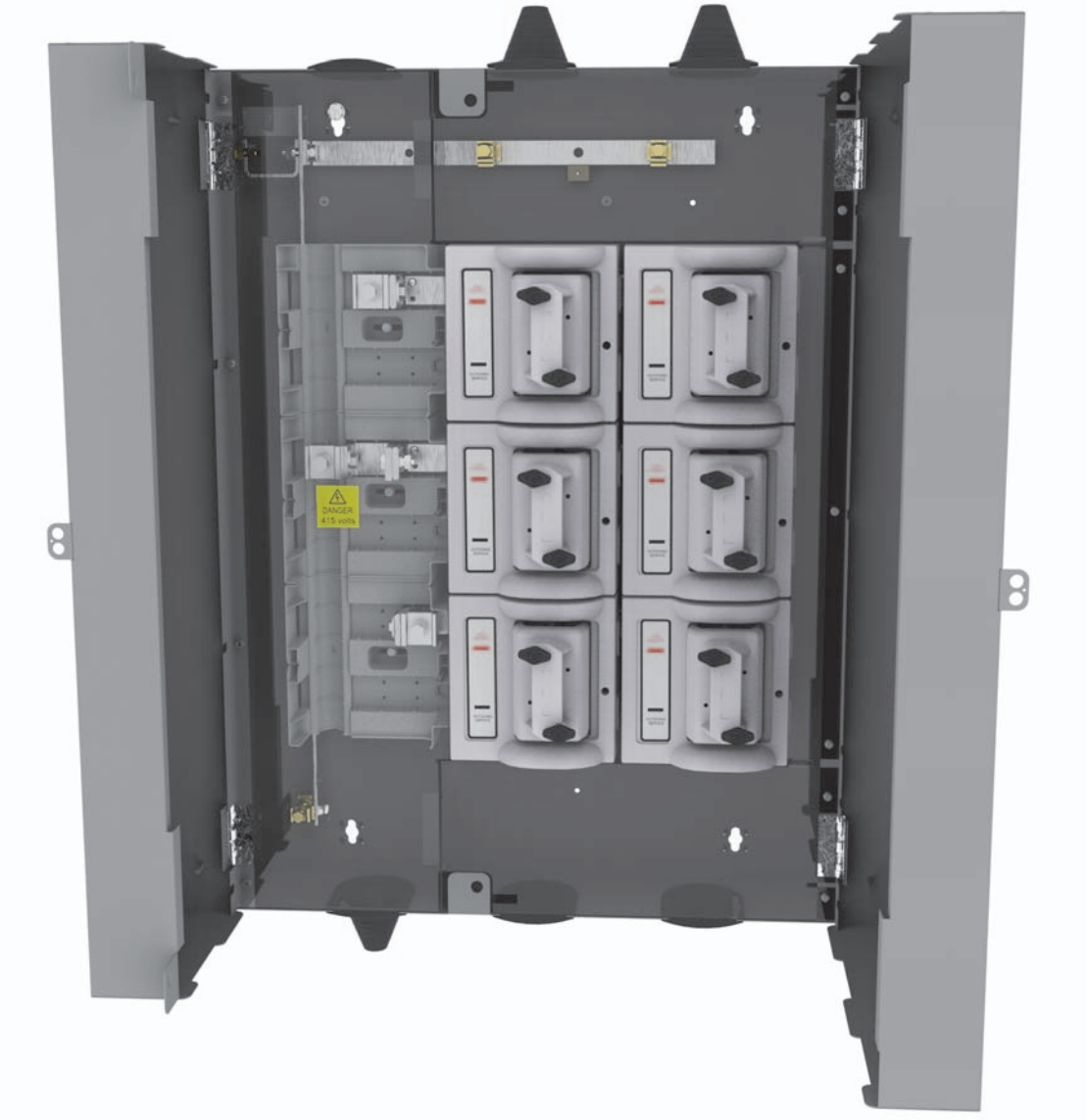
LV Sub Mains Distribution Board (SMDB)

Installation Manual



engineering intelligent solutions

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1. Validity

This manual was produced in March 2021 and applies to the LV SMDB range.

Due to Lucy Electric's policy of continuous research and development, Lucy Electric reserves the right to change the design and specification of its products without prior notice or liability.

Issue	Date	Author	Ammendment
1	3/11/21	P.Morriss	First Issue

2. Document Symbols

The symbols shown below may be found throughout this document, indicating hazard levels depending on the situation.
All symbols below are to **ISO 3864-2**.

DANGER: failure to follow this instruction **will result** in death or serious injury.

WARNING: failure to follow this instruction **may result** in death or serious injury.

CAUTION: failure to follow this instruction **may result** in injury.

INFORMATION: Pay special attention to this instruction

3. Safety

⚠ CAUTION

Installers of this equipment must have experience and expertise with LV equipment.
To minimise the risk of personal injury or equipment damage, this manual must be read carefully prior to installation.

⚠ CAUTION

This manual MUST be readily available whenever the unit is handled or during installation.
A copy will be found in every new SMDB procured and must be carefully read and complied with.

⚠ CAUTION

If this equipment has incurred damage prior to installation, contact the manufacturer and/or supplier immediately.

- Before commencing any work, ensure that the necessary safety precautions, risk assessments and safety documents are in place.
- Installation must be carried out observing the appropriate Operational Safety Rules.

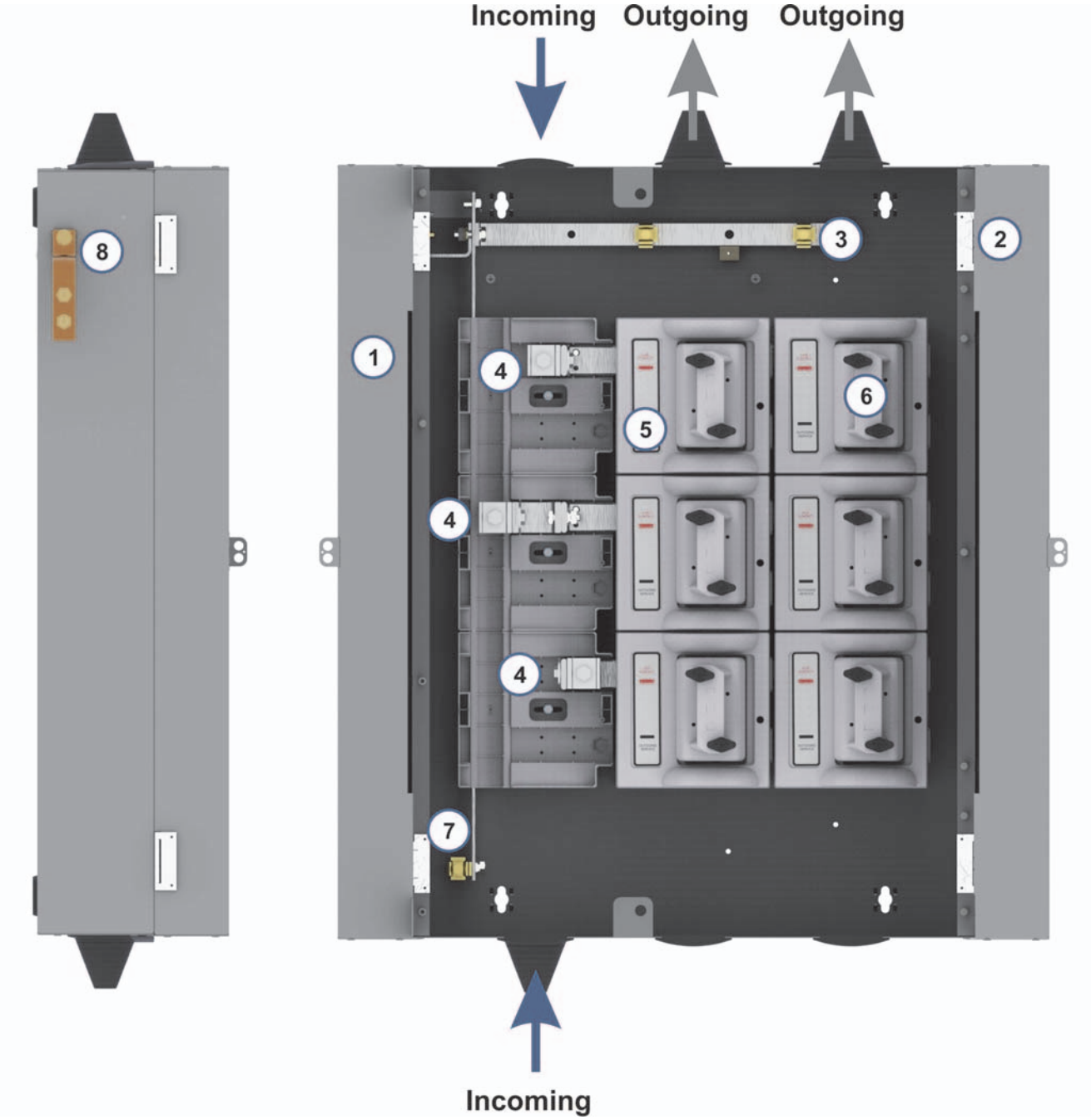
In all instances risk assessments should be undertaken prior to undertaking any new activity where potential hazards are concerned. This is particularly important in order to identify the necessity for specific PPE, that may be required and that cannot be avoided even with safe systems of work in place.

