BILL OF QUANTITY FOR ELECTRICAL WORKS FOR 11 KV SUB STATION AT GORAKHPUR MAIN BRANCH

SECTION-I- TRANSFORMER AND VCB PANEL WORKS

S. No.	Item Description	Unit	Qty	Rate	Amount
	VACUUM CIRCUIT BREAKER AND TRANSFORMERS				
	(A)- VACCUM CIRCUIT BREAKER				
1	**630A, 11KV 18.4kA HT Vacuum Circuit Breaker(VCB) panel**				
	HT SECTION:				
	Supply, Design, Testing, Transportation, Installation and Commissioning of 11kV 630 Amps 18.4kA HT VCB Panel (Single VCB-ICOG) with Al Bus Bar consisting of following components :				
A	**HT SWITCHGEAR Rating:**				
	Supply, Design & manufacturing of 11 KV Incoming VCB Panel with 630 Amp., 18.4kA/1Sec, 100/50 Amp. CT ratio, PT & associated material, VCB panel conforming to IS/IEC 62271-200 & IS/IEC 62271-100 as approved by Engineer in charge having with VCB VI, relay shall be of same principal manufacturer make and all are original factory fitted panels. Not a system house makes panels. The bus bar and connectors should be made from copper with proper cross section area, tinned and insulated properly with HT insulation compound/sleeves. Interconnection between HT switchgear and transformer shall be using 1C x 3 x 240 sq.mm Al armoured XLPE HT Cable.**(Make: Schneider/ABB/Crompton/CG Power/Siemens/LK/GE/Kirloskar)**				
B	**Fabricated Housing :**				
B1	Housing with Al 630A Interconnections Incomer : 630A- 01 Nos.				
B2	**630A Al Bus Bar** with 11KV Grade Sleeving (Extension for future 4th VCB) **Incomer : 630A- 01 Nos. Outgoing : 630A: 01 nos.**				
B	**CT & PT DETAILS :**				
B1	DUAL CORE CT CTR : 100/50A Core 1 : Class 1, BURDEN 15 VA Core 2 : Class 5P10, BURDEN 15 VA **(CT need to be >50 A)** CT Position shall be in Cable Chamber of Panel **Incomer : 03 Sets Outgoing : 03 Sets**				
B5	3 No. Single Phase Potential Transformer **(To be mounted at the rear end of the Panel and position will be above breaker position)** Ratio : 11KV/rt3/110V/rt3 Class 1, BURDEN - VA Material - **Cast Resin type Incomer : 01 Sets Outgoing : 00 Set**				
C	**BREAKER PANEL INDICATION LAMPS :**				
C1	Breaker On / Off / Trip / Spring Charge (As required) Incomer : 05 Sets Outgoing : 10 Sets				
C2	R-Ph. / Y-Ph. / B-Ph Incomer : 03 Sets Outgoing : 00 Sets				
D	**SWITCHES AND OTHER ACCESSORIES :**				
D1	DC ON/OFF Switch Incomer : 01 Set Outgoing : 01 Set				
D2	AC ON/OFF Switch Incomer : 01 Set Outgoing : 01 Set				
D3	Local Remote Switch Incomer : 01 Set Outgoing : 01 Set				
D4	T-N-C Switch Incomer : 01 Set Outgoing : 01 Set				
D5	15A, 230V, 3 pin plug plug & socket Incomer : 01 Set Outgoing : 01 Set				
D6	Mech. ON-OFF push button Incomer : 01 Set Outgoing : 01 Set				
D7	Heater with heater switch & thermostat Incomer : 01 Set Outgoing : 01 Set				
D8	Cubicle illumination lamp Incomer : 01 Set Outgoing : 01 Set				
E	**METERS :**				
E1	MFM EM6400 Incomer : 01 Set Outgoing : 01 Set				
E3	Ammeter with Selector Switch Incomer : 01 Set Outgoing : 01 Set				
E4	Voltmeter with Selector Switch Incomer : 01 Sets Outgoing : 01 Set				
F	**RELAYS :**				
F1	Numerical Non -Directional 3 Over Current/ 1 Earth Fault Protection- P1F1 Incomer : 01 Set Outgoing : 02 Sets				
F1	Trip Ckt Supervision Part of Main Numerical Relay				
F2	Antipumping Incomer : 01 Sets Outgoing : 02 Set				
F3	Master Trip Part of Main Numerical Relay				
F4	Auxillary Relay for Trafo Fault (VAA33 or Equiv.) Incomer : Sets Outgoing : 02 Sets				
F5	Power Pack Incomer : 01 Set Outgoing : 00 Set				
F6	8 Window Annunciator with Hooter Incomer : 01 Sets Outgoing : 00 Sets				
	Relay shall be with communication port				
	Protection CT shall be 40/1A 2.5VA 5P10.				
	Mechanical ON-OFF-TRIP mimic diagram				
	Fault Passage Indicator				
	Manometer				
	Terminal Protectors (BOOTS)				

