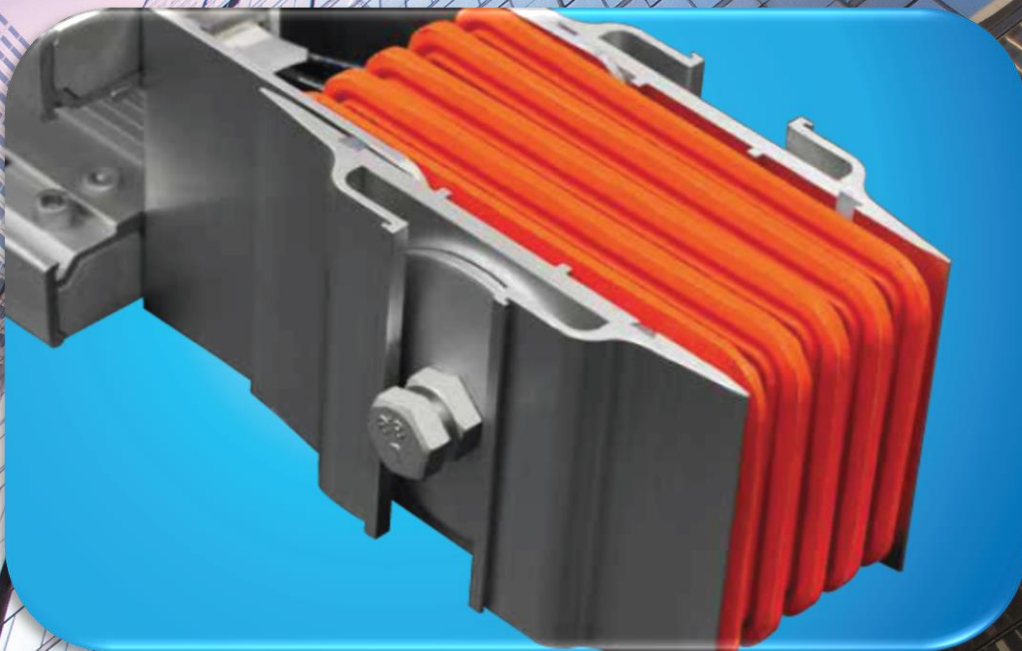


FURUTEC®



AH

Busduct System

Introduction

Furutec Busduct System is the result of cumulative years of research and manufacturing experience. It offers a broad range of busduct systems in a variety of applications and market segments as the products meet the high expectations and specification of customers.

With the innovation of R&D team, Furutec busduct system is successfully type-tested and certified by various reputable testing and certification bodies in compliance to the international standards, namely UL857, IEC61439-6, IEC61439-1, IEC60529, CNS14286, BS6387(adoption), IEC60331 (adoption), UBC Seismic Zone 4, etc.

Our product has been globally accepted and successfully installed in various prestigious projects in ASEAN, Middle East and around the world.



Summary of Product Specification

Description	Specification & Standards
Manufacturer	Furutec Electrical Sdn Bhd
Country of Manufacture	Malaysia
Brand	FURUTEC
Compliance Standard	IEC 61439-6 & IEC 61439-1
Model	AH
Type	Compact Sandwich
Rated Current	500A – 6300A
Rated Operational Voltage	690V
Rated Insulation Voltage	1000V
Rated Impulse Voltage	8kV
System Frequency	50/60Hz
System Configuration	3P4W (L1, L2, L3, N, 100% Housing Ground) 3P4W+50%E (L1, L2, L3, N, 50% Earth Bar) 3P3W (L1, L2, L3, 100% Housing Ground) 3P3W+50%E (L1, L2, L3, 50% Earth Bar)
Degree of Protection	IP65 / IP66
Mechanical Impact	IK10
Type of Earth Path	50% Earth Bar or 100% Housing Ground
Conductor Material	Aluminium
Plating of Conductor	Tin-Plating or Silver-Plating (optional)
Insulation Material	Polyester Film or Polyester film enhanced by Epoxy (optional)
Busduct Housing Material	3.0mm Aluminium Housing Alloy 6063
Busduct Joint Design	Joint Stack with double headed joint bolt

General

Furutec AH busduct is designed to meet a broad range of applications and market segments. It carries high current but reduced energy losses and heat as compared to the conventional cable system.

Furutec busduct is known for:

- Flexible & Modular in Design
- Occupying Lesser Space, but carry High Current Rating & Full Load Tested
- Fast Installation & Lower Installation Cost & Easy Maintenance
- Flexibility for Future Expansion & Relocation
- Strong Mechanical Strength & Higher Short-Circuit Current Ratings
- Lower Voltage Drop
- Fire-Resistance & Non-flammable Propagation
- Higher Degree of Protection

Design Standards

Furutec AH busduct is designed and manufactured in accordance to various international compliance standards.

IEC 61439-6 (Low voltage switchgear and controlgear assemblies-Part 6: busbar trunking system)

IEC 61439-1 (Low voltage switchgear and controlgear assemblies-Part 1: general rules)

BS 6387 Adoption(Performance requirement for cables required to maintain circuit integrity under fire conditions)

UBC Seismic Zone 4 (Earthquake resistance test)



Housing Construction

Furutec AH busduct system is constructed of extruded aluminium alloy. Aluminium alloy has superior properties. In corrosion resistance, heat dissipation and mechanical strength. It can be used as earth conductor with its low impedance and high electrical conductivity as compared with steel material.

During the manufacturing process, AH busduct is assembled by using automated RIVET technology which enable the housing to have better mechanical strength to withstand short circuit. It also maintains the ingress protection and mechanical impact consistency throughout the extruded aluminium alloy.

For outdoor application, Furutec cast resin busduct is completely made of casting insulation material engineered for outdoor installation without having to install any additional canopy. It is tested to IP68 in accordance to IEC60529.

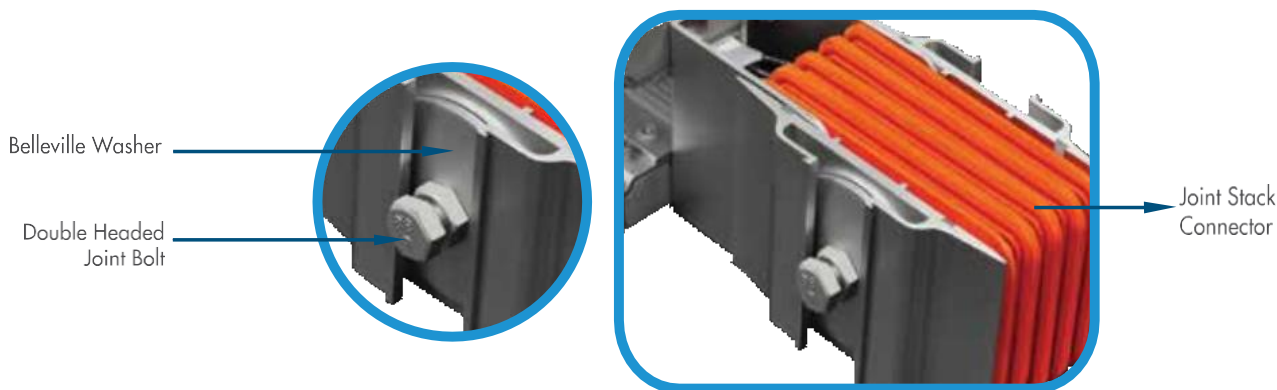


extruded aluminium housing with cooling fins

Busduct Joint Design

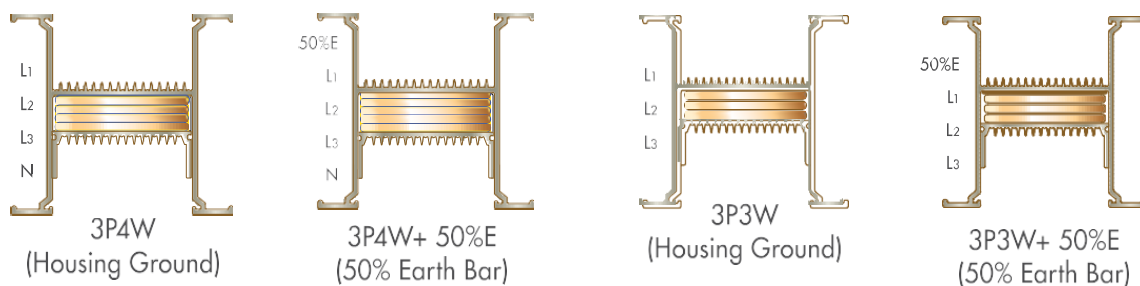
Furutec AH Busduct features a joint stack design that is maintenance-free and has taken into consideration of a bigger contact surface of the conductors in order to reduce power loss and improve cooling performance. Double headed joint bolts together with Belleville washer ensure a sufficient pressure required to secure each joint connection. The double headed joint bolt is also designed with a specific torque value whereby the outer head of the joint bolt (which acts as tightness indication) will shear off when it reaches the limit and this will prevent over tightening of the joint section.

Busduct Joint (IP65) – Indoor Installation



Conductor & System Configuration

Each conductor (except earth conductor) is insulated with polyester film (rated at 1000V) which is tested to comply with the verification of insulating materials to abnormal heat and fire at the glow wire temperature of 960°C in accordance to IEC61439-6 (Clause 10.2.3.2). As an option, the polyester film can be enhanced by epoxy insulation.



System Configuration

Product Specification & Standards

Voltage Drop at 50Hz

Busduct Rating	50Hz			Voltage Drop (Volt/meter) at Full Load Current					
	Resistance R ($\mu\Omega/m$)	Reactance X ($\mu\Omega/m$)	Impedance Z ($\mu\Omega/m$)	1.00 (V/m)	0.95 (V/m)	0.90 (V/m)	0.85 (V/m)	0.80 (V/m)	0.75 (V/m)
500A	209.100	45.500	213.993	0.1811	0.1842	0.1803	0.1747	0.1685	0.1618
630A	186.000	20.000	187.072	0.2030	0.1996	0.1923	0.1840	0.1755	0.1666
800A	140.400	18.500	141.614	0.1945	0.1928	0.1864	0.1789	0.1710	0.1628
1000A	108.500	13.900	109.387	0.1879	0.1860	0.1797	0.1724	0.1648	0.1568
1250A	73.000	10.000	73.682	0.1580	0.1569	0.1518	0.1457	0.1394	0.1328
1600A	43.000	9.800	44.103	0.1192	0.1216	0.1192	0.1156	0.1116	0.1073
2000A	31.000	8.000	32.016	0.1074	0.1106	0.1088	0.1059	0.1025	0.0988
2500A	22.600	7.100	23.689	0.0979	0.1025	0.1016	0.0994	0.0967	0.0937
3200A	21.500	4.900	22.051	0.1192	0.1216	0.1192	0.1156	0.1116	0.1073
3500A	17.800	4.600	18.385	0.1079	0.1112	0.1094	0.1064	0.1031	0.0993
4000A	15.500	4.000	16.008	0.1074	0.1106	0.1088	0.1059	0.1025	0.0988
4500A	13.200	3.800	13.736	0.1029	0.1069	0.1056	0.1031	0.1001	0.0967
5000A	11.300	3.550	11.845	0.0979	0.1025	0.1016	0.0994	0.0967	0.0937

Voltage Drop at 60Hz

Busduct Rating	60Hz			Voltage Drop (Volt/meter) at Full Load Current					
	Resistance R ($\mu\Omega/m$)	Reactance X ($\mu\Omega/m$)	Impedance Z ($\mu\Omega/m$)	1.00 (V/m)	0.95 (V/m)	0.90 (V/m)	0.85 (V/m)	0.80 (V/m)	0.75 (V/m)
500A	209.100	54.600	216.111	0.1811	0.1867	0.1838	0.1788	0.1732	0.1670
630A	186.000	24.000	187.542	0.2030	0.2009	0.1942	0.1863	0.1781	0.1695
800A	140.400	22.200	142.144	0.1945	0.1943	0.1886	0.1816	0.1741	0.1662
1000A	108.500	16.680	109.775	0.1879	0.1875	0.1818	0.1750	0.1677	0.1600
1250A	73.000	12.000	73.980	0.1580	0.1582	0.1537	0.1480	0.1420	0.1357
1600A	43.000	11.760	44.579	0.1192	0.1233	0.1216	0.1185	0.1149	0.1109
2000A	31.000	9.600	32.452	0.1074	0.1123	0.1113	0.1088	0.1059	0.1025
2500A	22.600	8.520	24.153	0.0979	0.1044	0.1043	0.1026	0.1004	0.0977
3200A	21.500	5.880	22.290	0.1192	0.1233	0.1216	0.1185	0.1149	0.1109
3500A	17.800	5.520	18.636	0.1079	0.1129	0.1118	0.1094	0.1064	0.1030
4000A	15.500	4.800	16.226	0.1074	0.1123	0.1113	0.1088	0.1059	0.1025
4500A	13.200	4.560	13.965	0.1029	0.1088	0.1082	0.1062	0.1036	0.1006
5000A	11.300	4.260	12.076	0.0979	0.1044	0.1043	0.1026	0.1004	0.0977

