Section- 8

Guaranteed Technical Particulars (GTP)

8.01(a). Guaranteed Technical Particulars of 33 KV Indoor Type Gas insulated switchgear (GIS) With Protection, Control and Metering Equipment (for Himchori New, Cox'sbazar, Ramu Cantonment, Keranihat, Potiya Bypass, Shikalbaha New, Diamond Cement, Satkania, Aziznagor, Lama substation)

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | DESCRIPTION | UNIT | BPDB REQUIREMENT | BIDDER'S GUARANTEED VALUES |
|-----|----------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------|----------------------------------|
| 1. | a) Manufacturer's name & address With website, official domain email. | - | Shall be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 2. | Type/ Model | - | Shall be mentioned | |
| 3. | Manufacturer & country of origin | - | USA/UK/EU/Japan/ South Korea/Malaysia | |
| 4. | Applied Standard | - | Latest version of IEC 62271 fully complied | |
| 5. | Rated nominal Voltage | kV | 33 | |
| 6. | Rated Voltage | kV | 36 | |
| 7. | Rated Frequency | Hz | 50 | |
| 8. | Material of Bus-Bar | - | HDHC Copper | |
| 9. | Busbar Scheme | - | Single Bus with Bus Coupler | |
| 10 | Installation | - | Free Standing | |
| 11. | Rated Current for Main Bus | | | |
| | Single Bus (As per scope) | Amps | 2000 | |
| 12. | Cross Section of bus bar | mm ² | Min 1600 for 2000A Bus or (As per IEC62271) | |
| 13. | Rated symmetrical short circuit breaking current for Single Bus | KA | 31.5 | |
| 14. | Short time current rated duration | Sec. | 3 | |
| 15. | Pressure relief device is integrated with each gas chamber | - | Yes | |
| 16. | Mimic diagram is depicted in front of switchgear panel | - | Yes | |
| 17. | Electrical and Mechanical interlock between Circuit breaker, isolator and earth switch | - | Yes | |
| 18. | Capacitive Voltage Indicator with Interlock contact for ES operation | - | Yes | |
| 19. | Circuit Breaker: | | | |
| | Type of interrupter | - | VCB | |

| | Class of Circuit Breaker | | E2M2 or better | |
|-----|---------------------------------------------|---------|-----------------------|--|
| | (Supported by Type Test report) | - | E2WIZ OF Detter | |
| | Designation of Internal Arc | _ | IAC AFLR 31.5 kA, | |
| | Classification | | 1 Sec | |
| | (Supported by Type Test Report) | | 1 500 | |
| | Insulation media | - | SF_6 | |
| | Interrupting media | - | Vacuum | |
| | Manufacturer's name and country of | - | To be mentioned | |
| | origin of vacuum interrupter | | | |
| | Manufacturer's model no. of Vacuum | - | To be mentioned | |
| | Interrupter | | | |
| | (Model no. shall be supported by Type Test) | | | |
| | Guaranteed nos. of operation for | | | |
| | Vacuum Interrupter | | | |
| | a) at rated Current switching | Nos. | Min. 10,000 | |
| | b) at Short circuit current switching | Nos. | ≥ 50 | |
| | Rated Voltage | kV | 36 | |
| | Rated Current for Incoming as per scope | А | 1250 | |
| | Rated Current for Outgoing | А | 1250 | |
| | Rated Current for Power Transformer | А | 1250 | |
| | Rated Current for Bus coupler (Single | А | 2000 | |
| | Bus) as per scope. | | | |
| | Rated Short Circuit Breaking Current for | kA | 31.5 | |
| | Single Bus. | | | |
| | Rated duration of short circuit current | sec | 3 | |
| | Rated Short Circuit Making Current for | kA | 80 | |
| | Single Bus. | | | |
| | Rated Breaking time | Cycle | ≤5 | |
| | | | | |
| | Opening time | Sec. | shall be mentioned | |
| | Closing time | Sec. | shall be mentioned | |
| | Rated operating Sequence | - | O-0.3 sec-CO-3 min-CO | |
| | Control Voltage | V | DC 110 | |
| | AC Voltage for the Universal Motor for | V | AC 230 | |
| | spring charge | | | |
| | Power Consumption of Charging motor | W | Max 250 | |
| | Power consumption of opening/trip coil | W | Max 300 | |
| | Nos. of Trip coils | Nos. | 2 | |
| 20. | Three position disconnector Switch (Bot | h Motor | and Manual) | |
| | Type/ Model | - | Shall be mentioned | |
| | Rated Voltage | kV | 36 | |
| | Rated Current for Incoming as per scope | А | 1250 | |
| | Rated Current for Outgoing | А | 1250 | |
| | Rated Current for Power Transformer | А | 1250 | |
| | Rated Current for Bus coupler (Single | А | 2000 | |

| | Bus) as per scope. | | | |
|-----|------------------------------------------|-----------------|-----------------------------------------------------|--|
| | Rated short time current for Single Bus. | kA | 31.5 | |
| | Short time current rated duration | Sec | 3 | |
| | Switch Position | _ | close, open, earth | |
| | Electrical and Mechanical interlock | _ | As per IEC 62271-200 | |
| | Mechanical Endurance Class | - | Shall be mentioned | |
| 21. | Current Transformer : | | Shull be mentioned | |
| | Туре | _ | Ring core/block type | |
| | | | with sensor | |
| | Rated Voltage | kV | 36 | |
| | Accuracy Class, Metering | - | 0.2 S | |
| | Accuracy Class, Protection | - | 5P20 | |
| | Rated Current Ratio for incoming as per | A | 600-1200/5-5A | |
| | scope | | 000 1200/5 511 | |
| | Rated Current Ratio (for Outgoing, | А | 400-800/5-5A | |
| | Station Auxiliary Feeder) | | 100 000/2 511 | |
| | Rated Current Ratio (for Bus Coupler; | A | 800-1600/5-5A | |
| | Single Bus) | | | |
| | Rated Current Ratio (for power | A | 400-800/5-5-5A | |
| | transformer panel) | | | |
| | Burden for metering | VA | 20 (at max CT ratio) | |
| | Burden for protection | VA | 20 (at max CT ratio) | |
| | Extended Current Rating for metering | Α | 120 % of rated Current | |
| | Instrument Security factor (metering) | - | < 5 | |
| | R_{CT} at $75^{\circ}C$ | | | |
| | (a) Measuring Core | mΩ | shall be mentioned | |
| | (b) Protection Core | mΩ | shall be mentioned | |
| | Knee Point Minimum Voltage | | | |
| | (Supported by Calculation) | | | |
| | (a) Measuring Core | V | shall be mentioned | |
| | (b) Protection Core | V | shall be mentioned | |
| | Rated frequency | Hz | 50 | |
| | CT burden shall meet the Short Circuit | - | Yes | |
| | Current (31.5 kA, 3 Sec) (Supported by | | | |
| | Calculation) | | | |
| 22 | 33 kV Cable Compartment: (For Incom | ing/Outgoi | | |
| | Material | - | Highly Conductive Copper | |
| | Bus bar type | - | Single | |
| | Cross Section | mm ² | Min 1600 for 2000A | |
| | | | Bus or | |
| | | | (As per IEC62271) | |
| | Nominal Current | А | 2000 | |
| | Cable connection as per scope | - | 1x1Cx800mm ² ,1x1Cx500mm ² | |
| | · · · | | (Incoming/Outgoing & Transformer Feeder Panels), | |
| | | | $3Cx95 \text{ mm}^2$ for Auxiliary x- | |

| | | | | r1 |
|----------|----------------------------------------|------------|------------------------------------------------------------------|----|
| | | | former XLPE armoured | |
| | | | copper cable per phase as per scope of works section 6. | |
| | | | scope of works section o. | |
| | | | Cable termination plug and | |
| | | | socket with all accessories | |
| | | | required for cable termination, suitable for terminating with | |
| | | | proper cable support shall be | |
| | | | provided. One spare cable | |
| | | | connection facility for each GIS panel and Sealing/cap for | |
| | | | unused cable termination shall | |
| | | | also to be provided. | |
| 23. | Bus Voltage Transformer : | 1 | | |
| | Type/ Model | - | Shall be mentioned | |
| | Number of Phase | - | Single Phase | |
| | Rated Primary Voltage | kV | 33/√3 | |
| | Rated Secondary Voltage | V | 110/√3 | |
| | Rated burden, Secondary | VA | 20 | |
| | Accuracy class (Metering & Protection) | - | 0.2 & 3P | |
| | LV Compartment | - | IP40 | |
| 24 | Line Voltage Transformer : | | | |
| | Type/ Model | - | Shall be mentioned | |
| | Number of Phase | - | Single Phase | |
| - | Rated Primary Voltage | kV | 33/√3 | |
| | Rated Secondary Voltage | V | 110/√3 | |
| | Rated Burden | VA | 20 | |
| | Accuracy class (Metering & Protection) | - | 0.2 & 3P | |
| 25. | SF6 Safety and life | | | |
| | SF6 Pressure | KPa | Shall be mentioned | |
| | Rated pressure at 20 degree C | KPa | Shall be mentioned | |
| | Bursting Pressure | KPa | Shall be mentioned | |
| | Gas leakage rate/year | KPa | ≤0.1% | |
| | (Supported by Type Test report) | | | |
| | Safety indication | - | To be incorporated | |
| | Capacitive voltage indicator | - | In the front of the panel | |
| | Gas pressure Manometer | - | As per IEC 62271-1 | |
| | Bus Bar Gas pressure Manometer | _ | As per IEC 62271-1 | |
| | Life/ Endurance of switchgear switches | | | |
| | a) Circuit Breakers | _ | As per IEC 62271-100 | |
| | b) Disconnectors & Earthing switches | - | As per IEC 62271-100 | |
| | Alarm level for insulation | Кра | 140 | |
| | Rated filling level for insulation | KPa KPa | 140 | |
| 26. | Dimension and Weight | isi a | 150 | |
| <u> </u> | Height | mm | Shall be mentioned | |
| | Width | mm | Shall be mentioned | |
| | Depth | mm | Shall be mentioned | |
| | Weight including Circuit Breaker | Kg. | Shall be mentioned | |
| 27. | Construction : | | | |
| <u> </u> | | 1 | | 1 |

| a) Stainless steel tank b) Equipped with disconnector and earthing switch. The earthing switch shall have full fault-making capacity. c) Each gas filled compartment shall be equipped with density sensors giving alarm by low gas density. Degree of Protection Enclosure | - | Shall be mentioned Shall be mentioned Shall be mentioned | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| earthing switch. The earthing switch shall have full fault-making capacity. c) Each gas filled compartment shall be equipped with density sensors giving alarm by low gas density. Degree of Protection | - | | |
| be equipped with density sensors giving alarm by low gas density. Degree of Protection | - | Shall be mentioned | |
| | | | |
| Enclosure | | | |
| | - | IP3X | |
| HV Compartment | - | IP65 | |
| LV Compartment | - | IP40 | |
| | | | |
| Ç . | | 70 | |
| | | 170 | |
| Type Test Report (as per IEC 62271-2 | 00) | | |
| Lightning Impulse Voltage Withstand tests | - | Shall be submitted | |
| Power frequency withstand tests | - | Shall be submitted | |
| Temperature/ Gas pressure Rise Tests. | - | Shall be submitted | |
| Measurement of resistance of the main circuit. | - | Shall be submitted | |
| Short circuit performance tests | - | | |
| | - | | |
| | - | | |
| Gas Leakage Test | - | Shall be submitted | |
| | | eeder) | |
| Differential and Restricted Earth Faul | t Relay | | |
| Manufacturer's Name | - | ABB- Sweden, Switzerland, Finland/ Siemens -Germany/ Schneider-France /UK / Alstom (UK/France)/ NR, China/ SEL, USA. | |
| Country of Origin | - | Shall be mentioned | |
| Manufacture's Model no. | - | | |
| Type of Relay | - | | |
| recommend settings: | | ^ | |
| | | | |
| | CT rating | | |
| initiation of fault and energize of | ms | Shall be mentioned | |
| | Insulation level : AC withstand voltage 1min. dry Impulse Withstand, full wave Type Test Report (as per IEC 62271-2 Lightning Impulse Voltage Withstand tests Power frequency withstand tests Temperature/ Gas pressure Rise Tests. Measurement of resistance of the main circuit. Short circuit performance tests Mechanical Endurance tests. Arc fault test Gas Leakage Test otection Control & Metering (Trans Differential and Restricted Earth Faul Manufacturer's Name Country of Origin Manufacture's Model no. Type of Relay Maximum through fault at which the pro recommend settings: a) Earth faults b) Phase faults Maximum time delay between | Insulation level :KVAC withstand voltage1min. drykVImpulse Withstand, full wavekVType Test Report (as per IEC 62271-200)Lightning Impulse Voltage Withstand tests-Power frequency withstand tests-Power frequency withstand tests-Temperature/ Gas pressure Rise TestsMeasurement of resistance of the main circuitShort circuit performance tests-Mechanical Endurance testsArc fault test-Gas Leakage Test-Otection Control & Metering (Transformer FDifferential and Restricted Earth Fault RelayManufacturer's Name-Country of Origin-Maximum through fault at which the protective equrecommend settings: a) Earth faultsrating % of CT ratingMaximum time delay between initiation of fault and energize ofms | Insulation level : Impulsion level : Impulsion level : AC withstand voltage 1min. dry kV 70 Impulse Withstand, full wave kV 170 Type Test Report (as per IEC 62271-200) Itele submitted Lightning Impulse Voltage Withstand tests - Shall be submitted Power frequency withstand tests - Shall be submitted Temperature/ Gas pressure Rise Tests. - Shall be submitted Measurement of resistance of the main circuit. - Shall be submitted Short circuit performance tests - Shall be submitted Mechanical Endurance tests. - Shall be submitted Gas Leakage Test - Shall be submitted Otection Control & Metering (Transformer Feeder) Differential and Restricted Earth Fault Relay Manufacturer's Name - ABB- Sweden, Switzerland, Finland/ Siemens -Germany/ Schneider-France /UK / Alstom (UK/France)/ NR, China/ SEL, USA. Country of Origin - Shall be mentioned Type of Relay - Numerical programmable Manufacture's Model no. - Shall be mentioned Type of Relay - Numerical programmable |

| | TI D 1 1 11 1 HEC (1950 | | X 7 | |
|-----|----------------------------------------|----------|-----------------------------------------|--|
| | The Relay shall be IEC 61850 | - | Yes | |
| | protocol type. | | 1108/1- | |
| | Relay Nominal operating voltage | - | 110Vdc | |
| | Relay CT Current rating | - | 5A | |
| | No of Binary Input (Minimum) | _ | There shall be total 42 BI | |
| | | | in Transformer Feeder | |
| | | | Panel | |
| | No of Binary Output (Minimum) | _ | There shall be total 32 BO | |
| | No of Dinary Output (Minimum) | | in Transformer Feeder | |
| | | | Panel | |
| | | | | |
| | No of Communication Ports | - | Shall be mentioned with | |
| | i) Electrical ii) Optical | | type. | |
| | Protection Functions | _ | Differential and | |
| | | | Restricted earth fault | |
| | | | protection (for a Two | |
| | | | winding transformer | |
| | | | considering Vector group | |
| | | | 0 0 I | |
| | | | of Dyn11) and other | |
| | | | mandatory functions | |
| | Relay Configuration Software (Name, | - | Shall be mentioned | |
| | Manufacturer, Version, License | | | |
| | Requirement (with name and version)) | | | |
| | Range of current setting : | % of CT | Shall be mentioned | |
| | (a) Earth Faults | rating | | |
| | (b) Phase Faults | 0 | | |
| | Range of timing settings | Sec | Shall be mentioned | |
| | | | | |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned | |
| | Percentage of current setting at which | % | Shall be mentioned | |
| | relay will reset. | | | |
| | The relay shall have IEC 61850 | - | Yes | |
| | communication Protocol | | | |
| 32. | Over Current & Earth Fault Protection | on Relay | | |
| | Manufacture's Name | - | ABB- Sweden, | |
| | Country of Origin | | Switzerland, Finland / | |
| | | | Siemens -Germany/ | |
| | | | Schneider-France /UK/ | |
| | | | Alstom (UK/France)/ | |
| | | | NR, China/ | |
| | Manager atoms is Mark 1 | | SEL, USA | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of relay | - | Numerical programmable Multifunction | |
| | Range of current setting: | - | | |
| | | | • | |

| | a) Phase element | % of CT | Shall be mentioned |
|----|-----------------------------------------|-------------|----------------------------|
| | b) Each fault element | rating | Shall be mentioned |
| | Relay Nominal operating voltage | - | 110Vdc |
| | Relay Rominal operating voltage | | 110 v de |
| | Relay CT Current rating | - | 5A |
| | | | |
| | No of Binary Input (Minimum) | - | There shall be total 42 BI |
| | | | in Transformer Feeder |
| | | | Panel |
| | No of Binary Output (Minimum) | _ | There shall be total 32 BO |
| | | | in Transformer Feeder |
| | | | Panel |
| | No of Communication Ports | | Shall be mentioned with |
| | | - | |
| | iii) Electrical | | type. |
| | iv) Optical | | |
| | Protection Function | - | Non-Directional O/C, |
| | | | E/F |
| | | | Other Necessary |
| | | | Functions. |
| | Maximum time delay between | - | Shall be mentioned |
| | initiation of fault and energize of | | |
| | breaker trip circuit. | | |
| | Relay Configuration Software (Name, | _ | Shall be mentioned |
| | Manufacturer, Version, License | | |
| | Requirement (with name and version)) | | |
| | Range of timing settings | Sec | Shall be mentioned |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned |
| | Drop off to Pick up ratio | • A % | Shall be mentioned |
| | Reset time after removal of fault | Sec | Shall be mentioned |
| | current | Bee | Shan be mentioned |
| | The relay shall have IEC 61850 | _ | Yes |
| | communication Protocol | | |
| | | | |
| 33 | Trip Circuit Supervision (TCS) Relay | (Separate | Relay for each trip coil) |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| 34 | Trip Relay (Separate Relay) for Diffe | rential and | |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| | Operating Time | ms | <10 |
| | Operating Coil Voltage- 110V DC | - | Yes |
| | Self-reset type for O/C, E/F protection | - | Yes |
| | Hand & Electrical reset type for | - | Yes |
| | Differential, REF and Transformer Self- | | |
| | protection | | |

| Separate Auxiliary Flag Relays for Transformer self-protection (OTA, OTT, WTA, WTT, BA, BT, OLTC Surge, PRD for main tank & OLTC. | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------|---------------------------------|--|
| ure's Name | - | Shall be mentioned | | |
| of Origin | - | Shall be mentioned | | |
| ure's Model no. | - | Shall be mentioned | | |
| Relay | - | Shall be mentioned | | |
| ator | | · | | |
| ure's Name | - | Shall be mentioned | | |
| of Origin | - | Shall be mentioned | | |
| ure's Model no. | - | Shall be mentioned | | |
| | nos. | 30 | | |
| buzzer and buttons for accept, | | Yes | | |
| , reset, etc. | - | | | |
| Dual Supply Provision | - | Yes | | |
| Switch | | | | |
| ure's Name | - | Shall be mentioned | | |
| of Origin | - | Shall be mentioned | | |
| ure's Model no. | - | Shall be mentioned | | |
| TNC/Discrepancy switch and | - | Yes | | |
| mote (L/R) selector switch | | | | |
| T m | NC/Discrepancy switch and ote (L/R) selector switch | NC/Discrepancy switch and - ote (L/R) selector switch | NC/Discrepancy switch and - Yes | |

| 38. | Over Current & Earth Fault Protection | on Relay | | |
|-----|-----------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | Manufacture's Name Country of Origin | - | ABB- Sweden, Switzerland, Finland/ Siemens -Germany/ Schneider-France /UK/ Alstom -(UK/France)/ NR- China/ SEL- USA | |
| | Manufacture's Model no. Type of relay | - | Shall be mentioned33kV Incoming/ Outgoing line feeders numerical relay shall have both directional and non-directional O/C & E/F protection (IDMT, DMT, Inst.) feature with monitoring functions"33kVBus coupler feeders numerical relay shall have non- directional O/C & E/F protection (IDMT, Inst.) and synchro check feature with monitoring functions. | |
| | Range of current setting : | - | | |

| a) Phase element | % of | Shall be mentioned |
|---------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| | CT | Shall be mentioned |
| b) Each fault element | rating | |
| Relay Nominal operating voltage | - | 110Vdc |
| Relay CT Current rating | - | 5A |
| No of Binary Input (Minimum) | - | 24 for line Feeder, 32 for Bus Coupler |
| No of Binary Output (Minimum) | - | 24 for line Feeder, 24 for Bus Coupler |
| No of Communication Ports v) Electrical vi) Optical | - | Shall be mentioned with type. |
| Protection Function | - | Directional and Non- Directional O/C, E/F, Over/ Under Voltage, Over and Under Frequency, Sync Check And Other Necessary Functions. |
| Maximum time delay between initiation of fault and energize of breaker trip circuit. | - | Shall be mentioned |
| Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) | - | Shall be mentioned |
| Maximum time delay between initiation of fault and energize of breaker trip circuit. | - | Shall be mentioned |
| Drop off to Pick up ratio | - | Shall be mentioned |
| Reset time after removal of fault current | - | Shall be mentioned |
| Range of timing settings | Sec | Shall be mentioned |
| Burden of relay at 20 time CT ratingThe relay shall have IEC 61850communication Protocol | - | Shall be mentioned Yes |

| 39 | Trip Circuit Supervision (TCS) Relay (| e Relay for each trip coil) | |
|----|----------------------------------------|-----------------------------|--------------------|
| | Manufacture's Name | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| 40 | Trip Relay (Separate Relay) | | |
| | Manufacture's Name | - | Shall be mentioned |

| | Country of Origin | - | Shall be mentioned | |
|----|----------------------------------------------|-----------|----------------------------|------------------|
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| | Operating Time | ms | <10 | |
| | Self-reset type for O/C, E/F protection | - | Yes | |
| | Operating Coil Voltage- 110V DC | - | Yes | |
| 41 | Annunciator | | 105 | |
| 71 | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | | Shall be mentioned | |
| | Manufacture's Model no. | | Shall be mentioned | |
| | Windows | nos. | 14 | |
| | Built in buzzer and buttons for accept, | 1105. | Yes | |
| | mute, test, reset, etc. | _ | 103 | |
| | AC /DC Dual Supply Provision | | Yes | |
| 42 | Control Switch | | 105 | |
| 42 | Manufacture's Name | | | |
| | | - | + | |
| | Country of Origin Manufacture's Model no. | - | + | |
| | Separate TNC/Discrepancy switch and | - | Yes | |
| | Local Remote (L/R) selector switch | _ | Tes | |
| 43 | Metering and Instrumentation (for Inco | ming/(| utgoing Power Transform | er & Rus Counler |
| 75 | feeder) | Jining/ C | utgoing, i ower i ransiorm | er & Dus Coupier |
| | a) Energy Meter (Multi Tariff Progra | mmahl | e Meter) | |
| | (N.B. Not applicable for Bus Coupler | | | |
| | Manufacture's Name | I allel) | | |
| | | - | Shall be mentioned | |
| | | | European Country/ | |
| | | | North American | |
| | Manufacture's Country | | Country/Japan/ Australia | |
| | | | | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Meter | | Numerical | |
| | | - | programmable | |
| | Class of Accuracy | - | 0.2 S | |
| | b) VOLT METERS with Selector Swi | itch | 0.2.5 | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | _ | Shall be mentioned | |
| | | | Analogue, 90 degree | |
| | Type of Meter | _ | scale range | |
| | Class of Accuracy | - | 1.0 | |
| | Bus Coupler panel shall have 2 nos. | - | | |
| | voltmeter with seven (7) position | _ | | |
| | voltage selector switch | | To be provided | |
| | c) Ampere Meters | | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | _ | Shall be mentioned | |
| | | - | Analogue, 240 degree | |
| | Type of Meter | - | scale range | |
| | Class of Accuracy | | | |
| | Separate A-meter for each phase | - | 1.0 Yes | |
| | Separate A-meter for each phase | - | 105 | |
| | Station Auxiliary Transformer Switchge | l | 1 | |

| 45. N 46. 7 47. H | Manufacturer's Name & Address Manufacturer country of origin Type Rated nominal Voltage | - | To be mentioned USA/UK/EU/Japan/ South Korea/Malaysia | |
|-------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------|--|
| 45. N 46. 7 47. H | Manufacturer country of origin Type Rated nominal Voltage | - | USA/UK/EU/Japan/ | |
| 47. I | Rated nominal Voltage | - | South Korea/Malaysia | |
| 47. I | Rated nominal Voltage | | | |
| | | - | Shall be mentioned | |
| 40 T | | kV | 33 | |
| | Rated Voltage | kV | 36 | |
| | Material of Bus-Bar | - | HDHC Copper | |
| | Rated Current for main bus | | | |
| | Single Bus (As per scope) | Amps | 2000 | |
| | Cross Section of busbar | mm ² | 1600 | |
| | Rated short time current | kA | 31.5 | |
| | Short time current rated duration | Sec. | 3 | |
| 54. (| Circuit Breaker : | | | |
| Ν | Manufacturer's model no. of vacuum | - | Shall be mentioned | |
| i | interrupter | | | |
| H | Rated Voltage | kV | 36 | |
| | Rated Current | А | 1250 | |
| F | Rated Short Ckt. Breaking Current | kA | 31.5 | |
| ŀ | Rated duration of short circuit current | sec | 3 | |
| ŀ | Rated Short CKt. Making Current | kA | 80 | |
| | Rated Breaking time | Cycle | ≤5 | |
| 55.] | TDS (DS ES) (motor & monually on | anatad) | | |
| | TPS (DS-ES) (motor & manually op Rated Maximum Voltage | kV | 36 | |
| | Operating Mechanism | - K V | Shall be mentioned | |
| | | | | |
| | Insulating media Rated Current | - | SF6 | |
| | | A | 1250 | |
| | Rated short time current | kA | 31.5 | |
| | Short time current rated duration | Sec | 3 | |
| | Switch Position | - | close, open, earth | |
| | Electrical and Mechanical interlock | - | As per IEC 62271-200 | |
| | Mechanical Endurance Class | - | Shall be mentioned | |
| | Insulation level : | | | |
| | AC withstand voltage 1min. dry | kV | 70 | |
| | Impulse Withstand, full wave | kV | 170 | |
| | Degree of Protection Enclosure | | IP3X | |
| | HV Compartment | - | IP3X IP65 | |
| | LV Compartment | - | <u>IP40</u> | |
| | Dimension and Weight | - | | |
| | Height | mm | Shall be mentioned | |
| | Weight | mm | Shall be mentioned | |
| | Depth | mm | Shall be mentioned | |
| | Type Test Report (as per IEC 62271-200 | | Shun be mentioned | |
| I | Lightning Impulse Voltage Withstand tests | - | Shall be submitted | |

| Power frequency withstand tests | - | Shall be submitted | |
|------------------------------------------|------|--------------------|--|
| Temperature/Gas pressure Rise Tests. | - | Shall be submitted | |
| Measurement of resistance of the main | | Shall be submitted | |
| circuit. | - | | |
| Short circuit performance tests | - | Shall be submitted | |
| Mechanical Endurance tests. | - | Shall be submitted | |
| Arc fault test | - | Shall be submitted | |
| Gas Leakage Test | - | Shall be submitted | |
| Protection Control & Metering for statio | rmer | | |

| 61 | Over Current and Earth Fault Protection Relay | | | |
|----|--------------------------------------------------|---|-----------------------------------------------|--|
| | Manufacture's Name | | ABB- Sweden, | |
| | Country of Origin | | Switzerland, Finland/ | |
| | | | Siemens –Germany/ | |
| | | | Schneider-France /UK / Alstom (UK/France)/ | |
| | | | NR, China/ | |
| | | _ | SEL, USA | |
| | Manufacture's Model no. | _ | Shall be mentioned | |
| | Type of relay | | Numerical | |
| | 51 5 | | programmable, | |
| | | | multifunction with | |
| | | | both directional and | |
| | | | non-directional O/C & | |
| | | | E/F protection (IDMT, | |
| | | | DMT, Inst.) feature | |
| | | | and monitoring | |
| | | | functions. | |
| | | _ | | |
| | Relay Nominal operating voltage | - | 110Vdc | |
| | Relay CT Current rating | - | 5A | |
| | No of Binary Input (Minimum) | - | 24 | |
| | No of Binary Output (Minimum) | - | 24 | |
| | No of Communication Ports | - | Shall be mentioned with | |
| | vii) Electrical | | type. | |
| | viii) Optical | | | |
| | Protection Function | - | Non-Directional O/C, | |
| | | | E/F | |
| | | | Other Necessary | |
| | | | Functions. | |
| | Maximum time delay between initiation | _ | Shall be mentioned | |
| | of fault and energize of breaker trip | | Shan oo montoned | |
| | or runn and energize of breaker urp | | | |

| | circuit. | | | |
|----|-------------------------------------------|-----------|--------------------------|---|
| | Relay Configuration Software (Name, | | Shall be mentioned | |
| | Manufacturer, Version, License | _ | Shan be mentioned | |
| | | | | |
| | Requirement (with name and version)) | | | |
| | Maximum time delay between initiation | - | Shall be mentioned | |
| | of fault and energize of breaker trip | | | |
| | circuit. | | | |
| | Range of Current Setting | - | Shall be mentioned | |
| | a) Phase Fault Element | | | |
| | b) Earth Fault Element | | | |
| | Range of timing settings | _ | Shall be mentioned | |
| | Trange of things | | | |
| | Drop off to Pick up ratio | - | Shall be mentioned | |
| | | | | |
| | Reset time after removal of fault current | - | Shall be mentioned | |
| | | | | |
| | Burden of Relay At 20 time CT rating. | VA | Shall be mentioned | |
| | The relay shall have IEC 61850 | - | Yes | |
| | communication Protocol. | | | |
| 62 | Trip Circuit Supervision (TCS) Relay (| Separate | e Relav) | |
| | | o par are | ,j) | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| 63 | Trip Relay (Separate Relay) | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| 64 | Annunciator | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Windows | nos. | 14 | |
| | Built in buzzer and buttons for accept, | | Yes | |
| | mute, test, reset, etc. | - | Vac | |
| | AC /DC Dual Supply Provision | | Yes | |
| 65 | AC /DC Dual Supply Provision Metering | - | | |
| 05 | a) Energy Meter (Multi Tariff | | | |
| | Programmable Meter) | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | | _ | European Country/ | |
| | | | North American | |
| | Manufacture's Country | - | Country/Japan/ Australia | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Meter | - | Numerical | |
| | Class of Accuracy | - | 0.2 S | |
| | b) Volt Meters | | | |
| | | I | | I |

| | Manufacturer's Name and Country | - | Shall be mentioned |
|----|-------------------------------------|---|-----------------------|
| | Manufacture's Model no. | - | Shall be mentioned |
| | | | Analogue, 90 degree |
| | Type of Meter | - | scale range |
| | Class of Accuracy | - | 1.0 |
| | c) Ampere Meters | | |
| | Manufacturer's Name and Country | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Meter | | Analogue, 240 degree |
| | Type of Meter | - | scale range |
| | Class of Accuracy | - | 1.0 |
| | Separate A-meter for each phase | - | Yes |
| 66 | Marking | - | "BPDB & Contract No." |
| 67 | Manufacturer must comply all the | - | Yes |
| | features of Technical Specification | | |
| | (Section 7) | | |

Seal & Signature of the Manufacturer

Seal & Signature of the Bidder

8.01(b) Guaranteed Technical Particulars of 33 KV Indoor Type Gas insulated switchgear (GIS) With Protection, Control and Metering Equipment (for Jhilonjha Bay Extension)

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | DESCRIPTION | UNIT | BPDB REQUIREMENT | BIDDER'S GUARANTEED VALUES |
|-----|----------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------|----------------------------------|
| 1. | a) Manufacturer's name & address | - | Shall be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 2. | Type/ Model | - | Shall be mentioned | |
| 3. | Manufacturer & country of origin | - | USA/UK/EU/Japan/ South Korea/Malaysia | |
| 4. | Applied Standard | - | Latest version of IEC 62271 fully complied | |
| 5. | Rated nominal Voltage | kV | 33 | |
| 6. | Rated Voltage | kV | 36 | |
| 7. | Rated Frequency | Hz | 50 | |
| 8. | Material of Bus-Bar | - | HDHC Copper | |
| 9. | Busbar Scheme | - | Double with Bus Coupler | |
| 10 | Installation | - | Free Standing | |
| 11. | Rated Current for Main Bus | | | |
| | Double Bus (As per scope) | Amps | 3150 | |
| 12. | Cross Section of bus bar | mm ² | Min 2500 for 3150A Bus or (As per IEC62271) | |
| 14. | Rated symmetrical short circuit breaking current for Double Bus | KA | 40 | |
| | Short time current rated duration | Sec. | 3 | |
| 15. | Pressure relief device is integrated with each gas chamber | - | Yes | |
| 16. | Mimic diagram is depicted in front of switchgear panel | - | Yes | |
| 17. | Electrical and Mechanical interlock between Circuit breaker, isolator and earth switch | - | Yes | |
| 18. | Capacitive Voltage Indicator with | - | Yes | |
| | Interlock contact for ES operation | | | |
| 19. | Circuit Breaker: | | | |
| | Type of interrupter | - | VCB | |
| | Class of Circuit Breaker | - | E2M2 or better | |

| | (Supported by Type Test report) | | | |
|-----|-----------------------------------------------------------------|---------|-----------------------|--|
| | Designation of Internal Arc | - | IAC AFLR 40 kA, | |
| | Classification | | 1 Sec | |
| | (Supported by Type Test Report) | | | |
| | Insulation media | - | SF ₆ | |
| | Interrupting media | - | Vacuum | |
| | Manufacturer's name and country of origin of vacuum interrupter | - | To be mentioned | |
| | Manufacturer's model no. of Vacuum Interrupter | - | To be mentioned | |
| | (Model no. shall be supported by Type Test) | | | |
| | Guaranteed nos. of operation for Vacuum Interrupter | | | |
| | a) at rated Current switching | Nos. | Min. 10,000 | |
| | b) at Short circuit current switching | Nos. | ≥ 50 | |
| | Rated Voltage | kV | 36 | |
| | Rated Current for incoming as per scope | А | 2500 | |
| | Rated Current for outgoing | А | 1250 | |
| | Rated Current for Power Transformer | А | 1250 | |
| | Rated Current for Bus coupler (Double | А | 3150 | |
| | Bus) as per scope. | | | |
| | Rated Short Circuit Breaking Current for | kA | 40 | |
| | Double Bus. | | | |
| | Rated duration of short circuit current | sec | 3 | |
| | Rated Short Circuit Making Current for | kA | 102 | |
| | Double Bus. | | | |
| | Rated Breaking time | Cycle | ≤5 | |
| | Opening time | Sec. | shall be mentioned | |
| | Closing time | Sec. | shall be mentioned | |
| | Rated operating Sequence | - | O-0.3 sec-CO-3 min-CO | |
| | Control Voltage | V | DC 110 | |
| | AC Voltage for the Universal Motor for | V | AC 230 | |
| | spring charge | | | |
| | Power Consumption of Charging motor | W | Max 250 | |
| | Power consumption of opening/trip coil | W | Max 300 | |
| | Nos. of Trip coils | Nos. | 2 | |
| 20. | Three position disconnector Switch (Bot | h Motor | | |
| | Type/ Model | - | Shall be mentioned | |
| | Rated Voltage | kV | 36 | |
| | Rated Current for incoming as per scope | А | 2500 | |
| | Rated Current for outgoing | А | 1250 | |
| | Rated Current for Power Transformer | А | 1250 | |
| | Rated Current for Bus coupler (Double | А | 3150 | |
| | Bus) as per scope. | | | |

| | Rated short time current for Double Bus. | kA | 40 | |
|----------|------------------------------------------|-----------|-----------------------------------------------------------------------|--|
| | Short time current rated duration | Sec | 3 | |
| | Switch Position | - | close, open, earth | |
| | Electrical and Mechanical interlock | - | As per IEC 62271-200 | |
| | Mechanical Endurance Class | _ | Shall be mentioned | |
| 21. | Current Transformer : | | | |
| | Туре | _ | Ring core/block type | |
| | | | with sensor | |
| | Rated Voltage | kV | 36 | |
| | Accuracy Class, Metering | _ | 0.2 S | |
| | Accuracy Class, Protection | _ | 5P20 | |
| | Rated Current Ratio for incoming as per | А | 1200-2400/5-5A | |
| | scope | | | |
| | Rated Current Ratio (for outgoing, | А | 400-800/5-5A | |
| | Station Auxiliary Feeder) | | | |
| <u> </u> | Rated Current Ratio for (Bus Coupler; | А | 1600-3200/5-5A | |
| | Double Bus as per scope) | | | |
| | Rated Current Ratio (for power | А | 400-800/5-5-5A | |
| | transformer panel) | | | |
| | Burden for metering | VA | 20 (at max CT ratio) | |
| | Burden for protection | VA | 20 (at max CT ratio) | |
| | Extended Current Rating for metering | А | 120 % of rated Current | |
| | Instrument Security factor (metering) | _ | < 5 | |
| | R_{CT} at $75^{\circ}C$ | | | |
| | (a) Measuring Core | mΩ | shall be mentioned | |
| | (b) Protection Core | mΩ | shall be mentioned | |
| | Knee Point Minimum Voltage | | | |
| | (Supported by Calculation) | | | |
| | (a) Measuring Core | V | shall be mentioned | |
| | (b) Protection Core | V | shall be mentioned | |
| | Rated frequency | Hz | 50 | |
| | CT burden shall meet the Short Circuit | - | Yes | |
| | Current (31.5 kA, 3 Sec) (Supported by | | | |
| | Calculation) | | | |
| 22 | 33 kV Cable Compartment: (For Incomi | ng/Outgoi | ing & Transformer Feeder) | |
| | Material | - | Highly Conductive Copper | |
| | Bus bar type | - | Double | |
| | Cross Section | mm^2 | Min 2500 for 3150A | |
| | | | Bus | |
| | | | or (As per IEC62271) | |
| | Nominal Current | A | 3150 | |
| | Cable connection as per scope | - | 3x1Cx800mm ² ,1x1Cx500mm ² | |
| | caste connection as per scope | | (Incoming/Outgoing & | |
| | | | Transformer Feeder Panels), 3Cx95 mm ² for Auxiliary x- | |
| | | | former XLPE armoured | |

| | | | copper cable per phase as per | |
|-----|----------------------------------------|-------|--------------------------------------------------------|---|
| | | | scope of works section 6. | |
| | | | Cable termination plug and | |
| | | | socket with all accessories | |
| | | | required for cable termination, | |
| | | | suitable for terminating with | |
| | | | proper cable support shall be | |
| | | | provided. One spare cable connection facility for each | |
| | | | GIS panel and Sealing/cap for | |
| | | | unused cable termination shall | |
| | | | also to be provided. | |
| 23. | Bus Voltage Transformer : | | | |
| | Type/ Model | - | Shall be mentioned | |
| | Number of Phase | - | Single Phase | |
| | Rated Primary Voltage | kV | 33/√3 | |
| | Rated Secondary Voltage | V | 110/√3 | |
| | Rated burden | VA | 20 | |
| | | | | |
| | Accuracy class (Metering & Protection) | - | 0.2 & 3P | |
| | LV Compartment | - | IP40 | |
| 24 | Line Voltage Transformer : | 1 | 1 | 1 |
| | Type/ Model | - | Shall be mentioned | |
| | Number of Phase | - | Single Phase | |
| | Rated Primary Voltage | kV | 33/√3 | |
| | Rated Secondary Voltage | V | 110/√3 | |
| | Rated Burden | VA | 20 | |
| | | ٧A | | |
| 25 | Accuracy class (Metering & Protection) | - | 0.2 & 3P | |
| 25. | SF6 Safety and life | | | |
| | SF6 Pressure | KPa | Shall be mentioned | |
| | Rated pressure at 20 degree C | KPa | Shall be mentioned | |
| | Bursting Pressure | KPa | Shall be mentioned | |
| | Gas leakage rate/year | KPa | ≤0.1% | |
| | (Supported by Type Test report) | | | |
| | Safety indication | - | To be incorporated | |
| | Capacitive voltage indicator | | In the front of the panel | |
| | | - | - | |
| | Gas pressure Manometer | - | As per IEC 62271-1 | |
| | Bus Bar Gas pressure Manometer | - | As per IEC 62271-1 | |
| | Life/ Endurance of switchgear switches | | | |
| | c) Circuit Breakers | - | As per IEC 62271-100 | |
| | d) Disconnectors & Earthing switches | - | As per IEC 62271-102 | |
| | Alarm level for insulation | Кра | 140 | |
| | Rated filling level for insulation | KPa | 150 | |
| 26 | | IXF a | 150 | |
| 26. | Dimension and Weight | | Chall have the 1 | |
| | Height | mm | Shall be mentioned | |
| | Width | mm | Shall be mentioned | |
| | Depth | mm | Shall be mentioned | |
| | Weight including Circuit Breaker | Kg. | Shall be mentioned | |
| 27. | Construction : | | | |
| | b) Stainless steel tank | - | Shall be mentioned | |
| | | | | |

| | b) Equipped with disconnector and | 1 | Shall be mentioned | |
|------|------------------------------------------------------------|-----------------|---------------------------|--|
| | earthing switch. The earthing | - | Shan be mentioned | |
| | switch shall have full fault-making | | | |
| | capacity. | | | |
| | c) Each gas filled compartment shall | - | Shall be mentioned | |
| | be equipped with density sensors | | | |
| | giving alarm by low gas density. | | | |
| 28. | Degree of Protection | | | |
| | Enclosure | - | IP3X | |
| | HV Compartment | - | IP65 | |
| | LV Compartment | - | IP40 | |
| 29. | Insulation level : | | | |
| | AC withstand voltage 1min. dry | kV | 70 | |
| | Impulse Withstand, full wave | kV | 170 | |
| 30. | Type Test Report (as per IEC 62271-2 | 00) | | |
| | Lightning Impulse Voltage Withstand tests | - | Shall be submitted | |
| | Power frequency withstand tests | - | Shall be submitted | |
| | Temperature/ Gas pressure Rise Tests. | - | Shall be submitted | |
| | | | | |
| | Measurement of resistance of the main circuit. | - | Shall be submitted | |
| | Short circuit performance tests | - | Shall be submitted | |
| | Mechanical Endurance tests. | - | Shall be submitted | |
| | Arc fault test | - | Shall be submitted | |
| | Gas Leakage Test | - | Shall be submitted | |
| E. F | Protection Control & Metering (Trans | sformer F | eeder) | |
| 31. | Differential and Restricted Earth Faul | | | |
| | Manufacturer's Name | - | ABB- Sweden, Switzerland, | |
| | | | Finland/ | |
| | | | Siemens -Germany/ | |
| | | | Schneider-France /UK / | |
| | | | Alstom (UK/France)/ | |
| | | | NR, China/ | |
| | | | SEL, USA. | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Numerical programmable | |
| | Maximum through fault at which the pro recommend settings: | tective equ | | |
| | a) Earth faults | rating % | Shall be mentioned | |
| | b) Phase faults | of CT rating | Shall be mentioned | |
| | Maximum time delay between | ms | Shall be mentioned | |
| | initiation of fault and energize of | | | |
| | breaker trip circuit. | | | |
| | | | | |
| | The Relay shall be IEC 61850 | - | Yes | |

| | Relay Nominal operating voltage | _ | 110Vdc |
|-----|---------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Ketay Nominal Operating Voltage | _ | |
| | Relay CT Current rating | - | 5A |
| | No of Binary Input (Minimum) | - | There shall be total 42 BI in Transformer Feeder Panel |
| | No of Binary Output (Minimum) | - | There shall be total 32 BO in Transformer Feeder Panel |
| | No of Communication Ports ix) Electrical x) Optical | - | Shall be mentioned with type. |
| | Protection Functions | - | Differential and Restricted earth fault protection (for a Two winding transformer considering Vector group of Dyn11) and other mandatory functions |
| | Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) | - | Shall be mentioned |
| | Range of current setting : (c) Earth Faults (d) Phase Faults | % of CT rating | Shall be mentioned |
| | Range of timing settings | Sec | Shall be mentioned |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned |
| | Percentage of current setting at which relay will reset. | % | Shall be mentioned |
| | The relay shall have IEC 61850 communication Protocol | - | Yes |
| 32. | Over Current & Earth Fault Protection | on Relay | |
| | Manufacture's Name Country of Origin | - | ABB- Sweden, Switzerland, Finland / Siemens -Germany/ Schneider-France /UK/ Alstom (UK/France)/ NR, China/ SEL, USA |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of relay | - | Numerical programmable Multifunction |
| ļ | Range of current setting: | - | |
| | a) Phase element | % of CT | Shall be mentioned |
| | b) Each fault element | rating | Shall be mentioned |

| Relay Nominal operating voltage | - | 110Vdc | |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relay CT Current rating | _ | 5A | |
| | | | |
| No of Binary Input (Minimum) | - | There shall be total 42 BI | |
| | | in Transformer Feeder | |
| | | Panel | |
| No of Binary Output (Minimum) | - | There shall be total 32 BO | |
| | | in Transformer Feeder | |
| | | Panel | |
| No of Communication Ports | - | Shall be mentioned with | |
| xi) Electrical | | type. | |
| | | | |
| Protection Function | - | Non-Directional O/C, | |
| | | E/F | |
| | | Other Necessary | |
| | | Functions. | |
| Maximum time delay between | - | Shall be mentioned | |
| | | | |
| _ | | | |
| * | _ | Shall be mentioned | |
| | | Shan ee mentioned | |
| | | | |
| | Sec | Shall be mentioned | |
| <u> </u> | | | |
| | | | |
| Reset time after removal of fault | Sec | Shall be mentioned | |
| current | | | |
| The relay shall have IEC 61850 | - | Yes | |
| communication Protocol | | | |
| Trip Circuit Supervision (TCS) Relay | (Separate | e Relay for each trip coil) | |
| Manufacture's Name | - | Shall be mentioned | |
| Country of Origin | - | Shall be mentioned | |
| | - | Shall be mentioned | |
| | - | | |
| | rential and | | |
| | - | | |
| | - | | |
| | - | | |
| | - me | | |
| | | | |
| | - | Yes | |
| Hand & Electrical reset type for | - | Yes | |
| Differential, REF and Transformer Self- | | | |
| protection | | | |
| Separate Auxiliary Flag Relays for Transf WTA, WTT, BA, BT, OLTC Surge, PRD | | | |
| | | | |
| | Relay CT Current rating No of Binary Input (Minimum) No of Binary Output (Minimum) No of Communication Ports xi) Electrical xii) Optical Protection Function Maximum time delay between initiation of fault and energize of breaker trip circuit. Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) Range of timing settings Burden of relay at 20 time CT rating Drop off to Pick up ratio Reset time after removal of fault current The relay shall have IEC 61850 communication Protocol Trip Circuit Supervision (TCS) Relay Manufacture's Name Country of Origin < | Relay CT Current rating - No of Binary Input (Minimum) - No of Binary Output (Minimum) - No of Communication Ports - xi) Electrical - xii) Optical - Protection Function - Maximum time delay between - initiation of fault and energize of - breaker trip circuit. Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) Range of timing settings Reset time after removal of fault current Sec Drop off to Pick up ratio % Reset time after removal of fault current Sec The relay shall have IEC 61850 communication Protocol - Trip Circuit Supervision (TCS) Relay (Separate Manufacture's Name Country of Origin - Country of Origin - Manufacture's Model no. - Type of Relay - Trype of Relay - Operating Time ms Operating Time - Operating Coil Voltage- 110V DC - Self-reset type for O/C, E/F protection - | Relay CT Current rating - 5A No of Binary Input (Minimum) - There shall be total 42 BI in Transformer Feeder Panel No of Binary Output (Minimum) - There shall be total 32 BO in Transformer Feeder Panel No of Communication Ports - Shall be mentioned with type. xi) Electrical type. - xii) Optical - Non-Directional O/C, E/F Protection Function - Shall be mentioned with type. wiii and energize of breaker trip circuit. - Shall be mentioned Relay Configuration Software (Name, Manufacturer, Version, License - Shall be mentioned Requirement (with name and version)) - Shall be mentioned - Burden of relay at 20 time CT rating VA Shall be mentioned - Reset time after removal of fault current - Shall be mentioned - Trip Circuit Supervision (TCS) Relay (Separate Relay for each trip coil) Manufacture's Name - Shall be mentioned Trip Relay (Separate Relay) for Differential and O/C & E/F - Shall be mentioned - Trip Circuit Supervision (TCS) Relay (Separate Relay for each trip coil) - Shall be mentioned < |

