Lectrobar
OPTIMUM DESIGN

LECTRO Bus Way System
[Series LSB II / 300A - 5000A]

LECTRO Bus Way System
[Series LSB II/ 300A - 5000A]

Energy demand is ever growing...
we attempt to provide efficient distribution
of electrical power with minimum power loss

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LECTRO BAR Series LSB II

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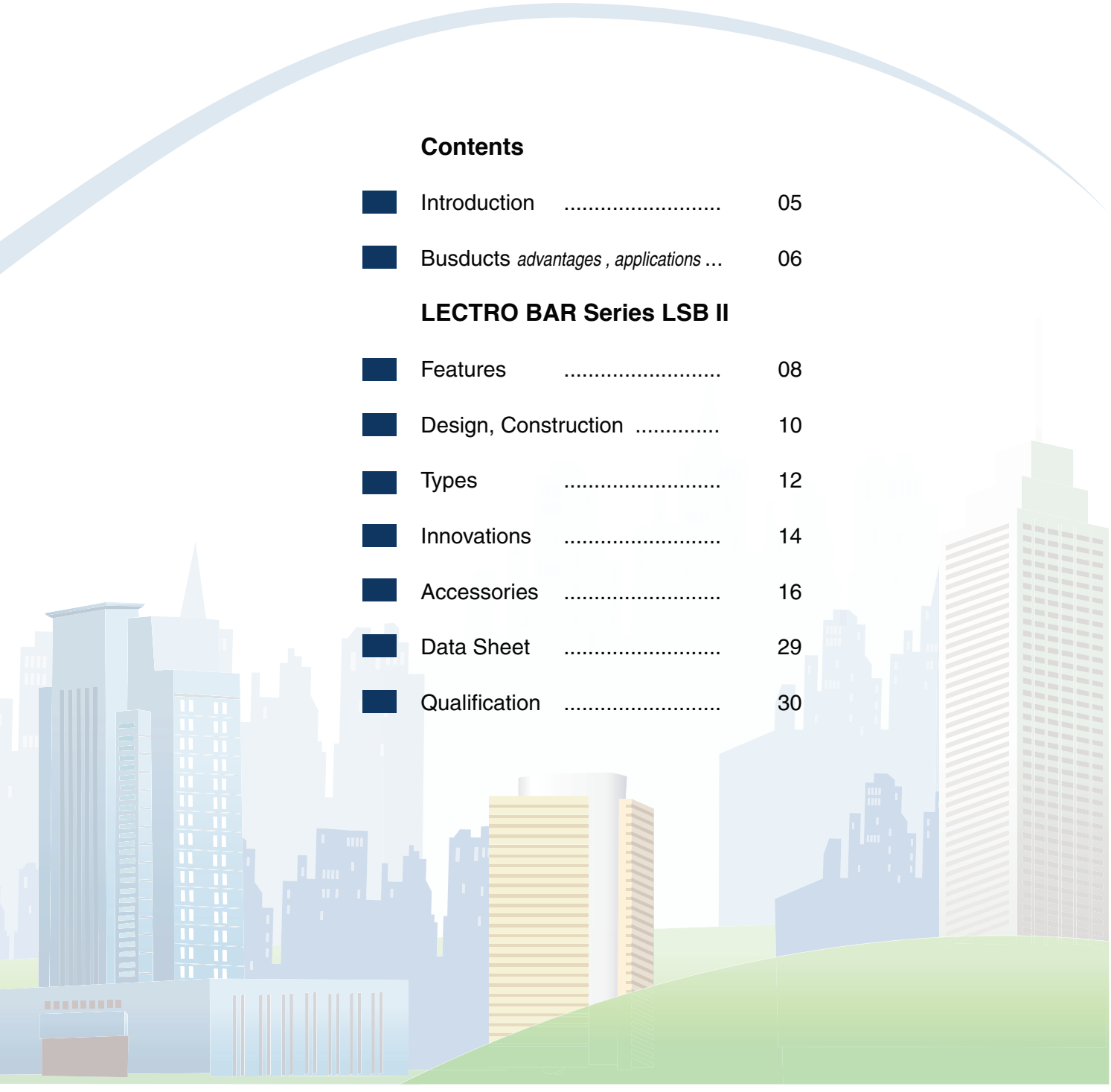
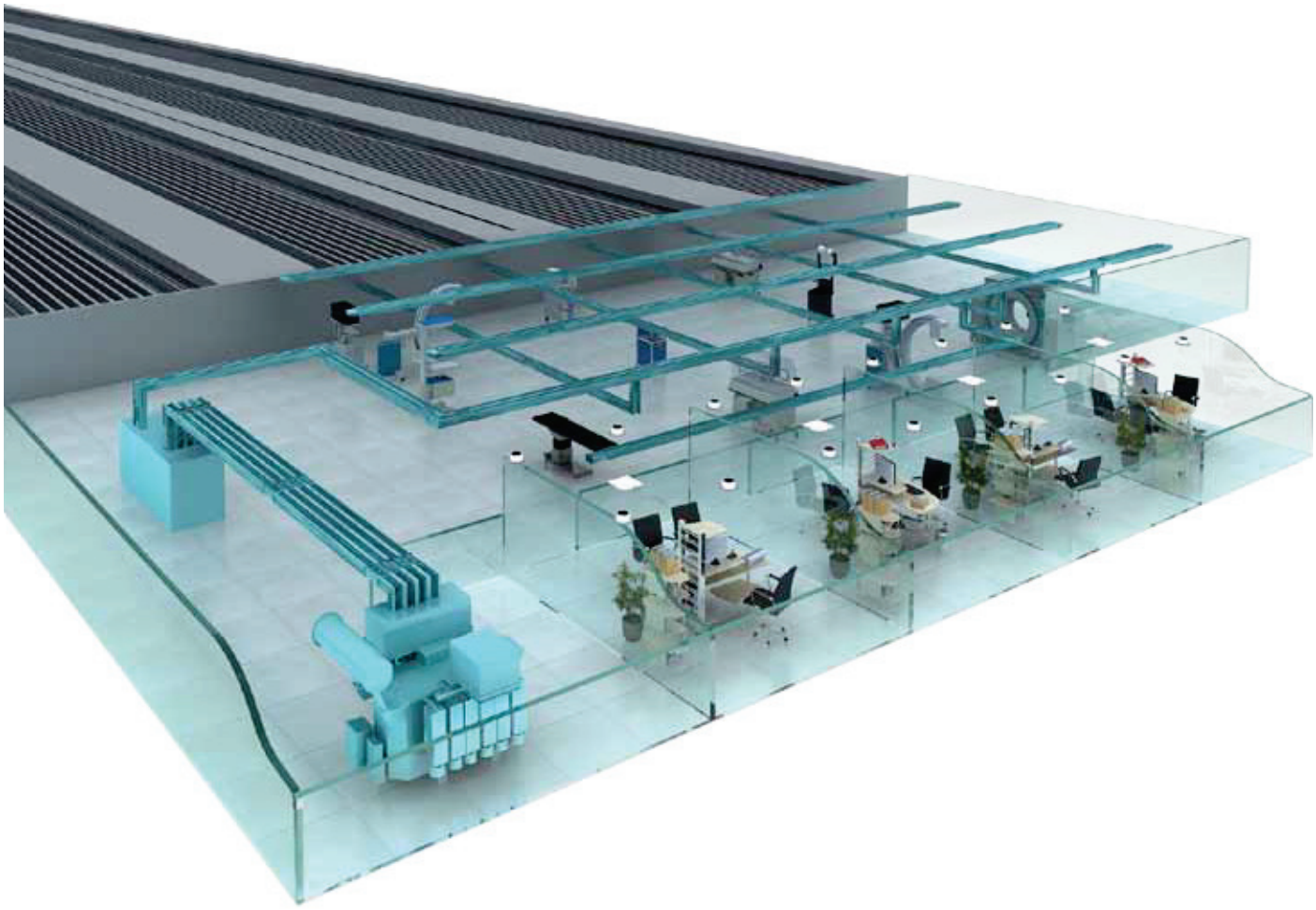




Introduction

Since 1980, Lectrobar has manufactured and installed thousands of meters of bus ducts.
State of the art ISO certified manufacturing facility has their products type tested by KEMA of Netherlands.
Lectrobar busducts are trusted for their high safety factor & long life span.

