Network Standard

Document No.
NS127

Title:
Low Voltage Cable Joints and Terminations

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Technical Approver		Authorised By			
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Revision

No	Date	Description	Technical Approver	Authorised By
8	1/12/2025	Conversion to new Network Standard template	Duminda Thenuwara	Evan Riddell

Table of Contents

List of Annexures

Scope

This Network Standard specifies Ausgrid's construction requirements for Low Voltage (LV) cable joints, terminations and LV Underground to Overhead (UGOH) Connections.

Ausgrid's network historically includes a variety of LV joints, terminations, and UGOH connections. This document details only the approved construction standards currently in use. Construction details for joints, terminations, and UGOH connections which are not covered in this standard should be sought from Ausgrid as required.

Reference Documents

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards.

Ausgrid Documents

NS001 Glossary of Terms

NS110 Design of Underground Residential Subdivisions

NS116 Design Standards for Distribution Equipment Earthing

NS125 Construction of Low Voltage Overhead Mains

NS130 Laying Underground Cables up to and including 11 kV

NS161 Testing of Underground Cables

NS260 Sub-Transmission Feeder Earthing

Other Standards and Documents

AS/NZS 1125 Conductors in insulated electric cables and flexible cords

AS/NZS 3000 Electrical Installations (Known as the Australian / New Zealand Wiring Rules)

AS/NZS 5000.1 Electric cables – Polymeric insulated

Service and Installation Rules of NSW

Acts and Regulations

Electricity Supply (General) Regulation 2014 (NSW)

Electricity Supply (Safety and Network Management) Regulation 2014

Work Health and Safety Act 2011 (NSW)

Work Health and Safety Regulation 2017 (NSW)

Clause	Standard Requirements

1 Approved Products and Private Equipment

1.1 Approved products

The construction drawings contained in this standard provide Ausgrid's stockcode numbers for all approved components. Alternative components shall not be used unless specifically approved by Ausgrid.

1.2 Private equipment

1.2.1 Ausgrid does not specify the requirements for the physical installation of private pits or pillars. Private pits and pillars shall be installed in accordance with the requirements of AS/NZS 3000 and the Service and Installation Rules of NSW.

1.2.2 Cable joints between Ausgrid's service cable and consumer's mains shall only be installed in private pits and be constructed using an approved jointing kit as per this standard.

1.2.3 Where an Ausgrid cable terminates in the customer's service protection device, pit or pillar the equipment shall be selected in accordance with the requirements of AS/NZS 3000.

2 Service Cables

Service cable specifications are according to Table 1.

Table 1 – Service cables

Cross-sectional area (mm²)	Cable Description	Stockcode
16	Circular, stranded, copper conductor, two core cable	**174565**
16	Circular, stranded, copper conductor, four core cable	**148668**
25		**H109462**
50		**149112**

Refer to the Approved Material List (AML) for additional service cables including single core cables.

3 Low Voltage UGOHs

3.1 Mechanical Protection of UGOHs

3.1.1 Service (underground service) UGOHs

3.1.1.1 Refer to Section 2 of the Service and Installation Rules of NSW. The required mechanical protection of Service UGOH cables between 2500mm above groundline and 300mm below groundline shall be tubular or 'U' section construction with no side flanges (side securing tabs are permitted) to minimise the surface area of the pole that is covered and help prevent unauthorised climbing.

3.1.1.2 The following non-metallic UGOH cover is approved for use as mechanical protection of Service UGOH cables:

Ausgrid Stockcode	Description
184570	Kit, UGOH cover, non-metallic, 60mm suitable for covering service and streetlight cable up to 35mm overall diameter.

3.1.1.3 If the mechanical protection used on Service UGOH cables is metallic, the metallic protection cover shall be made of galvanised steel and shall be bonded to the neutral of the LV overhead mains as illustrated in Figure 1, in accordance with NS116.

3.1.1.4 Mechanical protection shall be of non-metallic material for Service UGOH cables installed on poles supporting an earth down lead that is part of a HV earthing system.

3.1.1.5 Mechanical protection between 2000mm below the lowest set of overhead conductors and the top of the pole shall be of non-metallic (non-conductive) material.

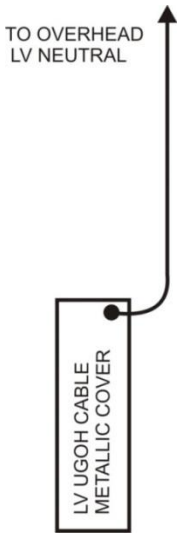


Figure 1 - Metallic UGOH Cover Bonded to Neutral

3.1.2 LV Network UGOHs

3.1.2.1 The required mechanical protection of LV Network UGOH cables between 3000mm above groundline and 300mm below groundline shall be of 'U' section construction with no side flanges (side securing tabs are permitted) to minimise the surface area of the pole that is covered and help prevent unauthorised climbing.

3.1.2.2 The following non-metallic UGOH cover is approved for use as mechanical protection of LV Network UGOH cables:

Ausgrid Stockcode	Description
184571	Kit, UGOH cover, non-metallic, 90mm suitable for covering lv distributor cable up to 60mm overall diameter.

3.1.2.3 If the mechanical protection used on LV Network UGOH cables is metallic, the metallic protection cover shall be made of galvanised steel and shall be bonded to the neutral of the LV overhead mains as illustrated in Figure 1, in accordance with NS116.

3.1.2.4 Mechanical protection shall be of non-metallic material for LV Network UGOH cables installed on poles supporting an earth down lead that is part of a HV earthing system.

3.1.2.5 Mechanical protection between 2000mm below the lowest set of overhead conductors and the top of the pole shall be of non-metallic (non-conductive) material.

3.1.3 Existing LV UGOH covers

3.1.3.1 If a metallic LV UGOH cable cover needs to be replaced and a non-metallic LV UGOH cable cover is used, any existing bonding between the metallic LV UGOH cable cover to the O/H LV neutral shall be removed.

3.1.3.2 If this requires removal of an Insulation Piercing Connector (IPC) from the LV ABC mains, the residual holes shall be sealed with vinyl-backed mastic tape (Ausgrid Stockcode 69807) to restore the insulation and prevent moisture ingress.

3.1.4 Cable Connection Bond for Metallic Covers

3.1.4.1 If a metallic LV UGOH cable cover is used, the metallic cable cover shall be bonded to the neutral of either the bare overhead mains or LV ABC. The figure below shows the detail of the connection at the metallic cable cover.

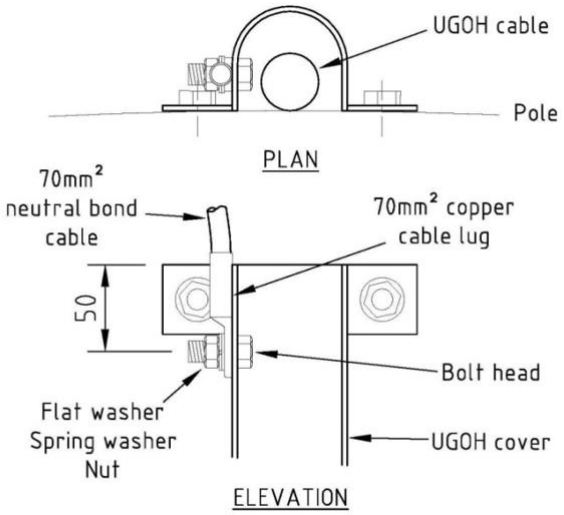


Figure 2 - Neutral Connection Bond to the Metallic Cover

3.1.4.2 If the metallic UGOH cover has a drilled hole in the cover (approximately 50mm from top of the cover) to fix the 70mm² lug (stockcode H95851), using stainless steel M12 nut, spring washer, flat washer and M12 x 20mm bolt, connect the neutral bond as shown above. Bolt head shall be inside the cover to avoid damage to the UGOH cable.

3.1.4.3 If there is no hole on the metallic cover, drill a hole of 13mm diameter 50mm from the top of the cover and reapply cold galvanising paint (stockcode 176055). Then, connect the neutral bonding cable as per above. Drilling of the hole shall be carried out before the UGOH cover is installed on the pole to avoid any damages to the UGOH cable.

3.1.4.4 To drill a hole for the neutral bonding connection in an existing LV UGOH metallic cover installed on a pole, the metallic cover shall be removed from the pole prior to drilling. This is to prevent any damage to the LV UGOH cable.

3.1.4.5 Install the neutral bond cable to the metallic cover before installing the cover on the pole to avoid any damage to the UGOH cable.

3.1.4.6 A 70 mm² copper insulated cable (stockcode 60111) shall be used to bond the LV UGOH cover to the neutral. The following three tables shows the methods and Ausgrid stockcodes which can be used to connect the 70 mm² copper bonding cable to the OH neutral conductor. Each table shows the different OH conductor type (LV ABC, bare aluminium and bare copper).

3.1.4.7 The 70mm² neutral bond cable (where no HV UGOH exists) shall be separately saddled straight up the pole using 12mm Galvanised double sided saddles (stockcode 176494) held in place using self-drilling timber screws type 17 10G x 30mm (stockcode 184996) not more than 600mm apart. Non-metallic mechanical protection (PVC Cover Strip stockcode 157552) shall be placed within 2m below of the LV mains or streetlight wire.

Table 2 - Method to connect the bonding cable to LV ABC mains:

LV ABC	25 mm²	95 mm²	150 mm²
Connector	See Note 1 below	IPC Stockcode: 176580	IPC Stockcode: 148387

Notes:

1) Insulation Piercing Connector (IPC) details: Sicame Australia Pty Ltd (Part No. TTD301XFA) or Preformed Line Products Australia (Part No. D-K445).
2) Install two IPCs when connecting the bonding cable to LV ABC mains.
3) Make sure that the PVC insulated bonding cable is new when connecting to the LV ABC mains using IPCs. If it is old and hard, it may prevent the teeth of the IPC connector making a sound electrical connection and cause the connection to fail.

Table 3 - Method to connect the bonding cable to bare aluminium mains:

Bare Aluminium	5.5 – 14 mm diameter	6.5 – 15.5 mm diameter
Connector	Bimetallic PG Clamp Stockcode: H88013	Bimetallic PG Clamp Stockcode: 176491

Table 4 - Method to connect the bonding cable to bare copper mains:

Bare Copper	Up to 70mm²	70 - 95 mm²	95 - 185 mm²
Connector	Split Bolt Natural Stockcode: 61374	Split Bolt Natural Stockcode: 61358	Split Bolt Natural Stockcode: 59139

4) Install two Split bolts when connecting the bonding cable to bare copper mains.

5) All bare overhead mains must be cleaned by application of a scratch brush to remove oxide components before any electrical connection is made.

3.2 UGOHs on Ausgrid poles

3.2.1 Location of UGOHs

3.2.1.1 UGOHs on Ausgrid poles shall be placed so that the danger of vehicle impact is minimised. Consideration shall be given to both nearside traffic flow and any adjacent driveway traffic.

3.2.1.2 Where UGOHs are to be placed on concrete poles they shall be secured to the pole by stainless steel bands. No holes shall be drilled in concrete poles.

3.2.1.3 UGOHs shall be spaced at ground level so that there is 50mm clearance between the outside edge of their mechanical protection and any adjacent UGOH (to enable easy installation and pole inspection).

3.2.1.4 UGOHs on wood poles shall be grouped at ground level so that one side of the pole, in its neutral axis, is free of any obstruction that may prevent the installation of any future steel splint. This shall be achieved by keeping an area free of obstructions that is one third of the circumference of the pole in size and by ensuring that the cable does not cross over onto the side of a wood pole that is reserved for future pole splinting until they reach a height of 4m above ground level.

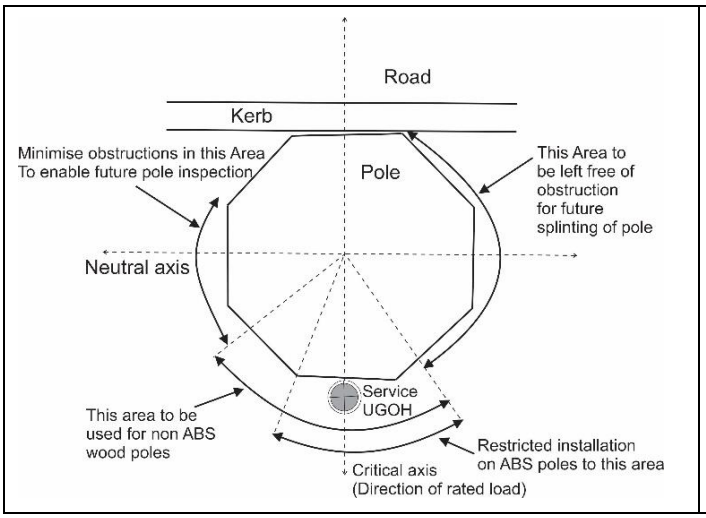


Figure 3 – LV UGOH locations on Ausgrid pole

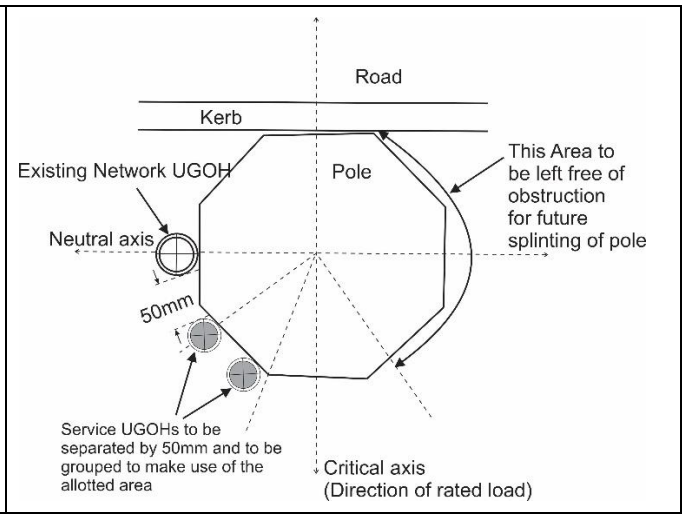


Figure 4 – LV UGOH locations on Ausgrid pole with existing Network UGOH

3.2.1.5 Where no LV Network UGOH exists on the pole the first Service UGOH shall be placed on the footpath side of the pole (or critical axis) in the allotted area. See the above Figure 3.

3.2.1.6 Where an LV Network UGOH exists on a pole, the first Service UGOH shall be installed adjacent to the LV network UGOH. See the above Figure 4.

3.2.1.7 All service UGOHs on poles that include High Voltage construction, except ABS poles, shall be connected on the non-climbing side of the pole.

3.2.2 Sub-transmission poles and UGOHs

Refer to NS260 for details.

3.2.3 UGOHs on air break switch (ABS) poles

3.2.3.1 Groundline placement of UGOHs on Air Break Switch (ABS) poles shall be in accordance with Figure 3.

3.2.3.2 Above 4m from ground line, the cable shall transfer to the side of the pole that is opposite the ABS down rod and handle arrangement (connection to the overhead mains shall be done on the side of the pole that is opposite the down rod).

3.2.4 UGOHs on substation poles (PTs)

UGOHs shall be installed on the non-climbing side of the pole (leaving the climbing side of the pole free for future splinting and unrestricted climbing).

3.3 Service UGOHs in excess of 200 amps

3.3.1 Supplies to services greater than 200 amps shall be via a distribution pillar installed in the footway, where site conditions allow it, to facilitate future service connections.

3.3.2 All further underground services must be connected at the pillar.

3.4 Phase and neutral/earth connectors

3.4.1 The cable connectors specified in this standard are either of the compression type or the mechanical type.

3.4.2 Connectors shall be installed strictly in accordance with their manufacturers' installation instructions.

3.4.3 Compression type connectors shall be installed using the correct dies, number and position of crimps as specified by the manufacturer.

3.4.4 Mechanical connectors shall be installed using the correct tools and sequence of fastening.

3.4.5 Installed connectors shall maintain the load current carrying capacity of the jointed cores in the case of phase conductors, and the earth fault current carrying capacity in the case of neutral/earth conductors.

4 Jointing and Termination Requirements

4.1 All heatshrink components shall be kept free of contamination during jointing.

4.2 The components and the prepared cable ends being worked on shall be kept free of contamination and shall not be damaged during the construction process.

4.3 Cables and cable cores shall not be bent tighter than the manufacturers' specified minimum internal bending radii either during the jointing process or after they have been set in position. Completed joints and the first 500 mm of each associated cable shall be kept straight when set in position.

4.4 Aluminium conductors prior to inserting them into the connector, shall be wire brushed.

4.5 Joints and terminations shall be constructed in accordance with the installation instructions supplied.

4.6 All components involved in joints and terminations (including cable components) which will come into contact with either mastic tape or adhesive sealants shall be thoroughly cleaned and degreased prior to the application of these sealing agents. Cleaning shall only be done using a lint-free cloth.

4.7 Heatshrink tubing shall be positioned correctly, and properly and evenly shrunk, free of voids and shall not be damaged due to overheating. Heatshrink components with adhesive sealant coatings shall provide effective sealing against moisture ingress when installed.

4.8 The specified overlapping distances between various heatshrink tubing and cable components shall always be adhered to.

4.9 Where polyurethane resin is specified for filling joints, the polyurethane resin shall be used in accordance with the manufacturer's instructions.

4.10 Completed heatshrink joints and terminations shall be allowed to cool down before they are subjected to any mechanical load.

4.11 The polyurethane resin in the completed joint shall be allowed to set before applying mechanical load to it or energising the joint. This is typically two hours.

4.12 The three active cable cores shall be coloured red, white (or uncoloured) and blue. The neutral core shall be coloured black.

4.13 The completed joint if direct buried, shall be surrounded in soft bedding material up to a depth of 100 mm above the joint. The bedding material shall comply with the requirements of NS130.

4.14 Sand backfill and sand/cement mix of the pillar base must be reinstated at the completion of the associated work (e.g. installation of extra service conduits).

4.15 Lubrication of stainless steel bolts and set-screws

4.15.1 Before installation of each stainless steel bolt or set-screw, the thread shall be lubricated with specially formulated anti-seize grease containing nickel available on Ausgrid stockcode 177212. Equivalent anti-seize grease containing nickel may be used but shall be submitted to Ausgrid for approval.

4.15.2 Anti-seize grease shall not contaminate the interface of the electrical contact surfaces. Any excess of anti-seize grease shall be removed using a clean dry cloth after the bolt or set-screw has been installed.

5 Field Recording of Network Assets

Information regarding the construction, modification, repair, and/or retirement of Ausgrid's network assets shall be recorded in accordance with NS100. These records shall be submitted to the Data Maintenance team in accordance with NS100.

6 Testing Cable Joints After Installation

All completed low voltage electrical works shall be tested prior to commissioning in accordance with the requirements of NS161.

Annexure A: Standard Construction Drawings

Table 5 LV UGOH drawings

Description	Construction No.	Drawing No.
Standard Construction LV overhead conductor multicore core service cable UGOH construction 1-500	LV1-14	255623
Standard Construction Bare LV overhead conductor UGOH construction for 240 or 300 AL4 XQ Z/SAC cable with fuse switch disconnector 1-503	LV1-5	255626
Standard Construction Bare LV overhead conductor UGOH construction for 185CU1 XQ Z cable with fuse switch disconnector 1-505	LV1-6	255628
Standard Construction Dual circuit bare LV overhead conductor UGOH construction for 240CU4 XQ Z cable with fuse switch disconnector 1-506	LV1-7	255629
Standard Construction LV overhead conductor single core service cable UGOH construction 1-510	LV1-11	255630
Standard Construction LV ABC conductor UGOH construction for 240 or 300 AL4 XQ Z/SAC cable with fuse switch disconnector 1-512	LV1-71	255632
Standard Construction LV ABC conductor UGOH construction for 185 CU1 XQ Z cable with fuse switch disconnector 1-514	LV1-73	255634
Standard Construction Dual LV ABC conductor UGOH construction for 240 AL4 or 300 XQ Z/SAC cable with fuse switch disconnector 1-521	LV1-46	255636
Standard Construction Dual LV ABC conductor UGOH construction for 185CU1 XQ Z cable with fuse switch disconnector 1-523	LV1-48	255638
Standard Construction Dual LV ABC conductor UGOH construction for 240 CU4 XQ Z cable with fuse switch disconnector 1-524	LV1-49	255639

Annexure B: Distribution Pillar (Two-Way) 240 AL4 XQ Z/SAC Cables (CMPBL2EA)

This specification provides the requirements for constructing a solid two-way Distribution Pillar for 240mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (240 AL4 XQ Z/SAC).

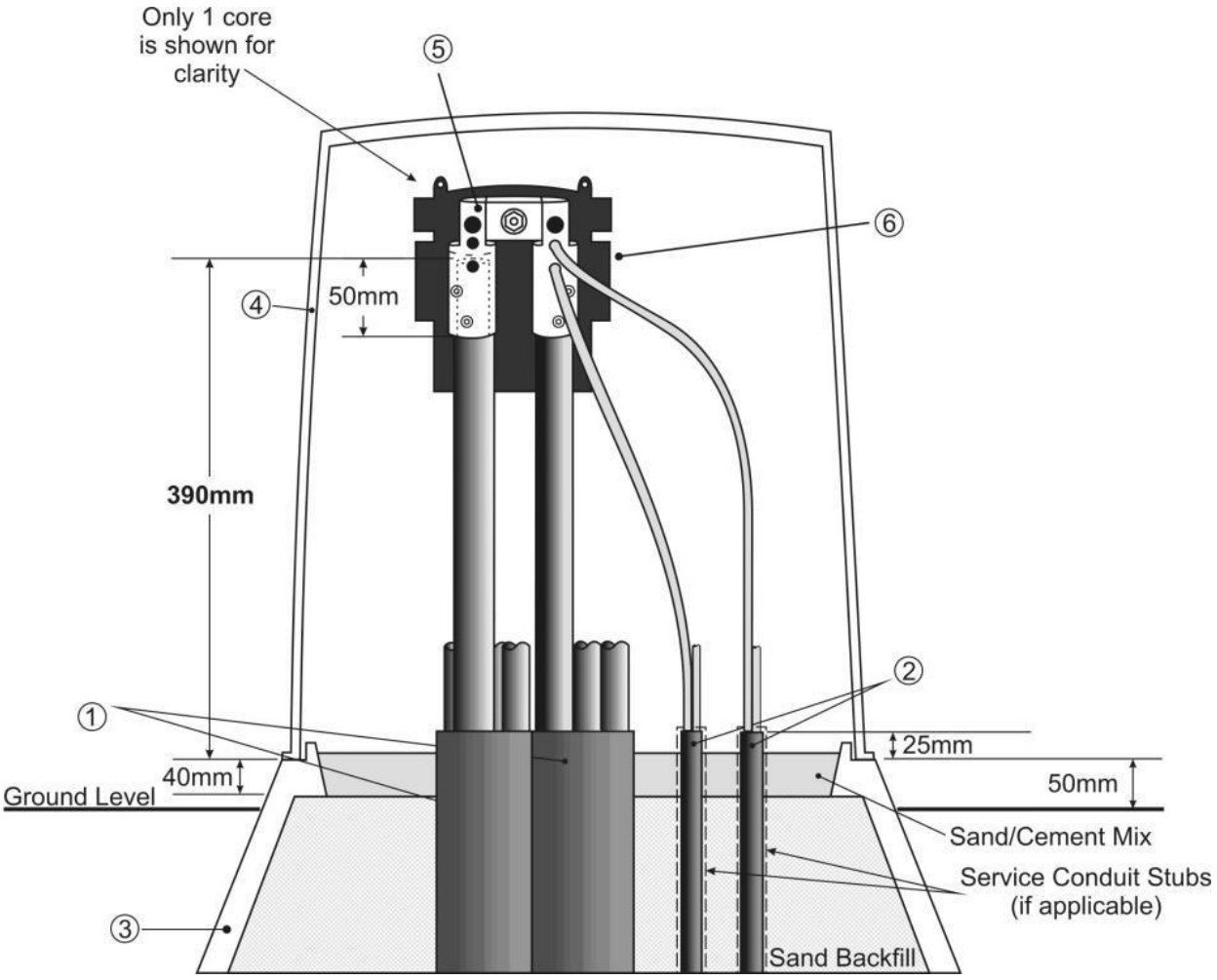


Figure 5 - General Arrangement (side view)

Note: The arrangement above is shown with the front half of the lug cover removed to show internal details. Service cables shall be installed with lug cover fully assembled.

