

NATIONAL POWER TRAINING INSTITUTE,
(Under the Ministry of Power, Govt. of India),
Southern Region,
Block-14, Neyveli 607 803

TENDER DOCUMENTS

Supply, Installation, Commissioning & Testing of
Relay Testing Lab Equipment
for Electrical Laboratory at NPTI (SR), Neyveli

NATIONAL POWER TRAINING INSTITUTE,
(Under the Ministry of Power, Govt. of India),
Southern Region,
Block-14, Neyveli 607 803

No.NPTI (SR)/NEY/STR/2009-2010/

Dated: .08.2009

NOTICE INVITING TENDER

Sealed tenders are hereby invited by the Principal Director, National Power Training Institute (Under the Ministry of Power, Govt. of India) for the work / purchase as per schedule, specifications and as per the terms and conditions enclosed herewith from the authorized dealers / distributors / manufacturer of branded suppliers.

1. Name of work : Supply, Installation, Commissioning & Testing of Relay Testing Lab Equipment for Electrical Laboratory at NPTI (SR), Neyveli
2. Cost of Tender Form : Rs.1000/-
3. Estimated cost : Rs.30.00 lakhs
4. Earnest Money : Rs.60,000/-
5. Last date of receipt of tender : 5th October 2009 up to 15.00Hrs.
6. Date of opening the tender : 7th October 2009 at 11.00 Hrs
7. Time of completion of job : 90 Days

The offer shall remain open for at least 90 days. Earnest money shall be accepted only in the form of demand draft drawn in favour of the NPTI (SR), Neyveli.

Sd/-
PRINCIPAL DIRECTOR

NOTICE INVITING TENDER

Important instructions: Terms & Conditions

Bid should be in two parts, a) Technical Bid, b) Price Bid in separate sealed envelopes. Both Bids envelope to be placed in a another single sealed envelope super-scribing tender No. Dt. The cover should be addressed to The Principal Director, National Power Training Institute, Southern Region, Block-14, Neyveli - 607 803

Sealed Bids in two envelopes are to be submitted as follows:

a. **Technical Bid:** This Envelope namely Technical Bid should contain only technical specification. This cover should be super-scribed **TECHNICAL BID** for “**Supply, Installation, Commissioning of Relay Testing Lab Equipment**” The Technical Bid should contain the following:

1. EMD in the form of Demand Draft drawn in favour of NPTI (SR) payable at Neyveli.
2. If the tender forms are downloaded from the internet, the Demand Draft of Rs.1000/- in favour of NPTI (SR) Payable at Neyveli should be enclosed along with the Technical Bid.
3. Income tax clearance certificate of last three years
4. Warranty for three years
5. Delivery period is to be indicated and maximum allowable period is 60 days from the placement of orders.
6. Validity period to be indicated and should be minimum 90 days from the date of opening of the tenders
7. Agreement towards the payment terms of NPTI
8. The tender must contain all the relevant technical specifications of the equipments as per the tender document along with the relevant technical literatures/brochures/pamphlets/drawings and alternate proposal. All the documents, technical specifications should be signed by authorized bidders with seal of the firm and date.
9. The copy of the tender documents along with its terms and conditions to be signed by the bidder in each page and enclose along with Technical bid as a token of acceptance of terms and conditions.

b. **Price Bid:** Second envelope namely Price Bid should contain only the price part and other information given below. This cover should be super-scribed Price Bid for “**Supply, Installation, Commissioning of Relay Testing Lab Equipment**”.

1. Details of Make of equipment, their rates should be included in the original price bid form
2. The price must be firm and final till the delivery of equipment inclusive of all taxes, Govt. levies and other duties on FOR destination basis.
3. The price must be quoted in figures and words.

