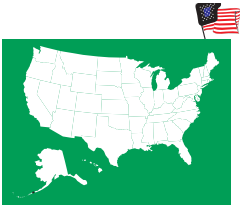


AccuSine® Improves power quality, allows for expansion of national accelerator laboratory

Improves harmonics, flicker and power factor

USA



Square D

ReactiVar™ AccuSine®

Power Correction Systems (PCS)



The laboratory requires a considerable amount of power to operate. Four substations with 480VAC transformers (two 2000 kVA and two 1500 kVA) are fed from a 13.5kV utility substation. One switchboard is fed from each transformer. The installation of a second accelerator axis has increased the loading on SWBA and SWBB and introduced loads on SWBC and SWBD. This is illustrated in Diagram 1.



Table 1

Measurement	No compensation					With AccuSine				
	SWBA	SWBB	SWBC	SWBD	13.5 kV Interface	SWBA	SWBB	SWBC	SWBD	13.5 kV Interface
Voltage (V)	415	425	435	435	12046	478	479	492	492	13268
Current (A)	2461	1334	1125	1125	221.8	1335	768	600	600	121.2
Real Power (kW)	1077	622	500	500	2736	1092	630	506	506	2746
Reactive Power (kVAR)	1363	737	737	666	3659	160	99	69	69	465
Power factor	0.62	0.65	0.60	0.60	0.60	0.99	0.99	0.99	0.99	0.99
THD(V) %	14.7	10.9	12.2	12.2	8.1	1.89	1.01	1.6	1.66	0.91
THD(I) %	13.2	16.3	14.3	14.3	13.9	2.51	4.21	3.13	3.13	1.77

The operation of the accelerator in its existing state created significant power quality disturbances that would be magnified with the proposed expansion.

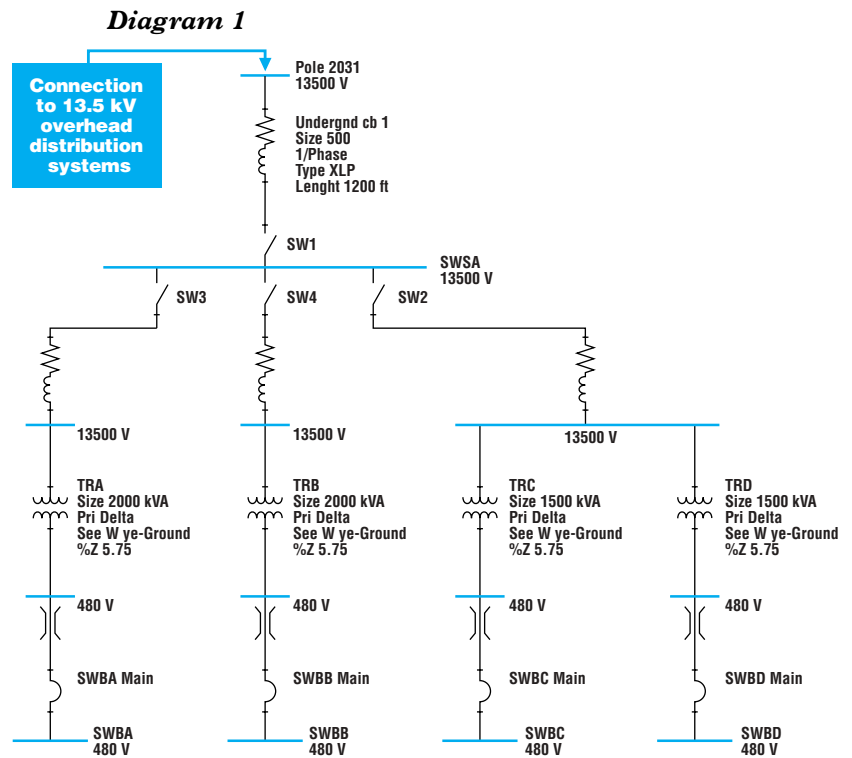
From measurements taken during site tests it was determined that:

- the line voltage drops significantly as a result of large inrush currents
- the power factor is very poor
- harmonic current distortion is high
- harmonic voltage distortion is excessive
- flicker occurs during each load cycle.

When the accelerator axis was energized the load changed from 25% to full load in two cycles (33.3 msec). The maximum load remained for approximately one minute after which it abruptly stopped in one to two cycles. The result is flicker from the voltage variations caused by the rapid on/off cycles. Additionally, poor power factor occurred throughout the entire operation period and high harmonic current distortion created excessive harmonic voltage distortion.

The recommended solution was to implement power factor correction and harmonic filtering to limit the adverse effects of loads on the electrical grid. Control of both would stabilize the line voltage and stop flicker to improve system performance.

Due to the rapid on/off cycles and the large amount of reactive power required, it was determined that an active harmonic filter that also has active reactive current injection was best suited. Active filters with analog logic control have the ability to respond to step load variations in 100 microseconds. AccuSine PCS is the only device capable of performing both functions in this rapid manner. Table 1 shows the stabilized conditions with and without AccuSine operating.



For more information, contact the Schneider Electric Power Quality Correction Group at (905) 678-6699 or pqc@squared.com or visit www.reactivar.com

Schneider Electric

Power Quality Correction Group
 3220 Caravelle Drive
 Mississauga ON, L4V 1K9
 Tel: (905) 678-6699
www.reactivar.com

Head Office/Siège social
 19, Waterman Avenue
 Toronto, ON M4B 1Y2
 Tel: (416) 752-8020
 Fax: (416) 752-6230

www.schneider-electric.ca