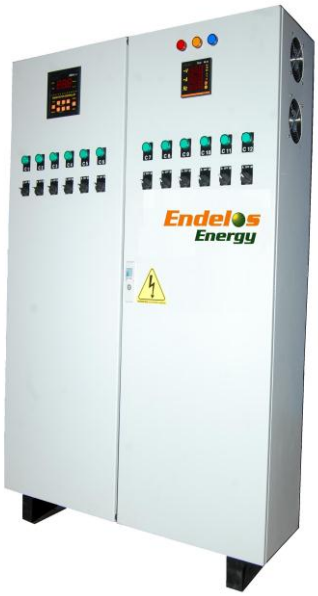
Endelos Energy

Made in USA

An Energy Efficiency & Renewable Energy Company



PowerRanger™

Power Factor Correction Equipment

50 kVAR to 500kVAR

Endelos Energy's PowerRanger™ Auto-Ranging Power Factor Correction product line increases the power factor of an entire facility by reducing the amount of reactive power (kVAR) that the load draws from the utility company. The PowerRanger™ unit's environmentally friendly Capacitor Banks stores the reactive power (kVAR) needed for the creation of the EMF required by all of the inductive loads within a building. These inductive loads consists of any appliance with motors, solenoids, relays and transformers such as air-conditioners, washers, dryers, refrigerators, induction motor, pumps, fans, power transformers, lighting ballasts, welder, induction furnace, etc. As the motor operates, this reactive power is "pulled" and "pushed" to and from the PowerRanger™ by the inductive load (motor). The amount of reactive power purchased from the utility company by power factor correction has been greatly reduced, or eliminated.

- ***Whole Building Distribution Based System:*** The PowerRanger™ Unit is installed and Integrated at the front-end of a building's power source which services the entire facility with a single system. A better solution than individual units serving a single motor.
- ***Whole Building 3-Phase Outage Protection:*** 3-Phase voltage detection for each phase identifies outage problems and distributes load to prevent motor damage.
- ***Whole Building Surge Protection:*** Capacitors Banks temporarily store to 525 VAC of electrical energy, smoothing out overcurrent mild events (spikes) and protects against more extreme overcurrent surges. System Interrupters open the circuit to protect against maximum 10,000 amp fault currents, UL recognized.
- ***Auto Ranging Load Detection*** – real time microprocessor based sensors provide analysis of reactive power requirement introducing capacitance though 12 stages, 4 kVAR minimum to 250 kVAR maximum.
- ***Remote Monitoring & Fault Detection Notification*** – Remote Monitoring System (Optional) provides "Smart-Grid Intelligence" for overall PowerRanger™ system monitoring performance status including, capacitor and circuit fault detection, Power Quality Analysis, 3-Phase Outage and Surge Protection with fault alarm e-mail notification and data logging for trouble shooting.

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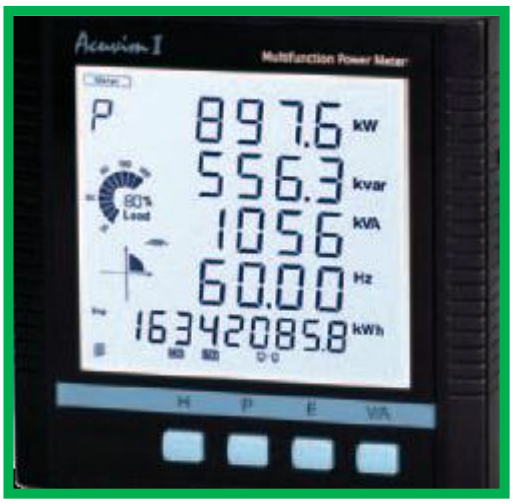
Remote Monitoring System (Optional)



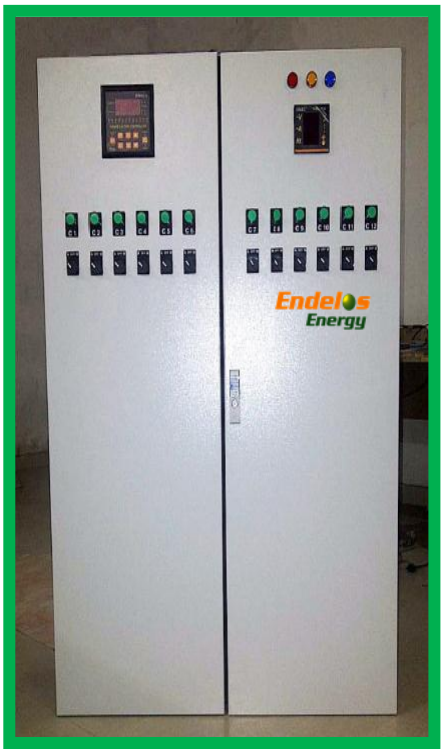
- **PowerRanger™ True RMS Meter Head** provides a true RMS measuring of VAN, VBN, VCN, VAB, VBC, VCA, IA, IB, IC, IN, voltage/current unbalance, power factor, line frequency, individual harmonics for voltage/current, THD, kW, kVAR, kVA, import and export kWh/kvarh, kVAh, and demand readings for current and power. Maximum and minimum values of measured quantities shall also be recorded and date/time stamped.

- **Power Quality Analysis** software included with system provides program to monitor meter's real-time parameters with a computer at a remote location and to perform data logging and recording.

- **User established over/under limit alarm conditions for all measured quantities**. These include frequency, phase voltage, line voltage, current, real / reactive / apparent power, voltage / current unbalance, power factor, and power demand. Meter automatically generates logs for over/under limit alarm events. Events records with time stamp stored in the meter and at IP address.

