Medium-voltage product offer

ANSI Panorama

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schneider-electric.us/mediumvoltage
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MV Air-insulated switchgear (AIS)

Masterclad metal-clad switchgear

Ratings/features

Meet IEEE/ANSI C37.20.2 metal-clad switchgear standards

- NEMA 1 enclosure
  - 5/15 kV, 1200 – 4000 A (force cooled), 25 – 63 kA, 95 kV BIL, 2-high
  - 27 kV, 1200 – 2750 A, 16 – 40 kA, 125 kV BIL, 2-high
- NEMA 3R enclosure
  - 5/15 kV, 1200 – 3000 A, 25 – 63 kA, 95 kV BIL, 2-high
  - 27 kV, 1200 – 2750 A, 16 – 40 kA, 125 kV BIL, 2-high
- Active arc-resistant switchgear (NEMA 1 and NEMA 3R)
  - Meets IEEE/ANSI C37.20.7 metal-clad switchgear Type 2BC
  - 5/15 kV, 1200 – 3000 A, 25 - 50 kA, 95 kV BIL, 2-high
- Passive arc-resistant switchgear (NEMA 1)
  - Meets IEEE/ANSI C37.20.7 metal-clad switchgear Type 2B
  - 5/15 kV, 1200 – 4000 A (FC), 25 – 63 kA, 95 kV BIL, 2-high

Benefits

- Arc Terminator — active arc flash mitigation
- Long life and minimum maintenance
  - Interrupters are sealed for life
  - Capable of 20 – 100 full-fault interruptions
- Grounded metal barriers between compartments and insulated bussing — live parts are not exposed
- Interlocks with the breaker racking system
- Direct connections (throat) to cast, liquid, or dry transformers
- UL, cUL, and CSA listing
MV Air-insulated switchgear (AIS)

VR circuit breaker

Ratings/features
- 3-cycle vacuum circuit breaker
- Up to 27 kV
- Up to 63 kA/164 kA pk
- Up to 4,000 A at 15 kV, 2,750 A at 27 kV
- Capacitive switching rated C1 at 410A
- Generator switching per ANSI/IEEE C37.013A
- Adheres to C37.04, C37.06, and C37.09 ANSI/IEEE standards

Benefits
- Maintenance requirements are minimized with the use of enclosed long-life vacuum interrupters for the VR circuit breaker
- When maintenance or inspection is required, the draw-out circuit breakers and instrument drawers allow easy access
- Special wheel design allows for easy maneuvering of the breaker in the rail channel support internal to the breaker section
- The inherent rigidity and mechanical strength of the circuit breaker design complement the operating mechanism, resulting in high endurance and reliability
- Allows for customized system designs and applications
MV Air-insulated switchgear (AIS)

Arc Terminator arc mitigation solution

Ratings/features
- Up to 15 kV, 50 kA fault current
- Arc Terminator tested in MasterClad to requirements of type 2BC per ANSI/IEEE C37.20.7

Benefits
- Mitigates arc fault damage to the equipment without the need to reinforce the enclosure or use exhaust plenums
- Extinguishes high-magnitude arc currents within 1/4 of a cycle, reduces buildup of high internal pressures
- Limits the effects of the arc beyond the point of initiation
- Light sensors are placed in each compartment for detection of arc flash
- After the arc is extinguished, normal protective devices function to detect and interrupt the current

Watch this MV arc flash event highlighting the Arc Terminator

Watch the video
MV Air-insulated switchgear (AIS)

HVL metal-enclosed load interrupter

Ratings/Features
- Current-carrying capacity up to 1,200 A at 15 kV, 600 A up to 38 kVA
- Switch interrupting capacity of 1,200 A up to 15 kV, 600 A up to 25 kV, 400 A up to 38 kV
- Short-time rating of 48 kA up to 15 kV and 25 kA up to 38 kV
- Over-toggle and stored-energy operating mechanism options
- Direct connections available for Schneider Electric transformers
- Fuselogic — missing/blown fuse indication (optional)
- Duplex switch options available
- Many options available including NEMA 3R, boric acid fuses, and motor operated
- Fusible or non-fusible load interrupter switchgear