Appropriate PPE must be worn when performing any form of switching operation in order to comply with company safety procedures.

3.1 Distribution rules

This document is not a commercial document, it is strictly a technical document provided by Lucy Electric Technical Department for installation purposes only.

4. Product Layout



Key:

1 : LH Door
2 : RH Door
3 : Outgoing Earth Connectors
4 : Incoming Connectors
5 : Live Connector Shrouds
6 : Fuse Handles
7 : Incoming Earth Connector
8 : Earth Point

5. Technical Data

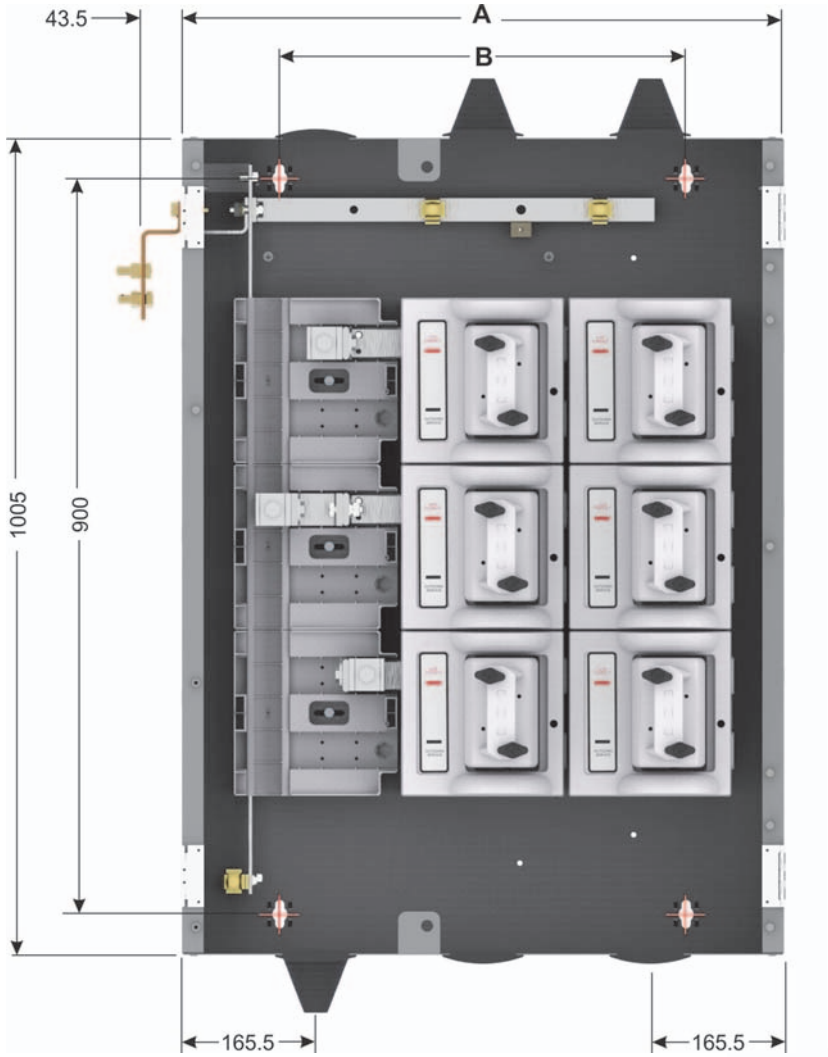
General		
Incoming Supply		630A max
Busbar Rating		630A nominal
Supply Voltage		415V a.c.
Frequency		50Hz
Rated Insulation Voltage		690V a.c.
Operator Protection	All Shrouds And Fuse Handles In Place	IPXXB
	Operational Condition, Both Doors Closed	IP3X
Recommended Torque for Neutral and Earth Bar Connecting Set Screws (M10)		45Nm
Cable Capacities (maximum)	Incoming	1 x 300mm² 4-core Waveform
	Outgoing	1 x 185mm² 4-core Waveform

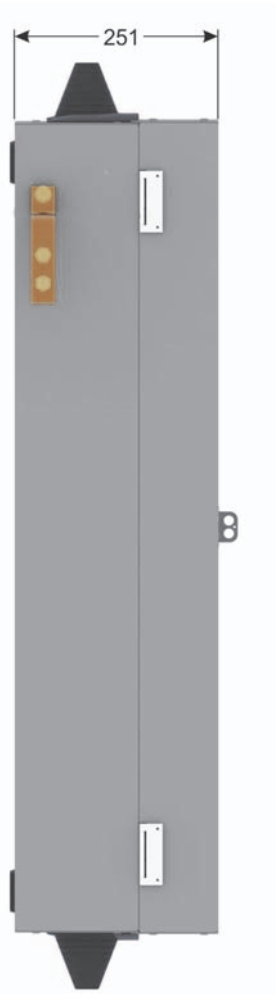
5.1 Standards

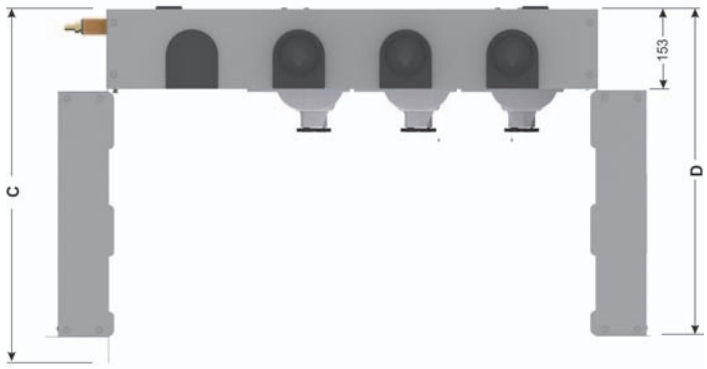
SMDB complies with the following standards:

