VERTIV.

PowerBar MPB3

Installer Manual

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit https://www.vertiv.com/en-us/support/ for additional assistance.

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1 Important Safety Instructions

Save these instructions

This manual contains important instructions that should be followed during the installation and maintenance of the Vertiv™ Vertiv™ PowerBar MPB3.

WARNING! The unit is supplied by more than one power source. The unit contains hazardous voltages if any of the input sources are ON, even when the unit is in bypass. To isolate the unit, turn OFF and lock out ALL input power sources.

Verify that all input power sources are de-energized and locked out before making connections inside unit. Lethal voltages exist inside the unit during normal operation. Only qualified service personnel should perform maintenance on the static switch.

NOTE: Read the entire manual before installing or operating the system. Adhere to all operating instructions and warnings on the unit and in this manual.

NOTE: For permanently connected equipment, an appropriate and readily accessible disconnect device shall be incorporated in the fixed wiring.

NOTE: The backfeed protection control terminals inside this unit must be wired to the shunt-trip hardware fitted on each external upstream. Disconnect Breaker feeding Source 1 and Source 2 respectively.

Vertiv neither recommends nor knowingly sells this product for use with life support or other FDA-designated “critical” devices.

Protect the unit from excessive moisture and install the unit in an area free from flammable liquids, gases, or corrosive substances.

The unit is designed to operate from solidly grounded AC power sources only. Provide input over current protection in accordance with the unit ratings. Wire and ground the unit according to national and local electrical safety codes. All wiring should be installed by a qualified electrician.

Before unit is placed into service for the first time, after equipment relocation, or after the unit has been de-energized for an extended period of time, a thorough equipment inspection and supervised startup by qualified service personnel are strongly recommended.

NOTE: The Vertiv™ PowerBar MPB3 is suitable for indoor use only.

CAUTION: This unit complies with the limits for a Class A digital device, pursuant to Part 15 Subpart J of the FCC rules. These limits provide reasonable protection against harmful interference in a commercial environment. This unit generates, uses and radiates radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this unit in a residential area may cause harmful interference that the user must correct at his own expense.

NOTE: The STS2 complies with EMC Directive EN55032:2015 and the published technical standards. Continued compliance requires installation in accordance with these instructions.

WARNING! Locate the center of gravity symbols and determine the unit's weight before handling the cabinet.

WARNING! The installer must apply a warning label on each dedicated and immediately upstream power.

2 Introduction

This Installation Manual is designed to assist in the safe handling and installation of the Vertiv™ PowerBar MPB3 system. These instructions are in addition to normal safe working practices as required by the local health and safety regulations. These instructions do not in any way advocate a departure from these requirements.

Vertiv™ PowerBar supply all busbar sections tested in accordance with type test requirements as detailed in IEC61439-6 and are subject to a full quality check before packaging.

Before starting installation, read and fully understand this installation guide.

WARNING! Risk of failure to follow the guideline. Can cause equipment damage, Electric connection failure of busbar, injury or death.

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3 Handling

This chapter describes how to handle the unit or its modules during shipping, moving to storehouse, or moving to the installation site.

WARNING! Risk of improper moving, lifting and handling. Improper handling can cause equipment damage, injury, or death. Verify that all lifting and moving equipment is rated for the weight of the unit before attempting to move, lift, remove packaging from the unit, or prepare the unit for installation. Refer to the local safety regulations about lifting and handling heavy loads.

3.1 Manual Lifting

WARNING! Risk of improper handling. Can cause equipment damage or injury or death. Only properly trained and qualified personnel who are wearing appropriate, OSHA approved PPE should work on this equipment.

CAUTION: Risk of contact with sharp edges, splinters, and exposed fasteners. Can cause injury. Only properly trained and qualified personnel wearing appropriate, OSHA approved PPE should attempt to move, lift, remove packaging from or prepare the unit for installation.

3.2 Mechanical Lifting

WARNING! Risk of improper moving, lifting, and handling. Improper handling can cause equipment damage, injury, or death. Verify that all lifting and moving equipment is rated for the weight of the unit before attempting to move, lift, remove packaging from the unit, or prepare the unit for installation.

Some sections of Busbar may require mechanical lifting due to their weight.

Equipment Recommended for Handling the Unit

- Lift
- Forklift
- Scissor lift
- Platform lift
- Block and tackle

A full assessment of the risks should be carried out by the installer before commencing work. The busbar must be safely secured to the lifting equipment before lifting. Always check that the load does not exceed the safe working load capacity of the lifting equipment. Ensure that equipment is used according to the requirement of manufacturer.

3.3 Storage

The busbar is delivered to the customer neatly stacked on a wooden pallet for ease of removal. The maximum weight of the pallet will not exceed 2500 kg. The busbar is protected from minor water ingress by means of an overall outer polythene wrap which should be left in position until the bar is mounted. If the busbar is not to be installed immediately upon delivery it should be stored in a heated, clean, dry area. Busbar should never be stored outdoors.

4 Installation

Notice

Read carefully the safety precautions as mentioned in Important Safety Instructions on page 1. Adhere to all warnings, cautions, notices, and installation, operating, and safety instructions/ labels on the unit and in this manual.

Inspection

Carefully inspect the unit for visible or hidden damage. Damage may be concealed by the protective shrink wrap but will still be evident by careful inspection.

4.1 Installation of Busbar

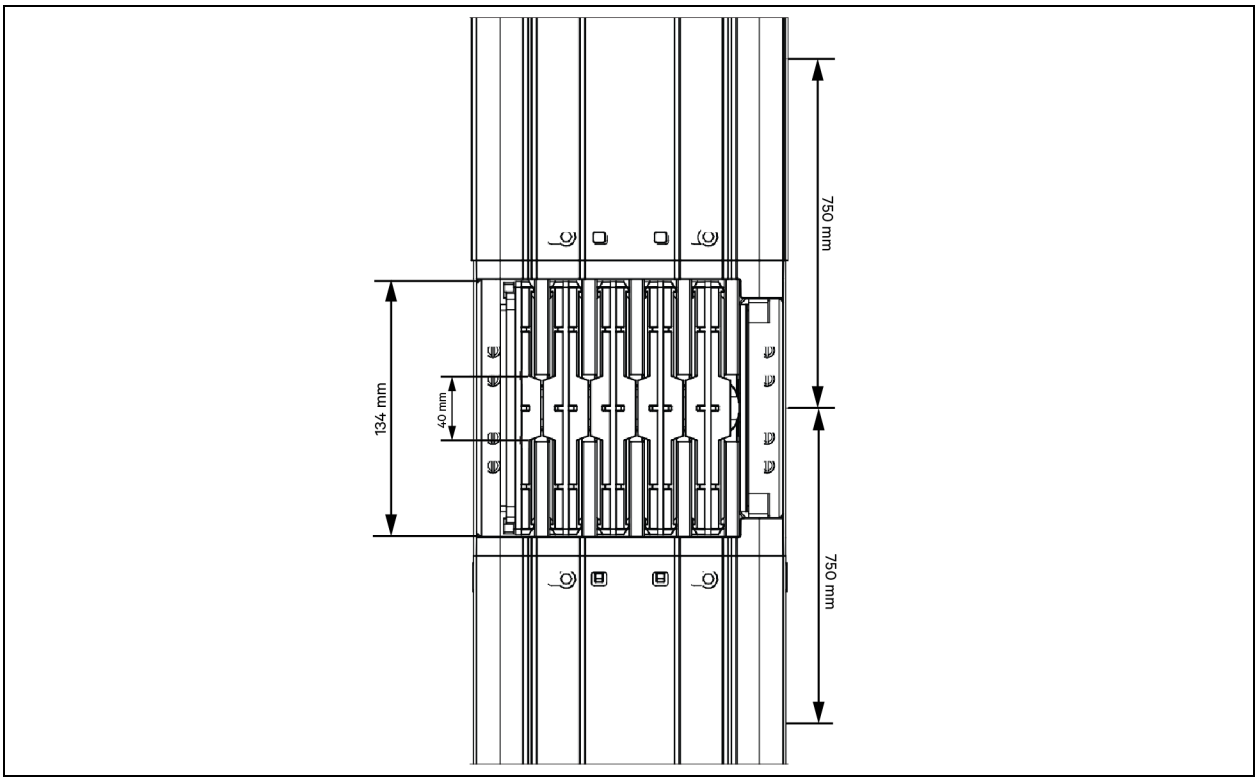
The Busbar Sections are secured to a framing system, such as unistrut or by using drop rods fixed to the ceiling. It can also be fixed to a wall. The bar can be secured both on its flat or on its edge.

