP	SP6
S50W-PCLNR/L19	▲	▲	63	50	47	450	35					

▲Stock available △Make-to-order

Applicable inserts

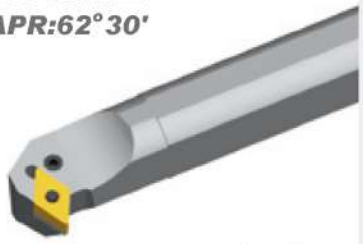
Application	For finishing	For semi-finishing	For roughing	For heavy machining	For cast iron machining
Inserts shape	XF  A52	XM  A54	DR Double-side  A56	HDR  A58	TC  A58
	DF  A52	PM  A53	DR Single-side  A57	HPR  A58	Without chipbreaker  A59
	SF  A52	DM  A54	ER Double-side  A57		
	EF  A52	EM  A55	ER Single-side  A57		
	ADF  A53	EG  A55	SNR Double-side  A57		
	NF  A53	EH  A55	LR Single-side  A56		
		NM  A55			

Tool holder type	For finishing	For semi-finishing	For roughing	For heavy machining	For cast iron machining
□□-PCLNR/L09	CN□□0903□□	CN□□0903□□			
□□-PCLNR/L12	CN□□1204□□	CN□□1204□□	CN□□1204□□	CN□□1204□□	CN□□1204□□
□□-PCLNR/L16	CN□□1606□□	CN□□1606□□	CN□□1606□□	CN□□1606□□	CN□□1606□□
□□-PCLNR/L19		CN□□1906□□	CN□□1906□□	CN□□1906□□	CN□□1906□□

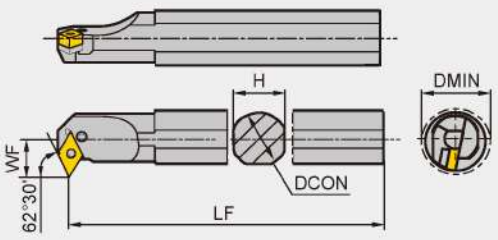
Corresponding tool holders of insert DN□□ P-type clamping

PDPNR/L

KAPR:62°30'



R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Lever	Shim	Shim pin
	R	L	DMIN	DCON	H	LF	WF					
S32T-PDPNR/L15-3	▲	▲	40	32	30	300	22	LEM8×21	WH30L	L4	D15AP	SP4
S40U-PDPNR/L15-3	▲	▲	50	40	38	350	27					
S32T-PDPNR/L15	△	△	40	32	30	300	22	LEM8×21	WH30L	L4B	D15AP	SP4
S40U-PDPNR/L15	△	△	50	40	38	350	27					

▲Stock available △Make-to-order

Applicable inserts

Application	For finishing	For semi-finishing	For roughing	For heavy machining	For cast iron machining
Inserts shape	**XF**  A60	**XM**  A63	**DR** Double-side  A65	**HDR**  A66	**TC**  A66
	DF  A60	**PM**  A62	**DR** Single-side  A65		Without chipbreaker  A67
	SF  A60	**DM**  A63	**ER** Double-side  A65		
	EF  A61	**EM**  A64	**ER** Single-side  A66		
	ADF  A61	**EG**  A64	**SNR** Double-side  A66		
	NF  A61	**NM**  A64	**LR** Single-side  A65		
	NGF  A62				

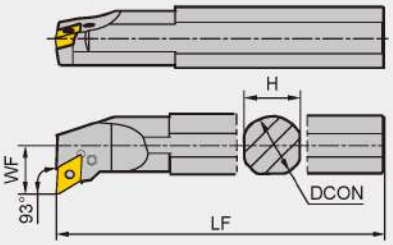
Tool holder type						
	□□-PDPNR/L15-3	DN□□1504□□	DN□□1504□□	DN□□1504□□		DN□□1504□□
	□□-PDPNR/L15	DN□□1506□□	DN□□1506□□	DN□□1506□□	DN□□1506□□	DN□□1506□□

Corresponding tool holders of insert DN□□ P-type clamping

PDUNR/L

KAPR:93°

R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Lever	Shim	Shim pin
	R	L	DMIN	DCON	H	LF	WF					
S20R-PDUNR/L11	△	△	25	20	19	200	13	LEM5×12B	WT09P	L3D	---	---
S25S-PDUNR/L11	△	△	32	25	23	250	17					
S32T-PDUNR/L15	△	△	40	32	30	300	22	LEM8×21	WH30L	L4B	D15AP	SP4
S32T-PDUNR/L15-3	△	△	40	32	30	300	22	LEM8×21	WH30L	L4	D15AP	SP4
S40U-PDUNR/L15	△	△	50	40	38	350	27	LEM8×21	WH30L	L4B	D15AP	SP4
S40U-PDUNR/L15-3	▲	▲	50	40	38	350	27	LEM8×21	WH30L	L4	D15AP	SP4

▲Stock available △Make-to-order

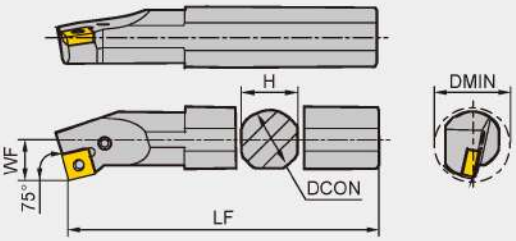
Applicable inserts

Application	For finishing	For semi-finishing	For roughing	For heavy machining	For cast iron machining
Inserts shape	XF A60	XM A63	DR Double-side A65	HDR A66	TC A66
	DF A60	PM A62	DR Single-side A65		Without chipbreaker A67
	SF A60	DM A63	ER Double-side A65		
	EF A61	EM A64	ER Single-side A66		
	ADF A61	EG A64	SNR Double-side A66		
	NF A61	NM A64	LR Single-side A65		
	NGF A62				
Tool holder type □□-PDUNR/L11	DN□□1104□□	DN□□1104□□			DN□□1104□□
□□-PDUNR/L15-3	DN□□1504□□	DN□□1504□□	DN□□1504□□		DN□□1504□□
□□-PDUNR/L15	DN□□1506□□	DN□□1506□□	DN□□1506□□	DN□□1506□□	DN□□1506□□

Corresponding tool holders of insert SN□□ P-type clamping

PSKNR/L
KAPR:75°

R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Lever	Shim	Shim pin
	R	L	DMIN	DCON	H	LF	WF					
S25S-PSKNR/L12	▲	▲	32	25	23	250	17	LEM6×13.4A	WH25L	L4A	---	---
S32T-PSKNR/L12	△	△	41	32	30	300	22	LEM8×21	WH30L	L4	S12APB	SP4
S40U-PSKNR/L12	△	△	50	40	38	350	27					

▲Stock available △Make-to-order

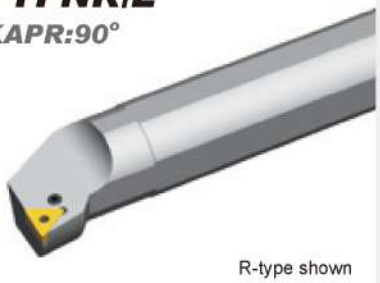
Applicable inserts

Application	For finishing	For semi-finishing	For roughing	For heavy machining	For cast iron machining
Inserts shape	**XF**  A68	**XM**  A70	**DR** Double-side  A73	**HDR**  A75	**TC**  A76
	DF  A68	**PM**  A70	**DR** Single-side  A74	**HPR**  A76	Without chipbreaker  A77
	EF  A68	**DM**  A71	**ER** Double-side  A74		
	ADF  A69	**EM**  A71	**ER** Single-side  A75		
	SF  A69	**EG**  A72	**SNR** Double-side  A75		
		NM  A72	**LR** Single-side  A72		
Tool holder type **□□-PSKNR/L12**	SN□□1204□□	SN□□1204□□	SN□□1204□□	SN□□1204□□	SN□□1204□□

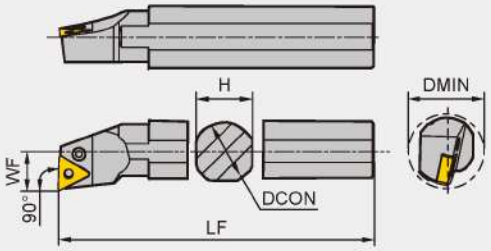
Corresponding tool holders of insert TN□□ P-type clamping

