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**Watt-hour, var-hour and maximum
demand indicators for telemetering—
Part 2: Measuring instruments used
in transaction or certification**

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law.

Consequently, **JIS C 1283**:1979 was withdrawn and partially replaced with this Standard.

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JIS C 1283 series consists of the following 2 parts under the general title “*Watt-hour, var-hour and maximum demand indicators for telemetering*”:

Part 1: General measuring instrument

Part 2: Measuring instruments used in transaction or certification

Watt-hour, var-hour and maximum demand indicators for telemetering— Part 2: Measuring instruments used in transaction or certification

Introduction

This Japanese Industrial Standard has been prepared in order to specify the technical standard and test methods concerning the structure and performance requirements of the maximum demand watt-hour meters, among other requirements stipulated for the specified measuring instruments given in Measurement Act. The conformance of the indicator with this Standard, by itself, is not to certify that the indicator has passed the verification test stipulated in Measurement Act. The indicators can not be given the marking as stipulated in Article 19 of the Industrial Standardization Law, which indicates their conformity to this Standard.

1 Scope

This Standard specifies the maximum demand watt-hour meters, for use in measurement in transaction or certification, combined with the indicators for telemetering (induction type and electronic type) which are used in combination with an instrument transformer, and indicate the maximum demand by receiving pulses transmitted from the transmitter-incorporating watt-hour meters, the packaged type maximum demand indicator of the watt-hour meter with a maximum demand indication and the watt-hour meter (hereafter referred to as “meters”).

Other requirements than specified in this Standard shall be in accordance with **JIS C 1210**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS C 1210 *General rules for electricity meters*

JIS C 60068-2-6 *Environmental testing Part 2: Tests—Test Fc: Vibration (sinusoidal)*

JIS C 60068-2-27 *Basic environmental testing procedures Part 2: Tests, Test Ea and guidance: Shock*

JIS K 2246 *Rust preventive oils*

JIS Z 2371 *Methods of salt spray testing*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS C 1210** and the following apply.

3.1 indication mechanism

a set of scale marks which indicate a measurement value continuously or intermittently at regular intervals

3.2 separable indication mechanism

an indication mechanism which is separated from the main body of a meter by a cord, etc., or externally connected to it by a connector, etc.

3.3 instrumental error

the rate of the value obtained by subtracting a true value from a measurement value to the true value

NOTE : In **JIS C 1283-1**, it is referred to as “error.”

3.4 instrumental error test

a test to judge, by measuring the instrumental error of a meter, whether the meter conforms to the technical standards concerning structure stipulated in Measurement Act

3.5 verification

an inspection of specified measuring instruments stipulated in Measurement Act

NOTE : It is stipulated in the Measurement Act that the verifications are to be performed, depending on the classification of the specified measuring instrument, by the prefectural governor, a designated verification body, National Institute of Advanced Industrial Science and Technology, and Japan Electric Meters Inspection Corporation.

3.6 inspection during use

an inspection of performance, etc. of meters being used in the market, conducted after the manufacture of electric meters and instrument transformers

3.7 verification tolerance

tolerance expressed by the absolute value of an instrumental error in verification

3.8 user's tolerance

tolerance expressed by the absolute value of an instrumental error in inspection during use

3.9 type approval marking

marking which indicates that the meter belongs to a certified type of specified measuring instruments stipulated in the Measurement Act

3.10 electronic meter

a meter which measures and operates by using electronic parts such as semiconductors

3.11 induction type meter

a meter which operates by electric currents induced in an induction movable element (generally a disk) due to electric currents passing in a fixed coil

3.12 analogue indication mechanism

a set of scale marks which display the measurement value continuously, also referred to as the “analogue type”

3.13 digital indication mechanism

a set of scale marks which display the measurement value intermittently at regular intervals, also referred to as the “digital type”

3.14 transmitter

a device which generates the electric pulse proportional to electric energy or reactive power for use in transaction or certification

3.15 transmitter-incorporating meter

a meter equipped with a transmitter

3.16 output mechanism

a mechanism which transmits data of measurement values, etc. to a computer, etc.

