A Call to Action: Say YES to Restricted Earth Fault Protection

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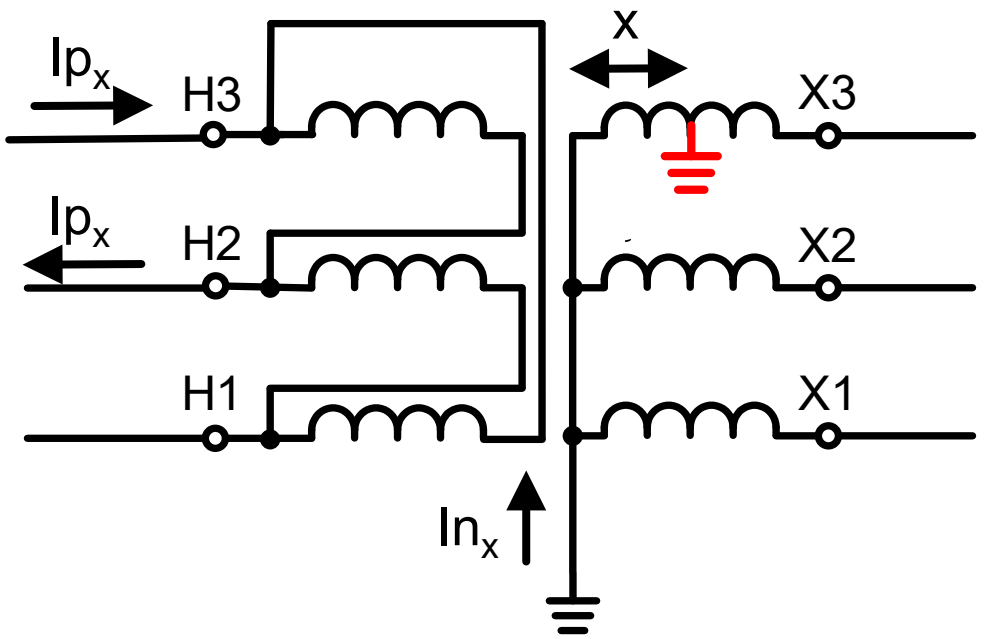
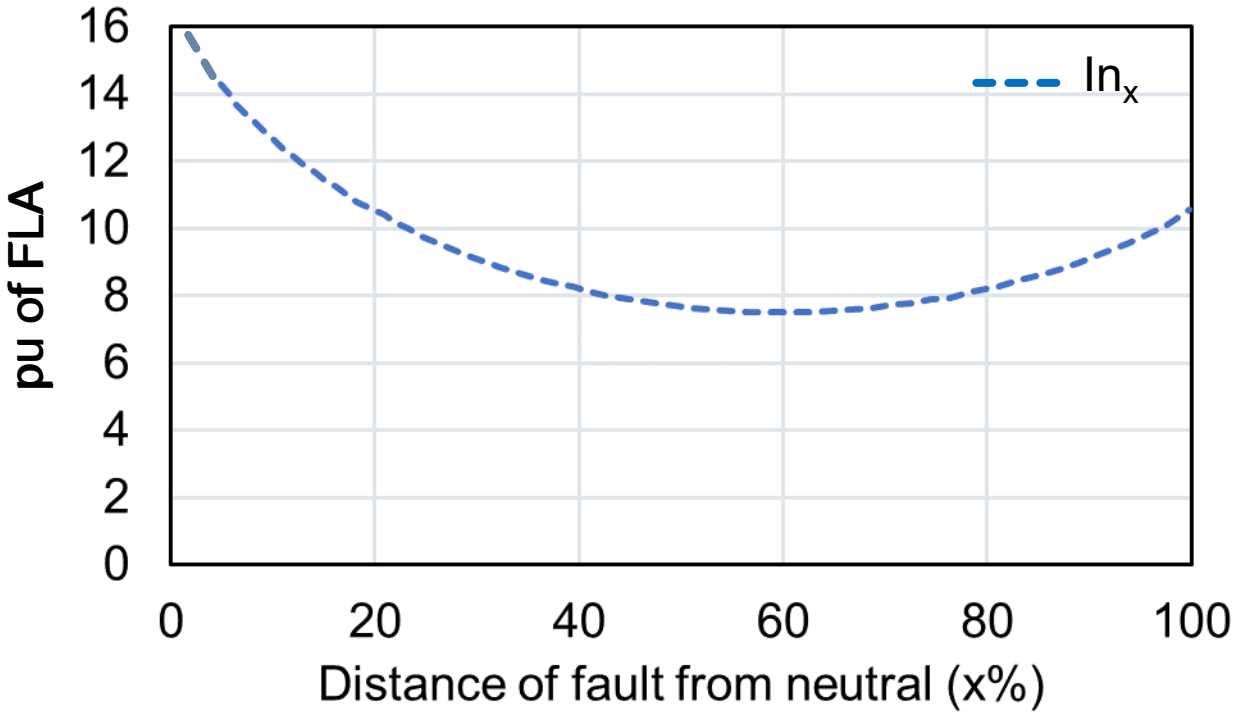
Reasons why REF is not adopted