PTFNR/L

KAPR:90°



R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Lever	Shim	Shim pin
	R	L	DMIN	DCON	H	LF	WF					
S25S-PTFNR/L16	▲	▲	32	25	23	250	17	LEM5×12B	WT09P	L3B	---	---
S32T-PTFNR/L16	△	△	41	32	30	300	21	LEM6×17	WH25L	L3	T16APB	SP3
S40U-PTFNR/L16	△	△	50	40	38	350	26					

▲Stock available △Make-to-order

Applicable inserts

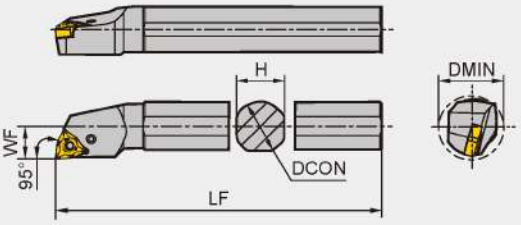
Application	For finishing	For semi-finishing	For roughing	For heavy machining	For cast iron machining
Inserts shape	XF A78	XM A80	DR Double-side A82	HDR A84	TC A84
	DF A78	PM A80	DR Single-side A83		Without chipbreaker A84
	SF A78	DM A81	ER Double-side A83		
	EF A79	EM A81	SNR Double-side A83		
	ES A79	EG A81	LR Single-side A82		
	ADF A79	EH A82			
Tool holder type □□-PTFNR/L16	TN□□1604□□	TN□□1604□□	TN□□1604□□	TN□□1604□□	TN□□1604□□

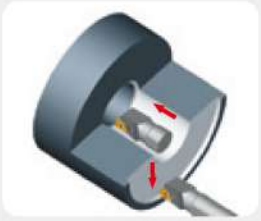
Corresponding tool holders of insert WN□□ P-type clamping

PWLNR/L

KAPR:95°

R-type shown





Type	Stock		Basic dimensions(mm)					Screw	Wrench	Lever	Shim	Shim pin
	R	L	DMIN	DCON	H	LF	WF					
S16R-PWLNR/L06	△	△	22	16	15	200	11	LEM5X12B	WT09P	L3B	---	---
S20R-PWLNR/L06	△	△	25	20	18	200	13			L3B		
S25S-PWLNR/L06	△	△	35	25	23	250	17					
S20R-PWLNR/L08	△	△	25	20	18	200	13	LEM6X13.4A	WH25L	L4A	---	---
S25S-PWLNR/L08	△	△	32	25	23	250	17					
S32T-PWLNR/L08	△	△	40	32	30	300	22	LEM8X21	WH30L	L4	W08AP	SP4

▲Stock available △Make-to-order

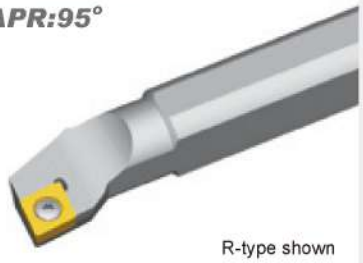
Applicable inserts

Application	For finishing	For semi-finishing	For roughing	For cast iron machining
Inserts shape	**XF**  A88	**XM**  A90	**DR** Double-side  A92	**TC**  A93
	DF  A88	**PM**  A90	**SNR** Double-side  A92	Without chipbreaker  A93
	SF  A88	**DM**  A91		
	EF  A89	**EM**  A91		
	ES  A89	**EG**  A91		
	ADF  A89	**EH**  A92		
	NF  A89	**NM**  A92		
Tool holder type **□□-PWLNR/L06**	WN□□0604□□	WN□□0604□□	WN□□0604□□	WN□□0604□□
□□-PWLNR/L08	WN□□0804□□	WN□□0804□□	WN□□0804□□	WN□□0804□□

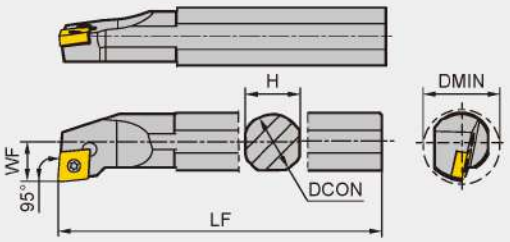
Corresponding tool holders of insert CC□□ S-type clamping

SCLCR/L

KAPR:95°



R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Shim	Shim screw
	R	L	DMIN	DCON	H	LF	WF				
S08K-SCLCR/L06	▲	▲	10	8	7.4	125	5	I60M2.5×5.5	WT07IP	---	---
S10K-SCLCR/L06	▲	▲	13	10	9	125	6				
S12M-SCLCR/L06	▲	▲	16	12	11	150	9	I60M2.5×6.5			
S12M-SCLCR/L09	▲	▲	16	12	11	150	9	I60M3.5×8	WT15IP	---	---
S14N-SCLCR/L09	△	△	18	14	13	160	9				
S16Q-SCLCR/L09	△	△	20	16	15	180	11				
S20R-SCLCR/L09	△	△	25	20	18	200	13	I60M3.5×8			
S25S-SCLCR/L09	△	△	32	25	23	250	17	I60M3.5×10	WT15IP	---	---
S20R-SCLCR/L12	△	△	25	20	19	200	12.5	I60M4×11X	WT15IP	---	---
S25S-SCLCR/L12	▲	▲	32	25	23	250	17	I60M4×11X	WT15IP	---	---
S32T-SCLCR/L12	△	△	40	32	30	300	22	I60M4×11X	WH40L WT15IP	C12BS	SM6×10XA
S40U-SCLCR/L12	△	△	50	40	37	350	27				

▲Stock available △Make-to-order

Applicable inserts

Application	For extra finishing	For finishing	For semi-finishing	For roughing	For cast iron machining	For Al machining
Inserts shape	**SF**  A95	**XF**  A95	**XM**  A96	**HR**  A98	**TC**  A98	**LH**  A99
		HF  A95	**HM**  A97			**LC**  A99
		EF  A96	**EM**  A97			
		AHF  A96	**EG**  A97			

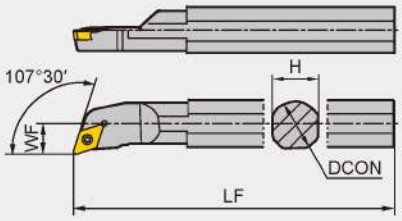
Tool holder type							
	□□-SCLCR/L06	CC□□0602□□	CC□□0602□□	CC□□0602□□	CC□□0602□□		CCGX0602□□
	□□-SCLCR/L09	CC□□09T3□□	CC□□09T3□□	CC□□09T3□□		CC□□09T3□□	CCGX09T3□□
	□□-SCLCR/L12		CC□□1204□□	CC□□1204□□		CC□□1204□□	CCGX1204□□

Corresponding tool holders of insert DC□□ S-type clamping

SDQCR/L

KAPR:107°30'

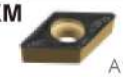
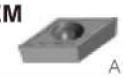
R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	---	---
	R	L	DMIN	DCON	H	LF	WF			---	---
S10K-SDQCR/L07	▲	▲	13	10	9	125	7	I60M2.5×5.5	WT07IP	---	---
S12M-SDQCR/L07	▲	▲	16	12	11	150	9	I60M2.5×6.5			
S16Q-SDQCR/L07	△	△	20	16	15	180	11				
S20R-SDQCR/L11	△	△	25	20	18	200	13	I60M3.5×8	WT15IP	---	---
S25S-SDQCR/L11	△	△	32	25	23	250	17	I60M3.5×10			
S32T-SDQCR/L11	△	△	40	32	30	300	22	I60M3.5×8			
S40U-SDQCR/L11	△	△	50	40	37	350	27	I60M3.5×10			

▲Stock available △Make-to-order

Applicable inserts

Application	For extra finishing	For finishing	For semi-finishing	For roughing	For Al machining
Inserts shape	SF  A100	XF  A100	XM  A101	HR  A102	LH  A103
		HF  A100	HM  A102		LC  A103
		EF  A101	EM  A102		
		AHF  A101			

