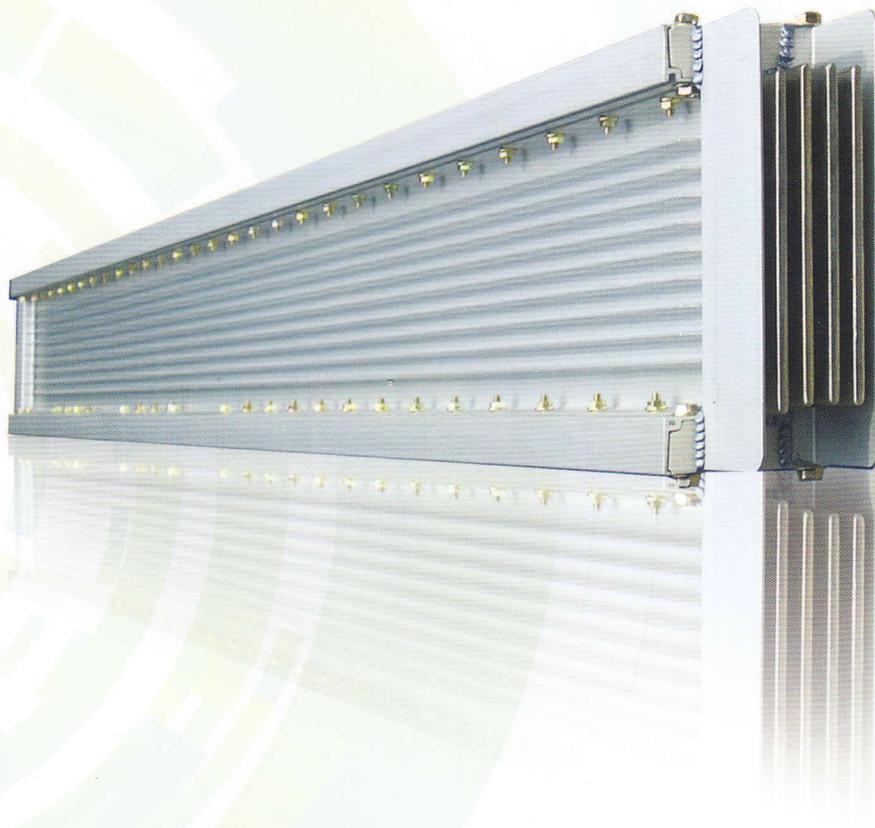


POWERDUCT SERIES

EXTRUDED ALUMINUM HOUSING WITH COOLING FIN

FULLY TYPE TESTED BUSDUCT SYSTEM



STAY COMPETENCE



CCA CE ASTA





ACHIEVEMENT

CERTIFICATE

This is to certify that:

Power Plug Busduct Sdn. Bhd.
 Unit 18, Jalan BUC 3,
 Kawasan Perindustrian BUC,
 79200 Nusajaya, Johor, Malaysia

has implemented and maintains a Quality Management System

Scope:
 Design and Manufacturing of Busbars, Trunking Systems

This organization has implemented a system of management system in accordance with the requirements of the following standard:

ISO 9001 : 2008

Certificate registration no: 48191-2008
 Date of original certification: 2011-05-16
 Date of last revision: 2012-05-17
 Valid until: 2014-05-15

DQS GmbH
 Head Office
 Wetzlar, Germany

Approved Body: DQS GmbH, registered in accordance with DIN EN ISO 9001:2008 and ISO 9001:2008. The certificate is issued in accordance with the requirements of the following standard: ISO 9001:2008. The certificate is issued in accordance with the requirements of the following standard: ISO 9001:2008.



SUPER EXCELLENT BRAND

Book of RECORDS



Table of Content

	Pages
GENERAL	1 - 4
GROUND RESISTANCE	5
IMPEDANCE & VOLTAGE DROP	6
ELECTRICAL DATA	7
IP RATING	8
DIMENSION & WEIGHT	9
PHYSICAL DATA	
• Feeder Section	10
• Plug-in Section	11
• Elbow & Tee	12
• Offset & Combination Elbow	13
• Reducer & Center Tap Box	14
• End Cable Tap Box	15
• Expansion Fitting	16
• Flange End	17 - 18
• Plug-in Unit	19 - 21
• Horizontal & Riser Application	22
• Joint Stack	23
• Joint Detail & Feeder Busway Dimension Spacing	24 - 25
• Busway connection Procedures	26
• Hangers & Floor Support	27 - 28
CATALOGUE NUMBERING SYSTEM	29 - 30
CERTIFICATE	31
BUSDUCT SYSTEM	32
JOB REFERENCE	33 - 34
FIRE RESISTANCE (FR) SYSTEM	35
NOTES	36

Housing

Powerduct busway is constructed with **extruded aluminum** and is designed with **cooling fin** on both top and bottom.

Benefits of such design are as follows:

- Super Compact & Light Weight
- Low Impedance
- Greater heat dissipation
- Better housing as Ground medium
- Dust free
- Corrosion free
- Low Installation Cost

No doubt, this construction has been tested and has achieved the highest 60-cycle short circuit withstand ratings under the IEC and BSEN publication 60439-2 : 2000 approved by third party certification.

The enclosure has also been tested for ingress protection and has achieved the highest **IP68** for **standard feeder** and **IP55** for **plug-in section** (ref. table 8.2).

Hence, this has proved Powerduct housing construction has mechanical strength and its reliability to protect the busbar conductor.

Standard

All the Powerduct busway product is designed and manufactured in compliance of the following standards:

- IEC 60529
- IEC 61439-6
- UL 857
- CSA 857
- CSA C22.9 NO. 27-94
- NEMA BUI
- JIS 8364

Plug in outlet

Powerduct plug in outlets being designed to meet IEC 529 and BS EN 60439-1,-2 and BS EN 60529 requirement whereby the opening safety rated for finger safety to IP2X.

Hinged dead designed at the front of each plug in outlet to protect the contact surfaces from rust, dirt and moisture. Pad lock designed on the outlet to lock the outlet for safety purpose. Gasket is used in IP55.

Plug In unit

Available in both moulded case circuit breaker and fusible type;

Powerduct Plug In features the following:

- **Interlocking door** during in 'ON' position to prevent the door from opening for safety purpose
- **Mechanically interlocking** with busway housing during 'ON' position to prevent being take off during energizing.
- The plug-in unit connection on **earth designed to engage first before phase connections** when installing plug-in unit for the safety purpose.
- All Plug In units have internationally recognized symbols indicating the "ON/OFF" position.

Thermal Indicator (optional):

Most of the busway manufacturer will have inspection covers to permit inspection of the joint periodically. However, Powerduct newly designed so call thermal indicator will provide a more convenient for continual visual inspection whereby the thermal indicator will show a sign when the joint is overheating. This benefits from convenience visual inspection without opening the cover and save time from labor inspection.

Insulation

The **130°C Class B insulation** is the primary insulation in all PPB conductors. Optional Mylar and epoxy insulation (Hybrid) 155°C Class F and 180°C Class H is available upon customer's request.

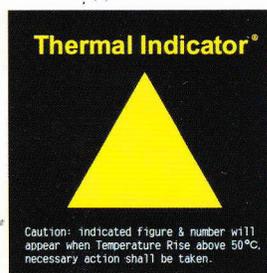
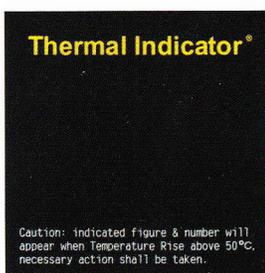
The innovated coating process provides high quality and uniform epoxy insulation. This epoxy is non-hygroscopic, self-extinguishing and bonded directly to the bus bar thus eliminating any air gap between the insulation and bus bars.

Advantage of using epoxy insulation are as follows:

- Able to withstand glitch and spikes in electrical system
- Halogen free
- Resistant against water and chemical
- High thermal conductivity
- High mechanical strength against impact and capable with standing heat shock
- Comply to UL 94 V - O
- Cater for expansion and contraction during peak and off-peak hours
- Long life compare to PVC and Mylar
- Impervious to acids, alkalis, acetones, mechanical oils and lubricants

Before

After



Joint

Powerduct Joint (bridge type) features a single/multiple bolt design with the double headed bolt, therefore improving the ease and the cost of the installation.

By using this newly designed joint stack, you will definitely reduce arrangement for installation time (on-site time as well as cost saving).

The use of the Belleville spring washers on the bolt ensures the original contact pressure is maintained giving a more secure and reliable joint.

Powerduct Bridge type joint Stack features performs;

- Twin headed Bolts and will shear off when torque exceeds 50lb/ft.
- Single Bolt joint system with the material composition of chromed black high tensile steel
- Ease of removal and installation without by moving entire Busway
- Maintenance Free.

Bus bars

All bus bars copper are manufactured from high electrical grade high conductivity electrolytic copper which comply with international standard-BS1433/1432. Aluminum bus bars also available.

The copper composition of the bus bar are of 99.9% or conductivity in excess of 99% IACS. The aluminum bus bar are of conductivity in excess of 60% IACS. All the copper and aluminum bus bars are **electroplated** with **tin** on all contact surfaces. Optional **silver plating** is also available. This will improve conductivity more effectively.

All Busway are constructed in sandwich type which means no air gap shall exist between bus bars except at the joint. This can obtain **lower impedance** and **better heat dissipation**. **Lower impedance** means **lower voltage drop**.

All the conductor also being insulated with epoxy powder (Hybrid Powder) coated which giving 100% water, rust and chemical resistance. Optional specification can be designed and fabricated to customer's request.

Bus bar are available in various configurations: Refer to next page picture.

1. 3P3W + Integral Ground
2. 3P3W + 50% Internal Ground
3. 3P3W + 100% Neutral + Integral Ground
4. 3P3W + 100% Neutral + 50% Internal Ground
5. 3P3W + 200% Neutral + Integral Ground
6. 3P3W + 200% Neutral + 50% Internal Ground

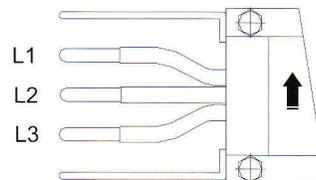
True 200% Neutral Construction

Harmonics occur generated by nonlinear load devices such as electronic ballast lighting, computers, printers, copier machines & etc. The harmonic current generated in neutral conductor can be 173% of phase current. This abnormal high neutral current results in overheating the neutral conductor and leads to deterioration of equipment performance and its life cycle.

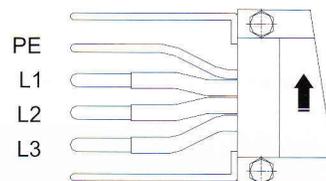
Therefore, we provide two separate 100% neutral bus bars within the same busway housing. This true 200% neutral is doubling the size of phase bus bars to prevent overheating caused by harmonics.

