



instrument

**2024
PRODUCT
INTRODUCTION**

Wireless Remote Meter Reading System



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Company Profile

Weifang AOBO Instrument Technology Development Co., Ltd., founded in 2002, with registration capital of 10 million RMB, is a "High-Tech" and "Double-Software Certification" enterprise specialized in "flow measurement and intelligent measurement & control" industry, integrating R&D, production, sales and service.

The company has a core R&D team for computer software and technology, automatic intelligent control, HVAC engineering design and flow measurement. It has the ability to provide customers with specific solutions and complete sets of products according to their different needs, based on years of practical experience. Especially in the heating industry, by the customer's recognition, has a high reputation in the industry.

The products are mainly used in the measurement and control of "steam, liquid, gas, sewage and tap water"; and especially suitable for energy monitoring and energy-saving control in many industries, such as thermal power plants, thermal companies, residential heating, petroleum, chemical industry, papermaking, food, coating, printing & dyeing and HVAC.

Since its foundation, based on self-developed and leading technology, reliable quality, high-quality service and good reputation, our company has been warmly accepted by customers, and become a designated supplier for many central enterprises and listed companies.

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I. Product Overview

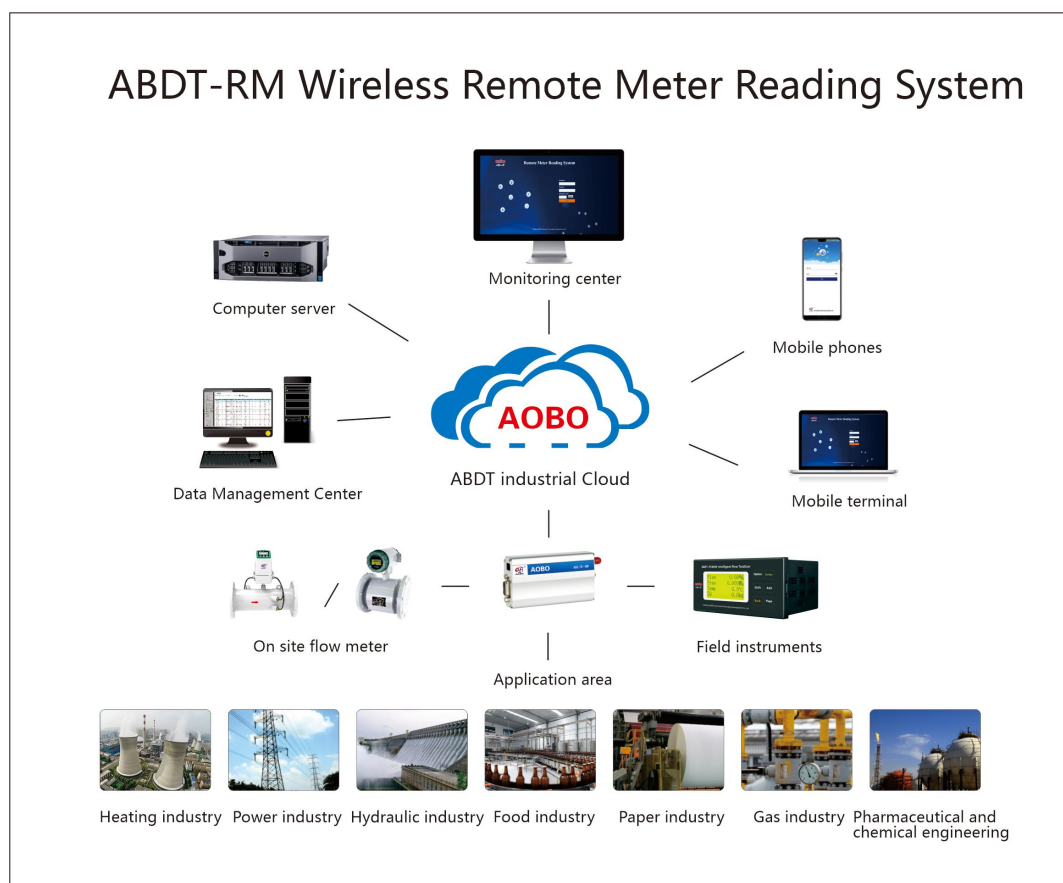
In order to meet the various needs of users for metering and energy saving, our company independently developed a (energy management) intelligent remote meter reading system that adapts to various user needs. It adopts standardized, reliable design in software and hardware and conforms to national standards. It is widely used in thermal power, chemical industry, natural gas, papermaking, pharmacy, biotechnology, urban heating and other fields. After several years of actual operation, it has been widely recognized by customers. The software and hardware of the system adopt standardized and reliable design, conform to national standards, and adapt to the relevant requirements of the energy industry. The software and hardware design of the remote meter reading system follows the principles of safety, reliability, openness, maintainability and scalability: adopts modular standardized design, conforms to national standards, and adapts to major enterprises' measuring instruments for water, electricity, steam, etc. Data collection, analysis and query, etc., provide strong data support for the refined management of enterprises.

