MSPDCL

Three Phase Whole Current Import –Export Meter

[Technical Specification]

Applicable Standards

IS 13779 (1999)	A.C. Static Watt hour meter class 1.0 and class 2.0
IEC 62052-11 (2003)	Electricity metering equipment (a.c.) – General requirements, tests and test conditions – Part 11: Metering equipment.
IEC 62053-21 (2003)	Electricity metering equipment (a.c) – Particular requirements: Static meters for active energy (classes 1 and 2)
IEC 62056-21	Electricity metering – Data exchange for meter reading, tariff and load control – Part 21: Direct local data exchange.
IS 15959 : 2011	Data exchange for meter reading, tariff and load control – Companion specification
CBIP – 304	Specification for A.C. Static Electrical Energy Meters (latest amendment).
CEA Regulation (2006)	Installation and operation of meters Dated: 17/03/2006.

Rated Electrical Parameters

The meter is rated for the following input conditions:

S. No.	Items	Specified Operating Range	Limit Operating Range
1.	Connection type	Three Phase four wire direct connected	
2.	Voltage	240 volts P-N	+20% to -30% Vref
3.	Current	20-100 A	Withstands 120% Imax
4.	Starting Current	0.2% of basic current	For both circuit phase & Neutral for Import & Export mode
5.	Frequency	50Hz	±5% (47.5 to 52.5)Hz
6.	Power Factor	O to 360 degree or Zero(lag)-Unity-Zero(Lead)	
7.	Accuracy	1.0	
8.	Withstand Voltage	440V up-to 5 minutes between Phase – Phase	

9.	Burden Voltage Circuit	1.5W/10VA	
10.	Burden Current Circuit	<4VA per phase	

Functional Specifications

Sr.No	Function/Feature	Details
1.	Measured Instantaneous Parameters	The meter computes the Electrical parameters on real time basis. Parameters are: • Date/Time • Phase-vise Voltage • Phase-vise Current (with import - export sign) • Neutral Current • Active/Apparent/Reactive Power • Phase-vise Power Factor with Lead/Lag sign • Net power Factor • Inst Frequency • Signed inst Active power • Inst Apparent power • Inst Average load factor • Inst Tamper Status • Active demand with sign /Apparent Demand
2.	Measured Energy Parameters	The meter measures total energy consisting of 50 Hz energy and harmonic energy. Total displayed energy include harmonic energy i.e. kWh = Fundamental + Harmonics. The meter correctly measures the energy within permissible accuracy limits at all power factor range from 0 to 360 degree, 1 to -1.Following Energy parameters are measured • Cumulative active energy • Cumulative apparent energy • Cumulative reactive lag energy • Cumulative reactive lead energy • Active Import Energy • Active Export Energy • Reactive lag energy (Q1) while Active energy import. • Reactive lag energy (Q3) while Active energy export. • Reactive lead energy (Q4) while Active energy import. • Reactive lead energy (Q2) while Active energy export. • Apparent Energy while Active energy import-Lag only. • Apparent Energy while Active energy export- Lag only. • TOD wise Cumulative active energy • TOD Wise Cumulative apparent energy • TOD Wise Cumulative import active energy • TOD Wise Cumulative Export active energy • TOD Wise Cumulative import apparent energy • TOD Wise Cumulative Export apparent energy • Fundamental Active energy KVAH is vector sum of Kwh, KVArh (Lag) and KVArh(Lead) .

3.	MD Registration	The meter continuously monitors the demand (KW) and update the Maximum Demand for the month.
		Meter stores MD in every 30 minute period along with date & time. At the end of every demand integration period, new MD will be computed & compared with previous MD and store whichever is higher and the same will be displayed.
		- MD KW - Cum MD KW - TOD vise MD in KW - MD KVA - Import MD in kVA - Export MD in kVA - TOD vise Import MD in kVA - TOD vise Export MD in kVA - Cum. MD kVA Import - Cum. MD kVA Export
4.	MD Reset	The MD will reset automatically at predefined Date & Time (Default last day of every month at 24:00hrs).
		MD can be reset manually by MD Reset Button or through CMRI with proper password based security.
5.	Load Survey data	The meter has NVM (Non Volatile memory) to store load survey data for 15-minutes block interval for 60 days.
		Available Load survey parameters are:
		- Date - Time - Phase wise Voltage & Current - Avg. voltage & Avg. current - Active Demand import and export - Active energy Import & Export - Total Active Demand & Energy - Apparent Demand import and export - Apparent energy Import & Export - Total Apparent Demand & Energy - Reactive Lag Demand & Reactive Lag energy - Reactive Lead Demand & Reactive Lead energy
6.	Daily Energy	The meter has NVM (Non Volatile memory) to store Daily Energy data for 30 days.
		Available parameters are:
		- Cumulative Active Energy - Cumulative Apparent Energy

