Tender Inviting Proposals with Terms & Conditions

1. **Tender Documents :** Tender documents shall be sold to the intending Tenderers, who are manufacturers or their authorized dealers only on receipt of Rs.1,000.00 (Rupees One thousand) only (non-refundable) in the shape of demand draft drawn on any scheduled bank in favour of the Engineer-in-Chief, Power & Electricity Department, Aizawl, Mizoram payable at State Bank of India, Dawrpui Branch, Aizawl, Mizoram. Further, the tender submitted using tender documents other than duly obtained as stated above if any, will be summarily rejected.

   Tender documents are available at the website www.tender.mizoram.gov.in.

2. **Scope of work :** The scope of work hereby tendered in brief shall include supply of electrical testing equipment in conformity to technical specifications (Section I – IV) enclosed and commissioning at site etc. as listed in the Annexure I.

3. **Pre-qualification/Eligibility Criteria :**

i) The Tenderer should be a regular manufacturer/ Original Equipment Manufacturer (OEM) or authorized representative/ dealer and should have capacity & capability to expand, to upgrade technology and to do Research & Development (R&D). In case the vendor is authorized representative of OEM, the complete system should be sourced from OEM only. Valid Authorisation Certificate/Letter from Original Equipment Manufacturer (in case of not directly quoted by OEM) for quoting of their system and provide support for commissioning and after sales services.

ii) The Original Equipment Manufacturer (OEM) should have at least 10 years of experience in manufacturing of the equipment and have an experience of supplying and commissioning directly or through their authorized dealer/representative to reputed organizations, especially NITs/IITs/IIITs/Central Universities/IISERs/CSIR labs, Power Utilities etc. Document for proof of such supplies at least for the preceding three years, where successful supply and installations have been made during this period should be given together with the full address, telephone numbers and fax numbers of the customers. Performance Certificate regarding satisfactory performance of the equipment mentioned from at least four mentioned (issued within 1year of tender opening) should be submitted along with the tender.

iii) Manufacturer should comply with relevant international standards/specifications and meet certification requirements with valid certificates for manufacturing practices of the equipments. Valid certificate to prove the genuineness of the products and of international standard i.e Manufacturer's certificate and ISO/ISI certificate must be enclosed.

iv) The Tenderer should provide maintenance support for the equipment as required by the Department. The Tenderer should submit the documentary evidences of having established mechanism/after sales service facilities for prompt services as and when required, indicating clearly the nearest 'after sales service centre' from Mizoram indicating detailed contact address etc.

4. **MVAT Clearance :** The successful tenderer should produce MVAT clearance certificate in Form – 38 before Letter of Intent is issued.

5. **Guaranteed Technical Particulars :** The GTP (Guaranteed Technical Particulars) of the testing equipments along with their complete technical description supported by drawing shall be furnished by the tenderer as per Schedule- I to IV. Relative specification like IS/ BS / IEC etc. should be mentioned.

6. Examination of the Documents : The Tenderer shall examine Conditions of the Tender and Specifications to satisfy himself about all the Terms & Conditions and circumstances affecting the Tendered Price. He shall quote price(s) according to his own views on these matters and understand the quoted prices are inclusive of all taxes, duties, freight, insurance etc,. The Tenderer shall give his/her signature with seal in each and every page of the Tender Document as an indication of his/her acceptance of the Terms and Conditions of the Tender.

No overwriting is allowed In the Tender. Dated initial should be given by the Tenderer to all corrections, if any, and the seal stamped on each.

Tenderers should submit the following along with their tenders :

i) Authorised Dealer must submit an Authorised Dealership Certificate issued by Manufacturers.

ii) Valid House Tax Payee Certificate in certificate in case of Tribal Tenderer.

iii) Court fee stamp worth Rs.8.25 in case of Non-Tribal Tenderer.

7. Earnest Money : The Tenderer shall have to furnish Earnest Money for Rs.1,40,000/- (Rupees One lakh and Forty thousand only) in the shape of Bank Draft/Deposit at call pledge in favour of the Engineer-in-Chief, Power and Electricity Department, Aizawl, Mizoram in a separate cover superscribing the Tender Specification Number and Date of opening. Tribal Tenderers are allowed to submit Earnest Money for half the above amount.

8. Price :

i) Price quoted should be firm and FOT delivery at Aizawl.
ii) Price quoted should be quoted both in figure and in words using Schedule of Prices given in Schedule-V.
iii) Price should be inclusive of all taxes, duties, insurance, freight, handling charges, etc.
iv) If there is any discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price should be corrected.
v) Similarly, if there is any discrepancy between the words and figures the price/amount in words should prevail.

9. Validity : Tender should be kept valid for a period of 12(twelve) months from the date of opening the tender.

10. Terms of Payment : 100% payment after the equipment is received in full and in good condition at destination by the consignee and after successful commissioning subject to availability of fund. No interest is claimable for delayed payment.

