

# Power Consultants Ltd

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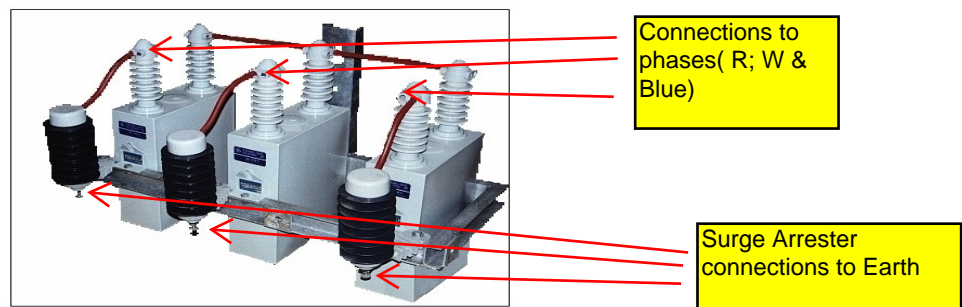
Dear Customer

## Power Factor Correction Unit Options

Please find basic Power Factor Correction Unit options, as available from Power Consultants. The units can be divided in units for Medium or High Voltage and units for Low Voltage Systems.

### A. High/Medium Voltages Systems

- 1) The first unit is based on the installation of **pole top capacitors** only, with surge arresters and bird caps. Utilities use these in conjunction with drop-out fuses or ABS units which are also available from us, if so required. These are normally used in distribution networks for **Voltage Boosting** where required.
  - a) A capacitor bank with single phase Capacitors with bank size of 750kVAr i.e. 3 x 250kVAr capacitors is quite popular to be installed, however any size is available...



Several of these units are installed on continuous bases in North Powers network at Whangarei.

- b) Capacitor switches can be added for **automated switching**.

Single phase switches can make use of Zero Voltage Close control which will limit/remove any transients. These switches need to be ordered as such as it is not upgradable to ZVC Control afterwards.

The switches are controlled by either pushbutton, Scada, power factor controller or whatever method is required for the method of switching.

#### VERSAVAC Distribution Capacitor Switches



JOSLYN Versavac Switches are used for pole top Capacitor switching. Versavac switches are a direct replacement for oil switches, designed to eliminate costly maintenance and hazards.

Information on the Capacitor switches is available on request and as per requirements.

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- 2) A Second option is a fully controlled Power Factor Correction Unit, selected to voltage control mode only, with current limiting reactors and is mainly used for voltage control in networks where required. .

The unit consist of 4 steps which are built into a metal Enclosure.

Each step consists of:

3 x Capacitors or combination per step

3 x Reactors (reactors for current limiting only),

Reactors to be used as filters to cater for harmonics or ripple control

3 x Capacitor Switches with/without Zero Voltage Crossing

(Zero Voltage close control can be included as mentioned under point no 1.)



The enclosure includes all busbars, insulators, interposing relays, controller etc

Several of these units have been installed at Network Tasman.

- 3) A third method is for a bank at 33 kV which was recently build for the Fiji Electricity Authority

The size of the bank was 2.4 MVAR and consisted of 2 steps of 1.2 MVAR each.

Each step consisted of:

A fused ABS unit, a Joslyn VBM Capacitor switch, current limiting reactors, capacitor fuses and 6 x 200kVAR capacitors( 400kVAR per phase) and complete set of steel structures to suit Fiji's Wind conditions etc.

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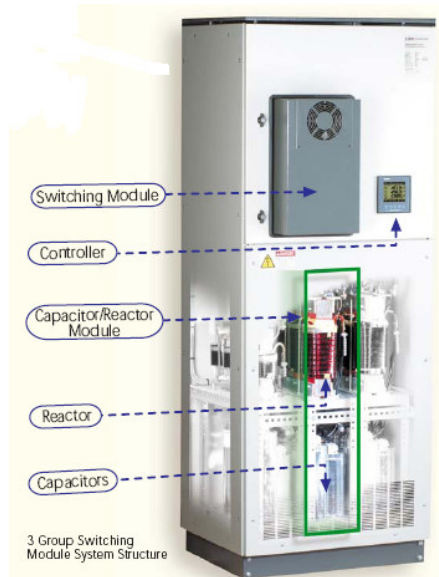
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- 4) More sophisticated units are available and depend on System requirements. These units are manufactured by American Super Conductor and are units such as Static and Dynamic Var Compensation on overhead lines, substations and wind farms etc.



## B. Low Voltage Systems


- 1) Sophisticated Low Voltage Units Manufactured by **Elspec** is available for low voltage installations and is available according to requirements.



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## 2) Microplanner Low Voltage regulation.

## Energy Conservation and Power Quality



Energy Choices is a commercial division of Ergon Energy responsible for the Australian distribution of MicroPlanet's Low Voltage Regulator (LVR) product. As well as distributing this product to other Australian utilities, we have invested considerable time in piloting the product with the aim of gaining power quality and efficiency on the Queensland electricity network.

After very positive results, Ergon Energy is deploying a number of these units across its regional Single Wire Earth Return (SWER) lines and isolated assets.

### What are Low Voltage Regulators?

Micro Planner's low voltage regulators, solve common utility problems such as flicker and excessive volt drop and maintain proper voltage at the point of service delivery.

This precision regulation of voltage ensures grid stability and compliance with appropriate standards. LVR's are currently installed in the United States, Canada, United Kingdom and Australia. The product can regulate the voltage **from 215V to 275V** and can dynamically regulate voltage up or down to within 1% of the programmable setpoint

Please contact us if more information is required on power factor correction and/or Power Quality.

Kind regards

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