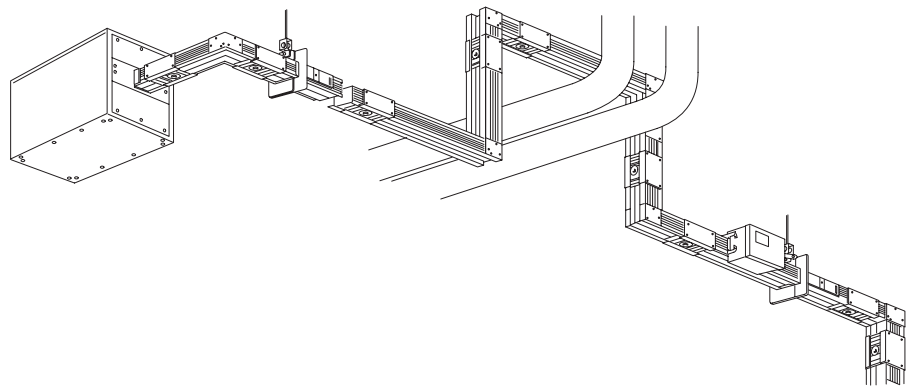


Sentron Low Amp Busway

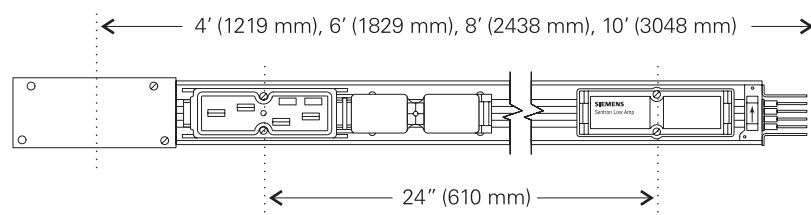
Sentron Low Amp Busway is a member of the Siemens Sentron Busway family. Sentron Low Amp Busway specifically addresses the needs of low amp power distribution applications, with ratings from 225A to 800A UL and 100A to 800A IEC. Low Amp Busway provides all the features and advantages of Sentron Busway.



Plug-In Sections

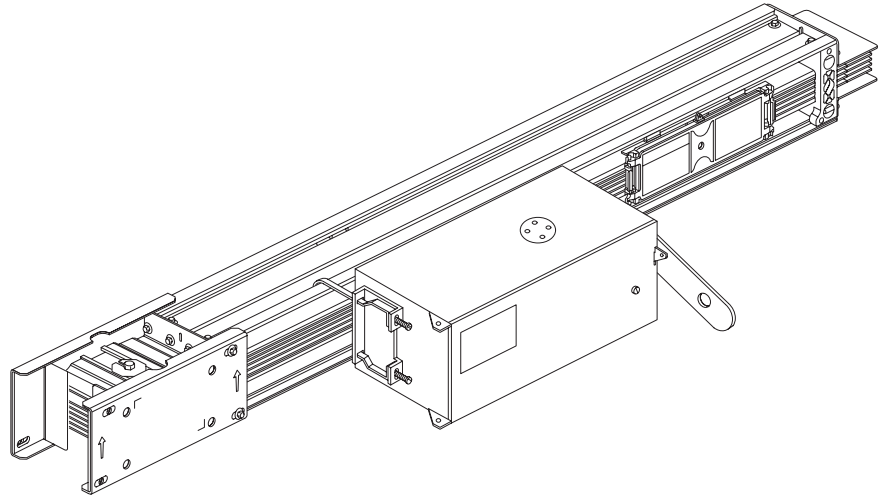
Sentron Low Amp is available as plug-in only, with aluminum or copper bus bars. Aluminum bars are available in 225 - 600 ampere sections. Copper bars are available in 225 - 800 ampere sections. Sections include an integral housing ground. An optional copper internal or isolated ground is available in most ratings.

Sentron Low Amp plug-in sections are available in 4' (1219 mm), 6' (1829 mm), 8' (2438 mm), and 10' (3048 mm) sections. Plug-in openings are centered on 24" (610 mm) and staggered on both sides of the busway. Plug-in outlets, like standard Sentron, are finger safe and IP 2X rated. Plug-in sections are protected to IP40 specifications. IP54 is optionally available.



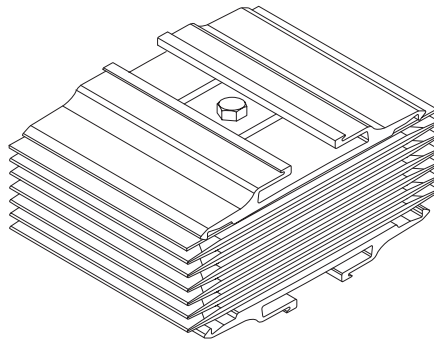
Bus Plugs

Sentron II bus plugs used with standard Sentron can also be used with Sentron Low Amp.



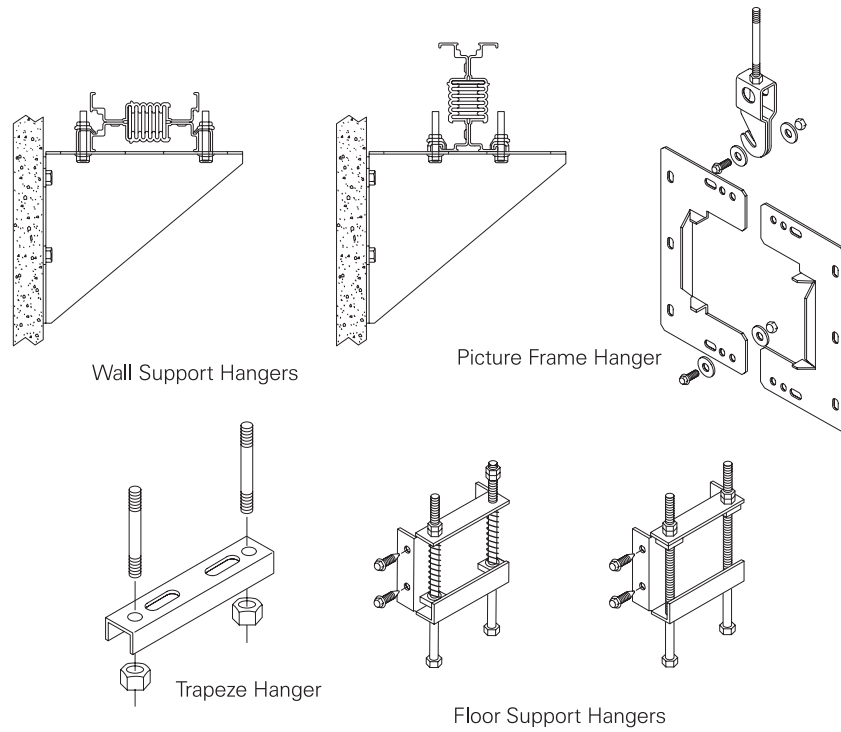
Joint Stack Assembly

Sentron Low Amp uses the same joint stack assembly design as standard Sentron.



