

UNINTERRUPTIBLE POWER SUPPLY

Technology Request for Bid



Rockford Public Schools

Quality Community – Quality Schools
Together Building a Tradition of Excellence

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DIVISION 00 - BIDDING AND CONTRACT REQUIREMENTS

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DIVISION 27 - TECHNOLOGY SYSTEMS

<u>Section</u>	<u>Description</u>
26 33 53	Uninterruptible Power Supply

APPENDICES

<u>Section</u>	<u>Description</u>
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OTHER RESOURCES

None

END OF SECTION

SECTION 00 11 16
INVITATION TO BID

PART 1 - GENERAL

1.01 WORK INCLUDED: Uninterruptible Power Supply

A. Rockford Public Schools (Owner) is seeking bids for District Data Center Uninterruptible Power Supply (UPS) and installation. Proposed systems shall be configured and installed to service Owner's needs across multiple instructional facilities, and as described herein. Contractor is responsible for demolition and disposal of the existing 3-phase UPS. Contractor is responsible for all associated electrical for a turnkey installation.

B. Project: Uninterruptible Power Supply

A. Owner: Rockford Public Schools
350 N. Main Street
Rockford, MI 49341

C. Designer: Communications by Design, Inc.

D. Sites of Work:

1. Rockford Freshman Center
4500 Kroes
Rockford, MI 49341

1.02 GENERAL DESCRIPTION OF PROJECT SEQUENCE

A. Sequences and dates specified herein are for information only and indicate the plan and intent of the Owner. Actual dates shall be established based on final award of project.

B. Sequence of operations shall be established by the Contractor within the guidelines established by the Owner as required to meet schedules.

C. Schedule:

1. Request for Bid Distributed: October 27, 2026
2. Pre-Bid Meeting: November 5, 2026 at 3:30PM
3. Intent to Bids Due: November 18, 2026 by 5:00pm
4. Question and Clarification Deadline: November 16 by 5:00pm

5. Public Bids Due: November 24, 2026 by 3:30pm

1.03 TYPES OF BIDS

- A. Bids shall be submitted in total and with required detail for each item bid and as is required herein and include all portions of the work identified for the individual bid package as specified herein. Bids shall be made on unaltered bid forms as included herein. Bidder shall fill in all blank spaces and the bid shall be signed by a legal officer or agent authorized to bind the bidder to a contract.

1.04 PRE-BID CONFERENCE

- A. A pre-bid conference will be held. A discussion of the project and review of bid documents will be followed by a site review and an opportunity to ask questions. Attendance is highly encouraged for all contractors interested in bidding on any components or portions of this project. Attendance at the pre-bid conference will be a factor considered during evaluation of bids.

- 1. Date: November 5, 2026 at 3:30pm
- 2. Location: Rockford Freshman Center (Media Center)
4500 Kroes
Rockford, MI 49341

1.05 TIME AND PLACE OF BID RECEPTION

- A. Physically sealed bids for the base bid work will be received at the district office and read aloud at a public opening. Bids arriving after the appointed time as determined by the Owner's representative conducting the public opening, shall be returned unopened. Bids will be accepted beginning forty-eight (48) hours prior to the appointed opening time provided they are in sealed packages and addressed as specified herein.

- B. Bid Receipt Deadline: November 24, 2026 by 3:30pm

- C. Bid Opening Location: Rockford Public Schools
Board Room
350 N. Main
Rockford, Michigan 49341

- D. Faxed or electronically delivered bids will not be accepted.

1.06 EXAMINATION AND PROCUREMENT OF DOCUMENTS

- A. Specifications and any relevant Drawings may be obtained from the Technology Designer. Contractors may obtain copies by documented request

to Communications by Design, Attn: Rebecca Szilagy. Requests may be made by:

1. Writing – 4101 Sparks Drive SE Grand Rapids, MI 49546
2. Email – rszilagy@cbdconsulting.com

1.07 BID SECURITY

- A. Bid security equal to five percent (5%) of the total bid amount, must accompany each base bid in accordance with the Instruction to Bidders.
- B. Bid security shall be either a Bid Bond issued by a company licensed in the State of Michigan to furnish bid security or Certified Check made payable to the Owner.

1.08 PERFORMANCE BOND COVERAGE

- A. Selected Contractor(s) will be required to provide a performance bond and payment bond in an amount equal to one hundred percent (100%) of the bid amount including any accepted alternates at the Owner's discretion. Such bonds shall be issued by surety licensed by the State of Michigan and acceptable to the Owner.

1.09 UNIVERSAL SERVICE FUND (USF) CONDITIONS

- A. IDENTIFICATION NUMBER – the service provider's USF Service Provider Identification Number (SPIN) **must be included in the Bid**. Direct all questions regarding the USF requirements in this document to the Universal Service Administrative Company (USAC), Schools and Libraries Division (SLD) at (888) 203-8100.
- B. FUNDING REQUESTS (FY26 E-rate) - The specified products and/or services are to be provided for FY27 (April 1, 2027-September, 2028) and qualify for universal service discounts under the FY26 universal service support mechanism, E-rate.
- C. UNIVERSAL SERVICE DISCOUNTS – The service provider contract may be conditional upon the Owner receiving universal service discounts under the FY26 universal service support mechanism, E-rate. The Owner reserves the unrestricted right to change the contract amount by adding to, and/or reducing the amount of services and/or products in order to meet budget requirements in the event the level of universal service discounts is changed. Any such adjustments to the contract amount will be taken prior to the start of the specific work being adjusted or eliminated on a given building and/or project.
- D. UNIVERSAL SERVICE DISCOUNT IMPLEMENTATION – The Owner reserves the unrestricted right to specify the filing option for the universal

service discount for each product and/or service offered within the Bid: Billed Entity Applicant Reimbursement (BEAR) or Service Provider Invoice (SPI).

- E. ELIGIBLE PRODUCTS AND SERVICES – The USF eligible products and/or services identified on the USAC FY27 (2027-2028) Eligible Services List, which is incorporated herein by reference, must be identified separately from any and all “ineligible” products and/or services in the Bid. Bidder shall note eligibility of items on required Schedule of Values form(s).
- F. FUNDING AVAILABILITY – Owner may or may not elect to proceed with project in whole or, or in part based on multiple possible sources of funding. Approval of E-rate funding will not be the sole criteria for Owner approval to proceed with any/all/some implementation activity on or after April 1, 2026.

1.10 OWNER’S RIGHT TO REJECT BIDS

- A. The Owner reserves the right to reject any and/or all bids. The Owner reserves the right to accept a bid, or portion thereof by issuance of a valid purchase order within ninety (90) calendar days following the bid opening. No bids may be withdrawn during this time without the specific approval of the Owner.
- B. Withdrawal of any Bids after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.

1.11 DEFINITIONS

- A. “Owner” is intended to mean Rockford Public Schools a general powers school district.
- B. For purposes of this project, the terms “Architect”, “Engineer” and “Designer” are used synonymously to refer to Communications by Design, Inc., a Michigan Corporation.
- C. The term “Bidder” refers to any organization properly and accurately submitting a complete “Intent to Bid Form” prior to the required time specified herein and subsequently properly submitting completed set of bid documents as specified herein.
- D. The term “Contractor” herein is a reference to the firm(s) eventually selected by the Owner to provide the intended system(s), or any portion thereof, and fulfill the terms of the contract.
- E. The term Contract is a reference to the collective set of documents, drawings, diagrams, Owner’s Purchase Order, Addenda and all other materials as provided for herein defining arrangement between Owner and Contractor.

- F. The term Addenda (or Addendum) are that portion of the Contract consisting of modifications, amendments, deletions or substitutions to the contract documents issued prior to the execution of the Contract.

END OF SECTION

SECTION 00300

BID FORMS

Intent to Bid Form

Complete and submit the following form if you have interest or intend to submit a Bid for this project. Unaltered and completed forms must be received on or before 5:00 PM on November 18, 2026. Only bidders returning a completed "Intent to Bid Form" will be directly notified of required addenda.

Company Information

Name: _____

Address Line1: _____

Address Line2: _____

City, State and Zip Code _____

Primary Contact Information

Name: _____

Phone No.: _____

Fax. No.: _____

E-Mail Address: _____

Portions of the bid for which you will be responding:

☐ Section 26 33 53 – Uninterruptible Power Supply

Submit unaltered and completed form to:

Rebecca Szilagy

Communications by Design, Inc.

rszilagy@cbdconsulting.com

SEALED BID LABEL

Separate, or fold over, the label on the line below, and affix to the exterior of sealed container so information is clearly visible for Bid Submission. Ensure label is attached in a manner to prevent accidental removal or defacement. Label shall serve as sole identification for sealed bid at submission.

BID TO: Rockford Public Schools
Attention: Mrs. Allison Clements
350 N. Main
Rockford, Michigan 49341

BID FROM: _____

PROJECT: UNINTERRUPTIBLE POWER SUPPLY #3112

INCLUDING Addendum No. _____ Dated _____
ADDENDA: Addendum No. _____ Dated _____

DUE: November 24, 2026 by 3:30pm

BID FORM

BID TO: Rockford Public Schools
Attention: Mrs. Allison Clements
350 N. Main
Rockford, Michigan 49341

BID FROM: _____

PROJECT: UNINTERRUPTIBLE POWER SUPPLY BID #3112

The undersigned, having familiarized themselves with all local conditions affecting the cost of work, and having examined the site and all applicable Bidding Documents herein, and herein referenced, including, but not limited to, all addenda issued thereto, hereby propose to furnish all labor, material, equipment, applicable taxes and services required for proper completion of each of the following categories of this project for the sum of:

Bid Category _____ Title _____
_____ Dollars (\$ _____).

Said amount written above constituting the Base Bid

Bid Category _____ Title _____

TAXES:

Bid sum includes all applicable taxes.

ALLOWANCES:

Base bid includes all applicable allowance cost(s) as set forth herein.

COST OF BONDS:

Bid sum includes cost of furnishing a Performance Bond and Labor and Material Payment Bond, each in the amount of one hundred percent (100%) of the bid.

ACKNOWLEDGEMENT OF ADDENDA:

The following addenda have been received, are hereby acknowledged, and their execution is included in both base bid and alternate bids herein.

Addendum No. _____ Dated _____ Addendum No. _____ Dated _____

ALTERNATES:

Based bid amount may be increased or decreased in accordance with each of the following alternate bids as may be selected, following procedures stated herein. Voluntary Alternates shown below are identified and described in detail on appropriate attachment(s) as referenced herein.

Mandatory Alternate A: Vertiv AMP2 56SC015BNCNNA0E APM2 15 KVA W/MBC
or equal_____

Mandatory Alternate B: Maintenance Bypass Cabinet or equal

Mandatory Alternate C: Valve-Regulated, Lead Acid Battery VRLA or equal

Voluntary Alternate A _____

Voluntary Alternate B _____

Voluntary Alternate C _____

PRINCIPAL SUBCONTRACTORS

As required herein, the following Subcontractors are proposed to be used for this project:

Legal Name:_____ Work Proposed_____

Legal Name:_____ Work Proposed_____

BID SECURITY:

Accompanying this Bid, as required herein, is a bid security in the form of Certified Check/Cashier's Check/Bidder's Bond in the amount of:

_____ Dollars (\$_____),
payable to the Owner, which it is agreed, shall be retained as liquidated damages, not as a penalty, by the Owner, if the undersigned fails to execute the Contract in conformity with the form of Contract incorporated and referenced herein and fails to furnish specified bonds within ten (10) days after date of issuance of a Letter of Intent to the undersigned.

