Size φ1～φ16

CXES

Super MG | UT COAT | 37°~40° | Flatland | Shank Dia 0/-0.005 | Variable Pitch | Variable Helix

Material Applications（★ Highly Recommended ● Recommended ○ Suggested）

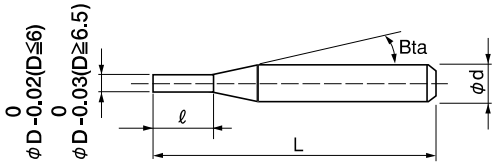
Work Material																
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels					Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
S45C S55C	SK / SCM SUS	NAK HPM	~ 50HRC	~ 55HRC	~ 60HRC	~ 65HRC	~ 70HRC										
●	●	●	●	○				○			●			○	○		

Features

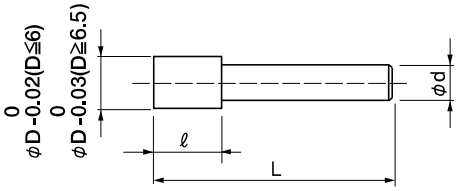
Variable Division & Helix design minimizes vibration and chattering.
Selected high toughness and chip resistant carbide material.
Optimized flute design offers outstandingly high efficiency milling and fine finishing.
Low friction coating resulting in excellent chip evacuation and resistance to wear.

The shank taper angle shown is not an exact value and to avoid contact with the work piece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece. Actual measurement is necessary when using longer length of cut than the written length.

Shape A



Shape B



Total 55 models　　Unit（mm）

Model Number	Outside Diameter φD	Length of Cut ℓ	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Shape	Suggested Retail Price ¥
CXES 4010-0250	1	2.5	16°	50	4	A	6,520
CXES 4010-0300		3		60	4		7,180
CXES 4010-0400		4		60	4		7,900
CXES 4010-0500		5		60	4		10,270
CXES 4015-0375	1.5	3.75	16°	50	4	A	6,520
CXES 4015-0600		6		50	4		7,900
CXES 4020-0500	2	5	16°	50	4	A	6,100
CXES 4020-0600		6		60	4		6,710
CXES 4020-0800		8		60	4		7,390
CXES 4020-1000		10		60	4		9,610
CXES 4025-0625	2.5	6.25	16°	50	4	A	6,100
CXES 4025-1000		10		50	4		7,390

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Unit (mm)

Model Number	Outside Diameter φD	Length of Cut ℓ	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Shape	Suggested Retail Price ¥
CXES 4030-0750	3	7.5	16°	50	6	A	7,000
CXES 4030-0900		9		60	6		7,700
CXES 4030-1200		12		60	6		8,470
CXES 4030-1500		15		60	6		11,020
CXES 4035-0900	3.5	9	16°	60	6	A	8,270
CXES 4040-1000	4	10	16°	50	6	A	7,350
CXES 4040-1200		12		60	6		8,090
CXES 4040-1600		16		60	6		8,900
CXES 4040-2000		20		60	6		11,570
CXES 4045-1150	4.5	11.5	16°	60	6	A	8,840
CXES 4050-1250	5	12.5	16°	50	6	A	7,900
CXES 4050-1500		15		60	6		8,690
CXES 4050-2000		20		60	6		9,560
CXES 4050-2500		25		70	6		12,430
CXES 4055-1400	5.5	14	16°	60	6	A	9,120
CXES 4060-1500	6	15	—	50	6	A	8,500
CXES 4060-1800		18		60	6		9,350
CXES 4060-2400		24		70	6		10,760
CXES 4060-3000		30		80	6		13,990
CXES 4065-1650	6.5	16.5	16°	60	8	A	11,970
CXES 4070-1050	7	10.5	—	100	6	B	14,880
CXES 4070-1750		17.5	16°	70	8	A	10,500
CXES 4075-1900	7.5	19	16°	60	8	A	11,970
CXES 4080-2000	8	20	—	60	8	A	10,500
CXES 4080-2400		24		70	8		11,550
CXES 4080-3200		32		80	8		15,600
CXES 4080-4000		40		90	8		20,280
CXES 4085-2150	8.5	21.5	16°	70	10	A	13,870
CXES 4090-1350	9	13.5	—	140	8	B	19,390
CXES 4090-2250		22.5	16°	80	10	A	12,500
CXES 4095-2400	9.5	24	16°	70	10	A	13,870
CXES 4100-2500	10	25	—	70	10	A	12,500
CXES 4100-3000		30		80	10		13,750
CXES 4100-4000		40		90	10		18,570
CXES 4100-5000		50		100	10		24,150
CXES 4110-1650	11	16.5	—	150	10	B	24,200
CXES 4110-2750		27.5	16°	100	12	A	17,800
CXES 4120-3000	12	30	—	90	12	A	17,800
CXES 4120-3600		36		100	12		19,580
CXES 4120-4800		48		110	12		26,440
CXES 4120-6000		60		120	12		34,380
CXES 4130-1950	13	19.5	—	160	12	B	30,390
CXES 4160-4000	16	40	—	110	16	A	54,150

