BCIT SCHOOL OF TRANSPORTATION

TRANSPORTATION PROGRAMS

Make your next career move

BCIT

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

- BCIT is a public post-secondary polytechnic institution providing industry recognized applied credentials
- Approximately 18,000 full-time students and 28,000 part-time students enroll every year
- Courses taught by industry professionals who have a minimum of 5-10 years experience in the field, following their credential completion
- There are five campuses around Greater Vancouver including the Aerospace Technology Campus in Richmond, the Marine Campus in North Vancouver, and the Annacis Island Campus in Delta

BCIT®

BCIT SCHOOL OF TRANSPORTATION

- Aerospace
- Automotive
- Marine Studies
- Motive Power
- Technology Management
- Trades Access

BCIT®

Transformation in Transportation

- **New technology can be found everywhere in transportation**
  - Electrification in everything
  - Automated Driver Assistance Systems
  - Alternate and Synthetic fuels
  - How can the Educators keep up with these rapid changes?

BCIT®

Upskilling BC's Automotive Workforce

BCIT's EV Technician Training Initiative

Rising EV Adoption: As the number of EVS in B.C. continues to grow, there is a pressing need for technicians trained in high-voltage systems, battery diagnostics, and EV-specific technologies.

Post-Warranty Service Demand: As more EVs reach the end of their manufacturer warranty periods, owners are turning to independent shops for service and repairs.

Workforce Skills Gap: Current automotive technicians are trained primarily on internal combustion engine (ICE) vehicles and lack the specialized skills needed for safe and effective EV diagnostics and repair.

BCIT®

Responding to the EV Transition in BC

How it Started:

- Funded by the Ministry of Energy and Climate Solutions
- Focused on upskilling existing automotive technicians
- Objective - close the knowledge gap for the aftermarket and independent repair shop techs
- Developed a one-week (36-hour) course to minimize workplace disruption

BRITISH COLUMBIA | Ministry of Energy and Climate Solutions

BCIT

Finding the right Expertise

- **Our challenge:**
  - EV knowledge was not yet available in-house or broadly in the industry
  - Needed access to cutting-edge OEM EV service protocols

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Leveraging Industry Relationships

The Power of Partnerships:

- Built partnerships via contract training and service agreements
- Faculty accessed OEM training programs for hands-on upskilling

Real-World R&D

Partnering with the City of Vancouver:

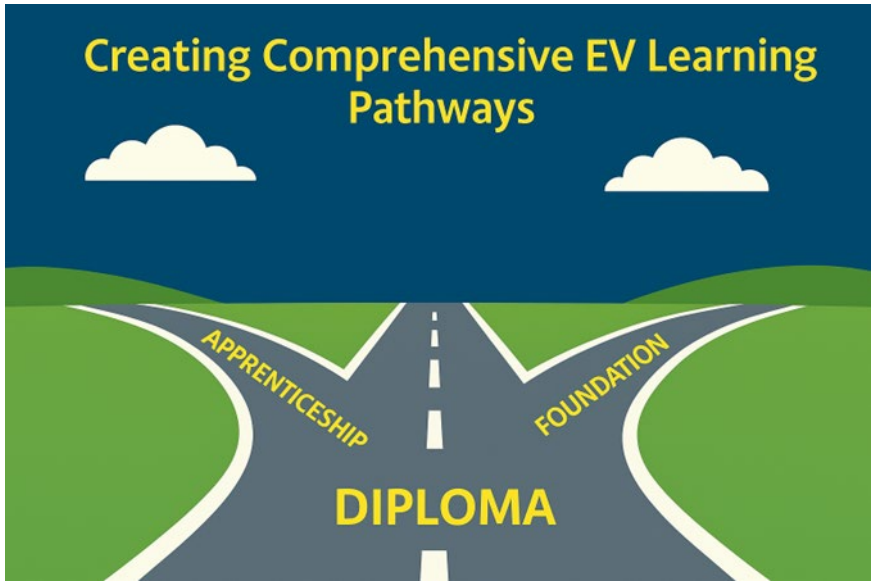
- Gained access to 144 City EVs for hands-on R&D
- Used fleet to inform practical curriculum components
- Collected real-world diagnostic data

CITY OF VANCOUVER

BCIT

Creating Comprehensive EV Learning Pathways

- Tailored OEM outcomes to fit industry technicians' needs
- Developed EV Service and Technology course
- Designed specifically for upskilling 3rd year apprentices & Red Seal technicians
- Mapped OEM outcomes into BCIT programs (not yet identified by RSOS)
- Integrated across Apprenticeship, Diploma, and Foundation



INTERPROVINCIAL STANDARD
CANADA
NORME INTERPROVINCIALE

BCIT

EV Service and Technology Pilot

Testing the Model:

- Launched pilot with City of Vancouver fleet technicians
- Used this pilot to test and refine our approach with experienced working technicians
- Refined delivery and validated curriculum

CITY OF VANCOUVER

BCIT

Train-the-Trainer Program Rollout

Expanding Provincial Capacity:

- Created EV 4011 Train-the-Trainer model
- Delivered course to 7 BC post-secondary institutions
- Scaled instructional capacity across the province

COLLEGE OF THE ROCKIES

College of New Caledonia
CNC

KWANTLEN POLYTECHNIC UNIVERSITY

CAMOSUN COLLEGE

VIU

BCIT

Cross-Sector Demand - Growing Interest Beyond Automotive

Delivered and tailored training for:

- First responders (RCMP, VFD)
- City and Municipal Fleets
- BC Marine Association
- BCAA
- Auto recyclers – Schnitzer Steel
- Charging infrastructure installers
- International: Jamaica's HEART Trust Institute engineering students

Coquitlam

VANCOUVER FIRE DEPARTMENT EST. 1867

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National Expansion and New Partnerships

Scaling Impact Through C2R2 Funding:

- C2R2 funding allowed us to expand our reach and deepen partnerships at a national level
- Licensed our EV curriculum to 5 Canadian post-secondary institutions
- Launched Tesla START Apprenticeship program (first in Canada)
- Delivered exclusive EV training to BC Canadian Tire Service Centers

Canadian Colleges for a Resilient Recovery

CANADIAN TIRE

TESLA

BCIT

Accelerating the Transition to a Zero-Emission Workforce

- Scalable, proven model with broad industry relevance
- Continuing to evolve to meet the needs of industry & Canada's zero-emission future
- Best practices being introduced to other SoT programs - Aerospace, MHDV, Marine and Rail

Class 8 electric tractor

Electric float plane

Rail freight goes electric


First all-electric tugboat

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HV Battery Testing

- Currently diagnosing HV Batteries as vehicles are now exceeding the OEM warranty
- Batteries may be replaced as an entire unit, but many are still serviceable after requiring minor repairs

Image courtesy of Jim Berladyn

HV Battery Diagnosis

Multiple diagnostic approach for assessing HV Battery condition.

- Tested in the vehicle
- Tested dynamically while driving
- Tested out of vehicle on stand