S. No.	Item Description	Unit	Qty	Rate	Amount
	Operating Handle				
	Incoming and Outgoing modules of the panel shall be suitable for 3C x 120 sq.mm HT 11 KV Cable termination. Outgoing modules should have provision to connect another cable of size 3C x 120 sq.mm, if required.				
	Sub Total(A)- Supply, Design, in house Testing of 11kV 630Amps 18.4 kA HT VCB Panel (ICOG) as Described as Above.	**SET**	**1**		
2	**(B)- TRANSFORMER**				
	Supply, Installation, Testing and Commissioning of 400 KVA 11/0.433 KV Delta-Star DYn11 COPPER Wound (HV and LV), ONAN Oil immerged type transformer with Off Circuit Tap Change(OCTC) tap links of range +5% to - 10% @ 2.5% each. Insteps of 2.5% each total 6 steps. Class of Insulation: A, Temperature Rise: 98 Deg. C, Losses (As per ECBC 2017) (Subjected to IS Tol.). Minimum 3 Star rated. **(Make: Schneider/ABB/Crompton/CG Power/Siemens/LK/GE/BHEL/Kirloskar)**				
	1. Type of Cooling : ONAN				
	2. Class of insulation Class A				
	3. No of phase and rated frequency : 3, 50 Hz				
	4. Winding				
	a) HV Copper				
	b) LV Copper				
	5.. Insulation level (Impulse withstand)(kVpeak)				
	a) HV 75				
	b) LV				
	6. Insulation level (power frequency withstand) (kVrms)				
	a) HV 28				
	b) LV 3				
	7. Tapping- On HV yes				
	a) Range +5% to -10% @ 2.5% Each				
	b) No of Steps 6				
	c) Tap changer type OCTC				
	8. Temperature rise of oil/winding over design ambient temperature of 50°C : 40/45(°C)				
	9. Hot spot temperature rise over a maximum yearly weighted : 98 °C				
	10. Short circuit Thermal withstand time (secs) : 2				
	11. % Impedance at 75°C , rated current &Frequency % (subject to IS tol) : 4.50				
	12. Total losses @ 50% Load at rated voltage & frequency kW (MAX) : 1.225				
	13. Total losses @ 100% Load at rated voltage & frequency kW (MAX) : 3.450				
	14. Bushings : HV				
	a) Reference standard : IS 2099 & IS 3349				
	b) Type of bushing : Porcelain				
	c) Voltage Rating (kV) : 17.5				
	d) Current Rating Amps : 250				
	15. Bushings : LV & LVN				
	a) Reference standard				
	b) Type of bushing : Epoxy				
	c) Voltage Rating (kV) : 1				
	d) Current Rating Amps : 630				
	16. Weight in Kgs (Approximate)				
	a) Core and winding : 1440				
	b) Oil : 505				
	c) Total weight : 2835				
	20. Fitting & Accessories as per specification Yes, IS : 2026 & CBIP				
	a) Overall Length*Breadth*Height(in mm) +/- 10% : 2350*2150*2150				
	18. Approximate Weight of Heaviest package (KG) : 4100				
	19. Approximate transport dimensions LxBxH (mm) : 3300 X2000 X 1800				
	20. Fitting & Accessories as per specification Yes, IS : 2026 & CBIP				
	21. Reference standard : IS 1180 & IS:2028				
	22. Termination				
	a) HV Cable Box : (1 Run / Ph)				
	b) LV Cable Box : (2 Run / Phase) B2B				
	c) Orientation : 180 Degree				
	23. % Efficiency at 75degC/Unity P.F.				
	a) At 100% load/75%/50%/25% : 99.14/99.29/99.39/99.34				
	24. % Efficiency at 75degC/0.8 P.F.				
	a)At 100% load/75%/50%/25% : 98.93/99.11/99.24/99.17				
	25. Maximum efficiency at unity P.F : 99.40				
	26. % Regulation at full load : at Unity PF 0.84 and at 0.8 PF 3.30				
	Sub Total (B) :11/0.433 KV, 400 KVA ONAN Type Transformer Described as Above.	**SET**	**1**		

