TECHNICAL SPECIFICATIONS FOR 0.2s ACCURACY CLASS DIGITAL SUMMATION UNIT SUITABLE FOR BULK CONSUMER MULTI-FEEDER METERING AND STANDARD SUMMATION METERING.

1.0 SCOPE

This specification covers the design, engineering, manufacture, assembly, inspection and testing before supply and delivery at site for destination of digital summation unit, along with other associated equipments as per details given in this specification. The digital summation unit shall be used for commercial / tariff metering for multi-feeder standard summation application at bulk consumer premises, in conjunction with compatible 0.2s accuracy class AC static trivector feeder meters.

1.1
One static type composite meter shall be installed for each circuit, as a self-contained device for measurement of power transmissions and certain other functions, detailed in the following paragraphs.

The summation unit / module shall be an integrated part of standard 19'' rack and this rack shall also have facility to accommodate maximum 4 individual 0.2s accuracy class feeder meter in the module.

It is not the intent to specify completely herein all the details of the design and construction of material. The material shall, however, conform in all respects to the best industry standards of engineering, design and workmanship and shall be capable of performing for continuous commercial operation in a manner acceptable to the purchaser. The offered equipment shall be complete in all respects including all components / accessories for effective and trouble free operation according to the specifications. Such components shall be deemed to be within the scope of this specification irrespective of whether those are specifically brought out or not.

It is mandatory that in case of all manufacturers, the offered meters shall be ISI marked and bidder shall have to furnish valid BIS certificate along with the offer.

The meter should be flexible enough to accommodate changing requirement in future and design for minimum maintenance.

1.2
A dedicated digital summation unit shall be provided that shall be capable to collect the required energy parameters from the feeder meter modules and calculate concurrent apparent demand & summated energy parameters as per principle specified below. It shall have the provision to summate the readings of up to four individual feeder meters in a typical installation.

2.0 APPLICABLE STANDARDS

2.1 STANDARDS

The equipment shall conform (for testing, performance and accuracy) in all respects the relevant Indian/ International metering standards with latest amendments thereof unless otherwise specified.

Sl. No.	Standard No.	Title
1.	IEC 62053-22	AC Static meters for active energy, class 0.2s & 0.5s
2.	IEC 62053-23	AC Static meters for reactive energy
3.	IS 14697-2021	AC static transformer operated Watt-hour and VAR-hour meters for class 0.2s and 0.5s
4.	IEC 60297	Dimensions of mechanical structures of 482.6 mm (19") series – Panels and Racks
5.	CBIP 325 with latest ammendments.	Specification for AC Static Electrical Energy Meters.

2.2 STANDARDS FOR METER READING INSTRUMENT

The Meter Reading Instrument or hand held unit (CMRI/HHU) shall conform in all respects to the following standards:

Sl. No.	Standard No.	Title
1.	CBIP technical report no 111 with latest amendment	Specification for Common Meter Reading Instrument

Equipment matching with requirements of other national or international standard which ensure equal or better performance than the standards mentioned above shall also be considered. When the equipment offered by the bidder conforms to standards other than those specified above, salient points of difference between standards adopted and standards specified in this specification shall be clearly brought out in the relevant schedule and copy of such standards along with their English translation shall invariably be furnished along with the offer.

3.0 CLIMATIC CONDITIONS

The meters to be supplied against this specification shall be required to operate satisfactorily and continuously under the following tropical conditions of hot, humid, dusty, rust and fungus prone environment.

i)	Max. ambient air temperature (°C)	: 50
ii)	Min. ambient air temperature (°C)	: (-) 5
iii)	Average daily ambient air temp. (°C)	: 32
iv)	Max. Relative Humidity (%)	: 95
v)	Min. Relative Humidity (%)	: 10
vi)	Max. Altitude above mean sea level (m)	: 2000
vii)	Average Annual Rainfall (mm)	: 1200
viii)	Max. wind pressure (Kg/Sq.m)	: 195
ix)	Isoceraunic level (days per year)	: 50
x)	Seismic level (Horizontal Accn. in g)	: 0.3

4.0 PRINCIPAL PARAMETERS

The energy metering rack with meters shall be indoor type connected with the secondary side of outdoor current and voltage transformers and mounted in suitable panel / cubicles.

Sl. No.	Item	Specification
1.	Type of Installation	Indoor panel / cubicle mounted
2.	PT secondary	3x110/√3 V Phase to Neutral (3P4W) (by default) 110 V (3P3W) (configurable) Variation -20% to +15%
3.	PT Ratio	33KV/√3/110V/√3
4.	CT secondary	3 x - /1 Amps (by default) to be configurable as 1A or 5A.
5.	CT Ratio	100/1
4.	Auxiliary AC Supply	48-276 V
5.	Auxiliary DC Supply	48-276 V
6.	System frequency	50HZ ± 5%
7.	Earthing System	Solidly Grounded

The meter should be suitable for working with above supply variations without damage and without degradation of its metrological characteristics.