Table 6 Material List

Item	Description	Material	Quantity	Stockcode
1	Distributor cable	240 AL4 XQ Z/SAC	As required	141739
2	Service cable	Refer to Clause 2	As required	–
3	Pillar base	Polyethylene	1	90993
4	Turret (large)	Polyethylene	1	6668
5	Two-way mechanical connector kit with lug covers supplied	CMPBL2EA	1	185411
6	Lug cover			

Notes:

1) Ausgrid will not provide any training for the installation of the Acculec Power URD pillars. Please refer to Business Development Manager at Acculec Power if training is required.
2) Refer to NS130 for the installation requirements of the pillar base.
3) The pillar base is backfilled with sand and has a 40mm deep sand/cement mix (20:1)
4) PVC sheaths of all cables shall be terminated 25mm above the surface of the sand/cement mix.
5) Refer to Figure 7 for service conduit stub details (if applicable).
6) The top of the pillar base is to be a minimum of 50 mm above the ground level.
7) The cable cores should be cut at a height of 390mm from the top of the pillar base.
8) If it is necessary to remove and reinstall the lug once it is installed; a new lug shall be used. The conductor shall be cut below the indentations and stripped to the required length.
9) The cables shall be centred within the pillar once they are connected.

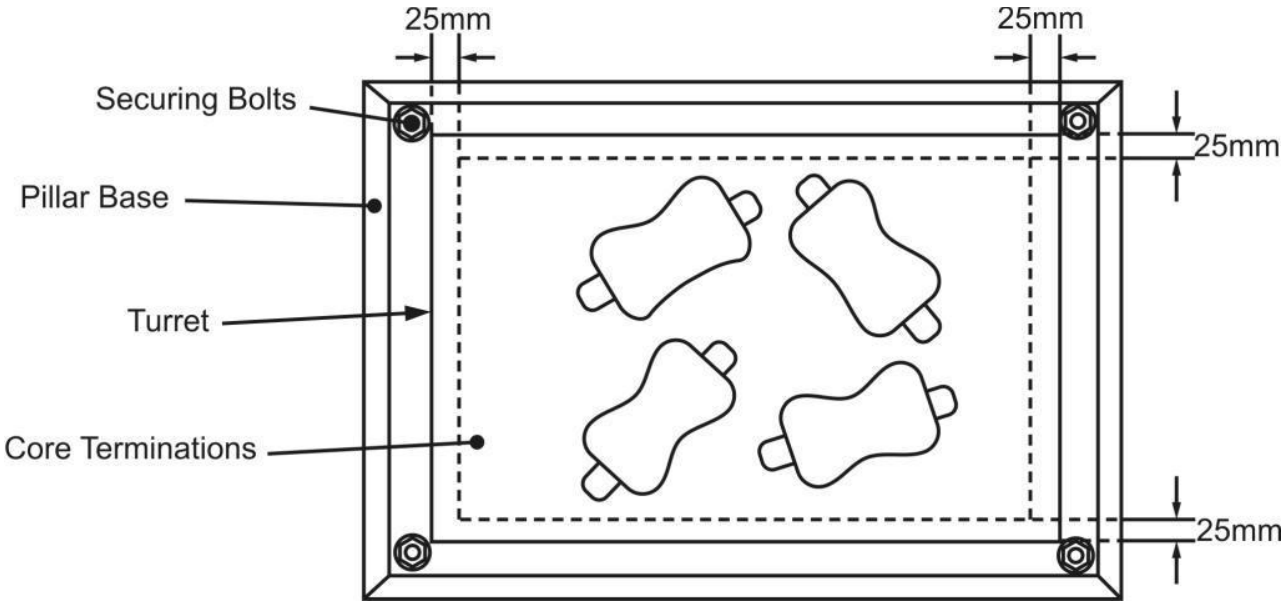


Figure 6 - Lug Cover Layout

10) The lug covers shall be arranged so that a minimum of 25mm clearance is maintained between any part of the lug cover and inner edge of the pillar base (Refer to Figure 6 allowing the turret to be fitted clear of the lug covers).

11) Fit the turret over the connections and ensure it sits in its correct position with the securing holes aligned without applying any force to the turret. Reposition the cables if necessary.

CAUTION
Incorrect installation of the turret (i.e. using the securing bolts to force it into position) will lead to premature failure.

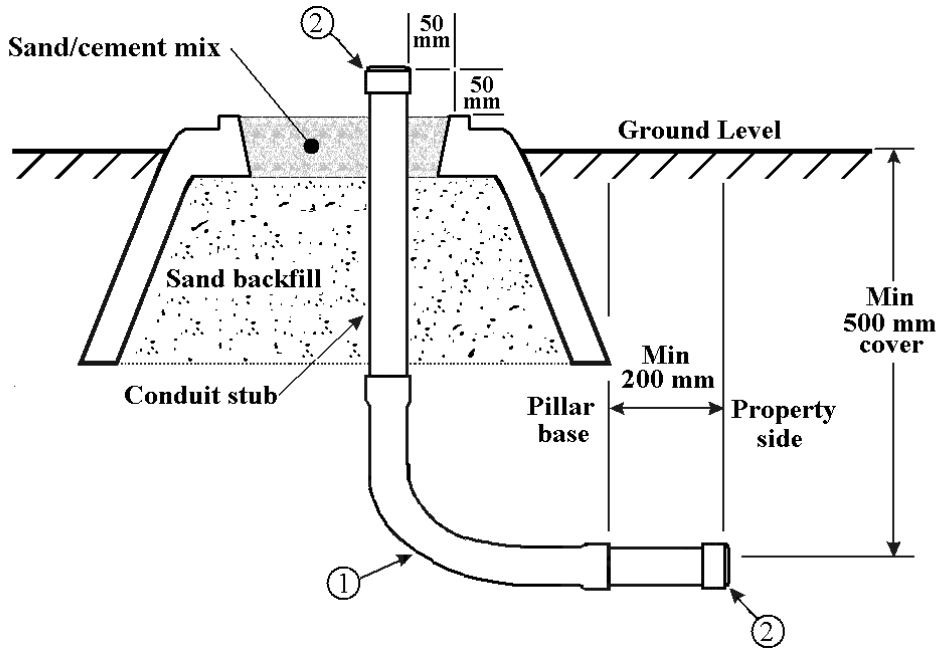


Figure 7 – Conduit Stub Details

Table 7 Material List

Item	Description	Material	Stockcode
1	Conduit 90 deg large sweep bends: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 247L40EO 52415 Clipsal Part No. 247P80EO
2	Conduit cap: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 262/40EO 179754 Clipsal Part No. 262P80

12) A conduit stub shall be installed in accordance with Figure 7 for each cable that has not been initially laid prior to the installation of the pillar noting the following:

- Conduit stubs shall be 40 mm or 50 mm diameter for 100 amp services and 80 mm diameter for 200 amp services and comply with NS130. All services shall be assumed to be 100 amp unless otherwise specified.
- Only use conduit 90 degree large sweep bends as any sharper angle will impede cable entry.
- The upper end of the conduit stub shall extend 50 mm above the sand/cement mix and be placed 50 mm clear of the inside edge of the pillar base.
- The conduit stubs are to extend a minimum of 200 mm outside the footprint of the pillar base on the property side of the pillar and shall be capped at both ends using conduit caps of the appropriate size.
- The minimum cover for the conduit stub shall be 500 mm.
- The PVC service cable sheath shall be terminated 10mm above the end of the conduit stub.

Annexure C: Distribution Pillar (Three-Way) 240 AL4 XQ Z/SAC Cables (CMPBL3EA)

This specification provides the requirements for constructing a solid three-way Distribution Pillar for 240mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (240 AL4 XQ Z/SAC).

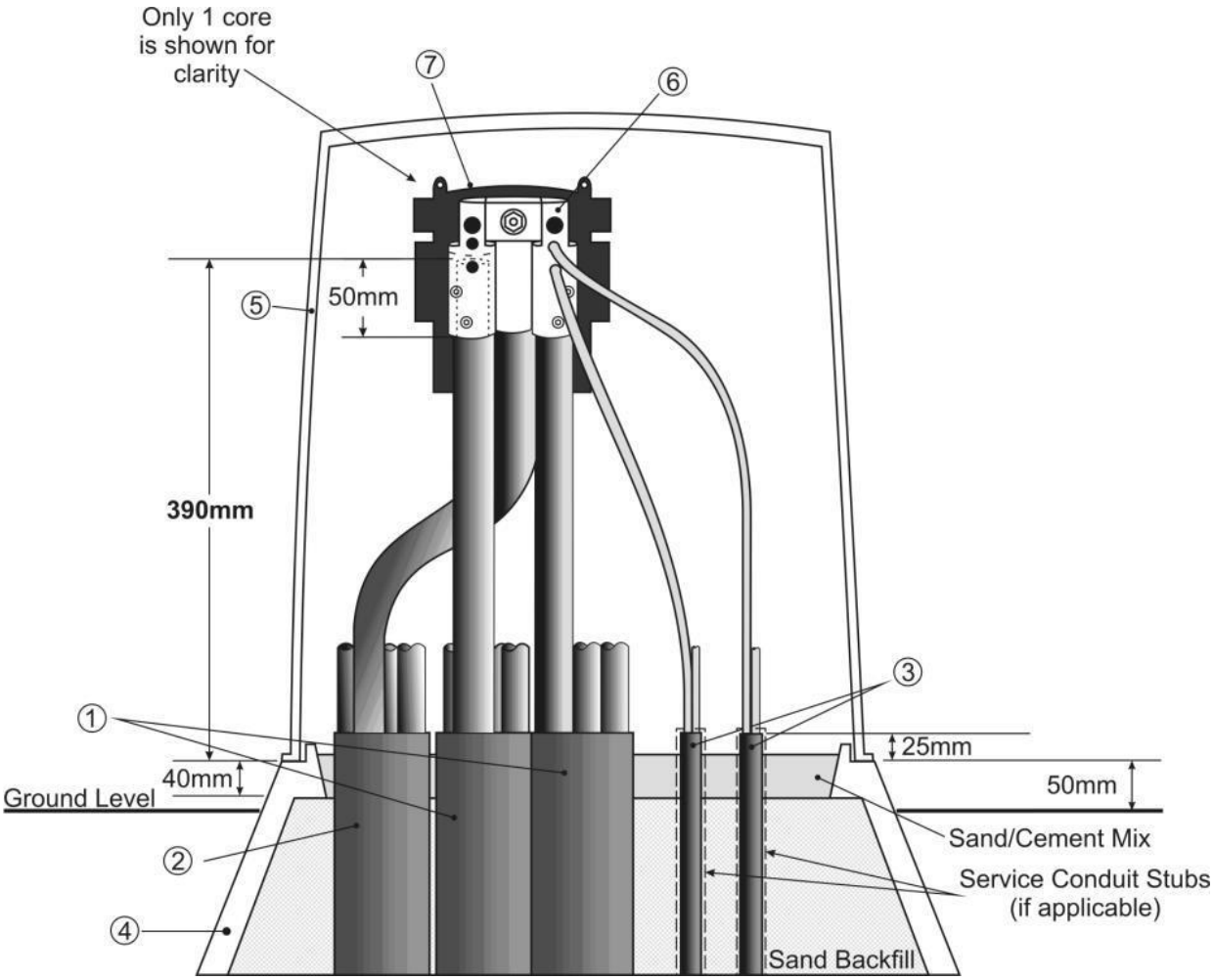


Figure 8 - General Arrangement (side view)

Note: The arrangement above is shown with the front half of the lug cover removed to show internal details. Service cables shall be installed with lug cover fully assembled.

Table 8 Material List

Item	Description	Material	Quantity	Stockcode
1	Distributor cable	240 AL4 XQ Z/SAC	As required	141739
2	Teed-off distributor cable	240 AL4 XQ Z/SAC	As required	141739
3	Service cable	Refer to Clause 2	As required	–
4	Pillar base	Polyethylene	1	90993
5	Turret (large)	Polyethylene	1	6668
6	Three-way mechanical connector kit with lug covers supplied	CMPBL3EA	1	185412
7	Lug cover			

Notes:

1) Ausgrid will not provide any training for the installation of the Acculec Power URD pillars. Please refer to Business Development Manager at Acculec Power if training is required.
2) Refer to NS130 for the installation requirements of the pillar base.
3) The pillar base is backfilled with sand and has a 40mm deep sand/cement mix (20:1)
4) PVC sheaths of all cables shall be terminated 25mm above the surface of the sand/cement mix.
5) Refer to Figure 11 for service conduit stub details (if applicable).
6) The top of the pillar base is to be a minimum of 50 mm above the ground level.
7) The cable cores should be cut at a height of 390mm from the top of the pillar base.
8) If it is necessary to remove and reinstall the lug once it is installed; a new lug shall be used. The conductor shall be cut below the indentations and stripped to the required length.
9) The cables shall be centred within the pillar once they are connected.

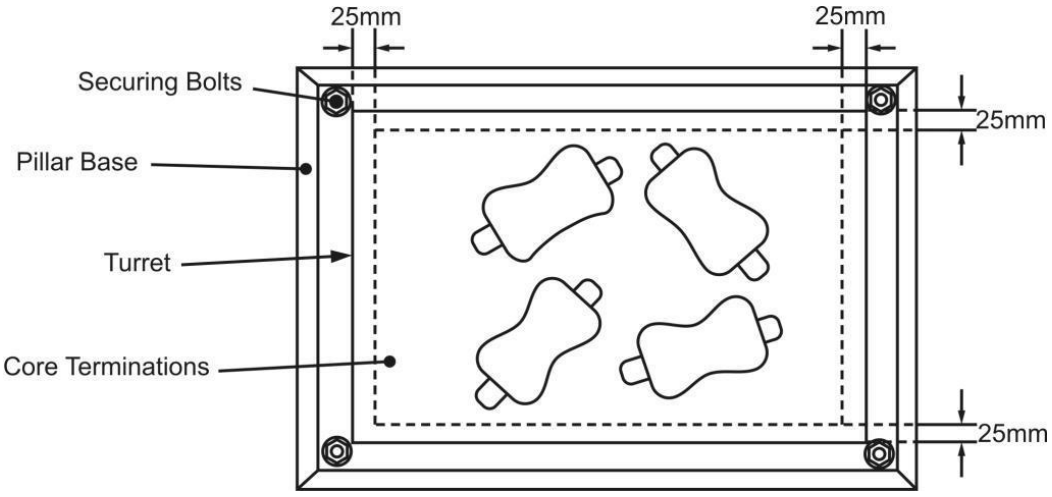


Figure 9 – Lug Cover Layout

10) The lug covers shall be arranged so that a minimum of 25mm clearance is maintained between any part of the lug cover and inner edge of the pillar base (Refer to Figure 10) allowing the turret to be fitted clear of the lug covers.

11) Fit the turret over the connections and ensure it sits in its correct position with the securing holes aligned without applying any force to the turret. Reposition the cables if necessary.

CAUTION
Incorrect installation of the turret (i.e. using the securing bolts to force it into position) will lead to premature failure.

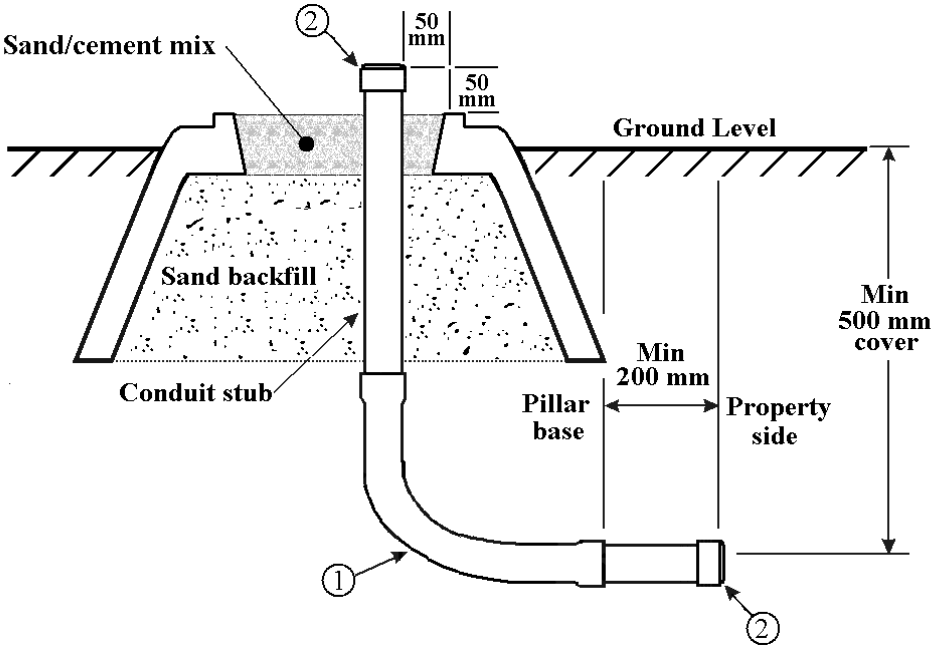


Figure 10 – Conduit Stub Details

Table 9 Material List

Item	Description	Material	Stockcode
1	Conduit 90 deg large sweep bends: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 247L40EO 52415 Clipsal Part No. 247P80EO
2	Conduit cap: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 262/40EO 179754 Clipsal Part No. 262P80

12) A conduit stub shall be installed in accordance with Figure 11 for each cable that has not been initially laid prior to the installation of the pillar noting the following:

- Conduit stubs shall be 40 mm or 50 mm diameter for 100 amp services and 80 mm diameter for 200 amp services and comply with NS130. All services shall be assumed to be 100 amp unless otherwise specified.
- Only use conduit 90 degree large sweep bends as any sharper angle will impede cable entry.
- The upper end of the conduit stub shall extend 50 mm above the sand/cement mix and be placed 50 mm clear of the inside edge of the pillar base.
- The conduit stubs are to extend a minimum of 200 mm outside the footprint of the pillar base on the property side of the pillar and shall be capped at both ends using conduit caps of the appropriate size.
- The minimum cover for the conduit stub shall be 500 mm.
- The PVC service cable sheath shall be terminated 10mm above the end of the conduit stub.

Annexure D: Distribution Pillar (One -Way, Two-Way or Three-Way) 240 AL4 XQ Z/SAC & 300 AL4 XQ Z/SAC Cables (LV1-82)

This specification provides the requirements for constructing a solid one-way, two-way or three-way Distribution Pillar for 240mm² and 300mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (240 AL4 XQ Z/SAC & 300 AL4 XQ Z/SAC).

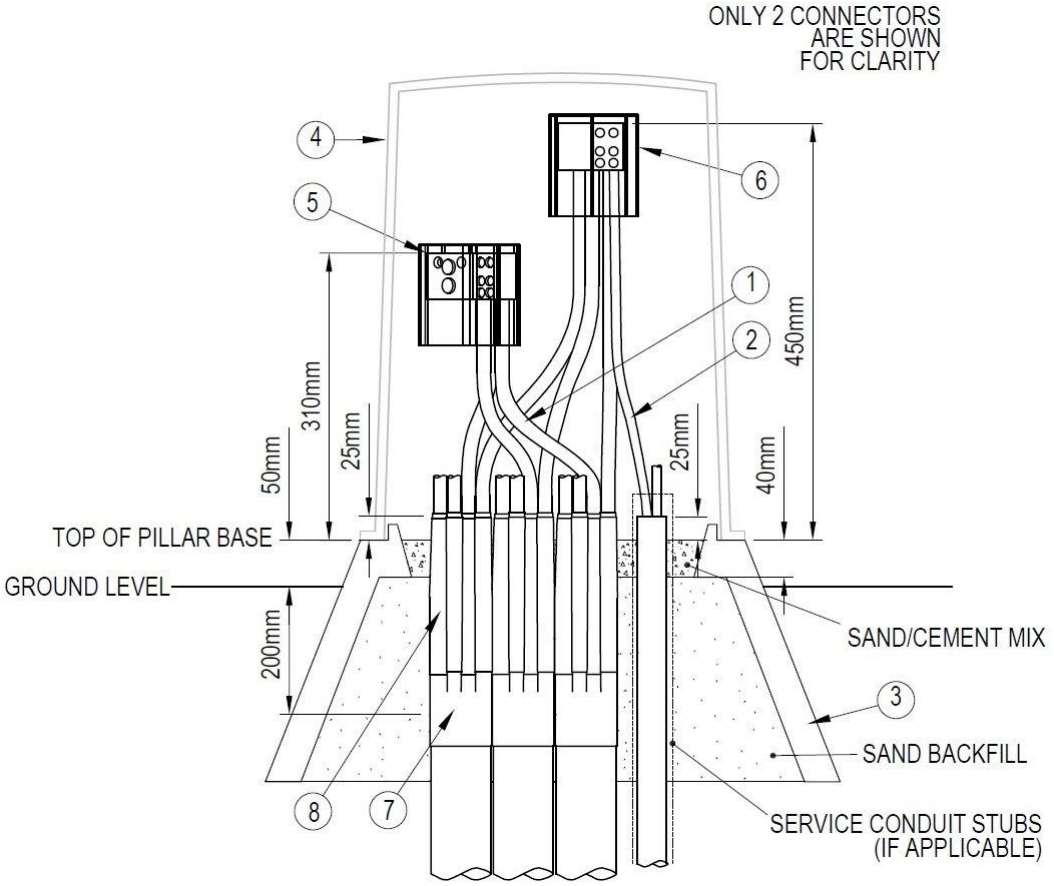


Figure 11 - General Arrangement (side view)

Note: The heatshrink tubing on the distributor cables ends 25mm above the pillar base.

Table 10 - Material List

Item	Description	Material	Quantity	Stockcode
1	Distributor cable	240 AL4 XQ Z/SAC 300 AL4 XQ Z/SAC	As required	141739 185413
2	Service cable	Refer to Clause 2	As required	–
3	Pillar base	Polyethylene	1	90993
4	Turret (large)	Polyethylene	1	6668
5	3-Way bolted block connector integrated with 6 service holes.	Tinned aluminium	1	186235
6	Connector cover	Polycarbonate cover		
7	Heatshink Insulating Glove, 4-way		1 per Distributor cable	78527
8	Heatshrink Insulating Sleeve, 12.5m Roll		1	60228

Notes:

1) The distribution pillar shall be constructed in accordance with the installation instruction supplied.
2) Refer to NS130 for the installation requirements of the pillar base.
3) The pillar base is backfilled with sand and has a 40 mm deep sand/cement mix (20:1).
4) PVC sheaths of all distributor cables shall be terminated 200 mm below ground level.
5) Refer to Figure 14 for service conduit stub details (if applicable).
6) The top of the pillar base is to be a minimum of 50 mm above the ground level.
7) Up to 6 service cables can be connected in each block - 4x70mm² (max) and 2x50mm² (max).
8) The 3-way bolted block connector (186235) is suitable for 1-way, 2-way and 3-way applications.
9) For 1-way and 2-way pillars, the remaining unused dovetails are to be stored inside a waterproof bag that is cable tied to the neutral core within the pillar, in case a future distributor cable is added.
10) The cables shall be centred within the pillar once they are connected.
11) The core terminals are staggered with two cores at 450mm and two cores at 310mm from the turret base, allowing the turret to be fitted clear of the core terminals.
12) Fit the turret over the connections and ensure it sits in its correct position with the securing holes aligned without applying any force to the turret. Reposition the cables if necessary.

CAUTION
Incorrect installation of the turret (i.e. using the securing bolts to force it into position) will lead to premature failure.

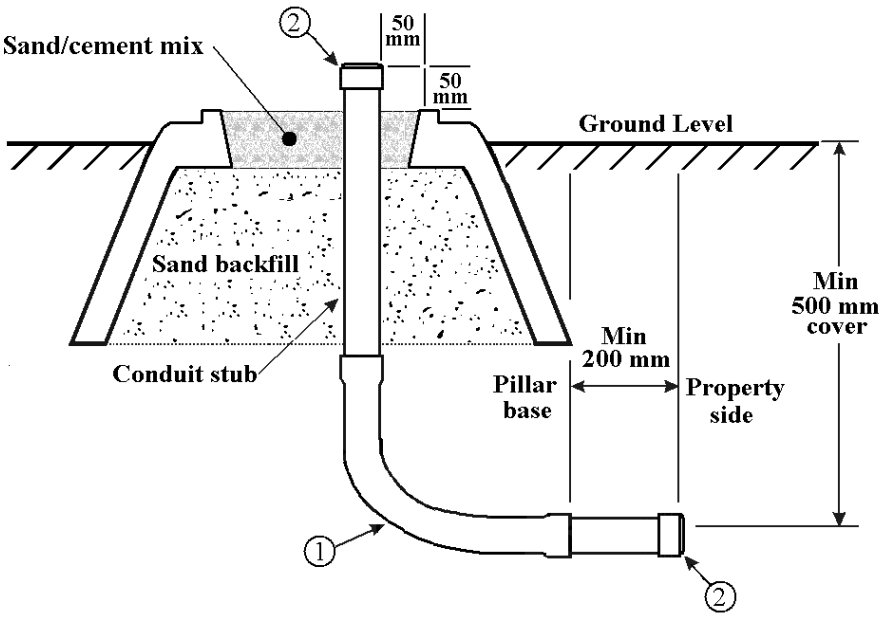


Figure 12 - Conduit Stub Details

Table 11 - Material List

Item	Description	Material	Stockcode
1	Conduit 90 deg large sweep bends: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 247L40EO 52415 Clipsal Part No. 247P80EO
2	Conduit cap: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 262/40EO 179754 Clipsal Part No. 262P80

Notes (cont.):

13) A conduit stub shall be installed in accordance with Figure 14 for each cable that has not been initially laid prior to the installation of the pillar noting the following:

- Conduit stubs shall be 40 mm or 50 mm diameter for 100 amp services and 80 mm diameter for 200 amp services and comply with NS130. All services shall be assumed to be 100 amp unless otherwise specified.
- Only use conduit 90 degree large sweep bends as any sharper angle will impede cable entry.
- The upper end of the conduit stub shall extend 50 mm above the sand/cement mix and be placed 50 mm clear of the inside edge of the pillar base.
- The conduit stubs are to extend a minimum of 200 mm outside the footprint of the pillar base on the property side of the pillar and shall be capped at both ends using conduit caps of the appropriate size.
- The minimum cover for the conduit stub shall be 500 mm.
- The PVC service cable sheath shall be terminated 10mm above the end of the conduit stub.