Hardware: The core module produced with international advanced technology is used to achieve permanent and stable online automatic search of the network;

Software: The system is designed with a B/S structure, featuring stable system and secure data. The database is SQL SERVER, with good versatility and strong pertinence. The interface is beautiful and brief, functional and practical, and the operation is simple and easy to understand. It realizes a multi-functional system such as real-time online system, software that is not limited by the number of terminal devices, automatic calculation of management losses, real-time monitoring of the official website, multi-level management, and remote access.

The construction of the energy management remote meter reading monitoring system and automated information system independently developed by our company is to use the on-site monitoring system to achieve automatic collection of data sources, use network resources to automatically load into real-time databases, provide open data platforms for applications at all levels of management departments, enable management personnel to

timely control and master the energy usage of each user, thereby achieving automatic management of the entire energy transmission process; It can also conduct statistics, analysis, and optimization on the real-time data obtained, thereby ensuring the normal operation of various metering and other equipment, reducing management costs, and providing an important basis for energy metering and management.



II. Function

The software and hardware of the system are designed in a standardized and reliable manner, meeting national standards and adapting to the relevant requirements of the energy industry. The software and hardware design of the remote meter reading system follows the principles of safety, reliability, openness, maintainability, and scalability: it adopts modular standardized design, conforms to national standards, and adapts to the collection, analysis, and query of water, electricity, steam, and other measurement instrument data by major enterprises, providing strong data support for enterprise refined management.

(1)Real-time online function: The system is real-time online, which can meet the requirements for real-time data acquisition and transmission.

(2)Automatic collection function: The system automatically collects data from various instruments of the user, and the collected data is processed by software to generate various reports, graphs, and curves for daily, monthly, and annual steam/electricity/water consumption, pressure, and temperature. Automatically calculate pipe losses, and provide pipe loss curves and information reports.

(3)Dynamic display function: The dynamic real-time data of various instruments can be viewed at any time on the remote meter reading system screen, and the instantaneous, cumulative data, and working condition data information of various instruments can be displayed.

► Centralized display function: Centralized display of important parameters of each user, such as instantaneous flow, temperature, pressure, cumulative flow, alarm status, communication status, etc.

► "Independent display function: displays all measured and set parameters of each user separately."

(4)The timed meter reading function can be set to freeze and display the accumulated data at a certain time on a certain day, solving the problem that manual meter reading cannot copy the accumulated data of each user at the same time, providing effective data support for analyzing the management loss of the entire heating network.

(5)Historical data query function: Automatically generate parallel historical curves such as instantaneous flow, temperature, pressure, and cumulative flow for each user, and can query historical data for any user, any parameter, or any period of time.

(6)Report generation and printing function: Automatically or manually generate daily energy consumption reports, monthly reports, and annual reports for each user. And can be printed through a printer at any time.

(7)Various sorting methods can be implemented for all parameters, such as instrument type, steam/water/electricity consumption plateau, etc. Different personnel in your company

can choose their own sorting method according to the actual situation.

(8)Compatibility function: The software is not limited by the number of terminal devices, supports unlimited point meters to send data simultaneously, and is compatible with smart meters from multiple instrument companies.

(9)Alarm function: The upper and lower limits of the alarm can be set by yourself, and when a user's instantaneous flow, pressure, temperature, and other parameters are abnormal, it can timely alarm; It can monitor the operation of the pipeline network in real time. At the same time, it can display and record various alarm information of the local flow measurement system in real time, such as flow, pressure, temperature overruns, communication failures, and other alarm information.

(10)Automatic network search function: The system automatically detects network conditions. As long as there is a problem at either end of the mobile network or data center network at the GPRS module end, the system can automatically search the network again to restore connectivity.

(11)Geographic information index function: It can display the on-site pipeline diagram and geographical distribution map of the entire system (including the situation of all instruments and other equipment, and the situation of steam flow direction can be distinguished by different colors). Click the corresponding icon of the location map to open the detailed parameters of each table, including instantaneous flow, temperature, pressure, etc. Easy for users to browse and query.

(12)Security and confidentiality function: The system has a multi-level permission management system, and the highest level permission management personnel can set different operation permissions according to different departments and personnel. After setting permissions, different operators can only execute their own bound permissions. Therefore, your company can set different operation permissions based on different departments and personnel to prevent unauthorized operations by operators at different levels. Therefore, it can maximize security and confidentiality.

(13)Remote query function: The software is released through the WEB network, enabling

relevant personnel of your company to access the system through a browser anytime and anywhere, and to access the system interface at any time using tools such as mobile phones and computers.

(14)Data management function: The system database has sufficient capacity for easy expansion and maintenance, and automatic storage of original and historical data can meet the needs of different customers for future reference; It can be used for statistical analysis of various instrument data, and for analysis and calculation of cumulative values, average values, maximum values, and minimum values of various parameters.

(15)Remote maintenance function: GPRS meter reading terminal can be maintained remotely; According to industry development and mobile network upgrades, our company provides free software upgrade services to ensure that the system can always operate normally.

(16)System features: strong real-time performance, large transmission capacity, fast data transmission speed, strong anti-interference, lightning protection function, high reliability, strong stability, good cost performance (convenient, wiring free, low communication costs), etc.

(17)Support for EXCEL export: All real-time data and various reports in the system support the EXCEL export function, greatly improving user efficiency.

