TECHNICAL QUALIFICATION REQUIREMENT

Name of Project: Vishnugad Pipalkoti Hydro Electric Project (4X111MW)
Name of Customer: THDC India Limited, Rishikesh, Uttarakhand
Name of Item: Marshalling Kiosk, Junction Box & its accessories
Ref. No.: VPHEP/TQR/MK&JB/00 dtd. 14.12.2022

TECHNICAL QUALIFICATION REQUIREMENT
The bidder must have manufactured and supplied at least Five (5) nos. of MK/ JB/ Distribution Boards for Substation/ Switchyard of 220kV or above voltage class in any one year in last 10 years as on the original scheduled date of technical bid opening of this tender.

SUPPORTING DOCUMENTS TO BE SUBMITTED BY BIDDER ALONG WITH TECHNICAL BID		
Sr	Required Criteria	Supporting Documents
1	Manufacturing	Approved Drawings / GTP / Approved Quality Plan / Factory Inspection Test Report etc. stabilising bidder as manufacturer of offered item in line with TQR
2	Supply	PO / Dispatch clearance / LR / Material Receipt certificate at site / installation or commissioning certificate etc. stabilising bidder as proven supplier of offered item in line with TQR

NOTES:

1. Bidder to please note that the submitted bid shall be liable to rejection in the absence of submission of valid Technical TQR documents along with technical bid.
2. Consideration of offer shall be subject to customer's approval of bidder's, if applicable.
3. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self- attested English translated document should also be submitted.
4. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
5. After satisfactory fulfilment of all the above criteria / requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

14/12/22

PREPARED BY | REVIEWED BY | APPROVED BY

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS ENGINEERING MANAGEMENT
NOIDA

DOCUMENT NO.	TB-382-316-022	REV 00	Prepared	Checked	Approved
TYPE OF DOC.	TECHNICAL SPECFICATION	NAME	BY	DKS	VK
Title: **Marshalling Kiosk, Junction Box & its accessories** *(Suitable for an altitude of approx. 1101 from Mean Sea Level (MSL))*		SIGN			
		DATE	14.12.22	14.12.22	14.12.22
		GROUP	TBEM		
		WO No.	84008A		

CUSTOMER	THDC India Limited, Rishikesh, Uttarakhand
PROJECT	Vishnugad Pipalkoti Hydro Electric Project (4X111MW)

Contents

Remarks: Bidder to note that data and details of Annexure-C (Guaranteed Technical Particulars) shall not be reviewed during technical evaluation/ scrutiny, hence compliance of guaranteed technical particulars in line with technical specification shall be bidder's responsibility.

Rev. No.	Date	Altered	Checked	Approved	
Distribution				To	
				Copies	

CHECKLIST FOR TECHNICAL EVALUATION

Along with the technical offer/ bids, the bidder should submit this checklist confirming the inclusion of the enclosures as listed below,

Sl. No.	Documents to be enclosed	Bidder to confirm (Please tick "Confirmed")
1.	Supporting documents for compliance of Technical Qualifying Requirement.	Confirmed
2.	Unpriced BOQ duly mentioning "Quoted" for all the items, signed and sealed.	Confirmed
3.	Annexure- A duly signed and sealed & Annexure- B duly filled, signed and sealed.	Confirmed

Note: Any bidder not meeting the above requirement shall be liable for non-evaluation. The above checklist is reviewed and verified for,

NIT Reference No.:

Name of Bidder:

Name of Project: Vishnugad Pipalkoti Hydro Electric Project (4X111MW)

Date: Bidder's Stamp & Signature

SECTION 1:
SCOPE, PROJECT SPECIFIC TECHNICAL REQUIREMENTS & BILL OF QUANTITIES

Contents

SECTION 1:
SCOPE, PROJECT SPECIFIC TECHNICAL REQUIREMENTS & BILL OF QUANTITIES

1. Scope

This technical specification covers the requirements of design, manufacture, inspection including third party inspection and testing at manufacturer's work before supply, proper packing and delivery to project of equipment **(Marshalling Kiosk, Junction Box & its accessories)** complete with all fittings, accessories, mandatory spares, as applicable of the equipment complete in all respects for efficient & trouble-free working mentioned under this specification.

This section covers the specific technical requirements of equipment. This constitutes minimum technical parameters for the above item as specified by the BHEL/ THDCIL. The offered equipment Insulated Switchgear shall also comply with the Section-3 (Project Details and General technical requirements for all equipment under the Project) of this specification.

The specification comprises of following sections:

Section-1 : Scope, Project Specific Technical Requirements & Bill of Quantities
Section-2 : Equipment Specification under scope of Supplies
Section-3 : Annexures
Annexure-A: Compliance Certificate to Technical Specification
Annexure-B: Deviation/ Change Request to Technical Specification
Annexure-C: Guaranteed Technical Particulars
Annexure D: Technical Checklist

The following order of priority shall be followed. In case of conflict between requirements specified in various documents, the more stringent one shall be followed. BHEL/ THDCIL concurrence shall, however, be obtained before taking a final decision in such matters.

