

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 1 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619
Item : Power Distribution Board

DETAILED SPECIFICATION OF HV SWITCHGEAR

HV SWITCHGEAR

1.00.00 CODES AND STANDARDS

Major standards, which shall be followed, are listed below. Other applicable Indian Standards for any component part, even if not covered in the listed standards:

i)	IS . 3427	xiii)	IS . 9224
ii)	IS . 13118	xiv)	IS . 9046
iii)	IEC . 62271	xv)	IS . 12063
iv)	IEC - 60694	xvi)	IS . 5082
v)	IS . 10118	xvii)	IS . 13516
vi)	IS . 5578	xviii)	IS . 11353
vii)	IS . 2705	xix)	IS . 11955
viii)	IS . 3231	xx)	IS . 4794
ix)	IS . 722	xxi)	IS . 6875
x)	IS . 1248	xxii)	IS . 996
xi)	IS . 9385	xxiii)	IS . 12729
xii)	IS - 3156	xxiv)	IS . 2544
		xxv)	IS . 61233

Including above the design and supply of this electrical system (HT PDB) under this package shall conform to the requirements of latest revisions Indian Standards, IE Rules, local rules and regulations.

2.00.00 DESIGN CRITERIA

2.01.00 The switchgear bus bar rating shall be equal to the rating of incomer. Rating of the Bus- section and tie-breaker shall be equal to the incoming breaker rating.

2.02.00 For continuous operation at specified rating, temperature rise of the various switchgear components shall be limited to the permissible values stipulated in the relevant standards and /or this specification.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 2 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619

Item : Power Distribution Board

- 2.03.00 The switchgear and components there of shall be capable of withstanding the mechanical forces and thermal stresses of the short circuit current listed in the annexure without any damage or deterioration of material.
- 2.04.00 Outgoing breaker shall be suitable for switching dry type as well as oil filled LT transformer both under loaded and unloaded conditions. Breaker or vacuum contactor controlling motors shall be capable of being used for frequent starting of normal squirrel cage induction motors as well as slip ring motor with rotor starter. In later case, the breaker / contactor shall be equipped for electrical signal exchange with rotor starter mounted in MCC room or near motor.
Circuit breaker / vacuum contactor shall not produce any harmful over-voltage during switching off induction motors. If required, surge protective devices shall be included in the scope of supply to limit over-voltage.
Indicative control schematic diagrams of circuit breakers/vacuum contactors are enclosed for guidance for bidder to develop their own drawings. All gadgets as required for sequential and protective interlocking with devices within or external to the switchgear, which are required for satisfactory and trouble free operation of the system are deemed to be included in the scope of work.
- 2.05.00 6600 V system is resistance grounded with ground fault current limited to 400A.
- 3.00.00 SPECIFIC REQUIREMENTS
- 3.01.00 Construction
- 3.01.01 Switchgear shall be such as to allow extension at either end.
- 3.01.02 The minimum thickness of sheet steel used shall be 2mm.
- 3.01.03 Switchgear assembly shall comprise a continuous, dead-front line . up of free standing, vertical cubicles. Each cubicle shall have a front hinged door with latches and a removable back cover. All covers and doors shall be provided with neoprene gaskets.
- 3.01.04 Switchgear cubicle shall be so sized as to permit closing of the front access door when the breaker is pulled out to TEST position. The working zone shall be restricted within 750 mm to 1800 mm from floor level.
- 3.01.05 Circuit breakers, instrument transformers, bus-bars, cable compartment etc. shall be housed in separate compartments within the cubicle. The design shall be such that failure of one equipment shall not affect the adjacent units. Vacuum Contactor shall be housed in drawout module.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 3 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619