	Third party tested to BS EN 61439-5
IP Rating	BS EN 60529
Incoming/Outgoing Fuses	BS 88 J Type

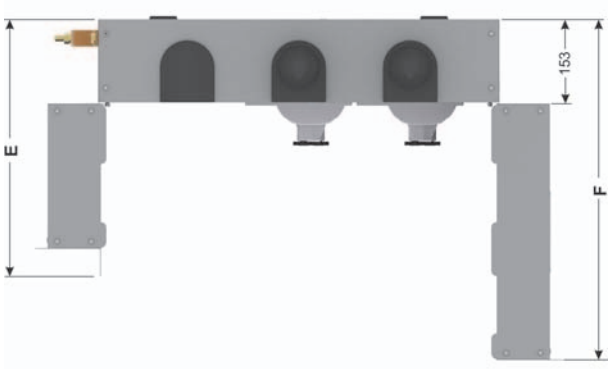
5.2 Dimensions & weights







Symmetric Doors (1, 3 & 5 Way)



Asymmetric Doors (2, 4 & 6 Way)

	Dimensions In mm						Gross Weight (kg)	Stripped Down Weight* (kg)
		Horizontal fixing Centres	Symmetric Doors		Asymmetric Doors			
Configuration	A	B	C	D	E	F		
1 - Way	536	296	469	424	-	-	-	-
2 - Way	750	498	-	-	469	624	-	-
3 - Way	950	674	656	624	-	-	76.6	-
4 - Way	1150	908	-	-	674	829	-	-
5 - Way	1360	1113	879	829	-	-	115	
6 - Way	1560	1318	-	-	879	1034	-	-

* Stripped down weight means all fuse handles, screens, live connector shrouds, connectors, ancillary bolt packs and both doors removed.

6. Installation Procedure

6.1 Procedure for preparing a Lucy Electric SMDB for manual handling and installation.

⚠ CAUTION

Safety notice: This equipment must be installed by competent personnel in full conformity with the latest edition of local and National Wiring Regulations currently in force and the Electricity at Work Regulations. Full PPE must be worn at all times. Note that this operation necessarily involves the intervention of two persons in order to comply with Health and Safety Manual Handling requirements.

⚠ WARNING

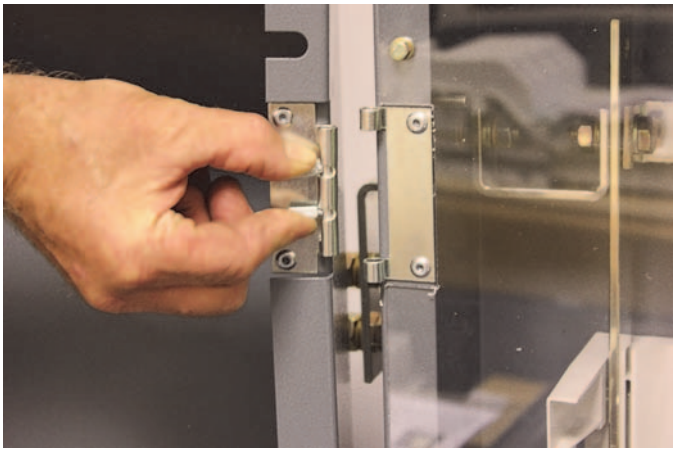
All the actions described in this manual MUST be carried out with the installation proved 'dead'.

- All work MUST be carried out in accordance with current issued Company Safety Rules.
- Make sure that the site is safe and work in accordance with your on-site risk assessment.
- If in doubt about any aspect of your work, contact your supervisor.
- When installing an SMDB the unit needs to be a minimum of 400mm from floor level (with the duct lining up with the cable entry). Where the duct does not line up with the cable entry, this height will need to be increased significantly. The actual height will be dependent upon the size of the cable and the amount of misalignment. The maximum bending radius of 12x the cable diameter must not be exceeded.
- "Do not under any circumstances disturb factory made bolted connections in the busbar circuits. They have been set to a pre-determined torque and the circuit resistivity recorded in the cabinet birth certificate. Subsequent intervention at these points may invalidate the product warranty.
- Any installer made M10 nut and bolt connection (ie. neutral connector brackets) must be torqued to 45Nm.

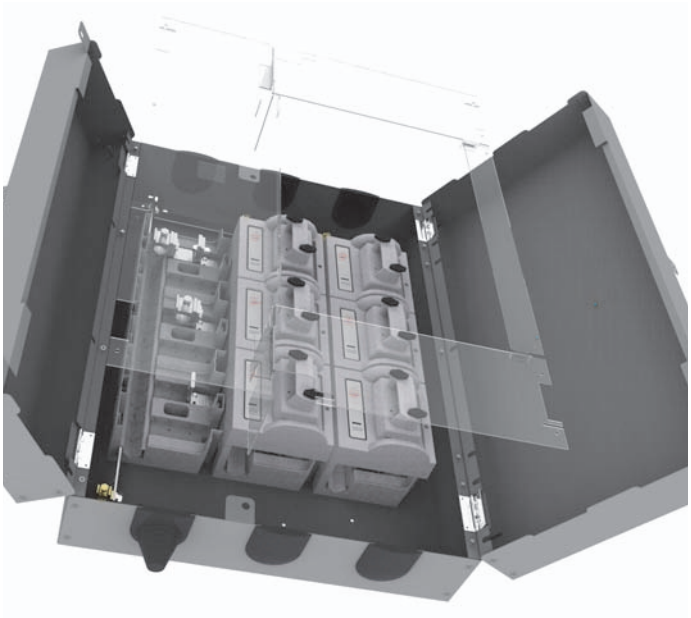
6.1.1 Procedure to strip down the SMDB (before mounting)

1 : Remove the nut and bolt which maintain the doors in the closed position and disconnect the door earth equipotential conductors which are secured by M6 nuts.

2 : With the doors opened and the weight relieved from the hinges, pinch the two hinge spring pins and lift the doors clear.



3 : Carefully remove all the clear covers from inside the SMDB by pulling on the black plastic fasteners. Take out the 'J' type fuse handles and loose stowed components including cable connectors and assorted fixings. For removal of the fuse handles, see section **"6.6 Fuse Handle"**.

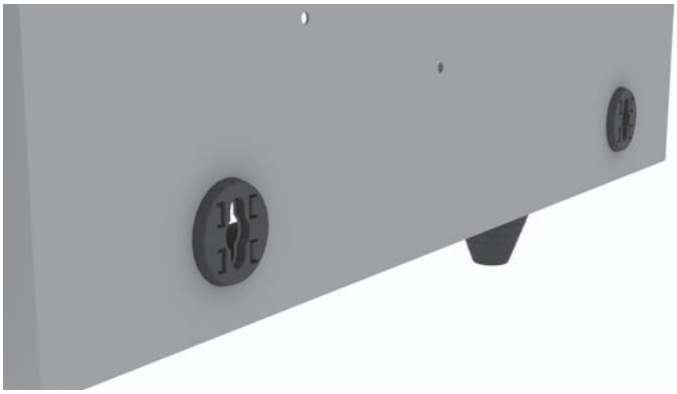


4 : Remove all the grey connector cover mouldings by slackening the single cross headed screws.

