

INVITATION FOR BIDS

NOTICE IS HEREBY GIVEN, pursuant to Article 5A of the General Municipal Law of the State of New York that sealed bids are sought by

THE VILLAGE OF MILLBROOK, NEW YORK

For: REQUEST FOR PROPOSAL FOR EMERGENCY GENERATOR PURCHASE

Sealed bids will be received by the **Village of Millbrook Village Hall**, Attention: Sarah Witt, 35 Merritt Avenue, PO Box 349, Millbrook, NY 12545 until 1:30 pm local time of March 1, 2023, and then at said office publicly opened and read.

The request for Quotations, consists of, but is not limited to the purchase of a new emergency 40 kW diesel engine generator set equipped with a dual wall fuel tank with a minimum of 24-hour capacity, a weather proof and sound proof enclosure, and automatic transfer switches.

All equipment, material, training, and work shall be completed within 200 days from date of the Notice to Proceed.

Digital copies of the Contract Documents may be obtained from Delaware Engineering. Email Jake Fogarty at jfogarty@delawareengineering.com.

Any Addenda will be emailed from Delaware Engineering.

The bidder(s), and /or significant subcontractor(s), shall have the requisite experience to perform the project work. Bidder(s) and subcontractor(s) shall provide a list of similar projects on-going and/or completed over the last ten (10) years with their bid. Those bidders lacking adequate experience will be deemed non-responsive and are encouraged to not submit a bid.

Bidders are responsible for the timely delivery of their Bid proposal to the proper department as indicated in this "Invitation to Bid". Bid proposals received after the date and time specified in the Invitation shall be considered unresponsive and will be returned to the Bidder unopened.

The Owner reserves the right to reject any and all Bids or waive any informality in the Bidding. Bids may be held by the Owner for a period not to exceed forty-five (45) days from the date of the openings of Bids for the purpose of reviewing the Bids and investigate the qualifications of the Bidders, prior to awarding the Contract.

Questions regarding this project should be directed to Jake Fogarty, P.E., Delaware Engineering, DPC., at (518) 452-1290.



DELAWARE ENGINEERING, D.P.C.

28 Madison Avenue Extension
Albany, New York 12203

Tel: 518.452.1290
Fax: 518.452.1335

Village of Millbrook, NY
Emergency Generator

Scope of Work

This document serves as a request from the Village of Millbrook to provide a proposal to furnish all labor, equipment, materials, services, insurance, etc. associated with the purchase of a new emergency generator, and appurtenances.

Supplier:

The Proposing Supplier Shall:

- Provide all labor, materials, equipment, shipping, warranty, equipment certifications, insurance, etc. to provide and deliver to the Village of Millbrook a new 40 kW diesel engine generator set equipped with a dual wall fuel tank with a minimum of 24-hour capacity, a weather proof and sound proof enclosure, and an automatic transfer switch as specified.
- Once delivered, and after all testing and training has been finalized and an acceptable load test has been approved the Generator shall be the property of the Village of Millbrook.
- Provide and adhere to the attached specifications and provide a five year warranty coverage and two year service contract as required.
- Supplier shall provide a startup test (load bank testing) and training for a minimum of 6 hours by a local representative.

Village:

The Village will:

- Schedule delivery of the new generator and schedule the local representative to witness and attend the startup testing, load bank test and training.
- Confirm final connection requirements with the suppliers.

Schedule

Provide a written schedule with your quote.

Quote Response

Provide sealed bid as follows:

- Fill out and submit Base Bid Sheets
- Any desired exceptions or changes to the scope of work can be added if desired, for Village to consider.
- Schedule for work (purchase, start up, load test and training dates after receiving approval to purchase).



DELAWARE ENGINEERING, D.P.C.

28 Madison Avenue Extension
Albany, New York 12203

Tel: 518.452.1290
Fax: 518.452.1335

Note that the Village intends to award the bid for the purchase to the responsible bidder with the requisite experience and the lowest cost.

The Village reserves the right to reject any or all bids.

Please provide your sealed proposal to Village of Millbrook at the following addresses via mail by March 1, 2023 at 1:30 pm.

Attention: Sarah Witt
Village Hall
35 Merritt Avenue
PO Box 349
Millbrook, NY 12545

Technical Questions:

Prospective bidders can contact Jake Fogarty, Delaware Engineering, DPC, at (518) 452-1290 or via email jfogarty@delawareengineering.com with technical questions.

Questions regarding the bidding process can be directed to Jake Fogarty, P.E., Delaware Engineering (see above for information).