Milling Conditions for CXES

Side Milling

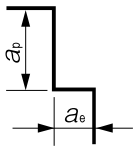
WORK MATERIAL			CARBON STEELS S45C / S50C Annealed Materials (~225HB)				ALLOY STEELS SK / SCM Annealed Materials (225~325HB)				STAINLESS STEELS SUS304 Use water soluble or oil coolant.			
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
4010-0250	1	2.5	18,000	620	2.5	0.2	18,000	460	2.5	0.2	14,500	320	2.5	0.1
4010-0300		3	18,000	620	3	0.03	18,000	460	3	0.03	14,300	310	3	0.015
4010-0400		4	18,000	620	4	0.02	18,000	460	4	0.02	13,900	290	4	0.01
4010-0500		5	18,000	620	5	0.02	18,000	460	5	0.02	13,900	290	5	0.01
4015-0375	1.5	3.75	13,500	770	3.75	0.3	13,500	570	3.75	0.3	13,300	340	3.75	0.15
4015-0600		6	13,500	770	6	0.03	13,500	570	6	0.03	12,700	310	6	0.015
4020-0500	2	5	11,000	930	5	0.4	11,000	690	5	0.4	12,200	360	5	0.2
4020-0600		6	11,000	930	6	0.06	11,000	690	6	0.06	12,000	340	6	0.03
4020-0800		8	11,000	930	8	0.04	11,000	690	8	0.04	11,600	300	8	0.02
4020-1000		10	11,000	930	10	0.04	11,000	690	10	0.04	11,600	300	10	0.02
4025-0625	2.5	6.25	9,500	1,060	6.25	0.5	9,500	800	6.25	0.5	11,000	490	6.25	0.25
4025-1000		10	9,500	1,060	10	0.05	9,500	800	10	0.05	10,400	430	10	0.025
4030-0750	3	7.5	8,500	1,200	7.5	0.6	8,500	900	7.5	0.6	10,000	640	7.5	0.3
4030-0900		9	8,500	1,200	9	0.3	8,500	900	9	0.3	9,100	580	9	0.15
4030-1200		12	8,500	1,200	12	0.06	8,500	900	12	0.06	7,300	460	12	0.03
4030-1500		15	8,500	1,200	15	0.06	8,500	900	15	0.06	7,300	460	15	0.03
4035-0900	3.5	9	7,800	1,250	9	0.7	7,500	950	9	0.7	8,600	680	9	0.35
4040-1000	4	10	7,200	1,350	10	0.8	6,700	1,000	10	0.8	7,500	730	10	0.4
4040-1200		12	7,200	1,350	12	0.4	6,700	1,000	12	0.4	6,600	640	12	0.2
4040-1600		16	7,200	1,350	16	0.08	6,700	1,000	16	0.08	4,800	460	16	0.08
4040-2000		20	7,200	1,350	20	0.08	6,700	1,000	20	0.08	4,800	460	20	0.08
4045-1150	4.5	11.5	6,550	1,400	11.5	0.9	6,000	1,050	11.5	0.9	6,300	770	11.5	0.45
4050-1250	5	12.5	6,000	1,500	12.5	1	5,400	1,100	12.5	1	5,400	810	12.5	0.5
4050-1500		15	6,000	1,500	15	0.5	5,400	1,100	15	0.5	4,600	690	15	0.25
4050-2000		20	6,000	1,500	20	0.1	5,400	1,100	20	0.1	3,700	450	20	0.1
4050-2500		25	6,000	1,500	25	0.1	5,400	1,100	25	0.1	3,700	450	25	0.1
4055-1400	5.5	14	5,450	1,550	14	1.1	4,900	1,150	14	1.1	4,900	810	14	0.55
4060-1500	6	15	5,000	1,600	15	1.2	4,500	1,200	15	1.2	4,500	810	15	0.6
4060-1800		18	5,000	1,600	18	0.6	4,500	1,200	18	0.6	3,700	660	18	0.3
4060-2400		24	5,000	1,400	24	0.12	4,500	1,050	24	0.12	2,900	360	24	0.12
4060-3000		30	5,000	1,400	30	0.12	4,500	1,050	30	0.12	2,900	360	30	0.12
4065-1650	6.5	16.5	4,400	1,500	16.5	1.3	3,950	1,150	16.5	1.3	3,950	780	16.5	0.65

