

Transformer Mounted Fuse Cabinet



Installation, Operation and Maintenance Instructions

WARNING

ALL WORK ON THIS EQUIPMENT THAT MAY BE LIVE MUST BE CARRIED OUT IN COMPLETE COMPLIANCE WITH THE ELECTRICITY AT WORK REGULATIONS AND ALL SAFETY PROCEDURES MUST BE OBSERVED. IN PARTICULAR DUTY HOLDERS AND, PERSONS WORKING ON THIS ASSEMBLY OR ADJACENT TO IT, SHOULD NOTE THAT THE DEGREE OF PROTECTION IPXXB PROVIDED BY THIS ASSEMBLY (DOORS OPEN FOR OUTDOOR ASSEMBLIES) MAY NOT SAFEGUARD AGAINST THE POSSIBILITY OF SMALL DIAMETER OBJECTS E.G. CABLE STRANDS COMING INTO CONTACT WITH HAZARDOUS LIVE PARTS. IF WORK IS CARRIED OUT WITH ANY PART OF THE EQUIPMENT LIVE A RISK ASSESSMENT SHOULD BE CONDUCTED AND APPROPRIATE PROCEDURES SHOULD BE EMPLOYED.

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The successful operation of all switchgear and fusegear depends largely upon systematic inspection at regular intervals and the maintenance of all parts in a satisfactory condition. If the equipment described in this manual receives the recommended attention, it will give many years of reliable service.

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Section 1 – General

1.1 - General description



1.2 - Introduction

These instructions cover all operations concerning handling, installation, operation and maintenance of the SCDB-TBO outdoor transformer mounted fuse cabinet.

The range comprises:-

4/5 Fuse way Cabinet:

- 800A/1600A incoming Type 1 or 2 (half neutral)
- 800A/1600A Incoming Type 1 or 2 (full neutral)

7 Fuse way Cabinet:

- 1600A/2500A Incoming Type 1 or 2 (half neutral)
- 1600A/2500A Incoming Type 1 or 2 (full neutral)

Type 1 indicates a Shielded busbar system

Type 2 indicates a SAIF busbar system

All work on this equipment that may be live must be carried out in complete compliance with the Electricity at Work Regulations and all safety procedures must be observed. In particular duty holders and persons working on this assembly or adjacent to it, should note that the degree of protection IPXXB provided by this assembly (doors open for outdoor assemblies) may not safeguard against the possibility of small diameter objects e.g. cable strands coming into contact with hazardous live parts. If work is carried out a risk assessment should be conducted and appropriate procedures should be employed.

1.3 - Weights and Dimensions

UNIT(S)		4 way Cabinet	5 way Cabinet	7 way Cabinet
AVERAGE	h	1633	1633	1633
DIMENSIONS (mm)	w	656	776	1036
	d	508	508	508
NET WIEGHT (Kg)		221	232	290
GROSS WEIGHT (Kg)*		229	270	>290

*.Maximum weight includes for a single freestanding unit that includes all available options, including the 50mm plinth to left hand side for the 7 way cabinet.

1.4 - Lifting Instructions

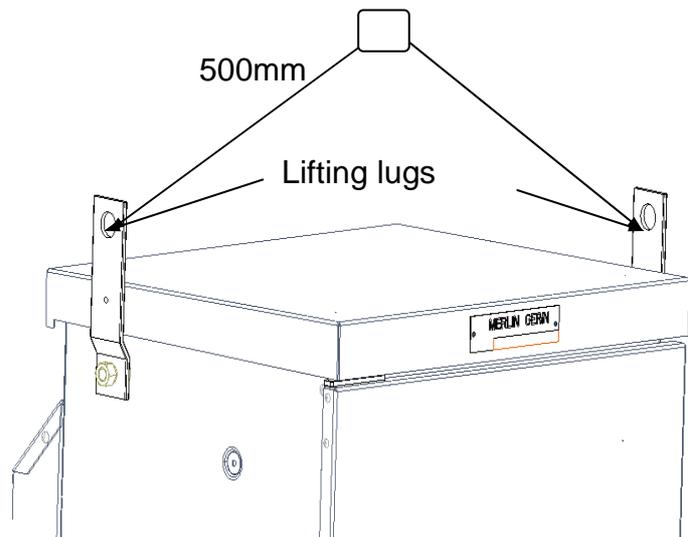
When lifting any equipment, ensure that all of the lifting points are used to maximise safety. All off-loading should be done using an over head crane.

