TeSys B bar-mounted contactors

Earthing the power supply rail of tramway
The ground-level power supply technique for tramways allows the overhead power supply line, which is not very attractive, to be eliminated in historic districts of cities. The technique involves energizing rail portions only when the motor unit passes over them. After being crossed by the tramway, the portion of the rail is automatically earthed.

**This system is implemented with a third centre rail, only the top surface of which is flush with the pavement**

The rail is formed of conductive segments. The positive direct voltage (e.g. 750 V) is present in the rail only when the tram set covers it completely; the power supply is managed by underground control units. As it advances, the tram set automatically activates the power supply for the centre rail by sending a signal to the control units via an inductive branch circuit. The current is collected by the tram set via two pads located under the bodies in the middle of the set. There is always at least one pad in contact with a segment of the conductive rail. At the points, the power supply is suspended to prevent short circuits between the pads (positive) and the tramway rails (negative).

A rail earthing contactor ensures human safety if, by error, a segment of the conductive rail were to remain energized at a time when no tram set is present.

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**No visual pollution:**

The ground-level power supply avoids the installation of catenary systems and suspended cables.
Typical installation

Ground-level power supply and power supply short-circuiting

1. When it is crossed by the tramway, the centre rail is energised on a portion equivalent to the length of the tramway. **The short-circuiter KM1 is open.**

2. After being crossed by the tramway, the rail is no longer energized: it is immediately earthed by means of the breaker-contactor. **The short-circuiter KM1 is closed.**
The Schneider Electric solution:
Schneider Electric offers a breaker-contactor, with high making capacity (up to 43 kA) for networks 1000 V DC, capable of ensuring earthing of the rail when it is no longer energized, but also in fault condition if it occurred.

Special requirements for earthing of power supply rails

Protecting human life against risks of electrocution
Where there is no tram present, energizing of the rail in the event of a control system fault must be prevented.

Only the bar-mounted contactor technology can perform, via breaker poles, the reverse function of a contactor, with a high making capacity.

Our bar-mounted contactors, dedicated to the short-circuiting of rails, ensure earthing of the rail at fault, until opening of the protection system.

Our bar-mounted contactors are fitted with an "iron hand"* and can withstand short-circuit currents of up to 43 kA peak.
* System to prevent repulsion of the poles upon a short circuit

Opening the short-circuiter to energize the rail when crossed by the tramway

Ensuring a large number of switching operations
According to the frequency of tramway crossing, all year long.

Our dedicated contactors are designed to perform 1 million switching operations unloaded, and 200,000 in the event of closing upon an electrical fault.
The Schneider Electric solution:
Schneider Electric offers a breaker-contactor, with high making capacity (up to 43 kA) for networks ≤1000 V DC, capable of ensuring earthing of the rail when it is no longer energized, but also in fault condition if it occurred that the rail remained energized after being crossed by the tram.

### TeSys B range of bar-mounted contactors

<table>
<thead>
<tr>
<th>Type of contactor</th>
<th>Type of network</th>
<th>Characteristics</th>
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</table>
| 2 poles in parallel | ≤ 1000 V DC | Select CV1 BKS contactor:  
- $U_i = 1000$ V  
- $I_e = 1000$ A DC  
- Making capacity: 30 kA peak |
| 3 poles in parallel | ≤ 1000 V DC | Select CV1 BKS contactor:  
- $U_i = 1000$ V  
- $I_e = 1400$ A DC  
- Making capacity: 43 kA peak. |
To find out more about TeSys B contactors

**General documentation:**

> Refer to the variable-composition contactor catalogue and the other data sheets on TeSys B contactors.

> Download the “Soft-CustomerB” software.

[www.schneider-electric.com](http://www.schneider-electric.com)