

# Rectimat 2

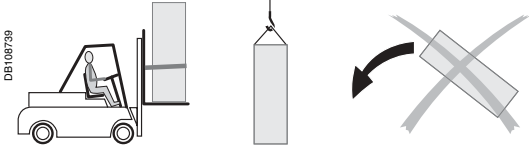
Low voltage capacitor banks  
Enclosures

User manual



# Taking delivery

## Description



### Presentation

The Rectimat 2 is an automatic capacitor bank in the form of:

- enclosures C1 and C2.

### Taking delivery of the equipment

- our goods always travel at the recipient's risk
- we cannot be held responsible for any missing parts or damage ascribable to the forwarding agent. Any claims must be sent by registered post to the forwarding agent
- make sure that no parcels are missing and that the equipment has not suffered any impacts that could affect its insulation capacity and its operation
- check that the technical data marked on the rating plates matches the data given on the order form
- in event of nonconformity, mark the reference of the dispatch note on the claim.

### Handling

- unpack the equipment on the installation site
- preferably use a fork-lift truck
- avoid impacts and deformation.

### Storage

- store the devices in a dry, ventilated room sheltered from rain, water splashes, chemical agents and dust
- storage temperature: -20 °C to +45 °C.

### Dimensions and weights

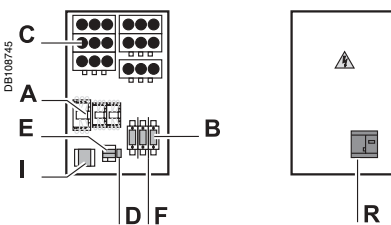
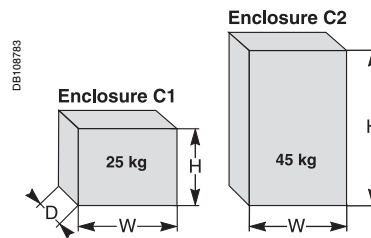


Fig. 1: enclosures C1 and C2.

### Description

- A: step control contactors
- B: step protection HRC fuse
- C: capacitors
- D: current transformer connection terminal block
- E: control circuit protection fuses
- F: power cable connection pads
- I: voltage transformer
- R: power factor controller.

#### Height of ground ref. F power cable connection pads (mm)

Enclosure C1	80
Enclosure C2	170

#### Dimension of enclosures (mm)

	H	W	D
Enclosure C1	400	500	250
Enclosure C2	800	500	250

# Ventilation Installation

## Ventilation

- place the device in a well ventilated room
- ensure that maximum temperatures are complied with when the device is in operation (see page 4, paragraph on “technical data”)
- ensure ventilation inlets are unobstructed
- make sure that the device is protected from dust and humidity.

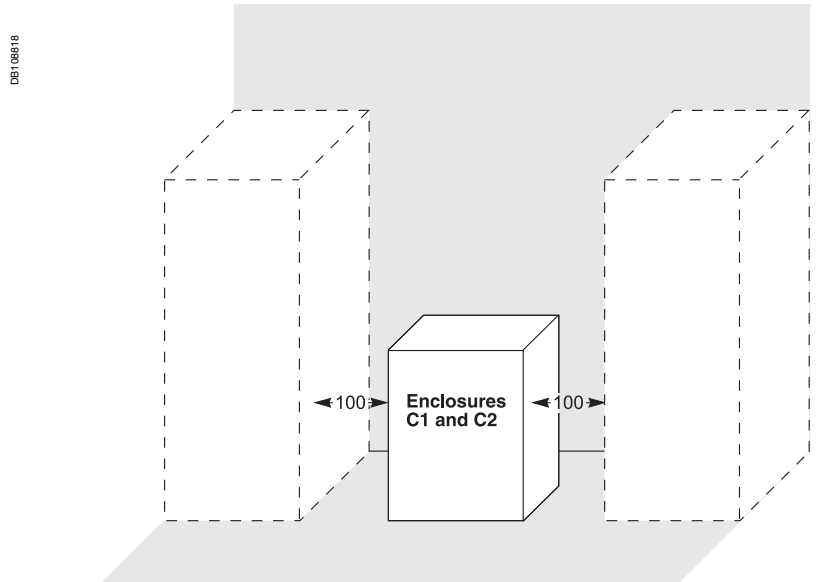


Fig. 2: enclosures C1 and C2.

