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TECHNICAL APPLICATION GUIDE

ReliaGear™ busway



ABB has broken the weight barrier with ReliaGear™ busway.

Its computer-designed, all-aluminum housing is up to 50 percent lighter than comparable wire and conduit — and lighter than other busways — while providing the current-carrying capacity (up to 6000 A) and short-circuit protection ABB busways are known for.

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Introduction

ReliaGear™ busway brings the benefits of the proven Spectra™ series busway and the sophisticated technology of the Tmax circuit breaker/fused switch to the busway market. This best-of-both-worlds offering is a custom-designed, modular electrical power distribution system and is available in both feeder and plug-in styles.

ReliaGear busway replaces the typical wire and conduit in most applications with reduced installed costs and improved reliability. Here is what you can expect from ReliaGear busway:



Less weight means big labor savings

Since ReliaGear busway is lighter than other busways, it's easier to handle and install. Customers save on labor and installation time (per NECA labor standards). This may lower total installed costs by up to 75 percent versus wire and conduit.



Epoxy insulation protects your investment

ABB has applied more than three decades of experience with material coatings to bring advanced epoxy insulation technology to ReliaGear busway. Special Class B 130°C Blue Coat™ epoxy insulation provides tougher, longer life (50 years expected) than mylar, PVC, and glass tape used by other manufacturers.



A load of extras

Both plug-in and feeder configurations offer identical low voltage drop. In fact, it's one of the most efficient busway systems available. The exclusive adjustable joint connector allows quick $\pm 1/2"$ busway length adjustment – right in the field. This new level of flexibility makes it easy to cope with unexpected building variations during installation. ReliaGear busway also includes a specially designed belleville spring washer that retains over 90 percent of its original contact pressure, resulting in a more secure, reliable and virtually maintenance-free joint. ReliaGear busway can often be supported with a unique hanger that employs just a single drop rod. Plug-assist and plug-position locators make installation a snap (even on larger plugs). And 50 percent integral housing ground is standard. Internal ground is available for both aluminum and copper busway.



Plating options

Copper busway: Tin plating is standard on all copper busway. Aluminum busway: Silver plating is standard on all aluminum busway. A complete silver plating system is optional on copper busway.

Busway tool kit

The Busway Tool Kit is a collection of electronic tools that quickly and easily answers customer questions, calculates costs savings for contractors, provides layout assistance to specifiers, and delivers value engineering to distributors.



Cable converter

Calculates how busway costs to compare to pipe and wire.



Speculator

Answers busway-related electrical questions.

The Busway Tool Kit is available online at
<https://electrification.us.abb.com/tools-and-calculators>.

Key features

State-of-the-art busway systems



All ReliaGear bus bars are integrity tested with 5000 Vac – for absolute performance confidence.



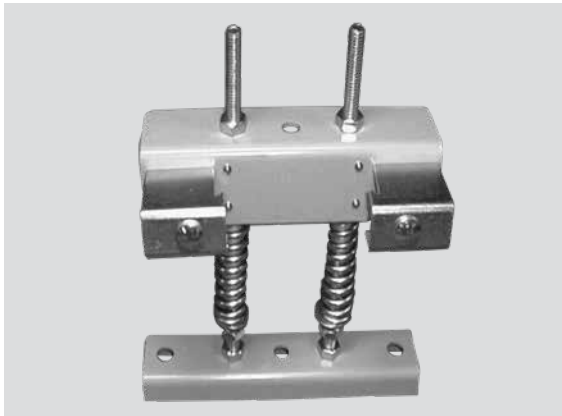
ABB experts closely monitor production performance – to help protect investment costs.



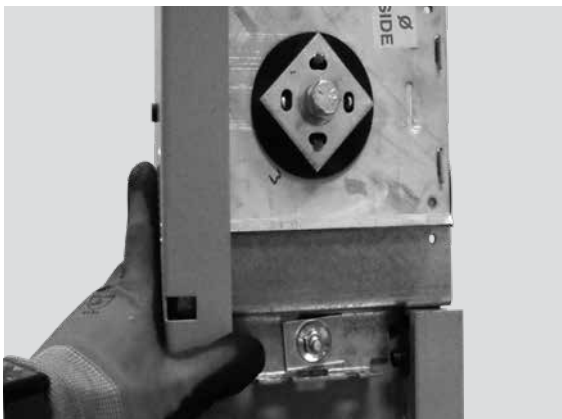
ReliaGear busway features an aluminum housing that cuts busway weight up to 50 percent – reducing installation costs. Single bolt joint with positive torque connection at 50 ft.-lbs. is standard. See page 55 for optional Joint-Guard bolt.



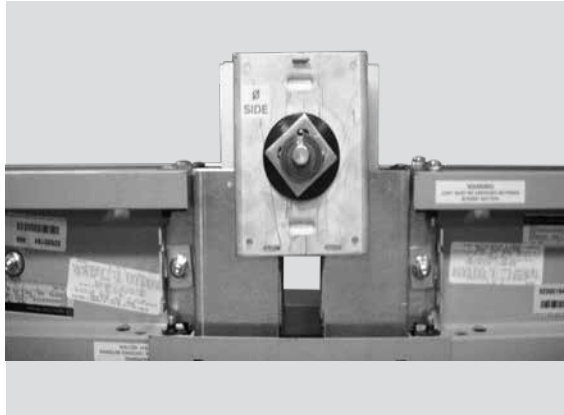
Sections can be hung every 10 feet with just a single drop rod hanger standard up to 2000 amp aluminum or 1600 amp copper. ReliaGear busway is extremely light – enough to lighten ceiling loads up to 50 percent.



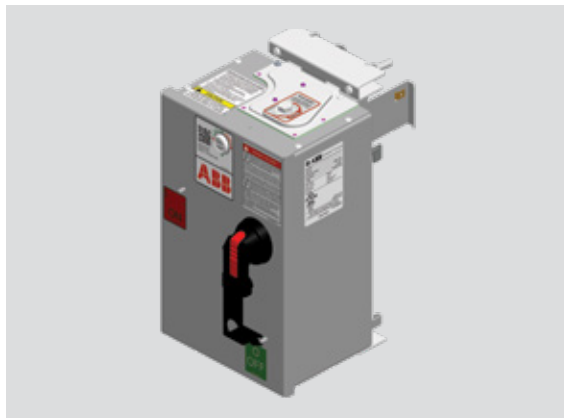
Easy-to-install, rugged vertical riser hanger supports simplify busway installation and adjustment.



For secure, flexible longterm reliability and minimal maintenance, ReliaGear busway offers up to $\pm 1/2$ " adjustable joints with belleville spring washers that do not require re-torquing.



Flex-A-Joint removable isolation joints allow individual sections to be conveniently taken out of service with minimum downtime or interruption of power. Accepts Flex-A-Tap™ bolted power take-off devices up to 1600 A at every joint, plug-in or feeder.



Plug-assist and plug-position locators simplify connection – assuring positive, safe installation.

See installation instructions, publication number 1VAL098202-MB for recommended low maintenance procedures.

Electrical data

—
01 ReliaGear
feeder busway

—
02 Bus bar sized options
based on Tables 1 and 2

Integrated housing ground resistance

ReliaGear busway all-aluminum housing provides an extremely low impedance ground path with less resistance (more continuous current capacity) than internal ground bus bars for both copper and aluminum systems. ReliaGear busway integrated housing ground resistance values exceed NEC 250-94 standards for minimum ground conductors.

Plug-in outlet grounding may be supplied with optional tin-plated copper tabs bolted to the aluminum housing for superior continuity through standard bus plug ground stabs. An internal ground bus bar (50 percent capacity, .125 inch thick) is also available to provide a complete system.



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01

Table 1

Bar width	DC resistance Ohms x 10 ⁻³ /100 ft. @ 75° C		
	Aluminum internal ¹ 50% ground bus	Copper internal 50% ground bus	Housing Ground
1.625	8.62	5.15	2.15
2.250	6.22	3.72	1.83
2.875	4.87	2.91	1.71
3.375	4.15	2.48	1.55
4.000	3.44	1.98	1.40
4.250	3.29	1.95	1.34
4.500	3.11	1.84	1.29
5.750	2.44	1.44	1.10
6.500	2.15	1.27	1.02
7.500	1.86	1.07	0.93
8.250	1.70	1.00	0.87

¹ The housing could satisfy 50 percent ground bus conductor requirements. An internal aluminum ground bar offers no electrical advantage.

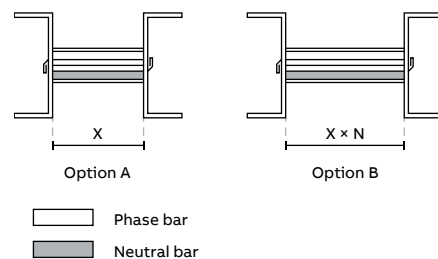
Busway applications with harmonics

For busway applications where non-linear loads are present, first determine the specific non-linear load condition for the application. Once the non-linear load condition is established, ReliaGear busway should be derated in accordance with Option A; see Table 1 and Figure 01. Where full nameplate loading is required, Spectra series busway should be sized in accordance with Option B; see Table 2 and Figure 02.

By increasing the width of both the phase and neutral bars equally, the busway will operate within UL heat rise limits at full nameplate rating, while also carrying up to twice the rated current in the neutral conductor.

Table 2

Non-linear Load (neutral harmonic current / total phase current)	Option A		Option B	
	Derating factor	Phase bar width	Neutral bar width	Phase bar width
0.00	1.000	X	X	
1.00	0.866	X	X	X × 1.15
1.25	0.811	X	X	X × 1.23
1.50	0.756	X	X	X × 1.32
1.75	0.703	X	X	X × 1.42
2.00	0.655	X	X	X × 1.53



Please contact the local ABB sales office for additional information on application of busway with non-linear loads.

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02

03 Effect of ambient temperature on busway operation

Short-circuit ratings

The ReliaGear busway design provides predictable, consistent strength and high short-circuit ratings.

The ratings shown below are UL recognized rms symmetrical amps for both feeder and plug-in phase-to-phase and phase-to-ground. Tests were run at three cycles minimum per UL standards. Additional tests were run at six cycles. ReliaGear busway is third-party certified by KEMA for short circuit withstand test at 1 and 3 seconds.

Table 3: Short-circuit ratings plug-in and feeder

Amp rating	Aluminum (kA)			Copper (kA)		
	3 and 6 cycles	1 sec.	3 secs.	3 and 6 cycles	1 sec.	3 secs.
225	50	24	14	50	40	21
400	85	24	14	50	40	21
600	85	24	14	85	40	21
1000	100	42	24	85	40	21
1200	100	50	29	100	51	29
1350	125	62	36	100	65	37
1600	150	84	49	100	76	44
2000	150	95	55	125	95	55
2500	150	121	70	150	129	75
3000	200	132	76	150	150	107
3200	200	169	97	200	191	110
4000	200	169	97	200	191	110
5000	-	-	-	200	200	149
6000	-	-	-	200	200	149

Table 4: Maximum fuse size for increased short-circuit protection

Amp Rating	Maximum "L" Fuse Size		
	AL	CU	100kA
225		225	1200 ²
400		400	1200 ²
-		600	1200 ²
600		800	2000 ²
-		1000	-
800		1200	-
1000		1350	-
1200		1600	-
1350		2000	-
1600		-	-
2000		2500	-

¹ Also 600J, 800T or 400R

² Also 600J, 800T or 600R

Example: A 225A (AL) short-circuit rating will increase to 100kA with a 1200A (L) fuse installed on the line side of the busway, normally mounted in the gear.

Standards

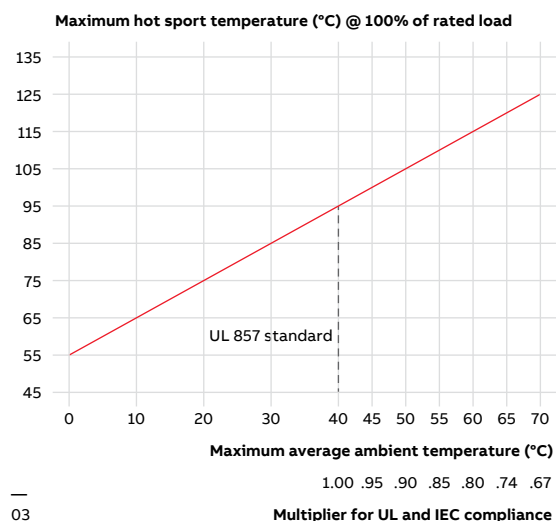
ReliaGear busway conforms to the latest revisions of NEMA BU-1; ANSI/ UL857; federal spec W-B-811b; cUL. Can comply with IEC 439-1 and 2. The ABB busway factory is ISO 9001:2015 certified. Contact factory for details.

Busway operation at other frequencies

ReliaGear busway continuous current ratings are for 50/60 Hz frequency. For 400 Hz operation, de-rate bus to 85 percent load.

Effect of ambient temperature on busway operation

Figure 03 illustrates the effect of various ambient temperature conditions on busway operating temperature. ReliaGear busway utilizes NEMA Class B 130°C insulation. This chart can be used to determine bus operating parameters in accordance with various standards.



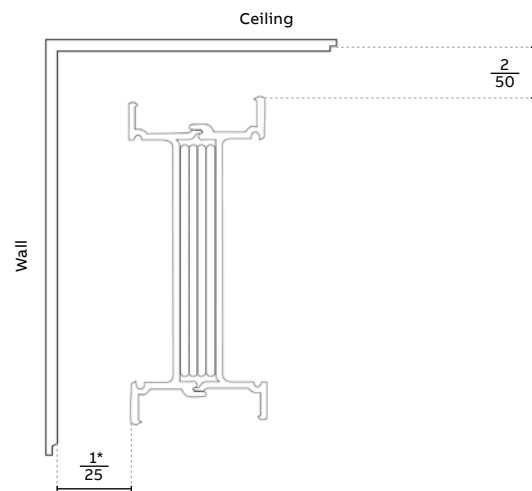
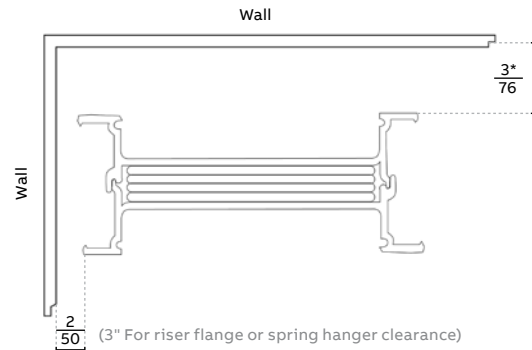
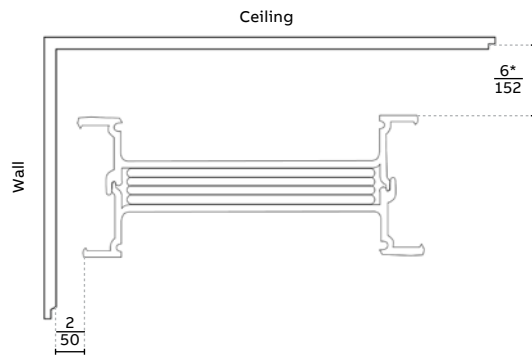
NOTICE

Notice: In addition to the standard illustrated in Figure 03, the Bluecoat™ epoxy insulation of ReliaGear busway has earned "Class B - 130°C UL recognition in accordance with UL 857." This superior insulation enables ReliaGear busway to operate satisfactorily at 50°C ambient with a 55°C heat rise, allowing 105°C maximum operating temperature, with some loss of the 50 year insulation life. See Figure 03 for derating details.

— 04 Plug-in or feeder, one or two stack

— 05 Reference multiplier graph to maintain a 55°C rise in a 40°C ambient

Inches
Millimeters

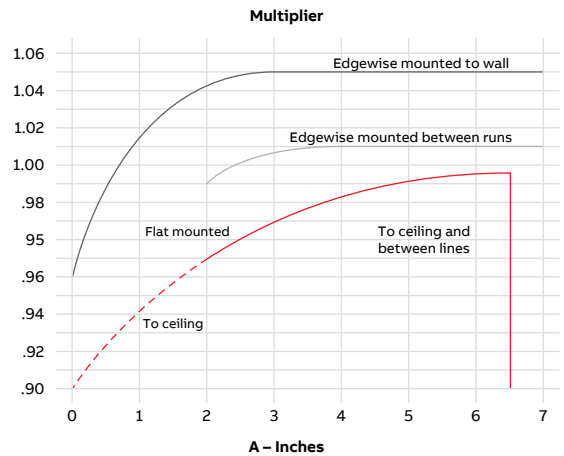
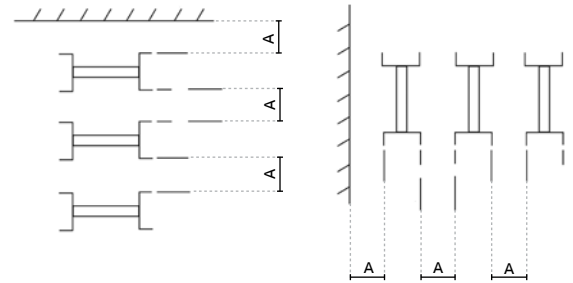


* 4" minimum provides clearance for 30-100 amp fusible plugs. 7" minimum for 200 amp fusible plugs. 8" minimum for all other plugs.

— 04

Proximity

Figure 04 shows the possible positions of busways relative to walls and to each other, as well as the proper multiplier required to maintain a 55°C rise in a 40°C ambient. If horizontally mounted busways are three high, there is an additional multiplying factor of 0.95 for the top run and 0.975 for the center run. The average current hours per week the busway runs at full load will need to be taken into account to determine if the installation requires derating as shown in Figure 05.



— 05

Voltage drop: plug-in or feeder

ReliaGear busway has excellent low-voltage-drop values. Minimum reactance (X) is due to very close bar spacings (sandwiched construction) and a non-magnetic housing. Values shown are identical for plug-in and feeder. 60 Hz values shown. For 50 Hz multiply reactance (X) by 0.83 and resistance values do not change.

For 400 Hz, multiply reactance by 3.9 and multiply resistance by 1.4. Calculate new voltage drop $V_d = \text{amps load} \times \sqrt{3} (R \cos \Theta + X \sin \Theta) \text{ ft}/100$, where $\cos \Theta = \text{Power Factor}$. Contact an ABB representative for a free copy of the Busway Tool Kit (DEU-066) to help with electrical calculations.

