

Isolate High Voltage Safely.

AHV26PT: LOTO Trainer for HV Vehicles with Fault Diagnosis

Practical training system for safe high voltage isolation on battery electric, plug-in hybrid and hybrid electric vehicles: learners identify hazards, select the correct isolation strategy, verify safe system status and recommission the vehicle after service.

REAL EXPERIENCE LEARNING

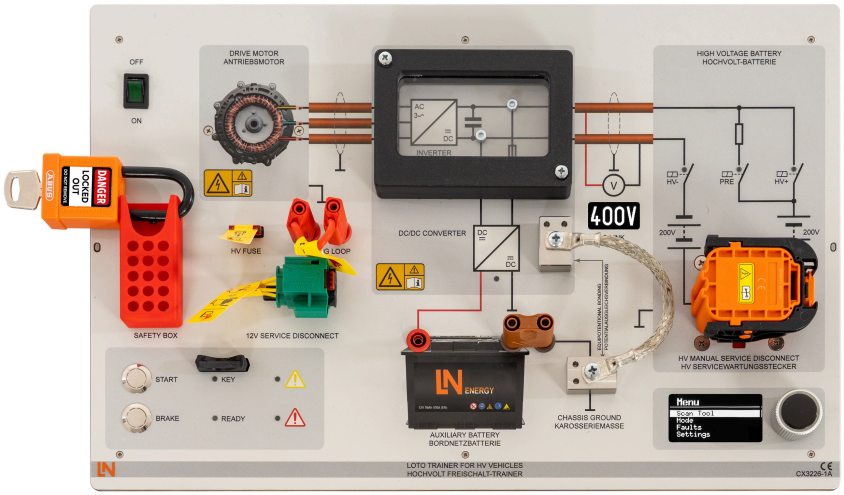
THE SYSTEM

A Complete HV System in Tabletop Format

Vehicle electrification is fundamentally changing automotive technology. Working safely on high voltage systems is one of the biggest challenges for workshops.

At its core is a realistic simulation of a 400 V DC vehicle system: HV battery with positive, negative and precharge contactors, high voltage interlock loop (HVIL), inverter, three-phase drive motor and DC/DC converter with a functional 12 V electrical system. The color-coded front panel separates the high voltage system from the 12 V system.

Learners isolate the system for service work, lock it out against reactivation, verify the absence of voltage and safely recommission it. They practice within the safe limits of the trainer before applying their skills to real vehicles.



Top view of the LOTO Trainer

All Common Isolation Methods

Learners safely isolate high and low voltage systems using five methods.

Integrated Fault Simulation

Ten selectable fault scenarios from everyday workshop practice.

Live-Dead-Live Testing

Test points under the screwed inverter cover for verifying the absence of voltage.

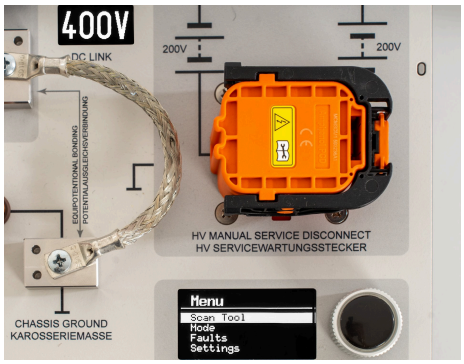
Start Like a Real Vehicle

Start only with the smart key inserted; status LEDs show the precharge process.

ISOLATION

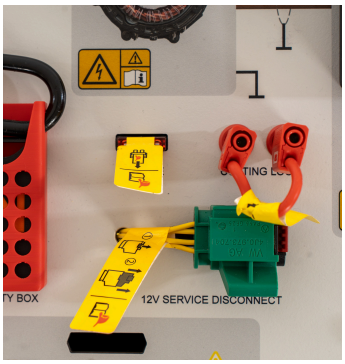
Five Standard Isolation Methods

Learners select the appropriate procedure depending on the vehicle condition and service situation: (1) manual service disconnect at the HV battery, (2) green 12 V service disconnect, (3) emergency cutting loop, (4) removal of the HV fuse or (5) scan tool-guided shutdown.



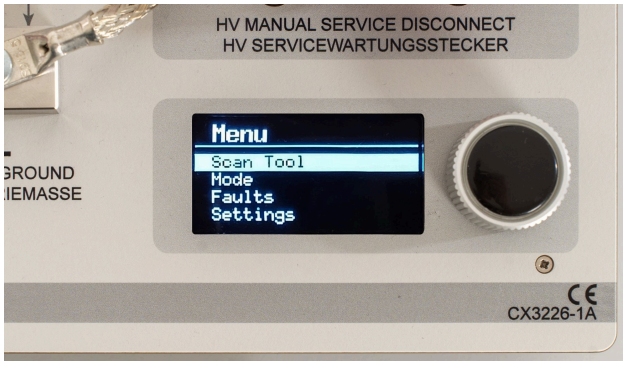
Manual Service Disconnect at the HV Battery

A real manual service disconnect separates the HV battery. LED indicators show the status of the main contactors.



Low Voltage Isolation Points

Indirect isolation via the green 12 V service disconnect, the emergency cutting loop and the removable HV fuse.



Scan Tool-Guided Shutdown

Using the integrated scan tool, learners perform the high voltage shutdown step by step.