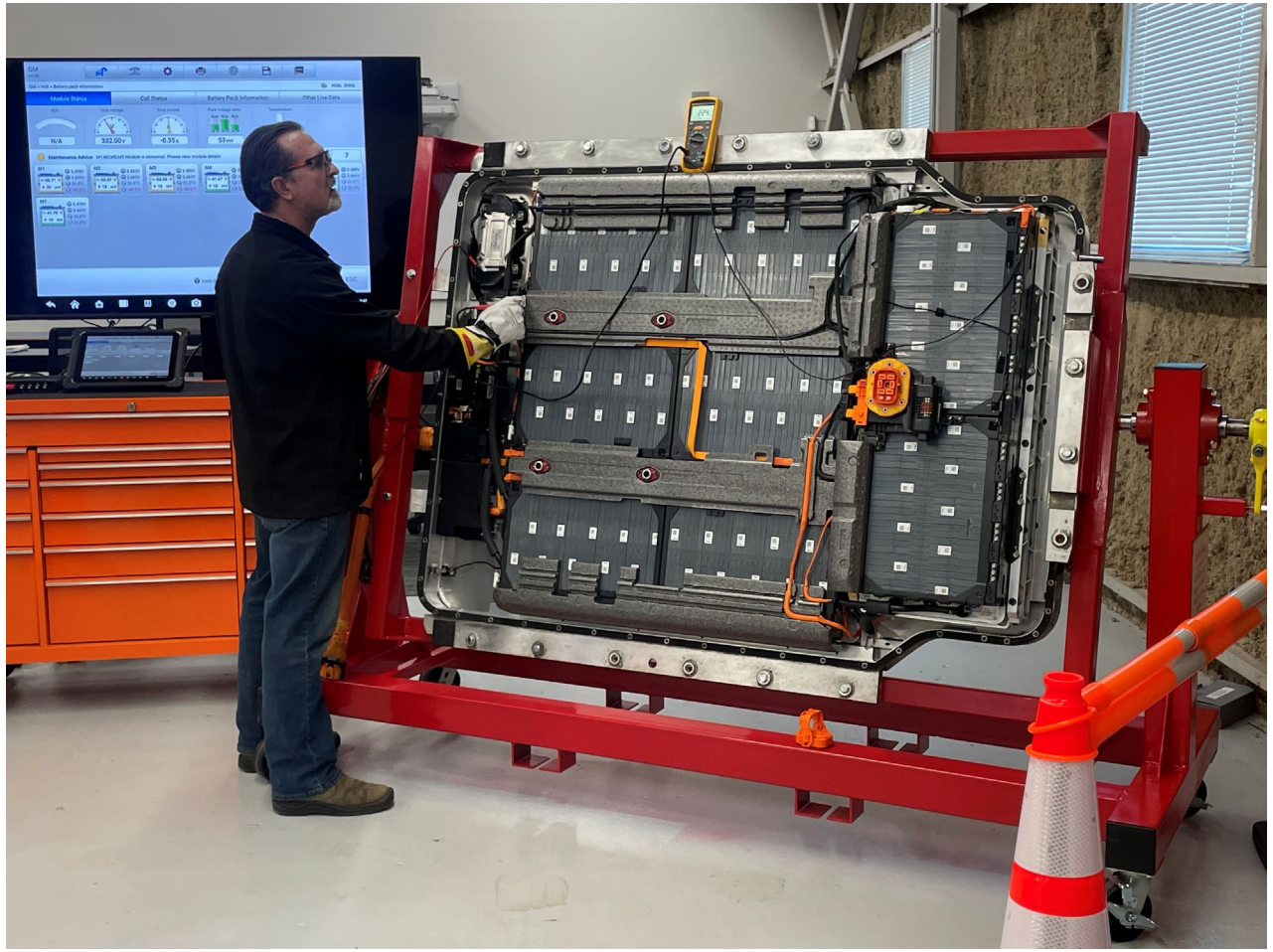


Image courtesy of Jim Berladyn

HV Battery Diagnosis

- Battery diagnosis needs to be determined before removing battery from vehicle
- Technician needs to identify
  - Module and cell location
  - Individual cell voltage
  - Battery Pack voltage Delta
  - Temperature readings
  - State of Charge

Image courtesy of Jim Berladyn

Some EV Scan tools will provide information not found on a regular scan tool

HV Battery on Stand

- Students connecting Volt HV Battery to scan tool to determine condition.
- For communication it will require:
  - Can +
  - Can –
  - 12V +
  - 12V –
  - Wake up signal