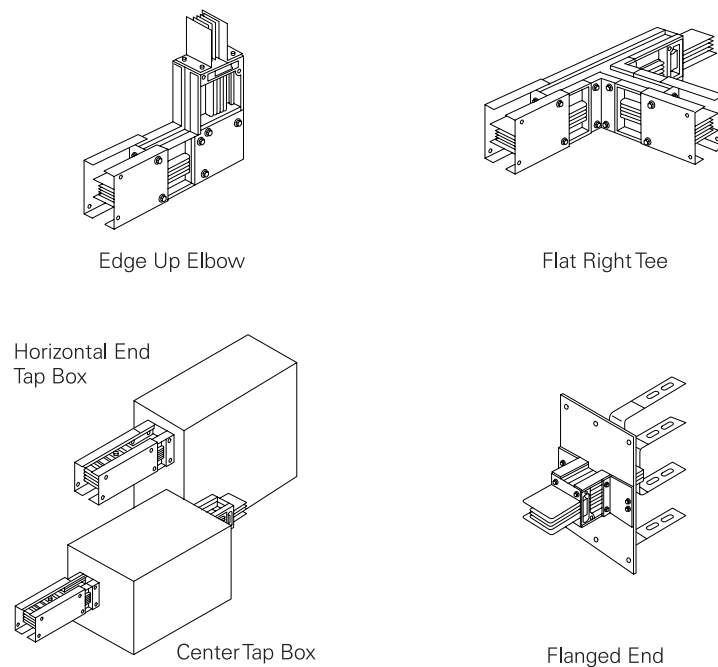
Hangers

In addition to the hanger shown below, Sentron Low Amp is available with the same type hangers and supports as available with standard Sentron.



Components

Sentron Low Amp is available with a full range of elbows, tees, offsets, tap boxes, flanged ends, expansion fittings, reducers, and phase rotation fittings.



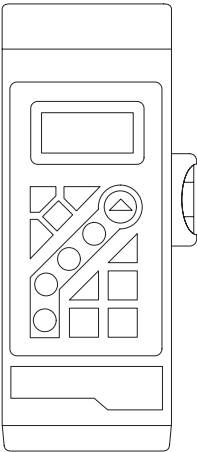
Planning a Sentron Busway System

There are several considerations when planning a busway run. The best route would require the fewest fittings and the maximum number of 10' straight sections.

There are a number of techniques to ensure an accurate measurement before purchasing and installing busway. The following procedures are given as an example and are useful in obtaining a correct measurement.

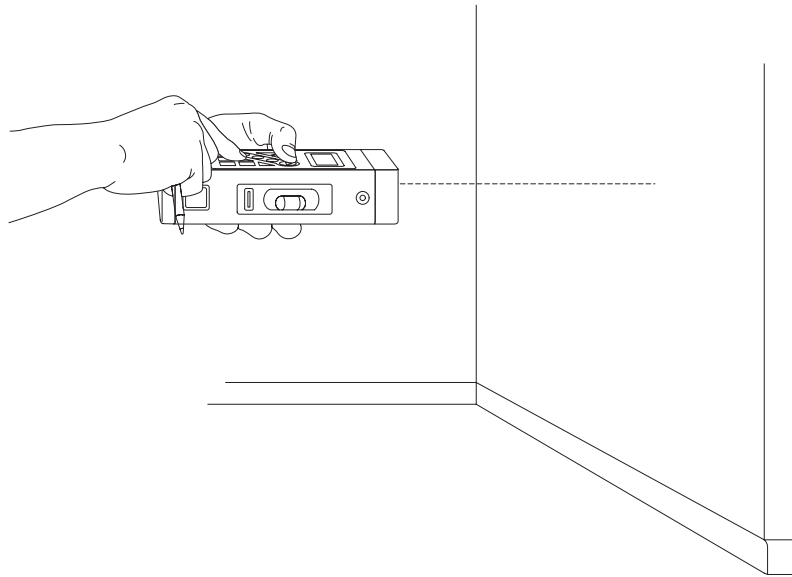
Laser Measuring Device

Laser measuring devices, such as the one illustrated below, provide an easy and highly accurate means of measuring a busway run.

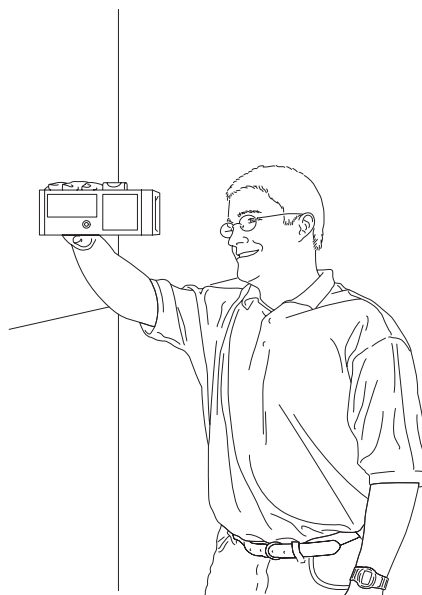


Note: Consult Busway factory for laser measuring device information.

Laser measuring devices project a laser beam which is reflected on an object such as a wall, ceiling, floor, or piece of machinery. The measuring device is able to accurately measure the distance the beam travels.

