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**Technical requirements for energy efficiency online monitoring
system of centralized air conditioning
(English Translation)**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

1 Scope

This standard specifies the definition, working environment requirements, system design requirements, and system functional requirements of the online energy efficiency monitoring system for centralized air-conditioning and the main performance indicators of the system.

This standard is applicable to the design, development, construction, operation and maintenance of the online monitoring system for energy efficiency of centralized air conditioners.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 2887 General Specification for Computer Site GB/T 17626.2 Electromagnetic compatibility test and measurement technology Electrostatic discharge immunity test GB/T 17626.3 Electromagnetic compatibility test and measurement technology Radio frequency electromagnetic field radiation immunity test GB/T 17626.4 Electromagnetic compatibility test and measurement technology Electrical fast transient pulse group immunity test GB/T 17626.5 Electromagnetic compatibility test and measurement technology surge (impact)

immunity test GB/T 17626.6 Electromagnetic compatibility test and measurement technology Radio frequency field induced conducted disturbance immunity GB/T 17626.8 Electromagnetic compatibility test and measurement technology Power frequency magnetic field immunity test GB/T 17626.12 Electromagnetic compatibility test and measurement technology Ring wave immunity test GB/T 17981 Economic operation of air conditioning system GB/T 31960.2-2015 Technical Specification for Power Energy Efficiency Monitoring System Part 2: Main Station Function Specification GB/T 31960.8 Technical Specification for Power Energy Efficiency Monitoring System Part 8: Safety Protection Specification GB/T 50155 Terminology standard for heating, ventilation and air conditioning GB 50168 Code for Construction and Acceptance of Cable Lines of Electrical Installation Engineering GB 50169 Code for construction and acceptance of grounding devices for electrical installations GB/T 50312 Code for acceptance of integrated wiring system engineering GB 50343 Technical Specification for Lightning Protection of Building Electronic Information System

3 Terms and definitions

The following terms and definitions defined in GB/T 17981 and GB/T 50155 apply to this document.

Centralized air conditioning system an air-conditioning system that centrally processes, transports and distributes working media. Including water-cooled central air-conditioning system, multi-line air-conditioning (heat pump) Types of systems and energy towers. The core equipment includes heat pumps, chillers (compression, absorption, constant flow, constant speed, variable speed, lithium bromide Etc.), hot water units (direct normal pressure, indirect normal pressure, etc.), cold and heat storage devices and fresh air units, etc.

Centralized air conditioning energy efficiency online monitoring system Through the installation of classification and sub-item energy efficiency metering devices for the centralized air conditioning system, real-time collection of energy efficiency data is achieved to achieve the performance of the centralized air conditioning system.

The general term for hardware and software systems with effective online monitoring and dynamic analysis functions.

Air conditioning system cooling load the cooling load borne by the air-conditioning system, in addition to the cooling load of the air-conditioning area, also includes various cooling loads such as fresh air cooling load and reheating cooling load.

Annual cooling consumption on air conditioning the total cold consumption of an air-conditioning user or all air-conditioning users in the cooling system in a year.

Annual heat consumption on air conditioning the total heat consumption of an air-conditioning user or all air-conditioning users in the heating system in a year.

Cooling or heating coefficient of performance Under the specified experimental conditions, the ratio of the cooling capacity and heating capacity of the refrigeration and heating equipment to its power consumption is expressed in W/W.

COP refrigeration unit = cooling capacity (W)/input power (W) **COP heating unit** = heating capacity (W)/input power (W) **3.7 Energy efficiency ratio of terminal system** the ratio of the total cold produced by the air conditioning system to the energy consumption at the end of the air conditioning system, referred to as EERt.

Seasonal energy efficiency ratio During the cooling season, the ratio of the total heat removed from the room during the cooling operation of the refrigeration equipment to the total power consumption, and its value is kWh/kWh said, referred to as SEER.

Heating seasonal performance factor During the heating season, the ratio of the sum of the total heat sent to the room during the heating operation of the heating equipment to the sum of the total power consumption, the value is kWh/kWh said, referred to as HSPF.

3.10

Annual performance factor Taking one year as the calculation cycle, the heat removed from the room by the same cooling and heating equipment during the cooling season and the amount of heat sent into the room during the heating season the ratio of the total amount of heat to the total amount of electricity consumed in the same period. Its value is expressed in kWh/kWh, abbreviated as APF.

3.11

Electricity consumption to transferred cooling or heat quantity ratio Under design conditions, the ratio of the total power consumption of the circulating water pumps of the air-conditioning cold and hot water system to the design cooling or heating load is a measure of the an indicator of the efficiency of cooling and heating energy, referred to as ECR-a or EHR-a.

3.12

Integrated part load value the part-load efficiency index of chillers and other equipment represented by a single value, which is based on the coefficient of performance when the unit is part-loaded the value is obtained by weighted summation calculation according to the operating time of the unit under various load rates and other factors, referred to as IPLV.

4.1 Environmental conditions of system equipment

Servers, workstations, display screens (devices), network communications, firewalls and other equipment used in the system master station, as well as buildings and surrounding environment the system access terminals include energy efficiency collection terminals, electricity and heat (cold) measurement and monitoring meters, temperature and humidity, pressure sensors, and DDC control the end temperature controller, etc. should meet the

requirements of Table 1 and Table 2.

5.1 System composition

The centralized air-conditioning energy efficiency online monitoring system consists of the centralized air-conditioning energy efficiency online monitoring main station, communication network, energy efficiency collection terminal and terminal transmission.

The system structure is shown in Figure 1.

Figure 1 Centralized air conditioning energy efficiency online monitoring system structure

Among them, the central air conditioning energy efficiency online monitoring main station is operated and maintained by the air conditioning energy efficiency monitoring administrator. The master station uses fieldbus, Ethernet, the internal communication network such as wireless is connected to the air conditioning energy efficiency collection terminal. The energy efficiency collection terminal can be used on-site such as BACnet, LonWorks, RS-485, etc.

The bus is connected to system terminals such as measurement monitoring meters and sensors to collect the following three types of data.

- a) The air-conditioning system as a whole and the main energy-consuming equipment such as main engine, circulating pump and cooling tower Electricity consumption data;
- b) Operating condition data of the air conditioning system host, circulating pump, and cooling tower;
- c) The temperature and humidity data of the main activity space in the building and the outdoor environment.

The centralized air-conditioning energy efficiency online monitoring system can be interconnected with the internal building automation system (BAS) and the upper-level energy management platform through.

5.2.1 Master station hardware equipment

The hardware equipment of the master station of the centralized air-conditioning energy efficiency online monitoring system shall meet the following requirements.

- a) The deployment location of the master station includes data center, computer room, etc., data center, computer room the hardware configuration must meet the system function requirements of Part 6 of this standard;
- b) The master station equipment should adopt the mainstream equipment that meets the standard, and the master station configuration should meet the system System functions and performance indicators are required to ensure the real-time, reliability, stability and safety of system operation, and fully consider Maintainability and scalability requirements.