KERALA MEDICAL SERVICES CORPORATION LTD
(A Government of Kerala Undertaking)
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CIN: U24233KL200TSGC021616, PAN : AADCK4029M, GSTIN : 32AADCK4029M1ZK

Running Contract Details	
Equipment Name	Diesel Generator 160 kVA
Running Contract Valid Till	28-01-2023
Tender Ref No	KMSCL/EP/T365(R)/311F/2020
Tendered Quantity	25
Supplier Name	M/s Power Engineering India Pvt Ltd
GST No	30AACCC2414P1ZY
Installation & Delivery Period	16 Week(s)
Up-time / PM vist	95% & 0 Visits per year
Warranty period	2 Years

Supplier`s Details		
Address	**Contact Details**	
58/A Tuem Industrial Estate Tuem Pernem North Goa Goa 403512	Contact Person	Mr. Milton Rodrigues
	Phone	0832â€•716â€•1000
	Mobile No	9372035047
	Email	tender@paikane.com , milton@paikane.com

Item-wise Price Details

#	Item Details	Unit Rate (Incl.all taxes & charges)	Service Charges (Through KMSCL)	Grand Total
1	Supply, Installation, testing and commissioning of 160 KVA Diesel generator except the following *Model & Make : PKGVE-160/Power Engineering(India)Pvt Ltd*	1091745.44 Incl.GST :18%	76422.18	1168167.62
2	**Supply of suitable size extra exhaust line as per standard including bends, flanges, nut, bolt and necessary supports and covered with laying of Glass wool and cladding with aluminium with accessories pipe and silencer wherever necessary suitable for DG set supplied. (Per Meter)**	14838.5 Incl.GST :18%	1038.7	15877.2
3	**The epoxy coating for all the metallic parts of the DG set and its components in costal areas**	2950 Incl.GST :18%	206.5	3156.5

Item-wise Price Details				
4	**Rcc Foundation for housing the DG set(above 62.5 KVA) in the ratio 1:2:4(M-20 grade)with 20mm metal ,10mm reinforcement on both side 15 cm c/c and cement plastering(Foundation should be constructed by providing additional 1 feet extension of the DG Dimension on each side. Also the height of foundation should be 30cm above .**	39235 Incl.GST :18%	2746.45	41981.45
5	**4 No's of GI Plate earthing pits required for the DG set including construction of earth chamber and covering with heavy duty cast iron cover hinged to cast iron frame including Providing and fixing 25 mm *5mm Copper strip on surface or in recess for connections etc.as required.The distance between 2 pits shall be minimum 3 metres**	77384.4 Incl.GST :18%	5416.91	82801.31
6	**All the electrical connections to the existing busbar/system through change over switch and commissioning with suitable cable of size 1.1KV grade 120 Sq mm 4 core (per meter).The laying of cable shall be as per the KSEI standards which includes Laying directly on wall surface (clamped with 40*3mm MS flat clamp)**	1418.36 Incl.GST :18%	99.29	1517.65
7	**All the electrical connections to the existing busbar/system through change over switch and commissioning with PVC insulated and PVC sheathed armoured aluminium power cable of 1.1KV grade size 185 Sq mm 4 core (per meter).Laying of cable in ground including excavation of trench of size 35 *75 cm,refilling the trench etc.as required but excluding sand cushioning and protective covering**	1182.36 Incl.GST :18%	82.77	1265.13
8	**All the electrical connections to the existing busbar /System through change over switch and commissioning with PVC insulated and PVC sheathed armoured aluminium power cable of 1.1 KV grade size 185 Sq mm 4 core(Per meter).Laying of cable in the RCC/HUME/STONE WARE/GI/DWC pipe as required(for road crossing etc)**	1361.72 Incl.GST :18%	95.32	1457.04
9	**All the electrical connections to the existing busbar /System through change over switch and commissioning with PVC insulated and PVC sheathed armoured aluminium power cable of 1.1 KV grade size 185 Sq mm 4 core(Per meter).Laying of cable on factory made perforated trays (300 mm width and 50 mm depth with required bends.**	2902.8 Incl.GST :18%	203.2	3106