| | Country of Origin | - | Shall be mentioned | |
|-------------|--------------------------------------------------|---------|--------------------------------------------|---------------|
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| 36 | Annunciator | | Shall be menuoned | |
| 50 | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Windows | nos. | 30 | |
| | Built in buzzer and buttons for accept, | | Yes | |
| | mute, test, reset, etc. | - | | |
| | AC /DC Dual Supply Provision | - | Yes | |
| 37 | Control Switch | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Separate TNC/Discrepancy switch and | - | Yes | |
| | Local Remote (L/R) selector switch | | | |
| F. 1 | Protection Control & Metering (Incor | ning/Ou | tgoing Feeder & Bus Co | oupler Panel) |
| 38. | Over Current & Earth Fault Protection | n Relay | | |
| | Manufacture's Name | _ | ABB- Sweden, | |
| | Country of Origin | | Switzerland, Finland/ | |
| | | | Siemens -Germany/ | |
| | | | Schneider-France /UK/ | |
| | | | Alstom -(UK/France)/ | |
| | | | NR- China/ | |
| | | | SEL- USA | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of relay | - | 33kV Incoming/ | |
| | | | Outgoing line feeders | |
| | | | numerical relay shall | |
| | | | have both directional | |
| | | | and non-directional O/C | |
| | | | & E/F protection | |
| | | | (IDMT, DMT, Inst.) feature with monitoring | |
| | | | functions" | |
| | | | Tunctions | |
| | | | 33kV Bus coupler | |
| | | | feeders numerical relay | |
| | | | shall have non- | |
| | | | directional O/C & E/F | |
| | | | protection (IDMT, | |
| | | | DMT, Inst.) and synchro | |
| | | | check feature with | |
| | | | monitoring functions. | |
| | | | | |
| | Range of current setting : | - | 01 11 1 | |
| | a) Phase element | % of | Shall be mentioned | |
| | | CT | Shall be mentioned | |
| | b) Each fault element | rating | | |

| | Relay Nominal operating voltage | | 110Vdc |
|----|-------------------------------------------|----------|-----------------------------|
| | Relay Nominal Operating Voltage | - | 110 v dc |
| | Relay CT Current rating | - | 5A |
| | , , , , , , , , , , , , , , , , , , , , | | |
| | No of Binary Input (Minimum) | - | 24 for line Feeder, 32 for |
| | | | Bus Coupler |
| | No of Binary Output (Minimum) | - | 24 for line Feeder, 24 for |
| | | | Bus Coupler |
| | No of Communication Ports | - | Shall be mentioned with |
| | i) Electrical | | type. |
| | ii) Optical | | |
| | Protection Function | - | Directional and Non- |
| | | | Directional O/C, E/F, |
| | | | Over/ Under Voltage, |
| | | | Over and Under |
| | | | Frequency, Sync Check |
| | | | And Other Necessary |
| | | | Functions. |
| | Maximum time delay between initiation | _ | Shall be mentioned |
| | of fault and energize of breaker trip | _ | Shan be mentioned |
| | circuit. | | |
| | Relay Configuration Software (Name, | | Shall be mentioned |
| | • | - | Shall be mentioned |
| | Manufacturer, Version, License | | |
| | Requirement (with name and version)) | | |
| | Maximum time delay between initiation | - | Shall be mentioned |
| | of fault and energize of breaker trip | | |
| | circuit. | | |
| | Drop off to Pick up ratio | - | Shall be mentioned |
| | Reset time after removal of fault current | | Shall be mentioned |
| | Reset time after removal of fault current | - | Shan be mentioned |
| | Range of timing settings | Sec | Shall be mentioned |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned |
| | The relay shall have IEC 61850 | - | Yes |
| | communication Protocol | | |
| 20 | The Character Company (TCC) Dalace (| <u> </u> | |
| 39 | Trip Circuit Supervision (TCS) Relay (| Separate | e Kelay for each trip coll) |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| 40 | Trip Relay (Separate Relay) | | |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| | Operating Time | ms | <10 |
| | Self-reset type for O/C, E/F protection | - | Yes |

| | Operating Coil Voltage- 110V DC | - | Yes |
|------|-----------------------------------------|----------|------------------------------------------|
| 41 | Annunciator | - | |
| -71 | Manufacture's Name | | Shall be mentioned |
| | Country of Origin | | Shall be mentioned |
| | Manufacture's Model no. | | Shall be mentioned |
| | Windows | nos. | 14 |
| | Built in buzzer and buttons for accept, | 1105. | Yes |
| | mute, test, reset, etc. | _ | 105 |
| | AC /DC Dual Supply Provision | | Yes |
| 42 | Control Switch | | |
| 72 | Manufacture's Name | _ | |
| | Country of Origin | | |
| | Manufacture's Model no. | | |
| | Separate TNC/Discrepancy switch and | - | Yes |
| | Local Remote (L/R) selector switch | _ | 105 |
| 43 | | oming/O | utgoing, Power Transformer & Bus Coupler |
| | feeder) | , o | |
| | a) Energy Meter (Multi Tariff Pro | gramm | able Meter) |
| | (N.B. Not applicable for Bus Co | | |
| | Manufacture's Name | | |
| | | - | Shall be mentioned |
| - | | | European Country/ |
| | | | North American |
| | Manufacture's Country | | Country/Japan/ Australia |
| | | | |
| | Manufacture's Model no. | | Shall be mentioned |
| | Type of Meter | | Numerical |
| | | - | programmable |
| | Class of Accuracy | - | 0.2 S |
| | b) VOLT METERS with Selector | Switch | |
| - | Manufacturer's Name and Country | - | Shall be mentioned |
| - | Manufacture's Model no. | - | Shall be mentioned |
| | | | Analogue, 90 degree |
| | Type of Meter | - | scale range |
| | Class of Accuracy | - | 1.0 |
| | Bus Coupler panel shall have 2 nos. | - | |
| | voltmeter with seven (7) position | | |
| | voltage selector switch | | To be provided |
| | c) Ampere Meters | | |
| | Manufacturer's Name and Country | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | | - | Analogue, 240 degree |
| | Type of Meter | | scale range |
| | Class of Accuracy | - | 1.0 |
| | Separate A-meter for each phase | - | Yes |
| G. 8 | Station Auxiliary Transformer Switchge | ear Unit | |
| | | - | |
| 44. | Manufacturer's Name & Address | - | To be mentioned |
| 45. | Manufacturer country of origin | | USA/UK/EU/Japan/ |
| | | - | South Korea/Malaysia |
| 46. | Туре | - | Shall be mentioned |

| 47. | Rated nominal Voltage | kV | 33 | |
|------------|------------------------------------------------|-----------------|------------------------------------------------------|--|
| 48. | Rated Voltage | kV | 36 | |
| 49. | Material of Bus-Bar | - | HDHC Copper | |
| 50. | Rated Current for Main Bus | | | |
| | Double Bus (As per scope) | Amps | 3150 | |
| 51. | Cross Section of bus bar | mm ² | Min 2500 for 3150A Bus or (As per IEC62271) | |
| 52. | Rated symmetrical short circuit | KA | 40 | |
| | breaking current for Double Bus | | | |
| 53. | Short time current rated duration | Sec. | 3 | |
| 54. | Circuit Breaker : | | | |
| | Manufacturer's model no. of vacuum interrupter | - | Shall be mentioned | |
| | Rated Voltage | kV | 36 | |
| | Rated Current | А | 1250 | |
| | Rated Short Ckt. Breaking Current | kA | 40 | |
| | Rated duration of short circuit current | sec | 3 | |
| | Rated Short CKt. Making Current | kA | 102 | |
| | Rated Breaking time | Cycle | ≤5 | |
| 55. | TPS (DS-ES) (motor & manually op | erated) | | |
| | Rated Maximum Voltage | kV | 36 | |
| | Operating Mechanism | - | Shall be mentioned | |
| | Insulating media | - | SF6 | |
| | Rated Current | А | 1250 | |
| | Rated short time current | kA | 40 | |
| | Short time current rated duration | Sec | 3 | |
| | Switch Position | - | close, open, earth | |
| | Electrical and Mechanical interlock | - | As per IEC 62271-200 | |
| | Mechanical Endurance Class | - | Shall be mentioned | |
| 56. | Insulation level : | | | |
| | AC withstand voltage 1min. dry | kV | 70 | |
| 7 0 | Impulse Withstand, full wave | kV | 170 | |
| 58. | Degree of Protection Enclosure | | IP3X | |
| | HV Compartment | - | IP 5X IP 65 | |
| | LV Compartment | | IP40 | |
| 59. | Dimension and Weight | - | | |
| | Height | mm | Shall be mentioned | |
| | Weight | mm | Shall be mentioned | |
| | Depth | mm | Shall be mentioned | |
| 60. | Type Test Report (as per IEC 62271-20 | | shun oe mentioned | |
| | Lightning Impulse Voltage Withstand tests | - | Shall be submitted | |
| | Power frequency withstand tests | - | Shall be submitted | |

| | Temperature/Gas pressure Rise Tests. | _ | Shall be submitted | |
|----|--------------------------------------------------|-----------|-------------------------|--|
| | Measurement of resistance of the main | | Shall be submitted | |
| | circuit. | - | Shan ee saennaea | |
| | Short circuit performance tests | - | Shall be submitted | |
| | Mechanical Endurance tests. | - | Shall be submitted | |
| | Arc fault test | - | Shall be submitted | |
| | Gas Leakage Test | - | Shall be submitted | |
| н. | Protection Control & Metering for station | n transfo | | |
| 61 | Over Current and Earth Fault Protection Relay | | | |
| | Manufacture's Name | | ABB- Sweden, | |
| | Country of Origin | | Switzerland, Finland/ | |
| | | | Siemens –Germany/ | |
| | | | Schneider-France /UK / | |
| | | | Alstom (UK/France)/ | |
| | | | NR, China/ | |
| | | - | SEL, USA | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of relay | | Numerical | |
| | | | programmable, | |
| | | | multifunction with | |
| | | | both directional and | |
| | | | non-directional O/C & | |
| | | | E/F protection (IDMT, | |
| | | | DMT, Inst.) feature | |
| | | | and monitoring | |
| | | | functions. | |
| | | _ | runetions. | |
| | Relay Nominal operating voltage | - | 110Vdc | |
| | Relay CT Current rating | - | 5A | |
| | No of Binary Input (Minimum) | - | 24 | |
| | No of Binary Output (Minimum) | - | 24 | |
| | No of Communication Ports | - | Shall be mentioned with | |
| | xiii) Electrical | | type. | |
| | xiv) Optical | | | |
| | Protection Function | - | Non-Directional O/C, | |
| | | | E/F | |
| | | | Other Necessary | |
| | | | Functions. | |
| | Maximum time dalar hatere initiati | | | |
| | Maximum time delay between initiation | - | Shall be mentioned | |
| | of fault and energize of breaker trip | | | |
| | circuit. | | | |
| | Delay Configuration Coffman (Nome | | Shall be mentioned | |
| | Relay Configuration Software (Name, | - | Shan be mentioned | |

| | Requirement (with name and version)) | | | |
|----|-------------------------------------------|----------|--------------------------|--|
| | | | Shall be mentioned | |
| | Maximum time delay between initiation | - | shan be mentioned | |
| | of fault and energize of breaker trip | | | |
| | circuit. | | | |
| | Range of Current Setting | - | Shall be mentioned | |
| | c) Phase Fault Element | | | |
| | d) Earth Fault Element | | | |
| | Range of timing settings | - | Shall be mentioned | |
| | | | | |
| | Drop off to Pick up ratio | - | Shall be mentioned | |
| | | | | |
| | Reset time after removal of fault current | - | Shall be mentioned | |
| | | | | |
| | Burden of Relay At 20 time CT rating. | VA | Shall be mentioned | |
| | The relay shall have IEC 61850 | - | Yes | |
| | communication Protocol. | | | |
| 62 | Trip Circuit Supervision (TCS) Relay (| Separate | e Relay) | |
| | | - | • | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| 63 | Trip Relay (Separate Relay) | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| 64 | Annunciator | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Windows | nos. | 14 | |
| | Built in buzzer and buttons for accept, | | Yes | |
| | mute, test, reset, etc. | - | | |
| | AC /DC Devel Serverley Deveries a | | Yes | |
| 65 | AC /DC Dual Supply Provision | - | | |
| 65 | Metering a) Energy Meter (Multi Tariff | | | |
| | | | | |
| | Programmable Meter) Manufacture's Name | | Shall be mentioned | |
| | | - | European Country/ | |
| | | | North American | |
| | Manufacture's Country | - | Country/Japan/ Australia | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Meter | - | Numerical | |
| L | Class of Accuracy | - | 0.2 S | |
| | b) Volt Meters | | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Meter | - | Analogue, 90 degree | |
| L | | - | maiogue, 70 degree | |

| | | | scale range |
|----|-------------------------------------|---|-----------------------|
| | Class of Accuracy | - | 1.0 |
| | c) Ampere Meters | | |
| | Manufacturer's Name and Country | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Meter | | Analogue, 240 degree |
| | Type of Meter | - | scale range |
| | Class of Accuracy | - | 1.0 |
| | Separate A-meter for each phase | - | Yes |
| | | | |
| 66 | Marking | - | "BPDB & Contract No." |
| 67 | Manufacturer must comply all the | - | Yes |
| | features of Technical Specification | | |
| | (Section 7) | | |

Seal & Signature of the Manufacturer

Seal & Signature of the Bidder

8.01(c) Guaranteed Technical Particulars of 33 KV Indoor Type Gas insulated switchgear (GIS) With Protection, Control and Metering Equipment (for Julda Bay Extension)

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | DESCRIPTION | UNIT | BPDB REQUIREMENT | BIDDER'S GUARANTEED VALUES |
|-----|----------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------|----------------------------------|
| 1. | a) Manufacturer's name & address | - | Shall be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 2. | Type/ Model | - | Shall be mentioned | |
| 3. | Manufacturer & country of origin | - | USA/UK/EU/Japan/ South Korea/Malaysia | |
| 4. | Applied Standard | - | Latest version of IEC 62271 fully complied | |
| 5. | Rated nominal Voltage | kV | 33 | |
| 6. | Rated Voltage | kV | 36 | |
| 7. | Rated Frequency | Hz | 50 | |
| 8. | Material of Bus-Bar | - | HDHC Copper | |
| 9. | Busbar Scheme | - | Double with Bus Coupler | |
| 10 | Installation | - | Free Standing | |
| 11. | Rated Current for Main Bus | | | |
| | Double Bus (As per scope) | Amps | 1250 | |
| 12. | Cross Section of bus bar | mm ² | Min 1000 for 1250A Bus or (As per IEC62271) | |
| | Rated symmetrical short circuit breaking current for Double Bus | KA | 31.5 | |
| 14. | Short time current rated duration | Sec. | 3 | |
| 15. | Pressure relief device is integrated with each gas chamber | - | Yes | |
| 16. | Mimic diagram is depicted in front of switchgear panel | - | Yes | |
| 17. | Electrical and Mechanical interlock between Circuit breaker, isolator and earth switch | - | Yes | |
| 18. | Capacitive Voltage Indicator with | - | Yes | |
| | Interlock contact for ES operation | | | |
| 19. | Circuit Breaker: | | | |
| | Type of interrupter | - | VCB | |
| | Class of Circuit Breaker | - | E2M2 or better | |

| | (Supported by Type Test report) | | | |
|----------|-----------------------------------------------------------------------------------------------------|---------|-------------------------------------|--|
| | Designation of Internal Arc | _ | IAC AFLR 31.5 kA, | |
| | Classification | | 1 Sec | |
| | (Supported by Type Test Report) | | 1 500 | |
| | Insulation media | - | SF ₆ | |
| | Interrupting media | - | Vacuum | |
| | Manufacturer's name and country of origin of vacuum interrupter | - | To be mentioned | |
| | Manufacturer's model no. of Vacuum Interrupter (Model no. shall be supported by Type Test) | - | To be mentioned | |
| | Guaranteed nos. of operation for Vacuum Interrupter | | | |
| | a) at rated Current switching | Nos. | Min. 10,000 | |
| | b) at Short circuit current switching | Nos. | ≥ 50 | |
| | Rated Voltage | kV | 36 | |
| | Rated Current for outgoing | А | 1250 | |
| <u> </u> | Rated Short Circuit Breaking Current for | kA | 31.5 | |
| | Double Bus. | | | |
| | Rated duration of short circuit current | sec | 3 | |
| | Rated Short Circuit Making Current for | kA | 80 | |
| | Double Bus. | | | |
| | Rated Breaking time | Cycle | ≤5 | |
| | Opening time | Sec. | shall be mentioned | |
| | Closing time | Sec. | shall be mentioned | |
| | Rated operating Sequence | - | O-0.3 sec-CO-3 min-CO | |
| | Control Voltage | V | DC 110 | |
| | AC Voltage for the Universal Motor for spring charge | V | AC 230 | |
| | Power Consumption of Charging motor | W | Max 250 | |
| | Power consumption of opening/trip coil | W | Max 300 | |
| | Nos. of Trip coils | Nos. | 2 | |
| 20. | Three position disconnector Switch (Bot | h Motor | and Manual) | |
| | Type/ Model | - | Shall be mentioned | |
| | Rated Voltage | kV | 36 | |
| | Rated Current for outgoing | А | 1250 | |
| | Rated short time current for Double Bus. | kA | 31.5 | |
| | Short time current rated duration | Sec | 3 | |
| | Switch Position | - | close, open, earth | |
| | Electrical and Mechanical interlock | - | As per IEC 62271-200 | |
| | Mechanical Endurance Class | - | Shall be mentioned | |
| 21. | Current Transformer : | | | |
| | Туре | - | Ring core/block type with sensor | |
| | Rated Voltage | kV | 36 | |
| <u> </u> | randa vonage | IX V | 50 | |

| | Accuracy Class, Metering | - | 0.2 S | |
|-----|---------------------------------------------------|-----------------|--------------------------------------------------------------|--|
| | Accuracy Class, Protection | _ | 5P20 | |
| | Rated Current Ratio (for outgoing, | A | 400-800/5-5A | |
| | Feeder) | | | |
| | Burden for metering | VA | 20 (at max CT ratio) | |
| | Burden for protection | VA | 20 (at max CT ratio) | |
| | Extended Current Rating for metering | A | 120 % of rated Current | |
| | Instrument Security factor (metering) | - | < 5 | |
| | $R_{\rm CT}$ at 75 ^o C | | | |
| | (a) Measuring Core | mΩ | shall be mentioned | |
| | (b) Protection Core | mΩ | shall be mentioned | |
| | Knee Point Minimum Voltage | | | |
| | (Supported by Calculation) | | | |
| | (a) Measuring Core | V | shall be mentioned | |
| | (b) Protection Core | V | shall be mentioned | |
| | Rated frequency | Hz | 50 | |
| | CT burden shall meet the Short Circuit | | Yes | |
| | Current (31.5 kA, 3 Sec) (Supported by | | | |
| | Calculation) | | | |
| 22 | 33 kV Cable Compartment: (For Outgo | ing Feeder |) | |
| | Material | - | Highly Conductive Copper | |
| | Bus bar type | - | Double | |
| | Cross Section | mm ² | Min 1000 for 1250A | |
| | | | Bus | |
| | | | 0r | |
| | | | (As per IEC62271) | |
| | Nominal CurrentCable connection as per scope | A | 1250 1x1Cx500mm ² (Outgoing | |
| | Cable connection as per scope | - | Feeder Panels), XLPE | |
| | | | armoured copper cable per | |
| | | | phase as per scope of works section 6. | |
| | | | | |
| | | | Cable termination plug and socket with all accessories | |
| | | | required for cable termination, | |
| | | | suitable for terminating with proper cable support shall be | |
| | | | provided. One spare cable | |
| | | | connection facility for each | |
| | | | GIS panel and Sealing/cap for unused cable termination shall | |
| | | | also to be provided. | |
| 23. | Bus Voltage Transformer (Not Applica) | | 01 11 1 | |
| | Type/ Model | - | Shall be mentioned | |
| | Number of PhaseRated Primary Voltage | - kV | Single Phase $33/\sqrt{3}$ | |
| | Rated Secondary Voltage | V KV | $\frac{33/\sqrt{3}}{110/\sqrt{3}}$ | |
| | Rated Secondary Voltage | V | 110/\s | |
| | Rated burden, Secondary | VA | 20 | |
| | Rated burden, Secondary Rated burden, Tertiary | VA VA | 20 | |
| L | rates oursell, renduly | , , , , | 20 | |

| | Accuracy class of secondary core | - | 0.2 | |
|-----|------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------|--|
| | Accuracy class of tertiary core | - | 3P | |
| | LV Compartment | - | IP40 | |
| 24 | Line Voltage Transformer : | | II TO | |
| | Type/ Model | - | Shall be mentioned | |
| | Number of Phase | - | Single Phase | |
| | Rated Primary Voltage | kV | $33/\sqrt{3}$ | |
| | Rated Secondary Voltage | V | 110/\sqrt{3} | |
| | Rated Burden | VA | 20 | |
| | Accuracy class (Metering & Protection) | • 7 1 | 0.2 & 3P | |
| 25. | SF6 Safety and life | - | 0.2 & 51 | |
| 23. | SF6 Pressure | KPa | Shall be mentioned | |
| | Rated pressure at 20 degree C | KPa | Shall be mentioned | |
| | | KPa | Shall be mentioned | |
| | Bursting Pressure | | | |
| | Gas leakage rate/year (Supported by Type Test report) | KPa | ≤0.1% | |
| | Safety indication | - | To be incorporated | |
| | Capacitive voltage indicator | - | In the front of the panel | |
| | Gas pressure Manometer | - | As per IEC 62271-1 | |
| | - | | As per IEC 62271-1 As per IEC 62271-1 | |
| | Bus Bar Gas pressure Manometer | - | As per IEC 02271-1 | |
| | Life/ Endurance of switchgear switches | | A | |
| | e) Circuit Breakers | - | As per IEC 62271-100 | |
| | f) Disconnectors & Earthing switches | - | As per IEC 62271-102 | |
| | Alarm level for insulation | Кра | 140 | |
| | Rated filling level for insulation | KPa | 150 | |
| 26. | Dimension and Weight | | | |
| | Height | mm | Shall be mentioned | |
| | Width Donth | mm | Shall be mentionedShall be mentioned | |
| | Depth Weight including Circuit Breaker | mm Ka | Shall be mentioned | |
| 27. | Construction : | Kg. | | |
| 27. | d) Stainless steel tank | - | Shall be mentioned | |
| | b) Equipped with disconnector and earthing switch. The earthing switch shall have full fault-making capacity. | - | Shall be mentioned | |
| | c) Each gas filled compartment shall be equipped with density sensors giving alarm by low gas density. | - | Shall be mentioned | |
| 28. | Degree of Protection | | | |
| | Enclosure | - | IP3X | |
| | HV Compartment | - | IP65 | |
| | LV Compartment | - | IP40 | |
| 29. | Insulation level : | | | |
| | AC withstand voltage 1min. dry | kV | 70 | |
| | Impulse Withstand, full wave | kV | 170 | |

| 30. | Type Test Report (as per IEC 62271-2 | 200) | | |
|------|--------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------|--|
| | Lightning Impulse Voltage Withstand tests | - | Shall be submitted | |
| | Power frequency withstand tests | - | Shall be submitted | |
| | Temperature/ Gas pressure Rise Tests. | - | Shall be submitted | |
| | Measurement of resistance of the main circuit. | - | Shall be submitted | |
| | Short circuit performance tests | - | Shall be submitted | |
| | Mechanical Endurance tests. | - | Shall be submitted | |
| | Arc fault test | - | Shall be submitted | |
| | Gas Leakage Test | - | Shall be submitted | |
| I. F | Protection Control & Metering (Tran | sformer F | eeder) (Not Applicable) | |
| 31. | Differential and Restricted Earth Fau | | | |
| | Manufacturer's Name | - | ABB- Sweden, Switzerland, Finland/ Siemens -Germany/ Schneider-France /UK / Alstom (UK/France)/ NR, China/ SEL, USA. | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Numerical programmable | |
| | Maximum through fault at which the pro- recommend settings: | otective equ | | |
| | a) Earth faults | rating % | Shall be mentioned | |
| | b) Phase faults | of CT rating | Shall be mentioned | |
| | Maximum time delay between initiation of fault and energize of breaker trip circuit. | ms | Shall be mentioned | |
| | The Relay shall be IEC 61850 protocol type. | - | Yes | |
| | Relay Nominal operating voltage | - | 110Vdc | |
| | Relay CT Current rating | - | 5A | |
| | No of Binary Input (Minimum) | - | There shall be total 42 BI in Transformer Feeder Panel | |
| | No of Binary Output (Minimum) | - | There shall be total 32 BO in Transformer Feeder Panel | |
| | No of Communication Ports xv) Electrical xvi) Optical | - | Shall be mentioned with type. | |

| | Protection Functions | | Differential and | |
|-----|--------------------------------------------------|---------|----------------------------|---|
| | Frotection Functions | - | Restricted earth fault | |
| | | | | |
| | | | protection (for a Two | |
| | | | winding transformer | |
| | | | considering Vector group | |
| | | | of Dyn11) and other | |
| | | | mandatory functions | |
| | Relay Configuration Software (Name, | - | Shall be mentioned | |
| | Manufacturer, Version, License | | | |
| | Requirement (with name and version)) | | | |
| | | | | |
| | Range of current setting : | % of CT | Shall be mentioned | |
| | (e) Earth Faults | rating | | |
| | (f) Phase Faults | | | |
| | Range of timing settings | Sec | Shall be mentioned | |
| | | | | |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned | |
| | Percentage of current setting at which | % | Shall be mentioned | |
| | relay will reset. | | | |
| | The relay shall have IEC 61850 | - | Yes | |
| | communication Protocol | | | |
| 32. | Over Current & Earth Fault Protection | | | |
| | Manufacture's Name | - | ABB- Sweden, | |
| | Country of Origin | | Switzerland, Finland / | |
| | | | Siemens -Germany/ | |
| | | | Schneider-France /UK/ | |
| | | | Alstom (UK/France)/ | |
| | | | NR, China/ | |
| | | | SEL, USA | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of relay | - | Numerical programmable | |
| | | | Multifunction | |
| | Range of current setting: | | | |
| | a) Phase element | % of CT | Shall be mentioned | |
| | b) Each fault element | rating | Shall be mentioned | |
| | Relay Nominal operating voltage | - | 110Vdc | |
| | Relay CT Current rating | - | 5A | |
| | No of Binary Input (Minimum) | - | There shall be total 42 BI | · |
| | - • • · · · · · · · · · · · · · · · · · | | in Transformer Feeder | |
| | | | Panel | |
| | No of Binary Output (Minimum) | - | There shall be total 32 BO | |
| | | | in Transformer Feeder | |
| | | | Panel | |
| | No of Communication Ports | - | Shall be mentioned with | |
| | xvii) Electrical | | type. | |
| | xviii) Optical | | - JP | |
| | | | | |

| | Protection Function | | Non Directional O/C | | |
|----|-----------------------------------------------------------------------------------------------------------------------------------|------|----------------------|--|--|
| | Protection Function | - | Non-Directional O/C, | | |
| | | | E/F | | |
| | | | Other Necessary | | |
| | | | Functions. | | |
| | Maximum time delay between | - | Shall be mentioned | | |
| | initiation of fault and energize of | | | | |
| | breaker trip circuit. | | | | |
| | Relay Configuration Software (Name, | - | Shall be mentioned | | |
| | Manufacturer, Version, License | | | | |
| | Requirement (with name and version)) | | | | |
| | Range of timing settings | Sec | Shall be mentioned | | |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned | | |
| | Drop off to Pick up ratio | % | Shall be mentioned | | |
| | Reset time after removal of fault | Sec | Shall be mentioned | | |
| | current | 500 | Shan be mentioned | | |
| | The relay shall have IEC 61850 | | Yes | | |
| | communication Protocol | | | | |
| | | | | | |
| 33 | Trip Circuit Supervision (TCS) Relay (Separate Relay for each trip coil) | | | | |
| | Manufacture's Name | - | Shall be mentioned | | |
| | Country of Origin | _ | Shall be mentioned | | |
| | Manufacture's Model no. | - | Shall be mentioned | | |
| | Type of Relay | - | Shall be mentioned | | |
| 34 | Trip Relay (Separate Relay) for Differential and O/C & E/F | | | | |
| | Manufacture's Name | - | Shall be mentioned | | |
| | Country of Origin | - | Shall be mentioned | | |
| | Manufacture's Model no. | - | Shall be mentioned | | |
| | Type of Relay | - | Shall be mentioned | | |
| | Operating Time | ms | <10 | | |
| | Operating Coil Voltage- 110V DC | - | Yes | | |
| | Self-reset type for O/C, E/F protection | - | Yes | | |
| | Hand & Electrical reset type for | - | Yes | | |
| | Differential, REF and Transformer Self- | | | | |
| | protection | | | | |
| 35 | Separate Auxiliary Flag Relays for Transformer self-protection (OTA, OTT, WTA, WTT, BA, BT, OLTC Surge, PRD for main tank & OLTC. | | | | |
| | Manufacture's Name | - | Shall be mentioned | | |
| | Country of Origin | _ | Shall be mentioned | | |
| | Manufacture's Model no. | - | Shall be mentioned | | |
| | Type of Relay | - | Shall be mentioned | | |
| 36 | Annunciator | | | | |
| - | Manufacture's Name | _ | Shall be mentioned | | |
| | Country of Origin | - | Shall be mentioned | | |
| | Manufacture's Model no. | - | Shall be mentioned | | |
| | Windows | nos. | 30 | | |
| | Built in buzzer and buttons for accept, | | Yes | | |
| | mute, test, reset, etc. | - | | | |
| | AC /DC Dual Supply Provision | - | Yes | | |
| 37 | Control Switch | | | | |
| | Manufacture's Name | _ | Shall be mentioned | | |

| Country of Origin | - | Shall be mentioned | | |
|-----------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Manufacture's Model no. | - | Shall be mentioned | | |
| Separate TNC/Discrepancy switch and | - | Yes | | |
| Local Remote (L/R) selector switch | | | | |
| J. Protection Control & Metering (Outg | oing Fe | eder) | | |
| 38. Over Current & Earth Fault Protection | n Relay | | | |
| Manufacture's Name | Manufacture's Name - | | | |
| Country of Origin | | Switzerland, Finland/ Siemens -Germany/ Schneider-France /UK/ Alstom -(UK/France)/ NR- China/ SEL- USA | | |
| Manufacture's Model no. | - | Shall be mentioned | | |
| Type of relay | - | 33kV Incoming/ Outgoing line feeders numerical relay shall have both directional and non-directional O/C & E/F protection (IDMT, DMT, Inst.) feature with monitoring functions" 33kV Bus coupler feeders numerical relay shall have non- directional O/C & E/F protection (IDMT, DMT, Inst.) and synchro check feature with monitoring functions. | | |
| Range of current setting : | - | | | |
| a) Phase element | % of CT | Shall be mentioned Shall be mentioned | | |
| b) Each fault element | rating | | | |
| Relay Nominal operating voltage | - | 110Vdc | | |
| Relay CT Current rating | - | 5A | | |
| No of Binary Input (Minimum) | - | 24 for line Feeder, 32 for Bus Coupler | | |
| No of Binary Output (Minimum) | - | 24 for line Feeder, 24 for Bus Coupler | | |
| No of Communication Ports i) Electrical ii) Optical | - | Shall be mentioned with type. | | |
| Protection Function | - | Directional and Non- Directional O/C, E/F, | | |

| | | 1 | |
|-----|----------------------------------------------|---------|-----------------------------|
| | | | Over/ Under Voltage, |
| | | | Over and Under |
| | | | Frequency, Sync Check |
| | | | And Other Necessary |
| | | | Functions. |
| | Maximum time delay between initiation | - | Shall be mentioned |
| | of fault and energize of breaker trip | | |
| | circuit. | | |
| | Relay Configuration Software (Name, | _ | Shall be mentioned |
| | Manufacturer, Version, License | | Shan be mentioned |
| | | | |
| | Requirement (with name and version)) | | |
| | Maximum time delay between initiation | - | Shall be mentioned |
| | of fault and energize of breaker trip | | |
| | circuit. | | |
| | Drop off to Pick up ratio | - | Shall be mentioned |
| | | | |
| | Reset time after removal of fault current | - | Shall be mentioned |
| | Range of timing settings | Sec | Shall be mentioned |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned |
| | The relay shall have IEC 61850 | - | Yes |
| | communication Protocol | | |
| 39 | Trip Circuit Supervision (TCS) Relay | Separat | e Relay for each trip coil) |
| | | | |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| 40 | Trip Relay (Separate Relay) | 1 | |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| | Operating Time | ms | <10 |
| | Self-reset type for O/C, E/F protection | - | Yes |
| 4.1 | Operating Coil Voltage- 110V DC | - | Yes |
| 41 | Annunciator Manufacture's Name | | Shall be mentioned |
| | | - | Shall be mentioned |
| | Country of Origin Manufacture's Model no. | - | Shall be mentioned |
| - | Windows | - | 14 |
| | Built in buzzer and buttons for accept, | nos. | Yes |
| | mute, test, reset, etc. | _ | 105 |
| | AC /DC Dual Supply Provision | - | Yes |
| 42 | Control Switch | | |
| | Manufacture's Name | - | |
| | Country of Origin | - | |
| | Manufacture's Model no. | - | |
| | Separate TNC/Discrepancy switch and | | Yes |
| | Local Remote (L/R) selector switch | - | |
| | | | |

| 43 | 43 Metering and Instrumentation (for Outgoing feeder) | | | | |
|--------------------------|-------------------------------------------------------------------------|-----------------|-----------------------------------|--|--|
| | a) Energy Meter (Multi Tariff Pro | | | | |
| | Manufacture's Name | 0 | | | |
| | | - | Shall be mentioned | | |
| | | | European Country/ | | |
| | | | North American | | |
| | Manufacture's Country | | Country/Japan/ Australia | | |
| | Manufacture's Model no. | _ | Shall be mentioned | | |
| | Type of Meter | - | Numerical | | |
| | Type of Weter | _ | programmable | | |
| | Class of Accuracy | _ | 0.2 S | | |
| | b) VOLT METERS with Selector Swi | - itch | 0.2.5 | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | | |
| | Manufacture's Model no. | | Shall be mentioned | | |
| | | | Analogue, 90 degree | | |
| | Type of Meter | - | scale range | | |
| | Class of Accuracy | _ | 1.0 | | |
| | c) Ampere Meters | | 1.0 | | |
| | Manufacturer's Name and Country | _ | Shall be mentioned | | |
| 1 | Manufacture's Model no. | _ | Shall be mentioned | | |
| | | _ | Analogue, 240 degree | | |
| | Type of Meter | | scale range | | |
| | Class of Accuracy | - | 1.0 | | |
| | Separate A-meter for each phase | - | Yes | | |
| K. 8 | Station Auxiliary Transformer Switchge Manufacturer's Name & Address | ear Unit | (Not Applicable) To be mentioned | | |
| 45. | Manufacturer s Name & Address Manufacturer country of origin | _ | USA/UK/EU/Japan/ | | |
| 43. | Manufacturer country of origin | | South Korea/Malaysia | | |
| 16 | T | - | - | | |
| 46. | Type | - 1-X/ | Shall be mentioned | | |
| 47. | Rated nominal Voltage | kV kV | 33 36 | | |
| 48. 49. | Rated Voltage Material of Bus-Bar | | HDHC Copper | | |
| 49. 50. | Rated Current for main bus | - | TIDITE Copper | | |
| 30. | Double Bus (As per scope) | Amps | 1250 | | |
| 51. | Cross Section of busbar | mm ² | 1000 | | |
| 51. 52. | Rated short time current | kA | 31.5 | | |
| 52. 53. | Short time current rated duration | Sec. | 3 | | |
| 55. 54. | Circuit Breaker : | 500. | 5 | | |
| | Manufacturer's model no. of vacuum interrupter | - | Shall be mentioned | | |
| | Rated Voltage | kV | 36 | | |
| | Rated Current | А | 1250 | | |
| | Rated Short Ckt. Breaking Current | kA | 31.5 | | |
| | Rated duration of short circuit current | sec | 3 | | |
| | Rated Short CKt. Making Current | kA | 80 | | |
| | Rated Breaking time | Cycle | ≤5 | | |
| | | 0,010 | | | |

| 55. | TPS (DS-ES) (motor & manually op | perated) | | |
|------------|--------------------------------------------------------------------------|------------|------------------------|--|
| | Rated Maximum Voltage | kV | 36 | |
| | Operating Mechanism | _ | Shall be mentioned | |
| | Insulating media | _ | SF6 | |
| | Rated Current | A | 1250 | |
| | Rated short time current | kA | 31.5 | |
| | Short time current rated duration | Sec | 31.5 | |
| | | | _ | |
| | Switch Position | - | close, open, earth | |
| | Electrical and Mechanical interlock | - | As per IEC 62271-200 | |
| | Mechanical Endurance Class | - | Shall be mentioned | |
| 56. | Insulation level : | | | |
| | AC withstand voltage 1min. dry | kV | 70 | |
| 70 | Impulse Withstand, full wave | kV | 170 | |
| 58. | Degree of Protection Enclosure | | IP3X | |
| | HV Compartment | - | IP3X IP65 | |
| | LV Compartment | - | IP65 IP40 | |
| 7 0 | - | - | 11 40 | |
| 59. | Dimension and Weight | | Shall be mentioned | |
| | Height | mm | | |
| | Weight | mm | Shall be mentioned | |
| | Depth | mm | Shall be mentioned | |
| 60. | Type Test Report (as per IEC 62271-20 |)0) | 1 | |
| | Lightning Impulse Voltage Withstand tests | - | Shall be submitted | |
| | Power frequency withstand tests | - | Shall be submitted | |
| | Temperature/Gas pressure Rise Tests. | - | Shall be submitted | |
| | Measurement of resistance of the main circuit. | - | Shall be submitted | |
| | Short circuit performance tests | - | Shall be submitted | |
| | Mechanical Endurance tests. | - | Shall be submitted | |
| | Arc fault test | - | Shall be submitted | |
| | Gas Leakage Test | - | Shall be submitted | |
| | Protection Control & Metering for statio Over Current and Earth Fault | on transfo | ormer (Not Applicable) | |
| 61 | Protection Relay | | | |
| | Manufacture's Name | | ABB- Sweden, | |
| | Country of Origin | | Switzerland, Finland/ | |
| | | | Siemens –Germany/ | |
| | | | Schneider-France /UK / | |
| | | | Alstom (UK/France)/ | |
| | | | NR, China/ | |
| | | - | SEL, USA | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of relay | | Numerical | |
| | | | programmable, | |
| | | | multifunction with | |
| | | - | both directional and | |

| | | non-directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. |
|---------------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------|
| Relay Nominal operating voltage | - | 110Vdc |
| Relay CT Current rating | - | 5A |
| No of Binary Input (Minimum) | - | 24 |
| No of Binary Output (Minimum) | - | 24 |
| No of Communication Ports iii) Electrical iv) Optical | - | Shall be mentioned with type. |
| Protection Function | - | Non-Directional O/C, E/F Other Necessary Functions. |
| Maximum time delay between initiation of fault and energize of breaker trip circuit. | - | Shall be mentioned |
| Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) | - | Shall be mentioned |
| Maximum time delay between initiation of fault and energize of breaker trip circuit. | - | Shall be mentioned |
| Range of Current Settingd) Phase Fault Elemente) Earth Fault Element | - | Shall be mentioned |
| Range of timing settings | - | Shall be mentioned |
| Drop off to Pick up ratio | - | Shall be mentioned |
| Reset time after removal of fault current | - | Shall be mentioned |
| Burden of Relay At 20 time CT rating.The relay shall have IEC 61850communication Protocol. | VA - | Shall be mentioned Yes |

| 62 | Trip Circuit Supervision (TCS) Relay (| Relay) | |
|----|----------------------------------------|--------------------|--------------------|
| | Manufacture's Name | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | Shall be mentioned | |

| 63 | Trip Relay (Separate Relay) | | | |
|----|-----------------------------------------|------|--------------------------|--|
| 05 | Manufacture's Name | | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | | - | Shall be mentioned | |
| 64 | Type of Relay Annunciator | - | | |
| 04 | Manufacture's Name | | Shall he mentioned | |
| | | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Windows | nos. | 14 | |
| | Built in buzzer and buttons for accept, | | Yes | |
| | mute, test, reset, etc. | - | ×7 | |
| | AC /DC Dual Supply Provision | _ | Yes | |
| 65 | Metering | | | |
| | a) Energy Meter (Multi Tariff | | | |
| | Programmable Meter) | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | | | European Country/ | |
| | | | North American | |
| | Manufacture's Country | - | Country/Japan/ Australia | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Meter | - | Numerical | |
| | Class of Accuracy | - | 0.2 S | |
| | b) Volt Meters | | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | | | Analogue, 90 degree | |
| | Type of Meter | - | scale range | |
| | Class of Accuracy | - | 1.0 | |
| | c) Ampere Meters | | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Turne of Mator | | Analogue, 240 degree | |
| | Type of Meter | - | scale range | |
| | Class of Accuracy | - | 1.0 | |
| | Separate A-meter for each phase | - | Yes | |
| 66 | Marking | - | "BPDB & Contract No." | |
| 67 | Manufacturer must comply all the | _ | Yes | |
| 07 | features of Technical Specification | | | |
| | (Section 7) | | | |
| | | | | |

Seal & Signature of the Manufacturer

8.01(d) Guaranteed Technical Particulars of 33 KV Indoor Type Gas insulated switchgear (GIS) With Protection, Control and Metering Equipment (for Dohazari Upgradation)

