SECTION 11 86 05 – GSE BATTERY CHARGERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Work Includes: Designing, manufacturing, testing, furnishing, installing and commissioning GSE Battery Charging systems rated as indicated herein.

1.2 RELATED SECTIONS

A. Drawings, General Provisions of the Contract, including General and Special Conditions, as well as Division 1 and General mechanical and electrical materials and methods of installation apply to work of this section.

1.3 REFERENCES

A. The standards and codes applicable to only a portion of the work specified in this section are referenced in the relevant parts or clauses. Standards and codes which are generally applicable to the work of this section, are listed below. The latest applicable version shall apply.

1. MIL-STD-461 - Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference.
2. NFPA 70 - National Electrical Code (NEC).
3. NFPA 70E - Standard For Electrical Safety in the Workplace
4. IEEE 519 - Recommended Practice and Requirements for Harmonic Control in Electric Power Systems
5. Canadian Standards Association (CSA).
6. NEMA ICS 6 - Enclosures for Industrial Control Devices and Systems.
7. NEMA ST 20 - Dry Type Transformers for General Applications.
8. NEMA ICS 1 - General Standards for Industrial Control and Systems.
9. ANSI C84.1-1977 Voltage Ratings for Electrical Power Systems and Equipment.
10. ATA 101 - Ground Equipment Technical Data.
11. BS ISO 6858 - Aircraft - Ground support electrical supplies - General requirements
12. SAE J1772 - Electric Vehicle Conductive Charge Coupler.
13. DFW Design Criteria Manual.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's data indicating, as a minimum, input/output voltages and amperages, power rating, physical characteristics, short circuit ratings, dimensions, and enclosure details.

B. Shop Drawings: Provide schematics and interconnection diagrams, indicate front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends. Differentiate between manufacturer-installed wiring and field-installed connections.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Operation Data: Include instructions for starting and operating battery charger, and describe operating limits that may result in hazardous or unsafe conditions.

E. Maintenance Data: Include routine preventive maintenance schedule, recommended spare parts list, and required special tools.

F. Operation and Maintenance Manuals: Include in ATA 101 format a general description, theory of operation and specification, schematics and wiring diagrams, start-up instructions, installation and maintenance procedures, parts list, recommended spare parts list, troubleshooting guides, controls and accessories information. O&M manuals shall also include:

1. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
2. Operation Data: Include instructions for starting and operating battery charger, and describe operating limits that may result in hazardous or unsafe conditions.
3. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. UL Compliance: AHUs shall be UL, or ETL listed and shall be labeled by a nationally recognized testing laboratories at the time of bid. Submit verification with bid submittals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle in accordance with manufacturer's written instructions. Handle carefully to avoid damage to components, enclosure, and finish.

C. Provide units which do not require disassembly and reassembly because of movement into the final location and follow manufacturer's written instructions.

D. Deliver equipment as a factory-assembled unit with protective crating and covering.

E. Store equipment and material in suitable facilities until delivery, installation, and acceptance.

F. Coordinate the delivery acceptance of this equipment at the job site. Receive, offload, store and protect this equipment until such time as it has been installed and final accepted.

1.7 WARRANTY

A. Provide two (2) year manufacturer warranty for battery charger inclusive of parts and labor from date of Substantial Completion. Date of Substantial Completion is defined as the date the equipment is turned over for normal operation, per Division 01 Specification Section 01 77 00.01 – Closeout Procedure- System Acceptance

B. Shipping and handling charges for warranty parts are the responsibility of the Provider.

C. Warranty Services shall be commenced with on-site representation, by qualified repair technicians, within 72 hours from the request of the Owner.

1.8 OPERATION AND MAINTENANCE MANUALS

A. Provide seven (7) copies of the approved, comprehensive Operation and Maintenance Manual to the Architect 14 days prior to Final Acceptance date.

B. The manuals shall fully describe each product, system, or subsystem numbered logically and separated into sections and contained in rigid plastic binders with identification inserted in clear plastic pockets on front and spine of each binder. Manuals shall be assembled in accordance with ATA 101.

