**J.N. Govt. Engineering, Sundernagar, Distt. Mandi (H.P.)**

**Department of Electronics and Communication Engg.**

**Name of Item:Diesel Generator Set**

***Corrigendum***

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No**. | **Name of Equipments (Brief Specifications)** | **Quantity to be purchased** | **Justification for Procurement** |
| 1. | Supplying, Installation, Testing and Commissioning of 180 KVA / 144 KW at 0.8 power factor, 415 V , 50 Hz, Silent D.G.set(including AMF panel) conform to ISO 8528 specification and should meet CPCB norms complete as detailed below:-**DIESEL ENGINE : - ECO, FRIENDLY (CPCB norms compliance ).*** 6 cylinders, 4 stroke cycle, developing 224 BHP(or above) at 1500 RPM under NTP condition of BS:5514. The engine shall be provided with electrical starting arrangement & shall give the electrical output of 180 KVA / 144 KW at 0.8 power factor, 415 V at the alternator terminal, complete with other accessories of the engine as under:-
* FUEL SYSTEM –

A diesel generator's fuel system must supply the diesel engine with a continuous and clean supply of fuel. It shall be fed through engine driven fuel pump.* LUBRICATING SYSTEM - It shall be so designed that when the engine starts after a long shut down lubrication failure does not occur.
* AIR IN TAKE SYSTEM - Dry type replaceable Paper element Air filter, Cleaner with restriction indicator,
* EXHAUST SYSTEM - Stainless steel exhaust flexible coupling
* STARTING SYSTEM - Starter, 24V, DC, Battery charging alternator, With in-built Regulator.

**GENSET CONTROLLER -*** There should be Microprocessor based integrated generator set monitoring, metering, protection and control system.
* Single Control for the Genset function :-Digital Voltage Control, Engine Control, Advance Control Function.
* Standard Features :-
* Engine Metering :-'RPM, battery Voltage, Lube Oil Pressure, Coolant temp.,
* Protection: -Low lube Oil Pressure, High Water temperature, High/ Low Voltage, Over speed, Fail to start, Sensor failure.
* Alternator Metering:-3 phase Voltage ( L-L and L-N ), 3 phase current, Frequency, KVA.
* Protection -Under Voltage, Over Voltage, Under/ Over frequency, Over Current, Field Overload.

**ALTERNATOR :-*** It should have rated capacity of 180 KVA, 415 Volts, 50 Hz, 0.8 Power factor, with Voltage regulation + / - 1% in static conditions , Speed 1500 RPM having " H " class insulation. Winding connection should be of Star connection. having over load capacity 10% for one hour in any 12 hours of operation
* The alternator should be self-excited, self regulated, self ventilated in brushless design, provided with suitable automatic voltage regulator and conforming to IS/IEC 60034-1
* For electrical control circuit of 24 volt DC, 2 Nos. batteries of 12 volts 180 AH each (dry and uncharged ) with battery leads for electrical starting of DG set.
* The fuel tank of min 350 liters (or above) capacity should be provided with DG Set. The tank should be provided be completed with level indicator marked in liters, filling inlet with removable screen, an outlet, a drain plug, an air vent, an air breather and necessary piping.

**AMF CONTROL PANEL FOR DG SET :*** It should be indoor type, floor mounted, dust and vermin proof in sheet steel construction. The panel should have doors at the front and back for proper maintenance. The panel should be constructed from 2 mm thick steel sheet.
* Monitoring and control devices should be housed on the front door. Generally the construction of the panel should be such that various equipments for application will be housed in compartment. All incoming and outgoing power and control cables should be from the bottom.

 The panel should be equipped as follows :-* (a)Control system equipments and components such as relays, contactors, timers, etc. both for automatic operation on main failure and as well as for manual operation.

