



**2x660 MW Ennore SEZ Supercritical Thermal Power
Project at Ash Dyke of NCTPS**

**TECHNICAL SPECIFICATION FOR NUMERICAL RELAY
EPD-TS-CPBG-NR, REV-0**

1	All relays shall be numerical and timers shall operate on available DC supply and not have any inbuilt batteries.
2	The relays shall have provision of both current and voltage inputs. Relay shall have provision for 5 sets of CT input, 3 no's for phase fault and 1 CT for earth fault & 1 CT input for CBCT. Relay shall be suitable for both residually connected CT input as well as CBCT input. Relays shall be suitable for CT secondary current of 1 A / 5 A selectable at site. Relays shall be rated for operation on 110 V, VT secondary voltage. Relays used in Incomers and bus couplers shall have provision of two sets of voltage signal inputs for the purpose of synchronization.
3	All CT and PT terminals shall be provided as fixed type terminals on the relay to avoid any hazard due to loose connection leading to CT opening or any other loose connection. In no circumstances Plug In type connectors shall be used for CT/ PT connections
4	All numerical relays shall have key pad / keys to allow relay settings from relay front. Relay to be self or hand reset shall be software selectable. Manual resetting shall be possible from remote. Relays shall have suitable output contact for breaker failure protection.
5	Relays shall have self-diagnostic feature with self-check for power failure, programmable routines, memory and main CPU failures.
6	The numerical relay shall be able to provide supervisory functions such as, circuit breaker state monitoring, PT and CT supervisions and recording facilities with Post fault analysis.
7	The numerical processor shall be capable of measuring and storing values of a wide range of quantities, all events, faults and disturbance recordings with a time stamping using the internal real time clock. Battery backup for real time clock in the event of power supply failure shall be
8	Relays shall have event recording feature, recording of abnormalities and operating parameters
9	Numerical relays shall be capable of storing Minimum of 150 time tagged events/ records with time stamping. The numerical relays shall be able to store last 5 faults including the indication, waveforms, protection operated, fault location relay and operating time, currents, voltage and time. All Setting parameters, Fault data, waveforms & event logs shall be stored in Non-volatile memory only
10	Sequence of events shall have 1ms resolution at device level.
11	Measurement accuracy shall be 1% for RMS Current and voltage
12	Relay shall be immune to capacitance effect due to long length of connected control cables. Any external hardware, if required for avoiding mal operation of the relay due to cable capacitance shall be included as a standard feature. All IOs shall have optical isolation. Analog inputs shall be protected against switching surges, harmonics etc
13	Relays shall have at least two sets or groups of two different sets of adaptable settings. Relays shall have multiple IEC/ ANSI programmable characteristics.
14	Numerical relays shall have two level pass word protections, one for read only and other for authorization for modifying the setting etc.
15	Timer functions shall be programmable for on/off delays.
16	Relay output contacts shall be suitable for directly wiring in the breaker closing and trip circuit operating from 220 V DC control voltage.
17	Making, carrying and breaking current ratings of their contacts shall be adequate for the circuits in which they are used. Interrogation voltage for the binary inputs shall be suitably selected to ensure avoidance of mal operation due to stray voltages.
18	No separate earth bus shall be required for the relays. It shall be possible to connect the relay earth to the common earth bus in the switchgear panel which shall be connected to the plant earth mat.


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19	All protective relays shall be latest numerical type, having following features/functions: • Protection functions as required • IEC IDMT characteristics • Measurements • Event/fault/disturbance recording • Binary input/output relays as required • LEDs to indicate status of the relay • LCD display for measurements, settings, faults etc. • Key pad on the front of the relay • Communication ports for transmitting settings, measurements, alarms, faults, events, disturbance records to DCS/Respective control system/SAS (Substation Automation System) • Communication port for software setting/access measurements/maintenance/fault analysis • Self-monitoring
20	All protective relays shall be latest numerical type with one USB /RS232/RJ45 port at the front for connecting to Laptop and one port (RJ45/FO port) at rear suitable for communication on IEC 61850 protocols.
21	Each BI and BO shall be independent. Changeover contact shall be consider as single BI or BO.
22	Each relay shall have Minimum 2 high break/high-current interrupting outputs.
23	Digital/Binary output contacts shall have minimum 5A continuous current rating and 30A for 3Sec short duration withstand capacity at an ambient/operating temeprature less than or equal to 55 degree C.
	Binary output shall be potential free and all the binary input shall be configured for 220VDC in group/individual. The threshold voltage for binary input shall be 150Vdc or less.
24	Watch Dog contact :Non-programmable contacts for relay healthy/relay fail indication.
25	3 no's communication cable for programming of numerical relay through laptop shall be provided by vendor.
26	Vendor has to develop PSL file and upload in each numerical relay before dispatch as per the logic provided by BHEL-EPD.PSL file shall be given by vendor for all type of logics.
27	Programming software licnence copy along with single user licence shall be provided by vendor before commencemnet of supply.
28	1 Class room training program at BHEL-EPD shall be considered by vendor. The schedule for the same shall be intimated by BHEL after award of contract.
29	1 training program at manufacturer works for BHEL as well end customer's representative shall be considered by vendor.
30	Minimum 4 visit (2-3 days each) at BHEL-EPD shall be consider by vendor for relay configuration. Service Engineer shall be deputed within 4 days from the date of intimation by BHEL.
31	The device shall include a five-year, noquestions-asked warranty for all material and workmanship defects
32	Numerical relay setting for breaker controlled motor feeder shall be provided by Vendor as and when required by BHEL. The same shall be provided by Vendor within 7 days from date of intimation.