Benefits
- Air-insulated load break switch
- Fuselogic protection system prevents closing of the switch if a fuse is blown or has not been installed
- Direct drive operating mechanism adds dependability and consistency
- During opening, the current is forced along an arc path where arc chutes extinguish the arc, preventing erosion of the main contacts
- All live parts are mounted on insulators and attached to grounded sheet metal of the enclosure, minimizing the potential of phase-to-phase faults
MV Air-insulated switchgear (AIS)

HVL/cc metal-enclosed load interrupter

**Ratings/features**
- Current-carrying capacity up to 1,200 A at 15 kV, 600 A up to 38 kV
- Short-time current rating of 25 kA up to 38 kV
- Dimensions as small as 14.75” W
- 20” W and 29.5” W options available
- Over-toggle and stored-energy operating mechanism options
- Quick ship options available
- Direct connections available for Schneider Electric transformers
- Designed for front access only
- Fusible or non-fusible load interrupter switchgear

**Benefits**
- Load break switch is inside a sealed-for-life tank, significantly reducing maintenance requirements
- Smallest footprint in the industry
- Fully compartmentalized for user safety
- Fuselogic — missing/blown fuse indication (available option)
MV Air-insulated switchgear (AIS)

HVL/cb metal-enclosed switchgear w/ Evolis vacuum circuit breaker

Ratings/features
- Current-carrying capacity from 600 A, 800 A, and 1200 A at 15 kV
- Short-time current rating of 25 kA up to 15 kV
- Basic Impulse Level of 95 kV up to 15 kV
- Dimensions 24” W x 65” D x 90” H
- Type 2b arc resistant
- Over-toggle and stored energy operating mechanism options
- Direct connections available for Schneider Electric transformers

Benefits
- Front and rear access designs available
- Virtually maintenance free
- Fully compartmentalized
- Integrated interlocking for personnel perfection

Watch the 3D video highlighting the evolutionary HVL/cb vacuum circuit breaker

Ratings/features
- 3-cycle vacuum circuit breaker
- Up to 15 kV
- Up to 25 kA
- Up to 1,200 A at 15 kV
- Up to 10,000 operations for mechanical endurance
- Adheres to C37.04, C37.06, and C37.09 ANSI/IEEE standards

Benefits
- The breaker is shipped internal to the switchgear, saving on shipping cost
- Removable design allows for the breaker to be disconnected from the main bus for servicing
- Upstream and downstream terminals for the power circuit connection
- Built-in operator counter for breaker operations
- Equipped with onboard bushings and current transformers (CTs)
MV Air-insulated switchgear (AIS)

MiniBreak metal-enclosed switch

Ratings/features
- Up to 5.5 kV and 200 A
- 12.5 kA, 2 s short-circuit rating
- 100 load-break operations
- Fused or non-fused versions
- Indoor or outdoor applications

Benefits
- Only 66 inches in height
- Easy to handle due to its lightweight and compact design
- Ideal for small to medium industrial applications and installations in which space is limited
- Free-standing enclosures
The new generation of MV switchgear featuring the innovative Shielded Solid Insulation System (2SIS).

**Ratings/features**
- Up to 15 kV, 1200 A, 25 kA for indoor and indoor arc-resistant applications
- Up to 15 kV, 600 A, 25 kA for outdoor applications
- Dimensions as small as 14.75" W
- Consistent range of two switches and four circuit breakers to suit any application
- Virtually arc free design
- Modular busbar system with shielded solid insulation
- Disconnecting load break switch or disconnecting circuit breaker using vacuum interrupters
- Built-in voltage and current sensors available
- Low power voltage transformer for protection or measurement

**Benefits**
- Completely shielded solid insulation system design provides optimized safety and extended equipment life
- Mix-and-match modular architecture based on functional blocks grants unsurpassed simplicity
- 3-in-1 integrated architecture for breaking, disconnection, and grounding ensures easiest and safest operation with built-in interlocking
- Disconnection in vacuum and grounding switch in controlled air ensure redundancy of isolation

Watch the video to learn about the latest technology, Shielded Solid Insulation System (2SIS).
MV Motor Control

Motorpact reduced voltage motor controls

Ratings/features
- Up to 7.2 kV, 50 kA 3 s, 3,000 A
- 200 A, 400 A, 450 A, and 720 A available contactor ratings
- IEEE C37.20.7 Type 2 and 2B arc resistant

