

Three-Pole Operated (GO) switchgear – C/B SynchroTeq MVX for energizing MV power transformers

Mandatory specifications:

- **Drive mechanism:** to achieve repeatable and predictable operation times, the switch or C/B mechanism shall be mechanically consistent and fitted with one of the following drive types:
 - “spring-loaded” type or
 - “electro-magnetic actuator” type or
 - “servo-driven actuator” type.

Caution: motorized mechanisms are not eligible for SynchroTeq MVX applications.

- **Repeatability:** the optimal mitigation of inrush currents / voltage dips when energizing transformers requires a pole repeatability of +/- 1ms or less under constant conditions. In our experience this is commonly achieved using the above-mentioned drive mechanisms.
- **DC-powered C/B coils and control circuits:** The C/B coils (O/C or TRIP/CLOSE), or the inputs of coil control modules, as well as the control circuits (I/Os including a 52a contact) must be DC powered.

Caution: AC-powered C/B coils or control circuits do not allow for SynchroTeq MVX applications.
- **SynchroTeq MVX power source:** the SynchroTeq MVX must be powered from a DC, uninterruptible source: 24V, 48V, 110V, 125V, 220V versions are available.

FAT / SAT:

Once integrated in the switchgear, the SynchroTeq MVX can be subject to a FAT / SAT at no load, at your facilities. At this occasion VIZIMAX will observe and collect:

- the C/B operation times and their dispersions,
- the effects of various C/B coil voltages on the C/B operation times.

The switchgear – C/B will be operated with LV injections (FAT) or with MV injections (SAT).

A variable DC power source will be provided by the customer for the collection of the operation times. The collected data, the matching switching events and SynchroTeq MVX configuration files will be delivered.

Notes:

1. **Outdoor applications / influence of the temperature on the C/B operation times:** the customer will check if the temperature influences the C/B operation time. When relevant, the C/B supplier will be asked for the applicable curves or data - minimum three (3) points - prior to the FAT/SAT services for configuring the compensation of the effects of the temperature variation.
2. Under particular conditions, the interruption of low magnetizing currents when switching off power transformers (in particular with vacuum poles) can produce voltage spikes/transients. This phenomenon cannot be addressed by the SynchroTeq MVX. Please consult your switchgear – CB supplier / your application engineers to evaluate the need for surge arresters or RC snubbers.

Definitions:

FAT: Factory Acceptance Tests. Generally performed at the switchgear manufacturer’s facilities.

SAT: Site Acceptance Tests. Generally performed in the field when upgrading/refurbishing existing switchgear.

Independent (Single) Pole Operated switchgear – C/B SynchroTeq MVX for energizing MV power transformers

Mandatory specifications:

- **Drive mechanism:** to achieve repeatable and predictable operation times, the switch or C/B mechanism shall be mechanically consistent and fitted with one of the following drive types:
 - “spring-loaded” type or
 - “electro-magnetic actuator” type or
 - “servo-driven actuator” type.

Caution: motorized mechanisms are not eligible for SynchroTeq MVX applications.

- **Repeatability:** the optimal mitigation of inrush currents / voltage dips when energizing transformers requires a pole repeatability of +/- 1ms or less under constant conditions. In our experience this is commonly achieved using the above-mentioned drive mechanisms.
- **DC-powered C/B coils and control circuits:** The C/B coils (O/C or TRIP/CLOSE), or the inputs of coil control modules, as well as the control circuits (I/Os including 52a contacts) must be DC powered.

Caution: AC-powered C/B coils or control circuits do not allow for SynchroTeq MVX applications.
- **SynchroTeq MVX power source:** the SynchroTeq MVX must be powered from a DC, uninterruptible source: 24V, 48V, 110V, 125V, 220V versions are available.

FAT / SAT:

Once integrated in the switchgear, the SynchroTeq MVX can be subject to a FAT / SAT at no load, at your facilities. At this occasion VIZIMAX will observe and collect:

- the C/B operation times and their dispersions,
- the effects of various C/B coil voltages on the C/B operation times.

The switchgear – C/B will be operated with LV injections (FAT) or with MV injections (SAT).

A variable DC power source will be provided by the customer for the collection of the operation times. The collected data, the matching switching events and SynchroTeq MVX configuration files will be delivered.

Notes:

1. **Outdoor applications / influence of the temperature on the C/B operation times:** the customer will check if the temperature influences the C/B operation time. When relevant, the C/B supplier will be asked for the applicable curves or data - minimum three (3) points - prior to the FAT/SAT services for configuring the compensation of the effects of the temperature variation.
2. Under particular conditions, the interruption of low magnetizing currents when switching off power transformers (in particular with vacuum poles) can produce voltage spikes/transients. This phenomenon cannot be addressed by the SynchroTeq MVX. Please consult your switchgear – CB supplier / your application engineers to evaluate the need for surge arresters or RC snubbers.
3. For optimal results, the controlled switching requires the following C/B poles specifications be met at all times over the rated service life:
 - Pole bouncing effects must be effectively dampened or avoided.
 - C/B poles with appropriate minimum arcing times. (RDDS > 1).

Definitions:

FAT: Factory Acceptance Tests. Generally performed at the switchgear manufacturer’s facilities.

SAT: Site Acceptance Tests. Generally performed in the field when upgrading/refurbishing existing switchgear.

