PROTECTION BOQ of 220kV Makansar Sub Station (220kV & 66kV System)				
Sr. No.	**Particulars of Item**	**Unit**	**Erection Qty.**	**Supply Qty.**
A	**Supply, Erection, Testing and Commissioning of Protection equipments and materials as per respective technical specifications and relevant special conditions and suitable for One Main Bus and One Main cum Transfer Bus system on 220 kV side**			
1	Control & Protection panels **(having IEC 61850 Edition 2 as well as Cyber security complient IEDs)** for 220 KV Bays (Control Voltage - 220V DC) as per tech specifications with following break up			
	1) Control & Protection panel for Line with Distance protection relays as Main-I & Main-II	Set	4	4
	2) Control & Protection panel for Transformer with Differential	Set	2	2
	3) Control & Protection panel for TBC	Set	0	0
	4) Control & Protection panel for BC cum TBC	Set	1	1
	5) Busbar Protection - (Central Unit - 24 bays, Peripheral Units - ***07*** Bays) [CU shall be mounted in one of the bay control & protection panel while PUs shall be mounted in respective bay control and protection panels as shown in panel GA drawing]	Set	1	1
2	GPS based Time Synchronising Unit (IEC 61850 compatible)	Set	1	1
B	**Supply, Erection, Testing and Commissioning of Protection equipments and materials as per respective technical specifications and relevant special conditions and suitable for Two main Bus system on 66 kV side**			
	Control & Protection Panel **(having IEC 61850 Edition 2 as well as Cyber security complient IEDs)** for 66 kV bays (Control Voltage - 220V DC) as per tech specifications & with following break up			
	1) Control & Protection Panel for two Lines	Set	3	3
	2) Control & Protection Panel for Interconnecting Line & Line	Set	0	0
	3) Control & Protection Panel for Line & Buscoupler Bay	Set	1	1
	4) Control & Protection Panel for Transformer W/O Differential Relay (220/66KV TRF LV) & Line	Set	2	2
	5) Control & Protection Panel for Tranformer with Differential Relay (66/11KV Transformer)	Set	1	1
	6) Control & Protection Panel for Capacitor bank	Set	0	0
	7) Under Frequency Panel	Set	0**	0**
C1	**Supply, Erection, Testing and Commissioning of Protection equipments and materials as per respective technical specifications and relevant special conditions and suitable for Single Bus system on 11kV side**			
2	SCADA comaptible Control & Protection panels for 11kV Bays with Bay Control & Protection Relay (Control Voltage - 220V DC) as per tech specifications & **suitable for conventional switchgear modules** with following break up			
	1) Control & Protection Panel for 66/11kV TRF LV	Set	1	1
D	**Supply, Erection, Testing and Commissioning of General purpose equipments and materials as per respective technical specifications and relevant special conditions and suitable for One Main and One Main cum Transfer Bus system on 220kV, One main Bus system on 132kV and Two Main Bus system on 66kV.**			
1	Battery set - **220 V, 250Ah at ECV -1.14, C5 Duly cycle {1.2 V, 174 cells} Ni-CAD Battery Set** with Two Step Two Tier FRP stand of adequate size. **OR** Battery set - **220 V, 250Ah at ECV 1.85V {2 V, 110 cells} Plante' type Lead Acid Battery Set** with Two Step Two Tier FRP stand of adequate size	No.	2	2
2	Battery Charger - **220 V (Float - 30A / Boost - 60A)** - (SCADA compatible) Suitable to Ni-Cd Battery set and shall be able to charge Battery set as per requirement during float / boost mode as well as it shall supply to load as per rated voltage of load components.	No.	2	2

