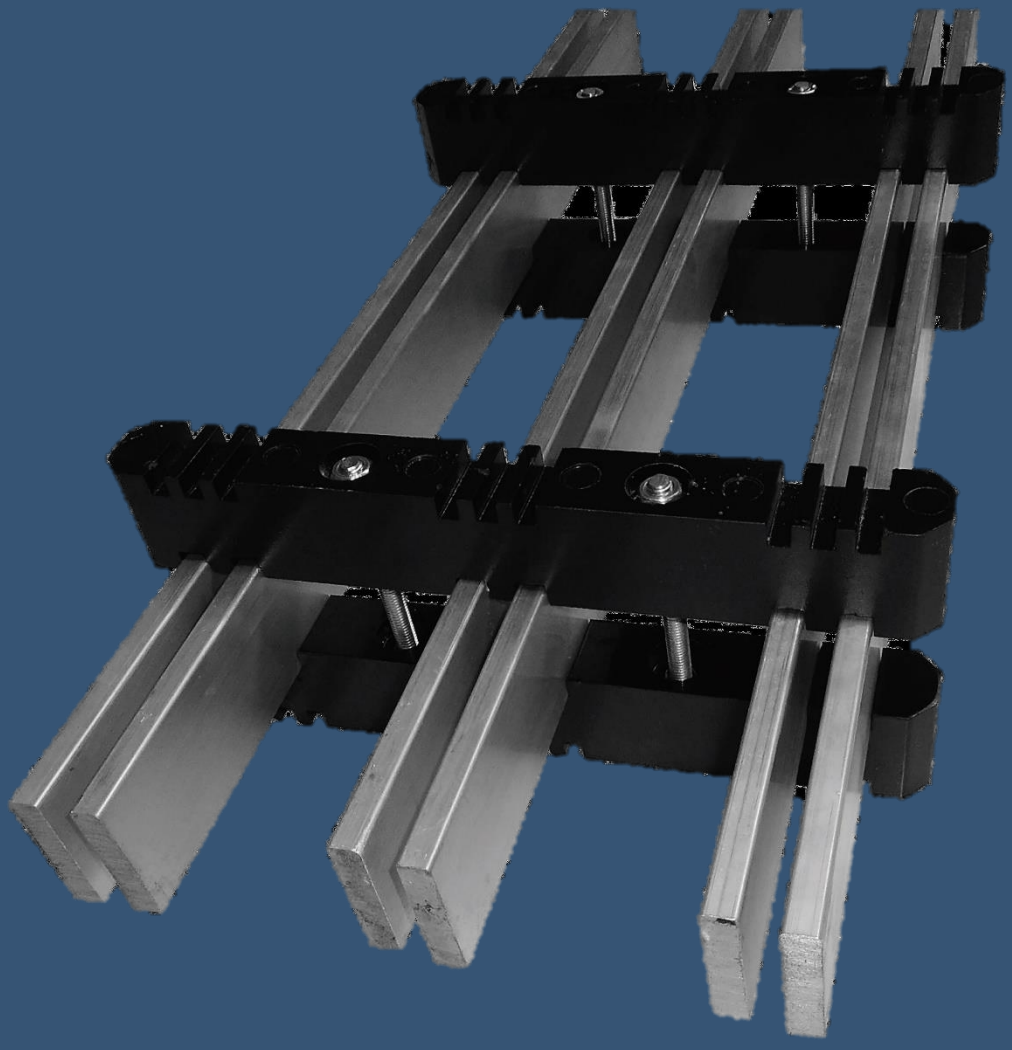
KENTAN

SWITCHBOARD EQUIPMENT AND AUTOMATION

Busbar Supports Type UBD

Low Voltage Switchboard Equipment



Publication UBD 2020

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Type UBD busbar supports suit most conventionally arranged busbar systems. These supports are designed to accommodate either 6.35mm or 10mm wide bars.

Technical

Material Details

The UBD supports are injection moulded from PA66 (Nylon type 6.6) with 50% glass fibre reinforcement. This is a compound specially selected to provide the highest flame retardancy (including glow-wire test at 960°C) with maximum mechanical strength. Colour is black.

