XLC Series Busway

Installation and Operation Manual

Zhenjiang Anyi Electrical Co., Ltd.

1.Scope of Application and Working Conditions of the Product

1.1Scope of Application

The XLC series busway (hereinafter referred to as the busway) is specially designed for transmitting electric energy in a power distribution system with alternating current three-phase five-wire (four-wire), frequency 50-60Hz, voltage up to 690V, and rated working current 250-6300A. It is widely applicable to large factories such as petroleum, chemical, transportation, and civil aviation, high-rise buildings, and other various places.

1.2Working Conditions

1.2.1The altitude does not exceed 2500 meters；

1.2.2The ambient air temperature does not exceed +40°C, and the average temperature within 24 hours does not exceed +35°C. The lower limit of the ambient air temperature is -5°C；

1.2.3The relative air humidity does not exceed 50% at the maximum temperature of +40°C. At lower temperatures, a higher relative humidity is allowed, for example, 90% at +20°C；

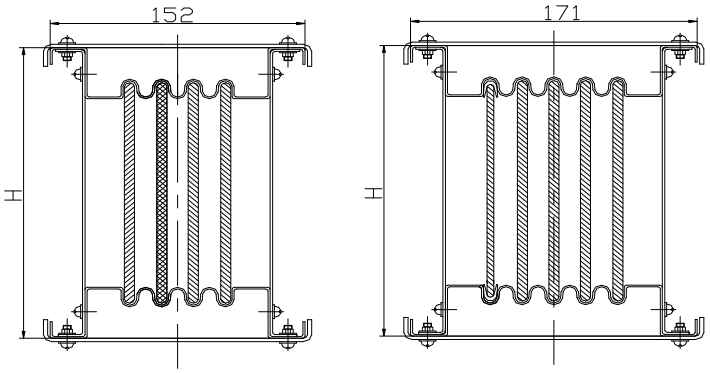
1.2.4The place without significant shaking or impact vibration；

1.2.5 In a medium without explosion hazard, and the medium does not contain gas or conductive dust sufficient to corrode metals and damage insulation；

1.2.7 The place without rain and snow invasion.

2.Basic Structure and Parameters of the Product

2.1 The busway cross-sectional dimensions and weight per meter are shown in the following diagrams and tables.



Four-wire System Five-wire System

Figure (1)

Table (1)

Rated Current（A）	H (mm)	Weight(kg/m)		Rated Current（A）	H (mm)	Weight(kg/m)	
		Four-wire	Five-wire			Four-wire	Four-wire
250	81	14.28	15.71	1600	191	40.47	44.83
400	91	16.68	18.37	2000	231	51.69	56.94
630	101	19.07	21.02	2500	281	66.28	73.04
800	111	21.60	23.82	3150	368	78.27	86.37
1000	131	26.26	29.02	4000	448	67.13	107.36
1250	151	31.42	34.71				

2.2Outline and Dimensions of the Busway Plug-in Box

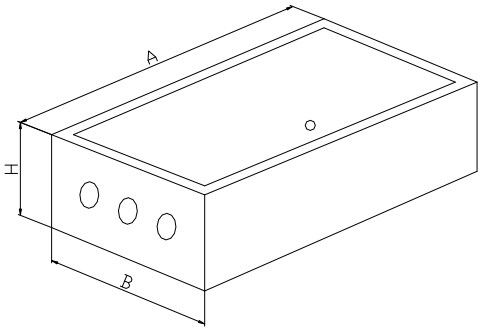


Figure (2)

Table (2)

Shell Frame Current（A）	A	B	H
≤160	A1+160～200	B1+90	H1+50
≤250	A1+240～320		
≤400	A1+320～400		

Note: The above dimensions are for conventional plug-in boxes (without any mechanical or electrical interlocks and protection). For special requirements, they are determined by the user or designed separately. A1, B1, and H1 are the length, width, and height of the supporting air switch respectively

2.3 Functional Units of the Busway

2.3.1 Code of Functional Units of the Busway Table (3)

Functional Unit Form	Code	Functional Unit Form	Code	Functional Unit Form	Code
Straight Section	A	Z-type Horizontal Bend	ZS	T-type Horizontal Tee	TS
Straight Section with Socket	An	Z-type Vertical Bend	ZC	T-type Vertical Tee	TC
L-type Horizontal Bend	LS	U-type Horizontal Bend	US	Cross-type Horizontal Cross	SS
L-type Vertical Bend	LC	U-type Vertical Bend	UC	Cross-type Vertical Cross	SC
Expansion Joint	P	Capacity Changer	BY	Phase Changer	BX
Starting End	S	Starting Inlet Box	SH	Terminal Flange	Z

2.3.2 Description of Functional Units

2.3.2.1 Straight Section Unit

It is divided into a straight section unit without a tapping device and a straight section unit with a tapping device.

