

Linton

AUTOMATIC DEGLUING

Customized



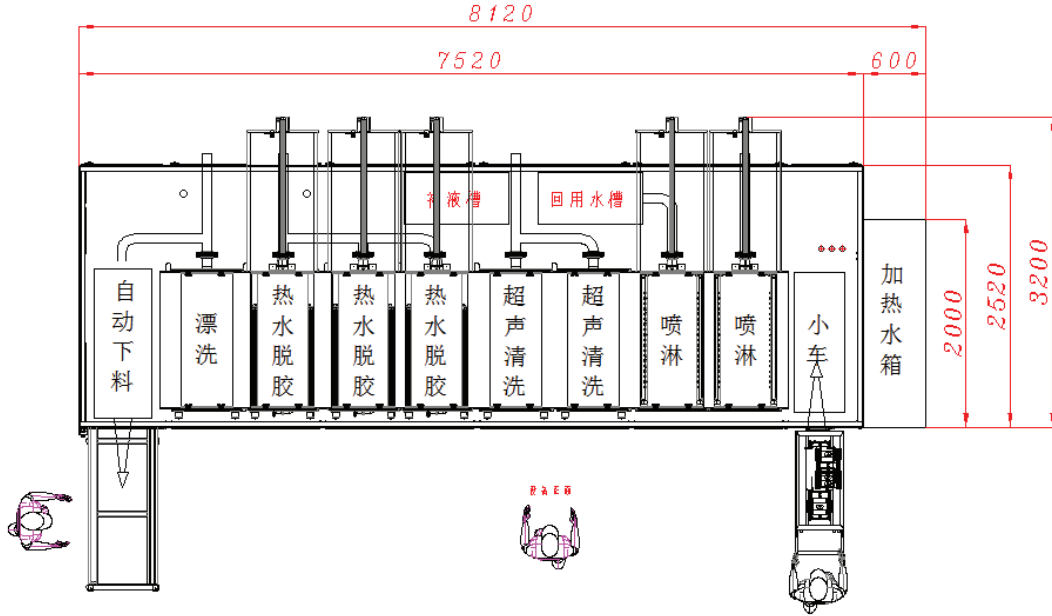
全自动脱胶机 Automatic Degluing Machine- Customized

1. 设备整体概述 Overall overview of the equipment

3.1 设备描述 Equipment description

序号 No	项目 Item	描述 Description
1	主要功能 Main Functions	对切片后的硅片进行脱胶 Degumming of sliced silicon wafers
2	上下料 Loading and unloading	手动拖车上料、下料槽自动下料 Manual trailer loading, automatic loading of the lower trough
3	过程控制 Process Control	品牌 PLC 自动控制, 设备自动处理 Brand PLC automatic control, equipment automatic processing
4	UPTIME	98% (24h/天, 年工作日在 353 天以上) 98% (24h/day, with 353+ working days per year)
5	MTBF	> 500H
6	MTRR	< 2H
7	设备噪音 Equipment noise	≤65 dB
8	挂载能力 Mounting capacity	≤200KG 运行, (2 套机械手) ≤200KG operation, (2 sets of robots)
9	设备方向 Equipment Direction	“右进左出” _____ 台以人正对设备操作面为参考方向 “左进右出” _____ 台以人正对设备操作面为参考方向 "Right-In-Left-Out" _____ table with a person facing the operating surface of the equipment as the reference direction "Left in, right out" _____ table with a person facing the operating surface of the equipment as the reference direction

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2. 设备设计参数 Equipment design parameters

4.1 生产能力 Production capacity

序号 No	项目 Projects	数据 Data
1	最大提升重量 Maximum lifting weight	≤200KG kg
2	生产时间 Production time	三班制 (注: 一天工作 24H/天, 330 天/年) Three shifts (Note: 24H/day for one day, 330 days/year)
3	节拍 Rhythm	<6-10min/批 (用户自定, 可调) <6-10min/batch (user-defined, adjustable)
4	适应晶棒 Adaptation of crystal bars	兼容 800-1000×300×250 的各种晶托 Compatible with various crystal trays from 800-1000×300×250
5	适应尺寸 Adapted size	各槽体尺寸: 满足 1000mm 晶棒 (含铁板、鸠尾座) 放入槽体运行 The size of each tank: to meet the 1000mm crystal bar (including iron plate, dove tail seat) into the tank operation

4.2 设备设计尺寸 Equipment design size

序号 No	项目 Projects	数据 Data
1	设备外型尺寸 Equipment size	(L8120×W3200×H2700)

备注: 尺寸仅供参考, 请以实际设计为准;

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Note: The dimensions are for reference only, please refer to the actual design.

3. 设备技术方案 Equipment Technology Solutions

5.1 设备清单 Equipment list

本自动设备由以下几个部分组成 This automatic equipment consists of the following parts

序号 No	名称 Name	数量 Quantity
1	上料小车 Loading trolley	6 辆 6 vehicles
2	自动配、补液系统 (酸)补液系统管理采用 PPH 材质 Automatic dispensing and refilling system (acid) refilling system management using PPH material	以实际设计为准 Subject to the actual design
3	高速移栽机械手 High-speed transfer robot	2 套 2 sets
4	电控箱 Electric control box	1 套 1 set
5	人机控制台 Human-machine console	1 套 1 set
6	脱胶花篮 Decoupage flower basket	12 个 12
7	酸性处理工位 Acid treatment station	3 个 3
	中性处理工位 Neutral handling station	5 个 5
	合计 Total	8 个工艺槽体 8 process tanks

5.2 工艺细节 Process details

序号 No	流程 Process	洗剂 Detergent	辅助 Auxiliary	加热棒 Heating Rod	时间 Time	温度 Temperature	补液 Rehydration fluid	溢流 Overflow	材质 Material	自动盖 Automatic cover	抽风 Twitch
上料 Loading											
1	喷淋 Spraying	水 Water	喷淋 Spraying	16Kw (储水箱) 16Kw (water storage tank)	<6min	40~60°C	/	排水 Drainage	SUS304	有 There are	有 There are
2	喷淋 Spraying	水 Water	喷淋 Spraying	16Kw (储水箱) 16Kw (water storage tank)	<6min	40~60°C	/	排水至储水箱 Drainage to storage tank	SUS304	有 There are	有 There are
3	超声清洗 Ultrasound	水 Water	超声 5Kw Ultrasound 5Kw	/	<6min	/	/	单面溢流 Single-sided overflow	SUS316	/	有 There are