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | DESCRIPTION | UNIT | BPDB REQUIREMENT | BIDDER'S GUARANTEED VALUES |
|-----|----------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------|----------------------------------|
| 1. | a) Manufacturer's name & address | - | Shall be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 2. | Type/ Model | - | Shall be mentioned | |
| 3. | Manufacturer & country of origin | - | USA/UK/EU/Japan/ South Korea/Malaysia | |
| 4. | Applied Standard | - | Latest version of IEC 62271 fully complied | |
| 5. | Rated nominal Voltage | kV | 33 | |
| 6. | Rated Voltage | kV | 36 | |
| 7. | Rated Frequency | Hz | 50 | |
| 8. | Material of Bus-Bar | - | HDHC Copper | |
| 9. | Busbar Scheme | - | Single Bus with Bus Coupler | |
| 10 | Installation | - | Free Standing | |
| 11. | Rated Current for Main Bus | | | |
| | Single Bus (As per scope) | Amps | 3150 | |
| 12. | Cross Section of bus bar | mm ² | Min 2500 for 3150A Bus or (As per IEC62271) | |
| 13. | Rated symmetrical short circuit breaking current for Single Bus | KA | 40 | |
| 14. | Short time current rated duration | Sec. | 3 | |
| 15. | Pressure relief device is integrated with each gas chamber | - | Yes | |
| 16. | Mimic diagram is depicted in front of switchgear panel | - | Yes | |
| 17. | Electrical and Mechanical interlock between Circuit breaker, isolator and earth switch | - | Yes | |
| 18. | Capacitive Voltage Indicator with | - | Yes | |
| | Interlock contact for ES operation | | | |
| 19. | Circuit Breaker: | • | | |
| | Type of interrupter | - | VCB | |
| | Class of Circuit Breaker | - | E2M2 or better | |

| | (Supported by Type Test report) | | | |
|-----|------------------------------------------------------|---------|-----------------------|--|
| | Designation of Internal Arc | - | IAC AFLR 40 kA, | |
| | Classification | | 1 Sec | |
| | (Supported by Type Test Report) | | | |
| | Insulation media | - | SF_6 | |
| | Interrupting media | - | Vacuum | |
| | Manufacturer's name and country of | - | To be mentioned | |
| | origin of vacuum interrupter | | | |
| | Manufacturer's model no. of Vacuum | - | To be mentioned | |
| | Interrupter (Model no. shall be supported by Type | | | |
| | Test) | | | |
| | Guaranteed nos. of operation for | | | |
| | Vacuum Interrupter | | | |
| | a) at rated Current switching | Nos. | Min. 10,000 | |
| | b) at Short circuit current switching | Nos. | ≥ 50 | |
| | Rated Voltage | kV | 36 | |
| | Rated Current for Incoming as per scope | А | 2500 | |
| | Rated Current for Outgoing | А | 1250 | |
| | Rated Current for Power Transformer | А | 1250 | |
| | Rated Current for Bus coupler (Single | А | 3150 | |
| | Bus) as per scope. | | | |
| | Rated Short Circuit Breaking Current for | kA | 40 | |
| | Single Bus. | | | |
| | Rated duration of short circuit current | sec | 3 | |
| | Rated Short Circuit Making Current for | kA | 102 | |
| | Single Bus. | | | |
| | Rated Breaking time | Cycle | ≤5 | |
| | Opening time | Sec. | shall be mentioned | |
| | Closing time | Sec. | shall be mentioned | |
| | Rated operating Sequence | - | O-0.3 sec-CO-3 min-CO | |
| | Control Voltage | V | DC 110 | |
| | AC Voltage for the Universal Motor for | V | AC 230 | |
| | spring charge | | | |
| | Power Consumption of Charging motor | W | Max 250 | |
| | Power consumption of opening/trip coil | W | Max 300 | |
| | Nos. of Trip coils | Nos. | 2 | |
| 20. | Three position disconnector Switch (Bot | h Motor | and Manual) | |
| | Type/ Model | - | Shall be mentioned | |
| | Rated Voltage | kV | 36 | |
| | Rated Current for Incoming as per scope | А | 2500 | |
| | Rated Current for Outgoing | А | 1250 | |
| | Rated Current for Power Transformer | А | 1250 | |
| | Rated Current for Bus coupler (Single | А | 3150 | |
| | Bus) as per scope | | | |
| | Rated short time current for Single Bus. | kA | 40 | |

| | Short time current rated duration | Sec | 3 | |
|-----|-----------------------------------------|-----------------|----------------------------------------------------------------|--|
| | Switch Position | - | close, open, earth | |
| | Electrical and Mechanical interlock | - | As per IEC 62271-200 | |
| | Mechanical Endurance Class | - | Shall be mentioned | |
| 21. | Current Transformer : | | | |
| | Туре | - | Ring core/block type | |
| | 51 | | with sensor | |
| | Rated Voltage | kV | 36 | |
| | Accuracy Class, Metering | - | 0.2 S | |
| | Accuracy Class, Protection | - | 5P20 | |
| | Rated Current Ratio for incoming as per | Α | 1200-2400/5-5A | |
| | scope | | | |
| | Rated Current Ratio (for outgoing, | Α | 400-800/5-5A | |
| | Station Auxiliary Feeder) | | | |
| | Rated Current Ratio for Bus Coupler; | A | 1600-3200/5-5A | |
| | Single Bus as per scope) | | | |
| | Rated Current Ratio for power | A | 400-800/5-5-5A | |
| | transformer panel | | | |
| | Burden for metering | VA | 20 (at max CT ratio) | |
| | Burden for protection | VA | 20 (at max CT ratio) | |
| | Extended Current Rating for metering | A | 120 % of rated Current | |
| | Instrument Security factor (metering) | - | < 5 | |
| | R_{CT} at 75 ^o C | | | |
| | (a) Measuring Core | mΩ | shall be mentioned | |
| | (b) Protection Core | mΩ | shall be mentioned | |
| | Knee Point Minimum Voltage | | | |
| | (Supported by Calculation) | | | |
| | (a) Measuring Core | V | shall be mentioned | |
| | (b) Protection Core | V | shall be mentioned | |
| | Rated frequency | Hz | 50 | |
| | CT burden shall meet the Short Circuit | - | Yes | |
| | Current (31.5 kA, 3 Sec) (Supported by | | 105 | |
| | Calculation) | | | |
| 22 | 33 kV Cable Compartment: (For Incom | ing/Outgoi | ng & Transformer Feeder) | |
| | Material | | Highly Conductive Copper | |
| | Bus bar type | - | Single | |
| | Cross Section | mm ² | Min 2500 for 3150A | |
| | | | Bus | |
| | | | 0r | |
| | New ind Come t | | (As per IEC62271) | |
| | Nominal Current | A | 3150 2x1Cx800mm ² ,1x1Cx500mm ² | |
| | Cable connection as per scope | - | (Incoming/Outgoing & Transformer Feeder Panels), | |
| | | | 3Cx95 mm ² for Auxiliary x- former XLPE armoured | |
| | | | copper cable per phase as per | |
| | | | scope of works section 6. | |

| | | | Cable termination plug and socket with all accessories required for cable termination, suitable for terminating with proper cable support shall be provided. One spare cable connection facility for each GIS panel and Sealing/cap for unused cable termination shall also to be provided. | |
|-----|-----------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 23. | Bus Voltage Transformer : | | 01 11 1 (* 1 | |
| | Type/ Model Number of Phase | - | Shall be mentioned Single Phase | |
| | Rated Primary Voltage | kV | $33/\sqrt{3}$ | |
| | Rated Secondary Voltage | V | 110/\sqrt{3} | |
| | Rated burden | VA | 20 | |
| | | • 7 1 | 0.2 & 3P | |
| | Accuracy class (Metering & Protection) LV Compartment | - | <u> </u> | |
| 24 | Live Compartment | - | 11 40 | |
| 27 | Type/ Model | _ | Shall be mentioned | |
| | Number of Phase | - | Single Phase | |
| | Rated Primary Voltage | kV | $33/\sqrt{3}$ | |
| | Rated Secondary Voltage | V | 110/\sqrt{3} | |
| | Rated Burden | VA VA | 20 | |
| | Accuracy class (Metering & Protection) | - | 0.2 & 3P | |
| 25. | SF6 Safety and life | | 0.2 & 31 | |
| 23. | SF6 Pressure | KPa | Shall be mentioned | |
| | Rated pressure at 20 degree C | KPa | Shall be mentioned | |
| | Bursting Pressure | KPa | Shall be mentioned | |
| | Gas leakage rate/year | KPa | ≤0.1% | |
| | (Supported by Type Test report) | IXI a | 0.170 | |
| | Safety indication | - | To be incorporated | |
| | Capacitive voltage indicator | _ | In the front of the panel | |
| | Gas pressure Manometer | _ | As per IEC 62271-1 | |
| | Bus Bar Gas pressure Manometer | _ | As per IEC 62271-1 | |
| | Life/ Endurance of switchgear switches | | | |
| | g) Circuit Breakers | _ | As per IEC 62271-100 | |
| | h) Disconnectors & Earthing switches | _ | As per IEC 62271-102 | |
| | Alarm level for insulation | Кра | 140 | |
| | Rated filling level for insulation | KPa | 150 | |
| 26. | Dimension and Weight | | | |
| | Height | mm | Shall be mentioned | |
| | Width | mm | Shall be mentioned | |
| | Depth | mm | Shall be mentioned | |
| | Weight including Circuit Breaker | Kg. | Shall be mentioned | |
| 27. | Construction : | | | |
| | d) Stainless steel tank | - | Shall be mentioned | |
| | b) Equipped with disconnector and earthing switch. The earthing | - | Shall be mentioned | |

| | switch shall have full fault-making | | | |
|------|--------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|--|
| | capacity. | | | |
| | c) Each gas filled compartment shall be equipped with density sensors giving alarm by low gas density. | - | Shall be mentioned | |
| 28. | Degree of Protection | | | |
| | Enclosure | - | IP3X | |
| | HV Compartment | - | IP65 | |
| | LV Compartment | - | IP40 | |
| 29. | Insulation level : | | | |
| | AC withstand voltage 1min. dry | kV | 70 | |
| | Impulse Withstand, full wave | kV | 170 | |
| 30. | Type Test Report (as per IEC 62271-2 | 200) | | |
| | Lightning Impulse Voltage Withstand tests | - | Shall be submitted | |
| | Power frequency withstand tests | - | Shall be submitted | |
| | Temperature/ Gas pressure Rise Tests. | - | Shall be submitted | |
| | Measurement of resistance of the main circuit. | - | Shall be submitted | |
| | Short circuit performance tests | - | Shall be submitted | |
| | Mechanical Endurance tests. | - | Shall be submitted | |
| | Arc fault test | - | Shall be submitted | |
| | Gas Leakage Test | - | Shall be submitted | |
| M. F | Protection Control & Metering (Tran | sformer F | eeder) | |
| 31. | Differential and Restricted Earth Fau | | | |
| | Manufacturer's Name | - | ABB- Sweden, Switzerland, Finland/ Siemens -Germany/ Schneider-France /UK / Alstom (UK/France)/ NR, China/ SEL, USA. | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of RelayMaximum through fault at which the pro- recommend settings: | - otective equ | Numerical programmable ipment is stable with | |
| | a) Earth faults | rating % | Shall be mentioned | |
| | b) Phase faults | of CT rating | Shall be mentioned | |
| | Maximum time delay between initiation of fault and energize of breaker trip circuit. | ms | Shall be mentioned | |
| | The Relay shall be IEC 61850 protocol type. | - | Yes | |
| | Relay Nominal operating voltage | - | 110Vdc | |

| | Relay CT Current rating | - | 5A |
|-----|----------------------------------------------------------|----------|-----------------------------------------|
| | No of Binary Input (Minimum) | | There shall be total 42 BI |
| | No of Binary input (Winninum) | _ | in Transformer Feeder |
| | | | Panel |
| | No of Binary Output (Minimum) | _ | There shall be total 32 BO |
| | No or Binary Output (Minimum) | - | in Transformer Feeder |
| | | | Panel |
| | No of Communication Ports | | Shall be mentioned with |
| | | - | |
| | v) Electrical | | type. |
| | vi) Optical Protection Functions | | Differential and |
| | rotection Functions | - | Restricted earth fault |
| | | | |
| | | | protection (for a Two |
| | | | winding transformer |
| | | | considering Vector group |
| | | | of Dyn11) and other |
| | | | mandatory functions |
| | Relay Configuration Software (Name, | - | Shall be mentioned |
| | Manufacturer, Version, License | | |
| | Requirement (with name and version)) | | |
| | | | |
| | Range of current setting : | % of CT | Shall be mentioned |
| | (g) Earth Faults | rating | |
| | (h) Phase Faults | | |
| | Range of timing settings | Sec | Shall be mentioned |
| | | | |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned |
| | Percentage of current setting at which relay will reset. | % | Shall be mentioned |
| | The relay shall have IEC 61850 | - | Yes |
| | communication Protocol | | |
| 32. | Over Current & Earth Fault Protection | on Relay | |
| | Manufacture's Name | - | ABB- Sweden, |
| | Country of Origin | | Switzerland, Finland / |
| | | | Siemens -Germany/ |
| | | | Schneider-France /UK/ |
| | | | Alstom (UK/France)/ |
| | | | NR, China/ |
| | Manafastanda M. 1.1 | | SEL, USA |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of relay | - | Numerical programmable Multifunction |
| | Range of current setting: | - | |
| | a) Phase element | % of CT | Shall be mentioned |
| | b) Each fault element | rating | Shall be mentioned |
| | Relay Nominal operating voltage | - | 110Vdc |
| | | | |

| Relay CT Current rating | - | 5A |
|---------------------------------------------------------------------------------------------------------------|-----|--------------------------------------------------------------|
| No of Binary Input (Minimum) | - | There shall be total 42 BI in Transformer Feeder Panel |
| No of Binary Output (Minimum) | - | There shall be total 32 BO in Transformer Feeder Panel |
| No of Communication Ports vii) Electrical viii) Optical | - | Shall be mentioned with type. |
| Protection Function | - | Non-Directional O/C, E/F Other Necessary Functions. |
| Maximum time delay between initiation of fault and energize of breaker trip circuit. | - | Shall be mentioned |
| Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) | - | Shall be mentioned |
| Range of timing settings | Sec | Shall be mentioned |
| Burden of relay at 20 time CT rating | VA | Shall be mentioned |
| Drop off to Pick up ratio | % | Shall be mentioned |
| Reset time after removal of fault current | Sec | Shall be mentioned |
| The relay shall have IEC 61850 communication Protocol | - | Yes |

| 33 | | | | |
|----|-------------------------------------------------------|-------------|--------------------|--|
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| 34 | Trip Relay (Separate Relay) for Differ | rential and | O/C & E/F | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| | Operating Time | ms | <10 | |
| | Operating Coil Voltage- 110V DC | - | Yes | |
| | Self-reset type for O/C, E/F protection | - | Yes | |
| | Hand & Electrical reset type for | - | Yes | |
| | Differential, REF and Transformer Self- protection | | | |
| 35 | Separate Auxiliary Flag Relays for Trans | | | |
| | WTA, WTT, BA, BT, OLTC Surge, PRD | for main ta | nk & OLTC. | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |

| | Manufacture's Model no. | _ | Shall be mentioned | |
|-----|--------------------------------------------------|---------|-------------------------|--------|
| | Type of Relay | _ | Shall be mentioned | |
| 36 | Annunciator | | | |
| 20 | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Windows | nos. | 30 | |
| | Built in buzzer and buttons for accept, | 105. | Yes | |
| | mute, test, reset, etc. | - | 100 | |
| | AC /DC Dual Supply Provision | - | Yes | |
| 37 | Control Switch | | | |
| 51 | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | _ | Shall be mentioned | |
| | Manufacture's Model no. | _ | Shall be mentioned | |
| | Separate TNC/Discrepancy switch and | | Yes | |
| | Local Remote (L/R) selector switch | - | 103 | |
| NE | Protection Control & Metering (Incor | ning/Ou | taging Feeder & Bus Ca | unler) |
| | _ | - | itgoing recuei & bus et | upier) |
| 38. | Over Current & Earth Fault Protection | 1 Relay | | |
| | | r | | |
| | Manufacture's Name | - | ABB- Sweden, | |
| | Country of Origin | | Switzerland, Finland/ | |
| | | | Siemens -Germany/ | |
| | | | Schneider-France /UK/ | |
| | | | Alstom -(UK/France)/ | |
| | | | NR- China/ | |
| | | | SEL- USA | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of relay | - | 33kV Incoming/ | |
| | | | Outgoing line feeders | |
| | | | numerical relay shall | |
| | | | have both directional | |
| | | | and non-directional O/C | |
| | | | & E/F protection | |
| | | | (IDMT, DMT, Inst.) | |
| | | | feature with monitoring | |
| | | | functions" | |
| | | | | |
| | | | 33kV Bus coupler | |
| | | | feeders numerical relay | |
| | | | shall have non- | |
| | | | directional O/C & E/F | |
| | | | protection (IDMT, | |
| | | | DMT, Inst.) and synchro | |
| | | | check feature with | |
| | | | monitoring functions. | |
| | | | montoring functions. | |
| | Range of current setting : | - | | |
| | a) Phase element | % of | Shall be mentioned | |
| | | CT | Shall be mentioned | |
| | b) Each fault element | rating | | |
| | Relay Nominal operating voltage | - | 110Vdc | |
| | | | | |

| | Relay CT Current rating | I | 5A |
|----|-------------------------------------------|------------|----------------------------|
| | Relay C1 Current rating | - | JA |
| | No of Binary Input (Minimum) | - | 24 for line Feeder, 32 for |
| | | | Bus Coupler |
| | No of Binary Output (Minimum) | - | 24 for line Feeder, 24 for |
| | | | Bus Coupler |
| | No of Communication Ports | | Shall be mentioned with |
| | i) Electrical | - | |
| | | | type. |
| | ii) Optical Protection Function | _ | Directional and Non- |
| | rotection runction | - | |
| | | | Directional O/C, E/F, |
| | | | Over/ Under Voltage, |
| | | | Over and Under |
| | | | Frequency, Sync Check |
| | | | And Other Necessary |
| | | | Functions. |
| | Maximum time delay between initiation | - | Shall be mentioned |
| | of fault and energize of breaker trip | | |
| | circuit. | | |
| | Relay Configuration Software (Name, | - | Shall be mentioned |
| | Manufacturer, Version, License | | |
| | Requirement (with name and version)) | | |
| | Maximum time delay between initiation | - | Shall be mentioned |
| | • | - | Shall be menuoled |
| | of fault and energize of breaker trip | | |
| | circuit. | - | |
| | Drop off to Pick up ratio | - | Shall be mentioned |
| | Reset time after removal of fault current | _ | Shall be mentioned |
| | | | |
| | Range of timing settings | Sec | Shall be mentioned |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned |
| | The relay shall have IEC 61850 | - | Yes |
| | communication Protocol | | |
| 39 | Trip Circuit Supervision (TCS) Relay (| Senarate | Relay for each trin coil) |
| 07 | | Copuration | |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| 40 | Trip Relay (Separate Relay) | | |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| | Operating Time | ms | <10 |
| | Self-reset type for O/C, E/F protection | - | Yes |
| 41 | Operating Coil Voltage- 110V DC | - | Yes |
| 41 | Annunciator | | |

| | Manufacture's Name | _ | Shall be mentioned |
|------|-------------------------------------------------------|----------|-------------------------------------------|
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | | Shall be mentioned |
| | Windows | nos. | 14 |
| | Built in buzzer and buttons for accept, | 1105. | Yes |
| | mute, test, reset, etc. | _ | 105 |
| | AC /DC Dual Supply Provision | - | Yes |
| 42 | Control Switch | - | 105 |
| 42 | Manufacture's Name | | |
| | Country of Origin | - | |
| | Manufacture's Model no. | - | |
| | Separate TNC/Discrepancy switch and | - | Yes |
| | Local Remote (L/R) selector switch | - | 105 |
| 43 | | oming/C | Outgoing, Power Transformer & Bus Coupler |
| | a) Energy Meter (Multi Tariff Pro | 0 | |
| | (N.B. Not applicable for Bus Co Manufacture's Name | upier P | |
| | Ivianulaciule s Ivallie | _ | Shall be mentioned |
| | | _ | European Country/ |
| | | | North American |
| | Manufacture's Country | | Country/Japan/ Australia |
| | | | |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Type of Meter | | Numerical |
| | ~* | - | programmable |
| | Class of Accuracy | _ | 0.2 S |
| | b) VOLT METERS with Selector Sw | itch | |
| | Manufacturer's Name and Country | | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | | | Analogue, 90 degree |
| | Type of Meter | - | scale range |
| | Class of Accuracy | - | 1.0 |
| | Bus Coupler panel shall have 2 nos. | - | 1 |
| | voltmeter with seven (7) position | | |
| | voltage selector switch | | To be provided |
| | c) Ampere Meters | | |
| | Manufacturer's Name and Country | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | | - | Analogue, 240 degree |
| | Type of Meter | | scale range |
| | Class of Accuracy | - | 1.0 |
| | Separate A-meter for each phase | - | Yes |
| 0. 9 | Station Auxiliary Transformer Switchge | ear Unit | |
| 44. | Manufacturer's Name & Address | - | To be mentioned |
| 45. | Manufacturer country of origin | | USA/UK/EU/Japan/ |
| | | - | South Korea/Malaysia |
| 46. | Туре | _ | Shall be mentioned |
| 47. | Rated nominal Voltage | kV | 33 |
| 48. | Rated Voltage | kV | 36 |
| | | | |

| 49. | Material of Bus-Bar | _ | HDHC Copper | |
|-----|------------------------------------------------|-----------------|------------------------------------------------------|--|
| 50. | Rated Current for Main Bus | | | |
| | Single Bus (As per scope) | Amps | 3150 | |
| 51. | Cross Section of bus bar | mm ² | Min 2500 for 3150A Bus or (As per IEC62271) | |
| 52. | Rated symmetrical short circuit | KA | 40 | |
| | breaking current for Single Bus | | | |
| 53. | Short time current rated duration | Sec. | 3 | |
| 54. | Circuit Breaker : | | | |
| | Manufacturer's model no. of vacuum interrupter | - | Shall be mentioned | |
| | Rated Voltage | kV | 36 | |
| | Rated Current | Α | 1250 | |
| | Rated Short Ckt. Breaking Current | kA | 31.5 | |
| | Rated duration of short circuit current | sec | 3 | |
| | Rated Short CKt. Making Current | kA | 80 | |
| | Rated Breaking time | Cycle | ≤5 | |
| 55. | TPS (DS-ES) (motor & manually op | erated) | | |
| | Rated Maximum Voltage | kV | 36 | |
| | Operating Mechanism | - | Shall be mentioned | |
| | Insulating media | - | SF6 | |
| | Rated Current | Α | 1250 | |
| | Rated short time current | kA | 31.5 | |
| | Short time current rated duration | Sec | 3 | |
| | Switch Position | - | close, open, earth | |
| | Electrical and Mechanical interlock | - | As per IEC 62271-200 | |
| | Mechanical Endurance Class | - | Shall be mentioned | |
| 56. | Insulation level : | | | |
| | AC withstand voltage 1min. dry | kV | 70 | |
| 50 | Impulse Withstand, full wave | kV | 170 | |
| 58. | Degree of Protection Enclosure | - | IP3X | |
| | HV Compartment | - | IP65 | |
| | LV Compartment | _ | IP40 | |
| 59. | Dimension and Weight | - | | |
| | Height | mm | Shall be mentioned | |
| | Weight | mm | Shall be mentioned | |
| | Depth | mm | Shall be mentioned | |
| 60. | Type Test Report (as per IEC 62271-20 | | Shan be mentioned | |
| | Lightning Impulse Voltage Withstand tests | - | Shall be submitted | |
| | Power frequency withstand tests | - | Shall be submitted | |
| | Temperature/Gas pressure Rise Tests. | - | Shall be submitted | |
| | Measurement of resistance of the main | - | Shall be submitted | |

| | circuit. | | | |
|----|---------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | Short circuit performance tests | - | Shall be submitted | |
| | Mechanical Endurance tests. | - | Shall be submitted | |
| | Arc fault test | - | Shall be submitted | |
| | Gas Leakage Test | - | Shall be submitted | |
| | Protection Control & Metering for station | n transfo | ormer | |
| 61 | Over Current and Earth fault Relay | | | |
| | Manufacture's Name Country of Origin | _ | ABB- Sweden, Switzerland, Finland/ Siemens –Germany/ Schneider-France /UK / Alstom (UK/France)/ NR, China/ SEL, USA | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of relay | | Numerical programmable, multifunction with both directional and non-directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. | |
| | Relay Nominal operating voltage | - | 110Vdc | |
| | Relay CT Current rating | - | 5A | |
| | No of Binary Input (Minimum) | - | 24 | |
| | No of Binary Output (Minimum) | - | 24 | |
| | No of Communication Ports ix) Electrical x) Optical | - | Shall be mentioned with type. | |
| | Protection Function | - | Non-Directional O/C, E/F Other Necessary Functions. | |
| | Maximum time delay between initiation of fault and energize of breaker trip circuit. | - | Shall be mentioned | |
| | Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) | - | Shall be mentioned | |
| | Maximum time delay between initiation | - | Shall be mentioned | |

| | | [| 1 | |
|----|-------------------------------------------|---------|--------------------------|--|
| | of fault and energize of breaker trip | | | |
| | circuit. | | | |
| | Range of Current Setting | - | Shall be mentioned | |
| | d) Phase Fault Element | | | |
| | e) Earth Fault Element | | | |
| | Range of timing settings | - | Shall be mentioned | |
| | Trange of thing settings | | Shan be mentioned | |
| | Drop off to Pick up ratio | - | Shall be mentioned | |
| | | | | |
| | Reset time after removal of fault current | - | Shall be mentioned | |
| | | | | |
| | Burden of Relay At 20 time CT rating. | VA | Shall be mentioned | |
| | The relay shall have IEC 61850 | - | Yes | |
| | communication Protocol. | | | |
| 62 | Trip Circuit Supervision (TCS) Relay (| Senarat | e Relay) | |
| 02 | The chical Supervision (105) Kelay (| ocparat | c iteruy) | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| 63 | Trip Relay (Separate Relay) | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Shall be mentioned | |
| 64 | Annunciator | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Windows | nos. | 14 | |
| | Built in buzzer and buttons for accept, | | Yes | |
| | mute, test, reset, etc. | - | | |
| | | | Yes | |
| | AC /DC Dual Supply Provision | - | | |
| 65 | Metering | | | |
| | a) Energy Meter (Multi Tariff | | | |
| | Programmable Meter) | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | | | European Country/ | |
| | | | North American | |
| | Manufacture's Country | - | Country/Japan/ Australia | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Meter | - | Numerical | |
| | Class of Accuracy | - | 0.2 S | |
| | b) Volt Meters | | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | | | Analogue, 90 degree | |
| | Type of Meter | - | scale range | |
| | Class of Accuracy | - | 1.0 | |

| | c) Ampere Meters | | |
|----|-------------------------------------|---|-----------------------|
| | Manufacturer's Name and Country | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Tupe of Motor | | Analogue, 240 degree |
| | Type of Meter | - | scale range |
| | Class of Accuracy | - | 1.0 |
| | Separate A-meter for each phase | - | Yes |
| 66 | Marking | - | "BPDB & Contract No." |
| 67 | Manufacturer must comply all the | - | Yes |
| | features of Technical Specification | | |
| | (Section 7) | | |

Seal & Signature of the Manufacturer

8.02 Guaranteed Technical Particulars of Substation Automation System (SAS)

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| SL No. | DESCRIPTION | UNIT | BPDB REQUIREMEN T | BIDDER'S GUARANTEED VALUES |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------|----------------------------------|
| 1 | a) Manufacturer's name & address With website, official domain email. | - | Shall be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 2 | Country of Origin | - | EU/USA/CANADA/ Japan/UK | |
| 3 | Model of the Substation Automation System | - | Shall be mentioned | |
| 4 | General Requirement: | | • | |
| | Communication protocol at all levels (Standards to be complied with Substation Automation system) | - | IEC61850 Fully complying with the standard. | |
| | Temperature range (min/max) | - | 0° to 50° C | |
| | Relative humidity | - | 20 to 90 % non- condensing | |
| | Base of Station HMI | - | Active X | |
| | System performance and inter-operability test Among ABB, Siemens, Alstom, Schneider, NR and SEL IEDs done in the system verification center. (Supported by Test Report) | - | Yes | |
| | Control IEDs and protection IEDs are from same manufacturer | - | Yes | |
| | Intelligent Electronic Devices (IED's) Manufacturer's name & address with official email address | | Shall be mentioned | |
| | Type or Model | | Shall be mentioned | |
| | Serial communication interface included | | YES (IEC61850) | |
| | Protection & Control IED's connected to same bus | | Yes | |
| | Self-monitoring | | To be provided | |
| | Display of measured values | | To be provided | |
| | Remote parameterization | | To be provided | |
| | Disturbance record upload & analysis | | To be provided | |
| | Availability Calculation shall be furnished for each equipment & as well as for the entire system | | To be provided with Bid. | |
| | Number of years of proven field experience of offered system. | - | 5 Years | |
| | (Note: Proof of experience should be furnished. The components used in the offered system and those with field experience should be | | | |

| | the same) | | | |
|---|------------------------------------------------------------------------------------------------------------------------------|-----|--------------------------------|--|
| | Engineering, Assembling and Wiring of | - | Yes | |
| | Automation Panel/Cubicle shall be done from | | | |
| | the origin of the manufacturer of the system | | | |
| | Dimensions of cubicle | - | Shall be | |
| | (Width x Depth x Height) | | mentioned | |
| | Floor load | - | max. 600 N/m² | |
| | Design life of Substation Automation System | - | \geq 20 Years | |
| | Availability of the Spare parts of the system shall be ensured for duration of design life | | Yes | |
| | Manufacturers quality assurance system | - | ISO 9001/9002 or equivalent | |
| 5 | Station Level Equipment: | | | |
| | Station Computer | - | Industrial PC | |
| | MTBF (Mean time between Failures) | Hrs | Shall be mentioned | |
| | | Hrs | Shall be | |
| | MTTR (Mean time to repair) | | mentioned | |
| | DualStationComputersProvidedinredundant hot standby configuration | - | Yes | |
| | Hot standby takeover time | - | Seconds | |
| | Number of years of proven field experience of offered software | - | 5 Yrs | |
| | Operating System | - | Windows | |
| | All standard picture as per technical specification included in HMI | - | To be provided | |
| | Process Status Display & Command Procedures | - | To be provided | |
| | Event processing as per technical specification | - | To be provided | |
| | Alarm processing as per technical specification | - | To be provided | |
| | Reports as per technical specification | - | To be provided | |
| | Trend Display as per technical specification | - | To be provided | |
| | User Authority levels as per spec | - | To be provided | |
| | System supervision & monitoring as per technical specification | - | To be provided | |
| | Automatic sequence control as per technical specification | - | To be provided | |
| | High quality SCD file complete with ICD files & station topology | - | To be provided | |
| | Operator Work Station (Master/Backup workstation) shall have separately connection to different Ethernet switch | - | Yes | |
| 6 | Gateway to Central Control Room (2 nos.) | - | · | |
| | Number of years of proven field experience of offered unit | Yrs | 5 Yrs | |
| | Insulation tests | - | IEC60255-5 | |
| | Fast disturbance tests | - | IEC 61000-4-4, Class 4 | |
| | Industrial environment | - | EN 50081-2, Class A | |
| | Industrial grade hardware with no moving parts | - | To be provided | |
| | Design life of offered equipment | - | 20Yrs | |
| | Communication channel with | - | To be provided | |
| | Communication channel with | | | |

| | associates/peripherals (Main & redundant | | | |
|----|---------------------------------------------------------------------------------------------|--------------|--------------------------------|--|
| | connection) | | | |
| | CPU | _ | To be provided | |
| | DC/DC Supply | _ | To be provided | |
| | MTBF (Mean time between Failures) | _ | Hrs | |
| | | _ | | |
| | MTTR (Mean time to repair) | - | Hrs | |
| | The Master slave Licenses for SCADA and SAS communication in the gateway shall be activated | - | To be provided | |
| 7 | Station Bus: | | | |
| / | Station Bus. | | Glass fiber optic | |
| | Physical Medium connection with associates | - | with Flexible | |
| | (Main & redundant communication) | | steel armoring | |
| 8 | Inter bay Bus: | | | |
| 0 | | _ | Glass fiber optic | |
| | Physical Medium connection with associates | | with Flexible | |
| | (Main & redundant communication) | | steel armoring | |
| | | | _ | |
| 9 | Printer Server | | | |
| | MTBF | Hrs | Shall be | |
| | | | mentioned | |
| 11 | Hard Copy Color Printer | | ~ | |
| | MTBF | Hrs | Shall be | |
| | Marter Olash - ODC (Olahal Daritianian | | mentioned | |
| 12 | Master Clock – GPS (Global Positioning System) Receiver: | | | |
| - | Name of the manufacturer | _ | Shall be | |
| | | | mentioned | |
| | Manufacturer's address | - | Shall be | |
| | | | mentioned | |
| | Model | - | Shall be | |
| | | | mentioned | |
| | MTBF | Hrs | Shall be | |
| - | | | mentioned | |
| 13 | Bay Control Unit-33 kV; Bay control functio | | | |
| | O/C & E/F relay for each bay/feeder, which wi However, Separate Bay control unit beside | | | |
| | acceptable. | U/C a | L/F Telay is also | |
| | Manufacturer's name & address | _ | Shall be mentioned | |
| | Type or Model | _ | Shall be mentioned | |
| | Country of Manufacture | _ | Shall be mentioned | |
| | | Yrs | 5 | |
| | Number of years of proven field experience of offered unit | 115 | 5 | |
| | Type of Bay controller offered | _ | HV | |
| | Separate Bay control unit is provided for each bay | _ | Shall be | |
| | & feeder or Bay Control function is provided in | | mentioned | |
| | the O/C & E/F relay | | | |
| | Single bit dependence | - | No | |
| | Control functionality implementation in software | - | To be provided | |
| | with | | · · | |
| | Select before Operate provision for Open-Execute | | | |
| | & Close-Execute, Interlocks and other necessary | | | |
| | information | | | |
| | Bay & Station Wide Synchro check function | X7 1. | G | |
| | Maximum Voltage difference Maximum Erzguency difference | Volt | Specify range | |
| | Maximum Frequency difference Maximum Phase difference | Hz Angle | Specify range Specify range | |
| | | Angle | specify fallge | |

| | Double command blocking | - | Yes | |
|----|---------------------------------------------------------------|------------|---------------------|--|
| | Independent settable parameter groups | _ | To be provided | |
| | | - | * | |
| | Local Display Unit | - | To be provided | |
| | Sequence of event recorder | N | C | |
| | Events Time resolution | Nos. | Specify | |
| | Disturbance recorder function | ms | To be provided | |
| | | - | - | |
| | Comprehensive self-supervision | - | To be provided | |
| | Battery free backup of events and disturbance records | - | Yes | |
| | Insulation tests | - | IEC60255-5 | |
| | Fast disturbance test | - | IEC61000-4- | |
| | MTDE | II | 4,Class4 | |
| | MTBF | Hrs | Shall be mentioned | |
| | MTTR | Hrs | Shall be | |
| | MITIK | 1115 | mentioned | |
| | Temperature range: IED's | | mentioneu | |
| | Operation | °C | -10 to +50 | |
| | Transport and storage | °Č | -10 to +70 | |
| | Relative humidity: | _ | | |
| | ✤ Operating max./min | % | 93 | |
| | Transport and storage | % | 93 | |
| 14 | Bay Control Unit-11 kV: Bay control function | shall be p | provided in the O/C | |
| | & E/F relay for each bay/feeder, which will | be the p | part of GIS Panel. | |
| | However, Separate Bay control unit besides | O/C & | E/F relay is also | |
| | acceptable. | 1 | 1 | |
| | Manufacturer's name & address | - | Shall be mentioned | |
| | Type or Model | - | Shall be mentioned | |
| | Country of Manufacture | - | Shall be mentioned | |
| | Number of years of proven field experience of offered unit | Yrs | 5 | |
| | Type of Bay controller offered | _ | MV | |
| | Separate Bay control unit is provided for each bay | _ | Shall be | |
| | & feeder or Bay Control function is provided in | | mentioned | |
| | the O/C & E/F relay | | mentionea | |
| | Single bit dependence | - | No | |
| | Control functionality implementation in software | - | To be provided | |
| | with | | 10 be provided | |
| | Select before Operate provision for Open-Execute | | | |
| | & Close-Execute, Interlocks and other necessary | | | |
| | information | | | |
| | Bay & Station Wide Synchro check function | | | |
| | Maximum Voltage difference | Volt | Specify range | |
| | Maximum Frequency difference | Hz | Specify range | |
| | Maximum Phase difference | Angle | Specify range | |
| | Double command blocking | - | Yes | |
| | Independent settable parameter groups | - | To be provided | |
| | Local Display Unit | - | To be provided | |
| | Sequence of event recorder | | | |
| | • Events | Nos. | Specify | |
| | Time resolution | ms | 1 | |
| | Disturbance recorder function | - | To be provided | |
| | Comprehensive self-supervision | - | To be provided | |
| h | Battery free backup of events and disturbance | - | Yes | |
| | * 1 ··· | I | | |

| | records | | | |
|-----|-----------------------------------------------|------|--------------------------------------|--|
| | Insulation tests | - | IEC60255-5 | |
| | Fast disturbance test | _ | IEC61000-4- | |
| | | | 4,Class4 | |
| | MTBF | Hrs | Shall be | |
| | | | mentioned | |
| - | MTTR | Hrs | Shall be | |
| | | | mentioned | |
| | Temperature range: IED's | | | |
| | Operation | °C | -10 to +50 | |
| | Transport and storage | °C | -10 to +70 | |
| | Relative humidity: | | | |
| | Operating max./min | % | 93 | |
| | Transport and storage | % | 93 | |
| 15 | Ethernet Switch | | | |
| | Name of manufacturer | - | Siemens/ ABB/ | |
| | | | CISCO/ | |
| | | | Schneider | |
| | Country | | Shall be | |
| | | | mentioned | |
| | Model number | - | Shall be | |
| | T | | mentioned | |
| | Туре | - | Industrial Grade, rackable 19"-24 | |
| | | | | |
| | Redundant Power supply | _ | ports To be provided | |
| | | - | - | |
| | Ethernet switch shall have dual connection to | - | Yes | |
| | each other. | | | |
| 16 | Operator Work Station (OWS) | | | |
| 16 | Operator Work Station (OWS) | | Any International | |
| | Brand | - | reputed brand. | |
| | Model | - | To be mentioned | |
| | Widdel | _ | Industrial PC | |
| | Туре | - | (Panel mounted) | |
| | Country of Manufacture | _ | To be mentioned | |
| | Country of Manufacture | _ | Intel core i7 8 th | |
| | Processor | GHz | generation or | |
| | ricessoi | UIIZ | latest | |
| | | | 3.0 GHz (min), 8 | |
| | Clock Speed | GHz | MB Cache | |
| | Storn Spood | | Memory(min) | |
| | Bus Speed | MHz | Min. 1600 MHz | |
| | | | 8 GB, Expandable | |
| | RAM | GB | to 16 GB | |
| | HDD | GB | 1 TB SSD | |
| | | - | Same Brand USB | |
| | Mouse | | Scroll Optical | |
| | | | Mouse | |
| | | - | Same brand USB | |
| 1 1 | TZ 1 1 | | | |
| | Keyboard | | Keyboard | |
| | Keyboard | | Keyboard Same brand LED | |
| | Keyboard | | | |
| | Monitor | inch | Same brand LED | |
| | | inch | Same brand LED 24", 1920x1080, | |

| | | | table/desk) | |
|----|------------------------------------|--------|----------------------------|--|
| | | - | Windows 10 | |
| | OS Support | | Professional or | |
| | | | latest | |
| | OS | - | License windows | |
| | 05 | | with recovery kit | |
| | Software | - | Licensed Anti- | |
| | Software | | Virus Software | |
| 17 | Engineer Work Station (EWS) | | | |
| | Brand | - | Any International | |
| | Dialid | | reputed brand. | |
| | Model | - | To be mentioned | |
| | | - | Laptop having | |
| | | | provision for to be | |
| | Туре | | locked (can be | |
| | | | mounted on the | |
| | | | SAS panel) | |
| | Country of Manufacture | - | To be mentioned | |
| | | | Intel Core i7 | |
| | D | CH | Processor, 8 th | |
| | Processor | GHz | generation or | |
| | | | latest | |
| | | | 3.0 GHz (min), 8 | |
| | Clock Speed | GHz | MB L3 Cache | |
| | | | Memory (min) | |
| | Bus Speed | MHz | Min. 1600 MHz | |
| | | CD | (2x4 GB) 1 | |
| | RAM | GB | DIMM DDR4 | |
| | HDD | GB | Min. 1 TB SSD | |
| | | - | Same Brand | |
| | Mouse | | Wireless Scroll | |
| | | | Optical Mouse | |
| | | - | Integrated | |
| | Keyboard | | standard | |
| | | | Keyboard | |
| | Monitor | in ala | 15.6", Full HD, | |
| | Wontor | inch | True Life Display | |
| | Dattam: | - | 6 cell lithium ion | |
| | Battery | | battery | |
| | Battery Backup | - | 4 hours or higher | |
| | | | with A/C Adapter | |
| | | - | Windows 10 | |
| | OS Support | | professional or | |
| | | | latest | |
| | OS | - | License windows | |
| | | | with recovery kit | |
| | | - | All types of | |
| | | | configuration | |
| | | | software with | |
| | | | licenses for SAS, | |
| | Software (To be installed & ready) | | Licensed Anti- | |
| | | | Virus Software, | |
| | | | Licensed OS & | |
| | | | other necessary | |
| | | | software | |
| 18 | Standard Color Printer | | | |
| | | | | |

| | | | A | |
|----|--------------------------------------------|-------|--------------------|--|
| | Brand | - | Any International | |
| | M. 1.1 | | reputed brand. | |
| | Model | - | To be mentioned | |
| - | Country of Manufacturer | - | To be mentioned | |
| | | - | Toner and | |
| | | | associated drum | |
| | Toner type | | unit in single | |
| | | | case, No starter | |
| | | | toner. | |
| | Resolution | dpi | 1200 × 1200 dpi | |
| | Resolution | upi | (Minimum) | |
| | | | 62-Page-per | |
| | Printing Speed | nnm | Minute (Letter), | |
| | Tinning Speed | ppm | 35 PPM (A4) | |
| | | | (min.) | |
| | First Page Print Out | secon | As fast as 8 | |
| | Flist rage rinn Out | d | seconds | |
| | | | 256 MB | |
| | Momorry | MD | (Minimum) | |
| | Memory | MB | Expandable to 1 | |
| | | | GB | |
| | | - | 100 sheet multi- | |
| | | | purpose input | |
| | | | tray,2 x 500 sheet | |
| | | | input tray | |
| | Trays | | 50-sheet face up | |
| | | | output tray, 250- | |
| | | | sheet face down | |
| | | | output tray | |
| | | - | Letter, Legal, A4, | |
| | Media Sizes | | A5, B5 and | |
| | | | custom sizes | |
| | | - | Paper (Plain, | |
| | | | Preprinted, | |
| | | | Letterhead, Bond, | |
| | Media Types | | Color, Recycled, | |
| | | | Rough), Transpare | |
| | | | ncies, Labels | |
| 19 | Firewall | | | |
| 17 | | | To be | |
| | Name of Manufacturer | | | |
| | | | mentioned | |
| | Brand | | To be | |
| | | | mentioned | |
| | Model/Type | | To be | |
| | | | mentioned | |
| | Country of Origin (Place of Manufacturing) | | To be | |
| | | | mentioned | |
| | ID Filtoring | | | |
| | IP Filtering | | To be provided | |
| | Port Filtering | | | |
| | MAC Filtering | | | |
| | URL Filtering | | | |
| | Port Forwarding | | | |
| | DMZ | | | |
| | Denial of Service | | | |
| | | | | |
| | NAT Mapping | | | |

| | Packet throughput of at least 150 Mbps | | To be | |
|----------|--------------------------------------------------------------------|---|----------------|---|
| | racket throughput of at least 150 hops | | mentioned | |
| | 3DES Encryption throughput of 20 Mbps | | To be | |
| | SDLS Liferyption throughput of 20 Mbps | | mentioned | |
| | Support for 200 VPNs | | To be | |
| | Support for 200 vi NS | | mentioned | |
| | Maximum concurrent sessions, with AVC | | To be | |
| | Maximum concurrent sessions, with AVC | | mentioned | |
| | Maximum new connections per second, | | To be | |
| | with AVC | | mentioned | |
| | Local On-device Management | | Yes | |
| | Application Visibility and Control (AVC) | | Standard | |
| | Security Intelligence | | Standard, with | |
| | Security intelligence | | IP, URL, and | |
| | | | DNS threat | |
| | | | intelligence | |
| 20 | System Performance: | | Intelligence | |
| 20 | - Exchange of display (First reaction) | | < 1 s | |
| | Presentation of a binary change in the process | | < 0.5 s | |
| | display | | | |
| | - Presentation of an analogue change in the | | <1 s | |
| | process display | | | |
| | - From order to process output | | <0.5 s | |
| | - From order to updated of display | | <1.5 s | |
| 21 | UPS with Panel (110 V DC from | - | 01 set | |
| | Substation main DC System Source will | | | |
| | be interfaced) | | | |
| 22 | List (Name & version) of all types of | | | |
| | software required for SAS configuration, | | | |
| | operation, monitoring and Remote control | | To be | |
| | individually for Both OWS and EWS | - | mentioned | |
| 23 | | _ | "BPDB & | |
| <u> </u> | | | Contract | |
| | Marking | | No." | |
| 24 | Manufacturer must comply all the features | | | |
| | of Technical Specification (Section 7) | - | Yes | |
| | | | • | • |

Seal & Signature of the Manufacturer

8.03 (a).Guaranteed Technical Particulars of 33 kV VCB (2500 Amps) for Dohazari Bay Extension.

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be

| non-respons | ive.) |
|-------------|-------|

| Sl. No. | Description | Unit | BPDB's Requirement | Manufacturer' s Guaranteed Particulars |
|------------|---------------------------------------------------------------------------------------------------------|----------|----------------------------|----------------------------------------------|
| 1 | a) Manufacturer's name & addressWith website, official domain email. | - | Shall be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2 | Manufacturer's model no. | - | To be mentioned | |
| 3 | Maximum Rated Voltage | KV | 36 | |
| 4 | Frequency | Hz | 50 | |
| 5 | Rated Normal current | А | 2500A | |
| 6 | No. of phase | - | 3 | |
| 7 | No. of break per phrase | - | To be mentioned | |
| 8 | Interrupting medium | - | Vacuum | |
| 9 | Manufacturer's name and country of vacuum interrupter | - | To be mentioned | |
| 10 | Manufacturer's model no. of vacuum interrupter | - | To be mentioned | |
| 11 | Class of Circuit Breaker (Supported by Test Report from independent laboratory) | - | E2M2 or better | |
| 12 | Designation of Internal Arc Classification (Supported by Test Report from independent laboratory) | - | IAC AFLR 31.5 kA, 1 sec | |
| 13 | Impulse withstand on $1.2/50 \ \mu s$ wave | KV | 170 | |
| 14 | Power Frequency Test Voltage (Dry), at 50Hz, 1 min. | KV | 70 | |
| 15 | Short time withstand current, 3 second, rms | KA | <mark>31.5</mark> | |
| 16 | Breaking capacity: a) Symmetrical, rms b) Asymmetrical, rms | KA KA | 40 As per IEC | |
| 17 | Short circuit making current, peak | KA | 102 | |
| 18 | First phase to clear factor | - | To be mentioned | |
| 19 | Rated transient recovery voltage at 100% rated short circuit breaking current | KVp | To be mentioned | |
| 20 | Rated line charging breaking current | А | To be mentioned | |
| 21 | Rated cable charging breaking current | А | To be mentioned | |
| 22 | Rated out of phase breaking current | А | To be mentioned | |