If awarded the Contract, the undersigned agrees to commence work within ten (10) calendar days after date of issuance of a Purchase Order, which shall be considered as the notice to proceed, and agrees to complete the work in accordance with the schedule herein.

FAMILIAL DISCLOSURE:

Accompanying this Bid, as required herein, is a legally executed and notarized Michigan Familial Disclosure Statement.

EXCEPTIONS:

Bidder takes no exception to terms, conditions, specifications and/or any other requirements herein unless expressly noted, and specifically identified as provided for herein on unaltered Contract Exception form accompanying this Bid.

SIGNATORY AUTHORITY:

The undersigned certifies they are an authorized agent of the bidding entity, and legally able to bind the bidding entity to the terms, conditions and responsibilities of this, and all referenced bid documents. Furthermore, the undersigned acknowledges an understanding that non-compliance of this authority or any other bidding requirements may result in forfeiture of bid security and/or dismissal of consideration of bid submitted.

AGREEMENT:

The undersigned agree(s) to provide the post-bid information required within ten (10) days after notification of a Letter of Intent and to execute an agreement for work covered by this Bid on the Owner's standard Purchase Order for which terms and conditions are expanded to include all Bidding Documents and subsequent addenda issued thereto.

In submitting this bid, it is understood that the Owner reserves the right to reject any or all bids. It is further agreed that this bid is binding for a period of Ninety (90) days from the opening thereof.

Respectfully submitted,

Date: _____

Firm Name: _____

By: _____

Signed: _____

Title: _____

Official Address: _____

Telephone Number: _____

Fax Number: _____

Primary Contact Email Address: _____

(If Corporation, affix Seal

Michigan Familial Relationship Disclosure Statement

In accordance with Section 1267 of Michigan Revised School Code this sworn and notarized statement of an authorized representative, discloses any familial relationship between the owner and/or any employee of the Bidder, and any member of the project Owner's governing Board(s) or Superintendent(s).

If any conflict of interest is discovered subsequent to submission of bid, written disclosure shall be submitted to the project Owner within seven (7) days of discovery. The project Owner reserves the right to immediately terminate any contract with Bidder upon notification of a conflict of interest. Upon such termination, the project Owner shall compensate Bidder only for the value of any goods or services provided to the Owner prior to such termination as determined by Designer.

(Check only one Box Below)

It is hereby acknowledged and certified by Bidder that no familial relationship exists between the owner or any employee of the Bidder and any member of the project Owner's governing Board(s) or Superintendent(s).

A familial relationship exists between the owner or an employee of the Bidder and a member of the project Owner's governing Board(s) or Superintendent(s). The person(s) and the relationship(s) are as follows:

Bidder

Board or Superintendent

_____	_____
_____	_____
_____	_____
_____	_____

Bidder Authorized Representative:

Bidder: _____

Representative's Signature: _____

Print or Type Name: _____

Representative's Title: _____

Subscribed and sworn this _____ day of _____, 2026.

In the County of _____ State of _____

By _____
Notary Public Signature

Seal or Stamp:

My commission expires on: _____

AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT
Michigan Public Act No. 517 of 2012

The undersigned, the owner or authorized officer of the below named contractor (the “Contractor”), pursuant to the compliance certification requirement provided in the **ROCKFORD PUBLIC SCHOOLS** (the “School District”) Request For Proposals for District Technology Renovations_ (the “RFP”), hereby certifies, represents and warrants that the Contractor (including its officers, directors and employees) is not an “Iran linked business” within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the “Act”), and that in the event Contractor is awarded a contract as a result of the aforementioned RFP, the Contractor will not become an “Iran linked business” at any time during the course of performing the Work or any services under the contract.

The Contractor further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than \$250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the School District’s investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on a request for proposal for three (3) years from the date the it is determined that the person has submitted the false certification.

CONTRACTOR:

BIDDER’S FIRM NAME _____

BY (SIGNATURE) _____

PRINTED NAME AND TITLE _____

STATE OF MICHIGAN)
)
COUNTY OF)

Subscribe and sworn before me on this _____

Seal:

day of _____, 20____, a Notary Public

in and for _____ County,

Notary Public

My Commission expires _____

REFERENCES

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

CONTRACT EXCEPTIONS

Check one Box

☐ Bidder takes no exception to, and agrees to comply with all sections, terms, conditions and/or requirements of the Contract Documents.

☐ Bidder proposes the following exceptions to the Contract Documents:

<i>Paragraph Number</i>	<i>Explanation</i>
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NOTE:

Exception(s) to any bid sections, terms, conditions and/or requirements deemed excessive for any reason by the Owner and/or Designer may result in disqualification of Bid.

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required. Form submitted must materially match below both in content and format. Electronic version of this form is required with bid package as Microsoft Excel compatible spreadsheet on USB Drive for each project section being bid. Failure to provide appropriate and complete SCHEDULE OF VALUES, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: Bid Division 26 33 53

[illegible]

END OF SECTION

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 OWNERSHIP

- A. Bidders prepare and provide bids without any cost to the Owner and/or Designer. Once opened, bids become the sole property of the Owner. Bidders have no claim to, or ownership of bids opened. Bids become subject to all legal statutes including, if applicable, United States and Michigan Freedom of Information Acts and related laws.

1.02 COMPLIANCE

- A. This document establishes the primary system(s) design configuration. The Bidder's bid response shall include all services, supplies, components and equipment required to provide a complete turnkey system(s) which meets or exceeds all specifications for each given bid item being proposed.
- B. Owner prefers to enter into a contract with a single bidder for all materials for completion of this project, but shall consider combinations of portions of bids from various bidders. If portions of separate bids are deemed compatible and compliant with the intent of the project, and a combination of partial bids is deemed to be in the Owner's best interest, and the Owner reasonably expects willing and compliant bidders will cooperate with others for the benefit of the Owner during implementation of the system, the Owner reserves the right to award portions of the project to multiple bidders which will cooperate to complete the work.
- C. By their response, Bidders agree to comply with all sections, terms, conditions and/or requirements of the contract documents except as expressly noted, and specifically identified by paragraph number on the unaltered Contract Exceptions Bid Form. Exceptions to any bid sections, terms, conditions and/or requirements deemed excessive by the Owner and/or Bid Coordinator may disqualify Bid.
- D. In compliance with the Freedom of Information Act (FOIA), the Owner shall make bid documents available for public review after issuance of purchase order to the successful bidder/s.
- E. In connection with the execution of this Contract, Contractor and any Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin.

- F. Negligence in preparation, improper preparation, errors in, or omissions from Bids shall not relieve Bidder from fulfillment of any and all obligations and requirements of the Contract Documents.
- G. All Bid documents and worksheets must be completed in detail and submitted together on time.
- H. All documents constituting the entire present agreement shall be construed in accordance with and governed by the laws of the State of Michigan.
- I. Designer shall have authority for interpretation of Contract Documents. In the event terms, provisions or any other portion of the Contract Documents is/are in dispute, Designer shall have full and final authority to interpret the Contract Documents, and such interpretation shall be final and binding.
- J. In the event of a conflict between any terms or conditions in any of the documents comprising the entire present Agreement, the terms and conditions set forth in this document shall take precedence.

1.03 NOTICE AND RESPONSE

- A. Upon notification of Bidder being considered as a finalist, the Bidder shall provide to the Owner and Designer, within 48 hours, a current “Dunn and Bradstreet Supplier Evaluation Report” and other documentation as may be required of finalists herein and as requested by Owner and/or Bid Coordinator.
- B. Bidder shall provide timely response to all requests from Designer and/or Owner regarding clarification and/or elaboration concerning, but not limited to its Bid as may be deemed relevant by the Owner and/or Designer.

1.04 PROTECTION AND SAFETY

- A. Contractor shall continuously maintain adequate protection of all Work from damage and shall protect the Owner’s property from injury or loss arising in connection with the execution of the Contract. Contractor shall make good any such damage, injury or loss, except such as may be directly caused by agents or employees of the Owner. The Contractor shall adequately protect adjacent property as required by law, by the Contract Documents, or as otherwise required, to cause no damage to them during the execution of the Contract. This requirement shall also apply to structures above and below ground as conditions of the site require.
- B. Contractor shall be solely responsible for, and have control over means, methods, techniques, sequences and procedures for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the contract. Contractor shall take all necessary precautions for the safety of employees and visitors on the site of the Project and shall comply with applicable provisions of federal, state, and municipal safety laws

and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of workers and the community.

- C. Contractor shall vigorously defend any and all suits that may be brought against the Owner by any person and/or entity, whether in the employ of the Contractor or not, for damage to property, and/or injury or death to persons alleged or claimed to have been caused by or through the performance of work.

1.05 DRAWINGS DIAGRAMS AND ILLUSTRATIONS

- A. Drawings, Diagrams and Illustrations are diagrammatic in nature and indicate general arrangement and nature of systems and work included.
- B. Floor plan drawings are provided to assist the contractor in preparing documentation and reports as required herein.

PART 2 - MATERIALS

2.01 VOLUNTARY ALTERNATES AND SUBSTITUTION OF SPECIFIED PRODUCTS

- A. This Request for Bid describes a particular implementation. All Bids must provide pricing on the “base bid” as described herein. Voluntary alternatives providing comparable functionality with significant cost reduction and/or performance enhancement may be proposed. Voluntary alternatives are encouraged, but must be identified as “Voluntary Alternates” and detailed on unaltered Bid Forms contained herein. Voluntary Alternates may be further detailed and/or explained in attachments to the unaltered Bid Forms contained herein. Exceptions to the Request for Bid specifications must be clearly noted and explained for each Voluntary Alternate proposed.
- B. No substitutions of specified products may be made without specific prior authorization by Designer and Owner. Individual bid divisions herein contain particular information related to acceptable manufacturer and product requirements.
- C. Trade-in, equipment/license exchanges or other return allowances may be provided as a voluntary alternate. Trade-in, exchange or other return equipment allowances shall not be included in base bid amount.

PART 3 - EXECUTION

3.01 EXAMINATION OF DOCUMENTS AND SITE

- A. Bidders shall carefully examine the Contract Documents and the construction site to obtain first-hand knowledge of existing conditions and requirements. No plea of ignorance of conditions that exist, or any other relevant matter concerning work to be performed in the execution of work will be accepted as justification for failure to fulfill every detail of all requirements as described herein.

3.02 QUESTIONS, INTERPRETATIONS AND ADDENDA

- A. Any bidder finding discrepancies between Drawings, Specifications and/or Bid Documents, or be in doubt as to the exact meaning of any provision or detail shall notify the Designer at once, and before the deadline for Questions and Clarifications. The Designer may then, at their option, issue Addenda clarifying same. The Designer is not responsible for oral instructions, or Bidder's/Contractor's misinterpretations of Drawings, Specifications and/or Bid Documents.
- B. The Designer reserves the right to issue Addenda at any time up to thirty-six (36) hours prior to the scheduled bid opening. All such addenda shall become, upon issuance, an inseparable part of the Specification/Contract Documents. Each bidder shall incorporate within their bid all costs for items listed in any/all Addenda, and shall acknowledge receipt and identifying number of each Addendum on the Bid Form and on the outside of the sealed bid container.
- C. Addenda will be forwarded to each bidder who has received a copy of the Bidding Documents and has submitted "Intent to Bid Form".

