Ground Lead Disconnectors on Distribution-Class Surge Arresters

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Many current models of zinc oxide distribution or riser pole arresters come equipped with ground lead disconnectors. This is a device which is mounted on the ground end of the arrester and which looks about like a small hockey puck. The enclosure is black, blue or green plastic, a couple of inches in diameter and an inch or so tall.

The normal failure mode of these arresters is a short circuit to ground, causing ground fault current to flow. This current will cause the arrester body to fail if it is not stopped quickly. The first function of the ground lead disconnector is to disconnect the ground lead of the surge arrester in case of an internal failure of the arrester, preventing explosive failure of the arrester body. The ground lead disconnector contains a cartridge in series with a gap. The gap is shunted by a resistor. As the current rises, the voltage across the gap increases until the gap flashes over, creating an arc which ignites the cartridge, blowing the ground lead free.

The ground lead disconnector is not a fault current interrupter. The arc drawn by the ground lead as it separates from the body of the arrester may or may not go out on its own. If it does not go out, a circuit breaker, recloser or fuse must operate to extinguish the arc. The ground lead disconnector is expected to create a gap which will not reignite when power is reapplied to the circuit, but the gap which will be created is a function of the length and flexibility of the ground lead.

The second function of the ground lead is to give a visible indication of arrester failure for arresters mounted on overhead distribution lines. If a lineman sees an arrester with its ground lead hanging in midair, he knows that he has a failure which must be replaced.

These explosive ground lead disconnectors are not suitable for use in metal-enclosed equipment. We do not want the explosion and subsequent uncontrolled arc inside equipment, where the clearances are not nearly as great as on overhead lines, and where secondary damage from the arc is much more likely to occur. The visible indication function of the disconnector is useless if the device is mounted within an enclosed equipment.

All surge arresters used in Powell's equipments should be of the type without ground lead disconnectors. If a user requests that we include a surge arrester with a ground lead disconnector, we should offer an equivalent model without the disconnector.

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