| 24 Trip coil current A To be mentioned 25 Trip coil voltage V, DC 110 26 Is the circuit breaker trip free? Yes/No Yes 27 Type of arc contacts or arc control Device - To be mentioned 28 Main Contact : - - To be mentioned 28 a) Type of contact - - 29 Does magnetic effect of load Yes/No To be mentioned 29 Does magnetic effect of load Yes/No To be mentioned 30 Length of each break/ phase mm To be mentioned 31 Length of stroke mm To be mentioned 32 Weight of circuit breaker unit complete, without operating mechanism and structure Kg To be mentioned 33 Weight of circuit breaker complete with all fittings as in service. Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension) To be mentioned 34 Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamber KN/m ² To be mentioned 37 Breaker tanks or chamber Current at making | 23 | Is circuit breaking restrike free? | Yes/No | Yes |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------|-------------------|---------------------------------------|
| 26 Is the circuit breaker trip free? Yes/No Yes 27 Type of arc contacts or arc control Device - To be mentioned 28 a) Type of contact - To be mentioned 28 a) Type of contact - To be mentioned 29 Does magnetic effect of load Yes/No To be mentioned 29 Does magnetic effect of load Yes/No To be mentioned 30 Length of cach break/ phase mm To be mentioned 31 Length of stroke mm To be mentioned 32 Weight of circuit breaker unit complete, without operating mechanism and structure Kg To be mentioned 33 Weight of circuit breaker complete with all futings as in service. Maximum shock load imposed on floor or foundation (state compression or tension) To be mentioned 34 Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamber KN/m ² To be mentioned 37 Design pressure type test on circuit Breaker due to chamber KN/m ² To be mentioned 38 a) Opening time: without current at low of the anber Sec. 0.05 (maximum) <tr< td=""><td>24</td><td>Trip coil current</td><td>А</td><td>To be mentioned</td></tr<> | 24 | Trip coil current | А | To be mentioned |
| 27Type of arc contacts or arc control Device-To be mentioned28Main Contact : a) Type of contact b) Material of contract surfaces c) Contract resistance-To be mentioned Less than 4029Does magnetic effect of load Currents increase contact pressure?Yes/ NoTo be mentioned30Length of each break/ phasemmTo be mentioned31Length of strokemmTo be mentioned32Weight of circuit breaker unit complete, without operating mechanism and structureKgTo be mentioned33Weight of circuit breaker complete with all fittings as in service.KgTo be mentioned34Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension)NTo be mentioned35Maximum pressure rise in circuit Breaker due thromberKN/m²To be mentioned36Routine pressure test on circuit Breaker tanks or chamberKN/m²To be mentioned37Degin pressure type test on circuit Breaker tanks or chamberSec.0.05 (maximum)38a) opening time: without current at b) Breaking timesec.0.05 (maximum)39Maximum arc duration of any duty Cycle as retast which maximum arc duration occurs circuit at which maximum arc duration occurs critical currentmsTo be mentioned41Make timemsTo be mentioned42Minimum time for arc extinction to Contract remark when adapted for auto re-closing trut adapted for auto re-closing <td>25</td> <td>Trip coil voltage</td> <td>V, DC</td> <td>110</td> | 25 | Trip coil voltage | V, DC | 110 |
| 1 Main Contact : - To be mentioned 28 a) Type of contact - To be mentioned 29 Does magnetic effect of load - To be mentioned 29 Does magnetic effect of load To be mentioned 20 Length of each break/ phase mm To be mentioned 30 Length of circuit breaker unit complete, without operating mechanism and structure Kg To be mentioned 31 Length of circuit breaker complete with all fittings as in service. Kg To be mentioned 33 Weight of circuit breaker complete with all fittings as in service. Kg To be mentioned 34 Maximum shock load imposed on floor or foundation when opening under fault conditions (state current in outer chamber N To be mentioned 35 Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamber KN/m ² To be mentioned 36 Routine pressure test on circuit Breaker due to making or chamber KN/m ² To be mentioned 37 Design pressure type test on circuit Breaker tanks or chamber Sc. 0.05 (maximum) 38 a) Opening time: without current at 100% of rated breaking time c) Cycle structurestion of relev | 26 | Is the circuit breaker trip free? | Yes/No | Yes |
| 28 a) Type of contact - To be mentioned b) Material of contract surfaces - To be mentioned c) Contract resistance µΩ To be mentioned 29 Does magnetic effect of load Yes/No To be mentioned 20 Length of each break/phase mm To be mentioned 30 Length of circuit breaker unit complete, without operating mechanism and structure Kg To be mentioned 31 Weight of circuit breaker complete with all fittings as in service. Kg To be mentioned 34 Waight of stroke N To be mentioned 35 Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension) N To be mentioned 36 Routine pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamber KN/m² To be mentioned 37 Design pressure type test on circuit Breaker tanks or chamber Sec. 0.05 (maximum) 38 0.0pening time: without current at 100% of rated breaking current b) Sec. 0.05 (maximum) 38 0.00% of rated breaking current b) Breaking time Cycle S5 | 27 | Type of arc contacts or arc control Device | - | To be mentioned |
| 29 Does magnetic effect of load Currents increase contact pressure? Yes/No To be mentioned 30 Length of each break/ phase mm To be mentioned 31 Length of stroke mm To be mentioned 32 Weight of circuit breaker unit complete, without operating mechanism and structure Kg To be mentioned 33 futtings as in service. Kg To be mentioned 34 Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension) N To be mentioned 35 Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer KN/m ² To be mentioned 36 Routine pressure test on circuit Breaker tanks or chamber KN/m ² To be mentioned 37 Design pressure type test on circuit Breaker tanks or chamber KN/m ² To be mentioned 38 0 Opening time: without current at 100% of rated breaking current b) sec. 0.05 (maximum) 39 Maximum arc duration of any duty Cycle as pre latest revision of relevant IEC standard (critical current) ms To be mentioned 40 Current at which maximum arc duration occurs (critical current) A To be mentioned | 28 | a) Type of contactb) Material of contract surfaces | - - μΩ | To be mentioned |
| 30Length of each break/ phasemmTo be mentioned31Length of strokemmTo be mentioned32Weight of circuit breaker unit complete, without operating mechanism and structureKgTo be mentioned33Weight of circuit breaker complete with all fittings as in service.KgTo be mentioned34Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension)NTo be mentioned35Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamberKN/m²To be mentioned36Routine pressure test on circuit Breaker tanks or chamberKN/m²To be mentioned37Design pressure type test on circuit Breaker tanks or chamberKN/m²To be mentioned38100% of rated breaking current b) Breaking time c) Closing timeSec.0.05 (maximum) To be mentioned39Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standard (critical current)Maximum arc duration occurs ATo be mentioned41Make timemsTo be mentioned42Minimum time for arc extinction to Contract remark when adapted for auto re-closingmsTo be mentioned43Time from closing of control switch to completion of closing stroke during fault makingmsTo be mentioned | 29 | ÷ | | To be mentioned |
| 32 Weight of circuit breaker unit complete, without operating mechanism and structure Kg To be mentioned 33 Weight of circuit breaker complete with all fittings as in service. Kg To be mentioned 34 Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension) N To be mentioned 35 Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamber KN/m ² To be mentioned 36 Routine pressure test on circuit Breaker due to making or breaking of current in outer chamber KN/m ² To be mentioned 37 Design pressure type test on circuit Breaker tanks or chamber KN/m ² To be mentioned 38 a) Opening time: without current at 100% of rated breaking current b) sec. 0.05 (maximum) 39 Maximum are duration of any duty Cycle as per latest revision of relevant IEC standard 4.1% To be mentioned 40 Current at which maximum arc duration occurs (critical current) M To be mentioned 41 Make time ms To be mentioned 42 Minimum time for arc extinction to Contract remark when adapted for auto re-closing ms To be mentioned 43 Time from closing of contro | 30 | | mm | To be mentioned |
| without operating mechanism and structure 0 33 Weight of circuit breaker complete with all fittings as in service. Kg To be mentioned 34 Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension) N To be mentioned 35 Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamber KN/m ² To be mentioned 36 Routine pressure test on circuit Breaker due to making or breaking of Rated current in outer chamber KN/m ² To be mentioned 37 Design pressure test on circuit Breaker due to fareaker tanks or chamber KN/m ² To be mentioned 38 a) Opening time: without current at 100% of rated breaking current b) sec. 0.05 (maximum) 39 Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standard At% M To be mentioned 40 Current at which maximum arc duration occurs (critical current) Make time ms To be mentioned 41 Make time ms To be mentioned ms 42 Minimum time for arc extinction to Contract remark when adapted for auto re-closing ms To be mentioned 43 Time from closing of control switch to compleation of | 31 | Length of stroke | mm | To be mentioned |
| 33 Weight of circuit breaker complete with all fittings as in service. Kg To be mentioned 34 Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension) N To be mentioned 35 Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamber KN/m ² To be mentioned 36 Routine pressure test on circuit Breaker due to making or breaking of Rated current in outer chamber KN/m ² To be mentioned 37 Design pressure type test on circuit Breaker tanks or chamber KN/m ² To be mentioned 38 0 Opening time: without current at 100% of rated breaking current b) Sec. 0.05 (maximum) 39 Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standard At% M To be mentioned 40 Current at which maximum arc duration occurs (critical current) M To be mentioned M 41 Make time ms To be mentioned M To be mentioned 43 Time from closing of control switch to completion of closing stroke during fault making ms To be mentioned | 32 | č | Kg | To be mentioned |
| 34Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension)NTo be mentioned35Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamberKN/m²To be mentioned36Routine pressure test on circuit Breaker tanks or chamberKN/m²To be mentioned37Design pressure type test on circuit Breaker tanks or chamberKN/m²To be mentioned380pening time: without current at b) Breaking time c)sec. 0.05 (maximum)39Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standard (critical current)msTo be mentioned40Current at which maximum arc duration occurs (critical current)To be mentionedTo be mentioned41Make timemsTo be mentioned100%43Time from closing of control switch to makingmsTo be mentioned | 33 | Weight of circuit breaker complete with all | Kg | To be mentioned |
| 35Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamberKN/m²To be mentioned36Routine pressure test on circuit Breaker tanks or chamberKN/m²To be mentioned37Design pressure type test on circuit Breaker tanks or chamberKN/m²To be mentioned37Design pressure type test on circuit Breaker tanks or chamberKN/m²To be mentioned38a)Opening time: without current at 100% of rated breaking current b)sec. 0.05 (maximum)38a)Opening time: without current at 100% of rated breaking current b)msTo be mentioned39Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standard (critical current)msTo be mentioned40Current at which maximum arc duration occurs (critical current)ATo be mentioned41Make timemsTo be mentioned42Minimum time for arc extinction to Contract remark when adapted for auto re-closingmsTo be mentioned43Time from closing of control switch to completion of closing stroke during fault makingmsTo be mentioned | 34 | Maximum shock load imposed on floor or foundation when opening under fault | N | To be mentioned |
| 36 Routine pressure test on circuit Breaker tanks or chamber KN/m^2 To be mentioned 37 Design pressure type test on circuit Breaker tanks or chamber KN/m^2 To be mentioned 37 Design pressure type test on circuit Breaker tanks or chamber KN/m^2 To be mentioned 38 a)Opening time: without current at 100% of rated breaking current b) Breaking time c)Sec. 0.05 (maximum) 38 a)Opening time: without current at c)Loop (Closing time)Sec. 39 Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standard (critical current)To be mentioned 40 Current at which maximum arc duration occurs (critical current)ATo be mentioned 41 Make timemsTo be mentioned 42 Minimum time for arc extinction to Contract remark when adapted for auto re-closingmsTo be mentioned 43 Time from closing of control switch to completion of closing stroke during fault makingmsTo be mentioned | 35 | Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer | KN/m ² | To be mentioned |
| 37Design pressure type test on circuit Breaker tanks or chamberKN/m2To be mentionedOperating Particulars :Operating Particulars :To be mentioned3800% of rated breaking current b) Closing timeSec. 0.05 (maximum) 39Maximum arc duration of any duty Cycle as | 36 | Routine pressure test on circuit | KN/m ² | To be mentioned |
| Operating Particulars :a)Opening time: without current at 100% of rated breaking current b)sec. 0.05 (maximum) 38100% of rated breaking current b)Breaking time meCycle ms ≤ 5 To be mentioned39Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standard (critical current)At%40Current at which maximum arc duration occurs (critical current)ATo be mentioned41Make timemsTo be mentioned42Minimum time for arc extinction to Contract remark when adapted for auto re-closing attent of closing stroke during fault makingTo be mentioned | 37 | Design pressure type test on circuit | KN/m ² | To be mentioned |
| 38100% of rated breaking current b)Cycle Breaking time ≤ 5 To be mentioned39Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standardmsTo be mentioned40Current at which maximum arc duration occurs (critical current)ATo be mentioned41Make timemsTo be mentioned42Minimum time for arc extinction to Contract remark when adapted for auto re-closingmsTo be mentioned43Time from closing of control switch to completion of closing stroke during fault makingmsTo be mentioned | | | 1 | |
| c)Closing timemsTo be mentioned39Maximum arc duration of any duty Cycle as per latest revision of relevant IEC standardmsTo be mentioned40Current at which maximum arc duration occurs (critical current)ATo be mentioned41Make timemsTo be mentioned42Minimum time for arc extinction to Contract remark when adapted for auto re-closingmsTo be mentioned43Time from closing of control switch to completion of closing stroke during fault makingmsTo be mentioned | 38 | 100% of rated breaking current | | , , , , , , , , , , , , , , , , , , , |
| per latest revision of relevant IEC standardAt%40Current at which maximum arc duration occurs (critical current)ATo be mentioned41Make timemsTo be mentioned42Minimum time for arc extinction to Contract remark when adapted for auto re-closingmsTo be mentioned43Time from closing of control switch to completion of closing stroke during fault makingmsTo be mentioned | | c) Closing time | ms | To be mentioned |
| 40Current at which maximum arc duration occurs (critical current)ATo be mentioned41Make timemsTo be mentioned42Minimum time for arc extinction to Contract remark when adapted for auto re-closingmsTo be mentioned43Time from closing of control switch to completion of closing stroke during fault makingmsTo be mentioned | 39 | | | To be mentioned |
| 41 Make time ms To be mentioned 42 Minimum time for arc extinction to Contract remark when adapted for auto re-closing ms To be mentioned 43 Time from closing of control switch to completion of closing stroke during fault making ms To be mentioned | 40 | Current at which maximum arc duration occurs | | To be mentioned |
| remark when adapted for auto re-closing ms To be mentioned 43 Time from closing of control switch to completion of closing stroke during fault making To be mentioned | 41 | | ms | To be mentioned |
| 43 Time from closing of control switch to ms To be mentioned completion of closing stroke during fault making | 42 | | ms | To be mentioned |
| | 43 | Time from closing of control switch to completion of closing stroke during fault | ms | To be mentioned |
| Constructional Features : | Cons | tructional Features : | | |

| 44 | Is an external series break Incorporated in the breaker? | Yes/ No | To be mentioned |
|----|---------------------------------------------------------------|---------|---------------------|
| 45 | Is any device used to limit transient Recovery voltage? | Yes/ No | To be mentioned |
| 46 | Method of closing | - | To be mentioned |
| 47 | Method of tripping | - | To be mentioned |
| 48 | Number of close/ trip operation possible on one spring charge | Nos. | To be mentioned |
| 49 | Rated voltage of spring winding motor for closing | V.AC | 230 |
| 50 | Spring winding motor current | А | To be mentioned |
| 51 | Closing release coil current | А | To be mentioned |
| 52 | Closing release coil voltage | V.DC | 110 |
| 53 | Minimum clearance in air : | | |
| | a) Between phase | mm | 370 |
| | b) Phase to earth | mm | 325 |
| | c) Across circuit breaker poles | mm | To be mentioned |
| | d) Live conductor to ground level | mm | To be mentioned |
| | e) Live insulator to ground level | mm | To be mentioned |
| 54 | Material of tank or chamber | - | To be mentioned |
| 55 | Material of moving contract tension rod | - | To be mentioned |
| 56 | Period of time equipment has been in commercial operation | Year | To be mentioned |
| 57 | No .of tripping coil | Nos. | 2 |
| 58 | Circuit breaker terminal connectors | - | Copper |
| 59 | Creepage distance (min) | mm/KV | 25 |
| 60 | Method of indicating VCB ON/ OFF | Mech.& | To be mentioned |
| (1 | T'fe of intermedia | | To be more the late |
| 61 | Life of interrupter | Years | To be mentioned |

| 62 | Pressure in vacuum tube for VCB | Bar | To be mentioned |
|----|-----------------------------------------------------------------------------------------|------|------------------------------|
| 63 | Guaranteed nos. of operation for vacuum Interrupter : | | |
| | a) at rated Current switching (Supported by Test Report from independent laboratory) | Nos. | 10,000 |
| | b) at Short circuit current switching | Nos. | ≥ 50 |
| 64 | Rated operating sequence | - | O-0.3sec- CO-3m-CO |
| 65 | All current carrying parts of VCB Shall be made of | - | Copper |
| 66 | Standard | - | IEC-60056/ IEC- 62271-100 |
| 67 | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes |

Note: All exposed MS parts should be Hot Dip Galvanized

Seal & Signature of the Manufacturer

8.03 (b). Guaranteed Technical Particulars of 33 kV VCB (1600 Amps) for Shikolbaha & Chokoria bay Extension.

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be

| non-respons | ive.) |
|-------------|-------|

| S1. No. | Description | Unit | BPDB's Requirement | Manufacturer' s Guaranteed Particulars |
|------------|---------------------------------------------------------------------------------------------------------|----------|----------------------------|----------------------------------------------|
| 1 | a) Manufacturer's name & addressWith website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2 | Manufacturer's model no. | - | To be mentioned | |
| 3 | Maximum Rated Voltage | KV | 36 | |
| 4 | Frequency | Hz | 50 | |
| 5 | Rated Normal current | А | 1600A | |
| 6 | No. of phase | - | 3 | |
| 7 | No. of break per phrase | - | To be mentioned | |
| 8 | Interrupting medium | - | Vacuum | |
| 9 | Manufacturer's name and country of vacuum interrupter | - | To be mentioned | |
| 10 | Manufacturer's model no. of vacuum interrupter | - | To be mentioned | |
| 11 | Class of Circuit Breaker (Supported by Test Report from independent laboratory) | - | E2M2 or better | |
| 12 | Designation of Internal Arc Classification (Supported by Test Report from independent laboratory) | - | IAC AFLR 31.5 kA, 1 sec | |
| 13 | Impulse withstand on $1.2/50 \ \mu s$ wave | KV | 170 | |
| 14 | Power Frequency Test Voltage (Dry), at 50Hz, 1 min. | KV | 70 | |
| 15 | Short time withstand current, 3 second, rms | KA | 31.5 | |
| 16 | Breaking capacity: a) Symmetrical, rms b) Asymmetrical, rms | KA KA | 31.5 As per IEC | |
| 17 | Short circuit making current, peak | KA | 80 | |
| 18 | First phase to clear factor | - | To be mentioned | |
| 19 | Rated transient recovery voltage at 100% rated short circuit breaking current | KVp | To be mentioned | |
| 20 | Rated line charging breaking current | А | To be mentioned | |
| 21 | Rated cable charging breaking current | А | To be mentioned | |
| 22 | Rated out of phase breaking current | А | To be mentioned | |

| 23 | Is circuit breaking restrike free? | Yes/No | Yes |
|----|----------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------|
| 24 | Trip coil current | А | To be mentioned |
| 25 | Trip coil voltage | V, DC | 110 |
| 26 | Is the circuit breaker trip free? | Yes/No | Yes |
| 27 | Type of arc contacts or arc control Device | - | To be mentioned |
| 28 | Main Contact :a)Type of contactb)Material of contract surfacesc)Contract resistance | - - μΩ | To be mentioned To be mentioned Less than 40 |
| 29 | Does magnetic effect of load Currents increase contact pressure? | Yes/ No | To be mentioned |
| 30 | Length of each break/ phase | mm | To be mentioned |
| 31 | Length of stroke | mm | To be mentioned |
| 32 | Weight of circuit breaker unit complete, without operating mechanism and structure | Kg | To be mentioned |
| 33 | Weight of circuit breaker complete with all fittings as in service. | Kg | To be mentioned |
| 34 | Maximum shock load imposed on floor or foundation when opening under fault conditions (state compression or tension) | N | To be mentioned |
| 35 | Maximum pressure rise in circuit Breaker due to making or breaking of Rated current in outer chamber | KN/m ² | To be mentioned |
| 36 | Routine pressure test on circuit Breaker tanks or chamber | KN/m ² | To be mentioned |
| 37 | Design pressure type test on circuit Breaker tanks or chamber | KN/m ² | To be mentioned |
| | Operating Particulars : | | |
| 38 | a) Opening time: without current at 100% of rated breaking current b) Breaking time | sec. Cycle | 0.05 (maximum) ≤5 |
| 39 | c)Closing timeMaximum arc duration of any duty Cycleasper latest revision of relevant IEC standard | ms ms At% | To be mentioned To be mentioned |
| 40 | Current at which maximum arc duration occurs (critical current) | At70 A | To be mentioned |
| 41 | Make time | ms | To be mentioned |
| 42 | Minimum time for arc extinction to Contract remark when adapted for auto re-closing | ms | To be mentioned |
| 43 | Time from closing of control switch to completion of closing stroke during fault making | ms | To be mentioned |

| Con | structional Features : | | | |
|-----|---------------------------------------------------------------|---------|-----------------|--|
| 44 | Is an external series break Incorporated in the breaker? | Yes/ No | To be mentioned | |
| 45 | Is any device used to limit transient Recovery voltage? | Yes/ No | To be mentioned | |
| 46 | Method of closing | - | To be mentioned | |
| 47 | Method of tripping | - | To be mentioned | |
| 48 | Number of close/ trip operation possible on one spring charge | Nos. | To be mentioned | |
| 49 | Rated voltage of spring winding motor for closing | V.AC | 230 | |
| 50 | Spring winding motor current | А | To be mentioned | |
| 51 | Closing release coil current | A | To be mentioned | |
| 52 | Closing release coil voltage | V.DC | 110 | |
| 53 | Minimum clearance in air : | | | |
| | a) Between phase | mm | 370 | |
| | b) Phase to earth | mm | 325 | |
| | c) Across circuit breaker poles | mm | To be mentioned | |
| | d) Live conductor to ground level | mm | To be mentioned | |
| | e) Live insulator to ground level | mm | To be mentioned | |
| 54 | Material of tank or chamber | - | To be mentioned | |
| 55 | Material of moving contract tension rod | - | To be mentioned | |
| 56 | Period of time equipment has been in commercial operation | Year | To be mentioned | |
| 57 | No .of tripping coil | Nos. | 2 | |
| 58 | Circuit breaker terminal connectors | - | Copper | |
| 59 | Creepage distance (min) | mm/KV | 25 | |
| 60 | Method of indicating VCB ON/ OFF | Mech.& | To be mentioned | |
| | | Elect. | | |

| 61 | Life of interrupter | Years | To be mentioned |
|----|-----------------------------------------------------------------------------------------|-------|------------------------------|
| 62 | Pressure in vacuum tube for VCB | Bar | To be mentioned |
| 63 | Guaranteed nos. of operation for vacuum Interrupter : | | |
| | a) at rated Current switching (Supported by Test Report from independent laboratory) | Nos. | 10,000 |
| | b) at Short circuit current switching | Nos. | ≥ 50 |
| 64 | Rated operating sequence | - | O-0.3sec- CO-3m-CO |
| 65 | All current carrying parts of VCB Shall be made of | - | Copper |
| 66 | Standard | - | IEC-60056/ IEC- 62271-100 |
| 67 | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes |

Note: All exposed MS parts should be Hot Dip Galvanized

Seal & Signature of the Manufacturer

8.04. Guaranteed Technical Particulars for 33 KV Protection Control and Metering Panel

| Sl | Description | Unit | BPDB's | Bidders |
|--------------------|--------------------------------------------------------------------------------------------|--------------------|-----------------------------|---------------------|
| No | | | Requirement | Guaranteed value |
| 1. | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2. | Manufacturer's Model no. | - | To be mentioned | |
| 3. | System nominal voltage | kV | 33 | |
| 4. | Maximum System Voltage | kV | 36 | |
| 5. | Rated Frequency | Hz | 50 | |
| A. Pi 6. | rotection Control & Metering (Transf Differential Relay | cormer Fee | der) Not Applicable | |
| | Manufacturer's Name | - | ABB- (Sweden/ | |
| | | | Switzerland/ Finland)/ | |
| | | | Siemens-(Germany)/ | |
| | | | Alstom-(France/UK)/ | |
| | | | Schneider-(France/UK)/ | |
| | | | NR, China/ | |
| | | | SEL, USA | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Relay | - | Numerical programmable | |
| | Maximum through fault at which t recommend settings: | he protecti | ve equipment is stable with | |
| | a) Earth faults | rating % | Shall be mentioned | |
| | b) Phase faults | of CT rating | Shall be mentioned | |
| | Maximum time delay between initiation of fault and energize of breaker trip circuit. | ms | Shall be mentioned | |
| | The Relay shall be IEC 61850 protocol type. | - | Yes | |
| 7. | Restricted Earth Fault Relay (in | built func | tion of differential relay) | |
| | Manufacture's Name & | - | ABB- (Sweden/ | |
| | Country of Origin | | Switzerland/Finland)/ | |
| | | | Siemens-(Germany)/ | |
| | | | Alstom-(France/UK)/ | |
| | | | Schneider-(France/UK)/ | |
| | | | NR - China/ | |
| | | | SEL- USA | |

| | Manufacture's Model no. | _ | Shall be mentioned | |
|----|--------------------------------------------------------------------------|----------------------------------|------------------------------------|---|
| | | - | Numerical programmable | |
| | Type of Relay | - | Shall be mentioned | |
| | Range of current setting:a) Phase element | - % of CT | Shall be mentioned | |
| | b) Earth fault element | rating | Shall be mentioned | |
| | Earth fault element Range of timing | Sec | Shall be mentioned | |
| | settings at 10 time CT rating | Sec | Shan be mentioned | |
| | Burden of relay at 10 time CT rating | VA | Shall be mentioned | |
| | Percentage of current setting at | % | Shall be mentioned | |
| | which relay will reset. | | | |
| | The Relay shall be IEC 61850 | - | Yes | |
| | protocol type. | | | |
| 8 | Over Current & Earth Fault Protec | tion Relay | | |
| | Manufacture's Name | - | ABB- (Sweden/Switzerland/ | |
| | Country of Origin | | Finland)/ Siemens(Germany)/ | |
| | | | Alstom-(France/UK)/ | |
| | | | Schneider-(France/UK) / | |
| | | | NR, China/ | |
| | | | SEL, USA | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of relay | - | Numerical programmable | |
| | | | Multifunction | |
| | The Relay shall be IEC 61850 | - | Yes | |
| | protocol type. | | | |
| | Range of current setting : | | | |
| | a) Phase element | % of CT | Shall be mentioned | |
| | b) Earth fault element | rating | Shall be mentioned | |
| | Range of timing settings at 10 time CT rating | Sec | Shall be mentioned | |
| | Burden of relay at 10 time CT rating | VA | Shall be mentioned | |
| | Percentage of current at which relay will reset | % | Shall be mentioned | |
| | Reset time after removal of 10 times CT rated current | Sec | Shall be mentioned | |
| 9 | Separate Auxiliary Flag Relays for 7 WTA, WTT, BA, BT, OLTC Surge, PR | | | |
| | Manufacture's Name | [| Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no | - | Shall be mentioned | |
| | Type of Relays | - | Shall be mentioned | |
| 10 | Trip Circuit Supervision (TCS) Relay (| Separate Re | lay for each trip coil) | |
| | Manufacture's Name | - | Shall be mentioned | |
| | Country of Origin | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Manufacture 5 Model no. | 1 | | l |
| | | - | Shall be mentioned | |
| 11 | Type of Relay | - ferential aı | | |
| 11 | Type of RelayTrip Relay (Separate Relay) for Diff | - ferential aı - | | |
| 11 | Type of RelayTrip Relay (Separate Relay) for DiffManufacture's Name | - ferential aı - - | nd O/C & E/F Shall be mentioned | |
| 11 | Type of RelayTrip Relay (Separate Relay) for Diff | - ferential aı - - - | nd O/C & E/F | |

| | Self-reset type for O/C, E/F protection | _ | Yes | |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | Hand & Electrical reset type for | | Yes | |
| | Differential, REF and Transformer Self- | - | 105 | |
| | protection | | | |
| | Operating coil voltage 110V DC | - | Yes | |
| 12 | Annunciator | | | |
| | | | | |
| | Manufacture's Name | - | Shall be mentioned Shall be mentioned | |
| | Country of Origin | - | | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Windows | nos. | 30 or More. | |
| | Built in buzzer and buttons for accept, mute, test, reset, etc. | - | Yes | |
| | AC/DC Dual Supply Provision | - | Yes | |
| 13 | Control Switch | | | |
| | Manufacture's Name& Country | - | Shall be mentioned | |
| | Manufacture's Model/Type No. | - | Shall be mentioned | |
| | Separate TNC/Discrepancy switch | - | Yes | |
| | and Local Remote (L/R) selector | | | |
| | switch | | | |
| D. F f | otection Control & Metering (Line Fee | | | |
| В. РГ 15 | Over Current & Earth Fault Protection | Relay with | | |
| | Over Current & Earth Fault Protection Manufacture's Name | Relay with | ABB-(Sweden/Switzerland/ | |
| | | Relay with | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ | |
| | Manufacture's Name | Relay with | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ | |
| | Manufacture's Name | Relay with | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ | |
| | Manufacture's Name | Relay with | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ | |
| | Manufacture's Name | Relay with | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA | |
| | Manufacture's Name Country of Origin Manufacture's Model no. | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned | |
| | Manufacture's Name Country of Origin | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA | |
| | Manufacture's Name Country of Origin Manufacture's Model no. | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, | |
| | Manufacture's Name Country of Origin Manufacture's Model no. | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F | |
| | Manufacture's Name Country of Origin Manufacture's Model no. | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, | |
| | Manufacture's Name Country of Origin Manufacture's Model no. | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated | - - - Yes/No | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. Yes | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated The relay shall have IEC 61850 | - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated The relay shall have IEC 61850 communication Protocol. | - - - Yes/No | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. Yes | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated The relay shall have IEC 61850 communication Protocol. Range of current setting : | - - Yes/No - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. Yes | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated The relay shall have IEC 61850 communication Protocol. Range of current setting : a) Phase element | - - - - Yes/No - % of CT | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. Yes Shall be mentioned | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated The relay shall have IEC 61850 communication Protocol. Range of current setting : a) Phase element b) Earth fault element | - - Yes/No - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. Yes Yes Shall be mentioned Shall be mentioned | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated The relay shall have IEC 61850 communication Protocol. Range of current setting : a) Phase element | - - - - Yes/No - % of CT | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. Yes Shall be mentioned | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated The relay shall have IEC 61850 communication Protocol. Range of current setting : a) Phase element b) Earth fault element | - - - - Yes/No - % of CT | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. Yes Yes Shall be mentioned Shall be mentioned | |
| | Manufacture's Name Country of Origin Manufacture's Model no. Type of relay Directional Feature can be activated/de-activated The relay shall have IEC 61850 communication Protocol. Range of current setting : a) Phase element b) Earth fault element Relay Nominal operating voltage | - - Yes/No - % of CT rating - | ABB-(Sweden/Switzerland/ Finland)/Siemens-(Germany)/ Alstom-(France/UK)/ Schneider-(France/UK)/ NR, China/ SEL, USA Shall be mentioned Numerical, programmable, multifunction with both directional and non- directional O/C & E/F protection (IDMT, DMT, Inst.) feature and monitoring functions. Yes Yes Shall be mentioned Shall be mentioned 110Vdc | |

| [| No of Binary Output (Minimum) | _ | 24 for line Feeder, 24 for |
|----|----------------------------------------------|------------|---------------------------------------|
| | To or Binary Output (Minimum) | | Bus Coupler |
| | No of Communication Ports | | Shall be mentioned with |
| | | - | |
| | xix) Electrical | | type. |
| | xx) Optical Protection Function | | Directional and Non- |
| | Protection Function | - | |
| | | | Directional O/C, E/F, Over/ |
| | | | Under Voltage, Over and |
| | | | Under Frequency, Sync |
| | | | Check |
| | | | And Other Necessary |
| | | | Functions. |
| | Maximum time delay between | - | Shall be mentioned |
| | initiation of fault and energize of | | |
| | breaker trip circuit. | | |
| | Relay Configuration Software | - | Shall be mentioned |
| | (Name, Manufacturer, Version, | | |
| | License Requirement (with name and | | |
| | version)) | | |
| | Maximum time delay between | | Shall be mentioned |
| | initiation of fault and energize of | - | Shan be mentioned |
| | _ | | |
| | breaker trip circuit. | | |
| | Drop off to Pick up ratio | - | Shall be mentioned |
| | Reset time after removal of fault | - | Shall be mentioned |
| | current | | |
| | Range of timing settings | Sec | Shall be mentioned |
| | Burden of relay at 20 time CT rating | VA | Shall be mentioned |
| | Percentage of Current setting at | % | Shall be mentioned |
| | which relay will reset | | |
| | Reset time after removal of 10 time | | Shall be mentioned |
| | CT rated current for: | | |
| | a) Phase element (100%) | Sec | |
| 10 | b) E/F element (40%) | Sec | |
| 16 | Trip Circuit Supervision (TCS) Relay (S | eparate Re | |
| | Manufacture's Name | - | Shall be mentioned Shall be mentioned |
| | Country of Origin Manufacture's Model no. | - | Shall be mentioned |
| | Type of Relay | - | Shall be mentioned |
| 17 | Trip Relay (Separate Relay) | _ | Shun oe mentioned |
| | Manufacture's Name | - | Shall be mentioned |
| | Country of Origin | - | Shall be mentioned |
| | Manufacture's Model no. | - | Shall be mentioned |
| | Operating Time | ms | <10 |
| | Self-reset type for O/C, E/F protection | - | Yes |
| | Operating coil voltage 110V DC | - | Yes |
| 18 | Annunciator | | |
| | Manufacture's Name& Country | - | Shall be mentioned |

| | Manufacture's Model no. | _ | Shall be mentioned | |
|------|-------------------------------------|---------|----------------------------|--|
| - | Windows | nos. | 14 | |
| | Built in buzzer and buttons for | | Yes | |
| | accept, mute, test, reset, etc. | - | | |
| | AC/DC Dual Supply Provision | - | Yes | |
| 19 | Control Switch | | | |
| | Manufacture's Name& Country | - | Shall be mentioned | |
| | Manufacture's Model/Type No. | - | Shall be mentioned | |
| | Separate TNC/Discrepancy switch and | | Yes | |
| | Local Remote (L/R) selector switch | - | | |
| 20 | Metering and Instrumentation | | | |
| 20.1 | Energy Meter (Multi Tariff Progra | ammable | | |
| | Meter) | | | |
| | Manufacture's Name | - | Shall be mentioned | |
| | | | European Country/ | |
| | | | North American Country/ | |
| | Manufacture's Country | | Japan/ Australia | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Meter | | Numerical programmable | |
| | | - | Multifunction | |
| | Class of Accuracy | - | 0.28 | |
| 20.2 | Volt Meters with Selector Switch | | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | | | Analogue, 90 degree scale | |
| | Type of Meter | - | range | |
| | Class of Accuracy | - | 1.0 | |
| 20.3 | AMPERE METERS | | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of Meter | - | Analogue, 240 degree scale | |
| | • | | range | |
| | Class of Accuracy | - | 1.0 | |
| | Separate A-meter for each phase | - | Yes | |
| 21 | Marking | - | "BPDB & Contract No." | |
| 22 | Manufacturer must comply all the | - | Yes | |
| | features of Technical Specification | | | |
| | (Section 7) | | | |

Seal & Signature of the Manufacturer

8.05 Guaranteed technical particulars of 110v 3x5(6)A, 3-phase, 4-wire, 3-element, solid state indoor type multi tariff programmable meter

| Sl. No. | Descr | iption | Unit | Required Specification | Manufacture's particulars |
|------------|----------------|-------------------------------------------------------------|----------------|---------------------------------------------------|---------------------------|
| 1 | Refer | ence Standard | - | Relevant ANSI / IEC Standard | |
| 2 | addre | nufacturer's name & ss With website, al domain email. | - | To be mentioned | |
| | b) Ye | ar of Manufacturing | Yr. | Not before 2023 | |
| 3 | Manu mode | facturer's type & l | - | Shall be mentioned | |
| 4 | Const | ruction/connection | - | 3-Phase 4-wire solidly grounded neutral | |
| 5 | Instal | lation | - | Indoor installation in A socket [for socket type] | |
| 6 | Numb | per of element | - | 3 (Three) | |
| 7 | Rated | Voltage | Volt | 110V | |
| 8 | Minin | num Biasing Voltage | Volt | 40V | |
| 9 | Varia | tion of Frequency | % | ± 2% | |
| 10 | Varia | tion of Voltage | % | + 10, -20% | |
| 11 | Accur | acy class | | Accuracy class: 0.2s (point two S) | |
| | Rated | Current | | | |
| | i) | Nominal Current | А | = 5 | |
| 12 | ii) | Maximum Current | А | ≥ 6 | |
| 13 | Resist | ter Type | | LCD Display | |
| 14 | | ber of Digits (Integer Decimal) | Nos. | 8 with 3 (Programmable) | |
| 15 | Startin | ng Current | ma | 0.1% of Nominal Current | |
| 16 | Losse | s at Nominal Load | Watt | Shall be mentioned | |
| 17 | Meter | Constant | Imp./ | Shall be mentioned | |
| | Integr | ation Period | - | 30 (Thirty) Minutes | |
| 18 | | ting Period | - | 1 (one) month | |
| 10 | Cumu | lative MD transfer | - | Built in | |
| | Cycle | Timing Device | - | Built in | |
| 19 | Size Displa | of the Digit of ay | E x H in mm | 4 x 8 | |
| 20 | No. of | f Terminal | Nos. | 10 (Ten) min | |

| 21 | Type of socket and country of origin | - | To be mentioned | |
|----|----------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------|--|
| 22 | Battery Service life and shelf Life (minimum) | Year | 10 (ten) & 15 (fifteen) | |
| 23 | Year of manufacture | | Shall be mentioned | |
| 24 | List of Recommended spare parts (if any) | any | Shall be mentioned | |
| 25 | Warranty | Year | 3 (three) | |
| 26 | Meter Service Life (Min) | Year | 15 (fifteen) | |
| 27 | Weight of meter | Kg | Shall be mentioned | |
| 28 | Dimensions | mm x mm x mm | | |
| 29 | Outlines, Drawings & Leaflets | | Shall be mentioned | |
| 30 | Performance Curve for Balanced & Unbalanced load | | Shall be mentioned | |
| 31 | Meter sealing condition | | Hermetically or Ultrasonic welded | |
| 32 | a) Country of Originb) Place of Manufacture c)Place of Testing | | Shall be mentioned | |
| 33 | Memory Storage | | | |
| | i) Equipment | | | |
| | Identification Code | | | |
| | ii) Security code | | _ | |
| | iii) Access code | | | |
| | iv) Number of Power Interruption with Date & Time | | Shall be mentioned by putting Yes/ No. | |
| | V Latest Power | | _ | |
| | Failure- Time & | | | |
| | Date | | | |
| | Vi Event logs | | | |
| | vii) Cumulative kWh, | | | |
| | kVarh $(Q_1 + Q_4)$ | | | |
| | Reading for | | | |
| | previous two | | | |
| | months | | | |
| 1 | viii) Load profile with 30 | | | |
| 1 | min interval at least 90 days for: | | | |
| 1 | KWh, kVarh | | | |
| 1 | (Q_1+Q_4) | | | |
| | Phase Voltage or | 1 | | |
| | Vh | | | |
| | Phase Amps or Ah | | | |

Metering and Indication

| 34. | KWh Meter | | |
|------|--------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------|
| 34.1 | Manufacture's Country | - | European Country/ North American Country/Japan/ Australia |
| 34.2 | Manufacture's Model no. | - | To be mentioned |
| 34.3 | Type of meter | - | Numerical programmable multifunction |
| 34.4 | Class of accuracy | - | 0.2S |
| 35 | Indication Volt Meters | | |
| 35.1 | Manufacturer's Name and Country | - | To be mentioned |
| 35.2 | Manufacture's Model no. | - | To be mentioned |
| 35.3 | Type of meter | - | Analogue |
| 35.4 | Class of Accuracy | - | To be mentioned |
| 36 | Indication Ampere Meter | S | |
| 36.1 | Manufacturer's Name and Country | - | To be mentioned |
| 36.2 | Manufacture's Model no. | - | To be mentioned |
| 36.3 | Type of meter | - | Analogue, 240° Scale Range |
| 36.4 | Class of Accuracy | - | To be mentioned |
| 36.5 | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes |

Seal & Signature of the Manufacturer

8.06 (a).Guaranteed Technical Particulars of 33kV Off-Load Isolator with Earth Blade (To be filled up by the Manufacturer in Manufacturer's Letterhead Pad with appropriate data, Otherwise bid shall be rejected. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| SI. No. | Description | Unit | BPDB's Requirement | Manufacturer' s Guaranteed Particulars |
|------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------|----------------------------------------------|
| | General Description of Dis | sconnecting | 0 | |
| 1. | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2. | Manufacturer's Model | - | To be mentioned | |
| 3. | Frequency | Hz | 50 | |
| 4. | System Nominal Voltage | kV | 33 | |
| 5. | System Maximum Voltage | kV | 36 | |
| 6. | Basic Insulation Level | kV | 170 | |
| 7. | Rated Normal Current | А | 2500 | |
| 8. | Power Frequency Withstand Voltage (for 1 min) | kV | 70 | |
| 9. | Rated short time withstands current (for 3sec.) | kA | 31.5 | |
| 10. | Installation | - | Outdoor | |
| 11. | Туре | - | Single Vertical Break | |
| 12. | Construction | - | Open | |
| 13. | Mounting Position | - | Vertical | |
| 14. | Number of Pole | nos. | 3 (Three) | |
| 15. | No. of break per pole | nos. | One | |
| 16. | Air gap between pole of phase | mm | 1000 | |
| 17. | Insulator Material | - | Porcelain | |
| 18. | Creepage distance of Insulator | mm/KV | 25 | |
| 19. | Current density at the minimum cross Section of a) Moving Blade b) Terminal Pad c) Contacts d) Terminal Connector | Amps/ Sq.mm | To be mentioned | |
| 20. | Maximum Temp. rise of current carrying parts when carrying rated current continuously (deg. C) | | To be mentioned | |
| Conta | cts: | | | |
| 21. | Materials of the current carrying path | | Copper with Nickel Plating | |
| 22. | Contract Resistance for DS & ES | μΩ | Less than 50 | |
| 23. | Contact Area: | | | |
| 23.1 | Moving Blade for DS | mm ² | 10x60 mm copper flat bar, length 750±20 mm -02 | |

| | | | Nos per phase | |
|------|-------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------|--|
| 23.2 | Moving Blade for ES | mm ² | 10x60 mm copper flat bar, length 500±15 mm -02 Nos per phase | |
| 23.3 | Terminal Pad | mm ² | 12x100 mm Copper flat bar -02 Nos per phase | |
| 24. | Contact type | | Spring loaded contact | |
| 25. | Operation | - | Gang | |
| 26. | Type of main DS operating mechanism | - | Manual | |
| 27. | Number of main DS operating mechanism per set | Nos | 1 | |
| 28. | Type of Earth Switch operating mechanism | - | Manual | |
| 29. | Number of Earth Switch operating mechanism per set | Nos | 1 | |
| 30. | Nos. of Auxiliary Contracts (NO/NC) For Isolator& Earth Switch | - | Isolator- 4NO-4NC Earth switch – 4NO-4NC | |
| 31. | Locking facility in the operating box in both close and open position | - | Yes | |
| 32. | Mechanical Interlocking facility between main DS and ES | - | Yes | |
| 33. | Operating GI Pipe Dimensions: | - | | |
| 33.1 | For main DS | - | OD- 44 mm, ID – 36 mm, Length – 6 meter | |
| 33.2 | For Earth Switch | - | OD- 44 mm, ID – 36 mm, Length – 6 meter | |
| 34. | MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) | - | | |
| 34.1 | For main DS | - | To be mentioned | |
| 34.2 | For Earth Switch | - | To be mentioned | |
| 35. | Total weight of Isolator | Kg | To be mentioned | |
| 36. | Total weight of earth switch | Kg | To be mentioned | |
| 37. | Total weight of Unit | Kg | To be mentioned | |
| 38. | Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure Arrangement | - | To be submitted | |
| 39. | Manufacturer's Printed Catalogue describing Specification & Technical Data of Offered type Equipment. | - | To be mentioned | |
| 40. | Standard | | IEC-62271-102 | |
| 41. | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes | |

Note: All exposed MS parts should be Hot Dip Galvanized Seal & Signature of the Manufacturer

8.06 (b).Guaranteed Technical Particulars of 33kV Off-Load Isolator with Earth Blade (To be filled up by the Manufacturer in Manufacturer's Letterhead Pad with appropriate data, Otherwise bid shall be rejected. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| SI. No. | Description | Unit | BPDB's Requirement | Manufacturer' s Guaranteed Particulars |
|------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------|----------------------------------------------|
| | General Description of Dis | sconnecting | | |
| 1. | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2. | Manufacturer's Model | - | To be mentioned | |
| 3. | Frequency | Hz | 50 | |
| 4. | System Nominal Voltage | kV | 33 | |
| 5. | System Maximum Voltage | kV | 36 | |
| 6. | Basic Insulation Level | kV | 170 | |
| 7. | Rated Normal Current | А | 1600 | |
| 8. | Power Frequency Withstand Voltage (for 1 min) | kV | 70 | |
| 9. | Rated short time withstand current (for 3sec.) | kA | 31.5 | |
| 10. | Installation | - | Outdoor | |
| 11. | Туре | - | Single Vertical Break | |
| 12. | Construction | - | Open | |
| 13. | Mounting Position | - | Vertical | |
| 14. | Number of Pole | nos. | 3 (Three) | |
| 15. | No. of break per pole | nos. | One | |
| 16. | Air gap between pole of phase | mm | 1000 | |
| 17. | Insulator Material | - | Porcelain | |
| 18. | Creepage distance of Insulator | mm/KV | 25 | |
| 19. | Current density at the minimum cross Section of a) Moving Blade b) Terminal Pad c) Contacts d) Terminal Connector | Amps/ Sq.mm | To be mentioned | |
| 20. | Maximum Temp. rise of current carrying parts when carrying rated current continuously (deg. C) | | To be mentioned | |
| Conta | cts: | | | |
| 21. | Materials of the current carrying path | | Copper with Nickel Plating | |
| 22. | Contract Resistance for DS & ES | μΩ | Less than 50 | |
| 23. | Contact Area: | | | |
| 23.1 | Moving Blade for DS | mm ² | 6x70 mm copper flat bar, length 750±20 mm -02 | |

| | | | Nos per phase | |
|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | | mm ² | | |
| 23.2 | | IIIII | 6x70 mm copper flat bar, length | |
| | Moving Blade for ES | | 500±15 mm -02 | |
| | | | Nos per phase | |
| | | mm^2 | 12x60 mm Copper | |
| 23.3 | Terminal Pad | | flat bar -02 Nos per phase | |
| | Contact type | | Spring loaded | |
| 24. | | | contact | |
| 25. | Operation | - | Gang | |
| 26. | Type of main DS operating mechanism | - | Manual | |
| 27. | Number of main DS operating mechanism per set | Nos | 1 | |
| 28. | Type of Earth Switch operating mechanism | - | Manual | |
| 29. | Number of Earth Switch operating mechanism per set | Nos | 1 | |
| 30. | Nos. of Auxiliary Contracts (NO/NC) | | Isolator- 4NO-4NC | |
| | For Isolator& Earth Switch | - | Earth switch – | |
| | | | 4NO-4NC | |
| 31. | Locking facility in the operating box in both close and | _ | Yes | |
| | open position | | | |
| 32. | Mechanical Interlocking facility between main DS and ES | - | Yes | |
| | | | | |
| 33. | Operating GI Pipe Dimensions: | - | | |
| | | - | OD- 42 mm, ID – | |
| 33. 33.1 | Operating GI Pipe Dimensions: For main DS | - | OD- 42 mm, ID – 36 mm, Length – 6 | |
| 33.1 | For main DS | - | 36 mm, Length – 6 meter | |
| | | - | 36 mm, Length – 6 meter OD- 42 mm, ID – | |
| 33.1 | For main DS | - | 36 mm, Length – 6 meter | |
| 33.1 | For main DS | - | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 | |
| 33.1 | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) | - | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 | |
| 33.1 | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang | - | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 | |
| 33.1 33.2 34. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) | | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter | |
| 33.1 33.2 34. 34.1 | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS | - - - - - Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch | | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 35. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch Total weight of Isolator | - - - - Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 35. 36. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch Total weight of Isolator Total weight of earth switch Total weight of Unit Outline Dimensional & Cross-section Drawings of | - - - Kg Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned To be mentioned To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 35. 36. 37. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch Total weight of Isolator Total weight of earth switch Total weight of Unit Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure | - - - Kg Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned To be mentioned To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 35. 36. 37. 38. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch Total weight of Isolator Total weight of earth switch Total weight of Unit Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure Arrangement | - - - Kg Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned To be mentioned To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 35. 36. 37. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch Total weight of Isolator Total weight of earth switch Total weight of Unit Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure | - - - Kg Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned To be mentioned To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 35. 36. 37. 38. 39. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch Total weight of Isolator Total weight of earth switch Total weight of Unit Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure Arrangement Manufacturer's Printed Catalogue describing Specification & Technical Data of Offered type Equipment. | - - - Kg Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 35. 36. 37. 38. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch Total weight of Isolator Total weight of earth switch Total weight of Unit Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure Arrangement Manufacturer's Printed Catalogue describing Specification & Technical Data of Offered type | - - - Kg Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned To be mentioned To be mentioned To be mentioned | |
| 33.1 33.2 34. 34.1 34.2 35. 36. 37. 38. 39. | For main DS For Earth Switch MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) For main DS For Earth Switch Total weight of Isolator Total weight of earth switch Total weight of Unit Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure Arrangement Manufacturer's Printed Catalogue describing Specification & Technical Data of Offered type Equipment. | - - - Kg Kg | 36 mm, Length – 6 meter OD- 42 mm, ID – 36 mm, Length – 6 meter To be mentioned To be mentioned | |

Note: All exposed MS parts should be Hot Dip Galvanized Seal & Signature of the Manufacturer

8.07 (a).Guaranteed Technical Particulars of 33 kV Off-Load Isolator without Earth Blade

| | non-respo | insive.) | | Manufacturer' s |
|-----|------------------------------------------------|--------------|--------------------------|-----------------|
| SI. | | | BPDB's | Guaranteed |
| No. | Description | Unit | Requirement | Particulars |
| | General Description of D | Disconnectir | ng Switch | |
| 1. | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2. | Manufacturer's Model | - | To be mentioned | |
| 3. | Frequency | Hz | 50 | |
| 4. | System Nominal Voltage | kV | 33 | |
| 5. | System Maximum Voltage | kV | 36 | |
| 6. | Basic Insulation Level | kV | 170 | |
| 7. | Rated Normal Current | А | 2500 | |
| 8. | Power Frequency Withstand Voltage (for 1 min) | kV | 70 | |
| 9. | Rated short time withstand current (for 3sec.) | kA | 31.5 | |
| 10. | Installation | - | Outdoor | |
| 11. | Туре | - | Single Vertical Break | |
| 12. | a) Construction | - | Open | |
| | b) Mechanical Endurance Class | - | M1 (Minimum) | |
| 13. | Mounting Position | - | Vertical | |
| 14. | Number of Pole | nos. | 3 (Three) | |
| 15. | No. of break per pole | nos. | One | |
| 16. | Air gap between pole of phase | mm | 1000 | |
| 17. | Insulator Material | - | Porcelain | |

| 18. | Creepage distance of Insulator | mm | To be mentioned | |
|-------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------|--|
| 19. | Current density at the minimum cross Section of a) Moving Blade b) Terminal Pad c) Contacts d) Terminal Connector | Amps/ Sq.mm | To be mentioned | |
| 20. | Maximum Temp. rise of current carrying parts when carrying rated current continuously (deg. C) | | To be mentioned | |
| Conta | cts: | I | | |
| 21. | Materials of the current carrying path | | Copper with Nickel Plating | |
| 22. | Contract Resistance | μΩ | Less than 50 $\mu\Omega$ | |
| 23. | | 1 | | |
| 23.1 | Moving Blade | mm ² | 10x60 mm copper flat bar, length 750±20 mm -02 Nos per phase | |
| 23.2 | Terminal Pad | mm ² | 12x100 mm Copper flat bar -02 Nos per phase | |
| 24. | Contact type | | Spring loaded contact | |
| 25. | Operation | - | Gang | |
| 26. | Type of main DS operating mechanism | - | Manual | |
| 27. | Number of main DS operating mechanism per set | Nos | 1 | |
| 28. | Nos. of Auxiliary Contracts (NO/NC) For Isolator | - | Isolator- 4NO-4NC | |
| 29. | Locking facility in the operating box in both and open position | _ | Yes | |
| 30. | Operating GI Pipe Dimensions : | - | | |
| | For main DS | - | OD- 44 mm, ID – 36 mm, Length – 6 meter | |

| 31. | MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized): | - | | |
|-----|-------------------------------------------------------------------------------------------------------------------|----|-----------------|--|
| | For main DS | - | To be mentioned | |
| 32. | Total weight of Isolator | Kg | To be mentioned | |
| 33. | Total weight of Unit | Kg | To be mentioned | |
| 34. | Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure Arrangement | - | To be submitted | |
| 35. | Manufacturer's Printed Catalogue describing Specification & Technical Data of Offered type Equipment. | - | To be mentioned | |
| 36. | Standard | | IEC-62271-102 | |
| 37. | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes | |

Note: All exposed MS parts should be Hot Dip Galvanized

| Seal & Signature of the Manufacturer | Seal & Signature of the Bidder |
|--------------------------------------|--------------------------------|
| | |

