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Thyristor Switching Modules

ABB's pF-TSM is a Thyristor Switch specifically designed for high speed switching of Power Factor Correction Capacitor Banks. (10kVAr, 25kVAr & 50kVAr @ 415/ 440VAC, 50Hz).

Triggering of Thyristor Switch is done by Power Factor Controller meant for such applications viz., ABB-RVT-D / ABB-PFR-T12 etc. having a Transistor Output for the said purpose. It can also be triggered by other means using PLCs & Solid State Relays as well.

Thyristor switching module is for high speed Reactive Power Compensation Systems in Low Voltage grids from 415 / 440 V, 50 Hz, using single or multiple components of 50kVAr, 25kVAr & 10kVAr.

- Suitable for capacitor units with or without detuning reactor.
- High speed switching at Zero differential voltages
- Self Cooled Units with Option of Forced Cooling.
- Monitoring of Supply Voltage, Input Trigger and Thermal Fault.

- No external Power required for TSM.
- Optional cooling FAN runs on external power 230VAC, 50Hz.
- Optional Annunciation Extension Unit using potential free contacts 30VDC, 1A or 230VAC, 1A.
- Robust connections via Copper Bus-bars with safety cover.
- Rodent entry protection.
- Extreme Climate Condition compliant.
- ROHS Compliant.
- No Eddy Current Cable Heating.
- IP Protection Class: IP20.
- Least maintenance.
- Lowest TCO.

Application examples:

High Speed Reactive Power Compensation is desired in applications where the Power Factor changes are very rapid, viz.,

- Welding Equipments.
- Wind Turbines.
- Fast Operation presses.
- Elevators.
- Cranes.
- Others.

TSM Mounting & Connection Information

The Thyristor Switch is mounted directly on the Component Mounting Plate of the Low Voltage Switchboard / Panel. Clearance of 150mm is required for ventilation. The

Power Supply connections are made using copper flexible cables appropriately sized, through protective devices (viz. high speed fuses) as mandated.

A 12 VDC - 24 VDC trigger signal coming from the Power Factor Controller or other arrangement is to be connected at points “T+ & T-”, for triggering ON the module. It is possible to trigger multiple Thyristor Switch Modules simultaneously to achieve a larger kvar step capacity.

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Starting up the Thyristor Switch Module

NOTE: DO NOT TOUCH ANY PART EVEN IN OFF CONDITION.

The Mains Supply must reach the Thyristor Switch Module through the High Speed Fuse protection.

The Green LED indicates Power Supply availability and readiness of the Thyristor Module for activation, in this case Capacitor will be fully charged. – "POWER ON"

The Yellow LED indicates trigger signal provided – "TSM TRIGGERED"

The Red LED indicates that the Temperature Switch on the Heatsink has been activated due to Over temperature beyond 80 °C – "OVER TEMPERATURE"

Technical Specifications:

Rated Supply Voltage	: 415 VAC.
Operating Voltage Range	: 400 V, ..., 440 V.
Rated Frequency	: 50 Hz.
Rated Power	: 10kVAr / 25kVAr / 50kVAr @ 415/ 440 VAC.
Trigger Current	: ~ 10mA, ~20mA @ 12VDC, 24VDC respectively. The Power Factor Controller or other Triggering Mechanism shall have the capability to deliver up to 20mA.
Connection time	: Less than 1 cycle.
Time for reconnection	: 20ms to 40ms depending upon the installed discharge resistor.

CDR22 Installation compulsory (refer below image)

Power Cable Connection	: For 50kVAr - Copper Terminals suitable for 35 mm^2 copper
:	flexible cable lugs – M8 size.
	: For 25kVAr - Copper Terminals suitable for 16 mm^2 copper
:	flexible cable lugs – M8 size.
	: For 10kVAr - Copper Flexible Cable 10 mm^2.
Maximum Current (A)	: 100 A (50kVAr), 50 A (25kVAr) and 20A (10kVAr) non continuous, since thermal load is important.
Power dissipation (W)	: 150W for 50kVAr, 75W for 25kVAr and 30W for 10kVAr typical.
Maximum Voltage (V)	: 440 V.
Fuses	: 3 x High speed fuses.

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Extension Annunciation Unit	: External Annunciation Unit for extending potential free Contact (Optional).
Dimensions (mm)	: 156mm x (200 + 50)mm x 236mm (W x H x D) – In mounted condition.
Mounting position	: Vertical with Heat Sink Duct facing upwards in naturally ventilated environment.
Clearance	: Minimum 150 mm on top and bottom.
Operating Temperature (°C)	: 0…50 °C (with nominal load).

CDR22 Capacitor Fast Discharge Resistor

PLEASE REFER TO OTHER IMPORTANT INSTRUCTIONS REGARDING HIGH SPEED FUSE SIZING, VENTILATION, ETC IN THE INSTALLATION MANUAL