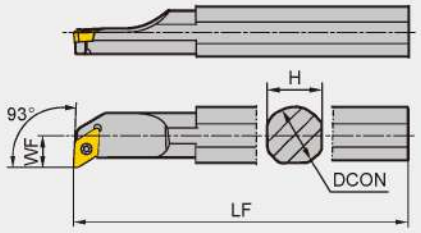
Tool holder type						
	□□-SDQCR/L07	DC□□0702□□	DC□□0702□□	DC□□0702□□		DCGX0702□□
	□□-SDQCR/L11	DC□□11T3□□	DC□□11T3□□	DC□□11T3□□	DC□□11T3□□	DCGX11T3□□

Corresponding tool holders of insert DC□□ S-type clamping

SDUCR/L

KAPR:93°

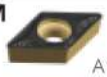
R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	---	---
	R	L	DMIN	DCON	H	LF	WF			---	---
S10K-SDUCR/L07	▲	▲	13	10	9	125	7	I60M2.5×5.5	WT07IP	---	---
S12M-SDUCR/L07	▲	▲	16	12	11	150	9	I60M2.5×6.5			
S16Q-SDUCR/L07	△	△	20	16	15	180	11				
S20R-SDUCR/L11	△	△	25	20	18	200	13	I60M3.5×8	WT15IP	---	---
S25S-SDUCR/L11	△	△	32	25	23	250	17	I60M3.5×10			
S32T-SDUCR/L11	△	△	40	32	30	300	22				
S40U-SDUCR/L11	△	△	50	40	37	350	27				

▲Stock available △Make-to-order

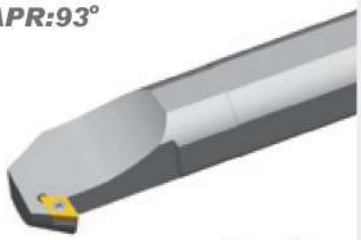
Applicable inserts

Application	For extra finishing	For finishing	For semi-finishing	For roughing	For Al machining
Inserts shape	**SF**  A100	**XF**  A100	**XM**  A101	**HR**  A102	**LH**  A103
		HF  A100	**HM**  A102		**LC**  A103
		EF  A101	**EM**  A102		
		AHF  A101			

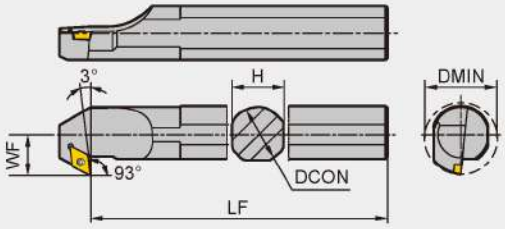
Tool holder type						
	□□-SDUCR/L07	DC□□0702□□	DC□□0702□□	DC□□0702□□		DCGX0702□□
	□□-SDUCR/L11	DC□□11T3□□	DC□□11T3□□	DC□□11T3□□	DC□□11T3□□	DCGX11T3□□

Corresponding tool holders of insert DC□□ S-type clamping

SDZCR/L
KAPR:93°



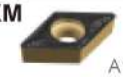
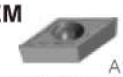
R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Shim	Shim screw
	R	L	DMIN	DCON	H	LF	WF				
S25S-SDZCR/L11	△	△	32	25	23	250	17	I60M3.5×10	WT15IP	---	---
S32T-SDZCR/L11	△	△	40	32	30	300	22	I60M3.5×12	WT15IP WH35L	D11BS	SM5×8.65XA
S40U-SDZCR/L11	△	△	50	40	37	350	27				

▲Stock available △Make-to-order

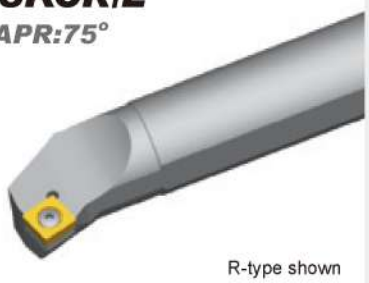
Applicable inserts

Application	For extra finishing	For finishing	For semi-finishing	For roughing	For Al machining
Inserts shape	**SF**  A100	**XF**  A100	**XM**  A101	**HR**  A102	**LH**  A103
		HF  A100	**HM**  A102		**LC**  A103
		EF  A101	**EM**  A102		
		AHF  A101			
Tool holder type **□□-SDZCR/L11**	DC□□11T3□□	DC□□11T3□□	DC□□11T3□□	DC□□11T3□□	DCGX11T3□□

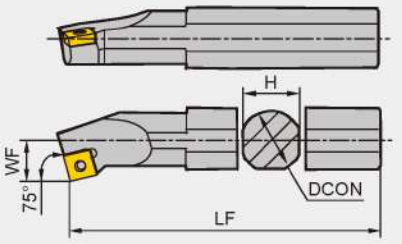
Corresponding tool holders of insert SC□□ S-type clamping

SSKCR/L

KAPR:75°



R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Shim	Shim screw
	R	L	DMIN	DCON	H	LF	WF				
S12M- SSKCR/L09	▲	△	16	12	11	150	9	I60M3.5×8	WT15IP	---	---
S16Q- SSKCR/L09	△	△	20	16	15	180	11				
S20R- SSKCR/L09	△	△	25	20	18	200	13				
S25S- SSKCR/L12	△	△	32	25	23	250	17	I60M4×11X	WT15IP	---	---
S32T- SSKCR/L12	△	△	40	32	30	300	22		WT15IP WH40L	S12BS	SM6×10XA

▲Stock available △Make-to-order

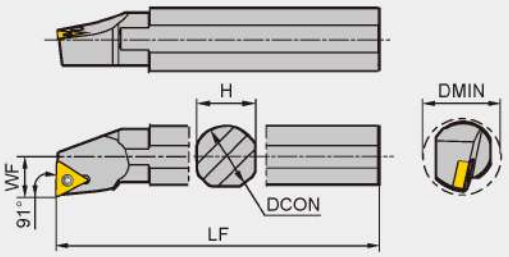
Applicable inserts

Application	For finishing	For semi-finishing	For roughing	For Al machining
Inserts shape	XF  A106	XM  A107	HR  A108	LH  A108
	HF  A106	HM  A107		LC  A108
	EF  A106	EM  A107		
	AHF  A106			
Tool holder type □□-SSKCR/L09	SC□□09T3□□	SC□□09T3□□	SC□□09T3□□	SCGX09T3□□
□□-SSKCR/L12		SC□□1204□□	SC□□1204□□	SCGX1204□□

Corresponding tool holders of insert TC□□ S-type clamping

STFCR/L
KAPR:91°

R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Shim	Shim screw
	R	L	DMIN	DCON	H	LF	WF				
S12M-STFCR/L11	▲	▲	16	12	11	150	9	I60M2.5×6.5	WT07IP	---	---
S16Q-STFCR/L11	△	△	20	16	15	180	11				
S20R-STFCR/L11	△	△	25	20	18	200	13				
S25S-STFCR/L16	△	△	32	25	23	250	17	I60M3.5×10	WT15IP	---	---
S32T-STFCR/L16	△	△	40	32	30	300	22	I60M3.5×12	WT15IP WH35L	T16BS	SM5×8.65XA
S40U-STFCR/L16	△	△	50	40	37	350	27				

▲Stock available △Make-to-order

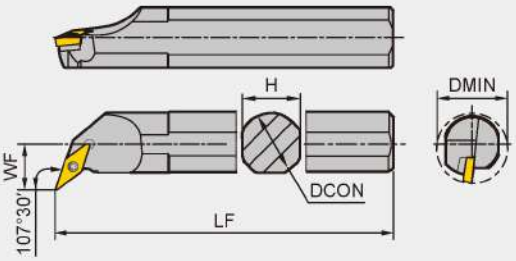
Applicable inserts

Application	For finishing	For semi-finishing	For roughing	For Al machining
Inserts shape	XF A109	XM A111	HR A112	LH A113
	HF A109	HM A112		LC A113
	EF A109	EM A111		
	AHF A111	EG A111		
Tool holder type □□-STFCR/L11	TC□□1102□□	TC□□1102□□	TC□□1102□□	TCGX1102□□
□□-STFCR/L16	TC□□16T3□□	TC□□16T3□□	TC□□16T3□□	TCGX16T3□□

Corresponding tool holders of insert VC□□ S-type clamping

SVQCR/L
KAPR:107°30'

