加工材料 Work Material		碳素钢・调质钢 Carbon Steels・Prehardened Steels S50C・NAK55・NAK80・HPM1 (～43HRC)				高硬度钢 Hardened Steels HPM38・STAVAX・SKD61 (～55HRC)				高硬度钢 Hardened Steels SKD11・PD613 (～62HRC)				高速钢 High Speed Steels SKH (～65HRC)			
外径 Dia.	颈长 Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm
0.1	0.3	40,000	150	0.005	0.06	40,000	120	0.003	0.05	40,000	100	0.002	0.04	40,000	70	0.002	0.03
	0.5	40,000	100	0.005	0.06	40,000	80	0.003	0.05	40,000	60	0.002	0.04	40,000	50	0.002	0.03
	0.75	40,000	80	0.003	0.06	40,000	70	0.002	0.05	40,000	50	0.001	0.04	40,000	30	0.001	0.03
	1	40,000	60	0.002	0.06	40,000	50	0.001	0.05	40,000	40	0.001	0.04	40,000	20	0.001	0.03
0.15	0.3	40,000	180	0.005	0.09	40,000	150	0.003	0.07	40,000	120	0.002	0.06	40,000	100	0.002	0.04
	0.5	40,000	150	0.005	0.09	40,000	120	0.003	0.07	40,000	100	0.002	0.06	40,000	80	0.002	0.04
	0.75	40,000	120	0.003	0.09	40,000	100	0.002	0.07	40,000	80	0.001	0.06	40,000	60	0.001	0.04
	1	40,000	100	0.002	0.09	40,000	80	0.001	0.07	40,000	60	0.001	0.06	40,000	40	0.001	0.04
	1.5	40,000	80	0.002	0.09	40,000	60	0.001	0.07	40,000	40	0.001	0.06	40,000	20	0.001	0.04
0.2	0.5	30,000	240	0.005	0.12	30,000	200	0.003	0.1	30,000	160	0.003	0.08	30,000	120	0.003	0.06
	0.75	30,000	200	0.005	0.12	30,000	180	0.003	0.1	30,000	140	0.003	0.08	30,000	100	0.003	0.06
	1	30,000	180	0.005	0.12	30,000	150	0.003	0.1	30,000	120	0.003	0.08	30,000	80	0.003	0.06
	1.5	30,000	120	0.003	0.12	30,000	100	0.002	0.1	30,000	80	0.002	0.08	30,000	60	0.002	0.06
	2	30,000	80	0.003	0.12	30,000	50	0.002	0.1	30,000	40	0.002	0.08	30,000	30	0.002	0.06
	2.5	30,000	60	0.002	0.12	30,000	50	0.001	0.1	25,000	40	0.001	0.08	25,000	30	0.001	0.06
	3	30,000	40	0.002	0.12	25,000	40	0.001	0.1	25,000	30	0.001	0.08	22,000	20	0.001	0.06
0.3	1	30,000	350	0.007	0.18	30,000	300	0.003	0.15	30,000	250	0.003	0.12	30,000	200	0.003	0.09
	1.5	30,000	260	0.007	0.18	30,000	200	0.003	0.15	30,000	160	0.003	0.12	30,000	120	0.003	0.09
	2	30,000	180	0.005	0.18	30,000	150	0.003	0.15	30,000	120	0.003	0.12	25,000	100	0.003	0.09
	2.5	30,000	150	0.004	0.18	25,000	100	0.002	0.15	25,000	80	0.002	0.12	20,000	60	0.002	0.09
	3	30,000	70	0.004	0.18	25,000	50	0.002	0.15	25,000	40	0.002	0.12	20,000	30	0.002	0.09
0.4	1	30,000	450	0.01	0.24	30,000	400	0.005	0.2	30,000	350	0.005	0.16	25,000	300	0.005	0.12
	1.5	30,000	400	0.01	0.24	30,000	360	0.005	0.2	30,000	330	0.005	0.16	25,000	250	0.005	0.12
