AXPERT- i-sine STATCON

MULTI-FUNCTIONAL ACTIVE STATIC VAR COMPENSATOR

"True Quality Power Solution"

Poor power factor escalate complications which affect all power distribution networks in industrial, commercial, airports, ship yards, water treatment plants, windmills, off-shore drilling and railway traction substations.

Most of the Electrical equipment are responsible for poor power factor. Axpert-i-Sine STATCON, the Multi-Functional Active Static VAR Compensator, designed with intelligent control algorithm, dynamically changes the switching frequency to optimize the performance and efficiency of upstream power equipments. The performance of Axpert-i-Sine STATCON is immune to supply voltage.

The Axpert-i-Sine STATCON controls and compensates reactive power dynamically. Its step-less response improves the voltage stability. It also offers load balancing for maximum utilization of demand power and reduces the heating of transformers. With Axpert-i-Sine STATCON, user can program different power factor for utility and auxiliary power.

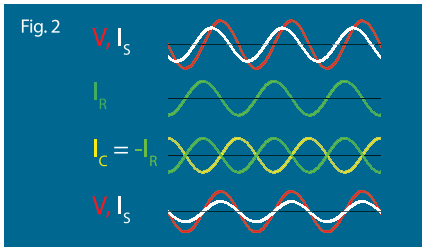
Monitor Continuously - Compensate Immediately

Principle of VAR Compensation

The compensation current I_C of the STATCON is controlled, so that its intensity is the same as that of the reactive current I_R present in load current I_L and its polarity is just reversed ($I_C = -I_R$). As a result, reactive current in the load current is compensated by the effect of STATCON and source current I_S remains only to fundamental current I_F, as shown in Fig. 2.

Fig. 1

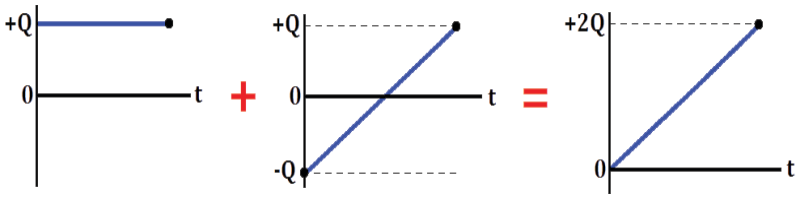
Fig. 2



This can be clearly explained by the expression : $I_L = I_F + I_R$, $I_C = -I_R$ So, $I_S = I_L + I_C = (I_F + I_R) + (-I_R) = I_F$

Combined Operation with Fixed Capacitor for Cost Optimization

Axpert-i-Sine STATCON can give dynamic reactive power compensation range of -Q (inductive) to +Q (capacitive) kVAR. It can easly tune and operate with installed fixed capacitor or detuned capacitor bank of +Q kVAR rating. So for inductive load dynamic compensation range is increased up +2Q kVAR.



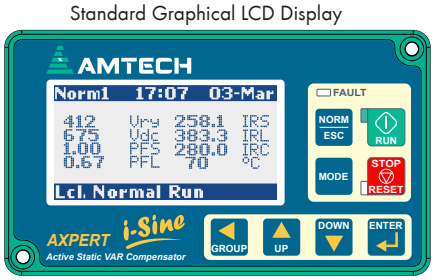
Axpert-i-Sine STATCON has three programmable potential free contacts. Parallel capacitor banks are controled through these potential free contacts. With the help of this feature, -Q to +2Q kVAR range is achieved.

Monitoring & Signaling

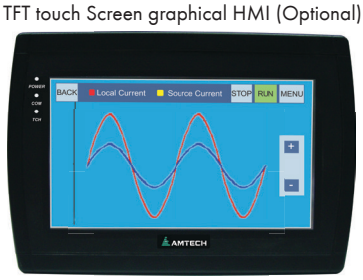
Axpert-i-Sine STATCON is equipped with a user-friendly LCD display. Self-explanatory full parameter names, easy navigation of parameters through well organized parameter sets and functional keys with 8-selectable parameters on single screen make it easy to operate and program.

The optional TFT touch screen graphical HMI with special white back light offers access to all parameters, waveforms and spectrums for management of both Axpert-i-Sine STATCON and system power quality.

Standard Graphical LCD Display



TFT touch Screen graphical HMI (Optional)



The standard LCD display / optional TFT touch screen graphical HMI gives easy access to:

- Monitoring of all metering parameters like V, I, F, kVA, kVAR, kW, PF, THD ...etc.
- Control commands and settings
- Waveforms (optional TFT touch screen HMI)
- Status & alarms

Why AXPERT-*i-Sine* Active VAR Compensator?