Before lifting a Busbar Section, ensure that a detailed risk assessment is carried out for the lifting procedure being performed in that specific area.

1. The hanging brackets should not exceed than 750 mm from the center of the joints. Ensure that busbar ends are not damaged during installation.
2. The hanging brackets must be mounted not more than 1500 mm apart from each other. Ensure that each section of busbar has at least one set of fixing brackets fitted and that the Busbar is level and plumb before final tightening of all joints. drop rod or unistrut style hanging brackets are supplied depending on the customer request.

NOTE: Vertiv™ PowerBar hanging bracket must used.

Figure 4.1 Busbar Installation

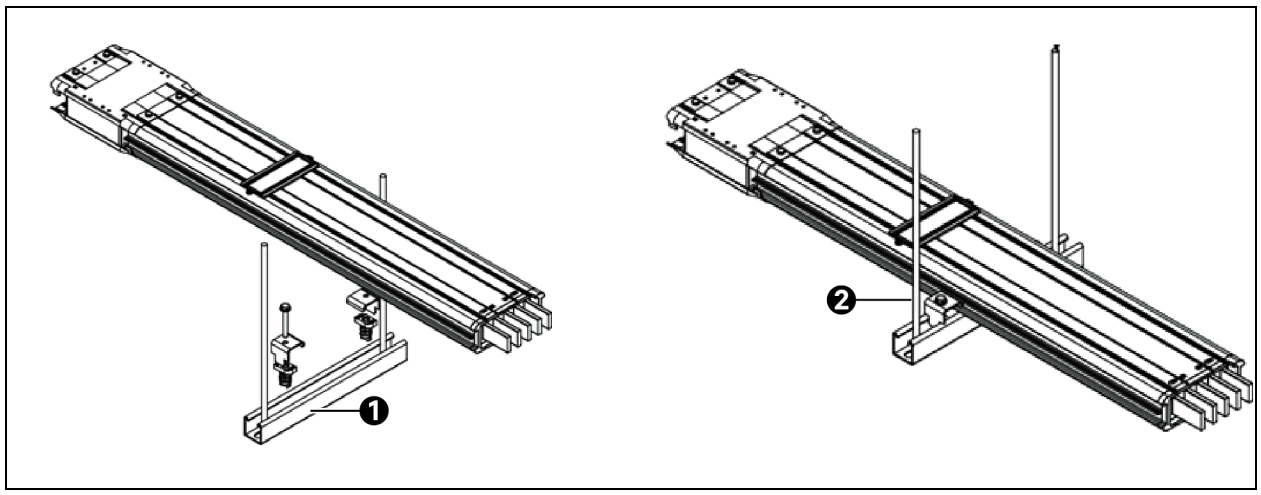


4.2 Installation of Hanging Brackets

Follow the below procedure to install the hanging brackets

1. Install the clamp brackets in edgewise horizontal installation at 1500 mm apart from each other. see Figure 4.2 below.

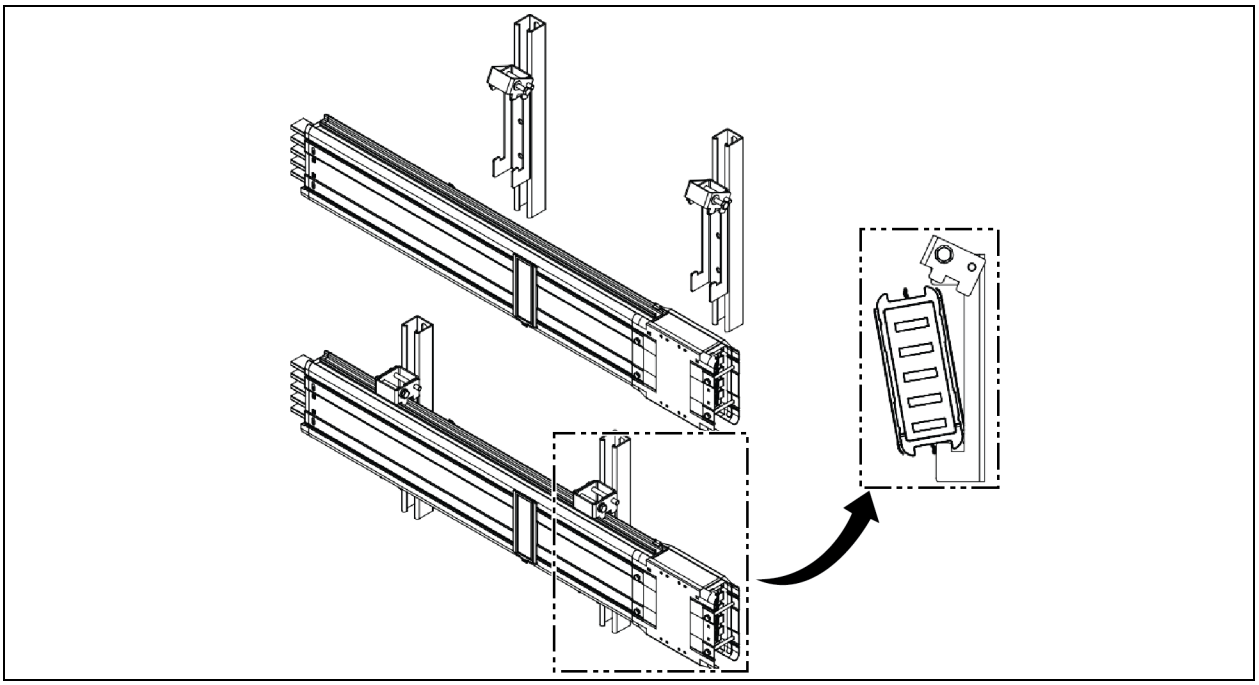
Figure 4.2 Position of Hanging brackets



Item	Description
1	Unistrut
2	Drop rod

2. Install the clip bracket in flatwise horizontal installation at 1000 mm apart from each other.

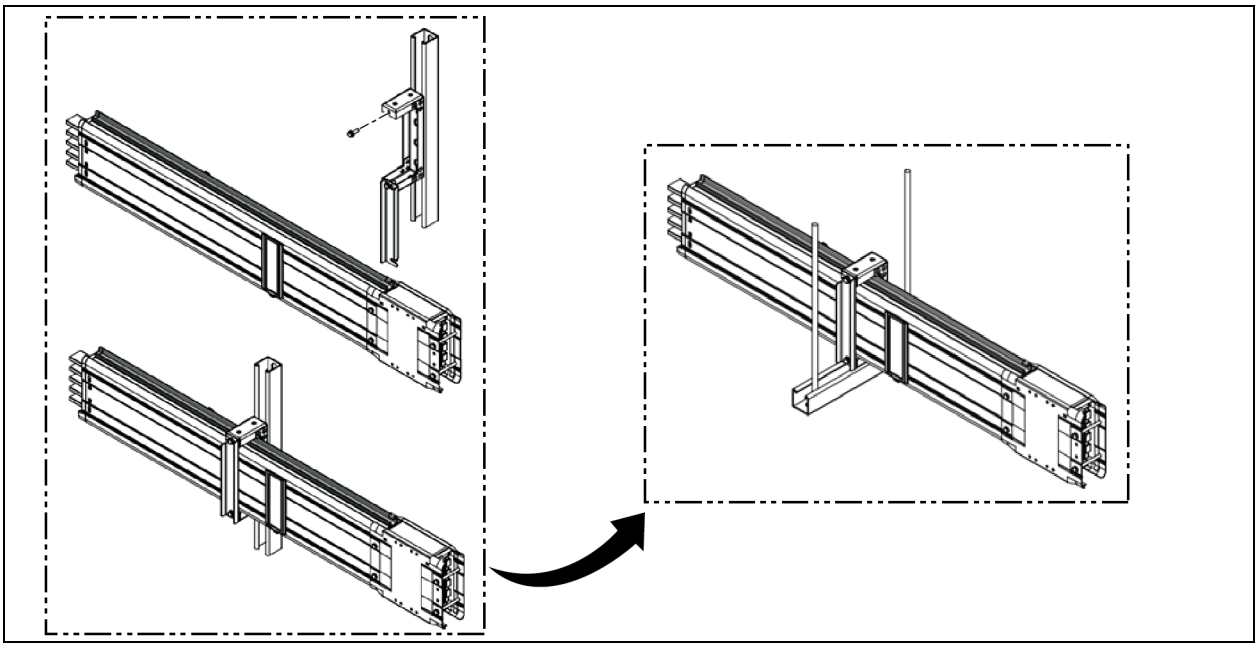
Figure 4.3 Installation of clips in brackets



The clip bracket does not obstruct tap off positions but need to be installed more frequently along the busbar run.