3.17 meter with an output mechanism

a meter equipped with an output mechanism

3.18 indoor meter

a meter which can be used in a place with no exposure to rain or direct sunlight

3.19 indoor weatherproof meter

a meter having a weather resistance structure, withstanding use in a place with no exposure to rain but directly exposed to sunlight

3.20 normal weatherproof meter

a meter installed outdoors, but inside the rainfall line, or indoors, having a weather-resistance structure to endure use in a place where it would be directly exposed to sunlight and occasionally exposed to partial rainfall spatter

3.21 element

a set of actuator in the induction type meter which gives driving torque to a rotor axis, and a part in the electronic meter in which conversion to the electric quantity which is proportional to the electric power obtained by multiplying input voltage and input current is performed

3.22 meter constant

a value which expresses the number of rotor revolutions per 1 kWh of a meter in the induction type meter, and a value which expresses the number of measurement pulses per 1 kW or 1 kWh in the electronic meter

3.23 pulse constant

a value which expresses the number of input or output pulses per 1 kW or 1 kWh of a transmitter and an indicator (including pulse synthesizer)

3.24 indicator

a device which displays the measurement indication, etc. of maximum demand

3.25 demand interval

time defined in order to obtain average power

3.26 timing device

a device which defines a demand interval

3.27 demand

average of the electric power during a demand interval

3.28 demand pointer

indication which repeatedly shows the demand for each time interval in the pointer type meter

3.29 demand index

indication which repeatedly shows the demand for each time interval in the digital display type meter

3.30 pusher

mechanism pushing a demand pointer which repeatedly indicates the maximum demand according to the demand for each time interval in the pointer type meter

3.31 return mechanism

a device which returns the indication of maximum demand and demand to a zero position

3.32 auxiliary power supply circuit

a circuit to which the voltage for operating an indicator is applied, which refers to the part of the circuit between auxiliary power terminals of the indicator

3.33 rated load

load in the case of the rated voltage, rated current, rated frequency and a power factor 1 of the secondary side of an instrument transformer

3.34 compound electric meter

a meter consisting of two or more electric meters structurally combined in one, in which two or more units of the combined meters are of the same type, and the electric meters concerned are equipped with the same detection part and the central processing unit

4 Indication type

The indication type of a meter shall be a pointer type and digital display type.

5 Marking

The following matters shall be clearly and indelibly marked on the conspicuous part of a meter.

- a) Classification (“Maximum demand meter”)
- b) Symbol of type
- c) Phase and wire system of applicable circuit
- d) Rated voltage (phase voltage for the three-phase four-wire system), rated current, rated frequency, rated load and rated demand interval specific to the meter
- e) Pulse symbol and pulse constant for meters for telemetering
- f) Manufacturing number
- g) Manufacturer’s name or registered trademark

NOTE : Registered trademark refers to that of Article 2, Paragraph 2 of Trade-mark Law (Law No. 127 of 1959).

- h) Year of manufacture (based on Christian year)
- i) Classification of attached transformer [whether it is a “current transformer”, “voltage transformer” (if it is a “capacitive voltage transformer” or a “voltage current transformer”, it shall be so stated)], and manufacturing number
- j) For the indoor meter, the indication “indoor type”
- k) For the indoor weatherproof meter, the indication “indoor weatherproof type”
- l) Transformation ratio expressed by the primary and secondary rated values of the transformer

6 Performance

6.1 Verification tolerance

When the meter is tested in accordance with **7.1 a)** or **7.1 b)**, the instrumental error (which is expressed in instrumental error percentage) shall satisfy the verification tolerance given in table 1 according to the load current.

Table 1 Verification tolerance of maximum demand meters

Load current (percentage with respect to rated current)	Power factor	Verification tolerance %
10 ^{a)} , 20 ^{b)} , 35 ^{c)} , 50 and 100	1	3.0
100	0.5 (lagging current)	3.0
Notes ^{a)} Applied to the digital type of an electronic system. ^{b)} Applied to the digital type of a mechanical system. ^{c)} Applied to the analogue type.		

6.2 Electrical performance

6.2.1 Temperature characteristics

The temperature characteristics shall be as follows.

- a) When the meter is tested in accordance with **7.2.1 a)**, the difference in instrumental error generated due to the change of ambient temperature shall not exceed the limit of 0.6 %, for power factor 1, and 1.0 %, for power factor 0.5 (lagging current).
- b) In the case of the meter with an output mechanism, the output mechanism shall function without any hindrance at a temperature in the range of -10 °C to 40 °C. Further, when the test is performed in accordance with **7.2.1 b)**, the output mechanism shall output the measurement values correctly.