The straight section unit with a tapping device is provided with a tapping port for each section to distribute power loads. The number of tapping ports is selected by the user, but the distance between multiple tapping devices set on the same trunk line is not less than 800mm. The maximum current drawn from the power supply reaches 400A.

2.3.2.2 Starting End Busway and Starting Inlet Box

The starting end busway and the starting inlet box are supporting components to form a connecting part between the busway and the cable, and can also be directly connected with the switchgear (distribution box) or transformer as the power output or input of the busway. A switch can be set in the starting inlet box, and its external dimensions, switch model, and specifications are provided by the user

2.3.2.3 Various Bend Joints

There are four types of bend joints: L-type, Z-type, T-type, and cross-type, which are used for the connection of horizontal and vertical busways and changing the direction of the busway

2.3.2.4 Terminal Cover

The terminal cover is used for the terminal of the busway for safety protection. Each specification of the busway is equipped with a matching terminal cover

2.3.2.5 Capacity Changer Busway

When the current capacity of the busway trunk line gradually decreases, the capacity changer busway is used for adjustment. The capacity changer busway can change from any current level to another current level

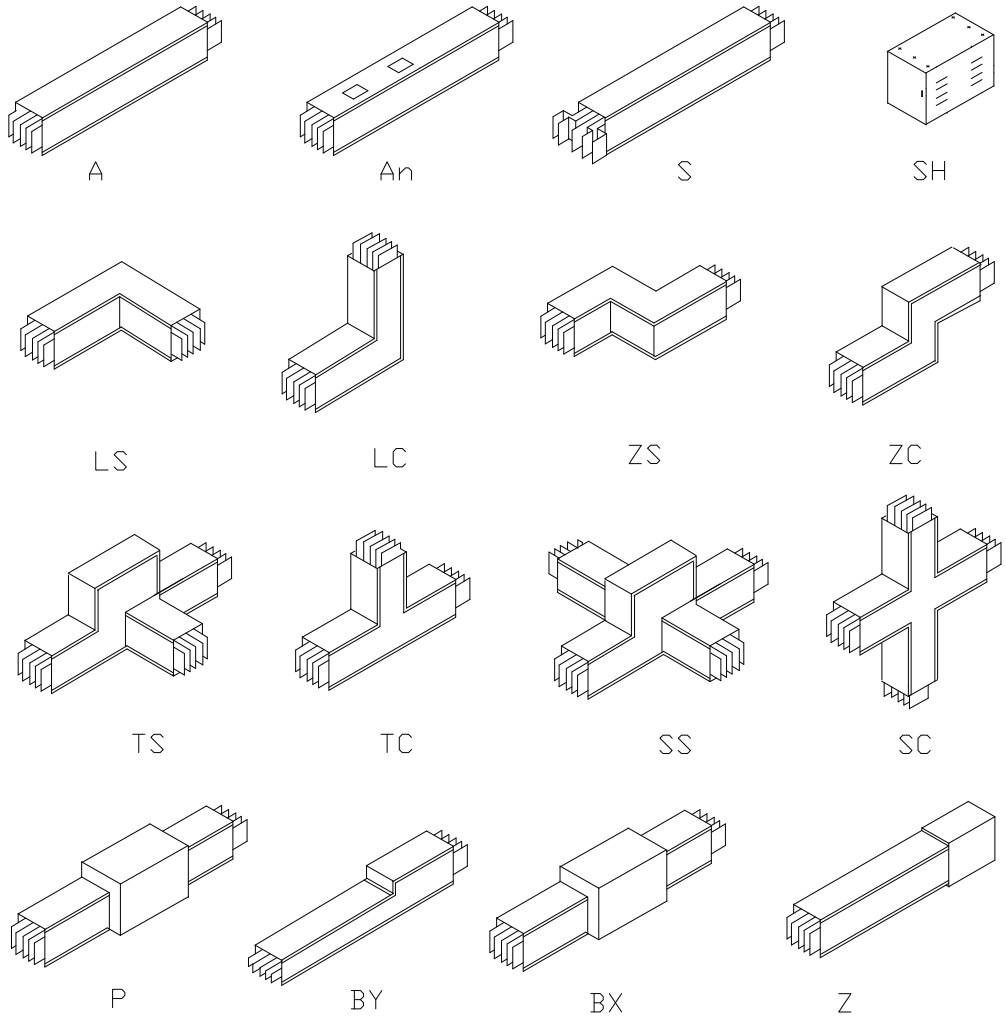


Figure (3)

2.3.2.6 Expansion Joint Busway

The expansion joint busway is used to absorb the axial elongation of the busway trunk line unit caused by thermal expansion. The number of installations mainly depends on the length of the busway system and the situation of bends. Generally speaking, for the horizontally installed busway without bends, an expansion joint is set every 40 meters; for the vertically installed busway, the installation of expansion joints is shown in Figure (4) and Table (4)

