



SWITCHBOARD EQUIPMENT AND AUTOMATION

# Busbar Supports Type UBS

Low Voltage Switchboard Equipment



Since product improvement is a continuing policy, we reserve the right to change specifications without notice.

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# Descriptive

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## Use

These are designed primarily for the support of vertical busbars in motor control centres and switchboards.

Supports are made for 6.35mm and 10mm thick busbars. They complement all composite plug-in switch-fuse units, moulded case circuit breakers and separate busplugs having contacts at 60mm phase centres.

## Ordering Information

| Poles | Busbar Thickness (mm) | Cat. No.    |
|-------|-----------------------|-------------|
| 3     | 6.35                  | UBS3 (6mm)  |
| 3     | 10                    | UBS3 (10mm) |
| 3     | 13                    | UBS3 (13mm) |
| 4     | 6.35                  | UBS4 (6mm)  |
| 4     | 10                    | UBS4 (10mm) |
| 4     | 13                    | UBS4 (13mm) |

- Each pair of supports is supplied with 2 inserts (for 3 poles) and 3 inserts (for 4 poles) as standard.
- If these are not requested, or if both supports require the inserts, please state at time of ordering. (Refer to Page 5 for details)
- Non-standard width of slots may be made to special order
- 10mm slots will accommodate KENTAN sleeving for 6.35mm busbars
- 13mm slots will accommodate KENTAN sleeving for 10mm busbars

## Weights

| Poles | Weight Per Pair (grams) |      |      |
|-------|-------------------------|------|------|
|       | 6mm                     | 10mm | 13mm |
| 3     | 322                     | 304  | 292  |
| 4     | 457                     | 437  | 422  |

Weight includes inserts for one support.

# Technical

## Material Details

The UBS 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** |
| <b>Physical Properties</b>     |           |                 |                   |           |        |
| Density                        |           | ISO 1183        | Kg/m <sup>3</sup> | 1610      |        |
| <b>Mechanical Properties</b>   |           |                 |                   |           |        |
| 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/m <sup>2</sup> | 85        |        |
| Charpy Notched Impact Strength | +23°C     | ISO 179/1 eA    | KJ/m <sup>2</sup> | 14        |        |
| <b>Thermal Properties</b>      |           |                 |                   |           |        |
| Melting Temperature            | 10°C/min  | ISO 11357-1-3   | °C                | 260       |        |
| Heat Deflection Temperature    | 1.8MPa    | ISO 75/2 A f    | °C                | 250       |        |
| <b>Flammability Properties</b> |           |                 |                   |           |        |
| 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   |        |
| <b>Electrical Properties</b>   |           |                 |                   |           |        |
| 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 copper and aluminium.

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 copper and aluminium 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.

| Temp Rise        | Base Temp | Minimum Cross-Sectional Areas (mm <sup>2</sup> )<br>Short-Circuit (kA) 1 Sec |     |     |      |
|------------------|-----------|--|-----|-----|------|
|                  |           | 40   | 50  | 65  | 80   |
|                  |           | <b>Copper</b>  | 0°C | 205 | 260  |
|                  | 90°C      | 360  | 450 | 585 | 720  |
| <b>Aluminium</b> | 0°C       | 322  | 400 | 525 | 645  |
|                  | 90°C      | 525  | 655 | 850 | 1050 |

## Dielectric Ratings

- Rated Voltage 1000V
- Rated Impulse Voltage : Uimp 12kV
- Clearance Distance 15.5mm
- Creepage Distance 15.5mm
  
- 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)

| Busbar Size<br>(mm) | Fault<br>Current<br>kA | I <sub>pk</sub><br>I <sub>rms</sub> | 66 | 105        | 143        | 176 |
|---------------------|------------------------|-------------------------------------|----|------------|------------|-----|
|                     |                        |                                     | 30 | 50         | 65         | 80  |
| 31 x 6.35           |                        | 500                                 |    |            |            |     |
| 40 x 6.35           |                        | 600                                 |    |            |            |     |
| 50 x 6.35           |                        | 650                                 |    | <b>240</b> |            |     |
| 63 x 6.35           |                        | 700                                 |    | <b>250</b> | 200        |     |
| 80 x 6.35           |                        | 750                                 |    | <b>260</b> | 210        | 140 |
| 100 x 6.35          |                        | 800                                 |    | 280        | 260        | 150 |
| 125 x 6.35          |                        | 800                                 |    | <b>300</b> | <b>300</b> | 150 |
| 40 x 10             |                        | 550                                 |    | <b>320</b> | <b>230</b> |     |
| 50 x 10             |                        | 600                                 |    | 340        | 240        |     |
| 60 x 10             |                        | 700                                 |    | 360        | 250        | 130 |
| 80 x 10             |                        | 800                                 |    | 380        | <b>260</b> | 140 |
| 100 x 10            |                        | 800                                 |    | 400        | <b>280</b> | 150 |
| 120 x 10            |                        | 800                                 |    | 400        | 290        | 150 |