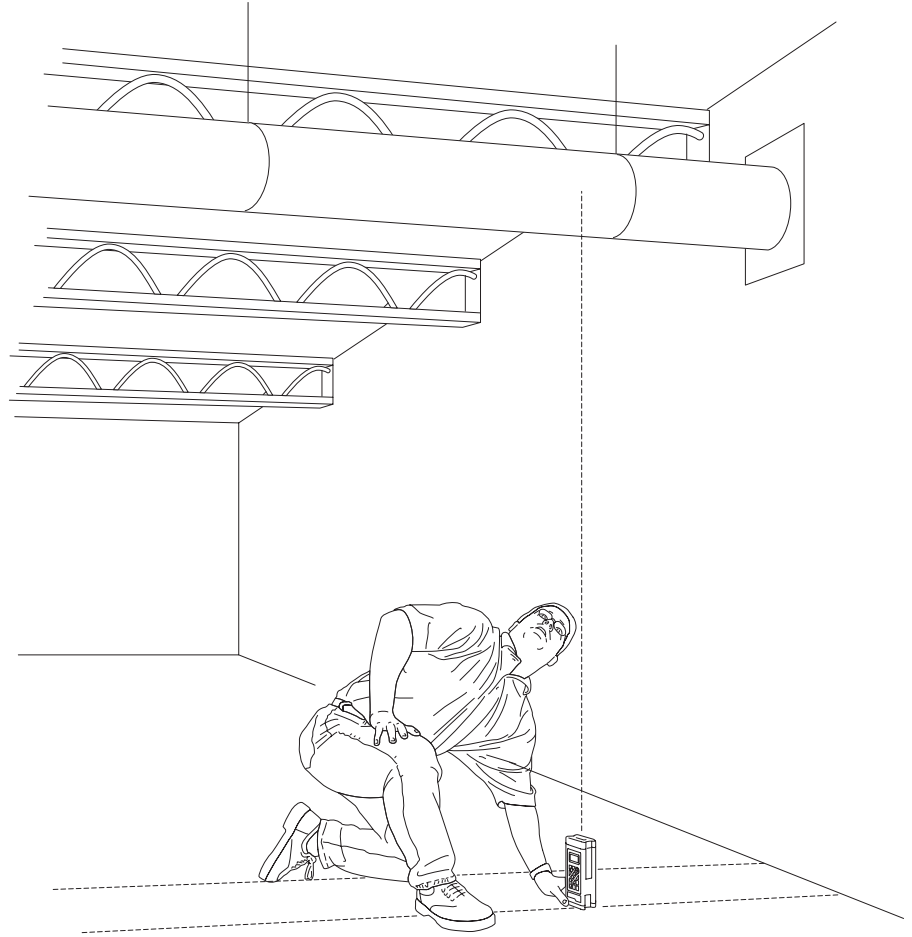


When measuring the distance from wall-to-wall or wall-to-obstruction, place the laser measuring device flat against the wall. The distance measured will be from the wall to the point the laser beam is interrupted.

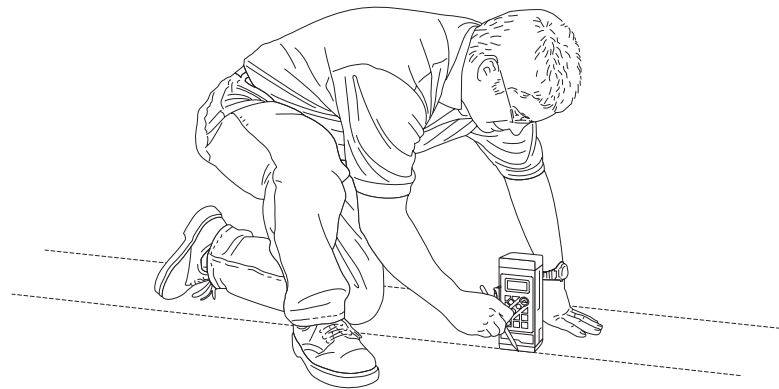


Laying Out a Run

Using the laser measuring device, determine the height and location of obstructions. Select a route requiring the fewest offsets.



The planned route can be laid out on the floor with a pencil or chalk. Transfer the position of pipes, ducts, beams, and other obstructions to the floor. It will be easier to transfer the planned busway route to paper if significant portions are laid out full scale first.

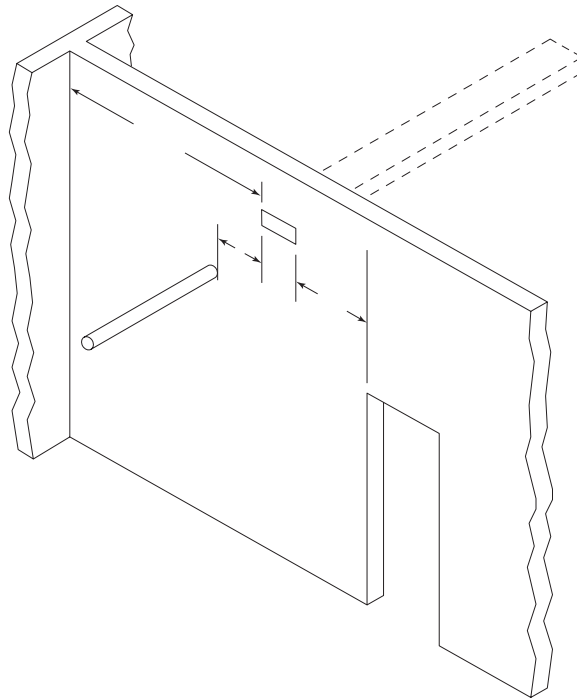


Once the route is laid out the laser measuring device can be used along the run to measure distance.



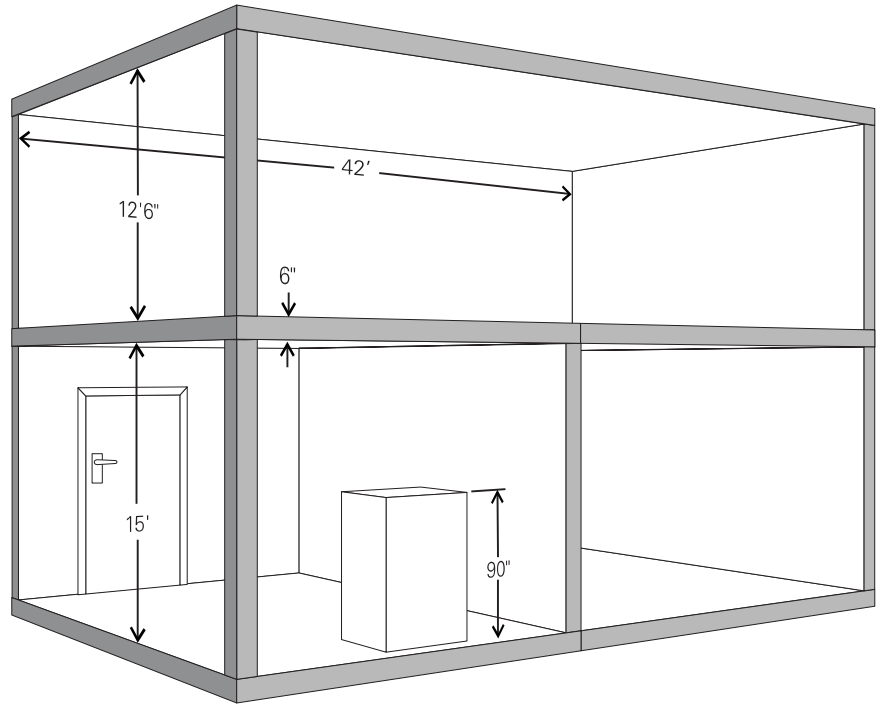
Walls, Ceilings, Floors

When piercing a wall, ceiling, or floor find a reference point which is common to both sides and measure from it. This may be a pipe, a wall, or a door.

