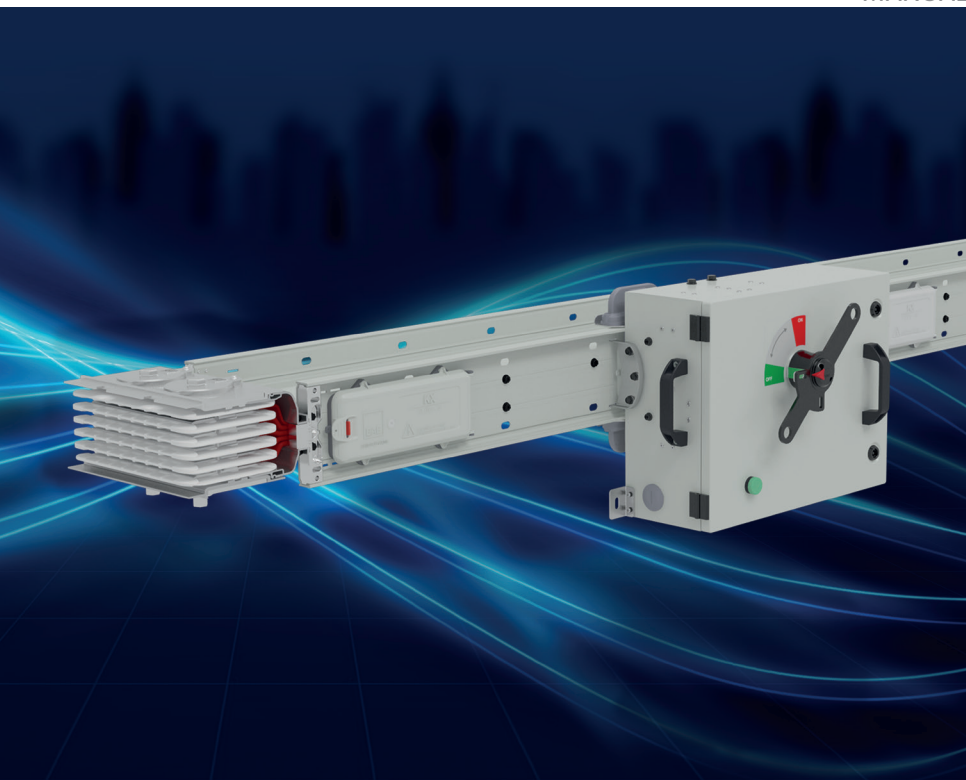




# E-LINEKX-III

MANUAL



**E-LINEKX-III**



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These instructions should be read carefully and acted upon before taking delivery of equipment on site.

### Dear Customer,

EAE Elektrik A.S. Products are designed to provide the maximum benefit in efficiency and service. Our products are manufactured in accordance with Management Systems standards and EAE quality principles in our modern production plants in Istanbul.

The components that you have purchased are manufactured by a completely environment conscious with the relevant Environmental management Standards and accordance with the principles of information Security Management systems, in accordance with the rules of occupational safety and health.

Handling, installation and operation of product should be carried out only by skilled, trained and authorized personnel using all associated equipment such as rubber gloves, helmet, safety glasses or face shields and flash resistant clothing in accordance with established safety practices.



### ► Safety Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed. This is the safety alert symbol. It is used to alert you to personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

#### **DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

#### **WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.

#### **CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

#### **NOTICE**

**NOTICE** is used to address practices not related to physical injury. The safety alert symbol is not used with this signal word.

Follow all safety precautions provided in this bulletin and all safety label instructions on this equipment.

### DANGER

#### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- This plug-in unit or busway systems must be installed and serviced only by qualified electrical personnel.
- Handle this equipment carefully and install, operate, and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to equipment or other property.
- Follow the safety label instructions on the equipment and inside this bulletin.
- Perform such work only after reading and understanding all of the instructions contained in this bulletin.
- Turn off power to busway before installing or removing plug-in unit.
- Do not install, operate, or remove plug-in unit with cover open or removed.
- Turn off power to busway before working on line side of plug-in unit.
- Turn off plug-in unit before opening or working inside enclosure.
- Always use a properly rated voltage sensing device at all line and load side fuse clips to confirm the plug-in unit is off.
- Before closing the door or replacing the cover-mechanism, carefully inspect the switch area to ensure no tools or objects have been left on or inside the equipment.
- The successful operation of this equipment depends upon proper handling, installation, operation, and maintenance.

**Failure to follow these instructions will result in death or serious injury.**

#### ► General Danger Safety Label

NEMA Publication BU 1.1 is provided with each busway project as a guide for proper installation, operation, and maintenance of busway products. This publication addresses such areas as inspection of all electrical joints and terminals for tightness, preventing the entry of water and contaminants into the busway, instructions for what to do if water and contaminants do enter the busway, and other maintenance topics. EAE recommends to help ensure the highest quality of product performance are as follows:

- NFPA 70–National Electrical Code (U.S.)
- NFPA 70B–Maintenance of Electrical Equipment
- NEMA BU 1–Busway Standard published by the National Electrical Manufacturers Association
- CSA C22.1–Canadian Electrical Code, Part 1

1-Installation according to the project of the busway system, planning and coordination with other distribution systems (mechanical, heat, steam, air installation etc.) is crucial.

2-Operational Success of the Busway systems is ensured by adhering to the right transport, proper installation and design. Improper application may cause malfunction of the system, personal injury and damage to operating systems.

3-The installation, operation and maintenance of the busway system should only be carried out by qualified personnel who know the dangers associated with installation a, construction and operation of electrical equipment for the purposes of this manual. Additionally, this personnel ;

- \* Knows the requirement of applicable electrical laws, other laws and standards.

- \* Be trained and authorized to test, energize, clean, ground, label and lock the system and equipment suitable for occupational safety applications.

- \* Be trained in the use and maintenance of personal protective equipment such as rubber gloves, helmets, protective goggles or face shields and gauze-resistant clothing in accordance with relevant work safety practices and potential hazard levels.

- \* Must be trained in first aid.

### WARNING

Dangerous voltage levels in the electrical components may result in the hazardous injury and death.

Installation, monitoring and maintenance must be carried out on de-energized busway electrical equipment. In this way, unintentional contact to the equipment under the energy is prevented. must be followed all warnings and related instructions.

### WARNING

Operation of the busway damaged by water or moisture can caused damage property, serious personal injury or death. To ensure proper installation resistance and to ensure that the moisture source is removed, observe the notes in section on page 17 item 13 you receive.

**BUSWAY SHOULD  
NOT BE IN TOUCH WITH  
ANY LIQUID MATERIAL**

Dry  
Envoirement



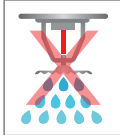
Rain



Water



Fire  
Sprinkler



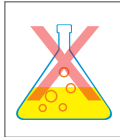
Drops



Chemicals



Urine

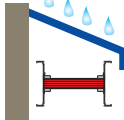


**CLOSE  
INDIRECT or DIRECT  
WATERWAYS.**

Please use canopy  
for outdoor  
applications.



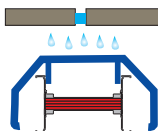
Please use porch  
for outdoor.



Please use porch  
for outdoor.



Please use canopy  
for building expansion  
points.



**BUSWAY THAT ARE NOT  
ASSEMBLED COMPLETELY  
HAVE NO PROTECTION  
AGAINST TO WATER.**



### ► Busway

1- General guidelines are given to protect the busway straight lengths and modules and reduce the risk of personal injury and equipment damage during handling on site.

2- As soon as the container or truck arrives on site, a suitable forklift is required for easy and convenient unloading from vehicle directly to the ground level.

3- All pallets should be checked by unpacking them sufficiently to inspect them for possible transit damage and to determine that the shipment is complete and correct as per Packing List provided.

\* If any of the items is missing from the Packing List or any piece is damaged during transportation, Insurance Company must be informed immediately for proper reporting with all required documents for further action.

4- All busway straight lengths and modules should be handled with care to avoid damage to internal components and the twisting of housing or its finish.

