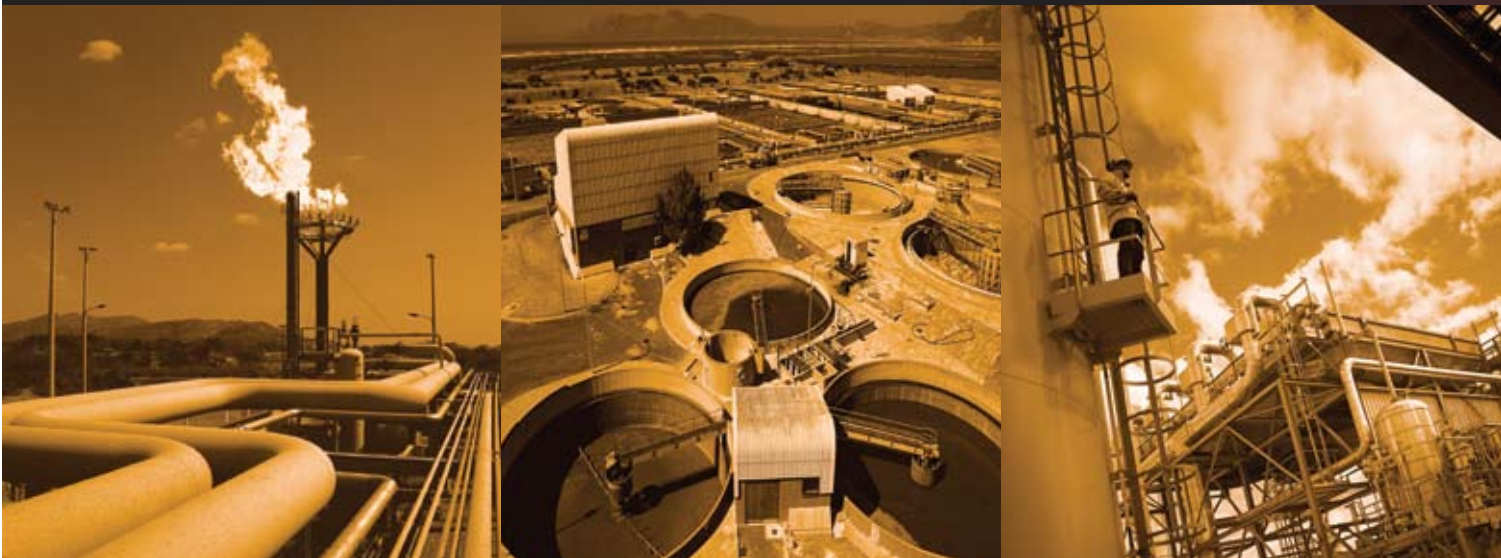


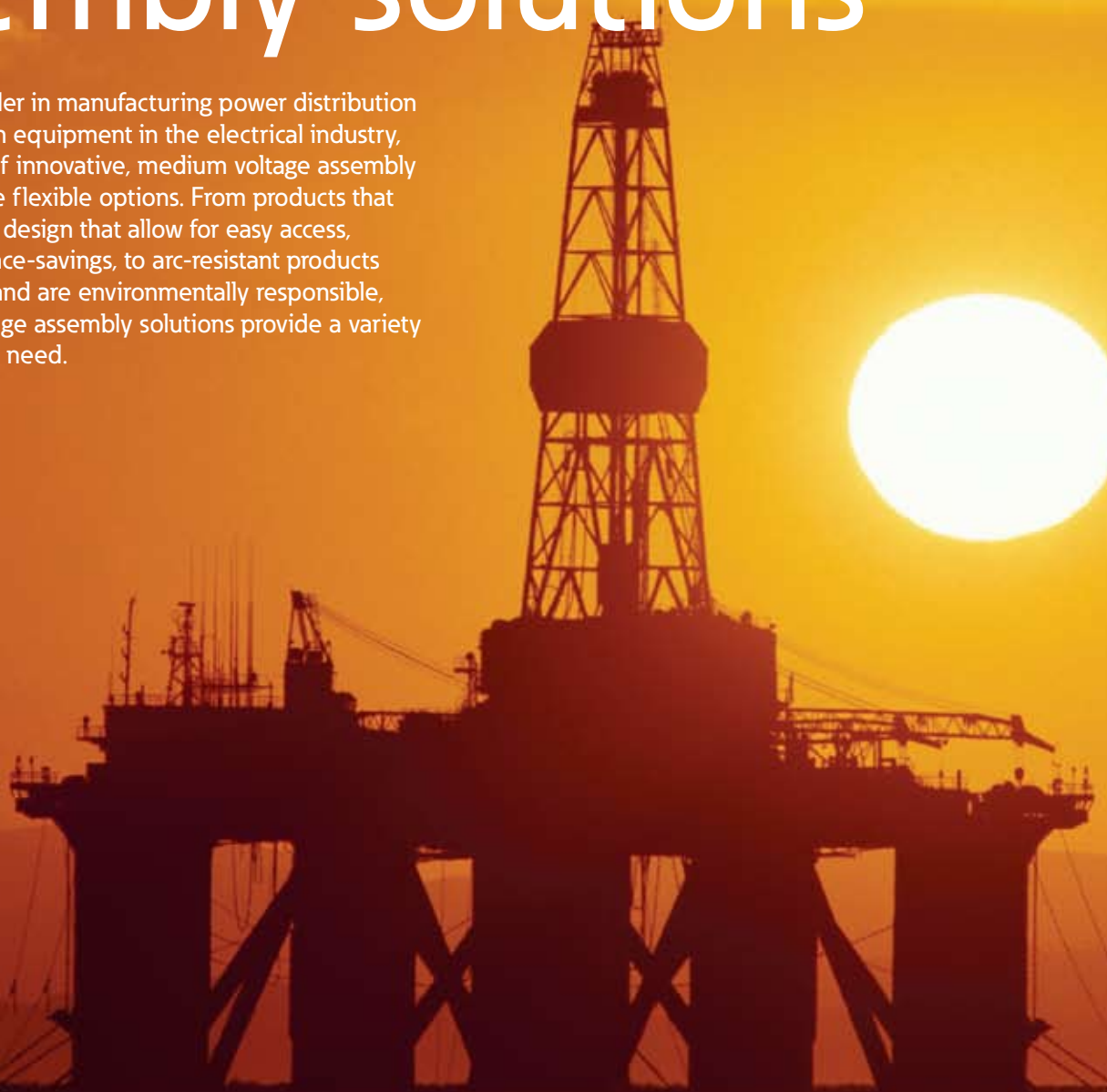
Medium Voltage Assembly Solutions



Powering Business Worldwide

Medium voltage assembly solutions

Eaton, a premier leader in manufacturing power distribution and power protection equipment in the electrical industry, offers a wide range of innovative, medium voltage assembly solutions that provide flexible options. From products that feature cutting-edge design that allow for easy access, maintenance and space-savings, to arc-resistant products that enhance safety and are environmentally responsible, Eaton's medium voltage assembly solutions provide a variety of products for every need.



Eaton® offers a comprehensive range of medium voltage assembly solutions to meet the needs of virtually every application.

As one of the only completely vertically integrated, diversified industrial manufacturers, Eaton designs not only the structure, but all of the components that comprise this MV equipment—from steel housing and breaker compartments, to vacuum interrupters and circuit breakers, to bus systems and fuses.

No other manufacturer provides such an extensive range of technologically advanced medium voltage assembly products than Eaton. Part of our complete electrical PowerChain Management™ solutions—which

help businesses minimize risks while realizing greater reliability, cost efficiencies, capital utilization and safety—Eaton's medium voltage equipment meets all applicable standards and certifications, including:

- NEMA
- ANSI
- IEC
- IEEE
- KEMA
- cUL
- UBC
- UL
- CSA

For more than 60 years, Eaton has manufactured electrical products under brand names that include Powerware®, Cutler-Hammer®, Durant®, Heinemann®, Holec® and MEM®, serving the industrial, utility, light commercial, residential, IT and OEM markets worldwide.

