EasyLogic™ APF

Catalog 2023

Multi-function Active Harmonic Filter
Reliable. Scalable. Simple.

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Life Is On Schneider Electric

Contents

Power is becoming more distributed, complex to manage and integrated into daily lives, making it more susceptible to disruption.

Power Quality issues are a primary cause of device malfunction, equipment failure, and power outages resulting in costly unplanned downtime. It's critical to bring stability and efficiency to power network for different segments & applications. Improved power quality maximizes money saving and business continuity.

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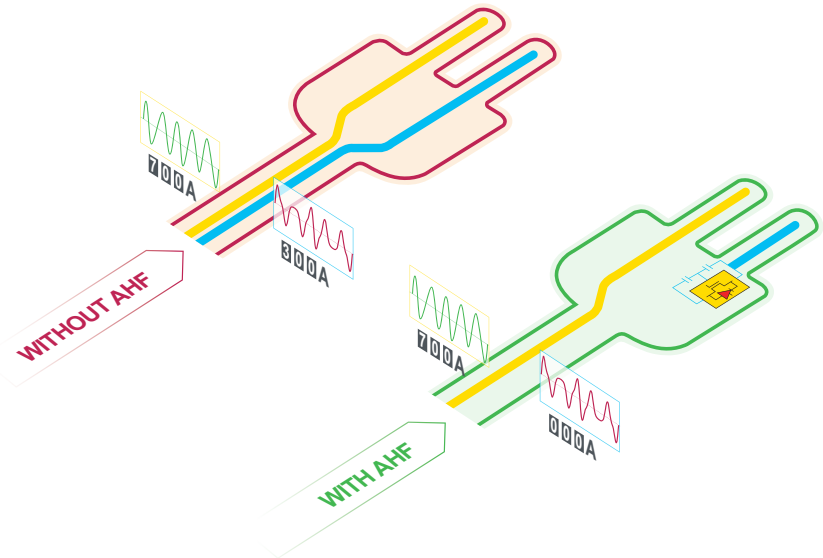
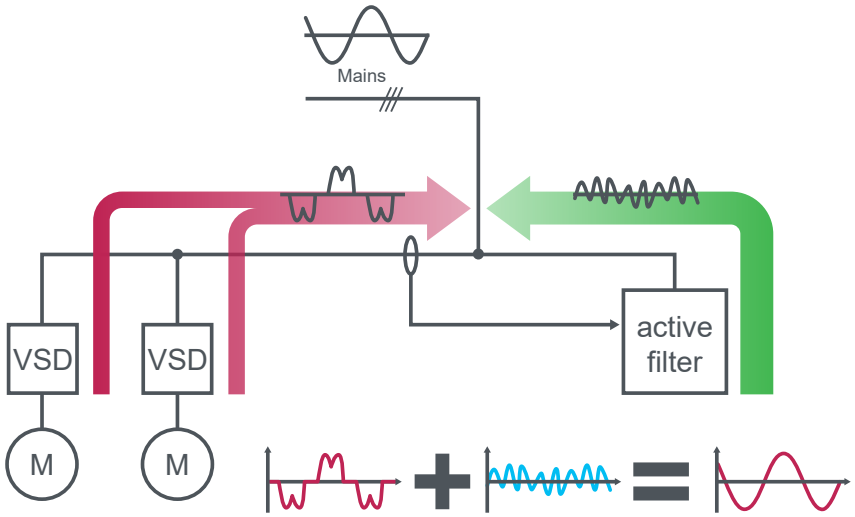
Buildings	Infrastructure	Industry	Healthcare
			
LED or CFL lights, computers, office loads, those non-linear loads are the cause of harmonic distortion impacting the stability of power network	Penalties, frequent system downtime, reduced machine life cycle and increased carbon emission	Power factor not up to standard, penalties, reduced capacity, and efficiency; increased CO_2 footprint	Medical equipment like imaging equipment that are non-linear loads generating harmonics, it can disrupt sensitive equipment

Schneider Electric aims to empower all to make the most of our energy and resources, bridging progress and sustainability for all.



