

# STATCOM

## Static Synchronous Compensators





# STATCOM Systems

## STATIC SYNCHRONOUS COMPENSATOR

Statcom (Static Synchronous Compensator) is a converter based digital controlled FACTS device providing complete solution for reactive power, harmonics, voltage unbalance, voltage fluctuations and neutral current problems. Statcom provides simultaneous solution to power quality problems according to operating priorities selected by user.

## SYSTEM APPLICATION

- Capacitive / Inductive Loads
- Nonlinear Loads
- Unbalanced loads
- Loads and drivers connected to weak grids

## SYSTEM ADVANTAGES

- Step-less and exact compensation
- Reduction in system losses, maintenance costs and increased productivity
- Fastest response time to voltage sags / swells
- Preventing penalties against power quality parameters such as reactive power, harmonics and flicker
- Insensitive to network disturbances and no performance reduction against network parameters variation
- Elimination of resonance risks
- Extended equipment lifetime and protection of sensitive electronic equipment
- Fully programmable interface including industrial communication protocols and monitoring options
- Modular and expandable structure, easy integration to existing systems





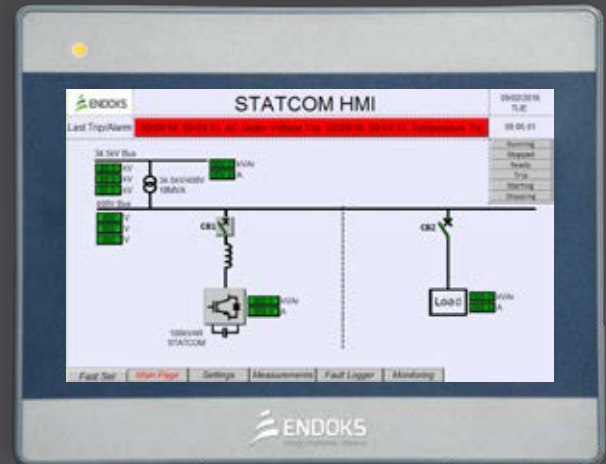
## SYSTEM FUNCTIONALITY

- Reactive Power Compensation
- Harmonic Filtering
- Load Balancing
- Voltage Regulation

## APPLICATION AREAS

- Wind Power Plants
- Railway Industry
- Iron and Steel Industry
- Cement Production Industry
- Automotive – Welding Industry
- Water Treatment and Pump Units
- Hydroelectric Application
- Aviation – Marine Application

**STATCOM**, realizes these functions by its DSP based digital control system and voltage source converter topology.



**STATCOM** systems generate its rated reactive power both in inductive and capacitive regions irrespective of supply voltage contrary to conventional compensation systems. **STATCOM** systems can provide active harmonic filtering and load balancing features in addition to reactive power compensation.

Custom designed **STATCOM** systems can be manufactured according to customer needs in addition to standard product configurations.

MODELS	ES400 / ES400N	ES690	ES1000
<b>Nominal Reactive Power *</b>	±100 to ±250 kVAr	±250 to ±500 kVAr	±500 to ±1000 kVAr
<b>Nominal Voltage **</b>	400 V <sub>rms</sub> (±10 %)	690 V <sub>rms</sub> (±10 %)	1000 V <sub>rms</sub> (±10 %)
<b>Nominal Current</b>	160 to 400 A <sub>rms</sub> (x3 Neutral Current for ES400N)	232 to 465 A <sub>rms</sub>	320 to 640 A <sub>rms</sub>
<b>Overload Capability</b>	Optional		
<b>Network Frequency</b>	50-60Hz (±5 %)		
<b>Line Connection</b>	3 phase/3 wire - 3 phase/4 wire	3 phase/3 wire	3 phase/3 wire
<b>Operation Modes</b>	Reactive / Harmonic / Unbalance / Voltage Regulation		
<b>Compensation Modes</b>	Closed Loop / Open Loop / Fixed / Hybrid / Remote		
<b>Harmonics Elimination</b>	Selective / 3 (ES400N) , 5, 7, 11, 13		
<b>Load Balancing ***</b>	Phase to Phase / Phase to Neutral (for ES400 and ES400N)		
<b>Efficiency</b>	<2,7%	<3%	<3%
<b>Response Time</b>	<1ms		
<b>Parallel Operation</b>	Up to 8 Modules in Master / Slave Configuration		
<b>User Interface ****</b>	4.3' Touch Screen	4.3' Touch Screen	10' Touch Screen
<b>Communication</b>	MODBUS RTU / TCP		
<b>Operation Temperature</b>	50°C without derating (IEC60721-3-3, Class 3k3)	50°C without derating (IEC60721-3-3, Class 3k3)	45°C without derating (IEC60721-3-3, Class 3k3)
<b>Cooling Method</b>	Air	Air	Liquid
<b>Noise Level</b>	<68dBA	<70dBA	<76dBA
<b>Humidity</b>	5% to 85% (IEC60721-3-3, Class 3k3)		
<b>Installation Altitude</b>	1000m without derating (IEC60721-3-3, Class 3k3)		

