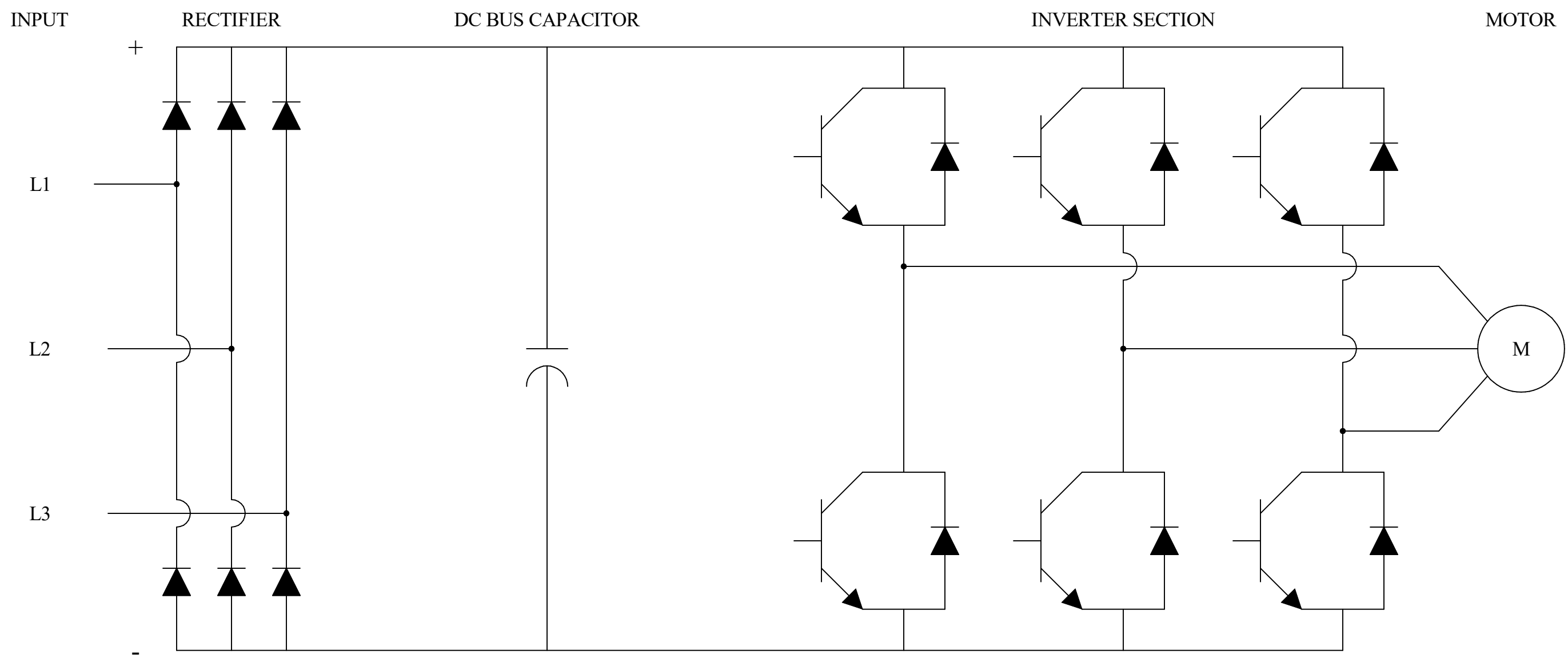


BASIC VFD DIAGRAM

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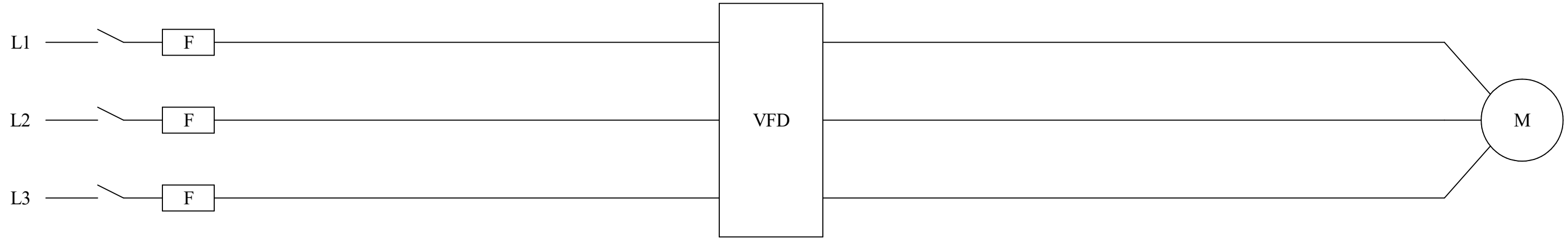
Converts AC to DC

Smooths DC

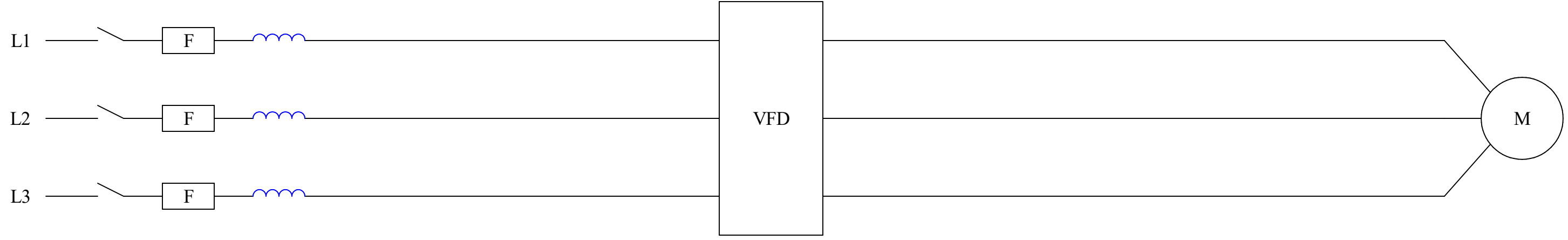
Converts DC to a controlled AC sinewave

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VFD without any filters. I don't recommend this.