3. Install the wrap around brackets in flatwise horizontal installation at 1500 mm apart from each other.

Figure 4.4 Installation of Wrap Around Bracket

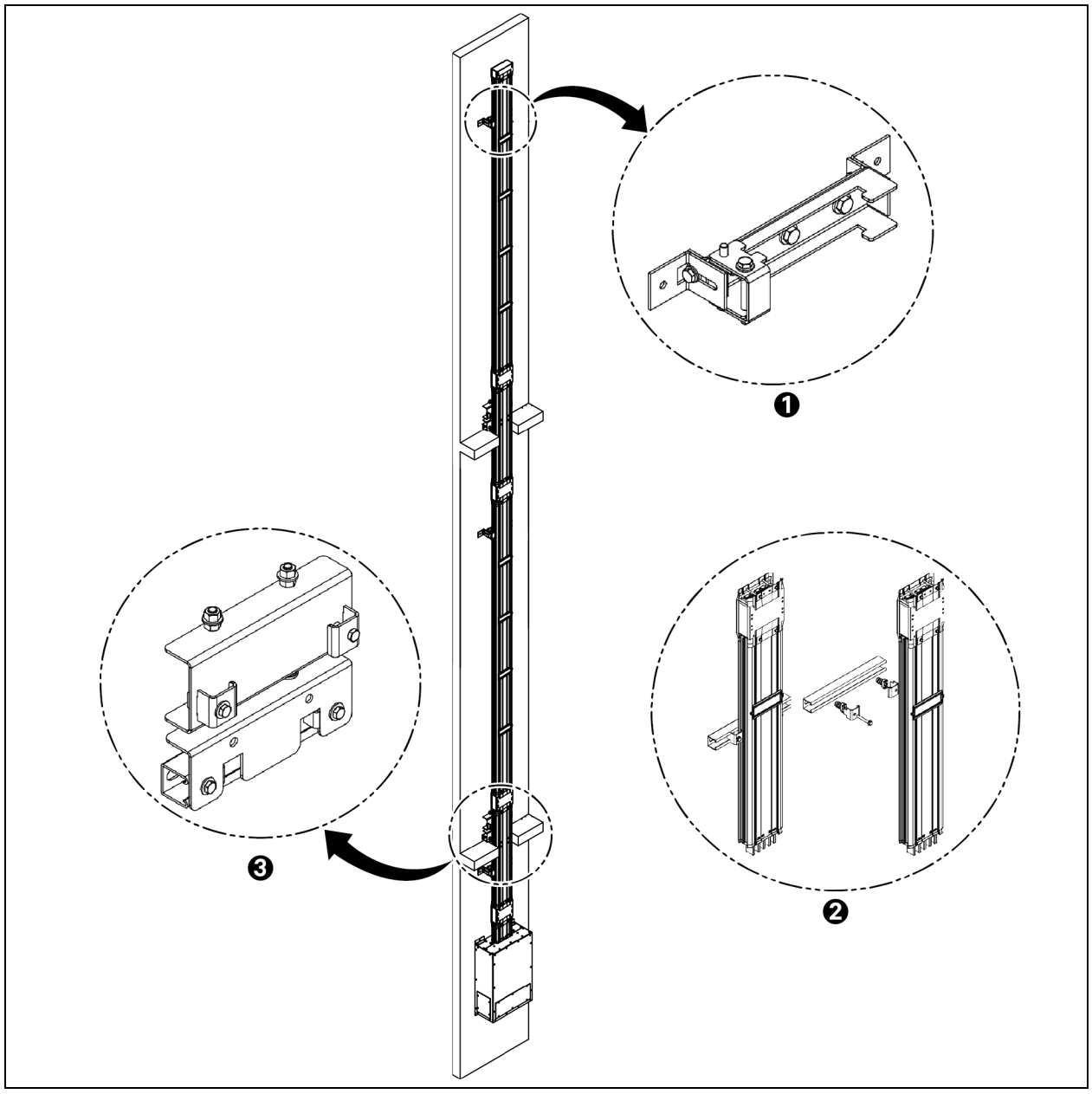


Tap off slot positions are to be considered when using wrap around brackets as they may obstruct a plug in point.

It is the responsibility of the support system supplier to ensure their system can safely support the weight of our product.

4.3 Installation of Rising Mains

For building expansion, spring hanger brackets are installed on each floor of the rising main. Additionally guide brackets are installed in between the floors.



Item	Description
1	Guide bracket
2	Clamp brackets*
3	Spring hanger bracket
NOTE: * For short vertical busbar run under 30 m clamp brackets can utilize.	

4.4 Installation of the Joint Pack

The steps below outline best practice, the Busbar orientation and site conditions may restrict installers from adhering to this methodology. In these cases installers must be cautious and ensure the joint pack is installed correctly. Ensure all parts are meggered and visually inspected prior to installation.

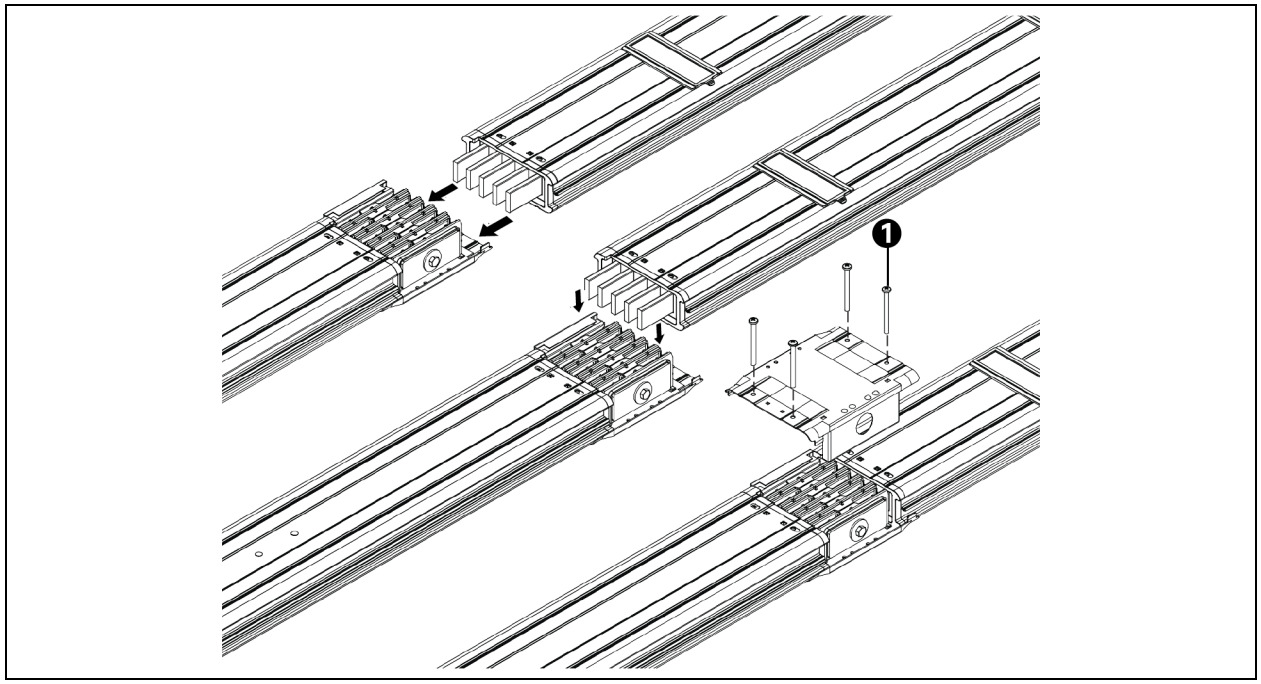
1. Remove the top cover of joint pack. The bottom covers are secured with the internal parts of joint packs.
2. Fix both lengths into place using the appropriate brackets. Ensure the phasing is lined up correctly by checking the labels and inspecting the earth channel.
3. Push the open end of the bar into or down onto the joint and check that the fish plate separators are tight up against both end pieces.

