

Power and productivity for a better world[™]



Functionalities for Resilient Distribution

Grids with Flexibilities

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- Distribution grid connected flexibilities can consist of active and reactive power control of MV and LV grid connected flexible resources like controllable DG units, energy storages, controllable loads and electric vehicles
- In the future real-time information about available flexibilities and flexibility forecasts, forecasted DSO flexibility needs and information sharing between DSOs, TSOs, aggregators and flexibility operators becomes essential in enabling system-wide and local distribution grid resiliency improvement
 - Costly network investments can be avoided, network hosting capacity can be increased and supply interruptions can be minimized by FlexZones

Modern Fault Passage Indicator Concept

- Fast & automatic fault management essential for future flexible networks
- Novel function Multi-frequency admittance based earthulletfault detection, using cumulative phasor summing (CPS)
- Universal applicability, both compensated and unearthed ulletnetwork operation





Field testing and experience

- First proof-of-concept was field tested in a practical ${\bullet}$ compensated 20kV network in Finland
- Nearly 60 individual primary E/F-tests conducted by varying ${\bullet}$ the fault type
- Results very good, examples below ${\color{black}\bullet}$



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