

**TECHNICAL SPECIFICATION OF PORTABLE ELECTRONIC REFERENC
ESUBSTANDARD ENERGY METER (ERS METER) FOR LT THREE PHASE ENERGY
METERS:-**

1.0 SCOPE:-

A portable lightweight electronic precision portable energy meter testing equipment which shall be capable of testing and calibration of all type of LT 3 phase, 4 wire and HT 3 phase 4 wire, whole current and CT operated induction as well as electronic Active, Reactive and Apparent Energy Meters at lab & site. The specification covers the design, manufacturing, testing and supply of high accuracy class 0.2 precision LT ERS meters in direct Mode up to 5 A. In Clamp on CT mode accuracy Class should be 0.5 accuracy class , with current range from 0.5 Amp. to 200 Amp.

The PCB of equipment shall be manufactured using surface mounting technology.

2.0 SERVICE CONDITIONS: -

Equipment to be supplied against this order shall be suitable for satisfactory continuous operation under the following tropical conditions:

- (a) Maxi. Amb. Temp. 50 °C
- (b) Maxi. Temp. in shade 45 °C
- (c) Mini. Temp. of air in shade 3.5 °C
- (d) Relative Humidity 10 to 95
- (e) Maxi. Annual Rainfall 1450 MR
- (f) Maxi. Wind pressure 150 Kg. Sq. Mtr.
- (g) Maxi. Altitude above sea level 1000 meter
- (h) Moderately hot & Humid tropical
Climate – conducive to rest & gangues growth.

3.0 APLICABLE STANDARDS IEC 60687/92 and IS 14697

Equipment meeting with the requirement of other authoritative standards, which ensure equal or better quality than this specification, shall also be considered. When the equipment offered by the tender confirm to other standard, salient point of difference between the standard adopted & this specification shall be clearly brought out. The copies of such standards, in English authentic translation shall be furnished along with the offer.

4.0 APPLICATION: HT/LT

ERS meters are suitable for Lab/site testing of **LT 3 ph. 4 wire** meter trivector meter/electronic/electro-mechanical meters and mentioned in the scope. The testing is possible with phantom load available at Lab. Also.

5.0 SUPPLY SYSTEM :-

- (A) Supply Voltage 415 V +/- 30% (Ph to Ph)
3 ph 4 w

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(B) Frequency	50 HZ +/- 10%
(C) Basic Current	5Amp and 200Amp. with Clamp on CTs of Cl 0.5 accuracy
(D) Working Range	0.1 % to 120 % Ib
(E) PF range	0.lag – UPF-0 lead (4 quadrant)
(F) Temp. efficient	0.01% per degree centigrade.

6.0 DISPLAY: -

The meters shall have 20 characters or bigger display to display test parameters.

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The meters shall have suitable LCD Display with backlit facility. The parameters to be displayed should be selected through front panel switch. Following parameters are to be displayed.

(a) Phase parameters	Per phase voltage Per phase current & PF of individual phase (Lag. Lead) Line Frequency.
(b) Instantaneous power	KW, KVA, KVAR, lag/lead indication
(c) Energy Consumption	KWH/WH, KVARH/VARH (lag/lead), KVAH/VAH.
(d) Date and time	
(e) Tampering features	(i) Missing potential (ii) Missing Current (iii) Reverse current (iv) Phase sequence, forward & reverse.

7.0 (a) DISPLAY RESOLUTION:-

Minimum resolution for various parameters will be as follows.

Voltage -	0.01V
Current -	0.001A
Power Factor -	0.001
Energy -	0.001 (WH/VARH/VAH)
Inst. Load -	0.001 (KW/KVAR/KVA)

Energy parameters shall have at least 4 digits after decimal & two digits after decimal shall be provided for Demand.

(b) Measurement Mode:-

The ERS shall have the following measurement modes to test LT CT operated meters & direct connected type meters.

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- (i) To test LT CT operated meter bigger clamp on CT shall be provided on the equipment. The inside diameter of the CT shall be of 90mm.
- (ii) Clamp on CT mode Three Clamp on Type CT shall be provided along with ERS to test direct connected meters without disconnecting them from the circuit. The measuring mode shall be selectable by using key board of the equipment. The static portable reference energy meter should not get damaged if 150% height rated current is applied for 30 minutes i.e. CT's should not be saturated up to 150% of the height rated current.

8) ACCURACY

The accuracy shall be sufficient in any condition for-testing KHW meter of accuracy class 1 & 2 and confirming to IS 13010 , IS 13779. The accuracy class shall be 0.2 for LT ERS meter.

9) STARTING CURRENT

0.01 IB at UPF

10) POWER LOSS

10 VA per phase

11) CONSTRUCTIONAL FEATURES

11.1 Errors are displayed directly with the help of bright LCD display.

11.2 The instantaneous value of per phase voltage, per phase current, instantaneous PF, Active/reactive/apparent power, frequency, phase sequence etc. shall be obtained by pressing the push -bottom.

11.3 Alphanumeric keyboard shall be provided for testing, for entering meter Sr. No. Consumer identification number, meter constant, CT Ratio of meter under test, test revolution, Alphabets. Decimal & for other functions like result, enter, delete & shift.

11.4 The ERS meter shall have memory to record the test date. The error data up to at least 200 tests, shall be stored in meter memory and these can be down loaded to computer using communication cord/pot (RS 232) so that print outs of test results can be taken out with compatible software. The test data stored in the memory of the ERS shall not be lost by roll over mode but after the memory is exhausted it should flashed the message on the LCD display. The roll over period shall be as per IS 13779/99. Test result should be with date and time.

