BUYLOG SECTION 16

Switchgear - low voltage

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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

ReliaGear® LV SG switchgear
ABB's flagship low-voltage swithgear 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)

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.

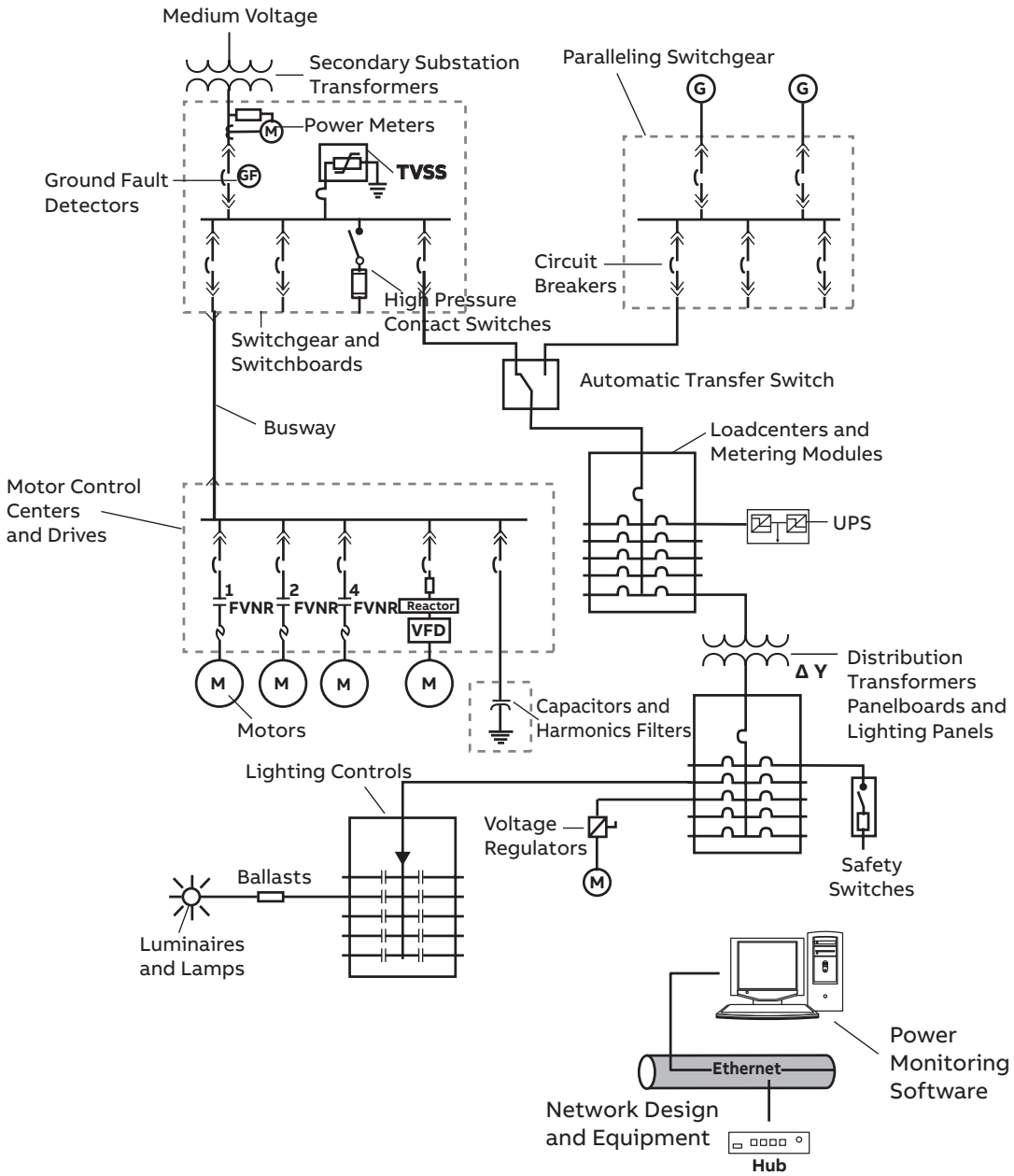
MNS-SG Arc resistance switchgear

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									
85	H-A									
65	S-A									
50	N-A									
42	B-A									

E6.2
E2.2
E4.2
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-installed[1]

Ekip Dip: trip unit vailable 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

Trip unit

Low-voltage switchgear

Entellisys® 5.6 intelligent switchgear

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

Introduction
Entellisys low voltage switchgear 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 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.

Product highlights
Safe, smart and sustainable solutions

Safe
Entellisys 5.6 takes a two-pronged approach to safety by reducing activity risk while lowering incident energy. Reduced energy let-through (RELT) mode lowers potential arc flash energy when operators are working near equipment. A touchscreen HMI in a remote-control stack or wall-mounted enclosure keeps operators safely outside the arc flash boundary where they can monitor, operate, and troubleshoot away from live gear. Remote circuit breaker racking allows operators to safely rack breakers in and out while remaining outside the arc flash boundary.

Smart
Entellisys 5.6 uses real-time monitoring and diagnostics to help reduce downtime. Engineered with multiple redundancy levels for protection and control, Entellisys 5.6 helps to ensure system readiness for mission-critical applications. Power transfers, load control, and emergency power restoration are critical concerns for customers in oil & gas, data center, industrial, and infrastructure markets. With traditional gear, two 90 percent reliable components in a series yield 81 percent reliability. With Entellisys 5.6, the same components, in parallel, yield 99 percent system reliability.

Sustainable
Centralized architecture significantly reduces components and wiring by deploying hardened devices and software diagnostics. System maintenance is based on actual mechanical and electrical usage, rather than on a fixed calendar.

