



Capacitor bank series APCQ  
Comprehensive solution for automatic  
power factor correction

# ABB and power quality

ABB ([www.abb.com](http://www.abb.com)) is a leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 145,000 people.

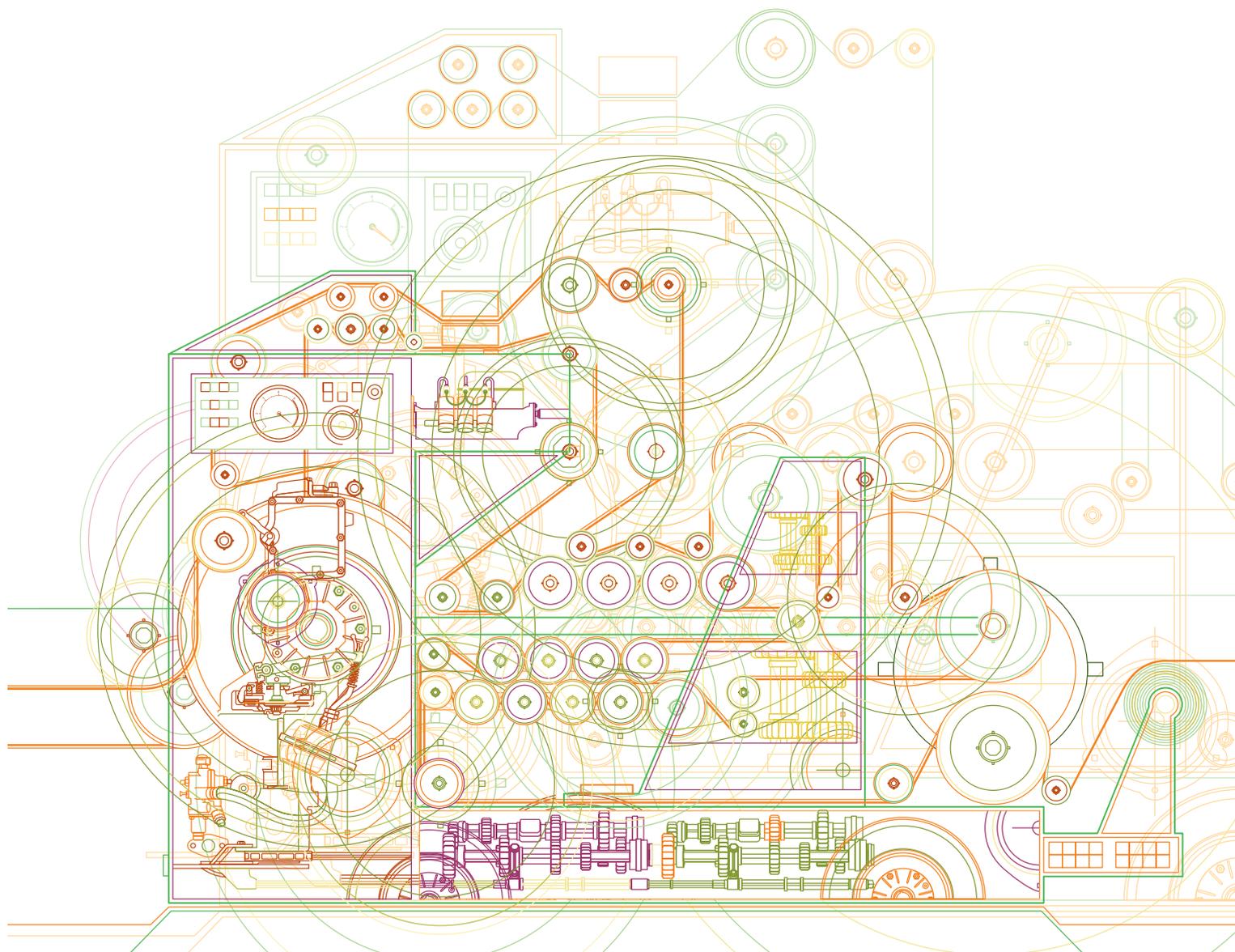
ABB delivers the full value chain in low, medium and high voltage technologies for electrical power transmission, distribution and usage. ABB has been driving development in the field of Power Quality for over 70 years and is responsible for several important developments in reactive power and filtering technologies.

