

Designed and built for today's market



Product offering

- UL® 1558
- 2000–10,000A bus
- 800–6000A breakers
- 100, 150 and 200 kA bus designs
- 600 Vac design
- Indoor enclosures
- Outdoor aisle and aisleless enclosures

Standards

- Assembly designed to UL 1558, NEMA® SG5, CSA®, ANSI C37.20.1 and C37.51
- Breaker designed to UL 1066, NEMA SG3, ANSI C37.13, C37.15 and C37.17
- Seismic Certified to UBC®, IBC and California Building Code to exceed Zone 4
- ABS certified

Customer value

- **Improved uptime**
Higher interrupting ratings and withstand ratings, better coordination capability
- **Improved maintainability**
Dedicated secondary terminals with separate access door and front-accessible control wireway
- **Increased reliability**
Modular design allows for reduced parts for both structures and breakers
- **Increased safety**
Complete enhanced performance suite of options
- **Reduced installation cost**
Front-accessible controls and wiring enables rapid installation and commissioning

Industry applications

- **Healthcare**
- **Commercial Construction**
- **Machine Building**
- **Infrastructure**
- **Data Centers**
- **Mining, Minerals and Metals**
- **Education**
- **Oil and Gas**
- **Electric Utilities**
- **Pulp and Paper**
- **Industrial and Manufacturing**
- **Food and Beverage**
- **Transportation**
- **Government**
- **Water/Wastewater**



Powering Business Worldwide

Optional features

Automatic transfer and intelligent control

Increase uptime and simplify switchgear design by specifying one of Eaton's pre-engineered automatic transfer and intelligent control packages for Magnum DS low voltage switchgear. The packages are designed with features to meet typical customer applications while still maintaining the flexibility to meet specific requirements. The packages are available on front and rear access in standard and arc-resistant designs.

Enhanced safety

Zone selective interlocking:

The Digitrip RMS zone selective interlocking (ZSI) capability provides positive system coordination without time delays. ZSI allows the breaker closest to the fault to trip without any preset time delay.

Arcflash Reduction Maintenance System™:

Eaton's Arcflash Reduction Maintenance System employs a separate, dedicated analog trip circuit that eliminates microprocessor latencies, resulting in clearing times that are faster than standard instantaneous tripping.

Integrated high resistant grounding:

high-resistance grounding can add the safety of a grounded system while minimizing the risk of service interruptions due to grounds.

Aftermarket solutions

Eaton has an extensive low voltage switchgear aftermarket offering of replacement and retrofit parts as well as breakers. This extensive offering allows for life extension of older switchgear that has obsolete breakers yet life available in the assemblies. Please contact your local Eaton sales engineer for details.

