TECHNICAL PRE QUALIFICATION REQUIREMENT

Name of Project: Substation Package- SS02 for Construction of 400kV GIS at Khavda PS-2 (GIS) S/s associated with "Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE parks" under TBCB Route

Name of Customer: Power Grid Corporation of India Ltd.

Name of Item: Junction Box

TECHNICAL PRE QUALIFICATION REQUIREMENT
Bidder should have manufactured, type tested and supplied JB to POWERGRID / NTPC/ any Power Utilities in last 7 years from the date of technical bid opening of this tender

SUPPORTING DOCUMENTS TO BE ATTACHED		
Sr	**Required Criteria**	**Supporting Documents to be submitted by bidder along with technical bid**
1	Manufacturing	Approved Drawings / GTP / Approved Quality Plan / Factory Inspection Test Report e.t.c
2	Supply	PO / Dispatch clearance / LR / Material Receipt certificate at site / installation or commissioning certificate e.t.c

Notes (General points):

1. Consideration of offer shall be subject to customer's approval of bidder's, if applicable.

2. 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.

3. 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.

4. 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.

PREPARED BY

REVIEWED BY

APPROVED BY

BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

DOCUMENT No.	TB-421-510-004	Rev. No.	00	Prepared	Checked	Approved
TYPE OF DOC.	TECHNICAL SPECIFICATION		SIGN			
TITLE			NAME	PC/AS	JS	VK
Junction Box			DATE	19/04/23	19/04/23	19/04/23
			GROUP	TBEM	W.O. No	

CUSTOMER	**Power Grid Corporation of India Ltd.**
PROJECT	**Substation Package- SS02 for Construction of 400kV GIS at Khavda PS-2 (GIS) substation associated with "Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE parks" under TBCB Route**
NOA NO.	**Dtd.27.03.2023**
Station	**Khavda PS-2, Gujrat**

CONTENTS

Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS

Distribution	To	TBEM	TBMM	TBQM	Vendor
	Copies	1	1	1	4

SECTION-1
Scope, Bill of Quantity, Specific Technical Requirements

1. SCOPE:

This technical specification covers the requirement of design, manufacture, testing at works, packing and dispatch of Junction Box complete with accessories
In case of any conflict between the technical details mentioned in this section and the remaining sections of this document, then Section-1 shall prevail and is to be considered as binding requirement.

The equipment is required for the following project:

Name of the customer : **Power Grid Corporation of India Ltd.**

Name of the project : **Substation Package- SS02 for Construction of 400kV GIS at Khavda PS-2 (GIS) substation associated with "Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE parks" under TBCB Route**

Site : **Khavda PS-2, Gujrat**

Refer Section-II for equipment specification
Section-III for Project Details and General Specifications.
Section-IV for Standard Technical Data sheet
Section-V for Checklist

***Note: The terms used in this specification namely, "Employer/Purchaser" refers to *PowerGrid*, "Contractor" refers to successful bidder.**

In case of any conflict among the various sections of this specification, the order of precedence shall be section 1, section 2 & the section 3.

2. BILL OF QUANTITY:

S.No	Description	Unit	Qty
1	CVT Junction Box JB D-75	No.	3

Note: The offered Junction Box shall include all accessories like fixing hardware / foundation bolts etc.

3. SPECIFIC TECHNICAL PARTICULARS:

Junction Box

i) The terminal blocks shall be disconnecting stud type

ii) The wiring diagram plate for the interconnections of the three single phase CVTs shall be provided inside the respective CVT Junction box. Please refer Section-II, Annexure A for a typical wiring diagram and terminal arrangement.

iii) The offered Junction Box shall include all accessories such as fixing hardware / foundation bolts etc

iv) The enclosure of Junction Box shall conform to IP-55 as per IS-13947 including the application of 1kV rms for 1 (one) minute, insulation resistance and functional test after IP-55 test.

