


# Technical Pre-bid Queries Response

Sr. no.	Description	Queries	TPSODL Remarks
1	Payment Terms	You have amended the payment terms & mentioned that 70% of the SITC amount will be paid after supply. Kindly confirm that, if we quote a complete SITC price of Rs.100/- for a product (Rs.80/- for Supply & Rs. 20/- for ITC) then on completion of supply, whether 70% of total SITC price i.e, Rs. 70/- will be released or 70% of Supply part that Rs.56/- will be released. Pls confirm.	<p>Payment Terms may be read as - Post submission of error free invoice from TPSODL, payment shall be released within 45 days as per below milestones. <b>Note- Payment shall be made location wise. Order shall be for SITC.</b></p> <p>a. 70% of the payment of the verified invoice value upon successful delivery of the material at site</p> <p>b. 20% payment of the Order Value after successful installation. However, If the installation is delayed beyond 180 days (not attributable to BA) from date of supplies made to TPSODL because of reason attributed to TPSODL only, TPSODL shall release balance 20% payment immediately after submission of error free invoice.</p> <p>c. Balance 10% payment of the Order Value after successful commissioning and integration of the Panels with complete handing over- taking over</p>
		Installation means mounting CRP on Foundation. Please confirm.	Proposed CRP- Installation means construction of CRP foundation , fixing of CRP on it and connection with VCB and other equipment installed in switchyard and CR building. For Dismantling case- New CRP to be installed on existing foundation. Rest of the job as mentioned above are the same. Installation works are already described in ITC part .
2	Buscoupler	Specification of 11 kV Buscoupler CRP protection Relays, meters etc to be specified	The same feeder protection CRP described in the Technical specification to be followed for Bus coupler CRP, including interlocking facility with incomer CRP and Bus coupler CRP. Detail design engineering of interlocking to be finalized during GTP approval phase.
3		All 33 & 11 kV Incomer are Transformer CRP without Differential. Please confirm	33KV Transformer control CRP to have its own differential protection only
4	Dismantling of Existing CRP, cables etc	Shall not be in bidders scope. Confirm	Dismantling of Existing CRP, cables etc is in bidders scope.
5	Page 12 Item 15 of Technical specification	BA shall carry out cut out, mounting and wiring of the free issue items supplied by others which are to be mounted in his panel - Please clarify what items to be mounted and wired	List of free issued items and the mounted items in the panel shall be finalized at the time of detail engineering, post award.
6	Clause 4.5 of technical spec Painting	Retro reflective paint strip shall be provided on the four faces of the panel which shall withstand the temperature conditions and reflect vehicular light at night time providing safety. These CRP shall be mounted in Substation. Please clarify if required	Please comply the specification. Tender terms and conditions shall prevail
7	Scope of ITC of Outdoor CRP	The scope of work identifies 3 type of CRP - 219 CRP in 19 Substations. The corrigendum mentions 457 nos CRP & 5 types of CRP. Please provide list of Substations for the 457 CRP and mention the type of CRP per Substation.	Details are enclosed
		The details of Qty and Type of CRP per substation - Please specify Drg or reference standard for foundation - please share	Bidder has to provide suitable standard drawing of foundation
		IRF monitoring: Internal Relay Failure contact / watchdog contact shall be looped for all 33kV relays and separately for all 11kV relays and shall be connected to RTU for monitoring through SCADA by the bidder. The cables required for this looping in outdoor switchyard shall be in scope of TPSODL Please confirm	Supply of control cable is in the scope of TPSODL
8	Supply of Ethernet cable (CAT-6) and RS-485 cable	Ethernet cable (CAT-6) and RS-485 cable to be considered in rate of CRP and supplied with CRP. Please confirm	Please refer Corrigendum 03
9	Supply of Material for Foundation	Cost of Material for Foundation to be specified separately or included in Rate of CRP. Please confirm.	Please refer Corrigendum 03
10	Revised annexure I -Schedule of items	We understand that based on the panel dimensions given, all 5 line items will be of Single feeder type. Kindly confirm.	All panel are for single feeder type

## Outdoor CRP Location

Sr. No.	District	Circle	Division	PSS Name	Total CRP Quantity Required in PSS				11 kV Bus Coupler CR Panel (Outdoor Type)
					Transformer CRP(33Kv) (Outdoor Type)	Transformer CRP(11Kv) (Outdoor Type)	33 KV feeder CR Panel (Outdoor Type)	11 KV feeder CR Panel (Outdoor Type)	
1	Boudh	Bhanjanagar	BOED	Charichak	2	2	3	4	
2	Boudh	Bhanjanagar	BOED	Janapank	2	2	2	3	
3	Ganjam	Bhanjanagar	BNED	Bhanjanagar	3	3	2	5	
4	Ganjam	Bhanjanagar	BNED	Sorada	2	2	4	4	
5	Ganjam	Bhanjanagar	BNED	Tilisingi	2	2	3	3	
6	Kandhamal	Bhanjanagar	PED	Kalinga	2	2	2	3	
7	Kandhamal	Bhanjanagar	PED	Sankarakhola	2	2	2	3	
8	Kandhamal	Bhanjanagar	PED	Tikabali	2	2	2	3	
9	Kandhamal	Bhanjanagar	PED	Tumudibandha	2	2	2	5	
10	Ganjam	Berhampur	GNED	KANHEIPUR	3	3	1	4	
11	Rayagada	Rayagada	RED	HATA MUNIGUDA	1	1	2	3	
12	Rayagada	Rayagada	RED	MITS MEGA FOOD PARK	1	1	1	2	
13	Rayagada	Rayagada	RED	NUAPADA	1	1	1	2	
14	Rayagada	Rayagada	RED	SORISAPADAR	1	1	2	2	
15	Rayagada	Rayagada	GED	BIKRAMPUR	1	1	1	3	
16	Rayagada	Rayagada	GED	GUMUDA	1	1	2	3	
17	Rayagada	Rayagada	GED	MINAJHOLA	1	1	1	3	
18	Rayagada	Rayagada	GED	RAMANAGUDA	2	2	2	4	
19	Rayagada	Rayagada	GED	UKKUMBA	3	3	1	3	
20	Paralekhemundi	Rayagada	PKED	BRAHMANIGAM	2	2	1	3	
21	Paralekhemundi	Rayagada	PKED	CHHELIGADA	2	2	2	3	
22	Paralekhemundi	Rayagada	PKED	GARABANDHA	2	2	2	1	
23	Paralekhemundi	Rayagada	PKED	MOHANA	2	2	2	4	
24	Paralekhemundi	Rayagada	PKED	RAIGADA	2	2	2	3	
25	Paralekhemundi	Rayagada	PKED	UPALADA	2	2	3	3	
26	Koraput	Jeypore	JED	B.SINGPUR	2	2	2	4	
27	Koraput	Jeypore	JED	BAIPARIGUDA	2	2	2	4	
28	Koraput	Jeypore	JED	DANGAGUDA	2	2	1	4	
29	Koraput	Jeypore	JED	KUNDRA	2	2	4	5	
30	Koraput	Jeypore	JED	KUSUMI	2	2	3	3	
31	Koraput	Jeypore	KED	ANALA BADI	2	2	1	2	
32	Koraput	Jeypore	KED	BANDHUGAON	2	2	2	3	
33	Koraput	Jeypore	KED	BILEIGUDA	2	2	2	2	
34	Koraput	Jeypore	KED	KAKRIGUMA	2	2	2	4	
35	Koraput	Jeypore	KED	NARAYANAPATNA	2	2	2	3	
36	Nabarangpur	Jeypore	NED	DABUGAON	3	3	2	4	
37	Nabarangpur	Jeypore	NED	JHARIGAM	2	2	3	5	
38	Nabarangpur	Jeypore	NED	KOSAGUMUDA	4	4	2	7	

39	Nabarangpur	Jeypore	NED	NANDAHANDI	2	2	1	4	
40	Nabarangpur	Jeypore	NED	PAPADAHANDI	1	1	2	2	
41	Nabarangpur	Jeypore	NED	TANDAGUDA	2	2	1	5	
42	Nabarangpur	Jeypore	NED	TENTULIKHUNTI	2	2	3	5	
43	Ganjam	City	BED-1	GOPALPUR			1		
44	Ganjam	Aska	AED-2	KS NAGAR			1		
45	Ganjam	Bhanjanagar	BNED	BANKA			1		
46	Nabarangpur	Jeypore	NED	DABUGAM			1		
47	Koraput	Jeypore	KED	KAKIRIGUMMA			1		
48	Koraput	Jeypore	KED	ANALABADI			1		
49	Koraput	Jeypore	JED	DANGAGUDA			1		
50	Koraput	Jeypore	JED	RANDAPALLI			1	1	
51	Kandhamal	Bhanjanagar	PED	RAIKIA				1	
52	Rayagada	Rayagada	GED	GUNUPUR				1	
53	Koraput	Jeypore	KED	BILEIGUDA				1	
54	Ganjam	City	BED-1	AMBAPUA					1
55	Ganjam	City	BED-1	NARENDRAPUR					1
56	Ganjam	City	BED-1	GOOD SHED					1
57	Ganjam	City	BED-2	CORPORATION ROAD					1
58	Ganjam	City	BED-3	LOCHAPADA					1
59	Ganjam	City	BED-2	AMBAGADA					3
60	Ganjam	Berhampur	PSED	PANDIA JUNCTION					1
61	Ganjam	Berhampur	GNED	CHATRAPUR					2
				<b>* New Connection</b>			10	20	
					<b>82</b>	<b>82</b>	<b>101</b>	<b>169</b>	<b>11</b>

