LAB1ST

> *Modular Scalability*
> *Cell Culture*
> *Precision Process Control*

BIOREACTOR

BR200-C-Master

Next-Gen Bioprocessing Platform: Flexible • Precise • Automated

Labfirst Scientific Instruments (Shanghai) Co., Ltd. | www.lab1st.com | sales@lab1st.com

Core Features

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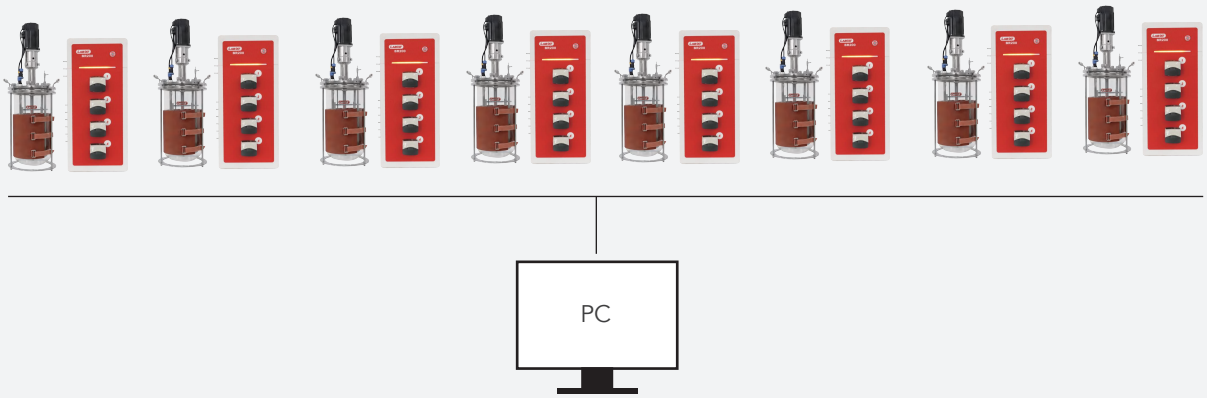
– One control system simultaneously manages two independent vessels

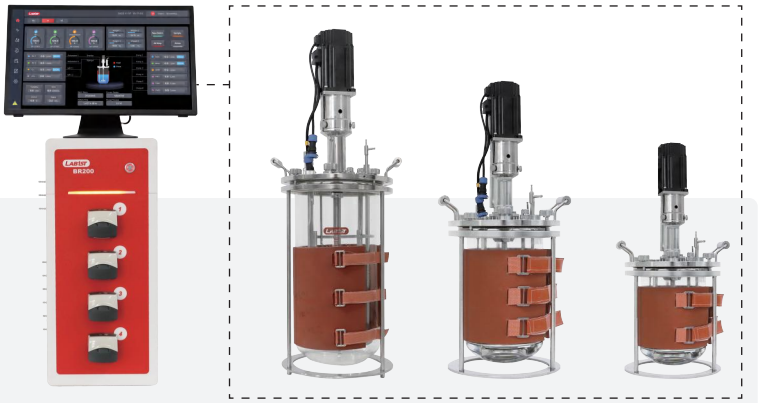
Dual-Vessel Control Mode

– Expandable to control up to 8 units for pilot-scale production

vvv

SCADA Central Monitoring





Flexible Vessel Switching

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– Single unit compatible with ***2L-15L*** culture vessels, easy changeover

Mode 1

Mode 2

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Dual Operation Modes

– 22" touchscreen operation, compatible with keyboard & mouse input, free switching

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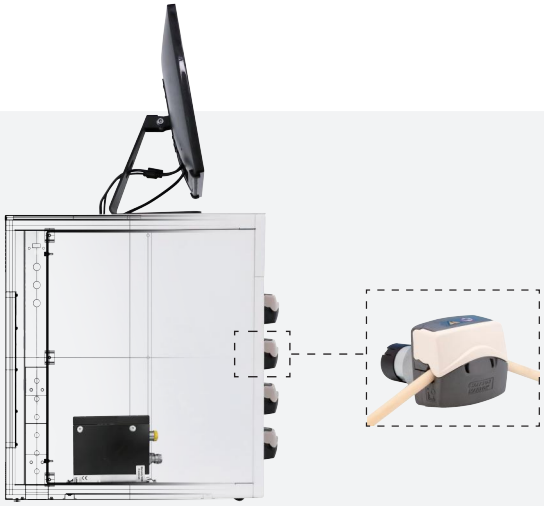
– Independent MFC and Watson Marlow peristaltic pump for accurate gas/liquid regulation