CAUTION: Never force the joint or strike it with any object, as this may damage the joint or the busbar section. Insert the joint with constant force.

Ensure the joint pack assembly is:

- Free from contaminates.
- Free from debris.
- Not damaged.
- Correctly aligned.

Figure 4.5 Position of Joint Pack Cover Bolt

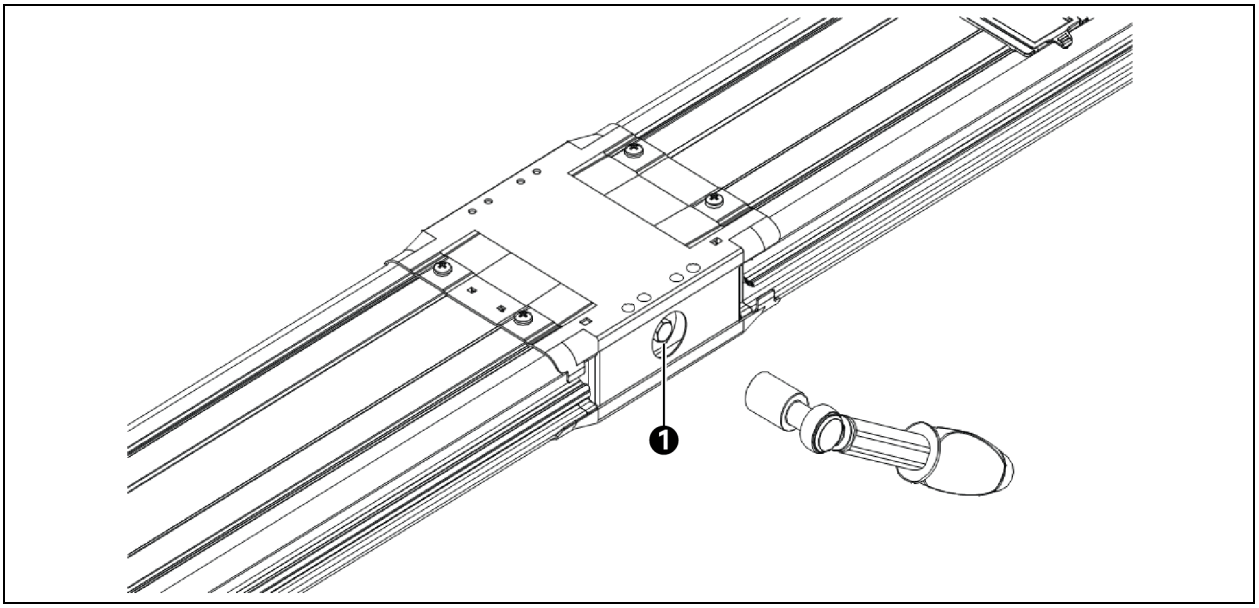


Item	Description
1	Joint pack cover bolt 7 Nm

4. Tighten the bolts on joint pack cover with a calibrated torque wrench. Set torque level to 7 Nm.

5. Tighten the bolts in the center of the joint pack with a calibrated torque wrench. Set torque level to 25 Nm.

Figure 4.6 Joint Pack Center Bolt



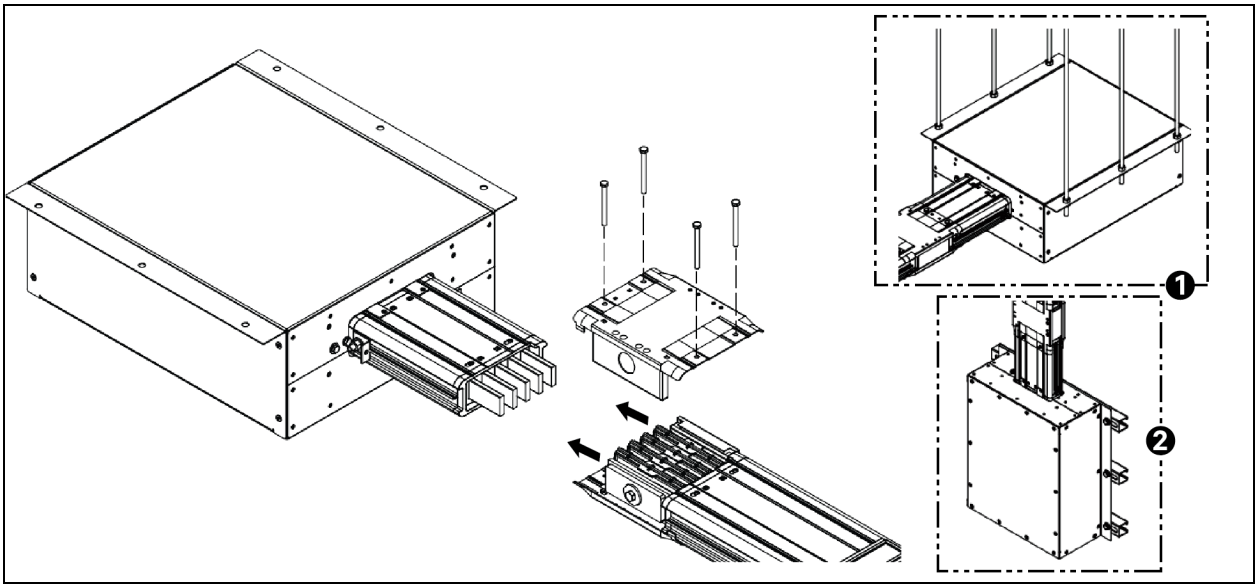
Item	Description
1	Joint pack center bolt

NOTE: Reattached the rubber bung to the opening once completed.

4.5 Installation of Cable End Box

This is generally the first component to be mounted on a run.

1. The entire route should initially be inspected for any obstructions before installation.
2. Install the box at the correct height as mentioned in the drawings.
3. Apply the plumb line at start of the run to the end of the run, as a guide for the installation of the busbar run.



Item	Description
1	Horizontal Bar Mounted with drop rods
2	Vertical Bar Mounted on unistrut

4.6 Installation of Elbows

Ensure all parts are meggered and visually inspected prior to installation.

