

# Power Components

## PF Controller and Accessories

### Overview

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 ( $\cos \varphi$ ).

The PF controller series BR604 (four stages) 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
- BR6000-T6R6 for mixed PFC systems with both slowly and fast-changing loads (optionally with RS485 interface)
- BR7000 offers the next generation in PFC controllers and is a consequent follow-up development of the well proven series BR6000. The main distinctive feature is the new 3-phases measuring system. Due to the 3-phases recording of voltage and current the device allows a convenient usage as grid measuring device and power factor controller. Beside the functions of BR6000 series which are aboard, the new BR7000 provides also an integrated Help-button and ESCape-button for easier menu handling and programming. The usage of a fully graphic support display allows an additional oscilloscope-mode where the phases (half waves) of voltage and current can graphically be displayed.

PF controllers BR6000-F, S, T even allow coupling, for instance in cascading two systems with two inputs and a single coupling switch.

### Cautions

Discharge time: Make sure that the discharge time set in controller matches the capacitor discharge time.

Number of switchings: Power 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.

Controller hunting must be avoided at any case.

### Accessories: adapter for PF controller BR6000

This adapter is used to align the PF controller BR6000 to grids without neutral conductor. To achieve this, input of the adapter is connected to the three phases of the grid, and the output is connected to the measuring voltage input of the controller.

The voltage at the measuring input must not exceed 525 V. At output "1/2 L1" half measuring voltage the L-N is disposable.

### Accessories: USB to RS485 converter

USB to RS485 converter to connect the power factor controller BR6000 or other devices with Interface RS485 to a PC with USB interface. Connection of several devices at RS485 possible.

## Benefits



- Display
  - Large and multifunctional LCD (2 x 16 characters)
  - Graphic and alphanumeric
  - LCD illumination<sup>1)</sup>
- 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<sup>1)</sup>
- Powerful alarm output<sup>1)</sup>

- Display of numerous of system parameters
  - System voltage (V AC)
  - Reactive power (kvar)
  - Active power (kW)
  - Frequency<sup>1)</sup>
  - THD-V, THD-I\*
  - Individual harmonics up to 19th<sup>1)</sup>
  - Monitoring of individual capacitor currents<sup>1)</sup>
  - Apparent power (kVA)
  - Apparent current (A)
  - Temperature (°C)<sup>1)</sup>
  - Real-time  $\cos \varphi$
  - Target  $\cos \varphi$
  - kvar value to target  $\cos \varphi$
- Alarm output<sup>1)</sup>
  - Insufficient compensation
  - Overcompensation
  - Undercurrent
  - Overcurrent
  - Overtemperature
  - Harmonics exceeded
  - Threshold value programmable
  - Internal error storage
  - Programming of 2nd signal relay random
- Recall recorded values
  - Number of contactor switching operations<sup>1)</sup>
  - Maximum voltage V (Vmax)
  - Maximum reactive power, Q (kvar)
  - Maximum value of harmonic<sup>1)</sup>
  - Maximum active power, P (kW)
  - Maximum apparent power, S (kVA)
  - Maximum temperature (°C)<sup>1)</sup>
  - Operation time of all capacitors<sup>1)</sup>
- Complete 2nd parameter set available<sup>1)</sup>
- Automatic initialization<sup>1)</sup>
- Dynamic PFC (transistor output)<sup>1)</sup>
  - Thyristor switching

<sup>1)</sup> Only for BR6000/BR7000 series.


