
APPLICATION GUIDE

Emax Link™ 2 Abbreviated

Low voltage, metal-enclosed,
drawout switchgear





Table of contents

4	General description		
5	Product description		
6	General information		
7	Section weight		
	Assembly construction		
8	Structure description		
8	Cubicle/device label		
8	Section arrangement		
9	Busbar compartments		
9	Bus phases		
10	Bus ratings and sizes		
10	Horizontal neutral bus (optional feature)		
10	Ground bar		
11	Vertical distribution busbar		
11	Device compartment		
11	Section and location numbering		
11	Device location numbering		
12	Wireways		
	Installation guidelines		
		13	Installation location requirements
		14	Preparation
		14	Section installation sequence
		14	Install and connect shipping splits
		14	Position shipping splits
		14	Connect sections
		15	Splice horizontal busbars
		17	Attach switchgear to floor
		17	Attach overhead lifting device
		18	Raise lift device
		18	Align wheels
		18	Push device off the forklift
		18	Operating the overhead lifting device
		19	Connect cable and wiring
		21	Direct connections to main sections
		21	Connect between horizontal and vertical wireways
		21	Connect control wiring between sections
		22	Inspect busbars
		22	Exterior metal damage repair
		22	Maintenance schedule
		23	Semi-annual inspection
		23	Annual inspection
		23	18-to-36-month inspection
		24	Torque fasteners
		24	Torque table

General description

Enter the ever-growing low voltage switchgear market without the high overhead costs of labor, design and testing. The ABB Emax Link 2 UR 1558 structures provide a turnkey solution for OEMs. Emax Link 2 combined with SACE® Emax 2 circuit breakers provides advanced power distribution technology and helps enhance safety in a fast, flexible and cost-effective solution for the OEM low voltage switchgear market.

ABB Emax Link 2 Abbreviated Low Voltage Switchgear is manufactured with rugged 12-gauge steel and electrodeposition coated gray paint to stand up to normal industrial environments. The switchgear is compartmentally designed to enclose all electrical parts. Emax Link 2 is UL Recognized to UL 1558 and is designed, manufactured, and tested in accordance with ANSI/ IEEE C37.20.1 and C37.51.

Front and rear doors/panels and doors are manufactured in 12-gauge and 14-gauge steel NEMA Type 1 ratings as standard.

All sections include a top and a bottom horizontal wireway for control wiring.

Units feature front, hinged doors held closed by one or more latches.

The rear door is secured by a swing handle with a door-lock mechanism that secures the door at four points of contact. A bolted rear cover is optional.

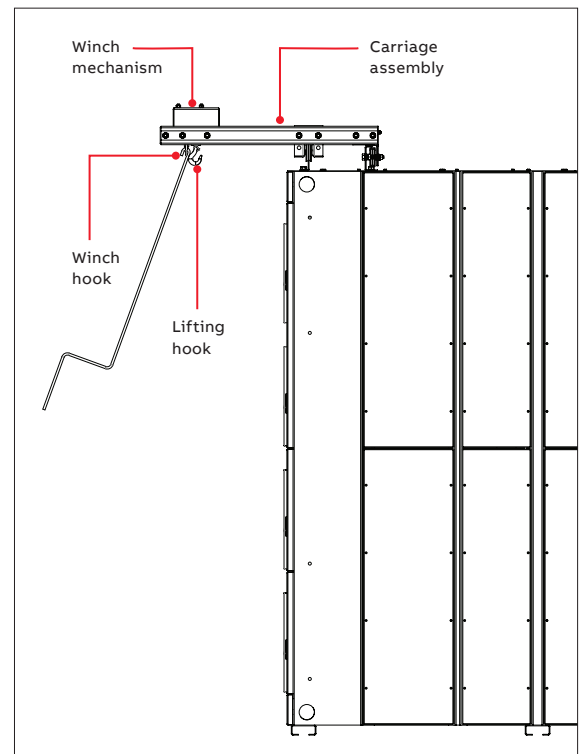
The switchgear assembly consists of one or more metal-enclosed vertical sections joined side-by-side with a horizontal bus. Each vertical section is an enclosed, vertical metal cabinet that contains devices, wireways and other internal components.

Up to three vertical sections are arranged and joined side-by-side at the factory. This facilitates shipping, handling and installation. A lineup may include more than one shipping split depending on the configuration.

Each vertical section is divided into several areas: The instrumentation/device compartment in the front of the section, the bus compartment in the middle and the cable compartment for the end terminal connections at the back.

The front compartment within a section can be divided into smaller modules to accommodate devices of different heights. One section may be divided into as many as four of these modules.

A traveling, overhead lifting device is available to assist with handling breakers. The front section of the switchgear provides support for the lifting device. The device travels the full width of the switchgear. Utilizing a lifting yoke, the breaker lifts from a completely withdrawn circuit breaker cradle. A worm-gear-driven mechanism and wire rope, operated by a removable hand crank, provide lifting power.



Product description

Ratings		
Switchgear ratings		
Maximum rated voltage		635V AC
Rated operating voltage		240V AC, 480V AC, 600V AC—3-phase 3-wire, 3-phase, 4-wire
Rated frequency		50/60Hz
Rated current		2000A, 3200A, 4000A, 5000A
Short circuit withstand (4 cycles)		100kA
Short-time withstand (60 cycles)		85kA, 100kA
Neutral current-carrying capacity		2000A, 3200A, 4000A, 5000A
Circuit breaker ratings		
E1.2	Rated current	250A, 400A, 800A, 1200A
	Interrupting ratings @ rated voltage	42kA, 50kA, 65kA @240V
		42kA, 50kA, 65kA @480V
		42kA @600V
	Rated short-time current	42kA, 50kA
E2.2	Rated current	250A, 400A, 800A, 1200A, 1600A, 2000A
	Interrupting ratings @ rated voltage	42kA, 50kA, 65kA, 85kA, 100kA @240V
		42kA, 50kA, 65kA, 85kA, 100kA @480V
		42kA, 50kA, 65kA, 85kA @600V
	Rated short-time current	42kA, 50kA, 65kA, 85kA
E4.2	Rated current	800A, 1200A, 1600A, 2000A, 2500A, 3200A
	Interrupting ratings @ rated voltage	65kA, 85kA, 100kA @240V
		65kA, 85kA, 100kA @480V
		65kA, 85kA, 100kA @600V
	Rated short-time current	65kA, 85kA, 100kA
E6.2	Rated current	4000A, 5000A
	Interrupting ratings @ rated voltage	85kA, 100kA @240V
		85kA, 100kA @480V
		85kA, 100kA @600V
	Rated short-time current	85kA, 100kA

Environmental conditions		
Enclosure rating		NEMA 1
Ambient temperature (storage)		+32 to +104 °F (0 to +40 °C)
Ambient temperature (operation)		-13 to +104 °F (-25 to +40 °C)
Humidity		95% non-condensing
Altitude		6600 ft (2000 m)

ANSI switchgear altitude correction factors (C37.20.1)		
Altitude	Voltage	Current
6600 ft. (2000 m) and below	100%	100%
8500 ft. (2600 m)	95%	99%
10000 ft. (3000 m)	90%	98%
11500 ft. (3500 m)	85%	97%
13000 ft. (3900 m)	80%	96%
14500 ft. (4400 m)	75%	95%
16000 ft. (4900 m)	70%	94%

Notes: Intermediate values may be obtained by interpolation.

