

# CM3 3-PHASE

## power factor control

# **Boddingtons Power Controls**

power factor control relay

## **BLR-CM 3phase**

Switches contactors and thyristors  
or combination of the two



- **3 phase measurement system guarantees optimum power factor correction with balanced and unbalanced reactive loads**
- **Stored kvar value of each step held in micro processor memory to provide optimum compensation plus shortest switching time**
- **Continual monitoring of capacitor kvar output and number of switching operations of each contactor/ thyristor**

Reactive compensation plays a vital part in reducing losses in cables, transformers etc thus reducing CO<sub>2</sub> levels. Today's microprocessor technology allows power factor control relays to accomplish far more functions than ever before. The CM 3phase relay combines a 3 phase power factor control regulator with a 3 phase multi meter – thus saving switchboard panel space and panel wiring time. Each phase is monitored independently by means of a CT on L1-L2-L3. In this way single phase capacitors can be switched so as to balance asymmetrical loads. The optimal size of capacitor is always selected when using the CM3. Each kvar step value is held in the memory and called upon when required. The CM3 has a complete programmable alarm system as detailed in the heading "supervision" below. If there is a failure of capacitors, contactors or fuses, the alarm will operate and the LCD display will indicate the cause of the alarm. A MODBUS RTU card can be fitted – RS485 and data logging can be undertaken using our MINISCARDA which can be connected to the internet by modem/GSM.

## REGULATION

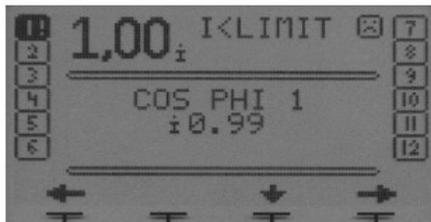
The 3-phase measurement system of the BLR-CM 3phase power factor regulator also detects unsymmetrical loads. Furthermore the regulation algorithm respects unsymmetrical capacitor steps during its work. Thus also in unsymmetrical electricity networks an optimum power factor correction is guaranteed. Short 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.



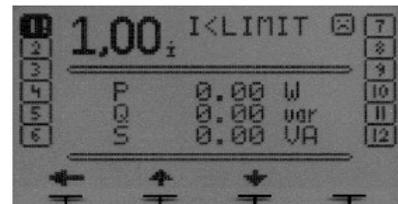
## MEASURING

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 2-31)
- 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

## 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

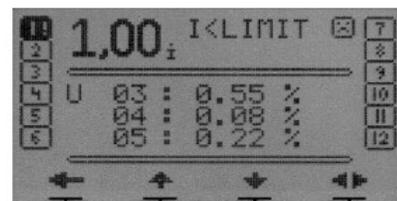
**Types of different switching outputs:**

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 separate common points)

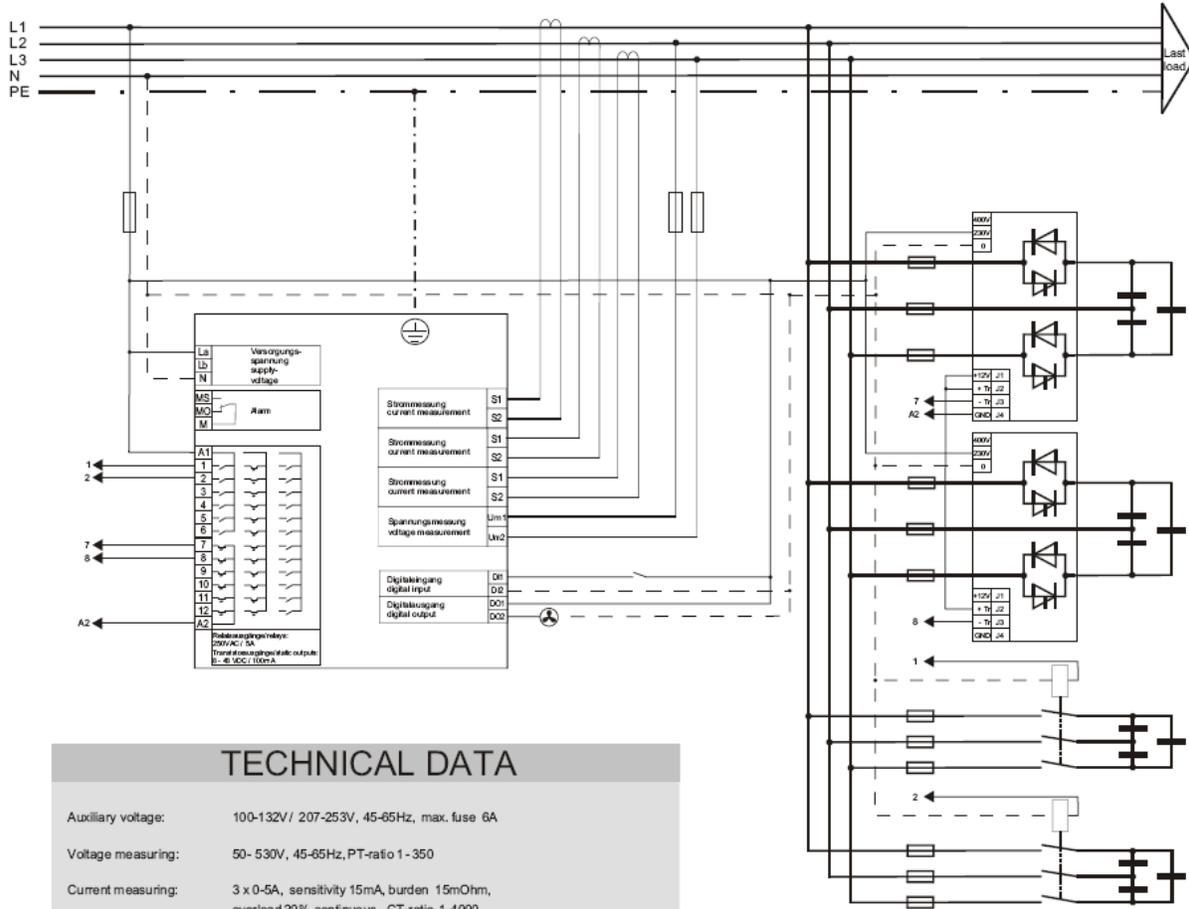
**Optional features:**

-MB: RS485 with Modbus RTU protocol

Different auxiliary voltage on request



# 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 Teil 1 (IEC 60664-1:1992) VDE 0411 Teil 1 (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 <sup>±0,5</sup> x 138 <sup>±0,5</sup> mm

## DIMENSIONS