3.03 BID SECURITY, BONDS AND INSURANCE

- A. Bid Security, Performance and Payment Bonds are required on this project.
 - 1. Bid security equal to five percent (5%) of the bid amount must accompany each bid in accordance with the Instruction to Bidders.
 - a. Bid security shall be either a Bid Bond issued by a company licensed in the State of Michigan to furnish bid security or Certified Check made payable to the Owner.
- B. The selected Contractor will be required to provide a performance bond and a payment bond in an amount equal to one hundred percent (100%) of the bid amount including any accepted alternates at the Owner's discretion.
 - 1. The surety of the performance bond shall remain in effect until all acceptances and final contract close-out requirements herein have been executed by the Owner.

- C. Contractor shall provide, prior to beginning any work at the sites, certificate of insurance for delivery to Owner indicating all required insurance coverage is in force.
1. Workers' Compensation and Employer's Liability Insurance
 - a. Coverage A – Statutory
 - b. Coverage B - \$1,000,000 Per Accident
 2. Broad Form Comprehensive General Liability Insurance (including – Premises, Elevators, Contractor's Protective Liability, Contractual, Products & Completed Operations – including Broad Form Extensions).
 - a. Each Occurrence - \$1,000,000
 - b. General Aggregate - \$2,000,000
 - c. Products & Completed Operation Aggregate - \$2,000,000
 - d. Personal Injury & Advertising Injury - \$1,000,000
 - e. Fire Legal - \$100,000
 3. Sub-contractors Operations, Products – Completed Operations and Contractual Liabilities, plus such excess coverage as may be appropriate for the limits listed.
 4. Comprehensive Automobile Liability Insurance (owned, hired, and non-owned automobiles).
 - a. Bodily - \$1,000,000 each Person and \$1,000,000 each Occurrence
 - b. Property Damage - \$1,000,000
 5. Furnish Owner with Contingent Liability Insurance Policy with coverage and liability limits the same as for Public Liability Insurance specified herein. Designate on policy as assured, only the Owner.
 6. Furnish Owner with Contingent Property Damage Insurance Policy with coverage and liability limits the same as for Property Damage specified herein. Designate on policy as assured, only the Owner.
 7. Policies shall include notification clause requiring ninety (90) days written notice to Owner in the event of policy cancellation, expiration, non-renewal, coverage reduction or other material change.

8. Contractor shall not commence work under the Contract until after all insurance required herein has been obtained and certificates for such are approved by Owner.
- D. All such bonds and/or insurance shall be issued by surety licensed by the State of Michigan and acceptable to the Owner.
 1. Insurance certificate(s) shall be signed by insurance agent licensed in the state of Michigan or a representative of the insurance company.
- E. Contractor agrees to indemnify and hold harmless the Owner and Designer, including their agents and employees, from and against all claims, damages, losses and expenses, including, but not limited to, attorney fees arising out of, or resulting from the performance of the work.

3.04 MODIFICATION AND WITHDRAWAL

- A. Bids may be withdrawn and/or changed any time prior to the bid opening. Bids may not be withdrawn or changed after the bid opening, and shall be deemed a firm offer continuing for ninety (90) calendar days. Bids received after the time and date for the public opening will be returned unopened at the Owner's discretion.
- B. Withdrawal of any Bid after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.

3.05 CODES, ORDINANCES, REGULATIONS AND RELATED

- A. All labor and materials shall be furnished and installed in strict accordance with the latest applicable codes, ordinances and regulations of any governing body having jurisdiction over this project.
- B. In the event the quality of labor and materials required by the Drawings and Specifications herein exceeds requirements of current applicable codes, ordinances and regulations, the Drawings and Specifications shall take precedence.
- C. In the event the quality of labor and materials required by current applicable codes, ordinances and regulations having jurisdiction over this project exceeds that of the Drawings and Specifications herein, the applicable codes, ordinances and regulations shall take precedence.
- D. The Contractor shall give all notices and comply with all codes, laws, ordinances, rules and regulations of any authority having jurisdiction, which bears on the performance of its work. This compliance includes, but is not limited to, the Michigan School Safety Initiative (PA129, PA130, PA131 and PA138) if applicable to work being performed.

- E. The Contractor shall pay for all licenses, permits, taxes, and fees required for this project; and shall comply with all federal, state, local and Owner's codes, laws, ordinances, regulations and other requirements applicable to the work specified at no additional cost to the Owner. Contractor shall submit copies of all approved certificates and approvals to the Owner upon receipt.

3.06 SUB-CONTRACTOR AND MATERIAL SUPPLIER

- A. The successful Bidder shall submit to the Owner and Designer a complete list of all sub-contractors and all material suppliers proposed to engage on the work. Sub-contracts shall not be awarded until after they have been approved by the Designer and Owner.
- B. Finalist bidders may be required to submit additional details related to sub-contractors and suppliers within forty-eight (48) hours after the bid opening.
- C. Names of any principal sub-contractors must be listed on the Bid Form.
- D. All contracts made by the successful Bidder with Subcontractors shall be covered by the terms and conditions herein. The successful Bidder shall see to it that Subcontractors are fully informed in regard to these terms and conditions, and shall bind all subcontractors to the same terms and conditions. Failure to do so will absolve the Owner from any liability for additional cost due to subcontractor claims for additional cost, time or any claim(s) for additional cost by subcontractor(s).

3.07 BID RESPONSE FORMAT

- A. Bidder shall provide complete Bid copies in two formats as described herein.
 - 1. One (1) Hard copy format responses shall be in a bound tabulated format. Each response shall have tab indicators for each section.
 - 2. One (1) Electronic copy format responses shall be submitted on a USB Drive, readable by a standard Microsoft Windows 11 workstation. Electronic media shall contain separate folders to organize response documentation as described herein. Files submitted on USB Drive shall be **Adobe Acrobat** "PDF" format (SCHEDULE OF VALUES is additionally required to be on the disk in the appropriate folder as a spreadsheet and as described herein).
- B. All Bid Response formats shall be clearly externally marked to include, but not be limited to:
 - 1. Bidder identification.
 - 2. Project Owner identification.

3. Project name.
 4. Bid submission date.
- C. Bid Responses shall include an index containing copies/PDF of a complete index of documents comprising Bid Response. Responses shall include, but not be limited to the following tabbed/folder sections:
1. Section 1 – Forms, which shall contain copies/PDF files of all required and completed bid forms.
 - a. BID FORM
 - b. Michigan Familial Relationship Disclosure Statement
 - c. Iranian Economic Sanctions Form
 - d. REFERENCES
 - e. CONTRACT EXCEPTIONS
 - f. SCHEDULE(s) OF VALUES
 - g. BID BOND
 2. Section 2 – Overview, which shall contain copies/PDF files of cover letter and/or executive overview.
 3. Section 3 – Submittals, which shall contain copies/PDF files of all required and voluntary submittals.
 4. Section 4 – Appendices, which shall contain copies/PDF files of other reference materials Bidder wishes to, or is required to submit.

3.08 AWARD OF CONTRACT

- A. The material proposed to be used for the completion of work, and the competency, solvency and responsibility of bidders will receive due consideration before award of contract. In the reception of bids for this work, the Owner incurs no obligation to accept the lowest, or any bid submitted. The right to accept or reject any and all bids or portion thereof is reserved by the Owner. The Owner reserves the right to require testimonial, accounting or legal documents pertaining to the solvency of a Contractor, or any other decision factor the Owner deems appropriate, prior to award of contract.
- B. Owner reserves the right to select individual components from schedule of values independent of installation as may be determined in Owners best interest. Selected bidder may be required to install selected components provided by others.

- C. Issuance of a Purchase Order by Owner in response to a valid bid shall be a Notice to Proceed, and shall become part of, but not limited to, all terms, conditions and requirements herein. Notice to Proceed shall have the full effect of contract award, and shall make all terms, conditions, requirements and responsibilities of Bidder binding upon issuance. Notice to Proceed, once issued, shall become an inseparable part of the contract documents herein, and constitute both Bidder and Owner's acceptance of contract.

3.09 TIME, SCHEDULES, PROJECT MANAGEMENT, MEETINGS AND PLANS

- A. Time is of the essence on this project. Award of contracts for this project will be contingent on the bidder's agreement to complete the work on or before the contract completion date stated herein.
- B. All Contractors will commence work in such a manner and at such a time as to expeditiously interface with the work of other Contractors, and will pursue the project diligently to completion. All Contractors will work in a cooperative manner with Owner and other Contractors.
- C. Contractor shall appoint an overall Project Manager acceptable to Owner, with skills and experience deemed appropriate by the Owner for the scope and size of the project. Project Manager shall be responsible for the scheduling of all Contractor resources and attending all project meetings. Upon notification of Bidder being considered a finalist, the Bidder shall submit professional resume of proposed Project Manager within forty-eight (48) hours.
 - 1. Project meetings shall be conducted at Owner's selected and identified location weekly and at Owner's and/or Designer's discretion.
 - 2. Within five (5) days of Notice to Proceed (issuance of a Purchase Order by the Owner), Contractor's Project Manager shall provide to the Owner a critical flow path in the form of a "Gantt Chart" (or equivalent) indicating the proposed sequence of events and approximate beginning and completion dates in accordance with, compliance to, and coordinated with requirements herein.
 - 3. Changes of the Project Manager during the project shall not be acceptable without prior written approval from the Owner.
 - 4. It is the responsibility of the Contractor's Project Manager to schedule work, work out issues, ensure that all required products and services are delivered according to schedule and attend to any other matters required by the Owner in the interest of professional and timely completion of the project.

5. The appointed Project Manager, or a designee acceptable to the Owner, shall be in attendance of all project meetings throughout the term of the project. Failure to do so may be considered a material breach of contract.
6. After a ten (10) business day notice, the Owner reserves the right to request a new Project Manager, when it appears that, in the Owner's sole discretion, the Project Manager is not fulfilling the full responsibilities of the position. Failure by Contractor to provide adequate Project Manager meeting requirements of the Owner, may result in Contract termination.

3.10 CHANGES IN THE WORK

- A. No changes in work with the effect of either increasing or decreasing in the project value shall be made without specific and prior authorization by the Owner and Designer.
- B. Owner, without invalidating the contract and without notice to any surety, may at any time order extra work or make changes by altering, adding to or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be authorized by a written Change Order approved by Owner and Contract Designer. Upon receipt of such an order Contractor shall promptly proceed with the work involved. All such work shall be executed under the conditions of the original Contract. Owner authorized change order(s) may be issued at any time prior to Contract close out.
- C. When so directed, Contractor shall promptly submit an itemized estimate and a unit price for performing or deleting such extra or changed work as may be contemplated. Any extensions or reductions of the contract time associated with extra or changed work shall be identified at the time Contractor submits such documentation.
- D. At the Owner's discretion, adjustments in the Contract Sum shall be determined by one or more of the following methods:
 1. By mutual acceptance of a lump sum cost, including overhead and profit, itemized and supported by sufficient substantiating data to permit evaluation.
 2. By unit prices stated in the Contract Documents including, but not limited to, Schedule of Values.
 3. By unit prices mutually agreed upon.

