



SWITCHBOARD EQUIPMENT AND AUTOMATION

Busplugs Type UP

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

Advantages of Plug-Type Power Connections in Switchboards and Motor Control Centres

For the Switchboard Manufacturer

- Assists in standardising method of switchboard construction.
- Simplifies changes made to drives and feeders while the switchboard or MCC is under construction
- Allows the demountable or withdrawable units to be made and tested away from the switchboard, then fitted at the final stage of manufacture.
- In the case of distribution boards, the MCCB's or switch-fuses can be purchased later in the construction programme due to the minimal amount of time needed to install.
- Reduces the amount of labour needed, compared to making solid connections onto the busbars.
- Provides a type tested method of connection.

For the Customer/User

- Simplifies changes on site. The plug-in method of connection means that drives and feeders can be added, deleted, modified or maintained without having to isolate the switchboard and disrupt power to the facilities.
- Allows quick removal and substitution of spare units in the event of a failure.

Safety

- Busplugs provide a positive means of isolation. Maintenance and repairs can be carried out on withdrawn units, even with the power on.
- Fully withdrawable units provide a visible confirmation of isolation of the circuit.

Use of Busplugs

Busplugs provide an "Off-load" disconnectable link between the busbar system and the short circuit protective device (SCPD.)

Busplugs are normally mounted on a tray or mounting panel containing all the protective, switching and control equipment for a motor drive or feeder circuit. The composite arrangement is then easily and safely "demountable" when the switchboard is alive. Withdrawable units (where both the line and power connections are unpluggable) would also use a busplug or similar device on the load side connections.

Caution

Busplugs should not be used to connect non-protective devices (e.g. Isolators and non-auto circuit breakers) unless that section of the supply is protected by a SCPD. Busplugs should not be installed on the line side of many main switches as the fault current and duration would exceed the capability of the busplug to carry the load. They should not be used as part of the main busbar circuit.

Descriptive

Construction

Housing

These are injection moulded from 25% glass filled nylon. The material is self extinguishing and listed as UL 94V-O.

Each phase is fully segregated. The deep cavities in the casing between each pole permits a separate opening into the busbar chamber and complete segregation between the dropper busbars.

Contacts

Contacts are press formed from electrolytic copper coil strip. The one piece design means that the current path is constricted only at the contact end. (Centre pivoted contact arrangements have constricted current paths at both ends of the contact.)

The contact area is curved in both directions to ensure a consistent point of contact to the busbars.

Contact pressure is maintained by a steel spring.

Contacts are silver plated. (Nickel plating can be provided when the plugs are installed in sulphurous or polluted atmospheres.)

Separate Contacts

Use

The UNI-PLUG contact sets can be used for earthing on withdrawable cells in Motor Control Centres and contacts in electrowinning cells etc.

A stainless steel plate is available to clamp the contact spring in place depending on the method of installation.

Each contact is rated at 250A.

They are available in 'standard' and 'extended' styles. (Refer to page 8)

Descriptive

Ordering Information/Weights

	Rating	Poles	Cat No.	Connection Type	Weight (kg)
Busplugs	63A	1	UP1063E	EXTERNAL	0.14
		3	UP3063I	INTERNAL	0.26
		3	UP3063E	EXTERNAL	0.35
		4	UP4063I	INTERNAL	0.47
		4	UP4063E	EXTERNAL	0.45
		250A	1	UP1250E	EXTERNAL
	3		UP3250I	INTERNAL	0.26
	3		UP3250E	EXTERNAL	0.35
	400A	4	UP4250I	INTERNAL	0.47
		4	UP4250E	EXTERNAL	0.56
		400A	1	UP1400E	EXTERNAL
	3		UP3400I	INTERNAL	0.40
	3		UP3400E	EXTERNAL	0.45
	4		UP4400I	INTERNAL	0.55
800A	4	UP4400E	EXTERNAL	0.63	
	3	UP3800	EXTERNAL	1.45	
4		UP4800	EXTERNAL	1.94	
	1000A	3	UP31000	EXTERNAL	2.10
4		UP41000	EXTERNAL	2.80	
1200A	3	UP31200	EXTERNAL	2.50	
	4	UP41200	EXTERNAL	3.34	
Contacts	250A		C250 C250E C250P	CONTACT/SPRING CONTACT/SPRING STAINLESS STEEL PLATE	

Technical

Standards and Type-Tests

AS/NZS61439.1: 2016 (IEC 61439-1)

Low Voltage Switchgear and Controlgear Assemblies.