v) The CVT star point earthing shall be made in respective yard Junction Box, provision for the same shall be provided.

vi) The following routine tests along with the routine tests as per IS:5039 shall also be conducted:

-check for wiring

-visual and dimension check

4. QUALIFYING REQUIREMENTS:

As per Annexure-TQR

5. TYPE TESTING, INSPECTION, TESTING & INSPECTION CERTIFICATE

a. All equipment being supplied shall conform to type tests as per technical specification and shall be subject to routine tests in accordance with requirements stipulated under section II.

b. The reports for all type tests as per technical specification shall be furnished by the Contractor along with equipment / material drawings. However, type test reports of similar equipments/ material already accepted in POWERGRID shall be applicable for all projects with similar requirement. The type tests conducted earlier should have either been conducted in accredited laboratory (accredited based on ISO / IEC Guide25 / 17025 or EN 45001 by the national accreditation body of the country where laboratory is located) or witnessed by POWERGRID/representative authorized by POWERGRID/representative of Utility /representative of accredited test lab/ representative of The National Accreditation Board for Certification Bodies(NABCB) certified agency shall also be acceptable.

Unless otherwise specified elsewhere, the type test reports submitted shall be of the tests conducted within **10 years** from the date of NOA (27.03.2023). In case the test reports are of the test conducted earlier than the years specified date of NOA, the Bidder shall repeat these test(s) at no extra cost to BHEL/Employer

c. Further, in the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes or due to non-compliance with the requirement stipulated in the Technical Specification or any/all type tests not carried out, same shall be carried out without any additional cost implication to the Employer/BHEL.

6. QUALITY PLAN

Bidder should have POWERGRID approved and valid SMQP by the date of technical bid opening.

7. DEVIATIONS:

The bidder shall list all the deviation from the specification separately. Offers without specific deviation will be deemed to be totally in compliance with the specification and NO DEVIATION on any account will be entertained at a later date.

8. DRAWING AND ENGINEERING DOCUMENTS

Date of Submission of first lot of drawings will be counted only from the date of submission of reasonably correct drawings. List of drawings required for technical clearance of manufacturing are as follows:

1. Approved General Arrangement, Wiring Drawings and BOM of Junction Box
2. Approved Type Test Report as per relevant IEC Standards

---xxxxxx---

SECTION-2
Equipment Specifications

1. SCOPE

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

2. SPECIFIC TECHNICAL REQUIREMENTS

Technical Parameters for Junction Box

a)	Installation	:	Outdoor
b)	Design Ambient air temperature	:	50°C
c)	Material used	:	sheet steel/aluminium
d)	Degree of protection	:	IP 55 as per IS 13947
e)	Paint Shade	:	Ext—RAL 7032 Int—RAL 7032
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		
	As per Below Table		
	Earthlinks	:	As required

3. Following type of Junction Boxes are proposed

TABLE-1

Sl No.	Type	No of TBs	Type of TBs
1	JB-D75	75	Stud Type, Disconnecting CATDM4/ Eq

Junction Box shall have terminals strips in vertical formation exclusively used for shorting the CVT secondary circuits. The type and number of TBs shall be as per selection ***Table-1*** above. ***Refer TB chart (Annexure A) for numbering methodology and dispositioning of TBs.***

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

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

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

5. 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 authorized 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 recognized standard other than the Indian standards, the salient features of comparison shall be brought out.

6. 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 boxes shall be made of stainless steel of atleast 1.5 mm thick or aluminum enclosure of atleast 1.6 mm thick and shall be dust, water and vermin proof. Stainless steel used shall be of grade SS304 (SS316 for coastal area) or better. 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. In case of aluminium enclosed box the thickness of aluminum shall be such that it provides adequate rigidity and long life as comparable with sheet steel of specified thickness. 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 double hinged doors with padlocking arrangement. All doors, removable covers and plates shall be gasketed all round with suitable profiled EPDM/Neoprene/PU 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. Gland plate shall have provision for some future glands to be provided later, if required.

