



Novaris

Lightning and Surge  
Protection

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# Novaris Signal Line Failsafe Design

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An analysis of  
potential failure  
modes

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Tristan King

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## Introduction

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An integral part of the design and application of the Novaris Signal Line protection units is taking into account their failure mode characteristics. Understanding the modes of failure can give an appreciation of the cause of such failures, identifying potential installation issues.

The Novaris signal line protection units have been designed to minimise possible unsafe failure situations.

## Overstressed Fault Mode

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The overstressed fault mode for the Novaris signal protection range is an open circuit failure mode. The PCB track width within the product has been designed to act as a fusing element. When a surge higher than the  $I_{max}$  of the product is applied, these tracks give way, releasing the load from the circuit where it will remain disconnected until the protection module is replaced. This is to ensure that surges higher than the rating of the surge protection components are not able to reach the load if the protection components fail.

## Overvoltage Fault Mode

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The overvoltage fault mode for the Novaris signal protection range is a short circuit fault mode. If the device is exposed to a constant over voltage greater than the voltage rating of the device the surge protection components will fail to a short circuit.

Between lines the surge protection component voltage rating is selected to allow for at least a 10% increase over the maximum recommended operating voltage of the signal protection device. This gives a clear safety margin whilst providing the lowest let through voltage possible. Careful selection of the signal line protection unit for the physical communications protocol used is essential to ensure that that an overvoltage fault does not occur.

Where applicable, between line and earth the Novaris signal protection range uses 100V protection components to minimise the chance of a short circuit fault from the signal lines to earth. If a line to earth failure does occur it is recommended to check the installation site for large earth potentials. It is also recommended that an EC90 base is used on the signal line protection at the remote end of the installation to provide 90V of isolation from constant earth potential differences.

Line to earth faults represent the least safe failure mode of the surge protection instrument as multiple failures could potentially cause issues such as wrong side failures. This is why the Novaris Signal Line protection units have been designed to minimise this risk.