



MEDIUM-VOLTAGE REACTIVE POWER COMPENSATION

RED-PFC Series

150 kvar – 30 Mvar · 6 – 35 kV · 50 / 60 Hz

Automatic medium-voltage capacitor bank systems for power factor correction, voltage support and loss reduction — fully type-tested, factory-assembled and commissioned before shipment, in indoor cabinet or outdoor containerised configurations.

Automatic reactive power compensation, engineered as a complete system

RED-PFC Series capacitor banks automatically regulate bus voltage, compensate inductive reactive power, reduce system line losses and hold power factor above grid penalty thresholds — raising equipment utilisation and cutting electricity costs. Capacitor units, series reactors, discharge coils, isolating switch, surge arresters, switching devices and the secondary control system are integrated into a single factory-built enclosure, delivered turn-key with minimal site work.

Automatic compensation

Reactive power and voltage regulation controller tracks the busbar in real time; multi-group refined switching via AVC/VQC for maximum energy-saving effect.

Modular building-block design

Up to 12 modular control units per bank in single- or double-star wiring — compact footprint, flexible model selection, low installed cost.

Complete protection

Open-delta, voltage-differential, unbalanced-current or bridge-differential relay schemes, plus over/under-voltage, over-current, harmonic over-limit and temperature lock-out.

Zero-crossing switching*

Optional phase-selective breaker eliminates closing inrush and opening restriking — longer switchgear and capacitor life, lower system impact.

Condition monitoring*

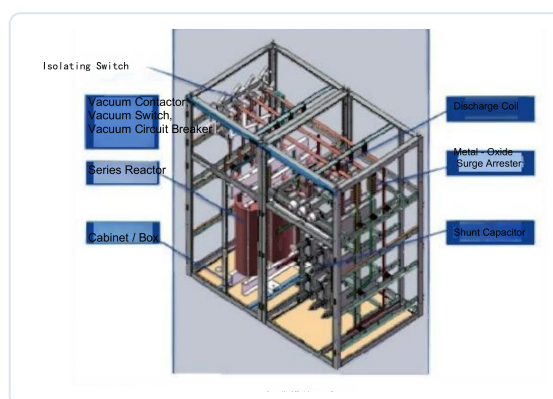
Online monitor tracks capacitance deviation, dielectric loss, unbalance and temperature with early warning, event-triggered waveform recording and fault prediction.

Open communications

RS232 / RS485 / Ethernet interfaces with Modbus, IEC 61850 and IEC 60870-5-103/-104 — direct integration with substation automation and SCADA.



RED-PFC cabinet-type capacitor bank — modular units with full-metal plate-structure enclosure.



Standard module — isolating switch, vacuum switching device, series reactor, discharge coil, surge arrester and shunt capacitors in one building-block unit.