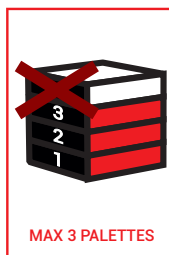


## WARNING

### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- Protect this equipment from contaminants such as water, salts, concrete, and other corrosive environments before, during, and after installation.
- Do not sit, walk, or stand on this equipment.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**



5- When the lengths and modules are required to be taken from the pallets to the erection area, those should be hoisted using metal rods or bars passed through the 2 sets of holes at each end of the housing body by ensuring the load is stable and safely secured. Then adequate sling and slinging method can be used for shifting from one place to another.

6- The removal of the products from one floor to the other floor must be done by means of a suitable electric and mechanical crane or elevator.

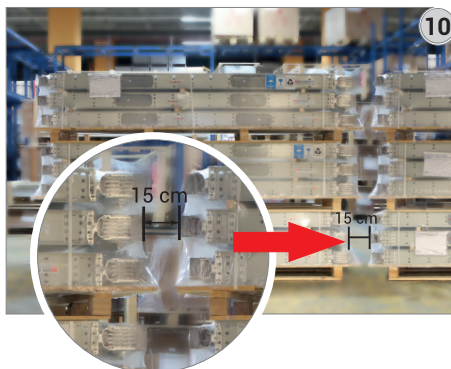
7- Repack the Busway if you need to store or hold before installation (Refer to chapter5.) as long as conditions permit, do not disassemble the busway until it reaches the lastest installation point.

8- Storage area should be a clean, dry space with a uniform temperature to prevent condensation and having adequate air circulation and protected from dirt, fumes, water. Storage area should be free of vehicle traffic to prevent physical damage to the products.



9- When busway straight lengths and modules are to be stored for certain time before installation, restore the packing for protection during that period and cover them with waterproof sheet in very well protected area from dust and any kind of liquid on sufficient quantities of wooden bearers.

10- The busway designed for the outdoor environment are not weatherproof until the insallation is complete and in accordance with the instructions and above recommended storage conditions must be applied for other busway.



11- When busway straight lengths and modules are to be stored for certain time before installation, restore the packing for protection during that period and cover them with waterproof sheet in very well protected area from dust and any kind of liquid on sufficient quantities of wooden bearers.

**NOTE:** Never drag the busway across the ground.

► **Busplug**

Plug-in units are shipped in corrugated cartons. Do not drop or perforate the cartons. Handle the plug-in units with care to avoid damage to internal components and the enclosure or to its finish. Avoid subjecting plug-in units to twisting, denting, dropping, or any other rough handling. Ensure the equipment at the installation site is adequate to handle the plug-in unit. Verify the lifting capacity of the crane or other available lifting equipment. Refer to the appropriate busway systems manual for weight specifications. If using a forklift, position the plug-in unit on the forks to distribute the weight properly. Take care not to damage the metal housing. Avoid using objects with sharp edges to lift the plug-in unit.

**NOTE:** Never drag the plug-in unit.

**NOTICE**

**POTENTIAL EQUIPMENT CONTAMINATION**

- Store the equipment in a clean, dry location.
- Protect the equipment from contaminants such as water, salts, concrete, and other corrosive elements.

**Failure to follow these instructions can result in equipment damage.**

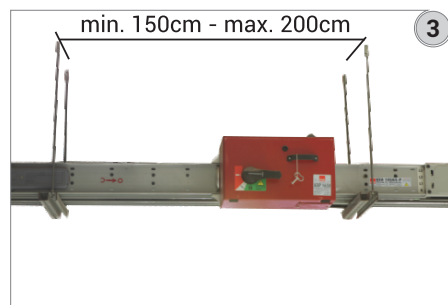
**NOTE:** If the plug-in unit is not going to be installed and energized immediately, store it indoors in a clean, dry place with a uniform temperature. Protect the unit from contaminants such as water, salt, concrete, and other corrosive elements.

#### IMPORTANT!

1- Please read this instruction manual before commencing the busway installation. Incorrect or incomplete mounting may cause damage to the equipment or system.

2- Installation of the busway system should commence after reading through busway application drawings. Locate the positions of individual pieces such as transformer-panel connections, expansion units, feeder units, end feeder units etc. and check that they are in accordance with the project drawings.

3- Seismic support systems should be used in earthquake risk areas. Please contact our company for details of seismic support products and project planning. The recommended distance between supports is 1.5m, the maximum distance is 2m. Make sure that support positions do not block either joint covers or tap off points.



4- DDT modules should be used at min. 20cm distance to the each floor concrete.

5- If the busway lines are used in the transition of building dilatations, appropriate dilatation module should be chosen. Please contact our company for support.

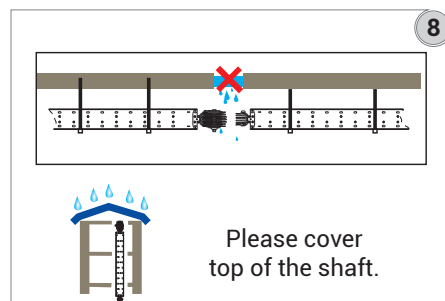
6- Busway system should be handled with care either by forklift, crane or any other means which will not damage the product while transporting or lifting. If hoisting the busway with a crane, use nylon straps to distribute the

weight of the section. If using cables, insert spreaders to avoid damage to the busway. If using a forklift, position the busway on the fork to distribute the weight properly. Take care not to damage the metal housing, which could result in a failure of the busway. Avoid using objects with sharp edges to lift the busway. When transporting busway, position its weight evenly. Generally vertical installation is provided in vertical lines.

Please read additional installation instructions.

7- When install horizontal and vertical, it must be aligned correctly to prevent collapses and bends.

8- Protect the busway against water and moisture from unfinished roofs and walls during installation.





# KX-III MANUAL

## ►► Installation

### ►► Points to be taken into consideration before installation



9- Tools required for the installation,

**Micrometer type adjustable/calibrated torque spanner**

9-a ½ inch square drive size 10mm, 13mm and

9-b 19mm socket

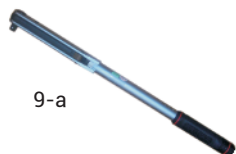
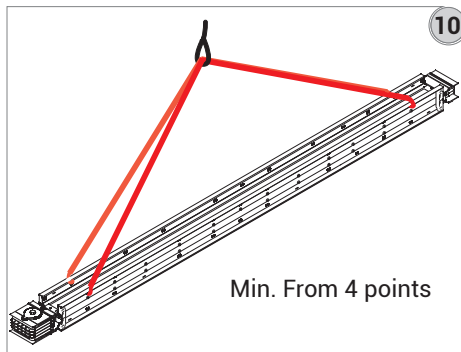
9-c Drilling Machine

9-d Size 10mm Spanner/Socket

9-e Screwdriver

9-f Hoist with cloth sling

10- The busway to be installed needs to be hanged min 4 points, as shown in below picture.