	2	30,000	360	0.01	0.24	30,000	320	0.005	0.2	25,000	280	0.005	0.16	25,000	220	0.005	0.12
	2.5	30,000	340	0.008	0.24	25,000	280	0.005	0.2	25,000	250	0.004	0.16	20,000	200	0.004	0.12
	3	30,000	320	0.008	0.24	25,000	260	0.004	0.2	20,000	220	0.003	0.16	18,000	180	0.003	0.12
	3.5	30,000	280	0.007	0.24	25,000	220	0.004	0.2	20,000	180	0.003	0.16	18,000	150	0.002	0.12
	4	30,000	250	0.006	0.24	25,000	200	0.003	0.2	20,000	160	0.002	0.16	18,000	120	0.002	0.12
	5	25,000	250	0.005	0.24	22,000	180	0.003	0.2	20,000	150	0.002	0.16	18,000	90	0.002	0.12
	6	25,000	200	0.004	0.24	22,000	150	0.002	0.2	18,000	130	0.002	0.16	16,000	70	0.001	0.12
	8	20,000	150	0.002	0.24	16,000	120	0.001	0.2	14,000	90	0.001	0.16	12,000	40	0.001	0.12
	10	16,000	100	0.002	0.24	13,000	80	0.001	0.2	12,000	50	0.001	0.16	10,000	20	0.001	0.12
0.5	1	30,000	550	0.02	0.3	25,000	500	0.01	0.25	23,000	450	0.007	0.2	20,000	400	0.005	0.15
	1.5	30,000	520	0.02	0.3	25,000	450	0.01	0.25	23,000	400	0.007	0.2	20,000	360	0.005	0.15
	2	30,000	500	0.02	0.3	25,000	420	0.01	0.25	23,000	380	0.007	0.2	20,000	320	0.005	0.15
	2.5	30,000	480	0.015	0.3	25,000	400	0.008	0.25	23,000	360	0.006	0.2	20,000	300	0.004	0.15
	3	30,000	420	0.015	0.3	25,000	350	0.007	0.25	23,000	320	0.005	0.2	20,000	280	0.003	0.15
	3.5	25,000	400	0.012	0.3	25,000	320	0.006	0.25	23,000	280	0.003	0.2	20,000	240	0.003	0.15
	4	25,000	380	0.01	0.3	25,000	280	0.005	0.25	23,000	240	0.003	0.2	20,000	200	0.002	0.15
	4.5	25,000	350	0.008	0.3	25,000	230	0.004	0.25	20,000	200	0.003	0.2	18,000	160	0.002	0.15
	5	25,000	320	0.007	0.3	20,000	200	0.003	0.25	18,000	150	0.003	0.2	16,000	100	0.002	0.15
	6	25,000	300	0.005	0.3	20,000	200	0.003	0.25	18,000	150	0.002	0.2	16,000	100	0.002	0.15
	7	20,000	250	0.005	0.3	16,000	180	0.003	0.25	14,000	140	0.002	0.2	14,000	80	0.002	0.15
	8	20,000	200	0.005	0.3	16,000	160	0.002	0.25	14,000	130	0.002	0.2	12,000	60	0.001	0.15
	9	20,000	200	0.003	0.3	16,000	150	0.002	0.25	14,000	120	0.001	0.2	12,000	50	0.001	0.15
	10	16,000	170	0.003	0.3	13,000	130	0.002	0.25	12,000	110	0.001	0.2	10,000	40	0.001	0.15
0.6	1.5	30,000	650	0.02	0.35	25,000	550	0.01	0.3	23,000	450	0.007	0.25	20,000	400	0.005	0.18
	2	30,000	550	0.02	0.35	25,000	500	0.01	0.3	23,000	400	0.007	0.25	20,000	350	0.005	0.18
	3	30,000	500	0.015	0.35	25,000	450	0.007	0.3	23,000	350	0.005	0.25	20,000	300	0.003	0.18
	4	25,000	450	0.01	0.35	25,000	400	0.005	0.3	23,000	300	0.003	0.25	20,000	250	0.002	0.18

