Switching Devices - Thyristor Modules for Dynamic PFC TSM Series

Ultrafast Smooth Switching • Natural Cooled • Compact Design • Enhanced Life of System

EPCOS

General

Conventional systems for power factor correction are used to optimize the power factor and reduce the level of harmonics in the grid. The usage of new technologies in modern industry has negative impacts on electric power quality of the main supply networks, e.g. frequent high load fluctuations and harmonic oscillation.

Excessive currents, increased losses and flickering will not only influence the supply capacity but will also have a significant impact on the operation of sensitive electronic devices.

The solution for this are dynamic power factor correction systems. With the thyristor module series TSM-LC and TSM-HV, we provide the main component – "the electronic switch" – for dynamic power factor correction.
The TSM module series offers fast electronically controlled, self-observing thyristor switches for capacitive loads up to 50 KVAr, that are capable to switch PFC capacitors within a few milliseconds nearly without a limitation to the number of switchings during the capacitor lifetime.

Applications

- Main supply networks with high load fluctuations for dynamic PFC systems
- Presses
- Welding machines
- Elevators
- Cranes
- Wind turbines

Features

- Easy installation: it can be used similar to a contactor
- All the intelligence needed is offered within the thyristor module itself
- Reaction time: 5 milliseconds only
  Permanent self-controlling of:
  – voltage parameter
  – phase sequence
  – capacitor output
- Display of
  – operation
  – faults
  – activation
- Voltage range: 440 V and 690 V
  Output range:
  440 V: 10, 25 and 50 KVAr
  690 V: 50 KVAr

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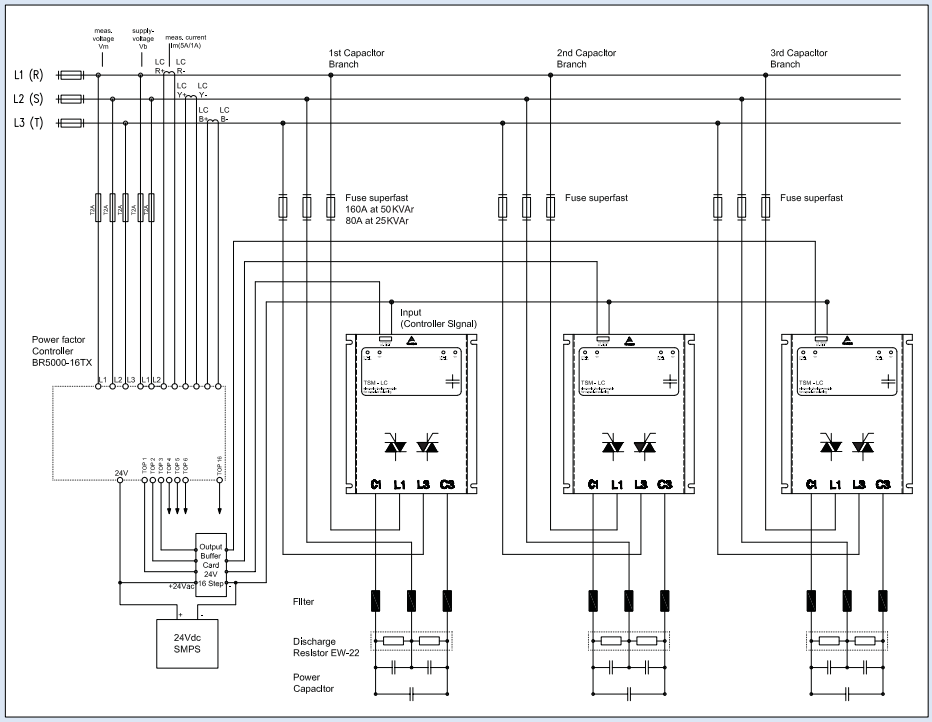
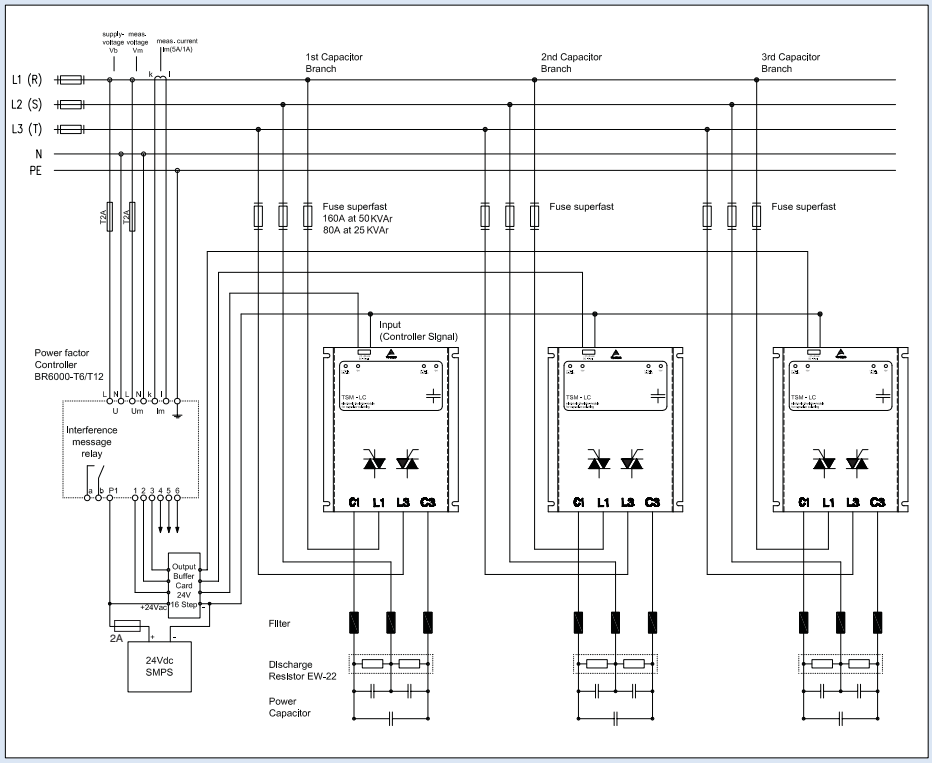
Dynamic PFC network BR5000-T multiple stages



