

Energy Storage and Distribution

Pre-saturated Core Fault Current Limiter

An Energy Technologies Institute project
Delivered by GridON



Pre-saturated Core Fault Current Limiter

A fault current limiter (FCL) suppresses the damaging currents which result from electricity network faults

Contact details



Rebecca Sweeney
Programme Manager
Email: rebecca.sweeney@eti.co.uk
Phone: 01509 20 20 68



Nicholas Eraut
Project Manager
Email: nicholas.eraut@eti.co.uk
Phone: 01509 20 20 22

Pre-saturated Core Fault Current Limiter

The Product

“Offers the advantages of a pre-saturated core type fault current limiter without the need for superconducting components”

- A fault current limiter (FCL) suppresses the damaging currents which result from electricity network faults.
- GridON's FCL uses a direct current coil to magnetically saturate the iron core – providing a very low impedance during normal operation and a high impedance to limit faults.
- Unlike previous technologies, this design offers the advantages of a pre-saturated core type fault current limiter without the need for superconducting components.
- The design is based on combining industry standard, proven transformer technology with GridON's unique and proprietary magnetic saturation technology.
- GridON's FCL, manufactured in partnership with Wilson Transformer Company, is commercially available now.

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The Benefits

“Fully scalable for use at all distribution and transmission voltages”

- Removes fault level constraints without costly network upgrades.
- Enables more distributed generation, with shorter connection times and reduced costs.
- Enables smart networks with increased efficiency, flexibility, reliability and resilience.
- Fully scalable for use at all distribution and transmission voltages.
- Provides— instant, self-triggering response to network faults – immediate recovery following clearance of a fault without network interruption – suppression of multiple consecutive faults - enhanced fault limiting capability relative to other pre-saturated core fault current limiters.
- Breakthroughs in design remove the need for superconducting components and associated cryogenic systems.

“Should cut capital expenditure and operating costs and extend the useful life of existing network assets”

- GridON's is the first such fully tested, commercially viable, non-superconducting pre-saturated core fault current limiter.
 - Will help to minimise the costs of upgrading electricity distribution and transmission networks over the next 20 to 30 years and help ensure that the UK has an affordable and adaptable energy infrastructure.
 - The product's inherent cost-effectiveness, ease of installation, reliability and minimal maintenance requirements should cut capital expenditure and operating costs and extend the useful life of existing network assets.
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Project Achievements to Date

“The FCL demonstrated perfect reliability and performance in limiting faults at site”

- The ETI commissioned and funded this development and demonstration project to drive the technology to a point at which network operators could deploy.
- Our funding and project management has allowed GridON to develop new capability and to build and test the device.
- It has been comprehensively tested at a certified high power laboratory in Australia with excellent results in over 50 stringent fault tests.
- UK Power Networks has fully approved the design and testing and is acting as the network operation customer during this latest demonstration phase.
- The FCL was commissioned into service in May 2013 at a UK Power Networks main substation in Newhaven, East Sussex.
- During the first year of operation the FCL has demonstrated perfect reliability and successfully limited currents according to specification through several network fault events.

Next Steps

- The device will continue to be demonstrated in operation until the summer of 2015. It will then be decommissioned and subjected to further testing at a certified laboratory to prove its condition and ultimate capability.

The ETI's Energy Storage & Distribution Programme

The programme is focused on how to move energy economically and efficiently to where and when it is needed. This is through the adaption and development of network designs to enable the delivery of a cost effective and secure low carbon energy system in the UK. The programme involves developing new infrastructure approaches and demonstrating new infrastructure technologies.





Contact information

Energy Technologies Institute
Holywell Building
Holywell Way
Loughborough
LE11 3UZ

www.eti.co.uk

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