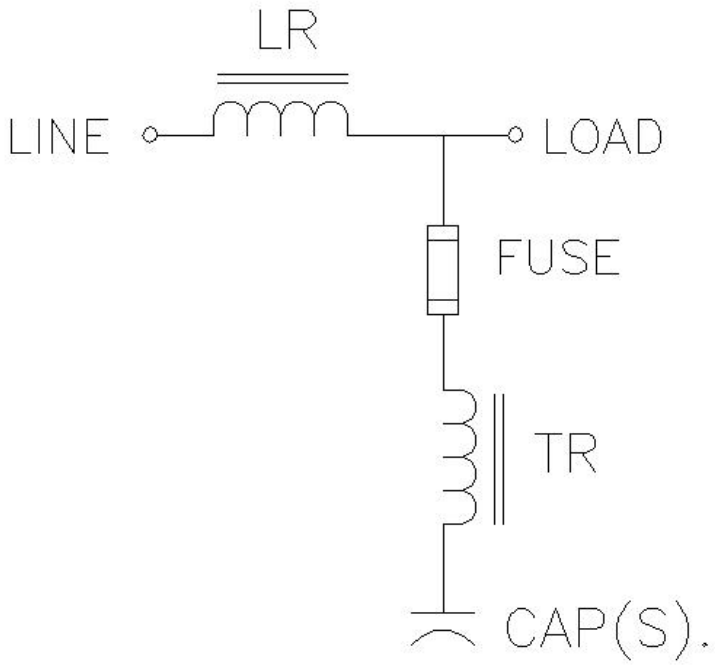
Benefits of Passive Harmonic Filters over 18 Pulse Transformers

18 pulse transformers have been available in the marketplace since the late 1980's. The technology works well if all the electrical characteristics of the connected power distribution system are in good condition.

However, an alternate technology emerged in the mid-1990's that were an improvement over 18 pulse transformers; passive harmonic filters.

A passive harmonic filter consists of a series inductor to dampen all of the harmonic frequencies and a tuned circuit to specifically address the largest harmonic – the 5th.



This strategy provides many benefits over 18 pulse transformers.