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<b>1.0</b>	<b>Scope of work</b>	<p>The scope of this specification covers all the Technical Requirements of Design, Engineering, Manufacturing, testing at manufacturer's works, packing, forwarding, supply and unloading at site/stores complete with all accessories of outdoor Control &amp; Relay panels at various sites of TPSODL.</p> <p>This specification will be applicable to all 33/11kV panels in the existing PSS/existing Bays/ Renovated PSS.</p>
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<b>2.0</b>	<b>Applicable Standards</b>	<p>The equipment covered by this specification shall unless otherwise stated, be designed, constructed and tested in accordance with latest revisions of relevant Indian/IEC/other applicable standards shall confirm to the regulations of local statutory authorities.</p> <p>IEC 60529 has been developed to rate and grade the resistance of enclosures of electric and electronic devices against the intrusion of dust and liquids. It also rates how easy it is for individuals to access the potentially hazardous parts within the enclosure.</p> <ul style="list-style-type: none"> <li>• IEC 61850 (All Parts)</li> <li>• IEC 62052-11 - <b>defining communication protocols for intelligent electronic devices at electrical substations.</b></li> <li>• IEC 61131-3- IEC 61131 for programmable logic controllers</li> <li>• IEC 62056- standards for electricity metering data exchange by International Electrotechnical Commission</li> <li>• IEC 61588/IEEE 1588v2- defines a network protocol, the Precision Time Protocol (PTP), enabling accurate and precise synchronization of the real-time</li> <li>• IEC 62351- <b>IEC 62351</b> is a standard developed by WG15 of IEC TC57. This is developed for handling the security of TC 57 series of protocols including IEC 60870-5 series</li> </ul>																															
<b>3.0</b>	<b>Climatic Conditions of the Installation</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">1</td> <td>Maximum ambient temperature</td> <td style="text-align: center;">50 deg C</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Max. Daily average ambient temp</td> <td style="text-align: center;">35 deg C</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Min Ambient Temperature</td> <td style="text-align: center;">15 deg C</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Maximum Humidity</td> <td style="text-align: center;">95%</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Average Annual Rainfall</td> <td style="text-align: center;">150cm</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Average No. of rainy days per annum</td> <td style="text-align: center;">120</td> </tr> <tr> <td style="text-align: center;">7</td> <td>Altitude above MSL not exceeding</td> <td style="text-align: center;">1000m</td> </tr> <tr> <td style="text-align: center;">8</td> <td>Wind Speed</td> <td style="text-align: center;">300 Km/hr</td> </tr> <tr> <td style="text-align: center;">9</td> <td>Earthquakes of an intensity in horizontal direction</td> <td style="text-align: center;">equivalent to seismic acceleration of 0.3g</td> </tr> <tr> <td style="text-align: center;">10</td> <td>Earthquakes of an intensity in vertical direction</td> <td style="text-align: center;">equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)</td> </tr> </table> <p>TPSODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally</p>		1	Maximum ambient temperature	50 deg C	2	Max. Daily average ambient temp	35 deg C	3	Min Ambient Temperature	15 deg C	4	Maximum Humidity	95%	5	Average Annual Rainfall	150cm	6	Average No. of rainy days per annum	120	7	Altitude above MSL not exceeding	1000m	8	Wind Speed	300 Km/hr	9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g	10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)
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		laden with mild acid, dust in suspension during the dry months and is subjected to fog in cold months.
<b>4.0</b>	<b>Technical Requirements</b>	
<b>.1</b>	<b>General Requirements from the Business Associates</b>	<ul style="list-style-type: none"> <li>• The supplier should have at least 10 years of experience in design and supply of control, protection and automation systems for electricity transmission and distribution applications.</li> <li>• The manufacturer, whose substation automation and protection system is offered, should have designed, manufactured, tested, installed and commissioned such a system for electricity transmission and distribution for at least 10 years.</li> <li>• The manufacturer needs to submit the proof of completing such tasks with other utilities/concerns as its experience certificate.</li> <li>• The Numerical Relays should be integrated with SCADA system on standard international protocols.</li> <li>• Relay should communicate to SCADA through RTU, RTU not in scope of bidder but testing will be done with SCADA by bidder.”</li> <li>• The Business Associate can offer an innovative and advanced system and the ways and cost to integrate the same in the existing infrastructure. The offer is subjected to an approval from TPSODL after a thorough discussion between the BA and TPSODL. In case, an approval is not awarded to the BA’s offered innovative system, TPSODL’s existing/desired infrastructure prevails and the BA shall provide the system accordingly.</li> </ul>
		<ul style="list-style-type: none"> <li>• The BA should optimize on the cost of software products offered to TPSODL considering already available licenses with TPSODL. The BA should clearly indicate licensing policy for the software tools for IEDs.</li> <li>• The BA should provide the ICD/SCD files for the substation project files for the IEDs.</li> <li>• The BA should provide necessary training to the personnel recommended by TPSODL to maintain the system and troubleshooting reports.</li> </ul>

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<b>4.2</b>	<b>General System Design</b>	<p>Protection and Control IEDs respond to the signals of currents and voltages measured at certain points of the power system, and assess the state of the protected power system component. The System shall be suitable for operation and monitoring of the complete substation including future extensions and shall works on IEC 61850. The offered IEDs shall be compliant to IEC 61850 Edition-2 with backward compatibility to Edition-1.</p> <p>The systems shall be of the state-of-the art suitable for operation under electrical environment present in high voltage substations (33/11kV), follow the latest engineering practice, and ensure long-term compatibility requirements and continuity of equipment supply and the safety of the operating staff.</p> <p>The system shall incorporate the control, monitoring and protection functions specified, self-monitoring, signaling and testing facilities, measuring as well as memory functions, event recording and evaluation of disturbance records. Signal list shall be provided at the time of commissioning.</p> <p>Maintenance, modification or extension of components shall not cause a shutdown of the whole system at substation. Self-monitoring of components, modules and communication shall be incorporated to increase the availability and the reliability of the equipment and minimize maintenance.</p> <p>All IEDs must have conformal coating for protection against harsh environments.</p> <p style="text-align: center;"><b>1. 33kV/11kV, Incoming / outgoing feeder panel:</b> This panel shall have numerical relay of O/C &amp; E/F type, Master trip relay of electrical reset type, auxiliary relay for contact multiplication, multifunction meter,</p>
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		<p>indicating lamps , TNC switch, local/remote switch, other auxiliary relays etc. for standard operations, control and monitoring requirements for 33kV/11kV bays in power system. Reset command for Master Trip Relay shall be implemented through SCADA.</p> <p>2. <b>Transformer differential and Over Current/earth fault protection in one relay:</b> 33kV power transformer shall have differential + Over current protection in one relay. Separate master trip relay shall be provided. Auxiliary relays such as RXSF/RXMS/RXKF shall be used for field devices such as</p> <p>2.1 Buchholz alarm &amp; trip</p> <p>2.2 WTI alarm &amp; trip</p> <p>2.3 OTI alarm &amp; trip</p> <p>2.4 MOG alarm</p> <p>2.5 PRD alarm &amp; trip</p> <p>2.6 OSR trip</p> <p>3. Master Trip Relay electrical reset through SCADA shall be implemented except for Transformers.</p> <p>4. <b>IRF monitoring:</b> Internal Relay Failure contact / watchdog contact shall be looped for all 33kV relays and separately for all 11kV relays and shall be connected to RTU for monitoring through SCADA by the bidder.</p> <p>5. <b>Contact multiplication relays (CMR)</b> of reputed make of 24V DC shall be used for status of CB on/off, Spring Charge, Transformer troubles wherever applicable.</p> <p>6. <b>Interconnecting cable schedule (ICS)</b> shall be provided by the bidder for each bay for control, metering and protection purpose.</p>
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		<p>8. <b>Phase wise fault current</b> shall be made available from Relay/IED to SCADA using IEC 61850 mapping.</p> <p>9. <b>Multifunction Meter</b> shall be provided on each control &amp; Relay panel. Multifunction meter on 33kV/11kV PTR Panel, 33kV side shall be self-powered by PT and rest shall be powered by auxiliary supply(24 V DC). In case these meters are required to put in daisy chain, no more than ten MFM shall be considered in each loop. Meter accuracy shall be equal or above 0.5 as per IEC62053:22. The current rating shall be three times continuous and 8 times for 1sec. MFM shall communicate on MODBUS RTU or ASCII, selectable at site. Aux power supply range shall be 18-72V DC. Mounting panel cutout shall be 92 x 92 mm. Real time &amp; average parameters are required. Real time clock and THD measurement is required. User defined registers are preferred.</p> <p>10. <b>Mounting space</b> for billing energy meter of 200mm x 200mm and test terminal block shall be made available for purchaser's future requirement, on each panel. Also, bidder to make cutout for billing energy meter based on the dimensions given by owner and fix blanking plate for mounting of billing meter in future.</p> <p>11. <b>Provision for TMU:</b> BA should provide sufficient space for installation of Transformer Monitoring Unit(TMU). Spare DC supply contact should be marked for TMU and Digital I/O terminal port should be provided for TMU operation. However, supply &amp; installation of TMU is not in the bidder's scope. (For 11KV I/C VCB &amp; 33KV PTR Protection CRP)</p>
<b>4.3</b>	<b>Electrical Circuit Grounding</b>	Where grounding is provided with the power source, safety grounding conductors shall be bundled with the power source conductors, but be insulated from the power conductors and from other equipment and wiring conduit. The ground conductor shall be terminated in the cabinet enclosure, and grounded only at the same point that the source of the electrical service to the cabinet or UPS neutral is grounded.