11. Delivery : The testing equipments are to be delivered within 90(ninety) days from the date of issue of order.

12. Preparation and Submission of tender :

i) The tender should be prepared and submitted in duplicate enclosing all documents in two sealed envelopes for original and duplicate separately superscribing tender notice number and date with date of opening.

ii) The tender should be submitted in two envelopes, i.e, one containing tender affixing court fee stamp in case of Non-Tribal Tenderers and valid House Tax Payee Certificate (HTPC) in case of Tribal Tenderers, and the other, externally attached to the tender envelope, containing the Earnest Money and Manufacturers'/Authorised Dealerships' certificate.

iii) The tender without Earnest Money in a separate envelope as explained above, shall not be opened and shall be summarily rejected.

iv) All the envelopes should bear the name and address of the Tenderer and marking should be made for the original and duplicate copy.

13. Reservation : The undersigned/Owner reserves the right to accept or reject, partly or wholly, or all the tenders without assigning any reason thereof if the situation so warrants. Further, he is not bound to propose the lowest Tenderer for selection. **The Technical Committee of the Department shall scrutinize and evaluate valid tenders with reference to the documents submitted by the Tenderer to be placed before the Purchase Advisory Board.** The Tenderers who do not accept the terms of payment as specified in clause no 8 above will be liable for rejection.

In the event of any specified date for submission or opening of the tender being declared as holiday, the tender will be received/opened at the appointed time on the next working day.

14. Guarantee : The Suppliers shall guarantee for satisfactory performance of the instrument/ kit for a minimum period of 12 (twelve) months from the date of commissioning or 18 (eighteen) months from the date of receipt whichever is earlier. In the event of any defect in the equipments within the guarantee period, the Tenderer shall guarantee to repair/replace to the satisfaction of the purchaser free of cost.

15. Address : All correspondences with regard to the above may be made to the following address :

Engineer-in-Chief
Power & Electricity Department
P &E Office Complex : Electric Veng
Aizawl : Mizoram, Pin -796001.

Annexure-I

List of Testing Equipments Tendered

Sl.No.	Name of Equipment	Preferred Make	Unit	Qnty	Remarks
1	Primary Injection Kit	MEGGER, OMICRON or equivalent	Set	1	
2	Current Transformer (CT) Analyser	OMICRON, PONOVO, SCOPE or equivalent	Set	1	
3	Circuit Breaker Operational Analyser with at least one channel DCRM	SCOPE, MEGGER, DOBLE or equivalent	Set	1	
4	Handheld Meter Testing Equipment	SCOPE, KINGSHINE or equivalent	Nos.	2	

Technical Specification For Primary Current Injection Test System

1. Scope :

This specification covers supply and delivery of Digital Primary Current Injection Test System with complete accessories from manufacturing company or their authorized dealers.

The system should be designed for primary injection testing of protective relay equipment and circuit breakers, turns ratio testing of current transformers and for other applications that require high variable currents.

It is not the intent to specify completely herein all the details of the specification and features of the Primary Current Injection Test System. However, the instrument shall conform in all respect to high standard of engineering, design and workmanship and shall be capable of performing in manner acceptable to the purchaser.

2. Operating range :

The system should be capable of delivering 0-700 Amperes continuously without any rest time required. The output should be continuously adjustable.

3. Main features :

The Primary Injection Test System must have the following features:

1.	*Input Power*	:	100-240VAC 50 Hz.
2.	*Display*	:	Digital type display of Time, output current, voltage, Phase angle etc.
3.	*Setting buttons*	:	Ammeter – Manual/Auto ranging, V/A meter, System, memory, etc.
4.	*Stop button*	:	Manual shut off/Automatic stop.
5.	*Status indicator*	:	Voltage availability, fulfillment of stop condition etc.

4. Physical requirement :

As the system is required for field work in different sub-stations, the size should be made minimum for easy carriage and the weight of one unit should not be more than 20 kgs.

5. Technical Requirements :

The desired technical features are as per stated below:

Measurement category	CAT I
Rated transient overvoltage	2200 V
Mains voltage	100 – 240 V AC, 50/60 Hz
Mains inlet	IEC 60309-1, -2. 16 A

Input current	Output current x open circuit voltage / input voltage
Protection	The output transformer must have a built-in thermal cut-out, and the primary side should be protected by a miniature circuit breaker.
Data transfer	USB Type B Female

6. Measurement required :

i) **Ammeters**

Measurement method	AC
Accuracy	1% of range ± 1 digit
Output	0 – 6.5 kA
Input	*0 – 20 A*
Resolution	
0-999 A	*1 A*
1.00 – 6.50 kA	*10 A*

ii) Voltmeter

Measurement method	AC 50.60 Hz, DC RMS
Range	0 – 0.2 V, 0 – 2 V, 0 – 20 V, 0 – 200 V, AUTO
Accuracy	1% of range ± 1 digit
Input resistance (R_{in})	240 kΩ (range 0 – 200 V) 24 kΩ (other ranges)
Dielectric withstand	2.5 kV

iii) Timer

Presentation	In seconds, mains frequency cycles or hours and minutes
Ranges	0.000 – 99999.9s 0 – 9999 cycles
Accuracy	± (1 digit + 0.01% of value)

d) Stop input

Max. input voltage	250 V AC / 275 V DC
Phase angle	
Range	0 – 359°
Resolution	1°
Accuracy	± 2°

7. Test Certificates :

Complete test certificates should be submitted along with the tender. Tenders without test certificates shall not be accepted.