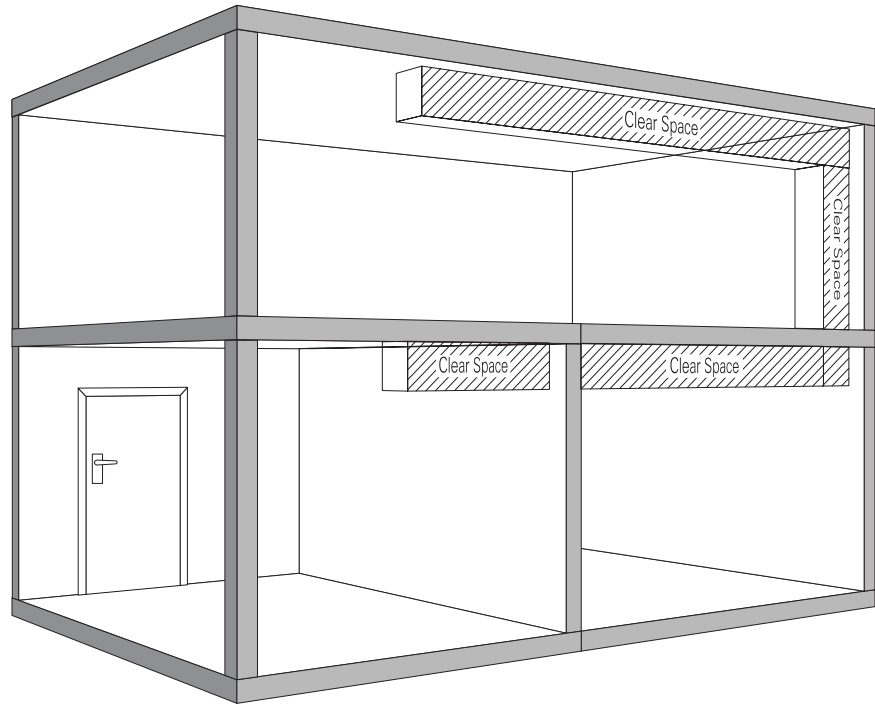


Sample Layout

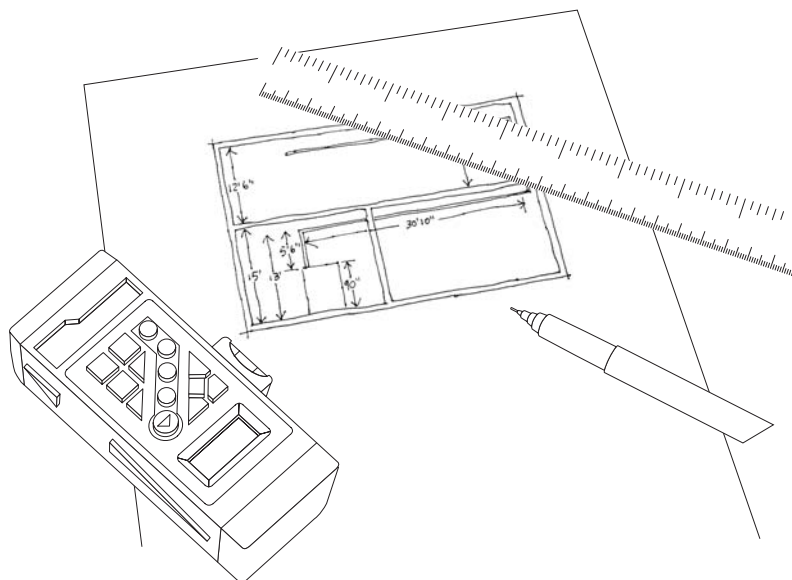
In the following example, a busway system, connected to a switchboard, will pass through three rooms. The floor to ceiling height is 15' on the first floor, and 12'6" on the second floor. The overall length is 42'. Walls and floors are 6" thick. The switchboard is a standard 90" high. Various types of equipment on the second floor will be connected to the busway through plug-in outlets along the length of the room.



It is determined that a clear space is available 13' above the floor in the switchboard room (5'6" from the top of the switchboard). The clear space extends on the other side of the wall in the second room to the far right wall. It is also clear on the second floor along the far right wall and 10' above the floor for the length of the second floor.



A rough sketch can now be made of the proposed busway system route.



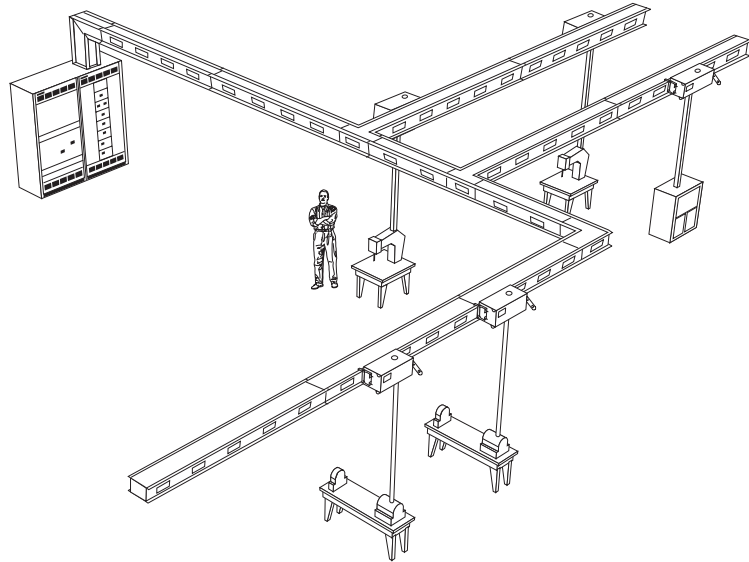
NEC® Requirements

An important part of applying a busway system is to be sure that the system meets the requirements of The *National Electrical Code*®.

