

LV Multi Service Distribution Board (MSDB)

Installation Manual



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Validity

This manual was produced in April 2017 and applies to the LV MSDB range.

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

This document (LIP10-034 Issue 1) supersedes LIP09-085 and LIP10-032, which have been withdrawn.

Issue	Date	Author	Ammendment
1	23/02/2017	P.Morriss	First Issue
2	25/04/2017	P.Morriss	Photo updated on page 15.

1. Document Symbols

The symbols shown below may be found throughout this document, indicating hazard levels depending on the situation.

All symbols below are to ISO 3864-2.



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



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



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



INFORMATION: Pay special attention to this instruction

2. Safety

CAUTION

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

CAUTION

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

CAUTION

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

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

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

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

2.1 Distribution rules

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

3. Technical Data

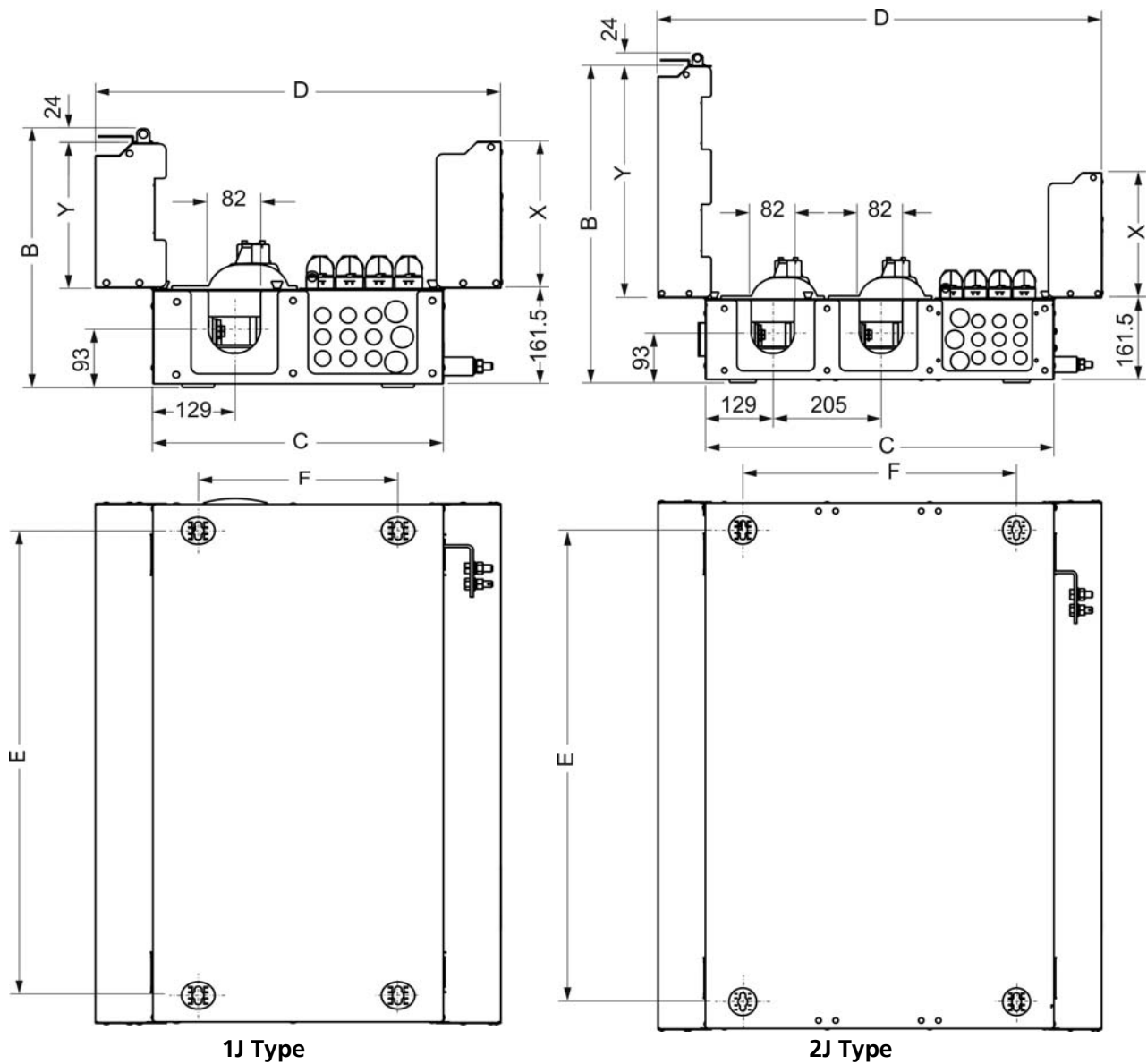
General		
Incoming Supply		630A max
Busbar Rating		630A nominal
Supply Voltage		415V a.c.
Frequency		50 - 60Hz
Rated Insulation Voltage		690V a.c.
Short Circuit Withstand Strength		18kA for 1 second
Operator Protection	All Shrouds And Fuse Handles In Place	IP2XB
	Operational Condition, Both Doors Closed	IP3X
Recommended Torque for Neutral and Earth Bar Conductor Pinching Screws		3.5Nm

