



Power Factor Correction

Power Quality Solutions

PQS-key components from EPCOS cover the entire range of products needed for successful power factor correction.

All parts are carefully matched to each other. With this unique portfolio EPCOS is more than a supplier of products: Power Quality Solutions is the strategy that has been developed to fulfill the demand of the market to offer solutions rather than single components. Consequently, PQS is not based on "hardware" alone: the bundled know-how of PQS partners worldwide form the second pillar of a customer-oriented strategy.

This product brief gives an overview of all PQS products for power factor correction and harmonic filtering. For detailed information, please refer to the PFC Product Profile and data sheets, available in the Internet at www.epcos.com/pfc or contact your local sales office.

PQS key components

PFC capacitors

- PhaseCap® Premium
- PhaseCap® Compact
- PhaseCap® HD
- PhiCap
- PoleCap
- MKV capacitors

Power factor controllers

- BR604
- BR6000

Multi measuring interface

- MMI6000

Capacitor contactors


- J230 series
- N230 series

Thyristor modules for dynamic PFC


- TSM-LC series
- TSM-HV series

Reactors – Antiresonance harmonic filter



Power Factor Correction: Capacitors

| Technical data | | | | |
|-------------------|--|---|---|------|
| |  | | | |
| Series | PhaseCap Premium | PhaseCap Compact | PhaseCap HD | |
| | Premium power capacitors for low-voltage power factor correction | Power capacitors for low-voltage power factor correction | High-density power capacitors for low-voltage power factor correction | |
| Features | | | | |
| Technology | MKK | MKK | MKK | |
| Inrush current | High pulse current with-standability up to $200 \cdot I_R$ for B25667 series; up to $300 \cdot I_R$ for B25668 series | High pulse current with-standability up to $300 \cdot I_R$ | High pulse current with-standability up to $200 \cdot I_R$ | |
| Discharge module | Pre-mounted | Pre-mounted | Included in the delivery | |
| Safety system | Triple: <ul style="list-style-type: none"> • Self healing • Overpressure disconnecter • Dry technology | Dual: <ul style="list-style-type: none"> • Self healing • Overpressure disconnecter | Triple: <ul style="list-style-type: none"> • Self healing • Overpressure disconnecter • Dry technology | |
| Impregnation | Inert gas, Nitrogen (N ₂) | Soft Polyurethane resin | Inert gas, Nitrogen (N ₂) | |
| Rated voltage | V _R 230 ... 800 | 230 ... 525 | 400, 440, 525 | V AC |
| Power | Q _R 5 ... 36 | 5 ... 33 | 40 ... 60 | kvar |
| Rated frequency | f _R 50/60 | 50/60 | 50/60 | Hz |
| Winding | Concentric | Concentric | Stacked | |
| Mounting position | Upright/horizontal | Upright/horizontal | Upright | |
| Ordering code | B25667B* B25668A* | B25673A* | B25669* | |
| Applications | | | | |
| | <ul style="list-style-type: none"> • Automatic PFC equipment • Individual fixed PFC • Fixed PFC • Tuned and detuned capacitor banks • 690 V and 800 V series for usage in harsh application conditions such as wind turbine and industrial applications with heavy harmonic loads | <ul style="list-style-type: none"> • Automatic PFC equipment • Individual fixed PFC • Fixed PFC • Tuned and detuned capacitor banks • All kinds of PFC | <ul style="list-style-type: none"> • Automatic PFC equipment • Individual fixed PFC • Fixed PFC • Detuned capacitor banks | |



Power Factor Correction: Capacitors

| Technical data | | | | |
|-------------------|---|---|---|------|
| |  | | | |
| Series | PhiCap | PoleCap | MKV | |
| | Power capacitors for low-voltage power factor correction | Power capacitors for outdoor applications or harsh environmental conditions | Power capacitors for high ambient temperatures and especially demanding loads | |
| Features | | | | |
| Technology | MKP | MKP/MKK | MKV | |
| Inrush current | High pulse current with-standability up to $200 \cdot I_R$ | High pulse current with-standability up to $200 \cdot I_R$ | High pulse current with-standability up to $500 \cdot I_R$ | |
| Discharge module | Pre-mounted for B32334D series; discharge resistors included in delivery | Pre-mounted | Included | |
| Safety system | Dual: <ul style="list-style-type: none"> • Self healing • Overpressure disconnecter | Triple: <ul style="list-style-type: none"> • Self healing • Overpressure disconnecter • Dry technology | Dual: <ul style="list-style-type: none"> • Self healing • Overpressure disconnecter | |
| Impregnation | Resin | Inert gas | Oil (PCB free) | |
| Rated voltage | V_R 230 ... 525 | 400, 440, 525 | 400 ... 800 | V AC |
| Power | Q_R 0.5 ... 30 | 0.5 ... 30 | 4.2 ... 30 | kvar |
| Rated frequency | f_R 50/60 | 50/60 | 50/60 | Hz |
| Winding | Stacked | MKP stacked MKK concentric | Stacked | |
| Mounting position | Upright | Upright/horizontal | Upright/horizontal | |
| Ordering code | B32340C* (single phase, fast-on terminals) B32343C* (three phase, fast-on terminals) B32344D* (three phase, SIGUT terminals) | B25671A* | B25836B* | |
| Applications | | | | |
| | <ul style="list-style-type: none"> • Automatic capacitor banks • Fixed PFC • Detuned PFC systems | <ul style="list-style-type: none"> • Pole mounted PFC, i.e. outdoor applications • Fixed PFC inside or outside a cabinet in surroundings with high dust or moisture concentrations • Automatic PFC systems to reduce labor costs | <ul style="list-style-type: none"> • Applications with high thermal loading • AC applications in industrial electronics, e.g. high dv/dt • Tuned harmonic filters • Industrial applications with heavy harmonic loads | |