Table 5: Voltage drop: Plug-in or feeder

		Rated Load Amps	Bar Width x 1/4" Thickness		Ohms x 10 ⁻³ /100Ft. Line-to-Neutral			Voltage Drop – Concentrated Load ¹ Line-to-Line/100 Ft. @ 100% Rated Load, 25°C Amb.							
			IN	MM	R	X	Z	Power Factor							
								.3	.4	.5	.6	.7	.8	.9	1.0
Aluminum	ReliaGear	225	1.625	41	4.09	1.28	4.29	.95	1.09	1.23	1.36	1.47	1.57	1.65	1.59
		400	1.625	41	4.20	1.28	4.39	1.72	1.98	2.22	2.46	2.67	2.86	3.01	2.9
		600	1.625	41	4.52	1.28	4.70	2.68	3.10	3.50	3.88	4.24	4.56	4.81	4.70
		800	2.875	73	2.48	.79	2.60	2.08	2.38	2.67	2.94	3.19	3.41	3.57	3.44
		1000	3.375	86	2.17	.68	2.27	2.25	2.58	2.90	3.20	3.47	3.71	3.90	3.76
		1200	4.25	108	1.73	.55	1.81	2.17	2.49	2.79	3.07	3.33	3.56	3.73	3.60
		1350	5.75	146	1.24	.41	1.31	1.78	2.04	2.28	2.51	2.71	2.89	3.03	2.90
		1600	6.50	165	1.12	.36	1.18	1.88	2.16	2.42	2.66	2.89	3.08	3.23	3.10
		2000	8.25	210	.89	.29	.94	1.88	2.15	2.41	2.65	2.88	3.07	3.21	3.08
		2500	(2)4.50	(2)114	.82	.26	.86	2.14	2.45	2.75	3.03	3.29	3.52	3.69	3.55
		3000	(2)5.75	(2)146	.64	.21	.67	2.04	2.33	2.61	2.87	3.11	3.32	3.47	3.33
		3200	(2)6.50	(2)165	.57	.18	.59	1.90	2.18	2.44	2.69	2.92	3.13	3.28	3.16
		4000	(2)8.25	(2)210	.45	.14	.47	1.86	2.14	2.40	2.65	2.88	3.08	3.23	3.12
			225	1.625	41	2.33	1.28	2.66	.75	.82	.89	.94	.99	1.03	1.03
	400		1.625	41	2.38	1.28	2.70	1.34	1.47	1.59	1.70	1.79	1.85	1.87	1.65
	600		1.625	41	2.48	1.28	2.79	2.04	2.25	2.44	2.61	2.75	2.86	2.90	2.58
	800		1.625	41	2.62	1.28	2.92	2.78	3.08	3.35	3.60	3.81	3.97	4.04	3.63
	1000		2.25	57	1.90	.98	2.14	2.61	2.87	3.12	3.33	3.52	3.65	3.70	3.29
	1200		2.875	73	1.49	.79	1.69	2.50	2.74	2.97	3.17	3.34	3.46	3.50	3.10
	1350		3.375	86	1.27	.68	1.44	2.41	2.65	2.86	3.05	3.21	3.33	3.37	2.97
	1600		4.25	108	1.00	.55	1.14	2.29	2.51	2.71	2.88	3.03	3.13	3.16	2.77
	2000		5.75	146	.73	.41	.84	2.11	2.31	2.49	2.65	2.78	2.88	2.90	2.53
	2500		7.50	191	.57	.32	.65	2.06	2.26	2.43	2.59	2.72	2.81	2.83	2.47
	3000		(2)4.00	(2)102	.53	.29	.58	2.26	2.48	2.68	2.86	3.00	3.11	3.14	2.73
	3200		(2)4.50	(2)114	.51	.25	.55	2.21	2.44	2.63	2.82	2.96	3.60	3.10	2.67
	4000		(2)5.75	(2)146	.37	.21	.42	2.16	2.36	2.54	2.70	2.83	2.92	2.94	2.56
	5000	(2)7.50	(2)191	.28	.16	.32	2.05	2.24	2.41	2.56	2.69	2.77	2.79	2.42	
Copper	ReliaGear	6000 (2)													

¹ For plug-in distributed loads divide by 2² Contact ABB factory for data

$$\text{Actual voltage drop} = V_d \text{ (from Table)} \times \frac{\text{actual load}}{\text{rated load}} \times \frac{\text{actual distance (ft/mm)}}{100 \text{ feet (30480mm)}}$$

Physical data

06 Fire-stop material guidelines

UL firestop system

UL listed through-penetration firestop system is available for use with ABB busway systems. The system is listed in the UL Fire Resistance Directory under XHEZ, System C-AJ-6003 with F rating = 3 hours and T rating = 1/2 hour for aluminum bars and T rating = 0 hours for copper bars.

The contractor installs a mineral wool batt (4 PCF Nominal) as shown below, on-site during the busway installation process. For riser applications, the system is used in combination with a standard ABB spring hanger and floor flange. For horizontal applications, the system is used in combination with two wall flanges (one per side). See publication 1VAL098202-MB for installation instructions.

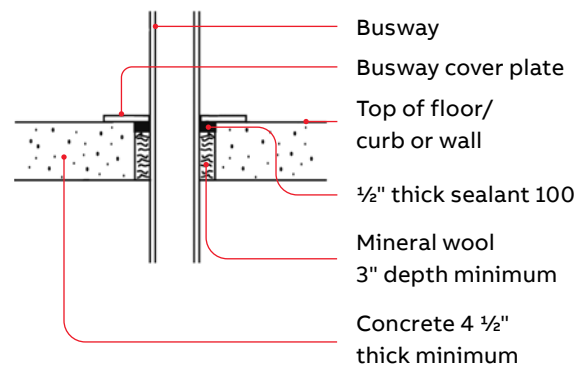
Table 6: Cubic Inches Required per floor and wall

Amp rating	Sealant 100 floor		Sealant 100 wall	
	AL	CU	AL	CU
225-600	17	17	34	34
800	21	17	42	34
1000	22	18	44	42
1200	23	20	46	44
1350	27	22	54	46
1600	28	23	56	54
2000	33	27	66	56
2500	46	33	92	66
3000	53	44	106	92
3200	60	46	114	92
4000	66	53	132	106
5000	-	66	-	132
6000 ¹	-	-	-	-

Sealant 100 standard tube equals 19 in³

¹ Contact factory for details

This information is provided as a guideline for typical fire-stop systems. If you have an annulus (or opening) greater than 1 inch beyond the busway enclosure, you will need to determine the proper amount of fire-stop material based on Figure 06. Quantities are based on application of recommended amount of material; more may be required if over-application occurs.



Note: Check with local NTL codes for curb required in riser applications.

06

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07 Seismic spring
riser hanger (Cat. no.
SBSR"X"). See pages 39
and 40 for more details

ReliaGear busway seismic certification facts

General

The complete standard commercial offering of ReliaGear busway is certified to IBC-2009 levels IEEE-693-2005 and UBC zone 4 seismic conditions with electrical calculations.

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Table 7: ReliaGear busway seismic certification configurations

Maximum acceptable parameters	Vertical riser configuration	Horizontal configuration
Acceptable orientations	Edgewise & flatwise	Edgewise & flatwise
Maximum ratings	5000A max copper / 4000A Max aluminum	5000A max copper / 4000A max aluminum
Maximum voltage	600 V max	600 V max
Service	3- & 4-wire	3- & 4-wire
Distribution	Plug-in & feeder	Plug-in & feeder
Hangers 23	Standard floor flange kit with seismic spring hanger assembly	Standard and seismic hanger system using trapeze hangers & clips
Maximum hanger spacing	16 feet (4876.8 mm) (See Table 12.2)	10 feet (3048 mm)
Full threaded drop rod	Standard 1/2" rod	Standard 1/2" rod Must be BOLTED through ceiling/floor using standard hardware ¹
Drop rod connection ¹	Not applicable	
Distribution equipment connection (Pbd., Swbd, Swgr, MCC, etc.) 53	Standard flanged-end stub – special Hardware & connections NOT required	Standard flanged-end stub – special Hardware & connections NOT required
Bus plugs	All types acceptable	All types acceptable
Fittings	All types acceptable	All types acceptable
Cable tap boxes	All types acceptable	All types acceptable
End boxes	All types acceptable	All types acceptable
Acceptable applications & constructions	Indoor, drip-proof & outdoor	Indoor, drip-proof & outdoor
Proximity to walls	Standard ¹	Standard ¹

¹ Drop rod must be bolted through ceiling/floor and secured on both sides with standard washers and nuts.

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Table 8: ReliaGear busway seismic parameters

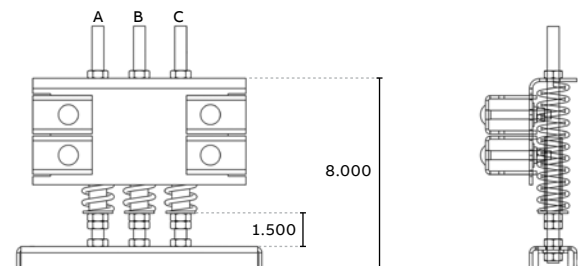
Configuration	Maximum support spacing	IBC-2012/CBC-2013		IEEE-693-2005
		z/h	S _{ps} (g)	
Horizontal trapeze – Mounted	10 ft (3048.0 mm)	1.0	1.97	High
	12 ft (3657.6 mm)	1.0	1.97	High
	16 ft (4876.8 mm)	1.0	1.11	High
Vertical – Mounted				

¹ For OSHPD related projects please refer to OSP-0314-10 for additional details

² IBC-2012 results are obtained through testing in accordance with ICC-ES AC156

Summary

These parameters for seismic conditions are identical to the complete standard commercial offering of ReliaGear busway. Therefore, ReliaGear busway can be used in applications in above seismic conditions without restrictions, special bracing or connections except when seismic spring hangers are required (see hangers section). Plus, ReliaGear busway can connect to equipment (panelboards, switchboards, motor control centers, switchgear, etc.) using standard flanged end stubs, cable tap boxes, and bus plugs.



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Catalog number	Group number	Spring location	Load on pair of hangers (lbs.)
SBSR1	G723	B	0-600
SBSR2	G724	A & C	600-1200
SBSR3	G725	A, B & C	1200-1800

— 08 One bar per phase

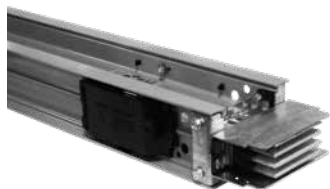
— 09 Two bar per phase

— 10 Three bar per phase

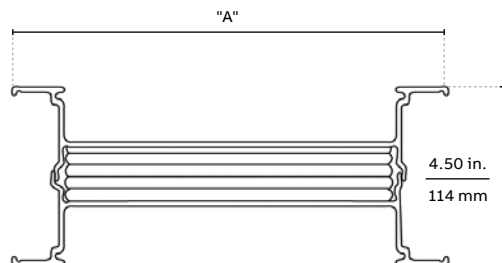
Inches

Millimeters

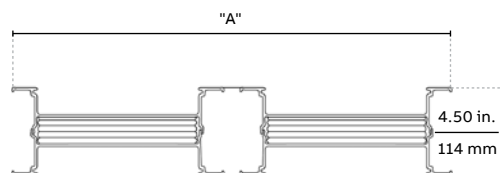
Straight lengths: dimensions and weights



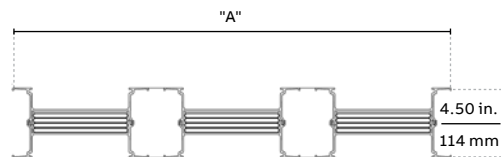
ReliaGear busway plug-in



08



09



10

Table 9: Plug-in and feeder, all busway UL listed @600 volts

		AC Ampere rating	Figure no.	Standard Bar						+1 Bar		Approximate weight ft./lbs.					
				"A" width in. mm		Bar sizes width x thickness		"A" width in. mm		Bar Size		DC Ampere rating	3 wire	4 wire	3- wire/G	4- wire/G	
						in.	mm			in.	mm						
Aluminum	ReliaGear	225	08	4.38	111	1.63 x .25	41 x 6	4.38	111	1.63	41	600	5	6	5	6	
		400	08	4.38	111	1.63 x .25	41 x 6	4.38	111	1.63	41	-	5	6	5	6	
		600	08	4.38	111	1.63 x .25	41 x 6	5.00	127	2.25	57	800/1000	5	6	5	6	
		800	08	5.63	143	2.88 x .25	73 x 6	6.13	156	3.38	86	1350	6	7	6	8	
		1000	08	6.13	156	3.38 x .25	86 x 6	7.00	178	4.25	108	1600	7	8	8	9	
		1200	08	7.00	178	4.25 x .25	108 x 6	7.25	184	4.50	114	-	8	9	9	10	
		1350	08	8.50	216	5.75 x .25	146 x 6	9.25	235	6.50	165	2500	9	10	10	11	
		1600	08	9.25	235	6.50 x .25	165 x 6	11.00	279	8.25	210	-	10	12	11	13	
		2000	08	11.00	279	8.25 x .25	210 x 6	15.00	381	(2)4.25	(2)108	3000	12	15	13	16	
		2500	09	15.50	394	(2)4.50 x .25	(2)114 x 6	18.00	457	(2)5.75	(2)146	4000	17	20	18	21	
		3000	09	18.00	457	(2)5.75 x .25	(2)146 x 6	19.50	495	(2)6.50	(2)165	-	19	23	21	25	
		3200	09	19.5	495	(2)6.50 x .25	(2)165 x 6	-	-	-	-	5200	21	24	23	25	
	4000	09	23.00	584	(2)8.25 x .25	(2)210 x 6	-	-	-	-	6000	25	30	27	32		
	Copper	ReliaGear	225	08	4.38	111	1.63 x .25	41 x 6	4.38	111	1.63	41	800	8	9	9	10
			400	08	4.38	111	1.63 x .25	41 x 6	4.38	111	1.63	41	-	8	9	9	10
			600	08	4.38	111	1.63 x .25	41 x 6	4.38	111	1.63	41	-	8	9	9	10
			800	08	4.38	111	1.63 x .25	41 x 6	5.00	127	2.25	57	1000/1200	8	9	9	10
			1000	08	5.00	127	2.25 x .25	57 x 6	5.63	143	2.88	73	1350/1600	10	12	11	12
			1200	08	5.63	143	2.88 x .25	73 x 6	6.13	156	3.38	86	-	12	15	13	16
			1350	08	6.13	156	3.38 x .25	86 x 6	7.00	178	4.25	108	2000	14	17	16	19
1600			08	7.00	178	4.25 x .25	108 x 6	7.25	184	4.50	114	2500	16	20	18	22	

11 Installation labor cost

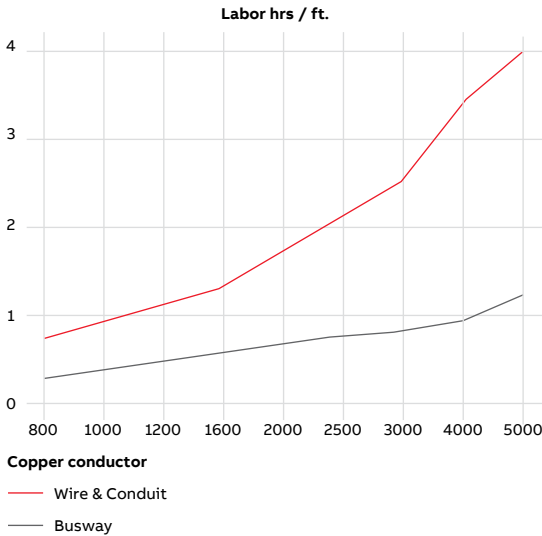
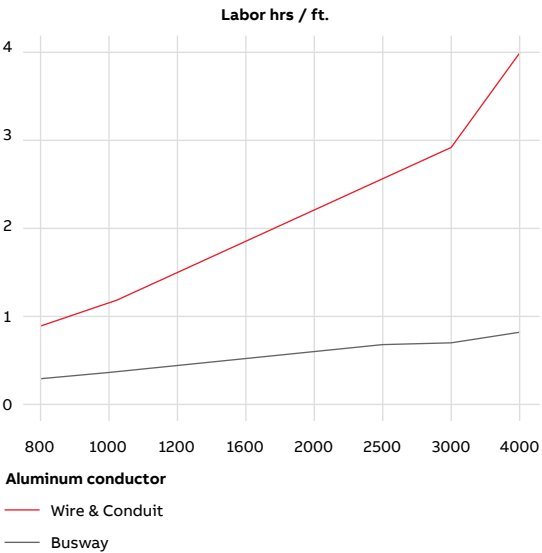
Comparison to wire and conduit

Estimates based on material costs alone often exclude the substantial cost savings and ease of installation available with the lighter, more compact ReliaGear busway. Labor savings can be significant, often resulting in lower total installed cost and the ability to free up time to complete more jobs. A Labor Estimating Manual, which uses NECA labor units, is available to assist in estimating and comparing the amount of labor required to install busway and wire and conduit. This manual, along with the "Total Installed Cost Worksheet" in the back of the manual, is a valuable, simple tool used to estimate and compare the total cost for busway and wire and conduit.

See publication number GEZ-7737. An ABB Account Manager can also assist. Layout and measurement support also are available through an ABB Account Manager.

Benefits of busway over wire and conduit

- Lower installed cost
- Smaller size, lighter weight
- Better efficiency
- No cutters, benders, oils, jellies, grease, scrap or cable reels
- Future expansion flexibility
- Higher short-circuit ratings
- Lower voltage drop
- Higher integrity and reliability



ReliaGear busway plug-in labor measurements are the same as feeder labor measurements.

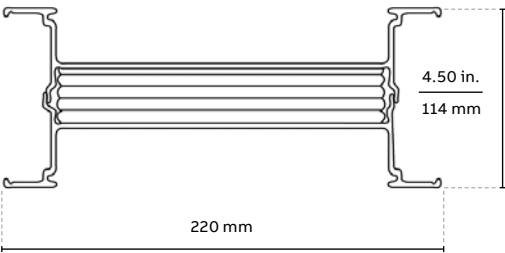


Table 10: Compact size

Amperes	Width	
	AL	CU
225–600	4.375	4.375
800	5.625	4.375
1000	6.125	5
1200	7	5.625
1350	8.5	6.125
1600	9.25	7
2000	11	8.5
2500	15.5	10.25
3000	18	14.5
3200	19.5	15.5
4000	23	18
5000	-	21.5
6000	-	29.75

Dimensions: Representative in inches for aluminum and copper housings. All depths are 4.5".

12 Innovative joint shield design provided with drip-proof, splash-proof, and outdoor bus

13 Complete outdoor run of ReliaGear busway

Table 11: Low weight

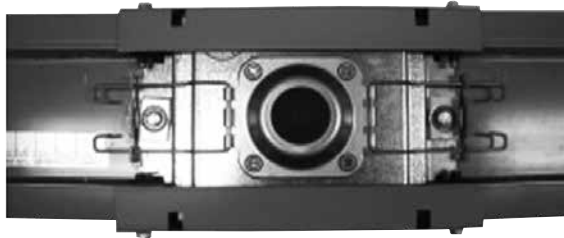
Amperes	AL3W	4W	CU3W	4W
225–600	5	6	8	9
800	6	7	8	9
1000	7	8	10	12
1200	8	9	12	15
1350	9	10	14	17
1600	10	12	16	20
2000	12	15	21	26
2500	17	20	26	33
3000	19	23	32	40
3200	21	24	34	43
4000	25	30	42	52
5000	-	-	52	66
6000	-	-	-	86

Pounds / 1 Foot: Representative for aluminum and copper housings with 3 wire and 4 wire applications.

ReliaGear busway provides optimum performance in the most demanding applications. Through superior design and applied materials technology, it assures uptime and reliability, even in severe-duty weather environments.