P 调质钢 Prehardened Steel
H ～52 HRC 高硬度钢 Hardened Steel
H ～60 HRC 高硬度钢 Hardened Steel
H ～65 HRC 高硬度钢 Hardened Steel
M 不锈钢 Stainless Steel
S 钛合金 耐热合金 Titanium Alloy Heat Resistant Alloy

常规系列
无限白金涂层
长颈造型
Regular Line
MUGEN PREMIUM
Long Neck Type

MHRH230

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢・调质钢 Carbon Steels・Prehardened Steels S50C・NAK55・NAK80・HPM1 (～43HRC)				高硬度钢 Hardened Steels HPM38・STAVAX・SKD61 (～55HRC)				高硬度钢 Hardened Steels SKD11・PD613 (～62HRC)				高速钢 High Speed Steels SKH (～65HRC)			
外径 Dia.	颈长 Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm
0.6	5	25,000	400	0.007	0.35	20,000	350	0.003	0.3	18,000	250	0.003	0.25	16,000	200	0.002	0.18
	6	25,000	350	0.005	0.35	20,000	300	0.002	0.3	18,000	200	0.002	0.25	16,000	150	0.001	0.18
0.7	2	30,000	750	0.04	0.4	25,000	600	0.03	0.35	23,000	450	0.02	0.28	20,000	400	0.012	0.21
	4	25,000	690	0.03	0.4	25,000	560	0.02	0.35	23,000	400	0.015	0.28	20,000	320	0.007	0.21
	6	25,000	550	0.02	0.4	20,000	410	0.015	0.35	18,000	300	0.012	0.28	16,000	240	0.007	0.21
	8	20,000	430	0.012	0.4	16,000	330	0.01	0.35	14,000	230	0.007	0.28	12,000	180	0.005	0.21
	10	16,000	300	0.008	0.4	13,000	200	0.005	0.35	12,000	180	0.003	0.28	10,000	120	0.002	0.21
0.8	3	25,000	850	0.04	0.45	25,000	780	0.03	0.4	23,000	650	0.02	0.32	20,000	550	0.012	0.24
	4	25,000	800	0.03	0.45	25,000	700	0.025	0.4	23,000	600	0.015	0.32	20,000	500	0.007	0.24
	5	25,000	700	0.03	0.45	23,000	630	0.02	0.4	20,000	530	0.012	0.32	18,000	450	0.006	0.24
	6	20,000	620	0.025	0.45	20,000	550	0.02	0.4	18,000	450	0.01	0.32	16,000	350	0.005	0.24
	8	16,000	500	0.015	0.45	16,000	400	0.007	0.4	14,000	300	0.005	0.32	12,000	200	0.003	0.24
	10	16,000	400	0.012	0.45	16,000	350	0.007	0.4	12,000	180	0.005	0.32	10,000	150	0.003	0.24
	12	16,000	300	0.007	0.45	13,000	220	0.005	0.4	12,000	120	0.003	0.32	10,000	120	0.002	0.24
1	2	25,000	1,200	0.07	0.6	23,000	1,000	0.06	0.5	18,000	900	0.05	0.4	14,000	600	0.035	0.3
	3	25,000	1,200	0.06	0.6	23,000	1,000	0.05	0.5	18,000	900	0.04	0.4	14,000	600	0.03	0.3
	4	25,000	1,000	0.05	0.6	23,000	900	0.04	0.5	18,000	800	0.03	0.4	14,000	500	0.02	0.3
	5	22,000	1,000	0.04	0.6	20,000	800	0.03	0.5	16,000	700	0.02	0.4	12,000	450	0.012	0.3
	6	20,000	900	0.03	0.6	18,000	700	0.02	0.5	14,000	600	0.01	0.4	10,000	400	0.007	0.3
	7	20,000	900	0.03	0.6	18,000	650	0.02	0.5	14,000	550	0.01	0.4	10,000	370	0.006	0.3
	8	18,000	800	0.03	0.6	16,000	600	0.02	0.5	12,000	500	0.01	0.4	8,000	340	0.005	0.3
