

S. N. Bose National Centre for Basic Sciences

Block JD, Sector III, Salt Lake, Kolkata – 700098

(An autonomous national centre funded by the Department of Science & Technology, Government of India)

Tender No.SNB/PUR/OT/25/035

Date: 07/03/2014

OPEN TENDER

Sealed tender in two parts (separate technical bid and price bid) are invited in the name of Director, S. N. Bose National Centre for Basic Sciences from only reputed & original manufacturer or its sole authorized distributor/dealer with original manufacturing authorization certificate for design, engineering, manufacturing, testing at manufacturer's works and satisfactory delivery to S. N. Bose National Centre for **11 KV HV Panel**, Item no.**02**. The detailed technical specifications and terms & conditions can be obtained from the website: <http://newweb.bose.res.in/InfoAnnouncements/Tender.jsp> The sealed tenders must reach this office within **27th March, 2014**.

Registrar

S. N. Bose National Centre for Basic Sciences

Block JD, Sector III, Salt Lake, Kolkata – 700098

(An autonomous national centre funded by the Department of Science & Technology, Government of India)

NOTICE INVITING TENDER

Tender No.SNB/PUR/OT/25/035

Date: 07/03/2014

Sealed tenders are invited for the equipment as per the details enclosed from the reputed, established and competent manufacturers / suppliers in two bids – technical and financial. The details of tender documents are as follows:-

1.	<i>Name of office inviting tender</i>	S.N. Bose National Centre for Basic Sciences Block JD, Sector III, Salt Lake, Kolkata – 700098
2.	<i>Name of the equipment</i>	11 KV HV Panel
3.	<i>Specifications of the equipments</i>	Can be obtained / downloaded from our website address: http://newweb.bose.res.in/InfoAnnouncements/Tender.jsp
4.	<i>Separate bid for Part-A: Technical and Part-B: Commercial</i>	One large envelope having two smaller envelopes containing separately – Part-A: Technical bid and Part-B: Commercial bid need to be submitted. Tender ref. no. and item name should be mentioned on top of the large envelope. Two smaller envelopes should be superscribed Technical bid / Commercial bid as the case may be.
5.	<i>Submission of Tender</i>	The tender documents duly filled in arranged and sealed in aforesaid manner should be sent to: The Director, at the address given under Sl.No.1 above so as to reach him within 27 th March, 2014 from the date of publication of advertisement. The envelope should be superscribed – “Item name: 11 KV HV Panel , Item no. 02 against Advt. No. SNB/PUR/OT/25/035 dtd:07/03/2014.” The commercial bid of only technical qualified tenders will be opened in presence of representative of the bidders. The technical bids will be opened and evaluated by the Centre internally.
6.	<i>Eligibility of bidder to participate in the tender</i>	Original Equipment Manufacturer (OEM) or its Sole Authorized Business Distributor/Dealer shall be able to bid with original authorization from OEM. No assemble or reseller shall be considered.
7.	<i>Opening of Commercial bid</i>	The Commercial bid will be opened in the presence of Tenderers/ their representatives. Technically qualified bidders will be intimated after technical selection internally.
8.	<i>Documents to be attached along with the tender</i>	All the documents mentioned in the tender document, Annexure I along with a detailed users list of the quoted item including their names, addresses, contact nos., email addresses etc. to be enclosed with the technical bid.

This Centre will not be responsible for postal or any other delay and the **Authority of the Centre reserves the right to accept or reject any or all tenders without assigning any reason thereof.** Tenders / offers sent by fax / email will not be considered and would be rejected.

DIRECTOR

S.N. BOSE NATIONAL CENTRE FOR BASIC SCIENCES

General Terms & Conditions:

- 1) The bid should be submitted in two bid system each of which is to be submitted in separate envelope. Main envelope should contain the “**Technical Bid**” mentioning the detailed technical specification and terms & condition, except price and the “**Price Bid**” should be enclosed in another envelope containing price of the quoted item in the prescribed format only. Both the envelopes should be separately sealed and sent in a large envelope which should be marked with tender reference number and name of the equipment. Separate bid with applicable EMD should be submitted for each of the items in the technical bid.
- 2) Quotation for each item should be submitted separately. Combined bids or combined EMD will not be entertained.
- 3) The tenderer should have high technical, financial reputation with sufficient experience and capable enough for satisfactory supply of similar type of equipment to actual users. Documentary evidence should be submitted in this respect with the technical bid.
- 4) Technical offer should be complete in all respect indicating detailed technical specifications of the offered items, make, model, duties, taxes, delivery period, gross and net weight of the consignment, together with the descriptive leaflet/catalogue/pamphlet/manufacturer’s brochure, etc.
- 5) **The offers shall remain valid at least for a period of 90 days. The period starts from the date of closing of tender submission.**
- 6) The Institute shall not be responsible for delay, loss or non-receipt of the tender through post/Air Mail
- 7) The aforesaid Open Tender is being issued with no financial commitment and purchaser reserves the right to change / vary any item or items thereof at any stage.
- 8) No tenderer shall be entitled for any compensation what so ever for rejection/non consideration of their tender.
- 9) Invitation of tender does not constitute any right or claim for issue of purchase order to the tenderer.
- 10) Only Price Bids will be opened in presence of the technically qualified bidders or their authorized representative who choose to attend on the date and time informed to them after opening of technical bids and its evaluation by the Centre internally.
- 11) The Centre will not be responsible for any misprinting by the newspapers concerned and inaccessibility of the downloading facility for any reason whatsoever and in that case the tenderer(s) should contact to the tendering authority to verify the fact in case of confusion.
- 12) If any information furnished by the tenderer is found incorrect or false at a later stage he shall be liable to be debarred from awarding the contract.
- 13) A copy of full tender document is to be submitted along with technical bid duly signed & stamped on all pages as an acceptance of all terms & conditions mentioned in tender documents.
- 14) a) Payment term: 90% of order value will be paid after delivery at site on satisfactory visual inspection.
b) Balance & final payment: 10% will be withheld as security deposit till expiry of warranty period which may be released against submission of bank guarantee from any nationalized bank

of India of equivalent amount by the supplier, which shall be valid for 18(eighteen) months from the date of its issue.

- 15) Vendors are requested to submit an Earnest Money Deposit (EMD) for the item as given below, in the form of Demand Draft in favour of “S. N. Bose National Centre for Basic Sciences”, payable at Kolkata. Bid without EMD will not be considered and shall be rejected. EMD should be enclosed with the technical bid only.
- 16) EMD of unsuccessful bidder will be refunded without interest after opening of the Commercial bids of the technically qualified vendors. In case of successful bidder EMD will be retained till successful delivery of the item at the Centre.

Sl. No.	Description of Items	Qty	Unit	EMD Amt.
2.	11 KV HT Panel			Rs.70,000.00
	4 panel HT switch Board(1 incomer & 3 outgoing feeder) as per detailed technical specification mentioned in the tender document.	Set	1	
	3 panel HT switch Board(1 incomer & 2 outgoing feeder) as per detailed technical specification mentioned in the tender document.	Set	1	

- 17) EMD will be liable to be forfeited if the vendor withdraws or found anything wrongful in the tender documents at any point of time after submission of bids.
- 18) Centre reserves the right to reject any or all bids without assigning any reason thereof.
- 19) Warranty: The items will be covered under onsite replacement warranty for a period of 18 months from the date of full & satisfactory delivery and its acceptance at the Centre.
- 20) Annexure – I of the tender document should be filled up, sealed & signed and submitted with the technical bid along with all relevant documents mentioned therein.
- 21) In case of any query please contact Mr.Supriyo Ganguly or Mr.Ganesh Gupta, JE(Electrical) over phone or in person on any working day during office hours of the Centre.

Annexure I

- The following form should be submitted with the technical bid duly filled and signed.
- **Relevant documents must be enclosed with the technical bid as per Sl. no. 01 to 13.**

S/ N	PARTICULARS	Yes/No	REMARKS
01	Technical bid & Price bid duly sealed & signed enclosed in separate envelopes as instructed.		
02	<u>Contents of Technical bid</u> (a) Technical details as per specification enclosed with technical bid ⇨ (b) Technical Compliance Statement to be prepared in a separate sheet ⇨ (and any deviation should be mentioned specifically) (c) Literature/Manual of the offered item ⇨ (d) Current Authorization Certificate from the Principal Manufacturer ⇨ (e) Name, address, email & ph. no. of users in India. ⇨		
03	Copy of Trade License, VAT, PAN, Service Tax Registration no. enclosed with the technical bid.		
04	Credentials of past experience		
05	Income Tax Clearance Certificate / copy of income tax return filed / PAN Card		
06	Copy of Proprietary Certificate of the firm in case applicable.		
07	Open Tender no. should be mentioned on top of all quotation envelopes		
08	Validity of Quotation should not be less than 90 days from the date of submission		
09	After sales maintenance procedure of the offered item to be mentioned		
10	Contact details of after sales service centres in Kolkata to be mentioned		
11	Bank details of the beneficiary to be mentioned		
12	In case of any defect found after receipt of material or in case of any deviation from the specifications or in case of any operational defect found during the warranty period, any part or the entire material is to be replaced by the supplier at no extra cost to the Centre.		
13	Whether your company has been blacklisted by any Central/State Govt. organization.		