8.07 (b).Guaranteed Technical Particulars of 33 kV Off-Load Isolator without Earth Blade

| SI. No. | Description | Unit | BPDB's Requirement | Manufacturer' s Guaranteed Particulars |
|------------|------------------------------------------------|-------------|--------------------------|----------------------------------------------|
| | General Description of D | isconnectin | - | |
| | _ | | _ | I |
| 1. | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2. | Manufacturer's Model | - | To be mentioned | |
| 3. | Frequency | Hz | 50 | |
| 4. | System Nominal Voltage | kV | 33 | |
| 5. | System Maximum Voltage | kV | 36 | |
| 6. | Basic Insulation Level | kV | 170 | |
| 7. | Rated Normal Current | А | 1600 | |
| 8. | Power Frequency Withstand Voltage (for 1 min) | kV | 70 | |
| 9. | Rated short time withstand current (for 3sec.) | kA | 31.5 | |
| 10. | Installation | - | Outdoor | |
| 11. | Туре | - | Single Vertical Break | |
| 12. | a) Construction | - | Open | |
| | b) Mechanical Endurance Class | - | M1 (Minimum) | |
| 13. | Mounting Position | - | Vertical | |
| 14. | Number of Pole | nos. | 3 (Three) | |
| 15. | No. of break per pole | nos. | One | |
| 16. | Air gap between pole of phase | mm | 1000 | |
| 17. | Insulator Material | - | Porcelain | |
| 18. | Creepage distance of Insulator | mm | To be mentioned | |

| 19. 20. | Current density at the minimum cross Section of a) Moving Blade b) Terminal Pad c) Contacts d) Terminal Connector Maximum Temp. rise of current carrying parts when | Amps/ Sq.mm | To be mentioned | |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------|--|
| | carrying rated current continuously (deg. C) | | | |
| Contac | cts: | | | |
| 21. | Materials of the current carrying path | | Copper with Nickel Plating | |
| 22. | Contract Resistance | μΩ | Less than 50 $\mu\Omega$ | |
| 23. | | | | |
| 23.1 | Moving Blade | mm ² | 6x70 mm copper flat bar, length 750±20 mm -02 Nos per phase | |
| 23.2 | Terminal Pad | mm ² | 12x60 mm Copper flat bar -02 Nos per phase | |
| 24. | Contact type | | Spring loaded contact | |
| 25. | Operation | - | Gang | |
| 26. | Type of main DS operating mechanism | - | Manual | |
| 27. | Number of main DS operating mechanism per set | Nos | 1 | |
| 28. | Nos. of Auxiliary Contracts (NO/NC) For Isolator | | Isolator- 4NO-4NC | |
| 29. | Locking facility in the operating box in both and open position | - | Yes | |
| 30. | Operating GI Pipe Dimensions : | - | | |
| | For main DS | - | OD- 42 mm, | |
| | | | ID – 36 mm, Length – 6 meter | |
| 31. | MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized): | - | | |

| | For main DS | - | To be mentioned | |
|-----|-------------------------------------------------------------------------------------------------------------------|----|-----------------|--|
| 32. | Total weight of Isolator | Kg | To be mentioned | |
| 33. | Total weight of Unit | Kg | To be mentioned | |
| 34. | Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure Arrangement | - | To be submitted | |
| 35. | Manufacturer's Printed Catalogue describing Specification & Technical Data of Offered type Equipment. | - | To be mentioned | |
| 36. | Standard | | IEC-62271-102 | |
| 37. | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes | |

Note: All exposed MS parts should be Hot Dip Galvanized

Seal & Signature of the Manufacturer

8.0 GUARANTEED TECHNICAL PARTICULARS OF 33 KV OFF-LOAD FUSED ISOLATOR FOR BUS PT

| SI. | Description | Unit | BPDB's | Manufacturer' s guaranteed Particulars |
|-----|------------------------------------------------|--------------|----------------------------------------------------|----------------------------------------------|
| No. | | | Requirement | |
| | General Description of D | visconnectir | ng Switch | |
| 1. | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2. | Application of the Disconnecting Switch | | For BUS PT | |
| 3. | Manufacturer's Model designation | - | To be mentioned | |
| 4. | Frequency | Hz | 50 | |
| 5. | System Nominal Voltage | kV | 33 | |
| 6. | System Maximum Voltage | kV | 36 | |
| 7. | Basic Insulation Level | kV | 170 | |
| 8. | Rated Normal Current | А | 400 | |
| 9. | Power Frequency Withstand Voltage (for 1 min) | kV | 70 | |
| 10. | Rated short time withstand current (for 3sec.) | kA | 25 | |
| 11. | Installation | - | Outdoor | |
| 12. | Туре | - | Single Vertical Break Offload Fused Isolator | |
| 13. | Construction | - | Open | |
| 14. | Mounting Position | - | Vertical | |
| 15. | Number of Pole | nos. | 3 (Three) | |
| 16. | No. of break per pole | nos. | One | |

| 17. | Air gap between pole of phase | mm | 1000 | |
|--------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------|--|
| 18. | Insulator Material | - | Porcelain | |
| 19. | Creepage distance of Insulator | mm | To be mentioned | |
| 20. | Current density at the minimum cross Section of a) Moving Blade b) Terminal Pad c) Contacts d) Terminal Connector | Amps/ Sq.mm | To be mentioned | |
| 21. | Maximum Temp. rise of current carrying parts when carrying rated current continuously (deg. C) | | To be mentioned | |
| Contac | ets | | | |
| 22. | Materials of the current carrying path | | Copper with Nickel Plating | |
| 23. | Contract Resistance | | Less than 50 μΩ | |
| 24. | Contact Area | | | |
| 24.1 | Moving Blade | mm ² | 5x30 mm copper flat bar, length 810±20 2 Nos per phase | |
| 24.2 | Terminal Pad | mm ² | 6x40 mm Copper bar flat 2 Nos per phase | |
| 25. | Contact type | | Spring loaded contact | |
| | Operating Mec | hanism | | |
| 26. | Operation | - | Gang | |
| 27. | Type of main DS operating mechanism | - | Manual | |
| 28. | Number of main DS operating mechanism per set | Nos | 1 | |
| 29. | Nos. of Auxiliary Contracts (NO/NC) For Isolator | - | Isolator- 4NO-4NC | |
| 30. | Locking facility in the operating box in both and open position | | Yes | |
| 31. | Operating GI Pipe Dimensions | | | |

| | For main DS | | OD- 42 mm, ID – 36 mm, Length – 6 meter | |
|-----|-------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------|--|
| 32. | MS Solid Square Shaft Dimensions for gang operation (Hot Dip Galvanized) | | | |
| 33. | For main DS | | 32x32x3600 mm | |
| 34. | Total weight of Unit | Kg | To be mentioned | |
| | Fuse Descrip | otion | | |
| 35. | Rated Fuse Voltage | kV | 33 | |
| 36. | Fuse type | - | Drop Out Fuse Barrel with Link | |
| 37. | Rated fuse link normal current | А | 1 -2 Amperes | |
| 38. | Rated fuse link interrupting current | kA | 31.5 kA, RMS Symmetrical | |
| 39. | Fuse link type | No | Two element, slow/fast unit | |
| 40. | Fuse holder type | - | Heavy duty, sealed cap with eye at both ends of fuse holder | |
| 41. | Fuse link co-ordination | - | Shall co-ordinate with existing system protective equipment | |
| 42. | Outline Dimensional & Cross-section Drawings of Offered type 33KV Isolator & Mounting Structure Arrangement | - | To be mentioned | |
| 43. | Manufacturer's Printed Catalogue describing | | | |
| | Specification & Technical Data of Offered type Equipment. | - | To be mentioned | |
| 44. | Standard | | IEC-62271-102 | |
| 45. | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes | |

Note: All exposed MS parts should be Hot Dip Galvanized

Seal & Signature of the Manufacturer

8.9. (a) Guaranteed Technical Particulars of 33 kV outdoor type single phase current Transformer for Dohazari Bay Extension.

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | non-responsive.) | | | | | | |
|------------|---------------------------------------------------|-------|-----------------------------------------------------------|---------------------------------------------|--|--|--|
| SI. No. | Description | Unit | BPDB's Requirement | Manufacturer's Guaranteed Particulars | | | |
| | a) Manufacturer's name & address | - | To be mentioned | | | | |
| 1 | · | | | | | | |
| | With website, official domain email. | | | | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | | | | |
| | | | | | | | |
| 2 | C) Country of Origin | | To be mentioned | | | | |
| 2 | Manufacturer's Model No. | - | To be mentioned | | | | |
| 3 | Application | - | Metering and Protection Induction | | | | |
| 4 5 | Type Installation | - | Outdoor | | | | |
| 6 | Construction | - | Sealed Tank | | | | |
| 7 | Insulation | - | Oil | | | | |
| 8 | Number of Phase | | Single | | | | |
| 9 | Rated Frequency | Hz | 50 | | | | |
| 10 | Mounting | - | On Supporting Structure | 1 | | | |
| 11 | Primary rated voltage (Phase to Phase) | kV | 33 | | | | |
| | Maximum System Voltage (Phase to | | | | | | |
| 12 | Phase) | kV | 36 | | | | |
| 13 | System Earthing | - | Effectively Earthed | | | | |
| 14 | Basic Insulation Level (1.2/50 Micro-Sec.) | kV | 170 | | | | |
| 15 | Power frequency withstand voltage (1 Min. 50 Hz.) | kV | 70 | | | | |
| 16 | Ratio for 33KV Line feeder: | А | 1200-2400/5-5A | | | | |
| 17 | Type of Winding: | | | | | | |
| | a) Primary | - | Single Winding | | | | |
| | | | Double (1 protection & 1 | | | | |
| | b) Secondary | - | measuring)/Triple winding (2 protection & 1 measuring) | | | | |
| 18 | Accuracy Class: | | | | | | |
| | a) for measurement | - | 0.2 S | | | | |
| | b) for Protection | - | 5P20 | | | | |
| 19 | R_{CT} at 75 ^o C: | | | | | | |
| | a) measuring core | mΩ | To be mentioned | | | | |
| | b) protection core | mΩ | To be mentioned | | | | |
| | Knee point voltage | | | | | | |
| 20 | (Supported by Calculation) For Measuring Core | V | To be mentioned | | | | |
| | For Protection Core | V | To be mentioned | | | | |
| 21 | Burden: | , , | | | | | |
| | a) for measurement | VA | 30 | | | | |
| | b) for Protection | VA | 30 | | | | |
| 22 | Short Time Current Rating for 3 Sec. | kA | 31.5 | | | | |
| | Extended Current Rating | | | | | | |
| 23 | (% of rated current) | % | 120 | | | | |
| 24 | Over Current Rating | А | <10 | | | | |
| 25 | Creepage Distance | mm/kV | | | | | |

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| | | (Min.) | 25 |
|----|----------------------------------------------------------------------------------------|--------|---------------------------|
| 26 | Rated accuracy limit factor | - | 20 |
| 27 | Bushing | - | Porcelain outdoor type |
| 28 | Standard | - | IEC 61869-1 & IEC 61869-2 |
| 29 | CT Burden shall meet the short circuit current (31.5 kA, 3 Sec) | - | Yes |
| 30 | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes |

Seal & Signature of the Manufacturer

8.9.(b)Guaranteed Technical Particulars of 33 kV outdoor type single phase current Transformer for (shikolbaha & Chokoria Bay Extension).

| | non-responsive.) | | | | | | |
|------------|---------------------------------------------------|-----------------|---------------------------------------------------------------------------------------|---------------------------------------------|--|--|--|
| Sl. No. | Description | Unit | BPDB's Requirement | Manufacturer's Guaranteed Particulars | | | |
| 4 | a) Manufacturer's name & address | - | To be mentioned | | | | |
| 1 | With website, official domain email. | | | | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | | | | |
| | C) Country of Origin | | To be mentioned | | | | |
| 2 | Manufacturer's Model No. | _ | To be mentioned | | | | |
| 3 | Application | _ | Metering and Protection | | | | |
| 4 | Туре | _ | Induction | | | | |
| 5 | Installation | _ | Outdoor | | | | |
| 6 | Construction | _ | Sealed Tank | | | | |
| 7 | Insulation | _ | Oil | | | | |
| 8 | Number of Phase | _ | Single | | | | |
| 9 | Rated Frequency | Hz | 50 | | | | |
| 10 | Mounting | - | On Supporting Structure | | | | |
| 11 | Primary rated voltage (Phase to Phase) | kV | 33 | | | | |
| 12 | Maximum System Voltage (Phase to Phase) | kV | 36 | | | | |
| 13 | System Earthing | - | Effectively Earthed | | | | |
| 14 | Basic Insulation Level (1.2/50 Micro-Sec.) | kV | 170 | | | | |
| 15 | Power frequency withstand voltage (1 Min. 50 Hz.) | kV | 70 | | | | |
| 16 | Ratio for 33KV Line feeder: | А | 600-1200/5-5A | | | | |
| 17 | Type of Winding: | | | | | | |
| | a) Primary | - | Single Winding | | | | |
| | b) Secondary | - | Double (1 protection & 1 measuring)/Triple winding (2 protection & 1 measuring) | | | | |
| 18 | Accuracy Class: | | | | | | |
| | a) for measurement | _ | 0.2 S | | | | |
| | b) for Protection | _ | 5P20 | | | | |
| 19 | R_{CT} at 75 ⁰ C: | | | | | | |
| | a) measuring core | mΩ | To be mentioned | | | | |
| | b) protection core | mΩ | To be mentioned | | | | |
| | Knee point voltage | | | | | | |
| | (Supported by Calculation) | | | | | | |
| 20 | For Measuring Core | V | To be mentioned | | | | |
| | For Protection Core | V | To be mentioned | | | | |
| 21 | Burden: | • | | | | | |
| | a) for measurement | VA | 30 | | | | |
| | b) for Protection | VA | 30 | | | | |
| 22 | Short Time Current Rating for 3 Sec. | kA | 31.5 | | | | |
| 23 | Extended Current Rating (% of rated current) | % | 120 | | | | |
| 24 | Over Current Rating | А | <10 | | | | |
| 25 | Creepage Distance | mm/kV (Min.) | 25 | | | | |

| 26 | Rated accuracy limit factor | - | 20 |
|----|----------------------------------------------------------------------------------------|---|---------------------------|
| 27 | Bushing | - | Porcelain outdoor type |
| 28 | Standard | - | IEC 61869-1 & IEC 61869-2 |
| 29 | CT Burden shall meet the short circuit current (31.5 kA, 3 Sec) | - | Yes |
| 30 | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes |

Seal & Signature of the Manufacturer

8.10 Guaranteed Technical Particulars of 33 kV Outdoor Type Single Phase Potential Transformer

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| SI. No. | Description | Unit | BPDB's Requirement | Manufacturer's Guaranteed Particulars |
|------------|----------------------------------------------------------------------------------------|---------|---------------------------------------------|------------------------------------------|
| 1 | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2 | Manufacturer's Model No. | - | To be mentioned | |
| 3 | Туре | - | Induction Type | |
| 4 | Ratio | V | 33000/\dds110/\dds110/\dds110/\dds110/\dds1 | |
| 5 | No. of phase | Nos. | Single Phase | |
| 6 | Total capacitance at 100 Hz | PF | To be mentioned | |
| 7 | 50 Hz 1 (One) minute withstand voltage wet | KV | To be mentioned | |
| 8 | Impulse withstand (1.2/50 micro sec. wave) | KV | 170 | |
| 9 | Rated burden per phase | VA | 30VA | |
| 10 | Class of accuracy | - | 0.2+3P | |
| 11 | Temperature co-efficient of ratio per ^o C | - | To be mentioned | |
| 12 | System earthing | - | Effectively Earthed | |
| 13 | Creepage Distance | mm/kV | 25 (min) | |
| 14 | Maximum errors with 5% primary vo | ltage: | | |
| | a) Ratio | % | To be mentioned | |
| | b) Phase angle | minutes | To be mentioned | |
| 15 | Total weight complete | Kg | To be mentioned | |
| 16 | Standard | - | IEC 61869-1 & IEC 61869-3 | |
| 17 | Manufacturer must comply all the features of Technical Specification (Section 7) | - | Yes | |

Seal & Signature of the Manufacturer

8.11 Guaranteed Technical Particulars of 33KV Single Phase Lightning Arrester

| SI. No. | Description | Unit | BPDB's Requirement | Manufacturer's Guaranteed Particulars |
|------------|-------------------------------------------------------------------------------------|-----------|---------------------------------------------------------|---------------------------------------------|
| 01 | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 02 | Country of Origin | | To be mentioned | |
| 03 | Place of manufacture | | To be mentioned. | |
| 04 | Manufacturer's model No. | - | To be mentioned | |
| 05 | Type of the Arrester | - | Metal Oxide (ZnO), Gapless-Outdoor (Single Unit,) | |
| 06 | Rated Arrester Voltage | kV | 36 | |
| 07 | Continuous Operating Voltage (COV, Uc) | kV | 22-27.5 | |
| 08 | Nominal Discharge Current (8/20micro sec) | KA | 10 | |
| 09 | Type of Lightning Arrester housing | - | Porcelain/polymer (Hydrophobic silicon) | |
| 10 | Power Frequency withstand voltage of the Arrester Housing, Dry & Wet | kV rms | 70 (Dry) & 70 (Wet) | |
| 11 | Impulse withstand Voltage of the Arrester Housing. | kV (peak) | 170 | |
| 12 | Lightning Impulse Residual Voltage (8/20 micro-second wave) | kV (peak) | 80 or better | |
| 13 | Maxm. Steep Current Impulse Residual Voltage at 10 KA of 1 micro second front time. | kV (peak) | 85 or better | |
| 14 | High Current Impulse Withstand Value (4/10 micro second) | KA | 100 or better | |
| 15 | Temporary Over voltage capability: | | | |
| | a) 0.1 Second | kV (peak) | Shall be mentioned | |
| | b) 1.0 Second | kV (peak) | Shall be mentioned | |
| 16 | c) 10 Second | kV (peak) | Shall be mentioned | |
| | d) 100 Second | kV (peak) | Shall be mentioned | |
| | Leakage Current at rated voltage | mA | < 1 mA | |
| 17 | Total Creepage distance (minimum) | mm/ kV | 31 | |
| 18 | Overall dimension : | | | |
| | a) Height | mm | Shall be mentioned | |
| 19 | b) Diameter | mm | Shall be mentioned | |
| | Total weight of Arrester | Kg. | Shall be mentioned | |
| 20 | Line discharge class | - | Shall be mentioned | |
| 21 | Short Circuit Current Withstand duration | Sec | 31.5kA, 1 sec | |
| 22 | Minimum Energy Discharge capability (KJ/KV) at rated | - | 5 | |

| | voltage | | |
|----|----------------------------------------------------------------------------------|-------------------|--|
| 23 | Min. Bending load (kgm) | 500 | |
| 24 | Surge Counter /Monitor | Shall be provided | |
| 25 | Cable for Connecting Surge Counter | Shall be provided | |
| 26 | Reference Standard | IEC 60099-4 | |
| 27 | Manufacturer must comply all the features of Technical Specification (Section 7) | Yes | |

Seal & Signature of the Manufacturer

8.12 Guaranteed Technical Particulars of 11KV Single Phase Lightning Arrester

| Sl. No. | Description | Unit | BPDB's Requirement | Manufacturer' s Guaranteed Particulars |
|------------|--------------------------------------------------------------------------|-----------|---------------------------------------------------------|----------------------------------------------|
| 01 | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 02 | Country of origin | | To be mentioned. | |
| 03 | Place of manufacture | | To be mentioned. | |
| 04 | Manufacturer's model No. | - | To be mentioned | |
| 05 | Type of the Arrester | - | Metal Oxide (ZnO), Gapless-Outdoor (Single Unit,) | |
| 06 | Rated Arrester Voltage | kV | 9 | |
| 07 | Continuous Operating Voltage (COV, Uc) | kV | 8- 10 kV | |
| 08 | Nominal Discharge Current (8/20micro sec) | KA | 5 | |
| 09 | Type of Lightning Arrester housing | - | Porcelain/polymer (Hydrophobic silicon) | |
| 10 | Power Frequency withstand voltage of the Arrester Housing, Dry & Wet | kV rms | $\geq 35 \text{ kV (Dry) & 30} \\ \text{kV (Wet)}$ | |
| 11 | Impulse withstand Voltage of the Arrester Housing. | kV (peak) | ≥75 kV (peak) | |
| 12 | Lightning Impulse Residual Voltage (8/20 micro-second wave) | kV (peak) | 35 kV (peak) | |
| 13 | Temporary Over voltage capability: | | | |
| 14 | a) 0.1 Second | kV (peak) | To be mentioned | |
| | b) 1.0 Second | kV (peak) | To be mentioned | |
| | c) 10 Second | kV (peak) | To be mentioned | |
| | d) 100 Second | kV (peak) | To be mentioned | |
| | Leakage Current at rated voltage | mA | < 1 mA | |
| 15 | Total Creepage distance (minimum) | mm/ kV | 25 | |

| 16 | Overall dimension : | | |
|----|-------------------------------------------------------------------------------------|-----|--------------------|
| | a) Height | mm | To be mentioned |
| 17 | b) Diameter | mm | To be mentioned |
| | Total weight of Arrester | Kg. | To be mentioned |
| 18 | Line discharge class | - | Shall be mentioned |
| 19 | Short Circuit Current Withstand duration | Sec | 25kA, 1 sec |
| 20 | Minimum Energy Discharge capability (KJ/KV) at rated voltage | - | Shall be provided |
| 21 | Min. Bending load (kgm) | | Shall be provided |
| 22 | Reference Standard | - | IEC 60099-4 |
| 23 | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes |

Seal & Signature of the Manufacturer

8.13 Guaranteed Technical Particulars of 11kV Gas Insulated Switchgear with Protection

and Control Equipment
(To be filled up by the Manufacturer in Manufacturer's Letterhead Pad with appropriate data, Otherwise bid shall be rejected. Manufacturer & Bidder has to mention
only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | only single country of origin as per ITT 6 DESCRIPTION | UNIT | BPDB | BIDDER'S |
|-----|-----------------------------------------------------------------------------|----------|-----------------------------------------------|----------------------|
| | | | REQUIREMENT | GUARANTEED VALUES |
| | TRANSFORMER INCOMING SV | VITCHGEA | R UNITS : | |
| 1. | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 2. | Manufacturer country of origin | | USA/UK/EU/Japan/ South Korea/Malaysia | |
| 3. | Type/ Model | | Shall be mentioned | |
| 4. | Applied Standard | | Latest version of IEC 62271 fully complied | |
| 5. | Rated nominal Voltage | kV | 11 | |
| 6. | Rated maximum Voltage | kV | 12 | |
| 7. | Rated Frequency | Hz | 50 | |
| 8. | Rated Current for main bus | Α | 2500 | |
| 9. | Cross section of Bus bar | mm2 | 2000 mm2 or as per IEC62271 | |
| 10. | Material of Bus-Bar | | HDHC Copper | |
| 11. | Rated short time current | KA | 25 | |
| 12. | Short time current rated duration | Sec. | 3 | |
| 13. | Rated normal current : | | | |
| | Incoming feeder from Transformer | А | 2500 A | |
| | a)Pressure relief device is | | Yes | |
| | integrated with each gas chamber | | | |
| | and pressure relief duct up to | | | |
| | outside the room | | | |
| | b)Percentage of Gas leakage per | | <0.1% | |

| | year of each gas filled | | | |
|-----|------------------------------------|-------|---------------------|--|
| | compartment (same as mentioned | | | |
| | in Type Test) | | | |
| 14 | Mimic diagram is depicted in | | Yes | |
| | front Of switch gear panel | | | |
| 15 | ElectricalandMechanicalinterlockb | | Yes | |
| | etweenCircuitbreaker,isolatorandea | | | |
| | rthswitch | | | |
| 16 | Capacitive Voltage Indicator | | Yes | |
| 17. | Circuit Breaker : | | | |
| | Туре | | VCB | |
| | Class of Circuit Breaker | | E2M2 or better | |
| | (through necessary Type test) | | | |
| | Insulation media | | SF ₆ | |
| | | | | |
| | Interrupting media | | Vacuum | |
| | Rated Voltage | kV | 12 | |
| | Rated Current | А | 2500 | |
| | Rated Short Ckt. Breaking Current | KA | 25 | |
| | Rated Short Ckt. Making Current | KA | 63.5 | |
| | Rated Breaking time | Cycle | ≤5 | |
| | Opening time | Sec. | Shall be mentioned | |
| | Closing time | Cycle | ≤5 | |
| | Rated operating Sequence | | 0-0.3 sec-CO-3 min- | |
| | | | СО | |
| | Nos. of Trip coils | - | 2 | |
| | Manufacturer's name and country | - | Shall be mentioned | |
| | Of origin of Vacuum interrupter | | | |
| | (Shall be same as mentioned in | | | |
| | Type Test Report) | | | |
| | | | | |

| | Manufacturer's model no. of vacuum interrupter | | Shall be mentioned | |
|-----|----------------------------------------------------------------------------------------------------|---------------|--------------------------|--|
| | Guaranteed no. of operation for Vacu | uum interrupt | er | |
| | a) Vacuum interrupter normal condition at rated current switching | nos. | Min 10000 | |
| | b) Vacuum interrupter in short circuit condition i.e. at the short circuit current switching | nos. | ≥ 50 | |
| | Control Voltage | V | DC 110 | |
| | AC Voltage for the Universal Motor for spring charge | V | AC 240 | |
| | Power Consumption of Charging motor | W | max 240 | |
| | Power consumption of closing coil | W | Shall be mentioned | |
| | Power consumption of opening coil | W | Shall be mentioned | |
| 18. | Three position disconnector Switch (Motor and manually operated) | | | |
| | Туре | | Shall be mentioned | |
| | Rated Voltage | KV | 12 | |
| | Rated Current | A | 2500 | |
| | Rated short time current | KA | 25 | |
| | Short time current rated duration | Sec. | 3 | |
| | Switch Position | | open, close, earth | |
| | Electrical and Mechanical interlock | | As per IEC 62271- 200 | |
| 19. | Current Transformer : | I | | |
| | Rated Voltage | KV | 12 | |
| | Accuracy Class, Metering | | 0.2 & F.S. < 5 | |
| | Accuracy Class, Protection | | 5 P20 | |

| | Rated Current ratio:- | | | |
|------|-------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------|--|
| | | | | |
| | Transformer Incoming Feeder | А | 900-1800/5-5-5A | |
| | Burden for metering | VA | 15 (at max CT ratio) | |
| | Burden for protection | VA | 15 (at max CT ratio) | |
| | Extended Current Rating for metering | А | 120% of rated Current | |
| | Туре | - | Ring Core/Block type with sensor | |
| | Knee Point Voltage (Minimum) (Supported by Calculation) a) Measuring Core b) Protection Core | V V | Shall be mentioned Shall be mentioned | |
| | CT Burden shall meet the short circuit current(25kA, 3s) (Supported by Calculation) | - | Yes | |
| 19.1 | Voltage Transformer: | | | |
| | Number of Phase | | Single Phase | |
| | Rated primary Voltage | KV | 11/V3 | |
| | Rated secondary voltage | V | 110/v3 | |
| | Rated Burden | VA | 20 | |
| | Accuracy Class (Metering & Protection core) | | 0.2 & 3P | |
| | Туре | | Resin Cast | |
| | Mounting on incoming panel at bus | | Yes | |
| 20 | OVER CURRENT & EARTH FAULT PROTECTION RELAY | | | |
| | Manufacturer's Name Country of Origin | - | ABB- Sweden, Switzerland, Finland /Siemens -Germany/ Schneider-France /UK/Alstom(UK/Fra nce)/ NR, China/SEL, USA | |

| Manufacture's model no. | - | Shall be mentioned | |
|------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|--|
| Type of relay | - | Numerical | |
| | | programmable | |
| The relay shall have IEC 61850 communication Protocol. | | Yes | |
| Directional Feature can be activated/de-activated | Yes/No | Yes | |
| Range of current setting : | | | |
| > Phase element | % of CT rating | Shall be mentioned | |
| Phase element Each fault element | | Shall be mentioned | |
| Relay Nominal operating voltage | - | 110Vdc | |
| Relay CT Current rating | - | 5A | |
| No of Binary Input (Minimum) | - | 32 | |
| No of Binary Output (Minimum) | - | 32 | |
| No of Communication Ports | - | Shall be mentioned | |
| xxi) Electrical xxii)Optical | | with type. | |
| Protection Function | - | Directional and Non- | |
| | | Directional O/C, E/F, | |
| | | Over/ Under Voltage, | |
| | | Over and Under | |
| | | Frequency Sync Check | |
| | | and Other Necessary | |
| | | Functions. | |
| Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) | - | Shall be mentioned | |
| Maximum time delay between | - | Shall be mentioned | |
| initiation of fault and energize of | | | |
| breaker trip circuit. | | | |
| Range of timing settings | Sec | Shall be mentioned | |
| Burden of relay at 20 time CT rating | VA | Shall be mentioned | |
| Drop off to Pick up ratio | % | | |
| Reset time after removal of fault | | | |
| current | | | |

| | a) Phase element (100%) | Sec | Shall be mentioned | |
|------|------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | b) E/F element (40%) | Sec | Shall be mentioned | |
| 20.1 | SEPARATE STANDBY EARTH FAULT PROTECTION | | | |
| 20.1 | Manufacture's name & country | - | ABB- (Sweden/ Switzerland/ Finland) / Siemens- (Germany)/ Alstom- (France/UK)/ Schneider- (France/UK) / NR, China/SEL USA. | |
| 20.2 | Manufacture's model no. | - | To be mentioned | |
| 20.3 | Type of relay | - | Numerical programmable with all necessary features | |
| 20.4 | Range of current setting : a) Phase element (% of CT rating) b) Earth fault element (% of CT rating) | % % | To be mentioned To be mentioned | |
| 20.5 | Range of timing settings | Sec | To be mentioned | |
| 20.6 | Burden of relay at 20 time CT rating | VA | To be mentioned | |
| 20.7 | Percentage of current setting at which relay will reset | % | To be mentioned | |
| 20.8 | Reset time after removal of 10 time CT rated current for : a) Phase element (100%) b) E/F element (40%) | Sec Sec | To be mentioned To be mentioned | |
| 21 | Trip Relays | | | |
| | Manufacturer's Name and Country | | To be mentioned | |
| | Manufacturer's Model/type No. | | To be mentioned | |
| | Operating Times | | <10 | |
| | Self-reset type for O/C, E/F protection | | Yes | |
| 22 | Trip Circuit Supervision Relay | | | |
| | Manufacture's name & country of relay | | To be mentioned | |
| | Manufacture's model no. | | To be mentioned | |
| 23 | METERING KWh Meter | | | |

| | Manufacture's Name | | Shall be mentioned | |
|----|-----------------------------------------|------|-----------------------------------------|--|
| | | - | | |
| | Manufacture's Country | | European Country/ | |
| | | | North American | |
| | | | Country/Japan/Australia. | |
| | Manufacture's Model no. | | Shall be mentioned | |
| | Type of meter | | Numerical | |
| | | | programmable | |
| | Class of accuracy | | 0.2 S | |
| 24 | INDICATION VOLT & AMPERE | | | |
| | METERS | | | |
| | Manufacturer's Name and Country | | | |
| | Manufacture's Model no. | | Shall be mentioned | |
| | Type of meter | | Analogue | |
| | Class of Accuracy | | 1.0 | |
| | Separate A-meter for each phase | | Yes | |
| 26 | Annunciator | | | |
| | | | ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ | |
| | Manufacture's Name | | Shall be mentioned | |
| | Country of Origin | | Shall be mentioned | |
| | Manufacture's Model no. | | Shall be mentioned | |
| | Windows | nos. | 16 | |
| | Built in buzzer and buttons for accept, | | Yes | |
| | mute, test, reset, etc. | | | |
| 27 | Cable Compartment : | | | |
| | Rated Current | А | 2500 | |
| | Cable connection | | 2x 1C×630mm ² / Phase | |
| | | | XLPE armoured copper | |
| | | | cable plug-socket with | |
| | | | all accessories required | |
| | | | for termination with | |
| | | | proper cable support | |
| | | | shall be provided. | |
| | | | _ | |
| | | | Sealing/cap for unused | |
| | | | cable termination shall | |
| | | | also to be provided. | |
| | | | <u> </u> | |

| | Capacitive Voltage Indicator | | Shall be incorporated in | |
|-----|-----------------------------------|---------|--------------------------|--|
| | | | the front side of the | |
| | | | panel | |
| 28 | Insulation level : | | | |
| | AC withstand voltage 1 min. dry | KV | 28 | |
| | Impulse Withstand, full wave | KV | 75 | |
| 29 | Degree of Protection | | | |
| | Enclosure | | IP3X | |
| | HV Compartment | | IP65 | |
| | LV Compartment | | IP40 | |
| | Cable Compartment | | IP40 | |
| 30 | Earthing Switch : | | | |
| | Туре | | Shall be mentioned | |
| | Short Time Current, 3 secs | KA | Shall be mentioned | |
| 31 | Dimension and Weight | | | |
| | Height | mm | Max. 2200 | |
| | Width | mm | shall be mentioned | |
| | Depth | mm | shall be mentioned | |
| | Weight including Circuit Breaker | Kg. | shall be mentioned | |
| BUS | COUPLER (WITH RISER) SWITCH | IGEAR U | INIT : | |
| 32 | a) Manufacturer's Name & Address | | Shall be mentioned | |
| | b) Manufacturer country of origin | | Shall be mentioned | |
| 33 | Type/ Model | | Shall be mentioned | |
| 34 | Applied Standard | | Shall be mentioned | |
| 35 | Rated nominal Voltage | kV | 11 | |
| 36 | Rated Maximum Voltage | kV | 12 | |
| 37 | a) Rated Current for main bus | A | 2500 | |
| | b) Cross section of Bus bar | mm2 | 2000 mm2 for 2500A | |

| | | | or as per IEC62271 | |
|-----|---------------------------------------------------------------------------------------------------------------|-------|--------------------|--|
| 38. | Material of Bus-Bar | | HDHC Copper | |
| 39. | Rated short time current | KA | 25 | |
| 40. | Short time current rated duration | Sec. | 3 | |
| | a)Pressure relief device is integrated with each gas chamber | | Yes | |
| | and pressure relief duct up to | | | |
| | outside the room | | | |
| | b)Percentage of Gas leakage per year of each gas filled compartment (same as mentioned in Type Test) | | <0.1% | |
| | | | | |
| 41 | Mimic diagram is depicted in front Of switchgear panel | | Yes | |
| 42 | ElectricalandMechanicalinterlockbet weenCircuitbreaker,isolatorandearths witch | | Yes | |
| 43 | Circuit Breaker : | | | |
| | Туре | | VCB | |
| | Insulation media | | SF ₆ | |
| | Interrupting media | | Vacuum | |
| | Class of Circuit Breaker(through | | E2M2 or better | |
| | necessary Type test) | | | |
| | Rated Voltage | KV | 12 | |
| | Rated Current | A | 2500 | |
| | Rated Short Ckt. Breaking Current | KA | 25 | |
| | Rated Short Ckt. making Current | KA | 63.5 | |
| | Rated Breaking time | Cycle | ≤5 | |
| | Opening time | Sec. | Shall be mentioned | |

| | Closing time | Sec. | shall be mentioned | |
|-----|----------------------------------------------------------------------------------------------------|-----------|----------------------|--|
| | Control Voltage | V | DC 110 | |
| | AC Voltage for the Universal Motor for spring charge | V | AC 240 | |
| | Nos. Of Trip coils | - | 2 | |
| | Manufacturer's name and country | - | Shall be mentioned | |
| | Of origin of Vacuum interrupter | | | |
| | (Shall be same as mentioned in | | | |
| | Type Test Report) | | | |
| | Manufacturer's model no. of vacuum interrupter | | Shall be mentioned | |
| | Guaranteed no. of operation for Vacuum | n interru | pter: | |
| | a) Vacuum interrupter normal condition at rated current switching | nos. | Min 10000 | |
| | b) Vacuum interrupter in short circuit condition i.e. at the short circuit current switching | nos. | ≥ 50 | |
| 44. | Three position disconnector Switch(Motor and manually operated) | | | |
| | Туре | | Shall be mentioned | |
| | Rated Voltage | KV | 12 | |
| | Rated Current | A | 2500 | |
| | Rated short time current | KA | 25 | |
| | Short time current rated duration | Sec. | 3 | |
| | Switch Position | | close, open, earth | |
| | Electrical and Mechanical interlock | | As per IEC 62271-200 | |
| 45. | Current Transformer : | <u> </u> | | |
| | Rated Voltage | kV | 12 | |
| | Accuracy Class, Metering | | 0.2 & F.S. < 5 | |

| | Accuracy Class, Protection | | 5P20 | |
|-----|-------------------------------------------------------------------------------------------------------|--------|------------------------------------------|--|
| | Rated Current ratio | А | 900-1800/5-5 | |
| | Burden | VA | 15 | |
| | Rated frequency | Hz | 50 | |
| | Туре | - | Ring Core/Block type with sensor | |
| | Knee Point Voltage (Minimum) (Supported by Calculation) c) Measuring Core d) Protection Core | v v | Shall be mentioned Shall be mentioned | |
| | CT Burden shall meet the short circuit current(25kA, 3s) (Supported by Calculation) | - | Yes | |
| 46. | Insulation level : | | | |
| | AC withstand voltage 1 min. dry | kV | 28 | |
| | Impulse Withstand, full wave | kV | 75 | |
| 47. | Degree of Protection | | | |
| | Enclosure | | IP3X | |
| | HV Compartment | | IP65 | |
| | LV Compartment | | IP40 | |
| | Cable Compartment | | IP40 | |
| 48 | Earthing Switch : | | | |
| | Туре | | Shall be mentioned | |
| | Short Time Current, 3 secs | KA | Shall be mentioned | |
| 49 | Dimension and Weight | | | |
| | Height | mm | Max. 2200 | |
| | Width | mm | shall be mentioned | |
| | Depth | mm | shall be mentioned | |
| | Weight including Circuit Breaker | Kg. | shall be mentioned | |
| 50 | OVER CURRENT & EARTH FAULT | | | |

| PROTECTION RELAY | | | |
|-----------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Manufacturer's Name Country of Origin | - | ABB- Sweden, Switzerland, Finland /Siemens -Germany/ Schneider-France /UK/Alstom(UK/Franc e)/ NR, China/SEL, USA | |
| Manufacture's model no. | - | Shall be mentioned | |
| Type of relay | - | Numerical programmable | |
| The relay shall have IEC 61850 communication Protocol. | | Yes | |
| Directional Feature can be activated/de- activated | Yes/N o | Yes | |
| Range of current setting : > Phase element > Each fault element | % of CT rating | Shall be mentioned Shall be mentioned | |
| Relay Nominal operating voltage | - | 110Vdc | |
| Relay CT Current rating | - | 5A | |
| No of Binary Input (Minimum) | - | 32 | |
| No of Binary Output (Minimum) | - | 24 | |
| No of Communication Ports xxiii) Electrical xxiv) Optical | - | Shall be mentioned with type. | |
| Protection Function | - | Directional and Non- Directional O/C, E/F, Over/ Under Voltage, Over and Under Frequency Sync Check and Other Necessary Functions. | |
| Relay Configuration Software (Name, Manufacturer, Version, License | - | Shall be mentioned | |

| Requirement (with name and version)) | | | |
|--------------------------------------------------------------------------------------------|-----|--------------------|--|
| Maximum time delay between initiation of fault and energize of breaker trip circuit. | - | Shall be mentioned | |
| Range of timing settings | Sec | Shall be mentioned | |
| Burden of relay at 20 time CT rating | VA | Shall be mentioned | |
| Drop off to Pick up ratio | % | | |
| Reset time after removal of fault current | | | |
| a) Phase element (100%) | Sec | Shall be mentioned | |
| b) E/F element (40%) | Sec | Shall be mentioned | |

| 51 | Trip Relay | | | |
|----|-----------------------------------------|---|--------------------|--|
| | Manufacturer's Name and Country | | To be mentioned | |
| | Manufacturer's Model/type No. | | To be mentioned | |
| | Operating Times | | <10 | |
| | Self-reset type for O/C, E/F protection | | Yes | |
| 52 | Trip Circuit Supervision Relay | | | |
| | Manufacture's name & country of relay | | To be mentioned | |
| | Manufacture's model no. | | To be mentioned | |
| 53 | INDICATION AMPERE METERS | | | |
| | Manufacturer's Name and Country | - | Shall be mentioned | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of meter | - | Analogue | |
| | Class of Accuracy | - | 1.0 | |
| | Separate A-meter for each phase | - | Yes | |
| 54 | INDICATION VOLT METERS | | | |

| | Manufacturer's Name and Country | - | | Shall be mentioned |
|-------|----------------------------------------------------------------------------------------------------------------|---------|---------------------------------------------|--------------------|
| | Manufacture's Model no. | - | | Shall be mentioned |
| | Type of meter | - | | Analogue |
| | Class of Accuracy | - | 1.0 | |
| | 2 nos. voltmeter with seven (7) position voltage selector switch for observing two (2) bus's bus voltage | - | Yes | |
| 55 | Control Switch | | | |
| | Manufacture's Name & Country | | Shall be mentioned | |
| | Manufacture's Model/Type No. | | Shall be mentioned | |
| | Separate TNC/Discrepancy switch and Local Remote (L/R) selector switch | | Yes | |
| 56 | Annunciator | | | |
| | Manufacture's Name | | Shall be mentioned | |
| | Country of Origin | | Shall be mentioned | |
| | Manufacture's Model no. | | Shall be mentioned | |
| | Windows | nos. | 12 | |
| | Built in buzzer and buttons for accept, mute, test, reset, etc. | | Yes | |
| 11 kV | OUTGOING FEEDER SWITCHGEAR | UNITS : | | |
| 57. | a) Manufacturer's Name & Address | | Shall be mentioned | |
| | b) Manufacturer country of origin | | USA/UK/EU/Japan/ South Korea/Malyasia | |
| 58 | Type/ Model | | Shall be mentioned | |
| 59 | Applied Standard | | Shall be mentioned | |
| 60 | Rated nominal Voltage | kV | 11 | |
| 61. | Rated maximum Voltage | kV | 12 | |
| 62. | Material of Bus-Bar | | HDHC Copper | |

| 63. | a) Rated Current for main bus | А | 2500 | |
|-----|---------------------------------------------------------|-------|--------------------------------|--|
| | b) Cross section of Busbar | mm2 | 2000 mm2 or as per IEC62271 | |
| 64 | Rated short time current | KA | 25 | |
| 65 | Short time current rated duration | Sec. | 3 | |
| 66 | Circuit Breaker : | | | |
| | Туре | | VCB | |
| | Insulation media | | SF_6 | |
| | Interrupting media | | Vacuum | |
| | Rated Voltage | KV | 12 | |
| | Rated Current | A | 630 | |
| | Rated Short Ckt. Breaking Current | KA | 25 | |
| | Rated Short CKt. making Current | KA | 63.5 | |
| | Rated Breaking time | Cycle | ≤5 | |
| | Opening time | Sec. | To be mentioned | |
| | Closing time | Sec. | To be mentioned | |
| | Rated operating Sequence | | 0-0.3 sec-CO-3 min- CO | |
| | Control Voltage | V | DC 110 | |
| | AC Voltage for the Universal Motor for spring charge | V | AC 240 | |
| | Nos. Of Trip coils | - | 2 | |
| | Manufacturer's name and country | - | Shall be mentioned | |
| | Of origin of Vacuum interrupter | | | |
| | (Shall be same as mentioned in | | | |
| | Type Test Report) | | | |
| | Manufacturer's model no. of vacuum interrupter | | Shall be mentioned | |

| | Guaranteed no. of operation for Vacuum interrupter: | | | | |
|-----|-------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------|--|--|
| | a) Vacuum interrupter normal condition at rated current switching | nos. | Min 10000 | | |
| | b) Vacuum interrupter in short circuit condition i.e. at the short circuit current switching | nos. | ≥ 50 | | |
| 67. | Three position disconnector Switch (Motor and manually operated) | | | | |
| | Туре | | Shall be mentioned | | |
| | Rated Voltage | KV | 12 | | |
| | Rated Current | A | 630 | | |
| | Rated short time current | KA | 25 | | |
| | Short time current rated duration | Sec. | 3 | | |
| | Switch Position | | close, open, earth | | |
| | Electrical and Mechanical interlock | | As per IEC 62271-200 | | |
| 68 | Current Transformer : | | | | |
| | Rated Voltage | KV | 12 | | |
| | Accuracy Class, Metering | | 0.2 & F.S. < 5 | | |
| | Accuracy Class, Protection | | 5P20 (if burden is 20VA) or 5P30 (if burden is 15VA) | | |
| | Rated Current ratio | А | 200-400/5-5A | | |
| | Burden | VA | 15 / 20 | | |
| | Rated frequency | Hz | 50 | | |
| | Туре | - | Ring Core/Block type with sensor | | |
| | Knee Point Voltage (Minimum) (Supported by Calculation) e) Measuring Core f) Protection Core | v v | Shall be mentioned Shall be mentioned | | |
| | CT Burden shall meet the short circuit current(25kA, 3s) | - | Yes | | |

| | (Supported by Calculation) | | | |
|----|------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 69 | OVER CURRENT & EARTH FAULT PROTECTION RELAY | | | |
| | Manufacturer's Name Country of Origin | - | ABB- Sweden, Switzerland, Finland /Siemens -Germany/ Schneider-France /UK/Alstom(UK/France)/ NR, China/SEL, USA | |
| | Manufacture's model no. | - | Shall be mentioned | |
| | Type of relay | - | Numerical programmable | |
| | The relay shall have IEC 61850 communication Protocol. | | Yes | |
| | Directional Feature can be activated/de-activated | Yes/No | Yes | |
| | Range of current setting : Phase element Each fault element | % of CT rating | Shall be mentioned Shall be mentioned | |
| | Relay Nominal operating voltage | - | 110Vdc | |
| | Relay CT Current rating | - | 5A | |
| | No of Binary Input (Minimum) | - | 24 | |
| | No of Binary Output (Minimum) | - | 24 | |
| | No of Communication Portsxxv)Electricalxxvi)Optical | - | Shall be mentioned with type. | |
| | Protection Function | - | Directional and Non- Directional O/C, E/F, Over/ Under Voltage, Over and Under Frequency Sync Check and Other Necessary Functions. | |
| | Relay Configuration Software (Name, Manufacturer, Version, License Requirement (with name and version)) | - | Shall be mentioned | |
| | Maximum time delay between initiation of fault and energize of | - | Shall be mentioned | |

| breaker trip circuit. | | | |
|----------------------------------------------|---------|--------------------|--|
| Range of timing settings | Sec | Shall be mentioned | |
| Burden of relay at 20 time CT ra | ting VA | Shall be mentioned | |
| Drop off to Pick up ratio | % | | |
| Reset time after removal of fault current | | | |
| a) Phase element (100%) | Sec | Shall be mentioned | |
| b) E/F element (40%) | Sec | Shall be mentioned | |

| 70 | Trip relay | | | |
|----|-----------------------------------------|---|-----------------------------------------------------------------|--|
| | Manufacturer's Name and Country | | To be mentioned | |
| | Manufacturer's Model/type No. | | To be mentioned | |
| | Operating Times | | <10 | |
| | Self-reset type for O/C, E/F protection | | Yes | |
| 71 | Trip Circuit Supervision Relay | | | |
| | Manufacture's name & country of relay | | To be mentioned | |
| | Manufacture's model no. | | To be mentioned | |
| 72 | METERING KWh Meter | | | |
| | Manufacture's Name & Country | - | Shall be mentioned | |
| | Manufacture's Country | | European Country/ North American Country/Japan/Australia. | |
| | Manufacture's Model no. | - | Shall be mentioned | |
| | Type of meter | - | Numerical programmable | |
| | Class of accuracy | - | 0.2 S | |
| 73 | INDICATION AMPERE METERS | | | |
| | Manufacturer's Name and Country | - | | |

| | Manufacture's Model no. | - | Shall be mentioned | |
|----|---------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | | | Analogu | |
| | Type of meter | - | e | |
| | Class of Accuracy | - | 1.0 | |
| | Separate A-meter for each phase | - | Yes | |
| 74 | Control Switch | | | |
| | Manufacture's Name & Country | | Shall be mentioned | |
| | Manufacture's Model/Type No. | | Shall be mentioned | |
| | Separate TNC/Discrepancy switch and Local Remote (L/R) selector switch | | Yes | |
| 75 | Annunciator | | | |
| | Manufacture's Name | | Shall be mentioned | |
| | Country of Origin | | Shall be mentioned | |
| | Manufacture's Model no. | | Shall be mentioned | |
| | Windows | nos. | 12 | |
| | Built in buzzer and buttons for | | Yes | |
| | accept, mute, test, reset, etc. | | | |
| 76 | Cable Compartment : | | | |
| | Rated Current | А | Shall be mentioned | |
| | Cable connection | | 3C x 185 mm ² XLPE armoured copper cable with provision for 1 nos./ feeder Panel. Copper cable plug-socket with all accessories required for termination with | |
| | | | for termination with proper cable support shall be provided. Sealing/cap for unused cable termination shall also to be provided. | |
| | Capacitive Voltage Indicator | | Shall be incorporated in the front side of | |
| | | | in the front side of | |

| | | | the panel | |
|-----|--------------------------------------------------------------------------------------------------------------------|-----------------|--------------------|--|
| 77. | Insulation level : | | | |
| | AC withstand voltage I min. dry | KV | 28 | |
| | Impulse Withstand, full wave | KV | 75 | |
| 78. | Degree of Protection and safety indicator | | | |
| | Enclosure | | IP3X | |
| | HV Compartment | | IP65 | |
| | LV Compartment | | IP40 | |
| | Cable Compartment | | IP40 | |
| 79. | Earthing Switch : | | | |
| | Туре | | Shall be mentioned | |
| | Short Time Current, 3 sec. | KA | Shall be mentioned | |
| 80. | Bus bar : | | | |
| | Material | | Copper | |
| | Cross Section | mm ² | 2000 | |
| 81. | Dimension and Weight | | | |
| | Height | mm | Max2200 | |
| | Width | mm | Shall be mentioned | |
| | Depth | mm | Shall be mentioned | |
| | Weight including Circuit Breaker | Kg. | Shall be mentioned | |
| 82 | # The PCM Panel for all feeders shall be complied all the technical specification mentioned in Section-7. | - | Yes | |