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4.3.2	<b>Power Supply</b>	Power for the substation automation system shall be derived from substation 24/48V DC system. In the event of Power failure, necessary safeguard software shall be built for proper shutdown and restart.
4.3.3	<b>Low Voltage Control Cables</b>	<p>1.5 sqmm cable used for AC/DC internal panel wiring and 2.5 sqmm cable used for CT/PT internal panel wiring RYB &amp; Black and RTU wiring shall be of 1.1kV class Low voltage cables of stranded copper conductor, PVC insulated. Cables shall be laid in Cables trays and in indoor trenches as a complete system. Trays shall be supported properly from the building structure. The entire cable tray system shall be rigid and leveled. The installation of cable tray support system shall be using the required accessories and using grip bolts for proper strength in fixing. All the above required material shall be supplied and installed by the bidder.</p> <p>Control cables shall be stranded copper conductor having minimum 7 strands, extruded PVC inner sheathed, galvanized steel wire armoured, over all sheathed, outer sheath (ST-2) made of FRLS PVC compound. The cables shall conform to IS-1554 (Part-1) 1988/IEC-60502 (1998) &amp; IEC-60502- amendment -1 999 in all other respects. In situations where accuracy of measurement or voltage drop in control circuit warrants, higher cross sections as required shall be used.</p>
4.3.4	<b>Low Voltage Power Cables</b>	L T Power cables for the 415V AC, 240V AC system and 220V DC system shall be single core/ Multi core 1100V earthed H4 grade with stranded aluminium/copper conductor, extruded cross-linked polyethylene (XLPE) insulated, core identification by colour coding, extruded PVC (Type -ST 2) inner sheathed, armoured, Aluminium wire armour for single core cables and galvanized steel wire for multi core cables and extruded PVC (Type ST-2) outer sheathed with FRLS properties, generally conforming to IS: 7098 (Part 1 ). Upto 16 sq.mm cables, Copper conductor shall be used and above 16 sq.mm cables, Aluminium conductor shall be used for L T power cables. For DC all cables shall be of Copper conductor irrespective of its size.
4.3.5	<b>Numerical Over Current and Earth Fault Relay / Bay Control &amp; Protection Unit</b>	<p><b>Following functions shall be available in the Protection Relay for 33KV Incomer / 33KV Outgoing / 11KV Incomer /11KV outgoing &amp; 33 kV Transformer Feeder.</b></p> <p>Current protection (Directional &amp; Non-directional feeder Protection)</p> <ol style="list-style-type: none"> <li>1) Over current instantaneous (50).</li> <li>2) Over current IDMT (51).</li> <li>3) Earth fault instantaneous (50N).</li> <li>4) Earth fault IDMT (51N).</li> <li>5) Breaker failure, Auto recloser, broken wire, sensitive e/f, Trip coil supervision</li> <li>6) Binary Input-17 &amp; Binary Output-10 Minimum Required.</li> <li>7) Trip and Close Logic Programmable Facility Function required in the Relay.</li> </ol>

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		<p>12) Current &amp; Voltage, Binary Input, Binary Output DR /Event same to be mapped with SCADA.</p> <p>13) The device should have front port serial communication with Software, RJ45, USB type or RS232.</p> <p>14) Rear ports shall be redundant with RSTP and PRP requirement for client server Communication.</p> <p>15) Rear ports should be either of electrical or optical RJ45 type.</p> <p>16) All configuration and Relay Protection Parameter Setting are uploading or downloading should be possible any of the relay ports irrespective of IEC 61850 configuration.</p> <p>17) Relay output Contact shall be possible for Breaker Close &amp; Open from Remote through SCADA</p> <p>18) All Protection internal triggering logic shall be interface with SCADA.</p> <p>19) Relay Suitable for SCADA Application.</p> <p>20) The relay shall have a facility to have communication on IEC61850 protocol through redundant rear port (<b>i.e., RJ45 PRP/RSTP</b>) which supports IEC 62439-3 PRP and latest redundant technology for SAS connectivity without use of any external converter. Further, the test levels of EMI as indicated in IEC 61850 shall be applicable to these.</p> <p>The relay shall support peer to peer communication</p>
4.3.6	<b>Numerical Relay for Transformer differential protection</b>	<p><b>Differential Relay Shall have the Following Function Required for transformer Protection:</b></p> <p>1) Relay shall be capable for Minimum Two Winding Transformer Differential Protection with any rating CT ratio.</p> <p>2) Binary Input-22 &amp; Binary Output-12 Minimum Required.</p> <p>3) 2<sup>nd</sup> and 5<sup>th</sup> Harmonics Blocking.</p> <p>5) Overcurrent / Derived Earth Fault / Measured or Sensitive earth Fault / Stand by Earth fault Selection HV or LV side Inbuilt programmable Enabled facility required.</p> <p>6) Breaker Failure Protection.</p> <p>7) Trip coil supervision</p> <p>8) Trip and Close Logic Programmable Facility Function required in the Relay.</p> <p>9) Current &amp; Voltage, Binary Input, Binary Output DR /Event same to be mapped with SCADA.</p> <p>10) The device should have front port serial communication with Software, RJ45, USB type or RS232.</p> <p>11) Rear ports shall be redundant with RSTP/PTP requirement for client server Communication.</p> <p>12) Rear ports should be of electrical RJ45 type.</p>

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		<p>12) All configuration and Relay Protection Parameter Setting are uploading or downloading should be possible any of the relay ports irrespective of IEC 61850 configuration.</p> <p>13) Relay output Contact shall be possible Breaker Close &amp; Open from Remote through SCADA.</p> <p>14) Downloading/ uploading file from any relay ports shall not change its 61850 engineering and device engineering.</p> <p>15) All Protection internal Protection triggering logic shall be interface with SCADA</p> <p>16) Relay Suitable for SCADA Application.</p> <p>17) The relay shall have a facility to have communication on IEC61850 protocol through redundant rear port (<b>i.e., RJ45 PRP/RSTP</b>) which supports IEC 62439-3 PRP and latest redundant technology for SAS connectivity without use of any external converter. Further, the test levels of EMI as indicated in IEC 61850 shall be applicable to these.</p>
4.3.7	<b><u>Relay requirement for SCADA Communication &amp; Other Functionalities</u></b>	<p>1) The relay should be modular type. It will be installed at outdoor CR Panel. Standard terminal blocks should be located at the rear of the relay providing connections for all input and output circuits.</p> <p>2) Large MIMIC display with CB Open Close button for breaker Control from Front</p> <p>3) Conformal Coating.</p> <p>4) Ring Type Terminal for CT &amp; VT.</p> <p>5) IEC 61850 edition / HSR &amp; PRP.</p> <p>6) Cyber Security.</p> <p>7) Proper enclosure Protection.</p> <p>8) The relay shall have a facility to have communication on IEC61850 protocol through redundant rear port (<b>i.e. RJ45 or FO</b>) which supports IEC 62439-3 PRP and latest redundant technology for SAS connectivity without use of any external converter. Further, the test levels of EMI as indicated in IEC 61850 shall be applicable to these.</p> <p>9) The relay shall support peer to peer communication.</p> <p>11) The relays shall generate GOOSE messages as per IEC 61850 standards, interlocking/tripping and also to ensure interoperability with third party relays.</p> <p>12) Necessary user-friendly configuration tool shall be provided to configure the relays. It should be compatible with SCL/SCD files generated by a third-party system.</p> <p>13) The Relay shall have facility for Time synchronization on IRIG B or SNTP port.</p>
		<p style="text-align: center;"><b>Approved Makes for Relays / BCPUs:</b></p> <ol style="list-style-type: none"> <li>1. ABB India Ltd.</li> <li>2. Siemens Ltd.</li> <li>3. GE T&amp;D India Ltd.</li> <li>4. Schneider Electric</li> </ol>