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## PF Controller

### Technical specifications

	BR604	BR6000-R6	BR6000-R6 110 V	BR6000-T6	BR6000-R12	BR6000-R12 110 V	BR6000-T12
Supply voltage	230 V AC		110 V AC	230 V AC		110 V AC	230 V AC
Measurement voltage range	= supply voltage: 230 V AC (L-N)	30 ... 300 V AC (i.e. 50 ... 525 V phase to phase)					
LCD illumination	no	yes					
Plain language	German/English	Czech / Dutch / English / French / German / Polish / Russian / Spanish / Portuguese					
Number of relay outputs	4	6		--	12		--
Number of transistor outputs	--	--		6	--		12
Alarm output	no	yes					
• Insufficient compensation	n/a	yes					
• Overcompensation	n/a	yes					
• Undercurrent	n/a	yes					
• Overcurrent	n/a	yes					
Switchover target $\cos \varphi$ 1/2	n/a	no					
Automatic initialization	n/a	yes					
Complete 2nd parameter set programmable / switchable	n/a	yes					
Test-run of complete PFC system	n/a	yes					
Interface	no						
<b>Parameters displayed</b>							
• System voltage	yes						
• Reactive power	yes						
• Active power	yes						
• Frequency	no	yes					
• THD-V, THD-I	no	yes					
• Individual harmonics up to 19th	no	yes					
• Monitoring of individual capacitor currents	no	yes					
• Apparent power	yes						
• Apparent current	yes						
• Temperature °C / °F	no	yes					
• Real time $\cos \varphi$	yes						
• Target $\cos \varphi$	yes						
• kvar value to target $\cos \varphi$	yes						
<b>Recall recorded values</b>							
• Number of contactor switching operations	no	yes					
• Maximum voltage	yes						
• Maximum active power	yes						
• Maximum reactive power	yes						
• Maximum value of harmonic	no	yes					
• Maximum apparent power	yes						
• Maximum temperature (°C)	no	yes					
• Operation time of all capacitors	no	yes					
Switching and discharge time range	1 ... 255 seconds	1 ... 1200 seconds					
Number of control series	23 series preset	20 series preset and control series editor for free programming					
Weight	0.5 kg	1 kg					
Dimensions	100 x 100 x 40 mm	144 x 144 x 55 mm					
Suitable for dynamic PFC	no			yes		no	yes

## Selection and ordering data (Dated 10/2010)

Measurement voltage range	Dimensions	Order No.	PU	PS*/P. unit	PG	Weight per PU approx.	
			Unit(s)	Unit(s)			kg
	mm						
	<b>BR604-R4, 4 steps standard</b> 230 V AC (L-N)	100 x 100 x 40	<b>4RB9 504-1CD50</b>	1	1	155	0.500
	<b>BR6000-R6, 6 steps standard</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 506-1CD50</b>	1	1	155	1.000
	<b>BR6000-R12, 12 steps standard</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 512-1CD50</b>	1	1	155	1.000
	<b>BR6000-R6, 6 steps standard -110V</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 506-1BB50</b>	1	1	155	1.000
	<b>BR6000-R12, 12 steps standard - 110V</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 512-1BB50</b>	1	1	155	1.000
	<b>BR6000-T6, 6 steps Dynamic</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 506-2CD50</b>	1	1	155	1.000
	<b>BR6000-T12, 12 steps Dynamic</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 512-2CD50</b>	1	1	155	1.000
	<b>BR6000-R12/F, with 2nd alarm relay</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 512-3CD50</b>	1	1	155	1.000
	<b>BR6000-R12/S485, 12 steps RS485+Software</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 512-4CD50</b>	1	1	155	1.000
	<b>BR6000-T12/RS485 - 12 steps dynamic - RS485+Software</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 512-5CD50</b>	1	1	155	1.000
	<b>BR6000-T6R6 - 6steps standard/ 6steps dynamic</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 512-6CD50</b>	1	1	155	1.000
	<b>BR6000-T6R6 - 6steps standard/ 6steps dynamic RS485+Software</b> 30 ... 300 V AC	144 x 144 x 55	<b>4RB9 512-7CD50</b>	1	1	155	1.000
	<b>BR7000-R15/S485, 15 steps RS 485+Software</b> 30 ... 440 V AC	144 x 144 x 60	<b>4RB9 515-4CD50</b>	1	1	155	1.000
Ambient temperature	Dimensions	Order No.	PU	PS*/P. unit	PG	Weight per PU approx.	
	mm		Unit(s)	Unit(s)		kg	
<b>BR6000 Hut rail mounting adapter (set; 2pcs)</b> -20 ... 55 °C	76 x 45 x 110	<b>4RB9 500-1AA00</b>	1	1	155	0.200	
<b>RS485 to USB adapterfor controller with Interface</b> -10 ... 60 °C	28 x 66 x 66	<b>4RB9 500-2AA00</b>	1	1	155	0.100	

