

KS

KOREAN INDUSTRIAL STANDARD

Demand controller

KS C 1213 : 1997

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Demand controller

1. Applying scope This Korean Industrial Standard specifies the maximum demand controllers which are used to control maximum demand electric power and the peripheral devices which are used together with those (such as electric power fetch devices, synchronized connection devices, external relay devices, remote controllers, monitoring softwares).

2. Normative references The following standards contain provisions which, through reference in this Standard, constitute provision of this Standard. As to those normative references, the most recent editions thereof shall be applied.

KS C 0220 Environmental test method(electricity & electronics), Test method for low temperature (cold-resistant)

KS C 0221 Environmental test method(electricity & electronics), Test method for high temperature (heat-resistant)

KS C 0227 Environmental test method(electricity & electronics), Test method for temperature and humidity cycle (12+12 hours cycle)

KS C 0241 Environmental test method(electricity & electronics), Test method for shock

KS C 1302 Insulated resistance meter(battery type)

3. Definition The main terms used in this Standard are defined as follow.

3.1 General terms

- a) **Maximum demand controller** This controller shuts and opens load automatically for the customers whose contracted watt-hours are more than 100kW to maintain the consumed electric power within the preset goal of watt-hour until the termination of demand time limit by measuring the consumed watt-hour and the demand time limit reset by real time during the time of demand limit, and which is possible at electric power stations, etc. to manage peak electric powers of customers by on-line direct control when it was necessary to control the electric power demand and supply.
- b) **Demand time limit** The demand time limit which is defined by certain length of time to calculate an average electric power is set to 15 min. in case of Korea, and which is a basic time for the maximum demand controller to calculate consumed watt-hours and to control load. In order to synchronize the demand time limit with the maximum demand watt-hour meter, this device detects the demand time limit meter in the watt-hour meter by using the non-contact method regardless of the terminal openings for services from the Korea Electric Power Company.
- c) **Demand electric power** The demand electric power means an averaged value of electric power measured for the demand time limit.

$$\text{Demand electric power} = \frac{\text{Consumed electric power for the demand time limit (kWh)}}{\text{Demand time limit(h)}}$$
- d) **Goal electric power** This electric power is preset for controlling the demand electric powers of customers according to the status of electric power consumption and the capacities of controllable loads.
- e) **Basic electric power** The basic electric power is the current value corresponding to the preset

goal electric power to control by comparing with the current electric power.

- f) **Maximum demand electric power** The maximum value of the electric powers that are recorded in watt-hour meter during the time of demand electric power measure.
- g) **Estimated electric power** The estimated electric power which is estimated ahead for the electric power at the termination of demand time limit is calculated by using the electric power changes during the unit time and the present demand electric power and reset automatically when the demand time expires.
- h) **Present electric power** The present electric power means the accumulated total value which is consumed actually from the beginning of demand time limit to the present which is reset automatically when the demand time limit expires.

3.2 Terms concerning the constituting devices and functions

- a) **Main body** The main body means the central part of this device which is the basic device to display electronic processes, computer communications and all informations.
- b) **Synchronized connection device** The synchronized connection device transmits to the main device by detecting the demand time limit for 15 min. of the watt-hour meter and then converting it the pulses identified with the demand time limit. The synchronized connection device shall be available to mount into the main body or to use an external type as well.
- c) **Electric power fetch device** The electric power fetch device detects the consumed watt-hours in customer correctly and then transmits it to the main body by converting the pulses.
- d) **Remote controller** The remote controller controls load in the field according to the commands for load control that the main body provides by communicating, which includes relays for shut and input inside.
- e) **External relay device** The external relay device provides the supplementary relay sequence that shuts or inputs directly the load to be controlled in the field.
- f) **Central processing unit (CPU)** The central processing unit is a part that charges central processing, calculation and control of the main device.
- g) **Memory** The memory is an semiconductor element that is used for storing programs in the main device and measured watt-hours and informations.
- h) **Display panel and manipulation panel** The display panel and the manipulation panel display various kinds of information and output the status by using liquid crystal display element (LCD), 7-segments, LED, CRT display, etc. in the main body, which have the key input functions to set goal electric power and established data.
- i) **Key input** The key input means the key input function that is able to set various kinds of variables in the main body.
- j) **RS-232C communication** The RS-232C is a basis for computer communication, which makes possible to connect with a computer for supervisor by using the 1:1 communication method that is most universal in the standard regulations of asynchronous type.
- k) **Pulse constant** The pulse constant is expressed with rev/kWh(pulse/kWh), that is number of rotations (number of pulses) per kWh, in watt-hour meter.
- l) **PCT ratio** As a converter and a transformer is used for operating a watt-hour meter, the PCT ratio means multiplication of the transformation ratios in the primary side and in the secondary side each.
- m) **Load control mode** There are "Automatic" and "Manual" modes in the modes to control load, and the automatic signifies to control the loads connected directly to the device, and the manual signifies that the device does not control load directly but the user control load voluntarily through the key input. And in the load control methods in the field, there are the direct connection method for signaling wires in a field through attachment of external relay device and the remote control method by using a remote control device and communication, and it shall be

available to select among those.