For devices used in switchgear assemblies, standards covering the specific devices should be used to determine the specific altitude correction factors.



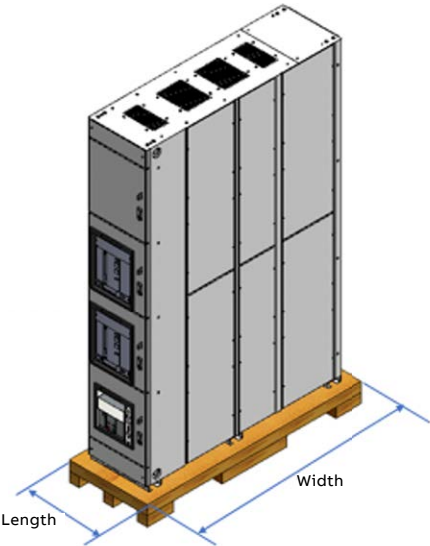
Product description

General information

ABB Emax Link 2 assemblies are shipped in one or more shipping splits, depending on the total number of vertical sections, or the limitations of handling facilities at the installation site. A typical configuration includes three vertical sections.

Shipping splits are mounted on wooden skids and enclosed in a covering to protect them from atmospheric conditions during shipment, however the covering is not suitable for storage outdoors.

For instructions regarding the various components, refer to the manual associated with each product.



Crate dimensions (H x W x D)

Number of sections in shipping block By selection width	Section depth	
	72"	84"
One 18"/22"/30"	24" X 78" / 28" X 78" / 36" X 78"	24" X 90" / 28" X 90" / 36" X 90"
One 38" or Two 18"/22"	44" X 78" or 42" X 78" / 48" X 78"	44" X 90" or 42" X 90" / 48" X 90"
Two 30" or Three 18"	66" X 78" or 60" X 78"	66" X 90" or 60" X 90"
Two 38" or Three 22"	82" X 78" or 72" X 78"	82" X 90" or 72" X 90"

Product description

Section weight

Weights listed in the following table are approximate. Consult equipment shipping documents for actual weights and dimensions.

Section estimated weight			
Typical configuration	Section width	Section depth	
		72.0 in (1829 mm)	84.0 in (2134 mm)
Auxiliary section			
	18.0 in (457 mm)	876 lbs / 398 kgs	902 lbs / 410 kgs
	22.0 in (559 mm)	997 lbs / 453 kgs	1021 lbs / 464 kgs
	38.0 in (965 mm)	1277 lbs / 580 kgs	1414 lbs / 642 kgs
Main/Tie section			
2000A	18.0 in (457 mm)	1024 lbs / 465 kgs	1050 lbs / 477 kgs
3200A	22.0 in (559 mm)	1365 lbs / 620 kgs	1389 lbs / 631 kgs
5000A	38.0 in (965 mm)	2207 lbs / 1002 kgs	2344 lbs / 1064 kgs
Main-Tie-Main section			
1200A	18.0 in (457 mm)	1314 lbs / 597 kgs	1340 lbs / 608 kgs
2000A	22.0 in (559 mm)	1807 lbs / 820 kgs	1831 lbs / 831 kgs
3200A	30.0 in (762 mm)	2408 lbs / 1093 kgs	2442 lbs / 1109 kgs
5000A	38.0 in (965 mm)	3663 lbs / 1663 kgs	3800 lbs / 1725 kgs
Feeder section			
3x1200A	18.0 in (457 mm)	1375 lbs / 624 kgs	1401 lbs / 636 kgs
3x2000A	22.0 in (559 mm)	1622 lbs / 736 kgs	1646 lbs / 747 kgs
3x2500A	30.0 in (762 mm)	2330 lbs / 1058 kgs	2364 lbs / 1073 kgs
4x1200A	18.0 in (457 mm)	1489 lbs / 676 kgs	1515 lbs / 688 kgs
4x2000A	22.0 in (559 mm)	1775 lbs / 806 kgs	1799 lbs / 817 kgs
4x2500A	30.0 in (762 mm)	2653 lbs / 1204 kgs	2687 lbs / 1220 kgs

Breaker/cradle

E1.2	E2.2	E4.2	E6.2
90.4 lbs	135 lbs	300 lbs	486 lbs
41 kg	61kg	136kg	220 kg

Accessories

Overhead lifting device	118 lbs
	54 kg

Assembly construction

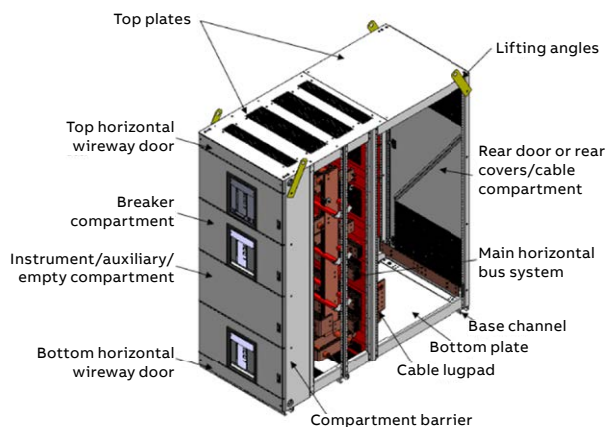
Structure description

The switchgear may accept power cable entry from the top, bottom or both. Bus duct or closed-couple connections are also an option.

The base channel is a feature utilized to install the switchgear in its final location. It will raise a unit by 1.67 inches and is an alternate method to welding the base channel to a metal structure.

All openings in the enclosure feature IP20 protection to help prevent vermin, rodents and snakes from entering the switchgear from the top, bottom and sides of the equipment.

Lifting angles are provided to allow lifting by crane.



Cubicle/device label

Each cubicle and device are prominently labeled to display approval agency marking.

ABB		Emax Link 2	
PROJECT #	<input type="text"/>	HORIZONTAL BUS RATING (A)	<input type="text"/>
NOMINAL VOLTAGE (V)	<input type="text"/>	VERTICAL BUS RATING(A)	<input type="text"/>
NOMINAL CURRENT (A)	<input type="text"/>	ENCLOSURE TYPE	<input type="text"/>
SHORT-CIRCUIT CURRENT (kA)	<input type="text"/>	SECTION #	<input type="text"/>
FREQUENCY (Hz)	<input type="text"/>	SECTION WEIGHT (Lb)	<input type="text"/>
PHASES	<input type="text"/>	DATE OF MANUFACTURE	<input type="text"/>
NEUTRAL %	<input type="text"/>		

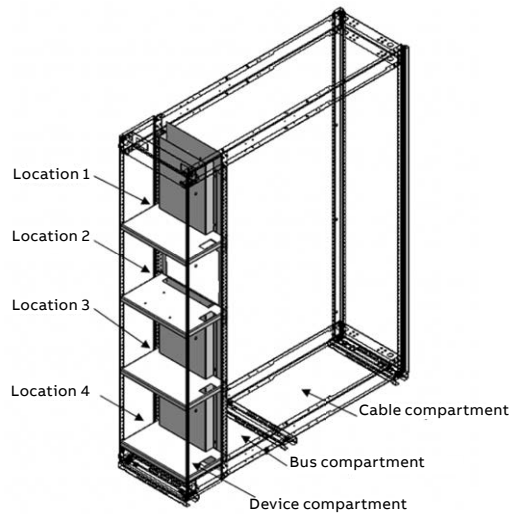
Section arrangement

Vertical sections are composed of the following three main compartments:

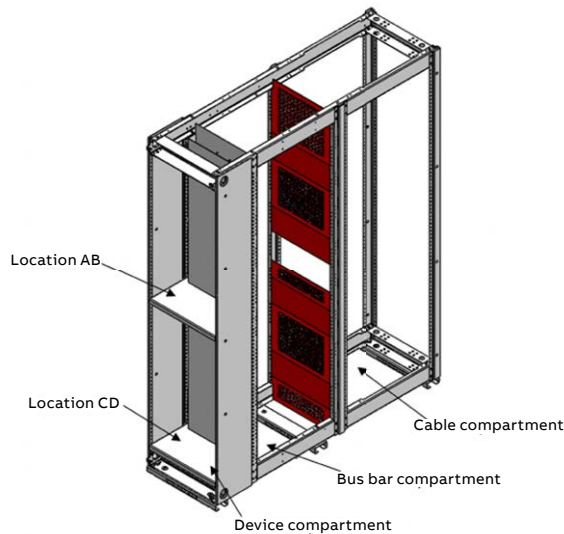
1. Device compartment: Composed of up to four vertical locations that house the installed devices, which are the main functional elements of the switchgear.

Assembly construction

2. Busbar compartment: The compartment where main and distribution busbar systems are installed.
3. Cable compartment: Location where power connections are made to the rear of the device.



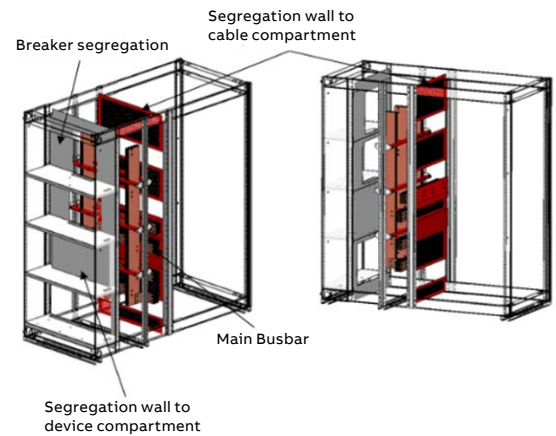
Emax Link 2 standard compartments



Emax Link 2 standard compartments

Busbar compartments

The main horizontal busbar is installed in the busbar compartment located at the middle of the section. The main horizontal bus may be supplied in various configurations depending on the current rating.



Horizontal busbars

Bus phases

The horizontal busbar is located at the bottom of each section. The phase arrangement of 3-phase horizontal busbar and vertical busbars is A, B, C from top to bottom, or left to right, as viewed from the front.

The busbar systems are installed in the lower level busbar compartment. The tie busing will be installed at the upper level.

Assembly construction

Bus ratings and sizes

The number of installed bars per phase depends on the current ratings. Up to five bars per phase may be installed.

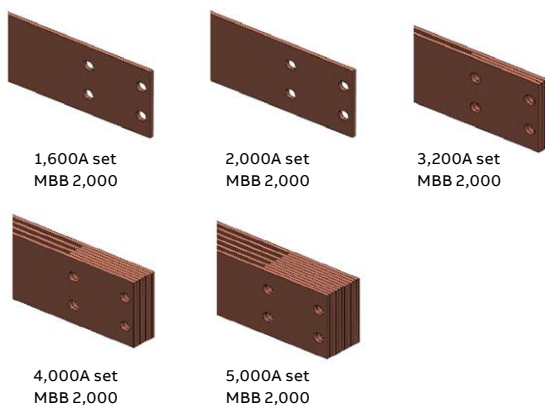
Busbar systems are 3-phase, 3-wire or 3-phase, 4-wire. See Horizontal Neutral Bus for details.

There is the option of only having 3-phase, 4-wire in the incoming section and the rest of the lineup will be 3-phase, 3-wire.

Sections in the same shipping split will be connected at the factory. For lineups that combine multiple shipping splits, each shipping split must be connected together during installation using the splice kits provided on each split. The splice kits' bolts must be tightened to the specified torque. See the Torque Table provided in this manual.

Horizontal bus is available in silver-plated copper or optional tin-plated copper.

Bus ratings and sizes

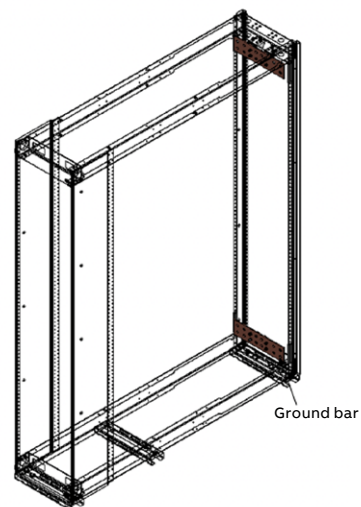


Horizontal neutral bus (optional feature)

When required, a 100% rated neutral horizontal busbar is provided in the busbar compartment above the lower A-phase horizontal busbar. For 4-wire systems that have no line-to-neutral load requirements, an incoming neutral connection point can be provided to facilitate the power system grounding connection, but without neutral horizontal or distribution busbars.

Ground bar

A continuous, sectionalized, copper ground bus, 1/4"X 4", is provided at the rear of all sections. In the cable compartment, the ground bar is linked to the ground bar in other sections by a splice link.



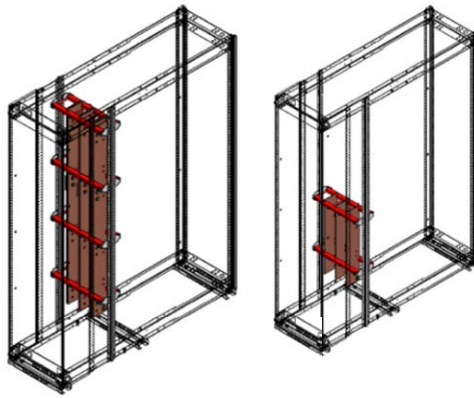
Ground bars

The switchgear ground bus must be grounded using equipment- grounding conductors sized according to NEC standards, or by bonding the ground bus to the raceway enclosing the main supply conductors according to NEC standards.

Assembly construction

Vertical distribution busbar

There are three standard vertical busbar types: full, three-quarters and half distribution busbars. All are located inside the busbar compartment. These busbars are arranged in A-B-C order from left to right.



Vertical Bottom/Full Distribution Busbar

Device compartment

Each device compartment is divided vertically into four locations, A through D. Locations A, B, C or D may contain feeders, equipped space, control or blank. Location B or C may contain main, tie, feeders or equipped space feeders. Location D may contain main, feeder or equipped space feeders.

Standard breaker unit instruments installed on the doors are pilot lights, push buttons, control switches and maintenance switches.

In addition to the standard items listed above, instrument compartments may also include ammeters, voltmeters, high-resistance grounds (HRGs), potential transformers and relays. These instruments can be installed inside the compartments or on the front of the instrument compartment door.

