



- Automatic Power Factor Correction & Manual.
- Automatic Self Adjustment to any Capacitor Step Value
- Digital Power Factor Indication, pre-set and specified Installation Data
- No-Volt Release Feature to immediately Disconnect all Capacitors in the Event of Power Failure
- Plug-in Terminal Connection
- Digital Setting of Individual Parameters including Target Power Factor, Switching Time, Step Limit, etc.
- Elimination of Defect Capacitor Steps, and their Indication.
- Visual Display of Target cos phi Alarm
- Visual Display of Over & Under Voltage Alarm.

General

Evaluation of the reactive load is achieved by taking instantaneous measurements in all four quadrants of voltage and current. The values are digitalized in the microprocessor and continuously evaluated so as to provide the active and reactive components. The value of cos phi is calculated from these two values. If the actual reactive load deviates from the target power factor, then a 'trial switching' will be made on the as yet 'unknown Capacitor Step Values'. The first process on new installations is a 'learning curve' of the value of each capacitor in the process of normal switching. It is no longer necessary to manually select the starting current or C/k value. The value of each capacitor step will be evaluated by the relay and stored in its memory permanently, even if the voltage supply to the relay fails. Any subsequent loss of reactive power from any capacitor step will be recognized and evaluated. Total loss of reactive step output due to fuse failure will be recorded in the relay memory as a defective step.

The relay will select from the bank of capacitors available the step(s) which are necessary in order to achieve the required level of reactive compensation. Switching exits which are not connected or defective capacitor steps (failed fuse for example) will be excluded from the regulation process. At weekly intervals, or each time the relay is re-energized, three attempts will be made to check any previously reported failed capacitor step. If the fuses have been replaced for example that step can then be brought back into the reactive compensation calculation.

The recognition of each capacitor's value step is achieved without unnecessary test, based on obtained in daily routine of reactive load compensation. Fixed switching programs are no longer required. The relay will automatically select from its memory the most appropriate cap step size to meet the reactive load demand.

Target Power Factor Setting

The target power factor setting is adjusted using function switch (3) located behind the nameplate cover.

The target cos phi can be precisely selected on the digital display using the + / - buttons (4 and 5).

Standard Comply	
IEC 1010	Safety requirements for electrical equipment for measurement, control and laboratory use
DIN 43 864	Current interface for pulse transmission between impulse meters and tariff devices (for pulse output)
DIN EN 50082-2	EMC interference immunity
DIN VDE 0470 Part 1 / EN 60529	IP protection
DIN 43 856	Electric meters, tariff switching clocks and ripple-control receivers
IEC 68-2	Basic environmental test procedures
EC 255-4	High-frequency disturbance test

Step Switching Time

The time delay per step is selected using function switch (3). Using the + / - buttons the precise switching time can be selected on the digital display within the range 1 ... 99 sec. For normal installations the switching time should not be less than 20 seconds per step. Shorter switching times can be selected when required. This is made possible by means of an integrated reactive load reversal switching delay feature. This will provide an additional 30sec. delay before any step which has just been switched off can be switched back on again. However, it must always be born in mind that shorter switching times will result in a higher switching rate and consequent wear on contactors etc.

Digital cos phi Indication

With function switch (3), in addition to regulating the reactive load the digital indicator will show the instantaneous value of the system power factor. This is achieved by calculating the relationship between active and reactive load, a feature which is becoming even more important due to the normal occurrence of non-sinusoidal waveforms.

Switching by Hand

With function switch (3), capacitor steps can be switched in and out according to the selected switching time delay, using the + / - buttons. Only one depression is necessary. Once the required switching is achieved the next command is given.

To return to automatic control, switch (3) must be returned to auto position. The function switch is in this position on delivery of the relay.

No-Volt Release Feature

In the event of a power failure longer than 35msec., the relay will immediately disconnect all capacitors from the supply. Once the supply is restored, there will be lockout time of 90 sec. before the relay starts switching.

This lock out time will also apply on initial energizing of a new installation.

