

Protection BOQ for 1 No. 220kV / xx kV \pm 125MVAR, STATCOM Bay at 220kV SAGAPARA substation				
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 TWO Main Bus and One Transfer Bus (3 Bus) system on 220 kV side			
1	Control & Protection panels (having IEC 61850 Edition 2 as well as Cyber security compliant IEDs) for 220 kV Bays (Control Voltage - 220V DC) as per tech specifications with following break up			
	1) Control & Protection panel for Line	Set	0	0
	2) SCADA compatible Control & Protection Panel for coupling Transformer HV Bay (220 kV/ xx kV HV) to suite the STATCOM system requirement OR 2) Conventional Control & Relay Panel for coupling Transformer HV Bay (220 kV/ xx kV HV) to suite the STATCOM system requirement^	Set	1^	1^
	3) Control & Protection panel for TBC	Set	0	0
	4) Control & Protection panel for BC cum TBC	Set	0	0
	5) Busbar Protection - Augmentation of existing Numerical Busbar protection scheme GE make MiCOM P74x (CU- MiCOM P741 & PU - MiCOM P743) by integrating bay under scope along with all required accessories and installation, testing & commissioning of complete Busbar protection scheme in all respect. Remark: Bus bar protection Bay unit (PU) compatible to existing Bus bar scheme will be provided by GETCO. Only integration and commissioning is in the scope of bidder	Job	LS	LS
	6) Establishment of Interfaces with existing Control & Relay Panel for BC, TBC, LBB, PT Selection, Interlocking etc.	Job	LS	LS
2	IEC 61850 compliant Global Positioning System based Time Synchronization Equipment to suite the STATCOM system requirement	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 xx KV Bus system			
	Control & Protection Panel (having IEC 61850 Edition 2 as well as Cyber security compliant IEDs) for xx kV bays (Control Voltage - 220V DC) as per tech specifications & with following break up			
	1) Control & Protection Panel for two Lines	Set	0	0
	2) Control & Protection Panel for Interconnecting Line & Line	Set	0	0
	3) Control & Protection Panel for Line & Bus coupler Bay	Set	0	0
	4) SCADA Compatible Control & Protection Panel for coupling Transformer LV Bay (220 kV/ xx kV LV) to suite the STATCOM system requirement	Set	1	1

Sr. No.	Particulars of Item	Unit	Erection Qty.	Supply Qty.
	5) Control & Protection Panel for Transformer with Differential Relay (66/11KV Transformer)	Set	0	0
	6) Control & Protection Panel for Capacitor bank	Set	0	0

Sr. No.	Particulars of Item	Unit	Erection Qty.	Supply Qty.
D	Supply, Erection, Testing and Commissioning of General purpose equipments and materials as per respective technical specifications and relevant special conditions and suitable for STATCOM System Requirement			
1	<p>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. <u>(Rating is tentative for estimation purpose please refer Remarks)</u></p> <p style="text-align: center;">OR</p> <p>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 <u>(Rating is tentative for estimation purpose please refer Remarks)</u></p>	No.	2**	2**
2	<p>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. <u>(Rating is tentative for estimation purpose please refer Remarks)</u></p>	No.	2**	2**
3	DCDB-220 V with 35 Feeder	No.	2	2
4	DCDB-220 V with 20 Feeder	No.	0	0
4a	DCDB-220 V with 20 Feeder (For PLCC Panels)	No.	0	0
5	SCADA Compatible 1000 Amp LT Panel Board suitable to STATCOM system requirement	No.	1	1
E	Supply, Installation, Testing and Commissioning of materials/item for Power Cable and Control Cable wiring including preparation of wiring schedule.			
1	<p>Supply and Laying of 1.1 kV FRLSH PVC armoured copper/Aluminium control/LT power cable in trench including binding/clamping of cable with <i>PVC locable wire tie</i> as per requirement including supply and fixing of identification tags on both ends and at distance of every 100 mtr for STATCOM Bay Coupling Transformer 220kV HV Bay</p> <p>(Note :- Aluminium cables of size 185 mm² & above shall be XLPE type)</p>			
	1) 2c x 2.5 mm ² , armoured copper control cable	Mtr.	350#	350#
	2) 2c x 4 mm ² , armoured copper control cable	Mtr.	110#	110#
	3) 4cx2.5 mm ² , armoured copper control cable	Mtr.	640#	640#
	4) 4c x 4 mm ² , armoured copper control cable	Mtr.	1810#	1810#
	5) 7c x 2.5 mm ² , armoured copper control cable	Mtr.	590#	590#
	6) 12c x 2.5 mm ² , armoured copper control cable	Mtr.	910#	910#
	7) 12c x 4 mm ² , armoured copper control cable	Mtr.	310#	310#
	8) 19c x 2.5 mm ² , armoured copper control cable	Mtr.	1840#	1840#
	9) 27c x 2.5 mm ² , armoured copper control cable	Mtr.	1330#	1330#
	10A) 1 x 50 mm ² , armoured copper cable	Mtr.	660#	660#
	10B) 4C x 10 mm ² , armoured copper control cable	Mtr.	110#	110#
	11) 4 x 10 mm ² , Al. armoured LT cable	Mtr.	110#	110#
	12) 3.5 x 25 mm ² , Al. armoured LT cable	Mtr.	260#	260#
	13) 3.5 x 50 mm ² , Al. armoured LT cable	Mtr.	0	0
	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.	0	0
	16) 1C x 240 mm ² , Al. armoured LT cable	Mtr.	110#	110#

Sr. No.	Particulars of Item	Unit	Erection Qty.	Supply Qty.
	17) 1C x 300 mm ² , Al. armoured LT cable	Mtr.	550#	550#
	18) 3.5 x 300 mm ² , Al. armoured LT cable	Mtr.	0	0
1a	Supply and Laying of 1.1 kV FRLSH PVC armoured copper/Aluminium control/LT power cable in trench including binding/clamping of cable with <i>PVC locable wire tie</i> as per requirement including supply and fixing of identification tags on both ends and at distance of every 100 mtr for STATCOM Bay Coupling Transformer xx kV Bay (Note :- Aluminium cables of size 185 mm ² & above shall be XLPE type)	Job	LS	LS
2	Termination of the control cable at panel / MK box/equipment including PVC binding dressing/shaping drilling of holes in panels for glands nuts for following size. The work also includes Looping in panel and MK box with using crimping type of lugs of suitable size with ferruling with proper size of copper cable wire. The loops should be bunched with 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

Sr. No.	Particulars of Item	Unit	Erection Qty.	Supply Qty.
3	Laying of 1.1kV PVC/XLPE armoured 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 armoured 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
3a	<u>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.</u> Nos. of Module requirement per cable entry in	Job	0	0
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) XX kV switch Yard	Mtr.	125	125
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) XX kV switch Yard	Mtr.	100	100
5	Providing and fixing bay MK as per tech spec	No.	1	1
6	Providing and fixing Yard LT ACDB as per tech spec -with 20 OG feeders (220kV & 66kV)	No.	0	0
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 (xx kV Bus)	No.	1	1
	2) CT JB (xx kV Coupling Transformer LV Bay)	No.	1	1
	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.^ Either SCADA compatible Control & Protection Panel or Conventional Control & Relay Panel shall be considered for 220/xx kV Coupling TRF HV Bay based on suitability of STATCOM System requirement