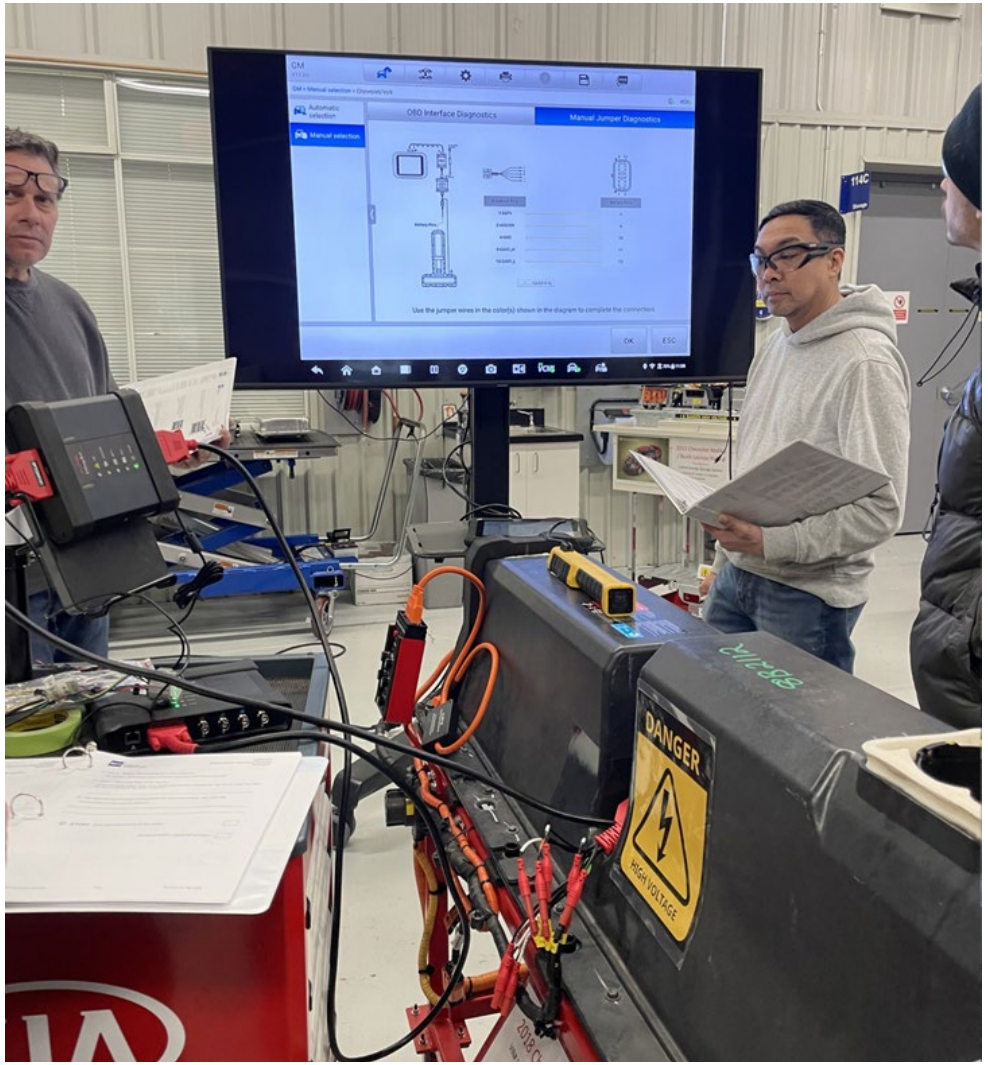


Image courtesy of Jim Berladyn

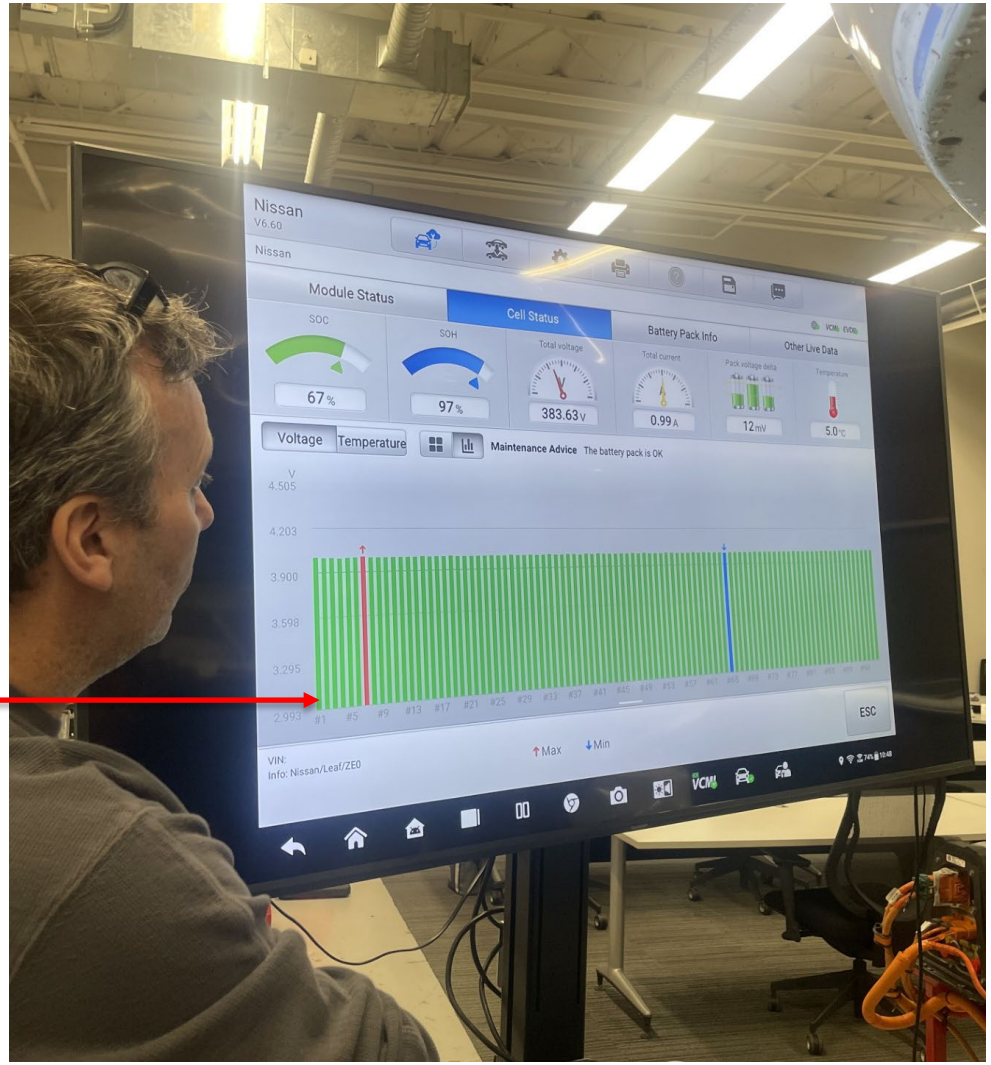
HV Battery on Stand

Students comparing HV Battery modules. Notice two modules in yellow that require maintenance and warning above it

Image courtesy of Jim Berladyn

HV Battery on Stand

- Student determining highest and lowest cell voltage (HV Battery Delta) on scan tool