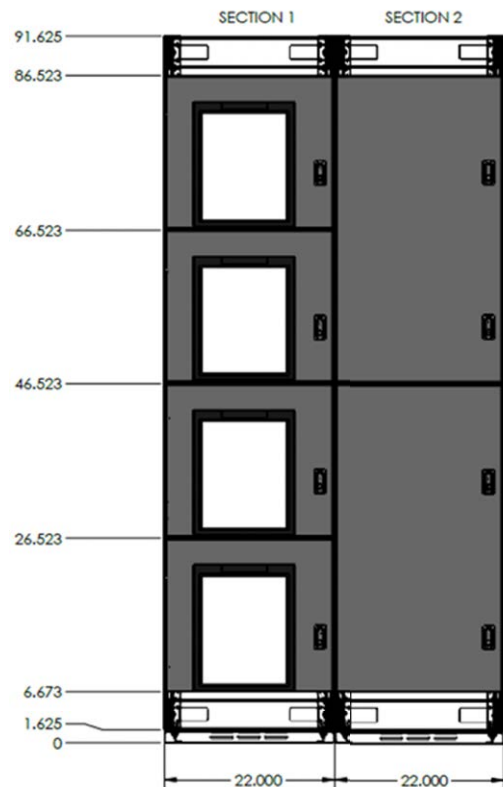
Section and location numbering

Each section is sequentially numbered as the general arrangement drawings are prepared. The left-most section is usually section 1, the next section to the right is 2, etc. This numbering scheme ensures the correct sequencing of vertical sections during installation.

The combination of the numeric section code (1, 2, 3, etc.) with the vertical level designation (A, B, C, and D) uniquely describes each device's location in the switchgear. For example, the device mounted in the top of the first section of a lineup would be coded 1-A.

Device location numbering

(A and B locations can be combined; C and D locations can be combined)



Assembly construction

Wireways

Cable compartment

A cable compartment is provided in each section. The compartment is located on the back of the section, extending the full height of the structure. It is used to route top or bottom incoming conductors to the individual devices within the section. The overall depth of a standard cable compartment for 72-inch section depth is 33.68 in (856 mm), and for 84-inch section depth is 45.68 in (1160 mm).

The overall depth of the switchgear is 72 in (1829 mm) or 84 in (2134 mm) having two cable compartment depths.

Cable compartments may be equipped with two 12 gauge [0.1 in (2.5 mm) thick] steel covers or single/double full-height, hinged doors. The doors swing open 120° for easy accessibility.

Cable compartment may have an optional cable support structure which is adjustable in vertical and horizontal position.

Top horizontal wireway

	Height (In)	Width (In)
18" W Section	3.75	16.7
22" W Section	3.75	20.7
30" W Section	3.75	28.7
38" W Section	3.75	36.7

The Top wireway provides the space for interconnection wiring and is covered by a steel, hinged door secured by a bolted cover.



Top horizontal wireway

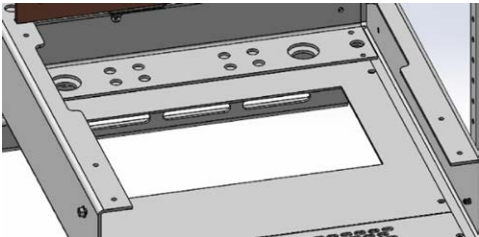
Bottom horizontal wireway

	Height (In)	Width (In)
18" W Section	3.75	16.7
22" W Section	3.75	20.7
30" W Section	3.75	28.7
38" W Section	3.75	36.7

The bottom horizontal wireway is covered by a steel, bolted cover and wireway includes a cutout for control conduit entry.



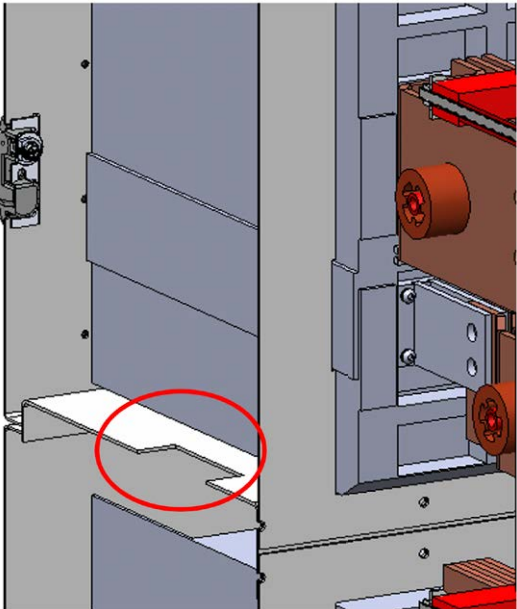
Bottom horizontal wireway



Control conduit entry cutout

Vertical wireway

The vertical wireway is formed by the segregation walls on either side of the device and is directly connected to the top and bottom with the horizontal wireways.



Vertical wireway

Installation guidelines

- Before beginning the installation, ensure that you have all necessary components:
 - Switchgear sections
 - Fastener hardware to connect sections
 - Shipping split connection hardware
- Check that all components are in good condition. If there is any evidence of damage to the equipment, contact an ABB representative to evaluate the condition of the equipment before proceeding with installation.
- Carefully review all supplied project drawings and notes to familiarize yourself with the layout and construction of the switchgear.
- Based on the footprint shown on the general arrangement drawings, mark the floor for all drill holes necessary to fasten the switchgear or base frame to the floor, and for cable conduits (if applicable). See Fastening Sections to a Base Frame.
- Install power and secondary (control) conduits before moving the switchgear to the site. The available space for conduits appears on the floor plans supplied with the switchgear. Conduits should not extend more than 1.0 in (24 mm) above floor level.

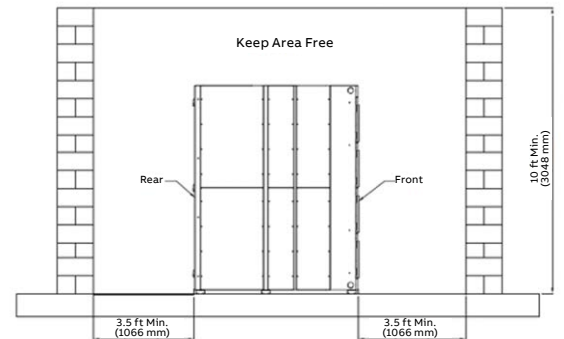
Installation location requirements

The installation must meet the following requirements:

- Indoor location protected from moisture and dramatic temperature changes. For longest equipment life, install the switchgear in an enclosed room with temperature and humidity control and filtered, and forced air ventilation.
- Level the site, preferably including a base frame that is either embedded in the concrete floor or rests on a false floor on supports. The floor must be straight and level to $\pm 1/4$ in (6 mm) over the entire length of the line-up.
- Prepare proper openings in the floor, wall and ceiling for cables, conductors, pipes, bars and ventilation in accordance with the construction drawings provided.
- Allow at least 2.5 ft (750 mm) from the top of the highest section to the ceiling, and at least 3.0 ft (920 mm) between the left and right end sections and the walls.
- Allow at least 3.5 ft (1066 mm) between the unit and the rear wall.



Clearances – front view



Clearances – side view

- For sections with left-mounted doors, provide at least 3.0 ft (920 mm) between the left wall and the left-end section so the doors can be opened more than 120°.
- Ambient temperature is to be above -22 °F (-30 °C) but not exceeding 104 °F (40 °C) at 90% non-condensing humidity. If ambient temperatures below 23 °F (-5 °C) will be experienced while in service, the manufacturer should consider addition of space heating or other means to help enable proper circuit breaker operation.
- Allow sufficient space for future expansions, if required
- Supporting brackets, beams, enclosures and foundation frames should be painted or treated with a corrosion-resistant coating. To facilitate installation and maintenance, the site should also have:
 - Convenient alignment with other equipment.
 - Accessibility for maintenance.
 - Adequate lighting.
 - Free access to the electrical equipment rooms.