9-a



9-d



9-b



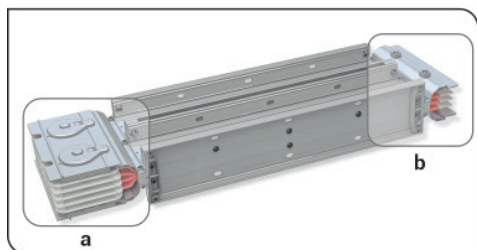
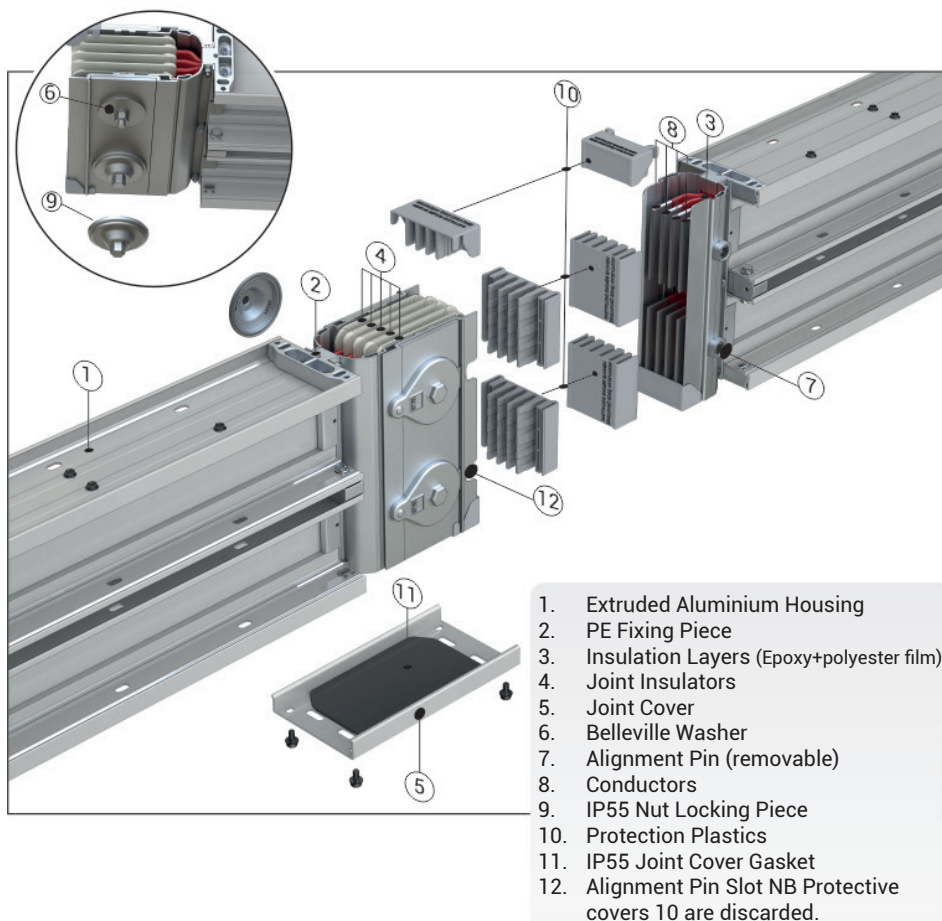
9-e



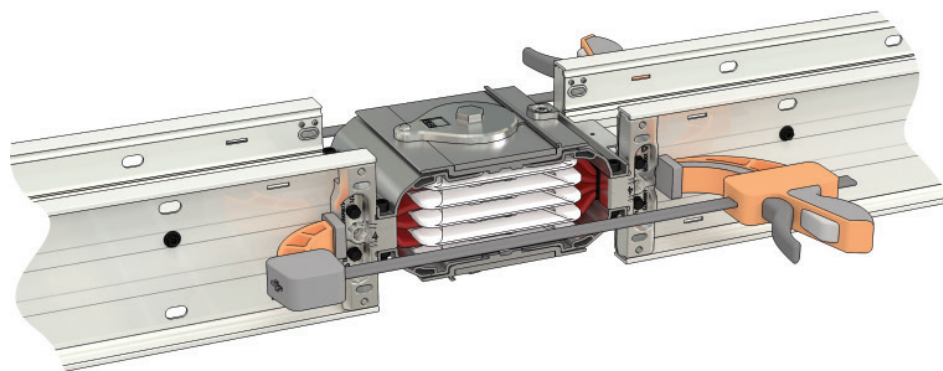
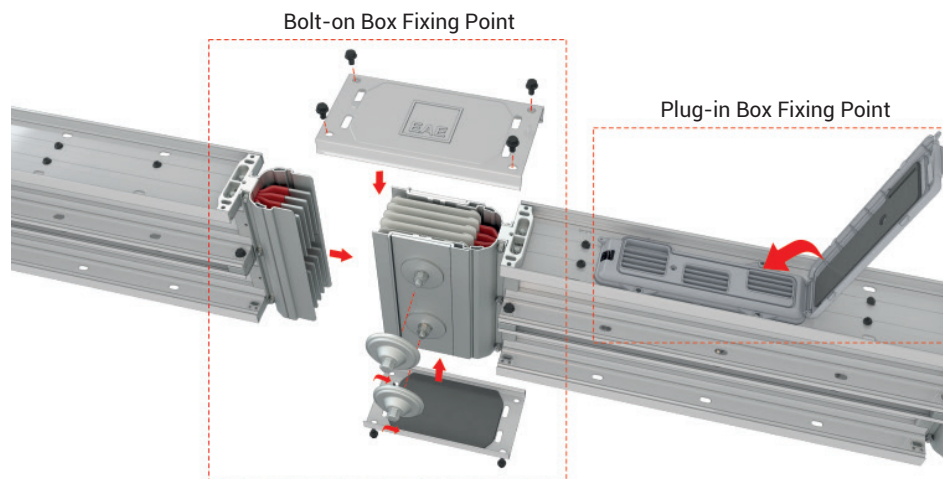
9-c



9-f



KX busway are manufactured in 3m lengths as standard, with special lengths as detailed on the project drawings. All modules have a block joint end and the other end of the module has not block joint.

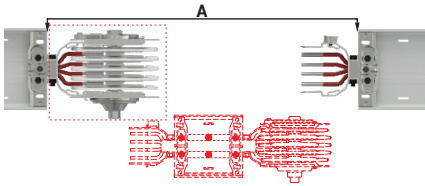


Use special hand clamps if it is difficult to move.

1- Special length (particular or custom size) busway are used in places where standard sizes do not fit when the busway is mounted and in other similar places. The minimum length for these special element is 35cm. Please measure the lengths of these modules as shown below.

2- Length A is measured between housing of 2 busway in cm. "A". The special length is calculated by deducting 25cm from this measured length.

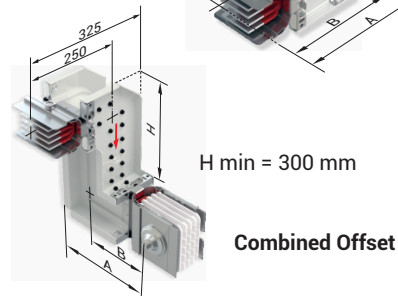
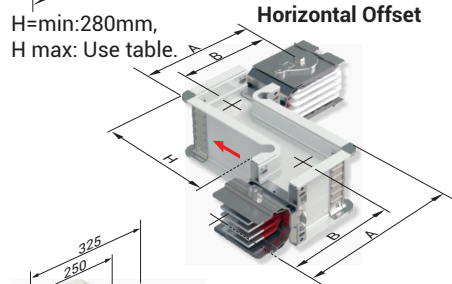
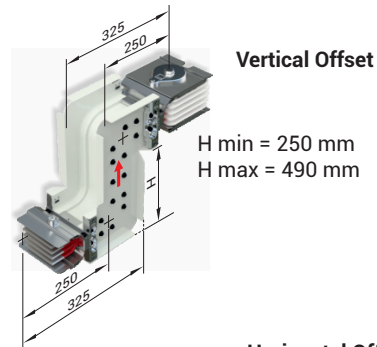
**X=A-25 (cm) X=Length of Special Busway**  
(The busway module will be manufactured as per X value.)

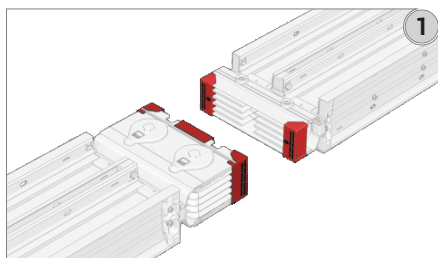


3- In the case in where custom-made intermediate-size busway are required, both ends of the intermediate-size busway can be produced with or without block joints. In such cases, please contact our company for technical support and technical information.

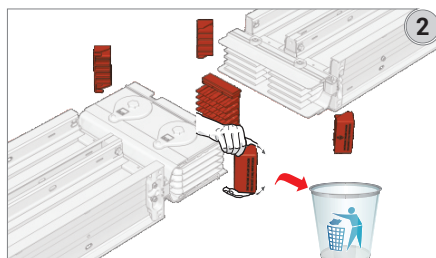
**Note:** Please send a drawing for combined offsets when ordering. Indicate bolted and non-bolted ends on the drawing.