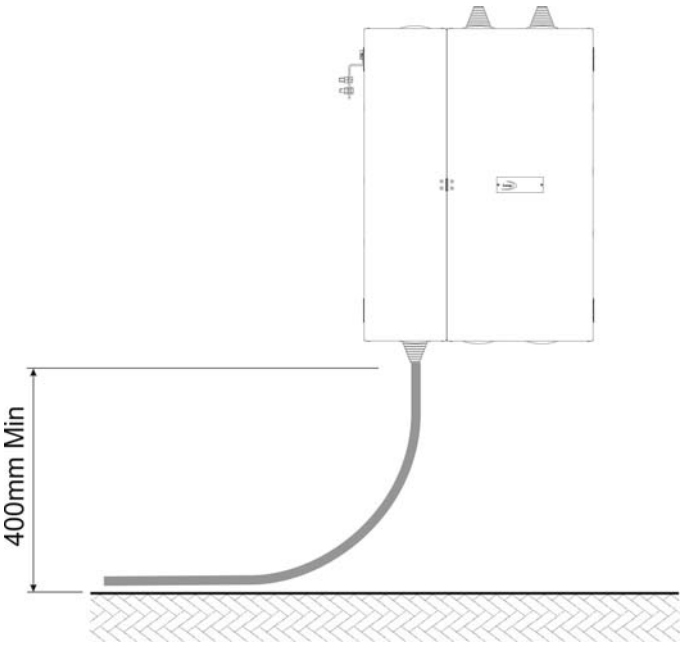
6.2 Procedure to mount the SMDB

1 : Ensure the unit is attached to a non-combustible surface that is flat and capable of supporting the weight of the SMDB when fully cabled.

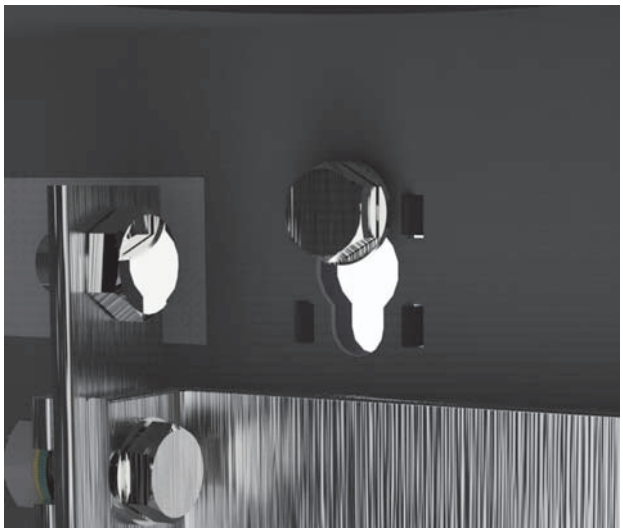
Note: The raised mounting pads on the rear of the SMDB can accommodate slight surface irregularities up to about 5mm.



2 : When determining the height of the unit, take into account the required cable bend radius for the section of cable being used.



3 : Mark then drill the mounting surface with an appropriately sized drill bit such that a Rawlplug insert for an M8 or M10 stud or setscrew can be inserted. If using a stud, it should protrude approximately 25mm from the mounting surface. A flat washer should be under the bolt head (or nut if using a stud) to spread the clamping force.



6.2.1 Cabinet External Earthing

Earth the SMDB unit externally using the external earth bar on the side of the unit. Seal the earth fixings as required.

6.3 Cabling preparation for the SMDB

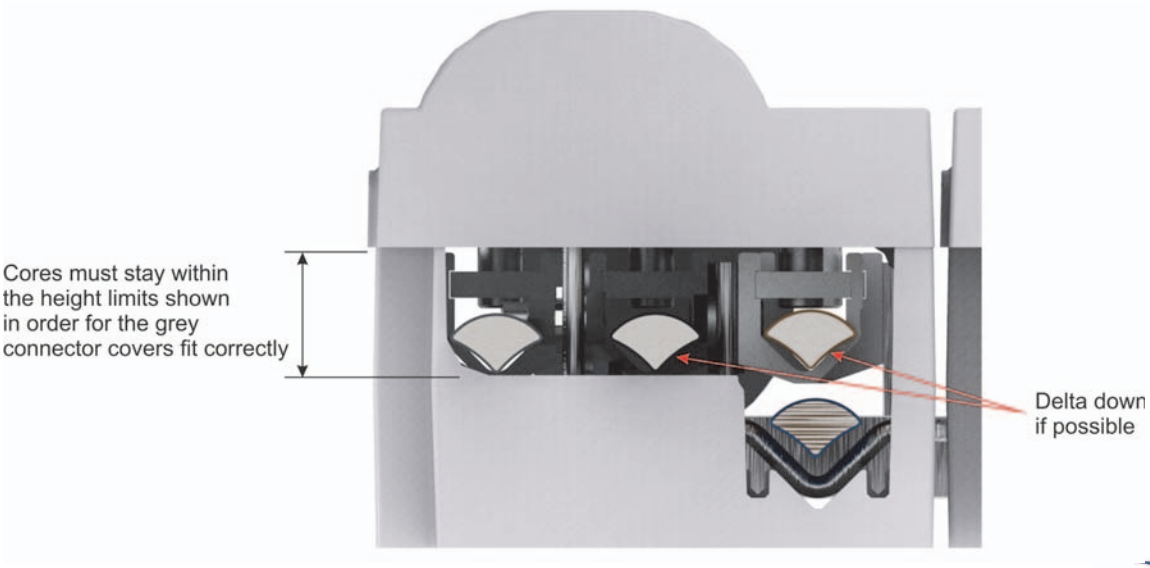
6.3.1 Presentation General Cabling Notes

Range presentation

- The range is formed of left-hand mains cable entry cabinets with two substantially similar sub-types:
  - -Direct incomer versions
  - -Fused incomer versions
- The Mains cable can enter the cabinet from either the bottom or the top. However, all service cables exiting the cabinet can only do so from the top.
- A PME link is provided in the 4 Core retrofit kit and all 4 Core factory made variants.
- All UT4F and brass BTCNE connectors are supplied with the cabinets.
- Maximum incoming cable size: 300mm² 4 Core waveform.
- Maximum outgoing cable size: 185mm² 4 Core waveform.

INFORMATION

- Always trim to size and place the PVC grommets over the cable ends before dressing the cores.
- There is a choice of connector mounting positions for each of the three phases allowing different conductor routes to give the optimum result for any given cable lay.
- Take care to ensure that clearance is maintained between the cores and the fuse stalks in the fuse ways.
- When a phase connector is situated either side of a fuse spill, special attention should be taken to ensure that the core placed within it is in the delta down orientation. This is especially relevant when using 300mm² cable as the extended part of the shear off stub that protrudes from the connector body is liable to clash with the underside of the grey connector cover moulding.
- On 4C SNE installations, always commence by positioning the neutral conductor as flatly as possible along the length of its channel. This is to ensure that there is clearance between it and any phase conductors situated above it.
- Any crossing of cores must take place as close as possible to the cable crutch to avoid a build-up of cores which would prevent the lowermost grey connector shroud from locating properly.
- Only commence the shearing of the connector bolt heads once all the cores have been cut to length and dressed. This avoids the risk of putting any of the connections under stress due to continued manipulation of the other cores.
- It is recommend.ed that both quick-release doors and all loose components are removed from the cabinets prior to manipulation.
- Ensure all cores lay flat to ensure the grey connector covers if correctly, see below



6.3.2 Cable preparation (all variants)

1 : Follow official Company procedures with respect to cable preparation and use only Company approved tools.

