Size φ0.25～φ2 UDC

UDCLRSF

MG UDC 0° R R ±0.01 Shank Dia 0/-0.005

Patented in Japan, US, China, Korea, Germany, Switzerland, and Liechtenstein

Additional 6 models

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										
													○			★	● *

* Hard Brittle (Non-Metallic) Materials: Ceramics (Alumina, Zirconia, etc.), Glasses and etc.

Total 58 models

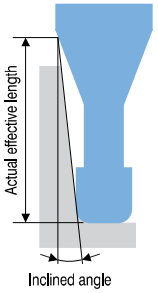
Unit（mm）

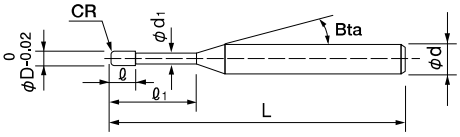
	Model Number	Outside Diameter φD	Corner Radius CR	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Suggested Retail Price ¥
※	UDCLRSF 20025-003X5	0.25	R0.03	0.5	0.125	0.23	16°	50	4	54,600
※	UDCLRSF 20025-003X8			0.8				50	4	54,600
※	UDCLRSF 20025-005X5		R0.05	0.5				50	4	54,600
※	UDCLRSF 20025-005X8			0.8				50	4	54,600
	UDCLRSF 2003-003006	0.3	R0.03	0.6	0.15	0.28	16°	50	4	54,600
※	UDCLRSF 2003-003009			0.9				50	4	54,600
	UDCLRSF 2003-005006		R0.05	0.6				50	4	54,600
※	UDCLRSF 2003-005009			0.9				50	4	54,600
	UDCLRSF 2005-003005	0.5	R0.03	0.5	0.25	0.46	16°	50	4	52,000
	UDCLRSF 2005-003010			1				50	4	52,000
	UDCLRSF 2005-003015			1.5				50	4	52,000
	UDCLRSF 2005-005005		R0.05	0.5				50	4	52,000
	UDCLRSF 2005-005010			1				50	4	52,000
	UDCLRSF 2005-005015			1.5				50	4	52,000
	UDCLRSF 2008-003008	0.8	R0.03	0.8	0.4	0.76	16°	50	4	46,700
	UDCLRSF 2008-003016			1.6				50	4	46,700
	UDCLRSF 2008-003024			2.4				50	4	46,700
	UDCLRSF 2008-005008		R0.05	0.8				50	4	46,700
	UDCLRSF 2008-005016			1.6				50	4	46,700
	UDCLRSF 2008-005024			2.4				50	4	46,700
	UDCLRSF 2008-010008		R0.1	0.8				50	4	46,700
	UDCLRSF 2008-010016			1.6				50	4	46,700
	UDCLRSF 2008-010024			2.4				50	4	46,700

※Additional model

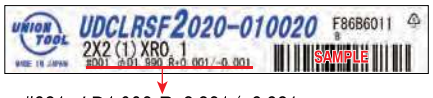
Features

Long Neck Radius End Mills for milling Cemented Carbide & Hard Brittle (Non-Metallic) Materials.
Upgraded version of UDCLRS.
Improved Diamond coating and optimum cutting geometries will "deep cuts" the material with offering long tool life.
Special cutting edge treatment helps to avoid the edge chipping & level gap on the work piece.
Recommended to use on semi-roughing & finishing process.





Label Sample



#001 φD1.990 R+0.001/−0.001

Diameter and Corner R accuracy measurements are printed on the label to support High Precision milling.

The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece.

Unit (mm)

