**XAP Series Busduct** Busduct systems range 250 – 6300A

# Adaptable busduct systems for virtually any application





# Energizing a world that demands more.

### We deliver:

- Electrical solutions that use less energy, improve power reliability and make the places we live and work safer and more comfortable
- Hydraulic and electrical solutions that enable machines to deliver more productivity without wasting power
- Aerospace solutions that make aircraft lighter, safer and less costly to operate, and help airports operate more efficiently
- Vehicle drivetrain and powertrain solutions that deliver more power to cars, trucks and buses, while reducing fuel consumption and emissions

### Discover today's Eaton.

### Powering business worldwide

As a global diversified power management company, we help customers worldwide manage the power needed for buildings, aircraft, trucks, cars, machinery and businesses.

Eaton's innovative technologies help customers manage electrical, hydraulic and mechanical power more reliably, efficiently, safely and sustainably. We provide integrated solutions that help make energy, in all its forms, more practical and accessible.

With 2018 sales of \$21.6 billion, Eaton employs 99,000 people worldwide, and sells products to customers in more than 175 countries.



### Eaton XAP Series Busduct Modular busduct system, 250 - 6300A

Eaton's XAP series busduct system is your obvious choice when searching for a combination of technical performance and attractive design.

Eaton's constant development of the busduct product portfolio has not only ensured economical and reliable solutions; XAP series busduct has evolved into an unsurpassed range able to adapt to virtually any installation.

As an integral part of the power distribution products offering from Eaton, XAP series busduct complements Eaton's range of power distribution equipment from packaged substations and MV and LV distribution switchboards to a complete selection of fused switchgear, circuit breaker systems, motor control gear and OEM products.

XAP series busduct systems are thoroughly tested and fully comply with GB7251.1/.6 and IEC61439-1/-6. CCC, CB and KEMA/ DEKRA certifications are available. The range extends from 250A to 6300A\* with a wide selection of accessories.

The straightforward and highly styled design makes XAP series busduct easy to both install and use.

### Working with XAP series busduct brings you the following advantages.

The Eaton range of XAP series busduct is tested to the latest GB7251.1/.6 and IEC61439-1/-6 standard makes for the perfect choice where flexibility and reliability are the key to a project's success. We have the ability to produce the busduct system that meets the requirements of any low-voltage installation.

The advantages of XAP series busduct summarized:

- High power busduct up to 6300 A\*;
- Verified by testing according to GB7251.1/.6 and IEC61439-1/-6;
- Applicable for vertical or horizontal installation;
- Complete range of tap-off units with Eaton devices and wide range of options and accessories;
- No de-rating in line with current standards with ambient temperature 35 degree;
- IP65 for feeder type, IP 54 for tap-off type;
- High degree of flexibility and ease of installation;
- Fit-for-purpose for Eaton's Low Voltage switchboards and panel boards
- Excellent customer service and worldwide references for busduct applications by Eaton.

### **XAP Series Busduct Application Area**





- Shopping malls - High rise buildings

 Industrial areas
Manufacturing facilities



- Date centers

- Hospitals
- Distribution warehouses



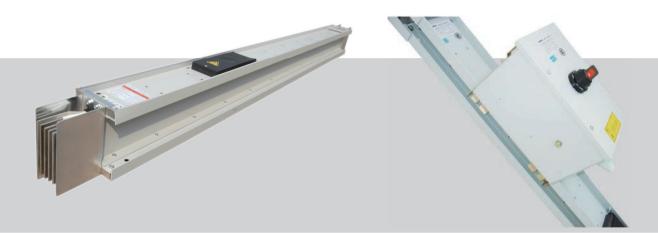
- High-rise buildings - Commercial areas

\*For busduct systems above 5000A, please consult Eaton.