Milling Conditions for CXES

4 Flutes

WORK MATERIAL			PREHARDENED STEELS HPM / NAK (30~45HRC)				HARDENED STEELS SKD / SKT / STAVAX (45~55HRC)			
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
4010-0250	1	2.5	12,900	320	2.5	0.2	12,900	180	2.5	0.05
4010-0300		3	12,800	320	3	0.03	12,900	180	3	0.015
4010-0400		4	12,600	320	4	0.02	12,900	180	4	0.01
4010-0500		5	12,600	320	5	0.01	12,900	180	5	0.005
4015-0375	1.5	3.75	10,500	390	3.75	0.3	9,300	280	3.75	0.075
4015-0600		6	10,200	390	6	0.03	9,300	280	6	0.015
4020-0500	2	5	9,350	450	5	0.4	7,600	390	5	0.1
4020-0600		6	9,250	450	6	0.06	7,600	390	6	0.03
4020-0800		8	9,050	450	8	0.04	7,600	390	8	0.02
4020-1000		10	9,050	450	10	0.01	7,600	390	10	0.01
4025-0625	2.5	6.25	8,300	540	6.25	0.5	6,500	510	6.25	0.125
4025-1000		10	8,000	540	10	0.05	6,500	510	10	0.025
4030-0750	3	7.5	7,400	630	7.5	0.6	5,900	500	7.5	0.3
4030-0900		9	7,050	630	9	0.3	5,900	500	9	0.15
4030-1200		12	6,350	630	12	0.06	5,900	500	12	0.03
4030-1500		15	6,350	630	15	0.03	5,900	500	15	0.015
4035-0900	3.5	9	6,500	640	9	0.7	5,200	510	9	0.35
4040-1000	4	10	5,900	650	10	0.8	4,700	520	10	0.4
4040-1200		12	5,500	650	12	0.4	4,700	520	12	0.2
4040-1600		16	4,700	580	16	0.08	4,700	520	16	0.04
4040-2000		20	4,700	580	20	0.04	4,700	520	20	0.02
4045-1150	4.5	11.5	5,300	660	11.5	0.9	4,250	520	11.5	0.45
4050-1250	5	12.5	4,800	680	12.5	1	3,850	530	12.5	0.5
4050-1500		15	4,400	680	15	0.5	3,850	530	15	0.25
4050-2000		20	3,600	580	20	0.1	3,850	530	20	0.05
4050-2500		25	3,600	580	25	0.05	3,850	530	25	0.025
4055-1400	5.5	14	4,350	680	14	1.1	3,500	530	14	0.55
4060-1500	6	15	4,000	680	15	1.2	3,200	540	15	0.6
4060-1800		18	3,600	680	18	0.6	3,200	540	18	0.3
4060-2400		24	2,800	560	24	0.12	3,200	540	24	0.06
4060-3000		30	2,800	560	30	0.06	3,200	540	30	0.03
4065-1650	6.5	16.5	3,500	660	16.5	1.3	2,850	530	16.5	0.65

