

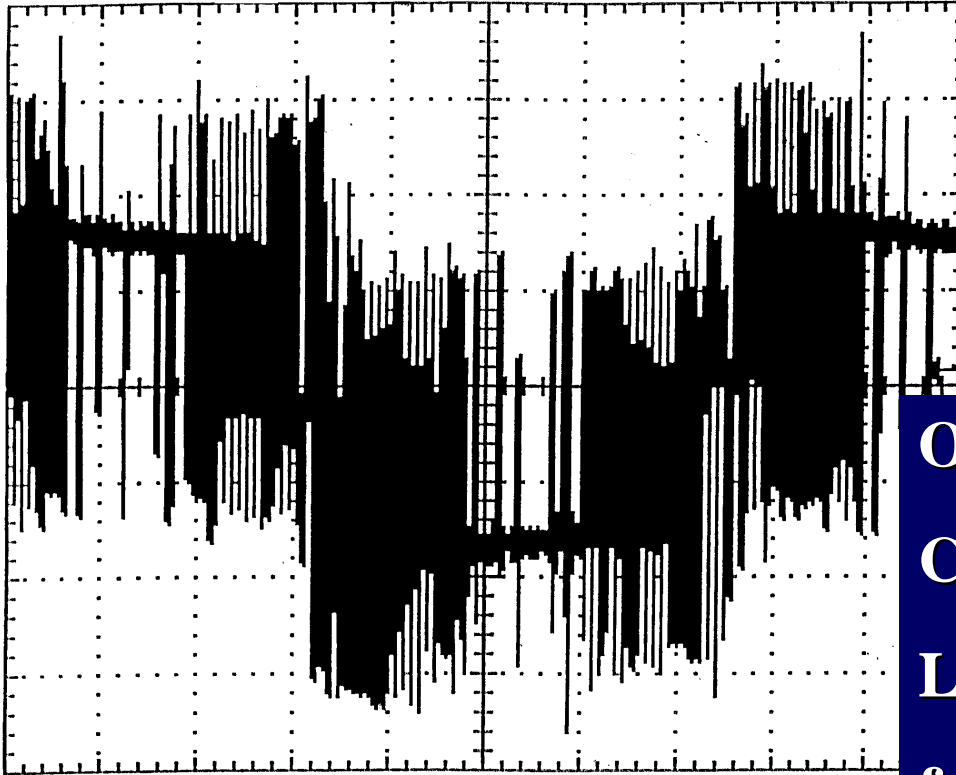
# Motor Protection Filters

- ✓ Purpose
- ✓ Motor Specs
- ✓ Alternatives

# MTE Motor Protection Filters...

- Eliminate motor repetitive voltage stress failures
- Eliminate long lead motor over voltage problem

# Drive Output Voltage



**Output Device = None**

**Circuit Length = 750 ft**

**Load = 3Ø 240 V, 3-1/4 A**

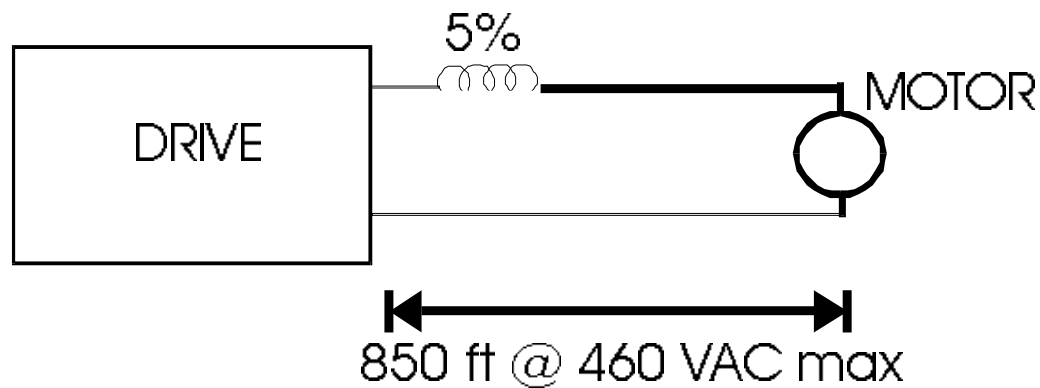
**$f_{SW} = 6\text{KHz}$**

**$f_{FUND} = 60\text{ Hz}$**

# Motor Protection Filter Options

- Single element low pass filter
- High frequency snubber
- Dual element low pass filter

