


4x125 MW KOSTI SUDAN TPS

TECHNICAL SPECIFICATION FOR RELAYS

DOC. NO. : PE-TS-250-506-E002, REV.-00



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

	NATIONAL ELECTRICITY CORPORATION THE REPUBLIC OF SUDAN		Doc. No. PE-TS-250-506-E002	
	4X125 MW KOSTI THERMAL POWER PROJECT		Volume	Section
			IIB	A
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SECTION- A
SCOPE OF ENQUIRY

- 1.0 This specification covers the design, manufacture, assembly, inspection & testing at manufacturer's works, air worthy packing, delivery to Mumbai of relays, complete with all accessories for efficient and trouble-free operation of 4 x 125MW thermal power plant proposed at Kosti Sudan.
- 2.0 It is not the intent to specify completely herein all details of the design and manufacture. However, the equipment shall conform in all respects to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation up to bidder's guarantee.
- 3.0 The general terms and conditions, instruction to bidders and other attachment referred to elsewhere are hereby made part of the Technical Specification.
- 4.0 The Bidder shall be responsible for and governed by all requirements stipulated hereinafter.
- 5.0 Bidder shall confirm total compliance to the specification without any deviations from the technical / quality assurance requirements stipulated.
- 6.0 The documents shall be in English language and MKS system of units.

PROJECT INFORMATION DATA

1	Owner	NATIONAL ELECTRICITY CORPORATION, SUDAN
2	Project	4 X 250 MW RATING, CRUDE OIL FIRED THERMAL POWER PLANT
3	Owner's consultant	Fichtner Gmbh & Co. KG
4	Location	The Power Station site is located near Kosti (White Nile State), 310 km south of Khartoum at latitude 13.10 North and longitude 32.6 East at an elevation of 380 meters above sea level. The northern boundary of the plot is adjacent to the Rabak-Sinnar highway
5	Nearest Airport	KHARTOUM
6	Nearest Port	PORT-SUDAN
7	Access to site	<div> <div>PORT-SUDAN</div> <div>850 km</div> <div>→</div> <div>KHARTOUM</div> <div>320 km</div> <div>→</div> <div>KOSTI</div> </div>

A	Altitude [Observatory]	380 meters above sea level
B	Ambient Conditions:	
1.	Mean Maximum Ambient Air Temperature (in hottest month)	45 Deg.C
2.	Mean Minimum Ambient Air Temperature (in coldest month)	18 Deg.C
	Temperatures	
1.	Minimum [Annual Mean]	25 –30 deg C, 16 deg C lowest
2.	Maximum [Annual Mean]	40-45 deg C
C	RELATIVE HUMIDITY	Low to very low in most part of the year. Rising only during rainy season.
1.	Maximum Humidity	71% in Aug
2.	Minimum Humidity	26% in April
D	RAINFALL	
1.	Annual Mean	300 to 400 mm spread over 150 days. Approx.50 TO 60% rainfall in July & Aug.
2.	Maximum	Max recorded is 182 mm in Aug,04
E	WIND DATA	
1.	Max Wind Speed	170Kmph
2.	Prevailing Wind Direction	Wind direction is northern from May to September and it is southern in other months
3.	Any other features	Occasional dust storms in May and June



**DATA SHEET-A
FOR**

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VOL. IIB

NUMERICAL RELAYS

SECTION

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SHEET 1 OF 2

1. Miscellaneous inputs (tick (✓)/ Purchaser to indicate against the requirement)

A. REALAY SELECTION-AS PER BILL OF QUANTITY

1. Relay Function

- a. Only Protection ☐ Yes ☐ No
- b. Protection & Metering ☒ Yes ☐ No
- c. Protection, Metering, Logic & Control ☐ Yes ☐ No
- d. Serial Communication ☐ Yes ☐ No
- e. Password Protection ☒ For Write
☐ For Read & Write
- f. Protection CT Secondary ☒ 1A ☐ 5A
- g. Earth Fault CT secondary ☒ 1A ☐ 5A
- h. Diff./REF CT Secondary ☒ 1A ☐ 5A
- i. PT Secondary voltage ☐ 63.5V AC ☒ 110V AC
- j. PT Synchronization secondary voltage ☐ 63.5V AC ☒ 110V AC
- k. Open Delta Voltage for Directional ☐ 110/3V AC

l. Functions Part of Numerical Relay

- Lock out Function(86) ☐ Yes ☒ No
- Trip Circuit Function(95) ☐ Yes ☒ No
- Watch Dog ☒ Yes ☐ No
- Timer Function ☒ Yes ☐ No

2. Construction Features

- a. Enclosure Type ☒ IP5X
- b. Display Type ☒ Alphanumeric LCD/LED + LED INDICATOR + Backlit Display
☐ Graphic LCD + LED + Backlit Display

3 Minimum Protection and Metering Function Required for Relay

a. Current Operated relay

- i. 3 phase O/C element (50, 51) ☒ I> ☒ I>> ☒ I>>>



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SHEET 2 OF 2

- ii. Characteristic Curves IDMT & DMT
- iii. E/F relay (50N, 51N, 51G) ☒ I₀> ☒ I₀>> ☒ I₀>>>
- iv. Characteristic Curves as per IEC IDMT & DMT
- v. Metering 3-Phase/Line Current
- b. **Voltage Operated relay**
 - i. 3 phase O/V element with time delay (59+2) ☒ OV> ☒ OV>>
 - ii. 3 phase U/V element with time delay (27+2) ☒ UV> ☒ UV>>
 - iii. 3 phase N/V element ☒ NV
 - iv. Synchro-check function ☐ Yes ☒ No
 - v. Metering 3-Phase/Line Voltage
- 4 **Protocol for Communication of relays**
 - ☐ IEC open Protocol (IEC-61850)
 - ☒ MODBUS-RTU
 - ☐ IEC60870-5-103
 - ☐ TCP-IP
 - ☐ Any other Open Protocol

BILL OF QUNATITY CUM PRICE SCHEDULE FOR RELAYS

S. No.	ITEM DESCRIPTION	Make	Remark	Unit	Total Quantity	Unit price (Ex-works)	Unit price including air worthy packing (Ex-works)	Total price (Ex-works)
1	UNDER VOLTAGE RELAY P921 - with communication facility, flush mounted	Schneider Electric	Aux. supply voltage- 110V DC	Nos.	3			
2	3EL. O/C+E/F RELAY P 111C - with communication facility, flush mounted	Schneider Electric	Aux. supply voltage- 110V DC	Nos.	5			
3	Motor Protection Relay P 211C -Areva - with communication facility, flush mounted	Schneider Electric	Aux. supply voltage- 110V DC	Nos.	5			
4	CONTACT MULTIPLIXAL RELAY (52X) VAJC11, flush mounted	Alstom	Aux. supply voltage- 110V DC	Nos.	10			
5	LOCK OUT RELAY (86) VAJHM-23, flush mounted	Alstom	Aux. supply voltage- 110V DC	Nos.	10			
6	TRIP SUPERVESION RELAY (95) VAX-31, flush mounted	Alstom	Aux. supply voltage- 110V DC	Nos.	10			
7	DC SUPPLY HEALTHY RELAY (80) VAA11, flush mounted	Alstom	Aux. supply voltage- 110V DC	Nos.	5			
						TOTAL		

Note: (1) Refer data sheet-A for technical details of relays.

(2) Bidder to note that since these spares shall be despatched to Sudan Site through air cargo, the packing of these items shall be suitable for air transportation.