QPJ1660C金刚石线多线切片机
QPJ1660C Diamond Wire Multi-wire Wafer Slicing Machine

基本性能参数

加工能力
装载长度（mm） 最大650 单排装料
工件尺寸（mm） 最大156×156
切片厚度（mm） 0.145~0.20

Basic Performance Parameter

Processing Power
Loading length (mm)　　　 Max 650　material loading on single row
Workpiece size (mm)　　　 Max 156 × 156
Wafer slicing thickness (mm)　 0.145~0.20

主要技术指标　　　　　　　　　　*Main Technical Index*

| 主要技术指标		*Main Technical Index*	
钢线运行方式	往复	Steel wire operation mode	reciprocation
钢线直径	Φ0.07~Φ0.10mm	Steel wire diameter	ϕ0.07~ϕ0.10mm
钢线速度	最大1500m/min	Steel wire speed	Max 1500m/mim
加速时间	4s	Acceleration time	4s
钢线张力	7~30N	Steel wire tension	7~30N
张力控制方式	伺服电机控制	Tension control mode	servo electrical motor control
钢线存储量	Φ0.12mm 50km	Steel wire storage capacity	ϕ0.12mm 50km
切割辊数量	2根	Cutting roller quantity	2 pcs
切割辊中心距	420mm	Cutting roller center distance	420mm
冷却液（切割液）	水基表面活性剂	Cooling liquid (cutting fluid)	water based surfactant
冷却液箱容量	460L	Cooling liquid tank capacity	460L
冷却液流量	最大210L/min	Cooling liquid flow	Max 210L/min
工作台行程	最大260mm	Worktable stroke	Max 260mm
工作台进给速度	0.1~3mm/min	Worktable feed speed	0.1~3mm/min
工作台快移速度	最大250mm/min	Worktable rapid traverse speed	Max 250mm/min
冷却水供水压力	0.35~0.5MPa	Cooling water supply pressure	0.35~0.5MPa
冷却水回水压力	小于0.15MPa	Cooling water return pressure	less than 0.15MPa
冷却水温度	10℃~15℃	Cooling water temperature	10℃~15℃
冷却水流量	最大20m³/h	Cooling water flow	Max 20m³/h
供气压力	0.4~0.6MPa	Air supply pressure	0.4~0.6MPa
供气流量	最大40m³/h	Air supply flow	Max 40m³/h
动力电源	380V/50Hz	Dynamic power source	380V/50Hz
机床额定电流	280A	Machine rated electricity	280A
机床额定功率	165kW	Machine rated power	165kW
机床重量	12t	Machine weight	12t
机床尺寸	4430×2950×3110mm	Machine dimension	4430×2950×3110mm

特点 *Trait*

1. 切割速度快、单机产能大。
2. 适合切割超薄单晶硅片，提高硅料的出片率和材料利用率。
3. 切片表面损伤层浅，切割质量高。
4. 清洁生产，采用水基切割液切割，硅粉可回收再利用，同时减少废液环境污染。
5. 相比砂浆切割工艺，生产效率高，能耗大幅度降低。
6. 设备控制系统硬件可靠性高。采用西门子工控机、可编程控制器、伺服驱动系统、总线通讯系统进行控制，提供了便利的操作平台，运算速度快、数据传输可靠。
7. 设备具有断电保护功能，电源突然中断，机器可以安全停机，不断线，减少用户损失。
8. 设备具有远程调试功能（可选），可以对机器进行远程诊断、维护和软件升级。
9. 设备具有MES接口（可选），可以在生产过程中对机器的各种数据进行采集。
10. 人机界面友好，图示清晰，方便现场操作。

1. The cutting speed is fast, and each machine has a great productivity.
2. The machine is suitable for cutting ultrathin monocrystal silicon wafer to improve the wafer production rate of silicon material & material utilization rate.
3. The damage layer on cutting surface is shallow, and the cutting quality is high.
4. The production is clean by adopting water based cutting fluid to cut, and the silicon powder is recycled, which reduces the environmental pollution caused by waste fluid meanwhile.
5. Compared with mortar cutting technology, the production efficiency is higher, and the energy consumption decreases more sharply.
6. The hardware reliability of equipment control system is high. SIEMENS IPC, PLC, servo drive system, and bus communication system are adopted for controlling, which has provided a convenient operation platform, that the calculation speed is fast, and the data transmission is reliable.
7. The equipment possesses power-off protection function. When power source breaks off, the machine can halt safely without breaking wire, which reduces user's loss.
8. The equipment possesses remote debugging function (optional), which can diagnose & maintain the machine and upgrade the software remotely.
9. The equipment possesses MES connector (optional), then every kind of the machine's data can be gathered in production course.
10. Friendly HMI and clear icons facilitate the operation on spot.