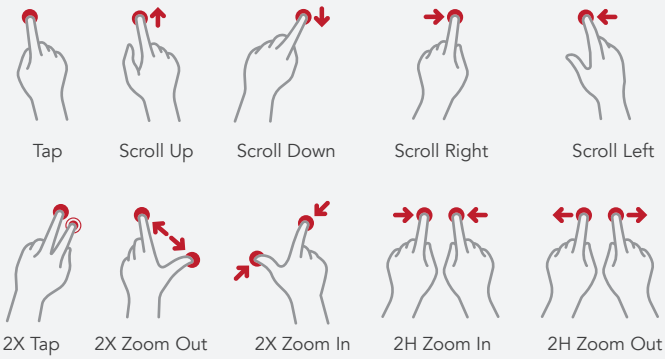


Modular Precision Control

vvv

– High-sensitivity capacitive touchscreen supports multi-touch and gloved operation

22" Multi-touch Screen



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Dual-mode Interface

– Optional dark/light background for your choice

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Smart Expansion Ports

– Supports external sensors and auxiliary equipment for customized needs

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Tri-color Status Lights

– Red/Yellow/Green indicators for alarm/-standby/operation status

designed for 21CFR Part11™

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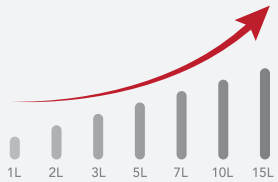
21 CFR Part 11 Compliance

– Complete e-records + audit trail + access control for regulatory compliance

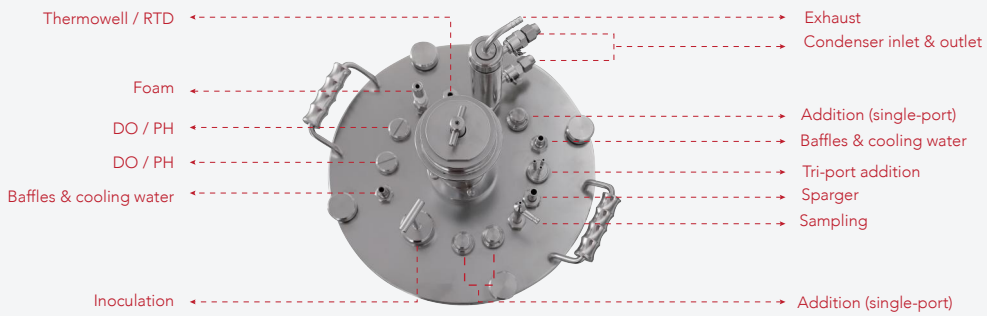
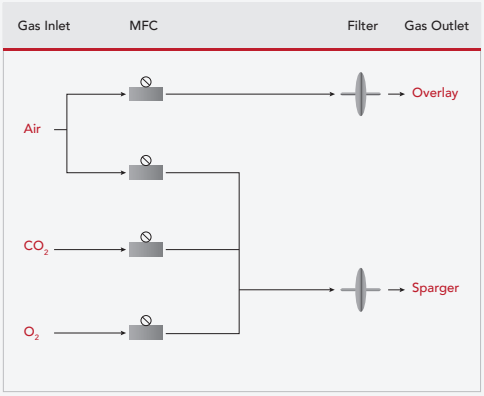
Quick Overview of BR200-C-Master

- Design Leadership: Premier solution for cell culture.
- Versatile vessel volumes: **7 vessel sizes (1L to 15L)** to suit diverse experimental needs.