3.1 Standards

MSDB complies with the following standards:

	Third party tested to BS EN 60439-1 (Form 4 compliant)
	Complies with draft ENA Technical Specifications for MSDB's
IP Rating	BS EN 60529
Incoming Fuses	BS 88 J Type
Outgoing Fuse Ways	BS 7657:2010

3.2 Dimensions & weights



1J Type

2J Type

Configuration	Dimensions In mm						Fixing Centres		Gross Weight (kg)	Stripped Down Weight* (kg)
	X	Y	C	D	A	B	E	F		
12 - way 1J	239	235	457	639	401	397	900	314	42	25.6
12 - way 2J	239	442	664	846	401	604	900	521	56	34.4
15 - way 1J	285	235	503	685	447	397	900	361	44	26.5
15 - way 2J	285	442	710	893	447	604	900	568	58	35
18 - way 1J	331	235	550	732	493	397	900	407	46	27
18 - way 2J	331	442	756	938	493	604	900	614	62	35.8
24 - way 1J	424	235	642	825	586	397	900	500	53	31.2
24 - way 2J	424	442	849	1032	586	604	900	707	69	40
30 - way 1J	517	235	735	918	697	397	900	593	60	36.3
30 - way 2J	517	442	942	1125	679	604	900	800	76	46
36 - way 1J	610	235	828	1010	772	397	900	686	66	36
36 - way 2J	610	442	1035	1217	772	604	900	893	82	44.8
45 - way 1J	749	235	967	1150	911	397	900	825	74	48.3

Depth (all): 250mm - Height (all): 1000mm

* Doors, fuse handles, connectors, miscellaneous fixings, shrouds and covers have been removed as detailed in Section '4.1.1 Procedure to strip down the Lucy Electric MSDB (before mounting)' on page 8

4. Installation Procedure

4.1 Procedure for preparing a Lucy Electric MSDB for manual handling and installation.

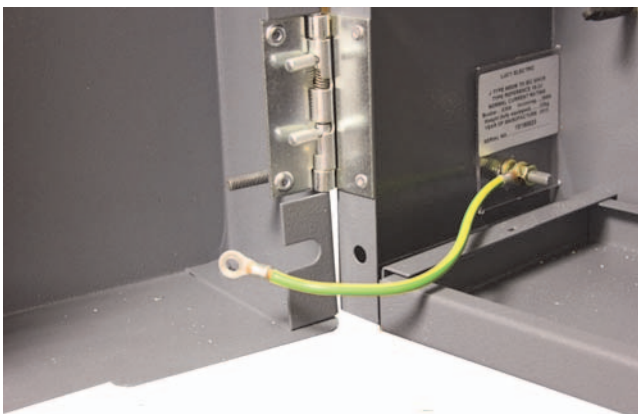
CAUTION

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

- All work **MUST** be carried out in accordance with current issued Company Safety Rules.
- This installation procedure **MUST NOT** be carried out with the cable live.
- Make sure that the site is safe and work in accordance with your on-site risk assessment.
- If in doubt about any aspect of your work, contact your supervisor.
- When installing an MSDB the unit needs to be a minimum of 400mm from floor level (with the duct lining up with the cable entry). Where the duct does not line up with the cable entry, this height will need to be increased significantly. The actual height will be dependent upon the size of the cable and the amount of misalignment. The maximum bending radius of 12x the cable diameter must not be exceeded.
- **DO NOT** disassemble the factory made busbar or terminal block connections thereto (exception: CNE link between the neutral and earth bars). They have been factory tightened to a specific torque and should not be disturbed.