When it comes to medium voltage assembly solutions, you can trust the one name with a long history of proven performance: **Eaton**.





Medium voltage motor control products



AMPGARD

Starters

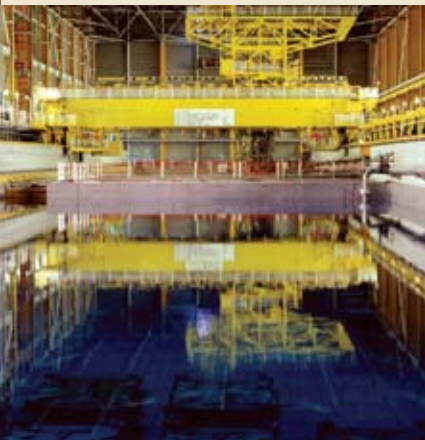
As the industry leader in medium voltage motor control, Eaton's Cutler-Hammer AMPGARD® starter family delivers unsurpassed flexibility, features and capabilities. With an innovative design that enables easier installation, maintenance, and long life, AMPGARD starters are ideal for a variety of industrial process applications where proper control and protection of motors and systems are paramount.

AMPGARD is the first starter designed as an integrated, complete unit—precisely matched to motor ratings and engineered to provide component-to-component circuitry and front accessibility of all components and terminals.

- Rated at 2.3 kV to 15.0 kV and up to 8000 Hp
- Features state-of-the-art MP3000 Microprocessor-based motor protective relay
- Isolated cable entry enhances safety
- Lighter weight contactor eases handling and maintenance
- Provides highest short circuit ratings in industry (8500 A for the 400 A model and 12,500 A for the 800 A model)
- Full coordination between fuse and contactor provides seamless protection
- Component-to-component design cuts the number of electrical connections in half

Also available:

- Squirrel Cage Motor Starters—Available in full or reduced voltage designs in all ratings
- Synchronous Motor Starters—Reliable, automatic starting of synchronous motors provided by field frequency circuitry to assure application of the field at proper motor speed
- Motor Operator for Isolation Switch—The Motor Operator allows the user to open or close the Isolation Switch at a distance of up to 25 feet from the front of the starter. One operator can be utilized for an entire lineup of AMPGARD Starters, helping to ensure personnel safety





AMPGARD® 7.2 kV Lineup



SL Medium Voltage Vacuum Contactor



AMPGARD 15 kV Starter with Incoming Cable Section

Application

The Cutler-Hammer AMPGARD medium voltage metal-enclosed control family from Eaton's electrical business provides control and protection of medium voltage motors and equipment rated 2300 to 13800 volts nominal/15000 volts maximum. AMPGARD control has a complete metal-enclosed offering:

- Full and reduced voltage starting of medium voltage motors up to 8000 hp. Reduced voltage starters include reactor, autotransformer, and soft start types
- SC9000 Adjustable Frequency Drive
- Main breaker metal-enclosed switchgear, a smaller footprint, single integrated assembly direct coupled to the AMPGARD starters and drives
- Integral LBS load break available as main, tie or feeder. The LBS can be supplied as fused or un-fused

AMPGARD Remote Operator

Available as an option for AMPGARD medium voltage motor starters, the ARO enables users to open or close the motor starter's isolation switch through the use of a pendant pushbutton station operated up to 30 feet away. Users can mount the ARO on the front of the starter, plug it into any available 120 Vac source, then easily and conveniently operate the isolation switch from outside the arc flash boundary.

SL Series of Contactors

Eaton's SL Series of contactors incorporate world-class Cutler-Hammer vacuum interrupters for increased safety and reliability, improved performance and reduced maintenance. The medium voltage contactors combine the highest ratings available in a cost-saving, reduced-size package that is lighter in weight and easy to install.