Note: Offer received without any of the relevant information / certificate / document asked in the above sl. nos. 01 to 13 may not be considered. The Centre reserves the right to accept or reject offer of the tenderer. The Centre's decision shall be final and binding on the tenderer. Attached documents should be duly marked.

Seal & Signature with date



SATYENDRA NATH BOSE NATIONAL CENTRE FOR BASIC SCIENCES
 [Funded by the Department of Science & Technology, Government of India]
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Price Bid for 11 KV HT Panel

“Design, Engineering, Manufacture, Testing at Manufacturer’s Works and Supply & Delivery to SNBNCBS.”

SI No.	Description of Items	Qty	Unit	Unit Rate (in Rs.)	Tot. Amt. (in Rs.)
2.	11 KV HT Panel 4 panel HT switch Board(1 incomer & 3 outgoing feeder) as per detailed technical specification mentioned in the tender document.	Set	1		
	3 panel HT switch Board(1 incomer & 2 outgoing feeder) as per detailed technical specification mentioned in the tender document.	Set	1		
Item Total					
Packing, Forwarding, Freight, Insurance, etc.,					
CST/VAT @%					
Others (if any) should be indicated					
Net F.O.R price up to S. N. Bose National Centre – Total (in words):					

 Seal & signature with date

❖ Note: Centre is exempted from payment of Central Excise Duty against DSIR certificate. CEDEC will be provided with the Purchase Order if required.

2. 11 KV HV Panel

3 Panel HT Switch Board & 4 Panel HT switch board

TOTAL-1 Unit (each)

SI No.	Technical Description of item	Qty
	3 Panel HT Switch Board (Make: Schneider/Crompton Greaves/Kirloskar/Siemens)	
	Feeder Qty-1 No.	
1.	INCOMER :	
(a)	Moving portion:	
	11 KV, 800A, 25KA, ELECTRICALLY OPERATED DRAWOUT (HORIZONTAL ISOLATION & HORIZONTAL DRAWOUT) TYPE VCB WITH MOTORISED SPRING CHARGE MECHANISM SUITABLE FOR 230V AC, CLOSING & TRIPPING COILS RATED 24 V DC	1 No.
	MECHANICAL ON / OFF INDICATOR	1 No.
	AUX. SWITCH 4NO+4NC	1 No.
	REAR ENTRY CABLE BOX	1 No.
(b)	PANEL, BUSBAR, CT & PT:	
	FULLY COMPARTMENTALISED SHEET STEEL ENCLOSURE, FLOOR MOUNTING TYPE WITH AUTOMATIC SAFETY SHUTTERS, INDEPENDENT PRESSURE DISCHARGE FLAPS ALONGWITH PVC ENCAPSULATED 800A CU BUSBAR, FOUNDATION BOLTS ETC WITH PROVISION FOR TERMINATING XLPE CABLE USING M-SEAL TYPE TERMINATION KITS (TERMINATION KIT NOT IN YOUR SCOPE OF SUPPLY).	1 No.
	EPOXY CAST RESIN INSULATED DOUBLE CTS HAVING RATIO OF 150-75/5+5A ,FOR METERING WITH ACCURACY CLASS 0.5, FOR PROTECTION WITH ACCURACY CLASS 5P10 , BURDEN 15/15 VA & STR 25 KA FOR 1 SEC.	3 Nos.
	3 PH,3LIMB POTENTIAL TRANSFORMER HAVING RATIO 11000/R3/110/R3PT WITH HV & LV FUSES, 50VA/CL.1, OVF1.9 for 30 Sec. for metering & 3P for protection, backed by LT MCBs	1 No.
(c)	BREAKER PANEL INDICATION LAMPS :	
	ON/OFF/TRIP/TRIP CKT HEALTHY/SP.CH	5 Nos
(d)	SWITCHES AND OTHER ACCESSORIES :	
	HEATER WITH HEATER SWITCH & THERMOSTAT	1 No.
	AC ON/OFF SWITCH	1 No.
	CUBICLE ILLUMINATING LAMP	1 No.
	15A, 230V, 3 PIN PLUG & SOCKET AND MCB	1 No.
	LOCAL-REMOTE SWITCH	1 No.
	T-N-C SWITCH	1 No.
	DC ON / OFF SWITCH	1 No.
	MCB	1 No.
	OPERATIONAL COUNTER	1 No.
(e)	METERS / TRANSDUCERS :	
	AMMETER WITH SELECTER SWITCH ANALOG TYPE (ACCURACY 1.0)	1 No.
	VOLTMETER WITH SELECTER SWITCH ANALOG (ACCURACY 1.0)	1 No.
	MULTIFUNCTION METER WITH 485COM PORT , 3 PH 3 WIRE, CL-0.5 , MODEL-EM-6400	1 No.