FEATURES

- Dynamic compensation with better resolution
- Operates with closed loop control
- Load balancing
- Capacitive and Inductive compansation
- Ability of parallel operation to increase power capacity
- Different compensation modes
- Inherent current limiting
- Shunt connection
- LCD display with backlit (optional TFT touch screen HMI)
- Modbus RTU communication compatible
- Advanced programmable digital I/O interface
- Intelligent control algorithm which dynamically changes the switching frequency to optimize the performance

BENEFITS

- Stepless compensation, improved voltage stability
- Best accuracy. Does not require detailed network analysis
- Optimum utilization of power capacity and reduction in kVA demand
- Easy tunning with installed capacitor bank
- Adaptive to increase in kVAR due to additional load being added
- Ability to work with any network condition
- Overload condition is prevented
- Easy maintenance
- User-friendly operation
- Facilitates networking ability and remote monitoring
- Selective power factor correction control by digital programming
- Minimum insertion loss resulting in efficient operation

Standard Specifications

Electrical				
Input power source [1]	415 VAC, 3-Phase, 3-Wire, 50 Hz (60 Hz optional)			
	Voltage -15 % & +10 %, Frequency ±5 %			
AMT-STC-XXX-4	**100**	**150**	**200**	**300**
Rated kVAR	100	150	200	300
Rated current (Amp)	140	210	280	420
Heat loss (Watt)	≤1900	≤2800	≤3700	≤5600
Control Functions				
Control method	Digital Fast Fourier Transform with Hysteresis current control			
Reactive power compensation and load balancing	Priority selectable between Reactive power compensation and Load balancing			
Power factor setting	Selectable, Auto (unity), Utility supply (0.6 lagging to 0.6 leading) and Auxiliary supply (0.6 lagging to 0.6 leading)			
P.F. improvement / Load balancing	Automatic P.F improvement up to the unutilized capacity of filter/Load balancing between line-to-line			
Max. average switching frequency	Approx 2 kHz			
Reaction time	78 uSec			
Transient response time	Less than one power cycle			
Operation Specifications				
Digital Inputs	5-Programmable sequence inputs, sink / source and Active Close / Active Open selectable			
Digital outputs	4-Programmable sequence outputs, open collector type			
Potential Free Contacts	3-Programmable relays with 1-NO, 1-NC for 5A @ 240Vac | Programmable between 15 different options			
Analog Outputs	2-Programmable analog outputs AO1 & AO2: Voltage (0...10) V / Current (4...20) mA with settable Gain, Bias, Min. and Max. scaling			
Soft-charge	Through resistor within 5 sec.			
Auto start	Yes, STATCON can start at power ON condition in local and serial mode.			
Auto Restart	Adjustable up to ten times for fault like Over current fault, Timed over current fault, Adjustable over current fault, DC bus over voltage fault, DC bus under voltage fault, Earth fault, Temperature fault, External fault with individual enable or disable.			
Display Indications				
Display and Keypad module	Digital Operation Panel 128 x 64 Graphical LCD with back light LED, 8-Key keypad, 3-Status indicating LED for Run, Stop, Fault Real Time Clock.			
	THD$_v$, Line Frequency, DC bus voltage, PF, DPF, kW, kVA, kVAR, kVAH, MVAH, V_{L-L}			
	Current of Load / Source / STATCON side for each phase, THDi of Load and Source side			
TFT module (optional)	TFT Touch screen graphical display			
	Display Current waveform of STATCON / Load / Source side for each phase.			
Communication				
Network connectivity	RS-485 for PC interface with Modbus-RTU protocol and Wi-Fi connectivity as standard (DeviceNet, Profibus DP (Slave), CANopen, Ethernet, ControlNet are optional)			
Protective Specifications				
Protective function	1. Over Current	7. Phase loss		
	2. Adjustable over current	8. Ground fault		
	3. Timed over current	9. External fault		
	4. DC bus over voltage	10. Charging Fault		
	5. DC bus under voltage	11. EEPROM fault		
	6. Over temperature	12. CT Detection Fault		
Fault history	Last 20 faults with status at time fault occurred stored in memory			
Electronic thermal overload	120 % Overload for 60 Seconds, above 100% compensating current is limited by software			
Environment				
Installation location	Indoor (consult Amtech for outdoor applications)			
Type of cooling	Forced Air Cooling			
Ambient temperature	-15...45 °C (5...113 °F), contact AMTECH for higher ambient temperature requirements.			
Storage temperature	-20...70 °C (-4...158 °F)			
Audible noise	≤ 72 dB @1m (3 ft)			
Altitude (above sea level)	1000 m (3300 ft)			
Model derating with temperature	Above 45 °C (113 °F)			
Humidity	0...95 % maximum, non condensing			
Mechanical Specifications				
Color	RAL 7035			
Protection class	IP 31 (consult Amtech for higher protection requirements)			
Dimensions (W X D X H) in mm [inch]	600 X 600 X 1995 [23.6 X 23.6 X 78.5]			
Approximate weight in kg [lb]	260 [573.2]	270 [595.2]	335 [738.5]	410 [903.9]
Installation	Floor mounting			
Reference Standard				
Safety	IEC 50178			

1. Above 300 kVAR requirement, multiple units up to 40 can be connected in parallel. Contact Amtech for 500 V or 600 V requirement and more details.
2. All models have bottom cable entry and front access.
3. All performance specifications are valid at nominal ratings.