4 Way

The lifting chains/ropes should be positioned 500mm from the lifting point as shown.

During the lifting operation, both of the lifting lugs should be used.

Maximum weight =229Kg

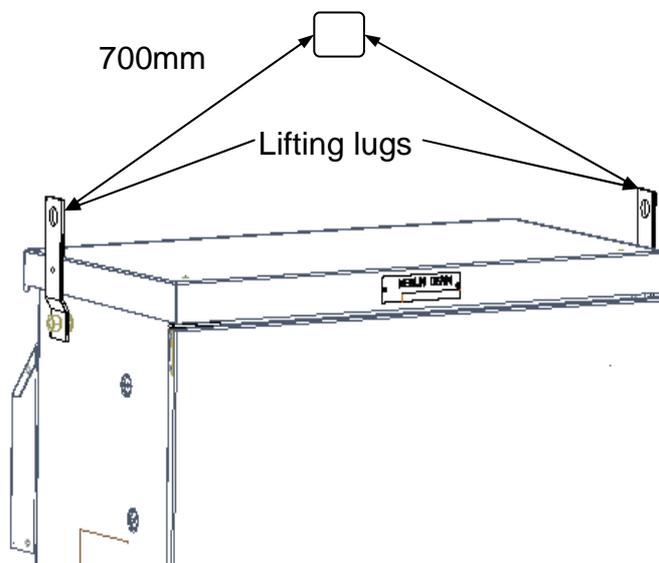


5 and 7 Way

The lifting chains/ropes should be positioned at 700mm from the lifting points as shown.

During the lifting operation, both lifting points must be used.

Maximum weight = 290Kg



Section 2 - Storage

2.1 - Outdoor units

The equipment is suitable for outdoor use. It is therefore necessary to protect the equipment from the environment before and during erection/commissioning. Should the busbar chamber or cable box become exposed to the elements, they should be thoroughly cleaned prior to energising. The busbar chamber or cable box should be stored in a warm, dry switch room and protected against dust and debris.

2.2 - Offloading

All units are offloaded using the lifting lugs that are fitted to the units as standard and should be offloaded using an overhead crane.

2.3 - Ancillary kits



Gasket on inside of the door

- The ancillary kits supplied with this unit:
- Fuse handles, provided that shielded fuse way option is chosen. These are supplied in boxes and supplied as loose items located in the outgoing cable space at the bottom of the fuse cabinet.
 - Flange gasket is supplied attached to the terry clip on the inside of the door.
 - Transformer connection kit is supplied in a clear plastic wallet in the spares tray to the rear of the front cross member.

Note: if SAIF fuse way option is chosen, the fuse carriers will be supplied in the 'ON' position within the SAIF fuseway.