- Powerful scalability: Interchangeable vessels with Slave chassis compatibility enable dual-culture upgrades without additional capital expenditure.
- Next-Gen interface: 22" touchscreen with intuitive second-generation GUI for effortless operation.
- Global remote access: Secure real-time monitoring via PC/mobile devices with worldwide connectivity.
- Space-efficient architecture: Compact footprint with flexible touchscreen placement for optimal lab space utilization.
- Advanced automation: Mass flow controllers (MFCs) replace rotameters for automated, quantified gas control and accelerated process development.
- Advanced software capabilities: Feedback-, time-, condition-, and script-based control strategies.
- Optimized vessel engineering: Premium materials with modular construction for easy disassembly and maintenance.
- Reliable precision performance: Equipped with globally top-tier hardware components for unmatched control accuracy.

At-a-Glance BR200-C-Master Configuration

Controller	Siemens S1200 PLC + Weinview HMI + 22" Elo projected capacitive touch display Internet-enabled remote control
Glass Vessel	Total volume 1-15 L with 25~75% working volume; Single-wall cylindrical design with round bottom, constructed with Boro 3.3 glass + electropolished SUS 316L (autoclavable) Integrated ports for pH/DO/temperature/foam probes, gas inlet/outlet, inoculation/feeding/sampling, etc.  * smart layout by volume
Agitation	Top-mounted servo-driven magnetic stirrer (5-500 rpm); Elephant ear impeller, Comb-style foam breaker  
Gas Intake	3 gas supply (Air/O_2/CO_2) with: - 4 x MFCs (2 L/min max total flow) - 1 x Overlay - 1 x Bottom sparger - 2 x Filters 
Exhaust	Exhaust gas condenser with filter
Sensor	Hamilton® pH; Hamilton® DO; German JUMO Pt100 RTD; Foam
Pump	4 Watson Marlow variable-speed 114 peristaltic pumps for adding acid, alkali, defoamer and feeding

Features

Unparalleled Automation and Process Flexibility

- Modular control adapts to multiple vessel configurations with seamless Slave chassis integration for dual-culture operations, reducing expenditure. and accelerating process development.
- The detachable touchscreen can be mounted on the chassis or placed on a benchtop, with support for peripheral devices (keyboard/mouse) and adjustable sizing to fit diverse lab workflows.
- Individual MFCs automate and precisely regulate all gas inputs, enhancing bioprocess consistency and hands-free operation.
- Equipped with variable-speed Watson Marlow peristaltic pumps for ultra-precise nutrient dosing, meeting stringent fed-batch and perfusion demands.
- Comprehensive control over critical parameters (temperature, pH, DO, agitation) ensures reproducible conditions, streamlining R&D scalability.

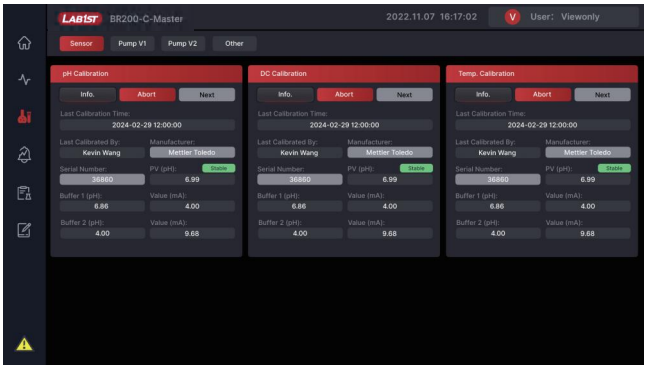
Smart Simplicity and Intuitive Operation

- User-friendly 22" HD capacitive touchscreen supports multi-touch, zooming and swiping for superior ergonomics, ensuring smooth operation even with gloves.
- Second-generation GUI delivers intuitive parameter visualization for enhanced usability and reduced learning curve.
- Aviation connectors and safety lock mechanisms ensure operational security while simplifying maintenance.
- Independent electric heating blanket provides uniform temperature distribution for consistent fermentation conditions.
- Round-bottom vessel design maximizes mixing efficiency while eliminating cleaning dead zones to prevent cross-contamination.