5.0 TECHNICAL REQUIREMENTS

The meters shall be suitable for being connected directly through its terminals to PTs having a rated secondary line- to- line voltage of 110 V, and to CTs having a rated secondary current of 1A. Any further

transformers / transducers required for their functioning shall be in-built in the meters. Necessary isolation and/or suppression shall also be built-in, for protecting the meters from surges and voltage spikes that occur in the PT and CT circuits of extra high voltage switchyards.

5.1 POWER FACTOR RANGE

The meter shall be suitable for full power factor range from zero (lagging) through unity to zero (leading). The metering module shall work as an active energy import and export meter along with reactive (lag and lead) meter. The energy measurement should be true four quadrant type.

5.2 ACCURACY

Class of accuracy of the metering system shall be 0.2s for both active and reactive energy measurement. The accuracy should not drift with time.

5.3 POWER CONSUMPTION OF METER

i) Voltage Circuit: The active and apparent power consumption in each voltage circuit including the power supply of metering module at reference voltage, reference temperature and reference frequency shall not exceed 1 Watt per phase and 1 VA per phase respectively.

ii) Current Circuit: The apparent power taken by each current circuit at basic current, reference frequency and reference temperature shall not exceed 1 VA per phase.

5.4 STARTING CURRENT

The metering module should start registering the energy at 0.1% Ib and unity power factor.

5.5 MAXIMUM CURRENT

The rated maximum current of the metering module shall be 200% of basic current (Ib).

5.6 The meter shall work accurately irrespective of phase sequence of the mains supply.

6.0 GENERAL CONSTRUCTIONAL REQUIREMENTS

The equipment shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However the following should be ensured:

i) Personnel safety against electric shock
ii) Personnel safety against effects of excessive temperature
iii) Protection against spread of fire
iv) Protection against penetration of solid objects, dust and water in normal working condition

All the materials and electronic power components used in the manufacture of the summation unit shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy.

The summation unit shall be designed with application specific integrated circuits. The electronic components shall be mounted on the printed circuit board using latest Surface Mount Technology (SMT).

All insulating materials used in the construction of meters shall be non-hygroscopic, non-aging and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion by providing suitable protective coating.

The metering system when mounted in panel shall conform to the degree of protection IP51 in the normal working condition of IS 12063/ IEC 529 for protection against ingress of dust and moisture.

7.0 MANUFACTURING ACTIVITIES

Meter should be manufactured using SMT (Surface Mount Technology) components and by deploying automatic SMT pick and place machine and reflow solder process; the Bidder should own such facilities.

Quality should be ensured at the following stages:

i) At PCB manufacturing stage, each board shall be subjected to computerized bare board testing.
ii) At insertion stage all components should under go computerized testing for conforming to design parameters and orientation.
iii) Complete assembled and soldered PCB should under go functional testing using Automatic Test Equipment.
iv) Prior to final testing and calibration, all meters shall be subjected to accelerated ageing test to eliminate infant mortality.
v) The calibration of meters shall be done in-house.

8.0 DISPLAY UNIT

The display shall be of dot matrix format alpha numeric LCD type with back-lit and soft key pad. Display shall be common for all the meters housed in a metering rack and necessary means shall be provided for selecting each metering modules and moving forward/ backward from one display to the other.

The display shall indicate direct values (i.e. without having to apply any multiplying factor) of measured/ computed parameters as per the meter commissioning. It should be possible to easily identify the single or multiple displayed parameters through legends on the metering system display.

The register shall be able to record and display starting from zero, for a minimum of 1500 hours, the energy corresponding to rated maximum current at reference voltage and unity power factor. The register shall not roll over in between this duration.

The common display of metering system which will be used for viewing feeder meters data shall also be used for viewing the display parameters of summation unit.