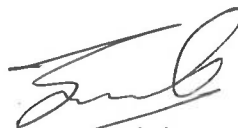
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	Documents to be submitted along with the bid :
1	Valid Type test reports (not more than 5years old) for all tests & communications as per applicable IEC standards to be submitted along with the bid.
2	All corresponding technical leaflets like data sheets, O&M manual, internal wiring drawing etc to be submitted along with the bid.


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Sl.No.	Material code	Component Specification
1	ELENRRNR190101	Numerical Relay for Incomer
		Aux.Supply: 220V DC
		Binary Input: 16
		Binary Output:10
		CT input:- 5 sets
		VT input:- 4 sets
		Protection:50,50N,51,51N,51Ns,27,74,64,64REF,86,98
		Relay Healthy feature In-Built
		Communication Protocol:61850
2	ELENRRNR190102	Numerical Relay for Buscoupler
		Aux.Supply: 220V DC
		Binary Input: 16
		Binary Output: 10
		CT input:- 3 sets
		VT input:- 4 sets
		Protection:50,50N,51,51N,74,25,98
		Relay Healthy feature In-Built
		Communication Protocol:61850
3	ELENRRNR190103	Numerical Relay for Bus PT
		Aux.Supply: 220V DC
		Binary Input:8
		Binary Output:8
		VT input:- 4 sets
		Protection:27
		Relay Healthy feature In-Built
4	ELENRRNR190104	Numerical Relay for Outgoing
		Aux.Supply: 220V DC
		Binary Input: 16
		Binary Output: 10
		CT input:- 4 sets
		VT input:- 4 sets
		Protection: 50,50N,51,51N, 98, 64,27,74 & 86
		Relay Healthy feature In-Built
5	ELENRRNR190105	Numerical Relay for Motor feeder
		Aux.Supply: 220V DC
		Binary Input: 10
		Binary Output: 10
		Protection:Thermal model with negative sequence current,Voltage compensated acceleration
		U/V, O/V, overload protection, short circuit & SC backup, current unbalance, Ground
		Fault, Temperate monitoring (stator, bearing), Phase reversal.,Blocked/locked Rotor,RTD Biased Thermal
		Overload
		Relay Healthy feature In-Built
		Communication Protocol:61850


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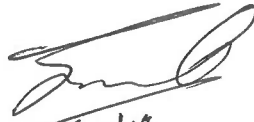
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TECHNICAL SPECIFICATION FOR NUMERICAL RELAY EPD-TS-CPBG-NR, REV-0

6	ELENRRNR190106	Numerical Relay for DG Incomer
		Aux.Supply: 220V DC
		Binary Input: 16
		Binary Output:10
		CT input:- 5 sets
		VT input:- 4 sets
		Protection:50,50N,51,51N,51Ns,27,74,64,64REF,86,98,87G
		Relay Healthy feature In-Built
		Communication Protocol:61850
7	ELENRRNR190107	Non linear resistor & Varistor for REF
8	ELENRRNR190108	Site Visit charge for relay configuration (Annexure-1)

ANSI:-

- 50 - Instantaneous Overcurrent Relay
- 50N - Neutral Instantaneous Overcurrent
- 51 - AC Time Overcurrent Relay
- 51N - Neutral Time Overcurrent
- 50Ns/51Ns - Sensitive earth-fault protection
- 64 - Ground Protective Relay
- 64REF – Restricted earth fault differentia
- 27 – Undervoltage rela
- 74 - Alarm Relay
- 86 - Locking-Out Relay
- 98-Trip Circuit Monitor
- 25 – Synchronizing or synchronism-check device
- 87G - Generator Differential protection relay


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(ANNEXURE-A)

SPECIFICATION NO. EPD-TS-CPBG-NR

VOLUME

SECTION

REV NO. 00

DATE :06/04/2018

SHEET

1

OF

1

ANNEXURE-A

PROJECT SITE VISIT CHARGES

(SL No. 8 of Main Price list)

SL.NO.	DETAILS	QUANTITY	UNIT PRICE	TOTAL PRICE
1	LUMP SUM ALL INCLUSIVE CHARGES PER VISIT FOR SKILLED TECHNICIAN (EXCEPT DAILY CHARGES)	5 VISITS		
2	LUMP SUM ALL INCLUSIVE DAILY CHARGES FOR SKILLED TECHNICIAN	30 DAYS		
			TOTAL	

NOTES:

- 1) AMOUNT PAYABLE FOR SKILLED TECHNICIAN PER VISIT TO SITE = VISIT CHARGES AS PER SL. NO. 1 ABOVE + (DAILY CHARGES AS PER SL. NO. 2 ABOVE X NO. OF DAYS AT SITE) (TO BE CERTIFIED BY BHEL SITE)