VFD with the bare MINIMUM filtering

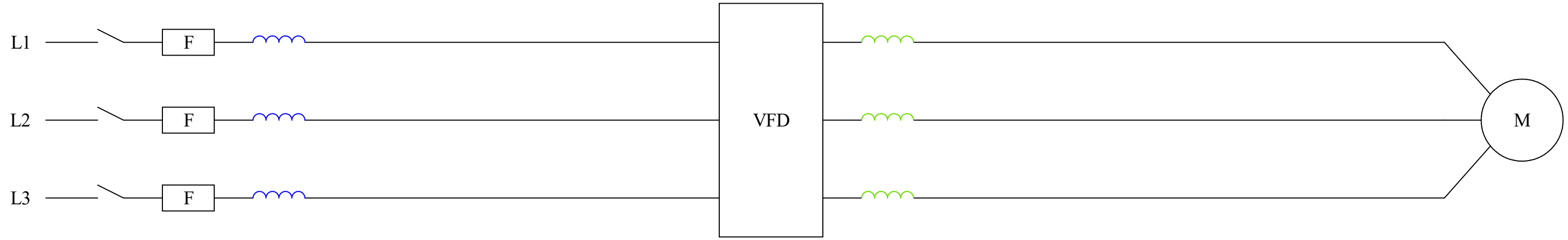


LINE REACTOR

A 5% line reactor, sized for the current input of the VFD, usually reduces %THD-I by at least 20%. It also helps reduce voltage spikes. It is good insurance to protect VFDs on the line side of the system.

