Technical Advantages of Puyi EGCS

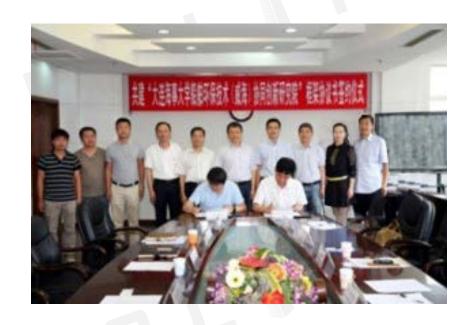




1 Advanced R&D



a. Asia's first professional company to conduct R&D of marine desulfurization technology (2009) and onboard installation(2014).







b. Over 20 patents, including the only international patent for magnesium-based desulfurization technology in the industry, and patents for magnesium hydroxide preparation and desulfurization wastewater treatment.





c. Self-developed PLC control system with software copyright.









Technical Advantages



- a. World-class equipment to guarantee system performance.
- b. Asia's first ground-based laboratory for test and optimization of desulfurization technology.

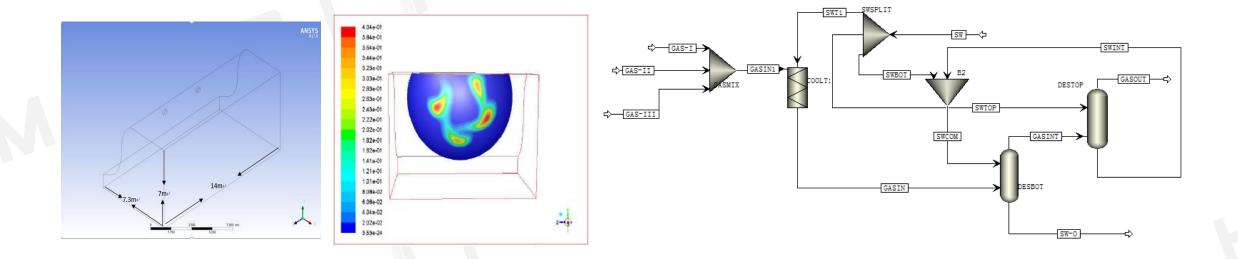






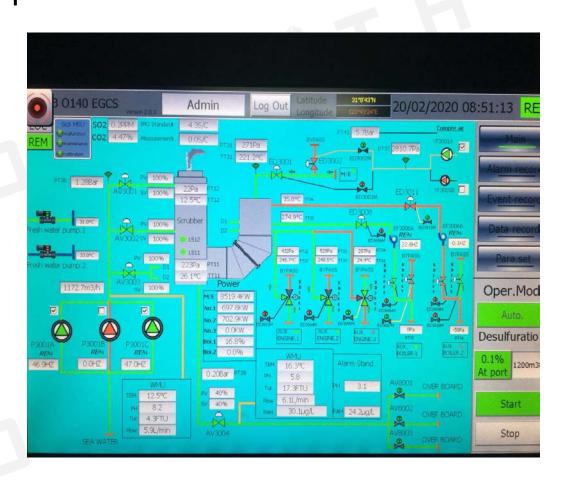


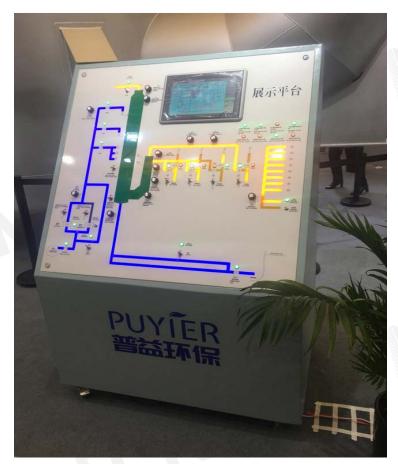
c. Professional software for smooth and dynamic process simulation to promote product refinement.





d. Self-developed PLC control system, and testing platform for test and optimization.







e. Compact, lightweight and power-efficient.