8.1 Each of the metering module shall display on demand the following quantities/ parameters:

i) LCD segment check
ii) Real Time
iii) Date
iv) Cumulative active energy import
v) Cumulative active energy export
vi) Cumulative reactive energy lag while active import
vii) Cumulative reactive energy lead while active import
viii) Cumulative reactive energy lag while active export
ix) Cumulative reactive energy lead while active export
x) Cumulative apparent energy (while active import)
xi) Cumulative apparent energy (while active export)
xii) Maximum demand apparent (while active import) for current month (0-24 hrs)
xiii) Maximum demand apparent (while active export) for current month (0-24 hrs)
xiv) Cumulative active import energy reading of predefined date and time for monthly billing purpose
xv) Cumulative active export energy reading of predefined date and time for monthly billing purpose
xvi) Cumulative apparent energy (while active import) reading of predefined date and time for monthly billing purpose
xvii) Cumulative apparent energy (while active export) reading of predefined date and time for monthly billing purpose
xviii) Maximum demand for apparent (while active import) of predefined date and time for monthly billing purpose

xix) Maximum demand for apparent (while active export) of predefined date and time for monthly billing purpose
xx) Instantaneous Phase voltage
xxi) Instantaneous Phase current
xxii) Instantaneous Power Factor of each Phase
xxiii) Instantaneous Average power factor
xxiv) Instantaneous frequency
xxv) Present anomaly status
xxvi) Date of first occurrence of anomaly
xxvii) Time of first occurrence of anomaly
xxviii) Date of last occurrence of anomaly
xxix) Time of last occurrence of anomaly
xxx) Date of last restoration of anomaly
xxxi) Time of last restoration of anomaly
xxxii) Total anomaly count

8.2 Load Survey: Each metering module shall have a non-volatile memory in which the following shall be automatically stored for each successive 15 minute block:

i) Active import
ii) Active export
iii) Apparent while active import
iv) Apparent while active export

15-minute average of the above parameters shall be available for last forty five (45) days. It shall be possible to select either energy or demand view at Base Computer Software (BCS) end. The load survey data should be available in the form of bar charts as well as in spreadsheets. The BCS shall have the facility to give complete time synchronized load survey data both in numeric and graphic form.

8.3 Billing parameters: The predefined date and time for registering the billing parameters of shall be 00.00 hours of the first day of each calendar (billing) month. Each meter shall store the following parameters corresponding to defined bill dates for up to last twelve (12) months:

i) Active energy import
ii) Active energy export
iii) Apparent energy (while active import)
iv) Apparent energy (while active export)

8.4 Daily midnight parameters: The metering modules shall store following end day parameters for last thirty five (35) days:

i) Active energy import
ii) Active energy export

8.5 The summation unit shall display on demand the following parameters:

i) Date
ii) Time
iii) Summated active energy import
iv) Summated active energy export
v) Summated reactive energy lag while active import
vi) Summated reactive energy lead while active import
vii) Summated reactive energy lag while active export
viii) Summated reactive energy lead while active export
ix) Summated apparent energy (while active import)
x) Summated apparent energy (while active export)
xi) Summated maximum apparent demand (while active import)
xii) Summated maximum apparent demand (while active export)
xiii) MD reset count

xiv) Summated active energy import energy reading of predefined date and time for monthly billing purpose
xv) Summated active energy export energy reading of predefined date and time for monthly billing purpose
xvi) Summated apparent energy (while active import) reading of predefined date and time for monthly billing purpose
xvii) Summated apparent energy (while active export) reading of predefined date and time for monthly billing purpose
xviii) Concurrent Maximum demand for apparent energy (while active import) for current month (0-24 hrs)
xix) Concurrent Maximum demand for apparent energy (while active export) for current month (0-24 hrs)
xx) Concurrent Maximum demand for apparent energy (while active import) reading of predefined date and time for monthly billing purpose
xxi) Concurrent Maximum demand for apparent energy (while active export) reading of predefined date and time for monthly billing purpose

9 SEALING

Proper sealing arrangement shall be provided in metering system as follows:

i) Two numbers seals shall be provided on the front cover of metering module.
ii) Provision shall be available to seal the back connections on the metering rack using the terminal cover.

The meter should be sealed in such a way that the internal parts of the meter becomes inaccessible and attempts to open the meter shall result in viable damage to the meter cover.
Except the above sealing arrangement, one number sealing screw shall be provided on the front cover of summation module. The sealing arrangement should be suitable for application of Polycarbonate seals.

10 MARKING OF METER

The marking on every meter shall be in accordance with IS 14697/ IEC62053-22. The basic marking on the metering module name plate shall be as follows:

i) Manufacturer's name and trade mark
ii) Serial Number
iii) Year of manufacture
iv) Type Designation
v) Number of phases and wires
vi) PT commissioning information
vii) CT commissioning information
viii) Reference frequency
ix) Accuracy Class
x) Guarantee Period 5 1/2 years from date of supply.

Additionally, following information shall also be available on name plate.
i) Property Of "Purchaser name"
ii) P.O. No. "Number"

Name plate details shall not possible to remove even after opening the meter cover.

10.4 The connection diagram of the metering module shall be shown on inside portion of the terminal cover via suitable means. The meter terminals shall be properly marked.