Table (4)

Support Situation	Legend	System Length (m) without Needing to Set Expansion Joint（m）
Both ends are not fixed	Ⅰ	≤120
One end is fixed, and the other end is not fixed	Ⅱ	≤90
Both ends are fixed	Ⅲ	≤30

注：The reason why the installation of expansion joints is different between horizontal installation and vertical installation is mainly that the resistance of the ground to the load is limited

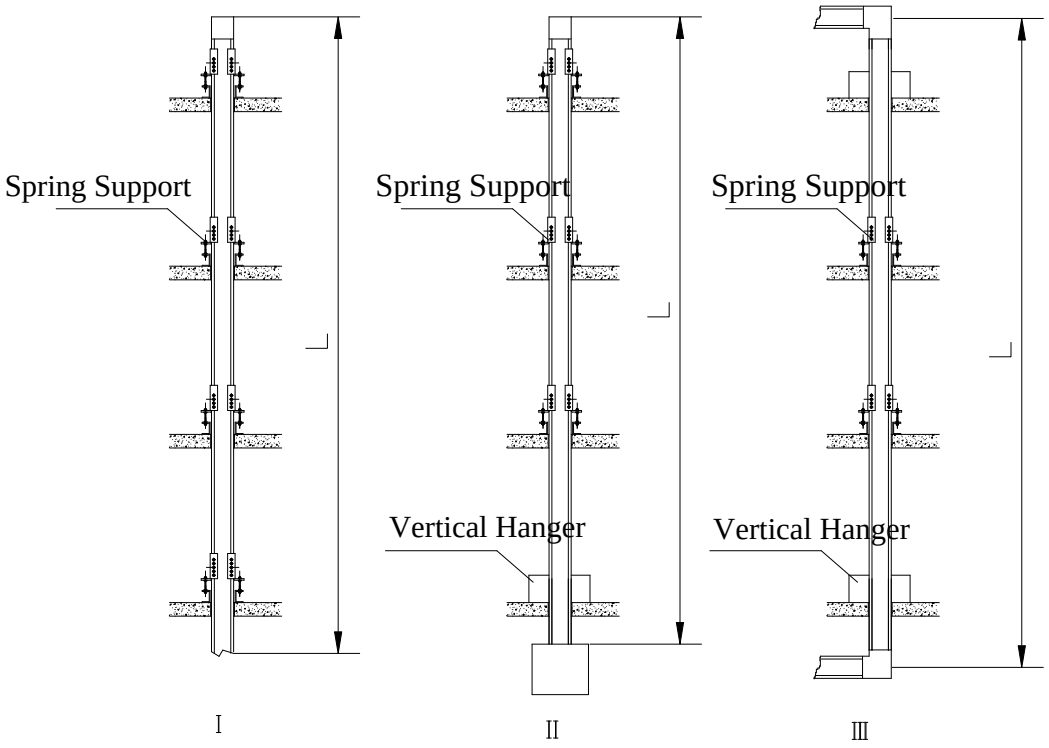


Figure (4)

4.Installation Methods and Construction

4.1 Horizontal Installation

4.1.1 Horizontal Wall-penetrating Installation

The dimensions of the prepared hole for horizontal wall-penetrating installation are shown in Figure (5) and Table (5)

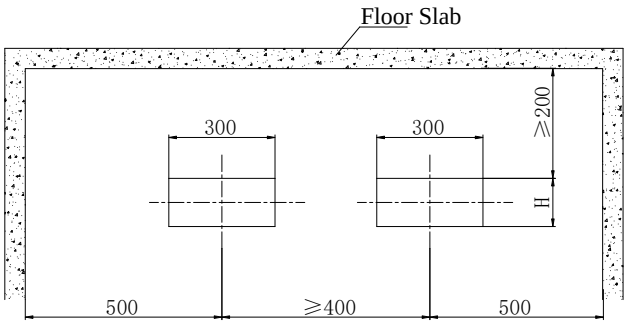


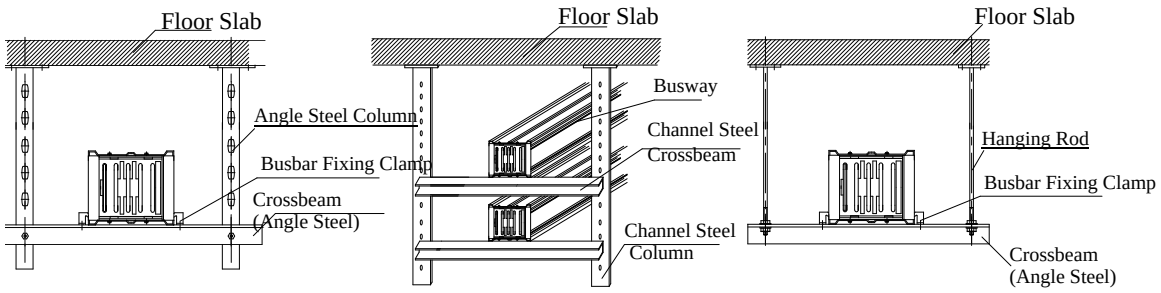
Figure (5)

