

TERMS & CONDITIONS

FOR SUPPLY OF MARSHALLING KIOSK AND JUNCTION BOX FOR WBPDCS SAGARDIGHI TPS PROJECT

1. For any technical clarification, please contact Mr. Rajat Kumar, Sr. Manager (TBEM); Contact No. 0120-674-8524; e-mail: rajat.kumar@bhel.in
2. For any commercial clarification, please contact Ms. Shipra Gupta (TBMM); Contact No.0120- 6748509; e-mail: shipra@bhel.in
3. **Delivery requirement: IMMEDIATE.** However, vendor has to quote their best delivery plan in activity schedule. In case, BHEL's delivery requirement is not met by vendor(s), then a chance may be given to all such vendors to review their quoted delivery schedule in line with BHEL's delivery requirement. However, if vendor fails to meet the requisite delivery plan, then BHEL reserves the right not to consider the offer of such vendor(s).

Sl. NO.	ACTIVITY	ACTIVITY TIME IN WEEKS	REMARKS IF ANY
1	Inputs to vendor by BHEL. Last inputs date will consider	2	BHEL Activity
2	Submission of Documents necessary for getting manufacturing clearance like Drawings, Date sheet etc.	4	Vendor to ensure Delivery completion date mentioned by BHEL
3	Approval of documents/ Manufacturing Clearance from BHEL / Customer *	6	BHEL Time to issue Manufacturing Clearance
4	Manufacturing time	16	Vendor to ensure Delivery completion date mentioned by BHEL
5	Inspection call	2	Vendor to ensure Delivery completion date mentioned by BHEL
6	Customer Inspection & Dispatch Clearance	2	BHEL Time to issue MICC
7	Dispatch	2	Vendor to ensure Delivery completion date mentioned by BHEL

4. SCOPE OF SUPPLY AND BOQ (BIDDER TO SUBMIT UN-PRICED BID FORMAT AND ENCLOSED)

SN	ITEM DESCRIPTIONS	UNIT	QTY
1	SUPPLY- MK & JB : MARSHALLING KIOSK WITH 200NOS INTERLOCKING TBS	No.	4
2	SUPPLY- MK & JB : JUNCTION BOX WITH DISCONNECTING TYPE 180 TBS	No.	6
3	SUPPLY- MK & JB : JUNCTION BOX WITH NONDISCONNECTING TYPE 45 TBS	No.	1

5. **Technical specification Doc. No. TB-SPEC-MKJB-031 Rev 00:** BHEL technical specification is applicable. No permissible Technical Deviation has been envisaged.
6. **Inspection agency** – to be inspected by Customer/BHEL/other agencies authorized by BHEL. MQP approval by Customer/Consultant, inspection by BHEL. Supplier to submit Quality Plan to BHEL for customer approval.

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7. **Defect Liability (Guarantee Specific Clause)** - Eighteen (18) Months from the date of completion of facilities or Twelve (12) months from the date of operational acceptance of the facilities (or any part thereof) whichever occurs first. (Schedule date of completion of facilities is 01-04-2024). Note: In case there is delay in ordering for this package beyond schedule completion date then defect liability period will be 18 months from the date of supply.
8. **Performance BG / Deposit Clause:** Supplier shall arrange to submit Performance BG / Deposit of 10% of contract value on a non-judicial stamp paper of appropriate value along with first invoice or within 60 days from placement of Purchase Order (PO) whichever is earlier. PBG should valid till guarantee period with claim period of 3 months extra over and above guarantee period.

Bidder agrees to submit performance security required for execution of the contract within the time period mentioned. In case of delay in submission of performance security, enhanced performance security which would include interest (SBI rate + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms defined in the NIT / contract, from the bills along with due interest.

9. **Quantity Variation:** As per GeM, \pm 25% of contract value.
10. **REVERSE AUCTION:** Applicable as per GeM procedure and guidelines.
11. **Make in India (PPP-MII) (Refer clause no: 17 of Addendum of GTC):** This tender is not a global tender and **only class-I** suppliers as defined under the DPIIT order no. P-45021/2/2017-PP (BE-II) dated 04.06.2020 are eligible to bid in this tender. **Bids received from Class-II & Non-Local supplier shall be rejected.** Bidder to specify the percentage of local content as per the format of self-declaration for local content” **endorsed by CA.**
12. **MOP Circular :** APPLICABLE
13. **INTEGRITY PACT:** Not Applicable.
14. **Vendor Approval-** Vendor should be approved with customer as on date of Techno-commercial bid opening. For non-approved vendors “Credentials of vendor like performance certificates, experience certificates for technically cleared vendors. If any other vendor comes through GeM then approval for the same shall be required from end customer”. Price bid of customer approved vendors shall be opened.

15. **BHEL TBG – TERMS OF PAYMENT CLAUSE**

For Supply only in scope of the supplier: 100% of payment after receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows:

- LR / GR duly endorsed by BHEL Site Official.
- Material Receipt Certificate issued by BHEL Site Official.
- GST Compliant Tax Invoice
- Packing List (Case-wise)
- Copy of Transit Insurance Certificate from underwriters.
- Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management

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- Guarantee Certificate
- Copy of Performance Bank Guarantee (PBG)
- Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order.

16. All other terms & conditions shall be applicable as per GEM GTC.

17. IMPORTANT INSTRUCTION:

- Bidder to mention QUOTED and GST in % against every items in their UN-PRICED BID FORMAT.
- Bidder to sign and stamp this Terms and conditions document and to be attached in bid offer.
- GeM Seller ID- GeM seller ID is mandatory for the bidders and must be mentioned in their offer. In case at the time of submission of offer GeM seller ID is not available with bidder, then successful tenderer should ensure to have GeM Seller ID prior to award of contract. Department of Expenditure (DOE) OM no. 6/9/2020-PPD dated 24.08.2020 may be referred in this regard.

SN	Deviation sheet	Deviation	Remarks if any
1.	Schedule of Commercial Deviation, if any (All terms and conditions shall be as per GeM except as mentioned above)	NIL	
2.	Schedule of Technical Deviation, if any (Against Technical Specification)	NIL	

“We confirm that we have quoted as per specified price format provided along with this tender”.

NAME & SEAL OF TENDERER

Enclosed:

- UN-PRICED BID FORMAT.
- PQR

PROJECT - SAGARDIGHI -MK JB

SCHEDULE OF UNPRICED BID

Enquiry No:

S.NO.	ITEM DESCRIPTION	HSN CODE	UNIT	QUANTITY	UNIT EX WORKS PRICES (INR)	TOTAL EX WORKS PRICES (INR) (Rs.)	GST RATE ON EX WORKS PRICES (%)	GST AMOUNT ON TOTAL EX WORKS PRICES (INR)	UNIT FREIGHT & INSURANCE CHARGES (INR)	TOTAL FREIGHT & INSURANCE CHARGES (INR)	GST ON FREIGHT & INSURANCE CHARGES (%)	GST AMOUNT ON FREIGHT & INSURANCE CHARGES (INR)	TOTAL FOR(D) PRICES (INR)
1	SUPPLY- MK & JB : MARSHALLING KIOSK WITH 200NOS INTERLOCKING TBS		NO.	4									
2	SUPPLY- MK & JB : JUNCTION BOX WITH DISCONNECTING TYPE 180 TBS		NO.	6									
3	SUPPLY- MK & JB : JUNCTION BOX WITH NON-DISCONNECTING TYPE 45 TBS		NO.	1									
A	TOTAL COST (SUPPLY) TO BHEL =												

FORMAT ONLY - NOT FOR FILLING PRICE

NOTE:

1. PLEASE NOTE THAT UNPRICED COPY OF PRICE BID (i.e. WITH ALL PRICES BLANKED) SHALL BE FURNISHED ALONG WITH TECHNO-COMMERCIAL BID.
2. REQUIRED COPIES OF FORMAT BE MADE & DETAILS MAY BE ANNEXED.

SIGNATURE & SEAL OF TENDERER

ANNEXURE-TOR

TECHNICAL PRE- QUALIFICATION REQUIREMENT

Name of customer: West Bengal Power Development Corporation Limited (WBPDCL)

Name of consultant: DCPL, Kolkata

Name of Project: Extension of 400KV Switchyard at 1X660MW Unit-5 Sagarighi TPP

Name of Item : Marshalling Kiosk and Junction Box

PI No :

PI Date :

PQR Sr. No	PQR Description	Supporting Document to be attached
01	Bidder should have supplied minimum 7 nos. MK / JB cumulatively in any one year during the last 10 years from the date of technical bid opening of this tender.	a) Copy of Purchase Orders b) Dispatch Instructions/ Material Receipt at site certificate/ Lorry Receipt details, etc.

Rajat
13/08/2021
RATAT KUMAR

Pras
13/08/21
Y. Leela Kumari

Souvik
13/08/21
(S.K. Shukla)

342011
13/8/21



BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS ENGINEERING MANAGEMENT
 NEW DELHI

DOCUMENT No.	TB-SPEC-MKJB-031	Rev	00	Prepared	Checked	Approved
CUSTOMER Doc. No.		NAME	RK	YLK	SKS	
TYPE OF DOC.	TECHNICAL SPECIFICATION	SIGN	<i>RK</i>	<i>YLK</i>	<i>SKS</i>	
TITLE	Marshalling Kiosk & Junction Box	DATE	12/08/2021	12/08/21	12/08/21	
		GROUP	TBEM			
		W.O. No	445			

Customer	West Bengal Power Development Corporation Limited
Consultant	Development Consultants Private Limited, Kolkata
Project	1x660MW, Sagardighi Thermal Power extension Project (Unit#5)

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Rev.	Date	Altered	Checked	Approved	REVISION DETAILS		
Distribution				CUSTOMER	TBMM	O/C	

SECTION 1 SCOPE AND QUANTITIES

1.0 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing and dispatch of Marshalling Kiosk and Junction Box complete with accessories as listed under this specification.

