DESIGN SPECIFICATION SHEET
DC COUPLED ENERGY STORAGE SYSTEM

(YOTTA BLOCK + DPI-208 or DPI-480 Microinverters)

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Summary

1) The Yotta DC-coupled energy storage is comprised of the following components/features:

    a) A four (4) channel Microinverter (DPI-208 or DPI-480) designed for commercial three-phase 208V and 480V grid connection (Data sheet available).
    b) The YOTTA BLOCK is a panel-level, modular, self-contained DC-coupled, Lithium Iron Phosphate ($LiFePO_4$) energy storage module for demand charge reduction and Time of Use (TOU) applications in commercial and industrial interconnections (Data sheet available).
    c) The Yotta DPI Microinverters and YOTTA BLOCK both have communication gateways which show system status through a web platform; ECU-R and SL-GW gateways are required (Data sheets available).

Submittals

1) Submittal shall be provided including the following items.

    a) Contractor supplied bill of materials which includes the DPI Microinverter and (YOTTA BLOCK) battery system meeting AC power and energy storage requested.
    b) Product specification sheets indicating general device descriptions, dimensions, electrical specifications, wiring details, and nomenclature.
    c) Installation drawing showing connection points and wiring connection points for power and data connections.
    d) Contractor installation information (must be completed before start-up).
    e) Service options including parts warranties, parts and labor warranties, and preventative maintenance schedule by authorized technicians.

Approvals

1) Prior approval from the owner's representative is required for products or systems manufactured by other companies.

2) Any alternate product or system that has not received prior approval from the owner’s representative at least 10 days prior to submission of a proposal package shall be rejected.

3) Alternate products or systems require submission of catalog datasheets, system overview documents, and installation manuals to the owner's representative. (System Integration)

Quality Assurance

1) Product Qualifications:

   a) System electrical components shall be listed or recognized by a nationally recognized testing laboratory (e.g., UL or CSA) and shall be labeled with required markings as applicable:
   b) All work must follow current National Electrical Code requirements:
      i) NFPA 855, "Standard for the Installation of Stationary Energy Storage Systems"
   c) Battery cell:
      i) UL 1642 "Standard for Lithium Batteries"
   d) Yotta Energy YOTTA BLOCK module-level energy storage module:
      i) The YOTTA BLOCK meets UL 1973 "Batteries for Use in Light Electric Rail Applications and Stationary Applications".
      ii) The YOTTA BLOCK is certified to UL 9540 "Energy Storage Systems and Equipment", and the report is available.
      iii) The YOTTA BLOCK is certified to UL 9540A "Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems and the report is available. Please note that the YOTTA BLOCK is self-contained, fireproof and does not need a fire protection system.
      iv) Appendix JA12 – Qualification Requirements for Battery Storage System (2022 version).

2) Yotta DPI Microinverters meet all grid interconnection standards, as applicable to the project as a whole:

   a) Institute of Electrical and Electronics Engineers (IEEE) 1547
   b) UL 1741 SA/SB, "Standard for Static Inverters and Charge, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources".

3) Other codes and standards that will apply include:

   a) UN 38.3 "Certification for Lithium Batteries" (Transportation)
   b) NFPA 855 Compliant
   c) American National Standards Institute (ANSI) C12.1 (electricity metering)
   d) American Society of Civil Engineers (ASCE)-7 Minimum Design Loads for Buildings and Other Structures
   e) All components and the facility where the product is manufactured must be RoHS compliant.

      (1) Installation and Startup Qualifications

(2) System startup and commissioning shall be performed by the installer.
(3) Service and Support Requirements
    (a) Phone Support: Toll-free technical support shall be available.
    (b) Remote Troubleshooting (System comms).
    (c) Service Contract: All work to be done by the BESS manufacturer.

4) Project Conditions

a) The Yotta DPI Microinverters and the YOTTA BLOCK are sealed to NEMA 4X and are designed for outdoor installation. The gateways can be mounted inside the building or housed in a NEMA 3R cabinet(s).
b) Equipment shall not be subjected to dust, debris, moisture, or temperature and humidity conditions exceeding the requirements indicated above or as marked on the product, at any point before installation.
c) Only properly rated equipment and enclosures, installed per the manufacturer's instructions, may be subjected to dust and moisture following installation.

5) Warranty

a) The YOTTA BLOCK provides a ten-year (10) warranty. Coverage shall begin on the date of commissioning the system.
b) The hardware warranty shall cover the repair or replacement (RMA) of any defective products within the warranty period.

6) Maintenance & Sustainability

a) The manufacturer shall make available to the owner upgrades, and/or replacements available for a minimum of ten (10) years following installation.

Equipment

1) Manufacturers

a) Acceptable Manufacturers
    i) Yotta Energy Inc.

2) System Architecture

a) The Yotta Energy BESS shall consist of the following major components.
    i) Yotta DPI Microinverter (208 or 480V) which converts DC power to AC power to 3-phase, 208V/480V.
    ii) The YOTTA BLOCK Energy Storage module stores the energy that is supplied from the solar modules and makes it available to the Yotta DPI

Microinverters when called to provide the energy to the user's system load.

iii) Safety – The Yotta Ecosystem is designed from the ground up for safety. Additional documentation can be requested through Yotta Energy's website (www.yottaenergy.com) and/or a sales representative.