Dynamic PFC network BR6000-T multiple stages



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Selection table TSM series

	TSM-LC 10	TSM-LC 25	TSM-LC 50	TSM-HV 50
Ordering code	B44066T0010R440	B44066T0025R440	B44066T0050R440	B44066T0050R690
Rated voltage	380 … 440 V	380 … 440 V	380 … 440 V	690 V
Max. grid voltage: – in conventional PFC systems(without reactors)	440 V	440 V	440 V	690 V
– in detuned PFC system (7% detuning)	440 V (no upwards tolerance)	440 V (no upwards tolerance)	440 V (no upwards tolerance)	690 V
– in detuned PFC system (14% detuning)	400 V	400 V	400 V	690 V
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Maximum power / at nominal voltage	10 KVAr	25 KVAr	50 KVAr	50 KVAr
Power circuit	Direct connection 4 pole via terminal clamps (D = 6 mm^2 resp. 4 mm^2)	Direct connection 4 pole via busbar (cable lug 25mm^2 D =8 mm)	Direct connection 4 pole via busbar (cable lug 25mm^2 D =8 mm)	Direct connection 4 pole via busbar (cable lug 25mm^2 D =8 mm)
Neutral required	No*	No*	No*	Yes**
Aux. supply voltage required	No	No	No	230 V AC
Connection	from bottom	from bottom	from bottom	from bottom
Losses (PD in W)	2.0 x I (in A) typical; 35 W (thermal)	2.0 x I (in A) typical; 75 W (thermal)	2.0 x I (in A) typical; 150 W (thermal)	3.0 x I (in A) typical; at 690 V/ 50 KVAr approx. 125 W (thermal)
Recommended fuses "superfast"	3 x BS Type (AC 690 V) 40 A	3 x BS Type (AC 690 V) 80 A	3 x BS Type (AC 690 V) 160 A	3 x BS Type (AC 690 V)
Dimensions in mm (w x h x d)	163 x 150 x 75	157 x 200 x 180	157 x 200 x 180	157 x 200 x 195
Weight	1.75 kg	4.8 kg	4.8 kg	5 kg
LED display per phase	2	2	2	1
Cascading	yes	yes	yes	yes
Ambient temperature	–10 °C ... 55 °C	–10 °C ... 55 °C	–10 °C ... 55 °C	–10 °C ... 55 °C
Discharge resistors EW-22 needed	1	1	1	Standard resistor sufficient
Three phase current limitation reactor needed* **	1	1	1	1