Numerous tests have been carried out as prescribed in clause 8 of the standard.

These tests include:

- Temperature rise.
- Dielectric properties.
- Clearance and creepage distances.
- Short circuit strength to 80kA in conjunction with HRC fuses and suitably rated moulded case circuit breakers for both motor circuits and feeders.
- Mechanical endurance of the contacts.
- The busplugs have also been included in numerous fault containment tests (to appendix ZD) up to 65kA prospective for motor drives and feeder circuits with fuses and moulded case circuit breakers.

Underwritten Laboratories UL LLC







The plastic housings comply with the relevant clauses of UL 1741, UL 508C, UL 746A and UL 94.

Material Details

The busplug housings are injection moulded from PA66 (Nylon type 6.6) with 25% glass fibre reinforcement.











Typical Properties	Units	Test Method	Values
Mechanical Properties			
Tensile Yield Strength	MPa	ISO 527-2/1A	140
Flexural Strength	MPa	ISO 178	200
Flexural Modules	MPa	ISO 178	9200
Notched IZOD Impact Strength @ +23°C	kJ/m ²	ISO 180/1A	7.0
Physical Properties			
Density	g/cm ³	ISO1183	1.61
Molding Shrinkage	%		0.3
Thermal Properties			
HDT AT LOAD 1.8Mpa	°C	ISO 75-2	238
Melting Point (DSC)	°C	ISO 3146	250
Equivalent UL94, 1.6mm	Classification	-	V 0
Glow Wire, 850oC	Classification	AS/NZS 60695	Pass 960°C
Electrical Properties			
Point Tracking Index (PTI)	Classification	-	Pass 175°C

Technical

<h2>Ratings</h2> <p>Busplugs connect to 6.35mm bars as standard.</p> <p>Busplugs for 10mm bars are available if specifically ordered. Add 10mm after Cat. No. e.g. UP3250I (10mm)</p> <p>Busplugs intended for use on 10mm wide bars are marked – “FOR USE ON 10mm BUSBARS ONLY”.</p>		
	UP1063E	UP1250E
		
	UP3063I	UP3250E
		
	UP4063E	UP4250I
	63A (2)	250A (2)
	UP1063 UP3663 UP4063	UP1250 UP3250 UP4250
Rated Thermal Current (A)	63	250
Rated Operational Voltage U_e (VAC)	1000	1000
Rated Insulation Voltage U_i (VAC)	1000	1000
Rated Impulse Withstand Voltage U_{imp} (kV)	20 (5)	
Short-Circuit Current (With Back-Up HRC Fuses) (kA)	80	
Short-Circuit Current (With Back-Up MCCB) (kA)	80	
Frequency (Hz)	40-60	
Permissible Ambient Temperature (°C)	-20 to +70	
Contacts per Pole	1	1
Contact Resistance Silver ($\mu\Omega$)	59 (4)	59 (4)

1. Test certificates for temperature rise and short-circuit strength (in conjunction with HRC fuses and MCCB's are available on request.
2. Busplugs available as internal (I) or external connection (E).
3. Busplugs 800-1200A can be made for 1000V if specified.
4. Average resistance per pole (at 10A DC).
5. Requires special order for 800-1200A busplugs.

Technical

			
UP1400E	UP1800		
			
UP5400E	UP3800	UP31000	UP31200
			
UP4400I	UP4800		
400A (2)	800A	1000A	1200A
UP1400 UP3400 UP4400	UP1800 UP3800 UP4800	UP3100 UP4100	UP31200 UP41200
400	800	1000	1200
1000	800 (3)	800 (3)	800 (3)
1000	800 (3)	800 (3)	800 (3)
2	4	5	61
34 (4)	19 (4)	26	23

Connection

Conductors

The busplugs may be connected to the SCPD by means of cable, or solid or flexible busbar.