8. Guaranteed & Other Particulars :

The guaranteed and other particulars shall be given as per Schedule-II enclosed along with the tender. Tenders without GTP shall not be accepted.

SCHEDULE – I

Guaranteed Technical Particulars For Primary Current Injection Test System

Make :

Model :

Place of manufacture :

Applicable Standards :

Maximum current output ac :

Auxiliary Voltage Output :

Display :

Current range & resolution :

Auxiliary voltage range :

Accuracy :

Timer range & resolution :

Timer accuracy :

Duty cycle :

Operation temperature range:

Storage temperature range:

Operation humidity range:

Storage humidity range:

Supply voltage:

Safety as per IEC1010-1:

CE marking *EMC* 2004/108/EC
LVD 2006/95/EC

Protection:

Dimension:

Weight:

Technical Specification for Current Transformer Analyser

1. Scope:

This specification covers the technical requirements for a portable current transformer test set CT Analyser) with all associated accessories for testing current transformers used for protection and for metering purpose. This test set shall measure single CTs as well as multi ratio CTs ratio error, polarity, phase error, winding resistance, excitation voltage and current, winding ratio, secondary burden, residual magnetism, remanence flux factor, and secondary time constant. The tests shall be performed automatically with a single-connection, and provide automatic assessment on whether it meets the nameplate specifications and accuracy class standard. All specifications are required and should be met as specified in this and subsequent para and in GTP. Any deviations from the Technical Specification or exceeds must be clearly identified and described.

The manufacturer of the test equipment shall have long time experience in high voltage applications and measurement equipment for these applications. The test set shall be field proven and in the market for at least five years. Customer references shall be shown on request.

2. Technical Requirement

The test set shall be suitable for acceptance testing, commissioning, troubleshooting and routine testing on all types of current transformers classified under IEC 61869-2, IEC 60044-1 and 60044-6 and under IEEE C57.13 inclusively C57.13.6 for high accuracy CTs. The test set shall be suitable for operation in laborites, manufacturing plants as well as in high voltage substation environment without degradation in accuracy, and shall be able to operate continuously for up to 8 hours or more.

The test set shall be able to perform the following tests, measurement, analyzing and reporting functions:

2.1 Testing Capabilities

The test shall be performed automatically however the capability to enable or disable individual test sequences shall be possible to provide highest flexibility. Following test capabilities shall be included.

a) Remanence test
b) Nameplate Guesser
b) Primary Resistance test
d) Secondary Resistance test
e) Secondary (operative) Burden test
f) Excitation test
g) Ratio test
h) Demagnetization

2.2 Test Application

The test set shall be able to test single ratio and multi ratio current transformers as standalone version as well as current transformers installed in power transformers or gas insulated switches. The test set shall be able to perform test and verification for current transformer used for protection and metering (billing) purposes.

a) Automated testing of single ratio current transformers
b) Automated testing of multi ratio current transformers up to 6 taps (S1-S6 / X1-X6)
c) Automated testing of bushing current transformers installed in Power Transformers
d) Test current transformer up to class 0.1 accuracy for metering (billing)
e) Test current transformer considering transient behavior for protection
f) Test current transformer excitation curve up to 30.000 Volt Knee-point level.
g) Demagnetization of the CT shall be performed automatically at the end of the test sequence and if the measurement is interrupted by the user

2.3 Measurement

The test set shall be designed to test a wide range of parameters of the current transformer to verify their designated usage according to its specifications.

a) Ratio measurement and accuracy considering nominal and operative Burden:

Ratio	**Accuracy**
0.2 – 1	typ: 0,05% (guaranteed 0,1%)
>1 – 2000	typ: 0,02% (guaranteed 0,05%)
>2000 -5000	typ: 0,03% (guaranteed 0,1%)
>5000 – 10000	typ: 0,05% (guaranteed 0,2%)

b) Phase Displacement considering nominal and operative Burden phase measurement accuracy: typ: 1 rad min. (guaranteed 3 rad min.)

c) Secondary Winding Resistance Measurement with range of 1mΩ to 3kΩ with accuracy better than 0.1%+1mΩ

d) Primary Winding Resistance Measurement with range of 1mΩ to 3kΩ with accuracy better than 0.1%+1mΩ

e) Secondary Burden Test with range of 1mΩ to 1kΩ with accuracy better than 1%

f) Remanence measurement in Vs and in % in reference to max. possible flux

g) Saturation measurement with graphical and tabular reporting, tests currents up to 15A pk, effective saturation voltage up to 30.000V and higher.