Lectrobar presents “Series LSB II” bus bar risers ranging from 300A upto 5000A.

At Lectrobar, you - the client, is the purpose for our pursuit of growth and most importantly, perfection.
Thank you for choosing us to partner your journey in creating effective, efficient and sustainable
power solutions.

Busducts

Advantages of busbar over cables

Flexibility: *reusable, expandable*

- Tapoffs make supply to additional loads easy at anytime
- Can be easily relocated and reused
- Distribution may need changes, bus ducts can accommodate those changes at any time
- Can be easily dismantled and reused if required

Efficiency: *Cost savings*

- Half the man-hours: Installation requires only half the time as compared to conventional methods resulting in considerable savings on installation costs
- Zero shut downs: continuity can be maintained as servicing times are really short and needs no operational shutdowns

Less space

- thanks to the sandwich design, busducts have very compact cross sectional sizes and occupy far less space compared to cables

Multiple Loads

Feeding multiple loads distributed through out a building/ manufacturing facility is easy and time saving with busducts. Conveniently placed tapoffs ensure that plugs can be installed and removed safely in no time. For higher ampere ratings, 'bolted on' tap offs provide up to 1600A protection at every joint.

Vertical Riser

The efficient method to feed high rise buildings, distribution to different floors is achieved through convenient tapoffs

Service entrance and single load

From the utility transformer to the main switchboard (service entrance), busduct provides the most hassle free feeding solution.

Normally used for feeding load concentrated in one area, feeder busduct is the choice of connection for a switch board to switchboard tie / switchboard to remote MCC / switchboard to single load.

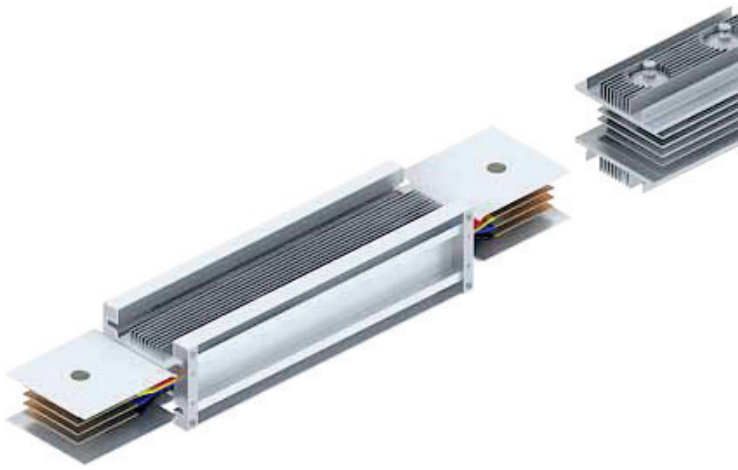
Applications of Busducts

- Basic function of power distribution through a busduct is applied in different modes depending on the specific requirement of each installation.

Lectrobar Busducts - Unique features

Since 1980 Lectrobar has manufactured thousands of meters installed busducts. State of the art ISO certified manufacturing facility has their products type tested by KEMA of Netherlands. Lectrobar busducts are trusted for their high safety factor & long life span.

Safe and versatile design.



- Meet the requirement of IEC-439/1-2
- Tested and approved by different accredited laboratories
- Fully type tested at KEMA testing facility, Netherlands
- Manufactured in an ISO 9001/2000 certified facility to ensure highest quality control
- More than thirty years in the market

Tin coated high purity copper bars

- Oxygen free copper
- High purity: better or equal to 99.995%
- High conductivity: better than 99.5%
- Good contact

True Sandwich for both feeder and plug-in

- No need to separate or flare the bars at the outlet
- High short circuit withstand for both feeder and plug-in. Low impedance and low voltage drop
- No flame smoke or gas propagation in the housing - chimney effect

High Insulation Tested At 2500V for 1 Minute

- Two Insulation layers used
- Main insulation Teflon coated fiberglass 250^{o}C working temperature and 5000V breakdown
- All insulation used better than class H
- Working temperature 50^{o} C, No deration required

Grounding and Neutral Flexibility

- Integral casing ground as standard, 50% additional ground bar, 100% ground bar
- 200%, 100% (Full), 50% (Half) neutral available
- No need for earth bar, the aluminum housing ground conductor is carried through the joint

Two Bolt Patent Joint Design

- More than two tons pressure on overlapping busbars at each bolt
- Adjacent phases separated with non-flammable fiber-glass sheets (2mm, 80kV/cm)
- Joint alignment with two bolts instead of one in the single bolt to ensure correct installation even with non skilled labour
- Maintenance free joint using special heat treated spring steel conical shape washers
- Unique design for the joint to make its temperature less than the rest of the busduct

Aluminum Casing

- Excellent heat dissipation
- Significant reduction in reactance and magnetic flux leakage
- Proper ground return path
- Dust and water protection
- Special coating for better heat dissipation

Space Saving Accessories

- Corner elbows, tees, crosses, reducers etc
- Maximum Layout flexibility
- Optimum utilization of space

Transformer Box

- Enclose flexible joint and transformer bushing
- Protect the system from the entry of any foreign body
- Easy check on transformer oil leakage without de-energizing the system

Single window from design to delivery

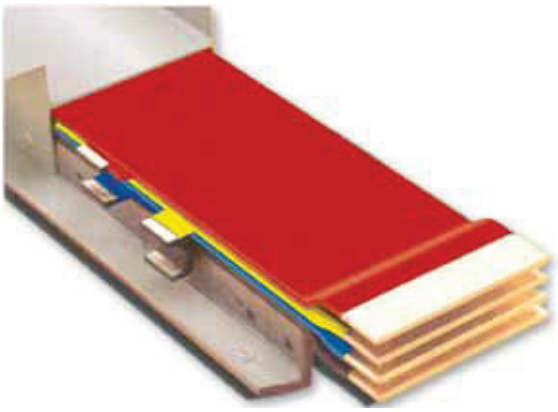
- Exact design, layout & selection aided by support of engineering team
- Detailed drawing in one week from receiving the order. Lower carbon footprint with shorter shipping time to middle east markets

Design & Construction

Lectrobar busducts have a sandwich type non-ventilated configuration. The non-ventilated housing design excludes potential points of penetration by moisture and dust.

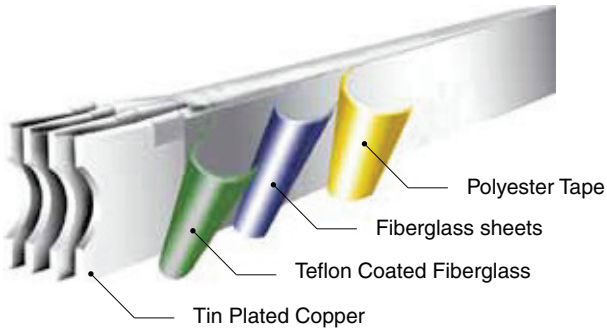
Busbars for plug-in applications, higher than 1000A have full size welded conductor tabs. This design extends the contact surfaces outside of the busduct casing and into the plug-in outlet, maintaining a true sandwich design throughout the entire busduct length for both feeder and plug-in busduct. This will eliminate the need to seperate or flare the conductor bars at the plug-in opening.