4.1.1 Procedure to strip down the Lucy Electric MSDB (before mounting)

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



Note: The weight of the unit as detailed in "3.2 Dimensions & weights" on page 7 can be achieved by following operations.

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



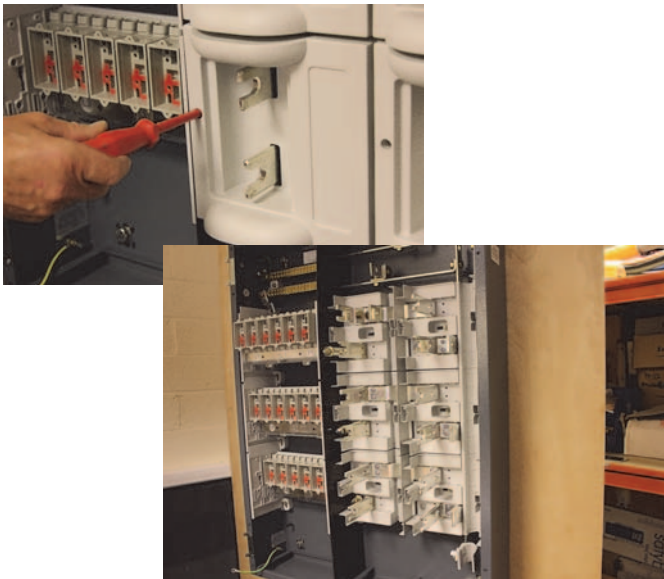
3 : Carefully remove all clear covers from inside the MSDB by pulling on the black plastic fasteners. Take out the J type fuse handles and loose stowed components including cable connectors, assorted fixings and cable boxes (if supplied).



4 : Remove all of the 100A Service way fuse handles. **Note:** This is purely to reduce the weight when mounting the MSDB unit.



5 : Using the appropriate screwdriver, unscrew the single captive screw retaining the insulated connector cover in place and set aside all the covers.



6 : Slide out the solid and perforated gland plates and set aside.