Benefits
- Eases the impact of motor starting on your electrical infrastructure
- Voltage taps permit the adjustment of starting voltage to suit system capabilities (RVAT)
- Acceleration times up to 30 seconds for medium duty making it suitable for a long starting period (RVAT)
- Starting parameters can be fine-tuned to meet wide variety of unique load conditions (RVSS)
- Advanced protection module protects both the motor and the solid-state power structure (RVSS)
MV Motor Control

Motorpact sequential smart start motor controls center

Ratings/features
• Cascade the starting and stopping of three or more motor starters within a single soft starter or drive
• 450 A continuous

Benefits
• Optimized cost by sharing a single soft start for multiple motors
• Depending on the application and number of motors being controlled, the S3 can lower your implementation costs between 25% and 65% per motor
• Reduces size and weight of installation by sharing the soft start or drive
• Lighter weight parts reduce personnel requirements for installation
MV Motor Control

Motorpact full voltage motor controls

**Ratings/features**
- Up to 7.2 kV, 50 kA 3 s, 3,000 A
- 200 A, 400 A, 450 A, and 720 A available contactor ratings
- IEEE C37.20.7 Type 2 and 2B Arc Resistant

**Benefits**
- Vacuum contactor is capable of 2.5 million mechanical operations
- Available in three widths (14.75", 20", 29.5")
- Robust construction and compact design
- No ventilation openings
- Withdrawable vacuum contactor
- Vacuum contactor is capable of 2.5 million mechanical operations
MV Gas-insulated switchgear (GIS)

GHA VCB Switchgear

Ratings/features

• Up to 38 kV, 2,500 A, 40 kA, and 170 kV BIL
• Vacuum circuit breaker
• Modular design of switchgear sections
• Internal arc tested 40 kA/0.5 s per IEEE C37.20.7
• UL listed per applicable IEEE standards

Benefits

• Installation and removal of panels without gas handling
• Innovative bus bar link “B-link” enables rapid on-site assembly and safety through robust solidly shielded insulation
• Customizable LV cabinet
• Intelligent Gas Density Information System (IDIS) for gas monitoring
• Camera system provides visible disconnect of the isolation and grounding switch
• Safety through sealed-for-life maintenance-free circuit breaker and bus bar compartments
• Use of T-type connectors eliminates the need for a cable vault or trough
• Completely front-accessible

Watch the video
MV Gas-insulated switchgear (GIS)

CBGS-0 SF6 circuit breaker switchgear

Ratings/features

- Up to 38 kV, 2,000 A, 31.5 kA, and 150 kV BIL
- Compact design 24” W for mains/feeders and 48” W for tie
- Fixed SF6 circuit breaker
- Solid insulated and shielded bus bar system
- Internal arc tested 31.5 kA/1 s per IEC 62271-200
- Complies with ANSI/IEEE C37.20.3 metal-enclosed switchgear
- UL listed per applicable IEEE standards

Benefits

- Installation and removal of panels without gas handling
- Impervious to environmental influences due to MV components being protected in a sealed pressure system
- Camera system provides visible disconnect of the isolation and grounding switch
- Safety through sealed-for-life maintenance-free gas filled compartment
- Use of T-type connectors eliminates the need for a cable vault or trough
- Completely front-accessible
Introduction to MV Switchgear for wind power

Watch the slide show

MV Gas-insulated switchgear (GIS)

DVCAS VCB Switchgear

Ratings/features
- Up to 38 kV, 600 A, 25 kA, and 150 kV BIL
- SF6 as an insulation medium
- Switchgear constructed to ANSI/IEEE C37.20.3, metal-enclosed switchgear
- Arc-resistant, complies with IEC 62271-200, AFLR 25 ka/1 second
- Available in NEMA 1 version
- Utilizes plug-in bushings for connecting incoming cables with T-type plug-in connectors
- Modular units with options
- Incoming line section with a load interrupter switch
- Transformer protection section with a vacuum circuit breaker
- Outgoing line auxiliary section
- UL listed per applicable IEEE standards

Benefits
- Compact for installation in wind farm turbines and MV transformer substations (largest modular unit only 24” wide)
- Reduced maintenance due to MV components being housed in a sealed-for-life, stainless steel, gas-tight cubicle
- Self-powered VIP relay provides phase functions, ground functions, and communications when auxiliary power is provided
- Can be installed in wind farms up to 6,561 ft/2,000 m above sea level
MV Outdoor circuit breakers