Maintaining a true sandwich design eliminates potential pathways for the propagation of flame, smoke and gas through the busduct casing, commonly referred to as the 'chimney effect'. The sandwich structure with low impedance ensures low voltage drop and thus enables the cost-effective transmission of large amount of power even at long distances.



Busbar and insulation

Lectro bars are fabricated from high strength pure electrolytic copper (99.99% with conductivity ~ 100%) tin coated with suitable cross section. Tin coating provides high conductivity, surface protection and good contact.



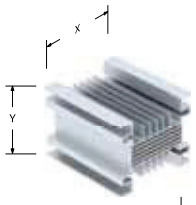
Shown is a section of Lectro bus duct insulation consisting of two different insulation materials. Conductors are insulated with Teflon Coated Fiberglass films (10 mil* thickness, 5000 V, 250^{O}C) and layered with fiber glass sheets. After assembly all the bars are wrapped together with polyester tape. The result is an insulation system that is virtually impervious to the stress of normal operation. The insulation system is tested after assembly with 2500 volt for one minute. This test is intended to confirm the integrity of the insulation system and helps ensure the highest quality bus duct possible. All the insulation materials are rated as class H (minimum) non-flammable hence no internal fire barrier is needed. Upon request the bars can be insulated with cycloaliphatic epoxy resin class B 130^{O}C.

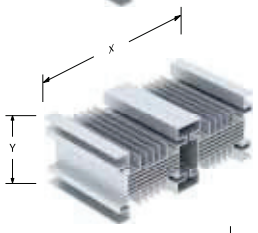
Design & Construction

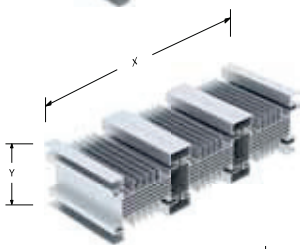
Lectrobar is constructed with extruded aluminum profile. The non -magnetic aluminum housing ensures excellent heat dissipation, a significant reduction in reactance and magnetic flux leakage. Both the new casing design and the special casing coating ensures the best heat dissipation possible from the system. This allows the system to work without derating upto 50°C. Standard casing is IP54. On request IP55, IP65 and IP67 casings can also be supplied.

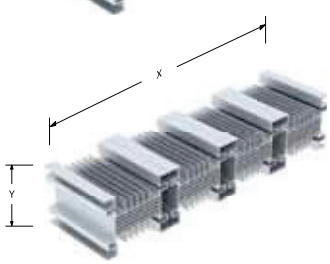
Aluminum casing provide an excellent ground return path. DC resistance /meter of the casing is less than 0.03 milliohm.

Hence integral housing ground is standard and provides full cross section grounding .The system ground continuity is maintained through each joint by the ground path end blocks and joint covers. In addition, the housing ground conductor is carried through the joint. This design ensures that the integrity of the ground path is maintained by the same mechanical pressure used to maintain the continuity of the conductive path (Casing tested as earth at KEMA Netherlands). An internal ground bus adds no benefit with this method .It adds only unnecessary cost to the system. However, for applications where the clients insist on 50% or 100% earth bar, Lectro can provide it as an optional.









Ampher rating(A)	Code	X (mm)	Y (mm	Weight (Kg)
300	**LSBIIC3FNHFI030SL3**	83	140	4.5
450	**LSBIIC3FNHFI045SL3**	87	140	7.0
700	**LSBIIC3FNHFI070SL3**	113	140	9.4
800	**LSBIIC3FNHFI080SL3**	143	140	13.5
1000	**LSBIIC3FNHFI100SL3**	163	140	16.5
1300	**LSBIIC3FNHFI130SL3**	183	140	21.3
1600	**LSBIIC3FNHFI160SL3**	183	140	27.0
2250	**LSBIIC3FNHFI225SL3**	326	140	35.6
2500	**LSBIIC3FNHFI250SL3**	366	140	43.0
3200	**LSBIIC3FNHFI320SL3**	489	140	53.4
3500	**LSBIIC3FNHFI350SL3**	549	140	64.0
4000	**LSBIIC3FNHFI400SL3**	652	140	71.2
5000	**LSBIIC3FNHFI500SL3**	732	140	85.3

Types of Busducts

Feeder Busducts

300 A, 450A, 700A, 800A, 1000A

1300A & 1600A

2250A & 2500A

3200A & 3500A

4000A & 5000A

Standard length 3000 mm

Ampere Rating (A)	Code
300A	LSBIIC3FNHFI030SL3
450A	LSBIIC3FNHFI045SL3
700A	LSBIIC3FNHFI070SL3
800A	LSBIIC3FNHFI080SL3
1000A	LSBIIC3FNHFI100SL3
1300A	LSBIIC3FNHFI130SL3
1600A	LSBIIC3FNHFI160SL3
2250A	LSBIIC3FNHFI225SL3
2500A	LSBIIC3FNHFI250SL3
3200A	LSBIIC3FNHFI320SL3
3500A	LSBIIC3FNHFI350SL3
4000A	LSBIIC3FNHFI400SL3
5000A	LSBIIC3FNHFI500SL3

Plug - In Busducts

300 A, 450A, 700A, 800A, 1000A

1300A & 1600A

2250A & 2500A

3200A & 3500A

4000A & 5000A

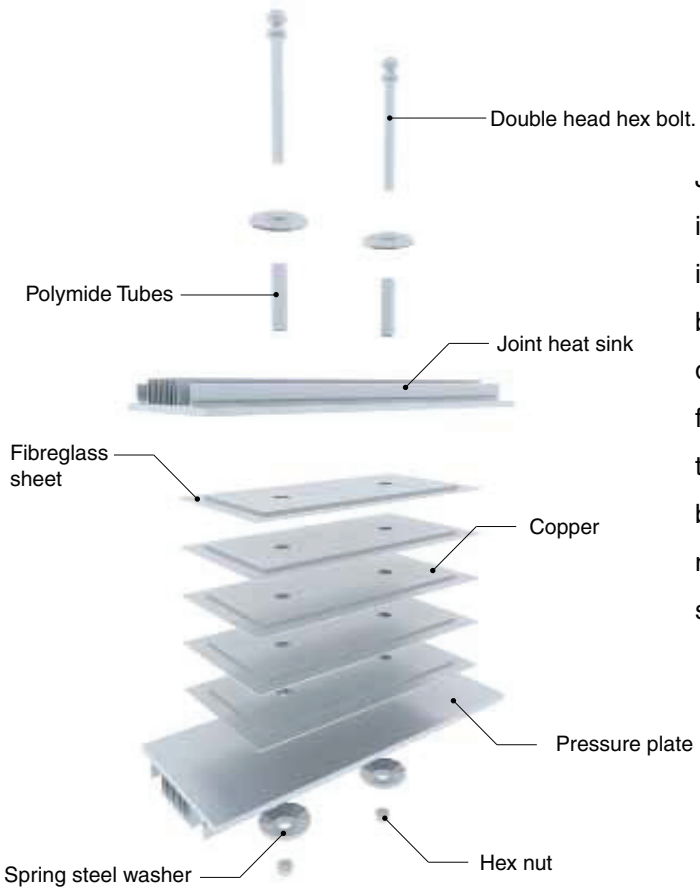
Standard length 3000 mm

Ampere Rating (A)	Code
300A	LSBIIC3FNHPI030SL3
450A	LSBIIC3FNHPI045SL3
700A	LSBIIC3FNHPI070SL3
800A	LSBIIC3FNHPI080SL3
1000A	LSBIIC3FNHPI100SL3
1300A	LSBIIC3FNHPI130SL3
1600A	LSBIIC3FNHPI160SL3
2250A	LSBIIC3FNHPI225SL3
2500A	LSBIIC3FNHPI250SL3
3200A	LSBIIC3FNHPI320SL3
3500A	LSBIIC3FNHPI350SL3
4000A	LSBIIC3FNHPI400SL3
5000A	LSBIIC3FNHPI500SL3

Innovations

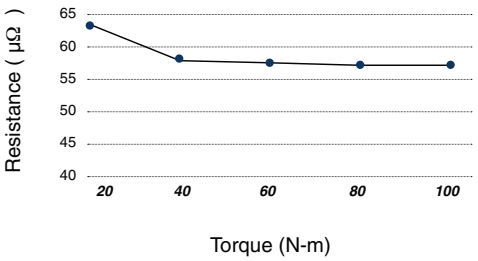
Joints:

Joints in all ratings are of a two bolts patent design, which can be checked for tightness without de-energizing the system. This design ensures excellent contact between each set of the busbars and the joint. This method exerts more than two tons of pressure on overlapping bus bars at each bolt. This force is distributed over the contact area by two pairs of large diameter spring steel conical shape washers. These washers ensure maintenance free joint.



