

BUYLOG SECTION 16

Switchgear - low voltage





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EXcelerate – low-voltage switchgear

Configurations

Switchgear offering comparison

Program	FastFlex	EXcelerate	Standard SG	Complex SG
Lead time			48 weeks	48+ weeks
Approval drawings	No	No	Required	Required
Category	CTO	CTO	ETO	DTO
Max. voltage	600	600	600	600
Max. amps	4000/6000	4000	6000	6000
Max. interrupting rating	100	100	100	100

Available configurations

The EXcelerate configure-to-order program offers preconfigured sections covering a broad range of common protection and control applications.

The CTO switchgear can be combined and field-assembled with ease to meet your particular application needs.



Single breaker

- Main/feed tie
- MLO
- 2000 A/4000 A
- 22 in./38 in.



4-high feeder section

- 4-high A/B/C/D
- 3-high aux/B/C/D
- 2-high aux/B/C/aux
- 1-high aux/aux/C/aux
- MLO
- 1600/2000/2000/1600
- 22 in.



Auxiliary section

- 22 in./38 in.



Closed coupled to dry transformer

- 22 in. left
- 22 in. right
- 4000 A

EXcelerate – low-voltage switchgear

Ratings and options

	Mains	Feeders
Voltage	480 V/600 V	480 V/600 V
System rating	3PH-3W/4W-60 Hz	3PH-3W/4W-60 Hz
ANSI short circuit rating	65 kA/85 kA/100 kA	65 kA/85 kA/100 kA
Bus bracing	100 kA	100 kA
Service entrance UL	Yes/no	N/A
Main bus	2000 A/4000 A	2000 A/4000 A
Bus plating	Silver/tin	Silver/tin
Neutral bus	50%/100%	50%/100%
Ground bus	0.25 x 3.00 Cu : 1 Ba	0.25 x 3.00 Cu : 1 Ba
Bus isolation/insulation	Yes	Yes
Compartmentation	Yes /no	Yes /no
Construction	Indoor	Indoor
Power connection	Cable/closed coupled to Xtrans	Cable
Power connection	Top / bottom - CC left-right	Top / bottom
Paint	Gray ANSI 61	Gray ANSI 61
Depth	74	74
Width	Amperage dependent	Amperage dependent
Breaker	Emax 2	Emax 2
Breaker frame	E2.2/E6.2	E2.2/E6.2
Trip unit	Ekip Hi-Touch LSIG	Ekip Hi-Touch LSIG
Rating plug	800-4000 A	800-4000 A
Breaker operation	Mechanical/electrical	Mechanical/electrical
Control voltage	120AC/125VCD/by others	120AC/125VCD/by others
Options		
Breaker electrical operation	•	•
Maintenance switch/RELT switch	•	•
Pilot lights (GRN/RED/YLW)	•	•
Extra breaker MOC (Mechanism Operated Contacts)	•	•
Extra breaker TOC (Breaker Truck Operated Contact)	•	•
Power supply	•	•
Control Power Transformer (CPT)	•	
Current Transformer (CT)	•	•
Breaker communication module	•	•
Receptacle outlet	•	
Breaker control switch	•	•
Remote breaker operation (Chks)	•	•
Remote reset breaker input	•	•
Trip coil monitor	•	
Surge protection device Class 1 - 2	•	•
Section heater and thermostat	•	•
Redudant power supply	•	

Low-voltage switchgear

Introduction

ABB low-voltage switchgear is heavy-duty equipment built to ANSI Standards. ABB switchgear is designed to have more margin within its ratings and to provide maximum continuity of service for those applications subject to severe duty such as repetitive switching encountered with motor starting, power factor correction, demand control, and load shedding, etc. A major factor contributing to this extended continuity of service is the availability of renewal parts complete with detailed maintenance instructions and original equipment documentation. From a coordination standpoint, air circuit breakers can provide full selectivity with each other and with other protective devices. The bus is thermally rated; i.e. based upon temperature rise, as opposed to switchboards where the bus may be sized on a current density basis.

Switchgear also houses instrumentation and other auxiliary circuit protective devices. It is available in single or multiple source configurations and applied as a power distribution unit or as part of a unit substation in indoor or outdoor construction.