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<b>4.3.8</b>	<b>Terminal Block and panel wiring</b>	<ol style="list-style-type: none"> <li>1) Terminal Blocks including disconnecting type TB's of Elmex make KLTD - M4 of 1.1kV class to be considered for CT's, PTs and DC voltage SCADA status/alarm and control requirement. 2.5 Sq mm cable to be considered for CT wiring. This shall be considered for all cabling from all cores of CTs.</li> <li>2) Disconnecting Type Terminal block For DC control and trip, CT &amp; PT Wiring Connection. 2.5Sqmm and 1.5Sqmm.</li> <li>3) Single Feed Terminal Block or suitable Terminal Block for Control Wire Connection 2.5 Sqmm and 1.5 Sqmm.</li> <li>4) Din Rails and Support Brackets Different type for Terminal Block and MCB Fixing during Retrofit work.</li> <li>5) Different Size Bundle wire Cable for 2.5Sqmm/1.5 Sqmm different Colour code (Red, Yellow, Blue, Black, Green &amp; Gray )</li> </ol>
<b>4.3.9</b>	<b>General Construction of CRP - Simplex panel</b>	<p>Simplex panel with dust proof design shall consist of a vertical front panel with equipment mounted thereon and having wiring access from rear for control panels &amp; either front or rear for relay panels.</p> <ol style="list-style-type: none"> <li>1. Panel shall be having dimensions equal to For Single Feeder W x D x H of 600mm x 500mm x 1500mm</li> <li>2. Doors shall have handles with either built-in locking facility or will be provided with pad-lock. To save space, rear door of the panel shall be provided with two halves.</li> <li>3. Please refer to sample panel layout drawing in <b>Annexure-A</b> and accordingly panel layout shall be submitted for review and approval. (Drawing is for only reference purpose, Actual may be vary)</li> <li>4. Control and Relay Board shall be of panels of simplex type design as indicated in bill of quantity. It is the responsibility of the BA to ensure that the equipment specified and such unspecified complementary equipment required for completeness of the protective/control schemes is properly accommodated in the panels without congestion.</li> <li>5. No price increase at a later date on this account shall be allowed. However, the width of panels that are being offered to be placed in existing switchyard , should be in conformity with the space availability. Panels shall be completely metal enclosed and shall be dust, moisture and vermin proof.</li> <li>6. The enclosure shall provide a degree of protection not less than IP-65 in accordance with IS: 2147. Panels shall be free standing, floor mounting type and shall comprise structural frames completely enclosed with specially selected smooth finished, cold rolled sheet steel of thickness not less than 3 mm for weight bearing members of the panels such as base frame, front sheet and door frames, and 2.0mm for sides, door, top and bottom portions. There shall be sufficient reinforcement to provide level transportation and installation. The Angle structure for Leg 75x75x6mm.</li> </ol>

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		<p>7. The enclosure shall be sized to facilitate easy maintenance at minimum height of 300 mm above FFL.</p> <p>8. The top of panel shall be fitted with a sloping canopy, the design of which shall be such that rain water shall not accumulate on the top.</p> <p>9. It shall have overhang and fascia of min. 100mm. 2 nos. lifting lugs of same material shall be provided.</p> <p>10. Three nos. heavy duty hinges shall be provided for each door such that they are not visible from outside and hence not removable. The hinge shall be of such construction that the door can be swung open by not less than 150°. The door shall be fitted with integral handle, flushed with the surface of the door.</p> <p>11. All doors, removable covers and panels shall be gasketed all around with synthetic rubber gaskets Neoprene/EPDM generally conforming to provision of IS 11149. However, XLPE gaskets can also be used for fixing protective glass doors. Ventilating louvers, if provided shall have screens and filters. The screens shall be made of either brass or GI wire mesh.</p> <p>12. Design, materials selection and workmanship shall be such as to result in neat appearance, inside and outside with no welds, rivets or bolt head apparent from outside, with all exterior surfaces true and smooth. Panels shall have dual exhaust fan at its rear end for dissipation of heat.</p> <p>13. Panels shall have base frame with smooth bearing surface, which shall be fixed on the embedded foundation channels/insert plates. Anti-vibration strips made of shock absorbing materials that shall be supplied by the contractor, shall be placed between panel &amp; base frame. Cable entries to the panels shall be from the bottom. Cable gland plate fitted on the bottom of the panel shall be connected to earthing of the panel/station through a flexible braided copper conductor rigidly.</p> <p><b>Mounting:</b></p> <p>14. All equipment on the panel and inside panels shall be mounted and completely wired to the terminal blocks ready for external connections. The equipment on front of panel shall be flush mounted. Equipment shall be mounted such that removal and replacement can be accomplished individually without interruption of service to adjacent devices and are readily accessible without use of special tools. Terminal marking on the equipment shall be clearly visible.</p> <p>15. The BA shall carry out cut out, mounting and wiring of the free issue items supplied by others which are to be mounted in his panel in accordance with the corresponding equipment manufacturer drawings. Cut outs if any, provided for future mounting of equipment shall be properly blanked off with blanking plate.</p> <p>16. The center lines of switches, push buttons and indicating lamps shall be not less than 750mm from the bottom of the panel. The center lines of</p>
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		<p>relays, meters and recorders shall be not less than 450mm from the bottom of the panel.</p> <p>17. The center lines of switches, push buttons and indicating lamps shall be matched to give a neat and uniform appearance. Likewise the toplines of all meters, relays and recorders etc. shall be matched.</p>
4.4	<b>Panel Internal Wiring</b>	<p>Panels shall be supplied complete with interconnecting wiring provided between all electrical devices mounted and wired in the panels and between the devices and terminal blocks for the devices to be connected to equipment outside the panels.</p> <ol style="list-style-type: none"> <li>When panels are arranged to be located adjacent to each other all inter panel wiring and connections between the panels shall be furnished and the wiring shall be carried out internally, this is in the BA's scope.</li> <li>All wiring shall be carried out with 1100V grade, single core, stranded copper conductor wires with PVC insulation.</li> <li>The terminal blocks for CTs, VTs and DC supply, trip and alarm shall be provided with disconnecting type terminals specified above. The CT terminal blocks shall be provided with short circuiting and earthing facilities. CT/PT /DC terminal block should have 20% terminals as spare terminals. All equipment mounted on front of the panels shall have individual nameplates with equipment designation engraved. Each panel shall also have circuit/feeder designation name plate.</li> <li>All wiring shall be with 1100 V grade, single core, PVC insulated stranded copper conductor. Wires shall be vermin proof. Minimum size of conductor shall be 1.5 sq. mm in general, but for CT &amp; VT circuits it shall be 2.5 sq.mm. CT VT wiring will be colored as per standard sign color configuration including neutral and neutral CT wiring. Rest wiring will be in grey color and earthing will be done by green colored control cable.</li> <li>Contractor shall be solely responsible for completeness and correctness of all the wiring, and for proper functioning of the connected equipment.</li> </ol> <p><b>Specification for Auxiliary relays/ MCB's</b></p> <p>Auxiliary contact multiplier relays should be of reputed make and selected on the basis of continuous current carrying capacity and rated voltage. The fluctuation in voltage level must be accounted for (+/-) 10% continuously.</p> <ol style="list-style-type: none"> <li>DC MCB's should not be substituted by AC MCB's for DC Distribution, irrespective of manufacturer's individual multi usage Recommendations.</li> <li>LED indication circuit shall be segregated from the control circuit by all means.</li> <li>Spare I/Os wiring shall be brought up to terminal block for future use. All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks.</li> </ol> <p>Wiring gutters &amp; troughs shall be used for this purpose. Auxiliary bus wiring for AC and DC supplies, voltage transformer circuits, annunciation circuits and other common services shall be provided near the top of the panels running throughout the entire length of the panels.</p>



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		<p>9. Wire termination shall be made with solder less crimping type and tinned copper lugs, which firmly grip the conductor. Insulated sleeves shall be provided at all the wire terminations. Engraved core identification plastic ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on the wire and shall not fall off when the wire is disconnected from terminal blocks.</p> <p>10. All wires directly connected to trip circuit breaker or device shall be distinguished by the addition of red colored unlettered ferrule.</p> <p>11. Longitudinal troughs extending throughout the run length of the panel shall be preferred for inter panel wiring. Inter-connections to adjacent panel shall be brought out to a separate set of terminal blocks located near the slots of holes meant for taking the inter-connecting wires.</p> <p>12. BA shall be solely responsible for the completeness and correctness of the internal wiring and for the proper functioning of the connected equipment.</p> <p>13. Unless otherwise specified, terminal blocks shall be suitable for connecting the following conductors of external cable on each side  All CT &amp; PT circuits: minimum of 2.5 sq. mm copper.  AC/DC Power Supply Circuits: 4 sq. mm Copper.  All other circuits: minimum of 2.5 sq. mm Copper.</p> <p>14. There shall be a minimum clearance of 250 mm between the first row of terminal blocks and the associated cable gland plate or panel side wall. Also the clearance between two rows of terminal blocks edges shall be minimum of 150mm.</p> <p>15. Arrangement of the terminal block assemblies and the wiring channel within the enclosure shall be such that a row of terminal blocks is run in parallel and close proximity along each side of the wiring-duct to provide for convenient attachment of internal panel wiring. The side of the terminal block opposite the wiring duct shall be reserved for the Owner's external cable connections. All adjacent terminal blocks shall also share this field wiring corridor. All wiring shall be provided with adequate support inside the panels to hold them firmly and to enable free and flexible termination without causing strain on terminals.</p> <p>16. Arrangement for DC and AC power supply with dual (redundant) source with manual changeover facility using selector switch shall be provided for all CR panels.</p> <p>17. The number and sizes of the TPSODL's multi core incoming external cables will be furnished to the BA after placement of the order. All necessary cable terminating accessories such as gland plates, supporting clamps &amp; brackets, wiring troughs and gutters etc. including glands &amp; lugs shall be included in scope of supply of the bidder.</p>
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4.5	<b>Painting</b>	<p>All sheet steel work shall be phosphate in accordance with the IS: 6005 "Code of practice for phosphate iron and steel". It should follow the seven tank process. Oil, grease, dirt and swarf shall be thoroughly removed by emulsion cleaning. Rust and scale shall be removed by pickling with dilute acid followed by washing with running water rinsing with a slightly alkaline hot water and drying. After phosphating, thorough rinsing shall be carried out with clean water followed by final rinsing with dilute dichromate solution and oven drying. The phosphate coating shall be sealed with application of two coats of ready mixed, stoved type zinc chromate primer. The first coat may be "flash dried" while the second coat shall be stoved. Thereafter an established painting procedure like electrostatic painting followed for powder coating the panel. After that the powder spray with spray gun to be used and to put into the oven for drying in 200deg.C. for 40min. The color shade shall be Siemens grey RAL 7032.</p> <p>The Retro reflective paint strip shall be provided on the four faces of the panel which shall withstand the temperature conditions and reflect vehicular light at night time providing safety.</p>
4.6	<b>Miscellaneous Accessories</b>	<p><b>Plug Point:</b> 240V, Single phase 50Hz, AC socket with switch suitable to accept 5 Amps and 15 Amps pin round standard Indian plug, shall be provided in the interior of each cubicle with ON-OFF switch.</p> <p><b>Interior Lighting:</b> Each panel shall be provided with an LED (6w led panel tub light ): lighting fixture rated for 240 Volts, single phase, 50 Hz supply for the interior illumination of the panel controlled by the respective panel door switch.</p> <p><b>Switches and Fuses:</b> Each panel shall be provided with necessary arrangements for receiving, distributing and isolating of DC and AC supplies for various control, signaling, lighting and space heater circuits. The incoming and sub-circuits shall be separately provided with miniature circuit breakers (MCB). Selection of the main and sub-circuit MCB rating shall be such as to ensure selective clearance of sub-circuit faults. MCBs shall conform to IS: 13947. Each MCB shall be provided with one potential free contact. However voltage transformer circuits for relaying and metering shall be protected by fuses. All fuses shall be HRC cartridge type conforming to IS: 13703 mounted on plug-in type fuse bases.. Fuse carrier base as well as MCBs shall have imprints of the fuse 'rating' and 'voltage'.</p> <p><b>Space Heater:</b> Each panel shall be provided with a space heater rated for 240V, single phase, 50 Hz Ac supply, 80W for the internal heating of the panel to prevent condensation of moisture. The fittings shall be complete with switch unit.</p>