Weather protection: features and benefits

- Industry Exclusive WEATHERSHIELD Epoxy Joint Insulators designed for long life. Joint Bolt access via easily removable, UL listed/cUL certified
- Extra drainage channels through the galvanized steel bracket help eliminate standing water near joints. Better efficiency
- Gasketing materials rated for extreme temperatures, -40 to 250 degrees Fahrenheit
- Internal sealants rated for use in extreme temperature environments of -40 to 200 degrees Fahrenheit
- All Gaskets and Sealants tested to verify superior UV resistance and excellent stability when subjected to long term thermal aging



Construction options

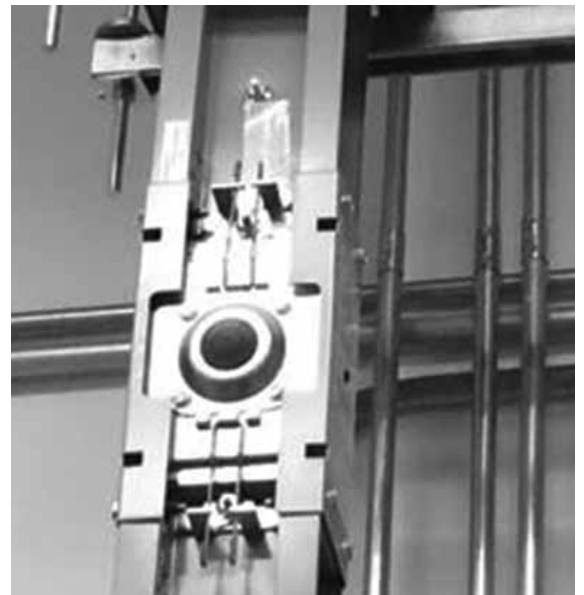
The materials and processes used in these construction options are the result of an intensive ISO and testing process. These products combine high reliability with new features that reduce assembly time by more than 50 percent. The joint shield, as shown in the photo above, uses an integral spring latch clamping system. This system provides optimum gasket compression at all joint connections, and eliminates the need for additional joint cover hardware.

Table 12: Enclosure construction type

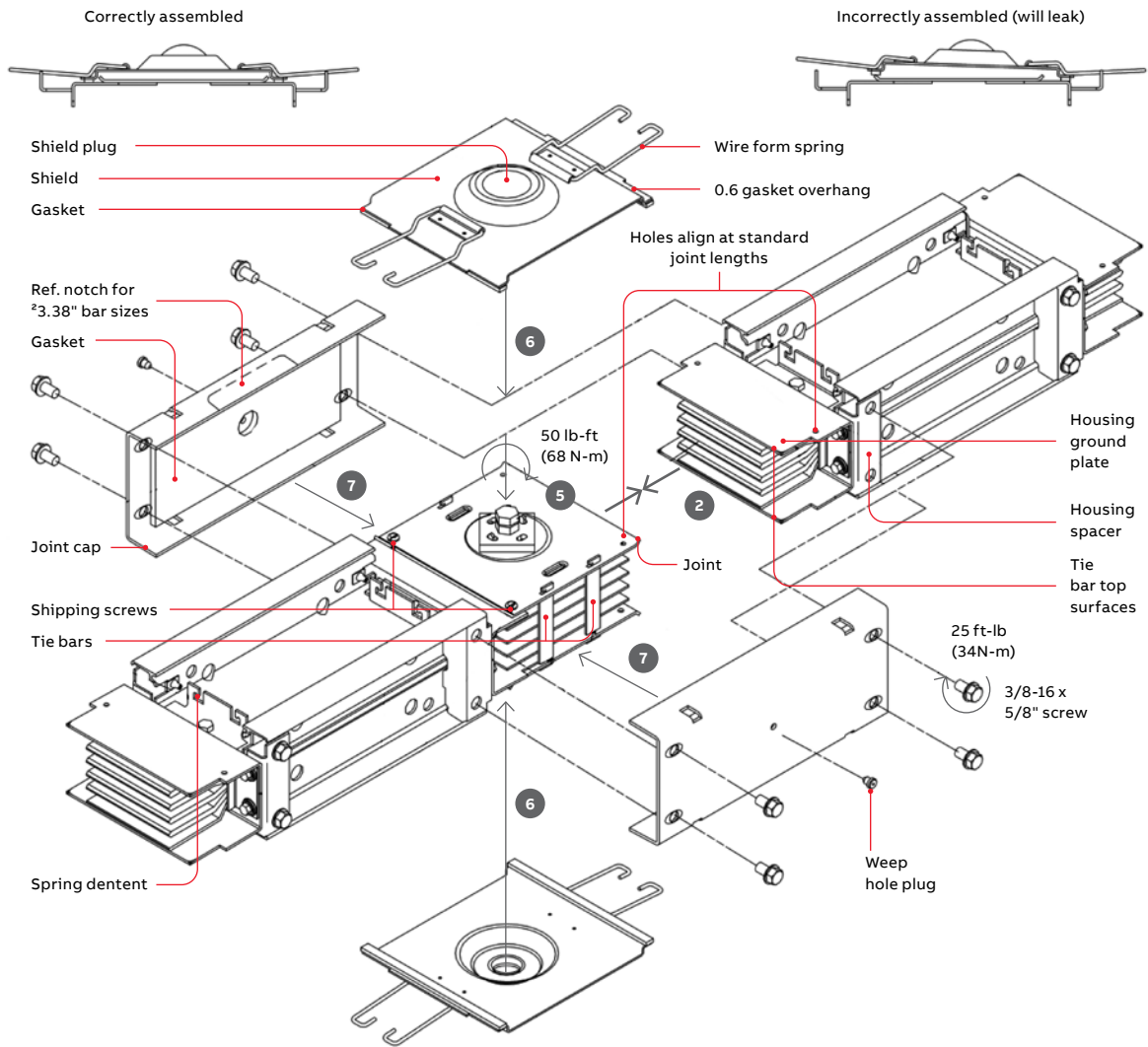
Construction type		IEC degree of protection	Joint insulator
Indoor (NEMA 1)	Feeder, Plug-in, Riser	IP-40	Standard
Drip-proof	Feeder, Plug-in, Riser	IP-43	Standard
Splash-proof	Feeder, Plug-in, Riser	IP-54/55	WEATHERSHIELD
Outdoor (NEMA 3R) ¹	Feeder (Only)	IP-65/66	WEATHERSHIELD

¹ – Excludes (2) stack flatwise elbow

The Splash-proof and Outdoor designs feature an industry-exclusive 100 percent epoxy insulation system throughout the bus and joints. This system includes Bluecoat epoxy on the bus bars and WEATHERSHIELD insulators in the joints.



14 Outdoor busway assembly



Note: Bottom shields are not included with IP43-rated and drip proof flat-mounted horizontal busway

- 15 ReliaGear plug-in bus with bus plug
- 16 Plug outlet locations
- 17 Typical plug mounting

Inches
Millimeters

Straight lengths: plug-in and feeder

ReliaGear busway is available in ratings from 225 A - 5000 A in both feeder and plug-in using common joint and housing parts. 6000 A busway is available in 4-wire feeder only.

Plug-in lengths are available in 2-, 4-, 6-, 8-, and 10-foot lengths, and feeder lengths are also available in 2- to 10-foot lengths in 1/8-inch increments.

Joints with $\pm 1/2$ -inch (12.7 mm) adjustability

Every Spectra series busway is supplied with up to $\pm 1/2$ -inch adjustable joint as standard.

The modular joint pack is preassembled to one end of each piece of busway and shipped in the “nominal” position. The joint caps have four housing mounting holes or slots (eight on 5000 amp Copper) the holes contain twistouts permitting expansion or contraction of the joint up to 1/2 inch in either direction.

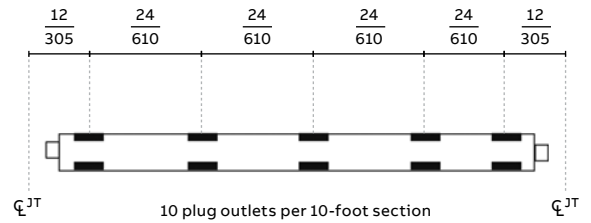
Plug-in busway has up to 10 unobstructed, usable plug outlets, standard as shown (trapeze hanger positions may obstruct some openings). Vertical riser plug-in busway is also available with plug outlet openings on one side (when the other side is inaccessible) for even greater value. Plug outlet covers are molded of tough, impact and chemical resistant polycarbonate thermoplastic.



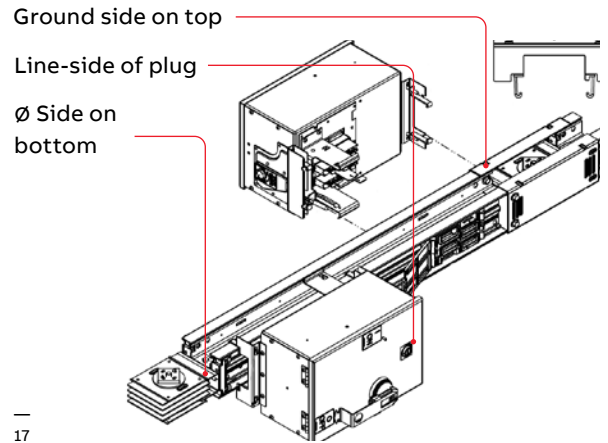
15

Plug-in flatwise mounted

Unless otherwise specified, horizontal runs of plug-in busway will be furnished with the phase, Ø side label on the bottom of the busbar stack so that plug On/Off position pointer, and labels will be visible from the floor. Additionally, vertical risers of plug-in busway will be furnished with the phase Ø side label on the right so that the line-side of the plug will be up.



16



17

- 18 Flatwise joint elbow indoor only (2) stack
- 19 Edgewise joint elbow
- 20 Proper elbow phase relationship

Fittings

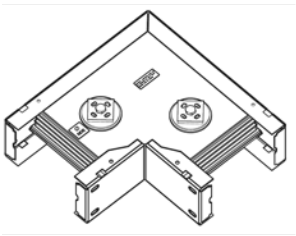
ReliaGear busway has a complete family of fittings to meet virtually all layout requirements using the compact minimum sizes shown. Special turns such as flat angles greater than 90° and crosses are also available.

Nomenclature for completely defining the turn is defined by looking into the joint end with phase Ø side facing down on the busway as shown in Figure 20.

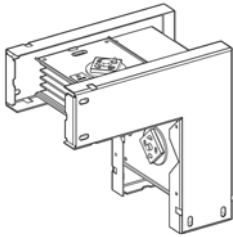
Each piece of busway is labeled to maintain proper phasing. All turn dimensions are defined from the centerline of the joint end to the centerline of the busways as “X,” “Y,” and “Z” (where applicable) leg lengths. Tables 14-17 Dimensions listed are standard. Variable leg lengths are available in 1/8” increments (except joint elbows). The total footage of any one fitting cannot exceed 10 feet (3048 mm) in length.

NOTICE

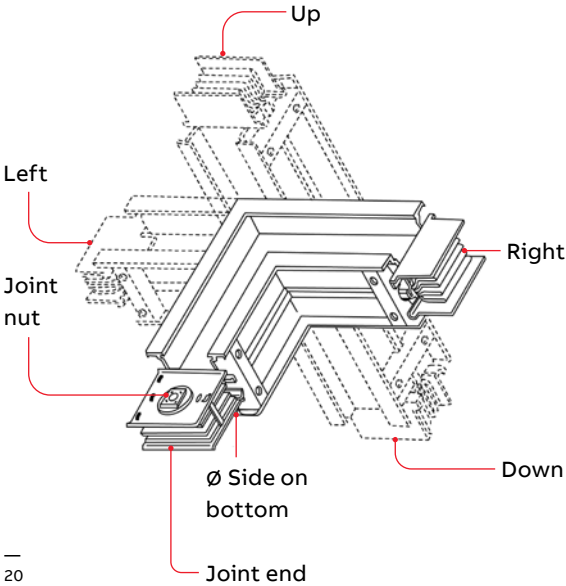
Notice: Offsets and combination elbows are typically used only when standard elbows will not fit.



18



19



20

Table 13: Standard joint-elbow dimensions

Bars per phase	Bar width (Inches)	Center to center distance (inches)		
		Flatwise elbows		Edgewise elbows
		Indoor	Outdoor	Typical indoor and outdoor
1	1.625	3	4	6
	2.25	3	4	6
	2.875	3	4	6
	3.375	4	4	6
	4.25	4	4	6
	4.5	4	4	6
	5.75	5	5	6
	6.5	5	5	6
	7.5	5	6	6
	8.25	5	6	6
2	4	8	N/A	6
	4.25	8	N/A	6
	4.5	8	N/A	6
	5.75	10	N/A	6
	6.5	10	N/A	6
	7.5	12	N/A	6
2	8.25	12	N/A	6

- 21 Edgewise up elbow
- 22 Flatwise right elbow
- 23 Edgewise down tee
- 24 Flatwise right tee

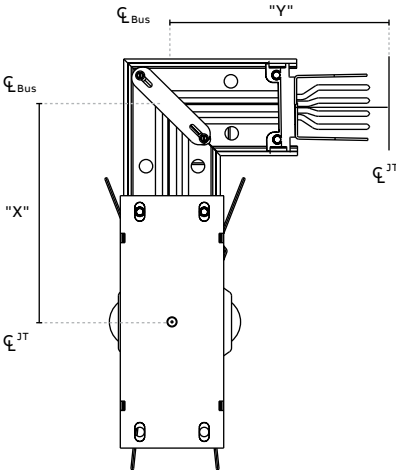
Inches
Millimeters

For use in applications where joint elbows do not apply, e.g., variable lengths, drip-proof, splash-proof and outdoor.

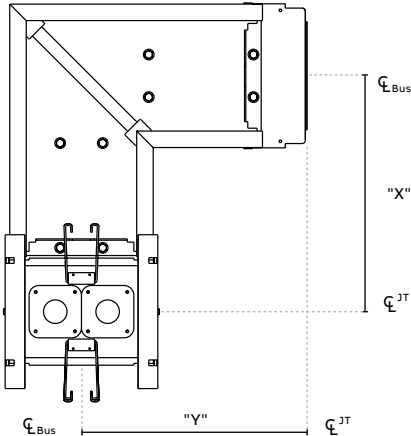
Table 14: Flat elbows

	Amps	Standard dimensions				
		X in.	X mm	Y in.	Y mm	Z
Aluminum	225–1350	12	305	12	305	-
	1600–3200	18	457	18	457	-
	4000	24	610	24	610	-
	225–2000	12	305	12	305	-
Copper	2500–4000	18	457	18	457	-
	5000	24	610	24	610	-

Elbows – drip proof, splash proof & outdoor only



21



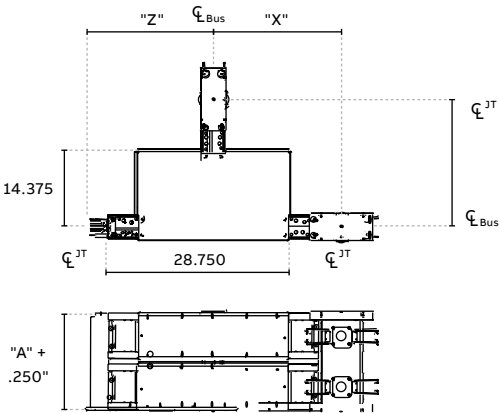
For use where joint elbows do not apply.

22

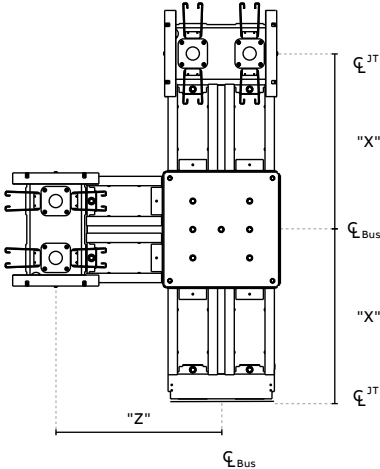
Table 15: Flat tees

	Amps	Standard Dimensions					
		X in.	X mm	Y in.	Y mm	Z in.	Z mm
Aluminum	225–1200	12	305	12	305	12	305
	1350–3200	18	457	18	457	18	457
	4000	24	610	24	610	24	610
	225–1600	12	305	12	305	12	305
Copper	2000–4000	18	457	18	457	18	457
	5000	24	610	24	610	24	610

Tees



23



24

25 Edgewise down offset

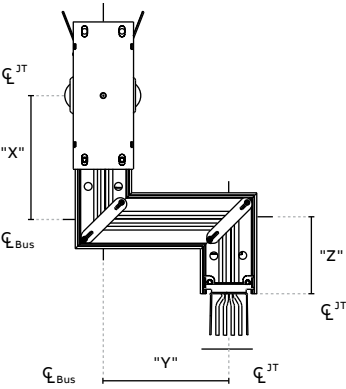
26 Left or right offsets (Flat)

27 Combination elbow

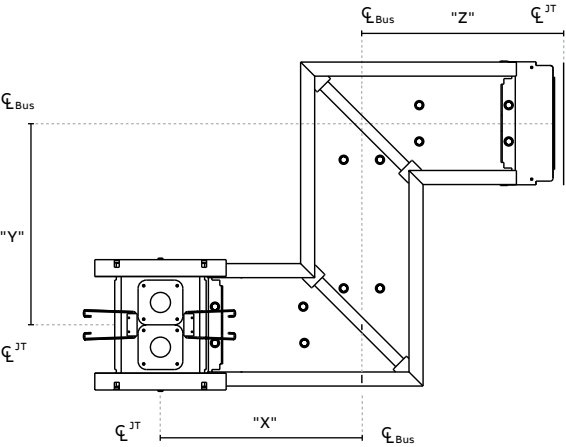
Inches
Millimeters

	Amps	Standard dimensions					
		X in.	X mm	Y in.	Y mm	Z in.	Z mm
Aluminum	225–1350	12	305	5	127	12	305
	1600–3200	18	457	5	127	18	457
	Except 2000	18	457	8	203	18	457
	4000	24	610	9	229	24	610
Copper	225–2000	12	305	5	127	12	305
	2500	18	457	8	203	18	457
	3000–4000	18	457	5	127	18	457
	5000	24	610	9	229	24	610

Offsets



25



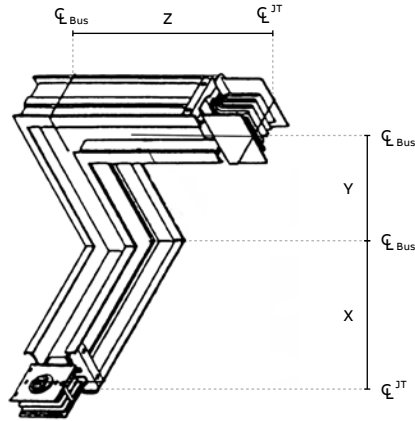
Flatwise Left offset shown

26

Table 17: Combination elbows

	Amps	Standard dimensions					
		X in.	X mm	Y in.	Y mm	Z in.	Z mm
Aluminum	225–1350	10	254	8	203	12	305
	1600–2500	10	254	12	305	18	457
	3200–4000	10	254	16	406	24	610
	225–2000	10	254	8	203	12	305
Copper	2500–3200	10	254	12	305	18	457
	4000–5000	10	254	16	406	24	610

Combination elbow



27

Cable tap boxes

ReliaGear busway tap boxes are used where a run of busway is fed by cable and conduit. The corner post design permits removal of up to three side walls for cable access/entrance and for greater flexibility and installation ease. Lugs are provided as shown in Table 18. Universal lug terminal plates and 100 percent ground lugs are available to accept almost all NEMA mechanical and compression lugs (max. width 1 7/8"/48mm).

NOTICE Notice: Certain local/city code requirements can affect the dimensions, number of lugs furnished, lug position, etc. of fittings. In these situations, refer to factory.