- 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

## 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

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The UBS supports have a hollow section (pocket) into which an insert with a recess for an M6 nut can be fitted. In keeping with the supports that were previously moulded with a hollow section and hex recess per pair, the hollow type may be referred to as Type A, and when fitted with the inserts as Type B. This arrangement provides flexibility in the means by which the supports may be used.

Unless otherwise specified, supports will be supplied with the inserts to make up one Type B per pair.



*Picture shows an insert being fitted into a pocket to make up a Type B support*

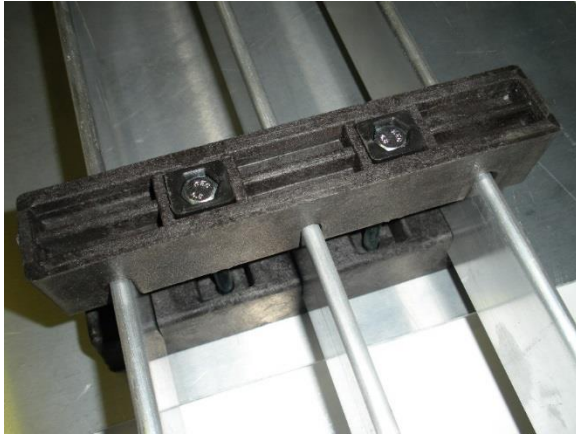


# Installation

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M6 bolts or the threaded rod of 4.6 grade (min) can be used.

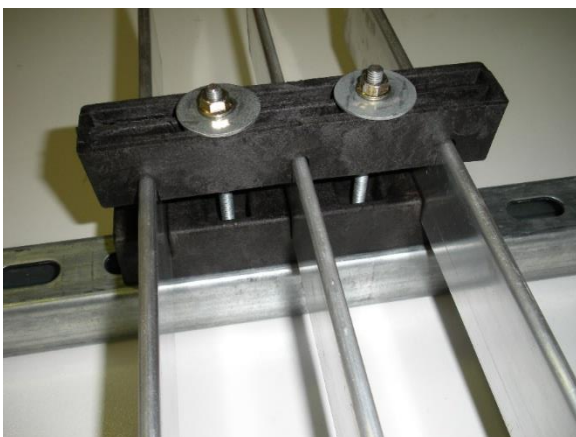
For busbars 125 and 160mm wide, the holes in the supports should be 8.5mm (drilled out by the installer), and M8 hardware fitted. Tightening torques: M6 – 8 Nm, M8 – 10 Nm



*M6 bolts (or nuts) using inserts*



*M6 bolts (or nuts) inside of pocket*



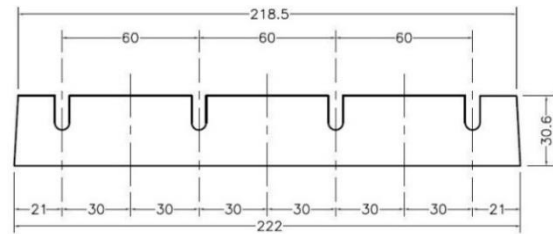
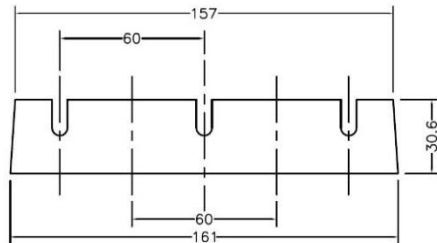
*M6 bolts using large washers*

# Dimensions

### 3 Poles

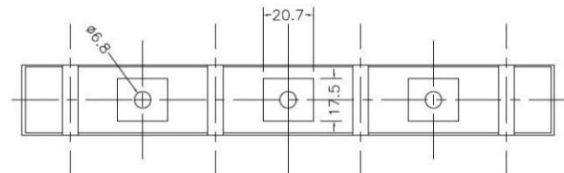
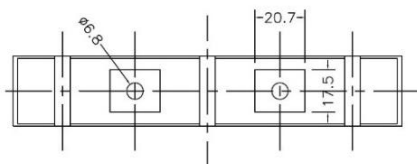
### 4 Poles