h) Plot excitation graph and calculation of knee-point according to IEC 61869-2 / IEC 60044-1 / IEC 60044-6 / IEEE C57.13

i) *Measurement parameter acc. IEC 60044-1 / 61869-2,*

- V-kn (knee point voltage acc. standard)
- I-kn (knee point current acc. standard)
- Ls (saturated inductance)
- Lm (non-saturated inductance)
- Ts (secondary time constant)
- Kr (remanence factor)
- εi(indirect error)
- ALF (accuracy limiting factor)
- ALFi (accuracy limiting factor indirect)
- Kx (dimensioning factor)
- Ek (accuracy limiting voltage)
- Ie (accuracy limiting current)
- E1 (user defined e.m.f.)
- Ie1 (excitation current @ E1)
- FS (instrument security factor)
- FSi (instrument security factor indirect)

j) *Measurement parameter in addition to all Standards*

- Residual Flux (residual flux in Vs)
- Residual magnetism (residual mag. in %)
- N (turns ratio)

2.4 Nameplate Guesser

The test set shall be able to evaluate Nameplate data from the measured data to support Nameplate indication if the nameplate data are not given or not readable.

a) Ipn (primary current)
b) Isn (secondary current)
c) Protection or metering (application)
d) Current transformer class according to IEC/IEEE Standard
e) Nominal burden value assigned to the current transformer class
f) Rct (secondary winding resistance)

g) Kssc (rated symmetrical short circuit current
h) Ktd (transient dimensioning factor)
i) Ts (secondary time constant)
j) Vb (rated secondary terminal voltage)

2.5 Analyze and Evaluate

The test set shall be able to support the user with additional functionality to analyze and evaluate the current transformer under test according to its specification and application.

a) Direct comparison of different excitation curves on equipment (GUI) and PC
b) Ratio error Matrix (table) over different primary current and burden levels on equipment (GUI) and PC
c) Phase displacement Matrix (table) over different primary current and burden levels on equipment (GUI) and PC
d) Comparison of the test results between nominal Burden assigned to the current transformers and actual burden connected to the current transformer

2.6 Assessment

The test set shall provide an automated Assessment of all class relevant parameters according to the relevant standard selected for the test. The test set shall indicate if one or more parameters are out of the limits defined by the standard.

2.7 Reporting

The test shall be able to deliver adequate tools to report the received results and allow the user to design own report sheets

a) Test files generated from the test equipment shall be protected for any manipulation
b) Test files changed or manipulated shall indicate this clear in the report
c) Test results shall be able to import into Microsoft® Word and Excel
d) Report templates shall be user customizable in terms of design and data content
e) Test preparation on a PC in advanced shall be possible

3. SW Specification

The test set must be operating on PC Software and shall be able to operate on actual Windows Software as well as on older versions to assure backwards compatibility.

The test set PC Software shall support the Operating systems : Windows XP or higher

4. Hardware Specifications

4.1 Hardware General

a) Front panel control with 6 inch graphical user interface – operation in bright sunlight has to be possible
b) PC control shall be possible. Software shall be provided to allow control of the test device via PC.
c) Data storage shall be on removable flash memory card
d) Outputs of the test device shall not be affected by interference on power supply
e) Rugged housing for outdoor use
f) The CT Tester shall be lightweight, weighing less than 25lbs (without cables and accessories)

4.2 Power Supply

a) Nominal input voltage: 100… 240 Vac, 1-phase
b) Permissible input voltage: 85 ... 264 Vac. Supply via a portable generator without ground connection shall be possible without any effect on specified accuracy.
c) Permissible frequency range. 45 … 65 Hz

4.3 Output Modes

a) Output current shall have a range of 0-5Arms (15A pk)

b) Output voltage shall have a range of 0-120Vac
c) Output power shall have a range of 0-400VArms (1500VA pk)

4.4 Measurement inputs (secondary)

a) Input shall have range of 0-0.3 / 3 / 30 / 300Vac (auto-ranging)
b) Input shall have an accuracy of better than 0.1%
c) Inputs shall be electrically insulated from other circuits

4.5 Measurement inputs (primary)

a) Input shall have range of 0-0.03 / 0.3 / 3 / 30Vac (auto-ranging)
b) Input shall have an accuracy of better than 0.1%
c) Inputs shall be electrically insulated from other circuits

4.6 Environmental Condition

A. Climate

a) The test device shall have an operating temperature range of -10°C to +50°C (14°Fto 122°F)
b) The test device shall have a storage temperature range of -25°C to +70°C (-13°F to 158°F)
c) The test device shall operate up to 2.000m (6.560 ft) altitude
d) The test device shall have an operating humidity range of 5% to 95% R.H. (non-condensing)
   i) Tested acc. to IEC 60068-2-78,
   ii) Cab, Damp Heat: Temp. 40°C (104°F), duration 48h,
   iii) Rel.humidity 95%

