

I n t r o d u c t i o n

BACKGROUND

LINKK busduct trunking systems have been established since 2010 and have successfully supplied many projects to overseas and local market. **LINKK BUSWAY SYSTEMS (M) SDN BHD** is the leading designer and manufacturer of busduct trunking systems in Asia Pacific.

With the continued product research and development process carried out by **LINKK BUSWAY SYSTEMS (M) SDN BHD**, we are able to provide uniquely designed and highly reliable products. This is achieved by adopting sophisticated thermodynamic design applications and quality manufacturing methods to deliver high performance products to our customer. Our track record shows the dedication and determination of our key personnel as they turn their dreams into reality.

OUR VISION

- We aim to become the leading busduct manufacturer in the world
- To meet customer needs and provide prompt services
- Committed to produce uniform product quality and achieve total customer satisfaction

VISION STATEMENT

We aim to design and manufacture the most reliable busduct system and provide custom engineering to our clients

OUR MISSION

- Improving our quality by benchmarking our product and process
- Expanding our range of products and services
- Increasing our marketing activities worldwide
- Investing in R&D
- Developing and enhancing our resources

COMPANY QUALITY POLICY

Total Customer's Satisfaction
Consistent Product Quality
Continual Improvement



TECHNICAL FEATURES

LINKK is a new series of busduct system developed by LINKK BUSWAY SYSTEMS (M) SDN BHD. It is designed for commercial and industrial electrical distributions with certain level of short-circuit protection.

Standards

LINKK systems are tested and certified by ASTA / KEMA / CPRI / PSB / SIRIM / CCC to comply with:

- BS 5486, Part 2, 1990
- IEC 60439 Part 1: 2009 (Updated from IEC60439 Part 1: 2005)
- IEC 60439 Part 2: 2009 (Updated from IEC60439 Part 2: 2005)
- IEC 60331
- IEC 60529
- IEC 61439 Part 6 : 2012

Busduct Types

LINKK is light weight, low impedance, non-ventilated, naturally cooled and totally enclosed within the steel or aluminium housing for protection against mechanical damages and dust accumulation. It consists of:

- Conductors with low impedance and high conductivity (IACS 99.98%) copper bars with high purity (>99.95%), or aluminium bars with conductivity > 61%
- Feeder and plug-in type busducts
- Busduct protection IP40 / IP42 / IP54 / IP55 / IP56 / IP65 / IP66 / IP67 / IP68
- Tap-off units (plug-in) protection IP2X / IP40 / IP42 / IP54 / IP55
- Fire retardant protection conforms to IEC 331 / IEC 332, NFPA 70, CNS 14286 and UL 1709

System Voltage

Our busduct can be applied to different system configurations as below:

- | | |
|--------------|----------------------|
| • 3P3W | • 3P4W(200%N) |
| • 3P3W+50%E | • 3P4W(200%N) + 50%E |
| • 3P4W | • 3P4W(50%N) |
| • 3P4W+50%E | • 3P4W(50%N) + 50%E |
| • 3P4W+100%E | |

Other type of configuration can be designed upon special request from customer.

Unique Features

The latest LINKK systems are incorporated with many improved designs / features to provide cost effective solutions for building a power system:

- Higher efficiency in power transmission / distribution
- Lower cost of installation
- Easier maintenance
- More compact and suitable for tight plan room space
- Higher reliability
- Longer life span
- Higher flexibility for future expansion
- Extremely high short circuit current ratings
- Extremely flexible in installation

LINKK Conductor

All LINKK conductors are of high density and conductivity up to (99.98% IACS) with a minimum purity of 99.95%. It is fabricated through a sophisticated thermal compression process developed by LINKK which involves application of tremendous heat under high pressure. It can be fully tinned or silver-plated with epoxy powder coated as insulation giving 100% water and chemical resistance. Optional specifications can be designed and fabricated to customer requirements.

Advantages of using LINKK conductor are:

- High electrical conductivity
- High thermal conductivity
- Low impurity
- High mechanical strength
- Excellent fatigue resistance
- Outstanding corrosion resistant

LINKK Epoxy

LINKK Epoxy System is the 3rd generation with our own formulation. The Class H - 180°C standard epoxy coating provides 100% water proofing and high mechanical strength. It has been tested in accordance with IEC 439-2 and BS 5486.

Advantages of using epoxy coating as insulations are:

- Design to withstand glitch and spikes in electrical system
- Design to cater for expansion and contraction during peak and off-peak hours
- Capable of withstanding heat shock
- High reliability under static conditions
- High mechanical strength against impact
- High thermal conductivity
- Water and chemical resistant

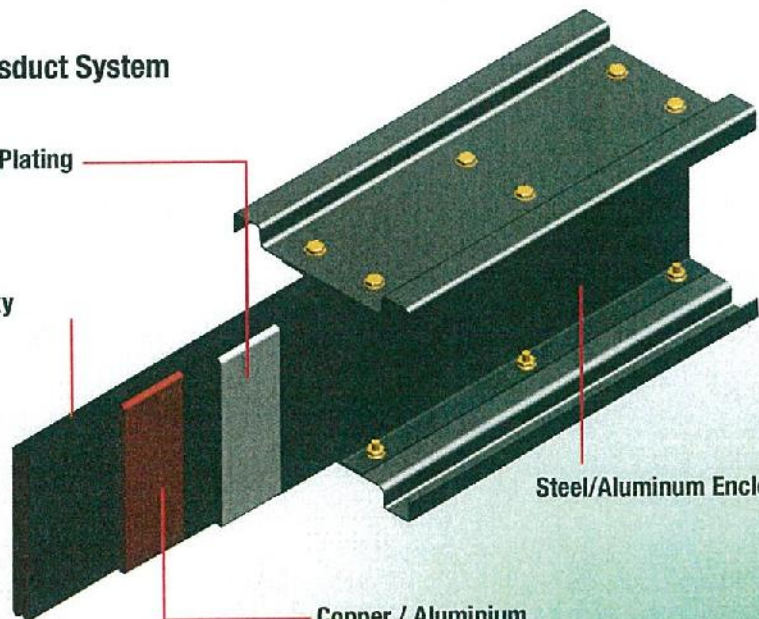
LINKK Busduct System

Tin / Silver Plating

LINKK Epoxy

Steel/Aluminum Enclosure

Copper / Aluminium



Other Insulation Type

Besides epoxy insulation, we also provide other classes of insulation as below:

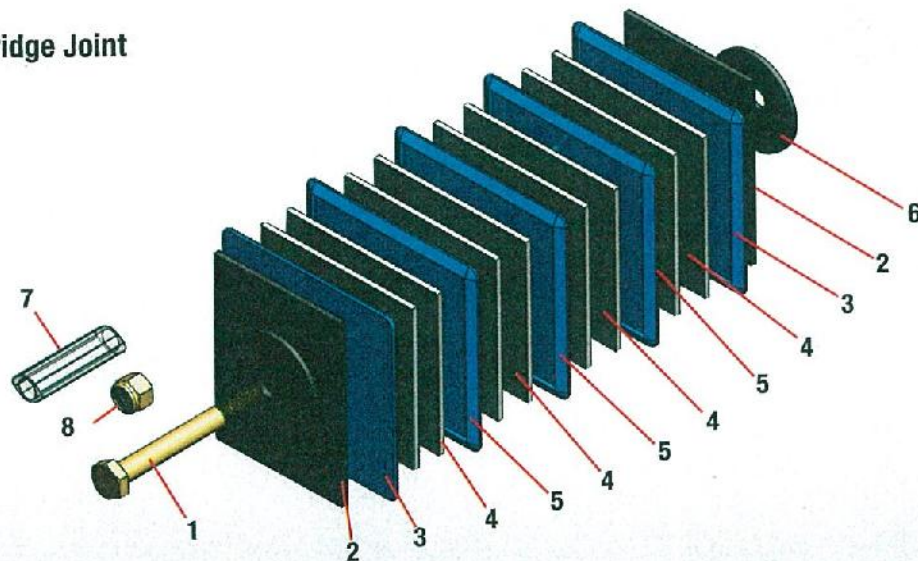
- Class B - It consists of two layers of Mylar (Polyester Film) which resists temperature upto 130 °C
- Class F - It consists of one inner layer of Nomex (Meta Aramid Paper) and two outer layers of Mylar (Polyester Film) which resists temperature upto 150 °C

