GUARANTEED TECHNICAL PARTICULAR OF LT THREE PHASE WHOLE CURRENT STATIC ENERGY METERS (SMART METER)

Sl. No.	Test	Minimum requirement	As per firm's offer
1	Name of manufacturer	To be mentioned	
2	Type, name & number	To be mentioned	
3	Standard Applicable	IS:16444 CBIP report 325 with latest amendment & Indian companion specification IS:15959 with latest amendments	
4	Type of Meter (Model No.)		
5	Category	3 Phase Whole Current Meter	
6	Rating		
	i) Accuracy class	Class-1.0	
	ii) Rated voltage	240V +20%_ -40%	
	iii) Rated Current		
	a) Whole current meter	Ib-20 Amp. Imax 80 Amp.	
	iv) Rated frequency	50 Hz ±5%	
	v) Power factor	0 lag to Unity to zero lead	
	vi)Shall work within accuracy upto max. loading	i) up to 120 Amp loading	
7	i) Continuous current rating (Amp.)	80Amp	
	ii) Running with no load & +115% voltage	No creeping	
8	Short time over current for 10 milli seconds	30 Imax	
9	Starting current (minimum) at which meter shall run & continue to run	0.4% of Ib at rated voltage and unity p.f as per IS 16444	
10	Power loss at rated frequency & reference temperature		
	a) Current circuit at rated current per phase	As per IS 16444	
	b) Voltage circuit at rated	As per IS 16444	
11	Momentary over voltage	As per IS	
12	Dielectric voltage-withstand	As per IS	
13	Communication port	Communication port as perIS 16444. AMR through optical port/ GPRS is acceptable.	
14	Communication protocol standard	2 nos. galvanically isolated optical port i.e.,. 1 NO galvanically isolated optical port for load survey facility etc. Optical	

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Sl. No.	Test	Minimum requirement	As per firm's offer
		Port and NIC Module will be provided in meter Indian companion specification IS:15959 with latest amendments. Communication protocol standard-meter shall be galvanically isolated communication port as per IS16444 i.e. one galvanically isolated optical port for load survey facility etc. & another for WAN/NAN communication module.	
15	Type of communication	Meter should be compatible for reading through MRI	
16	Battery backup	Lithium battery with min. life of 10.5 yrs	
17	Type of material used		
	a) Base		
	i) Material	High Impact strength, flame retardant, UV stabilized polycarbonate	
	ii) Thickness	2.0 mm	
	b) Terminal Block		
	i) Material	As above	
	ii) Thickness	2.0 mm	
	c) Meter cover		
	i) Material	As above Transparent Polycarbonate	
	ii) Thickness	2.0 mm	
	d) Terminal cover		
	i) Material	As above Transparent Polycarbonate	
	ii) Thickness	2.0 mm	
	e) Screw		
	i) Material	Nickle Plated - Brass	
	ii) Size	Size M-8 and length as per inner dia of terminal hole for proper gripping and tightening of cable.	
18	Size of Terminal Hole	Size of terminal hole (internal diameter minimum)- 9.5 MM, as per CBIP	
19	Transducers		
	i) Input	CT & PT	

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Sl. No.	Test	Minimum requirement	As per firm's offer
	ii) Output	LCD display with back light as & when needed	
	iii) Accuracy	Class-1.0	
20	Type of Display		
	i) No. of Digits display	7 (One digit after decimal point)	
	ii) Character size of display digits	10 MM	
21	Fixing/sealing arrangement		
	i) Fixing of meter	3 fixing holes (one at top & two at bottom terminal block)	
	ii) Sealing of meter cover to Base	2 nos., tightening from rear	
	iii) Sealing of terminal cover	One	
	iv) Min. size of flanges for tightning the sealing screws in meter cover and terminal cover	Terminal cover - 6 mm Meter cover - 10 mm (including top cover & base flanges)	
22	Type of hinged undetachable terminal cover & size/ thickness of hinges	Book (Door) type opening	
	Note:-	**Meter cover should be ultrasonically welded with base as per specification.** **The meter shall be encapsulated designed or ultrasonically welded base and top cover separated but chemical welded in case of encapsulated design.**	
23	Performance of meter in tamper conditions		
	i) Phase-neutral interchanged	Should work within specified accuracy	
	ii) Main & load wire are interchanged	--do--	
	iii) Load is not terminated back to meter & current is drawn through local earth fully or partially	--do--	
	iv) Indication on above tamper conditions	LED indication	
24	(i) Injection of abnormal frequency and voltage of the	Should sustain	