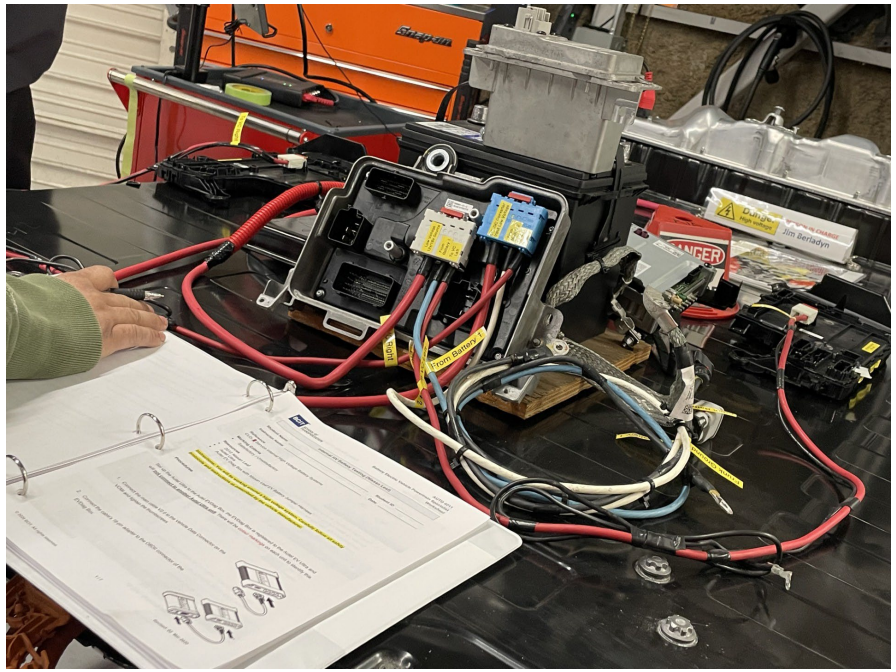


Student determining HV Battery module location

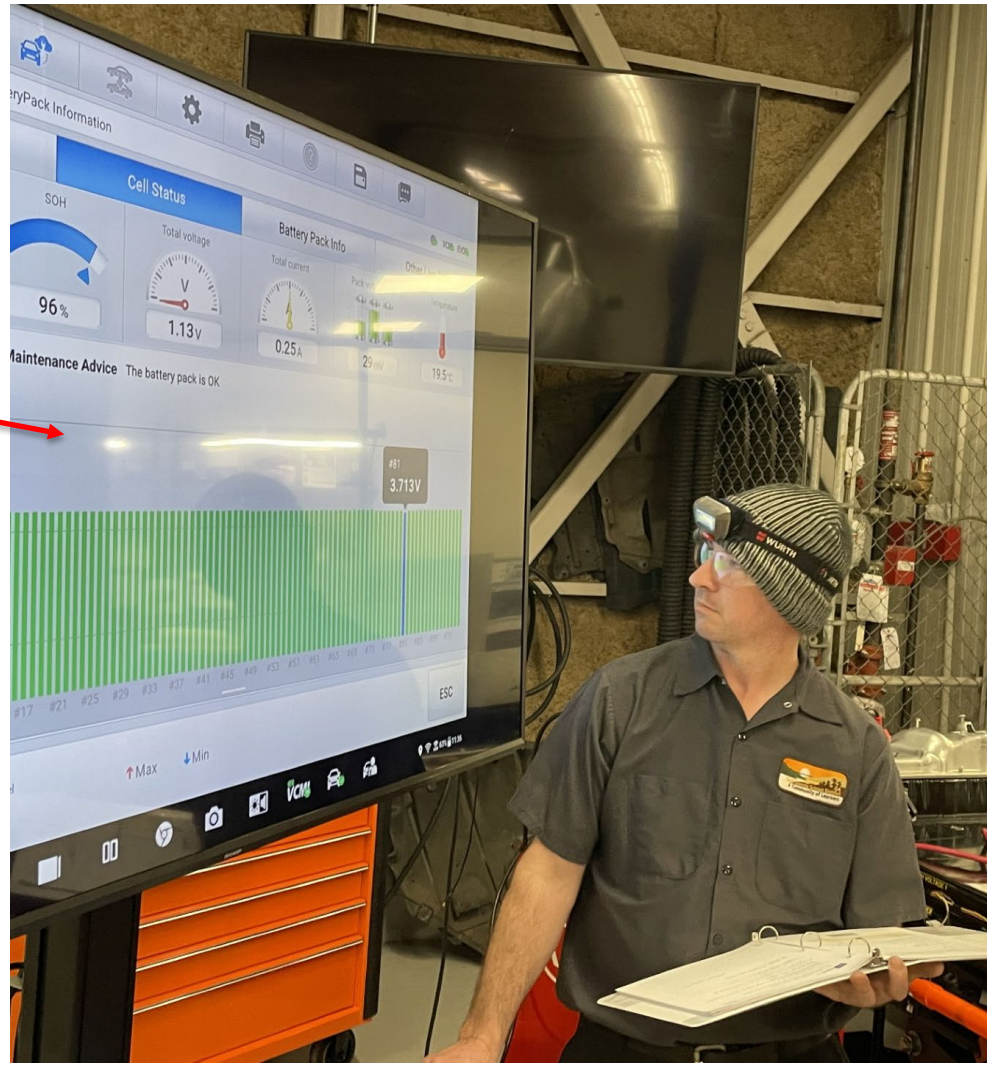
Images courtesy of Jim Berladyn

Tesla Model 3 Battery

- Students checking cells in each module to determine battery health

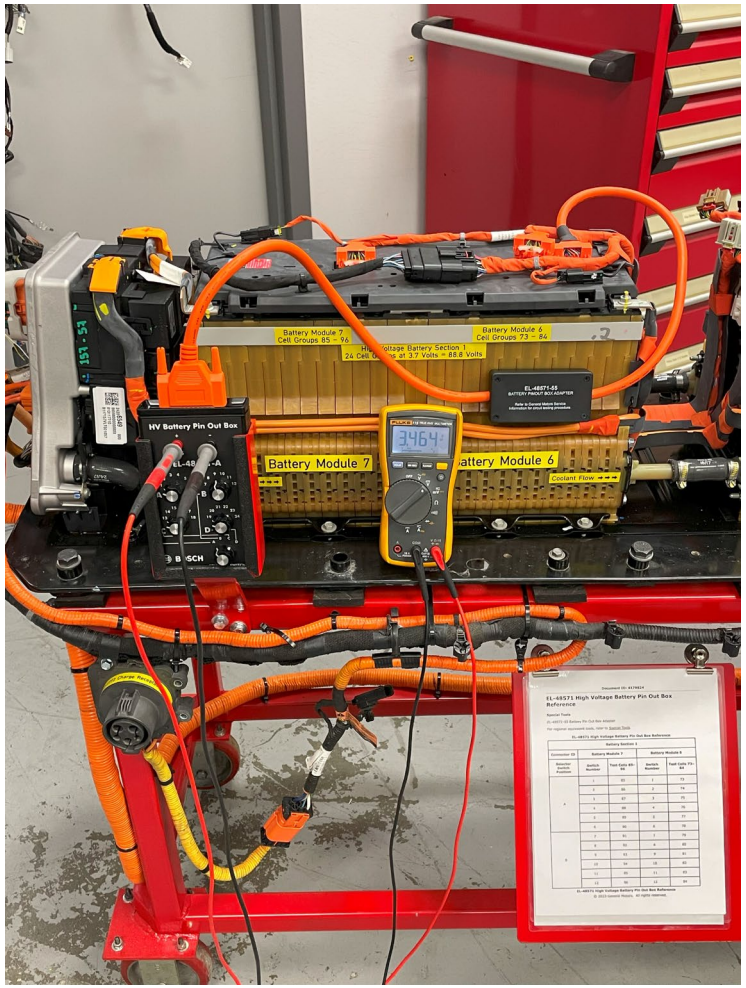


Students checks low voltage (16volt) of circuit

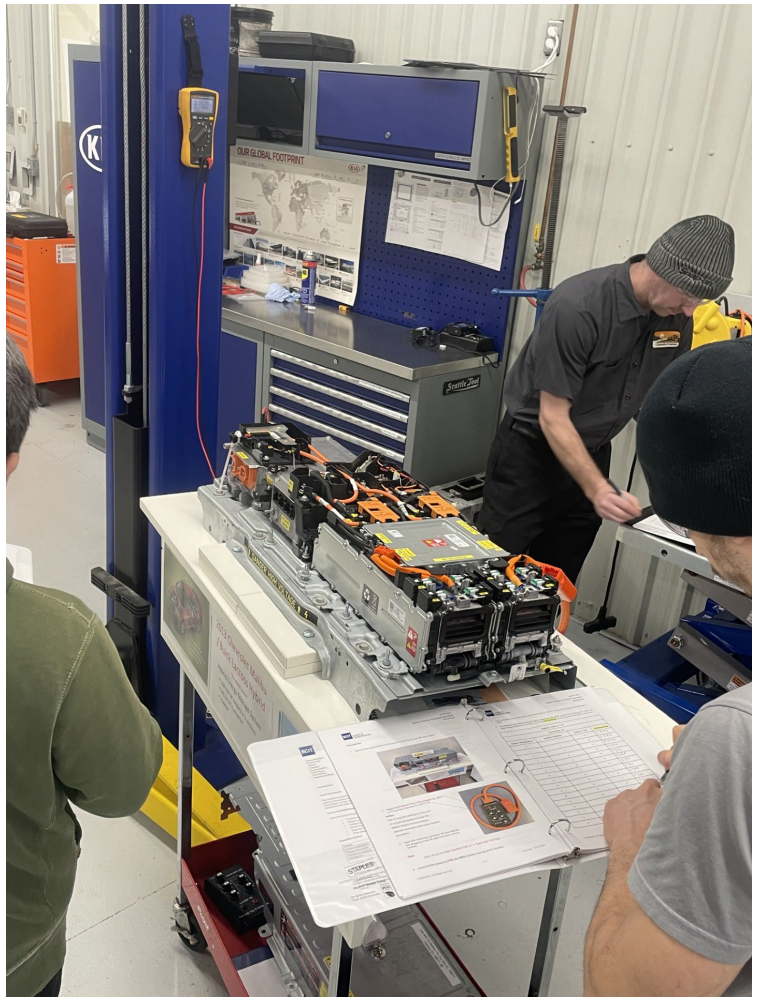


Images courtesy of Jim Berladyn

Individual Battery Cell Test

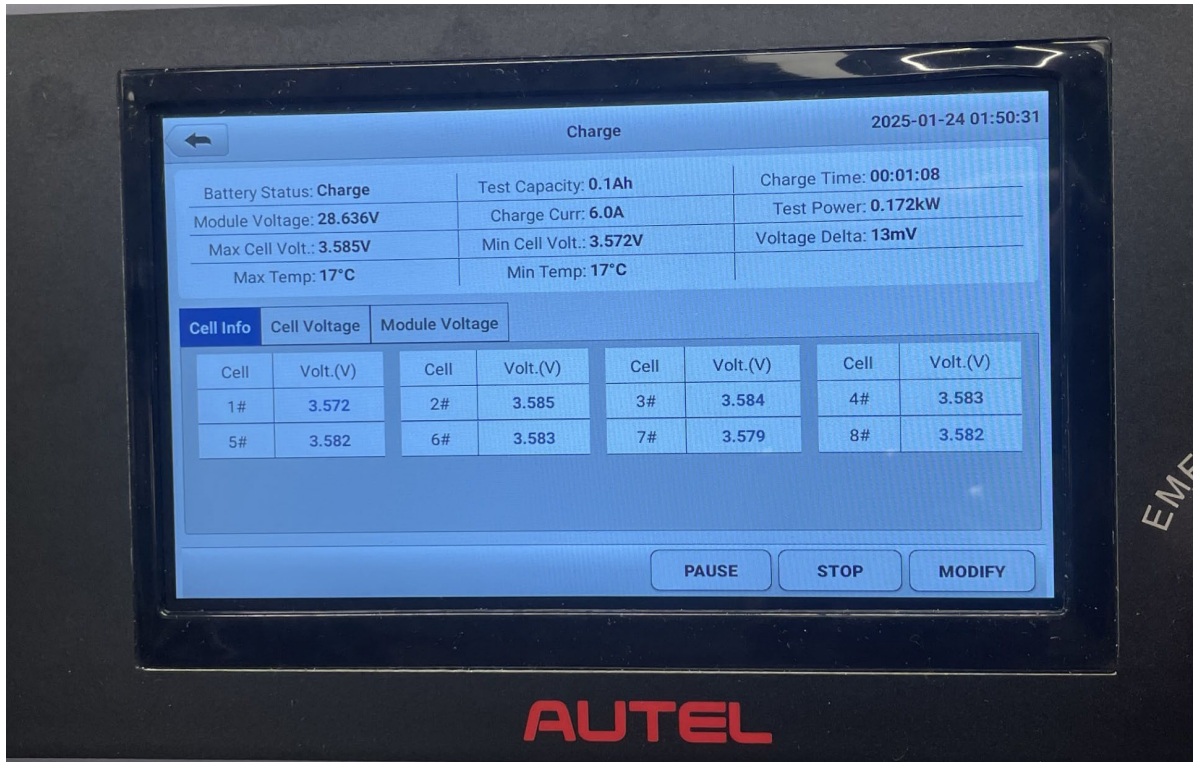


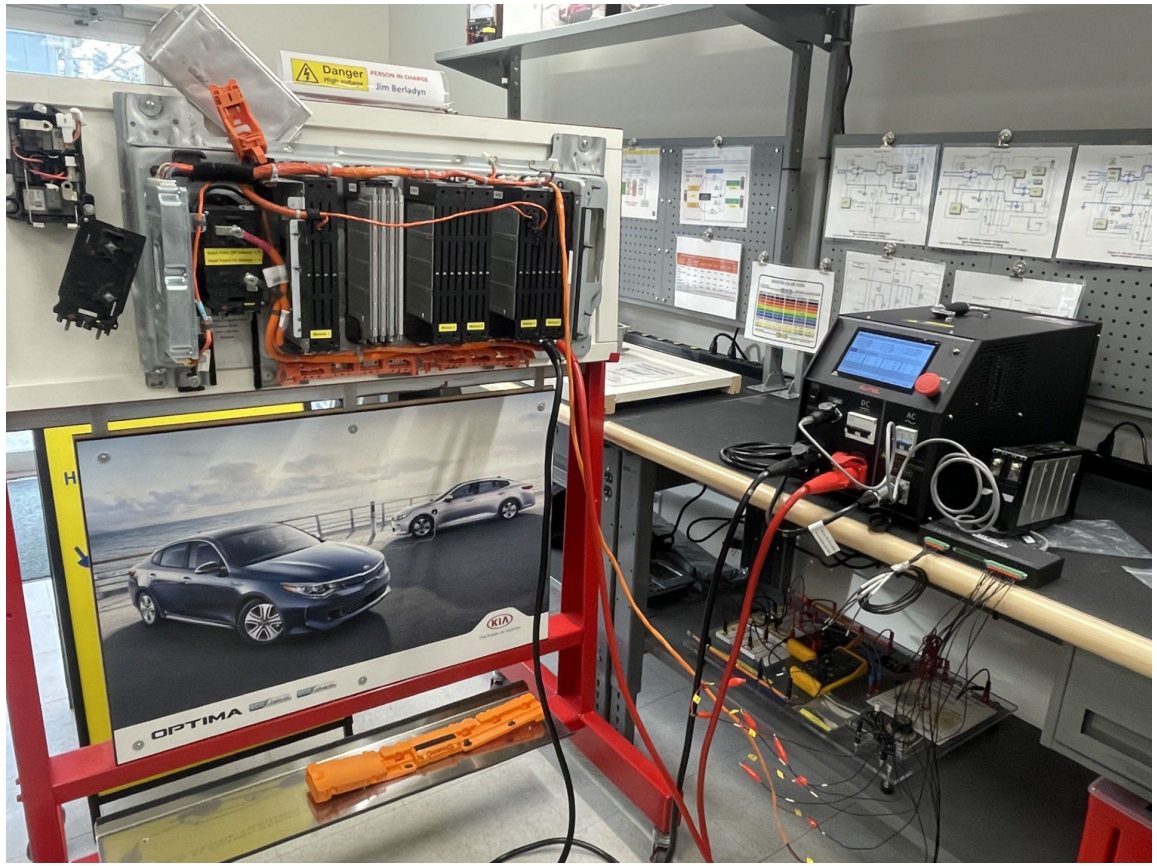