Annexure E: Distribution Pillar (Solid Connection - Lugged) (LV1-81)

This specification is the result of merging LV1-35 and LV1-80, and provides the requirements for constructing a solid connection Distribution Pillar for:

- 185mm² stranded copper conductor, XLPE insulated, PVC sheathed, single core cables (185 CU1 XQ Z).
- 240mm² four core, stranded copper conductor, XLPE insulated, PVC sheathed cables (240 CU4 XQ Z).
- 240mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (240 AL4 XQ Z/SAC).
- 300mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (300 AL4 XQ Z/SAC).

Note that if all distributor cables are solid-sector aluminium (240 AL4 XQ Z/SAC or 300 AL4 XQ Z/SAC), then use arrangement LV1-82, CMPBL2EA or CMPBL3EA as appropriate.

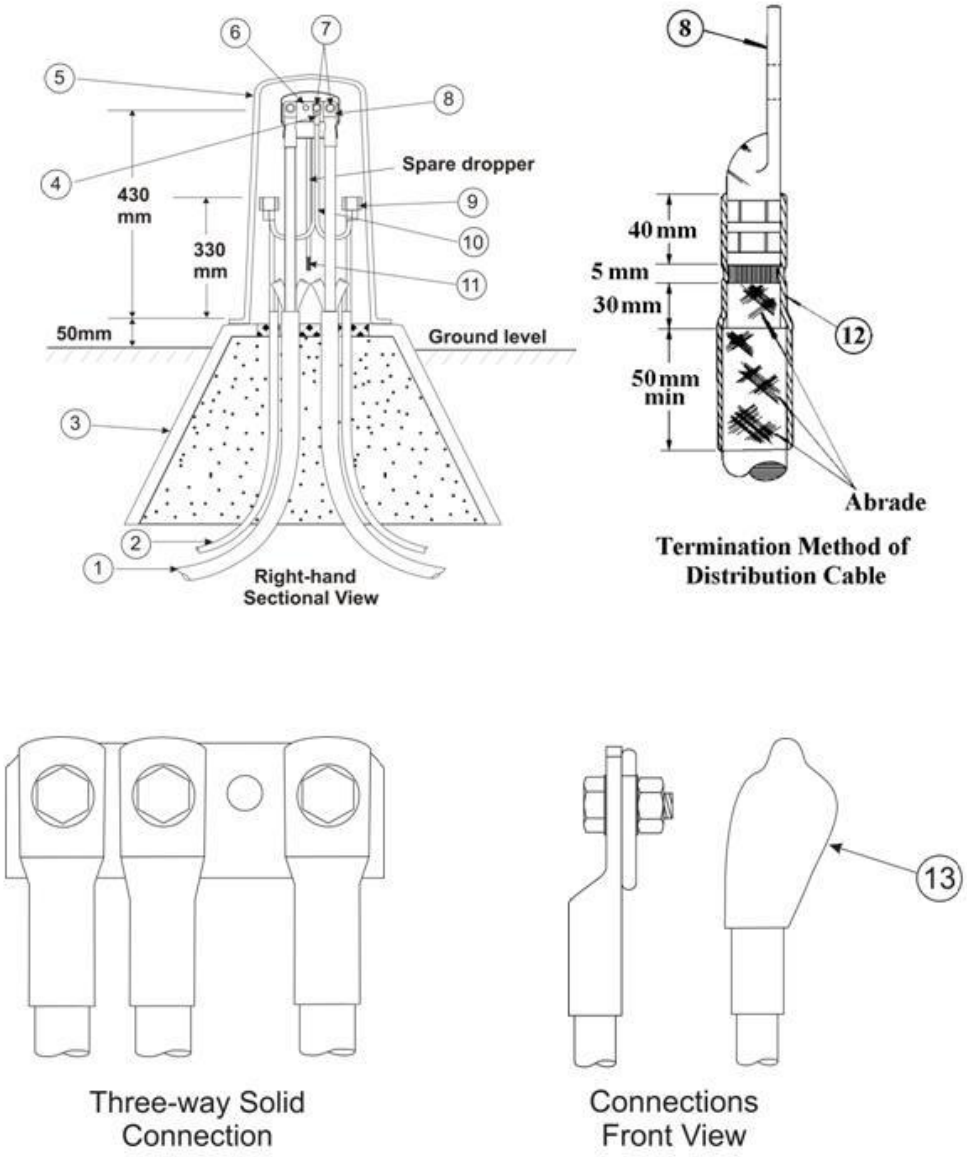


Figure 13 – General Arrangement

Table 12 - Common Components Independent of Cable Type

Item	Description	Material	Quantity	Stockcode
3	Pillar base	Polyethylene	1	90993
4	M12 Compression lug 50 mm²	Tinned copper	4	74823
5	Turret (Large)	Polyethylene	1	6668
6	Distributor and service bar	Tinned copper	1	Kit: 143784
9	6 hole service termination block	Tinned brass with clear polycarbonate cover	4	150409
10	Dropper cable (colour-coded cores)	50 CU4 XQ Z	Length as required	149112
11	Heatshrink cap	18/7mm medium-wall, mastic lined	4	176801
13	Heatshrink cap	145/71mm medium-wall, unlined	4	179701

Module A – For 185 CU1 XQ Z

Table 13 - Material List

Item	Description	Material	Quantity	Stockcode
1	Distribution cable	185 CU1 XQ Z/COM/ #COLOUR 185 CU1 XQ Z	As required	151183 61432
2	Service cable	Refer to Clause 2	As required	–
7	M12 x 35 mm bolt	Stainless steel	4	45021
	M12 nut	Stainless steel	4	8987
	M12 flat washer	Stainless steel	8	49429
	M12 spring washer	Stainless steel	4	143859
8	185 mm² compression lug	Tinned copper	4	175532
12	Heatshrink sleeve, 150 mm long	35/12mm medium-wall, mastic lined	4	181351 (available in pack of 16)

Module B – For 240 CU4 XQ Z

Table 14 - Material List

Item	Description	Material	Quantity	Stockcode
1	Distribution cable	240 CU4 XQ Z	As required	H108589
2	Service cable	Refer to Clause 2	As required	–
7	M12 x 30 mm bolt, nut, washers	Stainless steel	4	175911 (available in pack of 50)
8	240 mm² compression lug	Tinned copper	4	175533
12	Heatshrink sleeve, 150 mm long	51/16mm medium-wall, mastic lined	4	143776 (available in 1200mm length)

Module C – For 240 AL4 XQ Z/SAC or 300 AL4 XQ Z/SAC

Table 15 – Material List

Item	Description	Material	Quantity	Stockcode
1	Distribution cable	240 AL4 XQ Z/SAC 300 AL4 XQ Z/SAC	As required	141739 185413
2	Service cable	Refer to Clause 2	As required	–
7	M12 x 30 mm bolt, nut, washers	Stainless steel	4	175911 (available in pack of 50)
8	240 mm² compression lug 300 mm² compression lug	Bimetal Bimetal	4 4	141770 186234
12	Heatshrink sleeve, 150 mm long	51/16mm medium-wall, mastic lined	4	143776 (available in 1200mm length)

Notes:

1) The conductor of the 240 CU4 XQ Z cables shall be rounded with rounding dies (S/C 182051) before being inserted into the crimp lug.
2) Only one service active is to be connected into each hole of the termination block (9). This service terminal block also allows for 70mm² copper compacted conductor to be installed.
3) Only one service neutral is to be connected into each hole of the termination block (9). If additional neutral connections are required another termination block may be connected to the spare dropper cable.
4) Spare dropper cable to be installed on neutral bar only.
5) The hole centres in the distributor and service bar (6) for the distributor cable is to be 430 mm from the top of the pillar base.

6) The top of the service termination block (9) is to be 330 mm from the top of the pillar base.

7) Refer to Figure 17 for service conduit stub details (if applicable).

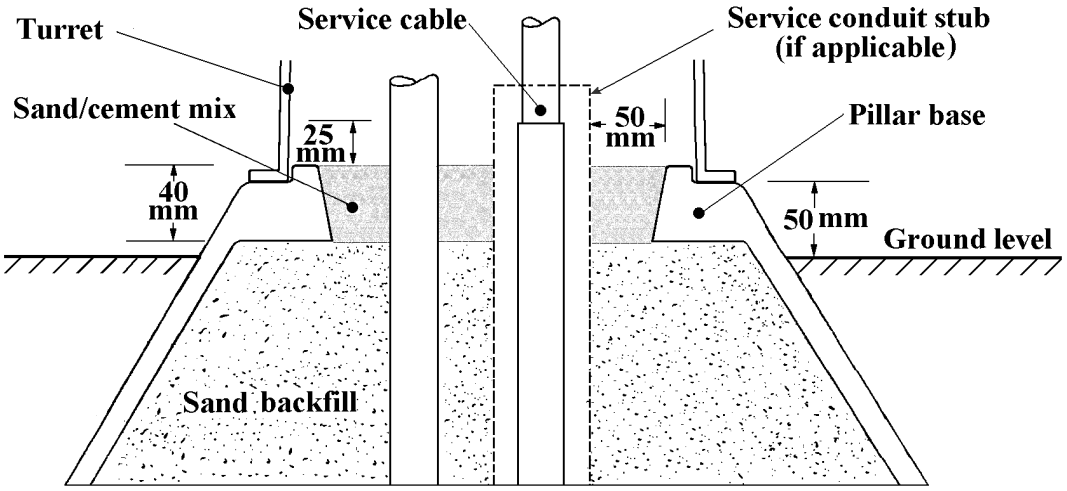


Figure 14 – Pillar Base Details

8) Refer to NS130 for the installation requirements of the pillar base.

9) The pillar base is backfilled with sand and has a 40 mm deep sand/cement mix (20:1).

10) PVC sheaths of multicore cables shall be terminated 25 mm above the surface of the sand/cement mix.

11) The top of the pillar base is to be a minimum of 50 mm above the ground level.

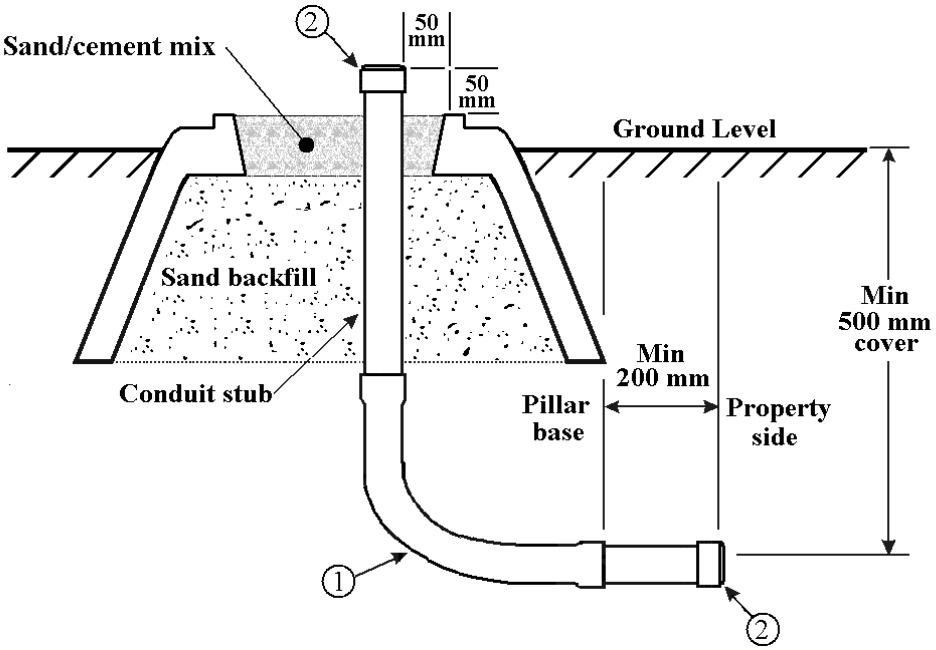


Figure 15 - Conduit Stub Details

Table 16 - Material List

Item	Description	Material	Quantity	Stockcode
1	Conduit 90 deg large sweep bends: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	1	 Clipsal Part No. 247L40EO 52415 Clipsal Part No. 247P80EO
2	Conduit cap: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	2	 Clipsal Part No. 262/40EO 179754 Clipsal Part No. 262P80

12) A conduit stub shall be installed in accordance with Figure 17 for each cable that has not been initially laid prior to the installation of the pillar noting the following:

- Conduit stubs shall be 40 mm or 50 mm diameter for 100 amp services and 80 mm diameter for 200 amp services and comply with NS130. All services shall be assumed to be 100 amp unless otherwise specified.
- Only use conduit 90 degree large sweep bends as any sharper angle will impede cable entry.
- The upper end of the conduit stub shall extend 50 mm above the sand/cement mix and be placed 50 mm clear of the inside edge of the pillar base.
- The conduit stubs are to extend a minimum of 200 mm outside the footprint of the pillar base on the property side of the pillar and shall be capped at both ends using conduit caps of the appropriate size.
- The minimum cover for the conduit stub shall be 500 mm.
- The PVC service cable sheath shall be terminated 10mm above the end of the conduit stub.

Annexure F: Single Link Distribution Pillar (LV1-37)

This specification provides the requirements for constructing a Single Link Distribution Pillar for:

- 185mm² stranded copper conductor, XLPE insulated, PVC sheathed, single core cables (185 CU1 XQ Z).
- 240mm² four core, stranded copper conductor, XLPE insulated, PVC sheathed cables (240 CU4 XQ Z).
- 240mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (240 AL4 XQ Z/SAC).
- 300mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (300 AL4 XQ Z/SAC).

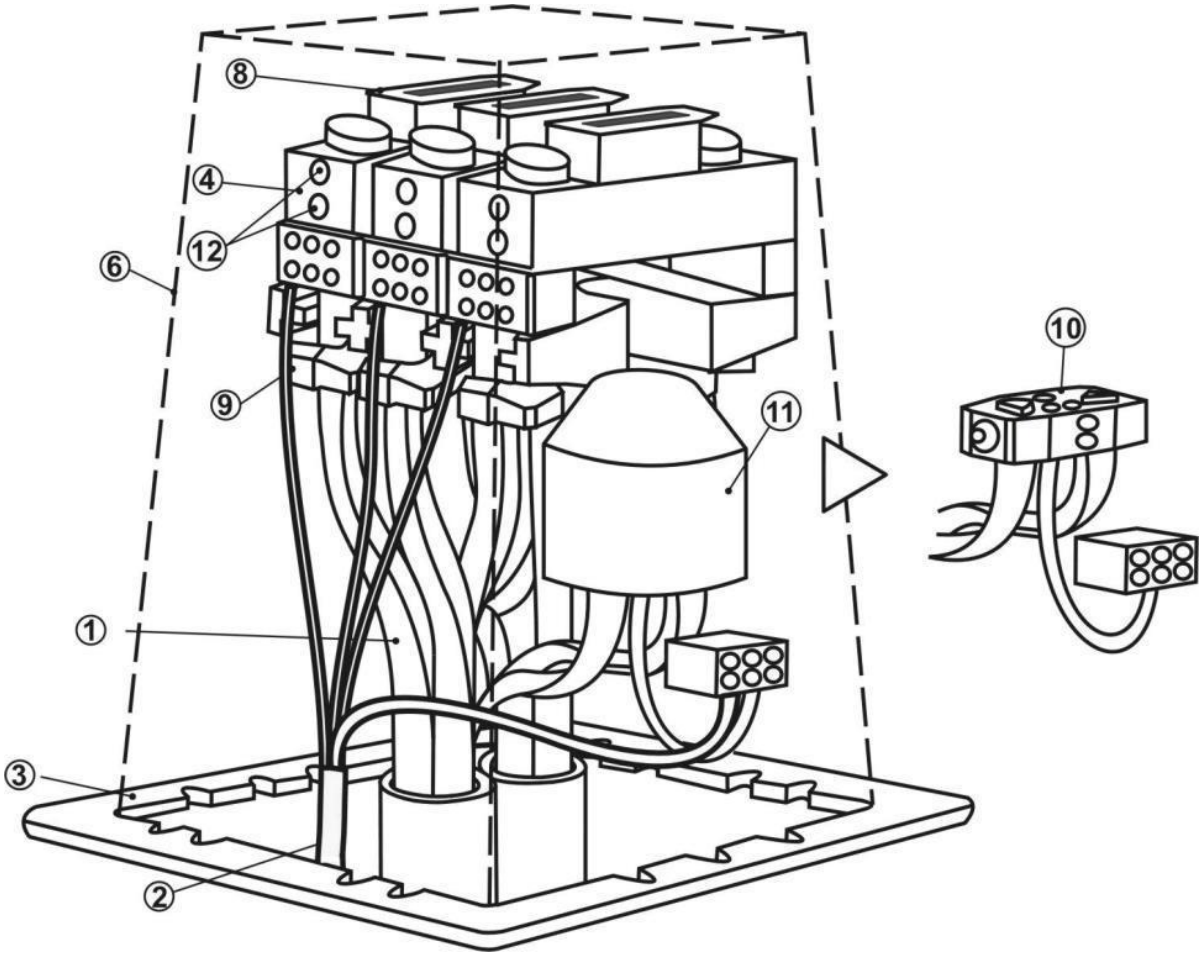


Figure 16 - General Arrangement

Table 17 - Material List

Item	Description	Material	Stockcode
1	Distributor cable	240 AL4 XQ Z/SAC 300 AL4 XQ Z/SAC 185 CU1 XQ Z/COM /#COLOUR 185 CU1 XQ Z 240 CU4 XQ Z	141739 185413 151183 61432 H108589
2	Service cable	Refer to Clause 2	–
3	Pillar base	Polyethylene	90993
4	Link Module incorporating service terminal block (See Note 4)	Tinned brass with polycarbonate cover	See Note 1
5	Activating Links (not shown)	Tinned brass and polycarbonate	See Note 1
6	Turret (Large)	Polyethylene	6668
7	T-shaped Operating Handle (not shown)	Polycarbonate	See Note 1
8	Link Covers	PVC	See Note 1
9	Clamping Base	Polycarbonate	See Note 1
10	Neutral connector complete with 200mm long 50mm² copper, black XLPE dropper cable and six hole terminal block (See Note 1)		See Note 1
11	Neutral Cover	PVC	See Note 1
12	Grommets for screw holes	Rubber	See Note 1
13	Cable Ties (not shown)	Nylon	See Note 1
* *	Link Kit	Various	178071
*	Replacement Activating Links	Tinned brass and polycarbonate	179155
*	Replacement T-shaped Operating Handles	Polycarbonate	179154

Notes:

1) Link kit (including Activating Links and Tee Operating Handle) is available on stockcode 178071. The link kit shall be constructed in accordance with the installation instructions supplied.

2) The terminal screws shall be tightened with a torque wrench to the tension specified in the following table:

Table 18 - Terminal screw torque settings

Cable	Torque (Nm)
240AL Solid Sector	45
300AL Solid Sector	45
185CU Stranded Circular	45
240CU Stranded Sector	50

3) Neutral connections are made using the 6 hole termination block (10). Only one service neutral is to be connected into each hole of the termination block. If additional neutral connections are required another termination block may be connected to the neutral bar.

4) Only one service active is to be connected per hole. The service terminal block also allows for a 70mm² copper compacted conductor in the middle terminal to be installed.

5) The initial designed number of services shall not exceed the number specified in NS110 Design of Underground Residential Subdivisions, i.e. four 100 amp 3-phase services per link pillar. The maximum number of services connected to each side of the pillar shall not exceed:

   - 1 x 200 Amp 3 phase service, or
   - 3 x 100 Amp 3 phase services.

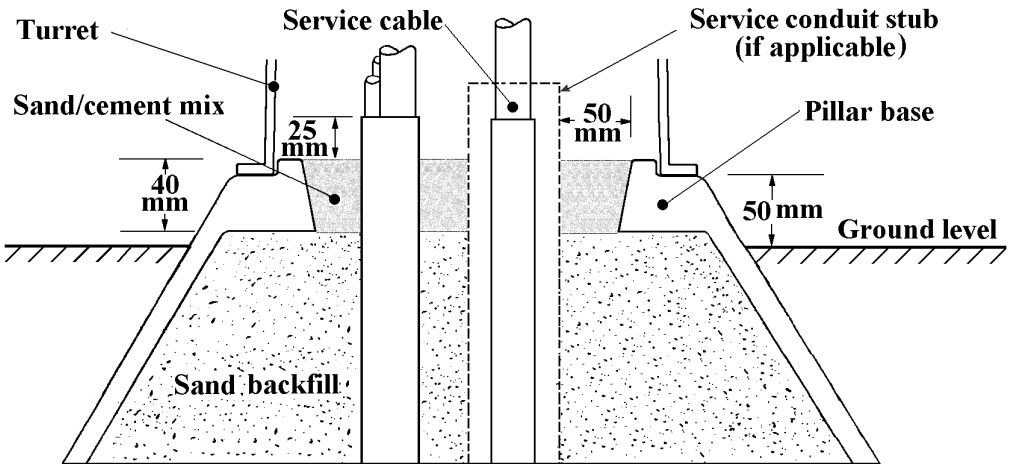


Figure 17 - Pillar Base Details

6) Refer to NS130 for the installation requirements of the pillar base.

7) The pillar base is backfilled with sand and has a 40 mm deep sand/cement mix (20:1).

8) PVC sheaths of all cables shall be terminated 25 mm above the surface of the sand/cement mix.

9) Refer to Figure 20 for service conduit stub details (if applicable).

10) The top of the pillar base is to be a minimum of 50 mm above the ground level.

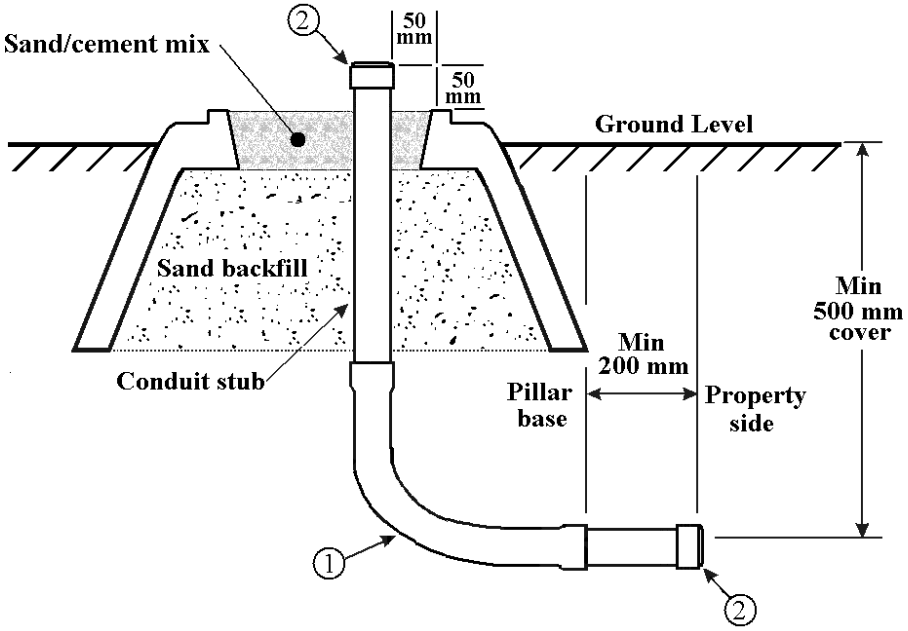


Figure 18 - Conduit Stub Details

Table 19 - Material List

Item	Description	Material	Stockcode
1	Conduit 90 deg large sweep bends: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 247L40EO 52415 Clipsal Part No. 247P80EO
2	Conduit cap: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 262/40EO 179754 Clipsal Part No. 262P80

11) Each distribution cable shall be terminated into the link modules on the side at which the cable enters the pillar.

