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 vehicules 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

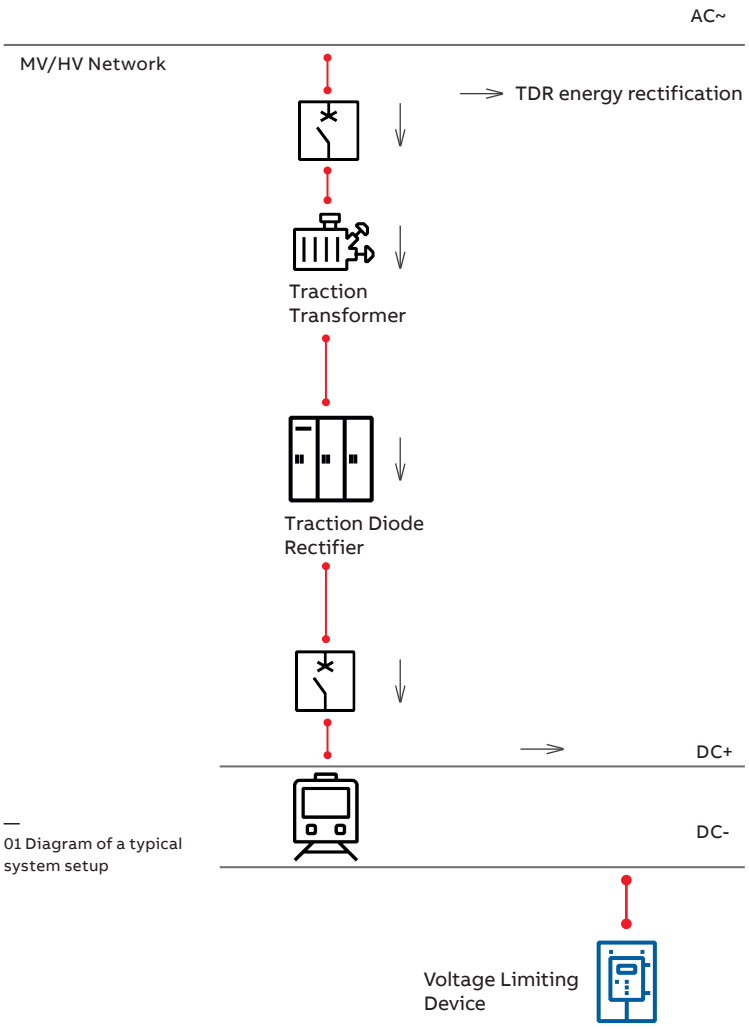
- Ensures compliance with EN 50122-1 safe touch voltage limits
  Thanks to its parallel thyristor/contactor architecture, which provides fast response with capacity for large ground currentsy
- Facilitates timely and safe ground fault clearance
  Provides a conducting return path and alarms, which help 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

Reliability and efficiency on track



01 Diagram of a typical system setup

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.

Technical data	Enviline VLD 750	Enviline VLD 1500
Nominal TPS (Traction Power Supply)	600 / 750 V_{DC}	1500 V_{DC}
Voltage detection	Dual polarity	Dual polarity
Operating voltage range	30 to 200 V_{DC} (settable)	30 to 200 V_{DC} (settable)
Time delay	1 ms to 10 s (settable)	1 ms to 10 s (settable)
Peak current withstand – 10 ms	70,000 A	70,000 A
Continuous current	1000 A	1000 A
Control power voltage	110 or 220 V_{DC}	110 or 220 V_{DC}
Cabinet dimensions (W x H x D)	600 x 2000 x 600 mm	600 x 2000 x 600 mm
Weight	350 kg	350 kg
Cable entry	Top or bottom	Top or bottom
Storage temperature	-20° to 60°C	-20° to 60°C
Operating temperature	0° to 50°C, no derating	0° to 50°C, no derating
Elevation	1000 m	1000 m
Enclosure	NEMA 2 / IP20	NEMA 2 / IP20
Remote access	TCP/IP and RS485 (Modbus)	TCP/IP and RS485 (Modbus)
SCADA output	6 contacts (form C)	6 contacts (form C)
EMC	EN 50121-5	EN 50121-5
Standards	EN 50122-1	EN 50122-1

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