FVR station breaker

Ratings/features
- Free-standing MV vacuum station breaker
- 15 kV, 600 A to 4,000 A, 110 kV BIL, 12.5 kA to 50 kA
- 27 kV, 1,200 A and 2,000 A, 125 kV BIL, 12.5 kA to 25 kA
- 38 kV, 1,200 A and 2,000 A, 150 kV BIL, 12.5 kA to 31.5 kA
- 38 kV, 1,200 A, 200 kV BIL, 25 kA
- Arc resistant class B, enclosure for breakers rated 2,000 A and below per EEMAC and IEC
- No fans required for 3,000 A rated breaker
- Seismic zone 4 per UBC

Benefits
- High-speed operation — three cycles or less
- Interrupter assemblies and contact wear indicators accessible via a bolted panel for ease of maintenance
- Hermetically sealed interrupters protect contacts from corroding elements and contamination
- Breaker height is adjustable from minimum to maximum in three-inch increments
- Minimal moving parts on the motor-driven, spring-charged Type RI mechanism

The FVR Station Breaker range has been sold to Myers Power Products, Inc. Please contact Myers direct at 330-834-3200 or visit their website.
**MV Outdoor circuit breakers**

**VOX station breaker**

**Ratings/features**
- Vacuum interruption technology
- Up to 38 kV, 40 kA, 2,000 A
- IEC and ANSI ratings available
- SF6 insulation in a stainless steel sealed-for-life, corrosion-free tank
- Large accommodation for bushing current transformer
- Suitable for high-speed auto-recloser switching duty
- -65 °C test available

**Benefits**
- Maintenance-free vacuum switching
- Immune from external influences such as salt, dust, humidity, small particles, and rodents
- Compact and lightweight design makes it easy to transport, handle, and install
- Separate support frame can be preinstalled to accept the breaker tank and control cabinet
- Reduced inspection and maintenance required with sealed-for-life tank
MV Distribution transformers

Model III packaged unit substation

Ratings/features
- Primary voltages: 2.4 kV – 13.8 kV
- Ratings of 75 kVA – 1,000 kVA at 480 V
- Ratings of 75 kVA – 500 kVA at 240 V
- Branch circuit breakers from 15 A – 1,200 A
- 80, 115, 150 °C transformer temperature rise

Benefits
- Combines primary switch, dry-type transformer, and I-Line™ distribution into a single, compact unit
- Efficient performance — Meets DOE new transformer efficiencies
- Compact design — Small size allows passing through standard-size doorways and narrow hallways
- Easy expansion — Substations divide a system into isolated areas
- Primary power is purchased from the utility at the lower primary power rates, resulting in operational cost savings throughout the life of the equipment
- Overall installed cost is lower because of the cost benefits of MV distribution cable as compared to LV cable or busway
- Efficient design — Can be installed against a wall or in a corner without derating

Learn the efficiency standards for distribution transformers

Watch the webinar
MV Distribution transformers

Power-Cast II and Uni-Cast II transformers

Ratings/features
• Cast windings designed with a solid resin dielectric and a 185 °C insulation system
• Available with copper or aluminum windings
• Partial discharge free
• Superior dynamic short-circuit current strength
• Resistance to moisture and atmospheric contaminants
• Optional blower cooling provides as much as 50% increase in capacity
• 2016 Department of Energy; energy-efficiency compliant

Benefits
• Designed to meet the demands of higher operating voltages
• Rugged durability for harsh environments
• Superior dynamic short-circuit current strength
• UL and CSA listed

Power-Dry II transformers

Ratings/features
• Available with primary voltages up to 35 kV in 112.5 kVA through 13 MVA sizes with a 220 °C insulation system
• Secondary voltages available through 15 kV
• Vacuum pressure impregnated
• Can be used stand-alone with air terminal chambers for cable termination or as part of a substation lineup
• Optional fan cooling provides 33.33% increase in capacity
• 2016 Department of Energy; energy-efficiency compliant

Benefits
• Liquid-free and lighter weight than cast-coil units
• Low installation, maintenance, and energy costs
• Flexible design ideal for power upgrades or retrofit applications
• No special waste disposal considerations

