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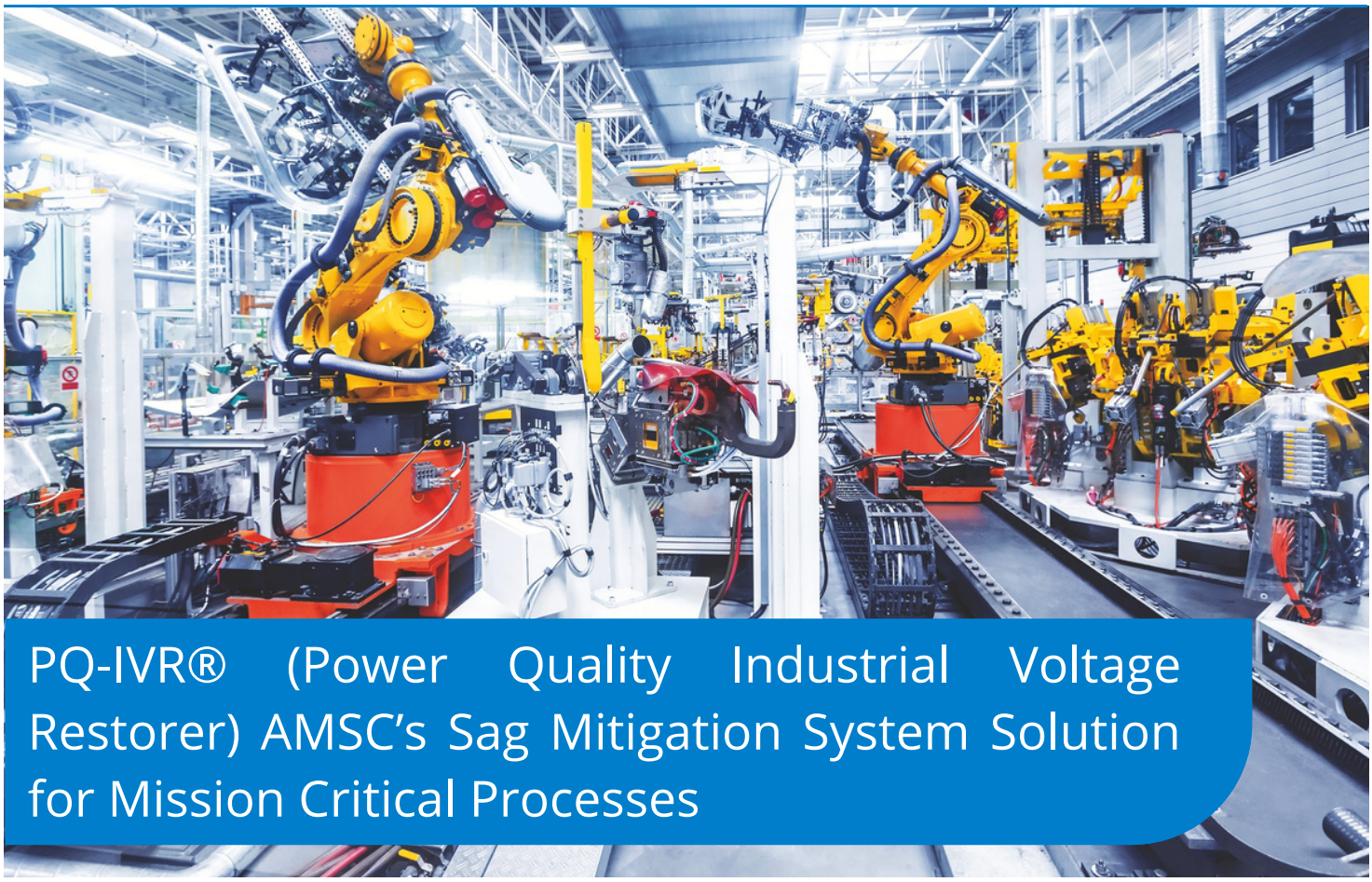
Enhancing Power Quality for Critical Manufacturing



PQ-IVR® (Power Quality Industrial Voltage Restorer) AMSC's Sag Mitigation System Solution for Mission Critical Processes

The Challenge

High-throughput, high-dollar manufacturing centers can be highly sensitive to even the briefest variations in electrical power quality. When voltages decline for even a few cycles, the cost can be enormous. Every year, billions of dollars in revenue are lost due to momentary power quality problems.

