
ENVILINE™ TDR, WDR

Traction Diode Rectifier for DC rail transportation



ENVILINE TDR, WDR – Traction Diode Rectifier

Most reliable and cost effective rectification solutions for DC wayside supply

Three-phase power supply is the most often used electricity source nowadays. However, most urban public transportation infrastructures powered by electrical energy utilize direct current. Therefore to be able to power trains, metros, trams and trolleybuses, it is necessary to use an electronic power converter — traction rectifier, converting alternating current into direct current.

ABB has vast experience in the design, construction and start-up of traction rectifiers, supported by many references worldwide.

Designers, engineers, project managers, as well as assemblers of ABB traction rectifiers are world-class specialists. Their competence is best proven by successfully completed contracts. ABB's ENVILINE solutions installed at one of the oldest metro systems – the London Underground lines Victoria, Metropolitan and Jubilee – facilitate the transportation of more than 200 million passengers a year. ABB highly contributes to modernization of railway infrastructure and municipal transport in Poland where the number of installed rectifiers exceeded 1000 units. Our rectifiers work also in municipal transport systems in Switzerland, France, Turkey, Hungary, Finland, Belarus, USA, Canada, Brazil, Australia, Malaysia, Egypt, Algeria, Nigeria.

Key benefits

- **Highest reliability**
ABB's dedicated support during development and execution stage, wide solution experience and robust technology minimize cost and risks providing highest reliability.
- **Cost effective solution**
ABB's flexible and tailored approach is optimized to minimize the total solution cost.
- **Dedicated support**
ABB's localized support, along with global footprint, mitigates technical and executional risks for customers.
- **Over 50 years of experience**

Key features

- Proven and robust technology
- Minimal operational and maintenance costs
- Easy maintenance
- Passive cooling
- High overload capability
- High level of conformity with individual requirements as well as international standards
- Compatible with all DC supply systems
- Stand alone or combined* units

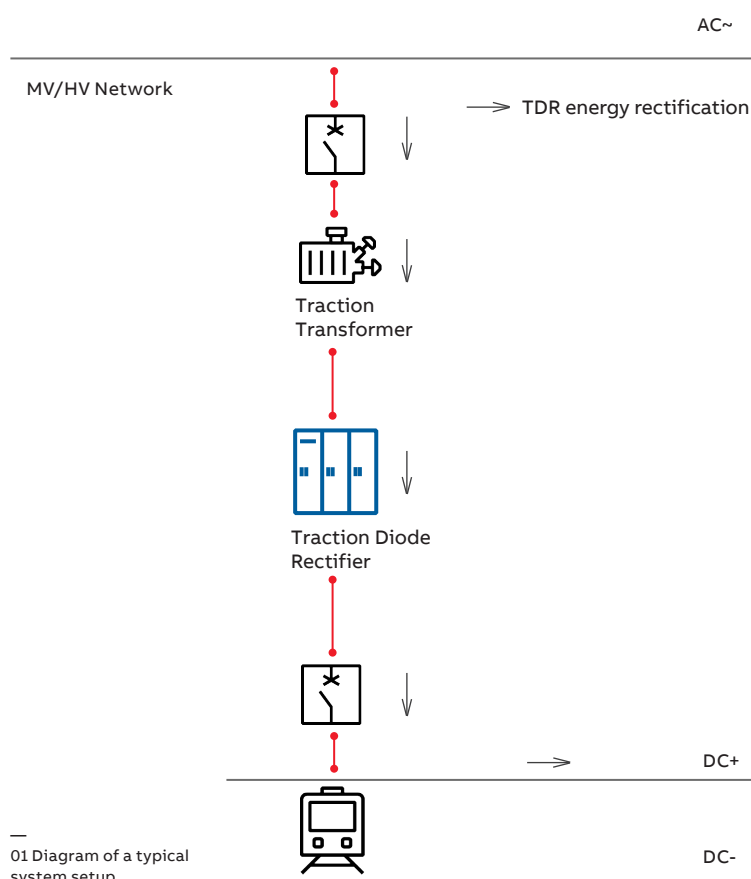
* (dry type transformer and rectifier in common enclosure)

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Reliability and efficiency on track



General information

ENVILINE TDR units are tested according to EN 50328, IEC 60146, IEEE 1653.2, NEMA RI-9 and offer overload class according to these standards. TDR units are designed for natural cooling that ensures low noise and practically maintenance free operation. They provide many variants of AC and DC interfaces.