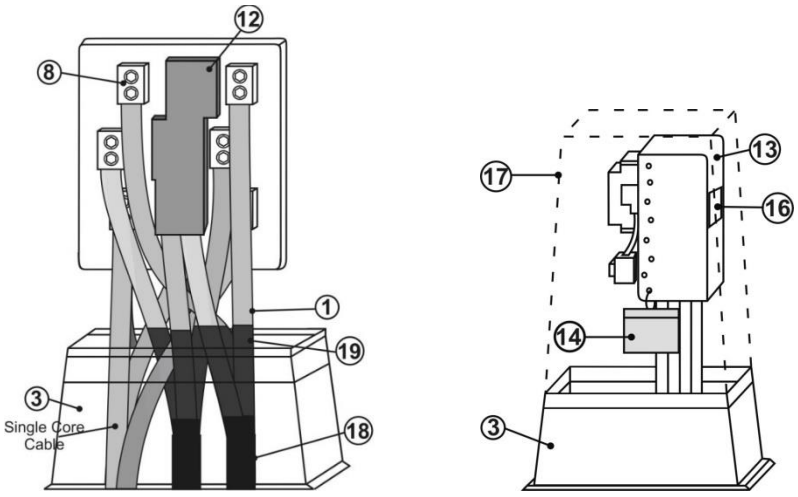
12) A conduit stub shall be installed in accordance with Figure 20 for each cable that has not been initially laid prior to the installation of the pillar noting the following:

- Conduit stubs shall be 40 mm or 50 mm diameter for 100 amp services and 80 mm diameter for 200 amp services and comply with NS130. All services shall be assumed to be 100 amp unless otherwise specified.
- Only use conduit 90 degree large sweep bends as any sharper angle will impede cable entry.
- The upper end of the conduit stub shall extend 50 mm above the sand/cement mix and be placed 50 mm clear of the inside edge of the pillar base.
- The conduit stubs are to extend a minimum of 200 mm outside the footprint of the pillar base on the property side of the pillar and shall be capped at both ends using conduit caps of the appropriate size.
- The minimum cover for the conduit stub shall be 500 mm.
- The PVC service cable sheath shall be terminated 10mm above the end of the conduit stub.

Annexure G: Double Link Distribution Pillar (LV1-60)

This specification provides the requirements for constructing a Double Link Distribution Pillar for:

- 185mm² stranded copper conductor, XLPE insulated, PVC sheathed, single core cables (185 CU1 XQ Z).
- 240mm² four core, stranded copper conductor, XLPE insulated, PVC sheathed cables (240 CU4 XQ Z).
- 240mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (240 AL4 XQ Z/SAC).
- 300mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (300 AL4 XQ Z/SAC).



Note: The heatshrink tubing on the 4-core cable, ends 25mm above the pillar base. The cable sheath of the single core cables end 10mm below the terminals.

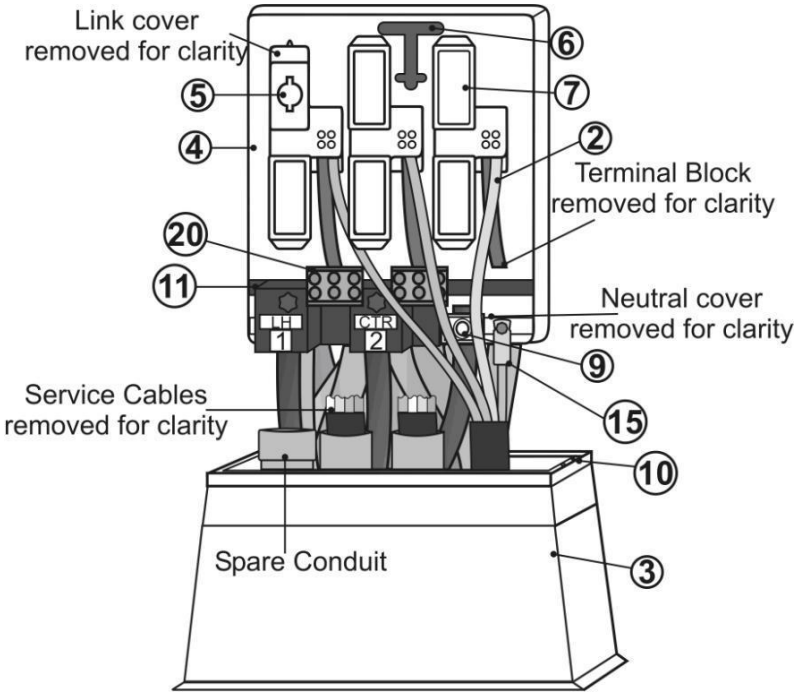


Figure 19 - General Arrangement

Table 20 - Material List

Item	Description	Material	Stockcode
1	Distributor cable	240 AL4 XQ Z/SAC 300 AL4 XQ Z/SAC 185 CU1 XQ Z/COM /#COLOUR 185 CU1 XQ Z 240 CU4 XQ Z	141739 185413 151183 61432 H108589
2	Service cable	Refer to Clause 2	–
3	Pillar base	Polyethylene	180101
4	Link panel assembly with neutral bar and integrated service blocks insulated and 3 three-hole termination blocks for additional services	Tinned Brass with Polycarbonate covers	See Note 1
5	Activating Links	Tinned brass and polycarbonate	See Note 1
6	T-shaped operating handle attached to link panel	Polycarbonate	See Note 1
7	Link Covers	PVC	See Note 1
8	Set of dovetails with two clamping screws	Tinned Brass	See Note 1
9	Set of dovetails with one clamping screw	Tinned Brass	See Note 1
10	Self-tapping screws for securing link panel assembly to pillar base	Stainless Steel	See Note 1
11	Neutral Cover	Polycarbonate	See Note 1
12	Centre Phase Cover	Polycarbonate	See Note 1
13	Panel Assembly Rear Cover	Polycarbonate	See Note 1
14	Plastic Storage Bag for Links	Plastic	See Note 1
15	M8 tinned copper compression lug	16mm² 50mm²	176555 57604
16	Distributor Labelling Panel	PVC	See Note 1
17	Turret (Large)	Polyethylene	6668
18	Heatshink Insulating Glove, 4-way		78527
19	Heatshrink Insulating Sleeve, 12.5m Roll		60228
20	3 hole service termination block (See Note 5)	Tinned brass with clear polycarbonate cover	See Note 1
* *	Link kit	Various	180091
*	Replacement Activating Links	Tinned brass and polycarbonate	179155
*	Replacement T-shaped Operating Handles	Polycarbonate	179154

Notes:

1) Link panel kit (including Activating Links and T-shaped Operating Handle) is available on stockcode 180091. The link kit shall be constructed in accordance with the installation instructions supplied. An additional labelling requirement for the Hunter Region is to include the link number issued for each link between the distributor numbers on the label, as shown in the example below:

   1 To AB-12345 (this refers to the pillar number connected to distributor no.1)

   LVL-12345 (this refers to the Low Voltage Link number between distributors 1 & 2)

   2 To CD-12345 (this refers to the pillar number connected to distributor no.2)

   LVL-12345 (this refers to the Low Voltage Link number between distributors 2 & 3)

   3 To EF-12345 (this refers to the pillar number connected to distributor no.3)

2) Training in the installation of this link pillar shall be completed prior to installing. Training for Ausgrid staff can be arranged by emailing training@ausgrid.com.au. ASPs are to directly contact the supplier of this pillar (TE Connectivity) on email tappat@te.com to arrange training.

3) The terminal screws shall be tightened with a torque wrench to the tension specified in the following table:

Table 21 – Terminal screw torque settings

Cable	Torque (Nm)
240AL Solid Sector	45
300AL Solid Sector	45
185CU Stranded Circular	45
240CU Stranded Sector	50

4) Service neutral connections are made by crimping an M8 compression lug onto the service neutral conductor and terminating it on to the neutral bar. Only one neutral allowed per bolted connection.

5) Only one service active is to be connected per hole. Service actives to be terminated into the service tunnels integrated with the link panel assembly prior to utilising the three-hole termination blocks.

6) The initial designed number of services shall not exceed the number specified in NS110 Design of Underground Residential Subdivisions, i.e. three 100amp 3-phase services. The maximum number of services connected to the pillar shall not exceed:

   - 1 x 200 Amp 3 phase service, or
   - 4 x 100 Amp 3 phase services.

A minimum of one service shall be connected when the pillar is being constructed as this will leave sufficient room in the pillar base for three conduit stubs for future services.

If installed in a new development where no services (including three phase street light circuits) are initially required, a maximum of 3 services may be taken from a double link pillar.

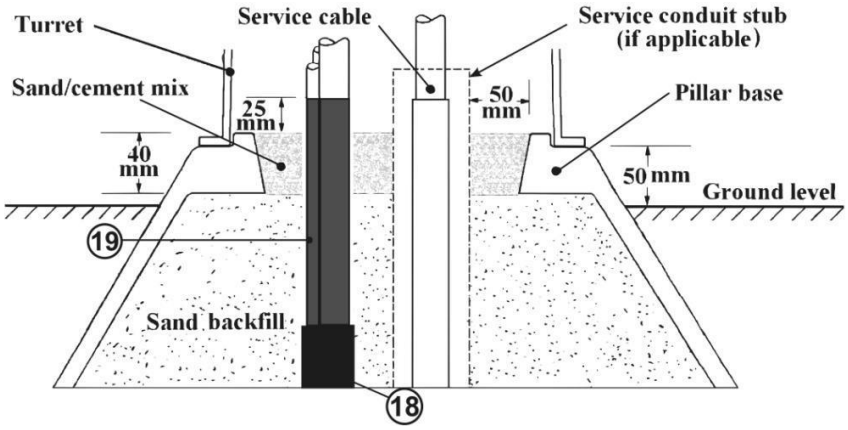


Figure 20 - Pillar Base Details

7) Refer to NS130 for the installation requirements of the pillar base.
8) The pillar base is backfilled with sand and has a 40 mm deep sand/cement mix (20:1).
9) PVC sheaths of all cables shall be terminated 25 mm above the surface of the sand/cement mix.
10) Refer to Figure 23 for service conduit stub details (if applicable).
11) The top of the pillar base is to be a minimum of 50 mm above the ground level.

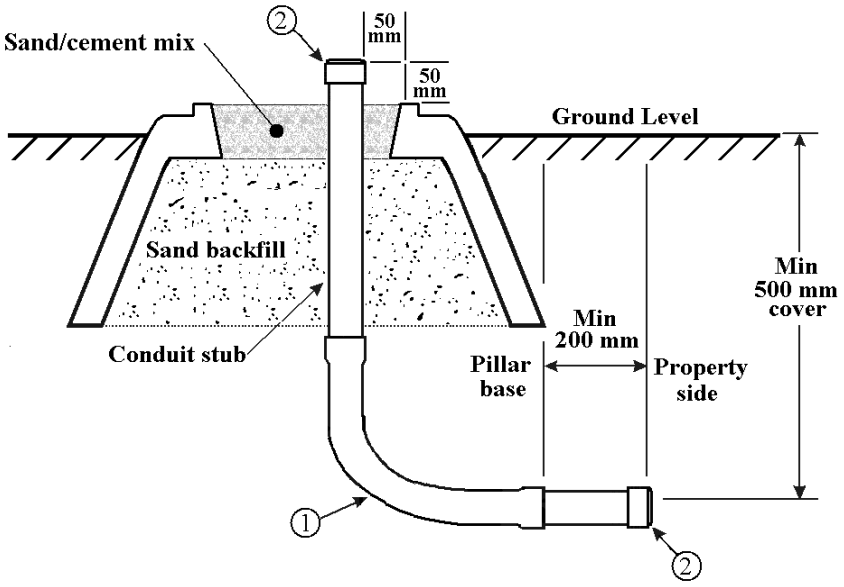


Figure 21 - Conduit Stub Details

Table 22 – Material List

Item	Description	Material	Stockcode
1	Conduit 90 deg large sweep bends: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 247L40EO 52415 Clipsal Part No. 247P80EO
2	Conduit cap: 40 mm (100 amp service) 50 mm (100 amp service) 80 mm (200 amp service)	PVC	 Clipsal Part No. 262/40EO 179754 Clipsal Part No. 262P80

12) A conduit stub shall be installed in accordance with Figure 23 for each cable that has not been initially laid prior to the installation of the pillar noting the following:

- Conduit stubs shall be 40 mm or 50 mm diameter for 100 amp services and 80mm diameter for 200 amp services and comply with NS130. All services shall be assumed to be 100 amp unless otherwise specified.
- Only use conduit 90 degree large sweep bends as any sharper angle will impede cable entry.
- The upper end of the conduit stub shall extend 50 mm above the sand/cement mix and be placed 50 mm clear of the inside edge of the pillar base.
- The conduit stubs are to extend a minimum of 200 mm outside the footprint of the pillar base on the property side of the pillar and shall be capped at both ends using conduit caps of the appropriate size.
- The minimum cover for the conduit stub shall be 500 mm.
- The PVC service cable sheath shall be terminated 10mm above the end of the conduit stub.

13) As the distributor cables hold the link panel in place, all three (3) distributor cables shall be installed during the construction of this pillar.

Annexure H: Underground SLCP Without Contactor (LV1-91)

This specification provides the requirements for constructing a pillar-mounted Street Lighting Control Point without a contactor.

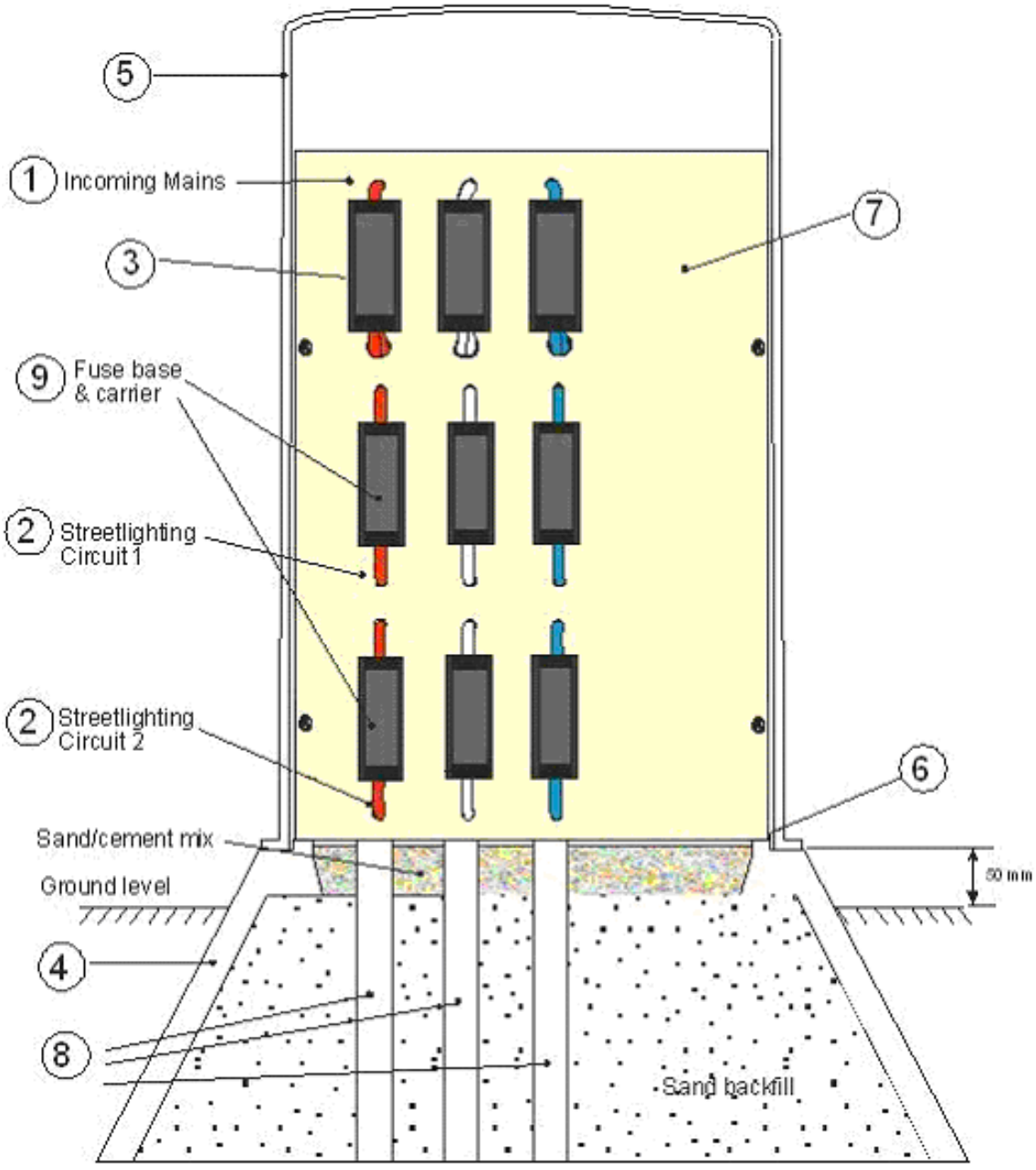


Figure 22 - General Arrangement (front view)

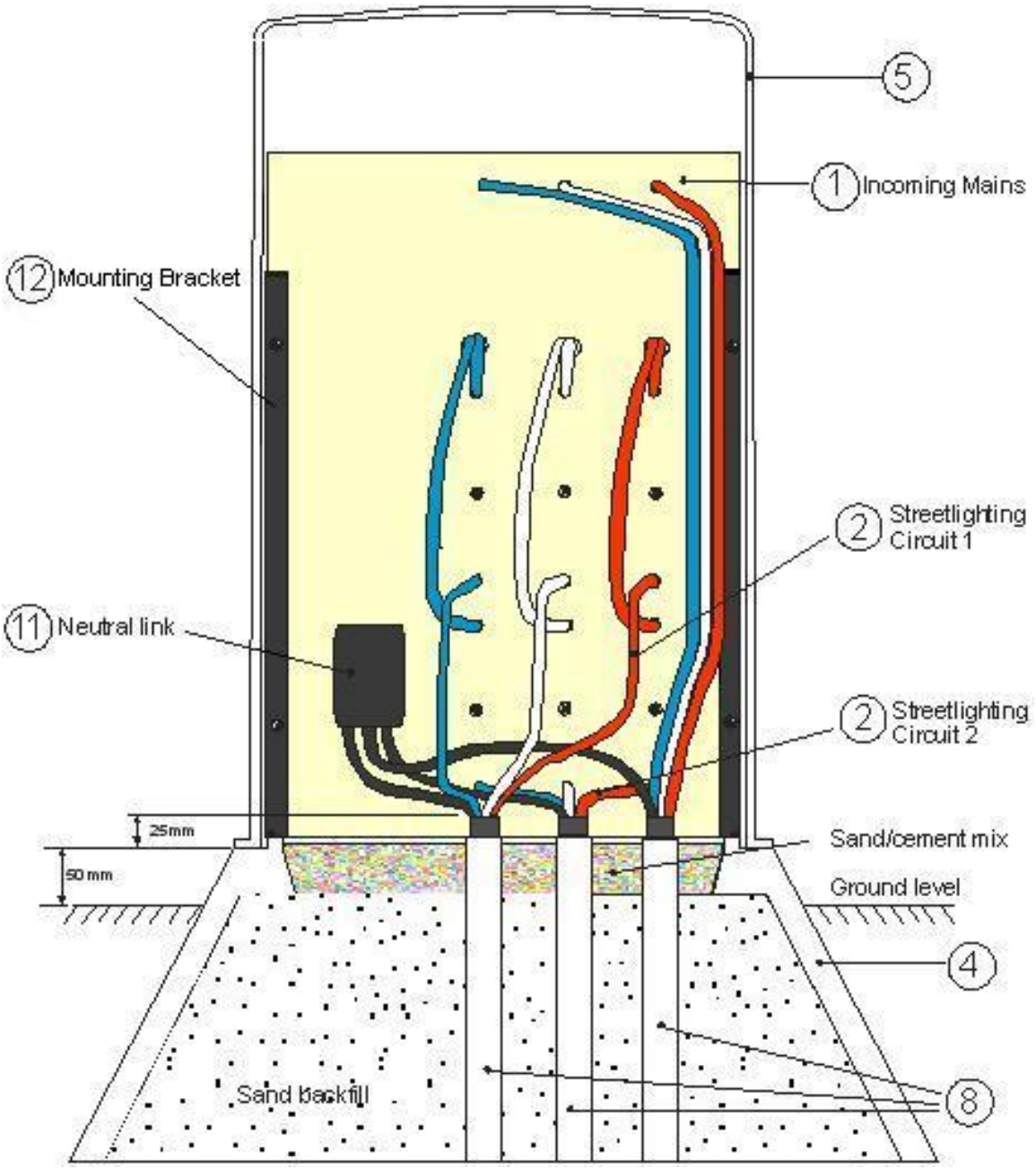


Figure 23 - General Arrangement (rear view)

Table 23 – Material List

Item	Description	Material	Qty	Stockcode
1	Incoming mains cable	16 Cu4 XQZ	-	148668
2	Streetlighting Cable	16 CU4 XQZ	-	148668
3	Active links	Red Spot RS63BW fitted with a Red Spot RS63CLINK Link.	3	See Note 1
4	Pillar base	Polyethylene	1	90993
5	Turret (large)	Polyethylene	1	6668
6	Screws	Stainless steel, SS304, Self tapping, Pan head, Phillips, 4G x 1". Blackwoods part no. 00292519 To affix the angle-iron bracket to the base behind the panel.	8	-
7	Panel		1	See Note 1
8	Conduit, 50mm	PVC	-	78022
9	Fuse base and carrier	SAFE CLIP SC32BW	6	See Note 1
9a	32A HRC fuses	32A HRC fuses. Offset tab.	6	18960
10	Conduit 90 deg large sweep bend, 50mm	PVC	3	52415
11	Neutral link	Clipsal BPT6	1	See Note 1
12	Angle Iron mounting bracket/s. (1 * Left and 1 * Right)	25mm Galvanised Angle Iron.	2	See Note 1

Notes:

1) Complete panel is available on stockcode 180223.

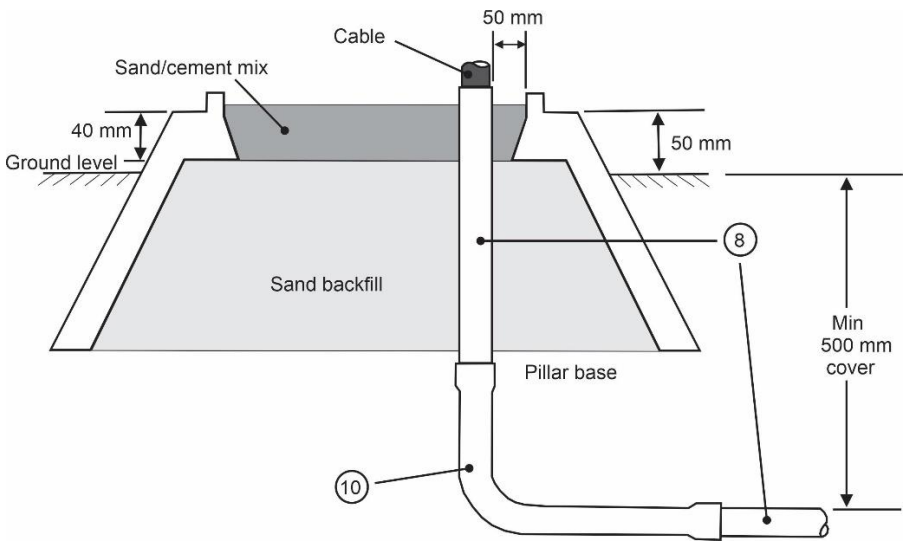


Figure 24 - Pillar Base Details

2) Refer to NS130 for the installation requirements of the pillar base.
3) The pillar base is backfilled with sand and has a 40 mm deep sand/cement mix (20:1).
4) PVC sheaths of all cables shall be terminated 25 mm above the surface of the sand/cement mix.
5) The top of the pillar base is to be a minimum of 50 mm above the ground level.

Annexure I: Indoor Terminations (LV1-41)

This specification provides the requirements for:

- 185mm² stranded copper conductor, XLPE insulated, PVC sheathed, single core cables (185 CU1 XQ Z).
- 300mm² stranded copper conductor, XLPE insulated, PVC sheathed, single core cables (300 CU1 XQ Z).
- 240mm² four core, stranded copper conductor, XLPE insulated, PVC sheathed cables (240 CU4 XQ Z).
- 240mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (240 AL4 XQ Z/SAC).
- 300mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (300 AL4 XQ Z/SAC).