Item-wise Price Details				
10	**Cancopy with 0.35mm thick powder coated GI sheet for the safeguard of DG set and enclosure to control panels .The sheet should be extended to 90 cm from the foundation on all sides.Truss work shall be with GI frame work sufficient to with stand the sheet roofing and the shall be neatly painted .Minimum height of Cancopy shall be 3.6 Mtrs from the foundation**	89680 Incl.GST :18%	6277.6	95957.6
11	**All statutory approval from electrical inspectorate,SPCB,Local bodies etc and the same is to be regularized from KSEB**	44840 Incl.GST :18%	3138.8	47978.8
12	**Supply and installation of GeneratorAMF control panel with required size of MCCB as incomer each for Mains and DG Supply contactors of required specifications,necessary indication lamps, control switches,fuses,push bottons,voltmeter,Ammeter,Frequency meter etc.**	53454 Incl.GST :18%	3741.78	57195.78
13	**Supply and Laying of 4c*2.5 sq.mm copper cable for AMF control cabling**	287.68 Incl.GST :18%	20.14	307.82
14	**Supply and installation of 250 A 4 pole manual Changeover switch for necessary by-pass arrangement if required(Main supply By-pass)**	39795.5 Incl.GST :18%	2785.69	42581.19
15	**Supply and laying of 12c X 2.5 sq.mm copper cable for AMF Control cabling**	539.26 Incl.GST :18%	37.75	577.01
		1461615.02	**102313.05**	**1563928.07**

Annual / Comprehensive Maintenance Charges (Exl.Tax)							
Rate	**3rd Year**	**4th Year**	**5th Year**	**6th Year**	**7th Year**	**8th Year**	**9th Year**
Supply, Installation, testing and commissioning of 160 KVA Diesel generator except the following							
Labour							
Comprehensive	1,70,000.00	1,70,000.00	1,70,000.00	1,70,000.00	1,70,000.00	1,70,000.00	1,70,000.00

Other terms & conditions

1. The supplier shall execute an agreement with the purchaser as per tender conditions (agreement format is given in the tender document).

2. The supplier shall submit performance security amounting to 5% of the value of the supply order.

3. The labour & comprehensive charges of equipment after the completion of warranty period is finalized by KMSCL as mentioned above.

4. Since discount rate is not applicable for equipment under Running Contract of KMSCL, purchase/supply order can be issued directly to supplier at the given rate with tax & other charges (exclusive of KMSCL service charges).

5. If purchase/supply order is issued directly to the supplier, KMSCL service charge need not be paid. But the copy of the said order may be forwarded to KMSCL for information.

Technical Specification

Equipment :Supply, Installation, testing and commissioning of 160 KVA Diesel generator except the following

I. Supply, installation ,testing and commissioning of ready to use diesel engine alternator set in acoustic enclosure of 160 KVA with AMF/ Manual control Panel comprising ESCORTS/ Kirloskar/ TATA/ Mahindra/ Cummins/ Ashok Leyland/ Greaves/ Perkins/ EICHER/ Caterpiller or superior make diesel engine, water cooled (for Gensets above 40 KVA)/ air cooled (for Gensets upto 40 KVA) , coupled to Kirloskar/ KEL/ BHEL/ Crompton/ Stamford or superior make Alternator and should have all provision for future DG automation without adding any components in the DG set and complete with control Panel, fuel tank of suitable capacity and battery with leads and anti-vibration pads and residential/ hospital type silencer. The DG set shall conform to detailed specifications attached with this schedule

Requirement

1. The Engine Alternator supplied should be of ready to use type (RTU), the BHP of engine may be suitably enhanced as per site conditions in order to deliver the minimum required KVA at site, in case of water cooled engine it should be supplied with first filling of coolant and water mixture as per the manufacturer recommendation. The Engine shall be equipped with governor of required accuracy and all standard fittings, flexible pipe, Engine compatible sealed maintenance free battery for starting, fixed between base frame, suitable capacity fuel tank for running the E/A set. Digital type electronic governor is not mandatory for all the ratings. Connected with steel wire/PVC braided fuel pipe, silencer, MS exhaust pipe of suitable size and length as per site requirement covered with two layers of 6 mm/ One Layer of 12 mm thick asbestos rope, instrument panel equipped with necessary instruments, directly coupled with alternator of suitable capacity on a suitable length of common base frame, channel fixed on suitable nos. AVM pads including required length of suitable size. Copper conductor un-armored XLPE cable with cable glands and lugs for inter connection between alternator and control panel, providing tools for normal maintenance and all other accessories complete as required and as per detailed specifications.
2. Operating Conditions: The engine alternator shall be capable of working at any ambient temperature between 0 Deg C to 50 Deg C with relative humidity upto 95% condition.
3. Performance requirement