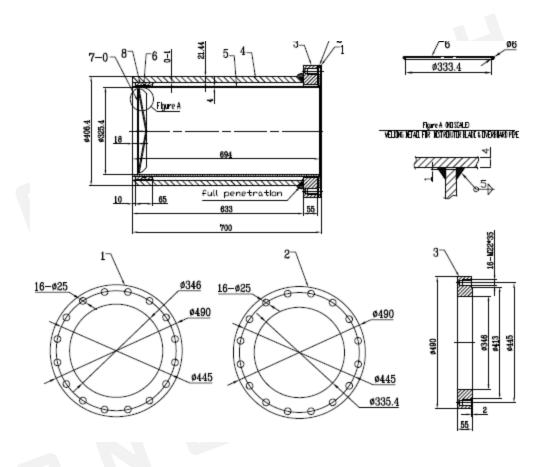
	PARAMETERS OF U-TYPE SCRUBBER									
Output Power(MW)	4	8	12	16	20	25	30	36	44	55
Back Pressure(Pa)	<1200									
Outside Diameter(m)	2. 1	3	3. 6	4. 1	4. 6	5. 1	5. 6	6. 1	6.8	7. 6
Height(m)	7. 2	7.8	8. 6	10. 2	11	11. 4	11. 9	12.5	13. 2	14. 4
Width (m)	5. 2	6	6. 6	7. 2	8	8. 7	9.3	10	10.8	12
Dry weight (ton)	8	12	16	19	23	26	30	33	38	44
Operation weight (ton)	10	15	20	24	30	35	42	48	55	65



System: OL	S01	Puyi	Competitator		
Typical shi	ip	6589TEU	6589TEU		
Puyi No.		200453 Puyi	Competitator		
Processing range	kg/h	0-350349	0-350349		
Scrubber size(U type)	Ø(mm)	6500	7050		
	W(mm)	10800	11000		
	H(mm)	14000	12000		
	Materials	S32205+SMO254	S32750 + UNS N08367		
	Weight(T)	35.5	41.7		
Seawater requirement	m3/h	2150	2250		
Power consumption	kW	521	560		
	Qty.	4(One standby)	4(One standby)		
Washing pump	Flow rate	725m3/hx65m	750m3/hx65m		
Sealing air fan	Qty.	2(One standby)	2(One standby)		
Exhaust gas fan	Qty.	X	x		
Power cabinet	Qty.	4	4		
Main control cabinet	Qty.	1	1		
Remote control box	Qty.	1	1		
CEMS	Qty.	1	1		
WQMS	Qty.	2	2		

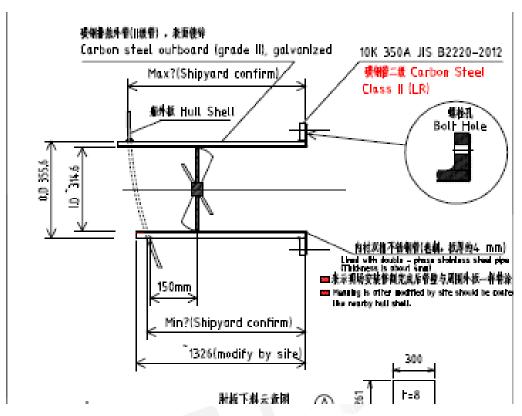


f. Overboard pipe design with higher anti-corrosion and safety.









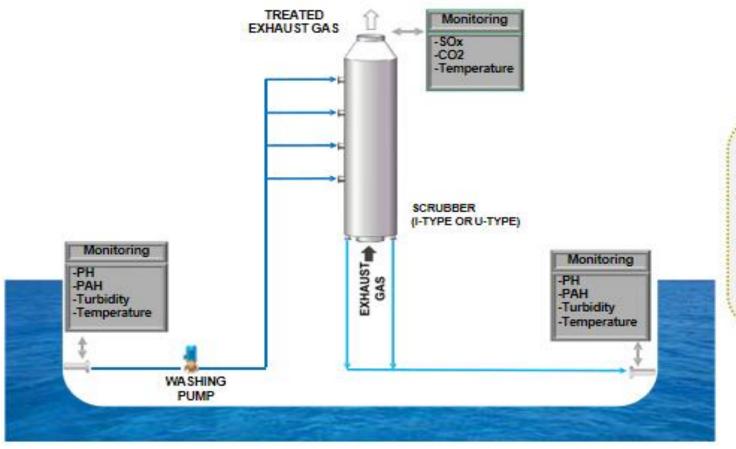




Diversification of System Modes



a. The widest selections of system modes in the industry.