Flexible and Reliable Integrated System

Software Capabilities: Intelligent Control & Connected Process Management

- Comprehensive control including manual, automatic, sequential, cascaded, conditional, etc. addressing diverse experimental needs with flexible process management.
- Multiple cascades for DO control integrates agitation speed, air/oxygen flows, and feeding for enhanced control responsiveness and fermentation precision.
- 24 programmable recipes with unlimited steps enable fully automated bioprocess execution, reducing manual intervention.
- On-the-fly calibration ensures sensor and pump accuracy, maintaining reliable process control throughout operations.
- Expandable trend monitoring provides real-time bioprocess visualization with customizable data display parameters.
- Comprehensive data security features 4GB expandable storage with multi-year batch/alarm/operation record retention and export/backup functionality.
- Three-level authority management with configurable alarm thresholds minimizes operational risks and ensures protocol compliance.
- Remote connectivity enables real-time monitoring and software updates via PC/mobile devices for off-site process management.



Advanced Culture Vessel: Hygienic Construction & Optimized Performance

- Single-wall cylindrical vessel combines electric heating blanket for uniform temperature distribution and efficient cleaning.
- Pharmaceutical-grade materials including electro-polished 316L stainless steel, Boro 3.3 glass, EPDM and Silicon sealing meet stringent hygienic standards.
- Optimized 2:1 aspect ratio delivers superior mass/heat transfer efficiency to meet demanding bioprocess requirements.
- Multiple standardized ports support seamless integration of accessories and sensors for flexible system configuration.
- Knurled screw design enables tool-free assembly and disassembly, streamlining cleaning and maintenance procedures.

Hardware Excellence: Robust Durability and Superior Quality

Gas Flow

- Integrated triple-gas system (air/O_2/CO_2) delivers precise overlay+bottom sparging (2 L/min max) for versatile cell culture requirements.
- Dedicated MFCs independently automate air/oxygen flow regulation, enabling advanced pH/DO control strategies with unmatched flexibility.
- Integrated 0.2um PTFE filters (Sartorius®) on gas inlets and exhaust ensure contamination-free operation throughout fermentation cycles.
- Optimized exhaust condenser effectively recovers volatile compounds while maintaining optimal cell culture conditions.

Stirring & Impeller

- Top-mounted servo agitator delivers maintenance-free performance with instant start/stop response (up to 500rpm) for precise mixing control.
- Low-shear elephant ear impeller ensures gentle mixing while preserving cell viability.
- Comb-style foam breaker mechanically eliminates surface foam to enhance gas-liquid mass transfer.
- Adjustable impeller system allows height modification and quick replacement, reducing downtime and operational costs.

Feeding

- 4 Watson Marlow variable-speed pumps for precisely adding acid, alkali, antifoam and feeding.

Sensor

- Hamilton® pre-pressurized gel-filled pH sensor with sterilizable PHI glass membrane for reliable bioprocess monitoring.
- Hamilton® polarographic DO probe incorporates FDA-approved membranes for hygienic process applications.
- JUMO® Pt100 RTD (Germany) offers rapid response and exceptional durability for temperature monitoring.
- Conductivity-based foam sensor triggers automatic antifoam dosing via peristaltic pump for stable operation.

Compliance

- Full CE certification guarantees compliance with international safety and performance standards.

INNOVATIVE BIOREACTOR SOLUTIONS FOR YOUR RESEARCH

Specification - Control Capacity

BR200-C-Master >>>

Independent Control Tower	
Housing Material	Cold rolled steel plate + white powder coating
Dimensions [WxDxH, mm]	240×535×560
Weight [Kg]	Approx. 32 Kg
Display I Operation	22-inch Elo projected capacitive touch display
Controller	Siemens S1200 series PLC, Weinview HMI
Integrated Pump	4 Watson Marlow 114 variable-speed peristaltic pumps
Flow Meter	4 MFCs
Communication	· 2 x USB · 1 x Industrial Ethernet · 1 x Internet · 1 x HDMI
Interface	· 1 x pH sensor cable · 1 x DO sensor cable · 2 x stirring motor control wires · 1 x temperature sensor interface · 1 x foam sensor cable · 1 x heating blanket control wire interface · 1 x main power interface
Water Interface	6× barb interface [inlet/outlet for exhaust condenser, cooling finger, chilled water]
Air Interface	2 × barb [Mixing gas to vessel], 3 × pneumatic [Gas supply]
Power Supply	220V (±10%), 50Hz, single phase
Rated Power [W]	Max. 1.5 KW