### Features and Advantages

- XAP series busduct is assembled with Self-Pressing Riveting Joint Technology which is capable of being used in harsh environment;
- Both feeder and tap-off units are available for XAP series. Feeder units apply to IP 65 and tap-off units apply to IP54;
- High grounding performance is secured by adopting earth busduct which is above 50% of phase line busduct capacity;
- Tap-off unit is applicable for both vertical and horizontal installation. Up to 10 tap-off outlets for a standard 3m length, which allows easy changes in layout with reserved joints;
- Protection against mechanical impact meets IK10 according to IEC 62262;

- Lightweight magaluma (aluminium-magnesium alloy) housing ensures the busduct has lower magnetic loss, better heat dissipation and be environmental friendly;
- Hard copper conductor with 99.95% purity for electrical engineering enables low impedance, lower voltage drops and line losses;
- Mylar EL polyester film is used for insulation which can meet 10kV per layer and heat-resisting can achieve Class B 130°C;
- The busduct is resistant to flame propagation according to IEC61439-6 10.101~102;
- The anti-seismic and vibration performance of AG3 is tested positively according to IEC60068.



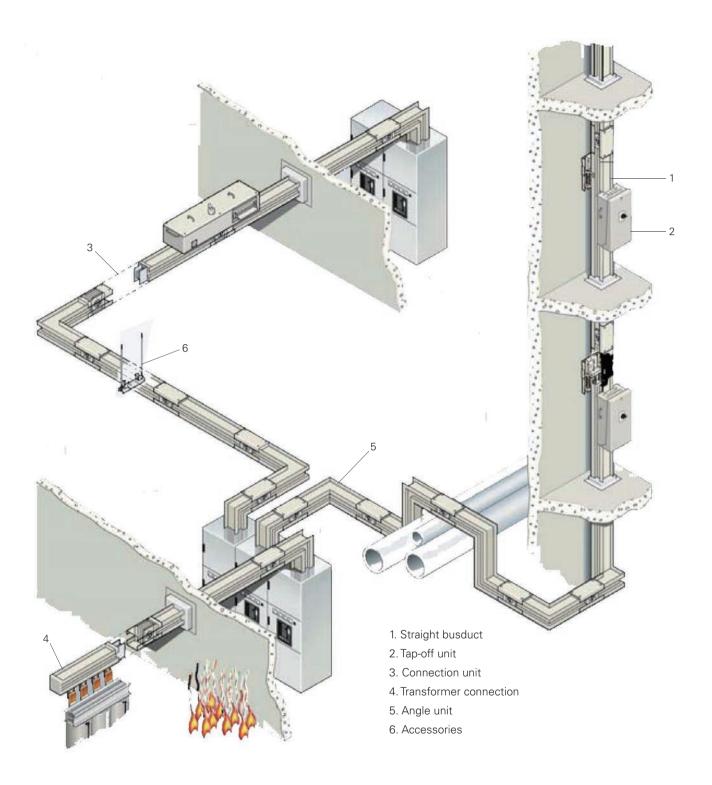
## In addition to Eaton's standard busduct features, many other custom made applications can be made possible



Eaton can offer the following services:

- Site measurement upon receipt of an order, an engineer will attend site to survey routes and discuss any technical detail or questions that you may have. This service normally applies to Rising Busduct Systems and complex lateral runs where special lengths or angles maybe necessary to complete the project.
- **Pricing and configuration** Eaton's common pricing and configuration tool provides a standardized working practice to provide budget quotations in the face of the customer. Linked closely with the latest drawing packages, Eaton can prepare full working drawings to make any installation run smoothly.
- Installation we have an experienced site installation team that will provide competitive pricing for your installation works. Alternatively, a full training program can be offered for installation techniques if required.
- **Commissioning** as part of our site services we can also offer the services for testing and commissioning of installations.

### **XAP Construction Overview**



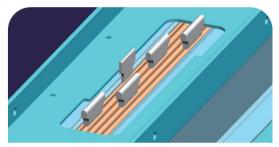
Busduct system is widely used as the transmission from transformer to switchgear and the distributer from switchgear to loads. Busduct system is more safe, reliable and convenient compared to cable systems as well as having a longer life time.

XAP series busduct is designed based on various applications in the market and can meet requirements from different customers.

