

PATRICIA A. PESHKA
PURCHASING AGENT



SCOTT AVEDISIAN
MAYOR

CITY OF WARWICK
PURCHASING DIVISION
3275 POST ROAD
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TEL (401) 738-2000 EXT. 6240
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The following notice is to appear on the City of Warwick's website Monday, November 2, 2015. The website address is <http://www.warwickri.gov/purchasing-division/pages/request-proposals-and-invitations-bid>.

**CITY OF WARWICK
BIDS REQUESTED FOR**

Bid #2016-191 Purchase & Installation of (1) Engine Generator at 925 Sandy Lane

Specifications are available in the Purchasing Division, Warwick City Hall, Monday through Friday, 8:30 AM until 4:30 PM on or after Monday, November 2, 2015.

Sealed bids will be received by the Purchasing Division, Warwick City Hall, 3275 Post Road, Warwick, Rhode Island 02886 up until 10:00 A.M., Monday, November 16, 2015. The bids will be opened publicly commencing at 10:00 A.M. on the same day in the Lower Level Conference Room, Warwick City Hall.

Awards shall be made on the basis of the lowest evaluated or responsive bid price. Please note that no bids can be accepted via email or fax.

Individuals requesting interpreter services for the hearing impaired must notify the Purchasing Division at 401-738-2000, extension 6241 at least 48 hours in advance of the bid opening date.

Original Signature on File

Patricia A. Peshka
Purchasing Agent

PLEASE SUBMIT THIS PAGE WITH YOUR BID

Acknowledgement of Addendum (if applicable)

Addendum Number	Signature of Bidder
_____	_____
_____	_____

COMPANY NAME: _____

COMPANY ADDRESS: _____

COMPANY ADDRESS: _____

BIDDER'S SIGNATURE: _____

BIDDER'S NAME (PRINT): _____

TITLE: _____ TEL. NO.: _____

EMAIL ADDRESS: _____*

*Please include your email address. Future bids will be emailed, unless otherwise noted.

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II. AWARD AND CONTRACT:

The CITY OF WARWICK, acting as duly authorized through its Purchasing Agent/Finance Director/Mayor (delete if inapplicable), accepts the above bid and hereby enters into a contract with the above party to pay the bid price upon completion of the project or receipt of the goods unless another payment schedule is contained in the specifications. All terms of the specifications, both substantive and procedural, are made terms of this contract.

DATE: _____

Bid #2016-191

Purchasing Agent

CERTIFICATION & WARRANT FORM*

**This form must be completed and submitted with sealed bid.
Failure to do so will result in automatic rejection.**

Any and all bids shall contain a certification and warrant that they comply with all relevant and pertinent statutes, laws, ordinances and regulations, in particular, but not limited to Chapter 16- Conflicts of Interest, of the Code of Ordinances of the City of Warwick. Any proven violation of this warranty and representation by a bidder at the time of the bid or during the course of the contract, included, but not limited to negligent acts, either directly or indirectly through agents and/or sub-contractors, shall render the bidder's contract terminated and the bidder shall be required to reimburse the City for any and all costs incurred by the City, including reasonable attorney fees, to prosecute and/or enforce this provision.

Signature

Date

Company Name

Address

Address

***This form cannot be altered in any way**

CITY OF WARWICK

NOTICE TO BIDDERS

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If you received this document from our homepage or from a source other than the City of Warwick Purchasing Division, please check with our office prior to submitting your bid to ensure that you have a complete package. The Purchasing Division cannot be responsible to provide addenda if we do not have you on record as a plan holder.

Bids received prior to the time of the opening will be securely kept, unopened. No responsibility will be attached to an officer or person for the premature opening of a bid not properly addressed and identified. No bids shall be accepted via facsimile or email.

The opening of bids shall be in the order established by the posted agenda and the agenda shall continue uninterrupted until completion.

Once an item has been reached and any bids on that item has been opened, no other bids on that item will be accepted and any such bid shall be deemed late.

The contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap for any position for which the employee or applicant is qualified and that in the event of non-compliance the City may declare the contractor in breach and take any necessary legal recourse including termination or cancellation of the contract.

A bidder filing a bid thereby certifies that no officer, agent, or employee of the City has a pecuniary interest in the bid or has participated in contract negotiations on the part of the City, that the bid is made in good faith without fraud, collusion, or connection of any kind with any other bidder for the same call for bids, and that the bidder is competing solely in his own behalf without connection with, or obligation to, any undisclosed person or firm.

All bids should be submitted with one (1) original and one (1) copy in a sealed envelope, which should read: *YOUR COMPANY NAME* plainly marked on the exterior of the envelope as well as **“Bid #2016-191 Purchase & Installation of (1) Engine Generator at 925 Sandy Lane.”**

Should you have any questions, please contact Joseph Blake, Building Maintenance, 3275 Post Rd. Annex, Warwick, RI at 401-738-2000, extension 6350.

All bids should be written in ink or typed. If there is a correction with whiteout, the bidder must initial the change.

Any deviation from the specifications must be noted in writing and attached as part of the bid proposal. The bidder shall indicate the item or part with the deviation and indicate how the bid will deviate from specifications.

The IRS Form W-9 attached should be completed and submitted with the bid if the bidder falls under IRS requirements to file this form.

The successful bidder must provide the City of Warwick with an original certificate of insurance for General Liability in a minimum amount of \$1 million, naming the **City of Warwick as the additional insured** and so stated on the certificate with the bid name and bid number. It is the vendor's responsibility to provide the City of Warwick with an updated Certificate of Insurance upon expiration of the original certificate.

Per Section 56-5(f), Post-Bid Award Requirement. When a bid is awarded to a corporation, limited liability company or other legal entity, prior to commencing work under the awarded bid, that corporation, company or legal entity shall provide to the Purchasing Agent a Certificate of Good Standing dated no more than thirty (30) days prior to the date upon which the bid award was made.

The successful bidder will provide said Certificate of Good Standing within ten (10) calendar days after notification of award or the City reserves the right to rescind said award.

The certificates may be mailed to the City of Warwick Purchasing Division or emailed to bids@warwickri.com.

The City is exempt from the payment of the Rhode Island Sales Tax under the 1956 General Laws of the State of Rhode Island, 44-18-30, Paragraph I, as amended.

The contractor must carry sufficient liability insurance and agree to indemnify the city against all claims of any nature, which might arise as a result of his operations or conduct of work.

The Purchasing Agent reserves the right to reject any and all bids, to waive any minor deviations or informalities in the bids received, and to accept the bid deemed most favorable to the interest of the City.

The City reserves the right to terminate the contract or any part of the contract in the best interests of the City, upon 30-day notice to the contractor. The City shall incur no liability for materials or services not yet ordered if it terminates in the best interests of the City. If the City terminates in the interests of the City after an order for materials or

services have been placed, the contractor shall be entitled to compensation upon submission of invoices and proper proof of claim, in that proportion which its services and products were satisfactorily rendered or provided, as well as expenses necessarily incurred in the performance of work up to time of termination.