1. Not really needed
2. Complicated
3. Notorious for misoperations

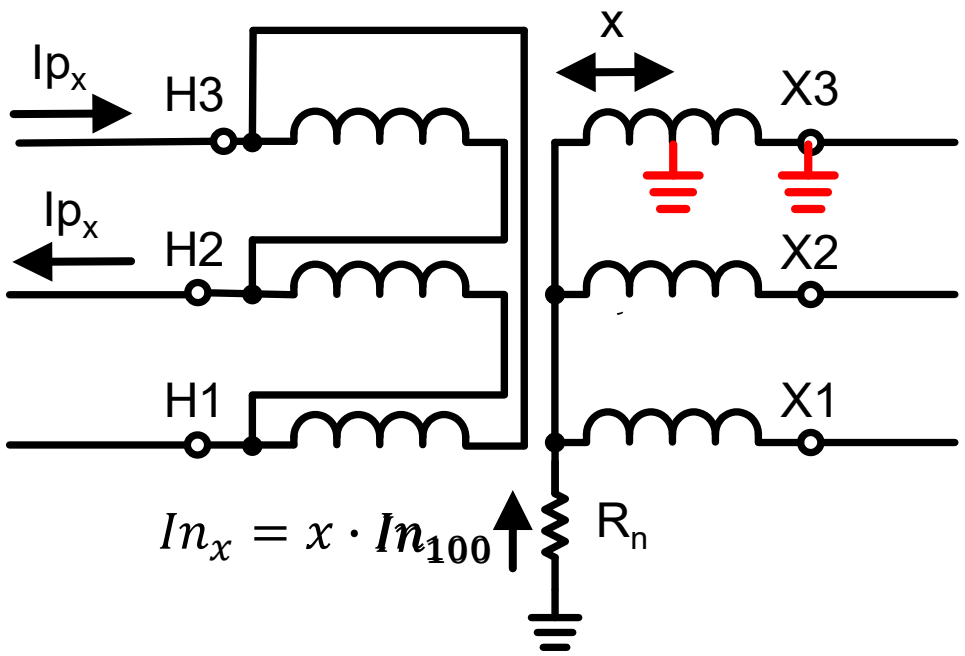
87R sensitivity on solidly grounded transformers

