Active Harmonic Filtering Solutions
Catalogue

2009

Schneider Electric

Contents

Offer positioning

Harmonics basic and their effects in the electrical systems

Harmonics are a growing concern in the management of electrical systems today.
Designers are requested to pay more and more attention to energy savings and improved electricity availability. In this context, the topic of Harmonics is often discussed but there is still a need for more explanation, in order to dissipate confusion and misinterpretation.
Power electronic devices have become abundant today due to their capabilities for process control and energy saving benefits. However, they also bring drawbacks to electrical distribution systems: harmonics.
The presence of harmonics in electrical systems means that current and voltage are distorted and deviate from sinusoïdal waveforms.

Harmonics: origin, effects and consequences

Harmonic currents are caused by non-linear loads connected to the distribution system. A load is said to be non-linear when the current it draws does not have the same waveform as the supply voltage. The flow of harmonic currents through system impedances in turn creates voltage harmonics, which distort the supply voltage.
Equipment consisting of power electronics circuits are typical non-linear loads. Such loads are increasingly frequent in all industrial, commercial, and residential installations and their percentage in overall electrical consumption is growing steadily.
Examples include:
- Industrial equipment (welders, induction furnaces, battery chargers, DC power supplies),
- Variable Speed Drives for AC or DC motors,
- Uninterruptible Power Supplies,
- Office equipment (PCs, printers, servers, etc.),
- Household appliances (TV sets, microwave ovens, fluorescent lighting, light dimmers).

Harmonic currents increase the r.m.s. current in the different circuits and deteriorate the supply voltage quality. They stress the electrical network and potentially damage equipment. They may disrupt normal operation of devices and increase operating costs.
Symptoms of problematic harmonic levels include overheating of transformers, motors and cables, thermal tripping of protective devices, and logic faults of digital devices. In addition, the life span of many devices can be reduced by elevated operating temperature.

Instantaneous effects

- Harmonics can disrupt controllers used in electronic systems and can adversely affect thyristor switching due to displacement of the zero-crossing of the voltage wave
- Harmonics can cause vibrations and audible noise in electrical machines (motors, transformers, reactors)
- Harmonics also reduce available system capacity

Long-term effects

- Capacitor heating and degradation (capacitance loss)
- Heating due to additional losses in transformers
- Heating of busbars, cables and equipment
- Thermal damage to induction motors and generators

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PE900010


PE90009


PE90050

Benefits of harmonic mitigation

Harmonic mitigation provides several benefits that could be translated into financial savings for the investor and for the user. It will contribute to improve competitiveness of companies in different ways:

- Up to 25% Capex and Opex reduction commonly achievable,
- Improved business performance: downtime significantly reduced, increased equipment lifetime, up to 32% for single phase machines, up to 18% for three phase machines and up to 5% for transformers.

Reduce capital expenditures

Saving on Capex is the permanent concern of the investor.
Harmonic management provides the opportunity for significant savings ; especially on the cost of equipment. Harmonic mitigation reduces the r.m.s. value of the current and so reduces the size of busbars and cables, and the rating of circuit-breakers and contactors.

Reduce operating expenses

Opex will be impacted in different ways:
- Harmonic mitigation generally contributes to reduced power losses in transformers, cables, switchgear…
- Harmonic mitigation allows reducing the subscribed power to the energy supplier.

This saving depends on the energy supplier.
In most of the cases, savings could be up to 10% of the electricity bill.

Improve electricity availability and business performance

- Increase reliability and service life.
- Reduce risks of outage.
- Increase productivity & quality.
- Extended equipment lifetime.

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PE900051 PE900052 PE900053

Reactive energy fluctuation

Equipment such as welders, induction furnaces, lifts, crushers … operate with rapid and frequent load variations. This results in rapid changes of reactive power requirements. Since the circulation of reactive power in the distribution networks is responsible for voltage drops along the lines, the consequence is the occurrence of fast and large voltage fluctuations at the user's level. This will produce light flicker and cause disturbances of sensitive equipment.

Renewable energy generators such as wind turbines, solar panels and small hydro generators are requested by the Utilities to supply reactive energy. The objective is to provide voltage support at the point of connection and reduce the effect of a weak grid.

In all these situations, the best result is obtained with fast and continuous reactive energy compensation.

Improve Power Quality

Avoid voltage fluctuations responsible for flicker and disturbance of sensitive equipment.

Provide voltage support on weak grids

Continuous and fast compensation contributes to the efficiency of renewable energy generators connected on weak grids.