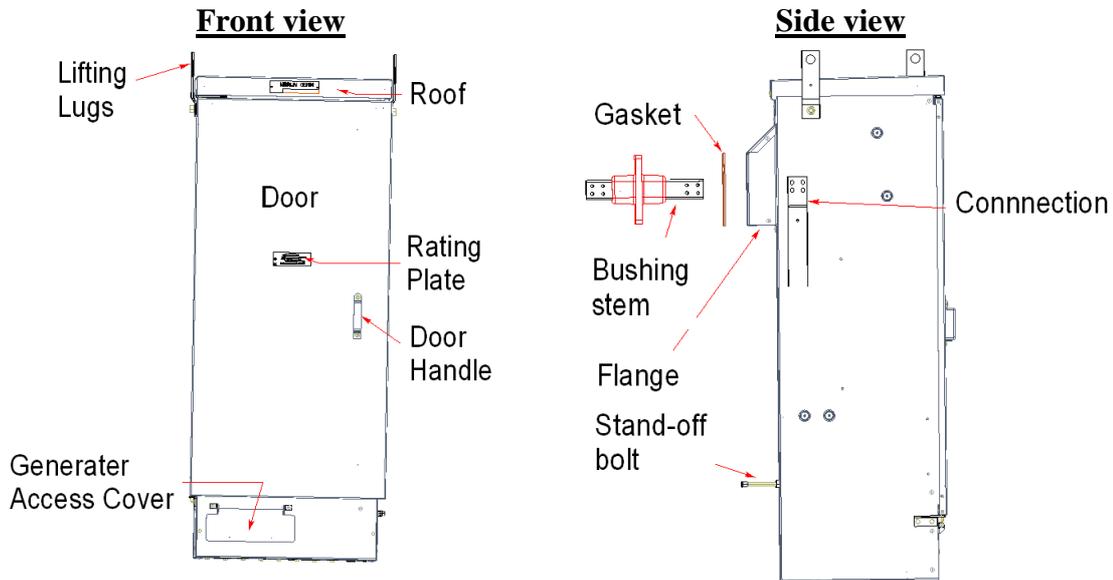
Fuse handles in the bottom of cabinet



Transformer connection kit

Installation

Section 3 - Mounting instructions



3.1 - Removing the roof



Open the cabinet door.



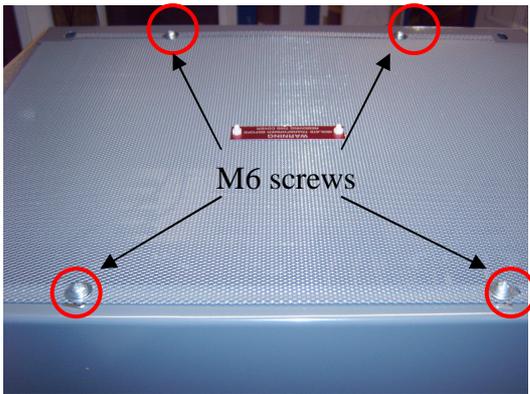
Remove the two M10 combi-nuts from inside of the cabinet (located just behind front cross-member at top of cabinet).

Lift the front of the roof approximately 25mm.

Push backwards until the roof pins clear the brackets then remove the roof.

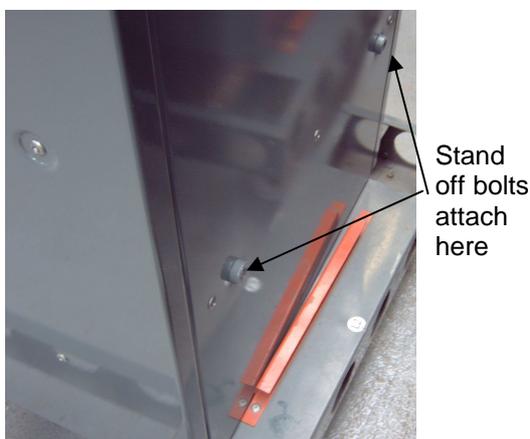
Note: on re-fitting the roof, do not over tighten the combi-nuts. Max torque setting = 10 Nm.

3.2 - Removing the ventilation mesh



1. Remove the roof.
2. Remove the four M6 screws securing the ventilation mesh.
3. Remove the mesh and store ensuring not to damage.

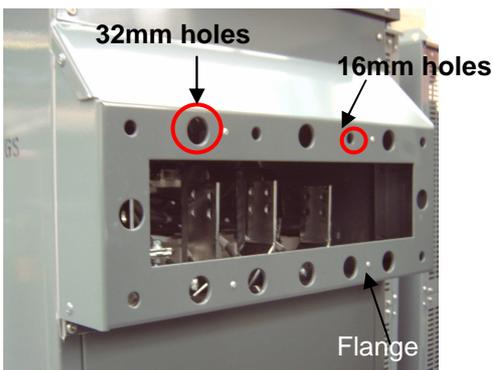
3.3 - Relocating the stand off bolts



1. Remove the two stand off bolts from inside the cabinet.
2. Relocate the stand off bolts from the rear with the lock nuts re-fitted inside the cabinet.
3. Adjust the stand off bolts to the approximate lengths required but do not tighten the lock nuts.