Item : Power Distribution Board

- 3.01.06 All relays, meters, breaker control switches, selector switches and indicating lamps shall be flush mounted on the respective cubicle door or on control cabinet built on the front of the cubicle. AC/DC auxiliary supply switches / isolation switches for cubicle space heater, cubicle lamp, spring charging motor circuit shall be located inside metering compartment.
- 3.01.07 Dummy panel shall be provided in the switchgear line up, if required, for easy termination access of power and control cables. Dummy panel / bus trunking panel shall be of full cubicle with closed roof and rear door similar to enclosures for active cubicles.
- 3.02.00 Bus and Bus Taps
The main buses and connections shall be of high conductivity copper alloy, sized for specified current ratings with maximum temperature limited to:
a. For bolted joints (Plain or tinned) : 90⁰ C
b. For bolted joints (Silver plated) : 105⁰ C
- 3.02.02 All bus connections shall be silver plated. Adequate contact pressure shall be ensured by means of two bolts connection with plain and spring washers and locknuts.
Bimetallic connectors shall be furnished for connections of outgoing cable (Al)
- 3.02.03 Busbars and connection shall be fully insulated for working voltage with adequate phase/ground clearance. Insulating sleeves for busbars and cast-resin shrouds for joints shall be provided, suitable for maximum temperature rise of bus bars. Bus insulator shall be flame-retardant, track resistant type with high creepage surface.
- 3.02.04 All buses and connections shall be supported and braced to withstand stresses due to maximum short circuit current and also to take care of any thermal expansion.
- 3.02.05 Busbars shall be colour coded for easy identification and so located that the sequence R-Y-B shall be from left to right, top to bottom or front to rear, when viewed from front of the switchgear assembly.
- 3.02.06 Bus bars shall be of same size for the entire length of the switchgear. Continuous current rating of bus connections/dropper shall be same as that of continuous in panel current rating of associated breaker.
- 3.02.07 Copper bus bars shall be used for bus bar for all the phases with maximum temperature rise limit
- 3.03.00 Circuit breaker
- 3.03.01 Circuit breaker shall be triple pole, single throw and vacuum type. For vacuum circuit breakers are offered, breakers shall be provided with a provision for online indication of loss of vacuum in the breaker.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 4 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619

Item : Power Distribution Board

- 3.03.02 Circuit breakers shall be horizontal isolation and horizontal drawout type, having SERVICE, TEST and DISCONNECTED positions with positive indication for each position.
- 3.03.03 Circuit breakers of identical rating shall be physically and electrically interchangeable.
- 3.03.04 Circuit breaker shall be re-strike free and shall have motor wound spring charged trip free mechanism with antipumping . feature and shunt trip. In addition facility for manual charging of spring shall be provided. An antipumping contactor shall be provided for each breaker even if it has built in mechanical anti pumping features.
- 3.03.05 For motor wound mechanism, spring charging shall take place automatically after each breaker closing operation. One open-close-open operation of the circuit breaker shall be possible after failure of power supply to motor.
- 3.03.06 Mechanical safety interlock shall be provided to prevent:
 - a. The circuit breaker from being racked in or out of the service position when the breaker is closed.
 - b. Racking in the circuit breaker unless the control plug is fully engaged.
- 3.03.07 Automatic safety shutters shall be provided to fully cover the female primary disconnects when the breaker is withdrawn.
- 3.03.08 Each breaker shall be provided with an emergency manual trip, mechanical ON-OFF, indication, an operation counter and mechanism charge/discharge indicator.
- 3.03.09 Each breaker shall be provided with following:
 - a. Auxiliary switch, with 6 NO + 6NC contacts, mounted on the drawout portion of the switchgear.
 - b. Position/cell switch with 4NO + 4NC contacts, one each for TEST and SERVICE position.
 - c. Auxiliary switch, with 4 NO + 4NC contacts, mounted on the stationary portion of the switchgear and operated mechanically by sliding lever from the breaker in SERVICE position. Alternatively electrically reset latching relay, may be used for the purpose.
 - d. Spring charge limit switch with 2 NO + 2 NC contacts.
- 3.03.10 Limit/auxiliary switches shall be convertible type that is facility for changing N.O. contact to N.C. and vice-versa. Switch contact shall be rated 10A A.C. and 2A D.C. at operating voltage.
- 3.04.00 Control & Indication
The circuit breaker shall be wired up for local & remote operation. Each breaker cubicle shall be equipped with following:-