Technical data

Magnum DS Switchgear Class UP 1066 Low Voltage Power Circuit Breakers ANSI

rms Symmetrical Current Ratings kA 50/60 Hz¹

Frame amperes	Breaker type	Frame type	Interrupting @ 254Vac	Interrupting @ 508Vac	Interrupting @ 635Vac	Short time withstanding rating @ 254/508Vac	Short time withstanding rating @ 635Vac
800	MDN-408	Narrow	42	42	42	42	42
	MDN-608	Narrow	65	65	65	65	65
	MDN-C08	Narrow	100	100	65	20	20
	MDS-408	Standard	42	42	42	42	42
	MDS-608	Standard	65	65	65	65	65
	MDS-808	Standard	85	85	85	85	85
	MDS-C08	Standard	100	100	100	85	85
	MDS-L08 ²	Standard	200	200	200	(2)	(2)
MDS-X08 ³	Standard	200	200	65	30	30	
1200	MDN-412	Narrow	42	42	42	42	42
	MDN-612	Narrow	65	65	65	65	65
	MDN-C12	Narrow	100	100	65	25	25
	MDS-X12	Standard	200	200	65	30	30
	MDS-612	Standard	65	65	65	65	65
	MDS-812	Standard	85	85	85	85	85
1600	MDS-C12	Standard	100	100	100	85	85
	MDN-416	Narrow	42	42	42	42	42
	MDN-516	Narrow	50	50	50	50	50
	MDN-616	Narrow	65	65	65	65	65
	MDN-C16	Narrow	100	100	65	30	30
	MDS-616	Standard	65	65	65	65	65
	MDS-816	Standard	85	85	85	85	85
	MDS-C16	Standard	100	100	100	85	85
2000	MDS-L16 ²	Standard	200	200	200	(2)	(2)
	MDS-X16 ³	Standard	200	200	65	30	30
	MDN-620	Narrow	65	65	65	65	65
	MDN-C20	Narrow	100	100	65	35	35
	MDS-620	Standard	65	65	65	65	65
	MDS-820	Standard	85	85	85	85	85
2500	MDS-C20	Standard	100	100	100	85	85
	MDS-L20 ²	Standard	200	200	200	(2)	(2)
	MDS-X20 ³	Standard	200	200	65	30	30
	MDS-625	Standard	65	65	65	65	65
	MDS-825	Standard	85	85	85	85	85
3200	MDS-C25	Standard	100	100	100	100	85
	MDS-632	Standard	65	65	65	65	65
	MDS-832	Standard	85	85	85	85	85
	MDS-C32	Standard	100	100	100	85	85
4000	MDS-X32 ³	Double	200	200		50	50
	MDS-840	Double	85	85	85	85	85
	MDS-C40	Double	100	100	100	100	100
	MDS-X40 (3)	Double	200	200		50	50
	MDN-640	Double Narrow	65	65	65	65	65
	MDN-840	Double Narrow	85	85	65	85	65
5000	MDN-C40	Double Narrow	100	100	65	100	65
	MDS-850	Double	85	85	85	85	85
	MDS-C50	Double	100	100	100	100	100
6000	MDS-X50 ³⁴	Double	200	200		50	50
	MDS-C60 ⁴	Double	100	100	100	100	100

1. Interrupting ratings shown based on breaker equipped with integral Digitrip rms Trip Unit. Interruption ratings for non-automatic breakers are equal to the published.

2. Magnum MDSL Current Limiting Power Circuit Breaker With Integral Current Limiters. Current Limiter selected determines short time and fixed instantaneous trip rating.

3. Magnum MDSX Current Limiting Power Circuit Breaker With Fast Opening Contacts.

4. Breaker applied in a tested fan cooled enclosure.

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Printed in USA
Publication No. PA01901001E / GG
November 2015

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Powering Business Worldwide

SIEMENS



usa.siemens.com/switchgear

Type WL low voltage switchgear

Equipment ratings

- 635V AC maximum
- 3 phase 3 wire, 3 phase 4 wire
- 50/60 Hz
- 6000 amp maximum horizontal bus
- 6000 amp maximum vertical bus
- Silver plated copper bus standard – tin plated copper optional
- Standard bus bracing 100kA – optional up to 200kA
- NEMA 1 Indoor, NEMA 3R outdoor (walk-in) and NEMA 3R (non- walk-in) enclosure options
- Three levels of horizontal bus through 5000 amps
- Insulated / isolated bus through 6000 amps

Circuit breaker ratings

- 800 to 6000 amp frame ratings (100% rated)
- 3 pole and 4 pole breakers
- Interrupting ratings from 50kA to 150kA (un-fused) and 200kA (fused)
- Manually or electrically operated
- Draw-out construction

Industry standards compliance

- ANSI: C37.13, C37.16, C37.17, C37.20.1, C37.50, C37.51
- UL: 1066, 1558
- NEMA: SG3, SG5
- CSA: C22.2 No. 31 (Optional cUL labeling)
- IEEE C37.20.7 (Optional arc resistant design)
- Optional marine certification to ABS, DNV, Lloyd's of London or USCG



Features and benefits

Reliable

- Increased breaker endurance (operations)
- Extended instantaneous protection
- Precision protection and metering capabilities (includes protective relaying functions and power quality analysis)