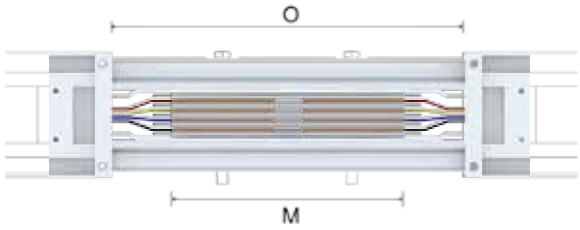
Joint alignment is made by two bolts instead of one bolt in the single bolt design. This design ensures the correct installation of the busduct joint even with non skilled labor. The joint temperature is less than rest of the busduct due to the specially designed heat sinks and contact surface. Figure A shows the contact resistance at different torque with the washers. The tightening torque of joint bolt does not run down after initial accomodation,and is maintained at a level that ensures stability of contact resistance and temperature rise.

Fig.A : Contact Resistance at joint



Innovations

The bolts are insulated with Teflon coated fiberglass and passed through the joint in a polyamide tube to eliminate any problems arising from joint bolts. Join blocks are used to ensure parallel joints of bars and complete mechanical jointing using non-flammable, US made, fiberglass sheet (2mm) with high dielectric strength (200V/mil,80kV/cm). Double head bolts are used. One head breaks at the required torque so no need for torque wrenches. Also smart bolts can be used as optional for critical sites. Using Smart bolts results in less fatigue for installers, no repeated torque wrench calibration, no sample re-tightening, no turn-of-nut confirmation required. Installers can easily identify and focus on loose bolts to re-tighten. The ability to visually inspect fasteners also creates safer working conditions particularly in elevated structures and areas exposed to hazardous materials.

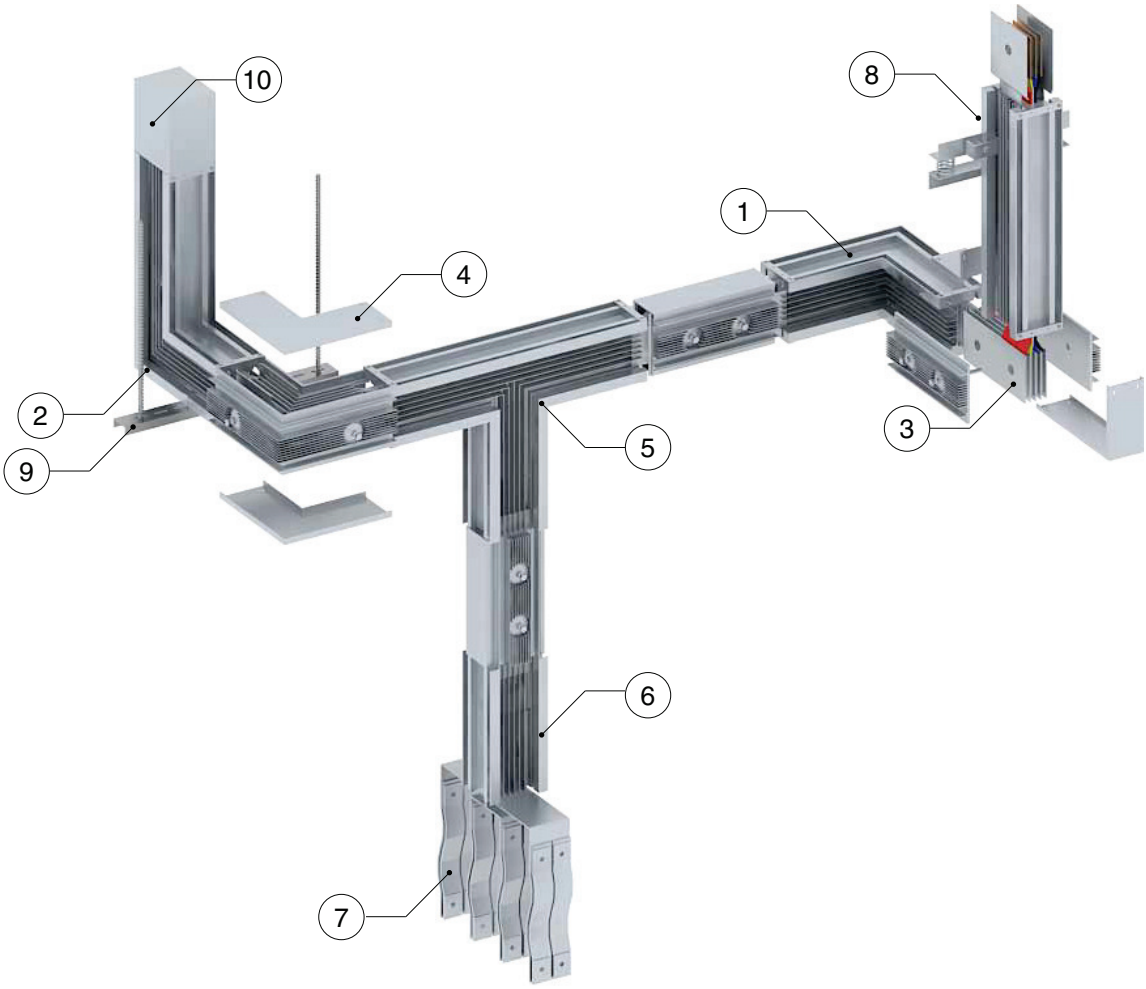


Ampere (A)	No	M(in mm)	O(in mm)
300	1	90	180
450	1	90	180
700	1	100	240
800	1	120	250
1000	1	120	250
1300	1	120	250
1600	1	120	250
2250	2	120	250
2500	2	120	250
3200	3	120	250
3500	3	120	250
4000	4	120	250
5000	4	120	250