Article 368.4

According to NEC® Article 368.4, busways shall be permitted to be installed where they are located as follows:

- (1) *Located in the open and are visible, except as permitted in 368.6 or*



- (2) *Installed behind access panels, provided the busways are totally enclosed, of nonventilating-type construction, and installed so that the joints between sections and at fittings are accessible for maintenance purposes. Where installed behind access panels, means of access shall be provided, and the following conditions shall be met:*
 - a. *The space behind the access panels shall not be used for air-handling purposes; or*
 - b. *Where the space behind the access panels is used for environmental air, other than ducts and plenums, in which case there shall be no provisions for plug-in connections, and the conductors shall be insulated.*

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Article 368.4 also restricts the use of busway in conditions where it may be damaged or cause damage.

Busways shall not be installed as follows:

- (1) *Where subject to severe physical damage or corrosive vapors*
- (2) *In hoistways*
- (3) *In any hazardous (classified) location, unless specifically approved for such use*
- (4) *Outdoors or in wet or damp locations unless identified for such use.*

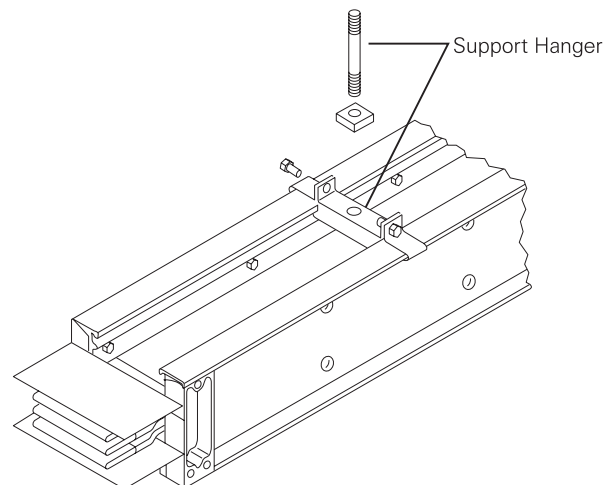
Lighting busway and trolley busway shall not be installed less than 2.5 m (8 ft) above the floor or working platform unless provided with a cover identified for the purpose.

Article 364.5

Article 368.5 requires adequate support for the busway. The following drawing illustrates one type of support available for Siemens Sentron™ busway.

Busways shall be securely supported at intervals not exceeding 1.5 m (5 ft) unless otherwise designed and marked.

Note: Picture frame and trapeze hangers used with Sentron Busway are designed on a maximum of 3.05 m (10 ft) centers.



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Article 368.6

Article 368.6 allows busway to pass through walls and floors provided there are no section joints in the wall or floor and vertical busway extends at least 6 feet through the floor. In addition, certain applications a curb may be required around busway passing through two or more dry floors. This will help eliminate the possibility of spilled liquid from running down the busway causing damage to the electrical system.

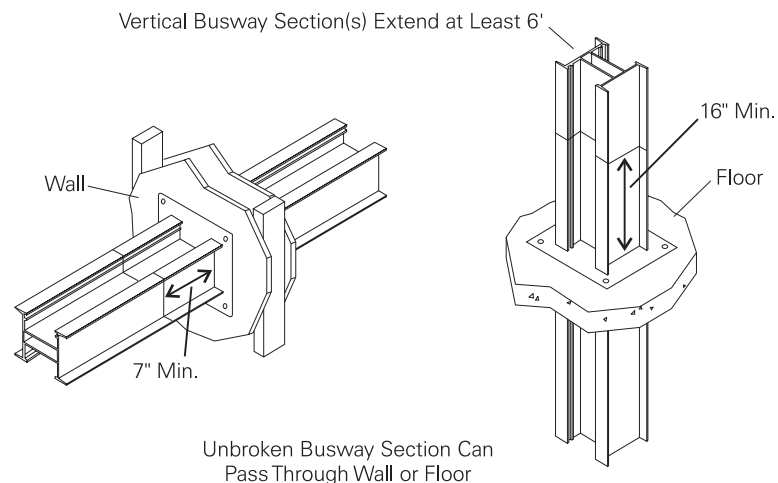
(A) Walls. Unbroken lengths of busway shall be permitted to be extended through dry walls.

(B) Floors. Floor penetrations shall comply with (1) and (2):

(1) Busways shall be permitted to be extended vertically through dry floors if totally enclosed (unventilated) where passing through and for a minimum distance of 1.8 m (6 ft) above the floor to provide adequate protection from physical damage.

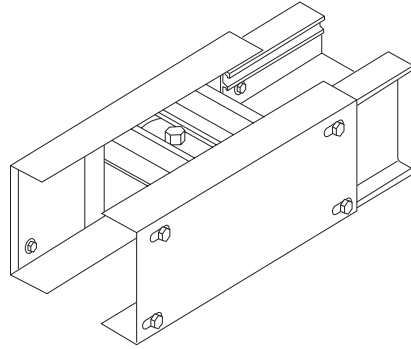
(2) In other than industrial establishments, where a vertical riser penetrates two or more dry floors, a minimum 100 mm (4 in.) high curb shall be installed around all floor openings for riser busways to prevent liquids from entering the opening. The curb shall be installed within 300 mm (12 in.) of the floor opening. Electrical Equipment shall be located so that it will not be damaged by liquids that are retained by the curb.

In addition to *NEC*[®] requirements, Sentron busway requires a minimum of 7" from a wall to a joint where a new section of busway begins. Sentron busway passing through a floor requires a minimum of 16" between the floor and a joint. This space is required for the floor supports.



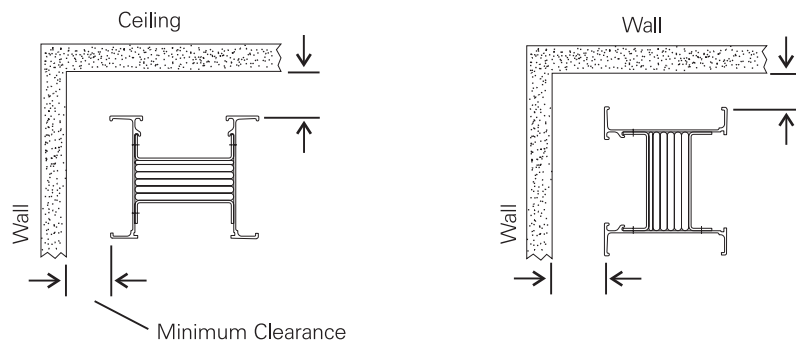
Article 368.7

Article 368.7 states that *a dead end of a busway shall be closed*. The following drawing illustrates the end closer used on Sentron busway.



