Attachment F

Automatic Transfer Switch Specification
American Embassy
Kyiv, Ukraine

1. AUTOMATIC TRANSFER SWITCH (ATS)
1.1 GENERAL
1.1.1 The automatic transfer switch shall be industrial (NOT residential) grade and furnished so as to maintain system compatibility and local service responsibility for the complete emergency power system. It shall be listed by Underwriter's Laboratory, Standard 1008, with circuit breaker protection afforded by the generator breaker. Representative production samples of the transfer switch, which have been demonstrated through tests, shall withstand 10,000 mechanical operation cycles (minimum) without failure. One operation cycle is the electrically operated transfer from normal to emergency and back to normal. The manufacturer shall furnish complete schematic and wiring diagrams for the particular automatic transfer switch and a typical wiring diagram for the entire system showing all components, relays and part numbers. This ATS shall be an integral part of the generator set and be secured to the weather-proof enclosure. All wiring and connections to integrate the ATS into the generator output shall be made by the vendor before acceptance by the Government.

1.2 ATS RATINGS & PERFORMANCE
1.2.1 The automatic transfer switch (ATS) shall be a minimum 4-pole design (3-pole + neutral), rated for full load, continuous operation. The ATS rating shall be ambient temperatures of -15 Degrees Celsius to +50 Degrees Celsius. Main power switch contact shall be rated to operate at 400/230 volts minimum unless otherwise specified herein. The transfer switch shall have a minimum withstand and closing rating of 42,000 amperes. The RMS symmetrical fault current ratings shall be the rating listed in the UL listing or component recognition procedures for the transfer switch.

1.3 ATS CONSTRUCTION
1.3.1 The transfer switch shall be open transition type, positively electrically and mechanically interlocked to prevent simultaneous closing and mechanically held in both normal and emergency positions. Independent break before make action shall be used as protection to prevent dangerous source to source connections. The transfer switch shall be approved for manual operation. The electrical operating
means shall be approved for manual operation. The electrical operating means shall be by electric solenoid. Every portion of the contactor is to be positively mechanically connected. No clutch or friction drive mechanism is allowed, and parts are to be kept to a minimum. This transfer switch shall not contain integral overcurrent devices in the main power circuit, including molded case circuit breakers or fuses.

1.3.2 The transfer switch electrical actuator shall have an independent disconnect means to disable the electrical operation during manual switching. Maximum electrical transfer time in either direction shall be 160 milliseconds, exclusive of time delays. Main switch contacts shall be high pressure silver alloy contacts to resist burning and pitting for long life operation.

1.3.3 There shall be one Single Pole Double Throw, 10 ampere, 250 volt auxiliary contact on both normal and emergency sides, operated by the transfer switch. Full rated neutral bar with lugs for normal, emergency and load conductors shall be provided inside the cabinet.

1.4 CONTROL EQUIPMENT

1.4.1 All control equipment shall be mounted on the inside of the cabinet door in a metal lockable enclosure with transparent safety shield to protect all solid state circuit boards. This will allow for ease of service access when main cabinet lockable door is open, but prevent access by unauthorized personnel. Control boards shall have installed cover plates to avoid shock hazard while making control adjustments. The solid state voltage sensors and time delay modules shall be plug-in circuit boards with silver or gold contacts for ease of service.

1.4.2 A solid state under-voltage sensor shall monitor each phase of the normal source and provide adjustable ranges for field adjustments for specific applications needs. Pick-up and drop-out settings shall be adjustable from a minimum of 70% to a maximum of 95% of nominal voltage. The utility input voltage shall be stepped down to 24VAC for safety and reliability.

1.4.3 Signal the engine-generator set to start in the event of a power interruption. A set of contacts shall close to start the engine and open for engine shutdown. An adjustable, solid state time delay start (1 to 180 seconds) shall delay this signal to avoid nuisance start-ups on momentary voltage dips or power outages.

1.4.4 Transfer the load to the engine-generator set after it reaches proper voltage (80%) and frequency (80%). A solid state time delay (30 seconds) shall delay this transfer to allow the engine-generator to warm-up before application of load. There shall be a switch to bypass this warm-up timer when immediate transfer is required.
1.4.5 Retransfer the load to the line after normal power restoration. A return to utility timer (5-10 minutes) shall delay this transfer to avoid short term normal power restoration.

1.4.6 The operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred. Controls shall provide an automatic retransfer of the load from emergency to normal if the emergency source fails with the normal source available.

1.4.7 Signal the engine-generator to stop after the load re-transfers to normal. An adjustable, solid state engine cool-down timer (3-10 minutes) shall permit the engine to run unloaded to cool-down before shutdown.

1.4.8 Provide an engine minimum run timer (10 minutes) to ensure an adequate engine run period.

1.4.9 Provide a solid state plant exercise clock to set the day and time of generator set exercise period. Clock shall have a seven days, 24 hour programmable clock powered from the load side of the transfer switch. A 150 hour internal battery shall be supplied to maintain the circuit board settings when the load side of the transfer switch is de-energized. Include a switch to select if the load will transfer to the engine-generator set during the exercise period.

1.4.10 The transfer switch shall have a time delay neutral feature to provide a time delay (5 seconds) during the transfer in either direction during which time the load is isolated from both power sources. This allows residual voltage components of motors or other conductive loads (such as transformers) to decay before completing the switching cycle. A switch will be provided to bypass this feature when immediate transfer is required.

1.4.11 Front mounted controls shall include a selector switch to provide for a NORMAL TEST mode with full use of time delays, FAST TEST mode which bypasses all time delays to allow for testing the entire system in less than one minute, or AUTOMATIC mode to set the system for normal operation.

1.4.12 Provide colored indicator lamps to be energized when the transfer switch position is in either UTILITY (white) or EMERGENCY (red). A third lamp shall be provided to indicate STANDBY OPERATING (amber). These lights shall be energized from utility or the engine-generator set.

1.4.13 Provide manual operating handle to allow for manual transfer. This handle shall be mounted inside the lockable enclosure so accessible only by authorized personnel.

1.4.14 Provide a safety disconnect switch to prevent load transfer and automatic engine start while performing maintenance. This switch will also be used for manual transfer switch operation.
1.4.15 Provide LED status lights to give a visual readout of the operating sequence. This shall include: utility on, engine warm up, engine warm up bypass, standby voltage "ready", standby frequency "ready", standby on, transfer to standby, return to utility, engine cool-down, engine minimum run and fast test mode.

1.5 MISCELLANEOUS ATS EQUIPMENT
1.5.1 The transfer switch mechanism and controls shall be mounted in a NEMA 4X enclosure for outdoor, weatherproof, corrosion-proof, dustproof installation.

1.6 OWNERS MANUALS
1.6.1 Two (2) hard copy sets of owner's manuals specific to the ATS and products supplied shall be located inside the unit and accompany the equipment. General operating instruction, preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model shall be included. A PDF version of the owner’s manuals shall also be provided on a compact disc and shipped with ATS.

1.7 WARRANTY
The offeror shall provide a one-year warranty on parts, which starts from the date the equipment is commissioned on-site. This requirement shall not modify or change the standard contract warranty agreement.