This section covers the specific technical requirements of MK and JB. This constitutes minimum technical parameters for the above item as specified by the customer WBPDCCL. The offered equipment shall also comply with the General Technical Requirements for the project as detailed under section-3 of this specification.

The specification comprise of following sections:

- Section-1: Scope & Bill of Quantities
- Section-2: Equipment Specification
- Section-3: General Technical Requirements
- Section-4: Checklist
- Section-5: Enclosures to Specification

In case of any conflict between various sections, **order of precedence** shall be in the same order as listed above.

1.1 THE EQUIPMENT IS REQUIRED FOR THE FOLLOWING PROJECT

- Name of customer : **THE WEST BENGAL POWER DEVELOPMENT CORPORATION LTD. (WBPDCCL)**
- Name of Consultant : **DEVELOPMENT CONSULTANTS PRIVATE LTD (DCPL). KOLKATA**
- Name of the project : **Extension of 400kV Switchyard at 1X660MW Unit-5 Sagardighi TPP**

Refer Section - 3 for Project Details and General Specifications.

1.2 QUANTITIES

S. No.	Description	Quantity
1.	Marshalling Kiosk MK-200P	4 Nos.
2.	CT Junction Box JB - D180	6 Nos.
3.	CVT Junction Box JB – N45	1 Nos.

Note – 1) Fixing Hardware (Nuts, Bolts and Washers) for mounting MK and JB's are deemed to be included in the equipment price.

2) 10mm wide plastic plates bearing identification mark shall be fixed inside the Marshalling Kiosk (MK) / Junction box (JB) at suitable locations. Quantity of plastic plates per MK / JB are as follows: -

a) Marshalling Kiosk - 10 Nos.

b) CT Junction Box - 6 Nos.

c) CVT Junction box – 3 Nos.

The engravings on plastic plate shall be informed at contract stage.

1.3 TYPE TESTS

The enclosure of marshalling box shall provide with a degree of protection of not less than IPW-55 as per IS-2147. Bidder shall submit valid type test reports (as per relevant IEC/IS standard) for the tests carried out within **last five years from the date of bid opening i.e. 18.03.2018**. The reports should have been conducted on identical or similar equipment/components to those offered.

In case the Bidder is not able to submit report of the type test(s) conducted within last five (5) years from the date of bid opening or in the case of type test(s) reports are not found to be meeting to specification requirement, the Bidder shall conduct all such test(s) under this contract at no additional cost to the Owner either at third party facility or in presence of Owner's representative and submit the reports for approval. The Bidder shall obtain the Owner's approval for the type test procedure before conducting the type test. The procedure shall specify the test set up, instrument to be used, acceptance norms, interval of recording etc. for the type test to be carried out.

1.4 INSPECTION & TESTING

Before being fitted on the equipment, all components shall be subjected to routine tests at the Contractors factory, as per the relevant IEC/IS standards. A detailed test report proving the successful passing of such tests shall be provided.

Prior to dispatch, the routine & acceptance tests shall be carried out on each MK and JB in accordance with the applicable IEC /IS and the material shall be offered for final inspection to BHEL and WBPDCCL in accordance with agreed quality plan with 3 weeks advance information.

1.5 PACKING

- a) All equipments shall be suitably protected, coated, covered or boxed and crated. To prevent damage or deterioration during transit, handling and outdoor storage (for a minimum period of 1 year) at site till the time of erection. While packing all the materials, the limitations from the point of view of availability of transportation facilities in India should be taken into account. The bidder shall be responsible for any loss or damage during transportation, handling and storage.

- b) The Bidder shall include and provide for security, protection and packing the Equipment so as to avoid loss or damage during transport by any mode.
- c) All packing shall allow for easy removal and checking at site. Wherever necessary, proper arrangement for attaching slings for lifting shall be provided. All packages shall be clearly marked for with signs showing 'UP' and 'DOWN' side of boxes, and handling and unpacking instructions as considered necessary. Special precautions shall be taken to prevent rusting of steel and iron parts during transit and storage. Gas seals or other methods proposed to be adopted for protection against moisture during transit shall be to the satisfaction of the purchaser.
- d) The cases containing easily damageable material shall be very carefully packed and marked with appropriate caution symbols i.e. FRAGILE, HANDLE WITH CARE, USE NO HOOKS etc.
- e) Each package delivered under the contract shall be marked by the Bidder at his expense and such marking must be distinct (all previous irrelevant marking being carefully obliterated). Such marking shall show the description and quantity of contents, the name of consignee and address, the gross and net weights of the package, the name of Bidder with a distinctive number of mark sufficient for purpose of identification. All markings shall be carried out with such materials as to ensure quickness of drying, fastness and legibility.
- f) Each Package shall contain a note quoting specifically the name of the Bidder, the number and date of contract or order and the name of office placing the contract, nomenclature of the stores and include a schedule of parts for each complete equipment giving the parts number with reference to the General Arrangement/ Assembly drawing and the quantity of each part, drawing number and tag numbers.
- g) All equipment/ material shall be suitably packed for transport, carriage at site and outdoor storage during transit. The Bidder shall be responsible for any damage to the equipment during transit. The contents of each package shall bear marking that can be readily identified from the package list and packing shall provide complete protection from moisture, termites and mechanical shocks etc.
- h) Any material found short inside the packing cases shall be supplied by the Bidder without any extra cost.
- i) Notwithstanding anything stated in this clause the Bidder shall be entirely Responsible for any loss, damage or depreciation to the stores.

1.6 DRAWING APPROVAL:

The successful bidder shall have to extend all possible support like timely submission/re-submission of drawings, visit to end customer to facilitate documents approval without any commercial implications to BHEL. Acceptance of bidder's documents shall be subject to end customer's approval. Date of Submission of first lot of drawings will be counted only from the date of submission of reasonably correct drawings.

Approval of the following will be required for technical clearance of manufacturing for Marshalling Kiosk / Junction Box along with accessories.

- OGA & Drawings
- Type tests

1.7 QUALITY PLAN

The contractor shall carry out contract works in accordance with sound quality management principles which shall include such as controls which are necessary to ensure full compliance to all requirements of the specification & applicable international standards. These quality management requirements shall apply to all activities during design, procurement, manufacturing, inspection, testing, packaging, shipping, inland transportation, storage, site erection & commissioning. Contractor shall submit detailed Quality Plan for BHEL / WBPDCCL approval.

SECTION-2
EQUIPMENT SPECIFICATION

I. MARSHALLING KIOSK

2.0 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing and despatch of MARSHALLING KIOSKS. No deviation from the requirements specified in various clauses of this specification shall be allowed.

2.1 SPECIFIC TECHNICAL REQUIREMENTS

Technical Parameters for Marshalling Kiosk

- | | | |
|-----------------------------------|---|--|
| a) Installation | : | Outdoor |
| b) Design Ambient air temperature | : | 50°C |
| c) Thickness of sheet steel | : | Atleast 3.0 mm Cold Rolled close annealed (CRCA) |
| d) Degree of protection | : | IPW 55 as per IS 2147 |
| e) Paint Shade | : | Ext--Shade as per purchaser
Int-- Shade as per purchaser
(To be furnished at contract stage) |
| f) Control Wiring | | |
| Size of conductor | : | 2.5mm ² |
| Conductor | : | Stranded copper |
| g) Space Heater Rating | : | 240 V, At least 40 W |
| h) No. of AC incoming feeders | | |
| 63A, 3-phase, 4-wire | : | 2 |
| Changeover between incomers | : | Automatic |
| i) No. of AC outgoing feeders | | |
| 16A, 3-phase, 4-wire | : | 6 Nos. |
| 10A, 1-phase, 2-wire | : | 4 Nos. |
| 32A, 3-Phase, 4-wire | : | 2 No. |
| j) Terminal Block | | |
| Make | : | Elmex or approved Eqv. |
| Earthlinks | : | As required |

2.2 Following type of different Marshalling kiosks are proposed with detailed description as given below--

Table-1

SI No.	Type	No. of Interlocking TBs	No of TBs for CT/ VT connections	100A Receptacle	No of AC Outgoing Feeders Amps- Nos
1	MK-120R	120	Nil	Yes	16A- 5 Nos 10A - 5 Nos
2	MK-180R	180	Nil	Yes	16A- 5 Nos 10A - 5 Nos
3	MK-240R	240	Nil	Yes	16A- 5 Nos 10A - 5 Nos
4	MK-120P	120	Nil	No	16A- 4 Nos 10A - 6 Nos
5	MK-200P	200	Nil	No	16A- 6 Nos 10A - 4 Nos 32A – 2 No
6	MK-240P	240	Nil	No	16A- 6 Nos 10A - 10 Nos
7	MK-300P	300	Nil	No	16A- 6 Nos 10A - 10 Nos
8	MK	Nil	Nil	No	16A- 8 Nos 10A - 10 Nos
9	MK-120	120	Nil	No	16A- 5 Nos 10A - 5 Nos
10	MK-180	180	Nil	No	16A- 5 Nos 10A - 5 Nos
11	MK-240	240	Nil	No	16A- 5 Nos 10A - 5 Nos
12	MK-300	300	Nil	No	16A- 5 Nos 10A - 5 Nos
13	MK-120D	120	75 for CT, 40 for VT, Disconnecting stud Type TBs (CATDM4/ Eq)	No	16A- 5 Nos 10A - 5 Nos
14	MK-180D	180	75 for CT 40 for VT Disconnecting Stud Type TBs (CATDM4/ Eq)	No	16A- 5 Nos 10A - 5 Nos
15	MK-120N	120	75 for CT 40 for VT Non- Disconnecting stud Type TBs (CATM4/ Eq)	No	16A- 5 Nos 10A - 5 Nos
16	MK-180N	180	75 for CT 40 for VT Non- Disconnecting stud Type TBs (CATM4/ Eq)	No	16A- 5 Nos 10A - 5 Nos

Marshalling kiosk shall have distinct compartments for the following purposes as applicable:

1) Auxiliary Power Circuits: The incoming and outgoing supplies shall be marshalled through cables terminated on Stud type terminal blocks. This compartment shall receive two incoming 415V, 3 phase, 63A AC supplies through 2 Nos TPN MCB units with auto-changeover including timers and distribute 16A, three phase outgoing supplies controlled by TPN MCBs. Also it shall distribute 240V, 10A, single phase supplies to be controlled by SP MCBs to be drawn from above three-phase incomers. The terminal blocks used for above mentioned aux power incomer circuits shall be **CBT170** of Elmex/ Eq for making **loop-in loop-out connection of 3.5x70 sq mm connected cable**. And for outgoing aux power circuits, terminal blocks shall be **CBTM5** of Elmex/ Eq. 20% spare TBs of each type are also required to be mounted.