Independent (Single) Pole Operated switchgear – C/B SynchroTeq MVX/MVR for energizing MV capacitor banks and filters

Mandatory specifications:

- **Drive mechanism:** to achieve repeatable and predictable operation times, the switch or C/B mechanism shall be mechanically consistent and fitted with one of the following drive types:
 - “spring-loaded” type or
 - “electro-magnetic actuator” type or
 - “servo-driven actuator” type.

Caution: motorized mechanisms are not eligible for SynchroTeq MVX/MVR applications.

- **Repeatability:** the optimal mitigation of inrush currents / voltage dips when energizing transformers requires a pole repeatability of +/- 1ms or less under constant conditions. In our experience this is commonly achieved using the above-mentioned drive mechanisms.
- **DC-powered C/B coils and control circuits:** The C/B coils (O/C or TRIP/CLOSE), or the inputs of coil control modules, as well as the control circuits (I/Os including 52a contacts) must be DC powered.

Caution: AC-powered C/B coils or control circuits do not allow for SynchroTeq MVX/MVR applications.

- **SynchroTeq MVX power source:** the SynchroTeq MVX/MVR must be powered from a DC, uninterruptible source: 24V, 48V, 110V, 125V, 220V versions are available.
- **Fast-switching of Capacitor Banks and Filters (SynchroTeq MVX only):** the C/B drive mechanisms, controllers and power supplies will be selected with respect to the required switching pace and to the applicable recharging time (spring loaded mechanisms or electronic control modules).

FAT / SAT:

Once integrated in the switchgear, the SynchroTeq MVX can be subject to a FAT / SAT at no load, at your facilities. At this occasion VIZIMAX will observe and collect:

- the C/B operation times and their dispersions,
- the effects of various C/B coil voltages on the C/B operation times.

The switchgear – C/B will be operated with LV injections (FAT) or with MV injections (SAT).

A variable DC power source will be provided by the customer for the collection of the operation times. The collected data, the matching switching events and SynchroTeq MVX configuration files will be delivered.

Notes:

1. **Outdoor applications / influence of the temperature on the C/B operation times:** the customer will check if the temperature influences the C/B operation time. When relevant, the C/B supplier will be asked for the applicable curves or data - minimum three (3) points - prior to the FAT/SAT services for configuring the compensation of the effects of the temperature variation.
2. For optimal results, the controlled switching requires the following C/B poles specifications be met at all times over the rated service life:
 - Pole bouncing effects must be effectively dampened or avoided.
 - C/B poles with appropriate minimum arcing times. (RDDS > 1).

Definitions:

FAT: Factory Acceptance Tests. Generally performed at the switchgear manufacturer’s facilities.

SAT: Site Acceptance Tests. Generally performed in the field when upgrading/refurbishing existing switchgear.

Independent (Single) Pole Operated switchgear – C/B SynchroTeq MVR for energizing MV shunt reactors

Mandatory specifications:

- **Drive mechanism:** to achieve repeatable and predictable operation times, the switch or C/B mechanism shall be mechanically consistent and fitted with one of the following drive types:
 - “spring-loaded” type or
 - “electro-magnetic actuator” type or
 - “servo-driven actuator” type.

Caution: motorized mechanisms are not eligible for SynchroTeq MVR applications.

- **Repeatability:** the optimal mitigation of inrush currents / voltage dips when energizing transformers requires a pole repeatability of +/- 1ms or less under constant conditions. In our experience this is commonly achieved using the above-mentioned drive mechanisms.
- **DC-powered C/B coils and control circuits:** The C/B coils (O/C or TRIP/CLOSE), or the inputs of coil control modules, as well as the control circuits (I/Os including a 52a contact) must be DC powered.

Caution: AC-powered C/B coils or control circuits do not allow for SynchroTeq MVR applications.
- **SynchroTeq MVR power source:** the SynchroTeq MVR must be powered from a DC, uninterruptible source: 24V, 48V, 110V, 125V, 220V versions are available.

FAT / SAT:

Once integrated in the switchgear, the SynchroTeq MVR can be subject to a FAT / SAT at no load, at your facilities. At this occasion VIZIMAX will observe and collect:

- the C/B operation times and their dispersions,
- the effects of various C/B coil voltages on the C/B operation times.

The switchgear – C/B will be operated with LV injections (FAT) or with MV injections (SAT).

A variable DC power source will be provided by the customer for the collection of the operation times. The collected data, the matching switching events and SynchroTeq MVR configuration files will be delivered.

Notes:

1. **Outdoor applications / influence of the temperature on the C/B operation times:** the customer will check if the temperature influences the C/B operation time. When relevant, the C/B supplier will be asked for the applicable curves or data - minimum three (3) points - prior to the FAT/SAT services for configuring the compensation of the effects of the temperature variation.
2. For optimal results, the controlled switching requires the following C/B poles specifications be met at all times over the rated service life:
 - Pole bouncing effects must be effectively dampened or avoided.
 - C/B poles with appropriate minimum arcing times. (RDDS value >1)

Definitions:

FAT: Factory Acceptance Tests. Generally performed at the switchgear manufacturer’s facilities.

SAT: Site Acceptance Tests. Generally performed in the field when upgrading/refurbishing existing switchgear.