Smart bolts *

* Upon request

Accessories



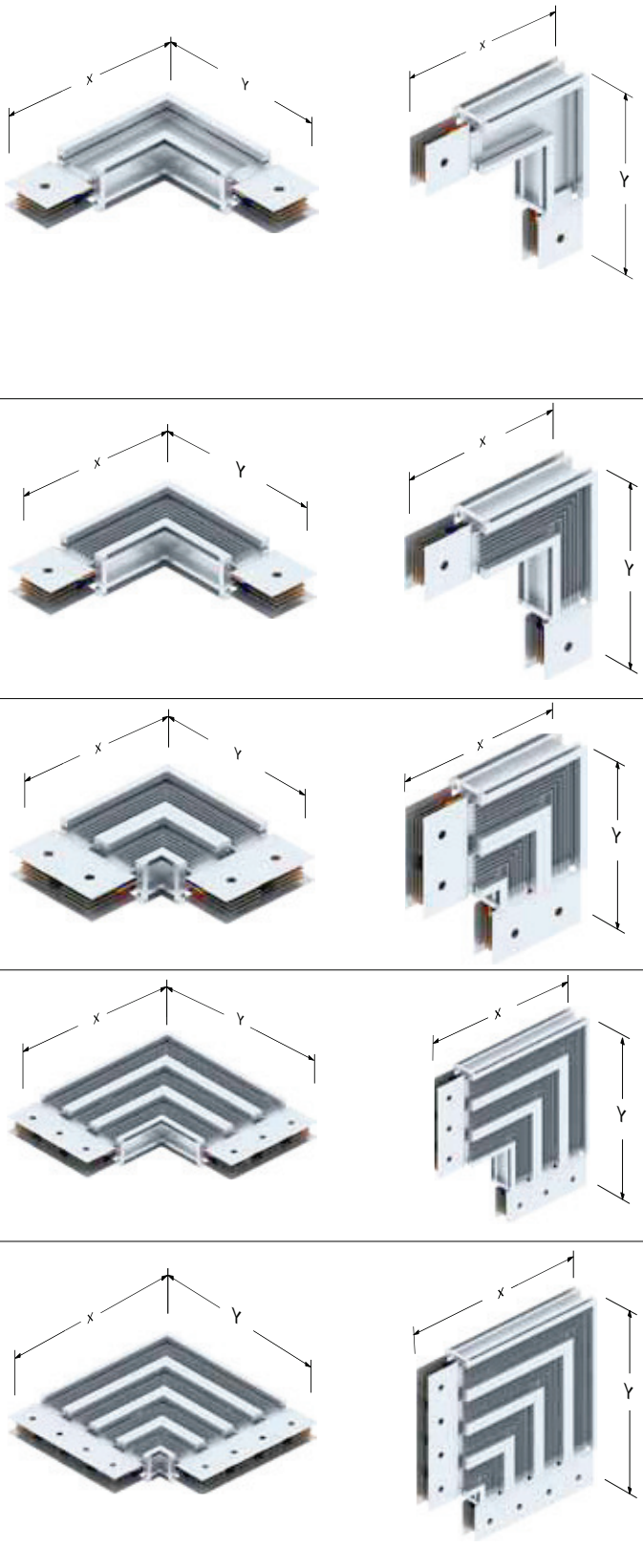
Complete line of ‘standard fittings’ or ‘made to fit’ accessories with wide varieties are available to meet every application need.

These accessories include :

1. Flat Elbows
2. Edgewise Elbows
3. Corner Flat Elbows
4. Corner Edgewise Elbows
5. Tees and Crosses
6. Transformer and Switchboard Flanges
7. Flexible joints
8. Spring Riser
9. Angle Hanger
10. End Closure

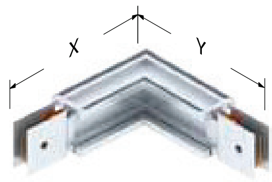
Accessories - Flat Elbow

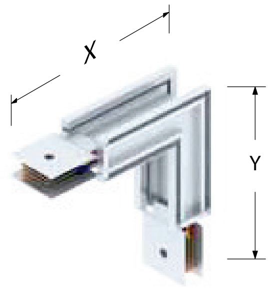
Ampere Rating (A)	Code	Min X,Y (mm)
300	LSBIIC3FNHFI030EF	25
450	LSBIIC3FNHFI045EF	25
700	LSBIIC3FNHFI070EF	35
800	LSBIIC3FNHFI080EF	35
1000	LSBIIC3FNHFI100EF	35
1300	LSBIIC3FNHFI130EF	40
1600	LSBIIC3FNHFI160EF	40
2250	LSBIIC3FNHFI225EF	55
2500	LSBIIC3FNHFI250EF	58
3200	LSBIIC3FNHFI320EF	70
3500	LSBIIC3FNHFI350EF	75
4000	LSBIIC3FNHFI400EF	87
5000	LSBIIC3FNHFI500EF	95

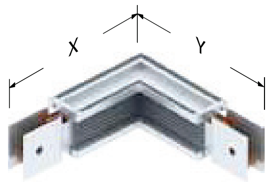


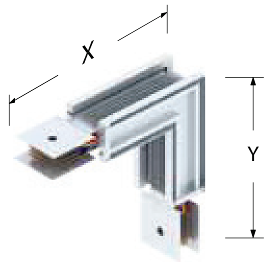
Accessories - Edgewise Elbow

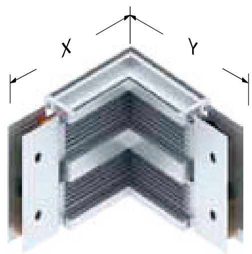
Ampere Rating (A)	Code	Min X,Y (mm)
300	LSBIIC3FNHFI030EE	32
450	LSBIIC3FNHFI045EE	32
700	LSBIIC3FNHFI070EE	35
800	LSBIIC3FNHFI080EE	35
1000	LSBIIC3FNHFI100EE	35
1300	LSBIIC3FNHFI130EE	35
1600	LSBIIC3FNHFI160EE	35
2250	LSBIIC3FNHFI225EE	35
2500	LSBIIC3FNHFI250EE	35
3200	LSBIIC3FNHFI320EE	35
3500	LSBIIC3FNHFI350EE	35
4000	LSBIIC3FNHFI400EE	35
5000	LSBIIC3FNHFI500EE	35

