PACIFIC VOLT
INTELLIGENT VOLTAGE CONTROL

Document Number
D*104054-3*
Revision A

Document Title: **Technical Specifications**
U3P-230Y400V-150kVA-50Hz
Pole Mount Electronic Voltage Regulator

Document Owner: Engineering

Authorizations: Signatures obtained per ECN of A release

Engineering:			Date:
Manufacturing:			Date:
Sales:			Date:
Quality:			Date:
Other:			Date:

Revision History

Revision	Description	ECN #	Date	By
A	Initial Release		05/17/21	GW

PRELIMINARY

TECHNICAL SPECIFICATIONS: U3P-230Y400V-150kVA-50Hz

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, and phase voltage balancing.
Optional motor load protection, data collection, remote monitoring and fault diagnostics.

Service Information – 230Y400 Volt, three phase wye, 4 wire, 218 Amps/phase
Power/Overload Rating – 150 kVA Nominal, 120 kVA continuous, then 150 kVA for 4 hours, then 195 kVA for 1 hour.
Motor Rating – Largest single motor load 90 kW (current crest factor ≤1.2)
Input Voltage - Nominal range 216-253V, Controllable range (see Note 1), Operational range 160–310 V_{RMS}
Output Voltage - Software programmable (200–250V in 0.1V steps), hardware/software enabled set-points
Regulation Accuracy Typically ± 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 – +/- 8% of the line IN voltage, +/-19.2V with 240V line IN
Phase unbalance - less than 1% (Note 2)
Regulation Response Time – 0.1 to 10 milliseconds maximum, depending on the magnitude of the input voltage change.
Software interface – Optically isolated serial interface per ANSI C12.18-1996 or Blue Tooth, optional WAN connectivity
Efficiency - Greater than 99% at all loads higher than 20 kVA
Frequency – 50Hz +/- 0.25Hz at specified accuracy. +/- 4 Hz with 0.25V drift at extremes.
Over Current Protection – Short term transient overload internally self-protecting, external fuse protection required, (Note 3)
Power Factor of EVR - The EVR by itself is a slightly capacitive load (-0.57 kVAR per phase)
Power Factor of load - 0.1 leading to 0.1 lagging (the EVR does not change the load PF)
Four Quadrant Power Operation – Reverse power can flow from Distributed Generation PV etc. without affecting regulator 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 1.2/50μS waveform), (Note 4)
Dielectric Withstand (production test) – 1.8 kV
Wiring Method – Compression lugs to studs, 3 each Line In, 3 each Load Out, 1 Neutral, 1 PE/Chassis
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 – 96 cm W, 128 cm H, 48 cm D (width includes the 11.5cm vent hood)
Weight – 283.5kg (625 Lbs), Shipping 295kg (650 lbs), typical
Enclosure – Powder coated Steel, 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 – 100kAIC (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 ½ 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 ½ sec data values for each 1 min interval, plus internal temperature.

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Options –

Options may be available from the following categories.
Consult the Pacific Volt Option Matrix for availability of options.

Non Standard Enclosures
Internal Breakers
Communications & Remote Monitoring

(**Note 1**) The Electronic Voltage Regulator (EVR) can Boost or Buck the incoming line voltage +/- 8%. In functional terms this means that if the set-point is programmed to 240 volts, it will maintain an output voltage of 240 volts +/- 1 V within the controllable line voltage range of 222.5-260.5V. With a 220 volt set-point the controllable range is 204-239V. Outside of the controllable range it continues to buck or boost by ± 8% of the line voltage. The regulator will function with line voltage between 160V and 310V, 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. Output voltage will drift up to 1.5V at extreme cold temperatures. *Also see note 7 if mains signaling is present.*

(**Note 2**) The regulator balances each phase voltage independently. Phase to phase unbalance will be <0.5% except when the controllable line voltage range is exceeded (note 1). The EVR does not change the power phase angle.

(**Note 3**) If the momentary inrush current exceeds 625A peak (≈442A_{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 100kA capacity when protected by an appropriate fuse with 200 A_{RMS} maximum rating.

(**Note 4**) For transient surge suppression the input is protected with metal-oxide varistors (MOV) rated at 910 joules and 70kA. The transient surge suppression protects the EVR and all loads and equipment, from line side transients.

(**Note 5**) The Electronic Voltage Regulator (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. Cooling is provided by a thermostatically controlled fan. Fan and thermostat status are monitored by the regulator and faults are reported.

(**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 disable state if this condition is temporarily necessary for line maintenance.

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