3.11 PAYMENT REQUESTS AND PAYMENTS

- A. Contractor's invoices shall be submitted monthly in correlation with the Project Schedule indicating percentage of work completed.

- B. All contract and change order invoices shall be sent directly to Contract Designer.
- C. A 10% retainage shall be held back on all payment requests, including, but not limited to hardware, software, change orders and services, until final completion and close out of the project or project phase as determined by Owner and Designer.
- D. Contractors are required to submit all invoices on approved AIA Payment Request Forms or other billing format pre-approved by Contract Designer. Each AIA Payment Request Form shall be accompanied by a properly completed, executed and notarized Waiver of Lien which shall be in a format and contain verbiage approved by Owner.
- E. The Contract Designer and Owner shall process payment requests on a monthly schedule and in accordance with their respective established processes and procedures. Payments will be made by the Owner based only on AIA Request Forms having been previously certified, audited and approved by Contract Designer and accompanied by acceptable Waiver of Lien.

END OF SECTION

SECTION 00 65 00
CONTRACT CLOSE OUT

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide an orderly and efficient transfer of the completed work to Owner.
- B. Details affecting work of this Section include, but is not limited to all other Sections herein and all related Contract Documents.
- C. Activities relative to Contract close-out are described in, but not limited to, this and other Sections of this document.

1.02 SUBSTANTIAL COMPLETION

- A. "Substantial Completion" shall be defined as:
 - 1. All responsibilities of Contractor for all provisions and requirements of all divisions and sections of complete Contract herein, and as amended, are properly and fully completed or properly, accurately and acceptably provisioned for.
 - 2. All systems, equipment, facilities, services, programming and/or components required by all divisions and sections of complete Contract are fully operational, acceptable and useful to the Owner for their intended purposes.
- B. Prior to requesting inspection by Designer to certify Substantial Completion, Contractor shall use adequate means to assure the Work is completed in accordance with the specified requirements and is ready for such inspection.

PART 2 - MATERIALS

2.01 NOT USED FOR THIS SECTION

PART 3 - EXECUTION

3.01 PROCEDURES

- A. Contractor shall submit a written request to Designer indicating they have achieved Substantial Completion of Work.
- B. Within a reasonable time after receipt of the request, Designer will inspect Work to determine status of completion.
- C. Should Designer determine the Work is not substantially complete:

1. Designer promptly will so notify Contractor, in writing giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.
 2. Contractor shall then expeditiously remedy the deficiencies and notify Designer in writing when ready for re-inspection.
 3. Designer will re-inspect the Work.
 4. Excessive re-inspections of Work may result in fees being assessed Contractor.
- D. Should Designer concur the Work is substantially complete:
1. Designer will prepare a letter of Substantial Completion.
 2. Designer will submit the letter to Owner and Contractor.
 3. Contract shall be deemed “Closed Out” for retainage purposes.
 4. Final Acceptance of the system shall be deemed complete.

END OF SECTION

SECTION 26 33 53
STATIC UNINTERRUPTIBLE POWER SUPPLY

PART 1 - GENERAL

1.01 Summary

The specifications mentioned in this document describe the requirements for a Modular, Scalable, & Digital Uninterruptible Power Supply (UPS) optimized for maximum efficiency. UPS architecture consists of one or more single power module units connected in parallel inside a standard frame. The UPS shall automatically maintain AC power within specified tolerances to the critical load, without interruption (for specified duration as per battery run time), during failure or deterioration of the mains power supply. The UPS system shall be expandable by inserting additional modules of the same rating, to provide for module redundancy or load growth requirements. The manufacturer shall design and furnish all materials and equipment to be fully compatible with electrical, environmental and space conditions at the site. The UPS includes all equipment to properly interface the AC power source to the intended load and will be designed for unattended operation.

Contractor is responsible for all electrical as it relates to installation of the new UPS. This includes all but is not limited to all associated electrical wiring and connections for complete turnkey installation, any necessary permits and all state requirements such as state plan review handled by the Bureau of Construction Codes (BCC) under the Michigan Department of Licensing and Regulatory Affairs (LARA) or by local enforcing agencies (LEAs) where code enforcement authority is delegated.

Contractor shall remove, uninstall the existing 3-phase power supply and all associated electrical that is not used as part of the new installation.

1.02 Standards

The modular UPS system along with the associated equipment and components will be manufactured in accordance with the following applicable standards:

General safety requirements for UPS	UL 1778 and CSA C22.2 NO.107.3, Fifth Edition
EMC requirements for UPS	FCC PART 15 ANSI C62.41
Method of specifying the performance and test requirements of UPS	VFI-SS-111
Environmental aspects, requirements, and reporting	GB/T2423-IEC 60068
Operating modes	VFI, VI, VFD (ECO) IEC 62040-3 Section 5.3.4
Surge protection	ANSI C62.41 B3 including C62.41.1, and C62.41.2 Category B

Electronic device regulations	FCC Rules and Regulations, Part 15, Subclass B, Class A. The UPS shall have a label stating FCC compliance
Wiring practices and materials	The UPS shall be compatible with the wiring practices, materials, and coding in accordance with the requirements of the National Electrical Code, OSHA, and applicable local codes and standards
Energy star	The UPS shall comply with Energy Star 2.0 requirements for Uninterruptable Power Suppliers (UPSs)
Seismic rating requirements	IBC 2021 Sds=1.33, Ip=1.5, and z/h=1 IBC 2021 Sds=1.61, Ip=1.5, and z/h=0 Optional seismic brackets shall be available from the UPS manufacturer for use in compliance with this certification

The Quality System for the engineering and manufacturing facility certificated to conform to Quality System Standard ISO 9001 for the design and manufacture of power protection systems for computers and other sensitive electronics.

1.03 System Description

A. Design Requirements

1. For non-redundant operation (applicable, not applicable), the complete integrated UPS system shall be sized to provide a maximum of kVA/kW quality power output at $\geq 104^{\circ}\text{F}$ (40°C) at automatic derating N.
2. For redundant operation (applicable, not applicable), the complete integrated UPS system shall be sized to provide a maximum of ___ kVA/kW quality power output at $\geq 104^{\circ}\text{F}$ (40°C) at full performance and $\geq 104^{\circ}\text{F}$ to 122°F (40°C to 50°C) with automatic derating $N \pm 1$.
3. Models available in one single frame for compatible voltage and ratings:

Product	Power Scalability	Optional
10 kVA to 60 kVA, 208 V/220 V	10, 15, 20, 25, 30, 40, 45, 50, 60	N +1 Power Module
20 kVA to 120 kVA, 480 V	20, 30, 40, 50, 60, 80, 90, 100, 120	N +1 Power Module

4. 208V and 480V frame configurations provide capability up to 60kVA 208v or 120kVA 480V both including N+1 Power Module redundancy (optional).
5. Load voltage and bypass line voltage shall be 208 VAC and 480 VAC, 3-phase, 3-wire/4-wire plus ground.

6. Input voltage shall be 208 VAC, 3-phase, 4-wire plus ground.
7. Input voltage shall be 480 VAC, 3-phase, 4-wire/3-wire plus ground.
8. The AC input source and bypass input source shall each be a solidly grounded wye service.
9. It will be able to supply all required power to full rated output kVA loads with power factor from 0.5 lagging to 0.5 leading without any deration.

B. Modes of Operation

The UPS shall operate as an on-line reverse transfer/double conversion system in the following modes:

1. Normal

The UPS inverter continuously supplies the critical AC load. The rectifier draws power from the commercial AC source and converts it into DC power for the inverter and the battery charger. The battery charger maintains the battery in a fully charged and optimum operational condition. The inverter converts the DC power into clean and regulated AC power which is supplied to the critical load (conditioned line).

2. ECO Mode

The critical AC load shall be continuously powered by the bypass with the inverter available to power the load if the bypass source voltage or frequency exceeds adjustable parameters of power quality. This feature shall also be available in parallel operation.

3. Dynamic Online Mode

If this mode is selected, all power switches (configured internally or externally) and the battery switches are closed except for the maintenance bypass switch, and the system prefers to put the load on the bypass, to achieve the aim of energy-saving. When the load power is fed by bypass supply, the inverter is in the mode of power quality compensation for the bypass voltage. When the voltage of the bypass supply is beyond the pre-defined and adjustable limits, the system will transfer to the inverter output. In this mode, the system can normally charge the battery. This feature shall also be available in parallel operation.

4. Intelligent Paralleling Mode

Allows the system to automatically adapt capacity to meet immediate load requirements by measuring the system output current and the real power needed by the load downstream, in order to switch excess units to standby mode sleep mode,

while ensuring continuous system availability. When units are running in an idle state, they are not completely switched off but they still have the inverter control active and synchronized, as well as the DC bus charged in order to be ready to start up in case of load increase. The activation time of idle units is less than 5 milliseconds and during this quick transitory phase/step, the remaining active units will continue to supply the load without any interruption supporting a temporary overload condition. Intelligent Paralleling mode allows each UPS unit to operate in standby (parallel configurations) for the same amount of time, ensuring an equal lifespan of module components.

5. Battery

Upon failure of utility AC power, the critical load shall be powered by the inverter, which, without any switching, shall obtain its power from the battery plant through the DC-DC converter. There shall be no interruption in power to the critical load upon failure or restoration of the utility AC source.

6. Recharge

Upon restoration of the utility AC source, the rectifier shall supply power to the output inverter and to the DC-DC converter, which shall simultaneously recharge the batteries. This shall be an automatic function and shall cause no interruption to the critical load.

7. Bypass

If the UPS must be taken out of service, the static transfer switch shall transfer the load to the bypass source. The transfer process shall cause no interruption in power to the critical load. An optional external wrap-around maintenance bypass shall be used to ensure full isolation of the unit for the service of internal components while providing safety from arc flash.

8. Off-Battery

If the battery is taken out of service, it shall be disconnected from the DC-DC converter by means of an external disconnect circuit breaker. The UPS shall continue to function and meet all the specified steady-state performance criteria, except for the power outage backup time capability. If multiple battery strings are used, each string shall be capable of being electrically isolated for safety during maintenance.

9. Peak Shaving

The UPS should be capable of powering the load by supplying part of the energy from the battery and part of the energy from the rectifier.

10. Automatic Restart Mode

The battery may become exhausted following an extended AC utility failure. The inverter shuts down when the battery reaches the End of Discharge voltage (EOD). The UPS may be programmed to Auto Recovery after EOD after a delay time if the AC utility recovers. This mode and any delay time may be programmed by the commissioning engineer.

11. Paralleling Operation

The UPS shall have the vertical and horizontal scalability option for redundancy or capacity expansion.

1. **Vertical Scalability:** UPS shall be capable to accommodate additional power modules within the same rack (limited to its maximum frame capacity) online without dropping the connected load. It shall be designed based on discrete control logic platform i.e. each power and static switch module shall have its own intelligent DSP controller to avoid single point of failure.
2. **Horizontal Scalability:** UPS shall have option to connect the four UPSs in parallel configuration for redundancy or capacity expansion. Under normal operating conditions, the power delivered to the load will be equally shared between number of UPS power modules connected to the parallel bus with a tolerance of 5%. In the event of an overload, the system will transfer to the bypass source.