BID SHEET FOR EMERGENCY GENERATOR

<u>Bid Item No.</u>	<u>Work Item No.</u>	<u>Item Description</u>	<u>Quantity</u>	<u>Unit of Measure</u>	<u>Unit Price</u>	<u>Total Price</u>
1	1.01	EMERGENCY GENERATOR - COMPLETE AS SPECIFIED	1	Lump Sum	\$ _____	\$ _____
BASE BID TOTAL (In Figures) \$ _____						
BASE BID TOTAL (In Words) _____						
BID SUBMITTED BY: _____ (Name of Company)					 DELAWARE ENGINEERING, D.P.C. CIVIL AND ENVIRONMENTAL ENGINEERING · ALBANY — ONEONTA, NEW YORK	
Date Submitted _____						
Note: Contract Bid Award is based on the sum of the ONE Base Bid Item (i.e., sum of the product of unit price multiplied by the quantity for each bid item and sub-items) , not the Bid Alternate Costs. Bid alternate pricing, IF INCLUDED ON SUBSEQUENT BID SHEETS, is to be provided for use in the contract should alternate or additional work be desired or required.						

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Automatic Transfer Switch: Section 16414.

1.02 SYSTEM DESCRIPTION

- A. Design Criteria: The diesel-alternator units are intended to:
1. Supply power on an emergency basis for short periods of time, less than 1000 hours annually or less than 10,000 hours during the initial 10 years of operation.
 2. Operate 5000 hours without major repairs or overhauls, and be rebuildable at least once.
 3. Operate in coordination with Automatic Transfer Switch.
- B. Description of System:
1. The diesel-alternator emergency system powers emergency feeders in the event of failure of the normal power source.
 2. In normal operating condition, the mechanism of the transfer switch is in the normal position and the diesel-alternator unit shut down. Sequence of transfer operation occurs as follows:
 - a. Upon signal from the Automatic Transfer Switch, the diesel-alternator unit automatically starts.
 - b. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
 - c. The diesel-alternator unit continues to run until the automatic transfer switch signals for the unit to shut down.

1.03 SUBMITTALS

- A. Submittals Package: Submit the product data, shop drawings, and quality control submittals specified below at the same time as a package.
- B. Shop Drawings:
1. Manufacturer's drawings showing the construction (outline) of the diesel-alternator unit, sound attenuating enclosure and accessories.
 2. Installation details.
 3. Housing details including layout of equipment, raceways, piping, etc.
- C. Product Data:
1. Catalog sheets, specifications and installation instructions.
 2. Bill of materials.
 3. Detailed sequence of operations (format similar to SYSTEM DESCRIPTION).
 4. Company's data indicating fuel consumption with the unit operating at 1/2, 3/4 and full load.
 5. Name, address and telephone number of nearest fully equipped service organization.

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

D. Quality Control Submittals:

1. Design Data:

- a. Company's data indicating hp, kW and kVA ratings with proof that the unit will meet the full load test without exceeding NEMA temperature rise specified.
- b. Certified data from the Company proving that the unit will meet the requirements of 1.02 A. Design Criteria.
- c. Torsional stress compatibility analysis for the proposed diesel/ alternator combination proving that the torsional stress will not exceed the specified limit.
- d. Ampere requirements of the starting system (at the batteries' specified minimum ambient temperature) during cranking.
 - 1) Include engine manufacturer's recommended battery ampere-hour capacity at the minimum ambient temperature condition for the specified duration and number of crank cycles.
 - 2) Include battery manufacturer's data proving that the batteries will meet the ampere-hour requirements at the batteries minimum ambient temperature.
 - 3) Include details of battery charger and battery rack recommended by battery manufacturer.

2. Company Field Advisor Data: Include:

- a. Name, business address and telephone number of Company Field Advisor secured for the required services.
- b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
- c. Services and each product for which authorization is given by the Company, listed specifically for this project.

3. Completed Installation Lists.

E. Contract Closeout Submittals:

1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner's Representative. Include name, address and telephone number of nearest fully equipped service organization.
2. Test Report: System acceptance test report.
3. Certificate: Affidavit, signed by the Company Field Advisor, certifying that the system meets the contract requirements and is operating properly.

1.04 QUALITY ASSURANCE

A. Source Quality Control: The Company producing the diesel-alternator unit shall have test facilities available which can demonstrate that the proposed system meets contract requirements.

1. If brand names other than those specified are proposed for use, pay all costs, including travel expenses to the test facility for the Owner's Representative to witness test demonstration.