No extra charges for delivery, handling or other services will be honored. All claims for damage in transit shall be the responsibility of the successful bidder. Deliveries must be made during normal working hours unless otherwise agreed upon.

All costs directly or indirectly related to the preparation of a response to this solicitation, or any presentation or communication to supplement and/or clarify any response to this solicitation which may be required or requested by the City of Warwick shall be the sole responsibility of and shall be borne by the respondent.

If the respondent is awarded a contract in accordance with this solicitation and the respondents bid or response and if the respondent fails or refuses to satisfy fully all of the respondents obligations thereunder, the City of Warwick shall be entitled to recover from the respondent any losses, damages or costs incurred by the City as a result of such failure or refusal.

The City reserves the right to award in part or full and to increase or decrease quantities in the best interest of the City.

Any quantity reference in the bid specifications are estimates only, and do not represent a commitment on the part of the City of Warwick to any level of billing activity. It is understood and agreed that the agreement shall cover the actual quantities ordered during the contract period.

The City reserves the right to rescind award for non-compliance to bid specifications.

The successful bidder must adhere to all City, State and Federal Laws, where applicable.

CITY OF WARWICK
PURCHASE AND INSTALLATION OF (1) ONE ENGINE GENERATOR AT 925 SANDY LANE WARWICK,
RI

PART 1 GENERAL

1.1 SUMMARY

- A This section includes the following items from a single supplier:
 - 1. Engine Generator Set.
 - 2. Enclosure
 - 3. Fuel Tank
 - 4. Related Accessories as specified

- B Products Furnished or Supplied but not installed

- C Products Installed but not furnished or supplied

- D Related Requirements
 - 1. It is the intent of this specification to secure an engine-driven generator set that has been prototype tested, factory built, production-tested, and site-tested together with all accessories necessary for a complete installation as shown on the plans and drawings and specified herein.
 - 2. Any exceptions to the published specifications shall be subject to the approval of the engineer and submitted minimum 10 days prior to the closing of the bid with a line by line summary description of all the items of compliance, any items that have been omitted or have been taken exception to, and a complete description of all deviations.
 - 3. It is the intent of this specification to secure a generator set system that has been tested during design verification, in production, and at the final job site. The generator set will be a commercial design and will be complete with all of the necessary accessories for complete installation as shown on the plans, drawings, and specifications herein. The equipment supplied shall meet the requirements of the National Electrical Code and applicable local codes and regulations.
 - 4. All equipment shall be new and of current production by an international, power system manufacturer of generators, transfer switches, and paralleling switchgear. The manufacturer shall be a supplier of a complete and coordinated system. There will be single-source responsibility for warranty, parts, and service through a factory-authorized representative with factory-trained technicians.

1.2 PRICE AND PAYMENT PROCEDURES

- A Allowances
- B Unit Prices
- C Alternates or Alternatives
- D Measurement and Payment

1.3 REFERENCES

- A Abbreviations and Acronyms
- B Definitions
- C Reference Standards

1.4 ADMINISTRATIVE REQUIREMENTS

- A Coordination
- B Pre-installation Meeting
- C Sequencing
- D Scheduling

1.5 SUBMITTALS

- A Action Submittals
 - 1. Product Data
 - a The submittal shall include prototype test certification and specification sheets showing all standard and optional accessories to be supplied; schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number each required interconnection between the generator set, the transfer switch, and the remote annunciator panel if it is included elsewhere in these specifications.
 - 2. Shop Drawings
 - 3. Samples
- B Informational Submittal
 - 1. Certificates

The generator set shall be listed to UL 2200 or submitted to an independent third party certification process to verify compliance as installed.
 - 2. Test and Evaluation Reports
 - 3. Manufacturer's Instruction
 - 4. Source Quality Control Submittals
 - 5. Field or Site Quality Control
 - 6. Manufacturer's Report
 - 7. Special Procedure Submittal
 - 8. Qualification Statement
- C Closeout Submittal
 - 1. Maintenance Contracts
 - 2. Operation And Maintenance Data
 - 3. Bonds
 - 4. Warranty Documentation
 - 5. Record Documentation
 - 6. Software
- D Maintenance Material Submittals

Provide one (1) copies of the following documents and manuals for the engine, the alternator, and the generator set:

 - a) Operation Manuals
 - b) Warranty Certificate
 - c) Installation Manuals
 - d) Wiring Diagrams
 - e) Specification Sheets

Provide one (1) copy of the following documents and manuals for the engine, the alternator, and the generator set:

 - a) Operation Manuals
 - b) Parts Catalogs
 - c) Wiring Diagrams

1.6 Quality Assurance

- A Regulatory Agency
 - 1. The generator set shall conform to the requirements of the following codes and standards:
 - a CSA C22.2, No. 14-M91 Industrial Control Equipment.
 - b EN50082-2, Electromagnetic Compatibility-Generic Immunity Requirements, Part 2: Industrial.
 - c EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
 - d IEC8528 part 4, Control Systems for Generator Sets.
 - e IEC Std 61000-2 and 61000-3 for susceptibility, 61000-6 radiated and conducted electromagnetic emissions.
 - f IEEE446 Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.

- g NFPA 70, National Electrical Code, Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
 - h NFPA 99, Essential Electrical Systems for Health Care Facilities.
 - i NFPA 110, Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1 prototype tests required by this standard shall have been performed on a complete and functional unit. Component level type tests will not substitute for this requirement.
2. Qualifications
 - a The equipment shall be produced by a manufacturer who is ISO 9001 certified for the design, development, production and service of its complete product line.
 - b The power system shall be produced by a manufacturer who has produced this type of equipment for a period of at least 10 years and who maintains a service organization available twenty-four hours a day throughout the year.
 3. Manufactures
 - a The power system shall be furnished by a single manufacturer who shall be responsible for the design, coordination, and testing of the complete system. The entire system shall be installed as shown on the plans, drawings, and specifications herein.
 4. Suppliers
 5. Fabricators
 6. Installers/ Applicators/ Erectors
 7. Testing Agencies
 8. Licensed Professional
 9. Certificates
 10. Preconstruction testing
 11. Field and Site Samples
 12. Mock-ups

1.7 Delivery, Storage, and Handling

- A Delivery and Acceptance Requirements
- B Storage and Handling Requirements
- C Packaging Waste Management

1.8 Field or Site Conditions

- A Ambient Conditions
 1. Engine- generator set shall operate in the following conditions without any damage to the unit or its loads.
 - a Ambient Temperature: 77 °F
 - b Altitude : 500 ft
 - c Relative Humidity: 95%
- B Existing Conditions

1.9 Warranty or Bond

A Manufacture Warranty

1. The generator set shall include a standard warranty covering one (1) year or 2000 hours, whichever occurs first, to guarantee against defective material and workmanship in accordance with the manufacturer's published warranty from the date of initial startup.
2. The generator set manufacturer and its distributor shall maintain a 24-hour parts and service organization. This organization shall regularly engage in maintenance contract programs to perform preventive maintenance and service on equipment similar to that specified. A service agreement shall be available and shall include system operation under simulated operating conditions; adjustment to the generator set, transfer switch, and switchgear controls as required, and certification in the owner's maintenance log of repairs made and functional tests performed on all systems.