Applications	Performance	Benefits
Water and wastewater treatment plants, textile mills, paper mills, pharmaceutical facilities, steel mills, package sorting facilities, oil platforms and marine vessels	• Total harmonic voltage distortion THD(V) to be <5% • Total Demand Distortion (TDD) to meet equipment operating environment to prevent damage to other equipment in the facility	• Reduce harmonics to meet industry standards • Reduce harmonic effects on equipment • Increase system capacity by improving total power factor
Smelters, induction furnaces, DC drives and cranes	Fast reactive power compensation in rich harmonic operating environment	• Eliminate highly fluctuating harmonic content • Provide real-time supply of reactive power to improve system voltage regulation
Data centers, hospitals and microelectronic manufacturers	Critical uptime requirements incorporate backup power systems with generators, UPS	• Reduce harmonics • Correct leading power factor when blade servers are used on the output of UPS
Welders, linear induction motors, windmills, X-ray and MRI machines	Ultra fast var compensation	• Provide ultra fast var compensation to ensure stable voltage level for the process • Eliminate flicker • Improve diagnostic machine up time

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Schneider Electric solutions: the right choice for each need

Schneider Electric is specialised in harmonic mitigation objectives and is therefore offering a broad range of solutions for every demand. We propose solutions which maximize the savings when balanced with the cost of the harmonic mitigation equipment to get a reasonable Return On Investment (ROI). Schneider Electric can propose 3 different ranges of active filters: SineWave, AccuSine Power Correction System (PCS), and AccuSine Engineered Solution (ES), which cover a large extent of customer needs. Their main characteristics are summarized below.

Buildings

SineWave

- Three or four wire connection (3 phase or 3 phase + Neutral).
- 400V supply, other voltages possible with transformers.
- Units from 20A to 120A, with possible parallel operation up to 480A.
- Cancellation up to the 25th harmonic.
- Neutral harmonic correction at 3 times unit rating.

Industry

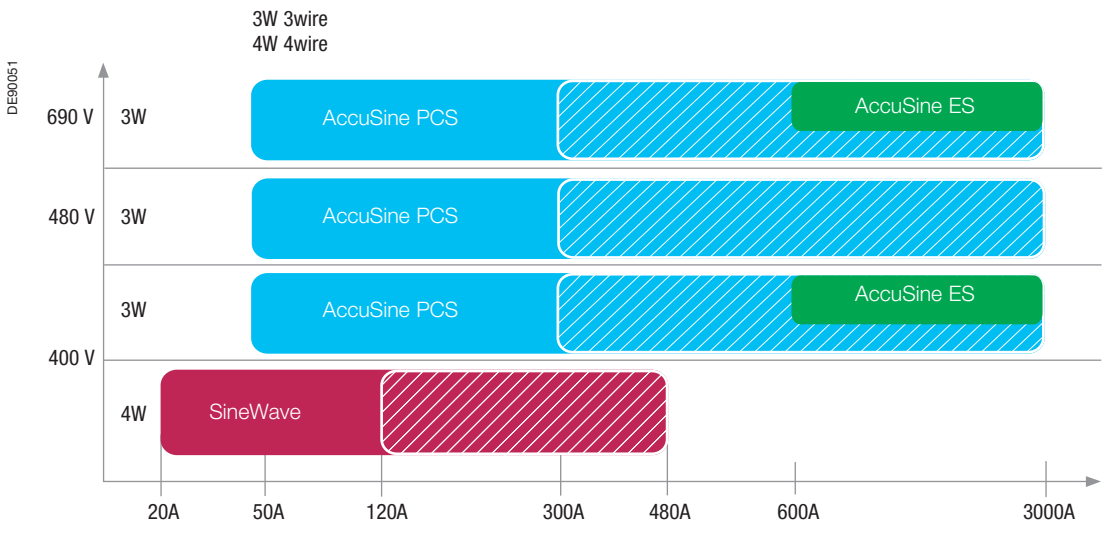
AccuSine Power Correction System (PCS)

- Three wire connection.
- From 230V to 480V supply (higher voltage level possible with transformer).
- Filtering at network level, units from 50A to 300A, with possible parallel operation up to 3000A.
- Cancellation up to the 50th harmonic.

Engineery

AccuSine Engineered Solution (ES)

- Three wire connection.
- 400V supply (higher voltage level possible with transformer).
- Filtering at network level up to 3000A.
- Cancellation up to the 25th harmonic.
- Possible correction of individual harmonics.
- Advanced Human Machine Interface (HMI).



Products:

SineWave *- p. 8*

AccuSine PCS *- p. 10*

AccuSine ES *- p. 14*

by paralleling of units

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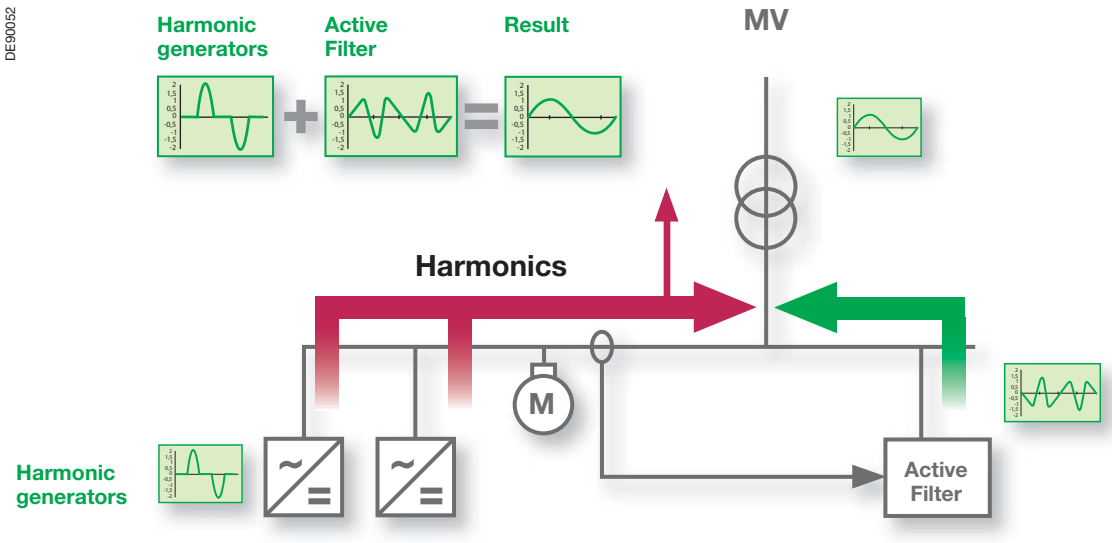
Active Filter operating principle

Active harmonic filters today are designed with two types of control schemes. Discrete logic uses Fast Fourier Transforms (FFT), or other digital means, to calculate the amplitudes and phase angle of each harmonic order. The power devices are directed to produce a current of equal amplitude but opposite phase angle for specific harmonic orders. This limits the response to specific harmonic orders and may require up to two or more cycles (>33 milliseconds) before responding. SineWave and AccuSine ES employ this logic.

The other control scheme (as used by AccuSine PCS) is called Full Spectrum Cancellation.
This control scheme doesn't perform FFT. The control algorithms are analog.
The controller acquires the current sample from the current transformer, removes the fundamental frequency component and starts injecting the correction within several hundred microseconds.
In this manner, all non-fundamental "noise" is removed for the electrical source.
This "noise" may contain non-integer frequencies, also known as inter-harmonics.

Sinewave and AccuSine active filters are also designed to inject reactive current at fundamental frequency to provide power factor correction and, in some cases, compensate for rapid load fluctuations to provide voltage support.



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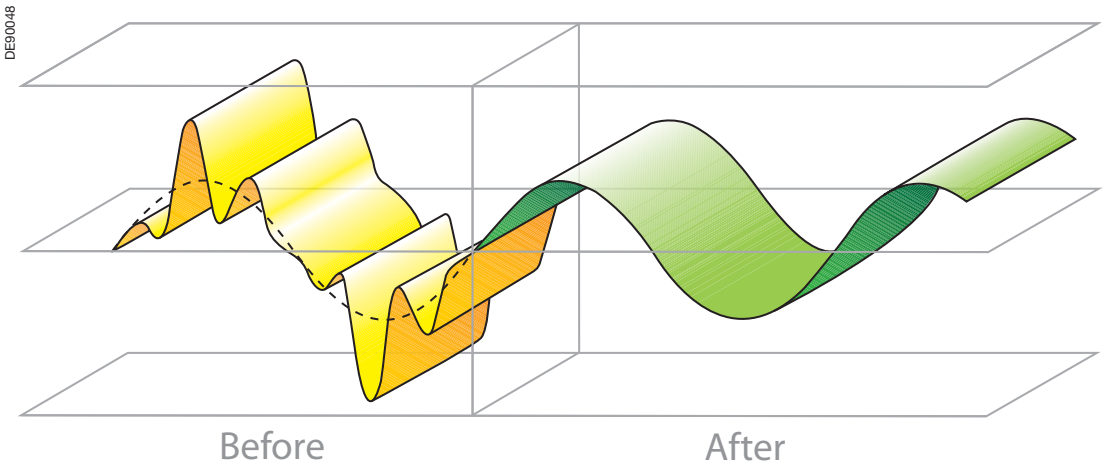
Standard compliances

By using Schneider Electric active filters, it is possible to put any installation in compliance with the most relevant standards and regulations:

- IEEE 519: recommended practices and requirements for harmonic control in Electrical Power Systems.
- IEC 61000.3.6: assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems.
- ER G5/4: planning levels for harmonic voltage distortion and the connection of non-linear equipment to transmission systems and distribution networks in the United Kingdom.



SineWave

PE90044

The Schneider Electric solution for harmonic filtering in buildings.

Key features and main benefits

- Correction capacity per unit: 20, 30, 45, 60, 90, 120 Amperes.
- Voltage: base design 400 VAC 3-phase supply, other voltages with transformer.
- Harmonic compensation: H3 to H25, global or selective.
- Reactive compensation: power factor correction, cos φ to near unity, selectable set point.
- Electrical systems: 3-wire or 4-wire.
- Neutral current correction: 3 times unit rating.
- Product standards: CE Certified.
- Parallel capability: up to 4 like units to 480 Amperes.
- Enclosure type: IP20, wall mounted.
- Communication: 3 dry (voltage free) contacts to monitor status from remote location; Optional via RS422/485 link for J-Bus and Modbus.
- Functionality: harmonic mitigation or power factor correction, separately or combined.
- Human Machine Interface: graphic display, seven languages.

