

## Low Voltage Spark Gap

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An internal low voltage spark gap has been developed as a means of protection for distribution transformers against secondary side surges. The Electric Utility Industry has been concerned about transformer failures attributed to secondary surges, although the failure rate is estimated to be less than 0.5% per year. The entire subject is very complex, but the phenomenon is very much related to system parameters, such as, house and pole ground resistance, length and type of service drop, and transformer load. The surge impedance of the transformer coil is also a significant factor, resulting in units larger than 50 kVA being typically immune from this type of failure. The Power Partners spark gap will provide the same degrees of protection as any other method presently available, and at a significantly lower cost.



The spark gap mounted internally on the LV neutral bushing with the electrodes connected to the X1 and X3 bushings.

### Application

The spark gap is mounted internally between the low voltage line bushings and the low voltage neutral and is designed to arc over during low voltage surges to protect the transformer windings.

### Testing

Exhaustive testing has proven that (1) the internal spark gap operates under surge conditions to protect the transformer winding, (2) the arc is extinguished under high available fault current conditions, and (3) the operation of the internal spark gap, under maximum oil temperature conditions, and with a wide range of oil vapor to air ratios, does not result in the development of an unsafe condition. This extensive testing proves conclusively that the internal spark gap provides the same degree of protection as that provided by interlaced secondary windings, low voltage MOV arresters, and external spark gaps.

### Advantage

Effective – prevents low-side surge failures.

Cost effective – a spark gap is considerably lower in cost than the other suggested methods of prevention.

Reliable – a spark gap does not degrade the overall transformer or the system reliability.

Easy installation – the internal spark gap can be easily retrofitted onto existing transformers.