ReliaGear® LV SG switchgear

ABB's flagship low-voltage switchgear incorporates the best of both worlds: cutting-edge SACE® Emax 2 air circuit breakers (ACB) with Ekip trip unit technology, integrated into the proven AKD evolving switchgear platform. ReliaGear LV SG switchgear brings reliability and innovation to the switchgear platform with ratings that range from 2000 A–8000 A as main bus and utilizing SACE Emax2 ACB covering 800 A–5000 A frames.

Product highlights

Safe, smart and sustainable solutions

• Safe

- Closed door racking
- ZSI on instantaneous
- RELT ready
- Full remote operation

• Smart

- Integrated auto transfer
- 1% metering option
- 8 different communication protocols
- Bluetooth connectivity

• Sustainable

- ABB Ability™ (PM data)
- Ekip Connect for settings uploads
- Ekip Connect commissioning reports
- User replaceable accessories (fast and simple)



ReliaGear LV SG

MNS-SG arc resistant switchgear

Arc resistant low-voltage switchgear continues the MNS tradition with SACE Emax2 ACB, while delivering system reliability features, enhanced arc flash protection and arc resistance gear construction.

The MNS® metal-enclosed low-voltage power circuit breaker switchgear for ANSI/NEMA/UL offers excellent flexibility due to the modularity of both the electrical and mechanical design. The modularity enables customization of the structural design, interior arrangement and degree of protection.

This intelligent low-voltage switchgear leverages sophisticated technology to protect low voltage power distribution systems, representing a significant advantage over traditional switchgear.

Entellisys® 5.6 intelligent switchgear

Entellisys® 5.6 helps reduce downtime, while improving operator safety. The newest iteration of Entellisys switchgear offers enhanced safety, advanced communications, and predictive diagnostics, and is easier to install, monitor, and maintain, while offering greater functionality. Entellisys 5.6 is available in all ANSI markets where NEMA standards are prevalent.