- Available in 7200 V and 15000 V models, up to 800 amperes
- Field adjustable coil voltages and drop-out times
- Longest life of any MV contactor
- Highest interrupt ratings in the industry
 - Improved performance, especially in dusty and corrosive environments
 - Reduce maintenance, downtime and unit weight
 - Quiet operation
 - Less wattage loss
- High quality and long life

AMPGARD 15 kV

The innovative AMPGARD 15 kV medium voltage motor starter features an enhanced design that offers longer life, reduced maintenance and a smaller footprint than traditional methods.

- Front-accessible design can be installed against a wall
- Conduit area easily accommodates two 350 kcmil cables per phase
- Large, easily accessible low voltage panel is completely isolated from medium voltage department
- For motors with up to 200 full load amps





AMPGARD 7.2 kV



AMPGARD SC 9000 Medium Voltage Adjustable Frequency Drive

Arc-Resistant

Arc-Resistant AMPGARD AR®

Long recognized as the industry leader in medium voltage motor control, Eaton's AMPGARD product line is now available in arc-resistant models (30 kA and 50 kA) for applications requiring increased operator protection. Extensively tested and verified to meet IEEE C37.20.7 requirements for Type 2B Accessibility, AMPGARD AR incorporates the key features of traditional models, including Type SL Vacuum Contactors, complete front accessibility and top-mounted main bus.

- Rear arc chamber, roof flaps and plenum allow arc gasses to flow away from the operator
- Strengthened front doors and latches to ensure closure during a fault
- Insulated main bus minimizes risk of bus fault
- Low voltage control compartment verified to meet arc resistant requirements

Adjustable Frequency Drives

AMPGARD SC 9000

Offering the ultimate in reliable and flexible motor drive technology, Eaton's AMPGARD SC 9000 combines innovative technology with the proven design and construction inherent in traditional AMPGARD products.

- Designed for use with induction or synchronous motors at 2400 to 4160 V up to 5000 hp
- Smallest footprint per hp in the industry requires less space
- Clean and quiet operation assures minimum component usage while reducing noise pollution
- Modular roll-in, roll-out inverter design reduces Mean Time to Repair (MTTR) for maximum uptime and time/cost savings
- Encapsulated draw-out inverter with patented insulation system reduces potential for environmental contamination



Medium voltage distribution products





5/15 kV Type VacClad-W
Arc-Resistant Switchgear

Arc-Resistant

Arc-Resistant Metal-Clad Switchgear

As the first manufacturer to design, test and implement arc-resistant metal-clad switchgear, Eaton is proud to offer Type 2 arc-resistant switchgear assemblies with Type VCP-W drawout vacuum circuit breakers. Configured in a variety of combinations to meet diverse application requirements, these switchgear products provide additional protection for personnel performing normal operating duties in close proximity to equipment.

- Available in 5/15 kV, 27 kV and 38 kV models
- Enclosure designed to withstand effects of internal arcing faults, with formed steel compartment design that seals joints under fault conditions, preventing gas and smoke from escaping the switchgear on any of the 4 external sides
 - Testing performed per ANSI C37.20.7
 - 4000 A main bus and main breakers available
 - 63 kA arc resistant ratings available
 - Direct Roll in breakers available
 - Type 2-B ratings available
- Switchgear is designed to divert pressure and burning from an internal arc fault up and out of the equipment protecting any personnel in the vicinity of the switchgear
- Circuit breaker compartments include through the door racking mechanism to prevent exposure to potential arc flash
- Type 2-B ratings available providing control compartment doors that can be opened for access to control wiring without losing the arc resistant protection of the enclosure
- Easy access and viewing ports on door allow standard functions to be completed without exposure to potential arc flash
- 2-high configurations coupled with the ability to mount relays on circuit breaker compartment door allow for the most compact switchgear arrangements available on the market