Side Milling



Milling Conditions for CXES

Side Milling

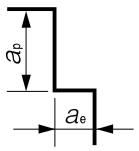
WORK MATERIAL			CARBON STEELS S45C / S50C Annealed Materials (~225HB)				ALLOY STEELS SK / SCM Annealed Materials (225~325HB)				STAINLESS STEELS SUS304 Use water soluble or oil coolant.			
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
4070-1050	**7**	10.5	3,900	1,450	10.5	0.7	3,550	1,120	10.5	0.7	3,550	760	10.5	0.35
4070-1750		17.5	3,900	1,450	17.5	1.4	3,550	1,120	17.5	1.4	3,550	760	17.5	0.7
4075-1900	**7.5**	19	3,500	1,400	19	1.5	3,250	1,100	19	1.5	3,250	750	19	0.75
4080-2000	**8**	20	3,000	1,300	20	1.6	2,900	1,050	20	1.6	2,900	720	20	0.8
4080-2400		24	2,800	1,230	24	0.8	2,600	1,050	24	0.8	2,600	600	24	0.4
4080-3200		32	2,400	1,090	32	0.16	2,000	800	32	0.16	2,100	360	32	0.16
4080-4000		40	2,400	1,090	40	0.16	2,000	800	40	0.16	2,100	360	40	0.16
4085-2150	**8.5**	21.5	2,550	1,200	21.5	1.7	2,450	1,000	21.5	1.7	2,450	680	21.5	0.85
4090-1350	**9**	13.5	2,250	1,150	13.5	0.9	2,150	980	13.5	0.9	2,150	650	13.5	0.45
4090-2250		22.5	2,250	1,150	22.5	1.8	2,150	980	22.5	1.8	2,150	650	22.5	0.9
4095-2400	**9.5**	24	1,950	1,050	24	1.9	1,900	950	24	1.9	1,900	620	24	0.95
4100-2500	**10**	25	1,600	1,000	25	2	1,500	900	25	2	1,500	580	25	1
4100-3000		30	1,500	900	30	1	1,500	850	30	1	1,500	580	30	0.5
4100-4000		40	1,300	800	40	0.2	1,500	750	40	0.2	1,500	580	40	0.2
4100-5000		50	1,300	800	50	0.2	1,500	750	50	0.2	1,500	580	50	0.2
4110-1650	**11**	16.5	1,400	900	16.5	1.1	1,350	830	16.5	1.1	1,350	560	16.5	0.55
4110-2750		27.5	1,400	900	27.5	2.2	1,350	830	27.5	2.2	1,350	560	27.5	1.1
4120-3000	**12**	30	1,200	800	30	2.4	1,200	750	30	2.4	1,200	540	30	1.2
4120-3600		36	1,150	750	36	1.2	1,150	720	36	1.2	1,150	540	36	0.6
4120-4800		48	1,050	700	48	0.24	1,050	660	48	0.24	1,050	500	48	0.24
4120-6000		60	1,050	700	60	0.24	1,050	660	60	0.24	1,050	500	60	0.24
4130-1950	**13**	19.5	1,100	650	19.5	1.3	1,100	600	19.5	1.3	1,000	460	19.5	0.65
4160-4000	**16**	40	1,000	500	40	3.2	1,000	440	40	3.2	720	340	40	1.6