1. Statutory Regulations
   In particular, the latest version of the following statutory regulations, as applicable, shall be followed for system,
   - o Indian Electricity Act
   - o CEA regulations
   - o The Factory Act
   - o Requirements of other statutory bodies as applicable, e.g. CEA etc.
2. Section-1
3. Section-2
4. Section-3
5. Codes & Standards

Bidder shall furnish list of conflicts/ ambiguities/ deviations, if any, along with their technical offer and also furnish the basis that is considered for submitting technical offer. BHEL/ THDCIL will resolve listed conflicts prior to award. In case of ambiguity, bidder shall inform BHEL/ THDCIL of their interpretation. In case bidder fails to convey the same prior to award, BHEL/ THDCIL decision on interpretation shall be considered final if need arises during the execution. No additional cost or extra time on account of conflicts/ ambiguities/ deviations shall be admissible.

In general, no deviation from the requirements specified in various clauses of this specification shall be allowed and hence, a certificate to this effect shall have to be furnished along with the offer (Annexure-A), however bidder shall furnish list of conflicts/ ambiguities/ deviations (Annexure-B), if any. Any conflicts/ ambiguities/ deviations mentioned elsewhere in technical offer shall not be reviewed.

The equipment is required for the following project:

Name of the Customer	:	**THDC India Limited, Rishikesh, Uttarakhand**
Name of Main Contractor	:	**Bharat Heavy Electricals Limited**
Name of the Project	:	**Vishnugad Pipalkoti Hydro Electric project (4X111MW)**

The scope of supplies shall be as per commercial terms and conditions enclosed separately with the notice inviting tender/ enquiry.

2. Codes & Standards

1. The rating as well as performance and testing of the equipment shall comply with the latest editions and amendments of the following standards as applicable, unless otherwise specified elsewhere in this specification,

IS 5039	Specification for Low Voltage Switchgear & Control Gear Assemblies
IS 8623	Specification for Low Voltage Switchgear & Control Gear Assemblies
IS 13947	Specification for Low Voltage Switchgear & Control Gear Assemblies
IEC 60439	Low-Voltage Switchgear & Control Gear Assemblies - Part 1: Type-Tested and Partially Type-Tested Assemblies

2. For the purpose of this specification all technical terms used hereinafter shall have the meaning as per IEC/ ISS specification.
3. The equipment meeting with the requirements of other authoritative standards, which ensure equal or better quality than the standards mentioned above shall also be acceptable. Where the equipment offered by the bidder confirms to other standards, salient points of difference between the standards adopted and the specified standards shall be clearly brought out in the offer.
4. In case of imported equipment, standards of the country of origin shall be applicable, if these standards are equivalent or stringent than the applicable Indian standards.
5. The equipment shall also conform to the provisions of Indian Electricity Rules, 1956 and other statutory regulations currently in force in the country.
6. In case Indian standards are not available for any equipment, standards issued by IEC/ BS/ VDE/ IEEE/ NEMA or equivalent agency shall be applicable.

3. Specific Technical Requirements

1. The equipment **(Marshalling Kiosk, Junction Box & its accessories)** shall perform satisfactorily under various other electrical, electromechanical and meteorological conditions of the site of installation.
2. The equipment shall also comply to facilitate erection of equipment, all items to be assembled at site shall be “match marked”.
3. **The equipment shall be installed at the altitude of +1101 approx. and hence, bidder shall**

submit detailed calculation of altitude correction factor for equipment and changes being done in design as per applicable IS/ IEC. It may please be noted that altitude correction factor may result in increased technical requirement of system parameters (basic impulse level, power frequency withstand voltage and switching impulse withstand voltage etc.) and minimum clearances (phase to phase, phase to earth, min. distance of the lowest earth part of insulators supporting live conductor from top of plinth level and section clearance etc.), applicable.

4. In addition to this, the other specific technical requirements for the equipment shall be as per details mentioned in Section-2.

4. General Technical Requirements

The general technical requirements for the equipment shall be as follows,

1. Fixing hardware (Nuts, bolts and washers etc.) for mounting Marshalling Kiosk and Junction Box are deemed to be included in the scope of supply.
2. CT Junction Box JB-D130 shall have disconnecting type TBs(Please refer Table-2)
3. VT Junction Box JB-N75 shall have non-disconnecting type TBs. (Please refer Table-3)
4. Other standard fittings and accessories, which are not specifically mentioned but are usually provided with equipment of type and rating being offered for efficient and trouble free operation.
5. The bidder must fill up all the details required for offered item/s. Instead of indicating "refer drawing, or as per IS/IEC", the exact value/s must be filled in.

5. Bill of Quantities

1. Quantities for the equipment shall be as per **Annexure- BOQ for Marshalling Kiosk, Junction Box & its accessories**. However, any item not appearing herein but required for completeness of the work and mentioned elsewhere is deemed to be included in bidder's scope.
2. The quantities in BOQ may vary up to ±20% in line with quantity variation clause. However, individual quantities may be deleted or vary up to any extent.

6. Drawings / Documents required for Technical Clearance for Manufacturing

The engineering drawings/ documents, shall be used for providing technical clearance for manufacturing of the equipment, which shall be used for delay analysis, if applicable, by TBMM.