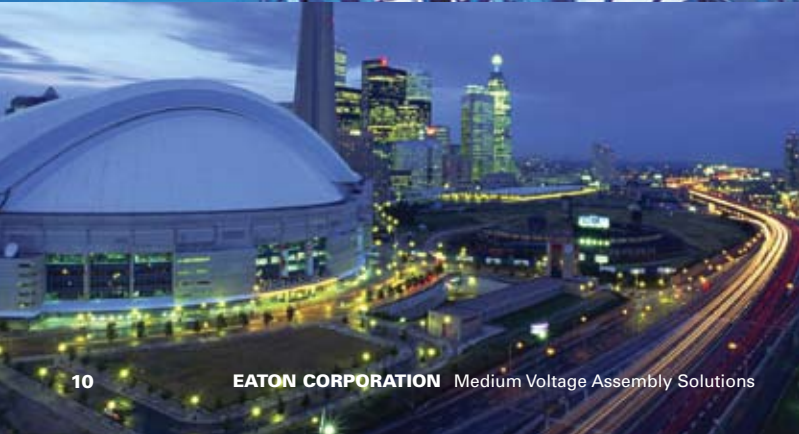
Front Accessible MV Switchgear

Medium Voltage Solutions

Front Accessible MV Switchgear

The most flexible, cost-effective, high-performance switchgear available, Eaton's Cutler-Hammer Front Accessible MV Switchgear (MEF) offers a space savings of more than 50 percent—within a complete package that can be transported using a fork truck or pallet jack, eliminating the need for cranes or other construction in retrofit applications. Even more, MEF's design can significantly reduce a project's overall cost with a wide variety of configurations, standard drawing packages, intelligent integrated trip units and reduced clearance installation.

- Available in ratings of 5 and 15 kV with 600, 1200 and 2000 A breakers
- Eaton's VCP-TL breaker's integral self-powering trip unit eliminates the need for an external power source in addition to a linear actuator that boasts 100,000 mechanical operations
- Truly front accessible construction eases installation, maintenance, and saves space in an electrical room
- 30" wide circuit breaker compartments minimize width to help save electrical room space
- Flexible configurations and standard building blocks provide easy scalability





High Resistance Grounding

Eaton's high resistance grounding enhances the safety of a grounded system while minimizing the risk of service interruptions. By providing a path for ground current via a resistance that limits the current magnitude—as well as a monitor to determine when an abnormal condition exists—these products facilitate maximum continuity of service, since no tripping occurs for the resistance-limited ground fault.

- Ground current path is provided at the point where the service begins by placing resistance in the connection from system neutral to ground
- Control equipment continuously measures ground current, while a relay detects when the current exceeds a predetermined level
- Built-in fault tracing assists in finding the source of the ground, and an alarm alerts building personnel that a ground exists

Product Offering

- Rated maximum voltage: 2.4 kV, 3.3 kV, 4.16 kV
- Ungrounded wye or delta systems
- Rated voltage withstand (BIL): 60 kV peak
- Maximum primary ground fault current: selectable 3, 4, 5 or 6 A
- Type of ground detection: current or voltage