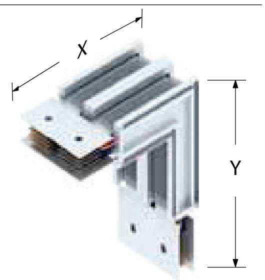


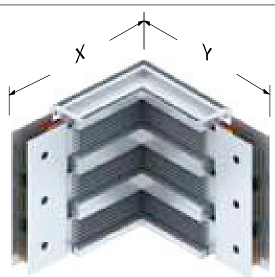


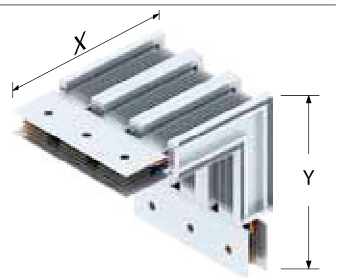


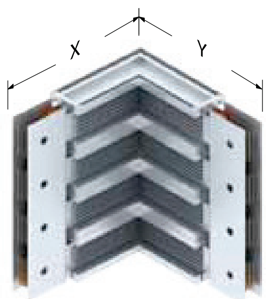


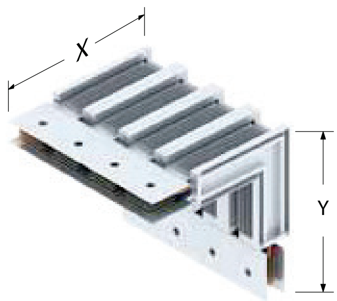






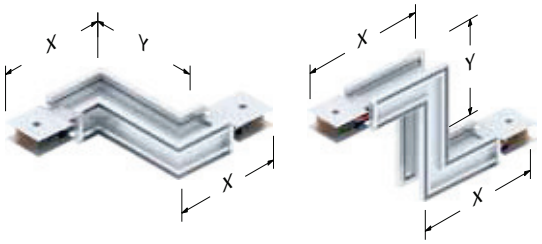


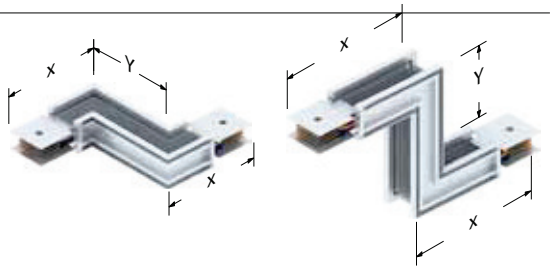


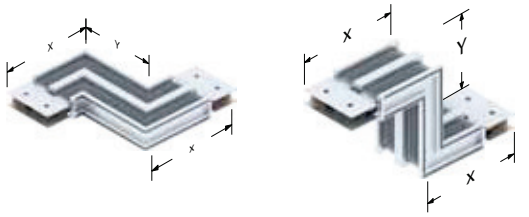


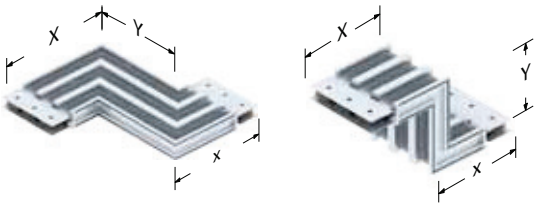
Accessories - Offset Elbow

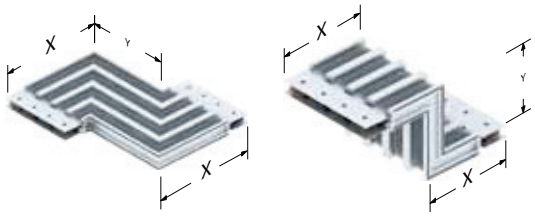
Ampere Rating (A)	Code offset elbow-flat	Code offset elbow- edgewise	Min X (mm)	Min Y (mm)
300	LSBIIC3FNHFI030OF	LSBIIC3FNHFI030OE	25	26
450	LSBIIC3FNHFI045OF	LSBIIC3FNHFI045OE	25	26
700	LSBIIC3FNHFI070OF	LSBIIC3FNHFI070OE	35	42
800	LSBIIC3FNHFI080OF	LSBIIC3FNHFI080OE	35	42
1000	LSBIIC3FNHFI100OF	LSBIIC3FNHFI100OE	35	42
1300	LSBIIC3FNHFI130OF	LSBIIC3FNHFI130OE	40	46
1600	LSBIIC3FNHFI160OF	LSBIIC3FNHFI160OE	40	46
2250	LSBIIC3FNHFI225OF	LSBIIC3FNHFI225OE	55	74
2500	LSBIIC3FNHFI250OF	LSBIIC3FNHFI250OE	58	85
3200	LSBIIC3FNHFI320OF	LSBIIC3FNHFI320OE	70	106
3500	LSBIIC3FNHFI350OF	LSBIIC3FNHFI350OE	75	120
4000	LSBIIC3FNHFI400OF	LSBIIC3FNHFI400OE	87	140
5000	LSBIIC3FNHFI500OF	LSBIIC3FNHFI500OE	95	160









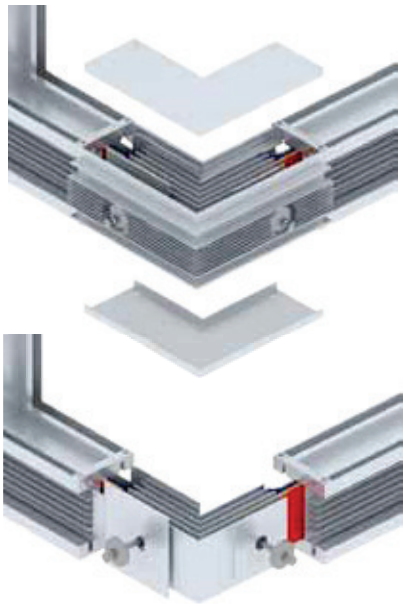


Accessories - Corner Elbows

In addition to these fittings, Lectro offers a space saving corner joint elbow. This elbow has the same construction of Lectro Joints in the form of elbow. Due to its compact design, the corner joint allows optimum utilization of space.

Edgewise: With a minimum leg length of 13 cm for an edgewise elbow, the corner joint elbow can solve any serious path problems and helps to achieve optimum layout with minimal space requirements.

Ampere rating(A)	Code Corner Elbow (Edgewise)
300A	LSBIIC3FNHFI030CEE
450A	LSBIIC3FNHFI045CEE
700A	LSBIIC3FNHFI070CEE
800A	LSBIIC3FNHFI080CEE
1000A	LSBIIC3FNHFI100CEE
1300A	LSBIIC3FNHFI130CEE
1600A	LSBIIC3FNHFI160CEE
2250A	LSBIIC3FNHFI225CEE
2500A	LSBIIC3FNHFI250CEE
3200A	LSBIIC3FNHFI320CEE
3500A	LSBIIC3FNHFI350CEE
4000A	LSBIIC3FNHFI400CEE
5000A	LSBIIC3FNHFI500CEE



Flat: The space saving flat elbow takes no additional space up to 1600A. It is a regular joint rotated 90 degree. These elbows are constructed with the same non-flammable fiberglass 2mm thickness sheets with a 80kV/cm dielectric strength.

Ampere rating(A)	Code Corner Elbow (Flat)
300A	LSBIIC3FNHFI030CEF
450A	LSBIIC3FNHFI045CEF
700A	LSBIIC3FNHFI070CEF
800A	LSBIIC3FNHFI080CEF
1000A	LSBIIC3FNHFI100CEF
1300A	LSBIIC3FNHFI130CEF
1600A	LSBIIC3FNHFI160CEF
2250A	LSBIIC3FNHFI225CEF
2500A	LSBIIC3FNHFI250CEF
3200A	LSBIIC3FNHFI320CEF
3500A	LSBIIC3FNHFI350CEF
4000A	LSBIIC3FNHFI400CEF
5000A	LSBIIC3FNHFI500CEF

Accessories - Tees and Crosses

Tees and busduct fittings for connection in three directions.

Crosses are suitable for connection in four directions. Crosses are applied when a bus run must branch off in three directions in the same plane.

The minimum leg lengths (L) are shown in table.

Flat

Edgewise

Ampere (A)	Code T-Elbow Edgewise	Code T-Elbow Flat	Code Cross Edgewise	Code Cross Flat	Length(mm)
300	LSBIIC3FNHFI030TE	LSBIIC3FNHFI030TF	LSBIIC3FNHFI030CE	LSBIIC3FNHFI030CF	250
450	LSBIIC3FNHFI045TE	LSBIIC3FNHFI045TF	LSBIIC3FNHFI045CE	LSBIIC3FNHFI045CF	300
700	LSBIIC3FNHFI070TE	LSBIIC3FNHFI070TF	LSBIIC3FNHFI070CE	LSBIIC3FNHFI070CF	350
800	LSBIIC3FNHFI080TE	LSBIIC3FNHFI080TF	LSBIIC3FNHFI080CE	LSBIIC3FNHFI080CF	350
1000	LSBIIC3FNHFI100TE	LSBIIC3FNHFI100TF	LSBIIC3FNHFI100CE	LSBIIC3FNHFI100CF	380
1300	LSBIIC3FNHFI130TE	LSBIIC3FNHFI130TF	LSBIIC3FNHFI130CE	LSBIIC3FNHFI130CF	400
1600	LSBIIC3FNHFI160TE	LSBIIC3FNHFI160TF	LSBIIC3FNHFI160CE	LSBIIC3FNHFI160CF	450
2250	LSBIIC3FNHFI225TE	LSBIIC3FNHFI225TF	LSBIIC3FNHFI225CE	LSBIIC3FNHFI225CF	550
2500	LSBIIC3FNHFI250TE	LSBIIC3FNHFI250TF	LSBIIC3FNHFI250CE	LSBIIC3FNHFI250CF	580
3200	LSBIIC3FNHFI320TE	LSBIIC3FNHFI320TF	LSBIIC3FNHFI320CE	LSBIIC3FNHFI320CF	700
3500	LSBIIC3FNHFI350TE	LSBIIC3FNHFI350TF	LSBIIC3FNHFI350CE	LSBIIC3FNHFI350CF	750
4000	LSBIIC3FNHFI400TE	LSBIIC3FNHFI400TF	LSBIIC3FNHFI400CE	LSBIIC3FNHFI400CF	870
5000	LSBIIC3FNHFI500TE	LSBIIC3FNHFI500TF	LSBIIC3FNHFI500CE	LSBIIC3FNHFI500CF	950

Accessories - Transformer Connection

Transformer Box

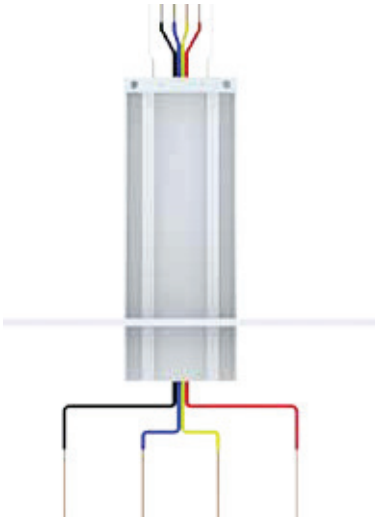
The transformer connection is equipped with the necessary flexible joints and is totally enclosed in an IP43 box that is uniquely provided by Lectrobar. The box is equipped with a door with a plexi glass to allow the check of the presence of an oil leak without de-energizing the system. The flexible connection is used to allow for busduct expansion and contraction on the low voltage spades.