2) Interlocking Circuits: TB Nos as per above selection Table-I shall be provided. Non-disconnecting stud type terminal blocks **CATM4** of Elmex/ Eq shall be provided in vertical formation for interlocking facilities

4) CT, CVT circuits: This portion shall have terminal strips in vertical formation exclusively used for shorting the CT & CVT secondary circuits (These shall be provided where asked as per selection table above). The CT terminal strips shall have total 70 terminal blocks & CVT terminal strips shall have total 40 terminal blocks. The type of TBs shall be as per selection table above.

5) Auxiliary circuit (Heater, Lamp and Socket) shall be provided.

2.3 Bidder must quote addition /deletion price for each and every type of the fitments viz., MCB, Contactors, Timer, Fuse, Switches, Terminal Blocks etc.

2.4 APPLICABLE STANDARDS

STANDARD	TITLE
IS 2147	Protection against ingress of water
IS 13947(Part 1)	Low voltage switchgear and control gear: General rules
IS 5039	Distribution feeder pillars for voltages not exceeding 1000V ac / 1200V dc.
IS 8623	Specification for Low voltage Switchgear and Control gear Assemblies
IEC 60439	Factory built assemblies of low voltage switchgear and control gear
IS 13703 (All Parts):	Specification for Low-Voltage Fuses for Voltages not exceeding 1000 V AC and 1500 V DC - General Requirements

The equipment shall conform to the latest applicable Indian standard and their amendments. The equipment complying with any authorised international standard will also be considered if it ensures performance equivalent to or superior to Indian standards. In the event of supply of equipment confirming to any internationally recognised standard other than the Indian standards, the salient features of comparison shall be brought out.

2.5 SPECIFIC DESIGN & MANUFACTURING REQUIREMENTS

Marshalling Kiosks shall generally conform to IS-5039, IS-8623 or IEC-60439, and/ or its latest amendments/ issues as applicable.

Marshalling Kiosk (MK) shall be of sheet steel and shall be dust, water and vermin proof. The thickness of sheet steel shall be 3 mm cold rolled close annealed (CRCA). The box shall be properly braced to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. Top of the boxes shall be sloped towards rear.

Marshalling kiosk may be front as well as rear opening type. The Marshalling Kiosks shall be free standing or pedestal-mounting type. The enclosures shall be provided with double hinged doors and /or removable covers with padlocking arrangements. The distance between two hinges shall be adequate to ensure uniform sealing pressure against atmosphere. All doors, removable covers and plates shall be gasketed all round with suitable profiled EPDM gaskets. The gasket shall be tested in presence of purchaser as per approved quality plan. All gasketed surfaces shall be smooth, straight and reinforced if necessary to minimize distortion and to make a tight seal. The quality of gaskets shall be such that it does not get damaged/ cracked during ten years of operation of the equipment or its major overhaul whichever is earlier. Ventilating louvers, if provided, shall be with screens and filters. The screen shall be fine wire mesh made of brass.

All housings shall be designed for the entry of cables from the bottom by means of weatherproof and dust-proof connections. MK shall be designed with generous clearance to avoid interference between the wiring entering from below and any terminal blocks or accessories mounted within the housing. A suitably gasketed undrilled cable gland plate projecting at least 150mm above the base of the housing shall be provided for this purpose. The gland shall project at least 25 mm above the gland plate to prevent entry of moisture in the cable crutch.

For incoming supply, SPN MCB of suitable rating shall be provided. Illumination of each compartment of each MK shall be with suitable number of door-operated 20W fluorescent tube or 15 watts CFL. Suitable 240 V, single phase, 50 Hz AC heaters with thermostats controlled by switch and fuse shall be provided to maintain inside temperature 10 deg. above the ambient. The fittings shall be complete with switchfuse unit and switching of the fittings shall be controlled by the respective panel door switch. All control switches shall be of rotary switch type and Toggle/ Piano switches shall not be accepted.

Each MK shall be provided with two Earthing pads to receive 75 mm x12 mm or 50mm x 6mm GS flat. The connection shall be bolted type with 2 bolts per pad. The hinged door shall be provided with danger plate, and internal wiring diagram pasted on inside of the door. The front label shall be on a 3 mm thick plastic plate white letters engraved on black background.

2.6 TERMINAL BLOCKS AND WIRING

Terminal blocks shall be 1100V grade and have continuous rating to carry the maximum expected current on the terminals. These shall be moulded, complete with insulating barriers, **stud type** terminals, complete with washers, nuts and lock nuts.

The terminal shall be such that maximum contact area is achieved when a cable is terminated. The terminal shall have a locking characteristic to prevent cable from escaping from terminal clamp unless it is done intentionally. The conducting part in contact with the cable shall preferably be tinned or silver-plated. However, nickel-plated copper or zinc-plated steel shall also be acceptable.

The terminal blocks shall be of extensible design. The terminal blocks shall have locking arrangement to prevent its escape from the mounting rails. Terminal block design shall include a white-fiber marking strip. Markings on terminal strips shall correspond to numbers on wiring diagrams. The terminal blocks shall be fully enclosed with removable covers of transparent, non-deteriorating type plastic material. Insulating barriers shall be provided between the terminal blocks. These barriers shall not hinder the operator from carrying out the wiring without removing barriers. The arrangement shall be such that it is possible to safely connect or disconnect terminals on the live circuits and replace fuse links when the cabinet is live.

Unless otherwise specified, terminal blocks shall be suitable for connecting minimum of two of 2.5 sq. mm copper flexible conductors on each side.

- a) All circuits except CT/CVT circuits Minimum of two of 2.5 sq. mm copper flexible on each side.
- b) All CT/CVT circuits Minimum of four of 2.5-sq. mm copper flexible on each side.

Space shall be provided for mounting 20% spare terminal blocks on each marshalling box. There shall be a minimum clearance of 250 mm between the first/ bottom row of terminal blocks and the associated cable gland plate. Also the clearance between two adjacent rows of terminal blocks shall be a minimum of 150 mm.

All internal wiring shall be carried out with single core, stranded copper conductor wires with PVC insulation and shall be flame, vermin and rodent proof.

The minimum size of stranded copper conductor used for internal wiring shall be 2.5-sq. mm

All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. Wiring gutters /troughs shall be provided for this purpose and for interlocking TBs as well.

Wire termination shall be made with solder less crimping type of tinned copper lugs, which firmly grip the conductor and insulation. Insulated sleeves shall be provided at all the wire terminations.

Engraved/ painted core identification plastic ferrules marked to correspond with panel wiring diagram numbering shall be fitted at both ends of each wire. Ferrules shall fit tightly on wires and shall not fall off when the wire is disconnected from the terminal blocks.

2.7 TESTING

TYPE TESTS

The enclosure of marshalling box shall provide with a degree of protection of not less than IPW-55 as per IS-2147. The bidder shall furnish the type test report at contract stage. In case the Test reports are more than five years old on the date of bid opening, fresh testing has to be conducted and report shall be submitted. The type test for degree of protection of enclosure shall be preceded and followed by following tests:

- a) 2.5 kV withstand for one minute
- b) Insulation Resistance
- c) Functional tests

ROUTINE TESTS

The Marshalling Kiosks shall be subjected to following routine tests, as per IS 5039:

- a) 2.5 kV rms. for one minute test
- b) Check for wiring
- c) Visual and dimensional check
- d) Checking for paint.

II. CT AND CVT JUNCTION BOX

2.0 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing and despatch of CT and CVT JUNCTION BOX. No deviation from the requirements specified in various clauses of this specification shall be allowed.

2.1 SPECIFIC TECHNICAL REQUIREMENTS

Technical Parameters for Junction Box

- | | | |
|-----------------------------------|---|--|
| a) Installation | : | Outdoor |
| b) Design Ambient air temperature | : | 50°C |
| c) Thickness of sheet steel | : | Atleast 3.0 mm Cold Rolled close annealed (CRCA) |
| d) Degree of protection | : | IPW 55 as per IS 2147 |
| e) Paint Shade | : | Ext--Shade as per purchaser
Int-- Shade as per purchaser
(To be furnished at contract stage) |
| f) Control Wiring | | |
| Size of conductor | : | 2.5mm ² |
| Conductor | : | Stranded copper |
| g) Space Heater Rating | : | 240 V, At least 40 W |
| h) Terminal Block | | |
| Make | : | Elmex or approved Eqv. |
| Earthlinks | : | As required |

2.2 Following different type of Junction Boxes are proposed

Table-2

SI No.	Type	No of TBs	Type of TBs
1	JB-N130	130	Stud Type, Non Disconnecting, CATM4/ Eq
2	JB-N90	90	Stud Type, Non Disconnecting CATM4/ Eq
3	JB-N75	75	Stud Type, Non Disconnecting CATM4/ Eq
4	JB-N45	45	Stud Type, Non Disconnecting CATM4/ Eq
5	JB-N30	30	Stud Type, Non Disconnecting CATM4/ Eq
6	JB-D180	180	Stud Type, Disconnecting CATDM4/ Eq
7	JB-D90	90	Stud Type, Disconnecting CATDM4/ Eq
8	JB-D75	75	Stud Type, Disconnecting CATDM4/ Eq
9	<i>JB-D45</i>	<i>45</i>	<i>Stud Type, Disconnecting CATDM4/ Eq</i>
10	JB-D30	30	Stud Type, Disconnecting CATDM4/ Eq

Junction Box shall have terminals strips in vertical formation exclusively used for shorting the CT & CVT secondary circuits. The type and number of TBs shall be as per selection **Table-2** above..