Model Number	Outside Diameter φD	Corner Radius CR	Effective Length ℓ1	Effective Length by Inclined Angles				
				30'	1°	1° 30'	2°	3°
UDCLRSF 20025-003X5	0.25	R0.03	0.5	0.51	0.53	0.54	0.56	0.60
UDCLRSF 20025-003X8			0.8	0.82	0.84	0.87	0.90	0.97
UDCLRSF 20025-005X5		R0.05	0.5	0.51	0.52	0.54	0.56	0.60
UDCLRSF 20025-005X8			0.8	0.82	0.84	0.87	0.90	0.96
UDCLRSF 2003-003006	0.3	R0.03	0.6	0.61	0.63	0.65	0.67	0.72
UDCLRSF 2003-003009			0.9	0.92	0.95	0.98	1.02	1.09
UDCLRSF 2003-005006		R0.05	0.6	0.61	0.63	0.65	0.67	0.72
UDCLRSF 2003-005009			0.9	0.92	0.95	0.98	1.01	1.09
UDCLRSF 2005-003005	0.5	R0.03	0.5	0.55	0.56	0.58	0.60	0.64
UDCLRSF 2005-003010			1	1.06	1.10	1.13	1.17	1.25
UDCLRSF 2005-003015			1.5	1.58	1.63	1.68	1.74	1.87
UDCLRSF 2005-005005		R0.05	0.5	0.55	0.56	0.58	0.60	0.64
UDCLRSF 2005-005010			1	1.06	1.09	1.13	1.17	1.25
UDCLRSF 2005-005015			1.5	1.58	1.63	1.68	1.74	1.86
UDCLRSF 2008-003008	0.8	R0.03	0.8	0.86	0.88	0.91	0.94	1.01
UDCLRSF 2008-003016			1.6	1.68	1.73	1.79	1.85	1.99
UDCLRSF 2008-003024			2.4	2.51	2.59	2.67	2.76	2.97
UDCLRSF 2008-005008		R0.05	0.8	0.85	0.88	0.91	0.94	1.01
UDCLRSF 2008-005016			1.6	1.68	1.73	1.79	1.85	1.98
UDCLRSF 2008-005024			2.4	2.50	2.58	2.67	2.76	2.96
UDCLRSF 2008-010008		R0.1	0.8	0.85	0.88	0.90	0.93	0.99
UDCLRSF 2008-010016			1.6	1.68	1.73	1.78	1.84	1.97
UDCLRSF 2008-010024			2.4	2.50	2.58	2.66	2.75	2.95

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2 Flutes UDC High-grade Long Neck Radius End Mills for Cemented Carbide and Hard Brittle Materials

Unit (mm)

Model Number	Outside Diameter φD	Corner Radius CR	Effective Length ℓ1	Length of Cut ℓ	Neck Diameter φd1	Shank Taper Angle Bta	Overall Length L	Shank Diameter φd	Suggested Retail Price ¥
UDCLRSF 2010-003010	1	R0.03	1	0.5	0.96	16°	50	4	46,700
UDCLRSF 2010-003020			2				50	4	46,700
UDCLRSF 2010-003040			4				50	4	46,700
UDCLRSF 2010-003060			6				50	4	46,700
UDCLRSF 2010-005010		R0.05	1				50	4	46,700
UDCLRSF 2010-005020			2				50	4	46,700
UDCLRSF 2010-005040			4				50	4	46,700
UDCLRSF 2010-005060			6				50	4	46,700
UDCLRSF 2010-010010		R0.1	1				50	4	46,700
UDCLRSF 2010-010020			2				50	4	46,700
UDCLRSF 2010-010040			4				50	4	46,700
UDCLRSF 2010-010060			6				50	4	46,700
UDCLRSF 2015-003015	1.5	R0.03	1.5	0.75	1.44	16°	50	4	46,700
UDCLRSF 2015-003030			3				50	4	46,700
UDCLRSF 2015-005015		R0.05	1.5				50	4	46,700
UDCLRSF 2015-005030			3				50	4	46,700
UDCLRSF 2015-010015		R0.1	1.5				50	4	46,700
UDCLRSF 2015-010030			3				50	4	46,700
UDCLRSF 2015-010040			4				50	4	46,700
UDCLRSF 2015-010060			6				50	4	46,700
UDCLRSF 2020-003020	2	R0.03	2	1	1.9	16°	50	4	46,700
UDCLRSF 2020-003040			4				50	4	46,700
UDCLRSF 2020-003060			6				50	4	46,700
UDCLRSF 2020-003080			8				50	4	46,700
UDCLRSF 2020-003100			10				50	4	46,700
UDCLRSF 2020-005020		R0.05	2				50	4	46,700
UDCLRSF 2020-005040			4				50	4	46,700
UDCLRSF 2020-005060			6				50	4	46,700
UDCLRSF 2020-005080			8				50	4	46,700
UDCLRSF 2020-005100			10				50	4	46,700
UDCLRSF 2020-010020		R0.1	2				50	4	46,700
UDCLRSF 2020-010040			4				50	4	46,700
UDCLRSF 2020-010060			6				50	4	46,700
UDCLRSF 2020-010080			8				50	4	46,700
UDCLRSF 2020-010100			10				50	4	46,700