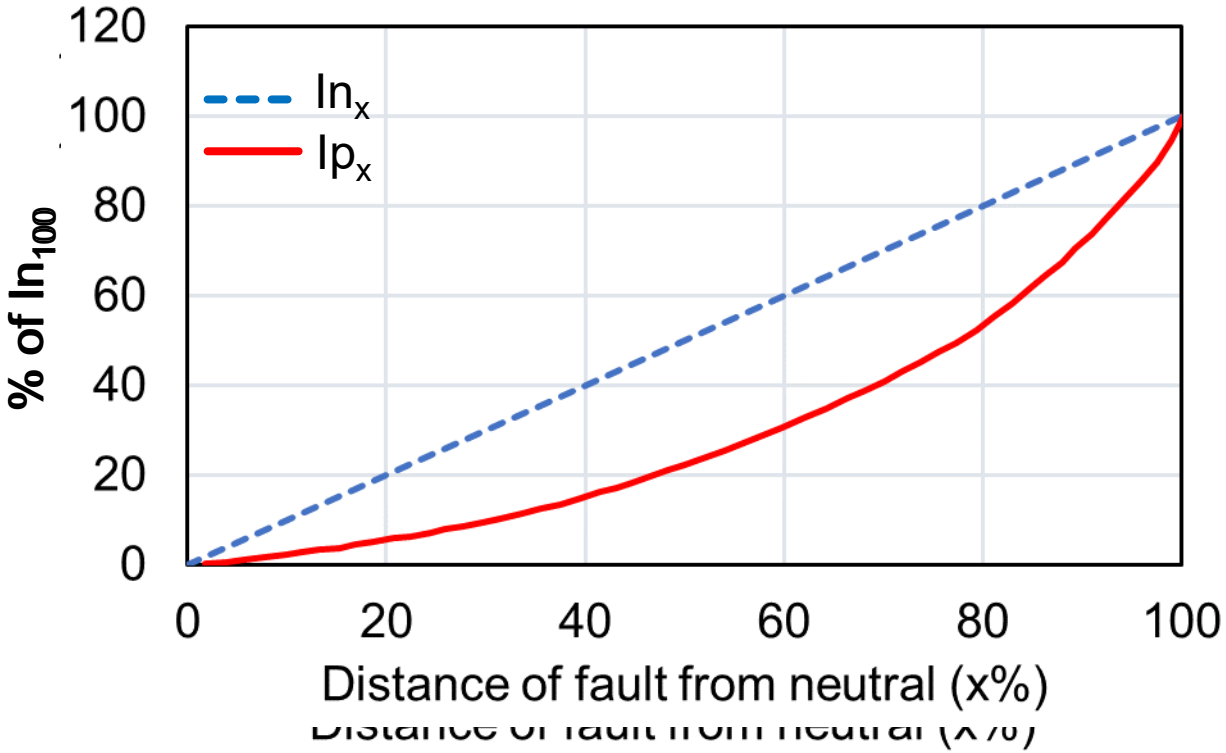


$$Ampere \cdot Turns = Ampere \cdot Turns$$

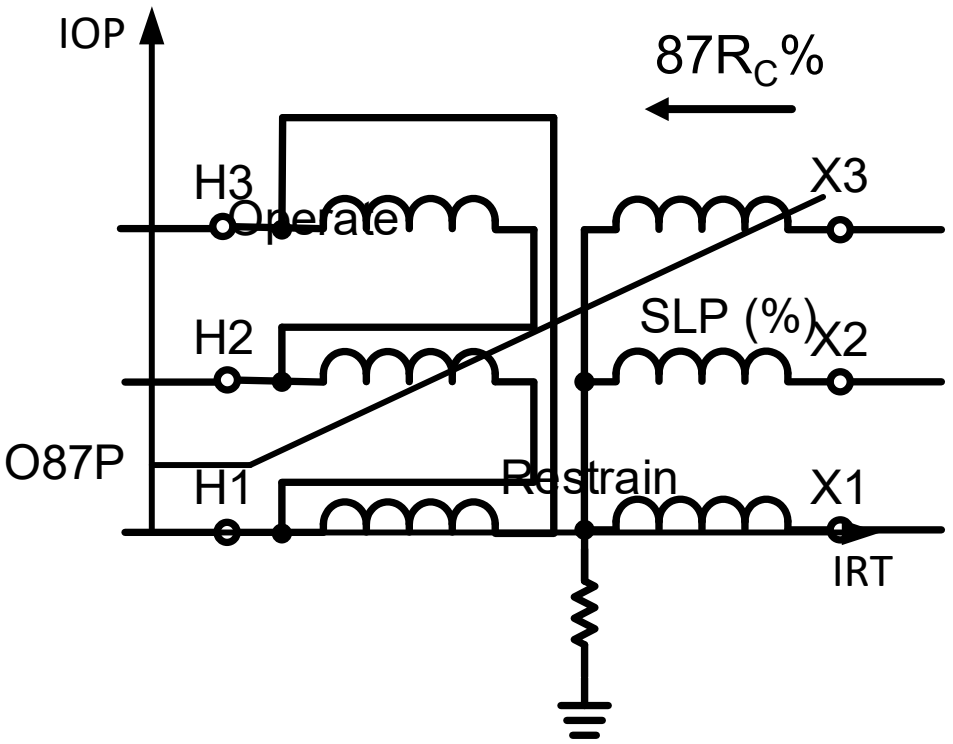


87R sensitivity on low-impedance grounded transformers





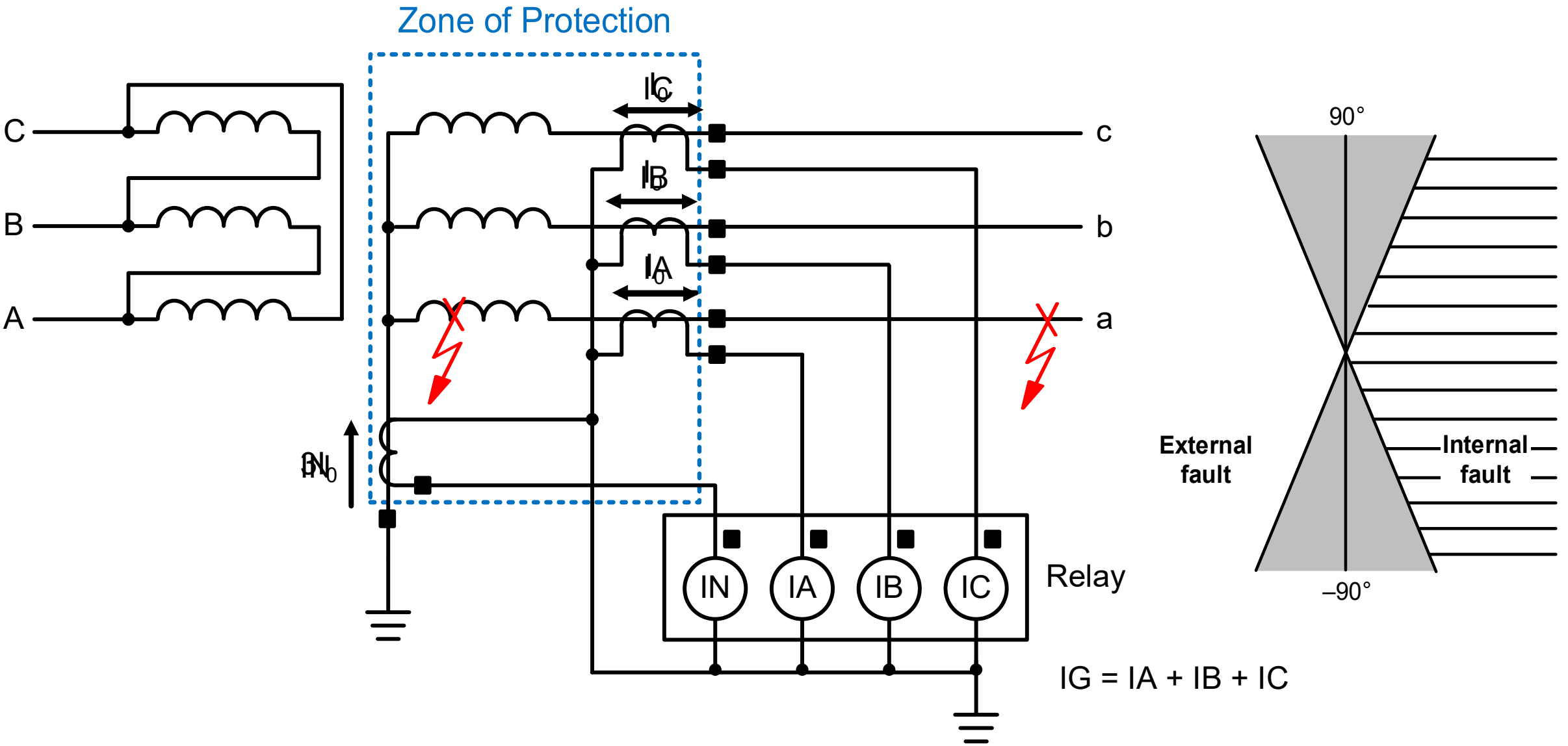