R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Shim	Shim screw
	R	L	DMIN	DCON	H	LF	WF				
S16Q-SVQCR/L11	▲	▲	22	16	15	180	13	I60M2.5×6.5	WT07IP	---	---
S20R-SVQCR/L16	△	△	27	20	18	200	14	I60M3.5×8	WT15IP	---	---
S25S-SVQCR/L16	△	△	35	25	23	250	20	I60M3.5×12	WT15IP WH35L	V16BS	SM5×8.65XA
S32T-SVQCR/L16	△	△	40	32	30	300	22				

▲Stock available △Make-to-order

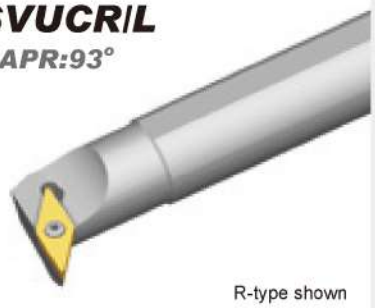
Applicable inserts

Application	For extra finishing	For finishing	For Al machining
Inserts shape	**SF**  A114	**XF**  A114	**LH**  A116
		NF  A114	**LC**  A116
		AHF  A114	

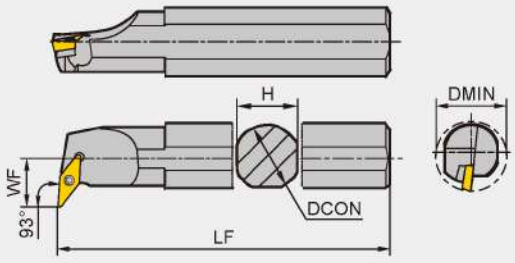
Tool holder type				
	□□-SVQCR/L11	VC□□1103□□	VC□□1103□□	VCGX1103□□
	□□-SVQCR/L16		VC□□1604□□	VCGX1604□□

Corresponding tool holders of insert VC□□ S-type clamping

SVUCR/L
KAPR:93°



R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Shim	Shim screw
	R	L	DMIN	DCON	H	LF	WF				
S16Q-SVUCR/L11	△	△	24	16	15	180	15	I60M2.5×6.5	WT07IP	---	---
S20R-SVUCR/L11	△	△	28	20	18	200	17			---	---
S25S-SVUCR/L16	△	△	33	25	23	250	19	I60M3.5×12	WT15IP	---	---
S32T-SVUCR/L16	△	△	40	32	30	300	22			---	---

▲Stock available △Make-to-order

Applicable inserts

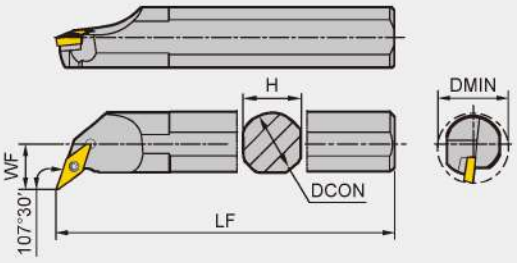
Application	For extra finishing	For finishing	For Al machining
Inserts shape	**SF**  A114	**XF**  A114	**LH**  A116
		NF  A114	**LC**  A116
		AHF  A114	

Tool holder type				
	□□-SVUCR/L11	VC□□1103□□	VC□□1103□□	VCGX1103□□
	□□-SVUCR/L16		VC□□1604□□	VCGX1604□□

Corresponding tool holders of insert VB□□ S-type clamping

SVQBR/L
KAPR:107°30'

R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Shim	Shim screw
	R	L	DMIN	DCON	H	LF	WF				
S20R-SVQBR/L16	△	△	27	20	18	200	14	I60M3.5×8	WT15IP	---	---
S25S-SVQBR/L16	△	△	35	25	23	250	20	I60M3.5×12	WT15IP WH35L	V16BS	SM5×8.65XA
S32T-SVQBR/L16	▲	▲	40	32	30	300	22				

▲Stock available △Make-to-order

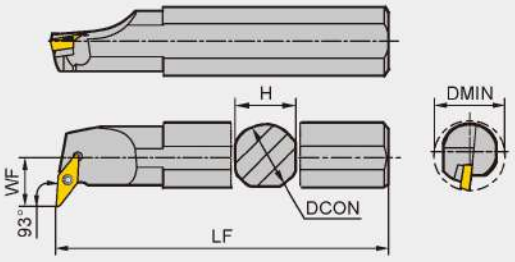
Applicable inserts

Application	For finishing	For semi-finishing	For roughing
Inserts shape	XF  A117	XM  A118	HR  A119
	EF  A117	HM  A119	SNR  A119
	NF  A118	EM  A118	
	NGF  A118		
	AHF  A118		
Tool holder type □□-SVQBR/L16	VB□□1604□□	VB□□1604□□	VB□□1604□□

Corresponding tool holders of insert VB□□ S-type clamping

SVUBR/L
KAPR:93°

R-type shown



Type	Stock		Basic dimensions(mm)					Screw	Wrench	Shim	Shim screw
	R	L	DMIN	DCON	H	LF	WF				
S25S- SVUBR/L16	△	△	33	25	23	250	18	I60M3.5×12	WT15IP	---	---
S32T-SVUBR/L16	△	△	40	32	30	300	22	I60M3.5×12	WT15IP WH35L	V16BS	SM5×8.65XA

※ Tool holder with cooling hole ▲Stock available △Make-to-order

Applicable inserts

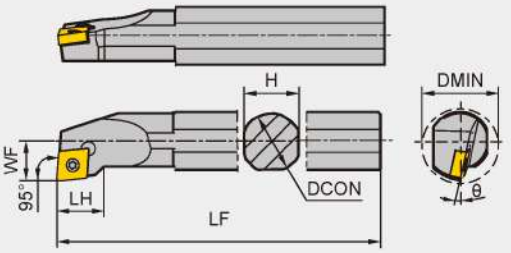
Application	For finishing	For semi-finishing	For roughing
Inserts shape	**XF**  A117	**XM**  A118	**HR**  A119
	EF  A117	**HM**  A119	**SNR**  A119
	NF  A118	**EM**  A118	
	NGF  A118		
	AHF  A118		
Tool holder type **□□-SVUBR/L16**	VB□□1604□□	VB□□1604□□	VB□□1604□□

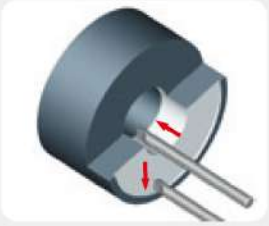
Corresponding tool holders of insert CP□□ S-type clamping

SCLPR/L

KAPR:95°

R-type shown





Type	Stock		Basic dimensions(mm)							Screw	Wrench	---	---
	R	L	DMIN	DCON	H	LF	WF	θ	LH			---	---
S10K-SCLPR/L06	▲	▲	12	10	9	125	6	-7°	17	I60M2.5×5.5	WT07IP	---	---
S12M-SCLPR/L06	▲	▲	16	12	11	150	8	-4°	20				
S16Q-SCLPR/L09	▲	▲	20	16	15	180	10	-4°	29	I60M3.5×8	WT15IP	---	---
S20R-SCLPR/L09	△	△	25	20	18	200	13	-4°	35				

▲Stock available △Make-to-order

Applicable inserts

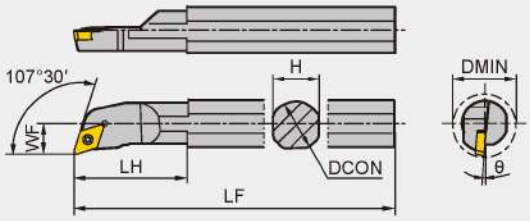
Application		For extra finishing
Inserts shape		SF  A120
Tool holder type	□□-SCLPR/L06	CP□□0602□□
	□□-SCLPR/L09	CP□□09T3□□

Corresponding tool holders of insert DP□□ S-type clamping

SDQPR/L

KAPR:107°30'

R-type shown



Type	Stock		Basic dimensions(mm)							Screw	Wrench	---	---
	R	L	DMIN	DCON	H	LF	WF	θ	LH			---	---
S10K-SDQPR/L07	△	△	13	10	9	125	7	-8°	20	I60M2.5×5.5	WT07IP	---	---
S12M-SDQPR/L07	▲	△	16	12	11	150	9	-8°	22				
S16Q-SDQPR/L07	▲	△	20	16	15	180	11	-6°	27	I60M2.5×6.5			
S16Q-SDQPR/L11	▲	△	20	16	15	180	11	-6°	32	I60M3.5×8	WT15IP	---	---
S20R-SDQPR/L11	△	△	25	20	18	200	13	-6°	33				