1. The working KVA rating at site condition after accounting for de-rating shall be obtained at 0.8 power factor.
2. When there is an electrical main supply failure it will be required to work continuously for a period which may even exceed 24hour at a time.
3. The set shall be capable of taking 10% overload for a period of one hour during every 12hours.

1. Output voltage frequency and waveform: Nominal output voltage shall be 415 Volt with + 1% manual adjustment at all conditions of the load. Frequency shall be 50Hz ± 1% Hz in output waveform.
2. Diesel engine: Engine shall be reciprocating compression ignition engine as per manufacturer standard design and conforming to IS10001-1981& BS5514.
3. Lubrication: Lubrication shall be positive pressure type lubricating all moving parts. No moving parts shall required lubrication by hand either prior to the starting of the engine or while it is in operation. Temperature and pressure gauge shall be fitted to the lubricating system.
4. Fuel tank: Fuel tank shall be drawn out type for easy maintenance provided between base frame or separately installed in case of installation in a canopy. The tank shall have level indicators marked in litres, filling inlet with removable screen, fuel out let located at minimum of 25mm above the bottom at outer face of canopy, drain plug air vent and necessary piping, hand pump for pumping the fuel into the service tank with necessary pipe or tube shall be provided. The outlet of the pump shall be provided with 3-meter long reinforced hosepipe. The capacity of the tank is so as to design that there should be a capacity to fill the diesel for minimum of 8 hour continuous operation for DG set up to including 160KVA.
5. Fuel Piping: MS Class-C/ PVC/ Steel wire braided pipe with hydraulically compressed benzo of superior quality shall be provided for fuel piping.
6. Silencer: Residential silencer with approved make/supplied by the engine manufacturer shall be provided. Silencer shall be supported on both ends and located as per engine manufacturer recommendations. Silencer shall be provided outside the canopy. The exhaust system of the generator must not be positioned so as to make any mark on the fence, containers or tower.

7. Speed and governing: The engine shall operate on 1500 RPM, and be able to meet site conditions with regard to Voltage, Speed, Frequency and regulation equipped with governor of required accuracy.
8. Engine start: Engine shall be cold and self-starting type. The starter battery shall have suitable copper connecting lead, sufficient to meet engine starting and control gear requirement as per manufacturer specification.
9. Battery charging: The battery charging shall be done through alternator and solid state battery charger.
10. The engine shall have following accessories: -

a. Heavy duties fly wheel.
b. Coupling with guard.
c. Fuel Pump suitable for lifting the fuel from fuel tank provided below E/A sets.
d. Governor.
e. Pre filters.
f. Fuel Filter.
g. Pre-filter in lift pump/button filter.
h. Lubricating oil filter.
i. Residential exhaust silencer.
j. Electrical Starter motor
k. Blower fan.
l. Charging Alternator.
m. Digital electronic Governor
n. Stainless steel exhaust flexible coupling
o. Radiator
p. Coolant inhibitor
q. Air Cleaner
r. All accessories included in the standard set like safeties, solenoid valve etc. shall be got from manufactures as a part of equipment.

1. Integrated control system: Microprocessor based generator set monitoring , protection and electronic governing system .The monitoring system should be designed for the genset environment, provides genset protection, engine control and displays genset parameters (both engine & alternator), eliminating use of multiple conventional controls & metering.

Physical construction:

a. LCD alpha- numeric display
b. Non metallic enclosure
c. LED display- faults, warnings and generator set status Key switch for OFF/RUNS/START.

Governor & Speed/ Frequency regulation: Integrated electronic/ Mechanical governing (adjustable up to 5%).