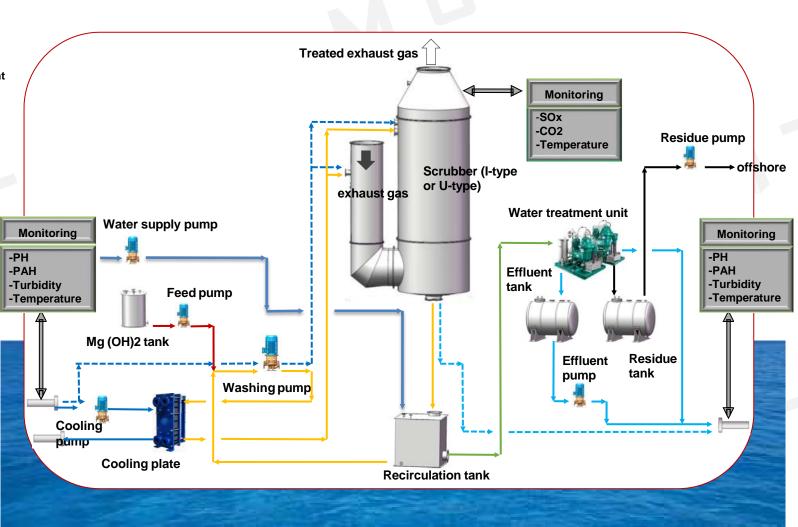


The open loop system uses sea water to neutralize the sulphur oxides of the exhaust gas. Sea water is supplied from the sea chest, pumped into the scrubber tower and distributed to spray nozzles. The discharge water will comply with the IMO regulations.

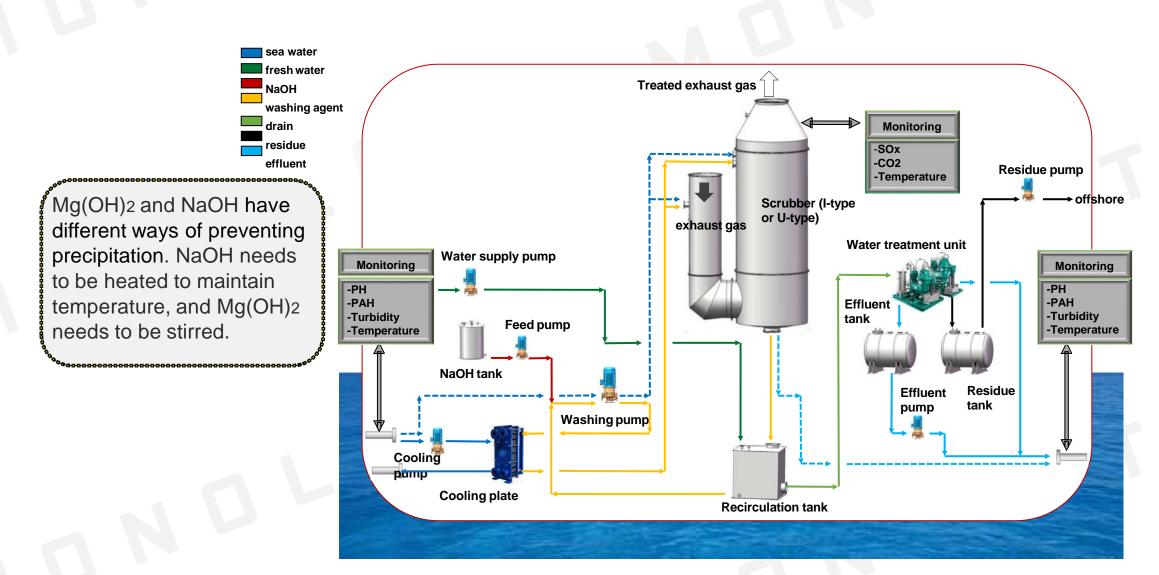




In the zero emission zones, the effluent should be stored in an effluent tank and will be discharged when sailing outside of these areas.









b. EPC projects to provide customers with combination service of system design, installation design and construction design.





Diversification of Retrofitting Vessel Types



a. Developed over 400 technical design solutions.







b. Onboard installation on multiple vessel types.







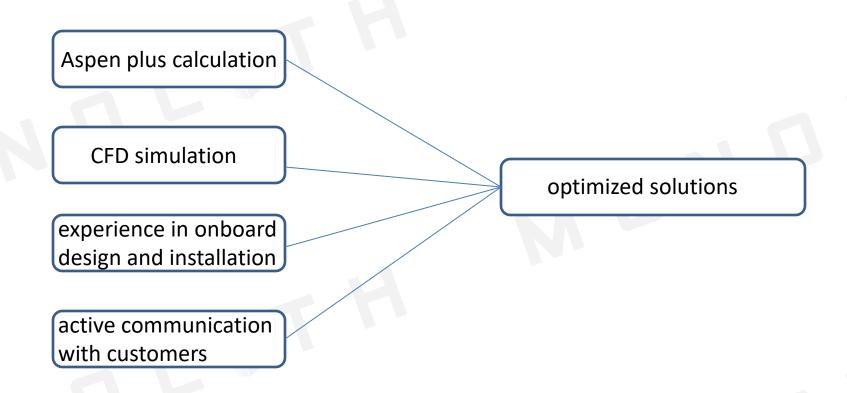








c. Provide solutions fast and accurately.