Auxiliary circuit (Heater, Lamp and Socket) shall be provided.

The Junctions Boxes shall be supplied alongwith fixing hardware/ bolts etc.

2.3 Bidder must quote addition /deletion price for each and every type of the fitments viz., Fuse, Switches, Terminal Blocks etc.

2.4 APPLICABLE STANDARDS

STANDARD	TITLE
IS 2147	Protection against ingress of water
IS 13947(Part 1)	Low voltage switchgear and control gear: General rules
IS 5039	Distribution feeder pillars for voltages not exceeding 1000V ac / 1200V dc.
IS 8623	Specification for Low voltage Switchgear and Control gear Assemblies
IEC 60439	Factory built assemblies of low voltage switchgear and control gear
IS 13703 (All Parts):	Specification for Low-Voltage Fuses for Voltages not exceeding 1000 V AC and 1500 V DC - General Requirements

The equipment shall conform to the latest applicable Indian standard and their amendments. The equipment complying with any authorised international standard will also be considered if it ensures performance equivalent to or superior to Indian standards. In the event of supply of equipment conforming to any internationally recognised standard other than the Indian standards, the salient features of comparison shall be brought out.

2.5 SPECIFIC DESIGN & MANUFACTURING REQUIREMENTS

Junction Box shall generally conform to IS-5039, IS-8623 or IEC-60439, and/ or its latest amendments/ issues as applicable.

Junction Box (JB) shall be of sheet steel and shall be dust, water and vermin proof. The thickness of sheet steel shall be 3 mm cold rolled close annealed (CRCA). The box shall be properly braced to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation.

The JB shall be structure mounted type. They shall have hinged doors with padlocking arrangement. All doors, removable covers and plates shall be gasketed all round with suitable profiled EPDM gaskets. The gasket shall be tested in presence of purchaser as per approved quality plan. All gasketed surfaces shall be smooth, straight and reinforced if necessary to minimize distortion and to make a tight seal. The quality of gaskets shall be such that it does not get damaged/ cracked during ten years of operation of the equipment or its major overhaul whichever is earlier. Ventilating louvers, if provided, shall be with screens and filters. The screen shall be fine wire mesh made of brass.

The enclosures shall be provided with hinged doors and /or removable covers with padlocking arrangements. The distance between two hinges shall be adequate to ensure uniform sealing pressure against atmosphere.

All housings shall be designed for the entry of cables from the bottom by means of weatherproof and dust-proof connections. JB shall be designed with generous clearance to avoid interference between the wiring entering from below and any terminal blocks or accessories mounted within the housing. A suitable undrilled cable gland plate projecting at least 150mm above the base of the housing shall be provided for this purpose. The gland shall project at least 25 mm above the gland plate to prevent entry of moisture in the cable crutch.

Incoming supply with **looping in and looping out facility for 2C X 16 Sq.mm cable** with SPN MCB of suitable rating shall be provided. Illumination of each compartment of each JB shall be with door-operated 20W fluorescent tube or 15 watts CFL. Suitable 240 V, single phase, 50 Hz ac heaters with thermostats controlled by switch and fuse shall be provided to maintain inside temperature 10 deg. above the ambient. The fittings shall be complete with switch fuse unit and switching of the fittings shall be controlled by the respective panel door switch. All control switches shall be of rotary switch type and Toggle/ Piano switches shall not be accepted.

Each JB shall be provided with two earthing pads to receive 75 mm x12 mm or 50mm x 6mm GS flat. The connection shall be bolted type with 2 bolts per pad. The hinged door shall be provided with danger plate, and internal wiring diagram pasted on inside of the door. The front label shall be on a 3 mm thick plastic plate white letters engraved on black background.

2.6 TERMINAL BLOCKS AND WIRING

Terminal blocks shall be 1100V grade and have continuous rating to carry the maximum expected current on the terminals. These shall be moulded, complete with insulating barriers, **stud type** terminals, complete with washers, nuts and lock nuts.

The terminal shall be such that maximum contact area is achieved when a cable is terminated. The terminal shall have a locking characteristic to prevent cable from escaping from terminal clamp unless it is done intentionally. The conducting part in contact with the cable shall preferably be tinned or silver-plated. However, nickel-plated copper or zinc-plated steel shall also be acceptable.

The terminal blocks shall be of extensible design. The terminal blocks shall have locking arrangement to prevent its escape from the mounting rails. Terminal block design shall include a white-fiber marking strip. Markings on terminal strips shall correspond to numbers on wiring diagrams. The terminal blocks shall be fully enclosed with removable covers of transparent, non-deteriorating type plastic material. Insulating barriers shall be provided between the terminal blocks. These barriers shall not hinder the operator from carrying out the wiring without removing barriers. The arrangement shall be such that it is possible to safely connect or disconnect terminals on the live circuits and replace fuse links when the cabinet is live.

Terminal blocks for cables going to a common destination shall as far as possible be grouped to each other. All input and output terminals of each control cubicle shall be tested for surge withstand capability in accordance with the relevant IEC publications, in both longitudinal as well as transverse modes. The Supplier shall also provide all necessary filtering, surge protection, interface relays and any other measures necessary to achieve an impulse withstand level at the cable interfaces of the equipment.

Space shall be provided for mounting 20% spare terminal blocks on each junction box. There shall be a minimum clearance of 250 mm between the first/ bottom row of terminal blocks and the associated cable gland plate. Also the clearance between two adjacent rows of terminal blocks shall be a minimum of 150 mm.

All internal wiring shall be carried out with single core, stranded copper conductor wires with PVC insulation and shall be flame, vermin and rodent proof.

The minimum size of stranded copper conductor used for internal wiring shall be 2.5-sq. mm

All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. Wiring gutters /troughs shall be provided for this purpose and for CT/ CVT circuits as well.

Wire termination shall be made with solder less crimping type of tinned copper lugs, which firmly grip the conductor and insulation. Insulated sleeves shall be provided at all the wire terminations.

Engraved/ painted core identification plastic ferrules marked to correspond with panel wiring diagram numbering shall be fitted at both ends of each wire. Ferrules shall fit tightly on wires and shall not fall off when the wire is disconnected from the terminal blocks.

2.7 TESTING

TYPE TESTS

The enclosure of junction box shall provide with a degree of protection of not less than IPW-55 as per IS-2147. The bidder shall furnish the type test report at contract stage. In case the Test reports are more than five years old on the date of bid opening, fresh testing has to be conducted and report shall be submitted. The type test for degree of protection of enclosure shall be preceded and followed by following tests:

- a) 2.5 kV withstand for one minute
- b) Insulation Resistance
- c) Functional tests

ROUTINE TESTS

The Junction Box shall be subjected to following routine tests, as per IS 5039:

- a) 2.5 kV rms. for one minute test
- b) Check for wiring
- c) Visual and dimensional check
- d) Checking for paint.

SECTION-3

3.0 GENERAL

This section stipulates the General Technical Requirements under the Contract and will form an integral part of the Technical Specification.

The provisions under this section are intended to supplement general requirements for the materials, equipments and services covered under other respective sections and are not exclusive. However in case of conflict between the requirements specified in this section and requirements specified under other sections, the requirements specified under respective sections shall hold good.

3.1 PROJECT INFORMATION AND SYSTEM PARAMETERS

a)	Customer/ Purchaser/ Owner	The West Bengal Power Development Corporation Ltd.
b)	Consultant/Owner's Engineer	Development Consultants Private Ltd. Kolkata
c)	Project Title	1X660MW thermal power extension project Unit-5 at Sagardighi- 400KV Switchyard
d)	Location	Site is located at Manigram village of Murshidabad district in West Bengal and around 240km from Kolkata. 13km north of Sagardighi town by the side of the SMGR(Sagardighi Manigram –Gankar –Raghunathganj) road at a distance of 20km from National Highway 34 . Nearest railway station is Manigram adjacent to the site on Bandel-Barhawara branch line and 6.5km from Sagardighi railway station on Sainthia-Azimhunj line of eastern railway. Nearest Airport –Kolkata. Nearest Seaport-Kolkata/Haldia
e)	Altitude	34 m above MSL
f)	Transport Facilities	Road/Rail
g)	Postal Address	To follow
SITE CONDITIONS		
a)	Maximum Design ambient dry bulb temperature	50°C
b)	Minimum Design ambient dry bulb temperature	5°C
c)	Average Relative humidity (for design)	73 %
d)	Maximum relative humidity	84%
e)	Pollution Severity	Heavily Polluted
f)	Seismic zone	III
g)	Wind velocity	47m/sec.
h)	Wind pressure	150kg/sq.mts

i)	Terrain category	2
j)	Risk coefficient (K1)	1.07
k)		
l)	Average rainfall	1389mm