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 5 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619

Item : Power Distribution Board

- 3.04.01 One (1) TEST . NORMAL . Sw. Gr. Selector switch stay puttype with pistol grip handle and key interlock.
- 3.04.03 Three (3) indicating lights on front of compartment:-
 - GREEN : Breaker open and spring charged
 - RED : Breaker closed
 - AMBER : Trip
 - WHITE : Trip circuit healthy
- 3.04.04 All indicating lamps shall be of high intensity cluster LED type
- 3.05.00 Vacuum contactor
- 3.05.01 Vacuum contactor shall be drawout type, three (3) pole vacuum break type designed for motor duty category with non-bouncing contacts.
- 3.05.02 Operating coil (i.e. closing and tripping coil) of the contactor shall be suitable for operation on 110V. DC supply.
- 3.05.03 Each contactor shall have two (2) NO and two (2) NC auxiliary contacts rated 2A. 110V DC
- 3.05.04 Vacuum contactors with HRC fuse feeder are 110V DC controlled and mechanically latched type.
- 3.05.05 Vacuum contactor surge impedance shall be restricted below flash voltage of the motor.
- 3.06.00 Current transformer
- 3.06.01 Current transformers shall be cast resin type. All secondary connections shall be brought out to terminal blocks where wye or delta connection will be made.
- 3.06.02 Accuracy class of the current transformers shall be:-
 - a. Class PS for differential relaying (or as required depending on the type of relay selected).
 - b. Class 5P 20 for other relaying.
 - c. Class 1.0 and ISF \leq 10 for metering.
 - d. Class 0.5 or better and ISF \leq 2 for performance and precision metering.Other particulars of the CTs like ratio burden. Knee point voltage, excitation current and the bidder shall decide secondary resistance.
- 3.06.04 Each feeder shall be provided with current transducers with calibration for full scale reading for remote metering. Output shall be 4 to 20 mA DC dual channel.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 6 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619

Item : Power Distribution Board

- 3.06.05 Current transformer secondary shall be rated for 1A.
- 3.07.00 Voltage transformer
 - 3.07.01 Voltage transformers shall be cast-resin, drawout type and shall have an accuracy class of 1.0. Voltage transformer shall be mounted on top of breaker panel with proper arrangement like rail, fuse protection etc.
 - 3.07.02 High voltage windings of voltage transformer shall be protected by current limiting fuses. The voltage transformer and fuses shall be completely disconnected and visibly grounded in fully draw-out position.
 - 3.07.03 Low voltage fuses, sized to prevent overload, shall be installed in all ungrounded secondary leads. Fuses shall be suitably located to permit easy replacement while the switchgear is energized.
- 3.08.00 Relay
 - 3.08.01 Relays shall be of draw out design with built-in testing facilities and flush mounted at the front of panel. Small auxiliary relays may be in non-draw out execution and mounted within the cubicle.
 - 3.08.02 Relays shall be rated for operation on 110V secondary voltage and 1 or 5A secondary current as shown on drawings. Number and rating of relay contacts shall suit the job requirement.
 - 3.08.03 Unless mentioned otherwise in the specification, protective relays shall be multifunction type numerical relays.
 - 3.08.04 Multifunction numerical relays shall be selected to provide an integrated protection. continuous measurement and monitoring functions. Features such as self-diagnosis and external testing, disturbance recording, sequence of event recording, time stampings shall be available with the relay. Relevant data shall be possible to be stored in non-volatile memory backed up by battery. The relay shall have multiple setting groups, optically isolated input/output, front LCD display and menus, fixed function and programmable LEDs, keypad and password protection. All functions including protection, Automation, communication, LEDs, Input/output shall be programmable and can be modified, if required, using the front panel user interface. Communication post for local and remote (with suitable protocol) communication shall be located in the front and rear part of the relay. A laptop loaded with support software. (complete version) shall be supplied for local off line programming, measurements, extracting and viewing of events, disturbance etc. The relay shall be housed in dust tight enclosure, suitable for IP 52 degree of protection.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 7 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619