Bus bar configurations

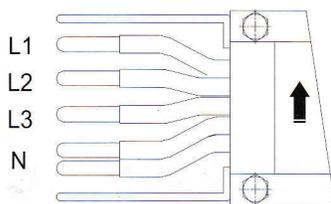
1. 3P3W + Integral Ground



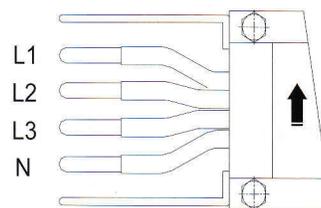
2. 3P3W + 50% Internal Ground



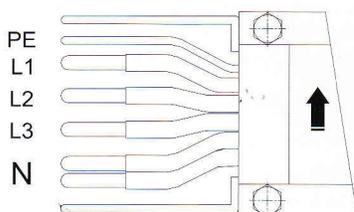
5. 3P3W + 200% Neutral + Integral Ground



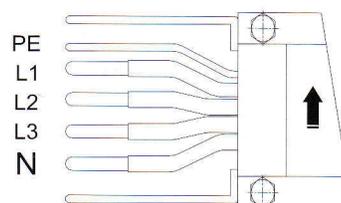
3. 3P3W + 100% Neutral + Integral Ground



6. 3P3W + 200% Neutral + 50% Internal Ground



4. 3P3W + 100% Neutral + 50% Internal Ground

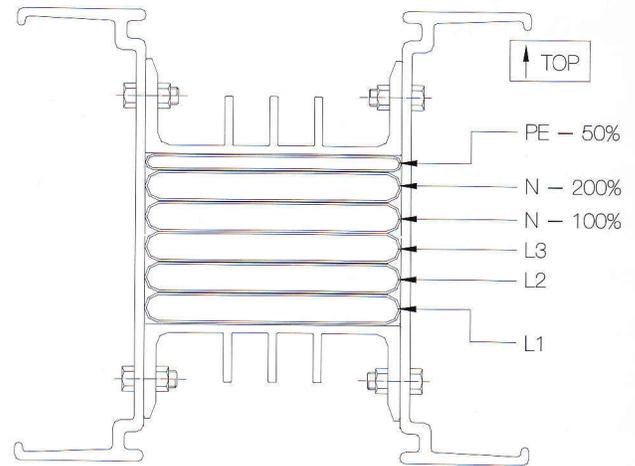


Ground Resistance

Powerduct Busway offers you a variety of ground options to meet your specification:

- Integral aluminum housing ground (standard)
- Copper internal ground
- Copper isolated ground

The Powerduct aluminum housing provides extremely high ground capacity. The table 5.1 showing the conductivity and current carrying capacity offered by the housing is at least 2 times greater than the active copper ground bar (sized 50% of the phase bar)



Powerduct busway-Ground Capacity Table 5.1

Ampere Rating	Aluminum housing Cross Sectional Area integral ground (mm ²)	Copper Sectional Area 50% internal Ground Bar (mm ²)	Current Carrying Capacity Ratio Integral / Internal
400	1326.70	58.10	13
600	1366.70	88.10	9
800	1446.60	133.10	6
1000	1614.60	178.10	5
1200	1674.60	223.10	4
1350	1734.60	268.10	4
1600	1910.60	328.10	4
2000	2873.00	448.10	4
2500	3410.50	553.10	3
3200	3289.15	656.10	3
4000	4775.00	896.10	3
5000	5849.20	1106.10	3

Aluminum Housing Ground : IACS > 55% conductivity
 Copper Ground Bar : IACS > 99% conductivity

Impedance & Voltage Drop

Energy Optimization

Powerduct busway system enable you to optimize the energy usage and reduce unnecessary energy wastage which is a hidden cost.

Better heat dissipation will provide cooler busway energizing. At the same time, the busway has lower impedance and lower voltage drop if compared to the other competitors' busway.

These features also include extremely low reactance due to non-magnetic housing and totally intimate contact of bus bars and housing. Please refer to the table 6.1 below for your further voltage drop information.

Table 6.1 Voltage Drop Line to Line (60Hz)

Current Load	Ohms* 10 ⁻³ /100m Line to Line			Voltage drop concentrated loads line to line/100M at rated load, 50°C ambient									
				POWER FACTOR									
	R	X	Z	1	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
COPPER													
400	15.59	3.17	15.91	10.80	10.68	9.96	9.13	8.24	7.30	6.33	5.33	4.31	3.26
600	10.42	2.12	10.63	10.83	10.71	9.98	9.15	8.26	7.32	6.35	5.35	4.32	3.27
800	7.13	1.45	7.28	9.89	9.77	9.11	8.35	7.54	6.68	5.79	4.88	3.94	2.99
1000	5.43	1.10	5.54	9.40	9.29	8.66	7.94	7.17	6.35	5.51	4.64	3.75	2.84
1200	4.46	0.91	4.55	9.28	9.17	8.55	7.84	7.07	6.27	5.44	4.58	3.70	2.80
1350	3.78	0.77	3.85	8.83	8.73	8.14	7.46	6.73	5.97	5.18	4.36	3.52	2.67
1600	3.15	0.64	3.22	8.74	8.64	8.06	7.38	6.66	5.91	5.12	4.31	3.49	2.64
2000	2.45	0.50	2.50	8.49	8.39	7.83	7.17	6.47	5.74	4.98	4.19	3.39	2.56
2500	1.92	0.39	1.96	8.31	8.21	7.66	7.02	6.33	5.61	4.87	4.10	3.31	2.51
3200	1.77	0.36	1.81	9.83	9.72	9.06	8.30	7.49	6.64	5.76	4.85	3.92	2.97
4000	1.36	0.28	1.39	9.44	9.33	8.70	7.97	7.20	6.38	5.53	4.66	3.76	2.85
5000	1.08	0.22	1.10	9.37	9.27	8.64	7.92	7.15	6.34	5.50	4.63	3.74	2.83
ALUMINUM													
400	11.58	2.35	11.81	8.02	7.93	7.39	6.78	6.12	5.42	4.70	3.96	3.20	2.42
600	11.58	2.35	11.81	12.03	11.90	11.09	10.17	9.17	8.13	7.05	5.93	4.80	3.63
800	8.79	1.79	8.97	12.18	12.04	11.23	10.30	9.29	8.24	7.14	6.01	4.87	3.69
1000	5.97	1.21	6.10	10.35	10.23	9.54	8.74	7.89	6.99	6.07	5.11	4.13	3.13
1200	5.03	1.02	5.13	10.45	10.33	9.63	8.83	7.97	7.06	6.12	5.16	4.17	3.16
1350	3.83	0.78	3.91	8.95	8.85	8.25	7.56	6.82	6.05	5.25	4.42	3.57	2.70
1600	3.47	0.70	3.54	9.62	9.51	8.87	8.13	7.33	6.50	5.64	4.75	3.84	2.91
2000	2.97	0.60	3.03	10.28	10.16	9.48	8.69	7.84	6.95	6.03	5.08	4.10	3.10
2500	2.10	0.43	2.14	9.08	8.97	8.37	7.67	6.92	6.14	5.32	4.48	3.62	2.74
3200	1.94	0.39	1.98	10.78	10.65	9.93	9.11	8.22	7.28	6.32	5.32	4.30	3.26
4000	1.63	0.33	1.67	11.32	11.19	10.43	9.56	8.63	7.65	6.63	5.59	4.51	3.42

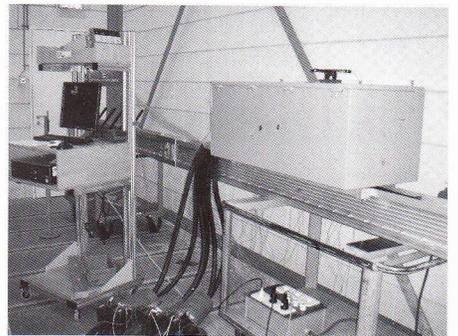
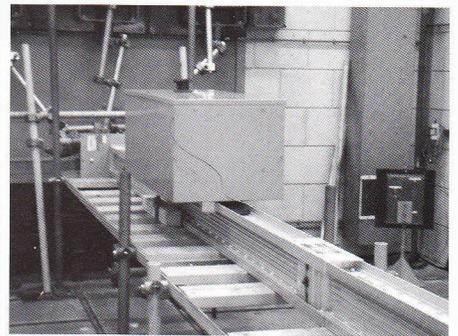
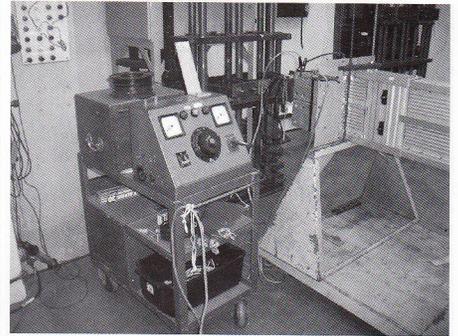
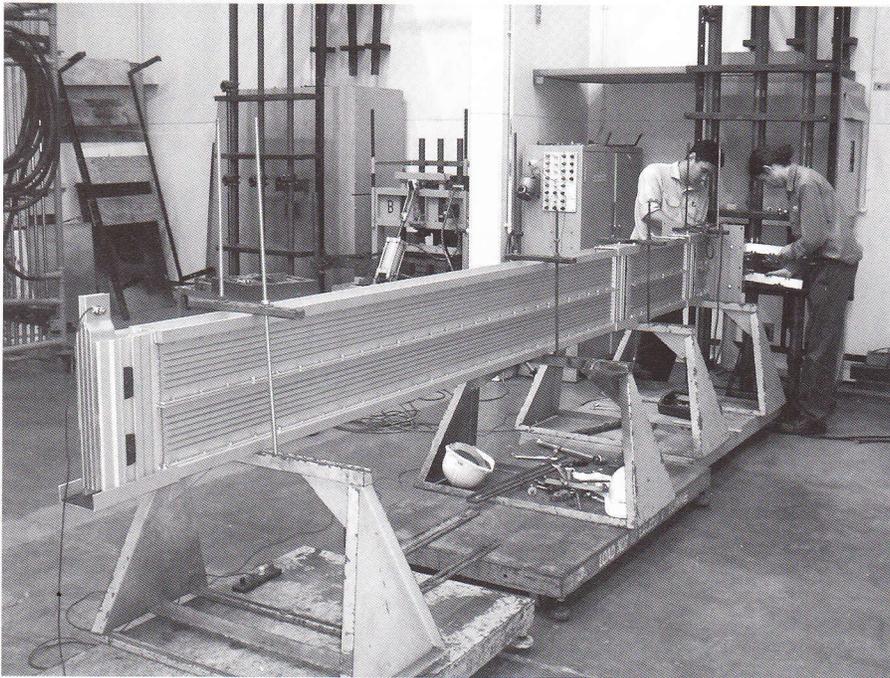
Note: Current density (amps/sq.in) rated busway available. Consult Factory

Voltage Drop Formula

1. Plug-in distributed loads application, divide voltage drop values by 2
2. To determine voltage drop line to neutral, multiply values from table by 0.577.
3. Actual voltage drop for different length and at loading less than full rated current can be calculated by using the formula :
 $V_d = V_{d (table)} \times \text{Actual load/Rated load} \times \text{Actual length (m)}/100 \text{ m}$
4. For 50Hz, multiply reactance (X) by 0.85 and resistance values do not change.
5. For 400Hz, Multiply reactance by 3.75 and multiply resistance by 1.4
6. Calculate new voltage drop : $V_d = \text{Amp loads} \times \sqrt{3} \times (R \cos \phi + X \sin \phi)$ per 100m, where $\cos \phi = \text{Power Factor}$

Short Circuit Protection and Capacity

Powerduct structure is designed to provide a very good short circuit protection. The short circuit has been certified by KEMA in accordance with IEC and BSEN Publication 60439-2 : 2000.