(f)	RELAYS :	
	2O/C +1 E/F RELAY, CDG-31,DMT-3SEC2NO+2NC H/R. O/C SETTING-50-200%, E/F SETTING 10-40 %, CTR-/5A, FLAG REQUIRED	1 No.
	Master Trip Relay Type VAJH13, Aux Supply 24 V DC	1 No.
	Trip Circuit Supervision Relay , VAX 31, S/R 24 V DC ,	1 No.
	ANTIPUMPING RELAY	
	Type of Feeder-630 KVA ONAN Transformer	
	Feeder Qty-2 Nos.	
2.	For Individual 11/0.433 KV,630 KVA ONAN transformer with OLTC	
(a)	Moving Portion	
	11KV, 800A, 25KA metal clad VCB ELECTRICALLY OPERATED DRAWOUT (HORIZONTAL ISOLATION & HORIZONTAL DRAWOUT) TYPE VCB WITH MOTORISED SPRING CHARGE MECHANISM SUITABLE FOR 230 V AC, CLOSING & TRIPPING COILS RATED 24 V DC	1 No.
	MECHANICAL ON / OFF INDICATOR	1 No.
	AUX. SWITCH 4NO+4NC	1 No.
	REAR ENTRY CABLE BOX	1 No.
(b)	PANEL, BUSBAR, CT AND PT DETAILS	
	FULLY COMPARTMENTALISED SHEET STEEL ENCLOSURE FLOOR MOUNTING TYPE WITH AUTOMATIC SAFETY SHUTTERS, INDEPENDENT PRESSURE DISCHARGE FLAPS ALONG WITH PVC ENCAPSULATED 800A BUSBAR, FOUNDATION BOLTS ETC WITH PROVISION FOR TERMINATING PVC/PILC/XLPE CABLE USING M-SEAL TYPE TERMINATION KITS (TERMINATION KIT NOT IN YOUR SCOPE OF SUPPLY).	1 No.
	EPOXY CAST RESIN INSULATED DOUBLE CTS HAVING RATIO OF 60-30/5+5A ,FOR METERING WITH ACCURACY CLASS 0.5,FOR PROTECTIONWITH ACCURACY CLASS 5P10 , BURDEN 15/15 VA & STR 25 KA FOR 1 SEC.	3 Nos.
(c)	BREAKER PANEL INDICATION LAMPS :	
	ON/OFF/TRIP/TRIP CKT HEALTHY/SP.CH	5 Nos.
(d)	SWITCHES AND OTHER ACCESSORIES :	
	HEATER WITH HEATER SWITCH & THERMOSTAT	1 No.
	AC ON/OFF SWITCH	1 No.
	CUBICLE ILLUMINATING LAMP	1 No.
	15A, 230V, 3 PIN PLUG & SOCKET AND MCB	1 No.
	LOCAL-REMOTE SWITCH	1 No.
	T-N-C SWITCH	1 No.
	DC ON/OFF SWITCH	1 No.
	MCB	1 No.
	OPERATIONAL COUNTER	1 No.
(e)	METERS / TRANSDUCERS :	
	ANALOG TYPE AMMETER WITH SELECTER SWITCH (ACCURACY 1.0)	1 No.
(f)	RELAYS :	
	2O/C +1 E/F RELAY, CDG-31,DMT-3SEC2NO+2NC H/R. O/C SETTING-50-200%, E/F SETTING 10-40 %, CTR-/5A, FLAG REQUIRED	1 No.
	Master TRIP RELAY TYPE VAJH13, Aux Supply 24 V DC	1 No.
	Trip Circuit Supervision Relay, VAX31 S/R 24V DC	1 No.
	Aux relay,24 V DC for Bouchloz relay A/T & winding Temp A/T, Aux supply 24 V DC,Type VA23	1 No.
	ANTI PUMPING RELAY	1 No.

