


F R O S T & S U L L I V A N

BEST PRACTICES

AWARDS

F R O S T & S U L L I V A N

BEST
2020 PRACTICES
AWARD

Schneider
 **Electric**TM

**2020 GLOBAL ACTIVE HARMONIC
FILTERS/POWER QUALITY
PRODUCT LEADERSHIP AWARD**

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated companies. Schneider Electric SE excels in many of the criteria in the active harmonic filters/power quality space.

AWARD CRITERIA	
<i>Product Portfolio Attributes</i>	<i>Business Impact</i>
Match to Needs	Financial Performance
Reliability and Quality	Customer Acquisition
Product/Service Value	Operational Efficiency
Positioning	Growth Potential
Design	Human Capital

Company Background

Schneider Electric SE (Schneider) is a leading global provider of energy and automation digital solutions for efficiency and sustainability, serving customers in the residential, buildings, data centers, industrial, grids, and infrastructure spaces in more than 80 countries. Founded in 1836 as a steel and machinery company in France, Schneider has grown into a €27 billion enterprise, sustaining two centuries of energy industry transformation and continuously innovating its product portfolio to meet customers' evolving needs. Schneider's AccuSine+ platform continues the company's trend of establishing industry standards, then exceeding them with innovative features and functionality.

Responding to Increasing Power Quality Challenges

The continuous growth of non-linear loads across industries, data centers, commercial facilities, hospitals, and buildings accelerates the need for a reliable power supply, high quality, and availability. This growth is critical to ensure loads function safely within the operational parameters for which they have been carefully planned and designed.

The presence of harmonic currents and reactive power within a facility is becoming pervasive and must be mitigated. Schneider Electric addresses this challenge with its stand-out AccuSine+ (a portmanteau of "Accurate" and "Sinewave") active harmonic filtering platform, first introduced to the market in 2015, upending the market with a comprehensive solution that provides dynamic harmonic mitigation, power factor correction, and load balancing to ensure safe and reliable power. AccuSine+ includes three high-

“Active harmonic filters have four key types of components: electromechanics, power electronics, controls, and firmware. While many solutions providers may excel in any one of these categories, the challenge they all face is to create the perfect harmony between them. This is how Schneider differentiates; the company’s active harmonic filters benefit from the perfect balance of these four component types.”

- Jeffrey Castilla, Best Practices Research Analyst

performance and top-quality products: AccuSine PCS+, AccuSine PFV+, and AccuSine PCSn.

AccuSine PCS+, the first active harmonic filter on the market using a 3-level IGBT technology and separate airflow for optimal thermal performance, provides active harmonic filtering as well as reactive power correction for heavy industries and harsh and mission-critical environments such as oil and gas platforms, water and wastewater plants, data centers, and metals and mining operations. To complement its harmonic mitigation, AccuSine PFV+ electronic VAR compensation provides electronic reactive current compensation that delivers power factor correction,

reduces voltage fluctuations, and extends equipment life.

As the market leader in the global active harmonic filters market, and having established the industry standard for three-level inverters with its AccuSine+ platform back in 2015, Schneider maintains its leadership through continuous innovation around performance and simplicity.

The most recent iteration of AccuSine+ is the AccuSine PCSn active harmonic filter. Schneider Electric launched AccuSine PCSn in 2018 to provide the building and commercial space with a simple, compact and modular solution capable of facing the industry’s specific power quality challenges. In addition to 3-phase mitigation, AccuSine PCSn can also compensate for neutral harmonic currents caused by single-phase non-linear loads, which are growing fast within the commercial and building segments.

A distinctive feature is its patented neutral current limit which gives customers greater flexibility, cost savings, and higher efficiency in selecting their cable and protection.

Frost & Sullivan finds that a proof of Schneider’s superiority in terms of technology platform strategy is the seamless interoperability of PCS+ and PCSn. These active harmonics filters can work together within the same network, and they can communicate and share priority to perform multiple compensation loads, either separately or all at once.

Performance: Setting the Benchmark High

Active harmonic filter design can be categorized into four key sections: electromechanical, power electronics, controls, and firmware. The challenge for any supplier is to create perfect harmony between them. This is how Schneider differentiates; AccuSine+ active harmonic filters benefit from the perfect balance of these four elements. Clear proof of that is Schneider’s harmonic attenuation and filtering performance helping customers exceed standard distortion levels through either current or voltage control. Such superior performance and ease of use provides peace of mind to the customer ensuring uptime and reliability.

Moreover, Schneider is first in the market to introduce optimized power factor (PF), which enables an additional level of intelligence within the AccuSine product to meet the customer PF requirements. In multi-units installations where higher current compensation is required, AccuSine+ provides true redundancy with its capability to load-share or make-up capacity. Such intelligent paralleling creates a completely different paradigm that allow each unit to communicate with each other. As a result, users

“Having established the standard for the active harmonic filter industry, Schneider maintains its leadership through continuous innovation. To drive value for its customers, the company considers the obstacles of installation, operations, and commissioning and translates its findings into frequent innovation that reflects customer needs and simplifies power quality management. The company builds intelligence into all of its products, designing them to be easy to install, use, and commission. This intelligence enables users to achieve their goals efficiently and effectively while minimizing disruption.”

- Jeffrey Castilla, Best Practices Research Analyst

who maintain the units do not have to check each individual unit. Since the units communicate and work together, the user can simply look at each cluster of units from the comfort of one HMI.