Temperature Rise

Powerduct busway is capable of carrying its full rated current continuously in ambient condition of 95% relative humidity and maximum temperature of 50°C without exceeding 55°C temperature rise.

Thermal cycling test

Powerduct tested to ambient 50°C test

Extract from KEMA Newsletter:

Busduct beats the heat in 50 °C test

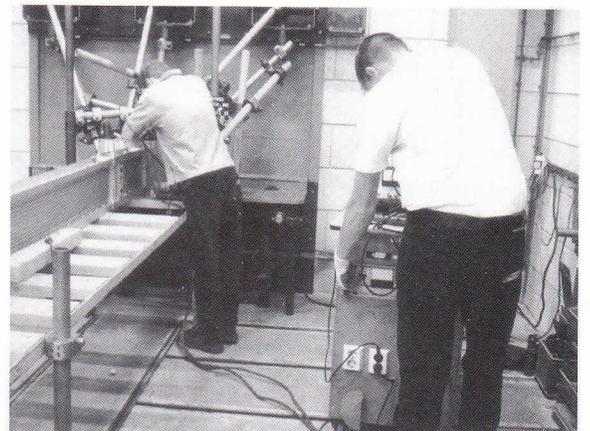
High-temperature test opens up new markets for Power Plug Busduct

KEMA

Tested to IEC60439-2

When many manufacturers of electrical gear in the Middle East are pushing the envelope in testing to make sure their products can withstand the extreme temperatures in the region, thanks to the KEMA high-temperature test, the Malaysian company Power Plug Busduct sdn bhd, whose products had already undergone KEMA type testing according to the international standard, can be confident that their power ducts will provide unwavering performance at 50 °C. High Temperature requirements

KEMA's Henk Kormelink says, "A bus duct tested according to the standard, complies to a mean ambient air temperature of less than or equal to 35 °C (IEC 60439-2 international standard). However, day time temperatures in the Middle East often exceed 50 °C. It was particularly important for this client to have their product tested at the most extreme temperatures, because many of their products carry high-voltage cables that are placed in uncooled areas of buildings. These ducts must continue to operate safely at the very highest temperatures and customers cannot afford failures."



Ingress Protection Level

Water Resistance and Rust Protection : Powerduct busway system has been successfully developed into as high as IP68, whereby the busway is protected against dust and the effects of immersion in water. This fine completion system is in 100% compliance IEC standards and is approved through third party authority certification.

Table 8.1

Busway Type	DEGREE OF PROTECTION						
	IP40	IP54	IP55	IP65	IP66	IP67	IP68
Feeder	X	X	X	X	X	X	X
Plug-in	X	X	X	—	—	—	—
Plug-in Units	X	X	X	—	—	—	—

Note: All Powerduct plug-in busway is IP 2x rated. (Finger Safe Plug-in outlets)

Table 8.2

Degree of Protection	IEC 529-Level of Protection
	Description
IP2x	Protection against objects greater than 12mm.
IP40	Enclosure protects against objects greater than 1mm. Indoor application <u>Indoor</u>
IP54	Enclosure is dust protected and splashed water. <u>Indoor</u>
IP55	Enclosure is dust protected and splayed water. <u>Indoor</u>
IP65	Enclosure is dust tight and splayed water. <u>Indoor</u>
IP66	Enclosure is dust tight and protects against heavy jets. <u>Indoor/Outdoor</u>
IP67	Enclosure is dust tight and protects against effects of immersion up to 1 meter. <u>Outdoor</u>
IP68	Enclosure is dust tight and protects against effects of immersion beyond 1 meter. <u>Outdoor</u>

Dimension & Weight

Table 9.1

Ampere Rating	Figure no.	Dimension in mm "A"	Approximate weight-Kg / Meter					
			TP only	TP w/ ground bar	TP & 100%N	TP & 100%N w/ground bar	TP& 200N	TP & 200%N w/ground bar
COPPER								
400	9.1	89	8	8	9	9	10	10
600	9.1	99	9	10	11	12	12	13
800	9.1	114	12	13	14	15	17	18
1000	9.1	129	15	16	18	20	21	23
1200	9.1	144	17	19	21	23	25	27
1350	9.1	159	20	22	25	27	29	32
1600	9.1	179	24	26	29	32	35	38
2000	9.1	219	32	36	40	44	48	52
2500	9.1	269	39	44	49	54	59	64
3200	9.2	295	50	56	62	68	73	79
4000	9.2	375	68	76	84	92	100	108
5000	9.2	475	82	92	101	111	121	131
ALUMINUM								
400	9.1	114	6	7	8	9	10	11
600	9.1	114	6	7	8	9	10	11
800	9.1	129	6	7	8	9	10	11
1000	9.1	159	9	10	11	12	14	15
1200	9.1	179	11	12	12	13	15	16
1350	9.1	219	15	16	18	19	21	22
1600	9.1	234	16	17	19	20	22	23
2000	9.1	269	18	19	21	22	24	25
2500	9.2	375	28	30	33	35	38	40
3200	9.2	405	30	32	35	37	40	42
4000	9.2	475	34	37	40	43	45	48

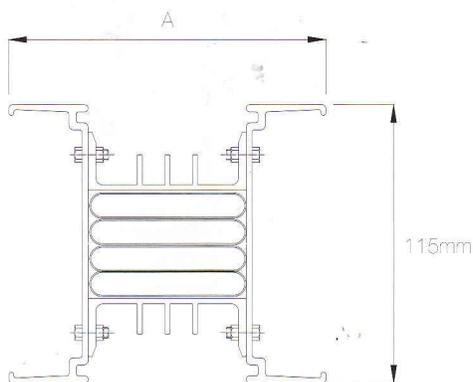


Fig.9.1

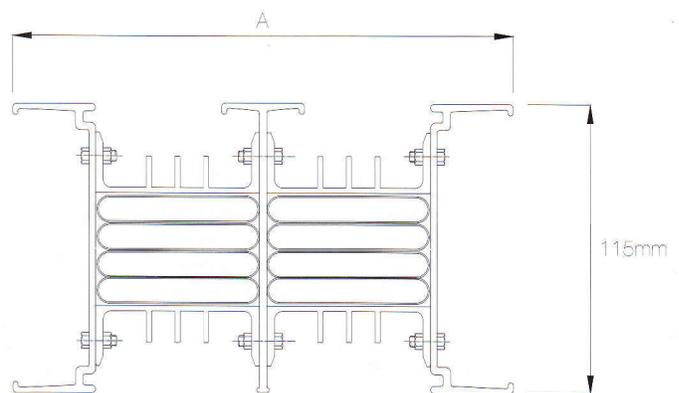


Fig.9.2

POWERDUCT BUSWAY ACCESSORIES

Feeder Section – is available in standard length of 3050mm and with minimum 610mm. This straight length feeder is used to carry power supply directly to the machine and power station without any plug-in opening on the section. (Concentrated Load application) Refer to the Fig.10.1

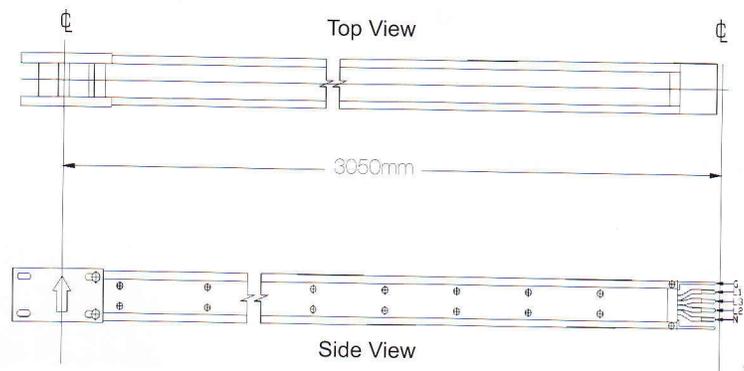


Fig 10.1 Standard feeder Section - Top and Side Views

Plug-in section – is designed to provide convenience and to allow the power to be tapped off from the LIVE busway section for a variety power usage based on the customer's requirement. It is complement with the plug-in unit. The maximum current capacity of each opening is 400A. Refer Fig.10.2

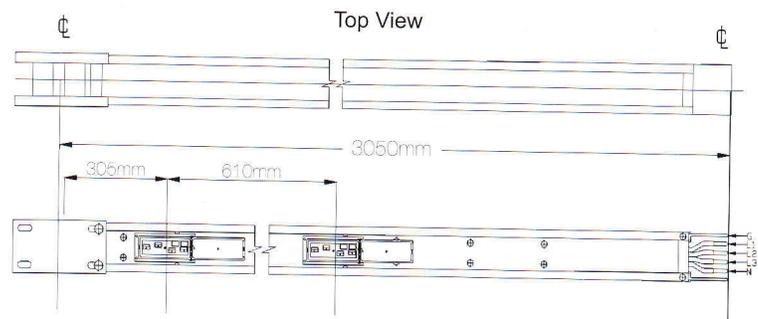


Fig 10.2 Standard Plug-in Section - Top and Side Views

Plug-In Section

Plug-In Section is available in minimum 1220mm and standard 3050mm length rating from 400A to 5000A. Custom length also is available on request.

The quantity of plug-in outlet is classified into:

Standard plug-in busway – whereas the openings outlet available in both sides to optimize the amount of plug-in units in horizontal application. Fig.11.1



Fig 11.1 Standard Plug-in

Riser – whereas opening outlet available in one side on interval 610mm to fit the vertical runs.