Minimum Clearance

There are certain minimum clearances required when installing busway near a wall, ceiling, or another busway run. It is beyond the scope of this course to cover in detail the minimum clearances of every component. The minimum clearances of Sentron busway components are listed in the *Sentron™ Busway Systems Selection and Application Guide*. Specifications for other systems are listed in their respective selection and application guides.

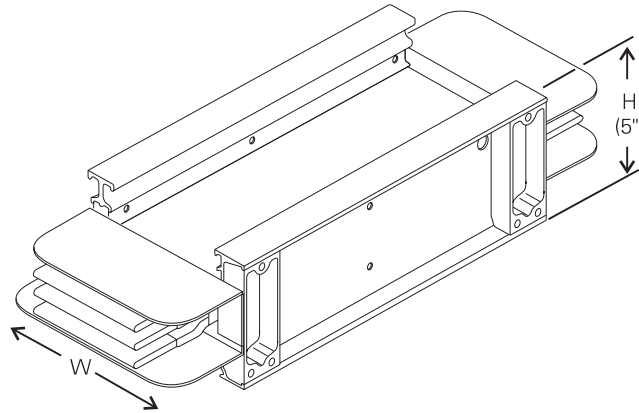


Dimensions

Component dimensions must also be considered when planning a busway system. The dimensions given in the following examples are for illustrative purposes. For a complete listing of Sentron busway components refer to the *Sentron™ Busway Systems Selection and Application Guide*. Specifications for other systems are listed in their respective selection and application guides.

Section Dimensions

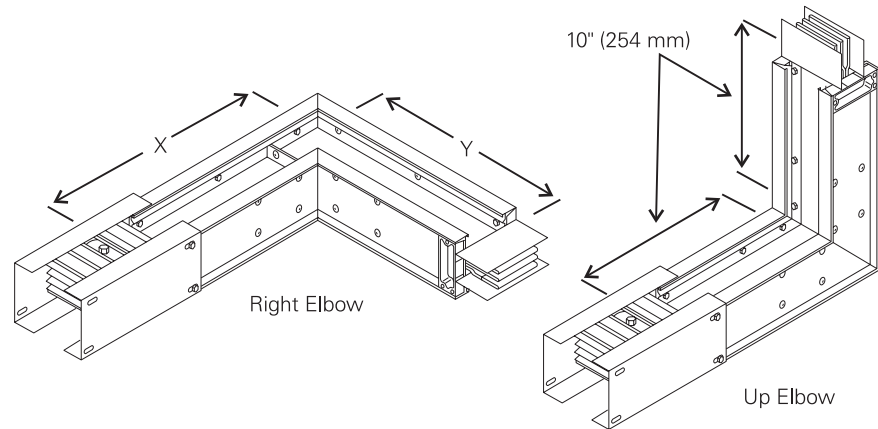
It has already been mentioned that Sentron plug-in busway is available in 4', 6', 8', and 10' sections, and feeder busway is available in lengths from 2' to 10' in increments of 0.125'. The height of Sentron busway is 5". The width varies with the maximum amperage rating. The width of 800 amp, one-bar-per-pole aluminum Sentron busway, for example, is 4.5" wide.



Aluminum		Copper	
Ampere Rating	Width (W) In. (mm)	Ampere Rating	Width (W) In. (mm)
800	4.5" (115)	800	3.9" (99)
1000	5.4" (137)	1000	4.4" (112)
1200	6.5" (166)	1200	5.0" (128)
1350	7.5" (191)	1350	5.6" (143)
1600	8.6" (219)	1600	6.6" (169)
2000	10.9" (277)	2000	8.1" (207)
		2500	10.6" (270)

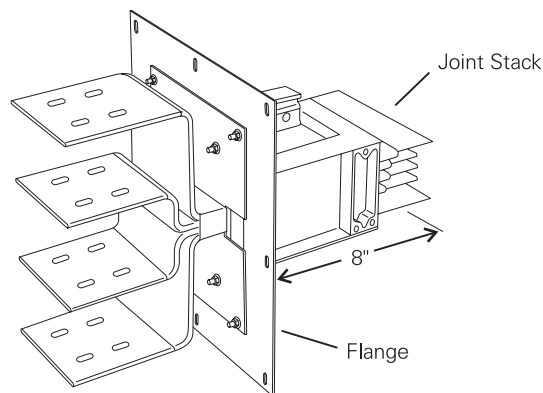
Other Component Dimensions

Other components, such as elbows, offsets, and tees must also be considered. Right and left elbows, for example, vary from 12" x 12" to 24" x 24." This is due to the variance of bus bar width with amperage rating. An 800 ampere aluminum system, for example, would be 12" x 12". Up or down elbows are 10" x 10".



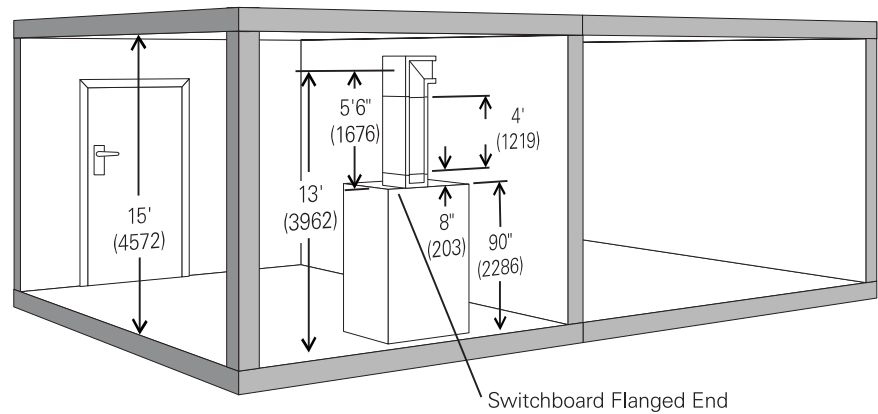
Left or Right Elbows					
Aluminum			Copper		
Ampere Rating	X In. (mm)	Y In. (mm)	Ampere Rating	X In. (mm)	Y In. (mm)
800 - 1350	12" (304)	12" (304)	800 - 2000	12" (304)	12" (304)
1600 - 3000	18" (457)	18" (457)	2500 - 4000	18" (457)	18" (457)
4000	24" (610)	24" (610)	5000	24" (610)	24" (610)

In the example busway system, the busway will be connected to a switchboard. A flanged end must also be selected. The flanged end is 8" long from the flange to the joint stack.