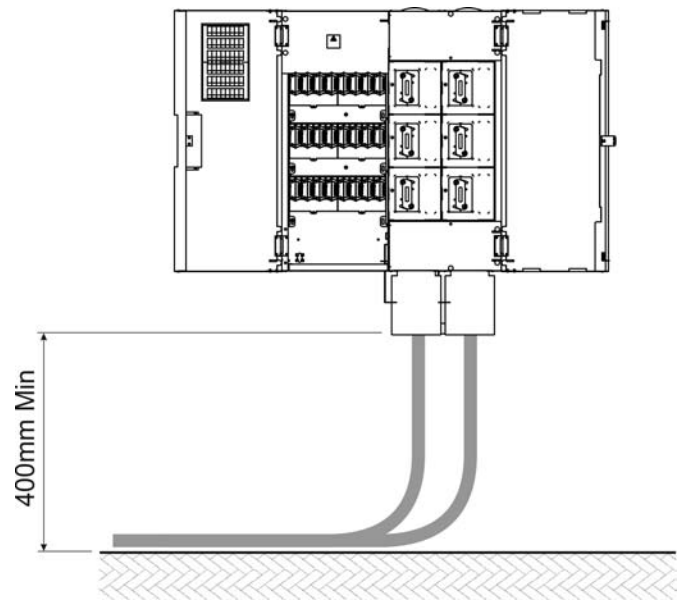


4.2 Procedure to mount the Lucy Electric MSDB

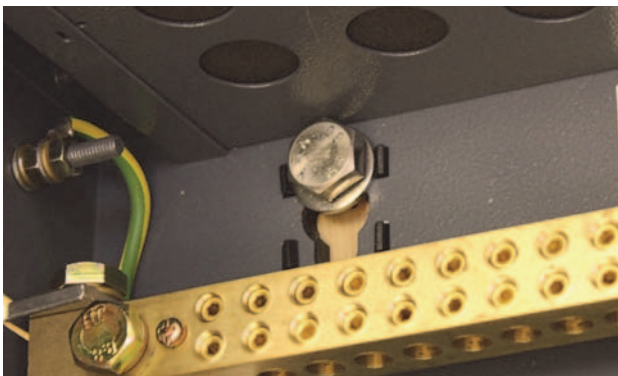
- 1 : The unit may now be mounted in position. Ensure the unit is attached to a non-combustible surface that is flat and suitable to support the weight of the unit when fully cabled.
- Note:** The raised mounting pads on the rear of the MSDB can accommodate slight surface irregularities up to about 5mm.



- 2 : When determining the height of the unit, take into account the required cable bend radius for the section of cable being used. Mark the top MSDB fixing holes using the Lucy MSDB fixing centre tape measure provided inside the MSDB. Repeat the process for the lower pair of holes ensuring they are perpendicular to the upper pair and 900mm lower.
- Note:** There are different fixing dimensions for a 1J and 2J type units.



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



4.3 Cabling preparation for the Lucy Electric MSDB

4.3.1 General Cabling Notes

! INFORMATION

- There is a choice of three phase connector mounting positions allowing different conductor routes to give the optimum result for any given cable lay.
- When making off the conductors, always avoid delta up situations as this hinders correct seating of the grey connector shrouds due to the protruding shear bolt stubs.
- On 4C SNE installations, always commence by positioning the neutral conductor as flatly as possible along the length of its channel. This is to ensure that there is clearance between it and any phase connects that may be situated above it.
- Any crossing of the cores must take place as close as possible to the cable crutch to avoid a build-up of cores which would prevent the lowermost grey connector shroud from locating properly.
- Only commence the shearing off of the connector bolt heads once all the conductors are located and loosely tightened in their respective connectors. This avoids the risk of connections loosening due to adjacent conductors being manipulated during the jointing process.
- In the event that meter tails are terminated in the cabinet, ensure that both the phase and neutral conductors pass through the same aperture in the MSDB casing.

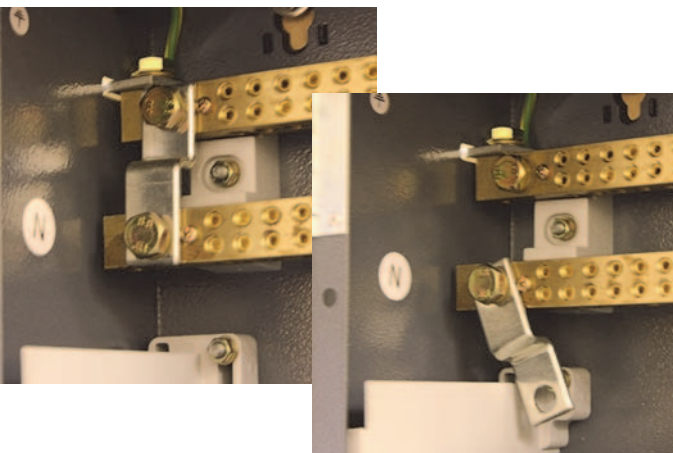
4.3.2 Cable preparation

- 1 : Strip out all redundant cable tapes and wadding, consolidate the strands of the copper earth conductor and offer up the cable to the cabinet.
- 2 : Perform a preliminary assessment of the routes the individual conductors will have to take and plan accordingly to avoid unnecessarily tight bends which are likely to induce stress to the assembly.

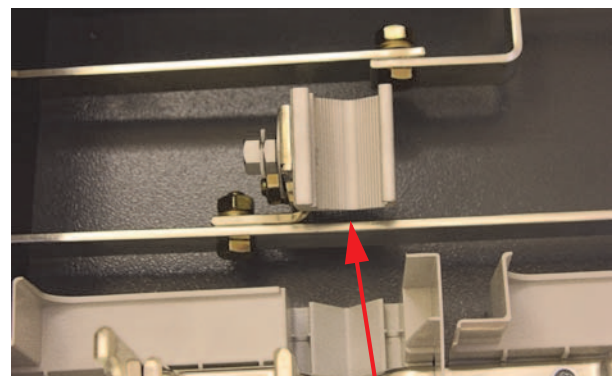
4.3.3 SNE installations

- 1 : Remove the link between the neutral and earth terminal bars by rotating the link away as shown.