B Special Warranty

C Extended Correction Period

PART 2 PRODUCTS

2.1 Owner-Furnished or Owner-Supplied

A New Products

B Existing Products

2.2 Equipment

A Equipment

1. The generator set shall be a Kohler model 125REZGC with a 4R13X alternator. It shall provide 160.00 kVA and 128.00 kW when operating at 120/208 volts, 60 Hz, 0.80 power factor. The generator set shall be capable of a 130°C Standby rating while operating in an ambient condition of less than or equal to 77 °F and a maximum elevation of 500 ft above sea level. The standby rating shall be available for the duration of the outage.

B Engine

1. The minimum 8.8 liter displacement engine shall deliver a minimum of 162 HP at a governed engine speed of 1800 rpm, and shall be equipped with the following:
 - a. Electronic isochronous governor capable of 0.5% steady-state frequency regulation
 - b. 12-volt positive-engagement solenoid shift-starting motor
 - c. 70-ampere automatic battery charging alternator with a solid-state voltage regulation
 - d. Positive displacement, full-pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain
 - e. Dry-type replaceable air cleaner elements for normal applications
 - f. The engine shall be turbocharged and fueled by Natural Gas.
 - g. The engine shall have a minimum of 8 cylinders and be liquid-cooled

2. The engine shall be EPA certified from the factory

3. The generator must accept rated load in one-step.

C Cooling System

1. The engine shall be liquid-cooled by a closed loop, unit mounted radiator rated to operate the generator set at full load at an ambient temperature of 50 degrees C (122 degrees F). The radiator fan and other rotating engine parts shall be guarded against accidental contact.

D Standard Air Cleaner

1. The air cleaner shall provide engine air filtration which meets the engine manufacturer's specifications under typical operating conditions.

Battery

1. Each genset requires a maintenance free BCI group 24 battery which must meet the engine manufactures' specifications for the ambient conditions specified in Part 1 Project Conditions and shall

comply with the NFPA requirements for engine cranking cycles. This battery shall be rated according to SAE Standards J-537 with a minimum cold cranking amp of 650 amps and a minimum reserve capacity of 120 Minutes at 80F. The battery plates shall be constructed of a Calcium-Lead alloy to provide long waterless operation and extended battery life. The battery must contain a handle to aid in lifting and the case must be constructed of polypropylene to resist breakage and extend service life.

2. Battery rack and battery cables capable of holding the manufacturer's recommended batteries shall be supplied.

E Housing

1. Level 1 Sound Attenuated Enclosure

The generator set shall be supplied with a Sound Attenuated Enclosure, providing a sound pressure of 71 dB(A) at 7 meters (23 feet) – free field – using acoustic insulation and acoustic-lined inlet hoods, constructed from a minimum of 0.125 inch thick formed heavy duty aluminum panels. The acoustic insulation used shall meet UL 94 HF1 flammability classification. The enclosure shall be manufactured from bolted panels to facilitate service, future modifications, or field replacement. The enclosure shall use external vertical air inlet and outlet hoods with 90 degree angles to discharge air up and reduce noise. The enclosure shall have an integral rodent guard and skid end caps and shall have bracing to meet 241 kph (150 mph) wind loading.

The enclosure components and skid shall be cleaned with a two-stage alkaline cleaning process to remove grease, grit, and grime from parts. Components shall then be subjected to a Zirconium-based conversion coating process to prepare the metal for electrocoat (e-coat) adhesion. All enclosure parts shall receive an 100% epoxy primer electrocoat (e-coat) with high-edge protection. Following the e-coat process, the parts shall be finish coated with powder baked paint for superior finish, durability, and appearance with a Power Armor™ industrial finish that provides heavy duty durability in harsh conditions, and is fade-, scratch- and corrosion-resistant.

The enclosure must surpass a 3,000 hour salt spray corrosion test per ASTM B-1117.

Enclosures will be finished in the manufacturer's standard color.

The enclosures shall allow the generator set to operate at full load in an ambient temperature of 50°C with no additional derating of the electrical output of the generator set.

Enclosures shall be equipped with sufficient side and end doors to allow access for operation, inspection, and service of the unit and all options. Minimum requirements are two doors per side. When the generator set controller faces the rear of the generator set, an additional rear facing door is required. Access to the controller and main line circuit breaker shall meet the requirements of the National Electric Code.

Doors shall be fitted with hinges, hardware, and the doors shall be removable.

Doors shall be equipped with lockable latches. Locks shall be keyed alike. Door locks shall be recessed to minimize potential of damage to door/enclosure.

A duct between the radiator and air outlet shall be provided to prevent re-circulation of hot air.

The complete exhaust system shall be internal to the enclosure.

The critical silencer shall be fitted with a tailpipe and rain cap.

F Fuel oil storage

G Controller

1. Decision-Maker® 3000 Generator Set Controller

- a. The generator set controller shall be a microprocessor based control system that will provide automatic starting, system monitoring, and protection. The controller system shall also provide local monitoring and remote monitoring. The control system shall be capable of PC based updating of all necessary parameters, firmware, and software.

- b. The controller shall be mounted on the generator set and shall have integral vibration isolation. The controller shall be prototype and reliability tested to ensure operation in the conditions encountered.

2. Codes and Standards

- a. The generator set controller shall meet NFPA 110 Level 1 requirements and shall include an integral alarm horn as required by NFPA.

- b. The controller shall meet NFPA 99 and NEC requirements.

- c. The controller shall be UL 508 listed.