The current rating of the conductors should be at least the FLC of the motor, or for a feeder circuit, the rating of the switch.

For currents above 500A, the conductors must also be sized to be able to carry the heating produced at the terminals of the SCPD. The following sectional areas are the minimum recommended for copper.

500A	180mm ²
630A	240mm ²
800A	300mm ²
1000A	600mm ²
1200A	800mm ²

The conductors may also be rated on the basis of the reduced short circuit stresses that would occur on the load side of the SCPD provided that the connections are made in accordance with clause 8.6.4 of AS/NZS61439.1:2016.

Internal Connections

Torque Settings	M8 12Nm
Max cable lug width	19mm
Max busbar size	25.4x6.35m



External Connections

	M8		M10	
	Steel Nut	Topped	Steel Nut	Tapped
Torque Settings	19N/m	12N/m	27N/m	

Connection

Barriers

3 and 4 Pole Busplugs 250 and 400A Busplugs.

These are supplied standard on 250 and 400A busplugs. They are a barrier to the inside termination to the contact/s. The 250A barrier has a cut-out for 25x3mm bars, and the 400A for 25x6.35mm bars.

These may be substituted for Insulation Cones (to be ordered separately - see page 9) or they may be discarded if segregation for the purpose of insulation or ionised gasses entering the busbar zone through the busplug is not an issue.



Single Pole Busplugs 63 - 400A

Barriers to prevent ionized gases entering the busbar zone through the busplug are not intended to be removed.



Connection

Insulation Cones

Use

These INSULATION CONES are designed for internally connected UNI-PLUGS rated 63 to 250 AMPS. They are recommended for use where:

- a) The connections are required to be shrouded to at least IP20.
- b) The connection between the busplug and short circuit protective device must be fully insulated to comply with clause 8.6.4 of AS/NZS 61439.1:2016
- c) The busplug is installed in an enclosure designed to contain the effects of an internal arcing fault.

Installation

The cone should be cut by means of a knife to provide an opening to suit the conductor. The hole is normally at the end of the cone, but any other position may be used.

The cone will accommodate cables up to 11mm external diameter (50mm²) and rectangular bars 20 x 6mm.

Material

The cones are injection moulded from pliable, flame retarded PVC.

CAT. No.

UPC (set of red, white and blue unless otherwise specified.)