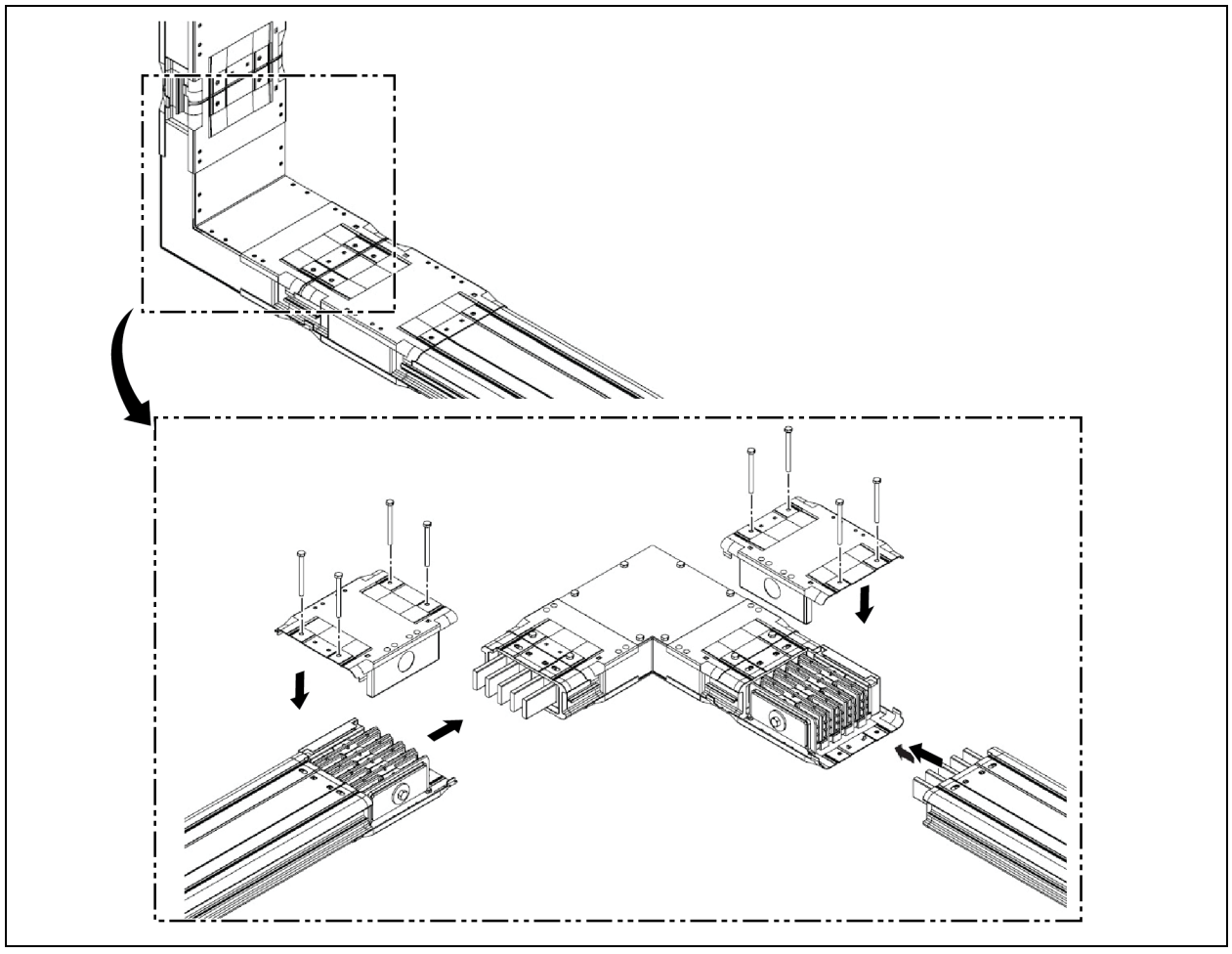
1. Mount busbar to frame.
2. Install the joint pack elbow to busbar.

CAUTION: Never force the joint or strike it with any object, as this may damage the joint or the busbar section. Insert the joint with constant force.

3. Install the second busbar as shown in the Figure 4.7 below.
4. Mount the second busbar section firmly to the frame work.
5. Tighten the bolts on the joint pack cover with a calibrated torque wrench. Torque level to be set at 7 Nm. If installed correctly the joint will appear level and no overlapping should appear.
6. After installing the joint between two adjacent sections, megger the complete installation again.

NOTE: Clear the area of any debris or foreign objects.

Figure 4.7 Position of busbar

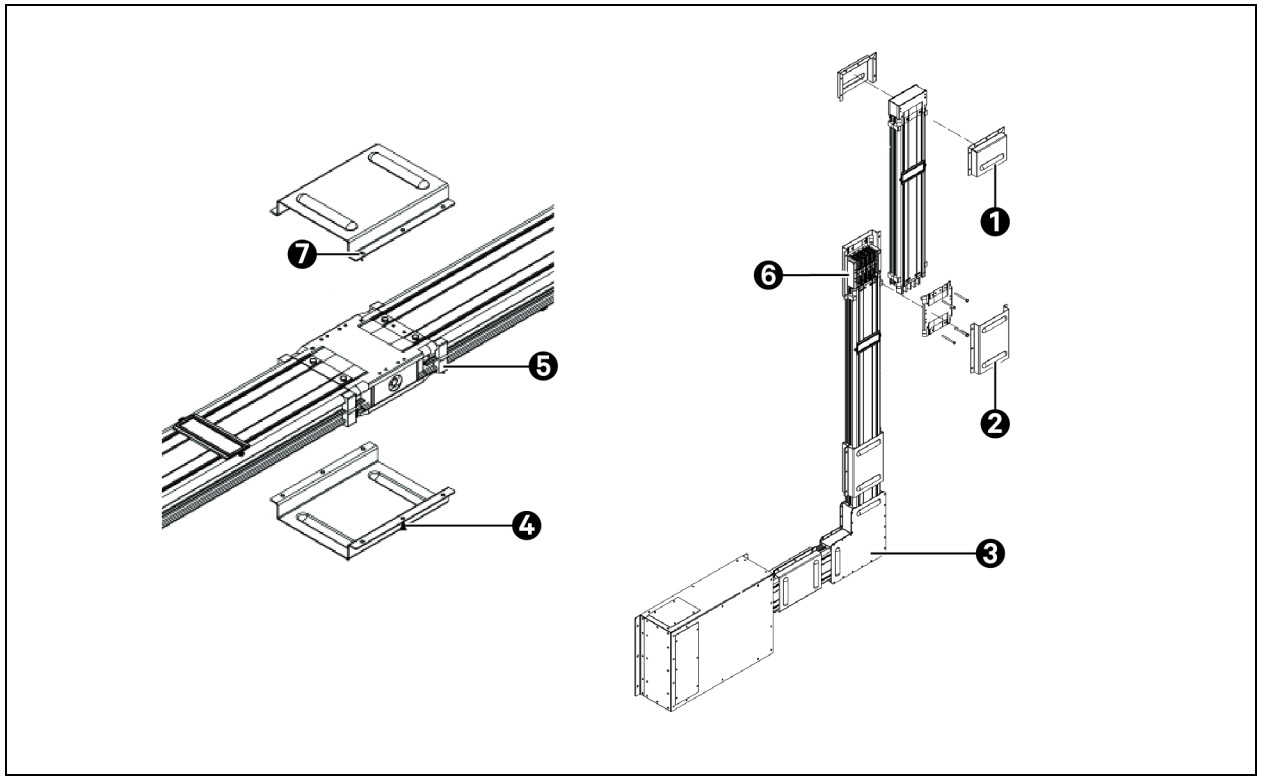


4.7 Installation of IP55 Covers

Additional covers are required when IP55 is specified. Joint covers and end caps are fitted on site over the factory fitted rubber seals. Elbow covers are fitted in factory. There are top and bottom covers (top covers have clearance holes/bottom covers have tapped holes).

1. Tighten the M6 bolts with a calibrated torque wrench. Set torque level to 10 Nm.

Figure 4.8 IP55 Cover



Item	Description
1	IP55 end cap
2	IP55 Joint Cover
3	Factory fitted elbow covers
4	Bottom cover with tapped holes
5	Factory fitted rubber seals
6	Bottom IP55 cover to be in place before installing next busbar length
7	Top cover with clearance holes

4.8 Type of Tap off Module

There are three types tap off modules as listed below:

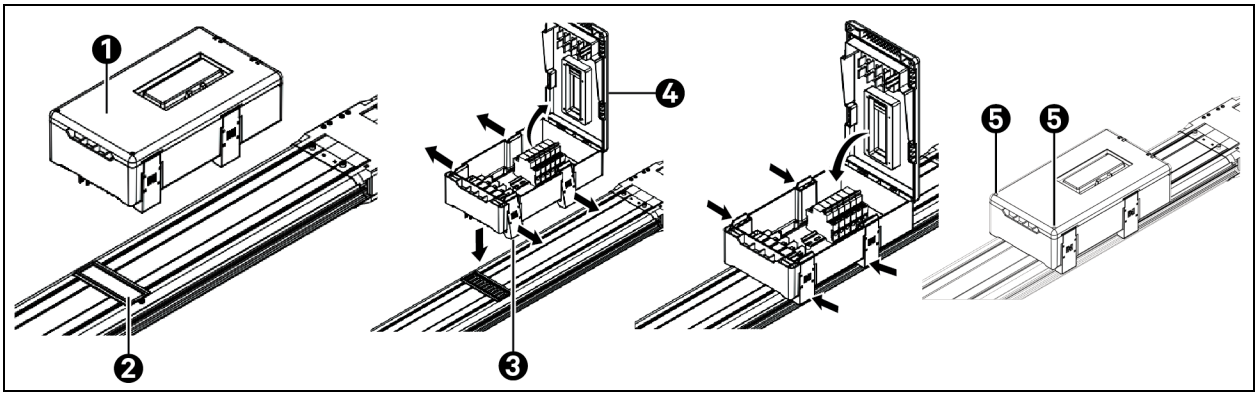
- Plastic tap off module
- Euro tap off module
- V type tap off module

4.8.1 Plastic Tap Off Modules

The Vertiv™ PowerBar MPB3 range of tap off modules has an arrangement of enclosure, circuit breaker, monitoring device, on load isolator, and safety interlocks which provide a unique set of safety features for installation.

- The knife arrangement ensures that the tap off box can only be inserted on to the MPB3 busbar system with the door open and therefore the bar isolated.
- The shutter ensures that the tap off conductors can be inserted onto the MPB3 bar whilst ensuring no conductors are exposed to the installer.
- The knife arrangement can only be engaged when the clips are closed fixing the box to the bar allowing the door to be closed. In turn the box cannot be removed from the bar without opening the door and isolating the bar.
- The tap off box is fully grounded/earthed before any phase connections are made and the earth/ground remains intact after any phase connections are broken in the event of Tap-off box isolation/withdrawal. This safety features ensures electrical safety throughout the operation.

Figure 4.9 Installation of Tap off Module



Item	Description
1	Tap off box
2	Tap off slot
3	Clip
4	Door of tap off box
5	Screw

To install the Plastic Tap off module follow the below procedure:

1. Carry out all works in line with HSE requirements using MS/RA for each installation.
2. Remove tap off from packaging and ensure no damage is visible to the device.

3. Remove tap off slot cover from bar and disgard.
4. Open the door of tap off box.
5. Push the four clips open on tap off as shown in Figure 4.9 on the previous page.
6. Install tap off module on bar. The longer earth contact on the knife arrangement should line up with the bigger openings on the tap off slot.

NOTE: The design of the box will not allow to insert in the wrong polarity.

7. Insert the tap off box onto the bar, close the 4 clips.
8. Close the door. This will engage the knife arrangement and the box will become live. Fit two screws as shown in Figure 4.9 on the previous page to secure the door.

4.8.2 Euro Tap Off Modules

The Vertiv™ PowerBar MPB3 range of tap-off modules comprise an arrangement of enclosure, circuit breaker, monitoring device, on load isolator and safety interlocks which provide a unique set of safety features for installation.

- The knife arrangement ensures that the tap-off box can only be inserted on to the MPB3 busbar system with the door open and therefore the bar isolated.
- The knife arrangement ensures that the tap-off conductors can be inserted onto the MPB3 bar whilst ensuring no conductors are exposed to the installer.
- The knife arrangement can only be engaged when the clips are closed fixing the box to the bar allowing the door to be closed. In turn the box cannot be removed from the bar without opening the door and isolating the bar.
- The tap-off box is fully grounded/earthed before any phase connections are made and the earth/ground remains intact after any phase connections are broken in the event of Tap-off box isolation/withdrawal. This safety features ensures electrical safety throughout the operation.

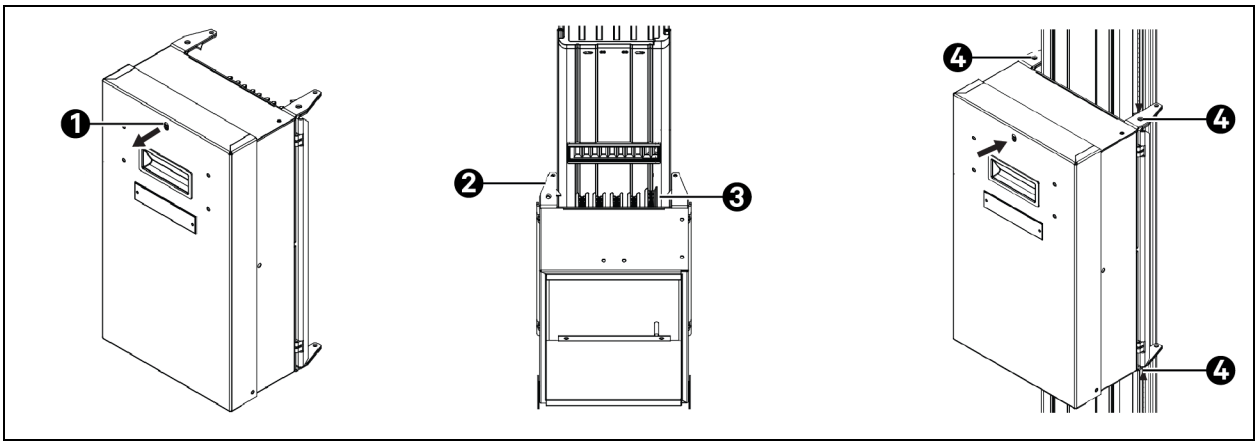
To install the Plastic Tap off module follow the below procedure:

1. Carry out all works in line with HSE requirements using MS/RA for each installation.
2. Remove tap off from packaging and ensure no damage is visible to the device.
3. Remove tap off slot cover from bar and disgard.
4. Remove bolt from door using 5 mm Allen key and open the tap off door.
5. Install tap off module on bar. The longer earth contact on the knife arrangement should line up with the bigger openings on the tap off slot.

NOTE: The box cannot be inserted in the wrong polarity as the design of the sprung shutter on the bar will not allow this.

6. When inserting the box onto the bar the two interlock brackets will snap onto the bar allowing the door to be closed.
7. Close the door. Replace the bolt on the door. Fit four bolts at the locations shown in Figure 4.10 on the facing page on the interlock brackets.

Figure 4.10 Position of Bolt



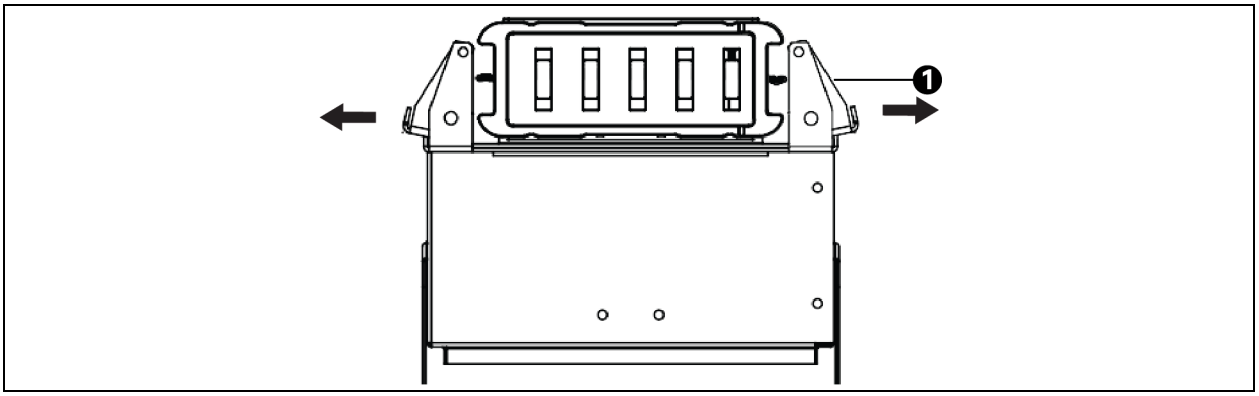
Item	Description
1	Bolt
2	Interlock bracket
3	Earth contact
4	Position of bolt

NOTE: Closing the door will engage the knife arrangement and the box will become live. This will also lock out the 2 interlock brackets preventing the box being removed from the bar whilst live.