Unit (mm)

Model Number	Outside Diameter φD	Corner Radius CR	Effective Length ℓ1	Effective Length by Inclined Angles				
				30'	1°	1° 30'	2°	3°
UDCLRSF 2010-003010	1	R0.03	1	1.06	1.10	1.13	1.17	1.25
UDCLRSF 2010-003020			2	2.09	2.16	2.23	2.31	2.48
UDCLRSF 2010-003040			4	4.16	4.29	4.43	4.59	4.93
UDCLRSF 2010-003060			6	6.22	6.42	6.63	6.86	7.37
UDCLRSF 2010-005010		R0.05	1	1.06	1.09	1.13	1.17	1.25
UDCLRSF 2010-005020			2	2.09	2.16	2.23	2.31	2.47
UDCLRSF 2010-005040			4	4.15	4.29	4.43	4.58	4.92
UDCLRSF 2010-005060			6	6.22	6.42	6.63	6.86	7.37
UDCLRSF 2010-010010		R0.1	1	1.06	1.09	1.12	1.16	1.24
UDCLRSF 2010-010020			2	2.09	2.16	2.22	2.30	2.46
UDCLRSF 2010-010040			4	4.15	4.28	4.43	4.58	4.91
UDCLRSF 2010-010060			6	6.22	6.41	6.63	6.85	7.36
UDCLRSF 2015-003015	1.5	R0.03	1.5	1.61	1.66	1.72	1.78	1.91
UDCLRSF 2015-003030			3	3.16	3.26	3.37	3.49	3.74
UDCLRSF 2015-005015		R0.05	1.5	1.61	1.66	1.72	1.78	1.90
UDCLRSF 2015-005030			3	3.16	3.26	3.37	3.48	3.74
UDCLRSF 2015-010015		R0.1	1.5	1.61	1.66	1.71	1.77	1.89
UDCLRSF 2015-010030			3	3.16	3.26	3.36	3.48	3.73
UDCLRSF 2015-010040			4	4.19	4.32	4.46	4.62	4.95
UDCLRSF 2015-010060			6	6.25	6.45	6.66	6.89	7.40
UDCLRSF 2020-003020	2	R0.03	2	2.20	2.27	2.35	2.43	2.61
UDCLRSF 2020-003040			4	4.26	4.40	4.55	4.70	5.05
UDCLRSF 2020-003060			6	6.33	6.53	6.75	6.98	7.50
UDCLRSF 2020-003080			8	8.39	8.66	8.95	9.26	9.95
UDCLRSF 2020-003100			10	10.45	10.79	11.15	11.54	12.40
UDCLRSF 2020-005020		R0.05	2	2.20	2.27	2.34	2.42	2.60
UDCLRSF 2020-005040			4	4.26	4.40	4.55	4.70	5.05
UDCLRSF 2020-005060			6	6.33	6.53	6.75	6.98	7.50
UDCLRSF 2020-005080			8	8.39	8.66	8.95	9.26	9.94
UDCLRSF 2020-005100			10	10.45	10.79	11.15	11.53	12.39
UDCLRSF 2020-010020		R0.1	2	2.20	2.27	2.34	2.42	2.59
UDCLRSF 2020-010040			4	4.26	4.40	4.54	4.69	5.04
UDCLRSF 2020-010060			6	6.32	6.53	6.74	6.97	7.49
UDCLRSF 2020-010080			8	8.39	8.66	8.94	9.25	9.93
UDCLRSF 2020-010100			10	10.45	10.79	11.14	11.53	12.38