Item : Power Distribution Board

- 3.08.05 The contractor shall furnish, install & co-ordinate all relays to suit the requirements of protection, interlock and bus transfer schemes as broadly indicated in the annexure and drawings.
- 3.09.00 Meter and Selector Switch
 - 3.09.01 Indicating instruments (96 x 96 mm) shall be switchboard type, with 250° scale, anti-glare glass and accuracy class of $\pm 2\%$ full scale. Each meter shall have zero adjuster on the front.
 - 3.09.02 Motor ammeter shall have extended suppressed end-scale range to indicate starting current (6-8 time full loads). Analogue type.
 - 3.09.03 Energy meter shall be three phase multifunction, digital type with communication port for DCS interface.
 - 3.09.04 Meter selector switch shall be maintained contact, stay put type with knob handle. Ammeter & Voltmeter selector switches shall be four position type- Ammeter selector switches shall have make before break contacts, to prevent open circuiting of CT secondary.
- 3.10.00 Secondary Wiring
 - 3.10.01 The switchgear shall be fully wired at the factory to ensure proper functioning of control, protection, transfer and interlocking schemes.
 - 3.10.02 Fuse and links shall be provided to permit individual circuit isolation from bus wires without disturbing other circuits. All spare contacts of relays, switches and other devices shall be wired up to terminal blocks.
 - 3.10.03 Wiring shall be done with flexible, 650V grade, PVC insulated switchboard wires with stranded copper conductors of 2.5 mm² for control and current circuits and 1.5mm² for voltage circuits.
 - 3.10.04 Each wire shall be identified, at both ends, with permanent markers bearing wire numbers as per Contractor's Wiring Diagrams.
 - 3.10.05 Wire termination shall be made with crimping type connectors with insulating sleeves. Wires shall not be spliced between terminals.
- 3.11.00 Terminal Blocks
 - 3.11.01 Terminal blocks shall be 660V grade box-clamp type with marking strips ELMEX 10 mm² or equal. Terminals for C.T. Secondary leads shall have provision for shorting.
 - 3.11.02 Not more than two wires shall be connected to any terminal. Spare terminals equal in number to 20% active terminals shall be furnished.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 8 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619
Item : Power Distribution Board

- 3.11.03 Terminal blocks shall be located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals. All control terminals including spare contacts required for external interfacing shall be brought out to control terminal box for individual breaker. This control terminal box shall be located on the back side of individual breaker panel.
- 3.12.00 Cable Termination
- 3.12.01 Switchgear shall be designed for cable entry from the bottom. Sufficient space shall be provided for ease of termination and connection.
- 3.12.02 All provisions and accessories shall be furnished for termination and connection of cables, including removable gland plates, cables supports, crimp type tinned copper/aluminum lugs, brass compression glands with tapered washer (Power cable only) and terminal blocks. Separate terminal box shall be provided at back side of individual breaker.
- 3.12.03 The gland plates shall be minimum 3 mm thick. The gland plate and supporting arrangement for 3 core 185 Sq. mm Al. & 150 Sq. mm armoured power cables.
- 3.12.04 Sufficient space shall be provided between the power cable termination and gland plate. Core balance CTs wherever specified, shall be accommodated within this space, inside the cubicle.
- 3.12.05 Minimum clearance between any live part of 6.6 KV of panel and floor level shall be minimum 500 mm (approx) during racked in position. And this clearance shall be minimum 250mm(approx) the breaker is in service position or in out position.
Clearance between gland plate and cable termination point shall be minimum 650 mm for out going power cables.
- 3.13.00 Bus Duct Connection (Not Applicable)
- 3.13.01 Bus duct connections, when specified on drawings/drawings, shall be furnished along with transition panel if required. Bus duct connections shall be generally from the top.
- 3.13.02 All connecting bus work shall have the same continuous rating as associated switchgear bus and shall be fully braced for the listed short circuit current.
- 3.13.03 All provisions such as matching flange and other accessories required for proper connection to the bus duct shall be furnished.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 9 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619

