

Document Title: **Technical Specifications**
1P-240V-30kVA-50Hz (UK)
LVR-30 Electronic Voltage Regulator

Document Owner: Engineering

Authorizations: Signatures obtained per ECN of A release

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Revision History

Revision	Description	ECN #	Date	By
A	Initial Release		5/25/2018	GW
B	Revised for sub-cycle regulation, added Geomagnetic Disturbance		7/13/2018	GW
C	Corrected and expanded on the voltage regulation accuracy		2/6/2019	GW
D	Added PIR, KW & PA data, CHG Dove tail drawing, CHG response time	461	11/11/19	GW
E	Corrected an error with the Over Current threshold in Note 3, and clarified the Power/Overload rating	466	02/27/20	GW

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TECHNICAL SPECIFICATIONS: 1P-240V-30kVA-50Hz (UK)

Key Features - 99% efficiency, surge protection, automatic pass thru mode – service is not interrupted, four quadrant operation for net metering and co-generation applications, programmable operation, multiple set points, thermal protection.
Optional data collection, remote monitoring and fault diagnostics.

Service Information – 240V single phase, 2 wire with earth, 125 Amp

Power/Overload Rating – 30 KVA Nominal, 24 kVA continuous, then 30 for 4 hours, then 39 kVA for 1 hr.

Motor Rating – Largest single motor load 11 kW (current crest factor ≤ 1.2)

Input Voltage - Nominal range 228-250, Controllable range (see Note 1), Operational range 160-300V_{RMS}

Output Voltage - Software programmable (220-250V in 0.1V steps), hardware/software enabled multiple set-points remotely selectable

Regulation Accuracy – Typically $\pm 0.1V$ L-N of the set-point within the controllable voltage range, regardless of load power factor (see Note 1 for exceptions)

Boost/Buck Range – $\pm 13\%$ of input voltage, or $\pm 31V$ with 240V line IN

Phase unbalance – N/A – (Note 2)

Regulation Response Time – 0.1 to 10 milliseconds maximum, depending on the magnitude and characteristics of the input voltage change

Software interface – Optically isolated serial interface per ANSI C12.18-1996 or Blue Tooth, optional WAN connectivity

External regulator control interface – Hook-able lever with regulate, and standby/reset positions

Efficiency - Greater than 99% at all loads higher than 4.5 kVA

Frequency - 50Hz $\pm 0.25Hz$ at specified voltage accuracy. ± 4 Hz with 0.25V drift at extremes.

Over Current Protection – Fused internally, short term overload internally self-protected (Note 3)

Power Factor of EVR - The EVR™ by itself is a slightly capacitive load (0.5 kVAR per phase)

Power Factor of load - 0.5 leading to 0.5 lagging (the EVR does not change the load PF)

Four Quadrant Power Operation – Reverse power can flow from Distributed Generation, PV, etc. without affecting regulation accuracy. (Note 8)

Power Interactive Regulation (PIR) – can be programed to perform bi-directional line drop compensation.

Harmonic Distortion – Meets EN 61000-3-4 (Note 6)

Surge Protection – Meets EN 61000-4-5 Class 5 (6kV 1.2/50 μ S waveform), (Note 4)

Dielectric (production test) – 1.8 kV

Geomagnetic Disturbances – Functional with $\pm 4V$ DC on mains, tolerant of higher values

Wiring Method – 3 M12x1.75 LV bushings, Line in, Line out, Neutral, and Chassis earthing stud

Mounting Method – Mounts to poles and flat cross arms using PN102415 - Dovetail Assembly (Note 9)

Status Indicator Light - Green = ok, Flashing = fault, (in pass thru) Off = regulator has failed (in pass thru)
Dry contact closure for building automation interface, optional communications available.

Dimensions – 20.7" W x 22.4" H x 13.3" D (527mm W x 570mm H x 338 mm D) (W does not include bushings)

Weight – 122 Lbs (56 kg,) Shipping 162.5 Lbs (74 kg.)

