	WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED
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Technical Specification of Automatic & Numerical Relay Test Kit

Scope of work:
Design, Manufacturing, Supply and delivery of Numerical relay test kit with licensed software suitable for testing of static, electromechanical and numerical relays including IEC 61850 complied relays used for various applications like distance, differential with harmonic restraint feature, frequency relay, non directional and directional over current and earth fault etc. Supply and delivery of laptop (with each kit) necessary to run the test kit is also on bidder's scope. All necessary driving software for numerical relay test kit including product support software, MS Office, antivirus of associated Laptop has to be supplied in CD form separately for each Test Kit/Laptop.

Qualifying requirement (QR):

The manufacture must have designed, manufactured, tested and supplied at least five (5) sets of similar or high end Relay Test Kit to WBSEDCL / other Power Utilities / other Govt. Departments in earlier occasions within last three financial years.

Documents in support of supply of the tendered items to WBSEDCL / other Power Utilities / other Govt. Departments in earlier occasions within last three financial years as mentioned below:

1) Purchase Orders, Inspection Offer letter, Despatch Instructions, Signed Challan etc. for completing supply of the item against a particular contract.

2) Successful Type Test Report carried out at NABL accredited Laboratory in India or equivalent international laboratories within last five years from the date of opening of tender. The Type Test should be carried out on similar Type and Model.

3) Performance Certificate from other Power Utilities / other Govt. Departments where the Test Kit was supplied earlier within last Five Years.

Bidder should have fully equipped technical support office/laboratory having facilities for testing, calibration, diagnosis and repair of equipment in India itself. Bidder should have technical support staff permanently posted in India for technical support after sale. List of Plant and Machinery, tools and tackles to carry out service shall be submitted along with offer.

Statement of orders executed for similar item during last three financial years

Standards:

Unless otherwise specified elsewhere, in this specification, the rating, performance and testing of test set shall confirm to the latest revisions, available at the time of placement of order of the relevant standards as below.

STANDARD NO	STANDARD TITLE
IEC 61010-1	Safety requirement for electrical equipment for measurement, control and laboratory use.
IP 54	Degree of Protection
IEC 61326-1	EMC
IEC 61000-4-2	Electrostatic Discharge
IEC 61000-4-3	Radio Frequency AM Electromagnetic Field
IEC 61000-4-4	Fast Transients
IEC 61000-4-5	Surge immunity Test
IEC 61000-4-8	Power Frequency Magnetic Field
IEC 61000-4-11	Dips test
IEC 61000-6-2	Generic Standards
IEC 60068-2-27	Shock Resistant (operation)
IEC 60068-2-6	Vibration during transport and operation
IEC 60068-2-6	Drop Test
IEC- 60255-21-2 IEC-60088-2-29	Shock and bump & Bumping during transport
IEC-60068	Environmental Testing

A. <u>Technical Specification of Microprocessor controlled Numerical & Automatic Relay Test Kit</u>:

1. AC Voltage outputs (at least four independent Voltage generators):

Control: Independent control of amplitude, frequency and phase angle

Fourth Voltage can be set as zero sequence voltage, line voltage, or any value

Range: 4x150 V

Accuracy: 0.1% or better

Resolution: 10mV or better

Output power: >= 4X 37VA at 150V or better

Operational indicator: overload, distortion,   over heat

Protection – Short Circuit – Unlimited for Each Phase to Neutral.

2. AC Current outputs (at least six independent Current generators):

Control: Independent control of amplitude, frequency and phase angle

Range: 6x15A

Accuracy: 0.1% or better

Resolution: 10mA or better

Output power: >= 6X12 VA at 1 Amp, 6X80 VA at 15 A or better

Operational indicator: overload, distortion, open circuit, over heat

Protection – Open Circuit (Permitted) as well as unlimited Short Circuit.

Remark: The above rating should be satisfied by the kit without any attachment of external amplifier unit.

3. Frequency (voltage and current generator)

Range: 1 Hz to 1000Hz (Sine signals)

Accuracy: $\pm$ 2.5 ppm

Resolution: 0.001 Hz

4. Phase Angle:

Range: 0 to $\pm$ 360^0

Accuracy $\pm$ 0.1^0

5. Auxiliary DC Supply:

Voltage Range: 0 to 250 V (Max. 50 Watts). The set should have site selectable feature to set the Aux DC Voltage at 30 V, 60 Volts, 110 V & 250 V.