*For operation with three-phase capacitor or three single-phase capacitors. **Only for and compulsorily for operation with single-phase capacitors. ***For PFC systems without detuning reactors mandatory.

Accessories for TSM-LC modules

Type/Description
Discharge resistors EW-22 at least 1 piece per step to be used for all types of TSM-LC if fast re-switching time is required. For higher rated steps please contact your local sales office.

Ordering Code
B44066T0022S400

EW-22:

Dimensions (w x d x h)	: 90 x 50 x 100 mm
Weight (approx.)	: 0.3 kg
Design panel	: for mounting on heat sink/fitting
Connection	: wago terminal, ready for three-phase connection to the capacitor

Note :
Three phase current limitation reactor for thyristor modules TSM-series in conventional dynamic PFC-systems without reactor is a must
Used for limitation of the pace of current increase di/dT in the thyristors to the maximum permissible value

Buffer Card

Current amplifier for TSM application • Short circuit protected

Output Buffer card

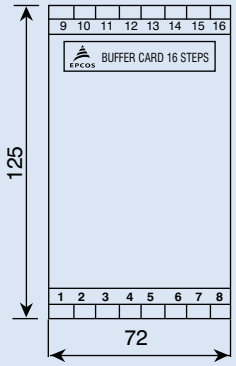
Features

- Transistorised output for fast switching
- Short circuit protection for outputs
- Standard DIN rail mount design provides for easy mounting

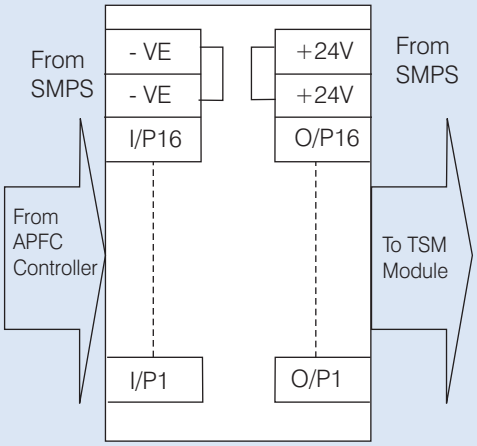
Technical Data

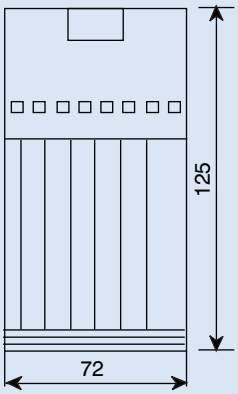
Input signal	24 VDC ± 3V, 15mA
Output voltage	Maximum 1V drop on input signal
Output current	100mA max.
Output type	Transistor output
Number of inputs	16
Number of outputs	16
Temperature range	0°C to 60°C
Mounting	Din Rail mounting
Dimensions (L x W x H)	72 x 125 x 125 mm
Total weight (kG)	0.4 kG (approx)

Dimensions and Connection

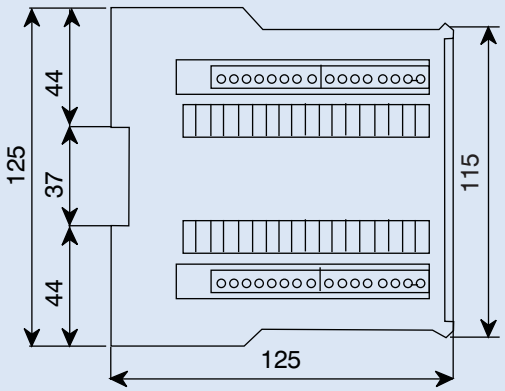


Front View





Top View



Side View