



Film capacitors – Power Factor Correction

Key components – Thyristor module TSM

Series/Type: TSM-HV50
Ordering code: B44066T0050E690
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Characteristics

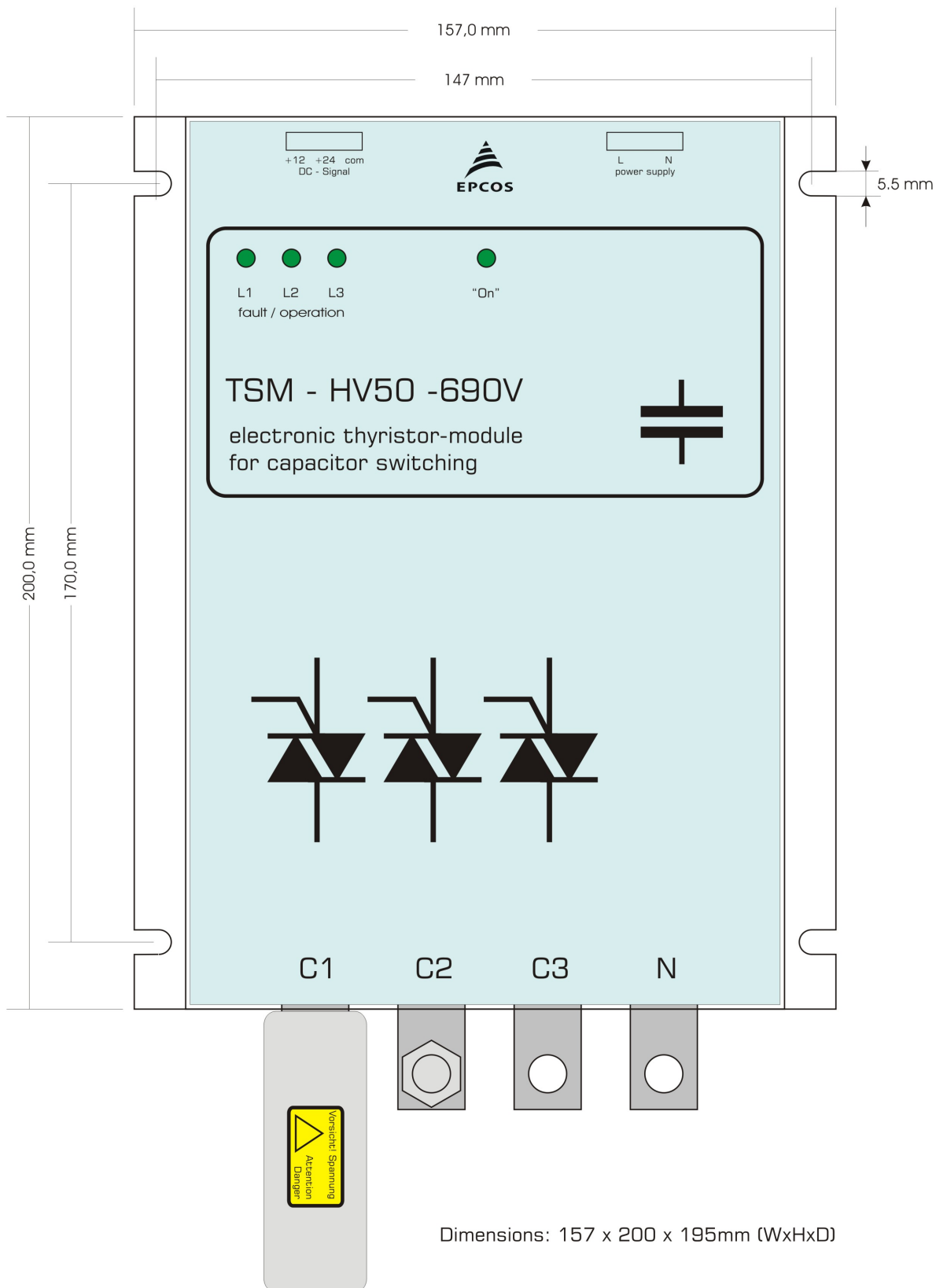
- Fast electronically controlled self observing thyristor switch
- Usage in dynamic (fast) power factor correction systems in 690 V grids, **neutral conductor required**
- For capacitive loads up to max. 60 kvar at 690 V
- Micro-processor controlled alignment to tuned or de-tuned capacitor branches (up to 14%) for optimized switching behavior
- No system perturbation due to switching operations (transients)
- Switching without delay
- Maintenance-free
- Long useful service life
- No noise emission during switching operations
- Compact module ready for connection