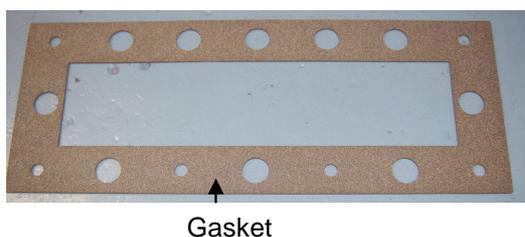
3.4 - Preparing the flange



Remove the M12 nuts on the transformer flange, which correspond to the 16mm holes in the cabinet flange.

Note: the remaining nuts, which correspond to the 32mm holes in the cabinet flange, must be left intact to secure the bushing assembly, which is below the oil level of the transformer.

3.5 - Fitting the gasket



Place the gasket, which is supplied loose inside the cabinet, the transformer flange ensuring that it is sat flat against the flange and is clear of the remaining nuts.

3.6 - Mounting the cabinet on the transformer

1. Use the lifting lugs to lift the cabinet so that the flange at the back of the cabinet and the flange on the transformer line up.
2. Engage the two flanges ensuring that the gasket is correctly located on the flanges and that copper connections line up with the bushing.
3. Fit the M12 nuts removed from the transformer flange (see section 3.4 'preparing the flange'), but only tighten finger tight.
4. Adjust the stand off bolts until they are touching the transformer tank and are holding the cabinet vertical.
5. **Tighten the lock nuts inside the cabinet.**
6. Tighten the flange nuts in sequence approximately $\frac{1}{2}$ turn at a time to ensure that the two flanges join together flat and without distortion to the gasket. At the same time ensure that the stand off bolts do not interfere with the correct alignment of the flange by adjusting as necessary.
7. When tightening of the flange is complete, check that the cabinet door opens and closes correctly. Minor alignment may be carried out by further adjustment to the stand off bolts before tightening the lock nuts inside the cabinet.

3.7 - Joining the connectors

All the screws, nuts, washers and packers are supplied loose inside plastic wallets inside the fuse cabinet.

1. Join the connections to the transformers stems using the screws provided.
2. The packers are for use with double connections-which are spaced at 20mm, when fitted to 12.5mm bushing stems. Only one packer is required for single lamination connections. Packers are not required 20mm bushing stems.
3. Ensure all joints are mechanically sound, including any adjacent connections/joints, which may have been loosened for adjustment.

3.8 - Refitting the ventilation mesh and roof



Roof re-fitted

To refit the ventilation mesh and roof, simply follow the instructions for removing them in reverse. See section 3.1 and 3.2.

Note: A gap of 50mm (minimum) must be maintained between the base of the cabinet and the ground to allow air to circulate freely.

