

Schedule of Quantities

Name of work: Supply , Installation, testing & commissioning of 82.5 KVA DG Set and ancillary works at Income Tax Building, kalaburagi.

Sl.No	Description	Qty.	Unit	Rate	Amount
	Wiring				
1	Wiring for circuit/ submain wiring along with earth wire with the following sizes of HFFR PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required				
1.1	4 X 16 sq. mm + 2 X 6 sq. mm earth wire	200	Mtr	1643.00	328600.00
	MCB & DB's				
2	Supplying and fixing following way, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 volts, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator)				
2.1	4 way (4 + 12), Double door	9	Each	4946.00	44514
3	Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 volts, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 amps tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCB's (but without MCB's and incomer) as required . (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.)				
3.1	8 way (4 + 24), Double door	3	Each	12118.00	36354

Sl.No	Description	Qty.	Unit	Rate	Amount
4	Supplying and fixing 5 amps to 32 amps rating, 240/415 volts, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
4.1	Single pole	108	Each	322.00	34776
5	Supplying and fixing following rating, double pole, (single phase and neutral), 240 volts, residual current circuit breaker (RCCB), having a sensitivity current upto 300 milliamperes in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
5.1	40 amps	9	Each	2839.00	25551
6	Supplying and fixing following rating, four pole, (three phase and neutral), 415 volts, residual current circuit breaker (RCCB), having a sensitivity current upto 300 milliamperes in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
6.1	40 amps	9	Each	3901.00	35109
6.2	63 amps	12	Each	4065.00	48780
7	Supplying and fixing following rating, four pole, 415 volts,"C" Curve MCB in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
7.1	80 A	3	Each	16246.00	48738

Sl.No	Description	Qty.	Unit	Rate	Amount
	DG SET				
8	Supply, installation, Testing & Commissioning of 'Silent Type Diesel Generating set as per CPCB IV + or better norms along with having Prime Power Rating of KVA as below, 415 volts at 1500 RPM, 0.8 lagging power factor at 415 V suitable for 50 Hz, 3 phase system & for 0.85 Load Factor, including testing at factory and site with fuel, load for test and other necessary arrangements Complete as per CPWD specifications, should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. and consisting of the followings:				
	(A) Diesel Engine: Turbo charged Diesel engine 4 stroke water cooled, multi cylinder, dynamically balanced fly wheel, electric start of suitable BHP at 1500 RPM suitable for above output of alternator at 40 Degree C, 50% RH & at 1000 Meter MSL , capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine will be with Electronic governor, Dry type Air filter with service indicator, first filling of engine fuel (after commissioning) lubricating Oil, Coolant and other consumables complete with all the required accessories, the Electronic governor shall be as per ISO 8528.				

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	The engine shall comply to the latest CPCB norms (CPCB IV + or better) and Conforming to BS 5514, BS 649, IS 10000, IS 10002, IS 13018 and as per CPWD specifications.				
	(B) Engine mounted Instrument Panel fitted with and having digital dis Plate for following: (i) Start-stop switch with key (ii) Water temperature indication (iii) Lubrication oil pressure indication (iv) Lubrication oil temperature indication (v) Battery charging indication and Voltage indication (vi) RPM indication (vii) Over speed indication (viii) Low lubrication Oil trip indication (ix) Engine Running Hours indication (x) Fuel Level (C) Alternator: Synchronous alternator rated of appropriate KVA, 415 volts at 1500 RPM,				
	3 phase 50 Hz, AC supply with 0.8 lagging power factor at 40 Degree C, 50% RH & at 1000 Meter MSL. The alternator shall be having Screen Protected Drip Proof (SPDP) enclosure IP23, brushless, continuous duty, dynamically balanced rotor, capable of taking 10% over loading for one hour after 12 hours of continuous operation, self cooled, self-excited and self-regulated through AVR conforming to IS13364(Part 2)/IS: 4722/BS 2613 suitable for tropical conditions and with class- H insulation.				