1	**Marshalling Kiosk**- OGA, BOM/ Component List with Guaranteed Technical Particulars, Wiring Diagrams
2	**Marshalling Kiosk**- Type Test Reports
3	**Marshalling Kiosk**- Quality Assurance Plan
4	**Junction Box**- OGA, BOM/ Component List with Guaranteed Technical Particulars, Wiring Diagrams
5	**Junction Box**- Type Test Reports
6	**Junction Box**- Quality Assurance Plan

Date of Submission of drawings/ documents shall be counted only from the date of submission of reasonably correct drawings/ documents. In case drawing/ document are not duly stamped in

category-1/ category-2 by customer, BHEL stamp/ confirmation shall be treated final to proceed further.

The technical clearance for manufacturing shall be provided to TBMM department after completion of engineering approval.

The successful bidder shall have to extend all possible supports 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/ THDCIL approval.

7. Type Testing

Bidder shall ensure that the equipment being procured shall be of proven design and should have valid type test certificates as per specified in IS/ IEC standards (amended up to date) at any NABL accredited laboratories.

The validity of type test reports shall be as per the latest CEA guidelines for the validity period of type test(s) conducted on major electrical equipment in Power Transmission system.

In case any of Type tests have not been conducted on the offered design or there has been a change in the design due to high altitude requirement/ any other technical issue after the type tests. The requisite tests shall be conducted by bidder on the offered design without any extra cost and delivery impact to BHEL/ Customer.

8. Quality Plan

The successful bidder shall submit Quality Assurance Plan with in-process inspection methods, tests, records, etc. for BHEL/ Customer approval. Customer hold points will also be included in the plan, which shall be mutually agreed by the BHEL/ THDCIL. In case bidder has reference Quality Assurance Plan agreed with BHEL/ THDCIL same shall be submitted for specific project to BHEL/ THDCIL approval. There shall be no commercial implication to BHEL/ Customer on account of Quality Plan approval.

Superior quality control system shall be adopted to assure high product quality. Raw materials of the best commercial grade quality and high reliability shall be used in the manufacture of the equipment. All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved quality plan. The supplier shall perform all tests necessary to ensure that the material and workmanship conform to the relevant standards and comply with the requirements of the specification. Charges for all tests for the equipment shall be deemed to be included in bidder's scope.

9. Inspection & Testing

1. Equipment shall be subject to inspection by BHEL/THDCIL or authorized representative at bidder/ manufacturers' works. Hence, Bidder shall furnish all necessary information concerning the supply to BHEL/ THDCIL.

2. Routine and acceptance tests as listed in relevant standard and section-2, technical specifications shall be complied.
3. Bidder shall also furnish factory acceptance test (FAT) from manufacturers for BHEL/ THDCIL approval in line with specific requirements mentioned in section-2, technical specification.

10. Makes of Equipment/ Components

1. The offered equipment shall be brand new with state of art technology and proven field track record. No prototype equipment shall be offered.
2. Bidder while ordering shall ensure the availability of spare parts and maintenance support services for the equipment at least for 10 years from the date of supply.
3. Bidder shall give a notice of at least one year to the BHEL/ THDCIL before phasing out the products/ spares to enable the owner for placement of order for spares and services.
4. The equipment offered by the bidder shall be complete in all respect. Any material and component not specifically stated in this specification but which are necessary for trouble free operation of the equipment and accessories specified in this specification shall be deemed to be included unless specifically excluded. All such equipment/ accessories shall be supplied without any extra cost. In addition to this, all similar components shall be interchangeable and shall be of same type and rating for easy maintenance and low spare inventory.
5. Specific reference in this specification and documents to any material by trade name, make or catalogue number shall be construed as establishing quality and performance requirements.

11. Packing and Dispatch

1. The equipment shall be properly packed for selected mode of transportation i.e. sea, rail and road in such a manner that it is protected against the climatic conditions and for any damage during transportation, transit and storage. The panels shall be wrapped in polyethylene sheets before being placed in wooden crates/ cases to prevent damage to the finish. Crates/ cases shall have skid bottoms for handling. Special notations such as 'Fragile', 'This side up', 'Weight', ‘Owner’s particulars\ ‘PO nos.' etc., shall be clearly marked on the package together with other details as per purchase order.
2. The equipment may be stored outdoors for long periods before installation. The packing should also be suitable for outdoor storage areas with heavy rains/ high ambient temperature unless otherwise agreed and hence, Packing shall be suitable for long storage (minimum 1 year).

12. Definitions Used

The following expressions hereunder and elsewhere in the technical specification used and their grammatical variations shall unless repugnant to the subject or context thereof, have the following meanings hereunder respectively assigned to them, namely:

1. Bid/ Bidding Documents: The totality of the documents comprising the Bidding Document for the notice inviting tender.
2. Contract: The totality of agreement between Customer/ Purchaser/ Owner and the Contractor/ BHEL as derived from the contract documents.
3. Contractor: The bidder selected by the Customer/ Purchaser/ Owner for the performance of the work and supply of materials. In this case, it is BHEL.