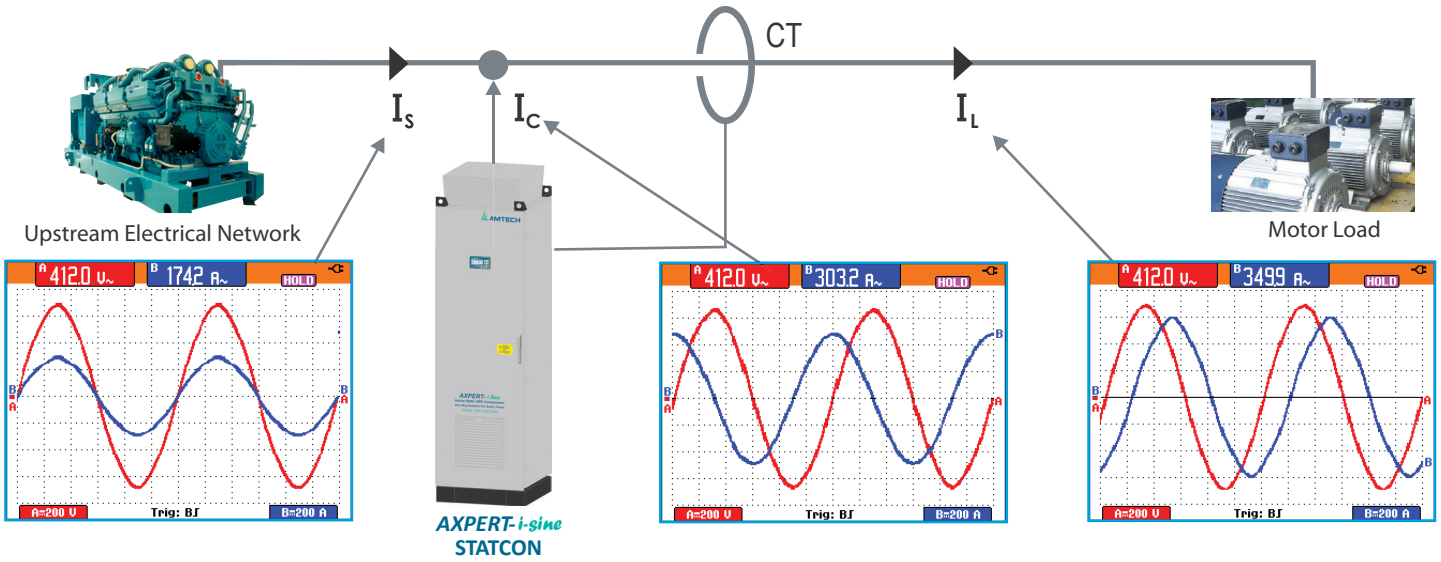
Applications

Amtech's Multi-Functional Axpert-i-Sine STATCON compensates the reactive currents of fundamental waves, load balancing currents etc. Due to its multiple functions, it is used in various applications such as,

- **Inductive and capacitive loads:** Furnace, Steel plants, Airports, Ship yards, Railway traction substation, Automobile plants, Chemical plants, Pulp and paper industries etc.
- **Highly fluctuating loads:** Crane facilities, welding plant, Off-shore drilling, Wind mills etc.
- Loads with weak networks: Process industries, City water and sewage pumping facilities, harbor cranes facilities, crane facilities at waste incineration plants, ropeway hoisting machines, amusement parks etc.

Case Study

Normally 3-Phase high rating motor takes the current from mains or auxilary source with very poor power factor. It can cause overload on mains or auxiliary source. Axpert-i-Sine STATCON is well adapted to operate with very poor power factor load to perform instantaneous and stepless compensation for dynamic reactive power.



We also offer following services related to Power Quality

- Detailed harmonic audit of plants
- Total solution for harmonic mitigation
- Design, supply & commissioning of harmonic filters
- Training on energy conservation, harmonic causes, effects and mitigation technique

AMTECH

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DRIVE FOR SUCCESS

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