Performance capability

- Stepless automatic adaption to load changes.
- Suitable for all types and mixes of nonlinear loads.
- Fast response at < 3 cycles.
- Assist in compliance to any worldwide harmonic standards: IEEE 519, G5/4-1, GBT 14549, IEC-61000-3.
- THDi reduction to approximately 1/10 of network THDi.
- Corrects power factor, cosφ, for IT servers to insure proper operation of UPS.
- Compatible with any type of neutral system.
- Automatic adaption for unbalanced phase loading.

Easy to Control

- Three LED indicators for run, stop, and current limit.
- Very user friendly graphic terminal.
- Choice of seven languages.
- Parameters and notifications clearly displayed.
- Graphic display of THDu, THDi.
- Remote run/stop via RS422/485 link via Modbus or J-Bus (Option).
- Remote monitoring of parameters and notifications via RS422/485 link via Modbus or J-Bus (Option).

Typical applications

- Data center & IT room.
- Offices and buildings.
- UPS systems.
- Fluorescent and HID lighting
- HVAC.
- Computer centers.
- Casinos.
- Power supplies for silicon production.

SineWave

PE90044

Technical specifications

	SW20	SW30	SW45	SW60	SW90	SW120
Compensation capacity per phase	20 A rms	30 A rms	45 A rms	60 A rms	90 A rms	120 A rms
Compensation capacity in the neutral[1]	60 A rms	90 A rms	135 A rms	180 A rms	270 A rms	360 A rms

System input

Nominal voltage[2]	400 V -20% +15%
Nominal frequency	50 Hz, 60 Hz, +/- 8%
Number of phases	3 phases with or without neutral
Current transformers	range from 300/1 to 4000/1

Technical characteristics

Compensated harmonic currents	H3 to 25, full equalization or individual equalization					
Harmonic attenuation rate	THDI load /THDI system less than 10, at the nominal rating of the equalizer					
Power Factor Correction	lagging or leading, up to 1.0					
Response time	< 40 ms					
Overload	Limitation of the nominal current, possibility of continuous operation with current limitation					
Inrush Current	< 2 x the nominal peak current					
Communication Capability	Jbus/Modbus card (optional)					
Heat losses	1000 W	1300 W	2100 W	2600 W	4200 W	5200 W
Acoustic noise (ISO 3746)	< 55 dBA		< 60 dBA		< 65 dBA	
Color	RAL 9002					

Environmental conditions

Operating temperature	0 to 40°C continuous
Relative humidity	0-95 % non condensing
Operating altitude	< 1000 m

Reference technical standards

Construction and safety	EN 60950-1
Design	IEC 146
Protection (enclosure)	IP 20 conforming to IEC 529

EMC

Conducted and radiated emission	EN 55011 level A
Immunity to electrostatic discharge	IEC 61000-4-2 level 3
Immunity to electromagnetic fields	IEC 61000-4-3 level 3
Immunity to impulse waves	IEC 61000-4-4 and IEC 61000-4-5 level 4

(1) Maximum capacity with PC-type data processing load and with three-phase balanced supply.
(2) Other voltages - 208 V, 220 V, 480 V - available on request.

Unit dimensions and installation guidelines

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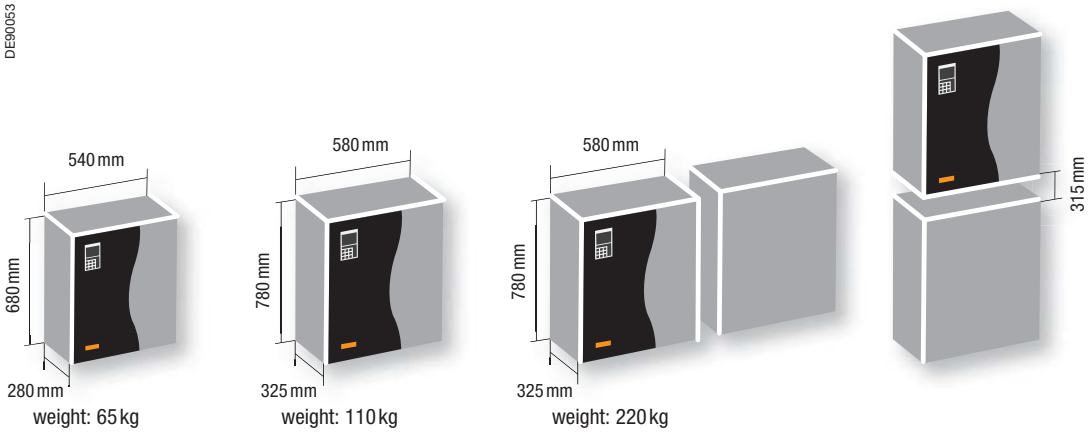


weight: 65 kg
SW 20, SW 30

weight: 110 kg
SW 45, SW 60

weight: 220 kg
SW 90, SW 120

AccuSine PCS

The Schneider Electric solution for active harmonic filtering in industrial installations.