Compact

- Industry leading equipment footprint

Easy to use

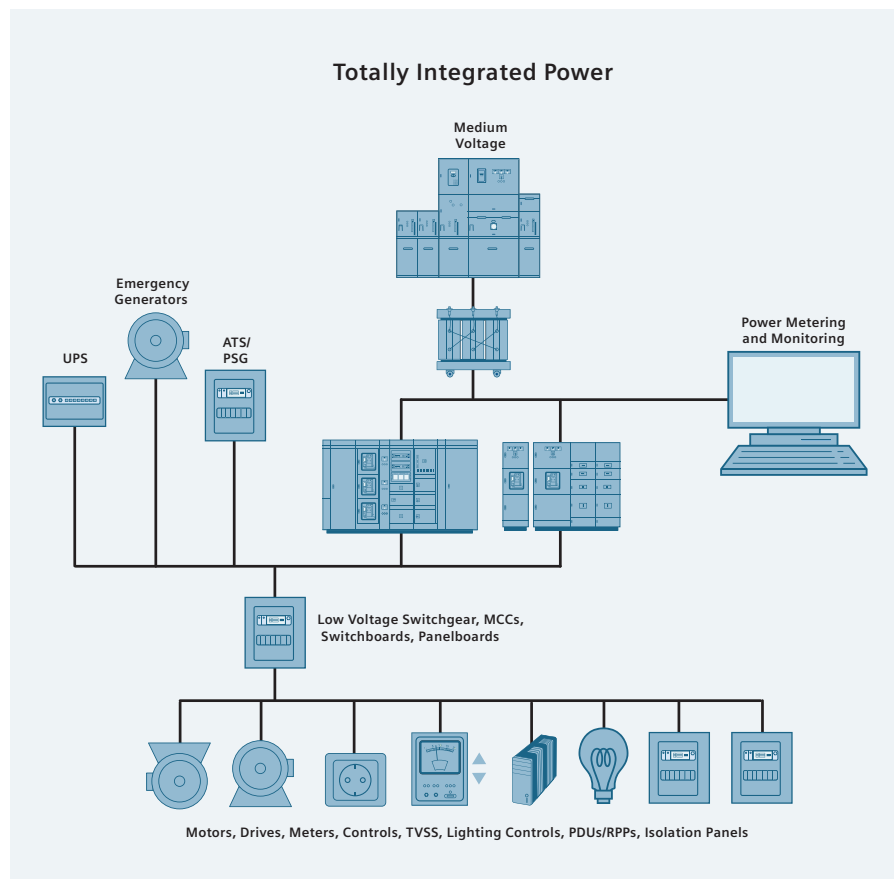
- Integrated racking handle
- Pull-apart front-mounted terminal blocks
- Simple selection and application tools

Modular and flexible

- Front-mounted common plug-in accessories
- Field upgradeable trip units
- Field changeable contacts and arc chutes
- Field installable GF and ZSI
- Field installable breaker digital input and output modules

System solution

- Monitoring and control through Ethernet, MODBUS, or PROFIBUS communications
- Supports energy management through advanced metering and quality analysis
- Totally Integrated Power and Totally Integrated Automation integration



Safety

- Dynamic Arc Flash Sentry (arc fault hazard reduction) using the patented dual breaker parameter setting capability of the Siemens WL breaker
- Type 2B arc resistant (IEEE C37.20.7)
- Sm@rtGear™ low voltage switchgear that provides out-of-the-box remote monitoring, configuration and control of Siemens WL breakers and other intelligent devices embedded in the Siemens Type WL low voltage switchgear

- IBC 2015 seismic compliance
- Visible ready-to-close indication
- Customizable interlocking
- Front accessible control and communication wiring terminations
- No front breaker door ventilation

Available support tools

- WL Switchgear Selection and Application Guide
- WL Circuit Breaker Selection and Application Guide

Published by
Siemens Industry, Inc.
2016.

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usa.siemens.com/switchgear
Order No. LVFL-SOLFL-0216
Printed in U.S.A.
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Power-Zone® 4 Low Voltage Switchgear

Rugged, Long Life Operation

The foundation of Power-Zone 4 low voltage switchgear performance is Masterpact® power circuit breakers. Known and admired by users for over two decades, they deliver the reliability and durability you expect along with improved functionality including:

- Higher short-time and interrupting ratings than competitive products
- 200kAIR without fuses
- Arc flash limiting feeder breakers
- Interconnection with Transparent Ready® equipment
- Built for maximum uptime without the need for frequent maintenance and inspections (exceeds ANSI number of mechanical and electrical operations without maintenance)
- Smaller, lighter, easier-to-install (consistently results in the smallest footprint on the market)
- Non-metallic case construction
- Field-replaceable parts or add-ons such as, electric charging motors, shunt trips and rating plugs

If you're looking for ways to increase electrical system uptime, Power-Zone 4 switchgear with Masterpact circuit breaker technology helps to ensure continuity of service.