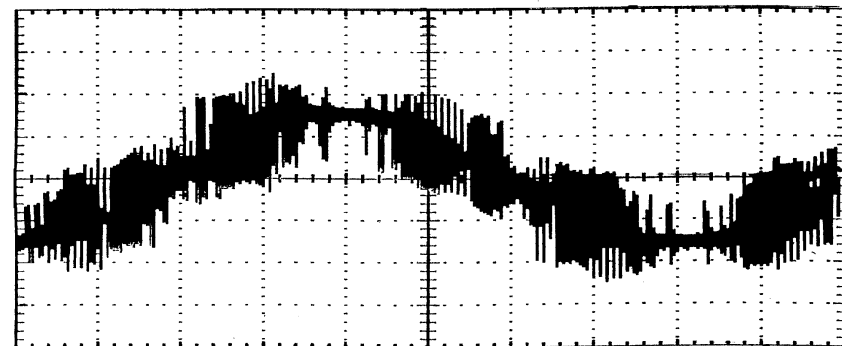
# Single Element Low Pass Filter



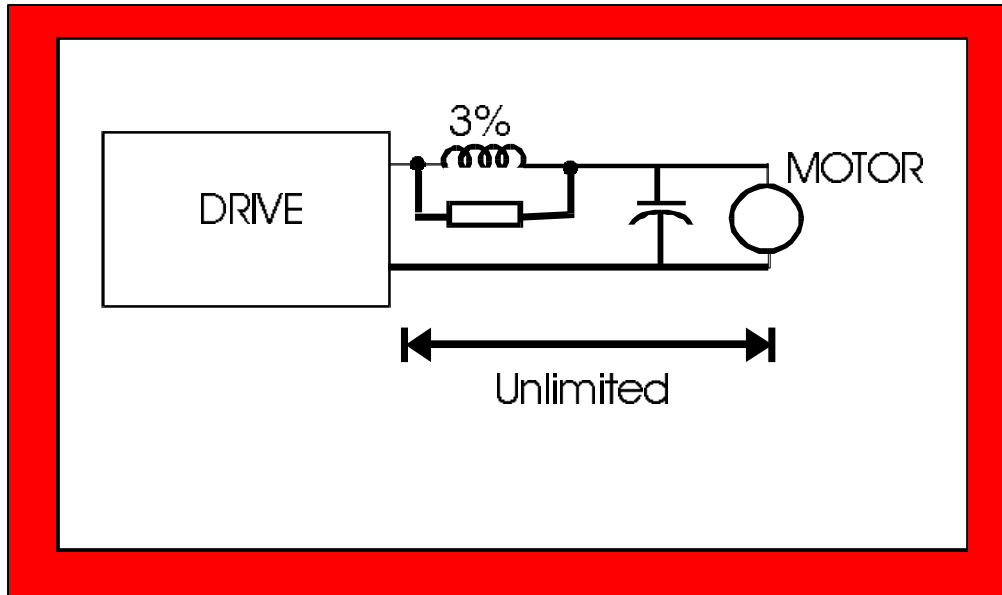
5% Reactor,  
1000 ft,  
240V--60 Hz,  
6KHz