Key features and main benefits

- Correction capacity per unit: 50, 100, 300 Amperes.
- Voltage: base design 208 - 480 VAC 3-phase supply, other voltages with transformer.
- Harmonic compensation: H2 to H50, full spectrum cancellation; includes interharmonics.
- Reactive compensation: power factor correction, cos φ to near unity, selectable set point.
- Electrical systems: 3-wire or 4-wire.
- Neutral current correction: None.
- Product standards: CE Certified, UL, cUL, CSA, ABS, C-Tick.
- Parallel capability: up to 10 units of any capcity.
- Enclosure type: NEMA 1, NEMA 12, IP30, IP54.
- Communication: 4 dry (voltage free) contacts to monitor status from remote location; Modbus TCP/IP or Ethernet IP.
- Functionality: harmonic mitigation or power factor correction, separately or combined.
- Human Machine Interface: graphic display with touch screen control.

Performance capability

- Stepless automatic adaption to load changes.
- Suitable for all types and mixes of nonlinear loads.
- Ultra fast response at < 1 cycle.
- Provides compliance to any worldwide harmonic standard: IEEE 519, G5/4-1, GBT 14549, IEC-61000-3.
- THDi reduction to approximately 1/10 of network THDi.
- Rapid injection of reactive current within 100 µSec (also known as VAR compensation or flicker control).
- Automatic adaption for unbalanced phase loading.

Easy to Control

- One LED indicator for power on.
- Very user friendly graphic terminal.
- Easy to read 96 mm QVGA screen.
- Parameters and notifications clearly displayed.
- Graphic display of all current trends.
- Remote monitoring and run/stop control via Modbus TCP/IP over ethernet.
- Total remote control, including parameter setup, and monitoring via Ethernet IP (webserver).

Typical applications

- Oil and gas platforms.
- Port cranes.
- Steel.
- Water/Wastewater.
- HVAC.
- Automotive.
- Process plants.
- Pulp and paper.
- Wind and solar farms.
- Lifts (ski or building)
- Marine vessels…

VAR compensation applications

- Arc welders.
- Rock crushers.
- Vehicle shredders.
- Arc furnaces.
- Roller coasters.

AccuSine PCS

Technical specifications

Standard RMS output current ratings	50A, 100A, 300A
Neutral current compensation	No

System input

Nominal voltage	208-480V +/- 10 % auto-sensing ; other voltages with transformers
Nominal frequency	50/60 Hz +/- 3 % auto-sensing
Number of phases	3P/3W, 3P/4W
Power Electronics	IGBT
Topology	Analog/digital interface
Operation with Single Phase Loads	Yes
Current transformers (CT)	1,000/5, 3,000/5, 5,000/5 (400Hz)
Number of CTs Required	2 or 3

Technical characteristics

Normal spectrum of compensation	2nd to 50th harmonic full spectrum
Attenuation ratio	>10:1
Parallel multiple units	Yes, up to 10 per set of CTs (any rating combinations)
CT Location	Either source or load sensing
Power factor correction	Yes, leading or lagging injection to target power factor
Response time	100 microseconds for step load changes, 1 cycle full response
Overload	Limited to nominal output, continuous operation
Dynamic Current Injection	Up to 2.25 times rated current
Display	High quality 3.8" QVGA screen
Languages	English
Operators	Magelis XBT graphic touch screen terminal
Display Parameters	• AC line voltage, DC bus voltage, load power factor unit output power factor • Load harmonic current, load reactive current, output harmonic current, corrected load current • Various fault codes, set up parameter points start, stop control screen
Communication Capability	Modbus, Modbus TCP/IP, Ethernet
Heat losses	N1 unit: 1,800 W for 50 A, 3,000 W for 100 A, 9,000 W for 300 A N12, IP units: 2,150 W for 50 A, 3,700 W for 100 A, 10,000 W for 300 A
Noise level (ISO 3746)	< 80 db at one meter from unit surface
Color	NEMA 1 Quartz Gray, all others RAL7035

Environmental conditions

Operating temperature	0° C to 40° C continuous
Relative humidity	0-95 % non-condensing
Seismic Qualification	IBC and ASCE7
Operating altitude	< 1,000 m, (derating factors apply for higher altitudes @10% per 1,000 m)

Reference technical standards

Design	Optional: CE EMC Certification IEC/EN 60439-1, EN 61000-6-4 Class A, EN 61000-6-2
Protection (enclosure)	NEMA 1, NEMA 12, IP30, IP54