7.	Billing Data	At billing date/time, meter stores following details as billing data : • Cumulative active energy • Cumulative apparent energy • Cumulative reactive lag energy • Cumulative reactive lead energy • Active Import Energy • Active Export Energy • Apparent Energy while Active energy import-Lag only. • Apparent Energy while Active energy export- Lag only. • Reactive lag energy (Q1) while Active energy import. • Reactive lag energy (Q3) while Active energy export. • Reactive lead energy (Q4) while Active energy import. • Reactive lead energy (Q2) while Active energy export. • TOD wise Cumulative active energy • TOD Wise Cumulative apparent energy • TOD Wise Cumulative import active energy • TOD Wise Cumulative Export active energy • TOD Wise Cumulative import apparent energy • TOD Wise Cumulative Export apparent energy • Fundamental Active energy • MD KW • Cum MD KW • TOD vise MD in KW • MD KVA • Import MD in kVA • Export MD in kVA • TOD vise Import MD in kVA • TOD vise Export MD in kVA • Cum. MD kVA Import • Cum. MD kVA Export • Load factor • Power on Hours • Avg. Power factor • Billing Tamper count • Cum. MD kVA Export
8.	TOD Metering(optional)	Meter is capable of doing TOD metering for Energies & Maximum Demands with 8 configurable time zones.
9.	Events/Tampers	Meter has provision to detect & log tampering conditions with instantaneous electrical parameters snap Shot details. It has provision to log 50 no. Of events with data, updated on FIFO basis. It has compartments to store various tamper data in different blocks. The visual alert/indication is also provided on meter display for present status. Different tamper condition monitored and logged are: • Potential Miss • Low/High Voltage • CT Bypass/short • CT open • Neutral Disturbance • High Frequency • Voltage/Current Unbalance Meter detects & log the change in configurations i.e. RTC setting, TOD parameters.

10	Compatibility for external influencing signals	The meter is designed in such a way that conducted or radiated electromagnetic disturbance as well as electrostatic discharge do not damage or substantially influence the meter and its performance. The disturbance to be considered are:- • Harmonics • Voltage dips and short interruptions • Conducted transients • D.C. and AC magnetic fields • Electromagnetic fields • Electrostatic discharges • High voltage sparks • High frequency
11	Self Diagnostics feature	Meter has Self Diagnostic facility i.e. RTC, Memory & Display check (on LCD only). The same can be viewed on the BCS.
12	RTC	The meter has a built-in calendar & clock, having an accuracy of +/-5 minutes per year or better. A separate internal Lithium battery back-up is provided for continuous operation of meter RTC for at least two years under meter un-powered conditions.
13	LCD	The meter has a 7-segment Liquid Crystal Display with backlit to clear visualization of parameters. It has (6+1) total 7 digits to display the Energy & Demand values including decimal values. The right most digits are clearly distinguishable from other digits (small in size from others). The values on Display have proper indication/Unit of Measures to identify. Enunciate to show PF (Lag/Lead), Current direction, Phase/current availability, present Tamper status, and Magnetic influence are provided on LCD.
14	Display Modes	Push Mode : This will activate when push button is pressed. Display parameters will scroll on pressing up -down button. The display will be switched to Auto mode if no button is pressed for 5 minutes. Auto mode : The meter will scroll the display parameters automatically on its LCD in auto mode.
15	Display Parameters	Required parameters can be configured on display. Auto Mode • LCD Test • Meter serial number • Real Time & Date (dd mm yy) • Rising Apparent Demand with elapsed time(Import & Export) Push Mode • Active Energy Import • Active Energy Export • Reactive Energy Lag while Active Energy Import

- Reactive Energy Lag while Active Energy Export
- Reactive Energy Lead while Active Energy Import
- Reactive Energy Lead while Active Energy Export
- Apparent Energy while Active Energy Import - Lag Only
- Apparent Energy while Active Energy Export - Lag Only
- Apparent M. D while Active Energy Import - Lag Only
- Apparent M. D while Active Energy Export - Lag Only
- TOD-vise Active Energies Import
- TOD-vise Active Energies Export
- TOD-vise Apparent Energies Import
- TOD-vise Apparent Energies Export
- TOD-vise Apparent Max. Demand Import
- TOD-vise Apparent Max. Demand Export
- Cumulative Apparent Maximum Demand Import
- Cumulative Apparent Maximum Demand Export
- Inst. Phase Voltages - Phase Wise
- Inst. Phase Currents - Phase Wise
- Instantaneous Neutral Current
- Signed Inst. Power Factor - Phase Wise
- Three Phase Power Factor Signed
- Inst. Active Power
- Inst. Apparent Power
- Inst. Frequency
- Present Tamper Status (PT/CT/Other)
- First Occurrence with Date & Time
- Last Occurrence with Date & Time
- Previous 3 months (at least) cumulative Kwh, Kvah and Maximum Demand in Kva at 24.00 hrs. of last date of the month.
- Cumulative Power failure in month - days - hrs. from the date of manufacturing.
- High resolution display for KWh, KVARH and KVAH minimum 2+4)
- Phase Sequence
- Connection check
- Self Diagnosis

16	LED	RED calibration LED (pulsed/Kwh) is given on meter front
17	Memory	The meters have non-volatile memory, so that the registered parameters will not be affected by loss of power. The non-volatile memory has a minimum retention time of 10 years.
18	Communication facilities	The meter is provided with a galvanically isolated optical communication port (IEC 1107) with removable cover and with locking arrangement so that it can be easily connected to a HHT (Hand Held Unit) / laptop for data transfer. The optical communication port will also have a sealing provision.
19	BCS(Base Computer Software)	Downloaded data by HHT will be uploaded in Base computer software. Using BCS data can be downloaded directly by laptop. Facilities in BCS are: 1. All stored data like billing, load survey, tampers, Events, transactions, daily energy consumption can be viewed in BCS. 2. Load survey parameters are available in matrix as well as in graphical format (weekly, monthly or day wise). 3. Required reports or Data can be generated and exported in excel file format by BCS