4 Panel HT Switch Board (Make: Schneider/Crompton Greaves/Kirloskar/Siemens)		
	FEEDER QTY. 2	
	INCOMER	
(a)	MOVING PORTION :	
	11KV, 800A, 25KA metal clad VCB ELECTRICALLY OPERATED DRAWOUT (HORIZONTAL ISOLATION & HORIZONTAL DRAWOUT) TYPE VCB WITH MOTORISED SPRING CHARGE MECHANISM SUITABLE FOR 230 V AC, CLOSING & TRIPPING COILS RATED 24 V DC, complete with self contained operated fully interlocked rack in & rack out mechanism.	1 No.
	MECHANICAL ON / OFF INDICATOR	1 No.
	AUX. SWITCH 4NO+4NC	1 No.
	REAR ENTRY CABLE BOX	1 No.
(b)	PANEL, BUSBAR, CT AND PT DETAILS	
	FULLY COMPARTMENTALISED SHEET STEEL ENCLOSURE FLOOR MOUNTING TYPE WITH AUTOMATIC SAFETY SHUTTERS, INDEPENDENT PRESSURE DISCHARGE FLAPS ALONGWITH PVC ENCAPSULATED 800A BUSBAR, FOUNDATION BOLTS ETC WITH PROVISION FOR TERMINATING PVC/PILC/XLPE CABLE USING M-SEAL TYPE TERMINATION KITS (TERMINATION KIT NOT IN YOUR SCOPE OF SUPPLY).	1 No.
	EPOXY CAST RESIN INSULATED DOUBLE CTS HAVING RATIO OF 60-30/5+5A ,FOR METERING WITH ACCURACY CLASS 0.5,FOR PROTECTION WITH ACCURACY CLASS 5P10 , BURDEN 15/15 VA & STR 25 KA FOR 1 SEC.	3 Nos.
	3 PHASE, 3 LIMB P.T HAVING RATIO 11000/R3/110/R3PT WITH HV & LV FUSES, 50 VA/CL.1 OVF1.9 FOR 30 Sec. For metering & 3P for protection, backed by LT MCBs	1 No.
(c)	BREAKER PANEL INDICATION LAMPS :	
	ON/OFF/TRIP/TRIP CKT HEALTHY/SP.CH	5 Nos.
(d)	SWITCHES AND OTHER ACCESSORIES :	
	HEATER WITH HEATER SWITCH & THERMOSTAT	1 No.
	AC ON/OFF SWITCH	1 No.
	CUBICLE ILLUMINATING LAMP	1 No.
	15A, 230V, 3 PIN PLUG & SOCKET AND MCB	1 No.
	LOCAL-REMOTE SWITCH	1 No.
	MCB	1 No.
	OPERATIONAL COUNTER	1 No.
(e)	METERS / TRANSDUCERS :	
	ANALOG TYPE AMMETER WITH SELECTER SWITCH (ACCURACY 1.0)	1 No.
	ANALOG TYPE VOLTMETER WITH SELECTER SWITCH (ACCURACY 1.0)	1 No.
	MULTIFUNCTION METER WITH 485COM PORT,3 PHASE,3 WIRE CL-0.5,MODEL EM-6400	1 NO.
(f)	RELAYS :	
	2O/C +1 E/F RELAY, CDG-31,DMT-3SEC2NO+2NC H/R. O/C SETTING-50-200%, E/F SETTING 10-40 %, CTR-/5A, FLAG REQUIRED	1 No.
	Trip Circuit Supervision Relay, VAX31 S/R 24V DC	1 No.
	MASTER TRIP RELAY TYPE VAJH13, Aux Supply 24 V DC	1 No.
	ANTI PUMPING RELAY	1 No.