AccuSine PCS

Selection table

AccuSine PCS selection table

Rated current A(rms)	Max. Reactive Power (kvar)			Catalog Number	Enclosure Information		Frame	Weight[e]
	208V	400V	480V		Rating	Style / cable entry	Figure #	Lbs(kg)
50	18	34.6	41.6	PCS050D5N15S	NEMA 1	Wall Mount/bottom[a]	1	250 (114)
				PCS050D5N16S				
				PCS050D5N125SC[d]	NEMA 12	Floor Standing[c]/ top or bottom	4	661 (300)
				PCS050D5N126SD[d]				
				PCS050D5CE305SC[bd]	IP30 (CE certified)			
				PCS050D5CE545SC[bd]	IP54 (CE certified)			
				PCS050D5IP305SC[d]	IP30			
				PCS050D5IP545SC[d]	IP54			
100	36	69.2	83.1	PCS100D5N15S	NEMA 1	Wall Mount/bottom[a]	2	350 (159)
				PCS100D5N16S				
				PCS100D5N125SC[d]	NEMA 12	Floor Standing[c]/ top or bottom	5	771 (350)
				PCS100D5N126SD[d]				
				PCS100D5CE305SC[bd]	IP30 (CE certified)			
				PCS100D5CE545SC[bd]	IP54 (CE certified)			
				PCS100D5IP305SC[d]	IP30			
				PCS100D5IP545SC[d]	IP54			
300	108	207.8	249.4	PCS300D5N15S	NEMA 1	Floor Standing[c]/top	3	775 (352)
				PCS300D5N16S				
				PCS300D5N125SC[d]	NEMA 12	Floor Standing	6	1,212(550)
				PCS300D5N126SD[d]				
				PCS300D5CE305SC[bd]	IP30 (CE certified)			
				PCS300D5CE545SC[bd]	IP54 (CE certified)			
				PCS300D5IP305SC[d]	IP30			
				PCS300D5IP545SC[d]	IP54			

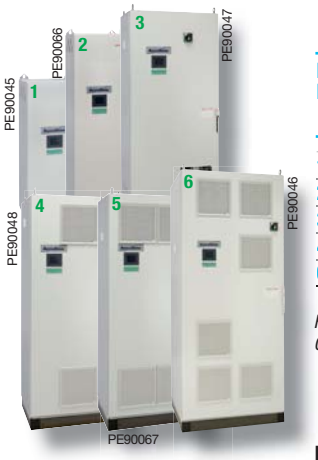
a: Floor stand can be ordered with part number – FSPCS100N1
b: CE certifi ed units meet EMC Directive 89/336 EEC
c: Floor-standing units include a door-interlocked main disconnect
d: C = 380–415 V fan, D = 480 V fan
e: Weight information is subject to change without notice

Round split-core CT selection table

Ampacity	Catalog Number	Dimensions (in.) A (ID)	D (OD)	Weight (lbs.)	Accuracy class	Burden capacity (A)	Secondary current (A)
1,000	CT1000SC	4.0	6.5	3.50	1	10	5
3,000	CT3000SC	6.0	8.5	4.25	1	45	5
5,000	CTFCL500058	8.0	10.5	5.50	1	45	5

Three CTs required for networks with single phase loads. Two CTs required for three phase loads. For installations requiring parallel connection of multiple AccuSine units, special considerations are required, and additional CT may be needed. Contact Schneider Electric for details.

AccuSine PCS



Unit dimensions and installation guidelines

Frame Size Figure	Exterior dimensions					
	Height		Width		Depth	
	in.	mm	in.	mm	in.	mm
1	48.0	1,219	20.7	525	18.5	469
2	64.9	1,648	20.7	525	18.5	469
3	75.3	1,913	31.5	801	19.6	497
4/5	75.0	1,905	31.5	801	23.8	605
6	90.7	2,303	39.4	1,000	31.7	805

For detailed installation instructions, please refer to installation bulletin 5820IB0802.
Chassis unit information is available upon request.

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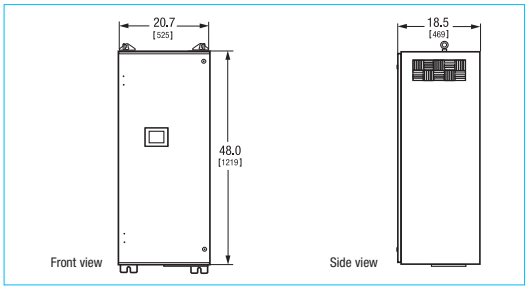

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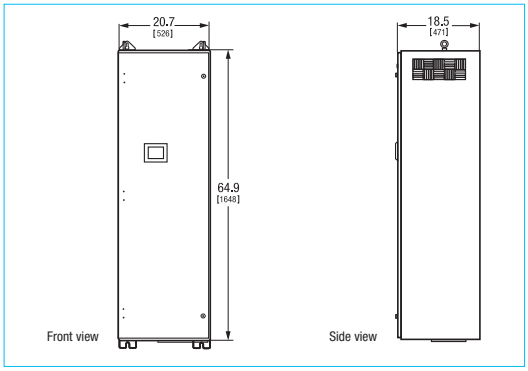