Table (5)

Current (A)	H	Current (A)	H
250	81	1600	191
400	91	2000	231
630	101	2500	281
800	111	3150	368
1000	131	4000	448
1250	151		

4.1.2 Horizontal Ceiling Installation

When the busway is installed on the ceiling, steel expansion bolts should be embedded in the floor by drilling holes in advance (holes can also be drilled on site for flexible installation, or steel parts can be embedded in advance for on-site welding of lifting brackets. The lifting brackets delivered with the product include angle steel columns (channel steel columns, suspension rods) plus crossbeams, as shown in Figure (6). The distance between the brackets should generally not exceed 2m. If there are special requirements, they should be negotiated with the manufacturer for solution.



Angle Steel Column and Crossbeam (Angle Steel) | Channel Steel Column and Crossbeam (Channel Steel) | Hanging Rod and Crossbeam (Angle Steel)

Figure (6)

4.1.3 Horizontal Wall-mounted Installation

When installing horizontally along the wall, steel expansion bolts should be embedded into pre-drilled holes on the wall or support columns, or installation brackets should be fixed by other methods. Pay attention to the straightness of the installation holes (i.e., the installation surface of the entire row of brackets should be in a horizontal plane), and refer to Figure (7) for the installation form.

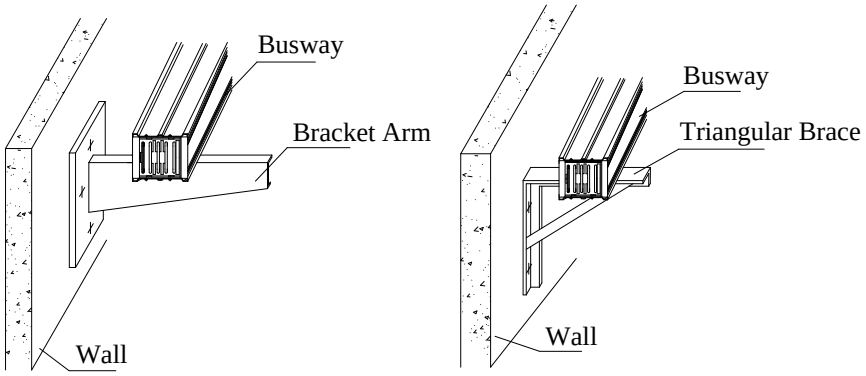


Figure (7)

4.2 Vertical Installation

4.2.1 The size of the prepared hole for the vertical busway passing through the floor is shown in Figure (8). If two or more rows of busways pass through, the distance between every two rows of busways should be not less than 400mm

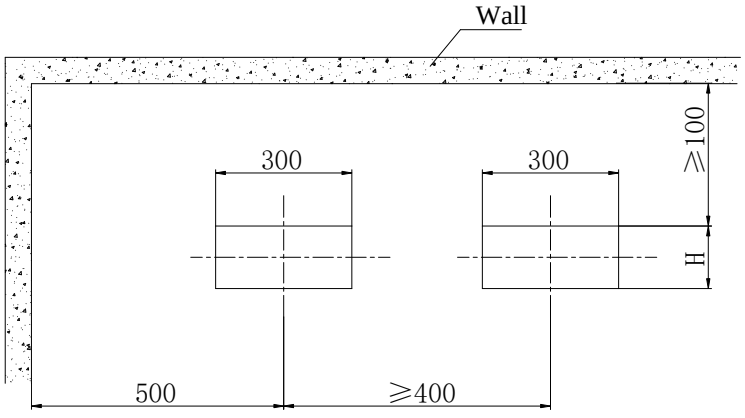


Figure (8)

4.2.2 Spring brackets are used for vertical fixation. The elastic force of the spring should be adjusted to (G+F) kg (where G is the weight of the busway between each floor, and F is 5-10 kg). The adjustment of the spring bracket can be referred to the attached drawing 3HS14.001. There are mainly three installation methods .