Table 18: Standard cable tab box data

Number of bars per phase	Dimensions, Cable Bending Space and Lug Data										Weight in lbs.			
	Aluminum					Copper					8" Stub (10" for 5000A/6000A copper)			
	W		W		H	Cable Bending Space "C"		Number of #2 600MCM Lug Per Phase	3 Wire	4 Wire	3 Wire	4 Wire	3 Wire	4 Wire
	Amp	Inches	mm	Inches		MM	Inches	MM						
1	225	14	356	14	356	34	864	20	508	1	144	149	151	157
	400	14	356	14	356	34	864	20	508	2	144	149	151	157
	600	14	356	14	356	34	864	20	508	2	144	149	151	157
	800	14	356	14	356	34	864	20	508	3	152	159	151	157
	1000	14	356	14	356	34	864	20	508	3	152	160	155	162
	1200	22	559	22	559	34	864	20	508	4	191	200	164	178
	1350	22	559	22	559	34	864	20	508	4	200	213	168	179
	1600	22	559	22	559	34	864	20	508	5	197	209	209	228
	2000	22	559	22	559	34	864	20	508	6	206	225	225	249
	2500	---	---	22	559	34	864	20	508	8			246	484
2	2500	32	813	---	---	34	864	20	508	8	260	276		
	3000	32	813	32	813	34	864	20	508	9	272	293	294	324
	3200	32	813	32	813	34	864	20	508	10	275	297	304	338
	4000	32	813	32	813	34	864	20	508	12	296	324	336	380
	5000	---	---	40	1016	34	864	20	508	15			401	458
3	6000	---	---	45	1143	34	864	20	508	18				543

Standard Length (L) for the box is 24" (610). This includes 3W, 3WG, 4W and 4WG.

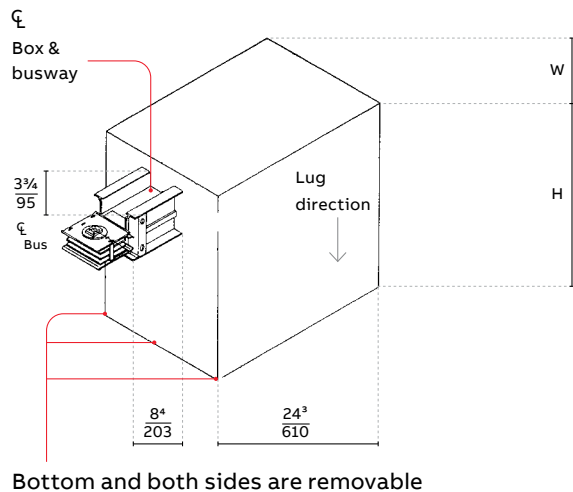
Mechanical type (CU-AL wire) lugs standard; crimp type optional. One ground lug standard through 4000-Amp cu. Two ground lugs standard for 4000-Amp al, 5000/6000-Amp cu. Box size may change when using some compression lugs or mechanical lugs greater than 600mcm depending on size and quantity. Check with factory.

— 28 End tap box: feeder or plug-in

— 29 Standard box down position, side view

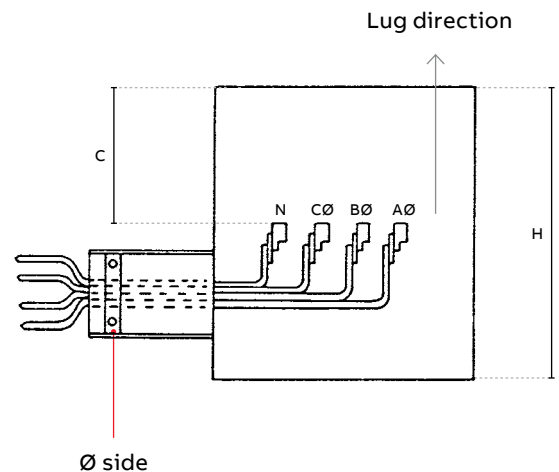
— 30 Inverted box up position, side view

Inches
Millimeters

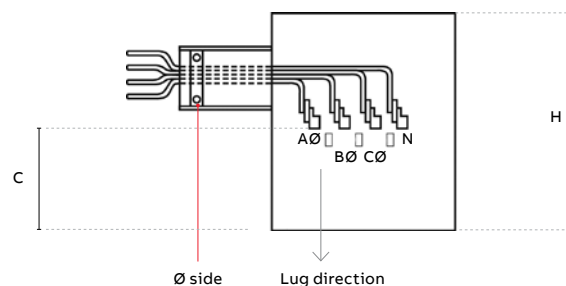


Bottom and both sides are removable

— 28



— 30



— 29

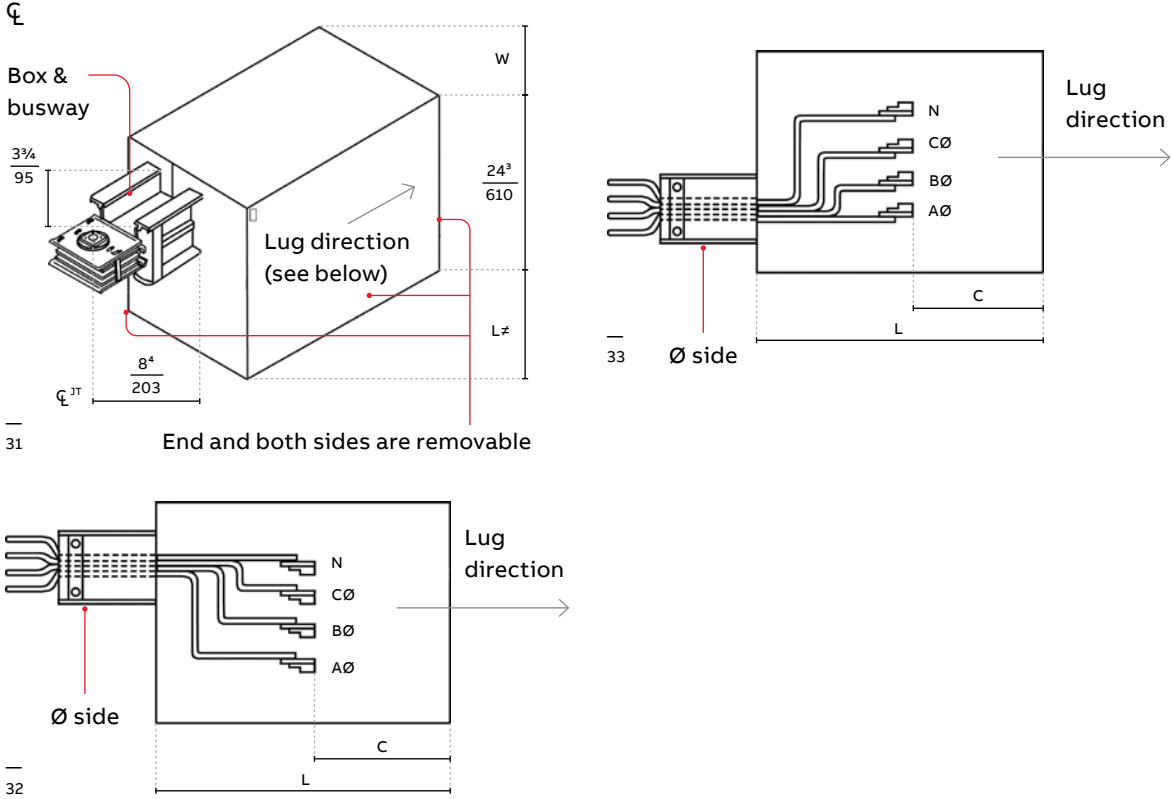
Note: Smaller special purpose end cable tap boxes are available. Contact the factory for details.

Table 19: Alternate cable tab box data

Number of bars per phase	Amps	Dimensions, cable bending space and lug data								Number of #2-600 MCM lugs per phase	Weight in lbs.			
		Aluminum				Copper					8" Stub (10" for 5000A/6000A copper)			
		W		W		L		Cable Bending Space "C"			Aluminum		Copper	
		in	mm	in	mm	in	mm	in	mm		3 wire	4 wire	3 wire	4 wire
1	225	14	356	14	356	34	864	20	508	1	144	149	151	157
	400	14	356	14	356	34	864	20	508	2	144	149	151	157
	600	14	356	14	356	34	864	20	508	2	144	149	151	157
	800	14	356	14	356	34	864	20	508	3	152	159	151	157
	1000	14	356	14	356	34	864	20	508	3	152	160	155	162
	1200	22	559	22	559	34	864	20	508	4	191	200	164	178
	1350	22	559	22	559	34	864	20	508	4	200	213	168	179
	1600	22	559	22	559	34	864	20	508	5	197	209	209	228
	2000	22	559	22	559	34	864	20	508	6	206	225	225	249
	2500	-	-	22	559	34	864	20	508	8	-	-	246	484
2	2500	22	559	-	-	34	864	20	508	8	260	276	-	-
	3000	30	762	30	762	34	864	20	508	9	272	293	294	324
	3200	30	762	30	762	34	864	20	508	10	275	297	304	338
	4000	30	762	30	762	34	864	20	508	12	296	324	336	380
	5000	-	-	40	1016	34	864	20	508	15	-	-	401	458
3	6000	-	-	40	1016	34	864	20	508	18	-	-	-	543

Standard Height (H) for the box is 24" (610). This includes 3W, 3WG, 4W and 4WG.
Mechanical type (CU-AL wire) lugs standard; crimp type optional. One ground lug standard through 4000-Amp cu. Two ground lugs standard for 4000-Amp al, 5000/6000-Amp cu.
Box size may change when using some compression lugs or mechanical lugs greater than 600mcm depending on size and quantity. Check with factory.

- 31 Alternate end tap box: feeder or plug-In
 - 32 Standard box down position, side view
 - 33 Inverted box up position, side view
- Inches
Millimeters



Center cable tap boxes

Table 20: Center cable tap data

Number of bars per phase	Amps	Dimensions, cable bending space and lug data														Cable bend space	Number of #2-600 MCM lugs per phase ¹	Weight in lbs.			
		Aluminum								Copper								8" stub			
		W ²		E		L		W ²		E		L		Aluminum				Copper			
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	3 wire	4 wire			3 wire	4 wire		
1	225	24	610	4.375	111	20	508	24	610	4.375	111	20	508	15	381	1	117	122	134	141	
	400	24	610	4.375	111	20	508	24	610	4.375	111	20	508	15	381	2	117	122	134	141	
	600	24	610	4.375	111	20	508	24	610	4.375	111	20	508	15	381	2	117	122	134	141	
	800	24	610	4.375	111	20	508	24	610	4.375	111	20	508	15	381	3	123	132	134	141	
	1000	24	610	4.375	111	20	508	24	610	4.375	111	20	508	15	381	3	127	132	141	151	
	1200	30	762	6	152	28	711	30	762	6	152	28	711	18	457	4	178	184	208	222	
	1350	30	762	6	152	28	711	30	762	6	152	28	711	18	457	4	184	191	214	230	
	1600	30	762	6	152	28	711	30	762	6	152	28	711	18	457	5	188	196	224	240	
	2000	36	914	9	229	28	711	36	914	9	229	28	711	18	457	6	246	267	250	276	
	2500	-	-	-	-	-	-	36	914	9	229	32	813	18	457	8	-	-	320	358	
2	2500	36	914	9	229	32	813	-	-	-	-	-	-	18	457	8	255	279	-	-	
	3000	48	1219	12.75	324	39	991	48	1219	12.75	324	39	991	23	584	9	345	370	395	436	
	3200	48	1219	12.75	324	39	991	48	1219	12.75	324	39	991	23	584	10	352	373	401	445	
	4000	48	1219	12.75	324	39	991	48	1219	12.75	324	39	991	23	584	12	447	503	498	569	
	5000	-	-	-	-	-	-	48	1219	12.75	324	46	1168	23	584	15	-	-	585	676	
	6000 (3)																				
2000 Amp (max) center branch tap boxes																					
1	2500	-	-	-	-	-	-	36	914	9	229	28	711	18	457	6	-	-	303	343	
	2500	36	914	9	229	28	711	-	-	-	-	-	-	18	457	6	239	264	-	-	
	3000	43	1092	12.75	324	28	711	43	1092	12.75	324	28	711	18	457	6	290	315	387	443	
	3200	43	1092	12.75	324	28	711	43	1092	12.75	324	28	711	18	457	6	296	318	393	452	
	4000	43	1092	12.75	324	28	711	43	1092	12.75	324	28	711	18	457	6	392	447	443	513	
2	5000	-	-	-	-	-	-	43	1092	12.75	324	28	711	18	457	6	-	-	500	591	
	6000 (3)																				

¹ Mechanical type (CU-AL wire) lugs standard; crimp type optional. One ground lug standard through 3000-Amp CU.

Two ground lugs standard for 4000-Amp AL, 5000-Amp CU. Optional one ground lug per phase lug.

² Box size may change when using some compression lugs or mechanical lugs greater than 600 mcm depending on size and quantity. Check with factory.

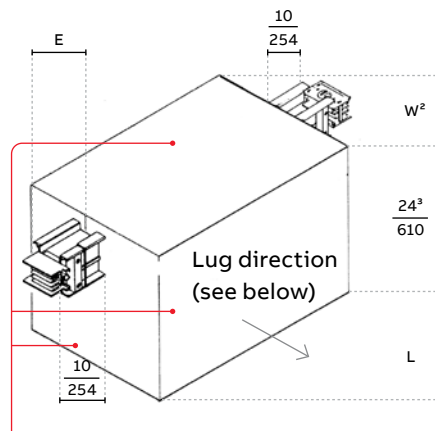
³ Please contact factory for details

34 Center tap box:
feeder or plug-In

35 Inverted box up
position, side view

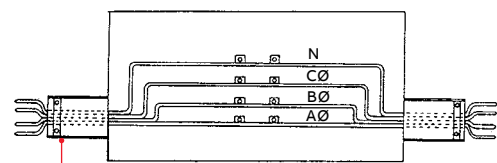
36 Standard box down
position, side view

Inches
Millimeters



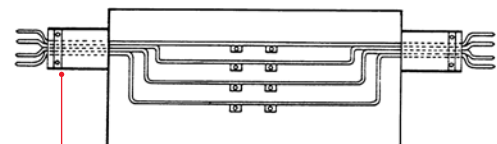
Top, bottom and both sides are removable

34



Ø side down

35



Ø side down

36

³ $\frac{24}{610}$ dimension changes to $\frac{28}{711}$ for 5000-Amp or if optional one ground lug per phase lug is required.
Standard stub length is 8"/203.2 mm, except for 5000A, which is 10"/254 mm.

37 Three-phase end tap

38 Standard lug position

Inches

Millimeters

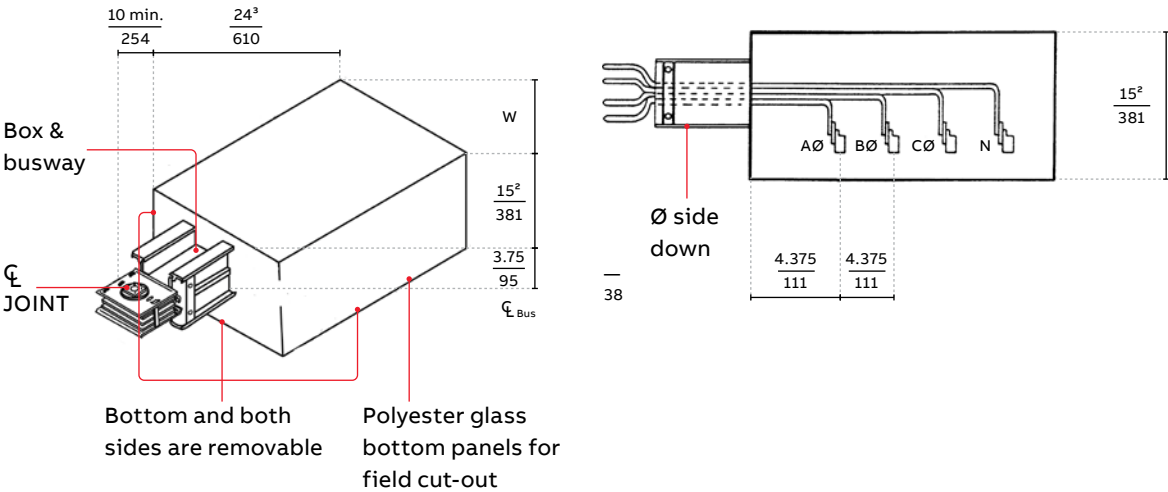
Transformer taps

Table 21: Dimensions for three phase end tap

Number of Bars Per Phase		Dimensions and lug data				Number of #2-600 MCM lugs per phase¹	Weight in lbs.			
		Aluminum		Copper			8" stub			
		W²		W²			Aluminum		Copper	
		Amps	in.	mm	in.		mm	3 wire	4 wire	3 wire
1	600	17	432	17	432	2	88	90	98	102
	800	17	432	17	432	2	90	92	98	102
	1000	17	432	17	432	2	92	94	102	108
	1200	20	508	20	508	3	99	102	108	114
	1350	20	508	20	508	3	102	105	113	122
	1600	20	508	20	508	3	104	109	124	135
	2000	26	660	26	660	4	120	126	144	159
	2500	-	-	26	660	5	-	-	161	180
	2500	26	660	-	-	-	131	139	-	-
	3000	33	838	34	864	6	149	159	188	210
2	3200	33	838	34	864	10	154	165	195	219
	4000	33	838	34	864	8	166	179	210	237
	5000	-	-	39	991	10	-	-	239	267

¹ Mechanical type (CU-AL wire) lugs standard; crimp type optional. One ground lug standard through 3000-Amp CU. Two ground lugs standard for 4000-Amp AL, 5000-Amp CU. Optional one ground lug per phase lug.

² Box size may change when using some compression type lugs. Check with factory.



37

³ $\frac{24}{610}$ dimension changes to $\frac{28}{711}$ for 5000-Amp or if optional one ground lug per phase lug is required.

39 Single-phase transformer taps

Inches
Millimeters

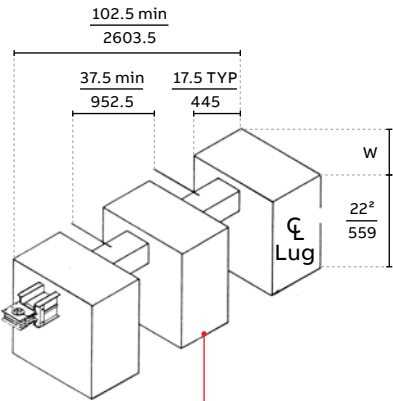
Table 22: Dimensions for single phase end tap

Number of bars per phase		Dimensions and lug data				Number of #2-600 MCM lugs per phase¹
		Aluminum		Copper		
		W²		W²		
		Amps	in.	mm	in.	
1	1000	16	406	-	-	2
	1200	16	406	16	406	3
	1350	20	508	16	406	3
	1600	20	508	16	406	3
	2000	20	508	20	508	4
	2500	-	-	20	508	5
	2500	24	610	-	-	5
2	3000	32	813	24	609	6
	3200	32	813	24	609	10
	4000	32	813	32	813	8
	5000	-	-	32	813	10

¹ Mechanical type (CU-AL wire) lugs standard; crimp type optional. One ground lug standard through 3000-Amp CU. Two ground lugs standard for 4000-Amp AL, 5000-Amp CU. Optional one ground lug per phase lug.

² Box size may change when using some compression type lugs. Check with factory.

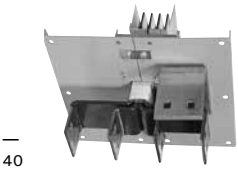
Standard stub length is 8", except for 5000A, which is 10".