Active Harmonic Filter

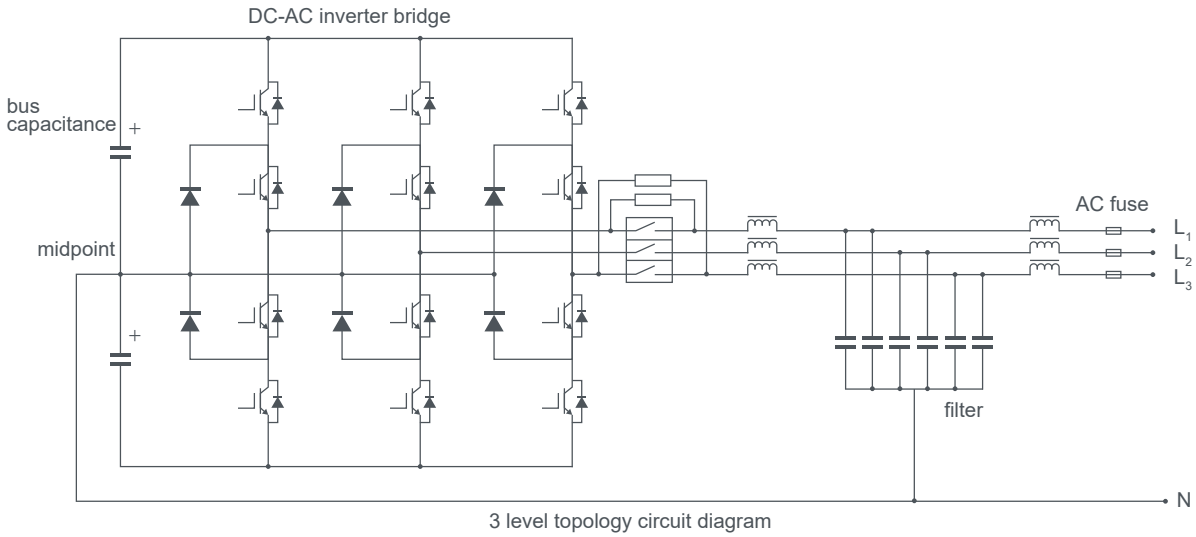
The active filter is based on the principle of measuring the harmonic currents and using this measurement on a real time basis to generate a harmonic current spectrum in phase opposition to the measured spectrum. This has the effect of canceling the original harmonic currents. Usually, an active filter is switched in parallel to the inverter. In other words, the active filter can be seen as a generator of harmonics. It produces the opposite harmonics of the measured distortions to compensate all harmonics in sum.



Optimize your harmonic filtering efficiency: 3-Level Topology Design Approach

The 3-level topology technology can greatly reduce the volume of high frequency filter inductance and implement modularity of APF.

With the 3-level topology technology, the IGBT's switch voltage stress and switching, and efficiency are improved tremendously.



3 level topology circuit diagram

Power quality problems are one of the major causes of unscheduled downtime, equipment malfunction, and damage. Reliability and consistency of electricity supply are critical to businesses, from industrial plants, medical facilities, data centers to office buildings. When power quality is imperfect due to disturbances such as interruptions, voltage dips or harmonic pollution, your business suffers. It is an area of growing concern for end users due to the frequency of occurrence and financial impact of issues: 30% to 40% of all unscheduled downtime today is related to power quality problems.

EasyLogic™ APF

High performance, cost-effective solutions for stabilizing electrical networks by providing harmonic mitigation, power factor correction and load balancing.

Applications

Buildings

Small & Medium Commercial
(non-critical application)

- Coffee-shop
- Restaurant
- Small-Mid Healthcare

Industry

Small & Mid-sized industrial site
(non-critical application)

- Water & Wastewater Food
- Food & Beverage
- Metal, Minerals & Mining

Energy

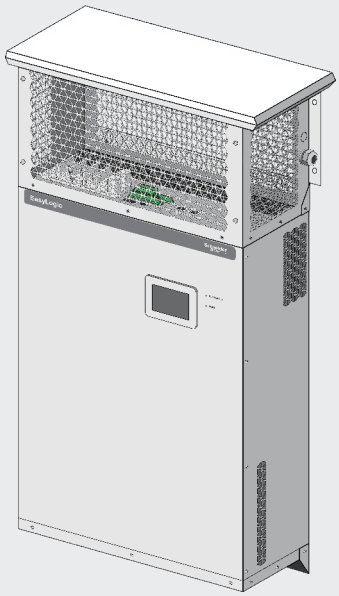
Low-end
(non-critical application)

- Utilities (Low-end DSO)
- Power Generation(Low-end)

