

ABB ULTRA-LOW HARMONIC (ULH) DRIVES FOR WATER/WASTEWATER (WWW)

## Dirty power issues? Solve with ABB ACQ580 ULH drives

Innovative technology and resilient performance for municipalities



We rely on utility power being available at all times or having backup generators take over in an instant when there is an emergency. In an ideal world, the utility power is 'clean' and compliant to recognized standards. However, are you aware of the many common and often hidden issues 'dirty' power cause when harmonics are present on your voltage and current waveforms?

Do you see damaging effects of harmonics?



Circuit breakers randomly tripping



Sensitive electronic equipment failing



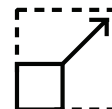
Generator voltage instability



Fuses blowing unexpectedly



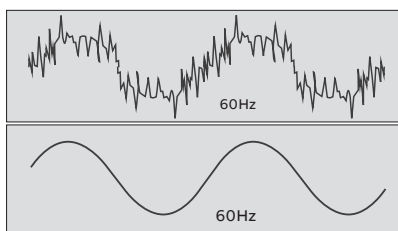
Distribution transformers overheating



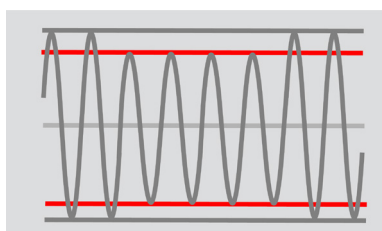
Transformers and generators sized larger than necessary

Poor power quality - what issues does it cause in municipal WWT treatment plants?

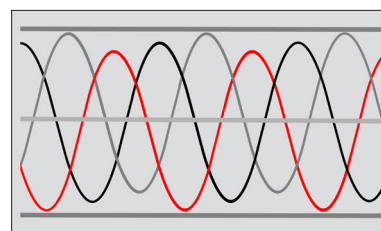
- Fines, penalties or sanctions for exceeding utility power quality limits (IEEE 519, ANSI C84.1)
- Damage or nuisance interference to sensitive electronic equipment caused by harmonic distortion, voltage imbalance, or prolonged Undervoltage
- Excessive motor heating and possible premature motor failures caused by Undervoltage conditions
- Back-up generator trips or becomes unstable because of harmonic distortion, leading power factor, or regenerating VFDs



Harmonic distortion limits  
TDD <= 5.0% at PCC  
IEEE 519- 2014, 1992



Undervoltage limits  
+/- 5% of nominal voltage  
ANSI C84.1



Imbalance limits  
Max imbalance limit is 3%  
ANSI C84.1

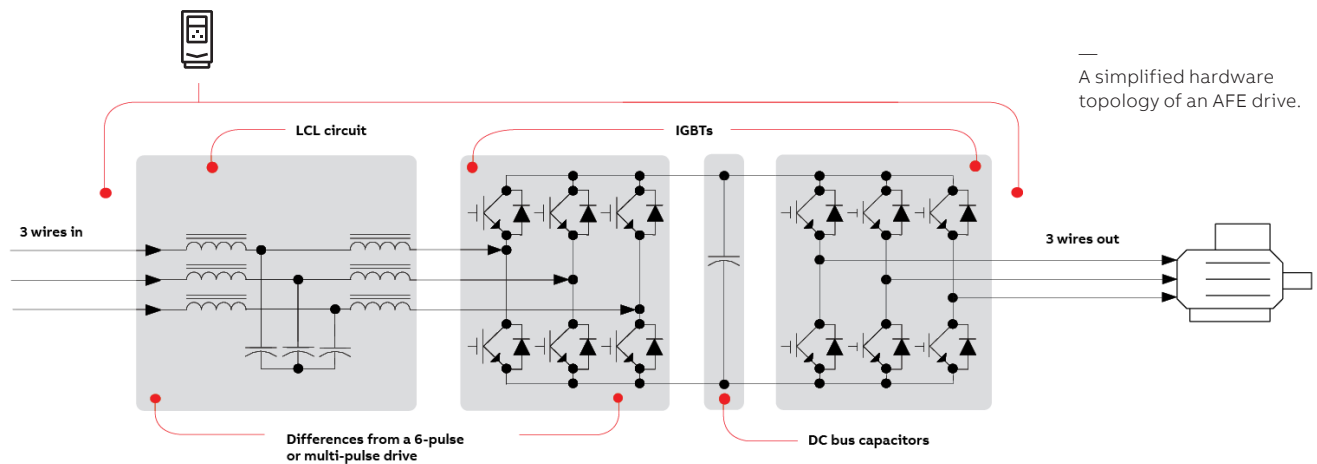
# Dirty power is not an issue with ABB Ultra-Low Harmonic (ULH) Variable Frequency Drives (VFDs)

ULH VFDs offer enhanced resilience and performance over 18-pulse solutions:

- Meets IEEE 519 at input lugs of VFD – THDi < 5%
- Tolerates input voltage imbalance while maintaining THDi < 5%
- Creates voltage boost to the motor to compensate for Undervoltage conditions (-15% to +10% V input)
- Unity Power Factor through the useful pump speed range offers better system efficiency
- 3 wire in and 3 wire out offers a small footprint, less weight, suitable to retrofit older 18-Pulse units
- Greater “wire-to-water” system efficiency requires less A/C cooling required
- No need to oversize backup generators & upstream transformers to account for harmonic heating

Some additional benefits of using the ACQ580 dedicated water/wastewater VFD:

- Innovative dedicated pump control software features of the ACQ580 portfolio
- Intuitive control panel (keypad) uses water industry terminology
- Connectivity to SCADA, connectivity to Ethernet I/P, and other common interfaces



The ULH (Active Front End) drive converts alternating current (AC) to direct current (DC) and then switches the direct current back to AC like a traditional 6-pulse variable speed drive.