Enclosure – Powder coated Aluminum, IP44, standard

Environmental - minus 40° to + 50°C at continuous load rating (Note 5); 0-90% relative humidity; 1-6,000 ft elevation

Safety Agency – CE per IEC 62103, IEC 60204, EN 61558-1

AIC Rating – 22kA (Note 3)

Mains Signaling (AFLC) – Complies with EN 50160, AS/NZS 61000.2.2 between 150Hz & 3000Hz (note 7)

EMI/EMC - Meets conducted and radiated requirements for Class A as defined in EN 61000-6-4:2007+A1 20011

Data Collection – Time stamped fault log, 24 to 48 hours of $\frac{1}{2}$ sec interval average Line Voltage, Load Voltage, and Load Current, kW & PA, up to 12 months of 1 min. interval average Line Voltage, Load Voltage, and Load Current, kW & PA, plus the Min & Max $\frac{1}{2}$ sec data values for each 1 min interval, plus internal temperature.

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Options –

Options are available from the following categories. Consult the Pacific Volt Option Matrix for availability.

Communications & Remote Monitoring

Software & Data Collection

(Note 1) The Electronic Voltage Regulator EVR™ can Boost or Buck the incoming line voltage +/- 13%. In functional terms this means that if the set-point is programmed to 240 volts, it will maintain an output voltage of 240 volts +/- 0.1 V within the controllable line voltage range of 212.5 - 275.5V. With a 230 volt set-point the controllable range is 204 - 264V. Outside of the controllable range it continues to buck or boost by +/- 13% of the line voltage. The regulator will function with L-N voltage between 160V and 300V, outside of that operational range it stops regulating. Service is not interrupted. Normal operation returns after the input voltage returns to within the specified limits. Voltage accuracy is based on the 1 minute average of one cycle RMS voltage values with <1% Voltage THD on the input line at 50Hz. Output voltage will drift up to 1.5V at extreme cold temperatures. *Also refer to frequency spec and see note 7 if mains signaling is present.*

(Note 2) N/A Three LVR-30s may be used in a Wye configuration, and two in a split phase configuration as long as they share a common neutral.

(Note 3) When ordering the Electronic Voltage Regulator EVR™ without the internal fuse, an external line disconnect and protection means is required. If the momentary inrush current exceeds 384A peak ($\approx 272 A_{RMS}$), the EVR™ will disabled itself and will automatically go to pass thru mode allowing for unregulated operation. The EVR™ will resume regulation approximately 2 sec. after the current returns to the normal range. The EVR will also disable regulation if the 1 min average current exceeds 1.5 times the full load current rating. It will return to regulation automatically 15 minutes after the 1 minute average current remains below the nominal current rating. The EVR™ will survive load short circuits from a source of up to 22kA capacity when protected by an appropriate fuse or circuit breaker of 125 A_{RMS} maximum rating.

(Note 4) For transient surge suppression the input is protected with metal-oxide varistors (MOV) rated at 570 joules and 70kA. The transient surge suppression protects the EVR™ from line side transients.

(Note 5) The EVR™ is equipped with internal temperature sensing, which will stop regulation in case of excessive temperature. During over-temperature shutdown, the EVR™ will automatically go to pass thru mode, allowing for unregulated operation. Regulation returns when internal temperatures reduce to normal levels.

(Note 6) Equipment according to IEC 61000-3-4, provided $R_{sce\ min} = 33$ as verified by the supply authority. The EVR does not change the load THD. It generates less than 0.2 % THD.

(Note 7) Reduced regulator regulation accuracy may be encountered with the lowest mains signaling frequencies between 110Hz and 150Hz. If you have a requirement within this low range consult factory with your specific frequency for evaluation. Voltage regulation accuracy may be subject to drift during signaling periods. Typically drift is less than +1.5V. Consult factory for more details.

(Note 8) The ERV cannot be back fed from a substation transformer and maintain regulation accuracy. In this condition the regulator will go into either a full buck or boost state on the input terminals. The regulator should be placed in the standby state (regulation is disabled) if this condition is temporarily necessary for line maintenance.

(Note 9) The Dovetail mounting assembly (see page 4) can be bolted or banded to wood or concrete poles. The pole bracket 102408 can be detached so that part 102409 can be bolted to a cross arm.

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