The Analysis on the Application of Digital Heating Technology Based on Informatization

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ABSTRACT

The paper introduces intelligent heating household metering system architecture based on the information-based, the analysis take the hot metering system based on the on-off time and area method as a case model, respectively, the paper structure by one function on the system sensor layer, network layer, application layer respectively. Finally, the paper analysis the host computer function of the intelligent heating household metering system based on the information. Information technology, intelligent technology in the household heating metering system on the application, to achieve the user's on-demand heating and maximize energy conservation.

INTRODUCTION

The traditional heating system operation is manual adjustment of manual experience, complaints on-site (on-site) operation and management mode, the basic is extensive management, experience control, low efficiency, heating quality is not high, energy consumption; with the development of electronic information technology. More and more advanced electronic information technology to join the field of heating, this paper to open-time time area of heat metering heating system as a model for the establishment and application of intelligent measurement system for the information based on the wisdom of heating Household metering system construction and implementation of a valuable reference.
INTELLIGENT HEATING METERING SYSTEM ARCHITECTURE BASED ON INFORMATION TECHNOLOGY.

In the existing heating system, the use of heating metering device for the user's heat situation for information collection, through a dedicated data communication transmission network remote transmission to the remote monitoring platform, the system architecture shown in Figure 1. In Figure 1, according to the planning framework the information-based intelligent heating household metering system is divided into three layers: (1) The sensing layer: the heating metering device use the sensor to monitor the basic parameters of the heating system as the heating system; (2) the network layer: the perception of the data collected by the use of data communication transmission network to the heat metering system database software; (3) application layer: the database formed by the network layer used for artificial experience to determine the analysis, control parameter settings, the control of the order issued, computer-aided analysis, decision-making, control.

Figure 1. Intelligent heating household metering system architecture based on Information.

THE INTRODUCTION TO THE SYSTEM SENSING LAYER

The system is the hot intelligent heating metering system based on the on-off time area method, in this first, introduced the principle of the system. The on-off time area method of heat measurement system principle shown in Figure 2, the installation diagram of heat user shown in Figure 3.

In Fig 2, the indoor thermostat to measure the indoor temperature, and the on-off controller infinite transmission, the on-off controller comparison indoor temperature and set the temperature difference to control the valve opening and closing, record and statistics household control valve collection time[1]. Ultrasonic heat meter to collect the floor heat consumption, the data communicated to the collection calculator; the acquisition calculator receive the data from the on-off controller and
Ludong thermal table data, data storage and processing. Calculate the user to share the heat consumption, and the data to the wireless way to pass to the household heat meter, to achieve "Loudong measurement, floor sharing"[2], the on-off time area method in the user installation diagram shown in Fig 3; The acquisition calculator will Data transmission through the mobile network to the database server and HECM calorie management software, to achieve the heat metering system of intelligent, automation, information technology[3].

![Figure 2. The heat metering system based on the on-off time area method.](image1)

![Figure 3. The User installation.](image2)

**NETWORK LAYER**

Wisdom heating heat metering system realize two functions using the network information technology: (1) Data transmission methods: the network communication way realized the collection heat metering system such as data remote transmission and control instructions like special optical fiber broadband access (ADSL), 3 g, GPRS; (2) The establishment of the server, database, software: automatic monitoring all discrete distribution of temperature, pressure and flow of the heating point of each parameter and the real-time fault in wireless way, to establish the GIS database of the city. In the thermal metering system, the network layer realizes the data between the components of the thermal metering system, the remote transmission of instructions and the establishment of mass database, and achieve the heat metering system of intelligent, information technology.

**APPLICATION ANALYSIS OF INTELLIGENT HEAT METERING SYSTEM**

In the heating system, the existing electronic information technology is used to collect the heating operation data to form a massive database. The researchers use the data of the database to analyze the temperature, water balance, energy consumption and heating effect of the heating network and other aspects of analysis.
The three-dimensional model of the heat metering system is established shown in Fig. 4, energy consumption analysis shown in Fig. 5, pipe network operation results shown in Fig. 6, indoor operation effect shown in Fig. 7.

In Figure 4, the district secondary network system to establish a pipeline network model using the way of the computer technology combined with higher information of the building layer, which reflects visually the pipe network layout of the hot user and the distance from the heat transfer station, so that the operator has a more intuitive understanding on the heat metering system, at the same time, which display the water supply and return temperature of each building in the interface, heating room temperature and other parameters.

In Figure 5, using the computer technology to collect data on heat users and compare the heat analysis, auxiliary decision analysis of the heat user's energy consumption and whether to meet the heat consumption by energy consumption situation, through the energy consumption comparison, which has some guiding significance for energy-saving operation.

In Figure 7, the image has an intuitive display of each user's actual room temperature, set room temperature, the water temperature, intelligent on-off valve opening and energy consumption trend. The image specially shows the running parameters of the hot user directly and which further assist the decision analysis and the heating effect. In Figure 6, comprehensive analysis system using computer technology to use thermal effect, determine the user heating problems.

In Figure 8, using computer technology analysis and collect the room temperature of Jiajia Park community users, to determine the thermal effect of hot users.

The thermal metering system uses the electronic information technology to collect the heating parameters in real time, form a massive database, conducts the multidimensional statistical analysis of the data, assist the operation personnel decision-making and release the control instruction, so as to realize the heating system unattended.
In response to the call of the state to save resources and make the heating system more humane, the mobile phone system APP is introduced to make the system truly unattended. The interface of mobile phone APP shown in Fig 9. Mobile phone APP achieve the function as information query analysis of heat supply within the scope of human rights, real-time understanding of heating conditions. The specific performance as the following two aspects: on the one hand, the heating system management staff not only remote understanding of the scope of the heating system within the temperature, pressure, flow, valve opening and other parameters. You can also retrieve the server in a variety of log information (control log, alarm records, single consumption query), analysis the operation of the heat networks; the other hand, hot users can monitor real-time of self-heating conditions, to understand their own heating network and the return water temperature, pressure, with heat, to achieve real-time users of the heating time, indoor temperature control. Mobile APP not only for the user to create a more comfortable environment, in the energy-saving of heat measurement and heating on-demand played a very big role.
CONCLUSIONS

In the past ten years, heating system introduce new technologies and continuous development, the basic parameters of heating are collected by means of heat meters, temperature sensors, pressure sensors and other electronic equipment, Mobile network will collect the data transmitted to the database, HECM heat management software, remote monitoring platform. Managers can use the mobile phone APP to achieve the remote management of the heating system, hot users to use mobile phones to achieve real-time mastering their own hot. Standing on the height of the wisdom of heating for the construction of heating metering system, the construction of heating metering system is the data base of intelligent heating, which has played the role of heating metering application.

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REFERENCES