Milling Conditions for CXES

4 Flutes

WORK MATERIAL			PREHARDENED STEELS HPM / NAK (30~45HRC)				HARDENED STEELS SKD / SKT / STAVAX (45~55HRC)			
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
4070-1050	7	10.5	3,150	640	10.5	0.7	2,550	520	10.5	0.35
4070-1750		17.5	3,150	640	17.5	1.4	2,550	520	17.5	0.7
4075-1900	7.5	19	2,850	620	19	1.5	2,250	510	19	0.75
4080-2000	8	20	2,500	600	20	1.6	2,000	500	20	0.8
4080-2400		24	2,350	600	24	0.8	2,150	500	24	0.4
4080-3200		32	2,050	530	32	0.16	2,150	400	32	0.08
4080-4000		40	2,050	530	40	0.08	2,150	400	40	0.04
4085-2150	8.5	21.5	2,150	550	21.5	1.7	1,700	490	21.5	0.85
4090-1350	9	13.5	1,950	520	13.5	0.9	1,500	480	13.5	0.45
4090-2250		22.5	1,950	520	22.5	1.8	1,500	480	22.5	0.9
4095-2400	9.5	24	1,750	480	24	1.9	1,350	470	24	0.95
4100-2500	10	25	1,500	430	25	2	1,200	450	25	1
4100-3000		30	1,500	430	30	1	1,200	450	30	0.5
4100-4000		40	1,500	430	40	0.2	1,200	450	40	0.1
4100-5000		50	1,500	430	50	0.1	1,200	450	50	0.05
4110-1650	11	16.5	1,250	380	16.5	1.1	1,060	430	16.5	0.55
4110-2750		27.5	1,250	380	27.5	2.2	1,060	430	27.5	1.1
4120-3000	12	30	1,000	320	30	2.4	960	420	30	1.2
4120-3600		36	1,000	320	36	1.2	930	400	36	0.6
4120-4800		48	1,000	320	48	0.24	870	360	48	0.12
4120-6000		60	1,000	320	60	0.12	870	360	60	0.06
4130-1950	13	19.5	1,000	260	19.5	1.3	890	350	19.5	0.65
4160-4000	16	40	1,000	220	40	3.2	720	280	40	1.6

Side Milling



Milling Conditions for CXES

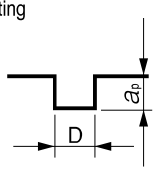
Slotting

WORK MATERIAL			CARBON STEELS S45C / S50C Annealed Materials (~225HB)			ALLOY STEELS SK / SCM Annealed Materials (225~325HB)			STAINLESS STEELS SUS304 Use water soluble or oil coolant.		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)
4010-0250	1	2.5	18,000	200	1	18,000	200	1	14,500	220	0.5
4010-0300		3	18,000	190	0.5※	18,000	190	0.5※	14,300	210	0.25※
4010-0400		4	18,000	170	0.5※	18,000	170	0.5※	12,500	190	0.25※
4010-0500		5	18,000	170	0.5※	18,000	170	0.5※	12,500	190	0.25※
4015-0375	1.5	3.75	13,500	320	1.5	13,500	280	1.5	13,300	240	0.75
4015-0600		6	13,500	290	0.75※	13,500	250	0.75※	12,700	210	0.375※
4020-0500	2	5	11,000	460	2	11,000	320	2	12,200	260	1
4020-0600		6	11,000	440	1※	11,000	310	1※	12,000	240	0.5※
4020-0800		8	11,000	400	1※	11,000	290	1※	11,600	200	0.5※
4020-1000		10	11,000	400	1※	11,000	290	1※	11,600	200	0.5※
4025-0625	2.5	6.25	9,500	540	2.5	9,500	360	2.5	11,000	310	1.25
4025-1000		10	9,500	480	1.25※	9,500	330	1.25※	10,400	250	0.625※
4030-0750	3	7.5	8,500	600	3	8,500	400	3	10,000	360	1.5
4030-0900		9	8,500	550	3	8,500	360	3	9,100	310	1.5
4030-1200		12	8,500	450	1.5※	8,500	280	1.5※	7,300	210	0.75※
4030-1500		15	8,500	450	1.5※	8,500	280	1.5※	7,300	210	0.75※
4035-0900	3.5	9	7,800	620	3.5	7,500	420	3.5	8,600	380	1.75
4040-1000	4	10	7,200	650	4	6,700	450	4	7,500	400	2
4040-1200		12	7,200	580	4	6,700	400	4	6,600	320	2
4040-1600		16	7,200	440	2※	6,700	300	2※	4,800	200	1※
4040-2000		20	7,200	440	2※	6,700	300	2※	4,800	200	1※
4045-1150	4.5	11.5	6,550	670	4.5	6,000	470	4.5	6,300	430	2.25
4050-1250	5	12.5	6,000	700	5	5,400	500	5	5,400	460	2.5
4050-1500		15	6,000	600	5	5,400	430	5	4,600	350	2.5
4050-2000		20	6,000	400	2.5※	5,400	290	2.5※	3,000	170	1.25※
4050-2500		25	6,000	400	2.5※	5,400	290	2.5※	3,000	170	1.25※
4055-1400	5.5	14	5,450	700	5.5	4,900	500	5.5	4,900	460	2.75
Milling Amount (mm)			a_p=1D ※a_p=0.5D			a_p=1D ※a_p=0.5D			a_p=0.5D ※a_p=0.25D		