Rise Time  $\geq 4\mu\text{sec}$

$f_{\text{SWITCH}} \leq 20 \text{ KHz}$



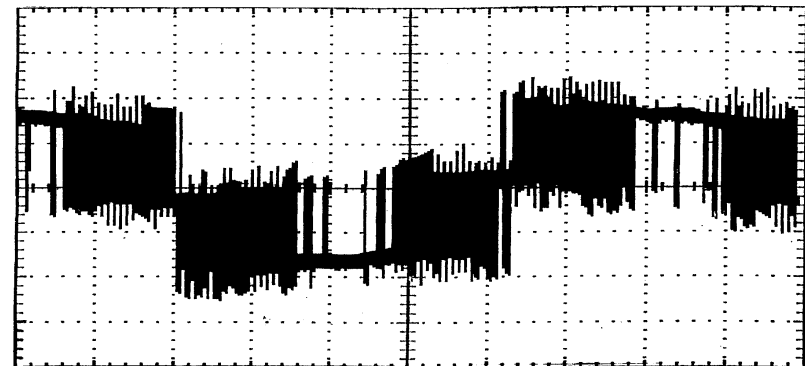
# High Frequency Snubber



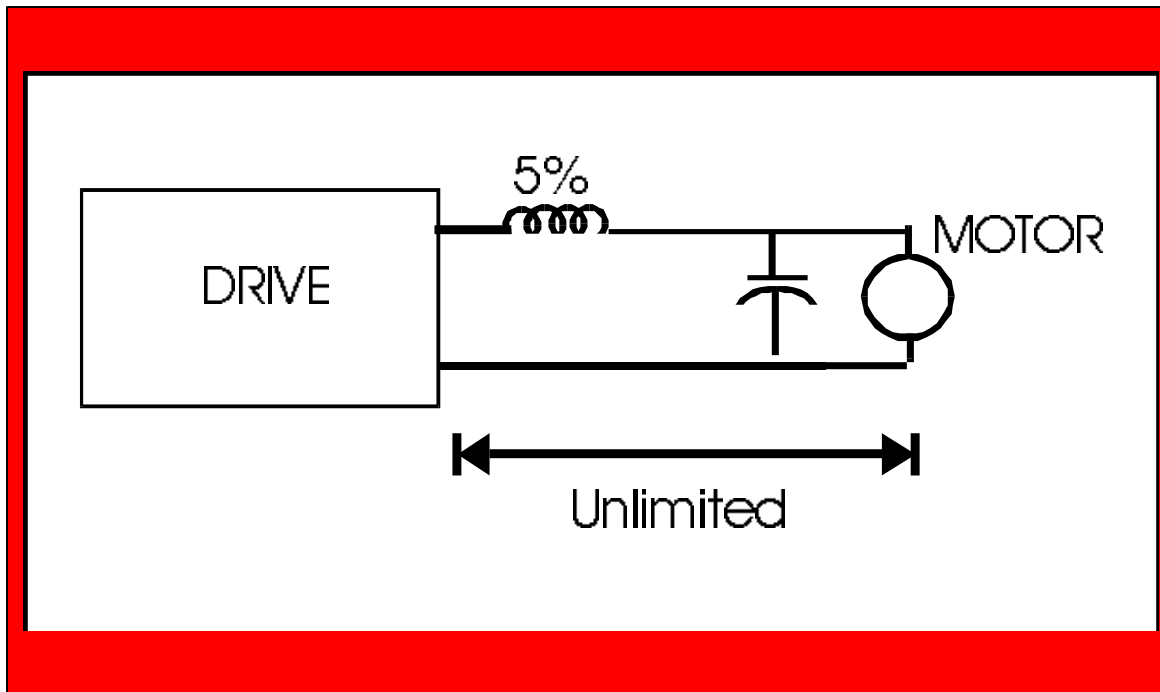
1000 ft,  
240V—60 Hz,  
3KHz

Rise time  $\geq 2\mu\text{sec}$

$f_{\text{SWITCH}} \leq 3.75\text{KHz}$



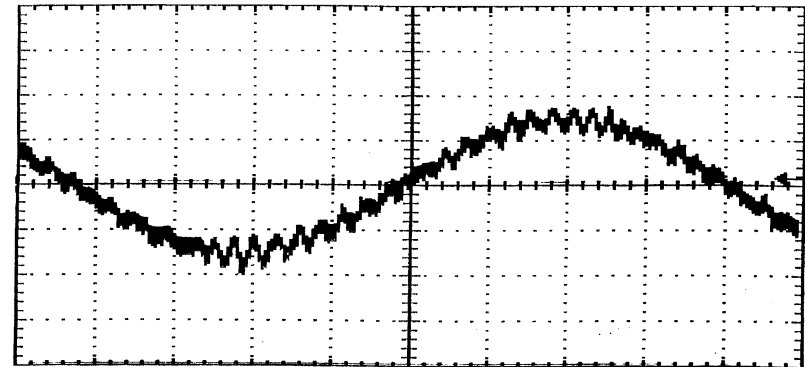
# Dual Element Low Pass Filter



LC Filter,  
1000 ft,  
240V--60 Hz,  
6KHz

Rise Time  $\geq 2\mu\text{sec}$

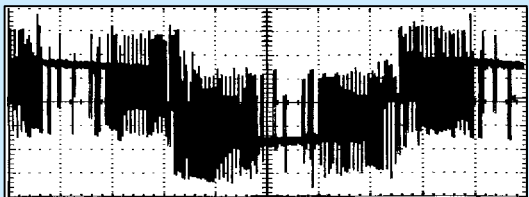
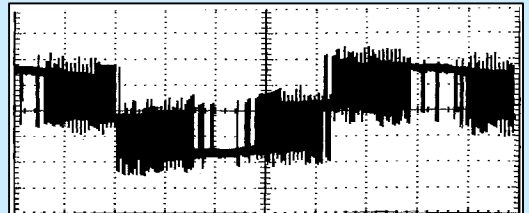
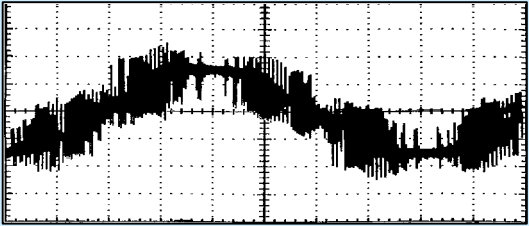
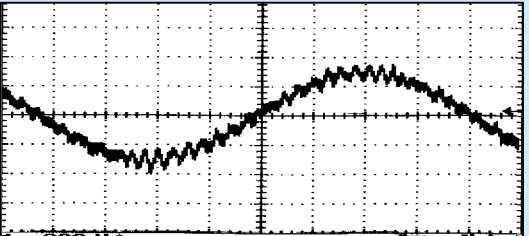
$5\text{KHz} \leq f_{\text{SWITCH}} \leq 20\text{KHz}$



# MTE Gives You...

- ➔ The lowest utilization cost
- ➔ Full range of solutions:
  - ◆ Reactors
  - ◆ Snubbers
  - ◆ Sine wave filters
- ➔ Total motor insulation protection
- ➔ The most durable product available
- ➔ Stocked components
- ➔ A global delivery system

# Motor Protection Filter Alternatives

OPTION	WAVEFORM	COST (5HP/460v)
Do Nothing		\$0
MTE Snubber		\$278
MTE 5% Reactor		\$153
MTE Motor Protection Filter		\$233

# Output Reactor Spec

Each variable frequency drive must be equipped with an output reactor offering no less than 4.5% effective impedance at rated motor amps (the fundamental current). Output reactors must be IGBT protected to withstand spikes of 16,000 volts per microsecond. They must be high frequency compensated and suitable for use with switching frequencies up to 20KHZ. They must be UL-506 and UL-508 approved. Nema 1 enclosed units must be UL Listed. The continuous current rating of the reactor must be equal to or greater than the rms output current rating of the drive. Reactors must be copper wound with a UL class H (180 C) insulation system. They must be suitable for an ambient temperature of 45 C and a have a maximum temperature rise of 115 C. Their watts loss must be less than 1% of the rated load. Box lug type terminals must be provided on all reactors rated from 2 amps thru 400 amps. Higher current reactors may be supplied with copper tab type terminals. Reactor must be MTE Corporation type "RL" series.

# **MTE** **CORPORATION**