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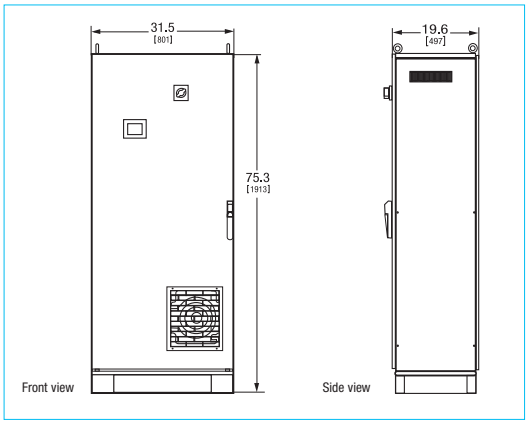

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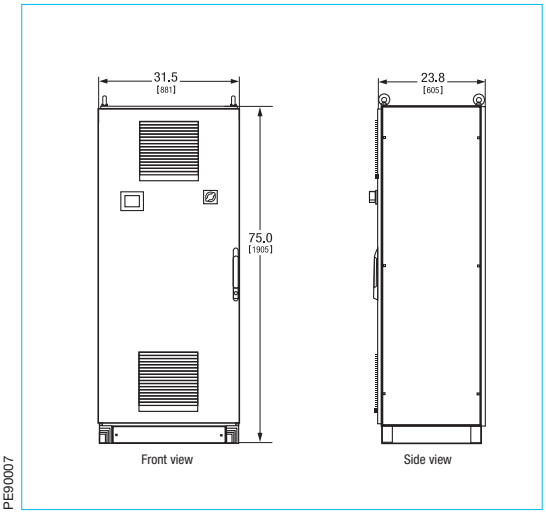

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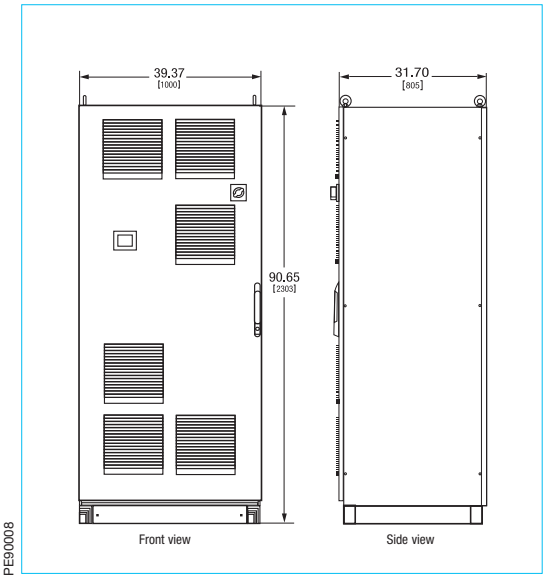

PE90008

AccuSine ES

PE90009

PE90056

PE90057

Dual IGBT bridge

The Schneider Electric solution for active harmonic filtering for specific and high performance solutions.

Key features and main benefits

- Correction capacity up to 1150 A at 400 V.
- Voltage: base design 400 VAC 3-phase supply, standard packages at 480 and 690 VAC, other voltages with transformer.
- Harmonic compensation: H2 to H25, global or selective via DHC.
- Reactive compensation: power factor correction, cos φ to near unity, selectable set point.
- Electrical systems: 3-wire.
- Neutral current correction: None.
- Product standards: CE Certified.
- Parallel capability: up to 10 units of any capacity.
- Enclosure type: IP23.
- Communication: 4 dry (voltage free) contacts to monitor status from remote location; Ethernet IP.
- Functionality: harmonic mitigation or power factor correction, separately or combined.
- Human Machine Interface: graphic display with touch screen control.

Performance capability

- Stepless automatic adaption to load changes.
- Suitable for all types and mixes of nonlinear loads.
- High dynamic response through ultra fast logic sampling every 12.5 µsec.
- Ultra fast response at < 1 cycle.
- Provides compliance to any worldwide harmonic standard: IEEE 519, G5/4-1, GBT 14549, IEC-61000-3.
- THDi reduction to approximately 1/10 of network THDi.
- Rapid injection of reactive current within 200 µSec (also known as VAR compensation or flicker control).
- Automatic adaption for unbalanced phase loading.
- Load balancing to protect the electrical network.

Easy to Control

- Two LED indicators for power on and status (color changes included).
- Very user friendly graphic terminal.
- Easy to read 213mm SVGA screen.
- Parameters and notifications clearly displayed.
- Graphic display of all current trends.
- Remote monitoring and run/stop control via ethernet.
- Total remote control, including parameter setup, and monitoring via Ethernet IP (webserver).
- Easy setup using PC.