	Type of Feeder-630 KVA ONAN Transformer	
	Feeder Qty-2 Nos.	
2.	For Individual 11/0.433 KV,630 KVA ONAN transformer with OLTC	
(a)	Moving Portion	
	11KV ,800 A,25KA metal clad VCB DRAWOUT(HORIZONTAL ISOLATION & HORIZONTAL DRAWOUT) TYPE VCB WITH MOTORISED SPRING CHARGE MECHANISM SUITABLE FOR 230 V AC, CLOSING & TRIPPING COILS RATED 24 V DC	1 No.
	MECHANICAL ON / OFF INDICATOR	1 No.
	AUX. SWITCH 4NO+4NC	1 No.
	REAR ENTRY CABLE BOX	1 No.
(b)	PANEL, BUSBAR, CT AND PT DETAILS	
	FULLY COMPARTMENTALISED SHEET STEEL ENCLOSURE FLOOR MOUNTING TYPE WITH AUTOMATIC SAFETY SHUTTERS, INDEPENDENT PRESSURE DISCHARGE FLAPS ALONGWITH PVC ENCAPSULATED 800A BUSBAR, FOUNDATION BOLTS ETC WITH PROVISION FOR TERMINATING PVC/PILC/XLPE CABLE USING M-SEAL TYPE TERMINATION KITS (TERMINATION KIT NOT IN YOUR SCOPE OF SUPPLY).	1 No.
	EPOXY CAST RESIN INSULATED DOUBLE CTS HAVING RATIO OF 60-30/5+5A ,FOR METERING WITH ACCURACY CLASS 0.5,FOR PROTECTIONWITH ACCURACY CLASS 5P10 , BURDEN 15/15 VA & STR 25 KA FOR 1 SEC.	3 Nos.
(c)	BREAKER PANEL INDICATION LAMPS :	
	ON/OFF/TRIP/TRIP CKT HEALTHY/SP.CH	6 Nos.
(d)	SWITCHES AND OTHER ACCESSORIES :	
	HEATER WITH HEATER SWITCH & THERMOSTAT	1 No.
	AC ON/OFF SWITCH	1 No.
	CUBICLE ILLUMINATING LAMP	1 No.
	15A, 230V, 3 PIN PLUG & SOCKET AND MCB	1 No.
	LOCAL-REMOTE SWITCH	1 No.
	T-N-C SWITCH	1 No.
	DC ON/OFF SWITCH	1 No.
	MCB	1 No.
	OPERATIONAL COUNTER	1 No.
(e)	METERS / TRANSDUCERS :	
	ANALOG TYPE AMMETER WITH SELECTER SWITCH (ACCURACY 1.0)	1 No.
(f)	RELAYS :	
	2O/C +1 E/F RELAY, CDG-31,DMT-3SEC2NO+2NC H/R. O/C SETTING-50-200%, E/F SETTING 10-40 %, CTR-/5A, FLAG REQUIRED	1 No.
	Master TRIP RELAY TYPE VAJH13, Aux Supply 24 V DC	1 No.
	Trip Circuit Supervision Relay, VAX31 S/R 24V DC	1 No.
	Aux relay,24 V DC for Bouchloz relay A/T & winding Temp A/T, Aux supply 24 V DC, Type VA23	1 No.
	ANTI PUMPING RELAY	1 No.

2. 11 KV H.V. PANEL

2.1 Scope

These specifications cover the detailed requirements for supply, installation, testing and commissioning of High Voltage Panels.

TYPE OF PANELS:

Vacuum Circuit Breaker.

2.2 HV Panel

2.2.1 The Panel board shall be of indoor type, having the incoming sectionalisation and outgoing switch gears as per IS 13118-1991 of VCB, IEC 62271-100 for Breakers and -200 for Panels/IS 3427 of switch board. The degree of enclosure protection shall be IP-45.

2.2.2 Rating: All panels assembled to form a board shall be suitable for the nominal operation voltage and rupturing capacity as specified. They should be rated as specified with a minimum of 630 Amps. And suitable for operation on 11 KV, 3 phase 50 Hz system. Type test certificate for the breaking capacity of the panel shall be supplied. A circuit breaker for a given duty in service is best selected by considering the individual rated values required by load conditions and fault condition.

2.2.3 Type: The HV panel Board shall be metal clad, indoor, floor mounting, free standing type. It shall be totally enclosed dust, damp and vermin proof.

2.2.4 General Construction: Separately earthed compartments shall be provided for circuit breakers, bus bars, relay & instruments, CT&PT and cable boxes, fully and effectively segregating these from one another so that fault in any one compartment do not cause damage to equipment(s) in other compartment(s). The housing shall be of bolted construction to ensure compact and rigid structure, presenting a neat and pleasing appearance. The sheet steel used should not be less than 2mm thick. The panels shall be bolted together to form a continuous flush front switch gear suitable for front operation of board and for extension at both ends.

2.2.5 General Design Aspects: The HV panel board shall be designed such that the switchgear, instruments, relays, bus bars, small wiring etc. are arranged and mounted with due consideration for the followings:-

(i) Facility for inspection, maintenance and repairs of testing terminals and terminal boards for ease of external connection.

(ii) Minimum noise and vibrations

- Risk of accidental short circuits and open circuits.

- Secured and vibration proof connections for power and control circuits.

(iii) Risk of accidental contact and danger to personnel due to live connections.

(iv) Mountings at approachable height

2.3 Circuit Breaker

2.3.1 General Arrangements: The circuit breaker panels shall be complete with the following:

(a) Racking in / Racking out mechanism.