Milling Conditions for UDCLRSF

WORK MATERIAL	CEMENTED CARBIDE(≧87HRA) / HARD BRITTLE MATERIALS												
Model Number	Spindle Speed (min⁻¹)	Z-Level Milling				Flat Milling			Side Milling			Slotting	
		Feed Rate (mm/min)	※Feed Rate 2 (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)
20025-003X5	30,000	220	50	0.014	0.2	220	0.014	0.2	100	0.063	0.006	110	0.014
20025-003X8	30,000	170	50	0.014	0.2	170	0.014	0.2	80	0.032	0.006	90	0.014
20025-005X5	30,000	220	50	0.018	0.2	220	0.018	0.2	100	0.063	0.006	110	0.018
20025-005X8	30,000	170	50	0.018	0.2	170	0.018	0.2	80	0.032	0.006	90	0.018
2003-003006	30,000	220	50	0.015	0.2	220	0.015	0.2	110	0.075	0.006	110	0.015
2003-003009	30,000	175	50	0.015	0.2	175	0.015	0.2	90	0.038	0.006	90	0.015
2003-005006	30,000	220	50	0.02	0.2	220	0.02	0.2	110	0.075	0.006	110	0.02
2003-005009	30,000	175	50	0.02	0.2	175	0.015	0.2	90	0.038	0.006	90	0.02
2005-003005	30,000	190	90	0.02	0.4	190	0.02	0.4	180	0.25	0.01	190	0.02
2005-003010	30,000	190	90	0.02	0.4	190	0.02	0.4	180	0.125	0.01	190	0.02
2005-003015	30,000	140	65	0.015	0.3	140	0.015	0.3	130	0.125	0.007	140	0.015
2005-005005	30,000	190	125	0.02	0.4	190	0.02	0.4	180	0.25	0.01	190	0.02
2005-005010	30,000	190	125	0.02	0.4	190	0.02	0.4	180	0.125	0.01	190	0.02
2005-005015	30,000	140	65	0.015	0.3	140	0.015	0.3	130	0.125	0.007	140	0.015
2008-003008	30,000	190	90	0.02	0.6	190	0.02	0.6	300	0.4	0.016	190	0.02
2008-003016	30,000	190	90	0.02	0.6	190	0.02	0.6	300	0.2	0.01	190	0.02
2008-003024	30,000	175	80	0.018	0.5	175	0.018	0.5	275	0.2	0.007	175	0.018
2008-005008	30,000	190	150	0.025	0.6	190	0.025	0.6	300	0.4	0.016	190	0.025
2008-005016	30,000	190	150	0.025	0.6	190	0.025	0.6	300	0.2	0.01	190	0.025
2008-005024	30,000	175	80	0.023	0.5	175	0.023	0.5	275	0.2	0.007	175	0.023
2008-010008	30,000	190	150	0.03	0.6	190	0.03	0.6	300	0.4	0.016	190	0.03
2008-010016	30,000	190	150	0.03	0.6	190	0.03	0.6	300	0.2	0.01	190	0.03
2008-010024	30,000	175	80	0.028	0.5	175	0.028	0.5	275	0.2	0.007	175	0.028
2010-003010	30,000	190	90	0.02	0.8	190	0.02	0.8	375	0.5	0.02	190	0.02
2010-003020	30,000	190	90	0.02	0.8	190	0.02	0.8	375	0.25	0.01	190	0.02
2010-003040	30,000	190	90	0.016	0.6	190	0.016	0.6	375	0.25	0.005	190	0.016
2010-003060	25,000	155	75	0.01	0.5	155	0.01	0.5	300	0.25	0.005	155	0.01
2010-005010	30,000	190	185	0.025	0.8	190	0.025	0.8	375	0.5	0.02	190	0.025
2010-005020	30,000	190	185	0.025	0.8	190	0.025	0.8	375	0.25	0.01	190	0.025
2010-005040	30,000	190	185	0.02	0.6	190	0.02	0.6	375	0.25	0.005	190	0.02
2010-005060	25,000	155	150	0.012	0.5	155	0.012	0.5	300	0.25	0.005	155	0.012
2010-010010	30,000	190	185	0.03	0.8	190	0.03	0.8	375	0.5	0.02	190	0.03
2010-010020	30,000	190	185	0.03	0.8	190	0.03	0.8	375	0.25	0.01	190	0.03
2010-010040	30,000	190	185	0.025	0.6	190	0.025	0.6	375	0.25	0.005	190	0.025
2010-010060	25,000	155	150	0.015	0.5	155	0.015	0.5	300	0.25	0.005	155	0.015