3. Applicability

- a. The controller shall be a standard offering in the manufacturer's controller product line.
 - b. The controller shall support 12-volt and 24volt starting systems.
 - c. The controller's environmental specification shall be: -40°C to 70°C operating temperature range and 5-95% humidity, non-condensing.
 - d. The controller shall mount on the generator or remotely within 40 feet with viewable access.
4. Controller Buttons, Display and Components
- a. The generator set controller shall include the following features and functions:
 1. Push button Master Control buttons. The buttons shall be tactile-feel membrane with an indicator light to initiate the following functions:
 - a. Run Mode: When in the run mode the generator set shall start as directed by the operator.
 - b. Off/Reset Mode: When in the Off/Reset mode the generator set shall stop, the reset shall reset all faults, allowing for the restarting of the generator set after a shutdown.
 - c. Auto Mode: When in Auto the mode the generator set shall be ready to accept a signal from a remote device.
 2. Emergency Stop Switch. The remote stop switch shall be red in color with a "mushroom" type head. Depressing the stop button will immediately stop the generator set and lockout the generator set for any automatic remote starting.
 3. Push Button/Rotary Selector dial. This dial shall be used for selection of all Menus and sub-menus. Rotating the dial moves you through the menus, pushing the dial selects the menu and function/features in that menu. Pushing the button selects the feature/function and sub-menus.
 4. Digital Display. The digital display shall be alphanumeric, with 2 lines of data and approximately 24 characters. The display shall have back lighting for ease of operator use in high and low light conditions. The display shall display status of all faults and warnings. The display shall also display any engine faults. While the generator set is running, the display shall scroll all-important information across the screen for ease of operator use. The scroll can be stopped by pushing the rotary dial. The display shall fall asleep when the generator set is not running and will wake-up when the generator set starts or the rotary dial is depressed.
 5. Fault Light. The controller shall have an annunciator fault light that glows red for faults and yellow for warnings. These faults and warnings shall be displayed in the digital display. The fault light will also glow yellow when not in AUTO.
 6. Alarm Horn. The controller shall provide an alarm horn that sounds when any faults or warnings are present. The horn shall also sound when the controller is not in the AUTO mode.
 7. Alarm Silence/Lamp Test Button. When this button is depressed, it shall test all controller lamps. This button will also silence the alarm horn when the unit is not AUTO.
 8. USB Connection. The controller shall have a USB connection on the face of the controller. This connection shall allow for updating of all software and firmware. This port shall also allow for all servicing of generator set parameters, fault diagnostics and viewing of all controller information via use a laptop computer.
 9. Dedicated user inputs. The controller shall have dedicated inputs for remote emergency stop switch, remote 2-wire star for transfer switch and auxiliary shutdown.
 10. The controller shall have auto resettable circuit protection integral on the circuit board.
5. System Controller Monitoring and Status Features and Functions

- a. The generator controller shall display and monitor the following engine and alternator functions and allow adjustments of certain parameters at the controller:
 1. Overview menu
 - a. Active shutdowns and warnings shall be displayed if present and without the need of operator interface
 - b. Engine runtime with total hours
 - c. Average line to line voltage
 - d. Coolant temperature
 - e. Fuel level or pressure
 - f. Oil pressure
 - g. Battery voltage
 - h. Software version
 - i. Frequency
 - j. Average current
 2. Engine metering menu.
 - a. Engine speed
 - b. Oil pressure
 - c. Coolant temperature
 - d. Battery voltage
 3. Generator metering menu.
 - a. Total power in VA
 - b. Total power in W
 - c. Rated power % used
 - d. Voltage L-L and L-N for all phases
 - e. Current L1, L2, L3
 - f. Frequency
 4. Generator set information.
 - a. Generator set model number
 - b. Generator set serial number
 - c. Controller set number
 5. Generator set run time.
 - a. Engine run time total hours
 - b. Engine loaded total hours
 - c. Number of engine starts
 - d. Total energy in kW
 6. Generator set system
 - a. System voltage
 - b. System frequency 50/60Hz
 - c. System phase, single/three phase
 - d. Power rating kW
 - e. Amperage rating
 - f. Power type standby/prime
 - g. Measurement units, metric/English units adjustable
 - h. Alarm silence, always or auto only
 7. Generator set calibration, the following are adjustable at the controller.
 - a. Voltage L-L and L-N all phases
 - b. Current L1, L2, L3
 - c. Reset all calibrations
 8. Voltage regulation, +/-0.5% regulation, the following is adjustable at the controller.
 - a. Voltage Adjustable +/- 10%
 9. Digital and Analog Inputs and outputs
 - a. Displays settings and status

10. Event Log
 - a. Stores event history, up to 1000 events
6. Controller Engine control features and functions
 - a. Automatic restart - the controller has automatic restart feature that initiates the start routine and re-crank after a failed start attempt.
 - b. Cyclic cranking - the controller shall have programmable cyclic cranking
 - c. Engine starting aid - the controller shall have the capability of providing control for an optional engine starting aid.
 - d. The control system shall include time delays for engine start and cool down.
 - e. The control system shall interface with the engine ECM and display engine fault codes and warnings. The ECM shall also include sender failure monitoring to help distinguish between failed senders and actual failure conditions.
 - f. The controller shall monitor and display engine governor functions with include steady state and transient frequency monitoring
7. Controller Alternator control features and functions
 - a. Integrated hybrid voltage regulator. The system shall have integral microprocessor based voltage regulator system that provides +/- 5% voltage regulation, no-load to full load with three phase sensing. The system is prototype tested and control variation of voltage to frequency. The voltage regulator shall be adjustable at the controller with maximum +/- 10% adjustable of nominal voltage.
 - b. AC output voltage regulator adjustment. The system shall allow for adjustment of the integral voltage regulator with maximum of +/- 10% adjustment of the system voltage.
 - c. Alternator thermal overload protection. The system shall have integral alternator overload and short circuit protection matched to each alternator for the particular voltage and phase configuration.
 - d. Power metering. The controller digitally displays power metering of kW and kVA.
8. Other control features and functions
 - a. Event logging. The controller keeps a record of up to 1000 events, for warning and shutdown faults. This fault information becomes a stored record of systems events and can be reset.
 - b. Historical data logging. The controller total number of generator set successful start shall be recorded and displayed.
 - c. Programmable access. The control system shall include a USB port that gives service technicians the ability to provide software and firmware upgrades. The system shall also be capable of allowing setting of all critical parameters using the service software and a laptop computer. All parameters and setting should be capable to being stored on a laptop for future upgrades of printing for analysis.
9. Generator Set Warning, Shutdown Alarm and Status
 - a. The generator set shall have alarms and status indication lamps that show non-automatic status and warning and shutdown conditions. The controller shall indicate with a warning lamp and or alarm and on the digital display screen any shutdown, warning or engine fault condition that exists in the generator set system. The following alarms and shutdowns shall exist as a minimum:
 1. Engine functions
 - a. Critical high fuel level (alarm)
 - b. ECM communication loss (shutdown)
 - c. ECM diagnostics (alarm & shutdown)
 - d. Engine overspeed (shutdown)
 - e. Engine start aid active
 - f. Engine under speed (shutdown)