Fig.11.2

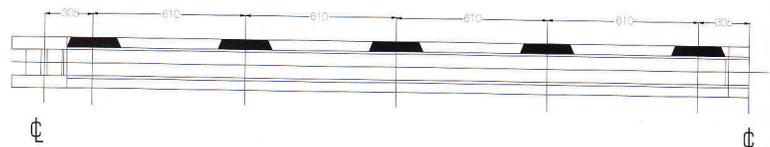


Fig 11.2 Standard Riser

Limited Access – whereas customized design. Plug-in outlet can be placed upon customer request.

Fig.11.3

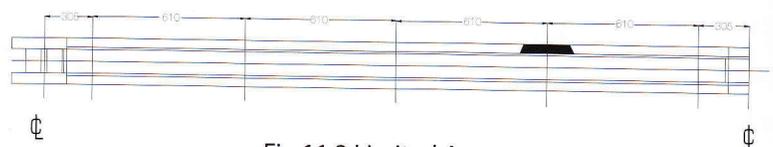


Fig 11.3 Limited Access

Standard Plug-in Outlet

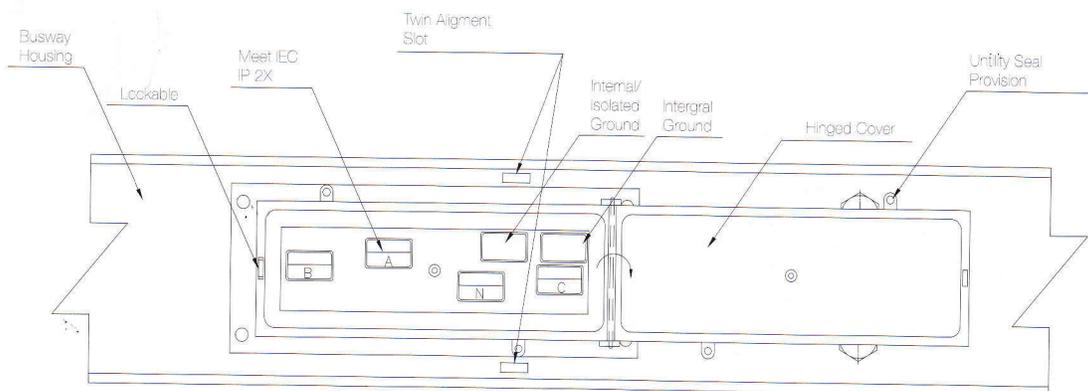
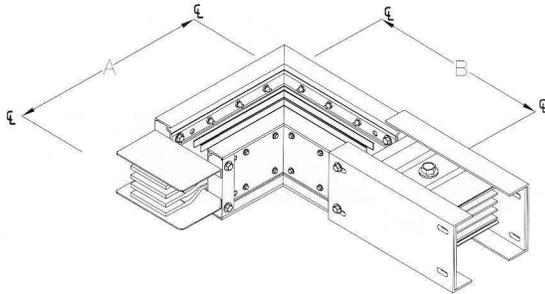


Fig 11.4

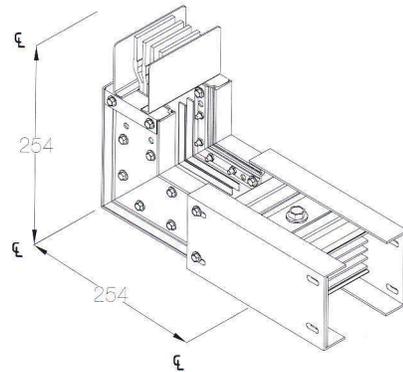
Physical Data

POWERDUCT SERIES

Flatwise Elbow

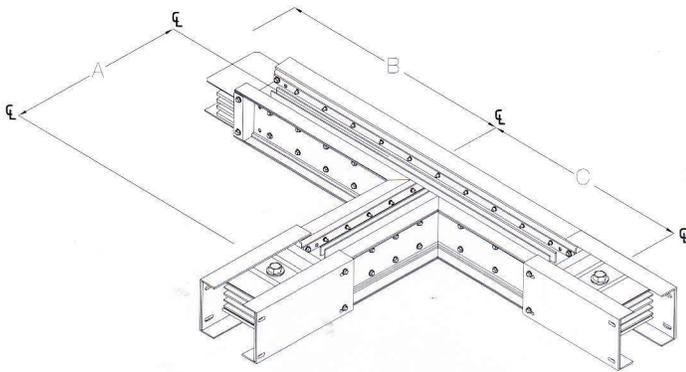


Edgewise Elbow

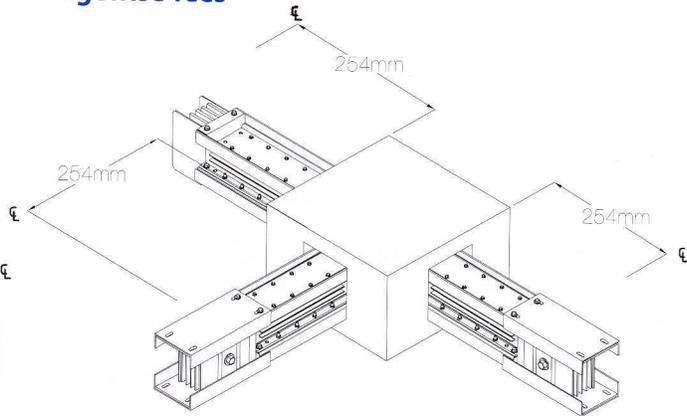


Current Rating (Copper)	Current Rating (Aluminum)	Standard Length (mm)	
		A	B
400 ~ 1600	400 ~ 1200	305	305
2000 ~ 4000	1350 ~ 3200	457	457
5000	4000	610	610

Flatwise Tees



Edgewise Tees



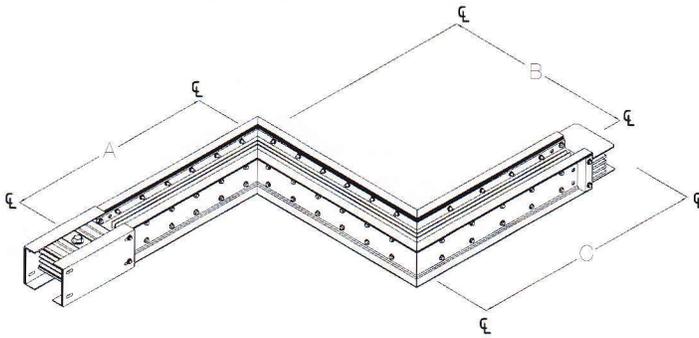
Current Rating (Copper)	Current Rating (Aluminum)	Standard Length (mm)		
		A	B	C
400 ~ 1600	400 ~ 1200	305	305	305
2000 ~ 4000	1350 ~ 3200	457	457	457
5000	4000	610	610	610

* Note: Please consult factory for the above dimension.

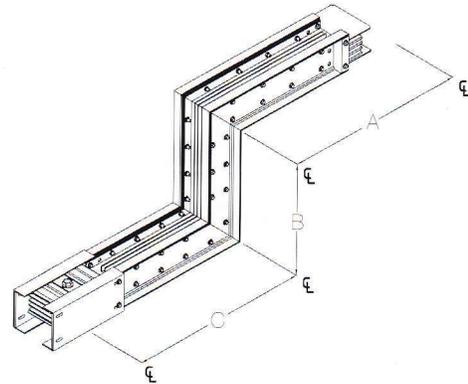
Physical Data

POWERDUCT SERIES

Flatwise Offset



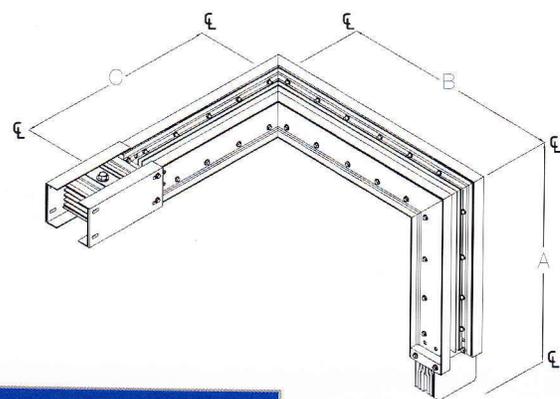
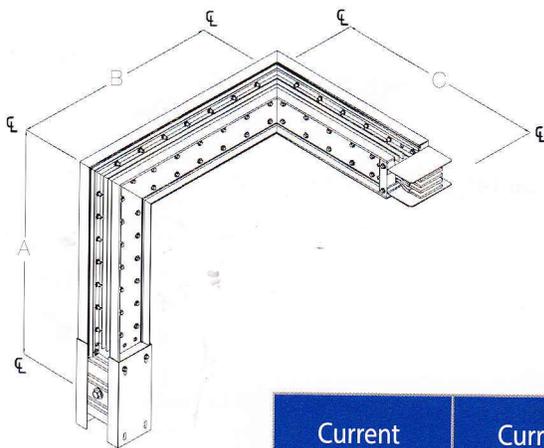
Edgewise Offset



Current Rating (Copper)	Current Rating (Aluminum)	Standard Flatwise Offset (mm)		
		A	B	C
400 ~ 1600	400 ~ 1200	305	305	305
2000 ~ 4000	1350 ~ 3200	457	457	457
5000	4000	610	610	610

Current Rating (Copper)	Current Rating (Aluminum)	Standard Edgewise Offset (mm)		
		A	B	C
400 ~ 1600	400 ~ 1200	254	254	254
2000 ~ 4000	1350 ~ 3200	254	254	254
5000	4000	254	254	254

Combination Elbow



Current Rating (Copper)	Current Rating (Aluminum)	Standard Combination Elbow (mm)		
		A	B	C
400 ~ 1600	400 ~ 1200	254	305	305
2000 ~ 4000	1350 ~ 3200	254	457	457
5000	4000	254	610	610

Physical Data

Reducer

Table 14.1

Ampere Rating (Copper)	W1 (mm)	W2 (mm)	S (mm)
600	89	99	10
800	99	114	15
1000	114	129	15
1200	129	144	15
1350	144	159	15
1600	159	179	20
2000	179	219	40
2500	219	254	35
3200	254	295	41
4000	295	375	80
5000	375	445	70

* Optional Reducer with MCCB / Fusible breaker is available. Please consult factory.