Connection with oil type transformer

Connection with dry type transformer

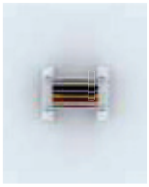
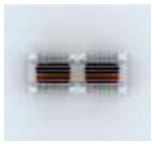
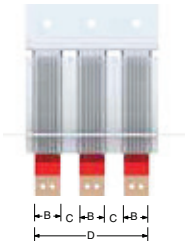
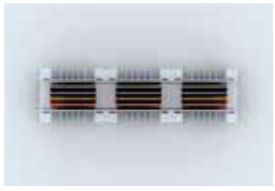
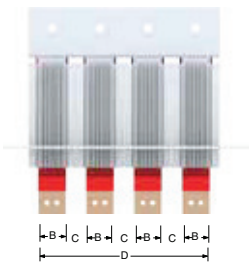
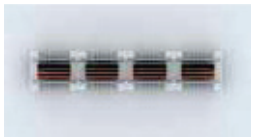
Transformer & switchboard flanges

Both Lectro feeder and plug-in busduct can be connected on both sides of transformer and switch board by a coordinated system in simple and easy way which saves 20% of switch board size. It also guarantees safe connection in minimum installation time. Lectro busduct enters the switchboard or leaves the transformer by special attachment which is tailored according to the dimension and design of both transformer and switch board. Cut out dimensions and drilling plans are provided with the customer drawings. For proper coordination between busduct and other equipment, detailed drawings including orientation, room plan and height, distance between transformer bushing, transformer and switch board dimensions should be given. Our design and planning group will prepare all necessary drawings and coordination.



Transformer Flange - Oil Type		Transformer Flange - Dry Type		Switchboard Flange	
Ampere (A)	**Code**	**Ampere (A)**	**Code**	**Ampere (A)**	**Code**
300A	LSBIIC3FNHFI030 TFOT	300A	LSBIIC3FNHFI030 TFDT	300A	LSBIIC3FNHFI030 SF
450A	LSBIIC3FNHFI045 TFOT	450A	LSBIIC3FNHFI045 TFDT	450A	LSBIIC3FNHFI045 SF
700A	LSBIIC3FNHFI070 TFOT	700A	LSBIIC3FNHFI070 TFDT	700A	LSBIIC3FNHFI070 SF
800A	LSBIIC3FNHFI080 TFOT	800A	LSBIIC3FNHFI080 TFDT	800A	LSBIIC3FNHFI080 SF
1000A	LSBIIC3FNHFI100 TFOT	1000A	LSBIIC3FNHFI100 TFDT	1000A	LSBIIC3FNHFI100 SF
1300A	LSBIIC3FNHFI130 TFOT	1300A	LSBIIC3FNHFI130 TFDT	1300A	LSBIIC3FNHFI130 SF
1600A	LSBIIC3FNHFI160 TFOT	1600A	LSBIIC3FNHFI160 TFDT	1600A	LSBIIC3FNHFI160 SF
2250A	LSBIIC3FNHFI225 TFOT	2250A	LSBIIC3FNHFI225 TFDT	2250A	LSBIIC3FNHFI225 SF
2500A	LSBIIC3FNHFI250 TFOT	2500A	LSBIIC3FNHFI250 TFDT	2500A	LSBIIC3FNHFI250 SF
3200A	LSBIIC3FNHFI320 TFOT	3200A	LSBIIC3FNHFI320 TFDT	3200A	LSBIIC3FNHFI320 SF
3500A	LSBIIC3FNHFI350 TFOT	3500A	LSBIIC3FNHFI350 TFDT	3500A	LSBIIC3FNHFI350 SF
4000A	LSBIIC3FNHFI400 TFOT	4000A	LSBIIC3FNHFI400 TFDT	4000A	LSBIIC3FNHFI400 SF
5000A	LSBIIC3FNHFI500 TFOT	5000A	LSBIIC3FNHFI500 TFDT	5000A	LSBIIC3FNHFI500 SF

Panel Flange

Dimensions in mm						Flange	Panel Collar
Ampere (A)	B	C	D	I	J		
300A	30	-	-	500	280		
450A	30	-	-	500	280		
700A	50	-	-	500	300		
800A	80	-	-	500	300		
1000A	100	-	-	500	350		
1300A	120	-	-	500	350		
1600A	120	-	-	500	350		
2250A	100	65	265	500	500		
2500A	120	65	305	500	550		
3200A	100	65	430	500	700		
3500A	120	65	490	500	750		
4000A	100	65	595	500	850		
5000A	120	65	675	500	950		

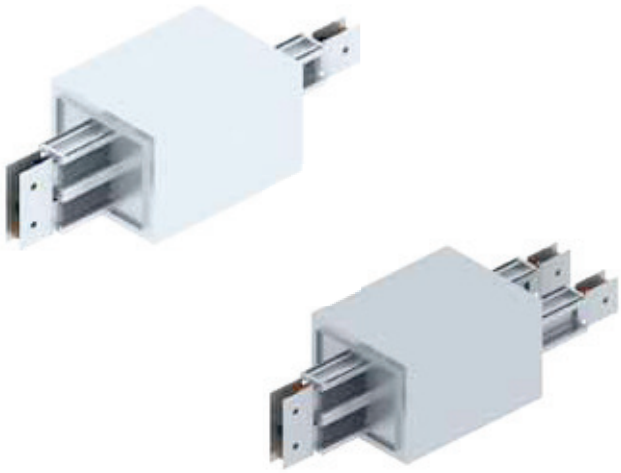
Accessories - Transformer Connection

Ampere rating(A)	Code oil type	Code dry type	oil type	dry type
300	LSBIIC3FNHFI030TFOT	LSBIIC3FNHFI030TFDT		
450	LSBIIC3FNHFI045TFOT	LSBIIC3FNHFI045TFDT		
700	LSBIIC3FNHFI070TFOT	LSBIIC3FNHFI070TFDT		
800	LSBIIC3FNHFI080TFOT	LSBIIC3FNHFI080TFDT		
1000	LSBIIC3FNHFI100TFOT	LSBIIC3FNHFI100TFDT		
1300	LSBIIC3FNHFI130TFOT	LSBIIC3FNHFI130TFDT		
1600	LSBIIC3FNHFI160TFOT	LSBIIC3FNHFI160TFDT		
2250	LSBIIC3FNHFI225TFOT	LSBIIC3FNHFI225TFDT		
2500	LSBIIC3FNHFI250TFOT	LSBIIC3FNHFI250TFDT		
3200	LSBIIC3FNHFI320TFOT	LSBIIC3FNHFI320TFDT		
3500	LSBIIC3FNHFI350TFOT	LSBIIC3FNHFI350TFDT		
4000	LSBIIC3FNHFI400TFOT	LSBIIC3FNHFI400TFDT		
5000	LSBIIC3FNHFI500TFOT	LSBIIC3FNHFI500TFDT		

Accessories - Reducers

Non Protected Reducer

Non-protected reducers are used to reduce the capacity of busduct without protection device. No protection is required where busduct is reduced in size provided that the length of the smaller busduct is less than 15m and has a current rating of at least 1/3 of the larger busduct.The reduction is made by a patent design joint to make the reduction in minimum space.