4. Customer/ Purchaser/ Owner: THDC India Limited
5. Consultant: Any person(s)/ Firm nominated/ assigned by the Customer/ Purchaser/ Owner for providing the engineering consultant services.
6. Bidder/ vendor/ OEM: The bidder selected for this intended work shall be known as vendor/ OEM.

13. Abbreviations Used

The following terminology/ acronym hereunder and elsewhere in the technical specification used and their grammatical variations shall unless repugnant to the subject or context thereof, have the following full form hereunder respectively assigned to them, namely,

AC:	Alternating Current
DC:	Direct Current
kV:	Kilovolt
Hz:	Hertz
IP:	Ingress Protection
BOQ:	Bill of Quantities
QAP:	Quality Assurance Plan
NIT:	Notice Inviting Tender
MK:	Marshalling Kiosk
JB:	Junction Box
OEM:	Original Equipment Manufacturer
BHEL:	Bharat Heavy Electricals Limited
BIS:	Bureau of Indian Standards
BS:	British Standard
ANSI:	American National Standards Institute
ASTM:	American Society for Testing and Materials
IS:	Indian Standards
IEC:	International Electro Technical Commission
IEEE:	Institute of Electrical & Electronics Engineers
CEA:	Central Electricity Authority
NEMA:	National Electrical Manufacturers Association

14. List of Documents/ Drawings

Following drawing/ documents are attached for information purpose,

1. Annexure- BOQ for Marshalling Kiosk, Junction Box & its accessories
2. Table-1, 2 & 3

TABLE-1
TB CHART FOR MK-180R

TB-1	TB-2	TB-3	TB-4	TB-5
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9
10	10	10	10	10
11	11	11	11	11
12	12	12	12	12
13	13	13	13	13
14	14	14	14	14
15	15	15	15	15
16	16	16	16	16
17	17	17	17	17
18	18	18	18	18
19	19	19	19	19
20	20	20	20	20
21	21	21	21	
22	22	22	22	
23	23	23	23	
24	24	24	24	
25	25	25	25	
26	26	26	26	
27	27	27	27	
28	28	28	28	
29	29	29	29	
30	30	30	30	
31	31	31	31	
32	32	32	32	
33	33	33	33	
34	34	34	34	
35	35	35	35	
36	36	36	36	
37	37	37	37	
38	38	38	38	
39	39	39	39	
40	40	40	40	

TABLE-2
TB CHART FOR JB-D130

TB-1			TB-2			TB-3			TB-4			TB-5		
D	1	1S1R	D	1	2S1R	D	1	3S1R	D	1	4S1R	D	1	5S1R
D	2	1S2R	D	2	2S2R	D	2	3S2R	D	2	4S2R	D	2	5S2R
D	3	1S3R	D	3	2S3R	D	3	3S3R	D	3	4S3R	D	3	5S3R
D	4	1S4R	D	4	2S4R	D	4	3S4R	D	4	4S4R	D	4	5S4R
D	5	1S5R	D	5	2S5R	D	5	3S5R	D	5	4S5R	D	5	5S5R
D	6		D	6		D	6		D	6		D	6	
D	7	1S1Y	D	7	2S1Y	D	7	3S1Y	D	7	4S1Y	D	7	5S1Y
D	8	1S2Y	D	8	2S2Y	D	8	3S2Y	D	8	4S2Y	D	8	5S2Y
D	9	1S3Y	D	9	2S3Y	D	9	3S3Y	D	9	4S3Y	D	9	5S3Y
D	10	1S4Y	D	10	2S4Y	D	10	3S4Y	D	10	4S4Y	D	10	5S4Y
D	11	1S5Y	D	11	2S5Y	D	11	3S5Y	D	11	4S5Y	D	11	5S5Y
D	12		D	12		D	12		D	12		D	12	
D	13	1S1B	D	13	2S1B	D	13	3S1B	D	13	4S1B	D	13	5S1B
D	14	1S2B	D	14	2S2B	D	14	3S2B	D	14	4S2B	D	14	5S2B
D	15	1S3B	D	15	2S3B	D	15	3S3B	D	15	4S3B	D	15	5S3B
D	16	1S4B	D	16	2S4B	D	16	3S4B	D	16	4S4B	D	16	5S4B
D	17	1S5B	D	17	2S5B	D	17	3S5B	D	17	4S5B	D	17	5S5B
D	18		D	18		D	18		D	18		D	18	
D	19		D	19		D	19	AS1R	D	19		D	19	
D	20		D	20		D	20	AS2R	D	20		D	20	
D	21		D	21		D	21		D	21		D	21	
D	22		D	22		D	22	AS1Y	D	22		D	22	
D	23		D	23		D	23	AS2Y	D	23		D	23	
D	24		D	24		D	24		D	24		D	24	
D	25		D	25		D	25	AS1B	D	25		D	25	
D	26		D	26		D	26	AS2B	D	26		D	26	

