IS 16444 : 2015

भारतीय मानक

Indian Standard

a.c. Static Direct Connected Watthour Smart Meter Class 1 and 2 — Specification

ICS 91.140.50

BUREAU OF INDIAN STANDARDS

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FOREWARD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Equipment for Electrical Energy Measurement, Tariff and Load Control Sectional Committee had been approved by the Electrotechnical Division Council.

Several programmes have been launched by Government of India to reform the energy and power sector. One such initiative was introduction of IT enabled services that has set the platform for deploying Smart Grids in India. The Smart Grid via its environment friendly and consumer centric approach would offer enhanced reliability, security, safety and efficiency for grid operations. The transition to Smart Grid would achieve the overarching objectives of Government to reduce AT&C losses and provide 24×7 power for all.

Advanced Metering Infrastructure (AMI) is a crucial part of a Smart Grid. It is an integrated system of smart meters, communication networks and data management systems that enables two way communication between the utilities and consumer premises equipment. The functional blocks of AMI typically include HES — Head end system, WAN — Wide area network, NAN — Neighbourhood area network, Data concentrator unit (DCU)/ Gateway and HAN — Home area network.

Smart Meter is a composite unit consisting of metrology elements, two way communication module/modules and control elements. It will have functions such as measurement, computation, event capturing, storing, communication and control. The smart meter would be required to provide data and information that are needed by various Smart Grid applications.

Smart grid deployment process is still evolving. Various domains of Smart Grids are infused with professional interventions to adopt and rollout standards-based technologies and products. Many standard making bodies like IEC, IEEE, NIST, CEN, CENELEC, ITU, ETSI, IETF are engaged in standardization activities pertaining to Smart Grids.

The Electrotechnical department of Bureau of Indian Standards has prepared many metering standards such as IS13779 : 1999 'ac Static watthour meters (Class 1 and 2) (*first revision*)', IS 14697 : 1999 'ac Static transformer operated watthour and var-hour meters, class 0.2S and 0.5S — Specification', IS 15884 : 2010 'Alternating current direct connected static pre-payment meters for active energy (Class 1 and 2) — Specification' and IS 15959 : 2011 'Electricity metering — Data exchange for meter reading, tariff and load control — Companion specification'. This standard on the smart meter has been prepared by Bureau of Indian Standards based on the technical specifications and functional requirements published in June 2013 by Central Electricity Authority.

While preparing this standard it has been endeavoured not to contradict on principle of the adopted/referred standards of other International organizations/institutions on which this standard is based upon. However, in case of any divergence/disparity, not amounting to conflict of interpretations that may be revealed later, provisions of this standard will prevail.

This standard specifies the requirements for smart meters only. Requirements for any other components shown or referred in the text or diagrams such as DCU, HES, IHD, HHU may be specified separately for functional and technical aspects taking into consideration the features and provisions of this standard for deployment of AMI. The requirements of other components chosen shall be finalised between buyer and seller.

While finalizing this standard a separate standard covering requirements for data exchange specific to smart meter has been prepares and it is in the final stage of approval. Therefore IS 15959 : 2011 is being revised as follows:

IS 15959 (Part 1) : 2011 'Data exchange for electricity meter reading, tariff and load control: Part 1 Comparison specification' (through Amendment)

IS 15959 (Part 2) : 2011 'Data exchange for electricity meter reading, tariff and load control: Part 2 Comparison specification for smart meter (*under preparation*)

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)' . The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

a.c. STATIC DIRECT CONNECTED WATTHOUR SMART METER CLASS 1 AND 2 — SPECIFICATION

1 SCOPE

1.1 This standard specifies static watt-hour smart meters of accuracy class 1 and 2 for the measurement of alternating current electrical active energy of frequency 50 Hz for single phase and three phase balanced and unbalanced loads. It applies to their type tests, routine tests and acceptance tests.

1.2 It applies to:

a) static watt-hour direct connected meters consisting of measuring element(s), time of use of register(s), display, load switch and built in type bi-directional communication module all integral with the meter housing.

b) alternately the bi-directional communication module could be plug-in type on a dedicated slot with suitable sealing arrangement. The plug-in module shall be field swappable with suitable integrated communication module as agreed between buyer and seller.

1.3 The smart meter types as specified in **1.2** (a) and **1.2** (b) shall be suitable for indoor/outdoor usage and capable of forward (import) or both forward (import) and reverse (export) energy measurement.

1.4 It does not apply to:

a) watt-hour meters where the voltage across the connection terminal exceeds 600 V (line to line voltage for meters for poly phase systems,

b) meters operated with external current transformers,

c) portable meters, and

d) meters without internal load switch.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IS No./ International Standards	*Title*
13779 : 1999	a.c. Static watthour meters, Class 1 and 2 — Specification
15884 : 2010	Alternating current direct connected static prepayment meters for active energy (Class 1 and 2) — Specification
15959 (Part 1) : 2011	Data exchange for electricity meter reading, tariff and load control : Companion specification
15959 (Part 2) : 2011	Data exchange for electricity meter reading, tariff and load control: Part 2 Companion specification for smart meter
IEEE 802.15.4 : 2003	Standard for local and metropolitan area networks
IEEE 1901 : 2010	Standard for broadband over power line networks: Medium access control and physical layer specifications
IEEE 1901.2 : 2013	Standard for low-frequency narrow band power line communications for smart grid applications
ITU-T G.9901 : 2014	Narrowband orthogonal frequency division multiplexing power line communication transceivers — Power spectral density specification
ITU-T G.9903 : 2014	Narrowband orthogonal frequency division multiplexing power line communication transceivers for G3-PLC networks
ITU-T G.9904 : 2012	Narrowband orthogonal frequency division multiplexing power line communication transceivers for prime networks

3 TERMINOLOGY

3.1 General Definitions — For the purpose of this standard all definitions given in IS 13779, IS 15884 and IS 15959 (Part 1) shall apply. In addition definitions given in **3.2** shall be applicable.

3.2 Definitions of General Smart Metering Terms

3.2.1 *Smart Meter* — Smart meter is an ac static watt-