6. Binary Inputs:

Number: 8 (at least)

Trigger criterion: i) potential free, ii) DC Triggering (Site Selectable) – at 30 V, 60 Volts, 110 V & 250 V. iii) Minimum DC Voltage triggering Option is to be mentioned.

7. Binary Outputs:

Number: 4 (at least)

Type: Potential free

9. Timer:

 Range: 0 – 9999.9 Sec,

 Auto Ranging

Accuracy: 0.001%

Resolution: 0.50 ms

10. Power Supply:

Permissible input: 90 to 260 V AC – Single phase to neutral Supply.

Permissible frequency: 47 to53 Hz

11. Surge Protector:

          Suitable external protective device has to be provided to protect the kit from high   voltage surge in power supply.

12. Interfaces:

Should have connectivity through USB/ Ethernet port. The Ethernet port shall be suitable for control through external computer. GOOSE configuration software should be provided with the kit for effective checking of protective relays/IEDs based on IEC 61850 protocols. It shall read, write, poll and check data

models/ values it details. It shall subscribe and publish GOOSE data. It will be the bidder's responsibility to demonstrate all the above IEC 61850 complied features.

13. Self – Diagnostic feature:

Test kit should be self Diagnostic feature and it requires activation on every 'Power On" of Relay test Set.

14. Software specification:

Should be provided with basic licensed software along with licensed software containing advance options for distance, differential, Directional and Non-directional relay **for whole life period of the kit**. In future, specially within Guarantee Period of Five years, if any up gradation required in software then it shall have to be upgraded free of cost.

- Software should be compatible with XP/Vista/Windows7 Professional operating system
- Should have a mode for simultaneous control of all available test signals (all voltages, current, AC/DC) of the test set in magnitude, phase angle and frequency with the scope of timing measurement. Should have scope to control the binary output of the test set. There should have vector view and auto report generation facility.
- Should have mode for generation of state sequencer to determine operating times and logical timing relations by state based sequence.
- Should have mode for Ramping for determining magnitude, phase and frequency threshold by ramping definition.
- There should be scope to import the relay setting template to the interfacing software for testing of the relays. The relay setting template of different manufacturers should be provided by the manufacturer of the Kit free of cost.
- Should have mode for testing of Directional and Non-directional relay.
- Should have mode for testing of electromagnetic, static and modern numerical Distance protection relay with all its features.
- Should have mode for testing of Differential protection relay. This should include for testing of electromagnetic and modern numerical relay with all its features. This also includes testing of 2nd harmonic and 5th harmonic characteristics of the relay.
- Should have mode for testing of auto reclosing features.
- Should have scope for transplay facility of the fault from disturbance record in COMTRADE file format.

- The kit shall be supplied with aluminium / hard fibber trolley case having adequate mechanical strength and shock absorbers so as it can be transported easily by testing crew.

15. Technical Specification of Laptop computer (Should be from known reputed brand)

1) **System feature**

a) **Operating System:** Windows 7 professional

b) Processor: i5 (3rd Gen), 2.5 GHz,) Brand-Intel

c) Chipset: Mobile HM76 Express,

d) Cache: 3MB

2) **Memory:**

a) System memory: 4GB DDR3

b) Expandable memory: 8 GB or above

3) **Storage:**

Hard drive space: At least 500GB, 7200rpm

4**) Display**:

a) Screen Size: 15.6 inch with LED backlit display

b) Resolution: 1366X768 pixel

c) Graphics: High definition display

5) **Optical Drive**: Super Multi DVD RW with dual layer support

6) **Port:**

a) 2 X USB 2.0 port, 2X USB 3.0 port

b) At least 1 RJ45

c) RS 232 port (9 pin serial) /   External USB to serial moxa convertor

7) **Input Device:**

a) Pointer Device: Touchpad

b) Keyboard: Full-size keyboard with Numeric Keypad

c) Webcam

8**) Audio:** integrated Digital Microphone with speaker

9) **Network Interface:**

Ethernet, wireless LAN, Bluetooth

8) **Dimension & Weight:**

Should be light weight and portable

10) **Power supply:**

a) Power supply: 230V AC, 50 Hz, 90 W (Not more than) AC Adaptor

b) Battery back-up: At least 3 hours

11) **Software CD:**

a) Product support software

b) Licensed copy of MS Office Standard

c) Reputed brand antivirus software with Five years validity.