Calculate 87R lack of coverage



No load

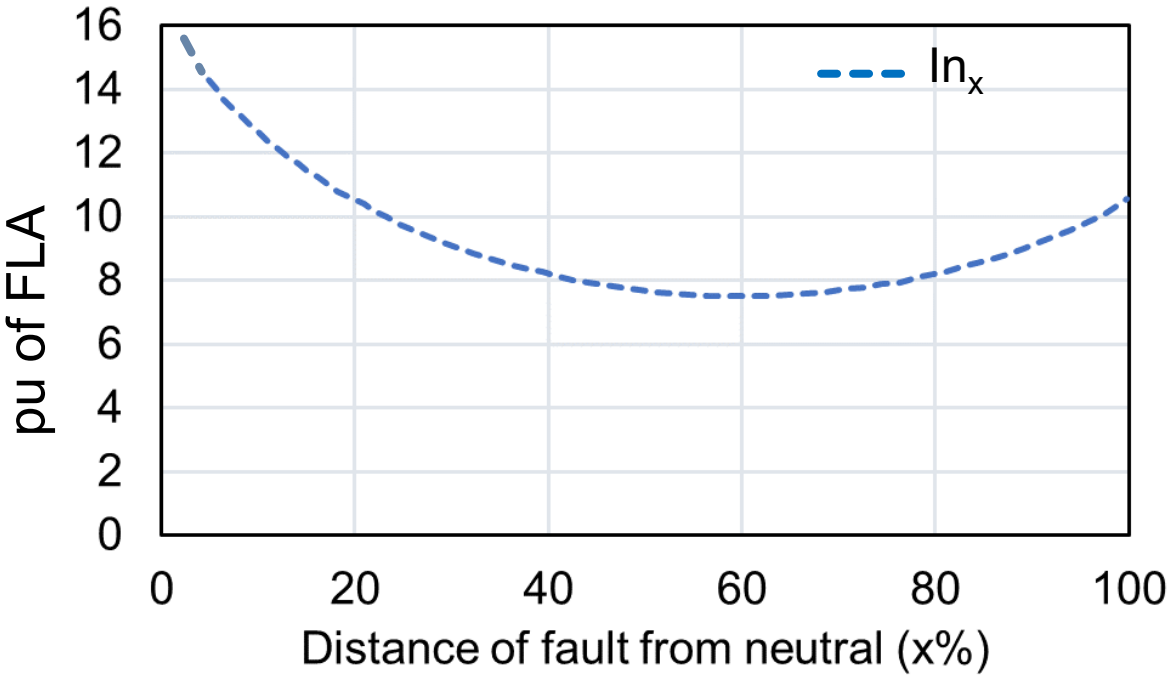
$$87R_C\% = 100 \bullet \left(1 - \sqrt{\frac{\sqrt{3} \bullet O87P \bullet CTR_P \bullet TAP_P \bullet R_n}{1{,}000 \bullet kV_{LL} \bullet TR}}\right)$$