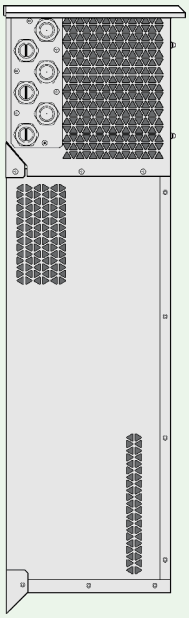
Functions

- Phase harmonic correction
- Neutral harmonic correction
- Power Factor Correction (cos ø)
- Mains load balancing

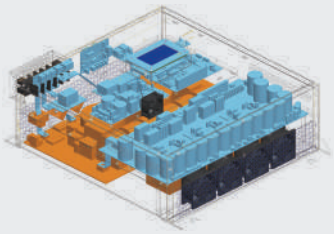
Higher air exhaust ingress protection



Cable glands for ease of installation



Built-In EMC filter for enhanced safety



Active Harmonic Filter Offer

EasyLogic™ APF

Technical Specifications

	208 V	400 V	480 V
Electrical Characteristics			
Standard RMS output current ratings	Wall: 50 A, 100 A Rack: 100 A	Wall: 50 A, 100 A, 150 A Rack: 50 A, 100 A, 150 A Cabinet: 300 A, 450 A	Wall: 50 A, 100 A, 150 A Rack: 100 A, 150 A
Nominal voltage	208 Vac, -15%/+25%	400 Vac, -40%/+15%	480 Vac, -20%/+10%
Nominal frequency	50/60 Hz, ±3 Hz auto sensing		
Connection type	3 ph/3wire or 3 ph/4wire within the same product		3 ph/3wire
Compensation type	3 ph only or 3 ph + Neutral		3 ph only
Earthing systems	TT, TN-C, TN-S, TN-C-S		
Network voltage distortion	THDv ≤ 15%, working THDv > 15%, shutdown		
Voltage notch limits	Notch depth: 10%, Notch area (AN): 13,667 Vµs @ 400 V as per IEEE 519-2014, Annex C		
Technical Product Characteristics			
Power electronics	3-level IGBT		
Control topology	Digital harmonic FFT		
Efficiency & Losses	≥ 95%	≥ 97%	
Current transformer	Any ratio with 5 A secondary		
Quantity of CT	2 or 3 CTS for 3-phase loads 3 CTs are required for 4-wire with neutral connected loads		
CT position	Grid sense or Load sense		
Control basis	Closed or Open loop		
Spectrum cancellation & selection	2nd to 31st harmonic order		
Modes of operation	Multi-modes simultaneously or discrete - Phase harmonic correction - Neutral harmonic correction - Power factor correction (cos ø) - Mains load balancing		
Harmonic attenuation & filtering performance	THDi ≤ 5% in closed loop control with no capacitance downstream (with load harmonic ≥ 50% unit rating) Total harmonic cancellation > 92%		
Power factor correction	Leading (capacitive) or lagging (inductive)		
Load balancing	Negative and zero sequence simultaneously		
Protection	Thermal, over/under voltage, overcurrent, phase loss, internal short circuit, inverter bridge abnormal operation, corresponding alarm		
Paralleling Characteristics			
Scalability & Expandability	Up to 8 units in parallel per set of CT; any size unit combination is possible		
Parallel operation options	Leader-Follower (previously called master-slave)		
Control & Communications			
Control response time	100 µs typical		
Harmonic correction time	≤ 2 cycles		
Reactive correction time	≤ 10 ms		
Communications protocol	Modbus RTU		

Active Harmonic Filter Offer

EasyLogic™ APF

Technical Specifications (contd.)