III. System Introduction

GPRS is the English abbreviation for General Packet Radio Service, which is developed on existing systems to provide GSM users with packet data services. It is particularly suitable for energy management related requirements such as remote meter reading and data transmission of monitoring and control systems in thermal power, natural gas, tap water, electric power, and other industries.

Through the comparative analysis of technology progressiveness, system compatibility, expansibility, network coverage, enterprise investment scale and benefits, the adoption of China Mobile's GPRS network as the communication transmission medium can improve the

timeliness, reliability, accuracy of enterprise measurement information and realize the informatization of enterprise production management. GPRS wireless internet remote meter reading is the most advanced, reliable, and ideal choice for enterprises.

The GPRS energy management wireless remote meter reading system developed by Weifang AOBO Instrument Co., Ltd. enables user terminals to automatically connect to the network when powered on, always online, automatically send real-time data of on-site operating conditions, and can respond to queries and control instructions from the central computer in a timely manner. The central computer is equipped with a network database and powerful data processing software, enabling data sharing between local and wide area networks and mobile office work for key leaders. It overcomes the shortcomings of all previous remote meter reading systems and integrates all the advantages. It is now the most advanced remote meter reading system.

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IV. System Composition

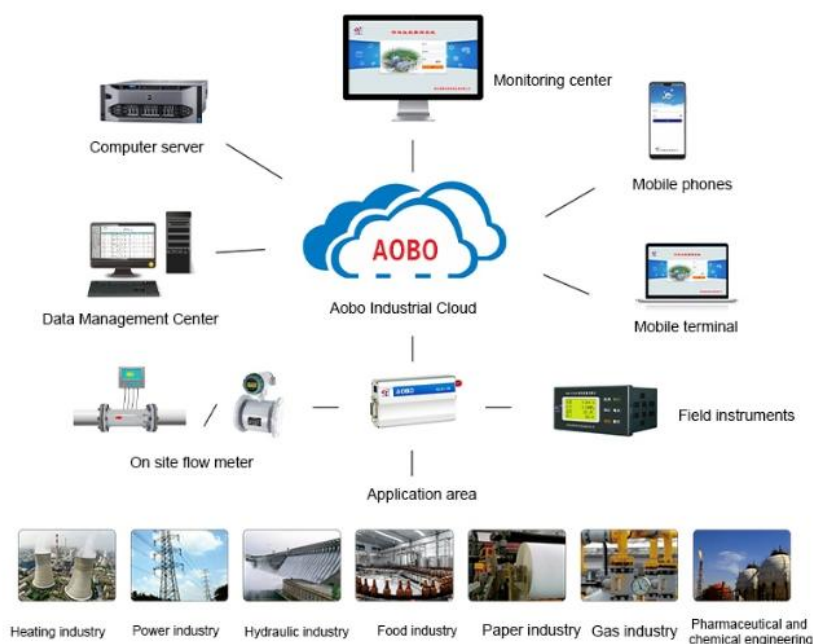
(1) Terminal equipment:

Measuring instrument: equipped with standard ModBus communication protocol (or other communication protocols) and 485 communication interface, such as MC51 series totalizer, electricity meter, etc;

Communications equipment: industrial grade GPRS wireless data transmission module; Based on mobile GPRS digital communication network, seamless coverage is achieved. Support static IP address and dynamic domain name resolution; Standard RS232 or RS485 interface, compatible with multiple technical protocols.

(2) Data center server:

A data server and a local area network are established within the company, which are connected to INTERNET. The server has a fixed IP address for receiving, sending, saving data, and realizing wide area network sharing of data. Access the server through the internal LAN for data query and backup.



V. Remote Monitoring Software

The data center monitoring system is designed with a B/S structure, featuring stable system stability and data security. The software is developed based on the .NET platform using common programming languages such as C # and JS. The database uses the network database SQL SERVER, which has good versatility and strong pertinence. It can analyze, process, and save real-time data transmitted from user instruments, generate various reports and curves, and produce various graphics, thereby achieving remote meter reading of the entire system, Real-time monitoring and automated management functions. The software has the advantages of beautiful and concise interface, practical functions, and easy to understand operation.

GPRS energy management remote meter reading system has been successfully applied in the following industries: thermoelectricity, chemical industry, papermaking, biotechnology, urban heating, etc. It mainly collects data from metering instruments and electronic scales for media such as steam, gas, water, electricity, and finished products, providing enterprises with the following data: cumulative amount, instantaneous amount, pressure, temperature, density, frequency (or differential pressure signal), working mode, instrument coefficient Number and time of power outages, etc.