Typical applications

- Oil and gas platforms.
- Port cranes.
- Steel.
- Water/Wastewater.
- HVAC.
- Automotive.
- Process plants.
- Pulp and paper.
- Wind and solar farms.
- Lifts (ski or building)
- Marine vessels…

VAR compensation applications

- Arc welders.
- Rock crushers.
- Vehicle shredders.
- Arc furnaces.
- Roller coasters.

AccuSine ES


PE90049

Technical specifications

	Solo	Top
Compensation capacity per phase		
400 V	580 A rms	1150 A rms
480 V	480 A rms	960 A rms
690 V	330 A rms	670 A rms
Compensation capacity in the neutral	No	

System input

Nominal voltage	400V, 480V, 690V +/- 10% ; other voltages with transformers
Nominal frequency	50/60 Hz +/- 1 Hz
Number of phases	3P/3W
Power Electronics	Four IGBT parallel
Current transformers	Passive 5 A rms
Number of CTs Required	3

Technical characteristics

Compensated harmonic currents	Up to 25th harmonic (DHC); Possible correction of individual harmonics
Harmonic attenuation rate	THDI load / THDI system less than 10 at the nominal rating of the filter
Parallel Multiple Units	Possible
CT Location	Either source or load sensing
Response time	< 40ms
Overload	Limited to nominal output, continuous operation
Display	No (Optional: Touch panel Magelis Smart 8.4")
Language	English
Communication Capability	Ethernet
Heat losses	< 4 % of nominal rating of the filter
Noise level (ISO 3746)	< 80 dB at one meter from the unit surface
Color	RAL 7032

Environmental conditions

Operating temperature	+5°C to +40° C supply air temperature
Climatic category	IE32 (EN 60721-3-3)
Operating altitude	< 1000 m (de-rating factors apply for higher altitudes @10% per 1000m)

Reference technical standards

Design	CE Certification, Construction Standard EN 61800-5-1, EMC standard 61800-3
Protection (enclosure)	IP23 (EN 60529)

Selection table

AccuSine ES Solo	Power	Current	Voltage
S-40-40-5-XX	400 kvar	580 A	400 V
S-40-48-6-AT	400 kvar	480 A	480 V
S-40-69-5-AT	400 kvar	330 A	690V

AccuSine ES Top	Power	Current	Voltage
T-80-40-5-XX	800 kvar	1150A	400V
T-80-48-6-AT	800 kvar	960A	480V
T-80-69-5-AT	800 kvar	670A	690V

Unit dimensions

AccuSine ES Solo	Dimension
S-40-40-5-XX	1421 x 616 x 1951 mm
S-40-48-6-AT	2226 x 616 x 1951 mm
S-40-69-5-AT	2226 x 616 x 1951 mm

AccuSine ES Top	Dimension
T-80-40-5-XX	2426 x 616 x 1951 mm
T-80-48-6-AT	3231 x 616 x 1951 mm
T-80-69-5-AT	3631 x 616 x 1951 mm

Human Machine Interface (HMI)

The three different ranges of active filters offered by Schneider Electric provide a Human Machine Interface (HMI) including a Graphical User Interface. Direct control, programming and monitoring are possible without using a PC.

Keypad

Direct control of the active filters is possible by using the RUN/STOP commands on a keypad.

Display

A graphical Display is used for different functions:
- Access and set up of operating parameters.
- Measurement data.
- Operation status (warnings, fault messages).

Menus are accessible for easy navigation.

Configuration parameters

List of selectable parameters:
- User language,
- 3- or 4-wire configuration,
- Harmonics or reactive energy compensation (separately or in combination),
- Current transformer ratio,
- Power factor target,
- Number of units in parallel,
- Communication parameters.

Measurements

A complete set of measurement data is accessible:
- Line-to-line r.m.s. voltages.
- Total r.m.s load currents (on three phases).
- Active filter output r.m.s currents (on three phases).
- Harmonic r.m.s load and line currents.
- Voltage and current distortions (THD_u and THD_i).
- Reactive r.m.s load current.
- Active filter reactive r.m.s output current.
- Heatsink temperature (in deg. C).

Alarms and Fault display

Detailed alarms and fault messages are displayed for easy trouble shooting:
- Supply voltage or frequency outside of normal operating range.
- Current limitation.
- Overtemperature.
- Controller fault.
- Communication fault.

Appendix

Relevant websites

www.schneider-electric.com/solutions/energyefficiency	
www.solution-toolbox.schneider-electric.com/segment	
www.reactivar.com	
www.APC.com	
www.pdrive.com	

Technical reference guides

Harmonic mitigation - Solution Handbook	SLTED109014EN
Harmonic disturbances in networks and their treatment	Technical guide N°152
The singularities of the third harmonic	Technical guide N°202
Harmonic detection & filtering	Expert guide N°4
Electrical installation guide	Expert guide N°6
AccuSine installation bulletin	
AccuSine PCS Active Harmonic Filter	

Active Harmonic Filtering Solutions

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