Note: N- Non-disconnecting type
D- Disconnecting type

TABLE-3
TB CHART FOR JB-N75

TB-X1

1AR	N	1
1BR	N	2
1NR	N	3
	N	4
1AY	N	5
1BY	N	6
1NY	N	7
	N	8
1AB	N	9
1BB	N	10
1NB	N	11
	N	12
	N	13

TB-X4

N	1
N	2
N	3
N	4
N	5
N	6
N	7
N	8
N	9
N	10
N	11
N	12

TB-X2

2AR	N	1
2BR	N	2
2NR	N	3
	N	4
2AY	N	5
2BY	N	6
2NY	N	7
	N	8
2AB	N	9
2BB	N	10
2NB	N	11
	N	12
	N	13

TB-X5

N	1
N	2
N	3
N	4
N	5
N	6
N	7
N	8
N	9
N	10
N	11
N	12

TB-X3

3AR	N	1
3BR	N	2
3NR	N	3
	N	4
3AY	N	5
3BY	N	6
3NY	N	7
	N	8
3AB	N	9
3BB	N	10
3NB	N	11
	N	12
	N	13

TB-X6

N	1
N	2
N	3
N	4
N	5
N	6
N	7
N	8
N	9
N	10
N	11
N	12

Note: N- Non-disconnecting type
D- Disconnecting type

SECTION-2
STANDARD EQUIPMENT SPECIFICATION FOR MARSHALLING KIOSK, JUNCTION BOX & ITS ACCESSORIES

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	:	40°C
c)	Thickness of sheet steel	:	At least 2mm Cold rolled/
			2.5 mm Hot Rolled
d)	Degree of protection	:	IP 55 as per IS 13947
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		
	3-phase, 4-wire	:	2
	Changeover between incomers	:	Automatic
i)	No. of AC outgoing feeders		
	3-phase, 4-wire	:	**32A - 8 Nos**
	1-phase, 2-wire	:	**16A - 10 Nos**
j)	Terminal Block		
	Make	:	Elmex or approved Eqv.
	Earthlinks	:	As required

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, ~~63 A /~~ 100 A AC supplies through 2 Nos ~~TPN /~~ Four Pole MCB units with auto-changeover including timers and distribute ~~16A /~~ 32A, three phase outgoing supplies controlled by ~~TP /~~ Four Pole MCBs. Also it shall distribute 240V, ~~10A /~~ 16A, single phase supplies to be controlled by ~~SP /~~ DP MCBs to be drawn from above three-phase incomers. The terminal blocks used for above mentioned aux power incomer circuits

shall be CBT110 of Elmex/ Eq for making loop-in loop-out connection of 3.5x35 sq mm connected cable (i.e., 16 Nos. CBT110 TBs + 20% spare are required for terminating incomer and loop cables) 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: Non-disconnecting stud type terminal blocks CATM4 of Elmex/ Eq shall be provided in vertical formation for interlocking facilities.

For 180 TBs -- *(Refer Table-1)*.

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

4) Receptacle: Each MK shall be provided with 63A, 3-phase, 4 pin industrial grade receptacle with rotary switch.

5) The Marshalling kiosk shall be supplied with fixing hardware/ foundation bolts.

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

2.3 APPLICABLE STANDARDS

STANDARD	TITLE
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.

2.4 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 2 mm cold rolled or 2.5 mm hot rolled. 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. ***The gland plate meant for each section shall be split in to two parts. The minimum cut-out depth available shall be 200mm for control cable entry.***

Each MK shall be provided with a 15A, 240 V AC, 2-pole, 3-pin industrial grade receptacle with switch. 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.

2.5 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 (end to end).

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.

2.6 TESTING

TYPE TESTS

The Marshalling Kiosks shall have been subjected to type test for the IP 55 degree of protection of enclosure as per IS 13947. 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 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 VT JUNCTION BOX

2.0 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing and despatch of CT and VT 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

k)	Installation	:	Outdoor
l)	Design Ambient air temperature	:	**40°C**
m)	Thickness of sheet steel	:	At least 2.0 mm Cold Rolled/ 2.5mm Hot rolled
n)	Degree of protection	:	IP 55 as per IS 13947
o)	Paint Shade	:	Ext--Shade as per purchaser Int-- Shade as per purchaser (To be furnished at contract stage)
p)	Control Wiring		
	Size of conductor	:	$2.5mm^2$
	Conductor	:	Stranded copper
q)	Space Heater Rating	:	240 V, At least 40 W
r)	Terminal Block		
	Make	:	Elmex or approved Eqv.
	Earthlinks	:	As required
~~s)~~	~~**16A HRC fuse in VTJB-N75**~~	~~**:**~~	~~**12 Nos. in each VT JB duly wired to TBs as shown in Table-3A.**~~

