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Solar Energy and Energy Storage Development

Modular Expandable Transportable Energy System (METES)
STANDARD SPECIFICATIONS

System Overview. The METES System is comprised of a single Master enclosure with options for up to three additional interconnected Solar Slave Enclosures to form a 4-Module Cluster. Multiple METES Clusters can be interconnected to form larger commercial sized systems. The Basic Master METES enclosure houses 8 kW/DC of solar capacity. The METES Hybrid version contains 7.6 kW of Lithium Ion energy Storage (expandable up to approx 75kWh), and optional generator or generator-ready features. Each Slave unit adds 8.0 kW/DC of solar capacity to the system. The solar panels and racking are stored and secured inside the enclosures for shipment, and once the solar panels have been installed, the Master unit has 12 feet of usable space that can be used for storage, integrated equipment, or for living/work spaces. The slave units are totally empty and are also available for other purposes. The METES Hybrid is intended to be

operated either off-the-grid or as a grid-tied energy backup system. The solar-only version is intended to be grid-tied only.

METES Hybrid Master Standard Specifications.

METES Enclosure. 20' x 8' x 8.5' (lwh) transportable enclosure. Shippable by truck, rail, ocean vessel, or Military Airlift, and can be stacked in an operational configuration up to two units high. NOTE: When stacked, only the top METES unit can be used with solar capability, while the bottom unit would be used for other purposes such as added energy storage, for integrated equipment, or for work/living space. The basic enclosures are standard ISO one-trip shipping containers that have been modified for the METES. Also available at a higher price are new enclosures designed on the same ISO shipping container format but are not certified as ISO Shipping Containers. Both systems use a fully self-supporting box steel frame with smooth steel sides treated with MilSpec Chemical Agent Resistant Coating (CARC). CARC is a durable polyurethane paint system developed by the military for use on vehicles and equipment.

The underneath portion is an outdoor rated plywood treated against insects and undercoated with a waterproof protective barrier. Equipment compartment interior walls and ceilings of the Master enclosures are sprayed with foam insulation and covered with 5/8" plywood. The Master unit has two compartments each with high security access doors. The larger 12-ft long rear compartment has two 48" wide lockable shipping container doors. The 8-ft long front compartment has a single 42" steel commercial security door on the side wall and has egress capability. The front equipment compartment houses the Main Distribution Panel (MDP), the Load Panel, Inverter(s), and optional equipment and batteries (for the Hybrid METES Model). For systems equipped with optional generators, these systems include an Automatic Transfer Switch (ATS)/MDP combination, and an exterior ground-mounted generator available in a variety of kW sizes. All METES units are equipped with fan-forced ventilation. Optional mini-split HVAC is available.

The Slave enclosures have a single compartment and a single high security rear access door. Like the Master units, the exterior is coated with MilSpec Corrosion Protective paint and the underside coated with a protective barrier. The Slave Enclosures, however, do not have lined walls or ceilings, and are not insulated (although those are options for an added charge). The treated plywood floors are standard on the Slave Enclosures.

Standard Solar Array. The METES is designed to be a mounting base for the 8 kW/DC solar array. Premeasured and cut commercial grade racking components attach to the roof. The standard mounting system is the Unirac ULA system adapted for this purpose. The standard solar panel is an "A" brand high efficiency panel in the 400 watt range. 20 solar panels attach to the ULA racking system. The solar panels connect electrically by means of a prefabricated pair of wiring harnesses that are housed in protective compartments for shipping. Connecting the harnesses to the solar panels require only the removal of the compartment covers, extending the harnesses, inserting the harnesses into the provided rail-mounted wireways, then connecting the solar connectors to the solar panels. The plug-and-play solar panel harnesses are designed to be easily connected to the correct solar panels.

Standard Hybrid METES Equipment. The standard Hybrid METES system is based on the 48 volt/DC SMA Sunny Islands using four Sunny Islands rated at 50 amps each and providing a total of 200 Amps of AC capacity at 240 volts. A number of Hybrid options are available to include a single Sunny Island version rated at 50 Amps/120 volts AC; 2 Sunny Islands rated at a total of 100 Amps/240 volts AC; 3 Sunny Islands rated at a total of 150 Amps/208 Three-Phase; or larger systems up to 100 kW/three-phase. The Standard METES Master Unit (Hybrid or Solar-Only) are equipped with a single SMA 8 kW Sunny Boy Inverter. Larger customized systems are available upon request.

MilSpec Lithium Ion Batteries. The METES Hybrid and Battery Energy Storage Systems are equipped exclusively with Simpliphi Lithium Ion Batteries. These batteries were chosen for their rugged design, long life, and high level of safety. Two 3.8kW, 48-Volt DC Simpliphi Batteries are standard in the METES Hybrid. Additional batteries (to include commecial shelf mounting) are available as options at additional cost.

Standard Electrical Service Equipment. The Standard METES Master units are manufactured by Square D and rated at 200 Amps. Other components are sized for the DC capacity of the system. All internal wiring and equipment is installed per the most current National Electrical Code.

Grounding. Once delivered, the enclosure is connected to earth grounds by means of two 8-foot stainless steel ground rods (included in the stored components). The ground rods are installed at the destination as part of the assembly process. The enclosure, all solar panels, all solar mounting rails, and all internal equipment are interconnected to a system-wide grounding system.

Load Servicing Feeders. The METES Master and Slave units are equipped with wireways (gutters or large junction boxes) with rigid conduit stubouts for electrical feeders. These stubouts are for three types of feeders: One type is to interconnect the individual Slave units to the Master; another type is to connect the Master to the utility company meter (if the grid-tied configuration is used); and the third connects the Master unit to the end loads (such as a building or house). THESE FEEDERS ARE NOT INCLUDED WITH THE METES SYSTEM AND MUST BE INSTALLED BY QUALIFIED ELECTRICIANS AT THE END LOCATION. Recommended feeders are 200 Amp rated underground direct burial feeder cable or 200 Amp rated conductors in schedule 40 PVC.

Generator Options. METES Master units can be equipped with optional generators of various sizes and fuel types, and if the generator option is chosen, the MDP (Main Distribution Panel) for this option is an upgraded 200 Amp rated Automatic Transfer Switch (ATS)/MDP combination panel, with line voltage sensing. All of the required control wiring and electrical connections to the ATS are made at the factory. The standard generator is a Kohler generator rated for continuous duty. These generators are available in sizes ranging from 20 kW to 200 kW, and can be fueled by diesel, propane, or natural gas. All Kohler generators are built to order, and must be field-installed (externally mounted) after the METES system has been delivered.

Other Options. The METES Hybrid is a very flexible system that can be equipped with many different features and options. These include Electrical Vehicle Charging stations, atmospheric water generators, custom buildouts (such as man camp living quarters or work space), and many other custom design features.

NOTICE. TeraVolt Energy employs a philosophy of continuous improvement. System designs and specifications may change without notice. In the event of supply chain interuptions, it may be necessary to provide (upon the customer's approval) equipment of equal quality other than the standard specified equipment.

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