Milling Conditions for UDCLRSF

WORK MATERIAL	CEMENTED CARBIDE (<87HRA)												
Model Number	Spindle Speed (min^{-1})	Z-Level Milling				Flat Milling			Side Milling			Slotting	
		Feed Rate (mm/min)	※Feed Rate 2 (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)
20025-003X5	24,000	300	50	0.014	0.2	300	0.014	0.2	200	0.063	0.003	300	0.014
20025-003X8	24,000	230	50	0.01	0.2	230	0.01	0.2	150	0.032	0.003	230	0.01
20025-005X5	24,000	300	50	0.018	0.2	300	0.018	0.2	200	0.063	0.003	300	0.018
20025-005X8	24,000	230	50	0.012	0.2	230	0.012	0.2	150	0.032	0.003	230	0.012
2003-003006	21,000	300	50	0.015	0.2	300	0.015	0.2	200	0.075	0.003	300	0.015
2003-003009	21,000	240	50	0.012	0.2	240	0.012	0.2	160	0.038	0.003	240	0.012
2003-005006	21,000	300	50	0.02	0.2	300	0.02	0.2	200	0.075	0.003	300	0.02
2003-005009	21,000	240	50	0.014	0.2	240	0.014	0.2	160	0.038	0.003	240	0.014
2005-003005	16,000	500	160	0.02	0.4	500	0.02	0.4	800	0.25	0.005	500	0.02
2005-003010	16,000	500	160	0.02	0.4	500	0.02	0.4	400	0.125	0.005	500	0.02
2005-003015	16,000	375	120	0.014	0.3	375	0.014	0.3	300	0.125	0.005	375	0.014
2005-005005	16,000	500	160	0.025	0.4	500	0.025	0.4	800	0.25	0.005	500	0.025
2005-005010	16,000	500	160	0.025	0.4	500	0.025	0.4	400	0.125	0.005	500	0.025
2005-005015	16,000	375	120	0.017	0.3	375	0.017	0.3	300	0.125	0.005	375	0.017
2008-003008	13,000	390	130	0.02	0.6	390	0.02	0.6	1,200	0.4	0.008	390	0.02
2008-003016	13,000	390	130	0.02	0.6	390	0.02	0.6	600	0.2	0.008	390	0.02
2008-003024	13,000	350	120	0.014	0.5	350	0.014	0.5	540	0.2	0.006	350	0.014
2008-005008	13,000	390	130	0.025	0.6	390	0.025	0.6	1,200	0.4	0.008	390	0.025
2008-005016	13,000	390	130	0.025	0.6	390	0.025	0.6	600	0.2	0.008	390	0.025
2008-005024	13,000	350	120	0.017	0.5	350	0.017	0.5	540	0.2	0.006	350	0.017
2008-010008	13,000	390	130	0.03	0.6	390	0.03	0.6	1,200	0.4	0.008	390	0.03
2008-010016	13,000	390	130	0.03	0.6	390	0.03	0.6	600	0.2	0.008	390	0.03
2008-010024	13,000	350	120	0.02	0.5	350	0.02	0.5	540	0.2	0.006	350	0.02
2010-003010	12,000	360	120	0.02	0.8	360	0.02	0.8	1,440	0.5	0.01	360	0.02
2010-003020	12,000	360	120	0.02	0.8	360	0.02	0.8	720	0.25	0.01	360	0.02
2010-003040	10,000	300	100	0.012	0.7	300	0.012	0.7	600	0.25	0.008	300	0.012
2010-003060	10,000	300	100	0.008	0.7	300	0.008	0.7	600	0.25	0.006	300	0.008
2010-005010	12,000	360	120	0.025	0.8	360	0.025	0.8	1,440	0.5	0.01	360	0.025
2010-005020	12,000	360	120	0.025	0.8	360	0.025	0.8	720	0.25	0.01	360	0.025
2010-005040	10,000	300	100	0.015	0.7	300	0.015	0.7	600	0.25	0.008	300	0.015
2010-005060	10,000	300	100	0.01	0.7	300	0.01	0.7	600	0.25	0.006	300	0.01
2010-010010	12,000	360	120	0.03	0.8	360	0.03	0.8	1,440	0.5	0.01	360	0.03
2010-010020	12,000	360	120	0.03	0.8	360	0.03	0.8	720	0.25	0.01	360	0.03
2010-010040	10,000	300	100	0.02	0.7	300	0.02	0.7	600	0.25	0.008	300	0.02
2010-010060	10,000	300	100	0.012	0.7	300	0.012	0.7	600	0.25	0.006	300	0.012