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	nd please wash										
4	超声请洗 Ultrasound please wash	水 Water	超声 5Kw Ultrasound 5Kw	/	<6min	/	/	单面溢流 Single-sided overflow	SUS316	/	有 The re are
5	酸洗 Pickling	水-酸液 Water-acid solution	/	2*12Kw	<6min	50~80°C	有 There are	单面溢流 Single-sided overflow	SUS316	有 There are	有 The re are
6	酸洗 Pickling	水-酸液 Water-acid solution	/	2*12Kw	<6min	50~80°C	有 There are	单面溢流 Single-sided overflow	SUS316	有 There are	有 The re are
7	酸洗 Pickling	水-酸液 Water-acid solution	/	2*12Kw	<6min	50~80°C	有 There are	单面溢流 Single-sided overflow	SUS316	有 There are	有 The re are
8	漂洗 Rinsing	水 Water v	/	2*8Kw	<6min	30~60°C	/	溢流至储水箱 Overflow to storage tank	SUS304	/	有 The re are
下料											

5.3 功能描述 Function description

本设备处理功能：

This equipment handles functions:

满足单多晶晶棒脱胶（166~230mm 硅片）

Meet the single polycrystalline wafer debonding (166~230mm wafer)

槽体、侧壁可直接用水冲洗，维护方便；

The tank and side walls can be flushed directly with water for easy maintenance.

具备自动配液和自动排液功能；

With automatic liquid dispensing and automatic liquid draining functions.

5.4 设备组成 Equipment Composition

5.4.1 机架 Racks

机架构成设备的基本框架，由方通和扁通焊接而成；

The frame constitutes the basic framework of the equipment and is made of square and flat passages welded together.

方通和扁通位均为不锈钢管

Square pass and flat pass bit are stainless steel tube

槽体底部设计带有斜度，排液更彻底；

The bottom of the tank is designed with a slope for more thorough drainage.

5.4.2 封板 Seal plate

封板构成设备的结构，用不锈钢板；

Seal plates forming the structure of the equipment, made of stainless steel plates;

封板组成了抽风道、接水盘、设备前部观察维修门、设备后部维修门；

The sealing plate forms the extraction duct, the water catching tray, the observation and maintenance door at the front of the equipment, and the maintenance door at the rear of the equipment.

设备前部观察维修门全透明设计且配有门保护控制系统，方便观察设备的整体运行状况；

The front observation and maintenance door of the equipment is fully transparent and equipped with a door protection control system,

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which is convenient to observe the overall operation of the equipment.

设备气密性好，正常运行时无气味泄漏；

Good gas tightness of the equipment, no odor leakage during normal operation.

5.4.3 移载机械手 Load transfer manipulator

移载机械手实现清洗蓝按工艺流程顺序移动；

The transfer robot realizes the movement of the cleaning blue according to the process sequence.

移载机械手能实现上下、左右方向的移动；

The ability to move up and down, left and right directions with the transfer robot.

机械手的运行由伺服驱动器控制，能精确定位，（精度±1mm）；

The operation of the robot is controlled by a servo drive, capable of precise positioning, (accuracy ±1mm).

机械臂采用平稳控制方式，提篮不会晃动；

Smooth control of the mechanical arm so that the basket does not sway.

可以对各个槽处理时间单独设置，实现柔性管理，可以自动和手动转换并继续原程序运行；

The possibility of setting the processing time for each slot individually for flexible management, with the possibility of automatic and manual conversion and continuation of the original program.

机械手定位以接近开关和伺服脉冲互相校对，精度极高，安全性好；

Manipulator positioning with proximity switches and servo pulses calibrated against each other for high precision and safety.

机械手的承载力≤200Kg，机械手直接钩取工装；

The load-bearing capacity of the manipulator ≤ 200Kg, and the manipulator hooks the workpiece directly.

机械手设有压篮监控功能；

Manipulator with basket press monitoring function.

机械手上下移动设有上、下、上极限、下极限限位感应器；

Manipulator up and down movement with up, down, upper limit and lower limit limit sensors.

机械手槽面以上部分全部采用耐腐蚀材料，内部无电路转接板或相关转接盒；

All parts above the groove surface of the manipulator are made of corrosion-resistant materials, with no internal circuit adapter plates or related adapter boxes.

二个机械手之间有行程和光电保护，防止相撞，安全防护措施；

Safety measures with travel and photoelectric protection between the two manipulators to prevent collision.

机械手坦克链具备耐酸碱腐蚀，耐磨，耐热，高速运动无噪音，且有隔离片（线与线之间有挡片），有序规整；

Manipulator tank chain has acid and alkali corrosion resistance, wear resistance, heat resistance, high speed movement without noise, and there are isolation pieces (there is a block between the line and the line), orderly and regular.

电机和驱动器线缆，采用进口带屏蔽层柔性电缆；

Motor and drive cables, using imported flexible cables with shielding layer.

机械手横移导轨需设置在槽体侧面，以免药液腐蚀导轨；

Manipulator traverse guide needs to be set on the side of the tank to avoid corrosion of the guide by the chemical solution.

导轨上的滑块都要配备注油嘴，且安装位置方便注油操作；

slider on the guide rail are to be equipped with oiling nozzles, and the installation position is convenient for oiling operations.

5.4.4 喷淋槽（1# 2#槽） Spraying tank (1# 2# tank)

槽体尺寸：满足1000mm晶棒（含铁板、鸠尾座）放入槽体运行；

Tank size: to meet the 1000mm crystal bar (including iron plate, dove-tail seat) into the tank operation.

清洗介质：水；Cleaning medium：Water；

配、补液方式：水；Distribution, rehydration mode: water.

处理方式：喷淋；Treatment method: spraying.

进排水方式：自动；Inlet and outlet mode: automatic.

槽材质：SUS30482.0；Slot material：SUS30482.0.

加热：储水箱加热器（16KW）；Heating: water storage tank heater (16KW).

清洗温度：40~60°C；Cleaning temperature：40~60°C；

温度管理：欧姆龙温控传感器；Temperature management: Omron temperature control sensors.

溢流：排走；Overflow: Drainage.

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5.4.5 超声清洗槽 (3#, 4#) Ultrasonic cleaning tank (3 #, 4 #)

槽体尺寸: 满足1000mm晶棒(含铁板、鸠尾座)放入槽体运行;
 Tank size: to meet the 1000mm crystal bar (including iron plate, dove-tail seat) into the tank operation.
 清洗介质: 水; Cleaning medium: water;
 配、补液方式: 水; Distribution and rehydration method: water.
 处理方式: 浸泡; Treatment: immersion.
 辅助方式: 超声+溢流; Auxiliary mode: ultrasound + overflow.
 槽材质: SUS316δ2.0; Tank material: SUS316δ2.0.
 溢流: 排走; Overflow: draining away.