▲Stock available △Make-to-order

Applicable inserts

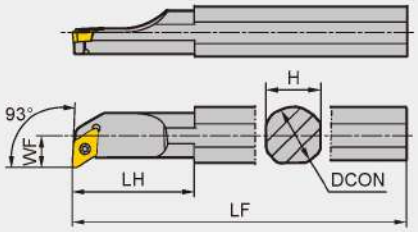
	Application	For extra finishing
	Inserts shape	SF  A120
Tool holder type	□□-SDQPR/L07	DP□□0702□□
	□□-SDQPR/L11	DP□□11T3□□

Corresponding tool holders of insert DP□□ S-type clamping

SDUPR/L

KAPR:93°

R-type shown



Type	Stock		Basic dimensions(mm)							Screw	Wrench	---	---
	R	L	DMIN	DCON	H	LF	WF	θ	LH			---	---
S10K-SDUPR/L07	▲	▲	15	10	9	125	9	-8°	18	I60M2.5×5.5	WT07IP	---	---
S12M-SDUPR/L07	▲	△	16	12	11	150	9	-8°	19				
S16Q-SDUPR/L07	△	△	20	16	15	180	11	-6°	25	I60M2.5×6.5			

▲Stock available △Make-to-order

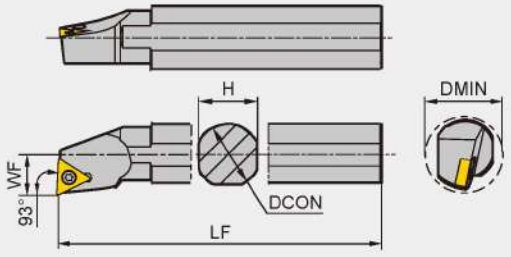
Applicable inserts

Application	For extra finishing
Inserts shape	SF  A120
Tool holder type □□-SDUPR/L07	DP□□0702□□

Corresponding tool holders of insert TP□□ S-type clamping

STUPR/L
KAPR:93°

R-type shown

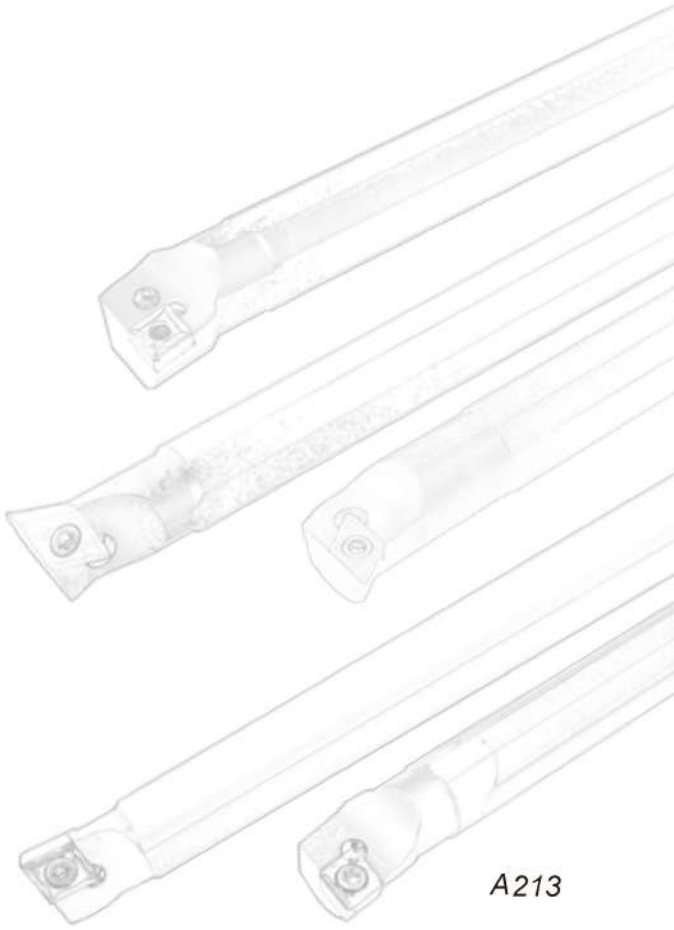


Type	Stock		Basic dimensions(mm)					Screw	Wrench	---	---
	R	L	DMIN	DCON	H	LF	WF			---	---
S10M-STUPR/L09	△	△	13	10	9.4	150	6	I60M2.2×5.5	WT07IP	---	---
S10M-STUPR/L11	△	△	13	10	9.4	150	6				
S12Q-STUPR/L11	△	△	16	12	11.4	180	7.5	I60M2.5×6.5	WT07IP	---	---
S16R-STUPR/L11	△	△	20	16	15	200	10				

▲Stock available △Make-to-order

Applicable inserts

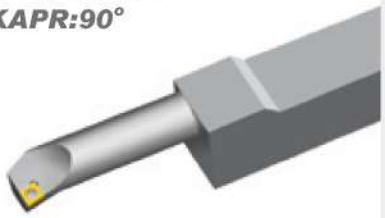
Application		For extra finishing
Inserts shape		SF  A122
Tool holder type	□□-STUPR/L09	TP□□0902□□
	□□-STUPR/L11	TP□□1103□□

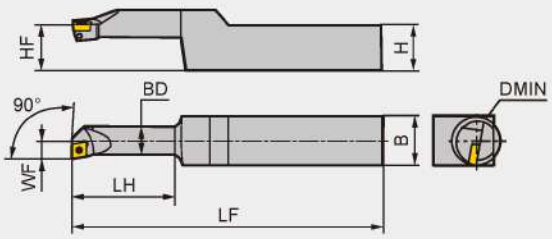


Corresponding tool holders of insert CC□□ S-type clamping

SCFCR/L

KAPR:90°





Type	Stock		Basic dimensions(mm)								Screw	Wrench	---	---
	R	L	DMIN	BD	LF	WF	H	HF	B	LH			---	---
S10M-SCFCR/L06S25	▲	▲	13	10	150	7	27	27	25	35	I60M2.5×5.5	WT07IP	---	---
S12P -SCFCR/L06S25	▲	▲	16	12	170	9	27	27	25	35	I60M2.5×6.5			
S16Q-SCFCR/L09S25	▲	▲	20	16	180	11	27	27	25	50	I60M3.5×8	WT15IP	---	---
S20R-SCFCR/L09S25	△	△	25	20	200	13	27	27	25	50				
S25R-SCFCR/L12S25	△	△	32	25	200	17	27	27	25	75	I60M5×13	WT20IP	---	---

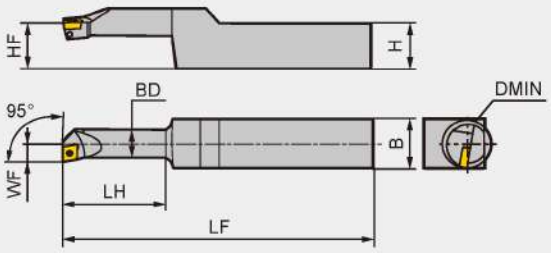
▲Stock available △Make-to-order

Applicable inserts

Application	For extra finishing	For finishing	For semi-finishing	For roughing	For cast iron machining	For Al machining
Inserts shape	**SF**  A95	**XF**  A95	**XM**  A96	**HR**  A98	**TC**  A98	**LH**  A99
		HF  A95	**HM**  A97			**LC**  A99
		EF  A96	**EM**  A97			
		AHF  A96	**EG**  A97			
Tool holder type **□□-SCFCR/L06S25**	CC□□0602□□	CC□□0602□□	CC□□0602□□	CC□□0602□□	CC□□0602□□	CCGX0602□□
□□-SCFCR/L09S25	CC□□09T3□□	CC□□09T3□□	CC□□09T3□□	CC□□09T3□□	CC□□09T3□□	CCGX09T3□□
□□-SCFCR/L12S25		CC□□1204□□	CC□□1204□□	CC□□1204□□	CC□□1204□□	CCGX1204□□