6.2.2 Voltage characteristics

The voltage characteristics shall be as follows.

- a) When the meter is tested in accordance with **7.2.2 a)**, the difference in instrumental error generated due to the voltage change of ± 10 % with respect to the rated voltage shall not exceed the limit of 1.0 %.
- b) The electronic meter shall function without any hindrance at the voltage of 80 % of the rated voltage. Further, when the test is performed in accordance with **7.2.2 b)**, the indication of the indication mechanism shall operate correctly in proportion to the number of pulses which measure the electric power.
- c) The meter with an output mechanism shall function without any hindrance at a voltage in the range of 80 % to 110 % of the rated voltage of the auxiliary AC power supply. Further, when the test is performed in accordance with **7.2.2 c)**, the output mechanism shall output the measurement values correctly.

6.2.3 Frequency characteristics

When the meter is tested in accordance with **7.2.3**, the difference in instrumental error generated due to the frequency change of ± 5 % with respect to the rated frequency shall not exceed the limit of 1.0 %, for power factor 1, and the limit of 2.0 %, for power factor 0.5 (lagging current).

6.2.4 Influence of external magnetic field

The influence of external magnetic field shall be as follows.

- a) When the meter is tested in accordance with **7.2.4 a)**, the difference in instrumental error generated by giving an external magnetic field shall not exceed the limit of 1.0 %.
- b) The meter with an output mechanism shall be free from any defects in the output mechanism caused by the influence of external magnetic field. Further, when it is tested in accordance with **7.2.4 b)**, the output mechanism shall output the measurement values correctly.

6.2.5 Influence of overcurrent

When the meter is tested in accordance with **7.2.5**, the indication of the indication mechanism shall operate correctly. For the meter with an output mechanism, the output mechanism shall output the measurement values correctly.

6.2.6 Influence of voltage unbalance

The electronic meter equipped with the function of open-phase protection shall be free from any defects in its performance when under voltage unbalance condition. Further, when it is tested in accordance with **7.2.6**, the difference in instrumental error with respect to the voltage balance condition shall not exceed the limit of 4.0 %.

6.2.7 Influence of interruption to service

The electronic meter, when tested in accordance with **7.2.7**, shall indicate the electric power correctly.

6.2.8 Influence of static electricity

When the electronic meter is tested in accordance with **7.2.8**, during the electrostatic-discharge application, the indication¹⁾ shall not change, and after the electrostatic-discharge application, the meter shall be free from damage and the indication¹⁾ shall not change, and the instrumental error shall satisfy the tolerance of ± 3.0 % according to the load current. Further, the meter with an output mechanism shall output the measurement values correctly after the electrostatic-discharge application.

Note ¹⁾ It applies to the indication used in transaction or certification of the meter concerned.

6.2.9 Influence of impulsive noise

When the electronic meter is tested in accordance with **7.2.9**, the difference in instrumental error generated by applying impulsive noise shall not exceed the limit of 2.0 %. Further, the meter with an output mechanism shall output the measurement values correctly after impulsive noise application.

6.2.10 Influence of electromagnetic waves

When the electronic meter is tested in accordance with **7.2.10**, after it is irradiated with electromagnetic waves with the rated voltage of the rated frequency applied, the indication¹⁾ of the meter shall not change, and the difference in instrumental error generated by irradiating it with electromagnetic waves shall not exceed the limit of 3.0 %. Furthermore, the meter with an output mechanism shall output the measurement values correctly after it is irradiated with electromagnetic waves.

6.3 Mechanical performance

6.3.1 Mechanism, etc.

The indication mechanism, gear ratio, return mechanism and timing device of a meter shall be as follows.

- a) When the meter is tested in accordance with **7.3.1 a)**, the difference between instrumental error obtained for each lapse of 500 h and that obtained immediately after the test start shall not exceed the limit of 1.5 %.
- b) For the gear ratio and gear engagement or the indication circuit of the indication mechanism of a meter, when the test is performed in accordance with **7.3.1 b)**, the instrumental error shall satisfy the tolerance in table 2 according to load current.