12. Online Maintenance

If the UPS needs to be maintained or repaired, all UPS power modules and static switch module bypass module in the system should be replaceable online hot swappable without shutting the system down. Additionally, the UPS should also be equipped with maintenance bypass for full system maintenance.

13. Common Battery

UPS shall be capable to support common battery configuration when multiple UPSs are connected in parallel. In this mode, each UPS can use the same battery to feed the required load.

14. Regen Mode

The UPS rack system shall have the ability to perform self-test for full rated capacity without using any external load banks. In this mode, UPS rectifier, inverter, and static bypass shall be tested up to full load capacity without any failure. Power consumption in this mode shall only be full load losses of UPS. This mode shall also be available in parallel UPS configuration.

C. Performance Requirements

The solid-state power components, magnetics, electronic devices, and overcurrent protection devices shall operate within the manufacturer's recommended temperature when the UPS is operating at 100% critical load and maintain battery charging under either of the following conditions:

- a. Any altitude within the specified operating range ≤ 9843 ft. (3000 m).
- b. Any ambient temperature within the specified operating range of 32 °F to 122 °F (0 °C to 50 °C).

D. Input

1. **Voltage:** Input voltage specifications of the UPS shall be,

a. Rectifier AC Input:

1. 208/220 V, 4-wire (3-phase + N +PE).
2. 480 V, 4-wire (3-phase + N +PE).
3. 480 V, 3-wire (3-phase +PE).

b. Bypass AC Input:

1. 208/220 V, 4-wire (3-phase + N +PE).
2. 480 V, 4-wire (3-phase + N +PE).
3. 480 V, 3-wire (3-phase +PE).

2. **Voltage Range:**

- a. For 480V, operation line voltage 288 V to 528 V.

Line voltage 408 V to 528 V at 100% load, 288 V to 408 V with linear derating.

- b. For 208V/220V, operation line voltage 125~249V (L-N 72 V to 144 V).

Line voltage 177 V to 249 V (102 V to 144 V) at 100% load, 125 V to 177 V (72 V to 102 V) with linear derating.

3. **Frequency Range:** 40 Hz to 70 Hz.

4. **Maximum Inrush Current:** UPS inrush current not to exceed 1.5 times rated input current.

5. Power Factor:

For all voltage grade Modules:

Input power factor will be ≥ 0.99 for being $< 50\%$ load.

Input power factor will be ≥ 0.98 for being $< 25\%$ load.

Input power factor will be ≥ 0.98 for being $> 50\%$ load for 480 frames inserted only one power module,

Input power factor will be ≥ 0.96 for being $> 25\%$ load for 480 frames inserted only one power module.

And input inactive power will $< 15\%$ rated power.

6. **Total Current Harmonic Distortion:** The total harmonic distortion of input current introduced by the rectifier will be less than or equal to 10% for 25% linear load, 3% for 100% linear load and 5% for 100% nonlinear load.
7. **Power Walk-in Period:** Need to support power walk-in function. All the power modules start at same time, 0% to 100% of full rated load over 1 to 30 seconds (default 5 seconds) per module.
8. **Surge Protection:** Withstands input surges of 4 kV (line to ground) without damage as per criteria listed in EN 61000-4-5:1995.
9. **Short Circuit Current Rating:** Units shall carry as standard 65 kA Short Circuit Withstand Rating. All ratings shall be certified, and a label shall be applied to the unit clearly identifying this rating as required by the National Electrical Code.

E. AC Output

1. AC Output Voltage:

- a. 208/220 V, 4-wire (3-phase + N + PE).
- b. 480 V, 4-wire (3-phase + N + PE).
- c. 480 V, 3-wire (3-phase + PE).

2. **Load Rating:** 100% of load rating for any load from 0.5 lagging to 0.7 leading.
3. **Inverter Voltage Distortion:** The inverter output is a sinusoidal waveform with a total harmonic distortion of 1% for 100% linear loads of all voltage grade, 3% for 100% nonlinear loads of 480 V, 5% for 100% nonlinear loads of 208 V/ 220 V.

4. Voltage Stability:

- a. $\pm 1\%$ RMS average for a 100% balanced 3-phase load.
 - b. $\pm 3\%$ RMS average for a 100% unbalanced load.
5. **Voltage Adjustment Range:** $\pm 5\%$ for line drop compensation adjustable by factory service personnel.
6. **Voltage Distortion:** 1% total harmonic distortion (THDv) maximum into a 100% linear load, 3% THDv maximum into a 100% non-linear load with crest factor ratio of 3:1.
7. **Bypass Frequency Synchronization Range:** $\pm 0.5, 1.0, 2.0, 3.0$ Hz, adjustable by factory service personnel, ± 2.0 Hz default setting.
8. **Frequency Slew Rate:** Single module system 0.1 Hz/sec to 3 Hz/sec, 0.6 Hz/sec default setting, parallel system 0.6 Hz/sec.
9. **Frequency Stability:** The inverter frequency regulation will be $\pm 0.1\%$ of rated frequency.
10. **System Efficiency:** Defined as output kW/input kW at rated lagging load power factor; and not less than the values listed below.
- a. **Double Conversion Mode:** For 480 V, up to $97 \pm 0.2\%$ for 30 kVA/2 U frames. For 208 V, up to $95 \pm 0.2\%$ for 30 kVA/3 U frames.
 - b. **In Dynamic Online Mode:** For 480 V, up to $98 \pm 0.1\%$. For 208 V, up to $97 \pm 0.1\%$.
 - c. **In Eco Mode:** For 400 V/480 V, up to $99 \pm 0.1\%$. For 208 V, up to $98.4 \pm 0.1\%$.

kVA Rating 208 V/220 V	Maximum Efficiency Double Conversion (%)	kVA Rating 480 V	Maximum Efficiency Double Conversion (%)
10	94.7	20	96.7
15	94.6	30	96.8
20	95	40	96.8
25	95	50	96.8
30	95	60	96.8
40	95	80	96.9
45	95.1	90	96.9
50	95.1	100	96.9
60	95	120	96.9

11. Phase Imbalance:

- a. **Balanced Loads:** $120^\circ \pm 1^\circ$.
- b. **100% Unbalanced Loads:** $120^\circ \pm 1.5^\circ$.

12. Voltage Transients (Average of All Three Phases):

- a. 0 to 100% or 100% to 0%.
Response Meets IEC 62040-3:2010.
- b. Figure 2 Curve 1, Class 1 Meets ITIC and CBEMA Curve Requirements
Output voltage recovery to $\pm 2\%$ tolerance band is within 20mS per IEC62040-3.

13. Inverter Output Overload at Full Output Voltage:

Table 1.1 Inverter Overload Duration

Load	Duration Inverter will Support Rated Load
$\leq 105\%$	Continuous
105% to 125%	10 minutes
125% to 150%	60 minutes
150% to 200%	Minimum 200 milliseconds

14. Bypass Output Overload at Full Output Voltage:

Table 1.2 Bypass Overload Duration

Load	Duration Inverter will Support Rated Load
$\leq 110\%$	Continuous
110% to 125%	10 minutes
125% to 150%	60 minutes
>150% (impact load)	200 milliseconds
1000%	10 milliseconds

The bypass circuit is protected by the bypass input circuit breaker. The breaker curves will be provided to assist in determining the maximum load and duration. Bypass will close when bypass overcurrent timeout.

F. Grounding

The UPS chassis shall have an equipment ground terminal.

G. Battery Management

1. Battery Autonomy Time Remaining

The UPS will predict the battery autonomy time remaining based on the percentage charge on the battery prior to discharge, the end cell voltage, and the loading on the system. There will be an approximate indication on battery autonomy time remaining through LCD and SNMP communications.

2. Temperature-Compensated Charging

The UPS system has battery charge temperature compensation function. When the ambient temperature is increased, the DC bus voltage (which charges the battery) will be reduced correspondingly to provide optimal charging voltage for the battery, thus prolonging the battery service lifetime.

3. Battery Load Testing

The UPS shall be capable of performing battery load testing under operator supervision. The UPS shall be capable of testing the battery without risk of disrupting power to the critical load. The UPS shall display and log the result of the test with appropriate alarms if reduced battery capacity or battery failure is detected.

1.04 Environmental Conditions

The UPS shall be able to withstand the following environmental conditions without damage or degradation of operating characteristics:

1. Operating Ambient Temperature

- a. **UPS:** 32 °F to 104 °F (0 °C to 40 °C) full performance, 104 °F to 122 °F (40 °C to 50 °C) with automatic derating. 104 °F to 113 °F (40 °C to 45 °C) derating 0.9, 113 °F to 122 °F (45 °C to 50 °C) derating 0.8.
- b. **Battery Temperature Compensation:** -3.0 (selectable from 5.0 to -5.0 around 25°C).

2. Storage/Transport Ambient Temperature

- a. **Storage without Battery:** -40 °F to 158 °F (-40 °C to 70 °C).
- b. **Storage with Battery:** 5 °F to 86 °F (-15 °C to 30 °C).

3. Relative Humidity

- a. 0 to 95%, non-condensing.

4. Altitude

- a. ≤ 3000 m, derate power by 1% per 100 m between 1500 m and 3000 m.

5. Audible Noise Level at 100% Load

- a. $<65 \pm 2$ dBA measured 1 m from the surface of the unit.

1.05 Warranty

A. UPS Warranty

The UPS manufacturer shall warrant the unit against defects in workmanship and materials for eighteen months after the shipping date. Product shipment date is determined only from the bill of lading (refer document SL-71249_ Limited Warranty_3-Phase AC Power Product).

B. Warranty—End User

Warranties associated with items not manufactured by the UPS supplier but included as part of the system shall be passed through to the end user.

1.06 Quality Assurance

A. Manufacturer's Qualifications

The manufacturer shall have a minimum of 30 years of experience in the design, manufacture and testing of solid-state UPS systems. The quality system for the engineering and manufacturing facility shall be certified to conform to Quality System Standard ISO 9001 for the design and manufacture of power protection systems for computers and other sensitive electronics.

B. Factory Testing

1. Before shipment, the manufacturer shall fully and completely test the UPS unit to ensure compliance with the specification.
2. The UPS unit shall be tested at the system-specified capacity. Testing shall be done using load banks at part-load and the full kW rating of the unit.
3. Operational discharge and recharge tests shall be conducted to ensure performance.
4. System operations such as startup, shutdown, and transfers shall be demonstrated.

5. A certified copy of the test results shall be available for each system as indicated on the order.

1.07 Submittals

A. Proposal Submittals

Submittals with the proposal shall include:

1. Descriptions of equipment to be furnished, including deviations from these specifications.
2. Document stating compliance with FCC requirements.
3. Document stating listing to UL, including edition used for listing.
4. Document showing compliance with required SCCR and labeling.
5. System configuration with single-line diagrams.
6. Detailed layouts of customer power and control connections.
7. Functional relationship of equipment, including weights, dimensions, and heat dissipation.
8. Information to allow distribution system coordination.
9. Size and weight of shipping units to be handled by contractor.