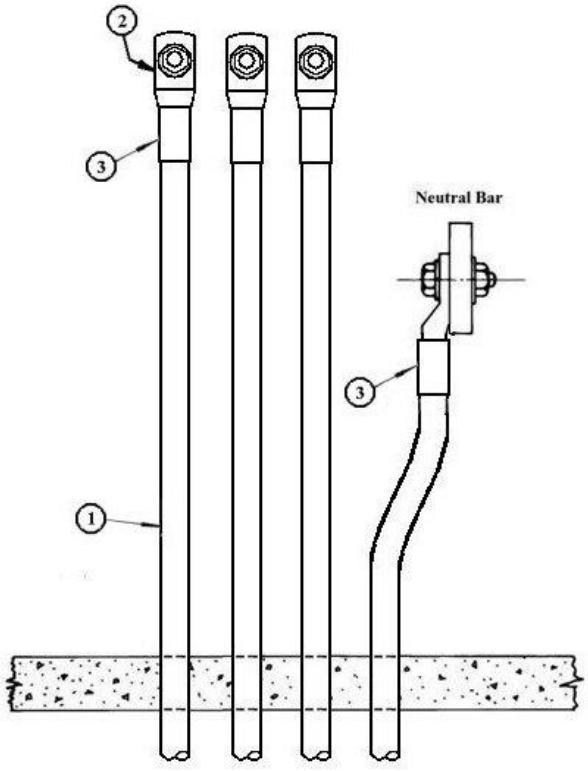
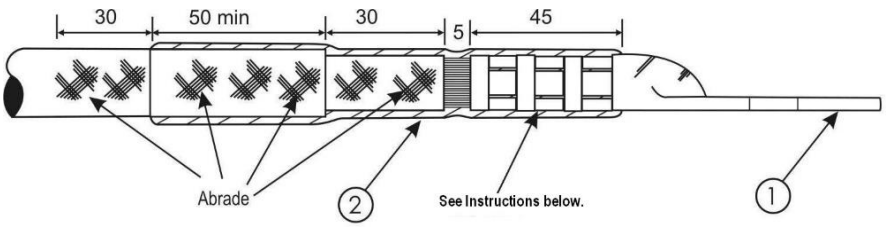


Figure 25 - General Arrangement for Single Core Cables



1) Pre-heat the compression lug before placing the heatshrink sleeve over the cable.
2) Shrink the sleeve starting from the cable end.
3) Apply additional heat to the sleeve and the palm of the lug until a bead of mastic appears around the ends of the sleeve.

Figure 26 - Application of Heatshrink on Single Core Cables

Module A – For 185 CU1 XQ Z

Table 24 – Material List

Item	Description	Material	Quantity	Stockcode
1	Distribution cable	185 CU1 XQ Z/COM/ #COLOUR 185 CU1 XQ Z	As required	151183 61432
2	185 mm² compression lug	Tinned copper	4	175532
3	Heatshrink sleeve, 150 mm long	35/12mm medium-wall, mastic lined	1	181351 (available in pack of 16)
4	Cable tie (black) 293 x 4.8 mm		1	176497 (available in pack of 100)

Module B – For 300 CU1 XQ Z

Table 25 – Material List

Item	Description	Material	Quantity	Stockcode
1	Distribution cable	300 CU1 XQ Z	As required	14266
2	300 mm² compression lug	Tinned copper	4	175534
3	Heatshrink sleeve	51/16mm medium-wall, mastic lined (Cut to 150mm lengths)	1	143776 (available in 1200mm length)
4	Cable tie (black) 293 x 4.8 mm		1	176497 (available in pack of 100)

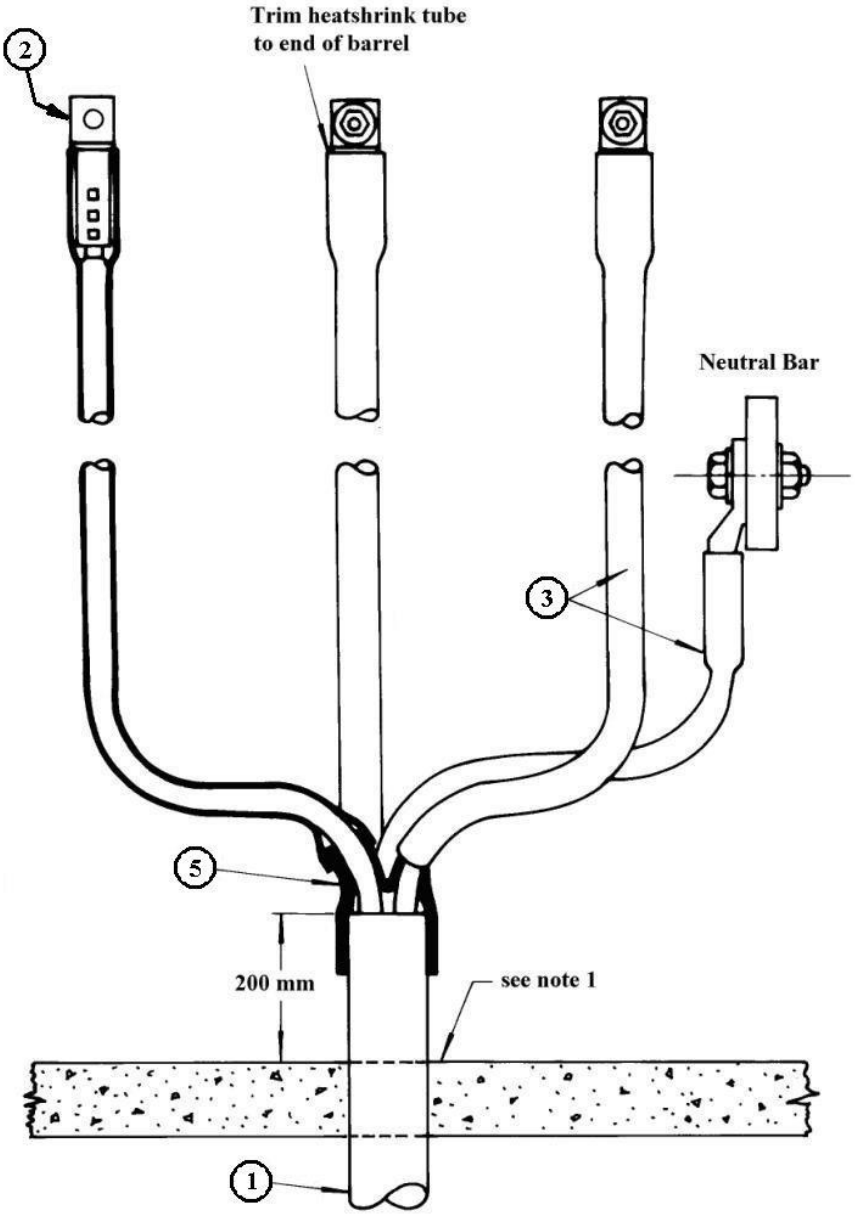


Figure 27 - General Arrangement

Notes:

PVC sheaths of all cables shall be terminated 200 mm above ground level.

Module C – For 240 CU4 XQ Z

Table 26 – Material List

Item	Description	Material	Quantity	Stockcode
1	Distribution cable	240 CU4 XQ Z	As required	H108589
2	240 mm² compression lug	Tinned copper	4	175533
3	Heatshrink sleeve	51/16mm medium-wall, unlined	1	60228 (available in 12.5m roll)
4	Cable tie (black) 293 x 4.8 mm		1	176497 (available in pack of 100)
5	4-way Glove	Heatshrink	1	78527

Notes:

The conductor of the 240 CU4 XQ Z cables shall be rounded with rounding dies (S/C 182051) before being inserted into the crimp lug.

Module D – For 240 AL4 XQ Z/SAC or 300 AL4 XQ Z/SAC

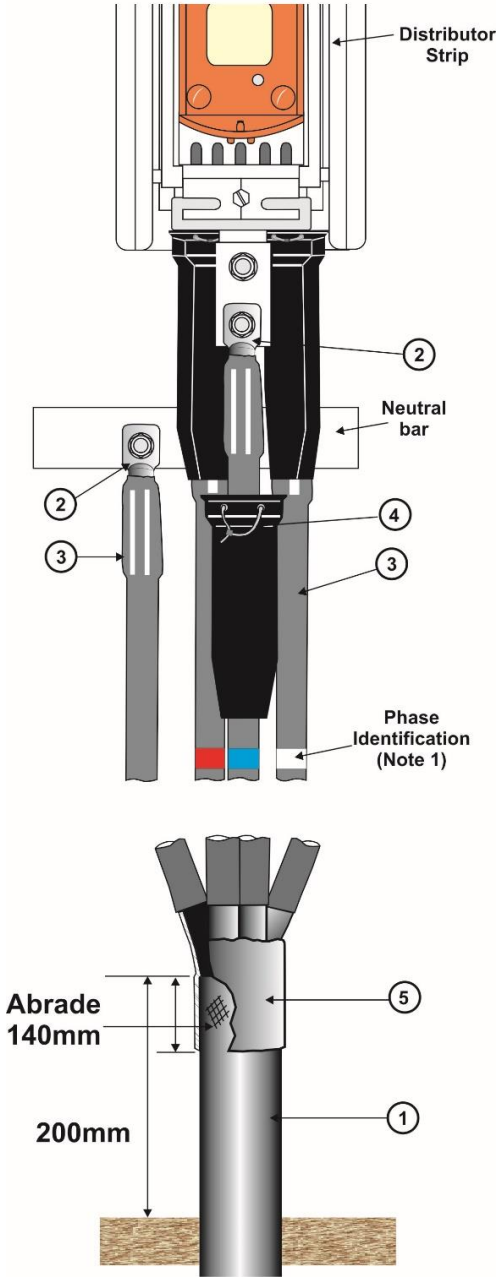
Table 27 – Material List

Item	Description	Material	Quantity	Stockcode
1	Distribution cable	240 AL4 XQ Z/SAC 300 AL4 XQ Z/SAC	As required	141739 185413
2	240 mm² compression lug 300 mm² compression lug	Bimetal Bimetal	4 4	141770 186234
3	Heatshrink sleeve	51/16mm medium-wall, unlined	1	60228 (available in 12.5m roll)
4	Cable tie (black) 293 x 4.8 mm		1	176497 (available in pack of 100)
5	4-way Glove	Heatshrink	1	78527

I1 Single circuit 400 amp SAIF board distributor strips

Refer to NS117 for Consumer Mains requirements for kiosks.

I1.1 General arrangement and description



For Four Core Cables

(Polycarbonate cover is not shown in the above drawing for clarity.)

Figure 28 - General Arrangement – Single Circuit 400A

Notes:

1) When the colour of the cable sheath does not correctly identify the cable, coloured heatshrink tubing or coloured PVC tape shall be used to correctly identify the cable. Colour coded for reference only.

2) Cable termination boots will be supplied with the switch.

Installation of cable termination boots on single circuit 400 amp distributor strips

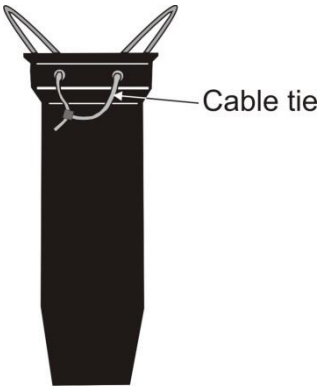
1) Construct the cable termination as per this annexure. Terminate the neutral cable first.
2) Cut the tapered end of the cable termination boots to the dimensions specified in Table 28 below dependent on cable size.

Table 28 – Termination boot dimensions

Cable Size	Dimension A
240 AL4 XQ Z/SAC	50 mm
300 AL4 XQ Z/SAC	50 mm
240 CU4 XQ Z	30 mm
185 CU1 XQ Z	30 mm
300 CU1 XQ Z	50 mm

3) Insert the cable tie through the holes in the cable termination boots and make a loose loop.

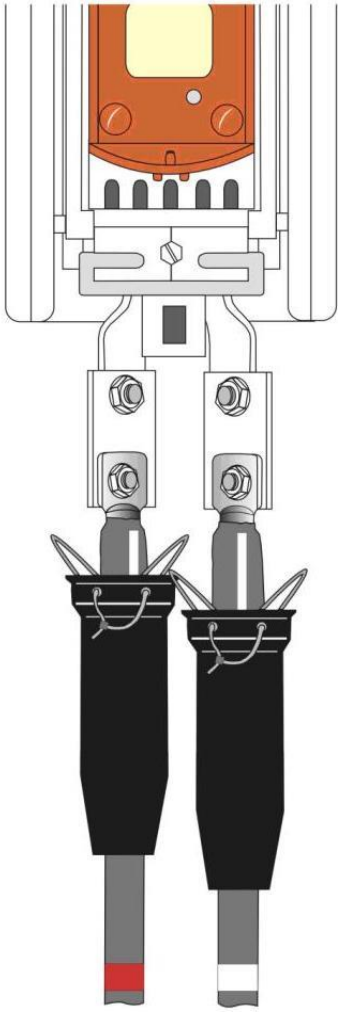
Note: Do not tighten the cable tie at this stage.



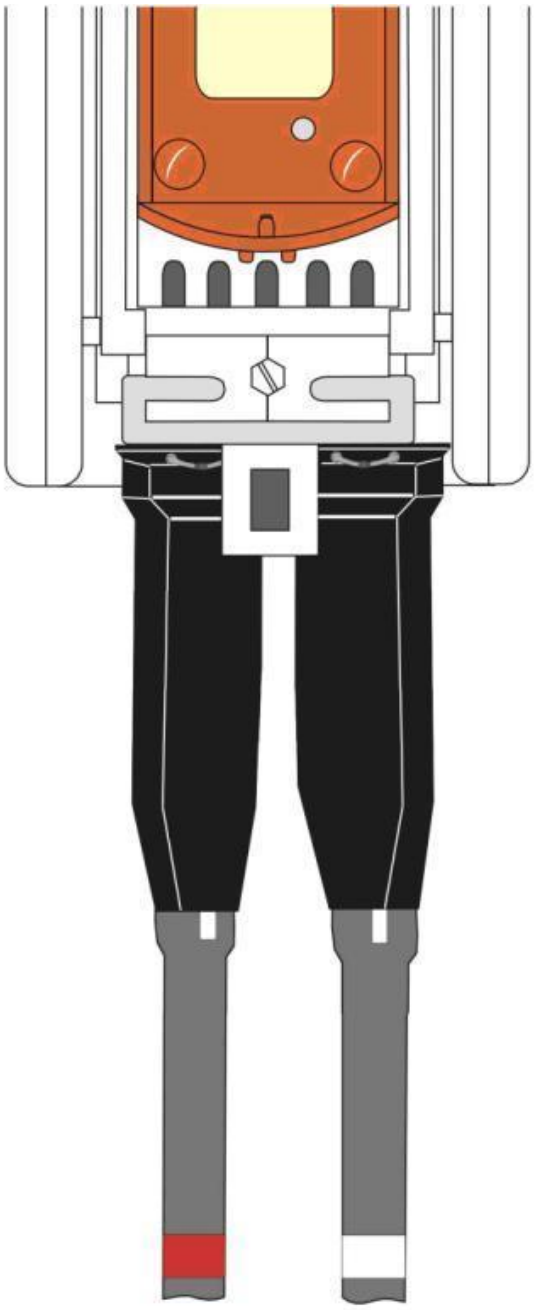
4) Slide the cable termination boot over each cable/core to expose the cable lug.

5) Unbolt the front busbar extension. Securely fasten the cable lug to the switchgear palm. Fasten the rear cable lugs first.

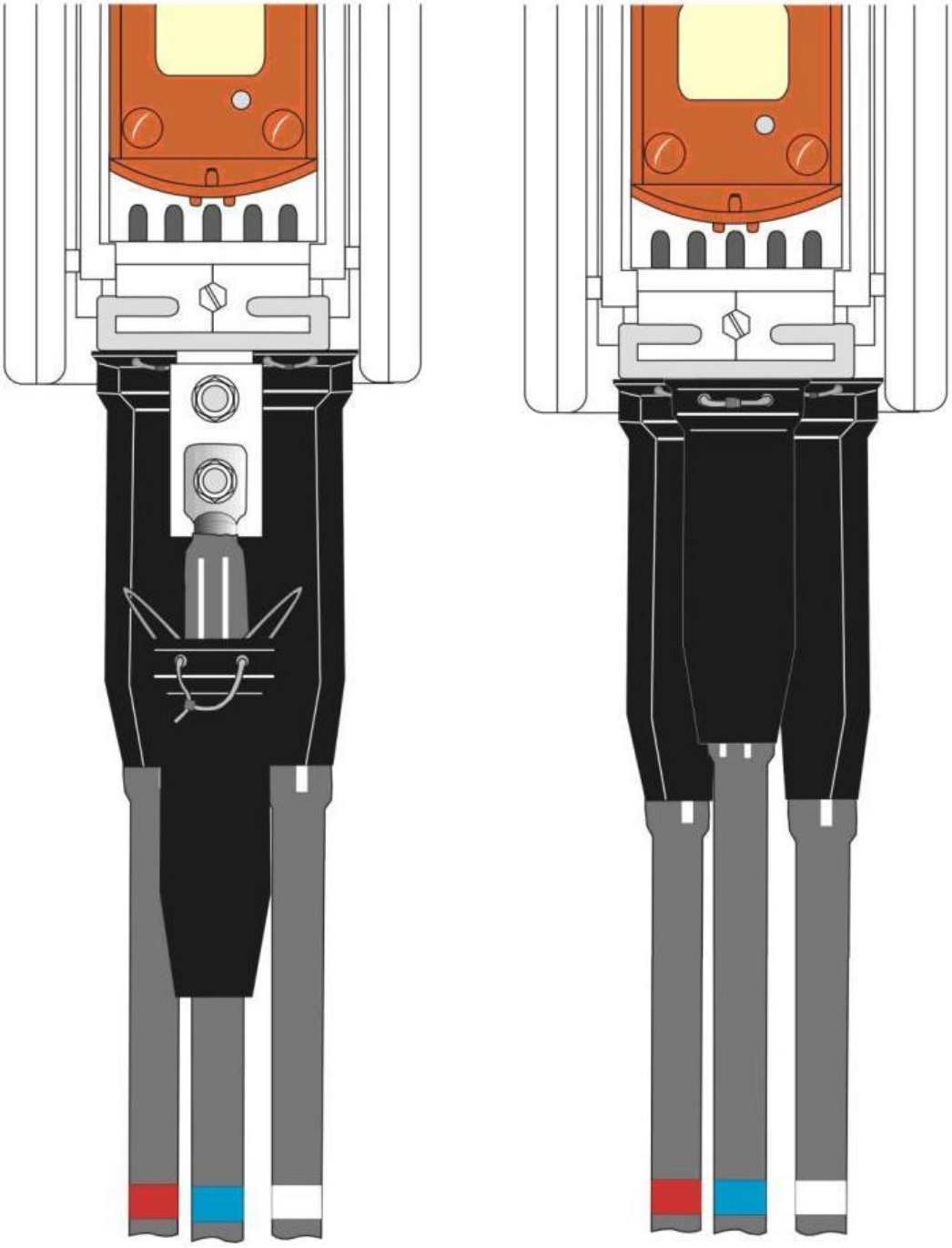
Note: Lubricate the thread as detailed in Clause 4.14 . Wipe all excess anti-seize off the thread after tightening.



6) Slide the cable termination boots of the rear terminations over each one of the terminations. Ensure that the top of the cable termination boot is touching the bottom of the distributor strips and that there is no exposed metal showing. Secure the cable ties and cut off the excess tie ends.

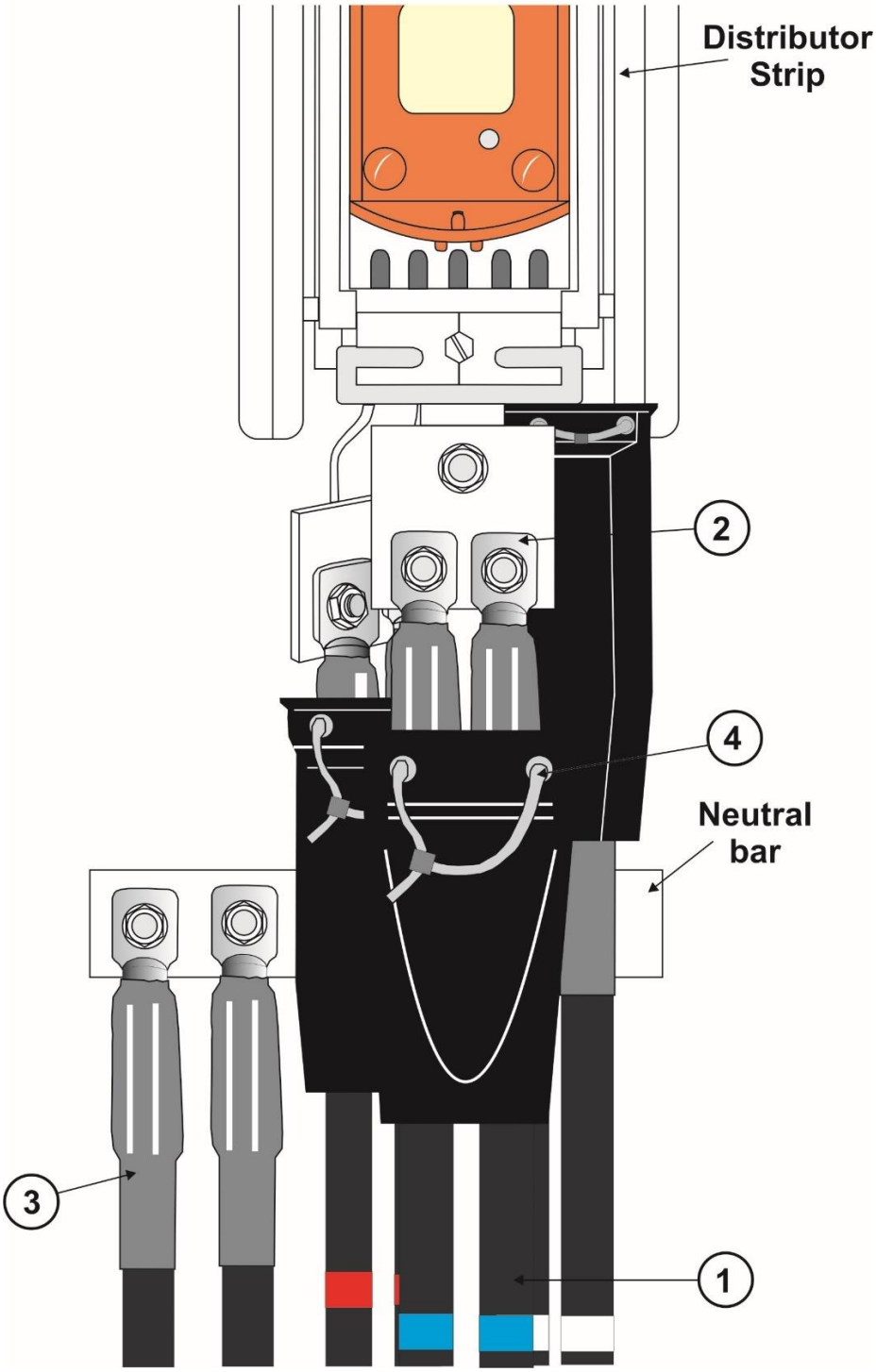


7) Fix the front extension busbar back in position. Securely fasten the cable lug to the switchgear palm. Slide the cable termination boot. Secure the cable tie and cut off the excess tie end.



I2 Double circuit 800 amp SAIF board distributor strips

I2.1 General arrangement and description



(Polycarbonate cover is not shown in the above drawing for clarity.)

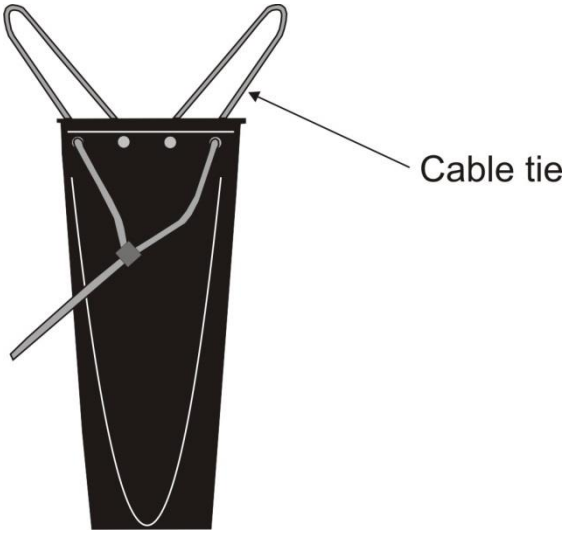
Figure 29 – General Arrangement – Double Circuit 800A

Items for 'Double Circuit 800Amp Distributor Strips' are the same as ‘Single Circuit 400Amp Distributor Strips’. Refer to the relevant Tables 24, 25, 26 or 27 above for item descriptions.

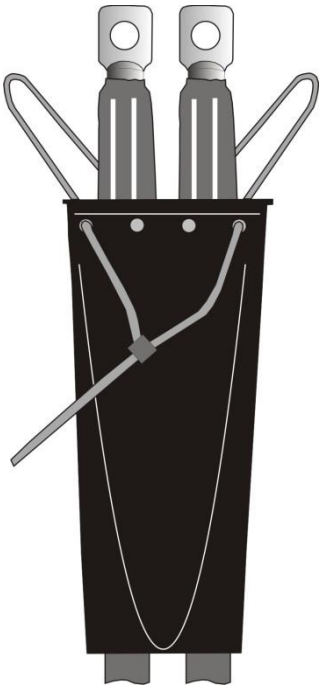
Installation of cable termination boots on double circuit 800 amp distributor strips

1) Construct the cable termination as per this annexure.
2) Insert the cable tie through the outside holes in the cable termination boot and make a loose loop.

