

PF Controllers BR6000 Series

Intelligent • User-friendly • Cost-effective • Version 5.0



General

Controllers for PFC are of major importance in the PFC system. They measure the actual power factor and connect or disconnect capacitor stages to achieve a specific desired value ($\cos \phi$).

The PF controller series and BR6000 (six and twelve stages) offer highly intelligent control behavior and are very user-friendly thanks to menu-driven handling (plain language). Their multifunctional display greatly simplifies installation, handling and maintenance.

Different versions of the BR6000 series provide solutions to various applications:

- BR6000-R6 and BR6000-R12 for conventional applications with slowly changing loads (optionally with RS485 interface)
- BR6000-T6 and BR6000-T12 for dynamic PFC in applications with fast-changing loads



Features

- Display
 - Large and multifunctional LCD (2 x 16 characters)
 - Graphic and alphanumeric LCD illumination
- Intelligent control
- Menu-driven handling (plain language)
- Self-optimizing control capability
- Recall function of recorded values
- Four-quadrant operation (e.g. stand-by generator)
- Large measuring voltage range
- Powerful alarm output
- Display of numerous of system parameters
 - System voltage (V AC)
 - Reactive power (KVAR)
 - Active power (kW)
 - Frequency
 - THD-V, THD-I
 - Individual harmonics up to 19th*
 - Monitoring of individual capacitor currents
 - Apparent power (KVA)
 - Apparent current (A)
 - Temperature (°C)
 - Real-time $\cos \phi$
 - Target $\cos \phi$
 - KVAR value to target $\cos \phi$
- Alarm output
 - Insufficient compensation
 - Overcompensation
 - Undercurrent
 - Overcurrent
 - Overtemperature
 - Harmonics exceeded
 - Threshold value programmable
 - Internal error storage
 - Programming of 2nd signal relay random
 - Undervoltage and overvoltage
- Recall recorded values
 - Number of contactor switching operations
 - Maximum voltage V (Vmax)
 - Maximum reactive power, Q (KVAR)
 - Maximum value of harmonic
 - Maximum active power, P (kW)
 - Maximum apparent power, S (KVA)
 - Maximum temperature (°C)
 - Operation time of all capacitors
 - Complete 2nd parameter set available
 - Automatic initialization
 - Dynamic PFC (transistor output)
 - Thyristor switching
- Dual target power factor setting (EB and DG) is available in selected models

⚠ Cautions:

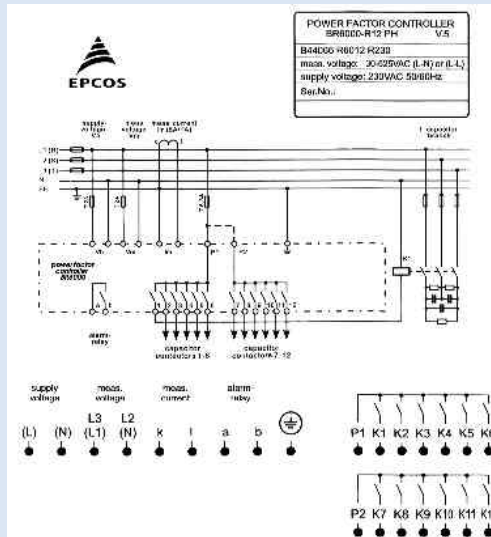
1. Discharge time: Make sure that the discharge time set in controller matches the capacitor discharge time. See page 84
2. Number of switchings: LV PFC capacitors according to standard IEC 60831 are designed for up to 5000 switching operations. Make sure that 5000 switching operations per year are not exceeded.

PF Controllers BR6000 Series

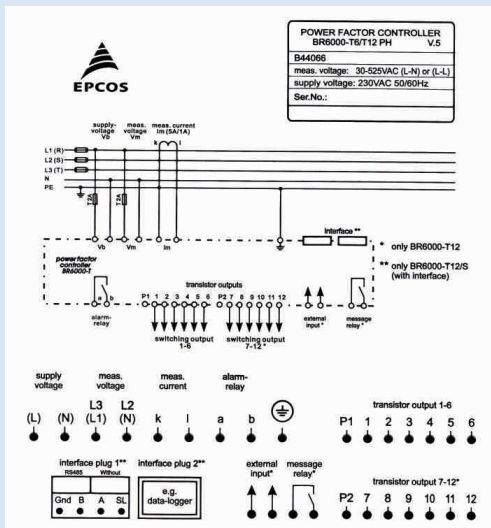
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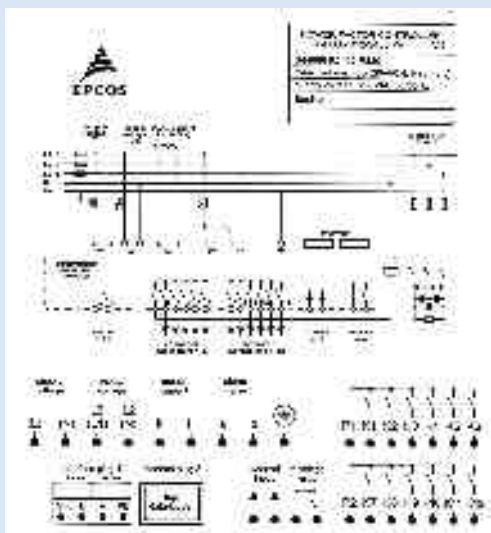
PF controller BR6000 R-12 : Relay output