MNS-SG Arc resistance switchgear



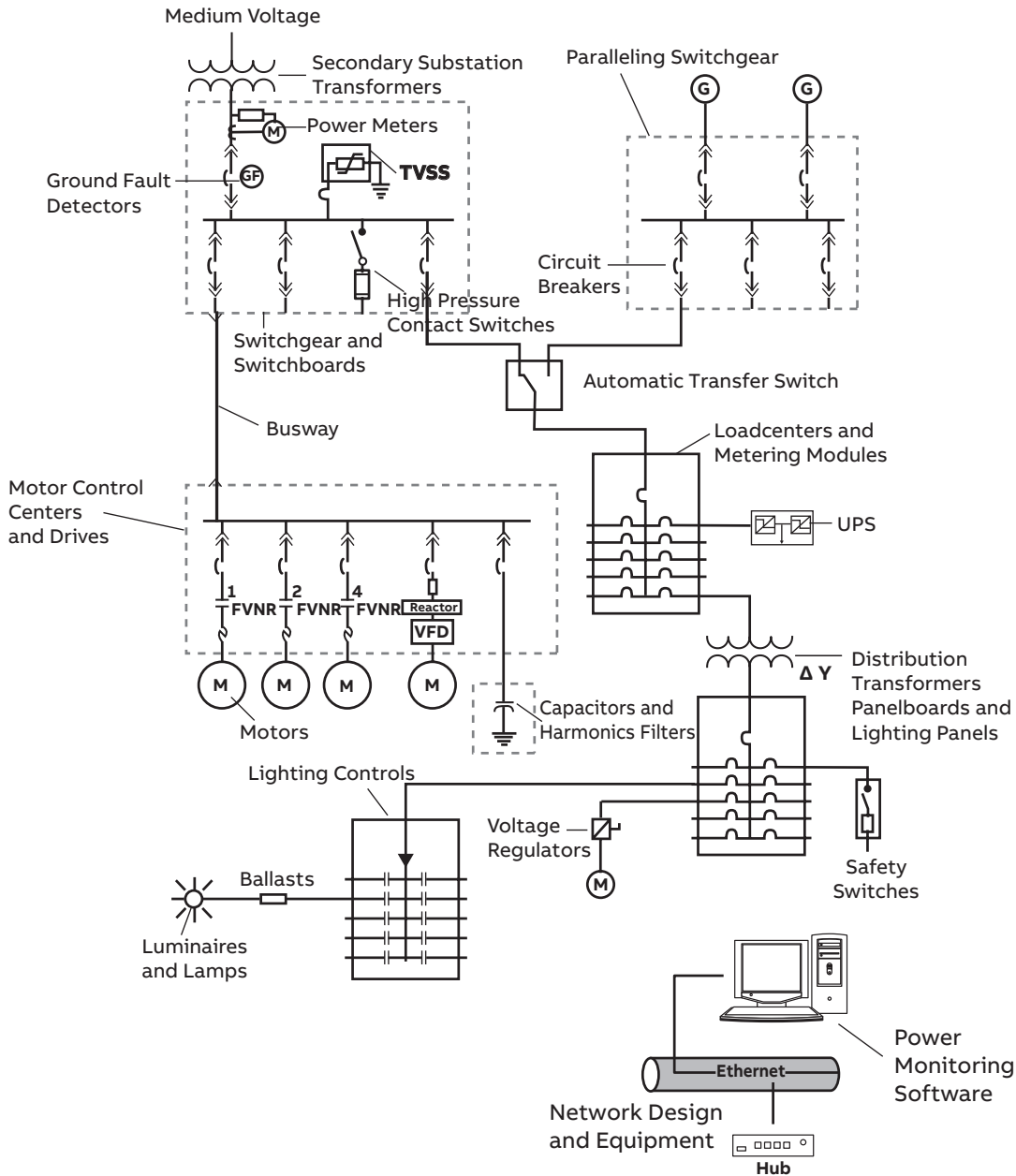
Entellisys® 5.6 intelligent switchgear

Low-voltage switchgear

Introduction

CSI specifications

- Low voltage metal enclosed
- 16400 low voltage switchgear
- 26 23 00 low voltage switchgear



Low voltage switchgear one-line

Low-voltage switchgear

ReliaGear® LV SG switchgear

For pricing and application assistance, contact your local ABB sales office.

Introduction

Incorporating the best of both worlds: cutting-edge SACE® Emax 2 air circuit breakers with Ekip trip unit technology, integrated into the proven AKD evolving switchgear platform.

ReliaGear LV SG Switchgear brings reliability and innovation to the switchgear platform with ratings that range from 2000 A–8000 A as main bus and utilizing Emax2 ACB covering 800 A–5000 A frames served by four envelopes (E1.2, E2.2, E4.2 and E6.2) and up to 600 V nominal equipment class compliance.

E1.2 envelope integration provides a 15-inch minimum four-high stack width. E2.2 provides a higher withstand without changing "envelope" i.e. up to 85 kA. The E4.2 can go all the way to 100 kA withstand and still fit in a 22-inch section (2000A and lower).

Main features and ratings

- 3P3W and 3P4W – 600/347 Vac, 480/277 Vac
- Fully rated 100 KAIC at 600/347 Vac, 480/277 Vac and 208/120 Vac
- Main circuit breakers: up to 5000 A
- Main bus: up to 8000 A
- Emax 2 Air circuit breakers: 250–5000 A
- Ekip trip unit touch standard provides high accuracy measurement, optional integral 1% metering, M-T-M or Utility-Gen auto transfer built in, and no external relays, PLCs or devices required. With optional sync check module on breaker for closed transitions. Ekip Hi-Touch optional.
- Embedded Bluetooth antenna in the trip unit
- ABB Ability readiness
- Non-arc resistant
- UL1558 and CSA C22.2 No.31 compliant
- Enclosures: NEMA Type 1 and 3R
- Seismic ratings: 1.33g sds a z/h of 1 CBC-2019/IBC-2018
- Depths: 54-74 inches
- Widths: 15-38 inches
- Breaker mount racking mechanism (E2.2 – E6.2)
- Positive position racking indicator
- Overhead lifting beam
- Compartment shutters standard offering
- Shutter padlocking locking provision (8mm dia.)
- Cradle mounted kirk interlock



ReliaGear LV SG

Optional features

- Ekip Hi-Touch: the ultimate trip unit
- Infrared scanning window in rear doors
- External metering, relays, and surge devices
- Lockable T-handles on circuit breaker cubicle door
- Lockable T-handles on rear doors
- Overhead breaker lifting hoist
- Insulated/isolated bus

Documents

- ReliaGear® LV SG switchgear [Fact sheet](#)
- ReliaGear® LV SG switchgear [Descriptive bulletin](#)
- ReliaGear® LV SG switchgear [Technical application guide](#)
- ReliaGear® LV SG switchgear [Installation, operations and maintenance manual](#)
- ReliaGear® LV SG switchgear [webpage](#)

