

# **Resistance Grounded Power Systems: Guideline on NGR Monitoring**

**Application Note**  
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## Introduction

Substation grounding designs for systems feeding moveable or mobile loads often employ a safety ground that is isolated from the substation ground. This isolation is to prevent ground-potential rise caused by a substation primary side ground fault from transferring to mobile loads. The neutral grounding resistor (NGR) monitoring devices must be connected in such a way that allows safe operation in the presence of a primary side fault. The relay must not be connected to both ground locations. The connection below is recommended for most systems that employ an isolated safety ground.

## NGR Monitoring

Using the connection on the side, the remote earth return path is a part of the monitored loop that includes: the resistance of the NGR and its connection to the supply neutral ( $X_0$ ) point, NGR connection to Remote Earth (RSG), Remote Earth resistance and the resistance of the substation connection to Remote Earth ( $R_{SUB}$ ). In this scenario, earth-path resistance changes (due to seasonal moisture fluctuations for example) might be large enough to cause an alarm. Suitable relay settings or an alternate connection that uses an isolation transformer and grounds the coupling device at the safety ground may need to be employed. Contact Bender technical support for any questions.

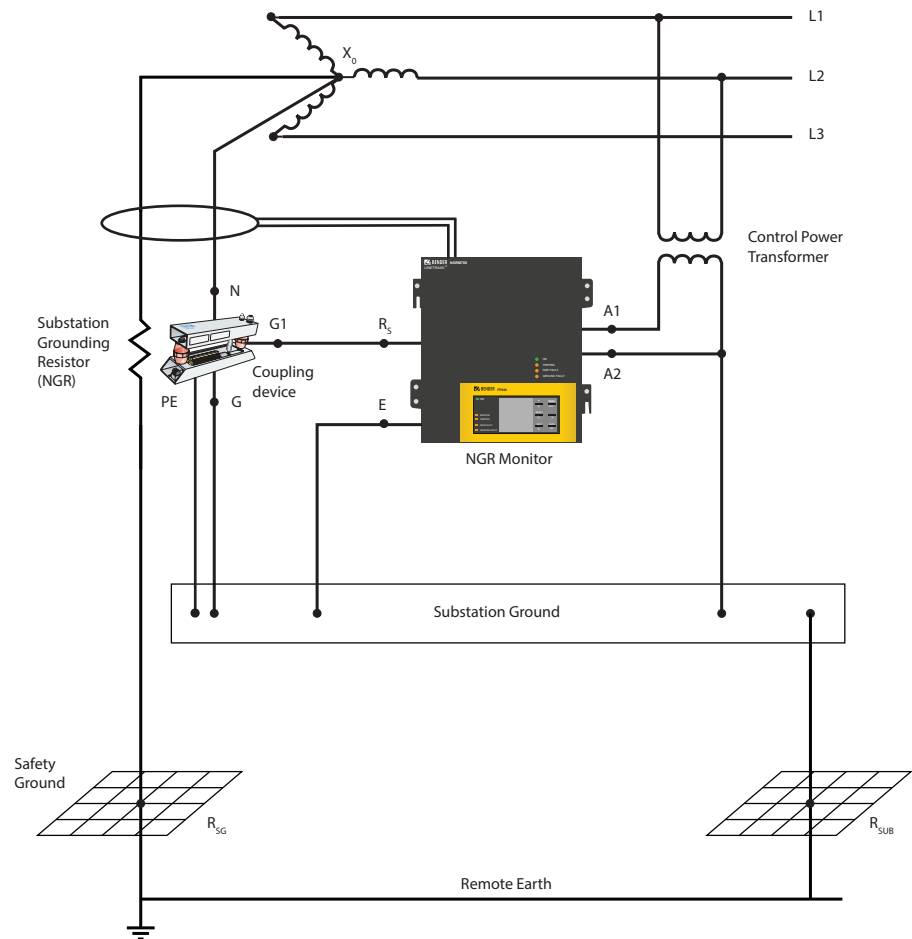


Figure 1: NGRM connections on a Mine Substation