Note: Do not tighten the cable tie at this stage.

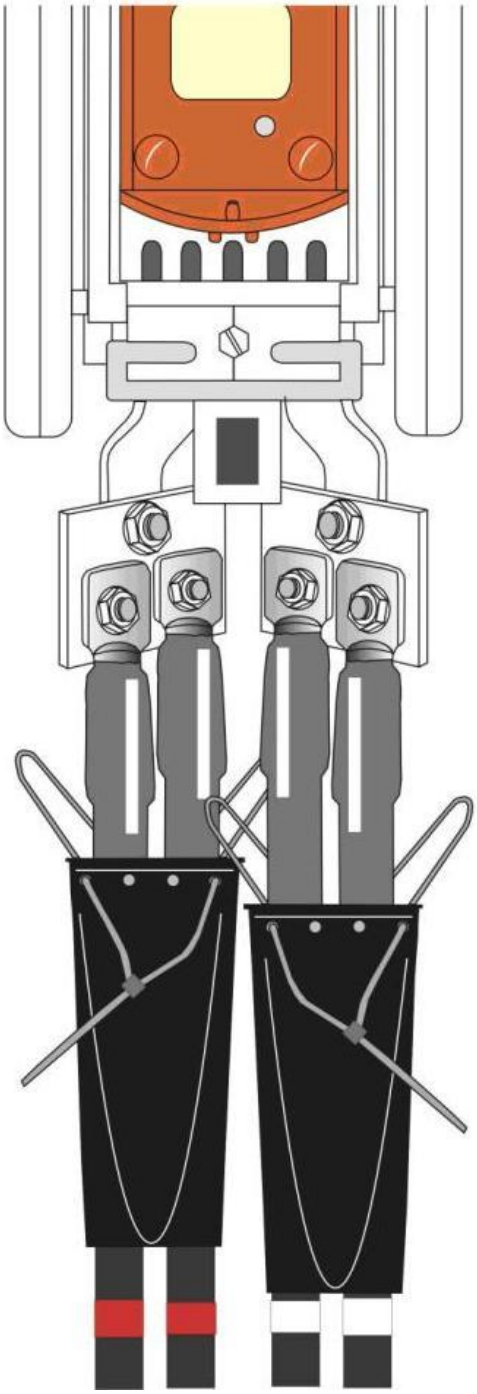


3) Slide the cable termination boot over the two cables/cores of the same phase to expose the cable lugs. Repeat for the remaining two phases.



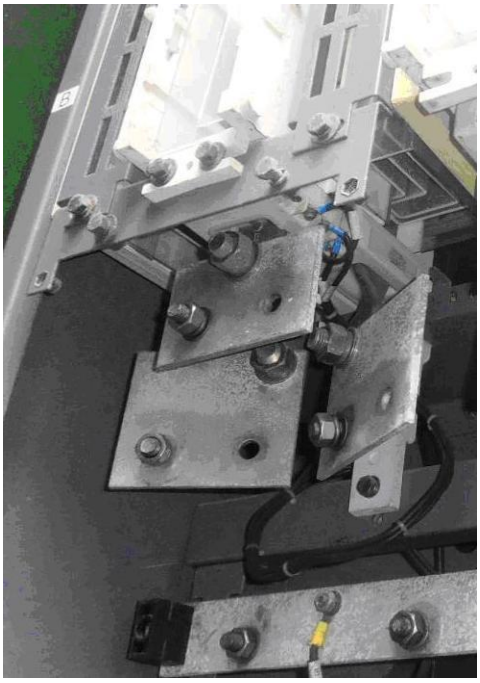
4) Unbolt the front busbar extension from the distributor strip.
5) Securely fasten each pair of cable lugs to their respective rear busbar extensions on the distributor strip.

Note: Lubricate the threads as detailed in Clause 4.14. Wipe all excess anti-seize off the threads after tightening.

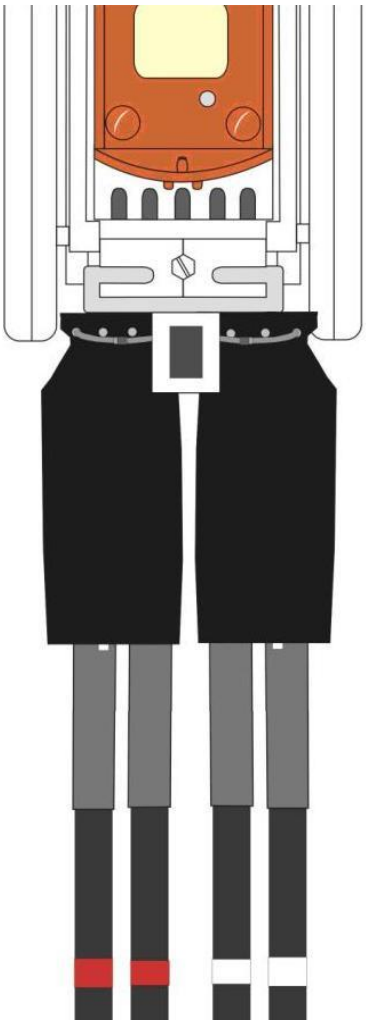


6) Slide the cable termination boot over each of the two rear cable terminations. Ensure that the top of the cable termination boots are touching the bottom of the distributor strip and that there is no exposed metal showing.

Note: If the MDI secondary wiring is installed at the base of the distributor strip (see photo below), ensure that the cable tie does not become entangled in the MDI secondary wiring and put undue pressure on the insulation of the MDI secondary wiring when the cable tie is secured.



7) Secure the cable ties and cut off the excess tie ends.



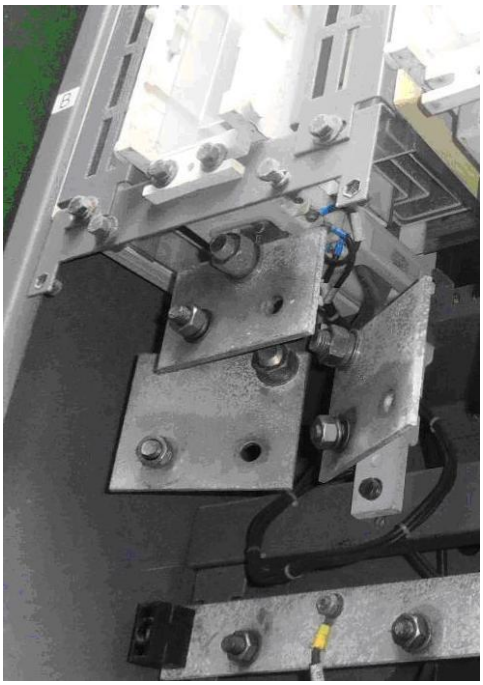
8) Secure the front busbar extension to the distributor strip palm using the M16 set screw, torque to 80Nm.

9) Securely fasten the cable lugs to the busbar extension.

Note: Lubricate the threads as detailed in Clause 4.14 . Wipe all excess anti-seize off the threads after tightening.

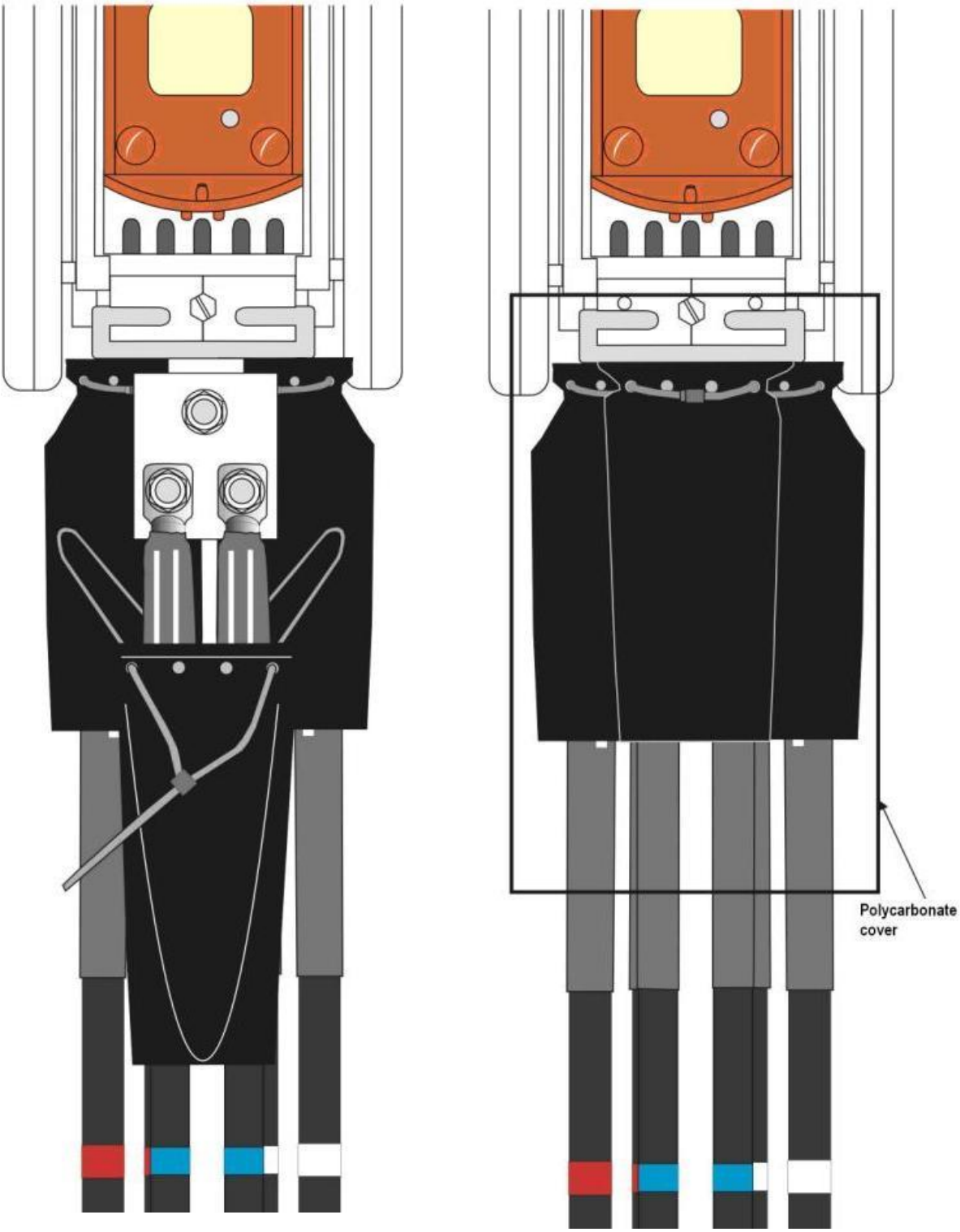
10) Slide the cable termination boot over the cable termination. Ensure that the top of the cable termination boot is touching the bottom of the distributor strip and that there is no exposed metal showing.

Note: If the MDI secondary wiring is installed at the base of the distributor strip (see photo below), ensure that the cable tie does not become entangled in the MDI secondary wiring and put undue pressure on the insulation of the MDI secondary wiring when the cable tie is secured.



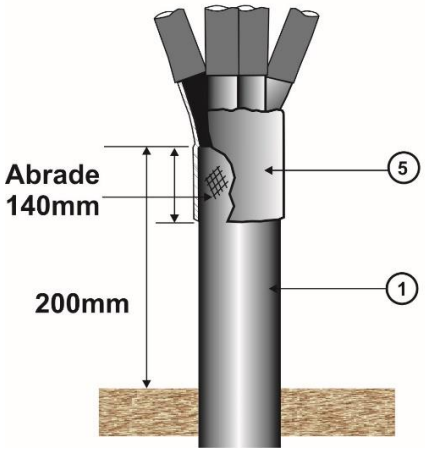
11) Secure the cable tie and cut off the excess tie end.

12) Install the polycarbonate cover.


Polycarbonate
cover

I3 Single circuit 400 amp Weber board distributor strips

I3.1 General arrangement and description



For Four Core Cables

Figure 30 – General Arrangement – Weber Single Circuit 400A

Notes:

1) When the colour of the cable sheath or core insulation does not correctly identify the phase of the cable, coloured heatshrink tubing or coloured PVC tape shall be used to correctly identify the phase. Colour coded for reference only. Only 1 coloured tubing or tape required per phase.

2) Cable termination boots will be supplied with the switch.

Installation of cable termination boots on single circuit 400 amp distributor strips

1) Construct the cable termination as per this annexure. Terminate the neutral cable first.
2) Cut the tapered end of the cable termination boots to exactly match the cable diameter,

Note: Do not slit the boot upwards.

3) Slide the cable termination boot over each cable/core to expose the cable lug.
4) Securely fasten the cable lug to the switchgear palm.

Note: Lubricate the thread as detailed in Clause 4.14. Wipe all excess anti-seize off the thread after tightening.

5) Slide the cable termination boots over each one of the terminations. Ensure that the top open part of the cable termination boot is touching the covered bottom of the distributor strips and that there is no exposed metal showing. Seal up the boot by using the black sealing pins and make sure boot is properly sealed and secure.

Annexure J: Pot End (Live End Seal) for Distribution Cables (LV1-50)

J1 Cables

This specification provides the requirements for a pot end (live end seal) on the following cables:

- single core paper-insulated lead sheathed cables.
- single core paper insulated lead sheathed, PVC oversheathed cables.
- single core cross-linked, polyethylene insulated PVC sheathed cables.
- four core sector shaped solid and stranded, cross-linked, polyethylene insulated, PVC sheathed cables.
- multicore paper insulated metal sheathed cables.

J2 Using pot ends

J2.1 Pot ends (Live End Seals) shall only be used for maintaining the existing network (e.g. decommissioning a section of LV cable) and shall not be used on newly installed cables or network extensions such as staged subdivisions.

J2.2 Where pot ends are to be used, they shall only be installed on cables:

- where it is possible to visually trace the entire length of cable from the pot end to the source of supply, or
- where it is possible to visually trace the entire length of cable from the pot end to the tee joint to which the pot ended section of cable is connected. Additionally, it shall be possible to identify the cables connected to the other two legs of the tee joint using cable identification equipment.

J2.3 When pot ends are to be direct buried, the pot end shall be located as close as practicable to either:

- the source of supply, or
- the tee joint to which the pot ended section of cable is connected.

This requirement is to minimise future civil works for the purposes of cable identification.

If it is intended to join cable to the pot ended section of cable in the future, sufficient cable length shall be left to allow for the pot end to be replaced with a straight through joint.

J3 Approved pot end kits

Ausgrid's stockcodes of approved pot ends are provided in the table below:

Table 29 – Material list

Cable Type	Stockcode
Single Core Cables, 95mm² to 300mm² (See Note 1)	152009
240mm² and 300mm² Four Core Cables	178611
Multicore Paper Insulated Cables, 35mm² to 97mm²	186531
Multicore Paper Insulated Cables, 120mm² to 185mm²	186532
Multicore Paper Insulated Cables, 194mm² to 323mm²	186533

Notes:

1) For 500 Cu1 XQ Z replace the small cable end cap included in the kit with a large cable end cap available on stockcode 62067.

Annexure K: Straight Through Joints for 240 AL4 XQ Z/SAC and/or 300 AL4 XQ Z/SAC Cables (LV2-35)

This specification provides the requirements for a straight through joint on four core sector shaped solid and stranded aluminium conductor, cross-linked, polyethylene insulated, PVC sheathed cables.

Ausgrid has approved the use of heatshrink or cold pour resin straight through joint kits for use on solid sector aluminium cables and only heatshrink straight through joint kits for use on stranded sector aluminium cables.

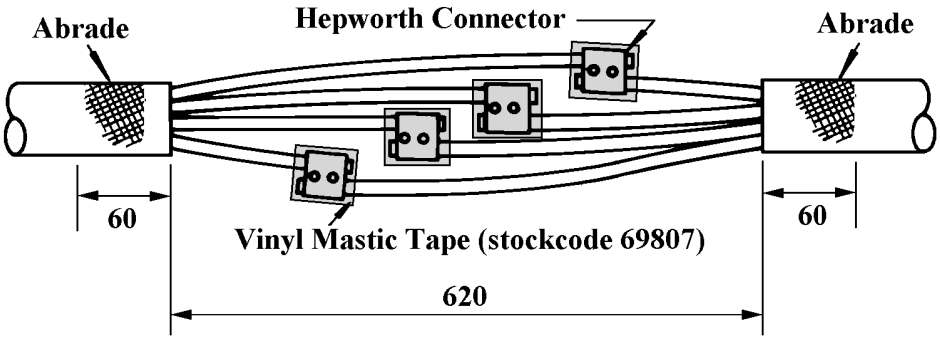
K1 Heatshrink straight through joint kit

Table 30 – Straight Through Joint – Heatshrink Kits

Straight Through Joints		Joint Kit Stockcode
Cable Type	Cable Type	
240 mm² AL4 XQ Z/SAC	240 mm² AL4 XQ Z/SAC	178444
240 mm² AL4 XQ Z/SAC	240 mm² AL4 XQ Z	178444
300 mm² AL4 XQ Z/SAC	240 mm² AL4 XQ Z/SAC	178444
300 mm² AL4 XQ Z/SAC	240 mm² AL4 XQ Z	178444
300 mm² AL4 XQ Z/SAC	300 mm² AL4 XQ Z/SAC	178444

Note 1. The above kits include mechanical connectors.

K2 Cold Pour Resin Joint Kits (only for solid sector aluminium cables)



Notes:

1) Joint mould omitted for clarity.
2) Vinyl mastic tape (stockcode: 69807) is applied with the ends left unsealed to allow the resin to flow around the connector.
3) Hepworth Connector Details:

Table 31 – Hepworth Connector Details

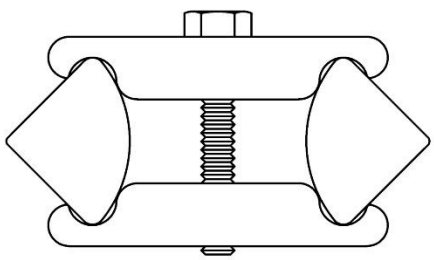
Straight Through Joints		Hepworth Connector Stockcode
Cable Type	Cable Type	
240 mm² AL4 XQ Z/SAC	240 mm² AL4 XQ Z/SAC	128132
300 mm² AL4 XQ Z/SAC	240 mm² AL4 XQ Z/SAC	128132
300 mm² AL4 XQ Z/SAC	300 mm² AL4 XQ Z/SAC	128132

4) Joint Mould and Resin Details:

Table 32 – Joint Mould and Resin Details

Description	Qty	Stockcode
Joint Mould	1	71274
Foam Tape (10 metre roll)	1	39172
Polyurethane Resin (6 litre mix)	2	75390

5) The conductor orientation in the connector shall be with the conductor apex pointing outwards as shown.



Annexure L: Straight Through Joints for 240 CU4 XQ Z to 240 CU4 XQ Z, 240 AL4 XQ Z, 240 AL4 XQ Z/SAC or 300 AL4 XQ Z/SAC Cables (LV2-34)

This specification provides the requirements for a straight through heatshrink joint from 240mm² four core, stranded copper conductor, XLPE insulated, PVC sheathed cables (240 CU4 XQ Z) to itself or to 240mm² four core solid (240 AL4 XQ Z/SAC) or stranded (240 AL4 XQ Z) or to 300mm² four core solid (300 AL4 XQ Z/SAC) aluminium conductor, XLPE insulated, PVC sheathed cables.

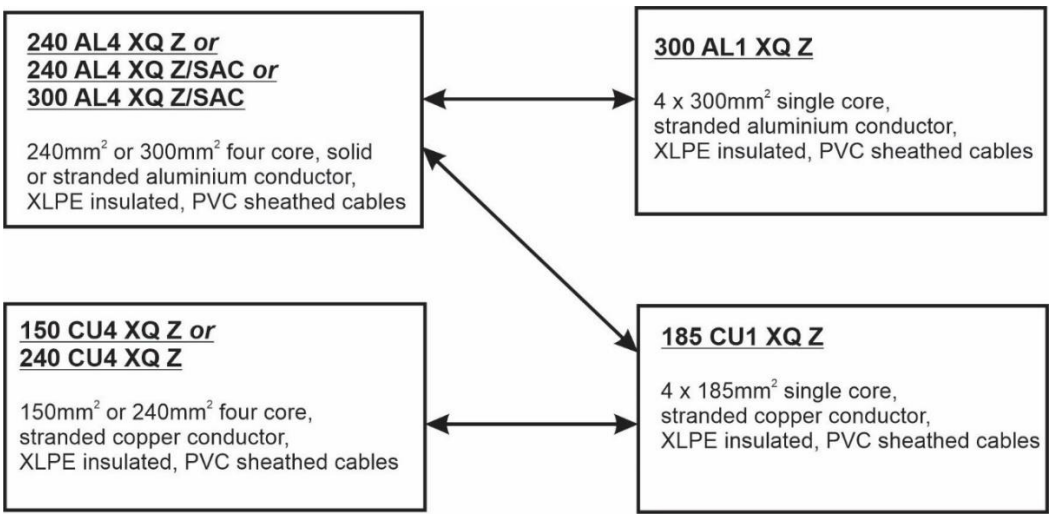
Table 33 – Straight Through Joint Kits

Straight Through Joints		Joint Kit	Connector
Cable Type	Cable Type	Stockcode	Stockcode
240 mm² Cu4 XQ Z	300 mm² AL4 XQ Z/SAC	182380	186229
240 mm² Cu4 XQ Z	240 mm² AL4 XQ Z/SAC	182380	182053
240 mm² Cu4 XQ Z	240 mm² AL4 XQ Z	182380	H109231
240 mm² Cu4 XQ Z	240 mm² Cu4 XQ Z	182380	182054

In addition to the requirements of Clauses 3.4 and 4, when jointing 240 CU4 XQ Z cables, the conductors shall be rounded with rounding dies (S/C 182051) before being inserted into the crimp links.

Annexure M: Four-to-One Heatshrink Joint 150, 240 or 300 Four Core Cables to 4x185 CU1 XQ Z or 4x300 AL1 XQ Z Cables (LV2-36)

This specification provides the requirements for constructing one of the following Four-To-One Heatshrink Joints:



Notes:

1) Any aluminium links are supplied pre-pasted - extra jointing paste is not required.
2) Scratch brush the outside strands of any aluminium conductor and immediately fit the link onto the conductor.
3) Compression links are marked with crimping position and required die size.
4) The joints shall be constructed in accordance with installation instruction supplied in the joint kit.
5) If 240 CU4 XQ Z is being used, the conductor shall be rounded with rounding dies (S/C 182051) before being inserted into the crimp link.

Table 34 – Four-to-One Joint Kits

Four-to-One Joints		Joint Kit	Connector
Cable Type	Cable Type	Stockcode	Stockcode
240 mm² AL4 XQ Z	300 mm² AL1 XQ Z	143818	177740
240 mm² AL4 XQ Z	185 mm² CU1 XQ Z	143818	H104828
240 mm² AL4 XQ Z/SAC	300 mm² AL1 XQ Z	143818	144048
240 mm² AL4 XQ Z/SAC	185 mm² CU1 XQ Z	143818	175332
300 mm² AL4 XQ Z/SAC	300 mm² AL1 XQ Z	143818	186231
300 mm² AL4 XQ Z/SAC	185 mm² CU1 XQ Z	143818	186230
150 mm² Cu4 XQ Z	185 mm² CU1 XQ Z	143818	177764
240 mm² Cu4 XQ Z	185 mm² CU1 XQ Z	143818	182082

Annexure N: Straight Through Joint for Single Core Cables (LV2-24)

This specification provides the requirements for the following single core straight through joints:

- single core cross-linked polyethylene insulated, PVC sheathed cables to single core cross-linked polyethylene insulated, PVC sheathed cables.
- single core cross-linked polyethylene insulated, PVC sheathed cables to single core paper insulated, metal sheathed, polymeric oversheathed cables.
- single core paper insulated, metal sheathed, polymeric oversheathed cables to single core paper insulated, metal sheathed, polymeric oversheathed cables.

Ausgrid's stockcodes of approved straight through joint kits for single core cables are provided in the tables below.