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VFD with better filtering



LINE REACTOR

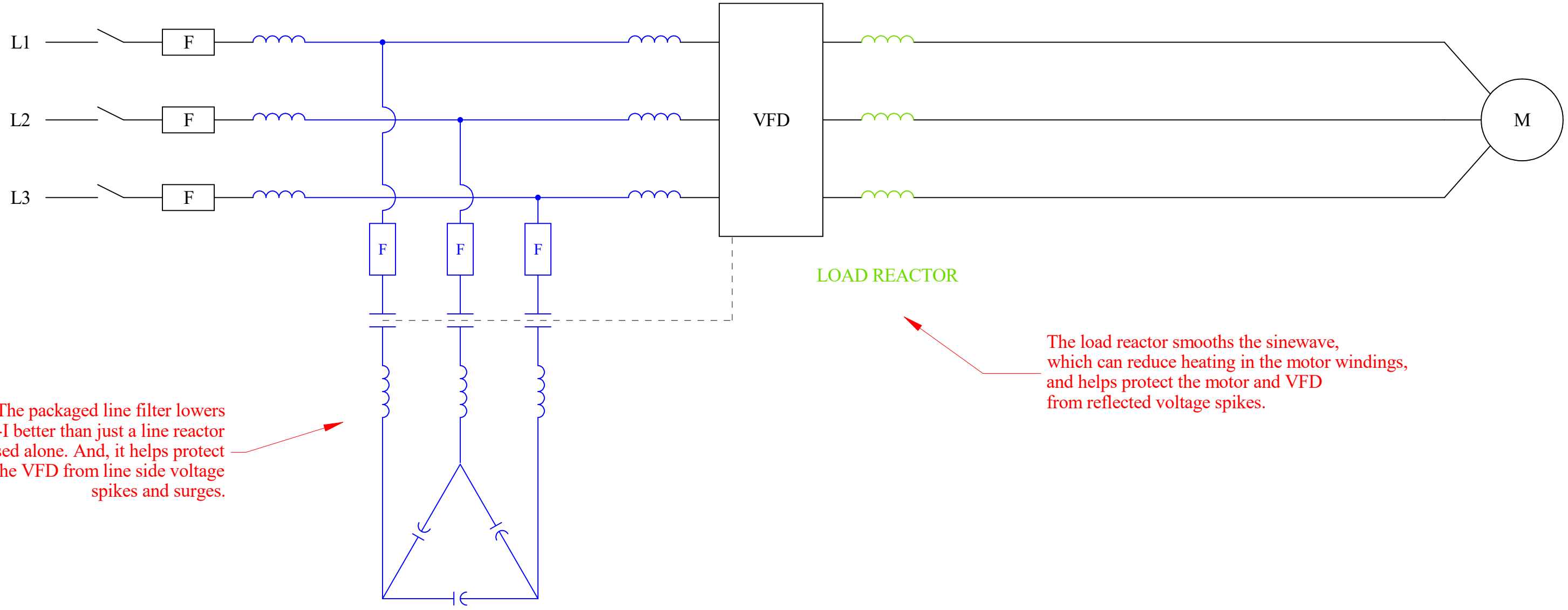
LOAD REACTOR

A 5% line reactor, sized for the current input of the VFD, usually reduces %THD-I by at least 20%. It also helps reduce voltage spikes. It is good insurance to protect VFDs on the line side of the system.

The load reactor smooths the sinewave, which can reduce heating in the motor windings, and helps protect the motor and VFD from reflected voltage spikes.

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VFD with a packaged line filter and load reactor. This is my most common recommendation.