Milling Conditions for CXES

WORK MATERIAL			PREHARDENED STEELS HPM / NAK (30~45HRC)			HARDENED STEELS SKD / SKT / STAVAX (45~55HRC)		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)
4010-0250	1	2.5	12,900	130	1	12,900	50	0.3※
4010-0300		3	12,800	120	0.5※2	N/A	N/A	N/A
4010-0400		4	12,100	100	0.5※2	N/A	N/A	N/A
4010-0500		5	N/A	N/A	N/A	N/A	N/A	N/A
4015-0375	1.5	3.75	10,500	180	1.5	10,500	100	0.45※
4015-0600		6	10,200	150	0.75※2	N/A	N/A	N/A
4020-0500	2	5	9,350	220	2	9,350	150	0.6※
4020-0600		6	9,300	200	1※2	N/A	N/A	N/A
4020-0800		8	8,600	160	1※2	N/A	N/A	N/A
4020-1000		10	N/A	N/A	N/A	N/A	N/A	N/A
4025-0625	2.5	6.25	8,300	270	2.5	8,300	240	0.75※
4025-1000		10	8,000	210	1.25※2	N/A	N/A	N/A
4030-0750	3	7.5	7,400	320	3	7,400	360	1.5
4030-0900		9	7,050	270	3	N/A	N/A	N/A
4030-1200		12	6,350	170	1.5※2	N/A	N/A	N/A
4030-1500		15	N/A	N/A	N/A	N/A	N/A	N/A
4035-0900	3.5	9	6,500	350	3.5	6,500	370	1.75
4040-1000	4	10	5,900	390	4	5,900	380	2
4040-1200		12	5,500	300	4	N/A	N/A	N/A
4040-1600		16	4,700	160	2※2	N/A	N/A	N/A
4040-2000		20	N/A	N/A	N/A	N/A	N/A	N/A
4045-1150	4.5	11.5	5,300	410	4.5	5,300	390	2.25
4050-1250	5	12.5	4,800	440	5	4,800	410	2.5
4050-1500		15	4,400	320	5	N/A	N/A	N/A
4050-2000		20	3,600	160	2.5※2	N/A	N/A	N/A
4050-2500		25	N/A	N/A	N/A	N/A	N/A	N/A
4055-1400	5.5	14	4,350	440	5.5	4,350	420	2.75
Milling Amount (mm)			a_p=1D ※1 a_p=0.8D ※2 a_p=0.5D			a_p=0.5D ※a_p=0.3D		

Slotting



D : Outside Diameter (mm)

