Microprocessor controlled power factor control relay with 3-phase measurement system and display of measurement values

- Full-automatic c/k-value setting, self-adapting, connection of different capacitor step sizes possible
- Capacitor capacity is stored as a 3phase value. Thereby 1phase capacitors can be used.
- Automatic detection and usage of the optimum capacitor step for 3 phase power factor control
- Manual mode possible
- Multiple connection types possible through adjustable phase compensation angle
- Capable for 4-quadrant operation
- Individually configurable discharging time allows quicker switching time
- 3-phase measurement system also suitable for non-sinusoidal currents and voltages
- Graphical LCD for display of step status, measurement values and system data
- Measurement display for U, I, P, Q, S, THD U, THD I, ΔQ, F, T
- Harmonics measurement for voltage and current up to the 30th order
- Counter for active and reactive work
- Flexible alarm system with up to 15 alarms
- Programmable digital input and digital output
- Programmable alarm relay with volt-free c/o contact
- 3 dimensional step database with storage of origin step size, actual step size and amount of switching cycles for each step
- Real time clock (available in Option –DM)
- Storage of min., max., average value and operating parameters in adjustable time intervals and possibility to synchronize via 2. digital input (24VDC)
- Storage of changing from any system parameter with date and time
- Storage of events, e.g. alarm with date and time
- Download of data via TTL/USB (with optional cable) or partly via Modbus or LCD of the controller (use option –DM)
- Supply voltage 115/230V, 45-65Hz, other voltages on request
- Voltage measuring 50 – 530V, 45 – 65Hz
- Current measuring 3 x 15mA – 5A, suitable for CT x/1A and x/5A
- Connection with pluggable screw terminals
- Instrument casing for cutout 144 x 144mm, depth 49mm
- Protection class IP20 (casing), IP50 (front)

Description	Type
Power Factor Controller BLR-CM 3phase with 06 relay outputs	CM 06R –3A
Power Factor Controller BLR-CM 3phase with 12 relay outputs	CM 12R –3A
Power Factor Controller BLR-CM 3phase with 06 transistor outputs	CM 06T –3A
Power Factor Controller BLR-CM 3phase with 12 transistor outputs	CM 12T –3A
Power Factor Controller BLR-CM 3phase with 06 relay and 06 transistor outputs	CM 12RT –3A
Options	
Interface RS485 protocol Modbus RTU	-MB
Data storage, Real time clock, 2. digital input + Interface RS485 protocol Modbus RTU	-DM
Accessories	
Data cable TTL/USB	UMS9
Transparent cover with lock IP54	- VT
Wall mounting bracket	3ZWC

REGULATION

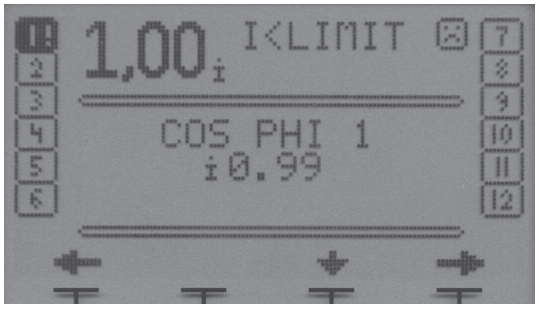
The 3-phase measurement system of the BLR-CM 3phase power factor regulator also detects unsymmetrical loads. Furthermore the regulation algorithm respects unsymmetrical capacitor steps during its work. Thus also in unsymmetrical electricity networks an optimum power factor correction is guaranteed. Short compensation times combined with smallest amount of operations and an equal dispersion of the operating cycles underline the superior intelligence of the BLR-CM 3phase.

All relevant parameters for the regulation are set ex works in the way that in nearly all cases no further adjustments are necessary to start the regulation. But this does not mean that the power factor controller BLR-CM 3phase cannot be adapted to the compensation system by the means of further adjustments.

In the standard setup-menu all basic settings of the BLR-CM 3phase can be done. Among these settings there are e.g. the current- and voltage transformer ratios, which are necessary for the correct display of the measurement values.

Switchover from target-cosphi 1 to target-cosphi 2 can selectively be done by programmable events. These events can be triggered by the digital input as well as by adjustable limits.

In the expert setup-menu there are many further extensive settings available. Entering this sumenu is password protected to avoid access of unauthorized people. By means of these settings the device can be adapted optimally to the pfc system if necessary. Inside this expert menu there are e.g. the alarm settings which can be set very comfortable.