Stable and Reliable Operation Onboard



- a. Having installed over 60 sets.
- b. Easy-operating control system.





Short Installation Period at the Shipyard



Generally, the installation and commissioning time of desulfurization equipment at the shipyard is controlled within 25 days.











Weihai Puyi Marine Environmental Technology Co., Ltd.

Introduction of Electrical Control System



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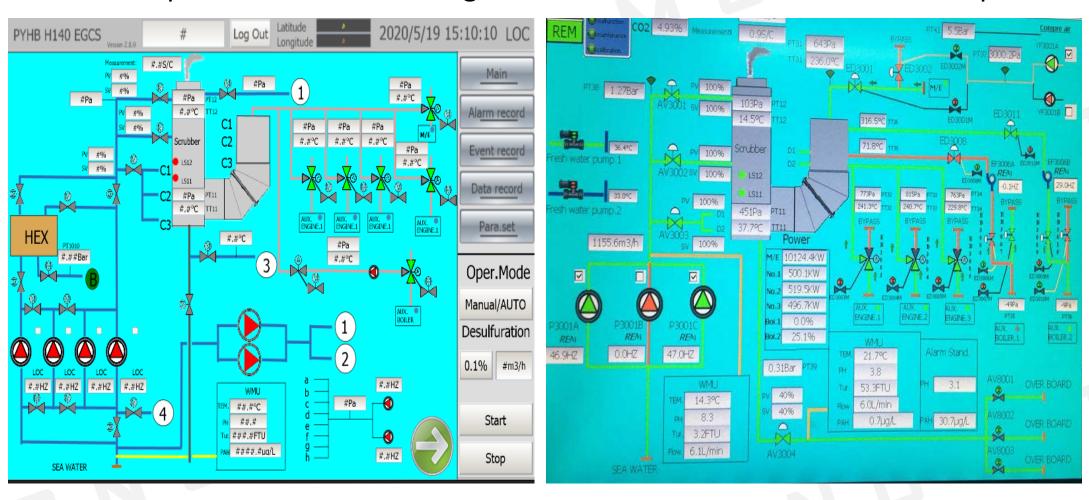
- 1. Operating system
- 2. Electrical control design
- 3. Development and inspection



1. Simple and Safe Operating System



• The simple and distinctive design of control screen makes it easier to operate.