5.4.6 酸洗槽 (5#, 6#, 7#) Acid washing tank (5#, 6#, 7#)

槽体尺寸: 满足1000mm晶棒(含铁板、鸠尾座)放入槽体运行;
 Tank size: to meet the 1000mm crystal bar (including iron plate, dove-tail seat) into the tank operation.
 清洗介质: 水+酸液; Cleaning medium: water + acid;
 配、补液方式: 水、乳酸; Distribution and rehydration methods: water, lactic acid.
 处理方式: 浸泡; Treatment: immersion.
 辅助方式: 鼓泡; Auxiliary method: bulging.
 槽材质: SUS316δ2.0; Tank material: SUS316δ2.0.
 加热: 棒式加热器 (2*12KW); Heating: Rod heater (2*12KW);
 清洗温度: 50~80°C; Cleaning temperature: 50~80°C;
 温度管理: 欧姆龙温控传感器; Temperature management: Omron temperature control sensors.
 溢流: 排走; Overflow: draining away.

5.4.7 漂洗槽 (8#) Rinsing tank (8#)

槽体尺寸: 满足1000mm晶棒(含铁板、鸠尾座)放入槽体运行;
 Tank size: to meet the 1000mm crystal bar (including iron plate, dove-tail seat) into the tank operation.
 清洗介质: 水; Cleaning medium: water;
 处理方式: 浸泡; Treatment: immersion;
 辅助方式: 单边溢流; Auxiliary mode: unilateral overflow;
 槽材质: SUS304δ2.0; Slot material: SUS304δ2.0;
 辅助方式: 鼓泡; Auxiliary method: bulging;
 加热: 棒式加热器 (2*8KW); Heating: Rod heater (2*8KW);
 清洗温度: 30-60°C; Cleaning temperature: 30-60°C;
 温度管理: 欧姆龙温控传感器;
 Temperature management: Omron temperature control sensors;
 溢流: 8#槽→储水箱→1#槽→排走;
 Overflow: 8# tank → storage tank → 1# tank → discharge away;

5.4.8 设备安全 Equipment safety

报警可分不同等级, 连锁, 用户可根据实际情况决定下步动作 (如停机、排液等);
 Alarm can be divided into different levels, chain, the user can decide the next action according to the actual situation (such as stop, drain, etc.).
 符合中国设备电气安全法规;
 Compliance with Chinese equipment electrical safety regulations.
 在调试和试生产过程中不能出现设备安全事故(以EHS部的评判为依据);
 No equipment safety accidents can occur during commissioning and trial production (based on the judgment of the EHS Department).
 设备工作区域有安全防护措施; Safety precautions in the working area of the equipment.
 设备使用材料、电气件、管路要符合安全标准, 管道走向无叠加在一起现象;
 Equipment using materials, electrical parts, pipelines to meet safety standards, pipeline direction without superimposed together phenomenon.
 设备操作要严格按照操作说明书进行, 操作维护人员要进行专门的培训;
 The operation of the equipment should be carried out in strict accordance with the operating instructions, and the operation and

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maintenance personnel should be specially trained.

可能对人体造成伤害的部分，在设备上有明显的警告标示；

Parts that may cause harm to humans are clearly marked with warnings on the equipment.

专业操作部分在设备上有明确的警告标示；

Professional operating sections are clearly marked with warnings on the equipment.

特殊部分有明确操作步骤；

Special sections with clear operational steps.

5.4.9 信息化集成要求 Information integration requirements

设备主 PLC 必须带有以太网口，并预留至少一个空余接口（配有小型交换机亦可）。且设备主 PLC 的 IP 地址及端口号可以根据用户的需求进行现场配置。如需要出厂时事先配置好 IP 的设备（现场不能再修改）用户可提前根据厂商需求提供相应的 IP 地址。

The main PLC must have an Ethernet port with at least one spare interface (a small switch is also available). And the IP address and port number of the main PLC can be configured on site according to the user's needs. If you need to factory-configured IP equipment (on-site can not be modified), you can provide the corresponding IP address in advance according to the manufacturer's requirements.

如果某一厂商设备较多，且已有自身局域网可由设备厂商增加路由器对其网络内的所有设备做好端口映射，并将映射对应关系表提供给用户。

If a vendor has more devices and has its own LAN, the device vendor can add a router to map all devices in its network and provide the mapping correspondence table to users.

有上位机软件的设备可提供 OPC 协议（建议如可直连至 PLC 尽量避免采用此种方式，因目前大多数上位软件支持的 OPC 协议为 OPC DA 协议，此协议集成时配置步骤繁琐，且后期稳定性差。如设备支持 OPC UA 协议则建议使用此方式）。

The OPC protocol is available for devices with host software (it is recommended to avoid this method if direct connection to PLC is available, because most of the OPC protocols supported by host software are OPC DA protocol, which is cumbersome to configure during integration and has poor stability later. (If the device supports OPC UA protocol, it is recommended to use this method).

设备如配有关系型数据库（如：Mysql、oracle、sql server）则可以采用 ODBC 方式采集数据。

If the device is equipped with a relational database (e.g., Mysql, oracle, sql server), the data can be collected by ODBC.

设备上位机软件如为自主开发（非第三方组态软件），可以采用 web service 接口的集成方式。

If the device upper computer software is self-developed (not third-party configuration software), the integration method of web service interface can be used.

对于既没有 PLC，也没有上位机软件的设备（如嵌入式的控制电路板）应支持最常见的 Modbus 协议（需配有串口转 RJ45 模块），便于系统集成。每个设备厂家必须提前告知用户需要做集成时需要用到的网络点位数量（网线数量）以及 IP 地址数量，以使用户提前安排弱电施工计划及规划 IP 地址，避免造成资源浪费。

For devices that have neither PLC nor upper computer software (such as embedded control boards) should support the most common Modbus protocol (need to be equipped with a serial to RJ45 module) to facilitate system integration. Each equipment manufacturer must inform the user in advance of the number of network points (number of network cables) and the number of IP addresses that need to be used when doing integration, so that the user can arrange the weak construction plan and plan the IP addresses in advance to avoid wasting resources.

5.4.10 设备软件要求 Equipment software requirements

5.4.10.1 通讯接口 Communication interface

1、提供机台所有 PLC 地址清单。Provide a list of all PLC addresses of the machine.

2、设备机台预配备安装支持标准 OPC 协议网络模块，便于网络接入对机台数据进行采集及控制。

The equipment is pre-equipped with a network module supporting standard OPC protocol, which is convenient for network access to collect and control the data of the machine.