LED Indication of Capacitor Steps

The LED display (6) will show the status of each capacitor step.

Alarm Internal Fault Signaling

The BLR-CA relay incorporates a fault signaling alarm which will indicate, for example, if there are insufficient capacitors to achieve the target power factor. The 'AL' will appear in the display, if DIP switch (2) is in the 'ON' position (up). The alarm will be indicated after a time delay of 75 times step switching time.

Alarm function selection switch is used to select whether the alarm operation is stored until cancelled (display '0') or cancelled automatically once the power factor improves to the target level (display '1'). The required selection is made by means of the + / - buttons. Moving DIP switch 2 to the 'OFF' position will delete the recorded fault signal alarm.



Nr	Description
1	Dip switch CT/5A or CT/1A
2	Code Number
3	Function Menu button
4	Decrease Value button
5	Increase Value button
6	Relays status
7	LED Display

Capacitor Harmonic Surveillance

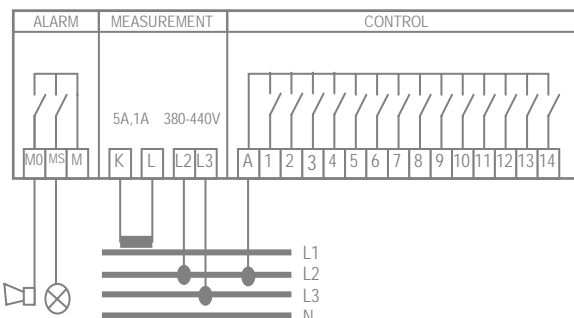
All BLR-CA relays are fitted with a specially developed harmonic surveillance device which will oversee the voltage dynamic du/dt. The measured voltage is reviewed with respect to its deviation from a pure sine waveform. Since Capacitor current is heavily influenced by the dynamic of the supply voltage, the total effect is evaluated by measuring the current. If this current exceeds its nominal value by approx. 120% over a time interval of 1 minute (current-time measurement), then the symbol 'HA' will appear in the display. This alarm can be coupled to an exit relay 'z' which will provide an external alarm signal of Harmonic Overload on the capacitor bank. This device requires the exact determination of the operation frequency 50 or 60 Hz. (to be stated in order).

BLR Type

There are 4 difference type as follows.

- 1) 10 relays output control Type BLR-CA10
- 2) 12 relays output control Type BLR-CA12
- 3) 14 relays output control Type BLR-CA14

Wiring Diagram



Technical Data

Display	Digital LED Accuracy 1.5%
Mechanical Design	
Housing Material	Polycarbonate, self-extinguishing and drip-proof per UL94V-0
Mounting Fasteners	Standard type screw clamp
Front Plate	Moveable & replaced under voltage-free conditions!
Replaceable	Bezels and face plates, May only be replaced under voltage-free conditions!
Terminals	Plug in screw terminals. Screws can turned with standard screw drivers tool.
Contact Protection	Finger-safe full cover included
Dimension	144 x 144 x 95 mm.
Cutout	138 x 138 mm.
Weight	1.3Kg.
Input	
Current Path	CT/5A, Burden 0.6VA CT/1A Burden 0.4VA.
Voltage Path	300- 400V Burden 1.4VA. 100-150V Burden 1.0VA.
Output	
Contact Rating	3000 VA per contact, 250 Vac (energizing) 1500 VA /250 V (hold)
No Volt Release	Automatic disconnection of all capacitors following voltage failure after only 35 msec Automatic switching will recommence 90 seconds after restoration of supply
Setting	
Power Factor	0.70... 1.0, shown on digital display
Switching time	5 - 99 sec.
Consumption	
Aux Supply	220-240V ac, 7VA
Ambient Conditions	
Operating Temperature	- 20 ... + 70 °C
Storage Temperature	- 40 ... + 80 °C
Relative Humidity	max. 95%
Frequency	45...65Hz.
Compliance with Regulations	
Protection	IP 52 front panel, Terminal IP20
Protection	Class 1