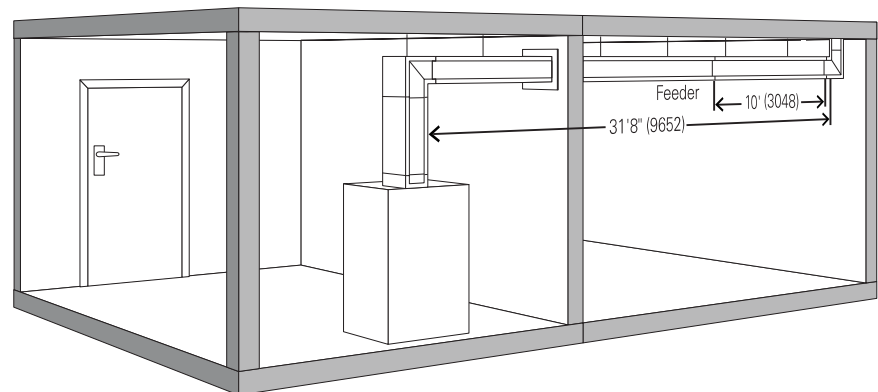


System Assembly

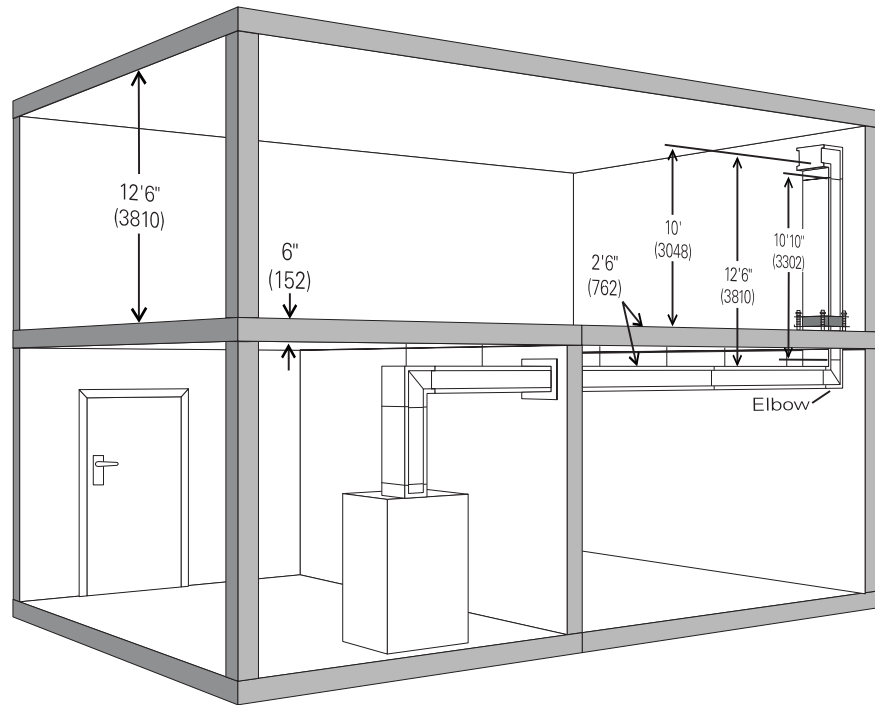
The components can now be selected for the installation. A switchboard flanged end (8" (203 mm)), a 4' (1219 mm) length of feeder busway, and one elbow (10" (254 mm)) is selected. The total height is 5'6" (1676 mm).



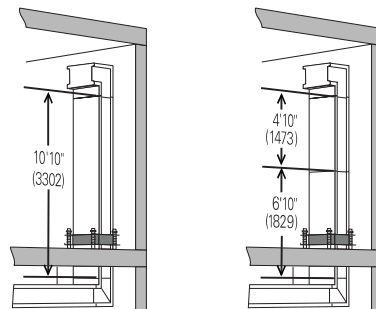
The busway runs horizontally on the first floor 31'8" (9652 mm) before making its second turn. Feeder busway is selected because no equipment will be connected to it on the first floor. A second elbow and three 10' (3048 mm) feeder sections are selected.



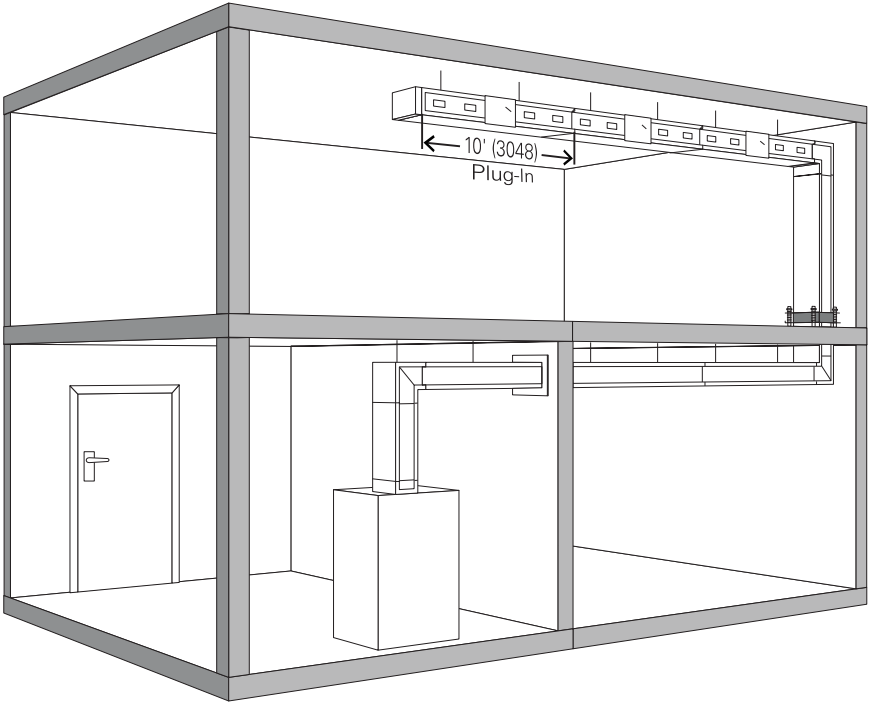
It is 2'6" (762 mm) from the top of the horizontal feeder run to the second floor level. The horizontal busway run on the second floor will be installed 10' (3048 mm) from the floor, for a total rise of 12'6" (3810 mm). One elbow is already installed on the first floor horizontal feeder busway run. A second elbow will be needed at the top of the vertical riser. Each elbow is 10" (254 mm), which is subtracted from the total rise of 12'6" (3810 mm). 10'10" (3302 mm) of vertical riser will complete the vertical rise.



