Enviline™ VLD
Voltage Limiting Device for DC rail transportation
Enviline VLD – Voltage Limiting Device
Protects people and equipment against rail to ground hazards

Electric transit systems use the running rails for returning the traction current back to the power substation. These rails are isolated from ground to prevent the current from flowing through unwanted paths. But this presents concerns for safety and reliability. For one, traction currents during acceleration are extremely high, and cause voltages to develop on the running rails that potentially exceed safe limits. Another area of concern is fault clearance. Ground faults on the positive side of the traction power system may not trip the feeding circuit breaker if there is no direct return path to the rectifier. Since modern DC traction power substations are typically isolated from ground, ground faults often produce harmful voltage levels that must be addressed.

For this reason, ABB offers Enviline VLD, a system which detects and removes hazardous voltage conditions by shorting the running rails to ground in a timely, effective and safe manner.

Peace of mind and ease of installation
Installed at substations, passenger stations and crossings, or wherever people are exposed to running rails or vehicles that are near grounded surfaces, the VLD protects passengers and employees from dangerous touch and accessible (step) voltages per EN 50122-1 and IEC 62128 (safety, earthing and provisions against electric shock). The VLD is an integral component of the overall safety measures that transit authorities can implement for the highest degree of rail power safety.

Key benefits
• Ensures compliance with EN 50122-1 safe touch voltage limits
  Thanks to its parallel thyristor/contactor architecture, which provides fast response with capacity for large ground currents
• Facilitates timely and safe ground fault clearance
  Provides a conducting return path and alarms, which help trigger the protection circuit breaker
• Prevents unnecessary stray currents
  Selectivity of turn on and turn off set points ensures that the system operates only as needed
• Helps understand the causes of stray currents
  Extensive monitoring capability provides complete information about firing events
• Flexible and easy installation
  Compact freestanding enclosure

Key features
• Hybrid thyristor/contactor construction for handling fast rising voltage conditions and large fault currents
• Hardware backup to ensure fail-safe operation in case of software lock up or absence of control power
• 3 programmable, time defined voltage trigger points per polarity to optimize the timing and duration of the grounding events
• Automatic turn off mode
• Manual bypass switch for lock out during maintenance
• Separate control and power compartments for maintenance accessibility and safety
• LED alarms and LCD touch screen display
• Friendly web-based access via a standard HTML browser
• Event recording and advanced monitoring capabilities
ENVILINE VLD - VOLTAGE LIMITING DEVICE FOR DC RAIL TRANSPORTATION

Enviline
Reliability and efficiency on track

The VLD solves rail grounding needs

Automatic rail grounding: the VLD detects voltage problems caused by high traction currents, lightning, cross coupling or other incidents, and temporarily grounds the running rails until the condition disappears.

Fault clearance: the positive side of the traction power line may be short circuited to ground due to equipment failure, current leakage, sabotage or other incidents. This will impact the voltage on the running rails, which the VLD will detect and provide a return path necessary to open the feeder breaker and remove the harmful condition.

Platform grounding: passenger platforms are usually isolated from ground. However, nearby metallic objects can provide a conductive path to earth through the train chassis and passengers. The VLD can be used to automatically short these metallic objects when the running rails carry harmful voltages.

Safe maintenance: even when disconnected from the traction power, the running rails can be exposed to lightning, cross coupling or other incidents that represent a safety hazard. The VLD can be set in manual lock position to safely ground the running rails during maintenance.

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Technical data

<table>
<thead>
<tr>
<th></th>
<th>Enviline VLD 750</th>
<th>Enviline VLD 1500</th>
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<tbody>
<tr>
<td>Nominal TPS (TPS)</td>
<td>600 / 750 VDC</td>
<td>1500 VDC</td>
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<td>Voltage detection</td>
<td>Dual polarity</td>
<td>Dual polarity</td>
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<td>Operating voltage range</td>
<td>30 to 200 VDC (settable)</td>
<td>30 to 200 VDC (settable)</td>
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<td>Time delay</td>
<td>1 ms to 10 s (settable)</td>
<td>1 ms to 10 s (settable)</td>
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<td>Peak current withstand – 10 ms</td>
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<td>70,000 A</td>
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<tr>
<td>Continuous current</td>
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<td>Control power voltage</td>
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<td>110 or 220 VDC</td>
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<td>600 x 2000 x 600 mm</td>
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<td>350 kg</td>
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<td>-20° to 60°C</td>
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01 Diagram of a typical system setup

AC-

MV/HV Network

TDR energy rectification

Traction Transformer

Traction Diode Rectifier

DC+

Voltage Limiting Device

DC-