

# MSDB 2.0

## LV Multi Service Distribution Boards

### Installation Manual



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# 1. Validity

This manual was produced in August 2025 and applies to the LV MSDB 2.0 range.

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

Issue	Date	Author	Amendment
1	11/11/2024	P. Morriss	First Issue
2	13/08/2025	P. Morriss	See ECN No. 502921

## 2. Document Symbols

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

All symbols below are to **ISO 3864-2**.



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



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



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



**INFORMATION:** Pay special attention to this instruction

## 3. Safety



### CAUTION

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



### CAUTION

This manual **MUST** be readily available whenever the unit is handled or during installation. A copy will be found in every new MSDB 2.0 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.

**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.**

### 3.1 Distribution rules

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

## 4. Technical Data

General		
Incoming Supply		500A
Busbar Rating		500A
Supply Voltage		230/400V a.c.
Frequency		50Hz
Rated Insulation Voltage		690V a.c.
Rated Impulse Withstand Voltage		8kV
Rated Conditional Short Circuit (Icc)		35.5kA
Incoming Fuse Handle rating		18kA for 1 second
Operator Protection	Doors open, all shrouds in place	IPXXB
	Doors closed, operational condition	IP3X
Torque for Neutral and Earth Bar M8 Pinching Screws		3.25Nm
Torque for Brass Earth Connector Body to Busbar		28Nm
Torque for the 'U' link M12 bolt in 2J cabinets		45Nm
Incoming cable connectors		SICAME UT4 type shear off head with capacity of 95mm <sup>2</sup> to 300mm <sup>2</sup>
Incoming Neutral earth connector		TYCO BTCNE 70mm <sup>2</sup> to 120mm <sup>2</sup>
Incoming main cable type		3C or 4C Aluminium Waveform cable up to 300mm <sup>2</sup> csa Low Smoke Zero Halogen (LS0H)
Outgoing service cable		Aluminium or copper concentric or split concentric service cable, 25mm <sup>2</sup> or 35mm <sup>2</sup> csa

### 4.1 Applicable Standards

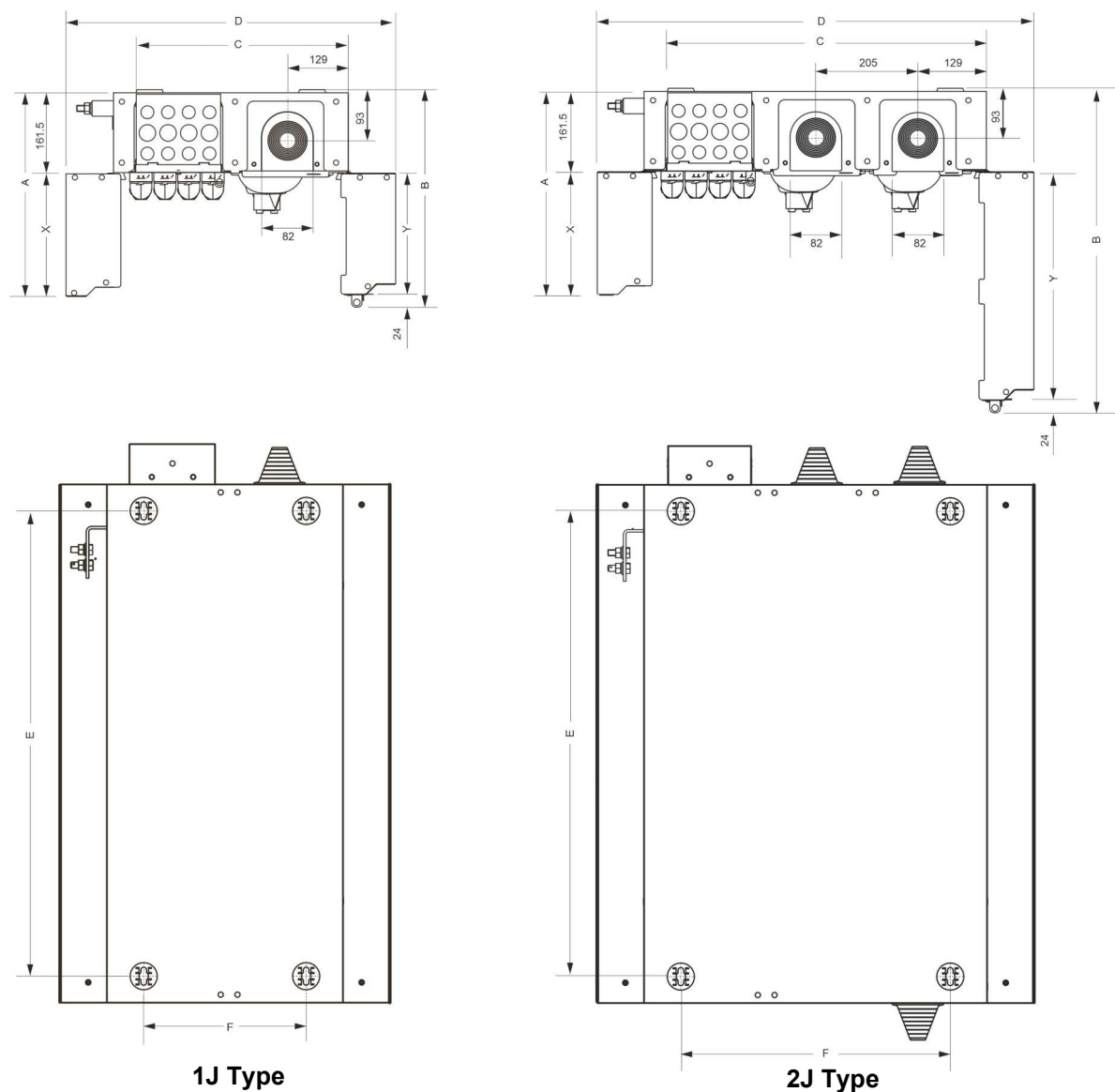
The Lucy MSDB 2.0 Vertical type complies with the following standards:

ENA Technical Specification	37-4:2022 Amd 1
Third party tested to	BS EN 61439-5
IP Rating	BS EN 60529
Incoming Fuses	IEC 60269-2
Outgoing Fuse Ways	BS7657:2022
Third party tests	

### 4.2 Reference Standards

- BS EN 61439-1
- BS EN 61439-2
- BS EN 60947-3

### 4.3 Dimensions and Weights (dims in mm)



Cable box accessories removed for clarity, not shown.

	Dimensions In mm						Fixing Centres		Gross Weight (kg)	Stripped Down Weight* (kg)
Configuration	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	679	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 '6.1.1 Procedure to strip down the Lucy Electric MSDB 2.0 (before mounting to reduce the weight)' on page 15.**

#### 4.3.1 Dimensions - General rules

- All cabinets are the same height (1m)
- All cabinets are the same overall depth (250mm)
- All cabinets are steel with double, padlockable, doors
- All doors are the same depth (90mm)
- Cable box dimensions are identical throughout the range enabling interchangeability
- Cabinet vertical fixing centres are always 900mm apart. Differing widths are indicated on the tape measure inside the cabinet

