

**TSGENCO
1 X 800 MW KOTHAGUDEM TPS**

**TECHNICAL SPECIFICATION FOR
ELECTRICAL LAB EQUIPMENT
(CALIBRATION & DIAGNOSTICS)**

SPECIFICATION NO.: PE-TS-410-556-E002, REV. 00



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NOIDA, 201301**

	1X800 MW KOTHAGUDEM TPS TECHNICAL SPECIFICATION FOR ELECTRICAL LABORATORY EQUIPMENTS (CALIBRATION & DIAGNOSTICS)	Doc. No. PE-TS-410-556-E002	
		Volume	Section
		IIB	
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Section

I

COMPLIANCE CERTIFICATE

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COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.
2. There are no deviation with respect to specification other than those furnished in the 'schedule of deviations'.
3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in Annexure-A [BOQ-Cum-Price schedule] of the specification shall not be considered (i.e., technical description & quantities as per specification shall prevail).
6. All essential accessories for each electrical laboratory equipment required for testing various electrical equipment /devices during Commissioning, Operation and Maintenance of power plant to be ensured by bidder in their offer.

BIDDER'S STAMP & SIGNATURE

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1.0 SCOPE

- 1.1 Design, manufacture, inspection and testing at manufacturer's work, proper packing and delivery to site of Electrical Laboratory Equipment as mentioned in different sections of this specification.
- 1.2 General technical requirements of the Electrical Laboratory Equipment are indicated in Section – II. Project specific technical requirements/changes w.r.t. Section-II are listed in section-I.
- 1.3 Electrical Laboratory Equipment shall be supplied along with all essential accessories required for the successful operation of the equipment.
- 1.4 Detailed technical parameters of Electrical laboratory equipment are listed in Annexure – I of Section-I.
- 1.5 Inspection & Testing of Electrical laboratory equipment are listed in Annexure – II of Section-I.
- 1.6 QA Specific requirements of Electrical laboratory equipment are listed in Annexure – III of Section-I.
- 1.7 The requirement of Section-I shall prevail and govern in case of conflict between the corresponding requirements of Section-I and section-II.

2.0 BILL OF QUANTITIES

Quantity requirement shall be as per 'BOQ cum price schedule' enclosed in NIT.

3.0 SPECIFIC TECHNICAL REQUIREMENT

S.No.	Reference Clause No. of Section-II	Specific Requirement/Change
1.	4.1	Clause 4.1 to be read as follows: "All equipment to be tested as per latest edition of relevant standards. Further, testing shall include verification of physical, functional & technical parameters of equipment & accessories, in line with approved datasheet. Further, refer ANNEXURE-II OF SECTION-I (INSPECTION & TESTING) and ANNEXURE-III OF SECTION-I (QA SPECIFIC REQUIREMENTS) for inspection & testing requirements".
2.	1.6	Refer Note No.1 of Annexure-I of Section-I (DETAILED TECHNICAL PARAMETERS)
3.	1.8	Refer Note No.1 of Annexure-I of Section-I (DETAILED TECHNICAL PARAMETERS)

4.0 DRAWING & DOCUMENTS TO BE SUBMITTED

- 4.1 Following documents/drawings for each Electrical Laboratory Equipment shall be submitted after placement of order for BHEL & customer's approval in addition to the documents/drawings listed in clause No. 8.2 of section-II:

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S.NO.	ITEM DESCRIPTION	Document no. of Technical Datasheet	Document no. of Technical Catalogue
1	Portable HV AC Test Set	PE-V0-410-556-E003	PE-V0-410-556-E035
2	Portable Primary & Secondary Current Injection Test Kit with Separate Control & Loading Units	PE-V0-410-556-E010	PE-V0-410-556-E042
3	Precision Digital Multi-meter	PE-V0-410-556-E013	PE-V0-410-556-E045
4	Portable High Voltage/Live Line Detector	PE-V0-410-556-E024	PE-V0-410-556-E056
5	HV Discharge Rod & Portable Earthing Equipment	PE-V0-410-556-E028	PE-V0-410-556-E060