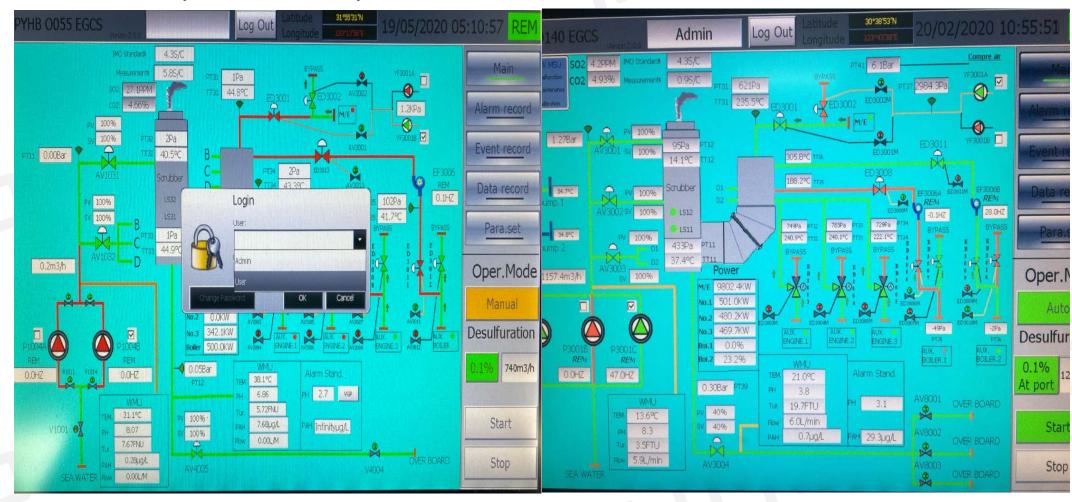


hybrid system

open-loop system

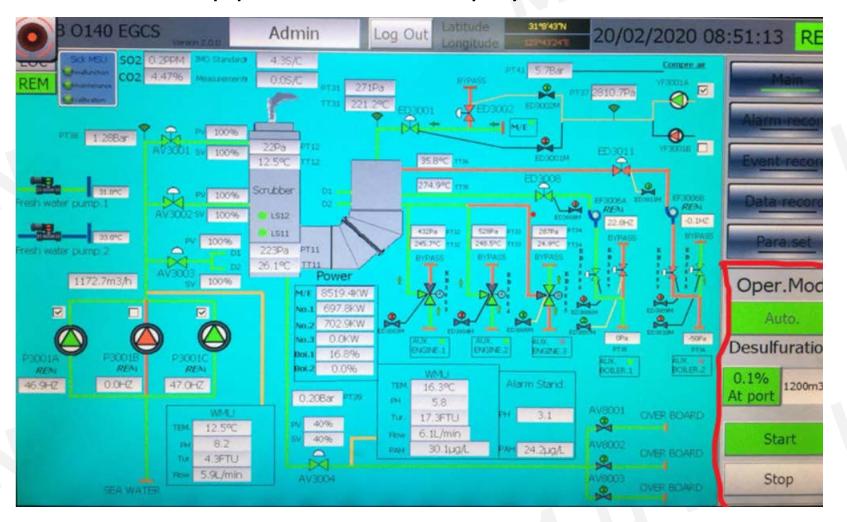


 Different login permissions with different levels of adjustment authorities to ensure system security.





 In the automatic mode, the system could be started with the Start button, and the real-time startup process will be displayed.





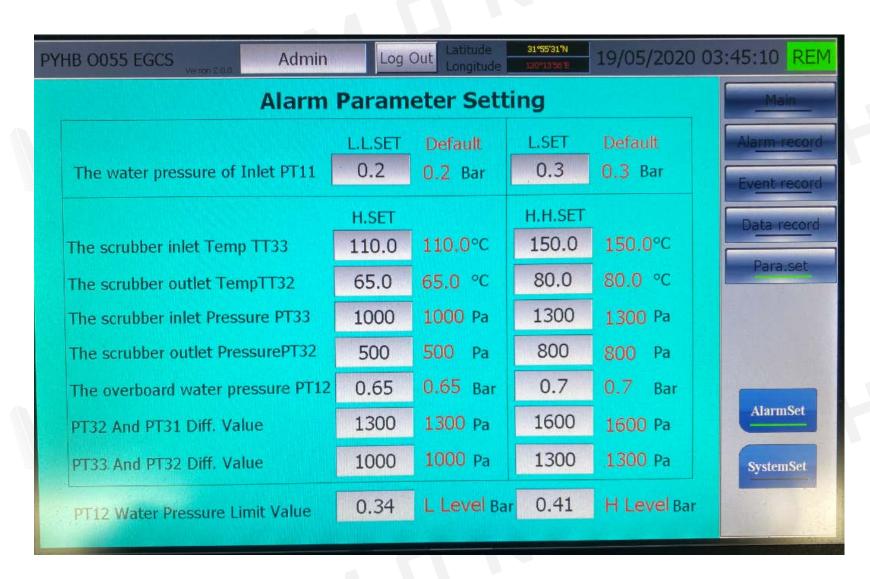
- Real-time monitoring and alarm system with history fault record.
- The fault will be connected to the vessel's AMS system for centralized fault management.