Operator Interface:

a. Manual stop/start
b. Cyclic cranking
c. Alpha numeric screen
d. Alternator trim adjustment
e. Model specific calibration
f. Field trim adjustment

AC Instruments:

a. 3-phase AC Amps
b. 3-phase AC volts
c. KW
d. VA
e. Power factor
f. Frequency
g. KWH

Measurements/ Instrumentation:

a. Lube oil pressure
b. Coolant temperature
c. Engine speed
d. Hours run
e. Battery voltage

Engine protection:

a. High coolant temperature (Audio-visual alarm & trip)
b. Low lube oil pressure (Audio-visual alarm & trip)
c. Fail to crank (trip)
d. Fail to start (trip)
e. Over speed (trip)
f. Low /High battery voltage (Audio-visual alarm)
g. Low coolant level shutdown(trip)
h. Engine shuts down due Charge alternator failure (Audio-visual alarm)
i. Engine shuts down due to lack of fuel (Audio-visual alarm)

AC protection:

a. Over frequency (trip)
b. Under frequency(warning)
c. Over voltage (trip)
d. Over current (trip)
e. Under voltage(Audio-visual alarm)

Miscellaneous:

a. Operating temperature range 0-60 ºC
b. Common fault alarm
c. Common shutdown
d. Date and time stamps for alarms

Others

a. Vibration damper.
b. Flywheel with housing.
c. ALTERNATOR

a. The alternator shall be shall be self exited, self regulated copper wound and totally enclosed for screen protected class-H insulation, designed and constructed to with stand tropical condition. Voltage regulation shall be + 1%. With digital automatic voltage regulator

b. The winding shall be star connected and neutral shall be brought out to the terminal box for earth with two independent earths. The terminal of the alternator output shall be enclosed in the terminal box. The AC/ DC wiring shall be separated from each other.

1. CONTROL PANEL: Control panel & its legs support shall be cubical type made of 16 gauge M.S. sheet with hinged type openable covers mounted on suitable channel at suitable location inside the canopy. All the control panel wiring should be easily accessible and shall have sufficient working space for making connections of cables etc. A tinned copper earth stud of adequate dimension shall be provided. Sign Writing shall be clear, good looking and to be done in factory. Shall have Generator Control Panel with 4 Pole MCCB/ MCB of required capacity (Full Load) and Neutral link for neutral earthing, Stand by Low set EFR shall be provided for Genset above 250 KVA. KWH meter and 4 No's CT including Neutral CT shall be provided in the GCP. KWH meter and CT units shall be tested from Government meter testing labs. Measuring instruments Voltmeter, Ammeter shall be provided.

CONTROL PANEL: It should consist of the following.

a. Control panel should be consist of 1 no compatible MCCB having the provisions of short circuit and overload protection mechanism and the relay should be of suitable range and the relay should be of suitable range so as to make the setting of EA

set full load current.

b. Provision of release of Solenoid automatically after 30 seconds while the Engine stops due to any fault.
c. One electrical/electronic hour counter meter installed inside panel connected from O/P of MCCB.
d. Sets of CT's for metering of 0.5 VA burden.
e. 1set of L.E.D. type pilot lamps with RED for set running and Green for set with load on.
f. A set of L.E.D. pilot lamp for phase indication.
g. 4 strips bus bar of compatible size and suitable length.
h. Battery Charger: Automatic trickle/ boost battery charger of SCR or SMPS type to charge the starting battery of DG set. This charging shall be done through main supply for which a suitable incomer shall be provided in the panel with suitable range of ammeter and voltmeter on the DC side with protective fuses. The connection of

i. Charging alternator & solid state battery charger shall be done as mentioned in detail specification.
ii. Push button for start, stop, reset, test, acknowledge located on Panel.
iii. Hooter.

