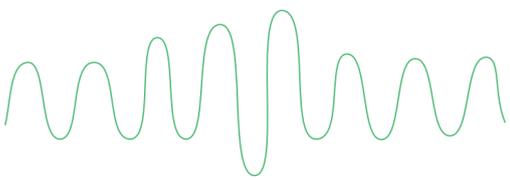
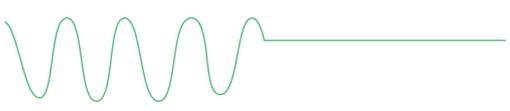
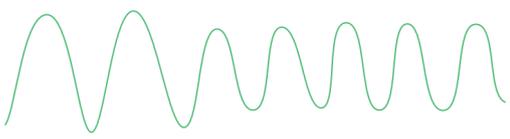
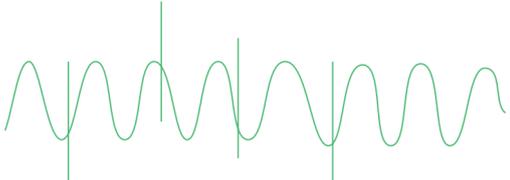
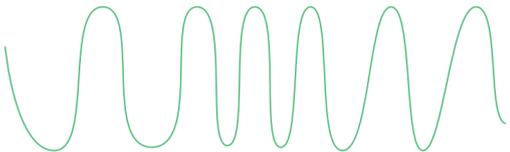
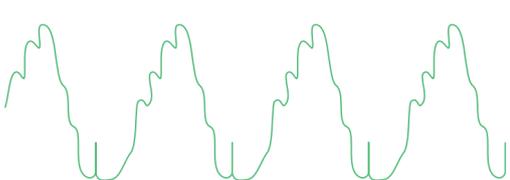


Recognize electrical disturbances. Understand their impact. Select the correct power solution.

Disturbance	Cause	Effects	Solution
Voltage Surge 	<p>Voltage surges can be caused by large load shut-downs, such as switching off high-power electric motors and the normal cycling of HVAC systems. They can also be caused externally as loads are shed from the utility.</p>	<p>Surges and swells can lead to significant equipment and hardware damages.</p>	<p>UPS Power Conditioners* Voltage Regulators</p> 
Power Interruptions 	<p>This total power disruption is typically created through an accident or equipment failure in the utility's generation or distribution network.</p>	<p>Power interruptions halt production and can decrease the lifespan of electrical equipment. The sudden nature of most power interruptions can also create hardware failures and crashes in PLCs and other computer-based equipment.</p>	<p>UPS* Generators</p> 
Brownouts 	<p>Overcapacity and other network issues can force utilities to intentionally create a brownout condition to compensate for high demand on the electrical power grid.</p>	<p>Brownouts can negatively impact the efficiency and lifespan of electrical equipment. They can also result in hardware crashes and occasional equipment failure.</p>	<p>Voltage Regulators*</p> 
Voltage Sags 	<p>Voltage sags are a result of large load start-up and utility switching. While short-lived, these disturbances can reduce the efficiency and lifespan of electrical equipment.</p>	<p>Similar to voltage reductions, repeated exposure to voltage sags can result in hardware failures and crashes in PLCs and other computerized equipment.</p>	<p>UPS* Power Conditioners Voltage Regulators Power Supplies with sag immunity</p> 
Voltage Transients 	<p>Voltage transients can come from outside the facility through lightning strikes, power outages and utility gridswitching. They can also originate inside the facility from short circuits, tripped breakers and the start-up of heavy equipment.</p>	<p>Sensitive electronic equipment is most at risk from these disruptions. A voltage transient may cause system lock-up or failure, which can corrupt or lead to loss of valuable data.</p>	<p>Surge Protective Devices* Power Conditioners Isolation Transformers</p> 
Frequency Variations 	<p>Frequency variations can exist if local power generation has poor speed regulations or through faults in the system. This disturbance can also be created by the disconnections of a large block or load or source of generation.</p>	<p>Frequency variations can cause system crashes and equipment damage, even ones that have UPS protection.</p>	<p>UPS*</p> 
Harmonic Distortion 	<p>This sinewave distortion is typically generated by non-linear loads similar to switchmode power supplies used by personal computers, office equipment, variable frequency drives and solid-state electronics.</p>	<p>Harmonics represent trouble for equipment throughout industrial facilities by overheating neutral conductors and transformers, tripping breakers, creating a high neutral current, reducing system capacities and even loosening electrical connectors.</p>	<p>Drive Isolation Transformers* K-Rated Transformers UPS Power Conditioners</p> 
Electrical Noise 	<p>It can be caused from both inside and outside the facility and also be generated by powerful electric disruptions, normal equipment operations or poor maintenance. Some sources include distant lightning strikes, switching power supplies, electronic circuits, poor brush contacts on motors, improper wiring and utility switching.</p>	<p>These random noise signals are superimposed on voltage waveforms and can cause computer bugs, glitches and other hard-to-diagnose computer maladies. They also produce undesirable effects in the circuits of control systems.</p>	<p>Isolation Transformers* Active Tracking® Filters Power Conditioners UPS</p> 

*Indicates optimal solution