	9	18,000	700	0.02	0.6	16,000	550	0.015	0.5	12,000	450	0.007	0.4	8,000	300	0.005	0.3
	10	16,000	600	0.02	0.6	14,000	500	0.01	0.5	10,000	400	0.007	0.4	6,000	250	0.005	0.3
	12	16,000	500	0.02	0.6	13,000	400	0.01	0.5	10,000	300	0.005	0.4	6,000	180	0.004	0.3
	14	16,000	450	0.015	0.6	13,000	360	0.008	0.5	10,000	280	0.005	0.4	5,500	160	0.004	0.3
	16	14,000	400	0.012	0.6	12,000	320	0.006	0.5	9,000	250	0.004	0.4	5,500	150	0.003	0.3
	18	14,000	300	0.01	0.6	12,000	240	0.006	0.5	8,000	200	0.004	0.4	5,000	120	0.002	0.3
	20	12,000	200	0.007	0.6	10,000	160	0.005	0.5	7,000	130	0.003	0.4	4,500	90	0.001	0.3
	22	12,000	180	0.005	0.6	10,000	150	0.003	0.5	6,000	100	0.002	0.4	4,200	60	0.001	0.3
1.2	6	20,000	900	0.04	0.7	18,000	700	0.03	0.6	14,000	600	0.02	0.5	10,000	400	0.01	0.4
	8	18,000	800	0.04	0.7	16,000	600	0.02	0.6	12,000	500	0.01	0.5	8,000	340	0.007	0.4
	10	16,000	600	0.03	0.7	12,000	500	0.02	0.6	10,000	430	0.01	0.5	8,000	300	0.005	0.4
	12	14,000	600	0.02	0.7	10,000	500	0.01	0.6	9,000	400	0.007	0.5	7,000	250	0.005	0.4
	16	12,000	400	0.018	0.7	9,000	300	0.01	0.6	8,000	260	0.005	0.5	6,000	180	0.003	0.4
1.4	6	22,000	1,000	0.06	0.8	20,000	800	0.04	0.7	18,000	700	0.03	0.56	12,000	450	0.02	0.42
	12	16,000	700	0.03	0.8	13,000	500	0.01	0.7	11,000	400	0.007	0.56	8,000	280	0.005	0.42
1.5	4	23,000	1,200	0.07	0.9	20,000	900	0.05	0.75	18,000	800	0.04	0.6	14,000	600	0.03	0.45
	6	23,000	1,000	0.06	0.9	20,000	800	0.04	0.75	18,000	700	0.03	0.6	14,000	500	0.02	0.45
	8	20,000	900	0.06	0.9	18,000	600	0.03	0.75	14,000	600	0.03	0.6	10,000	380	0.01	0.45
	10	20,000	800	0.04	0.9	16,000	500	0.03	0.75	14,000	500	0.02	0.6	10,000	350	0.01	0.45
	12	16,000	700	0.04	0.9	14,000	500	0.02	0.75	12,000	430	0.02	0.6	8,000	310	0.007	0.45
	14	14,000	600	0.03	0.9	12,000	400	0.02	0.75	10,000	380	0.01	0.6	7,500	250	0.007	0.45
	16	12,000	500	0.02	0.9	10,000	360	0.01	0.75	9,000	300	0.007	0.6	6,800	200	0.005	0.45
	18	10,000	400	0.02	0.9	9,000	330	0.008	0.75	8,000	260	0.005	0.6	6,000	170	0.004	0.45
	20	9,000	320	0.014	0.9	8,000	280	0.005	0.75	7,000	200	0.004	0.6	5,500	150	0.003	0.45
	25	8,000	250	0.01	0.9	7,000	200	0.004	0.75	6,000	150	0.003	0.6	4,500	100	0.002	0.45
	30	7,000	200	0.005	0.9	6,000	150	0.003	0.75	5,000	110	0.002	0.6	4,000	80	0.002	0.45
	35	6,000	150	0.003	0.9	5,000	110	0.002	0.75	4,500	90	0.002	0.6	3,500	60	0.002	0.45
1.6	6	22,000	1,000	0.06	0.96	19,000	850	0.04	0.8	17,000	750	0.03	0.64	13,000	600	0.025	0.48
	8	20,000	900	0.06	0.96	17,000	750	0.03	0.8	14,000	600	0.03	0.64	10,000	430	0.015	0.48