To remove the tap off module

1. Remove the bolts from the interlock bracket and the door.
2. Open the door. This will break the knife connection and isolate the box.
3. Pull the two interlock brackets away from the box.
4. Remove the box from the Busbar.

Figure 4.11 Remove the Tap off module



Item	Description
1	Interlock bracket

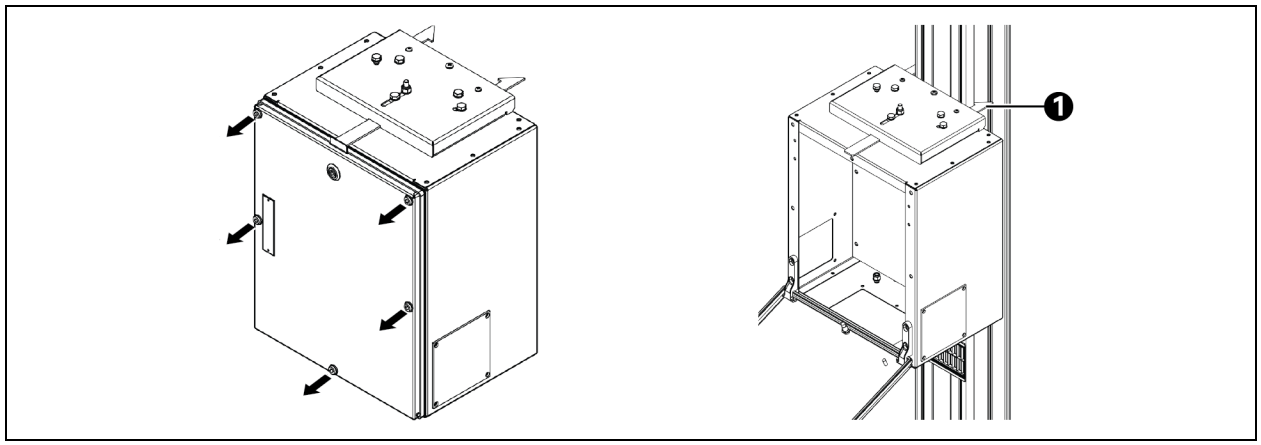
4.8.3 V Type Tap Off Modules

The Vertiv™ PowerBar MPB3 range of tap-off modules comprise an arrangement of enclosure, circuit breaker, monitoring device, on load isolator and safety interlocks which provide a unique set of safety features for installation.

To install the V type Tap off module follow the below procedure:

1. Carry out all works in line with HSE requirements using MS/RA for each installation.
2. Remove tap off from packaging and ensure no damage is visible to the device.
3. Remove tap off slot cover from bar and disgard.
4. Loosen the five bolts from door using 6 mm Allen key, these bolts are retained on the door. Open the tap off door with the provided quarter turn key.
5. Install tap off module on bar. The longer earth contact on the tap off should line up with the bigger openings on the tap off slot. The interlock arms will snap onto the bar. On the opposite side the arms can be secured with the provided bolts.
6. Ensure box is correctly installed. Close the door and reinstall the bolts on the door.

Figure 4.12 Bolt location

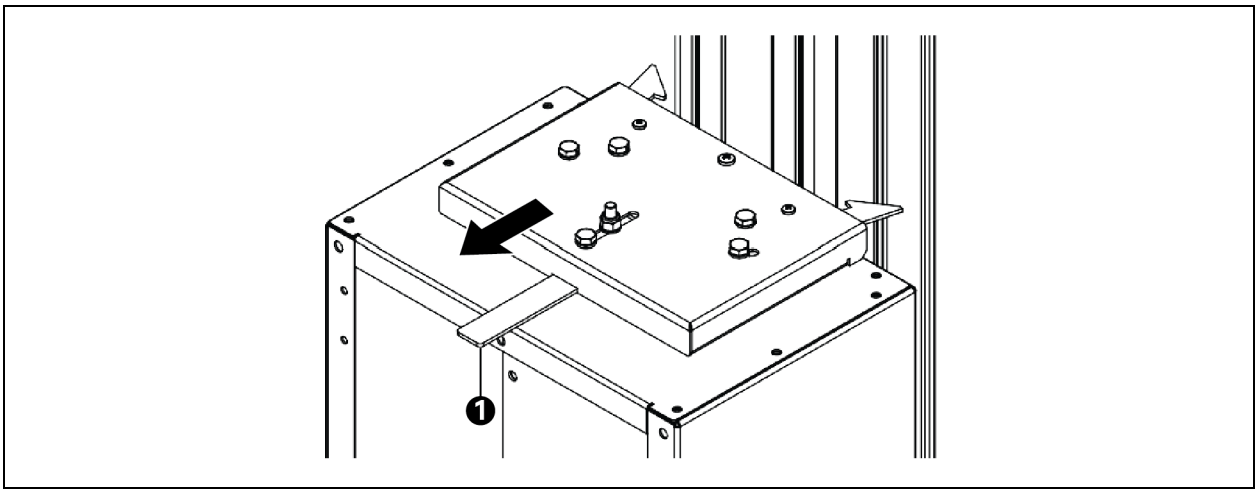


Item	Description
1	Interlock arms

To remove the tap off module

1. Loosen the bolts on the door.
2. Open the door.
3. Remove the bolts from the interlock arms.
4. Pull the lever on the interlock assembly away from the bar. This will release the interlock arms as shown Figure 4.13 on the facing page.
5. Remove the box from the busbar.

Figure 4.13 Removing the V Type Tap Off Modules



Item	Description
1	Lever arm

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5 Maintenance

5.1 Maintenance of Busbar

- Vertiv™ PowerBar MPB3 is constructed using simple, robust mechanisms with connection busway joint principles established and verified in the Electrical Industry for over 50 years.
- The design lends itself to simple reliable installation that enables future modifications to be carried out easily. It has therefore no defined routine maintenance requirements.
- The joint and busway design means that any maintenance that may be required is easily identified by thermal imaging of the run.
- All the system components are designed and tested according to the requirements of IEC61439.

5.2 Maintenance of Tap Off Module

- As with the main busbar system the joints require checking on the tap off connections. Thermal imaging can identify localized heat spots.
- As previously described, upon identifying a local problem preventative maintenance should be investigated with the busbar isolated.
- Visually check the installation of the tap off module, check outgoing cable connections.

Check the operation of the switching device positive ON, OFF operation. Examine protective device for sign of short circuit operation. If a short circuit has occurred on the equipment connected to the tap off module check operation of device and the integrity of the device.

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6 Energizing

6.1 Prior to Energizing

A test must be completed prior to energizing

1. Perform a continuity test to verify the run is complete.
2. perform a ductor test to check the resistance of the joints through the entire length.
3. A megger test, 1000 VDC between each conductor and ground. Readings will vary widely between site to site due to length of run, humidity, temperature and site conditions. If readings less than 5 MΩ are obtained, measures must be taken to identify the location of the low resistance level and take appropriate measures to increase the resistance level. This test should only be carried out by competent personnel.
4. Ensure all tap off boxes are installed correctly and are in the ON position for insulation resistance testing.
5. Ensure all connections to the busbar/tap off boxes are disconnected.
6. Verify that torque is applied as per the recommended settings. Ensure all joint covers are firmly secured.
7. When reconnecting the system prior to energization, ensure correct phase rotation is achieved by testing prior to energizing the supply.
8. Ensure all tap off are turned off again prior to energizing.

6.2 Instructions for Energizing

- Only authorized, competent personnel should energize electrical circuits in line with switching procedures and permit to work forms provided by the site electrical supervisor.
- All connected load to the busbar trunking via tap off boxes for example should be isolated prior to energizing the bar.
- The main supply switch to the busbar is to be energized first.
- The Protection Settings should be at the circuit breakers minimum protection level.
- Only when the busbar is being put into service are the protection settings set to the specified figures.
- Following the successful closing off the supply breaker, close the circuit breakers supplying the connected loads (via Tap-Offs) one by one.
- Visually inspect the energized busbar route to look for any anomalies. Listen for noises from the system as this could indicate untightened cover plates.