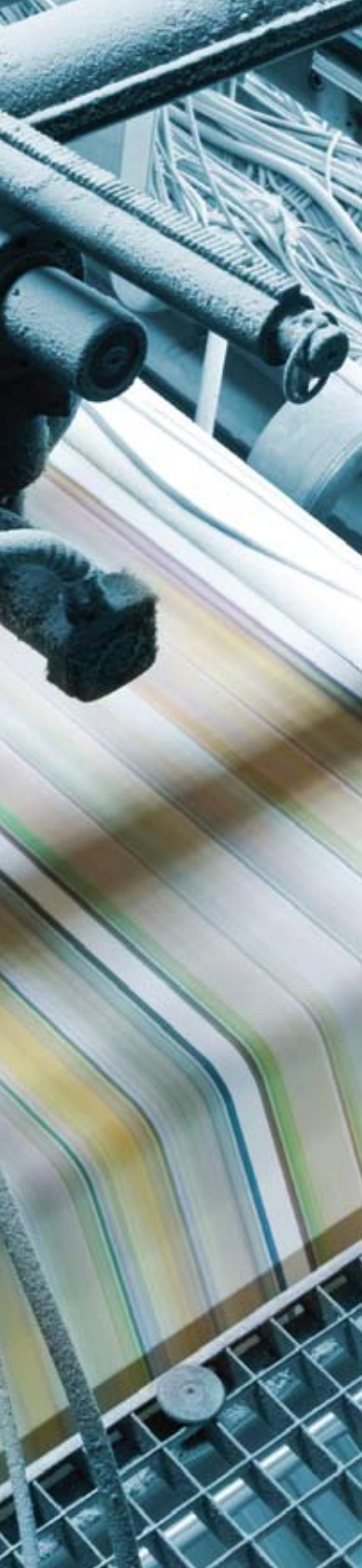
Standards

- IEEE C37.20.2

Product Applications

- Indoor and outdoor installations
- Ground fault detection and control of transient overvoltages during a single-phase to ground fault on an ungrounded system, and minimize possibility of insulation failure in motors, transformers, power cables and electronic equipment





Unitized Power Center



Integrated Unit Substation

Unitized Power Center

Control, protect and convert primary medium voltage power to utilization voltage at or near the load with the Unitized Substation. This is also an ideal solution for controlling, protecting and distributing low voltage power. Product offering includes:

- Primary switch: 600 A continuous and load break (non-fused or fused)
- Transformer: 3-phase kVA 112.5 through 1000
 - Primary voltage—2.4 kV, 5 kV, 15 kV
 - Secondary voltage—208-120 V four-wire, 240 V three-wire
 - 480-277 V four-wire, 480 V three-wire
- Voltage withstand (BIL)
 - Primary: 2.4 kV Class—20 kV peak
 - 5 kV Class—30 kV peak
 - 15 kV Class—60 kV peak
 - Secondary—10 kV peak
- Secondary distribution section
 - Main bus—250 to 2500 A
 - Molded case breakers—15 to 2500 A
 - Fusible switches—30 to 1200 A

IUS (Integrated Unit Substation)

Eaton's Cutler-Hammer IUS combines transformer primary and secondary protective devices in a single section. Eaton's IUS offers a significant floorspace reduction compared to other substation designs.

The IUS primary/secondary breaker section is UL listed. The IUS complies with ANSI C37.20.1 and ANSI C37.51 for the low voltage compartment, and ANSI C37.20.3 for the medium voltage compartment. Low voltage power switchgear distribution sections are UL 1558 listed and comply with ANSI C37.20.1. Transformer sections are UL 1562 listed and comply with ANSI C37.30.





Medium Voltage Fusible Switches

Medium Voltage Switch (MVS)

Eaton's Cutler-Hammer MVS Load Interrupter switchgear is an integrated assembly of switches, bus and fuses that are coordinated electrically and mechanically for medium voltage circuit protection. The metal-enclosed switchgear provides safe, reliable and cost-effective switching and fault protection for medium voltage circuits rated from 2.4 kV through 38 kV.

- Ideal for applications in lower-duty cycle operation environments
- Quick-make, quick-break mechanism provides full-load current interrupting capability. Fuses provide accurate, permanently calibrated, short-circuit detecting and interrupting capabilities
- Visibility of actual blade position improves safety by providing positive assurance of circuit de-energization
- Metal-to-metal direct drive mechanism eliminates chains or cables that may break or need adjusting

Mini-MVS

Space-optimized 26-inch wide design rated at 200 amperes available at 5 kV. For use in power distribution, transformer primary connections and isolation applications requiring a stand-alone assembly, cable in/cable out terminations and manual operation. The switch comes standard with built-in interlocks and safety features and is available fused or non-fused, with an option for an outdoor enclosure.

Duplex Switch Configuration

Two MVS load interrupter switch sections can be utilized to provide cost-effective source selectivity with a common load side bus feeding one load, fused or non-fused. Key interlocks are a standard feature provided to permit only one switch to be closed at a time and prevent any switch door from opening unless both switches are open.

Two-Position, No-Load Selector Switch

The MVS load interrupter switch is designed to provide the most cost-effective source selectivity in a single compact structure. It features a two-position non-load-break selector switch in series with the load break MVS switch, which is mechanically interlocked so operation can be performed only when the load interrupter switch is in the open position.

