

The Importance of Power Quality in Automation

Power quality represents significant opportunities to reduce costs, increase up-time, and gain a competitive advantage. Operators must monitor, analyse, and optimise energy use and power quality issues to benefit from these advantages.

The innovative precision and efficiency of modern technologies in automation and control processes deliver improvements, however, also present a concern. The concern is its susceptibility to power quality issues. Power quality is a silent cause of breakdowns, equipment damage, and safety risks, and impossible to detect without active monitoring.

Power quality issues may include:

- DC Offset
- Fluctuations or Flicker
- Harmonics
- Long and Short Interruptions
- Notching
- Noise
- Sags or Dips
- Surges or Swells
- Transients or Impulses
- Undervoltage or Overvoltage
- Voltage Unbalance

Effects of Poor Power Quality

Poor power quality can lead to inefficient electricity use and, as a result, higher operational costs. It can also mean increased downtime from early electrical components and equipment failure. The type of damage or impact caused by poor-quality power or failures can vary depending on the quality issue experienced. For example, this may include:

- Damaged equipment from the waveform created by Harmonics.
- Overheating and shortened lifespan of equipment due to increased voltage.
- Increased power supply costs due to additional equipment added to an inefficient system.
- Overpowered equipment to compensate for inconsistent power leads to more expenses.
- Loss of data from interrupted power causes issues further down the process.

Monitoring and Mitigation

The first move to better performance is understanding the power quality issues affecting processes and equipment. Power quality events can be brief and occasionally undetected. In addition, triggers can come from inside or outside the operations. For example, severe weather patterns or installing new or existing equipment in a system.

Monitoring solutions help identify power disturbances, whether complete operations, specific systems, or equipment. Information and data from monitoring can aid in understanding how downtime contributes to power quality issues and financial costs.

As soon as causes are determined, mitigation strategies and solutions are next. There are ways you can improve uptime and optimise operational processes. This ranges from voltage sag protectors and uninterrupted power supplies (UPS) to surge and filter protection,

In short, without consistent, dependable, quality power, the complexities of plant operations are pointless. As operations move towards complete digitalisation and automated control methods, the greater the impact of poor power quality will be on equipment and process reliability.