Product Specification & Standards

Temperature Rise

The current-carrying capacity of each conductor size is determined by the maximum temperature at which the conductor is permitted to operate. According to IEC 61439-6 and IEC 61439-1, the temperature rise limit is illustrated as follows:

Parts of Busduct System	Temperature Rise Limit Above Ambient Temperature
External Housing Surface	< 55°C
Internal Conductor	< 105°C
External Conductor	< 70°C



Short-Circuit Strength



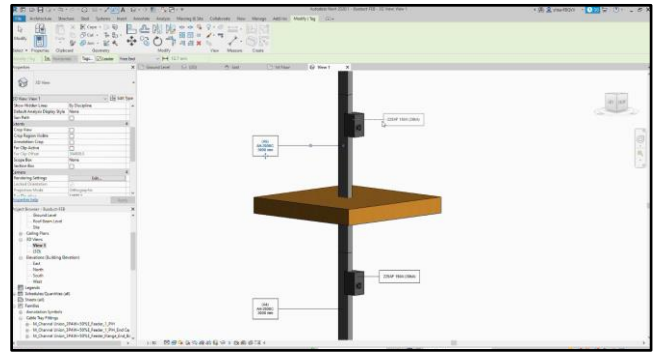
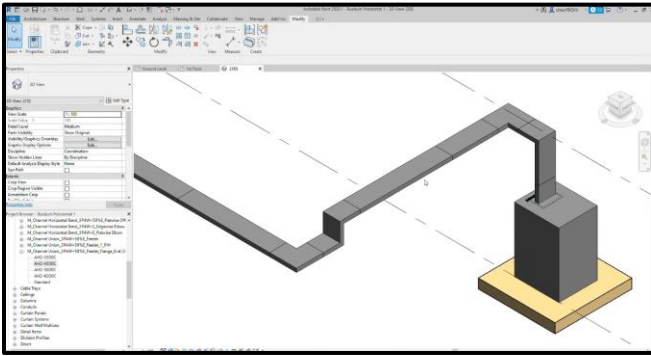
Busduct Rating	Short Circuit Rating (kA/ 1 sec)	Short Circuit Rating (kA/ 3 sec)	Short Circuit Rating - Ipk (kA)
500A	15	8.7	30
630A	15	8.7	30
800A	30	17.3	63
1000A	40	23.1	84
1250A	40	23.1	84
1600A	65	37.5	143
2000A	65	37.5	143
2500A	85	49.1	187
3200A	120	69.3	264
3500A	120	69.3	264
4000A	120	69.3	264
4500A	120	69.3	264
5000A	120	69.3	264
6300A	120	69.3	264

Product Specification & Standards

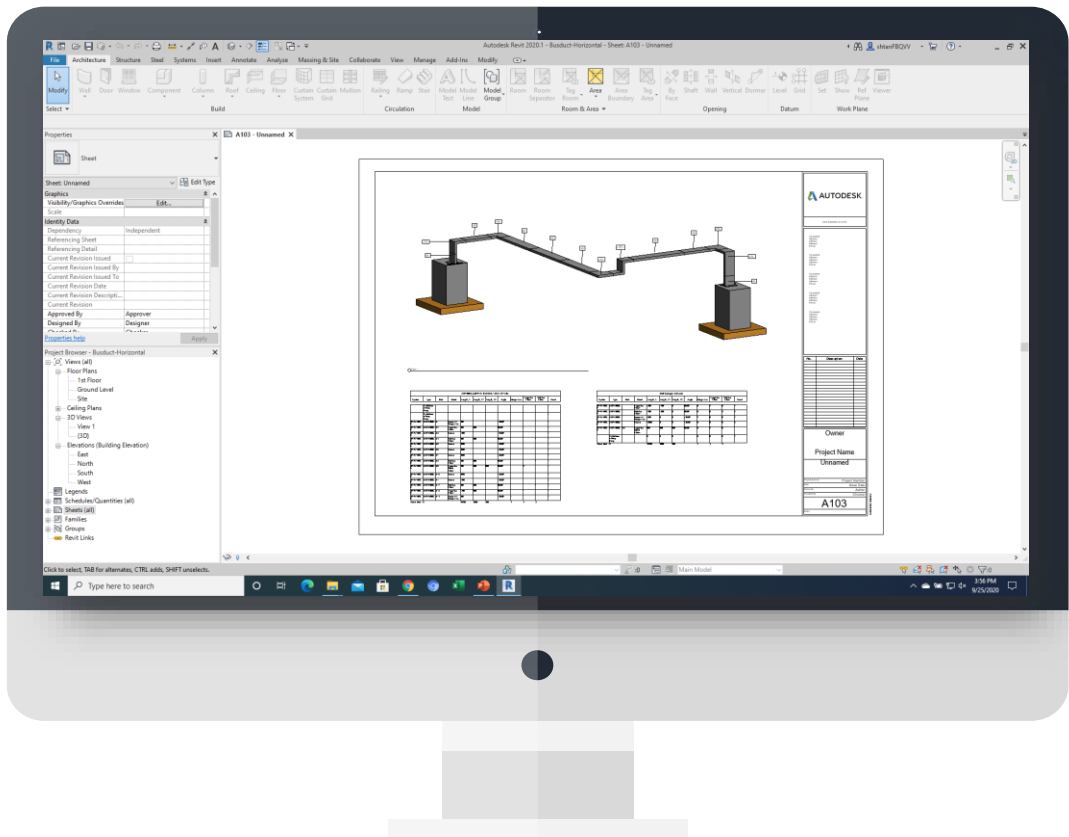
Building Information Modelling (BIM)

Furutech's Building Information Modelling (BIM) is ready for a better and more effective project fulfilment.

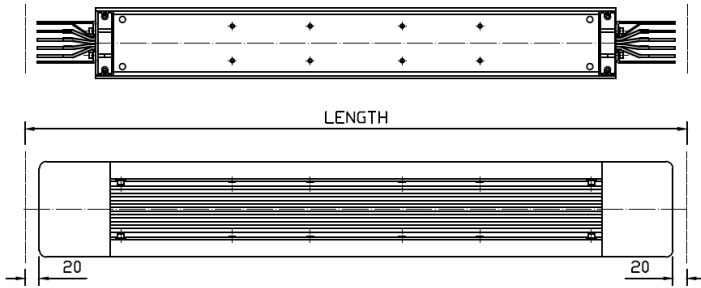
REVIT library provides a 3D model-based environment and methodology for Building Information Modelling (BIM) on construction projects



Exporting an accurate and error-free busduct BOQ from REVIT drawings within seconds compared to the conventional and time-consuming way.

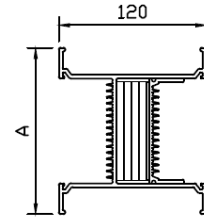


Busduct Straight Feeder



STANDARD LENGTH = 3000mm

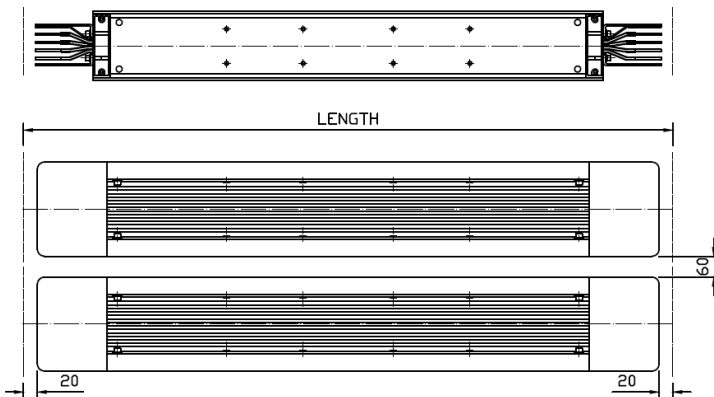
MIN LENGTH = 500mm, MAX LENGTH = 4000mm



AH-500A ~ AH-2500A

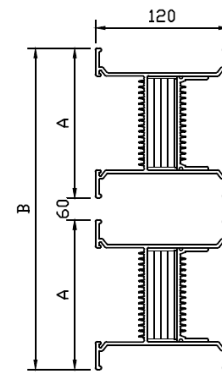
Figure 1

Busduct Rating	Product Code	A (mm)	Figure	Weight (kg/meter)			
				3P3W	3P3W+50%E	3P4W	3P4W+50%E
500A	AH-500A	90	1	5.4	5.6	5.9	6.1
630A	AH-630A	100		6.0	6.3	6.6	6.9
800A	AH-800A	115		7.0	7.3	7.7	8.1
1000A	AH-1000A	135		8.5	9.1	9.7	10.2
1250A	AH-1250A	160		10.7	11.4	12.3	13.1
1600A	AH-1600A	195		13.3	14.4	15.6	16.6
2000A	AH-2000A	245		17.1	18.5	20.1	21.5
2500A	AH-2500A	305		20.8	22.5	24.5	26.2



STANDARD LENGTH = 3000mm

MIN LENGTH = 500mm, MAX LENGTH = 4000mm

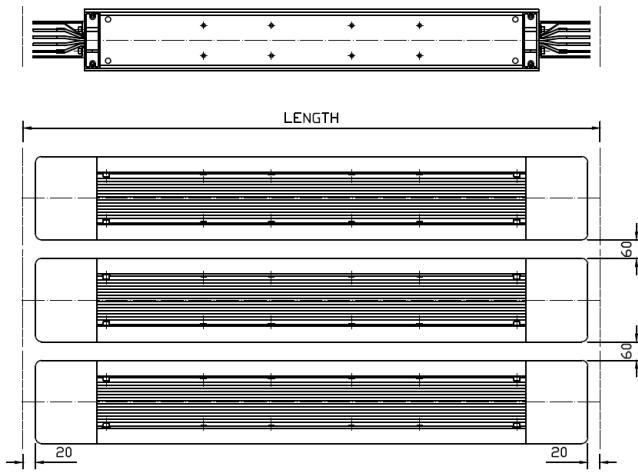


AH2-3200A ~ AH2-5000A

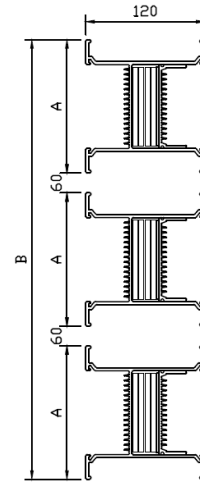
Figure 2

Busduct Rating	Product Code	A (mm)	B (mm)	Figure	Weight (kg/meter)			
					3P3W	3P3W+50%E	3P4W	3P4W+50%E
3200A	AH2-3200A	195	450	2	26.7	28.8	31.1	33.2
3500A	AH2-3500A	245	550		31.1	33.4	36.1	38.4
4000A	AH2-4000A	245	550		34.2	37.0	40.2	43.1
4500A	AH2-4500A	305	670		39.6	42.7	46.2	49.3
5000A	AH2-5000A	305	670		41.7	45.0	48.9	52.3

Busduct Straight Feeder



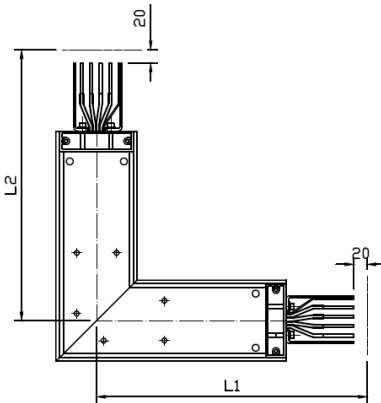
STANDARD LENGTH = 3000mm
 MIN LENGTH = 500mm, MAX LENGTH = 4000mm



AH3-6300A
 Figure 3

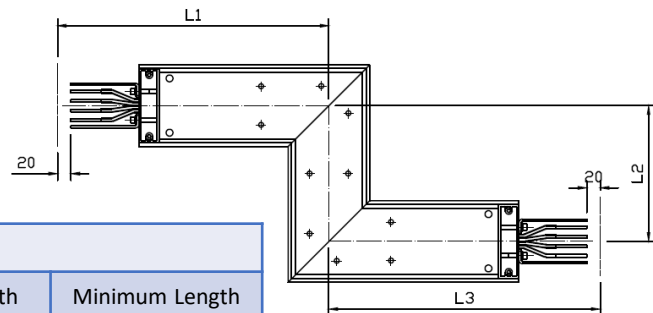
Busduct Rating	Product Code	A (mm)	B (mm)	Figure	Weight (kg/meter)			
					3P3W	3P3W+50%E	3P4W	3P4W+50%E
6300A	AH3-6300A	305	1035	3	59.5	64.0	69.4	73.9