B. Order Submittals

Submittals supplied at time of order shall include:

1. All the documentation presented with the proposal.
2. Detailed installation drawings including all terminal locations.
3. Interconnect wiring diagrams showing conduit wiring with terminal numbers for each wire.

C. UPS Delivery Submittals

Submittals upon UPS delivery shall include:

1. A complete set of submittal drawings.

2. One set of instruction manuals. Manuals shall include a functional description of the equipment, safety precautions, instructions, step-by-step operating procedures, and routine maintenance guidelines, including illustrations.

1.08 CONTRACTOR

- A. The Contractor shall accept complete responsibility for the installation, certification and support of the system. Contractor shall be an authorized vendor of all major components.
- B. All work shall be performed and supervised by Project Managers, Engineers and/or Technicians who are qualified to install system and perform related tests as recommended by the manufacturer and in accordance with the manufacturer's best practices and methods.
- C. Project Managers, Engineers and Technicians employed on this project shall be properly and fully trained and qualified by the manufacturer on the installation and testing of the equipment and systems to be installed.
- D. The Contractor shall have a proven track record in relevant similar system configuration and installation. This must be shown by the inclusion of references of at least three (3) projects involving the installation of similar systems completed by the Contractor in the prior two (2) years on unaltered forms with the sealed Bid Proposal as provided herein. Bid Proposal Form(s) may be duplicated as required in order to provide adequate space to list required number of reference installations for each division Bidder is responding to.

PART 2 - PRODUCT

2.01 Acceptable Manufactures (in alphabetical order)

A. VERTIV

1. Vertiv AMP2

- a. MODEL: 56SC030BNCNNA06 (Quantity 1)

1. DESCRIPTION: APM2 30 KVA Rated 15 KVA Cap W/ MBC

B. Or Equal

2.02 FABRICATION

A. Materials

All materials of the UPS shall be new, of current manufacture, high grade, and shall not have been in prior service except as required during factory testing. All active electronic devices shall be solid-state. All power semiconductors shall be sealed. Control logic and fuses shall be physically isolated from power train components to

ensure operational safety and to protect from heat. Minimum estimated life of the major components used in the UPS (includes fan and bus capacitors) shall not be less than 7 years.

B. UPS Internal Wiring

Wiring practices, materials, and coding shall be in accordance with the requirements of the National Electrical Code and applicable local codes and standards. All bolted connections of bus bars, lugs, and cables shall be in accordance with requirements of the National Electric Code and other applicable standards. All electrical power connections shall be torqued to the required value and marked with a visual indicator.

C. Field Wiring

All field wiring power connections shall be to tin-plated copper bus bars for connection integrity. Bus bars shall have adequate space to allow two-hole, long-barrel, and compression type lugs forming a permanent connection between field wiring and field- installed lugs. Provisions shall be made in the cabinets to permit installation of input, output and external control cabling using raceway or conduit. Provision shall be made for top and bottom access to input, output, bypass, and DC connections as per the technical specifications. In conformance with the NEC, connection cabinets shall provide for adequate wire bend radius.

D. Construction and Mounting

The UPS shall be housed in a NEMA Type 1 (IEC 60529, IP20) enclosure, designed for floor mounting. The UPS shall be structurally adequate and have provisions for forklift handling. Maximum cabinet height shall be 78.7 in. (2000 mm) for all UPS range.

E. Cooling

Forced air cooling shall be provided to ensure that all components are operated well within temperature ratings. Airflow shall be controlled according to load demand. If one of the cooling fans experiences a fault, the UPS shall be immediately notified of the condition through the user interface and through remote monitoring services.

2.03 EQUIPMENT

A. UPS System

The UPS system shall consist of an IGBT power factor-corrected rectifier, DC-DC converter and 3-phase, transformer-free I-type inverter, bypass static transfer switch, bypass synchronizing circuitry, protective devices, and accessories as specified. The specified system shall also include a battery disconnect breaker and battery system.

B. Surge Protection

The UPS shall have built-in protection against surges, sags, and overcurrent from the AC source. The protection shall meet the requirements of conducted radiation emission of FCC PART 15, ANSI C62.41.1 B3 including C62.41.1 and C62.41.2 and lightning protection requirements of YD/T944 and YD/T1095.

C. Output Protection

The UPS shall be protected against sudden changes in output load and short circuits at the output terminals. The UPS shall have built-in protection against permanent damage to itself and the connected load for all predictable types of malfunctions. Fast-acting, current-limiting devices shall be used to protect against cascading failure of solid-state devices. Internal UPS malfunctions shall cause the module to trip off-line with minimum damage to the module and provide maximum information to maintenance personnel regarding the reason for tripping off-line. The load shall be automatically transferred to the bypass line uninterrupted for an internal power modules malfunction. The status of protective devices shall be indicated on a graphic display screen on the front of the unit.

2.04 COMPONENTS

A. Rectifier

The term rectifier shall denote the solid-state equipment and controls necessary to convert alternating current to regulated direct current to supply the inverter and charge the battery. The DC output of the rectifier shall meet the input requirements of the inverter without the battery being connected.

1. Input Current Harmonic Distortion

2. The rectifier shall actively control and reduce input current distortion over the full operating range of the UPS without the need for an additional passive input filter. Input current THDi shall be less than 3% at rated linear loads and nominal voltage in double-conversion mode.

3. Dynamic Current Input Limit Reduction

The rectifier, in conjunction with the other UPS controls and circuitry, shall adjust the current demanded for battery charging as a function of UPS wattage load and input voltage level.

4. DC-DC Converter

The term DC-DC converter shall denote the equipment and controls to regulate the output of the rectifier to the levels appropriate for charging the battery and to

boost the battery voltage to the level required to operate the inverter. The DC-DC converter shall be solid-state, capable of providing rated output power and, for increased performance, shall be a pulse width- modulated design and shall utilize insulated gate bipolar transistors (IGBTs). The DC-DC converter shall control charging of the battery. The AC ripple voltage of the charger DC shall not exceed 1.4% RMS of battery voltage.

a. Battery Recharge

The rectifier/charger shall be capable of supplying an additional 15% power for recharging a fully discharged DC stored energy source for charging current with UPS at full load and input voltage at nominal. After the stored energy source is recharged, the rectifier/charger shall maintain the source at full charge until the next emergency operation.

b. Battery Equalize Charge

A manually initiated equalize charge feature shall be provided to apply an equalize voltage to the battery. The duration of equalize charge time shall be adjustable from 8 to 100 hours. A method shall be available to deactivate this feature for valve regulated battery systems.

c. Stop Battery Charging Function

Battery charging may be stopped by a shunt trip of the battery cabinet breaker when over temperature is sensed in the battery cabinet, on generator or when environmental contact is closed.

5. Overvoltage Protection

There shall be DC overvoltage protection so that if the DC voltage rises to the pre-set limit, the UPS shall shut down automatically and initiate an uninterrupted load transfer to bypass or shall disconnect the battery through the DC breakers in the battery string.

6. Temperature-Compensated Charging

The UPS shall adjust the battery charging voltage based on the battery temperature reported from external battery temperature sensors. When multiple sensors are used, the voltage shall be based on the average temperature measured. Excessive difference in the temperature measurements shall be reported and the charging voltage adjusted to protect the batteries from excessive current.

7. Battery Load Testing

The UPS shall be capable of performing battery load testing under operator supervision. The UPS shall be capable of testing the battery without risk of disrupting power to the critical load. The UPS shall display and log the result of the test with appropriate alarms if reduced battery capacity or battery failure is detected.

B. Inverter

The term inverter shall denote the equipment and controls to convert direct current from the rectifier or battery through the DC-DC converter to precise alternating current to power the load. The inverter shall be solid-state, capable of providing rated output power and, for increased performance, the inverter shall be a pulse-width-modulated design and shall utilize insulated gate bipolar transistors (IGBTs).

1. Overload Capability

The inverter shall be able to sustain an overload across its output terminals while supplying full rated voltage of up to 150% for 60 seconds. The inverter shall be capable of at least 250% current for short-circuit conditions including phase-to-phase, phase-to-ground, and 3-phase faults. After the fault is removed, the UPS shall return to normal operation without damage. If the short circuit is sustained, the load shall be transferred to the bypass source and the inverter shall disconnect automatically from the critical load bus.

2. Output Frequency

The inverter shall track the bypass continuously, providing the bypass source maintains a frequency of Nominal $\pm 10\%$.

3. Phase-to-Phase Balance

The inverter shall provide a phase-to-phase voltage displacement of no worse than ± 1.5 degrees with a 100% unbalanced load.

4. Inverter Fault Sensing and Isolation

The UPS shall be provided with a means to detect a malfunctioning inverter and isolate it from the critical load bus to prevent disturbance of the critical load voltage beyond the specified limits.

5. Battery Protection

The inverter shall be provided with monitoring and control circuits to protect the battery system from damage due to excessive discharge. Inverter shutdown shall be initiated when the battery voltage has reached the end of discharge voltage.

The battery end-of-discharge voltage shall be calculated and automatically adjusted for partial load conditions to allow extended operation without damaging the battery. Automatic shutdown based on discharge time shall not be acceptable.

C. Inverter Bypass Operation

When maintenance is required or when the inverter cannot maintain voltage to the load due to sustained overload or malfunction, a bypass circuit shall be provided to isolate the inverter output from the load and provide a path for power directly from an alternate AC (bypass) source. The UPS control system shall constantly monitor the availability of the inverter bypass circuit to perform a transfer. The inverter bypass circuit shall consist of a continuous duty bypass static switch and an overcurrent protection device to isolate the static bypass switch from the bypass utility source. The bypass static switch shall denote the solid-state device incorporating silicon-controlled rectifiers (SCRs) that can automatically and instantaneously connect the alternate AC source to the load.

1. Static Bypass Switch Rating

The static bypass switch shall be rated for continuous duty operation at full rated load for highest reliability without the use of mechanical devices as used with a momentary rated device.

2. Manual Load Transfers

A manual load transfer between the inverter output and the alternate AC source shall be initiated from the control panel. Manually initiated transfers shall be make-before-break, utilizing the inverter, and the bypass static switch.

3. Automatic Load Transfers

An automatic load transfer between the inverter output and the alternate AC source shall be initiated if an overload condition is sustained for a period more than the inverter output capability or due to a malfunction that would affect the output voltage. Transfers caused by overloads shall initiate an automatic retransfer of the load to the inverter only after the load has returned to a level within the rating of the inverter source and the alarm has been acknowledged.

4. Momentary Overloads

In the event of a load current inrush or branch load circuit fault more than the inverter rating, the bypass static switch shall connect the alternate AC source to the load for at least 100 milliseconds, allowing up to greater than 400% of the normal rated output current to flow. Output voltage shall be sustained to the extent the alternate AC source capacity permits. If the overload condition is removed before the end of the 100 milliseconds period, the bypass static switch

shall turn Off and the load shall remain on inverter power. If the overload remains, then a transfer to the alternate AC source is to be completed.

5. Back-Feed Protection

As required by UL1778 and CSA, the static transfer switch shall not back-feed UPS power to the bypass distribution system while the UPS is operating on battery during a bypass power outage. The purpose of this requirement is to prevent the risk of electrical shock on the distribution system when the normal source of power is disconnected or has failed. If a shorted SCR is detected, the static transfer switch shall be isolated by an external contactor-based circuit breaker and an alarm message shall be annunciate at the UPS control panel. The load shall remain on conditioned and protected power after detection of a shorted SCR and isolation of the bypass static switch.