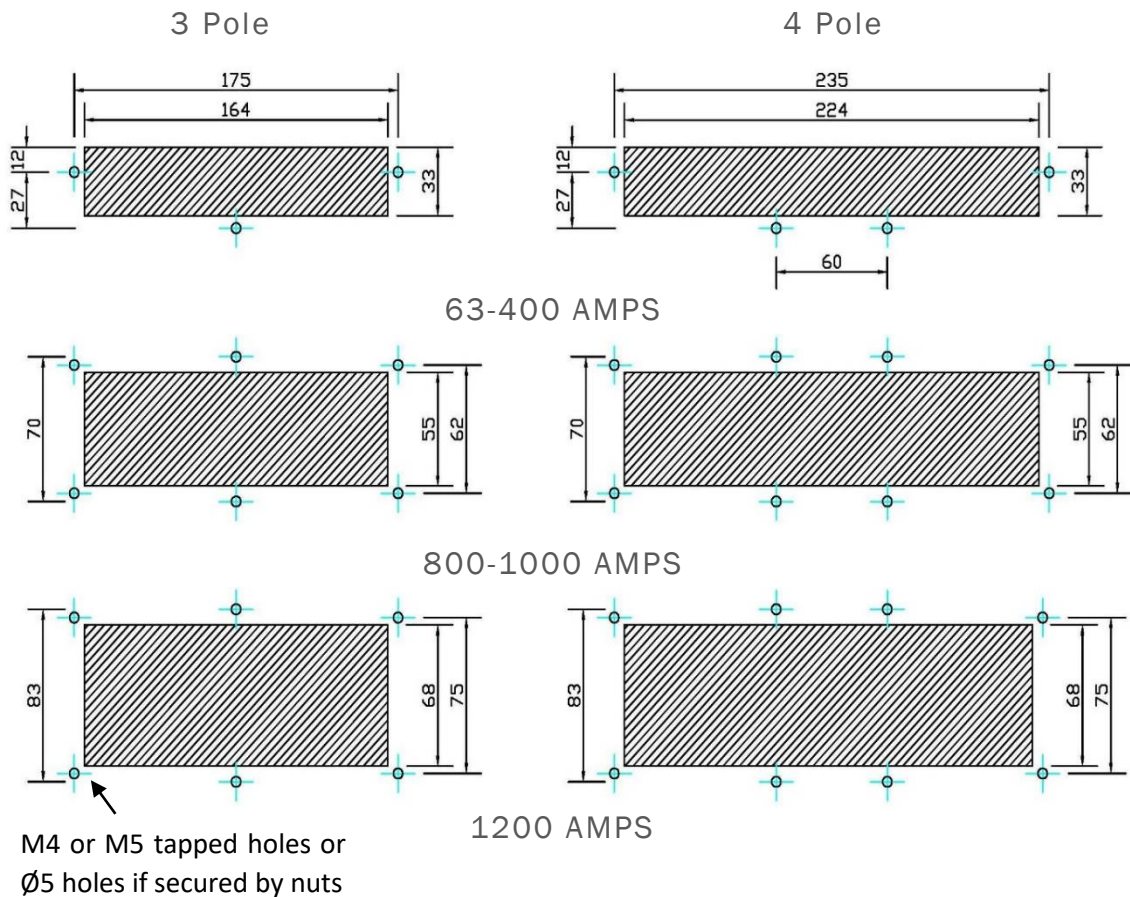
Colours

Standard colours are red, white, yellow, blue and black.