切割工艺示意图
Cutting Technology Diagram
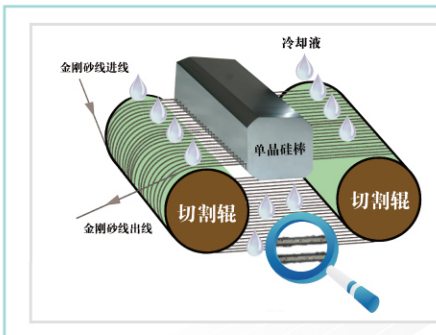
机器外型尺寸图
## Machine Overall Dimension Drawing
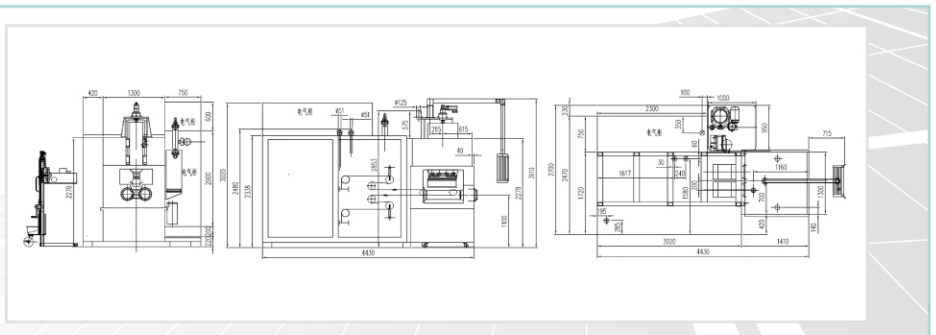
机器主要功能 Machine Main Function

❶切割区

机器设计的装料长度、切割辊中心距与金刚线切割工艺合理匹配，适合切割超薄硅片，提高硅料的出片率和利用率。

Cutting area

The material loading length designed for the machine and the cutting roller center distance match the diamond wire cutting technology reasonably, which is suitable for cutting ultrathin silicon wafer and improves the wafer production rate & utilization rate of silicon material.
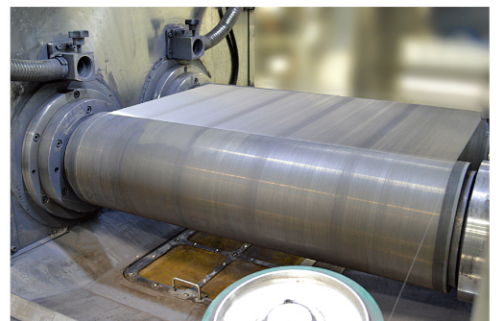
❷ 排线与张力控制系统

收放线、排线系统放设置在机器的同一侧，方便布线和装卸收放线辊。

排线过程中张力、位置控制精准，避免金刚石线表面损伤。

采用伺服电机控制张力，控制精度高。

Wire displacement & Tension control system

Wire collecting & laying system and wire displacement system are set on the machine's same side, which is convenient to displace wire and load & unload wire collecting & laying roller.

Tension and site are controlled precisely in wire displacement course to avoid damaging diamond wire's surface.

The control precision is high with adopting servo electrical motor to control tension.
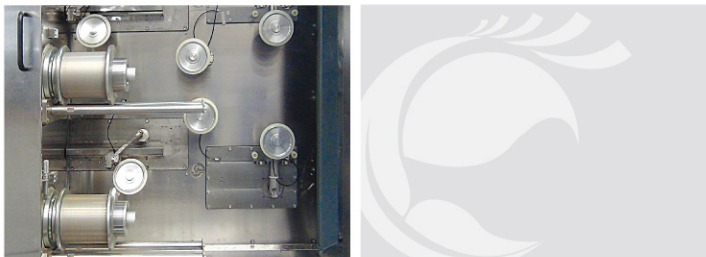
❸ 切割液与过滤系统

水基切割液成本低，可以循环利用。

用户可选配硅粉过滤系统，对切割液中的硅粉进行回收再利用。

Cutting fluid & Filtration system

The water based cutting fluid whose cost is low can be recycled. User can choose the optional silicon powder filtration system to recycle the silicon powder in cutting fluid.
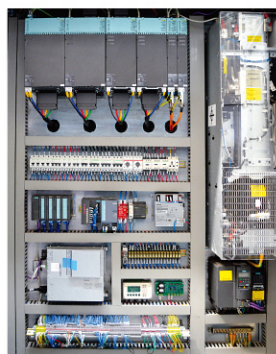
❹ 电气系统

采用西门子工控机、可编程控制器、伺服驱动系统、总线通讯系统，提供便利操作平台，运算速度快，传输数据可靠。

Electrical system

SIEMENS IPC, PLC, servo drive system, and bus communication system are adopted, which provides a convenient operation platform that the calculation speed is fast, and transiting data is reliable.

❺ 操作系统与人机界面友好

图示清晰、操作简易、安全可靠，具有实时记录与数据存储功能。用户可自主调节各项参数，使各参数达到最佳匹配。

Friendly operation system & HMI

The icons are clear, and the operation is simple, safe & reliable. The machine possesses the function of real-time recording and data saving. User can adjust every parameter independently to make every parameter reach the best match.

❻ 单独配备的上下料工具车，可方便地进行硅棒的上下料操作

With the material loading & unloading forklift equipped individually, loading & unloading silicon rod can be operated conveniently.
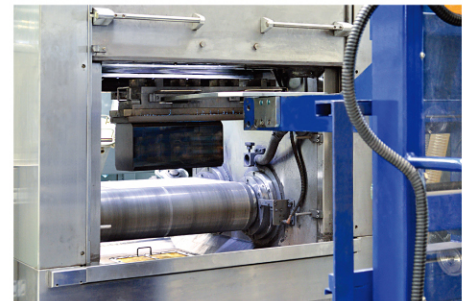
❼ 采用工具车装卸切割主辊

Adopt forklift to load & unload main cutting roller

❽ 配件及工具

收放线辊、切割主辊、粘料板、轴承箱装卸专用工具

Accessories & Tools

Wire collecting & laying roller, main cutting roller, material sticking plate, special tools for assembling & disassembling bearing box