IS 16444
AC DIRECT CONNECTED SMART METER SPECIFICATIONS
DEVELOPMENT AND PRESENT STATUS OF THE STANDARD

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IS 16444
AC DIRECT CONNECTED SMART METER- SPECIFICATIONS
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IS 16444- Aug 2015

Standard is based on

➢ Functional Specifications framed by CEA
➢ Specifications of ac static direct connected Wh meter IS 13779
➢ Data exchange - companion specifications - IS 15959
➢ Specifications of prepayment meter - IS 15884
Development of IS 16444

➢ IS 15959 renumbered as IS 15959 part 1.

➢ IS 15959 part 2 was developed for specific requirement of smart meters - Data exchange.

➢ IS 16444 was renumbered as IS 16444 part 1.

➢ IS 16444 part 2 was developed for Transformer operated smart meters.

➢ IS 15959 part 3 was developed for transformer operated smart meters Data exchange.
IS 16444, Part1

ac Static Direct Connected watt-hour Smart Meter class 1 and 2 Specifications.
(up to 100 A I max)

Direct connected Smart meter defined as-
Static meter with TOD registers, internal connect -disconnect switches ,with two way communication capability. Remotely accessible for collecting data/ event, programming for select parameters.

IS 16444, Part2

Transformer Operated ac Static watt-hour and VArhr Smart Meter class 0.2s, 0.5s and 1.0s- Specifications.

Transformer operated Smart meter defined as-
Static meter with TOD registers, with two way communication capability. Remotely accessible for collecting data/ event, programming for select parameters.
IS 16444 part 1 and 2 : Structure

- The standard defines Smart meter Architecture, Test requirement, data exchange protocol and communication.

- IS 16444- Part 1 refers to: IS 13779, IS 15884 and IS 15959 part 1 and part2

- IS 16444- Part 2 refers to: IS 14697 and IS 15959 part 1 and part 3
It applies to

- Direct connected meters consisting of measuring element, TOD register, display, load switch & built-in type/ plug-in bidirectional communication module.
- Suitable for Indoor/ outdoor type
- Forward (import) ; and Forward (Import) & reverse (Export)

It does not apply to

- Where voltage exceeds 600 V
- Meters with external CT
- Portable meters
- Meters without internal load switch
IS 16444 part 2 - Structure

It applies to

• Transformer operated meters consisting of measuring element, TOD register, display & built-in type/ plug-in bidirectional communication module.
• Suitable for Indoor
• Forward (import) ; and Forward (Import) & reverse (Export)

It does not apply to

➤ Where voltage exceeds 600 V
➤ Portable meters, outdoor meters
Direct connected Smart Meter – Architecture

LEGEND
A – Metrology
B – Load switch for control
C – Metering protocol
D – Communication

NOTES
1 The Smart Meter variant based on Fig. 1 shall provide connectivity C2 for two way communication with DCU using a NAN module.
2 If IHD is chosen this Smart Meter shall provide connectivity C1 for two way communication with IHD using the same NAN module or a suitable additional module as per buyer-seller agreement.

Fig. 1 Smart Meter Architecture
Direct connected Smart Meter – Architecture

**Legend**
- A = Meterology
- B = Load switch for control
- C = Metering protocol
- D = Communication

**Notes**
1. The Smart Meter variant based on Fig. 2 shall provide connectivity C3 for two way communication with HES using a WAN module.
2. If IHD is chosen this Smart Meter shall provide connectivity C1 for two way communication with IHD using a suitable additional module as per buyer-seller agreement.

**Fig. 2 Smart Meter Architecture**
IS 16444 part 1 - Structure

General Requirement, Metering and Metrology requirements, Mechanical, Climatic requirement

IS 13779

Electrical Requirement
EMI/ EMC
Load Switch
Power consumption of voltage circuit 5 W, 15 VA in idle condition 6W, 18 VA with IHD, additional 7 W during communication.