- Used to test individual cell voltages
- This test will also help diagnosis an internal wiring and connector issues



Images courtesy of Jim Berladyn

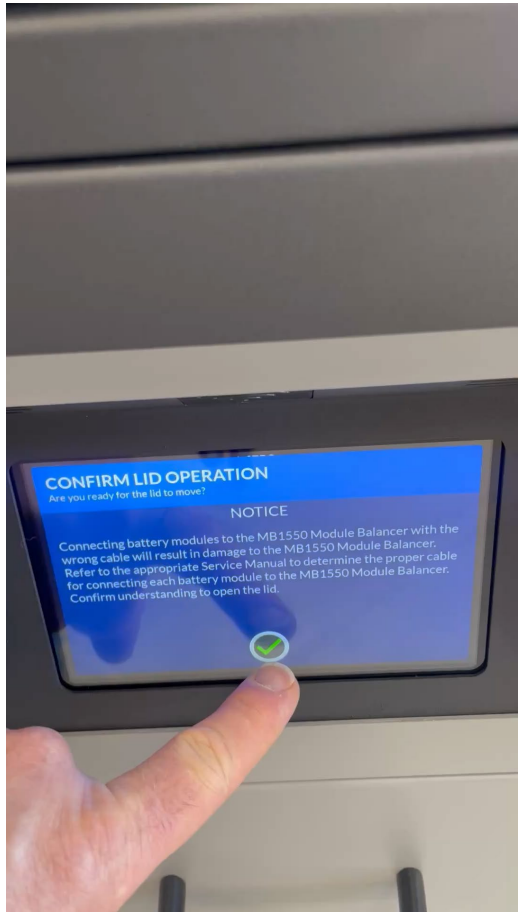
Battery Balancing





Images courtesy of Jim Berladyn

OEM Balancer



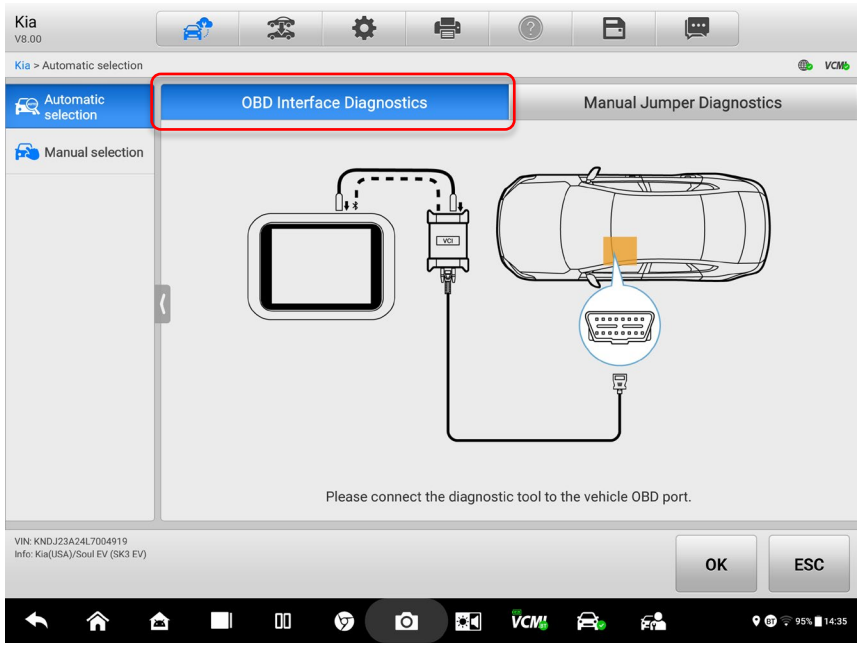
Images courtesy of Jim Berladyn

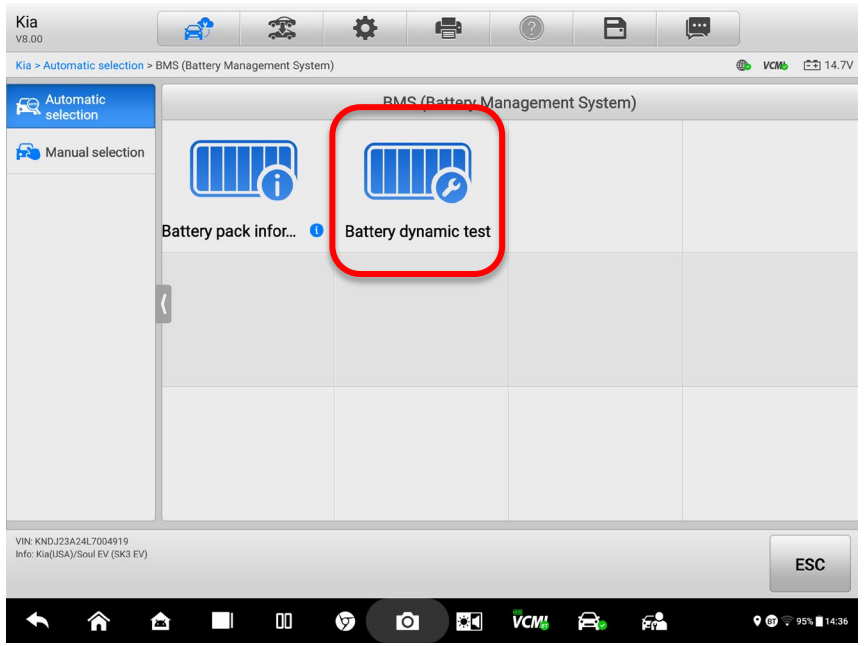
HV Battery Diagnosis

- Repairs need to be confirmed before installing battery into vehicle
- This may also help determine condition of used battery before purchase