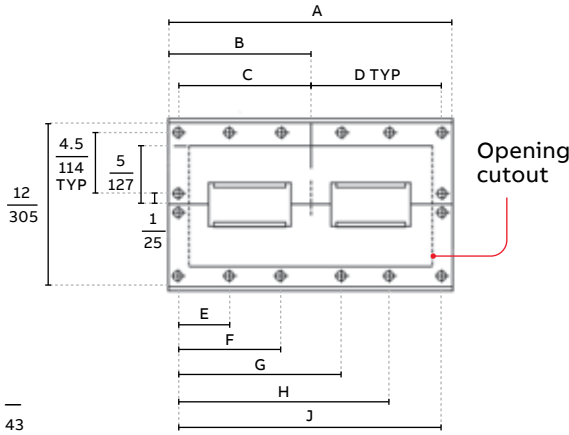
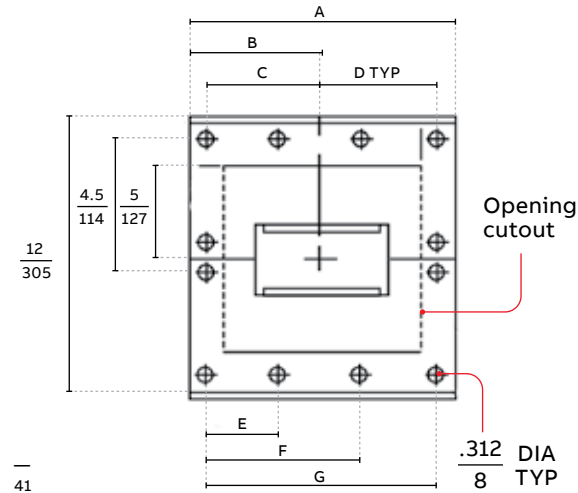
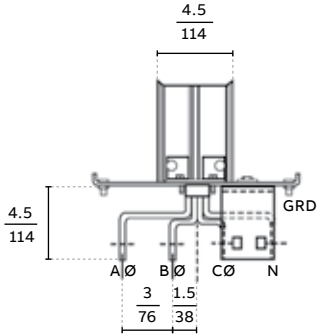
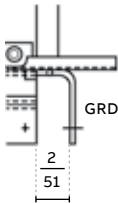
- 40 Flanged end stub
- 41 Flanged end without lugs, 1 bar per phase
- 42 Flanged end without lugs
- 43 Flanged end without lugs, 2 bars per phase
- 44 Bar hole dimensions

Inches
Millimeters

Flanged end stub
Provides a universal stub for field connections (customer connection only).



Note: Special OEM stubs are available. Contact the factory for details.



Bar hole pattern

(1 Stack and 2 Stack are same. All holes are $\frac{.438}{11} \times \frac{.562}{14}$ rect.)

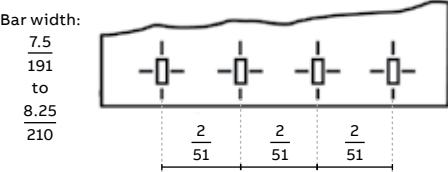
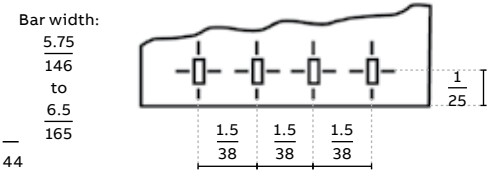
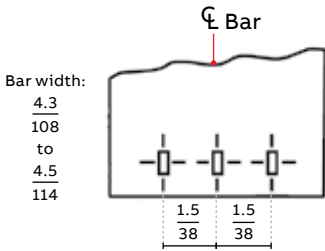
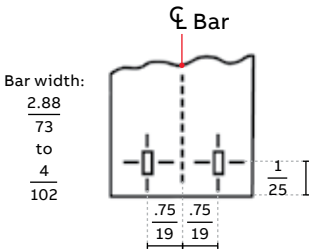
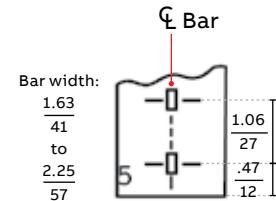


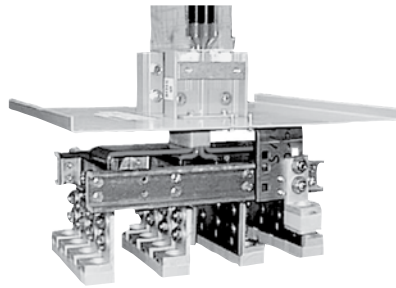
Table 23: Flanged end without lugs

	Amps	Figure	A	B	C	D	E	F	G	H	J
Aluminum	225–1200		11.5	5.75	5.25	4.75	5.25		10.5		
Copper	225–1600	23.2	292	146	133	121	133	-	267	-	-
Aluminum	1350–2000		15.25	7.62	7.12	6.62	4.75	9.5	14.25		
Copper	2000–2500	23.2	387	194	181	168	121	241	362	-	-
Aluminum	2500		19.75	9.88	9.37	8.88	4.69	9.37	14.06		18.75
Copper	3200	23.3	502	251	238	225	119	238	357	-	476
Aluminum	3000–4000		27.25	13.62	13.12	12.62	5.25	10.5	15.75	21	26.25
Copper	4000–5000	23.3	692	346	333	321	133	267	400	533	667

—
45 Flanged end
stub with lugs

—
46 Flanged end with
lugs, 1 bar per phase

—
47 Flanged end with
lugs, 2 bars per phase



—
45

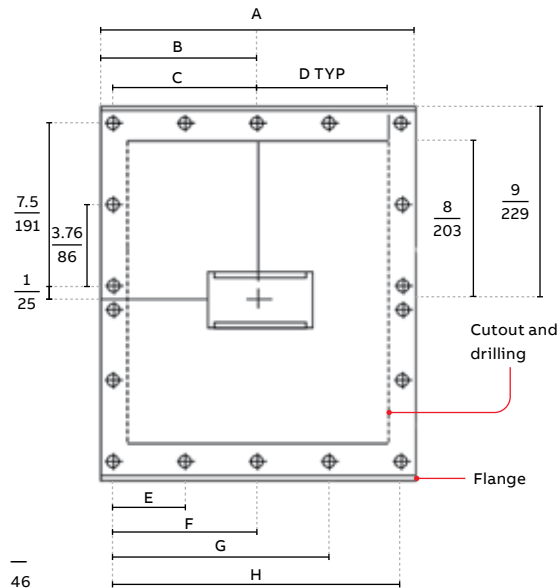
Flanged end with lugs

Lugs are provided as shown in Table 18. Universal lug terminal plates are available to accept almost all NEMA and non-NEMA mechanical and compression lugs. (Maximum 1.875" wide).

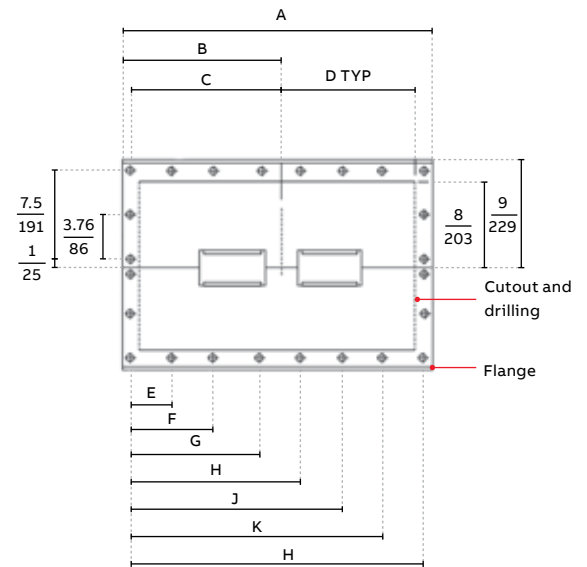
48mm

Standard lugs are #2-600mcm mechanical type (Cu-Al) wire lugs; crimp type is optional. One ground lug is standard through 3000A Cu. Two ground lugs are standard for 4000A Al, 5000A Cu. Optional one ground lug per phase lug.

Flanged end without lugs cutout and drilling pattern



—
46



—
47

Table 24: Flanged end with lugs

	Amps	Figure	A	B	C	D	E	F	G	H	J	K	L
Aluminum	225–600		14	7	6.5	6	4.5	8.5		13			
Copper	225–1000	24.1	356	178	165	152	114	216		330			
Aluminum	800–1000		15.12	7.56	7.06	6.56	4.69	9.44		14.12			
Copper	1200–1350	24.1	384	192	179	167	119	240		359			
Aluminum	1200		16.25	8.12	7.62	7.12	5.12	10.12		15.25			
Copper	1600	24.1	413	206	194	181	130	257		387			
Aluminum	1350–1600		18.25	9.12	8.62	8.12	5.75	11.5		17.25			
Copper	2000	24.1	464	232	244	206	146	292	NA	438			
Aluminum	2000		20	10	9.5	9	4.75	9.5	14.5	19			
Copper	2500	24.1	508	254	241	229	121	241	362	483			NA
Aluminum	2500	24.2	25.5	12.75	12.25	11.75	4.88	9.75	14.75	19.62			24.5
			648	324	311	298	200	248	375	498			622
Copper	3000		24	12	11.5	11	5.75	11.5	17.25				23
	3200	24.2	610	305	292	279	146	292	438	NA			584
Aluminum	3000		27	13.5	13	12.5	5.25	10.5	15.5	20.75			26
	3200	24.2	686	343	330	318	133	267	394	527	NA	NA	660
Copper	4000	24.2	31.5	15.75	15.25	14.75	4.37	8.75	13.12	17.37	21.75	26.12	30.5
			800	400	387	375	111	222	333	441	552	664	775
Aluminum	4000	24.2	32	16	15.5	15	4.5	9	13.5	17.5	22	26.5	31
			813	406	394	381	114	229	419	445	559	673	787
Copper	5000	24.2	37	18.5	18	17.5	6	12	18	24	30		36
			940	470	457	445	152	304	457	608	762	NA	914

Note: For quantity and size of lugs, refer to Cable Tap Box, page 24, Table 19.1.

— 48 Switchboard stub view

— 49 MCC stub view

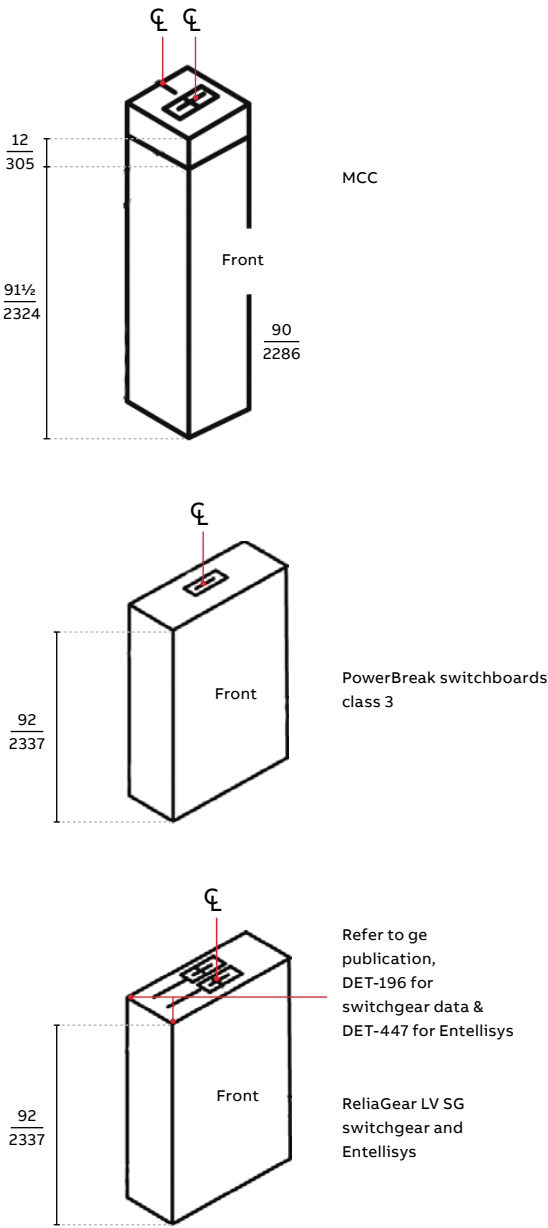
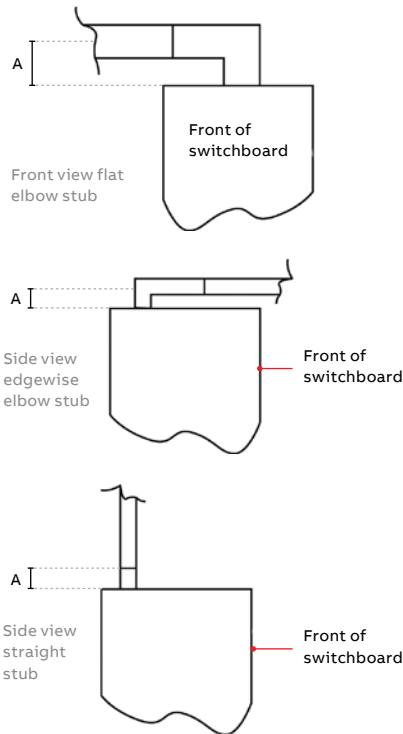
Switchboard/switchgear stub

ReliaGear busway offers full factory coordination to other equipment as shown. Other entrance combinations are available. Refer to company. Straight and elbow stubs are available with flange to joint or elbow dimensions per Table 25.

Table 25: Stubs, switchboard ends

	Amps	Minimum Stub Dimensions "A" ¹		
		Straight stubs	Edgewise elbows	Flat Elbows
		in. mm	in. mm	in. mm
Aluminum	225–600	8 203	6 152	4 102
	800–1200	8 203	6 152	5 127
	1350	8 203	6 152	6 152
	1600–2000	8 203	6 152	8 203
	2500	8 203	6 152	10 254
	3000	8 203	6 152	11 279
	3200	8 203	6 152	11 279
	4000	8 203	6 152	14 330
	225–800	8 203	6 152	4 102
	1000–1600	8 203	6 152	5 127
Copper	1600–2000	8 203	6 152	6 152
	2500	8 203	6 152	8 203
	3000	8 203	6 152	10 254
	3200	8 203	6 152	10 254
	4000	8 203	6 152	11 279
	5000	10 204	6 152	14 356

¹ Add 2 inches to dimensions shown for Type AKD-8/10 switchgear.



² – Standard dimension 6" from rear may vary and must be coordinated with switchboard factory.

50 Bolt on, flex-a-tap for PTO selection, see Table 26 & 27

51 Flatwise PTO section for PTO selection, see Table 28, 29 & 30

Inches

Millimeters

Power takeoffs (PTO)

Spectra series Flex-A-Tap joints accept bolted power takeoff devices up to 1600 A for many applications.

Table 26: Bolt on amp ratings

Bolt-On Tap	Amp Rating
Molded-case circuit breakers (PB Only)	1600 max.
Cable boxes	1600 max.

The compact size and flexibility resulting from the modular design allow takeoffs to be mounted at any joint, whether feeder or plug-in. See Fig. 51.

Table 27: Bolt on dimensions

Device	H		W		D	
	in.	mm	in.	mm	in.	mm
Cable Tap box	54	1372	24	610	15½	394
Power Break II	63	1600	24 9/32	617	18	457

Table 28: Power takeoff box weights

Power takeoff weight in lbs. (Add to feed through busway)			
Bars per phase	All		
	3 wire	4 wire	
1	73	87	
2	104	119	

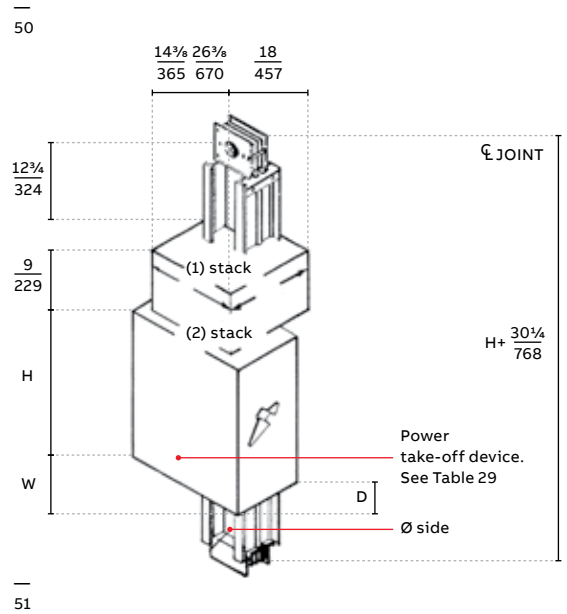
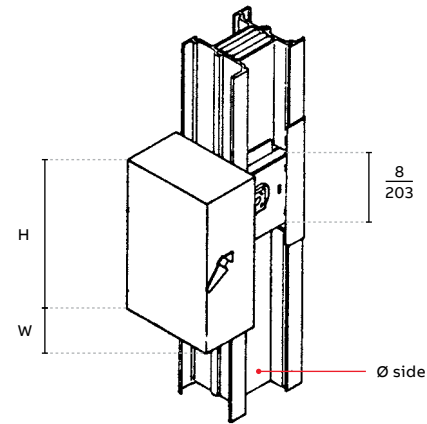
Table 29: Power takeoff device dimensions

Amp rating	Type	Voltage	H		W		D		PTO device weight (lbs.)	
			in.	mm	in.	mm	in.	mm	3 wire	4 wire
70-250	XT4	Up to 600V	20	508	10	254	8.5	216		
400-500*	XT5	Up to 600V	43.6	1108	18.2	463	11	279	Contact factory for details	Contact factory for details
800-1200*	XT7	Up to 600V	43.6	1108	18.2	463	11	279	Contact factory for details	Contact factory for details

*80% rated

Table 30: Power takeoff box dimensions

Bar per Ø	Bar width		A	
	in.	mm	in.	mm
	1.625	41		
	2.250	57		
	2.875	73		
	3.375	86		
	4.250	108		
	4.500	114	16.75	425
	5.750	146		
	6.500	165		
1	7.500	190	20.00	508



51

Table 30: Power takeoff box dimensions (continued)

Bar per Ø	Bar width		A	
	in.	mm	in.	mm
	4.250	108		
	4.000	102	25.00	635
	4.500	114	28.75	730
2	7.500	190	32.00	813

- 52 In-line Spectra G and K framed meter mod inches
Millimeters
- 53 Busway panel plug
- 54 Busway panel plug, front view
- 55 Panel plug, top view

RELT (Reduced Energy Let-through)

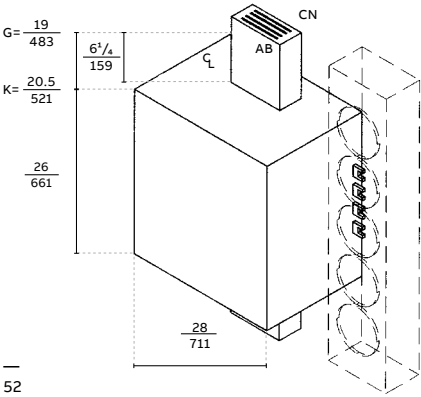
The energy-reducing maintenance switch is described in two sections of the 2017 National Electrical Code: article 240.87 for circuit breaker-protected circuits; and article 240.67 for fuse-protected circuits. In both cases, the function is identified as a method to reduce incident energy in circuits 1200A and larger. There is an increasing concern in the electrical industry about arc flash energy levels and the associated dangers when working on energized equipment. This concern is not limited to the design of new systems, but also the retrofiting of existing systems to incorporate features to limit the arc flash energy exposure of technicians working on energized equipment. RELT helps to minimize the risk of an arc flash event when approaching electrical equipment. When breakers and equipment temporarily change the instantaneous trip to lower levels, you dramatically lower incident energy potential. RELT protection switch is intended to be activated temporarily while personnel are near a protected circuit breaker. The RELT pickup threshold is usually set much lower than the normal overcurrent protection, to respond quickly to any faults and thus limiting possible arc flash energy.