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 MCB/rotary switch type and Toggle/ Piano switches shall not be accepted.

Each JB shall be provided with two earthing pads to receive 50mm x 6mm GS flat. The connection shall be bolted type with 2 bolts per pad. The earth wire shall be terminated on to the earthing pad and secured by the use of etching washer. Earthing of hinged door shall be done by using a separate earth wire. 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.

7. TERMINAL BLOCKS AND WIRING

Terminal blocks shall be 650V grade and have continuous rating to carry the maximum expected current on the terminals and non breakable type. 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 be of extensible design, multilayer terminal arrangement is not allowed in any junction box (Common MB, Individual MB, JB etc.). There should be sufficient space at both sides of terminals so that ferrule number of wires / TB numbers are clearly visible during wire removal or insertion.

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 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.

8. 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/IEC60947. The bidder shall furnish the type test report at contract stage. In case the Test reports are more than ten years old on the date of NOA (27.03.2023), 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:

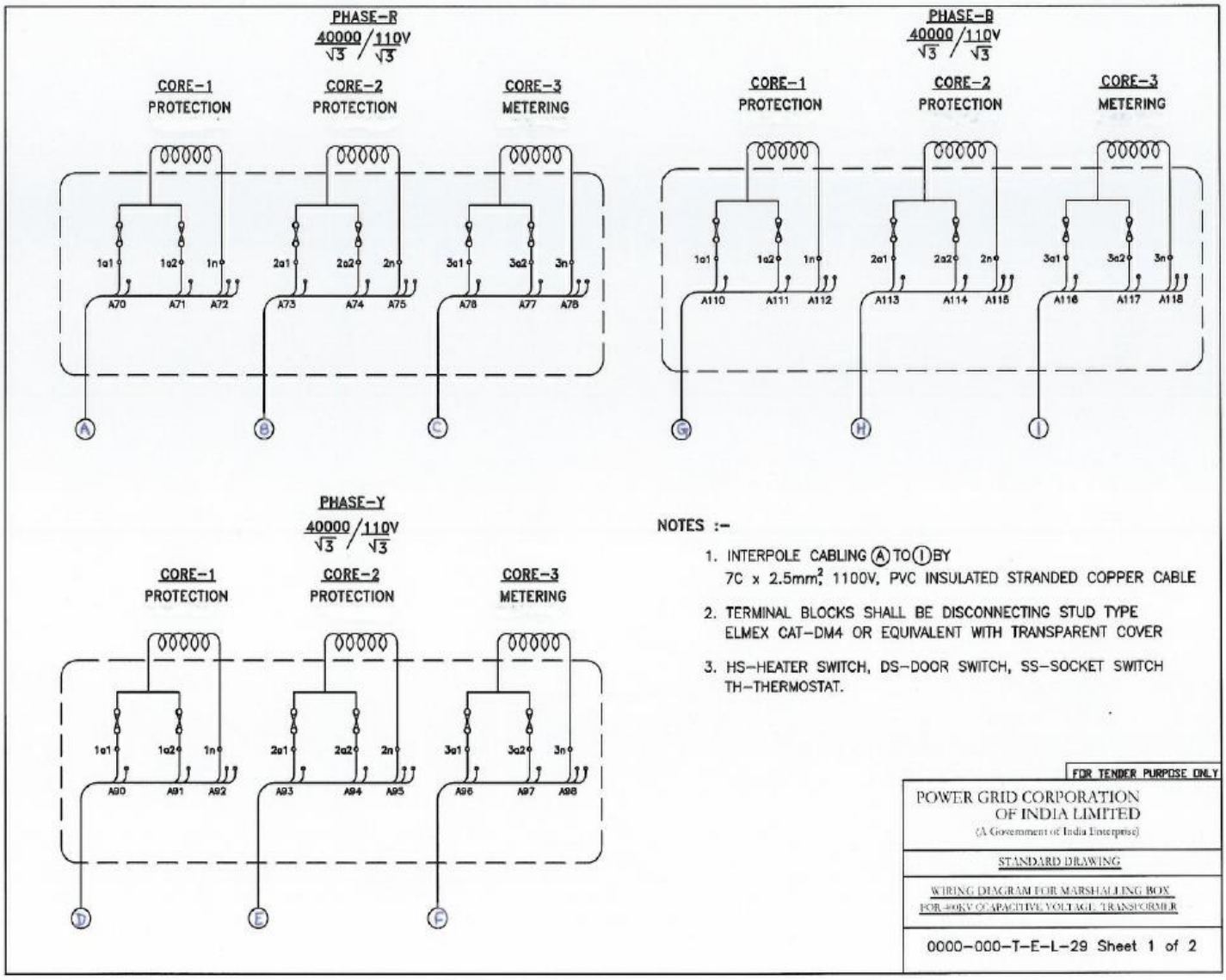
a) 1 kV withstand for one minute
b) Insulation Resistance
c) Functional tests