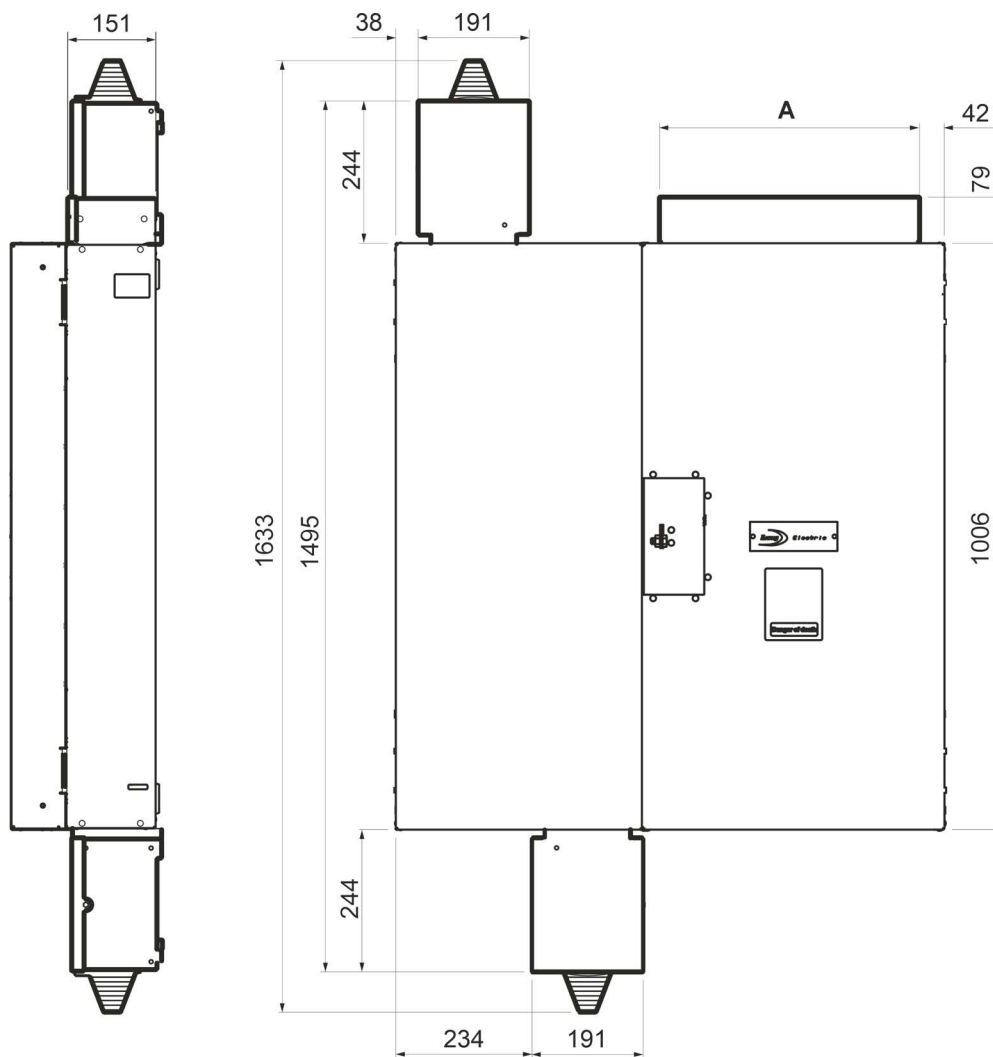
#### 4.3.2 Weights

Two weights are given:

- The as delivered gross weight
- The stripped-down weight which means all doors, gland plates, fuse handles, miscellaneous fixings, shrouds and covers removed ready for installation.

**Note:** To aid manual handling, a set of reusable lifting handles is available at extra cost under part number THM0083584. They are compatible with all Lucy vertical MSDB 2.0s, SMDBs and CTCOs.

#### 4.4 Main Cable Box and Top Hat Box Options Dimensions



### Top Hat Box Dimension Width

No. of ways	Dimension A (mm)
12	168
15	215
18	261
24	354
30	446
36	539
45	678

## Weights

Cable box - 2.5kg

Guide weight for Top hat box (18 way) - 1.4kg

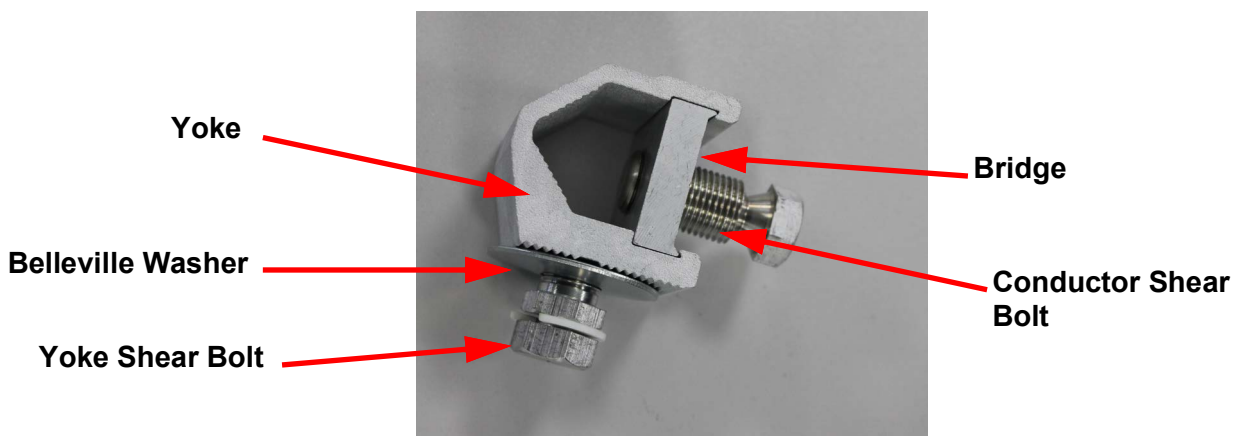
## 5. Use of aluminium and brass mechanical shear off connectors

For many years now mechanical shear bolt connectors have been used by installers in LV distribution pillars and similar devices. They offer numerous advantages foremost of which is reliability of results, but certain limitations need to be taken into account and these are described below.

### 5.1 Principle of operation

Typically, the shear bolts are designed to deliver consistent torque (i.e. clamping force) to a conductor placed in a connector without needing to use a torque wrench. **It is imperative that only a standard issue insulated ratchet hand spanner is used as battery powered impact wrenches can deliver the torque in an uncontrolled way causing the shear head to break off prematurely.** During the tightening process as the bolt approaches its design torque, the material of the bolt will start to be overstressed and begin to shear at the specially designed thinned down neck section under the bolt head. At this point, the fitter should prepare for the head to give way and break off, the risk obviously being a bruised knuckle. After one or two attempts, the fitter will become familiar with the process and learn to anticipate the shearing of the bolt head thereby avoiding any minor bruises.

### Constituent parts of a Sicame UT4F connector for Aluminium Waveform conductors



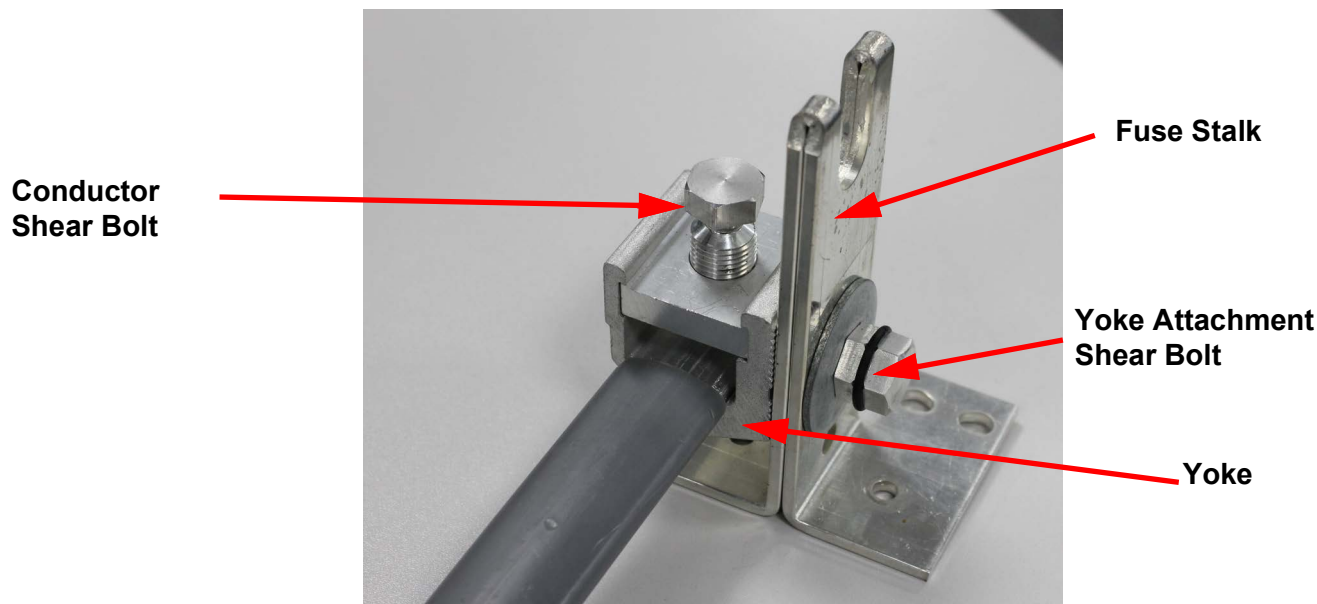
**Yoke** - This is the main 'U' shaped body. It will be fixed to a busbar.