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

- B. List of Completed Installations:
1. Diesel-Alternator Unit: If brand names other than those specified are proposed for use, furnish the name, address and telephone number of at least 5 comparable installations which can prove the proposed products have operated satisfactorily for 3 years.
 2. Other Products: If brand names other than those specified are proposed for use, furnish the name, address and telephone number of a least 5 comparable installations which can prove the proposed products have operated satisfactorily for 3 years.
- C. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 16 working hours for the following:
1. Render advice regarding installation and final adjustment of the system.
 2. Witness final system test and then certify with an affidavit that the system is installed in accordance with the contract documents and is operating properly.
 3. Train facility personnel on the operation and maintenance of the system (minimum of two 2 hour sessions).
 4. Explain available service programs to facility supervisory personnel for their consideration.
- D. Service Availability: A fully equipped service organization capable of guaranteeing response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.

1.05 PROJECT CONDITIONS

- A. The diesel-alternator unit shall meet all requirements at the following elevation and ambient temperatures (actual site conditions):
1. Elevation Above Sea Level: 500 feet.
 2. Maximum Ambient Temperature: 110 degrees F.
 3. Minimum Ambient Temperature: -20 degrees F.

1.06 MAINTENANCE

- A. Spare Parts for each unit:
1. Two sets of gaskets for routine engine maintenance.
 2. Two spare heating elements for water jacket heater. Furnish spare water jacket heater if elements are not replaceable.
 3. Set of belts.
 4. Set of oil filter elements.
 5. Set of fuel filter elements.
 6. Set of air cleaner elements.
 7. Hydrometer for testing anti-freeze solution.
 8. Test kit for checking chemical condition of coolant.
 9. One year supply of coolant conditioner.
 10. Special tools if required for the regular maintenance and minor repairs of the unit.

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

PART 2 PRODUCTS

2.01 DIESEL-ALTERNATOR UNIT

- A. Rating:
 - 1. Millbrook Bennet Rd PS: 40 kW, 0.80 pf, 240V, 3 ϕ , 60 Hz.
- B. Acceptable Companies: Caterpillar Tractor Co., Cummins/Onan Corp., Detroit Diesel Allison, Generac Holdings Inc., or Kohler Co.
- C. Base:
 - 1. Rigid, electrically welded structural steel base with diesel-alternator mounted directly thereon complete with spring type vibration isolators, provisions for foundation bolts and provisions for lifting entire unit.
 - 2. Base shall include "Belly Tank" sized for 24 hours of generator operation at full load.
- D. Engine:
 - 1. Industrial type diesel engine, water cooled, pressure lubricated, medium speed (1800 rpm maximum), full diesel with mechanical fuel injection. Engine shall be capable of starting cold, solely from the heat of compression, operating on No. 2 diesel fuel.
 - 2. Torsional stress of the engine crankshaft and alternator rotor shaft shall not exceed 5000 pounds per square inch when operating as an assembled unit at rated speed and power output.
 - 3. Maximum average fuel consumption: 3 gallons per hour at rated full load.
 - 4. Engine Accessories: Equip engine with the Company's standard accessories. Exception: In addition to, or in lieu of the Company's standard accessories for the following, equip engine with:
 - a. Electric starting system, 24 vdc minimum.
 - b. Fuel filters, full flow (redundant) spin on type.
 - c. Dry type air cleaner (replaceable element).
 - d. Lubricating oil filters, full flow (with by-pass valve), spin-on type.
 - e. Oil dipstick system that allows lubricating oil level to be checked while engine is running and stopped.
 - f. Governor which maintain speed at precise isochronous control for 60 Hz operation. The frequency at any constant load (including no load) shall remain within a steady state band width of ± 0.25 percent of rated frequency. Frequency modulation (defined as the number of times per second that the frequency varies from the average frequency in cyclic manner) shall not exceed one cycle per second.
- E. Engine Control and Instrumentation:
 - 1. Timer for selective number of cranking cycles.
 - 2. Circuit for bypassing oil pressure protective device during starting.
 - 3. Selector switch for stop, automatic and manual positions.
 - 4. Indicating Instruments and Safety Devices:
 - a. Audible alarm to sound when any safety device operates.

