

VAASCO energy efficiency solutions
Voltage as a Service (VAAS)TM

VAASCO Group

grid voltage control for commercial, industrial & government

10th August 2022

an effective step towards net zero energy

Under and Over Voltage Management



Voltage level	Voltage level	Characteristics/Issues
253 V and more	OVERVOLTAGE Overvoltage is excess voltage. It is commonly characterised by power swells or surges.	• electrical equipment overheating, and excess energy use • electrical circuit failure: tripping of protection system or insulation failure • reduced equipment operating life • consequences such as production and operation issues
230 – 253 V	ELEVATED VOLTAGE	• electrical equipment overheating, and excess energy use • reduced equipment operating life
220 - 230 V	NORMAL VOLTAGE	• efficient operation of electrical equipment as a result of operating with the designed voltage range • reduced likelihood of electrical equipment failure • reduced likelihood of production, operational and maintenance issues
216 V and less	UNDERVOLTAGE Undervoltage is a loss of voltage. It is commonly characterised by power sags or dips.	• lack of sufficient power to operate electrical equipment • increased current in alternating current (AC) motors • electrical circuit failure, leading to overheating • reduced equipment operating life • consequences such as production and operation issues, including process interruption due to protection trips

Responsive voltage optimization

Key performance specification

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Function	Measure
Responsive Power Optimisation	Stable Output $\pm 0.5V$
Active 3 Phase balancing	Balances 3 phases within $\pm 0.5V$
Super Fast Response	0.25 seconds
Intelligent Voltage Control	0.1V Incremental Control
Voltage Recovery	Buck or Boost voltage by 11% - 15%
Remote monitoring & control	Wi-Fi/LAN

Risk	Function	Benefits of responsive voltage control
Increasing volatility of supply from Multiple renewable energy feeds into the MV and HV Grid	Dynamic Voltage Control	Eliminates input voltage instability electronically by controlling VPO output voltage at a constant pre-determined voltage level (+/- 0.5V or 99.998% accuracy). This ensures that a site's equipment receives a highly stable voltage at a pre-set level.
Local brownouts result in the site's supply being too low for equipment to operate due to grid supply & demand constraints	Boost incoming supply voltage by 15%+ below set point	Protects the site against network voltage sags due to diminishing power quality and from rapid longer term voltage reduction (brownouts) caused by grid overloading. If input voltages sag to 185V the VPO will boost the voltage back to the set voltage point. Boosting lower voltage sags is achievable with custom units - increasing site resilience.
The incoming supply voltage fluctuates rapidly or becomes erratic due to grid issues from variable renewable generation	Ultra Fast Response	Autonomous very fast response time of <0.25secs - qualifying it for enhanced frequency response and demand response for an unlimited amount of time and does not impact site operation/equipment usage
Unbalance three phase supply due to Grid issues or single phase overloads reducing 3 phase equipment efficiency, operation and lifespan	Actively controlled 3 phase voltage balancing to within 0.1%	Actively corrects phase to phase voltage imbalance by correcting phase voltages to within 99.9% of each other, improving equipment operational efficiency and life span. Reducing kWh consumption.
Increased transients and harmonics from degraded power quality due to multi-directional Grid and uncontrolled renewable feed into the Grid.	Standard Voltage Power Optimiser function	Suppresses harmonics and common transients. Reduces kVAR (c.40%) and improves power Factor (8-20%)

**Fine resolution, rapid response and
independent phase balancing**

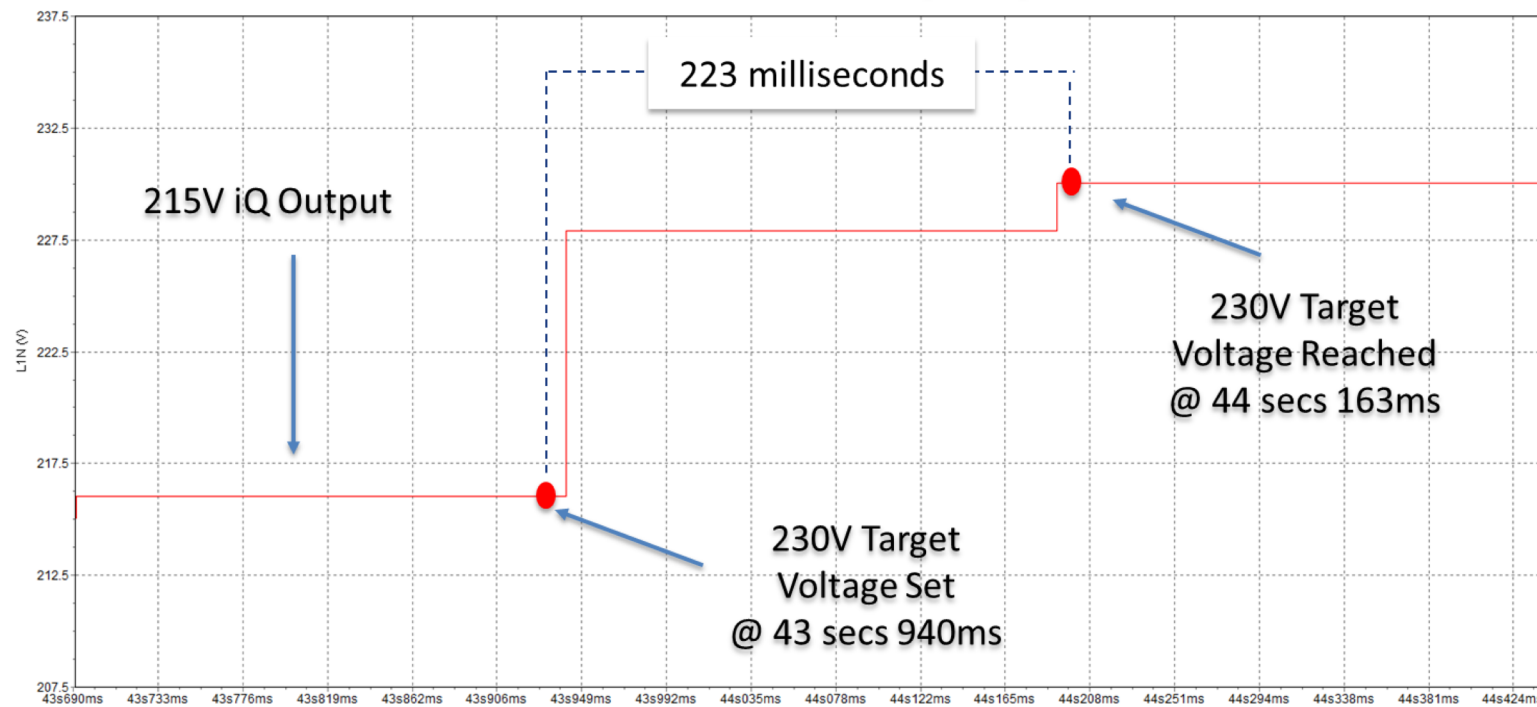
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Voltage boost

Speed of response - example

Screen shot of Power Quality Analyser



A nighttime photograph of a city skyline, likely Melbourne, with numerous skyscrapers and lights. Overlaid on the image are various digital icons representing different aspects of technology and connectivity. These include a location pin, a house, a group of people, a lightbulb, a smartphone, a cloud with a download arrow, a shopping cart, a padlock, a heart, a gear, a Wi-Fi router, and a car. Dotted lines connect these icons to specific points on the city skyline, suggesting a network or data flow.

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