4.2.2.1 The two types of front-mounted spring supports are shown in Figure 9.

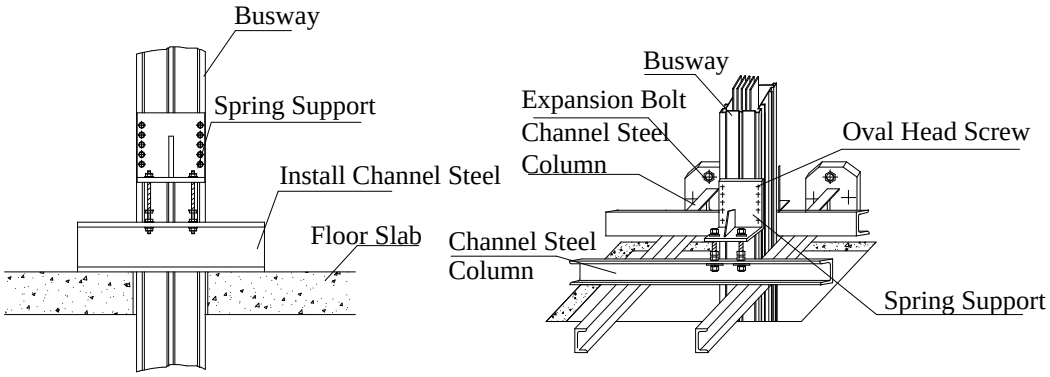


Figure (9)

4.2.2.2 The two types of side-mounted spring supports are shown in Figure 10.

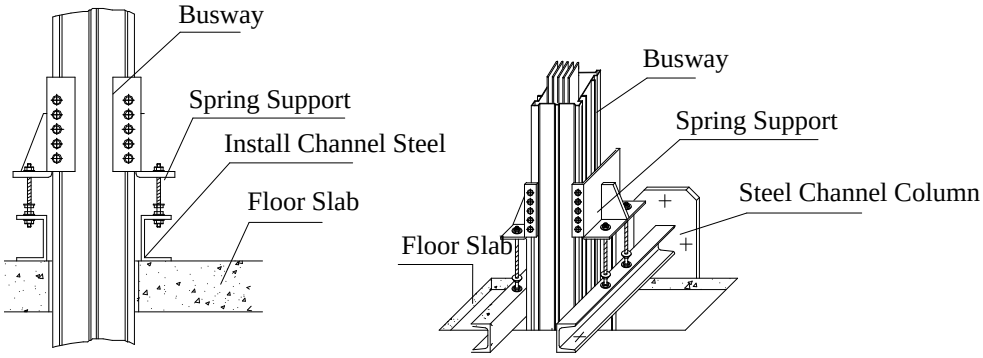
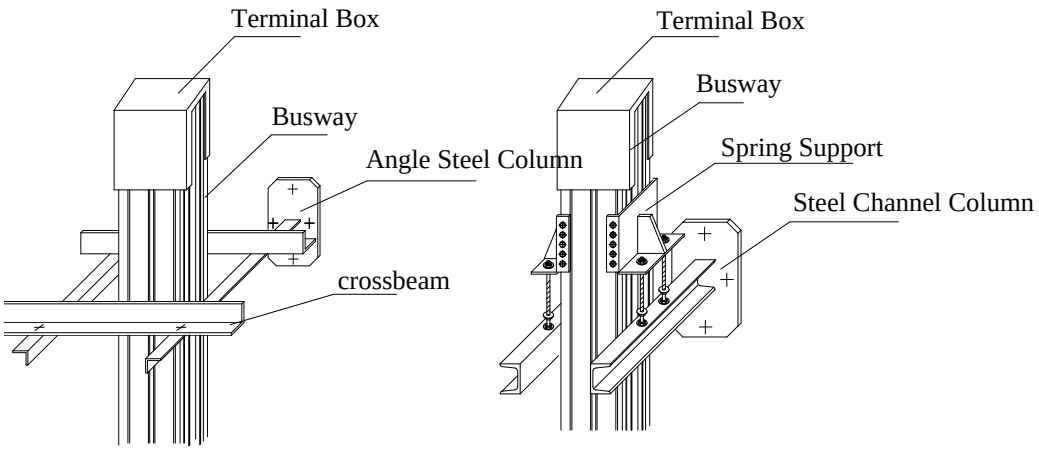


Figure (10)

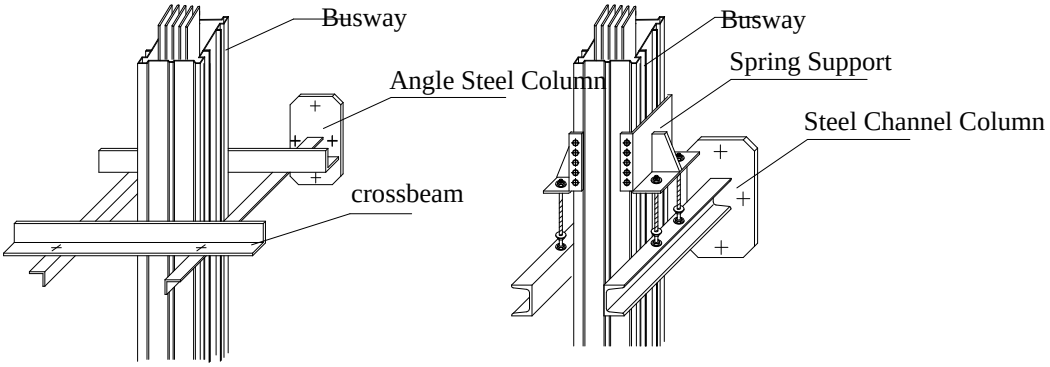
4.2.3 The fixation of the inlet end (starting end) and the terminal of the vertical (shaft) installati on busway can be carried out by referring to the method in Figure 11