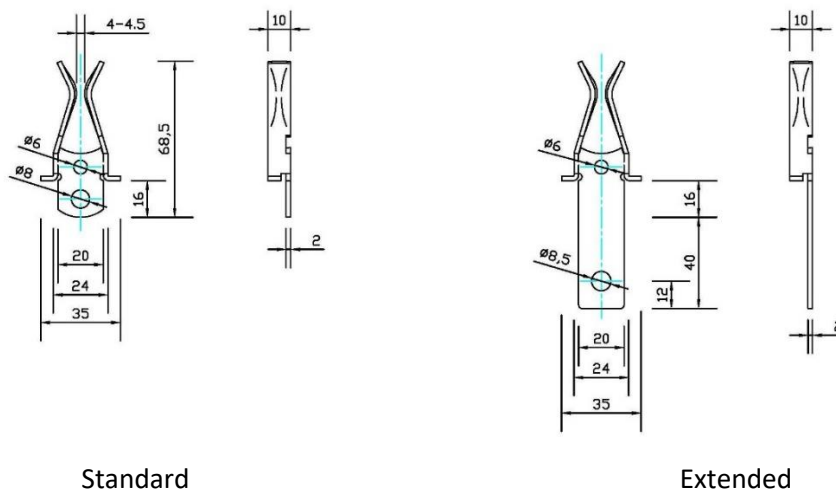


Dimensions

Panel Cut-Outs

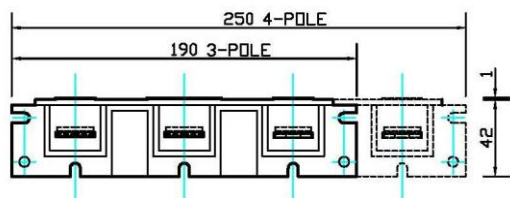


Separate Contacts

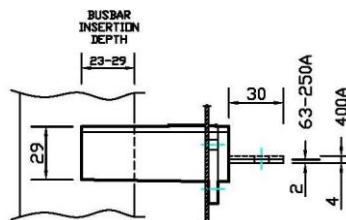


Dimensions

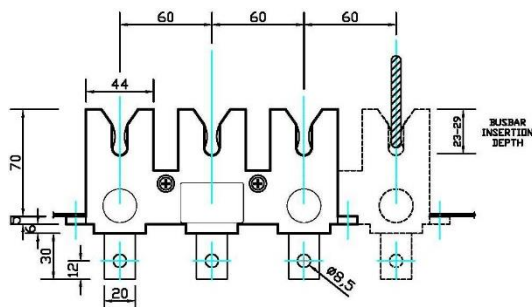
3 & 4 Poles



View from Inside Tray



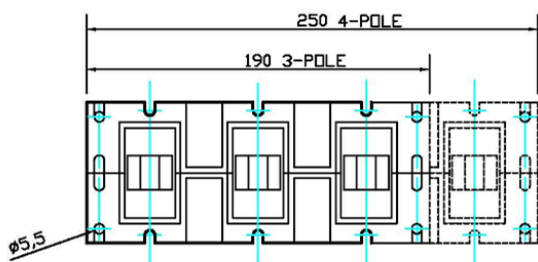
Elevation



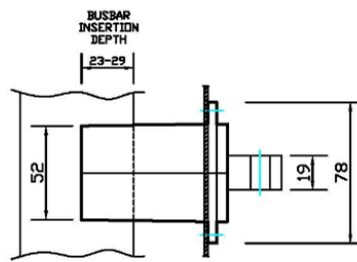
Plan

Internally connected busplugs do not have connection tags

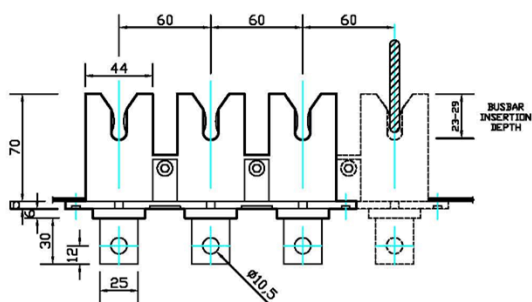
63 - 400 AMPS



View from Inside Tray



Elevation

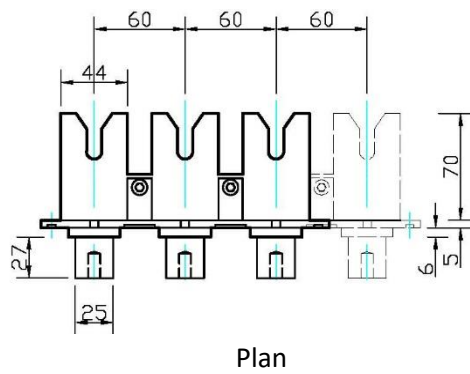
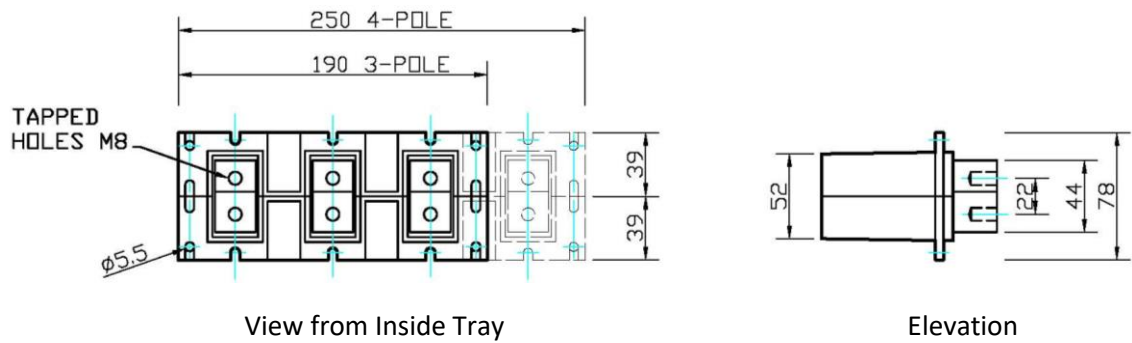


