TECHNICAL SPECIFICATIONS

FOR

SINGLE PHASE STATIC METER

Technical Specifications for Single Phase Static Meter

The equipment covered by these broad specifications shall conform to the requirements stated in latest editions of relevant Indian/ IEC Standards and Regulations.

1.0 STANDARDS APPLICABLE:

Unless specified elsewhere in this specification, the performance & testing of the meters should conform to the following Indian/International standards, to be read with up to date and latest amendments/revisions along with additional requirements at Annexure-I.

S. No.	Reference Detail	Reference Title
1	IS 13779 (1999)	A.C. Static Watt hour meter class 1.0 and 2.0
2	CEA Regulation (2006)	Installation and operation of meters Dtd: 17/03/2006
3	CBIP – TR No. 325	Guide on A.C.Static Electrical Energy Meters - Specification (latest amendment).
4	IS 9000	Basic Environmental testing procedure for electrical and electronic items.
5	IS 12346 (1999)	Specification for testing equipment for A.C.Electrical energy meter.
6	IS11000 (1984	Fire hazard testing
7	IEC 62052-11 (2003)	Electricity Requirements (AC) General Requirements Tests and Test conditions for A.C.Static Watt hour meter for active energy Class 1.0 and 2.0.
8	IEC 62053-21 (2003)	A.C.Static Watt hour meter for active energy Class 1.0 and 2.0
9	IS 15707 (2006)	Testing Evaluation installation and maintenance of AC Electricity Meters- Code of practice.
10	IEC 60068	Environmental testing

2.0 GENERAL TECHNICAL REQUIREMENTS:

Sl. No.	Particulars	Standard Specification
1	Type of the meter	Single phase two wire, whole current meter, direct reading type w/o any meter constant
2	Accuracy Class	1.0
3	Basic Current (Ib) & rated max. current (Imax)	I_b =10 Amp, Imax= 60 Amp.
4	Operating Voltage	Voltage +20 % to -40 % of Vref. However the meter should withstand the maximum system voltage
5	Operating Frequency	F= 50 Hz ± 5 %

6	Power consumption	As per IS
7	Starting Current	0.2 % of Ib
8	Short time over current	1800 A for 0.01 sec
9	Influence of heating	External surface of the meter shall not exceed 20 K at 45° C ambient temperature
10	Rated impulse withstand voltage	8 KV
11	AC withstand voltage for 1 minute	4 KV
12	Insulation resistance	
a	Between Frame & voltage & current Circuit	5 M Ohm
b	Between each current Circuit & other circuit	50 M Ohm
13	Mechanical requirement	As per Clause of 12.3 of IS 13779
14	Resistance to heat & fire	Shall not be ignited by thermal overload & material shall be fire retardant
15	Protection against penetration of dust & water	Degree of protection IP: 51 as per IS 12063 w/o suction in meter
16	Resistance against climatic influence	Clause 12.6 of IS: 13779
17	Electromagnetic compatibility	Requirement shall be as per CBIP technical report no. 325
18	power factor range	Zero Lag - Unity- zero Lead
19	Energy measurement	Fundamental energy + Energy due to harmonics
20	Test Output Device	Flashing LED visible from the front
21	Billing Data	a) Meter serial number, Date and time, KWH, MD in KW, History of KWH & MD for last 6 months along with TOD readings & meter shall log monthly ON/ Off hrs as history. Meter shall be capable of recording KVAh and power factor parameters, wherever applicable. b) All these data shall be accessible for reading, recording, and spot billing by downloading through optical port on CMRI or Laptop computers at site

22	MD registration	a) Meter shall store MD in every 30 minutes period along with date & time. At the end of every 30 minutes new MD shall be previous MD and store whichever is higher and the same shall be displayed. (b) It should be possible to reset MD automatically on the defined date.
23	Auto reset of MD	The MD resetting shall be automatic at the 1st of the month i.e. 0000 hours of 1st of the month. Manual MD reset button shall not be available. Provision shall be made to change MD reset date through MRI even after installation of meter on site.
24	TOD metering	Meter shall be capable of doing TOD metering for KWH, & MD in KW with 6 time zones wherever applicable. It shall be possible to reconfigure the meters for TOD Tariff, billing date, RTC etc. through proper authentication process via communication port.
25	Climatic condition	The meter should function satisfactorily with temperature ranging from 0-60^{0}C and humidity upto 95%
26	Calibration	Meter shall be calibrated at factory and modification in calibration shall not be possible at site by any means. Certified by manufacturer.
27	Meter Sealing	As per IS 13779 & CEA metering regulation 2006
28	Memory	Non-volatile memory independent of battery backup, memory should be retained upto 10 year in case of power failure.
29	Battery	In case battery removal or total discharge same should not affect the working & memory of the meter.
30	Load Survey	36 Days Load Survey for KW with 30 min integration period
31	Connection diagram	Shall be provided on terminal cover
32	Initial Startup of meter	Within 5 sec after ref voltage is applied to the meter terminal
33(a)	Internal dia of the terminal hole	As per CBIP
33(b)	Depth of the terminal hole	25 mm
34	Clearance between adjacent terminal	10 mm