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<b>4.7</b>	<b>Earthing</b>	<p>All panels shall be equipped with an earth bus securely fixed. Location of earth bus shall ensure no radiation interference for earth systems under various switching conditions of isolators and breakers. The material and the sizes of the bus bar shall be at least 25 X 6 sq. mm perforated copper with threaded holes at a gap of 50mm with a provision of bolts and nuts for connection with cable armors and mounted equipment etc for effective earthing. When several panels are Mounted adjoining each other, the earth bus shall be made continuous and necessary connectors and clamps for this purpose shall be included in the scope of supply of the Contractor. Provision shall he made for extending the earth bus bars to future adjoining panels on either side.</p> <p>Supply shall be included for each bus bar of the end panels for connecting to Substation earthing grid. Necessary terminal clamps and connectors for this purpose shall be included in the scope of supply of BA/bidder.</p> <p>All metallic cases of relays, instruments and other panel mounted equipment including gland plate, shall be connected to the earth bus by copper wires of size not less than 2.5 sq. mm. The colour code of earthing wires shall he green.</p> <p>Looping of earth connections, which would result in loss of earth connection to other devices when the loop is broken, shall not be permitted. However, looping of earth connections between equipment to provide alternative paths to earth bus shall he provided.</p> <p>VT and CT secondary neutral or common lead shall be earthed at one place only at the terminal blocks where they enter the panel. Such earthing shall be made through links so that earthing may be removed from one group without disturbing continuity of earthing system for other groups.</p>
<b>4.8</b>	<b>Control Switches</b>	<p>The control switch of breaker and isolator shall be of spring return to neutral type. The switch shall have spring return from close and trip positions to "after close" and "after trip" positions respectively.</p> <p>Instrument selection switches shall be of maintained contact (stay put) type. Ammeter selection switches shall have make-before-break type contacts so as to prevent open circuiting of CT secondary when changing the position of the switch. Voltmeter transfer switches for AC shall be suitable for reading all line- to-line and line-to-neutral voltages for non-effectively earthed systems and for reading all line to line voltages for effectively earthed systems.</p> <p>Lockable type of switches which can be locked In particular positions shall be provided when specified. The key locks shall be fitted on the operating handles.</p> <p>The contacts of all switches shall preferably open .and close with snap action to minimize arcing. Contacts of switches shall he spring assisted and contact faces shall be with rivets of pure silver or silver alloy. Springs shall not be used as current carrying parts</p> <p>The contact combination and their operation shall be such as to give completeness to the interlock and function of the scheme.</p> <p>The contact rating of the switches shall be as follows:  Contact rating for making and carrying shall be - 10A.  Continuous carrying for 0.5 sec shall be - 30A  Breaking for resistive load shall be - 20A</p>

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<b>4.9</b>	<b>Indicating Lamps</b>	<p>Indicating lamps shall be of cluster LED type suitable for panel mounting with rear terminal connections. Lamps shall be provided with series connected resistors preferably built in the lamp assembly. Lamps shall have translucent lamp covers to diffuse lights colored red, green, amber, dear white or blue as Specified. The lamp cover shall be preferably of screwed type, unbreakable and molded from heat resisting material.</p> <p>The lamps shall be provided with suitable resistors. Lamps and lenses shall be interchangeable and easily replaceable from the front of the panel. Tools, if required for replacing the bulbs and lenses shall also be included in the scope of the supply.</p> <p>The indicating lamps with resistors shall withstand 120% of rated voltage on a continuous basis.</p> <p>Red – Breaker ON Green – Breaker OFF White – Spring Charged Amber – 86 operated Blue - Trip circuit failure</p> <p>Annunciator: BA Shall provide Annunciator with hooter for following alert.</p> <ul style="list-style-type: none"> <li>• Overcurrent earth fault for feeder protection</li> <li>• For transformer feeder overcurrent earth fault, differential &amp; transformer trouble ( one window for each respectively)</li> </ul>
<b>4.10</b>	<b>Name Plate &amp; Marking</b>	<p>All equipment mounted on front and rear side as well as equipment mounted inside the panels shall be provided with individual name plates with equipment designation engraved. Also on the top of each panel on front as well as rear side, large and bold nameplates shall be provided for circuit/feeder designation.</p> <p>All front mounted equipment shall also be provided at the rear with individual name plates engraved with tag numbers corresponding to the one shown in the panel internal wiring to facilitate easy tracing of the wiring.</p> <p>Each IED and meter shall be prominently marked. All relays- and other devices shall be clearly marked with manufacturer's name, manufacturer's type, serial number and electrical rating data.</p> <p>Name Plates shall be made of anodized Aluminium. Name plates shall be black with white engraving lettering.</p> <p>Each switch shall bear clear inscription identifying its function e.g. 'BREAKER'52A`, "SYNCHRONISING" etc. Similar inscription shall also be provided on each device whose function is not other-wise identified. If any switch device does not bear this inscription separate name plate giving its function shall be provided for it. Switch shall also have clear inscription for each position Indication e.g. "Trip- Neutral-Close", "ON-OFF", "R-Y-B-OFF" etc.</p> <p>All the panels shall be provided with name plate mounted inside the panel bearing PO No &amp; Date, Name of the Substation &amp; feeder and reference drawing number, PROPERTY OF TPSODL</p>

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<b>4.11</b>	<b>TPSODL Preferred Make for CRP panel enclosures</b>	S. No.	Make
		1	Rittal India
		2	Pyrotech Electronics
		3	Valrack cabinets
		4	Siemens
<b>4.12</b>	<b>Tests</b>	<p><b>Factory Acceptance Test:</b> The manufacturing phase of the C&amp;R Panel shall be concluded by the factory acceptance test (FAT). The purpose is to ensure that the Contractor has interpreted the specified requirements correctly and that the FAT includes checking to the degree required by the user. The general philosophy shall be to deliver a system to site only after it has been thoroughly tested and its specified performance has been verified, as far as site conditions can be simulated in a test lab. If the FAT comprises only a certain portion of the system for practical reason.</p> <p><b>Hardware Integration Tests</b> shall be performed on the specified systems to be used for Factory tests when the hardware has been installed in the factory. The operation of each item shall be verified as an integral part of system. Applicable hardware diagnostics shall be used to verify that each hardware component is completely operational and assembled into a configuration capable of supporting software integration and factory testing of the system. The equipment expansion capability shall also be verified during the hardware integration tests.</p> <p><b>Integrated System Tests</b> shall verify the stability of the hardware and the software. During the tests all functions shall run concurrently, and all equipment shall operate a continuous 100 Hours period. The integrated system test shall ensure the IEDs is free of improper interactions between software and hardware while the system is operating as a whole.</p> <p><b>Type Test Certificates :</b></p> <ol style="list-style-type: none"> <li>1. Test reports for type tests as per latest IEC standards shall be submitted for the Protection IED along with the Bid.</li> <li>2. EMC test</li> <li>3. Atmospheric Environment test,</li> <li>4. IP65 test</li> <li>5. Mechanical Stress test</li> </ol>	