**Bridge** - This component fits into slots in the yoke body and provides a firm point from which the shear-off bolt can exert pressure on the conductor.

**Shear Bolt** - Component designed with a weak section that will shear when the correct torque is reached. There will be one or two shear bolts for the conductor and possibly another to secure the yoke to the busbar.

**Belleville Washer** - Domed washer that spreads the pressure and acts as a spring washer.

## 5.2 Termination Procedure



### Shear Off Sequence

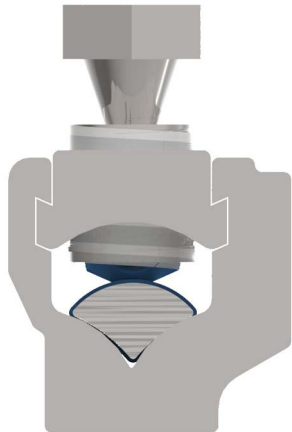
- 1 : With conductor correctly prepared, 'nip-up' the conductor shear bolt and the yoke attachment shear bolt.
- 2 : Proceed to shear off the conductor bolt head.
- 3 : Shear off the (outer) yoke attachment bolt head.

During the initial termination phase, it is highly recommended to 'nip up' the conductor shear bolt and then the yoke shear bolt to properly seat the conductor in the base of the yoke before shearing either one off. The purpose is to bring the connector in line with the conductor rather than attempt the more problematic converse operation. With the connector and conductor comfortably in situ and under no stress, proceed to shear off the conductor bolt. The yoke bolt can then be sheared off using only the outer head of this twin head bolt. The purpose of this second head is to allow yoke bolt removal for replacement of the yoke itself. **This yoke bolt, even though it has a head, should never be reused once removed.**

## 5.3 General rules for Sicame Aluminium UT4 type connectors

- 1 : The UT4F/M connectors supplied in MSDB 2.0s are principally designed for use with solid aluminium 3 core (120° section) or 4 core (90° section) conductors. However, they may be converted for use with stranded copper cables (see "Compatibility with Copper stranded conductors" on page 12).
- 2 : The connectors should only be used with the constituent parts (bridges, pressure plates, shear bolts and fixing accessories) with which they are supplied. Parts from other connectors should never be used even if from the same manufacturer.

3 : Solid sectoral conductors can be placed in the yokes either delta up or delta down and will perform identically. They should never be placed in any other orientation.



**Conductor - Delta Down**



**Conductor - Delta Up**

- 4 : The supplied yoke fixing shear bolt is machined to a specific length and should be flush with the inside edge of the threaded yoke BUT NOT PROTRUDE further inside the body where it would clash with the conductor.
- 5 : The Belleville washer used for the side fixing of the yoke must only be used with its domed side in contact with the head of the side shear bolt.
- 6 : The core should be perfectly flat where it sits in the yoke i.e. not be in the middle of a straightened out bend.
- 7 : The bridge should always be centrally located in the yoke.
- 8 : No part of the connector assembly should be modified in any way.
- 9 : Connectors are range taking with minimum and maximum capacities which must be respected.
- 10 : Standard mechanical shear off connectors are not designed to be reused after the shearing operation has been executed.

#### **5.4 Compatibility with Copper stranded conductors**

Aluminium Sicame UT4 connectors supplied in their standard format are not suitable for use with copper stranded conductors. The standard yokes can be converted to receive copper stranded conductors both round section and sectoral by the addition of a special kit which contains the following:

- A new bridge and conductor shear bolt
- A pressure pad to consolidate the conductor strands
- A piece of brass gauze



**Pressure pad**

**Brass gauze**

**Bridge and conductor shear bolt**

**Copper connector and kit**

## Sicame kit part numbers

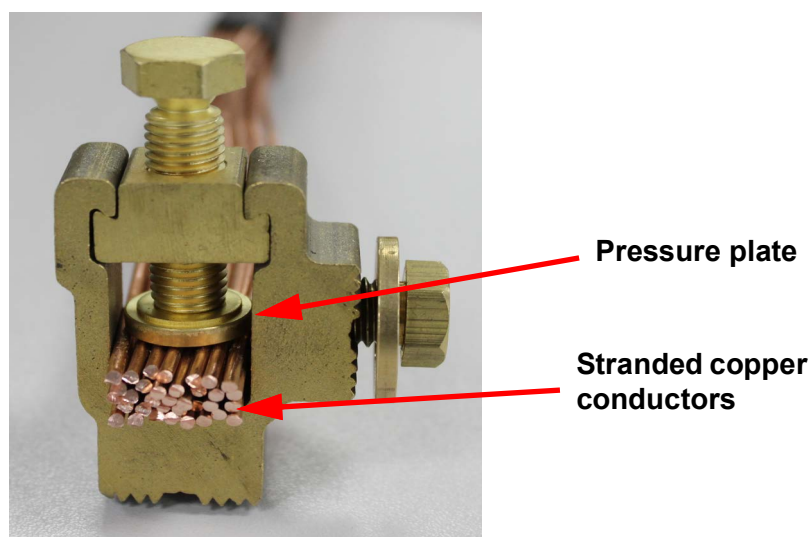
51812-01	(UT4F single shear bolt) 70-150mm <sup>2</sup> stranded copper cable
51812-02	(UT4F single shear bolt) 185-300mm <sup>2</sup> stranded copper cable
51812-03	(UT4M double shear bolt) 70-150mm <sup>2</sup> stranded copper cable
51812-04	(UT4M double shear bolt) 185-300mm <sup>2</sup> stranded copper cable

## 5.5 Copper Stranded Cable Utilisation Procedure

- 1 : Ensure that the conductors are neatly prepared and that above all, the strands are perfectly aligned i.e. as they were when the insulation was removed.
- 2 : Wrap the brass gauze around the copper strands.
- 3 : Place conductor in the yoke, lay the pressure pad on the strands concave side facing downwards and slide the bridge and shear bolt into position.
- 4 : Complete the conductor shear bolt operation.

## 5.6 General rules for Brass Neutral earth connectors

- 1 : Brass connectors are only suitable for stranded copper conductors.
- 2 : The supplied yoke fixing bolt (non-shear off) is of a specific length and should be flush with the inside edge of the threaded yoke BUT NOT PROTRUDE further inside the body where it would clash with the conductor. It is usually factory fitted and pre-torqued. If the connector has to be repositioned for any reason, the side fixing bolt should be re-torqued to 28Nm.
- 3 : The connectors should only be used with the constituent parts (bridges, pressure plates, shear bolts and fixing accessories) they are supplied with. Parts from other connectors should never be used even if from the same manufacturer.
- 4 : Connectors are range taking with minimum and maximum capacities which must be respected.
- 5 : No part of the connector assembly should be modified in any way.
- 6 : The bridge should always be centrally located in the yoke.
- 7 : Always use the supplied pressure plate.



**Typical Brass CNE connector**

**NOTE:** Image shows bolt not sheared off

## 6. Installation Procedure

The multi-faceted overhaul to the vertical MSDB 2.0 range encompasses not only improvements to the product installation phase but also permits simpler specification and commercial processes. For the fitter, the goal was to facilitate cabling by providing more space gained from the addition of modular cable box extensions and reorientation of certain busbar sections. As far as commercial aspects were concerned, a streamlined range was the prerequisite.

### Incoming/Outgoing mains cables:

If the largest 300mm<sup>2</sup> waveform cable is being used, there is an option to purchase the revised Main Cable Box with cable cleat option which has a discrete part number (THM0277029). When it is attached to the wall, this assembly provides a very firm anchor point from which the cable cores can be accurately set. Alternatively, if only 185mm<sup>2</sup> or smaller cable is being used, the cable box may be deemed unnecessary and accordingly the standard issue (always supplied with the main cabinet) flat gland plate and conical cone type inlet can be used.

The flat positioning (instead of on their edge) of the neutral and earth busbars which connect to the respective brass blocks facilitated a lower neutral connector height so that the neutral core on four core mains cables can now run straight into its connector without the upturn that was previously required.

### Outgoing service cables:

The provision of a Service Cable Extension box (also referred to as a Top Hat box) is a standard feature and this greatly improves accessibility for cabling of the neutral and earth as well as the phase cores.

