

We touch your **electricity** everyday!

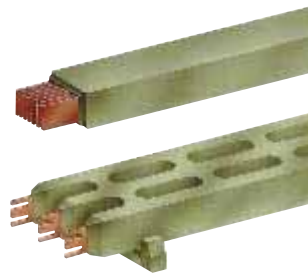
isobar



Haridwar & Greater Noida-India



Boom-Belgium



betobar

metabar



Haridwar-India



 **C&S + Eta-com**
electric

**GLOBAL SPECIALIST
FOR POWER BUSBARS**

C&S Electric Ltd. was founded in 1966 and is amongst the leading suppliers of electrical equipment in India. It's wide range of electrical and electronic products find application in power generation, distribution, control, protection and final consumption of electricity.

C&S employs over 4000 people including 400 engineers, and has 20 state-of-the-art manufacturing plants. It has 22 sales/marketing offices across India and its products are exported to 70 countries. C&S Electric also has joint venture companies with global leaders.

The Power Busbar Division of C&S founded in 1982 has been meeting the evolving needs of power generating stations, process and manufacturing industries, infrastructure establishments, technology and technological centers and real estate developments with its complete and fully tested product line of Busduct, Bustrunking and associated equipment.

The Eta-com group was founded in 1979 and ever since markets a full range of cast resin insulated busway systems. The concept which was already in use in the sixties in industrial installations is now in the third generation form. Due to the typical characteristics, the system guarantees the integrity of many projects worldwide, providing safe and maintenance free electrical power supplies in both Low Voltage and Medium voltage installations.

With the acquisition of Eta-com in December 2011, the co-operation between the two companies give birth to a **Global Power Busbars Specialist.**



Isobar range covers Isolated Phase Busduct, Segregated Phase Busducts and Non-Segregated Phase Busducts. C&S is a market leader in India and amongst the major global companies for design, manufacture, erection and commissioning of Isolated Phase Bus Ducts upto 800MW power plants and above.

Today, we have an enviable track record of having associated with **14 Units of 660 MW, 25 Units of 500 MW, 35 Units of 250 MW, 30 Units of 150 MW** Thermal Power Stations, Hydro Power Plants and Nuclear Power Plants, besides many Captive/Private Power Projects of capacity less than 100 MW. The largest proportion of power generated in India flows through C&S Isobar busducts.

Isobar busduct have been successfully type tested for highest peak current during short circuit test and also for temperature rise test at world famous laboratories like KEMA-Holland and EDF-France, CPRI-Bhopal & Bangalore and at IIT-Roorkee (For Seismic tests)

Isolated Phase Busduct

C&S offers a wide range of natural air cooled Isolated Phase Busducts from 11kV to 36 kV upto 28000A with a maximum Short Circuit Current withstand capability of 285 kA rms for 1 sec. and 900 kA peak. These IPB's have applications in all generating station from 60 MW and above.



Segregated Phase Busducts

C&S offer a wide range of Segregated Phase Busducts for Medium Voltage applications from 3.3 kV to 33 kV upto 5000A. Segregated Phase Busducts find applications in Power Generating Stations and Industrial or Distribution Plants for lower capacity generator connections, inter-connections between switchgear and transformers.

Other Products

- Non-Segregated Phase Busducts (415 to 1100 v upto 5000A)
- DC Busbar Systems
- PTSP Cubicles
- Generator Auxiliary Compartments (GAC)
- Neutral Grounding Cubicles
- Line & Neutral Side Terminal Boxes
- Pressurization System for IPB's
- Hot Air Blowing Equipment



Generator Auxiliary Compartments

betobar is the leading technology in the world for cast resin insulated busbars in low & medium voltage installations. This concept is unique as it is based on the direct encapsulation of copper or aluminium conductors with an insulation compound, B.I.M. casting mix, consisting of epoxy-resin mixed under vacuum. This B.I.M. casting mix has excellent electrical characteristics and high mechanical withstand with specific physical properties. It is moisture-resistant, fire-resistant and self-extinguishing. A flexible fabrication method, universal moulds and an integrated process controlled mixing technique allow the production of an almost unlimited number of element forms for L.V. as for M.V. applications. The prefabricated elements are self-supporting and are interconnected electrically with one another by joining the conductors with 2-sided compression contacts, ensuring an excess of contact surfaces and a maximum of adjustment. Junctions and element extremities are overcast with a B.I.M. casting mix resulting in a homogeneous insulation over the full length of the connection.