Edgewise Elbow



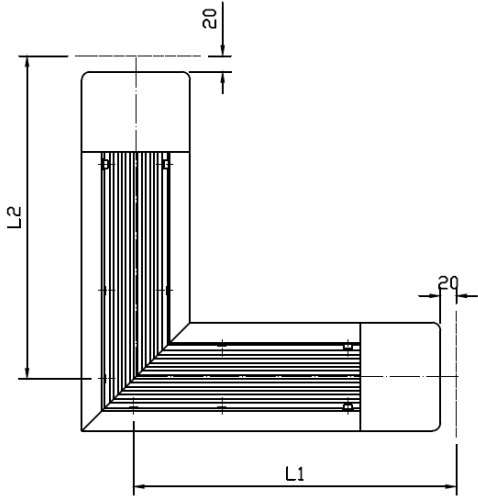
Edgewise Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2 (mm)
500A ~ 2500A	AH-500A ~ AH-2500A	600 x 600	260 x 260
3200A ~ 5000A	AH2-3200A ~ AH2-5000A		
6300A	AH3-6300A		

Edgewise Offset Elbow

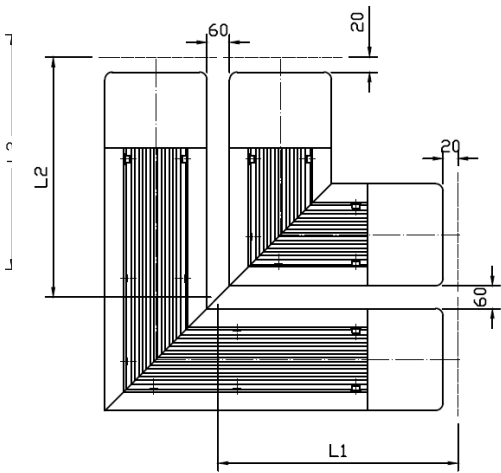


Edgewise Offset Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 x L3 (mm)	Minimum Length L1 x L2 x L3 (mm)
500A ~ 2500A	AH-500A ~ AH-2500A	600 x 600 x 600	260 x 200 x 260
3200A ~ 5000A	AH2-3200A ~ AH2-5000A		
6300A	AH3-6300A		

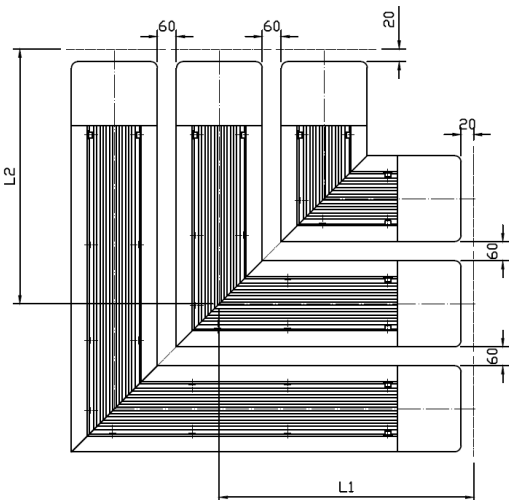
Flatwise Elbow



Flatwise Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2 (mm)
500A	AH-500A	600 x 600	240 x 240
630A	AH-630A		250 x 250
800A	AH-800A		260 x 260
1000A	AH-1000A		270 x 270
1250A	AH-1250A		280 x 280
1600A	AH-1600A		300 x 300
2000A	AH-2000A		320 x 320
2500A	AH-2500A		350 x 350



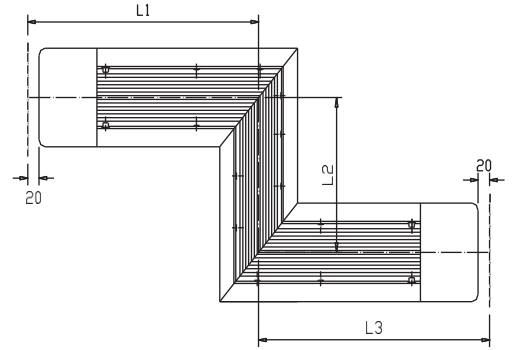
Flatwise Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2 (mm)
3200A	AH2-3200A	600 x 600	430 x 430
3500A	AH2-3500A		480 x 480
4000A	AH2-4000A		480 x 480
4500A	AH2-4500A		540 x 540
5000A	AH2-5000A		540 x 540



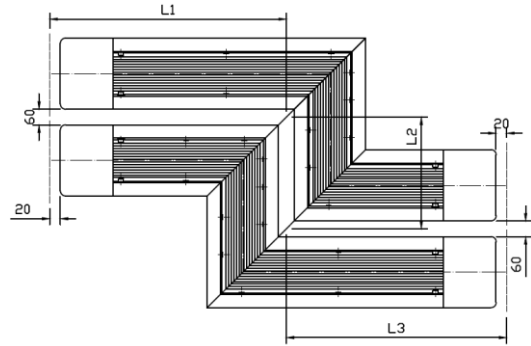
Flatwise Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2 (mm)
6300A	AH3-6300A	800 x 800	740 x 740

Flatwise Offset Elbow

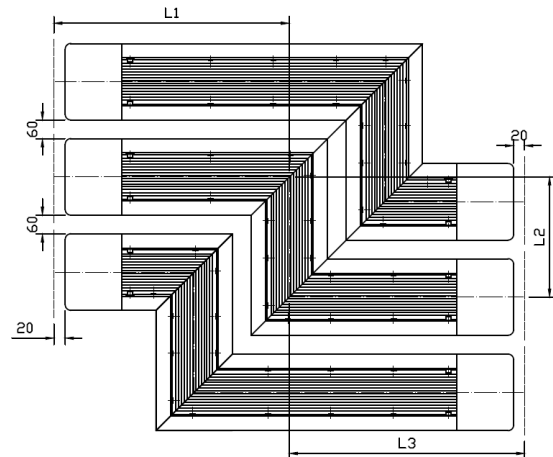
Flatwise Offset Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 x L3 (mm)	Minimum Length L1 x L2 (mm)
500A	AH-500A	600 x 600 x 600	240 x 100 x 240
630A	AH-630A		250 x 100 x 250
800A	AH-800A		260 x 100 x 260
1000A	AH-1000A		270 x 100 x 270
1250A	AH-1250A		280 x 100 x 280
1600A	AH-1600A		300 x 100 x 300
2000A	AH-2000A		320 x 100 x 320
2500A	AH-2500A		350 x 100 x 350



Flatwise Offset Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 x L3 (mm)	Minimum Length L1 x L2 x L3 (mm)
3200A	AH2-3200A	600 x 600 x 600	430 x 100 x 430
3500A	AH2-3500A		480 x 100 x 480
4000A	AH2-4000A		480 x 100 x 480
4500A	AH2-4500A		540 x 100 x 540
5000A	AH2-5000A		540 x 100 x 540

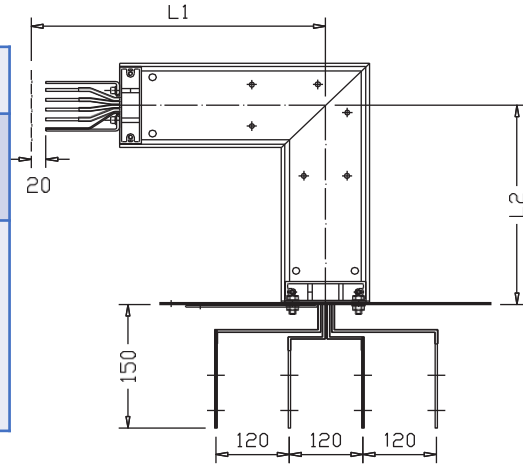


Flatwise Offset Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 x L3 (mm)	Minimum Length L1 x L2 x L3 (mm)
6300A	AH3-6300A	800 x 800 x 800	740 x 100 x 740



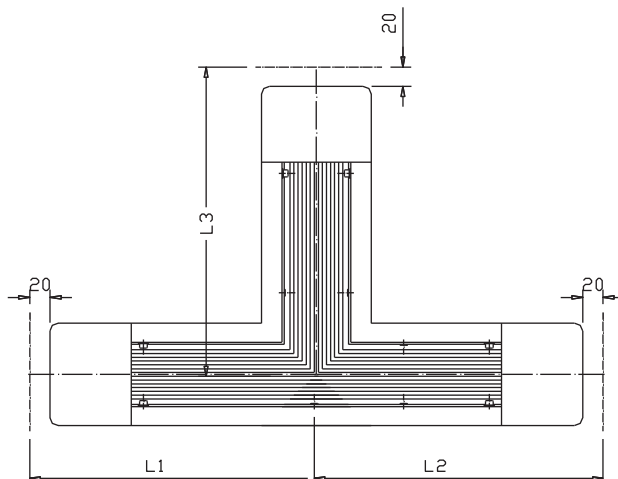
Edgewise Elbow with Flange End

Edgewise Elbow with Flange End			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2 (mm)
500A ~ 2500A	AH-500A ~ AH-2500A	600 x 600	260 x 300
3200A ~ 5000A	AH2-3200A ~ AH2-5000A		
6300A	AH3-6300A		

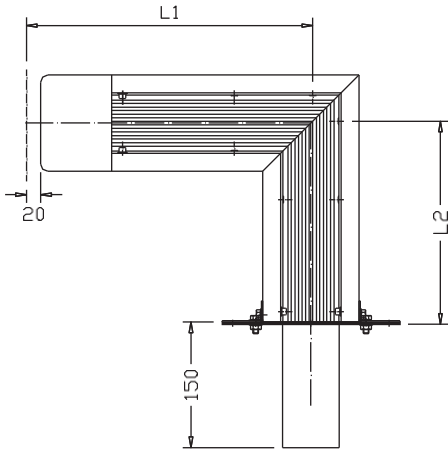


Flatwise Tee Elbow

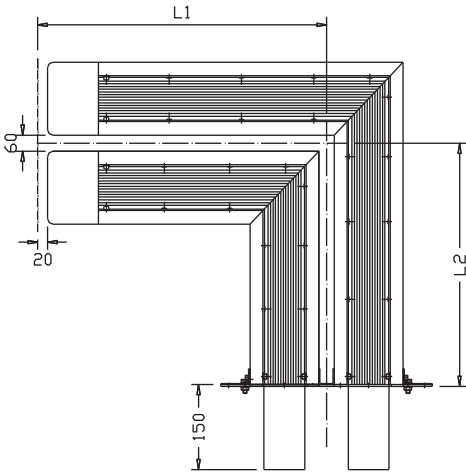
Flatwise Tee Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 x L3 (mm)	Minimum Length L1 x L2 x L3 (mm)
500A	AH-500A	600 x 600 x 600	240 x 240 x 240
630A	AH-630A		250 x 250 x 250
800A	AH-800A		260 x 260 x 260
1000A	AH-1000A		270 x 270 x 270
1250A	AH-1250A		280 x 280 x 280
1600A	AH-1600A		300 x 300 x 300
2000A	AH-2000A		320 x 320 x 320
2500A	AH-2500A		350 x 350 x 350



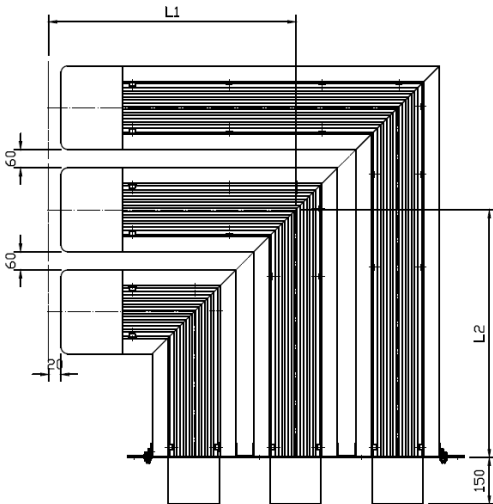
Flatwise Elbow With Flange End



Flatwise Elbow With Flange End			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2(mm)
500A	AH-500A	600 x 600	240 x 240
630A	AH-630A		250 x 250
800A	AH-800A		260 x 260
1000A	AH-1000A		270 x 270
1250A	AH-1250A		280 x 280
1600A	AH-1600A		300 x 300
2000A	AH-2000A		320 x 320
2500A	AH-2500A		350 x 350