Noteworthy is that the brass neutral and earth terminal bars are henceforth only positioned at the top of the cabinet. The bottom neutral and earth bar sub variants have been deleted. The 75mm extra vertical space the Top Hat extension box affords is best appreciated when using split concentric cable. Within this space, the Neutral and Earth brass terminal blocks have been further set apart in two planes; 5mm higher from the floor and 10mm in the vertical plane.

A further enhancement is that the middle row of Service Cable outlets is now dimensioned to receive three phase cables and has 32mm diameter entries.

As far as specification and commercialisation aspects are concerned, the objective was to simplify the offer by having universal cabling accessories that fitted all vertical type variants selectable at the point of ordering/purchase.

Additionally, the elimination of the bottom neutral earth sub-family as well as three core variants lessens the stocking burden on distributors.

### 6.1 Installation Procedure



**Safety notice: This equipment must only be installed by competent personnel in complete conformity with the latest editions of the National Wiring Regulations and the Electricity at Work Regulations and any other DNO or IDNO practices that may be applicable. 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 DNO or IDNO 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 2.0 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.**

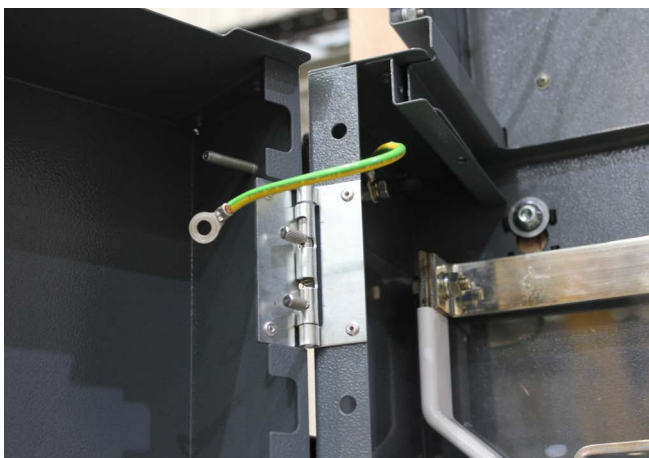
### 6.1.1 Procedure to strip down the Lucy Electric MSDB 2.0 (before mounting to reduce the weight)

#### INFORMATION

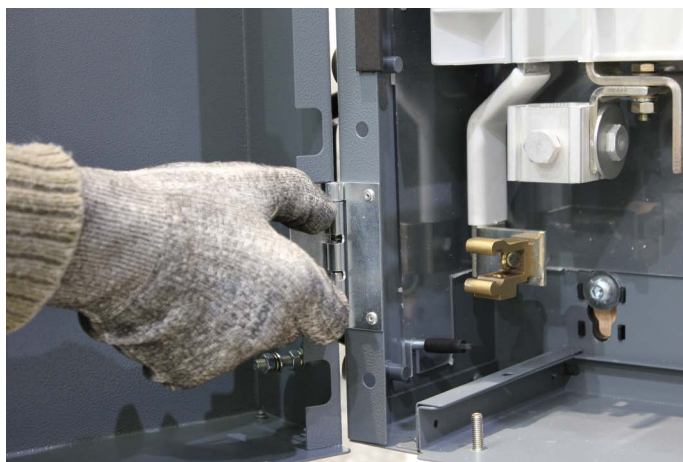
It is recommended to use the lifting handle kit which may be purchased as an optional extra. They are reusable and attach to the 8 pre-fitted threaded inserts located in the sides of the cabinet.

#### Lucy Electric Part No - THM0083584

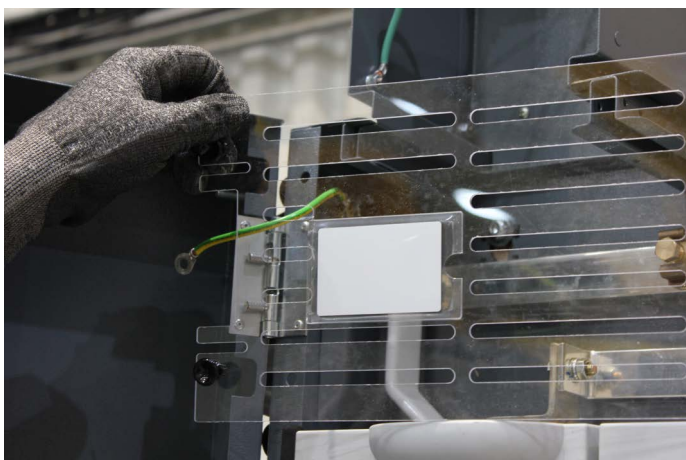
1 : Remove the nut and bolt which maintain the doors in the closed position and disconnect the door earth equipotential conductors which are secured by M6 nuts.



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



3 : Carefully remove all clear covers from inside the MSDB 2.0 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).

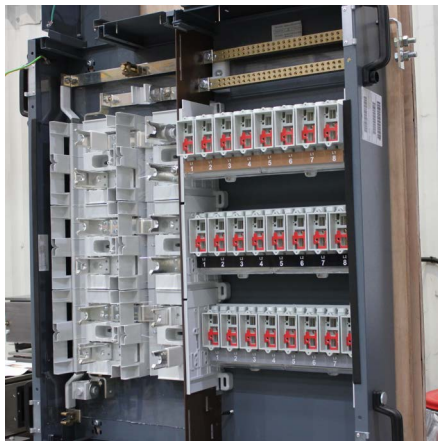


4 : Remove all of the 100A Service way fuse handles.

**Note:** This is purely to reduce the weight when mounting the MSDB 2.0 unit.



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



**Note:** The installation of an MSDB 2.0 necessarily involves the intervention of two operatives to comply with the Health and Safety Manual Handling requirements. As far as the heaviest variants in the range are concerned (both of the 36 way types and the 45 way), all the recommended weight removal measures should be implemented to achieve the allowable weight limits. (See Table in Section “4.3 Dimensions and Weights (dims in mm)” on page 7 for corresponding weights).

## 6.2 Procedure to mount the Lucy Electric vertical MSDB 2.0

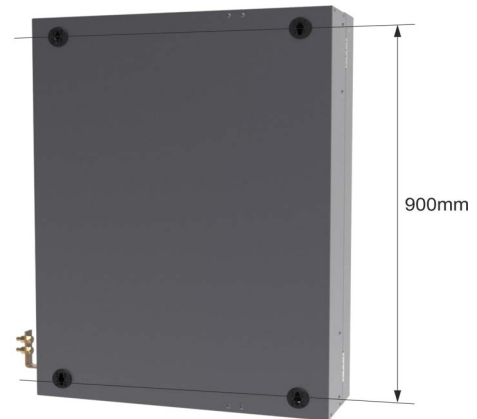
Ensure that the chosen mounting surface is non-combustible and stable enough to support the fully cabled cabinet.

**Note:** The raised mounting pads on the rear of the MSDB 2.0 can accommodate slight surface irregularities up to about 5mm.

- 1 : The mounting height of the cabinet is determined by the cable bend radius which is governed by the section of cable being used. If the recommended bend radius is not available from in-house sources, it can be obtained from the Cable Manufacturer. In addition to these requirements, allowances will need to be made if the cable box for the mains cable is fitted as opposed to the flat gland plate.



- 2 : Mark the top fixing holes using the Lucy fixing centre tape measure provided inside the cabinet. Repeat the process for the lower pair of holes ensuring that they are perpendicular to the upper pair and 900mm lower.



- 3 : Drill the mounting surface with an appropriately sized drill bit for Rawlplug inserts that will accept M8 or M10 studs or setscrews. If using studs, they should protrude approximately 25mm from the mounting surface. Flat washer should be placed under the bolt heads (or nuts if using studs) to spread the clamping force.



- 4 : Using the MSDB 2.0 lifting handles, hang the cabinet on the bolts and square up using the adjustment provided by the keyhole slots. Tighten up all four bolts evenly ensuring the washers are all in place. Remove the lifting handles and retain for future use.



## 6.3 Optional Main Cable Box Option

The Main Cable box is supplied in flat pack form and must be assembled according to the following procedure using the fixings provided.