SACE® Emax 2 UL 1066

Air case circuit breakers

Main pillar to ReliaGear® LV SG switchgear

- Performance - Satisfying all major requirements at the right size
- Control - Optimization of power flow even in emerging microgrid
- Connectivity - Satisfying all major requirements at the right size Integration into any digital system
- Ease of use - Simplified user experience; at all customer interactions during the product's lifestyle



E1.2



E2.2



E4.2



E6.2

kAIC Rating (508V)	Version	250A	400A	800A	1200A	1600A	2000A	3200A	4000A	5000A
100	V-A									E6.2
85	H-A							E2.2	E4.2	
65	S-A								E4.2	
50	N-A				E1.2					
42	B-A				E1.2					

SACE® Emax 2

Trip unit

The SACE Emax 2 trip unit is designed to be used in a wide range of applications. This complete, flexible protection trip unit can be adapted to the actual level of protection required, independently of the complexity of the system.

- Ekip Touch:** standard smart trip unit Ready to be upgraded and customized
- ABB Ability™ Marketplace ready
 - Advanced protection sets included:
 - Modified differential ground fault
 - 2I...reduced energy let-through ready
 - Embedded Bluetooth® antenna
 - Internal voltage sensing pre-installed¹



Trip unit

Ekip Dip: trip unit available upon request Current protection for basic distribution

- Thermal memory, separate settings for neutral
- LED with trip cause signalization

Ekip Hi-Touch: the ultimate trip unit Ekip Touch plus a lot more preloaded:

- Class 1% accuracy
- Directional protection for complex grids
- Dual setting for smart grids and arc-flash
- Enabled internal voltage sensing and self-power

The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by ABB is under license.

Low-voltage switchgear

Entellisys® 5.6 intelligent switchgear (Limited)

For pricing and application assistance, contact your local ABB sales, Service Business Development Manager (BDM) or Service Field Application.

Introduction

ABB Electrification Service has the capability to properly support spare parts and modernization options to our Entellisys low-voltage switchgear. It is designed for mission-critical applications, providing a better integrated, more responsive approach to power distribution needs. In healthcare, education, data centers, oil and gas, and industrial applications. Entellisys helps address customer concerns related to operator safety, arc flash mitigation and diagnostics.

Entellisys 5.6 and earlier versions 3 – 5.5 help reduce downtime, while improving operator safety. The newest iteration of Entellisys switchgear offers enhanced safety, advanced communications, and predictive diagnostics, and is easier to install, monitor, and maintain, while offering greater functionality. Entellisys 5.62 upgrade path is available from ABB Electrification Service in addition to all the spare parts of major components and parts.

Product highlights

Safe, smart and sustainable solutions

Entellisys 5.62 upgrade path

CPU:

- CPU with modern processor and version 5.62 software
- Remote I/O offering that replaces PMC I/O

HMI:

- Vartech to Moxa 19"
- Update HMI software to Windows® 10

Circuit breaker:

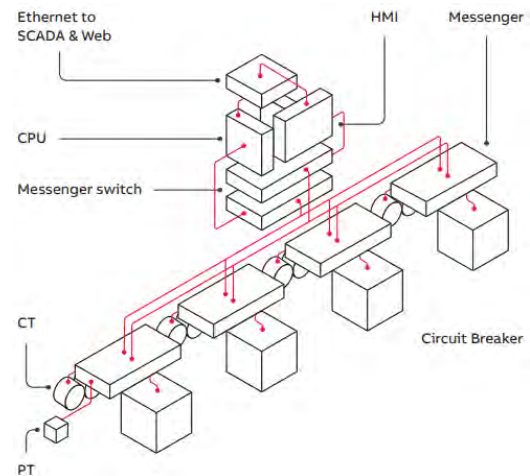
- EntelliGuard E retrofits are available for EntelliGuard (WavePro)

CPU

- New CPU with 8 cores and much faster processing times. Functionality is the same as previous CPUs, but future upgrades will avoid CPU hardware changes
- New CPU chassis - smaller footprint and more powerful fans to aid heat dissipation
 - NXP (Freescale) T2081 processor – 8 cores
 - Three 1 GB Ethernet Ports (2 IEEE 1588 capable)
 - Two 64-bit PMC slots
 - Real-time clock
 - On-board temperature sensors
 - TPM security chip
 - SD card slot
 - SATA NAND flash (up to 64 GB)
 - NAND flash (2 GB)
 - NOR flash (128 MB)
 - DDR3 RAM (8 GB)
 - VxWorks 7.0 Real-time operating system



