

## New integrated solution for DAC and VLF testing and diagnosis of distribution power cable circuits

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Referring to the worldwide practice in testing and diagnosis of distribution power networks both damped AC (DAC) and very low frequency (VLF) test voltages have been accepted and widely in use for after-laying, maintenance and diagnostic testing of medium voltage cable circuits. In the last 10 years it has been demonstrated that

1. PD monitored voltage withstand testing using DAC voltage is a very effective method to detect most insulation weak-spots. In combination with dissipation factor estimation ( $\tan \delta$ ) it can be used to investigate the degradation of oil-impregnated insulation,
2. The voltage-withstand testing using sinusoidal VLF is sensitive to demonstrate the insulation weak-spots. In combination with dissipation factor measurement ( $\tan \delta$ ) it is an excellent diagnostic tool for moisture related defects and cables with water-treeing.

As a result the recent IEEE 400 Guide (2012) and several national standards and guidelines describe that both technologies represent effective test voltages for testing and diagnosis of MV cable networks.

As the conventional DAC and VLF technologies used till now are respectively DAC or VLF single system solutions it is obvious that a multi voltage source solution would be an optimal solution for an effective on-site testing and diagnosis. Moreover in add-on to DAC or VLF voltage withstand testing the application of PD detection at DAC and dissipation factor estimation at both DAC and VLF are possible to localise discharging defects and/or to assess the insulation degradation of all types e.g. XLPE, paper-oil, EPR of cable insulation.

In this contribution supported by practical application an innovative (patent pending) new generation of combined DAC and VLF sinus voltage test and diagnosis (PD and  $\tan \delta$ ) solution up to 40kV will be presented.

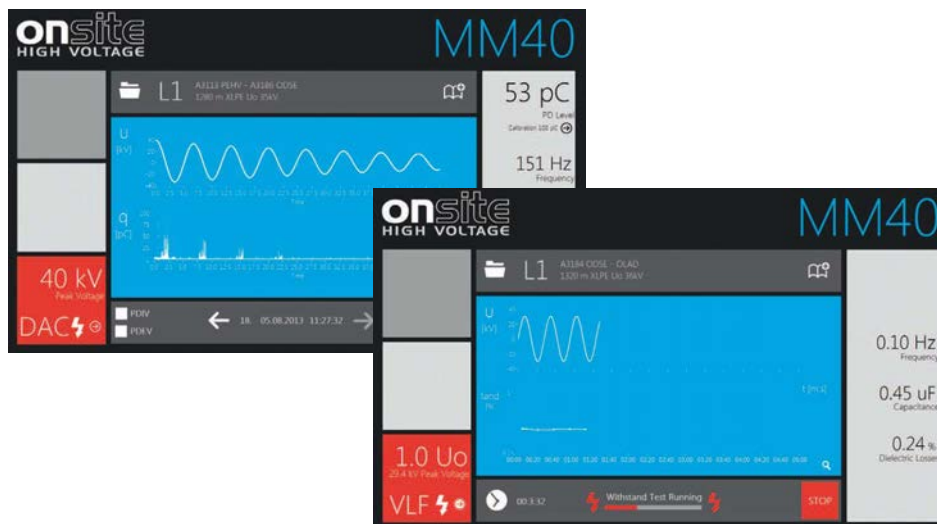


Figure 1: Example of a DAC and VLF testing of 36kV XLPE cable circuits.