



Power Factor Correction

Thyristor module TSM-LC-N480

Series/Type: TSM-LC-N480
Ordering code: B44066T3850E408
Date: January 2018
Version: 2

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Characteristics

- Thyristor module for dynamic compensation systems in grids from 380 to 480 V, 50/60 Hz, for 25 to 50 kvar
- Follow-on development TSM-LC-N
- Optimized switching behaviour by micro-processor controlled alignment to capacitor branches with or without detuning reactor
- No wear-out parts (no fan)
- Monitoring of voltage, phase and temperature; status via LEDs
- Switching without delay
- Auxiliary voltage 230 V AC
- Maintenance free, long service life
- Enhanced connection via plugs
- Enhanced temperature management

Applications

Dynamic compensation in fast processes:

- Presses
- Welding machines
- Elevators
- Cranes
- Wind turbines



Mounting and connection

- The mechanical mounting is done directly on a mounting plate. The main terminals can be directly connected via lines to the main fuse resp. capacitor. (max. 35 mm²).
- Connection is done according picture 1. It is mandatory to use superfast electronic fuses as branch fuses to protect the semiconductor device! Basics of dimensioning must be obeyed!
- Triggering of the module is taking place without any time delay by a 10 – 24 VDC signal (coming from the PFC-controller or an adequate control system) fed in at the connection X1 (signal).
- If an increase of the stage output is needed, a cascading of several modules is possible.

Putting into operation

After switching on the net voltage (engaging of the branch fuse) the thyristor module is ready for operation.

The thyristor module has 2 status-LEDs with the following meaning:

LED - left side

Green: operating voltage activated, thyristor module standby

Red permanent: capacitor without capacitance or not existent; thyristor or fuse defect

Red flashing: net voltage L1/L3 missing or too low

LED - right side:

Green: "Module ON" (Trigger)

Red flashing: Over-temperature

Technical data and specifications

Net voltage	380 ... 480 V AC, 50/60 Hz
Aux. voltage	230 V AC, 50/60 Hz
Max. power	Max. 75 A (up to 50 kvar/400 V)
Activation	10 ... 24 V DC (approx.. 10 mA) via terminal clamp, internally insulated
Switching-on time	Depending on degree of de-tuning and dimension of discharge resistor
Display	Via 2 LEDs
Switching time	Ca. 5 ms
Monitoring	Permanent monitoring of net voltage, real current, temperature and operation status. Before re-switching after temperature fault, heat sink temperature must be below 50 °C (hysteresis)!
Power circuit	Direct connection 4-pole via high-current clamps (cable lug 35 mm ²). Connection from bottom.
Max. RMS current	100 A No continuous current – thermal load has to be considered!
Power dissipation	PV (W) = 2.0 • I (in A); at 400 V/50 kvar typically 150 W
Max. voltage	480 V
Fuses	3x electronic fuse “superfast” (NH00 AC 690 V) 50 kvar: 125 A (e.g. SIBA Art.no. 20 209 20-125) 25 kvar: 63 A (e.g. SIBA Art.no. 20 209 20-63)
Dimensions	157 x 200 x 180 (w x h x d)
Weight	4.8 kg
Assembling	Direct mounting on mounting plate
Mounting position	Vertical, minimum 150 mm distance upwards and downwards
Operating ambient temperature with nominal load	-10 ... 55 °C