The Solution: PQ-IVR®

AMSC's PQ-IVRpower quality industrial voltage restorer eliminates hours of downtime and the need to recalibrate equipment due to slight voltage variations. The PQ-IVR system offers large industrial customers a superior way to mitigate disruptive power quality in milliseconds, resulting in improved reliability and smooth, efficient operation.

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Load Independent Shunt Connected System

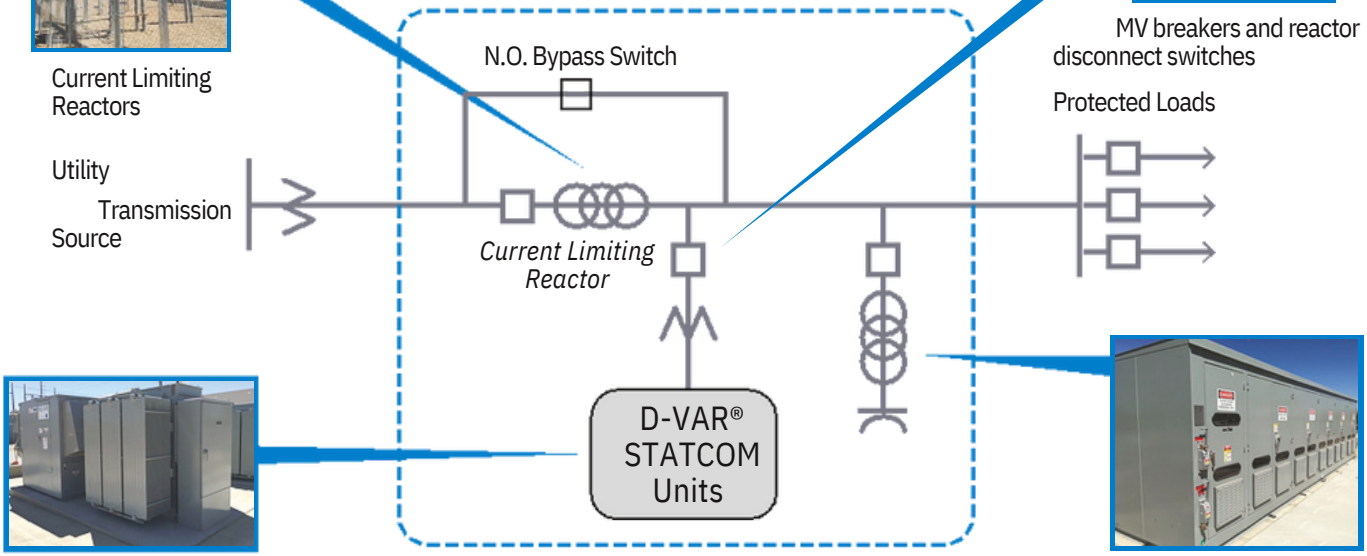
The PQ-IVR system is a medium-voltage shunt-connected voltage protection solution for large industrial facilities, designed specifically to provide facility-wide protection against voltage swells and sags. Unlike series-connected devices, the sag rebuild of the PQ-IVR system is not load dependent, so additional load can be added to the plant without impacting effectiveness.

Current Limiting Reactors

MV breakers and reactor disconnect switches

D-VAR® STATCOM Units with step-up transformers

Power factor correction caps (harmonic filters)



- ✔ *Protects industrial facilities from momentary voltage sags and swells*
- ✔ *Shunt connection eliminates risk to critical load*
- ✔ *Provides at least two seconds of ride-through at full power*
- ✔ *Configured based on facility protected load level*
- ✔ *Can be configured to accommodate growth in protected loads*
- ✔ *Lower electrical losses, as the system remains mainly on standby*
- ✔ *Protects against deep one-, two- and three-phase voltage sags*
- ✔ *Short term 3x overload minimizes physical equipment and space requirement*
- ✔ *Uses proprietary IGBT inverters with millions of reliable operation hours*
- ✔ *Rebuilds 3 phase voltages by up to 65%.*
- ✔ *Can support internal voltage excursions due to motor starting, etc*
- ✔ *Lower electrical losses, as the system remains on standby*
- ✔ *Rebuild solutions meet and exceed SEMI F47 standards*