11 MARKING OF SUMMATION UNIT

The basic marking on the name plate of summation unit shall be as follows:

i) Manufacturer's name and trade mark
ii) Serial Number
iii) Year of manufacture
iv) Type Designation

12 MEASUREMENT OF MAIN METER

12.1 The active energy measurement shall be carried out on 3 phase, 4 wire principle with an accuracy as per class 0.2s of IEC 62053-22. The meters shall compute the active energy and load import; active energy and load export from the substation bus bars during each successive integration period block and store it in its non volatile memory.

12.2 The reactive energy shall also be available in four different registers as-

i) Reactive import while active import
ii) Reactive import while active export
iii) Reactive export while active import
iv) Reactive export while active export.

12.3 Active and Apparent energies shall also be made available by meter in separate energy registers as –

i) Active energy Import
ii) Active energy Export
iii) Apparent energy (while active import)
iv) Apparent energy (while active export)

12.4 Meter shall have provision to compute apparent energy based on lag only or lag+lead (programmable).

12.5 For reactive power and reactive energy measurement, limits of errors all the four quadrants shall be in accordance to IEC 62053-23/ IS14697.

12.6 Each meter shall have a calibration LED (visual) for checking the accuracy of active energy measurement. Further, it shall be possible to switch over the same test output device to reactive energy via suitable means provided on the metering system. This LED shall be visible from the front side.

12.7 The metering system shall normally operate with the power drawn through self or auxiliary ACor DC supply. The metering system design should enable the auxiliary supply to be switched automatically between the self and AC and DC voltage, depending upon their availability. meter should have auxiliary power supply as (Self (Through PT supply) +Aux supply)).

12.8 TOD (Time of day registers): The meter shall have TOD registers for active energy import and export, apparent energy import and export and apparent MD import and export. Maximum eight time of day registers including universal (0-24 hrs) register can be defined. It shall be possible to program number of TOD registers and TOD timings through suitable high level software/ MRI as an authenticated transaction.

12.9 Maximum Demand (MD) Registration: The meter shall continuously monitor and calculate the average demand of configured parameter during the integration period set and the maximum, out of these shall be stored along with date and time when it occurred in the meter memory. The maximum demand shall be computed on fixed block principle. The maximum registered value shall be made available in meter readings. The integration period shall be set as 15 minutes that shall be capable to change to other integration period (15/ 60 minutes), if required, through suitable high level software/ MRI as an authenticated transaction. However SIP and DIP always should be same.

13 CONCURRENT APPARENT DEMAND/ ENERGY CALCULATION OF SUMMATION UNIT

This summation unit shall process the data of feeder meters to provide the summated energy parameters as specified below:

i) Summated active energy import
ii) Summated active energy export
iii) Summated reactive energy lag while active import
iv) Summated reactive energy lead while active import
v) Summated reactive energy lag while active export
vi) Summated reactive energy lead while active export

The Summation unit shall calculate the concurrent apparent demand from the incremental active and reactive energy readings of feeder meters. The apparent energy/ demand shall be calculated by vector (pythagoras) addition of active energy and reactive energy readings of feeder metering modules.

The Concurrent demand shall be computed on the fixed time block principle. The block interval shall be set as 15 minutes that shall be capable to change to other integration period (15/ 60 minutes), if required, through suitable high level software/ MRI as an authenticated transaction.

Summation unit shall provide the following apparent demand and energy parameters:

i) Summated maximum apparent demand (while active import)
ii) Summated maximum apparent demand (while active export)
iii) Summated apparent energy (while active import)
iv) Summated apparent energy (while active export)

The summation unit shall act as the master for all its feeder meters. It shall be possible to have a common MD reset operation, which shall be performed in the summation unit. During this common MD reset operation, MD of all the feeder meters and summation unit shall get reset concurrently. This shall ensure that all feeder meters and summation unit remain synchronized to each other. Further, it shall not be possible to perform individual MD reset operation in feeder meters.

13.1 The summation unit shall also draw its operating power from self (PT) and the auxiliary power supply, in the same manner as feeder meters. The metering system design should enable the auxiliary supply to be switched automatically between the self and AC and DC voltage, depending upon their availability. meter should have auxiliary power supply as (Self (Through PT supply) +Aux supply)). so that the summation system remains alive even if one or more feeder(s) is off. Thesystem shall continue to work even if any one of the above auxiliary supply (AC/ DC) is present.

13.2 Each summation module shall have a built-in calendar and clock, having an accuracy of one (1) minute per year or better. The calendar and clock shall be correctly set at the manufacturer's works.