3.9- Adjusting the doors



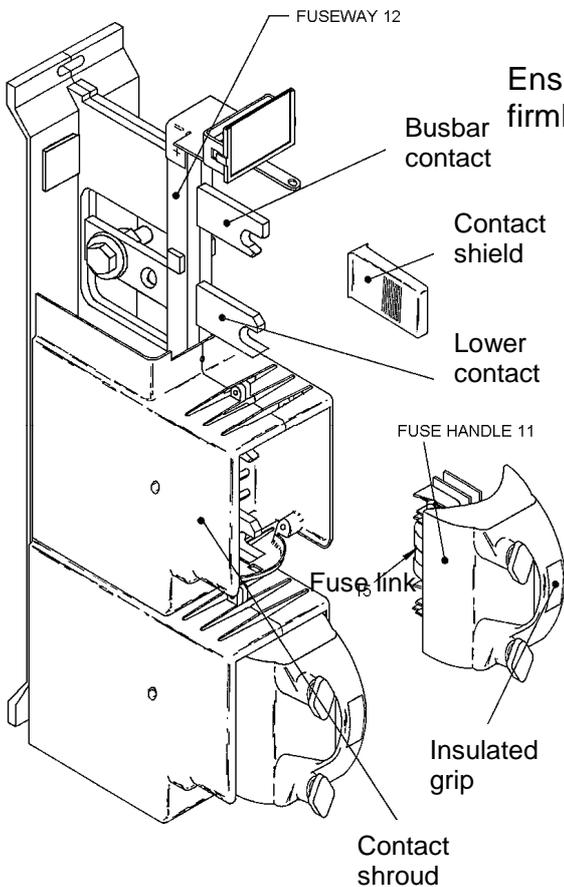
1. Remove the roof, as shown in section 3.1 'Removing the roof'.
2. Loosen the two M8 screws connecting the top hinge to the top front cross-member (DO NOT remove the M8 nuts completely as this may cause the door to fall).
3. Move the door to the desired location.
4. Re-tighten all the M8 screws.
5. Re-fit the roof. For details see section 3.8.

3.10 - Kit contents

Fixing Kits	Washers	Spring Washers	Nuts	Screws	Others
800A	2 M6 32 M8 C form 4 TX flange	2 M6 16 M8	2 M6 full nuts 16 M8 full nuts	2 M6 x 20mm coach bolts 16 M8 x 40mm	7 Copper Packers 4 Lifting Lug Discs
1600A	2 M6 32 M8 C form 4 TX flange	2 M6 16 M8	2 M6 full nuts 16 M8 full nuts	2 M6 x 20mm coach bolts 12 M8 x 50 4 M8 x 40	7 Copper Packers 4 Lifting Lug Discs

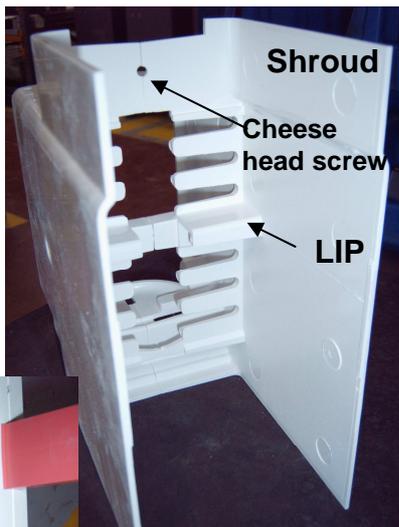
Section 4 - Fitting Instructions for shielded 400A and 630A Fuseways

4.1 - Preparing the fuseway



Ensure that the contact shields are fitted. They should be firmly pressed onto the busbar contact as firmly as possible.

4.2 - Removing the contact shrouds



1. Remove the cheese head screw situated in the top contact shroud on the fuseway.

2. Lift of the contact shrouds:

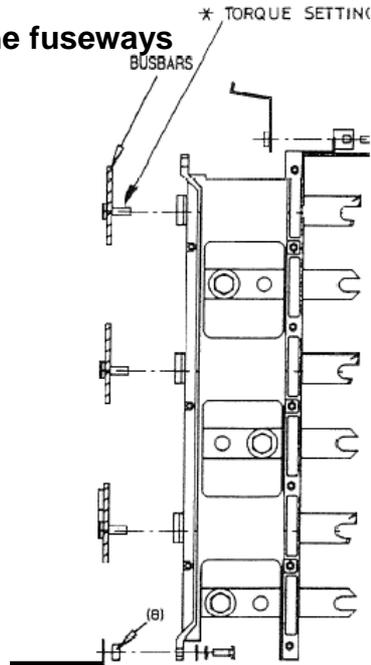
- Start at L1 phase at the top of the fuseway.
- Lift contact shroud until the lip on the inside face of the contact shroud clears the peg on the support moulding (approximately 15mm).
- Remove the contact shroud with a forward movement.
- Remove the L2 phase (middle) and then finally the L3 phase (bottom)

Note: In addition to the interlocking lip and peg, the contact shrouds also overlap each other and can only be removed in sequence described. Refitting must be carried out in the reverse order.