PF Controller BR6000 T- 6/12 : Transistor output



PF Controller BR6000 R-12 (RS 485) : Relay output



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| Selection table for controllers | | | | |
|---|---|---|---|---|
| | BR6000 relay output | | BR6000 transistor output | |
| | 6 STEP | 12 STEP | 6 STEP | 12 STEP |
| Steps | 6 STEP | 12 STEP | 6 STEP | 12 STEP |
| Switching | Contactar | Contactar | Thyristor | Thyristor |
| Ordering code | B44066R6006R230N1 | B44066R6012R230N1 | B44066R6106R230N1 | B44066R6112R230N1 |
| Auxiliary supply | 1-Phase, 2-Wire, 245 Vac (-20% to +20%) | 1-Phase, 2-Wire, 245 Vac (-20% to +20%) | 1-Phase, 2-Wire, 245 Vac (-20% to +20%) | 1-Phase, 2-Wire, 245 Vac (-20% to +20%) |
| Measurement voltage | 30-525 V AC (L-N) or (L-L) | 30-525 V AC (L-N) or (L-L) | 1Ph 30-300 V AC (L-N) | 1Ph 30-300 V AC (L-N) |
| Load CT Input current | 1 / 5 A | 1 / 5 A | 1 / 5 A | 1 / 5 A |
| No. of outputs | 6 | 12 | 6 | 12 |
| Alarm outputs | 1 No. | 1 No. | 1 No. | 1 No. |
| - Insufficient Compensation | Yes | Yes | Yes | Yes |
| - Overcompensation | Yes | Yes | Yes | Yes |
| - Over / under voltage | Yes | Yes | Yes | Yes |
| - Overcurrent | Yes | Yes | Yes | Yes |
| Automatic Initialisation | | Yes | Yes | Yes/Yes |
| Communication interface RSXXX | No | No* | No | No |
| Parameters displayed | | | | |
| System voltage | Yes | Yes | Yes | Yes |
| Load current | Yes | Yes | Yes | Yes |
| Capacitor current | No | No | No | No |
| Active power | Yes | Yes | Yes | Yes |
| Reactive power | Yes | Yes | Yes | Yes |
| Apparent power | Yes | Yes | Yes | Yes |
| Frequency | Yes | Yes | Yes | Yes |
| Individual harmonics measurement upto | 19 | 19 | 19 | 19 |
| THD - V | Yes | Yes | Yes | Yes |
| THD - I | Yes | Yes | Yes | Yes |
| Monitoring of individual capacitor current | Yes - Health check | Yes - Health check | No | No |
| Apparent current | Yes | Yes | Yes | Yes |
| Overttemperature | Yes | Yes | Yes | Yes |
| Real time cos | Yes | Yes | Yes | Yes |
| Target cos | Yes | Yes | Yes | Yes |
| KVAr value to target cos | Yes | Yes | Yes | Yes |
| Switching and discharge time range | | | | |
| - Correction time | 1 sec - 20 min | 1 sec - 20 min | 20-1000 m sec | 20-1000 m sec |
| - Discharge time | 1 sec - 20 min | 1 sec - 20 min | 20-1000 m sec | 20-1000 m sec |
| Number of control series | 20 + E series | 20 + E series | 20 + E series | 20 + E series |
| Weight (in kG) | 1kG | 1kG | 1kG | 1kG |
| Dimensions (L x D x H in mm) | 144 x 55 x 144 mm | 144 x 55 x 144 mm | 144 x 53 x 144 mm | 144 x 53 x 144 mm |

*RS 232-B44066R6312R230N1

*RS 485-B44066R6412R230N1

PF Controllers BR5000 Series

Intelligent • User-friendly • Cost-effective



General

The BR5000 controller series is intended to be used with unbalanced three phase loading conditions and to correct the power factor. The controller needs 3 Load CT inputs and corresponding voltages. The overall compensation is done on averaging basis. The controller is having ultra intelligent processor in built. It covers almost all the electrical parameters to be displayed and monitored .

The three versions of BR5000 Controller are

- BR5000 – 16 for contactor switching logic for slow varying loads
- BR5000 – 16TX for rapidly changing loading conditions (Option for GSM communication available)
- BR5000 – HT for High tension upto 33kV sensing of power factors and correction. Version available in 8/16 steps.



Features

- Microcontroller logic for measurements
- Control mode: Binary, unequal, Preset and user defined
- Multifunctional LCD display
- Three CT sensing for unbalanced loads
- Dual target Power Factor setting- useful for utility and DG mode operation
- Automatic synchronization possible
- Separate 3 CT monitoring of healthiness of capacitor within panel
- Data logging
- RS 232 in front and RS 232/485 switchable connection at rear
- Step operation indication on LCD display plus LED which facilitates viewing from a distance
- Unique facility of including 'Fixed Capacitor Bank' for purpose of Transformer compensation. This can be set such that the controller doesn't 'see' this capacitor
- Unique external temperature sensing by PT 100
- Settable alarm facility - undervoltage, overvoltage and so on
- Settable auxiliary outputs - 2 Nos for Alarm, etc.
- Auxiliary input -1 No
- EMI/EMC type tested
- Individual Harmonic measurement Upto 15th

Protection Warning

- Over / under voltage
- Capacitor over / under current
- Over / under frequency
- Load unbalance
- Over temperature
- Out of steps (Indication)
- NV-Ram battery down

Important display parameters

- Voltage
- Current
- Active power
- Reactive power
- Apparent power
- Capacitor current
- Per phase values of V, I and neutral current
- Power factor
- Frequency
- V_{THD}
- I_{THD}

Technical Data

- Auxiliary supply voltage -1Ph, 415V (-40% to + 20%)
- Measurement voltage: 3PH 3 wire 415 VAC (-40% to + 20%)
- Current Input - 1A or 5A
- Steps - 8 and 16 relay outputs
- Supply frequency - 45 Hz to 62 Hz

