



ZBB Energy Corporation

ZBB EnerSystem™

Overview & Application

Power Electronic Systems

- Intelligent Energy Management System
- Creates a Hybrid Power Conversion System
- Configurable, Modular, Flexible and Scalable for On-grid, Off-grid and as Grid-backup
- Combined with Energy Storage Supports Renewable Energy Sources and other Power Inputs
- Factory Built and Tested and Uniquely Configured to each Customer's Application

ZBB EnerSection™

Power & Energy Control Center

- Modular design that integrates any power input, any storage device
- Patented common DC bus design
- UL 1741 qualified grid-tie inverters
- DC bus can seamlessly hybridize multiple battery traits - fast response with long discharge
- 125kW AC to 1000kW (1 MW) AC power rating
- Operates in ambient temperature - 30° to +50°C for outdoor/industrial specs
- In operation without fail >18 months
- NARI Test Procedure in Process

optimizing energy availability



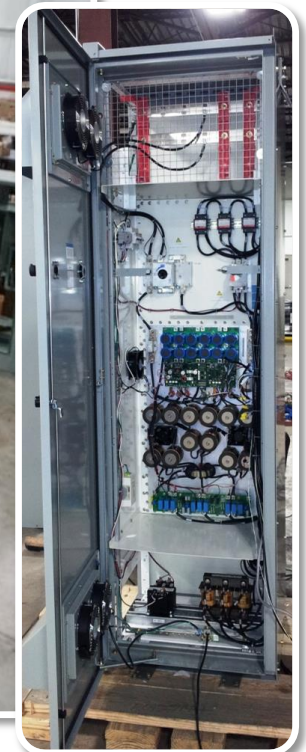
ZBB EnerSection Inverters



60 kW Inverter



Inverter Assembly - Milwaukee, WI

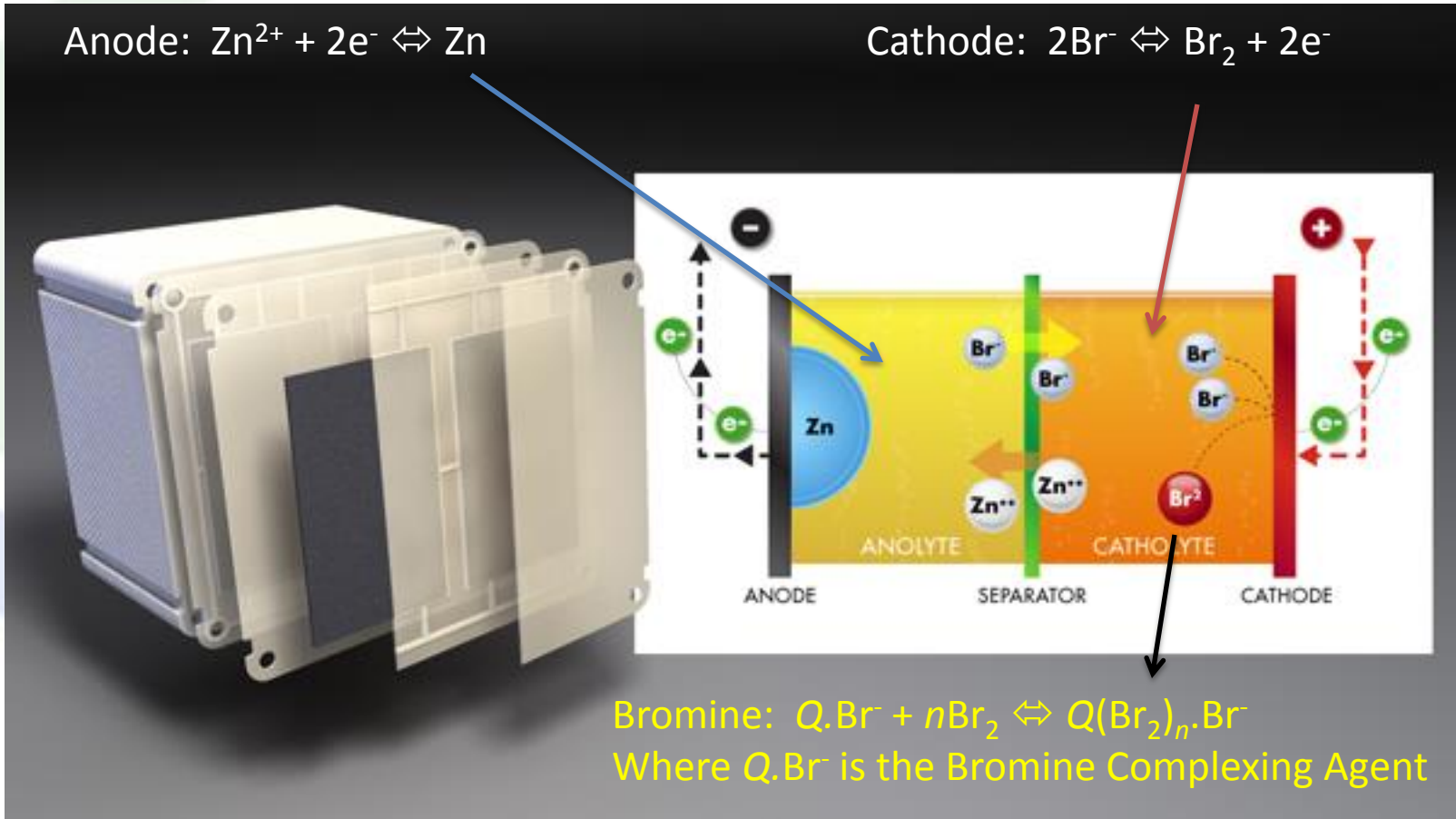
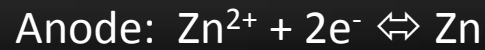