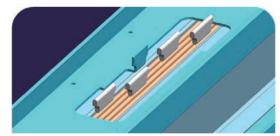
- Feeder and tap-off busduct straight length unit;
- Angle units: L-shape, T-shape, Z-shape;
- Connection units: transformer connection, switchgear connection, cable connection;
- Tap-off units;
- Standard design for all units while customization and site-inspection can also be offered to meet specific needs.

#### Straight busduct length

- Rated current: 250~6300A;
- Wall bushing is available;
- 1 to 10\* Tap-off units per 3 metres straight length;
- Apply to IP54 for tap-off length, IP65 for feeder length;
- Lightweight magaluma-housing construction has lower magnetic loss, better heat dissipation and be environmental friendly;
- High strength H-type concentrated construction for high mechanical strength and dynamic thermal stability;
- Standard length: 1m/2m/3m and 0.4m to 2.99m is optional.

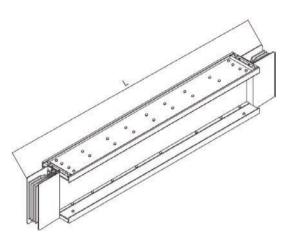


Independent PE bar

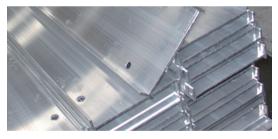


Using housing as PE bar

- Lightweight magaluma (aluminium-magnesium alloy) housing ensures the busduct has lower magnetic loss, better heat dissipation and environmentally friendly;
- Electrostatic powder coating for housing anti-corrosion and 1200H's salt spray test is passed positively;
- Can operate in high humidity, high salinity and high contamination level environment.

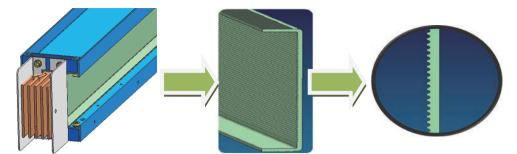


- Available for 4 bar 3-phase or 5 bar 3-phase, independent PE bar or using housing as PE bar;
  - 4 bar 3-phase: L1, L2, L3, N.
  - 5 bar 3-phase: N, L1, L2, L3, PE.



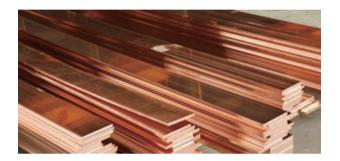


- The big surface of U-shape is processed to dentate structure;
- 60% more radiating area and higher stiffness.



- Hard copper conductor with 99.95% purity for electrical engineering according to GB5585-2005 is used;
- Low impedance, lower voltage drop and line losses;
- Tinned or silvered busduct is optional.





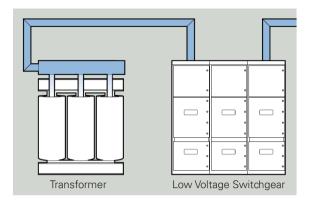
- Mylar EL polyester film is used for insulation which can meet 10kV per layer;
- Halogen free and toxic gas free while burning;
- Heat-resisting can achieve Class B 130°C;
- Test report from 3<sup>rd</sup> part lab is available.

- The copper is packaged by film as a whole;
- 6 layers of films are placed between two phases;
- No holes or sectional area change during the entire length of copper.



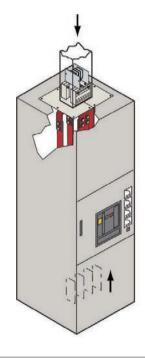
#### Connection to transformers

- The XAP busduct provides flexible connection with various types of transformers up to 6300A with minimal effects of transformer vibration leading to fastener loosening;
- We also offer customized design to ensure the minimized length of busduct and time of installation.



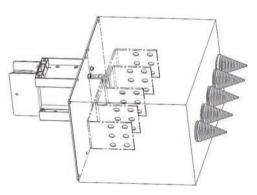
#### Connection to switchgears

- Offer panel flange connected to the terminals or busbar inside the switchgears directly;
- High protection level is achievable;
- Both top and bottom entry are available;
- Current rate up to 6300A;
- Customized design is optional to meet the special requirements.