General Terms and Conditions:

01. Delivery should be F.O.R destination basis i.e. NPTI (SR), Neyveli
02. Part supply is not allowed.
- 03. 90% of payment will be made on successful supply, installation, commissioning and Testing. Balance 10% of payment will be kept as Performance Guarantee for the period of warranty after installation, commissioning and Testing or against the Bank Guarantee for the period of warranty.**
04. Offer should include freight, packing, forwarding, delivery, warranty, Installation and Commissioning charges.
05. If the last date for receipt of the tenders happens to be a holiday, the next working day shall be the due date.
06. In the event of successful bidder's failure to deliver the material as per order within the stipulated delivery period, the order is liable for cancellation and EMD will be forfeited.
07. Postal delay or loss of tender in transit will not be responsibility of this office.
08. The tender document is not transferable
09. The tenderers are advised to go through the tender documents, terms and conditions thoroughly and must sign all the pages and submit along with technical bid.
10. In case of any dispute, the decision of Principal Director will be binding and final
11. NPTI will not be responsible for transit damages.
12. NPTI is the training institution under Ministry of Power, Govt. of India, if any discount applicable for educational / training institution, the same may be indicated in your Price Bid.
13. NPTI reserves the right to cancel the tender without assigning any reason and to increase or decrease the quantity of any items mentioned overleaf.
14. The suppliers shall be responsible for the safety of the material during transit and loading and unloading. This office does not own any responsibility if the material is damaged during transit, erection, commissioning and testing.
15. All equipment should be delivered in fully packed conditions and opened in the presence of NPTI representative.
- 16. Installation, Testing, Commissioning & Training-** The job includes supply, installation, testing and commissioning at site and one week training on relay testing lab. Equipment for the NPTI Personnel (4 nos.) should be arranged with free of cost at NPTI, Neyveli.

17. **Warranty-** the warranty for all equipments supplied shall be for a minimum period of **three** years from the date of commissioning. All the defects/defective parts should be rectified and / or replaced at the suppliers cost during the warranty period and regular maintenance to be carried out during warranty period.
18. The bidder at the request of NPTI shall arrange the demonstration and working of the equipment he has offered in this proposal. The demonstration shall be arranged at the cost of bidder.
19. Maximum period including delivery, installation, testing and commissioning shall be 90 days from the date of placement of order.
20. Authorization letter from the Original Equipment Manufacturer (OEM) to be enclosed with the offer.
21. Service & Calibration at factory to be done in presence of NPTI Personnel at NPTI, Neyveli
22. The work shall be executed as per the direction and satisfaction of the Engineer in-charge. Decision of the Engineer in-charge will be final and binding in case of any extra work.
23. The bidder should follow all safety measures at site and ensure that no damage is caused at the site. If any damage occurs as a result of the work, the bidder will restore the same or the cost of the same will be realized from the bill.
24. The supplier shall be responsible for the safety of his erection and commissioning team manpower.
25. The supplier has to make his own arrangement for the ordinary / special tools, machinery, and other consumables required for successful completion of Erection and Commissioning and testing.
26. Electrical work shall be carried out electrical license holders only.
27. The supplier shall submit the final bill in triplicate within three month of installation, commission and testing of work.

PRICE BID FORM

Quotation No. _____

Date: _____

To
The Principal Director,
National Power Training Institute,
Block-14,
NEYVELI-607 803.

Dear Sirs,

I accept your Terms & Conditions as per your Tender No.NPTI (SR)/STR/2009-10/
Dt. _____ and quote the following prices.

1.	Name of the Item & Quantity	
2.	Detailed Specification of the Item	
3.	a. Price which includes Guarantee / Warranty period, Installing & Commissioning, Sales Tax & Surcharge, Freight & Forwarding and Delivery charges	Rs.
	b. Warranty for	Years
	c. Discount if any	
4.	VAT & Surcharge if any	
5.	Delivery Period	
6.	Other provisions or facilities over and above the minimum specification	
7.	List of Enclosures	
	Signature of the Authorised Person with Date	
	Full Address of the Firm with seal	

TECHNICAL SPECIFICATIONS

Sl. No.	Description	Quantity
1.	Supply, integration, installation, testing and commissioning of state of the art, panel based, Numerical Relays along with testing kit, as per the specifications given below:	01 No.