Joint System

In order to overcome extreme rugged conditions at site, the new LINKK joint has been designed precisely and manufactured using the highest quality of materials to minimize all possible problems and enhance system performance. This special design provides outstanding features as follows:

- Incorporates a 5mm thermal expansion and movement at every joint
- Allows $\pm 15\text{mm}$ of lateral adjustment (total 30mm) to correct site measurement inaccuracy
- Able to tilt an angle of $\pm 5^\circ$ (total 10° along single axis)
- One bolt bridge joint system
- Bolts and nuts can be stainless steel, galvanized or chromed black high tensile steel
- Degree of protection of IP40/IP54/IP66/IP67/IP68
- Easy installation and removal of any joint in a run without disturbing the two adjacent busduct sections
- Water / chemical resistant DMC / SMC insulation plates
- Optional shear off twin headed bolts to required torque of (70N.m~75N.m)

Standard Single Bolt Bridge Joint



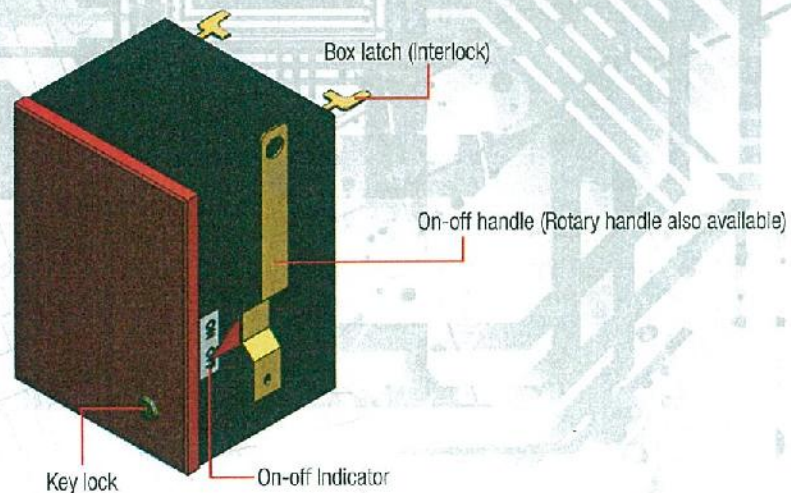
- | | |
|----------------------------|-------------------------|
| 1 Single Headed Joint Bolt | 5 Joint Phase Insulator |
| 2 Joint Backing Plate | 6 Belleville Washer |
| 3 Joint End Insulator | 7 Fiber Tube |
| 4 Joint Conductor Bar | 8 Nylon Lock Nut |

Tap - Off Units (Plug-in Units)

Tap off unit with non-fused circuit breakers (MCCB) or fused-switch breakers of various current ratings are available to cater for most installations. Maximum five tap off units per face can be installed, total ten (10) nos per length of 3m busduct subject to the size of MCCBs.

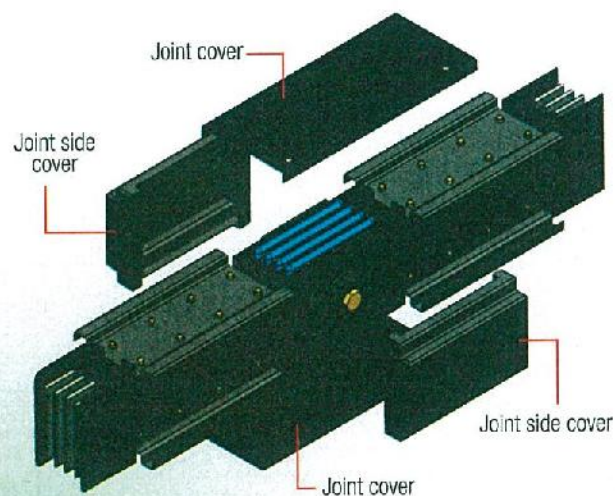
- All tap off units are interlocked to prevent removal when outgoing device is in 'on' position
- When the tap-off unit cover is 'open', it is interlocked such that MCCB can not be turned 'on'

Standard TOU Design

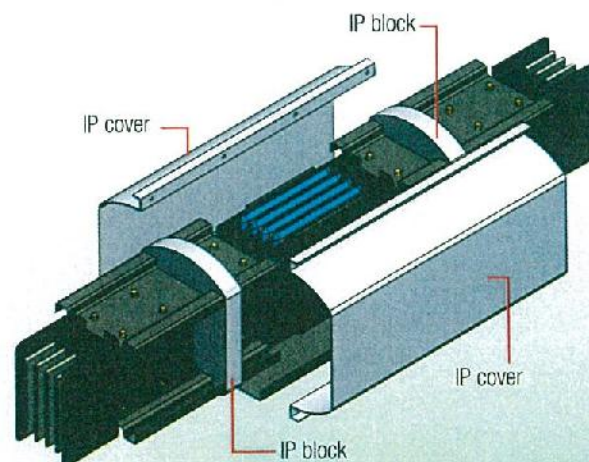


IP Busduct

IP 66 and below



IP 67 & IP 68



Configuration of LINKK Busway Trunking System

Electrical Characteristics For Copper & Aluminum in 50Hz

Copper Frequency: 50Hz

Rated Current (A)	Impedance ($10^{-6}\mu\Omega/m$)			Line to Line Voltage Drop in (mV/m) at Rated Current and Various Power Factors									
	R	X	Z	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10
400	112.45	88.44	143.06	77.90	98.82	99.09	98.29	95.76	92.02	87.32	81.83	75.62	68.76
600	67.47	53.64	107.46	70.12	101.00	108.25	111.16	111.51	110.34	107.71	103.96	99.19	93.50
800	49.19	36.63	91.06	63.17	107.63	118.24	123.51	125.84	126.04	124.58	121.74	117.67	112.46
1000	40.72	22.77	46.65	70.52	80.66	80.08	77.53	73.86	69.41	64.35	58.78	52.74	46.29
1200	36.77	17.38	42.49	80.59	88.27	86.14	82.20	77.24	71.57	65.33	58.63	51.50	43.99
1500	30.48	14.76	33.98	79.20	86.01	88.39	82.85	78.23	72.84	66.88	60.38	53.45	46.12
1800	24.13	13.76	27.78	86.87	76.80	76.37	74.04	70.63	68.46	61.70	56.44	50.74	44.63
2000	20.68	10.85	23.35	71.64	80.86	79.36	76.98	73.05	68.38	63.09	57.34	51.14	44.55
2500	18.64	9.23	18.94	71.63	81.89	81.29	78.69	74.96	70.44	65.29	59.63	53.50	46.94
3200	12.41	6.46	13.99	68.79	77.52	76.52	73.73	69.92	65.41	60.34	54.80	48.85	42.51
3500	12.81	5.52	13.95	77.64	84.46	82.19	78.25	73.36	67.80	61.73	55.22	48.32	41.06
4000	10.15	4.18	10.98	70.34	75.93	73.66	69.93	65.39	60.27	54.70	48.75	42.48	35.87
4500	9.11	3.71	9.34	70.99	76.50	74.15	70.36	65.74	60.55	54.92	48.90	42.55	35.89
5000	8.61	3.36	9.25	74.59	79.82	77.14	73.00	68.04	62.51	56.52	50.15	43.44	36.42
6300	8.20	2.11	6.55	67.66	70.95	67.97	63.84	59.05	53.81	48.21	42.30	36.13	29.72