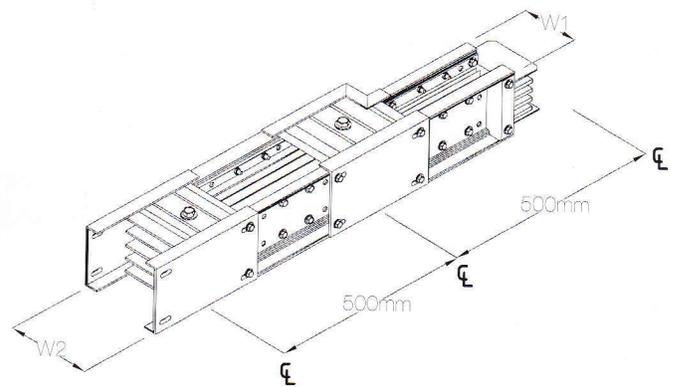
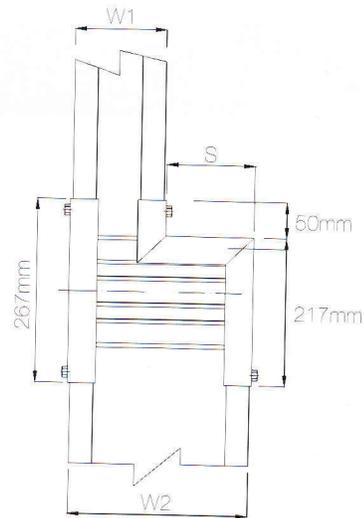


Fig. 14.1



Center Tap Box

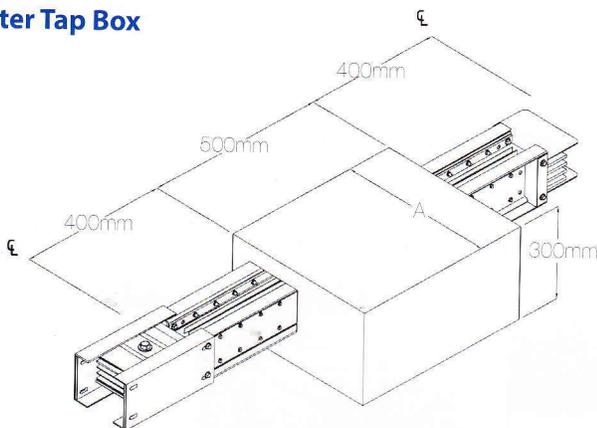


Table 14.2

Ampere (Copper)	Ampere (Aluminum)	Dimension 'A' in (mm)
400 ~ 1350	400 ~ 1000	405
1600 ~ 2500	1200 ~ 2000	555
3200 ~ 5000	2500 ~ 4000	725

* Optional Center Tap Box with MCCB / Fusible breaker is available. Please consult factory.

Center Tap Box is a device that is non-fusible utilized to take off power from the busway run. It is used in the condition when loads served by the busway run do not require over-current protection. Refer the table 14.2 for the dimension in (mm).

End Cable Tap Box

End Tap Box are non-fusible devices used to connect cable and conduit to the end of the busway run or where busway runs connect without the need for over current protection.

Table 15.1

Ampere Rating (Copper)	Ampere Rating (Aluminum)	A	B	C
400 ~ 1350	400 ~ 1000	290	525	285
1600 ~ 2500	1200 ~ 2000	390	625	385
3200 ~ 5000	2500 ~ 4000	570	675	435

* Optional End Cable Tap Box with MCCB / Fusible breaker is available. Please consult factory.

Vertical Application

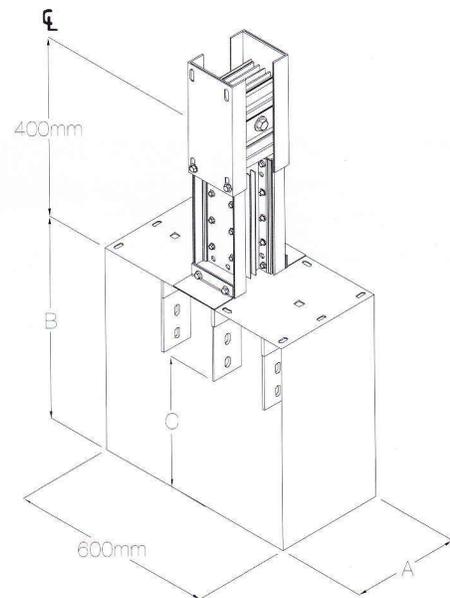


Fig. 15.1

Table 15.2

Ampere Rating (Copper)	Ampere Rating (Aluminum)	A	B	C
400 ~ 1350	400 ~ 1000	290	379	135
1600 ~ 2500	1200 ~ 2000	390	429	185
3200 ~ 5000	2500 ~ 4000	570	479	235

* Optional End Cable Tap Box with MCCB / Fusible breaker is available. Please consult factory.

Horizontal Application

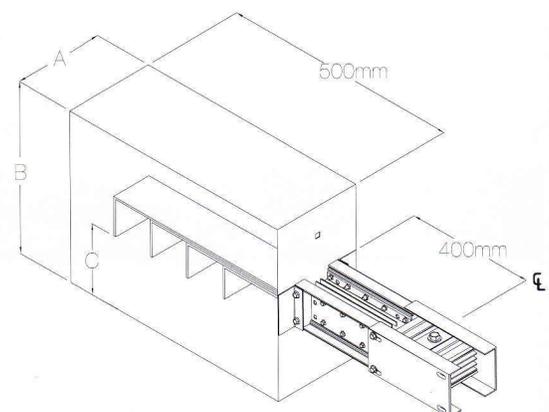


Fig. 15.2

Physical Data

Expansion Fitting

Powerduct Expansion Fitting is design to accommodate the busway thermal expansion in long straight runs which is over 60.8M without offsets or elbows and spring hanger are included and both ends are held fixed, or in a permanent position. In addition, it is also recommended when the busway crosses the building expansion joint.

Inside the Powerduct Expansion Fitting contains a flexible connector which provides $\pm 50\text{mm}$ linear movement along the straight busway system.

Standard Copper dimension in (mm) Fig. 16.1

Ampere (A)	Dimension "W" mm
400 ~ 1350	300
1600 ~ 2500	400
3200 ~ 5000	600

Standard Aluminum dimension in (mm) Fig. 16.1

Ampere	Dimension "W" mm
400 ~ 1000	300
1200 ~ 2000	400
2500 ~ 4000	600

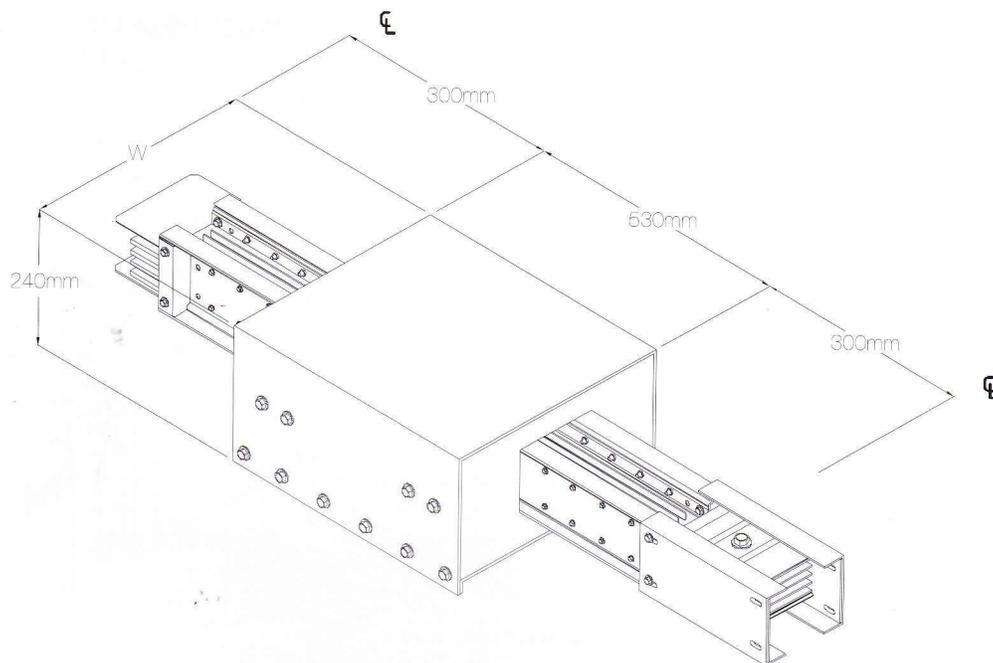
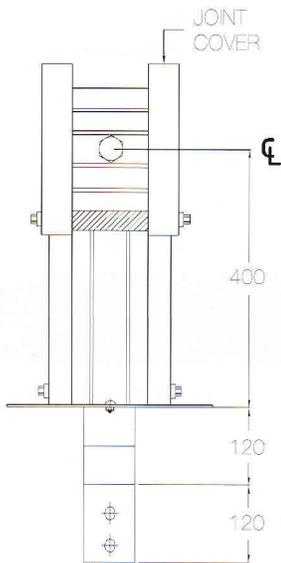


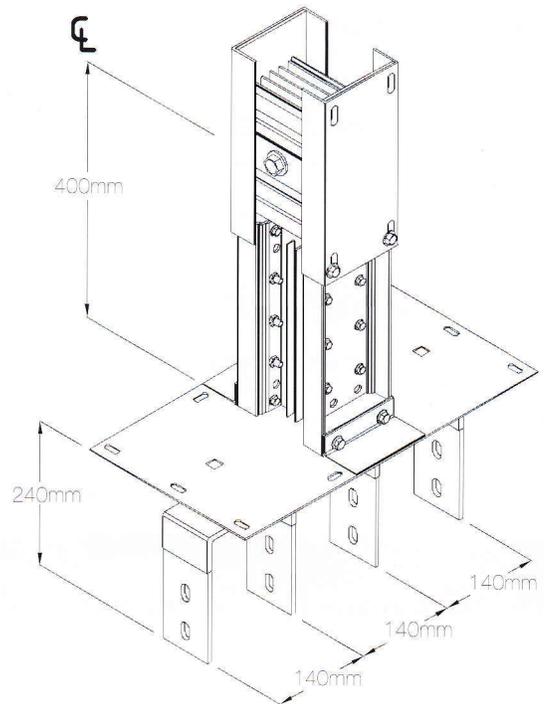
Fig. 16.1

Flanged End

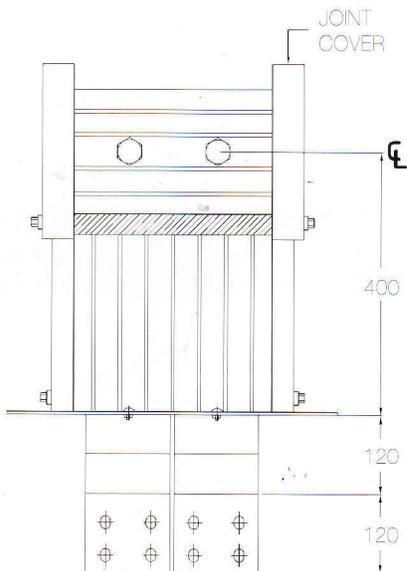
Flanged End provides the connection between busway and the low voltage switch board, control panel or other distribution system.