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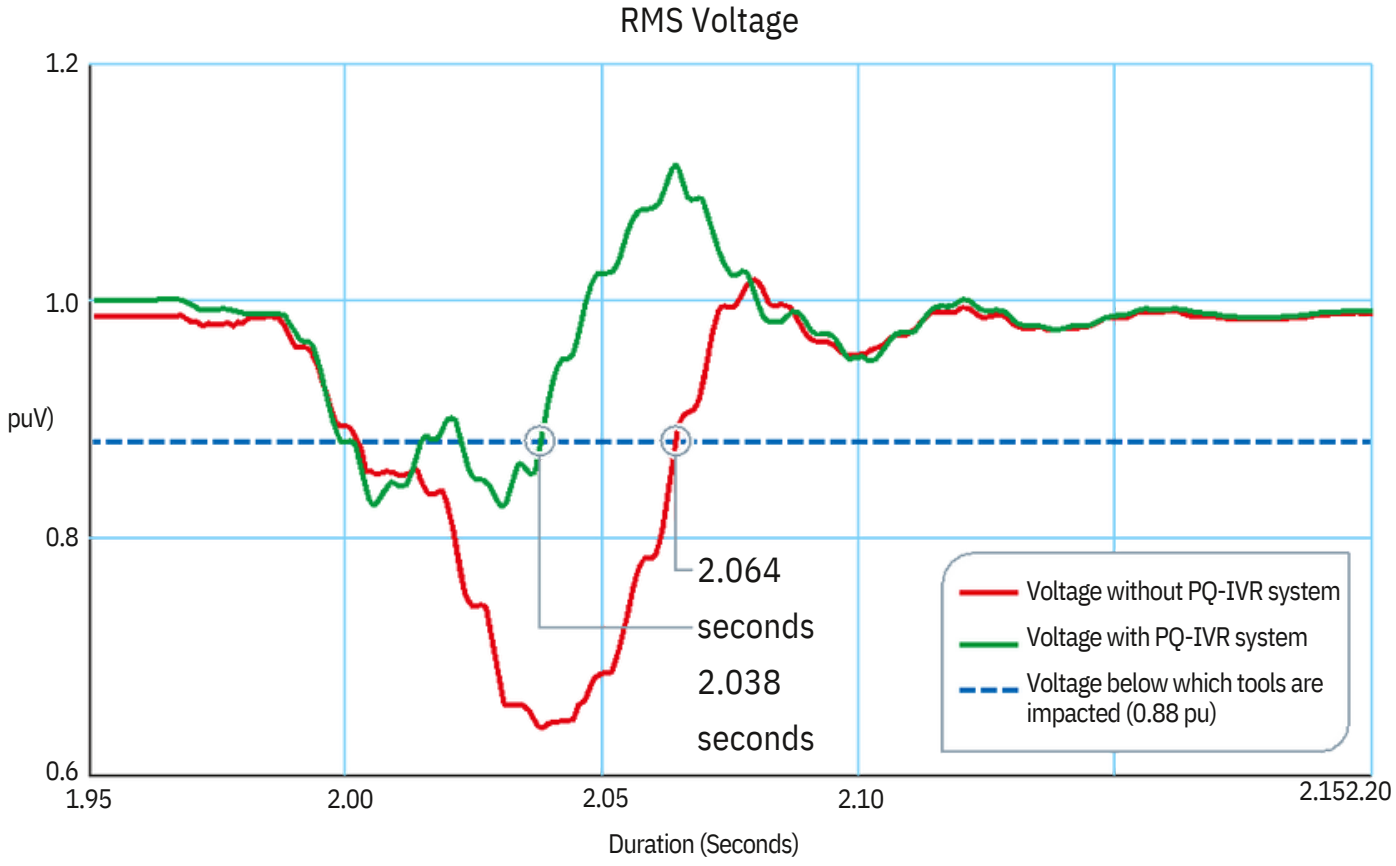
Keeps on working

The PQ-IVR system does not shut down or go into bypass mode when detecting a voltage dip that originates within the industrial facility or exceeds the PQ-IVR rebuild design limits.