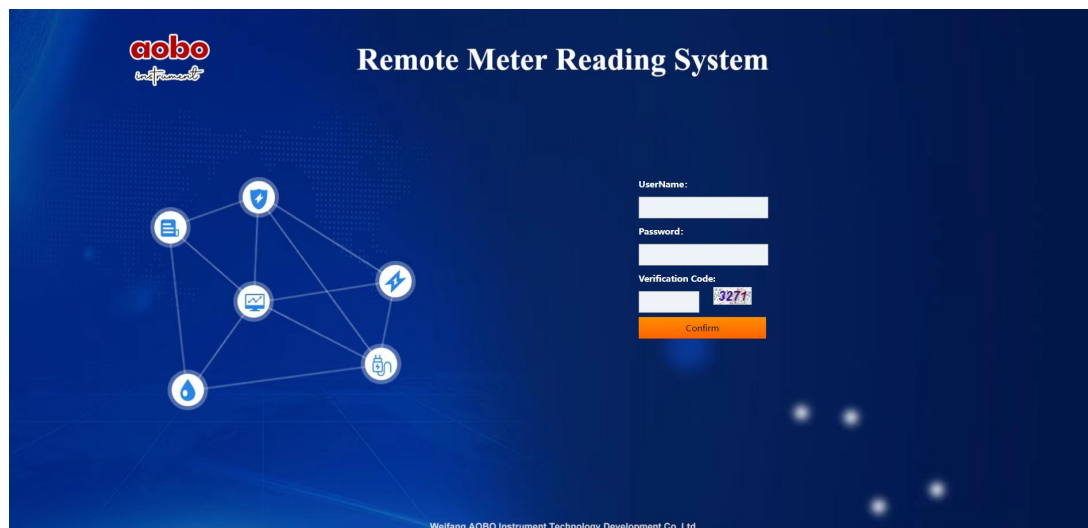
The transmission parameters of the electricity meter mainly include: active power, reactive power, ABC three-phase voltage, ABC three-phase current, active power, reactive power, power factor, etc.

The main transmission parameters of the natural gas instrument include: standard cumulative, standard instantaneous, work cumulative, work instantaneous, total gas purchase, gas purchase margin, frequency, pressure, temperature, battery voltage, etc.

Transmission parameters of vortex street, ultrasonic, and electromagnetic flow meters include instantaneous flow, cumulative flow, pressure, temperature, forward accumulation, and reverse accumulation.

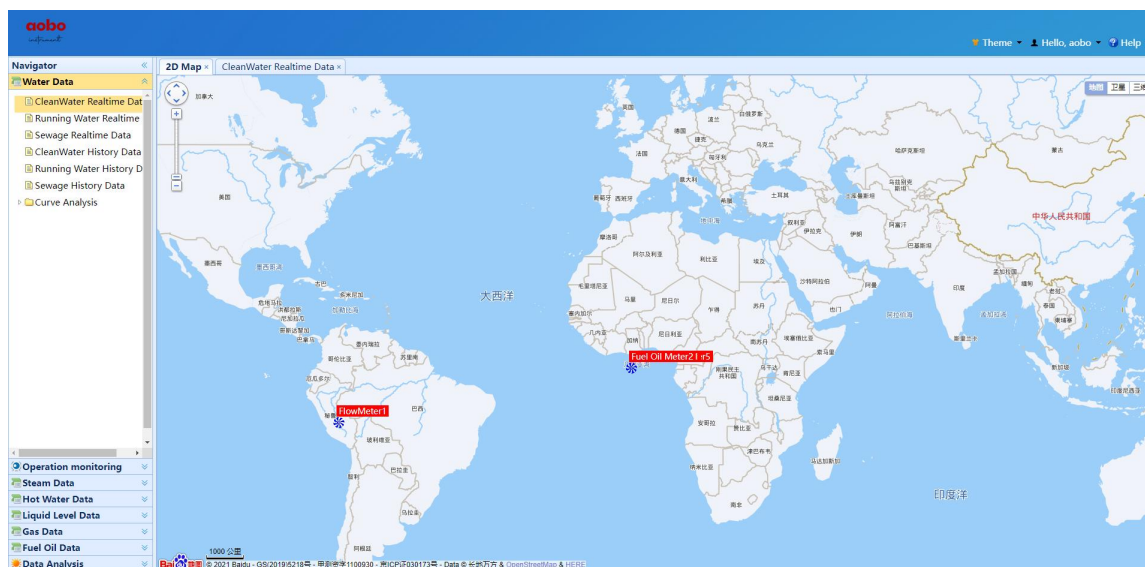
First, log in to the system: System operation and shutdown must be verified by legal permissions, including verification of user names and corresponding passwords. This

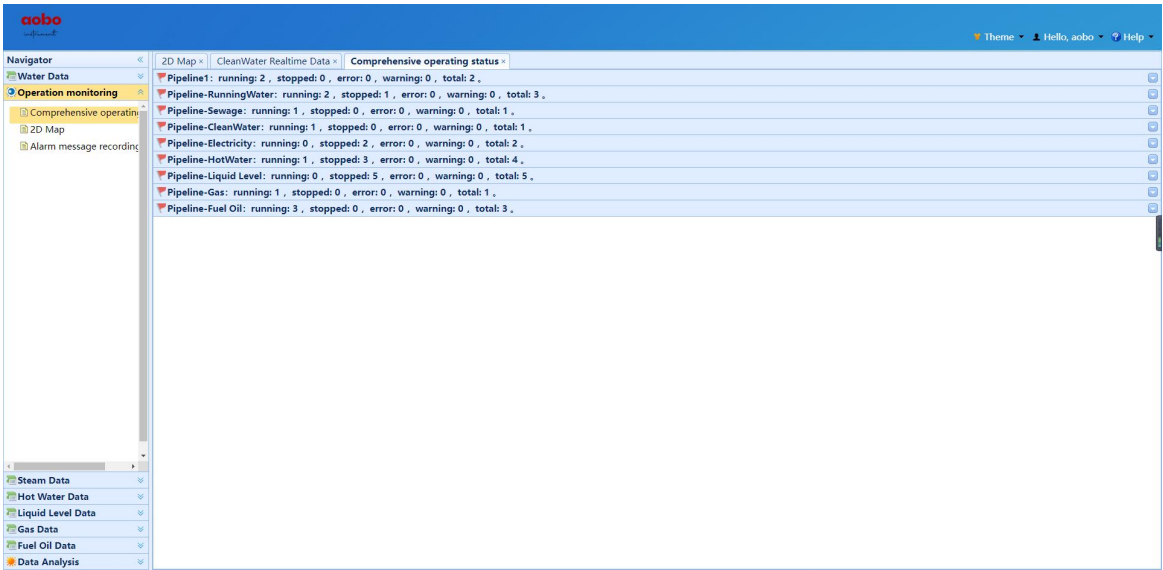
effectively protects the security of system data. Login interface:



