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创鑫激光连续激光器切割参数数据库

MAX laser continuous laser cutting parameters databases

（功率 1000-30000W 连续激光器 Power 1000-30000W continuous laser）

编号 No.	版本 Version	生效日期 Effective date	修订章节及简要内容 Revised chapter and brief content
1	1.0	2020.7.1	发行第一版参数 Release the first version parameters
2	1.1	2022.9.22	更新 6000,12000，30000 参数 Updated parameters 6000,12000,30000
3	1.2	2022.10.28	增加英文字段 Add English fields

目录

单模块 MFSC-1000X-50um 切割数据

Single Module MFSC-1000X-50UM Cutting Data

一、单模块 MFSC-1000X 切割数据 Single Module MFSC-1000X Cutting Data

1.1 创鑫 MFSC-1000X QBH 输出纤芯 50μm 切割数据(准直 100mm/聚焦 125mm)Max MFSC-1000X QBH Output Fiber Core 50μm Cutting Data(Collimation 100mm/ Focus 125mm)

MFSC-1000X 连续激光器（50μm） MFSC-1000X Continuous Laser (50μm)								
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point(mm)	切割高度 Cutting Height(mm)
碳钢 Carbon Steel	0.8	18-20	1000	N2/ Air	11	2.0 单 Single	0	0.6
	1	10-15			11	2.0 单 Single	0	0.6
	2	4-5	1000	O2	1.5	1.0 双 Double	+3	0.6
	3	2.5-3.2			0.6	1.0 双 Double	+4	0.6
	4	2.3-2.8			0.6	1.0 双 Double	+4	0.6
	5	1.8-2.1			0.6	1.0 双 Double	+5	0.6
	6	1.2-1.5			0.6	1.0 双 Double	+6	0.6
	8	1-1.1			0.6	1.5 双 Double	+5.5	1.5
	10	0.7-0.9			0.6	1.5 双 Double	+5	1.5
不锈钢 Stainless Steel	0.8	18-22	1000	N2	10	2.0 单 Single	0	0.5
	1	13-18			12	2.0 单 Single	0	0.5
	2	4-6			12	2.0 单	-1	0.5

						Single		
	3	2.5-3			12	3.0 单 Single	-1.5	0.5
	4	1-1.5			14	3.0 单 Single	-2	0.5
	5	0.6-0.8			16	3.0 单 Single	-3	0.5
铝合金 Aluminium Alloy	0.8	18-20	1000	N2	10	2.0 单 Single	0	0.8
	1	10-15			12	2.0 单 Single	0	0.5
	2	4-5			14	2.0 单 Single	-1	0.5
	3	1-1.5			16	2.0 单 Single	-1.5	0.5
黄铜 Brass	1	8.0-10	1000	N2	10	2.0 单 Single	0	0.5
	2	2.0-2.5			14	2.0 单 Single	-1	0.5
	3	0.8-1.0			16	3.0 单 Single	-1.5	0.5

备注：实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。

Note: The actual batch cutting, affected by machine tools, systems, cutting head, air pressure, materials and other factors, the data may be changed, the red mark parameters in the table are proofing parameters, in the actual processing is greatly affected by various factors, only suitable for small batch production, mass production and processing is not recommended, it is recommended to use higher power laser.

1. 2 单模块 MFSC-1000X 纤芯 50μm 穿孔参考 Single module MFSC-1000X fiber core 50μm perforation reference

创鑫 MFSC-1000X 10mm 碳钢氧气穿孔参数（仅供参考）MAX MFSC-1000X 10mm carbon steel oxygen perforation parameters (only for reference)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles	气压 Air Pressure	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)

				Height (mm)	(bar)			
高位 High-position	1000	45	100	15	1	-2	100	
中位 Middle-position	1000	45	100	12	0.6	-4	600	
低位 Low-position	1000	40	100	8	0.6	-6	2500	

创鑫 MFSC-1000X 5mm 不锈钢氮气穿孔参数（仅供参考）MAX MFSC-1000X 5mm stainless steel nitrogen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	1000	55	1000	15	10	-2	100	
中位 Middle-position	1000	50	1000	12	10	-4	500	
低位 Low-position	1000	45	1000	8	10	-6	1000	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, with the highest piercings being the first, and so on.

单模块 MFSC-1500X-50um 切割数据

Single module MFSC-1500X-50um cutting data

二、单模块 MFSC-1500X 切割数据 Single module MFSC-1500X cutting data

2.1 创鑫单模块 MFSC-1500X QBH 输出纤芯 50μm 切割数据（准直 100mm/聚焦 125mm）MAX Single module MFSC-1500X QBH output core 50μm cutting data (collimation 100mm/ focus 125mm)

MFSC-1500X 连续激光器（50μm）MFSC-1500X Continues Laser(50μm)								
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)
碳钢 Carbon Steel	1	22-25	1500	N2/ Air	10	2.0 单 Single	0	0.6
	2	4-5	1500	O2	1.5	1.0 双 Double	+5	0.6
	3	3-4			0.6	1.0 双 Double	+5	0.6
	4	2.3-2.8			0.6	1.0 双 Double	+5	0.6
	5	1.8-2.3			0.6	1.0 双 Double	+5	0.6
	6	1.6-2.0			0.6	1.0 双 Double	+5	0.6
	8	1.2-1.5			0.8	4.0 双 Double	+2	1.5
	10	0.9-1.2			0.8	4.0 双 Double	+2	1.5
	12	0.8			0.8	4.0 双 Double	+2	1.5
	14	0.65			0.8	4.0 双 Double	+2.5	1.5
	16	0.5			0.8	4.0 双 Double	+3	1.5
不锈钢 Stainless Steel	1	20-35	1500	N_2	10	2.0 单 Single	0	0.5
	2	8-10			10	2.0 单 Single	-1	0.5

	3	4.5-5.5			12	3.0 单 Single	-1.5	0.5
	5	1.5-2.0			15	3.0 单 Single	-5	0.5
	6	0.7-0.9			15	4.0 单 Single	-5	0.5
铝合金 Aluminium Alloy	1	15-18	1500	N_2	10	2.0 单 Single	0	0.5
	2	4.0-5.0			12	2.0 单 Single	-1	0.5
	3	1.5-2.5			14	2.5 单 Single	-1.5	0.5
	4	1.0-1.3			14	3.0 单 Single	-2.5	0.5
黄铜 Brass	1	12-15	1500	N_2	10	3.0 单 Single	0	0.5
	2	4.0-5.0			10	3.0 单 Single	-1	0.5
	3	1.5-2.0			10	3.0 单 Single	-1	0.5

备注：实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。

Note: the actual batch cutting, affected by machine tools, systems, cutting head, air pressure, materials and other factors, the data may be changed, the red mark parameters in the table are proofing parameters, in the actual processing is greatly affected by various factors, only suitable for small batch production, mass production and processing is not recommended, it is recommended to use higher power laser.

2.2 单模块 MFSC-1500X 纤芯 50μm 穿孔参考 Single module MFSC-1500X fiber core 50μm perforation reference

创鑫 MFSC-1500X 16mm 碳钢氧气穿孔参数（仅供参考）MAX MFSC-1500X 16mm carbon steel oxygen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)

高位 High-position	1000	55	100	15	1	-2	200	
中位 Middle-position	1000	45	100	12	0.6	-4	800	
低位 Low-position	1000	40	100	8	0.6	-6	2000	

创鑫 MFSC-1500X 6mm 不锈钢氮气穿孔参数（仅供参考）Nitrogen perforation parameters of MAX MFSC-1500X 6mm stainless steel (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	1000	55	2500	15	10	-2	200	
中位 Middle-position	1000	50	2000	12	10	-4	600	
低位 Low-position	1000	45	2000	8	10	-6	800	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, with the highest piercings being the first, and so on.

单模块 MFSC-2000X-50um 切割数据

Single module MFSC-2000X-50um cutting data

三、单模块 MFSC-2000X 切割数据　Single module MFSC-2000X-50um cutting data

3.1 创鑫单模块 MFSC-2000X QBH 输出纤芯 50μm 切割数据（准直 100mm/聚焦 125mm）Single module MFSC-2000X QBH output fiber core 50μm cutting data (collimation 100mm/ focus 125mm)

MFSC-2000X 连续激光器（50μm） MFSC-2000X Continuous Laser (50μm)								
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	喷高 Height of blowout (mm)
碳钢 Carbon Steel	1	25-30	2000	N2/ Air	10	2.0 单 Single	0	0.6
	2	6-8			10	2.0 单 Single	-1	0.5
	2	5-6	2000	O2	1.5	1.0 双 Single	+3	0.6
	3	3-4			0.8	1.0 双 Single	+4	0.6
	4	2.5-3.0			0.8	1.0 双 Single	+4	0.6
	5	2.2-2.6			0.6	1.0 双 Double	+5	0.6
	6	1.8-2.0			0.6	1.0 双 Double	+6	0.8
	8	1.2-1.6			0.6	1.2 双 Double	+5.5	0.8
	10	1.0-1.2			0.6	1.2 双 Double	+5	0.8
	12	0.8-1.0			0.6	4.0 双 Double	+4	1.0
	14	0.7-0.85			0.6	4.0 双 Double	+4	1.0
	16	0.6-0.7			0.6	4.0 双 Double	+4	1.0
	18	0.5-0.6			0.6	5.0 双 Double	+4	1.0
	20	0.4-0.5			0.6	5.0 双 Double	+4	1.0
不锈钢	1	28-35			10	2.0 单 Single	0	0.5

Stainless Steel	2	9.0-15	2000	N2	10	2.0 单 Single	-1	0.5
	3	6.0-7.0			12	3.0 单 Single	-1.5	0.5
	4	2.8-3.5			14	3.0 单 Single	-2	0.5
	5	1.5-2.5			15	3.0 单 Single	-3	0.5
	6	1.0-1.5			16	3.5 单 Single	-4	0.5
	8	0.7-0.9			18	4.0 单 Single	-5	0.5
铝合金 Aluminium Alloy	1	22-35	2000	N2	12	2.0 单 Single	0	0.5
	2	8.0-13			12	2.0 单 Single	-0.5	0.5
	3	4.0-4.5			14	3.0 单 Single	-1	0.5
	4	2.5-3.0			15	3.0 单 Single	-2	0.5
	5	1.5-2.0			16	3.0 单 Single	-3	0.5
	6	0.8-1.3			16	3.5 单 Single	-4	0.5
黄铜 Brass	1	15-18	2000	N2	10	2.0 单 Single	0	0.8
	2	6.0-8.0			10	2.0 单 Single	-1	0.5
	3	2.5-3.0			12	3.0 单 Single	-1.5	0.5
	4	1.0-1.3			13	3.0 单 Single	-2	0.5
	5	0.7-0.8			14	3.5 单 Single	-2.5	0.5
紫铜 Copper	1	20-22	2000	O2	12	3.0 单 Single	-1	0.5

	2	5.5-6.5			12	3.0 单	-1	0.5
	3	2.0-3.0			14	3.0 单 Single	-2	0.5

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

3.2 单模块 MFSC-2000X 纤芯 50μm 穿孔推荐 Single module MFSC-2000X fiber core 50μm perforation reference

3.2.1 创鑫 MFSC-2000X 20mm 碳钢氧气穿孔参数（仅供参考）MAX MFSC-2000X 20mm carbon steel oxygen perforation parameters (for reference only)

阶段 Stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	2000	55	100	20	0.8	-2	200	
中位 Middle-position	2000	45	100	15	0.7	-4	1000	
低位 Low-position	2000	55	100	8	0.6	-6	2000	

3.2.2 创鑫 MFSC-2000X 8mm 不锈钢氮气穿孔参数（仅供参考）Nitrogen perforation parameters of MAX MFSC-2000X 8mm stainless steel (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	2000	55	2500	16	10	-2	200	
中位 Middle-position	2000	50	2500	12	10	-4	1000	
低位 Low-position	2000	40	2000	8	10	-6	500	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

单模块 MFSC-3000X-50um 切割数据

Single module MFSC-3000X-50um Cutting data

四、单模块 MFSC-3000X 切割数据 Single module MFSC-3000X cutting data

4.1 创鑫 MFSC-3000X QBH 输出纤芯 50μm 切割数据（准直 100mm/聚焦 125mm）MAX MFSC-3000X QBH output core 50μm cutting data (collimation 100mm/ focus 125mm)

MFSC-3000X 连续激光器（50μm）MFSC-3000X continues laser(50μm)								
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height(mm)
碳钢 Carbon Steel	1	35-40	3000	N2/ Air	10	2.0 单 Single	0	0.6
	2	20-25			10	2.0 单 Single	-1	0.6
	2	5.0-6.0	3000	O2	1.5	1.0 双	+3	0.6