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Sl. No.	Test	Minimum requirement	As per firm's offer
	order of 35 KV with help of external device.		
	(ii) Suitability of meter to sustain over voltage i.e. phase to phase voltage injected between phase & neutral	Should sustain as per relevant IS	
25	Size of calibration LED & colour as per clause 5.12.3	to be indicated	
26	Electromagnetic compitability (EMI/EME severity level)	Should withstand severity level 4.	
27	Effect on accuracy of external electromagnetic interfe. of electrical discharge, external magnetic field & DC current in AC supply or in neutral.	Should work within accuracy as per latest ISS & CBIPreport-325	
28	Effect of accuracy in tamper conditions	Meter should record as per relevant electrical condition	
29	Cut off voltage (at which meter stop working)	Cut off voltage (at which meter stop working) shall be below 40% of the rated voltage (Vref)	
30	If there is current Ix (equal to or more than 2% Ib) in a phase even if reference voltage of that phase is Vx (equal to or less than 50% of V rated)	In such a case meter should record energy = V rated X Ix (taking u. p. f.) (The measurement for the affected phase will start at Vref, Actual Current in that phase and UPF after persistence time of 5 Minutes. And the tamper shall be recorded as Current without Voltage Tamper with time stamping and KWH reading) As there is no OBIS code for current without voltage tamper, the logging of missing potential tamper instead of current without voltage tamper is excepted.	
31	Input voltage & frequency variation within which meter works satisfactory	+20%- -40% of V. ref. +_ 5% of req. Frequency	
32	Relative humidity	95% (some times approaches to saturation)	
33	Ref. Temperature	27oC	
34	Temperature range of	-10oC to 60oC	

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Sl. No.	Test	Minimum requirement	As per firm's offer
	operation		
35	Drift in accuracy of measurement with time	No Drift in accuracy in measurement with time	
36	Fixing arrangement of name plate	Meter rating shall be fixed inside the meter cover and should be clearly visible from the window. It should not be faded with time.	
37	Approximate weight of meter	To be mentioned	
38	Type of body	Projection type	
39	Manufacturing activity		
	i) Whether SMT components & technology used	SMT component & technology necessary	
	ii) Whether submitted quality assurance plan	Required to submit	
40	Testing facility		
	i) Whether fully automatic computerised meter test bench with print out facility available	Must available	
	ii) Make & S.No. of Test bench	-	
	iii) Accuracy of ESS duly caliberated	0.1 class ESS	
	iv) Whether following in house testing facility available:		
	a) Insulation resistance	Must be available	
	b) Running on no load	-do-	
	c) Starting current	-do-	
	d) Accuracy requirement	-do-	
	e) Power consumption	-do-	
	f) Repeatability of error	-do-	
	g) Tamper condition	-do-	
	h) Electromagnetic compatibility	-do-	
41	Whether offered meter is type tested as per IS 16444 with latest amendment CBIP report-325 and tender specification.	Whether offered meter is type tested as per IS 16444 with latest amendment CBIP report-325 and tender specification	

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Sl. No.	Test	Minimum requirement	As per firm's offer
42	Guaranteed life of meter	manufacturer's warranty till Contract period.	
43	Other parameters/features not covered in the above GTP	Shall conform to specification of IS-13779 & CBIP report No.325	
44	Whether the display sequence of the offered meter is as per the technical specification.	Should comply	
45	Whether the offered meter is having 8 ToD over as per technical specification	Should comply	
46	Whether the MD integration period of the meter is 15 min, based on shiding window participate.	Should comply	
47	Whether the tamper features of the offered meter are as exactly as per Annexure- I of Vol III of Tender.	Should comply	
48	Whether the performance on DC injection in complying with the ref. Annexure- I of Vol III of Tender.	Should comply	
49	Whether the load survey features are complying with the requirements	Should comply	
50	Sealing of meter	As per TS	
51	Parameters (In case of net-meter both export & import parameters to be measured)	Instantaneous: As per IS 15959 (Part 2): 2016 Billing parameters: As per IS 15959 (Part 2): 2016 Reactive Energy as per IS 15959 Part 1, Category D2 Meter Daily Load Profile: As per IS 15959 (Part 2): 2016 The billing parameters shall be retained in the meter for 6 months and should automatically rollover. Last 6 month billing parameters are required as per IS 15959 part3. The billing parameters shall be retained in the meter for 12 months and should automatically rollover. With additional parameters of export TODs, Profile parameters for	

