Power Capacitors Limited

Power Quality Solutions

Power Factor Correction and Embedded Generation

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In the ever accelerating search for increased efficiencies, reduced costs, and falling CO2 emissions, embedded generation and CHP schemes are becoming increasingly popular.

In conjunction with a properly specified and implemented Power Factor Correction scheme, this can lead to optimised electrical supply arrangements, best suiting the needs of each application on an individual basis. However, without proper consideration and the benefit of years of experience in this specialist field, it is all too easy to fall innocently into the pitfalls of this sometimes confusing area.

Think again

Perhaps counter-intuitively, when the demand on the mains is reduced by the operation of a CHP scheme or other cogeneration system, the requirement for power factor correction equipment is increased, not decreased.

Furthermore, the 'industry standard' arrangement of power factor correction is frequently incapable of meeting the reactive power compensation requirements of this type of system. The standard 50kVAr steps and 1 minute response times are neither accurate enough nor fast enough. A more advanced, higher specification and better performing system is needed.

LoadTracker - The PFC Solution

The Power Capacitors LoadTracker PFC cubicles are a special development of the top specification BlueLine range. The small stages and fast reaction times this advanced design permits, together with the most robust components available, result in a Power Factor Correction system which is second to none. This, in conjunction with decades of experience, is what sets Power Capacitors Ltd apart in being able to provide the optimum solution for the most difficult of applications.

Power Factor Correction and Embedded Generation, an example installation

LOAD 400kW and 300kVAr	PFC 0kW and 175kVAr	CHP 250kW and 0kVAr	Total Mains Demand	Mains Power Factor
√	X	X	500kVA	0.80
√	√	X	419kVA	0.95
√	X	√	335kVA	0.45
√	√	√	195kVA	0.77
√	√ (250kVAr)	√	158kVA	0.95

With only the load connected, the power factor is at its natural value of 0.80 lagging.

With the load and the 175kVAr rated PFC in circuit, the power factor is improved to 0.95 lagging, and the demand reduced to 419kVA.

With the PFC out of circuit, but the CHP running, the kW loading on the mains is reduced from 400kW to 150kW, but the reactive power component of the load remains unchanged at 300kVAr, with the result that the demand is reduced to 335kVA, but the power factor falls to 0.45 lagging.

With the Load, CHP and 175kVAr of PFC equipment all in circuit, the demand is reduced to only 195kVA, but the power factor falls to 0.77 lagging. The PFC rating of 175kVAr calculated without consideration of the CHP scheme is no longer adequate.

Finally, if the PFC system is increased from its 'typical' rating of 175kVAr to 250kVAr, the power factor is maintained at or close to 0.95 lagging under ANY load condition. In order to accurately follow variations in load, PFC stages rated 12.5kVAr and 25kVAr are included.

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