Entellisys® 5.6 intelligent switchgear



Entellisys 5.62 upgrade path

Low-voltage switchgear

Entellisys® 5.6 intelligent switchgear (Limited)

HMI

- New HMI hardware
 - Capacitive touchscreen is easier to navigate and enable multi touch for future releases
 - 19-inch display
 - Solid state hard drive, no moving parts
- Windows® 10 Operating System – security enhancements

Input/Output configuration

- More flexible and less hardware dependent on the CPU
 - Redundancy achieved through PROFINET bus coupler
 - System reliability increased by using less components
 - Optional contact ratings maintained
 - LED status indication maintained
 - Material cost reduced 50%, less labor required for assembly

Upgrades

Recommended:

- Windows® 10 – For OS + Cyber Security
- Firewall – Cyber Security

Modernization/Enhancements:

- CPU
- I/O
- HMI

Aftermarket

- Lifecycle support
- Troubleshoot/Repair
 - Asset assessment
 - Preventative maintenance
 - Training

Documents

Enhance the safety, performance and lifespan of your switchgear. Learn more <https://electrification.us.abb.com/service/upgrades-retrofits-retrofills>

Contact us 1-888-434-7378 (US) | 1-540-387-8617 (Int'l)

- Entellisys® 5.6 intelligent switchgear [Fact sheet](#)
- Entellisys® 5.6 intelligent switchgear [Descriptive bulletin](#)
- AKD-20 and Entellisys [Installation, operations and maintenance manual - IOMM DEH-41472](#)
- Entellisys 5.6 intelligent switchgear [Technical application guide](#)
- Entellisys® 5.6 intelligent switchgear [webpage](#)

Upgrade compatibility matrix (HMI only upgrade capability)

Entellisys firmware version	CPU hardware	HMI software version	Hardware	Windows® operating system	Upgrade path
3	Puma	3.0	CDI Version 1	Windows 2000	Upgrade to Vartech hardware w/Windows 10
	Puma		CD Version 2	Windows XP	Upgrade to Vartech hardware w/Windows 10
	Puma		Vartech Version 1	Windows XP/Windows 7	Upgrade existing hardware image
	Puma		Vartech Version 2	Windows 7	Upgrade existing hardware image
4.0 – 4.1	Puma	4.2	CDI Version 1	Windows 2000	Upgrade to Vartech hardware w/Windows 10
	Puma		CD Version 2	Windows XP	Upgrade to Vartech hardware w/Windows 10
	Puma		Vartech Version 1	Windows XP/Windows 7	Upgrade existing hardware image
	Puma		Vartech Version 2	Windows 7	Upgrade existing hardware image
5.5	Orion	5.54	Vartech Version 1	Windows XP/Windows 7	Upgrade existing hardware image
	Orion		Vartech Version 2	Windows 7	Upgrade existing hardware image

Low-voltage switchgear

MNS-SG Arc resistance switchgear

For pricing and application assistance, contact your local ABB sales office.

Introduction

Modularity to meet the most rigorous requirements. The MNS® metal-enclosed low-voltage power circuit breaker switchgear for ANSI/NEMA/UL offers excellent flexibility due to the modularity of both the electrical and mechanical design. The modularity enables customization of the structural design, interior arrangement and degrees of protection.

The switchgear can be outfitted as needed with standardized components to perfectly adapt the MNS-SG to each application. MNS-SG was designed, built and tested to meet all applicable requirements for UL1558, ANSI C37.20.1 and ANSI C37.20.7.

The MNS-SG supports the ABB vision of providing equipment that delivers world class performance under the intense mechanical, electrical and thermal stress of today's rigorous manufacturing environments.

Main features and ratings

- Up to 480V at 100kA and 85kA at 600V
- Up to 5000A main and vertical bus
- ANSI type 2B accessibility to protect the operator with the low voltage instrument compartment door open
- Emax2, 100% rated UL 1066 air circuit breakers
 - 1600A Frame E2.2 @ 85KA
 - 3200A Frame E4.2 @ 100KA
 - 4000A Frame E6.2 @ 100KA
- Optional plenum contains exhaust pressure and gas and channels them to a designated safe area
- IEEE C37.20.7 Type 2B arc resistant
- ABS certified