Image courtesy of Jim Berladyn

Dynamic HV Battery Test



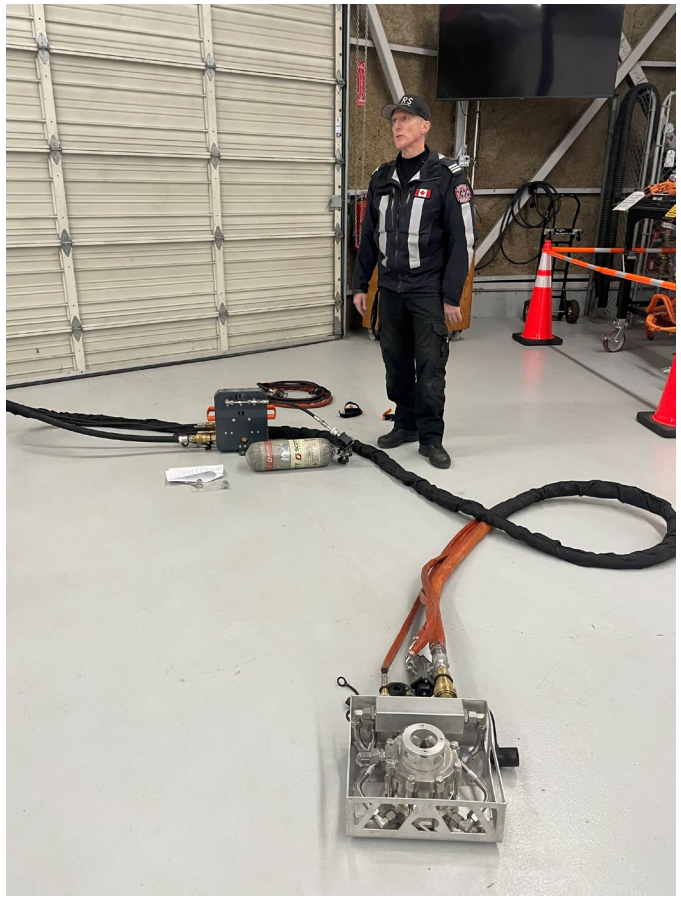


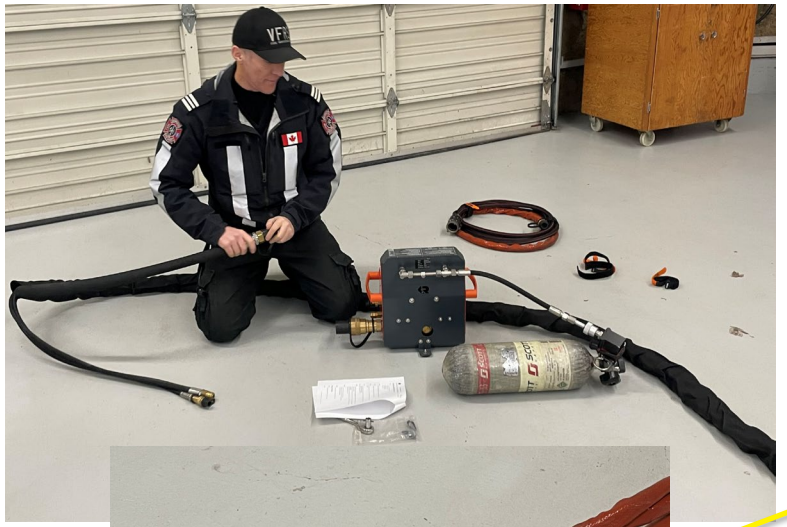
Drive the vehicle and follow directions on scan tool