Aluminium Frequency: 50Hz

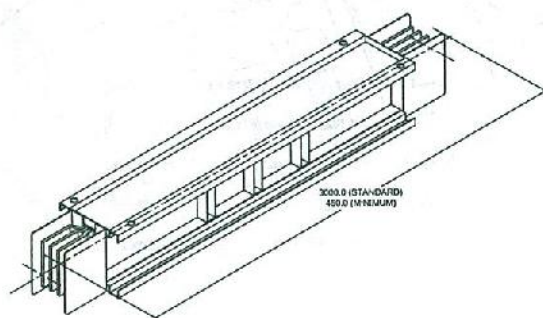
Rated Current (A)	Impedance ($10^{-6}\mu\Omega/m$)			Line to Line Voltage Drop in (mV/m) at Rated Current and Various Power Factors									
	R	X	Z	1.00	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10
400	134.25	82.12	157.4	93.01	108.51	108.55	105.74	101.32	95.78	89.35	82.18	74.35	65.91
600	106.19	75.42	130.2	110.36	133.48	135.31	133.22	128.92	123.06	115.98	107.88	98.87	89.02
800	73.80	20.16	76.5	102.26	104.21	98.57	91.53	83.70	75.32	66.51	57.33	47.82	38.02
1000	52.50	15.68	54.3	90.93	93.68	89.04	83.05	76.29	68.98	61.26	53.19	44.80	36.12
1200	47.33	11.26	48.7	98.37	98.74	92.74	85.57	77.75	69.45	60.80	51.84	42.61	33.12
1600	35.75	9.76	37.1	99.07	100.96	95.49	88.67	81.08	72.96	64.42	55.52	46.32	36.82
2000	29.87	7.97	30.9	103.47	105.16	99.34	92.15	84.17	75.65	66.69	57.38	47.75	37.82
2500	23.04	6.75	24.0	99.77	102.63	97.35	90.71	83.24	75.20	66.59	57.81	48.59	39.06
3200	18.88	5.02	19.5	104.53	106.21	100.32	93.04	84.98	76.36	67.31	57.90	48.17	38.14
4000	11.92	2.32	12.1	82.53	81.33	75.71	69.29	62.41	55.21	47.77	40.11	32.27	24.25
5000	7.85	1.24	7.9	67.98	65.87	60.83	55.26	49.38	43.29	37.04	30.64	24.12	17.48

Note: For the 60Hz calculation, divide the reactance (X) by 0.83. And the resistance (R) remains unchanged due to the negligible difference in frequency.

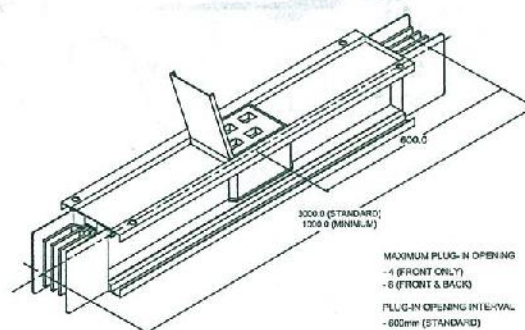
Short Circuit Rating of LINKK System

Ampere Rating (A)	Short Circuit Rating (kA/s)
400	30
600	50
800	50
1000	60
1200	60
1600	80
2000	100
2500	100
3200	120
3500	120
4000	150
4500	150
5000	150
6300	150

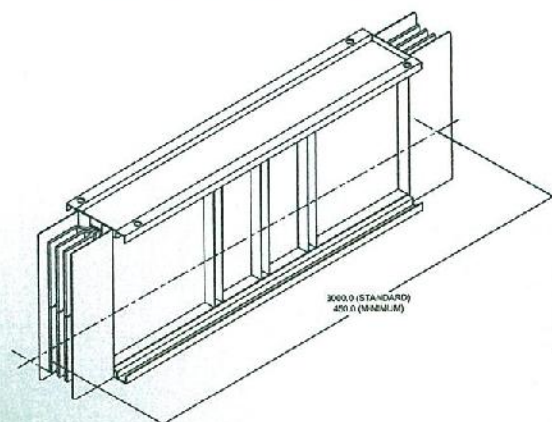
LINKK Busduct System



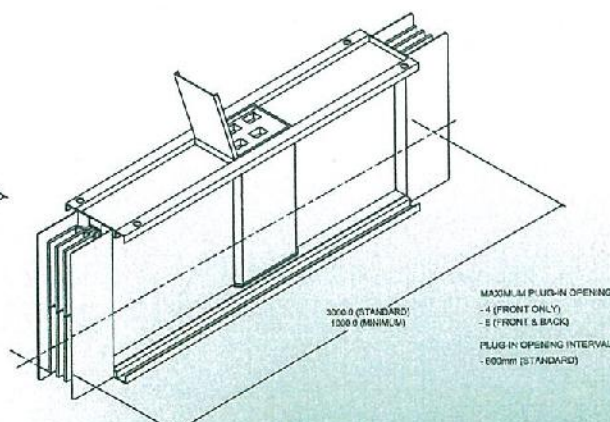
FEEDER BUSDUCT, DIMENSION (STANDARD/MINIMUM)



PLUG-IN BUSDUCT, DIMENSION (STANDARD/MINIMUM)



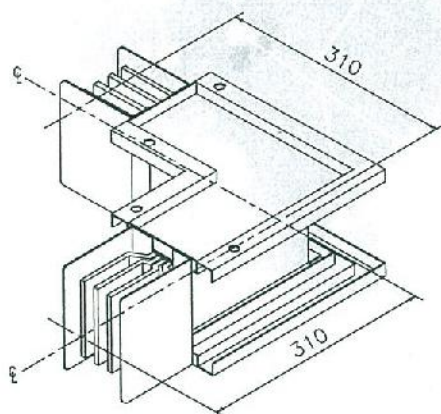
FEEDER BUSDUCT, DIMENSION (STANDARD/MINIMUM)



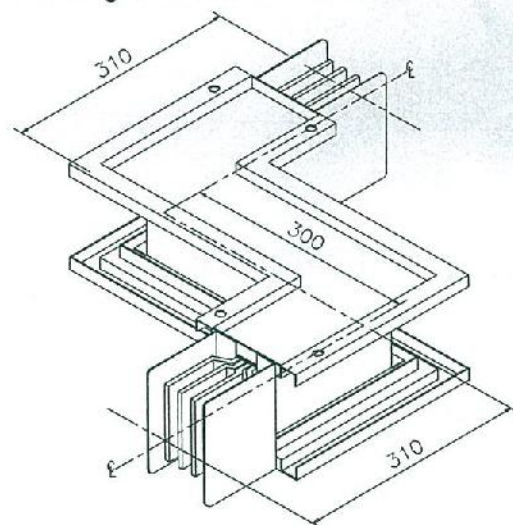
PLUG-IN BUSDUCT, DIMENSION (STANDARD/MINIMUM)