- Less Fault Current = Lower Incident Energy
- With lower incident energy potential, workers may be able to wear less restrictive PPE.
- RELT only lowers incident energy when needed to work safely and then you can restore settings that minimize the likelihood of trips.

RELT maintenance switch can be used with electrical equipment such as:

- Spectra RMS Circuit Breaker (PTOs, Meter Mod)
- Power Breaker II (Bolt-on Tap)
- New Generation High Pressure Contact (HPC) Switches.

For Detailed information refer to DET-1004 Application and Technical Guide.



Note: Allow 6 5/8" from centerline of busway to the wall

Busway panel plug

The busway panel plug is a plug-in device that allows a ReliaGear™ lighting panelboard to mount to the wall and stab directly into the plug-in outlet of a vertically mounted, 3 phase 4 wire AL/CU, ReliaGear busway. This unit is a labor saving device that comes completely assembled, with the main circuit breaker (MCB) prewired to the busway plug-in unit, ready to stab into vertical riser busway, mount to the wall and for the user to wire the load side of the A-Series branch breakers. The busway panel plug is UL listed device per UL 857 (E22178) and UL 67 (E21790). It uses enclosure sizes and surface mounted fronts which are standard as the regular ReliaGear™ LP offering.

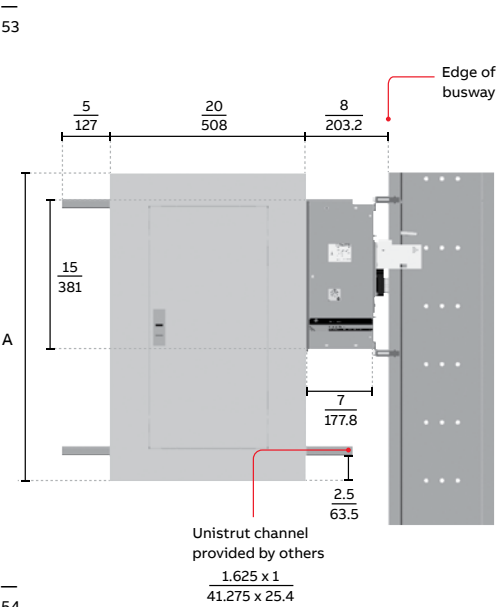
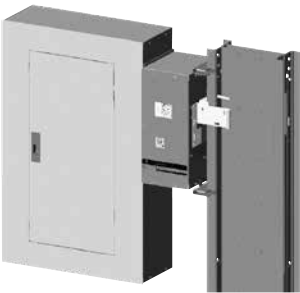
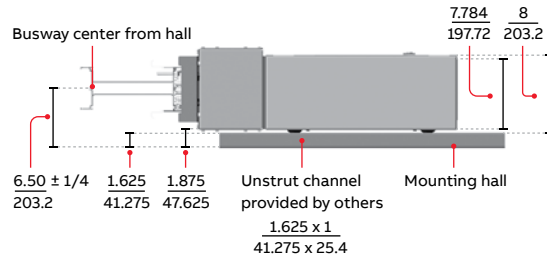


Table 31: Panelboard enclosures height

A
31.5
37.5
43.5
49.5
55.5
64.5

55 Panel plug, top view

Inches
Millimeters



55

Features

- **Alignment pin.** An alignment pin polarizes and locates the busway panel. Plug in the correct position only.
- **Sliding feature.** While the ReliaGear™ LP stays rigidly attached to the wall, the stab enclosure with the stab base slides with respect to the panelboard, viaa sliding channel and stainless steel hardware which provide a frictionless finish. This is strategically designed in order to account for the thermal expansion of the busway. The design accounts for a 2" deflection on either side top or bottom corresponding to 90 degree C temperature on the busway.
- **Right/Left mounting.** The busway pane plug can be connected on either side of the busway, left or right.
- **Polarization.** The vertical riser busway is always engineered with Phase A in the front, furthest from the wall. This ensures that the phase matching between the busway panel plug and the vertical riser busway is always intact.
- **One design fits all.** The stab enclosure plug-in unit is geometrically the same for 150-400 A busway panel plugs.
- **Compression terminals.** Compression terminals in are used in the connections between the panelboard and plug stab asm. Conversely to mechanical terminals, compression terminals do not require re-torquing over time, hence they have less maintenance needed, if at all.
- **Delivery.** This product ships compete and ready to be installed from the Selmer, Tennessee, plant.

Specification/information requirements when engineering/ordering a busway panel plug

1. The ReliaGear™ LP interior and front must be engineered in empower and it must be ordered separately from the Mebane, North Carolina plant and shipped to the Selmer, Tennessee plant. When ordering in empower use MOD CODE INT for interior only.
2. The ReliaGear™ LP front must be ordered through SFDC and shipped to Selmer, Tennessee plant, on the same order with interior. Use empower to obtain the correct enclosure height and front catalog number (see Table 31). The busway panel plug enclosure is ordered from Selmer, Tennessee plant, manufactured, wired, assembled, and shipped from Selmer, Tennessee to the customer job site.
3. Available only on ReliaGear™ LP with:
 - a. Top incoming feed location
 - b. Enclosure box sizes, 20" wide, 7.86" deep, up to 64.5" high; (42 position panel-400 A max.)
 - c. Surface mounted fronts
 - d. Applications for 3 phase 4 wire, interiors, and vertically mounted, 3 phase 4 wire, AL/CU Spectra series busway
 - e. Main Circuit Breaker (MCB) devices as shown on page 37 (See Table 32 — main circuit breaker Availability).
 - f. With SG MCB, the ReliaGear™ LP interior must be engineered with 200 percent neutral lugs (MOD CODE N2). Feed through lugs (MOD CODE), and sub-feed breakers cannot be selected with this configuration.
4. The short circuit rating is limited to the lower short circuit rating of either the ReliaGear™ LP interior, the vertical busway, or the main circuit breaker device.
5. Right/Left Mounting refers to the stab location with respect to the busway, when facing the phase/front side of the busway.
6. The service voltage of the vertical riser busway, must match the service voltage of the ReliaGear™ LP. Only 60 hertz frequency is allowed for this application.
7. For the busway panel plug installation instructions refer to ReliaGear busway plug-in unit IOMM-1VAL098201-MB.
8. For 150A plug rating, with a horizontal main circuit breaker (MCB), the MCB must be engineered in Speedi such that it is always on the same side as the stab enclosure plug-in unit.

—
Table 32: Example

1A interior	AQF3424JTX AXN2
1B box	AB64B not supplied
1C front	AF64S not supplied
ReliaGear Lighting panel	
Dimensions	64.5"H × 20"W × 5.75"D

Catalog nomenclature

RG	(150)	4	(31)	(L)	(P)
↓	↓	↓	↓	↓	↓
RG=ReliaGear busway	150=150A 250=250A 400=400A	4=3 PH, 4 W, GRD	31 = 31.5" high 37 = 37.5" high 43 = 43.5" high 49 = 49.5" high 55 = 55.5" high 64 = 64.5" high	R = Right side L = Left side	P = Phase A in front; Neutral in back

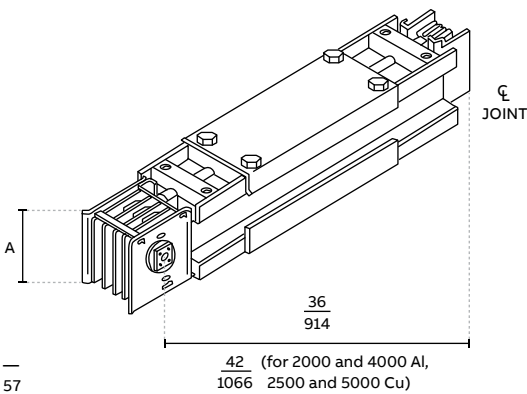
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Table 33: Main circuit breaker availability

Plug rating (A)	Old Frame Type	New Frame Type	Frame Key	No. of poles	MCB Interruption Current Rating (ka)		
						480V	600V
150	SED	XT4	XT4N150	3	50	25	18
150	SEH	XT4	XT4S150	3	65	35	22
150	SEL	XT4	XT4H150	3	100	65	25
150	SEP	XT4	XT4L150	3	200	100	50
250	SFH	XT4	XT4S250	3	100	35	22
250	SFL	XT4	XT4H250	3	150	65	25
250	SFP	XT4	XT4L250	3	200	100	50
250	FEN	XT5	XT5H250	3	150	65	35
250	FEH	XT5	XT5L250	3	200	100	65
400	SGD	XT5	XT5N400	3	65	35	18
400	SGH	XT5	XT5S400	3	100	50	25
400	SGL	XT5	XT5H400	3	150	65	35
400	SGP	XT5	XT5L400	3	200	100	65

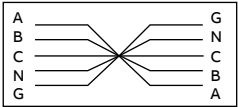
- 56 Phase transposition
- 57 Transposition length
- 58 Reducer cubicle;
For cubicle selection,
see Table 34

Inches
Millimeters

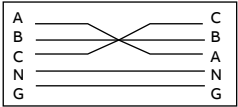
Transposition lengths
A transposition length is available in any dimension from 3 feet (914 mm) through 10 feet (3048 mm). Standard lengths are 36" and 42". "A" dimension varies with ampere rating. See Table 9 for "A" dimension.



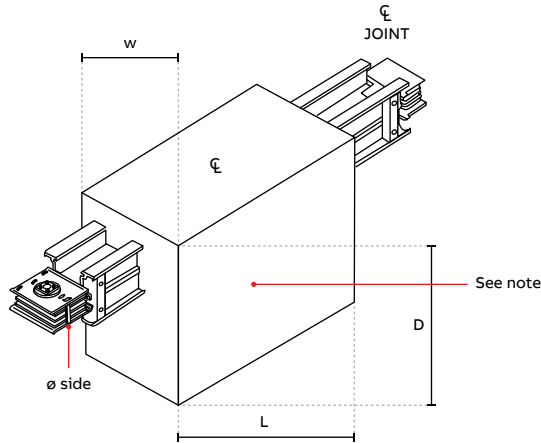
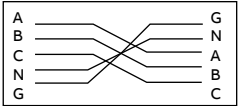
Total



Phase only



Neutral/ground only



Note: For standard flatwise mounted busway. Contact your local ABB representative for catalog numbers.
Standard lugs: #2-600mcm.

Adapter/reducer cubicle with overcurrent device

Table 34: Adapter cubicle dimensions

Amp rating	Type	Voltage	L		W		D		PTO device weight (lbs.)	
			in.	mm	in.	mm	in.	mm.	3 wire	4 wire
400-500*	XT5	Up to 600V	42	1067	18	457	13	330	Contact factory for details	
800-1200*	XT7	Up to 600V	42	1067	18	457	13	330		
800-4000	HPC	208Y/120V, 240V, 480Y/277V, 600V								Contact factory for details
800-4000	Power Break II	600V MAX								Contact factory for details

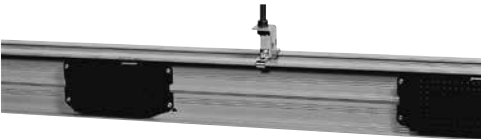
- 59 Standard clevis hanger
- 60 Cat. No. SBR “X”
- 61 One stack (standard) Flatwise cat. no. SBF “XX” (See table on previous page)
- 62 One stack edgewise cat. no. SBE45 (Up to 2000 Amp Max)

Hangers

Vertical mounting – spring hangers
(Must be ordered separately)

Spring hangers should be ordered to support the busway at each floor if the distance from floor to floor is less than 16 feet. When the floor-to-floor span is more than 16 feet, supports and additional spring hangers are required on 16-foot centers maximum. The quantity of springs supplied is based on busway weight. Simple adjustment procedures are included with installation instructions. Mounting holes align with floor flanges.

Cat. No. (SBR “X”) where “X” = Quantity of springs (1, 2 or 3) on each side of hanger (single spring up to 600 lbs. per floor). Floor opening size refer to Table 9 for “A” dimension.



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Table 35A: Spring hangers

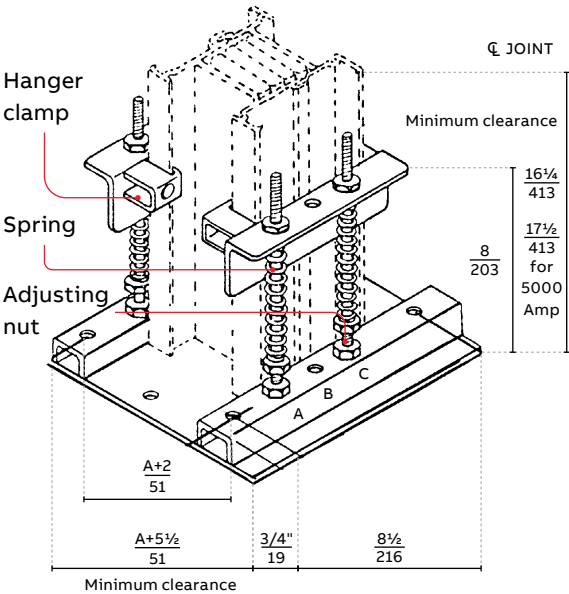
Catalog number	Group number	Spring location	Load on pair of hangers (lbs.)
SBR1	G701	B	0-600
SBR2	G702	A & C	600-1200
SBR3	G703	A, B & C	1200-1800

Refer to page 14 for Seismic Spring Hangers

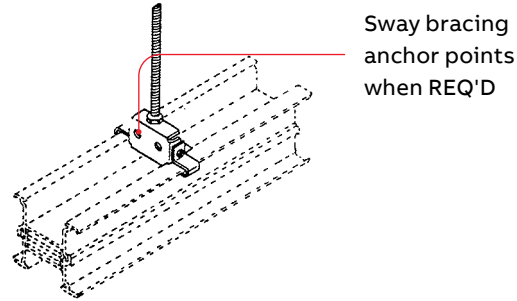
Horizontal mounting – 1 stack clevis hangers
(1 furnished every 10 feet. Requires (1) .50 inch diameter drop rods. Drop rods by others.)

Table 35B: One stack flatwise hangers

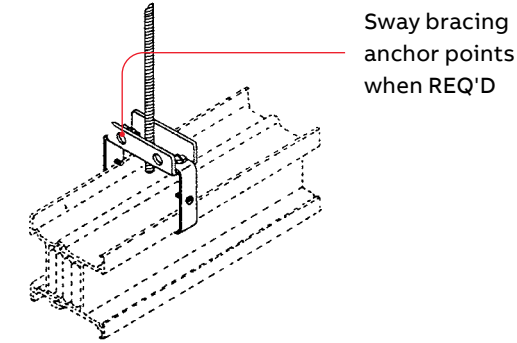
Aluminum		Copper	
Catalog Number	Ampere Range	Catalog Number	Ampere Range
SBF16	225–600	SBF16	225–800
SBF28	800	SBF22	1000
SBF33	1000	SBF28	1200
SBF42	1200	SBF33	1350
SBF57	1350	SBF42	1600
SBF65	1600		
SBF82	2000		



60



61



62

—
63 Horizontal
trapeze hanger

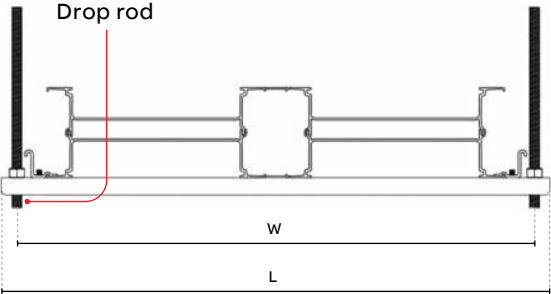
—
64 Edgewise trapeze
cat. no. SBTE Only

Inches
Millimeters

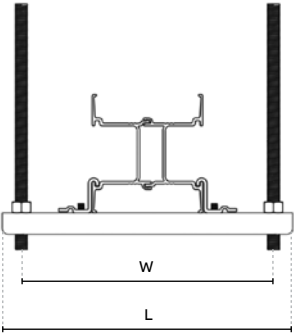
—
65 Reducer

Inches
Millimeters

Horizontal mounting – trapeze hangers
One hanger furnished for every 10 ft. of bus. requires two 0.50 inch diameter drop rods not supplied by ABB. Hanger will support 0.75 inch drop rods with field modification.



63



64

Table 35C: Trapeze hangers

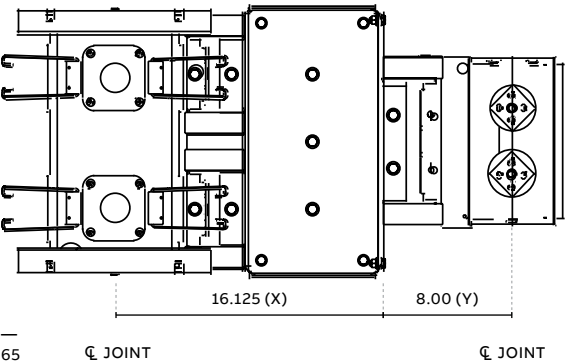
Catalog number	Stacks	Bar		W		L
		Widths		in.	mm	
SBT E	1	1.63" - 4.25"	10.25	260	11.81	300
SBT F	2	5.75" - 8.25"	14.00	356	15.56	395
SBT J	2	All	26.00	660	27.56	700

No fuse reducers

Table 36: Main circuit breaker availability

No. of Stacks	Amp	Aluminum		Copper	
		in.	mm	in.	mm
1	225	4.38	111	4.38	111
	400	4.38	111	4.38	111
	600	4.38	111	4.38	111
	800	5.63	143	4.38	111
	100	6.13	156	5.00	127
	1250	7.00	178	5.63	143
	1350	8.50	216	6.13	156
	1600	9.25	235	7.00	178
	2000	11.00	279	8.50	216
	2500	-	-	10.50	260
2	2500	15.50	394	-	-
	3000	18.00	457	14.50	368
	3200	19.50	495	15.50	393
	4000	23.00	584	18.00	457
	5000	-	-	21.50	546

Note: Per NEC 368.17 (B), a no-fuse reduced busway shall not exceed 50 feet (1270 mm) in length and have a current rating at least 1/3 the rating of the upstream overcurrent protective device.
For industrial applications only.



65

—
66 Expansion length

Inches _____
Millimeters _____

Thermal expansion

Consideration should be given to the effects of thermal expansion. The ± 1” (25 mm) expansion fittings may be necessary for vertical or horizontal applications of 150’ (45720 mm) or more.

The use of the ± 2” (51 mm) expansion fitting is required when the busway run is long and may cross a building expansion joint. Contact ABB Requisition Engineering for specific applications.