(b) Isolating plugs and sockets.

(c) Mechanical inter-locks and safety shutters.

(d) Mechanical ON/OFF indicator.

- (e) Minimum of 4 NO and 4 NC Auxiliary contacts directly operated by the circuit breaker. Additional NO & NC contacts can be provided with auxiliary contactors.
- (f) Anti condensation space heaters suitable for operation on 240V, 1Ø 50 Hz A.C. for each panel wherever specified.
- (g) Suitable tripping arrangement
- (h) Mechanical counters to assess the total number of operations of the breaker (if asked for specifically).

2.3.2 Type: The circuit breaker shall be of horizontal/ vertical isolation, horizontal draw out pattern.

2.3.3 Breaker Truck: The breaker carriage shall be fabricated from steel, providing a sturdy vehicle for the circuit breaker and its operating and tripping mechanism. The carriage shall be mounted on wheels, moving on guides, designed to align correctly and allow easy movement of the circuit breaker and for removing the carriage for inspection and maintenance purposes. Vacuum interrupters shall be hermetically sealed and shall be designed for minimum contact erosion, fast recovery of dielectric strength, maintenance free vacuum interrupter, suitable for auto-re closing. The drive mechanism shall preferably be provided with facility for pad locking at any position namely, "Service", "Test" and "Fully Isolated". It should be possible for testing the circuit breaker for its operation without energizing the power circuit in the "Testing" position. The contacts shall be made only after the breaker is inserted into service position. Interlocking should prevent contacts from being disconnected if circuit breaker is tried to be moved from service position.

2.3.4 General Features: Single break contacts are provided in sealed vacuum interrupter.

2.3.5 Rating: The circuit breakers shall be continuously rated as specified with a minimum rated current of 630 Amps. With voltage rating and breaking capacity as per IS.

2.3.6 Operating Mechanism: The operating mechanism shall be one of the following as specified:- Manually operated spring charged / motor wound spring charged with both mechanical and electrical release for closing. The operating mechanism shall be trip free. External auxiliary supply shall be made available for charging motors & heaters operation.

2.4 Bus Bar Section

2.4.1 General Requirement: The switch board shall be single bus bar pattern with air insulated encapsulated bus bars housed in a separate compartment, segregated from other compartments. Material: The bus bars shall be of high conductivity electrolytic copper rated as specified with a minimum rated current of 630 Amps. The bus bars shall be sized for carrying the rated and short circuit current without over-heating. Maximum bus bar temperature shall not exceed 95 degree C.

2.5 Current Transformer

2.5.1 General Requirements: Accommodation shall be provided in the circuit breaker panel to mount one set of three numbers dual core dual ratio CTs for metering and protection purposes. Access to the CTs for cleaning, testing or changing shall be from the front, back or top of the panel.

2.5.2 Rating: Dual core & dual ratio CTs of suitable burden (but not less than 15 VA) shall be preferred with 5 Amps secondary. The ratio shall be: 150/100/50/5/5.

Note: CT ratio shall be compatible with the loading pattern on HV side.

The CTs shall conform to relevant Indian Standards. The design and construction shall be robust to withstand thermal and dynamic stresses during short circuits. Secondary terminals of CTs shall be brought out suitably to a terminal block which will be easily accessible for testing and terminal connections. The protection CTs shall be of accuracy class 5 P 10 of IS 2705- Part III-1992. The metering CTs shall conform to the metering ratio and accuracy class 0.5 of IS 2705-1992 for incomer and class 1 for outgoing Panels.

2.6 Voltage Transformer

2.6.1 **General Requirements:** A voltage transformer of burden not less than 100 VA and of proper ratio shall be provided at the incoming panel. The accuracy class for the VT shall be class 0.5 as per IS 3156 parts I to III for incomer and class 1 for outgoing Panels. The transformer shall be of cast epoxy resin construction. It shall be fixed /withdraw able type. HRC fuses/MCBs shall be provided on both HV and LV sides.

2.7 Protection and Tripping Arrangement

2.7.1 **Protection:** The Relays shall be microprocessor based numerical relays with O/L,E/F and S/C protection Tripping relay shall be used for tripping signal to the Shunt Trip Coil of Circuit Breaker operating on 24V/30V D C supply / Power pack / 110 V VT supply.

Note: - 24V/30V DC shall be provided through 2 No. SMF batteries of 12/15 volts of minimum 26 AH capacity with a battery charger as per recommendation of the manufacturer both for protection as well as indications.