LINKK Standard Components

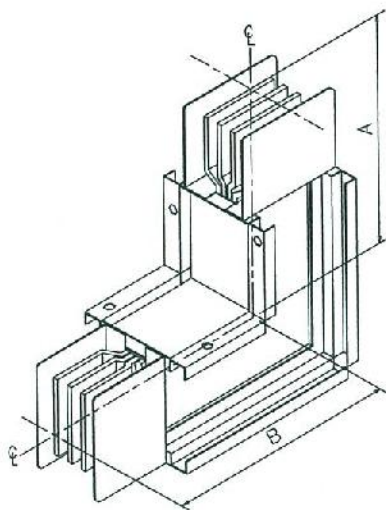
Edgewise Elbow



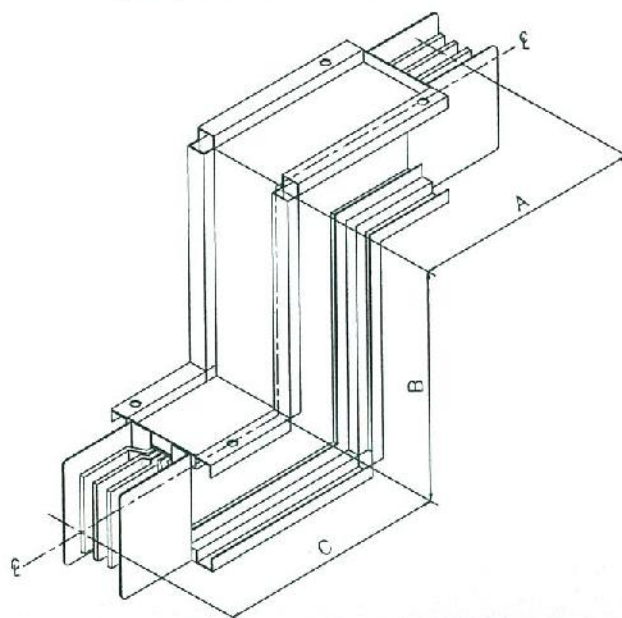
Edgewise Offset



Flatwise Elbow



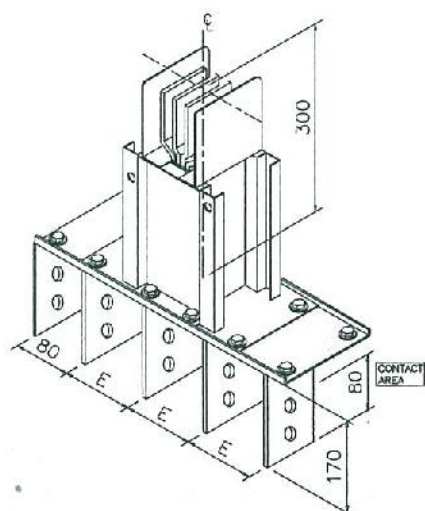
Flatwise Offset



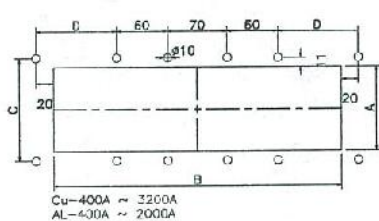
	Ampere (A)	Standard (mm) A x B
Cu	400A - 1600A	400 x 400
	2000A - 2500A	500 x 500
	4000A - 6300A	550 x 550
AL	400A - 1000A	350 x 350
	1200A - 2000A	400 x 400
	2500A - 3000A	500 x 500

	Ampere (A)	Standard (mm) A x B x C
Cu	400A - 1600A	400 x 300 x 400
	2000A - 2500A	500 x 300 x 500
	4000A - 6300A	550 x 300 x 550
AL	400A - 1000A	360 x 300 x 350
	1200A - 2000A	400 x 300 x 400
	2500A - 3000A	500 x 300 x 500

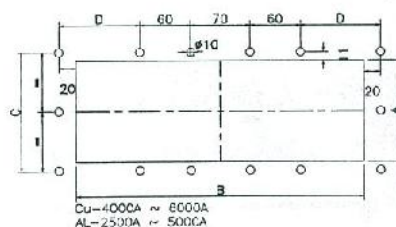
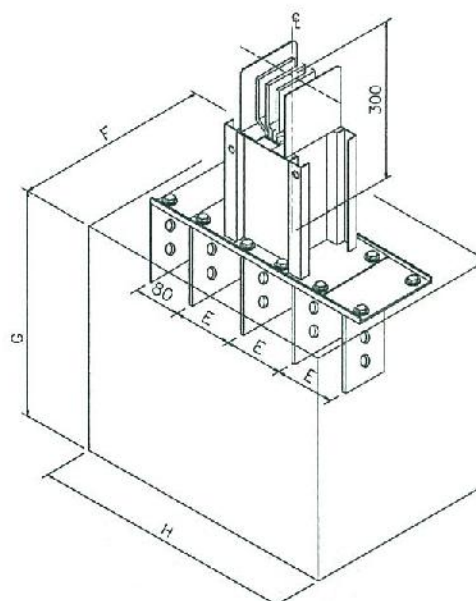
Flange End



Mounting Cut Out



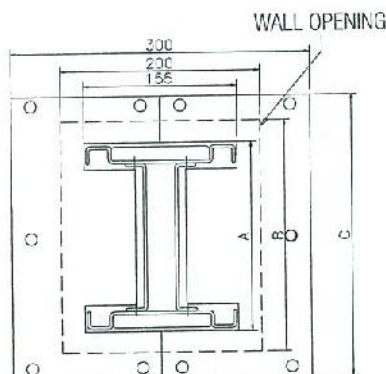
End Feed Box



Ampere (A)		Mounting Cut out (mm)				Interval (mm)	End Feed Box size (mm)		
		A	B	C	D	E	F	G	H
CU	400A	25	280	47	65	80	330	500	400
	600A	35		57					
	800A	50		72					
	1000A	60		82					
	1200A	70		92					
	1600A	100	122	95	100	400	650	450	
	2000A	132	154						
	2500A	163	185						
	3200A	215	237						
	4000A	291	313						
	5000A	378	400			500			
	6300A	440	462						

Ampere (A)		Mounting Cut out (mm)				Interval (mm)	End Feed Box size (mm)					
		A	B	C	D	E	F	G	H			
AL	400A	50	280	72	65	80	330	500	400			
	600A	60		82								
	800A	85		107								
	1000A	110		132								
	1200A	135		157								
	1600A	160	340	182	95	100	400	650	450			
	2000A	210		232								
	2500A	294		316								
	3200A	344		366								
	4000A	528		550								
	5000A	670		692						500		
	6300A	800		824								

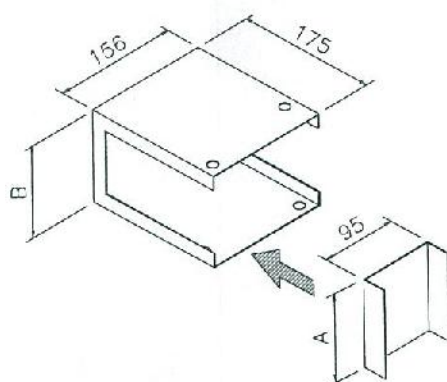
Wall Flange



Ampere (A)		Wall Flange Detail		
		A	B	C
CJ	400A	54	99	149
	600A	65	109	159
	800A	80	124	174
	1000A	90	134	18
	1200A	100	144	194
	1600A	130	174	224
	2000A	162	206	256
	2500A	193	237	287
	3200A	245	289	339
	4000A	321	365	415
5000A	408	452	502	
6300A	470	514	564	

Ampere (A)		Wall Flange Detail		
		A	B	C
AL	400A	79	124	174
	600A	90	134	184
	800A	115	159	209
	1000A	140	184	234
	1200A	155	209	259
	1600A	190	234	284
	2000A	240	284	334
	2500A	324	368	418
	3200A	374	418	468
	4000A	558	602	652
5000A	708	752	802	

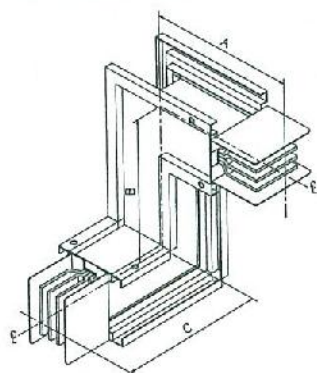
End Cover



Ampere (A)		Wall Flange Detail	
		A	B
CU	400A	49	55
	600A	59	65
	800A	74	80
	1000A	84	90
	1200A	94	100
	1600A	124	130
	2000A	156	162
	2500A	187	193
	3200A	239	245
	4000A	315	321
AL	5000A	402	408
	6300A	464	470

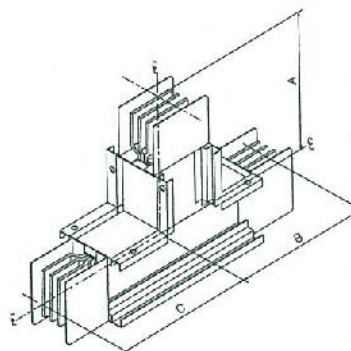
Ampere (A)		Wall Flange Detail	
		A	B
AL	400A	74	80
	600A	84	90
	800A	109	115
	1000A	134	140
	1200A	159	165
	1600A	184	190
	2000A	234	240
	2500A	318	324
	3200A	368	374
	4000A	552	558
5000A	702	708	