REF uses IN to easily detect ground faults

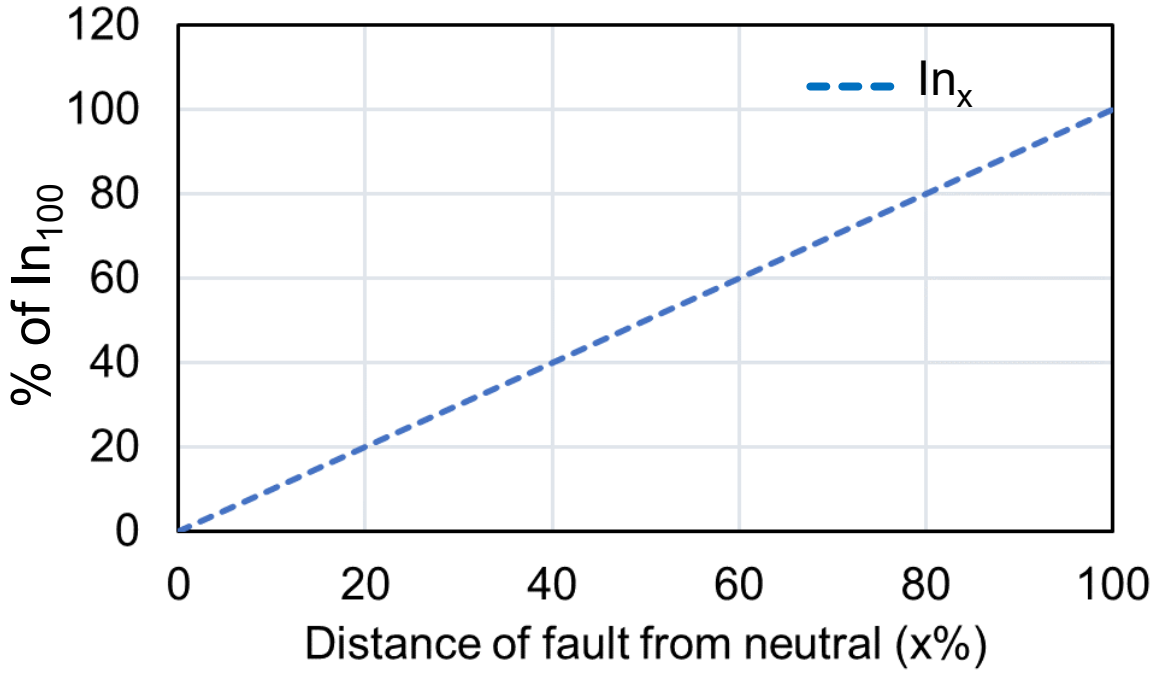


REF coverage

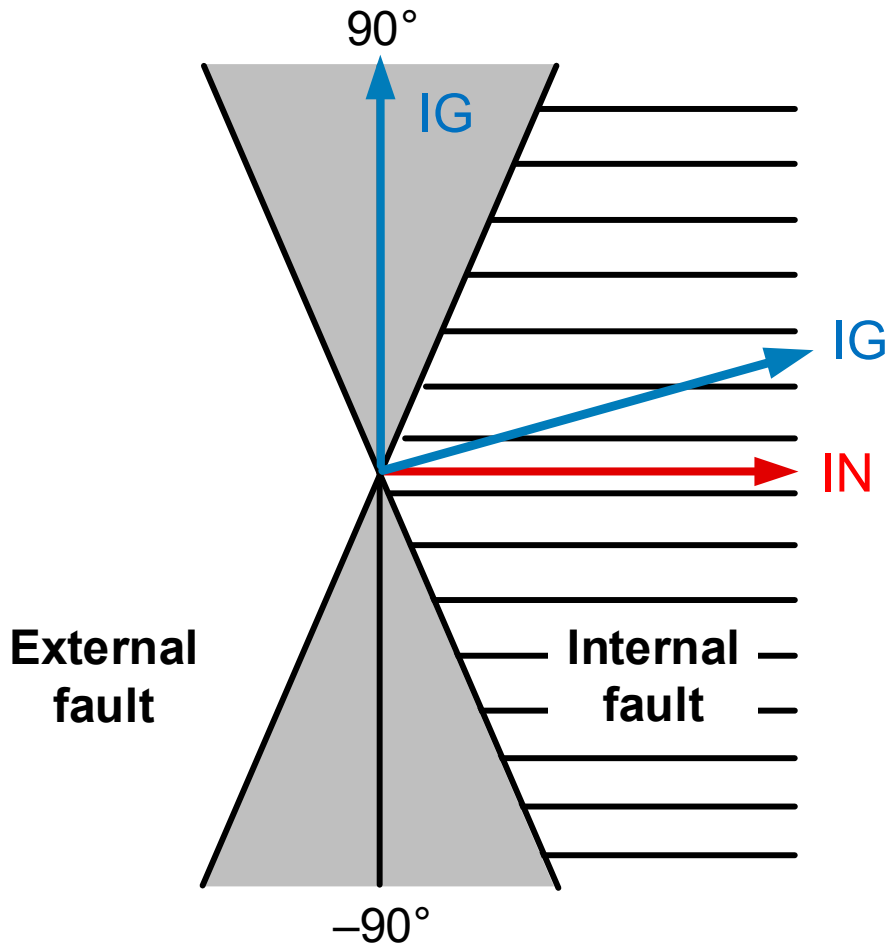