## Fixing

- fix:
  - the enclosures to a wall or to a plinth (fig. 3) leave a space of 10 cm between the enclosure and another equipment (see page 3, fig. 2)

Centre fixing distance of enclosures (mm)

	W	H	fix.
Enclosure C1	460	350	4 Ø 7
Enclosure C2	460	750	4 Ø 7

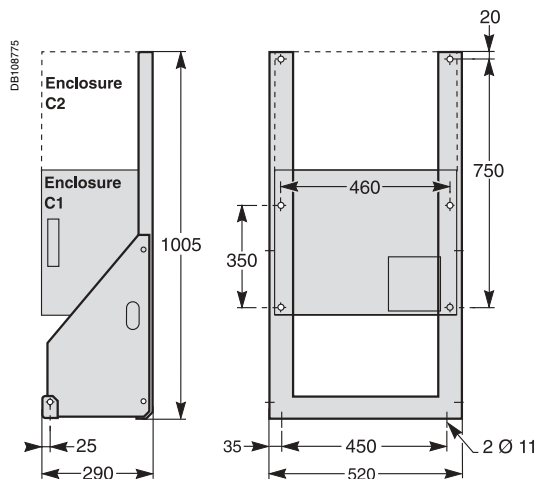


Fig. 3: freestanding plinth for enclosures, cat. no. 52671.

# Wiring diagrams

## Technical data

- voltage, frequency, power, as per rating plate
- capacitance value tolerance: 0, +10 %
- acceptable voltage overloads (8 hours over 24 hours as per IEC 831-1/2): 10 %.
- insulation level: 660 V
- withstand 50 Hz 1 min: 2.5 kV
- ambient temperature class of room:
- maximum temperature: 40 °C
- average temperature over 24 hours: 35 °C
- average annual temperature: 25 °C
- minimum temperature: -5 °C
- power loss:
- 1.5 W/kvar, standard and overrated type
- degree of protection: IP 21D (except bottom face ground side: IP 00)
- load shedding (main-emergency)
- colour:
- metal sheet: RAL 9002
- front plate: RAL 7021
- complies with standards IEC 439-1 and NF EN 60439.

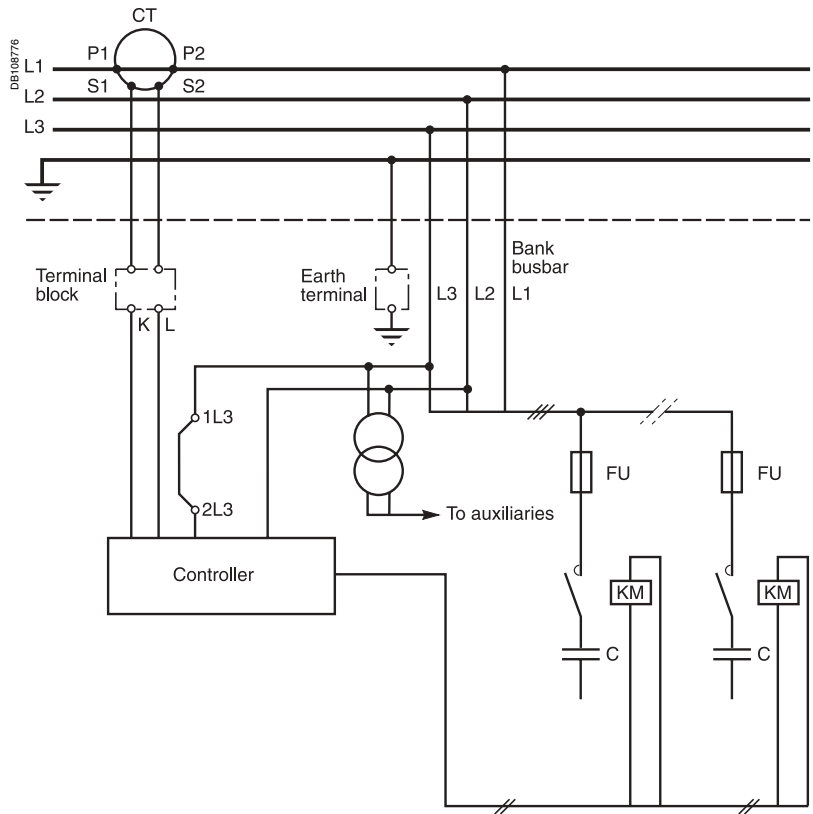


Fig. 4: schematic wiring diagram, standard type enclosures.