### 6.3.1 Main Cable box assembly

List of parts included in kit:

- 1 x box base
- 1 x box left side
- 1 x box right side
- 1 x box cover
- 1 x box bottom end cover
- 1 x cable cleat assembly
- 2 x cleat location studs with M10 nuts and washers
- 6 x M6 nuts
- 1 x rubber cable grommet

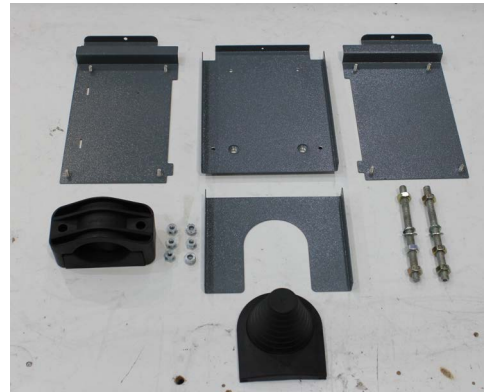


Illustration of kit parts

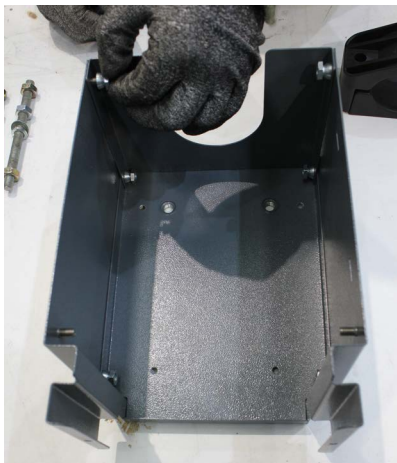
1 : Position the box bottom cover as shown against the box base such that the two lower fixing holes line up.



2 : Assemble the right-side panel to the box base and bottom cover and secure it with the three M6 nuts.

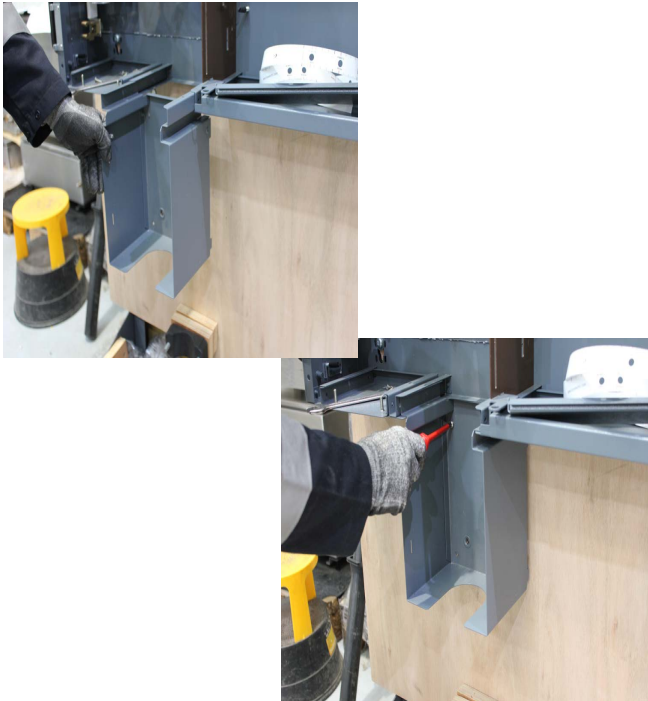


3 : Assemble the left-side panel to the box base and bottom cover and secure it with the three M6 nuts.



### 6.3.2 Cable box installation

1 : Once the cabinet is firmly attached to the wall, the pre-assembled cable box should be slid into position along its runners so that the fixing holes can be marked. Secure the cable box to the wall using the four fixing holes.



2 : Assemble the M10 stud lengths to the threaded bosses in the rear of the cable box and position an M10 nut on each one such that the desired base height for the rear cleat half is achieved.



3 : Fit the rear cleat half to the two studs and connect the earth cable.



## 6.4 Installation of the Service Cable extension box

1 : Slide the cable gland extension box into position along its runners so that the fixing holes can be marked.



2 : Secure the cable gland extension box to the wall using the two fixing holes and connect the earth cable.



## 6.5 Cabling preparation for the Lucy Electric MSDB 2.0

### 6.5.1 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 connectors 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.
- For CNE cabling, there is always a choice of three routes for the phase conductors which avoids the necessity for any core crossovers in the fuse ways.
- For SNE cabling, the same three routes for the phases exist and the neutral core sits in its own 'V' channel which runs under the outermost of the phases. The neutral core must always be terminated first as it lies under the phases.
- Once the phase cores have been set, decide in what order they need to be terminated to avoid situations where the passage of a core to a higher placed connector blocks access to a lower connector body attachment shear off.
- Before termination of the main Wavecon phase and neutral conductors, verify that the primary insulation is not in contact with any opposite polarity exposed metalwork i.e. fuse stalks. Adjust the clearances with a cable wedge if necessary.
- If single meter tails are terminated in the cabinet, ensure that both the phase and neutral conductors pass through the same aperture in the MSDB 2.0 casing. This is to mitigate the effects of eddy currents.

### 6.5.2 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 ensuring that the mains cable gland plate and grommet are fitted correctly positioned.
- 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.

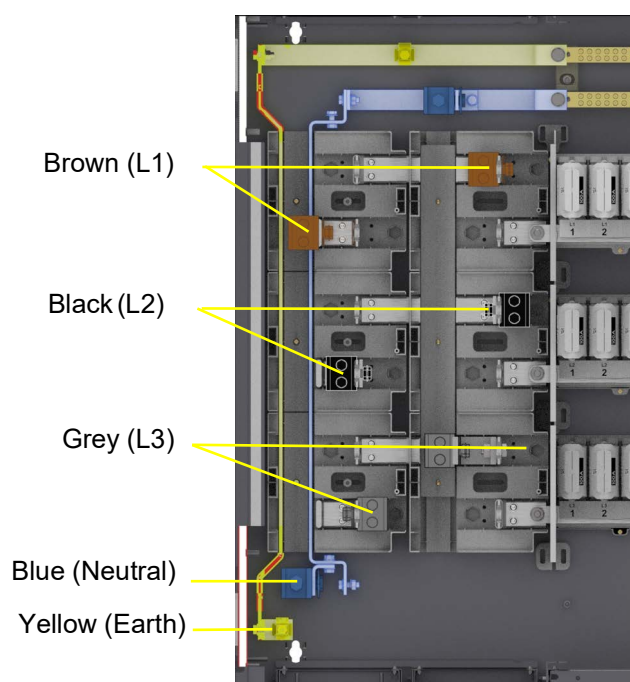
### 6.5.3 Setting of the cable cores

#### General rules:

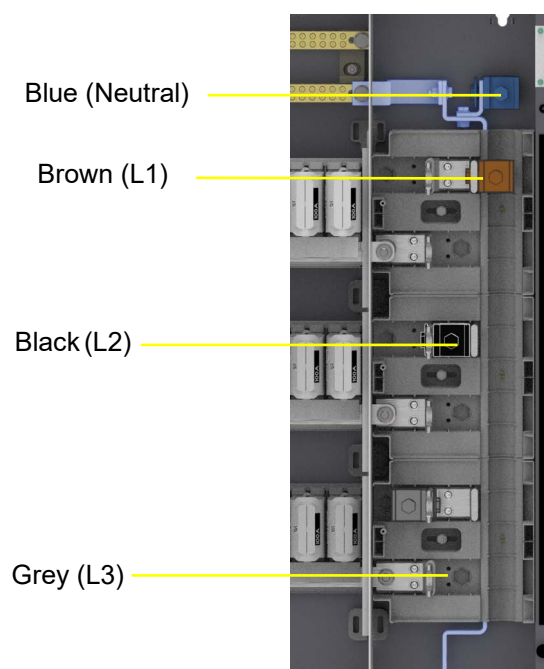
- Single incoming mains cable (1J) or incoming and outgoing mains cable (2J) cabinet variants cater for different installation scenarios.
- Incoming and outgoing mains cables can always enter/exit from the top or bottom of the cabinet. The only prerequisite is that the cable box(es) and neutral connector(s) are correctly positioned. No extra parts are necessary.
- For incoming and outgoing mains cables, the earth connector is always closest to the point of entry/exit of the mains cable and the N connector in SNE installations is furthest from point of entry/exit.
- Outgoing 100A Services only exit from the top of the cabinet.
- Perform a preliminary assessment of the routes the individual conductors will have to take and plan accordingly to avoid unnecessary tight bends which are likely to induce stress to the assembly. The schematics below indicate the configurations including the N connector positions for variants including 2J cabinets.

