General Generator Specifications

Part 1 - General

1.01 Standby Engine Generator

The installation of a standby electric power system shall include a Caterpillar or Olympian _____ Series electric generator set or equal. The rating of the standby generator shall be ___kW, ____kVA at ___/___V, 0.8 power factor, __ phase, 60 Hertz. The system shall be a package of new and current equipment consisting of:
a) An engine driven electric generating set to provide standby power.
b) An engine start/stop solid state system mounted on the generating set.
c) An automatic load transfer control to provide automatic starting and stopping of the engine and switching the load.
d) Mounted accessories as specified.

1.02 Responsibility

Each generator set shall be built, tested and shipped by the manufacturer, who has been regularly engaged in the production of the engine alternator sets and associated controls for a minimum of ten years so there is one source of supply and responsibility.

1.03 Manufacturer Qualification

Firm regularly engaged in manufacturing and design of engine generator sets for not less than ten years. The firm shall have produced engine generator sets that have been in continuous satisfactory operation for not less than three years in similar service.

Manufacturer must have a local service firm that has been factory authorized in the local area of responsibility.

1.04 Manufacturer Requirements

Single manufacturer responsibility for the complete engine generator set including the manufacture of the engine and/or the alternator, design and manufacture of controls, building of set, factory test, factory warranty and shipping. Coordinating between manufacturer, distributor, and contractor is essential. The manufacturer shall have printed literature and brochures describing the standard series offered (not a one-of-a-kind fabrication). The manufacturer shall provide schematic and wiring diagrams for the complete standby power system.

1.05 Supplier Qualification

Firm engaged in the provision and service of engine generator sets. Firm maintains a factory authorized service organization with factory trained service technicians and an appropriately sized fleet of dedicated service trucks equipped to service this equipment. Firm must be domiciled within a 50 mile radius of the project, maintain stock of standard spare parts and offer 24 hour service availability, 7 days a week. Firm shall be able to demonstrate their long-term ability to support a project of this scope. Major engine, controls, and alternator parts shall regularly be stocked locally. Additional parts shall be available within 48 hours per the manufacturers' stated program. Supplier shall have a documented record of supplying and supporting complete operating emergency and standby power systems including gensets, transfer switches, paralleling switchgear, and uninterruptible power supplies. Owner and/or Owner's Representative reserve the right to inspect supplier's facility to ensure compliance with these qualifications.

1.06 Acceptable Manufacturers

Caterpillar and Olympian must submit proposed product 10 days prior to bid.

Part 2 - Products

2.01 Engine

The engine shall be ____ fueled 4 cycle, water cooled with mounted radiator, fan, water pump and closed recovery system. The radiator shall be capable of providing sufficient cooling capabilities for operation in 110° (122°) Fahrenheit ambient temperature with a minimum 10° temperature rise factored in. It shall have ____ cylinders with a minimum cubic inch displacement of ____and shall have a minimum BHP of ____ at 1800 RPM.

The engine shall have hard faced exhaust valves with rotators. Lubrication shall be full pressure as supplied by a positive displacement lube oil pump. The engine shall be equipped with a dry type air cleaner and oil filter with replaceable

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elements.

Engine speed shall be controlled by an electronic governor to maintain alternator frequency within 1 Hertz from no load to rated alternator output. The engine shall have a 12 or 24 volt battery charging DC alternator with a transistorized voltage regulator. Remote starting shall be by a 12 or 24 volt solenoid shift electric starter.

The generator set shall contain a complete solid state start/stop control which starts the engine on closing contact and stops the engine on opening contact. Cycle cranking shall be provided to open the start circuit after eight attempts to start the engine have failed.

2.02 Alternator
The alternator shall be four pole revolving field design with a temperature compensated Volts/Hertz voltage regulator and brushless excitation system. The stator shall be directly connected to the engine flywheel housing and the rotor shall be drive through a semi-flexible flange to ensure alignment. The insulation system shall be class F as defined by the NEMA MG-1.65 definition. The three phase alternator shall be 10 or 12 lead reconnectable.

Frequency regulation shall not exceed 1 Hertz from no load to rated load. Voltage regulation shall be with +/- 1% of rated voltage at 60 Hertz from no load to full load. The instantaneous voltage dip shall be less than 12.5% of rated voltage when full 3 phase load and rated power factor is applied to the alternator. Recovery to stable operation shall occur within 2 seconds. A rheostat shall provide a minimum of +/- 5% voltage adjustment from rated value. Temperature rise shall be within the NEMA MG-22.40 definition.

2.03 Instrument Panel
The alternator instrument panel shall be housed in a NEMA 1 enclosure, wired, tested and shock mounted on the generating set by the manufacturer of the alternator. It shall contain panel lighting, automatic reset circuit breaker, oil pressure gauge, coolant temperature gauge, DC battery charge ammeter, frequency meter, running time meter, voltage adjusting rheostat, AC voltmeter, AC ammeter and phase selector switch. In addition, it will have the following shutdowns and indicator lights which will latch in the "on" position should a fault occur until manually reset. A test and reset switch shall also be provided to test the operation of the lights.

a) Low oil pressure
b) High coolant temperature
c) Low coolant level
d) Overcrank
e) Overspeed
f) RPM sensor loss
g) Low fuel
h) Switch not in auto.

