

POWER RESISTORS

- Neutral Grounding Resistors
- Generator Neutral Grounding & Leads Cubicles
- Inverter Braking Resistors
- Motor Starting & Control Resistors
- Cubicle Heaters
- Harmonic Filter Resistors
- Current Limiting Resistors
- RC Filters

REACTORS

- Current Limiting Reactors
- Neutral Grounding Reactors
- Shunt Reactors
- Harmonic Filtering Reactors
- Motor Starting Reactors
- Electric Arc Furnace Reactors
- Smoothing Reactors
- Line and Load Reactors
- Test Laboratory Reactors

TESTING SYSTEMS

- Turn-key Short Circuit Laboratories
- High Current Injection Test Sets
- R - L - C Load Banks

SWITCHGEAR

- CAPACITOR SWITCHING MODULE

TRANSIENT-FREE CAPACITOR SWITCHING MODULE



FEATURES

- Fully transient-free operation
- Instantaneous switching (Max. 20ms response time)
- No harmonic current or voltage content during switching
- Quiet operation
- Ease of installation
- No need for discharge resistors
- Protection against overvoltages resulting from input line side
- Fully software based control algorithm – ease of modification
- Unique and academically developed switching & control methods

TECHNICAL SPECIFICATION

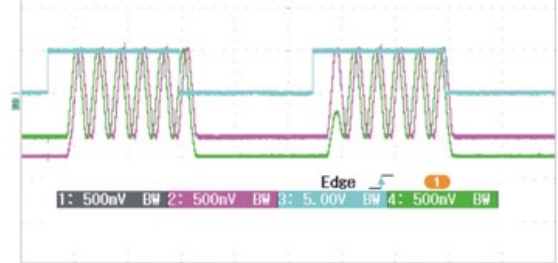
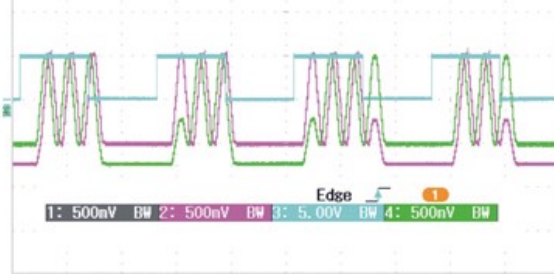
Rated Voltage	400 V AC, 3 Phase
Rated Current	72 A RMS
Frequency	50 Hz
Rated Power	50 kVAR
Operating Ambient Temperature	-10 +50 °C
Storage Ambient Temperature	-20 +80 °C
Relay Follow Frequency	DC 25 Hz
Supply Voltage	230 V AC Single Phase
Power Consumption	60 VA Maximum
Indicators	Red and Green LEDs
Overvoltage Protection Threshold	1050 V line-to-line capacitor voltage
Dimensions (mm)	187x180x205 (wxhxd)
Weight	7.5 kg

OPERATION

Switching of the module is made in accordance with the external relay signal. When doing the switchings, the module exhibits a maximum of 20ms response time. The control algorithm, which is developed specially for eliminating any current or voltage transients, decides on the proper switching instant for fully transient-free operation after the relay signal changes its state from OFF to ON. This is done by unique decision methods developed with an academic approach. It is tested in field that, no harmonic current or voltage content is created if these decision methods are applied. The following figures show the fully transient-free operation of the module. The capacitor voltage waveforms are given together with the relay signal.

50ms -21.000ms

50ms -20.000ms



In the figures above, the blue waveform is the relay signal, the pink and green signals are the capacitor voltages. It is seen that, with almost no delay, the capacitor voltages follow phase voltages when the relay signal becomes HIGH. Similarly they become DC voltages for the relay signal being LOW.

SUMMARY of ADVANCED FEATURES of QuickVAR

- The control algorithm is fully software based and any modification can be made easily according to customers' needs, if needed in the future.
- All of the operating principles of the thyristors, transient-free switching algorithm, the analog & digital parts of the control card are uniquely and academically developed by means of using many professional simulation software tools.
- QuickVAR is able to react to the relay signal within a period of 20ms at maximum.
- Overvoltage protection feature protects the capacitors and thyristors against unwanted input phase voltage disturbances.
- No current and voltage transients occur while the module switches ON and OFF ("Fully transient-free operation")
- It does not need any discharge resistors.
- It can follow a relay signal of frequency 25Hz without any delay. It can switch the PFC bank in and out 25 times in a second consecutively.