

# KOLEN Sp. z o.o.

## Infrastructure

The KOLEN company, operating since 1992, specializes in the field of earth-fault and electric shock protection as well as limiting stray currents in the electric traction supply system. Manufactured systems and measurement devices are shown in the diagram. Most devices are patented.

### **Patent No. 170994 of 1993 and No. 239737 of 2019 (VLD)**

**EZZ voltage limiting device** as earth fault protection in substations. The voltage dependent reaction time characteristic eliminates interferences caused by switching overvoltages in the circuit and provides selectivity for earth faults. Manufactured by Elester-PKP Sp. z o. o. under the license of KOLEN.

**TZD voltage limiting device** as earth fault protection for overhead contact line and in other circuits requiring bonding. The voltage dependent reaction time characteristic, for voltages above 700 V the reaction time is below a few microseconds. It can be used in high voltage AC earthing installations, e.g. for separating earthing installations of public electricity from traction earthing installations of direct current and alternating current.

### **Patent No. 199600 of 2003 and No. 237849 of 2019**

**Impulse resistance meter IMR** - resistance measurement device using its own single test probing pulse lasting approx. 40 ms with a maximum voltage of 150 V DC and a maximum current of 100 A, depending on the resistance of the circuit. One battery charge is sufficient for more than 100 field measurements. The unique algorithm of calculating the measured earth resistance or short-circuit loop eliminates the influence of AC and DC stray (equalizing) currents and their harmonics, circuit inductance and the constant component occurring before the measurement.

This allows accurate measurements of earth resistance in an urbanized area without the commonly used voltage probe. The IMR meter has many other measurement options related to the measurement of earth resistance, including soil resistivity.

### **Patent No. 206036 of 2005**

**Mobile tester of high-speed circuit breakers TWS**, using a battery of super capacitors as a test current source. Available models with output current capability up to 8 kA, single-phase 230 V AC power supply and computer-controlled probing current waveforms, including a probing test current with a rate of rise of 200 A/s. Equipped with measuring functions: tripping current settings, making capacity, contact resistance and switching off time for specific conditions.



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