INDUCTION SWITCH

HINTERGRUND

Switching high voltage sources is usually achieved by using gas discharge switches and semiconductor switches. However, known types of switches exhibit a number of disadvantages. The gas discharge switch electrode surface of the thyatron anode and cathode are exposed to erosion which is generated by the high current and power densities. Therefore, powerful trigger systems have a lifecycle of only a few thousands switching processes until they are defective due to sputter effects. Moreover, switches known from prior art are usually limited to block voltages of about 40 kV.

LÖSUNG

The present invention relates to an inductive switch consisting of a gas-filled discharge vessel and a coaxially interlaced electrode arrangement. The switch allows for switching high current. This is possible due to a generated dense plasma. Furthermore, the electrode gap is suffused with plasma ions.

The switch utilizes only a single discharge gap. Moreover, the discharge plasma is generated inductively. Thus, common disadvantages due to electrode-supported energy coupling are eliminated. The trigger system operates in the low pressure area (1Pa). Therefore, the gap distance of the pseudo-spark geometry can be increased by one order of magnitude from mm to cm. This implies a significantly higher holding power for a one-gap system as a result of the reduced electric field strengths. Additionally, the switch avoids electrode erosions because of an electrodeless energy coupling. The live time of the switcher corresponds to the live time of the gap system, because the trigger system components are not exposed to the discharge plasma. The induction switch can operate over a very wide voltage range from 10V up to several 100kV. This is due to the high conductivity of the inductive trigger discharging.
schematic structure of induction switch

**VORTEILE**

- discharge plasma is generated inductively
- trigger system operating in the low pressure area
- electrodeless coupling
- Long lifetime
- wide voltage range from 10V up to several 100kV

**ANWENDUNGSBEREICHE**

- electrical engineering
- impulse technique
- high voltage direct current transmission
- inverter technology
- impulse forming (operating x-ray and EUV sources)

**SERVICE**

The technologies can be licensed or assigned. Moreover, collaborations regarding further development are welcome.