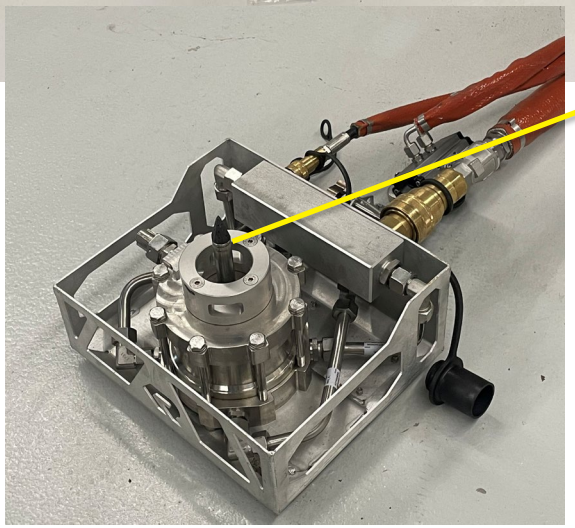
Battery Leak Testing

Images courtesy of Jim Berladyn

BEST Fire System

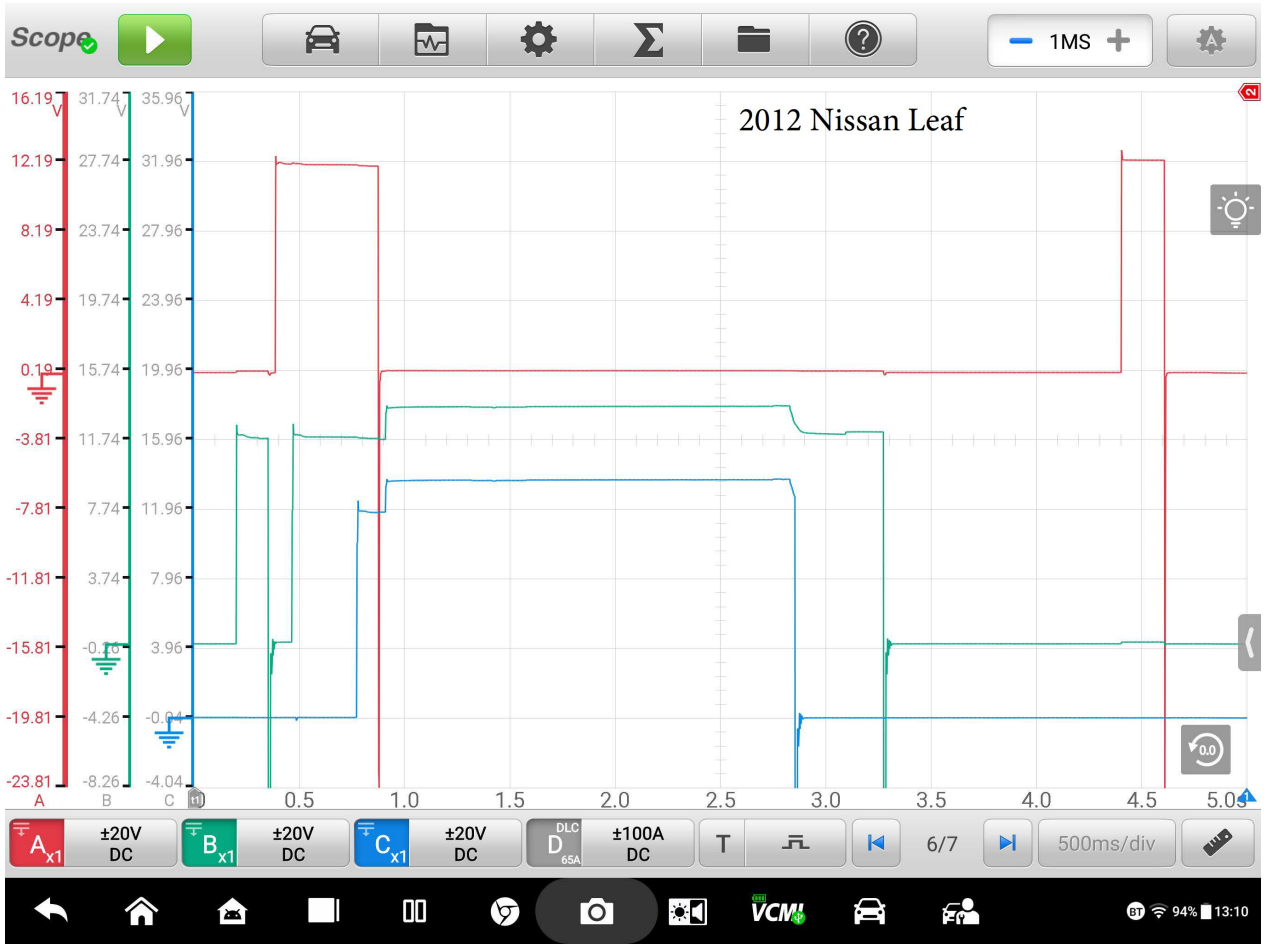






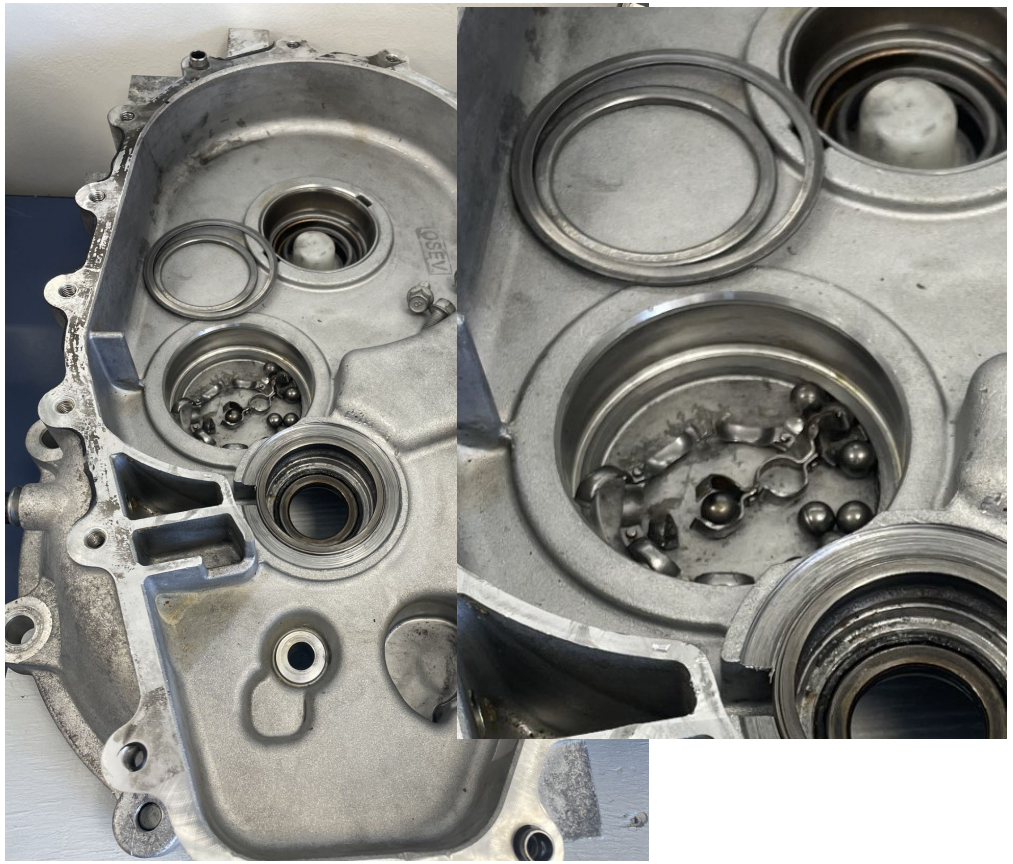
Photos: Courtesy of Jim Berladyn

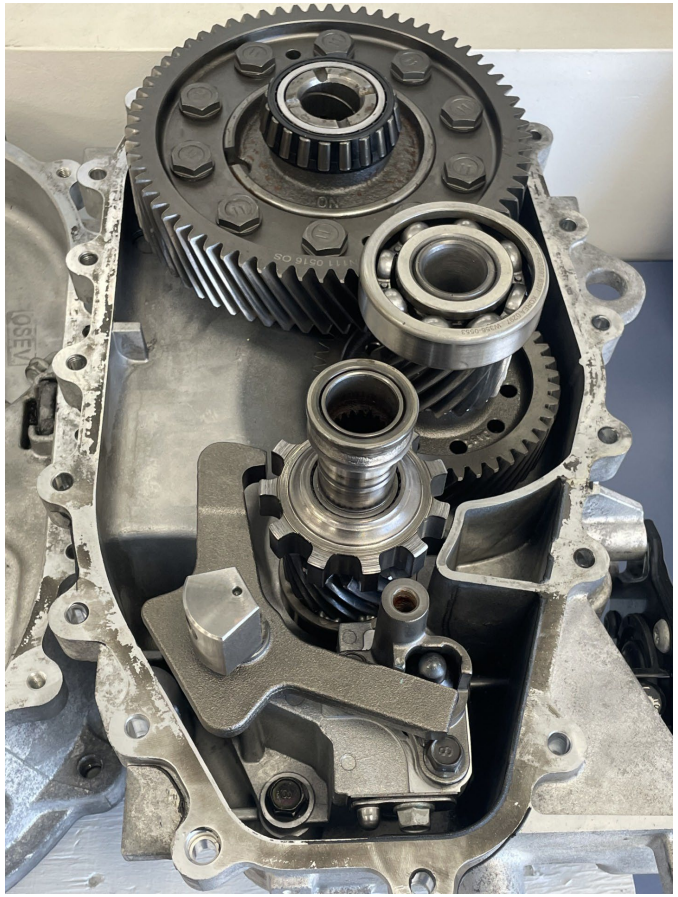
Contactor Sequencing



Images courtesy of Jim Berladyn

Bearing Failure