SYSTEM PARAMETERS

Nominal system voltage	400 kV
Highest system voltage	420 kV
System voltage variation	-5% to +5%
Basic Impulse Level(dry /wet)	1425kVp
Power frequency withstand voltage dry/wet	630kVrms
Switching Impulse withstand voltage (Phase to Earth)	1050kVp
Switching Impulse withstand voltage (Phase to Phase)	1575kVp
Lightning impulse withstand voltage (kVp between live terminals and earth.)	1425kVp
Lightning impulse withstand voltage (kVp impulse on one terminal and other terminal earthed) (across isolating distance).	1665kVp
Maximum radio interference voltage at 320kV rms phase to ground voltage	1000 micro volts for frequency between 0.5 MHz and 2.0 MHz
Rated short time current	50 kA for 1 sec
Frequency	50 Hz, +3% to -5%
Creepage distance	31 mm/kV
System Earthing	Effectively earthed

AUXILIARY POWER SUPPLY

3 phase A.C power supply	415V \pm 10%, 50 Hz \pm 5%, 3-phase 4 wire,50kA, solidly earthed, combined voltage and frequency variation \pm 10%
1 phase A.C power supply	240V \pm 10%, 50 Hz +3% to -5%, 1-phase AC supply
D.C. power supply	220V +10% to -15%, 2-wire , ungrounded 48V \pm 10%, 2 wire system positively earthed

3.2 GENERAL TECHNICAL REQUIREMENT

3.2.1 TYPE TESTS

All equipment/systems to be supplied shall conform to type tests as per relevant standards and proven type. The Bidder / Contractor shall furnish the reports of all the type tests carried out in within last **five years from date of techno commercial bid opening i.e. 18.03.2018**. as listed in relevant clauses in respective electrical specification and relevant standards for all components / equipment / systems. These reports should be for the tests conducted on identical/similar components/equipment/systems to those offered/proposed to be supplied under this contract.

Type tests done in an independent government laboratory or in the presence of representative of State Electricity Board or other reputed public undertakings, the type test reports of the same shall be submitted for scrutiny /approval. If these are found suitable and technically acceptable, conducting of type tests shall be waived off.

In case Contractor is not able to submit report of type test(s) conducted in last five years, or in case type test report(s) are not found to be meeting the specification/relevant standard requirements, then all such tests shall be conducted under this contract by the Bidder free of cost to Employer/Purchaser, and reports shall be submitted for approval. No charges shall be paid under this contract. All acceptance and routine tests as per relevant standards and specification shall be deemed to be included in the bid price.

3.2.2 CODES AND STANDARDS

All materials and equipment shall generally comply in all respect with the latest edition of relevant international electro-technical commission (IEC) or any other internationally accepted standard which ensure equal or better quality or relevant Indian standard(IS) mentioned against each equipment and this specification.

3.3 MATERIAL/WORKMANSHIP

3.3.1 General Requirements

Where the specification does not contain characteristics with reference to workmanship, equipment, materials and components of the covered Equipment it is understood that the same must be new, of highest grade of the best quality of their kind conforming to best engineering practice and suitable for the purpose for which they are intended.

The design of the Works shall be such that installation, future expansions, replacements and general maintenance may be undertaken with a minimum of time and expenses. Each component shall be designed to be consistent with its duty and suitable factors of safety, subject to mutual agreements and shall be used throughout the design. All joints and fastenings shall be devised, constructed and documented so that the component parts shall be accurately positioned and restrained to fulfill their required function. In general screw threads shall be standard metric threads. The use of other thread forms will only be permitted when prior approval has been obtained from purchaser.

Whenever possible, all similar part of the Works shall be made to gauge and shall also be made interchangeable with similar parts. All spare parts shall be interchangeable with, and shall be made of the same materials and workmanship as the corresponding parts of the Equipment supplied under the Specification. Where feasible, common component units shall be employed in different pieces of equipment in order to minimize spare parts stocking requirements. All equipment of the same type and rating shall be physically and electrically interchangeable.

All materials and equipment shall be installed in strict accordance with the manufacturer's recommendation(s). Only first-class work in accordance with the best modern practices will be accepted. Installation shall be constructed as being the erection of equipment at its permanent location. This, unless otherwise specified, shall include unpacking, cleaning and lifting into position, grouting, leveling, aligning, coupling of or bolting down to previously installed equipment bases/foundations, performing the alignment check and final adjustment prior to initial operation, testing and commissioning in accordance with the manufacturer's tolerances and instructions and the Specification. All factory assembled rotating machinery shall be checked for alignment and adjustments made as necessary to re-establish the manufacture's limits suitable guards shall be provided for the protection of personal on all exposed rotating and / or moving machine parts and shall be designed for easy installation and removal for maintenance purpose. The spare equipment(s) shall be installed at designated locations and tested for healthiness.

The Contractor shall apply oil and grease of the proper specification to suit the machinery, as is necessary for the installation of the equipment. Lubricants used for installation purposes shall be drained out and the system flushed through where necessary for applying the lubricant required for operation. The Contractor shall apply all operational lubricants to the equipment installed by him. All oil, grease and other consumables used in the Works/ Equipment shall be purchased in India unless the Contractor has any special requirement for the specific application of a type of oil or grease not available in India. In such is the case he shall declare in the proposal, where such oil or grease is available. He shall help purchaser in establishing equivalent Indian make and Indian Contractor. The same shall be applicable to other consumables too.

3.3.2 Provisions For Exposure to Hot and Humid climate

Outdoor equipment supplied under the specification shall be suitable for service and storage under tropical conditions of high temperature, high humidity, heavy rainfall and environment favorable to the growth of fungi and mildew. The indoor equipments located in non-air conditioned areas shall also be of same type.

3.4 PAINTING

The painting of equipment shall be as follows:

Epoxy based with suitable additives. The thickness of finish coat shall be minimum 80 microns (minimum total DFT shall be 100 microns). However in case electrostatic process of painting is offered for any electrical equipment, minimum paint thickness of 80 microns shall be acceptable for finish coat.

Painting process shall be of powder coating type. All surface shall be cleaned , phosphated and given two coats of rust –resistant primer followed by two coats of finish paints . The interior of all panels cabinets and enclosures shall be finished with gloss white enamel. Two final powder coats of synthetic enamel paint of light grey shade(631 of IS-5) shall be given to exterior surface of all the panels. Sufficient quantities of touch paint shall be furnished for application at site. All The indoor cubicles shall be of same colour scheme and for other miscellaneous items, **colour scheme will be approved by the purchaser.**

3.5 PROTECTION

All coated surfaces shall be protected against abrasion, impact, discoloration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or a non-metallic protecting device. All ends of all valves, piping and conduit equipment connections shall be properly sealed with suitable devices to protect them from damage.

All equipment accessories and wiring shall have fungus protection, involving special treatment of insulation and metal against fungus, insects and corrosion. The parts which are likely to get rusted, due to exposure to weather should also be properly treated and protected in a suitable manner. Screens of corrosion resistant material shall be furnished on all ventilating louvers to prevent entry of insects.

3.6 FUNGISTATIC VARNISH

Besides the space heaters, special moisture and fungus resistant varnish shall be applied on the parts, which may be subjected or predisposed to the formation of fungi due to the presence or deposit of nutrient substances. The varnish shall not be applied to any surface of part where the treatment will interface with the operation or performance of the equipment. Such surfaces or parts shall be protected against the application to the varnish.

3.7 SURFACE FINISH

All interiors and exteriors of tanks, control cubicles and other metal parts shall be thoroughly cleaned to remove all rust, scales, corrosion, greases or other adhering foreign matter. All steel surfaces in contact with insulating oil as far as accessible, shall be painted with not less than two coats of heat resistant, oil insoluble, insulating paints.

All metal surfaces exposed to atmosphere shall be given two primer coats of zinc chromate and two coats of epoxy paint with epoxy base thinner. All metal parts not accessible for painting shall be made of corrosion resisting material. All machine finished or bright surfaces shall be coated with a suitable preventive compound and suitably wrapped or otherwise protected. All paints shall be carefully selected to withstand tropical heat and extremes of weather within the limit specified. The paint shall not scale off or wrinkle or be removed by abrasion due to normal handling. All external painting shall be as per shade no. 631 of IS:5.

3.8 GALVANIZING

All ferrous parts including all sizes of nuts, bolts, Plain and spring washers, support channels, structures, shall be hot dip galvanized conforming to latest version of IS:2629 or any other equivalent authoritative standard. However, hardware less than M12 size shall be electro-galvanized. Minimum weight of zinc coating shall be 610 gm/sq.m and minimum thickness of coating shall be 85 microns for all items thicker than 6mm. For items lower than 6 mm thickness, requirement of coating shall be as per relevant ASTM.

3.9 PACKING

The following details are to be clearly indicated in the material forwarding documents:

- a) Name and address of the consignee.
- b) Purchase order number.
- c) Name of supplier/s.
- d) Description of equipment / material.
- e) Net weight.
- f) Gross weight.

Each package shall be accompanied by a packing note (in weather proof paper).

All the equipment shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at Site till the time of erection. On request of the purchaser, the Contractor shall also submit packing details/associated drawing for any equipment material under his scope of supply, to facilitate the purchaser to repack any equipment/material at a later date, in case the need arises. Any material found short inside the packing cases shall be supplied by the supplier without any extra cost. The cases containing easily damageable material shall be very carefully packed and marked with appropriate caution symbol i.e. fragile, handle with care, use no Hooks etc.

3.10 HANDLING, STORING AND INSTALLATION

Contractor may engage manufacturer's Engineers to supervise if required for unloading, transportation to site, storing, testing and commissioning of the various equipment being procured by them separately. In case of any doubt/misunderstanding as to the correct interpretation of manufacturer's drawings or instructions, necessary clarifications shall be obtained from the purchaser. Contractor shall be held responsible for any damage to the equipment consequent to not following manufacturer's drawings/instructions correctly.