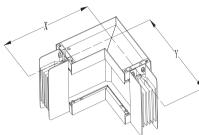
#### Connection to cables

- Rated current up to 2500A;
- Minimum size: 500x350x400mm (LxWxH);
- Maximum size: 1020x640x1120mm (LxWxH);
- Both single core or multi-core cables are applicable;
- 400mm<sup>2</sup> cables can be connected directly;
- Flange plate and cable shield are available.



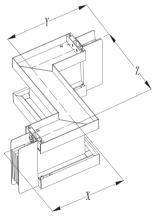
### Horizontal L-angle (ER/EL)

- Rated current: 250~6300A
- Standard length:
- X/Y=0.35m



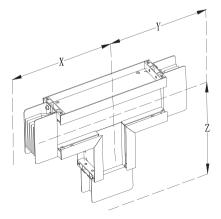
### Horizontal Z-angle (RL/LR)

- Rated current: 250~6300A
- Standard length:
  - X=0.35m; Y=0.35m; Z=0.3m



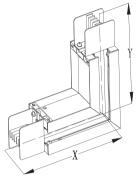
### Vertical T-angle (TE)

- Rated current: 250~6300A
- Standard length:
  - X=0.35m; Y=0.35m; Z=0.3m
  - X=0.5m; Y=0.5m; Z=0.3m
  - X=0.7m; Y=0.7m; Z=0.3m



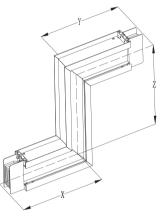
### Vertical L-angle (FO/FI)

- Rated current: 250~6300A
- Standard length:
- X/Y=0.35m, 0.5m, 0.7m



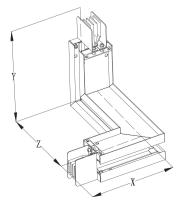
### Vertical Z-angle (IO/OI)

- Rated current: 250~6300A
- Standard length:
- X=0.35m; Y=0.35m; Z=0.3m
- X=0.5m; Y=0.5m; Z=0.3m
- X=0.7m; Y=0.7m; Z=0.3m



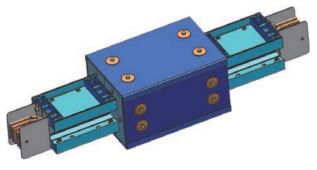
#### Combination shape angle (OL/IL)

- Rated current: 250~6300A
- Standard length:
  - X=0.35m; Y=0.35m; Z=0.35m
  - X=0.35m; Z=0.5m; Z=0.35m
  - X=0.35m; Z=0.7m; Z=0.35m



### Stretch Unit

- Used to compensate the length change of busduct due to temperature and vibration;
- Standard length: 1.4m.

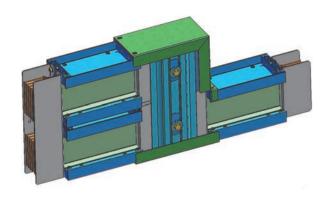


### Tap-off Unit

- Eaton components are integrated in tap-off unit as standard design and customer specified components such as MCCB, fuse, handle, RCD can also be used;
- Phase-dislocation free design ensures the correct installation of tap-off units;
- An effective electrical isolation is processed to all live parts of tap-off units. When installing a tap-off unit, grounding line will be connected before phase line. And grounding line will be disconnected last when uninstalling a tap-off unit to keep the safety of operator;
- Rated current: 16A-1250A\*. Tap-off units of 5 different dimensions are available to meet customer requirements.

### Reducer

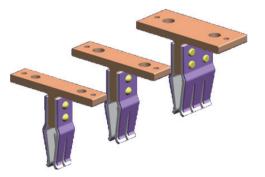
- Used to connect busducts with different current rate;
- Standard length: 1m.





#### T-shape connecter

- Advanced T-shape connector improves thermal dissipation and current carrying capacity by bigger radiating area, to ensure the dynamic thermal stability;
- Structure of bi-metal pins, silver plated, ensuring persistent contact pressure and low contact resistance.



\*For tap-off unit above 800A, please consult Eaton.