3、采用总线通讯系统，实现多轴联动，可快速抓取处理生产数据，对接大数据系统实现智能监控，信息以太网模式接入生产 MES 系统，独立触摸屏操控，电气元件采用 IP67 防水等级。

Adopt bus communication system, realize multi-axis linkage, can quickly capture and process production data, dock to big data system to realize intelligent monitoring, information can be connected to production MES system in Ethernet mode, independent touch screen control, electrical components with IP67 waterproof grade.

4、对于检测类设备，上位机程序数据保存到 Access, SQL server 等标准的关系型数据文件中。

For the detection class equipment, the upper computer program data is saved to Access, SQL server and other standard relational data files.

5、机台设备根据需求方增加状态模式切换（点检、维修、保养、停机等），实时故障报警，硬件参数上传。

machine equipment according to the demand side to increase the state mode switching (spot check, repair, maintenance, shutdown, etc.), real-time fault alarm, hardware parameters upload.

6、操控屏幕可接入扫描枪设备(USB),实现扫码交互。

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The control screen can be connected to the scanning gun device (USB) to realize the scanning code interaction.

7、提供以太网接口，提供 PLC 各级密码，以满足工厂 MES 生产信息化管理系统的需求。

Provide Ethernet interface and provide PLC password at all levels to meet the needs of factory MES production information management system.

5.4.10.2 HMI 功能 HMI functions

1、Warm/Alarm 等信息的指导性内容（含报警自我诊断相关联点提示及排查顺序）并可由高等级密码界面修改添加。

Warm/Alarm and other information of the guiding content (including alarm self-diagnosis associated with the point tips and troubleshooting sequence) and can be added by the high level password interface modification.

2、HMI 应具备每班的产量、每天的产量，数据在未清零前具备保存一个月的数据，并且具备详细的报警故障信息，以便于故障的快速排除，触摸屏必需有 I/O 点位显示及故障报警详细提示信息界面。

HMI should have the output of each shift, daily output, data before the data is not zeroed with a month of data storage, and has a detailed alarm fault information, so as to facilitate rapid troubleshooting, touch screen must have I/O point display and failure alarm detailed prompt information interface.

3、触摸屏增加维修保养界面（红色背景黑色大号文字），当点击维修界面时，在不输入密码情况下不能进入其他界面。

Touch screen to increase the maintenance interface (red background black large text), when clicking the maintenance interface, in the case of not entering the password can not enter other interfaces.

4、触摸屏操作界面可繁体中文、英文双语切换。

Touch screen operation interface can be switched between traditional Chinese and English.

5.4.10.3 程序设置权及密码 Program setting rights and passwords

分级设计，设置分级密码，分别定义不同人员的权限，做动态密码分权限控制。触摸屏画面设置高级参数密码。

Graded design, set graded passwords, define the rights of different personnel respectively, and do dynamic password sub-rights control. Touch screen screen to set advanced parameter password.

4. 动力条件要求 Power conditions requirements

6.1 设备电力供应 Equipment power supply

项目 Projects	数据 Data
操作控制回路 Operation control circuit	DC24V
设备总功率 Total power of equipment	1、~130KW（含预热槽功率） ~130KW (including preheating tank power) 2、480v, 60Hz, 3 相 5 线制 480v, 60Hz, 3 phase 5 wire system 3、设备进线开关上侧配备进线铜排（铜排 10cm，根据载流量选配），铜排从开关上侧引出 10cm；The upper side of the equipment inlet switch is equipped with an inlet copper row (copper row 10cm, optional according to the load capacity), and the copper row is led 10cm from the upper side of the switch. 4、设备内部各个电源最终全部集中在电柜内接线端子； Each power supply inside the equipment eventually all concentrated in the electrical cabinet terminals. 5、设备技术协议约定电源，厂家到货设备必须保持一致； The technical agreement of the equipment agreed power supply, the manufacturer's arrival of equipment must be consistent.

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6.2 设备公用工程条件 Equipment utility conditions

表 1-1 化学品参数
Table 1-1 Chemical parameters

介质 Media	温度[°C] Temperature	预留端口 Reserved ports	性质 Characteristic	压力 [mpa] Pressure	消耗量 [m ³ /h] Consumption
液体 Liquid					
水 Water	RT	2"PPR 管 (1 处) 2" PPR pipe (1 place)	/	0.25±0.05	/
乳酸 Lactic acid	RT	1"PPH 接头 1" PPH connector	/	/	由反应决定 Determined by reaction
气体 Gases					
压缩空气 Compressed air	RT	Φ10 气管接头 Φ10 gas pipe fitting	露点 < -40°C Dew point < -40°C	0.6±0.05	5

表 1-2 排水管连接
Table 1-2 Drainage pipe connection

排放类型 Type of emission	温度 [°C] Temperature	性质 Characteristic	连接 Connections	材质 Material
含碱/酸废水排放 Discharge of wastewater containing alkali/acid	< 60°C	含酸废水 Acid-containing wastewater	DN80	PPR
废水排放 Wastewater discharge	< 60°C	DI 废水 wastewater	DN80	PPR

4.3 设备环境 Equipment environment

项目 Projects		指标 Indicators
设备工作环境 Equipment working environment	温度 Temperature	19~25°C
	相对湿度 Relative Humidity	< 70%
	海拔高度 Altitude	3000m 以下 Below 3000m
设备存放环境 Equipment storage environment	温度 Temperature	5~40°C (在温度低于零度时注意对管道进行防冻保护措施) (pay attention to anti-freeze protection measures for pipes when the temperature is below zero)
	24 小时内温差 Temperature difference in 24 hours	< 20°C
	海拔高度 Altitude	15000m 以下 Below 15000m
	相对湿度 Relative Humidity	< 90%