#### MSDB 2.0 Layout colour coding

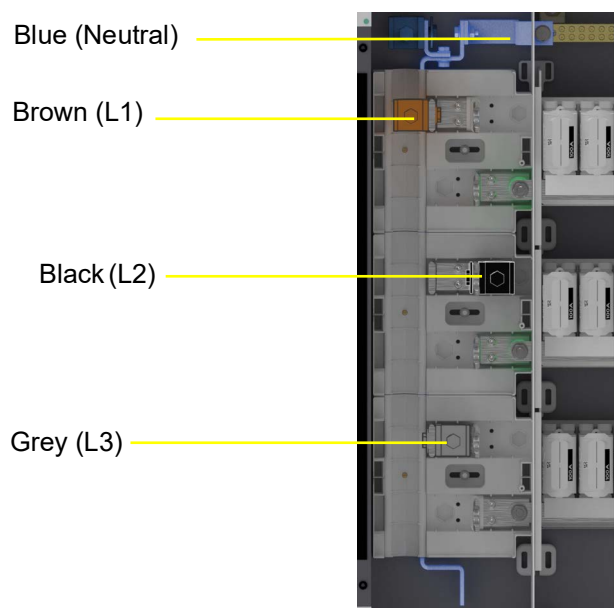
**Note:** Example connector positions shown which may vary according to cable lay



**2J-Left Hand-Top Neutral-Bottom In-Top Out**



**1J-Right Hand-Top Neutral-Bottom In**



**1J-Left Hand-Top Neutral-Bottom In**

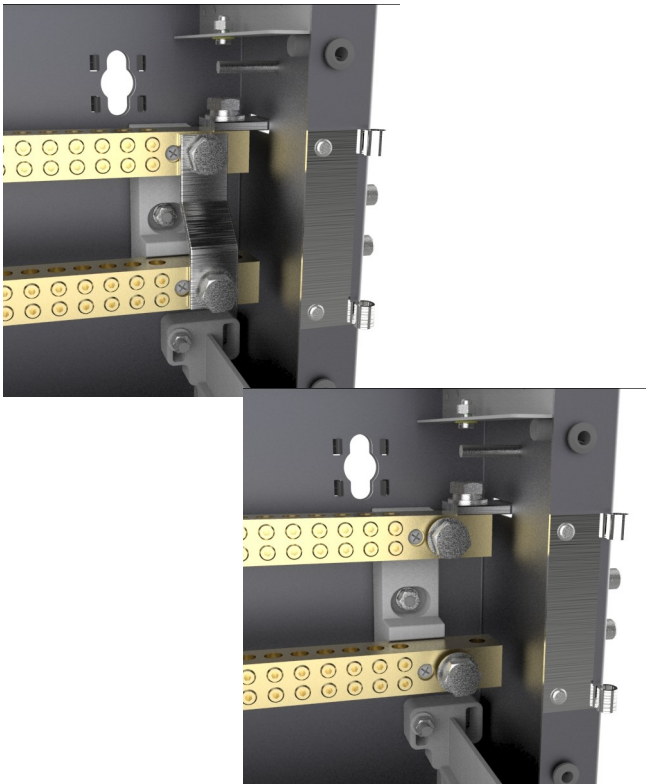
#### Legend

- Yellow - Earth
- Blue - Neutral
- Brown - L1 connector
- Black - L2 connector
- Grey - L3 connector

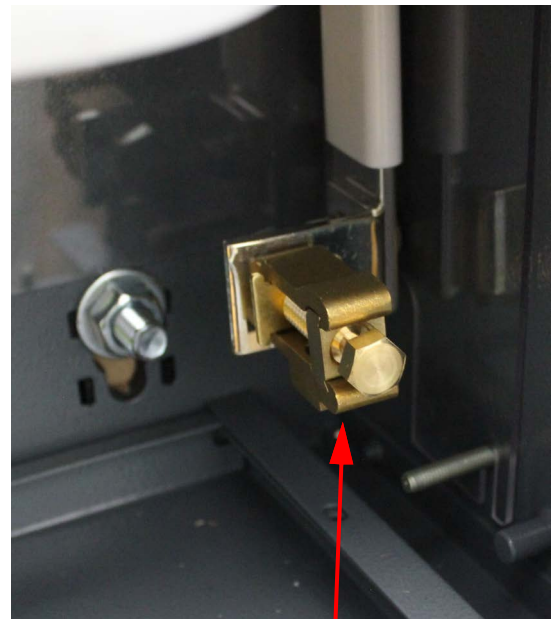
## 6.5.4 SNE installations

### Setting of the cable cores

1 : Remove the link between the neutral and earth terminal bars.

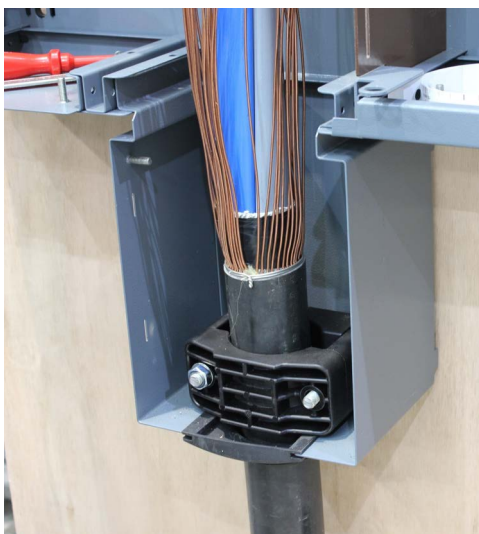


2 : Select the optimum orientation for the brass earth terminal and secure it to the busbar applying a torque of 28Nm (2J cabinet shown).

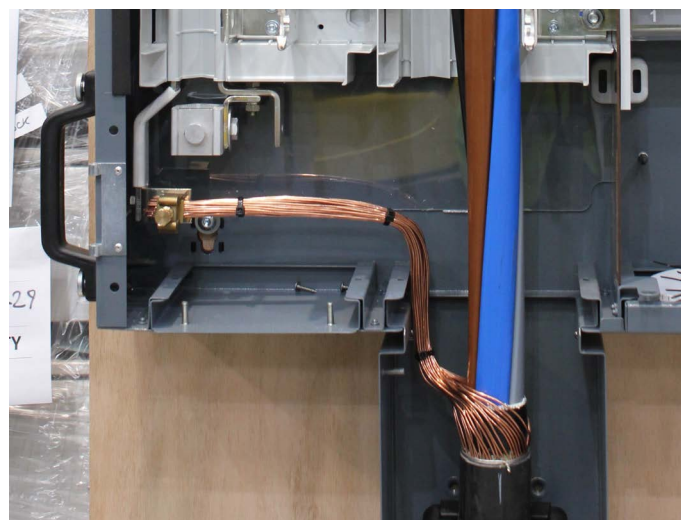


**Earth  
Connector**

3 : Cut and prepare the cable for connection. Fit into the cleat and secure taking care not to exceed the recommended 4Nm torque.

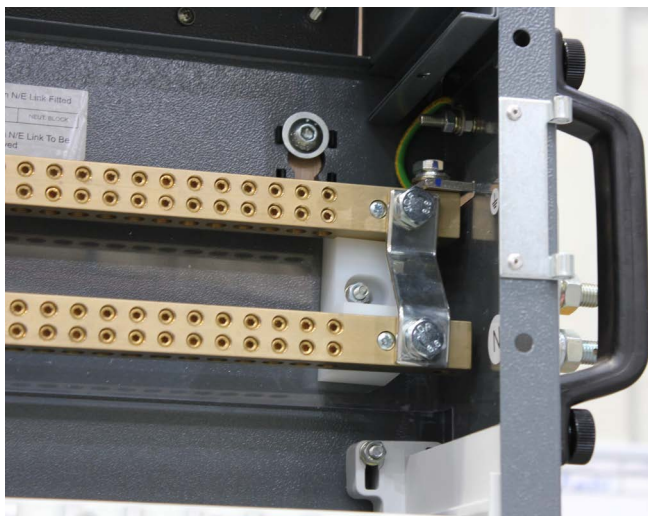


4 : Position the earth conductor in the connector and shear off making sure the brass pressure plate is in place between the conductors and the connector bolt end.