Installation guidelines

Preparation

Follow all instructions related to the installation of the switchgear to help avoid potentially hazardous situations that could result in serious injury or death.

If the switchgear will be installed near operational equipment, it may be appropriate to erect temporary barriers between that equipment and the switchgear.

If you are adding sections to existing switchgear, turn off all power supplying the equipment before working on or inside it, and follow appropriate lockout/tagout procedures.

Always use an appropriate voltage-sensing device to confirm that the power is off prior to installing or working with the switchgear.

Section installation sequence

Sections can be installed or added in any order, and new sections may be added between existing sections. If the sequential order designated during manufacturing is altered on site by adding sections to an existing lineup, the horizontal bus must be reviewed as the length depends on the width of the sections to be installed together. The main bussing must match, and the related drawings must be updated.

When adding, removing or rearranging sections, do not exceed the maximum amperage available on the horizontal bussing.

Install and connect shipping splits

Note: Diagrams showing the location of fasteners and the appropriate torque values are included in the Torque Table section of this manual.

Position shipping splits

Remove the shipping splits from their pallets or skids. If you need to support a multiple-section shipping split at the base after removing it from the pallet, use supports at the corner of each section. A two-section split must be supported at 8 points rather than 4.

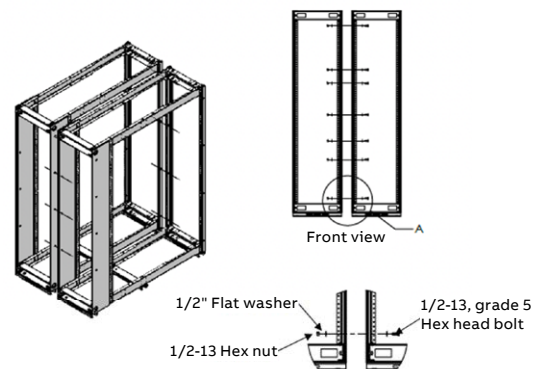
Position the shipping splits in their final arrangement and location. Connecting the sections together before attaching them to the floor and/or wall will help simplify splicing the horizontal bus.

If doors won't close easily or panels are twisted or stressed, this may indicate that the site is not leveled. You may be able to shim the sections to level them.

Connect sections

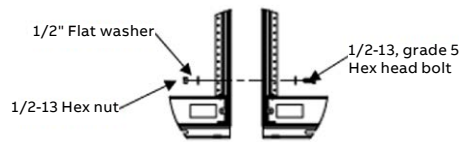
Note: Use only the provided fasteners to assemble the switchgear.

Begin the installation at either the left or the right end of the lineup by connecting the frames of the sections together. The left side of each frame is fitted with threaded inserts. Sections are fitted on the right side with the necessary rivet nuts. Insert the bolts from the left side of one frame to the inserts in the adjoining section to the right.



Frame connection using spacer bolts

Installation guidelines



Section frame connections

Connect the sections using the provided hardware, consisting of 1/2-13" bolts. Torque to 40-50 ft-lbs.

The hardware bag is typically affixed to the front of the switchgear shipping split.

After connecting the sections, you can attach the lineup to the floor (see below).

Splice horizontal busbars

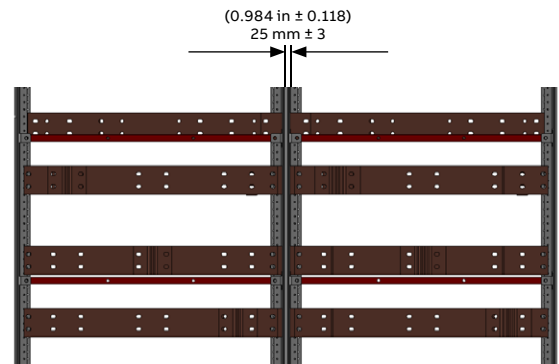
Note: The fasteners provided with the switchgear include an integrated thread coating that helps ensure they will remain at the torque value.

The bus in each section is designed to allow splicing with the bus of the adjacent sections to create a continuous horizontal bus. The splice links are located on the right-hand side for the neutral and phase A, and on the left-hand side for phases B and C of each section. Slide the splice links to the right or left to connect the bus to the adjacent section.

1. After installing and connecting the shipping splits, connect the main horizontal bus splice links and tighten the hardware to the specified torque. Splice kits supplied from the factory are installed on the right-hand side for neutral and phase A, and on the left-hand side for phases B and C of each shipping split.

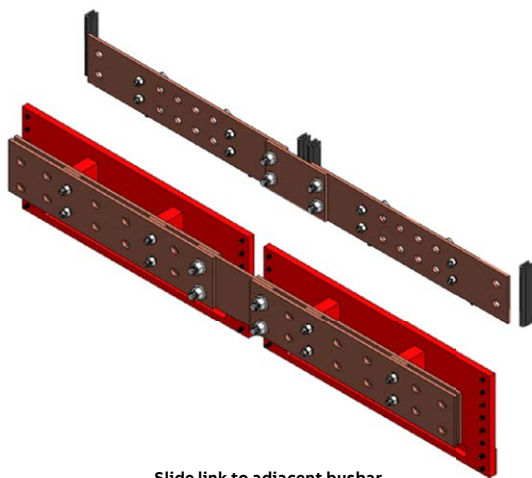
2. Loosen the bolts holding the splice link(s) in place and slide the link(s) to straddle the horizontal bus in the adjacent (right/left-hand) section. Carefully position each splice link so that it straddles the bus equally on both the left- and right-hand sections.

The maximum gap between the left and right busbar should be 0.9 in +/- 0.1 in (25 mm +/- 3 mm).



Busbar gap

Installation guidelines



Slide link to adjacent busbar

3. Tighten the four M12 bolts. For easiest installation, use a long ratchet extension that extends outside the front of the wireway and an 18 mm socket with a universal joint. Torque to 52 ft-lbs (70 Nm). Use only the fasteners provided for busbar connections. Do not use additional locking fluid.
4. Once torqued to the proper value, draw a line across each fastener head and the surrounding metal surface so you can visually check whether the fastener has been properly torqued.



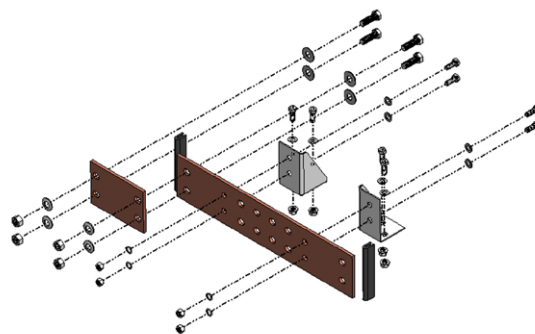
Torque marks

Repeat this process for all splice kits, including the neutral bus if provided. You must splice the horizontal ground bus between adjacent sections in the cable compartment. Splice links are provided on the right-hand side of each section for neutral and Phase A, and on the left-hand side for Phases B, C and the ground. The links may be loosened and bridged to the adjacent section.

Note: The holes at the ends of all busbars ensure adequate adjustment within the required tolerances. If the lineup has been installed properly, the busbars in adjacent sections will line up. Never drill or modify busbars if alignment is poor. Ensure that the adjacent sections are properly and completely connected together mechanically before connecting the horizontal bus splices.

Do not clean the contact surfaces on new switchgear.

Refer to the Torque Table for all tightening torques for horizontal bus bolted connections.



