



## Film capacitors – Power Factor Correction

### Key components – Thyristor modules

**Series/Type:** TSM-LC100  
**Ordering code:** B44066T0100E402  
**Date:** September 2008  
**Version:** 1

**Preliminary data**
**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**

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 <sub>V</sub> (W) = 2.0 × I (in A); at 400 V/100 kvar typical 300 W
Thermal warming	20 K above ambient temperature at nominal load

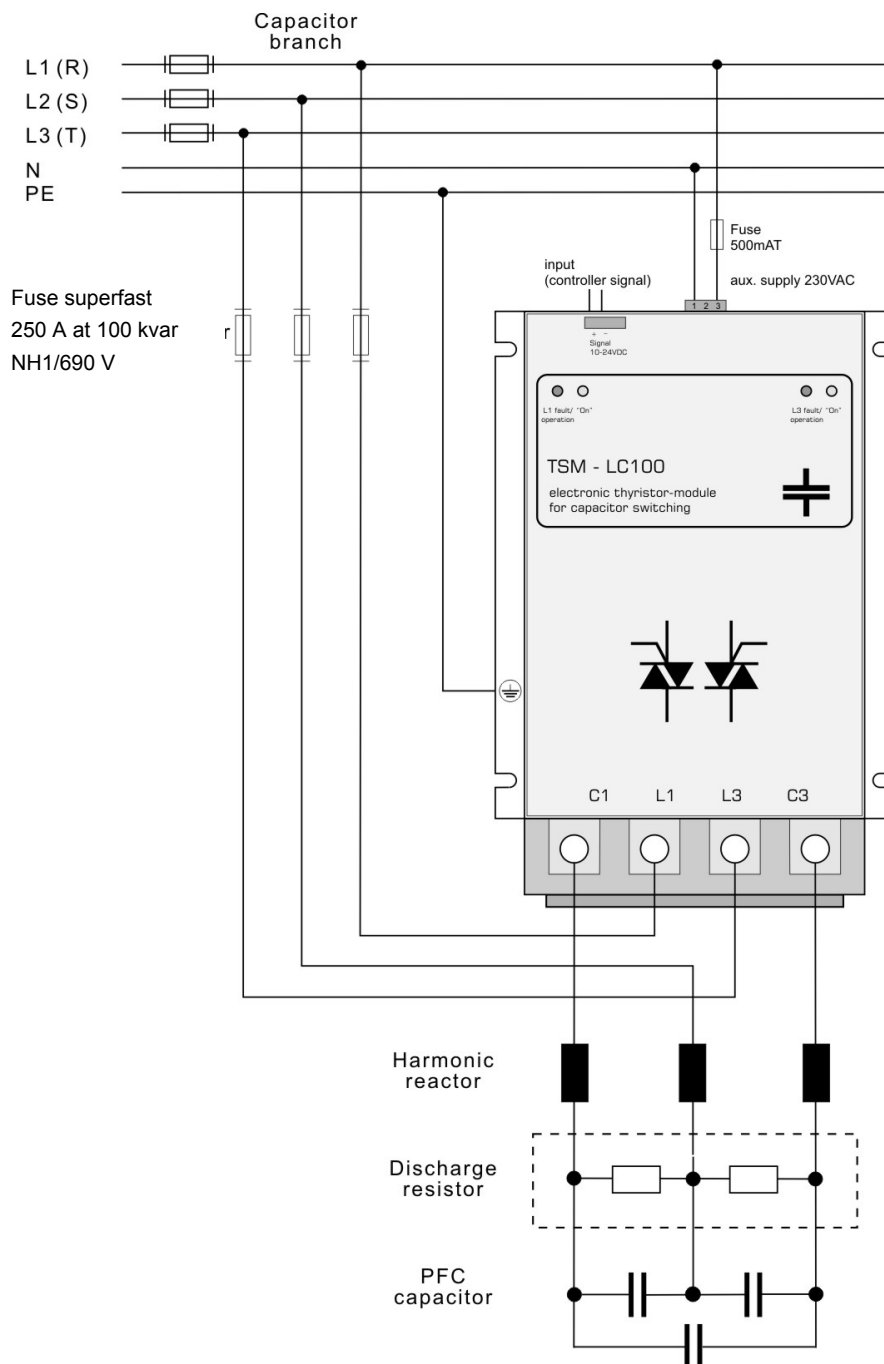
**Preliminary data**

Fuses* (required for protection of TSM-LC and capacitor) (*not included in the delivery)	3 × electronic fuse „superfast“ (NH1 AC 690 V) 100 kvar: 250 A (e.g. SIBA Art.No.: 20 211 20-250)
Switching time	approx. 5 ms
Operating ambient temperature with nominal load	–10 °C ... +55 °C
Assembling	Direct on mounting plate
Mounting position	Vertical, minimum 100 mm distance upwards and downwards

Preliminary data

Connection diagram

Three-phase load (standard)



## Preliminary data

**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 currents 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 the following rules have to be obeyed in any case:

- For standard PFC-systems (400 V grid, without reactors) capacitors of 440 V nominal voltage have to be used; for detuned systems (400 V grid) capacitors of 525 V nominal voltage have to be used.
- Due to the high voltage ( $2 \times$  peak value of nominal voltage) that occurs, the discharge resistors of the power capacitors have to be replaced by special types.
- In dynamic systems with TSM modules no fast discharge reactors may be used (reactor = DC-wise short circuit).
- For standard PFC-systems without (de-)tuned filter reactors 2 special current limiting reactors are mandatory per thyristor module. Further information on request.
- 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.**

**⚠** Please read cautions information about PFC capacitors and cautions as well as installation and maintenance instructions to ensure optimum performance and prevent products from failing, and in worst case, bursting and fire, etc. The actual Product Profile is available at [www.epcos.com/publications](http://www.epcos.com/publications).

Information given in the PFC-product profile and values given in the data sheet reflect typical specifications. You are kindly requested to approve our product specifications or request our approval for your specification before ordering.

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