KXA-III Al Conductors		KXA-III Cu Conductors		A		B		H=Offset (max)	
Rated Current	Busway Code	Rated Current	Busway Code	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)
400	04	-	-	10.12	257	8.54	217	17.00	432
550	05	630	06	10.51	267	8.74	222	17.40	442
-	-	800	08	10.71	272	8.82	224	17.60	447
630	06	-	-	11.10	282	9.02	229	17.99	457
-	-	1000	10	11.30	287	9.13	232	18.19	462
800	08	1250	12	12.08	307	9.49	241	18.98	482
1000	10	1350	14	12.68	322	9.80	249	19.57	497
1300	13	1600	16	13.86	352	10.39	264	20.75	527
1600	17	2000	20	15.63	397	11.26	286	22.52	572
2000	20	-	-	17.99	457	12.44	316	24.88	632
-	-	2000	22	16.81	427	11.85	301	23.70	602
-	-	2500	26	17.99	457	12.44	316	24.88	632
2500	25	3200	32	20.35	517	13.62	346	27.24	692
3000	30	-	-	23.89	607	15.39	391	30.78	782
-	-	4000	40	24.69	627	15.79	401	31.57	802
3200	33	-	-	26.26	667	16.57	421	33.15	842
4000	40	-	-	30.20	767	18.54	471	37.48	952
-	-	5000	50	28.62	727	17.76	451	41.42	1052
-	-	6000	60	33.35	847	20.12	511	46.14	1172
5000	50	-	-	35.71	907	21.30	541	48.50	1232

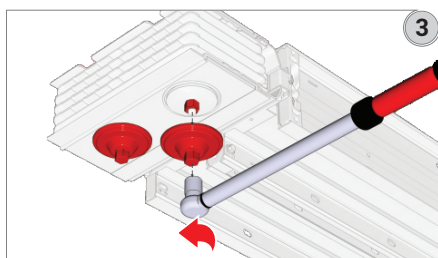




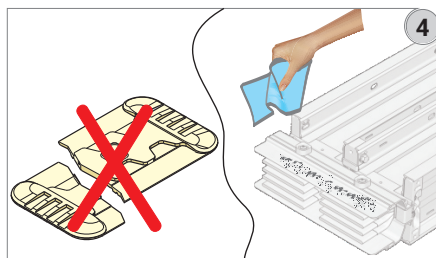
1- Align the two busway so that the parts with and without block joints are opposed.



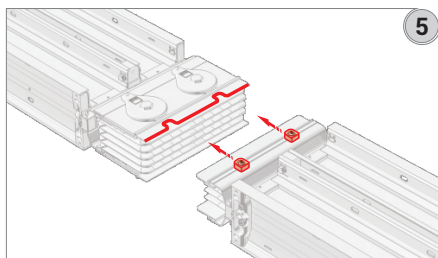
2- Remove the protective covers on the side with no block joints.



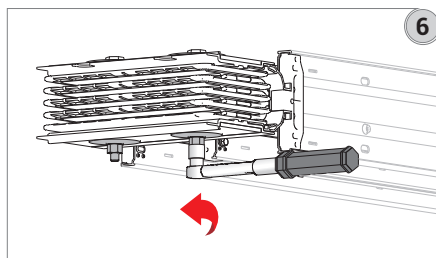
3- Remove the nut locking piece on the busway joint and loosen the joint. Remove the protective covers after loosening the joint.



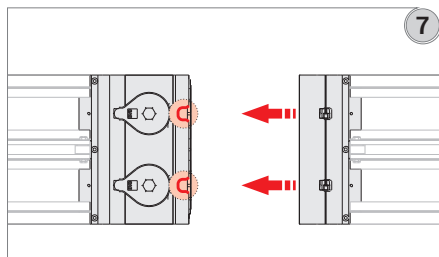
4- Ensure that the insulation plates of the joint, are not cracked, broken or damaged in anyway. Wipe the conductor surfaces with a cloth to clean dust, which can cause serious damage.



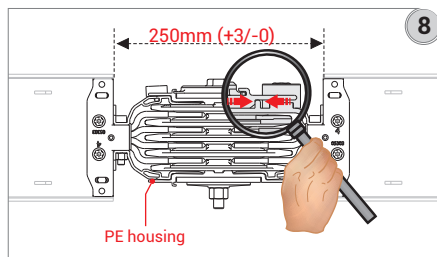
5- Align the block joint to the other busway's end.



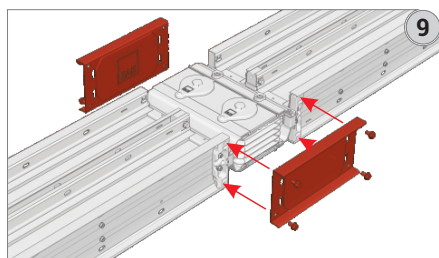
6- Loosen the nut at the joining point completely.



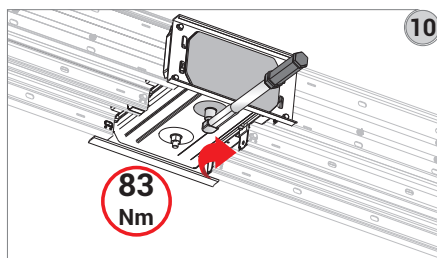
7- Adjust the channel in order to pivot the alignment piece to the housing.



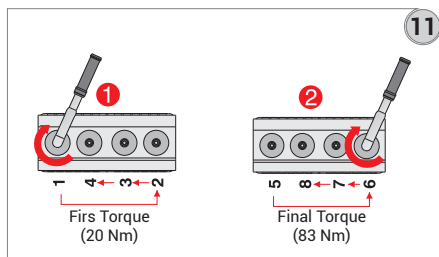
8- Push the two busway until they rest on each other.



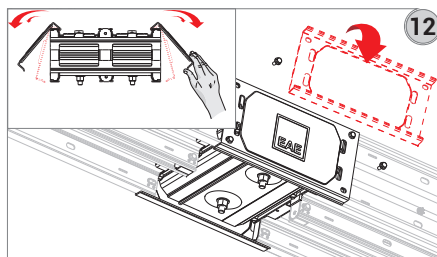
9- Assemble both the joint covers with the gaskets facing out.



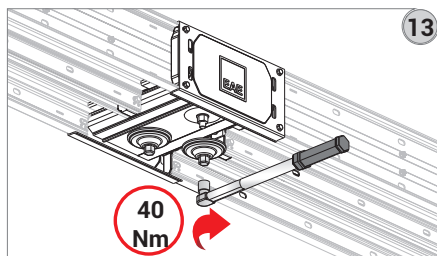
10- Adjust the torque wrench to 83 Nm (60 lbft) and tighten the joint nut.



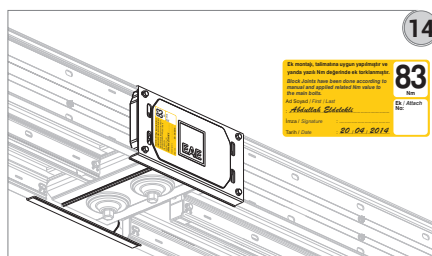
11- If there is more than one bolt per phase, the bolts should be tightened by hand to approximately 20-30 Nm as per the sequence shown above. Then finally torque to 83 Nm using the same sequence.



12- Remove the joint covers and reverse mount them with the gaskets facing in.



**13-** Finally tighten the locking piece to 40 Nm to complete the installation.



**14-** Please fill in the necessary places to verify that you are performing torque according to the specified norm. Attach to the joint cover.



1- When the installation has been completed, please check the position of the neutral conductor along the busway run. (Taking special care at locations where the run makes turns and offsets)

2- Carry out insulation test (minimum 1000V AC). Make sure that no protective device (switch, disconnector, etc.) is connected to the system and that the earth - neutral line is separate. All tap of boxes on the line must be set to «0». Keep in mind that the results can vary according to the busway length, width or number of bars. The results may also vary according to the moisture content. Values should not be less than 1 MegaOhm / 30 meters. It is recommended that no energy is supplied to the line even if the insulation test is completed successfully.