2.2 Following different type of Junction Boxes are proposed

TABLE - I

Sl 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**

Sl No.	Type	No of TBs	Type of TBs
~~*4*~~	~~*JB-N45*~~	~~*45*~~	~~*Stud Type, Non Disconnecting CATM4/ Eq*~~
~~5~~	~~JB-N30~~	~~30~~	~~Stud Type, Non Disconnecting CATM4/ Eq~~
6	**JB-D130**	**130**	**Stud Type, Disconnecting CATDM4/ ~~Eq 26 Nos. & Non-Disconnecting CATM4/ Eq 104 Nos.~~**
~~7~~	~~JB-D90~~	~~90~~	~~Stud Type, Disconnecting CATDM4/ Eq~~
~~8~~	~~JB-D75~~	~~75~~	~~Stud Type, Disconnecting CATDM4/ Eq~~
~~*9*~~	~~*JB-D45*~~	~~*45*~~	~~*Stud Type, Disconnecting CATDM4/ Eq*~~
~~10~~	~~JB-D30~~	~~30~~	~~Stud Type, Disconnecting CATDM4/ Eq~~

Junction Box shall have terminals strips in vertical formation exclusively used for shorting the CT & VT secondary circuits. The type and number of TBs shall be as per selection ***Table-I*** above. ***Refer TB chart (Table – 2 & 3) for numbering methodology and dispositioning of TBs.***

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 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

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 2 mm cold rolled/ 2.5mm Hot Rolled. 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.

Each JB shall be provided with a 15A, 240 V AC, 2 -pole, 3-pin industrial grade receptacle with switch. For incoming supply, 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 (end to end).

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/ VT 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 Junction Boxes shall have been subjected to type test for the IP 55 degree of protection of enclosure as per IS 13947. 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 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.

TABLE-1
TB CHART FOR MK-180R

TB-1	TB-2	TB-3	TB-4	TB-5
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9
10	10	10	10	10
11	11	11	11	11
12	12	12	12	12
13	13	13	13	13
14	14	14	14	14
15	15	15	15	15
16	16	16	16	16
17	17	17	17	17
18	18	18	18	18
19	19	19	19	19
20	20	20	20	20
21	21	21	21	
22	22	22	22	
23	23	23	23	
24	24	24	24	
25	25	25	25	
26	26	26	26	
27	27	27	27	
28	28	28	28	
29	29	29	29	
30	30	30	30	
31	31	31	31	
32	32	32	32	
33	33	33	33	
34	34	34	34	
35	35	35	35	
36	36	36	36	
37	37	37	37	
38	38	38	38	
39	39	39	39	
40	40	40	40	

TABLE-2
TB CHART FOR JB-D130

TB-1			TB-2			TB-3			TB-4			TB-5		
D	1	1S1R	D	1	2S1R	D	1	3S1R	D	1	4S1R	D	1	5S1R
D	2	1S2R	D	2	2S2R	D	2	3S2R	D	2	4S2R	D	2	5S2R
D	3	1S3R	D	3	2S3R	D	3	3S3R	D	3	4S3R	D	3	5S3R
D	4	1S4R	D	4	2S4R	D	4	3S4R	D	4	4S4R	D	4	5S4R
D	5	1S5R	D	5	2S5R	D	5	3S5R	D	5	4S5R	D	5	5S5R
D	6		D	6		D	6		D	6		D	6	
D	7	1S1Y	D	7	2S1Y	D	7	3S1Y	D	7	4S1Y	D	7	5S1Y
D	8	1S2Y	D	8	2S2Y	D	8	3S2Y	D	8	4S2Y	D	8	5S2Y
D	9	1S3Y	D	9	2S3Y	D	9	3S3Y	D	9	4S3Y	D	9	5S3Y
D	10	1S4Y	D	10	2S4Y	D	10	3S4Y	D	10	4S4Y	D	10	5S4Y
D	11	1S5Y	D	11	2S5Y	D	11	3S5Y	D	11	4S5Y	D	11	5S5Y
D	12		D	12		D	12		D	12		D	12	
D	13	1S1B	D	13	2S1B	D	13	3S1B	D	13	4S1B	D	13	5S1B
D	14	1S2B	D	14	2S2B	D	14	3S2B	D	14	4S2B	D	14	5S2B
D	15	1S3B	D	15	2S3B	D	15	3S3B	D	15	4S3B	D	15	5S3B
D	16	1S4B	D	16	2S4B	D	16	3S4B	D	16	4S4B	D	16	5S4B
D	17	1S5B	D	17	2S5B	D	17	3S5B	D	17	4S5B	D	17	5S5B
D	18		D	18		D	18		D	18		D	18	
D	19		D	19		D	19	AS1R	D	19		D	19	
D	20		D	20		D	20	AS2R	D	20		D	20	
D	21		D	21		D	21		D	21		D	21	
D	22		D	22		D	22	AS1Y	D	22		D	22	
D	23		D	23		D	23	AS2Y	D	23		D	23	
D	24		D	24		D	24		D	24		D	24	
D	25		D	25		D	25	AS1B	D	25		D	25	
D	26		D	26		D	26	AS2B	D	26		D	26	