Item : Power Distribution Board

3.14.00 Ground Bus

3.14.01 A ground bus, rated to carry maximum fault current, shall extend full length of the switchgear.

3.14.02 The ground bus shall be provided with two-bolt drilling with G.I. bolts and nuts at each end to receive 75 x 10 mm G.I. flat.

3.14.03 Each stationary unit shall be connected directly to the ground bus. The frame of each circuit breaker and drawout V.T. unit shall be grounded through heavy multiple contacts at all times except when the primary disconnecting devices are separated by a safe distance.

3.14.04 Wherever the schematic diagrams indicate a definite ground at the switchgear, a single wire for each circuit thus grounded shall be ran independently to the ground bus and connected thereto.

3.14.05 C.T. and V.T. secondary neutrals shall be earthed through removable links so that earth of one circuit may be removed without disturbing other.

3.15.00 Earthing Truck

Earthing trucks shall be provided for earthing the switchgear bus bars or outgoing cables. The trucks shall have a voltage transformer and an interlock to prevent earthing of any live connection. The trucks shall have audio-visual annunciation to warn the operator against earthing of live connections. It shall not be possible to use bus-earthing truck for cable earthing & vice versa. Earthing truck shall be non-fault making type. Circuit breakers provided with integral earth switch, as an alternative, is not acceptable.

3.16.00 Nameplates

3.16.01 Nameplates of approved design shall be furnished at each cubicle and at each instruments & device mounted on or inside the cubicle.

3.16.02 The material shall be lamicoid or approved equal, 3 mm thick with white letter on black back ground.

3.16.03 The nameplate shall be held by self-tapping screws. Nameplate size shall be minimum 20 x 75 mm for instrument / device and 40 x150 mm for panels.

3.16.04 Caution notice on suitable metal plate shall be affixed at the back of each vertical panel

3.17.00 Space heaters and Plug sockets

3.17.01 Each cubicle shall be provided with thermostat controlled space heaters and 5A, 3 pin plug socket.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 10 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619

Item : Power Distribution Board

- 3.17.02 In addition, motor feeder cubicle shall be wired-up for feeding the motor space heater through suitable rated breaker auxiliary NC contact and /or contactor.
- 3.17.03 Cubicle heater, Motor heater, Plug/socket circuits shall have individual switch fuse units.
- 3.17.04 A.C. load shall be so distributed as to present a balance loading on three-phase supply system.
- 3.18.00 A.C/D.C. power supply
- 3.18.01 The following power supplies shall be made available to each switchgear:
A.C. Supply : Single Feeder
D.C. Supply : Double Feeder
- 3.18.02 Isolating switch fuse units shall be provided at each switchgear for the incoming supplies, 4-pole, single throw for A.C. and 2-pole, double throw for D.C. molded case circuit breaker (MCCB) shall also be accepted as an alternative.
- 3.18.03 Bus-wires of adequate capacity shall be provided to distribute the incoming supplies to different cubicles. Isolating switch fuse units / MCCB shall be provided at each cubicle for A.C./D.C. supplies.
- 3.18.04 A.C. load shall be so distributed as to present a balance loading on three-phase supply system.
- 3.19.00 Accessories
Following accessories shall be furnished along with the switchgear:
a. Earthing equipment suitable for earthing the bus.
b. Earthing equipment suitable for earthing the outgoing cable.
- 4.00.00 Tests
- 4.01.00 The switchgear shall be completely assembled, wired, adjusted and tested at the factory as per the relevant standards.
- 4.02.00 Routine test
The tests shall include but not necessarily limited to the following:
a. Operation under simulated service condition to ensure accuracy of wiring, correctness of control scheme & proper functioning of the equipment.
b. All wiring and current carrying part shall be given appropriate high voltage test.
c. Primary current and voltage shall be applied to all instrument transformers.
d. Routine test shall be carried out on all equipment such as circuit