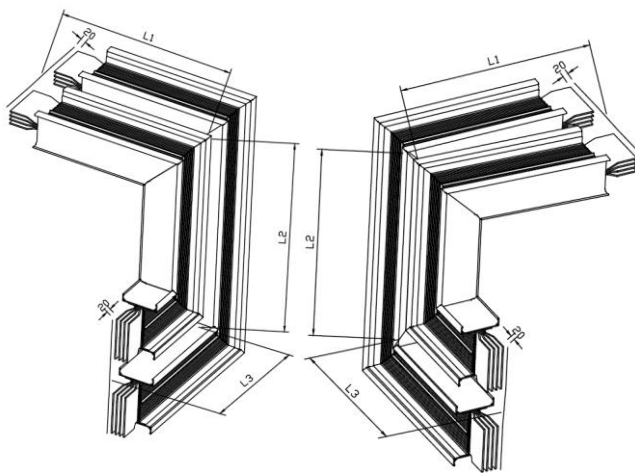
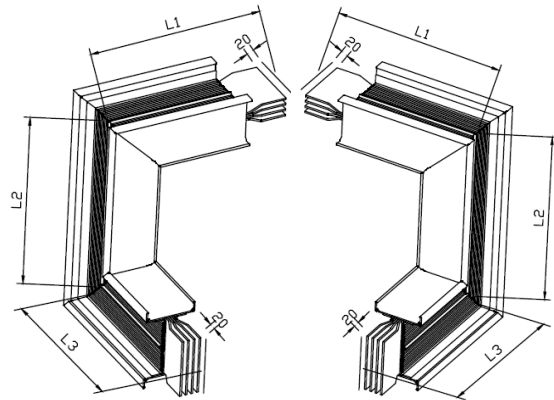
Flatwise Elbow With Flange End			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2 (mm)
3200A	AH2-3200A	600 x 600	430 x 430
3500A	AH2-3500A		480 x 480
4000A	AH2-4000A		480 x 480
4500A	AH2-4500A		540 x 540
5000A	AH2-5000A		540 x 540



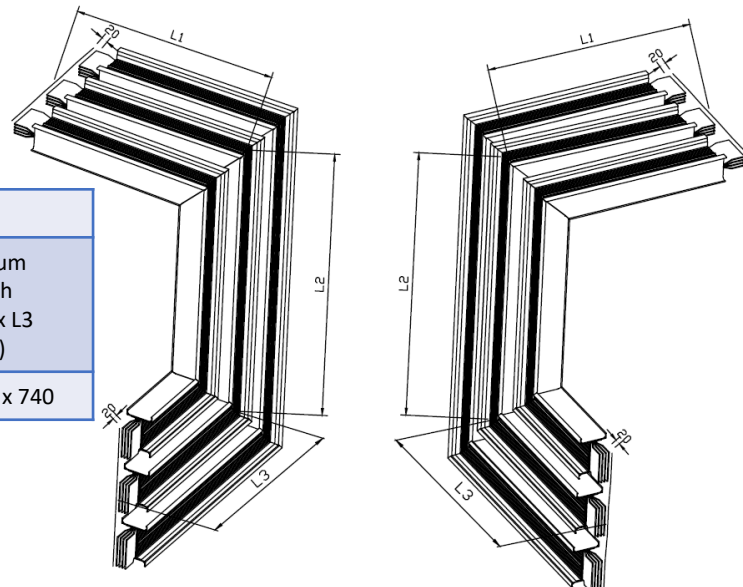
Flatwise Elbow With Flange End			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2 (mm)
6300A	AH3-6300A	800 x 800	740 x 740

Combination Elbow

Combination Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 x L3 (mm)	Minimum Length L1 x L2 x L3 (mm)
500A	AH-500A	600 x 600 x 600	260 x 130 x 240
630A	AH-630A		260 x 130 x 250
800A	AH-800A		260 x 140 x 260
1000A	AH-1000A		260 x 150 x 270
1250A	AH-1250A		260 x 160 x 280
1600A	AH-1600A		260 x 180 x 300
2000A	AH-2000A		260 x 200 x 320
2500A	AH-2500A		260 x 230 x 350

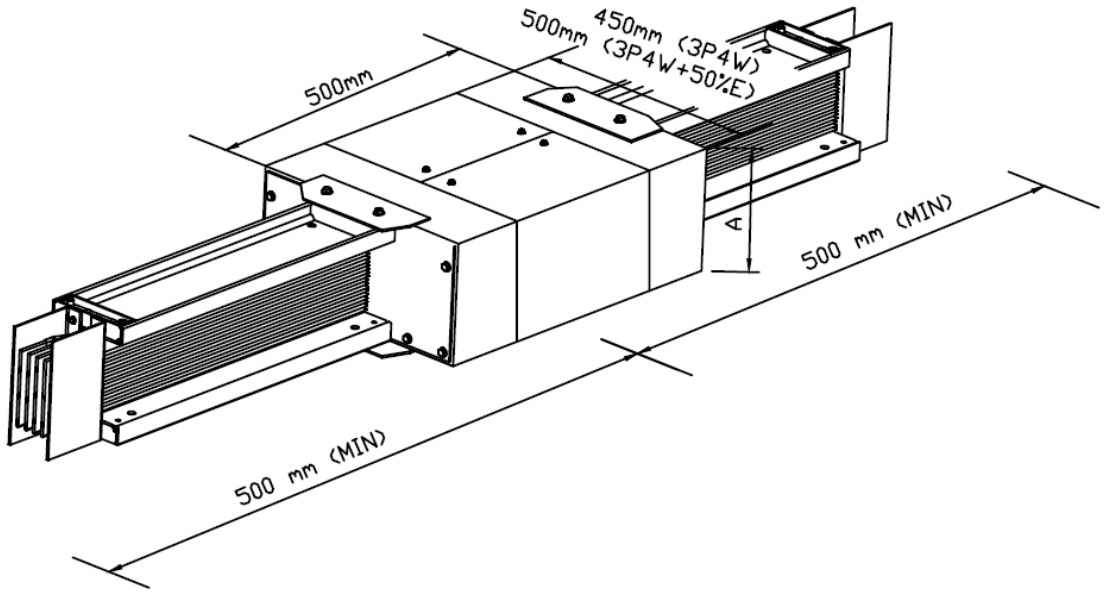


Combination Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 (mm)	Minimum Length L1 x L2 (mm)
3200A	AH2-3200A	600 x 600 x 600	260 x 310 x 430
3500A	AH2-3500A		260 x 360 x 480
4000A	AH2-4000A		260 x 360 x 480
4500A	AH2-4500A		260 x 420 x 540
5000A	AH2-5000A		260 x 420 x 540



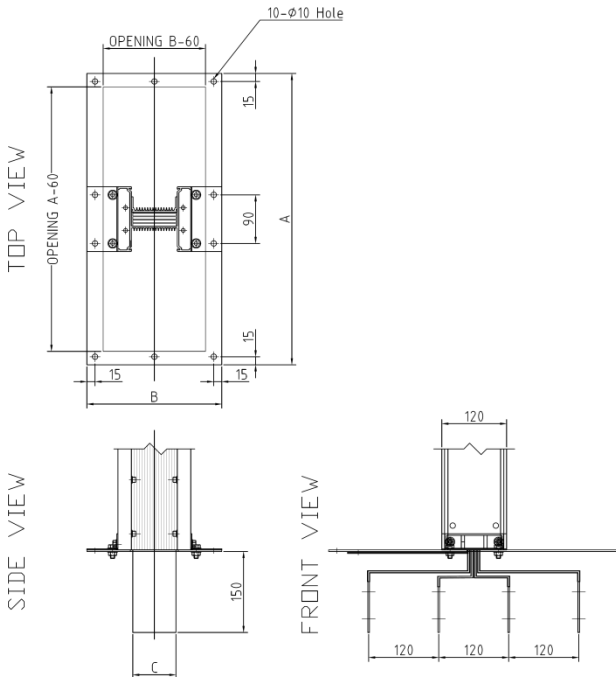
Combination Elbow			
Busduct Rating	Product Code	Standard Length L1 x L2 x L3 (mm)	Minimum Length L1 x L2 x L3 (mm)
6300A	AH3-6300A	800 x 800 x 800	260 x 620 x 740

Expansion Unit

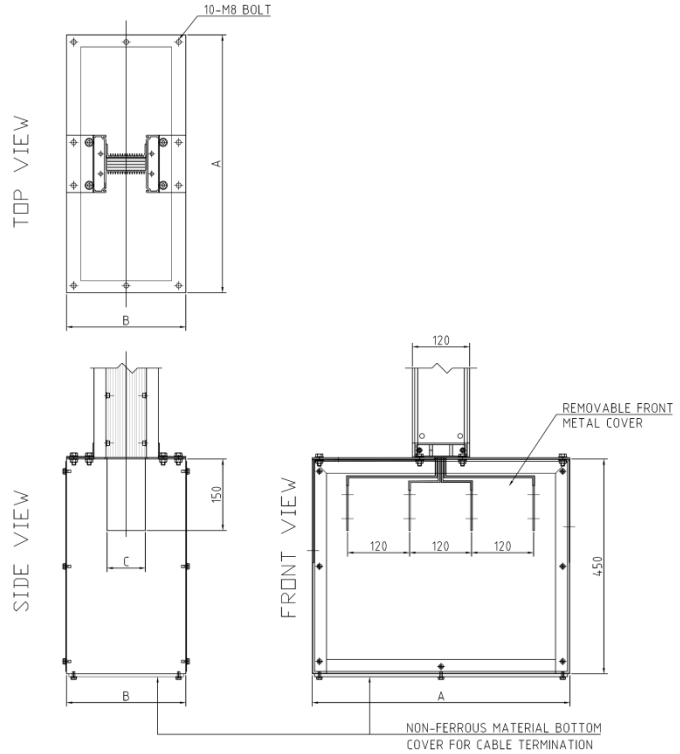


Expansion Unit		
Busduct Rating	Product Code	A (mm)
500A	AH-500A	90
630A	AH-630A	100
800A	AH-800A	115
1000A	AH-1000A	135
1250A	AH-1250A	160
1600A	AH-1600A	195
2000A	AH-2000A	245
2500A	AH-2500A	305
3200A	AH2-3200A	450
3500A	AH2-3500A	550
4000A	AH2-4000A	550
4500A	AH2-4500A	670
5000A	AH2-5000A	670
6300A	AH3-6300A	1035

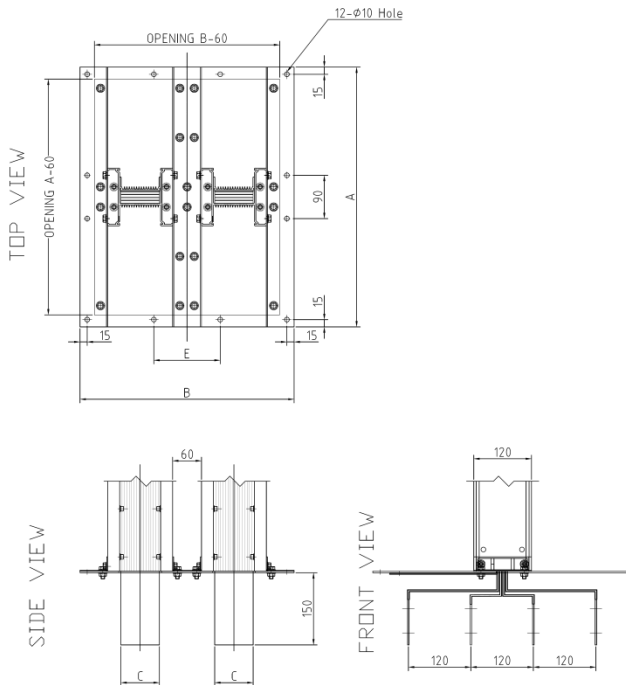
Flange End/ Flange End Box



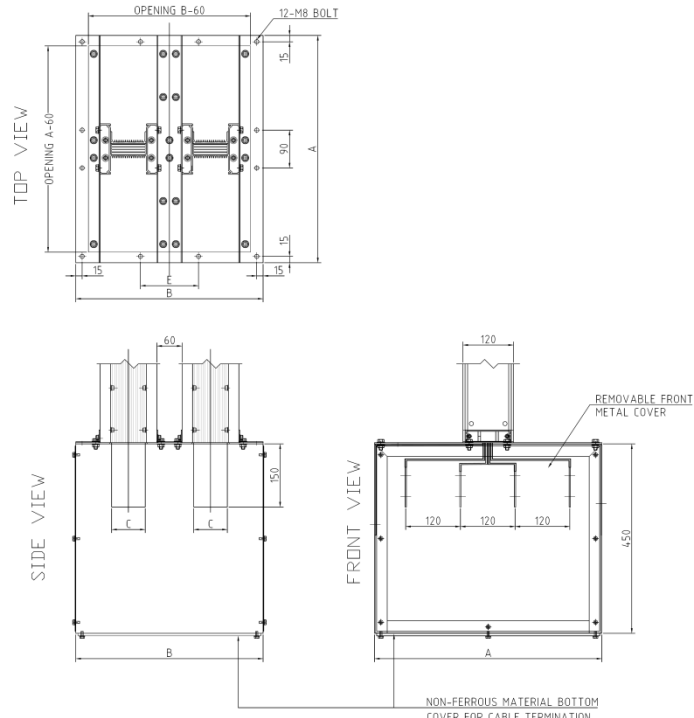
AH-500A ~ AH-2500A
Flange End



AH-500A ~ AH-2500A
Flange End Box

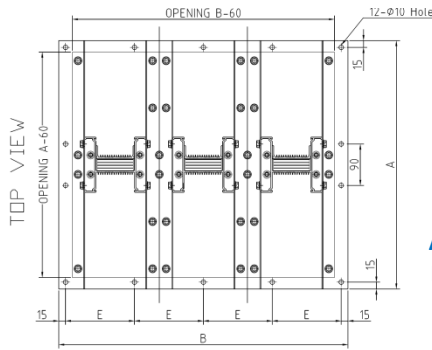


AH2-3200A ~ AH2-5000A
Flange End

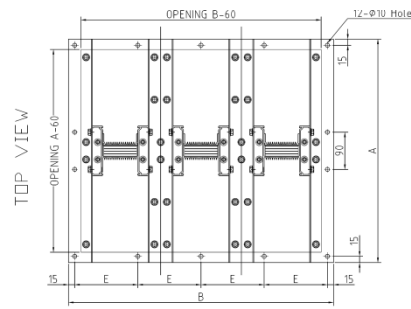
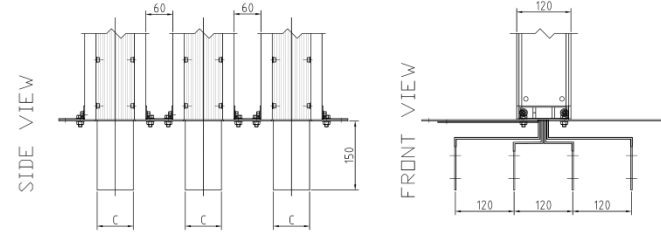