Mechanical and Maintenance

- Operating temperature - 0° to 70°C
- Storage temperature - -10°C to +75°C
- Humidity -0 to 98%

Dynamic Power Factor Controller (Transistorised) available in 16 steps

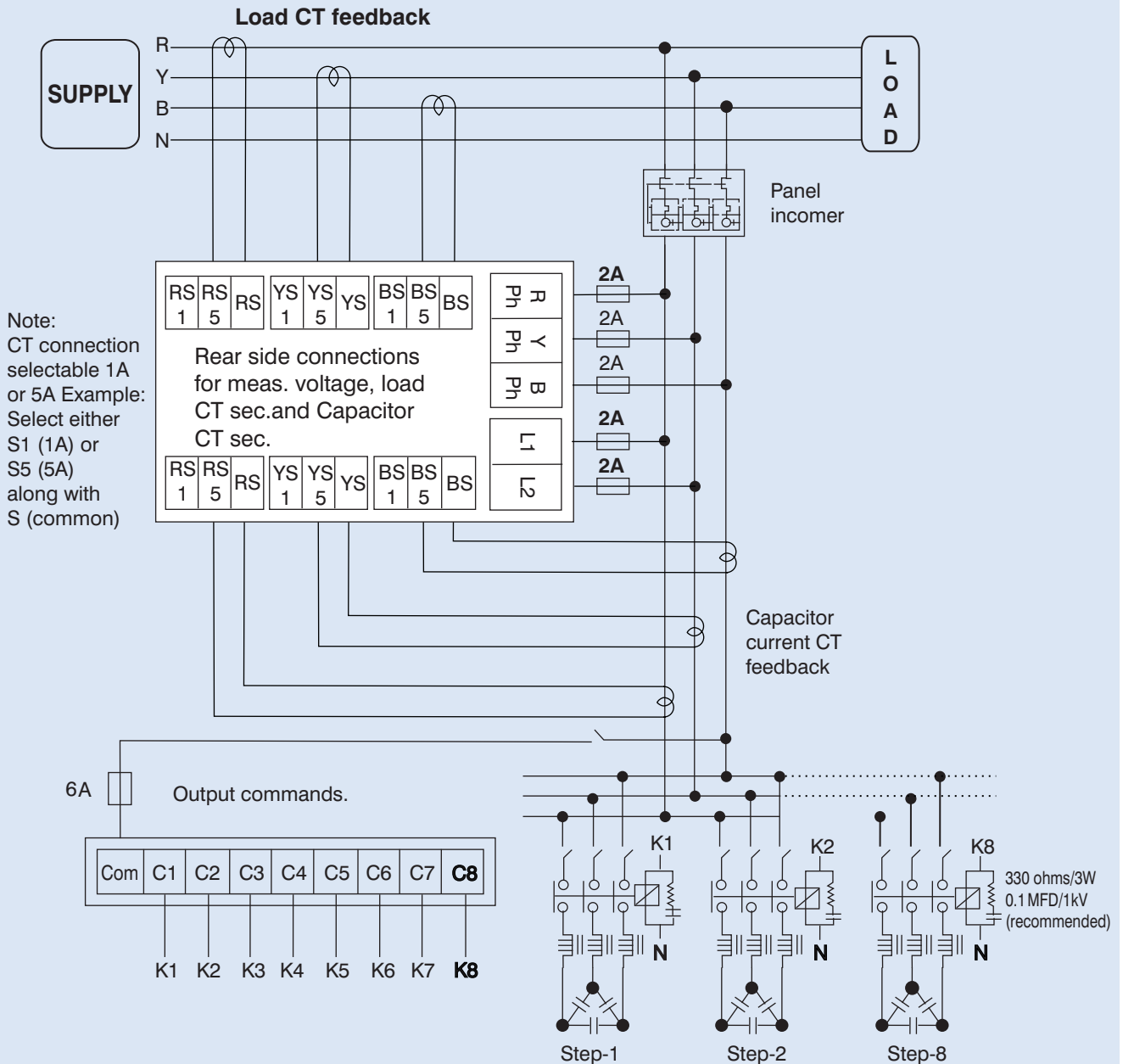
Special 8/16 step Controller for Medium Voltage application available