6. ECO-Mode

When selected, this mode of operation shall transfer the load to the bypass source and maintain it there if the bypass source frequency, slew rate, and voltage are within the adjusted operating parameters. While in this mode, the inverter shall remain operating to demonstrate the ability to instantaneously assume the load without interrupting the output voltage. Should the bypass source go outside the adjusted limits, the bypass static switch shall turn Off, isolating the load from the bypass while the inverter assumes the full critical load. The load shall be transferred from the bypass source to the inverter while maintaining the output voltage within the ITIC and CBEMA curves. There is provision to activate this function through touch screen display.

D. Dynamic Online Mode

This functioning mode allows significant energy savings by operating with a typical efficiency above $98.9 \pm 0.2\%$ while providing power conditioning to the load.

1. Normal (VI)

The operating mode will depend on the quality of the mains supply in the short-term past and on the electrical characteristic of the load. If the line quality remains within permitted tolerance parameters and the load needs power conditioning, (THDi, THDv, PF) the power interface will provide continuous supply to the critical AC load while the inverter operates as series and parallel active filter. The IGBT inverter will be able to compensate the power factor of the load and the current harmonic distortion guaranteeing optimum power conditioning to the load while maintaining the highest level of efficiency.

2. Fast Transfer to VFI

Emergency (due to mains supply failure or variance beyond tolerance limits) if the bypass mains supply varies beyond tolerance levels (adjustable using the software) that cannot be compensated through the active filter, the load will be transferred from the direct line to the conditioned line, with Class 1 output performance. The load is powered from the mains through the rectifier and inverter, (provided the input mains remains within the tolerances stated in technical specifications). If the input mains fall below the lowest limit, the batteries will be used to power the load through the inverter.

3. Return to VI

When the mains supply returns within tolerance limits, the UPS will continue to supply the load through the conditioned line for a period dependent on the direct line failure rate (the conditioned line draws power from the mains not the battery). When the direct line has stabilized, the UPS returns to normal VI operation. The battery charger automatically begins to recharge the battery so that maximum autonomy is guaranteed in the shortest possible time.

E. Display and Controls

1. UPS Control Panel

Each UPS module shall be equipped with a 9 in. (229 mm) touch screen, graphical LCD display. That will automatically provide all information relating to the status of current of the UPS as well as display metered values. The display shall be menu-driven, permitting the user to easily navigate through operator screens. The flexibility shall also be provided to change the display arrangement and information displayed as per the user requirement.

2. Logic

UPS system logic and control programming shall reside in a microprocessor-based control system with non-volatile flash memory. Rectifier, inverter, and system control logic shall utilize high-speed digital signal processors (DSPs). CAN bus shall be used to communicate between the logic and the User Interface as well as the options. Switches, contacts, and relays shall be used only to signal the logic signals shall be isolated from the UPS logic by relays or optical isolation.

3. Metered Values

A microprocessor shall control the display and memory functions of the monitoring system. All three phases of 3-phase parameters shall be displayed simultaneously. All voltage and current parameters shall be monitored using true RMS measurements for accuracy to $\pm 2\%$ of AC voltage, $\pm 5\%$ AC current, $\pm 0.1\%$ AC frequency, $\pm 5\%$ battery voltage, and $\pm 5\%$ battery current.

The following parameters shall be displayed:

- a. Input voltage, line-to-line.
- b. Input current per phase.
- c. Input frequency.
- d. Input power factor.
- e. Battery voltage.
- f. Battery charging/discharging current.
- g. Output voltage, line-to-line.
- h. Output frequency.
- i. Bypass input voltage, line-to-line.
- j. Bypass input frequency.
- k. Load current.
- l. Load real power (kW), total and percentage.
- m. Load apparent power (kVA), total, and percentage.
- n. Load percentage of capacity.
- o. Battery temperature, each battery string.
- p. Battery state of charge.
- q. Real time efficiency curve
- r. Crest Factor

4. Power Flow Indications

A power flow diagram shall graphically depict whether the load is being supplied from the inverter, bypass or battery and shall provide, on the same screen, the status of the following components:

- a. AC Input Circuit Breaker (optional).

- b. Battery Circuit Breaker, each breaker connection of complete battery complement, complete disconnection, and partial connection (one or more, but not all breakers open).
- c. Maintenance Bypass Status.

5. Main Display Screen

The following UPS status messages shall be displayed:

- a. Rectifier (Off/Soft Start/Main Input On/Battery Input On).
- b. Input Supply (Normal Mode/Battery Mode/All Off).
- c. Battery Self-Test (True/False).
- d. Input Disconnect (Open/Closed).
- e. EPO (True/False).
- f. Charger (On/Off).
- g. Output Disconnect (Open/Closed).
- h. Maintenance Disconnect (Open/Closed).
- i. Bypass Disconnect (Open/Closed).
- j. Inverter (Off/Soft Start/On).
- k. Bypass (Normal/Unable to Trace/Abnormal).
- l. Output Supply (All Off/Bypass Mode/Inverter Mode/Output Disable).
- m. Inverter On (Enable/Disable).

6. HMI Control Buttons

Buttons shall be provided to start and stop the inverter. A pop-up message requesting confirmation shall be displayed whenever a command is initiated that would change the status of the UPS. Other buttons shall be provided to reset faults and silence the alarm buzzer.

7. Event Log

This menu item displays the list of events that have occurred recently while the UPS was in operation. The Event Log stores up to 4096 records, with the oldest events being overwritten first if the log's capacity is reached.

8. Battery Status Indicator

A battery status indicator displays DC alarm conditions, temperature, battery state of charge, the present battery voltage, total discharge time, status of last battery test, and battery time remaining during discharge.

The UPS provides the operator with controls to perform the following functions:

- a. Configure and manage manual battery test.
- b. Modify test duration and minimum voltage.
- c. Start battery test.
- d. Monitor test status and progression.
- e. Stop battery test.
- f. Battery test status.

9. Alarms

The following alarm messages shall be displayed:

- a. Mains Voltage Abnormal.
- b. Mains Under voltage.
- c. Mains Frequency Abnormal.
- d. Charger Fault.
- e. Battery Reversed.
- f. No Battery.
- g. Parallel Common Fail.
- h. Bypass Unable to Track.
- i. Bypass Abnormal.

- j. Inverter Asynchronous.
- k. Fan Fault.
- l. Control Power Fail.
- m. Unit Overload.
- n. System Overload.
- o. Bypass Phase Reversed.
- p. System overload.
- q. Transfer Time-Out.
- r. Load Sharing Fault.
- s. Bypass Over Current.
- t. DC Cap Life Pre-warning.
- u. DC Cap Life Warning.
- v. Fan Life Pre-warning.
- w. Fan Life Warning.
- x. Intelligent Parallel Mode Active.
- y. Input Neutral Lost.
- z. Loss of Redundancy.
- aa. Multi Module System Inverter Manual ON

10. Controls

System-level control functions are:

- a. Start Inverter (and transfer to inverter).
- b. Stop Inverter (after transferring to bypass).
- c. Startup Screen.

- d. Battery Test Set Point Adjustment.
- e. Configure Manual Battery Test.
- f. Initiate Manual Battery Test.
- g. System Settings (Time, Date, Language, LCD Brightness, Password, Audio Level).
- h. Alarm Silence Command.
- i. Fault Reset Command.
- j. Energy Saving Modes.
- k. Warning and Critical Thresholds of Load and Battery.

11. Manual Procedures

- a. Load Transfers: HMI buttons (START INVERTER and STOP INVERTER) provides the means for the user to transfer the load to bypass and back on UPS.

12. Self-Diagnostics

- a. **Event Log File:** The control system shall maintain a log of the event conditions that have occurred during system operation. Each log contains the event name, event time/date stamp, and a set/clear indicator.
- b. **Fault Waveform Capturing:** Records 3 cycles data of voltage/current of rectifier/inverter/bypass when fault triggers, in 3 cycles of recorded data, 2 cycle of data shall be captured before trigger point, 1 cycle of data shall be captured after fault trigger point.

F. Remote Monitoring and Integration Capabilities

Vertiv™ LIFE™ Services 24×7 Remote Monitoring Services: The UPS manufacturer shall provide as an optional service, which provides 24x7 continuous monitoring of events and parametric data, event and data analysis reports, and dispatch of factory trained field service personnel. The UPS can initiate periodic and critical event-driven communication with a remote service center to transfer event and parametric data for analysis and action. The remote service centers are staffed with factory-trained service personnel who can receive, analyzing, and interpreting the communicated events and data. In case of any anomalies, the remote service center personnel will dispatch factory-trained field

service personnel with necessary tools and accessories to the location of the UPS to fix the problem.

1. **Communication Cards:** The UPS shall be equipped with following communication cards including:
 - a. **Vertiv™ Liebert® IntelliSlot™ IS-UNITY-DP Communication card:** This card provides Web access, environmental sensor data, and third-party customer protocols for the UPS and manage a wide range of operating parameters, sending data over ethernet networks through secure HTTPS protocol and alarms and notifications through SNMP traps or Modbus protocol. It is also capable to integrate with any existing building management system.
 - b. **Software:** Provided to support the monitoring of multiple number of UPS systems at single console platform.
 - c. **Relay Card:** Dry contact outputs are provided for Summary Alarm, Bypass Active, Low Battery, and AC Input Failure.
2. **Power Assist Software**
 - a. Contractor is responsible for configuration of Power Assist Software used to monitor UPSs and to gracefully shutdown an IT device when the UPS battery backup experiences a threatening condition.
3. **Customer Input Contacts:** The UPS shall have four discrete input contacts available for the input and display of customer-provided alarm points or to initiate a pre-assigned UPS operation. Each input can be signaled by an isolated, external, normally open contact. When an assembly is selected as a pre-assigned UPS operation, the following actions should be initiated:
 - a. On Generator: Provides selectable choices to enable or disable battery charging and enable or disable ECO Mode operation while on generator.
 - b. Transfer to Bypass: Manual command to transfer from inverter operation to static bypass operation.
 - c. Fast Power Off: Emergency Module Off (EPO) command to stop UPS operation.
 - d. Acknowledge Fault: Acknowledge a UPS alarm condition and present faults will be reset.
 - e. Bypass/Inverter Off: Emergency Power Off (EPO) command to stop UPS operation.
 - f. External Maintenance Bypass Breaker (MBB) status (open or closed).

G. Battery Disconnect Breaker

The battery cabinet shall have a properly rated circuit breaker to isolate it from the UPS. This breaker will be in a separate enclosure or in a matching UPS/battery cabinet. When this breaker is open, there shall be no battery voltage in the UPS enclosure. The UPS will be automatically disconnected from the battery by a shunt trip of the battery cabinet breaker when signalled by other control functions.

H. UPS Integrated Maintenance Bypass Breakers (Optional)

The UPS system shall incorporate a four breakers maintenance bypass breaker system (RIB, MIB, BIB, and MBB) with mechanical interlock for breaker sequence safe operation providing power isolation to top power section (power input top entry) of UPS. User can safely maintain critical maintenance components including control module, power module, static switch (bypass module), and internal battery modules. Includes mechanical interlock with safety switch for safe operation transfer to bypass mode.

