Complete Preassembled Capacitor Bank, For Pole-Mounted, Three-Phase Capacitor Banks For 7.2 kV Delta or 14.4 kV Solidly-Grounded Wye Systems

Specification

1.0 SCOPE

This specification covers the requirements for a complete three-phase, pole mounted shunt capacitor bank for connection to a standard distribution system in either a 7.2 kV ungrounded delta or 14.4 kV solidly-grounded wye configuration at 60 Hz.

2.0 APPLICABLE PUBLICATIONS AND STANDARDS

The capacitor bank assembly shall comply with the applicable provisions of the latest NEMA, IEEE, ANSI, and IEC standards relating to switchgear. Applicable standards include, but are not limited to:

2.1. IEEE Std 18 – Standard for Shunt Power Capacitors

2.2. IEEE 1036 – Guide for Application of Shunt Power Capacitors

2.3. IEEE Std. C37.66 – Standard Requirements for Capacitor Switches for AC Systems (1 kV to 38 kV)

2.4. IEEE Std. C37.99 – Guide for the Protection of Shunt Capacitor Banks

2.5. IEC 60871-1 – Shunt Capacitors for A.C. Power Systems Having a Rated Voltage Above 1,000 V

3.0 PRODUCT REQUIREMENTS

3.1. General

The assembled capacitor bank shall conform to the requirements of the standards referenced in Section 2.0 and the specifications herein, for use in the described application in Section 1.0.

The Preassembled Capacitor Bank shall be a complete site-ready package providing all the equipment and materials required for installation. The package shall provide a complete, operational, and functional system. Components that are connected to the frame shall be installed and wired.

System shall have zero-voltage sequence closing to eliminate inrush currents, lower peak voltage, and improve power quality after switching. System shall have an accuracy of +/- 0.05 milliseconds.

System shall utilize a single control enclosure.

3.2. **Configuration**

Capacitor Banks applied on the 7.2 kV ungrounded delta system shall be connected in an ungrounded-wye configuration.

Capacitor Banks applied on the 14.4 kV solidly-grounded wye system shall be connected in a grounded-wye configuration.

3.3. **Individual Capacitor Units**

The preassembled capacitor bank shall include individual capacitor units in accordance with the TDMIS referenced below.

3.4. **Capacitor Controls and Sensors**

The preassembled capacitor bank shall include a capacitor control in accordance with the TDMIS referenced below.

3.5. **Capacitor Switches**

The preassembled capacitor bank shall include capacitor switches in accordance with the TDMIS referenced below.

3.6. **Capacitor Racks**

The preassembled capacitor bank shall include a capacitor rack in accordance with the TDMIS referenced below.

3.7. **Conductors and Connectors**

All current carrying conductor shall be XLPE jacketed #2 stranded copper. Electrical connections between components mounted to the capacitor rack shall be made with XLPE jacketed #2 stranded copper. Ground conductors shall be #8 stranded copper.

All electrical connectors shall be AMPACT brand. Tapped connections to the overhead distribution lines shall be by stirrups.

3.8. **Cutouts**

Fused cutouts shall be installed as a means of disconnect and of protection for the capacitor bank. The cutouts shall be 15kV class, 95kV BIL minimum, 200A continuous current, and polymer construction. Refer to TDMIS-26.

3.9. **Fuse Links**

Fuse size and speed shall be in accordance with the TDMIS referenced below.

3.10. **Arresters**

Arresters for the 14.4kV grounded wye system shall utilize Heavy Duty 12kV, 10.2kV MCOV arresters with an 8.9kJ per kV rating.

Arresters for the 7.2kV ungrounded delta system shall utilize Heavy Duty 9kV, 7.65kV MCOV arresters with 8.9kJ per kV rating.

All arresters shall be polymer construction.

3.11. **Control Power Transformer (CPT)**

The CPT for the 14.4kV grounded wye system shall be rated for 1.5kVA, 8,320 V (l-g) primary and a 120 VAC secondary.

The CPT for the 7.2kV ungrounded delta system shall be rated for 1.5kVA, 7,200 V (l-l) primary and a 120 VAC secondary.

3.12. **Grounding**

All equipment, including but not limited to, line sensors, transformers, switches, capacitor unit tanks, metallic enclosures or mounting hardware, and the controller, associated with the switched capacitor bank shall be solidly connected to the pole ground wire, which shall be connected to a 5/8" x 10' copper ground rod. If a ground rod does not exist at the pole, or the existing ground rod is found to be deteriorated, a new one shall be installed. Refer to TDMIS-7.

On the 14.4kV solidly-grounded wye system, the neutral studs of the capacitor units shall be tied to the system neutral, and the system neutral shall be tied to the pole ground.

On the 7.2kV ungrounded delta system, **only** the capacitor unit tanks shall be tied to the pole ground. Connections shall be made by means of the manufacturer's specified tank ground point. If any neutral conductor exists on the pole, the tank ground shall **not** be tied to the system neutral, but shall be connected to the pole ground.

4.0 TESTING

Certified test reports substantiating compliance with the Standards listed in Section 2.0 shall be furnished upon request for any item in the capacitor bank assembly, as applicable.

5.0 ASSOCIATED TDMIS DOCUMENTS

5.1. TDMIS-9121 – Capacitor Controls and Sensors

5.2. TDMIS-9122 – Individual Capacitor Units

5.3. TDMIS-9123 – Capacitor Switches

5.4. TDMIS-9124 – Capacitor Racks

5.5. TDMIS-5131 - Three-Phase Controlled Capacitor Bank – 14.4 kV Grounded-Wye System

5.6. TDMIS-5132 – Three-Phase Controlled Capacitor Bank – 7.2 kV Delta System

5.7. TDMIS-2700 – Protection – Section 2732 - Fuse Selection for Overhead Capacitors