Combination Elbow



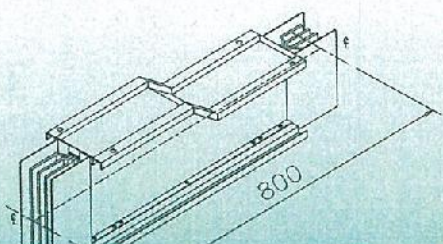
Ampere (A)		Standard (mm) A x B x C
Cu	400A - 1600A	310 x 300 x 400
	2000A - 2500A	310 x 300 x 500
	4000A - 6300A	310 x 300 x 550
AL	400A - 1000A	310 x 300 x 350
	1200A - 2000A	310 x 300 x 400
	2500A - 3500A	310 x 300 x 500
	4000A - 5000A	310 x 300 x 650

Flatwise Tee

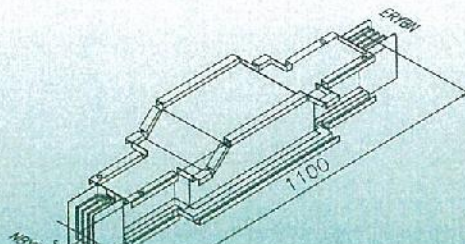


Ampere (A)		Standard (mm) A x B x C
Cu	400A - 1600A	400 x 400 x 400
	2000A - 2500A	500 x 500 x 500
	4000A - 6300A	550 x 550 x 550
AL	400A - 1000A	360 x 350 x 350
	1200A - 2000A	400 x 400 x 400
	2500A - 3000A	500 x 500 x 500
	4000A - 5000A	650 x 650 x 650

