

EZZ2

Electronic ground-fault protection



Electronic ground-fault protection is the basic protection of railway and tram power substations. It is designed to protect DC electric traction power supply systems with poles insulated from the ground. EZZv2 provides the detection, recognition of the characteristics and the shutdown of ground faults at the lower level of currents than guaranteed by the basic overcurrent protection in the DC switch's gears.

The purpose of the device is to continuously monitor the voltage between the reference pole (-) of the DC system and the ground of the substation / cabin. Depending on the characteristics of the detected events, three operating scenarios of the EZZv2 are provided.

1. In case of an increase in the voltage between the grounded pole and the ground above the value of 120 V, the short-circuit between the poles is activated, the purpose of which is to equalize their potentials.
2. In case of close ground faults, the ground fault is transformed into an inter-pole fault which forces the quick overcurrent protection to trip.
3. In case of exceeding the value of the monitored short-circuit current and failure of the overcurrent protection of the traction feeder, EZZv2 switches off the power substation.

Additionally, to extend possible protection scenarios, EZZv2 is equipped with dependent overcurrent protection. It is a multi-threshold protection, the operation of which is defined by the settings of the pairs: current - time delay. Activation of this protection causes launch of a special relay output, which can be used in protection automatics.

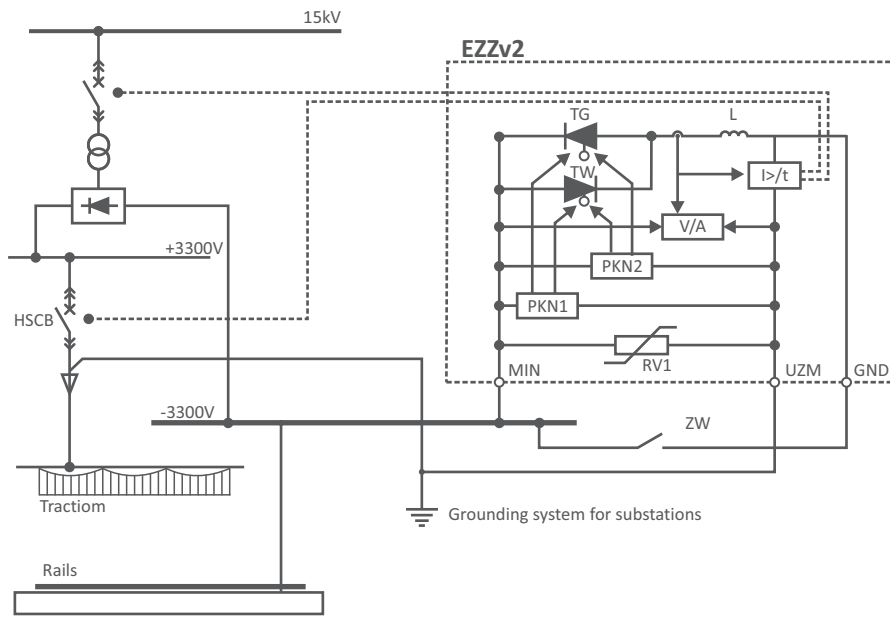
The EZZv2 has also been equipped with digital automation systems that allow to record data of electrical quantities and events. These data are presented on the device display or available in the form of exported files saved on an external medium. Changes to the settings can be made via the Ethernet interface, communicating with the web server implemented in EZZv2. The device is included in the integrated traction automation system, and its readings are visible in the supervision systems.

EZZv2 in DC power systems provide:

- » switching off ground faults in the substation / cabin or cables of traction feeders by transforming the ground fault into an inter-pole fault,
- » switching off substations when the return cables are broken,
- » shock, surge and fire protection,
- » supervision of the condition of the network and return cables through the control of voltages and ground currents,
- » limitation of stray currents thanks to the monitoring and signaling of the ground fault of the minus bus.



Simplified block diagram of EZZv2 with connection to a railway power substation



- HSCB - high speed circuit breaker
- ZW - earthing switch of the minus busbar or portable earthing device
- TG - main thyristor block
- L - steepness coil
- V/A - measuring block
- PKN1,2 - voltage control packages
- I>/t - overcurrent sensor with time delay circuit
- RV1 - varistor
- TW - reverse thyristor short-circuited

Electronic ground-fault protection EZZv2 was awarded:



» **Main Award of the Professor Jan Podoski, funded by the Polish Chamber of Urban Transport (IGKM) for the best products, innovative technical solutions and state-of-the-art technologies addressed to electric traction in urban transport presented at the International Railway Fair TRAKO.**



» **Distinction Award of the Professor Czesław Jaworski, funded by Polish Association Of Engineers & Technicians Of Transportation (SITK RP) for the outstanding achievements in the implementation of new technologies, equipment in electric traction and railway traffic control devices presented at the International Railway Fair TRAKO.**

The information provided is a general description of the technical possibilities, which may not always be applicable in specific cases. The expected parameters should be specified when placing the order.