THE CITY OF COLUMBUS
DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF POWER

MOLDED VACUUM SWITCHGEAR

Solid Dielectric, For Underground and Enclosure-Mounted Applications, Up to 15 kV

Specification

TDMIS-9274

Revised 09/2020

1.0 SCOPE

This specification covers the requirements for three-phase, solid dielectric, one-way, molded vacuum switchgear consisting of loadbreak vacuum switches and electronically controlled, resettable vacuum fault interrupters for use on standard distribution class voltages up to 15 kV.

2.0 APPLICABLE PUBLICATIONS AND STANDARDS

The switchgear shall comply with the applicable provisions of the latest NEMA, IEEE, ANSI, and IEC standards relating to switchgear. Applicable standards include:

2.1. ANSI/IEEE C37.74 – Standard Requirements for Subsurface, Vault, and Padmounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems up to 38 kV

2.2. IEEE 386 – Standard for Separable Insulated Connector Systems for Power Distribution Systems Rated 2.5 kV through 35 kV

2.3. IEC 62271-103 – International Standard for High-voltage Switchgear and Controlgear – Part 103: Switches for Rated Voltages Above 1 kV up to and Including 52 kV

3.0 PRODUCT REQUIREMENTS

3.1. General

The switchgear shall be available in a one-way molded vacuum switch (MVS) or interrupter (MVI) that can be used in vault/subsurface applications.

3.1.1. The switchgear shall be submersible and intended for either wet or dry vaults.

3.1.2. The equipment shall be provided with stainless steel mechanism enclosure(s) and hardware regardless of the type of vault.

3.1.3. The equipment shall be suitable for wall, floor, or ceiling mounting where necessary.

3.1.4. Parking stands shall be provided for 200-amp rated units.

3.2. Loadbreak Vacuum Switches

3.2.1. Loadbreak switches shall be group-operated three-phase and shall be of a compact, dead-front and submersible design.

3.2.2. The high voltage portion of the switch shall include a reliable vacuum interrupter encapsulated in pre-molded EPDM rubber insulation and shall be shielded with a semi-conductive, pre-molded EPDM rubber jacket. Semi-conductive paint shall not be acceptable.

3.2.3. Internal dielectric and environmental separation between line and ground potentials shall be accomplished using a silicone rubber diaphragm bonded to the insulated drive rod and the internal structural fiberglass tube.

3.2.4. The switch shall be equipped with a spring mechanism that is charged by an attached hot stick operable handle and shall provide high-speed operation independent of the operating handle speed.

3.2.5. Cable interfaces shall be either standard 200 amp bushing wells or 600 amp bushings in accordance with IEEE 386.

3.2.6. Switch shall include a hot stick operable handle with provisions to padlock in the open and close positions.

3.2.7. The switch shall be available in the following ratings:

Voltage class	15	kV
Maximum design voltage	17	kV
Frequency	60	Hz
BIL impulse	95	kV
One-minute AC withstand	35	kV
Five-minute DC withstand	53	kV
Load interrupting and loop switching	630	A
Capacitor or cable charging interrupting	10	A
Asymmetrical momentary and 3-operation fault close	25,600	A
Symmetrical one-second rating	16,000	A
Continuous current	630	A
Eight-hour overload current	900	A
Current sensor ratio	1,000:1	
Mechanism	Spring operating	

3.3. Vacuum Fault Interrupters

3.3.1. Resettable vacuum fault interrupters shall be three-phase trip configurations and shall be of a compact, dead-front and submersible design.

3.3.2. The high voltage portion of the interrupter shall include a reliable vacuum interrupter encapsulated in pre-molded EPDM rubber insulation and shall be shielded with a semi-conductive, pre-molded EPDM rubber jacket. Semi-conductive paint shall not be acceptable.

3.3.3. Internal dielectric and environmental separation between line and ground potentials shall be accomplished using a silicone rubber diaphragm bonded to the insulated drive rod and the internal structural fiberglass tube.

3.3.4. The interrupter shall be equipped with a spring mechanism that is charged by an attached hot stick operable handle and shall provide high-speed operation independent of the operating handle speed.

3.3.5. A separate opening spring shall be automatically charged during the closing operation to provide instant trip if the control detects an overcurrent condition.

3.3.6. Cable interfaces shall be either standard 200 amp bushing wells or 600 amp bushings in accordance with IEEE 386.

3.3.7. Interrupter shall include a hot stick operable handle with provisions to padlock in the open and close positions.

3.3.8. Interrupter shall include positive, color-coded, “OPEN” and “CLOSED” position indicator directly attached to the mechanism drive shaft.

3.3.9. Electronic Controls

a) The electronic control package shall be completely self-powered, requiring no batteries or external power.

b) Field-selectable fuse or relay curves and trip settings shall be available. The control package shall monitor current and signal the vacuum interrupters to trip upon detection of a fault.

c) Internal Control shall be internal and integral to the unit (no separate control box) and molded inside the current sensing device. The control shall be accessible via computer connection to view or modify settings. This control shall be used with a ganged three-phase or three single-phase mechanisms. Phase and Ground trip, as well as inrush restraint shall be available.

3.3.10. The interrupter shall be available in the following ratings:

Voltage class	15	kV
Maximum design voltage	17	kV
Frequency	60	Hz
BIL impulse	95	kV
One-minute AC withstand	35	kV
15-minute DC withstand	53	kV
Load interrupting and loop switching	630	A
Capacitor or cable charging interrupting	10	A
Line charging	2	A
Asymmetrical momentary and 3-operation fault close	25,600	A

Symmetrical one-second rating	16,000	A
Continuous current	630	A
Eight-hour overload current	900	A
Current sensor ratio	1,000:1	
Mechanism	Spring operating	

3.4. **Nameplate**

The switchgear shall be provided with a securely attached stainless steel nameplate containing the below information, which follows the IEEE standard requirements:

a) Manufacturer's catalog number
b) Manufacturer's serial number
c) Manufacture date
d) Maximum voltage
e) Impulse voltage (BIL)
f) Continuous & loadbreak current
g) Momentary & fault close
h) Total weight

4.0 TESTING

Certified test reports substantiating compliance with the Standards listed in Section 2.0 shall be furnished upon request.

5.0 STANDARD CONFIGURATIONS

TDMIS ID	Switch Type	Device	Phases	End Interface	Main Interface
UMVS6	Subsurface	Switch	3	600 A bushing	600 A bushing
UMVI2	Subsurface	Interrupter	3	600 A bushing	600 A bushing
UMVI6	Subsurface	Interrupter	3	200 A bushing well	200 A bushing well