2.2 ELECTRICAL CHECKS (ELEKTRİKSEL KONTROLLER)				
MEGGER TEST (MEGER TESTİ)				
Rated Insulation Voltage (Busbar İzolasyon Gerilim Değeri): .....				
Megger Test Voltage (Uygulanmış Meğer Test Gerilimi) : .....				
*(Test Voltage must be 1000V for busbars rated insulation voltage up to 1000V, test voltage must be 500V for rated insulation voltage up to 690V)				
*(Aynı izolasyon gerilimi 1000V'a kadar olan busbarlar için test voltajı: 1000V, 690V'a kadar olan busbarlar için test voltajı: 500V olmalıdır.)				
*(Measured resistances must be suitable for IEC 61439-1/11.9 standard.)				
*(Ölçülmüş dirençler IEC 61439-1/11.9 uygun olmalıdır.)				
L1-L2 : .....	Ohm > 1,0 MΩ	<input type="checkbox"/>	L3-N : .....	Ohm > .....
L1-L3 : .....	Ohm > 1,0 MΩ	<input type="checkbox"/>	L1-PE : .....	Ohm > .....
L2-L3 : .....	Ohm > 1,0 MΩ	<input type="checkbox"/>	L2-PE : .....	Ohm > .....
L1-N : .....	Ohm > 1,0 MΩ	<input type="checkbox"/>	L3-PE : .....	Ohm > .....
L2-N : .....	Ohm > 1,0 MΩ	<input type="checkbox"/>	N-PE : .....	Ohm > .....

(Explanation (Açıklama):

2.1- When the busway system is energized for the first time, qualified electrical personnel must be present. If short circuits and earth faults are detected due to any damage or faulty installation practices, serious damage can occur if the power is turned on.

2.2- When the power is supplied, there must be no electrical load in the busway.

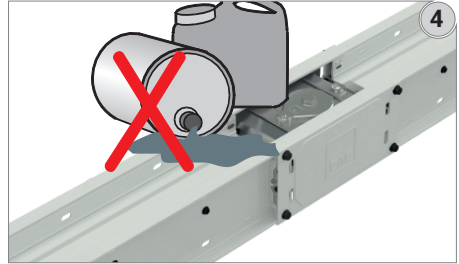
2.3- After the busway system is energized, loads must be switched in sequence (main and sub feed).

2.4- When the busway is used properly, it will have a moderate hum. Excessive noise may be an indication of hardware that has not been extruded or incorrectly mounted metal parts.

2.5- Spark formation at any point along the busway is not normal. The busway must be de-energized and de-energized until the spark condition is corrected.

3- Do not try to install five conductor units to four conductor units or vice versa.

4- Do not apply any kind of oil or chemical at the joints or to the contacts of tap off boxes.



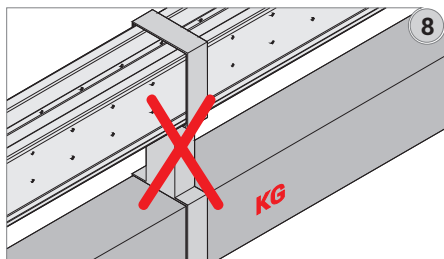


5- Do not use any other means than original tap off boxes to supply energy from the busway.

6- Current rating of the busway run should be equal to the rating of the breaker. Do not exceed busway nominal current during operation.

7- Make sure that any additional loads to the system following do not exceed the nominal current capacity of the busway.

8- Do not use busway system as a supporting structure for other systems.

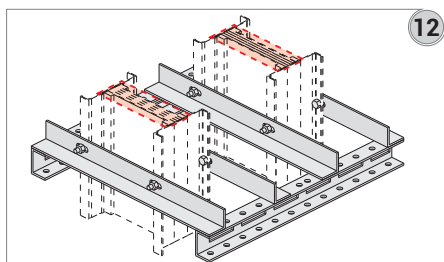


9- Do not use busway system as a walk way.

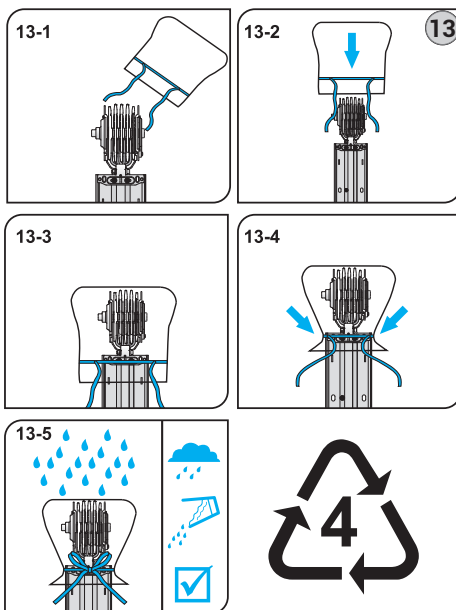
10- Do not light a fire or use welding equipment near the busway.

11- Take care when handling the system components. Do not drop the units.

12- Do not cut or drill the busway units. Please consider below picture when installing the busway for vertical applications. Please do not drill the busway at any place where is marked with red on the picture.

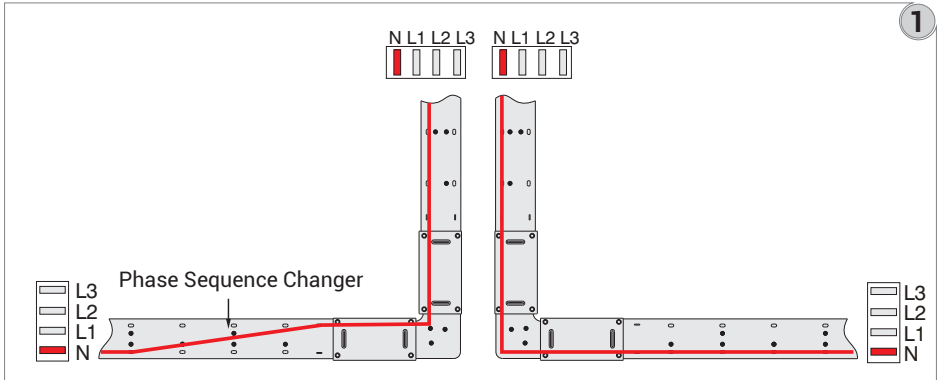


13- Take precautions against adverse environmental conditions such as rain and snow. In addition, the busway dripping cement, etc. inside the building. Protect from water, malfunctioning piping and all fluids that may come from water jets. Cover if necessary. Cap the ends to the busway joint points that have not been installed at the end of the work.



14- Ensure the selected degree of protection (IP rating) of the system is suitable for the working environment.

#### WITHSTAND PERIODS AGAINST TO WATER AS PER STANDARD



#### ► Vertical Shaft Application

1- The neutral bar of KX busway shall be at the bottom for horizontal busway lines and on the left for vertical busway lines. (Figure 1)

2- In order to maintain the neutral bar at the bottom and in the vertical busway on the left, it is required to use the phase changing module. (Figure 1)

## DANGER

### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- This plug-in unit must be installed and serviced only by qualified electrical personnel.
- Turn off power to busway before installing plug-in unit onto the busway.
- Turn off plug-in unit.
- Always use a properly rated voltage sensing device at all line and load side connections to confirm that the power is off.
- Do not install plug-in unit without circuit breaker installed.
- Do not install plug-in unit with cover open or removed.

**Failure to follow these instructions will result in death or serious injury.**

## ►► Wiring

### ► Busplug

## NOTICE

### POTENTIAL EQUIPMENT DAMAGE

Field modifications of the enclosure (other than the cable entrance holes) are not allowed, as they may adversely affect product performances and the IP55 protection.

**Failure to follow these instructions can result in equipment damage.**

**NOTE:** In order to maintain the IP55 rating of the plug-in unit while wiring the unit, IP55 (or higher) rated conduit and cable fittings must be installed.