Seal & Signature of the Manufacturer

Seal & Signature of the Bidder

8.14 Guaranteed Technical Particulars of Ni-Cd Battery (110 V DC) (To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. No. | Description | Unit | BPDB's Requirement | Manufacturer 's guaranteed Particulars |
|---------|----------------------------------------------------------------------------------|-------------------|------------------------------------------------------|----------------------------------------------|
| 1. | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2. | Manufacturer's model no. | - | To be mentioned | |
| 3. | Туре | - | Nickel Cadmium | |
| | | | Alkaline (enclosed | |
| | | | type) | |
| 4. | Operating Voltage | V | 110 DC | |
| 5. | Continuous Discharge Current at rate of 10 hour & Final Cell Voltage 1.1 Volt | Amp | 10 | |
| 6. | Short Time Discharge Current at rate of 2 hour & Final Cell Voltage 1.1 Volt | Amp | 50 | |
| 7. | Electrolyte type | - | To be mentioned | |
| 8. | Capacity at 5 hour rate | Ah | ≥160 | |
| 9. | Discharge Voltage | Volt | 1.0 to 1.14 V Per Cell | |
| 10. | Charging Voltage (Float) | Volt | 1.4 V Per Cell | |
| 11. | Number of cells | Nos. | 92 nos. + 5 nos. Spare | |
| 12. | Nominal Voltage per cell | Volt | 1.2 | |
| 13. | Charging Voltage (Boost) | Volt | 1.75 V Per Cell | |
| 14. | Normal float charge rate | А | To be mentioned | |
| 15. | Maximum boost charge rate | А | To be mentioned | |
| 16. | Amp hour efficiency at : | | | |
| | a) 10 hour rate | % | To be mentioned | |
| | b) 1 hour rate | % | To be mentioned | |
| 17. | Size of cell | mm | To be mentioned | |
| 18. | Weight of cell and electrolyte | kg | To be mentioned | |
| 19. | Standard | - | As per Latest Edition of applicable IEC- 60623 | |
| 20. | Specific gravity of electrolyte | - | To be mentioned | |
| 21. | Release pressure for valve regulated type | kg/m ² | To be mentioned | |
| 22. | Volume of electrolyte per cell | ml | To be mentioned | |
| 23. | Volume of reserve electrolyte per cell | ml | To be mentioned | |
| 24. | No of electrode plates per cell | Nos. | To be mentioned | |
| 25. | Type of racks & Dimension (a)Height (b)Width (c)Depth | - | To be mentioned | |

| 26. | Cell dimension: | | To be mentioned | |
|-----|-------------------------------------|----|-----------------|--|
| | (a) Height | mm | | |
| | (b) Width | mm | | |
| | (c) Depth | mm | | |
| 27. | Manufacturer must comply all the | | Yes | |
| | features of Technical Specification | | | |
| | (Section 7) | - | | |

Seal & Signature of the Manufacturer

Seal & Signature of the Bidder

8.15 Guaranteed Technical Particulars of Battery Charger (To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| SI. No. | Description | Unit | BPDB's Requirement | Manufacturer's guaranteed Particulars |
|------------|--------------------------------------------------------------------------------|--------|------------------------------------------------------------------------|---------------------------------------------|
| 1. | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| 2. | Year of Manufacturing | Yr. | Not before 2023 | |
| 3. | Country of Origin | | To be mentioned | |
| 4. | Manufacturer's model no. | - | To be mentioned | |
| 5. | Rated Input voltage range | V AC | $415~V\pm10\%$ | |
| 6. | Rated Frequency | Hz | 50 Hz (± 3%), | |
| 7. | No of Phase | - | 03 | |
| 8. | Control | - | Shall be mentioned | |
| 9. | Communication module for station automation | - | Shall be provided | |
| 10. | Rectifier type | - | Silicon | |
| 11. | Nominal output voltage | V DC | 110 | |
| 12. | Chargingoperating control | - | Boost and floating charge, automatic with manual operation | |
| 13. | A | A DC | ≥ 100 | |
| 14. | 5 | - | 110 % of rated current | |
| 15. | Efficiency | - | ≥ 85% at full load @ Nominal AC Input | |
| 16. | Voltage regulation | - | ≤ ±1 % | |
| 17. | Ripple voltage | - | ≤ 2 % rms | |
| 18. | Float charging voltage | V/Cell | 1.35 to 1.45 (programmable) | |
| 19. | Boost charging voltage | V/Cell | 1.6 to 1.75 (programmable) | |
| 20. | Boost charging time | hour | programmable | |
| 21. | Operating temperature | °C | 0 to 50 | |
| 22. | Humidity | % | 95 | |
| 23. | Audible noise | dB | ≤ 65 | |
| 24. | Facilities for paralleling with another charger | - | Shall be provided | |

| 25 | Drotaction against surge | [| Chall ha | |
|-----|--------------------------------------------------------|------------|-------------------------------|--|
| 25. | Protection against surge | - | Shall be | |
| 26 | voltage | | provided | |
| 26. | Protection against reverse | - | Shall be | |
| | polarity | | provided | |
| 27. | Provision for current | - | Shall be | |
| | limiting | | provided | |
| 28. | Dropping Diodes unit at in the | - | Yes | |
| 20 | output circuit during Boost Mode | | | |
| 29. | Provision of constant | - | Shall be | |
| 20 | voltage charge 90V -130V | | provided | |
| 30. | Provision of showing | - | Shall be | |
| | earth leakage current by analog | | provided | |
| 31. | meter | | Shall be | |
| 51. | BatteryTemperature | - | | |
| 32. | compensation | | incorporated. Shall be | |
| 52. | Alarm annunciator independent of the microprocessor | - | | |
| 33. | | | provided Shall be | |
| 33. | Analog/Digital meters for | - | provided | |
| | voltage and current measurement of input,output and | | provided | |
| | battery power | | | |
| 34. | Dimension | | Shall be | |
| 54. | Dimension | _ | mentioned | |
| 35. | Output voltage range | | mentioneu | |
| 00. | a) normal charge | V DC | $110 \text{ V} \pm 1\%$ | |
| | b) Float charge | V DC | $128 V \pm 1\%$ | |
| | c) boost charge | V DC | $126 V \pm 1\%$ 156 V ± 1% | |
| 36. | Normal/ boost charge | Yes/No | To be mentioned | |
| 50. | independent units? | 105/110 | To be mentioned | |
| 37. | Rated Battery Ah @ C ₅ rate | Ah | ≥160 | |
| 38. | Type of AVR | - | Static | |
| 39. | Installation Break Down Voltage | KV | 2kV for 1 Minute | |
| | Type of rectifier | Thyristor | To be mentioned | |
| 41. | MCCB Rating | 1119113001 | To be mentioned | |
| 41. | <u> </u> | | | |
| | For AC input | А | 25(Min.) | |
| | For DC main Output | A | 125 (Min.) | |
| | For DC Battery Output | А | 63 (Min.) | |
| 42. | Standard | - | As per Latest | |
| | | | Edition of | |
| | | | applicable IEC- | |
| | | | 60146 | |
| 43. | Manufacturer must comply all the | - | Yes | |
| | features of Technical | | | |
| | Specification (Section 7) | | | |

| 44. | Charger controller shall have | - | Yes | |
|-----|-------------------------------------|---|-----|--|
| | IEC61850 communication | | | |
| | protocol for SAS implementation. | | | |
| | All the measurement data, | | | |
| | controlling & operation facility of | | | |
| | the charger shall be available at | | | |
| | SAS. | | | |

Seal & Signature of the Manufacturer

Seal & Signature of the Bidder

8.16 GUARANTEED TECHNICAL DATA SCHEDULE FOR 33/11KV, 20/26MVA POWER TRANSFORMER

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | non-responsi | ve.) | | |
|------------|----------------------------------------------------------|------|------------------------------------|-------------------------------------------------|
| S1. No. | Description | Unit | BPDB's Requirement | Manufacture r's Guaranteed Particulars |
| 1. | RATING AND PERFORMANCE | 1 | | 1 |
| 1.1 | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Manufacturer's country of Origin | | To be mentioned | |
| | c) Year of Manufacturing | Yr. | Not before 2023 | |
| 1.2 | Manufacturer's Model no. | - | To be mentioned | |
| 1.3 | Continuous maximum rating (ONAN / ONAF) | MVA | 20/26 | |
| 1.4 | No. of phases | Nos. | 3 | |
| 1.5 | Rated frequency | Hz | 50 | |
| 1.6 | Normal transformation ratio at No-load and Principal Tap | kV | 33/11 | |
| 1.7 | Rated HT voltage (phase to phase) | kV | 33 | |
| 1.8 | Maximum HT voltage (phase to phase) | kV | 36 | |
| 1.9 | Rated LT voltage (phase to phase) | kV | 11 | |
| 1.10 | Maximum LT voltage (phase to phase) | kV | 12 | |
| 1.11 | Installation | - | Outdoor | |
| 1.12 | Type of Transformer | - | Core, Conservator, Oil immersed | |
| 1.13 | Direction of normal power flow | - | HT-LT | |
| 1.14 | No of windings | Nos. | 2 | |
| 1.15 | Bushing materials | - | Porcelain | |

| Coolant Type of earthing | - | Type- A, Unused insulating mineral oil, free from PCB | |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | - | insulating mineral | |
| Гуре of earthing | | | |
| Гуре of earthing | | | |
| Гуре of earthing | | (polychlorinated | |
| Гуре of earthing | 1 | biphenyl) | |
| | - | Effectively earth | |
| Гуре of base | - | On wheels with | |
| | | adequate size and | |
| | | length of rails and | |
| | | fixing arrangement | |
| Phase connection: | | | |
| a) 33 KV winding with bushing CT | - | Delta | |
| b) 11KV winding with bushing CT | - | Star | |
| Vector group | - | Dyn11 | |
| Neutral to be brought out : | | | |
| a) HT | - | Nil | |
| | | | |
| b) L1 | - | Yes | |
| Basic Insulation Level (BIL) : | | | |
| a) High voltage winding | KV | 170 | |
| b) Low voltage winding | KV | 75 | |
| - | | | |
| supported by Design Calculation sheet (to be encl | losed) on | the basis of Design Dat | a:- |
| a) Winding Temp. Rise | ⁰ C | 65 | |
| b) Top Oil Temp. Rise | ⁰ C | 55 | |
| Test Voltage : | | 1 | <u>'</u> |
| Impulse front wave test voltage (1.2/50 micro | | | |
| sec. wave shape) : | | | |
| a) High voltage side | | | |
| | kV | 170 | |
| b) low voltage side | kV | 75 | |
| | a) 33 KV winding with bushing CT b) 11KV winding with bushing CT //ector group Neutral to be brought out : a) HT b) LT Basic Insulation Level (BIL) : a) High voltage winding b) Low voltage winding b) Low voltage winding Max. Temp. Rise over 40°C of ambient (at CMR upported by Design Calculation sheet (to be encled) a) Winding Temp. Rise b) Top Oil Temp. Rise FEST VOLTAGE : mpulse front wave test voltage (1.2/50 micro ec. wave shape) : | a) 33 KV winding with bushing CT - b) 11KV winding with bushing CT - kettral to be brought out : - a) HT - b) LT - Basic Insulation Level (BIL) : - a) High voltage winding KV b) Low voltage winding KV Max. Temp. Rise over 40°C of ambient (at CMR & normation upported by Design Calculation sheet (to be enclosed) on a) Winding Temp. Rise °C b) Top Oil Temp. Rise °C FEST VOLTAGE : - mpulse front wave test voltage (1.2/50 micro ec. wave shape) : .) High voltage side b) High voltage side kV | Image: Instrument of the second se |

| 1.26 | Power Frequency withstand test voltage for 1 | | | |
|------|---------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------|--|
| | (one) minute : | | | |
| | a) High voltage side | kV | 70 | |
| | b) Low voltage side | kV | 28 | |
| 1.27 | Short circuit MVA available : | | | |
| | a) at 33 KV | MVA | 1800 | |
| | b) at 11KV | MVA | 500 | |
| 1.28 | Impedance voltage at 75 ^o C and at normal ratio and rated frequency and at ONAN condition (supported by type test report). | % | 8.5% | |
| 1.29 | All windings shall have uniform insulations | - | Yes | |
| 2. | VOLTAGE CONTROL (OLTC) | | | |
| 2.1 | Type of Tap Changer control | - | On load auto regulation and remote & manual control | |
| 2.2 | OLTC, MDU & AVR Manufacturer's name & country | - | MR Germany/ABB, Sweden/HM, China | |
| | c) Year of Manufacturing | Yr. | Not before 2022 | |
| 2.3 | Model Number | | Shall be mentioned | |
| 2.4 | Nos. of tapping | - | 17 | |
| 2.5 | Tapping steps | - | <u>+</u> 10% in steps of 1.25% 17 tapping (i.e. 33 <u>+</u> 8x1.25%) | |
| 2.6 | HV or LV winding | - | HV winding | |
| 2.7 | Power Frequency withstand test voltage between first and last contracts of the selector switch between diverter and switch contract. | kV | 75 | |

| 2.8 | Rated Voltage for control circuit | | Shall be mentioned | |
|------|---------------------------------------------------------------------------------------------------------------------------------|-------|--------------------|---|
| 2.9 | Power Supply for control motor | | Shall be mentioned | |
| 3. | GENERAL | | <u> </u> | I |
| 3.1 | Manufacturer's Name & Address | | To be mentioned | |
| 3.2 | Material of core & grading | | To be mentioned | |
| 3.3 | Core Loss/ Kg, supported by Characteristic Curve (to be submitted) | | To be mentioned | |
| 3.4 | Thickness of core, mm | | To be mentioned | |
| 3.5 | Core Dia, mm | | To be mentioned | |
| 3.6 | Total weight of core, Kg | | To be mentioned | |
| 3.7 | Maximum flux density in iron at normal voltage and frequency and at normal ratio (ONAF condition) | | | |
| | a) Cores | | | |
| | b) Yokes | Tesla | < 1.7 | |
| | | Tesla | To be mentioned | |
| 3.8 | Magnetizing current (approx.) | % | To be mentioned | |
| 3.9 | a) No load losses at rated voltage, ratio and frequency (supported by type test report). | KW | 12 - 20 | |
| | b) Full Load losses at rated voltage, normal ratio & frequency in ONAN condition at 75^{0} C. | KW | To be mentioned | |
| | c) Full Load losses at rated voltage, normal ratio & frequency in ONAF condition at 75^{0} C (supported by type test report). | KW | 90 – 120 | |
| | d) Auxiliary Losses | KW | To be mentioned | |
| | e) Total Loss (a+c+d) | KW | To be mentioned | |
| 3.10 | Maximum current density in core at CMR | A/mm | To be mentioned | |

| | | 2 | | |
|------|----------------------------------------------------------------------------------|-----------|------------------|----------|
| 3.11 | Simultaneous operating conditions under which maximum | | | |
| | flux density is attained: | | | |
| | a) Frequency | 11_ | To be manifed at | |
| | b) Voltage- | Hz | To be mentioned | |
| | HV | KV | To be mentioned | |
| | LV | к v KV | To be mentioned | |
| | c) Tap | | To be mentioned | |
| | d) Load | - MVA | To be mentioned | |
| | | and | 10 be mentioned | |
| | | P.F. | | |
| 3.12 | Maximum flux density in iron under conditions | Tesla | To be mentioned | |
| 5.12 | entered on | 1051a | 10 be mentioned | |
| | line 3.7 | | | |
| 3.13 | (a) Maximum current density in HV winding at Continuous Maximum Running (CMR) | A/mm 2 | < 2.5 | |
| | (b) Cross section of HV winding | mm2 | | |
| 3.14 | (a) Maximum current density in LV winding at Continuous Maximum Running (CMR) | A/mm 2 | < 2.5 | |
| | (b) Cross section of LV winding | mm2 | | |
| 4. | DETAILS OF CONSTRUCTION | <u> </u> | 1 | <u> </u> |
| 4.1 | Types of winding: | - | To be mentioned | |
| | a) HV | | | |
| | b) LV | | | |
| 4.2 | Copper Conductor's Manufacturer Name & Address | | To be mentioned | |
| 4.3 | Material of windings | - | copper | |

| 4.4 | Winding resistance of : | | | |
|------|-----------------------------------------------------------|-------------------|-----------------|--|
| | a) H.T. winding, | Ohm. | To be mentioned | |
| | b) L.T. winding, | Ohm. | To be mentioned | |
| 4.5 | Current density of : | | | |
| | a) H.T. winding, Amps/sq. mm | A/mm 2 | < 2.5 | |
| | b) L.T. winding, Amps/sq. mm | A/mm ² | < 2.5 | |
| 4.6 | Outer, Inner & Mean dia of copper winding: | | | |
| | a) H.T. winding, | mm | To be mentioned | |
| | b) L.T. winding, | mm | To be mentioned | |
| 4.7 | Size of Copper conductor/bar : | | | |
| | a) H.T. winding SWG, dia. in mm / area in mm ² | | To be mentioned | |
| | b) L.T. winding SWG, area in mm ² | | To be mentioned | |
| 4.8 | Number of Turns : | | | |
| | a) HT winding. | nos. | To be mentioned | |
| | b) LT winding | nos. | To be mentioned | |
| 4.9 | Copper weight of windings : | | | |
| | a) HT winding | Kg | To be mentioned | |
| | b) LT winding | Kg | To be mentioned | |
| 4.10 | Total weight of copper windings | Kg | To be mentioned | |
| 4.11 | Insulation Class | - | To be mentioned | |
| | Insulation Material | | To be mentioned | |
| | Insulation Weight | | To be mentioned | |
| | Type of insulation of : | | | |

| | a) Tapping | | | |
|------|------------------------------------------------|------|-----------------|----------|
| | b) Tapping connections | | | |
| | c) Core bolts | | | |
| | d) Core bolt washers | | | |
| | e) Side plates | | | |
| | f) Core laminations | | | |
| 4.12 | Type of winding connections | - | To be mentioned | |
| | (crimped or brazed) | | | |
| 4.13 | Thickness of transformer tank: | | | |
| | b) Top | mm | To be mentioned | |
| | c) Sidesd) Bottom | mm | To be mentioned | |
| | | mm | To be mentioned | |
| 4.14 | Vacuum withstand capability of the tank | | | |
| | Main tank | Кра | | |
| | Conservator | Кра | | |
| | Radiators | Кра | | |
| 4.15 | Provision of tank earthing and Core earthing | - | Yes | |
| 4.16 | Bladder / Air bag in Conservator | - | Yes | |
| 4.17 | Material used for gaskets for oil tight joints | mm | To be mentioned | |
| 5. | RADIATORS | | I | <u>.</u> |
| 5.1 | Thickness of radiator plates/ cooling tubes | mm | To be mentioned | |
| 5.2 | Equipment for ON cooling state | | | |
| | a) radiators on main tank | - | To be mentioned | |
| 5.3 | Number of radiators per transformer | Nos. | To be mentioned | |
| 5.4 | Rating of each radiator bank | KW | To be mentioned | |
| 5.5 | Power of each fan | KW | To be mentioned | |

| 5.6 | Nos. of fans | Nos. | To be mentioned | |
|------|---------------------------------------------------|--------|-------------------------------------------------------------------------------------------------|--|
| 6. | Oil Volume and Weight | | | |
| 6.1 | Type of oil | | Type- A, Unused insulating mineral oil, free from PCB (polychlorinated biphenyl) | |
| 6.2 | Manufacturer Name of oil | | Shall be mentioned | |
| 6.3 | Breakdown Voltage at 2.5mm gap between electrodes | | >50 kV | |
| 6.4 | Appearance | | Liquid and free from suspended matter or sediment | |
| 6.5 | Density at 20 [°] C | | 0.895 g/cm ³ (maximum)g/cm ³ (maximum) | |
| 6.6 | Flash point (Closed cup) | | 140 [°] C (minimum) | |
| 6.7 | Kinematics Viscosity at -15 ⁰ C | | 800 cSt. (Maximum) | |
| 6.8 | Kinematics Viscosity at 20 [°] C | | 40 cSt. (Maximum) | |
| 6.9 | Pour point | | -30 [°] C (maximum) | |
| 6.10 | Neutralization value | | 0.3 mg KOH/g (maximum) | |
| 6.11 | Neutralization value after oxidation | | 0.40 mg KOH/g (maximum) | |
| 6.12 | Total sludge after oxidation | | 0.05% weight (maximum) | |
| 6.13 | PCB Content | | Free from PCB | |
| 6.14 | Water content | | 25ppm (maximum) | |
| 6.15 | Total oil required including cooler system | Litres | To be mentioned | |
| 6.16 | Volume of oil above of the top yoke | Litres | To be mentioned | |

| 6.17 Total volume of conservator 6.18 Weight of core and winding assembly 6.19 Weight of each oil cooler bank complete with oil if mounted separately from transformer 6.20 Total weights of complete transformer, including attached radiators, voltage regulating equipment ,all fittings and oil Litres To be mentioned To be mentioned To be mentioned | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 6.19Weight of each oil cooler bank complete with oil if mounted separately from transformerTonesTo be mentioned6.20Total weights of complete transformer, including attached radiators, voltageTonesTo be mentioned | |
| oil if mounted separately from transformerImage: Constraint of the separately from transformer6.20Total weights of complete transformer, including attached radiators, voltageTones | |
| including attached radiators, voltage | |
| regulating equipment , an intelligs and on | |
| 6.21 Weight of transformer arranged for transport Tones To be mentioned | |
| 6.22 Brief description of transformer or parts - To be mentioned thereof subjected to short-circuit test or for which short-circuit calculations are available | |
| 7. TRANSFORMER BUSHING INSULATORS | |
| 7.1Manufacture's name & country-To be mentioned | |
| 7.2Insulator material-Porcelain | |
| 7.3Bushing housingPorcelain | |
| 7.4Bushing Current Rating at 75°CATo be mentioned | |
| 7.5Insulator type and rated voltage-To be mentioned | |
| 7.6Pitch circle diameter and drilling of flangemmTo be mentioned | |
| approx . | |
| 7.7Length of Insulator (overall)mmTo be mentioned | |
| 7.8Weight of InsulatorkgTo be mentioned | |
| 7.9One minute 50 Hz dry withstand routine testKVTo be mentionedvoltage | |
| 7.10Lightning Impulse flashover voltage (1.2/50KVTo be mentionedwave) | |
| 7.11 Full wave Lightning Impulse Voltage KV To be mentioned withstand | |
| 7.12 50 Hz wet withstand voltage across arcing KV To be mentioned | |

| | horns | | | |
|------|---------------------------------------------------|-----|---------------------|--|
| 7.13 | Under oil flashover voltage type test | KV | To be mentioned | |
| 7.14 | Total creepage distance of shedding | mm | Min. 25mm per KV | |
| 7.15 | Protected creepage distance of shedding | mm | To be mentioned | |
| 7.16 | Rated Short circuit Current withstand capability | | 31.5kA, 3 sec. | |
| 8. | BUSHING CTS 33 KV FOR DIFFERENTIAL PROTECTION | 1 | | |
| 8.1 | Manufacturer's name & country | - | To be mentioned | |
| 8.2 | Rated Voltage | | 33KV | |
| 8.3 | Rated maximum Voltage | | 36KV | |
| 8.4 | Ratio | A | 600/5 | |
| 8.5 | Rated output | VA | 30 VA | |
| 8.6 | Accuracy class | - | 5P20 | |
| 8.7 | Electrical Clearance from phase to phase | mm | To be mentioned | |
| 8.8 | Electrical Clearance phase to earth | mm | To be mentioned | |
| 9. | BUSHING CTS 11 KV FOR DIFFERENTIAL PROTECTION | 1 | | |
| 9.1 | Manufacturer's name & country | - | To be mentioned | |
| 9.2 | Rated voltage | KV | 11 | |
| 9.3 | Rated maximum voltage | KV | 12 | |
| 9.4 | Ratio | A | 1800/5 | |
| 9.5 | Rated output | VA | 30 VA | |
| 9.6 | Accuracy class | - | 5P20 | |
| 10. | NEUTRAL BUSHING CTS 11 KV FOR SEF & Protection | REF | | |
| 10.1 | Manufacturer's name & country | - | To be mentioned | |

| 10.2 | Rated voltage | KV | 11 | |
|------|--------------------------------------------|----|-----------------|--|
| 10.3 | Rated maximum voltage | KV | 12 | |
| 10.4 | Ratio | A | 1800/5/5 | |
| 10.5 | Rated output | VA | 30 VA | |
| 10.6 | Accuracy class | - | 5P20 | |
| 11.0 | Oil Temperature Indicator | | | |
| | Manufacturer Name | | To be mentioned | |
| | Alarm contact | | 01No | |
| | Trip Contact | | 01No | |
| | Alarm & Trip Range | | | |
| 12.0 | Winding Temperature Indicator | | | |
| | Manufacturer Name | | To be mentioned | |
| | Alarm contact | | 01No | |
| | Trip Contact | | 01No | |
| | Alarm & Trip Range | | | |
| 13.0 | Dial Thermometer | | | |
| | Alarm Contact | | 01No | |
| | Trip Contact | | 01No | |
| 14.0 | Buchholz relay (Both for main tank & OLTC) | | Yes/No | |
| | Manufacturer Name | | To be mentioned | |
| | Make/Model Number | | To be mentioned | |
| | Alarm contact | | 01No | |
| | Trip Contact | | 01No | |
| 15.0 | PRD (Both for main tank & OLTC) | | Yes/No | |
| | Manufacturer Name | | To be mentioned | |

| | Make/Model Number | | To be mentioned |
|------|--------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| | Alarm contact | | 01No |
| | Trip Contact | | 01No |
| 16.0 | Is terminal permanent terminal marking provided? | | Yes/No |
| 17.0 | Parallel operation of identical transformer | | Required |
| 18.0 | Marshalling Box | | Shall be provided |
| 19.0 | Silica Gel Breather | | Shall be provided |
| 20.0 | Guaranteed Noise level as per IEC 551 | db | |
| 21.0 | Harmonics | | |
| | R.M.S. value of the fundamental current | Amp. | To be mentioned |
| | R.M.S. value of 3rd harmonics current | Amp | To be mentioned |
| | R.M.S. value of 5th harmonics current | Amp | To be mentioned |
| 22.0 | Type of paint applied internally | | To be mentioned |
| 23.0 | Type of paint applied externally | | To be mentioned |
| 24.0 | Type of weatherproof anti rust material primer | | To be mentioned |
| 25.0 | Dimension of the transformer | | |
| | Length | mm | To be mentioned |
| | Width | mm | To be mentioned |
| | Height | mm | To be mentioned |
| 26.0 | Standard | | Design, Manufacture , Testing, Installation and performance shall be in accordance to the latest edition of the IEC 60076 |

| 28. | Manufacturer must comply all the features of Technical Specification (Section 7) | Yes | |
|-----|-------------------------------------------------------------------------------------|-----|--|
| 29. | Oil level indicator device for the transformer main tank. | Yes | |

Seal & Signature of the Manufacturer Seal & Signature of the Bidder

8.17 Guaranteed Technical Particulars of 33/11kV, 16/20 MVA Power Transformer

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. No. | Description | Unit | BPDB's Requirement | Manufacturer's Guaranteed Particulars |
|------------|----------------------------------------|------|----------------------------------------------------------------------------------------------|---------------------------------------------|
| 1. | RATING AND PERFORMANCE | · | | |
| 1.1 | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Manufacturer's country of Origin | - | To be mentioned | |
| | c) Year of Manufacturing | Yr. | Not before 2023 | |
| 1.2 | Manufacturer's Model no. | - | To be mentioned | |
| | Continuous maximum rating (ONAN/ONAF) | MVA | 16/20 | |
| 1.3 | Rated Primary Current (ONAN/ONAF) | А | 279.92/349.91 | |
| | Rated Secondary Current (ONAN/ONAF) | Α | 839.78/1049.72 | |
| 1.4 | No. of phases | Nos. | 3 | |
| 1.5 | Rated frequency | Hz | 50 | |
| 1.6 | Normal transformation ratio at No-load | kV | 33/11 | |
| 1.7 | Rated HT voltage (phase to phase) | kV | 33 | |
| 1.8 | Maximum HT voltage (phase to phase) | kV | 36 | |
| 1.9 | Rated LT voltage (phase to phase) | kV | 11 | |
| 1.10 | Maximum LT voltage (phase to phase) | kV | 12 | |
| 1.11 | Installation | - | Outdoor | |
| 1.12 | Type of Transformer | - | Core, Conservator, Oil immersed | |
| 1.13 | Direction of normal power flow | - | HT-LT | |
| 1.14 | No of windings | Nos. | 2 | |
| 1.15 | Bushing materials | - | Porcelain | |
| 1.16 | Type of cooling | - | ONAN/ONAF | |
| 1.17 | Coolant | - | Type- A, Unused insulating mineral oil, free from PCB (polychlorinated biphenyl) | |
| 1.18 | Type of earthing | - | Effectively earth | |
| 1.19 | Type of base | - | On wheels with adequate size and length of rails and fixing | |
| | | | arrangement | |

| | vinding with bushing CT | | | |
|----------------------|-------------------------------------------------|----------------|------------------------|-----------|
| | | _ | Delta | |
| | inding with bushing CT | _ | Star | |
| 1.21 Vector group | | _ | Dyn11 | |
| 1.22 Neutral to be | brought out : | | 5 | |
| a) HT | | - | Nil | |
| b) LT | | - | Yes | |
| , | on Level (BIL) : | | | |
| | tage winding | kVp | 170 | |
| , 6 | tage winding | kVp | 75 | |
| | Rise over 40° C of ambient (at CMR | - | 1 tap change position) | supported |
| - | lculation sheet (to be enclosed) on t | | | 11 |
| | Temp. Rise | ⁰ C | 65 | |
| b) Top Oil | * | ⁰ C | 55 | |
| TEST VOLTA | - | 1 | 11 | |
| | wave test voltage (1.2/50 micro | | | |
| sec. wave sha | | | | |
| a) High voltag | ge side | kVp | 170 | |
| b) low voltage | e side | kVp | 75 | |
| 1.26 Power Freque | ency withstand test voltage for 1 | | | |
| (one) minute | : | | | |
| a) High voltag | ge side | kV | 70 | |
| b) Low voltag | ge side | kV | 28 | |
| 1.27 Short circuit I | MVA available : | | | |
| a) at 33 KV | | MVA | 1800 | |
| b) at 11KV | | MVA | 500 | |
| Impedance vo | oltage at 75 ^o C and at normal ratio | % | 8.5% | |
| and rated free | uency and at ONAN condition | | | |
| - | bltage at 75 0 C and at normal ratio | % | Shall be mentioned | |
| and rated free | uency and at ONAF condition | | | |
| 1.29 All windings | shall have uniform insulations | - | Yes | |
| | ONTROL (OLTC) | | | |
| 2.1 Type of Tap (| Changer control | - | On load auto | |
| | | | regulation and | |
| | | | remote & manual | |
| | | | control | |
| | & AVR Manufacturer's name & | - | MR Germany/ | |
| country | | | ABB, Sweden/ | |
| | · · · | | HM, China | |
| Year of Man | utacturing | Yr. | Not before 2023 | |
| 2.3 Model Numb | er | | Shall be mentioned | |
| 2.4 Nos. of tappin | ng | - | 17 | |

| 25 | Tonning stong | | 100/ in atom of | |
|------|--------------------------------------------------|-------|----------------------------|--|
| 2.5 | Tapping steps | - | $\pm 10\%$ in steps of | |
| | | | 1.25% 17 tapping | |
| 0.5 | TTX7 T X7 ' 1' | | (i.e. 33 <u>+</u> 8x1.25%) | |
| 2.6 | HV or LV winding | - | HV winding | |
| 2.7 | Power Frequency withstand test voltage | kV | 75 | |
| | between first and last contracts of the selector | | | |
| | switch between diverter and switch contract. | | | |
| 2.8 | Rated Voltage for control circuit | - | Shall be mentioned | |
| 2.9 | Power Supply for control motor | - | Shall be mentioned | |
| 3. | GENERAL | | | |
| 3.1 | Manufacturer's Name & Address | - | To be mentioned | |
| 3.2 | Material of core & grading | - | To be mentioned | |
| 3.3 | Core Loss/ Kg, supported by Characteristic | - | To be mentioned | |
| | Curve & Core Manufacture's Brochure (to be | | | |
| | submitted) | | | |
| 3.4 | Thickness of core, mm | - | To be mentioned | |
| 3.5 | Core Dia, mm | - | To be mentioned | |
| 3.6 | Total weight of core, Kg (Supported by | - | To be mentioned | |
| | Calculation) | | | |
| 3.7 | Maximum flux density in iron at normal | | | |
| | voltage and frequency and at normal ratio | | | |
| | (ONAF condition) | Tesla | < 1.7 | |
| | a) Cores | Tesla | To be mentioned | |
| | b) Yokes | | | |
| 3.8 | No-load Current | % | To be mentioned | |
| 3.9 | a) No load losses at rated voltage, ratio and | kW | 10 - 17 | |
| | frequency (supported by type test report). | | | |
| | b) Full Load losses at rated voltage, normal | kW | To be mentioned | |
| | ratio & frequency in ONAN condition at | | | |
| | 75^{0} C. | | | |
| | c) Full Load losses at rated voltage, normal | kW | 80 - 100 | |
| | ratio & frequency in ONAF condition at | | | |
| | 75^{0} C (supported by type test report). | | | |
| | d) Auxiliary Losses | kW | To be mentioned | |
| | e) Total Loss (a+c+d) | kW | To be mentioned | |
| 3.10 | Simultaneous operating conditions under which | | | |
| | maximum flux density is attained: | | | |
| | a) Frequency | | | |
| | b) Voltage- HV | Hz | To be mentioned | |
| | LV | kV | To be mentioned | |
| | c) Tap | kV | To be mentioned | |
| | d) Load | - | | |
| | | MVA | To be mentioned | |
| | | and | | |

| | | P.F. | | |
|----------|-------------------------------------------------------------------|-------------------|-----------------|---|
| 3.11 | Maximum flux density in iron under conditions entered on line 3.6 | Tesla | To be mentioned | |
| 3.12 | (a) Maximum current density in HV winding at CMR | A/mm ² | 2.5 | |
| | (b) Cross section of HV winding | mm ² | To be mentioned | |
| 3.13 | (a) Maximum current density in LV winding at CMR | A/mm ² | 2.5 | |
| | (b) Cross section of LV winding | mm ² | To be mentioned | |
| 3.14 | (a) Maximum current density in Tap winding at CMR | A/mm ² | 2.5 | |
| <u> </u> | (b) Cross section of Tap winding | mm^2 | To be mentioned | |
| 4. | DETAILS OF CONSTRUCTION | 1 | 1 | 1 |
| 4.1 | Voltage per Turn | V/T | 50-65 | |
| 4.2 | Types of winding: | - | To be mentioned | |
| | a) HV | | | |
| | b) LV | | | |
| | c) Tap | | | |
| 4.3 | Copper Conductor's Manufacturer Name & Address | | To be mentioned | |
| 4.4 | Material of windings | _ | copper | |
| | Winding resistance of : | | 11 | |
| | a) H.T. winding (per phase at 75 deg C) | Ohm. | To be mentioned | |
| 4.5 | b) L.T. winding (per phase at 75 deg C) | Ohm. | To be mentioned | |
| | c) Tap Winding (per phase at 75 deg C) | Ohm. | To be mentioned | |
| | Current density of : (as per design calculation) | 011111 | | |
| | a) H.T. winding, Amps/sq. mm | A/mm ² | To be mentioned | |
| 4.6 | b) L.T. winding, Amps/sq. mm | A/mm ² | To be mentioned | |
| | Outer, Inner & Mean dia of copper winding: | | | |
| | a) H.T. winding, | mm | To be mentioned | |
| 4.7 | b) L.T. winding, | mm | To be mentioned | |
| | c) Tap winding | mm | To be mentioned | |
| | Size of Copper conductor/bar : | | | |
| | a) H.T. winding | - | To be mentioned | |
| 4.8 | b) L.T. winding | | To be mentioned | |
| | c) Tap Winding | | To be mentioned | |
| | Number of Turns : | | | |
| | a) HT winding. | Nos. | To be mentioned | |
| 4.9 | b) LT winding | nos. | To be mentioned | |
| | c) Tap Winding | nos. | To be mentioned | |
| | Copper weight of windings: | 1105. | 10 00 mentioned | |
| | a) HT winding | Kg | To be mentioned | |
| 4.10 | b) LT winding | - | To be mentioned | |
| 4.10 | 0) L1 winding | Kg | ro be menuoned | |

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| | c) Tap Winding | Kg | To be mentioned | |
|------|------------------------------------------------|--------------------|-----------------|---|
| 4.11 | Total weight of copper windings | Kg | To be mentioned | |
| 4.12 | Type of insulation of : | - | | |
| | a) Tapping | | To be mentioned | |
| | b) Tapping connections | | | |
| | c) Core bolts | | | |
| | d) Core bolt washers | | | |
| | e) Side plates | | | |
| | f) Core laminations | | | |
| | Type of winding connections | - | To be mentioned | |
| 4.13 | (crimped or brazed) | | | |
| | Dimension of Transformer Tank: | | | |
| 4.14 | a) Length | mm | To be mentioned | |
| | b) Width | mm | To be mentioned | |
| | c) Height | mm | To be mentioned | |
| | Thickness of transformer Tank: | | | |
| | a) Top | mm | To be mentioned | |
| | b) Sides | mm | To be mentioned | |
| | c) Bottom | mm | To be mentioned | |
| | | | | |
| | Vacuum withstand capability of the tank | | | |
| 4.15 | Main tank | kpa | To be mentioned | |
| | Conservator | kpa | To be mentioned | |
| | Radiators | kpa | To be mentioned | |
| 4.16 | Provision of tank earthing and Core earthing | - | Yes | |
| 4.17 | Bladder / Air bag in Conservator | - | Yes | |
| 4.18 | Material used for gaskets for oil tight joints | mm | To be mentioned | |
| 5. | RADIATORS | | | |
| 5.1 | Thickness of radiator plates/ cooling tubes | mm | To be mentioned | |
| 5.2 | Equipment for ON cooling state | | | |
| | a) radiators on main tank | - | To be mentioned | |
| 5.3 | Number of radiators per transformer | Nos. | To be mentioned | |
| 5.4 | Dimension of each Radiator | _ | To be mentioned | |
| 5.5 | No. of Fins in each radiator | Nos. | To be mentioned | |
| 5.6 | Rating of each radiator bank | kW | To be mentioned | |
| 5.7 | Power rating of each Fan | kW | To be mentioned | |
| 5.8 | Air flow rate of Fan | m ³ /hr | To be mentioned | |
| 5.9 | Nos. of fans running at ONAF | Nos. | To be mentioned | |
| 5.10 | Nos. of Standby fans (Same Capacity & | Nos. | 2 | |
| 5.10 | Model no. as mentioned in 5.9) | 105. | ~ | |
| 6. | OIL VOLUME AND WEIGHT | 1 | | l |
| υ. | | | | |

| 6.1 | Type of oil | | Type- A, | | |
|------|---------------------------------------------------|--------|-------------------------------------------|-------|---------------|
| 0.1 | Type of on | - | Unused insulating | | |
| | | | mineral oil, free | | |
| | | | from PCB | | |
| | | | (polychlorinated | | |
| | | | biphenyl) | | |
| 6.2 | Manufacturer Name of oil | - | Shall be mentioned | | |
| 6.3 | Breakdown Voltage at 2.5mm gap between electrodes | - | >50 kV | | |
| 6.4 | Appearance | - | Liquid and free | | |
| | | | from suspended | | |
| | | | matter or sediment | | |
| 6.5 | Density at 20° C | - | 0.895 g/cm^3 | | |
| 6.6 | Elash point (Closed oup) | | (maximum) 140 [°] C (minimum) | | |
| 6.6 | Flash point (Closed cup) | - | | | |
| 6.7 | Kinematics Viscosity at -15 ⁰ C | - | 800 cSt. | | |
| 6.8 | Kinematics Viscosity at 20 ⁰ C | _ | (Maximum) 40 cSt. (Maximum) | | |
| | - | | · · / | | |
| 6.9 | Pour point | - | -30 [°] C (maximum) | | |
| 6.10 | Neutralization value | - | 0.3 mg KOH/g (maximum) | | |
| 6.11 | Neutralization value after oxidation | _ | 0.40 mg KOH/g | | |
| 0.11 | Neutralization value after oxidation | _ | (maximum) | | |
| 6.12 | Total sludge after oxidation | _ | 0.05% weight | | |
| | C | | (maximum) | | |
| 6.13 | PCB Content | - | Free from PCB | | |
| 6.14 | Water content | - | 25ppm (maximum) | | |
| 6.15 | Total oil required including cooler system | Litres | To be mentioned | | |
| 6.16 | Volume of oil above of the top yoke | Litres | To be mentioned | | |
| 6.17 | Total volume of conservator | Litres | To be mentioned | | |
| 6.18 | Weight of core and winding assembly | Tones | To be mentioned | | |
| 6.19 | Weight of each oil cooler bank complete with | Tones | To be mentioned | | |
| | oil if mounted separately from transformer | | | | |
| 6.20 | Total weights of complete transformer, | Tones | To be mentioned | | |
| | including attached radiators, voltage | | | | |
| | regulating equipment, all fittings and oil | | | | |
| 6.21 | Weight of transformer arranged for transport | Tones | To be mentioned | | |
| 6.22 | Brief description of transformer or parts | _ | To be mentioned | | |
| 0.22 | thereof subjected to short-circuit test or for | | | | |
| | which short-circuit calculations are available | | | | |
| - | | | | T T 7 | T TX 7 |
| 7. | TRANSFORMER BUSHING INSULATORS | | | LV | HV |
| 7.1 | Manufacture's name & country | - | To be mentioned | | |
| 7.2 | Insulator material | - | Porcelain | | |
| 7.3 | Bushing housing | | Porcelain | | |
| 7.4 | Bushing Current Rating at 75°C | A | To be mentioned | | |

| 7.5 | Insulator type and rated voltage | - | To be mentioned | |
|------|--------------------------------------------------|--------|------------------|--|
| 7.6 | Pitch circle diameter and drilling of flange | mm | To be mentioned | |
| | | approx | | |
| | | • | | |
| 7.7 | Length of Insulator (overall) | mm | To be mentioned | |
| 7.8 | Weight of Insulator | kg | To be mentioned | |
| 7.9 | One minute 50 Hz dry withstand routine test | kV | To be mentioned | |
| | voltage | | | |
| 7.10 | Lightning Impulse flashover voltage (1.2/50 | kV | To be mentioned | |
| | wave) | | | |
| 7.11 | Full wave Lightning Impulse Voltage | kV | To be mentioned | |
| | withstand | | | |
| 7.12 | 50 Hz wet withstand voltage across arcing | kV | To be mentioned | |
| | horns | | | |
| 7.13 | Under oil flashover voltage type test | kV | To be mentioned | |
| 7.14 | Total creepage distance of shedding | mm | Min. 25mm per kV | |
| 7.15 | Protected creepage distance of shedding | mm | To be mentioned | |
| 7.16 | Rated Short circuit Current withstand capability | | 31.5KA, 3sec | |
| 8. | BUSHING CTS 33 KV FOR DIFFERENTIAL | | | |
| | PROTECTION | • | | |
| 8.1 | Manufacturer's name & country | - | To be mentioned | |
| 8.2 | Rated Voltage | - | 33kV | |
| 8.3 | Rated maximum Voltage | - | 36kV | |
| 8.4 | Ratio | А | 400/5 | |
| 8.5 | Rated output | VA | 30 VA | |
| 8.6 | Accuracy class | - | 5P20 | |
| 8.7 | Knee Point Voltage | V | To be mentioned | |
| | (Supported by Calculation) | | | |
| 8.8 | Electrical Clearance from phase to phase | mm | To be mentioned | |
| 8.9 | Electrical Clearance phase to earth | mm | To be mentioned | |
| 9. | BUSHING CTS 11 KV FOR DIFFERENTIAL | | · · · | |
| | PROTECTION | | | |
| 9.1 | Manufacturer's name & country | - | To be mentioned | |
| 9.2 | Rated voltage | kV | 11 | |
| 9.3 | Rated maximum voltage | kV | 12 | |
| 9.4 | Ratio | А | 1200/5 | |
| 9.5 | Rated output | VA | 30 VA | |
| 9.6 | Accuracy class | - | 5P20 | |
| 9.7 | Knee Point Voltage | V | To be mentioned | |
| | (Supported by Calculation) | | | |
| | × 11 ···· / ·····/ | | 1 | |

| 10. | NEUTRAL BUSHING CTS 11 KV FOR SE PROTECTION | F & REF | | |
|------|--------------------------------------------------|---------|-------------------|--|
| 10.1 | Manufacturer's name & country | - | To be mentioned | |
| 10.2 | Rated voltage | kV | 11 | |
| 10.3 | Rated maximum voltage | kV | 12 | |
| 10.4 | Ratio | A | 1200/5-5A | |
| 10.5 | Rated output | VA | 30 VA | |
| 10.5 | Accuracy class | • • • • | 5P20 | |
| | - | - | To be mentioned | |
| 10.7 | Knee Point Voltage | V | To be mentioned | |
| | (Supported by Calculation) | | | |
| 11.0 | Oil Temperature Indicator | | | |
| | Manufacturer's name & country | - | To be mentioned | |
| | Model Number | - | To be mentioned | |
| | Alarm contact | - | 02 NO | |
| | Trip Contact | - | 02 NO | |
| | Cooling Fan Start & Stop Contact | | To be provided | |
| | Alarm & Trip Range | - | To be mentioned | |
| 12.0 | Oil Level Indicator | | | |
| | Manufacturer's name & country | - | To be mentioned | |
| | Model Number | - | To be mentioned | |
| | Alarm contact | - | 02 NO | |
| 13.0 | Winding Temperature Indicator | | To be mentioned | |
| | Manufacturer's name & country | - | To be mentioned | |
| | Model Number | - | To be mentioned | |
| | Alarm contact | - | 02 NO | |
| | Trip Contact | _ | 02 NO | |
| | Cooling Fan Start & Stop Contact | | To be provided | |
| | Alarm & Trip Range | _ | To be mentioned | |
| 14.0 | Dial Thermometer | | | |
| | Manufacturer's name & country | _ | To be mentioned | |
| | Model Number | _ | To be mentioned | |
| | Alarm Contact | _ | 02 NO | |
| | Trip Contact | _ | 02 NO | |
| 15.0 | Buchholz relay (Both for main tank & OLTC) | | Yes/No | |
| | Manufacturer's name & country | - | To be mentioned | |
| | Model Number | - | To be mentioned | |
| | Alarm contact | - | 02 NO | |
| | Trip Contact | - | 02 NO | |
| 16.0 | PRD (Both for main tank & OLTC) | - | Yes/No | |
| | Manufacturer's name & country | - | To be mentioned | |
| | Model Number | - | To be mentioned | |
| | Alarm contact | - | 02 NO | |
| | Trip Contact | - | 02 NO | |
| 17.0 | Is terminal permanent terminal marking provided? | - | Yes/No | |
| 18.0 | Parallel operation of identical transformer | - | Required | |
| 19.0 | Marshalling Box | - | Shall be provided | |

| 20.0 | Cilias Cal Dreathan | 1 | |
|------|-------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 20.0 | Silica Gel Breather | - | Shall be provided |
| 21.0 | Guaranteed Noise level as per IEC 551 | db | To be mentioned |
| 22.0 | Harmonics | | |
| | R.M.S. value of the fundamental current | Amp. | To be mentioned |
| | R.M.S. value of 3rd harmonics current | Amp | To be mentioned |
| | R.M.S. value of 5th harmonics current | Amp | To be mentioned |
| 23.0 | Type of paint applied internally | - | To be mentioned |
| 24.0 | Type of paint applied externally | - | To be mentioned |
| 25.0 | Type of weatherproof anti rust material primer | - | To be mentioned |
| 26.0 | Dimension of the transformer | - | |
| | Length | mm | To be mentioned |
| | Width | mm | To be mentioned |
| | Height | mm | To be mentioned |
| 27.0 | Standard | - | Design, Manufacture, Testing, Installation and performance shall be in accordance to the latest edition of the IEC 60076 |
| 28. | Manufacturer must comply all the features of Technical Specification (Section 7) | - | Yes |

