Film Capacitors – Power Factor Correction

Power Factor Controller

Series/Type: BR7000-I/BR7000-I/S485
Ordering code: B44066R7012E230/B44066R7112E230
Date: October 2016
Version: 5
Characteristics

- 12 – 13 switching outputs
- 20 pre-programmed control series
- Control series editor
- Full graphic display 128 x 64 dots
- Plain language menu
- 4-quadrant-operation
- Automatic initialization possible
- Display of multiple grid parameters
- Display of harmonics (up to 33rd)
- Display of distortion factor THD-V/THD-I
- Display and control of temperature
- Monitoring of capacitor current
- Storage of maximum values
- Storage of switching operations and times
- Manual and automatic operation
- Zero voltage cut-off
- Various error messages/alarm relay
- Error storage
- Test run of system with error analysis
- Interface RS485 (version BR7000-I/S485)
- Internal clock with time stamp (version BR7000-I/S485)
- Panel mounting 144 x 144 x 55 mm

Inputs

Operation voltage: 110 … 440 V ~ +/- 10%
- Measuring voltage: 30 … 440 V ~ (L-N) / 50 … 760 V ~ (L-L)
- Current: X:1A / X:5A
- Standard service interface (e.g. for firmware update)
- Additional external input (110…230V) - optional

Outputs

- 12 relay outputs for capacitor
- 1 relay output (message/alarm/fan)
- 1 message relay (free programmable) – optional
Preliminary data

**Measuring and display of following grid parameters**

- Voltage, current, frequency
- Active, reactive and apparent power
- Power factor, missing reactive power
- Energy
- Harmonics of voltage (upto 33rd, linear up to 16th)
- Harmonic of current (33rd, linear up to 16th)
- 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
- Display of harmonics as bar chart

**Operation**

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

**Connection**

![Connection diagram]

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Please read Cautions and warnings and Important notes at the end of this document.

CAP FILM P PM PFC

October 2016

Page 3 of 7
Only for BR7000-I/S485 (with interface)

- Additional potential free input (programmable) for
  - Coupling of different devices/systems
  - Switch over 2nd target cos-phi respectively 2nd parameter set
  - Switching of a fixed step
  - Triggering of a reactive power offset

- Additional potential free relay output (message relay) for
  - Switching of a fan
  - Output of error or status message (programmable)

- Interface RS485 (MODBUS RTU) for
  - Controller coupling as master-slave (serial; up to 4 devices = 48 physical outputs)
  - Embedding of the controller into a network (e.g. in connection with software MMI-energy) or networking with a SPC (control system)
  - Output of measuring values in ASCII-protocol

- Internal clock (battery buffered) for
  - Creation of time stamp for all recorded maximum values
  - Creation of time stamp for all error messages
  - Availability of time stamp when using an external data logger (DataLog-SD) for recording and evaluation of all measured values of the system
  - Output of measured value in ASCII-protocol
### Technical data and specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>110 … 440 V ~ +/- 10 %, 50 and 60 Hz</td>
</tr>
<tr>
<td>Measuring voltage</td>
<td>30 … 440 V ~ (L-N); 50 … 760 V ~ (L-L); 50/60 Hz</td>
</tr>
<tr>
<td>Measuring current</td>
<td>X: 5 A / X: 1 A, selectable</td>
</tr>
<tr>
<td>Power consumption</td>
<td>&lt; 5 VA</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>50 mA/10 mA</td>
</tr>
</tbody>
</table>

### Switching outputs

- Relay outputs for capacitor branches: 12
- Alarm relay / message relay: 1/1* (*only version –I/S485)
- Switching power of relays: 250 V AC, 1000 W
- Number of active outputs: Programmable
- Version BR7000-I/S485: Interface RS485, for usage with evaluation software BR7000-SOFT, included in the delivery
  - One freely programmable external input, e.g. for 2nd parameter set
  - Additional freely programmable message relay
  - Internal clock

### Operation and display

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

### Control

- Control principle: Sequential switching, circle switching, intelligent switching behavior, 4-quadrant operation
- Automatic initialization/ test run: Possible
- Target cos-φ: 0.1 inductive up to 0.1 capacitive adjustable
- Switch on time: Selectable from 1 sec. to 130 min.
- Switch off time: Selectable from 1 sec. to 130 min.
- Discharge time: Selectable from 1 sec. to 130 min.
- Manual operation: Yes
- Fixed steps/skip steps: Programmable
- Zero voltage release: Standard

### Display/display functions

- Large display of 3 grid parameters: Selection in display editor
- Display of harmonics: 3rd to 33th harmonics of V and I; linear harmonics up to 16th
- Accuracy: Current/voltage: 1%; active, apparent and reactive power: 2%
- Integrated help function: Context dependent (German/English)
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 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.

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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