Note: N- Non-disconnecting type
D- Disconnecting type

TABLE-3
TB CHART FOR JB-N75

TB-X1

1AR	N	1
1BR	N	2
1NR	N	3
	N	4
1AY	N	5
1BY	N	6
1NY	N	7
	N	8
1AB	N	9
1BB	N	10
1NB	N	11
	N	12
	N	13

TB-X4

N	1
N	2
N	3
N	4
N	5
N	6
N	7
N	8
N	9
N	10
N	11
N	12

TB-X2

2AR	N	1
2BR	N	2
2NR	N	3
	N	4
2AY	N	5
2BY	N	6
2NY	N	7
	N	8
2AB	N	9
2BB	N	10
2NB	N	11
	N	12
	N	13

TB-X5

N	1
N	2
N	3
N	4
N	5
N	6
N	7
N	8
N	9
N	10
N	11
N	12

TB-X3

3AR	N	1
3BR	N	2
3NR	N	3
	N	4
3AY	N	5
3BY	N	6
3NY	N	7
	N	8
3AB	N	9
3BB	N	10
3NB	N	11
	N	12
	N	13

TB-X6

N	1
N	2
N	3
N	4
N	5
N	6
N	7
N	8
N	9
N	10
N	11
N	12

Note: N- Non-disconnecting type
D- Disconnecting type

SECTION 3:
ANNEXURES

Contents

ANNEXURE-A: Compliance Certificate of Technical Specification

The bidder shall confirm compliance to the following by signing and stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.

2. There are no deviation(s) with respect to specification other than those furnished in the schedule of deviations.

3. Only those technical submittals which are specifically asked for in Notice Inviting Tender (NIT) to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of technical offer.

4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.

5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in 'BOQ' of the specification shall not be considered (i.e., technical description & quantities as per the specification shall prevail).

Date: Bidder's Stamp & Signature

ANNEXURE-B: Deviation(s) of Technical Specification

Bidder shall list out all technical potential deviation/ change request (s) along with clause with respect to technical specifications.

Sl. No.	Page No.	Clause No.	Deviation	Reason/ Justification(s)

Any deviation not specifically brought out in this section shall not be admissible for any commercial implication at later stage. Except to the technical deviations listed in this schedule, bidder's offer shall be considered in full compliance to the tender specifications irrespective of any such deviation indicated / taken elsewhere in the submitted offer.

Date: Bidder's Stamp & Signature

ANNEXURE-C: Guaranteed Technical Particulars

A.	**Marshalling Kiosk**	
Sl. No.	Description	Particulars
1	Manufacturer's Name	
2	Indoor/Outdoor application	
3	Degree of protection	
4	Bill of material for all equipment mounted in marshalling kiosk giving following details:	
i)	Make & Type	
ii)	Applicable Standard	
iii)	Voltage rating	
iv)	Current rating	
v)	Duty class if applicable	
vi)	Manufacturer's catalogue No.	
vii)	Total heat load of kiosk (for purpose of ventilation requirement)	
5	Colour of finish paint (as per IS)	
i)	Indoor	
ii)	Outdoor	
6	Control wiring	
7	Space heater rating at 240V AC	
8	Marshalling kiosk drawing showing the following:	
i)	Outline dimension's floor opening, floor/ wall/ pedestal fixing arrangements, weights etc.	
ii)	Front view and inside view showing the mounting arrangement of various equipment	
iii)	Schematic wiring diagram of marshalling kiosk enclosed	
iv)	Interconnection drawing showing external cable connections to the marshalling kiosh enclosed	
9	Type test report to degree of protection enclosed	
10	Terminal blocks	
i)	Make & Type	
ii)	Current rating	
a.	Power terminals	
b.	Outer terminals	
B.	**Junction Box**	
1	Manufacturer's Name	
2	Indoor/Outdoor application	
3	Degree of protection	
4	Bill of material for all equipment mounted in marshalling kiosk giving following details:	
i)	Make & Type	
ii)	Applicable Standard	
iii)	Voltage rating	

iv)	Current rating	
v)	Duty class if applicable	
vi)	Manufacturer's catalogue No.	
vii)	Total heat load of kiosk (for purpose of ventilation requirement)	
5	Colour of finish paint (as per IS)	
i)	Indoor	
ii)	Outdoor	
6	Control wiring	
7	Space heater rating at 240V AC	
8	Marshalling kiosk drawing showing the following:	
i)	Outline dimension's floor opening, floor/ wall/ pedestal fixing arrangements, weights etc.	
ii)	Front view and inside view showing the mounting arrangement of various equipment	
iii)	Schematic wiring diagram of marshalling kiosk enclosed	
iv)	Interconnection drawing showing external cable connections to the marshalling kiosh enclosed	
9	Type test report to degree of protection enclosed	
10	Terminal blocks	
i)	Make & Type	
ii)	Current rating	
a.	Power terminals	
b.	Outer terminals	

Date: Bidder's Stamp & Signature

ANNEXURE-D: Technical Checklist

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**		
2.	**Type**			
3.0	**Construction feature**			
3.1	Thickness of Sheet Steel	Either of 2.0 mm Cold rolled/ 2.5mm Hot Rolled		
3.2	Degree of protection	IP 55 as per IS13947		
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& VT 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 110 of Elmex / Eq. For making loop-in & separately loop- out connection of 3.5 x 35 sq.mm connected cable.		
5.0	**Power circuit – Outgoing**			
5.1	No. of 3-phase AC outgoing feeders **(Indenter to tick)**	~~4~~ ~~5~~ ~~6~~ **8**		