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

- b. High water temperature cutout and indicating light.
 - c. Low lube oil pressure cutout and indicating light.
 - d. Overspeed shutdown and indicating light.
 - e. Overcranking cutout and indicating light.
 - f. Alarm system reset.
 - g. Lamp test switch.
 - h. Lubricating oil pressure gage.
 - i. Jacket water temperature gage.
 - j. Running time meter.
 - k. Sensor and warning device to indicate jacket water temperature below 70 degrees F.
 - l. Weak battery (alarm).
 - m. Low fuel daytank (alarm).
 - 5. Auxiliary contacts or relays to control opening and closing of motorized dampers.
 - 6. 16 Point Remote Annunciator Panel.
 - 7. Dry contacts for Generator Failed to Start, Generator Running, Generator General Fault, Low Fuel, Low Battery.
 - 8. Engine gages and control switches may be installed directly on an engine mounted panel or on instrument panel of an engine starting control panel.
 - a. Locate panel so that it may be observed conveniently by Facility operating personnel.
- F. Engine Cooling and Heating Equipment:
- 1. Unit mounted radiator:
 - a. Cooling core mounted vertically.
 - b. Factory test pressure of 20 pounds per square inch, operating pressure as required by the engine manufacturer.
 - c. Maximum operating temperature of 250 degrees F.
 - d. Cooling core guard.
 - e. OSHA approved fan guard.
 - f. Surge tank as recommended by radiator manufacturer.
 - g. Sight glass for coolant level indication.
 - 2. Water cooled exhaust manifold or other suitable means (insulating blankets, etc.) to protect personnel from hot exhaust parts, to prevent excessive heat rejection to the room from the exhaust manifold and to prevent excessive heat build-up in engine and accessories due to lack of cooling air flow over engine and accessories.
 - 3. Permanent type anti-freeze (ethylene glycol) for the cooling system; Dow Chemical Co.'s Dow Therm SR-1. Coolant mixture suitable for use to minus 50 degrees F.
 - 4. Engine mounted radiator system and pusher type fan designed to cool the jacket water and lubricating oil.
 - 5. Radiator flange for duct connection.
 - 6. Permanent type anti-freeze (ethylene glycol) for the cooling system as manufactured by Dow Chemical Co. or Union Carbide. Coolant mixture suitable for use to minus 50 degrees F.
 - 7. Coolant conditioner corrosion prohibitive chemical additive which controls acidity, softens water and leaves protective film on cooling passages. Type and method of application as recommended by engine manufacturer.

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

8. Thermostatically controlled electric water jacket heater in the cooling system to maintain engine temperature at minimum 70 degrees F.
 9. Lube oil cooler.
- G. Engine Exhaust Equipment:
1. Silencer: Suitable for critical noise areas; Burgess-Manning's BEO, Donaldson Co. Inc.'s TCU, Riley-Beaird Inc.'s Maxim Model M51, or Universal Silencer's EN5 with:
 - a. Flanges.
 - b. Hangers and supports (vibration isolation type).
 2. Exhaust Pipe: Schedule 40 black steel pipe with:
 - a. Corrugated (bellows) stainless steel flexible section for connection between exhaust manifold and exhaust pipe.
 - b. Hangers and supports.
 - c. Rain cap (vertical pipe).
 3. Insulation: 3 inch thick calcium silicate pipe insulation; Manville's Thermo-12, or Owens-Corning's Kaylo with Type 304 stainless steel metal jacketing, 0.010 inch thick, held in place with snap-in locking joints and stainless steel bands with snap straps.
- H. Alternator and Accessories: Multipole, revolving field alternator meeting NEMA Standards, having:
1. Brushless solid state permanent magnet (PMG) exciter system.
 2. Temperature compensated solid state voltage regulator. Voltage regulation within plus or minus 2 percent of rated voltage from no load to full load. Transient voltage dip not greater than 20 percent of rated voltage when full load at rated power factor is applied to the alternator.
 3. Stable alternator operating conditions reestablished within 2 seconds following any change in load between no load and full load or between full load and no load.
 4. Temperature rise in accordance with NEMA MG1-22.40, determined by resistance method, rated on standby duty basis, reference ambient temperature 40 degrees C (Class F insulation system 130 degrees C maximum rise; Class H insulation system 150 degrees C maximum rise).
 5. Rheostat for plus or minus 5 percent voltage adjustment.
 6. Amortisseur windings, suitable for paralleling.
 7. Alternator directly connected to engine and driven through a semi-flexible driving flange.
 8. Main circuit breaker mounted on unit, or on mounting frame adjacent to unit. Breaker shall be rated 65,000AIC
 9. Instruments in panel, shock mounted on the unit:
 - a. Frequency meter.
 - b. Rheostat Control.
 - c. AC voltmeter.
 - d. AC ammeter.
 - e. Individual or combination type selector switches for the voltmeter and ammeter.
 - f. Panel lights and switch.

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

2.02 BATTERIES AND ACCESSORIES

- A. Lead Acid batteries; with:
 - 1. Number of cell units as required for voltage of starting system (Cell voltage shall be based on 1.2 volts per cell).
 - 2. Plastic cell containers.
 - 3. Ampere-hour capacity as recommended by engine manufacturer for a minimum of 3 consecutive starting attempts of 15 seconds each.
 - 4. Ampere-hour capacity as recommended by engine manufacturer for 60 seconds of continuous cranking. Note: Engine overcrank device shall terminate cranking with enough reserve power to permit additional cranking after an investigation to find the reason for a failure to start.
 - 5. Full ampere-hour capacity delivered at ambient temperature of 32 degrees F.