4.3 - Preparing the cable gland area

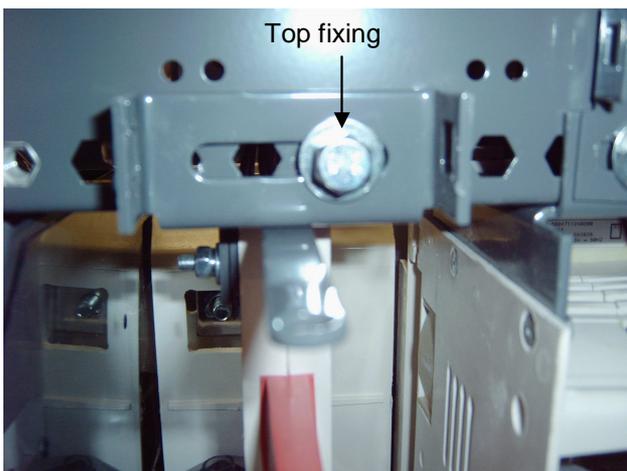
For details on preparing the cable glanding area see section 8.

4.4 - Fitting the fuseways

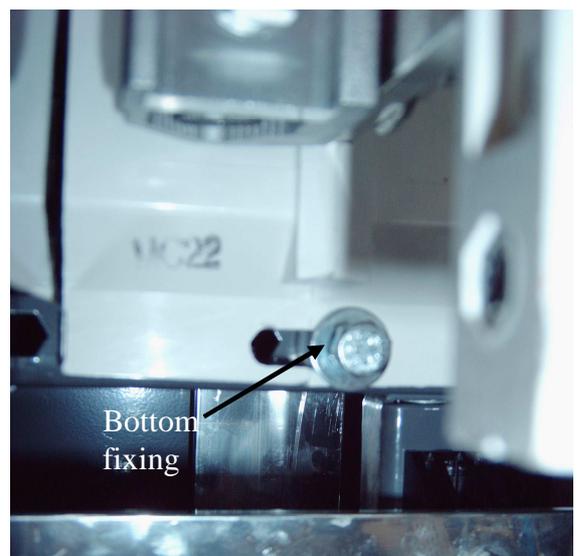


1. Offer up the fuseway with a upward movement so that the top rear mounting foot of the fuseway is located behind the top cross member.

2. Line up the studs on the busbars with the holes in the busbar contacts and engage by pushing the fuseway backwards.

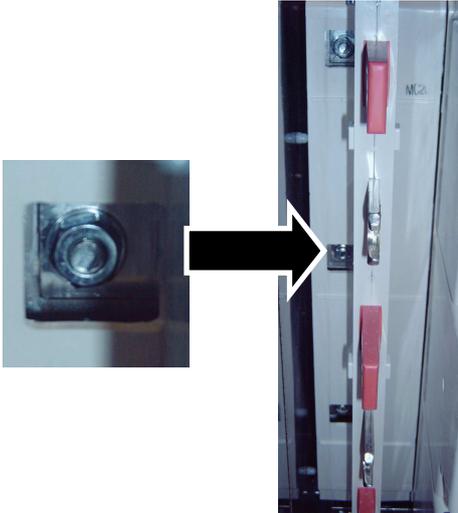


3. Enter the top fixing M8 screw to finger tightness only to hold the fuseway in position.

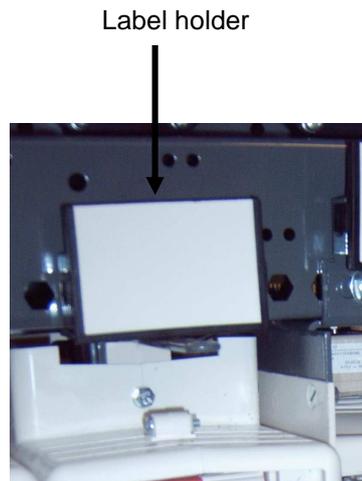


4. Hold the bush between the lower cross member and fuseway moulding whilst engaging the lower fixing M8 screw. Tighten to finger tightness only.