PF Controller BR5000 Relay Output

Intelligent • User-friendly • Cost-effective



Typical wiring diagram for PF correction : Contactor switching



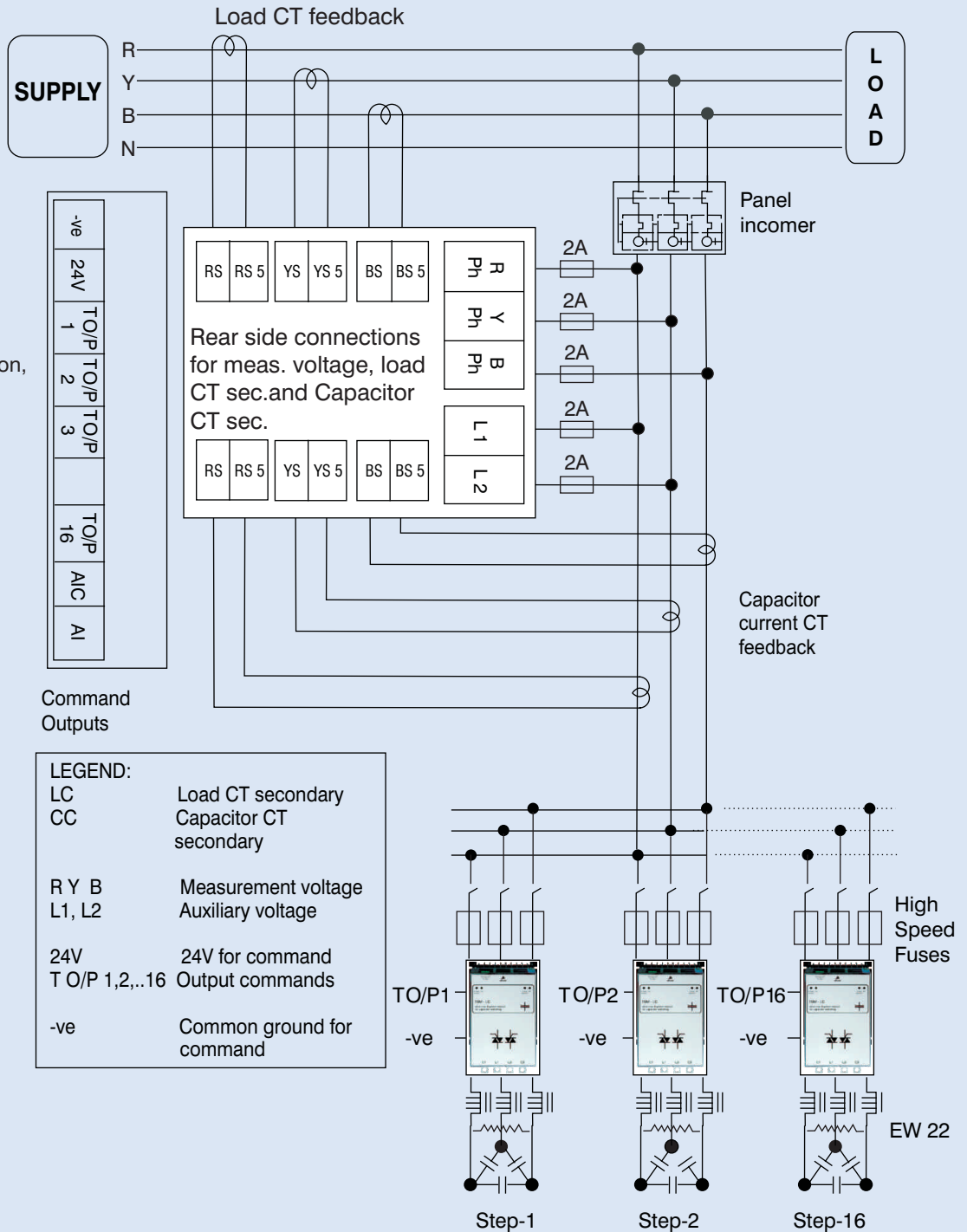
PF Controller BR5000 Transistor Output

Intelligent • User-friendly • Cost-effective



Typical wiring diagram for PF correction : TSM switching

Note:
Load CT and
Cap CT connection,
Secondary
should be 5A
for all 3 phase
Example: Select
RS5 (5A) with
RS common



PF Controllers BR5000 Series

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| Selection table for controllers | | | |
|---|--|--|--|
| | BR5000 relay output | | BR5000 transistor output |
| Steps | 8 STEP | 16 STEP | 16 STEP |
| Switching | Contactor | Contactor | Thyristor |
| Ordering code | B44066R5908A415N1 | B44066R5916A415N1 | B44066R5716A415N1 |
| Auxiliary supply | 1Ph 415V (-40% to +20%) | 1Ph 415V (-40% to +20%) | 1Ph 415V (-40% to +20%) |
| Measurement voltage | 3Ph 3wire 415V (-40% to +20%) | 3Ph 3wire 415V (-40% to +20%) | 3Ph 3wire 415V (-40% to +20%) |
| Load CT Input current | 1/5 A-separate connectors for either of the CT connections | 1 / 5 A-separate connectors for either of the CT connections | only 5Amp CT secondary |
| No. of outputs | 8 Nos. relay o/p of burden 1000VA by contactor coils | 16 Nos. relay o/p of burden 1000VA by contactor coils | 16 digital outputs maximum 20 mA loading |
| Alarm outputs | 2 Nos. | 2 Nos. | 1 No. |
| -Insufficient Compensation | Yes | Yes | Yes (only display) |
| -Overcompensation | Yes | Yes | Yes |
| -Over / under voltage | Yes | Yes | Yes |
| -Overcurrent | Yes | Yes | Yes |
| Automatic initialisation | | No | NoNo |
| Communication interface | RSXXX RS232 and RS485 | RS232 and RS485 | RS232 and RS485 |
| Parameters displayed | | | -- |
| System voltage | Yes | Yes | Yes |
| Load current | Yes | Yes | Yes |
| Capacitor current | No | No | No |
| Active power | Yes | Yes | Yes |
| Reactive power | Yes | Yes | Yes |
| Apparent power | Yes | Yes | Yes |
| Frequency | Yes | Yes | Yes |
| Individual harmonics measurement upto | 15 | 15 | 15 |
| THD - V | Yes | Yes | Yes |
| THD - I | Yes | Yes | Yes |
| Monitoring of individual capacitor current | Yes - Health check | Yes - Health check | Yes - total panel capacitor current monitored |
| Apparent current | Yes | Yes | Yes |
| Overtemperature | Yes | Yes (only INT temp.) | |
| Real time cos | Yes | Yes | Yes |
| Target cos | Yes (upper and lower target PF- programmable) | Yes (upper and lower target PF- programmable) | Yes- (upper and lower target PF- programmable) |
| KVAr value to target cos | Yes - displayed as System reactive power | Yes - displayed as System reactive power | Yes - displayed as System reactive power |
| Switching and discharge time range | | | |
| -Correction time | 1 - 240 sec | 1 - 240 sec | 20-5000 m sec |
| -Discharge time | 1 - 240 sec | 1 - 240 sec | NA |
| Number of control series | Unequal, C-series (1-15), E-series | Unequal, C-series (1-15), E-series | Binary, unequal C-series (1-15), E-series |
| Weight (in kG) | 2.5 kG | 2.5 kG | 2.5 kG |
| Dimensions (L x D x H in mm) | 144 x 155 x 144 mm | 144 x 155 x 144 mm | 144 x 155 x 144 mm |

