ENVILINE™ ITR
Integrated Transformer Rectifier for DC rail transportation
ENVILINE ITR – Integrated Transformer Rectifier
Most compact rectification solutions for DC wayside supply

Urban population growth combined with environmental performance pressure have a direct impact on public urban transportation development. Growth and modernization of the public transportation system are essential to meet the demand and are challenged with economic and land-use minimization targets. Traction power equipment footprint must be optimally planned to limit the footprint and reduce the size of the substation in expansions, or enable to fit into restrictive retrofit spacing.

Traditionally, the transformer and rectifier are provided in separate enclosures and are treated as separate pieces of equipment from a procurement, testing, documentation, shipping, installation and commissioning perspective. ABB is the traction power equipment provider that combines the world-class expertise of both transformer and rectifier design, and as such, has a vast experience in the design, construction and start-up of integrated traction transformer and rectifier units, supported by many references worldwide. The ENVILINE ITR brings you the same performance as traditional transformer-rectifier units, combined in a single product. The result is not only a compact solution for space savings, but also a simpler alternative that will help you save on documentation, logistics, installation and testing.

Key benefits
• Most compact
  ABB’s integrated transformer and rectifier units are specially designed and fitted together to make it compact and low weight.
• Highest reliability
  ABB’s dedicated support during development and execution, wide solution experience and robust technology minimize cost and risks providing highest reliability.
• Lowest upfront costs
  ABB’s flexible and tailored approach is optimized to minimize the total solution cost by reducing support expenses such as logistics, packaging, shipping, installation and testing.
• Dedicated support
  ABB’s localized support, along with global footprint, mitigates technical and executional risks for customers.

Key features
• Proven robust technology
• Minimal operational and maintenance costs
• Smallest footprint due to common enclosure
• Easy maintenance
• Passive cooling
• High overload capability
• High level of conformity with customer requirements as well as international standards
• Compatible with all DC supply systems

ENVINLE ITR 750
<table>
<thead>
<tr>
<th>Technical data</th>
<th>600 / 750 VDCnominal TPS (Traction Power Supply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Converter power range</td>
<td>1.5 to 2 MW</td>
</tr>
<tr>
<td>Pulsation</td>
<td>6, 12</td>
</tr>
<tr>
<td>Overload capability</td>
<td>Class VI / NEMA RI-9 Extra Heavy Duty Traction (others on request)</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>500 to 1000 VDC</td>
</tr>
<tr>
<td>Efficiency (transformer and rectifier)</td>
<td>Typically &gt; 98 %</td>
</tr>
<tr>
<td>Cooling</td>
<td>Natural convection</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20° to 60°C</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0° to 40°C (-20° to 50°C optionally)</td>
</tr>
<tr>
<td>Maximum temperature (with derating)</td>
<td>50°C</td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m (higher with derating)</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP00 / IP20 / IP21 (up to IP33 on request)</td>
</tr>
<tr>
<td>Standards</td>
<td>IEC 60076 / EN 50328 / IEC 60146 / IEEE 1653.2 / ANSI C34.2</td>
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ENVILINE ITR - INTEGRATED TRANSFORMER RECTIFIER FOR DC RAIL TRANSPORTATION

ENVILINE
Reliability and efficiency on track

Protection philosophy
ITRs are designed to withstand output short circuit conditions greater than 150 ms allowing ample time for external protection systems to trip. Sample over voltage and surge suppression passive circuits are used to protect transformer and diode rectifier modules, AC inputs, DC output as well as control circuits. Two levels of over temperature protection for transformer and rectifier are part of the many protection and monitoring options that are available to meet any of our customers’ needs.

Transformer
ABB transformers are designed for optimum space utilization, special requirements and the most demanding conditions. Dry-type transformers are the only transformers that can be installed close to utilization point. This allows an optimized installation design and reduced low voltage circuits with corresponding savings in losses.

The main features and accessories are:
- Dry-type vacuum cast coil hi-T Plus transformer
- Off-load tap changer on primary winding
- Class H insulation (F available)
- Bi-directional wheels
- Electrostatic screen

Diagnostics
A Diode Status Diagnostics (DSD) unit detects and monitors diode failures. DSD is equipped with a basic panel or touch screen for user operation.

Additional equipment
A variety of additional equipment can be added such as current and voltage measurement, protective ANSI relays, interlocks, door limit switches.

General information
ENVILINE ITR units are tested according to IEC 60076, EN 50328, IEC 60146, IEEE 1653.2, NEMA RI-9 and offer overload class according to these standards. ITR units are designed for natural cooling that ensures low noise and practically maintenance-free operation. They provide many variants of AC and DC interfaces.

01 Diagram of a typical system setup