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Sl. No.	Test	Minimum requirement	As per firm's offer
		meters (including Import - export parameters) shall be in line with IS16444 part1 requirements and import/export parameters shall be in line with the requirements of IS16444 part1 and IS15959 part2.	
52	Maximum Demand	Should have Maximum Demand registers kW and kVA with integration period 15 minutes. It should be programmable for 30/15 minutes. Resets should be auto-monthly as well as through HES. MD Recording should be based on sliding window principal with default MD integration Period 15 Min	
53	Load Survey/Interval Data	As per IS applicable shall be IS:16444 Part-II & IS:15959 Part-III with latest amendment for category _D3' LT CT operated meter for consumer metering. Block load profile parameters as per IS 15959 (Part 3): 2017 shall be recorded for 45 (Power ON) days data to be recorded with 15 minutes integration period. In addition, Daily load profile parameters as per IS 15959 (Part 3): 2017 shall also be recorded for 45 (Power ON) days. The register shall automatically rollover the data after 45 days based on first in first out (FIFO) basis. Survey block integration period shall be configurable for 15 min & 30 min, by defaults it should be provided in 15 minutes block for 45 days. By default, LS parameters shall be with 15 Min. integration period.	
54	Time of Use	As per IS 15959 (Part 2): 2016	
55	LCD Indicators	As per IS 16444:2015	
56	Tamper/Event recording	As per IS 15959 (Part-2):2016. 200 events shall be stored in local memory of Smart Meters (100 occurrence and 100 restoration)	
57	Alarm switch / contactor	As per IS 15884	
58	Measuring Elements	Meter should have Four measuring elements – Three in phase and	

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Sl. No.	Test	Minimum requirement	As per firm's offer
		other in neutral path.	
59	Anti-Tamper features	As per TS	
60	Disconnection/Reconnection Mechanism	As per IS 16444.	
61	Connect/Disconnect Indication	As per IS 16444	
62	Programmability	It should be possible to program the parameters limits / values remotely through adequate security mechanisms. Once programmed it will be possible for the programmed parameters to come into effect from a certain date & time. Metrology under such condition must remain intact and shall not be upgradable from remote & Meter shall be as per IS 15959 part 2	
63	Communication and Communication Protocol	As per IS 16444	
64	RTC & time synchronization	Meter shall have RTC with 20 years calendar programmed in the memory and provision for time synchronization, the maximum drift shall not exceed +/- 300 Seconds per year. The clock day/date setting and synchronization shall only be possible through password/Key code command from remote server through RF communication network. Contractor shall submit the methodology for the synchronization of RTC.	
66	Data display facility (manual/Auto)	Data Display shall have following features: Data display facility (manual/Auto) Minimum 7-digit LCD display having minimum 8.5x5 mm min for all digits Display of data as per TS. The Push button for manual scrolling in addition to auto scrolling with a persistence time of 10 seconds for each parameter shall be provided. High resolution (shall display energy value with resolution	

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Sl. No.	Test	Minimum requirement	As per firm's offer
		of 2 digits before decimal and 5 digits after decimal. Kwh total and fundamental kwh are essential to follow regulation • In case of Net Metering Import, Export and Net will be available at Meter Display and at HES also In case of prepaid meter Display parameters should be available as per IS 15959 and latest amendment and same shall be available at HES also. With additional parameters of export TODs, the requirement shall be in line with IS16444 part 2 for import - export meter parameters.	
66	Guarantee		
67	Remote Firmware Upgrade	As per IS 15959 (Part 2): 2016	
68	Testing of Smart Meter	Comply as per TS	
69	Other parameters/features not covered in the aboveGTP	Conform to specification of IS 16444 (with its latest amendment).	

REMARKS:

(1) All the information/parameters indicated above shall exist in the meter offered & shall withstand all the tests specified above within the variation of current/voltage frequency and climatic conditions specified therein.

(2) Even though if any features or parameters are not specifically covered in this GTP, but are essential for the satisfactory performance of the meter as per the specification, are deemed to have been covered in the GTP.

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Meter Data Display Requirements

A. Three Phase Whole Current Meters Display Data

1.1 Auto display mode in Three Phase Whole current

a. Date DD:MM:YY
b. Time HH:MM
c. Cumulative kWh
d. MD KW and KVA
e. Instantaneous P.F with sign of Lag / lead
f. Average PF to be provided for previous 6 months.
g. Main Billing active KWh
h. TOD 1,2,--,6 Billing active KWh
i. Billing MD kW and KVA

1.2 Display Parameter Push Button mode

The display of the following parameters shall be continuously scrolling one after another through push button. The display shall have ‗ON' time of at least 10 seconds of each measured value, except LCD segment check. The LCD segment check shall be on meter display for 15 seconds. Display parameters shall move forward if button pressed prior to the programmed time for display of each parameter.