FEATURES & SPECIFICATIONS

OVER CURRENT & EARTH FAULT RELAY	
FEATURES	
<ul style="list-style-type: none"> ✓ Software based design ✓ Very low burden ✓ High calibration accuracy ✓ High drop off /pick-up ratio ✓ Wide setting range ✓ Wide range of auxiliary supply both- AC / DC 	

TECHNICAL DATA	
RATINGS	
Current	1A
Frequency	50 Hz \pm 5 Hz
Auxiliary Supply	75 - 150V DC/AC
SETTINGS	
Phase Fault	0.05 x In to 2.5x In step 0.05x In 0.05 x In to 2.5x In step 0.05x In
Earth Fault	0.05 x In to 2.5x In step 0.05x In
Highest 1&2	2.5x In to 52.5x In step 0.5x In 0.05 xIn to 2.5x In step 0.05x In
Lowest	2.5x In to 52.5x In step 0.5x In
BURDEN	
Over Current (per phase)	1A - 0.03 VA (max) , 5A - 0.075VA (max)
Earth Fault	1A - 0.075 VA (max),5A - 0.5 VA (max) at rated current at all settings
Auxiliary Supply	6 - 10 watts (max)
OPERATING CHARACTERISTICS	
Accuracy of operating value	\pm 5% of the set value as per IEC 60255
Drop off to pick up ratio	> 90%
Operating time	1.3 x I set : Less than 50 milli seconds 5 x I set : Less than 40 milli seconds
Definite time	0 - 25 secs.adjustable in steps of 0.1 sec.
Accuracy on operating time	\pm 5% of the set value as per IEC 60255

OVERLOAD CAPACITY	
Over Current elements	
Continuous	2 times the rated current
3 secs.	20 times the rated current
1 sec.	100 times the rated current
Earth Fault Elements	
Continuous	1.25 times the aux. set current
3 secs.	20 times the max. set current
1 sec.	50 times the max. set current
Communication port	RS232 Port

TRANSFORMER DIFFERENTIAL RELAY	
FEATURES	
<ul style="list-style-type: none"> ✓ Biased current differential-protection ✓ Fast differential Hi-set ✓ Dual slope characteristics ✓ Inbuilt CT Ratio correction factor ✓ Adjustable 2nd harmonic restraint and Adjustable 5th harmonic blocking ✓ Two groups of settings ✓ Inbuilt Vector group compensation hence, no need of interposing CT's ✓ History of 5 latest faults 	

TECHNICAL DATA	
Ratings	
Primary current ratings	1A
Secondary current ratings	1A
Frequency	50Hz
Auxiliary supply	110V AC/ DC
Settings	
Pickup (ik)	0.10 to 1.00 per unit in 0.05 steps
Slope 1 (DF1)	10% to 100% in 5% steps
Slope 2 (DF2)	50% to 200% in 5% steps
Breakpoint (kp)	1.0 to 10.0 per unit 0.1 per unit steps
High set	2 to 20 per unit in 1 per unit steps
CT Ratio W1	0.5 to 2.00 per unit in 0.01 per unit steps
CT Ratio W2	0.5 to 2.00 per unit in 0.01 per unit steps
Inrush (2f)	10% to 50% in 5% steps
Over excitation (5f)	10% to 100% in 5% steps
Vector Groups	Yy0,Dd0,Yd1,Dy1,Dd2,Dd4,Yd5,Dy5,Yy6Dd6,Yd7,Dy7,Dd8,Dd10,Yd11,Dy11
Overload Ratings	
<ul style="list-style-type: none"> ✓ AC current input 2 times Rated continuous ✓ 20 times Rated for 3 secs. ✓ 100 times Rated for 1 sec. 	

Burden	
AC Current input	0.1V per phase (at Rated 5A) 0.05VA per phase (at Rated 1A)
Auxiliary Supply	Less than 4W (Non Operated) Less than 10W (Operated)
Operating time	
<ul style="list-style-type: none"> ✓ Differential current element Typical 35ms ✓ Differential Hi-set element Typical 30ms 	
Accuracy	
Differential current protection	±5%
Communication port	RS232 Port

INSTANTANEOUS / DEFINITE TIME CURRENT RELAY
FEATURES
<ul style="list-style-type: none"> ✓ Software based design ✓ High calibration accuracy ✓ High drop off /pick-up ratio ✓ Wide setting range