Today, ABB is recognized as a leader in Power Quality, partnering our customers to define the optimal solution for their systems.

## Quality capacitor banks for power factor correction

Industrial and commercial installations consume both reactive and active power, resulting in reduced availability and lower quality of power. This translates into lower capacity utilization and eventually additional capital and running costs.

ABB with its cutting-edge technologies and extensive experience has developed a wide range of advanced Low Voltage (LV) capacitor banks, which offer simple and cost effective solution to improve power quality and reduce costs.



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# APCQ capacitor bank series

The APCQ capacitor bank series from ABB are the safest and most reliable range of automatic capacitor banks that provide the ideal power factor correction solution for industrial and commercial applications.

APCQ series is easy to install, operate and service as well as ensure exceptional reliability, efficiency and safety.

The key feature of APCQ series is the QCap capacitor, the latest evolution of ABB low-voltage capacitors.

The APCQ capacitor bank series improves power factor in a wide variety of applications including:

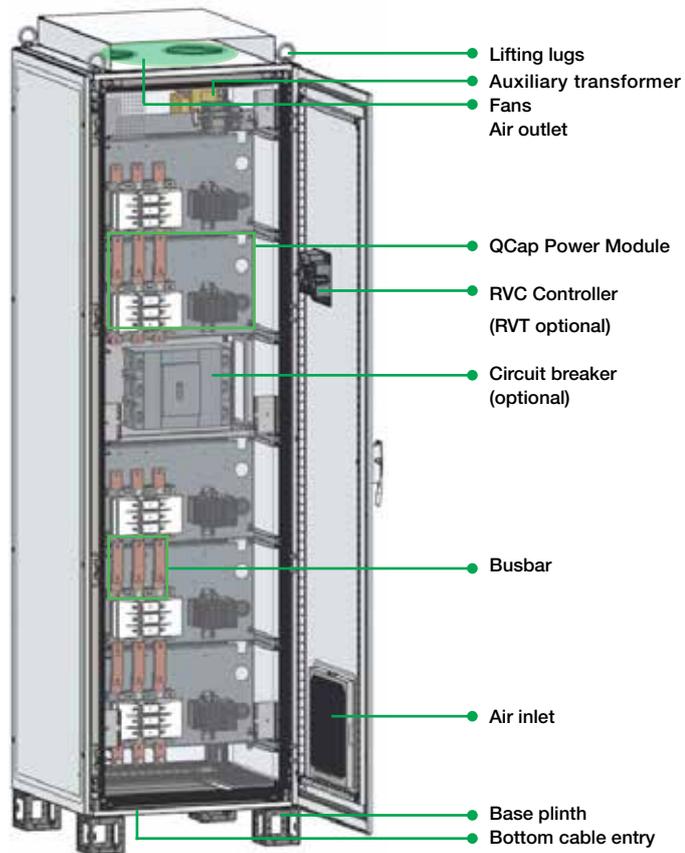
- Buildings
- Mining
- Steel industry
- Chemical
- Pulp and paper
- Cement
- Plastics
- Printing
- Food industry

## Comprehensive service

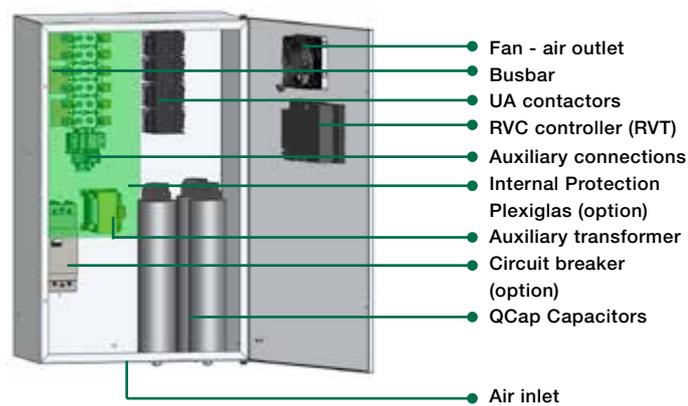
ABB offers a total service approach that goes well beyond supplying equipment. ABB supports its customers through every step of their project, from identification of the needs till installation and commissioning of the equipment. ABB also offers comprehensive equipment maintenance and repair service everywhere in the world..