						Double		
	3	3.5-4.5	3000		0.8	1.0 双 Double	+4	0.6
	4	3.2-4.0	3000		0.8	1.0 双 Double	+5	0.6
	5	3.0-3.5	3000		0.8	1.0 双 Double	+6	0.6
	6	2.5-3.0	3000		0.8	1.0 双 Double	+7	0.6
	8	2.0-2.3	3000		0.8	1.2 双 Double	+7	0.6
	10	1.4-1.8	3000		0.8	1.2 双 Double	+5	0.6
	12	1.2-1.4	3000		0.8	4.0 双 Double	+4	0.6
	14	0.8-0.9	2600		0.8	4.0 双 Double	+4	1.0
	16	0.7-0.9	2600		0.6	4.0 双 Double	+4	1.0
	18	0.65-0.75	2400		0.6	4.0 双 Double	+4	1.0
	20	0.6-0.7	2400		0.6	5.0 双 Double	+4.5	1.0
	22	0.5-0.6	2400		0.6	5.0 双 DOuble	+4.5	1.0
不锈钢 Stainless Steel	1	45-55	3000	N2	10	2.0 单 Single	0	0.5
	2	24-28			10	2.0 单 Single	-0.5	0.5
	3	8-13			12	3.0 单 Single	-1	0.5
	4	5-6			14	3.0 单 Single	-1.5	0.5
	5	3-4			15	3.0 单 Single	-3	0.5
	6	2.3-3.0			16	3.0 单	-4	0.5

						Single		
	8	1.0-1.5			16	4.0 单 Single	-5	0.5
	10	0.8-1.0			18	4.0 单 Single	-7	0.5
铝合金 Aluminium Alloy	1	40-50	3000	N2	10	2.0 单 Single	0	0.6
	2	15-20			10	2.0 单 Single	-0.5	0.5
	3	8-10			12	3.0 单 Single	-1	0.5
	4	4-5			14	3.0 单 Single	-2	0.5
	5	2.5-3.5			16	3.0 单 Single	-3	0.5
	6	2.0-2.3			16	3.0 单 Single	-4	0.5
	8	0.8-1.3			16	3.5 单 Single	-5	0.5
黄铜 Brass	1	25-28	3000	N2	10	2.0 单 Single	0	0.5
	2	13-15			10	2.0 单 Single	-1	0.5
	3	5.0-6.0			12	3.0 单 Single	-1	0.5
	4	2.5-3.0			12	3.0 单 Single	-2	0.5
	5	1.8-2.3			13	3.5 单 Single	-2.5	0.5
	6	1.0-1.3			14	4.5 单 Single	-3	0.5
紫铜 Copper	1	25-28	3000	O2	12	3.0 单 Single	-1	0.5
	2	8.0-10			12	3.0 单 Single	-1	0.5
	3	3.0-4.5			13	3.0 单	-2	0.5

						Single		
	4	2.0-2.5			14	3.5 单 Single	-4	0.5

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

4.2 单模块 MFSC-3000X QBH 输出纤芯 50μm 穿孔推荐 single module MFSC-3000X QBH output fiber core 50μm perforation reference

4.2.1 创鑫 MFSC-3000X 22mm 碳钢氧气穿孔参数（仅供参考）MAX MFSC-3000X 22mm carbon steel oxygen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	3000	45	200	20	0.8	-4	200	
中位 Middle-position	3000	45	150	12	0.7	-6	3000	
低位 Low-position	3000	55	150	8	0.6	-8	2000	

4.2.2 创鑫 MFSC-3000X 10mm 不锈钢氮气穿孔参数（仅供参考）MAX MFSC-3000X 10mm stainless steel nitrogen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	3000	55	2500	20	10	-4	150	
中位 Middle-position	3000	45	2500	12	10	-6	1000	
低位 Low-position	3000	45	2000	8	10	-8	500	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

单模块 MFSC-4000X-50um 切割数据

Single module MFSC-4000X-50UM cutting data

五、单模块 MFSC-4000X 切割数据 Single module MFSC-4000X cutting data

5.1 MFSC-4000X QBH 输出纤芯 50μm 切割数据（准直 100mm/聚焦 150mm）MFSC-4000X QBH output core 50μm cutting data (collimation 100mm/ focus 150mm)

MFSC-4000X 连续激光器（50μm）MFSC-4000X continues laser(50μm)									
材料 Material	厚度 thickness (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	1	40-50	4000	N2/ Air	10	2.0 单 Single	0	0.6	
	2	15-20	4000		10	2.0 单 Single	-1	0.6	
	3	10-12	4000		10	2.0 单	-1	0.6	

						Single			
	3	4.0-4.5	2500		0.6	1.0 双 Double	+4	0.6	
	4	3.5-4.0	3000		0.6	1.0 双 Double	+5	0.6	
	5	3.0-3.5	3300		0.6	1.0 双 Double	+5	0.6	
	6	2.6-3.2	3500		0.6	1.0 双 Double	+6	0.6	
	8	2.0-2.3	4000		0.6	1.2 双 Double	+6	0.8	
	10	1.8-2.5	4000		0.6	1.2 双 Double	+6	0.8	
	12	1.5-1.7	2600	O2	0.8	4.0 双 Double	+5	1.0	
	14	1.2-1.4	2600		0.8	4.0 双 Double	+5	1.0	
	16	1.0-1.2	2600		0.7	4.0 双 Double	+5	1.0	
	18	0.7-0.8	2600		0.7	4.0 双 Double	+5	1.5	
	20	0.6-0.7	2600		0.7	4.0 双 Double	+5	1.5	
	22	0.5-0.6	2600		0.6	5.0 双 Double	+5	1.5	
	25	0.4-0.5	2600		0.6	5.0 双 Double	+5	1.5	
不锈钢 Stainless Steel	1	50-60			10	2.0 单 Single	0	0.5	
	2	20-25			10	2.0 单 Single	-1	0.5	
	3	10-13			12	3.0 单 Single	-1.5	0.5	
	4	8-10			13	3.0 单 Single	-2	0.5	
	5	4-5			14	3.0 单	-2	0.5	

			4000	N2		Single			
	6	3.5-4.0			15	3.0 单 Single	-2	0.5	
	8	1.5-2.0			16	4.0 单 Single	-3	0.5	
	10	1.2-1.5			18	4.0 单 Single	-4	0.5	
	12	0.7-1.0			18	5.0 单 Single	-5	0.5	
	14	0.6-0.8			18	5.0 单 Single	-8	0.5	
	16	0.3-0.5			20	5.0 单 Single	-8	0.5	
铝合金 Aluminium Alloy	1	30-50	4000	N2	10	2.0 单 Single	0	0.6	
	2	20-24			12	2.0 单 Single	0	0.6	
	3	10-13			14	3.0 单 Single	-1	0.6	
	4	4-5			14	3.0 单 Single	-2	0.5	
	5	3-4			15	3.0 单 Single	-3	0.5	
	6	2-3			15	3.0 单 Single	-3	0.5	
	8	1.4-1.8			16	4.0 单 Single	-3	0.5	
	10	0.8-1.1			16	4.0 单 Single	-5	0.5	
	12	0.6-0.8			18	5.0 单 Single	-5.5	0.5	
黄铜 Brass	1	30-35	4000	N2	10	2.0 单 Single	0	0.5	
	2	15-20			10	2.0 单 Single	-1	0.5	
	3	8-10			12	3.0 单	-1	0.5	

						Single			
	4	5.0-6.0			13	3.0 单 Single	-2	0.5	
	5	2.0-3.0			13	3.5 单 Single	-2.5	0.5	
	6	2.0-2.5			14	3.5 单 Single	-3	0.5	
	8	1.0-1.2			14	4.5 单 Single	-3.5	0.5	
紫铜 Copper	1	26-30	4000	O2	10	3.0 单 Single	-1	0.5	
	2	10-13			12	3.0 单 Single	-1	0.5	
	3	5.5-6.5			12	3.0 单 Single	-2	0.5	
	4	2.0-3.0			14	3.5 单 Single	-4	0.5	

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

5.2 单模块 MFSC-4000M QBH 输出纤芯 50μm 穿孔参考 Single module MFSC-4000M QBH output fiber core 50μm perforation reference

5.2.1 创鑫 MFSC-4000M 25mm 碳钢穿孔参数（仅供参考）MAX MFSC-4000M 25mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio	频率 Frequency	喷嘴高度 Nozzles Height	气压 Air Press	焦点 Focus Point	穿孔时间 Aperture Time	停光吹气 Stop blowing

		(%)	(Hz)	(mm)	ure (bar)	(mm)	(ms)	(ms)
高位 High-position	4000	45	200	20	0.6	-4	200	
中位 Middle-position	4000	45	200	12	0.6	-6	1500	
低位 Low-position	4000	50	200	8	0.6	-10	1000	

5.2.2 创鑫 MFSC-4000M 12mm 不锈钢氮气穿孔参数（仅供参考）Nitrogen perforation parameters of MAX MFSC-4000M 12mm stainless steel (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	4000	55	3000	20	10	-2	200	
中位 Middle-position	4000	50	2500	15	10	-4	1500	
低位 Low-position	4000	45	1000	10	10	-8	500	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

多模块 MFMC-6000W-100um 切割数据

Multi-module MFMC-6000W-100um cutting data

六、多模块 MFMC-6000W 切割数据 Multi-module MFMC-6000W-100um cutting data

6.1 创鑫 MFMC-6000W 一体化 QBH 输出纤芯 100μm 切割数据（准直 100mm/聚焦 150mm）MAX MFMC-6000W integrated QBH output core 100μm cutting data (collimation 100mm/ focus 150mm)

MFMC-6000W 连续激光器（100μm）MFMC-6000W continues laser(100μm)									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	1	50-55	6000	N2/ Air	10	2.0 单 Single	0	0.6	1
	2	25-31			12	2.0 单 Single	-0.5	0.5	
	3	15-20			14	3.0 单 Single	-1.5	0.5	
	4	8-10			14	3.0 单 Single	-3	0.5	
	5	6-7			16	3.5 单 Single	-3.5	0.5	
	6	4.5-5			18	3.5 单 Single	-4	0.5	
	3	3.6-4.2	3000	O2	0.6	1.0 双 Double	+6.5	0.6	2
	4	3.3-3.8	3000		0.6	1.0 双 Double	+6.5	0.6	
	5	3-3.5	3500		0.6	1.0 双 Double	+6	0.6	
	6	2.5-3.0	4000		0.6	1.0 双 Double	+6	0.6	
	8	2.2-2.7	5000		0.6	1.2 双 Double	+6	0.6	
	10	2.0-2.4	6000		0.6	1.2 双 Double	+7	0.6	
	12	1.8-2.1	6000		0.6	1.2 双	+9	0.6	

							Double		
	14	1.4-1.7	6000		0.5	1.4 双 Double	+12	0.6	
	16	0.9-1.2	2200		0.5	5.0 双 Double	+3.5	0.6	
	18	0.7-1.0	2200		0.5	5.0 双 Double	+3.5	1.5	
	20	0.6-0.8	2300		0.5	5.0 双 Double	+3.5	1.5	
	22	0.55-0.65	2400		0.5	5.0 双 Double	+3.5	1.5	
	25	0.4-0.6	6000		0.85	1.6 单 Single	13	0.4	
不锈钢 Stainless Steel	1	55-60	6000	N2	10	2.0 单 Single	0	0.6	
	2	28-31			12	2.0 单 Single	0	0.5	
	3	18-21			12	3.0 单 Single	-0.5	0.5	
	4	12-14			12	3.0 单 Single	-1	0.5	
	5	7-9			14	3.0 单 Single	-1.5	0.5	
	6	4-5			14	4.0 单 Single	-2	0.5	
	8	3.0-3.8			16	4.0 单 Single	-4	0.5	
	10	2-2.2			16	4.5 单 Single	-7.5	0.5	
	12	1.2-1.5			16	4.5 单 Single	-8	0.5	
	14	1.0-1.2			16	4.5 单 Single	-10	0.5	
	16	0.8-0.9			18	4.5 单 Single	-11.5	0.5	
	18	0.7-0.8			18	5.0 单	-12.5	0.5	

						Single			
	20	0.6-0.7			18	5.0 单 Single	-13	0.5	
	22	0.4-0.5			20	6.0 单 Single	-13	0.5	
	25	0.1-0.2			25	6.0 单 Single	5	0.5	
铝合金 Aluminium Alloy	1	55-60	6000	N2	10	2.0 单 Single	0	0.6	
	2	25-28			10	2.0 单 Single	-0.5	0.5	
	3	14-16			14	3.0 单 Single	-1	0.5	
	4	10-12			14	3.0 单 Single	-1.5	0.5	
	5	6-8			15	3.0 单 Single	-2	0.5	
	6	3.5-4			16	4.0 单 Single	-2.5	0.5	
	8	2.5-3.0			16	4.0 单 Single	-2.5	0.5	
	10	2.0-2.5			18	4.0 单 Single	-3	0.5	
	12	1.0-1.5			18	4.0 单 Single	-4	0.5	
	14	0.9-1.1			20	5.0 单 Single	-5	0.5	
	16	0.8-0.9			20	5.0 单 Single	-7	0.5	
	18	0.7-0.8			25	5.0 单 Single	-9	0.5	
	20	0.5-0.7			25	5.0 单 Single	-10	0.5	
黄铜 Brass	1	40-50	6000	N2	10	2.0 单 Single	0	0.6	
	2	20-25			12	2.0 单	-0.5	0.5	