TECHNICAL DATA	
Ratings	
Current	1A
Frequency	50 Hz ± 5 Hz
Auxiliary Supply	75 - 150V DC/AC
Settings	
Over Current	50 to 200% adjustable in steps of 10%
Earth Fault	5 to 80% adjustable in steps of 5%
Inst. High set O/C	200 to 3000% adjustable in steps of 200%
Burden	
Over Current	1A - 0.05 VA (max), 5A - 0.2 VA (max) at rated current at all settings
Earth Fault	1A - 0.25 VA(max), 5A - 0.65 VA (max) at rated current at all settings
Auxiliary Supply	10W (max)
Operating Characteristics	
Accuracy of operating value	± 5% of the set value as per IEC 60255
Drop off to pick up ratio	> 85%
Operating time	
Instantaneous	1.3 x I set : Less than 50 milli seconds 5 x I set : Less than 40 milli seconds
Definite time	0 - 25 secs.adjustable in steps of 0.1 sec.
Accuracy on operating time	± 5% of the set value as per IEC 60255

Overload Capacity	
Over Current elements	
Continuous	2 times the rated current
3 secs.	20 times the rated current
1 sec.	100 times the rated current
Earth Fault Elements	
Continuous	1.25 times the aux. set current
3 secs	20 times the max. set current
1 sec	50 times the max. set current
Contacts	2 pairs , Self reset , N/O.
Operating Indicator	
Relay trip	Red 'LED'
Aux. supply healthy	Green 'LED'
Communication port	RS232 Port

FREQUENCY RELAY	
FEATURES	
<ul style="list-style-type: none"> ✓ Software based design ✓ Solid state reliability ✓ Continuous monitoring of line frequency ✓ Digital display of line frequency ✓ Indication through high bright LEDs ✓ Easy settings through push- switches 	

TECHNICAL DATA	
Ratings	
Rated voltage	110 V
Voltage range	60 to 120% of rated voltage
Rated aux. supply	110V
Rated frequency	50 Hz.
Settings	
Setting range	
First stage	45 - 55 Hz. in steps of 0.01 Hz
Sec. stage	45 - 55 Hz. in steps of 0.01 Hz
Operating characteristics	
Accuracy	± 0.01 Hz.
Evaluation time	5 periods
Time delay setting	0.5 to 20 seconds in steps of 0.05 second
Accuracy	± 2% of the setting or 50 milli seconds whichever is higher
Dropout frequency	Adjustable from 0.1 - 1.5Hz. in steps of 0.1Hz
Burden	
Burden on AC supply	Less than 10 VA
Communication port	RS232 Port

MOTOR PROTECTION RELAY	
FEATURES	
<ul style="list-style-type: none"> ✓ Software based design ✓ Wide range of current and time+ settings ✓ In-built locked rotor and single- phasing protection ✓ Indication with LEDs 	

TECHNICAL DATA	
Ratings	
Current	1A
Frequency	50 Hz ± 5 Hz
Auxiliary Supply	75 - 150V DC/AC
Settings	
Thermal (Iq)	0.2 to 2.0xIn, steps 0.01
Hot/Cold Ratio	OFF, 5 to 100% steps 5
Phase Fault	0.5 to 20.0xIn, steps 0.1
Earth Fault inhibit	4.0 to 20.0xIn, steps 0.1
Under Current	0.1 to 1.5xIn, steps 0.05
Max. no of starts	OFF, 1 to 20, steps 1
Starts Period	1 to 60 mins steps 1
Minimum Time between Starts	OFF, 1 to 60 mins, steps 1
Operating time	± 5%
Operating value	± 5%
Overload Capacity	
Continuous	2 times the rated current
3 secs.	20 times the rated current
Auxiliary supply burden	10 watts (max)
Contacts	Self reset or Hand reset, 2 Make contacts which are common for all the faults
Operating Indicator	LEDs should be provided for indication
Communication port	RS232 Port