切削参数参考表
Recommended Milling Conditions

加工材料 Work Material		碳素钢・调质钢 Carbon Steels・Prehardened Steels S50C・NAK55・NAK80・HPM1 (～43HRC)				高硬度钢 Hardened Steels HPM38・STAVAX・SKD61 (～55HRC)				高硬度钢 Hardened Steels SKD11・PD613 (～62HRC)				高速钢 High Speed Steels SKH (～65HRC)			
外径 Dia.	颈长 Under Neck Length	主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut		主轴转速 Spindle Speed	进给速度 Feed	切深量 Depth of Cut	
		min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm	min^{-1}	mm/min	ap mm	ae mm
1.8	6	20,000	1,000	0.07	1	18,000	900	0.05	0.9	15,000	750	0.04	0.7	12,000	600	0.03	0.5
	8	18,000	900	0.06	1	16,000	800	0.04	0.9	12,000	600	0.03	0.7	9,500	500	0.02	0.5
	10	16,000	800	0.06	1	14,000	700	0.04	0.9	12,000	500	0.03	0.7	9,500	450	0.02	0.5
	12	14,000	700	0.05	1	12,000	600	0.03	0.9	10,000	500	0.02	0.7	8,200	400	0.01	0.5
	14	14,000	700	0.05	1	12,000	600	0.03	0.9	10,000	430	0.02	0.7	8,200	360	0.01	0.5
	16	12,000	600	0.04	1	10,000	500	0.02	0.9	9,200	400	0.01	0.7	7,500	340	0.007	0.5
	18	10,000	500	0.04	1	9,200	410	0.02	0.9	8,500	370	0.01	0.7	6,000	320	0.007	0.5
2	4	20,000	1,200	0.1	1.2	18,000	1,000	0.08	1	15,000	800	0.06	0.8	12,000	600	0.04	0.6
	6	20,000	1,000	0.08	1.2	18,000	900	0.06	1	15,000	750	0.05	0.8	12,000	600	0.03	0.6
	8	18,000	900	0.07	1.2	16,000	800	0.05	1	12,000	600	0.04	0.8	9,500	500	0.02	0.6
	10	16,000	800	0.06	1.2	14,000	700	0.05	1	12,000	500	0.04	0.8	9,500	450	0.02	0.6
	12	14,000	700	0.05	1.2	12,000	600	0.04	1	10,000	500	0.03	0.8	8,200	400	0.01	0.6
	14	14,000	700	0.04	1.2	12,000	600	0.03	1	10,000	430	0.02	0.8	8,200	360	0.007	0.6
	16	12,000	600	0.04	1.2	10,000	500	0.03	1	9,200	400	0.02	0.8	7,500	340	0.007	0.6
	18	10,000	500	0.03	1.2	9,200	410	0.02	1	8,500	370	0.01	0.8	6,000	320	0.005	0.6
	20	10,000	400	0.03	1.2	9,200	380	0.02	1	8,500	340	0.01	0.8	6,000	260	0.005	0.6
	25	9,000	350	0.02	1.2	8,500	330	0.015	1	8,000	300	0.008	0.8	5,000	180	0.004	0.6
	30	8,000	300	0.015	1.2	7,500	280	0.01	1	7,000	250	0.006	0.8	4,500	150	0.004	0.6
	35	7,000	250	0.012	1.2	6,500	230	0.008	1	6,000	200	0.005	0.8	4,000	120	0.003	0.6
	40	6,000	200	0.008	1.2	5,500	180	0.005	1	5,000	150	0.004	0.8	3,500	100	0.003	0.6
	50	5,000	120	0.005	1.2	4,500	100	0.004	1	4,000	80	0.003	0.8	3,000	55	0.002	0.6
2.5	8	16,000	1,000	0.08	1.5	14,000	800	0.07	1.25	10,000	700	0.05	1	8,000	500	0.03	0.75
	12	14,000	800	0.07	1.5	12,000	700	0.06	1.25	9,600	600	0.04	1	7,500	480	0.02	0.75
	16	12,000	700	0.06	1.5	10,000	600	0.05	1.25	8,500	500	0.02	1	7,000	400	0.01	0.75
	20	10,000	600	0.06	1.5	8,200	500	0.05	1.25	7,500	500	0.02	1	5,000	400	0.01	0.75
	30	8,000	400	0.03	1.5	7,000	300	0.025	1.25	6,000	250	0.015	1	4,000	150	0.008	0.75
	40	6,000	250	0.015	1.5	5,500	200	0.012	1.25	5,000	180	0.01	1	3,500	110	0.005	0.75
	50	5,000	150	0.01	1.5	4,500	120	0.008	1.25	4,000	100	0.005	1	3,000	70	0.004	0.75
3	8	16,000	1,000	0.15	1.8	14,000	900	0.1	1.5	10,000	800	0.07	1.2	8,000	600	0.05	0.9
	12	14,000	900	0.1	1.8	12,000	800	0.08	1.5	9,200	700	0.06	1.2	7,200	500	0.04	0.9
	16	12,000	800	0.08	1.8	10,000	700	0.07	1.5	8,500	600	0.05	1.2	6,500	400	0.03	0.9
	20	10,000	800	0.08	1.8	9,000	700	0.07	1.5	7,800	600	0.04	1.2	5,800	400	0.02	0.9
	25	9,000	700	0.07	1.8	8,200	600	0.06	1.5	7,000	500	0.03	1.2	5,000	360	0.01	0.9
	30	8,000	700	0.05	1.8	7,000	600	0.03	1.5	6,500	500	0.02	1.2	4,500	330	0.007	0.9