2 : Using a sharp knife, cut off the end of the PVC grommets to the same diameter as the cable then feed over the unprepared cable such that it fits snugly about 1.2 metres from the end. Following a process of gradually coaxing the cable into position observing the correct bend radius for the chosen section, mark on the cable outer sheath the point up to which it needs to be removed, usually about 30 to 40mm inside the cabinet. Pull the cable away from the cabinet, remove the outer sheath and prepare according to recommended Company guidelines.

3 : Strip out all redundant cable tapes and wadding then straighten, consolidate and bind the copper stranded neutral earth conductors with earth tape. Bunch the neutral earth conductors on the side that faces the neutral earth connector.

4 : Take out any twist in the solid aluminium cores with a core twister such that they are substantially straight.

5 : Perform a preliminary assessment of the routes the individual conductors will have to take and plan accordingly to avoid unnecessary tight bends which are likely to induce strain on the assembly.

6.4 Cable Installation 4 Core SNE Configuration

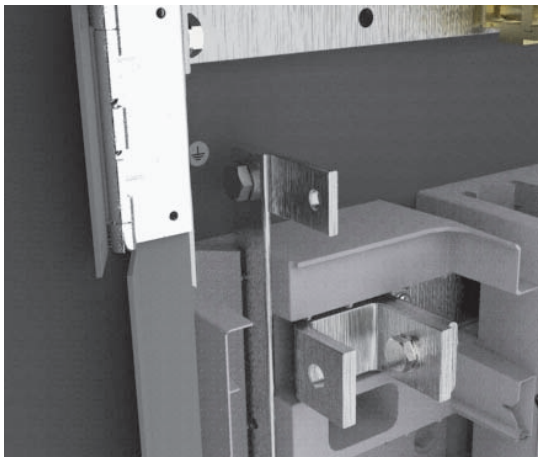
If the SMDB unit has not been setup for 4 core installation, a kit can be fitted by following the procedure **LIP10-042 SMDB 3- 4 Core Kit Instructions.**

6.4.1 Main incomer installation

Prepare the cable as described above.

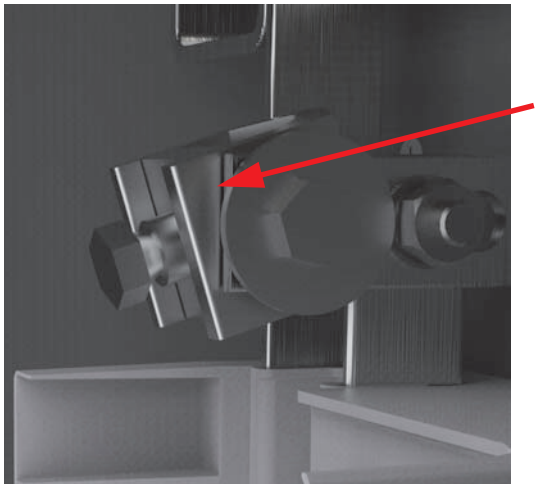
1 : Terminate the earth core in the brass earth terminal.

2 : The fourth (neutral) core must be straightened dressed and terminated prior to the phase cores as it runs under them in the neutral channel situated on the outboard edge of the cabinet. Attach the short stand-off length of copper using the M10 fixings supplied using the M10 hole. The stand-off must be placed on the inboard edge of the main neutral busbar as shown in the vertical position. **This connection must be tightened to 45Nm.**



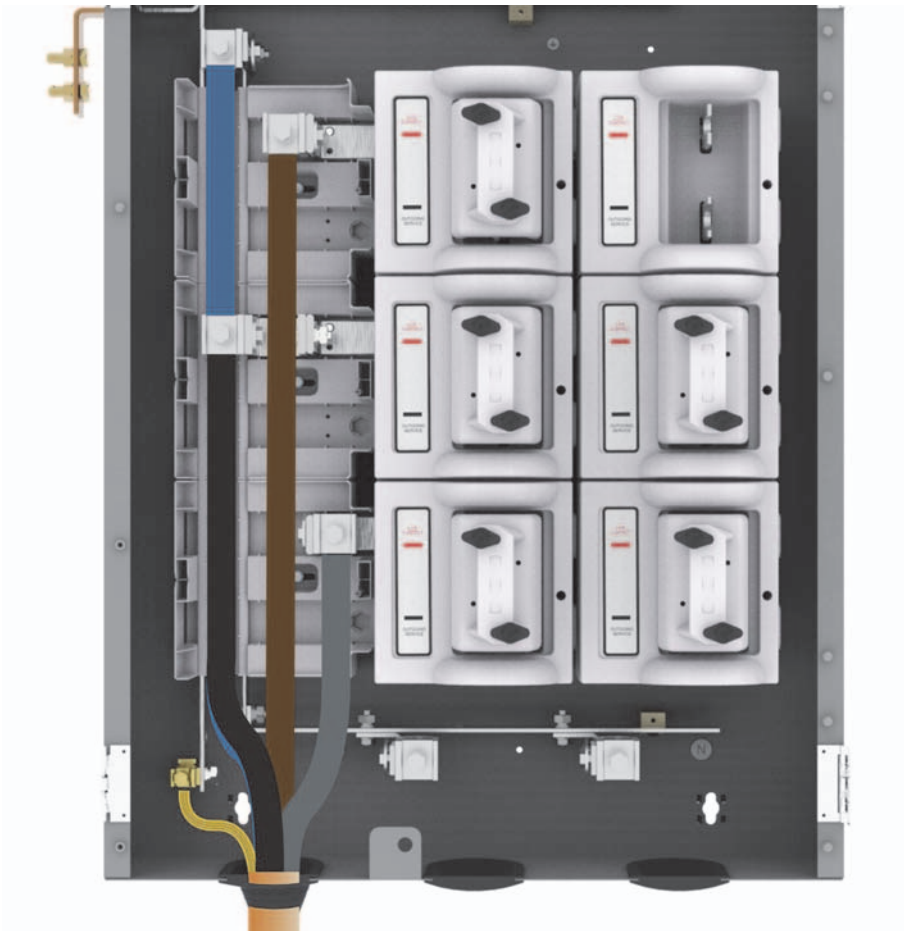
3 : Attach the aluminium neutral connector to the neutral stand-off and loosely assemble the shear bolt and Belleville washer with the raised dome of the washer facing the shear-bolt head.

4 : Orientate the neutral connector if necessary so that the N conductor lays perfectly flatly in the 'V' and shear off the conductor retaining bolt followed by the side connector body bolt.