4.2 The requirement of copies of Drawings/Documents for projects is as detailed below:

S.NO.	DESCRIPTION	NOS.(HARD COPY)	SOFT COPY (Through DMS)	CD ROM
1.	All Drgs./docs.- First submission/resubmission	-	YES IN PDF	-
2.	Docs. / drgs. for approval (Second & subsequent submission till approval)	-	YES IN PDF	-
3.	Final Drgs./docs. after approval for distribution purpose	10	YES IN PDF	1

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ANNEXURE-I OF SECTION-I
DETAILED TECHNICAL PARAMETERS

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ITEM No.	ITEM DESCRIPTION	QTY.	UNIT
1	Portable HV AC Test Set	1	No.
a)	An epoxy cast / oil filled, single phase, 50-200KV/240V, 5KVA(continuous with duty cycle 1hr ON / 1 hr OFF) and 10KVA (5 minute) rated low discharge transformer with maximum discharge level of 10 PC mounted in a steel tank fitted with swivel castor wheels, HV bushing.		
b)	A control unit with microprocessor based automatic control (programming key pad) / manual control, with digital display analog / digital ammeter & voltmeter, trip pushbutton, safety protections etc.		
c)	A zero interlock circuit shall be provided to prevent energization of HV output on less voltage control is set to zero. Necessary power & metering cables, removable earth link fuses etc. shall be provided.		
2	Portable Primary & Secondary Current Injection Test Kit with Separate Control & Loading Units	1	No.
	Control Unit		
	Current Output: 0-20A/0-50A (cont.) 0-50A/0-100A (up to 1 min)		
	Voltage Output: 0-230V/300V		
	Current & Voltage Measurement : By true RMS, Digital/Analog meters		
	Timing Units Range:0 – 999.9 Sec.		
	Power supply : 230V ±10% 1-Phase		
	Digital Display		
	Loading Unit		
	Ranges:0-3000A in various steps		
3	Precision Digital Multi-meter	1	No.
	7½digit precision multi-meter, having a large 24-digit display, a bar graph function allowing user programming of high and low pass/fail limits, audible & visual indication of component specification and Auto Dynamic Filter (ADF) to enable automatic selection of suitable filter.		
	Input Power: 110/220/240V AC 50 Hz		
	DC Voltage Measurement Range: 3 mV to 10 KV.		
	DC Current Measurement		
	Range: 3 µA to 30A		
	Resistance		
	Resistance Measurement: 30 meg ohm to 1 G ohms		
	Frequency		
	Measurement: 1 Hz to 100 KHz		

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	AC Voltage		
	Measurement: 3mV to 3 KV		
	AC Current		
	Measurement: 3 Micro Amp to 30A		
	Capacitance		
	Measurement: 0-300 Microfarad		
	Special Features: Self Test, Diode/Zener Test, Max/Min functions, continuity testing AC/DC coupled facility count down and sample beep on long filter periods.		
4	Portable High Voltage/Live Line Detector	1	No.
	Electronic type, giving audio-visual indication for presence of voltage/charge. Having in-built self-diagnostic check feature. Insulating stick shall be class 'F' insulated		
	Measuring range offered should be in single or combination covering 6.6V to 300KV with permissible voltage variation.		
5	HV Discharge Rod & Portable Earthing Equipment. Measuring range offered should be in single or combination covering 6.6V to 400KV with permissible voltage variation.	2	No.
	Equipment Class 'F' insulated. Having non-linear carbon film resistor.		