The betobar busbars can be supplied in the following standard types:

For Low Voltage:

LA-LB series

Up to 1000 V AC 45-55 Hz

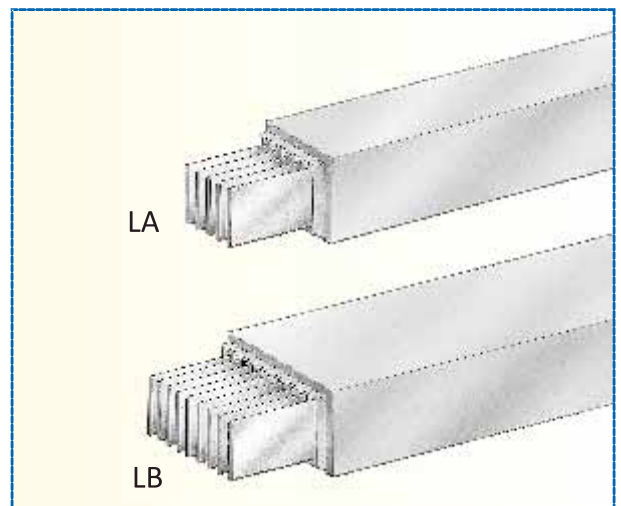
Three phase conductors and/or

Protective earth / 50,100,150 % neutral

Al-conductors range up to 5250 Amps

Cu-conductors range up to 6500 Amps

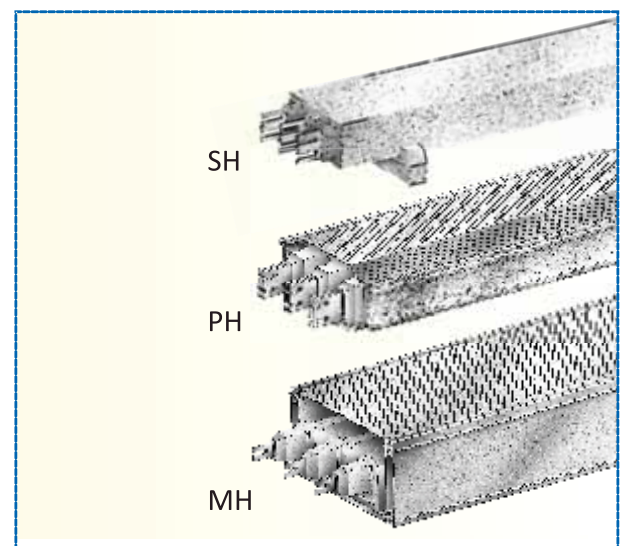
DC application on request



For Medium Voltage:

| Type | Current rating | Voltage rating |
|-----------|----------------|----------------|
| SH-series | up to 2000 A | up to 7.2 kV |
| PH-series | up to 4500 A | up to 17.5 kV |
| MH-series | up to 6300 A | up to 24.0 kV |

Other current ratings on request.



IP68.IK10
degree of protection



explosion proof

metabar range cover Sandwich Bustrunking, Air Insulated Bustrunking & Lighting Trunking.

Energy Saver

Bustrunking has lower impedance in comparison to cable and conventional busducts for the same application. Lower impedance means less energy lost during distribution and this translates into cost savings.

Flexible Distribution

Plug-in type arrangement at regular intervals or as per customer design provide efficient power distribution.

Less Space

Bustrunking system require less space for Installation in a building / industry as compared to conventional busduct and cable system, so optimum utilization of space.

Conserves Raw-materials & Produces less waste

Material and manpower used in busway is lower than cable & conventional busduct. Save money on raw materials and create less waste by buying pre-engineered lengths of busway.

Reusable

Bustrunking system comes with provision of expansions, changes, replacement and reusing.

SB - Sandwich Type

| | |
|--|---|
| Compliance of Standard | IEC 60439 (1&2) & IS 8623 (1&2) |
| Independent Certificate Authority | ASTA - UK, CPRI-India |
| Conductor Material & Ratings | Copper 630A ~ 6600A, Aluminium 400A ~ 5000A |
| Rate Operational Voltage (Ue) | 1000 Volt, AC |
| Rated Impulse Withstand Voltate (Uimp) | 12 KV (1.2/50 s) |
| Enclosure Material | G.I/AL |
| Busbar Insulation | Multi layer Class - 'F' Insulation |
| Degree of Protection | IP 54/ IP55 /IP65 /IP67 |
| Fire Rating | 240Min. (ISO 834) 55 |
| Seismic Compliance | Zone -5 (IS: 1893/IEEE 693) |
| Section Jointing | Uniblock Joint |
| Plug - in Box | 32~800A |



CB-Compact Air Insulated Type

| | |
|--|---------------------------------------|
| Compliance of Standard | IEC 60439 (1&2) & IS 8623 (1&2) |
| Independent Certification Authority | ASTA-UK, CPRI-India |
| Conductor Material & Ratings | Copper 125~2000A, Aluminium 200~1250A |
| Rated Operational Voltage (Ue) | 1000 Volt, AC |
| Rated Impulse Withstand Voltage (Uimp) | 12 KV (1.2/50 s) |
| Enclosure Material | G.I |
| Busbar Insulator | Class-F |
| Degree of Protection | IP 54 /55 |
| Fire Rating | 120Min. (ISO 834) 55 |
| Seismic Compliance | Zone-5 (IS:1893/IEEE 693) |
| Section Jointing | Uniblock Joint |
| Plug in Box | 32 ~ 800 A |