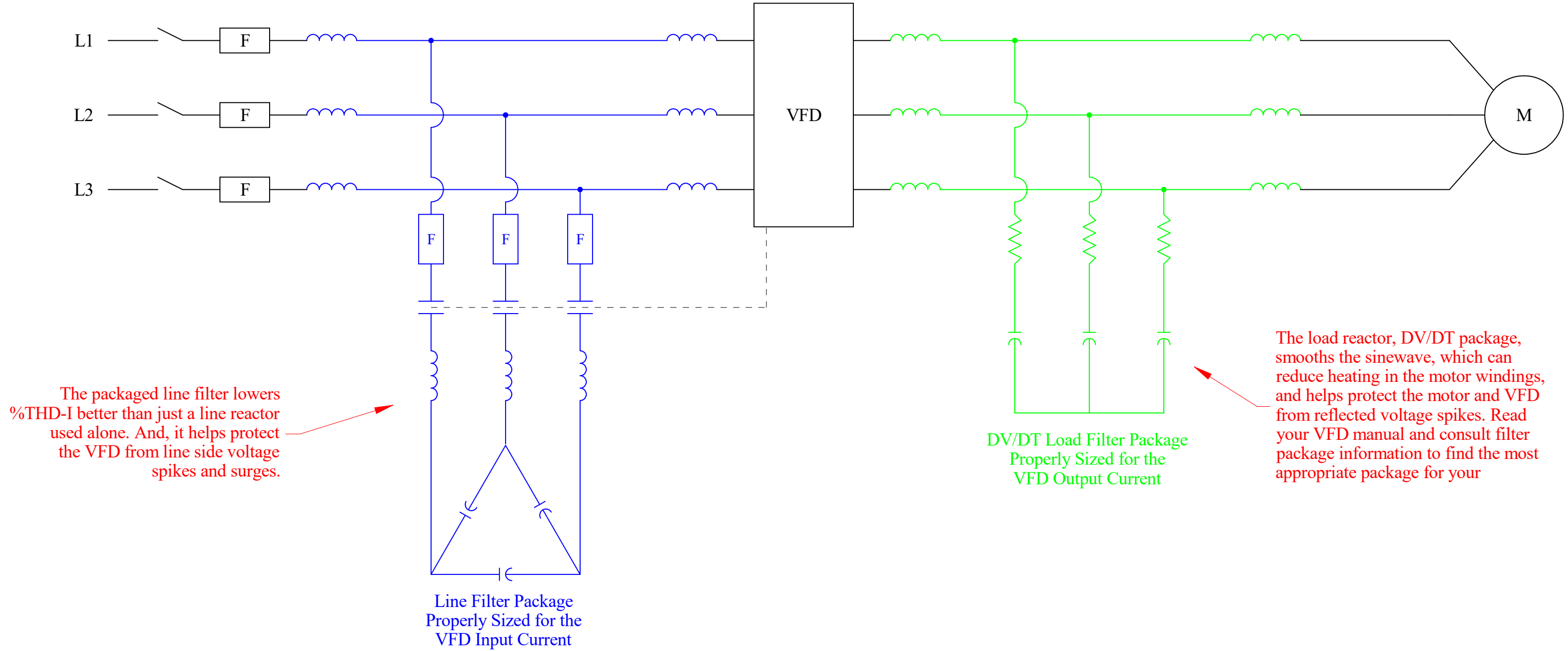
The packaged line filter lowers %THD-I better than just a line reactor used alone. And, it helps protect the VFD from line side voltage spikes and surges.

The load reactor smooths the sinewave, which can reduce heating in the motor windings, and helps protect the motor and VFD from reflected voltage spikes.

Line Filter Package Properly Sized for the VFD Input Current

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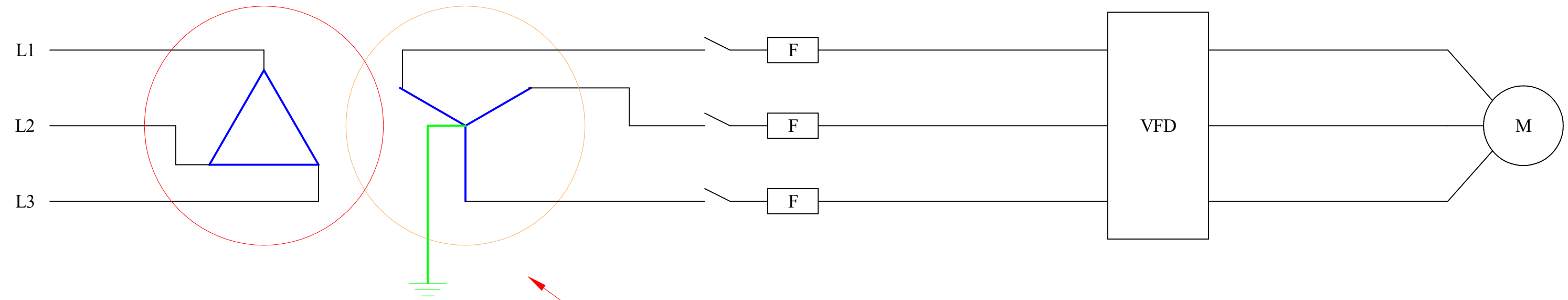
VFD with a packaged line filter and packaged DV/DT filter. I recommend this for motors located more than 200 feet from the VFD.