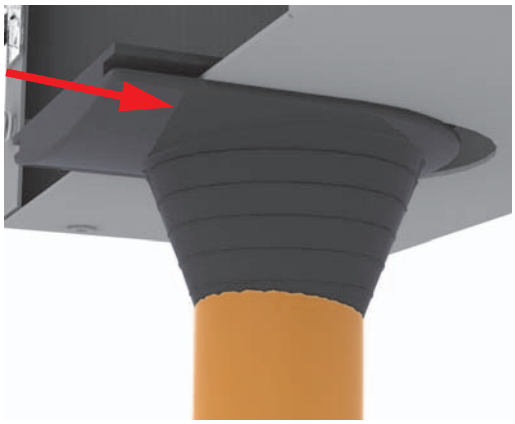


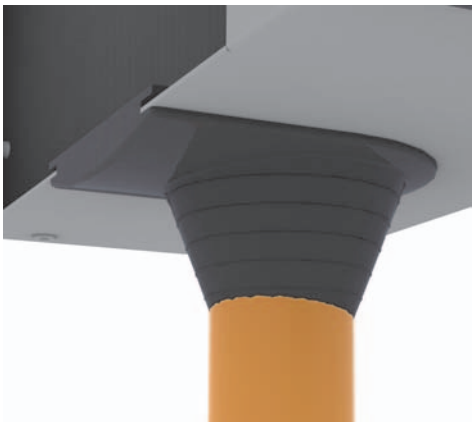
Note angle of the neutral connector to ensure the N conductor lays flat.

5 : Proceed to terminate the phase cores. An example configuration is shown below. Due to the lay of the cores on any one installation, this exact situation may not be achievable. The 'U' shaped lateral extension effectively enables a flexible 'third' position and is provided for this purpose. It is best used in either the Brown or Black phase position.



6 : Check that the groove in the grommet locates correctly in the ‘U’ slot in the cabinet when the cable is in it’s final position.



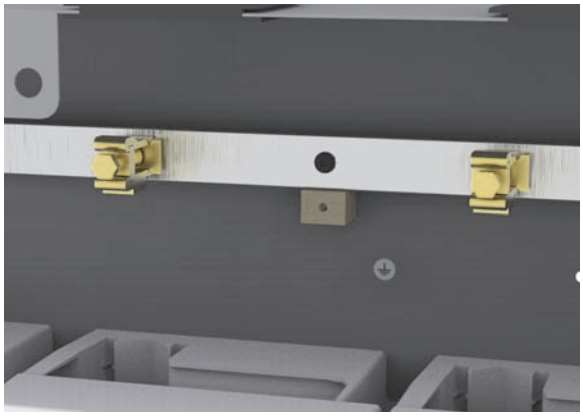


PME Link

⚠ CAUTION **It is vital to correctly configure the PME link according to the type of installation. If the PME link is required to provide the transition point between three and four core cables, the link should be installed. It is important to correctly torque the M10 fixings to 45Nm and ascertain that the PME link sticker is clearly displayed in the base of the cabinet in the immediate vicinity of the link.**

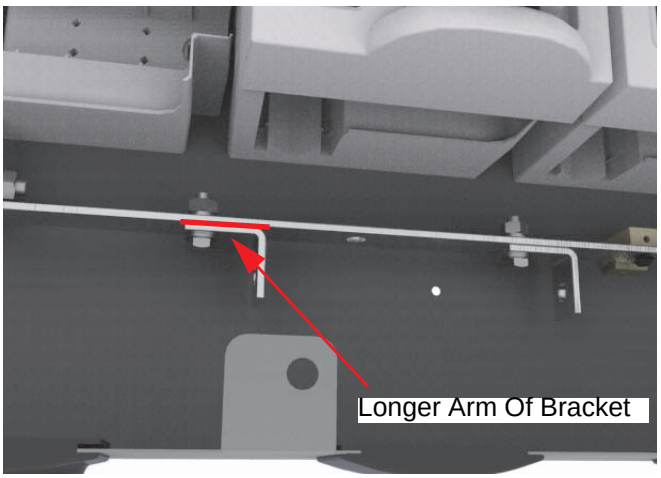
6.4.2 Outgoing cable installation

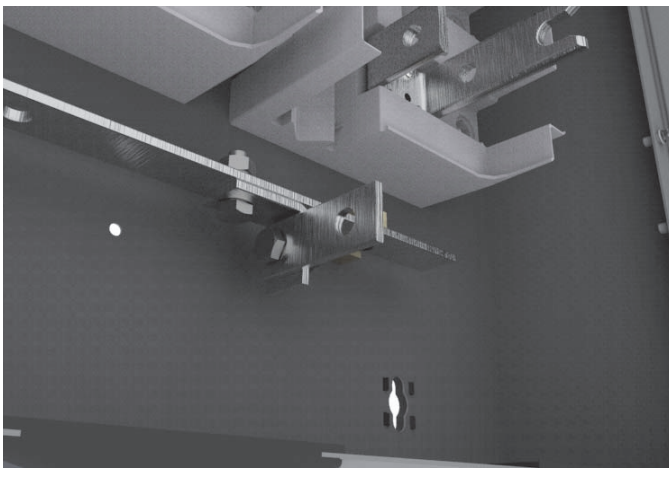
1 : Terminate the earth core in the brass earth terminal.



2 : Attach the angled brackets to the bottom neutral busbar using the M10 set screw, nut, flat and spring washers. **Torque - 45Nm**.
Note: Ensure the bracket is on the correct side of the neutral busbar and in contact with it along its longer arm.

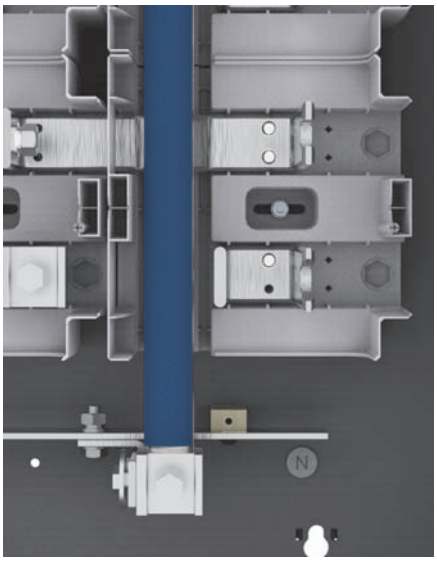
3 : Attach the copper stand-offs to the angled brackets using the M10 set screw, nut, flat and spring washers. **Torque - 45Nm**. Ensure that they are orientated vertically and that the larger diameter hole is left free for the connector.





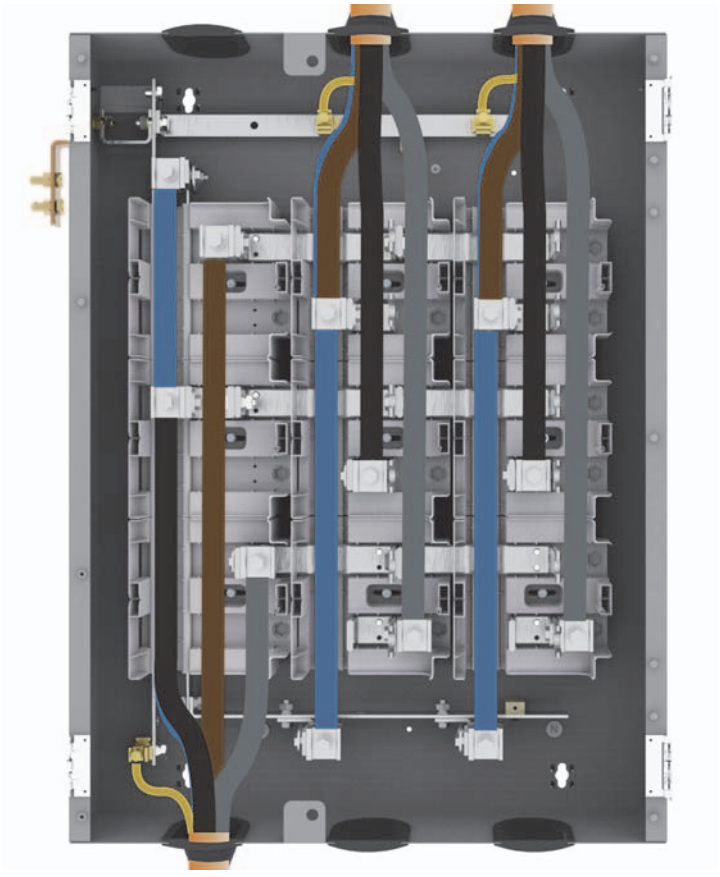
4 : The fourth (neutral) core must be straightened, dressed and terminated prior to the phase cores as it runs under them in the neutral channel situated to the left hand side of each fuse way run.