Note: 1. For all Laboratory instruments the Customer approved makes or equivalent Indian makes are as mentioned below:

- Megger (UK) or equivalent Indian makes
- Tinsley (UK) or equivalent Indian makes
- Vettiner (France) or equivalent Indian makes
- Fluke (USA) or equivalent Indian makes
- Omicron or equivalent Indian makes
- Doble or equivalent Indian makes
- Kusem Mecro or equivalent Indian makes
- Shivananda or equivalent Indian makes
- Motwane or equivalent Indian makes
- AE or equivalent Indian makes
- Haefely (Switzerland) for Item No.1 above or equivalent Indian makes

Bidder to quote as per Technical Specification requirements among above 11 Customer approved makes or any other equivalent Indian makes.

For all Laboratory instruments mentioned in ANNEXURE-I OF SECTION-I (DETAILED TECHNICAL PARAMETERS) & BOQ-CUM PRICE SCHEDULE (ANNEXURE-A), bidder to quote 'one or more' make/model best to suit specification

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requirement. Offers with any of the Customer approved makes as mentioned at Note. No.1 above shall be considered for evaluation. Further, any make of equipment quoted by bidders different from the makes mentioned at Note No.1 above shall be subject to the approval of BHEL/BHEL's customer and offers with makes acceptable to BHEL/BHEL's customer only shall also be considered for evaluation. Bidders to make their offers accordingly.



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ANNEXURE-II OF SECTION-I

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ANNEXURE-II
INSPECTION & TESTING

The minimum quality assurance plan/test of various Electrical Laboratory Instruments and their accessories is listed below. However, Bidder shall conduct any of her tests/inspection required at the manufacturer's works to ensure that the equipment being supplied shall conform to the requirement of this specification and other applicable standards and codes. The detail of checks to be carried out in various stages of manufacturing and erection of various items of the system shall be submitted to Owner's approval in the form of quality assurance plans, field quality plans and Test procedure as applicable.

Bidder has to ensure that the proposed bought out makes have proven track record. Bidder to submit the proposal of sub vendors of bought outs for Owner's approval along with their offer and no deviation with regard to approved sub vendors shall be acceptable.

The general quality assurance requirements as detailed in this technical specification (Annexure-III) shall be necessarily complied with.

The testing and inspection requirements shall be in line with technical specifications and other related standards. And no deviation in this regard is acceptable.

Material tests like physical, chemical and functional test on various components being used shall be done as per relevant standards. Manufacturer's test certificates shall be submitted for all those tests for the review and approval of Owner.

All raw materials including the bought out shall be subjected to bidders inspection/ TC review as per their procedure / approved QAP for total compliance. The same shall not be limited to mechanical, physical, electrical, operational, aesthetic and functional checks but shall confirm to the best engineering practice and strict adherence to the specifications and standards. Bidders QAP shall indicate all such tests and procedures.

The in process checks for various components shall confirm to the bidders internal procedures which shall confirm to best manufacturing practices, national and international standards. QAP shall reflect all such tests/ standards and procedures in detail. Internal test records / test reports shall be produced to Owner as required.

Type test certificates for all items in – line with the relevant standards and technical specifications shall be submitted for Owner's review and approval.



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ANNEXURE-II OF SECTION-I

SHEET 2 OF 3

Flammability and explosion proof equipment shall be of type tested design. Necessary certificates demonstrating this for similar item/equipment shall be submitted during bid.

All the tests mentioned herein shall be applicable to spares also.

The Bidder shall provide all test and maintenance equipment required at the site in duly calibrated condition.

The Bidder shall perform all the applicable tests in accordance with the latest revisions of pertinent codes.

For equipment not covered by these codes the Bidder shall apply his standard factory tests.

However Test procedures for these standard tests shall be prepared by the Bidder and shall be submitted for The Owner's review at least prior to the scheduled test. The tests shall be conducted, reported and certified by the Bidder.

All routine and acceptance tests shall be conducted on various components as applicable for the offered instruments. Acceptance and type tests shall be conducted as per applicable standards.

Bidder shall conduct Preliminary system testing and burn-in testing (where ever applicable) as per the approved test procedure.

Bidder shall obtain all statutory requirements required for the operation of the Instruments in a power plant.