Corresponding tool holders of insert CC□□ S-type clamping

SCLCR/L
KAPR:95°



Type	Stock		Basic dimensions(mm)								Screw	Wrench	---	---
	R	L	DMIN	BD	LF	WF	H	HF	B	LH			---	---
S10M-SCLCR/L06S20	▲	▲	13	10	150	7	22	22	20	30	I60M2.5×5.5	WT07IP	---	---
S12P -SCLCR/L06S20	▲	▲	16	12	170	9	22	22	20	35				
S16Q-SCLCR/L09S20	▲	▲	20	16	180	11	22	22	20	40	I60M3.5×8	WT15IP	---	---
S20R-SCLCR/L09S20	△	△	25	20	200	13	22	22	20	45				

▲Stock available △Make-to-order

Applicable inserts

Application	For extra finishing	For finishing	For semi-finishing	For roughing	For cast iron machining	For Al machining
Inserts shape	**SF**  A95	**XF**  A95	**XM**  A96	**HR**  A98	**TC**  A98	**LH**  A99
		HF  A95	**HM**  A97			**LC**  A99
		EF  A96	**EM**  A97			
		AHF  A96	**EG**  A97			
Tool holder type **□□-SCLCR/L06S20**	CC□□0602□□	CC□□0602□□	CC□□0602□□	CC□□0602□□	CC□□0602□□	CCGX0602□□
□□-SCLCR/L09S20	CC□□09T3□□	CC□□09T3□□	CC□□09T3□□	CC□□09T3□□	CC□□09T3□□	CCGX09T3□□

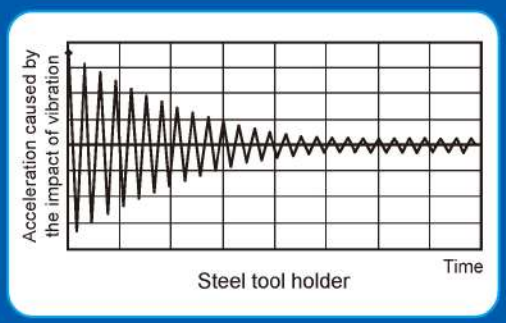
Damping tool holders for internal turning

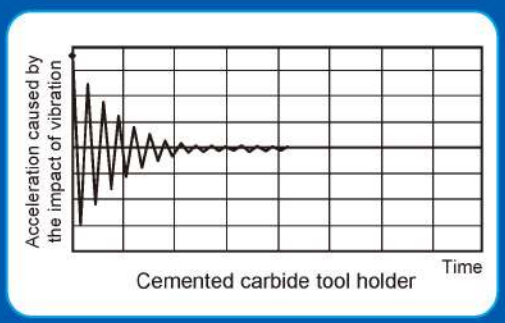
Technical features

Increasing material rigidity of tool holder can reduce the amplitude, or obtain larger overhang under the condition of same systemic stability. Therefore, compared with steel tool holder, cemented carbide tool holder has better dampening effect, smaller amplitude and reaches convergence point sooner. As for machining under the condition of long overhang and easy vibration, they can exert excellent performance and achieve higher dimensional accuracy and surface quality.

Under the same machining condition

The maximum overhang of cemented carbide tool holder can reach L≤6D, while the recommended maximum overhang of steel tool holder is L≤3D.



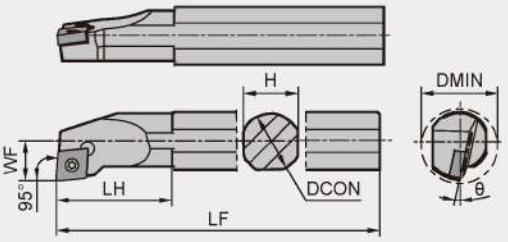


Corresponding tool holders of insert CP□□ (Damping tool holder) S-type clamping

SCLPR/L

KAPR:95°

R-type shown



Type	Stock		Basic dimensions(mm)							Screw	Wrench	--	--
	R	L	DMIN	DCON	WF	LF	LH	H	θ			--	--
C10M-SCLPR/L06	▲	△	12	10	6	150	17	9	-7°	I60M2.5×5.5	WT07IP	--	--
C12Q-SCLPR/L06	△	△	16	12	8	180	20	11	-4°				
C16R-SCLPR/L09	▲	△	20	16	10	200	29	15	-4°	I60M3.5×8	WT15IP	--	--
C20S-SCLPR/L09	△	△	25	20	13	250	35	18	-4°				

▲Stock available △Make-to-order

Applicable inserts

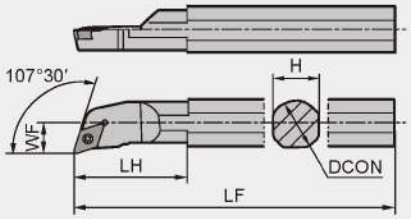
Application	For extra finishing
Inserts shape	**SF**  A120
Tool holder type **□□-SCLPR/L06**	CP□□0602□□
Tool holder type **□□-SCLPR/L09**	CP□□09T3□□

Corresponding tool holders of insert DP□□ (Damping tool holder) S-type clamping

SDQPR/L

KAPR:107°30'

R-type shown



Type	Stock		Basic dimensions(mm)							Screw	Wrench	---	---
	R	L	DMIN	DCON	WF	LF	LH	H	θ			---	---
C10M-SDQPR/L07	▲	△	13	10	7	150	20	9	-8°	I60M2.5×5.5	WT07IP	---	---
C12Q-SDQPR/L07	△	△	16	12	9	180	22	11	-8°				
C16R-SDQPR/L07	△	△	20	16	11	200	27	15	-6°	I60M2.5×6.5			
C16R-SDQPR/L11	△	△	20	16	11	200	32	15	-6°	I60M3.5×8	WT15IP	---	---
C20S-SDQPR/L11	▲	△	25	20	13	250	33	18	-6°				

▲Stock available △Make-to-order

Applicable inserts

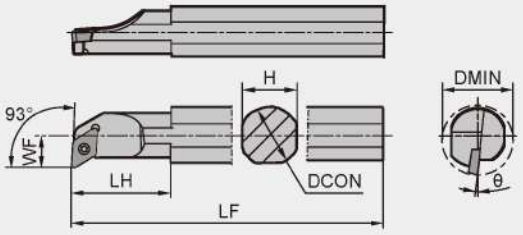
Application		For extra finishing
Inserts shape		SF  A120
Tool holder type	□□-SDQPR/L07	DP□□0702□□
	□□-SDQPR/L11	DP□□11T3□□

Corresponding tool holders of insert DP□□ (Damping tool holder) S-type clamping

SDUPR/L

KAPR:93°

R-type shown



Type	Stock		Basic dimensions(mm)							Screw	Wrench	---	---
	R	L	DMIN	DCON	WF	LF	LH	H	θ			---	---
C10M-SDUPR/L07	△	△	15	10	9	150	18	9	-8°	I60M2.5×5.5		---	---
C12Q-SDUPR/L07	△	△	16	12	9	180	19	11	-8°	I60M2.5×5.5	WT07IP	---	---
C16R-SDUPR/L07	△	△	20	16	11	200	25	15	-6°	I60M2.5×6.5		---	---

▲Stock available △Make-to-order

Applicable inserts

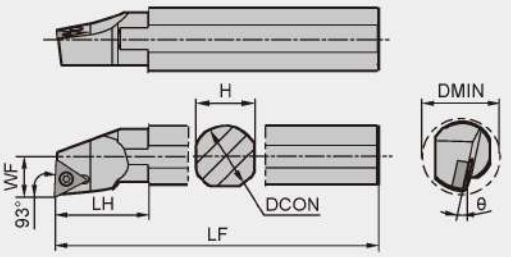
Application	For extra finishing
Inserts shape	SF  A120
Tool holder type □□-SDUPR/L07	DP□□0702□□

Corresponding tool holders of insert TP□□ (Damping tool holder) S-type clamping

STUPR/L

KAPR:93°

R-type shown



Type	Stock		Basic dimensions(mm)							Screw	Wrench	---	---
	R	L	DMIN	DCON	WF	LF	LH	H	θ			---	---
C10M-STUPR/L09	▲	△	12	10	6	150	20	9	-6°	I60M2.2×5.5	WT07IP	---	---
C12Q-STUPR/L09	▲	△	16	12	8	180	22	11	-4°				
C12Q-STUPR/L11	▲	△	16	12	8	180	25	11	-4°	I60M2.5×6.5	WT07IP	---	---
C16R-STUPR/L11	▲	△	20	16	10	200	27	15	-3°				