Open the user interface and provide a friendly Chinese operation screen. The overall feeling is clear and pleasing to the eye. The control panel adopts a tree structure with strong logic. Each page is equipped with a return and home button, which is convenient and quick.

(1) Pipe network map: The pipe network map in the user management interface has two methods: user-defined pipe network map and two-dimensional map. The interface can be arbitrarily scaled. The user can click to display the user's basic working condition data and status indicator light, and directly click the mouse to obtain instrument data and user real-time and historical curves, and can set parameters for the user. The steam pipe network diagram is shown below:

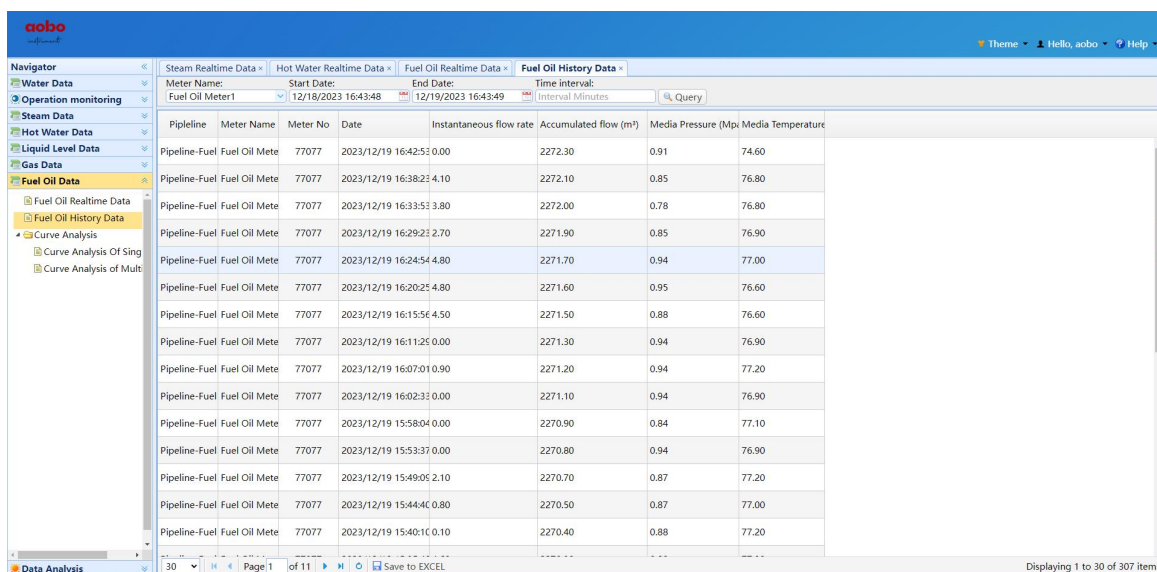




(2)Real time data: including user dynamic data and historical data curves. Click the corresponding command to obtain the flow rate, pressure, temperature, frequency, density, and other operating conditions or historical data and curves displayed by all user meters, and real-time refresh the display system to display all user real-time operating conditions



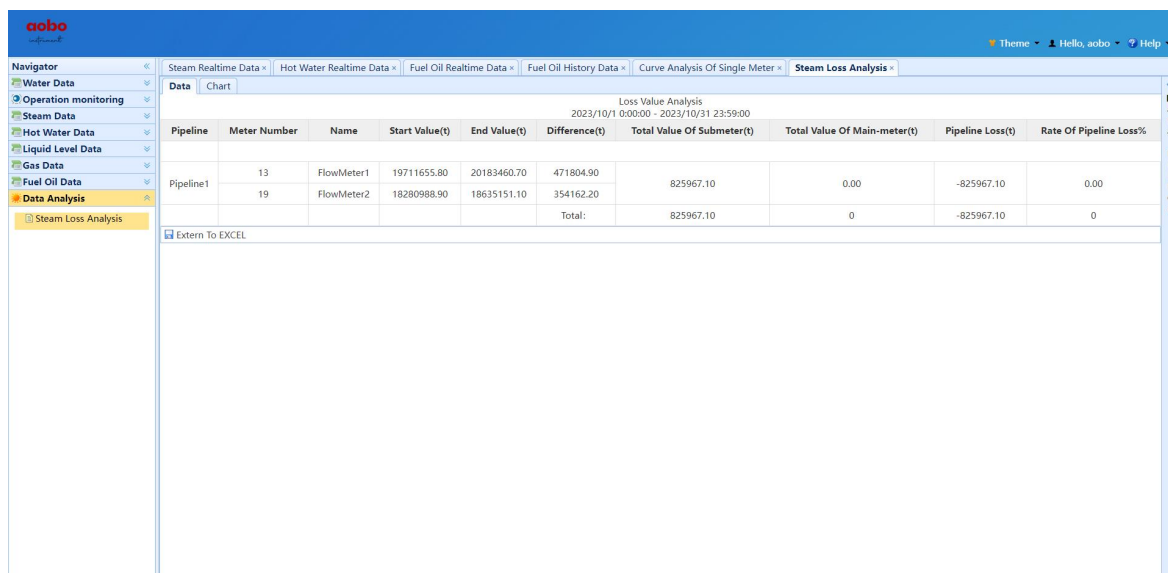
(3)Data query: The formed historical database can facilitate classified and combined queries. Provide historical data query on the year, month, and day of all users. All data and reports can be saved, exported, and printed. All users can be directly selected from the user drop-down list, and the time period can also be arbitrarily selected.



