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DESCRIPTIVE BULLETIN

Advance®

ANSI 5/8.25/15 kV switchgear

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Advance® is ABB's ANSI platform for 5, 8.25 and 15 kV rated metal-clad switchgear featuring a small footprint and designed and tested per IEEE C37.20.2. Using galvanized steel construction, hem bending techniques, and Delrin arc-quenching contacts the Advance product line is designed with safety, reliability and durability in mind.

Table of contents

004–005	Product overview and highlights
006	AMVAC breakers for the Advance platform
007	ADVAC breakers for the Advance platform
008	ADVAC breakers for 63 kA applications
009–011	Instrument transformers
012	Distribution protection and control

Advance® 63

Product overview and highlights

ABB's ANSI platform for 5, 8.25 and 15 kV rated metal-clad switchgear featuring a small footprint and designed and tested per IEEE C37.20.2.

Using galvanized steel construction, hem bending techniques, and Delrin arc-quenching contacts, the Advance product line is designed with safety, reliability and durability in mind.

Product Highlights

- Continuous current ratings of 1200, 2000, 3000 A, with 4000 A forced air cooled (FAC) available for 25-63 kA ratings
- Interruption ratings of 25-63 kA
- Fully compliant to IEEE C37.20.2-1999 for metal-clad switchgear construction
- PT, CPT and CPT fuse auxiliary units feature closed door racking
- Available SmartRack remote racking system for Breakers, PT and CPTs
- UL and CSA available
- Automatic secondary disconnects
- Large Lexan viewing window for viewing breaker status and position
- Modular design and construction
- Available two-high construction
- Available top and bottom cable or bus duct entry
- Standard 36-inch wide, 95-inch tall frame with depths of 85 or 92 inches
- Galvanized construction for superior rust protection and illumination properties
- Hem bending of 14 gauge steel for strength and rigidity
- Delrin arc-quenching contacts for auxiliary units
- ISO 9001 certified manufacturing facilities

Advance features the most competitive footprint in the market with available two-high configurations.

Available configuration/competitive footprint

Advance features the most competitive footprint in the market with available two-high configurations. Standard frames measures 36 inches wide, 95 inches tall and 85 inches deep, regardless of one or two-high breaker configurations. Even shallower depths are possible, depending upon ratings and devices installed.

When large additional equipment is needed in the rear, such as large CPTs and station class surge arresters, depths of 92 inches, or greater can be provided. When extra space is needed on the front doors, a 10-inch extension can be installed providing space for deeper relays and other control devices across most of the entire height of the front doors. ABB can assist in optimizing design requirements.

Indoor and outdoor enclosures

Advance is provided in a standard indoor enclosure, meeting or exceeding the requirements of ANSI C37.20.2, and is also available in both the non-walk-in and single row walk-in (sheltered aisle) type outdoor enclosures.

Delrin arc-quenching contacts

For PT, CPT and CPT fuse contacts, ABB uses Delrin arc-quenching contacts. Due to the unique properties of Delrin, which include self-lubrication, arcs created during load break conditions are extinguished by a gas emitted by the Delrin material as it heats. The recessed contact design also eliminates the need for safety shutters as access to live bus is very difficult.

- 01 Test cabinet
- 02 Lift truck
- 03 SmartRack®
- 04 Test cabinet



01



02



03



04

Galvanized Steel Construction

Advance switchgear is constructed of galvanized steel for increased protection from rust, scratches and corrosion. Galvanized steel is used inside low voltage compartments for its increased illumination properties to provide for better instrument viewing.

Hem Bending

The process of folding a single sheet of steel over upon itself, is used throughout the construction of Advance. This construction technique is the same as that used in arc-resistant switchgear offering increased rigidity, strength and reduced arc propagation beyond most competitor's non-arc-resistant switchgear designs. It also serves to protect maintenance personnel and any LV wiring inside the switchgear, eliminating sharp edges and burrs that are common in other techniques.

Advance Accessories

- Racking crank
- Test cabinet
- Test jumper
- SmartRack® electric racking device
- Lift truck
- Manually and electrically operated Ground & Test devices (25-50 kA ratings only)

Advance Options

- Outdoor non-walk-in and sheltered aisle enclosures
- Utility metering compartments
- IR viewing ports; ground studs; lightning arresters
- Generator circuit breakers
- Ultra Fast Earthing Switch (UFEST™)
- Fault current limiting devices
- Digital switchgear with current and voltage sensors and 61850-based communication
- SwitchgearMD™ 24x7 monitoring

Characteristics	Unit	Rated maximum voltage level*		
		5 kV	8.25 kV	15 kV
Rated nominal voltages	kV	2.4, 4.16, 4.8	4.8, 6.9, 8.2	6.9, 7.2, 8.4, 11, 12, 12.47, 13.2, 13.8, 14.4
Main bus continuous current	A	1200, 2000, 3000, 4000**		
Short circuit current (rms)	kA	25, 31.5, 40, 50, 63		
Rated frequency	Hz	50, 60		
Low Frequency Withstand (rms)	kV	19	36	36
Impulse level (BIL, crest)	kV	60	95	95

* Ratings given are for service conditions within temperature and altitude limitations as defined by IEEE C37.20.2-2015 metal-clad switchgear standard.