The manufacturer, prior to system assembly shall functionally test all electronic modules and components, used within the system as per relevant standards and specific requirement clauses mentioned in this specification and approved test procedure.

Calibration certificates clearly establishing the calibrating instruments traceability to national / International standard acceptable to client shall be submitted along with. All Primary standard test instruments used for Calibration shall be calibrated by instruments confirming to the above criteria and the same shall be demonstrated by the bidder to the complete satisfaction of Client.



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ANNEXURE-II OF SECTION-I

SHEET 3 OF 3

Initial checks like mechanical assembly checks harness connection checks shall be conducted by the bidder.

All painted surfaces shall be tested for shade, finish and DFT as per specifications.

TYPE TESTS

Bidder to submit the Type test certificates for the type tests (as per technical specifications and other applicable standards) conducted on similar equipment, which is not older than five years to the review and approval of Purchaser. However if these certificates are not acceptable to purchaser, bidder may have to repeat these type tests in presence of Purchaser. There shall be no delivery and cost implications to BHEL/Owner on account of these type tests.

SITE TESTS

The performance tests and calibration tests shall be conducted at site to demonstrate guaranteed performance and rectification of all defects shall be done satisfactorily. If any equipment fails to meet the guaranteed performance, the performance test shall be repeated after rectifications / replacements are made till guaranteed performance is demonstrated satisfactorily by the Bidder. The Bidder in the presence of the BHEL/Owner or his representative shall conduct the performance test.

All tests shall be carried out as per relevant codes and standards and as specified in the data sheet.

ANNEXURE-III OF SECTION-I

QA - SPECIFIC REQUIREMENTS

Sl. No.	Item	Make	Model	Type	Range	Rating, accuracy & resolution	Functional checks	Calibration checks	Completeness with all accessories	Compliance to specification requirements
1	Portable HV ac Test Set	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Portable Primary & Secondary Current Injection Test Kit	Y	Y	Y	Y	Y	Y	Y	Y Y	
3	Precision Digital Multimeter	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	Portable High Voltage/Live Line Detector	Y	Y	Y	Y	Y	Y	Y	Y	Y
5	HV Discharge Rod & Portable Earthing Equipment	Y	Y	Y	Y	Y	Y	Y	Y Y	

Note:

1. All instruments shall be supplied with Guarantee and warranty certificates, user manuals and applicable catalogues (English language).
2. Calibration certificates clearly establishing the calibrating instruments traceability to national/ International standard acceptable to BHEL/client shall be submitted along with.

3. Compliance to various standards as mentioned in the Technical specification shall be ensured in totality without any deviation.
4. All original software supporting the instruments shall be provided to the owner with user / upgrading rights.
5. Transformers tests in line with the applicable standards shall be done and certificates submitted. Microprocessor shall also be subjected to routine and acceptance tests as applicable.
6. Interface port for PC/printer shall be checked / tested.
7. Printer connectivity/In Built Printer and Battery shall be checked for functional requirements.
8. Tested for EMI & EMC as per relevant standards.
9. Remote interface check.
10. Memory and Interface checks.
11. Special Features as indicated in the specification shall be checked for compliance.
12. Loading time check.
13. Sensitivity check.
14. Software check.
15. Thermal Sensitivity and Battery checks.
16. In-built self- diagnostic check and Class of Insulation checks.
17. Minimum tooling check.
18. Insulation, self check and carrying case.
19. Visualization and communication protocol compliance