Property		Standard	Unit	Value	
				DAM*	Cond**
Physical Properties					
Density		ISO 1183	Kg/m^3	1610	
Mechanical Properties					
Tensile Modulus	1mm/min	ISO 527-2/1A	MPa	17300	
Stress at Break	5mm/min	ISO 527-2/1A	MPa	210	
Strain at Break	5mm/min	ISO 527-2/1A	%	2.5	
Flexural Modulus	2mm/min	ISO 178	MPa	16200	
Flexural Strength	+23°C	ISO 179/1 eU	KJ/m2	85	
Charpy Notched Impact Strength	+23°C	ISO 179/1 eA	KJ/m2	14	
Thermal Properties					
Melting Temperature	10°C/min	ISO 11357-1-3	°C	260	
Heat Deflection Temperature	1.8MPa	ISO 75/2 A f	°C	250	
Flammability Properties					
Flammability	0.8mm	UL 94	Class	V0	
Glow Wire Flammability Index	1mm / 2mm	IEC 60695-2-1/2	°C/mm	960 / 960	
Glow Wire Ignition Temperature	1mm / 2mm	IEC 60695-2-1/3	°C/mm	750 / 775	
Electrical Properties					
Volume resistivity	500V	IEC 60093	ohm · m	1 E+13	1 E+11
Surface resistivity	500V	IEC 60093	ohm	1 E+12	1 E+10
Comparative Tracking Index	Sol.A	IEC 60112	V	500	

* DAM = Dry As Moulded state

** Cond = Conditional state similar to ISO 1110

*** Melt Temp {°C] / Mold Temp [°C] / Cavity press (MPa]

Technical

Current Ratings (Short-Circuit)

The duration of the fault, limited by the protective device (approximately 6 cycles) is too short to allow the heat to dissipate from the bars, and will therefore be absorbed by the bars.

A maximum short-time temperature of up to 190°C is taken as a safe temperature for aluminium. (This limit is the same for copper in order to prevent damage to insulation and other parts of the same circuit.)

The temperature rise of the busbars as a result of a short-circuit must be taken into account in the design of the busbar arrangement. In some cases, this may be the determining factor, rather than the continuous current rating.

The chart below shows the minimum cross-sectional areas for aluminium and copper for various fault ratings. These show temperature rise from 0°C, and a short-circuit occurring at the maximum continuous rating. This is 90°C for aluminium and 105°C for copper. (Some specifications limit the operating temperature of copper to less than 105°C). It can be seen that the final temperature is not the sum of the temperature rise and the operating temperature. This is an exponential factor due to the ever increasing resistance due to temperature.

		Minimum Cross-Sectional Areas (mm^2) Short-Circuit (kA) 1 Sec			
Temp Rise	**Base Temp**	**40**	**50**	**65**	**80**
Copper	0°C	205	260	335	415
	90°C	360	450	585	720
Aluminium	0°C	322	400	525	645
	90°C	525	655	850	1050

Values show cross-sectional areas (mm^2)

Dielectric Ratings

- Rated Voltage 1000V
- Rated Impulse Voltage : Uimp 12kV
- Clearance Distance 26mm (min)
- Creepage Distance 26mm (min)

- Standard AS/NZS 61439.1:2016
- Pollution degree 3
- Material group II
- Material is 400 > 400 CTI < 600

Technical

Support Spacings (for Copper & Aluminium Bars) 6.35mm

UBD 1/210/306 (1-3 Bars)
UBD 1/310/406 (1-4 Bars)

Support intervals for UBD1 are based on 100mm phase centres. Greater spans are possible as the phase centres are increased.

Busbar Size (mm)	Fault Current kA		1 Bar				2 or More Bars		
		Ipk	66	105	143	176	105	143	176
		Irms	30	50	65	50	50	65	50
40 x 6.35									
50 x 6.35			650	**330**			360	340	
63 x 6.35			670	350	320		400	360	
80 x 6.35			700	**400**	**350**	190	420	**380**	200
100 x 6.35			750	420	360	190	450	380	200
125 x 6.35			800	420	360	200	450	380	220
160 x 6.35			800	420	360	220	450	380	240

UBD 3/110/106 (1 Bar)
UBD 4/110/106 (1 Bar)

32 x 6.35				
40 x 6.35		380		
50 x 6.35		400	**280**	
63 x 6.35		420	290	230
80 x 6.35		500	300	250
100 x 6.35		550	320	280

Refer to notes on Page 5

UBD 3/210/306 (1-3 Bars)
UBD 4/210/306 (1-3 Bars)

40 x 6.35								
50 x 6.35		650	**330**			360	340	
63 x 6.35		670	350	320		400	360	
80 x 6.35		700	400	350	170	420	380	200
100 x 6.35		750	420	360	190	450	380	200
125 x 6.35		800	420	360	200	450	380	220
160 x 6.35		800	420	360	220	450	380	240