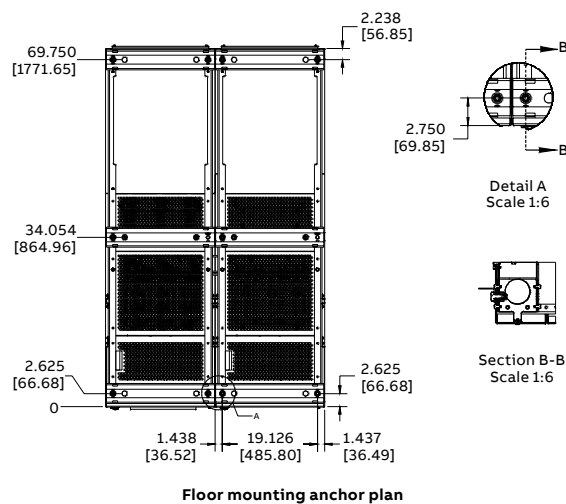
Main horizontal Busbar splice kit

Installation guidelines

Attach switchgear to floor

After completing the internal connections, attach the switchgear to its location. Switchgear may be:

- Attached to a base frame that has been secured to the floor (preferred method).
- Bolted directly to a concrete floor by setting vertical mounting bolts in the floor.
- Bolted to floor channels.



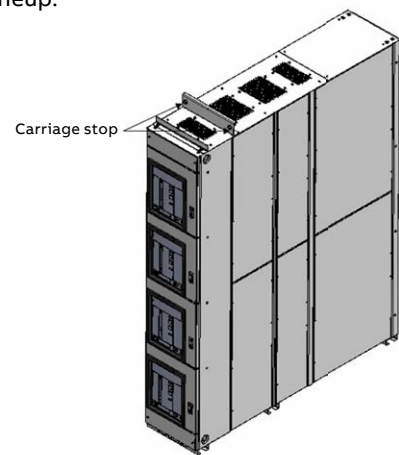
Attach the sections using four bolts through the holes in the section base to the floor or base frame. Use ½-13" (M14X2) or larger hardware. Torque to 45 ft-lbs (61 Nm).

Attach overhead lifting device

The driving mechanism allows for easy raising and lowering of circuit breakers into the compartments. See the corresponding ABB drawing for detailed operating instructions.

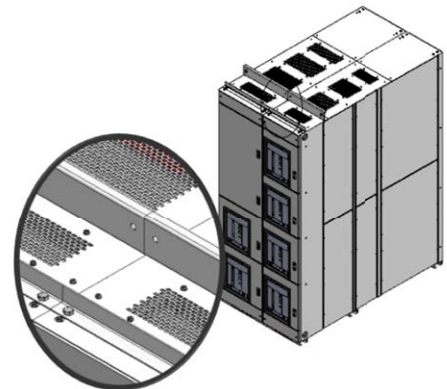
To attach the lifting device:

1. Remove the carriage stop from one end of the lineup.



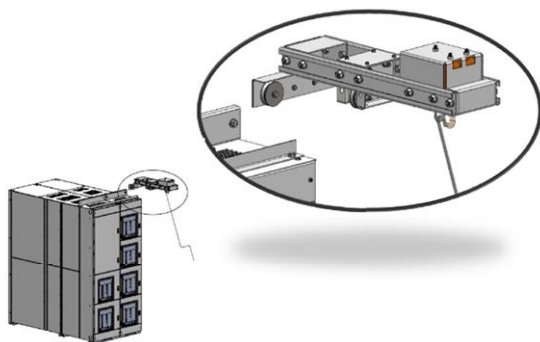
Remove carriage stop

2. Loosen all rails for the overhead lift device and mount the locator plates. Note that the plates have round bosses that mate with holes in the rails.
3. Adjust the rails as required to loosely secure the locator plates in place with the bosses in their mating holes.



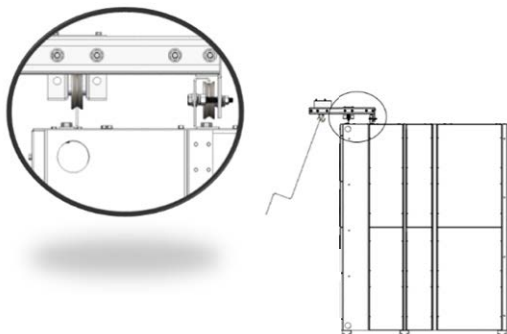
Installation guidelines

4. After mating all locator plates in place with the rails, secure the locator plates and the rails.
5. Position overhead lift device on the tines of forklift. Raise the overhead lift device up to the rails on the frame.

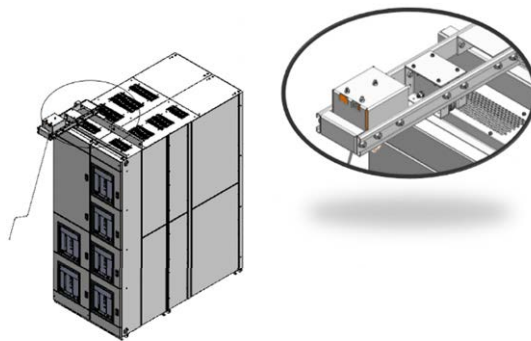


Raise lift device

Align wheels on the front rail and behind the rear rail. Adjust the upper-rear wheel to minimize vertical movement.



Align wheels



Push device off the forklift

Push the overhead lift device off the forklift onto the rails.

Test the continuous movement of the overhead lift device. If the movement is correct, reinstall the carriage stop bracket.

Operating the overhead lifting device

Observe the following requirements when operating the circuit breaker lifting device:

- The wheels must be properly set on track.
- Do not depend upon the drum attachment to support the full breaker weight.
- Allow 4-5 wraps of wire rope to remain on the drum.
- Prevent snarling, kinking or knotting the wire rope.
- Lift only circuit breakers.
- Do not alter the lifting device or the circuit breaker lifting yoke.
- Never walk or stand under a suspended breaker.
- Do not leave a circuit breaker suspended.

Installation guidelines

Connect cable and wiring

E1.2 breaker connection table

Section width (inches)	Continuous current	Run backs sizes	Number of lamination	Number of lug pad/phase	Number of holes per phase
18 22 30 38	800	4"X1/4"	NA	3	24
18 22 30 38	1200	3"X1/4"	NA	3	24

E2.2 breaker connection table (1600A and 2000A)

Section width (inches)	Continuous current	Run backs sizes	Number of lamination	Number of lug pad/phase	Number of holes per phase
18 22 30 38	800	4"X1/4"	NA	3	24
18 22 30 38	1200	3"X1/4"	NA	3	24
18 22 30 38	1600	4"X1/4"	1	3	24
18 22 30 38	2000	4"X1/4"	1	3	24