Angle Steel Column with Crossbeam Channel Steel Column with Spring Support

Figure (11)

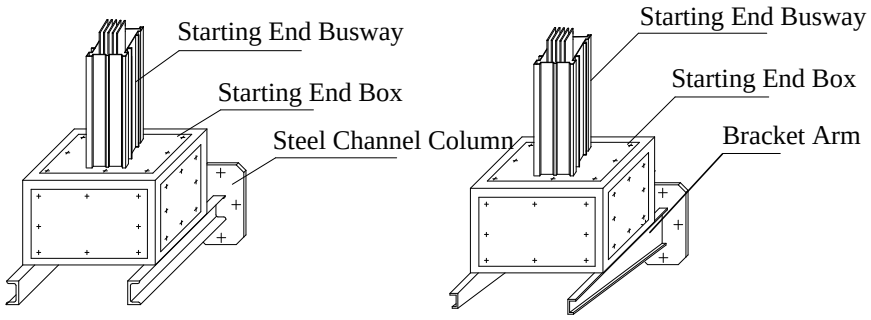
4.2.4 The vertical (shaft) installation busway needs intermediate reinforcement (generally when the floor height exceeds 4m or according to the special requirements of the user), which can be carried out by referring to the method in Figure (12)



Angle Steel Column with Crossbeam Channel Steel Column with Spring Support

Figure (12)

4.2.5 The fixation of the starting inlet box of the vertical (shaft) installation busway is carried out according to the method in Figure (13)



Fixation of Channel Steel Column Fixation of Bracket Arm

Figure (13)

5.Loading, Unloading and Storage

5.1 The busway should be handled with care during loading, unloading, and transportation to avoid collision, so as not to damage the packaging, surface treatment layer, insulation material, or cause mechanical damage .

5.2 After the busway is unloaded, the form and quantity of main components and parts should be checked in time according to the delivery list, and whether there is any damage during transportation should be checked .

5.3 During storage, the temperature can be in a sheltered environment from -25°C to 55°C, and the temperature can reach 70°C for a short time

5.4 The busway should be placed in a dry place and not be invaded by humidity and water; it should not be contaminated by soil. If necessary, it can be wrapped with waterproof paper .

5.5 The busway is generally packaged with plastic cloth and can only be opened before installation to ensure the cleanliness of the busway .

5.6 The busway should not be directly placed on the ground. A layer of wood must be added underneath, and it should be stacked stably as shown in Figure (14), with the stacking height not exceeding 1.5m .

6.Installation and Connection

6.1 Preparation

6.1.1 Before installation and use, the user should carefully read this Installation and Use Instructions .

6.1.2 Before installation, the busway and accessories should be checked to verify whether there is any damage during transportation, handling, and storage. The damaged busway and accessories should be timely notified to the manufacturer for confirmation and replacement .

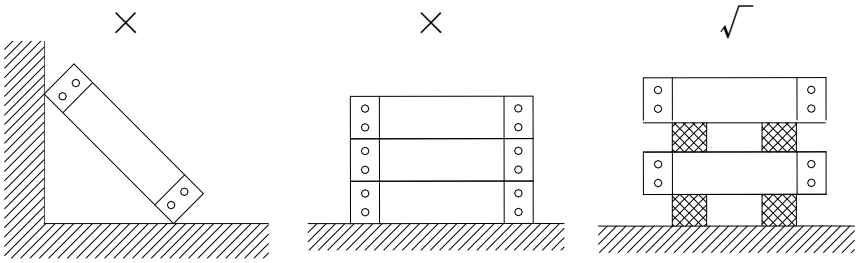


Figure (14)

6.1.3 Check the installation route of the busway thoroughly against the drawings, check whether there are obstacles (such as air ducts, water pipes, etc.) in the route, and pre-check whether the installed equipment is in place as specified. If there is a major change (allowable position error ±10mm), adjust it in time.

6.1.4 Check the path from the storage location to the installation location.

6.1.5 Check whether the environment around the busway is damaged and whether it meets the environmental requirements for the busway's use. Pay special attention to ensuring that the busway is not eroded by sewage or other debris during installation. For specific details, refer to Article 1.2 of this Installation and Use Instructions. For matters not covered, comply with the environmental requirements specified in standards GB7251.6-2015 and JB/T9662-1999.