- g. Fuel tank leak (alarm & shutdown)
 - h. High DC battery voltage (alarm)
 - i. High coolant temperature (alarm & shutdown)
 - j. High fuel level (alarm)
 - k. Low DC battery voltage (alarm)
 - l. Low coolant level (shutdown)
 - m. Low coolant temperature (alarm)
 - n. Low cranking voltage (alarm)
 - o. Low engine oil level (alarm & shutdown)
 - p. Low fuel level (alarm & shutdown)
 - q. Low fuel pressure (alarm)
 - r. Low oil pressure (alarm & shutdown)
 - s. No coolant temperature signal (shutdown)
 - t. No oil pressure signal (shutdown)
 - u. Overcrank (shutdown)
 - v. Speed sensor fault (alarm)
- 2. Generator functions
 - a. AC sensing loss over & under current (alarm & shutdown)
 - b. Alternator protection (shutdown)
 - c. Ground fault input (alarm)
 - d. kW overload (shutdown)
 - e. Locked rotor (shutdown)
 - f. Over-frequency (shutdown)
 - g. Over AC voltage (shutdown)
 - h. Under-frequency (shutdown)
 - i. Under AC voltage (shutdown)
 - j. Emergency stop (shutdown)
- 3. Other General functions
 - a. Battery charger fault (alarm)
 - b. Common fault (shutdown)
 - c. Common warning (alarm)
 - d. Master switch not in auto (alarm)
 - e. Generator running
 - f. Input/Output fault (alarm)
- 4. The generator set controller shall also be capable of meeting all necessary NFPA 110 level 1 requirements that include several of the above along with; EPS supplying load, Master switch “not in auto”, and contacts for local and remote common alarm.
10. Communications
- a. If the generator set engine is equipped with an ECM (engine control module), the controller shall communicate with the ECM for control, monitoring, diagnosis, and meet SAE J1939 standards
 - b. Kohler proprietary RBUS communication shall be available.
 - c. A RBUS shall be able to monitor and alter parameters, and start or stop a generator.
 - d. The controller shall have the capability to communicate to a personal computer (IBM or compatible) and appropriate application software
 - e. A variety of connections shall be available based on requirements:
 - 1. A single control connection to a PC via USB
 - 2. Internet connection via Ethernet
 - f. Generator and transfer switch controls shall be equipped with communications modules capable of connecting to the same communication network.

H Generator Overcurrent and Fault Protection

The generator shall be provided with a factory installed, 100% rated line circuit breaker rated at 400.00 amperes that is UL489 listed. Line circuit breakers shall be sized for the rated ampacity of the loads served by the breaker per the NEC.

The generator shall be provided with a 2nd factory installed, 80% rated line circuit breaker, if applicable, rated at 200.00 amperes that is UL489 listed. Line circuit breakers shall be sized for the rated ampacity of the loads served by the breaker per the NEC.

The circuit breaker(s) shall incorporate an electronic trip device with the following characteristics:

Adjustable long time delay

Adjustable short time delay [*As applicable*]

Instantaneous

Load side lugs shall be provided from the factory. The line circuit breaker shall include auxiliary contacts, shunt trip, undervoltage trip, alarm switch, and overcurrent switch functionality. Load side breaker connections made at the factory shall be separated from field connections.

The shunt trip device shall be connected to trip the generator breaker when the generator-set is shut down by other protective devices.

When GFI is required per the NEC, additional neutrals shall be factory installed, and the alarm indication shall be integrated with the generator-set alarms.

Barriers to provide segregation of wiring from an emergency source to emergency loads from all other wiring and equipment, if required by the NEC, shall be provided.

I Alternator

1. The alternator shall be salient-pole, brushless, 2/3-pitch, with 4 bus bar provision for external connections, self-ventilated, with drip-proof construction and amortisseur rotor windings, and skewed for smooth voltage waveform. The ratings shall meet the NEMA standard (MG1-32.40) temperature rise limits. The insulation shall be class H per UL1446 and the varnish shall be a vacuum pressure impregnated, fungus resistant epoxy. Temperature rise of the rotor and stator shall be limited to 130°C Standby. The PMG based excitation system shall be of brushless construction controlled by a digital, three phase sensing, solid- state, voltage regulator capable of maintaining voltage within $\pm 0.25\%$ at any constant load from 0% to 100% of rating with $< 0.5\%$ drift due to temperature variation. The AVR shall be capable of proper operation under severe nonlinear loads and provide individual adjustments for voltage range, stability and volts-per-hertz operations. The AVR shall be protected from the environment by conformal coating. The waveform harmonic distortion shall not exceed 5% total RMS measured line-to-line at full rated load. The TIF factor shall not exceed 50.
2. The alternator shall have dual maintenance-free bearings, designed for 40000 hour B10 life. The alternator shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.
3. The generator shall be inherently capable of sustaining at least 300% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current-support devices.
4. Motor starting performance and voltage dip determinations shall be based on the complete generator set. The generator set shall be capable of supplying 336.00 LRKVA for starting motor loads with a maximum instantaneous voltage dip of 35%, as measured by a digital RMS transient recorder in accordance with IEEE Standard 115. Motor starting performance and voltage dip determination that does not account for all components affecting total voltage dip, i.e., engine, alternator, voltage regulator, and governor will not be acceptable. As such, the generator set shall be prototype tested to optimize and determine performance as a generator set system.

J Vibration Isolation

1. Vibration isolators shall be provided between the engine-alternator and heavy-duty steel base.

2.3 Accessories

The generator set shall be provided with a run relay which shall provide a three-pole, double-throw relay with 10-amp/ 250 VAC contacts to indicate that the generator is running. The run relay dry contacts can be used for energizing or de-energizing customer devices while the generator is running (e.g. louvers, indicator lamps, etc.)

Battery rack and battery cables capable of holding the manufacturer's recommended batteries shall be supplied.

The generator set shall be supplied with a 6-ampere automatic float/equalize battery charger capable of charging both lead-acid and gel-cell type batteries, with the following features:

- i. Automatic 3-stage float to equalization charge
- ii. 1% steady-state voltage regulation from no load to full load over 10% AC input line voltage variation
- iii. Indicator LED lamps for charge state indication (bulk charge/absorption/float)
- iv. Ambient temperature operating range: -40°C to 70°C
- v. Potting for durability and waterproofing
- vi. Short-circuit and reverse polarity protection
- vii. UL 1236 listed
- viii. UL 2200 compliant
- ix. CSA certified
- x. Ring terminals for battery connection.

Supply flexible fuel lines to provide a flexible connection between the engine fuel fittings and the fuel supply tank piping and for the fuel return lines from the injector pump per engine manufacturer's recommendations. Flex line shall have a protective steel wire braid to protect the hose from abrasion.

The exhaust piping shall be gas proof, seamless, stainless steel, flexible exhaust bellows and includes the flex exhaust tube and the mounting hardware.

Block Heater - The block heater shall be thermostatically controlled, 1,800 watt, 110-120 VAC - single phase, with isolating valves, to maintain manufacturers recommended engine coolant temperature to meet the start-up requirements of NFPA 99 and NFPA 110, Level 1.

2.4 Source Quality Control

A. Non-Conforming Work

1. To ensure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer and/or local representative shall be responsible for three separate tests: design prototype tests, final production tests, and site tests.
 - a. **Design Prototype Tests.** Components of the emergency system, such as the engine/generator set, transfer switch, and accessories, shall not be subjected to prototype tests because the tests are potentially damaging. Rather, similar design prototypes and preproduction models shall be subject to the following tests:
 - i. Maximum power (kW)
 - ii. Maximum motor starting (kVA) at 35% instantaneous voltage dip.
 - iii. Alternator temperature rise by embedded thermocouple and/or by resistance method per NEMA MG1-32.6.
 - iv. Governor speed regulation under steady-state and transient conditions.
 - v. Voltage regulation and generator transient response.
 - vi. Harmonic analysis, voltage waveform deviation, and telephone influence factor.
 - vii. Three-phase short circuit tests.
 - viii. Alternator cooling air flow.
 - ix. Torsional analysis to verify that the generator set is free of harmful torsional stresses.
 - x. Endurance testing.
 - b. **Final Production Tests.** Each generator set shall be tested under varying loads with guards and exhaust system in place. Tests shall include:
 - i. Single-step load pickup
 - ii. Safety shutdown device testing
 - iii. Rated Power @ 0.8 PF
 - iv. Maximum power
 - v. Upon request, a witness test, or a certified test record sent prior to shipment.