Benefits

Cost Reduction

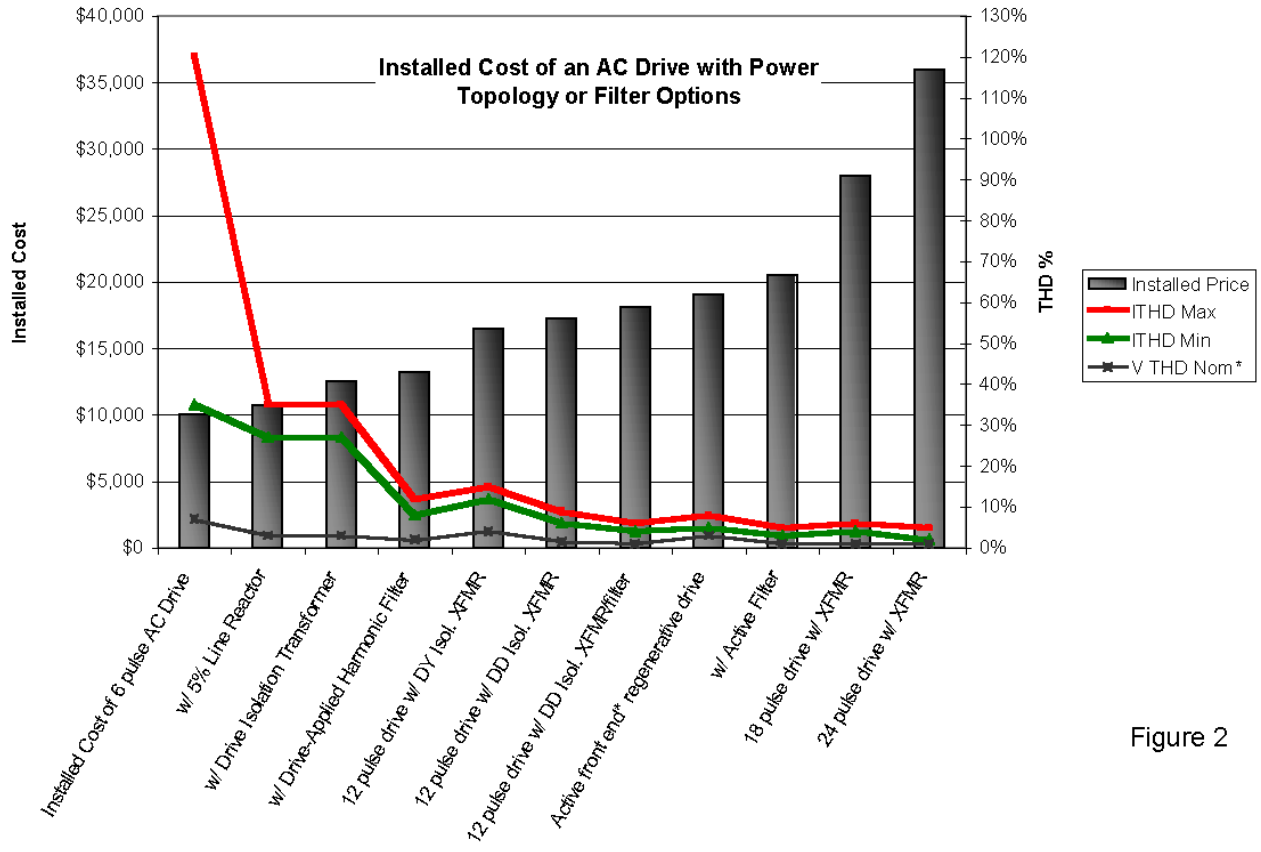


Figure 2

Standard Product

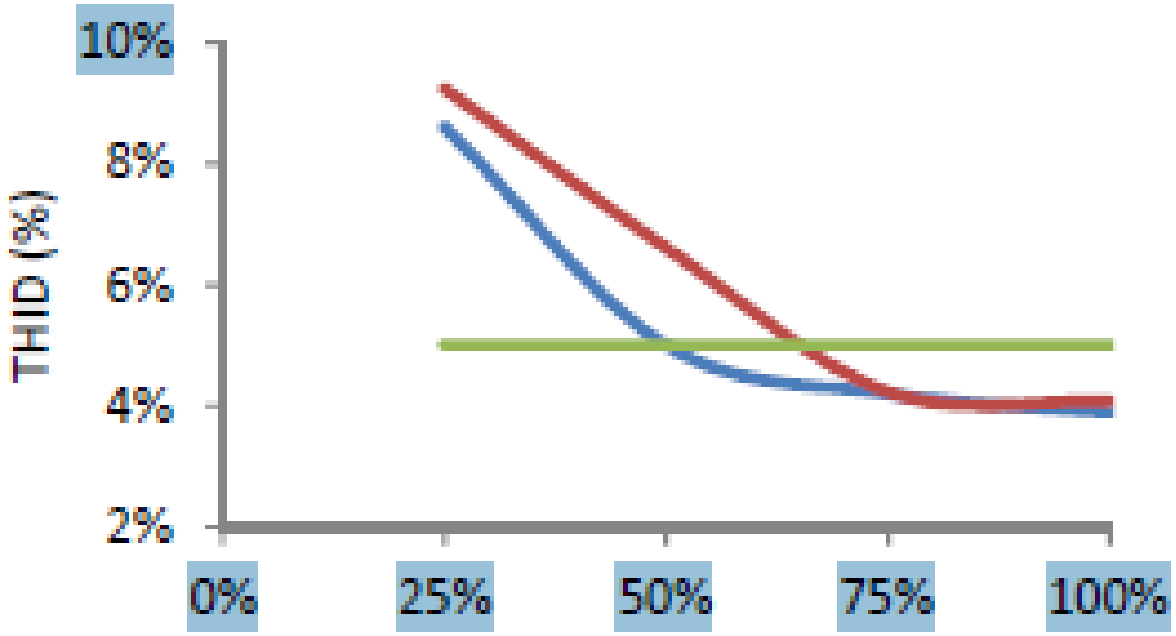
Passive harmonic filters are used with OTS VFDs supplied by the many VFD manufacturers. No special construction required.

Energy Efficiency

Hp	Watts Loss 18 Pulse - VT	TCI Losses	Additional Losses	Electricity Cost kW/Hr	Hours	Yearly Cost Adder for 18 pulse
50	2674	650	2024	0.1	8765	$ 1,774.04
60	2838	825	2013	0.1	8765	$ 1,764.39
75	3027	950	2077	0.1	8765	$ 1,820.49
100	3756	975	2781	0.1	8765	$ 2,437.55
125	4843	1150	3693	0.1	8765	$ 3,236.91
150	6637	1450	5187	0.1	8765	$ 4,546.41
200	7074	1775	5299	0.1	8765	$ 4,644.57
250	9582	2050	7532	0.1	8765	$ 6,601.80
300	11216	2500	8716	0.1	8765	$ 7,639.57
350	11684	2725	8959	0.1	8765	$ 7,852.56
400	12894	3100	9794	0.1	8765	$ 8,584.44
450	13793	3350	10443	0.1	8765	$ 9,153.29

Harmonic Levels

Passive harmonic filters compare closely to 18 pulse transformers in performance.



18 Pulse Passive Filter IEEE-519 5%

Summary

Passive harmonic filters are a better value than 18 pulse transformers because:

- First cost is less
- Less weight – lower freight costs and less floor stress
- Standard six pulse VFDs are used instead of custom
- Yearly operating costs are less
- Harmonic performance similar