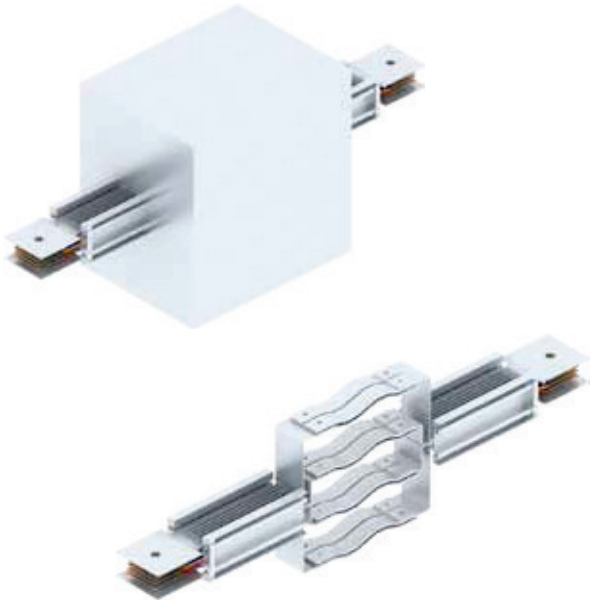
Protected Reducers

Reducer boxes with circuit breakers or fuses are used for protection and as a disconnecting means.

Reduction in bus capacity is made within the box .Minimum length of the protected reducer is 80cm.

Expansion coupling

Lectro busduct is designed to expand as a load is applied and the temperature of the busbar increases. If the installation can accept this movement, then no expansion coupling is required. Generally horizontal runs do not require expansion lengths. However, if both ends of the busduct are fixed, normal expansion is restricted. In this case expansion coupling will be necessary. Expansion couplings are manufactured using a layered laminated flexible section bolted to the adjacent copper conductors. Expansions are individually insulated within the truncking body and identified by means of a label attached to the side of the expansion length box.



Accessories

End closure

End closures terminate a busduct run and can be used to close right or left ends. It is constructed from thick fiberglass sheets laid between the busduct bars.

Feed Box

Feed units are used to supply power to the busduct. The box is made from sheet steel containing either connection strip, circuit breaker or fuses. However, it is recommended to feed busducts over 1600A directly from the distribution panel. The minimum length of the feed unit depends on the size of cables entering the box, but normally it is greater than 80cm.

Busduct final fit piece

A final fit section of busduct is typically an elbow or a short length; left intentionally for later shipment. Its purpose is to effectively manage the dimensional uncertainties that may involve in busduct layout.

Fixation and Hangers

Horizontal hangers: Angle hanger

Hangers are provided for every 3 meters of horizontally mounted busduct .The type of hanger supplied is determined by the specific mounting requirements of the busduct.

Vertical hangers: A spring suspension type is used for vertical runs.This hanger equalizes the weight of vertically mounted busduct along all supports. These hangers compensate for expansion and contraction of the busduct .At least one vertical hanger must be used for each floor.

Accessories - Tap offs

Plug - in

The tap -off boxes are made from sheet steel painted with electrostatic paint or galvanized. Tap-off with breakers have the following precautions to ensure safe operation.

- A cover interlock to prevent opening while the tap-off is in the ON position.
- An ON-OFF handle mounted on tap -off to operate the breaker without opening the cover.
- A switch interlock prevents putting the device into operation when the cover is open.
- A safety interlock prevents insertion or removal of the plug while in the ON position.

To ensure that the tap-off plugs are seated onto the busduct, the box is equipped with a clamping mechanism. This mechanism will draw the unit tight on to the busduct housing as the installer tightens the clamps. The contact resistance between plug pins and the tinned busbars is constant even after years of operation due to the high contact pressure.

Bolted on

Bolt-on tap-offs are used as power take-off up to 1600 A. When the required current is higher than the capacity of the plug-in, tap-off unit bolts directly to the contact surfaces of the busbar joint. The unit can carry either a circuit breaker or fuses.

For busduct risers or in applications where number of tap-off is limited, a bolt-on tap-off unit can be used with a feeder instead of plug-in busduct.This method offers a power take -off at each busduct joint.

Electrical Data Sheet

Description

Casing	: Extruded Aluminium
Protection Degree (IP)	: Standard - IP54, Optional - IP55, IP65, IP67
Rated Insulation Volltage (V)	: 1000
Rated Operation Volltage (V)	: upto 1000
Rated Impulse Volltage (kV)	: 8
Frequency (Hz)	: 50

Ampere Rating (A)

	300	450	700	800	1000	1300	1600	2250	2500	3200	3500	4000	5000
Short Circuit Current													
Short circuit current for 1sec (kA)	15	20	25	40	50	60	70	80	100	130	140	150	150
Peak Short Circuit (kA)	30	40	52.5	84	105	132	154	176	220	286	308	330	330
Characteristics under normal operation													
Phase resistance (μΩm)	400	240	120	75	60	50	37.5	30	25	20	16.7	15	12.5
Phase reactance (μΩ/m)	32	30	25	23	28.4	25.8	14.6	13.5	11.5	9.1	6.8	6.7	6
Phase impedance (μΩ/m)	401.5	241.7	122.5	78.4	66.4	56.3	40.3	32.9	27.5	22	18	16.4	13.9
Phase resistance (μΩ/m)	72	68	49	31	28	19	15.5	14	9.5	9.5	6.3	7	4.75
Voltage drop for distributed load*(μV/m)/A													
CosΦ = 0.8	294.9	181.6	96	63.8	56.2	48	33.5	27.7	23.3	18.5	15	13.8	11.7
CosΦ = 0.9	324.7	198.2	102.9	67.1	57.5	48.7	34.7	28.5	23.8	19	15.5	14.2	12
CosΦ = 1.0	346	207.6	103.8	64.8	51.9	43.2	32.4	25.9	21.6	17.3	14.4	12.9	10.8
Characteristics under fault conditions													
Phase to neutral resistance (μΩ/m)	1200	800	400	308.2	200	198	154	100	97	67	66	50	48.5
Phase to neutral reactance (μΩ/m)	185	159	99	89.9	80	58	53	47	35	31.4	22.8	27.6	20.6
Phase to neutral impedance (μΩ/m)	1214	815.6	412.1	321	200	206	163	110.5	103	74	69.83	57.1	52.7
Phase to earth resistance (μΩ/m)	1080	720	360	357	180	116	178	90	56	60	38.7	45	28
Phase to earth reatance (μΩ/m)	370	255	150	202	87	75	119	51	42	34	29.4	30	24.7
Phase to earth impdence(μΩ/m)	1142	763.8	390	410.2	179.9	138.1	214	103.4	70	96	48.6	54	37.3

* The value of the voltage drop is for distributed load.

For voltage drop in μ V/m multiply the table values by the actual current.

Shown values are line to line voltage drop.

Qualifications

Certifications

KEMA of Netherlands certified the complete type tests on Lectrobar bus ducts.

The ratings of the busbars tested successfully range from 300A to 5000A.


KEMA Quality
TEST CERTIFICATE

Patents

Lectrobar has its success attributed to their culture of technical innovation and research. Standing testimony to that are the three Patents held by Eng. Abed. One of them tested and approved by Westinghouse laboratories and witnessed by UL.

Q.A./Q.C. Certification

Lectro has a clearly defined quality system and policy . The system is religously understood and implemented in all levels in the company .SGS international certification services audited this system to certify fulfillment of ISO9001:2000 requirements.

A copy of quality manual can be forwarded upon request .

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