PF Controllers BR4000 Series

Intelligent • User-friendly • Cost-effective



General

The BR4000 controller series is the most economical series and intended to serve the basic purpose of power factor corrections... The simplest menu driven version controller with navigational keys. The microcontroller based logic, multifunctional display of electrical parameters, compact size 96 x 96 mm and protections makes this controller extremely user friendly.

BR4000 Controller series is available in 4 stages and 8 stages. Best suited with conventional APFC applications.



Features

- Microcontroller logic for measurements
- User friendly operation
- Control mode: binary, unequal, Preset and User defined
- Multifunctional LCD display
- Single CT sensing for unbalanced loads
- Compact 96X96 mm front fascia
- Suitable for auto / manual operation
- Individual harmonic measurement upto 15th

Protection Warning

- Over / under voltage
- Over / under load
- Over temperature
- User friendly operation

Important display parameters

- Voltage
- Current
- Active power
- Reactive power
- Apparent power
- Frequency
- V_{THD}
- I_{THD}

Technical Data

- Measurement voltage: 1PH 230 VAC (-25% to +20%)
- Current input selectable - 1A or 5A for load with class 2 accuracy
- Auxiliary supply - 1Ph, 230V (-25% to +20%)
- Steps - 4 and 8 relay outputs
- Supply frequency -47 Hz to 53 Hz

Mechanical and Maintenance

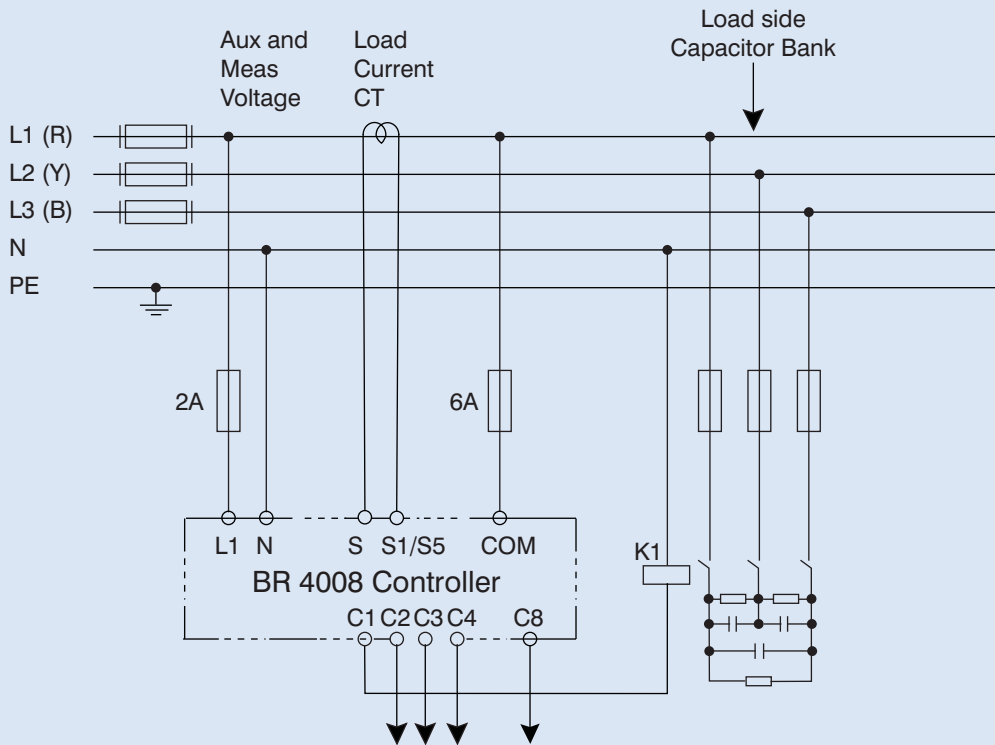
- Compact size
- Operating temperature - 0° to 50° C
- Storage temperature - -5°C to 65°C
- Humidity -0 to 98%

PF Controllers BR4000 Series

Intelligent • User-friendly • Cost-effective



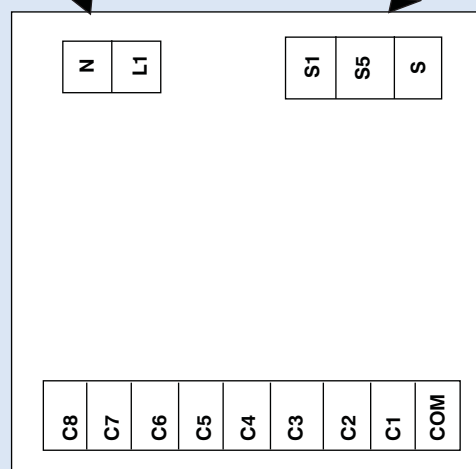
Typical wiring diagram for PF correction



Rear side terminals - measurement voltage, measurement current and auxiliary supply

Auxiliary and Measurement
Voltage Connection
230 V, 1 Phase, 2 Wire

Load CT Connection
Selectable 1A or 5A
Example: Select either
S1 (1A) or S5 (5A)
along with S (common)