The screenshot shows the 'Fuel Oil History Data' tab in the software. The table displays historical data for Fuel Oil Meter1, including instantaneous flow rate, accumulated flow, media pressure, and media temperature over time.

Pipeline	Meter Name	Meter No	Date	Instantaneous flow rate	Accumulated flow (m³)	Media Pressure (Mpa)	Media Temperature
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:42:52	0.00	2272.30	0.91	74.60
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:38:22	4.10	2272.10	0.85	76.80
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:33:53	3.80	2272.00	0.78	76.80
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:29:22	2.70	2271.90	0.85	76.90
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:24:54	4.80	2271.70	0.94	77.00
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:20:25	4.80	2271.60	0.95	76.60
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:15:56	4.50	2271.50	0.88	76.60
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:11:25	0.00	2271.30	0.94	76.90
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:07:01	0.90	2271.20	0.94	77.20
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 16:02:31	0.00	2271.10	0.94	76.90
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 15:58:04	0.00	2270.90	0.84	77.10
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 15:53:37	0.00	2270.80	0.94	76.90
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 15:49:05	2.10	2270.70	0.87	77.20
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 15:44:40	0.80	2270.50	0.87	77.00
Pipeline-Fuel	Fuel Oil Mete	77077	2023/12/19 15:40:10	0.10	2270.40	0.88	77.20

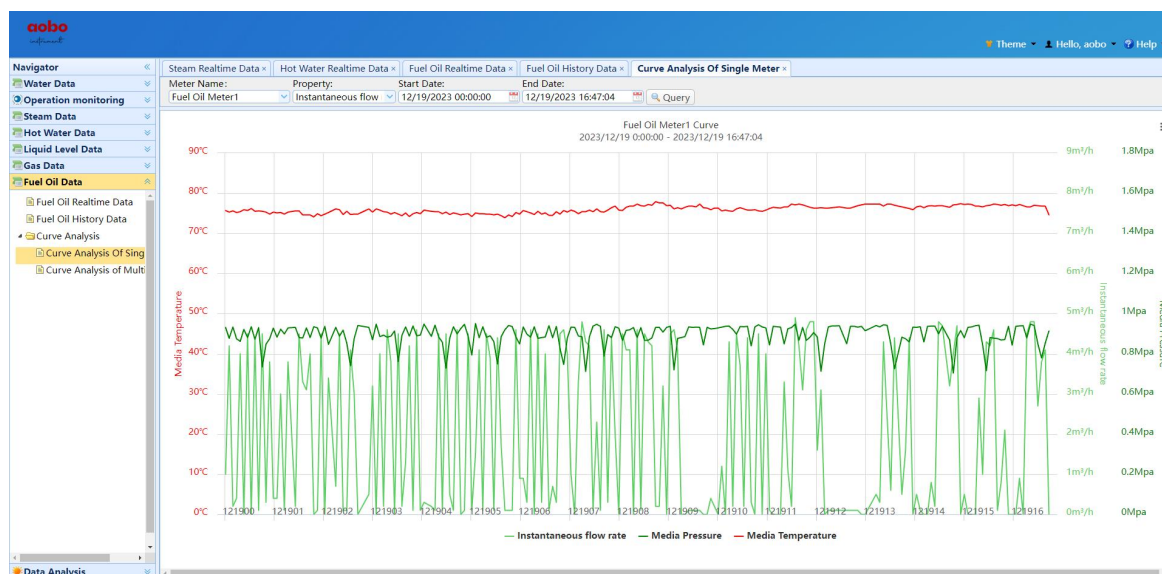
(4)Comprehensive Report: You can query the data parameters of all users for any historical time period, and save, export, and print them. This interface displays all user information. The time period includes the month, month, and day, which can be arbitrarily selected. You can display data and charts in two ways. You can generate reports for various single media, including daily reports, monthly reports, ten-day reports, and annual reports.