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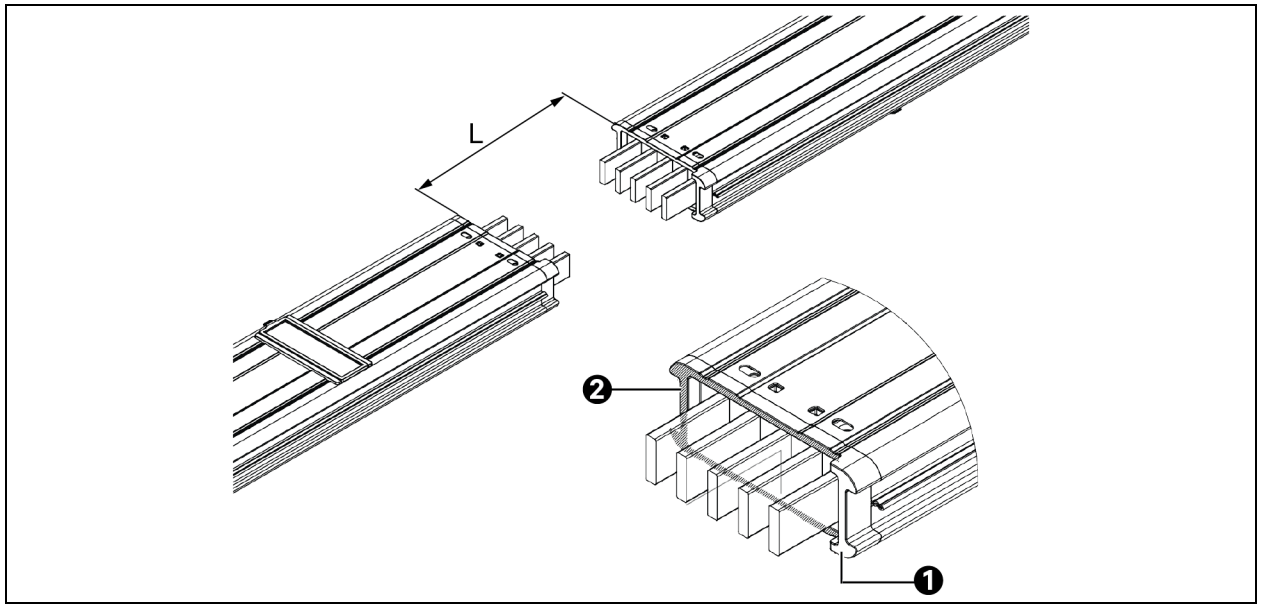
7 Site Measures

- Site measures are generally the last element to be installed in a run.
- The dimensions are measured on site after installation of the standard components.
- Select a straight section to be a site measure.
- Provide a minimum dimension of 800 mm for straight lengths to allow for an adjustment ±200 mm on site. The minimum leg length for straight lengths should be equal to 600 mm.
- Provide a minimum dimension of 600 mm for elbows to allow for an adjustment ±200 mm on site. The minimum leg length for straight lengths should be equal to 400 mm.
- Check the busbar phasing on each length is aligned i.e. Stepped earth side on each length line up with each other.

7.1 Measuring Straight lengths

The dimension between the faces of the end plastics (L) is required to order a straight length site measure.

Figure 7.1 Straight length measurement

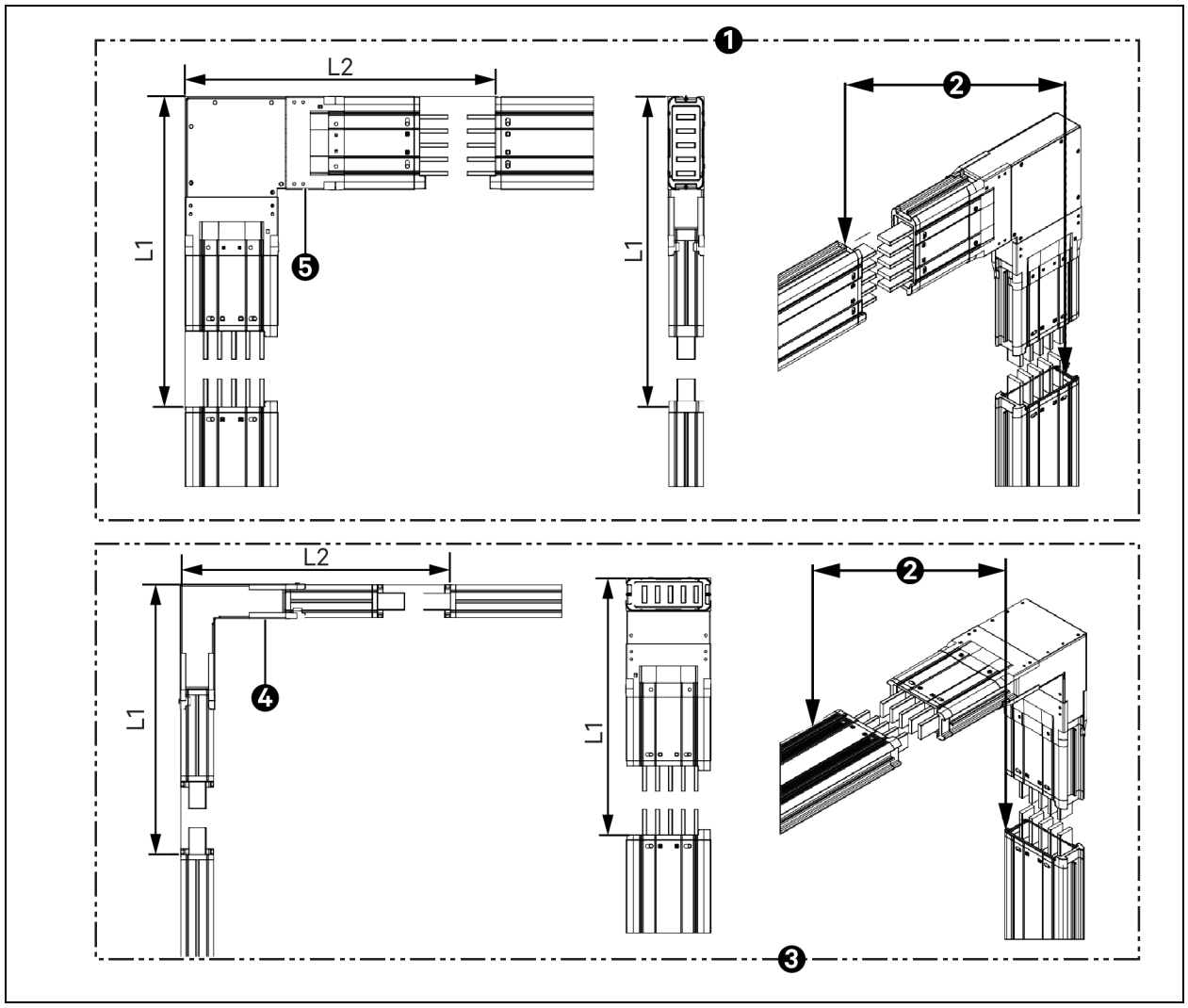


Item	Description
1	Stepped side indicates earth side
2	Measurement from this face

7.2 Measuring Elbows

The dimension between the face of the end plastic and extremity of the busbar (L1 and L2) are required to order an elbow site measure.

Figure 7.2 Measuring the elbows from different locations



Item	Description
1	Edgewise measurement
2	Measurement taken from outer most edge of housing to face of plastic end piece
3	Flatwise measurement
4	Flatwise elbow site measurement component
5	Edgewise elbow site measurement component

Appendices

Appendix A: Technical Support and Contacts

A.1 Technical Support/Service in the United States

Vertiv Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Vertiv™ PowerBar Products

Europe - +44(0) 2835 3030

USA - +1 864 375 1757

UAE - +971 488 64062

A.2 Locations

United States

Vertiv Headquarters

505 N Cleveland Ave

Westerville, OH 43082

Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

Asia

7/F, Dah Sing Financial Centre

3108 Gloucester Road, Wanchai

Hong Kong

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