#### ► Tap Off Boxes With Protective Devices Menin

1- EAE tap off boxes are not equipped with any protective device unless they are required by customer. Any type of devices can be fixed in tap off boxes providing specific informations about device prior to manufacture in order to adjust interlock mechanism.

2- Tap off boxes operating mechanisms of all electrical & mechanical interlocks should be exercised to determine that they operate freely to their full on and off positions.

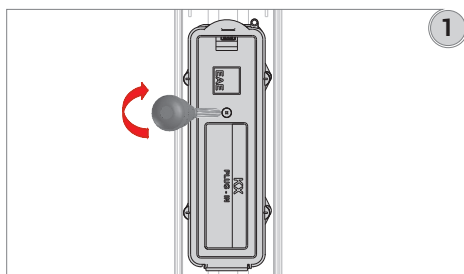
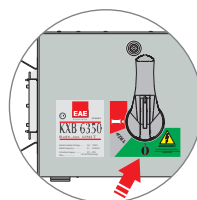
#### ► Vertical Application

##### Warning!

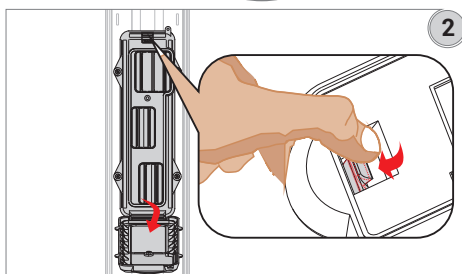
- \* Do not try to install plug-in tap off boxes to bolt-on busway or vice versa.
- \* Do not try to install 4 wire tap off boxes to 5 wire busway or vice versa.

3- The total continuous load current should be measured by proper instrument that does not exceed the current rating on the busway name plate or the designated design current.

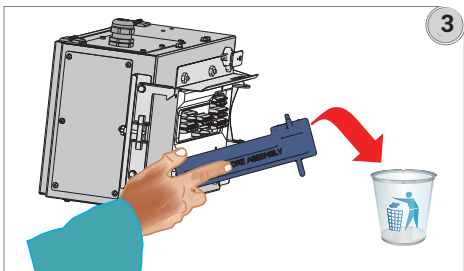
4- After performing all of the above inspections and necessary repairs, it may be desirable to perform an infra-red temperature test on all electrical connections after busway system is re-energized and reaches a stabilized operating temperature.



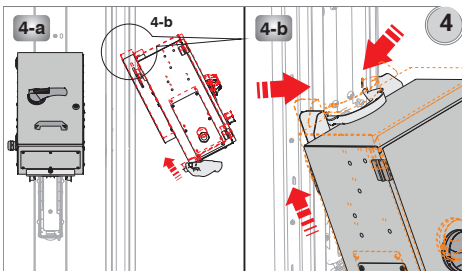
1- Remove the fixing screw of "plug-in" tap off point cover using cross-recessed screw driver.



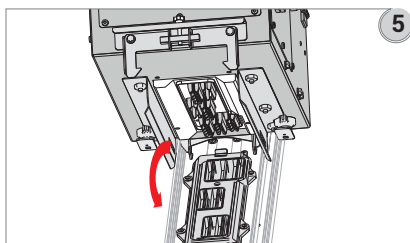
2- Open and push the cover back, the "plug-in" tap off point cover should be opened to a position which will not block the way for installation of the box. Do not remove the cover plate.



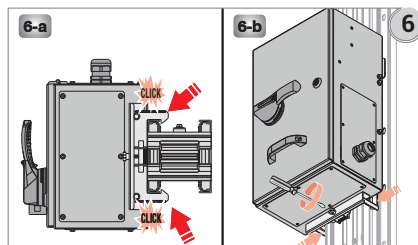
3- Throw the contact protection cover to the recycling waste bin.



4- Place the KXP Plug-in tap off box to the holes on the busway with an angle. Push the tap off box upwards as shown in figure 4-b.

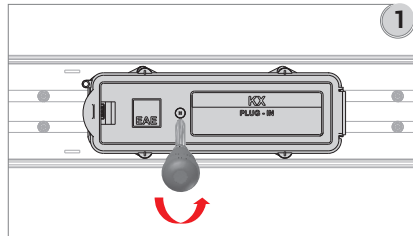


5- Check the alignment of the contacts. Push the box towards the busway.

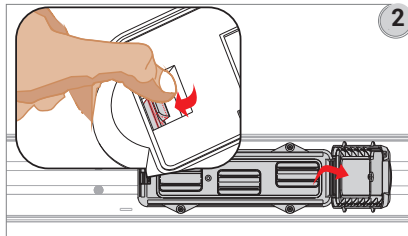


6- Push the box to the busway housing "click" sound will be heard from the locking parts on the box ensure the interlock between the box and the housing then tighten the screw.

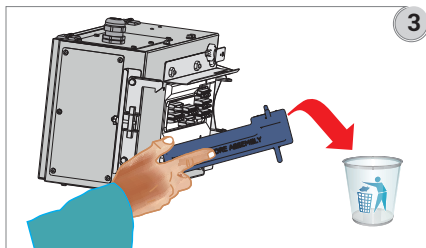
## ► Horizontal Application



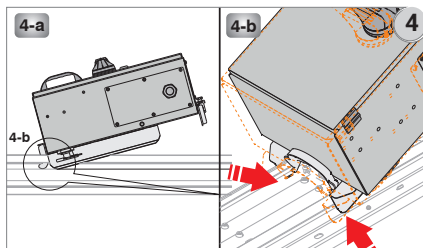
1- Remove the fixing screw of "plug-in" tap off point cover using cross-recessed screw driver.



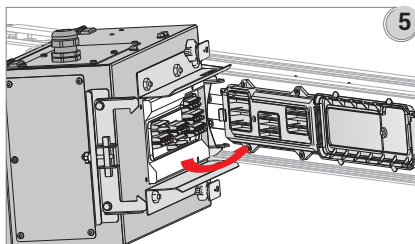
2- Open and push the cover back, the "plug-in" tap off point cover should be opened to a position which will not block the way for installation of the box. Do not remove the cover plate.



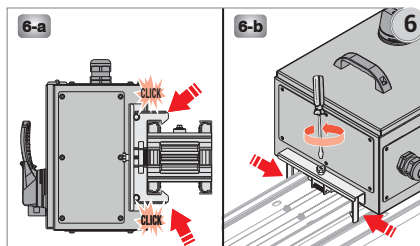
3- Throw the contact protection cover to the recycling waste bin.



4- Place the KXP Plug-in tap off box to the holes on the busway with an angle. Push the tap off box upwards as shown in figure 4-b.



**5-** Check the alignment of the contacts. Push the box towards the busway.



**6-** Push the box to the busway housing "click" sound will be heard from the locking parts on the box ensure the interlock between the box and the housing then tighten the screw.

1- When installing the feeder boxes B10, B11 make sure that the phase sequence of the feed box matches the phase sequence of the busway. (Care is to be exercised ensuring the neutral is correctly connected)

2- For multiway busway check the position of the paralleling conductor link, make sure that they are available and fitted correctly. Do not remove these conductor links.

3- Cable glands should be selected according to the size and number of feeder cables. Please consult to factory for requirements other the standard supplied ones.

4- Make sure that the incoming feeder cables to the box are all the same length for each phase.

5- Do not cut or drill the feeder units.

## » Energizing

### » Before Energizing

#### WARNING

HIGH VOLTAGE VALUES CAN CAUSE DEATH OR SERIOUS INJURIES. MAINTENANCE, INSTALLATION AND OBSERVATIONS IN THE CONSEQUENTIAL CONDITIONS; THE ENERGY AND THE CONNECTION MAY BE DONE ON THE Busway CUT OFF AND ELECTRICAL ISOLATED. THEREFORE, ACCIDENTAL RESPONSE TO BE CONTACTED BY PARTS UNDER ELECTRICALLY. FOLLOW ALL MANUFACTURER'S WARNINGS AND INSTRUCTIONS.

1- Make sure that all joint zone connections are correct. Follow the manufacturer's recommended torque.