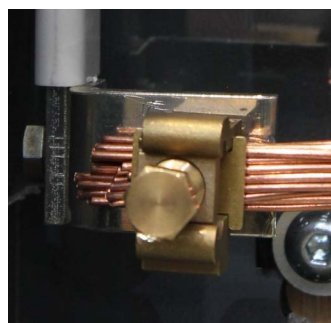


### 6.5.5 CNE installations

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

### 6.5.6 1J and 2J Cable installations



#### INFORMATION

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.

#### Example conductor routings shown below:

Routing of the Neutral conductor:



Making Off the Neutral conductor:



Routing of the Brown conductor:



Making Off the Brown conductor:



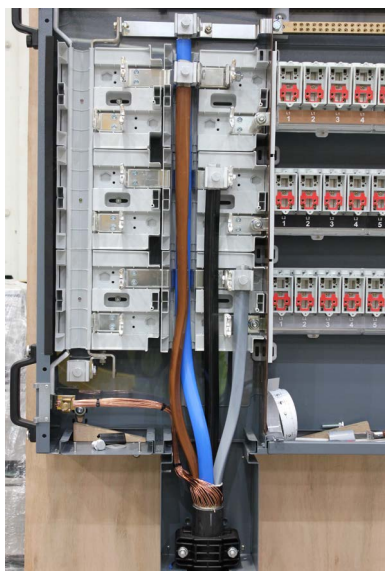
Routing of the Black conductor:



Making Off the Black conductor:



Routing of the Grey conductor:



Making Off the Grey conductor:



2 : Line up and insert the two tongues of the front cable box plate into the two slots.



3 : Secure plate with screw.



4 : 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.

5 : 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.



6 : 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.



7 : Wavecon Al 3c and 4c cable with cross sections including 95mm<sup>2</sup>, 185mm<sup>2</sup> and 300mm<sup>2</sup> 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. (See Section "6.7 Spare Parts" on page 31 for list of kits).

If, on a LH J cabinet, the main incoming cable enters from the top and is on a 4C system, a short neutral bar extension for the connector will need to be positioned to receive the connector. Similarly, on a RH J cabinet, also on a 4C system with Top In configuration, the same extension bar will need to be used but in a different position. Both layouts are shown in the schematics, the bar is consequently supplied loose in the accessory bag.

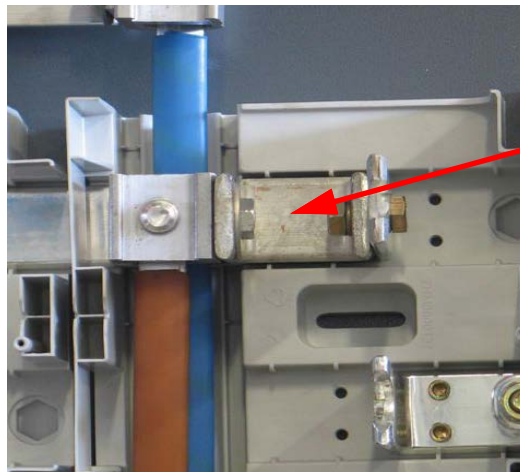
All other aspects of 2J main cable termination are identical to the previously described procedures for 1J cabinets. The example shown below is of 2J cabling arrangement:



#### 6.5.7 Additional Information for 2J Configuration Only

The 2J cabinets permit the installation of a second cable to feed another MSDB 2.0 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.

### 6.5.8 Earth bonding of removable cabinet steel panels and doors

It will be noted that each of the removable steel components that form the cabinet shell assembly is fitted with an M6 earth stud. These include the gland plates, blanking plates, cable boxes and doors. The accessory pack contains a set of earth leads that corresponds to the number of removable steel panels on a given product to bond these parts to the main body. These leads must always be fitted with the plain and spring washers provided. The M6 nuts should be tightened to 9Nm torque to ensure the earthing integrity of the cabinet shell.



### 6.5.9 Connection of outgoing 100A Service ways

The cabinets can either be cabled with single phase or three phase services according to installation requirements. No additional parts or accessories are necessary. The middle row of service cable outlets in the gland plate are oversized so that they can accept either single phase or three phase service cables.

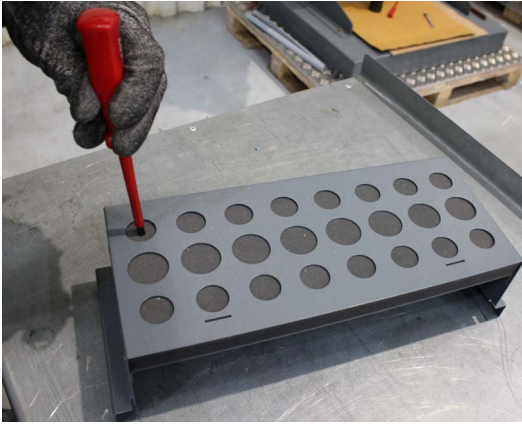
1 : Slacken the thumbscrews and extract the main J type fuse handles, if these have not already been removed.



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 35mm<sup>2</sup>.



- 5 : Proceed to terminate the Service way phase conductors. Tighten the hexagon headed grub screw closest to the fuse unit first followed by the one furthest away.

### ! INFORMATION

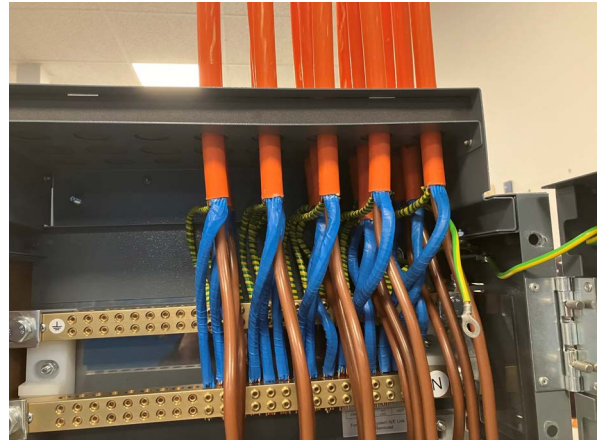
**The recommended terminal torque is 3.25Nm**



- 4 : Proceed to terminate the neutral or neutral earth conductors of the service ways.

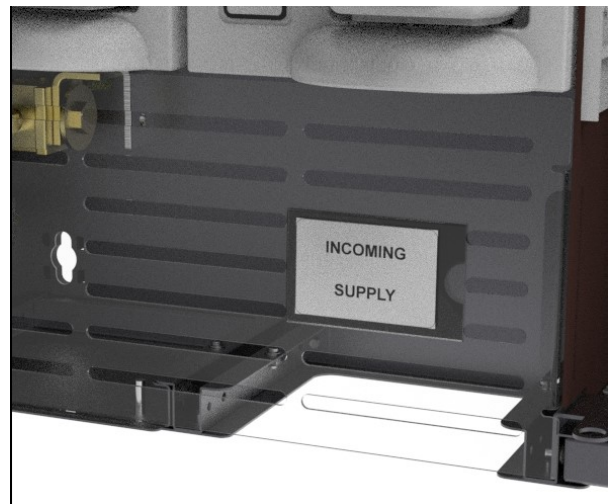
### ! INFORMATION

**Neutral earth conductors torque setting - 3.25Nm**



- 6 : Re-instate all previously removed covers, shields, case earth cables and fuse handles equipped with their appropriate fuses. Ensure cabinet is ready for putting into service and check Customer polarity. Fit the 'INCOMING SUPPLY' label within the clear wallet onto the transparent cover at the incoming supply.

**Note:** Ensure the surface is clean and dust free before applying the self-adhesive wallet.



#### 6.5.10 Common procedure for all variants

- If not already done, ensure that all the 100A fuse handles are removed before cabling the middle row.
- Starting at the base of the cabinet in the position furthest away from the 100A service fuses, pierce the foam seal with a small cross head screwdriver to allow the passage of the cable. The foam will provide a dust seal around the cable.
- Strip off the outer cable insulation and proceed to mark and cut the neutral earth conductors terminating them in the brass blocks as appropriate. Tighten the M8 grub screws to 3.25Nm torque using a torque screwdriver such as the Wiha illustrated.
- Offer up the phase cores to their intended point of termination by passing them over the neutral and earth blocks then mark prior to removing 25mm of primary insulation. Insert the bared conductor into the fuse base after having fully backed off the two pinching screws. The first of the two phase screws to be tightened should be the one furthest away from the end of the cable. Using the same torque screwdriver, tighten both to 3.25Nm.