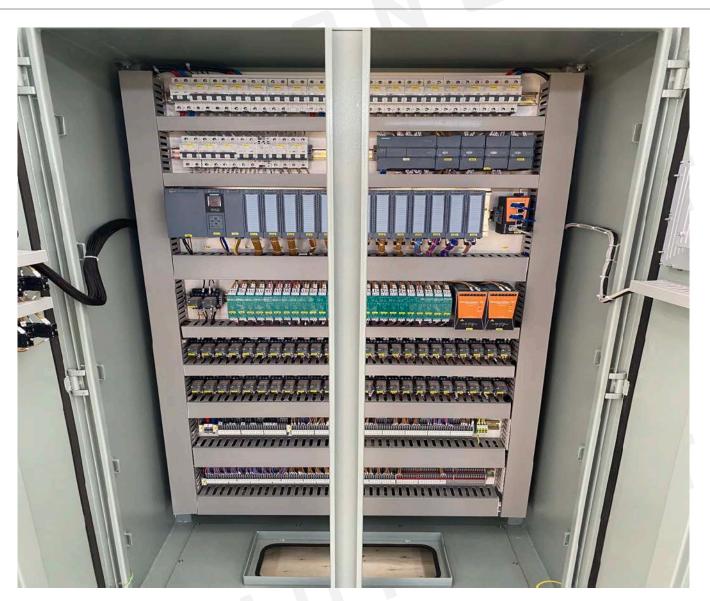


- Quick setting of internal data and parameter.
- Different login
 permissions with
 different adjustment
 authorities.





 Reliable redundant system and redundant operation ensure that the equipment can be operated manually in case of emergency.



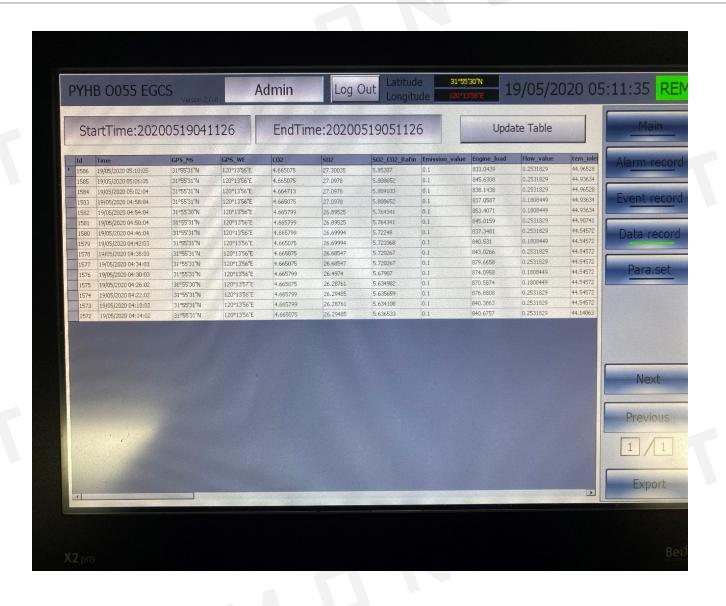


 Use frequency converter to drive the washing pump, and adopt intelligent adjustment to save power.





- Complete data record with storage time of 18 months, to ensure that important data is not lost.
- The operation data of any period can be checked at any time.

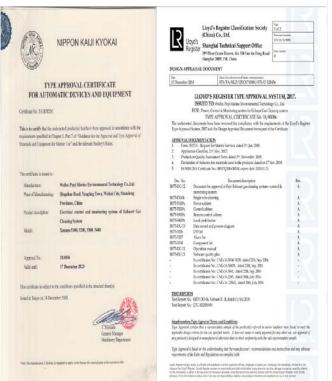




2. High-Quality Design of the Electrical Control System

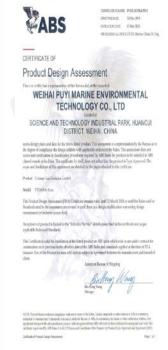


 The electrical cabinet has passed the rigorous environment simulation test, and obtained the type approval certificate from 6 class societies.











• The electrical cabinet is designed according to space availability of the vessel, to ensure the rationality of equipment installation.







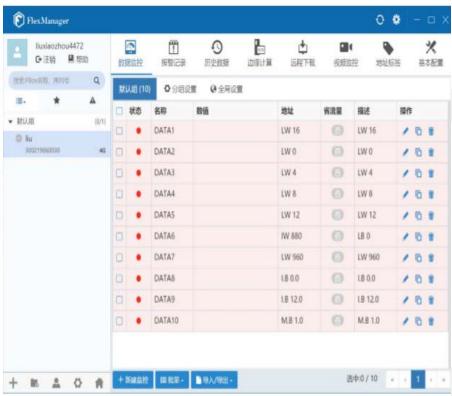
 The AC440V and AC220V power supply of the equipment are equipped with filters to reduce the impact on the vessel's power grid, to ensure the normal operation of the equipment.





 Remote communication module can be installed to realize remote data receiving and remote maintenance.







3. Development and Inspection of Equipment Control



 The company has a fully functional testing platform for software and hardware testing.









 The simulation operation of the control system is carried out before the equipment leaves the factory, to ensure that the software operation is consistent with operating condition of the vessel.