Solidly grounded

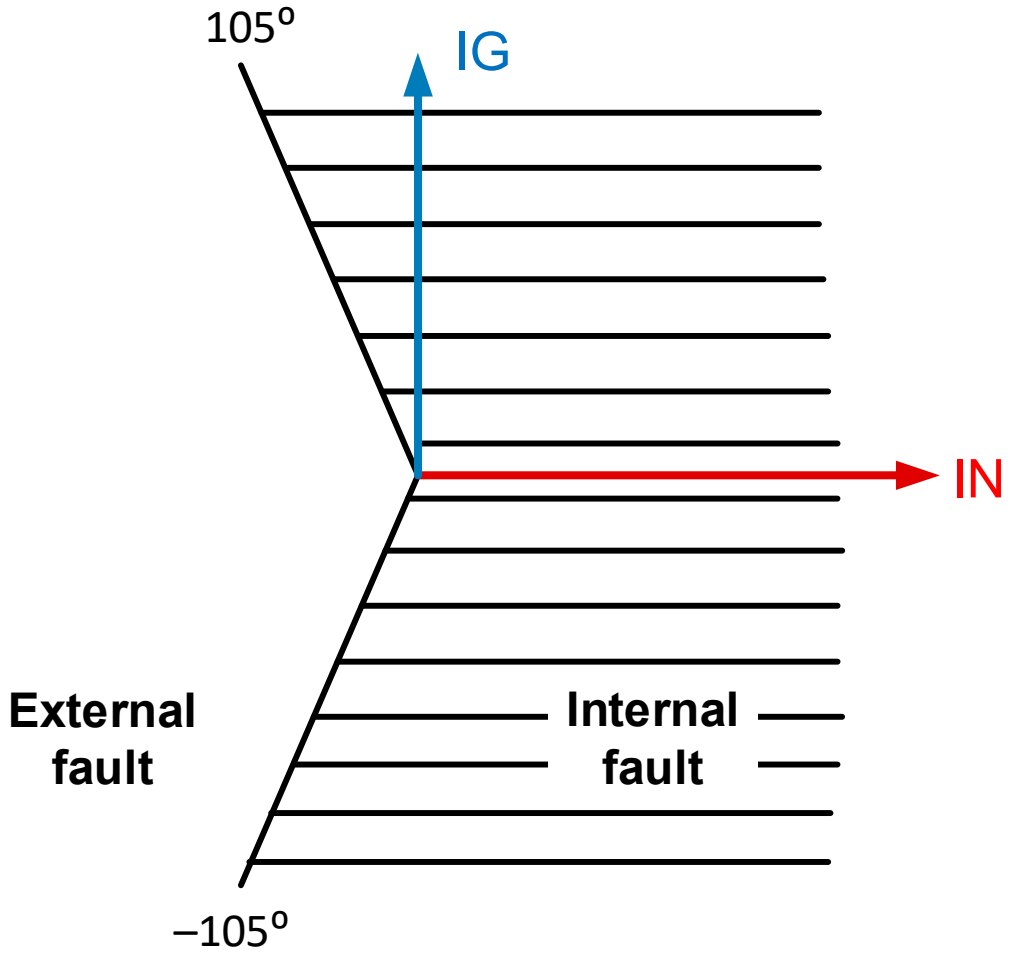


Low-impedance grounded

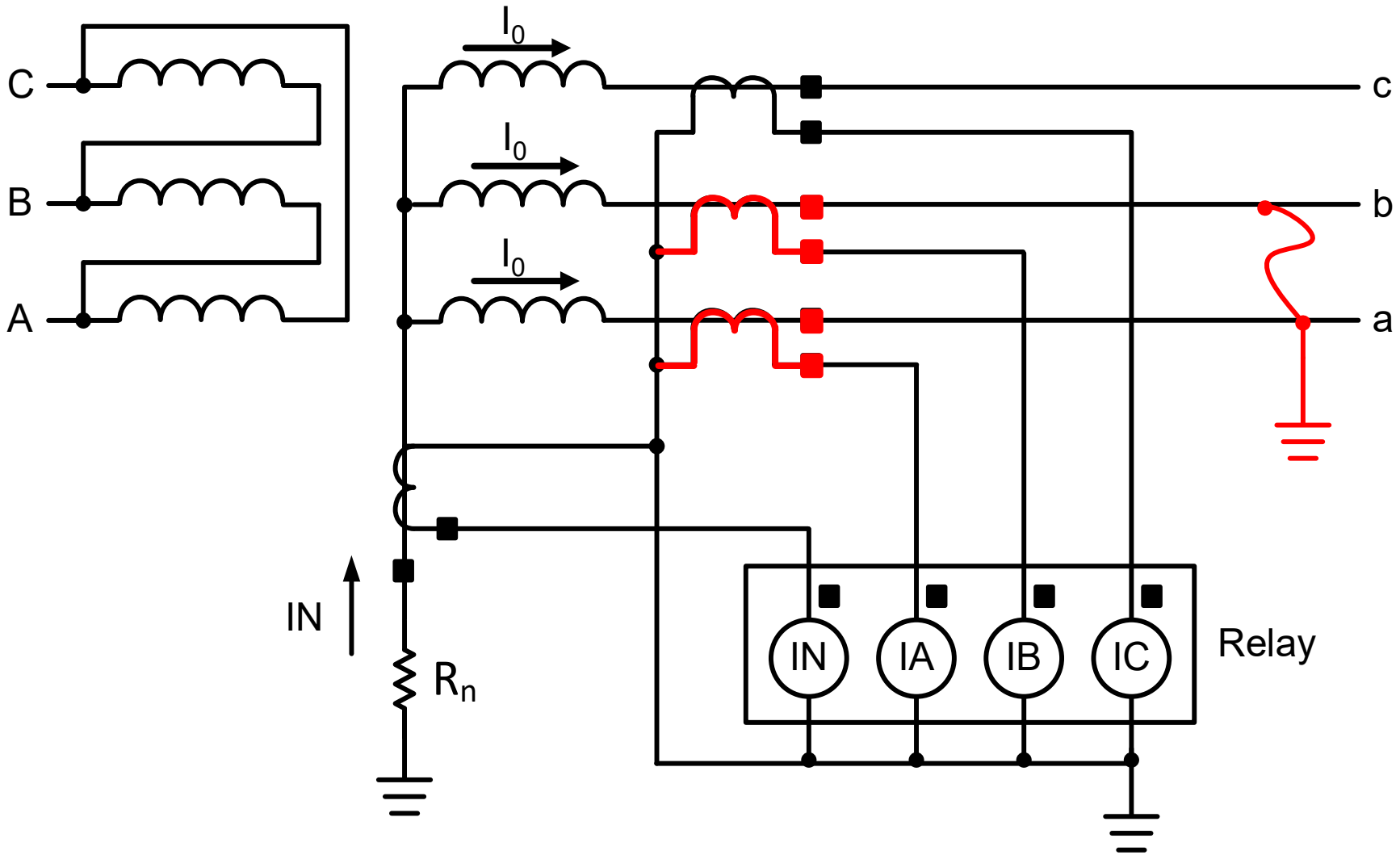