						Single		
	3	8.0-10			12	3.0 单 Single	-1	0.5
	4	6.0-7.0			14	3.0 单 Single	-1.5	0.5
	5	5.5-6.5			14	4.0 单 Single	-2	0.5
	6	3.0-4.0			16	4.0 单 Single	-2	0.5
	8	2.5-3.0			16	4.0 单 Single	-3	0.5
	10	2.0-2.2			16	4.0 单 Single	-3	0.5
	12	1.0-1.3			18	5.0 单 Single	-7	0.5
	16	0.8-1.0			18	5.0 单 Single	-8	0.5
	20	0.1-0.2			20	5.0 单 Single	-10	0.5
紫铜 Copper	1	28-32	6000	O2	10	3.0 单 Single	-1	0.5
	2	11-14			10	3.0 单 Single	-1	0.5
	3	6.0-8.0			12	3.5 单 Single	-2	0.5
	4	5.5-6.5			12	3.5 单 Single	-3	0.5
	5	4.5-5.5			13	4.5 单 Single	-3	0.5
	6	2.5-3.5			14	5.0 单 Single	-4	0.5
	8	1.5-2.0			16	5.0 单 Single	-5	0.5

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

6.2 多模块 MFMC-6000W 纤芯 100μm 穿孔参考 Multi module MFMC-6000W 100μm peration reference

6.2.1 创鑫 MFMC-6000W 25mm 碳钢穿孔参数（仅供参考）MAX MFMC-6000W 25mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	6000	50	100	20	0.6	-4	200	
中位 Middle-position	6000	45	100	12	0.6	-6	1500	
低位 Low-position	6000	45	300	8	0.7	-10	1000	

6.2.2 创鑫 MFMC-6000W 20mm 不锈钢氮气穿孔参数（仅供参考）

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	6000	55	3000	20	10	-8	200	
中位 Middle-p	6000	45	2500	12	10	-12	1500	

osition								
低位 Low-position	6000	45	2000	8	10	-16	1000	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

单模块 MFSC-6000W-100um 切割数据

Single module MFSC-6000W-100UM Cutting data

七、单模块 MFSC-6000W 切割数据 Single module MFSC-6000W Cutting data

7.1 MFSC-6000W 一体化 QBH 输出纤芯 100μm 切割数据（准直 100mm/聚焦 150mm）
MFSC-6000W integrated QBH output core 100μm cutting data (collimation 100mm/ focus 150mm)

MFSC-6000W 连续激光器（100μm）MFSC-6000W Continues Laser(100μm)									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	1	50-60	6000	N2/ Air	10	2.0 单 Single	0	0.6	
	2	30-35			12	2.0 单 Single	-0.5	0.5	
	3	20-24			14	3.0 单 SIngle	-1.5	0.5	
	4	15-20			14	3.0 单 Single	-3	0.5	
	5	10-13			16	3.5 单 Single	-3.5	0.5	

	6	7-9			18	3.5 单 Single	-4	0.5	
	3	3.6-4.5	3000		0.6	1.0 双 Double	+6.5	0.6	
	4	3.2-3.5	3000		0.6	1.0 双 Double	+6.5	0.6	
	5	2.6-3.2	3500		0.6	1.0 双 Double	+6	0.6	
	6	2.5-2.8	4000		0.6	1.0 双 Double	+6	0.6	
	8	2.2-2.5	5000		0.6	1.2 双 Double	+6	0.6	
	10	2.0-2.2	6000		0.6	1.2 双 Double	+7	0.6	
	12	1.8-2.0	6000	O2	0.6	1.2 双 Double	+9	0.6	
	14	1.4-1.7	6000		0.5	1.4 双 Double	+12	0.6	
	16	0.9-1.2	2200		0.5	5.0 双 Double	+3.5	0.6	
	18	0.7-1.0	2200		0.5	5.0 双 Double	+3.5	1.5	
	20	0.6-0.8	2300		0.5	5.0 双 Double	+3.5	1.5	
	22	0.55-0.65	2400		0.5	5.0 双 Double	+3.5	1.5	
	25	0.4-0.6	6000		0.85	1.6 单 Single	13	0.4	
不锈钢 Stainless Steel	1	50-60	6000	N2	10	2.0 单 Single	0	0.6	
	2	30-35			12	2.0 单 Single	0	0.5	
	3	20-24			12	3.0 单 Single	-0.5	0.5	
	4	13-16			12	3.0 单 Single	-1	0.5	

	5	9-12			14	3.0 单 Single	-1.5	0.5
	6	6.0-8.5			14	4.0 单 Single	-2	0.5
	8	3.0-4.8			16	4.0 单 Single	-4	0.5
	10	1.8-2.5			16	4.5 单 Single	-7.5	0.5
	12	1.5-1.8			16	4.5 单 Single	-8	0.5
	14	0.8-1.2			16	4.5 单 Single	-10	0.5
	16	0.7-0.95			18	4.5 单 Single	-11.5	0.5
	18	0.6-0.7			18	5.0 单 Single	-12.5	0.5
	20	0.5-0.6			18	5.0 单 Single	-13	0.5
	22	0.4-0.5			20	6.0 单 Single	-13	0.5
	25	0.1-0.2			25	6.0 单 Single	5	0.5
铝合金 Aluminium Alloy	1	60-80	6000	N2	10	2.0 单 Single	0	0.6
	2	30-45			10	2.0 单 Single	-0.5	0.5
	3	20-28			14	3.0 单 Single	-1	0.5
	4	12-15			14	3.0 单 Single	-1.5	0.5
	5	6-8			15	3.0 单 Single	-2	0.5
	6	4-5			16	4.0 单 Single	-2.5	0.5
	8	3.0-3.5			16	4.0 单 Single	-2.5	0.5

	10	2.0-2.5			18	4.0 单 Single	-3	0.5	
	12	1.0-1.3			18	4.0 单 Single	-4	0.5	
	14	0.8-1.1			20	5.0 单 Single	-5	0.5	
	16	0.5-0.8			20	5.0 单 Single	-7	0.5	
	18	0.4-0.6			25	5.0 单 Single	-9	0.5	
	20	0.4-0.55			25	5.0 单 Single	-10	0.5	
黄铜 Brass	1	40-50	6000	N2	10	2.0 单 Single	0	0.6	
	2	20-25			12	2.0 单 Single	-0.5	0.5	
	3	8.0-10			12	3.0 单 Single	-1	0.5	
	4	6.5-7.5			14	3.0 单 Single	-1.5	0.5	
	5	5.5-6.5			14	4.0 单 Single	-2	0.5	
	6	3.5-4.5			16	4.0 单 Single	-2	0.5	
	8	1.5-1.8			16	4.0 单 Single	-3	0.5	
	10	0.8-1			16	4.0 单 Single	-3	0.5	
	12	0.6-0.7			18	5.0 单 Single	-7	0.5	
	16	0.3-0.4			20	5.0 单 Single	-9	0.5	
	20	0.1-0.2			20	5.0 单 Single	-10	0.5	
紫铜 Copper	1	30-35	6000	O2	10	3.0 单 Single	-1	0.5	

	2	12-15			10	3.0 单 Single	-1	0.5
	3	7.0-9.0			12	3.0 单 Single	-2	0.5
	4	6.0-7.0			12	3.5 单 Single	-3	0.5
	5	5.0-6.0			13	4.5 单 Single	-4	0.5
	6	2.5-3.5			14	5.0 单 Single	-5	0.5
	8	1.5-2.0			14	5.0 单 Single	-5	0.5

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

7.2 单模块 MFSC-6000W 纤芯 100μm 穿孔参考 Single module MFSC-6000W 100μm perforation reference

7.2.2 创鑫 MFSC-6000W 25mm 碳钢穿孔参数（仅供参考）MAX MFSC-6000W 25mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位	6000	50	100	20	0.6	-4	200	

High-position								
中位 Middle-position	6000	45	100	12	0.6	-6	1500	
低位 Low-position	6000	45	300	8	0.7	-10	1000	

7.2.2 创鑫 MFSC-6000W 20mm 不锈钢氮气穿孔参数（仅供参考）MAX MFSC-6000W 20mm stainless steel nitrogen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	6000	55	3000	20	10	-8	200	
中位 Middle-position	6000	45	2500	12	10	-12	1500	
低位 Low-position	6000	45	2000	8	10	-16	1000	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

单模块 MFSC-6000W-50um 切割数据

Single Module MFSC-6000W-50um Cutting Data

八、单模块 MFSC-6000W 切割数据 Single Module MFSC-6000W Cutting Data

8.1 MFSC-6000W 一体化 QBH 输出纤芯 50μm 切割数据（准直 100mm/聚焦 200mm）
MFSC-6000W integrated QBH output core 50μm cutting data (collimation 100mm/ focus 200mm)

MFSC-6000W 连续激光器（50μm）MFSC-6000W Continues Laser(50μm)									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure(bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	1	60-80	6000	N2/ Air	8	2.0	0	0.6	1
	2	50-60			8	3.0	-0.5	0.5	
	3	23-28			8	3.0	-1.5	0.5	
	4	17-20			10	3.0	-3	0.5	
	5	10-14			10	3.5	-3.5	0.5	
	6	8-12			12	3.5	-4	0.5	
	3	3.6-4.5	4000	O2	0.6	1.0	+6.5	0.6	2
	4	3.5-4.0	4000		0.6	1.0	+6.5	0.6	
	5	2.8-3.0	4000		0.6	1.0	+6	0.6	
	6	2.6-2.8	4000		0.6	1.0	+6	0.6	
	8	2.2-2.6	5000		0.6	1.2	+6	0.6	
	10	2.0-2.2	6000		0.6	1.2	+7	0.6	
	12	1.8-2.0	6000		0.6	1.2	+9	0.6	
	14	1.4-1.6	6000		0.5	1.4	+12	0.6	
	16	1.0-1.3	6000		0.6	双 1.4	+14	0.3	
	18	0.8-1.1	6000		0.6	单 1.6	+14	0.3	
	20	0.6-1.0	6000		0.6	单 1.6	+15	0.3	
	22	0.55-0.6	6000		0.65	单 1.6	+15	0.3	

		5							
	25	0.5-0.6	6000		0.8	单 1.7	+16	0.3	
	30	0.4-0.5	6000		0.8	单 1.7	+18	0.3	
	35	0.3-0.4	6000		1	单 1.7	+19	0.3	
	40	0.2-0.3	6000		1	单 1.7	+19	0.3	
不锈钢 Stainless Steel	1	50-60	6000	N2	8	2.0	0	0.6	
	2	30-40			8	3.0	0	0.5	
	3	25-30			8	3.0	-1	0.5	
	4	20-21			8	3.0	-2	0.5	
	5	13-15			8	3.0	-1.5	0.5	
	6	10-12			8	4.0	-2	0.5	
	8	7.0-8.0			8	5.0	-4	0.5	
	10	2.5-3.0			16	4.5	-7.5	0.5	
	12	1.5-2.0			16	4.5	-8	0.5	
	14	1.0-1.3			16	4.5	-10	0.5	
	16	0.8-1.0			18	4.5	-11.5	0.5	
	18	0.6-0.7			18	5.0	-12.5	0.5	
	20	0.5-0.65			18	5.0	-13	0.5	
	22	0.4-0.5			20	6.0	-13	0.5	
	25	0.15-0.2			25	6.0	6	0.5	
	35	0.1			25	6.0	6	0.5	
铝合金 Aluminium Alloy	1	60-80	6000	N2	10	2.0	0	0.6	
	2	55-60			10	3.0	-1	0.5	

	3	24-28			10	3.0	-1	0.5
	4	16-19			10	3.0	-1.5	0.5
	5	12-14			10	3.5	-2	0.5
	6	10-12			10	5.0	-2	0.5
	8	3.0-4.0			14	5.0	-3	0.5
	10	2.0-2.5			15	5.0	-3.5	0.5
	12	1.4-1.7			15	5.0	-4	0.5
	14	1.0-1.2			18	5.0	-5（2000/98）	0.5
	16	0.8-1.0			20	5.0	-6（2000/98）	0.5
	18	0.7-0.9			20	5.0	-7（2000/98）	0.5
	20	0.6-0.8			20	5.0	-7（2000/98）	0.5
黄铜 Brass	1	60-80	6000	N2	10	2.0	0	0.6
	2	50-60			10	3.0	0	0.5
	3	25-30			10	3.5	0	0.5
	4	16-20			12	3.5	-1.5	0.5
	5	12-14			14	4.0	-2	0.5
	6	8-10			14	5.0	-2.5	0.5
	8	5.0-7.0			16	4.0	-3	0.5
	10	2.0-2.5			16	4.0	-3	0.5
	12	1.5-1.9			16	5.0	-4.5	0.5