11.5 The ERS meter shall be provided with optical sensor head for sensing red mark of rotating disc or pulsing LED of static meter.

11.6 The meter shall be suitable for testing 3 phase 3 wire connection. Solidly earthed & capable of testing meter supplying balanced, unbalanced loads of all PF ranging from zero leg. UPF lead PF.

11.7 Meter shall have facility to display the readings directly.

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- 11.8 Switch shall be provided to test 5 A & 1 A mode on front panel & meter shall comply the requirement of relevant standards of different load & PF errors.
- 11.9 Meter shall be provided with suitable leads for safe/quick connections and insulated leads for current/voltage connection. The leads should be capable of being connected to the meter test terminal block of the meter.
- 11.10 A selector switch is to be provided for selecting single or three phase system.
- 11.11 The meter shall have test output in the form of blinking LFD to be provided to test its own accuracy.
- 11.12 Self diagnose feature LCD test is required to be provided on meter's display to indicate the healthiness of all segments of LCD display.
- 11.13 The ERS meter derives its power from main voltage only and does not need any battery back up for its operation or data storage.
- 11.14 Meter may be fitted in brief case. (i.e. of standard make like VIP, Safari, Aristrocate etc.)
- 11.15 Snap switch for Start/stop of meter shall be provided.
- 11.16 One set of potential and current leads to be provided.
- 11.17 A complete 3 meter long power card, connecting 3 terminals/plugs.
- 11.18 Any other accessory required to the extra pollution of specified measuring capabilities of sub standard ref. Meter.

12) ADDITIONAL INDICATIONS

Provision shall be made for the following additional indications.

- (i) The energy flow direction.
- (ii) Warning for over load beyond the limits specified in the voltage & current circuits.

13) AUXILIARY POWER SOURCE:

The auxiliary power source shall be supplied to the device by the 50 Hz net work at 240 V or device shall have facility to power up with the help of long range power supply . In any case auxiliary power consumption of the device shall be loss than 30 VA.

14) ELECTROMAGNETIC COMPATIBILITY

The equipment shall be fully protected against electromagnetic interference, introduced through the connection cable, through capacitive or induct ire coupling or by radiated electromagnetic compatible shall be within the limits specified in IEC 60687/92 & IS-14697

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15) ERS meter shall have snap switch optical scanning head for counting number of revolution /pulse output of meter under test.

16) Adequate protection fuses or otherwise should be provided in particulars for current circuit.

17) The Provision for direct print out of the error of meter under test starting errors, date, time and meter Sr. No. shall be in built feature of the equipment.

18) Shock and Vibration Protections.

19) The equipment shall be immune to impact, vibration and bumping due to transport. It shall be within the limits specified in IEC 687/92 or IS 11426 & IS-14697

20) DIELECTRIC STRENGTH

The equipment shall be capable to withstand between circuits, and between circuits and case 2000 VAC 50 HZ for.

21) TEST CERTIFICATE

Routine test report, calibration certificate & operation manual is to be provided along with cash

22) TYPE TEST REPORT

The tender shall have to submit type-test report carried out as IEC-60687/92 & at Govt. approved Laboratory, NPL, Delhi or equivalent along with offer. No time limit will be given for submission. The offer without type test report shall be ignored

23) The tender shall have to submit list of order executed and list of machinery /equipment and testing facility available at their factory. The bidder shall have minimum five years of experience in the field of manufacturing of meter testing equipments.

The LT ERS meters shall be verified for all the features stated in this specification i.e. Sr. No. 1 to 23 during lot inspection as well as other acceptance test stated in the relevant standard.

After inspection of the lot the L.T. ERS meters shall be sent for calibration at ERDA, Baroda or at any Govt. approved laboratory viz: NPL, ETDC, ERTL or CPRI only. After calibration of the meter and on submission of calibration certificate to C.E. (P&P), UGVCL the Dispatch Instruction shall be given. The charges for calibration of L.T./H.T. ERS meters shall be **borne by the bidders only** .

24) TRAINING

The successful tender shall be required to provide facilities for in-plant training at no extra cost to the purchaser to at least four engineers to be nominated by the purchaser at his works where the equipment offered shall be manufactured.

If the equipment offered is being designed and manufactured in collaboration with the other manufacturer. The supplier shall provide facility for additional two engineers to be nominated by the purchaser, in-pant training in the collaboration work.

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In case of training within India, the to & fro travel expenses, loading and boarding expenses as prescribed by Board according to eligibility in respect of Trainee shall be beat by the supplier. However, the supplier shall provide for suitable facilities for lodging and boarding as well as to & fro transport to place of training.

In case of training outside India, such to & fro journey expenses from India to the place of training shall be borne by the purchaser. However, the cost of difference of the expenses of the trainees for lodging and boarding, out of pocket allowance, local transport etc. as per the rates prevailing at the time of training shall be borne by the supplier.

The period and program of training shall be discussed and finalized by the purchaser with the supplier.

25) GUARANTEE

The L.T ERS meters shall be guaranteed for five years from the date of dispatch. Any defects observed during guarantee period shall be required / rectified / replaced by the bidders free of cost.

26) AFTER SALES SERVICE

The bidder has to indicate clearly what type after sales service will be provided within guarantee period and outside guarantee period and address of Sales service central, details of Engineers shall be submitted with offer.

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