Medium Voltage Metal-Enclosed Switches

Outdoor Medium Voltage Switch

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Outdoor Medium Voltage Switch—MVS Cable Connection to Liquid-Filled Transformer

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An Eaton Green Solution

Product Description

Eaton's MVS load interrupter switchgear is a metal-enclosed assembly consisting of a switch, bus and fuses.

MVS switchgear is available in one or more vertical section assemblies. The three-pole switch will interrupt its rated load current with its quick-make, quick-break mechanism. Optional fuses ensure short-circuit protection at all times.

Application Description

MVS switchgear provides safe, reliable switching and fault protection for medium voltage circuits where high duty cycle operation is not needed.

- Single switch and transformer primary
- Duplex switch
- Selector switch
- Automatic transfer control

Features, Benefits and Functions

Quick-make, quick-break mechanism: A reliable heavy-duty coil spring mechanism drives the switch blades at high speed into either the open or the closed position. The speed of operation is independent of the person operating the switch.

Direct drive mechanism: A metal-to-metal direct drive mechanism eliminates chains or cables that may break or need adjusting.

DE-ION® arc interruption: DE-ION arc chambers and spring-loaded auxiliary blades ensure fast load current interruption and eliminate arcing damage to the main contacts.

Positive switch position indication: Red and green multilingual (English/Spanish/French) labels located directly on the switch operating mechanism give visual indication of switch position.

Interlocked for safety: Mechanical interlocks prevent closing the switch when the compartment door is open, or the opening of the door when the switch is closed.

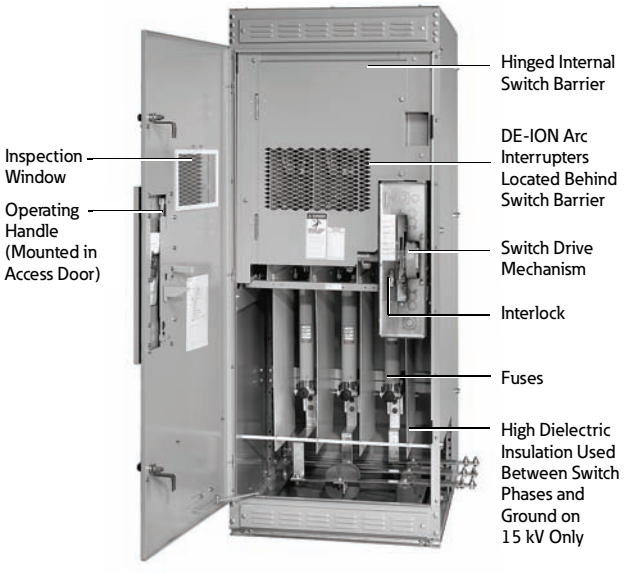
Safety under fault conditions: The switch, depending upon the rated voltage, is available with three or four fault-closing operations with ratings up to 61,000 amperes rms asymmetrical, exceeding the industry standards one time operation.

Safety barrier: A hinged solid metal barrier with a perforated metal viewing area shields the disconnect switch when the compartment door is opened.

Short-circuit protection: A full range of Eaton fusing options is available for short-circuit protection.

Eaton's SF_6-free switchgear: Eaton medium voltage switchgear use vacuum switches combined with solid insulation material. This environmentally-friendly technology avoids the use of SF_6 as an insulation gas.

Indoor Medium Voltage Switch—MVS Bus Connection to Dry-Type Transformer



Standards and Certifications

MVS switchgear meets or exceeds IEEE® C37.20.3 as it applies to metal-enclosed switchgear.

Either Underwriters Laboratories® (UL) or Canadian Standards Association® (CSA) listing is available for MVS switchgear in many configurations, with a number of options.

MVS switchgear is available seismically qualified to meet the requirements of the Uniform Building Code® (UBC), California Title 24 and BOCA® requirements in many configurations with a number of options.

Reference Information

See *Consulting Application Guide* for detailed list of ratings and options. For renewal parts, see CA08105001E.

Product Selection

Contact Eaton for pricing.

Technical Data and Specifications

- Rated maximum voltage classes of 5, 15, 27 and 38 kV
- Rated impulse levels, kV BIL: 60, 95, 125, 150
- Continuous and load-break ratings: 600 amperes available at all voltage classes; 1200 amperes available at 5 and 15 kV
- Designs available in indoor and outdoor non-walk-in configurations
- Manual or motor operated

Indoor Medium Voltage Switch and Fixed Breaker—MSB

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An Eaton Green Solution

Product Description

Eaton's MSB switchgear is an integrated assembly of a visible load-break disconnect switch, fixed-mounted vacuum circuit breaker, and control devices that are integrated electrically and mechanically for circuit protection. All major components are manufactured by Eaton, establishing one source of responsibility for the equipment and ensuring high standards in quality, coordination, reliability and service. MSB switchgear would typically be used where both cost and protection are important design parameters.