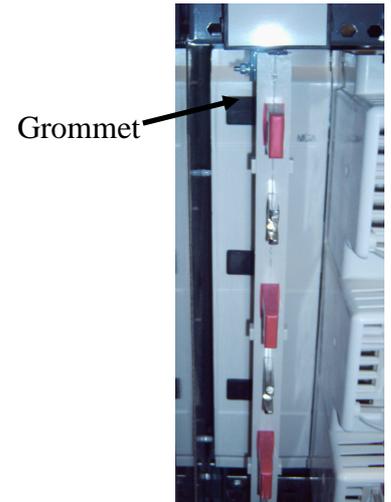
Installation



5. Engage the M10 combi-nuts and tighten in turn whilst ensuring that all contact faces properly align with the busbar faces. Tighten the combi-nut to a torque setting of 44Nm.



6. Tighten the fixing M8 screws and fit the label holder.



7. Fit the blind square grommets into the moulding to seal the joints.

4.5 - Re-fitting the contact shrouds

See section 4.2 'Removing the contact shrouds'.

4.6 - Fuse links

For details of the type of fuse link to be used with this equipment see section 9.3.

Section 5 - Fitting instructions for shielded 800A Fuseways

5.1 - Preparing the fuseway

Process exactly the same as for 400/630A fuseways, for details see section 4.1.

5.2 - Removing the contact shrouds

The same as for 400/630A fuseway (see section 4.1). Except screens are an integral part of the contact shrouds which themselves are joined together as a three-phase unit. Lift off contact shrouds complete with side screen all as one unit by moving upwards (approx. 15mm) and forward to remove.

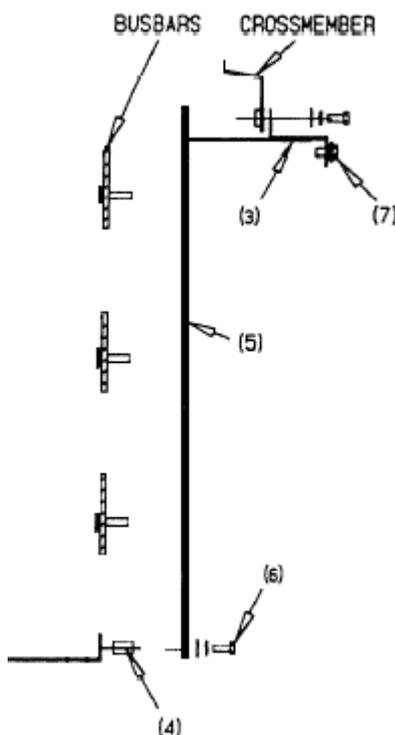
5.3 - Fitting the fuseway

Fitting the fuseways is the same as for a 400/630A fuseway, for details see section 4.4.

5.4 - Preparing the cable gland area

For details on preparing the cable glanding area see section 8.