**Masterpact NW
Power Circuit Breaker**



**Masterpact NT
Power Circuit Breaker**

Low Voltage Switchgear

With Power-Zone 4 switchgear, Schneider Electric offers proven, reliable and durable low voltage switchgear. We developed it with your values in mind – all to improve your electrical system uptime and efficiency.

- small, flexible footprint
- extended maintenance intervals
- segregated front access to all wiring
- easy-to-add “smart” functionality like communications interfaces
- power monitoring and control capability
- Transparent Ready equipment options

Breaker Type	Frame Type	Continuous Amps	Instantaneous Interrupting Ratings (kA)			Short-Time Ratings (kA)	Close & Latch Rating (kA)
			240V	480V	600V		
NW50L1	Y	5000A	200	200	130	100	35
NW50H3	Y	5000A	100	100	85	85	75
NW50H2	Y	5000A	85	85	85	85	85
NW40L1	Y	4000A	200	200	130	100	35
NW40H3	Y	4000A	100	100	85	85	75
NW40H2	Y	4000A	85	85	85	85	85
NW40H1	Y	4000A	65	65	65	65	65
NW32L1	Y	3200A	200	200	130	100	35
NW32H3	Y	3200A	100	100	85	85	75
NW32H2	W	3200A	85	85	85	85	85
NW32H1	W	3200A	65	65	65	65	65
NW20L1	W	2000A	200	200	130	30	25
NW20L1F	W	2000A	200	200	130	22	22
NW20H3	W	2000A	100	100	85	85	40
NW20H2	W	2000A	85	85	85	85	50
NW20H1	W	2000A	65	65	65	65	65
NW16L1	W	2000A	200	200	130	30	25
NW16L1F	W	1600A	200	200	130	22	22
NW16H3	W	1600A	100	100	85	85	40
NW16H2	W	1600A	85	85	85	85	40
NW16H1	W	1600A	65	65	65	65	65
NW16N1	W	1600A	42	42	42	42	42
NW80L1F	W	800A	200	200	130	22	22
NW80H3	W	800A	100	100	85	85	40
NW80H2	W	800A	85	85	85	85	40
NW80H1	W	800A	65	65	65	65	65
NW80N1	W	800A	42	42	42	42	42
NT80H1	T	800A	42	42	-	42	40
NT80N1	T	800A	42	42	-	42	40

Circuit Breakers

ANSI C37.13
ANSI C37.16
ANSI C37.50
UL 1066

Low Voltage Switchgear

ANSI C37.20.1
ANSI C37.51
UL 1558

Ratings

Main Bus Breaks = 1600A, 2000A, 3200A, 4000A, 5000A
Application Voltages = 120/208 to 600 Volts AC, 1PH - 3W,
3PH - 3W, 3PH - 4W

*For more information about Power-Zone® 4 low voltage switchgear,
call your local Square D sales office or nearby authorized distributor.
You can also visit our web site at www.us.squared.com*

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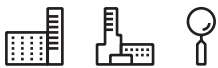
ReliaGear® LV SG

Low voltage switchgear



ABB is pleased to share the ReliaGear® LV SG low voltage switchgear platform incorporating the best of both worlds: cutting edge SACE Emax 2 Air Circuit Breaker (ACB) technology integrated into the proven AKD low voltage switchgear platform. This new generation LV switchgear platform provides the latest technological innovations and reliability customers expect from ABB.

Accuracy: Current 0.5%,
Voltage 0.5%, Power 1%, Energy 1%



Perfectly suitable for
SCADA integration



Low current detection,
starting from 0.4% of In



Analysis of
energy demand



With technology rapidly evolving, it's nearly impossible to futureproof what your needs will be.