5. 元器件清单 Component List

7.1 主要元件清单 List of main components

序号 No	名称 Name	规格 Specification	供应商 Suppliers
1	PLC	设计选型 Design Selection	西门子 Siemens
2	触摸屏 Touch Screen	10 寸	威纶 Wylon
3	塑壳断路器 Plastic Case Circuit Breaker	A 系列 A Series	施耐德/正泰 Schneider/Chint
4	漏电断路器 Earth leakage circuit breaker	GS 系列 GS Series	施耐德/正泰 Schneider/Chint
5	固态继电器 Solid State Relays	KSI 系列 KSI Series	旭瑞
6	交流接触器 AC Contactors	AX 系列 AX Series	施耐德/正泰 Schneider/Chint
7	中间继电器 Intermediate Relay	AR 系列 DC24V AR Series DC24V	施耐德 Schneider
9	光电开关 Optical switch	设计选型 Design Selection	OMRON (日本) /LANBAO OMRON (Japan)/LANBAO
10	按钮开关 Push Button Switch	LA 系列 LA Series	长江 Yangtze River
11	升降马达 Lifting motor	伺服电机 Servo Motor	西门子 Siemens
12	平移马达 Panning motor	伺服电机 Servo Motor	西门子 Siemens
13	滑块 Slider	设计选型 Design Selection	上银 (台湾) /银泰 Shangyin (Taiwan)/Yintai
14	滚珠丝杆 Ball Screws	SFU2510 系列 SFU2510 Series	上银 (台湾) /银泰 Shangyin (Taiwan)/Yintai
18	气缸 Cylinder	设计选型 Design Selection	亚德客 Ardeche
19	磁性开关 Magnetic switch	D 系列 D Series	亚德客 Ardeche
20	电磁阀 Solenoid Valve	设计选型 Design Selection	亚德客 Ardeche
21	三相异步电动机 Three-phase asynchronous motor	设计选型 Design Selection	万鑫 Wanxin
23	泵 Pump	设计选型 Design Selection	南方泵 Southern Pumps
24	电加热器 Electric heater	12KW	/

由于市场的变化或产品的升级，设备实际采用会有所不同，但保证替代品的品质会更优。

The actual adoption of the equipment will vary due to market changes or product upgrades, but the alternatives are guaranteed to be of better quality .

7.2 专用工具清单 List of special tools

序号 No	名称 Name	规格 Specification	供应商 Suppliers	数量 Quantity
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1	活动扳手 Activity Wrench	10 吋	国产 Homemade	1 把 1 hand
2	内六角扳手 Hexagonal wrench	/	国产 Homemade	1 套 1 set
3	一字螺丝批 One-way screwdriver	200	国产 Homemade	1 把 1 hand
4	十字螺丝批 Phillips screwdriver	200	国产 Homemade	1 把 1 hand

7.3 备品备件清单 Spare parts list

序号 No	备件名称 Spare parts name	规格型号 Specification Model	品牌 Brands	单位 Unit	数量 Quantity	备注 Remark
1	液位开关 Liquid level switch	耐高温不锈钢 (弯) High temperature resistant stainless steel (curved)	国产 Homemade	件 Pieces	6	
2	带方形座轴承 Bearing with square seat	UCFC206	哈轴 Ha axis	件 Pieces	4	
3	横移齿轮 Traversing Gear	Z=20,M=3,附图 FC17-006-02- 18 Z=20,M=3,Attachment FC17-	哈轴 Ha axis	件 Pieces	2	
4	滑块 Slider	SBR40UU	国产 Homemade	件 Pieces	8	
5	发生器 Generator	28KHz, 2.4Kw	国产 Homemade	件 Pieces	9	
6	带立式座轴承 Bearing with vertical seat	UCP205,塑料底座, SUS304 轴 承 UCP205-bearing steel	哈轴 Ha axis	件 Pieces	6	
7	带方形座轴承 Bearing with square seat	UCF205, 轴承钢 UCF205, bearing steel	哈轴 Ha axis	件 Pieces	6	
8	骨架油封 Simmerring oil seal	35*25*7, 丁晴橡胶 35*25*7, Buna-N	国产 Homemade	件 Pieces	6	
9	气缸 Cylinder	MFD32*75S,附 2 个磁感应开关 MFD32*75S,with 2 magnetic induction switches	AIRTAC	件 Pieces	3	
10	喷嘴 Nozzle	2005DT-1/4-PP-6510,3 巴, 3.9L/min 2005DT-1/4-PP-6510, 3 bar, 3.9L/min	科艺 Science and Technology	件 Pieces	1500	
11	电磁阀 Solenoid Valve	4V210-08-B	AIRTAC	件 Pieces	8	
12	电磁阀 Solenoid Valve	4V220-08-B	AIRTAC	件 Pieces	10	

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7.4 易损件清单 List of wearing parts

序号 No	备件名称 Spare parts name	规格型号 Specification Model	品牌 Brands	单位 Unit	数量 Quantity	备注 Remark
1	液位开关	耐高温不锈钢 (弯)	国产	件	6	
2	带方形座轴承	UCFC206	哈轴	件	4	
3	滑块	SBR40UU	国产	件	8	
4	带立式座轴承	UCP205,塑料底座, SUS304 轴承	哈轴	件	6	
5	带方形座轴承	UCF205, 轴承钢	哈轴	件	6	
6	骨架油封	35*25*7, 丁晴橡胶	国产	件	6	
7	喷嘴	2005DT-1/4-PP-6510,3 巴, 2.0L/min	科艺	件	1500	

6. 安全性能 Safety Performance

8.1 参考标准和规范 Reference standards and specifications

- 《通用用电设备配电设计规范》 GB50055-2011
Design Code for the Distribution of General Electricity Equipment GB50055-2011
- 《流量测量节流装置用孔板、喷嘴和文丘里管测量充满圆管的流体流量》 GB/T2624-93
Flow measurement throttling device with orifice, nozzle and venturi to measure the flow of fluid filled with a circular tube GB/T2624-93
- 《工业自动化仪表工程施工及验收规范》 GB50093-2013
Specification for Construction and Acceptance of Industrial Automation Instrumentation Engineering GB50093-2013
- 《石油化工企业设计防火规范》 (99 年修订)GB50160-2008
Code of Practice for the Design of Petrochemical Enterprises (Revised in 1999) GB50160-2008
- 《自动化仪表选型规定》 HG/T20507-2000
Provisions on the Selection of Automation Instruments HG/T20507-2000
- 《控制室设计规定》 HG/T20508-2000
Control Room Design Regulations" HG/T20508-2000
- 《仪表供电设计规定》 HG/T20509-2000
Instrument Power Supply Design Provisions" HG/T20509-2000
- 《仪表供气设计规定》 HG/T20510-2000
Design Provisions for Instrument Gas Supply" HG/T20510-2000
- 《信号报警、联锁系统设计规定》 HG/T20511-2000
Design Provisions for Signal Alarm and Interlocking System" HG/T20511-2000
- 《可编程序控制器系统设计规定》 HG/T20700-2000
Design Provisions for Programmable Controller System" HG/T20700-2000
- 《过程测量和控制仪表的功能标志和图形符号》 HG/T20505-2000
Functional signs and graphic symbols for process measurement and control instruments" HG/T20505-2000
- 《仪表配管配线设计规定》 HG/T20512-2000
Instrument Piping and Wiring Design Regulations" HG/T20512-2000
- 《仪表系统接地设计规定》 HG/T20513-2000
Instrument System Grounding Design Regulations" HG/T20513-2000
- 《自控安装图册》 HG/T21581-2010
Self-Control Installation Drawing Book" HG/T21581-2010
- 《化工装置自控工程设计规定》 HG/T20636-20639-98