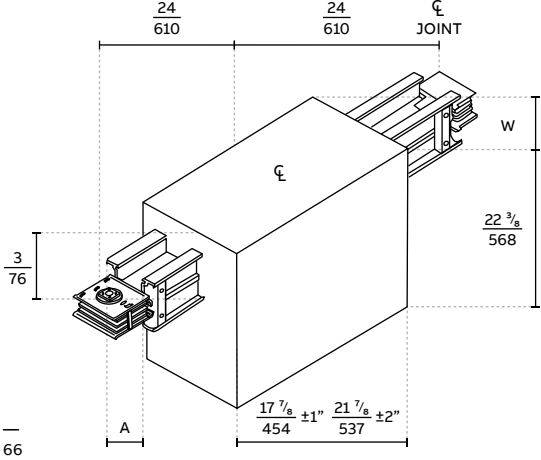


Table 37: “W” dimensions

No. of Stacks	Amp	Weight in lbs. ± 1 inch								Weight in lbs. ± 2 inches			
		Aluminum		Copper		Aluminum		Copper		Aluminum		Copper	
		in.	mm	in.	mm	3 wire	4 wire	3 wire	4 wire	3 wire	4 wire	3 wire	4 wire
1	225	16	406	16	406	71	82	83	92	82	93	96	107
	400	16	406	16	406	71	82	83	92	82	93	96	107
	600	16	406	16	406	71	82	83	92	82	93	96	107
	800	16	406	16	406	83	94	83	92	101	116	96	107
	1000	17.6	448	16	406	94	107	100	114	108	124	111	127
	1200	17.6	448	16	406	104	118	115	137	120	138	128	151
	1350	21.6	549	17.6	448	121	140	149	169	143	166	143	167
	1600	21.6	549	17.6	448	130	148	144	171	152	179	162	192
	2000	21.6	549	21.6	549	151	181	185	219	178	214	203	242
	2500	-	-	21.6	549	-	-	216	261	-	-	252	304
2	2500	29	737	-	-	194	226	-	-	224	263	-	-
	3000	29	737	29	737	230	274	263	316	269	323	293	353
	3200	30.5	775	29	737	262	309	272	329	278	328	338	412
	4000	33.6	854	29	737	281	336	358	433	297	355	375	453
	5000	-	-	33.6	854	-	-	455	560	-	-	457	561

67 Wall cutout guide

68 End boxes

Inches

Millimeters

Table 38: Flange and cutout dimensions

Ampere	Dimensions			
	Flange		Cutout	
	in.	mm	in.	mm
Aluminum				
225	9.88	251	5.38	137
400	9.88	251	5.38	137
600	9.88	251	5.38	137
800	11.13	283	6.63	168
1000	11.63	259	7.13	181
1200	12.5	318	8	203
1350	14	356	9.5	241
1600	14.75	375	10.25	261
2000	16.5	419	12	305
2500	21	533	16.5	419
3000	23.5	597	19	483
3200	25	635	20.5	521
4000	28.5	724	24	610
Copper				
225	9 $\frac{7}{8}$	251	5.38	137
400	9 $\frac{7}{8}$	251	5.38	137
600	9 $\frac{7}{8}$	251	5.38	137
800	9 $\frac{7}{8}$	251	5.38	137
1000	10 $\frac{1}{2}$	267	6	152
1200	11 $\frac{1}{8}$	283	6.63	168
1350	11 $\frac{3}{8}$	295	7.13	181
1600	12 $\frac{1}{2}$	318	8	203
2000	14	356	9.5	241
2500	15 $\frac{3}{4}$	400	11.25	286
3000	20	508	15.5	294
3200	21	533	16.5	419
4000	23 $\frac{1}{2}$	597	19	483
5000	27	686	22.5	572

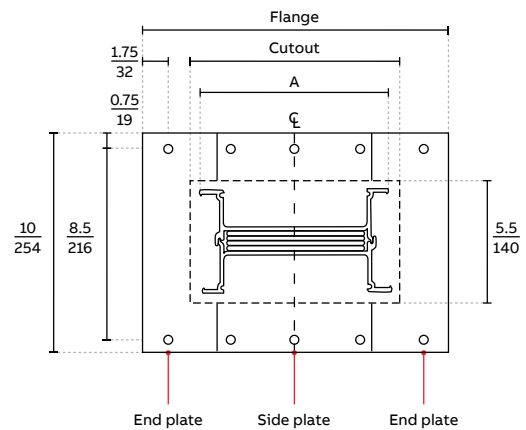
6000A wall flange design not available, consult plant to be determined possible options if required.

Wall, ceiling, and floor flanges

Flanges are used to close wall openings when busway runs pass through walls, ceilings and floors. See Table 38. Hole pattern aligns with spring riser brackets. See Table 9 for “A” dimension.

NOTICE

Notice: Floor or wall opening should be 1" (25 mm) larger than applied busway.

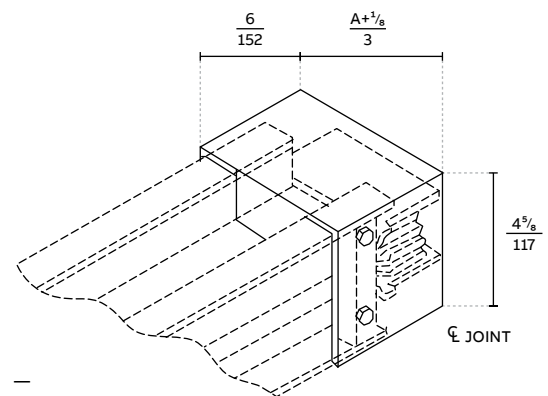


Cutout allows .5", 13mm on all sides of busway.

67

End boxes

End boxes are used to terminate busway runs. No joint is required. End surface of box adds 6" (152 mm) to length of drip-proof, splash-proof and outdoor runs. See Table 9 for “A” dimension. Box is secured via joint cap bolts.



68

ReliaGear™ busway plug-in unit

69 ReliaGear plug in unit

Switch-operated fusible plugs are equipped with type OS quick-make, quick-break mechanisms, in ratings from 30 to 600 A, 240 and 600 V. Positive pressure NEC fuse clips are furnished standard. They are also available with class “J” or “R” fuse clips.

Circuit breaker plug in units are available with molded case circuit breakers, in ratings from 15 to 800 A, 240 to 600 V.



69

Both fusible and circuit breaker ReliaGear busway plug in units have:

- A cover interlock that prevents opening the cover when the switching device is in the “ON” position. The interlock can be defeated by operating the release mechanism through the door. However, by bending down a tab inside the cover, the interlock becomes non-defeatable
- A device interlock that prevents the switching device from being accidentally operated when the cover is open
- A provision to padlock the plug in unit in the “OFF” position when the cover is closed (suitable for single padlock with a 5/16-inch shank)
- A handle that can be operated by a hook stick
- A safety interlock that prevents insertion or removal of the plug in unit when in the “ON” position
- Positive locator pin for exact, safe positioning
- Splash-proof (IP54/55) plug-in units are available

Table 39: Recommended type OS and OT fusible switch combinations

Type	Amperes	U/L class fusing	Fuse description	Short-circuit rating in Ampere	
				RMS symmetrical	
OS	30-600	J	Current Limiting Rejection	200.000	
	30-600	H/NEC	One-time	10.000	
OT	30-100	R	Current Limiting Rejection	200.000	

The interrupting rating of the fuse must equal or exceed the short-circuit rating of the switch. If it is lower, then the interrupting rating of the switch is the same as for the fuse.

Table 40A - Fusible Plug-in unit horsepower ratings (H class fuses)

Switch Type	Switch	Poles	Device	Short Circuit	UL	3 phase Maximum HP Rating		
	Cat. No.		Rating	Rating rms	Fuse Class			
	(A)				240V AC	480V AC	600V AC	
OT30	OT100F3	3	30A	10kA	H	10	20	30
OT60	OT100F3	3	60A	10kA	H	20	40	40
OT100	OT100F3	3	100A	10kA	H	30	50	50
OT200	OT200U30	3	200A	10kA	H	75	150	200
OT400	OT400U21	3	400A	10kA	H	125	250	350
OT600	OT600U21	3	600A	10kA	H	200	450	500

² Ratings are based on NEC Article 430. Horsepower ratings for plugs with NEC fuses are based on one-time fuses having minimum time delay. When time delay fuses are used, the horsepower ratings are maximum for the plug.

Table 40B-Fusible Plug-in unit horsepower ratings (J class fuses)

Switch Type	Switch	Poles	Device	Short Circuit	UL	3 phase Maximum HP Rating		
	Cat. No.		Rating	Rating rms	Fuse Class			
	(A)				240V AC	480V AC	600V AC	
OT200	OT200U30	3	30A	200kA	R	10	20	30
OT200	OT200U30	3	60A	200kA	R	20	40	40
OT200	OT200U30	3	100A	200kA	R	30	50	50

Table 40C-Fusible Plug-in unit horsepower ratings (H class fuses)

Switch Type	Switch	Poles	Device	Short Circuit	UL	3 phase Maximum HP Rating		
	Cat. No.		Rating	Rating rms	Fuse Class			
	(A)				240V AC	480V AC	600V AC	
OS30	OS30FAJ12	3	30A	200kA	J	7,5	15	20
OS60	OS60GJ30	3	60A	200kA	J	15	30	50
OS100	OS100GJ30	3	100A	200kA	J	30	60	75
OS200	OS200J30	3	200A	200kA	J	60	125	150
OS400	OS400J21	3	400A	200kA	J	125	250	350
OS600	OS600J21	3	600A	200kA	J	200	400	500

Table 41A: ReliaGear Tmax plug in unit

Construction	Tmax frame	Trip ratings (Amps)	Old frame type	Trip ratings (Amps)	Tmax frame IC ratings		
					240 V	380, 415, 480 V	600 V
Low Tier	-	-	SEDA	15-150	-	-	-
	XT2N	15-125	SEHA	15-150	65	25	18
	XT4N	70-250	SFHA	70-250	65	35	22
	XT5N	250-500	SGHA	250-600	65	35	25
	XT7S	300-800	SKHA	300-800	65	50	25
Mid Tier	XT2S	15-125	SELA	15-150	100	65	25
	XT4S	70-250	SFLA	70-250	100	65	25
	XT5S	250-500	SGLA	250-600	100	65	42
	XT7H	300-800	SKLA	300-800	100	65	42
	XT2L	15-125	SEPA	15-150	200	100	35
High Tier	XT4L	70-250	SFPA	70-250	200	100	50
	XT5L	250-500	SGPA	250-600	200	65	42
	XT7L	300-800	SKPA	300-800	200	65	42

Table 41B: 100% rated bus plug in unit



Tmax XT2	Tmax XT4	Tmax XT5	Tmax XT7
Small, reliable, versatile. High performing circuit breaker for all standard applications	Capable of supporting both simple and extremely complex operations	Compact, powerful and flexible. Shows the world what a circuit breaker of the future can do	The ultimate choice. Deals with heavy-duty demands effortlessly
125A frame up to 600V	250A frame up to 600V	600A frame up to 600V	1200A frame up to 600V
Thermal magnetic, basic and advanced electronic trip units	Thermal magnetic, basic and advanced electronic trip units	Thermal magnetic, basic and advanced electronic trip units	Basic and advanced electronic trip units
Maximum interrupting rating 100kAIC @ 480V	Maximum interrupting rating 100kAIC @ 480V	Maximum interrupting rating 100kAIC @ 480V	Maximum interrupting rating 100kAIC @ 480V
At a glance:	100% rated up to 250A	80% rated up to 500A	80% rated up to 800A

70 ReliaGear SPD
bus plug-in units

ReliaGear bus plug-in units with surge protective device (SPD) protection

ReliaGear bus plug-in units are available with integral SPD devices (see Table 42A Table 42B) for a variety of location categories and exposure levels. Indicating lights communicate proper system operation.

Ratings and specifications:

- SPDs are individually fused through Thermally Protected MOV Technology
- Suitable for medium to high exposure, service entry or branch panel locations
- UL-1449, Third Edition; cUL and UL-1283 Recognized Component
- Maximum surge current rating is based on the 8/20 ms test waveform
- Maximum single impulse surge current ratings of 65kA to 300kA per mode tested on a complete SPD unit and all components that make up SPD system. Modes are expressed as (L-L, L-N, N-G, L-G); Phase is expressed as (L-N + L-G)
- Repetitive surge current tested — ANSI/IEEE C62.41, Category C3 (High) Exposure Level:
 - 125kA-300kA per mode rated device; 10kA/8x20 ms: 20,000 impulses
 - 65kA-100kA per mode rated device; 10kA/8x20 ms: 5,000 impulses
- Short Circuit Current Rating (SCCR): 200kA maximum

- UL 1449 Nominal Discharge Current Rating (In): 20kA — rated for use on UL96A Lighting Protection Systems. Refer to UL directory VZCA. E320456 for the Voltage Protection Rating (VPR) UL 1449 3rd Edition ratings

NOTICE

Notice: Suppression Voltage Rating (SVR) are no longer assigned by UL and are provided for reference purpose only. Refer to FES-006, DET-516, DET-514 for UL-1449, Second Edition SVR values.

- Maximum Continuous Operating Voltage (MCOV). 115 percent of nominal system voltage or greater (depending on model voltage type). 125 percent on 120 volt models. Refer to UL directory category VZCA. E320456 for specific MCOV values
- Noise Filter Capability: -50dB minimum at 100kHz
- Contact an ABB representative for more details



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Table 42A-ReliaGear plug-in units with Tranquell SPD protection - medium exposure models

Nominal Voltage (Volts, RMS)	Configuration	Medium exposure models					
		65kA per mode		80kA per mode		100kA per mode	
		Plug cat. no.	SPD cat. no.	Plug cat. no.	SPD cat. no.	Plug cat. no.	SPD cat. no.
120/240	1 phase, 3 wire + grd	RG306SPD120SGNPS	TPME120S06	RG308SPD120SGNPS	TPME120S08	RG310SPD120SGNPS	TPME120S10
120Y/208	3 phase, 4 wire + grd	RG406SPD208YGNPS	TPME120Y06	RG408SPD208YGNPS	TPME120Y08	RG410SPD208YGNPS	TPME120Y10
240 Delta	3 phase, 3 wire + grd	RG306SPD240DGNPS	TPME240D06	RG308SPD240DGNPS	TPME240D08	RG310SPD240DGNPS	TPME240D10
120/240 Delta HL	3 phase, 4 wire + grd	RG406SPD240HGNPS	TPME240H06	RG408SPD240HGNPS	TPME240H08	RG410SPD240HGNPS	TPME240H10
240Y/415	3 phase, 4 wire + grd	RG406SPD240YGNPS	TPME240Y06	RG408SPD240YGNPS	TPME240Y08	RG410SPD240YGNPS	TPME240Y10
277Y/480	3 phase, 4 wire + grd	RG406SPD480YGNPS	TPME277Y06	RG408SPD480YGNPS	TPME277Y08	RG410SPD480YGNPS	TPME277Y10
220Y/380	3 phase, 4 wire + grd	RG406SPD220YGNPS	TPME220Y06	RG408SPD220YGNPS	TPME220Y08	RG410SPD220YGNPS	TPME220Y10
480 Delta	3 phase, 3 wire + grd	RG306SPD480DGNPS	TPME480D06	RG308SPD480DGNPS	TPME480D08	RG310SPD480DGNPS	TPME480D10
347Y/600	3 phase, 4 wire + grd	RG406SPD600YGNPS	TPME347Y06	RG408SPD600YGNPS	TPME347Y08	RG410SPD600YGNPS	TPME347Y10
600 Delta							Not Available

Table 42B: Reliagear Plug-in units with Tranquell SPD protection- Medium Exposure Models

Nominal Voltage (Volts, RMS)	Configuration	Medium exposure models					
		125 kA per mode		150 kA per mode		200 kA per mode	
		Plug cat. no.	SPD cat. no.	Plug cat. no.	SPD cat. no.	Plug cat. no.	SPD cat. no.
120/240	1 phase, 3 wire + grd	RG312SPD120SGNPS	TPHE120S12	RG315SPD120SGNPS	TPHE120S15	RG320SPD120SGNPS	TPHE120S20
120Y/208	3 phase, 4 wire + grd	RG412SPD208YGNPS	TPHE120Y12	RG415SPD208YGNPS	TPHE120Y15	RG420SPD208YGNPS	TPHE120Y20
240 Delta	3 phase, 3 wire + grd	RG312SPD240DGNPS	TPHE240D12	RG315SPD240DGNPS	TPHE240D15	RG320SPD240DGNPS	TPHE240D20
120/240 Delta HL	3 phase, 4 wire + grd	RG412SPD240HGNPS	TPHE240H12	RG415SPD240HGNPS	TPHE240H15	RG420SPD240HGNPS	TPHE240H20
240Y/415	3 phase, 4 wire + grd	RG412SPD240YGNPS	TPHE240Y12	RG415SPD240YGNPS	TPHE240Y15	RG420SPD240YGNPS	TPHE240Y20
277Y/480	3 phase, 4 wire + grd	RG412SPD480YGNPS	TPHE277Y12	RG415SPD480YGNPS	TPHE277Y15	RG420SPD480YGNPS	TPHE277Y20
220Y/380	3 phase, 4 wire + grd	RG412SPD220YGNPS	TPHE220Y12	RG415SPD220YGNPS	TPHE220Y15	RG420SPD220YGNPS	TPHE220Y20
480 Delta	3 phase, 3 wire + grd	RG312SPD480DGNPS	TPHE480D12	RG315SPD480DGNPS	TPHE480D15	RG320SPD480DGNPS	TPHE480D20
347Y/600	3 phase, 4 wire + grd	RG412SPD600YGNPS	TPHE347Y12	RG415SPD600YGNPS	TPHE347Y15	RG420SPD600YGNPS	TPHE347Y20
600 Delta							Not Available

Table 42C: Reliagear Plug-in units with Tranquell SPD protection-Medium Exposure Models

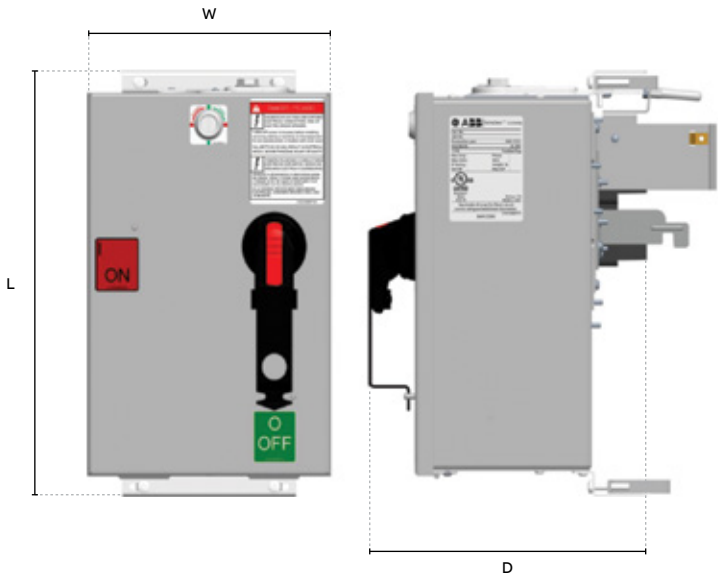
Nominal Voltage (Volts, RMS)	Configuration	Medium exposure models	
		300 kA per mode	
		Plug cat. no.	SPD cat. no.
120/240	1 phase, 3 wire + grd	RG330SPD120SGNPS	TPHE120S30
120Y/208	3 phase, 4 wire + grd	RG430SPD208YGNPS	TPHE120Y30
240 Delta	3 phase, 3 wire + grd	RG330SPD240DGNPS	TPHE240D30
120/240 Delta HL	3 phase, 4 wire + grd	RG430SPD240HGNPS	TPHE240H30
240Y/415	3 phase, 4 wire + grd	RG430SPD240YGNPS	TPHE240Y30
277Y/480	3 phase, 4 wire + grd	RG430SPD480YGNPS	TPHE277Y30
220Y/380	3 phase, 4 wire + grd	RG430SPD220YGNPS	TPHE220Y30
480 Delta	3 phase, 3 wire + grd	RG330SPD480DGNPS	TPHE480D30
347Y/600	3 phase, 4 wire + grd	RG430SPD600YGNPS	TPHE347Y30
600 Delta			Not Available

Notes:

1. All SPD catalog numbers followed by suffix NSBX, Type 2 installation locations.
2. SPD plug-in units come with SPDs individually fused with Thermally Protected MOV Technology.
3. (Optional Offering) SPD plug-in units with additional UL recognized component (E60314) special purpose MOV protector fuse, one per phase, manufactured by Mersen, catalog number VSP100-XL. Add suffix "F" to plug-in unit catalog number.

