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**Information technology - Energy consumption monitoring
system of energy user - Part 3: Basic information and format**

信息技术 用能单位能耗在线监测系统 第3部分:基础信息与格式

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1 Scope

The document gives the basic information and formats of the energy consumption on-line monitoring system and lays down the codes for energy user information, for data collection sources, for collected data, for data use and for the combination of collected data items, together with the units of measurement and the significant figures used by the system.

It applies to the application software of the system platform, to the use of transmission interface protocols and to the development of the related software in end devices.

The normative references are GB/T 2260 on administrative division codes, GB/T 4754 on the classification of national economic activities, GB 32100 on the rules for the unified social credit code of legal persons and other organizations, and JJF 1051 on the naming and classification coding of measuring instruments.

3 Terms and definitions

3.1 industrial control system: a system made up of industrial process control components and of process control components for real-time data acquisition and supervision. A note names the core components as the distributed control system, the fieldbus control system and the programmable logic controller, and states that the system acquires and monitors real-time data so as to run equipment automatically and to manage and supervise business processes.

3.2 production monitoring management system: a real-time system that links the production control system and the related auxiliary systems into one whole through a communication network and that, taking the data acquired in real time from the production process as its basis, combines real-time process monitoring and analysis, optimizing control and management of the production process.

3.3 management information system: an information software system that embodies most of the management functions of the energy user, decision, planning, organization, leadership, supervision and analysis among them, that supplies real-time, relevant, accurate and complete data, and that provides managers with a basis for decision.

3.4 comprehensive energy consumption: the sum, converted by the prescribed calculation method and into the prescribed units, of the various forms of energy actually consumed by the energy user in its production and operating activities during the reporting period, after deduction of the duplication arising from the output of energy processing and conversion and from energy recovery and reuse.

3.5 comprehensive energy consumption of the process: the sum, converted by the prescribed calculation method and into the prescribed units, of the physical quantities of the various forms of energy and energy-carrying media actually consumed during the reporting period by a given process or installation of the energy user in producing a given product or providing a given service.

4 Codes for energy user information

4.1 General. So that information may be stored, retrieved and used conveniently, the system assigns codes to certain items when it processes data; the codes given to administrative division, industry, energy user, production process and process unit are called basic information codes. The basic information of the energy user has to conform to A.1.

4.2 to 4.4. Administrative division codes follow GB/T 2260. Industry codes follow GB/T 4754, which divides activity into section, division, group and class; the code has to reach the class, that is, one Latin letter and four Arabic digits. The energy user code follows GB 32100 and matches the unified social credit code of that user.

4.5 Metering instrument code. The code is made of an instrument type code, an instrument grade code and an instrument serial number. The type code is eight Arabic digits. The grade code divides instruments into three grades, marked 1, 2 and 3, for instruments metering energy entering and leaving the user, instruments on the main secondary energy-using units, and instruments on the main energy-using equipment. The serial number, three Arabic digits, orders instruments of the same type and the same grade. The document works the example 152610001002, in which 15261000 is the type electronic watt-hour meter, 1 is the grade for an instrument metering energy entering and leaving the user, and

002 is the second instrument of that kind. Basic information on energy metering instruments has to conform to A.2, and Table 1 lists the instrument codes.

Table 1 pairs a name with an eight-digit code for each family of energy metering instrument: non-automatic weighing instruments and their kinds, automatic weighing instruments including gravimetric filling instruments, continuous and discontinuous totalizing instruments, dynamic weighbridges and nuclear belt scales, load cells and weight indicators, flowmeters by measuring principle, gas meters, heat meters, pressure instruments, pressure transmitters and sensors, and watt-hour meters including alternating current, electronic, multi-rate, maximum demand and direct current types.