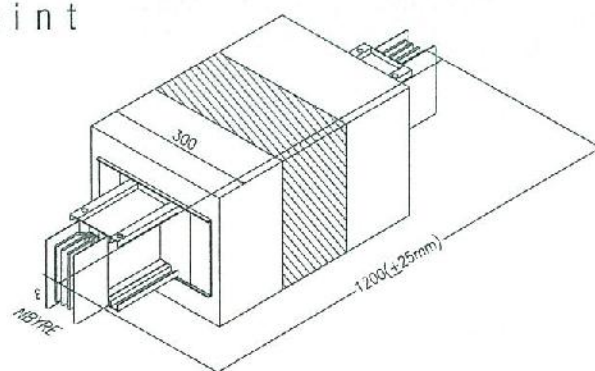
Reducer



Phase Transposition

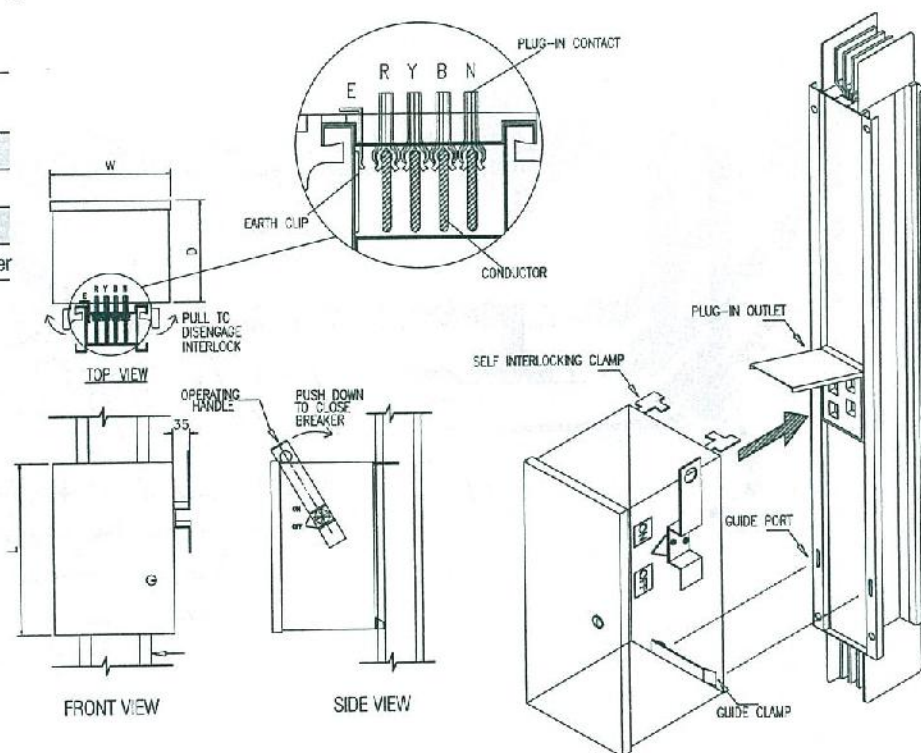


Expansion Joint

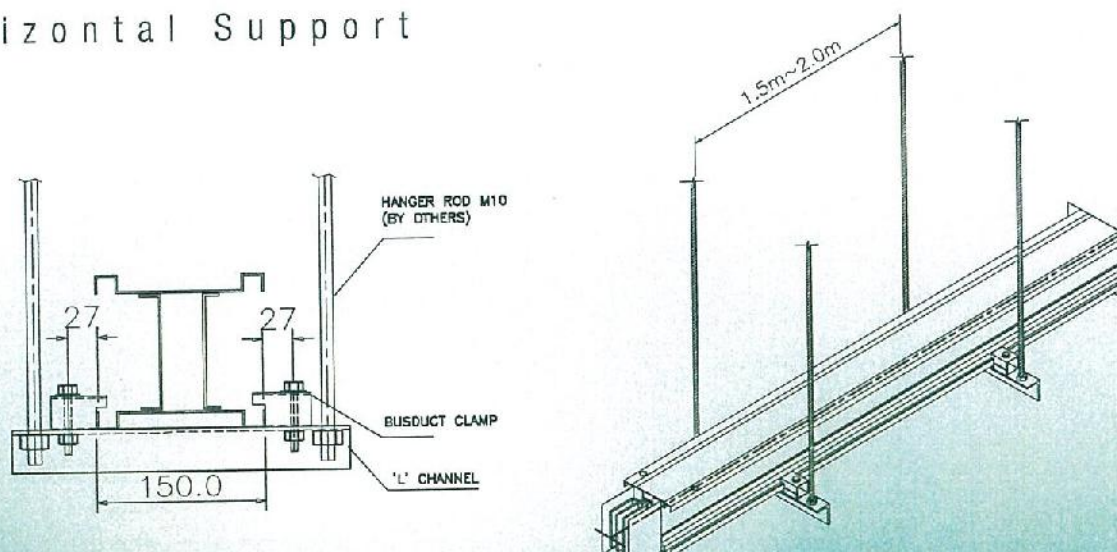


Tap Off Unit

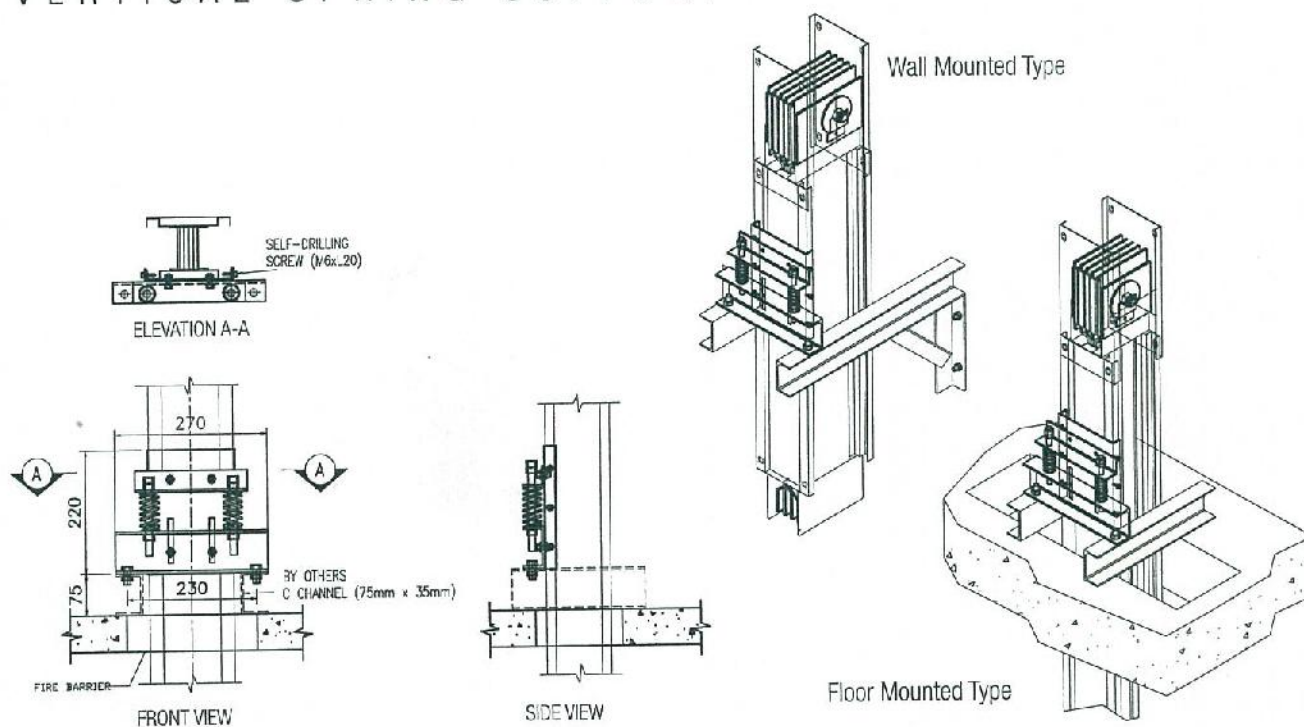
Current Rating (A)	Box Size (mm)		
	L	D	W
15A - 250A	350	220	250
300A - 400A	500	250	250
500A - 800A	850	300	350
Above 800A	Refer to manufacturer		