9. ROUTINE TESTS

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

a) 1 kV rms. for one-minute test
b) Check for wiring
c) Visual and dimensional check
d) Checking for paint.

ANNEXURE-A



NOTES :-

1. INTERPOLE CABLING (A) TO (I) BY 7C x 2.5mm^2, 1100V, PVC INSULATED STRANDED COPPER CABLE
2. TERMINAL BLOCKS SHALL BE DISCONNECTING STUD TYPE ELMEX CAT-DM4 OR EQUIVALENT WITH TRANSPARENT COVER
3. HS-HEATER SWITCH, DS-DOOR SWITCH, SS-SOCKET SWITCH TH-THERMOSTAT.

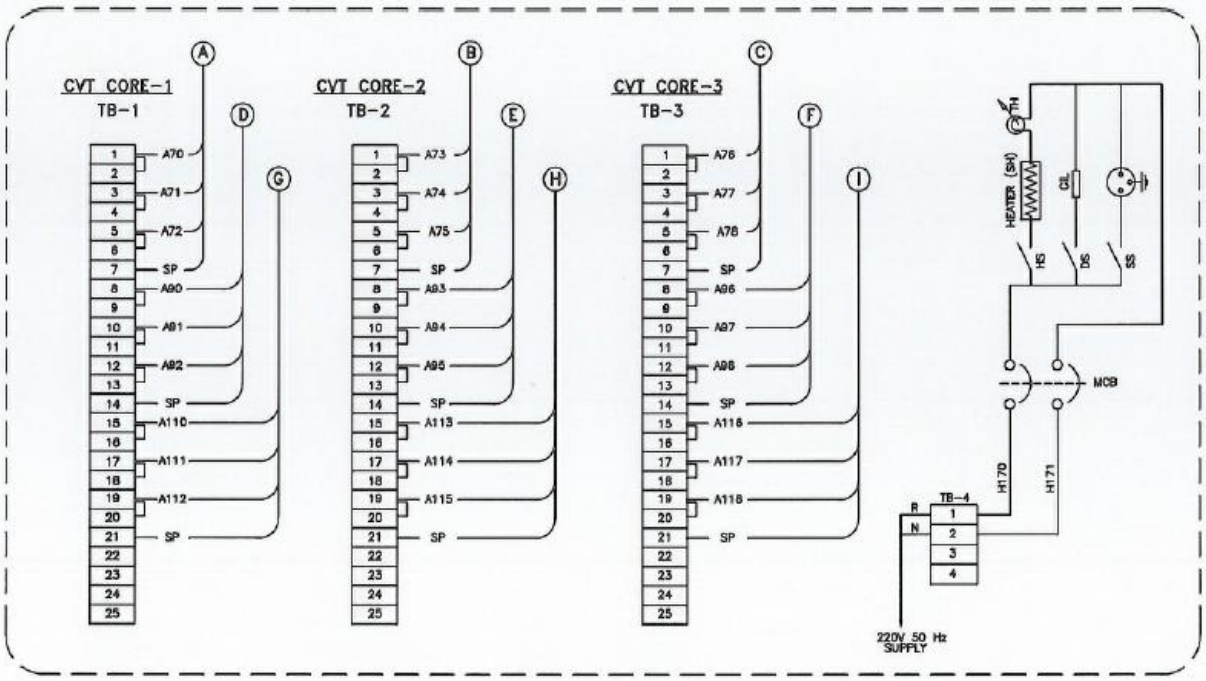
FOR TENDER PURPOSE ONLY

POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

STANDARD DRAWING

WIRING DIAGRAM FOR MARSHALLING BOX FOR 400kV CAPACITIVE VOLTAGE TRANSFORMER

0000-000-T-E-L-29 Sheet 1 of 2



CVT MARSHALLING BOX

NOTES :-

1. INTERPOLE CABLING (A) TO (I) BY
   7C x 2.5mm, 1100V, PVC INSULATED STRANDED COPPER CABLE
2. TERMINAL BLOCKS SHALL BE DISCONNECTING STUD TYPE
   ELMEX CAT-DM4 OR EQUIVALENT WITH TRANSPARENT COVER
3. HS-HEATER SWITCH, DS-DOOR SWITCH, SS-SOCKET SWITCH
   TH-THERMOSTAT.

FOR TENDER PURPOSE ONLY

POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

STANDARD DRAWING

WIRING DIAGRAM FOR MARSHALLING BOX FOR 400KV CCVT/ACTIVE VOLTAGE TRANSFORMER

0000-000-T-E-L-29 Sheet 2 of 2

SECTION-3

Project Details & General Specification

Please refer General Technical requirement document no. TB-KPS2-316-S03, Section-3

SECTION-4
Guaranteed Technical Particulars

1.	Manufacturer's name and country.		
2.	Indoor/ Outdoor applicable.		Outdoor
3.	Design Ambient air temperature.	°C	50
4.	Thickness of Sheet Steel	mm	
5.	Degree of Protection provided -		IP 55