i. PROOF ENCLOSURE
ii. It should be sound proof, weather proof & environment friendly, conforming to the latest environment (protection).
iii. The acoustic panels shall be fabricated in 2mm thick CRCA sheet. The finished sheet metal component shall undergo seven tank treatment process for degreasing, derusting, phosphatising etc. for longer life and should by Polly polyester based coated inside& outside. The nuts bolts and other hardware shall be Zinc coated. The door shall be provided with high quality EPDM gaskets to avoid leakage of sound. The door handles and hinges shall be Zinc plated &lockable type.
iv. Adequate ventilation shall be provided to meet the air requirement for combustion & also to expel heat to maintain temperature inside the enclosure within 5 degree Celsius above ambient at 10% overload with tripping arrangement between (50 – 60) degree Celsius.
v. An arrangement for adequate illumination inside the enclosure shall be provided
vi. Separate door with locking arrangement for easy access to D.G. set during operation & maintenance should be provided.
vii. The enclosure shall be guaranteed for a period of 24 months from the date of completion of work against defective materials& rust, welding, painting, smooth functioning of doors, inspection window etc. minor civil work is to be carried out without any extra cost.
viii. Small see through window for reading meters etc. made of transparent polymer sheet of thickness not less then10mm shall be provided.
ix. Radiator bellows to be provided in case of Water Cooled Engines.
x. Fuel Tank and Control Panel shall be incorporated inside the canopy.
xi. Two point lifting arrangement.
xii. Main base frame of suitable size MS channel welded with suitable size thick MS sheet for bolting arrangement complete as required.
xiii. Framework will be provided for floor made out of 3mm thick chequered plate i/c welding, painting etc complete around foundation as required.
xiv. The canopy shall be provided with emergency stop button easily approachable from outside.
xv. The canopy shall be provided with following meters (visible from outside): -
xvi. Lub. Oil pressure gauge.
xvii. Water temperature gauge (for water cooled engines only).
xviii. Dial type fuel gauge with sensing arrangement.

GENERAL REQUIREMENT

a. The set shall have minimum vibration and noise under all conditions of load. The set shall be dynamically balanced. Anti vibration mounting shall be provided for supporting the set.
b. Air filter should be easily accessible for maintenance.
c. Coolant system shall be either Water or Oil – tropicalised radiator with engine driven blower type fan and coolant pump with low water level captor.
d. Visual oil pressure meter for lubrication oil should be provided.
e. Water separator fuel filter to be provided.
f. The set shall be fitted with radio interference suppressers in case of slip ring type alternator.
g. Control wiring shall be done with 1.5 Sq.mm multi strand PVC insulated copper conductor cable.
h. Earthing provision should be made for earthing all current carrying metal parts of the equipment. Earthlugs of suitable size shall be provided.
i. All the exposed moving parts like coupling etc. shall be provided with suitable guards covering.

j. All exposed metal parts shall be suitably finished to prohibit corrosion.
k. A nameplate showing rating connection diagram should be provided on engine and alternator. All the important and major parts should bear there catalogue number make of the parts etc. All the control wiring shall be provided with letter number ferules at both ends. Three sets of manual giving the details about design, specifications, special features of the equipment schematic and wiring diagram instructions regarding installation and maintenance etc. should be supplied. A laminated control wiring diagram should be pasted inside the control panel.

a. Control Panel with changeover switch: Control panel shall be cubical type made of Minimum 16 gauge CRCA sheet dust proof, vermin proof & powder coated Control panel, comprising of all safety and indication arrangements with hinged type openable covers mounted above base frame at suitable location and supported on both sides on base frame. All the control panel wiring should be easily accessible and shall have sufficient working space for making connections of cables etc. The changeover of suitable rating and the separate indication lamp for DG/EB supply are to be included.
b. Potential Free Contact for Remote Monitoring: Potential free relay contacts shall be made available for remote monitoring of the following:
c. Low lubrication oil Pressure
d. Over loading
e. High water temperature
f. High cylinder head temperature
g. Start failure after three consecutive attempts
h. Low fuel level
i. Load on mains
j. Load on Dg

a. GENERAL SPECIFICATION FOR AMF CHANGE OVER PANEL

a. General Features

The control panel shall be fabricated out of 2 mm thick sheet Steel, totally enclosed, dust, damp and vermin proof free standing Floor mounted type & front operated. It shall be made into sections such that as far as feasible, there is no mixing of control, power, DC & AC functions in the same section and they are sufficiently segregated except where their bunching is necessary. Hinged doors shall be provided preferably double leaf for access for routine inspection from the rear.