	16	0.5-0.8			20	5.0	-9	0.5	
	20	0.1-0.2			20	5.0	-10	0.5	
紫铜 Copper	1	50-60	6000	O2	10	3.0	-1	0.5	3
	2	30-36			10	3.0	-1	0.5	
	3	15-18			12	3.0	-2	0.5	
	4	8-10			12	3.5	-3	0.5	
	5	6.0-7.0			13	4.5	-4	0.5	
	6	4.0-5.0			14	5.0	-5	0.5	
	8	1.5-1.8			14	5.0	-5	0.5	
	10	0.8-1.2			14	5.0	-6	0.5	

备注 1：碳钢 1-6mm 推荐使用空气或氮气切割，切割速度比用氧气的更快，会有轻微挂渣。备注 2:根据现场气体纯度、板材质量等方面的不同，调试所使用的功率以及调试的速度也会有所不同。备注 3：紫铜需使用高压氧气切割，使用其他气体切割可能会有损坏激光器得风险。备注：表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

8.2 单模块 MFSC-6000W 纤芯 50μm 穿孔参考 Single Module MFSC-6000W 50μm Perforation Reference

8.2.2 创鑫 MFSC-6000W 25mm 碳钢穿孔参数（仅供参考）MAX MFSC-6000W 25mm carbon

steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	6000	50	100	20	0.6	-4	200	
中位 Middle-position	6000	45	100	12	0.6	-6	1500	
低位 Low-position	6000	45	300	8	0.7	-10	1000	

8.2.2 创鑫 MFSC-6000W 20mm 不锈钢氮气穿孔参数（仅供参考）

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	6000	55	3000	20	10	-8	200	
中位 Middle-position	6000	45	2500	12	10	-12	1500	
低位 Low-position	6000	45	2000	8	10	-16	1000	

多模块 MFMC-8000W-100um 切割数据

Multi Mudule MFMC-8000W-100um Cutting Data

九、多模块 MFMC-8000W 切割数据 Multi Mudule MFMC-8000W Cutting Data

9.1 创鑫 MFMC-8000W 一体化 QBH 纤芯 100μm 切割数据（准直 100mm/聚焦 200mm）
MFMC-8000W integrated QBH core 100μm cutting data(collimation 100mm/focus 200mm)

MFMC-8000W 连续激光器（100μm）MFMC-8000W Continues Laser（100μm）									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	1	55-60	8000	N2/ Air	10	2.0 单 Single	0	0.6	1
	2	30-35			12	2.0 单 Single	0	0.5	
	3	20-25			13	3.0 单 Single	-1	0.5	
	4	15-20			15	3.0 单 Single	-1.5	0.5	
	5	10-14			15	3.5 单 Single	-2	0.5	
	6	7-9			16	4.0 单 Single	-3	0.5	
	8	4.5-6.5			16	4.5 单 Single	-4	0.5	
	8	2.3-2.5	4000	O2	0.6	1.2 双 Double	+6	0.6	2
	10	2.0-2.3	5000		0.6	1.2 双 Double	+7	0.6	
	12	1.8-2.1	6000		0.6	1.2 双 Double	+8	0.6	
	14	1.7-1.9	8000		0.6	1.4 双 Double	+9	0.6	
	16	1.5-1.6			0.6	1.4 双 Double	+10	0.6	
	20	1.0-1.3			0.6	1.6 双	+12	0.6	

						Double		
	22	0.6-0.8			0.7	1.6 双 Double	+13	0.7
	25	0.4-0.5			0.7	1.8 双 Double	+14	0.7
	30	0.2-0.3			1.3	1.8 双 Double	+13	1
不锈钢 Stainless Steel	1	55-65	8000	N2	10	2.0 单 Single	0	0.6
	2	35-40			12	2.0 单 Single	0	0.5
	3	24-30			12	3.0 单 Single	0	0.5
	4	15-20			13	3.0 单 Single	-1	0.5
	5	12-16			15	4.0 单 Single	-2	0.5
	6	8-10			15	4.0 单 Single	-2.5	0.5
	8	5-6			16	4.5 单 Single	-3.5	0.5
	10	3.5-5			18	4.5 单 Single	-4.5	0.5
	12	2-3			18	5.0 单 Single	-6	0.5
	14	1.5-2.0			18	5.0 单 Single	-7	0.5
	16	1-1.4			20	5.0 单 Single	-8	0.5
	18	0.9-1.2			22	5.0 单 Single	-9.5	0.5
	20	0.8-0.9			25	5.0 单 Single	-11	0.5
	25	0.3-0.5			25	5.0 单 Single	+8	0.5

铝合金 Aluminium Alloy	1	35-45	8000	N2	10	2.0 单 Single	0	0.6	
	2	25-30			12	2.0 单 Single	-1	0.5	
	3	16-20			12	3.0 单 Single	-1	0.5	
	4	10-13			13	3.0 单 Single	-3	0.5	
	5	6-7.5			14	3.5 单 Single	-4	0.5	
	6	5.0-6.5			14	3.5 单 Single	-4	0.5	
	8	3-4			16	4.5 单 Single	-6	0.5	
	10	2-3			16	4.5 单 Single	-7	0.5	
	12	1.5-2.0			18	5.0 单 Single	-8	0.5	
	14	1.2-1.5			18	5.0 单 Single	-9	0.5	
	16	0.8-1.0			20	5.0 单 Single	-10	0.5	
	18	0.6-0.8			25	5.0 单 Single	-11	0.5	
	20	0.4-0.6			25	5.0 单 Single	-13	0.5	
	25	0.3-0.4			25	5.0 单 Single	-16	0.5	
黄铜 Brass	1	38-45	8000	N2	10	2.0 单 Single	0	0.6	
	2	25-28			12	2.0 单 Single	-1	0.5	
	3	15-20			12	3.0 单 Single	-1	0.5	
	4	10-12			12	3.0 单 Single	-2	0.5	

	5	6-8			14	3.0 单 Single	-3	0.5	
	6	5-6			16	3.5 单 Single	-4	0.5	
	8	2.8-3.5			16	4.5 单 Single	-5	0.5	
	10	2.0-2.5			18	5.0 单 Single	-6	0.5	
	12	1.5-2.0			18	5.0 单 Single	-8	0.5	
	14	0.8-1.3			20	5.0 单 Single	-9	0.5	
	16	0.6-1.0			25	5.0 单 Single	-11	0.5	
紫铜 Copper	1	30-35	8000	O2	10	3.0 单 Single	-1	0.5	3
	2	16-20			10	3.0 单 Single	-1	0.5	
	3	10-14			12	3.0 单 Single	-2	0.5	
	4	6.0-8.0			12	3.5 单 Single	-3	0.5	
	5	5.0-6.0			14	4.5 单 Single	-4	0.5	
	6	3.0-4.0			14	5.0 单 Single	-4	0.5	
	8	1.8-2.5			14	5.0 单 Single	-5	0.5	
	10	0.7-1.0			16	5.0 单 Single	-5	0.5	

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be

changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

9.2 多模块 MFMC-8000W 一体化 QBH 纤芯 100μm 穿孔参考 Multi-module MFMC-8000W integrated QBH fiber core 100μm perforated reference

9.2.1 创鑫 MFMC-8000W 20mm 碳钢穿孔参数（仅供参考）MAX MFMC-8000W 20mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	8000	45	100	20	0.6	-2	200	
中位 Middle-position	8000	45	100	12	0.6	-4	1500	
低位 Low-position	8000	55	100	8	0.6	-6	500	

9.2.2 创鑫 MFMC-8000W 30mm 碳钢穿孔参数（仅供参考）MFMC-8000w 30mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	8000	45	100	20	0.6	-4	200	
中位 Middle-position	8000	45	100	12	0.7	-6	2500	
低位	8000	55	120	8	0.6	-10	1500	

Low-position								

9.2.3 创鑫 MFMC-8000W 20mm 不锈钢氮气穿孔参数（仅供参考）MAX MFMC-8000W 20mm stainless steel nitrogen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	8000	55	2500	20	8	-6	200	
中位 Middle-position	8000	45	2500	15	8	-8	2000	
低位 Low-position	8000	40	2000	10	8	-12	500	

9.2.4 创鑫 MFMC-8000W 30mm 不锈钢氧气穿孔参数（仅供参考）

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	8000	45	150	20	0.6	-6	500	
中位 Middle-position	8000	45	150	12	0.6	-8	2500	
低位 Low-position	8000	55	200	8	0.6	-12	1000	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range,

and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

多模块 MFMC-12000W-100um 切割数据

Multi mudule MFMC-12000W-100um Cutting Data

十、多模块 MFMC-12000W 一体化 LOE 输出切割数据 Multi-module MFMC-12000W integrated LOE output cutting data

10.1 创鑫 MFMC-12000W 纤芯 100μm 切割数据（准直 100mm/聚焦 200mm）MFMC-12000W fiber core 100μm cutting data (collimation 100mm/ focus 200mm)

MFMC-12000W 连续激光器（100μm）MFMC-12000W Continues Laser（100μm）									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	1	50-60	12000	N2/ Air	10	2.0 单 Single	0	1	1
	2	33-43			12	2.0 单 Single	0	0.5	
	3	28-36			13	3.0 单 Single	0	0.5	
	4	18-24			13	3.5 单 Single	0	0.5	
	5	14-18			13	4.0 单 Single	0	0.5	
	6	10-14			13	4.5 单 Single	0	0.5	
	8	8-10			13	4.5 单 Single	-1.5	0.5	
	10	5-6.5			13	4.5 单 Single	-3	0.5	
	10	2.2-2.4	6000	O2	0.6	1.2 双 Double	+8	0.6	2

	12	1.8-2.1	7500		0.6	1.2 双 Double	+9	0.6	
	14	1.7-1.9	8500		0.6	1.4 双 Double	+9	0.6	
	16	1.6-1.8	9500		0.6	1.4 双 Double	+11	0.6	
	20	1.4-1.6	12000		0.6	1.6 双 Double	+12	0.6	
	22	1.2-1.3			0.7	1.6 双 Double	+12	0.6	
	25	0.8-1.0			0.7	1.4 单 Single	+13	0.6	
	30	0.5-0.8			1	单 1.7 Single	+13	0.5	
	40	0.2-0.3			1.3	单 1.7 Single	+13	0.5	
不锈钢 Stainless Steel	1	60-70	12000	N2	10	2.0 单 Single	0	1	
	2	35-45			12	2.0 单 Single	0	0.5	
	3	30-35			12	3.0 单 Single	-0.5	0.5	
	4	20-26			12	3.0 单 Single	-1	0.5	
	5	15-20			12	3.5 单 Single	-1	0.5	
	6	12-15			12	4.0 单 Single	-1.5	0.5	
	8	9-11			13	5.0 单 Single	-3	0.5	
	10	6-7			14	5.0 单 Single	-3	0.5	
	12	4-4.5			14	5.0 单 Single	-3.5	0.5	
	14	3-3.5			15	5.0 单 Single	-6	0.3	

	16	2.3-2.6			15	5.0 单 Single	-8	0.3	
	18	1.6-1.8			16	5.0 单 Single	-9	0.5	
	20	1.3-1.5			18	5.0 单 Single	-10	0.5	
	25	0.8-1			25	5.0 单 Single	-13	0.5	
	30	0.25-0.35			25	5.0 单 Single	+7	0.5	
	40	0.1-0.2			25	5.0 单 Single	+8	0.5	
不锈钢 空气 Stainless Steel air	1	60-70	12000	Air	10	2.0 单 Single	0	1	
	2	35-45			12	2.0 单 Single	0	0.5	
	3	30-35			13	3.0 单 Single	-0.5	0.5	
	4	20-26			12	3.0 单 Single	-1	0.5	
	5	15-20			12	3.5 单 Single	-1	0.5	
	6	12-15			12	4.0 单 Single	-1.5	0.5	
	8	9-11			13	5.0 单 Single	-3	0.5	
	10	7-8			14	5.0 单 Single	-3	0.5	
	12	4-4.5			14	5.0 单 Single	-3.5	0.5	
	14	3-3.5			15	5.0 单 Single	-6	0.3	
	16	2.3-2.6			15	5.0 单 Single	-8	0.3	
	18	1.6-1.8			16	5.0 单 Single	-9	0.5	

	20	1.3-1.5			18	5.0 单 Single	-10	0.5	
	25	0.8-1			25	5.0 单 Single	-13	0.5	
	30	0.25-0.35			25	5.0 单 Single	+7	0.5	
铝合金 Aluminium Alloy	1	50-60	12000	N2	12	2.0 单 Single	0	0.6	
	2	35-40			12	2.0 单 Single	-1	0.5	
	3	25-30			12	2.0 单 Single	-1	0.5	
	4	18-23			12	2.0 单 Single	-2	0.5	
	5	14-17			14	2.5 单 Single	-3	0.5	
	6	10-12			14	2.5 单 Single	-4	0.5	
	8	7-8			14	2.5 单 Single	-6	0.5	
	10	5-6			14	5.0 单 Single	-7	0.5	
	12	2.6-3.5			16	5.0 单 Single	-7	0.5	
	14	1.7-2.5			16	5.0 单 Single	-8	0.5	
	16	1.6-2.0			16	5.0 单 Single	-9	0.5	
	18	1.2-1.5			16	5.0 单 Single	-10	0.5	
	20	1-1.3			16	5.0 单 Single	-12	0.3	
	25	0.6-0.8			25	5.0 单 Single	-13	0.5	
	30	0.3-0.4			25	5.0 单 Single	+7	0.5	