An automatic backup for continued operation of the calendar-clock shall be provided through a long life battery, which shall be capable of supplying the required power for at least three years under meter un-powered conditions. The summation module shall be supplied duly fitted with the batteries, which shall not require to be changed for at least ten years, as long as total supply interruption does not exceed three years.

The real time clock of the summation unit shall be used as the master clock for its feeder metering modules so that all the feeder meters remain time synchronized with summation unit.

13.3 Billing parameters: The predefined date and time for registering the billing parameters of shall be 00.00 hours of the first day of each calendar (billing) month. The summation unit shall store following parameters corresponding to defined bill dates for up to last twelve (12) months:

i) Summated active energy import
ii) Summated active energy export
iii) Summated apparent energy (while active import)
iv) Summated apparent energy (while active export)

v) Concurrent Maximum Demand Apparent (while active import)
vi) Concurrent Maximum Demand Apparent (while active export)

13.4 Daily midnight parameters: The summation unit shall store following end day parameters for last thirty five (35) days:

i) Summated active energy import
ii) Summated active energy export

13.5 Load Survey: Summation unit shall have a non-volatile memory in which the following shall be automatically stored for each successive 15 minute integration period block:

i) Summated active import
ii) Summated active export
iii) Summated apparent (while active import)
iv) Summated apparent (while active export)

14.0 Maximum Demand Reset:

Following provisions shall be available for MD reset in summation unit –

i) Auto billing at predefined date and time
ii) Manual via MD reset button (optional)
iii) Authenticated transaction through suitable high level software/ MRI (optional)

15.0 Anti Tamper Features

15.1 The meter shall have features to detect and log the occurrence and restoration of the following anomalies, along with date and time of event:

i) Phase wise Missing Potential – The meter shall detect missing potential (1 or 2 phases) provided the line current is above a specified threshold. The voltage at that stage would be below a specified threshold.
ii) Voltage Unbalance - The meter shall detect voltage unbalance if there is unbalance in voltages.
iii) Phase wise current circuit Reversal - The meter shall detect reversal of polarity provided the current terminals are reversed. This shall be recorded for 1 or 2 phase CT reversal.
iv) Current Unbalance – The meter shall detect current unbalance if there is unbalance in load conditions. Meter should ensure true system conditions before going for current unbalance checks.
v) CT Open – The meter shall detect current miss if the current is below a defined threshold, provided the phase voltage is above a specified threshold.
vi) Magnetic Disturbances – As per relevant IS and CBIP 325 along with latest amendments.
vii) Neutral Disturbances – If logged.

Snapshots of phase wise voltage, phase wise active current and phase wise power factor shall be provided with above specified anomaly events.

Further, each meter module shall record the following events along with total duration:

i) Power On/Off – The meter shall detect power off if both the auxiliary supplies fail. The event shall be recorded on the next power up. At the same time power on event shall be recorded. No snapshot shall be logged with this event.

ii) Feeder Supply Fail – This event shall be logged when feeder supply i.e. all the voltages goes below certain threshold. No snapshot shall be logged with this event.

15.2 Last two hundred (100) events (occurrence and restoration consider separate event), in total, shall be stored in the meter memory on first in first out basis.There shall be four separate compartments for logging of different type of anomalies:

Compartment No.1	20 events for voltage related tamper
Compartment No.2	30 events for current related tamper
Compartment No.3	20 events for Magnet, Neutral Disturbance & 35 KV Spark
Compartment No.4	30 events of feeder fail and Power On/Off

Once one or more compartments have become full, the last anomaly event pertaining to the same compartment shall be entered and the earliest (first one) anomaly event should disappear. Thus, in this manner each succeeding anomaly event shall replace the earliest recorded event, compartment wise. Events of one compartment / category should overwrite the events of their own compartment /category only.

15.3 Anomaly count should increase as per occurrence (not restoration) of anomaly events. Total no. of counts shall be provided on BCS.

THRESHOLD VALUE OF THE ABOVE TAMPER LOGIC is attached.

16.0 DATA COMMUNICATION CAPABILITY

Feeder as well as Summation unit shall have an optical galvanically isolated communication port (compatible to RS232) on its front for tapping all the data stored in its memory. Meter reading instrument (MRI) shall be used for the purpose of local meter reading via this optical communication port. MRI shall serve as the interface between meters and PC loaded with Base Computer Software. It shall also be possible to download meter data via this port by connecting laptop computer directly. The complete data for last thirty five (35) days shall be downloaded within five (5) minutes from front optical port. The overall intention is to tap the data stored in meter once a month and transmit the same to PC with BCS for view and print.