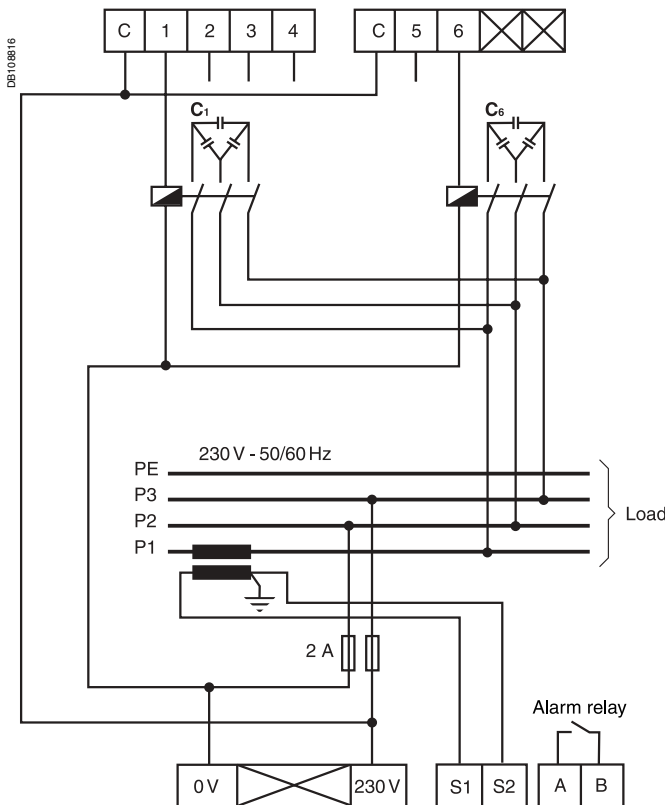


Fig. 5: 230 V line to line connection.

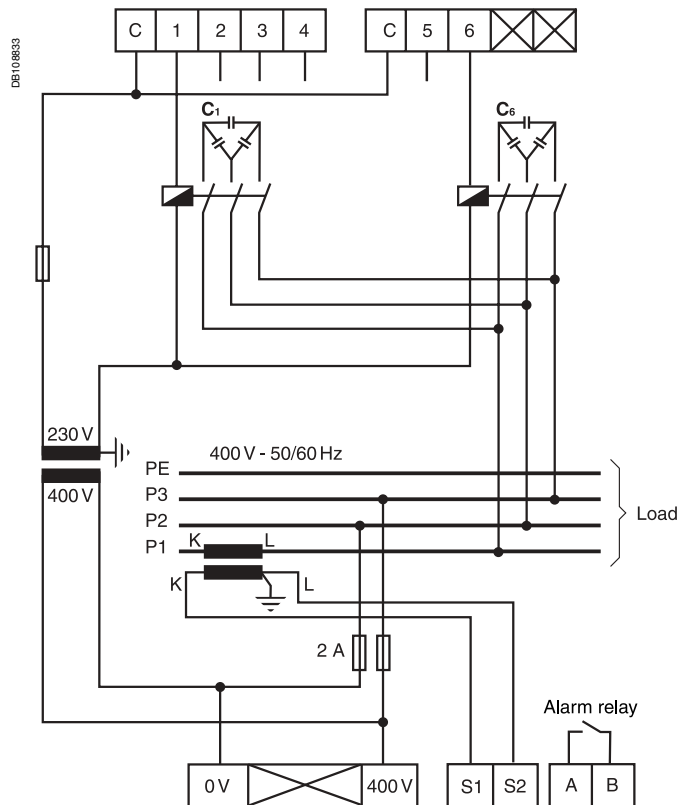


Fig. 5 bis: 400 V line to line connection.

# Electrical connections

Electrical connection is based on the wiring diagrams (page 4, fig. 4 and 5). For power connection, a protective device must be provided in some cases.

- cross-section of cable connecting current transformer and controller: 2.5 mm<sup>2</sup> minimum
- sizing current of cables and switchgear in 400 V - 50 Hz (at 30 °C):
  - 2 A/kvar, standard type
  - 2.2 A/kvar, overrated type.

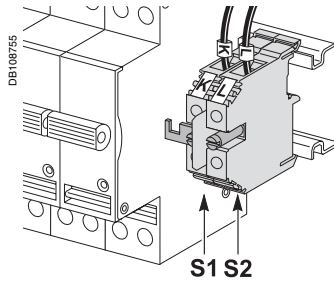


Fig. 6: connection of the current circuit.