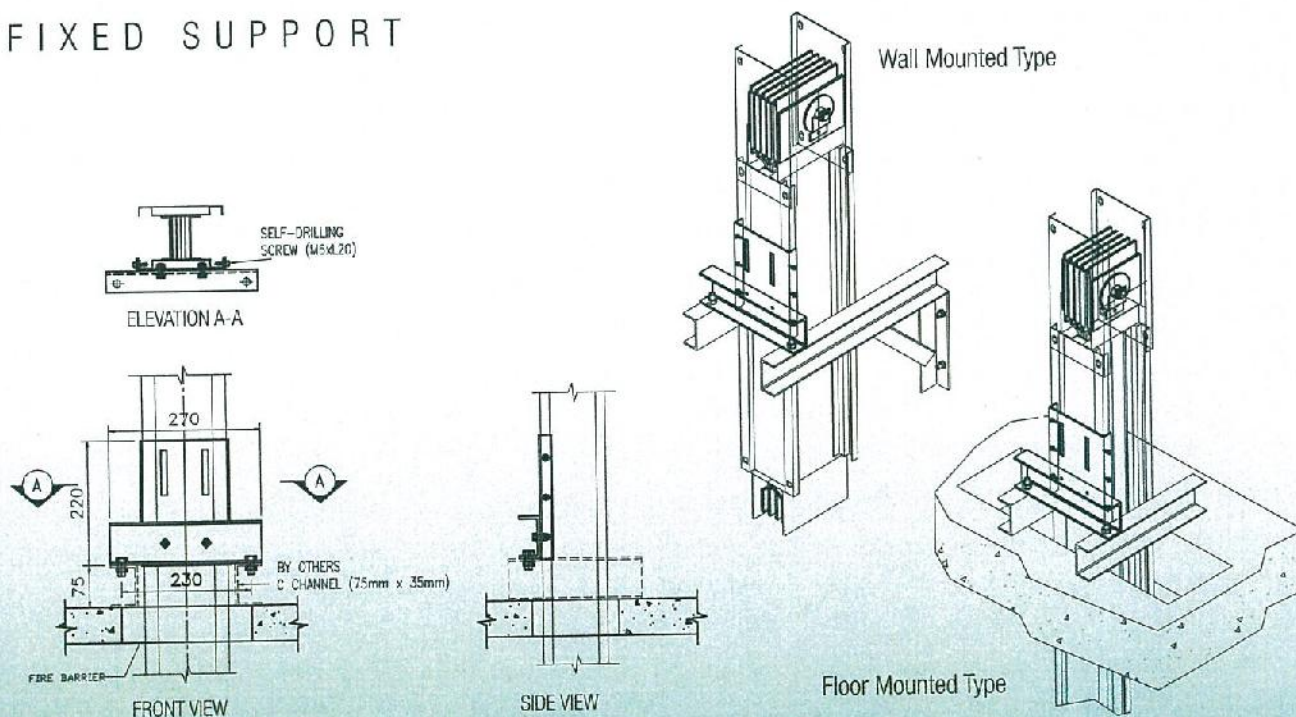
Horizontal Support



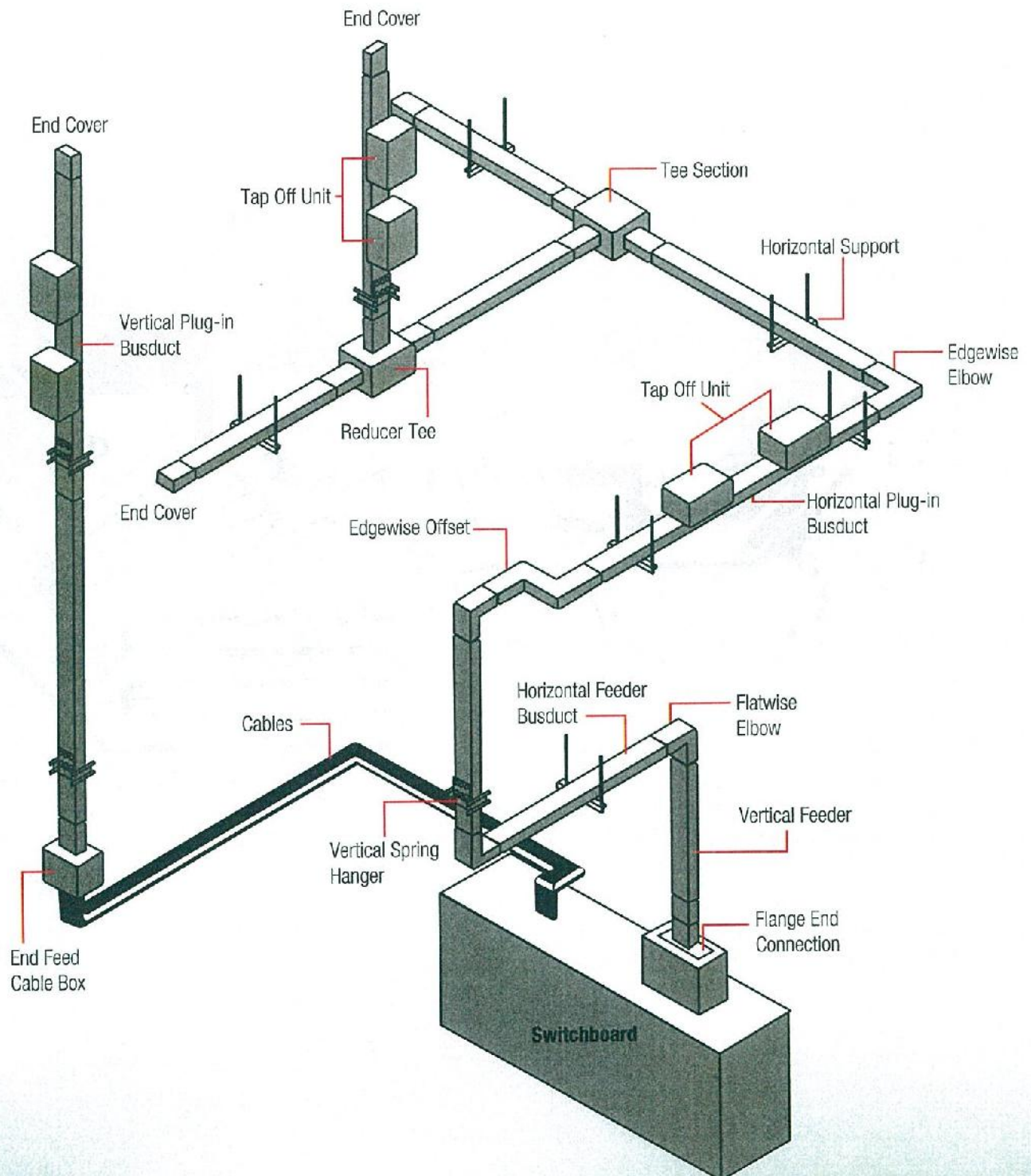
VERTICAL SPRING SUPPORT



FIXED SUPPORT

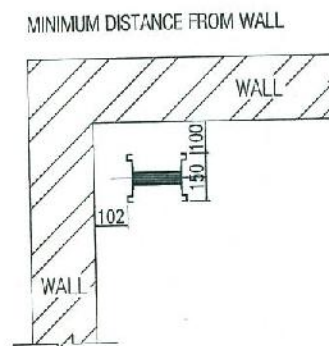
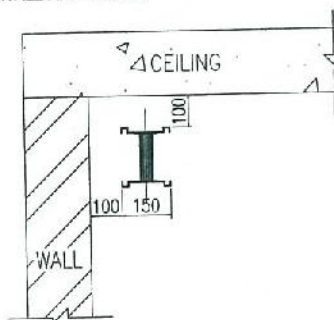
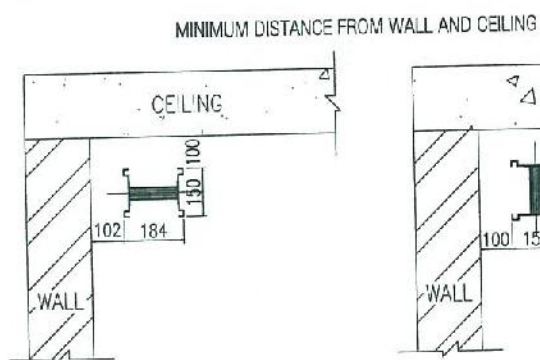
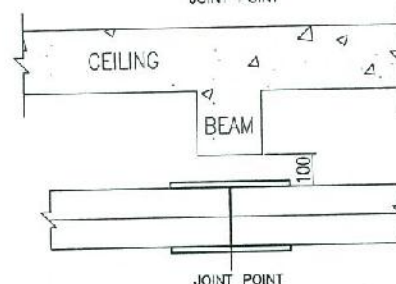
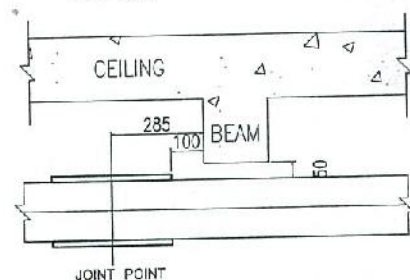
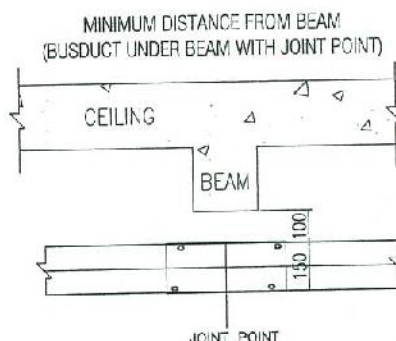
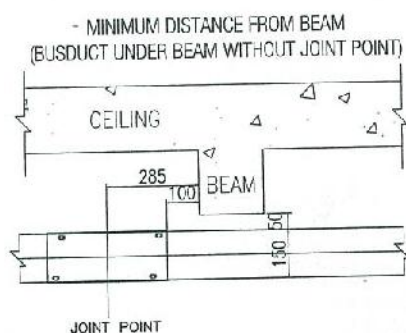


Illustrations Of LINKK Busduct Trunking System

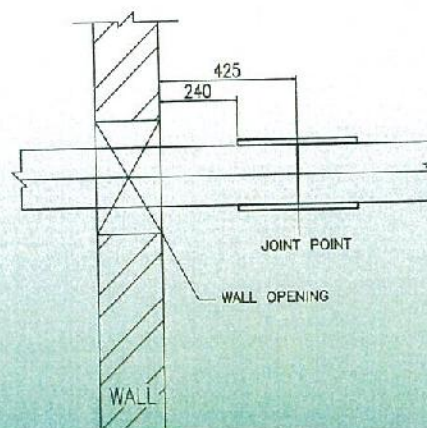
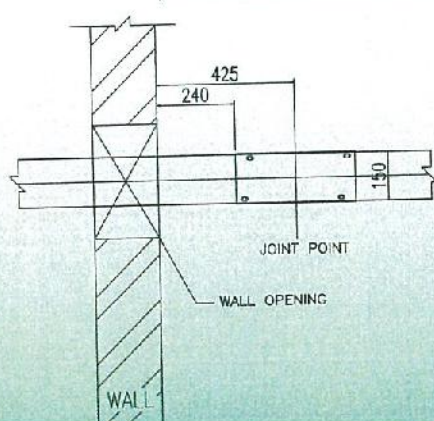


Busduct Layout Design Consideration

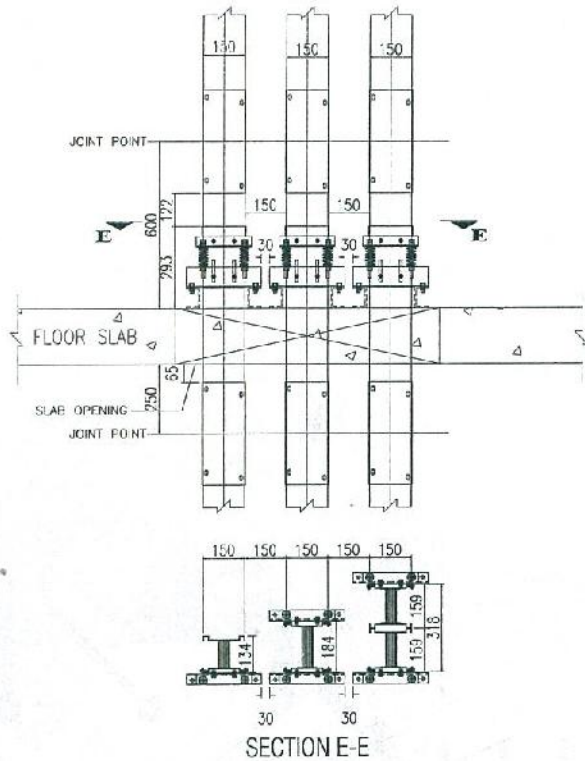
Below are some examples of design considerations for busduct layout at site:



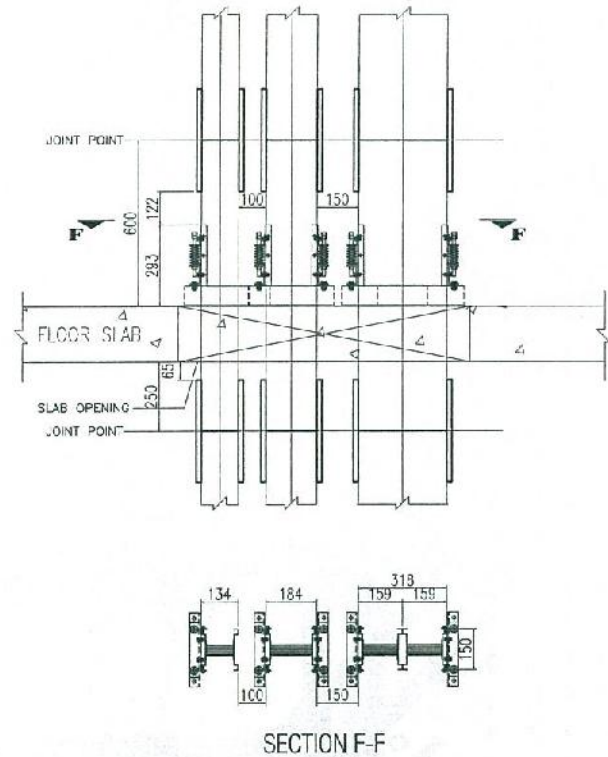
BUSDUCT JOINTING POINT THROUGH WALL OPENING INSTALLATION
(JOINTS SHOULD NOT BE INSTALLED IN BETWEEN WALLS)