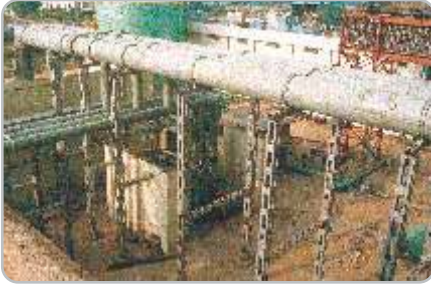


LB-Lighting Trunking

| | |
|-----------------------------------|--|
| Compliance of Standard | IEC 60439 (1&2) & IS 8623 (1&2) |
| Independent Certificate Authority | CPRI - India |
| Conductor Material & Ratings | Copper - 25A, 32A, 40A, 63A |
| Rated Operational Voltage (Ue) | 500 Volt, AC |
| Enclosure Material | Aluminium |
| Busbar Insulation | Flame Retardant PVC (Class 'A'-105 Deg C |
| Section Jointing | Inbuilt push fit joint |
| Plug in Box rating | Upto 16 A (with/without fuse) |
| Degree of Protection | IP 55 / IP 54 |



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| S.No | Brief Technical Details of the Equipment | Utility/Customers | Name of the Power Station / Installation site |
|------|---|--|---|
| 1. | 27KV, 25,200A Isolated Phase Busducts and associated equipment. | L&T Limited, Baroda | APPDCL, 2x800MW Sri Damodaram Sanjeevaiah TPS at Krishnapatnam |
| 2. | 27KV, 20500A, 12000A, 2000A Isolated Phase Busducts | NTPC, Noida | Sipat STPP, Stage I, 3 x 660MW |
| 3. | Supply of 15kV, 8000A & 11kV, 10000A Isolated Phase Busduct and Accessories | BHEL, Hyderabad | 4 x Fr. 9E, GTG for Sulaymaniyah in IRAQ |
| 4. | 24KV, 25000A Isolated Phase Busducts and associated equipment. | Reliance Energy Limited, Mumbai | HPGCL, 2 x 600MW, Hisar Thermal Power Project, Hisar, Haryana |
| 5. | 3.3KV, 1250 A Segregated Phase Busducts and 440V, 2000A & 1250A TPN Non-segregated phase busducts | Al-Ahleia, Switchgear Co., Kuwait | Kuwait National Petroleum Corporation |
| 6. | 22kV, 25000A Isolated Phase Busducts and associated equipment. | Powergen Infrastructure (L.L.C) Mumbai | Adani Power Maharashtra Ltd, 5x660MW TirodaTPP, Tiroda, Maharashtra |
| 7. | 24kV, 25 kA Isolated Phase Busducts and associated equipment. | Larsen & Toubro Ltd, ECC Division, Chennai | MAHAGENCO, Koradi TPS Expansion Project 3x660MW |
| 8. | Supply of 15.75, 7000A Isolated Phase Busducts | Lotte E&C, Korea | Al Qatrana CCGT, Jordan |
| 9. | Supply of Isolated Phase Busduct & its accessories | Alstom Hydro, France | 1x105MVA Ruacana HEP 4th Unit, Namibia |
| 10. | 24KV, 25KA Isolated Phase Busducts and associated equipment | Lanco Infratech Limited, Gurgaon | Lanco Babandh TPP Stg-I (2x660MW) Distt-Dhenkanal, Orissa |
| 11. | 24KV, 20KA, Isolated Phase Generator Busducts and allied equipments. (only erection) | National Thermal Power Corp. Ltd., New Delhi | Korba Super Thermal Power Project, Stage-II. 3x500MW. |
| 12. | Supply of 15kV, 10000A Isolated Phase Busduct and Accessories | Toshiba Plant System & Services | 3 x 205 MW Nam Ngum HEP in Laos |
| 13. | Supply of 15kV, 10000A Isolated Phase Busduct and Accessories | ABENGOA | ISCC AINBENI MATHAR (Marocco) GTG & STG |
| 14. | 24KV, 20000A, 12000A, 1600A Isolated Phase Busducts | MSEB, Bombay | Chandrapur TPS Unit-7 1x500MW |
| 15. | 24KV, 20KA, 12.5KA, 1.25KA Isolated Phase Busducts with all accessories | Larsen & Toubro Ltd, Chennai | NPC Tarpour, 2 X 500MW |
| 16. | 24kV, 13000A, Isolated Phase Busduct & Accessories | SONALGAZ | 2 x 271MW Berrouaghia, Algeria |