Sl.No	Description	Qty.	Unit	Rate	Amount
	<p>(D) Base Frame & Foundation: Both the engine and alternator shall be mounted on suitable base frame made of MS channel with necessary reinforcement which shall be installed on suitable cement concrete foundation and vibration isolation arrangement as per recommendations of manufacturer.</p> <p>(E) FUEL TANK: Daily service fuel tank of suitable litres capacity as per CPWD Specifications, fabricated out of 3 mm thick M.S. sheet complete with all standard accessories and fuel piping between fuel tank and diesel engine</p>				
	<p>with MS class 'C' pipes of suitable dia. Complete with valves, level indications & accessories as required as per specifications.</p> <p>(F) Exhaust System: Dry exhaust manifold with hospital type exhaust silencer and catalytic convertor.</p> <p>(G) Starting System: 12V/24V DC starting system comprising of starter motors: voltage regulator and arrangement for initial excitation complete with suitable numbers of batteries (180 AH capacity lead acid SMF type) as required as per specifications. The battery shall be housed inside the acoustic enclosure of DG Set.</p>				

Sl.No	Description	Qty.	Unit	Rate	Amount
	(H) Acoustic and weather proof enclosure with arrangement for fresh air intake for cooling of the engine & alternator, extraction, discharging hot air in to the atmosphere and the temperature rise inside the enclosure, noise level outside enclosure. The acoustic enclosure should be suitable for cable connection/connection through bus-trunking. Such arrangements on acoustic enclosure should be water proof & dust-proof conforming to IP-65 protection. The enclosure shall be as per CPCB IV + or better norms etc. and as per CPWD specifications.				
	(I) AMF Panel: Free standing floor mounted IP 42 automatic mains failure control panel including auto by-pass, suitable for KVA as below for silent type DG set complete with relays, timers, set of CTs for metering & protection and energy analyser to indicate currents, phase and line voltages, frequency, power factor, KWH, Kilo Volt Ampere Reative Hour (KVARH), KVA (Phase & Total), KW & provision for overload, short circuit, restricted earth fault, under frequency, power (aluminium) and control (copper) cabling of suitable size upto 15 meter between AMF panel, LT Panel and DG Set				

Sl.No	Description	Qty.	Unit	Rate	Amount
	<p>including connection interconnection etc. as required, all complete and inter locking and communication/ Ethernet /RS485/SNMP port open protocol for BMS integration including suitable software, the panel shall be of DG Set OEM make etc. as per approved by Engineering in charge and including the following:</p> <ol style="list-style-type: none"> 1. Suitable numbers and appropriate capacity 4 pole motorised electrically operated draw out with cradle type 3 position ACB/ MCCB with electronic release for O/C & E/F and shunt trip. 2. Auto/Manual/Test/Off selector switch 3. Protection for under and over voltage 				
	<p>phase reversal (2 nos Over voltage relay, 2 Nos. reverse power relay and 2 Nos. under voltage relay).</p> <ol style="list-style-type: none"> 4. 3 Sets of current transformers 15 P 10 accuracy for protection and 15 VA class-I for metering 5. Energy analyser unit to indicate current, Voltage(L-N & L_L), kW, kVA (Phase & Total), Frequency, KWH, PF. 6. LED Indicating lamps for load on mains and load on set 7. Fuse/ MCB for instruments 				

Sl.No	Description	Qty.	Unit	Rate	Amount
	8. Battery charger, complete with transformer/ rectifier, D.C. voltmeter and ammeter, selector switch for trickle, off and boost and current adjustment. 9. Main supply failure monitor 10. Supply failure timer 11. Restoration timer 12. Control unit with three impulse automatic engine start/stop and failure to start lockout. 13. Impulse counter with locking and reset facility. 14. ON/OFF/Control circuit switch with indicator 15. Audio/Video annunciation for (i) High water temperature (ii) Low lubricating oil pressure				
	(iii) Engine over speed (iv) Engine fails to start (v) Full load/maximum load warning 16. Protection for over/under Frequency, Loss of AC sensing, Over Current, Unbalancing load with suitable number of relays and accessories 17. Maintenance notification based on Engine Run Hour & due date. 18. Load Management through PLC to achieve auto opening and closing of incomer breakers, bus coupler switching of essential panel, interlocking providing signal to AMF Panel for load status and AMF shall give command to DG Set to auto start / auto stop				

Sl.No	Description	Qty.	Unit	Rate	Amount
	depending upon load status and requirement etc. and necessary hardware and software required to perform the operation shall be provided by the contractor including all control wiring.				
8.1	82.5 KVA	1	Each	837802.00	837802
9	Providing, supplying, installing, testing and commissioning of exhaust gas piping system for 82.5 kVA DG Set, comprising of 100 mm dia 'B' class MS black steel pipe conforming to IS:1239, or suitable diameter as per DG Set OEM recommendations, including all necessary accessories such as bends, reducer at silencer end, clamps, supports, anti-vibration mountings, flexible bellows and all other required fittings. The exhaust piping shall be thermally insulated with 50 mm mineral wool of suitable thickness and density 120 kg/m ³ , wrapped with wire mesh and finished with 1.0 mm thick aluminium sheet				
	cladding, complete in all respects. The exhaust pipe shall be properly supported from ground level with suitable MS channel/angle iron brackets, including all necessary clamps, fasteners, structural supports, scaffolding and other accessories as required for proper installation. The work shall be carried out strictly as per CPWD specifications, relevant IS codes, approved drawings and DG Set OEM recommendations, complete in all respects.	25	Mtr	2728.00	68200