Simplicity: Easy to install, Easy to Commission, and Easy to Use

To drive value for its customers, the company considers the obstacles of installation, commissioning, and operations, and translates them into frequent innovation that reflects customer needs and simplifies power quality management. The company builds intelligence into all of its products, designing them to be easy to install, use, and commission, which translates into a powerful competitive advantage that resonates particularly well during the customer acquisition stage.

Frost & Sullivan considers that a good example of that is AccuSine+ unparalleled onboard commissioning wizard. Schneider introduced this feature in 2015 with the initial launch of AccuSine+. In a very similar fashion to downloading and installing software on a personal computer, users can set up AccuSine+ active harmonic filters following a step-by-step intuitive process in the human-machine interface, without the need for any additional software or computer or highly technical specialization.

With over 90% of on-site installation and commissioning issues related to incorrect placement of current transformers (CTs), another distinctive element of the AccuSine+ platform is its automatic calibration features for CT configuration, calibration, and polarity correction. While competing manufacturers inform the users when CT polarity is incorrect, AccuSine PCS+ and PCSn detect, calibrate and correct CT polarity automatically.

Quality and Reliability

Schneider's products are globally known for being premium and high-quality, which the company obtains through extensive research and development, product testing, and validation. Schneider performs hardware-in-the-loop (HIL) simulations throughout the entire product lifecycle, including research phases, product development, verification, and validation. With HIL testing, Schneider can fulfill exhaustive real-life scenarios and determine a control stability for challenges that may arise in the field. This process complements the task of recreating field scenarios in a lab environment, enabling the company to cover thousands of cases within short time frames. HIL simulations assure that AccuSine+

active harmonics filters can perform well under any situation, assuring product quality and peace-of-mind to customers. An example of such robustness is that both AccuSine PCS+ and PCSn are fully compliant to seismic and marine applications.

Schneider's active harmonic filters also provide superior reliability. For example, for ambient temperature safety, AccuSine+ products monitor and report in real time several temperature points within the equipment. Rather than only activating an alarm when approaching critical temperature levels, the software automatically rolls back units' capacity or shuts them down if temperatures reach a dangerous, programmable limit. This feature offers users the safety and comfort of reliability.

Driving Extra Value with EcoStruxure™ Platform

EcoStruxure™ is Schneider's single, open, and Internet of Things-enabled platform, which adds new functionality to AccuSine+ platform products. On top of the power measurement, power correction, power monitoring, and systems protection capabilities self-contained in AccuSine+ harmonic filters, connectivity to EcoStruxure™ Platform provides system-level visibility and enhanced capabilities for end users' power quality management. By using EcoStruxure™ analytics, users can extract insights from current operations and identify further actions to drive value for their businesses.

Conclusion

Schneider Electric SE (Schneider) has had a pulse on the power quality solutions market for the last two decades and has cemented a position for itself as a global leader. Not only does the company set the standard for other industry participants to follow, but it innovates quickly across the entire ecosystem be it hardware, firmware, control, edge and analytics to deliver customer value. Schneider Electric SE's AccuSine+ active harmonic filtering platform is one such example. The company set the industry benchmark high when it introduced AccuSine+ in 2015, then continued to enrich and advance the technology, culminating in the 2018 release of AccuSine PCSn, the most accurate, efficient, though modular and versatile harmonic filter on the market that integrates seamlessly with the other AccuSine+ platform products.

Schneider Electric SE has exceeded Frost & Sullivan's expectations by garnering positive feedback across all end-user markets for AccuSine+ active harmonics filters for its superior harmonic attenuation and filtering performance and its easiness to deploy and operate, reflecting customer needs and simplifying power quality management.

Frost & Sullivan firmly believes that with AccuSine+, Schneider Electric SE has the right technology in place to maintain its current leadership position in this highly competitive market and foresees strong opportunities for growing sales as power quality concerns increase across end-user verticals, and more companies understand the advantages of using active harmonic filters as a solution.

As a result of this dedication and its commitment to power quality solutions, Schneider Electric SE earns Frost & Sullivan's 2020 Global Product Leadership Award in the active harmonic filters/power quality market.

What You Need to Know about the Product Leadership Recognition

Frost & Sullivan's Product Leadership Award recognizes the company that offers a product or solution with attributes that deliver the best quality, reliability, and performance in the industry.

Best Practices Award Analysis

For the Product Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Product Portfolio Attributes

Match to Needs: Customer needs directly influence and inspire the product portfolio's design and positioning

Reliability and Quality: Products consistently meet or exceed customer expectations for performance and length of service

Product/Service Value: Products or services offer the best value for the price compared to similar market offerings

Positioning: Products serve a unique, unmet need that competitors cannot easily replicate

Design: Products feature innovative designs, enhancing both visual appeal and ease of use

Business Impact

Financial Performance: Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

Customer Acquisition: Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

Operational Efficiency: Company staff performs assigned tasks productively, quickly, and to a high-quality standard

Growth Potential: Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

Human Capital: Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention

About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at <http://www.frost.com>.

The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create on-going growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.

Key Impacts:

- **Growth Pipeline:** Continuous flow of Growth opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



The Innovation Generator™

Our six analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

- **Mega Trend (MT)**
- **Business Model (BM)**
- **Technology (TE)**
- **Industries (IN)**
- **Customer (CU)**
- **Geographies (GE)**