Where assemblies are supplied in more than one section, contractor shall make all necessary mechanical and electrical connections between sections including the connection between buses. Contractor shall also do necessary adjustments/alignments necessary for proper operation of circuit breakers, isolators and their operating mechanisms. All components shall be protected against damage during unloading, transportation, storage, installation, testing and commissioning.

Contractor shall be responsible for examining all the shipment immediately of any damage, shortage, discrepancy etc. for the purpose of Purchaser's information only. Any demurrage, pilferage and other such charges claimed by the transporters, railways etc. shall be to the account of the Contractor. The Contractor shall be fully responsible, for the equipment/material until the same is handed over to the purchaser in an operating condition after commissioning.

The minimum phase to earth, phase to phase and section clearance along-with other technical parameters for the various switchyard voltage levels to be maintained shall be strictly as per the approved drawings.

The design and workmanship shall be in accordance with the best engineering practices to ensure satisfactory performance throughout the service life. If at any stage during the execution of the Contract, it is observed that the erected equipment(s) do not meet the above minimum clearances, the Contractor shall immediately proceed to correct the discrepancy at his risks and costs.

3.11 DEGREE OF PROTECTION

The enclosures to be installed shall be provided with degree of protection as detailed here under:

- a) Installed out door: IP-55
- b) Installed indoor in air conditioned area: IP-31
- c) Installed in covered area IP:52
- d) Installed indoor-in non-air-conditioned area where possibilities of entry of water is limited:IP-41
- e) For LT switchgear (AC & DC distribution Boards): IP-54
- f) 11kV & 3.3kV Switchgears: IP4X
- g) 415V MCC / DBs / Fuse Board IP52 for indoor and IP65 for outdoor.
- h) Motor (Indoor/Outdoor): IP55
- i) Motor Actuator: IP65
- j) Control and Relay Panel in AC area: IP3X
- k) Control and Relay Panel in normal area: IP42
- l) Pushbutton Station/Kiosk/Panel - Indoor IP55
- m) Pushbutton Station/Kiosk/Panel -Outdoor IP65
- n) Indoor Junction boxes for cables / wires: IP55
- o) Outdoor lighting fixtures: IPW65
- p) Battery Charger Panel: IP42

The degree of protection shall be in accordance with IS:13947, (Part-1)/IEC-947(Part-1). Type test report/or degree of protection test on each type of the box shall be submitted for approval.

3.12 RATING PLATES, NAME PLATES AND LABELS

Type or serial number together with details of the loading conditions under which the item of the substation in question has designed to operate and such diagram plates as may require by the Purchaser. The rating plate of each equipment shall be according to IEC requirements.

All such nameplate instruction plates, rating plates shall be bilingual with Hindi inscription first followed by English. Alternately two separate plates one with Hindi and other with English inscriptions may be provided. All measurements shall be in M.K.S units.

3.13 EARTHING

Equipment shall be provided with two grounding pads suitable for connection to galvanized steel flat. Control panels, Relay panel, outdoor marshalling boxes, Junction boxes, lighting panels and distribution board shall be provided with two grounding pads, for connection to galvanized steel flat. The two pads shall be provided, one each at the middle of the two opposite sides of the bottom frame of the equipment. Earthing of hinged door shall be done by using a separate earth wire.

3.14 TERMINAL BLOCKS AND WIRING

Control and instrument leads from the switchboards or from other equipment will be brought to terminal boxes or control cabinets in conduits. All Inter-phase and external connections to equipment or to control cubicles will be made through terminal blocks.

Terminal blocks shall be 1100 V grade box –clamp type and have continuous rating to carry the maximum expected current on the terminals. Those shall be of molded piece complete with insulated barriers stud type terminals, washers nuts and lock nuts. Screw clamp, overall insulated, insertion type, rail mounted terminals can be used in place of stud type terminals. But preferably the terminal blocks shall be non-disconnecting stud type equivalent to Elmex type CATM4, Phoenix cage clamp type of Wedge or equivalent. The Insulating material of terminal block shall be nylon 6.6 which shall be free of halogens, fluorocarbons etc.

Terminal block for current transformer and voltage transformer secondary leads shall be provided with test links and isolating facilities. The current transformer secondary leads shall also be provided with short circuiting and earthing facilities.

The terminal shall be that maximum contact area is achieved when a cable is terminated. The terminal shall have a locking characteristic to prevent cable from escaping from the terminal clamp unless it is done intentionally. The conducting part in contact with cable shall preferably be tinned or silver plated however Nickel plated copper or zinc plated steel shall also be acceptable. The terminal blocks shall be of extensible design. The terminal blocks shall have locking arrangement to prevent its escape from the mounting rails.

The terminal blocks shall be fully enclosed with removable covers of transparent, non deteriorating type plastic material. Insulating barriers shall be provided between the terminal blocks. These barriers shall not hinder the operator from carrying out the wiring without removing the barriers.

Unless otherwise specified terminal blocks shall be suitable for connecting the following conductors on each side.

All circuits except CT circuits : Minimum of 2 nos. of 2.5 sq.mm, copper flexible.

All CT circuits : Minimum of 4 nos. of 2.5 sq.mm, copper flexible..

The arrangements shall be in such a manner so that it is possible to safely connect or disconnect terminals on live circuits and replace fuse links when the cabinet is live. At least 20 % spare terminals shall be provided on each panel/cubicle/box and these spare terminals shall be uniformly distributed on all terminals rows.

There shall be a minimum clearance of 250mm between the first bottom row of terminal block and the associated cable gland plate. Also the clearance between two rows of terminal blocks shall be a minimum of 150 mm. The Supplier shall furnish all wire, conduits and terminals for the necessary inter-phase electrical connection (where applicable) as well as between phases and common terminal boxes or control cabinets.

All input and output terminals of each control cubicle shall be tested for surge withstand capability in accordance with the relevant IEC Publications, in both longitudinal and transverse modes. The supplier shall also provide all necessary filtering, surge protection, interface relays and any other measures necessary to achieve an impulse withstand level at the cable interfaces of the equipment.

3.15 CONTROL CABINETS, JUNCTION BOXES, TERMINALS BOXES AND MARSHALLING BOXES FOR OUTDOOR EQUIPMENTS

All types of boxes, cabinets etc. shall generally conform to and be tested in accordance with IS-5039, IS-8623 or IEC-439, as applicable and the clause given below.

Control cabinet, Junction boxes, Marshalling boxes & Terminal boxes shall be made of **CRCA sheet** steel of minimum 2 mm thickness. The thickness of door s/covers shall not be less than 1.6 mm. The box shall be properly braced to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. Cabinet/boxes shall be free standing floor mounting type, wall mounting type or pedestal mounting type as per requirements.

Cabinet /boxes shall be provided with double hinged doors with padlocking arrangements. The distance between two hinges shall be adequate to ensure uniform sealing pressure against atmosphere. The quality of gaskets shall be such that it does not get damaged/cracked during the operation of the equipment.

All door, removable covers and plates shall be gasketed all around with suitably profiled **Neoprene gaskets**. The gasket shall be tested in accordance with approved quality plan. The quality of gasket shall be such that it does not get damaged /cracked during the years of the equipment or its major overhaul whichever is earlier. All gasketed surfaces shall be smooth, straight and reinforced if necessary to minimize distortion and to make a tight seal. Ventilating

Louvers, if provided, shall have screen and filters. The screen shall be fine wire mesh made of brass.

All boxes/cabinets shall be designed for the entry of cables from bottom by means of weather proof and dust-proof connections. Boxes and cabinets shall be designed with generous clearances to avoid interference between the wiring entering from below and any terminal blocks or accessories mounted within the box or cabinet. Suitable cable gland plate projecting at least 150 mm above from the base of the Marshalling Kiosk/box shall be provided for this purpose along with the proper blanking plates. Necessary number of cable glands shall be supplied and fitted on this gland. The gland shall project at least 25mm above gland plate to prevent entry of moisture in cable crutch. Gland plate shall have provision for some future glands to be provided later, if required.

3.16 SPACE HEATERS

The heater shall be suitable for continuous operation at 240 V AC supply voltage and shall be provided with on – off switch and fuse shall be provided for heater.

One or more adequately rated, thermostatically connected heaters shall be supplied to prevent condensation in any compartment. The heater shall be installed in the lower portion of the compartment and electrical connections shall be made from below the heater to minimize deterioration of supply wire insulation. The heaters shall be suitable to maintain the compartment temperature to prevent condensation.

The heaters shall be suitably designed to prevent any contact between the heater wire and air and shall consist of coiled resistance wire centered in metal sheath and completely encased in a highly compacted powder of Magnesium Oxide or other material having equal heat conduction and electrical insulation properties, or they shall consist of a resistance wire wound on a ceramic and completely covered with a ceramic material to prevent any contact between the wire and air. Alternatively, they shall consist of resistance wire mounted into a tubular ceramic body built into an envelope of stainless steel or the resistance wire is wound on a tubular ceramic body and embedded in glaze the surface temperature of the heaters shall be restricted to a value which will not shorten the life of the heater sheaths or that of insulated wire or other component in the compartments.

3.17 QUALITY

BHEL quality plan to be followed subject to TBEM / customer's approval.

3.18 DOCUMENTATION

3.18.1 LIST OF DOCUMENTS

The bidder shall submit a detailed list of drawings / documents along with the bid proposal which

he intends to submit to the Employer after award of the contract.

The supplier shall necessarily submit all the drawings / documents unless any thing is waived.

All engineering data submitted by the Contractor after final process including review and approval by the Employer shall form part of the Contract Document and the entire works performed under this specification shall be performed in strict conformity, unless otherwise expressly requested by the Employer in Writing.

3.18.2 DRAWINGS

All drawings submitted by the Contractor including those submitted at the time of bid shall be in sufficient detail to indicate the type, size, arrangement, material description, Bill of Materials, weight of each component, break-up for packing and shipment, the external connections, fixing arrangement required, the dimensions required for installation and interconnections with other equipment and materials, clearances and spaces required for installation and interconnection between various portions of equipment and any other information specifically requested in the specifications.

