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Power Factor Controller
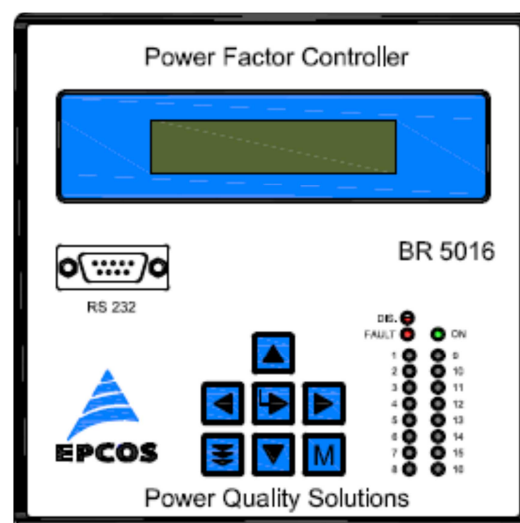
Series/Type: BR5000-R16

The following products presented in this data sheet are being withdrawn.

Ordering Code	Substitute Product	Date of Withdrawal	Deadline Last Orders	Last Shipments
B44066R5916A415	B44066R5615A415	2024-08-23	2024-12-06	2025-03-07
B44066R5908A415	B44066R5908A415	2024-08-23	2024-12-06	2025-03-07

Please contact your nearest TDK sales office if you need support in selecting a suitable substitute. The addresses of our worldwide sales network are presented at www.tdk-electronics.tdk.com/sales.

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Film Capacitors – Power Factor Correction	BR5000-R8…..R16
Power Factor Controller	**BR5000**

Characteristics

- Three phase three wire measuring and controlling

- Switching relays customizable for three phase compensation

- Advance automatic synchronization features. It is Capable of giving correct results even for phase Interchange connections at CT terminals and also Wrong polarity of CTs with the help of Capacitor CT.

- Usage as power factor controller and/or as measuring device

- Intelligent control

- Menu driven handling (English language)

- 7 dedicated keys provide for modify/change the Setting and Confirm the setting by pressing the memory key.

- Programming key provide for selection the mode of operation.

- Measurement Accuracy – Class 2

- Display of harmonics (upto 15th)

- Two months of data logging. Data in the form of hourly

  Records & faults events records- recording all electrical values.

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Important notes at the end of this document.

Measurement and display

- 3-phase measurement of all relevant grid parameters (voltage, current, reactive power, active power, apparent power, frequency, Vthd and Ithd of each phase fundamental/RMS value.)
- Storage of values on hourly basis with date and time stamping.
- Display of date, time.
- Display of switching counter of individual banks with reset option.
- Display of harmonics upto 15th order

Operation

- LCD display 16 characters with 2 lines
- User interface English language

Modes of operation

- Auto mode of operation (normal control)
- Manual mode of operation
- Programming mode

Controlling

- Simple controlling 3-phase, 3wire measurements supply. Eight switching outputs for 8steps models, sixteen switching outputs for 16step model. For 3-phase-measurement the controlling is done according to the average value of Power factor. The PF has two limit, PF upper limit and PF lower limit. The control starts when the load side PF goes below the set limit of Lower side limit.

Error messages

- Over voltage/under voltage/no voltage
- Over /Under load
- Under compensated(only Indication)
- Over temperature
- C-defect
- Faults with time stamp
- NV –RAM Battery down
- Over/ under frequency
- Load unbalance

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Two characters represent one of the following status of faults/ error:

OK	Controller status is okay
VA	Measurement voltage is absent
OD	Outputs are disabled
UC	Under capacitor current
OC	Over capacitor current
NV	NV RAM Check sum error
BF	Battery Fail
ET	Over external temperature

LU	Load unbalance
OB	Out of Banks(Undercompensate)
OH	Over capacitor current THD
UT	Over Internal temperature
OT	Over internal temperature
UF	Under frequency
OF	Over frequency
UV	Under voltage
OV	Over voltage

Inputs

- Auxiliary voltage: 415VAC (L-L) (+20%, to -30%)
- Measuring voltage: 3 phase 3 wire , 415VAC (L-L) (+20%, -30%)
- 3 current: X:1A / X:5A selectable through the connection terminal for Load & Capacitor CT
- PT 100 :   one PT100 connection for monitor the temperature at the outside
- Auxiliary Input :   one Auxiliary input 120- 230Vac programmable for switch over 2nd target cos-phi, Reset the system faults