Technical data and specifications

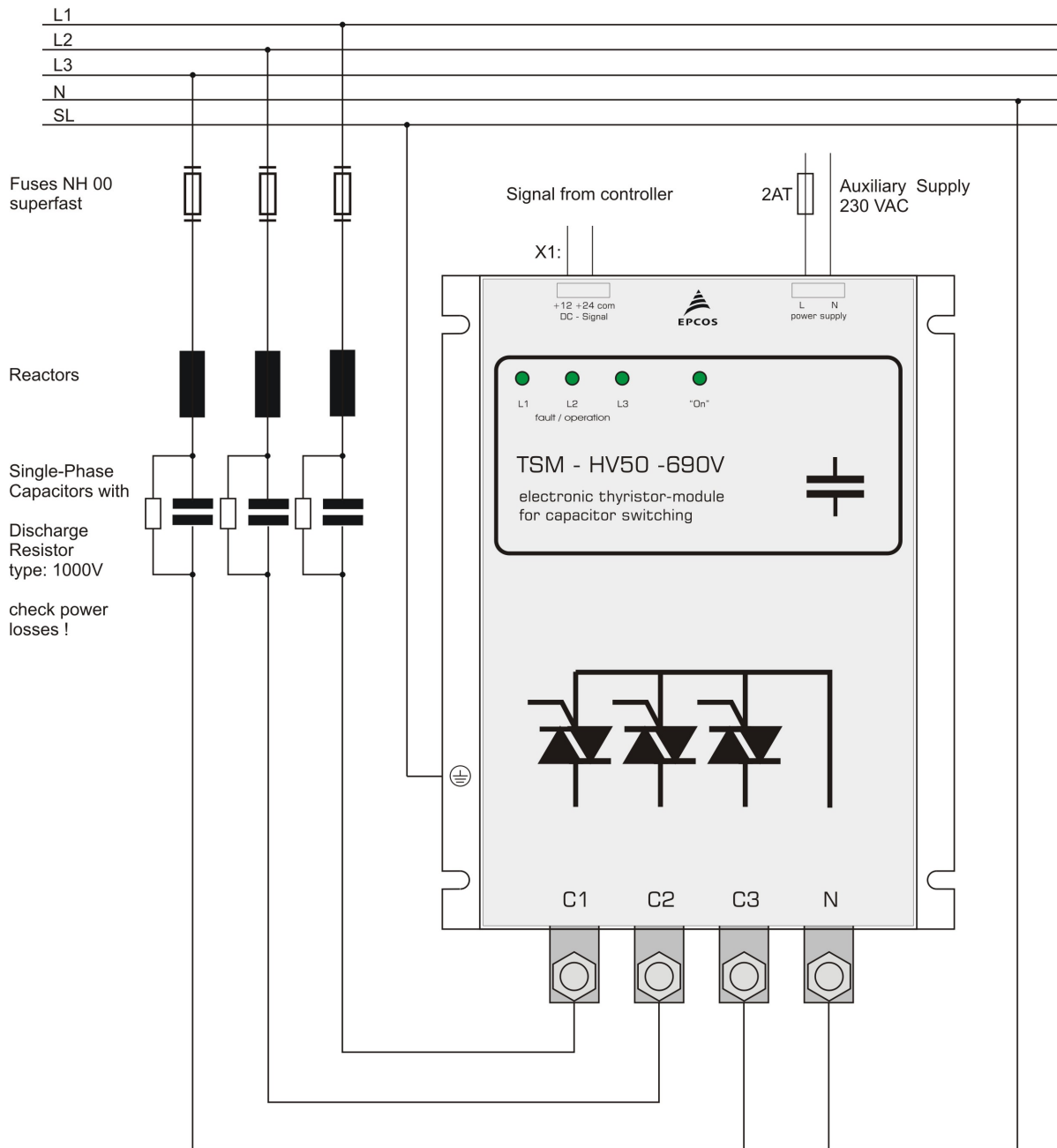
Dimensions (w × h × d)	157 × 200 × 195 mm
Weight	5 kg
Rated voltage	690 V
Maximum voltage	
- in conventional PFC-systems (without reactors)	690 V +/-10%
- in detuned PFC-systems (7% detuning)	690 V +/-10%
- in detuned PFC-systems (14% detuning)	690 V +/-10%
Frequency	50/60 Hz
Maximum power	60 kvar
Auxiliary supply	230 V AC
Activation	10 ... 24 V DC (approx. 20 mA) via terminal clamp, internally electrically isolated
Monitoring	Grid voltage, temperature and operation status Note: Before re-switching after temperature fault, heat sink temperature must be below +50 °C (hysteresis!)
Display	1 status LED per phase: operation/fault and over temperature, 1 LED: triggering signal
Switching time	Approx. 5 ms
Reset time	Depending on degree of detuning and dimension of discharge resistor
Power circuit	Direct connection 4 pole via bus bar cable lug max. 25 mm ² , D = 8 mm
Power dissipation	P_D (in W) = 3.0 × I (in A); at 690 V/50 kvar approx. 125W thermal Note: Ensure proper air convection; forced cooling inside the panel (switchboard)
Fuses (mandatory for protection of components)	3 × electronic fuse „superfast“ NH00 AC 690 V 50/60 kvar: max. 100 A (e.g. SIBA Art.No. 20 209 20-100) 25 kvar: max. 63 A (e.g. SIBA Art.No. 20 477 20-63)
Ambient operating temperature at nominal load	-10 °C ... +55 °C
Mounting position	Vertical; minimum 100 mm distance upwards and downwards
Assembling	Directly on mounting plate

Dimensional drawing



Connection diagram
(three-phase standard)

GRID 3x 690V



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 3-phase switching of the TSM-HV50, standard resistors are sufficient.
- In dynamic systems with TSM modules no fast discharge reactors may be used (reactor = DC-wise short circuit).
- 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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