Note 1: These are just representations of common products. There are many filtering schemes that work. Check the manufacturer's diagrams for the most accurate information.

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Isolation Transformer Option

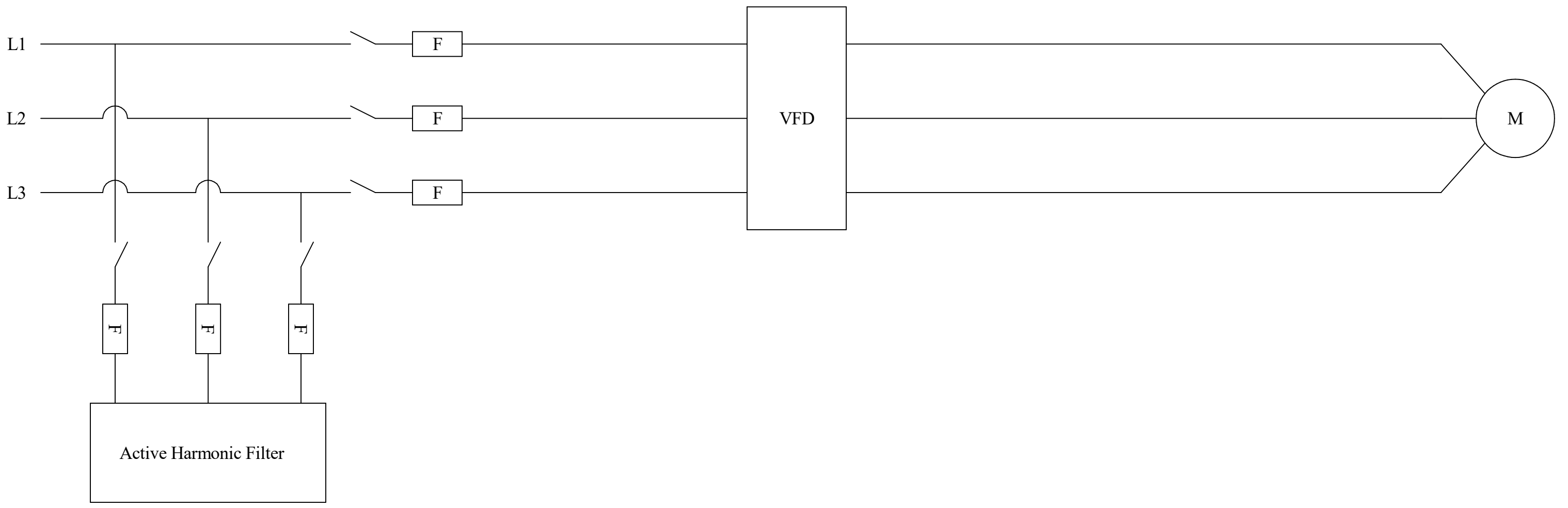


The isolation transformer option is somewhat similar to using line reactors, but it works better. It provides line isolation and does a good job reducing line harmonics. Since it works better, it is also usually more expensive. Look for a transformer designed specifically for VFD isolation use. They will have will likely be K rated and have higher impedance.

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Active Harmonic Filter



Active Harmonic Filters are usually the most expensive option. They can be added upstream of a VFD, or group of VFDs. They monitor the harmonic distortion on the system, then inject signals that correct the system sine wave. They use power to do this, so you have to carefully design your system to use these.

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