Sl.No	Description	Qty.	Unit	Rate	Amount
10	Providing, supplying, fabricating and installing MS structural supports for DG set exhaust pipe line, comprising suitable size MS angle iron, flats, channels and other structural sections, designed and installed as per DG Set/OEM manufacturer's recommendations, for supporting the exhaust pipe line along the building wall up to a height of 20 metres, including cutting, drilling, welding, grinding, making of brackets/clamps, necessary stiffeners, base plates, anchor fasteners, foundation/anchoring arrangements wherever required, and all other accessories required for proper and rigid support				
	of exhaust pipe line.The work shall include transportation of fabricated supports from workshop to site, loading, unloading, stacking, handling and erection at required height, including all necessary scaffolding/lifting arrangements and safety precautions.The complete MS support structure shall be finished with one coat of approved red oxide/zinc phosphate primer and two coats of approved synthetic enamel paint, including surface preparation, complete in all respects as per CPWD specifications, approved drawings and site requirements.	100	Kg	179	17900

Sl.No	Description	Qty.	Unit	Rate	Amount
	UG Cabling				
11	Supply of the following sizes of armoured XLPE insulated Aluminium conductor cable of 1.1 KV grade confirming to IS 7098 (Part I) 1988 amended up to date duly ISI marked in the existing RCC/ HUME/ METAL pipe as required. complete as required.				
11.1	3.5C x 95 Sq.mm	80	Mtr	1612.00	128960
12	Supply of the following sizes of armoured XLPE insulated copper conductor cable of 1.1 KV grade confirming to IS 7098 (Part I) 1988 amended up to date duly ISI marked in the existing RCC/ HUME/ METAL pipe/Surface as required. complete as required.				
12.1	3.5C x 35 sqmm	15	Mtr	5743.00	86145
13	Supply of the following sizes of 1.1 kV grade, XLPE insulated, PVC sheathed, unarmoured copper conductor power cable, conforming to IS 7098 (Part 1) with latest amendments, duly ISI marked, suitable for laying in existing RCC/Hume/metal pipes or on surface as required, including all necessary accessories, handling and complete as required.				
13.1	4C x 25 sq mm	85	Mtr	3435.00	291975
14	Supplying and making end termination with brass compression gland and aluminium/Copper lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
14.1	3.5 X 35 sq. mm (32mm)	2	Each	494.00	988
14.2	4 X 25 sq. mm (28mm)	6	Each	421.00	2526

Sl.No	Description	Qty.	Unit	Rate	Amount
15	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe /DLP casing as required.				
15.1	Upto 35 sq. mm	100	Meter	53.00	5300
15.2	Above 35 sq. mm and upto 95 sq. mm	80	Meter	81.00	6480
16	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	160	Meter	57	9120
17	Providing and fixing 4.00 mm dia copper wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	200	Meter	157	31400
18	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc..direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
18.1	63 mm dia (OD-63 mm & ID-51 mm nominal)	15	Meter	327	4905
18.2	90 mm dia (OD-90 mm & ID-76 mm nominal)	80	Meter	380.00	30400

Sl.No	Description	Qty.	Unit	Rate	Amount
	EARTHING				
19	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required.	2	Set	16955.00	33910
20	Providing and fixing 25 mm X 5 mm copper strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	15	Metre	1851	27765
21	Earthing with G.I. earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required.	4	Each	9437	37748
22	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	20	Meter	853.00	17060
23	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	10	Meter	324.00	3240

Sl.No	Description	Qty.	Unit	Rate	Amount
	LT Panel				
24	Supplying, installation, testing and commissioning of floor mounting cubicle type outdoor LT panel suitable for 415 V, 3 Phase, 4 Wire, 50 Hz AC supply system, suitable for receiving supply from 82.5 kVA DG set, fabricated in compartmentalized design from CRCA sheet steel of 2 mm thickness for framework and covers and 3 mm thickness for gland plates, including cleaning, degreasing, phosphating and finishing by 7-tank process followed by powder coating in approved shade, complete with 200 A capacity extensible type TPN aluminium alloy busbars of high conductivity, mounted on suitable				
	DMC/SMC insulated busbar supports, with adequate short-circuit withstand capacity, complete with bottom base channel of MS angle section not less than 50mm×50mm×6mm thick, fabrication in transportable sections, complete panel having continuous aluminium earthbar of size				