4.6 to 4.8. A production process is a specific step in making a product or reaching a given result; its code is two Arabic digits assigned by industry, and the codes for the several industries are set by the corresponding standards or by the competent authorities. A process unit is the concrete entity of one production process and is coded on two Arabic digits, 01, 02 and so on, in the order of the units the user has. Energy-using equipment is coded on four Arabic digits, the first two for the equipment type and the last two for the equipment number, the detailed codes again being set by the corresponding standards or by the competent authorities.

5 Codes for data collection sources

The data collection source is the source from which the system collects, identifies and selects data, and generally covers the management information system, the production monitoring management system, the industrial control system and other business information systems, as well as field instruments and manual entry.

One Arabic digit codes the source. Table 2 pairs the management information system with 1, the production monitoring management system with 2, the industrial control system with 3, the field instrument with 4, manual entry with 5, the energy supply organization with 6 and other sources with 7.

6 Codes for collected data

6.1 Types of collected data. The data collected fall into ten types: primary energy, secondary energy, energy-carrying media, non-energy products, coefficients for converting primary energy to standard coal, the same for secondary energy, the same for energy-carrying media, energy efficiency indicators, operating indicators and other indicators. A coefficient for conversion to standard coal is the ratio between the actual calorific value of the energy and that of standard coal; the coefficients for each energy variety and each energy-carrying medium are given in Annex B. Table 3 codes the ten types on two Arabic digits, from 01 for primary energy to 10 for other indicators.

6.2 Codes for energy varieties. An energy variety is coded on four Arabic digits, the first two

being the class code and the last two the subclass code. Table 4 runs from raw coal, with subclasses for mixed raw coal, raw coal, anthracite, coking bituminous coal, general bituminous coal and lignite, through washed coal for coking and for power use, other washed coal, coal products, coke and semi-coke, other coking products, the manufactured gases including coke oven, blast furnace and converter gas, natural gas and liquefied natural gas, other fuel gases, crude oil and the refined products from gasoline to asphalt, heat, electricity with subclasses by generating source, coal gangue, municipal solid waste, biomass residues, waste heat and waste pressure, other industrial residues and other fuels. A footnote explains that mixed raw coal covers the use of two or more raw coals together where they cannot be monitored separately in real time.

6.3 Codes for energy-carrying media. An energy-carrying medium is a working substance consumed in production that is neither used as a raw material nor enters the product, but whose preparation consumes energy; it is a non-thermal energy carrier obtained by one or more energy conversions. It is coded on four Arabic digits split into a class and a subclass. Table 5 gives four classes: gases, with compressed air, oxygen, nitrogen, argon, shielding gas, carbon dioxide and acetylene; water, with industrial water, purified water, circulating water, deaerated water, desalinated water, condensate, fresh water and softened water; air, with industrial air and instrument air; and solids, with calcium carbide.

6.4 to 6.7. Non-energy products are coded on four Arabic digits split into a class and a subclass, the codes for each industry being set elsewhere. Energy efficiency indicators are coded on four Arabic digits, and the document distinguishes three kinds of indicator: those covering the whole production flow, such as energy consumption per unit of product and comparable energy consumption per unit of product; those covering a main process, stage or item of equipment, which refine the first kind and expose the gap against a benchmark user; and the key process parameters such as pressure, temperature and flue gas composition, which are not energy efficiency indicators but are closely bound to the energy efficiency of a process or of the whole plant. Operating indicators are the financial statistics of the user, and Table 6 codes gross industrial output value, industrial added value, sales revenue, taxes and profits paid, production cost and energy cost. Table 7 codes the other data, which are comprehensive energy consumption, comprehensive energy consumption of the process, and fossil energy consumption.

7 Codes for data use

Data use is the statistical purpose the energy user assigns to the data collected. It is coded on two Arabic digits, the first being the class and the second the subclass.

Table 8 gives nine classes. Purchase covers purchased, purchased and consumed, and purchased and not consumed. Consumption covers consumption, industrial production consumption, non-industrial production consumption and industrial production consumption as raw material. Output covers output, use in industry and use outside industry. Recovery