(b) Equipment and components necessary for testing generating set’s healthiness with test mode and with load on mains. (c) Necessary instruments and accessories such as voltmeter, power  factor meter, KW meter, KWH meter, Ammeter, Frequency meter etc. in one energy analyzer unit with selector switch to obtain the reading ofdesired parameters. (d) Necessary indication lamps, fuses, terminal blocks, push buttons, control switches etc. as required  (e) Necessary engine/ generating set shut down devices due to faults /abnormalities MCCB of suitable rating with overload and short circuit Protections**SOUND ATTENUATED SYSTEM*** High class sheet metal fabricated enclosure for reducing the noise level of DG set & it must acts as a weather proof housing.Enclosure construction should be fully bolted keeping in view the major service requirements all doors should be provided with specially designed hinges and lockable handles, Battery, Fuel tank should be housed inside the enclosure.
* ACOUSTIC MATERIALS :- High quality noise absorbant and fire-retardant grade acoustic insulation material (PU Foam) complying to IS 8183
* VENTILATION:- Acoustic enclosure should be designed in such a way that there are no hot pockets around engine and it should be provided with suitable designed engine radiator which does not allow the temperature to rise more then 7° C above ambient temperature.
* To achieve optimal output and minimum sound level from the DG set, suitable openings with acoustic hood should be provided for increasing the inflow of air required for combustion & forced ventilation. Air intake system as per the recommendations and engine requirement should be provided.
* Acoustic hoods with noise splitters should be provided to block and reduce the sound leakage.
* The sound control system should be designed to support the sound level to 75 db maximum at 1 meter distance in open free field environment as per ISO 8528 part 10.
* SILENCER:- Specially designed low noise silencer should be provided. Silencer and engine exhaust outlet, Connected with flexible SS bellow.
* VIBRATION ISOLATION:- To avoid transfer of vibration from genset to enclosure & surrounding specially designed vibration isolators should be used.
* Complete rate of DG Set includes : Price of DG set, Price of AMF Panel (For AMF application Control/instrument cables should be provided), Installation charges, Cable connection (including inside college campus wiring) etc. complete in all respects with warranty period of 3 years
 | 1 | To carry academic activities in College in case of power failure |
| 2 | Providing, laying and fixing of one No. aluminium conductor, PVC insulated and PVC sheathed,armoured/XLPE power cable, working voltage 1100 volts grade on surface etc. of the required size:-1) Armoured cable 240 sq. mm (3.5 core)2) Armoured cable 35 sq. mm (3.5 core) | 90 mtr (approx)200 mtr(approx) | Required for proper installation & wiring of DG set |
| 3 | Supplying and fixing of following way, single pole and neutral sheet steel MCB distribution board, 240 volts, on surface / recess, complete with tinned copper bus- bar, wireset, neutral link, earth bar, din-bar, detachable gland plate, blanking plate, cable, identification labels interconnections, phosphatized and powder painted, including earthing etc. as required:- 1) Double door-12 way | 12 | Required for proper installation & wiring of DG set |
| 4 | Supplying and erection of 40/50/63 amps rating, 10 KA breaking capacity, 240 volts, 'C' curves, miniature circuit breaker of following poles in the existing MCB DB complete with connections etc. as required:-a) Double pole.  | 12 | Required for proper installation & wiring of DG set |
| 5 | Earthing with copper earth plate 600 mmx600 mmx 3 mm thick, including accessories and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. ( but without charcoal or coke and salt ) complete as required | 4 sets | Required for earthing |
| 6 | Providing salt and charcoal for G.I. or copper plate earth electrode complete as required. | 4 sets | Required for earthing |
| 7 | Providing and fixing 25mm x 5mm copper strip on surface or in recess for earth connections etc as required | 40  | Required for earthing |
| 88 | Supplying & erection of 6 Amp to 32 Amp rating 10 KA breaking capacity,240 volt, C curves,miniature circuit breaker of following poles in the existing MCB DP complete with connections etc as required:- single pole | 100 | Required for proper installation & wiring of DG set |
| 9 | Supplying and fixing sheet metal bus-bar chamber suitable for 400 Amp. 415 volts capacity with 4 No. copper strip bus-bars each of length 600mm & cross-sectional area (38.10mmx6.35mm), enclosure made from 1.6 mm thick M.S. sheet having overall dimensions (680mmx550mmx200mm) nominal with all accessories including connections, earthing the body etc. as required. | 1 | Required for proper installation & wiring of DG set |
| 10 | Wiring for circuit/sub-main with following size PVC insulated heat resistant flame retardant (HRFR) and low smoke single core (flexible) copper conductor cable in surface/recessed PVC conduit along with 1 No.HRFRLS/PVC insulated single core copper conductor cable of same size for earthing as require:- 1) 2x6 Sq. mm.2) 2x10 Sq. mm | 150 mtr(approx)250 mtr(approx) | Required for proper installation & wiring of DG set |
| 11 | Providing and fixing folowing rating, 4 pole 415 volt, on-load change overswitch unit, A C 23 Amp duty, in sheet steel enclosure, with side handle operation, including drilling holes on the board, making connections etc as required:-1) 100 Amp2)400 Amp | 11 | Required for proper installation & wiring of DG set |
| 12 | Supplying and fixing sheet metal bus-bar chamber suitable for 100 Amp. 415 volts capacity with 4 No. copper strip bus-bars each of length 600mm & cross-sectional area (25.4mmx3.17mm), enclosure made from 1.6 mm thick M.S. sheet having overall dimensions (680mmx400mmx150mm) nominal with all accessories including connections, earthing the body etc. as required | 2 | Required for proper installation & wiring of DG set |
| 1313 | Supplying and fixing sheet metal bus-bar chamber suitable for 63 Amp. 415 volts capacity with 4 No. copper strip bus-bars each of length 450mm & cross-sectional area (16mmx3.17mm), enclosure made from 1.6 mm thick M.S. sheet having overall dimensions (530mmx350mmx150mm) nominal with all accessories including connections, earthing the body etc. as required | 2 | Required for proper installation & wiring of DG set |
| 14 | Excavation in foundation trench etc in earth work right upto 1.5 mtr and then returning and laying cement concrete 1:4:8 (1 cement:4 sand:8 graded stone aggregate 25mm N.S.) AND Curing complete excluding cost of work form work in foundation & plinth brest and retaining walls and cement concrete flooring 1:2:4(1 cement :2 sand:4 graded stone aggregate 20 mm N.S.) layed in one layer finished with a floating coat of heat cement 40mm thick.(1) foundation size 4.4m X 1.4 m X 0.7 m (0.2 mtr above Grnd Level & 0.5 m below Ground level | 1 | Required for earthing |
| 15 | Providing and fixing TP&N switch disconnector fuse unit cubical type, 415/500 volts with 3 No. HBC/HRC fuses, in sheet steel enclosure including drilling holes on the board, connections, earthing the body etc. as required.  1) 100 Amp. | 2 | Required for proper installation & wiring of DG set |
| 16 | Providing and fixing TP&N switch disconnector fuse unit cubical type, 415/500 volts with 3 No. HBC/HRC fuses, in sheet steel enclosure including drilling holes on the board, connections, earthing the body etc. as required.   1) 63 Amp. | 2 | Required for proper installation &wiring of DG set  |