Note: Depending on the variant chosen, the neutral and earth terminal bars may be located either at the top or bottom of the unit.



- 2 : Position the short neutral connector upstand in a vertical orientation on the neutral busbar, insert the bolt through the busbar and with the plain and spring washers in place, tighten to a torque of 45Nm. Attach the neutral connector to the upstand and tilt slightly downwards to avoid having a double set in the conductor.

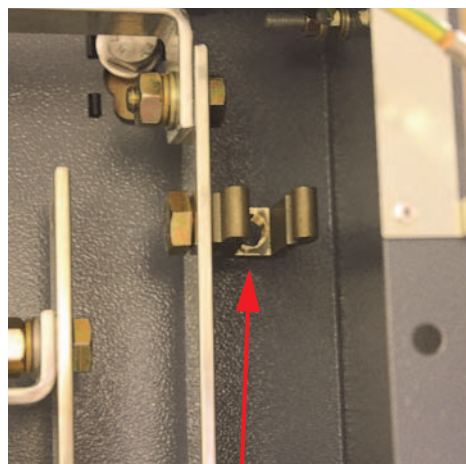


Neutral Connector

3 : Neutral conductor shown correctly located in the bottom of its channel.



4 : Select the optimum orientation for the brass earth terminal, secure it to busbar (28Nm torque) and terminate the earth conductor via the shear head bolt (2J shown).



Earth Connector

4.3.4 CNE installations

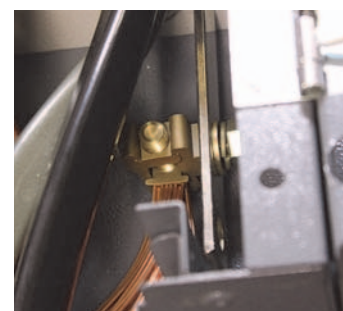
1 : Make sure that the link is in place between the neutral and earth bars and securely tightened (28Nm).



2 : Select the optimum orientation for the brass neutral earth terminal, secure it to earth busbar (28Nm torque) and terminate the neutral earth conductor via the shear head bolt.



2J Type



1J Type

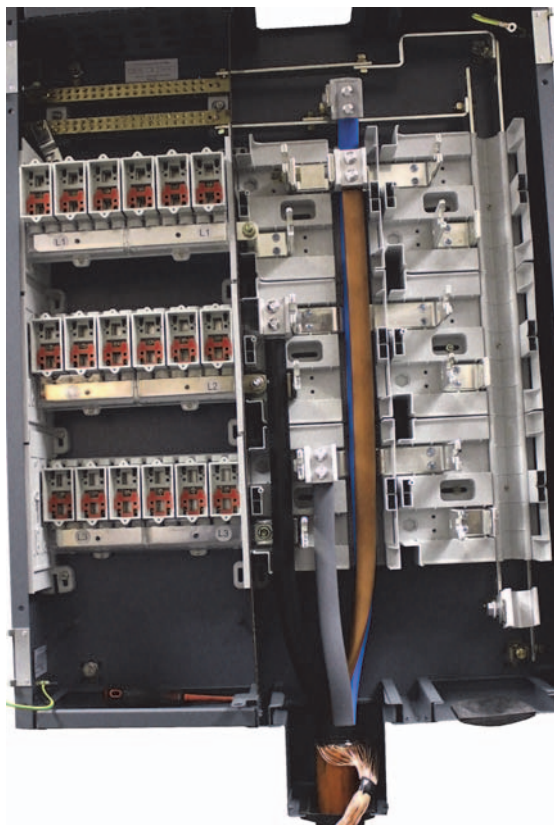
4.3.5 1J And 2J Cable installations

Note: Always position the neutral core first when cabling either a 1J or 2J unit.

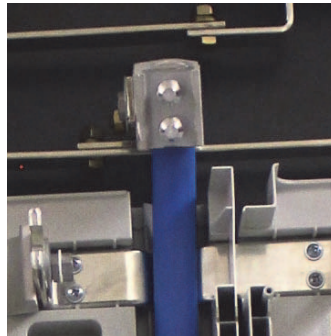
1 : Assemble the cable connectors to the phase stalks in positions most favourable to minimise crossing of the cores. Once the cable connector positions have been determined secure on the phase stalks using the shear off fixing bolts.

