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Three Phase Smart Energy Meter (10-60 A) with Zigbee Communication

1. SCOPE :

This specification covers design and feature of offered three phase smart meter. Smart meter is suitable for measurement of differential electrical parameter in AC balanced/unbalanced system over power factor range of zero lag to unity to zero lead.

The meter has communication port to interface for remote reading and relay for remote connection/disconnection feature for AMI application. The meter has capability for data transfer over low power RF ZigBee communication.

2. STANDARD

The offered three phase smart meter conforms in all respects to the following relevant standard specification with latest amendment:

Indian standard No	Title
IS : 13779 : 1999 CBIP Technical Repot : 88	Indian standard for AC static Watt Hour Meter of Class 1 & 2

3. SERVICE CONDITION :

The offered three phase smart meter is suitable for satisfactory continuous operation under the following tropical conditions:-

(a)	Maximum ambient air temperature	55°C
(b)	Maximum Relative Humidity	95%
(c)	Minimum ambient air temperature	-10 °C
(d)	Number of month of tropical monsoon	4 month
(e)	Maximum altitude above sea level	1000 meter
(f)	Average Annual rain fall	120 cms
(g)	Maximum wind Pressure	200 kg/sq.m

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4. TECHNICAL SPECIFICATION FOR THREE PHASE SMART METER :

Sr.No	Particular	Specification
1.0	Name of Manufacturer	BBIPPL
2.0	Model	BB1M0003
3.0	Standard Applicable	IS : 13779, CBIP 88
4.0	**Rating**	
(a)	Type of Meter	3 phase, 4 wire
(b)	Accuracy	1.0
(c)	Voltage Rating	3 x 240 V AC
(d)	Voltage Variation	- 40% to +20 % of rated Voltage
(e)	Current Rating	10 - 60A
(f)	Maximum Over load Current	150% I Max
(g)	Impulse rating	1200 Impulses / kWh
(h)	Rated Frequency	50 Hz ± 5 %
(i)	Power Factor	-1 to +1
5.0	Continuous current rating	60 A
6.0	Running with no load & 115% of rated voltage	No creeping
7.0	Starting current at which meter shall start registration	0.2 % of basic current
8.0	Electromagnetic Compatibility	As per the IS 13779 : 1999 & CBIP 88
9.0	Electrical Compliances	i) Impulse Voltage ± 6 kV ii) Surge Test 4 kV AC
10.0 (a)	Power consumption in voltage circuit	Less than 2.5 W & 10 VA (each phase)
(b)	Power consumption in current circuit	Less than 1 VA (each phase)
11	**Display Detail**	
(a)	Type of Display	Backlit LCD display
(b)	Operation suitability	Up to 80° C
(c)	Display Mode	Manual and Auto
12	Energy Registration Mechanism	Four Quadrant Forward Energy Measurement
13	**Maximum demand**	KW / KVA Selectable
(a)	Maximum Demand period	15 / 30 Min. Selectable
(b)	Reset Mechanism	Manual / Auto , Monthly / Bi – monthly, Odd / Even month selectable
14	**Billing Information**	
(a)	Billing parameter	Forward kWh & Maximum demand kW
(b)	Billing History	Last 6 Month
15	**Load Survey Detail**	
(a)	Parameter logged	Active energy
(b)	Logging interval	15 Minute
(c)	No of days of load survey	30 days
16	**Tamper Detail**	
(a)	Energy recording in tamper condition	Forward Energy Registration

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Sr.No	Particular	Specification
(b)	Tamper logging	YES,FIFO basic
(c)	Tamper indication on display	YES, Tamper Code on display
17	**Fixing & Sealing arrangement**	
(a)	Fixing arrangement	Two Mounting hole & 1 Key hole at rear side.
(b)	Sealing arrangement	Two seal provision b/w meter base & top cover. Seal provision at terminal cover
18	**Communication Capability**	
(a)	Local optical Port	YES
(b)	Local Serial Port	RS Port
(c)	Communication	LPR - Zigbee - 2.4 GHz
19	**AMI Function support**	
(a)	Remote connection/disconnection	YES.

5. DISPLAY :

The meter display following parameter in two different modes as follows:

Auto Mode Display:

- LCD Test
- Cumulative active forward energy
- Current MD in kW
- Current MD date
- Current MD time
- Last Occurrence tamper identification.

Manual Mode Display:

- LCD Test
- Serial Number
- Date
- Time
- Current Month MD in kW
- Current Month MD date
- Current Month MD time
- Phase Wise Voltage
- Phase Wise Current
- Active Load
- Reactive Load
- Apparent Load
- Power Factor

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- Cumulative active KWh forward energy
- Cumulative apparent energy
- Frequency
- Last six month billing History for kW MD
- Last six month billing History for cumulative active KWh energy

Optional Features :

- Import and Export Active Energy Measurement
- Import and Export Apparent Energy Measurement
- Import and Export Reactive Energy Measurement
- Total Harmonic Distortion Measurement in Voltage
- Total Harmonic Distortion Measurement in Current
- Individual Harmonic content measurement up to 31st order in voltage.
- Individual Harmonic content measurement up to 31st order in current.
- Connect – disconnect feature for remote ON/OFF
- MODBUS protocol for RTU application
- DLMS protocol for serial data collection
- TOD calculations.

6. Energy Measurement

The offered meter configured to measure active, reactive and apparent in forward direction in all four quadrants. The meter record 30days load profile of forward active energy for 15 minute block period in meter memory.

7. Maximum Demand Registration and Reset

The Offered meter continuously monitor and calculate average maximum kwdemand with demand integration period of 15minutes. The maximum demand automatic reset at 24:00Hrs of last date of each calendar month.

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8. Tamper & Fraud Protection

The offered meter record energy in forward direction under following tamper condition:

- Phase Sequence reverse
- Interchanging of I/C and O/G wire
- Local earth load condition
- Neutral Missing
- Potential Unbalance / Missing
- Magnetic Influence
- Current unbalance / Short Circuit
- Cover Open Tamper

The offered meter record tampers in meter memory with date &time on FIFO basis.

9. Communication Capability

The offered smart meter has optical communication port for local reading .The meter also has facility to communicate with AMR/AMI devices like modem, DCU etc.

Features -

Automatic Functions

- Automatic registration of the smart meter on the system
- Scheduled Daily Load Profile retrieval for 30 minute intervals
- Scheduled daily midnight register readings
- Scheduled events and alarms
- Event log management
- Daily collection of interval data and register data

On Demand Functions

- De-energisation and re-energisation
- On demand profile reading
- On demand register reading
- Re-configuration of parameters on meter
- Power quality monitoring
- Data Collection and Operation
- Auto Deployment / Self Registration
- Notification of events and alarms
- Remote operation
- Latency