GENERATOR PROTECTION RELAY	
FEATURES	
<ul style="list-style-type: none"> ✎ Three-zone mho phase distance (21) ✎ V/Hz Over excitation (24) ✎ Phase Under voltage (27) ✎ 100% Stator Ground Fault Protection using Third harmonic neutral under voltage (27TN) ✎ Directional Reverse/Low forward power (32) ✎ Dual-zone, offset mho loss-of-field (40) ✎ Sensitive Negative-sequence O/C (46) ✎ Inadvertent generator energizing (50/27) ✎ Generator breaker failure (50BF) ✎ Definite time O/C for split-phase differential(50DT) ✎ Instantaneous over current (50) ✎ Instantaneous neutral over current (50N) ✎ Inverse time neutral over current (51N) ✎ Inverse time O/C with voltage control/restraint(51V) ✎ Phase Over voltage (59) ✎ Neutral Over voltage (59N) ✎ VT fuse-loss detection (60FL) ✎ Out-of-step (mho characteristics)/ Pole slipping(78) ✎ Over/ Under frequency (81) ✎ Rate of change of frequency (81R) ✎ Phase differential (87) ✎ Ground differential (87GD) ✎ Metering: The relay provides metering of voltages (phase, neutral and sequence quantities), currents (phase, neutral and sequence quantities), real power, reactive power, power factor and impedance measurements.. 	
Communication port	RS232 Port.

DISTANCE PROTECTION RELAY	
Mho Distance Zones	Phase (2 FWD, 2 FWD/REV)
Mho Distance Zones	Ground (2 FWD, 2 FWD/REV)
Quad. Distance Zones	Ground(2 FWD, 2 FWD/REV)
Instantaneous O/C	(Phase, Ground, Negative Sequence)
Directional Phase	O/C-3 Torque controlled
Directional Ground	O/C - (2 FWD, 2 FWD/REV)
Directional Negative Sequence	(2 FWD, 2 FWD/REV)
Features	
<ul style="list-style-type: none"> ✎ Fault Locator ✎ Broken conductor detection ✎ Check Synchronizing ✎ Weekend infeed ✎ Switch on to fault ✎ Out-of-Step Trip/Block ✎ Carrier Intertripping ✎ VT Supervision (PT Fuse Failure) ✎ DC Line Check 	
Communication port	RS232 Port.

RELAY PANEL	
FEATURES	
<ul style="list-style-type: none"> ✎ The size of the panel shall be 36' X 78' X 18' ✎ The panels shall be constructed of 16 ASW gauge steel sheets ✎ Relay Panel with individual test/terminal blocks for the above mentioned relays ✎ Provision for AC, DC supply voltage terminals ✎ All the wiring inside panel shall be done appropriately coded ferrules as per standard ✎ The wiring diagram shall be provided for easy O&M ✎ The panel shall have powder coated gray color paint finishing ✎ The panel shall have round edges for safety of operating personnel ✎ The panel shall have hooks for handling, placement and grouting 	

RELAY TESTING KIT	
TECHNICAL	
AC Amplitude Accuracy at 50 Hz Voltage and Current Sources	
From 20° to 30° C	0.02% typical, 0.09% guaranteed. Typically 0.02% of reading
Convertible Source in Current Mode	
From 20° to 30° C	<0.5% guaranteed
Distortion at 50 Hz Voltage and Current Sources	
Total Harmonic Distortion (THD)	< 0.02% typical < 0.1% guaranteed
Phase Angle	
Range	0 to +359.9° (Lead) / 0 to -359.9° (Lag)
Accuracy	±0.25° at 50 Hz
Resolution	±0.1° at 50 Hz
Frequency	
Bandwidth	DC to 3 kHz at full power for transient playback
Range	DC; AC from 0.1 Hz to 2 kHz at full power continuous load
Resolution	0.001 Hz
Accuracy	0.5 ppm (typical), 1.5 ppm (20° to 30° C), 10 ppm (0° to 50° C)
Ramp/Set	
Ramp	Increments/decrements voltage, current, phase angle, and frequency at user defined ramp rates. Should ensure smooth, linear changes in value
Metering Functions	
DC Meter Inputs	
Input Range	0 to ±10V DC or 0 to ±20 mA DC
Accuracy	<0.003% typical, <+0.05% guaranteed
AC Sources	
Accuracy	<0.02% for typical meter loads
Logic Inputs as Counters	
Frequency	10 kHz
Pulse Width	>175 microseconds