6–35 kV

SYSTEM VOLTAGE

30 Mvar

MAX RATED CAPACITY

12

MODULAR UNITS PER BANK

50/60 Hz

RATED FREQUENCY

IP54

OUTDOOR PROTECTION

Applications

Utility substations ≤ 220 kV

Data centres

Semiconductor & battery plants

Metallurgy & petrochemical

Mining & cement

Rail & traction supply

Pumped storage & water

HV motor compensation

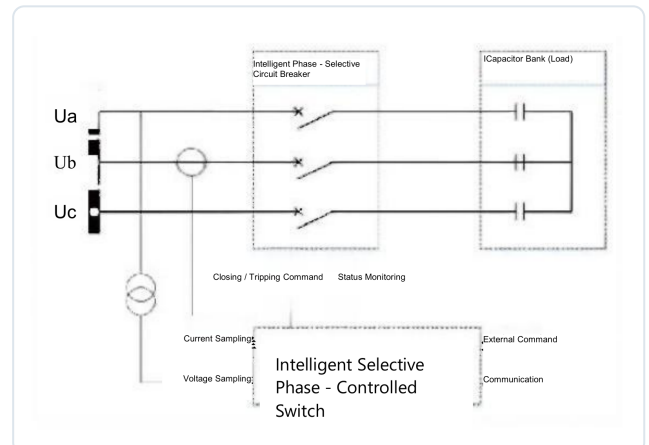
Wind & solar plants

Where the RED-PFC Series earns its keep

- **Utility substations.** Deployed in substations at 220 kV and below; works with reactive power automatic control to switch banks, regulate bus voltage and improve voltage qualification rate — and interfaces with integrated substation automation for unattended operation.
- **Data centres.** With electricity typically around half of total operating cost, automatically switched banks at 110/220 kV intake substations deliver fine-grained group compensation and better energy savings from a small footprint.
- **High-end manufacturing.** Semiconductor and lithium-battery lines tolerate only 1–2 power-frequency cycles of poor power. Comprehensive control and protection functions and high platform reliability safeguard sensitive continuous processes.
- **Heavy industry.** Electric energy is 5–30% of enterprise cost in metallurgy, petrochemical and mining; sites below 0.9 power factor face grid penalties. RED-PFC banks lift power factor above assessment thresholds and unlock tariff rebates.
- **HV motor compensation.** Motor-side compensation for pumps, compressors, crushers, fans, mills and hoists — the most economical compensation point — across pumped storage, water treatment and cement plants.
- **Cabinet-type (indoor).** IP2X/IP3X full-metal plate-structure enclosure for switchrooms or central control rooms, coordinated with front-end switchgear. Electrical and mechanical anti-misoperation interlocks ("five-prevention") as standard.
- **Container-type (outdoor).** IP44–IP54 weatherproof housing for outdoor substation yards and constrained sites — shipped, lifted and energised as one unit.
- **Turn-key delivery.** Every bank is assembled, wired and debugged in-factory, then packaged and shipped whole — minimising site workload and commissioning time.



Cabinet-type — indoor installation, IP2X/IP3X.



Intelligent phase-selective switching — each phase closes at voltage zero, eliminating inrush current and restrike.

Options & monitoring

Phase-selective zero-crossing switching

Online condition monitor

Wireless busbar temperature sensing

Capacitance-deviation early warning

Harmonic over-limit alarm

Event waveform recording

Vacuum CB / contactor / load switch

IEC 61850 / Modbus integration

RED-PFC Series — technical data

Parameter	RED-PFC-C · Cabinet-type	RED-PFC-X · Container-type
SYSTEM		
System nominal voltage	6 / 10 / 20 / 35 kV	
Rated capacity	150 – 30,000 kvar	
Rated frequency	50 / 60 Hz	
Main wiring mode	Single-star or double-star	
Control mode	Automatic (AVC / VQC) or manual	
INSULATION & ENVIRONMENT		
Insulation level (AC / LI withstand)	6 kV: 30/60 kV · 10 kV: 42/75 kV · 20 kV: 65/125 kV · 35 kV: 95/185 kV	
Ambient temperature	–40 °C to +45 °C	
Installation	Indoor	Outdoor
Degree of protection	IP2X / IP3X	IP44 / IP52 / IP54
Pollution level	Class III	Class II
Creepage distance	25 mm/kV (relative to maximum system voltage)	
Seismic withstand	Intensity 8 · 0.2 g horizontal / 0.1 g vertical	
PROTECTION & CONTROL		
Relay protection schemes	Open-delta · voltage-differential · unbalanced-current · bridge-differential	
Device protection functions	Short-circuit trip, over/under-voltage, over-current, harmonic over-limit, unbalance, over-temperature, fault lock-out	
Switching device	Vacuum circuit breaker · vacuum contactor · load switch · phase-selective breaker (optional)	
Communications	RS232 / RS485 / Ethernet · Modbus, IEC 61850, IEC 60870-5-103/-104	
Condition monitoring (optional)	Capacitance deviation, dielectric loss, unbalance, temperature early-warning, waveform recording	
CONSTRUCTION & STANDARDS		
Primary composition	Capacitor units, series reactors, discharge coils, isolating switch, metal-oxide surge arresters, online monitor, secondary control system	
Design standards	IEC 60871 series and equivalent national standards	

Special designs are available beyond the ranges shown. All banks are type-tested by accredited institutions and factory-assembled, tested and commissioned before whole-unit shipment. Wiring, grouping and protection schemes are configured per project.

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