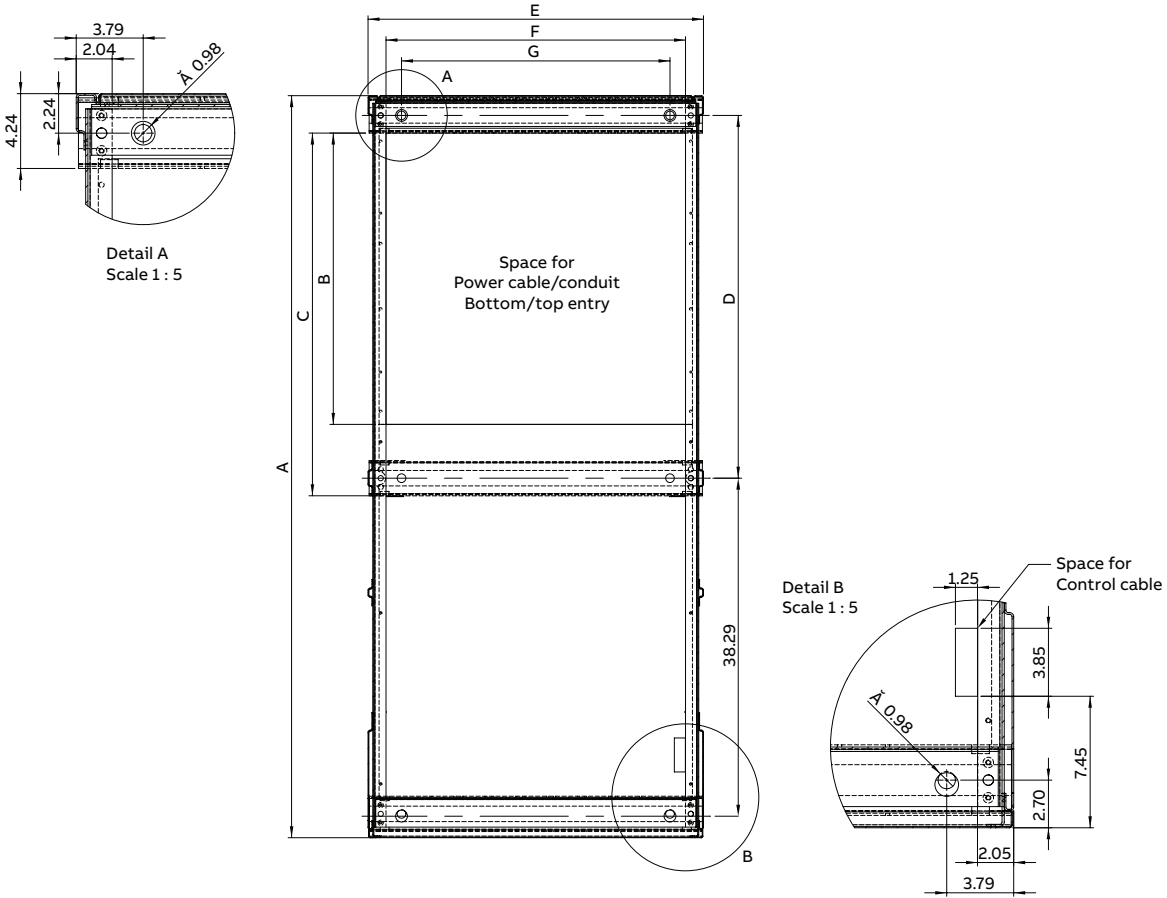
E4.2 breaker connection table (1600A & 3200A)

Section width (inches)	Continuous current	Run backs sizes	Number of lamination	Number of lug pad/phase	Number of holes per phase
18 22 30 38	800	4"X1/4"	NA	3	24
18 22 30 38	1200	3"X1/4"	NA	3	24
18 22 30 38	1600	4"X1/4"	1	3	24
18 22 30 38	2000	4"X1/4"	1	3	24
22 30 38	2500	4"X1/4"	2	6	48
22 30 38	3200	5"X1/4"	2	6	98

E6.2 breaker connection table (4000A & 5000A)

Section width (inches)	Continuous current	Run backs sizes	Number of lamination	Number of lug pad/phase	Number of holes per phase
38	4000	5"X1/4"	4	12	180
38	5000	5"X1/4"	4	12	180

Installation guidelines



Section depth	Conduit space depth	Distance to bus compartment	Distance between base channels
A	B	C	D
72.00	20.75	29.00	29.10
84.00	32.75	41.00	41.10

Section width	Conduit space width	Distance between anchor holes
E	F	G
18.00	14.00	10.41
22.00	18.00	14.41
31.00	26.00	22.41
38.00	34.00	30.41

Installation guidelines

Direct connections to main sections

For main sections, entry spaces for connections are provided at the top or bottom of the sections. The top plates and bottom plates are removable to facilitate installing conduit or making other modifications.

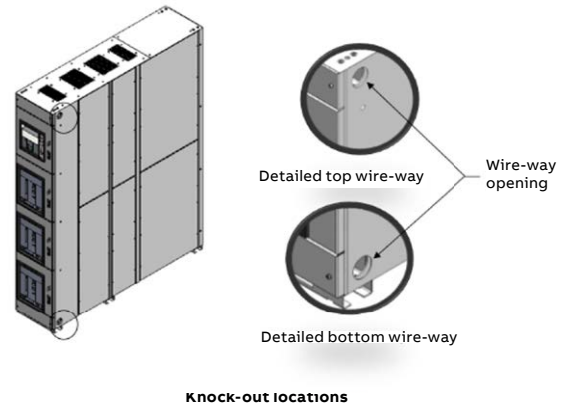
The top and bottom horizontal wireway are dedicated to control wires. The horizontal wireway enables running control wiring between sections.

Connect between horizontal and vertical wireways

There are openings available between the vertical locations (A, B, C, D) for control wiring. Openings are 2.5 in (63.5 mm) in diameter.

Connect control wiring between sections

The device compartment segregation walls have openings to connect the horizontal wireways between sections.



Installation guidelines

Inspect busbars

Changes in environmental conditions can cause the busbar mounting components to loosen over time. During scheduled inspections, check the condition of the busbar system in locations where it is possible to access them. The components that can be removed to provide busbar access include the rear panels, side walls, segregation barrier between the cable compartment and main busbar compartment, and the roof plates.

Exterior metal damage repair

Any scratches or damage to the surface of the vertical sections must be repaired in order to avoid oxidation, which can reduce the life of the equipment.

Maintenance schedule

A periodic maintenance program for the switchgear is highly recommended. The frequency of maintenance activities depends on equipment usage and the operating environment.

Perform a visual inspection, front and rear, to see that there is no evidence of loose parts, warping or undue vibration. Take steps to remedy any deficiencies of this nature that may appear. Keep the assembly dry. Cover to prevent moisture from dripping on the equipment. Do not block vents.

There are hazards of electrical shocks and/or burns whenever working in or around electrical equipment. Turn off power ahead of the switchgear before performing any maintenance operations and follow lockout/tagout procedures. Check incoming line terminals to verify that the equipment is de-energized. Check outgoing terminals to make sure that no feedback conditions exist.

Use OSHA approved of solvents to remove grease and contamination from primary conductors, insulation, and unpainted metallic surfaces.

Do not use alcohol or halocarbon products. Use a non-flammable solvent with a threshold limit of 300 PPM or higher. Use solvents in well-ventilated areas.

Installation guidelines

Semi-annual inspection

At least twice yearly, perform a thorough inspection of the switchgear. Emphasize the following checks:

- Perform an overall visual inspection.
- Check all indicators, meters and instruments for proper operation.
- Make sure all bolted panels are secure.
- Verify operation of heaters and thermostats, if used.
- Check for undue noise or vibration that might loosen bolted connections.
- Look for evidence of moisture in the switchgear.