# Design



APCQ-R cubicle



APCQ-L enclosure

With up to 400 kvar in one single cubicle (without reactor), APCQ delivers maximum reactive power with minimum footprint.

APCQ series is available in two models: free floor standing cubicles (APCQ-M and APCQ-R) and wall-mounted (APCQ-L).

# Features



ABB metallized film

## QCap answers the following customer needs

- **Reliability:** Capacitors can be of poor quality if made with non-capacitor grade-film. ABB's strict selection criteria of raw materials and its first class capacitor film ensure QCap's high reliability.
- **Quality:** The unique low losses design of the QCap decreases the temperature of the capacitor and increases its lifetime. The optimized thermal dissipation prevents premature failure which is not uncommon with many low quality capacitors.
- **Safety:** At the end of its lifetime the capacitor must disconnect itself safely. The specially designed overpressure disconnection device by ABB guarantees a safe disconnection.
- **Consistency:** A consistent quality over time is most often a challenge for manufacturers. ABB tests 100% of its products with criteria surpassing even international standards.

## QCap power module

QCap power module is all-in-one pre-wired power module, which includes capacitor – QCap type, contactor, fuses and reactors (if existing). QCap power module provides all advantages of QCap dry capacitor technology in a compact case, delivering high performance within a small footprint.

QCap power module offers a number of exceptional features like: high voltage withstand capability, excellent peak current handling capacity, high capacitance stability, long life even under high electrical stress, low losses, exceptional reliability and safety.



QCap capacitor units

# Controllers

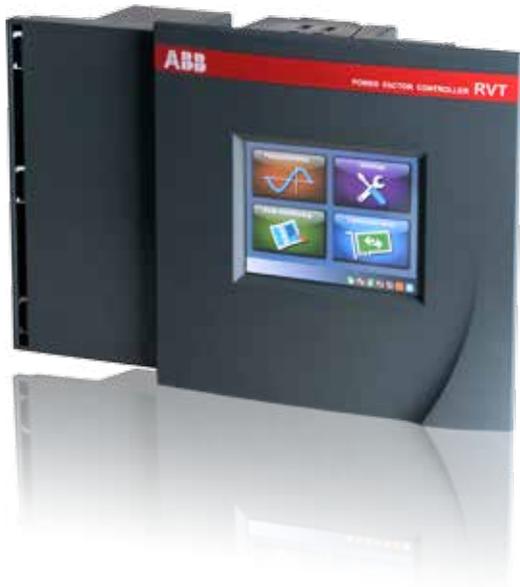


RVC Controller

## RVC Controller

APCQ capacitor bank series is simple and easy to operate thanks to the automatic functions provided by the RVC controller:

- User-friendly interface
- Easy commissioning
- Complete automatic set-up
- Display of:  $\cos \phi$ , V, I, THDV, THDI
- Multiple built-in protections
- Not affected by harmonics
- Designed for hot environments (+60°C)
- Hardware and software switches

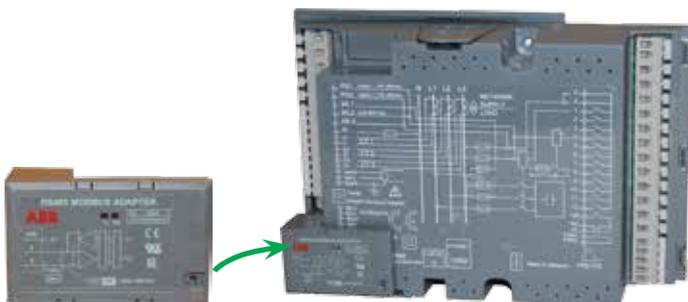


RVT Controller

## RVT Controller

For enhanced functionality, ABB recommends its advanced RVT controller with the following features:

- Three-phase measurement and control
- Communication interfaces: Ethernet, USB2 and RS-485 Modbus adapter, complete graphical display, touchscreen with back-lighting
- Multi-language
- Programmable protection thresholds



RS-485 Modbus adapter attached to the RVT controller

# Design features

## Detuned installation

The presence of harmonics may overstress the capacitors, resulting in technical issues or premature ageing.

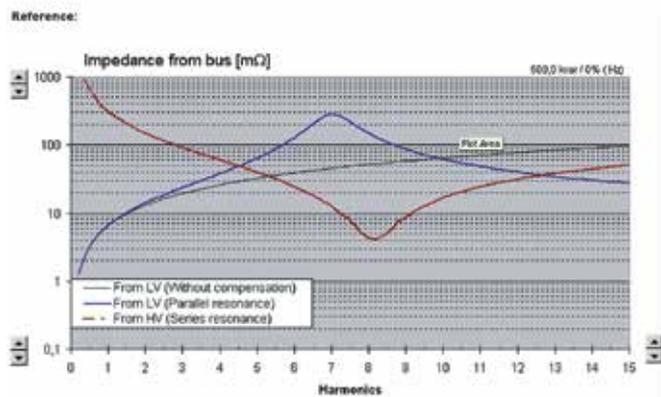
In such cases the capacitors can be protected with reactors.



ABB Reactor, specific design

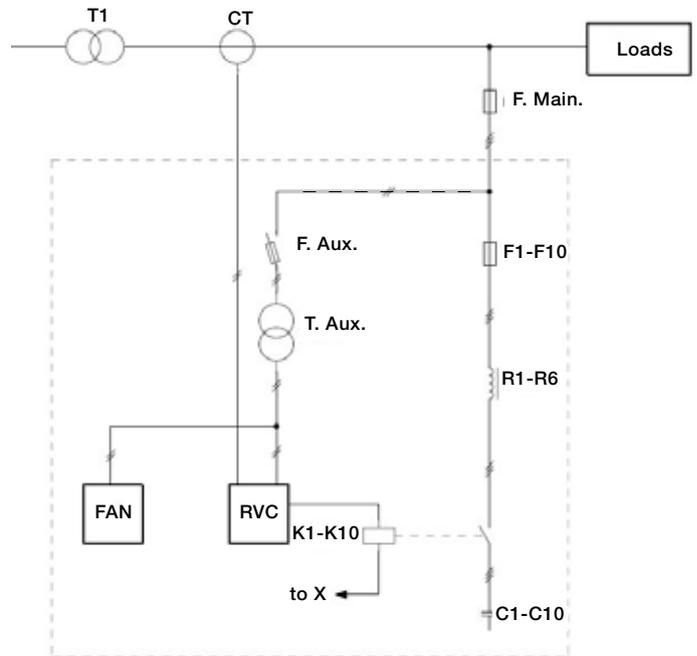
## Network analysis

ABB Power Quality specialists can conduct a detailed study of harmonics for your network and propose a solution that is safe and customized to your installation.



Harmonic analysis

## Wiring diagram



## APCQ capacitor bank

- C1...C10 capacitor steps
- F. Main. feeder main fuses or protective devices (not provided)
- F. Aux. auxiliary fuses
- F1...F10 capacitor step fuses
- K1...K10 contactors
- RVC Power Factor controller
- T1 power transformer
- T. Aux. auxiliary transformer
- CT current transformer (not provided)
- FAN fan(s)
- R1...R6 reactors (APCQ-R only)