Application Description

Applications include ground fault protection, primary and/or secondary switching, and protection on unit substations, automatic transfer switching at medium voltage levels, capacitor switching, high duty cycle and tight system coordination protection.

MSB switchgear can also be an economic benefit in single-ended substations because it may allow the customer to eliminate the secondary main protection and switching device.

- Low resistance ground schemes
- Single-ended substation designs
- Overcurrent protection

Features, Benefits and Functions

- Visible isolation
- Fully rated fixed vacuum circuit breaker
- Electrical operation
- No fuses
- Improved coordination capability
- Improved transformer protection
- Ground fault protection
- Capacitor switching
- High switching duty cycle
- Integral overcurrent protection

Eaton's SF_6-free switchgear: Eaton medium voltage switchgear use vacuum switches combined with solid insulation material. This environmentally-friendly technology avoids the use of SF_6 as an insulation gas.

Standards and Certifications

MSB switchgear meets or exceeds IEEE C37.20.3 as it applies to metal-enclosed switchgear.

CSA listing is available for MSB switchgear in many configurations with a number of options.

MSB switchgear is available seismically qualified to meet the requirements of the Uniform Building Code, California Title 24 and BOCA requirements in many configurations with a number of options.

Reference Information

See *Consulting Application Guide* for detailed list of ratings and options. For renewal parts, see CA08105001E.

Product Selection

Contact Eaton for pricing.

Technical Data and Specifications

- Rated maximum voltages of 4.76–15 kV
- Continuous current ratings up to 1200 amperes
- 25 and 40 kA rms symmetrical short-circuit interrupting capacity
- Designs available in indoor and outdoor non-walk-in configurations
- Single vertical section and transformer primary configurations
- Lineups consisting of MSB and MVS vertical sections

Indoor Metal-Enclosed Drawout Vacuum Breaker—MEB
Used as Main for Two Fused Switches

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Product Description

Eaton's MEB switchgear is a metal-enclosed assembly of single high drawout VCP-W vacuum circuit breakers and control devices that are integrated electrically for circuit protection. (For drawout vacuum breaker metal-clad switchgear, type VacClad-W, see **Volume 3, Tab 7**) All major components are manufactured by Eaton, establishing one source of responsibility for the equipment and ensuring high standards in quality, coordination, reliability and service.

Application Description

MEB can be applied as the primary main device and integrated with fused feeder switches in a lineup of fused MVS switchgear.

Applications include ground fault protection, primary and/or secondary switching, and protection on unit substations, automatic transfer switching at medium voltage levels, capacitor switching, high duty cycle and tight system coordination protection.

MEB switchgear can also be an economic benefit in single-ended substations because it may allow the customer to eliminate the secondary main protection and switching device.

- Low resistance ground schemes
- Single-ended substation designs
- Overcurrent protection

Features, Benefits and Functions

- Fully rated drawout vacuum circuit breaker
- Electrical operation
- Improved coordination capability
- Improved transformer protection
- Ground fault protection
- Capacitor switching
- High switching duty cycle
- Integral overcurrent protection

Standards and Certifications

MEB switchgear meets or exceeds IEEE C37.20.3 as it applies to metal-enclosed switchgear.

CSA listing is available for MEB switchgear in many configurations with a number of options.

MEB switchgear is available seismically qualified to meet the requirements of the Uniform Building Code, California Title 24 and BOCA requirements in many configurations with a number of options.

Reference Information

See *Consulting Application Guide* for detailed list of ratings and options. For renewal parts, see CA08105001E.

Product Selection

Contact Eaton for pricing.

Technical Data and Specifications

- Rated maximum voltages of 4.76 and 15 kV
- Continuous current rating of 1200 or 2000 amperes
- Short-circuit current ratings up to 38 kA rms symmetrical
- Designs available in indoor and outdoor non-walk-in configurations
- Single vertical section and transformer primary configurations
- Lineups consisting of MEB vertical sections and MVS vertical sections

Indoor Unitized Power Centers

Bottom Cable Entry and Top Cable Entry

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Description ***Page***

Unitized Power Centers—UPC
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Product Description

Eaton's Unitized Power Centers combine an MVS primary disconnect switch, a ventilated dry-type transformer and Pow-R-Line 4 secondary distribution devices in a compact, factory-assembled integral unit. These self-contained units provide maximum kVA in minimum space, and their unitized construction simplifies installation.

Other advantages include:

- Front accessibility
- Against-the-wall mounting
- Dimensions consistent with standard doorways
- Liberal space for primary and secondary cables
- Molded case circuit breaker or fusible switch secondary distribution

Features, Benefits and Functions

The primary disconnect switch is a manually operated, two-position, quick-make, quick-break type MVS. Distribution class surge arresters protect the transformer from surge voltages, and current limiting fuses protect against fault currents. Insulated cable passes through a steel barrier to connect the switch to the transformer.