xxvii) LCD segment check
xxviii) Date DD:MM:YY
xxix) Time HH:MM
xxx) Rising demand register
xxxi) MD reset count
xxxii) Cumulative kWh energy register
xxxiii) Cumulative kVArh lag energy register
xxxiv) Cumulative kVArh lead energy register
xxxv) Cumulative kVAh energy register
xxxvi) KW and KVA MD register
xxxvii) Cumulative MD register KW and KVA
xxxviii) Instantaneous P.F with sign of Lag / lead
xxxix) Frequency
xl) TOD 1,2,--,8 Cum. KWh
xli) TOD 1,2,--,8 Cum. KVAh
xlii) TOD 1,2,--,8 MD KW and KVA
xliii) Average PF to be provided for previous 6 months.
xliv) Billing MD kW and KVA

xlv) Billing MD datexlvi) Billing MD time
xlvii) TOD 1,2,--,8 Billing MD registers
xlviii) Main Billing KWh register
xlix) TOD 1,2,--,8 Billing KWh registers
l) Main Billing KVAh register
li) TOD 1,2,--,8 Billing KVAh registers

lii) Tamper information-This shall be displayed when tampered with following.
a) Date of last tamper occurrence

b) Time of last tamper occurrence

c) Number of times meter tampered

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Communication Protocol:-

1. Communication Protocol As per IS 15959/DLMS-COSEM (RF **/RF MESH, NBIoT, WBIoT/GPRS**)
2. Remote Firmware Upgrade As per IS 15959 Part 3
3. Should be able to Integrate with JIO HES and a integration confirmation is required from JIO

DCU and its capabilities as minimum requirement as below:
DCU shall push events such as tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.
The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP65).
A suitable mounting provision shall be made for the equipment.
Enclosure: Provision for security sealing shall be provided and in case the gasket of the cover is used for protection against moisture, dust and insects, the gasket shall be made of weather and aging resistant material.

DCU Communication:

Min Requirement: The communication architecture shall be any, as defined under IS 16444.
The DCU shall ensure the appropriate backhaul for secure transfer of data to HES either via cellular or Fiber Optic communication. In case of cellular backhaul, it shall support SIM card with dynamic/static IP from any service provider.
It shall have Wide Area Network (WAN) connectivity to the HES through suitable means.
DCU shall be able to communicate with meters either on RF / RF mesh (Unlicensed or Licensed frequency band as permitted by WPC/Statutory Bodies in country of deployment as applicable) or PLCC.
DCU shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads. It shall push events such as tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.
DCU shall be able to acquire and send data to HES for full capacity (as per designed for no. of meters/field devices) to ensure the performance level. Full capacity of DCU is required to be indicated in the offer

Min Requirement: After Power Interruption, on restoration of power supply, DCU shall establish communication with underlying devices as well as upstream application automatically.
DCU shall be able to communicate with the nearest meters depending on topographical features. For further communication among the meters, distance of the other meters with the DCU shall not be a constraint as communication of the nearest meters shall be established with other meters through appropriate mesh formation / other formation.
Remote Firmware Upgrade: The DCU shall support remote firmware upgrades as well as remote configuration from the network operation cum monitoring center. Configuration of programmable parameters of Smart Meters shall be done through HES.
All meters falling under one DCU shall be commissioned and checked for proper communication in presence of Utility incharge.

DCU shall keep the records of minimum of the following events:

- No of packet failures
- Retry attempts
- Missed periodic readings
- Failure to connect
- Tamper events
- First Breath and Last Gasp on Power restore and Fail

Smart Metering Rating and Compliances

Sl. No	Material Description (Short text)	Additional Description	BIS COMPLIANCE	Warranty and Life	Remark
1	3 PH SMART METER (Whole Current) Current - 20-80 Amp Voltage - 3x240 Volt Class : 1 Freq : 50 Hz Three Phase 4 Wire IS:16444 Part-1	THREE PHASE SMART METER 20-80A,3 x 240V, Cl-1, 50 HZ, WITH IN BUILT COMMUNICATION (COMMUNICATION MODULE WITH NBIOT /GPRS/RF) IS: 16444 COMPLIANCE, REMOTE CONNECT / DISCONNECTION SUITABLE FOR ONLINE PRE PAYMENT FUNCTIONALITY, ONLINE CREDIT RECHARGE WITH PAYMENT GATEWAY AND NBIOT SIM OF RELIANCE JIO / AIRTEL / GPRS SIM /RF ALONG WITH METER.	IS:16444 Part-I & IS:15959 Part-II with latest amendment for Project	10.5 Years	with backlit LCD display and communication port for data downloading, Two Way communication, NIC card plug and play, TOD Energy and Demand recording etc.

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