Main features and ratings
- Up to 6000 A horizontal bus and 5000 A breakers
- 150 kAIC@ 480 V, 100 kAIC@ 600 V
- EntelliGuard breakers
- UL-1558 equipment and UL-1066 breakers
- NEMA 1, 3R (contact factory) | Control stack in climate-controlled area
- IEEE C37.20.1 (Non-arc-res) | Arc-res upon request only
- UBC-2015 seismically rated

Entellisys® 5.6 intelligent switchgear

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

New in Entellisys 5.6
- New CPU with latest modern processor
- New CPU chassis/enclosure
- Update HMI with capacitive touchscreen and 19-inch display with software to Windows 10
- New IO offering improving system reliability with LED status indication maintained

Benefits of Entellisys
- Increased uptime with a redundant architecture and comprehensive diagnostics to identify issues quickly
- Keep operators outside the arc flash boundary with the touchscreen HMI in a remote control stack or wall mounted enclosure
- Lower incident energy with dynamic zone selective interlocking and bus differential protection
- Easy remote communications over Modbus TCP/IP. All of the lineup's information and control at your finger tips

Documents
- 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
- Entellysis 5.6 intelligtent switchgear Technical application guide
- Entellisys® 5.6 intellitgent switchgear webpage

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 office.

ABB type AKD-20 low-voltage switchgear consists of EntelliGuard G power circuit breakers and state-of-the art 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.

AKD-20 low-voltage switchgear

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

- AKD-20 application guide - DET-890

Low-voltage switchgear

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

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

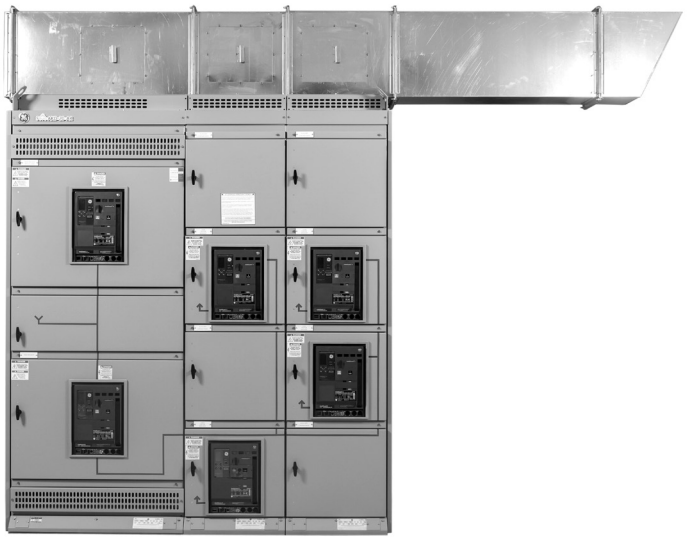
AKD-20 Arc Resistant (AR) switchgear solutions are for applications where an extra margin of safety is essential. They meet the IEEE C37.20.7 Type 2B AR standard which states that the equipment will provide arc resistance protection on the front, rear, and sides while opening designated low-voltage compartments.

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



AKD-20 Arc Resistant low-voltage switchgear

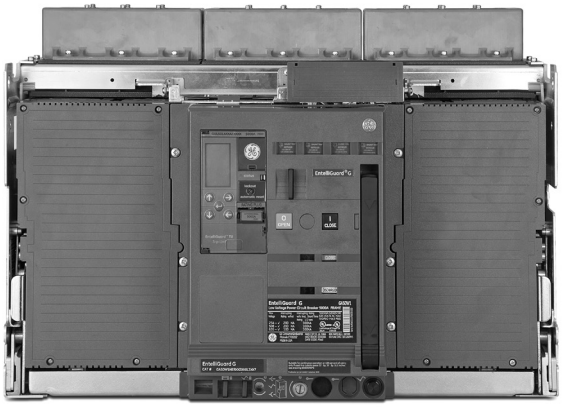
EntelliGuard G

Low voltage power circuit breakers

- Time proven—for trouble free performance
- Five cycle stored energy closing
- 6 frame sizes 800-5000 amps—for application flexibility
- Interrupting ratings: 30kA-200kA
- Fully maintainable—to assure operational readiness
- MicroVersaTrip™ solid-state protection trip unit with LCD—increased flexibility and accuracy with true rms sensing for standard (s) and optional (o) time-current adjustments:
  - Adjustable current setting (s)
  - Adjustable long-time delay (s)
  - Phase selectable digital rms ammeter (s)
  - Adjustable instantaneous pick-up (s)
  - Adjustable ground fault pick-up and adjustable ground fault delay with selectable I2t curve (o)
  - Adjustable short-time pick-up and adjustable short-time delay with selectable I2t curve (o)
  - Zone selective interlocking—for improved selectivity on both short-time and ground-fault or ground-fault only (o)
  - Defeatable GF (o)
  - Switchable INST/ST and GF (o)
- Integrally fused breakers—for high fault-current applications
- Rating plugs for added flexibility
- Power+ trip unit with true rms sensing and rotary selection of pick-up and delay settings:
  - Adjustable long-time pick-up and delay (s)
  - Adjustable instantaneous pick-up (s)
  - Adjustable short-time pick-up and delay with I2t in or out (o)
  - Adjustable ground fault pick-up and delay with I2t in or out (o)
  - Defeatable ground fault (o)
  - Target module with LED trip indicators (o)
  - Ground fault function contained within the rating plug

Document

- EntelliGuard G low voltage power circuit breaker application guide - DET-653



EntelliGuard G

Notes