2.7.2 **Relays:** Over current Relays shall have adjustable setting for current from 50% to 200% and earth fault from 10% to 40% or 20% to 80%. These should be of manual reset type. All relays shall have a LED indicator which will indicate operation for each function. It shall be possible to reset it only by manual operation. The number and types of relays shall be as specified.

2.8 Small Wiring

The small wiring shall be carried out with minimum 1.5sq. mm FRLS/HFFR insulated copper conductor cables. CT wiring shall be done with minimum 2.5 sq mm wires with colour code: RYB, Gray for auxiliary DC circuits and Black for auxiliary AC circuits The wiring shall be securely fixed and neatly arranged to enable easy tracing of wires. Identification tags shall be fitted to all wire terminals to render identification easy and to

facilitate checking in accordance with IS 375. Necessary terminal blocks and cable entries shall be provided for RTD relay wiring, power supply etc.

2.9 Metering Instrument, Panel Accessories (Digital)

2.9.1 **Metering:** Energy metering shall be done either on the incomers or on the feeders.

2.9.2 **Voltage Selection Scheme:** Where a bus coupler is incorporated and only one incomer feeder (out of two available) is intended to be operated at a time, a VT Transfer Relay shall be incorporated to provide necessary potential for metering. This will be necessary when energy metering is done on individual feeders or where VT supply is used for trip circuits. Alternatively PTs shall be provided on both the bus sections (incomers) with individual metering on each incomer.

2.9.3 **Instrument Panels:** The instrument panel shall form part of the housing. Relays, meters and instruments shall be mounted as per general arrangement drawings to be submitted by the tenderer. They shall be preferably of flush mounting type at a maximum height of 1800 mm.

2.9.4 Instrumentation:

- (a) A voltmeter of class 1.5 accuracy as per IS-1248 shall be provided at each incomer panel, with selector switch. The instrument shall be calibrated for the ranges specified.
- (b) Energy meters of class 1.0 conforming to IS. 722 (Part IX) and power factor meter of class of accuracy of 2 shall be provided, if specified.
- (c) Ammeter of specified range of class 1.5 accuracy as per IS-1248 shall be provided at both incomer and outgoing panels alongwith necessary selector switches.
- (d) The panel assembly shall also take care of the following requirements:

- (i) Lamp indication shall be provided to indicate ON/OFF (BY red green respectively) of switch gear.
- (ii) Panel illuminating lamp.
- (iii) Mechanical indication for spring charged status. If possible an indicating lamp could be provided.
- (iv) Lamp indicating tripping at fault status.
- (v) Healthy trip supply shall be indicated by clear lamp.
- (vi) Separate fuses/MCBs shall be provided for lamps, heaters, voltmeters and other instrumentation etc. on each panel.
- (vii) Anti-condensation space heaters shall be provided, and shall be suitable for operation on 240 V, 1 phase, 50 Hz A.C. for each panel if specified.
- (viii) Where there are more than one incomer and bus sections, these shall be castle key interlocked as per interlocking scheme as specified.

2.10 Cable Boxes

Cable boxes shall be situated in a compartment at the rear / side of the housing as specified.

2.11 Cable Entry

Provision for top (bus ducts preferred for top entry) / bottom or such other side entry shall be made as per requirement with sufficient head room for cable termination. 3mm thick removable gland plate shall be provided for cable termination.

2.12 Earthing

The earthing of the breaker body and moving portion shall be so arranged that the earthing of the non-current carrying structure to the frame earth bar is completed well before the main circuit breaker plugs enter the fixed house sockets. The entire panel board shall have a common tinned copper earth bar of suitable section with 2 earth terminals for effectively earthing metallic portion of the panels.

2.13 Testing at works before delivery

Procedure for testing of relay shall be in general accordance with good practice. Checks and tests shall include in addition to checking of all small wiring connections, relays calibration and setting tests by secondary injection method and primary injection method. Primary injection test will be preferred for operation of relay through CTs. In addition all routine megger tests shall be performed. Checks and test shall include following.

- (a) Interlock function checks.
- (b) Continuity checks of wiring, fuses etc. as required.
- (c) Insulation tests.
- (d) Trip test and protection gear tests (functional test).
- (e) The complete panel shall be tested with 5000V megger for insulation between poles and poles to earth. Insulation test of secondary of CTs and VT to earth shall be conducted using 500V megger.
- (f) Any other tests as may be required by the Centre shall be conducted.
- (g) Where specified, the entire switch board shall withstand high voltage test after installation.
- (h) H.V. test up to 28 KV.

☞ **Single line drawing of 11KV HV panel is uploaded in the website in Autocad LT2011 version.**