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Outputs

- 8 / 16 relay outputs (contact NO) as switching outputs for 8 and 16 step models respectively.
- 1 independent isolated interfaces RS232
- 2 Independent isolated Auxiliary outputs potential free 5A, 230V

Interfaces

- 1 - independent, isolated RS232 interface (D type nine pin connector)usage
- 1 – RS485 interface with MODBUS protocol, selectable through DIP Switch
- As interface for PC for usage with BR5000 data downloading dedicated software

Technical data

Type	BR 5000
Operating voltage	415 V AC(L-L) +20% to -30% , 50Hz
Measuring voltage(3-phase,3wire)	415 V AC(L-L) +20% to -30% , 50Hz
Measuring current (3-phase)	3 · X: 5A / X:1A selectable through connection terminals for load & capacitor CT
Power consumption	< 10 VA (with max 16 relay ON)
Sensiblity	200 mA / 100 mA
Switching outputs	
Relay outputs for capacitor branches	8 / 16 relays, freely programmable for switching of 3-phase capacitors
Switching power of relays	250 V AC, 1250VA/ 150W
Number of active outputs	programmable
Operation and display	illuminated LCD display 16 x 2 line
Menu languages	English
Controlling	reach controlling of each phase (L-L)
Modes of operation	3- phase: 8 / 16 three-phase capacitors
Control principle	self-optimized intelligent switching mode
	4-quadrant operation
Automatic initialization	possible
target cos φ	0.3 ind ... 0.3 cap adjustable
Correction time	selectable from 1 sec to 600 sec
Discharge time	selectable from 1 sec to 600 sec
Manual operation	yes
Fixed steps	programmable

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Display/Display functions	
Display of grid parameters	3- phase values
	cos φ, U, I, f, Q, P, S, THD-V, THD-I
Precision	current/voltage: 2%
	active, reactive, apparent power: 3%
Storage function	
Storage of faults events values	voltage, current, temperature, recorded in controller with date and time stamping
Storage of switching operations	each output, separately re-settable
Faults record events	Yes with time stamp
Temperature monitoring	automatic switching off of steps
Temperature measuring range	0 … 70 °C
Interface	1 independent isolated interfaces
	RS232 (with EPCOS dedicated protocol)
	GSM connectivity available with dedicated Modem
Casing	panel-mounted instrument
	144(L)mm × 144(H)mm × 125(D) mm
	Door cutout (138mm x 138mm)
Weight	2.5 kg
Operating ambient temperature	0 … +65 °C
Protection class	Front IP: 41(with RS232 cover) IP 20(without RS232 cover) rear: IP20
EMI/ EMC	
	IEC61000-4-2: ±8kV for Air discharge; ±4KV for contact discharge
	IEC61000-4-3
	IEC61000-4-4: ±2kV
	IEC61000-4-5: ±4KV(Measurement supply); ±0.5KV(Aux. supply)
	IEC61000-4-6
	IEC61000-4-8

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Ordering Codes :