Seal & Signature of the Manufacturer Seal & Signature of the Bidder

8. 18 Guaranteed Technical Particularsfor 33/ 0.415 KV, 3-Phase, 250kVA Station Auxiliary Transformer

(To be filled up by the Manufacturer in Manufacturer's Letterhead Pad with appropriate data, Otherwise bid shall be rejected. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. No. | mention only single country of origin as per ITT 6.3 for individua Description | BPD | • | Manufacturer's Guaranteed Data |
|------------|-----------------------------------------------------------------------------------|------------|-------------------------|--------------------------------------|
| 1 | a) Manufacturer's name & address With website, official domain email. | To b | e mentioned | |
| | b) Year of Manufacturing | Not | before 2023 | |
| | a) Manufacturer's name & address | To b | e mentioned | |
| | With website, official domain email. | | | |
| 2 | Manufacturer's Type & Model No. | To b | e mentioned | |
| 3 | KVA Rating | 250 | | |
| 4 | Number of Phases | 3 | | |
| 5 | Rated frequency, Hz | 50 | | |
| 6 | Rated primary voltage, KV | 33 | | |
| 7 | Rated no load sec. voltage, V | 415 | | |
| 8 | Vector group | Dyn | 11 | |
| 9 | Highest system voltage of : | | | |
| | a) Primary winding, KV | 36 | | |
| | b) Secondary winding, V | 457 | | |
| 10 | Basic insulation level, KVp | 170 | | |
| 11 | Power frequency withstand voltage, KV | | | |
| | a) HT Side | 70 | | |
| | b) LT Side | 2.5 | | |
| 12 | Type of cooling | ONA | N | |
| 13 | Max. Temp. Rise over 40°C of ambient support | ed by Calc | ulation (to be submi | tted) of Load Loss, |
| | Temperature Rise and Heat Dissipation by Rac | | | |
| | a) Windings deg. C | | 65 | |
| | b) Top oil deg. C | | 55 | |
| 14 | Type of primary tapping off load, % | | +3x2.5%, 0, -3x 2.5% | |
| 15 | Percentage Impedance at 75° C, %(supported l test report) | by type | 5% | |
| 16 | No-load loss, Watts(supported by type test rep | oort) | 812 | |
| 17 | Load losses at rated full load at 75°C, Watts(su by type test report) | pported | 3637 | |
| 18 | Magnetising current at normal voltage, Amps | | To be mentioned | |
| 19 | Efficiency at 75°C and 100% load : | | | |
| | a) at 1.0 power factor, % | | To be mentioned | |
| | b) at 0.8 power factor, % | | To be mentioned | |
| 20 | Efficiency at 75°C and 75% load : | | | |
| | a) at 1.0 power factor, % | | To be mentioned | |
| | b) at 0.8 power factor, % | | To be mentioned | |
| 21 | Efficiency at 75°C and 50% load : | | | |
| | a) at 1.0 power factor, % | | To be mentioned | |
| | b) at 0.8 power factor, % | | To be mentioned | |
| 22 | Efficiency at 75°C and 25% load : | | | |
| | a) at 1.0 power factor, % | | To be mentioned | |
| | | | To be mentioned | 1 |

| Sl. No. | Description | BPDB'S Requirement | Manufacturer's Guaranteed Data |
|------------|-----------------------------------------------------------------------------------|-----------------------|--------------------------------------|
| 23 | Regulation at full load : | | |
| | a) at 1.0 power factor, % | To be mentioned | |
| | b) at 0.8 power factor, % | To be mentioned | |
| | Transformer Oil : | | |
| 24 | a) Type of oil | Mineral | |
| | | Insulating Oil | |
| | b) Manufacturer's Name & Address | To be mentioned | |
| 25 | Total weight of oil, Kg | To be mentioned | |
| 26 | Breakdown Voltage at 2.5mm gap between electroe | des > 50 kV | |
| | Transformer Core : | | |
| 27 | Manufacturer's Name & Address | To be mentioned | |
| 28 | Total weight of core, Kg | To be mentioned | |
| 29 | Material of core & grading | To be mentioned | |
| 30 | Core Loss/ Kg, supported by Characteristic Curve& Core Manufacturer's Brochure | To be mentioned | |
| 31 | Thickness of core, mm | To be mentioned | |
| 32 | Core Dia, mm | To be mentioned | |
| 33 | Max. magnetic flux density, Tesla | < 1.7 | |
| | Transformer Windings : | | |
| 34 | Copper Conductor's Manufacturer Name & Address | s To be mentioned | |
| 35 | Material of windings | copper | |
| 36 | Winding resistance of : | | · |
| | a) H.T. winding, Ohm. (per phase at 75°C) | To be mentioned | |
| | b) L.T. winding, milli-Ohm. (per phase at 75°C) | To be mentioned | |
| 37 | Current density of : | | • |
| | a) H.T. winding, Amps/sq. mm | To be mentioned | |
| | b) L.T. winding, Amps/sq. mm | To be mentioned | |
| 38 | Outer, Inner & Mean dia of copper winding: | | · |
| | a) H.T. winding, mm | To be mentioned | |
| | b) L.T. winding, mm | To be mentioned | |
| 39 | Size of Copper Conductor : | | |
| | a) H.T. winding SWG, dia. in mm & area in mm ² | To be mentioned | |
| | b) L.T. winding SWG, area in mm ² | To be mentioned | |
| 40 | Number of Turns : | | • |
| | a) HT winding, nos. | To be mentioned | |
| | b) LT winding, nos. | To be mentioned | |
| 41 | Copper weight of windings : | | |
| | a) HT winding, Kg | To be mentioned | |
| | b) LT winding, Kg | To be mentioned | |
| 42 | Total weight of copper windings, Kg | To be mentioned | |
| 43 | Dimension of Transformer : | | · |
| | a) Width, mm(supported by type test report) | To be mentioned | |
| | b) Length, mm(supported by type test report) | To be mentioned | |
| | c) Height, mm(supported by type test report) | To be mentioned | |
| | d) Tank Sheet thickness of top, bottom & side, mm | To be mentioned | |
| | e) Total weight of transformer tank, Kg | To be mentioned | |
| 44 | a) Total weight of active part (core, coil and other | To be mentioned | |

| Sl. No. | Description | BPDB'S Requirement | Manufacturer's Guaranteed Data |
|------------|----------------------------------------------------------------------------------------------------|------------------------|--------------------------------------|
| | accessories), Kg | | |
| | b) Total weight of complete Transformer including | To be mentioned | |
| | fittings & oil, Kg | | |
| 45 | Type of breathings | To be mentioned | |
| 46 | Name of relevant IEC or other Equivalent Standard Design, manufacture, testing and performance. | s for To be mentioned | |
| 47 | Drawing : | | |
| | a) General Arrangement & Outline Dimensions | To be submitted | |
| | b) Internal Construction Details/ Sectional draw | | |
| | of active parts including Insulation arrangeme | | |
| | c) HT & LT Bushings with dimension & current | To be submitted | |
| | ratings | | |
| | d) Cross-section & Dimensional drawing of Core | & To be submitted | |
| | Windings | | |
| | e) Radiator with detail dimensional drawing | To be submitted | |
| | f) Tap changer with dimension & current rating | s. To be submitted | |
| 48 | Routine Test Report : | | |
| | a) Measurement of turn ratio test. | To be submitted | |
| | b) Vector group test. | To be submitted | |
| | c) Measurement of winding resistance. | To be submitted | |
| | d) Measurement of insulation resistance. | To be submitted | |
| | e) Measurement of no load loss & no-load curren | | |
| | f) Measurement of impedance voltage & load los | s. To be submitted | |
| | g) Dielectric withstands Tests. | To be submitted | |
| | h) Transformer oil test (including Tan delta). | To be submitted | |
| 49 | Type Tests report along with details test result | and drawings for 33/0 | .415KV, 250KVA, 3- |
| | Phase, Dyn11 Distribution Transformer from an i per IEC 60076. | ndependent testing Lab | oratory/ Institute as |
| | a) Impulse Voltage Withstands test. | To be submitted | |
| | b) Temperature Rise test. | To be submitted | |
| 50 | Short-circuit Tests Report for the offered 33/0.415 | | |
| | 200KVA, 3-Phase, Dyn11 Distribution Transformer | | |
| | per relevant IEC with detail test results & drawing | | |
| | from reputed independent testing Laboratory/ | | |
| | Institution or detail calculation on the basis of desi | gn | |
| | data by the manufacturer. | ~ | |
| 51. | Manufacturer must comply all the features of Technic | cal | |
| | Specification (Section 7) | Yes | |

Manufacturer's Seal & Signature

Bidder Seal & Signature

8.19 Guaranteed Technical Particulars for Single-Core, 800 mm² 33 kV XLPE Insulated Copper Cable

(To be filled up by the Manufacturer in Manufacturer's Letterhead Pad with appropriate data, Otherwise bid shall be rejected. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. No. | Description | Unit | Purchaser's Requirement | Manufacturer's Particulars |
|---------|--------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1 | Name of the Item | | 1CX800 mm ² 33 kV XLPE Insulated Copper Cables | |
| 2 | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Address of the Manufacturer | | Shall be mentioned | |
| 4 | Standard | | Performance, Design and Testing shall be in accordance to the BS, IEC, BDS or equivalent International standards. | |
| 5. | Country of Origin | | Shall be mentioned | |
| 6. | VOLTAGE Voltage between phases of three Phase circuit | | | |
| | U U _{max} | kV kV | 33 36 | |
| 7. | CORES | | | |
| | Number of Cores | No. | one | |
| 8. | Manufacturing Process | | CCV/VCV | |
| 9. | CONDUCTOR material | | Electrolytic annealed copper | |

| | cross sectional area | mm^2 | 800 |
|-----|------------------------------------------------|------------------|----------------------|
| | Min. No. &Dia of wires | Nos./mm | 91/ To be mentioned |
| 10. | CONDUCTOR SCREEN | | |
| | Material | | semi-conducting XLPE |
| | Nominal Thickness | mm | 0.8 |
| | Diameter over screen | mm | To be mentioned |
| 11. | INSULATION | | |
| | Material | | XLPE |
| | Type of dry curing | | Inert gas |
| | Nominal Thickness | mm | 8.0 |
| | Diameter of over Insulation | mm | To be mentioned |
| 12. | CORE SCREEN | | |
| | Material | | semi-conducting XLPE |
| | Nominal Thickness | mm | 0.5 |
| | Diameter over screen | mm | To be mentioned |
| 13 | METALLIC SCREEN | | |
| | Number and diameter of copper | No./mm | Based on Design |
| | screen strands | or | Calculation |
| | or | No./mm | |
| | Copper Wire with helically applied Copper Tape | with Thicknes | |
| | | s of tape | |
| 14. | SEPARATION SHEATH | | |
| | Material | | To be Mentioned |
| | Thickness of bedding | mm | 1.6 |
| 15. | Armour ARMOUR | No./mm | Based on Design |
| | Number & diameter of aluminum | or | Calculation |
| | wire | mm | |
| | or | | |

| | Thickness of Corrugated | | |
|-----|-----------------------------------------|-------|---------------------|
| | Aluminum sheath | | |
| 16. | OUTER COVERING | | |
| | Material | | Black extruded MDPE |
| | Minimum average thickness | mm | 2.8 |
| 17. | COMPLETED CABLE | | |
| | Overall diameter | mm | To be mentioned |
| | Weight per metre | kg | 9.8 |
| | Maximum drum length | m | 500 |
| 18. | CABLE DRUMS | | |
| | Material | | Steel |
| | Overall diameter | mm | To be mentioned |
| | Width | m | To be mentioned |
| | Gross weight (with cable) | kg | To be mentioned |
| 19. | CONTINUOUS CURRENT CARRYING CAPACITY | | |
| | Based on the conditions specified: | | |
| | One circuit | А | 950 |
| | Two circuits | А | 787 |
| | Three circuits | А | 685 |
| | In Air | | |
| | One circuit | А | 1240 |
| 20. | PERMISSIBLE OVERLOAD | | |
| | In Service Conditions | % | To be mentioned |
| | For a period of | Hours | To be mentioned |
| 21. | MAXIMUM CONDUCTOR TEMPERATURE | | |
| | Laid direct in ground | | |

| | Drawn into ducts | °C | 90 | |
|-----|------------------------------------|--------|-----------------------------|--|
| | Erected in air | °C | 90 | |
| | | °C | 90 | |
| | | C | | |
| 22. | CONDUCTOR SHORT CIRCUIT CURRENT | | | |
| | Carrying capacity for one second, | | | |
| | Cable load as above prior to | | | |
| | Short circuit and final conductor | | | |
| | Temperature of 250°C` | | | |
| | | | | |
| | | KA | 114.4 | |
| 23. | METALLIC LAYER/SHEATH | | | |
| | EARTH FAULT CURRENT | | | |
| | Carrying capacity for one second, | | 40(with detail calculation) | |
| | Cable loaded as above prior to | | | |
| | Earth fault | KA | | |
| 24. | MINIMUM RADIUS OF BEND | | 20 times of overall | |
| | Around which cable can be laid | m | diameter of cable | |
| 25. | MAXIMUM DC RESISTANCE | | | |
| | Per km of cable at 20°C | | | |
| | of conductor | ohm | 0.0221 | |
| | of metallic layer | ohm | To be mentioned | |
| 26. | MAXIMUM AC RESISTANCE | | | |
| | Of conductor per km of cable at | | | |
| | Maximum conductor temperature | ohm | 0.051 | |
| 27 | INSULATION RESISTANCE | | | |
| | Per km of cable per core | | | |
| | at 20°C | Megohm | 400 | |
| | at maximum rated temperature | Megohm | 40 | |
| 28. | EQUIVALENT STAR | | | |

| | REACTANE | | |
|-----|----------------------------------------------------------------|-------|-----------------|
| | Per km of 3 phase circuit at | Ohm/K | 0.103 |
| | Nominal frequency | m | |
| 29. | MAXIMUM ELECTROSTATIC | | |
| | CAPACITANCE | | |
| | Per Km of cable | μF | 0.307 |
| 30. | MAXIMUM INDUCED VOLTAGE | | |
| | On metallic layer/sheath | v | To be mentioned |
| | Under fault condition | v | To be mentioned |
| 31. | MAXIMUM CHARGING CURRENT | | |
| | | | |
| | Per core per metre of cable at | mA | To be mentioned |
| | Nominal voltage Uo | | |
| 32. | MAXIMUM DIELECTIC LOSS | | |
| | Of cable per metre of 3 phase | | |
| | circuit when laid direct in the ground at nominal voltage Uo | | |
| | and normal frequency at | | |
| | maximum conductor | | |
| | Temperature | | |
| | | W/m | 0.33 |
| 33. | METALLIC SHEATH LOSS | | |
| | Of cable per metre of 3 phase | | |
| | circuit, At nominal voltage Uo, normal frequency And at the | | |
| | specified current rating | | |
| | | W | To be mentioned |
| | | | |
| 34. | MAXIMUM PULLING TENSION | kg | To be mentioned |
| 35. | Manufacturer must comply all the | | Yes |
| | features of Technical | | |

| Specification (Section 7). | | |
|----------------------------|--|--|
| | | |

Seal and Signature of the manufacturer: Seal and Signature of the Bidder:

8.19 Guaranteed Technical Particulars of Single-Core, 500 mm² 33 kV XLPE Insulated Copper Cable

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. No. | Description | Unit | Purchaser's | Manufacturer's |
|---------|---------------------------------|-----------------|------------------------------|----------------|
| | | | Requirement | Particulars |
| 1 | Name of the Item | - | 1CX500 mm ² 33 kV | |
| | | | XLPE Insulated Copper | |
| | | | Cables | |
| 2 | Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain | | | |
| 3 | email. Year of Manufacturing | Yr. | Not before 2023 | |
| 4 | Standard | | Performance, Design and | |
| 7 | Standard | - | Testing shall be in | |
| | | | accordance to the BS, IEC, | |
| | | | BDS or equivalent | |
| | | | International standards. | |
| 5. | Country of Origin | _ | Shall be mentioned | |
| | | - | Shan be mentioned | |
| 6. | VOLTAGE | | | |
| | Voltage between phases of three | | | |
| | Phase circuit | | | |
| | U | kV | 33 | |
| | U _{max} | kV | 36 | |
| 7. | Manufacturing Process | | CCV/VCV | |
| 8. | CORES | | | |
| | Number of Cores | No. | one | |
| 9. | CONDUCTOR | | | |
| | material | 2 | Electrolytic annealed | |
| | cross sectional area | mm ² | copper | |
| | Min. No. & Dia of wires | Nos./mm | 500 | |
| | | | 61/ To be mentioned | |
| 10. | CONDUCTOR SCREEN | | | |
| | Material | | semi-conducting XLPE | |
| | Nominal Thickness | mm | 0.8 | |
| | Diameter over screen | mm | To be mentioned | |
| 11. | INSULATION | | | |
| | Material | | XLPE | |
| | Type of dry curing | | Inert gas | |
| | Nominal Thickness | mm | 8.0 | |
| | Diameter of over Insulation | mm | To be mentioned | |
| 12. | CORE SCREEN | | | |
| | Material | | semi-conducting XLPE | |
| | Nominal Thickness | mm | 0.5 | |
| | Diameter over screen | mm | To be mentioned | |

| 13. | METALLIC SCREEN | No./mm | |
|-----|-------------------------------|-----------|---------------------|
| 15. | | or | Based on |
| | Number and diameter of copper | No./mm | |
| | screen strands | with | Design Calculation |
| | or | Thickness | |
| | Copper Wire with helically | of tape | |
| | applied Copper Tape | - | |
| 14. | SEPARATION SHEATH | | |
| | | | |
| | Material | | To be mentioned |
| | Thickness of bedding | mm | 1.6 |
| 15. | ARMOUR | | |
| | Number & diameter of amour | No./mm | Based on Design |
| | wire | or | Calculation |
| | or | mm | |
| | Thickness of Corrugated | | |
| | Aluminum sheath | | |
| 16. | OUTER COVERING | | |
| | Material | | Black extruded MDPE |
| | Minimum average thickness | mm | 2.6 |
| 17. | COMPLETED CABLE | | |
| | Overall diameter | mm | 52 |
| | Weight per metre | kg | 6.2 |
| | Maximum drum length | m | 500 |
| 18. | CABLE DRUMS | | |
| | Material | | Steel |
| | Overall diameter | mm | To be mentioned |
| | Width | m | To be mentioned |
| | Gross weight (with cable) | kg | To be mentioned |
| 19. | CONTINUOUS CURRENT | | |
| | CARRYING CAPACITY | | |
| | Based on the conditions | | |
| | specified: | А | 702 |
| | One circuit | А | 579 |
| | Two circuits | А | 504 |
| | Three circuits | | |
| | In Air | А | 877 |
| | One circuit | | |
| 20. | PERMISSIBLE OVERLOAD | | |
| | In Service Conditions | % | To be mentioned |
| | For a period of | Hours | To be mentioned |
| 21. | MAXIMUM CONDUCTOR | | |
| | TEMPERATURE | | |
| | Laid direct in ground | °C | 90 |
| | Drawn into ducts | °C | 90 |
| | Erected in air | °C | 90 |
| L | | C | |

| 22. | CONDUCTOR SHORT | | | |
|-----|-----------------------------------|--------|------------------------------|--|
| | CIRCUIT CURRENT | KA | 71.5 | |
| | Carrying capacity for one second, | | | |
| | Cable load as above prior to | | | |
| | Short circuit and final conductor | | | |
| | Temperature of 250°C` | | | |
| 23. | METALLIC LAYER/SHEATH | | | |
| | EARTH FAULT CURRENT | KA | 40 (with detail calculation) | |
| | Carrying capacity for one second, | | | |
| | Cable loaded as above prior to | | | |
| | Earth fault | | | |
| 24. | MINIMUM RADIUS OF BEND | | 20 times of overall | |
| | Around which cable can be laid | m | diameter of cable | |
| 25. | MAXIMUM DC RESISTANCE | | | |
| | Per km of cable at 20°C | | | |
| | of conductor | ohm | 0.0366 | |
| | of metallic layer | ohm | To be mentioned | |
| 26. | MAXIMUM AC RESISTANCE | | | |
| | Of conductor per km of cable at | | | |
| | Maximum conductor temperature | ohm | 0.051 | |
| 27. | INSULATION RESISTANCE | | | |
| | Per km of cable per core | | | |
| | at 20°C | Megohm | 400 | |
| | at maximum rated temperature | Megohm | 40 | |
| 28. | EQUIVALENT STAR | | | |
| | REACTANE | | | |
| | Per km of 3 phase circuit at | Ohm/K | 0.122 | |
| | Nominal frequency | m | | |
| 29. | MAXIMUM ELECTROSTATIC | | | |
| | CAPACITANCE | | | |
| | Per Km of cable | μF | 0.307 | |
| 30. | MAXIMUM INDUCED | | | |
| | VOLTAGE | | | |
| | On metallic layer/sheath | V | To be mentioned | |
| | Under fault condition | | | |
| 31. | MAXIMUM CHARGING | | | |
| | CURRENT | | | |
| | Per core per metre of cable at | mA | To be mentioned | |
| | Nominal voltage Uo | | | |
| 32. | MAXIMUM DIELECTIC LOSS | | | |
| | Of cable per metre of 3 phase | W/m | 0.33 | |
| | circuit when laid direct in the | | | |
| | ground at nominal voltage Uo | | | |
| | and normal frequency at | | | |
| | maximum conductor | | | |

| | Temperature | | | |
|-----|----------------------------------------------|----|-----------------|--|
| 33. | METALLIC SHEATH LOSS | | | |
| | Of cable per metre of 3 phase | W | To be mentioned | |
| | circuit, At nominal voltage Uo, | | | |
| | normal frequency And at the | | | |
| | specified current rating | | | |
| 34. | MAXIMUM PULLING | kg | 3500 Kg | |
| | TENSION | | | |
| 35 | Manufacturer must comply all the features of | 1 | Yes | |
| | Technical Specification (Section 7) | - | | |

Seal and Signature of the manufacturer:

Seal and Signature of the Bidder:

8.20 Guaranteed Technical Particulars of 11kV, XLPE, 3C x 185mm² COPPER CABLE

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. No | Description | Unit | Purchaser's Requirement | Manufacturer's Particulars |
|-----------|--------------------------------------------------------------------------|-----------------|-------------------------------|-------------------------------|
| • | | | | |
| 1 | Name of the Item | - | 3C x185 mm ² 11 kV | |
| | | | XLPE Insulated Copper | |
| | | | Cables | |
| 2 | Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| 3 | Year of Manufacturing | Yr. | Not before 2023 | |
| 4 | Standard | - | Performance, Design and | |
| | | | Testing shall be in | |
| | | | accordance to the BS, | |
| | | | IEC, BDS or equivalent | |
| | | | International standards. | |
| | Country of Origin | - | To be mentioned | |
| 5. | VOLTAGE | | | |
| | Voltage between phases of three | | | |
| | Phase circuit | | | |
| | U | kV | 11 | |
| | U _{max} | kV | 12 | |
| 6. | CORES | | | |
| | Number of Cores | No. | Three | |
| | Manufacturing Process | | To be mentioned | |
| 7. | CONDUCTOR | | | |
| | material | 2 | Electrolytic annealed | |
| | cross sectional area | mm ² | copper | |
| | Min. No. & Dia of wires | Nos./mm | 185 | |
| | | | 37/ To be mentioned | |
| 8. | CONDUCTOR SCREEN | | | |
| | Material | | semi-conducting XLPE | |
| | Nominal Thickness | mm | 0.5 | |
| | Diameter over screen | mm | To be mentioned | |
| 9. | INSULATION Material | | VIDE | |
| | Material | | XLPE | |
| | Type of dry curing Nominal Thickness | mm | Inert gas 3.4 | |
| | Diameter of over Insulation | mm | To be mentioned | |
| 10. | CORE SCREEN | mm | | |
| 10. | Material | | somi conducting VI DE | |
| | Nominal Thickness | mm | semi-conducting XLPE 0.5 | |
| | Inominiai Thickness | mm | 0.5 | |

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| | Diameter over screen | mm | To be mentioned |
|-----|------------------------------------|-----------|---------------------|
| 11. | METALLIC SCREEN | | |
| | Number and diameter of copper | No./mm | Based on Design |
| | screen strands | or | Calculation |
| | or | No./mm | |
| | Copper Wire with helically | with | |
| | applied Copper Tape | Thickness | |
| | | of tape | |
| 12. | INNER JACKET | | |
| | Material | | PVC |
| | Nominal Thickness | mm | 1.7 |
| | External diameter | mm | To be mentioned |
| 13. | ARMOUR | | |
| | Number & diameter of amour | No./mm | Based on Design |
| | wire | or | Calculation |
| | or | mm | |
| | Thickness of Corrugated | | |
| | Aluminium sheath | | |
| 14. | OUTER COVERING | | |
| | Material | | Black extruded MDPE |
| | Minimum average thickness | mm | 3.1 |
| 15. | COMPLETED CABLE | | |
| | Overall diameter | mm | 64 |
| | Weight per metre | kg | 7.8 |
| | Maximum drum length | m | 250 |
| 16. | CABLE DRUMS | | |
| | Material | | Steel |
| | Overall diameter | mm | To be mentioned |
| | Width | m | To be mentioned |
| | Gross weight (with cable) | kg | To be mentioned |
| 17. | CONTINUOUS CURRENT | - | |
| | CARRYING CAPACITY | | |
| | Based on the conditions specified: | | |
| | One circuit | А | 403 |
| | Two circuits | А | 329 |
| | Three circuits | А | 285 |
| | In Air | | |
| | One circuit | А | 440 |
| 18. | PERMISSIBLE OVERLOAD | | |
| | In Service Conditions | % | To be mentioned |
| | For a period of | Hours | To be mentioned |
| 19. | MAXIMUM CONDUCTOR | | |
| | TEMPERATURE | | |
| | Laid direct in ground | °C | 90 |
| | Drawn into ducts | °C | 90 |
| | Erected in air | Ĩ | 90 |

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| | | °C | |
|-----|-----------------------------------------------------------------|--------|---------------------|
| 20. | CONDUCTOR SHORT | ~ | |
| 20. | CIRCUIT CURRENT | | |
| | Carrying capacity for one second, | | |
| | Cable load as above prior to Short | | |
| | circuit and final conductor | | |
| | Temperature of 250°C` | KA | 26.5 |
| 21. | METALIC SCREEN EARTH | | 20.5 |
| 21. | FAULT CURRENT | | |
| | Carrying capacity for one second, | KA | 25 (with detail |
| | Cable loaded as above prior to | IX Y | calculation) |
| | Earth fault | | |
| 22. | MINIMUM RADIUS OF BEND | | 20 times of overall |
| 22. | Around which cable can be laid | m | diameter of cable |
| 23. | MAXIMUM DC RESISTANCE | | |
| 20. | Per km of cable at 20°C | | |
| | of conductor | ohm | 0.0.0991 |
| | of metallic layer | ohm | To be mentioned |
| 24. | MAXIMUM AC RESISTANCE | | |
| 21. | Of conductor per km of cable at | | |
| | Maximum conductor temperature | ohm | 0.129 |
| 25. | INSULATION RESISTANCE | | |
| | Per km of cable per core | | |
| | at 20°C | Megohm | 400 |
| | at maximum rated temperature | Megohm | 40 |
| 26. | EQUIVALENT STAR | | |
| | REACTANE | | |
| | Per km of 3 phase circuit at | Ohm/Km | 0.103 |
| | Nominal frequency | | |
| 27. | MAXIMUM ELECTROSTATIC | | |
| | CAPACITANCE | | |
| | Per Km of cable | μF | 0.412 |
| 28. | MAXIMUM INDUCED | | |
| | VOLTAGE | | |
| | On metallic layer/sheath | V | To be mentioned |
| | Under fault condition | | |
| 29. | MAXIMUM CHARGING | | |
| | CURRENT | | |
| | Per core per metre of cable at | mA | To be mentioned |
| | Nominal voltage Uo | | |
| 30. | MAXIMUM DIELECTIC LOSS | | |
| | of cable per metre of 3 phase | | |
| | circuit when laid direct in the | W/m | 0.44 |
| 1 I | ground at nominal voltage Us and | | |
| | ground at nominal voltage Uo and normal frequency at maximum | | |

| | conductor Temperature | | | |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------|--|
| 31. | METALLIC SHEATH LOSS Of cable per metre of 3 phase circuit, At nominal voltage Uo, normal frequency And at the specified current rating | W | To be mentioned | |
| 32. | MAXIMUM PULLING TENSION | kg | 1295 Kg | |
| 33 | Manufacturer must comply all the features of Technical Specification (Section 7) | - | Yes | |

Seal & Signature of the Manufacturer

Seal & Signature of the Bidder

8.21 Guaranteed Technical Particulars of Termination Kit all type XLPE COPPER CABLE

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | | Purchaser's | Manufacturer's |
|----------|----------------------|--------------------------------------------|----------------|
| Item No. | Description of Items | Requirement | Particulars |
| : | Amplication | For 33KV, 1-core, XLPE 500 mm ² | |
| i | Application | Copper Conductors | |
| ii | Installation | For underground horizontal | |
| 11 | Instantation | mounting | |
| iii | System | 33KV, effectively earthed | |
| | 5 y 5 c 5 i 1 | system | |
| iv | Cable conductor | 500 mm ² 1-core, Copper | |
| 17 | | Conductors | |
| v | Construction | The joint shall be proof against | |
| • | | ingress of moisture and water | |
| | | - Compression ferrules | - |
| | | - Valid filling tape | |
| | | - Heat shrinkable stress | |
| | | control tubing | |
| | | - Truck resistant sealant tape | |
| | | - Heat shrinkable high voltage | |
| | | insulating tape | |
| | Kit content | - Heat shrinkable black/red | |
| vi | | dual wall | |
| VI | Kit content | - Estomeric tube | |
| | | - Roll spring | |
| | | - Heat shrinkable outer jacket | |
| | | tube | |
| | | - Cable preparation kit | |
| | | - Solderless earth connection | |
| | | kit | |
| | | - Misc. other material | |
| | | - Installation instructions | |

(A) Straight-through joint box for 33KV XLPE, 1-Core, 500 mm² Copper cable

| (B) Indo | or Termination | n Kits for 1 | 33KV, X | LPE, 1-Cor | re, 500 mm ² | Copper cable |
|----------|----------------|--------------|---------|------------|-------------------------|---------------------|
|----------|----------------|--------------|---------|------------|-------------------------|---------------------|

| Item No. | Description of Items | Purchaser's Requirement | Manufacturer's Particulars |
|----------|-------------------------|---------------------------------------------------|-------------------------------|
| i | Application | For 33KV, 1-core, XLPE 500 mm ² Copper | |

| | | Conductors | |
|-----|-----------------|-----------------------------------------------|---|
| ii | Installation | For Indoor switchgear terminations | |
| iii | System | 33KV, effectively earthed system | |
| iv | Cable conductor | 500 mm ² 1-core, Copper Conductors | |
| v | Kit content | - Heat shrinkable high voltage | - |
| | | insulating and non- tracking tubing | |
| | | - Heat shrinkable stress control | |
| | | tubing | |
| | | - Stress relieving mastic strip | |
| | | - Truck resistant sealant tape | |
| | | - Cable preparation kit | |
| | | - Solderless earth connection kit | |
| | | - Compression lugs for 500 mm ² | |
| | | Copper Conductors | |
| | | - Installation instructions | |

(C) Outdoor Termination Kits for 33KV, XLPE, 1-Core, 500 mm² Copper cable

| Item No. | Description of Items | Purchaser's Requirement | Manufacturer's Particulars |
|----------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| i | Application | For 33KV, 1-core, XLPE 500 mm ² Copper Conductors | |
| ii | Installation | For outdoor installation on poles/structures | |
| iii | System | 33KV, effectively earthed system | |
| iv | Cable conductor | 500 mm ² 1-core Copper Conductors | |
| V | Kit content | Heat shrinkable high voltage insulating and non-tracking tubing Heat shrinkable stress control tubing Stress relieving mastic strip Truck resistant sealant tape Heat shrinkable truck resistant rain skirt Support insulator Cable preparation kit Solderless earth connection kit Compression lugs for 500 mm² Copper Conductors Support insulators Tee Brackets Installation instructions | - |

| Item No. | Description of Itoms | Purchaser's | Manufacturer's |
|----------|------------------------------------------------------------------------------|-------------------------------------------|----------------|
| Item no. | Description of items | Requirement | Particulars |
| i | Application | For 33KV, 3-core, XLPE 95 mm ² | |
| 1 | Application | Copper Conductors | |
| ii | Installation | For underground horizontal | |
| 11 | Instantation | mounting | |
| iii | Description of ItemsApplicationInstallationSystemCable conductorConstruction | 33KV, effectively earthed | |
| 111 | | system | |
| iv | Application Installation System Cable conductor Construction | 95 mm ² 3-core, Copper | |
| ĨV | | Conductors | |
| V | Construction | The joint shall be proof against | |
| • | Construction | ingress of moisture and water | |
| | | - Compression ferrules | - |
| | | - Valid filling tape | |
| | | - Heat shrinkable stress | |
| | | control tubing | |
| | | - Truck resistant sealant tape | |
| | | - Heat shrinkable high voltage | |
| | | insulating tape | |
| | | - Heat shrinkable black/red | |
| vi | Kit content | dual wall | |
| VI | Kit content | - Estomeric tube | |
| | | - Roll spring | |
| | | - Heat shrinkable outer jacket | |
| | | tube | |
| | | - Cable preparation kit | |
| | | - Solderless earth connection | |
| | | kit | |
| | | - Misc. other material | |
| L | | - Installation instructions | |

(D) Straight-through joint box for 33KV XLPE, 3-Core, 95 mm² Copper cable

(E) Indoor Termination Kits for 33KV, XLPE, 3-Core, 95 mm² Copper cable

| Item No. | Description of Items | Purchaser's Requirement | Manufacturer's Particulars |
|----------|-------------------------|---------------------------------------------------------------|-------------------------------|
| i | Application | For 33KV, 3-core, XLPE 95mm ² Copper Conductors | |
| ii | Installation | For Indoor switchgear terminations | |

| iii | System | 33KV, effectively earthed system | |
|-----|-----------------|----------------------------------------------|---|
| iv | Cable conductor | 95 mm ² 3-core, Copper Conductors | |
| v | Kit content | - Heat shrinkable high voltage | - |
| | | insulating and non- tracking tubing | |
| | | - Heat shrinkable stress control | |
| | | tubing | |
| | | - Stress relieving mastic strip | |
| | | - Truck resistant sealant tape | |
| | | - Cable preparation kit | |
| | | - Solderless earth connection kit | |
| | | - Compression lugs for 3X95 mm ² | |
| | | Copper Conductors | |
| | | - Installation instructions | |

| (F) Outdoor Termination Kits for 33KV, XLPE, 3-Core, 95mm ² | Copper cable |
|------------------------------------------------------------------------|--------------|
|------------------------------------------------------------------------|--------------|

| | Description of | Purchaser's | Manufacturer's |
|----------|-----------------|--------------------------------------------------|----------------|
| Item No. | Items | Requirement | Particulars |
| i | Application | For 33KV, 3-core, XLPE 95 mm ² Copper | |
| | | Conductors | |
| ii | Installation | For outdoor installation on | |
| | | poles/structures | |
| iii | System | 33KV, effectively earthed system | |
| iv | Cable conductor | 95 mm ² 3-core Copper Conductors | |
| v | Kit content | - Heat shrinkable high voltage | - |
| | | insulating and non- tracking tubing | |
| | | - Heat shrinkable stress control | |
| | | tubing | |
| | | - Stress relieving mastic strip | |
| | | - Truck resistant sealant tape | |
| | | - Heat shrinkable truck resistant rain | |
| | | skirt | |
| | | - Support insulator | |
| | | - Cable preparation kit | |
| | | - Solderless earth connection kit | |
| | | - Compression lugs for 3X95 mm ² | |
| | | Copper Conductors | |
| | | - Support insulators Tee Brackets | |
| | | - Installation instructions | |

| Item No. | Description of Itoms | Purchaser's | Manufacturer's |
|----------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------|
| Item No. | Description of items | Requirement | Particulars |
| ; | Application | For 11KV, 3-core, XLPE 185 mm ² | |
| 1 | Description of ItemsApplicationInstallationSystemCable conductorConstruction | Copper Conductors | |
| ii | Installation | For underground horizontal | |
| 11 | Installation System Cable conductor | mounting | |
| iii | Application Installation System Cable conductor Construction | 11KV, effectively earthed | |
| | | system | |
| iv | Application Installation System Cable conductor Construction | 185 mm ² 3-core, Copper | |
| 1. | | Conductors | |
| V | Construction | The joint shall be proof against | |
| | | ingress of moisture and water | |
| | ii Installation iii System iv Cable conductor v Construction | - Compression ferrules | - |
| | | - Valid filling tape | |
| | | - Heat shrinkable stress | |
| | | control tubing | |
| | | - Truck resistant sealant tape | |
| | | - Heat shrinkable high | |
| | | voltage insulating tape | |
| | | - Heat shrinkable black/red dual wall | |
| vi | Kit content | | |
| | | - Estomeric tube | |
| | | - Roll spring | |
| | | - Heat shrinkable outer jacket tube | |
| | | | |
| | | Cable preparation kitSolderless earth connection | |
| | | kit | |
| | | - Misc. other material | |
| | | - Installation instructions | |
| | | - Instantation Instructions | |

(K) Indoor Termination Kits for 11KV, XLPE, 3-Core, 185mm² Copper cable

| Item No. | Description of Items | Purchaser's Requirement | Manufacturer's Particulars |
|----------|-------------------------|----------------------------------------------------------------|-------------------------------|
| i | Application | For 11KV, 3-core, XLPE 185mm ² Copper Conductors | |
| ii | Installation | For Indoor switchgear terminations | |
| iii | System | 11KV, effectively earthed system | |
| iv | Cable conductor | 185 mm ² 3-core, Copper Conductors | |

| V | Kit content | - Heat shrinkable high voltage | - |
|---|-------------|---------------------------------------------|---|
| | | insulating and non- tracking tubing | |
| | | - Heat shrinkable stress control | |
| | | tubing | |
| | | - Stress relieving mastic strip | |
| | | - Truck resistant sealant tape | |
| | | - Cable preparation kit | |
| | | - Solderless earth connection kit | |
| | | - Compression lugs for $3x185 \text{ mm}^2$ | |
| | | Copper Conductors | |
| | | - Installation instructions | |

(L) Outdoor Termination Kits for 11KV, XLPE, 3-Core, 185mm² Copper cable

| Itom No | Description of | Purchaser's | Manufacturer's |
|----------|-----------------|----------------------------------------------|----------------|
| Item No. | Items | Requirement | Particulars |
| i | Application | For 11KV, 3-core, XLPE 185 mm ² | |
| | | Copper Conductors | |
| ii | Installation | For outdoor installation on | |
| | | poles/structures | |
| iii | System | 11KV, effectively earthed system | |
| iv | Cable conductor | 185 mm ² 3-core Copper Conductors | |
| v | Kit content | - Heat shrinkable high voltage | - |
| | | insulating and non- tracking tubing | |
| | | - Heat shrinkable stress control | |
| | | tubing | |
| | | - Stress relieving mastic strip | |
| | | - Truck resistant sealant tape | |
| | | - Heat shrinkable truck resistant rain | |
| | | skirt | |
| | | - Support insulator | |
| | | - Cable preparation kit | |
| | | - Solderless earth connection kit | |
| | | - Compression lugs for 3x180 mm ² | |
| | | Copper Conductors | |
| | | - Support insulators Tee Brackets | |
| | | - Installation instructions | |

Seal & Signature of the Manufacturer

Seal & Signature of the Bidder

8.22 GUARANTEED TECHNICAL PARTICULARS FOR Three-Core, 95 mm²33 kV XLPE INSULATED COPPER CABLES

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| - | shall be non-responsive.) | | | | | |
|------------|---------------------------------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------|--|--|
| Sl. No. | Description | Unit | Purchaser's Requirement | Manufacturer's Particulars | | |
| 1 | Name of the Item | | 3CX95mm ² 11kV XLPE | | | |
| | | | Insulated Copper Cables | | | |
| | a) Manufacturer's name & address | - | To be mentioned | | | |
| 2 | With website, official domain email. | | | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | | | |
| 3 | Country of Origin | | To be mentioned | | | |
| - | | | | | | |
| 4 | Standard | | Performance, Design and Testing shall be in accordance to the BS, IEC, BDS or Equivalent International Standard. | | | |
| | Country of Origin | | To be mentioned | | | |
| 5 | VOLTAGE Voltage between phase of three Phase | | | | | |
| | circuit | | | | | |
| | U | kV | 11 | | | |
| | U _{max} | kV | 12 | | | |
| | Manufacturing Process | | CCV/VCV | | | |
| 6 | CORES | | | | | |
| | Number of Cores | No. | Three | | | |
| 7 | CONDUCTOR | | | | | |
| | Material | | Electrolytic Annealed Copper | | | |
| | Cross Sectional Area | mm^2 | 95 | | | |
| | Min. No. & Diameter of Wires | Nos./mm | 15/To be mentioned | | | |
| 8 | CONDUCTOR SCREEN | | | | | |
| | Material | | Semi-Conducting XLPE | | | |
| | Nominal Thickness | mm | 0.80 | | | |
| | Diameter over Screen | mm | To be mentioned | | | |
| 9 | INSULATION | | | | | |
| | Material | | XLPE | | | |
| | Type of Dry Curing | | Inert Gas | | | |
| | Nominal Thickness | mm | 8.00 | | | |
| | Diameter over Insulation | mm | To be mentioned | | | |
| 10 | INSULATION SCREEN | | | | | |
| | Material | | Semi-Conducting XLPE | | | |
| | Nominal Thickness | mm | 0.50 | | | |
| | Diameter over Screen | mm | To be mentioned | | | |
| 11 | METAL SCREEN | | | | | |
| | Number and Diameter of Copper Screen Strands | No./mm | Based on Design Calculation | | | |
| | Or Copper Wire with Helically Applied Copper Tape | No./mm | Based on Design Calculation | | | |

| 10 | CEDADATION CHEATH | | | |
|----|------------------------------------------------|------------|-----------------------------------|--|
| 12 | SEPARATION SHEATH | | | |
| | Material | | To be mentioned | |
| | Thickness of Bedding | mm | 1.80 | |
| 13 | ARMOUR | | | |
| | Number & Diameter of Armour Wire | No./mm | Based on Design | |
| | Tumber & Diameter of Armour whe | 110./11111 | Calculation | |
| | Or | | | |
| | Thickness of Corrugated Aluminum | | Based on Design | |
| | Sheath | mm | Calculation | |
| 14 | OUTER COVERING | | | |
| | Material | | Black Extruded MDPE | |
| | Minimum Average Thickness | mm | 3.10 | |
| 15 | COMPLETED CABLE | | | |
| 10 | Overall Diameter | mm | 92.90 | |
| | Weight per Meter | kg | 10.05 | |
| | Maximum Drum Length | - | 500 | |
| | CABLE DRUMS | m | 500 | |
| 10 | Material | | Steel | |
| | | | | |
| | Overall Diameter | mm | To be mentioned | |
| | Width | mm | To be mentioned | |
| | Gross Weight (with cable) | kg | To be mentioned | |
| 17 | CONTINUOUS CURRENT CARRYING CAPACITY | | | |
| | Based on the conditions specified: | | | |
| | One Circuit | А | 239 | |
| | Two Circuit | А | 191 | |
| | Three Circuit | А | 165 | |
| | In Air: | | | |
| | One Circuit | А | 279 | |
| 18 | PERMISSIBLE OVERLOAD | | | |
| | In Service Conditions | % | To be mentioned | |
| | For a period of | Hours | To be mentioned | |
| 19 | MAXIMUM CONDUCTOR TEMPERATURE | 110 010 | | |
| 17 | Laid Direct in Ground | °C | 90 | |
| | Drawn into Ducts | °C | 90 | |
| | Erected in Air | °C | 90 90 | |
| 20 | CONDUCTOR SHORT CIRCUIT CURRENT | | 70 | |
| 20 | Carrying Capacity for One Second, Cable | | | |
| | Load as above prior to Short Circuit and Final | | | |
| | Conductor Temperature of 250°C | kA | 13.59 | |
| 21 | METALLIC LAYER/SHEATH | | | |
| | EARTH FAULT CURRENT | | | |
| | Carrying Capacity for One Second, Cable | | | |
| | Loaded as above prior to Earth Fault | kA | Min. 40 (with detail calculation) | |
| 22 | MINIMUM RADIUS OF BEND | | | |
| | Around which Cable can be Laid | m | 15 times of overall diameter of | |
| | | m | cable | |
| 23 | MAXIMUM DC RESISTANCE | | | |
| | Per km of Cable at 20°C: | | | |
| | of Conductor | ohm | 0.193 | |
| | of Metallic Layer | ohm | To be mentioned | |
| 24 | MAXIMUM AC RESISTANCE | | | |
| | Of Conductor per km of Cable at | ohm | 0.247 | |
| L | | 51111 | 0.2 . , | |

| | Maximum Conductor Temperature | | | |
|----|---------------------------------------------------------------------------------------------------|--------|-----------------|--|
| 25 | INSULATION RESISTANCE | | | |
| | Per km of Cable per Core: | | | |
| | At 20°C | Megohm | 400 | |
| | At Maximum Rated Temperature | Megohm | 40 | |
| 26 | EQUIVALENT STAR REACTANCE | | | |
| | Per km of 3 Phase Circuit at Nominal | | | |
| | Frequency | ohm/km | 0.128 | |
| 27 | MAXIMUM ELECTROSTATIC CAPACITANCE | | | |
| | Per km of Cable | μF | 0.165 | |
| 28 | MAXIMUM INDUCED VOLTAGE | | | |
| | On Metallic Layer/Sheath Under Fault Condition | V | To be mentioned | |
| 29 | MAXIMUM CHARGING CURRENT | | | |
| | Per Core per Meter of Cable at Nominal Voltage U ₀ | mA | To be mentioned | |
| 30 | MAXIMUM DIELECTRIC LOSS | | | |
| | Of Cable per Meter of 3 Phase Circuit when Laid Direct in the Ground at Nominal voltage U_0 and | | | |
| | Nominal Frequency at Maximum Conductor | | 0.0=40 | |
| | Temperature | W/m | 0.0748 | |
| 31 | METALLIC SHEATH LOSS | | | |
| | Of Cable per Meter of 3 Phase Circuit, At Nominal Voltage U_0 , Normal Frequency and at | | | |
| | the Specified Current Rating | W | To be mentioned | |
| 32 | MAXIMUM PULLING TENSION | kg | To be mentioned | |
| | Manufacturer must comply all the | | Yes | |
| 33 | features of Technical Specification | | | |
| | (Section 7) | | | |