Plan

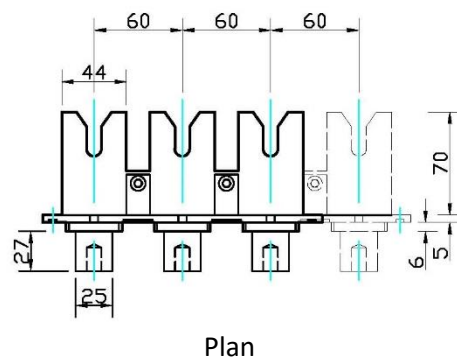
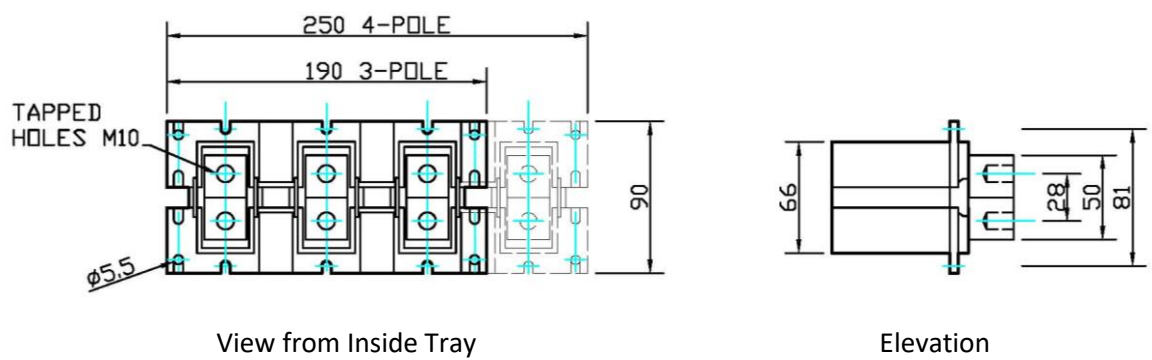
800 AMPS

Dimensions

3 & 4 Poles



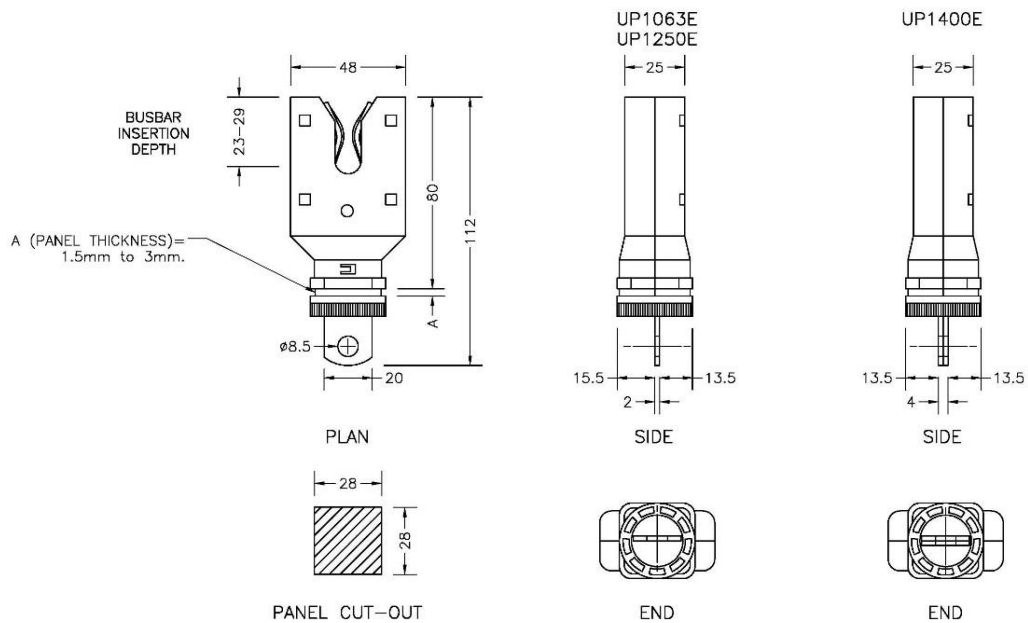
1000 AMPS



1200 AMPS

Dimensions

1 Pole



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