B. Shock and Vibration

a) Tested according to IEC 60068-2-6;
   i) frequency range 10 to 150 Hz; acceleration
   ii) 2g continuous (20 m/s2); 20 cycles per axis
b) Tested according to IEC 60068-2-27
   i) (operating mode); 15g / 11ms, half-sinusoid,
   ii) 3 shocks in each axis

c) *EMC – Emission*

The test device shall have valid certificate stating that it has satisfied the following standards:

a) Europe EN 61326-1 Class A
b) International IEC 61326-1 Class A
c) USA FCC Subpart B of Part 15 Class A

d) *EMC – Immunity*

The test device shall have valid certificate stating that it has satisfied the following standards:

a) Europe EN 61326-1
b) International IEC 61326-1

5. Quality& Sustainability

a) Manufacturer of test set shall be ISO9001 2008 certified
b) Type test report from vendor shall be made available on request
c) Manufacturer shall be ISO 14001 (environmental management system) certified
d) Manufacturer shall be OHSAS 18001 (Occupational Health- and Safety Assessment Series) certified

6. Documentation

a) Printed user manual shall be supplied
b) Electronic version of the user manual shall be supplied
c) Electronic version of remote interface description shall be supplied
d) Application notes shall be supplied

SCHEDULE - II

Guaranteed Technical Particulars for Current Transformer Analyser

A. GENERAL INFORMATION

1	Make	:
2	Model	:
3	Place of Manufacture	:
4	Applicable Standards	:
5	Input Power Supply and Range	:
6	Output Power Range	:
7	Display	:
8	Operating Software	:

B. GENERAL FEATURES:

A check-mark in the "Comply" column must only be made if there is complete compliance of the requirement.

Sl No	Items	Comply	Comment
1	**Ratio measurement and accuracy considering nominal and operative Burden :** 0.2 – 1 typ: 0,05% guaranteed 0,1% >1 – 2000 typ: 0,02% guaranteed 0,05% >2000 -5000 typ: 0,03% guaranteed 0,1% >5000 – 10000 typ: 0,05% guaranteed 0,2%	☐	
2	**Phase Displacement measurement accuracy considering nominal and operative Burden:** typ: 1 rad min. guaranteed 3 rad min.	☐	
3	**Secondary Winding Resistance Measurement** with range of 1mΩ to 3kΩ with accuracy better than 0.1%+1mΩ	☐	
4	**Primary Winding Resistance Measurement** with range of 1mΩ to 3kΩ with accuracy better than 0.1%+1mΩ	☐	
5	Secondary Burden Test with range of 1mΩ to 1kΩ with accuracy better than 1%	☐	
6	Remanence measurement in Vs and in % in reference to max. possible flux	☐	
7	Saturation measurement with graphical and tabular reporting, tests currents up to 15A pk, effective saturation voltage up to 30.000V and higher.	☐	
8	**Measurement parameter acc. IEC 60044-1 / 61869-2**		
	- V-kn (knee point voltage acc. standard)	☐	

	- I-kn (knee point current acc. standard)	☐	
	- Ls (saturated inductance)	☐	
	- Lm (non-saturated inductance)	☐	
	- Ts (secondary time constant)	☐	
	- Kr (remanence factor)	☐	
	- εi(indirect error)	☐	
	- ALF (accuracy limiting factor)	☐	
	- ALFi (accuracy limiting factor indirect)	☐	
	- Kx (dimensioning factor)	☐	
	- Ek (accuracy limiting voltage)	☐	
	- Ie (accuracy limiting current)	☐	
	- E1 (user defined e.m.f.)	☐	
	- Ie1 (excitation current @ E1)	☐	
	- FS (instrument security factor)	☐	
	- FSi (instrument security factor indirect)	☐	
9	**Measurment parameter acc. IEC 60044-6 / 61869-2**		
	- Rct (secondary winding resistance)	☐	
	- Kssc (rated symmetrical short circuit current)	☐	
	- V-al (accuracy limiting voltage)	☐	
	- I-al (accuracy limiting current)	☐	
	- E-max (maximum e.m.f. voltage)	☐	
	- εpeak(peak instantaneous error)	☐	
	- Ktd (transient dimensioning factor)	☐	
10	**Measurment parmeter acc. IEEE C 57.13 / C57.13.6**		
	- V-kn (knee point voltage acc. standard)	☐	
	- I-kn (knee point current acc. standard)	☐	
	- Ls (saturated inductance)	☐	
	- Lm (non-saturated inductance)	☐	
	- Ts (secondary time constant)	☐	
	- Kr (remanence factor)	☐	
	- RCF (ratio correction factor)	☐	
	- TCF (transformer correction factor)	☐	
	- Vb (rated secondary terminal voltage)	☐	
11	***Measurement parameter in addition to all Standards***		
	- Residual Flux (residual flux in Vs)	☐	
	- Residual magnetism (residual mag. in %)	☐	
	- N (turns ratio)	☐	
12	Plot excitation graph and calculation of knee-point according to IEC 61869-2 / IEC 60044-1 / IEC 60044-6 / IEEE C57.13	☐	
13	Automatic Class Assessment - **according to IEEE C 57.13** for class C, K, T, PX (protection class) and for class 0.3, 0.6, 1.2 (metering class).	☐	
	- **according to IEEE C 57.13.6** for class 0.15, 0.15S (high accuracy metering class)	☐	