35	Display	LCD (6 Digit), Height 10 mmX6 mm, pin type, viewing angle min 160 degrees
36	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, communication write etc.
37	Software/ Compatibility/ Communication port Communication	Optical port with RS 232 compatible to transfer the data locally through CMRI & remote through PSTN / Optical fiber / GSM / CDMA / RF / any other technology to the main computer. The Supplier shall supply Software required for CMRI (Atleast for Analogic & SANDS make) & for the connectivity to AMR modules. The software should be compatible to Microsoft Windows systems. The software should have polling feature with optional selection of parameters to be downloaded for AMR application. The Supplier shall provide meter reading protocols.

Annexure-I

Additional Requirement for Single Phase Energy Meter

S. No.	Features in addition to BIS	
	Features	**Requirement**
1	Functional • Starting current	• 0.2 % of I_b
2	Measuring Parameters	• Cumulative kWh • Cumulative KVAh, wherever applicable • Real time & Date • Maximum Demand • Six Month History • Time of Day tariff • ON/ Off hours • Instantaneous Voltage • Instantaneous Current • Instantaneous Load KW • Meter Sr. No.
3	Anti Tamper Features	• I/C & O/G Interchanged • Phase & Neutral Interchanged • I/C Neutral Disconnected, O/G Neutral & Load Connected To Earth. • I/C Neutral Disconnected, O/G Neutral Connected To Earth Through Resistor & Load Connected To Earth. • I/C Neutral connected, O/G Neutral Connected to Earth through Resistor & Load Connected to Earth. • I/C (Phase & Neutral) Interchanged, Load Connected To Earth. • I/C & O/G (Phase or Neutral) Disconnected, Load Connected To Earth. • Single wire temper (Neutral Missing) • Reverse energy • Neutral wire energy measurement • Neutral wire energy measurement • Welded meter body • Tamper history
4	Tamper logging	• Low Voltage • Protection against HV spark • External Magnetic tampers • Write Transactions • Top cover Open • Abnormal Power off
5	EL LED	• EL LED
6	Additional Features(optional)	• Mid night data • Temperature logging • Power factor recording • KVAh • Net Metering

TECHNICAL SPECIFICATIONS

FOR

THREE PHASE ENERGY METER

Technical Specifications for Three Phase Energy Meter

The equipment covered by these broad specifications shall conform to the requirements stated in latest editions of relevant Indian/ IEC Standards and Regulations.

2.0 STANDARDS APPLICABLE:

Unless specified elsewhere in this specification, the performance & testing of the meters should conform to the following Indian/International standards, to be read with up to date and latest amendments/revisions along with additional requirements at Annexure-I.

S. No.	Reference Detail	Reference Title
1	IS 13779 (1999)	A.C. Static Watt hour meter class 1.0 and 2.0
2	CEA Regulation (2006)	Installation and operation of meters Dtd: 17/03/2006
3	CBIP – TR No. 325	Guide on A.C.Static Electrical Energy Meters - Specification (latest amendment).
4	IS 9000	Basic Environmental testing procedure for electrical and electronic items.
5	IS 12346 (1999)	Specification for testing equipment for A.C.Electrical energy meter.
6	IS11000 (1984	Fire hazard testing
7	IEC 62052-11 (2003)	Electricity Requirements (AC) General Requirements Tests and Test conditions for A.C.Static Watt hour meter for active energy Class 1.0 and 2.0.
8	IEC 62053-21 (2003)	A.C.Static Watt hour meter for active energy Class 1.0 and 2.0
9	IS 15707 (2006)	Testing Evaluation installation and maintenance of AC Electricity Meters- Code of practice.
10	IEC 60068	Environmental testing

2.0 GENERAL TECHNICAL REQUIREMENTS:

Sl. No.	Particulars	Standard Specification
1	Type of the meter	Three phase four wire, whole current meter , direct reading type
2	Accuracy Class	1.0
3	Basic Current (Ib) & rated max. current (Imax)	Ib =20 Amp, Imax= 100 Amp
4	Operating Voltage	Voltage +20 % to -40 % of Vref. However the meter should withstand the maximum system voltage
5	Operating Frequency	F= 50 Hz ± 5 %