- B. Battery Charger: Constant voltage, current limiting type as recommended by the battery manufacturer, having:
 - 1. Fully automatic, 2 rate (float and high-rate/equalize) charging control.
 - 2. DC ammeter.
 - 3. DC voltmeter.
 - 4. High-rate indicator light.
 - 5. Common audible alarm and individual indicating lights (with provision for connection to remote annunciator) for:
 - a. Ground fault (if ungrounded type dc system).
 - b. AC input failure.
 - c. Low dc voltage.
 - d. High dc voltage.
 - e. No dc voltage at batteries.
 - 6. Remote annunciator panel with common audible alarm and individual indicating lights for:
 - a. Ground fault (if ungrounded type dc system).
 - b. AC input failure.
 - c. Low dc voltage.
 - d. High dc voltage.
 - e. No dc voltage at batteries.
 - 7. Common audible alarm and individual indicating lights for:
 - a. Ground fault (if ungrounded type dc system).
 - b. AC input failure.
 - c. Low dc voltage.
 - d. High dc voltage.
 - e. No dc voltage at batteries.

- C. Battery Rack: As recommended by battery manufacturer.

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

2.03 HOUSING

- A. All units shall be provided with a factory weatherproof level 1 sound attenuated housing to completely enclose unit, having:
1. All equipment and devices installed within the housing (except muffler) including main circuit breaker, batteries, etc. connected and ready for use as complete package.
 - a. Sound attenuation shall be as follows:
 1. 75 dBA at 23 feet
 2. Base:
 - a. Minimum 6-inch channel iron with minimum 4 inch, 11-gauge formed crossmembers.
 - b. Painted with black epoxy
 - c. Lifting hooks.
 - d. Grounding lugs.
 - e. Rodentproof skirt.
 3. Walls and Roof:
 - a. Minimum 16-gauge steel exterior pan for 14-gauge Color of exterior white.
 - b. Acoustic composite foam insulation (R value 19.8).
 - c. Minimum 50 pounds per sq. ft. snow loading for roof.
 - d. Zinc plated or stainless steel fasteners
 4. Insulated exterior door Doors equipped with key lock exterior latch handle.
 5. All doors hinged. Hinges constructed of brass or stainless steel.
 6. Exterior Emergency stop button.
 7. Oil and coolant piped to outer perimeter of engine.
 8. Crankcase breather and day tank vented to outside of housing.
 9. Exhaust silencer with tail pipe and bird screen, mounted internally in housing.
 10. All wiring from auxiliary equipment (water jacket heater, battery pad heater, alternator strip heater, etc.) to diesel-alternator designated control terminal strip. Contractor shall supply 120/240 volt 40 amp circuit for accessory power.

2.04 ENGINE FUEL EQUIPMENT

- A. Base Tank:
1. 24 hour capacity.
 2. Double Walled with rupture basin & alarm.
 3. Low fuel alarm.
 4. Provide labeled fill cap or metal plaque set in concrete pad near fill pipe stating "Diesel Fuel".

PART 3 EXECUTION

3.01 INSTALLATION

- A. Connections: Make all connections to unit with flexible connections designed for the specific purpose.

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

- B. Diesel Fuel:
 - 1. Provide diesel fuel as required to initially fill the fuel storage tank before commencing the preliminary system test.
 - 2. Upon completion of all tests provide additional diesel fuel as required to fill the fuel storage tank.
 - 3. Diesel fuel shall have characteristics as recommended by the diesel-alternator unit engine manufacturer.
- C. Phase Relationship: Correctly phase emergency and normal service so that motor rotation will not reverse upon transfer from normal to emergency feeder.

3.02 FIELD QUALITY CONTROL

- A. Preliminary System Test:
 - 1. Preparation: Have the Company Field Advisor adjust the completed system (with the contract automatic transfer switch connected). Coordinate with automatic transfer switch company field advisor switch/system test requirements. Operate it long enough to assure that it is performing properly.
 - 2. Run a preliminary test for the purpose of:
 - a. Determining whether the system is in a suitable condition to conduct an acceptance test.
 - b. Checking and adjusting equipment.
 - c. Training facility personnel.
- B. System Acceptance Test:
 - 1. Preparation: Coordinate test with automatic transfer switch manufacturer and notify the Owner's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
 - 2. Make the following tests:
 - a. Test each system function step by step as summarized under SYSTEM DESCRIPTION.
 - b. Test starting system and battery capacity. Crank engine for the required time and number of consecutive starting attempts.
 - c. Load test at unity (1.0) power factor and rated voltage in the following sequence (run each test segment continuously):
 - 1) One hour at half load.
 - 2) One hour at three-quarters load.
 - 3) Four hours at full load.
 - 4) During the test period take voltage, current, frequency and all engine instrument readings and record results at the beginning and end of test and at fifteen minute intervals during test.
 - d. Measure fuel consumption during the full load test period.
 - 3. Supply an adjustable resistive load bank or other approved apparatus to load unit for variations of test loads.
 - 4. Supply equipment necessary for system adjustment and testing.
 - 5. Submit written report of test results signed by Company Field Advisor and the