6.1.6 Install the supports and hangers first.

6.1.7 Investigate the on-site assembly conditions in advance to determine the most favorable assembly sequence. The project should generally start from the positioned equipment or a certain bend functional unit.

6.2 Installation

6.2.1 Use sufficiently strong materials to ensure the safety of transportation and lifting during installation.

6.2.2 When hoisting the busway with ropes, pad thick cloth or corrugated paper at the stress points to protect the busway from damage.

6.2.3 When hoisting busways with a current rating above 2500A, clamp the busway with a strong wooden board and then bind it with ropes to prevent deformation of the busway shell.

6.2.4 Before connecting the busway, inspect the contact surfaces and insulation materials for damage, as well as any soil, dust, or foreign objects. If found, clean them thoroughly.

6.2.5 Install according to the layout diagram by matching the corresponding numbers, ensuring the installation sequence is not disrupted. Verify the positioning dimensions of all direction-changing sections, reserved segments, and interface sections.

6.2.6 During installation, pay attention to the storage of components. Handle the busway body and parts with care to avoid collision, rough operation, or striking with hammers or hard metal tools, which may cause cracking, damage, or deformation that affects assembly and busway performance.

6.2.7 Conduct insulation resistance testing during installation. For each busway section, measure the insulation resistance between phases and between each phase and ground, which should be no less than 20MΩ. After installing each section, test the entire busway system and record the results. If the resistance is less than 0.4MΩ or shows a significant drop, identify the cause and adjust or reinstall until qualified.

6.2.8 Perform electrical continuity checks. Measure the resistance between any unpainted point on the outer surface of the connected joint accessories and the ground, which should not exceed 0.1Ω.

6.2.9 It is strictly prohibited to install or disassemble the tap box under load.

6.2.10 When the project is suspended, re-wrap and seal the ends of the connected parts with plastic sheeting to prevent contamination of the joints.

6.2.11 Fire protection is crucial in high-rise buildings. Fire barriers or fire-stopping boards should be used for fireproofing where busways pass through walls horizontally or in high-rise structures. This prevents the spread of smoke, fire, and heat through busway units to adjacent rooms or floors during a fire, and even prevents water seepage during fire fighting. Refer to Figure (15).

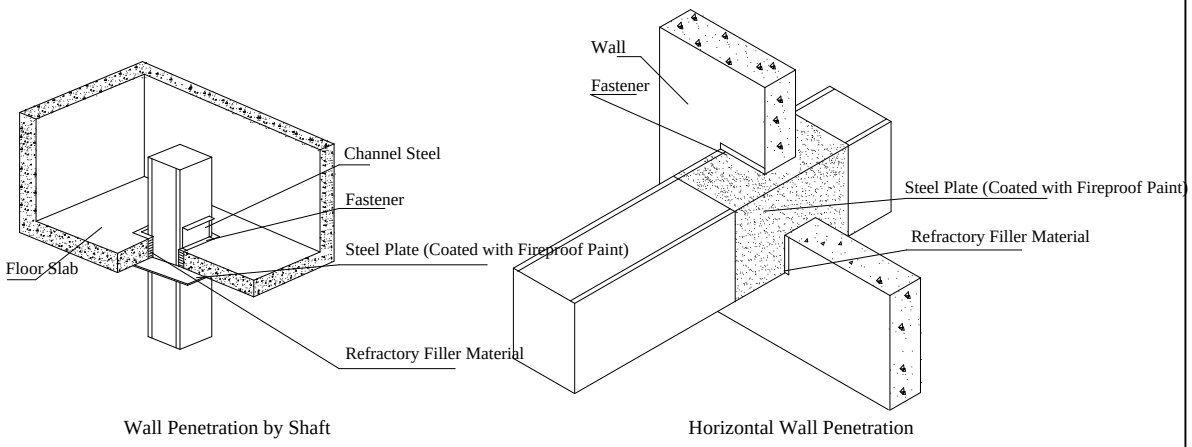


Figure (15)

6.2.12 After installation, each construction procedure must be inspected to ensure no omissions.

6.3 Connection

The connection diagram of the busway is shown in Figure (16).