Technical

Support Spacings (for Copper & Aluminium Bars) 10mm

UBD 1/210/306 (1-2 Bars)
UBD 1/310/406 (1-3 Bars)

Busbar Size (mm)	Fault Current kA Ipk / Irms	1 Bar				2 or More Bars		
	Ipk	66	105	143	176	105	143	176
	Irms	30	50	65	50	50	65	50
40 x 10		650						
50 x 10		680	**430**	360		450		
60 x 10		700	430	380	220	450	400	240
80 x 10		750	440	**400**	230	460	400	250
100 x 10		800	450	420	250	460	420	260
120 x 10		800	450	420	250	460	430	260
160 x 10		800	450	420	260	460	430	270

UBD 3/110/106 (1 Bar)
UBD 4/110/106 (1 Bar)

30 x 10		380	300	
40 x 10		400	320	
50 x 10		500	**350**	250
60 x 10		530	350	270
80 x 10		600	360	280
100 x 10		600	380	300

Refer to notes on Page 5

UBD 3/210/306 (1-2 Bars)
UBD 4/210/306 (1-2 Bars)

40 x 10		650	400					
50 x 10		680	420	**380**		450		
60 x 10		700	430	380	220	450	400	240
80 x 10		750	440	390	230	460	**400**	250
100 x 10		800	450	400	250	460	420	260
125 x 10		800	450	**430**	250	460	430	260
160 x 10		800	450	430	260	460	430	270

Technical

Test Details

- **Tests have been carried out on a typical switchboard enclosure to comply with the intention of clause 10.11.5.1 (test arrangements)**
- Test voltage 415V 50Hz
- Duration 1 second
- Tests in accordance with AS/NZS 61439.1:2016 Clause 10.11.5.3.3
- Test reports available for distances shown in bold letters
- Tests conducted at TUV Rheinland in Melbourne, Australia
- Refer to Temp Rise chart on Page 3 for minimum size bars for a given fault rating
- It is assumed that parallel bars are bolted together at intervals not less than 800mm

Current Ratings (Continuous)

In addition to the size and material of the busbars, the continuous current (thermal) ratings of busbars are dependent upon a number of factors. These are determined by the switchboard builder, and is therefore not part of the scope of this brochure. These are:

- Ambient temperature
- Limit of final temperature
- Ratio between cross-section area of bars and enclosure or compartment
- Material of the enclosure (e.g. ferrous or non-ferrous)

Installation

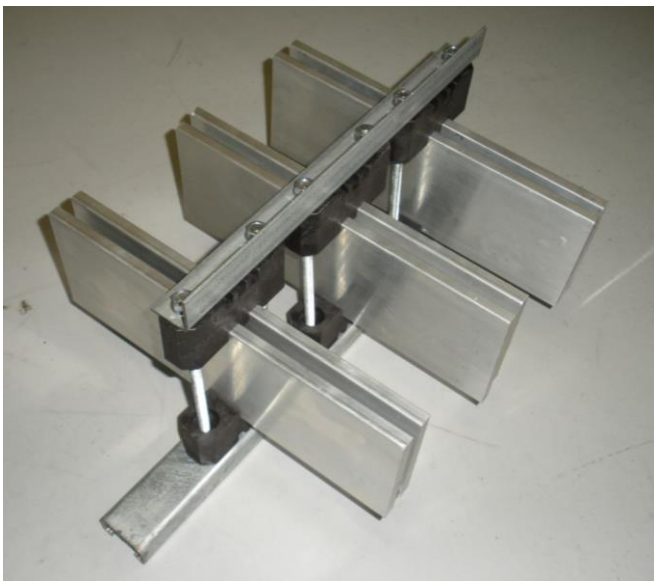
Fixing Bolt Tightening Torques

Cat No.	Phases	Busbar (Side 1)	Busbar (Side 2)	Fixing Bolt	Torque (Nm)
BSD 1/210/306	1	2x10mm	3x6mm	M8	10
BSD 1/310/406	1	3x10mm	4x6mm	M8	10
BSD 3/110/106	3	1x10mm	1x6mm	M6	8
BSD 4/110/106	4	1x10mm	1x6mm	M6	8
BSD 3/210/306	3	2x10mm	3x6mm	M8	10
BSD 4/210/306	4	2x10mm	3x6mm	M8	10

Mild Steel (4.6 grade min) threaded.