## Connection of the current circuit

### For an existing CT (fig. 6):

- ensure that it is placed upstream from the installation, including the capacitor bank
- ensure that its secondary is 5 A
- connect the power factor controller in series with the existing circuit.

### For a CT to be installed (fig. 7 and 8):

The current transformer MUST be placed upstream from the capacitor bank and loads (motors, etc.) on an LV main board phase. P1 transformer or source side P2 load and capacitor bank side

### Once the CT is installed:

- identify the phase on which the CT has been placed as phase L1
- ensure that phase L1 of the bank is connected to the busbar pad on which the CT is placed
- connect the information from the CT, S1 on terminal K and S2 on terminal L of the terminal block (fig. 4, 5 and 6).

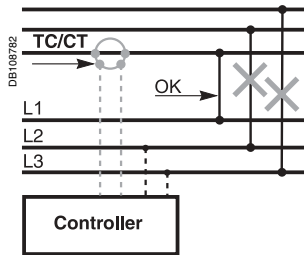


Fig. 7

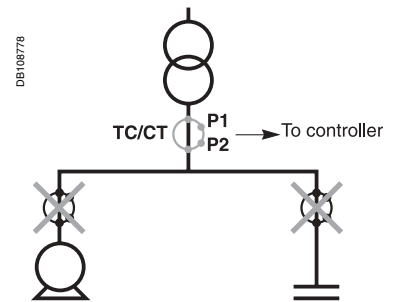


Fig. 8

## Connection of the power circuit

- connect the phases marked L1, L2, L3 on the pads marked L1, L2, L3 (fig. 9).

## Earthing connection (fig. 11)

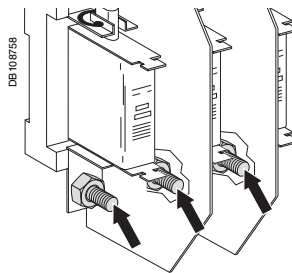


Fig. 9: power connection of enclosures C1 and C2.

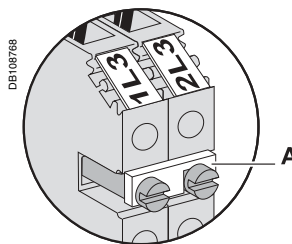


Fig. 10: intervention on the voltage circuit.

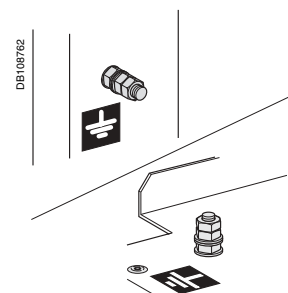
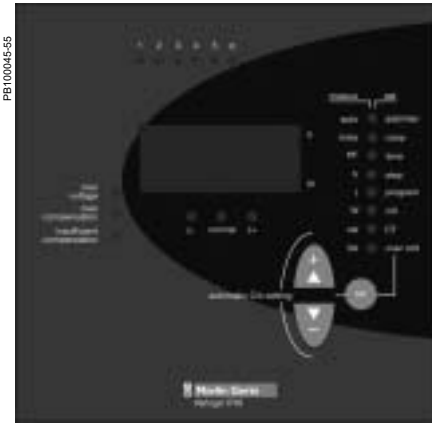


Fig. 11: horizontal or vertical earthing connection.

## Intervention on the voltage circuit (fig. 10)

- load shedding (main-emergency)
- 2 terminals marked 1L3 and 2L3 are bridged using jumper A
  - open this circuit to insert a normally closed contact from the installation (see page 4 fig. 4).

# Configuration of the Varlogic RT6



## Commissioning the Varlogic RT6 controller

### Setting the controller

The power factor controller has been configured in accordance with capacitor bank characteristics.

The only operations required at commissioning are as follows:

- if applicable, set the required  $\cos \Phi$
- configure the current transformer ratio.

### Important:

- for a supply via a summing CT (an installation with several incoming transformers), the ratio to be taken into account is the sum of the ratios of the various instrument CTs
- for an installation with a generating set (load shedding), ensure that the capacitor bank is OFF before switching to the genset, by turning off the supply to the controller. See page 5 the paragraph on "Intervention on the voltage circuit".

### Commissioning the capacitor bank

The parameters required for the capacitor bank to work correctly are factory set. Some parameters depend on the installation specifications and will have to be modified on site during commissioning

- $\cos \Phi$  setting (default value = 1)
- current transformer ratio allowing the measurements to be correctly displayed
- response current value (C/k): it is automatically detected during the automatic C/k setting sequence.