<table>
<thead>
<tr>
<th>Power-Cast II</th>
<th>Uni-Cast II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Cast</td>
</tr>
<tr>
<td>Secondary</td>
<td>Cast</td>
</tr>
<tr>
<td>Primary voltage</td>
<td>Up to 46 kV</td>
</tr>
<tr>
<td>Secondary voltage</td>
<td>Up to 15 kV</td>
</tr>
<tr>
<td>kVA</td>
<td>112.5 kVA thru 13 MVA</td>
</tr>
</tbody>
</table>
MV Distribution transformers

Liquid-filled transformers

Liquid-filled substation transformer

Ratings/features

- Available in primary voltages up to 69 kV in 225 kVA through 20 MVA
- Secondary voltages ratings from 600 V through 35 kV
- Available as stand-alone installation using terminal compartments or close-coupled to primary and secondary switchgear providing a complete substation lineup
- Mineral oil or high-fire-point fluids options
- Higher standard impulse levels than conventional dry-type units
- Self-cooled and fan-cooled overload capabilities
- Copper or aluminum windings
- Secondary busway connection option
- 2016 Department of Energy; energy-efficiency compliant

Benefits

- Unrivaled reliability
- High efficiency
- Sealed-tank construction allows for installation in less-than-ideal environments

Liquid-filled pad mount transformers

Ratings/features

- Available with primary voltages up to 46 kV in 45 kVA through 20 MVA, sizes with 600 V through 25 kV secondary ratings
- Copper or aluminum windings
- Mineral oil or high-fire-point fluid available
- Self-cooled overload capabilities
- Fusing and switching options
- Loop feed option available
- Secondary busway connections and circuit breaker options available
- 2016 Department of Energy; energy-efficiency compliant

Benefits

- Compact and tamper-resistant for underground power distribution systems
- Designed to save space and energy
- High efficiency with low operating costs
- Sealed-tank construction allows for installation in less-than-ideal environments
Pole-mounted switchgear

**RL series sectionalizer/load break switch**

**Ratings/features**
- Up to 38 kV
- Ampacity: 630 A
- SF6 insulated
- Automatic sectionalizing based on both current and voltage
- Controller features include: sectionalizer function, monitoring, metering, local and remote control, as well as communications
- Compatible with ADVC 2 Control

**Benefits**
- 316 marine-grade stainless steel allows for installation in all environments and security of a heavy-duty enclosure
- Simple, low-cost solution
- Easy installation with the choice of manual switching or complete automation
- Automation and communication features embedded in the sectionalizer control to provide flexibility in outdoor applications

**W-series single-phase recloser**

**Ratings/features**
- Up to 24 kV and 400 A rated load current
- Up to 6 kA short-circuit current
- Ideal for single-phase lateral circuits
- Epoxy bushing insulates the vacuum interrupter
- Integrated CT and VT for optimized automation, remote control, data logging, and monitoring
- Compatible with ADVC 2 or ADVC Lite Control

**Benefits**
- Vacuum arc interrupter, contained in an epoxy bushing, eliminates the need for insulating materials such as oil, gas, or other environmental contaminants
- Improved reliability with a single magnetic actuator for both tripping and closing
- 316 marine-grade stainless steel tank and lid provide ultimate protection from the environment
Pole-mounted switchgear

U-series three-phase recloser

Ratings/features
• Up to 27 kV and 630 A rated load current
• Up to 12.5 kA short-circuit current
• Easily integrated into smart grid applications with advanced capabilities such as loop automation and automatic changeover
• Flexible for use in stand-alone pole-mounted or complex substation applications
• Solid epoxy dielectric bushings with vacuum interrupters
• Compatible with ADVC 2 Control

Benefits
• Current and voltage transformers molded into the I-side terminal allow easy monitoring for your overhead voltage network
• Reduced purchasing, installation, and operating costs with intelligent solid-dielectric switchgear
• 316 marine grade stainless steel tank and lid provide ultimate protection from the environment

N-series three-phase recloser

Ratings/features
• Up to 38 kV
• Up to 800 A rated load current
• Up to 16 kA short-circuit current
• Applications include overhead network protection, loop automation, automatic changeover, generator control, smart grid, and feeder automation
• Integrated CTs and VTs (source-side and load-side voltage sensing)
• Vacuum interrupters in a SF6 gas-filled tank
• Sold with ADVC 2 Control

Benefits
• Capable of making intelligent switching decisions in just fractions of a second with six phases of voltage measurement and current measurement built into the unit
• Reduced purchasing, installation, and operating costs with intelligent digitally controlled switchgear
• 316 stainless steel tank and lid provide ultimate protection from the environment
Pole-mounted switchgear