FEATURES

All relays are fitted with these features as standard:

Auxiliary voltage separate from voltage measuring

Auxiliary voltage:	115/230V, 45-65Hz
Voltage measuring:	1 x 50 - 530V
Current measuring:	3 x 15mA - 5A
Relay output alarm:	1 x C/O contact
Digital input:	1 x 50 - 250V AC
Digital output:	1 x N/O contact

Sensor for temperature measuring

Types of different switching outputs:

BLR-CM*3phase* 06R: 6 relays (one common point)
BLR-CM*3phase* 12R: 12 relays (one common point)
BLR-CM*3phase* 06T: 6 static outputs (one common point)
BLR-CM*3phase* 12T: 12 static outputs (one common point)
BLR-CM*3phase* 12RT: 6 static outputs, 6 relays
(two seperate common points)

Optional features:

-MB: RS485 with Modbus RTU protocol

Different auxiliary voltage on request

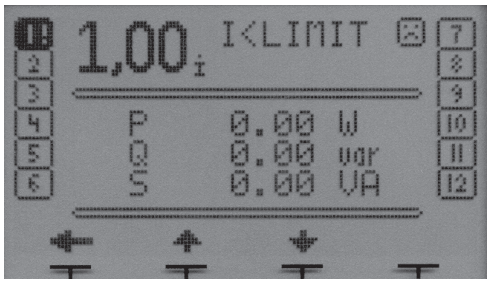
MEASURING

By means of the measurement values of voltage and current BLR-CM calculates the conditions in the network. As standard, the voltage L2-L3 and current in L1, L2 and L3 is used. The separation of auxiliary voltage and voltage measuring allows a voltage measuring range between 50 - 530V. Additionally, there is the possibility to change the phase shift between voltage and current in steps of 15 degrees. The result is the maximum possible flexibility of the relay for applications with voltage measuring phase/neutral, phase/phase and for mixed measuring with different transformer types.

The BLR-CM is measuring the temperature in the panel by using the integrated temperature sensor. This measurement value can be handled flexible, e.g. it can be used for an alarm message. By the means of the digital output an additional fan can be activated.

At BLR-CM the following measurement values can be displayed:

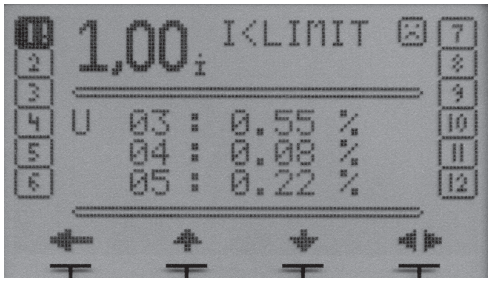
- voltage (phase/phase and phase/neutral)
- current L1, L2, L3
- active power (total)
- reactive power (total)
- apparent power (total)
- THD voltage
- THD current L1, L2, L3
- harmonics for voltage (order 2 - 31)
- harmonics for current L1, L2, L3 (order 2 - 30)
- counter active work import / export
- counter reactive work inductive / capacitive
- missing reactive power for target-cosphi
- frequency
- temperature