# Range

## Standard range\*1

400V 50Hz - Clean network

	Power (kvar)	Regulation (x*kvar)
APCQ-L	37.5	12.5 + 25
	50	2* 2.5 + 25
	62.5	12.5 + 2*25
	75	3*25
	87.5	12.5 + 3*25
APCQ-M	100	4*25
	125	25 + 2*50
	150	2*25 + 2*50
	175	25 + 3*50
	200	4*50
	200	2*25 + 3*50
	225	25 + 4*50
	250	5*50
	300	6*50
	350	7*50
400	8*50	

## Detuned range

400V 50Hz - Polluted network

5.67% - 7% - 12.5% reactors	Power (kvar)	Regulation (x*kvar)
APCQ-R	100	4*25
	125	25 + 2*50
	150	3*50
	150	2*25 + 2*50
	175	25 + 3*50
	200	4*50
	200	2*25 + 3*50
	225	25 + 4*50
	250	5*50
	300	6*50

## Reinforced range (capacitor rated at 457V)\*2

400V 50Hz - Slightly polluted network

	Power (kvar)	Regulation (x*kvar)
APCQ-L	37.5	12.5 + 25
	50	2*12.5 + 25
	62.5	12.5 + 2*25
	75	3*25
	87.5	12.5 + 3*25
APCQ-M	100	4*25
	125	25 + 2*50
	150	2*25 + 2*50
	175	25 + 3*50
	200	4*50
	200	2*25 + 3*50
	225	25 + 4*50
	250	5*50
	300	6*50
	350	7*50
400	8*50	

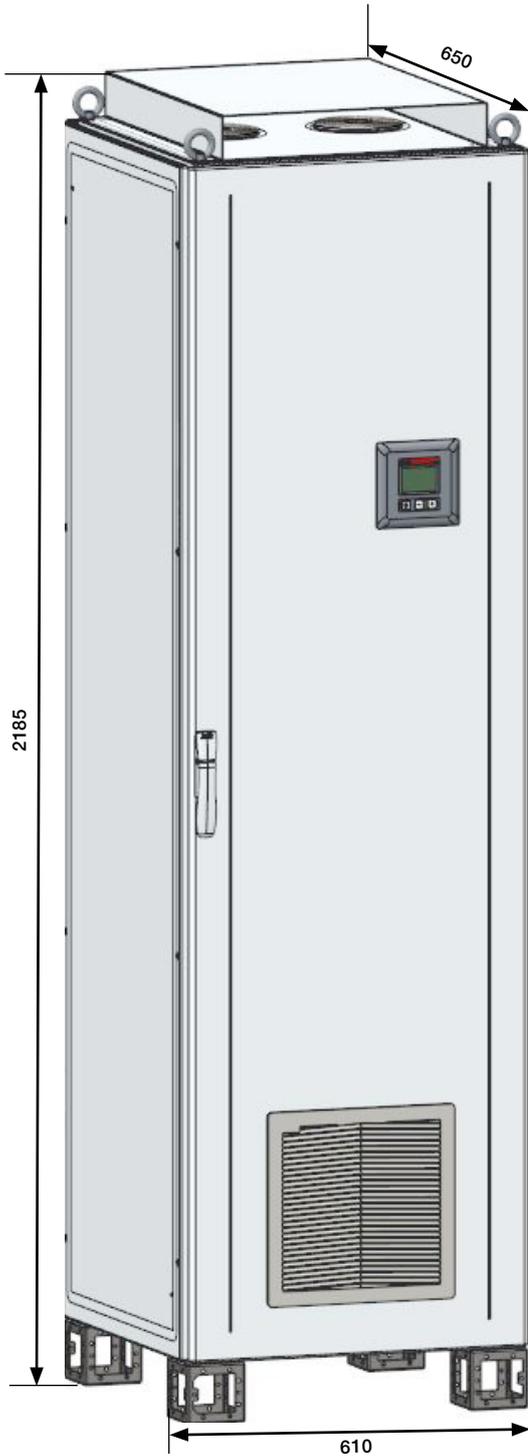
\*1 suitable for installation when less than 15% of non linear loads and no resonance

\*2 suitable for installation when less than 25% of non linear loads and no resonance