BR200-C-Slave >>>

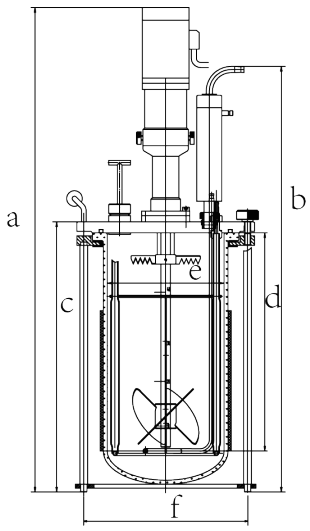
Independent Control Tower	
Housing Material	Cold rolled steel plate + white powder coating
Dimensions [Wxdxh, mm]	240×535×560
Weight [Kg]	23 Kg
Display I Operation	N/A
Controller	Distributed I/O
Integrated Pump	4 Watson Marlow 114 variable-speed peristaltic pumps
Flow Meter	4 MFCs
Communication	· 2 x Industrial Ethernet · 1 x RS232
Interface	· 1 x pH sensor cable · 1 x DO sensor cable · 2 x stirring motor control wires · 1 x temperature sensor interface · 1 x foam sensor cable · 1 x heating blanket control wire interface · 1 x main power interface
Water Interface	6× barb interface [inlet/outlet for exhaust condenser, cooling finger, chilled water]
Air Interface	2 × barb [Mixing gas to vessel], 3 × pneumatic [Gas supply]
Power Supply	220V (±10%), 50Hz, single phase
Rated Power [W]	Max. 1.5 KW

Specification - Control Capacity

Agitation Control	
Motor	Maintenance-free, low noise servo motor
Speed Range and Accuracy	5 - 500 rpm, ± 0.5%
Rated Power [W]	1L: 100 W, 2-7L: 400 W, 10-15L: 750 W
Gas Control	
Gas Source	Air, O_2, CO_2
Control Method	4 x MFCs
Gas Supply	Overlay (for Air) + Ring sparger
Flow Range	Overlay O_2: up to 2 L/min | Sparger Air, O_2, CO_2: up to 2 L/min
Flow Accuracy	1%
Temperature Control	
Control Method	Robust PID algorithm
Heating Method	Electric blanket heating [additional]
Cooling Method	Tap water or circulating cooling water [additional chiller]
Sensor	Germany JUMO Pt100 RTD
Measurement Range and Accuracy	0~150.0℃, ± 0.1°C
Control Range and Accuracy	8.0 °C above coolant to 40.0 °C above ambient (0-65.0 °C absolute), ± 0.2°C
PH Control	
Control Method	· Robust PID algorithm · Cascade control with peristaltic pump by adding alkali or MFC by adding CO_2
Sensor	Hamilton Sterilizable Gel-filled pH electrode
Measurement Range and Accuracy	2.00~12.00, 0.01
Control Accuracy	± 0.05
DO Control	
Control Method	· Robust PID algorithm · Cascade control with different parameters (agitation, gas flow and peristaltic pump)
Sensor	Hamilton Sterilizable polarographic DO electrode
Measurement Range and Accuracy	0.0~150.0%, 0.1%
Control Accuracy	± 3%
Foam Control	
Control Method	· Cascade control with peristaltic pump by adding defoamer · Mechanical defoaming blade

Specification - Vessel

Glass Vessel							
Type	Single-wall round-bottom cylindrical vessel, available for electric blanket						
Total Volume [L]	1	2	3	5	7	10	15
Max. Working Volume [L]	0.75	1.50	2.25	3.75	5.25	7.50	11.25
Min. Working Volume [L]	0.25	0.50	0.75	1.25	1.75	2.50	3.75
Material [Wetted Part]	· Glass vessel material: Boro 3.3 high borosilicate glass · Vessel cover and inner parts: SUS 316L · Seal: EPDM and Silicon						
Surface Treatment	· Inner surface: electrolytic polishing, Ra ＜0.4 μm · Outer surface: Ra ＜0.6 μm						
Pressure Design	Working pressure: 0~1 bar @ 150°C Autoclavable						
Height to Diameter Ratio [H: D]	Approx. 2:1						
Vessel Dimensions	Refer to "Table A for ST series"						
Vessel Weight [Excluding Motor] [Kg]	8	9	10	12	13.5	15	18
Vessel Lid Interface	1 × Agitator flange for top mechanical stirring　1 × Inoculation port 2 × Baffle port, including cooling coil　1 × Gas inlet port for ring sparger 1 × Exhaust port, including water-cooled exhaust condenser　1 × Sampling port 1 × PH sensor port　1 × DO sensor port　1 × PT100 temperature sensor port 1 × Foam sensor port　1 × Overlay　N × Feeding port						
Impellers	· 2 layers, top: foam breaker, bottom: 3-blade elephant-ear impeller · Detachable, height adjustable, various type						
Baffles	N/A						