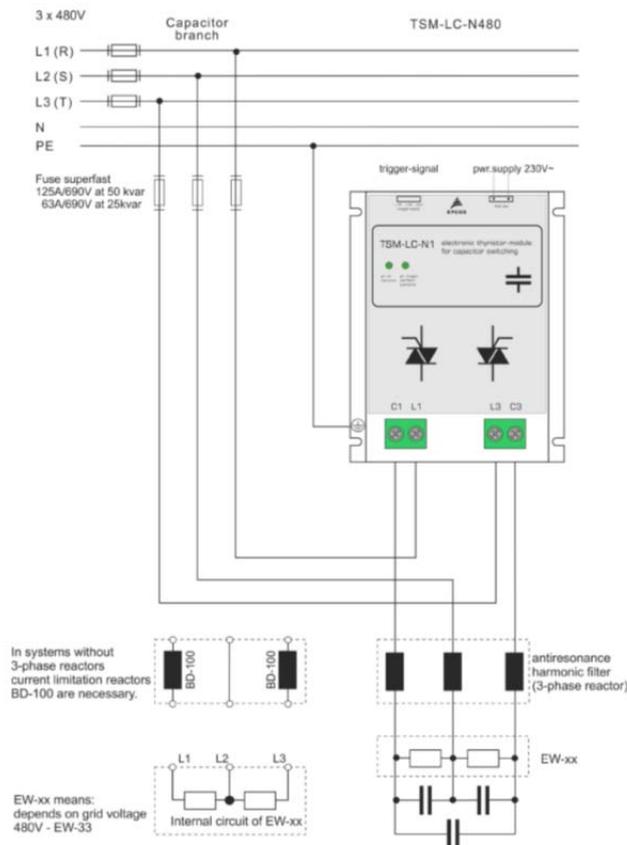
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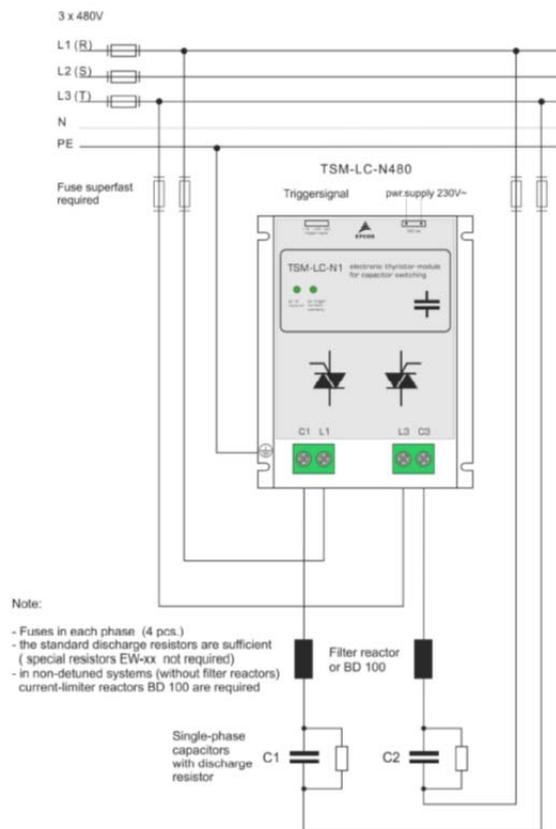
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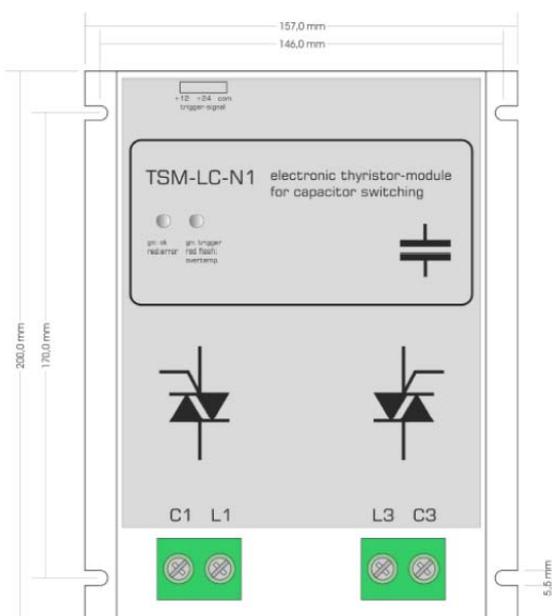
Pict.1: Connection diagram, three phase load (standard)



Pict.2: Connection diagram, two phase load



Pict. 3: Dimensions TSM-LC-N480



Cautions and Warnings

General

- The TSM-LC thyristor-modules may only be used according their intended utilization.
- The TSM-LC thyristor-modules must only be used in combination appropriate safety devices (e.g. superfast fuses).
- The TSM-LC thyristor-modules have to be projected in such a way that no uncontrolled high currents and voltages can occur in case of faults.
- The devices have to be protected against humidity and dust – a sufficient ventilation has to be assured.
- The TSM-LC thyristor-modules must only be switched to the net if any harm or danger to human beings or the PFC-system is eliminated.
- Due to the switching principle of the thyristor modules the PFC-capacitors are permanently loaded at the peak value of the grid voltage (DC current) even when they are disconnected! Therefore, the following instructions have to be obeyed:
- For fast discharging the capacitors special high-voltage resistors are required (e.g. type EW-xx) Standard resistors cannot be used. (EW-xx - type depends on the grid voltage: EW-33 at 480V)
- In dynamic PFC-systems with TSM-LC thyristor-modules fast discharge reactors must not be used (reactor = direct current short circuit.)
- In non-detuned PFC-systems (without reactors) 2 current limitation reactors per thyristor-module are mandatory! Available as accessory (BD100).
- The TSM-LC-thyristor modules have to be protected by superfast electronic fuses in any case. Dimensioning principles have to be observed. Fuses in the PFC-system must be marked!
- Due to the special switching the PFC-capacitors are fully loaded even if the step is switched off. An appropriate protection against touch must be assured!
- Even when electronic switches are turned off, no electrical isolation is given. Therefore even after switching off the complete PFC-system (main circuit breaker), parts of the PFC-system must only be touched after the discharge-time of the PFC-capacitor elapsed.
- In the PFC-system warning signs indicating the presence of residual voltage even at disconnected stage have to be visible.

Maintenance, Repair

The TSM-LC thyristor-switch has to be deactivated for maintenance purpose and main circuit breaker must be released. It must be assured that it cannot be switched on during maintenance. It must be checked that there is no voltage at all. Maintenance must only be executed by specially skilled personnel. In case any repairs are needed, this must only be done from the manufacturers of the TSM- thyristor-module!

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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