Sr. No.	Particulars of Item	Unit	Erection Qty.	Supply Qty.
3	DCDB-220 V with 35 Feeder(For 66kV System)	No.	2	2
4	DCDB-220 V with 20 Feeder(For 220kV System)	No.	2	2
4a	DCDB-220 V with 20 Feeder (For 220kV PLCC Panels)	No.	2	2
5	SCADA compatible 400A, LTPB suitable for AIS switchgear module and related accessories as per specifications but not less than the requirement of specification.	No.	2	2
E	**Supply, Installation, Testing and Commissioning of materials/item for Power Cable and Control Cable wiring including preparation of wiring schedule.**			
1	Supply and Laying of 1.1 kV PVC armoured copper/Aluminium control/LT power cable in trench including binding/clamping of cable with *PVC lockable wire tie* as per requirement including supply and fixing of identification tags at both ends and at distance of every 100mtr. (Note :- Aluminium cables of size 185 mm^2 & above shall be XLPE type)			
	1) 2c x 2.5 mm^2, armoured copper control cable	Mtr.	2000#	2000#
	2) 2c x 4 mm^2 , armoured copper control cable	Mtr.	1800#	1800#
	3) 4cx2.5 mm^2, armoured copper control cable	Mtr.	7300#	7300#
	4) 4c x 4 mm^2 , armoured copper control cable	Mtr.	7600#	7600#
	5) 7c x 2.5 mm^2, armoured copper control cable	Mtr.	2200#	2200#
	6) 12c x 2.5 mm^2, armoured copper control cable	Mtr.	5800#	5800#
	7) 12c x 4 mm^2, armoured copper control cable	Mtr.	4300#	4300#
	8) 19c x 2.5 mm^2 , armoured copper control cable	Mtr.	9800#	9800#
	9) 27c x 2.5 mm^2 , armoured copper control cable	Mtr.	4300#	4300#
	10A) 1 x 50 mm^2 , armoured copper cable	Mtr.	2000#	2000#
	10B) 4C x 10 mm^2 , armoured copper control cable	Mtr.	400#	400#
	11) 4 x 10 mm^2 , Al. armoured LT cable	Mtr.	400#	400#
	12) 3.5 x 25 mm^2 , Al. armoured LT cable	Mtr.	1000#	1000#
	13) 3.5 x 50 mm^2 , Al. armoured LT cable	Mtr.	300#	300#
	14) 3.5 x 120 mm^2 , Al. armoured LT cable	Mtr.	0	0
	15) 1C x 150 mm^2 , Al. armoured LT cable	Mtr.	1100#	1100#
	16) 1C x 240 mm^2 , Al. armoured LT cable	Mtr.	0	0
	17) 1C x 300 mm^2 , Al. armoured LT cable	Mtr.	0	0
	18) 3.5 x 300 mm^2 , Al. armoured LT cable	Mtr.	0	0
2	Termination of the Control and Power cable at panel / MK box/equipment including PVC binding, dressing, shaping, drilling of holes in panels for glands nuts includings supply of all required materials, providing of glands for following size. The work also includes looping in Panel and MK box by using crimping type lugs of suitable size with ferruling (machine printed) with proper size of copper cable wire. The loops should be bunched by using button tape and proper shaping etc.			
	1) cables from 2 core to 7 core of 2.5 & 4.0 Sq.mm size	No.	1150#	0
	2) cables above 7 core	No.	1300#	0
3	Laying of 1.1kV PVC/XLPE armored Al. LT power cable in ground by digging trench of suitable width and 450 mm depth with providing and fixing of brick and sand layer covering the cable in any type of soil and Laying of 1.1kv PVC armored copper control cable in heavy duty PVC pipe of suitable size buried in ground by digging trench of suitable width and 450 mm depth in any type of soil including supply and fixing of Pipe and identification tags at distance of every 100 Mtrs for following size			
	1) Control Cables upto 7 core	Mtr.	2050#	0
	2) Control Cables above 7 core and all LT cables	Mtr.	2500#	0

Sr. No.	Particulars of Item	Unit	Erection Qty.	Supply Qty.
3a	Supply, Erection, Testing and Commissioning of Modular Variable-diameter Cable sealing system as per respective technical specification and relevant special conditions wherever the electrical / instrumentation / communication / LT Power cable underground and over-ground enter or leave bay kiosks / control room of substations / cable trench / basement. *	Job	LS	LS
4	Providing and fixing of suitable BOX type GI perforated tray with necessary clamps and couplings for control cable of CT/PT/CVT etc. equipments including fixing with structures up to plinth level as per instruction of Engineer-in-charge.			
	1) 220 KV Switch Yard	Mtr.	150	150
	2) 132 KV Switch Yard	Mtr.	0	0
	3) 66 KV switch Yard	Mtr.	135	135
4a	Providing and fixing of suitable BOX type GI perforated tray with necessary clamps and couplings for control cable of CB, Isolator, Earth Switch etc. equipments including fixing with structures up to plinth level as per instruction of Engineer-in-charge.			
	1) 220 KV Switch Yard	Mtr.	150	150
	2) 132 KV Switch Yard	Mtr.	0	0
	3) 66 KV switch Yard	Mtr.	125	125
5	Providing and fixing bay MK as per tech spec	No.	7	7
6	Providing and fixing Yard LT ACDB as per tech spec -with 20 OG feeders (220KV & 66KV)	No.	2	2
7	Providing and fixing Yard LT ACDB as per tech spec -with 12 OG feeders	No.	0	0
8	Providing and fixing of CT-PT/CVT JB as per Technical specification			
	1) PT JB(220kV -2,66kV -2 & 11kV- 1)	No.	5	5
	2) CT JB (66kV Yard - 12 Nos., 11kV Yard - 1 No.)	No.	13	13
	3) CVT JB	No.	0	0

Notes:-

1.# The quantities of control and power cables shown in the BOQ are based on typical cable philosophy. Hence, the contractor shall work out actual requirement of quantity for execution by calculating cable lengths.

2. All the cables shall be laid through minimum possible route and accordingly the quantity of cables shall be calculated and considered as per actual measurement. Any adjustment found during execution is to be absorbed and final amendment of quantity shall be based on approved 'As Built' quantity.

3.**Under Frequency (UFR) protection Panel is not considered as per O.N. No: GETCO/OTHER/e-file/447/2024/5456/Technical Dated:26.03.2024

4.* The cable sealing system Module quantity & Frames are standardized as per O.N. No: GETCO/ CE(Engg)/V/C /O-006881 Dated:17.06.2021