UBD 1/210/306
UBD 1/310/406

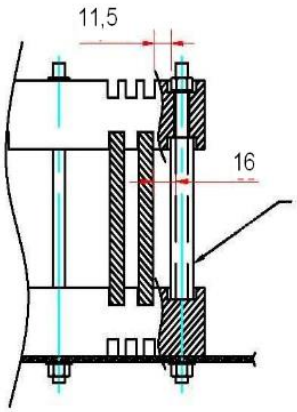
These supports would normally only be used where the phase centres exceed 100mm. For 100mm centres the UBD3 or 4/240/306 are the first choice. The UBDs supports require a brace across the top as illustrated below. This aligns and strengthens the arrangement. The brace should be of aluminium or bakelite. Flat bars (30x6) or angles (30x30x5) is recommended.



Installation

UBD4/210/306

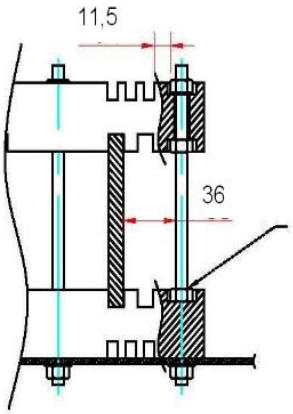
It is essential that these UBD BUSBAR SUPPORTS are not overstressed by tightening. The connecting bolts or rods beyond the recommended limit. This is 10Nm for M8 bolts and applies in particular to the outer fixings, and especially where the outside slot is not utilized. To prevent overstressing, a spacer tube or nut should be used as illustrated below. The spacer tube also increases the creepage distance to earth.



16mmØ medium duty electrical conduit

Conduit is 3mm less than bar height.

Spacer Tube



Bottom nut optional

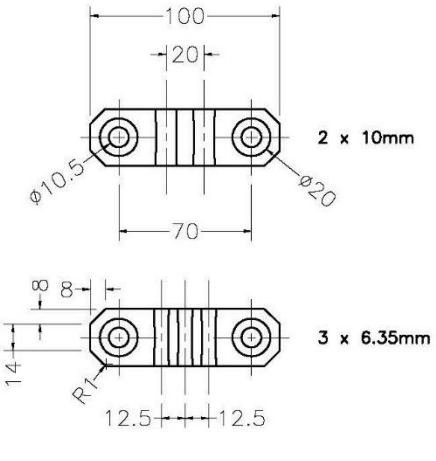
M8 Hex Nut

Weights

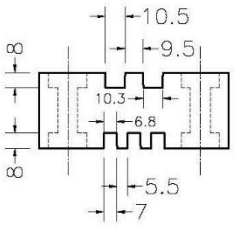
Support	Weight Per Pair (kg)
UBD 1/210/306	0.29
UBD 1/310/406	0.34
UBD 3/110/106	0.44
UBD 4/110/106	0.60
UBD 3/210/306	0.85
UBD 4/210/206	1.25

Dimensions

UBD 1/210/306

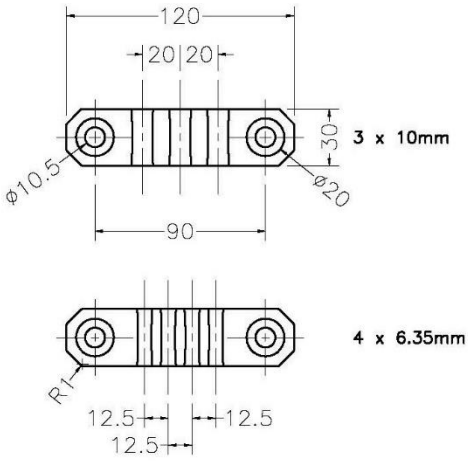


Plan



Front Elevation

UBD 1/310/406



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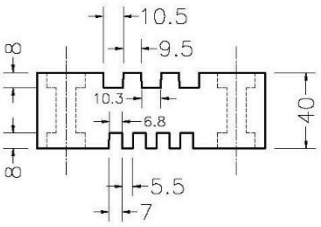
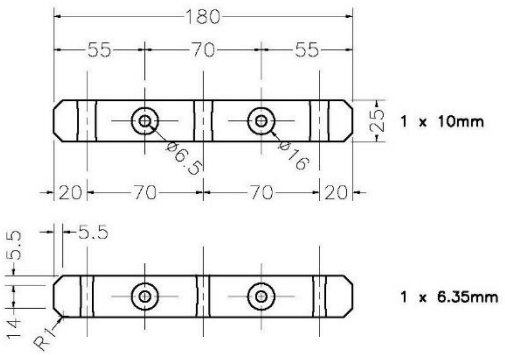