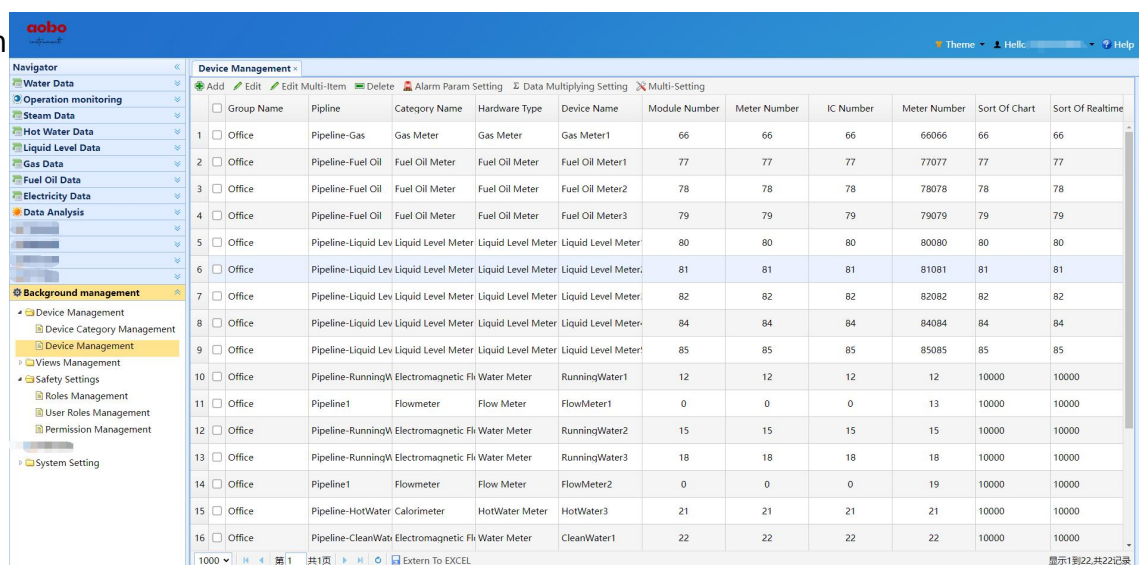
The screenshot shows the 'Steam Loss Analysis' tab in the software. The table displays loss value analysis for Pipeline1, including start and end values, difference, total value of submeter, total value of main-meter, pipeline loss, and rate of pipeline loss.

Pipeline	Meter Number	Name	Start Value(t)	End Value(t)	Difference(t)	Total Value Of Submeter(t)	Total Value Of Main-meter(t)	Pipeline Loss(t)	Rate Of Pipeline Loss%
Pipeline1	13	FlowMeter1	19711655.80	20183460.70	471804.90	825967.10	0.00	-825967.10	0.00
Pipeline1	19	FlowMeter2	18280988.90	18635151.10	354162.20				
		Total:				825967.10	0	-825967.10	0

(5)Curve analysis: You can query instantaneous quantity curve, cumulative quantity curve, pressure curve, and temperature curve; The time period, including the month, month, and day, can be arbitrarily selected, and multiple devices can be selected at the same time to facilitate data analysis and can be saved, exported, and printed.

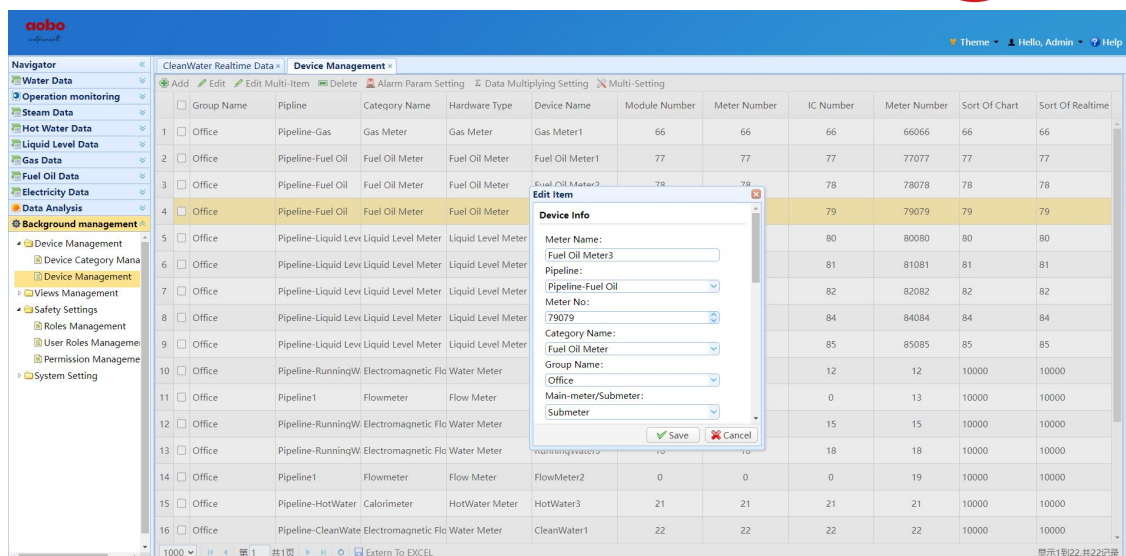


(6)Background management: including device management, view management, security settings, and system settings. In device management, users can be added indefinitely and alarm