SECTION 16231
DIESEL-ALTERNATOR EMERGENCY SYSTEM

Owner's Representative.

3.03 TRAINING

- A. The engine manufacturer's local representative shall provide eight hours of on-site training for appropriate site personnel at each location. Training shall include maintenance, parts ordering, safety, operation, troubleshooting, and a complete review of operation and service manuals.

PART 4 WARRANTY AND SERVICE

4.01 GENERATOR WARRANTY

- A. Generator shall be supplied with a two years part, labor and mileage warranty covering the generator set and all accessories including ATS.
- B. Warranty period shall commence after the generator has been successfully acceptance tested.

4.02 SERVICE CONTRACT

- A. A service contract shall be included with the purchase of the Generator. The service contract shall cover all factory recommended service and maintenance. Minimum service shall include annual inspection and maintenance as well as all repairs and service recommended as a result of said annual inspection.
- B. The service contract shall cover a period of two years after the unit has successfully completed on-site acceptance testing.

END OF SECTION

SECTION 16414
AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Diesel-Alternator Emergency System: Section 16231.
- B. Switchboards: Section 16441.

1.02 REFERENCES

- A. UL 1008 listed, CSA certified.
- B. NFPA 70- National Electric Code
- C. NFPA 110.
- D. NEMA Standard ICS2-447-AC Transfer Switches.
- E. IEEE Standard 446.
- F. NEC Articles 700,701, 702
- G. ISO 9001.

1.03 TRANSFER SWITCH OPERATING DESCRIPTION

- A. Design Criteria: The transfer switch is required to:
 - 1. Transmit signals to the diesel-alternator indicating when the unit should start and stop.
 - 2. The automatic transfer switch shall have provisions to transfer supply to emergency loads in the facility between the normal source (utility feed) and the standby source (diesel generator package). In phase voltage monitoring shall be provided to control switch operation between two energized sources.
 - 3. The automatic transfer switch shall have provisions to test the diesel-alternator unit under load and unloaded. A selector switch shall be provided for “TEST UNDER LOAD” and “TEST UNLOADED”.
 - 4. The automatic transfer switch shall have provisions to automatically test the diesel-alternator unit on a scheduled basis, as well as to manually initiate a test. A “MANUAL/OFF/AUTOMATIC” Test selector switch as well as “PUSH TO START TEST” and “PUSH TO STOP TEST” pushbuttons shall be provided.
 - 5. Provisions shall be provided to select the frequency (daily/weekly/monthly) and the day of the month/week and time of day that the automatic testing is initiated.
 - 6. Indication shall be provided for availability of both the “Normal” and “Emergency” sources.
 - 7. Indication shall be provided for the switch position – “Normal” or “Emergency”.
 - 8. Provide remote alarm and indication capability.
 - 9. Controls using touch screen controller are acceptable, if not provided then physical

SECTION 16414
AUTOMATIC TRANSFER SWITCH

switches and buttons will be required.

B. Description of Operation – Automatic Operation:

1. The transfer switch monitors electrical parameters of normal and emergency feeders.
2. In normal operating condition, the mechanism of the transfer switch is in the normal position and the diesel-alternator (Section 16231) unit shut down. Sequence of transfer operation occurs as follows:
 - a. The voltage on any phase of the normal feeder drops below 85 percent of normal, initiating in the transfer switch after an adjustable time delay (set at 2 seconds) to ride through voltage fluctuations and momentary outages.
 - b. At the end of the adjustable time delay, the diesel-alternator unit is signaled to automatically start.
 - c. A voltage-frequency device in the transfer switch prevents transfer until the emergency feeder voltage rises to 90 percent of normal and the frequency reaches 95% nominal.
 - d. The transfer switch transfers load to the emergency feeder.
 - e. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
 - f. When voltage on all phases of the normal feeder is restored to 90 percent voltage, transfer from emergency to normal feeder is initiated after an adjustable time delay (set at 30 minutes) in the transfer switch.
 - g. The transfer switch transfers load to the normal feeder at the end of the time delay provided that the in phase monitor is satisfied. Exception: If the emergency power source should fail and the normal power source has been restored, retransfer to the normal source of power shall be immediate, by passing the retransfer delay timer.
 - h. The unit continues to run unloaded 5 minutes, after which the control equipment shuts down the engine and resets the system.
 - i. Permanently attached manual operating handle(s) allow for safe manual transfer under load. The switch operating speed is the same operated electrically or manually.