- n) **Load control method** "Cyclic control" signifies to proceed cyclically the procedures to shut and input load, and "Priority control" signifies the method to input inversely against the shut procedures according to the priority orders. And "Composite control" means the method to use cyclic control and priority control together.
- o) **Operating method for the goal electric power** There are "Self" mode and "On-line direct control" mode in the goal electric power setup and operation mode. A customer setups a goal electric power and operates by itself in the "Self" mode. And a goal electric power is set by downloading itself into the customer's place remotely according to an agreement in advance between the electric power company and the customer in necessary range of time in the "On-line direct control" mode. And it turns back to the self mode when the corresponding time range expires.

4. Environmental conditions for standard use The environmental standard for use shall conform to the following conditions if other special conditions have not been prepared.

- a) **Temperature range** The operating temperature range of device shall conform to - 10℃~ +50℃.
- b) **Humidity range** 10% ~ 90% (It shall not make dew.)
- c) **Using place** The place shall be less than 500m above the sea level and conform to the installation conditions of the watt-hour meter.

5. Constituents and the rated

5.1 Constituents Range of the meters that are applied by this Standard shall conform to Table 1 below.

Table1 Constituents

Applied product	Constituent	Main function	Remarks
Maximum demand electric power controller	Main device	Calculation and load control	Individual device of indoor installation type or PC device & others
	Synchronized connection device	Detects the demand time limit of watt-hour meter and transmits to the main body	Individual device
	Watt-hour fetch device	Detects the consumed watt-hour and transmits it to the main body after pulse conversion	Individual device
	Software for supervisor	Monitors the electric power status and outputs it by printer	Above Hangeul WINDOWS 3.1
	Remote controller	Controls load remotely by communication connection	
	External relay devices	Provides relay sequence for load control in the field	Connected directly to the signaling line in the field.

5.2 The rated

- a) **Control electric power** The rated control electric power for this device shall be AC 220V.
- b) **Rated frequency** 60Hz

6. Function This device shall have the following functions and sufficient to each function.

6.1 Main body

6.1.1 Control function of maximum demand electric power

- a) The present electric power shall be calculated and compared with the expected electric power and the basic electric power.
- b) The load shall be cut off if the expected electric power exceeds maximum demand electric power.
- c) More than 8 loads at the minimum shall be controllable individually in 1 main body, the more loads shall be controllable through group control, and the following alerts shall be output according to the situations.
 - 1) When the present demand electric power exceeds the basic electric power.
 - 2) When the load control puts into.
 - 3) When all the loads are shut off.

6.1.2 Display panel

- a) Display of the present electric power and the demand time limit that remains.
- b) Goal electric power
- c) Expected electric power
- d) Display of the maximum demand electric power on day/month/year.
- e) Display of various kinds of data (pulse constant, PT/CT ratio, load control method, load capacity, etc.).
- f) Display of present date, hours and day of the week.

6.1.3 Operation panel

- a) It shall be easy to set data and to display by key manipulation.
- b) It shall be possible to correct the setup data under the monitoring environment.

6.1.4 Communication panel

- a) Exclusive communication port for supervisor monitoring software.
- b) Independent exclusive communication port for on-line direct control by electric company.

6.1.5 Output panel

- a) It shall be possible to connect to the external relay device through the signaling wires in the field at the load control output terminal of the main body.
- b) It shall have more than 2 independent output terminals for the use of alert output, etc..

6.1.6 Setup the conditions dependent on customer

- a) The load control method shall be possible to select among "Cyclic control", "Priority control" and "Composite control".
- b) The load control time shall be possible to setup when shutting off the load or when inputting the load in each.
- c) It shall be possible to cut off the load manually.
- d) It shall be possible to distinguish the customers individually according to the regulation for electric charge.
- e) The PCT ratio and the pulse constant in the transformer part shall be changeable.
- f) In the device, the alert output shall be selectable, and that output shall be possible to write out to an alert device at the customer through an independent output terminal.
- g) It shall be possible to setup S/W for supervisor and communication speed.
- h) The output for shut off and the output for input shall be possible to distinguish and to select independently according to the characteristics of objective load to control.

6.1.7 Power stoppage compensation function It shall be possible to preserve the data for 1 month continually. And the on-going function at present shall be proceeded normally after recover.

6.1.8 Process function on sundays and public holidays

- a) According to the kinds of electric charge, it shall be possible to process the dates of sundays and public holidays.