Note: The cores can be mounted either on the outboard extension or on either side of the stalk if required.

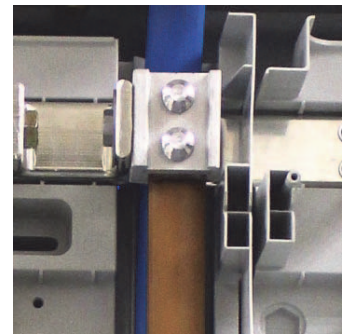
Shown below is an example of how the 2J MSDB can be cabled using 4C SNE cable. Determine the best possible conductor routing that suits the given cable lay before commencing work.



Making Off The Neutral



Making Off The Brown Phase



Making Off The Black And Grey Phases



2 : When all the phase conductors are set and in position in their connectors, verify that conductor secondary insulation is not in contact with any exposed metalwork of opposite polarity and shear off the connector bolts.

3 : The next sequence is a reversal of section 4.1.1. Remove all cabling debris that may be present in the cabinet. Replace and secure all previously removed screens and covers ensuring that they seat correctly. Reinstall the doors and attach the earth leads to their studs.

4 : Cabinets are fitted with an external earth bar having two M12 nuts/bolts for connection to the DNO earth. Once the termination has been completed, DNO sealing wires can be put in place preventing the earth from being disconnected.

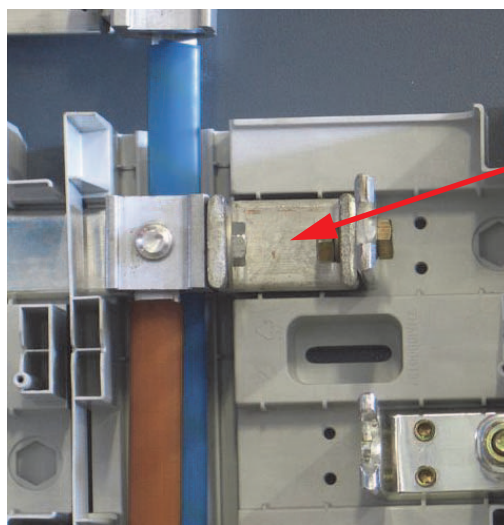


5 : Wavecon Al 3c and 4c cable with cross sections including 95mm², 185mm² and 300mm² can be terminated in these cabinets. Four different sizes of Steel Wire Armoured cable gland (40mm, 50mm 63mm and 75mm) can be installed using the appropriate kits. It is also possible to convert a 3c cabinet to a 4c using the kit of parts shown below. Note that there are two kits, one for 1J cabinets (THM0001540) and one for 2J cabinets (THM0005855).

4.3.6 Additional Information For 2J Configuration

The 2J cabinets permit the installation of a second cable to feed another MSDB located, for example, on a different floor with one cable entering the cabinet at the bottom and the other exiting at the top. In all 4c installations, the solid neutral core should run the full length of the DNO fuse compartment and terminate at the opposite end of the cabinet from the point of entry. As with 1J cabinets there are three possible mounting positions for the phase conductors.

For the incoming cable way, this is achieved by the use of an additional 'U' shaped copper extension which bolts to the fuse stalk.



'U' shaped copper extension

The cabinet is prepared for attachment to the wall in exactly the same manner as 1J units by removing doors, fuse handles and phase shrouds. There are four M8/M10 wall fixing points with keyhole slots as per the 1J unit although they are spaced further apart to reflect the extra width of the 2J units.