- c. **Site Tests.** The manufacturer's distribution representative shall perform an installation check, startup, and building load test. The engineer, regular operators, and the maintenance staff shall be notified of the time and date of the site test. The tests shall include:
- i. Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations, under the environmental conditions present and expected.
 - ii. Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. These shall include: block heaters, battery chargers, alternator strip heaters, remote annunciators, etc.
 - iii. Generator set startup under test mode to check for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during operation, normal and emergency line-to-line voltage and frequency, and phase rotation.
 - iv. Automatic start by means of a simulated power outage to test remote-automatic starting, transfer of the load, and automatic shutdown. Prior to this test, all transfer switch timers shall be adjusted for proper system coordination. Engine coolant temperature, oil pressure, and battery charge level along with generator set voltage, amperes, and frequency shall be monitored throughout the test.

- B Non-Conforming Work
- C Manufacture Services
- D Coordination of Other Tests and Inspections

END OF SECTION

AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.1 SUMMARY

- A This section includes the following items from a single supplier:
 - 1. Automatic transfer switch
 - 2. Related Accessories as specified
- B Products Furnished or Supplied but not installed
- C Products Installed but not furnished or supplied
- D Related Requirements
 - 1. It is the intent of this specification to secure an automatic transfer switch that has been prototype tested, factory built, production-tested, and site-tested together with all accessories necessary for a complete installation as shown on the plans and drawings and specified herein.
 - 2. Any exceptions to the published specifications shall be subject to the approval of the engineer and submitted minimum 10 days prior to the closing of the bid with a line by line summary description of all the items of compliance, any items that have been omitted or have been taken exception to, and a complete description of all deviations.
 - 3. It is the intent of this specification to secure an automatic transfer switch that has been tested during design verification, in production, and at the final job site. The automatic transfer switch will be a commercial design and will be complete with all of the necessary accessories for complete installation as shown on the plans, drawings, and specifications herein. The equipment supplied shall meet the requirements of the National Electrical Code and applicable local codes and regulations.
 - 4. All equipment shall be new and of current production by an international, power system manufacturer of generators, transfer switches, and paralleling switchgear. The manufacturer shall be a supplier of a complete and coordinated system. There will be single-source responsibility for warranty, parts, and service through a factory-authorized representative with factory-trained technicians.

1.2 PRICE AND PAYMENT PROCEDURES

- A Allowances
- B Unit Prices
- C Alternates or Alternatives
- D Measurement and Payment

1.3 REFERENCES

- A Abbreviations and Acronyms
- B Definitions
- C Reference Standards

1.4 ADMINISTRATIVE REQUIREMENTS

- A Coordination
- B Pre-installation Meeting
- C Sequencing
- D Scheduling

1.5 SUBMITTALS

- A Action Submittals
 - 1. Product Data
 - a The submittal shall include specification sheets showing all standard and optional accessories to be supplied; schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number each required interconnection between the generator set, the

transfer switch, and the remote annunciator panel if it is included elsewhere in these specifications.

2. Shop Drawings
 3. Samples
- B Informational Submittal**
1. Certificates
 2. Test and Evaluation Reports
 3. Manufacturer's Instruction
 4. Source Quality Control Submittals
 5. Field or Site Quality Control
 6. Manufacturer's Report
 7. Special Procedure Submittal
 8. Qualification Statement
- C Closeout Submittals**
1. Maintenance Contracts
 2. Operation And Maintenance Data
 3. Bonds
 4. Warranty Documentation
 5. Record Documentation
 6. Software
- D Maintenance Material Submittals**
1. Literature
 2. Spare Parts
 3. Extra Stock Materials
 4. Tools

1.6 Quality Assurance

A Regulatory Agency

1. The automatic transfer switch shall conform to the requirements of the following codes and standards:
 - a UL 1008 - Standard for Transfer Switch Equipment
 - b IEC 947-6-1 Low-voltage Switchgear and Control gear; Multifunction equipment; Automatic Transfer Switching EquipmentEN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
 - c NFPA 70 - National Electrical Code
 - d NFPA 99 - Essential Electrical Systems for Health Care Facilities
 - e NFPA 110 - Emergency and Standby Power Systems
 - f IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
 - g NEMA Standard ICS 10-2005, Electromechanical AC Transfer Switch Equipment.
 - h EN61000-4-4 Fast Transient Immunity Severity Level 4
 - i EN61000-4-5 Surge Immunity Class 4 (voltage sensing and programmable inputs only)
 - j IEEE 472 (ANSI C37.90A) Ring Wave Test
 - k IEC Specifications for EMI/EMC Immunity (CISPR 11, IEC 1000-4-2, IEC 1000-4-3, IEC 1000-4-4, IEC 1000-4-5, IEC 1000-4-6, IEC 1000-4-8, IEC 1000-4-11)
 - l CSA C22.2 No. 178 certification
2. Qualifications
 - a The automatic transfer switch shall be produced by a manufacturer who is ISO 9001 certified for the design, development, production and service of its complete product line.
 - b A manufacturer who has produced this type of equipment for a period of at least 10 years and who maintains a service organization available twenty-four hours a day throughout the year shall produce the automatic transfer switch.
3. Manufactures

- a The automatic transfer switch shall be furnished by a single manufacturer who shall be responsible for the design, coordination, and testing of the complete system. The entire system shall be installed as shown on the plans, drawings, and specifications herein.
- b The manufacture shall maintain a national service organization of employing personnel located throughout the contiguous United States. The Service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.
- c The manufacture shall maintain records of each switch, by serial number, for a minimum of 20 years.