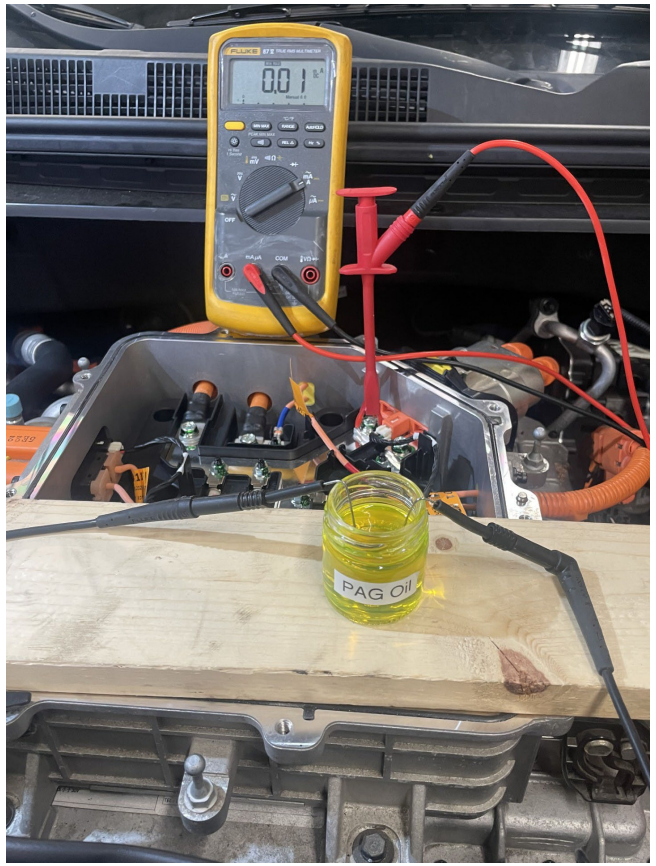


Images courtesy of Jim Berladyn

EV Fluids

Images courtesy of Jim Berladyn

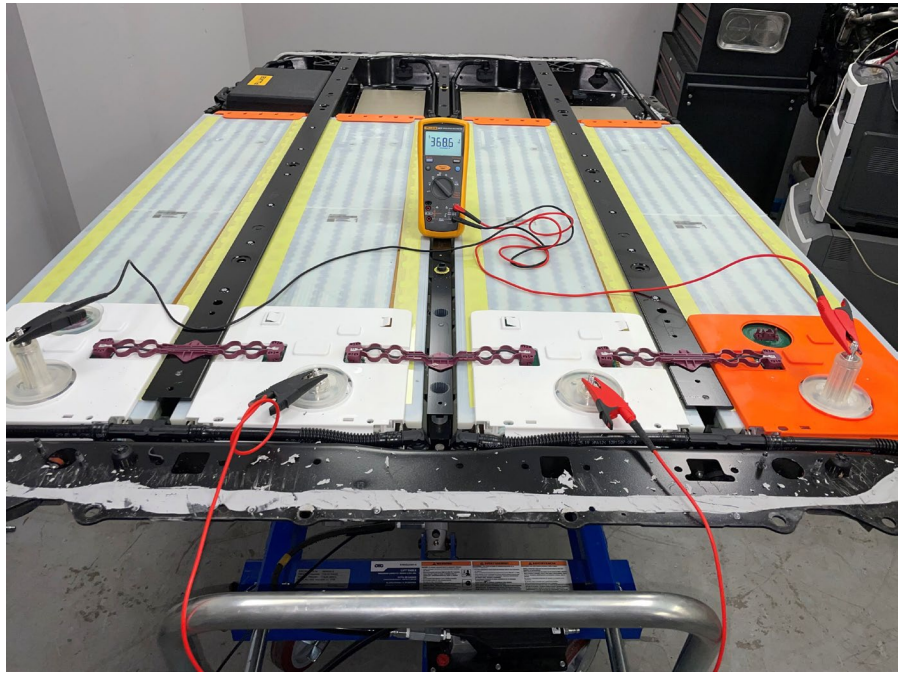
Checking for HV Loss of Isolation

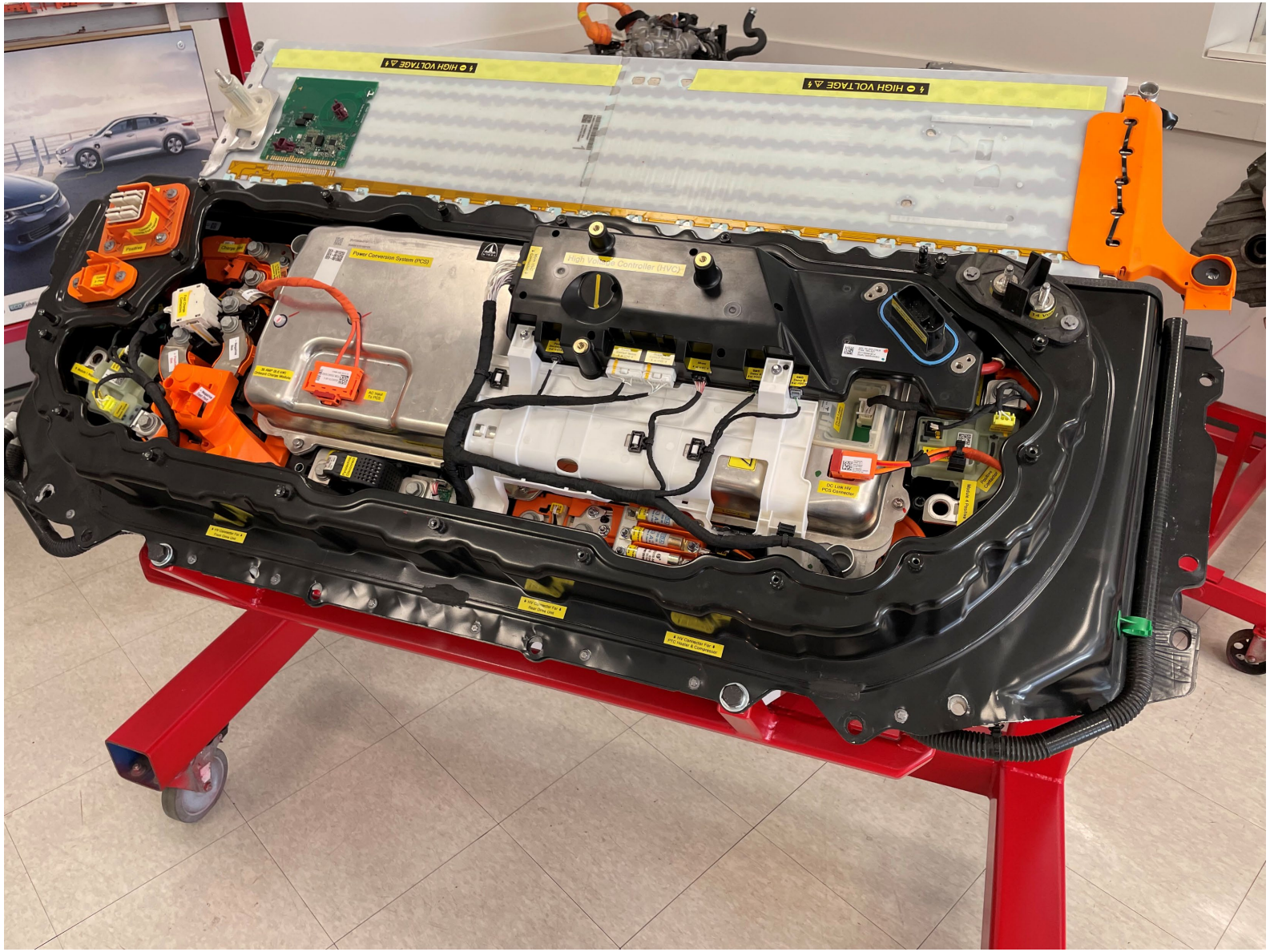


Images courtesy of Jim Berladyn

Training Aids

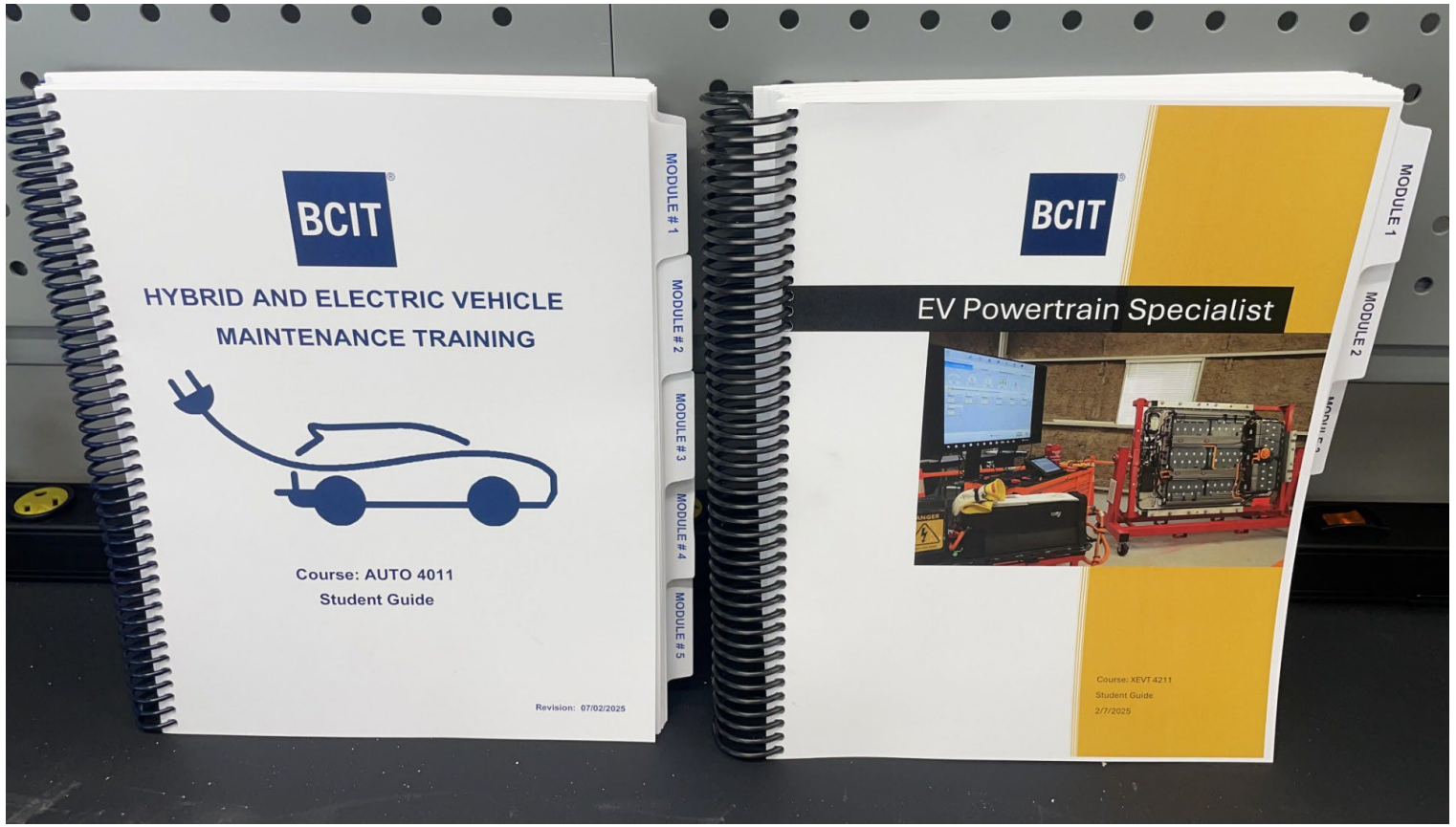
Tesla





DP World Training

EV Training Courses



QUESTIONS?