Design Regulations of Chemical Plant Self-Control Engineering" HG/T20636-20639-98
 《钢制管法兰、垫片、紧固件》HG20592~20635-2009
 Steel pipe flanges, gaskets, fasteners" HG20592~20635-2009
 《供配电系统设计规范》GB50052-2009
 Code for the Design of Power Supply and Distribution Systems GB50052-2009
 《10kV 及以下变电所设计规范》GB50053-94
 Design Code for Substation of 10kV and below GB50053-94
 《低压配电设计规范》GB50054-2011
 Low-voltage Distribution Design Code GB50054-2011
 《工业与民用电力装置的接地设计规范》GBJ65-1983
 Grounding Design Code for Industrial and Civil Power Installations" GBJ65-1983
 《石油化工静电接地设计技术规范》HG3097-2000
 Technical Specification for Electrostatic Grounding Design of Petrochemical Industry HG3097-2000
 《电力工程电缆设计规范》GB50217-2007
 Specification for the Design of Electric Power Engineering Cables GB50217-2007

8.2 设备安全 Equipment safety

设备操作要严格按照操作说明书进行，操作维护人员要进行专门的培训；
 The operation of the equipment should be carried out in strict accordance with the operating instructions, and the operation and maintenance personnel should be specially trained.
 可能对人体造成伤害的部分，在设备上有明显的警告标示；
 Parts that may cause harm to humans are clearly marked with warnings on the equipment.
 专业操作部分在设备上有明确的警告标示；
 Professional operating sections are clearly marked with warnings on the equipment.
 特殊部分有明确操作步骤；
 Special sections with clear operational steps.

8.3 设备上的安全标志 Safety signs on the equipment

设备运行状态三色指示灯，绿色：设备正常运行中，黄色：设备休止或其他，红色：设备异常或故障；
 Three-color indicator for equipment operation status, green: equipment in normal operation, yellow: equipment rest or other, red: equipment abnormal or fault.
 设备操作主要控制台，包括有手动/自动转换开关，蜂鸣器停止开关，自动启动、停止开关，紧急停止开关等；
 Main console for equipment operation, including a manual/automatic transfer switch, buzzer stop switch, automatic start and stop switch, emergency stop switch, etc..
 各处紧急停止开关和安全操作标识；
 Emergency stop switches and safety operation signs at all locations.
 设备主体部分紧急停止开关；
 Emergency stop switch for the main part of the equipment.
 电控柜总电源安全警告标识；
 Safety warning signs for the main power supply of the electric control cabinet.
 设备高温警告标识；
 Equipment high temperature warning signs.
 上料台处安全操作警告标识；
 Warning signs for safe operation at the loading table.
 机械手操作维护方法提示；
 Tips on how to operate and maintain manipulators.
 机械手操作保养方法提示；
 Tips on how to operate and maintain robots.
 机械手动操作控制开关；
 Manually operated control switches for manipulators.
 电气盒操作安全警告及手动阀门在设备运行时开关状态指示牌标识；
 Mechanical hand operation safety warnings and manual valve opening and closing status indicator signs during equipment operation.

各类安全标识

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Various safety signs



9. 设备安装和调试 Equipment installation and commissioning

9.1 设备的安装和调试 Installation and commissioning of equipment

设备的安装由釜川（无锡）负责，并于安装前一到两周提供安装场地要求；

The installation of the equipment is the responsibility of FIT (Wuxi) and the installation site requirements are provided one to two weeks prior to the installation.

在调试条件具备后，由客户开始设备的调试工作；

Commissioning of the equipment by the customer when the conditions for commissioning are available.

在客户提供保证条件的情况下，釜川（无锡）应按进度日程，保证质量完成安装调试工作；

FIT (Wuxi) shall complete the installation and commissioning work according to the schedule and with quality assurance, provided that the customer provides guaranteed conditions.

9.2 出厂测试 Factory test

验收流程，在釜川（无锡）完成设备安装以后，双方在釜川（无锡）工厂进行设备的出厂验收工作。在双方共同监督下进行设备运行状态模拟（上海釜川提供市水/洁净压缩空气/不含加热的电力负载支持）。如果设备能够完全满足规定的指标，即证明设备出厂验收合格。

Acceptance process, after the installation of the equipment at FIT Wuxi, the factory acceptance of the equipment is carried out at the FIT Wuxi factory. Simulation of the operating condition of the equipment is carried out under the supervision of both parties (FIT Shanghai provides municipal water/clean compressed air/electric load without heating support). If the equipment fully satisfies the specified specifications, the equipment is certified as qualified for factory acceptance.

验收地点：釜川（无锡）厂内；

Acceptance site: FIT (Wuxi) plant.

验收条件：满足釜川（无锡）模拟运行/静态检测条件；

Acceptance conditions: meet the FIT (Wuxi) simulation operation/static testing conditions.

9.3 最终验收 Final acceptance

验收流程，在客户指定地点完成设备安装和调试以后，双方进行设备的验收工作。在双方共同监督下进行连续 7 天的生产。如果设备能够完全满足以下规定的指标，即证明设备验收合格，双方可签署验收合格证书

Acceptance process, after completing the installation and commissioning of the equipment at the customer's designated location, both parties will carry out the acceptance of the equipment. Under the joint supervision of both parties, the production will be carried out for 7 consecutive days. If the equipment can fully meet the following indicators, it is proved that the equipment is accepted and both parties can sign the acceptance certificate

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验收地点: 客户厂内 ; Acceptance location: customer's plant.

验收条件: 满足釜川 (无锡) 提供的 FUM 清单电力项目;

Acceptance conditions: meeting the FUM list electricity items provided by FIT

设备未注明细节按照釜川 (无锡) 标准生产;

Equipment not specified in detail manufactured according to FIT standards.

设备连续试生产运行 7 日后, 若设备正常运转, 客户须进行正式验收;

After 7 days of continuous trial production operation, if the equipment is in normal operation, the customer shall conduct formal acceptance.

未验收的设备不可投入生产, 若投入生产的设备完全等同于已经验收合格;

Unaccepted equipment may not be put into production, if the equipment put into production is exactly the same as having been accepted.

验收签署的报告作为验收的依据, 验收报告双方各执一份;

Acceptance of the signed report as the basis for acceptance, a copy of the acceptance report for each side

10. 质量保证及措施 Quality assurance and measures

10.1 质量保证要求 Quality assurance requirements

釜川 (无锡) 对设备售后的质保期为 1 年;

FIT warrants the equipment for 1 year after sale.