- 4. Suppliers
- 5. Fabricators
- 6. Installers/ Applicators/ Erectors
- 7. Testing Agencies
- 8. Licensed Professional
- 9. Certificates
- 10. Preconstruction testing
- 11. Field and Site Samples
- 12. Mock-ups

1.7 Delivery, Storage, and Handling

- A Delivery and Acceptance Requirements
- B Storage and Handling Requirements
- C Packaging Waste Management

1.8 Field or Site Conditions

- A Ambient Conditions
 - 1. Automatic transfer switch shall operate in the following conditions without any damage to the unit or its loads.
 - a Ambient Temperature: -4 to 158 Degrees F
 - b Relative Humidity: 5% to 95% noncondensing
- B Existing Conditions

1.9 Warranty or Bond

- A Manufacture Warranty
- B Special Warranty
- C Extended Correction Period

PART 2 PRODUCTS

2.1 Owner-Furnished or Owner-Supplied

- A New Products
- B Existing Products

2.2 Equipment

- A Equipment
 - 1. Furnish and install an automatic transfer switches system(s) with 3-Pole / 4-Wire, Solid Neutral, 400 Amps, 208V/60Hz. Each automatic transfer shall consist of an inherently double throw power transfer switch mechanism and a microprocessor controller to provide automatic operation. All transfer switches and controllers shall be the products of the same manufacturer.
 - 2. Furnish and install an automatic transfer switches system(s) with 3-Pole / 4-Wire, Solid Neutral, 200 Amps, 208V/60Hz. Each automatic transfer shall consist of an inherently double throw power transfer switch mechanism and a microprocessor controller to provide automatic operation. All transfer switches and controllers shall be the products of the same manufacturer.
- B Manufacture
 - 1. Automatic transfer switches shall be Kohler Specific Breaker Rated - Standard Transition (KSS)/KSS-ACTA-0400S. Any alternate shall be submitted for approval to the consulting engineer at least 10 days prior to bid date. Alternate bids shall include a line-by-line clarification of the specification marked with "D" for deviation; "E" for exception, and "C" for comply.

2. Automatic transfer switches shall be Kohler Specific Breaker Rated - Standard Transition (KSS)/KSS-ACTA-0200S. Any alternate shall be submitted for approval to the consulting engineer at least 10 days prior to bid date. Alternate bids shall include a line-by-line clarification of the specification marked with "D" for deviation; "E" for exception, and "C" for comply.

C Construction

1. The transfer switch shall be electrically operated and mechanically held with double throw construction, and operated by a momentarily energized solenoid-driven mechanism. Main operators shall include overcurrent disconnect devices; linear motors or gears shall not be acceptable.
2. All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.
3. The switch shall be positively locked and unaffected by momentarily outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
4. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.
5. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 800 amperes and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.
6. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources, are not acceptable.
7. For two and three pole switches, where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.
8. For four pole switches with a switching neutral, where neutral conductors must be switched as shown on the plans, the contactor shall be provided with fully rated switched neutral transfer contacts. Overlapping neutral contacts may be used as an alternative.

D Enclosure

1. The ATS shall be furnished in a NEMA 1 enclosure.
2. All standard door mounted switches and indicating LEDs shall be integrated into a flush-mounted, interface membrane or equivalent in the enclosure door for easy viewing & replacement. The panel shall be capable of having a manual locking feature to allow the user to lockout all membrane mounted control switches to prevent unauthorized tampering. This cover shall be mounted with hinges and have a latch that may be padlocked. The membrane panel shall be suitable for mounting by others when furnished on open type units.

2.3 Description

- A Regulatory Requirements
- B Sustainability Characteristics

2.4 Performance / Design Criteria

- A Capacities

2.5 Operation

- A Operators
- B Controls

1. A four line, 20 character LCD display and dynamic 4 button keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and control through the communications interface port or USB. The following parameters shall only be adjustable via a password protected programming on the controller:
 - a Nominal line voltage and frequency
 - b Single or three phase sensing
 - c Operating parameter protection

- d Transfer operating mode configuration (Standard transition, Programmed transition, or Closed transition)
- C Voltage and Frequency
1. Voltage (all phases) and frequency on both the normal and emergency sources shall be continuously monitored. Voltage on both normal and emergency sources and frequency on the emergency sources shall be adjustable with the following pickup, dropout, and trip setting capabilities (values shown as % of nominal unless otherwise specified):

a Parameter	Dropout/Trip	Pickup/Reset
b Under voltage	75 to 98%	85 to 100%
c Over voltage	06 to 135%	95 to 100% of trip
d Under frequency	95 to 99%	80 to 95%
e Over frequency	01 to 115%	105 to 120%
f Voltage unbalance	5 to 20%	3 to 18%
 2. Repetitive accuracy of all settings shall be within $\pm 0.5\%$ over an operating temperature range of -20°C to 70°C .
 3. An adjustable dropout time for transient voltage and frequency excursions shall be provided. The time delays shall be 0.1 to 9.9 seconds for voltage and .1 to 15 seconds for frequency.
 4. Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad, remotely via the communications interface port or USB.
 5. The controller shall be capable of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or BAC). Unacceptable phase rotation shall be indicated on the LCD; the service required LED and the annunciation through the communication protocol and dry contacts. In addition, the phase rotation sensing shall be capable of being disabled, if required.
 6. The controller shall be capable of detecting a single phasing condition of a source, even though a voltage may be regenerated by the load. This condition is a loss of phase and shall be considered a failed source.
 7. Source status screens shall be provided for both normal & emergency to provide digital readout of voltage on all 3 phases (phase to phase and phase to neutral), frequency, and phase rotation.
- D Time Delays
1. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 12 or 24 VDC power supply.
 2. A time delay shall be provided on transfer to the emergency source, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.
 3. A time delay shall be provided on re-transfer to normal. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.
 4. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.
 5. A time delay activated output signal shall also be provided to drive external relay(s) for selective load disconnect and reconnect control. The controller shall be capable of controlling a maximum of 9 individual output time delays to step loads on after a transfer occurs. Each output may be individually programmed for their own time delay of up to 60 minutes. Each sequence shall be independently programmed for transferring from normal to emergency and transferring from emergency to normal.
 6. All time delays shall be adjustable in 1 second increments.
 7. All time delays shall be adjustable by using the display and keypad, with a remote device connected to the communications interface port or USB.
 8. Each time delay shall be identified and a dynamic countdown shall be shown on the display. Active time delays can be viewed with a remote device connected to the communications interface port or USB.
- E Additional Features

1. The controller shall have 3 levels of security. Level 1 shall allow monitoring of settings and parameters only. The Level 1 shall be capable of restricted with the use of a lockable cover. Level 2 shall allow test functions to be performed and Level 3 shall allow setting of all parameters.
2. The display shall provide for the test functions, allowed through password security. The test function shall be load, no load or auto test. The auto test function shall request an elapsed time for test. At the completion of this time delay the test shall be automatically ended and a retransfer sequence shall commence. All loaded tests shall be immediately ended and retransfer shall occur if the emergency source fails and the normal source is acceptable.
3. A contact closure shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
4. Auxiliary contacts shall be provided consisting of a minimum of two contacts, closed when the ATS is connected to the normal source and two contacts closed, when the ATS is connected to the emergency source.
5. LED indicating lights shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).
6. LED indicating lights shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal (green) and emergency sources (red), as determined by the voltage, frequency and phase rotation sensing trip and reset settings for each source.
7. A membrane switch shall be provided on the membrane panel to test all indicating lights and display when pressed.
8. Provide the ability to select "commit/no commit to transfer" to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.
9. Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which closes to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad, communications interface port or USB. A "not-in-auto" LED shall indicate anytime the controller is inhibiting transfer from occurring.
10. An in-phase monitor shall be a standard feature in the controller. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The in-phase monitor shall be specifically designed for and be the product of the ATS manufacturer. The in-phase monitor shall be capable of being enabled or disabled from the user interface, communications interface port or USB.
11. A time based load control feature shall be available to allow the prioritized addition and removal of loads based during transfer. This feature may be enabled for either or both sources. The user shall be able to control up to nine loads with independent timing sequences for pre and post transfer delays in either direction of transfer.
12. The controller shall provide 2 inputs for external controls that can be programmed from the following values:
 - a Common fault, Remote test, Inhibit transfer, Low battery voltage, Peak shave, Time delay bypass, Load shed forced to OFF position (Programmed transition only)
13. The controller shall provide two form "C" contact outputs rated for up to 12A @ 240VAC or 2A @ 480VAC that can be programmed from the following values:
 - a Aux switch open, Transfer switch aux contact fault, Alarm silenced, Alarm active, I/O communication loss, Contactor position, Exercise active, Test mode active, Fail to transfer, Fail to acquire standby source, Source available, Phase rotation error, Not in automatic mode, Common alarm, In phase monitor sync, Load bank control active, Load control active, Maintenance mode active, Non-emergency transfer, Fail to open/close, Loss of phase, Over/under voltage, Over/under frequency, Voltage unbalance, Start signal, Peak shave active, Preferred source supplying load, Standby source supplying load