### 6.5.11 Circuit identification

Check that the identification labels correspond to the designation of the circuits and are securely in place. This includes both the incoming and outgoing circuit labels.

### 6.5.12 Cabinet reassembly post termination

- Remove any debris that may have accumulated during the cabling process. Final check that adequate clearances have been maintained between conductors and the connectors of opposing polarity and replace the fuse way covers making sure they seat correctly on the fuse way bases.
- Replace the fuse handles as appropriate or make safe the incoming fuse stalks with the insulated stubs that are available separately.
- Clip back the transparent screens noting where there are interlock locator tabs and make the complete installation safe by putting barriers or notices in place as appropriate.
- Ensure all case earth cables are fitted and check continuity

## 6.6 Recapitulation of the salient installation points



### INFORMATION

**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.**

- 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 : Use the set of 4 lifting handles (THM0083584) to manoeuvre the cabinet (if available).
- 4 : 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.
- 5 : Drill the mounting surface and install the appropriate fixing devices.
- 6 : Bring the (lightened) unit to the wall and affix.
- 7 : Trial fit all the cores before commencing the shear-off operation.
- 8 : Sectoral aluminium conductors should be laid delta down in the phase and neutral connectors to keep shear-off bolt stub protrusions to a minimum.
- 9 : Execute any core cross overs as close as possible to the cable point of entry in to the cabinet.
- 10 : 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.
- 11 : Access to the outgoing Service ways and J fuses may be restricted through the use of DNO safety padlocks in the respective door tabs.

## 6.7 Spare Parts

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

Part Number	Description
THM0004955	50mm dia Gland Plate Kit
THM0004953	63mm dia Gland Plate Kit
THM0119243	75mm dia Gland Plate Kit
ET08000005	BTCNE brass terminal
ET08000012	NET 1 large capacity brass earth terminal
WA03000017	J type MSDB 2.0 cable entry grommet – conical rubber gland
THM0001543	J Type MSDB 2.0 Connector adaptor
THM0004237	J type MSDB 2.0 2J copper U link bracket
THM0005455	J type MSDB 2.0 incoming fuse tangs plastic safety cover (kit of three)
THM0083584	MSDB 2.0 Lifting Handle Keeper Assembly
1070001027	JW4 Solid Link - 92mm Suitable for MSDB 2.0
THM0178638	Spare Fuse Handle Assy
THM0004956	40mm dia SWA Gland Plate Kit
THM0277029	J type Extension cable box inc. cable cleat, rubber cone, studs and nuts (complete kit)
THM0155029	J type Extension cable box (bare) and rubber cone
THM0301274	J type cable cleat, studding and fixings for cable box
THM0258047	J type main cable way blanking plate
THM0277020	J type incoming cable gland kit
THM0271592	12W J type Service way cable extension boxes, foam and cover (complete assembly)
THM0271702	15W J type Service way cable extension boxes, foam and cover (complete assembly)
THM0271742	18W J type Service way cable extension boxes, foam and cover (complete assembly)
THM0271805	24W J type Service way cable extension boxes, foam and cover (complete assembly)
THM0160464	30W J type Service way cable extension boxes, foam and cover (complete assembly)
THM0272042	36W J type Service way cable extension boxes, foam and cover (complete assembly)
THM0272060	45W J type Service way cable extension boxes, foam and cover (complete assembly)
THM0271694	J type 12W solid blank plate
THM0271734	J type 15W solid blank plate
THM0271752	J type 18W solid blank plate
THM0271804	J type 24W solid blank plate
THM0273732	J type 30W solid blank plate
THM0272041	J type 36W solid blank plate
THM0272061	J type 45W solid blank plate
THM0301217	12W J type flat service cable gland plates and foam
THM0301251	15W J type flat service cable gland plates and foam
THM0301256	18W J type flat service cable gland plates and foam
THM0280116	24W J type flat service cable gland plates and foam
THM0301259	30W J type flat service cable gland plates and foam
THM0301271	36W J type flat service cable gland plates and foam
THM0301264	45W J type flat service cable gland plates and foam

## Lucy Electric international offices

### Lucy Electric UK Limited

Howland road, Thame, Oxfordshire, OX9 3UJ,  
United Kingdom.  
Tel: +44 (0) 1844 267 267  
E-mail: [salesuk@lucyelectric.com](mailto:salesuk@lucyelectric.com)  
Aftersales:  
[contractmanagement@lucyelectric.com](mailto:contractmanagement@lucyelectric.com)

### Lucy Electric GridKey Ltd

8 Argent Court, Sylvan Way,  
Southfields Business Park,  
Basilidon, Essex, SS15 6TH, United Kingdom.  
Tel: +44 (0) 1268 850000  
E-mail: [sales@gridkey.com.uk](mailto:sales@gridkey.com.uk)

### Lucy Middle East F.Z.E.

PO Box 17335, Jebel Ali, Dubai,  
United Arab Emirates.  
Tel: +9714 812 9999  
E-mail: [salesme@lucyelectric.com](mailto:salesme@lucyelectric.com)  
Aftersales: [customer.service@lucyelectric.com](mailto:customer.service@lucyelectric.com)

### Lucy Electric (Thailand) Limited

388 Exchange Tower, 37th Flr Unit 3702  
Sukhumvit Road, Klongtoey Sub district  
Klongtoey District, Bangkok, 10110  
Thailand  
Tel: +66 (02) 663 4290  
E-mail: [salesthailand@lucyelectric.com](mailto:salesthailand@lucyelectric.com)

### Lucy Switchgear Arabia Ltd

Tahlia St, Andlous Dist.  
Jameel Square Center,  
Office No 118, Jeddah, 21533,  
Saudi Arabia  
Tel: +966 02 6648573

### Lucy Electric Manufacturing & Technologies India (Private) Ltd

Village Noorpura, Baska besides Polycab,  
Halol Baroda Toll Road, Taluka Halol,  
Panchmahal, Gujarat, 389350,  
India.  
Tel: +91 2676 304912

### Lucy Electric Gridkey Swindon

607 Delta, Welton Road,  
Swindon, SN5 7XF.  
E-mail: [sales@gridkey.co.uk](mailto:sales@gridkey.co.uk)

### Lucy Electric (South Africa)

Unit 12 & 13, Block C, Honeydew Business Park,  
1503 Citrus Street, Laser Park, Honeydew, 2170,  
South Africa.  
Postal Address: P.O. Box 1078, Honeydew.  
Tel: +27 11 0257490  
E-mail: [salesza@lucyelectric.com](mailto:salesza@lucyelectric.com)

### Lucy Equipamentos Elétricos Ltda

Av. das Araucárias 2558  
Thomaz Coelho  
CEP 83707-067  
Araucária  
Paraná State • Brazil  
Tel: +55 (41) 2106 2801  
E-mail: [salesbrazil@lucyelectric.com](mailto:salesbrazil@lucyelectric.com)

### Lucy Electric Australasia Pty Ltd

Tel: +61 467 237 879  
E-mail: [salesaustralia@lucyelectric.com](mailto:salesaustralia@lucyelectric.com)

### Lucy Electric India Private Ltd

2B-46 & 47, 2nd Floor,  
Kurla West  
Mumbai, 400070,  
India.  
Tel: +91 22 62366616

### Lucy Asia Pacific Sdn. Bhd

Unit 17-05-06, Level 17  
PJX-HM Shah Tower,  
No16A Jalan Persiaran Barat, 46050  
Petaling Jaya, Selangor, Malaysia  
Tel: +603 74910700  
E-mail: [salesmy@lucyelectric.com](mailto:salesmy@lucyelectric.com)

### Lucy Electric East Africa

13th Floor Landmark Plaza,  
Argwings Knodhek Road,  
Nairobi.  
P.O. Box-00606 - 00400  
Kenya.  
Tel: +254 (0) 203 673 927

### Lucy Switchgear Arabia Co. Ltd

Novotel Business Centre, PO Box 35340  
Dammam 31488, Saudi Arabia.  
Tel: +96 6138 147 910  
E-mail: [salesksa@lucyelectric.com](mailto:salesksa@lucyelectric.com)