设备设计布局图在合同生效 20 个工作日后提供;

Equipment design layout drawings to be provided 20 working days after contract commencement.

工艺布局、设备布置、总装配图等技术文件需经双方确认会签后方可投入施工;

Process layout, equipment layout, general assembly drawings and other technical documents need to be confirmed and countersigned by both parties before they can be put into construction.

釜川 (无锡) 保证所有材料和零部件的质量、规格、品牌、产地与合同要求相符;

Kama River (Wuxi) guarantees that the quality, specifications, brand and origin of all materials and components are in accordance with the contract requirements.

客户在协议签订后, 若在设计、制造过程中有技术、工艺改动, 需双方确认后生效, 同时协商是否延期交货以及其他相关事项;

After the agreement is signed, if there are technical and technological changes in the design and manufacturing process, both parties need to confirm before the agreement can take effect, while negotiating whether to delay delivery and other related matters.

由于技术的不断进步, 允许釜川 (无锡) 做以提高设备性能的技术调整;

Due to continuous technological progress, Kama River (Wuxi) is allowed to make technical adjustments to improve the performance of the equipment.

釜川 (无锡) 制造施工应严格执行图纸、技术文件和有关规定的要求, 并进行各方面的技术质量监督控制;

FIT manufacturing construction should strictly implement the requirements of drawings, technical documents and relevant regulations, and carry out technical quality supervision and control in all aspects.

客户在釜川 (无锡) 制造过程中对制造质量进行中间检查。设备出厂前客户在釜川 (无锡) 工厂进行预验收;

Intermediate inspection of manufacturing quality by the customer during the manufacturing process in Kama River (Wuxi). Pre-inspection by the customer at the FIT factory before the equipment leaves the factory.

釜川 (无锡) 提供的设备必须运转正常、安全可靠、外观美化、色调和谐;

The equipment provided by FIT must be in normal operation, safe and reliable, with a beautified appearance and harmonious color.

每台设备在运行时应平稳、无爬行撞击或抖动泄漏等不良现象, 加热系统安全可靠, 风管布置合理;

Each equipment should be smooth in operation, no crawling impact or shaking leakage and other undesirable phenomena, safe and reliable heating system, reasonable air duct arrangement.

所有电器、配电箱及控制箱的设计安装, 应符合国家电器技术的安全标准, 所有机械安装应符合国家有关规定的要求和精度等级;

The design and installation of all electrical appliances, distribution boxes and control boxes shall conform to the national safety standards for electrical technology, and all mechanical installations shall conform to the requirements and precision levels of the relevant national regulations.

水路、气路, 风路连接处, 不得有漏气、漏风、漏水等现象;

Water, air and wind connections must not have air, wind or water leaks.

设备各衔接处, 应平直, 金属表面喷涂应平整、光滑、无漏漆、颜色均匀;

Each articulation of the equipment, should be straight, metal surface spraying should be smooth, smooth, no leakage of paint, uniform color.

设备、热风机或其他动力设备应有良好的过载保护, 并有紧急制动等保护装置;

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Equipment, heaters or other power equipment should have good overload protection, and have emergency brakes and other protective devices.

文件确认方式：签字、正式传真、会议纪要；

Document acknowledgement methods: signature, official fax, minutes of meetings.

10.2 质量保证措施 Quality assurance measures

设计控制：釜川（无锡）依据本协议的全部要求，并按照行业规范，做出合理的设计，并在与客户交流过程中，不断优化方案设计。对设备的线体、传动、动力、气动、温控等部分的结构、选型必须留有余量，保证能够长期安全、可靠、稳定地运行，为客户保证产品质量提供最基本的条件；

Design control: FIT makes reasonable design according to all the requirements of this agreement and in accordance with the industry norms, and constantly optimizes the program design during the communication with the customer. The structure and selection of the line body, transmission, power, pneumatic, temperature control and other parts of the equipment must be left to ensure that it can operate safely, reliably and stably for a long time, providing the most basic conditions for customers to ensure product quality.

上海釜川分供方的审查认定：为釜川（无锡）提供原材料、部件、整机的分供方，需要有对其质量保证的认证。釜川（无锡）提供封样样品，客户按封样验收；

Review and recognition of FIT Shanghai sub-suppliers: Sub-suppliers who provide raw materials, components and complete machines to FIT Wuxi need to have certification of their quality assurance. FIT Wuxi provides sealed samples and the customer accepts them according to the sealed samples.

制造过程控制：釜川（无锡）为客户制作设备的过程中，应严格按照规定进行过程控制，保证按设计要求生产出合格产品；

Manufacturing process control: In the process of making equipment for customers, FIT Wuxi shall carry out process control in strict accordance with the regulations to ensure that qualified products are produced according to the design requirements.

生产的检验和验收：釜川（无锡）在设备制作过程中和形成部件成品后，进行严格的检验和试验，不合格品不得进入下一工序；

Inspection and acceptance of production: FIT Wuxi conducts strict inspections and tests during the production of equipment and after the formation of finished parts, and unqualified products are not allowed to enter the next process.

搬运、存储、包装、防护和交付：釜川（无锡）应采取保证产品质量的措施，这种保护应延续到交付的目的地，直至安装、调试完毕，交付客户验收；

Handling, storage, packaging, protection and delivery: FIT Wuxi shall take measures to ensure the quality of the product, and such protection shall continue to the destination of delivery until installation, commissioning and delivery to the customer for acceptance.

安装、调试：釜川（无锡）按行业规定进行设备的安装、调试；

Installation and commissioning: FIT Wuxi carries out the installation and commissioning of equipment according to industry regulations.

11. 技术服务与培训 Technical service and training

11.1 备品备件 Spare parts

免费提供从调试之日起一年的技术支持、服务及设备正常使用及维护所需的备品备件；

Free technical support, service and spare parts required for the normal use and maintenance of the equipment for one year from the date of commissioning.

验收完成，釜川（无锡）提供以下清单：

Acceptance is complete and FIT (Wuxi) provides the following list:

保修期外三年强制配备部分（价格不包含在设备报价中，需要客户另行购买/放置在客户工厂备件库）；

Compulsory equipment part for three years outside the warranty period (the price is not included in the equipment quotation and needs to be purchased separately by the customer/placed in the customer's factory spare parts store).

保修期外三年推荐配备部分（价格不包含在设备报价中，需要客户另行购买/放置在釜川（无锡）工厂内）；

Recommended equipment part for three years outside the warranty period (price is not included in the equipment quotation and needs to be purchased separately by the customer/placed in the FIT (Wuxi) factory).