▲Stock available △Make-to-order

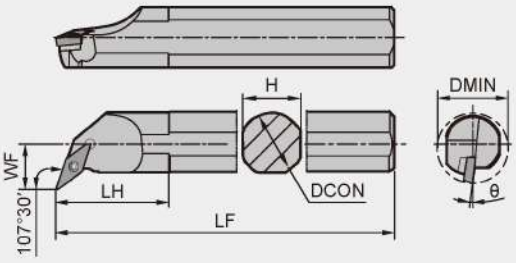
Applicable inserts

Application	For extra finishing
Inserts shape	SF  A122
Tool holder type □□-STUPR/L09	TP□□0902□□
Tool holder type □□-STUPR/L11	TP□□1103□□

Corresponding tool holders of insert VC□□ (Damping tool holder) S-type clamping

SVQCR/L
KAPR:107°30'

R-type shown

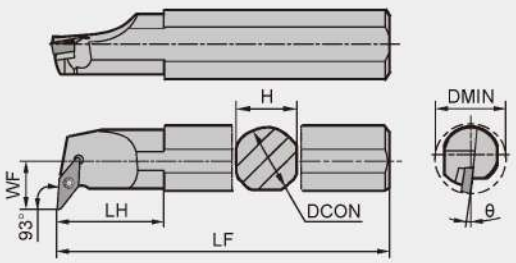


Type	Stock		Basic dimensions(mm)							Screw	Wrench	---	---
	R	L	DMIN	DCON	WF	LF	LH	H	θ			---	---
C16R-SVQCR/L11	△	△	22	16	13	200	28	15	-6°	I60M2.5×6.5	WT07IP	---	---
C20S-SVQCR/L11	△	△	26	20	15	250	32	18	-4°			---	---

▲Stock available △Make-to-order

SVUCR/L
KAPR:93°

R-type shown



Type	Stock		Basic dimensions(mm)							Screw	Wrench	---	---
	R	L	DMIN	DCON	WF	LF	LH	H	θ			---	---
C16R-SVUCR/L11	△	△	24	16	15	200	25	15	-6°	I60M2.5×6.5	WT07IP	---	---
C20S-SVUCR/L11	△	△	28	20	17	250	30	18	-4°			---	---

▲Stock available △Make-to-order

Applicable inserts

Application		For extra finishing	For Al machining
Inserts shape		SF  A114	LH  A116
			LC  A116
Tool holder type	□□-SVQCR/L11	VC□□1103□□	VCGX1103□□
	□□-SVUCR/L11	VC□□1103□□	VCGX1103□□

Table of recommended cutting parameters for general turning

ISO	Materials		Hardness HB	CVD Coating			PVD Coating			Cermet	Coated cermet
				YBC152	YBC252	YBC352	YBG102	YBG202	YBG302	YNG151	YNG151C
				Feed rate (mm/rev)							
				0.1-0.6	0.1-0.8	0.2-1.0	0.2-0.4	0.1-0.6	0.05-0.8	0.05-0.2	0.05-0.2
				Cutting speed (m/min)							
P	Carbon steel	C=0.15%	125	500-270	480-240	430-220	460-220	380-180	360-165	550-350	580-350
		C=0.35%	150	460-250	460-230	350-200	440-210	300-170	280-150	500-300	520-300
		C=0.60%	200	400-220	400-200	310-180	380-180	260-150	240-130	460-260	480-260
	Alloy steel	Anneal	180	400-180	400-200	250-150	380-180	200-120	180-100	410-240	430-240
		Hardened	275	280-150	260-140	200-120	240-120	140-90	120-70	300-180	320-180
		Hardened	300	260-150	240-120	180-110	220-100	125-80	100-60	250-170	270-170
		Hardened	350	230-120	220-120	160-100	200-100	110-75	90-55	230-150	250-150
	High alloy steel	Anneal	200	360-190	310-170	220-130	290-150	175-100	155-80	350-200	370-200
		Hardene	325	190-130	150-100	140-90	130-80	85-60	65-40	170-110	190-110
	Cast steel	Non-Alloy	180	280-160	250-140	190-130	230-125	135-95	115-75	260-170	280-170
		Low alloy	200	280-110	220-110	170-130	200-90	120-100	100-80	260-170	280-170
		High alloy	225	210-110	190-100	150-110	170-80	95-55	95-55	260-100	280-100

ISO	Materials		Hardness HB	CVD Coating			PVD Coating				Cermet	Coated cermet
				YBM153	YBM251	YBM253	YBM215	YBG202	YBG205	YBG302	YNG151	YNG151C
				Feed rate (mm/rev)								
				0.2-0.6	0.2-0.6	0.2-0.6	0.2-0.4	0.1-0.4	0.2-0.4	0.2-0.6	0.1-0.3	0.1-0.3
				Cutting speed (m/min)								
M	Stainless steel	Ferrite	180	280-180	250-140	260-140	290-190	300-190	290-190	250-150	330-220	350-210
		Austenite	260	250-150	200-110	210-110	240-160	250-160	240-160	220-120	250-150	270-140
		Martensite	330	200-140	210-130	220-130	250-170	260-170	250-170	210-120	270-170	290-160

Table of recommended cutting parameters for general turning

ISO	Materials		Hardness HB	CVD Coating			Cermet	Coated cermet	Nonmetallic ceramics
				YBD052	YBD102	YBD152	YNG151	YNG151C	CN3100
				Feed rate (mm/rev)					
				0.1-0.4	0.1-0.4	0.1-0.5	0.1-0.4	0.1-0.4	0.1-1.5
				Cutting speed (m/min)					
K	Malleable cast iron	Ferrolites	130	350-230	330-220	320-105	280-160	300-180	800-600
		Pearlyte	230	250-105	230-100	230-100	220-120	240-150	700-500
	Low grade cast iron		180	520-200	480-200	480-190	400-250	420-270	700-500
	High grade cast iron		260	230-120	220-115	210-100	360-240	380-260	800-600
	Ductile iron	Ferrolites	160	310-150	300-150	290-140	330-190	350-210	600-450
		Pearlyte	250	230-110	220-105	210-100	310-200	330-220	500-350

ISO	Materials		Hardness HB	PVD Coating					Cermet	CBN		PCD	Nonmetallic ceramics
				YBG102	YBG105	YBG202	YBS103	YBG212	YD101	YCB011	YCB012	YZB221	YCD011	CN3100
				Feed rate (mm/rev)										
				0.05-0.15	0.05-0.15	0.05-0.2	0.05-0.2	0.05-0.2	0.05-0.35	0.05-0.5	0.05-0.2	0.05-0.2	0.05-0.5	0.05-0.2
				Cutting speed (m/min)										
N	Aluminium alloy	Unheated	60						1750-800				<2500	
		Heat treatment	100						510-250				<2500	
	Cast aluminium alloy	Unheated	75						460-175				<2500	
		Heat treatment	90						300-110				<2500	
	Copper alloy	Lead alloy	110						610-205				630-65	
		Copper, red bronze	90						310-195				630-65	
		Copper, Lead-free copper, electrolytic copper	100						225-115				375-30	
S	Nickel-based alloy	Nickel-based alloy	40	90-30	90-40	90-30	90-20	90-30	70-20					150-260
H	Other material	Hard steel	45 HRC								350-225	350-225		
		Extra hard steel	50~60 HRC								250-135	250-135		
		Chilled cast iron	500							180-120				

Table of correctional cutting parameters of internal turning

Internal turning tools by P-type clamping

Workpiece material		Hardness HB	Machining category	L/D≤3		L/D=3-4 (Diameter of shank≥Ø16mm)	
				Feed rate (mm/rev)	Cutting depth (mm)	Feed rate (mm/rev)	Cutting depth (mm)
P	Carbon steel, Alloy steel45#, 42CrMo	HB180—280	For semi-finishing	0.1-**0.25**-0.4	<5.0	0.1-**0.2**-0.3	<4.0
M	Carbon steel, Alloy steel 1Cr18Ni9Ti 0Cr18Ni9	≤HB220	For semi-finishing	0.1-**0.2**-0.3	<4.0	0.1-**0.15**-0.25	<3.0
K	Cast iron HT250	HB170—230	For semi-finishing	0.1-**0.25**-0.4	<5.0	0.1-**0.2**-0.3	<4.0