C. The content of the manuals shall be limited to information and data that specifically apply to products provided and shall include routine normal and special operating instructions and sequences. Also included shall be routine maintenance procedures and guides for troubleshooting, disassembly and reassembly instructions, and recommended spare parts list consisting of current prices and sources.

D. Wiring diagrams and schematics shall be incorporated into the manuals to clearly show features such as controls, switches, instruments, and indicators by name and location.

1.9 ROYALTIES AND LICENSE FEES

A. The battery charger manufacturer shall pay all royalties and license fees and shall defend all suits or claims for whatever infringements of any prior, pending, or future patent rights and shall save the Owner and Engineer harmless from liability, expense, or loss on account thereof, with respect to any processes, devices, methods, articles, inventions, or procedures used by the manufacturer.

1.10 TRAINING

A. Manufacturer shall provide a complete training program for the Owner's operating, engineering, and maintenance personnel. Training shall include both classroom and hands-on instruction and be of sufficient duration to adequately train personnel to perform on site routine, preventative, and remedial maintenance of the equipment, product or system. Unless noted otherwise, maintenance training shall consist of a minimum of two (2) classes of four (4) hours classroom instruction and four (4) hours hands-on instruction for eight (8) personnel, and operator's training shall consist of a minimum of four (4) sessions of two (1) hour duration each, hands-on instruction for eight (8) personnel.

B. Operator training shall be completed no later than seven (7) days prior to beneficial use. The manufacturer shall provide maintenance training within 30 days of beneficial use. At least 60 days

prior to substantial completion, a training program summary, course syllabus, instructor qualifications, and copy of the training manual shall be submitted for review and approval.

C. Training shall be conducted at the installation site property at the direction of the Owner.

D. Provide Owner a minimum of seven (7) days notice prior to conducting any training.

PART 2 - PRODUCTS

2.1 MANUFACTURER OF GSE CHARGER

A. PosiCharge

B. Substitutions: As approved by Engineer.

2.2 MANUFACTURER OF CABLE RETRIEVER

A. Averist Inc.

B. Substitutions: As approved by Engineer.

2.3 INPUT REQUIREMENTS

A. Input Voltage Rating: 480 Volts (nominal), 3-phase, 3-wire plus ground.

B. Input Amperage Rating: 40 Amps

C. Input Power Factor: Unit shall be rated at 0.96 power factor minimum at 480 volts.

D. Harmonic Distortion: 10 percent THD maximum at load.

2.4 OUTPUT REQUIREMENTS

A. Charging Ports: 2

B. Output Voltage: 0-120 Volts DC.

C. Efficiency: Shall be not less than 88% at any load.

D. Output Amperage:

1. The system shall be capable of providing up to 500 Amps from any charge port. Actual output current provided should be intelligently determined by the need of the connected batteries. Batteries with a low state of charge shall be provided with higher current than those which have a high state of charge. Output current should only be limited by battery capacity, state of charge, temperature and the total available power for each system as described above.

E. EMI/RFI: Unit shall be designed so as not to affect aircraft radio/navigation equipment. It shall be applicable throughout the entire aircraft radio frequency range. Provisions shall be designed into the unit to protect it from voltage fluctuations which might result from the operation of aircraft radio frequency equipment.

F. Cable Retriever: Contractor shall supply and install 2 cable retrievers per charger unit, as shown on contract drawings.

2.5 USER INTERFACE

A. Front mounted control panel for user configuration. Panel shall incorporate LED quick status indicators.

B. High contrast, 2 lines by 20 characters display for indication of:

1. State of Charge (SOC).
2. Status of charge.
3. Real time record of charge events (Date, Day, Time).
4. Battery and fault history display:
    a. Last 100 fault/warning events.
    b. Last 200 charging events.
5. Programmable charger configuration and battery characteristics.

C. RS-232 diagnostic port.

2.6 FUNCTIONAL REQUIREMENTS

A. Battery charger shall incorporate fast charging to intelligently and quickly charge batteries commonly used in aircraft ground support equipment (GSE).

B. Charger shall be capable of automatically charging upon battery connection. Connection to or from battery shall utilize instant anti-arcing disconnect.