Do not change any other parameters.

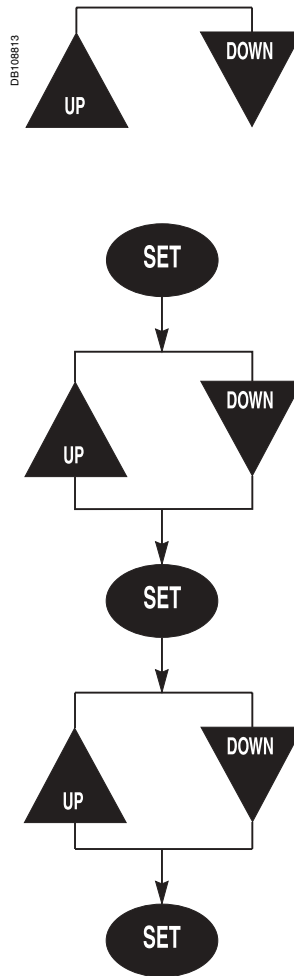
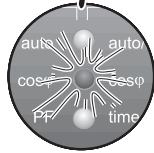
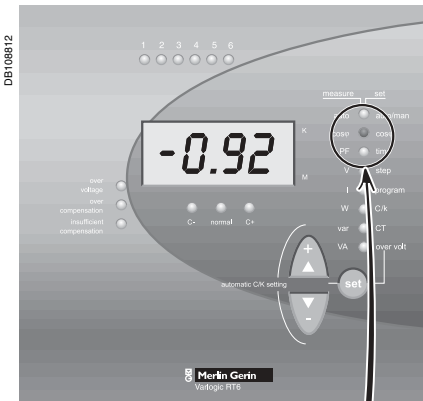
**In particular the time delay must never be less than 50 s, otherwise the battery could be seriously damaged and cease to be covered by the warranty.**

### Operating performance check

- check that  $\cos \Phi$  is the required value
- for full load operation, check that each step is correctly connected
- when the equipment has been in operation for a few hours, check the ambient room temperature.

For further information, please refer to user manual Varlogic RT6.

# Configuration of the Varlogic RT6 (continued)



## Automatic C/k adjustment

C/k adjustment is started by pressing UP-DOWN buttons together.

## Cos $\Phi$ adjustment

By pressing SET button 3 seconds SET menu is started.

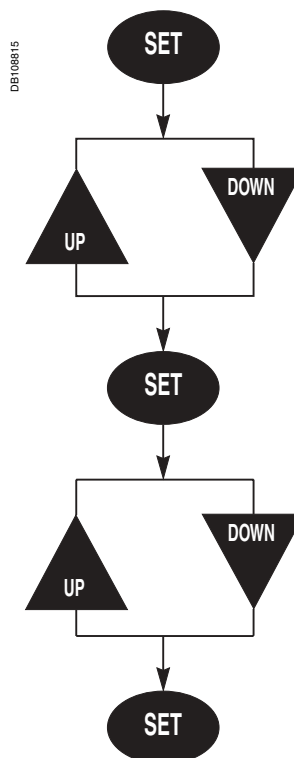
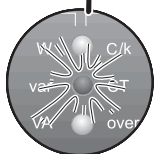
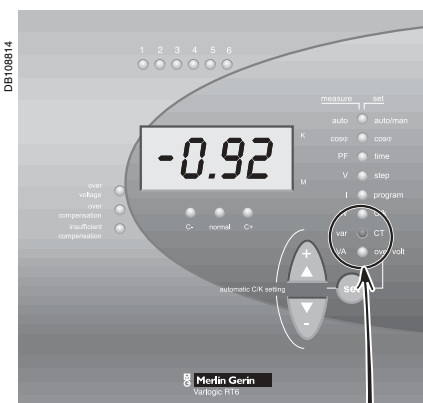
**AUTO** → Display

Cos  $\Phi$  LED is selected by using UP and DOWN buttons. Cos symbol is displayed.

Cos  $\Phi$  adjustment is selected by pressing SET button. Previously adjusted value is shown at the display.

A value between 0.85-1.00 is adjusted by using UP-DOWN buttons.

When targeted value is displayed, it is stored by pressing SET button and RT6 returns to its normal operating mode.



## Selection of current transformer primary value

By pressing SET button 3 seconds SET Menu is started.

**AUTO** → Display

CT LED is selected by means of UP-DOWN buttons. CT symbol is displayed.