ADVC 2 control

Ratings/features

• Stainless steel cubicle in two sizes:
  – ULTRA for complex applications and customer space
• Two operator interface options:
  – flexVUE for users who prefer working with status lamps and configurable command buttons
  – setVUE for users who prefer a menu-driven operator interface
• Control panel provides access to system status, event log, measurement, protection, automation, and communication
• Communication connections:
  – Control and protection module includes (4) DB9, RS-232 ports (2 with handshaking), IP port, and USB port
• Power supply and batteries located at the bottom of the cubicle provide uninterrupted power to the switchgear, protective relay, and communication devices

Benefits

• Defer capital works by offering features that reduce stresses
• Easily integrated into smart grid applications with advanced capabilities
• Flexible applications from complex substation to stand-alone pole mounted installations
• Automatic isolation of permanent faults

ADVC Lite control

Ratings/features

• Stainless steel enclosure:
  – Compact for lightweight overhead single-phase feeder installations
• Lite-view interface option
• Control panel provides LED indication of system status and operating conditions
• Communication connections:
  – Control Protection and Communications Unit (CPCU) include DB9 RS-232 and USB ports
• Power supply and batteries located at the bottom of the cubicle
• Provide uninterrupted power to the switchgear, protective relay, and communication devices
• Standard 12 V – 1 A accessory supply included

Benefits

• Easily integrated into smart grid applications with standard DNP 3 SCADA capabilities
• Flexible applications from stand-alone pole mounted to remotely operable automated device
• Automatic isolation of permanent single-phase faults
Distribution network control and fault indication

Easergy T300 grid automation platform

Ratings/features
- Detect overcurrent faults including distributed generation
- Detect broken conductors and voltage loss
- Reconfigure the network automatically after a fault (centralized or de-centralized architectures)
- Compliance with IEC 62351 and IEEE 1686
- SCADA communication security and Wi-Fi access
- Secure access point supporting customer in NERC CIP compliance

Benefits
- Deliver MV and LV stability by accommodating demand growth
- Reduce installation, operation, and maintenance expenditures through modular automation solutions
- Manage energy consumption by reducing technical and non-technical losses

Easergy T300 remote terminal unit

Watch the video
Distribution network control and fault indication

Easergy HU250 head unit communication gateway
- Standard and secure protocol: IEC 101/104, DNP3, IEC 61850, modbus
- Open peer-to-peer communication to self-healing application
- Flexible communication media (Ethernet, USB, GPRS, 2G, 3G, 4G, radio, PSTN, etc.)
- Cybersecurity management
- Open to third-party devices with many protocol capabilities
- Built-in webserver for commissioning and maintenance with local and remote access, compatible with PC, tablet, and smartphone devices
- Embedded IEC 601131-3 PLC for automation design

Easergy SC150 switch controller
- Control and monitoring of all switchgear types
- Phase-phase and phase-earth detection 50/51, 50N/51N
- Directional phase-phase and phase-earth detection 67/67N
- Broken conductor detection (one phase lost) 47BC
- Large current and voltage measurement capabilities: standard CT for current, LPVT, VT, VDS, VPIS, and capacitor interface for voltage
- Current and voltage measurement according to IEC 61557-12
- Power quality to IEC 61000-4-30 Class S

Easergy LV150 transformer and LV monitoring
- Transformer temperature measurement and monitoring
- Voltage, current and power measurement according to IEC 61557-12
- Broken conductor detection (one phase lost MV or LV) based on 47BC
- Power quality to IEC 61000-4-30 class S
- LV110 gateway with Zigbee communication

Easergy LV110 self-powered and wireless power meter for LV feeder
- LV110 uses power harvesting technology based on current sensors
- Wireless communication with LV150 based on ZigBee PRO Green Power
- LV110 is synchronized with LV150 for power measurement according to IEC 61557-12
- LV feeder blown fuse detection

Easergy PS25 and PS50 power supply
- PS25: designed for monitoring solutions with only one voltage output, 12 VDC or 24 VDC
- PS50: harsh environment power supply
Distribution network control and fault indication

Easergy Flair 2xd range

Ratings/features
- Fault detection and ammeter: Flair 21D and 22D
- Overcurrent detection and ground fault detection
- Real-time indication of your load
- Available within switchgear
- Optional outdoor indicator lamp