C. Automatic system restart upon loss and reactivation of input power.

D. Programmable equalization schedules.

E. Programmable maximum charge current.

F. Capable of parallel charging up to the indicated charge ports simultaneously.

G. Charger Incorporates automatic charge algorithm that prevents overheating by adapting to the internal temperature of battery. Charger actively measures electrolyte temperature during the charge event. Charger measures internal electrolyte temperature on flooded batteries and external temperature on sealed batteries.

H. Shall automatically adapts equalization profile for sealed and unsealed batteries.

I. Each charger output shall be independently controlled through continuous monitoring of battery state of charge, temperature, voltage, and charge current in real time.

J. Battery mounted record of battery type, identification, last charge and equalization information.

K. Pilot interlock (SAE J1772) shall remove power from charge port within 20 ms of loss of pilot signal.

2.7 PHYSICAL CHARACTERISTICS

A. Design and Construction

1. The unit shall be designed and constructed so that parts will not work loose in service. It shall be designed to withstand the strains, jars, vibration and other conditions incident to shipping, storage, installation and service.
2. The unit shall be equipped with approved weather tight fittings for all wiring that pass through the weather tight compartments to prevent the entrance of moisture and dust into isolated electronic compartments.
3. All wiring terminals shall result in a permanent, secure bond between the wire and terminal. All circuits which continue to field-wired components shall terminate at suitably identified and easily accessible terminal boards.
4. Workmanship: The unit, including all parts and accessories shall be fabricated and finished in a workmanlike manner. Particular attention shall be given to freedom from defects, burrs, sharp edges, quality of soldering, welding, brazing, painting, wiring, riveting, alignment or parts and tightness of assembly screws, bolts, etc.

B. Cabinet

1. The cabinet enclosure shall be designed to be suitable for the intended environmental conditions. The components and sub-assemblies shall be mounted in a suitable NEMA 3R enclosure.
2. Access doors and covers shall be provided for easy access to all component parts.
3. The unit shall be designed for lifting and transporting by forklift.
4. Manufacturer shall provide all mounting brackets and hardware necessary to mount the battery charging system in the locations specified in the contract drawings.

C. Finishes

1. Case components shall be painted and suitably protected from oxidation and corrosion.
2. External surfaces shall be painted to Architect specified color.

D. Charger cables shall be 30' in length to provide adequate reach to equipment.

2.8 ENVIRONMENTAL CONDITIONS

A. The unit shall successfully operate under the following conditions:

1. Ambient Temperature Range: 25 degrees F to 125 degrees F.

PART 3 - EXECUTION

3.1 CABINET MOUNTING

A. The cabinet shall be mounted in such a manner that no damage shall occur as a result of transportation.

B. Battery charging system components shall be mounted as indicated in contract drawings.

3.2 EXAMINATION

A. Verify/perform the following items or tasks.

1. Air inlets or exhaust louvers are not obstructed
2. Check to be sure that there are no tools or loose objects in the unit.
3. Make a final check of the security of the power connections.
4. Re-install any covers removed during installation.

3.3 INSTALLATION

A. Testing and Commissioning shall be by the manufacturer or manufacturer's authorized representative.

B. Install in accordance with manufacturer's instructions.

C. Arrange installation of cables to provide adequate clearance for service and maintenance.

D. The unit and cables shall be properly aligned and adjusted before final acceptance.

E. Complete functional testing and all punchlist items.

F. A factory trained field representative shall be present at the job site during installation and testing, and while "Punch List" discrepancies are being corrected.

3.4 INTERFACE WITH OTHER WORK

A. Installation of unit shall be coordinated with other trades associated with project.

3.5 FIELD QUALITY CONTROL

A. Inspect for loose connections, proper grounding connections, and bolting of equipment frame.

3.6 STARTING EQUIPMENT

A. Provide manufacturer's field representative to prepare and start equipment. Coordinate this service with installing contractor and the Architect.

B. Adjust for proper operation within manufacturer's published tolerances.

C. Demonstrate proper operation of equipment.

3.7 CLEANING

A. Clean unit from all construction dust and debris prior to start-up.

B. Touch up scratched or marred surfaces to match original finish.

C. Protect the installed unit from subsequent construction operations.

3.8 DEMONSTRATION

A. Provide operating instruction using manufacturer's field service personnel at project after commissioning of battery charging systems.

END OF SECTION 11 86 05