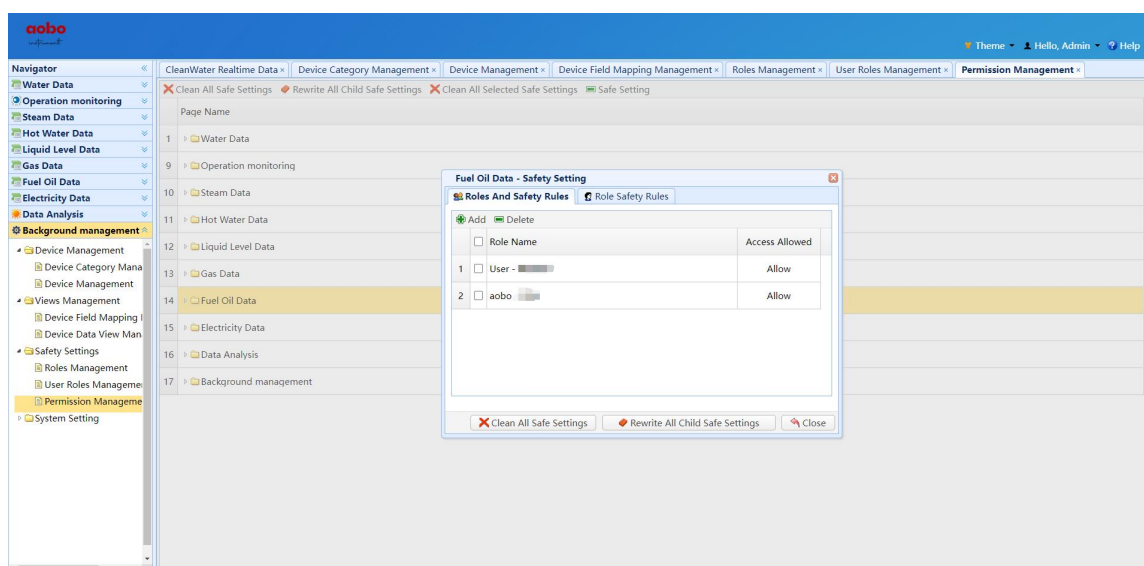


	Group Name	Pipeline	Category Name	Hardware Type	Device Name	Module Number	Meter Number	IC Number	Meter Number	Sort Of Chart	Sort Of Realtime
1	Office	Pipeline-Gas	Gas Meter	Gas Meter	Gas Meter1	66	66	66	66066	66	66
2	Office	Pipeline-Fuel Oil	Fuel Oil Meter	Fuel Oil Meter	Fuel Oil Meter1	77	77	77	77077	77	77
3	Office	Pipeline-Fuel Oil	Fuel Oil Meter	Fuel Oil Meter	Fuel Oil Meter2	78	78	78	78078	78	78
4	Office	Pipeline-Fuel Oil	Fuel Oil Meter	Fuel Oil Meter	Fuel Oil Meter3	79	79	79	79079	79	79
5	Office	Pipeline-Liquid Lev	Liquid Level Meter	Liquid Level Meter	Liquid Level Meter	80	80	80	80080	80	80
6	Office	Pipeline-Liquid Lev	Liquid Level Meter	Liquid Level Meter	Liquid Level Meter	81	81	81	81081	81	81
7	Office	Pipeline-Liquid Lev	Liquid Level Meter	Liquid Level Meter	Liquid Level Meter	82	82	82	82082	82	82
8	Office	Pipeline-Liquid Lev	Liquid Level Meter	Liquid Level Meter	Liquid Level Meter	84	84	84	84084	84	84
9	Office	Pipeline-Liquid Lev	Liquid Level Meter	Liquid Level Meter	Liquid Level Meter	85	85	85	85085	85	85
10	Office	Pipeline-RunningW	Electromagnetic Fl	Water Meter	RunningWater1	12	12	12	12	10000	10000
11	Office	Pipeline1	Flowmeter	Flow Meter	FlowMeter1	0	0	0	13	10000	10000
12	Office	Pipeline-RunningW	Electromagnetic Fl	Water Meter	RunningWater2	15	15	15	15	10000	10000
13	Office	Pipeline-RunningW	Electromagnetic Fl	Water Meter	RunningWater3	18	18	18	18	10000	10000
14	Office	Pipeline1	Flowmeter	Flow Meter	FlowMeter2	0	0	0	19	10000	10000
15	Office	Pipeline-HotWater	Calorimeter	HotWater Meter	HotWater3	21	21	21	21	10000	10000
16	Office	Pipeline-CleanWate	Electromagnetic Fl	Water Meter	CleanWater1	22	22	22	22	10000	10000

In view management, you can set parameters displayed in data center and curve analysis.



Role management, user role management, and permission management can be set in security management; According to permission management, it can be set as super administrator, administrator, and general user; A super administrator has all management permissions, and administrators and ordinary users can only perform their own binding permissions.



(7) Work indicator light: The function of the work indicator light is clearly described on the panel, that is, when the instrument is normal, abnormal (such as power failure of the instrument), out of limit alarm, and not connected, it is indicated with different color indicator lights.

(8) Various reports can be customized according to user requirements.

VI. Data Security

The system adopts a B/S structure, and the administrator of the system has the highest permissions. Other users need to open their permissions for using data. Low privilege users can only view the assigned privilege data and reports, and cannot access data beyond their authority, nor can they access data with each other.

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