



## Film Capacitors – Power Factor Correction

### Key components – Thyristor module TSM-LC

**Series/Type:** TSM-LC100  
**Ordering code:** B44066T0100E402  
**Date:** June 2012  
**Version:** 3

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### Characteristics

- Fast electronically controlled self observing thyristor switch
- Usage in dynamic (fast) power factor correction systems
- For capacitive loads up to 100 kvar

### Features

- Easy installation: self-check after turn-on of main voltage
- Display and control via LED-display
- Permanent self-controlling: voltage parameters, phase sequence, capacitor output, temperature
- Forced cooling by fan, temperature controlled

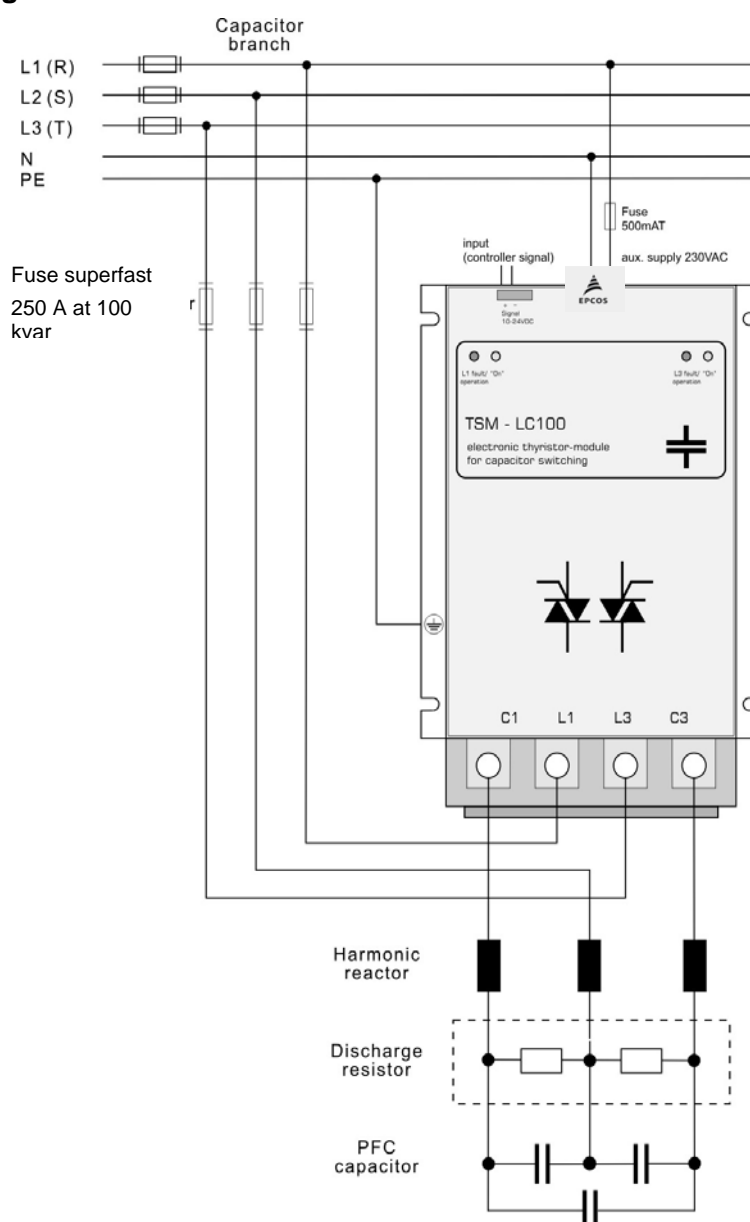


### Technical data and specifications

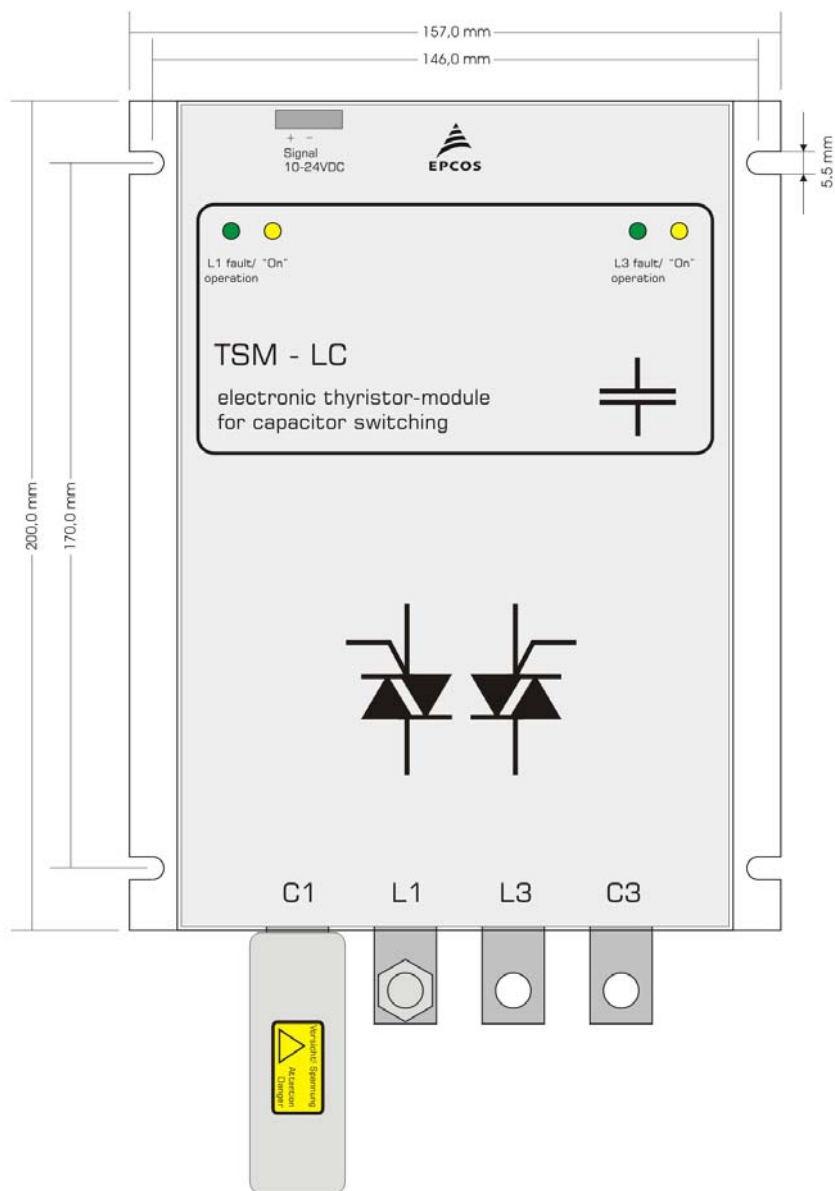
Dimensions	157 × 240 × 195 mm (w × h × d)
Weight	5.5 kg
Voltage	3 × 400 V
Maximum voltage	
- in conventional PFC systems (without reactors)	440 V
- in detuned PFC systems (7% detuning)	440 V (no upward tolerance permitted)
- in detuned PFC systems (14% detuning)	400 V
Frequency	50 Hz/60 Hz
Max. power	75 ... 100 kvar
Max. RMS current* (*no continuous current – thermal load has to be considered)	200 A
Auxiliary supply	230 V AC (needed for fan) via terminal clamp; automatically controlled cooling, over temperature switch off
Activation	10 ... 24 V DC (20 mA), via terminal clamp; internally insulated

Monitoring	Net voltage, temperature and operation status Note: Before re-switching after temperature fault, heat sink temperature must be below 50 °C (hysteresis)!
Display	2 LEDs/phase: operation/error, triggering signal
Power circuit	Direct connection 4-pole via bus bar cable lug 70 mm <sup>2</sup> , D = 10 mm), connection from bottom
Power dissipation	$P_V$ (W) = 2.0 × I (in A); at 400 V/100 kvar typical 300 W
Thermal warming	20 K above ambient temperature at nominal load

### Connection diagram



Dimensional drawing



## Cautions and Warnings

### General

- Thyristor modules TSM series may only be used for the purpose they have been designed for.