2- Make sure that all bolt-on and plug-in boxes are in the "off" position. Boxes without power interrupts must be removed from the busway if they cannot be isolated with auxiliary power breakers.

3- Make sure that the connections between the busway and the panel, transformer and other connections are interrupted.

4- Resistance testing is to be carried out with a resistance tester of 1000 volts per part of the busway to ensure that the system does not contain short circuit and ground faults. (Phase-earth, phase-neutral, phase-to-phase). Record the results of the test and deliver it to the project or the responsible company. Note that the results may vary depending on the busway length, width, or number of bars. The results may also vary according to the humidity. If the values are less than 1 MegaOhm / 30 meters, please contact the manufacturer.

5- Before connecting the busway to the transformer, panel and other connections, make sure that the phase of the system and the phase of the busway overlap.

6- Make sure that the ventilation and drainage holes are open. Make sure that the screws and plugs in the drain holes for the outdoor busway are removed according to the manufacturer's instructions.

**7-** It is recommended that no energy is applied to the line even if the insulation resistance test described in page 12 section 2 successfully completed.

**8-** When the equipment is energized for the first time, qualified electrical personnel must be present. If short circuits and earth faults due to damage or poor installation practices are not detected in the exit procedure, serious damage may occur when the power is turned on.

**9-** When the power is supplied, the busway must not have an electrical load. Since the busway typically runs through several rooms and ground level, care must be taken to see that all devices supplied by the busway path are in the "OFF" position.

**10-** The equipment must be energized in sequence starting from the welding end of the system and working towards the load side. In other words, it energizes the main devices, then the feeder devices and then the branch-circuit devices. Turn the devices to the "ON" position with a solid positive motion.

**11-** Once all overcurrent devices have been switched on, loads such as lighting circuits, contactors, heaters and motors can be turned ON.

**12-** When properly used, the busway will have a moderate hum. Excessive noise may be an indication of hardware that has not been extruded or incorrectly mounted metal parts.

**13-** All busway ratings, routings and supporting systems should be checked as per final isometric drawings.

**14-** All busway ratings, routings and supporting systems should be checked as per final isometric drawings.

**15-** All busway system should be checked visually to be certain that they are clean and secure. Loose and/or contaminated connections increase electrical resistance which can cause overheating.

**16-** Any type of blower or compressed air should not be used to avoid blowing dust into busway joints, tap off boxes or circuit breakers. If there is accumulation of dust and dirt, clean it off by using a soft brush, vacuum cleaner, or clean lint free rags.

**17-** All joints should be correctly tightened according to the torque value given and should be marked. Then install the locking plates correctly.

**18-** All Tap Off boxes fed from the busway should be on "OFF" position.

**19-** The busway runs should be isolated by disconnecting all connections to transformers, switchboards, meters, etc.

**20-** Insulation resistance test with an insulation resistance test equipment rated 1000V AC should be conducted to verify the integrity of the system. This test should be performed between phases, neutral and earth. Permanent records should be kept of resistance readings. If the insulation reading appears to be lower than 1 megohm, then the cause should be investigated.

**21-** The system phase sequence should be checked in order to match the busway phases sequence before reconnecting all connections to transformers, switchboards, meters, etc.



### ► Energizing The Equipment

1- The equipment should be only energized by authorised personnel. If short circuits and ground faults caused by damage or poor installation practices have not been detected in the checkout procedure, serious damage can result when the power is turned on.

2- There should be no electrical load on the busway system when it is energized. Because busway typically extends through several rooms and floor levels, ensure that all devices fed from the busway are in the off position.

3- Hazardous voltages in electrical equipment can cause severe personal injury or death. Energizing a busway run for the first time is potentially dangerous. Therefore system operational voltage should be checked

4- The connected equipment should be energized in sequence by starting at the source to end of the system

5- After all overcurrent devices have been turned on, loads such as lighting circuits, contactors, heaters and motors may be turned "ON".

6- EAE busway system is particularly quiet when operating normally. In some installations however there may be a moderate hum. Excessive noise may be an indication of hardware that has not been tightened or of metal parts that have been improperly assembled and this should be checked after de-energizing the system and isolating it safety.

7- Occurrence of sparking at any point along the busway is not a normal condition. De-energize the busway immediately. Correct the cause of the sparking condition. Then conduct an insulation resistance test before attempting to energize again.

## DANGER

### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must be installed and serviced only by qualified electrical personnel.
- Close covers at all unused openings.
- The successful operation of this equipment depends upon proper handling, installation, operation, and maintenance.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## DANGER

### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before performing any work on or inside the plug-in unit and before removing or installing the fuses or making load side connections:
  - Turn off the plug-in unit.
  - Wear protective equipment appropriate for the hazard, including insulated gloves and a face shield.
- Turn off power to the busway before working on the line side of the switch.
- Always use a properly rated voltage sensing device at all line and load side fuse clips to confirm that the plug-in unit is off.
- Never operate the plug-in unit with the door open.

**Failure to follow these instructions will result in death or serious injury.**

## CAUTION

### HAZARD OF PERSONAL INJURY AND EQUIPMENT DAMAGE

- Do not force closed the cover when plug-in unit handle to the ON (I) position with the cover open.
- Never insert fingers through any slot of the mechanism housing.
- When turning the mechanism handles, make sure there are no obstructions, such as body parts, in the handle's path.

**Failure to follow these instructions will result in death or serious injury.**

## DANGER

### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before performing any work on or inside the plug-in unit and before removing or installing the fuses or making load side connections:
  - Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
  - Turn off the plug-in unit.
- Always use a properly rated voltage sensing device at all line and load side fuse clips to confirm that the plug-in unit is off.
- Never operate the plug-in unit with the door open.

**Failure to follow these instructions will result in death or serious injury.**

Use only appropriately sized and rated fuses for the application . Tighten all fuse clamp bolts and / or fuse mounting nuts to the torque values indicated on the plug-in.

### DANGER

#### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must be installed and serviced only by qualified electrical personnel.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume all circuits are live until they are completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Always use a properly rated voltage sensing device to confirm power is off.
- Close covers at all unused openings.
- Handle this equipment carefully and install, operate, and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to equipment or other property.
- Carefully inspect your work area and remove any tools and objects left inside the equipment.
- Replace all devices, doors, and covers before turning on power to this equipment.
- All instructions in this bulletin assume that the customer has taken these measures before performing maintenance or testing.

**Failure to follow these instructions will result in death or serious injury.**



#### Important!

Hazardous voltages in electrical equipment can cause severe personal injury or death unless otherwise specified. Installation, inspection and preventive maintenance should only be performed on busway system to which power been turned off, disconnected and electrically isolated so that no accidental contact can be made with energized parts. Operation of busway trunking which has been water or moisture damaged can cause property damage, severe personal injury, or death. Observe the precautions to assure adequate insulation resistance and that sources of moisture are eliminated.

1- Carefully inspect all visible electrical joints and terminals. Verify that bolts and nuts are correctly tightened.

2- Check torque on joint bolts. If the torque on any joint bolt is found to be less than 40 lb-ft (54.5 m), contact EAE representative. Insulators may be damaged due to overheating and re-torquing, which could cause a busway outage.

3- If joints or terminations are badly discolored, corroded, or pitted, or if they show evidence of having been subjected to high temperatures,

the devices must be replaced with new, factory-built devices. Torque joint bolts to 61 lb-ft  $\pm$  10 lb-ft (83 Nm  $\pm$  61 Nm).

4- Check the insulation resistance before re-energizing the busway. Keep a permanent record of resistance readings. If readings decrease appreciably with time, deterioration is occurring. Conduct the insulation resistance test from "Before Energizing" on page 25.

5- Energize equipment following the instructions in "Energizing the Equipment" on page 27.

6- After performing all of the above inspections and necessary repairs, it may be desirable to perform an infrared temperature test on all electrical connections. Do this after the busway has been re-energized and has reached a stable operating temperature.

