



### Welcome to our new Tech-Aware Series: Volume 2

We have recently had a couple of technical enquiries regarding NER monitoring and PT's in parallel on the Secondary of the supply transformer where the NER monitoring is located.

The NER system must consist of the NER resistance only.

To satisfy the monitoring circuit of the SE-330 / SE-330AU the change in NER resistance must be satisfy a change in the monitoring circuit resistance of:

Up to 3.3kV: 500Ω Change +/- 200Ω  
6.6 kV – 35kV: 2.5kΩ +/- change +/- 1kΩ

If PT's are introduced to the circuit in parallel with the NER, the sensing circuit now has a parallel path for monitoring. In some cases, this may result in the NER monitor being unable to register an Open Circuit NER as the change in resistance in the monitoring circuit has not satisfied the above criteria.

To reiterate this, the SE-330 /SE330AU manual provides the following information:

#### Section 1.1

**Do not** use a grounding transformer with a low-voltage resistor:

- \* The combined cost of a transformer and a low voltage resistor is more than the cost of a resistor rated for line-to-neutral voltage.
- \* A transformer saturated by a ground fault through a rectifier can make ground-fault protection inoperative.
- \* Transformer inrush current up to twelve times rated current can cause a ground-fault voltage larger than expected.
- \* **A parallel transformer winding makes it difficult to monitor NGR continuity.**
- \* A transformer can provide the inductance necessary to cause ferroresonance if the NGR opens.

#### Section 1.2

Power-circuit elements, **other than neutral-connected NGR's**, that purposefully connect the power system to ground are often not compatible with SE-330 NGR monitoring. These elements include single-phase grounding transformers, grounded-wye-primary PT's, and grounded-wye-primary power transformers.

#### Section 1.2

If neutral voltage exceeds the VN TRIP LEVEL setting, and if NGR current is less than 5% of the CT rating, the SE-330 will trip on resistor fault. If the resistor-fault circuit is tripped and the neutral voltage exceeds the VN TRIP LEVEL setting for an interval greater than the GF TRIP TIME setting, the ground-fault circuit will also trip.



To assist in providing some further information on NER Monitoring, please see the attached Technical Note (TN)

We hope you enjoy reading this brief Tech Note. Please do not hesitate to contact Startco should you have any questions regarding NER Monitoring / Parallel connections on NER monitoring systems or any other issue relating to protection relays, installation or site complications.