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 11 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619
Item : Power Distribution Board

breakers, instrument transformers, relay meters etc.

4.03.01.1 Type test

Test reports for the following type tests shall be submitted.

- a. Short circuit duty test on circuit breaker, mounted inside the panel offered along with CTs, bushings and separators.
- b. Short time withstand test on circuit breaker, mounted inside the panel offered together with CTs, bushings and separators.
- c. Lightning impulse withstand test on breaker and panel.
- d. Temperature rise test on breaker and panel together. For this test, the set-up shall include three panels with breakers, the test breaker and panel being placed in the centre. The adjacent panel shall also be loaded to their rated current capacity.
- e. Measurement of resistance of main circuit.

RATINGS AND REQUIREMENTS

1.0 SWITCHGEAR

1.1 General

Type : Metal-clad, horizontal isolation and horizontal draw out type
Service : Indoor
Enclosure : IP - 4X

1.2 System

Voltage : 6600 V \pm 10%
Phase : 3
Frequency : 50 Hz \pm 5%
System ground : Non-effectively earthed through resistance.

1.3 Design ambient temperature : 50°C

1.4 Rated current inside the cubicle and at design ambient temperature of 50°C

Bus bar : 800A
Incoming/Bus coupler/other
Circuit breaker : 800A

1.5 Short Circuit Rating

Interrupting : 25 kA (min.)
Shorting time for 3 Secs : 25 kA (min.)

1.6 Insulation level : 60/20KV (peak/r.m.s)

1.7 AC/DC Power supply

Control voltage : 110V + 10% to -15% DC for circuit breaker/vacuum contactor from DC system.

Service voltage : 240V \pm 10%. 1Ph. 50 Hz \pm 5%

1.8 Termination details

Incommer/Tie feeder : Bottom entry cable

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 12 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619
Item : Power Distribution Board

	Outgoing motor feeder	: Bottom entry cable
1.9	Painting requirement	
	a) Finish paint:	: Powder coating
	b) Paint base	: Epoxy/poly-eurethene
	c) Paint shade	: 631 a per IS-5
2.0	Circuit breaker	
2.1	Duty cycle	: 0-3q CO-3q CO
2.2	Breaking current	
	A.C. Symmetrical	: 25 kA (min.)
	A.C. Asymmetrical	: As per IEC
2.3	Making current (peak)	: 62.5 kA (min.)
2.4	Operation time	
	Break time	: Not more than 3 cycles
	Make time	: Not more than 5 cycles
2.5	Auxiliary voltage	
	Closing	: 110 V D.C. (85% - 110%)
	Tripping	: 110 V D.C. (70% - 110%)

PROTECTIONS

1.0 The minimum protections to be provided for different type of circuits are given below.

a. Incomer : Instantaneous over current relay (50)
: Inverse time over current relay (51) for phase fault
: Inverse time O/C relay (51N) for earth fault

b. Motor (As applicable) : 1 . motor protection relay (99) for protection against:-

- Thermal over load
- Phase fault
- Unbalance (negative sequence)
- Locked rotor
- : Definite time over current relay (50G) for earth fault (through CBCT)

1-Differential protection (87) for motor above 1000 KW rating

: Under voltage relay with 2 contacts for closing circuit and tripping circuit.

