



AVL E-STORAGE LV™

Highly dynamic regenerative power supply optimized for testing low-voltage micro and mild hybrid systems (48 V)

AREA OF APPLICATION

The AVL E-STORAGE LV is a low-voltage variant out of the successful E-STORAGE product family that is optimized for characterization and verification of electric driveline components in the automotive, marine, aviation and stationary power industry. The system is based on an advanced grid connected regenerative DC power supply that can be easily adapted to meet customer-specific requirements in testbeds and in dedicated laboratories.

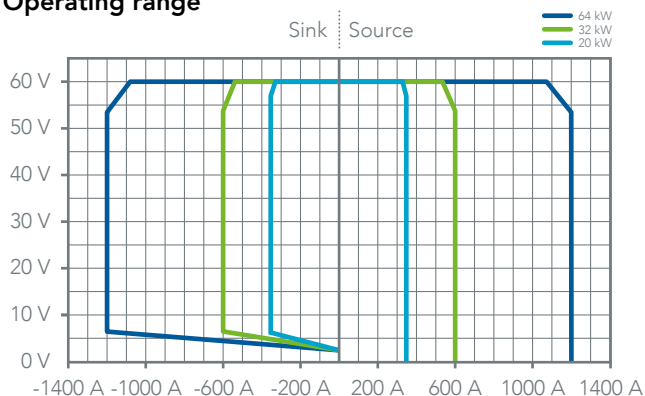
The E-STORAGE LV is optimized for the testing of low-voltage micro and mild hybrids. A 48 V system is an upcoming trend that allows significant CO₂ reduction through electric hybridization of the drivetrain with an acceptable additional cost. A battery with a maximum voltage below a legal threshold of 60 V is combined with an e-motor that is used for regeneration of the kinetic energy and optimization of the usage of the IC engine.

SYSTEM DESCRIPTION

Thanks to its excellent dynamic performance and high control accuracy the E-STORAGE LV can precisely follow a predefined duty cycle to expose the device under test to a real operating condition, e.g. a cold-start of an engine. Equipped with the advanced AVL Battery Models, the E-STORAGE LV can accurately emulate a real battery supplying the device under test with a voltage that depends on multiple input parameters.

The E-STORAGE LV is fully compatible with AVL's engine and vehicle test systems allowing an easy integration into existing testbeds, but can be also operated as a stand-alone application. Excellent EMC characteristics with lower noise levels enable applying sensitive measurement sensors in close proximity. Thanks to a protection class up to IP54 the system can be placed in a test cell without additional protection.

Operating range



BATTERY EMULATION AND TESTING

The E-STORAGE LV is available as a battery tester (BT), emulator (BE) and a combined tester and emulator (BTE). The user-friendly battery testing automation software AVL LYNX makes the AVL E-STORAGE LV compliant with the requirements of the test run standards (ISO12405, VDA, etc.). The software also provides a possibility to integrate any subsystems like BMS, climatic chamber, shaker, I/O systems as well as additional AVL products such as AVL SANTORIN or AVL CONCERTO.

The system can be set up to emulate a battery by a simple internal resistance model or more sophisticated models with an AVL Controller:

- Basic battery model with U_0 and R_i as $f(T, SOC)$
- Advanced battery model with U_0 and RC network as $f(T, SOC)$
- External Matlab/Simulink® battery model interface
- Customer-specific energy storage model interface

Key Features

The air cooled system can be operated in two quadrants (source $I > 0$, sink $I < 0$) with voltage and current measurement with a resolution of 16 bits. As an option it can be operated locally with a built-in control panel.

- Operated by AVL's automation system (AVL LYNX, PUMA) or by customer's system via 1 kHz CAN interface
- Safe shutdown acc. to ISO 13849-1 PL e (optional for BE and BTE)
- Ground fault detection unit with remote signaling and adjustable limits for earth leakage monitoring and detection of insulation faults
- Discharge unit to discharge the capacitors of the UUT (optional for BE and BTE)
- Compact, mobile design with wheels

TECHNICAL DATA

| | |
|--|---|
| AC line | |
| Line voltage | 3 x 380–480 ± 10 % VAC |
| Line frequency | 47–63 Hz |
| Mains connection type | 3L+PE (no neutral) |
| Input current in source mode | 3 x 32 A (20 kW), 3 x 51 A (32 kW), 3 x 102 A (64 kW) |
| DC ratings | |
| Voltage | 0–60 VDC ¹ |
| Power | ± 20 kW, ± 32 kW, ± 64 kW |
| Current | ± 385 A (20 kW), ± 600 A (32 kW), ± 1200 A (64 kW) |
| System characteristics | |
| Voltage tolerance static | max. ± 0.1 % FS |
| Current tolerance static | max. ± 0.1 % FS |
| Current rise/fall time (10 %...+90 % of a step) | < 2.0 ms ² |
| Load regulation time for CV operation | < 1.1 ms (20 kW), < 1.5 ms (32 kW), < 2.0 ms (64 kW) ³ |
| Measurement accuracy | |
| Voltage | ± 0.05 % FS |
| Current | ± 0.05 % FS |
| Mass | 200 kg (20/32 kW), 350 kg (64 kW) ⁴ |
| Main dimensions with wheels (H x W x D) | 1150 x 665 x 900 mm (20/32 kW), 1850 x 665 x 900 mm (64 kW) |
| Ambient conditions | |
| Operating temperature | 5–40 °C |
| Storage temperature | -18–70 °C |
| Protection classes | IP23, IP54 |
| Conformity (CE) | |
| General requirements | EN 50178, EN 61439-1 |
| EMC emission | EN 61000-6-4 |
| EMC immunity | EN 61000-6-2 |
| Safety requirements for power converter systems and equipment- Part 1: General | EN 62477-1 |
| Electrical equipment of Machines, Part 1: General requirements | EN 60204-1 ⁵ |
| Safety related parts of the control system | EN ISO 13849-1 ⁶ |

FS = full scale

¹ Can be extended to 65 V (option).

² May be increased in quadrant change for 64 kW unit and in multi-unit operation.

³ Typical recovery time to within ± 5 % band of set value for a load step 10–90 % including a quadrant change, ohmic load, at constant line input and temperature conditions.

⁴ Without cables. The mass depends on the product variant and options.

⁵ For BE and BTE only.

⁶ Optional, for BE and BTE only.

FIND OUT MORE

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