kVArCORRECT
POWER FACTOR SPECIALISTS

Technology Refresh for Capacitor-Based Power Factor Correction Systems

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Current Situation:

Capacitor-based Power Factor Systems are the backbone of the Power Factor and Peak Demand control industry. Properly designed systems can last for many years and can be maintained quite simply to achieve great reliability. In the last few years in particular we see changes in the loads supplied by the grid or supplier at many installations, and many of these new loads are very difficult for capacitor-based systems to control. Examples of these new loads include LED lights; other new types of lights such as fluorescent energy saving bulbs; switch mode power supplies used in almost all modern electronic devices; and the increasing use of inverter based air conditioning units. These new loads are often very fast changing and at certain times may actually present the supply with a leading power factor. With the tightening market as far as the cost of electricity is concerned, supply authorities are looking at ways of increasing their revenues, and there are warning signs that tariffs for excess peak demand and indeed, direct power factor penalties (as have been applied in New Zealand for many years) are on the cards for all of Australia.

At the same time as the rise of these more complex loads, electronic power factor systems have become available. These can control all the above new loads and also add benefit to the control of the traditional loads. However, these electronic systems are costly, and have usually meant removal of the existing system and the subsequent upheaval that this entails. These electronic power factor systems

are called by a variety of names that include "Static VAr Generators" or "SVG's", "Active Electronic Power Factor Systems", and "Electronic Power Factor Systems". Here we will call them SVG's. The following table shows the characteristics of both capacitor-based systems and SVG's:

	Capacitor-Based System	SVG (Active Power Factor System)
Cost	Lowest	Highest
Maintenance Personnel	Electrician	Electronics Engineer
Reliability	With maintenance, Excellent	With maintenance, Average
Heat Load	Lowest	Twice that of capacitor system
Leading Power Factor	No – unable to handle	Yes – able to handle
Speed of response	5-20 seconds	<1 second
Accuracy of Control	Usually +/- 5% of total	Near Perfect
Upgradeable	Yes, medium cost	Yes, expensive
Cost to repair	Low	Very high

The Solution:

kVArCorrect has designed a system that marries the two technologies above to create a Hybrid system that takes the best of both worlds. Redrawing the table with this new system included:

	Capacitor-Based System	SVG (Active Power Factor System)	kVArCorrect Hybrid System
Cost	Lowest	Highest	Middle
Maintenance Personnel	Electrician	Electronics Engineer	Electrician
Reliability	With maintenance, Excellent	With maintenance, Average	With maintenance, Excellent
Heat Load	Lowest	Twice that of capacitor system	Middle
Leading Power Factor	No – unable to handle	Yes – able to handle	Yes – able to handle
Speed of response	5-20 seconds	<1 second	<1 second
Accuracy of Control	Usually +/- 5% of total	Near Perfect	Near Perfect
Upgradeable	Yes, medium cost	Yes, expensive	Yes, medium cost
Cost to repair	Low	Very high	Low

For Enquiries, please contact your local
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Integration into Existing Systems:

Recognizing that there is a huge installed base of capacitor based systems, kVArCorrect has designed the Hybrid Technology Unit so that can be easily added to existing installations, regardless of make or model. The Hybrid Technology Unit takes the form of a wall mounted box/cabinet mounted close to the existing system. One of the 50kVAr steps in the existing system is decommissioned, and the supply that fed this decommissioned step is re-wired to supply the Hybrid Technology unit. The existing Power Factor Controller is replaced with the kVArCorrect Hybrid Controller, and a data cable is wired between this controller and the wall mounted Hybrid Unit. There are no changes to CT wiring, and there is no Switchboard rewiring required.

Time to install the Add-On is under 4 hours.

Commissioning of the new system is a 5-10 minute exercise, and then the total system is completely upgraded and ready to go. The kVArCorrect Hybrid Technology Unit is set to revolutionize the market!

About the Author

The opinions expressed here are the researched views of Allan Ramson, General Manager, kVArCorrect Ltd. All claims have been substantiated by testing and observations from the Australasian market between 2007 and 2018. Having been associated with the design, manufacture and supply of many thousands of power factor capacitors and over 500 power factor systems, kVArCorrect are confident that their solutions are leading the way.

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