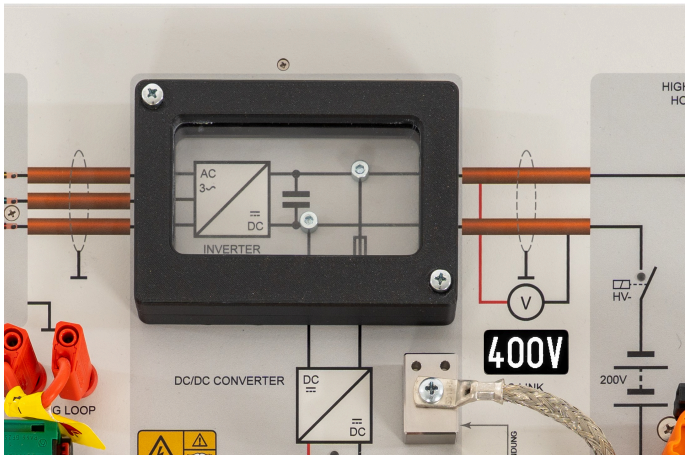


Lockout/Tagout with Safety Box

Learners lock the smart key in the red safety box with one of the two supplied padlocks, preventing unintended reactivation.

MEASUREMENT AND DIAGNOSIS

Measure, Diagnose, Recommission



Live-Dead-Live Testing at the Inverter

The inverter cover can be removed with a screwdriver. Underneath are test points where learners verify the absence of voltage using the live-dead-live method. A digital display shows the DC link voltage of the simulated 400 V system.

Simulation	HV battery, inverter, three-phase drive motor and DC/DC converter
Contactors	Positive, negative and precharge contactors with simulated precharge
Safety circuit	High voltage interlock loop (HVIL) with monitoring
Display	Graphical display with rotary encoder: scan tool, DTCs, live data, fault selection
Indicators	KEY, READY and warning LEDs, audible warning alarm
Test sockets	4 mm safety sockets with internal protective impedances



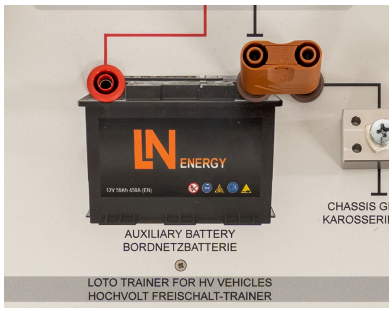
Equipotential Bonding

Learners measure equipotential bonding on real component housings. A bonding cable with a fault is included for practical testing.



Controls Like a Real Vehicle

START and BRAKE controls, smart key activation and KEY, READY and warning indicators.



12 V Electrical System

Learners monitor the 12 V system voltage in different operating states and practice jump-starting with a second trainer.

TRAINING SCENARIOS

Scenarios from Workshop Practice

Ten selectable fault scenarios range from routine service work to abnormal vehicle conditions that require further diagnosis or appropriately qualified personnel. Examples:

1 **Isolation and Lockout/Tagout**
Perform a complete high voltage shutdown, secure the vehicle against reactivation and verify the absence of voltage.

2 **Scan Tool-Guided Shutdown**
Interpret vehicle status information and shut down the high voltage system using the integrated scan tool.

3 **Incorrect Isolation Procedure**
Identify procedural errors, determine why safety conditions have not been achieved and isolate correctly.

4 **High Voltage Interlock Fault**
Investigate an interlock fault, interpret diagnostic information and assess its effect on HV system operation.

5 **Equipotential Bonding Fault**
Find defective bonding connections by measurement and evaluate the effect on electrical safety.

6 **Residual Voltage After Shutdown**
Perform live-dead-live testing, identify unexpected voltage and determine the appropriate safety response.

7 **Contactor Faults**
Investigate abnormal contactor operation and determine whether the system can be safely isolated.

8 **Insulation Fault**
Interpret insulation monitoring information and determine the required precautions and next steps.

9 **12 V Battery and Charging System**
Diagnose a discharged 12 V battery and DC/DC charging failures; jump-start using a second trainer.

10 **Vehicle Recommissioning**
Restore the system after service, clear DTCs and verify correct operation.

Meets the ASE xEV standards for Level 1 and Level 2 and builds a foundation for advanced qualifications such as ASE L3.

For vocational schools, colleges, technical training centers and OEM training.

Scope of Supply and Technical Data

SCOPE OF SUPPLY	CATALOG NO.
LOTO Trainer for HV Vehicles with fault diagnosis	**CX3226-1A7**
Carrying case for accessories	
PH2 screwdriver	
Two padlocks	
Equipotential bonding cable with fault	
Replacement cutting loops	
Special tool for unlocking the service maintenance connector	
Replacement smart key	
Training materials including workshop manual and work orders	
Operating instructions	
Measuring Instruments and PPE	
Digital milliohmmeter, 400 mΩ/4/40 Ω	**LM8334**
Digital insulation tester, 125/250/500/1000 V, 4000 MΩ	**LM8335**
Two-pole voltage tester, 12–690 V AC/DC	**LM8302**
US electric service gloves, Class 0	**LM85708**

TECHNICAL DATA	
Catalog no.	**AHV26PT**
Simulated system	400 V DC
Isolation methods	5
Fault scenarios	10, selectable
Design	Tabletop unit
Power supply	120 V AC, 60 Hz
Dimensions	18 × 11.7 × 4.7 in (456 × 297 × 120 mm) (W × D × H)
Weight	approx. 6.6 lb (3 kg)
Training standard	ASE xEV Level 1 and Level 2



Carrying case with spare parts, tools and padlocks

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REAL EXPERIENCE LEARNING

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