Milling Conditions for UDCLRSF

WORK MATERIAL	CEMENTED CARBIDE(≧87HRA) / HARD BRITTLE MATERIALS												
Model Number	Spindle Speed (min^{-1})	Z-Level Milling				Flat Milling			Side Milling			Slotting	
		Feed Rate (mm/min)	※Feed Rate 2 (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)
2015-003015	25,000	190	90	0.03	1.3	190	0.03	1.3	375	0.75	0.02	190	0.03
2015-003030	25,000	190	90	0.03	1.3	190	0.03	1.3	375	0.375	0.01	190	0.03
2015-005015	25,000	190	125	0.04	1.3	190	0.04	1.3	375	0.75	0.02	190	0.04
2015-005030	25,000	190	125	0.04	1.3	190	0.04	1.3	375	0.375	0.01	190	0.04
2015-010015	25,000	190	150	0.045	1.3	190	0.045	1.3	375	0.75	0.02	190	0.045
2015-010030	25,000	190	150	0.045	1.3	190	0.045	1.3	375	0.375	0.01	190	0.045
2015-010040	25,000	190	150	0.043	1.2	190	0.043	1.2	350	0.375	0.008	190	0.043
2015-010060	25,000	190	150	0.04	1	190	0.04	1	350	0.375	0.005	190	0.04
2020-003020	20,000	190	90	0.04	1.8	190	0.04	1.8	375	1	0.02	190	0.04
2020-003040	20,000	190	90	0.04	1.8	190	0.04	1.8	375	0.5	0.01	190	0.04
2020-003060	20,000	190	90	0.037	1.7	190	0.037	1.7	325	0.5	0.007	190	0.037
2020-003080	20,000	190	90	0.03	1.5	190	0.03	1.5	325	0.5	0.005	190	0.03
2020-003100	20,000	190	90	0.025	1.3	190	0.025	1.3	300	0.5	0.005	190	0.025
2020-005020	20,000	190	90	0.05	1.8	190	0.05	1.8	375	1	0.02	190	0.05
2020-005040	20,000	190	90	0.05	1.8	190	0.05	1.8	375	0.5	0.01	190	0.05
2020-005060	20,000	190	90	0.045	1.7	190	0.045	1.7	325	0.5	0.007	190	0.045
2020-005080	20,000	190	90	0.04	1.5	190	0.04	1.5	325	0.5	0.005	190	0.04
2020-005100	20,000	190	90	0.028	1.3	190	0.028	1.3	300	0.5	0.005	190	0.028
2020-010020	20,000	190	125	0.06	1.8	190	0.06	1.8	375	1	0.02	190	0.06
2020-010040	20,000	190	125	0.06	1.8	190	0.06	1.8	375	0.5	0.01	190	0.06
2020-010060	20,000	190	125	0.055	1.7	190	0.055	1.7	325	0.5	0.007	190	0.055
2020-010080	20,000	190	125	0.045	1.5	190	0.045	1.5	325	0.5	0.005	190	0.045
2020-010100	20,000	190	125	0.033	1.3	190	0.033	1.3	300	0.5	0.005	190	0.033

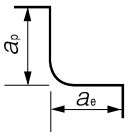
These milling parameters are based on VF-20, VM-40, VC-70, VU-70 (TAS standard) for Cemented Carbide, and Alumina for Hard Brittle Materials. These are for reference only.
Tool life may differ depending on the type of Cemented Carbide / Hard Brittle Materials.
For best result, fine parameter adjustments may be required, depending on the materials of Cemented Carbide / Hard Brittle Materials; milling shape and strategy; machine rigidity and spindle capability.

※Feed Rate2: Feed rate of approach and *connection moves.
*Changing from one engagement point to the next.