Dependability challenge: high charging current in cable distribution systems

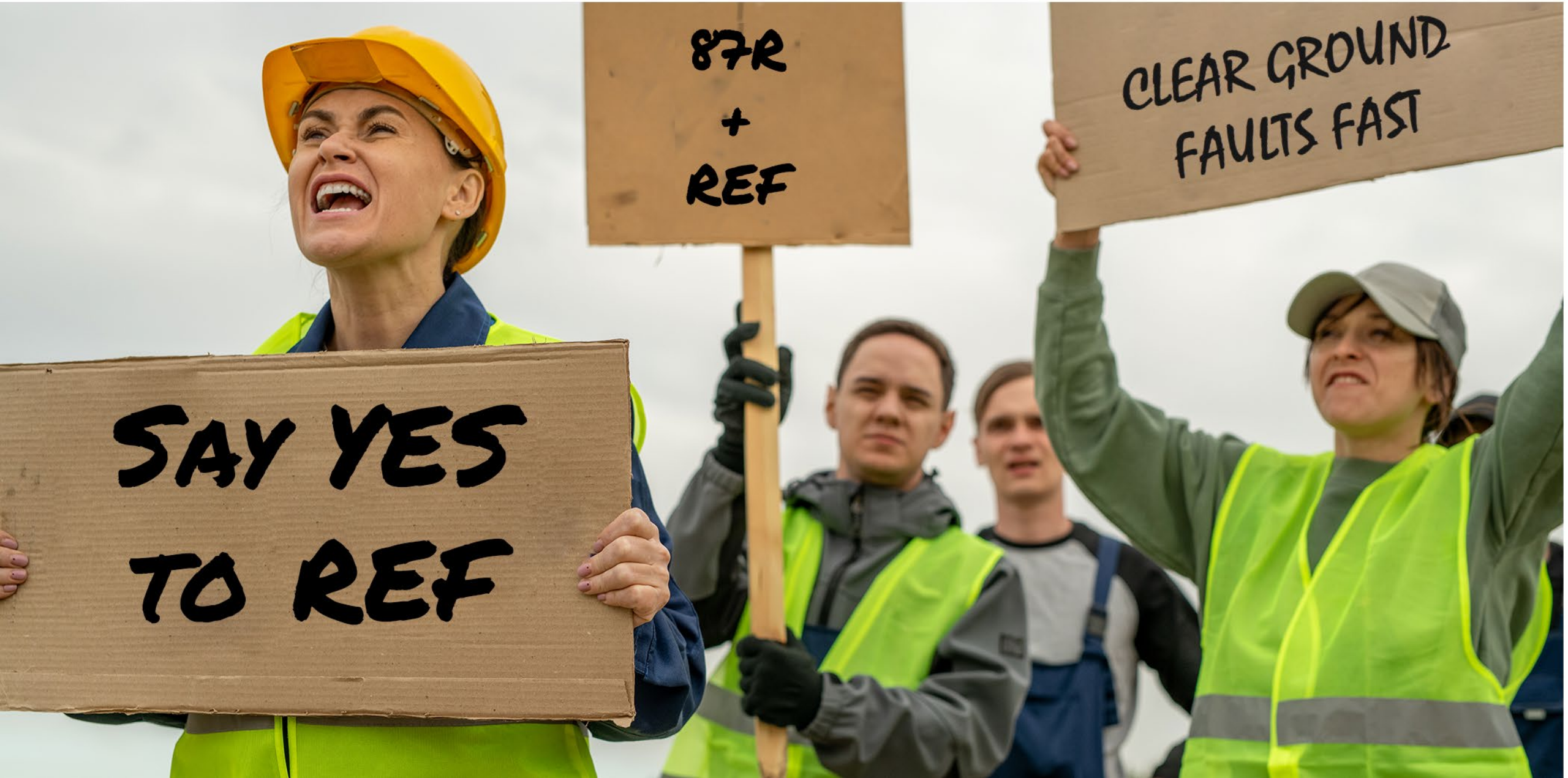




Security challenge: PPG faults in low impedance grounded systems



$I_2 >> I_0$


SAY YES
TO REF
87R
+
REF
CLEAR GROUND
FAULTS FAST

Questions?