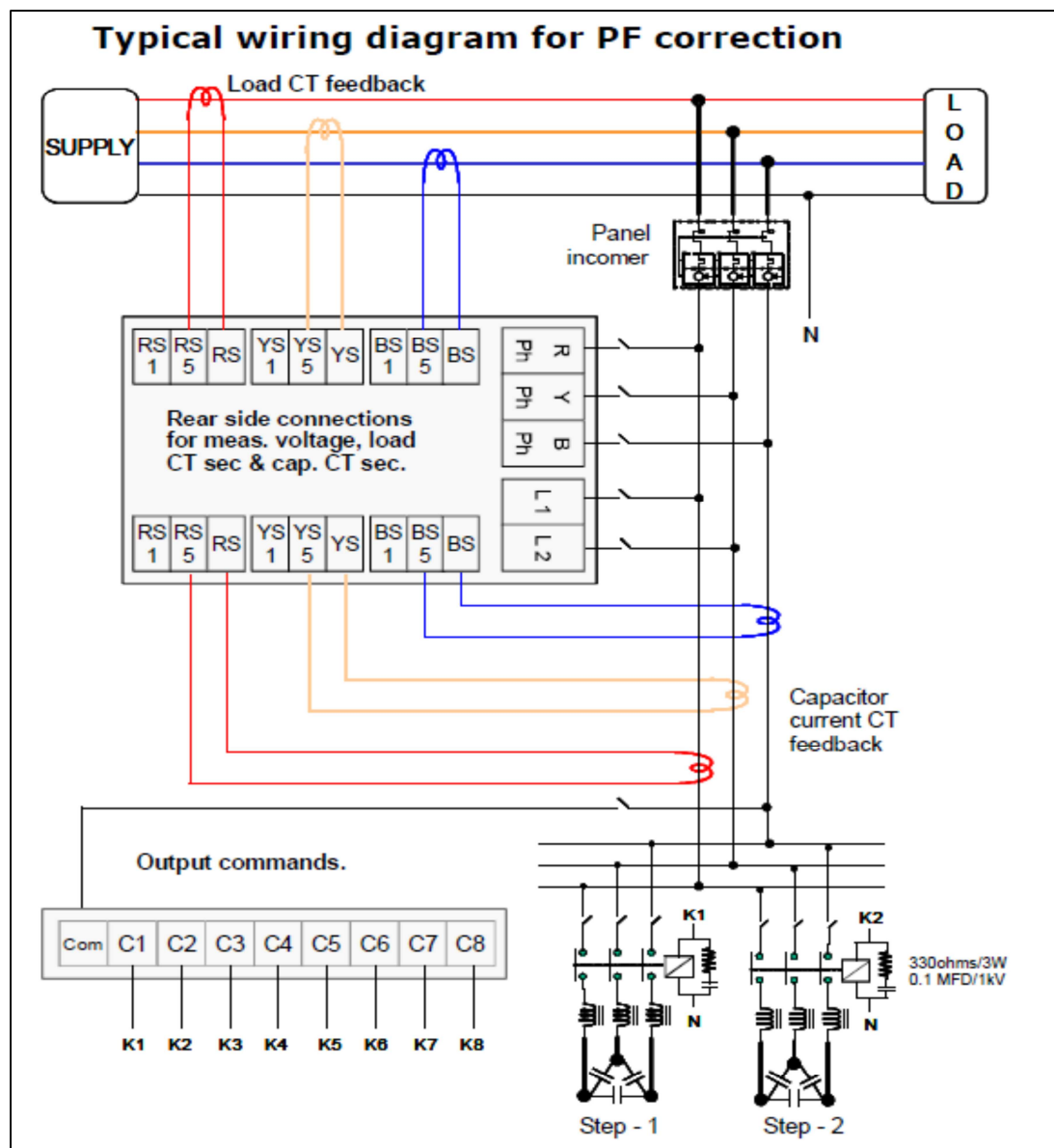| Types	Voltage 50 Hz	Measurement (R,Y, B)	Relay Output	Interface	Ordering code
BR5000-R8	415V	3 Phase, 3Wire	8	RS232	B44066R5908A415N1
BR5000-R16	415V	3 Phase, 3Wire	16	RS232	B44066R5916A415N1

⚠ Cautions :-

1. Controller hunting: - when putting the capacitor bank into operation, it is required to avoid needless switching cycles (means permanent switching on and off of steps without significant change of consumer load). This so called "controller hunting" would increase the number of switching operations of the connected contactors and capacitors and decrease the expected life cycle (wear out) and, in worst case, capacitor bursting and fire, etc. This can be avoided by a proper programming of the BR5000 with the actual system parameters (current transformer primary, step kvar and correction time)

2. Minimum discharge time set in the controller must be in line with the discharge device of the capacitors e.g. standard discharge resistors used by EPCOS are designed for 60 seconds discharge time. A discharge time set in BR5000 shorter than the capacitor discharge time leads to extremely high inrush current and can damage the capacitor as well as distribution equipment and may in worst case lead to capacitor bursting and fire.

Beside high inrush currents, it has to be considered that according IEC831 standard the annual number of switching operations is limited to 5000 switching. In case of very fast switching and higher number of switching operations you are kindly request EPCOS approval for your application. For fast switching LV PFC we recommend dynamic PFC systems.

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Connection plan

Typical wiring diagram for PF correction

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1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application.** As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.

2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified.** In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.

3. **The warnings, cautions and product-specific notes must be observed.**

4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.epcos.com/material). Should you have any more detailed questions, please contact our sales offices.

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