- **Fault Alarm Notification** - HTTP server sends email fault alarm notifications to selected users when alarm triggers or according to the preset time interval.

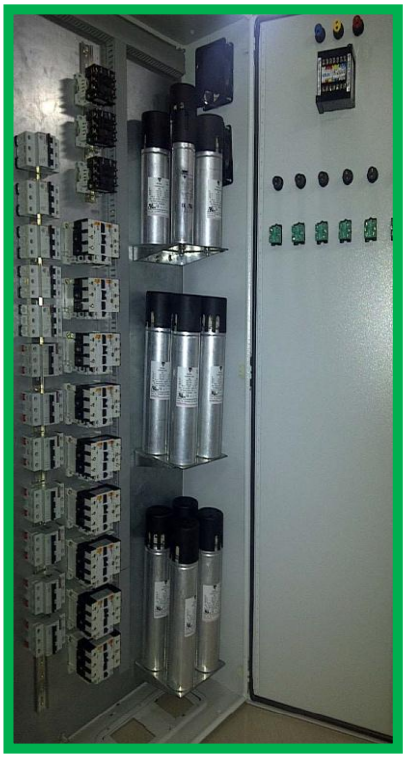
PowerRanger™ Enclosure Construction



The PowerRanger™ all metal cabinet is a CRCA NEMA1 ANSI 61 compliant and UL Approved enclosure. The cabinet has integrated lifting eyes and gasket sealed lockable doors. The NEMA1 enclosure houses microprocessor based and electrical components which include the three phase capacitor bank cells, controller, sensors, contactors, fuses, and fuse blow indicator lights, ventilation power, ON/OFF indicator lights, and push to test buttons. All units include split core current transformer which is used in conjunction with the controller. For safety, the door interlock automatically disengages capacitors and power continues to be provided to the unit until the disconnect switch is opened.

Typical Commercial Grade PowerRanger™ Enclosure dimension is 60" tall x 30" wide x 24" deep. The unit will weigh approximately 250 lbs. However, these dimensions and weight change based on proper sizing of the system to customer specific needs and the alignment of capacitors within the unit.

PowerRanger™ Capacitor Cell Bank Design



The PowerRanger™ Metallized polypropylene capacitors offer improved performance and proven reliability in applications requiring power factor correction or harmonic filtering. Metallized polypropylene film is used for its ability to operate at low temperatures and minimal loss of capacitance over the life of the cell. Encapsulated by a thermal setting polymer resin, excellent heat dissipation is achieved. In the event of a fault, the three-phase pressure sensitive interrupters disconnect all three phases effectively taking the capacitor out of the circuit

Individual capacitors are self-healing. Vacuum deposited conductors on a polypropylene dielectric act as electrodes in self-healing process. The dielectric material exhibits a loss of less than 0.5 Watts per KVAR. Each three-phase capacitor is furnished with a U.L. Recognized, pressure sensitive interrupter. The interrupter will disconnect all three phases at the same time to maintain a balanced circuit. Individual capacitor cells are covered by a 2-year limited warranty and Nominal design life of 20 years.

PowerRanger™ Technical Specification

STANDARDS

- UL 810 C22 no 190
- Canadian standards ANSI IEEE 18

MECHANICAL

- The PowerRanger™ all metal cabinet is a CRCA NEMA1 ANSI 61 compliant
- UL Approved enclosure
- Enclosure 495 Cfm Vent Fan to keep all of the internal workings cool.
- PowerRanger™ Enclosure dimension is 60” tall x 30“ wide x 24” deep.
- Unit weighs approximately 250 lbs.
- Free-standing with individual footings and leg levelers.

ELECTRICAL CHARACTERISTICS

- 480 VAC standard, 120/208 voltage (optional)
- 50 to 500 kVAR engineered to match application
- Capacitance tolerance is + or - 15%
- Over current tolerance is 135% of rated current continuously.
- Overvoltage tolerance is 110% of rated voltage.

- The capacitor design has a total loss which is less than 0.5 Watts per KVAR at 60 HZ @ 25 degrees C.

OPERATIONAL SPECIFICATION

- Ambient temperature -5 to +45 degrees C
- Operating temperature -40C to +90C
- Rated Voltage 480/277 VAC, 120/208 (optional)
- Rated Frequency 60HZ
- Altitude 1000M
- Short Circuit Rating kA for 5 – 20 kVAr, 25 kA< 25 kVAr
- All internal conductors are insulated and stranded copper wire rated at 90C Internal wiring using FRLS cable of adequate section. Cable entry through bottom panel.
- Front cover is made of 2.0mm mild steel sheet. Enclosure basic structure is made of 1.5mm mild steel sheet. Component mounting plates: 3.0mm steel sheet. NEMA 1 compliant (UL approved)
- Protection rating is IP55 to EN60 529/10 91
- Relay current input signal 0.333V from Control Transformer on line/CT rope
- Relay voltage signal tapped internally.
- Power supply is (3) phase (4) wire.
- Incomer suggested MCCB 400 Amp TP ICU 50 kA.
- Capacitors: Cylindrical dry type 3 phase.
- 10.91 contactors
- Solid state microprocessor control with 12 outputs and over current interrupter.
- UL approved components and complete devise.
- Wire rating: 600V, THHN or MTW or THWN or AWM, gasoline & oil resistant.
- Duty rating: Continuous.
- The internal protection fuses are time delay rated at 600 vac with the sizing based upon the nominal amperage rating of the KV capacity.

For more information on the PowerRanger™ Product Line please contact us at:

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