S. No.	Item Description	Unit	Qty	Rate	Amount
3	**(C)- MAIN L.T. PANEL**				
a)	commissioning of new fully compartmentalised, wall/ Floor mounted, if floor mounted than stand should be made of MS channel/angle grouted to floor with the panel 450 mm above ground level, bottom/top cable entry, front operating, indoor duty, dust & vermin proof, dead back main electrical panel made of 16g CRCA sheet steel painted with one coat of red oxide primer and two coat of outdoor type synthetic enamel paint (spray painted) after de greasing, de rusting and phosphading, with two earth studs, 30x6 mm G.I. Earth bus, SMC/DMC insulator, the panel shall have changeover facility & interlocking through PLC to achieve electrical interlocking, as required and comprising of the following:				
	(Each Incomming MCCB shall have thermal magnetic release and variable current setting from front, adjustable overcurrent, short circuit & earth fault protection, front extended lockable handle, pad lockable in off position, shrouding on incomer side, termination shall be suitable for aluminium bus bars / cables and as per specification.)				
	Incomer :: 1 No. 630 Amp FP Moulded Case Circuit Breaker with thermal magnetic based adjustable over current, short circuit. **(For 1 x 630 KVA Incomer)** (50 KA)				
	Outgoing : I One 415V, 4P, 400A, 35KA breaking capacity MCCB with adjustable thermal and fixed magnetic release outgoing**(Gorakhpur Main Branch)**.				
	ii. Three nos. 415V, 4P, 250A, 35KA breaking capacity MCCB**(one for PB branch, Capacitor panel and one for SCB)**				
	ii. One nos. 415V, 4P, 160A, 25KA breaking capacity MCCB **(spare)**				
	Iii. Two nos. 415V, 4P, 125A, 25 KA breaking capacity MCCB with adjustable thermal and fixed magnetic release out going.(One for DGM Bungalow and one spare)				
	iv. One nos. 415V, 4P, 63A, 10 KA breaking capacity MCB with adjustable thermal and fixed magnetic release out going.(light Dbs and one spare)				
	iv. Two no. 230V, DP, 63A, 10 KA breaking capacity MCB with adjustable thermal and fixed magnetic release out going.				
	v. One spare compartment for 4P, 100A MCCB and 4P 63 MCB(With fixing of MCCB and MCB).				
	Bus bar chamber with R,Y,B and N bus bars made of 25x10 mm Aluminium(Indal, Hindalco, Balco).				
	Digital Ammeter with CT Set and selector switch, RYB LED LAMP				
	ON/OFF Indicating Lamp				
	1 set 3 phase digital ammeter with CT				
	1 set 3 phase digital voltmeter				
	1 set phase digital frequency meter with CT				
	Danger plate should be provided. All MCCB should be with external rotary handle, separator sheet and spreader terminals. Minimum phase to phase distance 32 mm, phase to neutral and earth 26 mm. Metallic partition should be provided between adjacent cubical/compartment. Cubical should be made of vermin and dust proof by means of suitable gasket around all door/covers removable gland plates to be provided. All bus bar should be sleeved by heat shrinkable PVC red, yellow, blue and black coloured. All wiring to be done by PVC insulated 1100V grade copper flexible conductor wire of following size. CT circuit : 2.5 sq. mm PT circuit : 1.5 sq. mm all wires to be provided with appropriate crimping type lugs/ferrules for termination. Protection shrouds to be provided on incoming side of incomer and on normally live parts when cubical door is opened. Bakelite barriers of 4 mm thickness shall be provided on incoming and outgoing side of incomer. Approval of general layout, manufacturing and single line diagram drawings from consultant/Bank's Engineer is required before commencing manufacture and the panel should be tested in the presence of Consultant/Bank's Engineer at manufacturer's premises before dispatch to site along with HV withstand and insulation resistance test reports.				
	Sub Total(C) for Main LT panel as described above	**Set**	**1**		
	(D)- HT Cabling				
4	**11 KV END TERMINATION:**				
	Supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required :				
4.1	3C x 120 Sqmm, 11KV XLPE	**SET**	**4**		
5	**11 KV H.T. CABLE:**				