* Table A - ST series vessel

Dimension							
Vessel Volume [L]	1	2	3	5	7	10	15
a [mm]	450	471	567	622	712	753	851
b [mm]	430	450	492	546	636	641	738
c [mm]	227	214	292	347	437	442	484
d [mm]	170	190	230	280	370	360	450
e [mm]	Ø90	Ø110	Ø130	Ø150	Ø160	Ø185	Ø203
f [mm]	180	190	190	212	212	248	270
Sterilization Requirement							
Minimum Size [mm]	Ø220x450	Ø230x470	Ø230x500	Ø265x550	Ø265x640	Ø300x645	Ø335x740
Recommended Size [mm]	Ø280x500	Ø280x500	Ø280x550	Ø300x600	Ø300x700	Ø350x700	Ø380x800

Options & Upgrades

Culture Vessel

Item	Description	Function
DW series	Double-wall round-bottom cylindrical vessel + water jacket temperature control	A variety of vessels to meet different needs

Impeller

Item	Description	Function
Impeller Type	Lift impeller, oblique leaf impeller, rotary filter, Marine impeller, Spin filter, packed-bed impeller, etc.	Flexible customization to meet different application requirements

ST series DW series

Sensors

Item	Description	Function
pH Sensors	Hamilton® Arc smart pre-pressurized gel-filled sensor for real-time pH monitoring	Pre-calibrated, ready to use, automatic diagnostics
	Mettler Toledo Brand	More brand choices, adaptable to different systems
DO Sensors	Mettler Toledo Brand	More brand choices, adaptable to different systems
	Hamilton® optical dissolved oxygen sensor	No polarization required, quick start
More Sensors	Mettler Toledo Brand	More brand choices, adaptable to different systems
	Hamilton DCO2 sensor	Online real-time monitoring of carbon dioxide dissolved in liquids
	Hamilton VCD sensor	Online real-time monitoring of viable cell density
	Hamilton OD sensor	Online real-time monitoring of cell turbidity

More Options

Item	Description	Function
Control Cabinet	Stainless steel 304 housing material	More hygienic
HMI	Siemens	International recognition
Pump	Additional external pumps	Support more in/out materials
Gas	Nitrogen, Methane, etc	Enables automated flow regulation and precise measurement for specialized application requirements
Communication	SCADA	Integrate systems for powerful real-time monitoring and data analysis
Power Supply	110V (± 10%), 60Hz, single phase	Adapt to voltage standards of different countries and regions
Wetted Part Material	2205 duplex stainless steel/titanium	Tolerant to high salinity environments
Aspect Ratio	1.5:1 | 2.5:1 | 3:1 | Customizable	Flexible customization to meet different application requirements
Stirring Method	Top magnetic stirring	Magnetic coupling further enhances sealing
Sparger Type	Microsparger	Smaller bubble size, stronger gas-liquid mass transfer efficiency
Adapter	Adapter for sensor height adjustment	Flexible positioning of sensor height to suit different vessel volumes
Sampling	Sterile sampling device	Consist of Luer head, one-way valve, T-joint, needle filter, and sterile syringe, suitable for sterile sampling.
Exhaust Gas Analysis	Exhaust gas analyzer for O_2 and CO_2	Online real-time detection of CO_2 and O_2 in exhaust gas, analysis of respiratory metabolic parameters CER/OUR/RQ
Exhaust Gas Heating	Exhaust heater	Heating the exhaust gas filter to avoid filter clogging
Weighing	Vessel weighing | Feed weighing	Weight measurement for level control
Qualification	IQ/OQ documentation	Meet compliance requirements
Certification	Comply with ASME, BPE, UL and other certifications	Meet the certification requirements of different countries and regions

- SCADA