12) **Carry case:** Free with Laptop

B. **Defect liability:**

a) All the equipments supplied against this specification shall be guaranteed for a defect liability period of **60 months** from the date of receive at DTD store duly passed acceptance testing at DTD lab after delivery.
b) Any engineering error, omission, wrong provision, equipment failure etc. the equipment shall be attended by the bidder at free of cost during defect liability period.
c) For any defect in the kit during defect liability period repairing has to be completed within fifteen days. **Otherwise substitute set of same type has to be provided within fifteen days from the date of reporting**. It will be handed over back to supplier on repair & receipt of original set.
d) If any defect is observed during defect liability period, it is bidder's responsibility to collect kit from **site/ consignee** to attend the same.
e) On each failure of test set, supplier shall submit detailed report of failure analysis to Distribution Testing Department, WBSEDCL.
f) Necessary life time licensed copy of interfacing and analysis software with test kit should be supplied free of cost with test equipment.

C. **Demonstration:**

During technical scrutiny of the bid, purchaser will ask to demonstrate the offered Relay Test Kit and requisite Accessories at DTD Relay Laboratory. The bidder shall have to demonstrate the test equipment within three weeks of intimation from purchaser. The purchaser will evaluate the suitability of product for their application. The purchaser's decision will be final & unchallenged for acceptance/ non acceptance of product even, if product will comply other tender terms. It is bidder's responsibility to arrange the demonstration with all necessitate at DTD lab.

d. Accessories – Sufficient quantity of Connecting Leads (Properly socket - terminated at Both End) for all voltage, current and Binary Input/Outputs each of length at least 2 Meter long,, Input Power Cable and other relevant accessories required for "Rely Test Kit" and the "Laptop"

e) **Literature & Technical manual** - The manufacturer is to provide at least two sets of Literature & technical manual per set.

--End—

GTP Numerical Relay Test Kit
(To be submitted by the Bidder)

Sl. No.	Particulars	Offered Specification	Remarks
1	**Qualifying Requirements** The manufacture must have designed, manufactured, tested and supplied at least five (5) similar or high end Relay Test Kit to WBSEDCL / other Power Utilities / other Govt. Departments in earlier occasions within last three financial years. Documents in support of supply of the tendered items to WBSEDCL / other Power Utilities / other Govt. Departments in earlier occasions within last three financial years as mentioned below: 1) Purchase Orders, Inspection Offer letter, Despatch Instructions, Signed Challan etc. for completing supply of the item against a particular contract. 2) Successful Type Test Report carried out at NABL accredited Laboratory in India or equivalent international laboratories within last five years from the date of opening of tender. The Type Test should be carried out on similar Type and Model. 3) Performance Certificate from other Power Utilities / other Govt. Departments where the Test Kit was supplied earlier within last Five Years. Bidder should have fully equipped technical support office/laboratory having facilities for testing, calibration, diagnosis and repair of equipment in India itself. Bidder should have technical support staff permanently posted in India for technical support after sale. List of Plant and Machinery, tools and tackles to carry out service shall be submitted along with offer.		
(A)	**Supply Source**		
1.	a) Make & Type		
	b) Model No		
	(1) Mains Input		
2.	Voltage		
3.	Frequency		
4.	Power Rating		

	(2) Output		
5.	Voltage: (without attachment of any output kit)		
	a) Output site selectable variable voltage Range		
	b) No Of Voltage Channels		
	c) Accuracy of Voltage output		
	d) Minimum Resolution of per Chanel Voltage variation		
	e) Variation of Phase Angle of all independent voltage channel (range – 0^0 to 360^0) with minimum available resolution		
	f) Output Power at max Voltage per channel		
	g) Availability of Operational Indicator		
	h) Available Protection in Output Voltage Circuit		
6	Current: (without attachment of any output kit)		
	a) Output site selectable variable Current Range		
	b) No Of Current Channels		
	c) Accuracy of Current output		
	d) Minimum Resolution of per Chanel Current variation		
	e) Variation of Phase Angle of all independent current channel (range – 0^0 to 360^0) with minimum available resolution		
	f) Output Power at max current per channel		
	g) Availability of Operational Indicator		
	h) Available Protection in Output current Circuit		
7.	**Frequency: (voltage and current Generator)**		
	a) Output site selectable variable Frequency Range		
	b)Accuracy		
	c) Resolution		
8.	**Auxiliary DC Supply:**		
	a) Output Voltage range		
	b) Resolution		
	c) Output Power at Max voltage		
9.	**Binary Input:**		
	a) Nos. of Potential free Binary Input		