** 4000 A is forced-air cooled.

Ratings shown are for usual service conditions. For 27 kV applications, reference Advance 27 documentation 1VAL107001-FL.

AMVAC™ breakers for the Advance platform

General overview



The AMVAC™ breaker is a magnetically actuated and latched breaker capable of a high number of operations due to its simplified design. Fully compliant with IEEE Standards C37.04, C37.06 and C37.09, the AMVAC breaker is a great fit for many applications.

Features

- Mechanical operations counter
- Optional roll-on-floor design
- Open, closed, ready/not ready lights and push-buttons

Available AMVAC breaker ratings

Voltage class	Nominal voltages	Continuous current	Short circuit/ withstand (2 sec)	Close and latch	BIL (lightning impulse withstand)	Low frequency withstand (Hi-Pot)
kV	kV	A	kA, rms	kA, peak	kV, crest	kV, rms
5	2.4, 4.16, 4.8	1200, 2000, 300	25 31.5 40 50	65 82 104 130	60	19
8.25	4.8, 6.9, 7.2	1200, 2000, 3000	40	104	95	36
15	6.9, 7.2, 8.4, 11, 12, 12.47, 13.2, 13.8, 14.4	1200, 2000, 3000	25 31.5 40 50	65 82 104 130	95	36

ADVAC® breakers for the Advance platform

General overview



The ADVAC® breaker is a spring mechanism breaker with modular, easy to maintain design. Fully compliant with IEEE Standards C37.04, C37.06 and C37.09, the ADVAC breaker is a great fit for many applications.

Features

- Mechanical operations counter
- Open, closed, ready/not ready lights and push-buttons
- Mechanical anti-pump

Available ADVAC breaker ratings

Voltage class	Nominal voltages	Continuous current	Short circuit/ withstand (2 sec)	Close and latch	BIL (lightning impulse withstand)	Low frequency withstand (Hi-Pot)
kV	kV	A	kA, rms	kA, peak	kV, crest	kV, rms
5	2.4, 4.16, 4.8	1200, 2000, 3000	25 31.5 40 50	65 82 104 130	60	19
8.25	4.8, 6.9, 7.2	1200, 2000, 3000	40	104	95	36
15	6.9, 7.2, 8.4, 11, 12, 12.47, 13.2, 13.8, 14.4	1200, 2000, 3000	25 31.5 40 50	65 82 104 130	95	36

ADVAC® breakers for 63 kA applications

General overview



The ADVAC series is a complete line of ANSI-rated vacuum circuit breakers offering power distribution system customers the advantages of the latest technology that reduces ownership costs through improved reliability and maintainability. Maintenance costs are further reduced due to ABB vacuum interrupter and contact design, with contacts that wear less than 1 mm during the life-time of the breaker.

Available ADVAC breaker ratings

Voltage class	Continuous current	Max wave voltage (kV, rms)	Short circuit/ withstand (2 sec)	Close & latch (kA, peak)	BIL (kV)	Low frequency withstand (Hi-pot)	Cap switch rating (15 kA peak, 2.0 kHz)	Interrupt time (cycles)	Closing time (msec)
kV	A		kA, rms	kA, peak		kV, rms			
5/15 kV	1200 A	5/15	63	164	95	36	C1 (1600 A)	3	50-80
	2000 A	5/15	63	164	95	36	C1 (1600 A)	3	50-80
	3000 A	5/15	63	164	95	36	C1 (1600 A)	3	50-80

Instrument transformers

Current transformers

Advance is designed and tested for use with the ABB SAB-1/1D current transformers for 1200 and 2000 A applications, and the SAB-2/2D current transformers for 3000 A and 4000 A applications. These CT's are used for voltage ratings of 5, 7.5 and 15 kV and are located on the breaker primary bushings.

Each breaker primary bushing can accommodate up to two (2) standard accuracy CTs (SAB-1 or SAB-2), for a total possible four (4) current transformers per phase. For high accuracy requirements the bushings can accommodate one (1) CT, for a total of two (2) CTs per phase.

SAB CTs are available in single and multi-ratio styles with primary ampere ratings from 50 to 5,000 amps. These current transformers are used as a source of current for both relaying and metering. The deeper case SAB-D is used when high burden relaying and metering is required.

The ring-type core is insulated and toroidally wound with a fully distributed secondary winding. The protective case, made of an impact-resistant polycarbonate, is assembled using self-tapping screws.

Secondary terminals are 10-32 brass terminal screws with hardware.

Saturation, overcurrent ratio correction factor and phase-angle curves are available upon request.

IEEE test reports are stored electronically and can be emailed in various formats at the time of shipment.

These units meet all applicable IEEE and NEMA standards and are UL Recognized components.