	40	0.2-0.3			25	5.0 单 Single	+8	0.5	
黄铜 Brass	1	40-50	12000	N2	10	2.0 单 Single	0	0.6	3
	2	30-35			12	2.0 单 Single	-1	0.5	
	3	22-25			12	3.0 单 Single	-1	0.5	
	4	17-20			12	3.0 单 Single	-2	0.5	
	5	14-16			14	3.5 单 Single	-3	0.5	
	6	9-11			14	4.0 单 Single	-3	0.5	
	8	7-8			14	4.5 单 Single	-4	0.5	
	10	4.5-5.5			14	4.5 单 Single	-5	0.5	
	12	2.4-3.0			14	4.5 单 Single	-5	0.5	
	14	1.4-2.0			16	5.0 单 Single	-8	0.5	
	16	0.8-1.0			16	5.0 单 Single	-11	0.5	
紫铜 Copper	1	30-35	12000	O2	10	2.0 单 Single	-0.5	0.6	3
	2	20-25			12	2.0 单 Single	-1	0.5	
	3	16-20			13	3.0 单 Single	-2	0.5	
	4	10-13			13	3.5 单 Single	-3	0.5	
	5	7-10			13	4.0 单 Single	-4.5	0.5	
	6	4.5-5.5			14	4.5 单 Single	-5	0.5	

	8	2.5-3.0			16	4.5 单 Single	-6	0.5	
	10	1.0-1.5			18	4.5 单 Single	-8	0.5	

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

10.2 多模块 MFMC-12000W 纤芯 100μm 穿孔参考 Multi-module MFMC-12000W fiber core 100μm perforation reference

10.2.1 创鑫 MFMC-12000W 20mm 碳钢穿孔参数（仅供参考）MAX MFMC-12000W 20mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	12000	45	100	20	0.6	-4	200	
中位 Middle-position	12000	45	100	12	0.6	-6	1000	
低位 Low-position	5000	55	100	8	0.6	-10	300	

10.2.2 创鑫 MFMC-12000W 30mm 碳钢穿孔参数（仅供参考）

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	12000	45	100	20	0.6	-4	200	
中位 Middle-position	12000	45	100	12	0.6	-8	2500	
低位 Low-position	12000	45	150	8	0.7	-12	500	

10.2.3 创鑫 MFMC-12000W 20mm 不锈钢氮气穿孔参数（仅供参考）MAX MFMC-12000W 20mm stainless steel oxygen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	12000	35	2500	20	8	-2	150	
中位 Middle-position	12000	45	2500	12	8	-4	1000	
低位 Low-position	12000	45	1000	8	8	-6	500	

10.2.4 创鑫 MFMC-12000W 30mm 不锈钢氧气穿孔参数（仅供参考）MAX MFMC-12000W 30mm stainless steel oxygen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	1200	45	100	20	0.8	-6	500	
中位 Middle-position	12000	45	150	12	0.8	-8	2500	
低位 Low-position	12000	45	150	10	0.8	-12	500	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

单模块 MFSC-12000W-50um 切割数据

Single Module MFSC-12000W-50um Cutting Data

十一、单模块 MFSC-12000W 切割数据 Single Module MFSC-12000W Cutting Data

11.1 MFSC-12000W 一体化 QBH 输出纤芯 50μm 切割数据（准直 100mm/聚焦 200mm）

MFSC-12000w integrated QBH output core 50μm cutting data (collimation 100mm/ focus 200mm)

MFSC-12000W 连续激光器（50μm）MFSC-12000W Continues Laser(50μm)									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢	1	60-80	12000	N2/	8	2.0	0	0.5	1

Carbon Steel	2	45-50		Air	8	3.0	-0.5	0.5	
	3	32-38			8	3.0	-1	0.5	
	4	23-28			8	3.0	-1	0.5	
	5	20-23			8	4.0	-2	0.5	
	6	16-20			8	4.0	-2	0.5	
	8	10-13			8	5.0	-3	0.5	
	10	5.5-7.5			10	5.0	-3	0.5	
	12	4.0-5.5			16	5.0	-3	0.5	
	8	2.3-2.5	4000	O2	0.6	1.2	+10	0.6	
	10	2.0-2.2	6000		0.6	1.2	+11	0.6	
	12	1.8-2.0	6000		0.6	1.2	+12	0.6	
	14	1.6-1.8	8000		0.6	1.4	+12	0.6	
	16	1.5-1.7	8000		0.5	单 1.4 Single	+13	0.5	
	18	1.6-1.7	10000		0.5	单 1.5 Single	+14	0.5	
	20	1.4-1.6	12000		0.5	单 1.5 Single	+15	0.5	
	22	1.3-1.5	12000		0.5	单 1.5 Single	+15	0.5	
	25	1.0-1.2	12000		0.55	单 1.5 Single	+15	0.5	
碳钢 Carbon Steel	30	0.8-1.0	12000	O2	0.7	单 1.7 Single	+16	0.5	
	35	0.5-0.7	12000		1.5	单 1.7 Single	+17	0.5	
	40	0.3-0.4	12000		1.2	单 1.7 Single	+17	0.5	
不锈钢	1	60-80	12000	N2	8	2.0	0	0.5	

Stainless Steel	2	60-70			8	3.0	-0.5	0.5	
	3	50-60			8	3.0	-0.5	0.5	
	4	35-43			8	3.0	-1	0.5	
	5	20-25			8	4.0	-1.5	0.5	
	6	18-22			8	4.0	-2	0.5	
	8	15-17			8	5.0	-3	0.5	
	10	7.0-8.0			8	5.0	-3	0.5	
	12	6.0-7.0			18	5.0	-3	0.5	
	14	4.0-5.0			18	5.0	-5	0.5	
	16	2.5-3.0			20	5.0	-6	0.5	
	18	1.6-2.0			20	5.0	-10	0.5	
	20	1.4-1.5			20	5.0	-11	0.3	
	22	1.2-1.4			20	5.0	-12	0.5	
	25	0.8-1.2			20	6.0	-13	0.5	
	30	0.3-0.4			25	5.0	7	0.5	
	35	0.2-0.3			25	5.0	7	0.5	
	40	0.1-0.15			25	5.0	7	0.5	
铝合金 Aluminium Alloy	1	60-80	12000	N2	8	2.0	0	0.5	
	2	60-70			8	3.5	-1	0.5	
	3	40-50			10	3.0	-1	0.5	
	4	30-35			12	3.0	-1	0.5	
	5	25-30			13	3.5	-1.5	0.5	
	6	20-25			16	4.0	-2.5	0.5	
	8	10-12			16	4.0	-2	0.3	

	10	5.0-6.0			16	4.0	-3	0.5	
	12	3.0-4.0			16	5.0	-2	0.3	
	14	2.0-2.5			16	5.0	-4	0.3	
	16	1.6-2.0			16	5.0	-4	0.3	
	18	1.4-1.6			20	5.0	-5	0.5	
	20	1.2-1.4			20	5.0	-5	0.5	
	25	0.8-1.0			20	5.0	-6	0.5	
	30	0.4-0.6			20	5.0	-6	0.3	
	35	0.2-0.3			20	5.0	+7	0.3	
黄铜 Brass	1	60-80	12000	N2	8	3.0	-1	0.5	
	2	50-60			8	3.0	-1	0.5	
	3	40-50			8	3.0	-1	0.5	
	4	30-35			10	3.0	-1.5	0.5	
	5	25-30			10	4.0	-2	0.5	
	6	20-25			10	4.0	-3	0.5	
	8	10-13			10	5.0	-3	0.5	
	10	5.0-6.0			12	5.0	-3.5	0.5	
	12	4.0-5.0			13	5.0	-4	0.5	
	14	2.0-3.0			14	5.0	-5	0	
	16	1.5-2.0			18	5.0	-6	0.5	
紫铜 Copper	1	50-60	12000	O2	8	3.0	0	0.5	3
	2	40-50			8	3.0	0	0.5	
	3	30-36			10	3.0	-1	0.5	
	4	20-24			12	3.5	-2	0.5	

	5	15-18		13	4.5	-2	0.5	
	6	9.0-11		14	5.0	-3	0.5	
	8	6.0-7.0		14	5.0	-3	0.5	
	10	3.0-3.5		16	5.0	-4	0.5	
	12	2.0-2.5		16	5.0	-4	0.5	

备注 1：碳钢 1-6mm 推荐使用空气或氮气切割，切割速度比用氧气的更快，会有轻微挂渣。备注 2:根据现场气体纯度、板材质量等方面的不同，调试所使用的功率以及调试的速度也会有所不同。备注 3：紫铜需使用高压氧气切割，使用其他气体切割可能会有损坏激光器得风险。备注：表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

11.2 单模块 MFSC-12000W 纤芯 50μm 穿孔参考 Single Module MFSC-12000W fiber core 50μm perforation reference

11.2.2 创鑫 MFSC-12000W 25mm 碳钢穿孔参数（仅供参考）MAX MFSC-12000W 25mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位	12000	45	100	20	0.8	-4	200	

High-position								
中位 Middle-position	12000	45	100	12	0.8	-6	1500	
低位 Low-position	12000	45	100	8	0.7	-8	1000	

11.2.2 创鑫 MFSC-12000W 20mm 不锈钢氮气穿孔参数（仅供参考）

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	12000	55	3000	20	10	-8	200	
中位 Middle-position	12000	45	2500	12	10	-12	1500	
低位 Low-position	12000	45	2500	8	10	-16	500	

多模块 MFMC-15000W-100um 切割数据

Multi Module MFMC-15000W-100um Cutting Data

十二、多模块 MFMC-15000W 一体化 LOE 输出切割数据 Multi Module MFMC-15000W Integrated LOE Output Cutting Data

12.1 创鑫 MFMC-15000W 纤芯 100μm 切割数据（准直 100mm/聚焦 200mm）MFMC-15000W fiber core 100μm cutting data (collimation 100mm/ focus 200mm)

创鑫 MFMC-15000 连续激光器（100μm）MAX MFMC-15000W Continues Laser（100μm）

材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	1	60-80	15000	N2/ Air	10	2.0 单 Single	0	1	1
	2	50-60			10	2.0 单 Single	0	0.5	
	3	30-33			12	3.0 单 Single	0	0.5	
	4	23-26			12	3.0 单 Single	0	0.5	
	5	20-22			12	3.5 单 Single	0	0.5	
	6	17-19			12	3.5 单 Single	0	0.5	
	8	11-12			12	4.0 单 Single	-1	0.5	
	10	7-8			13	4.0 单 Single	-1	0.5	
	12	5-6			13	4.5 单 Single	-2	0.5	
	14	4.0-4.5			15	4.5 单 Single	-6	0.5	
	16	3-3.5			16	5.0 单 Single	-8	0.5	
	10	2.0-2.3	6000	O2	0.6	1.2 双 Double	+8	0.5	2
	12	1.8-2.1	7500		0.6	1.2 双 Double	+8	0.5	
	14	1.7-1.8	8500		0.6	1.4 双 Double	+9	0.5	
	16	1.6-1.7	9500		0.6	1.4 双 Double	+10	0.5	
	20	1.4-1.6	15000		0.6	1.6 双 Double	+12	0.5	

	22	1.2-1.4			0.7	1.6 双 Double	+12	0.5
	25	1.0-1.2			0.7	1.4 单 Single	+13	0.3
	30	0.4-1			0.9	1.6 单 Single	+12	0.3
	40	0.2-0.3			1.3	1.8 单 Single	+13	0.3
	50	0.1-0.2			1.5	1.8 单 Single	+13	0.3
不锈钢 Stainless Steel	1	60-80	15000	N2	8	2.0 单 Single	0	1
	2	40-50			8	2.0 单 Single	0	0.5
	3	34-38			8	3.5 单 Single	0	0.5
	4	23-30			8	3.5 单 Single	-1	0.5
	5	18-23			8	4.0 单 Single	-1	0.5
	6	16-19			8	4.5 单 Single	-2	0.5
	8	10-12			10	5.0 单 Single	-3	0.5
	10	8-10			10	5.0 单 Single	-4	0.5
	12	6-7			12	5.0 单 Single	-5	0.5
	14	3.5-4.5			12	5.0 单 Single	-7	0.5
	16	2.5-3.5			16	5.0 单 Single	-8	0.5
	18	1.8-2.3			18	5.0 单 Single	-9	0.5
	20	1.5-2.0			20	5.0 单 Single	-11	0.5