Table 35 – Straight Through Joint Kits for Single Core Polymeric Cables

Straight Through Joints		Joint Kit	Connector
Cable Type	Cable Type	Stockcode	Stockcode
120 mm² AL1 XQ Z	185 mm² Cu1 XQ Z	186499	186500
185 mm² AL1 XQ Z	185 mm² Cu1 XQ Z	74583	57018
185 mm² Cu1 XQ Z	185 mm² Cu1 XQ Z	74583	150250
194 mm² AL1 XQ Z	185 mm² Cu1 XQ Z	74583	179667
240 mm² AL1 XQ Z	185 mm² Cu1 XQ Z	74583	H104828
300 mm² AL1 XQ Z	300 mm² AL1 XQ Z	74583	148320
300 mm² Cu1 XQ Z	300 mm² Cu1 XQ Z	74583	80929
300 mm² AL1 XQ Z	185 mm² Cu1 XQ Z	74583	56994
323 mm² AL1 BR Z	185 mm² Cu1 XQ Z	74583	179664

Table 36 – Straight Through Transition Joint Kits for Single Core Cables

Straight Through Transition Joints		Joint Kit for Phase Conductor Stockcode	Joint Kit for Neutral Conductor Stockcode (See Note 1)	Earthing Kit Stockcode (See Note 2)	Phase Connector Stockcode
Cable Type	Cable Type				
185 mm² Cu1 XQ Z	185 mm² Cu1 PL Z	152306	184041	184030	150250
185 mm² Cu1 XQ Z	194 mm² Cu1 PL Z	152306	184041	184030	184561
300 mm² Cu1 XQ Z	300 mm² Cu1 PL Z	152306	184042	184030	80929
300 mm² Cu1 XQ Z	323 mm² Cu1 PL Z	152306	184042	184030	184562

Notes:

1) The neutral connector is included in the neutral joint kit.

2) One earthing kit is sufficient to bond the sheaths of four single core PILC cables. All four tinned copper braids are bolted together using a M12 x 35mm SS bolt (stockcode 45021), two M12 SS flat washers (stockcode 49429), one SS spring washer (stockcode 143859) and M12 SS nut (stockcode 8987).

Table 37 – Straight Through Joint Kits for Single Core PILC Cables

Straight Through Joints		Joint Kit	Earthing Kit	Connector
Cable Type	Cable Type	Stockcode	Stockcode	Stockcode
185 mm² Cu1 PL Z	185 mm² Cu1 PL Z	152306	152330	150250
300 mm² Cu1 PL Z	300 mm² Cu1 PL Z	152306	152330	80929

Annexure O: Straight Through Joint AL4 XQ Z/SAC To AL3 XQ CU(NW) Z/SAC Cable (LV2-37)

This specification provides the requirements for constructing a straight through joint from four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (AL4 XQ Z/SAC) to three core, solid aluminium conductor, XLPE insulated, copper wave-wound concentric wire neutral, PVC sheathed cables (AL3 XQ CU(NW) Z/SAC).

Table 38 – Straight Through Joint Kits

Straight Through Joints		Joint Kit Stockcode	Phase Connector Stockcode	Neutral Connector Stockcode
Cable Type	Cable Type			
240 mm² AL4 XQ Z/SAC	120 AL3 XQ CU(NW) Z/SAC	186667	186664	186796
240 mm² AL4 XQ Z/SAC	185 AL3 XQ CU(NW) Z/SAC	186667	186664	186797
240 mm² AL4 XQ Z/SAC	240 AL3 XQ CU(NW) Z/SAC	186668	186664	144014
300 mm² AL4 XQ Z/SAC	120 AL3 XQ CU(NW) Z/SAC	186667	186664	186798
300 mm² AL4 XQ Z/SAC	185 AL3 XQ CU(NW) Z/SAC	186667	186664	186799
300 mm² AL4 XQ Z/SAC	240 AL3 XQ CU(NW) Z/SAC	186668	186664	186232

Note: Some variations of wave-wound concentric cable may include a centre copper SL cable. Contact Ausgrid for guidance on how to terminate or joint this cable.

Annexure P: Four-to-One Heatshrink Joint AL3 XQ CU(NW) Z/SAC Cables to 4 x 185 CU1 XQ Z (LV2-29)

This specification provides the requirements for constructing a four-to-one straight through joint from three core, solid aluminium conductor, XLPE insulated, copper wave-wound concentric wire neutral, PVC sheathed cables (AL3 XQ CU(NW) Z/SAC) to 185mm² single core, stranded copper conductor, XLPE insulated, PVC sheathed cables (185 Cu1 XQ Z).

Table 39 – Four-to-One Joint Kits for AL3 XQ CU(NW) Z/SAC cables

Four to One Joints		Joint Kit Stockcode	Phase Connector Stockcode	Neutral Connector Stockcode
Cable Type	Cable Type			
120 AL3 XQ CU(NW) Z/SAC	185 mm² Cu1 XQ Z	186669	186793	186767
185 AL3 XQ CU(NW) Z/SAC	185 mm² Cu1 XQ Z	186669	179665	See Note 1
240 AL3 XQ CU(NW) Z/SAC	185 mm² Cu1 XQ Z	186671	186794	179711

Notes:

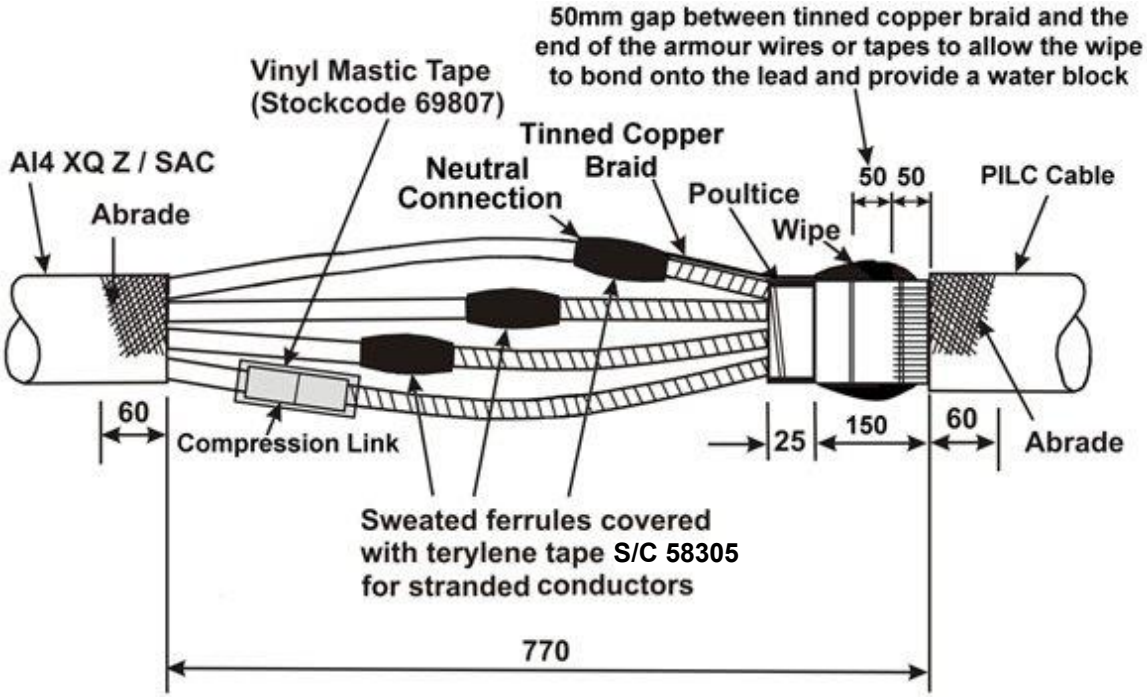
1) Buy in from TE Connectivity Part No CKR185-95. Acculec Power Part No CASR185/95EA is not suitable for this connection.

2) Some variations of wave-wound concentric cable may include a centre copper SL cable. Contact Ausgrid for guidance on how to terminate or joint this cable.

Annexure Q: Multicore Transition Joint for PILC cables (LV2-41)

This specification provides the requirements for the following Multicore Transition Joints:

- Four core, stranded conductor, paper insulated, lead sheathed, polymeric oversheathed, armoured and unarmoured cables to four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables.
- Four core with reduced neutral, stranded conductor, paper insulated, lead sheathed, polymeric oversheathed, armoured and unarmoured cables to four core, solid aluminium conductor, XLPE insulated PVC sheathed cables.



Notes:

1) Joint mould omitted for clarity.
2) Vinyl mastic tape (stockcode: 69807) is applied with the ends left unsealed to allow the resin to flow around the connector.
3) The Neutral Connection can only be a weak back ferrule (stockcode 63834).

Table 40 – Material List

Multicore Transition Joints		Phase Connector Stockcode	Weak Back Ferrule Neutral Connector Stockcode	Earth Bond
PILC Cable	Solid Polymeric Cable			
0.15 inch² (97 mm²) Cu4	240 or 300 mm² Al4	63834	63834	See Note 4
185 mm² Cu3.5	240 mm² Al4	175332	63834	See Note 5
185 mm² Cu3.5	300 mm² Al4	186230	63834	See Note 5
185 mm² Cu4	240 mm² Al4	175332	63834	See Note 5
185 mm² Cu4	300 mm² Al4	186230	63834	See Note 5
185 mm² Al4	240 or 300 mm² Al4	63834	63834	See Note 5
0.3 inch² (194 mm²) Cu3.5	240 or 300 mm² Al4	63834	63834	See Note 5
0.3 inch² (194 mm²) Cu4	240 or 300 mm² Al4	63834	63834	See Note 5
0.3 inch² (194 mm²) Al4	240 or 300 mm² Al4	63834	63834	See Note 5
0.3 inch² (194 mm²) Al3.5	240 or 300 mm² Al4	63834	63834	See Note 5
240 mm² Al4	240 or 300 mm² Al4	63834	63834	See Note 5
300 mm² Cu4	240 or 300 mm² Al4	63834	63834	See Note 6
0.5 inch² (323 mm²) Cu3.5	240 or 300 mm² Al4	63834	63834	See Note 6
0.5 inch² (323 mm²) Al3.5	240 or 300 mm² Al4	63834	63834	See Note 6

4) 35mm² tinned copper earth braid available direct from TE Connectivity Part No EPPA 013-5-1000.

5) 70mm² tinned copper earth braid available direct from TE Connectivity Part No EPPA 013-9-1000.

6) 85mm² tinned copper earth braid available direct from TE Connectivity Part No EPPA 013-5-1000 for the 35mm² braid and EPPA 013-6-1000 for the 50mm² braid.

Table 41 – Joint Mould and Resin Material List

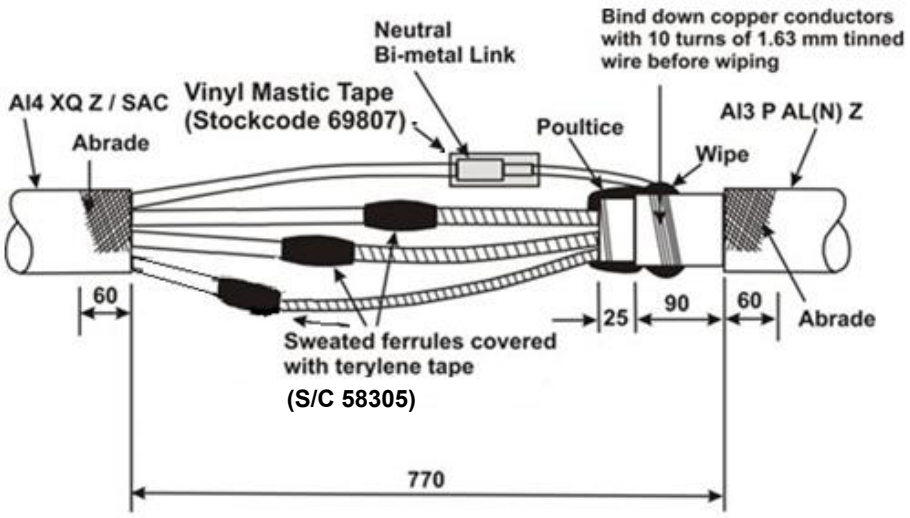
Description	Qty	Stockcode
Joint Mould	1	71274
Foam Tape (10 metre roll)	1	39172
Polyurethane Resin (6 litre mix)	2	75390

Q1 Requirements

In addition to the requirements of Clauses 3.4 and 4 the solid aluminium conductors shall be abrasion tinned prior to sweating.

Annexure R: Multicore Transition Joint for CONSAC Cables AL4 XQ Z/SAC To AL3 PAL(N) Z Cable (LV2-38)

This specification provides the requirements for constructing Transition Joint from four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (AL4 XQ Z/SAC) to three core, solid or stranded aluminium conductor, paper insulated, aluminium sheathed, PVC oversheathed cables (AL3 PAL(N)Z).



Notes:

1) Joint mould omitted for clarity.
2) Vinyl mastic tape (stockcode: 69807) is applied with the ends left unsealed to allow the resin to flow around the connector.
3) For the Neutral bond refer to Table 44.

Table 42 – Phase Connectors

Multicore Transition Joints		Phase Connector Stockcode
Consac Cable	Solid Polymeric Cable	
0.15 inch² (97 mm²) Al3	240 or 300 mm² Al4	63834
0.2 inch² (129 mm²) Al3	240 or 300 mm² Al4	63834
185 mm² Al3	240 or 300 mm² Al4	63834
0.3 inch² (194 mm²) Al3	240 or 300 mm² Al4	63834
0.45 inch² (297 mm²) Al3	240 or 300 mm² Al4	63834
300 mm² Al3	240 or 300 mm² Al4	63834
0.5 inch² (323 mm²) Al3	240 or 300 mm² Al4	63834

Table 43 – Joint Mould and Resin Details

Description	Qty	Stockcode
Joint Mould	1	71274
Foam Tape (10 metre roll)	1	39172

Polyurethane Resin (6 litre mix)	2	75390

Table 44 – Neutral Bonding Cable for Transition Joints for CONSAC cables

Consac Cable	Neutral Bonding Cable	Neutral Bonding Cable Stockcode	Neutral Connector Stockcode	
			240mm² Solid Poly Cable	300mm² Solid Poly Cable
0.15 inch² (97 mm²) Al3	120mm² Copper Cable	64196	144014	186232
0.2 inch² (129 mm²) Al3	120mm² Copper Cable	64196	144014	186232
185 mm² AL3 PAL(N) Z/SAC	120mm² Copper Cable	64196	144014	186232
185 mm² AL3 PAL(N) Z	120mm² Copper Cable	64196	144014	186232
0.3 inch² (194mm²) AL3 PAL(N) Z/SAC	120mm² Copper Cable	64196	144014	186232
0.3 inch² (194mm²) AL3 PAL(N) Z	120mm² Copper Cable	64196	144014	186232
0.45 inch² (297mm²) AL3 PAL(N) Z	185mm² Copper Cable	61390	175332	186230
300 mm² AL3 PAL(N) Z/SAC	185mm² Copper Cable	61390	175332	186230
300 mm² AL3 PAL(N) Z	185mm² Copper Cable	61390	175332	186230
0.5 inch² (323mm²) AL3 PAL(N) Z	185mm² Copper Cable	61390	175332	186230

Annexure S: Straight Through Joint 240AL4 XQ Z/SAC to 194mm²-323mm² AL4 Z AL Z/SAC Cables (LV2-39)

This specification provides the requirements for constructing a straight through joint from 240mm² four core, solid aluminium conductor, XLPE insulated, PVC sheathed cables (240AL4 XQ Z/SAC) to 194mm² – 323mm² four core, solid aluminium conductor, PVC insulated, aluminium armoured, PVC sheathed cables (194mm² – 323mm² AL4 Z AL Z/SAC).

The parts required to construct the joint are detailed below.

Table 45 – Material List

Item	Description	Ausgrid stockcode	Qty required
1	Joint mould	181762	1
2	Resin 6 Litre tubs	75390	4
3	Foam tape 10m	39172	1
4	Clamping ring	181748	1
5	Core connectors (70-300mm²)	181745	3
6	Connector with 2 service tap-offs	181746	1
7	CR Insulation pad for phase connector	181752	3
8	CR Insulation pad for neutral connector	181761	1
9	Copper conductor 35mm²	H118612	2m
10	35mm² Tinned Cu lug M10	73155	2

The joint shall be constructed in accordance with the Installation Instruction located in Annexure AA of this Network Standard.

Annexure T: Four-to-One Straight Through Joint 194mm²-323mm² AL4 Z AL Z/SAC to 185Cu1 XQ Z Cables (LV2-40)

This specification provides the requirements for constructing a four-to-one straight through joint from 185mm² single core, stranded copper conductor, XLPE insulated, PVC sheathed cables (185Cu1 XQ Z) to 194mm² – 323mm² four core, solid aluminium conductor, PVC insulated, aluminium armoured, PVC sheathed cables (194mm² – 323mm² AL4 Z AL Z/SAC).

The parts required to construct the joint are detailed below.

Table 46 – Material List

Item	Description	Ausgrid stockcode	Qty required.
1	Joint mould	181762	1
2	Resin 6 Litre tubs	75390	4
3	Foam tape 10m	39172	1
4	Clamping ring	181748	1
5	Core connectors (70-300mm²)	181745	3
6	Connector with 2 service tap-offs	181746	1
7	CR Insulation pad for phase connector	181752	3
8	CR Insulation pad for neutral connector	181761	1
9	Copper conductor 35mm²	H118612	2m
10	35mm² Tinned Cu lug M10	73155	2
11	4-Way Glove	78527	1
12	Mastic-lined heatshrink sleeve, 150mm length	181351	1 pack (contains 16 in a pack)

The joint shall be constructed in accordance with the Installation Instruction located in Annexure BB of this Network Standard.

Annexure U: Four-to-One Transition Joints for CONSAC cables (LV2-42)

This specification provides the requirements for the following Four-To-One Transition Joints:

- Three core stranded aluminium conductor, paper insulated, aluminium sheathed, PVC oversheathed cables (CONSAC) to single core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables.
- Three core solid aluminium conductor, paper insulated, aluminium sheathed, PVC oversheathed cables (CONSAC) to single core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables.

Ausgrid's stockcodes of approved straight through joint kits for single core cables are provided in the table below.

Table 47 – Four-to-One Transition Joint Kits for CONSAC cables

Four-To-One Transition Joints		Joint Kit Stockcode	Phase Connector Stockcode
Consac Cable	Cable Type		
185 mm² AL3 PAL(N) Z/SAC	185 mm² Cu1 XQ Z	179669	179665
185 mm² AL3 PAL(N) Z	185 mm² Cu1 XQ Z	179669	57018
0.3 inch² (194mm²) AL3 PAL(N) Z/SAC	185 mm² Cu1 XQ Z	179669	179666
0.3 inch² (194mm²) AL3 PAL(N) Z	185 mm² Cu1 XQ Z	179669	179667
300 mm² AL3 PAL(N) Z/SAC	185 mm² Cu1 XQ Z	179669	179668
300 mm² AL3 PAL(N) Z	185 mm² Cu1 XQ Z	179669	56994
0.5 inch² (323mm²) AL3 PAL(N) Z	185 mm² Cu1 XQ Z	179669	179664

Table 48 – Neutral Bonding Cable for Four-to-One Transition Joints for CONSAC cables

Consac Cable	Neutral Bonding Cable	Neutral Bonding Cable Stockcode	Neutral Connector Stockcode
185 mm² AL3 PAL(N) Z/SAC	120mm² Copper Cable	64196	179711
185 mm² AL3 PAL(N) Z	120mm² Copper Cable	64196	179711
0.3 inch² (194mm²) AL3 PAL(N) Z/SAC	120mm² Copper Cable	64196	179711
0.3 inch² (194mm²) AL3 PAL(N) Z	120mm² Copper Cable	64196	179711
300 mm² AL3 PAL(N) Z/SAC	185mm² Copper Cable	61390	150250
300 mm² AL3 PAL(N) Z	185mm² Copper Cable	61390	150250
0.5 inch² (323mm²) AL3 PAL(N) Z	185mm² Copper Cable	61390	150250

Annexure V: Four-to-One Transition Joints for PILC cables (LV2-43)

This specification provides the requirements for the following Four-To-One Transition Joints:

- Four core, stranded conductor, paper insulated, lead sheathed, polymeric oversheathed, armoured and unarmoured cables to single core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables.
- Four core with reduced neutral, stranded conductor, paper insulated, lead sheathed, polymeric oversheathed, armoured and unarmoured cables to single core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables.

Ausgrid's stockcodes of approved straight through joint kits for single core cables are provided in the table below.

Table 49 – Four-to-One Transition Joint Kits for PILC cables

Four-To-One Transition Joints		Joint Kit Stockcode	Phase Connector Stockcode	Neutral Connector Stockcode
PILC Cable	Polymeric Cable			
0.1 inch² (65 mm²) Cu4	185 mm² Cu1	187714	187715	187716
95 mm² Cu4	185 mm² Cu1	187714	176517	See Note 1
0.15 inch² (97 mm²) Cu4	185 mm² Cu1	187714	176517	See Note 1
0.2 inch² (129 mm²) Cu4	185 mm2 Cu1	See Note 2	See Note 3	See Note 4
150 mm² Cu4	185 mm2 Cu1	See Note 2	177764	See Note 5
0.25 inch² (161 mm²) Cu3.5 reduced neutral 0.1 inch² (65 mm²)	185 mm2 Cu1	See Note 2	179882	187716
0.25 inch² (161 mm²) Cu3.5 reduced neutral 0.2 inch² (129 mm²)	185 mm2 Cu1	See Note 2	179882	See Note 4
0.25 inch² (161 mm²) Cu4	185 mm2 Cu1	See Note 2	179882	See Note 6
185 mm² Cu3.5	185 mm² Cu1	184476	150250	184472
185 mm² Cu4	185 mm² Cu1	184476	150250	184474
185 mm² Al4	185 mm² Cu1	184476	57018	184471
0.3 inch² (194 mm²) Cu3.5	185 mm² Cu1	184476	184561	184472
0.3 inch² (194 mm²) Cu4	185 mm² Cu1	184476	184561	184474
0.3 inch² (194 mm²) Al4	185 mm² Cu1	184476	179667	184471
0.3 inch² (194 mm²) Al3.5	185 mm² Cu1	184476	179667	184470
300 mm² Cu4	300 mm² Cu1	184477	80929	184475
0.5 inch² (323 mm²) Cu3.5	185 mm² Cu1	184478	See Note 7	184474
0.5 inch² (323 mm²) Cu3.5	300 mm² Cu1	184477	184562	184473
0.5 inch² (323 mm²) Al3.5	185 mm² Cu1	184478	179664	184471

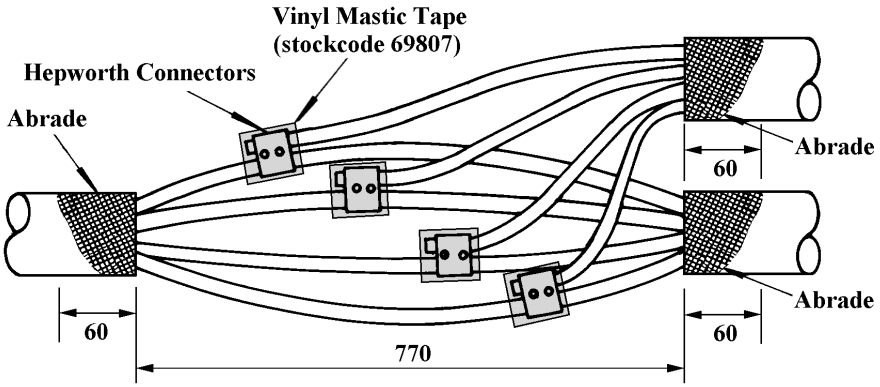
Notes:

1) Buy in from TE Connectivity Part No CKB95-97/185X01.

2) Buy in from TE Connectivity Part No EPKJ-SY402.
3) Buy in from TE Connectivity Part No: CKR185-129/1 or from Acculec Power Part No: CASR185/129
4) Buy in from TE Connectivity Part No: CKB185-129X01/1
5) Buy in from TE Connectivity Part No: CKB185-150X01/1
6) Buy in from TE Connectivity Part No: CKB185-161X01/1
7) Buy in from TE Connectivity Part No CKR323-185/1.

Annexure W: Lay-On Tee Joint AL4 XQ Z/SAC Cables (LV3-40)

This specification provides the requirements for constructing Lay-On Tee Joint from four core, solid aluminium conductor, XLPE insulated, PVC sheathed main cables (AL4 XQ Z/SAC) to four core, solid aluminium conductor, XLPE insulated, PVC sheathed tee cables (AL4 XQ Z/SAC).