Features

- Internal exhaust chimney
- Plenum-less design
- No forced ventilation
- Heavy-duty enclosure (12 AWG external) steel
- Insulated/isolated bus (Option)
- Section barriers and shutters
- Heavy-duty, two-point breaker door latches
- Pressure activated rear vent flaps
- Full height hinged and bolted rear doors
- Floor plates in cable compartment



MNS-SG Arc resistance switchgear

Other options

- Infrared scanning window in rear doors
- Remote Racking Device
- Overhead Breaker lifting hoist

Benefits

- Personnel protection and safety
- Reliable, flexible and scalable
- Improved system protection with E-Max breakers

Documents

- MNS-SG AR [Application guide](#)
- MNS-SG AR [Specification guide](#)
- MNS-SG AR [product webpage](#)

Low-voltage switchgear

AKD-20 low-voltage switchgear (Classic)

For pricing and application assistance, contact your local ABB sales, Service Business Development Manager (BDM) or Field Application Engineer.

ABB Electrification Service has the capability to properly support spare parts and modernization options to our AKD-20 low-voltage legacy switchgear. ABB type AKD-20 low-voltage switchgear consists of EntelliGuard G power circuit breakers and EntelliGuard TU digital trip unit that together provide enhanced protection, endurance and safety. The key features of the AKD-20 are the tried and true construction of the AKD family heritage, common transitions to older versions of AKD equipment, true closed door racking with remote racking devices, non-vented circuit breaker panels, insulated and isolated bus construction and it integrates our new state-of-the-art EntelliGuard breaker-trip unit system. It also features an optimized footprint so that it now fits into a smaller area for the most common configurations. The product is fully rated to UL 1066 and 1558; CSA C22.2; NEMA SG-3 and SG-5; ANSI C37.13, ANSI C37.16, C37.17, C37.20.1 and C37.50; Seismic ratings to IBC-2003, UBC-2015 and IEEE-693-1997.

Main features/ratings

- Up to 8000A horizontal bus and 6000A breakers
- 150kAIC @ 480V, 100kAIC @ 600V
- EntelliGuard G breakers
- Low voltage power circuit breakers
 - Time proven—for trouble free performance
 - Five cycle stored energy closing
 - 6 frame sizes 400-6000 amps—for application flexibility
 - Interrupting ratings: 50kA-150kA
 - Fully maintainable—to assure operational readiness
 - The EntelliGuard trip units may be supplied with either Modbus or Profibus communications protocols. The breaker-trip unit system delivers superior circuit protection without compromising selectivity or arc flash protection.
- NEMA 1, 3R (walk-in and non walk-in)

Optional features

- Rear extensions to 60, 67 and 74 inch deep frames
- Infrared scanning window in rear doors
- Lockable T-handles on circuit breaker cubicle door
- Lockable T-handles on rear doors
- Overhead breaker lifting hoist
- Insulated/isolated bus
- Section barriers and shutters

Documents

Enhance the safety, performance and lifespan of your switchgear. Learn more <https://electrification.us.abb.com/service/upgrades-retrofits-retrofills>

Contact us 1-888-434-7378 (US) | 1-540-387-8617 (Int'l)

- AKD-20 application guide - DET-890



AKD-20 low-voltage switchgear

Low-voltage switchgear

AKD-20 Arc Resistant low-voltage switchgear (Limited)

For pricing and application assistance, contact your local ABB sales, Service Business Development Manager (BDM) or Field Application Engineer.

ABB Electrification Service has the capability to properly support replacement parts only for the switchgear and modernization options to our AKD-20 low-voltage legacy switchgear components such as power breakers and pilot devices. AKD-20 Arc Resistant (AR) switchgear solutions are for applications where an extra margin of safety is essential. They meet the IEEE C37.20.7 Type 2B AR standard which states that the equipment will provide arc resistance protection on the front, rear, and sides while opening designated low-voltage compartments.

Redirect arc flash explosions

AKD-20 AR is designed to contain and redirect the arc flash energy and exhaust gases up through vent flaps at the top of the enclosure and away from the system through a plenum. In the case of an arc flash event, pressure activated flaps slam shut to seal ventilation areas in the rear cable compartment.