The power transformer is of a ventilated, dry-type, core-form construction. Standard Class 220°C insulation allows normal operation at 150°C temperature rise above a 30°C nominal ambient and a 40°C peak ambient.

The secondary distribution section consists of group mounted Series C® molded case circuit breakers or FDP-W fusible switches separated from the transformer by steel barriers. Additional vertical sections may be added for additional low voltage distribution.

Standards and Certifications

Power transformer core and coil assemblies meet all applicable IEEE/ANSI/NEMA® standards.

Reference Information

See *Consulting Application Guide* for detailed list of ratings and options.

Product Selection

Contact Eaton for pricing.

Technical Data and Specifications

- Indoor enclosure only
- Maximum primary voltages:
  - 3 kV through 15 kV
  - Three-phase, 60 Hz, delta primary
- Primary BIL:
  - Voltages not exceeding 2.5 kV maximum—20 kV BIL
  - Voltages above 2.5 kV up to 7.2 kV maximum—30 kV BIL
  - Voltages above 7.2 kV up to 15 kV maximum—60 kV BIL
- Transformer:
  - 12.5–1000 kVA
  - Winding material, copper type, ventilated dry
- Insulation:
  - Class H 220°C rise (standard)
  - 150°C, 115°C and 80°C rise available
  - Fan cooling available to increase kVA rating by $33^1/_3$%
  - Taps: ±(2) 2.5% FCAN and FCBN
- Secondary voltages:
  - 208Y/120 volts—four-wire
  - 240 volts—three-wire
  - 480Y/277 volts—four-wire
  - 575 volts—four-wire
- Secondary BIL: 10 kV BIL

OEM Fusible Switches

MVS-C Switch

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Product Description

MVS-C switches are open frame switches that must be mounted in a suitable enclosure for the OEM market. Eaton's MVS-C load interrupter switches are available in many ratings. When properly applied, they will provide safe, low-cost switching where occasional or infrequent disconnecting means is desired. The three-pole switch, with its quick-make, quick-break mechanism, will interrupt its rated load current.

Application Description

MVS-C switches can be applied in suitable enclosures for many switching duties whether manual or automatic operation is specified:

- Transformer primary switching
- Transformer secondary switching
- Power distribution switching

Features, Benefits and Functions

Plug & Play™: The switch and operating mechanism install as a single entity. No handle and chains or cables to mount and adjust. Improves productivity in assembly reducing overall cost.

Quick-make, quick-break mechanism: A reliable heavy-duty coil spring mechanism drives the switch blades at high speed into either the open or the closed position.

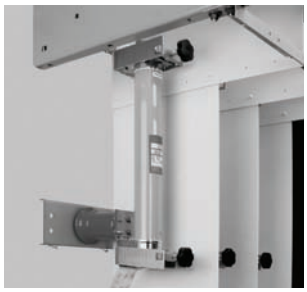
DE-ION arc interruption: DE-ION arc chambers and spring-loaded auxiliary blades ensure safe, fast load current interruption and eliminate arcing damage to the main contacts.

Positive switch position indication: Red and Green multilingual (English/Spanish/French) labels located directly on the switch operating mechanism give visual indication of switch position.

Interlocked for safety: When properly installed to utilize the built-in design feature, mechanical interlocks prevent closing the switch when the enclosure door is open, or opening the door when the switch is closed. As an alternate interlock method, key interlock provisions are included.

Safety under fault conditions: The switch, depending upon the rated voltage, is available with three or four fault-closing operations with ratings up to 61,000 amperes rms asymmetrical, exceeding the industry standards one-time operation.

Fuse mountings: Complete three-phase fuse mounting assemblies or fuse live parts are available that are fully compatible with MVS-C switches. The fuse mountings are intended for use with Eaton's fuses.



MVS-C Fuse Mounting

Direct drive mechanism: A metal-to-metal direct drive mechanism eliminates chains or cables that need adjusting or break.

Standards and Certifications

- MVS-C switches meet or exceed ANSI C37.22 ratings
- UL and CSA recognized component listing services are available for 5 and 15 kV manual and motor operated MVS-C switches

Reference Information

For renewal parts, see CA08105001E.

Product Selection

Contact Eaton for pricing.

Technical Data and Specifications

- Rated maximum voltage classes of 5, 15, 27 and 38 kV
- Rated impulse levels, kV BIL: 60, 95, 125, 150
- Continuous and load-break ratings: 600 amperes available at all voltage classes; 1200 amperes available at 5 and 15 kV
- Rated momentary and fault close currents, 40 and 61 kA rms asymmetrical; 40 kA available at all voltage classes; 61 kA available at 5, 15 and 27 kV
- Manual, motor or shunt-trip operated