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SECTION-II

STANDARD TECHNICAL SPECIFICATION

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LABORATORY EQUIPMENTS**

1.0 TECHNICAL REQUIREMENTS

- 1.1 Basic technical requirements for Electrical Lab Equipment shall be as indicated in this section, in addition to technical requirements specified in Section-I.
- 1.2 The intent of specification is not to specify herein all the details of design and manufacture. However, the equipment shall confirm in all respect to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation up to vendors guarantee.
- 1.3 The Bidder may note that the equipment range, rating, quantities as detailed herein, are the minimum requirement only. All accessories for the equipment not covered here, if necessary for satisfactory and trouble free operation of the equipment, shall be quoted by the Bidder.
- 1.4 The instrument shall be suitable for satisfactory operation at an ambient temperature from 0°C to 55°C.
- 1.5 The Analog instruments shall be provided with knife-edge pointer and anti – parallax mirror.
- 1.6 The Bidder to quote only ‘one’ make/model against each equipment best to suit specification requirement.
- 1.7 The instrument shall be suitable for hand held operation, rugged in construction and suitable for field use.
- 1.8 All the equipment components shall be procured from reputed manufacturers and make of equipment shall be subject to the approval of BHEL/ BHEL’s Customer.
- 1.9 **Bidder to note that "In case any offered make / model becomes obsolete or is stopped manufacturing by manufacturer, next higher model of the same make may be considered for ordering / supply at contract stage, without any price implication. In such cases, bidder is required to furnish valid confirmation letter from OEM as proof of change of model (citing reason: obsolete technology or stopping of manufacturing with date of effect) and that the offered model is “technically equivalent or better”.**

2.0 CODES AND STANDARDS

Some of the standards, which shall generally be followed, are listed below. Other applicable relevant standards for any component part, even if not covered in listed standards shall be followed.

- i) IS – 6103 Method of test for specific resistance (resistivity) of electrical insulating fluid.
- ii) IS – 6700 Requirements of general purpose Cathode Ray Oscilloscope.
- iii) IS – 722 Specification for AC electricity meters.
- iv) IS – 8143 Specification for plugs & keys for resistance boxes.
- v) IS – 6104 Method of test for interfacial tension of oil against water.
- vi) IEC-51 Direct acting indicating analogue electrical measuring instruments and their accessories.

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vii) Any other relevant National/ International standards as mentioned in Section-II with technical specification.

3.0 DESIGN CRITERIA:

- 3.1 Electrical Laboratory Equipment shall be used for metering, testing, calibration, diagnostics etc. of various electrical equipment/ devices during Commissioning, Operation and Maintenance of power plant.
- 3.2 The Equipment will be kept in a clean but hot, humid and tropical atmosphere when not in use. Equipment will be placed in dust laden, hot, humid atmosphere during its use.
- 3.3.1 For continuous operation at specified rating, temperature rise of various equipment/ components shall be limited to the permissible value stipulated in the relevant standards and this specification.

4.0 TEST REQUIREMENTS:

- 4.1 All equipment to be tested as per latest edition of relevant standards. Further, testing shall include verification of physical, functional & technical parameters of equipment & accessories, in line with approved datasheet.
- 4.2 The tests shall be carried out by the vendor at in-house lab/ OEM lab/ Third party govt. accredited lab. Charges for all these tests shall be deemed to be included in the bid price.
- 4.3 Vendor to furnish test report to BHEL for review/ acceptance. BHEL/BHEL's customer may witness the testing of equipment.

5.0 PACKING:

All equipment shall be properly packed in Galvanized sheet steel trunk/ box with proper lock & key arrangement except for equipment which are trolley mounted or are already available in rugged steel/wooden box packing. Further, any damage (reading error/calibration error/broken parts/missing parts etc.) found on receipt at site, leading to replacement of parts/whole item, shall be to bidder's account.

6.0 DEMONSTRATION TO BHEL / BHEL'S CUSTOMER

- 6.1 The vendor shall be responsible for demonstration of the supplied equipment at site, conforming the satisfactory operation.
- 6.2 The equipment for which demonstration is required at site shall be intimated by BHEL at contract stage.
- 6.3 The charges for visit to site for demonstration at site shall be in-line with Annexure- I of Section-II.