保修期外三年易损件部分（价格不包含在设备报价中，需要客户另行购买/放置在釜川（无锡）工厂内）；

The part of wearing parts for three years outside the warranty period (the price is not included in the equipment quotation and needs to be purchased separately by the customer/placed in the FIT (Wuxi) factory).

11.2 软件服务 Software Service

提供设备相关硬件、软件升级服务；

Providing equipment-related hardware and software upgrade services.

硬件升级包括：自动化升级和搭接模块升级，速度提升，产量提升等；

Hardware upgrades including: automation upgrades and lap module upgrades, speed increases, yield increases, etc..

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软件升级包括：正常设备软件升级，生产管理系统 MES，射频识别 RFID 等；

Software upgrade including: normal equipment software upgrade, production management system MES, RFID, etc..

设备主 PLC 必须带有以太网口，并预留至少一个空余接口（配有小型交换机亦可）及相关通讯模块（作设备间交互使用）。设备 PLC 应支持 S7 TCP/IP Ethernet、Modbus TCP/IP、EtherNet/IP 等主流协议中的一种。

The main PLC of the equipment must have an Ethernet port and at least one spare interface (with a small switch) and related communication modules (for interaction between devices). The equipment PLC should support one of the mainstream protocols such as S7 TCP/IP Ethernet, Modbus TCP/IP, EtherNet/IP, etc.

有上位机软件的设备需提供 OPC Server、ODBC、web service 接口的集成方式。

Devices with upper computer software need to provide OPC Server, ODBC, web service interface integration method.

11.3 操作培训 Operation Training

设备试生产运行期间，提供详细的操作、维护、应急处理培训，具体内容如下：

Detailed training on operation, maintenance and emergency handling is provided during the trial production operation of the equipment, as follows.

序号 No	内容 Content	参与培训人员 Training Participants	开始时间 Start time	时间 Time	备注 Remarks
1	设备原理 结构培训 Equipment Principle Structural Training	负责设备的电气及机械 工程师 Electrical and mechanical engineer in charge of the equipment	在用户通电调试 一周后 After a week of commissioning by the user	0.5-2 天 0.5-2 days	提供设备说明书及培训资料及相关录 像资料 Provide equipment manuals and training materials and related video materials
2	应急处理 维修保养 Emergency Handling Maintenance	负责设备的电气及机械 工程师 Electrical and mechanical engineer in charge of the equipment	在用户通电调试 一周后 After a week of commissioning by the user	0.5-3 天 0.5-3 days	提供设备说明书及培训资料及相关录 像资料 Provide equipment manuals and training materials and related video materials
3	设备原理 结构培训 Equipment principle Structural Training	设备使用人员 Equipment users	在用户通电调试 三周后 After three weeks of power commissioning by the user	0.5-2 天 0.5-2 days	提供设备说明书及培训资料及相关录 像资料 Provide equipment manuals and training materials and related video materials
4	设备操作 Operation Emergency Handling 应急处理	设备使用人员 Equipment users	在用户通电调试 三周后 After three weeks of power commissioning by the user	0.5-3 天 0.5-3 days	提供设备说明书及培训资料及相关录 像资料 Provide equipment manuals and training materials and related video materials

11.4 设备附件及零备件 Equipment accessories and spare parts

提供设备正常使用及维护所需的备品备件；

Provide spare parts required for normal use and maintenance of the equipment.

提供易损件清单及有关图纸；

Provide a list of wearing parts and relevant drawings.

11.5 设备技术资料 Equipment technical data

使用维护说明书：设备安装调试完成后，向客户提供最终使用维护说明书；

Maintenance manual: After the installation and commissioning of the equipment is completed, the final use and maintenance manual is provided to the customer.

安装说明书或现场安装指导，关键外购件说明书；

Installation instructions or on-site installation instructions, instructions for key external parts.

设备验收单；

Equipment acceptance sheets.

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11.6 技术培训 Technical Training

设备试生产运行期间，釜川（无锡）负责培训客户指定机电维修人员，培训包括设备操作维护，普通故障的分析和处理；

During the trial production operation of the equipment, FIT (Wuxi) is responsible for training the customer's designated electromechanical maintenance personnel, which includes equipment operation and maintenance, analysis and treatment of common faults.

设备投入试生产后，釜川（无锡）派技术人员一名跟进 7 天；

A technician from FIT (Wuxi) to follow up for 7 days after the equipment is put into trial production.

釜川（无锡）质保期内每年派出 1-2 名相关技术人员到厂作指导及进行相应维护；

FIT (Wuxi) will send 1-2 relevant technicians to the factory every year during the warranty period for guidance and maintenance.

12. 售后服务承诺 After-sales service commitment

12.1 售后服务承诺 After-sales service commitment

质保期内非操作原因出现设备故障，釜川（无锡）保证在接到客户通知 72 小时内到达现场（国内），并在 24 小时内解决。人工费、差旅费由上海釜川承担；

In case of equipment failure during the warranty period for non-operational reasons, FIT (Wuxi) guarantees to arrive at the site (domestic) within 72 hours of notification from the customer and to solve the problem within 24 hours. Labor costs and travel costs are borne by FIT Shanghai.

质保期内操作原因出现设备故障，釜川（无锡）保证在接到客户通知 72 小时内到达现场（国内），并在 24 小时内解决。其间因发生的更换零部件费用由客户承担，人工费由客户承担，差旅费由客户承担；

If the equipment fails for operational reasons during the warranty period, FIT (Wuxi) guarantees to arrive at the site (domestic) within 72 hours of receiving notification from the customer and to solve the problem within 24 hours. The cost of replacement parts, labor costs and travel expenses incurred during this period shall be borne by the customer.

质保期外出现设备故障，釜川（无锡）保证在接到客户通知 96Hr 内到达现场，并在 48Hr 内解决（国内）。其间发生的更换零部件费用由客户承担，人工费由客户承担，差旅费由客户承担；

In case of equipment failure outside the warranty period, FIT (Wuxi) guarantees to arrive at the site within 96Hr of notification from the customer and to solve the problem within 48Hr (domestic). The cost of replacement parts, labor costs and travel expenses incurred during this period will be borne by the customer.

釜川（无锡）保证优先低价向客户提供备品备件；

FIT (Wuxi) guarantees the supply of spare parts to customers at preferential prices;

釜川（无锡）对设备终身提供售后服务；

FIT (Wuxi) provides lifetime after-sales service for the equipment.

由于技术的不断进步，以上方案允许做以提高设备性能的技术调整。

Due to continuous technological advances, the above solutions allow for technical adjustments to improve the performance of the equipment.