25 kW Inverter

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Basic Overview of the ZBB Battery



ZBB EnerStore – V3 Battery Stack



Overview

Comprises of 60 cells in series

Nominal voltage of 100 V

Energy capacity of 7.2 kWh

Max continuous discharge of 3.6 kW

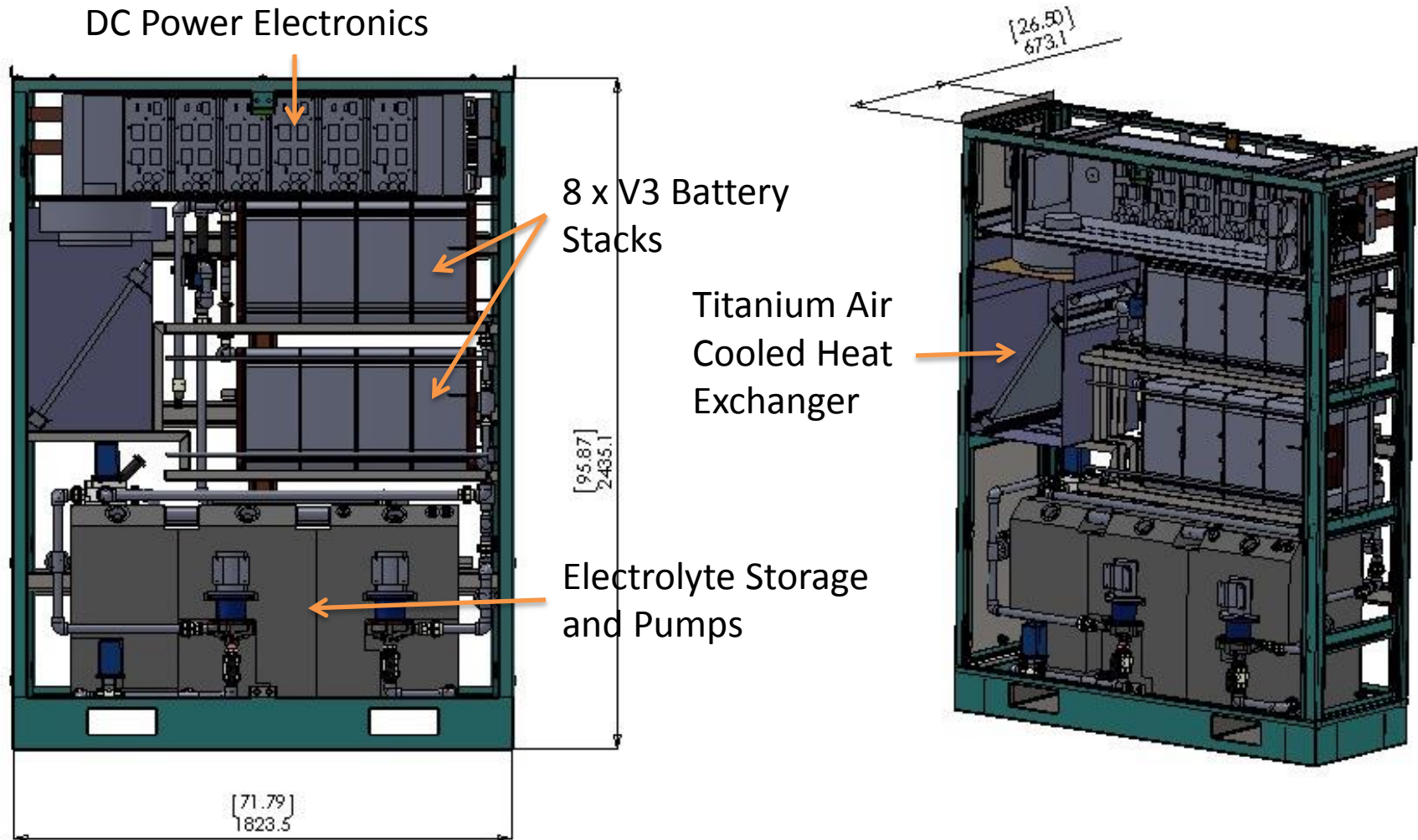
Size: 445mm x 385mm x 240mm

Dry weight: < 20 kg

Expected operational life > 3 years

Expected cycle life > 2,000 cycles

ZBB EnerStore V3 50 kWh Module



ZBB EnerStore Flow Batteries



ZBB EnerStore 50 kWh Module



Cell Stacks



*ZBB EnerStore Assembly –
Milwaukee, WI*

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IIT Campus – Summer 2012



250 kW / 500 kWh Zinc Bromine Energy Storage System being installed at Illinois Institute of Technology (IIT) Galvin Institute's "Perfect Power" campus micro grid project. 6

ZBB EnerSystem™ with:

- 2x 125kW ETC certified to UL 1741 standards inverter sections
- 10x 50kWh ZBB EnerStore 50 Zinc flow battery modules
- 300kVA Isolation transformer (480V/208V)
- EnerSystem Comm Module with local HMI and remote comms
- EnerSystem Grid Isolation Disconnect (GID) module
- 10' x 40' Secured, walk-in enclosure with external disconnect

ZBB's EnerSystem™ GID allows for "islanding" capability to use the platform for emergency power to an adjacent campus building on grid loss.

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ZBB Projects – Summer 2012

United States

- Oregon State
- Calif. Public Utility Comm.
- NAVFAC/SEI (So. Calif.)
- NAVFAC/SNI (So. Calif.)
- General Atomics (So. Calif.)
- Major Sports Stadium (Arizona)
- Military - Undisclosed (Texas) 
- Eaton/Ft Sill (Oklahoma)
- Lower Valley (Wyoming)
- DoD/Transportable (Wisconsin)
- UWM (Wisconsin)
- CCG/IIT (Illinois)
- UE Corp. (N. Virginia)
- Envinity (Pennsylvania)
- Pualani Manor (Hawaii)
- Military – Undisclosed (Hawaii)

International

- BC Hydro (Canada)
- Dundalk (Ireland)
- China – Two Sites TBD
- JeJu Island (Korea)
- Honam Lab (Korea)