There is no objection to have single leaf hinged door in the front, all indication lamps, instruments meter etc. shall be flushed in the front. The degree of protection required will be IP-42 conforming to IS 2147

a. Terminal Blocks and Wiring

Terminal blocks of robust type and generally not less than 15 Amps capacity, 250/500 V grade for DC upto 100 V and 660/ 1100 volts grade for AC and rest of the junction shall be employed in such a manner so that they 20 are freely accessible for maintenance. All control and small wiring from unit to unit inside the panel shall also be done with not less than 2.5 sqmm copper conductor PVC insulated and 660/ 1100 volts grade. Suitable colour coding can be adopted. Wiring system shall be neatly formed and run preferably, function wise and as far as feasible segregated voltage wise. All ends shall be identified with ferrules at the ends.

a. Labeling

All internal components shall be provided with suitable identification labels suitably engraved. Labels shall be fixed on buttons, indication lamps etc.

a. Painting

The entire panel shall be given primer coat after proper treatment and powder coating with 7 tanks process before assembly of various items.

a. Equipment requirements

The control cubical shall incorporate into assembly general equipment and systems as under:

i. 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.
ii. Equipment and components necessary for testing generating set's healthiness with test mode and with load on mains.
iii. 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 of desired parameters.
iv. Necessary indication lamps, fuses, terminal blocks, push buttons, control Switches etc. as required.
v. Necessary engine/ generating set shut down devices due to faults /abnormalities.
vi. Necessary visual audio alarm indication and annunciation facility as specified.
vii. Necessary battery charger.
viii. Necessary excitation control and voltage regulating equipment. (Alternatively provided on the Alternator itself).
ix. Necessary over head bus trunking terminations all internal wiring, connections etc. as required.
x. Breakers (MCCB/MCB).

Alternator Protection

Following protection arrangement shall be made:

i. Over load
ii. Short circuit
iii. Over voltage
iv. Earth Fault Relay (Required for Gensets 250 KVA and above only)

i. Monitoring and Metering Facilities
ii. Necessary energy analyzer unit for visual monitoring of mains, alternator and load voltage, current, frequency, KWH, power factor, etc.
iii. A set of visual monitoring lamp indication for:

1. Load on set
2. Load on mains
3. Set on test (Alternator on operation duty, Alternator on standby duty).
4. Set of lamp for engine shut down for over speed, low lub. oil pressure and high coolant water temperature, overload trip of alternator, earth fault trip of alternator, engine lock out and failure to start etc. All these indications shall have an audio and visual alarm. When operator accepts the alarm, the hooter will be silenced and the fault indication will become steady until reset by operating a reset button.

1. Operating Devices

A set of operation devices shall be incorporated in the front of panel as under:

a. Master Engine Control Switch: This shall cut off in ‘OFF’ position DC control to the entire panel, thus preventing start-up of engine due to any cause. However, battery charger, lamp test button for testing the healthiness of indication lamps, DC volt mater / ammeter etc. shall be operative. It shall be feasible to lock the switch in OFF position for maintenance and shut down purposes.

a. Operation selector switched OFF/ AUTO/ MANUAL/ TEST position.
b. Energy analyzer unit for display of various electrical parameters like voltage, current, frequency, KW, power factor, etc.
c. A set of push button as specified.
d. Relays, contactors, timers, circuit breakers as required.
e. Necessary battery charger with boost/ trickle selector, DC voltmeter and DC ammeter.

Note: AMF panel shall be physically segregated from Generator Control Panel/ Canopy for Gensets above 62.5 KVA

i. Check List:

Sl. No.	Description
1	250 A 4 Pole MCCB/ MCB for MAINS
2	250 A 4 Pole MCCB/ MCB for ALTERNATOR
3	250 A 4 Pole Contractor for MAINS
4	250 A 4 Pole Contractor for ALTERNATOR
5	Analog/ Digital electronic voltmeter with selector switch and control MCB’s
6	Analog/ Digital electronic ammeter with selector switch.
7	Digital electronic KWH meter
8	Digital electronic frequency meter
9	Digital electronic kilowatt meter
10	Phase indicating light with control MCB’s
11	Under voltage relay
12	Overvoltage relay
13	Earth fault Relay (Required for Gensets 250 KVA and above only)
14	DC shunt trip
15	Mains supply voltage sensing relay
16	Emergency stop push button
17	DC control Contractors/ timers incorporating engine start/ stop three attempt starting facility and failure to start lockout.
18	Selector switch for Auto/ Manual/ Test
19	Selector switch for engine control OFF/ ON
20	Push Buttons Start, Stop, Reset, Test, and Accept
21	Indicating lamps “Load on set”, “Load on mains”, and “Set fail to start”
22	Set of relays for automatic closing and opening of the Mains and alternator power Contractors as required
23	Indicating lamp “Load on set”, “Load on mains”, “Set fails to start”