Protection philosophy

TDRs are designed to withstand output short circuit conditions greater than 150 ms allowing ample time for external protection systems to trip. Reliable over voltage and surge suppression passive circuits are used to protect diode rectifier modules, AC inputs, DC output as well as control circuits. Two levels of over temperature protection and two level diode protection for redundant designs are part of the many protection and monitoring options that are available to meet any of our customer's needs.

Diagnostics

Diode Status Diagnostics (DSD) unit detects and monitors diode failures. DSD is equipped with basic panel or touch screen for user operation. Diagnostics typically report on the following functions: detection of shorted diode, Open Circuit Arm Detection (OCAD), monitoring of high speed fuses.

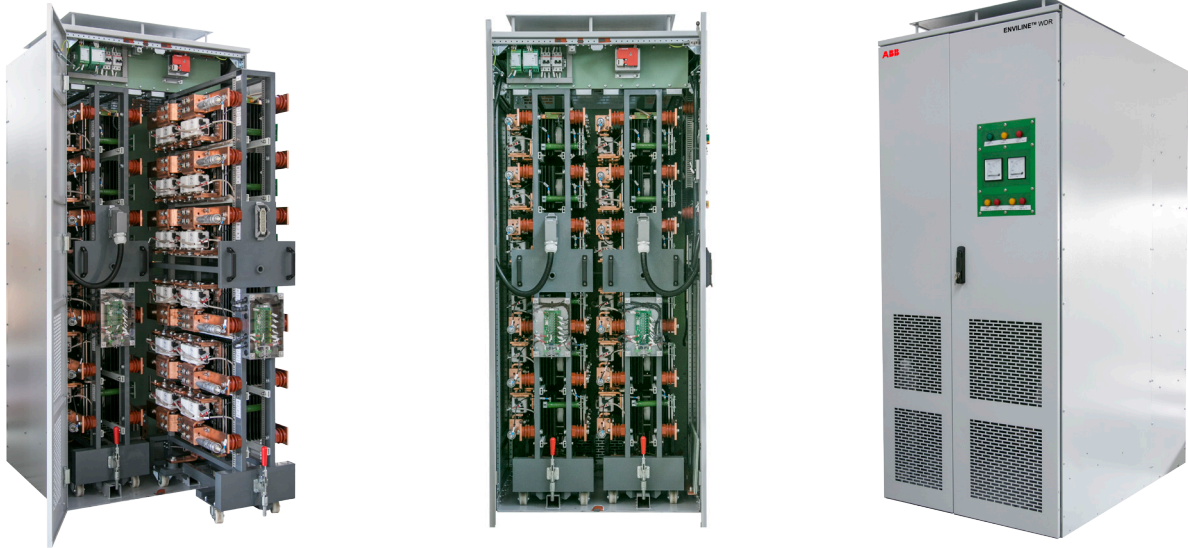
Additional equipment

A variety of additional equipment can be added like inter-phase transformer, DC disconnecting switch, current and voltage measurement, protective ANSI relays, PLC for control and communication, interlocks, door limit switches and many others.