	25	0.9-1.2			25	5.0 单 Single	-13	0.5	
	30	0.3-0.4			25	5.0 单 Single	-16	0.5	
	40	0.15-0.2			25	5.0 单 Single	+8	0.5	
	50	0.1-0.15			25	5.0 单 Single	+9	0.5	
不锈钢 空气 Stainless Steel Air	1	60-80	15000	Air	10	3.0 单 Single	-1	1	
	2	40-60			12	3.0 单 Single	-1	0.5	
	3	30-35			13	3.5 单 Single	-1	0.5	
	4	25-28			14	3.5 单 Single	-2	0.5	
	5	22-25			16	4.0 单 Single	-4	0.5	
	6	18-20			16	4.5 单 Single	-4	0.5	
	8	10-12			16	4.5 单 Single	-4	0.5	
	10	8-9			16	4.5 单 Single	-5	0.5	
	12	6-7			18	4.5 单 Single	-6	0.5	
	14	4-4.2			18	5.0 单 Single	-8	0.5	
	16	2.5-3			20	5.0 单 Single	-10	0.5	
	18	2-2.3			20	5.0 单 Single	-10	0.5	
	20	1.8-2			25	5.0 单 Single	-15	0.5	
	25	1.2-1.4			25	6.0 单 Single	-19	0.5	

	30	0.8-1			25	6.0 单 Single	-21	0.5	
	35	0.4-0.6			25	6.0 单 Single	-24	0.5	
铝合金 Aluminium Alloy	1	60-70	15000	N2	10	3.0 单 Single	0	0.6	
	2	40-50			12	3.0 单 Single	-1	0.5	
	3	34-40			14	3.0 单 Single	-1	0.5	
	4	21-26			14	3.5 单 Single	-2	0.5	
	5	16-20			14	3.5 单 Single	-3	0.5	
	6	13-15			14	4.0 单 Single	-4	0.5	
	8	9-11			16	4.0 单 Single	-6	0.5	
	10	6-8			16	4.5 单 Single	-7	0.5	
	12	2.5-4			16	4.5 单 Single	-9	0.5	
	14	2-3			16	5.0 单 Single	-9	0.5	
	16	1.5-2			18	5.0 单 Single	-10	0.5	
	18	1.3-1.8			18	5.0 单 Single	-11	0.5	
	20	0.8-1.3			20	5.0 单 Single	-13	0.3	
	25	0.5-0.7			25	5.0 单 Single	-14	0.5	
	30	0.4-0.5			25	5.0 单 Single	-17	0.5	
	40	0.2-0.3			25	5.0 单 Single	+8	0.5	

	50	0.1-0.2			25	5.0 单 Single	+9	0.5	
黄铜 Brass	1	50-60	15000	N2	12	2.0 单 Single	0	1	
	2	38-42			12	2.0 单 Single	-1	0.5	
	3	25-30			12	3.0 单 Single	-1	0.5	
	4	20-24			12	3.5 单 Single	-2	0.5	
	5	18-21			14	3.5 单 Single	-3	0.5	
	6	9-11			14	4.0 单 Single	-3	0.5	
	8	7-9			14	4.0 单 Single	-4	0.5	
	10	5-6			14	4.5 单 Single	-5	0.5	
	12	3-3.5			14	4.5 单 Single	-5	0.5	
	14	2.5-3.0			16	4.5 单 Single	-8	0.5	
	16	1.3-1.5			18	5.0 单 Single	-11	0.5	
	18	1.0-1.2			18	5.0 单 Single	-11	0.5	
	20	0.6-0.8			18	5.0 单 Single	-12	0.3	
紫铜 Copper	1	38-42	15000	O2	10	2.0 单 Single	-0.5	0.6	3
	2	28-32			10	2.0 单 Single	-1	0.5	
	3	20-24			10	3.0 单 Single	-2	0.5	
	4	14-16			12	3.5 单 Single	-3	0.5	

5	8-10		12	3.5 单 Single	-4.5	0.5	
6	6-7		13	4.0 单 Single	-5	0.5	
8	2.5-3.5		13	4.0 单 Single	-6	0.5	
10	1.5-2.0		14	4.0 单 Single	-8	0.5	

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

12.2 多模块 MFMC-15000W 纤芯 100μm 穿孔参考 Multi Mudule MFMC-15000W Fibel Core 100μm Perforation Refernece

12.2.1 创鑫 MFMC-15000W 20mm 碳钢穿孔参数（仅供参考）MAX MFMC-15000W 20mm Carbon Steel Perforation Parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	12000	45	100	20	0.6	-2	200	
中位 Middle-position	15000	45	100	12	0.6	-4	800	
低位 Low-pos	8000	35	150	8	0.6	-6	200	

ition								

12.2.2 创鑫 MFMC-15000W 30mm 碳钢穿孔参数（仅供参考）MFMC-15000W 30mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	12000	45	100	20	0.6	-4	200	
中位 Middle-position	15000	45	100	12	0.6	-8	2000	
低位 Low-position	15000	55	120	8	0.7	-10	1000	

12.2.3 创鑫 MFMC-15000W 20mm 不锈钢氮气穿孔参数(仅供参考)MAX MFMC-15000W 20mm stainless steel nitrogen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	15000	45	80	20	6	-2	150	
中位 Middle-position	15000	35	100	15	8	-4	1000	
低位 Low-position	15000	45	80	10	8	-6	500	

12.2.4 创鑫 MFMC-15000W 30mm 不锈钢氧气穿孔参数(仅供参考)MAX MFMC-15000W 30mm stainless steel oxygen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	10000	55	2500	20	6	-10	500	
中位 Middle-position	15000	45	2500	14	8	-16	2500	
低位 Low-position	12000	55	2000	10	8	-20	500	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

多模块 MFMC-20000W-150um 切割数据

Multi Module MFMC-20000W-150um Cutting Data

十三、多模块 MFMC-20000W 切割数据 Multi Module MFMC-20000W Cutting Data

13.1 创鑫 MFMC-20000W 一体化 LOE 纤芯 150μm 切割数据（准直 100mm/聚焦 200mm）
MFMC-20000w Integrated LOE core 150μm cutting data (collimation 100mm/ focus 200mm)

MFMC-20000W 连续激光器（150μm）MFMC-20000W Continues Laser(150μm)									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark

碳钢 Carbon steel	1	60-80	20000	N2/ Air	10	3.5 单 Single	0	0.5	1
	2	40-50			10	3.5 单 Single	0	0.5	
	3	35-45			10	3.5 单 Single	0	0.5	
	4	28-35			10	3.5 单 Single	-0.5	0.5	
	5	23-30			10	3.5 单 Single	-0.5	0.5	
	6	18-23			12	3.5 单 Single	-0.5	0.5	
	8	13-16			13	4.5 单 Single	-1	0.5	
	10	10-13			13	4.5 单 Single	-1.5	0.5	
	12	7-8			14	4.5 单 Single	-2	0.5	
	14	5.5-6.5			16	4.5 单 Single	-3	0.5	
	16	4.0-4.5			25	5.0 单 Single	-4	0.5	
	18	3.2-3.5			25	5.0 单 Single	-6	0.5	
	20	2.6-3.0			25	6.0 单 Single	-10	0.5	
	10	2.2-2.5	6000	O2	0.6	1.2 双 Double	+8	0.6	2
	12	1.9-2.1	6500		0.6	1.2 双 Double	+9	0.6	
	14	1.8-1.9	8000		0.6	1.4 双 Double	+10	0.6	
	16	1.6-1.8	8500		0.6	1.4 双 Double	+11	0.6	
	18	1.5-1.7	12000		0.6	1.6 双 Double	+12	0.6	

	20	1.4-1.6	12000		0.6	1.6 双 Double	+12	0.6	
	22	1.3-1.5			0.7	1.6 双 Double	+12	0.6	
	25	1.2-1.4			1.0	1.4 单 Single	+12	0.3	
	30	1.1-1.3			1.2	1.6 单 Single	+13.5	0.3	
	35	1.0-1.2			0.8	1.6 单 Single	+14	0.3	
	40	0.6-0.8	20000		1.0	1.6 单 Single	+14	0.3	
	50	0.3-0.5			1.3	1.8 单 Single	+14	1.5	
	60	0.1-0.2			1.6	1.8 单 Single	+14	1.5	
	70	0.1-0.2			1.6	1.8 单 Single	+14	1.5	
	80	0.1-0.2			1.6	1.8 单 Single	+14	1.5	
不锈钢 Stainless Steel	1	60-80	20000	N2	10	3.0 单 Single	0	1	
	2	45-55			10	3.0 单 Single	0	0.5	
	3	35-40			10	3.0 单 Single	0	0.5	
	4	30-35			12	3.5 单 Single	0	0.5	
	5	23-28			12	3.5 单 Single	0	0.5	
	6	18-22			13	4.5 单 Single	-1	0.5	
	8	14-16			13	4.5 单 Single	-3	0.5	
	10	11-13			14	4.5 单 Single	-3	0.3	

	12	8-10			14	4.5 单 Single	-4	0.5
	14	5.5-6.5			14	4.5 单 Single	-6	0.5
	16	4.5-5.5			16	5.0 单 Single	-8	0.5
	18	3.5-4.5			18	5.0 单 Single	-8	0.5
	20	2.8-3.3			20	5.0 单 Single	-9	0.5
	25	1.7-2.0			25	6.0 单 Single	-13	0.5
	30	1.0-1.3			25	6.0 单 Single	-15	0.5
	35	0.5-0.8			25	7.0 单 Single	-17	0.5
	40	0.3-0.5			25	5.0 单 Single	+8	0.3
	50	0.1-0.2			25	5.0 单 Single	+9	0.3
	60	0.1-0.2			25	6.0 单 Single	+9	0.3
	70	0.1-0.15			25	8.0 单 Single	+9	0.3
	80	0.1-0.15			25	8.0 单 Single	+9	0.3
	90	0.05-0.1			25	8.0 单 Single	+9	0.3
	100	0.05-0.1			25	8.0 单 Single	+9	0.3
不锈钢 Stainless Steel	1	60-80	20000	Air	8	2.0 单 Single	0	1
	2	50-60			8	2.0 单 Single	0	0.5
	3	40-45			10	3.0 单 Single	-1	0.5

	4	35-39			10	3.0 单 Single	-1	0.5	
	5	25-30			11	3.5 单 Single	-1	0.5	
	6	22-26			11	3.5 单 Single	-2	0.5	
	8	15-18			12	4.0 单 Single	-2	0.5	
	10	12-14			13	4.0 单 Single	-3	0.3	
	12	10-11			13	4.5 单 Single	-3.5	0.3	
	14	6.5-7.5			14	4.5 单 Single	-3.5	0.3	
	16	5.0-5.8			16	4.5 单 Single	-7	0.3	
	18	3.8-4.5			20	4.5 单 Single	-9	0.3	
	20	3.0-3.5			20	5.0 单 Single	-10	0.3	
	25	1.5-2.0			25	5.0 单 Single	-13	0.3	
	30	1.0-1.3			25	5.0 单 Single	-15	0.3	
	40	0.5-0.6			25	6.0 单 Single	-17	0.3	
	50	0.1-0.2			25	6.0 单 Single	+9	0.3	
	60	0.1-0.2			25	8.0 单 Single	+9	0.3	
	70	0.1-0.15			35	8.0 单 Single	+9	0.3	
铝合金 Alumniu m Alloy	1	60-80	20000	N2	8	3.0 单 Single	0	0.5	
	2	50-60			8	3.0 单 Single	0	0.5	

	3	35-45			8	3.0 单 Single	-1	0.5
	4	30-40			8	3.0 单 Single	-1	0.5
	5	20-25			10	4.5 单 Single	-2	0.5
	6	15-22			10	4.5 单 Single	-2	0.5
	8	14-20			10	5.0 单 Single	-3	0.5
	10	8.0-10			10	5.0 单 Single	-3	0.5
	12	7.0-8.0			10	5.0 单 Single	-4	0.5
	14	4.0-6.0			12	5.0 单 Single	-5	0.5
	16	3.0-4.5			14	5.0 单 Single	-6	0.5
	18	2.3-3.0			14	5.0 单 Single	-6	0.5
	20	2.0-2.3			16	5.0 单 Single	-7	0.5
	25	1.0-1.5			18	6.0 单 Single	-8	0.5
	30	0.6-0.8			20	6.0 单 Single	-8	0.5
	40	0.3-0.6			25	6.0 单 Single	8	0.5
	50	0.3-0.4			28	6.0 单 Single	8	0.5
	60	0.2-0.3			28	6.0 单 Single	8	0.5
黄铜 Brass	1	50-60	20000	N2	10	3.0 单 Single	0	0.5
	2	35-45			10	3.5 单 Single	0	0.5

	3	28-35			10	3.5 单 Single	0	0.5	
	4	23-28			10	3.5 单 Single	-1	0.5	
	5	15-20			12	4.5 单 Single	-1	0.5	
	6	12-15			12	4.5 单 Single	-1.5	0.5	
	8	8.0-10			12	5.0 单 Single	-2	0.5	
	10	5.0-7.0			13	5.0 单 Single	-3	0.5	
	12	3.5-5.5			14	5.0 单 Single	-3	0.5	
	14	3.0-4.5			14	5.0 单 Single	-4	0.5	
	16	2.0-3.0			14	5.0 单 Single	-5	0.5	
	18	1.0-1.5			16	5.0 单 Single	-6	0.5	
	20	0.7-0.9			18	6.0 单 Single	-6.5	0.5	
紫铜 Copper	1	30-40	20000	O2	8	3.0 单 Single	0	0.5	3
	2	22-30			8	3.0 单 Single	0	0.5	
	3	20-25			8	3.5 单 Single	0	0.5	
	4	15-18			10	3.5 单 Single	-1	0.5	
	5	12-14			10	5.0 单 Single	-1	0.5	
	6	7.0-9.0			10	5.0 单 Single	-2	0.5	
	8	4.5-5.5			10	5.0 单 Single	-3	0.5	