Milling Conditions for CXES

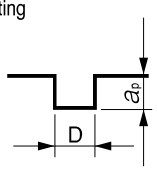
Slotting

WORK MATERIAL			CARBON STEELS S45C / S50C Annealed Materials (~225HB)			ALLOY STEELS SK / SCM Annealed Materials (225~325HB)			STAINLESS STEELS SUS304 Use water soluble or oil coolant.		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)
4060-1500	6	15	5,000	700	6	4,500	500	6	4,500	460	3
4060-1800		18	5,000	560	6	4,500	410	6	3,700	320	3
4060-2400		24	5,000	280	3※	4,500	230	3※	2,100	150	1.5※
4060-3000		30	5,000	280	3※	4,500	230	3※	2,100	150	1.5※
4065-1650	6.5	16.5	4,400	650	6.5	3,950	450	6.5	3,950	420	3.25
4070-1050	7	10.5	3,900	300	7	3,550	200	7	3,550	200	3.5
4070-1750		17.5	3,900	600	7	3,550	400	7	3,550	390	3.5
4075-1900	7.5	19	3,500	550	7.5	3,250	380	7.5	3,250	380	3.75
4080-2000	8	20	3,000	500	8	2,900	360	8	2,900	360	4
4080-2400		24	2,800	330	8	2,600	260	8	2,600	240	4
4080-3200		32	2,400	230	4※	2,000	180	4※	2,000	130	2※
4080-4000		40	2,400	230	4※	2,000	180	4※	2,000	130	2※
4085-2150	8.5	21.5	2,550	450	8.5	2,450	330	8.5	2,450	310	4.25
4090-1350	9	13.5	2,250	210	9	2,150	160	9	2,150	140	4.5
4090-2250		22.5	2,250	420	9	2,150	300	9	2,150	260	4.5
4095-2400	9.5	24	1,950	400	9.5	1,900	300	9.5	1,900	250	4.75
4100-2500	10	25	1,600	380	10	1,500	270	10	1,500	220	5
4100-3000		30	1,500	250	10	1,500	180	10	1,500	190	5
4100-4000		40	1,300	180	5※	1,500	150	5※	1,500	130	2.5※
4100-5000		50	1,300	180	5※	1,500	150	5※	1,500	130	2.5※
4110-1650	11	16.5	1,400	170	11	1,350	120	11	1,350	100	5.5
4110-2750		27.5	1,400	340	11	1,350	240	11	1,350	200	5.5
4120-3000	12	30	1,200	300	12	1,200	210	12	1,200	180	6
4120-3600		36	1,150	200	12	1,150	140	12	1,150	150	6
4120-4800		48	1,050	160	6※	1,050	120	6※	1,050	100	3※
4120-6000		60	1,050	160	6※	1,050	120	6※	1,050	100	3※
4130-1950	13	19.5	1,100	190	13	1,100	90	13	1,000	80	6.5
4160-4000	16	40	1,000	400	8※	1,000	280	8※	720	240	4※
Milling Amount (mm)			a_p=1D ※a_p=0.5D			a_p=1D ※a_p=0.5D			a_p=0.5D ※a_p=0.25D		

Milling Conditions for CXES

WORK MATERIAL			PREHARDENED STEELS HPM / NAK (30~45HRC)			HARDENED STEELS SKD / SKT / STAVAX (45~55HRC)		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)	Spindle Speed (min^{-1})	Feed Rate (mm/min)	a_p Axial Depth (mm)
4060-1500	6	15	4,000	440	6	4,000	440	3
4060-1800		18	3,600	290	6	N/A	N/A	N/A
4060-2400		24	2,800	140	3※2	N/A	N/A	N/A
4060-3000		30	N/A	N/A	N/A	N/A	N/A	N/A
4065-1650	6.5	16.5	3,500	420	6.5	3,500	400	3.25
4070-1050	7	10.5	3,150	190	7	3,150	190	3.5
4070-1750		17.5	3,150	410	7	3,150	380	3.5
4075-1900	7.5	19	2,850	400	7.5	2,850	370	3.75
4080-2000	8	20	2,500	390	8	2,500	340	4
4080-2400		24	2,350	200	8	N/A	N/A	N/A
4080-3200		32	2,050	110	4※2	N/A	N/A	N/A
4080-4000		40	N/A	N/A	N/A	N/A	N/A	N/A
4085-2150	8.5	21.5	2,150	330	8.5	2,150	300	4.25
4090-1350	9	13.5	1,950	150	9	1,950	140	4.5
4090-2250		22.5	1,950	300	9	1,950	270	4.5
4095-2400	9.5	24	1,750	270	9.5	1,750	270	4.75
4100-2500	10	25	1,500	220	10	1,500	240	5
4100-3000		30	1,500	180	8※1	N/A	N/A	N/A
4100-4000		40	1,200	90	5※2	N/A	N/A	N/A
4100-5000		50	N/A	N/A	N/A	N/A	N/A	N/A
4110-1650	11	16.5	1,250	100	11	1,350	110	5.5
4110-2750		27.5	1,250	200	11	1,350	230	5.5
4120-3000	12	30	1,000	180	12	1,200	220	6
4120-3600		36	1,000	140	9.6※1	N/A	N/A	N/A
4120-4800		48	800	70	6※2	N/A	N/A	N/A
4120-6000		60	N/A	N/A	N/A	N/A	N/A	N/A
4130-1950	13	19.5	1,000	80	13	1,100	90	6.5
4160-4000	16	40	1,000	240	8※2	1,000	220	4.8※
Milling Amount (mm)			a_p=1D ※1 a_p=0.8D ※2 a_p=0.5D			a_p=0.5D ※a_p=0.3D		