The summation unit shall also be supporting the common RS232 communication port (as shall be available on the metering system) for on-demand remote data transfer to a central location. This port shall be capable of data transfer to a remote computer over suitable communication media (GSM/ VSAT/ Leased line/ OFC) using suitable communication hardware (modems/ multiplexer/ communication cables etc.) as required for proper functioning of remote meter reading scheme. Base Computer Software shall provide functionality for remote meter reading via suitable menu options.

16.1 The summation unit shall have a unique identification code i.e. serial number, which shall be marked on name plate as well as in its memory.

16.2 Each summation unit shall have a nonvolatile memory in which the parameters as mentioned in this specification shall be stored. The nonvolatile memory shall retain the data for a period not less than 10 years under un-powered condition; battery backup memory shall not be treated as NVM.

17.0 TRANSACTIONS

The summation unit shall record critical events (as performed in authenticated manner) of Time set, MD reset operation, Communication status with feeder meter and tariff change. These events shall be logged in roll over mode for up to twenty (20) numbers.

18.0 BCS & SOFTWARE REQUIRMENT

The data stored in the meters memory including defrauded energy should be available in the BCS. Only one BCS should be provided for down loading data and authenticated command from HHU /CMRI and Laptop. **At the time of reading the meter should get the authenticated command.**

19.0 TECHNICAL SUPPORT, MANUALS AND TRANING

Extensive technical support, detail technical literature (should supply with each unit at the time of packing) and training is to be provided by the manufacturer. Supply of external battery pack if required to be provided by the manufacturer and should be clearly offered in their bids.

20.0 ACCURACY

There shall be no drift in accuracy for the period of ten(10) years from the date of supply. In case any drift in accuracy is noticed which is beyond the permissible limits (including RTC), the bidder shall replace the total unit by a new unit without any extra cost within 45 days from the date of written intimation.

21.0 INSPECTION, TESTING OF ALL METERS

All meters will be tested at manufacturer works as well as WBSEDCL lab in presence of manufacturer representative.

GURANTEED TECHNICAL PARTICULARS – FEEDER METERS

S. No.	Technical Specification Requirements	Bidder's Offer
1.	Manufacturer's name & Country	
2.	Type of Meter (3P4W)	
3.	Name and model no. of offered product	
4.	Standards to which meter complies	
5.	Accuracy class a. Active energy measurement b. Reactive energy measurement	
6.	Metrology indicator provided on meter and switching facility for active and reactive energy	
7.	Variation of voltage at which system functions normally	
8.	Minimum Starting current	
9.	Maximum current	
10.	P.F. range	
11.	Power consumption per phase a. Voltage Circuit b. Current Circuit	
12.	AC and DC Auxiliary supply ratings for powering up the metering system	
13.	Sealing arrangement	
14.	Energy parameters recorded in meter	
15.	TOD compatibility	
16.	Demand integration period	
17.	Load survey parameters recorded in meter	
18.	Billing parameters recorded in meter	
19.	Daily Midnight parameters recorded in meter	
20.	Communication Capability for a. Local reading b. On demand Remote reading	
21.	Facility of external CT/ PT error compensation	
22.	Anomaly detection features	

GURANTEED TECHNICAL PARTICULARS – STANDARD
SUMMATION UNIT

S. No.	Technical Specification Requirements	Bidder's Offer
1.	Manufacturer's name & Country	
2.	Name and model no. of offered product	
3.	MD Reset provisions a. Auto b. Manual	
4.	Demand integration period	
5.	Method of concurrent apparent demand/ energy calculation	
6.	Load survey parameters recorded in summation unit	
7.	Billing parameters recorded in summation unit	
8.	Daily Midnight parameters recorded in summation unit	
9.	Communication Capability for a. Local reading b. On demand Remote reading	

TECHNICAL OFFER OF METERING PANEL FOR SUMMATION METERING

1. Scope:

This specification covers for the design, engineering, manufacturing assembly, inspection and testing before supply and delivery at site to accommodate maximum four (4) nos, 0.2 class, 2 feeder digital summation meters fitted in the space of 19" standard rack used in metering system of WBSEDCL.

2. Applicable standard:

The meter panel will confirmed to the following Indian/international standards and all related Indian/international standards to be read with up to date and latest amendments/revisions thereof:

Sl. No.	Standard No.	Title
1	IEC 60297	Dimensions of mechanical structures of 279.6 mm (11") series-panels and racks
2	IS-9000 With latest amendment	Basic environmental testing procedures For electronic and electrical items.