	- **according to IEC 60044-1** for class 0.1, 0.2, 0.2S, 0.5, 0.5S, 1, 3, 5 (metering class) and for class P, PR, PX (protection class)	☐	
	- **according to IEC 60044-6** for class TPS, TPX, TPY, TPZ (protection class considering transient behavior)	☐	
	- **according to IEC 61869-2** For class 0.1, 0.2, 0.2S, 0.5, 0.5S, 1, 3, 5 (metering class) and for class P, PR, PX (protection class) and for class TPX, TPY, TPZ (protection class considering transient behavior)	☐	
14	**Test Reporting**		
	Test files generated from the test equipment shall be protected for any manipulation	☐	
	Test files changed or manipulated shall indicate this clear in the report	☐	
	Test results shall be able to import into Microsoft® Word and Excel	☐	
	Report templates shall be user customizable in terms of design and data content	☐	
	Test preparation on a PC in advanced shall be possible	☐	

SECTION - III

Technical Specification for Circuit Breaker Operational Analyser with at least one Channel DCRM

1. Scope:

This specification covers the technical requirements for a portable Circuit Breaker Operational Analyser with all associated accessories for testing and measuring HV and LV Circuit Breakers parameters. The test set must be designed for measuring parameters such as contact timings of Main/ PIR & Auxiliary contacts, Close/Trip Coil Current characteristics and Static Contact resistance of R, Y & B poles simultaneously. The test set must be accompanied with a TFT touch screen display for direct view of the test result in graphical as well as numerical form and must be possible to print the graph on built-in thermal printer or download record to PC for further analysis on software.

2. General Requirement:

2.1) The analyzer should be required to measurement health of circuit breakers up to 400kV.

2.2) The analyzer shall have the features of system configuration, rugged data acquisition and signal condition hardware, user friendly, windows based Graphical user interface

2.3) The analyzer should be adapted for outdoor use and should be possible to run stand alone.

2.4) The analyzer should be able to measure & store parameter:

a. Timing of Main Contact of all three phase up to two breaks per phase, simultaneously. Result should be presented as traditional timing measurement.
b. Timing of PIR (Pre-insertion Resistor Contacts) of 25 Ohm to 10 k Ohm with Main Contact measurement.
c. Timing of auxiliary contact.
d. It is possible to measure Static resistance measurements in same hook up with same kit.
e. Dynamic Contact Resistance of main & arcing contact with 100A DC each.
f. Motion Measurement
g. Coil current measurement separately for 3 phase
h. Breaker Operation
    i. Close
    ii. Open
    iii. Close- Open
    iv. Open-Delay-Close
    v. Open-Delay-Close-Open

2.5) It should be supported by Microsoft Windows based software for handling measurement data & analysis.

2.6) The hardware & software shall be portable and installed in another PC of similar configuration. The supplier shall assure that he will support in any such event where change of PC arise.

2.7) The analyzer should have inbuilt display or other facility to observe & validate the measurement taken at site itself, otherwise it will supply with laptop for interfacing.

2.8) Printing of test report should be possible on any printer with its driver loaded in window.

2.9) The system shall have electrical safety featuring complying IEC 61010-1 and EMC as per IEC: 61326-1.

3. Technical Parameters:

3.1) Power Specification :

Input Supply:230V AC ± 10%, 50HZ ± 5%

3.2) Measuring Ranges:

a. GENERAL

Trigger Operations : Open, Close, C-O,O-C,O-C-O

Sampling Speed : 1KC to 20KC – Selectable

Trigger : Internal through build in software/ hardware

Display : Monitor of laptop or in Build at least 5" diagonally LCD display

Test Leads : Suitable for circuit breaker testing

b. CONTACT TIMING MODULE

Configuration : Isolated channel for timing of 6 Main + 6 PIR + 4 Auxiliary Contacts

Resolution : 0.05 mSec at 20KC

Accuracy : Value ± 0.05%±resolution

Isolation : 2KV between two channel & channel to earth

Power : DC, Internally derived

c. CONTROL MODULE

Configuration : 3 Solid state 'NO' contracts rated at 25A/ 250V, DC for issuing commands to the breaker. Over current protection inbuilt.

Allotted for : 1 each for CLOSE & TRIP1 & TRIP2 commands

Switching: Within 50 µSec

Isolation : 2KV between two channels and between channels & earth

Power : internally derived

d. ANALOG INPUT MODULE

Configuration : Two for CLOSE/ TRIP1 or TRIP2 coil currents, signal conditioning inbuilt. Programmable gain selection for maximum amplification.

i. Current Range : 0 to 25 Amps. User selectable

Resolution : 8 bit

Accuracy : Value ± 1% ± resolution

Isolation : 2KV between two channels and between channels & earth

Configuration : One for closing/ tripping speed and mechanism travel, signal conditioning inbuilt, automatic gain/ offset selection for maximum amplification. Excitation source for transducer inbuilt (5V DC)

i. Resolution : 8 bit

ii. Accuracy : Value ± 1% ± resolution

iii. Isolation : 2KV between two channels and Channels & earth

e. DCRM CHANNEL

Configuration : 1 Channel each for resistance & test current measurement of circuit breaker single pole contact.

ii. Range : 1000 to 10000 μO

iii. Current Range : 1 X 100A DC

iv. Resolution : 8 bit

v. Accuracy : Value ± 1% ± resolution

3.3) Transducer with fixture Suitable for breakers

ABB : 132, 66 and 33 KV SF6, Vacuum type and Air Pump.

