

VOLTAGE-LIMITING DEVICE TZD-1NR(T)



APPLICATION

- protection against impermissible touch voltages
- open group bonding system of DC traction (railway, tramway, metro)
- protection of other objects directly related to electrical DC traction
- limitation of stray currents
- separation between public electricity earthing and traction earthing
- other earthing separation

BENEFITS

- same device can work as VLD-F and VLD-O
- no external power supply
- bidirectional, recoverable (class 2.2)
- filtering out of commutation overvoltages due to the unique voltage dependent reaction time characteristic
- compliant with to EN-50562
- suitable for outdoor operation, additional enclosures available

Voltage limiting device TZD-1NR(T) is dedicated for use as the open connection in equipotential bonding system and for protection of other objects directly related to electrical DC traction, where earth-fault may occur, but the direct connection to the running rails is unacceptable due to the stray currents.

Voltage limiting devices TZD-1NR, can be also installed between substation earthing and cooper shield of HV cables, where during the normal conditions electrical connection (bond) due to the stray current limitations is not recommended, but such connection is necessary in faulty conditions to assure people and equipment safety.

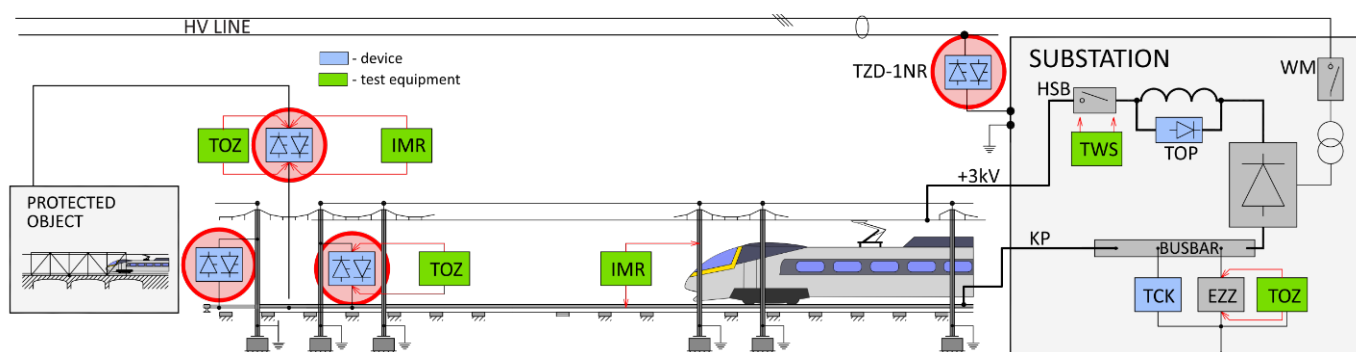
For tramway, metro. depots and similar locations voltage limiting device TZD-1NR/T is offered, which has exactly the same functionality and parameters except reduced to 60 V triggering voltage.

TZD1NR devices are used for earth-fault protection in the electrical traction of Polish State Railways (PKP) since more than 20 years.

PARAMETERS

Nominal triggering voltage	U_{Tn} - 120 V (60 V)
Rated current	I_r - 150 A
Long-time withstand current	I_{th} - 1,5 kA @ 1min 750 A @ 5 min 300 A @ 30 min
Short-time withstand current	I_w - 12 kA @ 100 ms
Nominal current impulse 8/20 μ s	I_{imp-n} - 30 kA
Climatic conditions	outdoor
Ambient temperature	from -30 C to +40C
Dimensions	345 x 200 x 160 mm
Weight	7,1 kg





Voltage limiting device TZD-1NR becomes conductive when the voltage at its terminals approaches triggering voltage. TZD-1NR conducts current till the opening of high speed circuit breaker in substation and then, it returns to non-conductive state (recovers). Triggering of TZD-1NR may be caused by earth faults and other effects like overvoltages due to the commutations. Recovering to non-conductive state happens when the flowing current approaches zero.

The voltage limiting device type TZD-1NR (VLD class 2.2) is designed for earth fault and shock protection in the DC overhead contact line and other circuits requiring bonding. The TZD1-NR device, meets the requirements for VLD type F (and type O), has been tested and approved for use in the earth fault protection system and other facilities of the PKP (Polish Railways) traction network already in year 2001. From that moment, TZD-1NR devices are installed on the new and refurbished railway lines. Since many years, they have also been installed to protect objects in the tramway traction.

The voltage dependent reaction time characteristics of TZD1NR devices practically eliminates false triggering operation due to the overvoltages, which can reach values up to several hundred volts in a few milliseconds. TZD1-NR, exceptionally to other devices equipped with a constant delay of 1 to 2 milliseconds, does not become conductive from overvoltages coming from normal operation. Since TZD1-NR conducts in the situation of real earth faults the stray currents are significantly reduced.

Reaction time of TZD-1NR devices for voltages above 700 V is in the range of a few microseconds. This allows application of these devices in high voltage AC installations, e.g. for separating earthing installations of public electricity from earthing installations of traction current (both AC and DC). For the same reason, TZD-1NR can also be used to separate any earthing area where stray or equalizing (DC or AC) currents may interfere with the operation of sensitive systems or devices, e.g. railway traffic control centers, hospitals, computer centers, etc.

Typically, TZD-1NR is installed directly on the mast. However, KOLEN offers suitable additional enclosures, to protect persons from coming into direct contact with the return circuit wire. TZD-1NR/T is dedicated for tramway traction protection circuits and for workshops, depots and similar locations where reduced voltage has been chosen considering the high risk of injury for persons due to uncontrolled reactions caused by touch voltages at work.