	208 V	400 V	480 V
Environmental Conditions			
Operating temperature	-10...+40 °C (full performance, continuous operation) 40...50 °C with derating		
Relative humidity	0...90%, non-condensing		
Operating altitude	≤1500 m (full performance, continuous operation) Derate 1% per 100 m above Absolute max altitude: 3700 m		
Ambient temperature safety	Automatic temperature roll back based upon IGBT over temperature		
Contaminant Levels - operating (IEC 60721-3-3)	Chemical Class 3C2, Mechanical Class 3S6 No conductive particles permitted		
Shipping & Packaging	Tested in accordance with ISTA-3B requirements		
Standards & Certification			
Design compliance	IEC 62477-1, EN 61000-6-2, EN 61000-6-4 Class A, ISO 9001, IEEE Std 519-2014		
EMC compliance	Electromagnetic emission EN/IEC61000-6-4 Class A Electromagnetic immunity EN/IEC61000-6-2 Class B		
Product certification	RoHS, REACH, Green Premium	CE certified, RoHS, REACH, Green Premium	RoHS, REACH, Green Premium
Mechanical & Installation Characteristics			
Mounting configuration	Indoor; Vertical (wall mount)/Horizontal (rack mount)/Floor Standing Cabinet		
Ingress protection	Wall mount: IP20 & IP31 Rack mount: IP20	Wall mount: IP20 & IP31 Rack mount: IP20 Floor cabinet: IP20	Wall mount: IP20 & IP31 Rack mount: IP20
PCBA protection	Conformal coating on all PCBAs. Pollution degree 2		
Incoming circuit protection	none	Wall and Rack module: none Floor standing cabinet: circuit breaker	none
Cable entry	Wall mount: left side entry for power cables, right side entry for other cables Rack module: rear	Wall mount: left side entry for power cables, right side entry for other cables Rack module: rear Floor cabinet: top	Wall mount: left side entry for power cables, right side entry for other cables Rack module: rear
Cooling configuration	Forced ventilation. Air flow: 540 m³/hr for 50 A, 1195 m³/hr for 100 A/150 A; Wall mount: bottom to top; Rack module: front to back	Forced ventilation. Air flow: 540 m³/hr for 50 A, 1195 m³/hr for 100 A/150 A, 3000 m³/hr for 300 A, 4000 m³/hr for 450 A. Wall mount: bottom to top; Rack module: front to back; Floor Standing Cabinet: front to top	Forced ventilation. Air flow: 540 m³/hr for 50 A, 1195 m³/hr for 100 A/150 A; Wall mount: bottom to top; Rack module: front to back
Noise level	≤ 65 dB(A) typical	module: ≤65 dB(A) typical; cabinet: ≤70 dB(A) typical	≤ 65 dB(A) typical
HMI & Service Provisions			
Operator interface	Wall mount: 4.3 inch HMI mounted on unit Rack mount: no HMI mounted on unit, order separately	Wall mount: 4.3 inch HMI mounted on unit Rack mount: no HMI mounted on unit Floor standing cabinet: 7 inch HMI mounted on unit	Wall mount: 4.3 inch HMI mounted on unit Rack mount: no HMI mounted on unit, order separately
User interface options	Language: English		

Selection Table

EasyLogic™ APF 208 V 50/60 Hz						
Current Rating (A)	Commercial Reference Number	IP	Mounting Type	Cable Entry	Dimension H x W x D (mm)	Mass (kg)
50	EZAPF05024W20	IP20	wall mount	Top	750 x 507 x 205	41
100	EZAPF10024W20				750 x 507 x 205	41
50	EZAPF05024W31	IP31	wall mount	Side	960 x 600 x 230	45
100	EZAPF10024W31					45
100	EZAPF10024R20	IP20	rack mount	Rear	200 x 530 x 733	41
EasyLogic™ APF 400 V 50/60 Hz						
Current Rating (A)	Commercial Reference Number	IP	Mounting Type	Cable Entry	Dimension H x W x D (mm)	Mass (kg)
50	EZAPF05044W20	IP20	wall mount	Top	620 x 507 x 185	28
100	EZAPF10044W20				750 x 507 x 205	41
150	EZAPF15044W20				805 x 507 x 275	55
50	EZAPF05044W31	IP31	wall mount	Side	835 x 600 x 210	32
100	EZAPF10044W31				960 x 600 x 230	45
150	EZAPF15044W31				1015 x 600 x 300	60
50	EZAPF05044R20	IP20	rack mount	Rear	180 x 530 x 603	28
100	EZAPF10044R20				200 x 530 x 733	41
150	EZAPF15044R20				270 x 530 x 788	55
300	EZAPF30044F20	IP20	floor standing	Top	2000 x 1000 x 600	342
450	EZAPF45044F20					405

Selection Table (contd.)

