

# Arcteq Innovation: Disturbance recorder and documenting power quality

## Disturbance recorder capacity

The disturbance recorder in AQ 200 series IEDs is a high capacity and fully digital recorder integrated to protection relay. Maximum sample rate of the recorder analog channels is 64 samples per cycle. The recorder supports 96 digital channels simultaneously with measured 9 analog channels. Even all measured and calculated values can be registered as digital channels with 5ms sample time. This feature is useful in for instance motor start up sequence, as users can track fully sampled analogue waveform values and every 5ms sampled RMS values simultaneously. The memory capacity in AQ 200 series IEDs allows for up to 100 non-volatile records with total of 500 second recording time with full sample rate and maximum number of recorded channels.

Recorder output is in general comtrade format and it is compatible with most viewers and relay test sets. The comtrade file is based on the IEEE Std C37.111-1999 standard.

### Disturbance recorder setting examples

Samples per cycle	64	64	64
Analogue channels	8	8	8
Digital channels	24	24	24
Record duration	5s	10s	60s
Total number of records	100	52	8

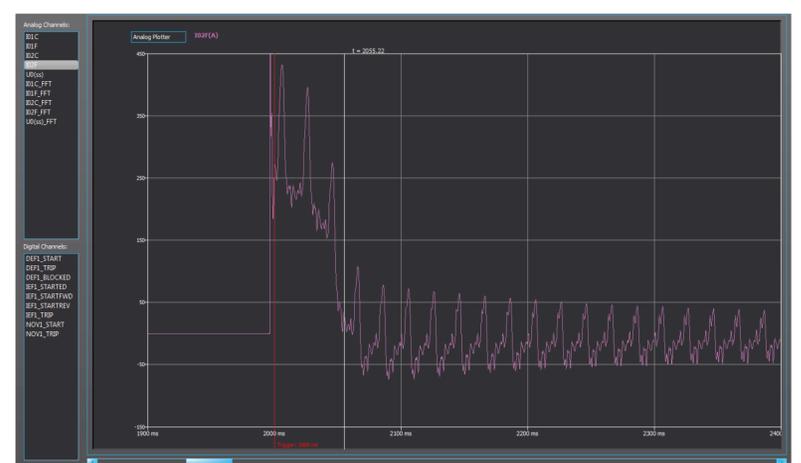
*Examples of non-volatile disturbance recorder memory capacity in AQ 200 series IEDs.*

## Documenting voltage sags and swells with disturbance recorder

AQ 200 series' disturbance recorder is a great tool for analyzing the performance of the power system in network disturbance situations. Voltage sags and swells are often monitored for power quality analyzes. The disturbance recorder can be triggered with any signal in the IED. Over-and undervoltage or any programmable protection stages can be used to trigger the recorder. With Arcteq's fast acting protection stages the voltage sags and swells of as little as 10-15ms can be recorded and documented.

## Harmonics monitoring

The AQ 200 series IEDs are measuring harmonics of up to 31st order for both currents and voltages. Arcteq's innovative and unique harmonic overcurrent stages (50/50h) can be used for alarming, tripping and triggering the disturbance recorder. Freely settable harmonic overcurrent stages can monitor and act on any of the current harmonics from 2nd to 19th order. The disturbance recorder can record harmonic content up to 31st order.



*Example recording with high harmonic content.*