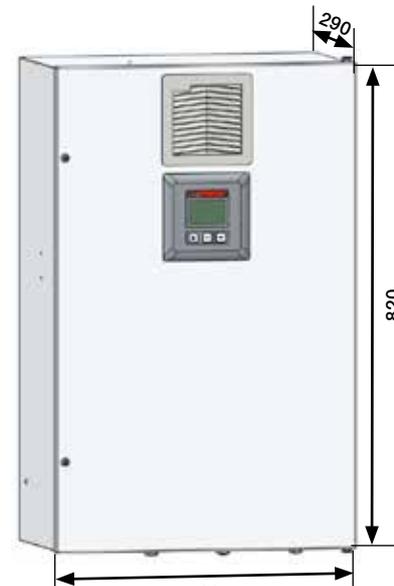
For other rating, please consult us.

# Dimensions

Type	H (mm)	W (mm)	D (mm)	Weight
APCQ-L	820	500	290	Maximum 30 kg
APCQ-M	2185	610	650	Maximum 260 kg
APCQ-R	2185	610	650	Maximum 550 kg



APCQ-M and APCQ-R



APCQ-L

# Technical specifications

<b>Voltage range</b>	400V at 50Hz For other voltages, please consult us
<b>Working ambient temperature</b>	-5°C (23°F)/+40°C (104°F) according to EN 61921
<b>Installation</b>	- APCQ-L: wall mounted, bottom cable entry Clearance lateral: not necessary - top and bottom: 200 mm - APCQ-M and APCQ-R cubicles: free floor standing, bottom cable entry (top cable entry optional) Clearance lateral & back: 50 mm but no clearance required between 2 APCQ cubicles
<b>Connection</b>	Three-phase, balanced network
<b>Protection</b>	- IP23 (closed door) - optional IP54 - Protected against direct and accidental contact (open door) - optional
<b>Execution</b>	Indoor
<b>Color</b>	Beige RAL 7035
<b>Dimensions and weight</b>	- APCQ-L: 500x290x820 mm (WxDxH) - max 30 kg - APCQ-M: 610x650x2185 mm (WxDxH) - max 260 kg - APCQ-R: 610x650x2185 mm (WxDxH) - max 550 kg
<b>Ventilation</b>	Forced air cooling
<b>Noise</b>	- APCQ-L: about 55 dBA (1m) - APCQ-M/R: about 70 dBA (1m)
<b>Power factor setting</b>	From 0.7 inductive to 0.7 capacitive
<b>Starting current setting (C/k)</b>	From 0.01A to 3A for the RVC controller From 0.01A to 5A for the RVT controller (optional)
<b>Operation</b>	During operation, RVC (RVT) controller displays: - the number of active outputs - the inductive or capacitive power factor - the alarm conditions; target $\cos \varphi$ , over/undervoltage, THDV, overtemperature - the demand for switching on/off a capacitor step
<b>Losses at 400V 50 Hz</b>	- Without reactors: less than 1.5 Watt/kvar - With reactors: less than 5.5 Watt/kvar
<b>Capacitors QCap type</b>	- Dry type self healing according to IEC 60831-1&2 - Dielectric: 2.15 Un between terminals during 10 sec at rated frequency - Acceptable overvoltage: +10% max. (maximum 8h/day) as per IEC 60831-1 - Acceptable overcurrent: +30% permanently - Temperature range: -25°C (-13°F)/ class D according to IEC 60831-1&2
<b>Reactors (APCQ-R only)</b>	- Dry type resin embedded according to IEC 289, IEC 76 - Maximum harmonic pollution: 8% THDV with specific spectrum
<b>Standards</b>	EN 61921 IEC 60831-1&2 (capacitors) CE marked
<b>Options</b>	RVT controller (if <440V, otherwise provided by default) Circuit breaker Temperature probe (with RVT only) Internal plexiglas protection for APCQ-L Internal grid (IP20 open door) for APCQ-M/R IP54 enclosure Base frame: 200 mm Top cable entry for APCQ-M/R Cable entry cubicle and cubicle for interconnection bars for APCQ-M/R

# Contact us

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