### Joint Unit

- Discard the traditional design, XAP uses a single bolt clamping structure, making assembly fast and reliable. Its speed of assembling is multi-times faster than that of conventional joint;
- Dual-head torque bolt is used to ensure the pressure required for connection is reached easily. And a special disk spring ensures the sustain pressure between connection contact surfaces;



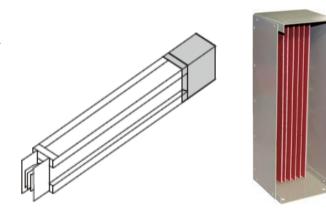
- Cross-sectional area of joint is above 1.2 times of that of busduct feeder, and busduct's copper conductors are connected to joints on both sides. This structure effectively reduces the contact resistance;
- Different colors are used to indicate phase bar and PE/N bar in order to avoid phase-dislocation.
- Waterproof design applied. And cover plate with insulation sealing strip ensures the high protection level of connections.



Use different color to indicate the PE/N bar

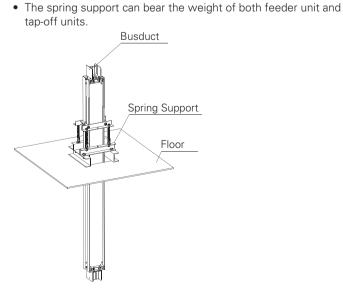
### Terminal unit

• Assembled at the end of busduct to protect the copper conduct.



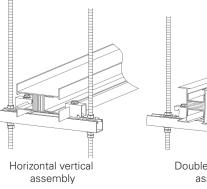
#### Horizontal Assembling Support

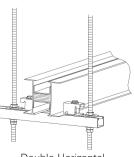
• The assembling methods are available: horizontal vertical assembly and double horizontal assembly.



Vertical Assembling Support

Spring support is available for vertical assembling;



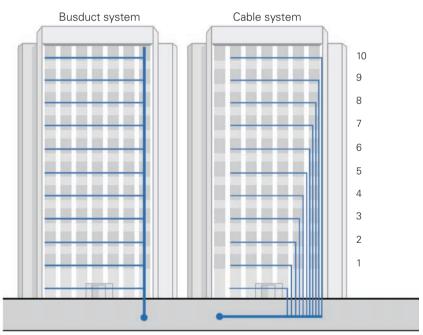


Double Horizontal assembly

### Advantages of using Busduct in place of cables

- Busducts are a cost-effective alternative to cabling. The initial purchase of cable can be less expensive compared to busduct and hence should not be compared purely on purchase price.
- It must be noted that as current ratings increase the advantages of using busduct increase. As current increases the busduct rating can increase in size however cable sizes are limited and multiple cables may have to be used to carry the equivalent of one busduct.
- Busduct replaces multiple cable runs with associated supporting metal work.
- Busduct require less termination space in switchboards and transformers.
- Busducts have short installation time compared to cables. Cable can be difficult and timely to install requiring in some instance specialist cable pulling teams to pull the cable around a building resulting in high labor costs. Busducts do not need cable trays and have no requirement for multiple cable runs (Installation Cost savings for contractor). Busduct has less fixings per metre run than for cable.
- Busducts have greater mechanical strength than cables with minimal fixings.
- Busduct systems can be installed by non-specialist installers. The competent person is the one that tests the installation.

- Due to the Low impedance the busducts have low heat dissipation. This reduces the cost of energy losses and implies that busducts are a sustainable product.
- Busduct is manufactured to fit the building resulting in minimum wastage. i.e. busduct can be made with 90-degree bends but cable has to be installed to regulation with strict adherence to bending radius rules and hence will use more material and space. Busduct connections are there for compact and take up less space.
- Busduct elements in the systems are certified and type tested products.
- Busduct systems are easily extendible. Busduct can be easily modified and circuits can be added easily by means of plug-in tap-off boxes.
- Busducts have a facility for multiple Tap-off outlets (Flexibility to accommodate power requirement changes).
- Busducts have type tested short circuit fault ratings.
- Voltage drop for busbars is lower than the equivalent cable arrangement.