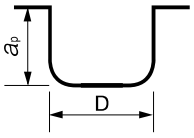
Milling Conditions for UDCLRSF

WORK MATERIAL	CEMENTED CARBIDE (<87HRA)												
Model Number	Spindle Speed (min^{-1})	Z-Level Milling				Flat Milling			Side Milling			Slotting	
		Feed Rate (mm/min)	※Feed Rate 2 (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)	a_e (mm)	Feed Rate (mm/min)	a_p (mm)
2015-003015	11,000	330	110	0.03	1.3	330	0.03	1.3	1,440	0.75	0.01	330	0.03
2015-003030	11,000	330	110	0.03	1.3	330	0.03	1.3	720	0.375	0.01	330	0.03
2015-005015	11,000	330	110	0.04	1.3	330	0.04	1.3	1,440	0.75	0.01	330	0.04
2015-005030	11,000	330	110	0.04	1.3	330	0.04	1.3	720	0.375	0.01	330	0.04
2015-010015	11,000	330	110	0.045	1.3	330	0.045	1.3	1,440	0.75	0.01	330	0.045
2015-010030	11,000	330	110	0.045	1.3	330	0.045	1.3	720	0.375	0.01	330	0.045
2015-010040	11,000	330	110	0.045	1.1	330	0.045	1.1	720	0.375	0.01	330	0.045
2015-010060	11,000	330	110	0.03	1.1	330	0.03	1.1	720	0.375	0.009	330	0.03
2020-003020	10,000	300	100	0.04	1.8	300	0.04	1.8	1,440	1	0.01	300	0.04
2020-003040	10,000	300	100	0.04	1.8	300	0.04	1.8	1,440	1	0.01	300	0.04
2020-003060	10,000	300	100	0.036	1.6	300	0.036	1.6	1,440	0.5	0.01	300	0.036
2020-003080	10,000	300	100	0.023	1.6	300	0.023	1.6	1,440	0.5	0.009	300	0.023
2020-003100	10,000	300	100	0.018	1.6	300	0.018	1.6	1,440	0.5	0.009	300	0.018
2020-005020	10,000	300	100	0.05	1.8	300	0.05	1.8	1,440	1	0.01	300	0.05
2020-005040	10,000	300	100	0.05	1.8	300	0.05	1.8	1,440	1	0.01	300	0.05
2020-005060	10,000	300	100	0.045	1.6	300	0.045	1.6	1,440	0.5	0.01	300	0.045
2020-005080	10,000	300	100	0.028	1.6	300	0.028	1.6	1,440	0.5	0.009	300	0.028
2020-005100	10,000	300	100	0.02	1.6	300	0.02	1.6	1,440	0.5	0.009	300	0.02
2020-010020	10,000	300	100	0.06	1.8	300	0.06	1.8	1,440	1	0.01	300	0.06
2020-010040	10,000	300	100	0.06	1.8	300	0.06	1.8	1,440	1	0.01	300	0.06
2020-010060	10,000	300	100	0.054	1.6	300	0.054	1.6	1,440	0.5	0.01	300	0.054
2020-010080	10,000	300	100	0.034	1.6	300	0.034	1.6	1,440	0.5	0.009	300	0.034
2020-010100	10,000	300	100	0.023	1.6	300	0.023	1.6	1,440	0.5	0.009	300	0.023

Note:
- This application requires a high cutting force. A machine with poor rigidity and high vibration is not recommended.
- Allow sufficient machine and spindle warm-up time for stability and to remove any expansion of the main spindle before running the program.
- Tool setting length should achieve the least possible overhang.
- Avoid contact with the coated area of the shank. This will prevent tip vibration and tool jamming in the collet / holder.
- Run-out and vibration should be checked dynamically at the tool point while mounted in the machine and both should achieve the lowest level possible.
- Does not require to be slowed down in the approach sequence when slotting and side milling.
- Use an inclined or helical approach when Z-level milling (Recommended inclination angle: <1 degree).
- For flat and side milling, set the axial depth (ap) and radial depth (ae) to allow for the uncut material of the corner radius.
- Decrease both spindle speed and feed rate proportionally.
- Air blow is highly recommended for longer tool life. Both oil mist and oil coolant are alternatives.
- Recommend water soluble coolant for Hard Brittle (Non-Metallic) Materials.
- When milling some work pieces, heavier chips may be created. To evacuate these chips it is important to accurately position the coolant nozzle on the milling part.
- Remove chips to prevent heat generation and ignition during milling process.
- Protective gear, such as safety glasses and face guards are required when milling.
- Chips / dust generated while milling can have adverse affects on the machine parts if they are not properly evacuated. Take steps to assure proper evacuation.



Z-Level / Side / Flat Milling



Slotting
D : Outside Diameter (mm)