AH2-3200A ~ AH2-5000A
Flange End Box

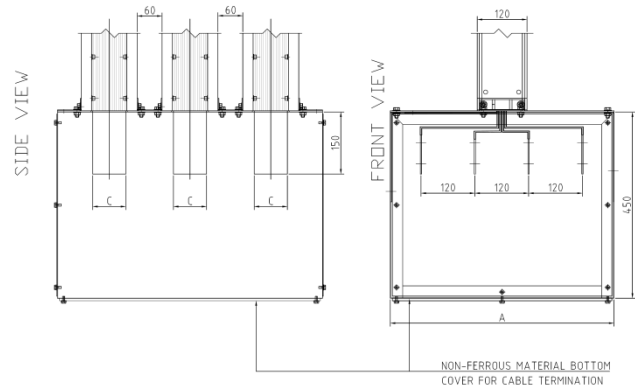
Physical Data



**AH3-6300A
Flange End**



**AH3-6300A
Flange End Box**



The following busbar hole of flange end & flange end box is designed for switchboard/cable termination.
Flange end termination at transformer & generator shall be referred from the details of flexible link.

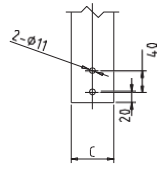


Fig.1

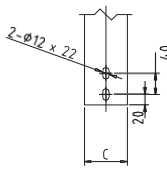


Fig.2

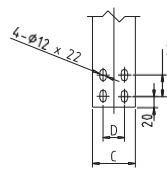


Fig.3

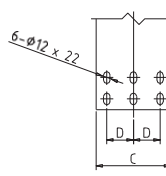


Fig.4

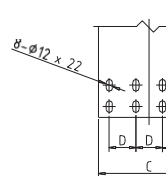


Fig.5

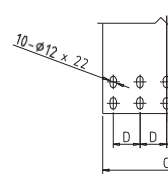


Fig.6

Busduct Rating	Product Code	Figure	A (mm)		B (mm)	C (mm)	D (mm)	E (mm)
			3P4W 3P4W+50%E	3P3W 3P3W+50%E				
500A	AH-500A	1	540	410	205	35	-	-
630A	AH-630A	2			215	45	-	-
800A	AH-800A	2			230	60	-	-
1000A	AH-1000A	3			250	80	40	-
1250A	AH-1250A	3			275	105	50	-
1600A	AH-1600A	4			310	140	50	-
2000A	AH-2000A	5			360	190	50	-
2500A	AH-2500A	6			420	250	50	-
3200A	AH2-3200A	4			565	140	50	178
3500A	AH2-3500A	5			665	190	50	211
4000A	AH2-4000A	5			665	190	50	211
4500A	AH2-4500A	6			785	250	50	251
5000A	AH2-5000A	6			785	250	50	251
6300A	AH3-6300A	6			1150	250	50	280

Note: The above is subject to changes without prior notice

Flexible Link

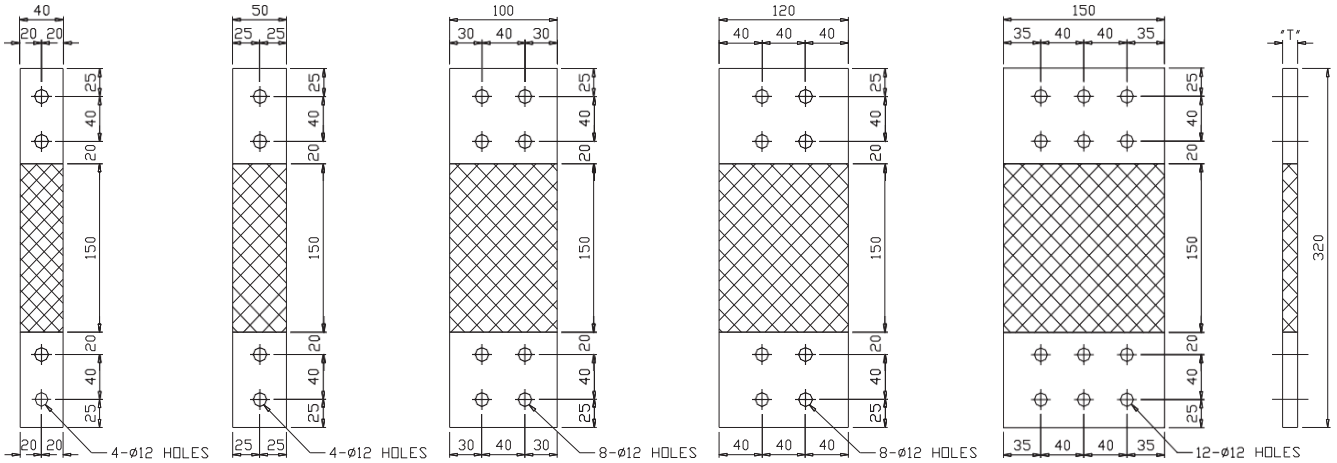
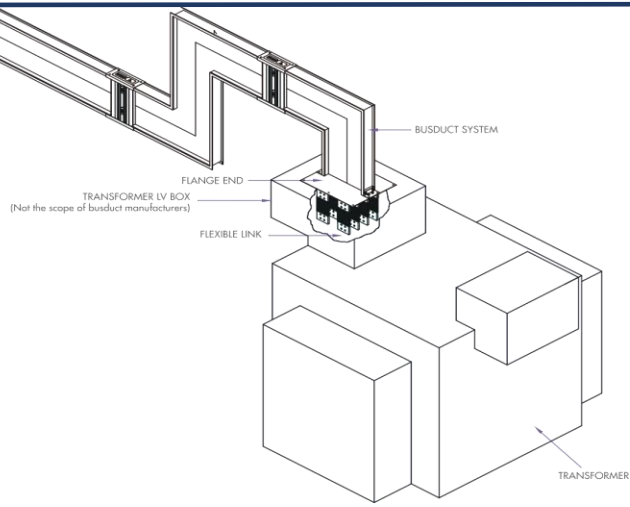


Figure 1

Figure 2

Figure 3

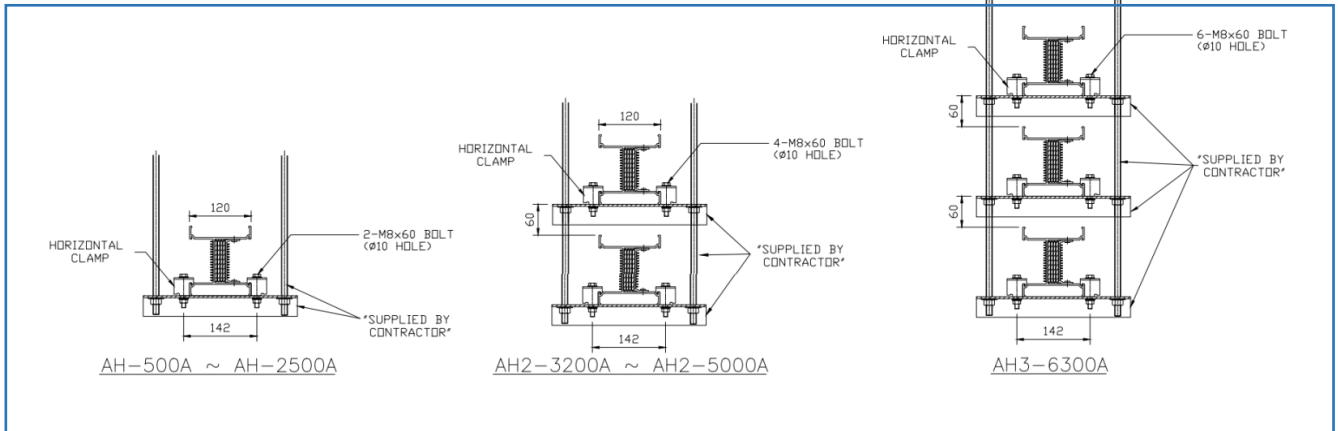
Figure 4

Figure 5

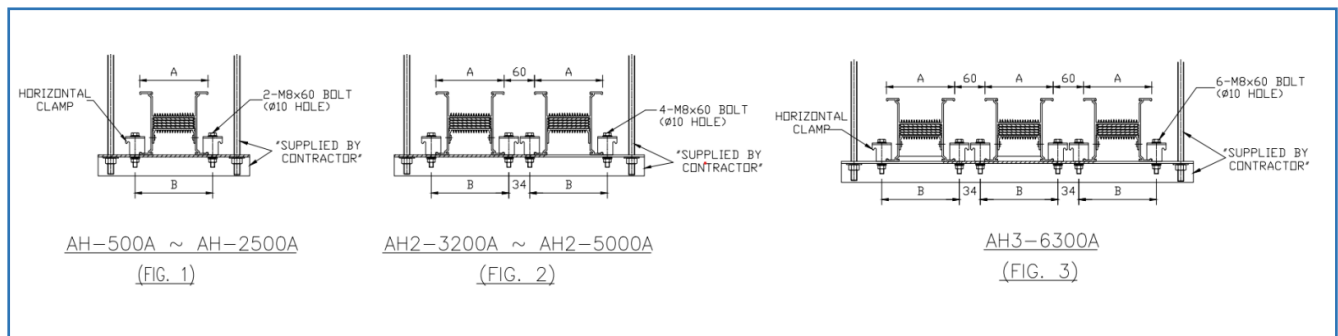
Busduct Rating	Figure	Flexible Link Model	Dimension "T" (mm)	Quantity of Flexible Link per Phase
500A	1	F4008	8.6	1
630A	1	F4013	13.8	1
800A	2	F5013	13.0	1
1000A	2	F5016	16.7	1
1250A	3	F10011	11.2	1
1600A	4	F12014	14.0	1
2000A	4	F12014	14.0	1
2500A	5	F15014	14.5	1
3200A	4	F12014	14.0	2 (1 for each duct)
3500A	4	F12014	14.0	2 (1 for each duct)
4000A	4	F12014	14.0	2 (1 for each duct)
4500A	5	F15014	14.5	2 (1 for each duct)
5000A	5	F15014	14.5	2 (1 for each duct)
6300A	5	F15014	14.5	3 (1 for each duct)

Horizontal clamp shall be installed in every 1500mm interval along horizontally-installed busduct system

Horizontal Clamp (Edgewise Installation)



Horizontal Clamp (Flatwise Installation)

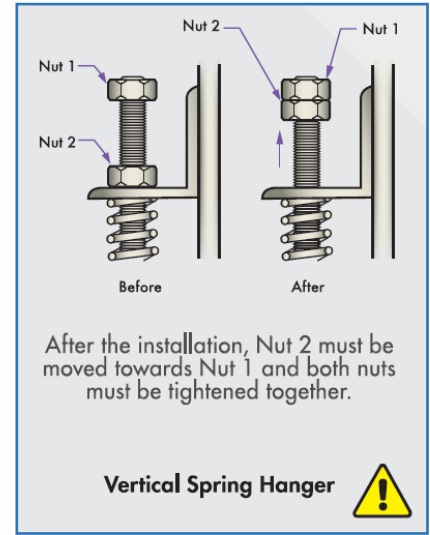
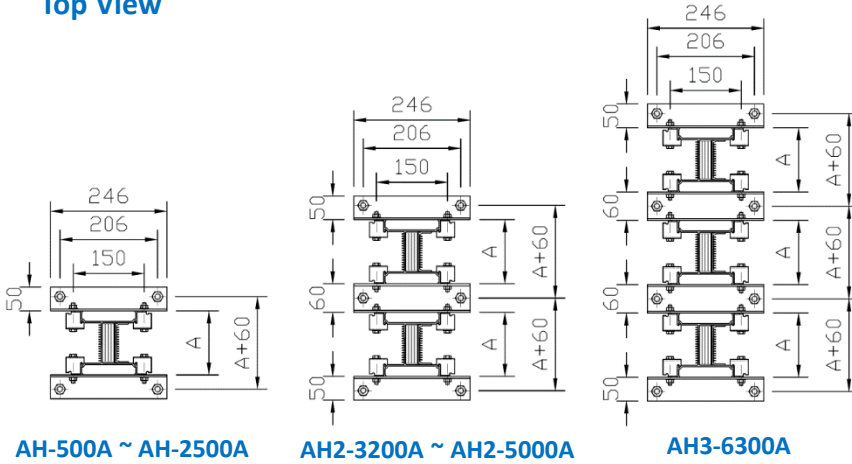