	b) Triggering voltage range: (Min and Max)		
10.	**Binary Output:**		
	a) Nos. of Potential free Binary output		
	b) Contact rating		
11.	Timer		
	a) Range:		
	b) Accuracy		
	c) Resolution		
12.	Availability of surge protector in power supply		
13.	Interfaces:		
	a) Nos. and types of connectivity port suitable for control through external computer and testing of IEC 61850 complied relays (GOOSE massaging, subscribing and publishing)		
	b) Ports Mbps capacity		
14.	Calibration:		
	a) Capability of self calibration or by calibration software.		
15.	Availability of Permanent licensed Software for characteristic and function checking with free of cost up gradation for whole life:		
	a) Advanced distance		
	b) Advance differential		
	c) Directional and non directional		
	d) Ramping for determining magnitude, phase and frequency threshold by ramping definition.		
	e) Scope to import the relay setting template to the interfacing software for testing of relays.		
	f) relay setting template of different relay manufacturers free of cost		
	g) Mode of differential protection relay including testing of 2nd and 5th harmonic characteristics of the relay.		
	h) Mode of generation state sequencer to determine operating times and logical timing relations by state based sequence.		
	h) Scope for Transplay facility of the fault from disturbance recorder in COMTRADE file format.		
	i) Control of binary output, Vector view and auto report generation facility.		

	j) Compatibility of software with windows operating system version.		
16.	**Accessories:**		
	a) Input power cable		
	b) current and voltage cable		
	c) Communication cable		
17.	**Carrying Case:**		
	Aluminium/ Hard fibre trolley case having adequate mech. strength and shock absorbers.		
18.	**Laptop computer**		
	Make:		
	1) **System feature**		
	a) **Operating System:**		
	b) Processor:		
	c) Chipset:		
	d) Cache:		
	2) **Memory:**		
	a) System memory:		
	b) Expandable memory:		
	3) **Storage:**		
	Hard drive space:		
	4) **Display**:		
	a) Screen Size:		
	b) Resolution:		
	c) Graphics:		
	5) **Optical Drive**:		
	6) Nos. of available **Ports:**		
	7) **Input Device:**		
	a) Pointer Device:		
	b) Keyboard:		
	c) Webcam		
	8) **Audio**		

		9) **Network Interface:**		
		8) **Dimension & Weight:**		
		10) **Power supply:**		
		b) Battery back-up:		
		11) **Software CD:**		
		a) Product support software		
		b) MS Office Standard		
		12) Carry case; free with laptop		
	19.	**Defect Liability: Warranty**		
		a) Warranty period:		
	20.	**Demonstration as a part of techno – commercial Evaluation:**		
	21	**Computer and Software**		
	22.	Details of Hardware configuration of computer		
	23.	Type of Printer provided		
	24.	Is the software of Relay Test Kit capable of: • Software should be compatible with XP/Vista/Windows7 Professional operating system • Should have a mode for simultaneous control of all available test signals (all voltages, current, AC/DC) of the test set in magnitude, phase angle and frequency with the scope of timing measurement. Should have scope to control the binary output of the test set. There should have vector view and auto report generation facility. • Should have mode for generation of state sequencer to determine operating times and logical timing relations by state based sequence. • Should have mode for Ramping for determining magnitude, phase and frequency threshold by ramping definition. • There should be scope to import the relay setting template to the interfacing software for testing of the relays. The relay setting template of different manufacturers should be provided by the manufacturer of the Kit free of cost. • Should have mode for testing of Directional and Non-directional relay.		

	• Should have mode for testing of electromagnetic, static and modern numerical Distance protection relay with all its features. • Should have mode for testing of Differential protection relay. This should include for testing of electromagnetic and modern numerical relay with all its features. This also includes testing of 2nd harmonic and 5th harmonic characteristics of the relay. • Should have mode for testing of auto reclosing features. • Should have scope for transplay facility of the fault from disturbance record in COMTRADE file format.		
25.	**Others Accessories –** Sufficient quantity of Connecting Leads (Properly socket - terminated at Both End) for all voltage, current and Binary Input/Outputs each of length at least 2 Meter long,, Input Power Cable and other relevant accessories required for "Rely Test Kit" and the "Laptop"		
26.	**Literature & Technical manual** - The manufacturer is to provide at least two sets of Literature & technical manual per set.		

Date :   Signature :

Place :   Name :

Company stamp :   Designation :