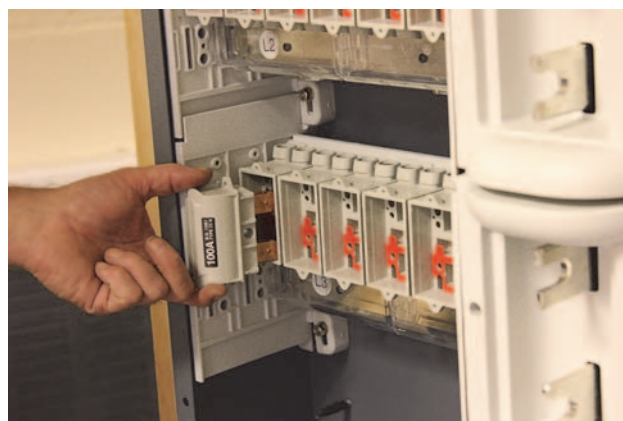
Observe the same cabling methodology as previously stated for the 1J in relation to core routing and conductor orientation in terminals. When installing the neutral terminal in 4c configurations, do not omit to tighten all the setscrews on the short terminal upstand if this has been disturbed.

4.3.7 Connection of outgoing 100A Service ways

1 : Slacken the thumbscrews and extract the main J type fuse handles, if these have not already been removed.



2 : Similarly remove the 100A Service way fuse handles in the adjoining compartment, if not already removed.



3 : Pierce the foam self-sealing gasket in the gland plate with a bradawl and lay in the Service cables allowing sufficient length for re-termination if so desired. The fuse bases accept solid aluminium Service (or stranded copper) cables of up to 35mm².

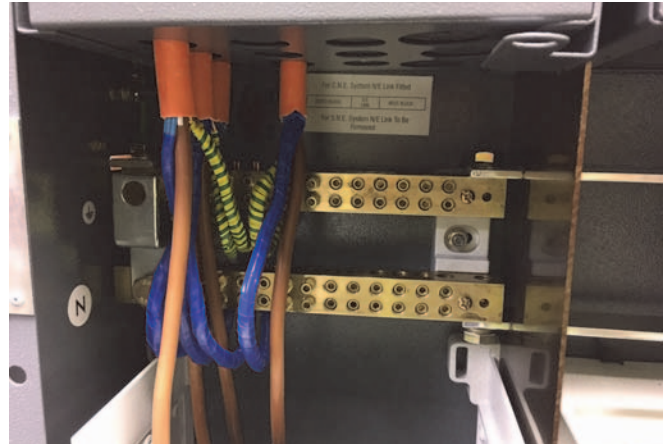


5 : Tighten the hexagon headed grub screw closest to the fuse unit first followed by the one furthest away. The recommended terminal torque is 3.25Nm.



6 : Re-instate all previously removed covers, shields and fuse handles equipped with their appropriate fuses. Ensure cabinet is ready for putting into service and check Customer polarity.

4 : Proceed to terminate the neutral or neutral earth conductors using the same 3.25Nm torque setting. **These connections MUST always be made before the phase connections.**



4.4 Recapitulation of the salient installation points:

INFORMATION

- 1 : Conduct a risk assessment and ensure that there is adequate manpower to lift the units into position. Close attention should be paid to compliance with the Manual Handling Operators Regulations (SI 1992/2793). Weights range from 42kgs to 82kgs fully equipped with doors and fuse handles attached.
- 2 : Remove doors, shields, fuses etc. to lighten the unit prior to manhandling to the installed position.
- 3 : Using the fixing centre tape provided, mark the wall at the height that will allow the correct cable bend radius for the cable being used.
- 4 : Drill the mounting surface and install the appropriate fixing devices.
- 5 : Bring the (lightened) unit to the wall and affix.
- 6 : Trial fit all the cores before commencing the shear-off operation.
- 7 : Sectorial aluminium conductors should be laid delta down in the phase and neutral connectors to keep shear-off bolt stub protrusions to a minimum.
- 8 : Execute any core cross overs as close as possible to the cable point of entry in to the cabinet.
- 9 : Replace the doors, door earth leads and all previously removed covers and shields. Ensure that the circuit identification labels are filled in and securely attached. Check that the cable glands are correctly fitted.
- 10 : Access to the outgoing Service ways and J fuses may be restricted through the use of DNO safety padlocks in the respective door tabs.

4.5 SWA gland sizes

The four SWA gland sizes are 40mm, 50mm, 63mm and 75mm.

THM0004956	40mm dia Gland Plate Kit
THM0004955	50mm dia Gland Plate Kit
THM0004953	63mm dia Gland Plate Kit
THM0005296	75mm dia Gland Plate Kit

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