Details of Horizontal Clamp (Flatwise Installation)

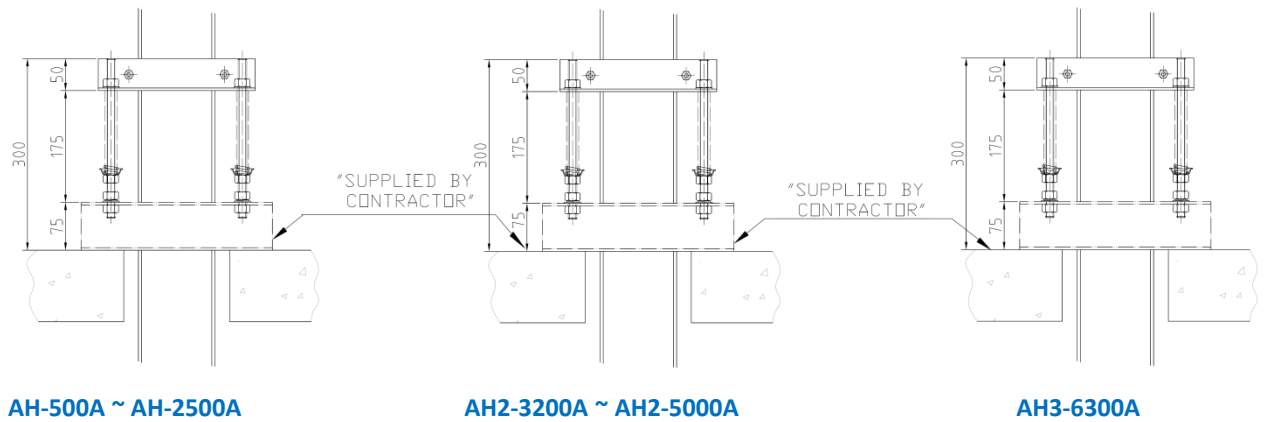
Busduct Rating	Figure	A	B
500A	1	90	109
630A	1	100	119
800A	1	115	134
1000A	1	135	154
1250A	1	160	179
1600A	1	195	214
2000A	1	245	264
2500A	1	305	324
3200A	2	195	214
3500A	2	245	264
4000A	2	245	264
4500A	2	305	324
5000A	2	305	324
6300A	3	305	324

Vertical Spring hanger

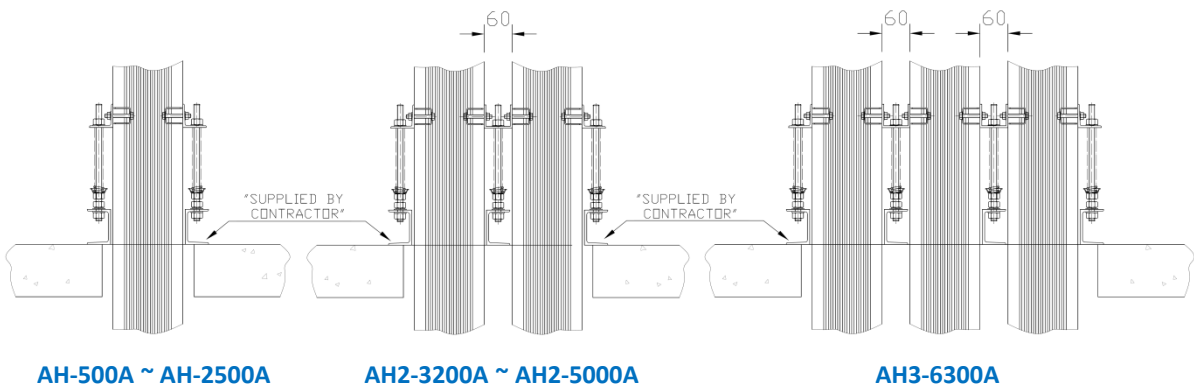
Top View



Front View

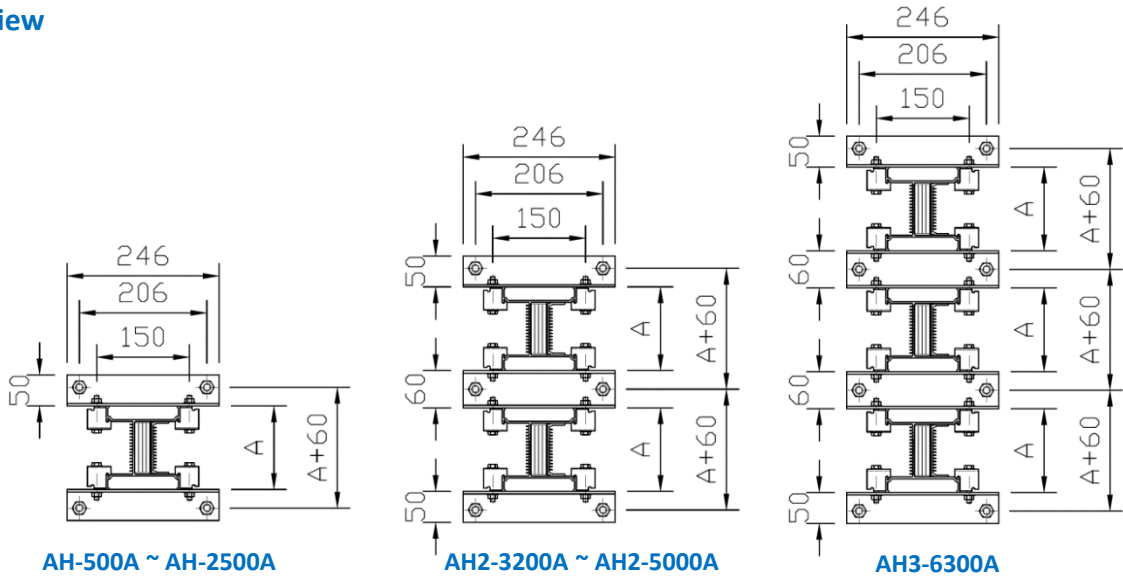


Side View

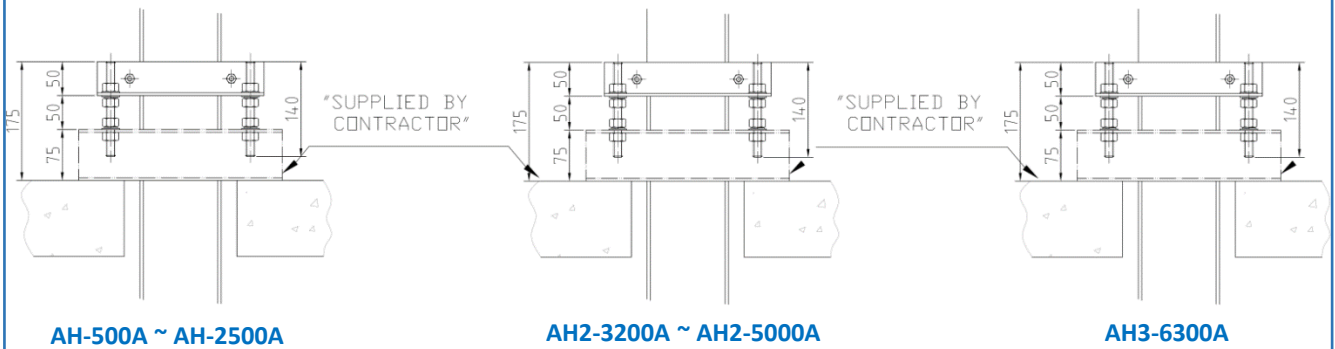


Vertical hanger

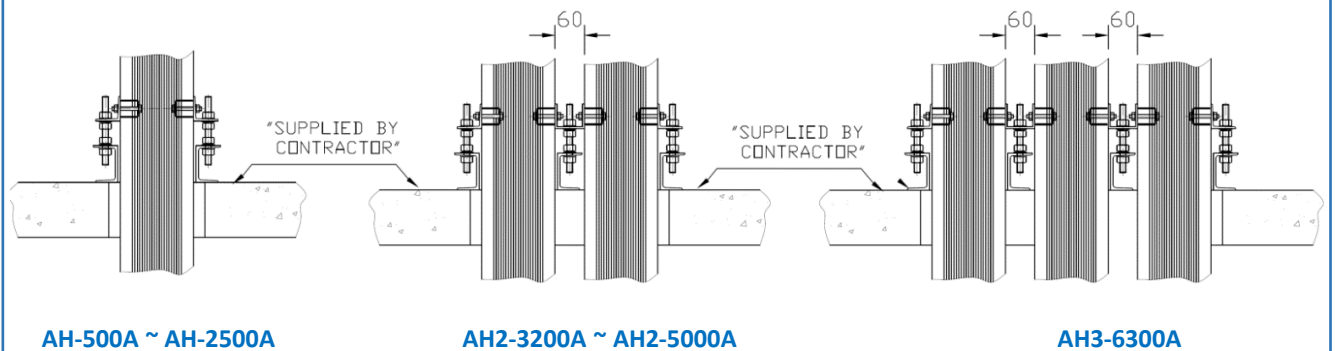
Top View



Front View



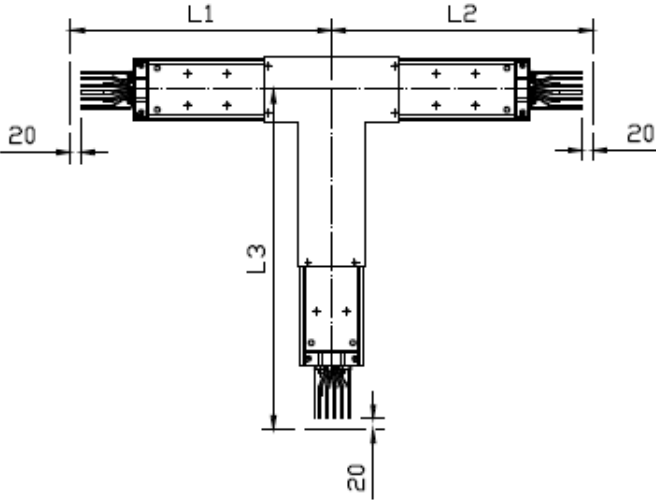
Side View



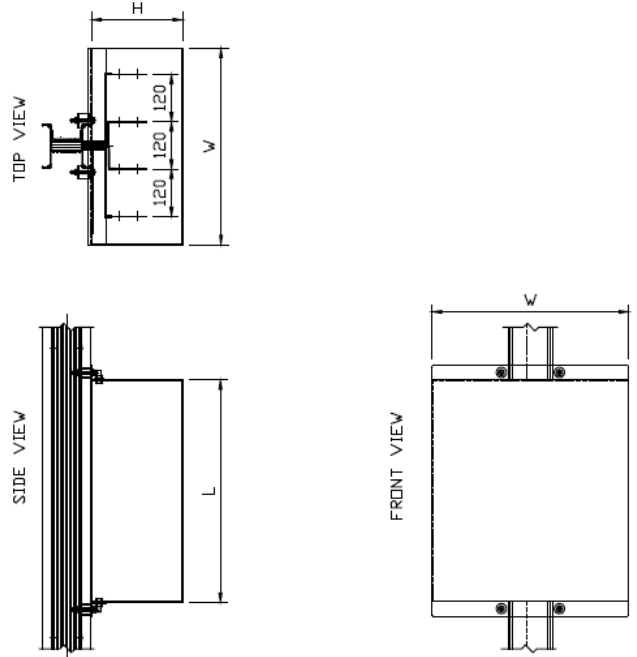
Physical Data

Dimension of other functional units shall be provided in Furutec's detailed drawing.