Power Factor Correction: Key Components

| Technical data | | |
|-----------------------------|--|---|
| |  |  |
| Series | Power Factor Controllers BR604 and BR6000 | Multi Measuring Interface MMI6000 |
| Features | | |
| | Large and multifunctional display (2 x 16 characters, backlight for BR6000 series) | Coupling with PF controller BR6000 via interface for determination of real capacitor current |
| | Menu driven handling (plain language) | Capacitor protection by step switch-off at current limit |
| | Self-optimizing control capability | Fast trigger for dynamic PFC |
| | Recall function of recorded values | Independent switching of a single capacitor step |
| | Automatic initialization possible for BR6000 Option: interface RS485 for BR6000 | Stand-alone measuring device with interface for read-out Measurement of V, I, P, Q, S, cos φ, f, W, T (read out via RS485) |
| Technical data | | |
| | <ul style="list-style-type: none"> • Supply voltage: 230 V AC, 50/60 Hz • Measurement voltage range: 30 ... 300 V AC phase to neutral, 50 ... 525 V AC phase to phase for BR6000 V5 • Sensitivity: 40 mA/10 mA • Measuring current: X:5/X:1A | <ul style="list-style-type: none"> • Operating and measuring voltage: 230 V AC, 50/60 Hz • Measuring current: X:5/X:1A • Sensitivity: 40 mA • Graphic LCD-Display (2 · 16 characters); alphanumeric |
| Versions and ordering codes | | |
| | BR604 (4 steps) | B44066R6004E230 |
| | BR6000-R6 (6 steps) | B44066R6006E230 |
| | BR6000-R12 (12 steps) | B44066R6012E230 |
| | BR6000-R12/F (12 steps) (2nd auxiliary relay) | B44066R6212E230 |
| | BR6000-R12/S485 (12 steps with RS485 interface) | B44066R6412E230 |
| | BR6000-T6 (6 steps for dynamic PFC) | B44066R6106E230 |
| | BR6000-T12 (12 steps for dynamic PFC) | B44066R6112E230 |
| | BR6000-T12/S485 (12 steps for dynamic PFC, interface RS485) | B44066E6412E231 |
| | BR6000-T6R6 6 relay outputs, 6 transistor outputs for mixed compensation (standard/dynamic) | B44066E6066E230 |
| | BR6000-T6R6/S485 6 relay outputs, 6 transistor outputs for mixed compensation (standard/dynamic) with interface RS485 | B44066E6466E230 |
| | | MMI6000-R (standard version with relay output) B44066M6000E230 |
| | | MMI6000-T (dynamic version with transistor output) B44066M6100E230 |

Power Factor Correction: Key Components

| Technical data | | | | |
|-----------------------------|---|--|-----------------|------------------------------------|
| |  |  | | |
| Series | Capacitor Contactors J230/N230 | Thyristor Modules for Dynamic PFC | | |
| Features | | | | |
| Standards | Excellent damping of inrush current | Easy installation: usage similar to a contactor | | |
| | Soft switching of capacitors to increase the life expectancy of PFC systems | Ultra-short reaction time, almost no inrush current | | |
| | Reduced ohmic losses | Permanent self controlling of various parameters: • voltage • phase sequence • capacitor output | | |
| | High safety standards | Display of: • operation • faults • activation | | |
| | Reduction of voltage sags and transients | • Maintenance-free • Long service life • No switching noise | | |
| | Extension of life time of PFC system, contactors as well as of capacitors | | | |
| | Series J230: with pre-charge resistors for conventional PFC systems without reactors Series N230: without pre-charge resistors for detuned PFC systems | | | |
| Technical data | | | | |
| | <ul style="list-style-type: none"> • Voltage range: 400 ... 690 V • Output range: 12.5 ... 100 kvar • Auxiliary contacts: included (normally open) • Mounting: integrated DIN-rail • Approval: cUL | <ul style="list-style-type: none"> • Output at 400 V: 10, 25, 50, 100, 200 kvar • Output at 690 V: 50 and 200 kvar • Switching time: approx. 5 ms | | |
| Versions and ordering codes | | | | |
| | J230 series | B44066S****J230 | TSM-LC (400 V): | B44066T0***E402 |
| | N230 series | B44066S****N230 | TSM-HV (690 V): | B44066T0050E690 B44066T0200E690 |

Power Factor Correction: Key Components

| Technical data | |
|----------------------------|--|
| |  |
| Series | Reactors – Antiresonance Harmonic Filter |
| Features | |
| | High harmonic loading capability, very low losses |
| | High linearity to avoid choke tilt, low noise emission |
| Technical data | |
| | Voltage range: 400 V, 440 V, 690 V |
| | Measurement output range: 10 ... 100 kvar |
| | Frequency: 50 or 60 Hz |
| | Temperature protection: microswitch (NC) |
| | Detuning factor: 5.67%, 7%, 14% |
| Ordering codes | |
| | B44066D****S*** / B44066D****M*** |
| General information | |
| | <p>We constantly strive to improve our products. Consequently, the products described in this publication may change from time to time. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.</p> <p>We also reserve the right to discontinue production and delivery of products. Consequently, we cannot guarantee that all products named in this publication will always be available.</p> |

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