Benefits
- Ready to use — no settings, starts by itself
- No maintenance
- No minimum current to operate — Flair 22DV
  - Can be used on the complete MV network
  - Dual power (self-powered and lithium battery)
Remote terminal units (RTUs)

SAGE 1410, 1430, 1450, 2400 RTUs

<table>
<thead>
<tr>
<th>Ratings/features</th>
<th>1410</th>
<th>1430</th>
<th>1450</th>
<th>2400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two RS232 serial communications ports built-in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(can be expanded up to 10, by adding up to two, 4-port communication expansion modules)</td>
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</tr>
<tr>
<td>One RS485 communications port built-in</td>
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<tr>
<td>One serial fiber optic port built-in</td>
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<tr>
<td>LEDs for visual indications of communications, power, and other functions</td>
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<tr>
<td>Two 10/100 MB Ethernet communications built-in (separate NICs)</td>
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<tr>
<td>10 – 33 VDC input power</td>
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<tr>
<td>Two RS485 communications ports built-in</td>
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<td></td>
</tr>
<tr>
<td>16 DI (Status/Accum), and 4 T/C Controls (8 DO)</td>
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<tr>
<td>20 – 60 VDC, 85 – 350 VDC, 120/220 VAC input power options</td>
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<tr>
<td>Four RS232 serial communications ports built-in</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(can be expanded up to 12, by adding up to two, 4-port communication expansion modules)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 DI (Status/Accum), and 4 T/C Controls (8 DO)</td>
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<td></td>
</tr>
<tr>
<td>Three currents and three voltage AC analog inputs (CT/PT/LPS)</td>
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</tr>
<tr>
<td>Base I/O - 16 DI (Status/Accum), 8 AI (0 – 1 ma, 4 – 20 ma, etc.) and 4 T/C Controls (8 DO)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I/O Expansion (240 DI, 232 AI, 128 SBO T/C Control Pairs, 384 1ms SOE, 12 AO, 8 Sets ACI)</td>
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<td></td>
</tr>
</tbody>
</table>

Benefits

- Data monitoring, grid analytics, rules-based economic decision-making tools
- Compact footprint and flexible point counts
- Flexible I/O to meet needs of integrating both modern microprocessor and electromechanical relays
- Long life and low maintenance reduces life cycle costs
- NERC CIP compliant with expandable communications
- 100% backward compatible with Micro/1C series
Substation automation platforms

SAGE 3030 Magnum

Ratings/features

- Two built-in 10/100 Mbps Ethernet ports (independent IPs), optional internal three port Ethernet switch, 16 built-in RS232 communications ports, separate PPP port for serial dial-up (RX, TX, RTS, CTS, and DCD/+5V on each port)
- AMD LX-800 500 MHz CPU with 1 GB flash memory, Non-Windows\textsuperscript{®} OS and PC/104\textsuperscript{™} bus architecture
- Browser based user interface configuration tool (uses Internet Explorer\textsuperscript{®}), no proprietary software required
- Optional external digital, analog, and SBO control output points (224 digital/5 msec. SOE/accumulator inputs, 64 T/C momentary and latching control outputs, 256 analog inputs)
- Wide range input power supply for standard substation voltages
- Full three-year warranty standard
- IP Sec Security (HTTPS, encryption, SSL/SSH, firewall)
- Over 100 LEDs for positive visual indications (Power, Run, Reset, Local, Time Source Failed, IED Failed, User Logged In, Configuration Changed, RLL Running, Ethernet Link, and Alarm 1 and 2, Communications LEDs)
- Electric utility standards (IEEE 472, ANSI C37.90 SWC, C37.90.1)
- Rugged relay-style metal enclosure for easy rack mounting
- Optional internal GPS receiver
- Continuous IRIG-B output with built-in bus to all communication ports for IRIG-B, GPS, RTC, or protocol time synchronization
- Complete MTU/IED protocol library (standard with every unit)

Benefits

- Efficient solution for upgrading legacy RTUs
- Flexible I/O to meet needs of integrating both modern microprocessor and electromechanical relays
- Long life and low maintenance reduces life cycle costs
- Common software suite reduces training costs
- Cybersecure to NERC CIP
Metal-enclosed bus duct system