Current transformer primary value is selected by pressing SET button. Previously selected CT value is shown on the display.

A value between 5-10000 is adjusted by using UP-DOWN buttons.

When targeted value is displayed, it is stored by pressing SET button and RT6 returns to its normal operating mode.

# Maintenance

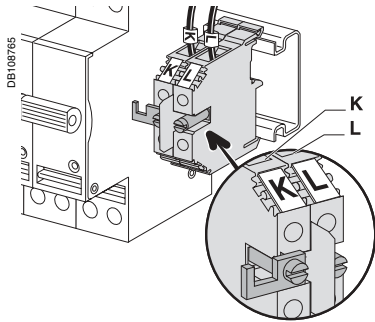


Fig. 12

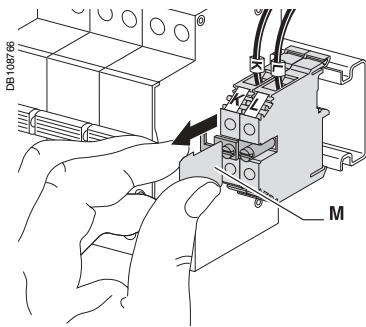


Fig. 13

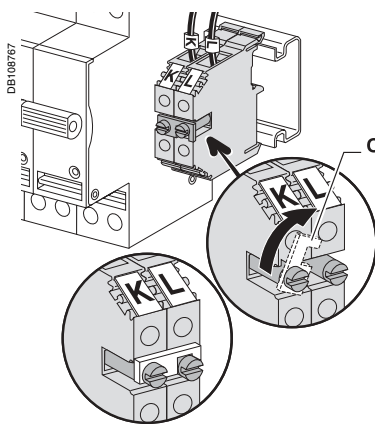


Fig. 14

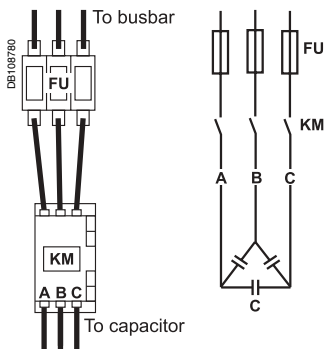


Fig. 15: on line breaking.

The capacitors in the enclosures are accessed via the front panel.

## Maintenance on the current circuit

(fig. 12, 13 and 14)

- first remove the circuit separator **M**, then use jumper **O** to bridge terminals S1 and S2 of the CT (terminals **K** and **L** of the terminal block) (risk of destroying the current transformer with the secondary open)
- once maintenance is complete, lift and disconnect jumper **O** and put back separator **M**.

## Protection of people

Each capacitor is equipped with discharge resistors which reduces the voltage at the terminals to 50 V **one minute after de-energising**.

### Before performing maintenance on the equipment:

- de-energise it
- respect the discharge period (compulsory)
- ensure that each capacitor has fully discharged by short-circuiting and earthing the contactor terminals.

### Caution:

refer to the capacitor bank wiring diagram to identify the contactor/capacitor connection mode.

### Capacitor discharge

- on line breaking (fig. 15)

To ensure that the capacitor has fully discharged, short-circuit terminals AB, AC and BC in turn.

## Annual verifications

One month after energising, check: the contactor terminals for tightness.

Once a year, check the following:

- overall cleanliness of the equipment
- the filters and ventilation system
- proper tightening of the electrical connection terminals
- the condition of the switching and protective devices
- room temperature
- capacitor capacitance (please consult us in the event of a 10 % variation in capacitance).

## Safety

All the operations described in this manual must be performed in accordance with current safety standards under the responsibility of a competent authority.



# Errors and warnings

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## Errors and warnings

The alarm relay is activated if the following "errors" occur.

### Over voltage

If the phase-phase voltage exceeds or equals to preset over voltage value which is programmable (between 410/480 V), then RT6 waits for 1 minute. At the end of 1 minute if there is still over voltage then "OVER VOLTAGE LED" turns on. Depending on selection of over voltage protection function, RT6 switches off all the capacitor steps or continues to compensation.

### Low power factor

When target power factor is not reached to target value, although all the capacitor steps have been connected, low power factor's LED is ON and the alarm relay is activated after 1 min. delay.

### Over compensation

If the system is still capacitive although all the capacitor steps are disconnected, "OVER COMPENSATION LED" is ON and alarm relay is activated after 1 min. delay.

For further information, please refer to user manual Varlogic RT6.





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