	10	3.0-3.5			12	5.0 单 Single	-4	0.5
	12	2.0-2.5			14	5.0 单 Single	-5	0.5

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

13.2 多模块 MFMC-20000W 纤芯 150μm 穿孔参考 Multi-module MFMC-20000W 150-μm perforation reference

13.2.1 创鑫 MFMC-20000W 30mm 碳钢穿孔参数（仅供参考）MAX MFMC-20000W 30mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	15000	45	150	20	0.6	-4	200	
中位 Middle-position	15000	45	100	12	0.6	-6	1000	
低位 Low-position	20000	55	100	8	0.6	-8	200	

13.2.2 创鑫 MFMC-20000W 40mm 碳钢穿孔参数（仅供参考）MAX MFMC-20000w 40mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	20000	45	100	20	0.6	-6	200	
中位 Middle-position	20000	45	150	12	0.7	-8	2500	
低位 Low-position	15000	50	150	8	0.7	-12	500	

13.2.3 创鑫 MFMC-20000W 30mm 不锈钢氮气穿孔参数（仅供参考）MAX MFMC-20000W 30mm stainless steel nitrogen piercing parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	20000	55	2500	20	6	-8	200	
中位 Middle-position	20000	45	2500	15	8	-12	1500	
低位 Low-position	20000	45	80	10	8	-16	500	

13.2.4 创鑫 MFMC-20000W 30mm 不锈钢氧气穿孔参数（仅供参考）MAX MFMC-20000W 30mm stainless steel oxygen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency	喷嘴高度 Nozzles Height	气压 Air Pressu	焦点 Focus Point	穿孔时间 Aperture Time	停光吹气 Stop blowing

			(Hz)	(mm)	re (bar)	(mm)	(ms)	(ms)
高位 High-position	20000	45	100	20	0.6	-6	200	
中位 Middle-position	20000	45	100	12	0.8	-8	2000	
低位 Low-position	12000	55	100	10	0.8	-12	500	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

多模块 MFMC-20000W-100um 切割数据

Multi Module MFMC-20000W-100um Cutting Data

十四、多模块 MFMC-20000W 切割数据 Multi Module MFMC-20000W Cutting Data

14.1 创鑫 MFMC-20000W 一体化 LOE 纤芯 100μm 切割数据（准直 100mm/聚焦 200mm）MAX MFMC-20000W Integrated LOE Core 100μm Cutting Data(Collimation 100mm/focus 200mm)

MFMC-20000W 连续激光器（100μm）MFMC-20000W Continues Lase（100μm）									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	1	60-80	20000	N2/ Air	10	3.0 单 Single	0	0.5	1
	2	40-50			10	3.0 单 Single	0	0.5	

3	35-45			10	3.0 单 Single	0	0.5	
4	30-35			10	3.5 单 Single	0	0.5	
5	25-30			10	3.5 单 Single	0	0.5	
6	20-25			12	3.5 单 Single	-0.5	0.5	
8	14-18			13	4.5 单 Single	-1	0.5	
10	10-13			13	4.5 单 Single	-1.5	0.5	
12	7-8			14	4.5 单 Single	-2	0.5	
14	5.5-6.5			16	4.5 单 Single	-3	0.5	
16	4.0-4.5			25	5.0 单 Single	-4	0.5	
18	3.2-3.5			25	5.0 单 Single	-6	0.5	
20	2.7-3.0			25	6.0 单 Single	-10	0.5	
10	2.2-2.5	6000	O2	0.6	1.2 双 Double	+8	0.6	2
12	1.9-2.1	6500		0.6	1.2 双 Double	+9	0.6	
14	1.8-1.9	8000		0.6	1.4 双 Double	+10	0.6	
16	1.6-1.8	8500		0.6	1.4 双 Double	+11	0.6	
18	1.5-1.7	12000		0.6	1.6 双 Double	+12	0.6	
20	1.4-1.6	12000		0.6	1.6 双 Double	+12	0.6	
22	1.3-1.5	12000		0.7	1.6 双 Double	+12	0.6	

	25	1.2-1.4	15000		1.0	1.4 单 Single	+12	0.3	
	30	1.1-1.3	18000		1.2	1.6 单 Single	+13.5	0.3	
	35	1.0-1.2	20000		0.8	1.6 单 Single	+14	0.3	
	40	0.6-0.8			1.0	1.6 单 Single	+14	0.3	
	50	0.3-0.5			1.3	1.8 单 Single	+14	1.5	
	60	0.2-0.25			1.6	1.8 单 Single	+14	1.5	
	70	0.1-0.2			1.6	1.8 单 Single	+14	1.5	
	80	0.1-0.15			1.6	1.8 单 Single	+14	1.5	
不锈钢 Stainless Steel	1	60-80	20000	N2	10	3.0 单 Single	0	0.5	
	2	40-45			10	3.0 单 Single	0	0.5	
	3	35-40			10	3.0 单 Single	0	0.5	
	4	30-33			12	3.5 单 Single	0	0.5	
	5	23-25			12	3.5 单 Single	0	0.5	
	6	20-22			13	4.5 单 Single	-1	0.5	
	8	15-18			13	4.5 单 Single	-3	0.5	
	10	11-13			14	4.5 单 Single	-3	0.3	
	12	8-10			14	4.5 单 Single	-4	0.5	
	14	5.5-6.5			14	4.5 单 Single	-6	0.5	

	16	4.5-5.5			16	5.0 单 Single	-8	0.5
	18	3.5-4.5			18	5.0 单 Single	-8	0.5
	20	3.0-4.0			20	5.0 单 Single	-9	0.5
	25	1.9-2.4			25	6.0 单 Single	-13	0.5
	30	0.8-1.2			25	6.0 单 Single	-15	0.5
	35	0.5-0.8			25	7.0 单 Single	-17	0.5
	40	0.3-0.5			25	5.0 单 Single	+8	0.3
	50	0.2-0.3			25	5.0 单 Single	+9	0.3
	60	0.15-0.2			25	6.0 单 Single	+9	0.3
	70	0.1-0.15			25	8.0 单 Single	+9	0.3
	80	0.08-0.1			25	8.0 单 Single	+9	0.3
	90	0.05-0.07			25	8.0 单 Single	+9	0.3
	100	0.04-0.06			25	8.0 单 Single	+9	0.3
不锈钢 Stainless Steel	1	60-80	20000	Air	8	2.0 单 Single	0	0.5
	2	50-60			8	2.0 单 Single	0	0.5
	3	40-45			10	3.0 单 Single	-1	0.5
	4	35-39			10	3.0 单 Single	-1	0.5
	5	25-30			11	3.5 单 Single	-1	0.5

	6	22-26			11	3.5 单 Single	-2	0.5	
	8	15-18			12	4.0 单 Single	-2	0.5	
	10	12-14			13	4.0 单 Single	-3	0.3	
	12	10-11			13	4.5 单 Single	-3.5	0.3	
	14	6.5-7.5			14	4.5 单 Single	-3.5	0.3	
	16	5.0-5.8			16	4.5 单 Single	-7	0.3	
	18	3.8-4.5			20	4.5 单 Single	-9	0.3	
	20	3.0-3.5			20	5.0 单 Single	-10	0.3	
	25	1.5-2.0			25	5.0 单 Single	-13	0.3	
	30	1.0-1.3			25	5.0 单 Single	-15	0.3	
	40	0.5-0.6			25	6.0 单 Single	-17	0.3	
	50	0.2-0.3			25	6.0 单 Single	+9	0.3	
	60	0.1-0.2			25	8.0 单 Single	+9	0.3	
	70	0.1-0.15			35	8.0 单 Single	+9	0.3	
铝合金 Aluminium Alloy	1	60-80	20000	N2	8	3.0 单 Single	0	0.5	
	2	45-55			8	3.0 单 Single	0	0.5	
	3	38-45			8	3.0 单 Single	-1	0.5	
	4	30-40			8	3.0 单 Single	-1	0.5	

	5	23-28			10	3.5 单 Single	-2	0.5
	6	16-20			10	4.5 单 Single	-2	0.5
	8	10-12			10	5.0 单 Single	-3	0.5
	10	9-10			10	5.0 单 Single	-3	0.5
	12	5-6			10	5.0 单 Single	-4	0.5
	14	4-5			12	5.0 单 Single	-5	0.5
	16	3-4			14	5.0 单 Single	-6	0.5
	18	2.3-2.8			14	5.0 单 Single	-6	0.5
	20	2.0-2.3			16	5.0 单 Single	-7	0.5
	25	1.0-1.5			18	6.0 单 Single	-8	0.5
	30	0.6-0.8			20	6.0 单 Single	-8	0.5
	40	0.4-0.5			25	6.0 单 Single	8	0.5
	50	0.3-0.4			28	6.0 单 Single	8	0.5
	60	0.2-0.3			28	6.0 单 Single	8	0.5
黄铜 Brass	1	50-60	20000	N2	10	3.0 单 Single	0	0.5
	2	35-45			10	3.5 单 Single	0	0.5
	3	28-32			10	3.5 单 Single	0	0.5
	4	20-25			10	3.5 单 Single	-1	0.5

	5	18-21			12	4.5 单 Single	-1	0.5	
	6	13-17			12	4.5 单 Single	-1.5	0.5	
	8	9.0-12			12	5.0 单 Single	-2	0.5	
	10	6.0-8.0			13	5.0 单 Single	-3	0.5	
	12	4.0-6.0			14	5.0 单 Single	-3	0.5	
	14	3.5-4.5			14	5.0 单 Single	-4	0.5	
	16	2.0-3.0			14	5.0 单 Single	-5	0.5	
	18	1.0-1.5			16	5.0 单 Single	-6	0.5	
	20	0.7-0.9			18	6.0 单 Single	-6.5	0.5	
紫铜 Copper	1	35-40	20000	O2	8	3.0 单 Single	0	0.5	3
	2	26-30			8	3.0 单 Single	0	0.5	
	3	24-28			8	3.5 单 Single	0	0.5	
	4	16-20			10	3.5 单 Single	-1	0.5	
	5	12-15			10	5.0 单 Single	-1	0.5	
	6	8.0-10			10	5.0 单 Single	-2	0.5	
	8	5.0-6.0			10	5.0 单 Single	-3	0.5	
	10	3.0-3.5			12	5.0 单 Single	-4	0.5	
	12	2.0-2.5			14	5.0 单 Single	-5	0.5	

备注：碳钢和不锈钢等空气、氮气切割时，效率和稳定性都会提升，承着厚度增加，也容易出现挂渣现象，

上面数据参数在实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。紫铜需用高压氧气切割，空气或氮气易造成激光器损坏。

Remark: Carbon steel and stainless steel, such as air, nitrogen cutting, efficiency and stability will be improved, bearing the increase of thickness, but also prone to hanging slag phenomenon, the above data parameters in actual bulk cutting, machine tool, system, cutting head, air pressure, materials and other factors, there may be changes, the data in the table red mark parameters for proofing, greatly influenced by various factors in the actual processing, It is only suitable for small batch production. Mass production is not recommended. Higher power lasers are recommended. Copper needs to be cut with high pressure oxygen, air or nitrogen are easy to cause damage to the laser.

14.2 多模块 MFMC-20000W 纤芯 100μm 穿孔参考 Multi Module MFMC-20000W Fibel Core 100μm Perforation Reference

14.2.1 创鑫 MFMC-20000W 30mm 碳钢穿孔参数（仅供参考）MAX MFMC-20000W 30mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	15000	45	150	20	0.6	-4	200	
中位 Middle-position	15000	45	100	12	0.6	-6	1000	
低位 Low-position	20000	55	100	8	0.6	-8	200	

14.2.2 创鑫 MFMC-20000W 40mm 碳钢穿孔参数（仅供参考）MFMC-20000w 40mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)

高位 High-position	20000	45	100	20	0.6	-6	200	
中位 Middle-position	20000	45	150	12	0.7	-8	2500	
低位 Low-position	15000	50	150	8	0.7	-12	500	

14.2.3 创鑫 MFMC-20000W 30mm 不锈钢氮气穿孔参数（仅供参考）MAX MFMC-20000W 30mm stainless steel nitrogen piercing parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	20000	55	2500	20	6	-8	200	
中位 Middle-position	20000	45	2500	15	8	-12	1500	
低位 Low-position	20000	45	80	10	8	-16	500	

14.2.4 创鑫 MFMC-20000W 30mm 不锈钢氧气穿孔参数（仅供参考）MAX MFMC-20000W 30mm stainless steel oxygen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	20000	45	100	20	0.6	-6	200	

中位 Middle-position	20000	45	100	12	0.8	-8	2000	
低位 Low-position	12000	55	100	10	0.8	-12	500	

穿孔参数以当前功率下能够穿透的极限碳钢/不锈钢厚度为例，穿孔参数可调节范围大，依据实际效果可调节占空比和频率等参数，达到最佳效果；穿孔按顺序逐级排序，高位为第一级穿孔，以此类推。

The perforation parameters are taken as the limit carbon steel/stainless steel thickness that can be penetrated under the current power as an example. The perforation parameters can be adjusted in a wide range, and the duty cycle and frequency can be adjusted according to the actual effect to achieve the best effect. The piercings are sorted step by step, the high position is perforated for the first level, and so on.

