

## ELECTRIC TRANSMISSION SUPERCONDUCTING CABLE LINE

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Proposed superconducting cable line provides increased efficiency and energy saving by distributing electricity through two conductors of the superconducting cable in the electrical grid. The usage of a superconducting cable that has two superconducting wires made of two high-temperature superconducting layers separated by an insulating layers, in which there is an alternate transmission of electricity through a rectifier unit of two valves, reduces power losses.

Each power line of three cable phases is placed in its own cryostat, filled with a refrigerant (nitrogen), which simplifies the repair, as well as operation. The scheme of the distributed electric power supply transmission of the superconducting three phase cable line is given in Fig. 1.

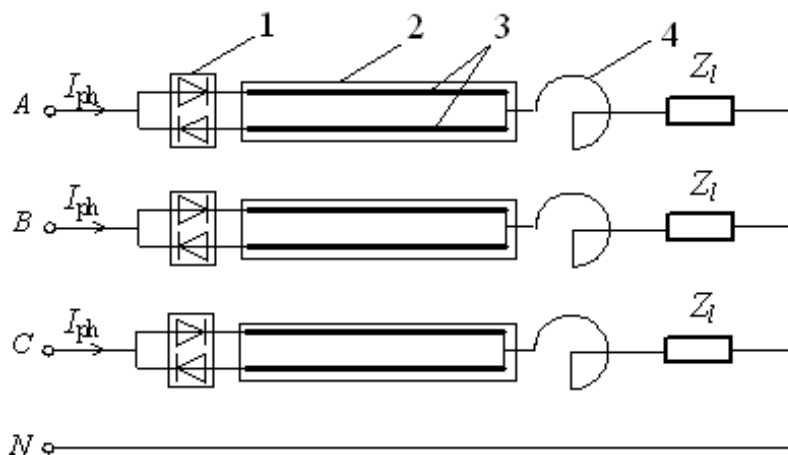


Figure 1

The essence of the power distribution in the three phase system with superconducting cable line is in usage of two high-temperature conductors in each superconducting cable, with a rectifier unit, which is included in each phase.

In the nominal operation mode of the power line, the phase current  $I_{ph}$  flows through the rectifier unit 1, where it is distributed over the superconducting wires 3, which are located in a single cryostat 2, and fed through the current limiting reactor 4 for protection from short-circuit on the load  $Z_l$ . Transmission of electricity power on two superconducting wires 3 is carried out in turn every half-period.

In order to increase the safety of the transmission cable line and the effectiveness of the protection equipment current limiting reactor limits the magnitude of the emergency current to an acceptable level in the case of a short-circuit.

Usage of proposed superconducting cable with two high-temperature superconducting wires can increase capacity of power and decrease power losses.