TOP 10 QUESTION from the Tech Talk

TECHTALK

Understanding Modern Arc Flash Protection & Mitigation Techniques

In this Tech Talk, Understanding Modern Arc Flash Protection & Mitigation Techniques, review the fundamentals of arc flash, including causes, energy profiles and impact. Then dive into modern mitigation approaches, with a focus on centralized protection strategies and architectures.

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LET'S GO!

GE VERNOVA

Understanding Modern Arc Flash Protection & Mitigation Techniques

QUESTION	ANSWER
Do low impedance bus differential schemes require dedicated CTs, or can the CTs be used with other relays?	Unlike high impedance bus differential relays, low impedance bus differential relays do not require dedicated CTs. High impedance schemes load the CTs with high impedance to force error differential current from saturation through the CTs and not the relay. This scheme requires the resistance of the CTs to be low so they cannot be used for other relaying purposes. The CTs used must all be the same ratio and class. The low impedance scheme like that in the B30 and B90 allows you to use CTs with different ratios, and those CTs can be used by other protective relays. The low impedance scheme can also provide back-up protection to your primary relaying system. A centralized protection scheme like the one offered in the B30 can incorporate feeder and bus protection for up to 24 feeders in one relay.
Which protection methodology is faster / recommended: Current monitoring (50/87) or light?	Utilizing light provides faster protection; however, there is greater risk of mis-operation. Supervising the light sensor with high speed overcurrent elements provides protection and security. This type of protection is offered in the Multilin 8 Series and 350 relays.
Why would you use arc flash protection and not just overcurrent protection?	Traditional coordinated overcurrent protection does not provide fast enough protection at the bus for arc flash. The use of an arc flash relay like an 8 Series or 350, or a bus protection relay like the B30, reduces the energy during the fault as well as damage from the fault.
Which protection method provides the greatest reduction in calories during a fault?	Since calorie reduction is a factor of time, the fastest protections would provide the greatest reduction in calories. The greatest to least would be light with overcurrent available in the 8 Series, differential bus provided by the B30, and the zone interlock scheme which can be configured using an 8 Series relay.
In bus differential protection, what happens if one of the CTs saturates?	In a high impedance scheme, the saturated CT has lower impedance than the impedance of the relay. As a result, the error current flows through the saturated CT and not the relay, keeping the relay secure. In a low impedance scheme, like the B30, if one of the CTs saturates, the relay detects this saturation by recognizing the rapid change from the restraint to the trip region. At this point, the relay forces the algorithm to look at the direction of the current. If the current is moving in the opposite direction, it is external, and the relay restrains.

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QUESTION	ANSWER
What methods can be using in calculating arc flash?	The methods for calculating arc flash include IEEE Standard 1584 and NFPA 70E.
Can high impedance differential be used with any overcurrent relay, or does it have to be used only with UR?	The high impedance differential is used with the UR-F35 because it has current inputs with higher sensitivity as low as 5mA. The 850 can also be used if the pickup current required is 50mA or greater.
Which solution would have the lower price: High or low impedance differential?	The high impedance bus differential will have a higher price because of the dedicated CTs that are required for that scheme. The low impedance differential does not require dedicated CTs and can be used with existing relays.
What does GE Vernova offer for a merging unit (such as one to upgrade an existing breaker cubicle)? Does the merging unit control the breaker and read the CTs / PTs?	GE Vernova offers the MU320E. This merging unit can control the breaker and convert the analog signals to sampled values using IEC 61850-9-2-LE. The benefit of this is that it is an accepted standard and not a proprietary solution. The MU320E can have up to 16 analog inputs, 8CT/8VT, and combinations of I/O providing up to 96 binary inputs or 48 binary outputs.
What is required to conduct an arc flash study?	An arc flash study generally has three phases: Data collection, short circuit analysis, and the arc flash study. Data collection is paramount because - without accurate data - there will be many assumptions made. These assumptions can result in wrong PPE recommendations, resulting in too little protection or too much protection (which will limit movement).

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