Annual inspection

- Bolted connections should be tight. Discoloration, excessive corrosion, embrittled or discolored insulation may indicate an overheated connection.
- Inspect all cables for tight connections and ample support.
- Inspect control wiring for signs of wear and damage. Replace wires if signs of wear or damage.
- Examine resistors and other devices prone to overheating.
- Open all hinged panels and remove all bolted panels.
- Clean insulation thoroughly.
- Withdraw and clean all drawout components.
- Clean the stationary portion of the switchgear by wiping with a clean cloth.
- Compressed dry air is useful for cleaning inaccessible areas.
- Remove covers of all panel devices where possible. Check wiring for secure connections. Clean contacts on relays and switches wherever necessary. Replace covers.
- Inspect the gearing of the overhead lifting device when used. Keep well lubricated. In very dirty or gritty conditions, use a dry lubricant.
- Follow the recommendations of any individual device instructions furnished for maintenance of the device.

18-to-36-month inspection

Perform the following at 18- to 36- month intervals, or sooner if required by local conditions or regulations.

Clean the circuit breaker primary contacts. See document 1SDH000999R0002 & SDH001000R0002 Listed breaker installation, service and maintenance instructions. Inspect for evidence of excessive heat, arcing, or corrosion.

Installation guidelines

Torque fasteners

Heat generated by improper terminal torque is a leading cause of equipment failure. Torque terminals to the values shown in the table.

Once torqued to the proper value, draw an “X” across the fastener head and the surrounding metal surface so you can visually check whether the fastener has changed position and may require attention. Bolts torqued at the factory will be marked in the same way.

The torque tables apply to horizontal component screw connections, vertical bus bar screw connections, electrical terminal connections and structural components of the Emax Link 2 Abbreviated LV Switchgear.

Note: For equipment connections and mountings, see the manufacturers’ technical data sheets.

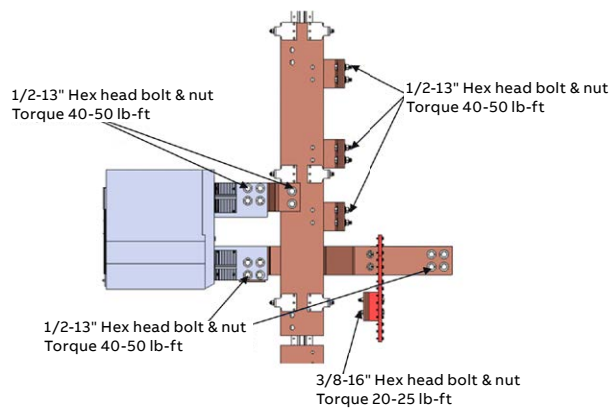
Torque table

Torque fasteners as specified below when assembling the switchgear.

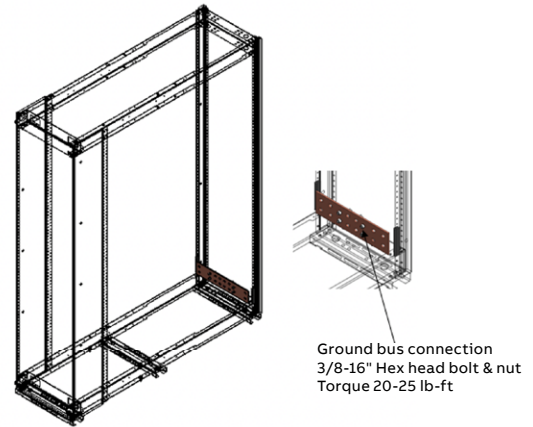
Emax Link 2 LV switchgear torque table

Union Description	Screw	English (ft/lbs)
Splice kit connections		
Breaker connections		
Run-ins / run-backs to E1.2 breaker	3/8-16	33
Run-ins / run-backs to E2.2 breaker	3/8-16	33
Run-ins / run-backs to E4.2 breaker	1/2-13	78
Run-ins / run-backs to E6.2 breaker	1/2-13	78
Bus bar ground connections		
Run-ins to vertical riser	1/2-13	78
"L" connection to vertical riser	1/2-13	78
"L" connection to horizontal bus	1/2-13	78
Ground bracket to frame	3/8-16	33
Insulating barrier and support connections		
Run-backs to cable compartment barrier	3/8-16	33
Run-backs to lug pads	1/2-13	78
GPO3 cable compartment barrier to frame	1/4-20	10
GPO3 to riser support bracing	3/8-16	33
Exterior metal panels and enclosures		
Frame assembly	1/4-20	10
Top plate to frame	1/4-20	10
Bottom plate to frame	1/4-20	10
Compartment to frame	1/4-20	10
Front door to frame	1/4-20	10
Rear door / panels to frame	1/4-20	10

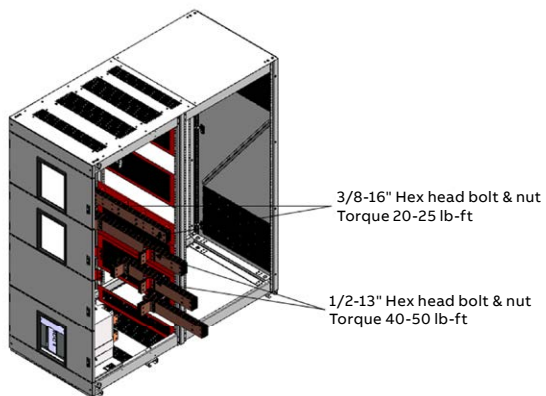
Installation guidelines



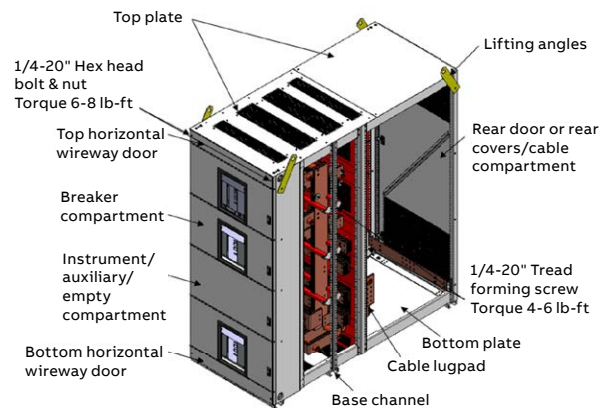
Busbar torque values (Copper to copper)



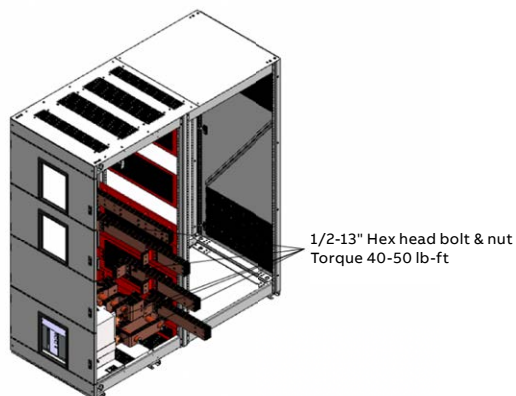
Ground bars



Main busbar to insulation supports torque



Frame and Enclosure Fasteners Torque



Main busbar copper-to-copper torque



ABB Inc.

305 Gregson Drive
Cary, NC 27511
electrification.us.abb.com

Customer service:

888-862-3290
abbinsidesalesupport@us.abb.com
Monday - Friday, 7am - 5:30pm, Central Time

Technical Support:

888-437-3765
Monday - Friday, 7am - 5pm, Central Time

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB Inc. does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB Inc. © 2021 ABB Inc. All rights reserved.

NEC is a registered trademark of National Fire Protection Association, Inc.
UL is a registered trademark of UL LLC.