Each drawing submitted by the Contractor shall be clearly marked with the name of the Employer, name of consultant, the unit designation, contract no., and the name of the Project. If standard catalogue pages are submitted, the applicable items shall be indicated therein. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be in metric units.

Further work by the Contractor shall be in strict accordance with these drawings and no deviation shall be permitted without the written approval of the Employer if so required.

All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the Contractor's risk. The Contractor may make any changes in the design which are necessary to make the equipment conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Employer. Approval of Contractor's drawing or work by the Employer shall not relieve the contractor of any of his responsibilities and liabilities under the Contract.

3.18.3 APPROVAL PROCEDURE

The scheduled dates for the submission of these as well as for, any data/information to be furnished by the Employer would be discussed and finalized at the time of award. The supplier shall also submit required no. of copies as mentioned in this specification of all drawings/design documents/test reports for approval by the Employer. The following schedule shall be followed generally for approval.

i.	Initial submission of drawings and data sheet	Within 2 (two) weeks from PO date.
ii.	Approval/comments/by employer on	Within 2 (two) weeks of receipt

	Initial submission	
iii.	Resubmission	Within 1 (one) weeks (whenever from date of comments required) Including both ways postal time.
iv.	Approval or comments	Within 1 week of receipt of resubmission
v.	Furnishing of distribution copies	1 week from the date of last approval.

Note: The contractor may please note that all resubmissions must incorporate, all comments given in the submission by the Employer failing which the submission of documents is likely to be returned. Every revision shall be a revision number, date and subject, in a revision block provided in the drawing, clearly marking the changes incorporated.

The title block of drawings shall contain the following information incorporated in all contract drawings. Please refer enclosed sheet for details of Title block.

3.18.4 DOCUMENTS TO BE SUBMITTED ALONGWITH OFFER

- 1) Drawings
- 2) Guaranteed Technical Particulars
- 3) Type Test Reports
- 4) Manufacturing Quality Plan

3.18.5 DOCUMENTATION SCHEDULE

S. No.	DESCRIPTION	TENDER STAGE	CONTRACT STAGE FOR APPROVAL	FINAL DOCUMENTATION	
				Prints	CDs
1	Drawings and Data Sheets	1	6	7	4 nos of all drawings/ documents
2	Drawings "As Built "	-	-	7	
3	Type Test Reports	1	6	7	
4	Erection Manuals	-	6	7	
5	Operation and Maintenance Manuals	-	6	7	
6	Manufacturing Quality Plan	1	6	7	
7	Field Quality Plan	1	6	7	
8	Inspection Test Reports	-	-	7	

O & M Manuals shall be submitted 3 months prior start of unit commissioning,
The manual shall be submitted as follows-

The West Bengal Power Development Corporation Ltd. Bharat Heavy Electricals Ltd.
1X660 MW Thermal power extension project Unit-5 at Sagardighi- 400KV Switchyard,

1. 1 soft copy + 12 sets of hard copy to WBPDC Sagardighi site.
2. 1 soft copy + 3 sets of hard copy to WBPDC Corporate office.

Soft copies of drawings at contract stage shall also be submitted in **PDF format**.

Drawings will also be submitted in mini cartridges in AUTOCAD Release -14 package or any other CAD package along with conversion files for all major items.

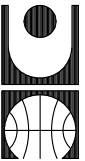
Final Documentation shall be submitted in bound volumes with Customer & Project etc. written on top.

CUSTOMER:



THE WEST BENGAL POWER DEVELOPMENT CORPN. LTD. (WBPDCL)
1X660MW,SAGARDIGHI THERMAL POWER EXTENSION PROJECT (UNIT #5)

CONSULTANT:



DEVELOPMENT CONSULTANTS PRIVATE LIMITED
KOLKATA

JOB NO. 445

STATUS CONTRACT

DISTRIBUTION



BHARAT HEAVY ELECTRICALS LTD
TRANSMISSION BUSINESS GROUP
NOIDA

TO

NO.

REV. DATE

ALTD

CHD

APPD

COPY RIGHT AND CONFIDENTIAL

The information on this document is the property of
BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or
indirectly in any way detrimental to the interest of the company.

DEPT CODE	NAME	SIGN	DATE
DRN	--		--
DESN	--		--
CHD	--		--
APPD	--		--

TITLE

DRAWING NO.

4

3

DEPT. SIGN	SCALE	DATE

SHEET -- OF -- REV. --

Fold-1

SIZE-A0

SECTION-4

I. **APPLICABLE FOR MARSHALLING KIOSK**

CHECK LIST FOR INFORMATION TO BE FURNISHED WITH OFFER RETURN THIS CHECKLIST AS PART OF THE OFFER DULY SIGNED

The offer may not be considered if the following information and this Checklist are not enclosed with the Offer.

BHEL ENQUIRY. NO:

BIDDER:OFFER REFERENCE:

A)

(1)	(2)	(3)				(4)	(5)
S.No.	Parameters	Data				Yes / No	Remarks in case reply in Col (4) is NO
1.	Applicable Standard	Latest IS -5039,IS-8623 or IEC-60439, IS-13947,IS-2147					
2.	Type						
3.0	Construction feature						
3.1	Thickness of Sheet Steel	3.0mm Cold rolled close annealed (CRCA)					
3.2	Degree of protection	IPW 55 as per IS 2147					
3.3	Control Wiring	2.5 mm ² , Stranded copper					
3.4	Space Heater / Lamp for illumination /Socket	Provided					
3.5	Distinct compartments for aux. Power circuits, interlocking circuit, receptacle (if applicable), CT& CVT circuit (if applicable)	Provided					
4.0	Power circuit Incoming						
4.1	No. of AC Incomer feeders	Two					
4.2	Rating of Incomer feeders	63/ 100 -amp, 3 - Phase, 4 - wire to be controlled by TPN/ 4-pole MCB					
4.3	Changeover between incomers	Automatic					
4.4	Terminal blocks of Incomer	CBT 170 of Elmex / Eq. For making loop-in loop- out connection of 3.5 x 70 sq.mm connected cable.					
5.0	Power circuit - Outgoing						
5.1	No. of 3-phase AC outgoing feeders (Indenter to tick)	4	⊕	6	⊗		

(1)	(2)	(3)					(4)	(5)
S.No.	Parameters	Data					Yes / No	Remarks in case reply in Col (4) is NO
5.2	Rating of 3 -phase AC outgoing feeder	16 amp, 3-phase, 4 -wire controlled by TP/ 4-pole MCB						
5.3	No. of 3-phase AC outgoing feeders for Air conditioning	2 no.						
5.4	Rating of 3 -phase AC outgoing feeder for Air conditioning	32 amp, 3-phase, 4 -wire controlled by TP/ 4-pole MCB						
5.5	Type of terminal blocks for 3-phase outgoing feeders	CBT M5 of Elmex / Eq.						
5.6	No. of 1- phase AC outgoing feeders (Indenter to tick)	5	6	4				
5.7	Rating of 1- phase AC outgoing feeders	10 amp, 1-phase, 2 -wire controlled by SP/ DP MCB						
5.8	Type of terminal blocks for 1-phase outgoing feeders	CBT M5 of Elmex / Eq.						
5.9	Provision of spare TBs of each type for power circuit	20 %						
6.0	Interlocking circuit							
6.1	No. of Interlocking terminal block (Indenter to tick)	120	200	240	300	Nil		
6.2	Type of Interlocking terminal block	Non - disconnecting stud type CAT M4 of Elmex /Eq.						
7.0	CT circuit (Indenter to tick)	Applicable			Not applicable			
7.1	No. of terminal block	75						
7.2	Type of terminal block	Disconnecting stud type CATD M4 of Elmex /Eq.			Non disconnecting stud type CATD M4 of Elmex /Eq.			
8.0	CVT circuit (Indenter to tick)	Applicable			Not applicable			
8.1	No. of terminal block	40						
8.2	Type of terminal block	Disconnecting stud type CATD M4 of Elmex /Eq.			Non disconnecting stud type CATD M4 of Elmex /Eq.			

B) TYPE TESTS

i) Whether type test reports of the following test conducted earlier on identical or similar material are available (test reports are of the test conducted not earlier than 5 (five) years prior to the date of bid opening i.e. 18.03.2018.). (YES / NO)

S.No.	TESTS	REPORT NO.	Date	Conducted at accredited laboratory or witnessed by independent authority
1	Degree of protection test			

ii) If type test reports are not acceptable to BHEL/Customer then above tests shall be conducted by the bidder free of cost. (YES / NO)

C)

S.No.	Description	Confirmation of Supplier
1.	Bidder to confirm that at all drawings / data sheets/QP/ valid type tests reports/ all relevant information shall be submitted to BHEL for organising approval of ultimate customer.	
2.	Bidder to confirm that it will offer approved Make of the components and fitments at contract stage. In case the offered make is not approved by the customer, then alternate make shall be supplied without any commercial implications to BHEL.	

Date:

Signature of the authorized representative of Bidder

Company Seal

II. **APPLICABLE FOR CTJB**

CHECK LIST FOR INFORMATION TO BE FURNISHED WITH OFFER RETURN THIS CHECKLIST AS PART OF THE OFFER DULY SIGNED

The offer may not be considered if the following information and this Checklist are not enclosed with the Offer.