3) Yotta DPI Microinverters Microinverter

a) Each Yotta DPI Microinverter device is often referred to as the power conversion device. The Yotta DPI Microinverters convert the DC input power including Yotta Energy's (YOTTA BLOCK) into AC power to be used by the user's system loads.
b) The Yotta DPI Microinverters datasheet can be requested through Yotta Energy's website (www.yottaenergy.com) with highlights shown below:
   i) DPI (Dual Power Microinverter) designed to work with PV and Yotta's (YOTTA BLOCK) Energy Storage System.
   ii) Native 3-Phase output (208V & 480V).
   iii) Low voltage DC input (<60V).
   iv) 4 Solar module input channels, 2 MPPT's .
   v) Continuous rated AC output power 1728VA at 208V and 1800VA at 480V.
   vi) Engineered for high-capacity PV modules.
   vii) Maximum input current 20A.
   viii) Integrated safety protection relay.
   ix) Rapid Shutdown Complaint.
   x) Adjustable Power Factor.

4) YOTTA BLOCK modular energy storage module.

a) The YOTTA BLOCK Energy Storage System is Lithium Iron Phosphate ($LiFePO_4$) chemistry. It has a nominal energy storage of 1kWh. The modular design means just adding ESS units to meet desired capacity (retrofittable system). For example, 100 kWh needs 100 YOTTA BLOCK batteries. The unit can be cycled daily. After 10 years of daily cycling the Yotta will meet; provide no less than 70% of 1kWh per module.
b) Yotta Energy warrants the YOTTA BLOCK capacity and provides remedy if there should be a shortfall before unlimited daily cycles for 10 years.
c) The Yotta Energy BESS is a safe electrical low voltage (SELV) grouping as defined by UL60950; below 60Vdc.
d) Each YOTTA BLOCK battery has SoC (State of Charge) balancing and thermal management technology.
e) Thermal separation between individual cells in the YOTTA BLOCK is designed to avoid thermal coupling between cells.
f) The YOTTA BLOCK is self-contained and does not require external cooling. Its patented thermal management system manages individual cells and internal electronics.
g) The operating temperature range is: -20 to 60ºC (-4 to 120ºF) Max continuous.

5) System Specification

    a) The Yotta Energy System – including Yotta DPI Microinverters and the YOTTA BLOCK Energy Storage System is very safe since it is not housed in a common cabinet which concentrates the battery cells in a big box. Each Yotta product is self-contained with metal enclosures protecting the site from all 9450A tested failures (Distributed system).

6) The YOTTA BLOCK datasheet can be requested through the Yotta Energy website with highlights shown below.

    a) Best-in-class fire safety.
    b) Plug-and-play for simplified deployment.
    c) Low Voltage DC architecture (<60V).
    d) Single-phase or 3-phase (208V or 480V) options -Engineered for high-capacity PV modules -Light-weight design for ease of handling during installation.
    e) High-efficiency DC-coupled architecture delivers more savings.
    f) Modular design that can expand to meet the changing needs of buildings.
    g) Compliance; see Yotta Energy's YOTTA BLOCK data sheet.
    h) Auxiliary Power – The ESS does not require auxiliary power, although, power for the gateway (SL-GW) is required (110-120V)
    i) The BESS does not need regular maintenance.
    j) The BESS does not need a fire suppression system.
    k) The SL-GW (gateway) can provide a single communication interface via CAT6 cable; local WiFI network keeps the system synced. Cellular network upon request available.

7) Basic Control

    a) The BESS shall be installed in the default operation mode to allow charging only from an on-site photovoltaic system when the photovoltaic system production is greater than the on-site electrical load. The BESS shall discharge only when the photovoltaic (PV) system production is less than the on-site electrical load.

8) Time of Use (TOU) Control

    a) The battery storage system shall be installed in the default operation mode to allow charging from an on-site photovoltaic system. The BESS shall begin discharging during the highest-priced TOU hours of the day. The operation schedule shall be pre-programmed from the factory, updated remotely, or programmed during the installation/commissioning of the system.

Execution

1) Installation Requirements

a) Installation Procedures and Verification
    i) The successful bidder shall review all required installation and pre-startup procedures with the manufacturer's representative through pre-construction meetings.
    ii) The successful bidder shall install and connect the BESS according to the manufacturer's installation instructions, wiring diagrams, the project submittals and plans specifications while complying to all applicable local codes.
b) Coordination with owner's IT Network Infrastructure
    i) The successful bidder is required to coordinate with the owner's representative to secure all required BESS data connections to the owner's IT network infrastructure.
c) Documentation and Deliverables
    i) The installing contractor shall be responsible for documenting the installed location of the BESS system and all electrical components feeding the BESS.

2) System Startup

a) Upon completion of installation by the installer, including completion of all required verification and documentation required by the manufacturer, the system shall be started up and programmed by the installer and/or Yotta Energy.

3) Project Turnover

a) System Documentation
    i) The installer shall submit a software database file with desired device labels and notes completed.
    ii) Installing contractor to grant access to the owner for the programming setup.
b) Owner Training and Responsibilities
    i) Options for onsite training for owner and designated attendees to be included in the submittal package.
    ii) The installer and end customer will come to a continued monitoring agreement post-installation. Yotta will support installer/direct purchaser inquiries only.