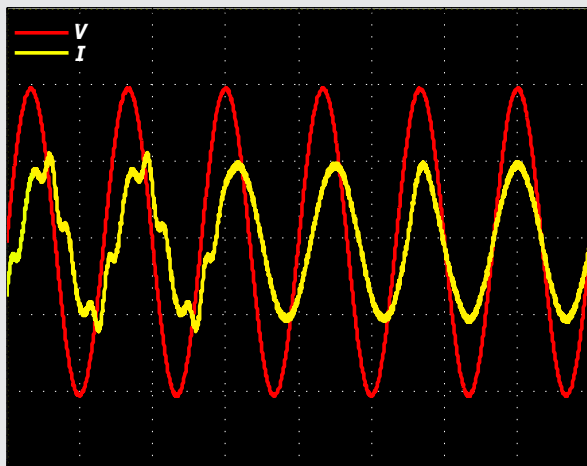
\* Other power ratings available on customer request

\*\* Other voltage ratings available on customer request

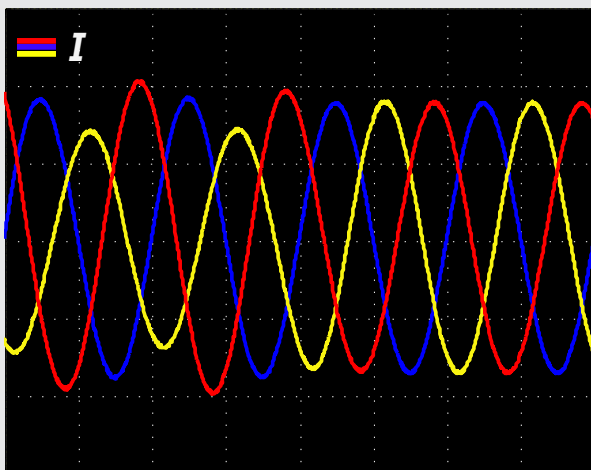
\*\*\* Max 50 % of nominal current

\*\*\*\* Other screen sizes up to 10' available on customer request





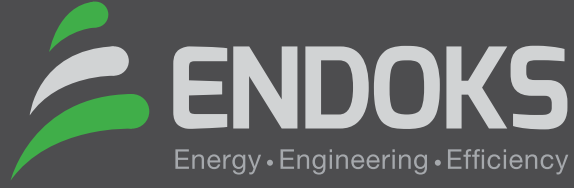
Before STATCOM | Harmonic Filtering | Reactive Power Compensation



Before STATCOM | Load Balancing

### OPERATION PRINCIPLES

- Statcom is a controlled current source device with IGBT based converter technology.
- Reactive power is transferred through a coupling reactor in capacitive and inductive regions by the generation of magnitude controlled voltage at the converter output. STATCOM provides its nominal current irrespective of the network voltage by controlling converter output voltage.
- Statcom is able to inject anti-phase low order harmonic currents to minimize current distortion at supply side. Harmonic filtering is limited to most common LV network harmonics which are 3<sup>rd</sup>, 5<sup>th</sup>, 7<sup>th</sup>, 11<sup>th</sup> and 13<sup>th</sup> harmonics.
- Unsymmetrical load currents are balanced by injecting negative sequence currents to the network.
- STATCOM provides the best voltage regulation performance during voltage sags/swells by using its overload capability in addition to fastest reactive power generation.



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