7.0 PERFORMANCE GUARANTEE

The bidder shall guarantee that the equipment offered shall meet the requirement as stipulated in this specification and as confirmed by them in Technical Data Sheet. In case the performance of equipment is not as per performance guarantee, the bidder will have to replace the equipment at site free of cost.

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8.0 DRAWING DATA & MANUAL

8.1 To be submitted with the bid as technical offer:

- a) Data Sheet – B (as enclosed) indicating compliance to Technical parameters of various equipment as specified in Annexure-I of Section-I.
- b) Technical leaflets/ Catalogues/Product Manual of the Equipment

The Bidder may note that the drawing, data and manual listed herein are minimum requirement only. The Bidder shall ensure that the other necessary write-ups, curves and information required to fully describe the equipment are submitted with the bid.

8.2 Following documents/drawings shall be submitted after placement of order for BHEL & customer's approval:

- a) Technical Datasheet for each equipment
- b) Technical leaflets/ Catalogues/Product Manual of the Equipment
- c) Tests Reports and calibration certificate
- d) General arrangement drawing showing constructional features, accessories, connections, range and rating, mounting arrangement, space requirement etc.
- e) Detail instructions for application, assembly & testing of equipment.
- f) Wiring and schematic diagrams (if applicable).
- g) Instruction manual/ O&M manual of individual equipment

8.3 Instruction manual/O&M Manual of individual equipment

The manual shall clearly indicate in English the installation and connection method, check list of the tests to be carried out before commissioning of equipment. Maintenance and Calibration method shall also be provided in the manual.

8.4 Bidder to furnish all user instruction manuals, maintenance, handling, installation manuals & all test reports complete in all respect in bound volumes & soft copies to BHEL / BHEL's customer at the time of handing over the same to BHEL / BHEL's Customer.

8.5 Bidder to note that quoted item cost shall include cost of main item, cost of all accessories required for successful operation of equipment and testing cost of all equipment test as per relevant standard.

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	<u>ANNEXURE-I OF SECTION – II</u> <u>DEMONSTRATION & HANDING OVER CHARGES</u>	Rev. : 00 DATE-15.06.2019	

**SCHEDULE OF PRICES FOR DEMONSTRATION & HANDING OVER TO
BHEL / BHEL'S CUSTOMER**

SL. NO.	DETAILS	ACTIVITY	UNIT CHARGES
1	LUMP SUM ALL INCLUSIVE CHARGES PER VISIT FOR EXPERIENCED / CAPABLE ENGINEER (EXCEPT DAILY CHARGES)	1 VISIT	20000/-
2	LUMP SUM ALL INCLUSIVE CHARGES FOR EXPERIENCED / CAPABLE ENGINEER PER DAY	1 DAY	5000/-

Note:

- TOTAL CHARGES = (Charges as per S.No.1) + [No. of Days(*) x Unit Charges as per Sl. No. 2]
- *: To be certified by BHEL site
- Bidder to note that provision of maximum 2 visits amounting to total 6 man days is envisaged for respective bidders.



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DATA SHEET-B (ANNEXURE-II OF SECTION-II)