- Thyristor modules TSM series may only be used in combination with appropriate pre-switched grid separator device.
- Thyristor modules have to be projected in such a way that in case of any failure no uncontrolled high current and voltages may occur.
- The devices in operation have to be protected against moisture and dust, sufficient cooling has to be assured.

### Attention

Due to the switching principle of the thyristor module the power capacitors are permanently loaded to the peak value of the grid voltage (DC voltage) even when switched off. Therefore following rules have to be obeyed in any case:

- For standard PFC-systems (without reactors) power capacitors of 440 V nominal voltage have to be used; for detuned systems PFC capacitors of 480 V nominal voltage have to be used.
- Due to the high voltage (2 x peak value of nominal voltage) that occurs, the discharge resistors of the power capacitors have to be replaced by special types (2 x accessory EW22 in parallel).
- In dynamic systems with TSM modules no fast discharge reactors may be used (reactor = DC-wise short circuit).
- For standard PFC-systems 2 current limiting reactors are mandatory per thyristor module (2 x BD200).
- Thyristor modules in general have to be protected by superfast electronic fuses. Principles for dimensioning have to be considered. Fuses in the system have to be marked.
- Due to the special switching, the PFC capacitors are fully loaded even when the particular step has been switched off. Protection against contact has to be guaranteed. Warning signals in the systems are required.
- Even in switched off state no electrical isolation is achieved for electronic switches. Therefore parts of the systems may not be touched after switching off the complete system before the capacitors have been completely discharged.

FAILURE TO FOLLOW CAUTIONS MAY RESULT, WORST CASE, IN PREMATURE FAILURES OR PHYSICAL INJURY.

### Note

For detailed information about PFC capacitors and cautions, refer to the latest version of EPCOS PFC Product Profile.

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