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<b>4.13</b>	<b>Pre-Dispatch Inspection</b>	<p>Equipment shall be subject to inspection by a duly authorized representative of the Purchase. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection.</p> <p>Bidder shall grant free access to the places of manufacture to Purchaser's representatives at all times when the work is in progress. Inspection by the Purchaser or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications</p> <p>Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by the Purchaser.</p> <p>Following documents shall be sent along with material :</p> <ol style="list-style-type: none"> <li>a) Test reports</li> <li>b) MDCC issued by TPSODL</li> <li>c) Invoice in duplicate</li> <li>d) Packing list</li> <li>e) Drawings &amp; catalogue</li> <li>f) Guarantee / Warranty card</li> <li>g) Delivery Challan</li> <li>h) Other Documents (as applicable)</li> </ol>
<b>4.14</b>	<b>Guarantee/ Warranty</b>	<p>Bidder shall stand guarantee towards design, materials, workmanship &amp; quality of process/manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 60 months from the date of commissioning supplier shall be liable to undertake to replace/rectify such defects at his own costs within the mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges ( @ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.</p> <p>Bidder shall further be responsible for 'free replacement' for another period of three years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company</p>
<b>4.15</b>	<b>Packing</b>	Bidder shall ensure that all equipment covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit.
<b>4.16</b>	<b>Minimum Testing Facilities</b>	The Bidder shall have in house testing facilities for carrying out all routine tests and acceptance tests as per relevant international/Indian standards.
<b>4.17</b>	<b>Manufacturing Activities</b>	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line with the Quality assurance plan submitted with the offer. The bar chart will have to be submitted within 15 days from the release of the order.
<b>4.18</b>	<b>Spares, Accessories and Tools</b>	<b>NA</b>

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<b>4.19</b>	<b>Grounding</b>	<p>Grounding is required for all equipment. Control and data acquisition equipment shall not ground a floating power source. Care shall be exercised to ensure ground compatibility when grounded power sources are used. Separate 2 no. of pits required for CRP panel connected separately which will be connected with the Grid Earthing mesh, supply of pits is not in manufacturer scope but connection to up to pits to be provided.</p> <p>Separate trays for cable laying for communication/automation &amp; LV power/control cables shall be used.</p>
<b>4.20</b>	<b>Device Grounding</b>	All devices within one cabinet shall be grounded together by means of a ground cable or strap. Earthing Strip (copper) shall be available in panel for device earthing.
<b>5.0</b>	<b>Quality Control</b>	<p>The bidder shall submit with the offer, quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and after finishing, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The purchaser's engineer or its nominated representative shall have free access to the manufacturer/sub-supplier's works to carry out inspections.</p> <p>The bidder shall have a proven track of not less than 5 years in manufacturing and servicing of the items in Indian market. The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.</p>

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		<p>The Bidder shall invariably furnish following information along with his bid, failing which the bid shall be liable for rejection. Information shall be separately given for individual type of equipment offered.</p> <p>Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in the presence of Bidder's representative, copies of test certificates.</p> <p>Information and copies of test certificates as in (a) above in respect of bought out accessories.</p> <p>List of manufacturing facilities available.</p> <p>Quality Assurance Plan (QAP) with holds points for purchaser's inspection.</p> <p>The successful Bidder shall within 10 days of placement of order, submit following information to the purchaser.</p> <p>List of raw materials as well as bought out accessories and the names of sub-Suppliers selected from those furnished along with offer. Type test certificates of the raw materials and bought out accessories. The successful Bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing.</p> <p><b>NAMEPLATE:</b></p> <p>Name plate shall be provided with non-rusting metal with white engraved lettering on black base ground for easy identification. This shall be positioned so as to be clearly visible.</p>
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<b>6.0</b>	<b>Minimum Testing Facilities</b>	<p>a. The Bidder shall have in house testing facilities for carrying out all routine</p> <p>b. tests and acceptance tests as per relevant international/Indian standards.</p>
<b>7.0</b>	<b>Manufacturing Activities</b>	<p>c. The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line with the Quality assurance plan submitted with the offer. The bar chart will have to be submitted within 15 days from the release of the order.</p>
<b>8.1</b>	<b>Support ServicesSLA</b>	<p>Services to be included during guarantee period</p> <p>2. Guarantee shall be for 60 months from the date of commissioning</p> <p>3. Vendor shall conform in a signed SLA to the following guidelines to mitigate major failure rate. To mitigate major failure like Complete system failure, IED system instability, loss or failure of any major subsystem or system component such as to cause a significant adverse impact to system availability, performance, or operational capability</p> <p>a. Vendor shall report to site within 48 hours of receipt of reporting of the failure occurrence.</p> <p>b. Vendor shall provide replacement of the faulty equipment within 7 days after confirmation of the fact that the equipment can't be repaired at site. Failure to this clause may have some penalty reference on vendor.</p> <p>c. Vendor always will provide detailed analysis report of the faulty equipment within 30 days from the date of the site visit by BA</p> <p>d. Any spare Equipment replacement, testing and its commissioning to be done by vendor only without any cost implications. Any equipment, any software or any hardware to test the IEDs/RTU to be borne by vendor only.</p> <p>e. Any up gradation in application software and RTU (except hardware) will be informed to us and necessary up gradation to be carried out by vendor without any cost implications.</p> <p>Services to be included during tender</p> <p>1. Tri-party agreement to be made to have protection against quitting of executing vendor.</p> <p>2. Vendor need to provide life cycle support and supplies to ensure necessary support in terms of services and spares for next 15 years from date of Purchase Order. Vendor shall provide expected life of IEDs in writing.</p> <p><b><u>SLA / Delivery Terms/ Period of contract:</u></b></p> <p>The supply of material shall be completed within 60 days from the date of award, subject to availability of clearance provided by TPSODL.</p> <p>The work of CRP installation &amp; commissioning of supplied Relay of substation, shall be done within 5 days per substation.</p> <p>The site / substation clearance / equipment outage requirement for above activities shall be provided by TPSODL engineer in charge.</p>

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		Overall contract period shall be 5 months from the date of issuance of Work Order.
<b>8.2</b>	<b>Spares</b>	<p>The bidder is required to list the spares, which may be required for ensuring the availability during the guaranteed availability period. The final list of spares shall form part of scope of supply and accordingly the price thereof shall be quoted by the bidder and shall be considered in the evaluation of the bids. During the guaranteed availability period, the spare parts supplied by the Contractor shall be made available to the Contractor for usage subject to replenishment at the earliest. Thus, at the end of availability period the inventory of spares with the Employer shall be fully replenished by the Contractor. However, any additional spares required to meet the availability of the system (which are not a part of the above spares supplied by the Contractor) would have to be supplied immediately by the Contractor free of cost to the Employer.</p> <p>The list shall include the following:</p> <ul style="list-style-type: none"> <li>• Item identification</li> <li>• Recommended spares quantities</li> <li>• Base price</li> <li>• Procurement lead time Probability the required item is available given its MTBF based on recommended spares and procurement lead time.</li> <li>• Quantity of item held in Local office by Supplier as emergency spare parts</li> </ul> <p>Quantity of item held in head office as an emergency spare part All spare parts shall be fully tested.</p>

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<b>9.0</b>	<b>Drawing and Documents</b>	<p>Following drawings and documents shall be prepared on Purchaser's specifications and statutory requirements and shall be submitted with the bid:</p> <ol style="list-style-type: none"> <li>1. Completely filled in Technical Particulars</li> <li>2. General description of the equipment and all components including brochures</li> <li>3. Bill of material</li> <li>4. Type test certificates</li> <li>5. Hardware Specification</li> </ol> <p>After the award of the contract four (4) copies of drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, Test certificates shall be submitted after the final approval of the same to purchaser.</p> <p>All the documents &amp; drawings shall be in English language.</p> <p>Instruction Manuals: Bidder shall furnish two softcopies (CD) and four (4) hard copies of nicely bound manuals (in English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.</p> <p><b>DRAWINGS AND DOCUMENTS:</b></p> <p>Following documents shall be prepared based on TPSODL specifications</p> <ol style="list-style-type: none"> <li>1. Technical Particulars.</li> <li>2. General Arrangement drawing of the equipment</li> <li>3. Plan and Section drawing</li> <li>4. Foundation drawing</li> <li>5. Bill of Material</li> <li>6. Type test Certificates if applicable</li> <li>7. Sizing Calculations of various components</li> <li>8. ICD/CID Cite (IED capability description file)</li> <li>9. SCD file (substation configuration description)</li> </ol> <p>After the award of the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submitted after the final approval of the same to the TPSODL.</p>
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	Following Drawings/Documents shall be submitted after the award of the contract:				
	S · N o	Description	For App r o v a l	For Review Inform a t i o n	Final Sub m i s s i o n
	1	Technical Parameters	√	√	√
	2	General Arrangement drawing including panel door layout	√	√	√
	3	Plan & Section drawings	√	√	√
	4	Foundation drawing	√	√	√
	5	QA & QC Plan	√	√	√
	6	Schematic drawings including SLD	√	√	√
	7	Document for Factory inspection tests and checks	√	√	√
	8	Routine, Acceptance and Type test Certificates as applicable	√	√	√
	9	Site tests and checks	√	√	√
	10	As-built drawings			
	<b><u>(TO BE ENCLOSED WITH TECHNICAL BID)</u></b>				

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<b>10.0</b>	<b>SCHEDULE OF DEVIATIONS</b>	<p>All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:</p>		
		<b>S. No</b>	<b>Clause No.</b>	<b>Details of deviation with justifications</b>
		<p>We confirm that there are no deviations apart from those detailed above.</p> <p>Seal of the Company:</p> <p style="text-align: right;">Signature</p> <p style="text-align: right;">Designation</p>		

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## Scope of work ITC for outdoor - CRP

### INSTALLATION TESTING AND COMMISSIONING of outdoor CRP:

The scope of this specification covers, unloading at site/stores complete with all accessories including, installation, testing and commissioning of Outdoor Control & Relay panels at various sites of TPSODL.

This specification will be applicable to all 33/11kV panels in the existing PSS/existing Bays/ Renovated PSS.