Precise Voltage rebuild

The system contiguously monitors and corrects for any voltage sags within milliseconds, immediately injecting precise amounts of reactive power into the network to quickly correct both balanced and unbalanced voltages as shown below.



The PQ-IVR system is designed and configured to provide the right amount of voltage rebuild and protection capability to allow critical manufacturing process to stay on line and adhere to power quality standards including SEMI F47.

The system is a cost effective medium voltage solution that provides required protection for all the critical loads while ensuring minimum downtime and interruptions.

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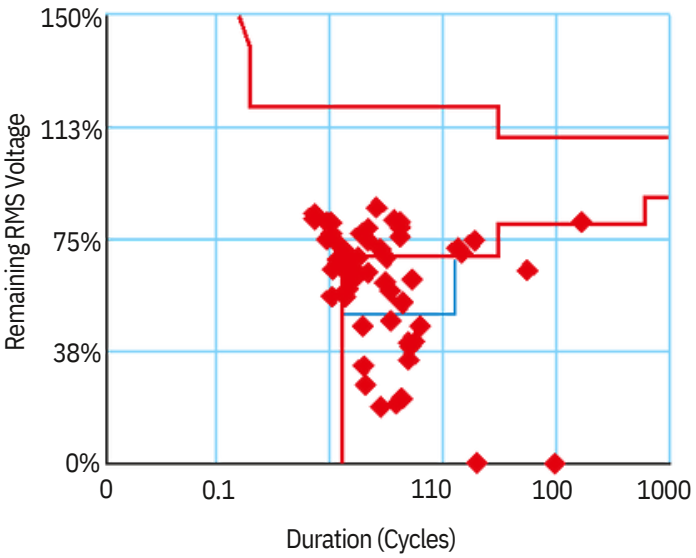
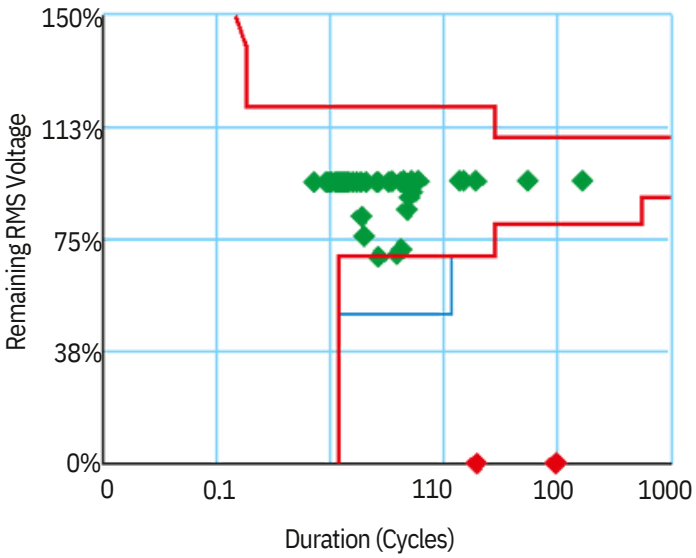
Unmitigated Sags



With PQ-IVR System Installed



Independent module operation improves reliability.

AMSC's PQ-IVR systems use the latest proprietary power electronic converters. They can be configured to meet a wide range of requirements, allowing industrial facilities to realize their full potential. Each system contains four-quadrant IGBT inverters stacked to handle the required output demand. Every Power Module block operates independently, thereby improving reliability

Smooth and efficient operation

With short lead times, quick payback and minimal impact on facility operations and infrastructure, PQ-IVR systems provide a cost-effective solution that allows industrial facilities to operate smoothly and efficiently.

Contact AMSC to discuss how our state of the art and field proven PQ-IVR system can help protect your critical manufacturing facilities from unforeseen events in the transmission grid. Customers have access to advanced tools and methodology to analyze and configure the most optimum solution for individual plant needs.

To find out more about AMSC's power protection solutions:
www.amsc.com/gridtec/critical-power-solutions

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PQIVR_SAG_MITIGATION_LTR_922

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