: VT fuses failure at bus PT to protect under voltage operation against PT primary and secondary fuse failure detection scheme.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 13 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619
Item : Power Distribution Board

- c. Transformer : Instantaneous over current relay (50)
: Inverse time over current relay (51) for phase fault.
: Inverse time O/C relay (51N) for earth fault.
: Restricted earth fault relay (64R)
: Lot multiplication relay for winding temperature alarm and trip.
: Lot multiplication relay for oil temperature alarm and trip.
: Lot multiplication relay for conservation oil level low alarm and trip.
: Lot multiplication relay for gas pressure alarm and trip.
: Lot multiplication relay for pressure relief device operated alarm
- 2.0 Incase any trip function is not available in a single relay, separate numerical relay shall be provided to achieve the requirement.
- 3.0 All protective relays shall be provided with self reset type contacts.
- 4.0 Apart from protective relays, each breaker shall be provided with discrete auxiliary relays for anti-pumping (94). Trip annunciation (30), trip supervision (74) electrically reset type breaker contacts multiplication (52x) relay and lockout (86) functions. Lockout relay shall be hand reset type. For multifunction relays however, trip circuit supervision function as an integral feature of the relay is acceptable. Individual trip circuit supervision function shall be provided with respect to each trip coil of circuit breaker. For Vacuum contactor circuits also, supervision (74) and lockout relay (86) shall be provided.
- 5.0 Numerical under voltage relays (27) with time delay relay including VT fuse failure relay shall be provided for VTs.
- 6.0 IDMTL relay version shall be decided as per system requirement and the same shall be finalized during detail engineering.
- 7.0 Zero-sequence CT and associated relay combination shall be such as to ensure a pick-up sensitivity of 10A primary ground fault current.
- 8.0 Separate locked rotor protection relay (50 LR) with auxiliary relay (50 LRX) shall be furnished, if required.
- 9.0 It is deemed to be bidder's responsibility to offer those relays only which are not to be phased out of manufacturing range.

URANIUM CORPORATION OF INDIA LIMITED
JADUGUDA MINES

Annexure-1
Page 14 of 14

Public Tender No. : PUR / 1 / 97 / 9994 / 619
Item : Power Distribution Board

<u>MANDATORY SPARE PARTS FOR PACKAGE UCTL -4</u>	
<u>Item</u>	<u>Quantities</u>
H.T. Switch board	
a. Spring charging motor	01 set
b. Closing coil	01 set
c. tripping coil	01 set
d. Breaker mechanism auxiliary contact	01 set
e. Vacuum bottle(Breaker)	01 set (set of 03)
f. One set of complete indicating lamp with holder for i/c breaker	01 set

MANDATORY MAINTENANCE EQUIPMENT

<u>Sl. No.</u>	<u>ITEM</u>	<u>QUANTITY</u>
1.	BUSBAR Earthing Truck (With due interlock)	1 set
2.	Circuit / Cable side earthing truck (With due interlock)	1 set

NOTE:

1. For each set of switchgear panel the accessories i.e. spring charging handle, panel keys, breaker handling trolley, bus earthing trolley etc. considered shall be clearly mentioned in the technical bid.
2. All motor protection relays shall be numerical type of make: Siemens/Schneider Electric (MICOM Series). All Motor and feeder protection relays shall be comprehensive type. Type of numerical relay shall be furnished in offer.
3. Only **EE (ALSTOM) make relays** are desirable to be used for incomers and transformer feeders. However if EE (Alstom) make relays are not available, 2 nos. reliable numerical relays of make Siemens/Schneider Electric shall be used for each of incomer and transformer feeders and protections shall be achieved through these 2 nos. of numerical relays by incorporating some of protections in one numerical relay and some protections in other numerical relay. This is to avoid complete failure of protections in case one numerical relay fails/malfunctions. Type of numerical relay shall be furnished in offer.