6mm



Elevation

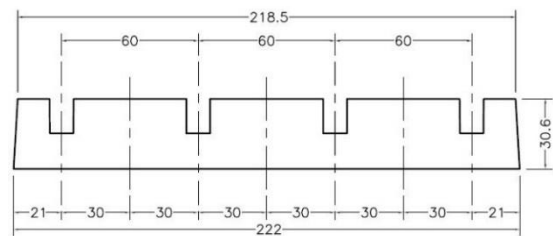
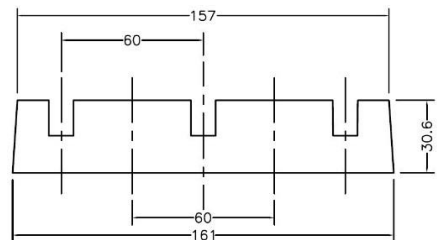
Elevation



Plan

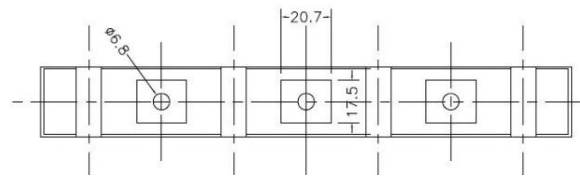
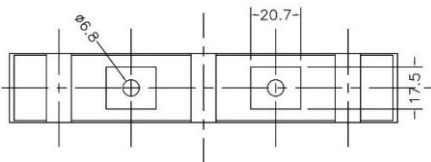
Plan

10mm



Elevation

Elevation



Plan

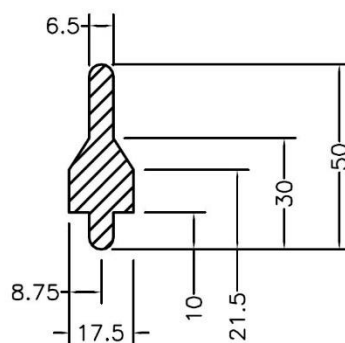
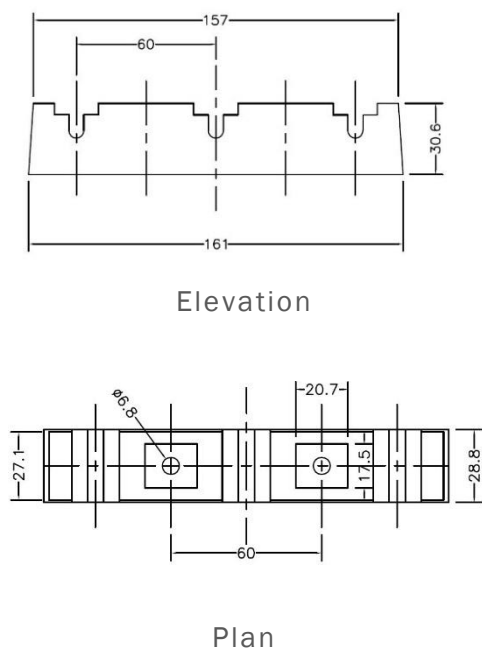
Plan

# Dimensions

## 3 Poles for Special Profile Bars

Available to order (min run quantities apply)

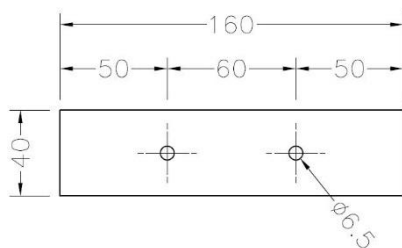
### 3 Poles



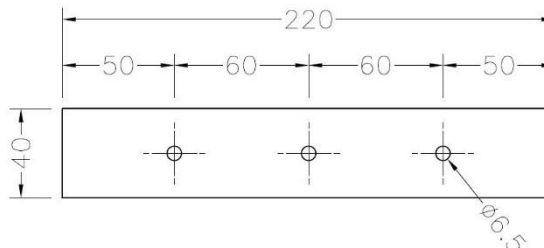
## Insulation Plates

Not required for 10000. Used when required creepage distance to earth is 25mm. Made from 2mm clear polycarbonate sheet.

### 3 Poles



### 4 Poles



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