LV Voltage Control

Complete voltage support for today's bi-directional low voltage circuits



Use Cases

- Suitable for all LV circuits
- Regulatory compliance
- Rooftop PV hosting capacity maximisation
- Avoid solar export curtailment
- Long LV circuit voltage balancing
- SWER voltage regulation at LV

Outcomes

- Lowest cost, highest impact solution
- Maximise PV hosting capacity
- Minimise daytime vars
- Voltage balancing, minimise neutral voltage rise
- VPP output maximisation
- Microgrid voltage stability
- Flicker reduction
- Highly resilient to onerous PQ
- Network augmentation deferral
- LV feeder and customer asset life optimisation

Attributes

- 240 V L-N connection
- 30 kVA per phase
- Up to 13% voltage buck/boost
- Configurable target voltage
- Sub-cycle response
- Bi-directional power flow
- On-board data logging
- Bluetooth or optional WAN
- External control switch/lock
- 99.6% efficiency

Application

LVR-30 is designed to ensure regulatory voltage compliance in today's highly volatile low voltage circuits. The industry leading correction capability of LVR-30 improves the capacity of the network to support high levels of rooftop solar and complex loads such as EV chargers.

The techniques utilised in LVR-30 deliver a high performance, low-cost approach to discrete voltage regulation, suitable for all circuit designs, operating conditions and demand profiles, while remaining resilient to onerous power quality conditions.

The sub-cycle response of the power electronics at the heart of LVR-30 delivers continuous control of voltage, seamlessly maintaining compliance in circuits with voltage excursions exceeding +/- 20% of nominal voltage.

The device is configured to autonomously achieve its preset target voltage, with no need for external control interventions.

LVR-30 is resilient to source impedances up to 1 ohm, harsh power quality events such as large motor starts, DOT loads, and deep notching from arc welders or other non-linear loads.

Value

LVR-30 delivers genuine value to all stakeholders:

- Maintains regulatory voltage compliance
- Defers expensive network augmentation
- Equalises voltage unbalance to improve the performance of three phase loads and avoid elevated neutral voltage
- Helps virtual power plants to maximise their economic performance
- Direct voltage correction reduces the need for volt-var mode in smart inverters, improving network power factor and increasing hosting capacity.
- Consumers receive balanced, regulated voltage with reduced flicker, improving customer experience and extending the operational lifetime of consumer goods.

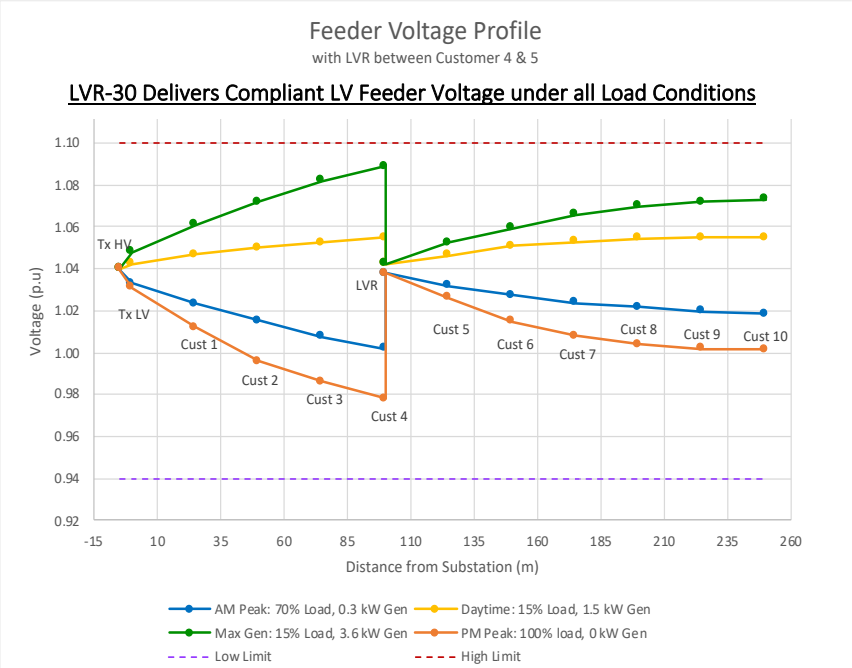
These customer experience enhancements help distribution utilities meet to their strategic objectives for customer service.

LVR technology been successfully deployed for over 20 years at power utilities, the US military, and commercial customers across 3 continents, including long term operations in the harsh Australian environment.

LVR-30 is reliable, robust, and well proven.

LVR-30 Performance Characteristics

Series voltage regulation delivers reliable voltage compliance on any LV circuit under all operational conditions. The following chart reflects a conventional circuit profile and illustrates how LVR-30 autonomously delivers a compliant voltage profile for all duty cycles across the day.



LVR-30 performance is not dependent on either the X/R ratio of the circuit or the load reactance. Series regulation is shown to be up to 10 times more efficient than shunt regulators (var control), with more voltage compensation and no power quality penalty.

Insertion of the LVR-30 does not negatively impact THD, power factor, impedance, phase angle, fault current, or ripple load control signals (AFLC) on the LV network.

The LVR-30 appears as a reduced source impedance to the downstream network, and reduces flicker by up to 66%.

High rooftop solar PV contributions incrementally increase the circuit voltage, leading to constrained inverter connections and limit exporting capability. Smart inverters can consume vars (volt-var mode) to limit the voltage rise, degrading the efficiency of the network. In volt-watt mode inverters can be power limited or even disconnected completely. Managing voltage directly with LVR-30 limits the need for the inverter var-based control techniques, and improves PQ and export capacity.

The advanced LVR-30 low voltage regulator is simple to apply and can be quickly and easily installed to provide immediate voltage compliance, deferring network reinforcement.

Please contact Flexity for further advice on LVR-30 including recommended applications and implementation advice.

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