EasyLogic™ APF 480 V 50/60 Hz						
Current Rating (A)	Commercial Reference Number	IP	Mounting Type	Cable Entry	Dimension H x W x D (mm)	Mass (kg)
50	EZAPF05053W20	IP20	Wall mount	Top	750 x 507 x 205	41
100	EZAPF10053W20				750 x 507 x 205	41
150	EZAPF15053W20				805 x 507 x 275	55
50	EZAPF05053W31	IP31	Wall mount	Side	960 x 600 x 230	45
100	EZAPF10053W31				960 x 600 x 230	45
150	EZAPF15053W31				1015 x 600 x 300	60
100	EZAPF10053R20	IP20	Rack mount	Rear	200 x 530 x 733	41
150	EZAPF15053R20				270 x 530 x 788	55

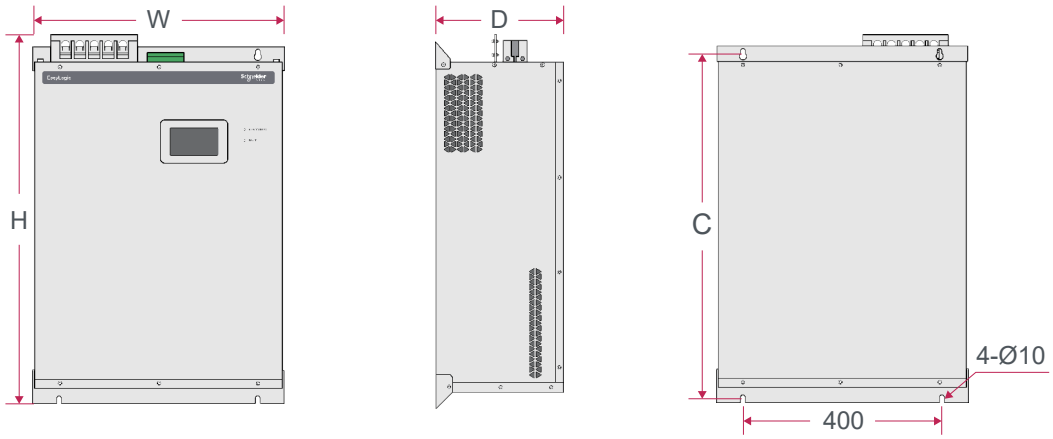
Accessories

EasyLogic™ APF Accessories				
Commercial Reference Number	Description	Mounting unit	Dimension H x W x D (mm)	Mass (kg)
EZAPF070HMI	EasyLogic™ APF 7 inch HMI	For rack-mounted modules or wall-mounted modules connected in parallel	135 x 192 x 71	1.5

Unit Dimensions

IP20 wall mount module

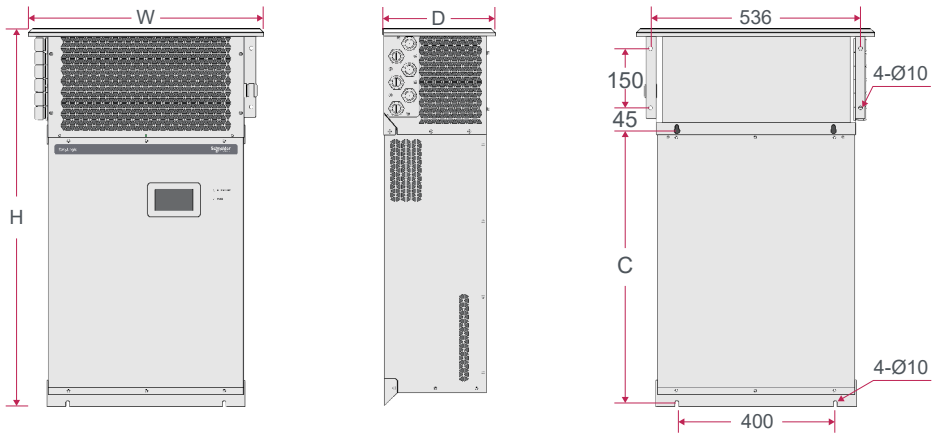
Equipped with a 4.3 inch HMI



Commercial Reference Number	Exterior Dimensions (mm)			
	H	W	D	C
EZAPF05044W20	620	507	185	574
EZAPF10044W20	750	507	205	699
EZAPF15044W20	805	507	275	754
EZAPF05024W20	750	507	205	699
EZAPF10024W20	750	507	205	699
EZAPF05053W20	750	507	205	699
EZAPF10053W20	750	507	205	699
EZAPF15053W20	805	507	275	754

IP31 wall mount module

Equipped with a 4.3 inch HMI



Unit Dimensions (contd.)