5 : After the neutral core has been dressed and set, shear off the core retention bolt followed by the connector side shear off attachment bolt.

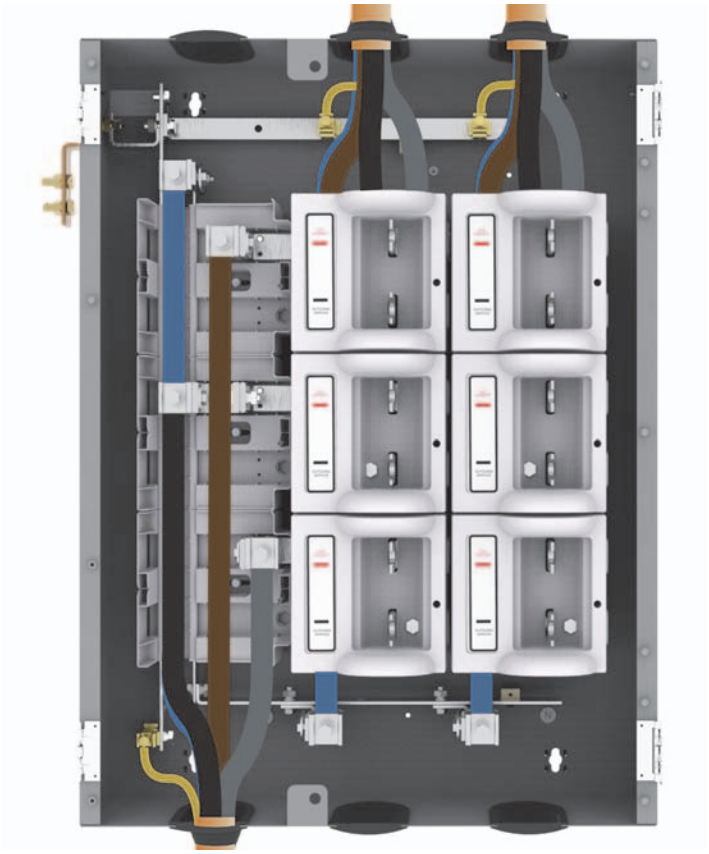


6 : Proceed to terminate the phase cores. An example configuration is shown below. Due to the lay of the cores on any one installation, this exact situation may not be achievable. The 'U' shaped lateral extension effectively enables a flexible 'third' position and is provided for this purpose. It is best used in either the Brown or Black phase position.

7 : After the phase cores have been dressed and set, shear off the core retention bolt followed by the connector side shear off attachment bolt of each connector.



8 : When all the cables have been terminated and the appropriate cable identifications have been added, proceed to conduct final polarity and continuity tests. With these satisfactorily completed, all the covers can be refitted.



9 : Check that the groove in the grommet locates correctly in the ‘U’ slot in the cabinet when the cable is in it’s final position.

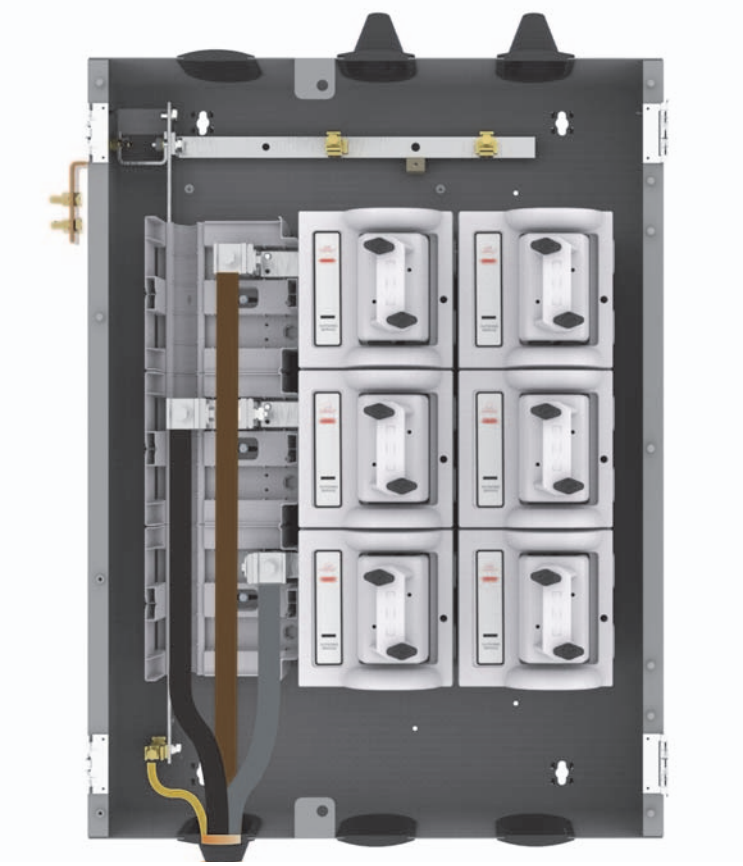
6.5 Cable Installation 3 Core CNE Configuration

6.5.1 Main incomer installation

Prepare the cable as described above.

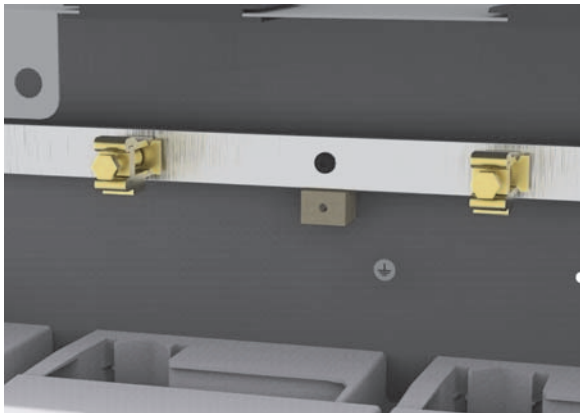
1 : Terminate the neutral earth conductor in the brass terminal.

2 : Proceed to terminate the phase cores. An example configuration is shown below. Due to the lay of the cores on any one installation, this exact situation may not be achievable. The 'U' shaped lateral extension effectively enables a flexible 'third' position and is provided for this purpose. It is best used in either the Brown or Black phase position.