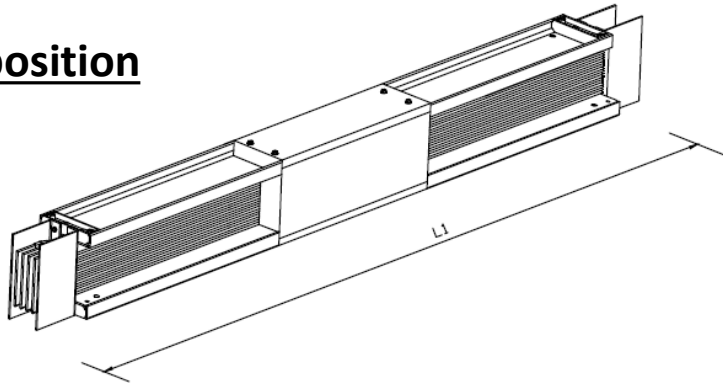
Edgewise Tee Elbow



Centre Feed In Box

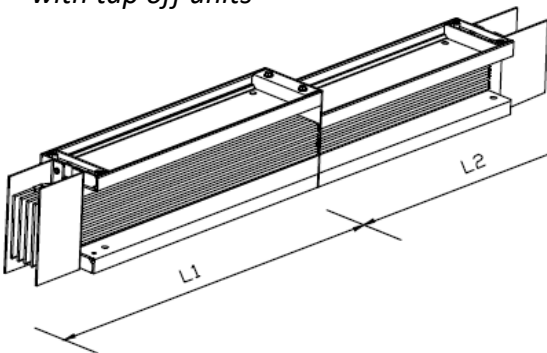


Phase Transposition

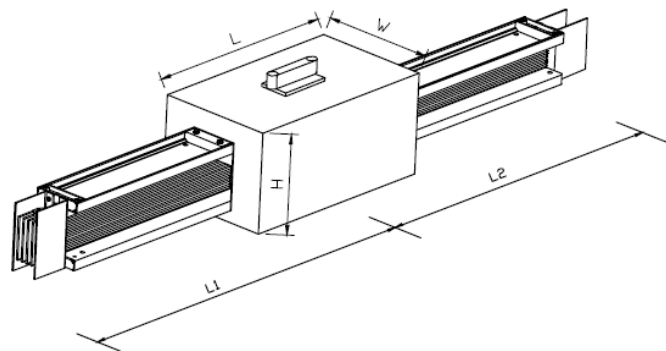


Reducer without MCCB

(Not recommended for busduct system with tap off units)



Reducer with MCCB

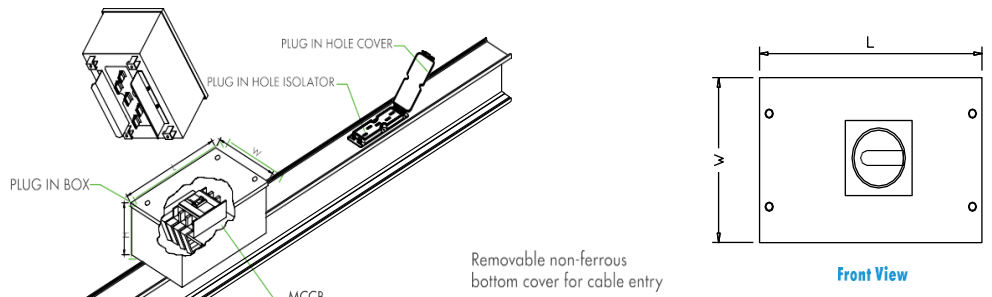


Physical Data

Tap Off Unit (TOU)

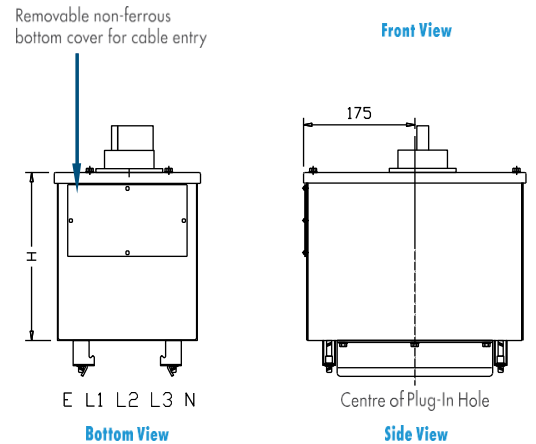
Tap off unit is mechanically interlocked with busduct housing to prevent installation or removal while the MCCB is in 'ON' position. It makes positive ground connection to the busduct housing before making contact to the phase conductor at plug in hole.

Tap off unit is tested to comply with the verification of temperature rise limit, short circuit strength and thermal cycling test in accordance to IEC 61439-6.



Tap Off Unit (Plug-in Type)

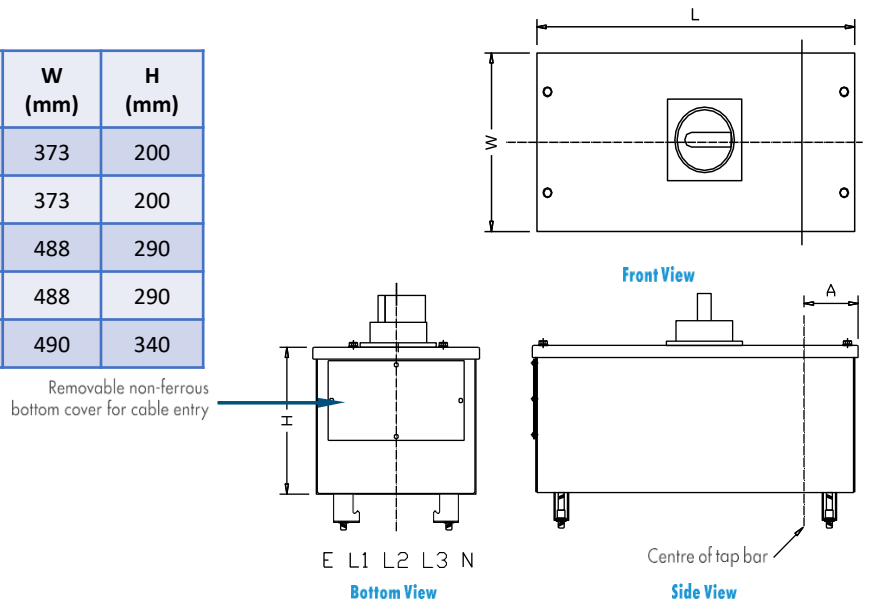
Tap off Unit Rating	L (mm)	W (mm)	H (mm)
100AF	350	230	235
225AF	430	265	260
400AF	550	310	340



Plug In Tap Off Unit (100AF - 400AF)

Tap Off Unit (Bolt-on Type)

Tap off Unit Rating	A (mm)	L (mm)	W (mm)	H (mm)
630AF	100	908	373	200
800AF	100	998	373	200
1000AF	115	1108	488	290
1250AF	115	1108	488	290
1600AF	140	1205	490	340



Bolt-On Tap Off Unit (630AF - 1600AF)

i-DC Tap Off Unit for Data Centre

It is designed for the critical power distribution of data centre. The following components shall be included to meet different project requirement and specification as well as matching customer's need.

- SPN or TPN MCB from 63A to 100A
- 3 to 5 Pole Receptacle/Industrial Socket
- Digital Power Meter/Power Quality Meter (PQM)
- RCD, RCBO, RCCB
- Weight is supported by heavy-duty overhead busduct System
- Live plug in on energized busduct system
- Plug In Clip tested to verify the short circuit strength in compliance to IEC 61439-6



Fire Resistance

Furutec IP68 cast resin busduct (CR model) protects the incoming and outgoing circuit of emergency main switchboard. It is tested in accordance to the following international standards.

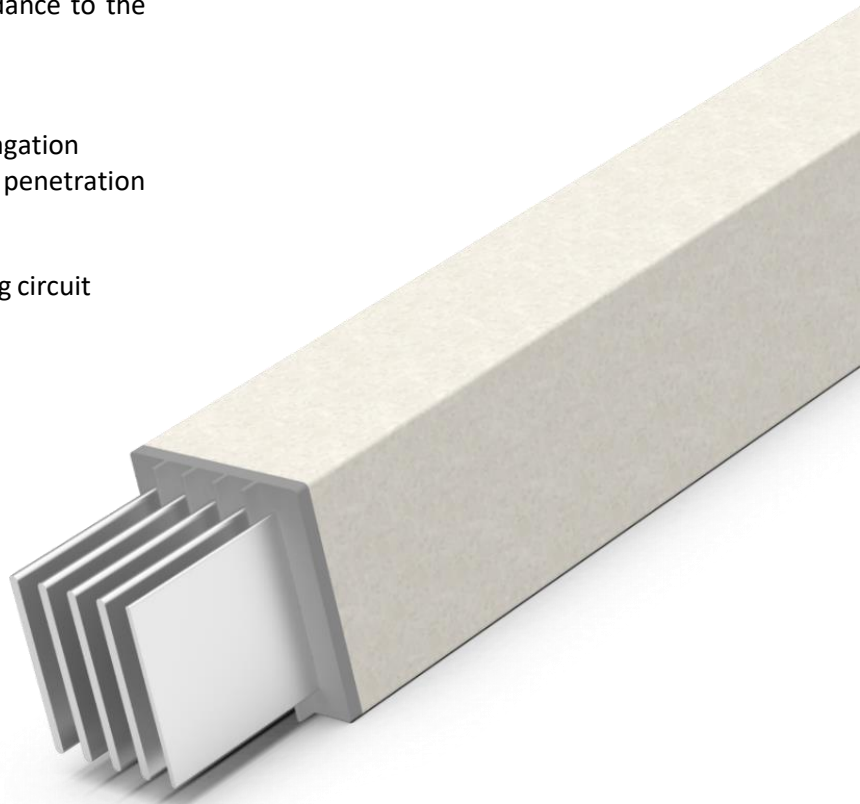
IEC 61439-6

Clause 10.101 Resistance to flame propagation

Clause 10.102 Fire resistance in building penetration

BS 6387, IEC 60331 & SS299 (adoption)

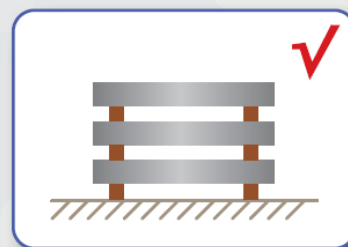
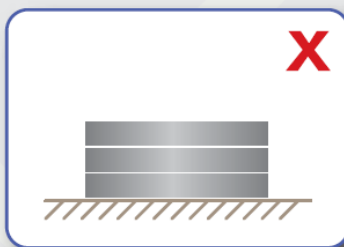
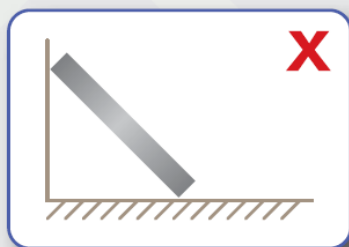
Performance requirement of maintaining circuit integrity during fire conditions



Installation & Maintenance Procedure

Before Busduct Installation

1. When the busduct arrives at project site, check the type and quantity of busduct feeders and accessories from delivery orders. Inspect for any physical damages caused during transportation and unloading.
2. Keep the busduct in a dry place, away from water and moisture, preferably under a roof, protected from rain. Cover the busduct with water-proof material, if necessary.
3. Do not lay the busduct directly onto the ground or in an upright position. Always place pieces of wood under the busduct and stack up firmly.
4. For long periods of storage, ensure that the busduct is placed in a dry place, free from condensation.

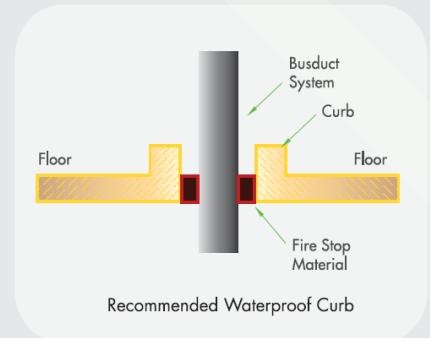


5. To prevent the busduct joint from being soiled, wrap both busduct ends with water-proof material while unpacking. Before busduct joint installation, examine the conductor contact surface or insulation materials for any damages. It is important to ensure that the joint sections are not soiled with dust, dirt and other foreign matter.
6. Sufficiently strong materials and equipment must be used during handling and lifting to reduce the risk of personal injury and equipment damage at site. Busduct must be handled with care to avoid damage to internal components and aluminium housing.
7. During unloading, do not drop it or let it hit other objects. Do not drag the busduct across the floor or across other busduct sections. A fork lift may provide a more convenient method of handling and has the added advantage of permitting it to be lifted between levels.
8. Platform/Scissor lifts or elevators, either manually or power operated, can be used advantageously in moving the busduct between elevations. Remember to check that the weight of the personnel plus busduct is within the capacity of the lift/elevator.
9. If a crane is used to move the busduct, use nylon straps and distribute the weight on each lift. If rope is used, insert thick pieces of rag, foam or corrugated cardboard between them to prevent the busduct from being damaged/scratched. Do not place slings, rope or chains around the busduct ends since damage can easily occur. For busduct rated 2500A and above, pieces of strong wood should be used when rope is applied, in order to prevent the busduct housing from being deformed.
10. If a fork lift or similar hoist is used, properly position the busduct on the fork to distribute its weight. Careful approach is a must to avoid any damage to the aluminium housing.
11. While installing vertical busduct, it may be easier to lower the busduct feeder from one floor above where it will be installed. The busduct feeders are usually stored on the floor above their final location to facilitate lowering them into position. Protect both busduct ends when rising from horizontal to vertical positions.
12. When the installation work is suspended or halted at job site, the end section of the connecting busduct feeders should be protected against water and dust by covering them with polythene or other appropriate materials.