(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 /~~ 32 amp, 3-phase, 4 -wire controlled by ~~***TP/***~~***4-pole*** MCB		
5.3	Type of terminal blocks for 3-phase outgoing feeders	CBT M5 of Elmex / Eq.		
5.4	No. of 1- phase AC outgoing feeders **(Indenter to tick)**	~~5~~ ~~6~~ **10**		
5.5	Rating of 1- phase AC outgoing feeders	~~10 /~~ 16 amp, 1-phase, 2 -wire controlled by ~~SP/~~***DP*** MCB		
5.6	Type of terminal blocks for 1-phase outgoing feeders	CBT M5 of Elmex / Eq.		
5.7	Provision of spare TBs of each type for power circuit	20 %		
~~5.8~~	~~Contacts for remote alarm for supply fail (AC Incomer)~~	~~Provided~~		
6.0	**Interlocking circuit**			
6.1	No. of Interlocking terminal block **(Indenter to tick)**	~~150~~ 180 ~~240~~ ~~400~~ ~~***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.~~		
~~**8.0**~~	~~**VT 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.~~		
9.0	**Receptacle (Indenter to tick)**	Applicable ~~Not applicable~~		
9.1	Rating of receptacle	63 ~~/ 100~~ Amp complete with 3-ph, 4- pin industrial grade rotary switch		

(1)	**(2)**	**(3)**	**(4)**	**(5)**
S.No.	**Parameters**	**Data**	**Yes / No**	**Remarks in case reply in Col (4) is *NO***
9.2	Terminal block for Receptacle	CBT 250 of Elmex / Eq.		
10.0	**Clearance between TBs**			
10.1	Clearance between two rows of terminal blocks (End to End)	150 mm minimum		
10.2	Clearance between first/bottom row of terminal blocks and associated cable gland plate	250 mm minimum		
11.0	Feeder names with purpose shall be indicated in drawings	Yes		
12.0	Name plate details, type etc. shall be mentioned in notes of drawings	Yes		
13.0	Door handle with integral lock & master key	Provided		
14.0	TBs fully enclosed with removable covers of transparent, non-deteriorating type plastic material	Provided		
15.0	Fixing Hardware (Nuts, Bolts and Washers) for mounting MK	Provided		
16.0	Base Frame for MK	Provided		

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 10 (ten) years prior to the date of techno-commercial bid opening). **(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)**

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**		
2	**Type of JB**			
3.0	**Construction Feature**			
3.1	Thickness of Sheet Steel	Either of 2.0 mm Cold rolled/ 2.5mm Hot Rolled ~~/ 1.6 mm hot dip galvanized~~		
3.2	Degree of protection	IP 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)**	**As per Table-2 of Section-1/ 2**		
4.1	No. of terminal block **(Indenter to tick)**	~~30~~ ~~45~~ ~~75~~ ~~90~~ **130**		
5.0	**Clearance between TBs**			
5.1	Clearance between two rows of terminal blocks (End to End)	150 mm minimum		
5.2	Clearance between first/bottom row of terminal blocks and associated cable gland plate	250 mm minimum		

(1)	(2)	(3)	(4)	(5)
S.No.	**Parameters**	**Data**	**Yes / No**	**Remarks in case reply in Col (4) is *NO***
6.0	Name plate details, type etc. shall be mentioned in notes of drawings	Yes		
7.0	Door handle with integral lock & master key	Provided		
8.0	TBs fully enclosed with removable covers of transparent, non-deteriorating type plastic material	Provided		
9.0	Fixing Hardware (Nuts, Bolts and Washers) for mounting JB	Provided		

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 10 (ten) years prior to the date of techno-commercial bid opening). **(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)**

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

III. APPLICABLE FOR VTJB

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**			
2	**Type of JB**				
3.0	**Construction Feature**				
3.1	Thickness of Sheet Steel	Either of 2.0 mm Cold rolled/ 2.5mm Hot Rolled ~~/ 1.6 mm hot dip galvanized~~			
3.2	Degree of protection	IP 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)**	**As per Table-3 of Section-1/2**			
5.0	**Clearance between TBs**				
5.1	Clearance between two rows of terminal blocks (End to End)	150 mm minimum			
5.2	Clearance between first/bottom row of terminal blocks and associated cable gland plate	250 mm minimum			

(1)	(2)	(3)	(4)	(5)
S.No.	**Parameters**	**Data**	**Yes / No**	**Remarks in case reply in Col (4) is *NO***
6.0	Name plate details, type etc. shall be mentioned in notes of drawings	Yes		
7.0	Door handle with integral lock & master key	Provided		
8.0	TBs fully enclosed with removable covers of transparent, non-deteriorating type plastic material	Provided		
9.0	Fixing Hardware (Nuts, Bolts and Washers) for mounting JB	Provided		
~~10.0~~	~~Fuse~~	~~18 Nos. 6A HRC fuses provided with internal wiring for VT JB-N75, as shown in Table-3 of Section-2~~		

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 10 (ten) years prior to the date of techno-commercial bid opening). **(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)**

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