Table 43: ReliaGear breaker plug in unit data

Plug-in unit dimensions				
Rating (amps)	ABB Device	Length "L" [in/mm] (hanger to hanger)	Width "W" [in/mm]	Depth "D" [in/mm] (top of handle to edge of busway housing)
125	XT2	20.00/508	9.80/249	12.50/318
250	XT4	20.00/508	9.80/249	12.50/318
500	XT5	37.75/959	18.50/470	17.20/437
800	XT7	37.75/959	18.50/470	17.20/437



71 Vertical riser bus with plug installed

72 Typical vertical application with ReliaGear riser busway

73 Plug-in unit door hinge and dimension reference

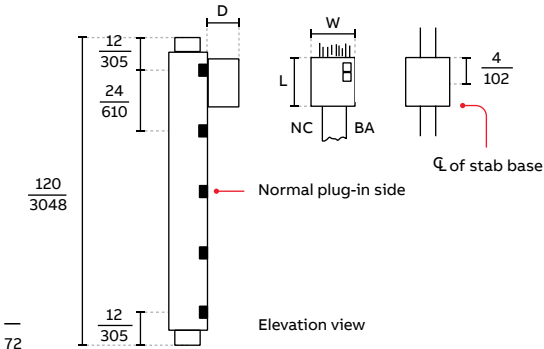
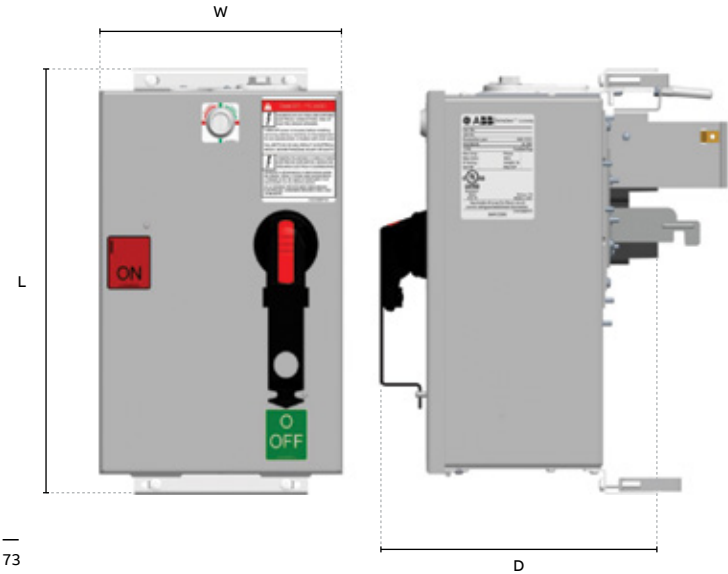


Table 44: ReliaGear fusible plug in unit data

Plug-in unit dimensions					
Rating (amps)	ABB Device	Length [in] (hanger to hanger)	Width [in]	Depth "D" [in/mm] (top of handle to edge of busway housing)	Plug-in outlets
30 H	OT100	23	12,5	14	1
60 H	OT100	23	12,5	14	1
100 H	OT100	23	12,5	14	1
200 H	OT200	23	12,5	14	1
200 H Extended	OT200	30	12,5	14	2
400 H	OT400	37,2	22,5	18,9	2
600 H	OT600	42	22,5	21,63	2
30 R	OT200	23	12,5	14	1
60 R	OT200	23	12,5	14	1
100 R	OT200	23	12,5	14	1
200 R	OT400	37,2	22,5	18,8	2
400 R	OT600	42	22,5	21,7	2
600 R	OT800	42	22,5	21,7	2
30 J	OS30	16	9,75	14	1
60 J	OS60	16	9,75	14	1
100 J	OS100	16	9,75	14	1
200 J	OS200	24,8	17	18,5	2
400 J	OS400	24,8	17	18,5	2
600 J	OS600	32,3	22,75	21,75	2



Cataloging

Busway plug-in units

Fusible busway plug-in unit catalog numbering system. Refer to page 49 for enclosure sizes.

Type	Code	Description
PRODUCT	RG	ReliaGear Busway
	RL	ReliaGear Low Amp
	RA	Armor-Clad
SERVICE	3	3Ø3W
	4	3Ø4W
	2	240 ¹
VOLTS	6	600
	3	30
	6	60
	10	100
	20	200
	40	400
	60	600
	80	800
AMPS	T	OT
	S	OS ²
	H	Class H
FUSE CLIPS	R	Class R
	J	Class J
	N	None
PLUGS ASSIST	P	Plug Assist
	I	Indoor
ENCLOSURE RATING	S	Splash/Drip Proof

RG 3 6 3 T H P I

Notes:

1. Lugs size may vary depending on the application. Contact factory for details.

2. Compression lugs are available as an option.

* Plug assist feature is standard on 200 amp and greater; optional for plugs 150 and below.

—
74 Bus plug-in unit
with plug assist

Plug-in units

A plug assist is furnished as standard on all plug-in units 200 A and greater listed on this page. If plug assist is required on other plug-in units, add suffix “P” to catalog number. Grounding stab to engage internal or integrated housing ground bus is standard on all ReliaGear plugs. Mating stab is optional on ReliaGear plug-in busway. All fusible plug-in units are furnished with Type “NEC” fuse clips as standard. Optional fuse clips are available. Refer to page 49 for enclosure sizes.



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Exclusive plug assists are furnished on all plug-in units 200 A and above that will mechanically engage or disengage the plug-in units from the busway only when the plug-in unit is in the OFF position. Plug assist is optional on plug-in units less than 200 A.

Emax2 air circuit catalog numbering system**RG 3 015 XT2LU P I S****Busway plug-in units**

Breaker busway plug-in unit catalog numbering system

Type	Code	Description
PRODUCT	RG	ReliGear Busway
	RL	ReliGear Low Amp
	RA	Armor-Clad
SERVICE	3	3Ø3W
	4	3Ø4W
	015	15
	020	20
	030	30
	040	40
	050	50
	060	60
	070	70
	080	80
	090	90
	100	100
	110	110
	125	125
	150	150
	175	175
	200	200
	225	225
	250	250
	300	300
	400	400
	500	500
	600	600
	700	700
AMPS	800	800
	XT2NU	
	XT2SU	
	XT2HU	
	XT2LU	
	XT4NU	
	XT4SU	
	XT4HU	
	XT4LU	
	XT5NU	
	XT5SU	
	XT5HU	
	XT5LU	
	XT7SU	
	XT7HU	
	XT7LU	
BREAKER FAMILY		
	N	None
PLUGS ASSIST	P	Plug Assist
	I	Indoor
ENCLOSURE RATING	S	Splash/Drip Proof
	N	None
SHUNT TRIP	S	Shunt Trip

Guide form specifications

Drawing notes for ReliaGear feeder and plug-in busway

The following information should appear on the electrical drawings:

1. Amp rating, continuous.
2. Service: ____ phase, ____ wire, ____ volts, with or without internal ground.
3. Available short-circuit current at input end in amps rms symmetrical.
4. Maximum voltage drop and power factor at output end and whether load is distributed along run or concentrated at end of run.
5. Bus bar material (aluminum or copper).
6. Location of all fittings. For expansion fittings, show amount of compensation required as “± inches/mm, total ____ inches/mm.”
7. Limiting dimensions of busway width and depth where passing through walls or floors or around obstructions.
8. Mounting position of busway (flatwise, edgewise, or vertical riser).

Feeder busway specifications

Where shown on plans, furnish and install a totally enclosed, low-impedance busway system of the indicated ratings with all necessary fittings, power takeoffs, hanging devices and accessories.

Material and installation shall comply with all applicable codes, recommended practices, and standards of ANSI, IEEE, NEMA and UL.

All components of the busway shall be UL listed. Arrangements, details, and locations shall be as shown on the drawings and specified herein.

The housing shall be of extruded aluminum to provide maximum protection against corrosion from water and other contaminants normally encountered during construction. All hardware shall be plated to prevent corrosion.

Tie bolts shall brace aluminum housing and bars to withstand, without damage or permanent distortion, short-circuit currents of the magnitude shown on the drawings when tested in accordance with UL standard. Busway shall be finished in ANSI-61 grey enamel. Joints shall be of the one-bolt removable/isolatable type with through-bolts that can be checked for tightness without deenergizing the system. It shall be possible to make up a joint from one side in the event the busway is installed against a wall or ceiling. The joint shall be so designed as to allow removal of any length without disturbing adjacent lengths. Belleville springs shall be provided to give positive pressure over complete contact area. Where required, the joint bolt shall provide a direct visual indication of pressure (tension) applied to the joint contact area. The means of visual indication shall be a color change in the head of the bolt. This indication shall remain accurate after multiple tightenings and loosening of the bolt.

The maximum hot-spot temperature rise at any point in the busway at continuous rated load shall not exceed 55°C above a maximum ambient temperature of 40°C in any position. (Ambient temperature averaged over 24-hour period.) Bus bars shall be suitably plated at all joints and contact surfaces.

All insulation material shall be NEMA class B epoxy (130°C).

Horizontal runs of busway shall be UL Listed for hanging on 10-foot (3.05 meters) centers in any position. Vertical riser runs of busway shall be supported with rigid and/or spring hangers in positions indicated on plans (max 16'/4.88 meters) centers.

Final field measurements shall be made by the contractor prior to release for manufacture to assure coordination with other trades. The busway shall be ReliaGear busway.

Plug-in units

Where shown on plans, furnish and install busway plug-in units of the types and ratings indicated. When applicable, plug-in units shall be UL labeled.

Housing shall completely enclose the switching device and shall be of sheet steel furnished in ANSI-61 grey enamel over a rust inhibitor. Provide stab shields that protect stabs and ground plug body to busway housing before stabs make power contact. Provide grounding terminal inside plug-in unit body and adequate shielding to prevent access to live parts when cover is open. Provide means for padlocking cover and operating handle in "OFF" position. All current-carrying parts shall be suitably plated.

Operating switch type plug-in units shall have positive quick-make, quick-break interrupter, and positive-pressure fuse clips. Provide a releasable cover interlock that prevents opening cover except when switch is in "OFF" position. This interlock shall be convertible to non-releasable type on the job. A releasable interlock preventing closing switch with cover open shall also be included, as well as interlock to prevent insertion or removal from busway when in "ON" position.

Circuit breaker type plug-in units shall have an interrupting rating of not less than _____ amps rms symmetrical. They shall have a releasable cover interlock that prevents opening of cover except with breaker in "OFF" position. This interlock shall be convertible to non-releasable type on the job. An interlock to prevent insertion or removal from busway when in "ON" position shall be provided, as well as an interlock (releasable) to prevent closing circuit breaker with cover open.

Plug assists shall be furnished on all plug-in units over 200 A that will mechanically engage or disengage the plug-in unit from the busway, but only when the plug-in unit is in the "OFF" position.

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To determine the length of the piece to be inserted, measure the opening length “Y” (end of bar to centerline of joint) or “Z” (end of bar to end of bar)

Important notes

- This program is designed to provide flexibility on critical jobs in which exact dimensions are not known at the time of order
- To determine the length of the piece to be inserted, measure the opening length “Y” (end of bar to centerline of joint) or “Z” (end of bar to end of bar). See Figure 75
- To qualify for shipment of field check piece shipments within 7 working days, all information (including drawings) must be on or attached to this form. A maximum of 5 straight length pieces are allowed. More than 5 field check pieces can be ordered, but additional pieces do not qualify for the 7-day shipping schedule. For elbows, mark up drawings and attach to this form. Elbows do not qualify for the 7-day shipping schedule
- In addition to the 7 working days until shipment, allow for delivery time to the construction site
- Contact an ABB Account Manager if air delivery is required
- Contact the Selmer order center for cycle times for elbows or more than 5 pieces

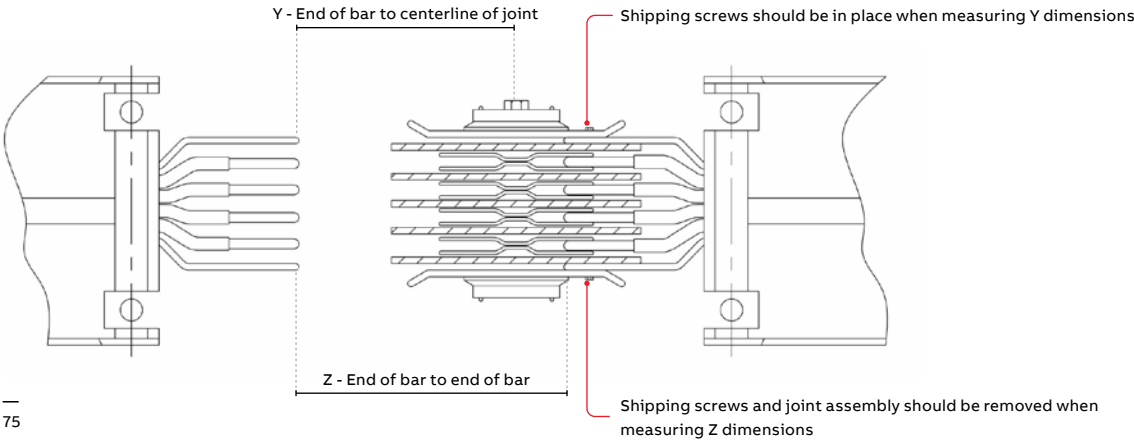
Field check piece procedure

ReliaGear busway only

To place an order, send this form to your local account manager.

To: _____
From: _____
Job name: _____
Date: _____
Phone: _____
SO #: _____

Field check piece	Amperes	Run #	3W/ 4W/ G	90° elbows (either “Y” or “Z”)	
				Y	Z
1					
2					
3					
4					
5					

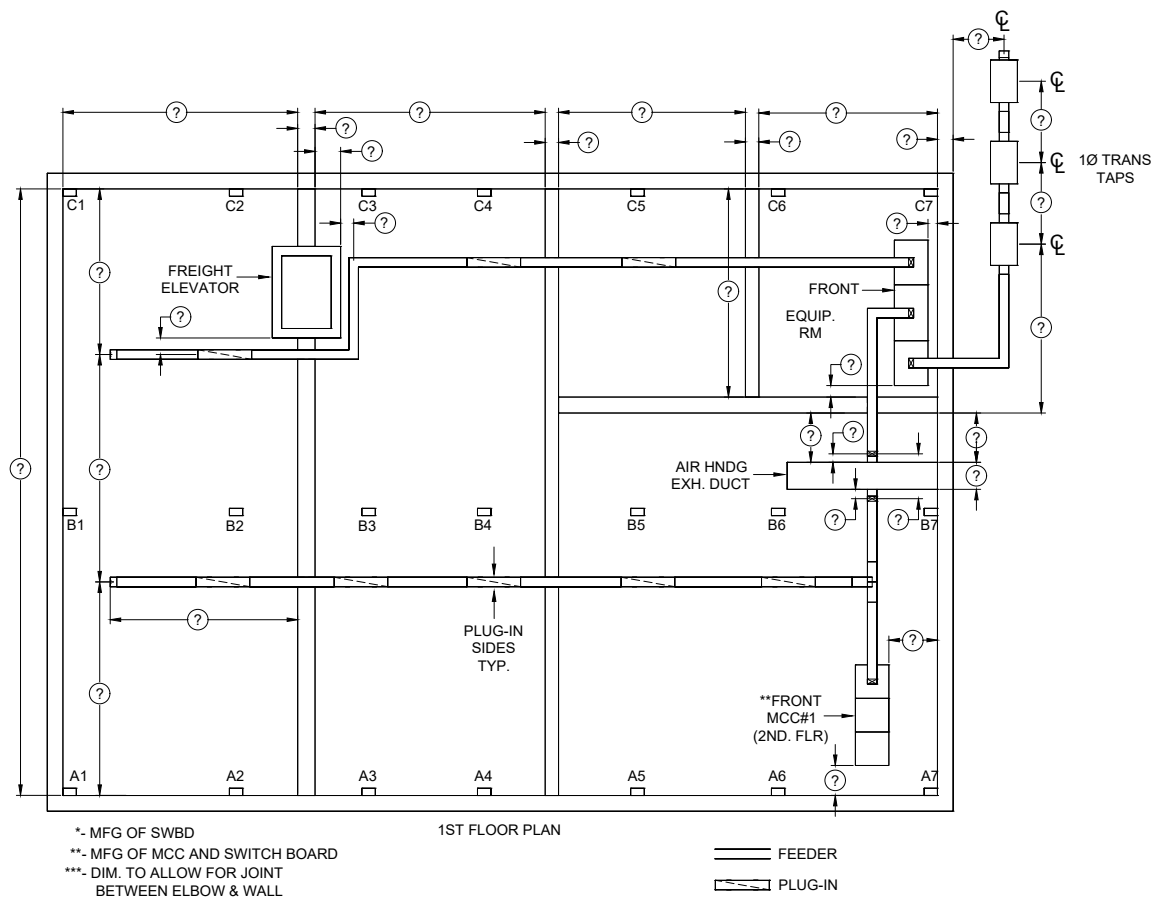


Installations

76 Busway installation
schematic guidelines

How to measure for ReliaGear busway installation

1. Determine general right-of-way (and elevation) of busway run by walking through the entire facility.
2. Locate all tie-in equipment (SWBD, etc.) with respect to building steel, walls, etc.
3. Locate any utility power to be connected, specify type.
4. Take all measurements to walls, ceilings, floors or building steel and to bottom of beams and face of columns.
5. Locate obstructions and/or walls through which busway must pass (specify wall thicknesses and dimensions of obstructions).
6. Measure floor dimensions (and floor thickness). Determine if curb is to be poured around bus openings, and if so indicate thickness.
7. In general, establish the corridor through which the busway will run, providing sufficient information, dimensions and sketches so that layout drawings may be prepared by the factory.



Joint-Guard

Positive torque indication. Time after time.

ABB's exclusive Joint-Guard protection system uses color to indicate whether a busway joint is loose or tight. The center spot is bright red when a joint is loose and turns dark when proper torque is applied.

It does this not just once — as with double-headed break-off bolts — but even after the repeated tightening and loosening so often required during installation. And it will keep on working that way for 30 years¹.

Easy maintenance

Joint-Guard simplifies periodic maintenance, too. Visual inspection, even from a distance, tells you whether the busway joint is properly torqued. No more unnecessary and labor-intensive re-torquing.

It gets even easier: when combined with the superior torque retention design of the industry-leading Belleville washer, Joint-Guard bolts deliver the best solution for any maintenance program.

How it works

Joint-Guard technology was developed for the nuclear and aerospace industries. It measures the elongation of the busway joint bolt, and is more accurate than a torque wrench, which is subject to substantial variations in static and dynamic friction, depending on thread wear and lubrication.

¹ Assumes busway operates 14 hours per day, six days per week, at 81 percent load in 25°C ambient. Joint-Guard bolts are sold separately.

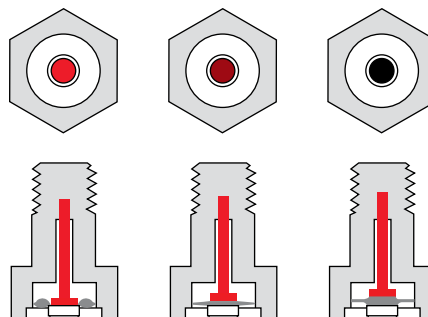


ABB Inc.

305 Gregson Drive
Cary, NC 27511 USA
abb.com/contacts

abb.com/lowvoltage

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