Busduct vs cable in rising main applications

### Reference



#### Infrastructure:

- National Development Bank
- Pingjiang Hospital
- Shenzhen Aotech Innovation Center
- Shandong Radio and Television Center
- Wanzhou Jiangnan New District Government
- Wanzhou North High Speed Train Station South Square
- Shenzhen Procuratorate
- Quanzhou Administration Center
- The Number Nine Sewage Work of YunNan Province



#### **Industry**:

- Shenzhen Cold Chain Logistics Center
- Pinghu Kobelco Project
- Wuxi NOK Water Treatment Project
- Shenyang Michelin tires
- Beijing Benz Engine
- Guangzhou Dongfeng Honda Automobile
- Tianjin BASF Polyurethane Project
- Jinan Heavy Vehicle Project
- Pacific Water Treatment Center



#### Commercial Building:

- Shenzhen Yongxin Times Square
- Shenzhen Bay One
- Western International Expo City
- Hangzheng Storage Industrial and Commercial Bank building
- Tianjin Cultural Center business body
- Xiamen Exhibition Center
- Suzhou Phoenix International Book City
- ChuangYe Building of ZheJiang WenLing Chamber of Commerce



#### **Data Center:**

- Beijing Wanguo data center
- Baoshan Data Center Phase II
- Sunshine insurance project
- China Merchants Bank Chengdu Financial Background Service Center
- CICC data center
- Shanghai Bank Data Center

### **Technical Data**

### System

Item	Parameter		
Environment Temperature Min (°C)	-5		
Environment Temperature Max (°C)	+40		
Environment Temperature Daily Avg (°C)	+35		
Humidity Daily Avg (Non-Condensing)	95%		
IP	54/65		
Torque for joints (Nm)	70±6		
Surface Treatment	Powder Painting		
Housing Material	Aluminium-magnesium Alloy		
Housing Color	RAL 7035		
Rated VoltageU <sub>e</sub> (VAC)	1000 (BTS) 400 (TOU)		
Rated Insulation Voltage Ui (VAC)	1000 (BTS) 800 (TOU)		
Rated Impulse Withstand Voltage U <sub>imp</sub> (kV)	12 (BTS) 8 (TOU)		
Rated Frequency (Hz)	50/60		
Short-time Withstand Current (kA/s)	50-120		
Contamination Level	3		
Seismic rating degree	AG3		
IK Degree	10		

BTS: Busbar Trunking System; TOU: Tap-Off Unit

#### Working Temperature: 20°C

Current	Rated short-time withstand current (I <sub>cw</sub> )	Rated peak withstand current (I <sub>pk</sub> )	AC resistance	Inductive reactance	Impedance	Voltage drop	Size		Weight Kg/Meter	
(A)	kA	kA	(mΩ)/m	(mΩ)/m	(mΩ)/m	(V/m)	Width	Height	4 Bar	5 Bar
400	30	63	0.151	0.042	0.157	0.107	142	118	9.3	9.9
630	30	63	0.105	0.035	0.111	0.120	142	118	11.2	12.1
800	30	63	0.080	0.031	0.086	0.119	142	118	13.1	14.4
1000	50	105	0.061	0.027	0.067	0.115	142	126	16.0	17.6
1250	50	105	0.044	0.022	0.050	0.107	142	149	20.4	22.6
1600	65	143	0.033	0.018	0.037	0.103	142	179	26.4	29.4
2000	65	143	0.025	0.014	0.028	0.097	142	215	33.4	37.4
2500	80	143	0.018	0.009	0.020	0.087	142	274	44.9	50.4
3200	100	176	0.016	0.007	0.017	0.085	142	376	54.2	60.4
4000	120	220	0.012	0.003	0.013	0.085	142	448	68.2	76.4
5000	120	220	0.009	0.002	0.009	0.064	142	558	89.6	100.4
6300	120	264	0.007	0.001	0.007	0.053	142	638	131.6	147.3

### Certificates





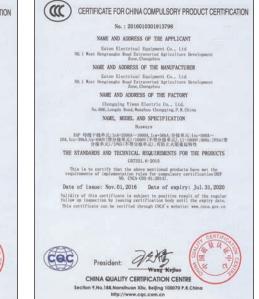




### Certificates









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