3. Climatic condition:

The meter panels to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions:

i)	Max. ambient air temperature (°C)	:	55
ii)	Min. ambient air temperature (°C)	:	(-) 5
iii)	Average daily ambient air temp. (°C)	:	32
iv)	Max. relative humidity (%)	:	95
v)	Max. relative humidity (%)	:	10
vi)	Max. altitude above mean sea level (m)	:	2000
vii)	Average annual rainfall (mm)	:	1200
viii)	Max. wind pressure (kg/sq.m)	:	195
ix)	Isoceraunic level (days per year)	:	50
x)	Seismic level (horizontal accn. In g)	:	0.3

4. Construction:

i. The energy meters and any other ancillary equipment making a part of the metering system will be housed in a steel panel. Offered metering panel will be suitable to mount eight (8) nos. meters in the space provided for standard racks.

ii. Dimension of the base of a meter panel will be 2 feet x 2 feet with a height of approx 6 feet as per enclosed drawing. However manufacturers standard may be accepted if it fulfills the requirement of the purchaser for which approval of drawings shall have to be obtained before commencement of the manufacturing.

iii. Metering panel will be suitable for indoor installation of vertical construction, free standing type and will have access to the inside from the rear.

iv. Panels will be fabricated from steel not less than 1.6 mm thick CRCA. All load bearing members and frame will be fabricated from CRCA sheet.

v. All screws and bolts used for assembling control board members and panels will be provided with lock washer.

vi. Hinged doors will be provided at the rear for access to the inside of the panel. The door shall have a handle lock and sealing arrangement.

vii. Hinged door with glass windows will be provided at the front of the panel for viewing the display of all the energy meters. It will also have a handle lock and sealing arrangement.

viii. No equipment will be mounted less than 200 mm above the floor.

ix. All metal surfaces will be powder coated with structure finish of colour IS5-631 shade (Internal & External) of renowned paint manufacturer & base will be black.

x. The meters will be housed in a single unit rack mounted at indoor panels.

5. Lighting and receptacles:

Proper arrangement will be made for panel lighting. A door-operated switch will be provided with the rear door. A three pin, single phase, 230V AC service receptacle will be provide in each panel.

6. Grounding:

Ground bus of galvanized iron bar not less than 5 mm X 25 mm will be provided along the back of panels, maximum length of the bar will be 200 mm. the ground buses will be bolted to the frame of the panel in such a way as to make good electrical contact with the panel. Hinged doors and all equipment on the metering cubicle will be connected to the frame with braided copper wire.

7. Auxiliary transformer:

A transformer of input 230 / 110Volt and output 230 / 110Volt AC rating should be provided in the panel for auxiliary supply to the existing apex metering rack.

8. Test terminal blocks:

The eight nos. test terminal blocks will be semi-flush front mounted, back connected with removable cover having provision for sealing suitable for 3 phase 4 wire type connections.

Test blocks will be rated not less than 250 volts, 10A and shall withstand dielectric test voltage of 2000 volt, 50 Hz for one minute.

9. Terminal blocks and terminals:

a) Terminal blocks will be designed according to adequate rating requirements.

b) Terminal blocks will be arranged with sufficient room for connection of each incoming cable, parallel rows of terminal blocks shall be spaced at least 20 mm apart.

c) Terminal block will be used for CT secondary connection & for PT connection.

d) Blocks will be mounted in vertical columns along the sides of cubicles or on vertical panels specially provided for terminal blocks.

10. Indications of voltages:

a. Indications of PT voltages against each eight meters will be provided separately on top of panel.

b. Indications of AC & DC voltages for auxiliary supply of will be provided.

c. LEDs / lamp will used for indications to minimise power consumptions for it.

11. Component wiring:

All internal wiring will be made with annealed copper conductor. Wires for current transformer and voltage transformers circuits will not be smaller than 2.5 sp. mm respectively. Wiring associated with electronic circuitry will not be less than 1.5 sp. Mm. wiring between terminals of various devices will be point to point (no splicing or "T" connection will be carried out). All internal wiring will be neatly truncated in wiring troughs, bound and anchored. Sufficient stack will be left at component. Wiring will terminate not lower than 200 mm above the floor of the panel. All wires will be identified at both ends using ferrules.

12. Drawings:

Approx. dimension drawing metering panel enclosed with bid and we will submit for approval purposes before start the manufacturing of panels. Please provide AC & DC voltage rating of panel along with order to incorporate in drawing.
Detailed specification of Metering panel with drawing along with wiring diagram has been attached including link- delink feature.