1. Make of Material:

1. Change over Switches/ Havells/ MCCB/ Contactors/ Relays: L&T/ GE/ C&S/ ABB/ Siemens/ Schenider/ Similar superior make
2. Cables: Gloster/ Universal/ Havels/ Rallison/ XLPE Similar Superior make

1. Installation requirements

Sl. No	Description
1	Supply, Installation, testing and commissioning of 160 KVA Diesel generator
2	RCC Foundation for housing the DG Set (above 62.5 KVA) in the ratio 1:2:4 (M-20 grade) with 20mm metal, 10 mm reinforcement on both sides 15 cm c/c and cement plastering. (Foundation should be constructed by providing additional 1 feet extension of the DG Dimension on each side. Also the the height of foundation should be 30 cm above ground level)
3	Supply of suitable size extra MS exhaust line as per standard including factory made bends, flanges, nut, bolt and necessary supports and covered with laying of Glass wool and cladding with aluminium with accessories pipe and silencer wherever necessary suitable for DG set supplied. (Per Meter). Pipe sleeve large dia should be used while passing the pipe through concrete wall & gap should be filled with felt lining
4	4 No's of GI Plate earthing pits required for the DG set including construction of earth chamber and covering with heavy duty cast iron cover hinged to cast iron frame including Providing and fixing 25 mm X 5 mm Copper strip on surface or in recess for connections etc. as required. The distance between 2 pits shall beminimum 3 metres
5	All the electrical connections to the existing busbar/ system through change over switch and commissioning with suitable cable of size 1.1 KV grade, 185 Sq mm 4 core or next higher size (Per Meter) . The laying of cable shall be as per the KSEI standards, which includes Laying directly on wall surface (clamped with 40 x 3mm MS flat clamp)
6	All the electrical connections to the existing busbar/ system through change over switch and commissioning with PVC insulated and PVC sheathed armoured aluminium power cable of 1.1 KV grade 185 Sq mm 4 core or next higher size (Per Meter). Laying of cable in ground including excavation of trench of size 35 x 75 cm, refilling the trench etc. as required but excluding sand cushioning and protective covering
7	All the electrical connections to the existing busbar/ system through change over switch and commissioning with PVC insulated and PVC sheathed armoured aluminium power cable of 1.1 KV grade 185 Sq mm 4 core or next higher size (Per Meter). Laying of cable in in the RCC/ HUME / STONE WARE/ GI/ DWC pipe as required (For Road Crossing etc)
8	All the electrical connections to the existing busbar/ system through change over switch and commissioning with PVC insulated and PVC sheathed armoured aluminium power cable of 1.1 KV grade 185 Sq mm 4 core or next higher size (Per Meter). Laying of cable on factory made perforated trays(300mm width and 50mm depth) with required bends.
9	Canopy with 0.35mm thick powder coated sheet sheet for the safeguard of DG set and enclosure to control panels. The sheet should be extended to 90 cm from the foundation on all sides. Truss work shall be with GI frame work sufficient to withstand the sheet roofing and the shall be neatly painted.
10	All statutory approval from electrical inspectorate, SPCB, Local bodies etc and the same is to be regularized from KSEB
11	Supply and installation of Generator AMF control panel with required size of MCCB as incomer each for Mains and DG supply , contactors of required specifications, necessary indication lamps, control switches, fuses, push bottons, voltmeter, Ammeter, Frequency meter etc
12	Supply and laying of 12c X 2.5 sq.mm copper cable for AMF Control cabling
13	Supply and laying of 4c X 2.5 sq.mm copper cable for AMF Control cabling
14	Supply and installation of 250 A 4 pole Manual Changeover switch for necessarry by-pass arrangement if required. (Mains supply By-pass)
15	The epoxy coating for all the metallic parts of the DG set and its components in coastal areas (Not taken for evaluation)
16	The tenderer should submit the time to time construction photos (UG cable laying, Foundation works, earthing, etc) of site with time and date.

NOTE: Work done shall be as per the standards of Kerala State Electrical Inspectorate

50% tank capacity Diesel shall be provided during installation.