C. Description of Operation – Generator/Transfer Switch Test:

1. Automatic Test:
 - a. With the Test Selector Switch in the “AUTOMATIC” position the generator shall be exercised as follows on a scheduled basis.
 1. When the time specified on the test scheduler occurs the diesel-alternator unit is signaled to automatically start.
 2. With the load selector switch in the “TEST UNLOADED” position the generator runs unloaded for the length of time established above for retransferring load to the Normal Source (set at 30 minutes) after which the generator shuts down.
 3. With the load selector switch in the “TEST UNDER LOAD” position an auxiliary device (in-phase monitoring or programmed transition) in the transfer switch assures the normal and emergency power sources are synchronized.

SECTION 16414
AUTOMATIC TRANSFER SWITCH

4. The transfer switch transfers load to the emergency generator.
 5. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
 6. The generator carries the load for 30 minutes (as described above), after which the generator synchronizes with the normal (utility) source and the transfer switch operates to connect the load to the utility.
 7. The generator continues to run unloaded in the cool down mode for 5 minutes after the load is transferred to the normal source before the transfer switch sends a command to shut down the engine.
2. Manually Initiated Test:
- a. With the Test Selector Switch in the “MANUAL” position the generator shall be exercised as follows:
 1. When the “PUSH TO START TEST” button is pressed the diesel-alternator unit is signaled to start.
 2. With the load selector switch in the “TEST UNLOADED” position the generator runs unloaded for the length of time established above for retransferring load to the Normal Source (set at 30 minutes) after which the generator shuts down.
 3. With the load selector switch in the “TEST UNDER LOAD” position an auxiliary device (in-phase monitoring or programmed transition) in the transfer switch assures the normal and emergency power sources are synchronized.
 4. The transfer switch transfers load to the emergency generator.
 5. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
 6. The generator carries the load until the “PUSH TO STOP TEST” pushbutton is pressed, after which the generator synchronizes with the normal (utility) source and the transfer switch operates to reconnect the load to the utility.
 7. The generator continues to run unloaded in the cool down mode for 5 minutes after the load is transferred to the normal source before the transfer switch sends a command to shut down the engine.

1.04 SUBMITTALS

- A. Submittals Package: Submit the product data, shop drawings, and quality control submittals specified below at the same time as a package.
- B. Shop Drawings:
 1. Installation details (coordination with connected equipment).
- C. Product Data:
 1. Catalog sheets, specifications and installation instructions.
 2. Bill of materials.
 3. Detailed sequence of operations (format similar to TRANSFER SWITCH OPERATING DESCRIPTION).

SECTION 16414
AUTOMATIC TRANSFER SWITCH

4. Company's data indicating maintenance schedule.
 5. Name, address and telephone number of nearest fully equipped service organization.
- D. Quality Control Submittals:
1. Design Data:
 - a. Company's data indicating the switch will meet the requirements of 1.03 B.
 - b. Certified data from the Company proving that the switch will meet the requirements of 1.03 A. Design Criteria.
 2. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the Company, listed specifically for this project.
 3. Completed Installation List.
- E. Contract Closeout Submittals:
1. Operation and Maintenance Data: Deliver 2 copies, covering the installed product, to the Owner's Representative. Include name, address and telephone number of nearest fully equipped service organization.
 2. Test Report: Switch/System acceptance test report.
 3. Certificate: Affidavit, signed by the Company Field Advisor, certifying that the switch operation with the related equipment meets the contract requirements and is operating properly.

1.05 QUALITY ASSURANCE

- A. List of Completed Installations: If brand names other than those specified are proposed for use, furnish the name, address and telephone number of a least 5 comparable installations which can prove the proposed products have operated satisfactorily for 3 years.
- B. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 8 working hours for the following:
1. Render advice regarding installation and final adjustment of the switch.
 2. Witness final switch/system test and then certify with an affidavit that the switch is installed in accordance with the contract documents and is operating properly.
 3. Train facility personnel on the operation and maintenance of the switch (minimum of one 2 hour session).
 4. Explain available service programs to facility supervisory personnel for their consideration.
- C. Service Availability: A fully equipped service organization capable of guaranteeing response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.