Output commands to capacitor contactors

PF Controllers BR4000 Series

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| Selection table for controllers | | |
|---|--|--|
| | BR4000 relay output | |
| Steps | 4 STEP | 8 STEP |
| Switching | Contactor | Contactor |
| Ordering code | B44066R4904A230N1 | B44066R4808A230N1 |
| Auxiliary supply / Measurement voltage | 1-Phase, 2-Wire, 230 Vac (-25% to +20%) (common for both measurement and auxiliary) | 1-Phase, 2-Wire, 230 Vac (-25% to +20%) (common for both measurement and auxiliary) |
| Load CT input current | 1 / 5 A - separate connectors for either of the CT connections | 1 / 5 A - separate connectors for either of the CT connections |
| No. of outputs | 4 Nos. Relay o/ps of 5A @230V AC Resistive | 8 Nos. Relay o/ps of 5A @230V AC Resistive |
| Alarm outputs | No | No |
| -Insufficient compensation | Yes (only display) | Yes (only display) |
| -Overcompensation | No | No |
| -Over / under voltage | Yes (not editable) (Factory set UV@170V (P-N) resume@178V, OV@276V (P-N) resume@264V) | Yes, programmable |
| -Overcurrent | No | Yes, programmable |
| Automatic initialisation | No | No |
| Communication interface RSXXX | No | No |
| Parameters displayed | | |
| System voltage | Yes | Yes |
| Load current | Yes | Yes |
| Capacitor current | No | No |
| Active power | Yes | Yes |
| Reactive power | Yes | Yes |
| Apparent power | Yes | Yes |
| Frequency | Yes | Yes |
| Individual harmonics measurement upto | 15 | 15 |
| THD - V | Yes | Yes |
| THD - I | Yes | Yes |
| Monitoring of individual Capacitor current | No | No |
| Apparent current | Yes | Yes |
| Overtemperature | Yes (only INT temp.) | Yes (only INT temp.) |
| Real time cos | Yes | Yes |
| Target cos | Yes (single target PF - programmable) | Yes (upper and lower target PF programmable) |
| KVAr value to target cos | Yes (as system reactive power) | Yes (as system reactive power) |
| Switching and discharge time range | | |
| - Correction time | 1 - 1200 sec | 1 - 65530 sec |
| - Discharge time | 1 - 1200 sec | 1 - 65530 sec |
| Number of control series | Only unequal | Binary, unequal, C-series, E-series |
| Weight (in kG) | 1 kG | 1 kG |
| Dimensions (L x D x H in mm) | 96 x 90 x 96 mm | 96 x 90 x 96 mm |

PF Controller BR7000

15 relay outputs • Three-phase measuring and controlling



General

The PF controller BR7000* is a follow-up development of the PF controller BR6000-series, featuring two devices in one: it can be used as a controller as well as a grid measuring tool.

The BR7000 offers 15 relay outputs for the steps and three message/ alarm relays. Due to the possibility of programming, the 15 outputs can be used for a broad range of applications, for example:

- 15 conventional steps, each for one three-phase capacitor
- 15 steps for single-phase capacitors, where each output will switch

a single-phase capacitor to N (usually 5 per phase, balancing of grid is possible)

- Mixed operation: 6 single-phase capacitors (2 per phase) for balancing plus 9 steps for conventional compensation (three-phase capacitors)

The controller can be connected to a PC via an RS485 interface. The Windows-based software BR7000-SOFT allows the readout of acquired data. The possibility of graphical display of all values offers a comfortable visualization.



Features

- LCD full graphic display
128 x 64 dots, 8 lines
- Self explanatory menu navigation in five languages
- Three-phase measuring and controlling; display of following grid parameters:
 - Voltage
 - Current
 - Frequency
 - Real power
 - Reactive power
 - Apparent power
 - Power factor
 - Missing reactive power
 - Harmonic of voltage and current (up to 31st)
 - THD-V
 - THD-I
 - Temperature
- HELP-button for interactive help text
- 15 switching outputs
3 additional alarm/message relays
- 2 isolated interfaces
- Detailed error messages with time stamp
- Automatic initialization/test run
- Automatic and manual operation, service operation, expert mode
Three-phase and single-phase controlling; mixed mode possible
- Display and storage of maximum values, switching operations and operating time
- Display of date and time
Time-controlled functions possible by internal timer
- Oscilloscope mode for graphical display
- Quick programming

*BR7000 is imported and sold in India.

PF Controller BR7000

15 relay outputs • Three-phase measuring and controlling



| Technical data : BR7000 controller | |
|---|---|
| BR7000 | |
| Supply voltage | 110 ... 230 V AC 50/60 Hz |
| Measurement voltage range | 3 · 30 ... 440 V AC (L-N); 50 ... 760 V AC (L-L) |
| Power consumption | < 3 VA |
| Operating ambient temperature | -20 ... 60 °C |
| Display | illuminated graphic display, 128 x 64 dots, 8 lines |
| Large display of 3 grid parameters | selection in display editor |
| Plain language | E / ES / GER / RU / TR |
| In- and outputs | |
| Number of relay outputs | 15 switching outputs, freely programmable for switching of 1- or 3-phase capacitors |
| Number of transistor outputs | - |
| Alarm/message relay | 1/1 |
| Additional separate fan relay | yes |
| Interface | 2 independent isolated RS485-interfaces |
| Input 2nd parameter-set switchover target PF | yes |
| Special functions | |
| Measuring | three-phase |
| Controlling | single-phase, three-phase, mixed mode |
| Automatic initialization | yes |
| Test-run of complete PFC-system | yes |
| Quick-program | yes |
| Internal timers | yes |
| Oscilloscope (graphical display) mode | yes |
| Display editor | yes |
| Backwards navigation ESCAPE button | yes |
| HELP button for interactive help text | yes |
| Number of control series | 20 series pre-set |
| Control series editor for free programming | yes |