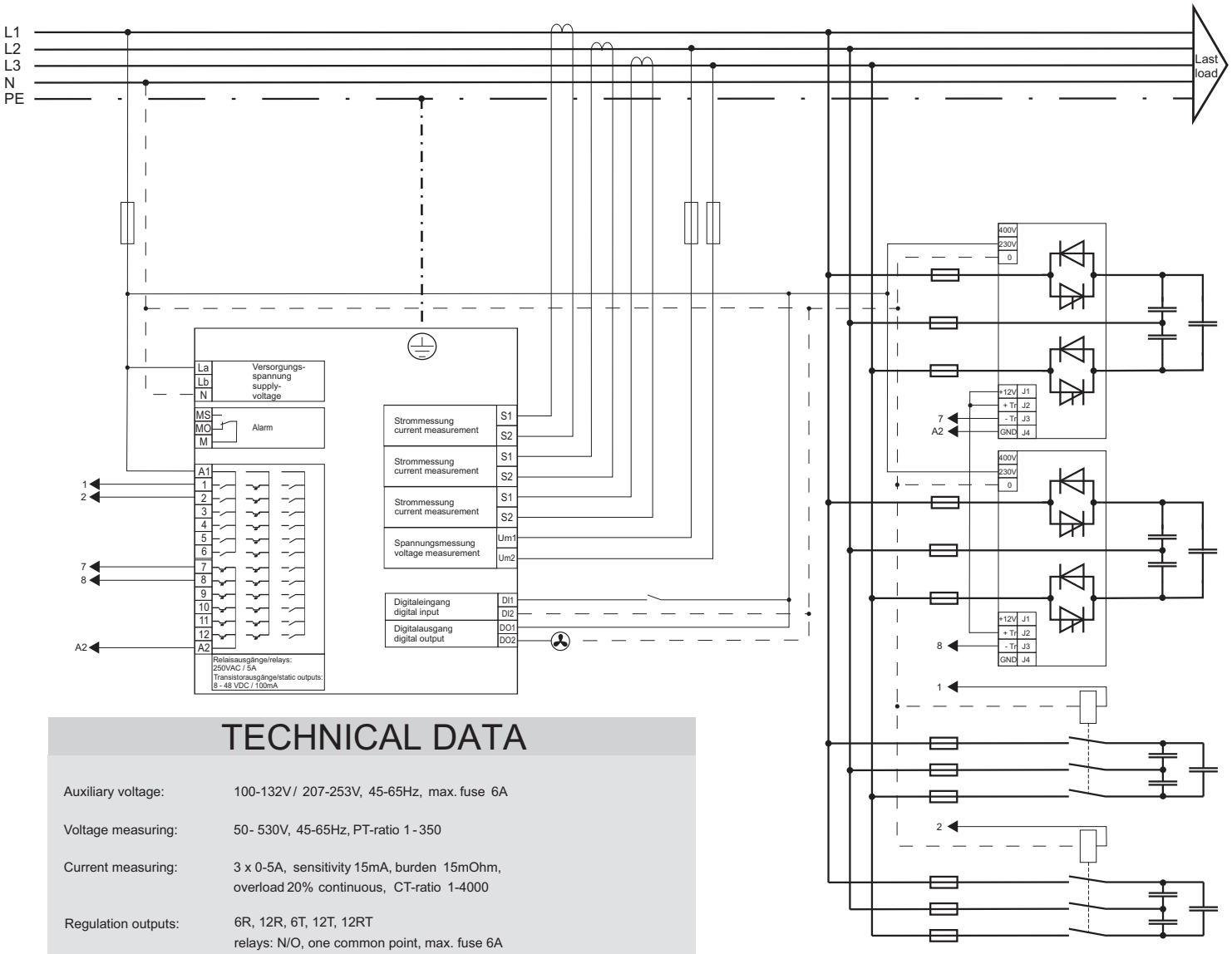
SUPERVISION

The BLR-CM includes a lot of different supervision functions to guarantee a durable safe operation of the compensation system and to ensure a long life cycle of the used components. Some of these supervising functions are:

- under- and overvoltage
- harmonics
- defective steps
- maintenance (loss of power and amount of operations)
- alarm by not reaching the target cosphi
- temperature measuring with fan control and switching off steps
- digital input



CONNECTION DIAGRAM



TECHNICAL DATA

Auxiliary voltage:	100-132V / 207-253V, 45-65Hz, max. fuse 6A
Voltage measuring:	50- 530V, 45-65Hz, PT-ratio 1 - 350
Current measuring:	3 x 0-5A, sensitivity 15mA, burden 15mOhm, overload 20% continuous, CT-ratio 1-4000
Regulation outputs:	6R, 12R, 6T, 12T, 12RT relays: N/O, one common point, max. fuse 6A breaking capacity: 250V AC / 5A static outputs: open-collector, breaking capacity: 8-48V DC / 100mA
Alarm contact:	C/O, voltfree, programmable max. fuse 6A, breaking capacity 250V AC / 3A
Digital input:	50 - 250V AC, programmable
Digital output:	N/O, voltfree, programmable max. fuse 6A, breaking capacity 250V AC / 5A
Interface:	RS485 (optional) Modbus RTU protocol (Slave)
Ambient temperature:	operation: 0°C ... +70°C, storage: -20°C ... +85°C
Humidity:	0% - 95%, without moisture condensation
Overvoltage class:	II, pollution degree 3(DIN VDE 0110, Teil 1 / IEC 60664-1)
Standards:	DIN VDE 0110 Teil1(IEC 60664-1:1992) VDE 0411 Teil1 (DIN EN 61010-1 / IEC 61010-1:2001) VDE 0843 Teil 20 (DIN EN 61326 / IEC 61326: 1997 + A1: 1998 +A2:2000)
Conformity and listing:	CE, UL, cUL
Terminals:	screw-type, plugable, max. 2,5qmm
Casing:	front: instrument casing plastic (UL94-VO), rear: metal
Protection class:	front: IP54, rear: IP20
Weight:	ca. 0,8 kg
Dimensions:	144 x 144 x 58mm h x w x d, cutout $138^{+0.5}$ x $138^{+0.5}$mm

DIMENSIONS