18/11/25

06/11/25

18-11-2025

Tamper logging threshold values for Feeder Meter (3 Phase 4 Wire)

Tamper event	Occurrence	Restoration
1. Missing potential (Missing Voltage)		
Voltage	< 15 % V_{ref}	> 40 % V_{ref}
Line current	Ignored	Ignored
Persistence time	5 Min	5 Min
Missing Potential detection will be phase wise		
2. CT polarity Reversal		
Line current	> 5 % of I_{basic}	> 5% of I_{basic}
Direction	Negative	Positive
Power Factor	> 0.1	> 0.1
Persistence time	5 Min	5 Min
CT polarity reversal detection will be phase wise. During 3 phase CT reverse No tamper will log.		
3. Current imbalance		
Missing voltage event should not persist.		
Deviation of line (Imax-Imin)	>30% of I_{max} for that Period	<29% of I_{max} for that period
Average Line current	> 10 % of I_{basic}	Ignored
Persistence time	5 Min	5 Min
4. Voltage Unbalance	**V_{3x}>70%of V_{ref}**	**V_{3x}>70%of V_{ref}**
V_{max}-V_{min}	> 10 % V_{ref}	< 10 % V_{ref}
Persistence time	5 Min	5 Min
5. Current Open		
Line current	<2 % of I_{basic}	Ix>2% I_{basic}
Residual current	>10% of I_{basic}	<10% of I_{basic}
Persistence time	5 Min	5 Min
6. Current terminal shorting		
Line current	>2 % of I_{basic}	Ix>2% I_{basic}
Residual current	>10% of I_{basic}	<10% of I_{basic}
Average Line current	Ignored	>10% of I_{basic}
Persistence time	5 Min	5 Min
7. Low Power Factor		
Power Factor	< 0.3	>0.3
Line Current	>10% of I_{basic}	>10% of I_{basic}
Persistence time	5 Min	5 Min

8. Feeder Fail

All Phase Voltage threshold	< 20 % of V_{ref}	>50 % of V_{ref}
Persistence time	1 Min	1 Min

9. Over Voltage

Any Phase Voltage threshold	> 115 % V_{ref}	< 110 % V_{ref}
Persistence time	5 Min	5 Min

10. Under Voltage

Any Phase Voltage threshold	<60 % V_{ref}	> 60 % V_{ref}
Persistence time	5 Min	5 Min

11. Invalid Voltage

Voltage	>60 % of V_{ref}	
Difference of angles between Two phases	>±10 degrees	<±10 degrees
Persistence time	5 Min	5 Min

12. Invalid Phase Association

Line current	>5 % of I_{basic}	>5 % of I_{basic}
Phase Sequence of Voltage & Current	In Different Sequence	In same Sequence

13. Phase wise Voltage THD: Voltage shall be healthy for both Occ & Rest

Voltage THD	> 5 %	< 4 %

14. Phase wise Current THD: Current shall be healthy for both Occ & Rest

Current THD	>8 %	< 7 %

15. Power ON/OFF event

Power ON/OFF occurs if power goes for more than persistence time and restored when power resumes.

Occurrence persistence time: 5 minute

Restoration persistence time: immediate

16. Magnet

Meter comply as per IS: 14697 and CBIP 325 with latest amendments (including 0.5 T permanent magnet) & whenever the Meter functionality gets affected on account of presence of any magnetic field, meter shall log it as an event and start recording at Imax if does not remain immune. In Tamper Snap Shot Imax must be shown (either occurrence or restoration), with Date and Time stamp. If meter detects magnetic tamper in "Export" mode, the energy increment shall be made in Import mode as per Vref, Imax and UPF.

Persistence time: 30 seconds (Approx.) for occurrence and restoration

17. Neutral Disturbance

In case any spurious signal injected to the neutral of meter, than meter will be either immune or log

the event in its memory and energy increment shall be made in Import mode as per Vref, Actual current and UPF. If meter detects Neutral Disturbance tamper in "Export" mode, the energy increment shall be made in Import mode as per Vref, Actual current and UPF.
Persistence time: 30 seconds (Approx.) for occurrence and restoration.

18. **Cover Open**
Cover open event will be detected whenever cover gets opened. Occurrence event will be logged with date and time stamp.

19. **Extended Terminal Cover Open**
Extended Terminal Cover Open event will be detected whenever terminal cover gets opened. Occurrence event will be logged with date and time stamp.

Power Quality Events

Tamper event	Occurrence	Restoration
1. **Voltage Sag (Phase wise)** Persistence time Event snapshot will have duration of event	<90% of Vref 3 to 5 sec	>95% of Vref 3 to 5 sec
2. **Voltage Swell (Phase wise)** Persistence time Event snapshot will have duration of event	>110% of Vref 3 to 5 sec	<105% of Vref 3 to 5 sec
3. **Voltage Interruption (Phase wise)** Persistence time Event snapshot will have duration of event	<10% of Vref 3 to 5 sec	>20% of Vref 3 to 5 sec
4. **Voltage Unbalance** Persistence time Event snapshot will have duration of event	>20% of Vref 3 to 5 sec	<20% of Vref 3 to 5 sec