6	Power consumption per phase	As per IS
7	Starting Current	0.2 % of I_b
8	Short time over current	3000 A for 0.01 sec
9	Influence of heating	External surface of the meter shall not exceed 20 K at 45° C ambient temperature
10	Rated impulse withstand voltage	8 KV
11	AC withstand voltage for 1 minute	4 KV
12	Insulation resistance	
a	Between Frame & voltage & current Circuit	5 M Ohm
b	Between each current Circuit & other circuit	50 M Ohm
13	Mechanical requirement	As per Clause of 12.3 of IS 13779
14	Resistance to heat & fire	Shall not be ignited by thermal overload & material shall be fire retardant
15	Protection against penetration of dust & water	Degree of protection IP: 51 as per IS 12063 w/o suction in meter
16	Resistance against climatic influence	Clause 12.6 of IS: 13779
17	Electromagnetic compatibility	Requirement shall be as per CBIP technical report no. 325
18	Power factor range	Zero Lag - Unity- zero Lead
19	Energy measurement	Fundamental energy + Energy due to harmonics
20	Test Output Device	Flashing LED visible from the front
21	Billing Data	a) Meter serial number, Date and time, KWh, KVAh, Power factor, MD in KW & KVA, History of KWh, KVAh & MD of both for last 6 months along with TOD readings. KVAh is computed based on KVARh and KWh. If Power factor is 1 or leading then, KVAh shall be treated equal to KWH b) All these data shall be accessible for reading, recording, and spot billing by downloading through optical port on CMRI or Laptop computers at site.

22	MD registration	a) Meter shall store MD in every 30 minutes period along with date & time. At the end of every 30 minutes new MD shall be previous MD and store whichever is higher and the same shall be displayed. (b) it should be possible to reset MD automatically on the defined date.
23	Auto reset of MD	The MD resetting shall be automatic at the 1st of the month i.e. 0000 hours of 1st of the month. Manual MD reset button shall not be available. Provision shall be made to change MD reset date through MRI even after installation of meter on site.
24	TOD metering	Meter shall be capable doing TOD metering for KWH, KVAH & MD in KW & KVA with 6 time zones wherever applicable. It shall be possible to reconfigure the meters for TOD Tariff, billing date, RTC etc. through proper authentication process via communication port.
25	Climatic condition	The meter should function satisfactorily with temperature ranging from 0-60°C and humidity upto 95%
26	Calibration	Meter shall be calibrated at factory and modification in calibration shall not be possible at site by any means. Certified by manufacture
27	Meter Sealing	As per IS 13779 & CEA metering regulation 2006
28	Memory	Non-volatile memory independent of battery backup, memory should be retained upto 10 year in case of power failure.
29	Battery	In case battery removal or total discharge same should not affect the working & memory of the meter
30	Load Survey	60 Days Load Survey for KW, KVA, Voltage, Current of each phase, with 30 minutes integration period
31	Connection diagram	Shall be provided on terminal cover
32	Initial Startup of meter	Within 5 sec after ref voltage is applied to the meter terminal
33 (a)	internal dia of the terminal hole	As per CBIP
33 (b)	Depth of the terminal hole	25 mm

34	Clearance between adjacent terminal	10 mm
35	Display	LCD (6 Digit), Height 10 mmX6 mm, pin type, viewing angle min 160 degrees
36	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, communication write etc.
37	Software/ Communication Compatibility/ Communication port	Optical port with RS 232 compatible to transfer the data locally through CMRI & remote through PSTN / Optical fiber / GSM / CDMA / RF / any other technology to the main computer. The Supplier shall supply Software required for CMRI (Atleast for Analogic & SANDS make) & for the connectivity to AMR modules. The software should be compatible to Microsoft Windows systems. The software should have polling feature with optional selection of parameters to be downloaded for AMR application. The Supplier shall provide meter reading protocols.

Annexure-I

Additional Requirement for Three Phase Whole Current Energy Meter

S.No.	Feature in addition to BIS	
	Features	**Requirement**
1	Functional • Starting current	• 0.2 % of I_b
2	Measuring Parameters	• Real time & Date • Cumulative kWh • Other energy kVAh (Lag), kVArh(lead) & kVArh (lag) • Current Maximum demand in kW & KVA • Inst V,I & Power Factor • Maximum Demand • Six month energy history • Load Survey • Time of Day tariff • On/ Off hours
3	Anti Tamper And Anti-Fraud Features	• Reverse Phase Energy • Phase sequence reversal • Detection of missing potential • Current Coil shorting • Welded meter body • Tamper History • Energy computation during missing potential • Power On/Off • Abnormal Power Off • Snap-on parameters • Protection against HV spark/ ESD • Low voltage event • Low Power factor recording • Top cover open • Write Transactions • Neutral Disturbance • Only two Phase (One phase and one neutral missing)
4	Additional Features(Optional)	• Mid night data • Temperature • Net Metering