ABB believes in creating solutions that give you what you need today with flexibility to scale for tomorrow.

ReliaGear LV SG brings reliability and innovation to the switchgear platform with ratings that range from 2000 A–8000 A as main bus and utilizing SACE Emax 2 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.

The key differentiators and value proposition for this low voltage switchgear include:

Footprint: E1.2 envelope integrated provides a 15-inch minimum 4 high stack width.

Enhancement: E2.2 provides a higher withstand without changing “envelope” size; (ie. up to 85 kA). The E4.2 can go all the way to 100 kA withstand and still fit in a 22-inch section (2000 A and lower).

Metering: New Ekip trip unit with high accuracy measurement, optional; Integral 1 percent metering; no external CTs, PTs or meters required.

Functionality: M-T-M or Utility-Gen auto transfer built in to the Ekip Trip Unit. No external relays, PLCs or devices required. With optional sync check module on breaker for closed transitions.

Functionality: From a reliability and up-time standpoint, ABB has incorporated new functionalities with advanced electronics in the Ekip Touch trip units. Customers are now able to add additional protections, measures, and functionalities to the breaker via ABB MarketPlace, while the breaker is in the closed position, using Ekip Connect Software.

Watchdog: Ekip trip units ensure high reliability thanks to an electronic circuit that periodically checks the continuity of internal connections, such as trip coil, rating plug and each current sensor (ANSI 74). In case of an alarm, a message is shown on the display (Ekip Touch) or through LEDs signalization (Ekip Dip).

If a protection function intervenes, the unit always checks that the circuit breaker has been opened through auxiliary contacts that indicate the position of the main contacts. Otherwise, the unit creates an alarm (ANSI BF code - Breaker Failure) that can be used to command the opening of the upstream circuit breaker. Ekip trip units are also provided with self-protection against abnormal temperature (OT) to ensure correct operations.

Safety: An energy reducing maintenance switch makes it possible to keep operators outside the arc flash boundary, reducing the risk of arc flash incidents. The Ekip Com Actuator module can be installed in the front of the device to remotely control the circuit breaker.

Reduced Energy Let Through (RELT) is now available in SACE Emax 2 Ekip with a dedicated module 2i protection that can clear in as little as 1.5 cycles at 60 Hz.

Lower incident energy with dynamic zone selective interlocking and RELT 2i significantly reduce the risk of arc flash incidents.

Dual setting: Data centers, hospitals, manufacturing plants, and many other facilities rely on backup generators to maintain continuity of electrical service when there is an unexpected power outage. With the Ekip Hi-Touch, continuity of service and selectivity can be maintained using the integrated dual setting feature. The dual setting feature can add an extra level of protection against arc flash within a system.

When this feature is used in a switchgear, for example, it can be set to activate the second set of parameters that minimize protection delays if the switchgear door is opened. This can greatly reduce the risk of an operator being injured by an arc flash incident.

Preventive maintenance: The SACE Emax 2 with Ekip Touch provides contact wear status in terms of percentage from the HMI display allowing for monitoring and notification when it is time to have the breakers serviced. Scheduled service dates can also be entered into the breaker which will signal when it is time to have the breakers serviced. The last date of service can also be entered into the HMI. In addition, Predictive Maintenance functionality with SACE Emax 2 using ABB Ability EDCS can be used to understand, analyze and predict the health and status of breakers.

Communication: There are a vast variety of communication protocols which the customer can use to remotely supervise and control the breakers via BMS. Communication and Connectivity Ekip Touch and Hi-Touch trip units can be easily integrated into the most modern supervision systems through several communication protocols:

- IEC 61850
- Modbus TCP
- Modbus RS-485
- Profibus
- Profinet
- DeviceNet™
- EtherNet/IP™

Redundancy: Repetition of communication allows for greater system reliability. The circuit breaker can be equipped with two communication modules at the same time, allowing the information on two buses to be exchanged simultaneously. Measurements, status and alarms can be easily programmed and viewed by remote function, with no need of external interface devices. Several communication modules with different protocols can be used simultaneously.

Please visit abb.com/lowvoltage for further information and the latest updates on ABB solutions.