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| Place | Project | Consultant Engineering Contractor | BT/HTA |
|------------|----------------------------------|-----------------------------------|--------|
| Algeria | Sonatrach GP2Z | Siemens Brussel | MV |
| Austria | Kaindi | Siemens/Va Tech EBG | LV/MV |
| Azerbaijan | Yenikend Hydro Power Station | Pauwels International | LV/MV |
| Belgium | Sidmar | Engineering Sidmar | LV |
| Brasil | Petrobras P-50 offshore | Siemens | MV |
| Chad | Doba | GE Energy Products | MV |
| China | Pumped Storage Power Station II | Siemens Eriangen | LV |
| Denmark | Offshore Maersk Giant | ABB National Electric | LV |
| Egypt | Calro West Power Station | ABB Schaltaniagen | LV |
| France | ASP | Forclum | LV |
| Germany | Deutsche Bundesbank DBB | ESA Elektrotechnik | LV |
| Hungaria | Procter & Gamble substation | | LV |
| India | Buddha International Circuit | Tilka/sanalac | LV |
| Indonesia | PT Riau Andalan Pulp & Paper | Siemens Germany | MV |
| Iran | EO/EG Plant | Jaboun | MV |
| Italy | Pont Ventoux Hydro Power Station | Carlo Gavazzi | MV |
| Malaysia | FPSO-MSE offshore | | LV |
| Norway | Sakhalin | Siemens AS | LV |
| Qatar | Liquefied Natural Gas Co. | Siemens Advanced Engineering | MV |
| Russia | Moscow City Power Plant | Alstom Power Sweden | MV |
| U.A.E. | Ruwais Borouge Petrochem. | Switchgear & Instrumentation | LV |
| U.K. | Canary Wharf | N.G. Bailey/Delta Electrical | LV |

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| Sl. No. | Project | Contractor | Rating |
|---------|--|------------|---|
| 1 | IJM MCD Civic Centre, New Delhi | AL | 5000A, 3200A, 2500A, 1250, 1000A |
| 2. | Airtel Data Centre, Bangalore | AL+CU | 4000A, 3200A, 1600A, 630A, 500A, 315A, 250A |
| 3. | HCL Technology Ltd. | AL+CU | 3200A, 2500A, 1600A, 1250A, 800A, 630A |
| 4. | Wipro, Chennai | AL | 3200A, 2500A |
| 5. | L&T Infotech | AL | 800A |
| 6. | Dafna Residential Tower, Doha | CU | 2500A, 1600A, 800A, 400A |
| 7. | Port Saeed Dubai | AL | 2500A, 1600A, 1250A |
| 8. | JSC SOEMI, Russia | AL | 6300A, 400A, 250A |
| 9. | Select City Walk, Saket, New Delhi | AL | 3500A |
| 10. | Inorbit Mall, Navi Mumbai | CU | 630A |
| 11. | Medcity, Gurgaon | AL | 3200A, 1250A, 800A |
| 12. | AIIMS, Patna | AL | 1250A |
| 13. | Phoneix Hotel, Tanzania | CU | 400A |
| 14. | Fortis Hospital, Gurgaon | AL | 3200A |
| 15. | Power Lux ME FZC, Saif Zone Sharjah, UAE | CU | 3600 A |
| 16. | Oberoi Westinn Hotel, Goregaon, Mumbai | AL | 800A, 2500A, 400A |
| 17. | Taj Hotel, Bangalore | AL | 800A, 2500A |
| 18. | HKM Hotel, Singapore | AL | 2000A |
| 19. | JW Marriot, Chennai | AL | 800A, 1250A |
| 20. | E-services, Phillipines | AL | 4000A, 3000A |
| 21. | Suzuki Powertrain, Manesar | AL | 3200A, 1600A, 1200A, 800A, 400A, 160A |
| 22. | Ford India- Engine Shop, Chennai | CU | 800A, 1600A |
| 23. | Airport Authority of India, Mumbai | AL | 1250A, 1600A, 800A |
| 24. | P.S. Bank, Phillipines | CU | 2500A, 600A |
| 25. | Land Mark Plaza, Kenya | CU | 400A |
| 26. | Delhi International Airport | AL | 4000A, 2500A |



● C&S + Etacom Installations

*This Map is only for pictorial representation and to be used



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Marketing & Sales :

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Email : info.isobar@cselectric.co.in

Works-1:

B1, Site IV, Surajpur, Industrial Area,
Kasna Road, Greater Noida

Works-2:

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Southern Region

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email : info.metabar@cselectric.co.in

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24, Park Street, Development House,
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Western Region

#A 301 / 302, 3rd floor, Nav Bharat Estate,
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Fax: +91-22-241137858, 24114704
email : info.metabar@cselectric.co.in

Works

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