



# THE BATTERY TEST LAB CASE STUDY

THE  
PACKAGED  
INNOVATION  
EXPERTS

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# VARIABLE ENVIRONMENT



Our 20' ISO container contains 4 testing chambers - two cold, and two hot. With individual environmental controls, each chamber can be programmed to operate at different temperatures, providing more dynamic testing scenarios.

- Two (2) Refrigerated Chambers - Down to 35°F
- Two (2) Heated Chambers - Up 40°F from Ambient
- Four (4) Ramp/Soak Temperature & Process Controllers
- Insulated Walls & Partitions For Improved Thermal Properties

## BESPOKE SOLUTIONS



# INTEGRATED SAFETY MEASURES



Keeping personnel safe during testing procedures is a top priority. As such, we've integrated a number of features to ensure that the testing chambers offer protective measures - minimizing risk to both technicians and equipment.

- Rotary Trapped Key Interlock Switches
- Distributed Sensors For Localized Gas Detection
- Smoke & Fire Detection Elements with Active Indication Lights
- Actuated Damper & Exhaust Systems To Escape Harmful Gases

**CUSTOM ELEMENTS  
FOR A TRULY UNIQUE  
BUILD**

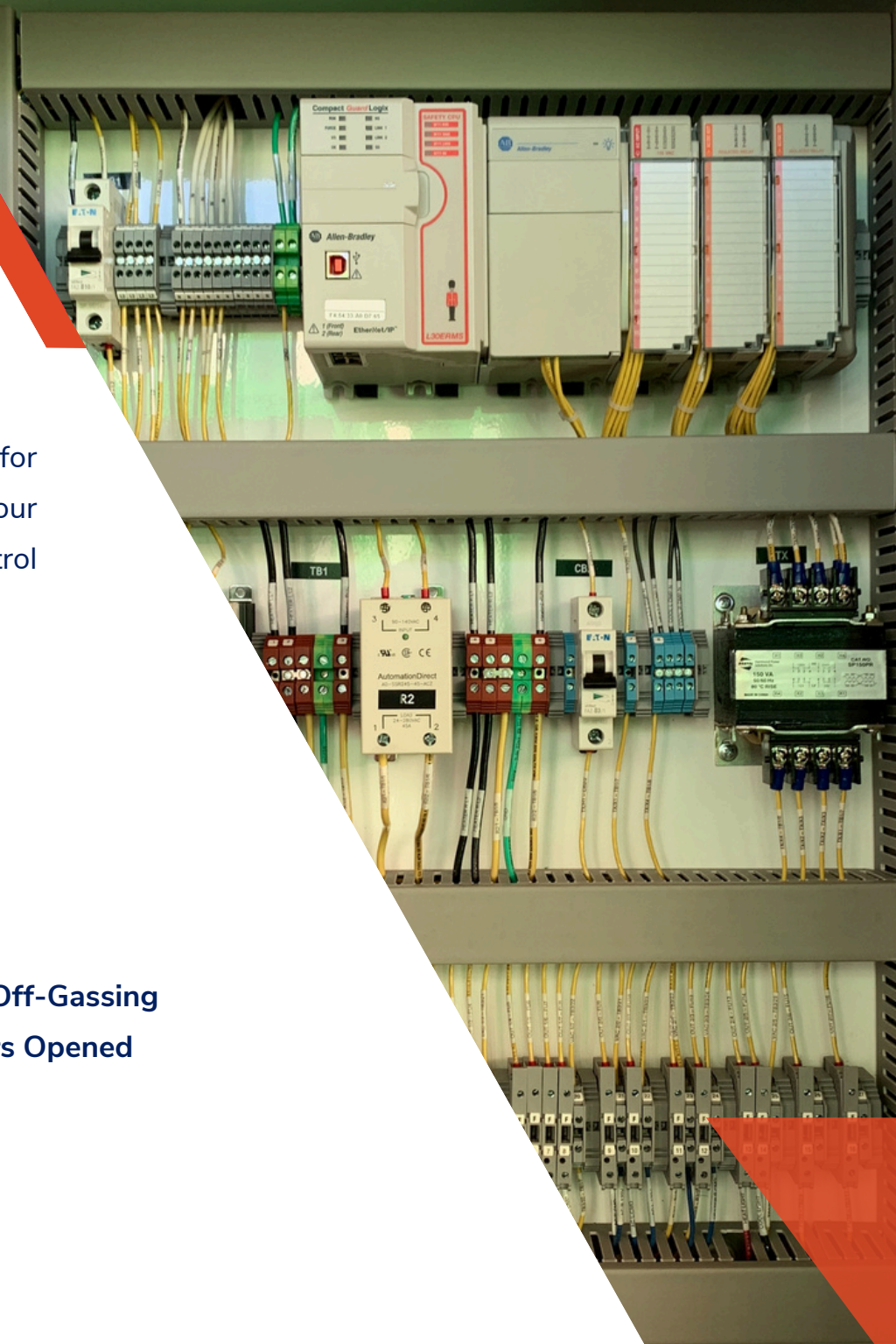


# NEXT GEN PLC LOGIC CONTROL SYSTEM



GEM's PLC architecture delivers top of the line hardware for our battery test chambers. The system communicates with our safety systems, and possesses highly responsive local control to ensure data continuity and operational integrity.

- Digatron Lithium-Ion Test Equipment
- Robust Data Acquisition Framework
- System Shutoff In The Event of Smoke/Fire or Off-Gassing
- Power Safety Disconnect When Chamber Doors Opened



# WHY BATTERY ENERGY STORAGE?



Many areas across the globe are known to suffer disabling rolling black-outs due to the age and overstress of the existing transmission & distribution (T&D) infrastructure, extreme weather conditions, and many other critical failure factors. To combat these T&D issues, more and more utilities, independent power producers, battery OEM's, and end-users of electrical energy are considering the implementation of battery energy storage system (or BESS) technology. Therefore, as the battery market continues to grow, the ability to test the viability of chemistries, configurations and operating conditions become critical to a successful integration. **GEM's** unique testing container places top-notch testing equipment in a mobile platform, allowing you to perform mission-critical testing when and where needed. Here's a breakdown of the components contained within this 20' HC ISO container:

- **REFRIGERATION: 4,000 BTUH (X2)**
- **HEATING: 17,100 BTU/HR (X2)**
- **SMOKE DETECTION SYSTEM**
- **OFF-GASSING SENSORS**
- **ACTIVE CHAMBER LIGHTING**
- **TEMPERATURE CONTROLLERS**
- **ACTUATED DAMPERS & EXHAUST FAN SYSTEM**
- **KEY INTERLOCK SWITCHES**
- **REMOVABLE PARTITIONS FOR INCREASED TESTING VOLUME**



# THE FINAL PRODUCT



Upon receipt of the approved drawing package, we initiate production of your custom container. Photos and updates will be sent regularly and kept in our digital database for record of the entire process.



## DESIGN & ENGINEERING



## CONTAINER MODIFICATION



## PROCESS DRIVEN DESIGN



# THANK YOU



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