Crompton Greaves : 132, 66 and 33 KV SF6, Vacuum type and Air Pump.

AREVA : 132, 66 and 33 KV SF6.

3.4) Environment

i. Temperature : -5 oC to +50 oC

RH : 5% to 90% non condensing

3.5) Dimension :

The test set dimension should be such that it can be easily transported to any site via four wheeler jeep like vehicles. The kit also should also be transported easily in internal yard.

3.6) Shocks & Vibrations :

The kit shall be used for testing of vacuum bottle at various locations in GETCO substations. The kit will therefore be required extensive transportation by road, making it prone to shocks & vibration and its performance should not be affected in any way. This is very important feature and hence relevant type test satisfying relevant IEC/IS should be got conducted in accredited national lab and test certificate should be attached for the same.

SCHEDULE – III

Guaranteed Technical Particulars for Circuit Breaker Operational Analyser with at least one Channel DCRM

The GTP is to be filled up in this format and, in the page of Tender Specification only, to be submitted in duplicate along with the offer. This is intended for speedy comparison of various bidders GTP. The tenderer shall fill in the particulars against appropriate items in respect of each rating and type of equipment offered in the broad categories listed below:

1	**Maker's Name**	
2	**Type and Model of Instruments**	
3	**POWER SPECIFICATION**	
4	**Input**	
5	**MEASURING RANGES**	
A	**General**	
	a) Trigger Operation	
	b) Sampling Speed	
	c) Internal Trigger (Yes/ No)	
	d) Display Size (Diagonally)	
	e) Test Leads (Size & Nos)	
B	**Contact Timing Module**	
	a) Channel Configuration	
	b) Resolution	
	c) Accuracy	
	d) Isolation	
	e) Accuracy	
C	**Control Module**	
	a) Channel Configuration	
	b) Allotted For	
	c) Switching Time	
	d) Isolation	
D	**Analog Input Module**	
I)	Measurement of Close/Trip Coil Current	
	a) Channel Configuration	
	b) Current Range	
	c) Resolution	
	d) Accuracy	
	e) Isolation	
II)	Measurement of Mechanism speed, travel	
	a) Channel Configuration	
	b) Resolution	
	c) Accuracy	
	d) Isolation	

III)	DCRM Channel	
	a) Configuration	
	b) Range	
	c) Current injection	
	d) Resolution	
	e) Accuracy	
5	Safety: Provision for testing of CB with dual grounding (Yes/No)	
6	Transducer Provided (Mentioned type)	
	a) ABB : 132, 66 and 33 KV SF6, Vacuum type and Air Pump.	
	b) Crompton Greaves– : 132, 66 and 33 KV SF6, Vacuum type and Air Pump	
	c) AREVA : 132, 66 and 33 KV SF6.	
7	Kit Warm Up Time to comply parameter as per specification	
8	LIST OF ACCESSORIES	
9	ENVIRONMENT	
	a) Temperature	
	b) RH	
10	COMPITABILITY WITH EMI/EMC AS PER RELEVANT IEC. CERTIFICATE TO BE SUBMITTED	
11	CE-Marking available (Yes/ No)	
12	OTHER	
13	Dimension	
14	Weight (Including Accessories)	
15	GURANTEE/WARRANTY OFFERED	
16	ANY OTHER RELATED INFORMATION TO FURNISH	

Technical Specification for Handheld Meter Testing Equipment:

1.0 Scope:

This specification covers the technical requirements for a Handheld Meter Testing Set (MTS) with all associated accessories for online and offline testing of System Meters installed power Sub-Stations. This test set shall measure and test single phase as well as three phase meters, at different voltage levels. The tests shall be performed automatically with a single-connection, and provide automatic assessment on whether the equipment under test meets the nameplate specifications and accuracy class standard. All specifications are required and should be met as specified in this and subsequent para and in GTP. Any deviations from the Technical Specification or exceeds must be clearly identified and described.

The manufacturer of the test equipment shall have long time experience in high voltage applications and measurement equipment for these applications. The test set shall be field proven and in the market for at least five years. Customer references shall be shown on request.

The vendor shall be able offer training sessions for the test equipment at the customer side or at the vendor locations.

The Testing Set shall be suitable to test energy meters under the following conditions.