Seal and Signature of the manufacturer:

Seal and Signature of the Bidder:

8.23 Guaranteed Technical Particulars for Single-Core, 630 mm² 11 kV XLPE Insulated Copper

Cable

| SI. | Description | Unit | Purchaser's | Manufacturer |
|-----|-------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------|----------------|
| No. | | | Requirement | 's Particulars |
| 1 | Name of the Item | | 1CX630 mm ² 11 kV XLPE | |
| | | | Insulated Copper Cables | |
| 2 | a) Manufacturer's name & address with website, official domain | - | To be mentioned | |
| | email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | | Performance, Design and Testing shall be in accordance to the BS, IEC, BDS or equivalent International standards. | |
| 5. | Country of Origin | | | |
| 6. | VOLTAGE | | | |
| | Voltage between phases of three | | | |
| | Phase circuit | kV | 11 | |
| | U | kV | 12 | |
| | U _{max} | | | |
| 7. | Manufacturing Process | | CCV/VCV | |
| 8. | CORES | | | |
| | Number of Cores | No. | one | |
| 9. | CONDUCTOR | | Electrolytic annealed copper | |
| | material | | 630 | |
| | cross sectional area | mm^2 | 61/ To be mentioned | |
| | Min. No. & Dia of wires | Nos./m | | |
| | | m | | |
| 10. | CONDUCTOR SCREEN | | | |
| | Material | | semi-conducting | |
| | Nominal Thickness | mm | 0.8 | |
| | Diameter over screen | mm | To be mentioned | |
| 11. | INSULATION | | | |
| | Material | | XLPE | |
| | Type of dry curing | | Inert gas | |
| | Nominal Thickness | mm | 3.8 | |
| | Diameter of over Insulation | mm | To be mentioned | |
| 12. | INSULATION SCREEN | | | |
| | Material | | semi-conducting | |
| | Nominal Thickness | mm | 0.5 | |

(To be filled up by the Manufacturer in Manufacturer's Letterhead Pad with appropriate data, Otherwise bid shall be rejected. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| | Diameter over screen | mm | To be mentioned | |
|-----|------------------------------------|---------|-----------------------------|--|
| 13. | METALLIC SCREEN | | | |
| | Number and diameter of copper | No./mm | | |
| | screen strands | or | Based on Design Calculation | |
| | or | No./mm | 6 | |
| | Copper Wire with helically | with | | |
| | applied Copper Tape | Thickne | | |
| | | ss of | | |
| | | tape | | |
| 14. | SEPARATION SHEATH | - | | |
| | Material | | To be mentioned | |
| | Thickness of bedding | mm | 1.2 | |
| 15. | ARMOUR | | | |
| | Number & diameter of amour wire | No./mm | Based on Design Calculation | |
| | or | or | _ | |
| | Thickness of Corrugated | mm | | |
| | Aluminium sheath | | | |
| 16. | OUTER COVERING | | | |
| | Material | | Black extruded MDPE | |
| | Minimum average thickness | mm | 2.5 | |
| 17. | COMPLETED CABLE | | | |
| | Overall diameter | mm | To be mentioned | |
| | Weight per metre | kg | 7.0 | |
| | Maximum drum length | m | 500 | |
| 18. | CABLE DRUMS | | | |
| | Material | | Steel | |
| | Overall diameter | mm | To be mentioned | |
| | Width | m | To be mentioned | |
| | Gross weight (with cable) | kg | To be mentioned | |
| 19. | CONTINUOUS CURRENT | | | |
| | CARRYING CAPACITY | | | |
| | Based on the conditions specified: | | | |
| | One circuit | А | 695 | |
| | Two circuits | А | 564 | |
| | Three circuits | А | 487 | |
| | In Air | | | |
| | One circuit | А | 858 | |
| 20. | PERMISSIBLE OVERLOAD | | | |
| | In Service Conditions | % | To be mentioned | |
| | For a period of | Hours | To be mentioned | |
| 21. | MAXIMUM CONDUCTOR | | | |
| | TEMPERATURE | | | |
| | Laid direct in ground | °C | 90 | |
| | Drawn into ducts | °C | 90 | |
| | Erected in air | °C | 90 | |

| 22. | CONDUCTOR SHORT | | | |
|-----|-------------------------------------------------------------------------|-------|------------------------------|--|
| 22. | CIRCUIT CURRENT | | | |
| | | | | |
| | Carrying capacity for one second, Cable load as above prior to Short | KA | 71.5 | |
| | circuit and final conductor | KA | /1.5 | |
| | Temperature of 250°C` | | | |
| 23. | METALIC SCREEN EARTH | | | |
| 23. | FAULT CURRENT | | | |
| | Carrying capacity for one second, | KA | 25 (with detail calculation) | |
| | Cable loaded as above prior to | КА | 25 (with detail calculation) | |
| | Earth fault | | | |
| 24. | MINIMUM RADIUS OF BEND | | 20 times of overall diameter | |
| | Around which cable can be laid | m | of cable | |
| 25. | MAXIMUM DC RESISTANCE | | | |
| | Per km of cable at 20°C | | | |
| | of conductor of metallic layer | ohm | 0.0366 | |
| | | | | |
| 26. | MAXIMUM AC RESISTANCE | | | |
| | Of conductor per km of cable at | | | |
| | Maximum conductor temperature | ohm | 0.053 | |
| 27. | INSULATION RESISTANCE | | | |
| | Per km of cable per core | | | |
| | at 20°C | Megoh | 400 | |
| | at maximum rated temperature | m | 40 | |
| | | Megoh | | |
| | | m | | |
| 28. | EQUIVALENT STAR | | | |
| | REACTANE | | 0.400 | |
| | Per km of 3 phase circuit at | Ohm/K | 0.102 | |
| | Nominal frequency | m | | |
| 29. | MAXIMUM ELECTROSTATIC | | | |
| | CAPACITANCE | | 0.600 | |
| 20 | Per Km of cable | μF | 0.628 | |
| 30. | MAXIMUM INDUCED | | | |
| | VOLTAGE | V | To be montioned | |
| | On metallic layer/sheath Under fault condition | V | To be mentioned | |
| 31. | MAXIMUM CHARGING | | | |
| 51. | CURRENT | | | |
| | Per core per meter of cable at | mA | To be mentioned | |
| | Nominal voltage Uo | | | |
| 32. | MAXIMUM DIELECTIC LOSS | | | |
| 52. | Of cable per meter of 3 phase | | | |
| | circuit when laid direct in the | | | |
| | ground at nominal voltage Uo and | | | |
| | Broand at nominal voltage 00 and | | | |

| | normal frequency at maximum | W/m | 0.33 | |
|-----|----------------------------------|-----|-----------------|--|
| | conductor Temperature | | | |
| 33. | METALLIC SHEATH LOSS | | | |
| | Of cable per meter of 3 phase | | | |
| | circuit, At nominal voltage Uo, | | | |
| | normal frequency And at the | W | To be mentioned | |
| | specified current rating | | | |
| 34. | MAXIMUM PULLING | kg | To be mentioned | |
| | TENSION | | | |
| 35. | Manufacturer must comply all the | | Yes | |
| | features of Technical | | | |
| | Specification (Section 7) | | | |

Seal and Signature of the manufacturer:

Seal and Signature of the Bidder:

8.24 GUARANTEED TECHNICAL PARTICULARS FOR FOUR CORE, 120 mm² PVC Insulated and PVC Sheathed Copper Cable

| Sl. No. | Description | Unit | Purchaser's Requirement | Manufacturer's Particulars |
|---------|--------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 1 | Name of the Item | | 4CX120 sq. mm PVC Insulated and PVC Sheathed Cables | |
| 2 | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | | Performance Design and Testing shall be in accordance to the BS, IEC, BDS or equivalent International standards. | |
| 5 | Cable Size | mm ² | 4CX120 | |
| 6 | Material | - | PVC Insulated and PVC Sheathed plain annealed copper | |
| 7 | Numbers & Diameter of wires | mm | Min. 30 Wires | |
| 8 | Shaped of conductor | - | Sector Shaped | |
| 9 | Maximum resistance at 30°C | Ω/km | 0.1010 | |
| 10 | Nominal thickness of insulation | mm | 2.00 | |
| 11 | Colour of insulation | - | Red, Yellow, Blue, Black | |
| 12 | Nominal thickness of inner sheath | mm | 1.60, Black | |
| 13 | Nominal thickness of sheath | mm | 2.80 | |
| 14 | Colour of sheath | - | Black | |
| 15 | Approximate Outer-diameter | mm | 56.30 | |

(To be filled up by the Manufacturer in Manufacturer's Letterhead Pad with appropriated data)

| 16 | Approximate weight | kg/km | 8725 | |
|----|----------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------|--|
| 17 | Continuous permissible service voltage | V | 600/1000 | |
| 17 | Current rating at 30°C ambient temperature in U/G | Amps | 330 | |
| 18 | Current rating at 35°C ambient temperature in air | Amps | 350 | |
| 20 | Drum wound length | М | 500 | |
| 21 | Net Weight | kg | Shall be mentioned | |
| 22 | Gross weight | kg | Shall be mentioned | |
| 23 | Treated Wooden Drum Standard | | AWPA C ₁ -82, C ₂ -83, C ₁₆ -82, P ₅ -83 | |
| 24 | Manufacturer must comply all the features of Technical Specification (Section 7) | | Yes | |

Seal and Signature of the Manufacture:

8.25 Guaranteed Technical Particulars of Single-Core, 150 mm² PVC Insulated and PVC Sheathed **Copper Cable.**

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be no

| | | • \ | |
|--------|------|-------|--|
| on-res | pons | 1ve.) | |
| | Pono | | |

| Sl. | Description | Unit | Purchaser's | Manufacturer's |
|-----|----------------------------------------|-----------------|-------------------------------------------------------------------------------------------|----------------|
| No. | L L | | Requirement | Particulars |
| 1 | Name of the Item | - | 1C x 150 sq. mm PVC Insulated | |
| | | | and PVC Sheathed Cables | |
| 2 | a) Manufacturer's name & address | - | To be mentioned | |
| | | | | |
| | With website, official domain | | | |
| | email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | - | Performance Design and Testing | |
| | | | shall be in accordance to the BS, | |
| | | | IEC, BDS or equivalent | |
| | | | International standards. | |
| 5 | Cable Size | mm ² | 1C x 150 | |
| 6 | Material | - | PVC Insulated and PVC | |
| | | | Sheathed plain annealed copper. | |
| 7 | Numbers & Diameter of wires | Mm | Min 18 Wires | |
| 8 | Maximum DC resistance at 30 deg. | Ω/Κ | 0.124 | |
| | С | Μ | | |
| 9 | Nominal thickness of insulation | Mm | 1.8 | |
| 10 | Nominal thickness of sheath | Mm | 1.8 | |
| 11 | Colour of sheath | | Black | |
| 12 | Approximate outer diameter | Mm | 21.9 | |
| 13 | Approximate weight | Kg/K M | 1640 | |
| 14 | Continuous permissible service voltage | V | 600/1000 | |
| 15 | Current rating at 30 deg. C ambient | Amp | 350 | |
| | temperature U/G | s | | |
| 16 | Current rating at 35 deg. C ambient | Amp | 405 | |
| | in air | s | | |
| 17 | Drum wound length | М | 500 | |
| 18 | Net Weight | Kg | Shall be mentioned | |
| 19 | Gross weight | Kg | Shall be mentioned | |
| 20 | Treated Wooden Drum Standard | - | AWPA C ₁ – 82, C ₂ –83, C ₁₆ –82, P ₅ –83. | |
| 21 | Manufacturer must comply all the | - | Yes | |
| | features of Technical Specification | | | |
| | (Section 7) | | | |

Seal and Signature of the manufacturer:

8.26 Guaranteed Technical Particulars of Single-Core, 120 mm²PVC Insulated and PVC Sheathed Copper Cable for grounding system

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be

| | | n-respons | | |
|-----|--------------------------------------|-----------|-----------------------------------------------|----------------|
| SI. | Description | Uni | Purchaser's | Manufacturer's |
| No. | | t | Requirement | Particulars |
| 1 | Name of the Item | - | 1C x 120 sq. mm PVC Insulated | |
| | | | and PVC Sheathed Cables | |
| 2 | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | - | Performance Design and Testing | |
| | | | shall be in accordance to the BS, | |
| | | | IEC, BDS or equivalent | |
| | | | International standards. | |
| 5 | Cable Size | mm^2 | 1C x 120 | |
| 6 | Material | - | PVC Insulated and PVC | |
| | | | Sheathed plain annealed copper. | |
| 7 | Numbers & Diameter of wires | Mm | Min 18 Wires | |
| 8 | Maximum resistance at 30 deg. C | Ω/Κ | 0.153 | |
| | | Μ | | |
| 9 | Nominal thickness of insulation | Mm | 1.6 | |
| 10 | Nominal thickness of sheath | Mm | 1.8 | |
| 11 | Color of sheath | | Black | |
| 12 | Approximate outer diameter | Mm | 20.0 | |
| 13 | Approximate weight | Kg/ | 1340 | |
| | | КЙ | | |
| 14 | Continuous permissible service | V | 600/1000 | |
| | voltage | | | |
| 15 | Current rating at 30 deg. C ambient | Am | 310 | |
| | temperature U/G | ps | | |
| 16 | Current rating at 35 deg. C ambient | Am | 350 | |
| | in air | ps | | |
| 17 | Drum wound length | M | 500 | |
| 18 | Net Weight | Kg | Shall be mentioned | |
| 19 | Gross weight | Kg | Shall be mentioned | |
| 20 | Treated Wooden Drum Standard | - | AWPA C ₁ – 82, C ₂ –83, | |
| 01 | | | C ₁₆ -82, P ₅ -83. | |
| 21 | Manufacturer must comply all the | - | Yes | |
| | features of Technical Specification | | | |
| | (Section 7) | | | |

Seal and Signature of the manufacturer

8.27 Guaranteed Technical Particulars of 4CX2.5 mm² PVC Insulated and PVC Sheathed Copper Cable

| Sl. | Description | Unit | Purchaser's | Manufacturer's |
|-----|------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------|----------------|
| No. | | | Requirement | Particulars |
| 1 | Name of the Item | - | 4C x 2.5 mm ² PVC Insulated and PVC Sheathed Copper Cable with Armouring | |
| 2 | a) Manufacturer's name &addressWith website, official domain | - | To be mentioned | |
| | email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | - | Performance Design and Testing shall be in | |
| | | | accordance to the BS, IEC, | |
| | | | BDS or equivalent | |
| | | | International standards. | |
| 5 | Cable Size | mm ² | $4CX2.5 \text{ mm}^2$ | |
| 6 | Material | | Plain annealed Copper | |
| | | | Cable | |
| 7 | Numbers & Diameter of | mm | 7/0.67 | |
| | Copper wires | | | |
| 8 | Diameter of Steel wires | mm | 1.4 | |
| 9 | Thickness of Steel Tape | mm | To be mentioned | |
| 10 | Maximum resistance at 30 deg. C | Ω/ΚΜ | 7.28 | |
| 11 | Nominal thickness of insulation | mm | 0.8 (min.) | |
| 12 | Nominal thickness of sheath | mm | 1.8 (min) | |
| 13 | Colour of sheath | | Black | |
| 14 | Colour of Core | | Red, Yellow, Blue, Black | |
| 15 | Approximate outer diameter | mm | 17 | |
| 16 | Approximate weight | Kg/KM | 670 | |
| 17 | Drum wound length | М | 1000 | |
| 18 | Net Weight | Kg | Shall be mentioned | |
| 19 | Gross weight | Kg | Shall be mentioned | |
| 20 | Treated Wooden Drum Standard | - | AWPA $C_1 - 82$, $C_2 - 83$, $C_{16} - 82$, | |
| 01 | | | P ₅ -83. | |
| 21 | Manufacturer must comply all | - | Yes | |

| the features of Technical | | |
|---------------------------|--|--|
| Specification (Section 7) | | |

Seal & Signature of the Manufacturer

8.28 Guaranteed Technical Particulars of 4CX6 mm² PVC Insulated and PVC Sheathed Copper Cable

| Sl. | Description | Unit | Purchaser's | Manufacturer's |
|-----|----------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------|----------------|
| No. | | | Requirement | Particulars |
| 1 | Name of the Item | - | 4Cx6 mm ² PVC Insulated and PVC Sheathed Copper Cable with Armouring | |
| 2 | a) Manufacturer's name & address With website, official domain email. | - | To be mentioned | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | - | Performance Design and Testing shall be in accordance to the BS, IEC, BDS or equivalent International standards. | |
| 5 | Cable Size | mm ² | 4Cx6 mm ² | |
| 6 | Material | | Plain annealed Copper Cable | |
| 7 | Numbers & Diameter of Copper wires | mm | 7/1.04 | |
| 8 | Numbers & Diameter of Steel wires | mm | 4x0.8 | |
| 9 | Nominal size of Steel Tape | mm | 0.25 | |
| 10 | Maximum resistance at 30 deg. C | Ω/ΚΜ | 3.20 | |
| 11 | Nominal thickness of insulation | mm | 1.0 (min.) | |
| 12 | Nominal thickness of sheath | mm | 1.8 (min) | |
| 13 | Colour of sheath | - | Black | |
| 14 | Colour of Core | - | Red, Yellow, Blue, Black | |
| 15 | Approximate outer diameter | mm | 21 | |
| 16 | Approximate weight | Kg/KM | 920 | |
| 17 | Drum wound length | М | 1000 | |
| 18 | Net Weight | Kg | Shall be mentioned | |
| 19 | Gross weight | Kg | Shall be mentioned | |
| 20 | Treated Wooden Drum Standard | - | $\begin{array}{c} AWPA \ C_1 - 82, \\ C_2 - 83, \ C_{16} - 82, \end{array}$ | |

| | | | P ₅ -83. | |
|----|------------------------------|---|---------------------|--|
| 21 | Manufacturer must comply all | - | Yes | |
| | the features of Technical | | | |
| | Specification (Section 7) | | | |

Seal & Signature of the Manufacturer

8.29 Guaranteed Technical Particulars of 4Cx4 mm² PVC Insulated and PVC Sheathed Copper Cable

| Sl. | Description | Unit | Purchaser's | Manufacturer's |
|-----|----------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------|----------------|
| No. | | | Requirement | Particulars |
| 1 | Name of the Item | - | 4Cx4 mm ² PVC Insulated and PVC Sheathed Copper Cable with Armouring | |
| 2 | a) Manufacturer's name & addressWith website, official domain | - | To be mentioned | |
| | email. b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | - | Performance Design and Testing shall be in accordance to the BS, IEC, BDS or equivalent International standards. | |
| 5 | Cable Size | mm ² | 4Cx4 mm ² | |
| 6 | Material | | Plain annealed Copper Cable | |
| 7 | Numbers & Diameter of Copper wires | mm | 7/0.85 | |
| 8 | Numbers & Diameter of Steel wires | mm | 4x0.8 | |
| 9 | Nominal size of Steel Tape | mm | 0.25 | |
| 10 | Maximum resistance at 30 deg. C | Ω/ΚΜ | 1.90 | |
| 11 | Nominal thickness of insulation | mm | 1.0 (min.) | |
| 12 | Nominal thickness of sheath | mm | 1.8 (min) | |
| 13 | Colour of sheath | - | Black | |
| 14 | Colour of Core | - | Red, Yellow, Blue, Black | |
| 15 | Approximate outer diameter | mm | 20 | |
| 16 | Approximate weight | Kg/KM | 810 | |
| 17 | Drum wound length | М | 1000 | |
| 18 | Net Weight | Kg | Shall be mentioned | |
| 19 | Gross weight | Kg | Shall be mentioned | |
| 20 | Treated Wooden Drum Standard | - | AWPA $C_1 - 82$, $C_2 - 83$, $C_{16} - 82$, $P_5 - 83$. | |

| 21 | Manufacturer must comply all | - | Yes | |
|----|------------------------------|---|-----|--|
| | the features of Technical | | | |
| | Specification (Section 7) | | | |

Seal & Signature of the Manufacturer

8.30 Guaranteed Technical Particulars of 8Cx2.5 mm² PVC Insulated and PVC Sheathed Copper Cable

| Sl. | Description | Unit | Purchaser's | Manufacturer's |
|-----|---------------------------------|-----------------|------------------------------------------|----------------|
| No. | _ | | Requirement | Particulars |
| 1 | Name of the Item | - | 8Cx2.5 mm ² PVC | |
| | | | Insulated | |
| | | | and PVC Sheathed | |
| | | | Copper Cable with | |
| | | | Armouring | |
| 2 | a) Manufacturer's name & | - | To be mentioned | |
| | address | | | |
| | | | | |
| | With website, official domain | | | |
| | email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | - | Performance Design and | |
| | | | Testing shall be in | |
| | | | accordance to the BS, IEC, | |
| | | | BDS or equivalent | |
| | | | International standards. | |
| 5 | Cable Size | mm ² | $8Cx2.5 \text{ mm}^2$ | |
| 6 | Material | - | Plain annealed Copper | |
| | | | Cable | |
| 7 | Numbers & Diameter of | mm | 7/0.67 | |
| | Copper wires | | | |
| 8 | Numbers & Diameter of Steel | mm | 4x0.8 | |
| | wires | | | |
| 9 | Nominal size of Steel Tape | mm | 0.25 | |
| 10 | Maximum resistance at 30 deg. | Ω/KM | 1.19 | |
| | С | | | |
| 11 | Nominal thickness of insulation | mm | 0.8 (min.) | |
| 12 | Nominal thickness of sheath | mm | 1.8 (min) | |
| 13 | Colour of sheath | - | Black | |
| 14 | Colour of Core | - | Red, Yellow, Blue, Black | |
| 15 | Approximate outer diameter | mm | 24 | |
| 16 | Approximate weight | Kg/KM | 1140 | |
| 17 | Drum wound length | М | 1000 | |
| 18 | Net Weight | Kg | Shall be mentioned | |
| 19 | Gross weight | Kg | Shall be mentioned | |
| 20 | Treated Wooden Drum | - | AWPA C ₁ – 82, | |
| | Standard | | C ₂ -83, C ₁₆ -82, | |

| | | | P ₅ -83. | |
|----|------------------------------|---|---------------------|--|
| 21 | Manufacturer must comply all | - | Yes | |
| | the features of Technical | | | |
| | Specification (Section 7) | | | |

Seal and Signature of the manufacturer:

8.31 Guaranteed Technical Particulars of 16CX2.5 mm² PVC Insulated and PVC Sheathed Copper Cable

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. | Description | Unit | Purchaser's | Manufacturer's |
|-----|--------------------------------------|-----------------|----------------------------|----------------|
| No. | | | Requirement | Particulars |
| 1 | Name of the Item | - | $16Cx2.5 mm^2 PVC$ | |
| | | | Insulated | |
| | | | and PVC Sheathed | |
| | | | Copper Cable with | |
| | | | Armouring | |
| 2 | a) Manufacturer's name & address | - | To be mentioned | |
| | With website, official domain email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | - | Performance Design and | |
| | | | Testing shall be in | |
| | | | accordance to the BS, IEC, | |
| | | | BDS or equivalent | |
| | | | International standards. | |
| 5 | Cable Size | mm ² | $16Cx2.5 \text{ mm}^2$ | |
| 6 | Material | | Plain annealed Copper | |
| | | | Cable | |
| 7 | Numbers & Diameter of | mm | 7/0.67 | |
| | Copper wires | | | |
| 8 | Numbers & Diameter of Steel | mm | 4x0.8 | |
| | wires | | | |
| 9 | Nominal size of Steel Tape | mm | 0.25 | |
| 10 | Maximum resistance at 30 deg. | Ω/KM | 7.69 | |
| | C | | | |
| 11 | Nominal thickness of insulation | mm | 0.8 (min.) | |
| 12 | Nominal thickness of sheath | mm | 1.8 (min) | |
| 13 | Colour of sheath | | Black | |
| 14 | Colour of Core | | Red, Yellow, Blue, Black | |
| 15 | Approximate outer diameter | mm | 25 | |
| 16 | Approximate weight | Kg/KM | 1430 | |
| 17 | Drum wound length | М | 1000 | |
| 18 | Net Weight | Kg | Shall be mentioned | |
| 19 | Gross weight | Kg | Shall be mentioned | |
| 20 | Treated Wooden Drum | - | AWPA $C_1 - 82$, | |

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| | | Standard | | C ₂ -83, C ₁₆ -82, | |
|---|----|------------------------------|---|------------------------------------------|--|
| | | | | P ₅ -83. | |
| 4 | 21 | Manufacturer must comply all | - | Yes | |
| | | the features of Technical | | | |
| | | Specification (Section 7) | | | |

Seal and Signature of the manufacturer:

8.32 Guaranteed Technical Particulars of 24Cx2.5 mm² PVC Insulated and PVC Sheathed Copper Cable

| Sl. | Description | Unit | Purchaser's | Manufacturer's |
|-----|------------------------------------|-----------------|------------------------------------------|----------------|
| No. | | | Requirement | Particulars |
| 1 | Name of the Item | - | 24Cx2.5 mm ² PVC Insulated | |
| | | | and PVC Sheathed Copper | |
| | | | Cable with Armouring | |
| 2 | a) Manufacturer's name & | - | To be mentioned | |
| | address | | | |
| | With website, official domain | | | |
| | email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| 3 | Country of Origin | | To be mentioned | |
| 4 | Standard | - | Performance Design and | |
| | | | Testing shall be in accordance | |
| | | | to the BS, IEC, BDS or | |
| | | | equivalent International | |
| | | | standards. | |
| 5 | Cable Size | mm ² | 24Cx2.5 mm ² | |
| 6 | Material | | Plain annealed Copper Cable | |
| 7 | Numbers & Diameter of | mm | 7/0.67 | |
| | Copper wires | | | |
| 8 | Numbers & Diameter of Steel | mm | 4x0.8 | |
| | wires | | | |
| 9 | Nominal size of Steel Tape | mm | 0.25 | |
| 10 | Maximum resistance at 30 deg. C | Ω/ΚΜ | 7.69 | |
| 11 | Nominal thickness of insulation | mm | 0.8 (min.) | |
| 12 | Nominal thickness of sheath | mm | 1.8 (min) | |
| 13 | Colour of sheath | - | Black | |
| 14 | Colour of Core | - | Red, Yellow, Blue, Black | |
| 15 | Approximate outer diameter | mm | 28 | |
| 16 | Approximate weight | Kg/K | 1730 | |
| | | М | | |
| 17 | Drum wound length | М | 1000 | |
| 18 | Net Weight | Kg | Shall be mentioned | |
| 19 | Gross weight | Kg | Shall be mentioned | |
| 20 | Treated Wooden Drum | - | AWPA $C_1 - 82$, | |
| | Standard | | C ₂ -83, C ₁₆ -82, | |
| | | | P ₅ -83. | |
| 21 | Manufacturer must comply all | - | Yes | |

| the features of Technical | |
|---------------------------|--|
| Specification (Section 7) | |

Seal and Signature of the manufacturer:

8.33 Guaranteed Technical Particulars of ACSR MARTIN

| Sl. | Description | non-respo Unit | Purchaser's | Manufacturer |
|-----|---------------------------------------------|-------------------|--------------------------------|------------------|
| No | Description | Umt | Requirement | 's Particulars |
| 1 | Name of the Item | _ | ACSR MARTIN | s i al ticular s |
| 2 | Name of the Manufacturer | _ | Shall be mentioned | |
| 3 | Address of the Manufacturer | _ | Shall be mentioned | |
| 4 | Standard | _ | Performance Design and | |
| т | Standard | | Testing shall be in accordance | |
| | | | to the BS, IEC, ASTM, BDS or | |
| | | | equivalent International | |
| | | | standards. | |
| 5 | Installation | - | Overhead | |
| 6 | Туре | - | Stranded | |
| 7 | Material | - | Hard drawn Aluminium | |
| 0 | | | steel reinforced | |
| 8 | Overall diameter | mm | 36.17 | |
| 9 | Nominal cross sectional area of | mm ² | 772.10 | |
| 10 | conductor | NT / | 54/4.02 | |
| 10 | Number/diameter of Aluminium | No./m | 54/4.02 | |
| 11 | Strand Nominal Aluminium cross sectional | m mm^2 | <u>(95.40</u> | |
| 11 | | mm | 685.40 | |
| 12 | area Number/diameter of Steel Strand | No./m | 19/2.41 | |
| 12 | Number/drameter of Steel Strand | m | 19/2.41 | |
| 13 | Nominal Steel cross sectional area | mm^2 | 86.70 | |
| 14 | Weight of conductor | Kg/K | 2590 | |
| 14 | Weight of conductor | M | 2370 | |
| 15 | Drum wound length | M | 500 | |
| 16 | Net weight | Kg | Shall be mentioned | |
| 17 | Gross weight | Kg | Shall be mentioned | |
| 18 | Maximum DC Resistance of | Ω/KM | 0.0425 | |
| | Conductor at 20 °C | | | |
| 19 | Minimum breaking Load of | Kg | min 11400 | |
| | Conductor | 0 | | |
| 20 | Maximum working tension of | KN | Shall be mentioned | |
| | conductor | | | |
| 21 | Current rating at 35°C rise over | Amps. | Shall be mentioned | |
| | 40°C ambient temperature (75°C) | | | |
| 22 | Practical (final) modulus of | hbar | 7700 | |
| | elasticity | | | |
| 23 | Co-efficient of linear expansion | /°C | shall be mentioned | |
| 24 | Aluminum to Steel Ratio | | Shall be mentioned | |
| 25 | Lay length for Outermost Layer of | mm | Shall be mentioned | |
| | Aluminium | | | |
| 26 | Lay direction for Outermost Layer | - | Right hand | |
| | of Aluminium | | | |
| 27 | Lay ratio for Outermost Layer of | - | 10-14 | |
| • • | Aluminium | | | |
| 28 | Treated Wooden Drum Standard | - | AWPA $C_1 - 82$, $C_2 - 83$, | |

| | | | C ₁₆ -82, P ₅ -83. | |
|----|----------------------------------------------------------------------|---|------------------------------------------|--|
| 29 | Manufacturer must comply all the features of Technical Specification | - | Yes | |
| | (Section 7) | | | |

Seal and Signature of the manufacturer:

8.34 Guaranteed Technical Particulars for Disc Insulator

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| C1 | | responsive.) Purchaser's | Manufaatumania |
|-----|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| SI. | Description | | Manufacturer's |
| No. | Nouse of the House | Requirement | Particulars |
| 01. | Name of the Item | Disc Insulator | |
| 02. | a) Manufacturer's name & address | To be mentioned | |
| | With website, official domain email. | | |
| | b) Year of Manufacturing | Not before 2023 | |
| | C) Country of Origin | To be mentioned | |
| 03. | Manufacturer's Code No. | To be mentioned | |
| 04. | Standard | Performance, Design and Testing shall be in accordance to the BS, IEC, ASTM, BDS or equivalent International standards. | |
| 05. | Installation | Overhead | |
| 05. | | Disc | |
| 00. | Type Material | Porcelain | |
| 07. | Creepage Distance | 292 mm | |
| 08. | Flash over voltage | | |
| 09. | Power Frequency, Dry Power Frequency, Wet | 78 kV 45 kV | |
| 10. | Withstand Voltage Power Frequency, Dry Power Frequency, Wet | 70 kV 40 kV | |
| 11. | Power Frequency Puncture Voltage | 110 kV | |
| 12. | 50% Impulse flashover Positive | 120 kV | |
| 13. | 50% Impulse flashover Negative | 125 kV | |
| 14. | Mechanical Failing Load | 70 KN | |
| 15. | Nominal Diameter | 255 mm | |
| 17. | Minimum Spacing | 146 mm | |
| 18 | Dry Arching Distance minimum | 171 mm | |
| 19 | Coupling Size | 16 mm | |
| 20 | Weight in Kg | To be mentioned | |
| 21 | Manufacturer must comply all the features of Technical Specification (Section 7) | Yes | |

Seal and Signature of the manufacturer:

8.35 Guaranteed Technical Particulars of 33 KV Bus bar insulator string

| | | non-resp | (0151 ve.) | Manafaat |
|------------|---------------------------------------------|----------|--------------------------|---------------------------------------------|
| Sl. No. | Description | Unit | BPDB's Requirement | Manufacturer's guaranteed Particulars |
| | a) Manufacturer's name & | - | To be mentioned | |
| | address | | | |
| 1 | | | | |
| | With website, official domain | | | |
| | email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | C) Country of Origin | | To be mentioned | |
| 2 | Manufacturer's model no. | - | To be mentioned | |
| 3 | Insulator material | - | Porcelain | |
| 4 | Number of units per string | Nos. | 4 | |
| 5 | Insulator Voltage Class | KV | 15 | |
| 6 | Insulator Materials | | Porcelain | |
| 7 | Type of Insulator | - | Ball and socket type | |
| | | | disc, security clip made | |
| | | | of rod brass alloy. | |
| 8 | Creepage/ leakage distance (min.) | mm | 298 | |
| 9 | Total creepage distance of string | mm | 850 | |
| 10 | Unit Spacing | mm | 146 | |
| 11 | Dry Arcing distance (minimum) | mm | 1968 | |
| 12 | Diameter of Insulator | mm | 256 | |
| 13 | Withstand Voltage, Minimum : | | | |
| | a) Power Frequency, dry (one | KV | 70 | |
| | min.) | | | |
| | b) Power Frequency, wet (one | KV | 40 | |
| | min.) | | | |
| | c) Impulse 1.2/50 µ sec | KV | 110 | |
| 14 | Flashover Voltage, Minimum : | | | |
| | a) Power Frequency, dry | KV | 80 | |
| | b) Power Frequency, wet | KV | 50 | |
| | c) 50% Impulse 1.2/50 μ sec | KV | 125 | |
| | wave, positive or impulse 1.2/50 | | | |
| | µsec wave positive. | | | |
| | d) 50% Impulse 1.2/50 μ sec | KV | 130 | |
| | wave Negative | | | |
| 15 | Power Frequency Puncture | KV | 110 | |
| 1.6 | Voltage, minimum | | | |
| 16 | Radio Influence Voltage Data, | | | |
| | minimum | | 10 | |
| | a) Power frequency test voltage | KV | 10 | |
| | RMS to Ground b) Maximum PIV at 1 000 Ke | | 50 | |
| 17 | b) Maximum RIV at 1,000 Kc | μV | 50 | |
| 17 | Minimum Mechanical Strength for | <u> </u> | | |
| | a) Electro-mechanical Breaking | Kg | 7260 | |
| | Load | | | |

| 1 | | 77 | (000 | |
|----|----------------------------------|--------------|---------------------------|--|
| | b) Mechanical Breaking load | Kg | 6800 | |
| | c) Tension Proof Test Load | Kg | 3400 | |
| | d) Time Load Test Value | Kg | 4536 | |
| | e) Mechanical Impact Strength | mm Kg | 630 | |
| 18 | Minimum Mechanical Strength for | Strain Strin | nging : | |
| | a) Electro-mechanical Breaking | Kg | 11340 | |
| | Load | - | | |
| | b) Mechanical Breaking load | Kg | 11340 | |
| | c) Tension Proof Test Load | Kg | 3400 | |
| | d) Time Load Test Value | Kg | 4536 | |
| | e) Mechanical Impact Strength | mm Kg | 530 | |
| 19 | Insulator Hardware | - | Insulator hardware for | |
| | | | insulator strings or bus- | |
| | | | support such shall have | |
| | | | UTS-120 KN and | |
| | | | galvanized as per BS- | |
| | | | 729 OR ASTM A-153. | |
| 20 | Standard | - | AS per latest editions of | |
| | | | IEC-383. | |
| 21 | Manufacturer must comply all the | - | Yes | |
| | features of Technical | | | |
| | Specification (Section 7) | | | |

Seal & Signature ofthe Manufacturer

8.36 Guaranteed Technical Particulars for H-Type Connector

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| S1. | Description | Purchaser's | Manufacturer's |
|-------|--------------------------------------|--------------------------------|----------------|
| No. | - | Requirement | Particulars |
| Compa | atible for ACSR MARTIN | · · | |
| 1. | a) Manufacturer's name & | To be mentioned | |
| | address | | |
| | With website, official domain email. | | |
| | b) Year of Manufacturing | Not before 2023 | |
| | C) Country of Origin | To be mentioned | |
| 2. | Manufacturer's Code No. | Shall be mentioned | |
| 3. | Applicable Standard | Design, Testing & Performance | |
| | | shall be in accordance to BS, | |
| | | IEC, BDS, ANSI, ASTM or | |
| | | equivalent international | |
| | | standards. | |
| 4. | Installation | Outdoor and shall be installed | |
| | | for the above-mentioned | |
| | | conductor. | |
| 5. | Туре | H-Type | |
| 6. | Material | Aluminium | |
| 7. | Minimum Continuous Current | 362 Amps (min). | |
| | rating at 35°C rise over 40°C | | |
| | ambient temperature (75°C) | | |
| 8. | Length | 112 mm | |
| 9. | Weight of 100 nos. in Kg | Shall be mentioned | |
| 10. | Manufacturer must comply all | | Yes |
| | the features of Technical | | |
| | Specification (Section 7) | - | |

Seal and Signature of the manufacturer:

8.37 Guaranteed Technical Particulars for Guy/Earth Wire.

| S1. | Description | Unit | Purchaser's | Manufacturer's |
|-----|---------------------------------------|--------------------|--------------------------------------------|----------------|
| No. | | | Requirement | Particulars |
| 1 | Name of the Item | - | Guy/Earth Wire | |
| 2 | a) Manufacturer's name & address | - | To be mentioned | |
| | | | | |
| | With website, official domain | | | |
| | email. | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | |
| | | | | |
| 2 | C) Country of Origin | | To be mentioned | |
| 3 | Manufacturer's Code No. | - | Shall be mentioned | |
| 4 | Standard | - | Performance Design | |
| | | | and Testing shall be in | |
| | | | accordance to the BS, | |
| | | | BDS or equivalent International | |
| | | | standards. | |
| 5 | Installation | | | |
| 5 | | - | Overhead/Stay Stranded, Solid and | |
| 0 | Туре | - | Bare | |
| 7 | Material | _ | High Strength Steel | |
| 8 | Overall diameter | Mm | 9.50 | |
| 9 | Number/diameter of each strand | No./mm | 7/3.15 | |
| 10 | Nominal cross sectional area of | mm ² | 54.53 | |
| 10 | conductors | | 0 1100 | |
| 11 | Weight of Guy Wire | Kg/KM | 430 | |
| 12 | Ultimate Tensile Strength | KN | 62.75 | |
| | e e e e e e e e e e e e e e e e e e e | | | |
| 13 | Galvanisation | - | As per ASTM B498- | |
| | | | 74, Class-A | |
| 14 | Modulus of Elasticity | Kg/mm ² | 19.7 x 10 ³ | |
| 1.7 | | /00 | 11.2 10-6 | |
| 15 | Coefficient of linear expansion | /°C | 11.3 x 10 ⁻⁶ | |
| 16 | Drum wound length | М | 1500 | |
| 17 | Net weight | Kg | Shall be mentioned | |
| 18 | Gross weight | Kg | Shall be mentioned | |
| 19 | Lay length | Mm | Shall be mentioned | |
| 20 | Lay direction | - | Right hand | |
| 21 | Lay ratio | - | 13-18 | |
| 22 | Treated Wooden Drum Standard | - | AWPA C ₁ – 82, C ₂ – | |
| | | | 83, | |
| | | | C ₁₆ -82, P ₅ -83. | |
| 23 | Manufacturer must comply all the | - | Yes | |

| features of Technical Specification | | |
|-------------------------------------|--|--|
| (Section 7) | | |

Seal and Signature of the manufacturer:

8.38 Guaranteed Technical Particulars for PG Clamp

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. | Description | Purchaser's | Manufacturer's |
|-------|----------------------------------------------|--------------------------------|----------------|
| No. | * | Requirement | Particulars |
| Compa | tible for ACSR MERTIN to ACSI | | |
| 1. | a) Manufacturer's name & | To be mentioned | |
| | address | | |
| | | | |
| | With website, official domain | | |
| | email. | | |
| | b) Year of Manufacturing | Not before 2023 | |
| | g | | |
| | C) Country of Origin | To be mentioned | |
| 2. | Manufacturer's Code No. | Shall be mentioned | |
| 3. | 3. Applicable Standard Design, Testing & Per | | |
| | | shall be in accordance to BS, | |
| | | IEC, BDS, ANSI, ASTM or | |
| | | equivalent international | |
| | | standards. | |
| 4. | Installation | Outdoor and shall be installed | |
| | | for the above-mentioned | |
| | | conductor. | |
| 5. | Туре | Bolted Type | |
| 6. | Material | Aluminium Alloy | |
| 7. | Minimum Continuous Current | 362 Amps (min). | |
| | rating at 35°C rise over 40°C | | |
| | ambient temperature (75°C) | | |
| 8. | Dimension | 110 mm x 45 mm | |
| 9. | Weight of 100 nos. in Kg | Shall be mentioned | |
| 10. | Manufacturer must comply all | | |
| | the features of Technical | | |
| | Specification (Section 7) | Yes | |

Seal and Signature of the manufacturer:

8.39 Guaranteed Technical Particulars of Steel Structure Design

| Sl. No. | Description | Unit | BPDB's Requirement | Manufacturer' s guaranteed Particulars | | |
|-----------------------------------------------|------------------------------------------------|--------------------|-----------------------|----------------------------------------------|--|--|
| 1 | a) Manufacturer's name & address | - | To be mentioned | | | |
| | With website, official domain email. | | | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | | | |
| | C) Country of Origin | | To be mentioned | | | |
| 2 | Maximum ratio of unsupported length of steel | | | | | |
| | compression to their least radius of gyration: | | | | | |
| | a) Main members | mm | 120 | | | |
| | b) Bracing's | mm | 180 | | | |
| | c) Redundant | mm | 180 | | | |
| 3 | B.S. 4360 grade 43A steel or other approved | 1 | | | | |
| | standard : | | | | | |
| | a) Elastic limit stress in tension members | Kg/mm ² | To be mentioned | | | |
| | b) Ultimate stress in compression members | Kg/mm ² | Sc=F/S[{1+0.0001 | | | |
| | (expressed as function L/R) | | $1x (L/R)^2/M$] | | | |
| 4 B.S. 4360 grade 50C steel or other approved | | | | | | |
| | standard : | | | | | |
| | a) Elastic limit stress in tension members | Kg/mm ² | To be mentioned | | | |
| | b) Ultimate stress in compression members | Kg/mm ² | Sc=F/S[{1+0.0001 | | | |
| | (expressed as function L/R) | | 66 x{ $(L/R)^2/M$ }] | | | |
| 5 | Formula for calculation of ultimate stress in | - | SC=F/S[1+{LE/ π^2 | | | |
| | compression. | | $E_x \{(L/R)^2/M\}$] | | | |
| | Where, | | | | | |
| | SC = Ultimate stress in compression | Kg/mm ² | To be mentioned | | | |
| | F = Yield strength | Kg | To be mentioned | | | |
| | S = Section | mm ² | To be mentioned | | | |
| | L/R = Length / Radius of gyration | cm | To be mentioned | | | |
| | LE = Elastic limit stress | Mg/mm ² | 24 or 36 | | | |
| | E = Elasticity module | Kg/mm ² | 22000 | | | |
| | M = Rigidity Coefficient at each end | - | To be mentioned | | | |
| | M=1 with only one bolt at each end of member | - | To be mentioned | | | |
| | M=2 with two bolts at each end of a member | - | To be mentioned | | | |
| | M=4 if L/R between 110 and 130 | - | To be mentioned | | | |
| | M=3 if L/R over to 130 | - | To be mentioned | | | |
| 6 | Minimum size of member | mm | 45 x 45 x | | | |

| 7 | Weight of each Column | Kg | To be mentioned | |
|----|----------------------------------------------|----|-----------------|--|
| 8 | Weight of each Girder | Kg | To be mentioned | |
| 9 | Total weight | Kg | To be mentioned | |
| 10 | Manufacturer must comply all the features of | | Yes | |
| | Technical Specification (Section 7) | - | | |

Seal & Signature of the Manufacturer

8.40 Guaranteed Technical Particulars of Shield Wire, Earthing Grid and Earthing Electrode

| Sl. No. | Description | Unit | BPDB's Requirement | Manufacturer 's guaranteed Particulars | | |
|------------|------------------------------------------------------------|--------------------|--------------------------------|----------------------------------------------|--|--|
| A. | SHIELD WIRES | | | | | |
| 1 | a) Manufacturer's name & address | - | To be mentioned | | | |
| | With website, official domain email. | | | | | |
| | b) Year of Manufacturing | Yr. | Not before 2023 | | | |
| | | | | | | |
| | C) Country of Origin | | To be mentioned | | | |
| 2 | Material | - | High Strength | | | |
| | | | Steel | | | |
| 3 | Grade of Steel | Kg | 60000 | | | |
| 4 | Nos. of Strand | Nos. | 7 | | | |
| 5 | Diameter of each strand | mm | 3.05 | | | |
| 6 | Overall diameter | mm | 9.525 | | | |
| 7 | Nominal cross -section | mm^2 | 35 | | | |
| 8 | Weight per km length | Kg | 407 | | | |
| 9 | Maximum rated current (3 seconds) | А | To be mentioned | | | |
| 10 | Maximum working tension of main connection | Kg/m ² | To be mentioned | | | |
| 11 | Resistance of conductors per 1000 meters at 20 c | ohms | To be mentioned | | | |
| 12 | Rated Ultimate Tensile Strength | Kg/mm ² | 4900 | | | |
| 13 | Maximum permissible span length | m | To be mentioned | | | |
| 14 | Maximum sag under own weight of maximum span | mm | To be mentioned | | | |
| 15 | Co-efficient of liner expansion | $cm/{}^{0}C.$ | To be mentioned | | | |
| 16 | Class of Zinc Coating | - | Class-A | | | |
| 17 | Galvanization | - | As per BS-729 OR ASTM A-153 | | | |
| B. | EARTHING GRID | | | • | | |
| 1 | Manufacturer's name & country | - | To be mentioned | | | |
| 2 | Material | - | Copper | | | |
| 3 | Overall diameter | mm | To be mentioned | | | |
| 4 | Nominal cross -section | | | | | |
| | a) Interconnecting the earth electrodes | mm^2 | To be mentioned | | | |
| | b) Connecting equipment to mesh | mm ² | To be mentioned | | | |
| 6 | Area of each earthing grid | m x m | To be mentioned | | | |
| 7 | Depth of bedding of conductor | mm | To be mentioned | | | |
| 8 | Maximum earth fault current for 3 sec. | KA | 20 | | | |
| 9 | Resistance of conductors per 1000 meters at 20° c | Ohms | To be mentioned | | | |
| C. | EARTHING ELECTRODES | • | | | | |
| 1 | Manufacturer's name & country | - | To be mentioned | | | |
| 2 | Material | _ | Copper | İ | | |

| 3 | Dimensions : | | |
|---|----------------------------------------------|-----|-------------------|
| | a) Dia | mm | 16 |
| | b) Length | mm | 4 |
| 4 | Number of electrodes per group | - | As per schedule |
| 5 | Number of earthing point per substation | - | To be mentioned |
| 6 | Calculated resistance of combined earth grid | ohm | Less than one (1) |
| | and points | | |
| 7 | Manufacturer must comply all the features of | | Yes |
| | Technical Specification (Section 7) | - | |

Seal & Signature of the Manufacturer

8.41 Guaranteed Technical Particulars Of Automatic Fire protection and Firefighting system with smoke and heat detectors for 33 kV and 11 kV Switchgear Room

(To be filled up appropriately, then Seal & Signed by both manufacturer and bidder on Manufacturer's Letterhead Pad. Manufacturer & Bidder has to mention only single country of origin as per ITT 6.3 for individual item. Otherwise his bid shall be non-responsive.)

| Sl. No. | Description | BPDB's Requirement | Manufacturer's guaranteed Particulars |
|------------|------------------------------------|-----------------------|---------------------------------------|
| 1 | Manufacturer's name & country | To be mentioned | 8 |
| 2 | Standard | To be mentioned | |
| 3 | Name of accessories and detail BOQ | To be mentioned | |

Seal & Signature of the Manufacturer

Section-9

Drawing, SLD