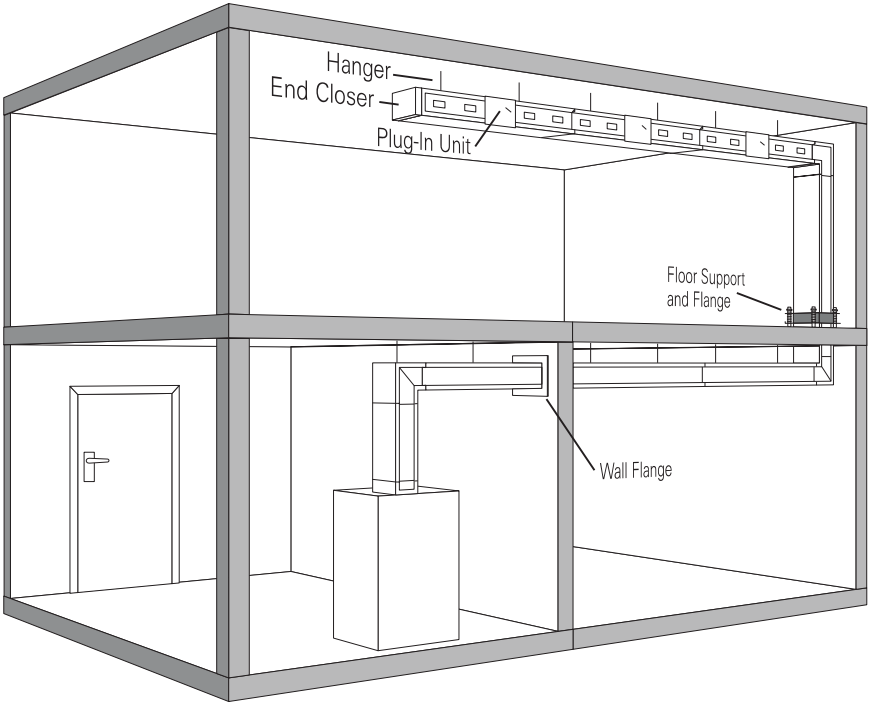
In addition to the standard lengths of 4' (1219 mm), 6' (1829 mm), 8' (2438 mm), and 10' (3048 mm), Sentron feeder busway also comes in any length from 2' (609 mm) to 10' (3048 mm) in 0.125" (3.17 mm) increments. One solution for the vertical riser might be to select one 6' (1829 mm) and one 4'10" (1473 mm) section.



The busway run is completed with three 10' (3048 mm) plug-in sections on the second floor.

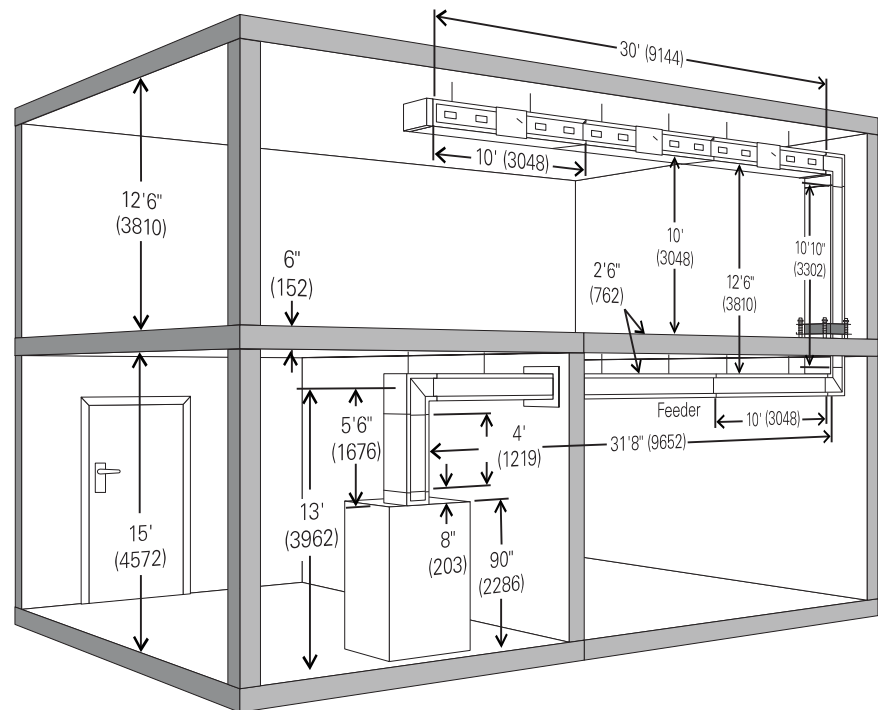


An end closer, wall and floor flanges, floor support, hangers, and the desired number of plug-in units finish the system. In this example three plug-in units were used.



Bill of Material

We now have the dimensions needed to assemble a bill of material for our example project.



Qty	Item
3	Bus Plugs
1	0'8" Stub
1	4'0" Feeder
3	10'0" Feeder
1	4'10" Feeder
1	6'0" Feeder
3	Edge Elbow
3	10'0" Plug-In
1	End Closer
1	Floor Flange
2	Floor/Wall Flange
12	Hangers

Information Needed to Order Busway

The following information is necessary when planning a busway installation or expansion:

- Description of application
- Type of busway
- Voltage and number of conductors
- Maximum current
- Length and configuration of run
- Location and type of power supply to busway
- Number of hangers
- Type and number of tap-off devices (tees, crosses)
- Type and number of accessories

Review 5

1. According to *NEC*® Article 368.7 a dead end of a busway shall be _____ .
2. Dimensions of Sentron busway can be found in the _____ .
3. A right elbow with copper bus bars, rated at 5000 amperes has an X measurement of _____ inches and a Y measurement of _____ inches.
4. According to *NEC*® Article 368.5 busway shall be securely supported at intervals not exceeding _____ feet unless the busway is otherwise designed and marked.
5. According to the *National Electrical Code*® it _____ to extend unbroken lengths of busway through dry walls.
 - a. is permissible
 - b. is not permissible