7- Refer to NEMA bulletin BU 1.1 for additional maintenance instructions. Inspect the unit once each year and look for any appreciable accumulation of dust or liquids. The gaskets used to maintain the IP55 rating may have chemical incompatibility when the unit is installed in specific adverse environments

(corrosive gases, liquids, or dust). Also, do not allow paint to be in contact with these gaskets. For more details, contact EAE. When relocating the plug-in unit, inspect the joint compound on the connections for contamination. To order accessories and replacement parts contact EAE

**NOTE:** Protect the busway from dirt, dust, or other material that may settle on the top and block the drain holes. When cleaning, use a brush, vacuum cleaner, or clean, lint-free rag. Do not use a blower or compressed air.

1- An external inspection of the system should be carried out once a year.

2- Any dripping or other source of moisture onto the busway modules should be eliminated from installed area.



#### **Important!**

Hydrocarbon spray propellants and, hydrocarbon based sprays or compounds will cause degradation of certain plastics. Contact EAE before using these products to clean, dry, or lubricate components during installation or maintenance.

## ► Removal

### **DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, or CSA Z462.
- This plug-in unit must be removed and serviced only by qualified electrical personnel.
- Turn off power to busway before removing the plug-in unit.
- Turn off the plug-in unit.
- Always use a properly rated voltage sensing device at all line and load side connections to confirm that the power is off.
- Do not remove the plug-in unit with the cover open or removed.

**Failure to follow these instructions will result in death or serious injury.**

### KX III 400A – 6000A COMPACT BUSWAY PRODUCT FEATURES

KX III–UL busway system allows users to distribute electrical energy safely with 46 years of experience in design and manufacturing of busway systems. KX III–UL, features flexible power supply, short installation time, superior heat dissipation and electrical characteristics. 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.

#### 1- Standards & Certification

- KX III–UL Busway system has been designed and manufactured as per UL 857 standard, which requires below listed tests. Each busway rating has been type tested individually and comply with recent UL 857 standards for all type tests and certified by independent authorized testing laboratory as UL including below test:
- Compliant for: CUL Listing
- Compliant for: National Electric Code (NEC) Article 364 – Busways 19
- Compliant: NEMA AB1, Molded Case Circuit Breakers and Molded Case Switches
- Compliant: NFPA 70 – National Fire Protection Agency
- EAE has ISO 9001, ISO 14001, OSHA 18001, ISO 27001 and ISO 17025 certifications.
- All the required type tests for each rating according to IEC 61439-6 and certified with 3rd Party.
- Compliant: IEC 60364-1 Low-voltage electrical installations
- KX III–UL Busway has high flame resistance and circuit integrity properties under fire conditions according to IEC 60331, BS 6387, BS 8491 standards including joints and tap-off boxes.

#### 2- Electrical Characteristics

- KX III–UL Busway systems nominal voltage is 600 V.
- Operating Frequency: 50/60 Hz
- 6 Cycle RMS Symmetrical Short Circuit Rating shall be:  
For Aluminium Conductors;  
400-630A : 50kA  
800-1300A : 65kA  
1600-2000A : 100kA  
2500A : 125kA  
3200A : 200kA  
4000A : 150kA  
5000A : 200kA

For Copper Conductors;  
630-1000A : 65kA  
1250-2000A : 125kA  
2000-6000A : 200kA

- Position: 100% rating for any horizontal or vertical orientation.
- The maximum hot-spot temperature rise at any point in the busway at continuous rated load shall not exceed 122°F

#### 3- Components

##### 3.1- Housing

- KX III–UL Busway system has "Sandwich-Compact" structure. Conductors are packed and placed into the housing without leaving air gap in order to provide low reactance.
- The housing shall be RAL7038-Electrostatic painted extruded aluminum to provide maximum protection against corrosion from water and other contaminants normally encountered during construction.
- The busway housing shall be of 100% aluminum construction to reduce hysteresis and eddy current losses.
- Busway housing shall have optional powder coating finish if required per project design.
- "Compact structure of the housing has been provided by M6 screws applied at every 7.48 in. along the entire length.
- The sandwich-compact structure continues at the plug-in points too. There isn't any air gap between conductors at the plug-in points.
- The housing material and paint are selected with non-propagating properties.

##### 3.2- Conductors

- Conductors: Individual isolated and insulated. Aluminum or Copper conductors are epoxy coated. All phase and neutral conductors joints and contact surfaces are plated tin (optimal Silver).
- Straight sections of feeder busway can be supplied in any length, from a 12.00-inch (350 mm) minimum to a 10-feet (3048 mm) maximum
- Bus bars shall be suitably plated at all joints and contact surfaces.
- KX III–UL busway system has aluminum conductors between 400A – 5000A,
- KX III–UL busway system has copper conductors between 630A – 6000A,
- KX III–UL busway system has the following number of conductors and wire configuration;  
A. 4/5 Conductors: (4 full size conductors + PE (50% earth conductor + housing)).  
B. 5 Conductors: (4 full size conductors + PE (100% earth conductor + housing)).  
C. 6 Conductors: (5 full size conductors + PE (100% earth conductor + housing)).

##### 3.3- Insulation

- Insulation system is suitable for 600 V continuous operation.
- Specially formulated Class B epoxy insulation has been applied as insulation material which provides high insulation resistance and high peak temperature resistance.
- The insulation process apply is the spray insulation process which produces uniform application of the epoxy powder over the entire conductor bar. It is further enhanced by inline filter process and magnetic separator that help to eliminates contaminants common to fluidized bed systems.
- Epoxy is UL V0 class and halogen and toxic free properties.
- All insulators must be UL recognized.

##### 3.4- Joint Structure

- Electrical and mechanical connection is making by placing conductor joints into the joint blocks of the connected conductors and followed by tightening and fastening of the joint bolts.
- KX III–UL Busway also includes special EAE Belleville spring washer be provided to give positive pressure over complete contact area, that retains its original contact pressure ensuring proper electrical contact. Offers securer, more reliable and virtually maintenance-free joint.
- All parts of the joint structure are plated with tin against contact losses due to corrosion in order to get safe and reliable earth connections and have very low resistance values entire length.
- 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.

##### 3.5- Accessories and Components

- All conductive fittings including Tees, flanges, Reducers, Expansion joints and Elbows etc. shall be of the same material from the same manufacturer.
- End pieces and end caps will be provided to install at the ends of each line.
- KX III–UL Busway system has all necessary accessories (elbows, offsets, panel-transformer connections, reductions, etc.) EAE supply special dimensioned units in short time, if the project conditions require.
- For horizontal runs, a horizontal expansion unit has been used at every 40m and expansion points of the building.
- For vertical applications, a vertical expansion unit has been used at every floor. Busway system must be rigidly fixed by supports at every floor.
- 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.

##### 4- Tap-Off Boxes

- Tap off points shall be easily modifiable for phase configuration and be safe for installation and decommissioning while the busway is in its live state. All tap off distribution points shall have safety features prohibiting their installation while under load
- Plug-In busways have minimum 2 and maximum 5 plug-in points on each 10 inch length.
- Plug-in tap off boxes are suitable to install or removed from busways without switching off the power on the busway.
- Contacts of plug-in tap off box are plated by silver.
- Tap off boxes are manufactured of sheet steel and epoxy painted.
- Plug-in tap off boxes have electromechanical safety interlock system. Which means;  
- Electromechanical interlock mechanism ensures that the tap off box cannot be removed mechanically from the busway, when the switch is at "ON" position.  
- Electromechanical interlock mechanism ensures that, cover of the box can be opened, when the switch is at "OFF" position. It is possible to open the cover to a special pin when the switch "on" position, it is depending on customer requests  
- While inserting the contacts of plug-in tap off box, earth contact makes the first touch. While removing, it is disconnected last.

**Final field measurements shall be made by the contractor prior to release for manufacture to assure coordination with other trades.**  
**The installer will follow all manufacturers' installation details.**

## PRODUCT TYPES



## BUSWAY ENERGY DISTRIBUTION SYSTEMS



## CABLE TRAYS



## TROLLEY BUSWAY ENERGY DISTRIBUTION SYSTEMS



## INDOOR SOLUTIONS



## SUPPORT SYSTEMS



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