Motor Operated MVS Switches

The MVS Pow-R-Drive motor operator—which provides the safety, convenience and coordination inherent in remote switch operation—is a standard, manually operated switch in combination with a heavy-duty electric motor-driven linear actuator that charges the spring. The linear actuator, located in a separate isolated low voltage compartment, smoothly and quietly extends or retracts the proper distance to cause the switch mechanism to operate. Standard motor operators are mounted in the switch enclosure, eliminating the separate motor compartment to conserve floor space.



Sustainability

It's a part of everything Eaton does

geothermal
power plant



Recycling



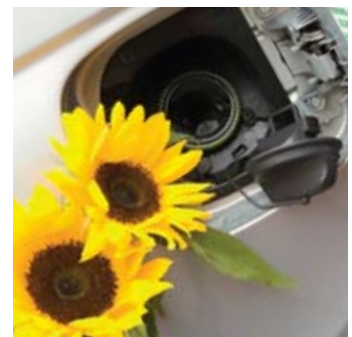
Solar panels



Wind power



Biofuel
from sunflowers



Finding the solution for you



An Eaton Green Product

...SF₆ free design is Eaton's
solution to a better planet

Environmentally responsible

Eaton offers a variety of MV switchgear solutions that utilize environmentally responsible and safety conscious medium-voltage insulation materials. These alternative solutions include air-insulated and solid-insulated switchgear designs that avoid the use of SF₆ gas and can offer a lower total cost of ownership over the complete life cycle of the equipment.

While MV switchgear requires an insulation medium to provide electrical insulation between internal components, insulation types can vary among applications, and several can be harmful to the environment, particularly the gas insulated switchgear (GIS) designed by some manufacturers. Conversely, Eaton's MV air-insulated switchgear relies on air and/or solid insulation materials.

Installing medium-voltage, SF₆ insulated switchgear is not consistent with the sustainability principles and greenhouse gas reduction goals of many leading-edge corporations and institutions. The safety and special handling concerns can also raise issues with internal Environmental Health & Safety policies. Furthermore, the installation, operation and maintenance, and end of life/recycling concerns associated with medium-voltage GIS switchgear can dramatically raise the total cost of ownership.

Eaton's medium voltage assembly products encompass a wide range of innovative electrical products that are an important part of our PowerChain Management® solutions—helping businesses to minimize risk, increase reliability and maximize savings.

Eaton offers a full line-up of arc resistant products engineered to meet your specific needs. The expansion of this product line further extends Eaton's reputation as an industry leader in safety-related products.

To learn more about Eaton's wide array of electrical products, visit our Web site: eaton.com/electrical

Or, call to locate your nearest Eaton representative:
877-ETN-CARE (877-386-2273)

Eaton's electrical business is a global leader in power distribution, power quality, control and industrial automation products and services. Eaton's global electrical product lines, including Cutler-Hammer®, Moeller®, Powerware®, Holec®, MEM®, Santak®, and MGE Office Protection Systems™ provide customer-driven PowerChain Management® solutions to serve the power system needs of the data center, industrial, institutional, government, utility, commercial, residential, and OEM markets worldwide.

PowerChain Management solutions help enterprises achieve sustainable and competitive advantages through proactive management of the power system as a strategic, integrated asset throughout its life cycle. With Eaton's distribution, control and automation and power quality equipment; full-scale engineering services; and information management systems, the power system is positioned to deliver powerful results: greater reliability, operating cost efficiencies, effective use of capital, enhanced safety, and risk mitigation.

Eaton Corporation
Electrical Group
1000 Cherrington Parkway
Moon Township, PA 15108
United States
877-ETN-CARE (877-386-2273)
Eaton.com

© 2009 Eaton Corporation
All Rights Reserved
Printed in USA
Publication No. BR02200001E / MSC
June 2009



**PowerChain
Management®**

PowerChain Management is a registered trademark of Eaton Corporation.

All other trademarks are property of their respective owners.