I. Maintenance Bypass Cabinet (Mandatory Alternate)

The UPS system shall incorporate a matching cabinet to house a wraparound maintenance bypass with the following features:

1. 3 or 4 breakers for complete electrical isolation of the UPS with system voltage.
2. Optional Kirk Key Interlock interface with solenoid key release unit (SKRU).

J. Valve-Regulated, Lead Acid Battery VRLA (Mandatory Alternate)

1. The UPS system shall be provided with a valve-regulated, lead acid battery plant.
2. The battery shall be fully charged per the manufacturer's instructions during startup and shall demonstrate the specified operating time.

K. External VRLA Traditional Battery Cabinet

1. The battery cabinet shall be same height and depth as UPS module and provide capability for mechanical connection to the UPS and include castors for ease of installation.
2. The battery cabinet shall consist of sealed, valve-regulated batteries, a circuit breaker for isolating the battery from the UPS and a control interface to the UPS module.
3. The circuit breaker shall be sized to allow discharge at the maximum published rating of the battery. The interface to the UPS module shall provide status and thermal data to allow the UPS to regulate the charging voltage and inhibit the conditions associated with battery thermal runaway. If the temperature measurement in a battery cabinet indicates that thermal runaway is occurring, then the UPS controls shall isolate the cabinet from the charger by tripping the battery

breaker in that cabinet while leaving the other battery cabinets connected to allow UPS operation during a loss of power to the rectifier.

4. The battery cabinet shall be rated NEMA 1, matching the UPS style and design.
 - a. Battery Cabinets Connected Directly to the UPS: The manufacturer shall provide all power and control parts necessary to connect the UPS to the battery cabinets.
 - b. Battery Cabinets Separated from the UPS: The manufacturer shall provide all power and control parts necessary to interconnect the battery cabinets. The installer shall provide all cabling necessary to interconnect the UPS and the battery cabinets.
5. Both overhead and under-floor site installed cabling shall be accommodated. Cable installation shall not require removal of batteries or any other battery cabinet assemblies.
6. The battery shall be lead-calcium, sealed, valve-regulated type with a minimum three years full warranty and a seven years pro rata warranty under full float operation. The battery design shall utilize absorbent glass mat (AGM) technology to immobilize the electrolyte.

L. Reliability and Serviceability

1. Mean time between failure (MTBF)

The calculated mean time between failure for the UPS is expected to meet or exceed 170k hours when operated at an ambient temperature of 77 °F (25 °C) and 100% resistive load.

2. Mean time to repair (MTTR)

The UPS will be designed for an approximately 0.5 hours replacement MTTR by the service engineer at the customer site.

3. Service Access

Front only, all standard configuration serviceable parts shall be from the front of the UPS with door open 90 degrees.

4. Expected Operational Life Critical Components

- a. UPS Life 15 to 20 years of life.
- b. AC caps: 20 years of life for 100% load (77 °F (25 °C), humidity: 50%).
- c. DC caps: 15 years of life for 100% load (77 °F (25 °C), humidity: 50%).

- d. Fans 5 to 7 years of life.
- e. Battery System History and Life Information, UPS shall maintain for each battery string the install dates, number of discharges, and duration of discharges to determine the life of the battery string and overall battery system.
- f. Power Module and Battery String Management, The UPS shall maintain the history of each power module and battery string for the life of the UPS. Only the installed modules and existing battery strings are used in the UPS life calculation.
- g. Power Module History and Life Information, UPS shall maintain the power module install date, number of run hours, and duration of elevated ambient temperatures which reduce the life of the UPS.

5. DC Ground Fault

The UPS shall provide a method to detect and annunciate battery DC ground faults, in order to facilitate proactive resolution of such ground faults. The UPS can be configured to allow the circuit breaker to open or remain closed upon detection of a ground fault.

2.05 ALLOWANCES

- A. Contractor shall include allowances for equipment and/or other contract service reimbursements as required below in base bid lump sum amount(s). Equipment and/or contract services shall be provided and sourced at Owner's discretion and convenience with full cooperation by Contractor and paid for from successful bidder's contract in the amount(s) provided for herein. Any allowance amount proving to be excessive for the intended equipment and/or contract services shall be credited to the Owner against contract payment requests.
 - 1. Allowance shall be made in the amount of \$15,000 for contract services related to supply, installation, and connection of contingency upgrades.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

The following inspections and test procedures shall be performed by factory-trained field service personnel during the UPS startup.

1. Visual Inspection

- a. Inspect equipment for signs of damage.

- b. Verify installation per drawings supplied with installation manuals or submittal package.
- c. Inspect cabinets for foreign objects.
- d. Verify that neutral and ground conductors are properly sized and configured per OEM requirements as noted in OEM drawings supplied with installation manuals or submittal package.
- e. Inspect each battery jar for proper polarity.
- f. Verify that all printed circuit boards are configured properly.

2. Mechanical Inspection

- a. Check all control wiring connections for tightness.
- b. Check all power wiring connections for tightness.
- c. Check all terminal screws, nuts, and/or spade lugs for tightness.
- d. Electrical Inspection
- e. Check all fuses for continuity.
- f. Confirm input and bypass voltage and phase rotation are correct.
- g. Verify control transformer connections are correct for voltages being used.
- h. Verify connection and voltage of the battery strings.

3.02 UNIT START UP

- A. Energize control power.
- B. Perform control/logic checks and adjust to meet the manufacturer's specification.
- C. Verify DC float and equalize voltage levels.
- D. Verify DC voltage clamp and overvoltage shutdown levels.
- E. Verify battery discharge, low battery warning, and low battery shutdown levels.
- F. Verify fuse monitor alarms and system shutdown.

- G. Verify inverter voltages and regulation circuits.
- H. Verify inverter/bypass sync circuits and set overlap time.
- I. Perform manual transfers and returns.
- J. Simulate utility outage at no load.
- K. Verify proper recharge.

3.03 MANUFACTURER'S FIELD SERVICE

1. Service Personnel

The UPS manufacturer shall directly employ a nationwide service organization, consisting of factory-trained field service personnel dedicated to the startup and maintenance of UPS and power equipment.

The manufacturer shall provide a national dispatch center to coordinate field service personnel schedules. One toll-free number shall reach a qualified support person 24 hours/day, 7 days/week, and 365 days/year. If emergency service is required, on-site response time shall be 4 hours or less within 150 miles of a Vertiv Services center.

Two local customer engineers shall be assigned to the site with a regional office as a backup. Escalation procedures shall be in place to notify Power Technical Support if a site is not functioning within 24 hours.

2. Replacement Parts Stocking

Parts shall be available through an extensive network to ensure round-the-clock parts availability throughout the continental United States.

Spare parts shall be stocked by local field service personnel with backup available from regional parts centers and the manufacturing location. A customer support parts coordinator shall be on call 24 hours a day, 7 days a week, 365 days a year for immediate parts availability.

3.04 MAINTENANCE CONTRACT

A complete offering of preventive and full-service maintenance contracts for both the UPS system and battery system shall be available.

3.05 TESTING

- A. In an effort to ensure a smooth "turn-up" of the new system Contractor shall submit to a thorough testing process as defined herein prior to cut-over.

- B. Prior to requesting testing by Designer, the Contractor shall use adequate means to assure the work is completed in accordance with the specified requirements, meets the owner's specific application requirements and is ready for functionality and integrity testing.
- C. Testing Procedures
1. Prior to system "turn-up", Contractor shall submit a written request to Architect indicating they have completed full and final configuration of the system, and are ready to have system integrity and functionality tested.
 2. Within reasonable time after receipt of request, Architect will provide a test schedule and coordinate testing date(s) with Owner and Contractor.
 3. Should Architect determine the Work is not acceptably configured or not of adequate integrity:
 - a. Architect promptly will so notify Contractor, giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.
 - b. Contractor shall then expeditiously remedy the deficiencies and notify Architect in writing when ready for re-testing.
 - c. Architect will schedule re-test of the Work.
 - d. Excessive re-testing of Work may result in fees being assessed Contractor.
 4. Should Architect and Owner concur the Work is configured properly and system integrity is as required:
 - a. Architect will review Contractors detailed "turn-up" plan, and upon finding it acceptable issue a memorandum of Testing Completion to Owner and Contractor after which system "turn-up" can proceed.

3.06 DOCUMENTATION

- A. Contractor shall provide Owner as-built drawings and manuals of all equipment installed, warranty and maintenance information and other information the Contractor, Architect and/or Owner deem necessary. Documentation shall also be provided in a digital format in file formats and on media as specified by Owner and/or Architect.
- B. Contractor shall be responsible for providing thorough, timely documentation on all hardware, software. Documentation shall include, but not be limited to:
1. Equipment description.
 2. Equipment make.

3. Model number.
4. Software release.
5. Date installed.
6. Manufacturer's warranty.
7. Maintenance contract terms.
8. Verification of maintenance contract engagement.
9. Telephone numbers for service and support.
10. Detailed technical support and service procedure instructions.
11. All product (hardware and software) manuals and manufacturer supplied documentation, including, but not limited to owner manuals, system administrator manuals and configuration guides. Where number of duplicate copies for particular manual or documentation item could be reasonably considered excessive, Contractor shall request direction from Owner and Architect.
12. Photocopy of original invoice listing make and model for all components and equipment from individual manufacturer(s), distribution source(s), or authorized agent(s) to establish manufacturer warranty start date for potential use after end of contract warranty provisions.
13. System Configuration Report.
14. Complete inventory of installed hardware and system software. Hardware inventory shall include, but not be limited to, model numbers, serial number, physical installation location and software/firmware options.
15. Complete record of all system and administrative passwords for full operation and administration of all system components and operations.

3.07 SITES OF WORK

1. Rockford Freshman Center
4500 Kroes
Rockford, MI 49341

3.08 TRAINING

- A. Contractor shall provide physical on-site training for the Owner designated system administrator(s). Owner shall designate up to four (4) system administrators to be trained. Training shall be a minimum of two (2), four (4) hour session(s) in length, at

the convenience of the Owner personnel, and of sufficient duration to satisfactorily complete training on all system administration functions including, but not limited to:

1. Basic configuration and system administration of the installed system
2. Basic trouble shooting of the installed system and components including diagnostic and problem resolution actions.
3. System back-up and restore functions and procedures for all system parameters and configurations.
4. Review of system alerts, logs and monitoring of configuration parameters including, but not limited to, configuration changes and device status.
5. System database updates and maintenance.
6. Review standard system reports
7. Configuration of Power Assist Software and associated training.

3.09 SCHEDULE, MEETINGS AND PLANS

- A. Planned sequence of operations shall be established by the Contractor within the guidelines established by the Owner, as required herein and as required to meet schedules.
- B. Schedule
 1. Post bid Interviews: November 24, 2026
 2. Contractor Chosen: December 14, 2026
 3. Work Commences: From issue of Purchase Order or Notice to Proceed
 4. Substantial Completion of Project: July 23, 2026
 5. Project Close-out: August 2026
- C. All work shall be coordinated with Owner's construction manager on site.
- D. Project progress meetings shall be held, but not limited to, weekly at a site and time identified as convenient for Owner and as required herein. Meetings will be attended as required herein.