Installation & Maintenance Procedure

During Busduct Installation

1. In vertical busduct installation, busduct feeder which will be supported by vertical hanger should be installed before other busduct feeders in order to prevent a downward weight or load from concentrating on the busduct at the lower floor.
2. Flange end box must not be fixed permanently to the wall and floor. However, flange end box can only be permanently secured provided that all the busduct installations are completed (if unavoidable).
3. Vertical hanger/vertical spring hanger must be installed to the busduct system to allow for busduct elongation/expansion & contraction as well as the shrinkage of the building.
4. Waterproof curb is recommended to be installed at each floor opening where the busduct passes through. It prevents water (caused by plumbing leaks, fire sprinkler system leaks, fluid spills, etc) from seeping into the busduct system. Additionally, the floor opening should be sealed with fire stop material to prevent fire from passing through the floors in case of fire in the building.



After Busduct Installation

1. After the completion of busduct installation at project site, it is advisable to carry out a thorough inspection of the whole busduct route, followed by measurement of insulation resistance/Megger.
2. Before conducting the measurement of insulation resistance, all the equipment connected to busduct system should be disconnected and MCCB rotary handle of tap-off units should be in 'OFF' position.
3. The insulation resistance value cannot be specified due to different length of the busduct and environment condition. But if it is installed in a dry atmosphere, the value of resistance should be more than 10 M Ω (500V Megger).
4. The following inspection procedures should be carried out. Determine whether:-
 - 4.1 The busduct feeders are physically damaged.
 - 4.2 All the connecting parts are fixed precisely (e.g. flange end box, tap-off units, etc)
 - 4.3 The bolts for connecting the equipment are securely fastened.
 - 4.4 The busduct joint are tightened in accordance to Furutec's requirement and recommendation.
 - 4.5 The busduct is supported securely by the hangers.
 - 4.6 Conduct Thermal Scanning Test on busduct housing, joint section and other connections to detect any abnormal heat or hot spot.

Recommended Maintenance Procedures

The following maintenance procedures and periodical inspection are recommended to ensure a safe operation of busduct system for long terms.

1. Period of Inspection

An inspection on the busduct once a year or once every two years is recommended. If the busduct system is installed in unfavourable conditions such as, temperature and/or humidity is high, there is a lot of dust or in similar environment; the periodical inspection must be conducted.

In the event of the following unusual conditions, inspection must be carried out immediately in each case:

- a) After severe earthquake
- b) After a fire has occurred
- c) After being exposed to water
- d) After an electrical fault

2. Maintenance and Routine Inspection

2.1 [Inspection on External Appearance](#)

Check whether:-

- ✓ There is any deformation, damage, dirt, etc throughout the whole length of the busduct systems
- ✓ There is any dislocation, bending and other abnormality of the connecting covers, hangers and plug-in appliances

2.2 [Environmental Inspection](#)

The environment, where the busducts are installed, could change after its installation. Check whether the environment has become hazardous due to water, moisture, high temperature, corrosive gas, immoderate vibration, dust, etc.

2.3 [Inspection for Abnormal Heat](#)

An Infra Red Thermography instrument is recommended to detect any abnormal heat and to measure the operating temperature of busduct system. As an option, a thermal indicator can be placed onto the busduct housing. If the temperature rise of the busduct housing exceeds the limit, the colour of the indicator will change.

2.4 [Inspection on Connections Sections](#)

Check whether:-

- ✓ The outer head of the double headed joint bolt shears off at each busduct joint section.
- ✓ Busduct is supported by vertical spring hangers, vertical hanger, edgewise/flatwise horizontal hangers according to manufacturer's requirement and recommendation.
- ✓ All the connecting parts, such as double headed joint bolt, hangers, busduct joints, joint covers, etc are fixed precisely.

2.5 [Inspection on Load Condition](#)

After the busduct installation, increase of load is expected. An inspection has to be carried out to ensure that the total connected load does not exceed the rated current of the busduct before the load is increased.

2.6 [Measurement of Insulation Resistance](#)

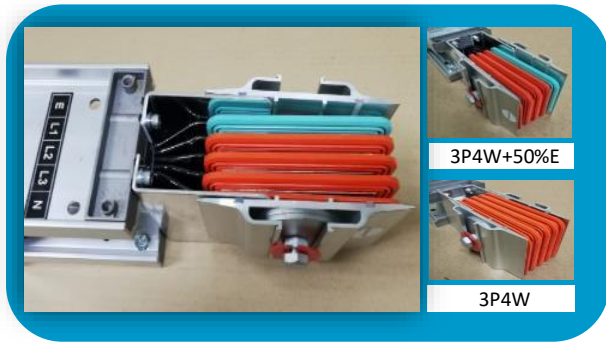
Measure the insulation resistance between each conductor and between conductor and housing. When the measurement is carried out, the electrical loads and connected equipment should be disconnected.

2.7 [Inspection on Busduct Housing](#)

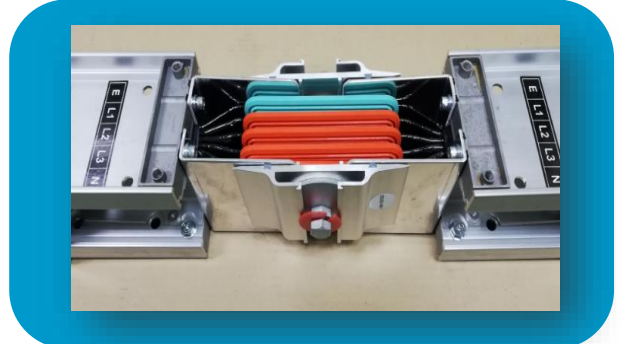
The busduct housing must not be dismantled by any parties without the official authorization from the manufacturer for any purposes. Any violation or abuse will result the respective party to be responsible for all the consequences and compensation. Furthermore, the manufacturer reserves the right to void the warranty if any violation or abuse occurs to the busduct system.

Installation & Maintenance Procedure

Installation Guideline of Busduct Joint



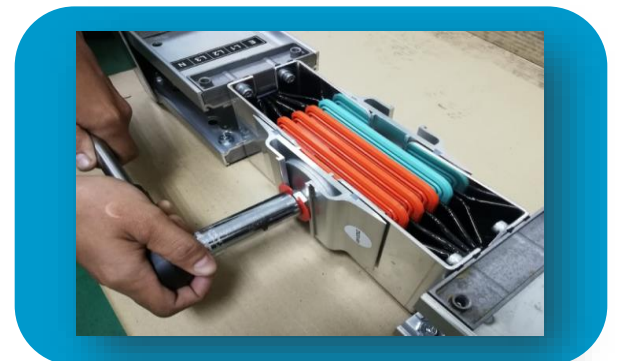
- 1 Identify the correct joint stack connector (either 3P4W or 3P4W+50%E) and its phase orientation before joint installation. Protective earth (PE) is indicated with green colour phase isolator. Insert the joint stack connector to a busduct feeder.



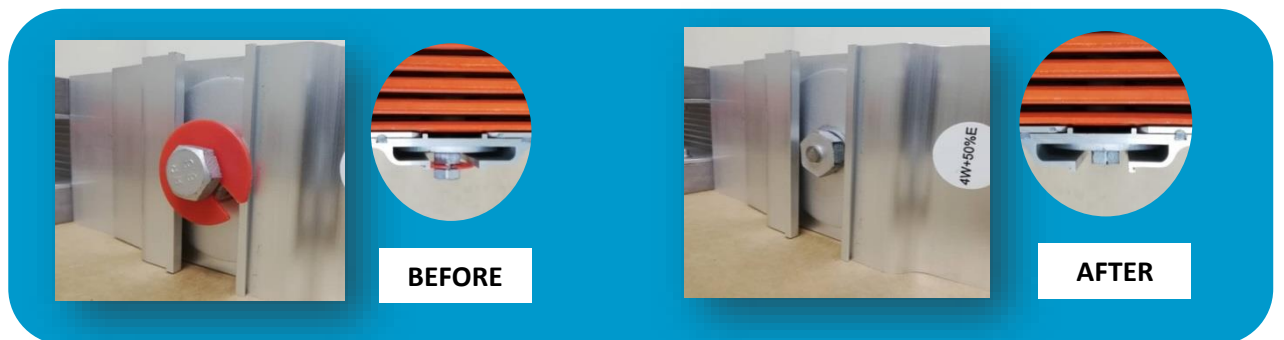
- 2 Align and connect the other busduct feeder to the joint stack connector.



- 3 Joint stack stopper acts a guideline to ensure a full contact surface of the overlapping conductors.



- 4 Tighten the double headed joint bolt by using socket wrench until the outer head shears off.



- 5 The double headed joint bolt is tightened until the outer head shears off

Installation & Maintenance Procedure

Installation Guideline of Busduct Joint



- 6** Place the joint covers on both sides of the busduct joint section and tighten all the bolts and nuts with socket wrench.



- 7** Busduct Joint Installation is completed

Recommended Tightening Torque Value:

M12 Double Head Bolt at Joint Stack = 60.0Nm to 80.0Nm

M8 Bolt at Joint Cover for IP65 = 9.0Nm

M8 Bolt at Joint Cover for IP66 = 15.0Nm

Recommendation (optional):

For faster and easier installation, we recommend to use a heavy-duty bar clamp to join the busduct joint section faster and less energy is required. It can also be used as a spreader to detach the busduct joint section.



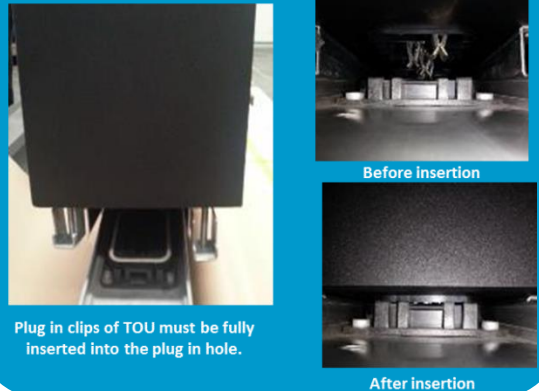
Installation & Maintenance Procedure

Installation Guideline of Tap-Off Unit



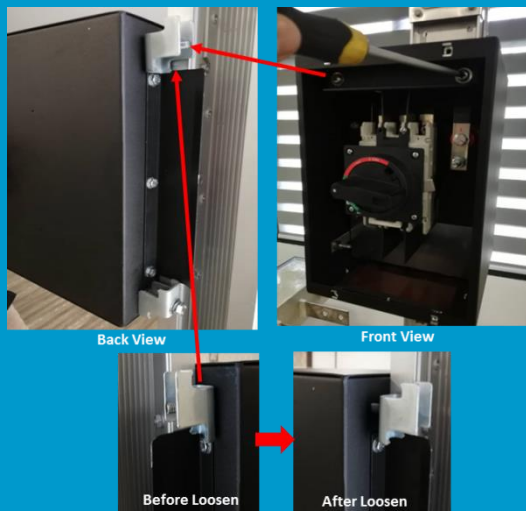
1 Identify the correct location of TOU by verifying from the as-built drawing

2 Open the cover of the plug in hole



3 Ensure that the MCCB handle is in "OFF" position before commencing the installation of TOU.

4 Verify the phase indication of TOU before inserting the plug in clip of TOU into the plug in hole of the busduct. Afterwards, TOU should be fully inserted to the busduct's plug in hole.



5 Loosen the M8 bolt of both interlock hanging clamp at the upper side of the TOU.

6 Loosen the M8 bolt of both hanging clamp at the lower side of the TOU.

Installation & Maintenance Procedure

Installation Guideline of Tap-Off Unit



7 Fix both interlock hanging clamps at the upper side of the TOU to the busduct body and tighten M8 bolt of the interlock hanging clamp sufficiently. Refer to Step 5.



8 Fix both hanging clamps at the lower side of the TOU to the busduct body and tighten the M8 bolt of the hanging clamp sufficiently. Refer to Step 6.



9 The TOU shall be attached firmly to the busduct by fours of the hanging clamps to complete the installation of TOU. Afterwards , cable shall be terminated to the outgoing terminal of the MCCB and insert the interpole barrier to prevent any accidental contact with the live parts of the MCCB terminal.

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