S.No.	Parameter	Range
1.	Voltage Reference	Upto 700Vrms
2.	Frequency	50 Hz ± 5 %
3.	Power Factor	Zero Lag -Unity - Zero Lead

2.0 Climatic Conditions :

The equipment to be supplied against this specification shall be compatible for EMI / EMC / Safety environment requirements should be capable of performing and maintaining the required accuracy for satisfactory operation under all tropical conditions mentioned below:

S.No.	Parameter	Range
1.	Maximum ambient temperature	50 º C
2.	Minimum ambient temperature	-5 º C
3.	Maximum ambient air temperature in shade	45 º C
4.	Average daily ambient temperature	40 º C

5.	Maximum relative humidity	95%

3.0 Technical Requirements:

3.1. All the materials, electronic and power components ICs used in the manufacturing of the reference standard meter shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy

3.2. The electronic components shall be mounted on the PCB using latest surface mount technology (SMT).

3.3. The MTS shall be of rugged construction, lightweight and shall be of portable, handy and compact type. It shall have ergonomic design

3.4. The MTS shall be suitable for laboratory and field testing of three phase HT meter as per relevant standard

3.5. An error calculator shall be incorporated in the MTS which shall have facility to calculate error in percentage of meter under test by feeding the meter constant and number of revolutions / pulses for which meter was tested with MTS, through the inbuilt key board

3.6. The equipment shall have suitable facility for input of data such as a key-pad/touch screen preferable.

Item	**Range**	**Accuracy**
Voltage	10～700Vrms	±0.3%
Current	Optional for 20A, 60A, 100A, 500A and 1000A CT	±0.3%
Frequency	40～70Hz	±0.01Hz
Phase	0～360°	±0.5°
Active power	-----	**±0.5%**
Reactive power	-----	±1.0%
Active energy	------	±0.5%
Reactive energy	------	±1.0%
Power factor	0.00～1.00	±1.0%
Harmonics	Volt harmonics: 1～50	Volt harmonics: ±0.01(%f)
	Current harmonics:1～50	Current harmonics: ±0.5%
Impulse constant	FL=36000×(5/I_e)P/kW	I_e: CT range

Resolution shall be as follows-

Current	10mV
Voltage	10mA
Power	0.01kW
Energy	0.01kWh

The system shall be suitable for testing both LT and HT meters. The MTS should be hand held. MTS should be battery operated as well as can be powered through mains supply. Online test without

disconnecting the meter circuit should be possible with the MTS. For this correct clamps and other accessories shall be provided by the supplier for successful testing of the meters in online condition.

Meter Testing Set should be suitably type tested in NABL accredited lab for different parameters as per relevant IEC 60068 / IS 9000 Standard. Type test report shall be submitted along-with the bid.

3.7.The MTS should be able to perform following task-

Meter Testing	1. Three phase metering unit 2. Three phase power meter 3. Single phase metering unit 4. Single phase power meter 5. High –volt power meter
Online monitor	1. Test active energy, reactive energy, Power factor in low-volt with load 2. Active energy, reactive energy, Power factor of power meter in different voltage rate.
Wiring Check	Can detect and display wrong connections
Harmonics Measurement	Can measure harmonic components in voltage and current up to 50^{th} order

4.0 Software :

MTS shall be supplied along with PC software. The software shall be suitable for downloading the test results into PC having windows operating system or through Pen drive using USB port.

5.0 Guarantee:

Warranty / Guarantee period: Minimum 01 year from the date of successful & complete commissioning at sub-station.

All the materials, including accessories, cables, laptops, etc. are to be covered under warranty / guaranty period.

6.0 Calibration Certificate:

Unit shall be duly calibrated before supply and the date of calibration shall not be older than two month from the date of supply of kit. The calibration certificate should have traceability to NPL or any NABL accredited Laboratory.

SCHEDULE – IV

Guaranteed Technical Particulars

for Handheld Meter Testing Equipment

C. GENERAL INFORMATION

1	Make	:
2	Model	:
3	Place of Manufacture	:
4	Applicable Standards	:
5	Input Power Supply and Range	:
6	Output Power Range	:
7	Display	:
8	Operating Software	:
9	Voltage Reference	:
10	Frequency	:
11	Power Factor	:
12	Weight and Dimensions	:

D. GENERAL FEATURES:

Item	**Range**	**Accuracy**
Voltage		
Current		
Frequency		
Phase		
Active power		
Reactive power		
Active energy		
Reactive energy		
Power factor		
Harmonics	Volt harmonics: 1～50	
	Current harmonics:1～50	
Impulse constant		

SCHEDULE-V

SCHEDULE OF PRICES FOR TESTING EQUIPMENTS (to be filled in by Tenderer)

Sl.No	Item Description	Unit	Approx. Qnty	Price for each unit	
				Total Unit Price inclusive of taxes & duties	Total Landing Price inclusive of taxes & duties
				(Rs.)	(Rs.)
1	**2**	**3**	**4**	**5**	**6 = 4 x 5**
1	Primary Current Injection Test Kit				
2	Current Transformer Analyser				
3	Circuit Breaker Operational Analyser with at least one Channel DCRM				
4	Handheld Meter Testing Equipment				

Total amount in Words
Rupees……..……
……...…only

Signature of Tenderer along with Seal & date
:

Note:

1) Any column left blank shall be treated as NIL / Inclusive of.
2) Unit price under Column-12 is inclusive of all.
3) In case of discrepancy between unit price and total price, the unit price shall prevail over the total price.