



## Film Capacitors – Power Factor Correction

### Dynamic and Hybrid Power Factor Controller

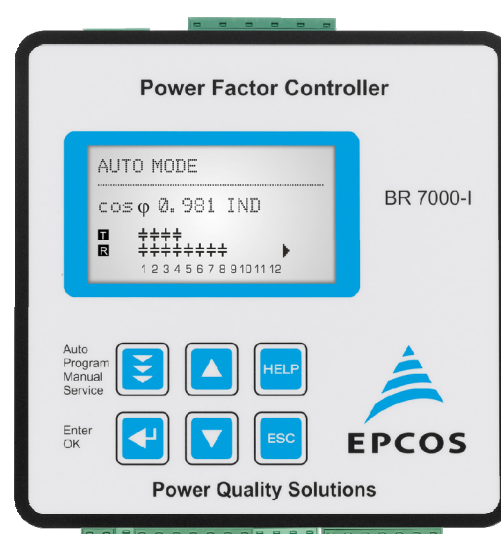
**Series/Type:** BR7000-I-TH, BR7000-I-TH/S485  
**Ordering code:** B44066R7412E230/B44066R7612E230  
**Date:** March 2014  
**Version:** 1

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### Characteristics

- 12 transistor and 12 relay outputs
- Direct triggering of up to 32 thyristor switches  
TSM-LC-S at the bus; bi-directional communication;  
design of self-monitoring dynamic systems with  
bus coupling (only version /S485)
- 20 pre-programmed control series
- Control series editor
- Full graphic display 128 x 64 pixel
- Plain language menu
- 4-quadrant-operation
- Display of multiple grid parameters
- Display of harmonics (up to 33<sup>rd</sup>)
- Display of distortion factor THD-V/THD-I
- Display and control of temperature
- Storage of maximum values
- Storage of switching operations and times (relay outputs)
- Manual and automatic operation
- Zero voltage cut-off
- Various error messages/alarm relay
- Error storage
- Interface RS485 for version -/S485
- Panel mounting 144 x 144 x 55 mm



### Inputs

- Operation voltage: 110 ... 230 V AC +/- 15%
- Measuring voltage: 30 ... 440 V AC (L-N) / 50 ... 760 V AC (L-L)
- Current: X:1A / X:5A
- Standard serial interface (e.g. for firmware update)
- Version -/S485: 1 external input

### Outputs

- 12 relay outputs
- 12 transistor outputs
- 1 relay output (alarm/fan)
- Version -/S485: 1 message relay (free programmable)
- Version -/S485: interface RS485

### Measuring and display of following grid parameters

- Voltage, current, frequency
- Active, reactive and apparent power
- Power factor, missing reactive power
- Harmonics of voltage (up to 33<sup>rd</sup>/even up to 16<sup>th</sup>)
- Harmonic of current (up to 33<sup>rd</sup>/even up to 16<sup>th</sup>)
- TDH-V, THD-I
- Temperature
- Well-arranged display of power factor and actual status of switching outputs
- Display and storage of maximum values, switching operations and operation time (only static stages)
- Display of harmonics as bar chart

### Operation

- Graphic display 164 x 64 dots with 8 lines maximum
- Plain language menu in several languages
- Optimum navigation in the menus via return (ESCAPE) button
- HELP-button for interactive help text

### Version with interface (BR7000-1-TH/S485)

- Additional potential free input (programmable) for
  - Switch over 2<sup>nd</sup> target cos-phi
  - Triggering of a reactive power off-set
- Additional potential free relay output (message relay) for
  - Switching of a fan
  - Display of error- or status messages (programmable)
- Interface RS485 (MODBUS RTU) for
  - Direct triggering of up to 32 addressable thyristor switches TSM-LC-S with bi-directional communication
  - Imbedding of the controller into a network
  - Usage of software BR7000-Soft
  - Output of measured values in ACSII-protocol
- Internal battery-buffered clock for
  - Creation of time stamp of all recorded maximum values
  - Creation of time stamp for all error messages

**Technical data and specifications**

Operating voltage	110 ... 230 V AC +/- 15 %, 50 and 60 Hz
Measuring voltage	30 ... 440 V AC (L-N); 50 ... 760 V AC (L-L); 50/60 Hz
Measuring current	X: 5 A / X: 1 A, selectable
Power consumption	< 5 VA
Sensitivity	50 mA/10 mA

**Switching outputs**

Relay outputs for capacitor contactors	12
Transistor outputs for thyristor switches	12
Alarm relay	1
Message relay	1 for version -/S485 only
Switching power of relays	250 V AC, 1000 W
Switching power of thyristors	24 V DC, 50 mA
Number of active outputs	Programmable

**Operation and display**

Display	Illuminated full graphic display 128 x 64 dots
Menu languages	CZ/EN/ES/FR/GER/NL/PL/PT/RU/TR
Freely editable control series	1 via Editor

**Control**

Control principle	Sequential switching, circle switching, intelligent switching behavior, 4-quadrant operation
Operation modes	Dynamic or hybrid PF-controller
Target cos-φ	0.1 inductive up to 0.1 capacitive adjustable
Switch on time (dynamic/relay)	20 ... 1000 ms / 1 sec ... 20 min
Switch off time	20 ... 1000 ms / 1 sec ... 20 min
Discharge time	20 ... 1000 ms / 1 sec ... 20 min
Manual operation	Yes
Fixed steps/skip steps	Programmable
Zero voltage release	Standard

**Display/display functions**

Display of grid parameters	Cos-φ, V, I, f, W, Q, P, S, ΔQ, THD-V, THD-I
Display of harmonics	3 <sup>rd</sup> to 33 <sup>rd</sup> harmonics of V and I; even harmonics up to 16 <sup>th</sup>
Accuracy	Current/voltage: 1% Active, apparent and reactive power: 2%
Integrated help function	Context dependent (German/English)

<b>Storage function</b>	
Storage of maximum values	Voltage, current, active/reactive/apparent power, temperature, THD-V, THD-I
Storage of switching operations	Each output can be reset separately (only contactor stages)
Storage of operation time	Each capacitor can be reset separately (only contactor stages)
Error storage	Error register in plain language
<b>Temperature monitoring</b>	
Monitoring	Automatic step switch off
Temperature measuring range	-30 ... +100 °C
<b>Casing</b>	
Panel mounted instrument	DIN 43700, 144 x 144 x 55 mm
Weight	1 kg
Ambient operating temperature	-20 ... +60 °C
Protection class accord. DIN 40050	Front: IP54, rear: IP 20
Safety regulations	IEC 601010-1
Interference resistance	IEC 61000-6-2; EN 61326
EMC-interference	IEC 61000-4-2; IEC61000-4-4
<b>Ordering codes</b>	
BR7000-I-TH (without interface)	B44066R7412E230
BR7000-I-TH/S485 (with interface RS485)	B44066R7612E230

### Cautions and Warnings

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 BR7000-I-TH and BR7000-I-TH/S485 with the actual system parameters (current transformer prim. and sec., first kvar step, control series, switching time).

**⚠ Please read cautions information about PFC capacitors and cautions as well as installation and maintenance instructions in the actual version of the Product Profile *Power Factor Correction* to ensure optimum performance and prevent products from failing, and in worst case, bursting and fire, etc. The actual Product Profile is available at [www.epcos.com/publications](http://www.epcos.com/publications).**

**Information given in the PFC-product profile and values given in the data sheet reflect typical specifications. You are kindly requested to approve our product specifications or request our approval for your specification before ordering.**

### Note

For detailed information about PFC capacitors and cautions, refer to the latest version of EPCOS PFC Product Profile.

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