6.	Bill of Material for all the equipment mounted - in JB giving details a) Make & Type b) Applicable Standards c) Voltage Rating d) Current Rating e) Duty Class, if applicable f) Manufacturer's Catalogue No.		
7.	Control Wiring a) Size of Conductor (sq. mm.) i) For CT Circuits ii) For other circuits b) Conductor solid/ stranded		
8.	Space Heater Rating	W	
9.	Drawing enclosed showing the following a) Outline Dimensions, floor opening, fixing arrangement, weight, etc. b) Front view and inside view showing the mounting arrangement of various equipment		
10.	Schematic/ wiring diagram enclosed		
11.	Interconnection drawing showing external cable connections to the MK		
12.	Type Test Report to verify degree of protection		
13.	Terminal Block a) Make, type & Cat No.		

b) Current Rating
   i) Power Terminals A
   ii) Other Terminals A

14. PAINTING
   a) Type/designation/brand name
   b) Shade
   c) No. of coats Fabricated Steel Structures
   d) Whether descriptive pamphlet enclosed

SECTION-5
Checklist

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 material used	1.5 mm stainless steel / 1.6 mm Aluminum							
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 CATD M4 of Elmex /Eq.**		
		~~180~~	~~130~~	75	~~50~~	~~30~~	~~12~~		
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		
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	TB covers	TBs fully enclosed with removable covers of transparent, non-deteriorating type plastic material		
9.0	Fixing Hardware (Nuts, Bolts and Washers) for mounting JB	Provided		
10.	Approval	POWERGRID approved and valid SMQP by the date of technical bid opening.		

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 NOA (27.03.2023).

(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