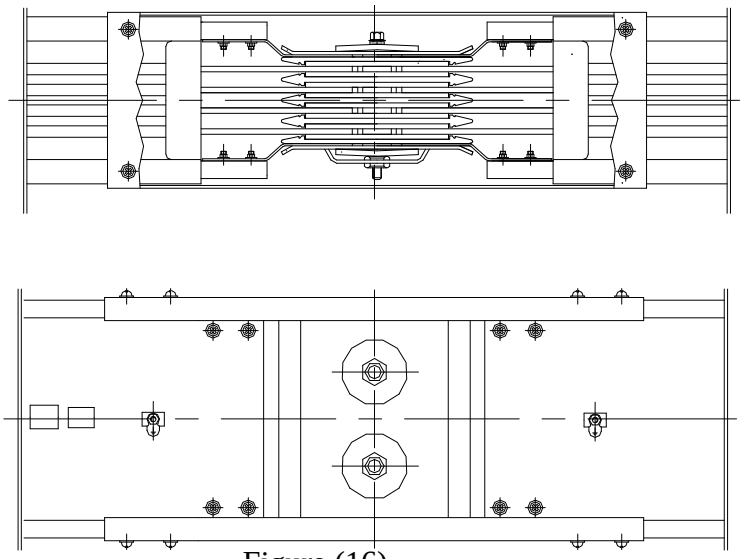


Figure (16)

6.3.1 The busway adopts a single-bolt (double-end) joint connection kit with red visual markers, which can save time and achieve the required torque simply and accurately without a torque wrench. The second bolt head is reserved for maintenance, installation and disassembly, eliminating the need to purchase new bolts. The red marker will naturally fall off when the connecting bolt reaches the tightening torque. After the busway installation is completed, it is possible to check whether any joint is tightened on the ground without rechecking one by one.

6.3.2 Remove the joint connection kit assembled on the busway (sometimes separately packaged) and place it in a dry and clean place.

6.3.3 Align the ends of the two busways to be connected, insert the joint connection kit according to the attached drawings, and then tighten the torque bolt with a theoretical tightening torque of 68N·m. It should be particularly noted that rough operation should be avoided when inserting the connecting copper busbars and partitions in sequence. When the insertion force is high, a wooden hammer or rubber hammer can be used to tap gently, instead of a sledgehammer or other hard metal objects.

6.3.4 Finally, install and fasten the connection cover plate, and use claw-type washers to ensure the electrical continuity of the busway.

7.Debugging and Operation

After the installation of the entire busway system is completed, the insulation resistance should be greater than 20MΩ. However, in humid installation environments, the insulation resistance often drops below 20MΩ after a period of time. When energized, the insulation resistance must be no less than 0.4MΩ. If the insulation resistance is between 0.1MΩ and 0.4MΩ, the system can be run without load for 4 to 16 hours first, and then put into operation with load. For insulation resistance below 0.1MΩ, power-on is prohibited, and the cause must be identified for rectification.

Note: Before energization, an electrical test should be conducted on the installed busway system to verify that the phase relationship between the connected equipment in the system is correct.

8.Maintenance

8.1 Before maintenance, use a multimeter to measure the conductive busbars to confirm that the busway is not energized.

8.2 The busway should undergo a minor maintenance every year of continuous operation. The main objects of maintenance are busways and joints with relatively loud operating sounds. The maintenance contents include checking whether the fasteners and the contact of the conductive parts are loose. A torque wrench is mainly used to detect whether the tightening torque meets the specified requirements (for the contact surface of the conductive parts, a 0.05×10mm feeler gauge can generally be used for inspection: if the width of the busbar is more than 80mm, it shall not be inserted by 6mm; if the width is 50mm or less, it shall not be inserted by 4mm). The insulation resistance shall be measured (and the power frequency withstand voltage test shall be carried out when conditions permit).

8.3 The busway should undergo a major inspection once every three years of continuous operation, covering all busways and joints. The inspection contents include:

8.3.1 Replacing damaged, corroded, or aged components in the busway system.

8.3.2 Measuring the insulation resistance of the busway system.

8.3.3 Checking the electrical continuity of the busway system.

8.3.4 Performing all contents of the minor inspection.

8.4 Maintain the use environment strictly to ensure the busway operates normally within the specified environmental requirements.

8.5 Conduct regular inspections, keep records, and address issues promptly. The inspection contents include:

8.5.1 Appearance inspection: Check for twisting, bending deformation, damage, dust contamination of the busway, and abnormalities in connections, supports, hangers, and plug-in boxes.

8.5.2 Environmental inspection: Check whether the surrounding environment of the busway is damaged by water, humidity, high temperature, toxic gases, vibration, or dust.

5.5.3 Connection inspection: Regularly increase the clamping force of connection parts.

8.5.4 Load inspection: Verify whether the busway load exceeds its rated capacity, especially at T-type branches or cross-branches of the main trunk.

9.Ordering Instructions

9.1 The following parameters should be specified when placing an order:

a. Busway model, rated current, voltage, system wiring configuration, and surface treatment method.

b. Standard length and quantity of busways, quantity of each functional unit and supporting components, or detailed routing diagrams.

c. Number of tapping ports for each busway section.

d. Number of tap boxes, with specification of switch element models and setting parameters.

e. For vertically routed busways, provide sectional dimension drawings.

9.2 Inlet boxes can be designed according to user requirements.

9.3 Please specify special requirements in writing.

9.4 Our factory reserves the right to modify the structure of busways and accessories without compromising quality.