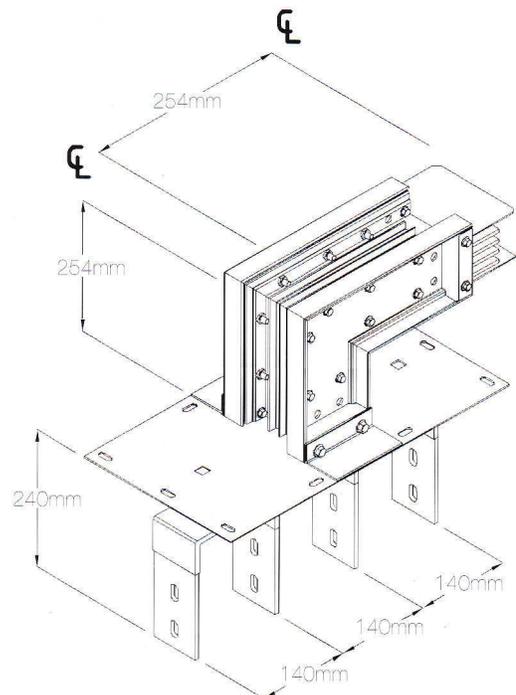
Case and Bars
One Bar Per Phase



Right Edge Elbow With Flanged End



Case and Bars
Two Bar Per Phase



Flanged End Cut Out and Drilling Pattern

Copper	Dimensions in mm			
Ampere	A	B	C	Fig. no.
400	260	200	114	18.1
600	260	200	114	18.1
800	260	200	114	18.1
1000	260	200	114	18.1
1200	260	200	114	18.1
1350	260	200	114	18.1
1600	354	294	161	18.1
2000	354	294	161	18.1
2500	354	294	161	18.1
3200	476	416	110	18.2
4000	476	416	110	18.2
5000	546	486	181	18.2

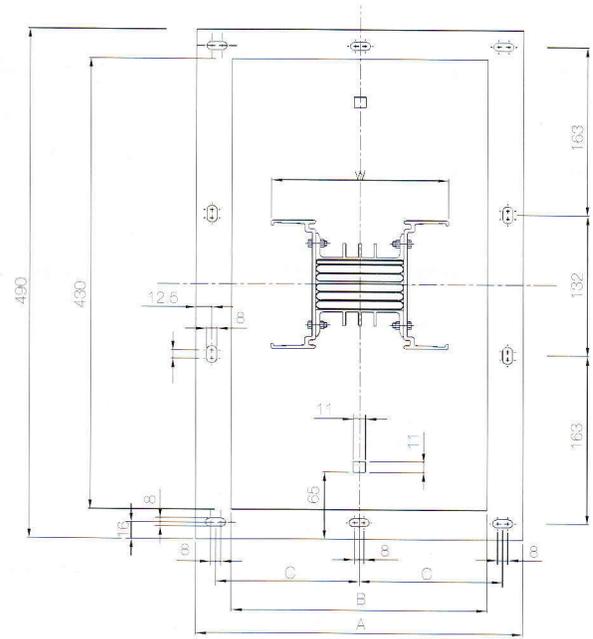


Fig. 18.1

Aluminum	Dimensions in mm			
Ampere	A	B	C	Fig. no.
400	260	200	114	18.1
600	260	200	114	18.1
800	260	200	114	18.1
1000	260	200	114	18.1
1200	354	294	106	18.1
1350	354	294	80	18.1
1600	354	294	80	18.1
2000	354	294	80	18.1
2500	476	416	110	18.2
3200	546	486	102	18.2
4000	546	486	102	18.2

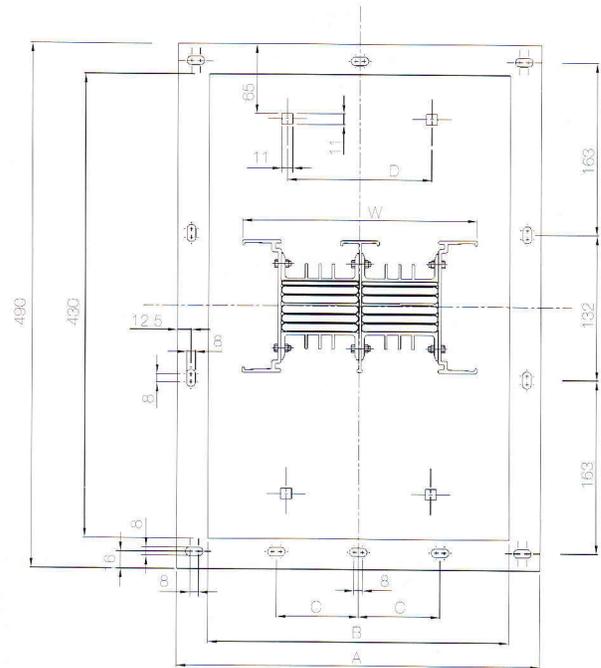


Fig. 18.2

Plug-in Unit

Powerduct plug-in unit is available from rating 15A to 800A with different levels of fault protection. A maximum ten pieces of 400A (max) plug-in unit can be mounted on a standard 3050mm plug-in busway. The **maximum** amperage carried by **each plug-in opening is 400A**. Therefore, 500A ~ 800A will accommodate two openings.

Safety Features:

Powerduct plug-in unit features mechanical interlock system. This is to prevent the insertion or removal when the plug-in unit is in "ON" position (energizing). (Fig. 19.2)

The front operating switch allows padlocking at the "OFF" position. This is to prevent switching to "ON" accidentally during servicing and maintenance. The plug-in earth contact is being designed so that the earth contact is made prior contact to the LIVE busway during installation. Besides, it also features water resistant capability to suit customers' need. The plug-in unit is rated from IP40 as standard but customers can order IP55 as optional.

Refer to the table 19.1 for the sizes availability of the unit with ampere rating.

Table 19.1 Plug-in dimension

Ampere rating	Dimension mm		
	H	W	D
15 ~ 100	380	270	240
125 ~ 250	480	270	240
300 ~ 400	580	270	280
500 ~ 630	1060	480	380
800 ~ 1000	1060	480	420

* For above 1000A consult factory

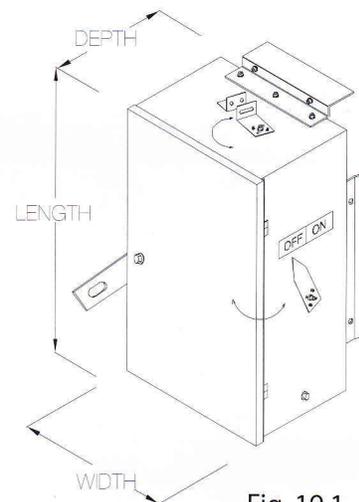


Fig. 19.1

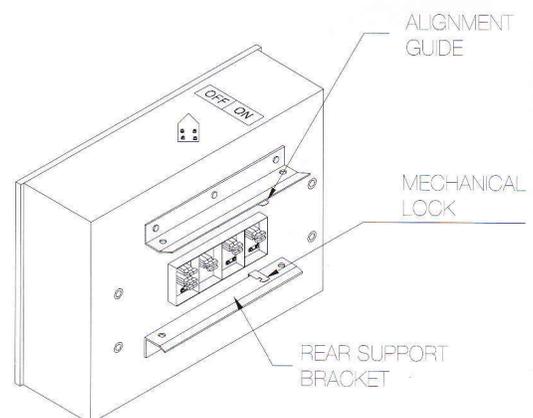


Fig. 19.2

Plug In Unit

Safety Lock-

Door Interlock- plug in door locked soon the operating switch is 'ON' position.

Mechanical Interlock with Busway Housing-The plug in cannot be attached or detached from the busway when the operating switch is 'ON'

Knock-out Hole

No knock-out hole is provided. Make it at site in conformity with the cable size.

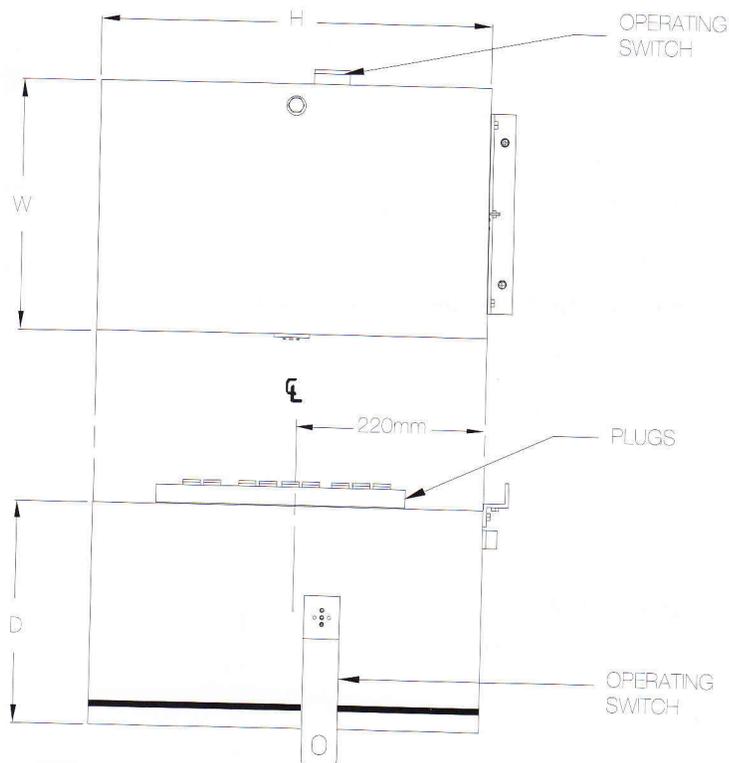
Grounding

Plug in enclosures shall make positive ground connection to the busway housing prior to the bus bar contact.

