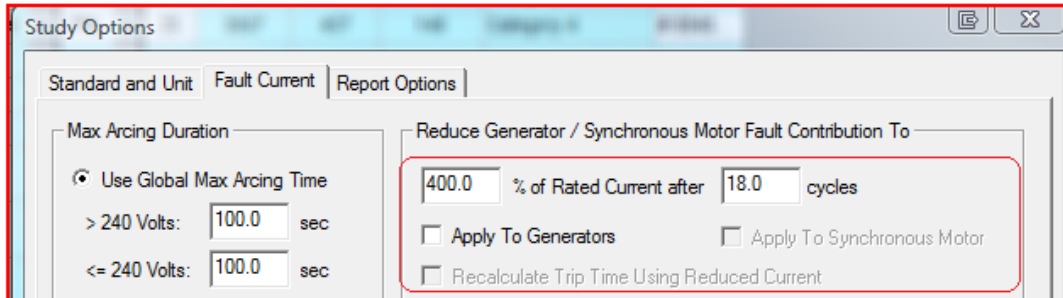


Why does my protective device not pick up the fault after checking both “Apply to Generators” and “Recalculate Trip Time Using Reduced Current” in the Arc Flash Options menu?

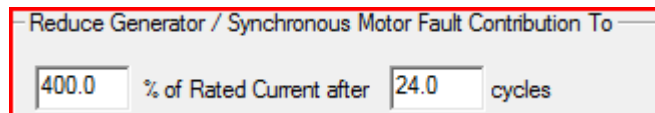
In the following example, Arc Flash is being completed without both options checked. The result displays two protective devices operating at the fault on Bus A.



Bus Name	Protective Device Name	Bus KV	Bus Bolted Fault (kA)	Prot Dev Bolted Fault (kA)	Prot Dev Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Ground	Equip Type	Gap (mm)	Arc Flash Boundary (mm)	Working Distance (mm)	Incident Energy (J/cm2)	Required Protective FR Clothing Category
A	B-AB	0.440	65.88	33.27	14.96	0.3	0.050	Yes	PNL	25	3248	457	125	Category 4
A	OC1	0.440	65.88	25.71	11.56	0.4	0.083	Yes	PNL	25	3606	457	148	Category 4

The second protective device, OC1, picks up the fault at 0.4 seconds (24 cycles). It should be noted that the real operating time for OC1 is 0.4 + 0.083 seconds (28.98 cycles). This time includes the relay operating time plus the breaker operating time.

If the user checks both boxes and enters a value smaller than 28.98 Cycles, OC1 will not pick up the current unless it lasts for more than 28.98 cycles. The following example demonstrates both options, “Apply to Generators” and “Recalculate Trip Time Using Reduced Current”, checked while the number of cycles is entered as 24 cycles.



Bus Name	Protective Device Name	Bus kV	Bus Bolted Fault (kA)	Prot Dev Bolted Fault (kA)	Prot Dev Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Ground	Equip Type	Gap (mm)	Arc Flash Boundary (mm)	Working Distance (mm)	Incident Energy (J/cm2)	Required Protective FR Clothing Category
A	B-AB	0.440	65.88	33.27	14.96	0.3	0.050	Yes	PNL	25	3248	457	125	Category 4
A	OC1	0.440	65.88	25.71	11.56	99.917	0.083	Yes	PNL	25	63214	457	16288	Dangerous! (*N9) (*N16)

OC1 doesn't pick up the initial current because 24 cycles lasted less than 28.98 cycles. Based on the settings, the initial current will only last up to 24 cycles (0.4 seconds) so the OC1 relay will not see this current yet. After 24 cycles, PTW will then decrease the generator contributions to 400% to that fault location. This decreased fault value from the generator is what the software will then use to calculate the trip time of OC1. This decreased fault value is very small which causes OC1 to sense the current at a much longer time.

For the same case, if the user enters a value larger than 28.98 cycles, it will not change the results from the first case. OC1 will trip at 0.4 + 0.083 seconds while B-AB will trip at 0.3 + .05 seconds. This is because OC1 and B-AB will have already seen the fault before the generator decays the fault contribution. In other words, PTW will decrease the fault current after both devices have operated.

Technical Support Group

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