BHEL ENQUIRY. NO:

BIDDER:OFFER REFERENCE:

A)

(1)	(2)	(3)				(4)	(5)
S.No.	Parameters	Data				Yes / No	Remarks in case reply in Col (4) is NO
1	Applicable Standard	Latest IS -5039,IS-8623, or IEC-60439, IS 13947, IS-2147					
2	Type of JB						
3.0	Construction Feature						
3.1	Thickness of Sheet Steel	3.0 mm Cold rolled close annealed (CRCA)					
3.2	Degree of protection	IPW 55 as per IS 13947					
3.3	Control Wiring	2.5 mm ² , Stranded copper					
3.4	Space Heater / Lamp for illumination /Socket	Provided					
4.0	Type of terminal block (Indenter to tick)	Disconnecting stud type CATD M4 of Elmex /Eq.	Non disconnecting stud type CAT M4 of Elmex /Eq.				
4.1	No. of terminal block (Indenter to tick)	30	45	75	90	180	

B) TYPE TESTS

i) Whether type test reports of the following test conducted earlier on identical or similar material are available (test reports are of the test conducted not earlier than 5 (five) years prior to the date of bid opening i.e. 18.03.2018.). (YES / NO)

S.No.	TESTS	REPORT NO.	Date	Conducted at accredited laboratory or witnessed by independent authority
1	Degree of protection test			

ii) If type test reports are not acceptable to BHEL/Customer then above tests shall be conducted by the bidder free of cost. **(YES / NO)**

C)

S.No.	Description	Confirmation of Supplier
1.	Bidder to confirm that at all drawings / data sheets/QP/ valid type tests reports/ all relevant information shall be submitted to BHEL for organizing approval of ultimate customer.	
2.	Bidder to confirm that it will offer approved Make of the components and fitments at contract stage. In case the offered make is not approved by the customer, then alternate make shall be supplied without any commercial implications to BHEL.	

Date:

Signature of the authorized representative of Bidder

Company Seal

III. **APPLICABLE FOR CVT JB**

CHECK LIST FOR INFORMATION TO BE FURNISHED WITH OFFER RETURN THIS CHECKLIST AS PART OF THE OFFER DULY SIGNED

The offer may not be considered if the following information and this Checklist are not enclosed with the Offer.

BHEL ENQUIRY. NO:

BIDDER:OFFER REFERENCE:

A)

(1)	(2)	(3)			(4)	(5)
S.No.	Parameters	Data			Yes / No	Remarks in case reply in Col (4) is NO
1	Applicable Standard	Latest IS -5039,IS-8623, or IEC-60439, IS 13947,IS-2147				
2	Type of JB					
3.0	Construction Feature					
3.1	Thickness of Sheet Steel	3.0 mm Cold rolled close annealed (CRCA)				
3.2	Degree of protection	IPW 55 as per IS 2147				
3.3	Control Wiring	2.5 mm ² , Stranded copper				
3.4	Space Heater / Lamp for illumination /Socket	Provided				
4.0	Type of terminal block (Indenter to tick)	Disconnecting stud type CATD M4 of Elmex /Eq.	Non disconnecting stud type CAT M4 of Elmex /Eq.			
4.1	No. of terminal block (Indenter to tick)	30	45	75	90	130

B) TYPE TESTS

i) Whether type test reports of the following test conducted earlier on identical or similar material are available (test reports are of the test conducted not earlier than 5 (five) years prior to the date of bid opening i.e. 18.03.2018.). (YES / NO)

S.No.	TESTS	REPORT NO.	Date	Conducted at accredited laboratory or witnessed by independent authority
1	Degree of protection test			

Customer: WBPDC
Extension of 400kV Switchyard at 1X660MW Unit-5
Sagardighi TPP
Technical Specification
Marshalling Kiosk and Junction Box

Bharat Heavy Electricals Ltd.
Doc. No. TB-SPEC-MKJB-031
Rev. No. 00

ii) If type test reports are not acceptable to BHEL/Customer then above tests shall be conducted by the bidder free of cost. **(YES / NO)**

C)

S.No.	Description	Confirmation of Supplier
1.	Bidder to confirm that at all drawings / data sheets/QP/ valid type tests reports/ all relevant information shall be submitted to BHEL for organizing approval of ultimate customer.	
2.	Bidder to confirm that it will offer approved Make of the components and fitments at contract stage. In case the offered make is not approved by the customer, then alternate make shall be supplied without any commercial implications to BHEL.	

Date:

Signature of the authorized representative of Bidder

Company Seal

SECTION 5

ENCLOSURES TO SPECIFICATIONS

ANNEXURE 1	CHECK LIST FOR INFORMATION TO BE FURNISHED WITH THE OFFER
ANNEXURE 2	SCHEDULE OF DEVIATION

Customer: WBDCL
Extension of 400kV Switchyard at 1X660MW Unit-5
Sagardighi TPP
Technical Specification

Bharat Heavy Electricals Ltd.

Doc. No. TB-SPEC-MKJB-031

Rev. No. 00

Marshalling Kiosk and Junction Box Annexure 1

CHECK LIST FOR INFORMATION TO BE FURNISHED WITH OFFER

BIDDER SHALL PUT A TICK '✓' IF THE INFORMATION IS ENCLOSED WITH THE OFFER, PUT A CROSS 'X' IF THE INFORMATION IS NOT ENCLOSED OR WRITE 'NOT APPLICABLE' IF THE QUERY/ SCHEDULE IS NOT RELEVANT AND RETURN THIS CHECKLIST AS PART OF THE OFFER DULY SIGNED

The offer may not be considered if the following information and this Checklist are not enclosed with the Offer.

BIDDER:

OFFER REFERENCE:

1. Technical offer with detailed schedules of equipment/ material and spares _____
2. Guaranteed Technical Particulars as per Section - 4 _____
3. Schedule of Deviations listing deviations, if any, clause-wise with respect to technical specification _____
4. List of past supplies complete with Purchase Order & Project name, quantity, order reference, etc., where identical equipment have been supplied. _____
5. Manufacturer's Quality Plans for approval _____
6. Field Quality Plan for approval _____
7. General Arrangement drawings with dimensions and weights and foundation/ fixing details _____
8. Drawing/ data submission Schedule _____
9. Type test reports. The type test reports shall be accompanied with a list listing all the relevant clauses of the applicable standard and the corresponding type test report. The manufacturer shall also furnish a certificate certifying that the test reports have been carried out on equipment identical in all respects to the one offered. In case the reports are for a different equipment and the applicability of the report is permitted as per applicable standards, the justification shall be enclosed to the list of type test reports. _____
10. Bar Chart showing time schedule showing time required for design, manufacture, test and inspection, transport, erection, site testing and commissioning _____
11. Makes of all important components, like motors, operating switches, fuses, etc. _____
12. Any additional information called for in any part of the technical specification. _____

Date:

Signature of the authorized representative of Bidder

Company Seal

Customer: WBPDC
Extension of 400kV Switchyard at 1X660MW Unit-5
Sagardighi TPP
Technical Specification
Marshalling Kiosk and Junction Box

Bharat Heavy Electricals Ltd.
Doc. No. TB-SPEC-MKJB-031
Rev. No. 00

Annexure 2

SCHEDULE OF DEVIATIONS

Certified that the following are only deviations from the specification (for the equipment and systems being offered)

S.No.	Page No.	Clause No.	Deviation	Reason / Justification
-------	----------	------------	-----------	------------------------

Date :

Signature :

Name:

Designation :

101	SWITCHYARD CONTROL PANELS	ABB India Limited	Approved
		GE T&D India Limited Noida Uttar Pradesh	Approved
		Schneider Electric Infrastructure Limited Noida Uttar Pradesh	Approved
		Siemens Ltd	Approved
102	SPACER COUPLING (REGIFLEX TYPE)	SIEMENS LTD	Approved
		ESCO COUPLING NV	Approved
		KTR Couplings (India) pvt.ltd	Approved
		UNIQUE TRANSMISSION INDIA P LTD.	Approved
		ESCO COUPLING & TRANSMISSION PVT LTD.	Approved
		Cubic Transmission pvt ltd unit-II	Approved
		RATHI TURBOFLEX PVT LTD	Approved
		Dipl.ing.Herwarth Reich GMBH	Approved
		Reich India ltd	Approved
KTR KUPPLUNGSTECHNIK Gmbh	Approved		
103	BAY CONTROL UNIT	ALSTOM	Approved
		SIEMENS	Approved
		ABB	Approved
104	FRP JUNCTION BOXES/ JUNCTION BOXES(POWER/CONTROL), LIGHTING JB	Jakson Engineers Limited	Approved
		Jasper Engineers Private Limited	Approved
		Mika Engineers	Approved
		Popular Switchgears Pvt Ltd	Approved
		Pyrotech Electronics Pvt Ltd	Approved
		RSI Switchgear Private Limited	Approved
		Sarvana Switchgears	Approved
		Unilec Engineers Ltd	Approved
105	MARSHALLING KIOSK	Mika Engineers Thane Maharashtra [MSE: MICRO]	Approved
		Popular Switchgears Pvt Ltd Nashik Maharashtra	Approved
		Pyrotech Electronics Pvt Ltd Udaipur Rajasthan	Approved
		RSI Switchgear Private Limited Bhiwadi Rajasthan	Approved
		RST Electricals Pvt. Ltd. Sahibabad Uttar Pradesh	Approved
		Sarvana Switchgears Bangalore Karnataka	Approved
		Unilec Engineers Ltd Gurgaon Haryana	Approved
106	PIPE STRUCTURE	Advance Steel Tubes Ltd. Ghaziabad Uttar Pradesh	Approved
		Associated Power Structures Pvt. Ltd. Vadodara Gujarat upto 400 kV System	Approved
		Goodluck India Limited Sikandrabad Uttar Pradesh	Approved
		Vijay Transmission Pvt. Ltd Raipur Chhattisgarh	Approved
		New Modern Technomech Pvt Ltd	Approved
		Rs Infraprojects Pvt. Ltd. Noida Uttar Pradesh	Approved
		UTKARSH TUBES & PIPES LIMITED Kolkata	Approved
		DEEPAK FASTNERS LTD	Approved