ITEM No.	ITEM DESCRIPTION	QTY.	UNIT	MAKE	MODEL No	COUNTRY OF MANUFACTURE	EQUIPMENT & ACCESSORIES CONFIRMS TO ALL TECHNICAL REQUIREMENTS IN TOTALITY - (YES/NO)	REMARKS
1	Portable HV AC Test Set	1	No.					
a)	An epoxy cast / oil filled, single phase, 50-200KV/240V, 5KVA(continuous with duty cycle 1hr ON / 1 hr OFF) and 10KVA (5 minute) rated low discharge transformer with maximum discharge level of 10 PC mounted in a steel tank fitted with swivel castor wheels, HV bushing.							
b)	A control unit with microprocessor based automatic control (programming key pad) / manual control, with digital display analog / digital ammeter & voltmeter, trip pushbutton, safety protections etc.							
c)	A zero interlock circuit shall be provided to prevent energization of HV output on less voltage control is set to zero. Necessary power & metering cables, removable earth link fuses etc. shall be provided.							
2	Portable Primary & Secondary Current Injection Test Kit with Separate Control & Loading Units	1	No.					
	Control Unit							
	Current Output:0-20A/0-50A (cont.)0-50A/0-100A (up to 1 min)							
	Voltage Output:0-230V/300V							
	Current & Voltage Measurement : By true RMS, Digital/Analog meters							
	Timing Units Range:0 – 999.9 Sec.							
	Power supply : 230V ±10% 1-Phase							
	Digital Display							
	Loading Unit							
	Ranges:0-3000A in various steps							
3	Precision Digital Multi-meter	1	No.					
	7½ digit precision multi-meter, having a large 24-digit display, a bar graph function allowing user programming of high and low pass/fail limits, audible & visual indication of component specification and Auto Dynamic Filter (ADF) to enable automatic selection of suitable filter.							
	Input Power: 110/220/240V AC 50 Hz							
	DC Voltage Measurement Range: 3 mV to 10 KV.							
	DC Current Measurement							
	Range: 3 µA to 30A							
	Resistance							
	Resistance Measurement: 30 meg ohm to 1 G ohms							
	Frequency							
	Measurement: 1 Hz to 100 K Hz							
	AC Voltage							
	Measurement: 3m V to 3 KV							
	AC Current							
	Measurement: 3 Micro Amp to 30A							
	Capacitance							
	Measurement:0-300 Microfarad							

	1X800 MW KOTHAGUDEM TPS						Doc. No. PE-TS-410-556-E002
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DATA SHEET-B (ANNEXURE-II OF SECTION-II)

ITEM No.	ITEM DESCRIPTION	QTY.	UNIT	MAKE	MODEL No	COUNTRY OF MANUFACTURE	EQUIPMENT & ACCESSORIES CONFIRMS TO ALL TECHNICAL REQUIREMENTS IN TOTALITY - (YES/NO)	REMARKS
	Special Features: Self Test, Diode/ZenerTest, Max/Min functions, continuity testing AC/DC coupled facility count down and sample beep on long filter periods.							
4	Portable High Voltage/Live Line Detector	1	No.					
	Electronic type, giving audio-visual indication for presence of voltage/charge. Having in-built self-diagnostic check feature. Insulating stick shall be class 'F' insulated							
	Measuring range offered should be in single or combination covering 6.6KV to 300KV with permissible voltage variation.							
5	HV Discharge Rod & Portable Earthing Equipment. Measuring range offered should be in single or combination covering 6.6KV to 400KV with permissible voltage variation.	2	No.					
	Equipment Class 'F' insulated. Having non-linear carbon film resistor.							

NOTE :-

1) EQUIPMENT TO BE SUPPLIED ALONG WITH ESSNTIAL ACCESSORIES FOR SUCCESSFUL OPERATION OF EQUIPMENT AT SITE .i.e. CLAMPS, CLIPS,LEADS ,CARRYING CASE etc.

2) ALL EQUIPMENTS SHALL BE SUPPLIED WITH VALID CALIBRATION CERTIFICATE, WHEREVER APPLICABLE.

3) ALL EQUIPMENT SHALL BE PROPERLY PACKED IN GALVANIZED SHEET STEEL TRUNK/ BOX WITH PROPER LOCK & KEY ARRANGEMENT EXCEPT FOR EQUIPMENT WHICH ARE TROLLEY MOUNTED OR ARE ALREADY AVAILABLE IN RUGGED STEEL/WOODEN BOX PACKING. FURTHER, ANY DAMAGE (READING ERROR/CALIBRATION ERROR/BROKEN PARTS/MISSING PARTS ETC.) FOUND ON RECEIPT AT SITE, LEADING TO REPLACEMENT OF PARTS/WHOLE ITEM, SHALL BE TO BIDDER'S ACCOUNT.