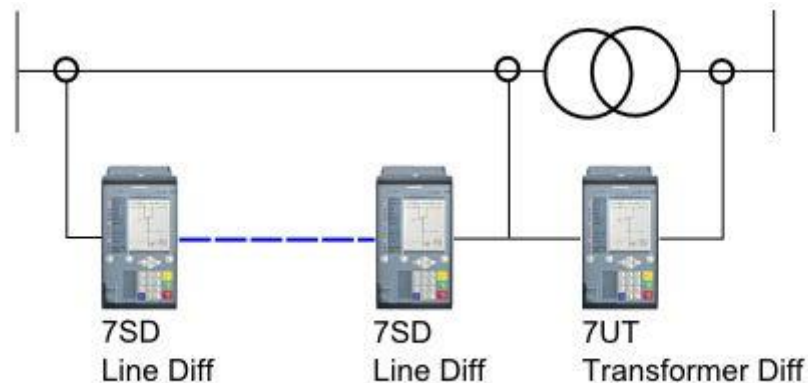


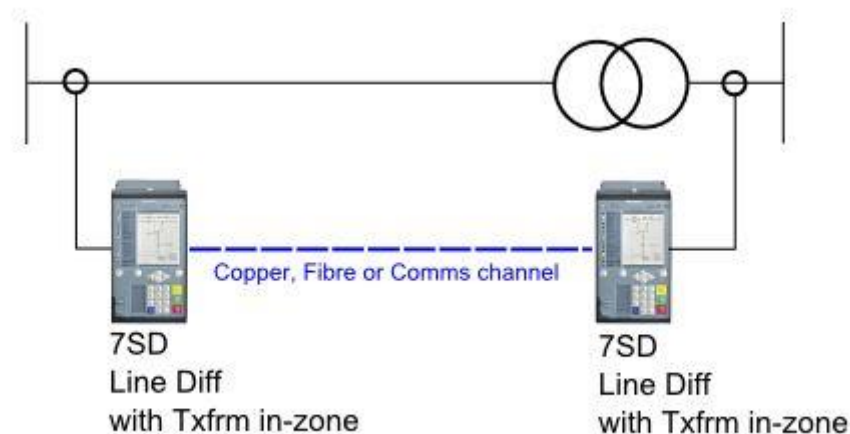
**DIGSI 5 QUICK NOTES****DIGSI-5-QN0025: Line Differential Protection Options for Transformer in-zone**

The ability of Siemens SIPROTEC 5 7UT8x series to communicate with Line Diff relays introduces another design option for customers. With most competitors protection relays, separate Line Diff and Transformer Diff relays have been required (Figure 1).



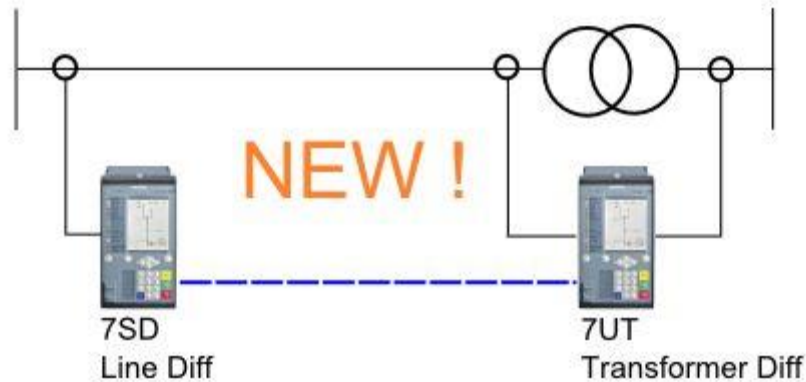
**Figure 1. Traditional separate Line Diff and Transformer Diff.**

Siemens have however, been highly regarded for their support of transformer-in-zone differential schemes, eliminating the need for HV breakers (Figure 2)



**Figure 2. Transformer in-zone**

The ability for the 7UT8 to function as one end of a line diff scheme introduces another protection arrangement for consideration – appropriate where more sensitive line diff protection is desired - eliminating the need to consider zero-sequence filtering or the effect of the tap changer. While HV CT's are required, it does avoid the expense of a dedicated transformer HV CB, and allows simple identification of whether the fault is in the line or the transformer (Figure 3)



**Figure 3. Innovated transformer in-zone protection.**