14. The controller shall be capable of expanding the number of inputs and outputs with additional modules.
15. Optional input/output modules shall be furnished which mount on the inside of the enclosure to facilitate ease of connections.
16. Engine Exerciser - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to 21 different exercise routines based on a calendar mode. For each routine, the user shall be able to:
 - a Enable or disable the routine
 - b Enable or disable transfer of the load during routine.
 - c Set the start time, time of day, day of week, week of month (1st, 2nd, 3rd, 4th, alternate or every)
 - d Set the duration of the run.
 - e At the end of the specified loaded exercise duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. All loaded exercises shall be immediately ended and retransfer shall occur if the standby source fails. The next exercise period shall be displayed on the main screen with the type of exercise, time and date. The type of exercise and the time remaining shall be display when the exercise is active. It shall be possible of ending the exercise event with a single button push.
17. Date and time - The date shall automatically adjust for leap year and the time shall have the capability of automatically adjusting for daylight saving and standard times.
18. System Status - The controller shall have a default display the following on:
 - a System status
 - b Date, time and type of the next exercise event
 - c Average voltage of the preferred and standby sources
 - d Scrolling through the displays shall indicate the following:
 - i) Line to line and line to neutral voltages for both sources
 - ii) Frequency of each source
 - iii) Load current for each phase
 - iv) Single or three phase operation
 - v) Type of transition
 - vi) Preferred source
 - vii) Commit or no commit modes of operation
 - viii) Source/source mode
 - ix) In phase monitor enable/disable
 - x) Phase rotation
 - xi) Date and time
19. Controllers that require multiple screens to determine system status or display "coded" system status messages, which must be explained by references in the operator's manual, are not permissible.
20. Self-Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.
21. Communications Interface - The controller shall be capable of interfacing, through a standard communications with a network of transfer switches and generators. It shall be able to be connected via an RS-485 serial communication (up to 4000 ft. direct connect or multi-drop configuration). This module shall allow for seamless integration of existing or new communication transfer devices and generators.
22. The transfer switch shall also be able to interface to 3rd party applications using Modbus RTU open standard protocols utilizing Modbus register maps. Proprietary protocols shall not be acceptable.
23. The controller shall contain a USB port for use with a software diagnostic application available to factory authorized personnel for downloading the controller's parameters and settings; exercise event schedules; maintenance records and event history. The application can also adjust parameters on the controller.
24. Data Logging - The controller shall have the ability to log data and to maintain the last 2000 events, even in the event of total power loss. The following events shall be time and date stamped and

maintained in a non-volatile memory. The controller shall be able to display up to the last 99 events. The remaining events shall be accessible via the communications interface port or USB.

- a Event Logging
 - i) Data, date and time indication of any event
 - b Statistical Data
 - i) Total number of transfers*
 - ii) Total number of fail to transfers*
 - iii) Total number of transfers due to preferred source failure*
 - iv) Total number of minutes of operation*
 - v) Total number of minutes in the standby source*
 - vi) Total number of minutes not in the preferred source*
 - vii) Normal to emergency transfer time
 - viii) Emergency to normal transfer time
 - ix) System start date
 - x) Last maintenance date
 - xi) * The statistical data shall be held in two registers. One register shall contain data since start up and the second register shall contain data from the last maintenance reset.
25. External DC Power Supply - An optional provision shall be available to connect up to two external 12/24 VDC power supply to allow the LCD and the door mounted control indicators to remain functional when both power sources are dead for extended periods of time. This module shall contain reverse battery connection indication and circuit protection.

F Operation Sequence

2.6 Materials

2.7 Assembly or Fabrication

- A Factory Assembly
- B Shop Fabrication
- C Assembly or Fabrication Tolerances

2.8 Mixes

2.9 Finishes

- A Primer Materials
- B Finish Materials
- C Shop Finishing Materials

2.10 Accessories

2.11 Source Quality Control

- A Test and Inspection
 - 1. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.
 - 2. The ATS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001.
- B Non-Conforming Work
- C Manufacture Services
- D Coordination of Other Tests and Inspections

PART 3 EXECUTION

3.1 Installers

- A Installer List
- B Substitution Limitations

3.2 Examination

- A Verification of Conditions
- B Pre-installation Testing

C Evaluation and Assessment

3.3 Preparation

A Protection of In-place Condition

B Surface Preparation

C Demolition/ Removal

3.4 Installation

A Special Techniques

B Interface with Other Work

C System Integration

D Tolerances

3.5 Repair/ Restoration

3.6 Reinstallation

3.7 Field or Site Quality Control

A Field or Site Tests and Inspection

B Non-Conforming Work

C Manufacturer Services

3.8 System Startup

3.9 Adjusting

3.10 Cleaning

A Waste Management

3.11 Closeout Activities

A Demonstration

B Training

3.12 Protection

3.13 Maintenance

3.14 Attachments

END OF SECTION

CITY OF WARWICK

BID AND CONTRACT FORM

TITLE OF SPECIFICATION: Bid #2016-191 Purchase & Installation of (1) Engine Generator at 925 Sandy Lane

I. BID:

WHEREAS, the CITY OF WARWICK has duly asked for bids for performance of services and/or supply of goods in accordance with the above-indicated specifications.

The person or entity below does irrevocably offer to perform the services and/or furnish the goods in accordance with the specifications, which are hereby incorporated by reference in exchange for the bid price below;

This offer shall remain open and irrevocable until the CITY OF WARWICK has accepted this bid or another bid on the specifications or abandoned the project.

The bidder agrees that acceptance below by the CITY OF WARWICK shall transform the bid into a contract. This bid and contract shall be secured by Bonds, if required by the specifications.

Description	Price
Purchase and install (1) one engine generator at 925 Sandy Lane, Warwick RI	\$