Notes:

1) Joint mould omitted for clarity.
2) Vinyl mastic tape (stockcode: 69807) is applied with the ends left unsealed to allow the resin to flow around the connector.
3) Hepworth Connector Details:

Table 50 – Hepworth Connector Details

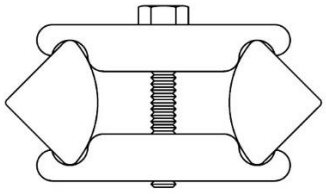
Straight Through Joints		Hepworth Connector Stockcode
Main Cable Type	Tee Cable Type	
240 mm² AL4 XQ Z/SAC	240 mm² AL4 XQ Z/SAC	128132
240 mm² AL4 XQ Z/SAC	300 mm² AL4 XQ Z/SAC	128132
300 mm² AL4 XQ Z/SAC	240 mm² AL4 XQ Z/SAC	128132
300 mm² AL4 XQ Z/SAC	300 mm² AL4 XQ Z/SAC	128132

4) Joint Mould and Resin Details:

Table 51 – Joint Mould and Resin Details

Description	Qty	Stockcode
Joint Mould	1	71282
Foam Tape (10 metre roll)	1	39172
Polyurethane Resin (6 litre mix)	2	75390

5) The conductor orientation in the connector shall be with the conductor apex pointing outwards as shown.



Annexure X: Disconnection Link Box (Four-Way) for Single Core Cables (LV5-9)

This specification provides the requirements for constructing a four-way underground disconnection link box for connecting four 4 x 185mm² stranded copper conductors, XLPE insulated, PVC sheathed, single core cables. The cast iron frame and lid are designed for installation in areas reserved for pedestrians only.

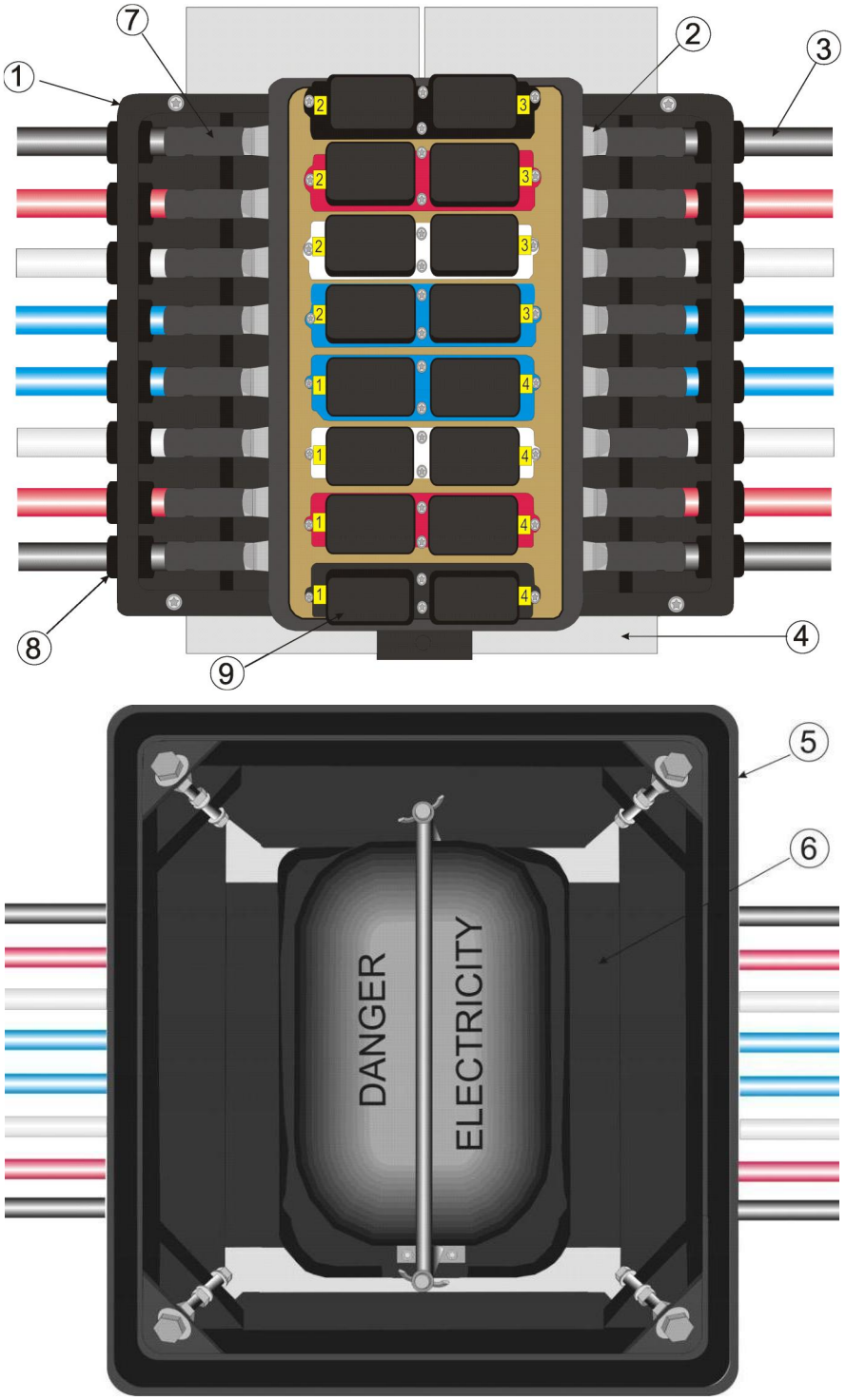


Figure 31 – Link box and frame

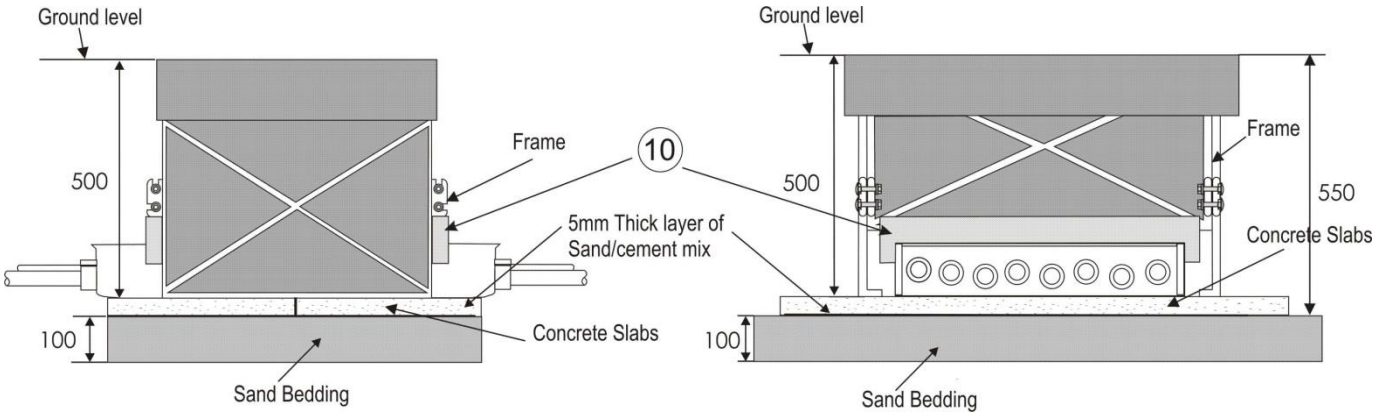


Figure 32 – Link Box – Front and End Elevation

Note: Apply a 5mm thick layer of sand/cement mix on top of the sand bedding prior to installing the concrete slabs.

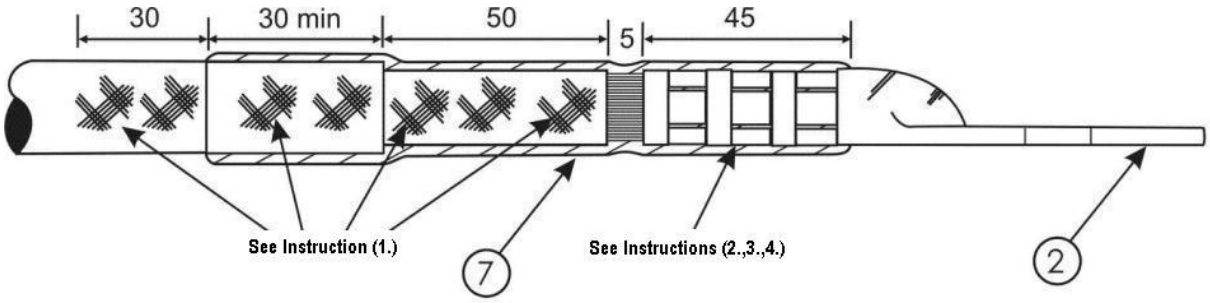


Figure 33 – Link Box Cable Termination

1) Abrade the cable sheath and the cable insulation to the dimensions shown.
2) Pre-heat the compression lug before placing the heatshrink sleeve over the cable.
3) Shrink the sleeve starting from the cable end.
4) Apply additional heat to the sleeve and the palm of the lug until a bead of mastic appears around the ends of the sleeve.

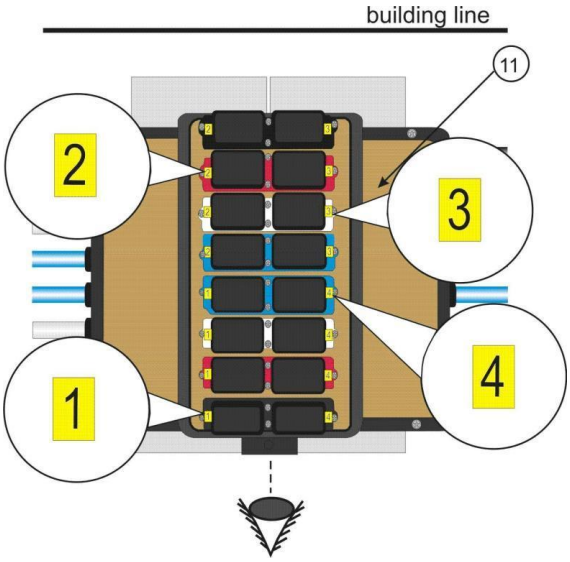
Table 52 – Material List

Item	Description	Qty	Stockcode
1	4-way Link box	1	180181
2	185mm² Copper Cable Lug	16	175532
3	Single Core Cables: 185 Cu1 XQ Z/COM/#COLOUR 185 Cu1 XQ Z	As required	 151183 61432
4	Concrete slabs	2	59725
5	Cast iron frame	1	180252
6	Cable Trough Covers	2	See Note 1
7	Mastic-lined heatshrink sleeve, 150mm length	1 pack (contains 16 in a pack)	181351
8	Foam tubes	16	See Note 1
9	Link Cover	16	See Note 1
10	Sand barrier	2	See Note 1
11	Resin	4 tubs	75390

Notes:

1) Disconnection link box is available on stockcode 180181 and comes complete with activating links, link covers, tee operating handle, foam tubes, bell housing, circuit numbers, circuit number housings, cable trough covers and sand barriers.
2) The dimensions of the disconnection link box are 470mm wide x 720mm long x 410mm high.
3) The threads of the stainless steel studs shall be lubricated with Nickel anti-seize grease (stockcode 177212) prior to tightening. Wipe off any excess anti-seize after the nuts have been tightened.
4) Cable connections to be tighten to a torque of 45Nm.

5) The link box shall be positioned so that when facing the link box and the building line “1” is in the bottom left corner followed by “2”, “3”, and “4” in a clockwise direction. See drawing below.



6) Resin shall be used in accordance with the manufacturer’s instructions.

7) The resin shall be allowed to set before applying mechanical load to it or energising the link box. This will typically be a minimum of 2 hours.

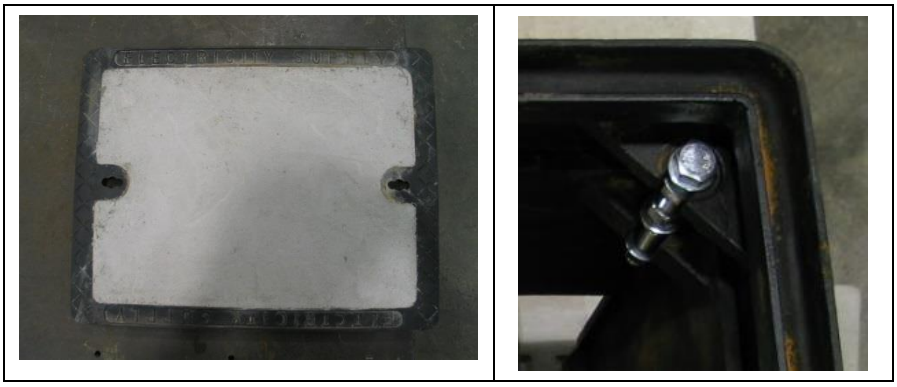


Figure 34 – Cast Iron lid and the bolts provided with the pit frame

Note: Use string lines to determine the pavement height and then adjust the bolts provided with the pit frame to ensure that the cast iron lid is level with the pavement surface.

The Cast Iron lid shall be infilled with concrete.

Annexure Y: Straight Through Joint Streetlight and Service Cables (LV2-45)

Y1 Joints

This specification provides the requirements for the following straight through joints:

- two core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables to two core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables.
- four core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables to four core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables.
- four core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables to three core stranded copper, cross-linked polyethylene insulated, copper helically wound concentric wire neutral, PVC sheathed cables.
- four core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables to single core stranded copper, PVC insulated, PVC sheathed cables.
- five core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables to five core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables.
- transition joint from two core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables to two core stranded copper paper insulated, lead sheathed, polymeric oversheathed armoured and unarmoured cables.
- transition joint from four core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables or three core stranded copper, cross-linked polyethylene insulated, copper helically wound concentric wire neutral, PVC sheathed cables to four core stranded copper paper insulated, lead sheathed, polymeric oversheathed armoured and unarmoured cables.
- transition joint from four core stranded copper, cross-linked polyethylene insulated, PVC sheathed cables to three core solid sector aluminium paper insulated, metal sheathed, polymeric oversheathed cables.

Ausgrid's stockcodes of approved straight through joint kits for service cables are provided in the table below.

Table 53 – Straight Through Joint Kits for Streetlight and Service Cables

Straight Through Joints		Joint Kit	Connector
Cable Type	**Cable Type**	**Stockcode**	**Stockcode**
16 mm² Cu2 XQ Z	0.0225inch² (15 mm²) CU1 Z Cu(N) YQ	74138 *	90092
16 mm² Cu2 XQ Z	0.0225inch² (15 mm²) CU2 P L Z	186665	90092 – Phase 177742 – Neutral
16 mm² Cu2 XQ Z	0.0225inch² (15 mm²) CU2 P L DT J	186665	90092 – Phase 177742 – Neutral
16 mm² Cu2 XQ Z	16 mm² Cu2 XQ Z	74138	90092
16 mm² Cu2 XQ Z	15 mm² Cu2 Z Z	74138	90092
16 mm² Cu3 XQ Cu(N) Z	0.0225inch² (15 mm²) CU4 P L Z	186666 *	90092 – Phase 177742 – Neutral
16 mm² Cu3 XQ Cu(N) Z	0.0225inch² (15 mm²) CU4 P L DT J	186666 *	90092 – Phase 177742 – Neutral
16 mm² Cu4 XQ Z	0.0225inch² (15 mm²) CU4 P L Z	186666	90092 – Phase 177742 – Neutral

Straight Through Joints		Joint Kit	Connector
Cable Type	Cable Type	Stockcode	Stockcode
16 mm² Cu4 XQ Z	0.0225inch² (15 mm²) CU4 P L DT J	186666	90092 – Phase 177742 – Neutral
16 mm² Cu4 XQ Z	16mm² Cu1 Z Z	167742	90092
16 mm² Cu4 XQ Z	16 mm² Cu3 XQ Cu(N) Z	74120 *	90092
16 mm² Cu4 XQ Z	16 mm² Cu4 XQ Z	74120	90092
16 mm² Cu4 XQ Z	25 mm² AL3 P AL(N) Z/SAC	179134	177742
16 mm² Cu5 XQ Z	16 mm² Cu5 XQ Z	74120 **	90092
50 mm² Cu4 XQ Z	50 mm² Cu3 XQ Cu(N) Z	74211 *	57174
50 mm² Cu4 XQ Z	50 mm² Cu4 XQ Z	74211	57174

* The neutral insulating sleeve for the ceander cable is to be cut to length from 40m roll (stockcode 177751).

** The core insulating sleeve for the 5th core shall be cut to a length of 100mm from a MWTM-16/5-1200 mastic lined heatshrink tube.

Table 54 – Neutral Bonding Cable for Multicore CONSAC Service Cable

Service Cable	Neutral Bonding Cable	Stockcode
25mm² Aluminium Multicore CONSAC Service Cable	16mm² Copper Cable	90126

Y2 Requirements

In addition to the requirements of Clauses, wire brush the surface of the aluminium conductors prior to applying jointing compound with conductive zinc particles. Use a different wire brush, to again abrade the surface of the aluminium conductors prior to terminating into the connectors.

Annexure Z: Pot End (Live End Seal) for Streetlight and Service Cables (LV1-55)

Z1 Cables

This specification provides the requirements for a pot end (live end seal) on the following cables:

- two core cross-linked, polyethylene insulated PVC sheathed cables.
- four core cross-linked, polyethylene insulated PVC sheathed cables.
- multicore paper insulated metal sheathed cables.

Z2 Using pot ends

Pot ends (Live End Seals) shall only be used for maintaining the existing network (e.g. decommissioning a section of LV cable) and shall not be used on newly installed cables or network extensions such as staged subdivisions.

Where pot ends are to be used, they shall only be installed on cables:

- where it is possible to visually trace the entire length of cable from the pot end to the source of supply, or
- where it is possible to visually trace the entire length of cable from the pot end to the tee joint to which the pot ended section of cable is connected. Additionally, it shall be possible to identify the cables connected to the other two legs of the tee joint using cable identification equipment.

When pot ends are to be direct buried, the pot end shall be located as close as practicable to either:

- the source of supply, or
- the tee joint to which the pot ended section of cable is connected.

This requirement is to minimise future civil works for the purposes of cable identification.

If it is intended to join cable to the pot ended section of cable in the future, sufficient cable length shall be left to allow for the pot end to be replaced with a straight through joint.

Z3 Approved pot end kits

Ausgrid's stockcodes of approved pot ends for service and streetlight cables are provided in the table below:

Table 55 – Material List

Cable Type	Stockcode
16mm^2 Cu1 XQ Cu(N) Z	185023*
16mm^2 Cu2 XQ Z	185023
16mm^2 Cu3 XQ Cu(N) Z	185025*
16mm^2 Cu4 XQ Z	185025
50mm^2 Cu3 XQ Cu(N) Z	185026*
50mm^2 Cu4 XQ Z	185026
Multicore Paper Insulated Cables, 15mm^2 to 25mm^2	186530
Multicore Paper Insulated Cables, 35mm^2 to 97mm^2	186531

* The neutral insulating sleeve for the ceander cable is to be cut to length from 40m roll (stockcode 177751).

Annexure AA: Installation Instruction – LV 4-Core Straight Through Joints 240AL4 XQ Z/ SAC Cable

The Installation Instruction is stored externally to this standard.

Annexure BB: Installation Instruction – LV 4 to 1 Straight Through Joint 185Cu1 XQ Z Cables

The Installation Instruction is stored externally to this standard.

Annexure CC: Service Terminal Boxes – Replacement of old-style service terminal boxes

This annexure specifies requirement for replacing old-style underground service terminal box.

CC1 Preparing to install a new service terminal box

If the service is paper insulated and/or require extending, the extension shall be constructed in accordance with Figure 39.

CC2 Material list

The table below lists individual parts. The numbers in the Item column (1 to 5 only) refer to the circled numbers in Figure 39.

Table 56: Material List.

Item	Qty	Description	Material	Stockcode
1	- -	Service Cable (colour-coded cores) 16mm^2 or Service Cable (colour-coded cores) 50mm^2	copper copper	148668 149112
2	3	Mechanical Connector	Brass	177742
3	4	Mastic–lined Heat shrink Sleeve		See Note 1
4	1	4-way Mastic Lined Glove		See Note 1
5	-	Mastic–lined Heat shrink Sleeve MWTM 50/16	Cut 150mm length	143776
6	-	Jointing Compound		H19293
7	1	50mm conduit coupler (Clipsal part no. 242/50)	Grey plastic	Buy in
8	-	50mm conduit	Grey plastic	Buy in
9	2	50mm conduit saddle	Gal steel	66019
10	-	40mm conduit	Grey plastic	But in
11	2	40mm conduit saddle	Gal steel	Buy in
12	-	PVC solvent cement		38463
13	1	Enclosure (Legrand part no. 350 28) - 100/200A	Grey plastic	178964
14	4	3 hole terminal block		176271
15	1	50mm gland for service mains conduit (Clipsal P/N 263/50)	Grey plastic	Buy in
16	1	Gland to suit consumer mains conduit	Grey plastic	Buy in
17	2	Anti-tamper seals	Plastic	176781
18	-	Plastic silicone adhesive Dow Corning 739 available from Blackwoods P/N 0095 1830	Silicone	Buy in
19	1	“DANGER ELECTRICITY” sticker	Sticker	69708

Note 1: The heat shrink components (except for Item 5) required for the multi-core cable terminations are packaged as a single kit and are available on stockcode 74104.

CC3 100 or 200 amp service termination.

All service terminations inside the new service terminal box shall be terminated by utilising three hole terminal blocks as detailed in Table 56, and shown in Figure 35.

Figure 35: 100 or 200 Amp service termination with terminal blocks

CC4 Preparing the enclosure for Tamper-Proof sealing before installation

Before installation, the service terminal box shall be drilled at diagonally opposite corners to allow for the installation of tamper-proof seals after installation as shown in Figure 36.

Note: Fix the “DANGER ELECTRICITY” sticker to the enclosure’s lid as shown in Figure 36.

Figure 36: New style service terminal box

fitted with tamper proof seals and Danger Electricity sticker.

CC5 Transition joint, extension of AL3PAL(N)Z/SAC cables for service terminal boxes.

If the service requires extending, the extension shall be constructed as per Figure 37.

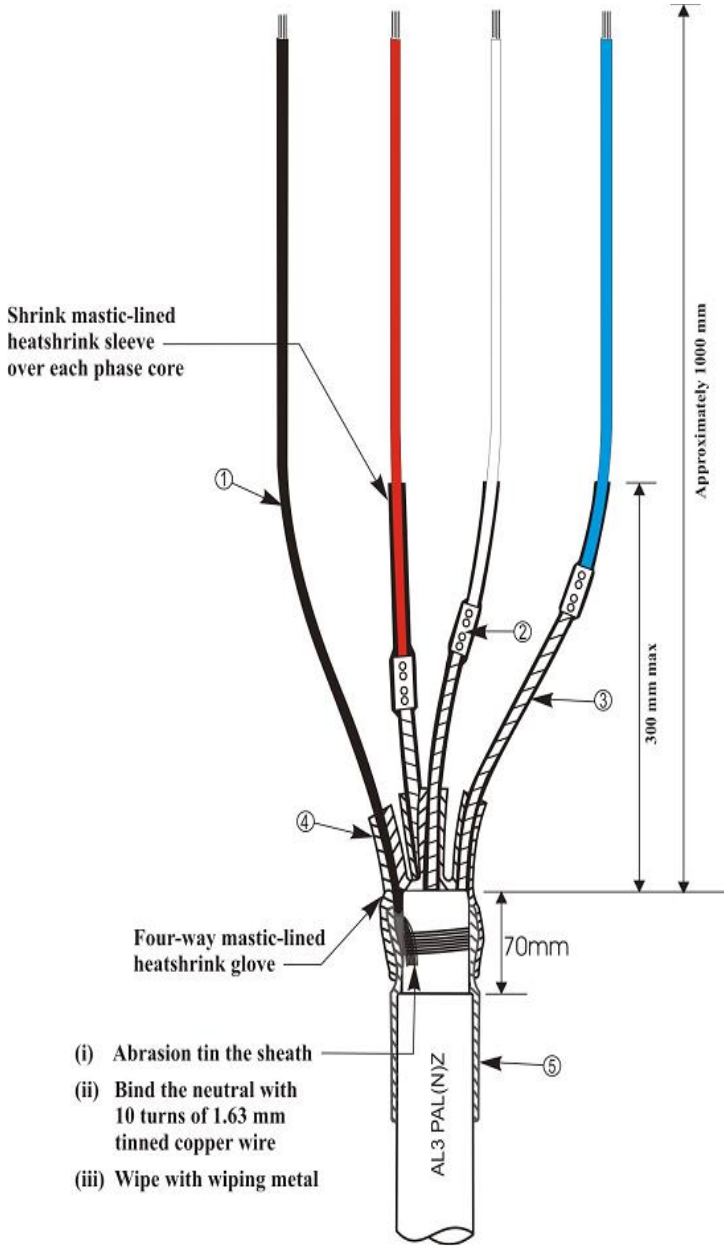


Figure 37: Transition joint, extension of AL3 PAL(N)Z/SAC cables for service terminal box (LV1-4)

Notes:

1) Item 5 is applied over the wipe and shrunk into position prior to installing the four-way glove.
2) Using a wire brush, abrade the surface of the aluminium conductors. Apply jointing compound (stockcode H19293) to all aluminium conductors. Using a different wire brush, again abrade the surface of the aluminium conductors prior to terminating into the connectors.
3) Stagger the location of the connectors as shown.