Plug In unit Dimensions

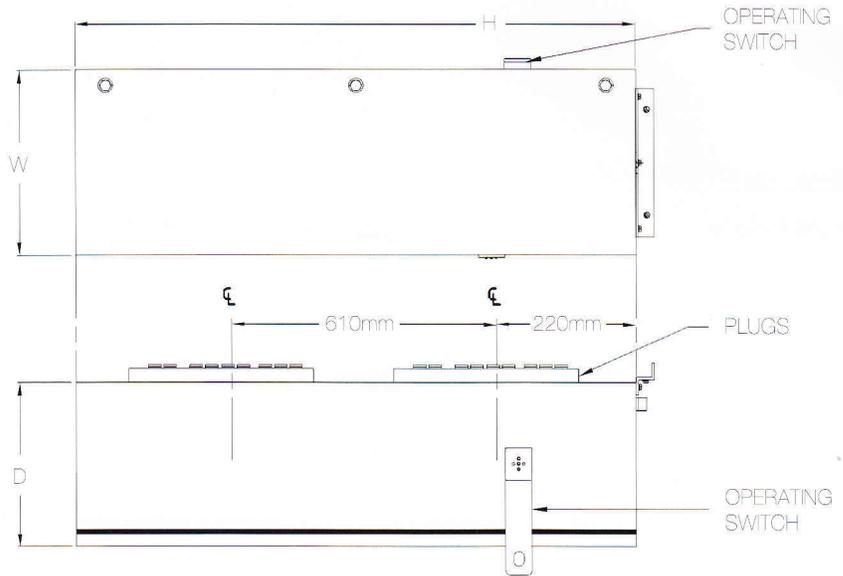
Front View
(15A ~ 400A)

Side View
(15A ~ 400A)



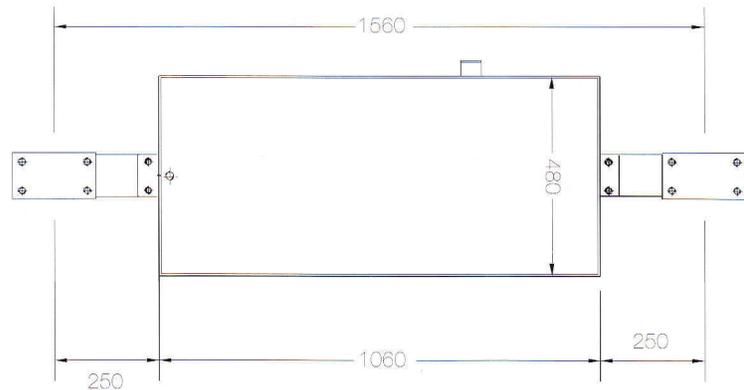
Plug In unit Dimensions

Front View
(500A ~ 630A)

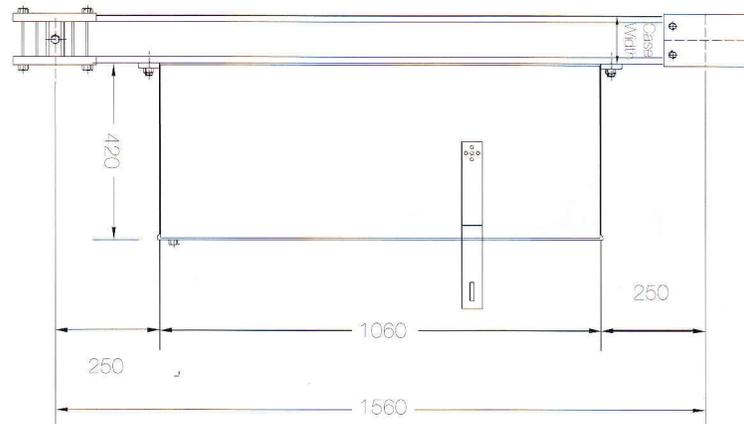


Side View
(500A ~ 630A)

Front View
(800A & Above)



Side View
(800A & Above)



Horizontal Application

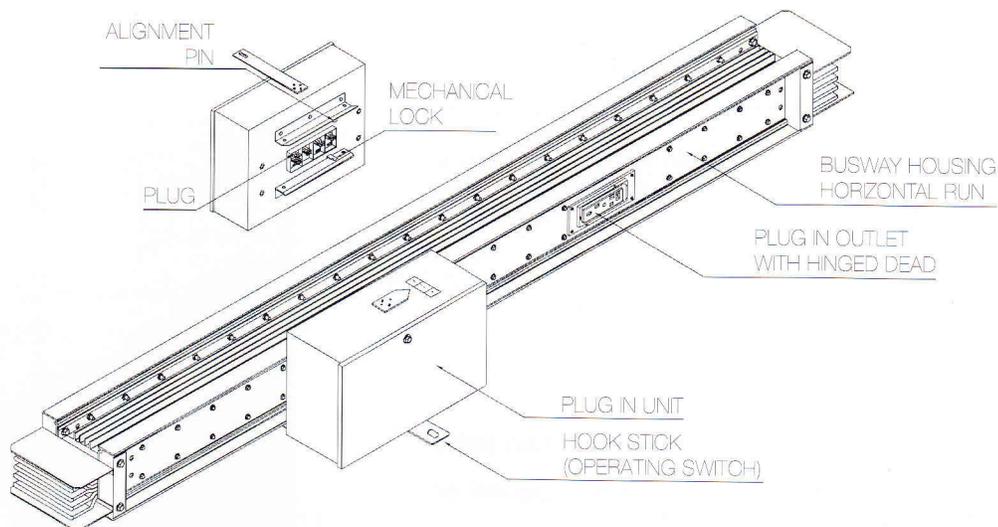


Fig. 22.1

Riser Application

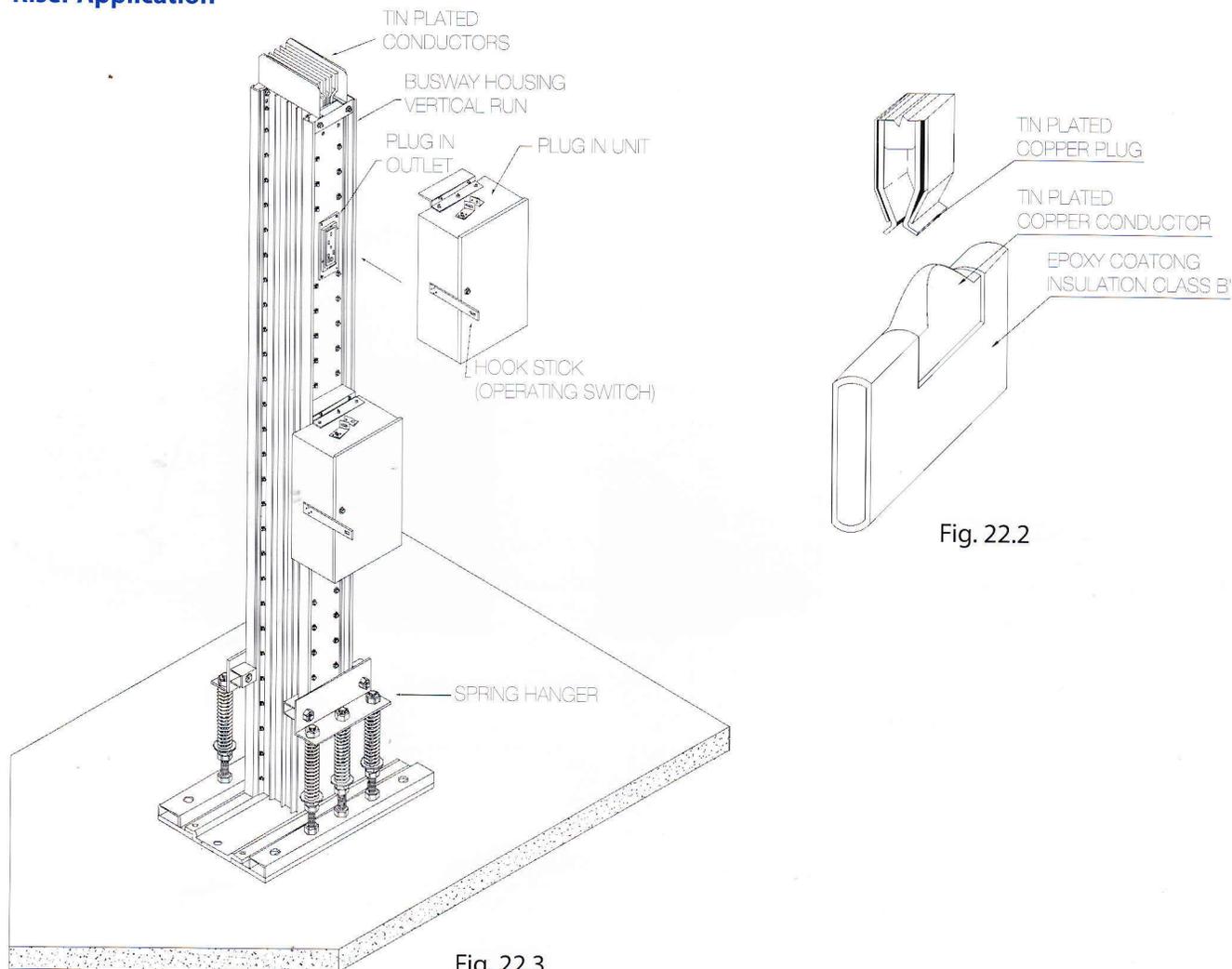


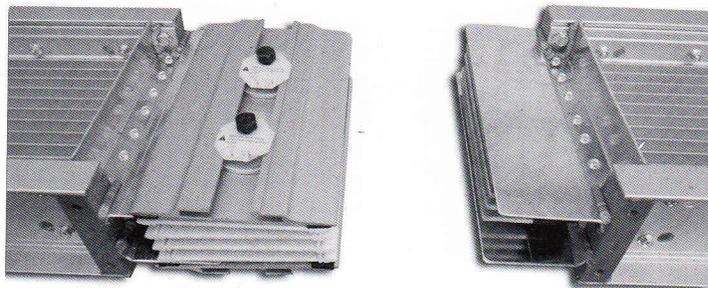
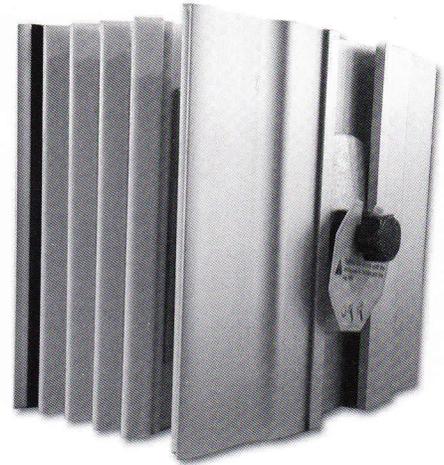
Fig. 22.2

Fig. 22.3

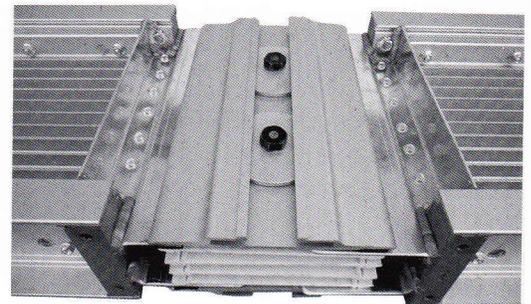
Joint Stack

Powerduct joint stack features a single bolt with double headed design. The high strength steel bolts together with the Belleville spring washers provide equal pressure across the complete joint contact area to assure proper electrical contact. Double head bolt will shear off to ensure the proper torque is applied.