IS 15884

Data Exchange Protocol

IS 15959 part 1 & IS 15959 part 2

Communication – wire or wireless complying to IPV6, comply with WPC requirements. Equipment type approval as per DOT
Transformer Operated Smart Meter – Architecture

**Variant 1**

**SMART METER**

**A**

**C**

Data Exchange Protocol

**B**

**D**

Communication

IHD-Module for IHD (Optional)

Communication NAN-Module

**C1**

IHD (Optional)

**C2**

DCU / Network Element

**HES**

**Optical Port**

**LEGEND**

A – Metrology

C – Data Exchange and Metering Protocol

D – Communication

**NOTES**

1. The smart meter variant based on Fig. 1 shall provide connectivity C2 for two way communication with DCU using a NAN module.

2. If IHD is chosen this smart meter shall provide connectivity C1 for two way communication with IHD using the same NAN module or a suitable additional module as per buyer-seller agreement.

**Fig. 1 Smart Meter Architecture (For Transformer Operated Meters)**
Transformer Operated Smart Meter – Architecture

IS 16444 (Part 2) : 2017

Variant 2

SMART METER

LEGEND
A – Metrology
C – Metering protocol
D – Communication

Optical port — As per IS 15959 (Part 2)
C1 – IHD Connectivity SMIHD (Optional)
C3 – WAN Connectivity SMaHES

NOTES
1 The smart meter variant based on Fig. 2 shall provide connectivity C3 for two way communication with HES using a WAN module.
2 If IHD is chosen this smart meter shall provide connectivity C1 for two way communication with IHD using a suitable additional module as per buyer-seller agreement.

Fig. 2 SMART METER ARCHITECTURE (FOR TRANSFORMER OPERATED METERS)
IS 16444 part 2- Structure

- General Requirement ,
  Metering and Metrology requirements,
- Mechanical,
- Climatic requirement

- Electrical Requirement
- EMI/ EMC

- Data Exchange Protocol

Communication – wire or wireless complying to IPV6,
comply with WPC requirements. Equipment type approval as per DOT
IS 16444 part 1

Smart meter functionality –

Disconnection Mechanism- over current, load control, events, prepayment
Reconnection Mechanism - local- over current, load control
remote/ HES - events, repeated O/L

Reconnection for prepayment meter
Standards- Present status - *Indian Standards*

- Single Phase and three phase conventional whole current meters
  - IS 13779 up to amendment 5 (Standard under Revision)
- Single phase/ three phase Prepaid whole current meters
  - IS 15884 (under Revision)
- Three phase transformer operated Meters - IS 14697, up to am 4
- Whole current Single phase and three phase Smart Meters
  - IS 16444 part 1, 2015, am 1 & IS 15959 part 2, 2015, am 1 and 2
- Transformer operated Smart Meters - IS 16444 part 2, 2017 & IS 15959 part 3, 2017
- Data Exchange Protocol – IS 15959 part 1 Am. 1 to Am. 4
Standards and their status - IEC Standards

- IEC 62052-11 General Requirement – Metering equipment, Am 1, 2016
- IEC 62053-21 Static Meters for Active Energy class 1 and 2
  - Specific requirement, Am 1, 2016
- IEC 62053-22 Static Meters for Active Energy class 0.2s and 0.5s
  - Specific requirement, Am 1, 2016
- IEC 62053-24 Static Meters for Reactive Energy at fundamental frequency class 0.5s, 1s and 1, am 1, 2016
  - Specific requirement
- IEC 62055-31, Static prepayment meters class 1 and 2 Specific requirement
- IEC 62052-31, 2015 Electricity metering Equipment (ac)
  General requirement, test and test condition Product Safety requirement and tests.
• IEC 62052 Part 11: Metering equipment (CD2)

• IEC 62053 Part 21: Static meters for a.c. active energy (classes 1 and 2) : (CD2)

• IEC 62053 Part 22: Static meters for a.c. active energy (classes 0,1 S, 0,2 S and 0,5 S): (CD2)

• IEC 62053 Part 23: Static meters for a.c. (classes 2 reactive energy and 3): (CD2)

• IEC 62053 Part 24: Static meters for fundamental component a.c. reactive energy (classes 0,5 S, 1 S and 1) (CD2)

IEC 62052 Part 31: Product safety requirements and tests : (amendment under preparation)
Proposed activities of standardization – BIS ET13

- IS 13779 under revision
- Harmonization of IS and IEC
- Standard for DC meters
- Standard for panel meters
- Revision of IS 15884
- Standard for reliability
Thank you

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