The control panel shall also have the following pre-alarm lights:

a) Low oil pressure
b) High coolant temperature
c) Low coolant temperature
d) High battery voltage
e) Low battery voltage

2.04 Miscellaneous Equipment
The standby power system shall also have the following items:

a) Critical type muffler
b) Flex exhaust connection
c) Starting batteries
d) Battery rack
e) Battery cables

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f) Flexible fuel lines
g) ____ amp main line circuit breaker
h) Block heater

2.05 Battery Charger (Choose one)
A 2 amp, ___ volt trickle type battery charger will be included to maintain starting batteries at proper voltage. One battery charger shall be provided and shall be fully automatic, float type, self-regulating, constant voltage ____ volt output, 120 volt input, 10 amp minimum, mounted in a NEMA 1 cabinet. The charger shall have a high charge rate of at least 9 amps. It shall have silicon diode rectifiers, automatic surge suppressor, DC output ammeter, auto reset, DC circuit breaker, and AC fuse.

2.06 Weather Housing
Where plans indicate the standby generator will be located outdoors, the generating set shall be enclosed in a weather protective zinc coated sheet metal housing with hinged, locking doors. Finish shall be baked enamel.

2.07 Remote Annunciator (If applicable)
Contractor shall supply a 12/24 volt annunciator panel for remote installation with signals indicating condition and possible malfunction of the emergency electric plant. Indication signals are as follows:

a) High water temperature light
b) Low water temperature light
c) High battery voltage light
d) Low battery voltage light
e) Generator power light
f) System ready light
g) Alarm switch off light
h) Line power light
i) Overcrank light
j) Overspeed light
k) Low fuel light
l) Low oil pressure light
m) Alarm on/off switch
n) Reset switch
o) Test switch
p) Battery fuse
q) Annunciator horn

2.08 Fuel System (Choose one for diesel fueled units)
A sub-base mounted fuel tank shall be supplied with enough fuel capacity to run the standby generator under full load for a minimum of ____ hours.

A ____ gallon day tank shall be included with the unit. It shall have a 2 gallon per minute fuel transfer pump, fuel level gauge and float switch.

Tanks less than 240 gallons shall be double-walled, UL142 listed. Tanks 240 gallons or larger shall be double-walled, UL2085 listed.

Part 3 - Execution

3.01 Miscellaneous
Contractor shall install the complete electrical generating system including all fuel connections between main fuel supply, engine, etc., all in accordance with manufacturer's recommendations. Contractor shall supply owner's operating personnel with detailed operation and maintenance manuals including complete parts list. Manuals shall include engine manufacturer's maintenance recommendations as well as alternator operating instructions.

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3.02 Warranty
Standby electric generating components, including engine, generator, instrument panel, and radiator shall be warranted by the manufacturer against defects in materials and factory workmanship for a period of two years. Supplier shall be the sole executor of all warranty repairs. Suppliers unable to perform warranty repairs and must subcontract them to another manufacturer's representative do not meet this specification. Extended service coverages up to 10 years shall be available. The warranty period shall commence when the standby power system is first placed into service.

3.03 Submittals
Provide ___ sets of submittals for engineering review and approval prior to production release. The submittals shall include engine data, installation drawings, all wiring and interconnect diagrams, the manufacturers published warranty, spec sheets and all other pertinent information relative to this unit.

3.04 Check Out And Start Up
Supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to check out the complete installation and perform the initial start-up of the system. They shall meet with the owners operating personnel to review the operation of the complete standby system. Once the system is operational, the load will be transferred to the standby generator system to demonstrate the ability of the standby generator to assume the emergency load.

Part 4-Automatic Transfer Switch

4.01 General
The automatic transfer switch shall be rated ____ amps, ____ volts and have ____ poles. The standard control components shall be compatible with the requirements of the standby set and provide the following features:

a) UL 1008 listed.
b) 100% equipment rated. Can be used at rated current continuous duty with deration.
c) NEMA 12 enclosure, NEMA 3R if plans indicate transfer switch will be located outdoors.
d) Contacts shall be electrically operated and mechanically held.
e) There shall be front access to all solid state control boards.
f) Control boards are to be protected in a separate lockable enclosure located in the door of the automatic transfer switch. It shall have a transparent cover to allow visual reading of voltage settings and time delays.
g) The automatic transfer switch shall contain a neutral block suitable for the connection of all neutral conductors.
h) The transfer time shall be 160 milliseconds or less.
i) The normal source voltage shall be monitored across all phases of normal power with drop out and pick up points adjustable from 70% to 90%.
j) The switch must contain a manual operating handle.
k) Utility interrupt delay shall be adjustable from 5 seconds to 3 minutes.
l) The automatic transfer switch shall have an engine warm up bypass selector switch.
m) Standby voltage required before transfer shall be adjustable from 70% to 90% of nominal, standby frequency required before transfer shall be adjustable from 80% to 90% of nominal.
n) Return to utility delay shall be adjustable from 1 to 30 minutes.
o) Engine cool down timer shall be adjustable from 1 to 30 minutes.
p) Minimum run timer shall be adjustable from 5 to 30 minutes.
q) The automatic transfer switch shall include a 7 day exerciser.
r) The automatic transfer switch shall have status lights to provide a visual read out of operation sequence including: utility on, engine warm up, engine warm up bypass, standby voltage ready, standby frequency ready, standby operating, return to utility, engine cool down, engine minimum run, switch in fast test mode.
s) Front mounted controls shall include a selector switch for normal test and fast test mode. It will also have utility and emergency lights to indicate switch position and a lamp to indicate standby operating
t) The automatic transfer switch shall provide one set of auxiliary contacts.
u) The 100 to 1200 amp 600 volt switches shall incorporate built-in-arc chutes to suppress and extinguish the arc.