Sl.No	Description	Qty.	Unit	Rate	Amount
	25mm×5mm at rear with 2Nos. earthstuds, solid connections from main bus bar to switchgears with required size of aluminium busbars, control wiring with minimum 2.5sq.mm HFFR PVC insulated copper conductor single core cables, cable alleys, removable gland plates in two halves, danger notice plate, indicating labels, inter connections, testing and commissioning complete as required, and making suitable foundation as directed by Engineer-in-Charge, complete in all respects.				
	(LT Panel shall be as per specifications and confirming to the CPWD general specifications Part-I (Internal)2023, Part-II (External)2023, Part-IV (Sub station) 2013 as amended upto date complete as required)				
	(I) Incomer:				
	(a) 200A 415V FP MCCB 25KA (Ics=100%Icu) with TMR Based with spreader terminals and rotary handle - 1 Nos				
	(b) Digital Multifunction meter with class 1 accuracy for voltmeter, Ammeter, KWH meter, KW Meter, PF Meter, Frequency meter and with suitable CT etc., 1 No				
	(c) 3 Phase indicating LED lamps, with 2 Amps back up SPMCB for breaker 'ON' indicating light etc. as required.				

Sl.No	Description	Qty.	Unit	Rate	Amount
	(II) Bus Bars :				
	(a)TPN aluminium bus bars of minimum of 200Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bar cross section, size supports & their spacing etc. for with standing fault level of 31MVA for 1 Sec.				
	(III) Outgoing:				
	(a) 160A 415V FP MCCB 25A (Ics=100%Icu) with TMR Based with spreader terminals and rotary handle - 2 Nos				
	(b) All MCCBs shall be with rotary handles and all compartment doors with locking facility when MCCB is "ON" position.				
	(c) All switch gears shall be marked clearly indicating the incoming & outgoing, on & off position of switch gear.				
	(d) Suitable size of M V Danger boards shall be permanently fixed.	1	Job	112972.00	112972
25	Providing, laying and fixing following dia RCC pipe NP2 class (light duty) in ground complete with RCC collars, jointing with cement mortar 1:2 (1 cement : 2 fine sand) including trenching (75 cm deep) and refilling etc as required.				
25.1	250 mm dia	12	Metre	1266.00	15192

Sl.No	Description	Qty.	Unit	Rate	Amount
26	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.a) All kinds of soil.	3	Cum	446.00	1338
27	Providing and laying in position cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) in foundation of pump, DG set etc including form work etc as required.	1	Cum	9929.00	9929
28	Providing and laying in position cement concrete 1:3:6 (1 cement : 2 coarse sand : 6 graded stone aggregate 20 mm nominal size) in foundation of pump, DG set etc including form work etc as required.	1	Cum	9015.00	9015
29	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level. a) Thermo-Mechanically Treated bars of grade Fe-500D or more	50	Kg	125.00	6250
30	Supplying and fixing following 4 way outgoing Sub-main Distribuion board (SMDB) , with IEC 61439-2 compliance, short time with stand current not less than 25/36KA for 1sec, IP 43 or better including following parts and accessories, wiring on suitable mounting baseetc complete as required				
	A) 4 Way Sub main distribution board				

Sl.No	Description	Qty.	Unit	Rate	Amount
	i) 160 Amps, 3 pole,25 kA ,thermal magnetic release,adjustable type overload and short circuit setting MCCB-1No				
	ii) 100 Amps, 3 pole,25 kA ,thermal magnetic release,adjustable type overload and short circuit setting MCCB-04Nos				
	iii) Digital type single phase Ammetre, accuracy class 1.0, flush mounting 96X96mm,inbuilt selector switch -3Nos				
	iv) Digital type three phase Voltmetre, accuracy class 1.0, flush mounting 96X96mm,inbuilt selector switch -1No				
	v) LED Indication Lamps for RYB Phases -1Set				
	vii) Top/Bottom Cabling Box-1No				
	viii) Left Side Cabling Box-1No				
	ix) Right Side Cabling Box-1No				
	x) Corner Box-4Nos				
	xi) Metering Extension Box-1No				
	xii) Mounting base-1 No	1	Job	131920.00	131920
	Total				25,30,862.00

Assistant Engineer (E) (P)
HCED, CPWD, Hubballi

Executive Engineer (E)
HCED, CPWD, Hubballi