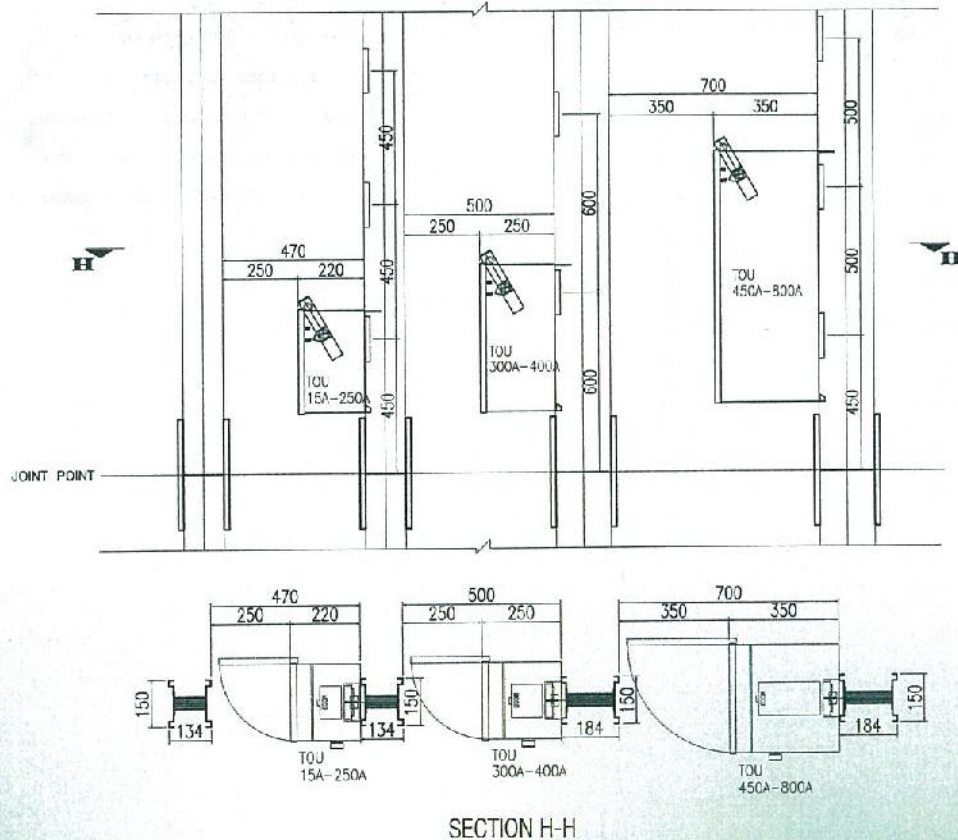
MINIMUM CLEARANCE OF VERTICAL FEEDER BUSDUCT JOINTS SIDE BY SIDE WITH VERTICAL SPRING HANGER



MINIMUM CLEARANCE OF VERTICAL FEEDER BUSDUCT INSTALLED FLAT IN PARALLEL POSITION WITH VERTICAL SPRING HANGER



MINIMUM CLEARANCE OF PLUG-IN BUSDUCTS WITH TAP-OFF UNIT INSTALLED FLAT IN PARALLEL POSITION (SHALL BE DETERMINED BY TAP-OFF UNIT SIZE)



CERTIFICATE

ISO 9001

CERTIFICATE **TUV NORD**

Management system as per
BS EN ISO 9001 : 2008

In accordance with TÜV UK Ltd procedures, it is hereby certified that

Linkk Busway Systems (M) Sdn Bhd

(1018052-0)
Lot 43117, Wisma LFE,
Off Jalan Balakong,
Balakong, 43300
Seri Kembangan,
Selangor D.E., Malaysia



applies a management system in line with the above standard for the following scope:

Design, Manufacturing, Testing & Delivery of Electrical Busway Trunking System & Accessories

Certificate No.: MA00005

Audit Report No.: 2013/22942

PGM



Valid until: 04/09/2018

Initial certification: 05/09/2013

London, 05/08/2013

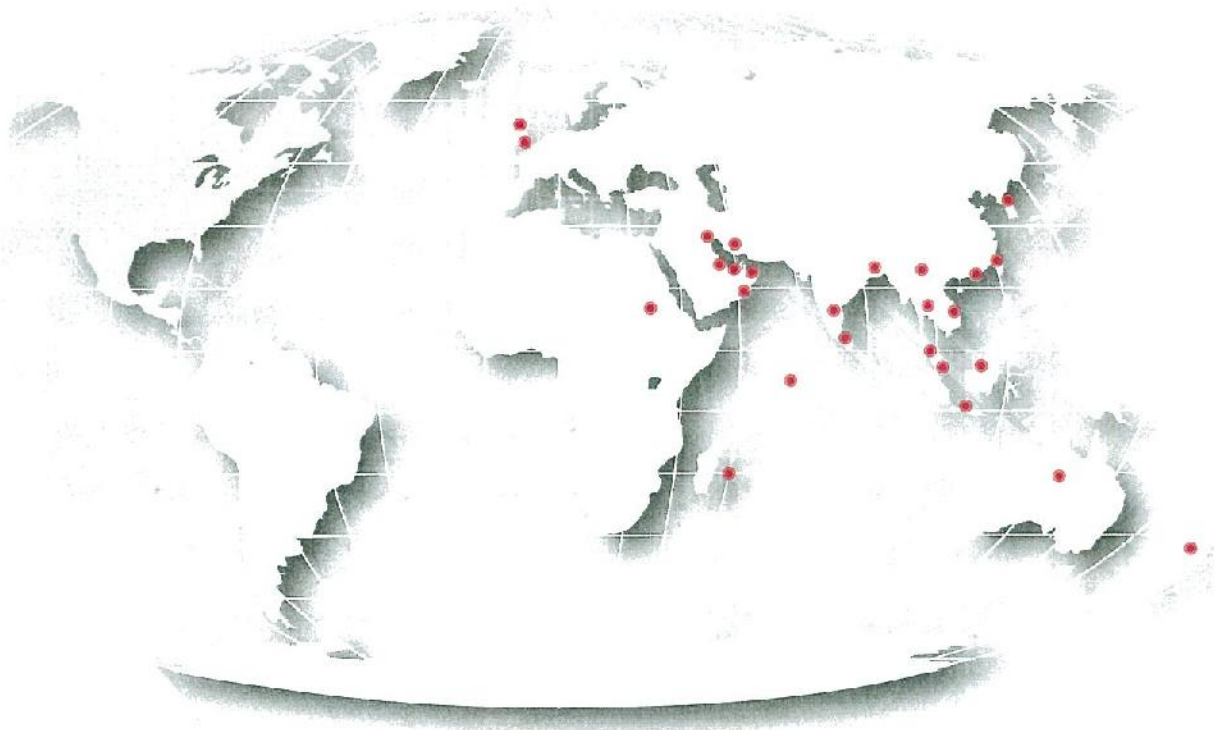
Signed for and on behalf of TÜV UK Ltd,
the Certification body

This certificate, which remains the property of TÜV UK Ltd, was issued in accordance with the TÜV UK Ltd auditing and certification procedures as amended from time to time and its validity is subject to regular surveillance audits.

TÜV UK Ltd, Surrey House, Surrey Street, Croydon CR9 1XZ, UK www.tuv-uk.com



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