LV UG precise cable fault location surge generator

The following problem statement has been developed by the innovation teams within the UK's Gas and Electricity Networks for the 2026 Energy Innovation Basecamp.

Theme: Flexibility and Forecasting

Network Areas: Electricity Distribution

What is the problem?

The current process to locate a UG LV fault typically begins by analysing the TDR (Time Domain Reflectometer) readings at the LV substation (having confirmed via a Fusemate that the fault is not transient or due to a blown fuse). An impedance trace can be used to find the approximate distance to fault – however, there are typically multiple branching paths in an interconnected network that may fit this distance. From here, a sniffer device is used to find an approximate location – however this is slow, imprecise, and requires drilling into the ground to measure for gas emissions.

For MV and HV faults, more precise devices are used – these use a surge generator to send high voltage pulses through the cables, allowing the on-site engineers to 'listen' for an audible signal using a specialised receiver when this surge hits the cable fault (commonly called 'thumping'). However, a DNO's LV network (230/400V) does not currently have a similar device that can quickly and safely be used to locate a cable fault location.

What are we looking for?

A portable unit that can be used to quickly and precisely locate LV UG Faults. This may look like a portable surge generator unit and receiver device powerful enough to produce and detect an audible response from any LV cable fault, but that will not risk damaging any customer property or blowing the fuses in any connected substation.

This should be capable of connecting to a LV fuse board within a substation, and potentially an LV linkbox. Any connections to the network should be secure and ideally lockable.

A – A portable surge generator and receiver device that can be connected to an LV board or linkbox.

B – A portable surge generator and receiver device that can only be used on an LV board.

C – Any solution that allows quick location of LV UG faults once an impedance trace has been run without the need to drill/use a sniffer device (not necessarily using a surge generator/receiver).

What are the constraints?

Any solution must be safe to use on LV networks (230/400V) and **not pose a risk of damage to customer property**.

Any solution must comply with ESQCR regulations.

If the solution is designed to be installed on an LV Board, it must be adaptable to fit 82mm and 92mm fuse stalks.

The solution must also be secure when connected to the network whether on a LV fuse board, Linkbox, or other connection points – this connection must be unable to slip (i.e. clips) and should be lockable.

Who are the key players?

District engineers involved in LV fault finding and LV Jointers will be the key users who will adopt this solution and use any tool developed.

Any innovators who have experience in surge generators or devices to monitor the LV network would be the target market for this problem statement [(i.e. Megger EZ Thump, EA Alvins, Camlin Bidoyngs, Eneida monitors)].

Does this problem statement build on existing or anticipated infrastructure, policy decisions, or previous innovation projects?

SPEN currently has LV monitors and recloser devices that can be used to provide impedances and estimated distance to fault. There is also an established process for LV UG fault location, as detailed in the first section of this document. Any device developed would need to provide greater accuracy and faster restoration times than these existing methods.

What else do you need to know?

When fixed to an LV board, the device must fit 82 and 92mm stalks. As, depending on the final unit, the unit may be used by a lone worker and may be left live, it should be able to be securely connected (preferably with lockable connection points) within a substation (this unit would not be left unsupervised in a linkbox or other connection point outside of a lockable LV Substation).

Any solution should function for multiple cable sizes (0.1cu, 0.2cu, 95wf, 185wf, up to 300mm2), across 3 core and 4 core cables.

While safety measures can be built into procedure around the device, any inbuilt safety mechanism or procedure validation would be desirable.

Innovator submissions to this problem statement will be open on the Smarter Networks Portal from 4th February to the 13th March, but we encourage you to submit your response as early as possible, as networks will be able to review submissions as soon as they come in.

You can also use the virtual Q&A on the Smarter Networks Portal to ask for more information about this problem statement. Questions may be answered online or at the ENA Problem Statement Launch on 4th February 2026. More information on last year's Basecamp programme can be found on the Smarter Networks Portal.