

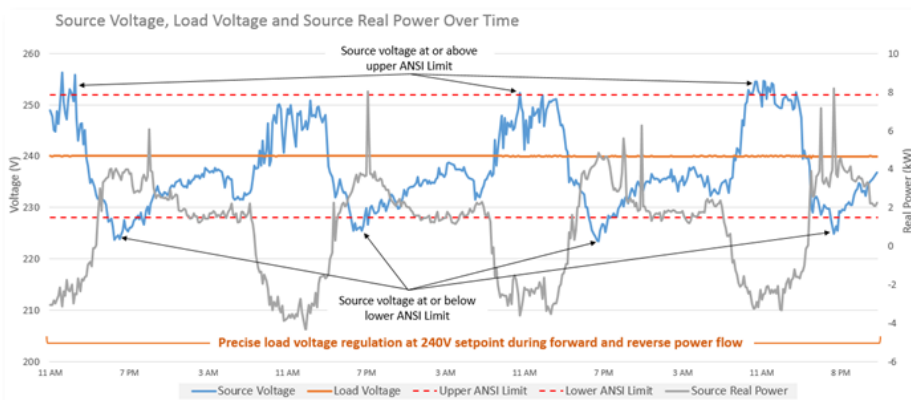
IPR-50

Low Voltage, Single-Phase, 60 Hz, 50 kVA Pole-mounted In-Line Power Regulator™

The Gridco Systems Low Voltage Single-Phase, 60 Hertz, In-line Power Regulator™ (IPR) is a new class of agile grid infrastructure designed to enable a more flexible and resilient distribution network. It provides utilities a tool for dynamically controlling voltage, power factor and harmonics to more effectively integrate distributed energy resources, increase energy efficiency, manage peak demand, support sensitive customer equipment, and increase overall system reliability.

The IPR is a standalone, self-contained hardware system with advanced, passively cooled power electronics designed for outdoor installation on wooden or concrete poles. IPRs may be deployed as part of new electrification projects to make the neighborhood “future ready” or to augment existing feeders addressing specific application requirements, eliminating costly infrastructure modifications. Targeting secondary locations where the load current will be at or below its maximum rating for regulation, IPRs can be mounted to the same pole as the existing transformer, on an adjacent pole, or on a pole further downstream closer to the load. This makes the IPR-50 suitable for use in many locations with 25, 37.5, and 50 kVA transformers and on a split bus or a smaller secondary segment with 100 kVA transformers.

Built with robust power electronics and advanced control algorithms, the IPR is a multi-function hardware system that is flexible, cost-effective and reliable. Designed to provide distributed, dynamic power control, the IPR effectively addresses today’s challenges while ensuring long-term value and support for ongoing grid modernization. It simplifies grid planning and operations, and allows utilities to avoid the long delays and high costs associated with conventional approaches to solving distribution challenges.



The IPR delivers a consistent voltage (orange line) despite grid side voltage fluctuations (blue) and changes in power flow (gray) direction



KEY FEATURES

- **Load Voltage Regulation:** directly boosts and bucks voltage across a wide range during forward and reverse power flow
- **Sag/Swell Mitigation:** protects sensitive loads from voltage sags and swells caused by disturbances on the grid
- **Reactive Power Compensation:** regulates power factor by dynamically injecting or absorbing reactive power
- **Harmonic Cancellation:** corrects source current and load voltage harmonic distortion, reducing overall THD
- **Power Quality Monitoring:** enables high resolution PQ monitoring via integrated voltage and current sensors
- **Operational Flexibility:** operates autonomously with options for remote management and visibility
- **Dynamic and Precise:** responds and regulates reliably and accurately in sub-cycle timeframes
- **Maintenance Free:** operates continuously with no wear-and-tear and no scheduled service unlike conventional equipment
- **High Availability:** supports non-disruptive failure-to-normal and replacement of power electronics via a built-in bypass mechanism

Reliable Multi-Function Power Control

Multi-function means load voltage regulation (boost and buck) in both forward and reverse power flow conditions, reactive power compensation (inject or absorb VARs), source current and load voltage harmonic cancellation, and on-board sensing all in one integrated package. The IPR offers fast, continuous and precise power control to mitigate distributed and dynamic power fluctuations that are impossible to eliminate with conventional systems. Engineered to withstand harsh outdoor environments for 25 years, the unit leverages a ruggedized, passively cooled design for maintenance-free operation. This combination of functionality and reliability provides immediate value in multiple applications, making the IPR a key element for modern distribution systems.

Flexible Management & Control

The IPR regulates autonomously once configured and installed. It offers a local control option as well as remote management capabilities using a built-in or external Gridco Systems Distributed Grid Controller™ (DGC). The IPR can be integrated into utility SCADA/DMS systems and/or the Gridco Systems Grid Management and Analytics Platform™ (GMAP) enabling real-time remote configuration and monitoring, alarm and event reporting, data access and visibility. GMAP provides additional capabilities for data analytics to confirm system performance and improve understanding of distribution circuit behavior near end customers.

Applications

Renewables Integration

Increase solar PV hosting capacity and simplify integration of other DERs

Enhanced Power Quality

Compensate for sags, swells and harmonics to prevent tripping of sensitive customer equipment, and extend customer and utility asset life

Conservation Voltage Reduction / Volt-Var Optimization

Implement a simple CVR program or combine local multi-function power control with existing VVO systems to enhance energy efficiency, peak reduction and grid optimization



IPR-50 is designed for simple, flexible field installation

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Data subject to change

IPR-50 SPECIFICATIONS

| | |
|-------------------------------|---|
| Phase | Single |
| Frequency | 60 Hz |
| Rating (nominal) | 208 A (50 kVA) |
| Form | Pole-mounted |
| Source Voltage | 240 VAC nominal |
| Source Voltage Range | 0.55 – 1.25 p.u. |
| Load Voltage | 240 VAC nominal |
| Load Voltage Regulation Range | ±10% of nominal @ 208A, ±8% of nominal @ 250A; programmable set point or dead-band |
| VAR Compensation Range | 10% of rating, leading or lagging; programmable VAR or PF set point |
| Harmonic Correction | 3 rd to 7 th harmonic 3 rd to 15 th (measured) |
| Harmonic Distortion | Voltage THD <3% Current TDD <5% |
| Efficiency | ≥ 99% |
| Response Time | < 1 cycle |
| Operating Temperature | -40° to 55° C (ambient) |
| Cooling | Passive air |
| Noise | < 35 dBA |
| Enclosure | NEMA-4 |
| Communication Protocols (DGC) | Secure Web Services Secure DNP3.0 |
| Communication Modules (DGC) | 3 rd party wired or wireless |
| Dimensions | 22”H x 20”W x 25”D |
| Weight | 320 lbs. |