It is very important to get the joint installed properly and accurately. Improper tightening of the connection bolts will cause the joint overheating after certain period of time during energizing. Powerduct bolt is maintenance free design.



BEFORE



AFTER

Joint Detail

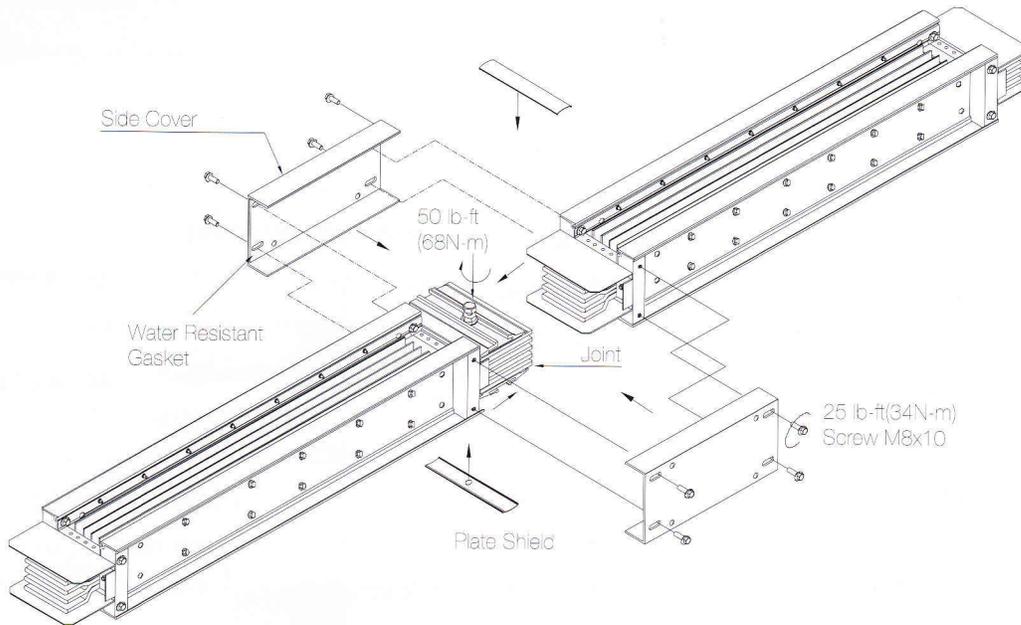
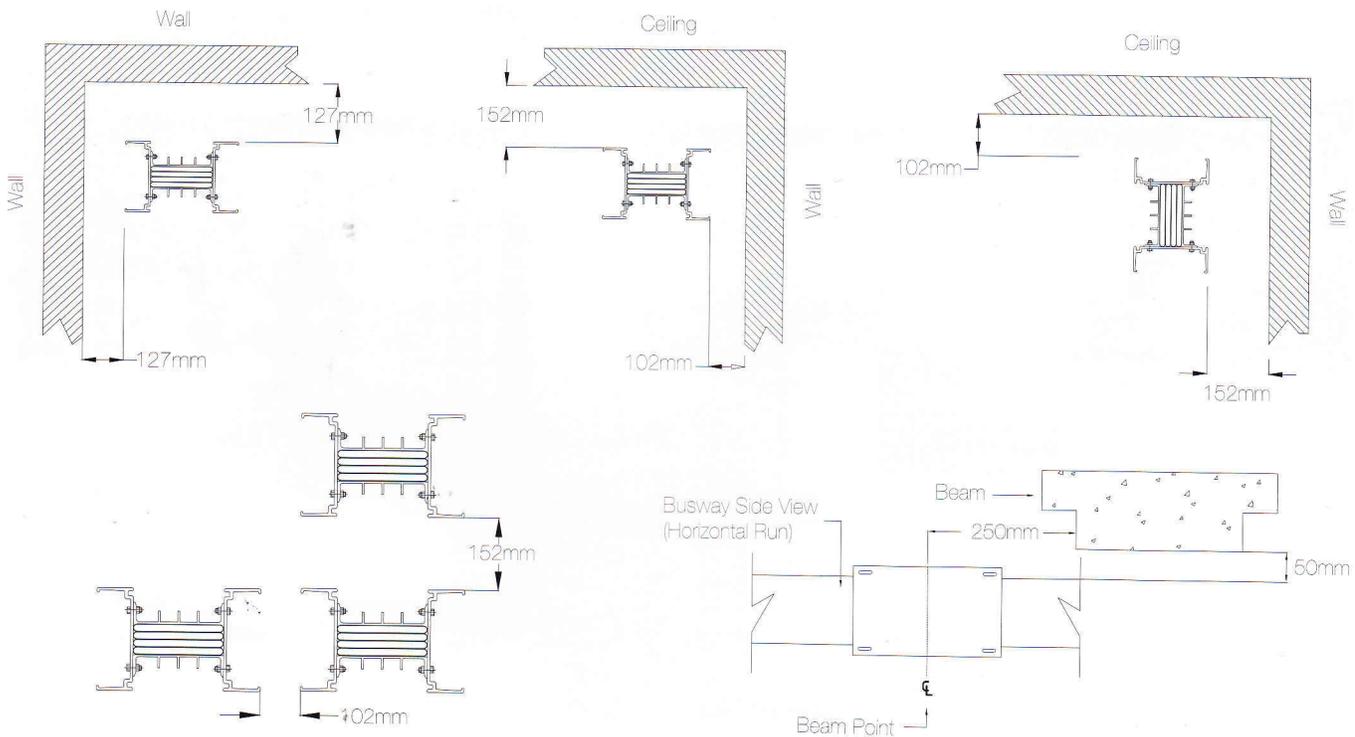


Fig. 24.1

Feeder Busway Dimension Spacing Between Runs & Minimum Clearance

The minimum clearances for installing between feeder busway with wall, and ceiling are shown as the following picture below.

Additional clearance may required for the plug-in devices installation. Refer to the next page.

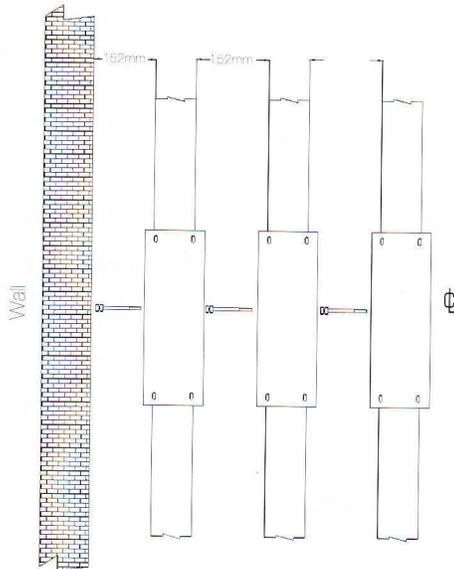


Minimum Distance between parallel-installed busway

Feeder Busway

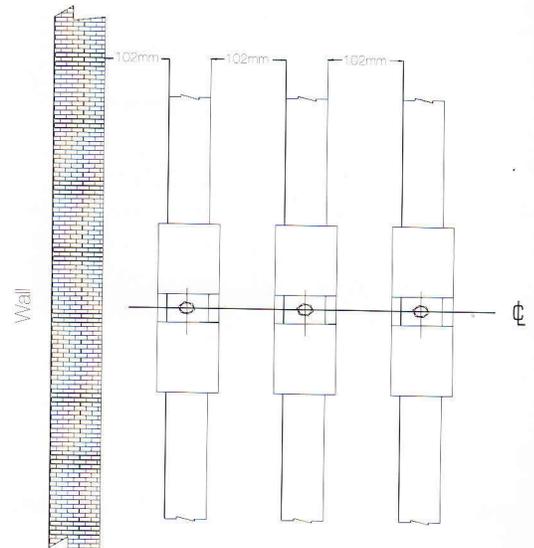
In case the busway been installed side by side.

(Flatwise Installation)



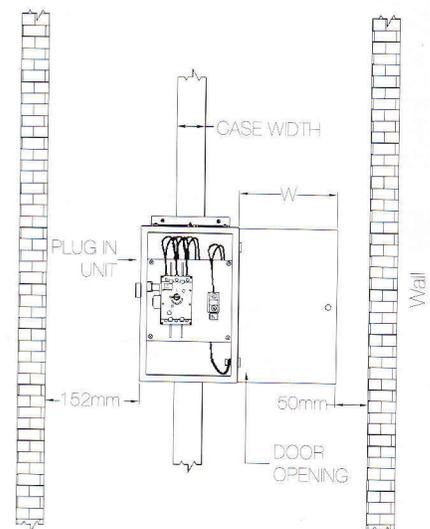
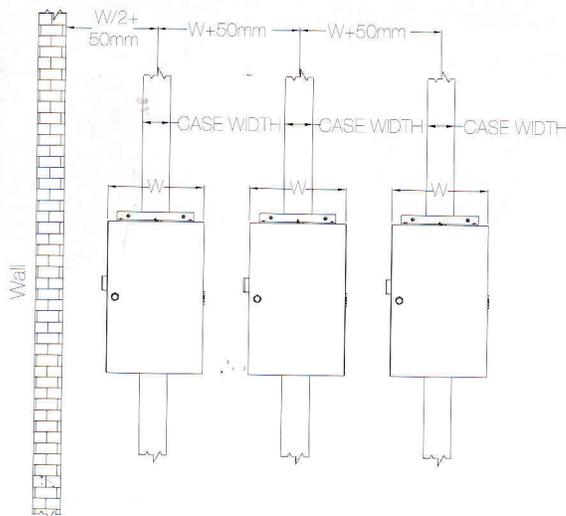
In case the busway been installed side by side.

(Edgewise Installation)



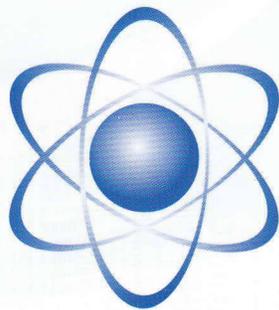
Plug-In type

Minimum clearance of plug-in busway installed in parallel is shown as below. The minimum clearance shall be determined between the plug-in to ensure that 50mm clearance is given. When the busway is to be installed in a tight places, make sure clearance shall be given enough for the plug-in to get opened which is shown as picture below:



Note

* Dimensions 'D', 'H', 'W' refer to the dimensions table on 19.1



PPB
BBB



Power Plug Busduct Sdn. Bhd. (Company No.: 545918-D)

Lot 19, Jalan SiLC 2,
Kawasan Perindustrian SiLC,
79200 Nusajaya, Johor,
Malaysia.

Tel: +607-532 1988(Hunting Line)
+607-532 1922
+607-532 1299
Fax: +607-532 1177

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