备 注 Notes

※1 本切削参数仅供参考。请根据实际的加工形状和所使用的机床等调整切削参数。
※2 切深量的ap表示轴向切深量，ae表示径向切深量。
※3 切削高硬度钢时，建议使用油雾冷却方式。
※4 轴向进刀建议采用螺旋进刀及倾斜进刀方式。
※5 L(颈长)/D(外径)超过8倍时，立面附近的进给速度须调整至50%以下，切深量：ae调整至30%以下。
※6 沟槽切削时建议参考切削参数表，切深量ap及进给速度设定为50%以下，并采用来回切削加工方式。
※7 发生振刀时，请以相同的比率降低主轴转速和进给速度。此外，主轴转速过低时，也以相同的比率降低。
※8 L(颈长)/D(外径)为5倍以上时，建议先使用颈长较短的刀具切削初期定位槽。
※9 ϕ0.5以下或L(颈长)/D(外径)为15倍以上时，根据加工形状及使用机床等，有时必须对加工参数进行大幅调整。

※1 These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.
※2 ap:Axial Depth of Cut, ae:Radial Depth of Cut.
※3 Recommend to use oil mist coolant for machining hardened steel.
※4 Recommend to apply herical or ramping for approaching into axial direction.
※5 Adjust feed rate 50% lower and cutting depth(ae) 30% lower for milling deep wall area. When L/D exceeds 8 for stable milling.
※6 For slotting, recommend reciprocating milling by adjusting feed & ap in below 50% of recommended milling condition.
※7 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.
※8 Recommend guide slotting process with short neck tool before milling with L/D 5 time or longer neck tool.
※9 Major adjustment of milling conditions appropriately on milling profile, machine tool and etc. required for the tools smaller than Dia. 0.5mm, or L/D 15 times longer.

P 调质钢 Prehardened Steel ◎
H ～52高硬度钢 HRC Hardened Steel ◎
H ～60高硬度钢 HRC Hardened Steel ◎
H ～65高硬度钢 HRC Hardened Steel ○
M 不锈钢 Stainless Steel ○
S 钛合金 耐热合金 Titanium Alloy Heat Resistant Alloy ○

常规系列
无限白金涂层
长颈造型
Regular Line
MUGEN PREMIUM
Long Neck Type