多模块 MFMC-30000W-150um 切割数据

Multi Module MFMC-30000W-150um Cutting Data

十五、多模块 MFMC-30000W 切割数据 Multi Module MFMC-30000W Cutting Data

15.1 创鑫 MFMC-30000W 一体化 LOE 纤芯 150μm 切割数据（准直 100mm/聚焦 200mm）

MFMC-30000W Integrated LOE core 150μm cutting data (collimation 100mm/ focus 200mm)

MFMC-30000W 连续激光器（150μm）MFMC-30000W Continues Laser（150μm）								
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)
碳钢 Carbon Steel	8	14-16	30000	N2/ Air	10	4.5 单 Single	-1	0.5
	10	12-14			10	4.5 单 Single	-2	0.5
	12	8-10			12	4.5 单 Single	-3	0.5
	16	5-6			14	5.0 单 Single	-4	0.5
	20	2.5-3.2			20	6.0 单 Single	-6	0.5

	25	1.5-2.0			20	6.0 单 Single	-8	0.5
	10	2.3-2.6	6000		0.6	1.2 双 Double	+8	0.6
	12	1.8-2.1	6000		0.6	1.2 双 Double	+9	0.6
	16	1.6-1.8	8500		0.5	1.4 双 Double	+9	0.6
	20	1.5-1.6	12000		0.55	1.6 双 Double	+12	0.6
	25	1.3-1.4	13000		0.8	1.6 单 Single	+13	0.3
	30	1.2-1.3	16000	O2	0.8	1.7 单 Single	+13	0.3
	35	1.0-1.2	18000		0.8	1.8 单 Single	+14	0.3
	40	1.0-1.1	22000		1.2	1.8 单 Single	+15	0.3
	45	0.8-1.0	30000		1.3	1.8 单 Single	+15	0.3
	50	0.4-0.5	30000		1.5	1.8 单 Single	+16	0.3
不锈钢 Stainless Steel	8	18-22	30000	N2/ Air	8	单 5.0 Single	-2	0.5
	10	13-16			10	单 5.0 Single	-2	0.3
	12	10-12			12	单 5.0 Single	-4	0.5
	16	7-8			13	单 5.0 Single	-5	0.5
	20	5.0-6.5			13	单 5.0 Single	-7	0.5
	25	2.8-3.5			18	单 5.0 Single	-10	0.5
	30	1.8-2.5			25	单 6.0 Single	-12	0.5

	35	1.4-1.8			30	单 6.0 Single	-15	0.5
	40	0.8-1.2			30	单 6.0 Single	-15	0.3
	50	0.2-0.25			30	单 6.0 Single	+6	0.3

备注：实际批量切割时，受机床、系统、切割头、气压、材料等因素影响，数据可能会有变动，表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工，建议使用更高功率激光器。

Remark: actual batch cutting, affected by machine tools, systems, cutting head, air pressure, materials and other factors, the data may be changed, the red mark parameters in the table are proofing parameters, in the actual processing is greatly affected by various factors, only suitable for small batch production, mass production and processing is not recommended, it is recommended to use higher power laser.

多模块 MFMC-30000W-100um 切割数据

Multi Module MFMC-30000W-100um Cutting Data

十六、多模块 MFMC-30000W 切割数据 Multi Module MFMC-30000W Cutting Data

16.1 创鑫 MFMC-30000W 一体化 LOE 纤芯 100μm 切割数据（准直 100mm/聚焦 200mm）MAX MFMC-30000W Integrated LOE Core 100μm Cutting Data(Collimation 100mm/focus 200mm)

MFMC-30000W 连续激光器（100μm）MFMC-30000W Continues Laser（100μm）									
材料 Material	厚度 thicknes (mm)	速度 Speed (m/min)	功率 Power (W)	气体 Gas	气压 Pressure (bar)	喷嘴 Nozzles (mm)	焦点位置 Focus Point (mm)	切割高度 Cutting Height (mm)	备注 Remark
碳钢 Carbon Steel	8	20-25	30000	空气/氮气	10	4.5	-1	0.5	
	10	15-20			10	4.5	-2	0.5	
	12	10-14			12	4.5	-3	0.5	
	14	9.0-10.5			14	4.5	-3	0.5	
	16	8.0-9.5			14	5.0	-4	0.5	

	18	6.0-7.0			20	5.0	-7	0.5	
	20	4.0-5.0			25	6.0	-10	0.5	
	10	2.2-2.5	6000		0.6	1.2	+8	0.6	
	12	1.9-2.1	6500		0.6	1.2	+9	0.6	
	14	1.8-1.9	8000		0.6	1.4	+10	0.6	
	16	1.6-1.8	8500		0.6	1.4	+11	0.6	
	18	1.5-1.7	11000		0.5	单 1.5 Single	+12~13	0.3	
	20	1.5-1.6	11000		0.5	单 1.5 Single	+12~13.5	0.3	
	22	1.3-1.5	12000		0.5	单 1.6 Single	+12~13.5	0.3	
	25	1.25-1.4	12000		0.5	单 1.6 Single	+13~14.5	0.3	
	30	1.1-1.3	17000	O2	0.8	单 1.6 Single	+13~14.5	0.3	
	35	1.1-1.2	17000		1.0	单 1.7 Single	+13.8~14.5	0.3	2
	40	0.9-1.1	20000		1.2	单 1.8 Single	+14~15	0.3	
	45	0.7-0.9	28000		1.2	单 1.8 Single	+15~+16	0.3	
	50	0.4-0.5	30000		1.3	单 1.8 Single	+15~+16	0.3	
	60	0.2-0.3	30000		1.6	单 1.8 Single	+16~+17	0.3	
	70	0.1-0.2	30000		1.6	单 1.8 Single	+16~+17	0.3	
	80	0.1-0.15	30000		1.6	单 1.8 Single	+16~+17	0.3	
不锈钢 Stainless Steel	6	30-35	30000	N2	8	4.5	+1~-2	0.5	
	8	25-28			8	5.0	-1~-2	0.5	

	10	20-22			8	5.0	-1~-3	0.5	
	12	15-17			10	5.0	-1~-5	0.5	
	14	10-12			14	5.0	-3~-5	0.5	
	16	8.5-10.0			14	5.0	-4~-5	0.5	
	18	6.0-7.0			16	5.0	-5~-6	0.5	
	20	5.0-6.0			20	6.0	-5~-6	0.5	
	25	3.0-4.0			20	6.0	-6.5~-7.5	0.5	
	30	2.0-2.5			25	8.0	-9.5~-10.5	0.3	
	35	1.5-1.8			25	8.0	-11~-13	0.3	
	40	0.9-1.2			25	8.0	-15~-16.5	0.3	
	50	0.2-0.25			25	6.0	+8	0.3	
	60	0.15-0.2			25	6.0	+9	0.3	
	70	0.1-0.15			25	8.0	+9	0.3	
	80	0.08-0.12			25	8.0	+9	0.3	
	90	0.05-0.1			25	8.0	+9	0.3	
	100	0.05-0.08			25	8.0	+9	0.3	
铝合金 Aluminium Alloy	1	60-80	20000	N2	8	3.0	0	0.5	
	2	50-60			8	3.0	0	0.5	
	3	35-45			8	3.0	-1	0.5	
	4	30-40			8	3.0	-1	0.5	
	5	20-25			10	4.5	-2	0.5	
	6	15-22			10	4.5	-2	0.5	
	8	14-20			10	5.0	-3	0.5	

	10	8.0-10			10	5.0	-3	0.5	
	12	7.0-8.0			10	5.0	-4	0.5	
	14	4.0-6.0			12	5.0	-5	0.5	
	16	3.0-4.5			14	5.0	-6	0.5	
	18	2.3-3.0			14	5.0	-6	0.5	
	20	2.0-2.3			16	5.0	-7	0.5	
	25	1.0-1.5			18	6.0	-8	0.5	
	30	0.6-0.8			20	6.0	-8	0.5	
	40	0.3-0.6			25	6.0	8	0.5	
	50	0.3-0.4			28	6.0	8	0.5	
	60	0.2-0.3			28	6.0	8	0.5	
黄铜 Brass	1	50-60	20000	N2	10	3.0	0	0.5	
	2	35-45			10	3.5	0	0.5	
	3	28-35			10	3.5	0	0.5	
	4	23-28			10	3.5	-1	0.5	
	5	15-20			12	4.5	-1	0.5	
	6	12-15			12	4.5	-1.5	0.5	
	8	8.0-10			12	5.0	-2	0.5	
	10	5.0-7.0			13	5.0	-3	0.5	
	12	3.5-5.5			14	5.0	-3	0.5	
	14	3.0-4.5			14	5.0	-4	0.5	
	16	2.0-3.0			14	5.0	-5	0.5	
	18	1.0-1.5			16	5.0	-6	0.5	

	20	0.7-0.9			18	6.0	-6.5	0.5	
紫铜 Copper	1	30-40	20000	O2	8	3.0	0	0.5	3
	2	22-30			8	3.0	0	0.5	
	3	20-25			8	3.5	0	0.5	
	4	15-18			10	3.5	-1	0.5	
	5	12-14			10	5.0	-1	0.5	
	6	7.0-9.0			10	5.0	-2	0.5	
	8	4.5-5.5			10	5.0	-3	0.5	
	10	3.0-3.5			12	5.0	-4	0.5	
	12	2.0-2.5			14	5.0	-5	0.5	

备注 1：碳钢 1-20mm 推荐使用空气或氮气切割，切割速度比用氧气的更快，会有轻微挂渣。备注 2：10-20mm 碳钢氧气切割，使用高功率高速亮面切割工艺，喷嘴使用的是高速双层尖喷嘴。根据现场气体纯度、板材质量等方面的不同，调试所使用的功率以及调试的速度也会有所不同。备注 3：紫铜切割工艺中，必须使用氧气进行切割，不可使用空气或氮气进行切割。备注：表中红标参数为打样参数，在实际加工中受各类因素影响较大，仅适合小批量生产，不推荐大批量生产加工。

Note 1: Carbon steel 1-20mm is recommended to be cut by air or nitrogen. The cutting speed is faster than that of oxygen, and there will be slight hanging slag.

Note 2:10-20mm carbon steel oxygen cutting using high power high speed bright surface cutting process with high speed double tip nozzle. According to the field gas purity, plate quality and other aspects of the difference, the use of debugging power and debugging speed will be different.

Note 3: In copper cutting process, oxygen must be used for cutting, air or nitrogen can not be used for cutting.

Note: The red mark parameters in the table are sample making parameters, which are greatly affected by various factors in actual processing, and are only suitable for small batch production. Mass production and processing are not recommended.

16.2 多模块 MFMC-30000W 纤芯 100μm 穿孔参考 Multi Mudule MFMC-30000W 100 μm perforation reference

16.2.1 创鑫 MFMC-30000W 30mm 碳钢穿孔参数（仅供参考）MFMC-30000W 30mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	15000	45	150	20	0.6	-4	200	
中位 Middle-position	15000	45	100	12	0.6	-6	1000	
低位 Low-position	20000	55	100	8	0.6	-8	200	

16.2.2 创鑫 MFMC-30000W 40mm 碳钢穿孔参数（仅供参考）

MAX MFMC-30000W 40mm carbon steel perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	20000	45	100	20	0.6	-6	200	
中位 Middle-position	20000	45	150	12	0.7	-8	2500	
低位 Low-position	15000	50	150	8	0.7	-12	500	

16.2.3 创鑫 MFMC-30000W 30mm 不锈钢氮气穿孔参数（仅供参考）

MAX MFMC-30000W 30mm stainless steel nitrogen perforation parameters(for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	20000	55	2500	20	6	-8	200	
中位 Middle-position	20000	45	2500	15	8	-12	1500	
低位 Low-position	20000	45	80	10	8	-16	500	

16.2.4 创鑫 MFMC-30000W 30mm 不锈钢氧气穿孔参数（仅供参考）MAX MFMC-30000W 30mm stainless steel oxygen perforation parameters (for reference only)

阶段 stage	功率 Power (W)	占空比 duty ratio (%)	频率 Frequency (Hz)	喷嘴高度 Nozzles Height (mm)	气压 Air Pressure (bar)	焦点 Focus Point (mm)	穿孔时间 Aperture Time (ms)	停光吹气 Stop blowing (ms)
高位 High-position	20000	45	100	20	0.6	-6	200	
中位 Middle-position	20000	45	100	12	0.8	-8	2000	
低位 Low-position	12000	55	100	10	0.8	-12	500	