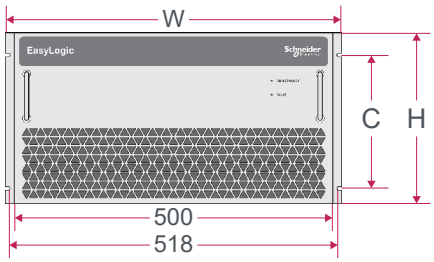
IP31 wall mount module

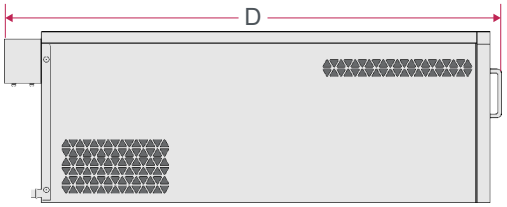
Equipped with a 4.3 inch HMI

Commercial Reference Number	Exterior Dimensions (mm)			
	H	W	D	C
EZAPF05044W31	835	507	600	210
EZAPF10044W31	960	507	600	230
EZAPF15044W31	1015	507	600	300
EZAPF05024W31	960	507	600	230
EZAPF10024W31	960	507	600	230
EZAPF05053W31	960	507	600	230
EZAPF10053W31	960	507	600	230
EZAPF15053W31	1015	507	600	300

IP20 rack mount module

HMI is not included and must be ordered separately.





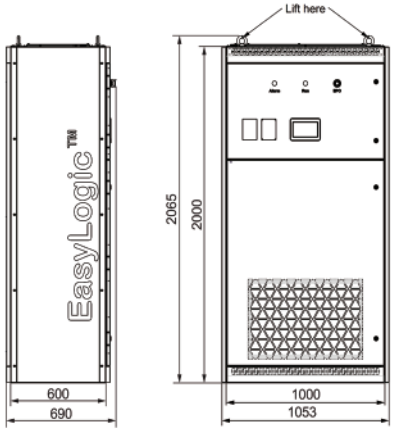
Commercial Reference Number	Exterior Dimensions (mm)			
	H	W	D	C
EZAPF05044R20	180	530	603	140
EZAPF10044R20	200	530	733	140
EZAPF15044R20	270	530	788	219
EZAPF10024R20	200	530	733	140
EZAPF10053R20	200	530	733	140
EZAPF15053R20	270	530	788	219

Note: See accessories in section Selection Table.

Unit Dimensions (contd.)

IP20 floor standing cabinet

Equipped with a 7 inch HMI



Commercial Reference Number	Exterior Dimensions (mm)		
	H	W	D
EZAPF30044F20	2000	1000	600
EZAPF45044F20	2000	1000	600

Green Premium™

An industry leading portfolio of offers delivering sustainable value

More than 75% of our product sales offer superior transparency on the material content, regulatory information and environmental impact of our products:

- RoHS compliance
- REACH substance information
- Industry leading # of PEP's*
- Circularity instructions

Discover what we mean by green
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The Green Premium program stands for our commitment to deliver customer valued sustainable performance. It has been upgraded with recognized environmental claims and extended to cover all offers including Products, Services and Solutions.

CO_2 and P&L impact through… Resource Performance

Green Premium brings improved resource efficiency throughout an asset's lifecycle. This includes efficient use of energy and natural resources, along with the minimization of CO_2 emissions.

Cost of ownership optimization through… Circular Performance

We're helping our customers optimize the total cost of ownership of their assets. To do this, we provide IoT-enabled solutions, as well as upgrade, repair, retrofit, and remanufacture services.

Peace of mind through… Well-being Performance

Green Premium products are RoHS and REACH compliant. We're going beyond regulatory compliance with step-by-step substitution of certain materials and substances from our products.

Improved sales through… Differentiation

Green Premium delivers strong value propositions through third-party labels and services. By collaborating with third-party organizations we can support our customers in meeting their sustainability goals such as green building certifications.

*PEP: Product Environmental Profile (i.e. Environmental Product Declaration)

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Schneider Electric Industries SAS
35, Rue Joseph Monier
CS 30323
92506 Rueil Malmaison Cedex

RCS Nanterre 954 503 439
Capital social 928 298 512 €
www.se.com

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EasyLogic™ APF
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As standards, specifications and designs develop from time to time, please ask for confirmation of the information given in this document.

Over 75 % of Schneider Electric products have been awarded the Green Premium ecolabel.

Green Premium™