Logic Inputs	
Number of Logic Inputs	8 total
Isolated Inputs	2
Configurable as Voltage Sense or Contact Sense	
Voltage Sense	Up to 250 V AC or DC
Open Circuit Test Voltage	12 VDC nominal
Short Circuit Test Current	20 mA DC nominal
Response Time	0.1 millisecond max pickup and dropout
Isolation	±500 V peak
Paired Logic Inputs	3 pairs (6 total)
Configurable as Voltage Sense or Contact Sense	
Voltage Sense	Up to 250 V AC or DC
Open Circuit Test Voltage	4 Volts DC nominal
Short Circuit Test Current	>50 mA DC nominal
Response Time	0.1 millisecond max pickup & dropout
Isolation	±500 V peak

Logic Outputs	
Number of Logic Outputs	8
Configurable as Normally Open (NO) or Normally Closed (NC) switches	
High-Speed Electronic Switches	4
Input Voltage	250 V DC or AC
Switching Current	0.5 A make or break, maximum
Response Time	0.1 millisecond maximum pickup and dropout
Isolation	±500 V peak
Outputs	Relays: 4
Breaking Cap AC	2000 VA with Vmax 250 V, Imax 8 A
Breaking Cap DC	50W with Vmax 300 V, Imax 8 A
Response Time	<10 millisecond max pickup and dropout
Isolation between Pairs	±500 V peak

Variable Output Battery Simulator	
Range	Adjustable 6 to 300 VDC
Resolution	0.3 V
Power	90 W, 1.5 A max
50 Hz Ripple	<0.2% of range
Accuracy	< +/- 5%

Analog Input Measurement	
Recording	8 external analog and digital channels
Source Recording	12 internal sources
Ranges	250 mV RMS, 2.5 V RMS, 25 V RMS, 250 mV RMS
Accuracy	±0.06% typical, ±0.15% maximum
Bandwidth	DC to 5 kHz
Input Impedance	150k ohms
Max. Input Voltage	250 V RMS/DC
Isolation	±500 V peak channel-to-channel

Timers and Triggers	
Timers	
Number	8
Max Recording Time	<24 hours
Accuracy	±0.0005% of reading, ±50 microseconds
Resolution	100 microseconds
Time can be displayed as milliseconds, seconds, or cycles	
Triggers	
Number	8
Boolean combination of logic inputs can be used to define triggers	

GENERAL	
Quality Assurance Management System	
Third-party certification to ISO 9001:2000	
Calibration	
Certification traceable to N.I.S.T. standards	
Electrostatic Discharge Immunity	
IEC 801-2 I.E.C. performance level 1 @ 10 kV: normal performance within specifications. I.E.C. performance level 2 @ 20 kV: no permanent damage	
Surge Withstand Capability	
ANSI/IEEE C37.90. The instrument should function as a source during surge withstand capability tests, when the ANSI/IEEE specified isolating circuit is interposed between the instrument and the test relay	
Interfaces	RS 232 to PC
Line Power Supply	105-132 V or 210-264 V, 47-63 Hz
EMC	CE conform (89/336/EEC) and EN 61326-1
Emission	FCC 47 CFR Part 15 Class A, EN 61326
Safety	EN 61010-1, EN 61010-2-31, IEC 61010-1
Operating Temperature	0° to 50° C (32° to 122° F)
Storage Temperature	-50° to 85° C (-58° to 185° F)
Humidity	Up to 95% relative humidity, non-condensing
PC Communication	
Communication between PC to testing kit via serial RS 232 port. Self-diagnostics of the hardware upon each startup. Automatic supervision and error checking on voltage and current source outputs during testing.	

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CHECK LIST & CRITICAL DATES

Before submit your quotation please confirm the following:

1. Sealed quotation in 2 parts - Technical & Price Bid in separate covers
2. Superscribe in the outer cover “Tender for _____” and Tender Enquiry No. _____ due on
3. DD for EMD amount of Rs.
4. Technical Literature / pamphlet should be enclosed along with the Technical Bid
5. Enclose the list of clients / customers
6. Enclose authorization letter in case representing their principals
7. Endorse your signature in the tender

CRITICAL DATES

The NPTI reserves the right to amend the dates shown below.

The critical dates are as follows:

Date of release of the tender	: 21.08.2009
Venue	: NPTI (SR), Neyveli
Last Date for Bid submission	: 5 th October 2009 up to 15.00Hrs.
Technical Bid opening	: 7 th October 2009 at 11.00 Hrs
Price Bid Opening	: Will be intimated to the qualified bidders.