Internal turning tools by S-type clamping

Workpiece material		Hardness HB	Machining category	L/D≤3		L/D=4		L/D=5		L/D=6	
				Feed rate (mm/rev)	Cutting depth (mm)	Feed rate (mm/rev)	Cutting depth (mm)	Feed rate (mm/rev)	Cutting depth (mm)	Feed rate (mm/rev)	Cutting depth (mm)
P	Carbon steel, Alloy steel 45#, 42CrMo	HB180-280	For finishing	0.05-**0.1**-0.15	<0.2	0.05-**0.1**-0.15	<0.2				
			For semi-finishing	0.15-**0.25**-0.35	<3.0	0.1-**0.15**-0.2	<1.5				
M	Stainless steel 1Cr18Ni9Ti 0Cr18Ni9	≤HB220	For finishing	0.05-**0.1**-0.15	<0.2	0.05-**0.1**-0.15	<0.2				
			For semi-finishing	0.15-**0.2**-0.25	<2.0	0.1-**0.15**-0.2	<1.0				
N	Al alloy	---	For finishing	0.05-**0.1**-0.15	<0.2	0.05-**0.1**-0.15	<0.2	0.05-**0.1**-0.15	-0.15	0.05-**0.1**-0.15	<0.1
			For semi-finishing	0.05-**0.1**-0.15	<2.0	0.05-**0.1**-0.15	<1.5	0.05-**0.1**-0.15	-1.0	0.05-**0.1**-0.15	<1.0

Damping internal turning tools

Workpiece material		Machining conditions	Chipbreaker	Inserts material	Feed rate (mm/rev)	Cutting depth (mm)
P	Steel HB180-280	For finishing	SF	YNG151 YNG151C	0.05-**0.2**-0.35	0.05-**0.1-0.3**-0.5
M	Stainless steel ≤HB220				0.05-**0.2**-0.35	0.05-**0.1-0.3**-0.5
K	Cast iron HB170-230				0.05-**0.2**-0.35	0.05-**0.1-0.3**-0.5

Blue words are recommended cutting parameters.

Frequent problems of turning and solutions

Common problem	Cause	Solutions	Tool material		Cutting conditions				Tool shape							Machine clamping system		
			Harder materials	Tougher materials	Cutting speed	Feed rate	Cutting depth	Cutting liquid	Change chipbreaker of inserts	Rake angle	Nose radius	Approach angle	Cutting edge strength	Increase precision of inserts	Increase rigidity of tool holder	Clamping of tool holder and workpiece	Overhang of tool holder	Power, gap
Over abrasion on nose	Bad precision during machining	Abrasion intensified on flank	✓								↑							
		Unsuitable cutting conditions			↓	↑												
Surface precision deterioration	Bad surface quality	Abrasion intensified and cutting edge not sharp enough	✓		↓			✓		↑	↑		↓	✓				
		Cutting edge breakage		✓		↓	↓		✓		↑		↑			✓	✓	✓
		Unsuitable geometrical shape of cutting edge							✓		↑		↓	✓				
		Unsuitable cutting conditions			↑	↓	↓	✓										
		Vibration		✓	↑↓	↓	↓	✓	✓	↑	↓	↑	↓		✓	✓	✓	✓
		Built-up edge			↑	↑		✓	✓	↑			↓	✓				
Radiation	Effect of cutting heat	Unsuitable cutting conditions			↓	↓	↓											
		Unsuitable geometrical shape of cutting edge	✓						✓	↑			↓					
Bad precision of dimensions	Dimensions fluctuate during cutting	Insert tolerance												✓				
		Offset of workpiece or tools							✓	↑	↓	↑			✓	✓	✓	✓
Breakage	Abrasion on flank and rake face	Abrasion on clearance face	✓		↓				✓	↑	↑		↓					
		Abrasion on rake face	✓		↓	↓	↓		✓	↑		↓						
	Edge chipping	Vibration and impact		✓		↓	↓		✓			↓	↑		✓	✓	✓	✓
	Built-up edge	Unsuitable workpiece hardness for cutting conditions			↑	↑		✓	✓	↑			↓	✓				
	Thermal cracking	Hardness of workpiece material and tool material unsuitable for cutting conditions			↓	↓	↓	✓	✓	↑			↓					
	Cutting edge nose deformation	Occurring during intermittent machining with high feed rate	✓		↑	↓	↓	✓	✓	↑	↑	↓	↓					
	Tool life	Unsuitable materials and cutting conditions		✓		↓	↓		✓		↑	↓	↑		✓	✓	✓	✓
Chip controlling	Long, unbroken and snarled chips	Unsuitable cutting condition			↓	↑	↑	✓										
		Unsuitable geometry							✓		↓	↑						
	Too short and hard chips	Unsuitable cutting condition				↓	↓	✓										
		Unsuitable geometrical shape of cutting edge							✓		↑	↓						
Burr and knockdown flange	Steel and Al, burrs occurring	Unsuitable cutting condition			↑	↓		✓										
		Tool abrasion and unsuitable geometrical shape	✓						✓	↑	↓	↑	↓					
	Edge break out on cast iron	Unsuitable cutting conditions			↓	↑		✓										
		Tool abrasion and unsuitable geometrical shape	✓						✓	✓	↓	↓	↓					
	Heavy burr on soft steel	Unsuitable cutting condition				↓	↓											
		Tool abrasion and unsuitable geometrical shape	✓						✓	↑	↑		↑		✓	✓	✓	✓

Abrasion of tools and various damages

Tool damage type	Phenomenon	Cause	Solution
Flank wear	Cutting resistant force increasing Groove wear on flank	Tool material is too soft. Cutting speed is too high. Clearance angle is too small. Feed rate is too low.	◆Select tool materials with good wear resistance. ◆Reduce cutting speed. ◆Enlarge clearance angle. ◆Increase feed rate.
Rake face wear (Crater wear)	Bad chip controlling Surface quality deterioration	Tool material is too soft. Cutting speed is too hig. Feed rate is too high.	◆Select tool materials with good wear resistance. ◆Reduce cutting speed. ◆Reduce feed rate.
Cutting edge breakage	Occasional breakage Instability of tool life	Tool material is too hard. Feed rate is high. Cutting edge strength is not high enough. Rigidity of tool holder and tool bar is small.	◆Select tool materials with good toughness. ◆Reduce feed rate. ◆Increase land width (if rounding changes into chamfering). ◆Enlarge tool bar size.
Breakage	Cutting resistant force increasing Deterioration of surface roughness	Tool material is too hard. Feed rate is high. Cutting edge strength is not high enough. Rigidity of tool holder and tool bar is low.	◆Select tool materials with good toughness. ◆Reduce feed rate. ◆Increase land width (if rounding changes into chamfering). ◆Enlarge tool bar size.
Plastic deformation (Cutting edge collapse)	Workpiece dimensions change Nose abrasion	Tool material is too soft. Cutting speed is too high. Cutting depth and feed rate are too high. Cutting edge temperature is too high.	◆Select tool material with good wear resistance ◆Reduce cutting speed. ◆Reduce cutting depth and feed rate. ◆Select tool materials with good heat conductivity.
Built-up edge (Bonding)	Surface quality deterioration during finishing Cutting resistant force increasing	Cutting speed is low. Cutting edge is not sharp enough. Tool material is unsuitable.	◆Increase cutting speed. ◆Enlarge rake angle. ◆Select tool materials that are not easy to adhere together (coating, cermet, etc.)
Thermal cracking	Damage because of thermal circulation Normally occurring during intermittent machining	Premature edge failure due to thermal cracks. Tool material is too hard.	◆Adopt dry cutting. ◆Select tool materials with good toughness.
Chattering	burrs occurring Cutting resistant force increasing	Feed rate and cutting speed are too high.	◆Select tool materials with good wear resistance. ◆Sharpen cutting edge by enlarging rake angle. ◆Reduce cutting speed.
Flaking	Usually occurring when machining super hard materials, which is accompanied with vibration	Bonding occurs on cutting edge. Chip flow is obstructed.	◆Sharpen cutting edge by enlarging rake angle. ◆Enlarge chip pocket.