Front Elevation

UBD 3/110/106



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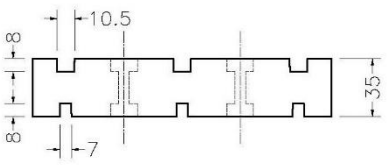
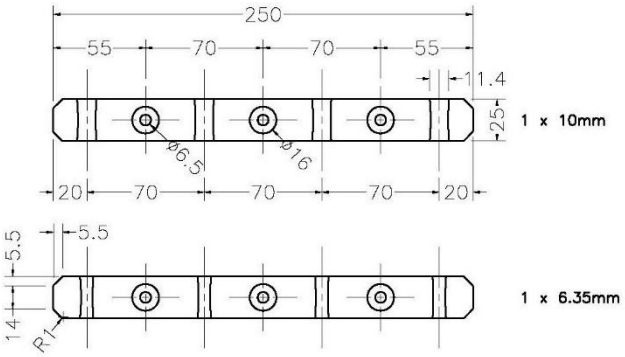
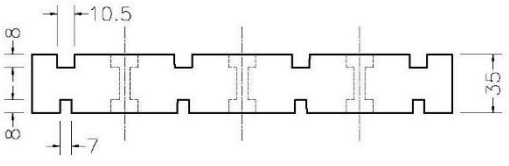


Front Elevation

UBD 4/110/106



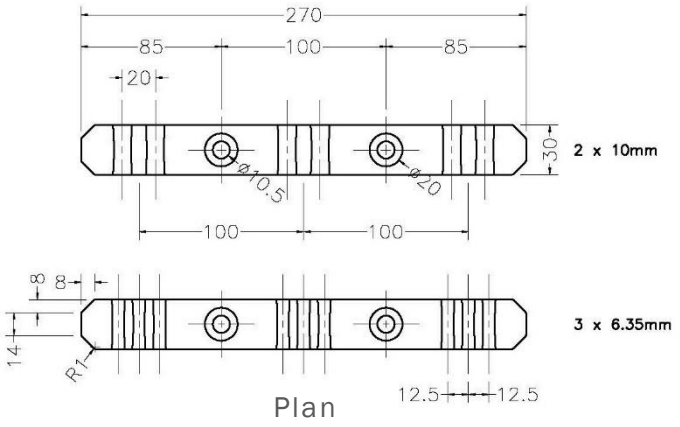
Plan



Front Elevation

Dimensions

UBD 3/210/306



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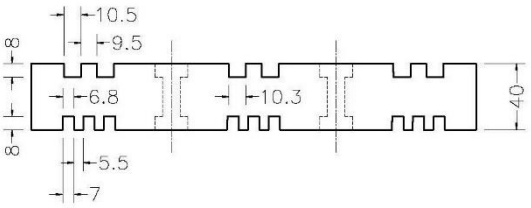
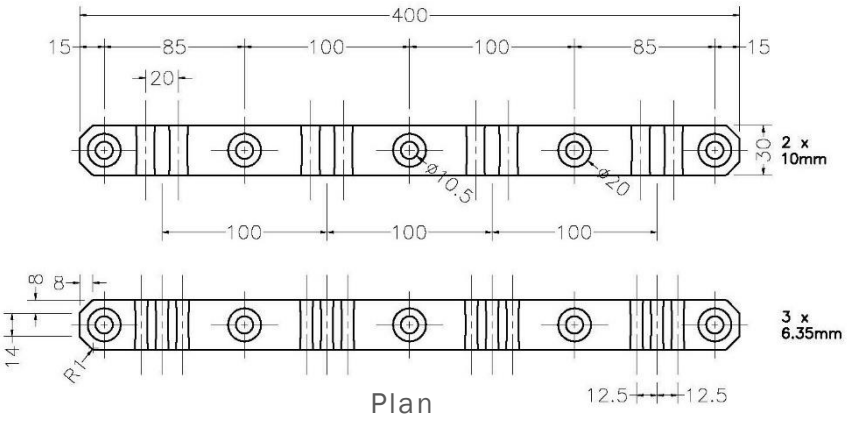


Front Elevation

UBD 4/210/306



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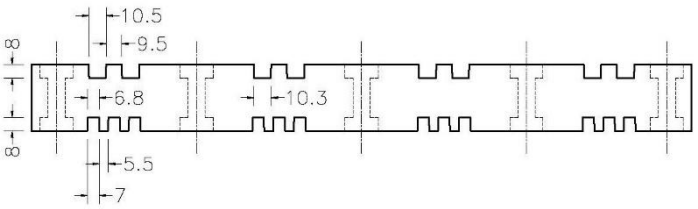

Front Elevation

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