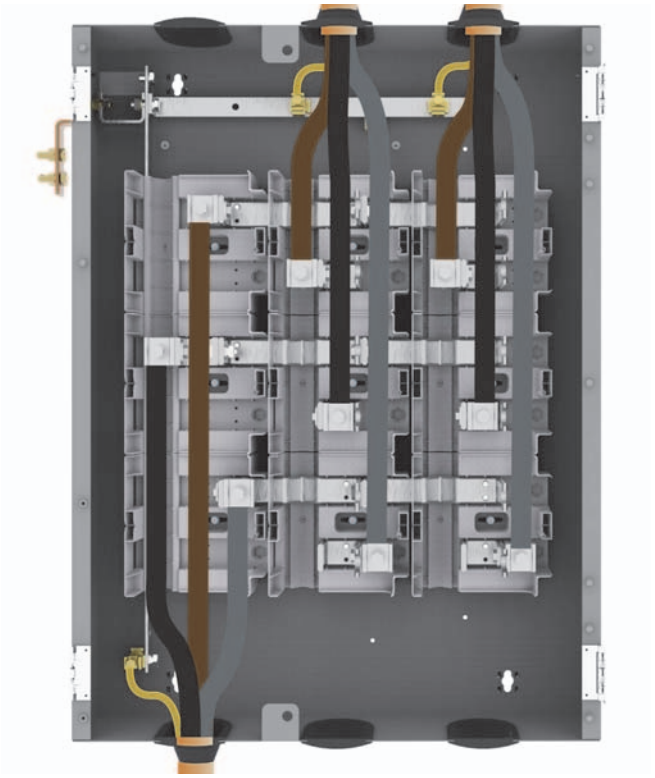
6.5.2 Outgoing cable installation

1 : Terminate the neutral earth conductor in the brass terminal.

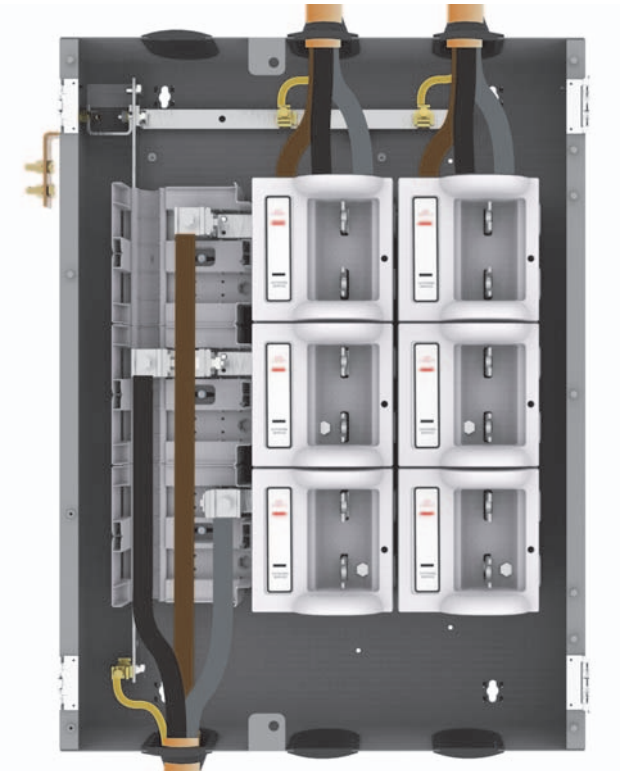


2 : Proceed to terminate the phase cores. An example configuration is shown below. Due to the lay of the cores on any one installation, this exact situation may not be achievable. The 'U' shaped lateral extension effectively enables a flexible 'third' position and is provided for this purpose. It is best used in either the Brown or Black phase position.

3 : After the phase cores have been dressed and set, shear off the core retention bolt followed by the connector side shear off attachment bolt of each connector.



4 : When all the cables have been terminated and the appropriate cable identifications have been added, proceed to conduct final polarity and continuity tests. With these satisfactorily completed, all the covers can be refitted.



6.6 Fuse Handle

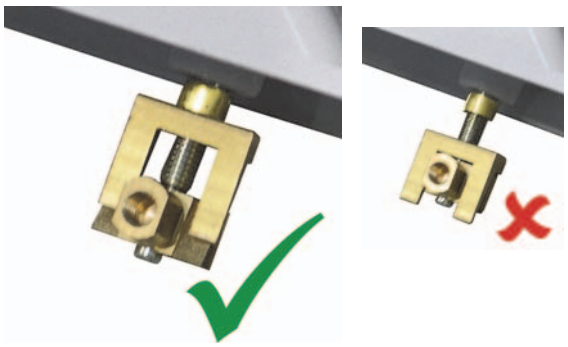
6.6.1 Fuse handle removal

1 : Slacken the two thumbscrews and extract the fuse handle by pulling out.

6.6.2 Fuse handle installation

1 : Remove both of the large cheese headed fuse retention screws and discard hardboard spacer.

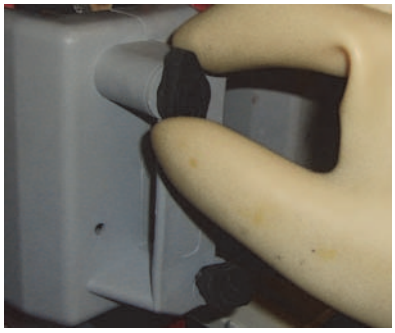
2 : Ensure both clamps are in their fully released position by backing off the thumbscrews.
Note: Failure to do this will render fuse handle insertion considerably more difficult as the fuse tangs will be partially compressed.



3 : Place a BS88 fuse with 92mm fixing centres over the brass spigots which form part of the clamping wedges. Ensure that the fuse link is attached as shown with its open slot uppermost.

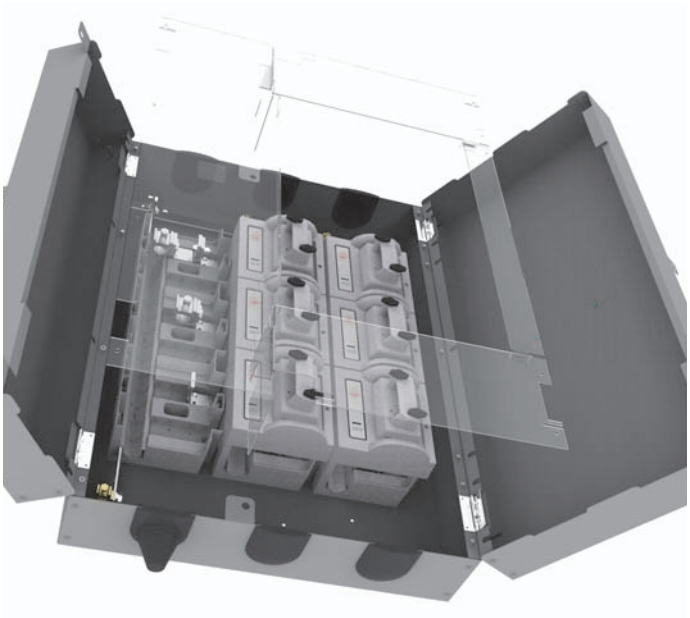
4 : Tighten both retention screws down to their abutment shoulders.

5 : Using the appropriate PPE, install the fuse handle and tighten both thumbscrews as tight as is comfortably possible. This corresponds to a torque of approximately 7-8Nm.



6.7 Installation Completion

1 : With the all cabling satisfactorily completed, the covers and fuse handles refitted, the final energisation process can begin after all the screens and doors have been refitted.



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