PF Controller BR7000

15 relay outputs • Three-phase measuring and controlling



| Technical data : BR7000 controller | |
|---|---|
| Parameters displayed (three-phase display) | |
| Apparent current (A) | real value / large display / in % |
| Reactive power (KVAr) | real value / large display / in % |
| Active power (kW) | real value / large display / in % |
| Apparent power (kVA) | real value / large display / in % |
| KVAr value to target cos | real value / large display / in % |
| Energy | real value / large display |
| Frequency | real value / large display |
| Temperature | real value / large display |
| Real-time cos | real value / large display |
| Target cos | real value / large display |
| Individual harmonics up to | up to 31st, real value / in % / bar graph |
| THD-V, THD-I | real value / in % / bar graph |
| Time/date | yes |
| Recall recorded values | |
| Min. and maximum voltage | yes, with time stamp |
| Maximum current | yes, with time stamp |
| Maximum active power | yes, with time stamp |
| Maximum reactive power | yes, with time stamp |
| Maximum apparent power | yes, with time stamp |
| Maximum value THD-V, THD-I | yes, with time stamp |
| Maximum temperature (°C) | yes, with time stamp |
| Operation time of all capacitors | yes |
| Number of contactor switching operations | yes |
| Others | |
| Weight | 1 kg |
| Dimensions (h x w x d) | 144 x 144 x 60 mm |
| PC-software included | yes |
| Suitable for dynamic PFC | no |
| Ordering code | B44066R7415E230 |

PF Controller BR7000

15 relay outputs • Three-phase measuring and controlling

BR7000-SOFT Windows-based software

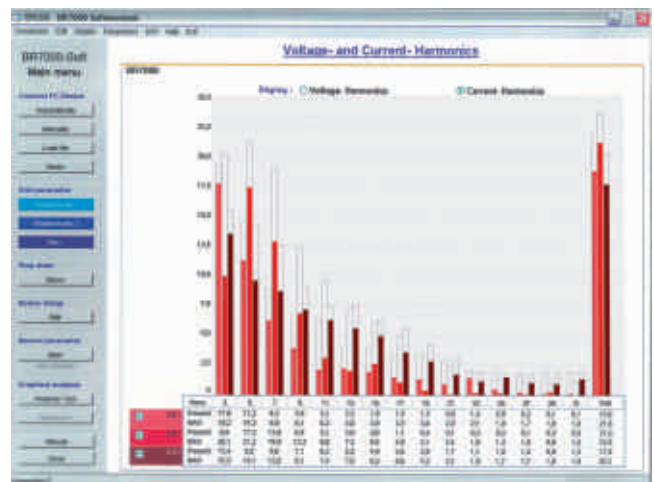
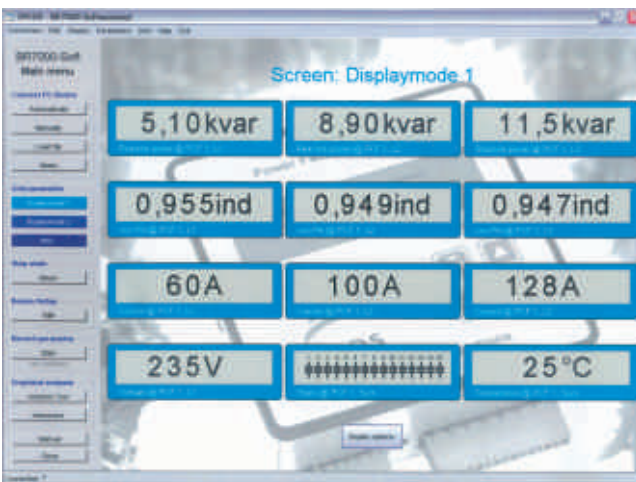
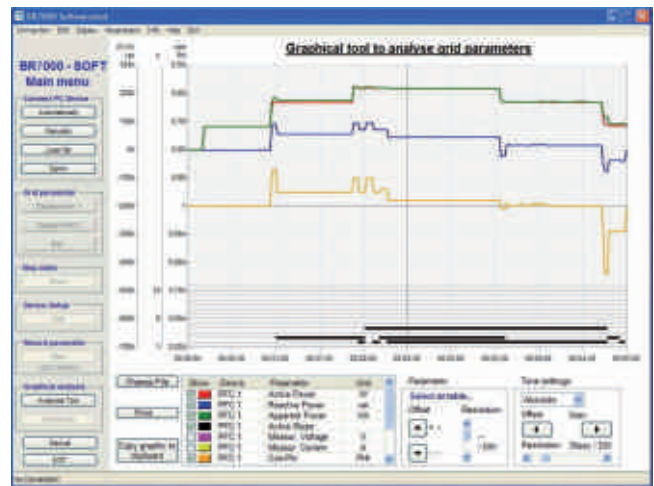
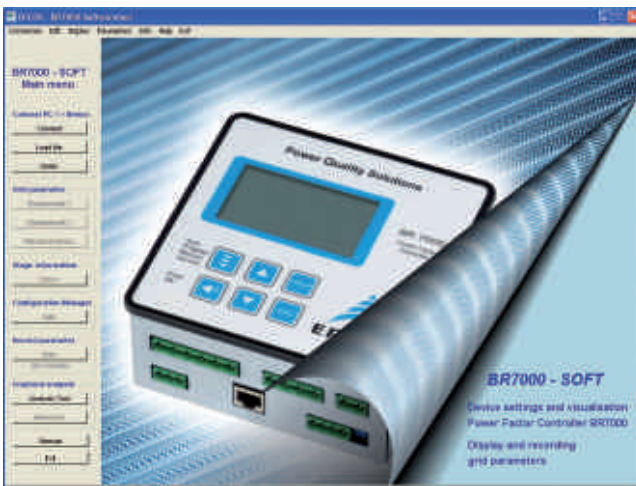
This program offers the possibility for a comfortable parameterization, recording, analysis and visualization of grid parameters in online operation via a PC. It is compatible with PF controllers BR6000-R12/S485 (V5.0 onwards) and series BR7000.