1. Bidder shall be responsible for construction of civil foundation (for RCC -M25 / for PCC M15 ) for CR panel. (Please Refer to sample picture given below in this document). Proper Civil foundation should be made as per the approved outdoor CR panel dimension drawing and grouting shall be of suitable Channel pieces along with suitable foundation bolts.
2. Installation of outdoor 33KV & 11KV CRP Panels including placing, fixing with suitable G.I. Nuts & Bolts in proper position and any related work as per direction of TPSODL Site engineer shall be in bidders scope. Proper alignment of 33KV & 11KV CR Panels should be checked. Cables laying and termination using double compression glands, suitable lugs and proper dressing inside CR panels shall be ensured by the bidder.
3. Earth Pits will be provided by TPSODL. BA shall connect the panel earthing to the grid earthing by GI strip of 50x 6 mm as per TPSODL norms. Joints will be welded with high quality arc welding and painting should be done for welded joints. Grounding of panel at two different locations shall be provided with GI 50x6mm flat.
4. Construction of Cable trench along with support channel (Approx 1 meter distance) and installation of PVC Pipe between CR panel and control room/ kiosk as per site requirement shall be in TPSODL scope.
5. Control cables shall be supplied by TPSODL. Transportation & shifting of all types of cables as per details given in Annexure-1 from store to PSS (including necessary loading, unloading arrangements, Vehicle, Manpower, Suitable Tools and Tackles etc.) shall be in Bidder's scope.
6. Laying and termination of cables from CR panel to ACDB, DCDB, RTU inside Control room/ Kiosk shall be in bidder's scope. Laying and termination of cables from outdoor CRP Panel to Circuit breaker, CT, PT, Transformer marshalling box through suitable size HDPE is also in Bidder's Scope. (Please refer Sample Cable Schedule per bay). Supply of HDPE pipe and soil excavation for laying purpose shall be in bidder's scope.
7. Cable tags shall be provided by bidder at both ends of cables. Print type Ferrules and lugs with suitable size shall be used for termination as per Cable Termination details to be provided by TPSODL.
8. Supply, laying and termination of Ethernet cable (CAT-6) from outdoor CR panels till Ethernet Switch inside control room (kiosk) through HDPE pipe is in bidder's scope. Armoured Cat-6 cable shall be 4 Pairs, 23 AWG Solid Bare Copper Conductor, PE Insulation, Unshielded Twisted Pair (UTP) with separator and PVC Outer Jacket. It should be designed to the ANSI/TIA-568-C.2 | ISO / IEC 11801 Category 6 requirements and transmit data at 1000 Mbps (~1 Gigabit per second) with a frequency of 250 MHz and suitable for 10BASE-T, 100BASE-TX Fast Ethernet and 1000BASE-T / 1000BASE-TX (Gigabit Ethernet). Preferred makes are- Finolex, D-Link, Belden, Polycab etc.

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9. Supply, laying & termination of Serial cable (RS-485) at MFM end through HDPE pipe is in bidder's scope. Armored RS-485 cable shall be 1 Pair, 24 AWG Tinned Copper, PE Insulation, Overall Foil + Tinned Copper Braid (90%) Shield, PVC Outer Jacket. Preferred makes are- D-Link, Belden, Polycab etc. The above-mentioned Cable Laying Scope, termination, connection, including printed ferrules, double Compression gland, and different types of lugs are in bidders Scope.
10. The cable length for Ethernet cable (CAT-6) and RS-485 cable shall be considered as maximum 600m per substation (PSS).
  - i. SITC of CAT -6 cable lump-sum per PSS as per scope requirement
  - ii. SITC of Serial cable lump-sum per PSS as per scope requirement
11. Supply and Fabrication of New Cable Gland Plate with Suitable thickness 3mm shall be in bidders scope. Termination at existing switchyard equipment like Circuit Breaker, CT, PT etc. including necessary modification to existing gland plates shall be in bidder's scope. Bidder to ensure blocking of all the cable openings on the bottom plate (gland plate) of panel for rodent and vermin proofing. This activity to be done under supervision of OEM of Numerical Relays.
12. Installation and fixing of Cable Tray inside control room (as per site requirement) shall be in bidder's scope. Cable Tray System shall be earthed in accordance with IS 3043
13. TPSODL will provide CT/PT junction boxes and installation of these Junction Boxes shall be in bidders scope including necessary fabrication, welding and any other miscellaneous work.

#### **Testing & Commissioning Checks:**

Testing and commissioning of Control and Relay panel comprising of numerical relays and multi-function meters shall be in bidder's scope. Necessary testing instruments for primary injection and secondary injection (having three phase double Source arrangement) shall be provided by bidder. Calibrated instruments shall be used by bidder. Following works may be considered as bidders Scope:

1. Termination of Internal panel wiring including inter panel bus wiring panel
2. Any Scheme Modification as per site condition in CRP Panel.
3. Over Current, Earth Fault Relay Configuration with suitable Software as per Protection & SCADA Requirement, pick up Test, and Timing Test along with trip logics checks.
4. Differential Relay Configuration with Suitable software as per Protection & Scada Requirement Point of view.
5. Differential relay/ REF/SEF functional Check like Low Set, High Set pick up, Timing Test, 2nd,5th Harmonics blocking, Stable, Unstable Condition checks with 3 phase injection kit along with trip logics.
6. Signal Simulation from CRP and checking up to RTU or SCADA, associate with Scada team.
7. Cable Continuity, ferruling, loop checks as per cable schedule and Termination.
8. CT Primary Injection Test / Secondary Injection test from CT to relay panel need to be verified.
9. Functional checks shall be performed on the control panel as per control wiring diagram.
10. All alarm, annunciation and trip circuits / indication & alarm circuits shall be tested and made operative,
11. Control relays shall be calibrated and checked for tripping and closing operations.
12. Pick up time / trip time and tripping at normal and reduced voltages shall be checked, properly adjusted and recorded.
13. Latching arrangement of relays shall be checked for operation.
14. CT ratio and protection setting as per site requirement.

#### **Tools and tackle**

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The B.A shall provide all the construction equipment tools and tackle required for offloading, storage, pre-assembly, erection, testing and commissioning of the equipment covered under the Contract. Bidder shall submit a list of all such materials to the Site engineer before the commencement of pre-assembly at Site. These tools and tackles shall not be removed from the Site without the written permission of TPSODL Site engineer . The Contractor shall maintain an accurate and exhaustive record detailing all equipment received by him for the purpose of erection and keep such record open for the inspection of the Site engineer. All equipment shall be handled carefully to prevent any damage or loss. All equipment stored shall be properly protected to prevent damage. Equipment from the store shall be moved to the actual location at an appropriate time so as to avoid damage of such equipment at Site. All the materials stored in the open or dusty location shall be covered with suitable weather-proof and flameproof covering material. The Contractor shall be responsible for making suitable indoor facilities for the storage of all equipment which requires to be kept indoors.

**Sample Foundation Picture for reference only. (Outdoor CR Panel)**



**Annuxure-1**

**Sample Cable Schedule:**

SNO	FROM EQUIPMENT	TO EQUIPMENT	CABLE SIZE	LENGTH OF CABLE(MAXIMUM)
1	AC DB	33KV INCOMER CR PANEL	4CX2.5SQMM	150 Meter
2	AC DB	33KV PTR-1 CR PANEL	4CX2.5SQMM	150 Meter
3	AC DB	33KV PTR-2 CR PANEL	4CX2.5SQMM	150 Meter
4	AC DB	33KV PTR-3 CR PANEL	4CX2.5SQMM	150 Meter
5	AC DB	11KV INCOMER-1 CR PANEL	4CX2.5SQMM	150 Meter
6	AC DB	11KV INCOMER-2 CR PANEL	4CX2.5SQMM	150 Meter
7	AC DB	11KV OUTGOING-1 CR PANEL	4CX2.5SQMM	150 Meter
8	AC DB	11KV OUTGOING-2 CR PANEL	4CX2.5SQMM	150 Meter
9	AC DB	11KV OUTGOING-3 CR PANEL	4CX2.5SQMM	150 Meter
11	DC DB	33KV INCOMER CR PANEL	4CX2.5SQMM	150 Meter