S. No.	Item Description	Unit	Qty	Rate	Amount
	Supply of 11 KV grade aluminium conductor, cross linked polyethylene (XLPE) insulated individual core screened, flat steel/strip armoured PVC sheathed cable complete as required.				
5.1	3C x 120 Sqmm, 11 KV XLPE	**M**	**50**		
6	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in existing trench including excavation and dismanteling, safe keeping of existing cable at at, protective covering and refilling as required the trench etc as required.				
6.1	Upto 120 sq. mm	**M**	**50**		
	Sub Total (D) HT Cabling				
	(E) -LT Cabling				
7	**DISTRIBUTION CABLE:**				
	SUPPLY AND LAYING OF LT CABLE:				
	Supply of following sizes of 1.1KV grade aluminium conductor XLPE insulated and FRLS PVC sheathed armoured cable conforming to relevant IS. (Cable shall be purchased only after approval of cable schedule by Engineer In charge/ architect / consultant).				
7.1	3.5 core, 300 sq.mm.	**M**	**50**		
7.2	3.5 core, 150 sq.mm.	**M**	**30**		
7.3	3.5 core, 95 sq.mm.	**M**	**40**		
7.4	3.5 core, 70 sq.mm.	**M**	**50**		
7.5	3.5 core, 50 sq.mm.	**M**	**40**		
7.6	3.5 core, 35 sq.mm.	**M**	**60**		
7.7	3.5 core, 25 sq.mm.	**M**	**70**		
8	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size direct in ground including excavation and refilling the trench etc as required, excluding sand cushioning, protective coverin.				
8.1	Above 185 sq. mm and upto 400 sq. mm	**M**	**50**		
8.2	Above 95 sq. mm and upto 185 sq. mm	**M**	**30**		
8.3	Above 35 sq. mm and upto 95 sq. mm	**M**	**130**		
8.4	upto 35 sq. mm	**M**	**130**		
9	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
9.1	3.5 Core X 300 sq. mm	**Each**	**12**		
9.2	3.5 core, 150 sq.mm.	**Each**	**8**		
9.3	3.5 core, 95 sq.mm.	**Each**	**8**		
9.4	3.5 core, 70 sq.mm.	**Each**	**10**		
9.5	3.5 core, 50 sq.mm.	**Each**	**12**		
9.6	3.5 core, 35 sq.mm.	**Each**	**14**		
9.7	3.5 core, 25 sq.mm.	**Each**	**12**		
	Sub Total (E) LT Cabling				

S. No.	Item Description	Unit	Qty	Rate	Amount
	(F)- Earthing and other works				
10	Earthing with G.I. plate 600mmx600mmx6mm thick, top of the plate placed at least 3 mt. below ground level with 20 mm Class-B, G.I. pipe for watering, as per IS 3043, with 32x6 mm GI earthing lead in 50mm B class GI pipe from plate to masonry inspection pit, with salt and charcoal and providing 12 mm diax 80mm long GI bolt, nut and double washers for connecting earth lead including restoring the surface duly rammed as per specification with 300 mmX300mmX300mm(inside) finished masonry chamber with 8 mm thick MS sheet hinged,lockable cover and MS frame on top of chamber.	**Each**	**3**		
11	Earthing with copper plate 600mmx600mmx3mm thick, top of the plate placed at least 3M below ground level with 20 mm Class-B, G.I. pipe for watering as per IS 3043-1987 with 32x6 mm Cu earthing lead in 40 mm B class GI pipe from plate to masonry inspection pit, with salt and charcoal including passivated 2 mm diax80 mm long brass bolt, nut and double washers for connecting earth lead including restoring the surface duly rammed as per specification with 300 mmX300mmX300mm(inside) finished masonry chamber with 8 mm thick MS sheet hinged,lockable cover and MS frame on top of chamber.	**Each**	**3**		
12	Providing and fixing earth bus of 40 mm X 6 mm copper strip on surface or underground as required for connections etc. as required.	**M**	**40**		
13	Providing and fixing 40 mm X 6 mm G.I. strip on surface or in recess or underground as required for connections etc. as required.	**M**	**60**		
14	Dismantling, shifting at suitable place in same premises and safekeeping of existing 01 nos. 250KVA 11/0.433 KV old transformer	**L.S.**	**1**		
15	Charges for liaisoning with power supply and other statutory authorities like Directorate of electrical Safety for obtaining necessary clearances/ approvals including preparation of drawings, filling up norms, follow-up on behalf of Employer etc. in connection with the subject installation. And getting power supply off and on from UPPCL.	**L.S.**	**1**		
	Sub Total (F)- Earthing and other works				
	TOTAL (A+B+C+D+E+F)				
	GST @.....%				
	Total amount including GST				
					Including GST

Note: Rates are considered inclusive of all including GST. However, break up to be submitted and bill is to be raised showing GST at prevalent rates/ rules.