SECTION 16414
AUTOMATIC TRANSFER SWITCH

1.06 MAINTENANCE

A. Spare Parts:

1. Special tools if required for the regular maintenance and minor repairs of the switch.

1.07 WITHSTAND AND CLOSE RATINGS:

- A. The ATS shall be rated to close on and withstand the available rms symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans. WCR ATS ratings as be as follows when used with specific circuit breakers:

ATS Size	Withstand & Closing Rating Mccb	W/CURRENT LIMITING FUSES
30	22,000A	100,000
70 - 200	22,000A	200,000
230	22,000A	100,000
260 – 400	42,000A	200,000
600 – 1200	65,000A	200,000
1600 – 2000	85,000A	200,000
2600 – 3000	100,000A	200,000

PART 2 PRODUCTS

2.01 AUTOMATIC TRANSFER SWITCH

- A. Automatic Switch Co.'s ASCO 300 Series with Group G Controller, Russelectric Inc.'s, Model RMT, or Zenith Controls Inc.'s ZTS, with:
1. Double throw construction.
 2. Ratings as indicated on drawings.
 3. Accessories to perform the functions specified in TRANSFER SWITCH OPERATING DESCRIPTION.
 4. NEMA 4X enclosure.
 5. Electrically operated and mechanically held.
 6. Adjustable time delay, 0-6 seconds, to override momentary outages before initiating engine starting. Once engine is signaled to start it must run for at least the duration of the time delay before engine shut down.
 7. Adjustable time delay, 0-30 minutes, on retransfer to normal feeder with bypass of time delay in event of emergency feeder failure.
 8. Adjustable time delay, 0-10 minutes, on engine cool down.
 9. Adjustable time delay, 0-5 seconds, on transfer to emergency feeder.
 10. Test switch, momentary type, (permanent type are acceptable when accompanied by flashing red lights at the transfer switch and generator set to indicate switch is not in automatic mode), to simulate normal feeder failure (unit to start and transfer to emergency feeder).

SECTION 16414
AUTOMATIC TRANSFER SWITCH

11. In-phase Monitor, or Programmed Transition (Programmed transition adjustable 0-6 second time delay, factory set at 2 seconds).
12. Presignal transfer time delay contact closure (time adjustable, factory set at 15 seconds).
13. Two identified pilot lights to indicate switch position (green normal, red emergency).
14. Start contacts, silver plated.
15. Auxiliary contact on main shaft (closed on normal).
16. Auxiliary contact on main shaft (closed on emergency).
17. Automatic exerciser for exercising the referenced diesel-alternator engine (no transfer to emergency feeder), minimum 30 minutes every 168 hours (7 days).
18. Equipment ground lug.
19. Communications interface to work with the Remote Annunciator.
20. Include auxiliary dry contacts for remote monitoring to include:
 - a. General ATS fault
 - b. Failed to Transfer
 - c. On Backup Power
21. Live parts shielded from personnel when door is open.
22. ATS shall be 4-pole.

2.03 NAMEPLATES

- A. General: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high as indicated on the One Line Diagram.
 1. Phenolic: Two color laminated engravers stock, 1/16-inch minimum thickness, machine engraved to expose inner core color (black letters on white background).

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install all required engine starting signal circuitry from switches to engine start conductor junction box. Engine start signal shall be transmitted automatically upon loss of normal source voltage. The start signal shall prevent dry cranking of the generator by requiring the generator to reach proper output and run for at least the duration of the cool-down timer.
- B. Install switch so that the maximum height above the floor to the center of the operating handle does not exceed 6'-0".
- C. Identify switch, indicating designation, load served and normal feeder designation, by riveting or bolting nameplate to cover.

3.02 FIELD QUALITY CONTROL

- A. Preliminary Switch/System Test:
 1. Preparation: Have the Company Field Advisor adjust the switch for the completed

SECTION 16414
AUTOMATIC TRANSFER SWITCH

system (including the related equipment) and then operate it long enough to assure that it is performing properly.

2. Run a preliminary test for the purpose of:
 - a. Determining whether the switch is in a suitable condition to conduct an acceptance test.
 - b. Checking and adjusting equipment.
 - c. Training facility personnel.

B. Switch/System Acceptance Test:

1. Preparation: Coordinate test with related equipment manufacturer and notify the Owner's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
2. Make the following tests:
 - a. Test each switch function step by step as summarized under TRANSFER SWITCH OPERATING DESCRIPTION.
3. Submit written report of test results signed by Company Field Advisor and the Owner's Representative. Give a copy of the final report to the Owner's Representative.

END OF SECTION

SECTION 16414
AUTOMATIC TRANSFER SWITCH

This page was intentionally left blank