Product features

- 600 volt indoor
- 10 kV BIL
- 25 through 400 Hertz
- 50-5000 primary amperes
- Mechanical rating:
 - 180 x rated current
- Thermal rating:
 - 80 x rated current, one second
- Continuous current rating factor:
 - 50-4000 primary amperes:
 - 1.33 @ 30°C ambient
 - 1.00 @ 55°C ambient
 - 5000 primary amperes:
 - 1.00 @ 30°C ambient
 - 0.50 @ 55°C ambient
- UL Recognized Component; File No. E96461



Instrument transformers

5 kV voltage transformers

For 5 kV applications, Advance is designed and tested for use with the ABB VIY-60 indoor voltage transformers.

The VIY-60 indoor voltage transformers are fused and used for metering or relaying applications.

Advance utilizes drawout trays for PTs that offer closed-door racking for increased safety. These trays are available in both single phase and three-phase PT applications, and include both Wye-Wye and Open Delta configurations.

The primary and secondary coils are wound using special winding and shielding techniques for improved voltage stress distribution. The coils are designed to withstand continuous operation at 1.1 times the line-to-line voltage level and the line-to-ground voltage level for Y burden units.

Each coil is insulated with mylar film to provide a high dielectric strength between layers. The coils and core are combined to create a complete winding structure that is assembled to a support frame. The entire assembly is vacuum cast in polyurethane for added insulation and protection.

IEEE test reports are stored electronically and can be emailed in various formats at the time of shipment.

These units meet all applicable IEEE and NEMA standards and are UL Recognized components.

Product features

- 5 kV indoor
- 60 kV BIL, 60 Hertz
- Primary volts: 2400 - 4800
- UL Recognized Component, File No. E148620



Instrument transformers

15 kV voltage transformers

For 8.25 – 15kV applications, Advance is designed and tested for use with the ABB VIZ Indoor Voltage Transformers.

The VIZ-75 and VIZ-11 indoor voltage transformers are fused and used for metering or relaying applications. Both units are available in single, double and tapped secondary designs with two accuracy and thermal rating options.

Advance utilizes drawout trays for PTs that offer closed-door racking for increased safety. These trays are available in both single phase and three-phase, and include both Wye-Wye and Open Delta configurations.

The primary and secondary coils are wound using special winding and shielding techniques for improved voltage stress distribution. The coils are designed to withstand continuous operation at either 1.1 or 1.25 times the line-to-line voltage level for Z burden units and 1.9 times the line-to-ground voltage level for Y burden units.

Each coil is insulated with mylar film to provide a high dielectric strength between layers. The coils and core are combined to create a complete winding structure that is assembled to a support frame. The entire assembly is vacuum cast in polyurethane for added insulation and protection.

IEEE test reports are stored electronically and can be emailed in various formats at the time of shipment.

These units meet all applicable IEEE and NEMA standards and are UL Recognized components.

Product features

- 8.25 and 15 kV indoor
- 75 and 110 kV BIL, 60 Hertz
- Primary volts: 2400 - 14400
- UL Recognized Component, File No. E148620



Distribution protection and control

ABB's Relion® family of protection and control relays for distribution applications provides the performance, safety, and ease-of-use that switchgear specifiers and users demand. The Relion 615 and 620 series offer complete protection and control for feeders, motors, and transformers in switchgear applications and are characterized by their flexibility and performance in today's and future distribution schemes.

The IEC 61850 implementation in Relion includes fast peer-to-peer communication over the substation bus. GOOSE (Generic Object Oriented Substation Events) communication is used between Relion devices in switchgear to form a stable, reliable, and high-speed busbar protection system, provide fast and dependable auto transfer schemes and zone interlocking. Separate hard-wiring is not needed for the horizontal communication between the switchgear cubicles.

Relion relays for feeder protection offer an optional cable fault detection function that can detect extremely short duration underground faults. These faults are typically undetectable by conventional protection where there is no operation of the breaker. This feature helps users to learn of these events faster, resulting in reduced down time.

Relion 615R, 615 and 620 series relays include:

- Comprehensive set of protection and metering functions for feeders, transformers, and motors
- Draw-out design
- Integrated Open/Close push buttons and Local/Remote selector with indicating lights
- Protection and control for one and two breakers as well as breaker-and-a-half schemes
- Enhanced safety with optional arc fault protection in all 615 and 620 series relays
- Web browser based user interface accessible through an RJ45 front port
- Trip coil monitoring
- Monitoring of breaker health parameters such as travel time, number of operations, wear and tear, and spring charging time
- DNP3 and Modbus protocols included standard in all relays
- Relion relays are fully IEC 61850 compliant for communication and interoperability of substation automation devices
- Fully ANSI and RoHS compliant as well as UL listed

ABB's COM600 Grid Automation Controller can be used as a local HMI to display switchgear single line diagrams and the status of devices such as breakers and protection relays. COM600 also provides gateway functionality to enable switchgear integration into SCADA systems. It can be easily installed as part of the switchgear control devices.

— 01 Relion 615 series

— 02 Relion 620 Series

— 03 COM600 Distribution automation controller



01



02



03