Technical data	ENVILINE TDR 750	ENVILINE TDR 1500	ENVILINE TDR 3000
Nominal TPS (Traction Power Supply)	600 / 750 V _{DC}	1500 V _{DC}	3000 V _{DC}
Converter power range	0.5 to 5 MW	0.5 to 8 MW	1 to 8 MW
Pulsation	6, 12, pseudo 24 pulses	6, 12, pseudo 24 pulses	6, 12, pseudo 24 pulses
Overload capability	Class VI (others on request)	Class VI (others on request)	Class VI (others on request)
Operating voltage range	500 to 1000 V _{DC}	1000 to 2000 V _{DC}	2000 to 4000 V _{DC}
Efficiency	Typically > 99.5 %	Typically > 99.5 %	Typically > 99.5 %
Cooling	Air natural	Air natural	Air natural
Storage temperature	-20° to 60°C	-20° to 60°C	-20° to 60°C
Operating temperature	0° to 40°C (-20° to 50°C optionally)	0° to 40°C (-20° to 50°C optionally)	0° to 40°C (-20° to 50°C optionally)
Maximum temperature (with derating)	50° C	50° C	50° C
Elevation	1000 m (higher with derating)	1000 m (higher with derating)	1000 m (higher with derating)
Enclosure	IP00, IP20 - IP33	IP00, IP20 - IP33	IP00, IP20 - IP33
Remote access	CAN / IEC61850 / MODBUS TCP/IP	CAN / IEC61850 / MODBUS TCP/IP	CAN / IEC61850 / MODBUS TCP/IP
EMC	EN 50121-5	EN 50121-5	EN 50121-5
Redundancy	Optional	Optional	Optional
Standards	EN 50328 / IEC 60146 / IEEE 1653.2 / ANSI C34.2	EN 50328 / IEC 60146 / IEEE 1653.2 / ANSI C34.2	EN 50328 / IEC 60146 / IEEE 1653.2 / ANSI C34.2

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The WDR offers the same functionality of a traditional traction diode rectifier (TDR), with the difference that the diode modules are installed on a removable trolley, accessible by the front of the unit.

Design

In applications with no rear access to the rectifier for maintainability, the withdrawable diode rectifier offers the flexibility of permitting back to the wall installation, while enabling access to the power components. The removable trolley consists of the power diode modules, its associated protection fuses, transient suppressors and is available as a 12 diode or an 18 diode cart. Flexible cart configurations make it possible to offer a variety of 6 or 12 pulse, 750 or 1500 V_{DC} cubicles.

Safety

The WDR is equipped with a full set of safety features, such as locking system, overheat monitoring, voltage and current measurements, earth relay and overload protection. Control lamps on the front panel are indicating any type of trip or fault. In case of any issue, the cart can be easily replaced by the spare one. Continuous grounding is provided during cart inserting and withdrawing. Rotary pair of wheels at the front guarantee easy maneuvering.

Key benefits

- Back to the wall installation: reduced footprint, and line up with transformer and/or DC Switchgear for ease of installation
- Front access for optimized maintainability
- Building block modular approach- standardized modules to facilitate lead times and spare parts management

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Reliability and efficiency on track

Technical data	ENVILINE WDR 750	ENVILINE WDR 1500
Nominal TPS (Traction Power Supply)	600 / 750 V _{DC}	1500 V _{DC}
Converter power range	0.5 to 4 MW	0.5 to 8 MW
Pulsation	6, 12, pseudo 24 pulses	6, 12, pseudo 24 pulses
Overload capability	Class VI / NEMA RI-9 Extra Heavy Duty Traction (others on request)	Class VI / NEMA RI-9 Extra Heavy Duty Traction (others on request)
Operating voltage range	500 to 1000 V _{DC}	1000 to 2000 V _{DC}
Efficiency	Typically > 99.5 %	Typically > 99.5 %
Cooling	Air natural	Air natural
Cabinet Dimensions (WxHxD)		
Version 18	0.8 x 2.2 x 1.4 m	0.8 x 2.2 x 1.4 m
Version 24	1.0 x 2.2 x 1.4 m	1.0 x 2.2 x 1.4 m
Storage temperature	-20° to 60°C	-20° to 60°C
Operating temperature	0° to 40°C (-20° to 50°C optionally)	0° to 40°C (-20° to 50°C optionally)
Maximum temperature (with derating)	50° C	50° C
Elevation	1000 m (higher with derating)	1000 m (higher with derating)
Enclosure	IP21, IP31	IP21, IP31
Remote access	IEC61850 / MODBUS TCP/IP	IEC61850 / MODBUS TCP/IP
EMC	EN 50121-5	EN 50121-5
Redundancy	Optional	Optional
Standards	EN 50328 / IEC 60146 / IEEE 1653.2 / ANSI C34.2	EN 50328 / IEC 60146 / IEEE 1653.2 / ANSI C34.2

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