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12	DC DB	33KV PTR-1 CR PANEL	4CX2.5SQMM	150 Meter
13	DC DB	33KV PTR-2 CR PANEL	4CX2.5SQMM	150 Meter
14	DC DB	11KV INCOMER-1 CR PANEL	4CX2.5SQMM	150 Meter
15	DC DB	11KV INCOMER-2 CR PANEL	4CX2.5SQMM	150 Meter
16	DC DB	11KV INCOMER-2 CR PANEL	4CX2.5SQMM	150 Meter
17	DC DB	11KV OUTGOING-1 CR PANEL	4CX2.5SQMM	150 Meter
18	DC DB	11KV OUTGOING-2 CR PANEL	4CX2.5SQMM	150 Meter
19	DC DB	11KV OUTGOING-3 CR PANEL	4CX2.5SQMM	150 Meter
22	11KV INCOMER-1 RPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
23	11KV INCOMER-1 YPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
24	11KV INCOMER-1 BPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
25	MARSHALLING BOX	11KV INCOMER-1 CR PANEL	4CX2.5SQMM	150 Meter
26	11KV INCOMER-1 CR PANEL	11KV OG-1 CR PANEL	4CX2.5SQMM	150 Meter
28	11KV INCOMER-2 RPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
29	11KV INCOMER-2 YPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
30	11KV INCOMER-2 BPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
31	MARSHALLING BOX	11KV INCOMER-2 CR PANEL	4CX2.5SQMM	150 Meter
32	11KV INCOMER-2 CR PANEL	11KV OG-2 CR PANEL	4CX2.5SQMM	150 Meter
33	11KV INCOMER-3 RPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
34	11KV INCOMER-3 YPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
35	11KV INCOMER-3 BPH PT	MARSHALLING BOX	4CX2.5SQMM	150 Meter
36	MARSHALLING BOX	11KV INCOMER-3 CR PANEL	4CX2.5SQMM	150 Meter
37	11KV INCOMER-3	11KV OG-3 CR PANEL	4CX2.5SQMM	150 Meter
38	11KV INCOMER-1 CR PANEL	33KV PTR-1 CR PANEL	4CX2.5SQMM	150 Meter
39	11KV INCOMER-2 CR PANEL	33KV PTR-2 CR PANEL	4CX2.5SQMM	150 Meter
40	11KV INCOMER-3 CR PANEL	33KV PTR-3 CR PANEL	4CX2.5SQMM	150 Meter
41	AC DB	RTU PANEL	4CX2.5SQMM	150 Meter
42	DC DB	RTU PANEL	4CX2.5SQMM	150 Meter
			TOTAL	6300 Meter
43	AC DB	BATTERY CHARGER	4CX16SQMM	10(TPSODL SCOPE)
44	STN TRAF0 LTDB	ACDB	3.5X95SQMM	70(TPSODL SCOPE)

**IP65 Panel to Equipment Cable Details. (Sample Cable Schedule).**

New Cable Required from Each feeder to Outdoor New IP65 Panel			
Descriptions	Type of Cables	Maximum Consider	Remarks
C.B to IP65 Panel	4C*2.5sqmm	25meter	This all-cable length multiply with number of feeders
C.B to IP65 Panel	19C*2.5sqmm	25meter	This all-cable length multiply with number of feeders
C.T to IP65 Panel -Rph	6C* 2.5 Sqmm	25meter	This all-cable length multiply with number of feeders

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C.T to IP65 Panel -Yph	6C* 2.5 Sqmm	25meter	This all-cable length multiply with number of feeders
C.T to IP65 Panel -Bph	6C* 2.5 Sqmm	25meter	This all-cable length multiply with number of feeders
P.T to IP65 Panel- Rph , Yph,Bph	6C* 2.5 Sqmm	25 Meter	This all cable length multiply with number of feeders
C.B to IP65 Panel DC cable (for CB DC Power Supply)	4C*2.5sqmm	25meter	This all cable length multiply with number of feeders
C.B to IP65 Panel AC Cable ( For CB AC Power Supply)	4C*2.5sqmm	25meter	This all-cable length multiply with number of feeders
PTR Marshalling Box to 33KV IP65 Panel Cable ( PTR trouble)	2X6C * 2.5 sqmm	25meter	This all cable length multiply with number of feeders

**List of Rural PSS: (OUTDOOR TYPE).**

Sl no	Circle	Division	PSS Name	33kv single feeder	Transformer feeder 33kv side	11kv single feeder
1	Bhanjanagar	BoED	CHATARANG	2	2	6
2	Jeypore	KED	NANDAPUR	3	2	6
3	Raygada	RED	KASIPUR	5	2	7
4	Aska	GSED	Pudamari	1	3	7
5	Aska	GSED	Patrapur	3	4	10
6	Aska	AED - I	BALISIRA	2	3	6
7	Berhampur	PSED	BEGUNIAPADA	3	3	7
8	Berhampur	PSED	Kodala PSS	2	2	6
9	City	BED - III	Kukudhakhandi	1	2	6
10	City	BED - III	Lathi	1	3	6
11	City	BED - III	Jagapur	2	3	7
12	Bhanjanagar	BNED	SORADA	4	2	6
13	Bhanjanagar	BoED	Manamunda	5	3	9
14	Bhanjanagar	BoED	Kantamal	3	2	6
15	Bhanjanagar	PED	K. Nuagam	4	2	5
16	Bhanjanagar	PED	Daringbadi	1	2	6
17	Bhanjanagar	PED	Raikia	4	2	7
18	Bhanjanagar	PED	Khajuripada	1	2	6
19	Jeypore	NED	Podagada (Khatiguda)	1	2	6
				48	46	125

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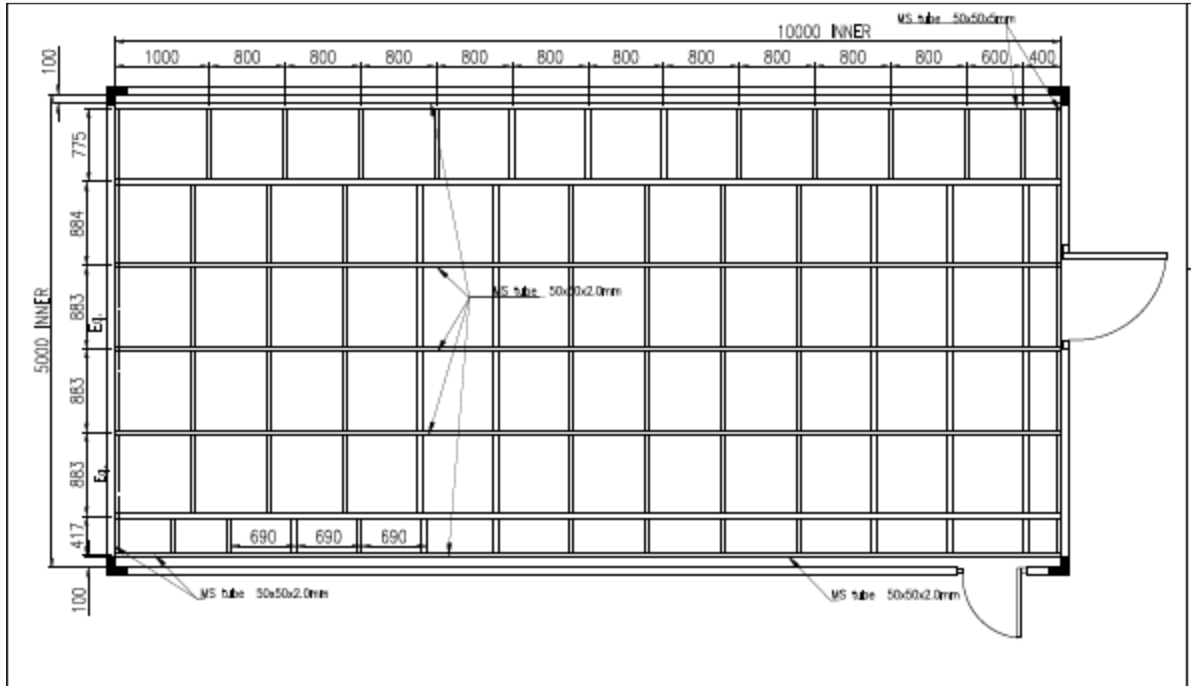
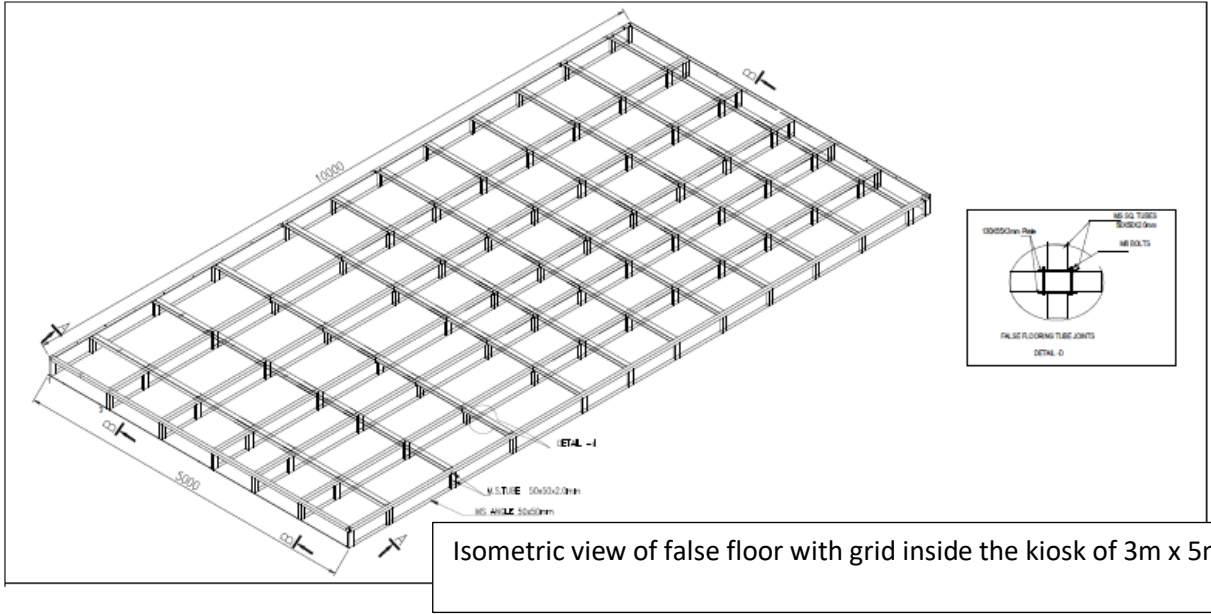
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