Power-Zone non-segregated busway system

Ratings/features
• 600 V up to 38 kV
• 5 kV, 15 kV, or 38 kV fluidized bed epoxy insulation
• 1,200 A up to 6,000 A bus ratings
• Copper or aluminum construction
• Aluminum, steel, or stainless steel housing
• Weatherproof housing available as an option
• Components include: equipment terminations, elbows and tees, expansion joints, fire, and smoke barriers

Benefits
• Custom designed and manufactured for each application
• The bus conductors are completely enclosed in a grounded metal housing for the protection of both personnel and property
Walk-in substations

Powerhouse/Power-Zone Center

Ratings/features

- Containerized substation comprised of:
  - MV switchgear (AIS, GIS)
  - LV switchboards
  - Monitoring, control, protection, and measurement devices
- Pre-engineered, pre-assembled, and pre-commissioned custom designed solution
- Designed to satisfy various NEMA classifications, including NEMA 3R, 4, 4X, 7, 9, or 12
- Base constructed of welded steel channels and angle supports, sized and reinforced to accommodate specific loading requirements
- Flooring constructed of 1/4" steel plate finished with ANSI-61 skid-resistant epoxy
  - Optional tread plate steel available for flooring
- Wall panels formed of galvanized steel with interlocking, self-framing design
- Standard peaked roof or single sloped roof
- Equipped with removable lifting lugs
- Skid mounted unit substations with or without Power-Zone Center also available

Benefits

- Single-source responsibility of designing, engineering, and manufacturing saves time and causes minimal disruption
- Increased reliability owing to full assembly and quality control in the factory
- Interlocking panel design allows easy adaptability to various equipment layouts
- Rear-hinged access doors grant easy access to electrical equipment without the need of additional building space
- Portability and classification as electrical equipment allow faster depreciation than a block building

![Image of walk-in substations]
## Protection and control

<table>
<thead>
<tr>
<th>Application</th>
<th>Sepam 10 series</th>
<th>Sepam 20 series</th>
<th>Sepam 40 series</th>
<th>Sepam 80 series</th>
<th>MiCOM Px10 series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeder</td>
<td>Multifunction protection relay for basic applications</td>
<td>Multifunction protection relay for standard applications</td>
<td>Multifunction protection relay for demanding applications</td>
<td>Multifunction protection unit for critical and customized applications</td>
<td>Multifunction protection relays for basic electrical schemes</td>
</tr>
<tr>
<td>Transformer</td>
<td>Nondirectional overcurrent and ground-fault protection, specifically adapted for LV and MV applications.</td>
<td>Designed to provide the necessary protection for the operation of machines, industrial electrical distribution networks, and utility substations for all voltage levels.</td>
<td>Designed to adapt to demanding applications that call for current and voltage metering when providing protection for machines, industrial electrical distribution networks, and utility substations for all voltage levels.</td>
<td>The Sepam relay line’s most robust and advanced IED allowing for custom-designed application via Logipam (ladder logic programming). The Sepam 80 is IEC 61508 compliant and SIL2 rated for use in nuclear and hydro applications.</td>
<td>Nondirectional overcurrent and ground-fault protection, specifically adapted for LV and MV applications.</td>
</tr>
<tr>
<td>Feeder</td>
<td>Bus bar</td>
<td>Transformer</td>
<td>Motor</td>
<td>Feeder</td>
<td>Feeder</td>
</tr>
<tr>
<td>Bus bar</td>
<td>Transformer</td>
<td>Motor</td>
<td></td>
<td>Bus bar</td>
<td>Bus bar</td>
</tr>
<tr>
<td>Transformer</td>
<td>Motor</td>
<td></td>
<td></td>
<td>Transformer</td>
<td>Transformer</td>
</tr>
<tr>
<td>Generator</td>
<td></td>
<td></td>
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*Dependent upon selected relay application type*
## Protection and control

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<td>The Px20 series is designed to provide the essentials of protection. Applications range from main or backup protection to neutral systems protection.</td>
<td>Designed for the rigorous requirements with focus on feeder and transformer protection and control. Programmable scheme logic (PSL) for flexibility and customization.</td>
<td>Designed for the rigorous requirements with focus on feeder and transformer protection and control. Programmable scheme logic (PSL) for flexibility and customization.</td>
<td>The VAMP system has been designed to cover basic and advanced level applications for MV arc flash mitigation.</td>
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