Slotting



D : Outside Diameter(mm)

Note:
- Decrease both spindle speed and feed rate proportionally in case of chattering.
- These milling parameters are calculated based on the shortest overhang length. Longer overhangs may require an adjustment to the milling parameters.
- Reduce the milling amount and feed rate in accordance with required milling precision.
- Every coolant offers stable milling.
- Recommend water soluble or oil coolant for Stainless Steels and Copper.

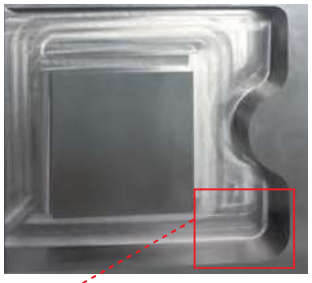
Milling Example CXES ϕ10 S55C

Roughing and finishing with a single tool

	Roughing		Finishing	
Tool	Conventional 4 Flutes	CXES 4100-2500	CXES 4100-2500	
Milling Part	Side / Slot		Bottom	Side
Spindle Speed	2,600 min^{-1}	2,500 min^{-1}	1,600 min^{-1}	
Feed Rate	525 mm/min	1,500 mm/min	380 mm/min	1,000 mm/min
a_p	20 mm	19.9 mm	0.1 mm	0.1 mm
a_e	0.7 mm	1.2 mm	0.4 mm	0.1 mm
Coolant	Oil		Oil	
Milling Distance	—	11.5 m	1.5 m	0.7 m
Efficiency *	1	4.8	—	

* Efficiency : Feed Rate × Axial Depth × Radial Depth

Size : 105 mm × 92 mm × 20 mm



Enlarged view

Finishing surface

Bottom

Side

No surface burrs after finishing process

4.8 times milling efficiency compared to conventional 4 flutes when roughing

Total Milling Distance 21 m

Milling Example CXES ϕ6 SUS304

Tool	CXES4060-1500	
Milling Method	Roughing	Finishing
Spindle Speed	4,500 min^{-1}	4,500 min^{-1}
Feed Rate	810 mm/min	400 mm/min
a_p	15 mm	15 mm
a_e	0.6 mm	2.5 mm (Standing Wall Finishing Allowance 0.1mm)
Overhang Length	20 mm	20 mm
Coolant	Water Soluble (Through Spindle)	Water Soluble (Through Spindle)
Cycle Time	1:11:29	0:18:43

① Roughing Surface

② Finishing Surface

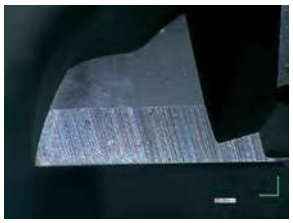
Enlarged view

Smooth Side Finishing

CXES Milling Video

Tool Wearing after Roughing Process

End Profile



Peripheral Cutting Edge