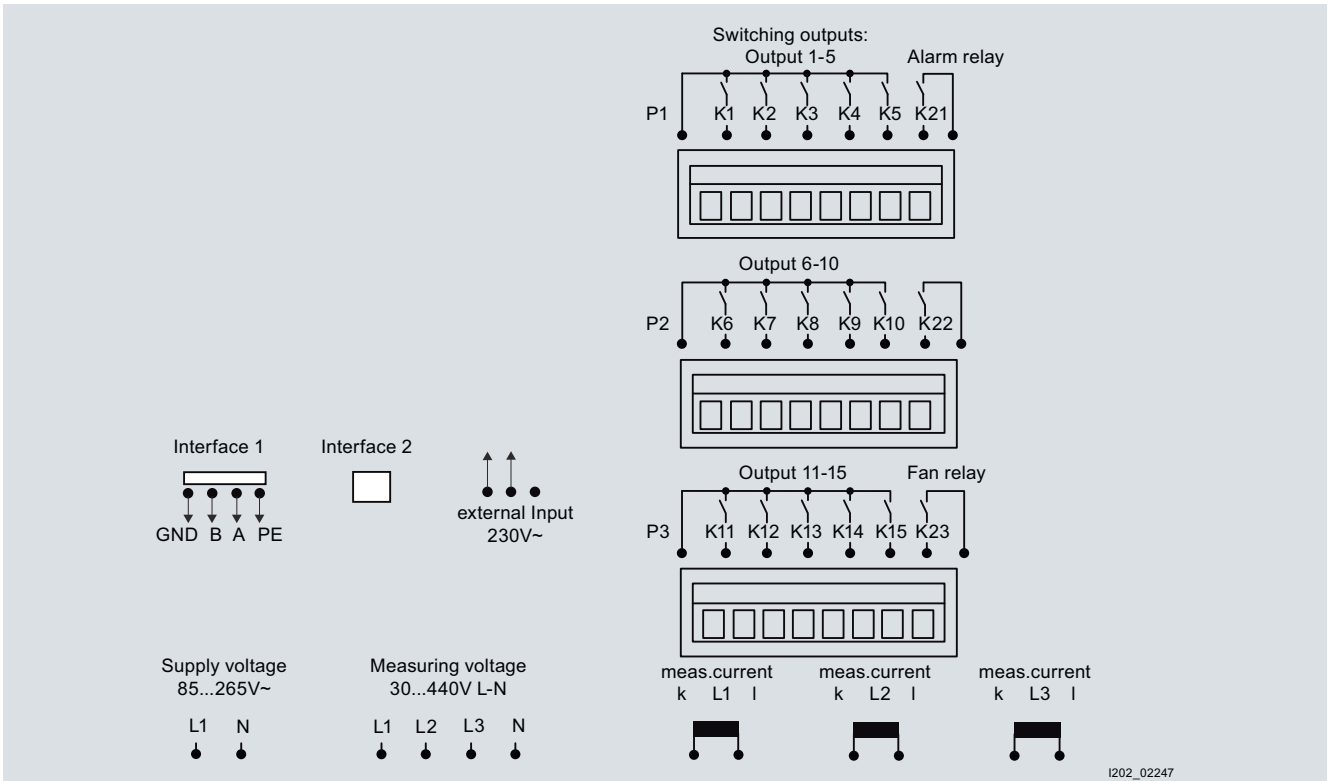
\* You can order this quantity or a multiple thereof.

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## PF Controller

### Dimensional drawings

#### PF controller BR6000



#### PF controller BR7000