The software allows the recording and a graphical evaluation of all values including export- and print function. The spectrum of harmonics can be displayed as bar chart.

The configuration manager is used for a complete read out, editing, storing and writing of all parameters of the PF controller via PC. All data can be stored in a configuration file.

Features

- Connection to RS485-bus
- Administration of several
- PF controllers possible
- Convenient analysis of recorded values
- Direct connection to USB port of a PC via USB adapter
- CD-ROM included in the delivery of PF controller BR7000



Grid Analysis Tool MC7000-3

Three-phase measuring • Easy evaluation of data • 1GB memory card included



General

The measuring device MC7000-3* has been developed for three-phase measuring, display and storage of electric parameters in low-voltage grids. The Windows-based software (included in the delivery) allows a fast and comfortable evaluation of the measured data. Based on the findings of this evaluation the optimum design for a tailor-made PFC solution or the inspection of an existing one is easily performed. The collected data is available in Excel-format giving the user further processing options. As an additional feature the MC7000-3 is equipped with an

SD memory card slot. A memory card (1 GB) for data storage and easy passing on to a PC is already included in the delivery. Featuring an illuminated 128 x 64 graphic display and a large number of configuration options for data collection, display and storage the new standard measuring tool is flexible and easy to use in the field. Additionally its compact design and the light weight suitcase make it easy to transport. A further benefit for very user is the availability of not only English, but also German, Spanish, Russian and Turkish as menu languages.



Features

- Measuring, display and storage of numerous parameters
 - Voltage (3-phase)
 - Current (3-phase)
 - Frequency (3-phase)
 - Active power (3-phase)
 - Reactive power (3-phase)
 - Apparent power (3-phase)
 - Power factor (3-phase)
 - Active, reactive and apparent energy
 - Voltage harmonics (up to 51st)
 - Harmonics of current (up to 51st)
 - TDH-V (3-phase)
 - THD-I (3-phase)
 - Temperature
- Comfortable programming of recording interval and duration via timers
- Display and internal storage of maximum values with time stamp
- Display of date and time
- Display of harmonics, bar diagram available
- Large number of display options e.g. rotating display and adjustment of font size

PC software included

- Software for evaluation of grid parameters for Windows operating system
- Administration of several projects possible
- Graphical display
 - Several pre-configured graphical display of standard values
 - Graphical display of selected grid values, large number of configuration options
 - Comfortable editing of parameters and time interval
 - Display as line graph or bar diagram
 - Copy into clipboard and print function available
- Mathematical evaluation of measured values
 - Automatic calculation of required KVA_r (target-cos- to be set by user)
 - Evaluation of measured harmonics and recommendation of detuning factor of a PFC system of calculated size
 - Influence of detuning on the harmonics for the calculated detuning factor and system size is provided

*MC7000-3 is imported and sold in India

Grid Analysis Tool MC7000-3

Three-phase measuring • Easy evaluation of data • 1GB memory card included



| Technical data : Grid analysis tool MC7000-3 | |
|--|---|
| Grid analysis tool MC 7000-3 | |
| Weight | Approx. 4 kg |
| Dimensions (h x w x d) | Compact light weight plastic suitcase 390 x 310 x 147 mm (outside dimensions) |
| Operating voltage (auxillary voltage) | 110 ... 230 V AC \pm 15% |
| Power consumption | < 5 VA |
| Frequency | 50/60 Hz |
| Max. measuring voltage¹⁾ (3-phase) | 3 · 30 ... 440 V AC (L-N), 50/60 Hz 3 · 50 ... 760 V AC (L-L), 50/60 Hz |
| Measuring current (3-phase) | 30, 300, 3000 A (MiniFlex flexible current clamps, to be ordered separately) |
| Display | Illuminated, full graphic, 128 x 64 dots |
| Menu | D / E / ES / RU / TR |
| Ambient temperature range (operation) | -10 ... 50 °C |
| Storage temperature range | -20 ... 60 °C |
| Pollution degree | 2 |
| Overvoltage class | CAT III |
| Protection degree accord. IEC 60529 | IP40 |
| Connection | N connection mandatory, PE in case N not available |
| Security | IEC 61010-1 :2001, EN 61010-1:2001 |
| Accessories included | 3 safety voltage measuring cables 2 m (black, red, violet), 1000 V, CAT IV, incl. high power fuse 1 safety voltage measuring line 2 m, blue, 1000 V, CAT III 4 safety dolphin clips 1000 V, CAT III, black, red, violet, blue Windows-based software CD-ROM Low power device connection Ordering code: B44066M7777E230 |
| Accessory mandatory, but not included | 3 flexible MiniFlex current clamps, cable 2.8 m, 600 V rms (CAT IV), 1000 V rms (CAT III) Max. 3000 A, sensor 400 mm Ordering code 1 piece: B44066M1301E230 Ordering code 3 pieces: B44066M1303E230 |

¹⁾ Incl. all tolerances and overvoltages

