

Lineator™ vs Multipulse Drive

Item	Multipulse Drive	Mirus Lineator AUHF
Harmonic Mitigation Performance	Poor in real-world conditions	Excellent performance even with voltage imbalance and background voltage distortion
Background Voltage Distortion	Performance degrades with higher levels of voltage distortion	Guaranteed to maintain performance even up to 5% background distortion
3-phase Voltage Imbalance	Performance degrades as phase shifting becomes less effective with voltage imbalance	Little degradation in harmonic mitigating performance with voltage imbalance
Energy Efficiency	Less efficient over the entire operating range due to additional losses of transformers	2 - 3% higher efficiency over the entire operating range
Operating cost	\$\$	\$
Initial Investment	\$\$	\$

- Although the phase shifting in multipulse drive systems (12-Pulse, 18-Pulse or 24-Pulse) can substantially lower VFD harmonic currents, the cancellation effect drops off quickly in the presence of voltage imbalance and background voltage distortion. Claimed performance can only exist in laboratory environments where voltage imbalance and voltage distortion are low. With voltage imbalance as little as 2%, multipulse performance is no better than a standard 6-pulse VFD and any background voltage distortion will contribute to even worse performance.
- Mirus' Lineator AUHF in combination with a simple 6-Pulse VFD can match the best performance of multipulse drive systems and is guaranteed to maintain this performance even with voltage imbalance up to 3% and background voltage distortion as high as 5%. The Lineator AUHF provides a true 'Real World' performance guarantee.
- Multipulse drives introduce significant losses. The required phase shifting transformers and reactors introduce at least 2 - 3% more losses than a Lineator AUHF with a 6-Pulse VFD.
- Although multipulse drive configurations do not use capacitors, this does not necessarily make them better than all passive harmonic filters and particularly the Mirus Lineator AUHF.
 - Mirus Lineator AUHF is designed to prevent resonance with the power system. It is tuned to a resonant frequency that is below the characteristic harmonic frequencies found in the power system. When combined with the power system inductance, the resonance frequency is further reduced, preventing troublesome harmonic resonance with the power system from occurring.
 - Many passive filters introduce too much capacitive reactance due to their relatively large capacitor banks. This can cause issues with generator automatic voltage regulators (AVRs) or high voltage boost and require contactors to switch out the capacitor banks under no load or light load. The Lineator AUHF, with its relatively small capacitor bank, rarely needs a capacitor switching contactor since its output voltage boost is kept below 3% and capacitive reactance is kept below 15% of rated kW. Capacitor switching contactors need only be considered in applications where the total filter connected load is substantially greater than the generator capacity.