Main features/ratings

- Up to 5000A horizontal bus and 5000A breakers
- 65kA @ 480V and 600V
- NEMA 1 only
- EntelliGuard G breakers
- UL-1558 equipment and UL-1066 breakers
- IEEE C37.20.7 Type 2B (Arc Res)
- UBC-2015 Seismically rated

Optional features

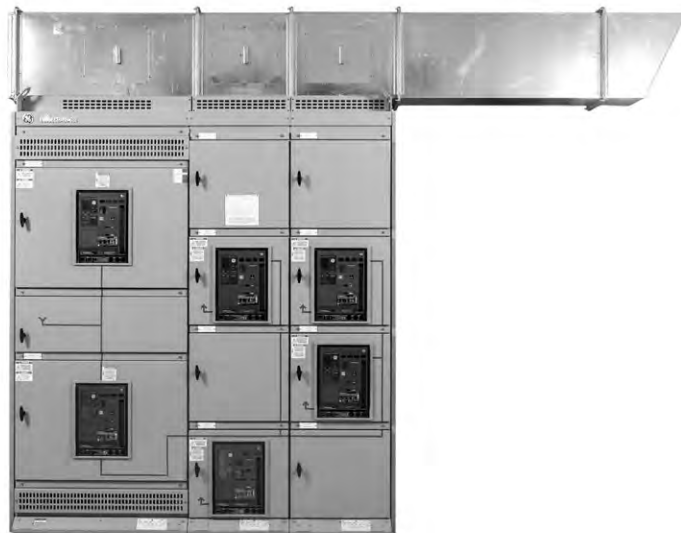
- Rear extensions to 60, 67, 74 inch deep frame
- Infrared scanning window in rear doors
- Lockable T-handles on circuit breaker cubicle door
- Lockable T-handles on rear doors
- Overhead breaker lifting hoist
- Insulated/isolated bus
- Section barriers and shutters

Document

Enhance the safety, performance and lifespan of your switchgear. Learn more <https://electrification.us.abb.com/service/upgrades-retrofits-retrofills>

Contact us 1-888-434-7378 (US) | 1-540-387-8617 (Int'l)

- AKD-20 AR installation and maintenance - DEH-41473



AKD-20 Arc Resistant low-voltage switchgear

EntelliGuard G

Low voltage power circuit breakers

The US Electrification Service factory in Florence, SC, currently manufactures all EntelliGuard circuit breakers, including the EntelliGuard G, E, and R circuit breakers. The Florence facility has the capability to properly maintain and support our US and global customers.

In accordance with ABB Electrification Service's global lifecycle management, the EntelliGuard G circuit breaker is in limited phase as a product with Electrification Service; the product is not obsolete, and all required parts and replacement circuit breakers are fully available. Spare parts and replacement circuit breakers are available for switchgear with future spaces and when new sections are added to existing lineups.

EntelliGuard low voltage circuit breakers are available in 3- and 4-pole designs rated from 400 A to 6000 A, supporting the installed base that includes AKD-20 and Entellisys low voltage switchgear, and switchboards with fault interruption ratings up to 200 kAIC.

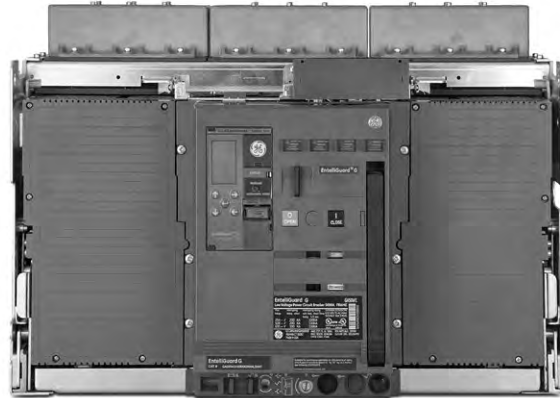
EntelliGuard TU Trip Unit: Integral to the EntelliGuard G circuit breakers, EntelliGuard TU Trip Units provide superior system protection, system reliability, monitoring and communications. The circuit breaker trip unit system delivers reliable circuit protection without compromising selectivity or arc flash protection.

Arc Flash Protection and Selectivity: Reliable circuit and equipment protection is the circuit breaker's primary purpose. Providing appropriate overcurrent protection while preserving selective coordination to maximize system reliability is the main goal of virtually every system designer.

The EntelliGuard G circuit breaker-trip unit system achieves selectivity in a wide range of situations without excessive sacrifice of arc flash protection. With its Reduced Energy Let-through (RELT) setting, the system protects at HRC1 or 2 for available fault currents as high as 100 kA.

Document

- EntelliGuard G low voltage power circuit breaker application guide - 9AKK108468A1736



EntelliGuard G