5.5 - Fitting the 800A fuseway screens

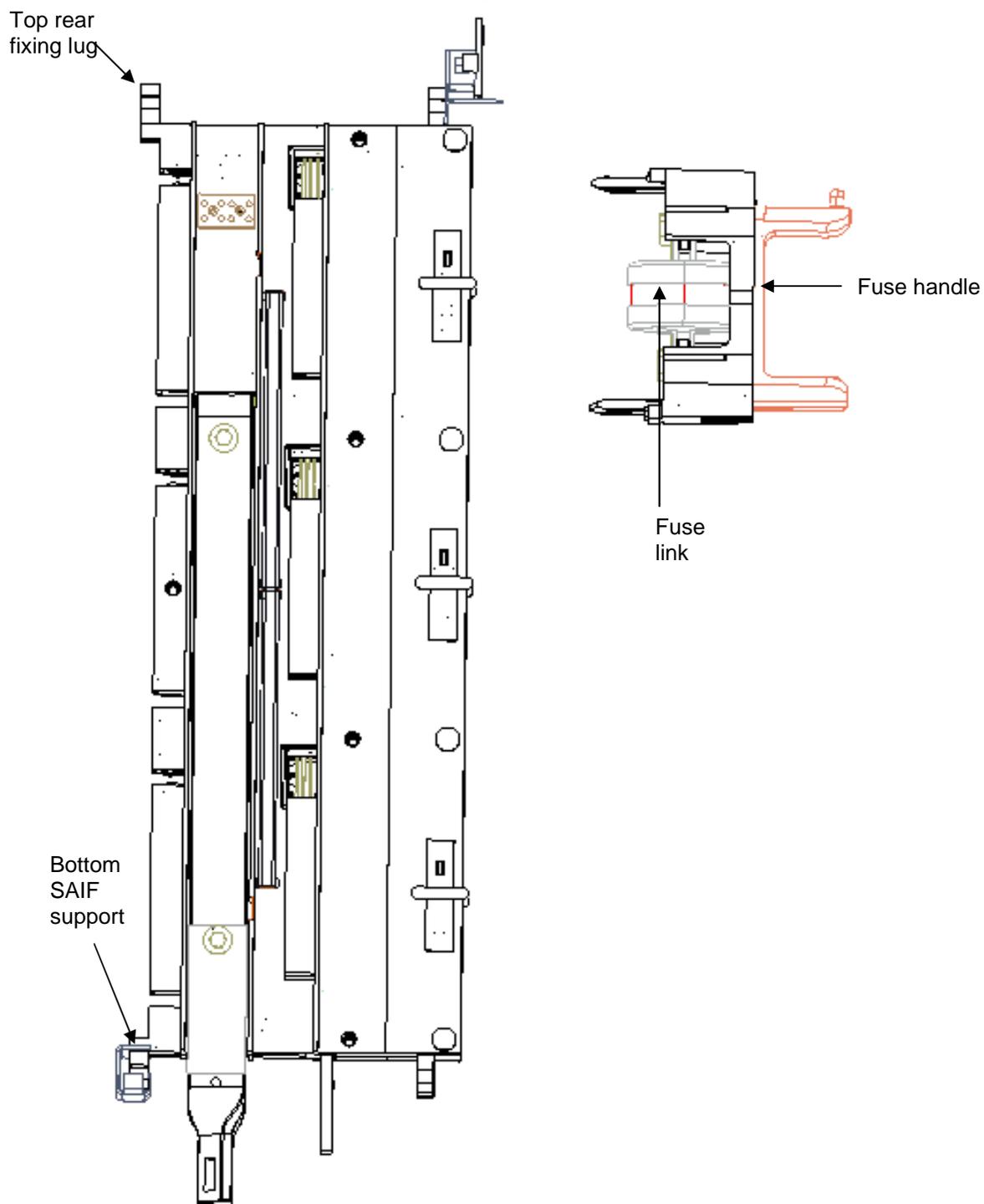


1. Fix the bracket (3) to the top cross member on the left hand side of the fuseway.
2. Hold the bush (4) between the lower cross member and retaining strip (5) whilst engaging the lower fixing screw (6), together with the washer and spring washer.
3. To re-fit the combined contact shrouds and screen, reverse the process for removal (see section 4.2 'Removing the contact shrouds') and secure by the fixing screws (7).
4. Tighten the fixing screws whilst ensuring that the screen butts to the adjacent screen or fuseway.

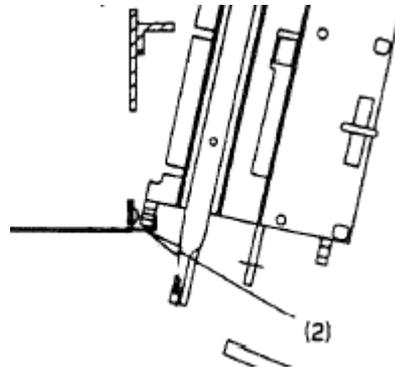
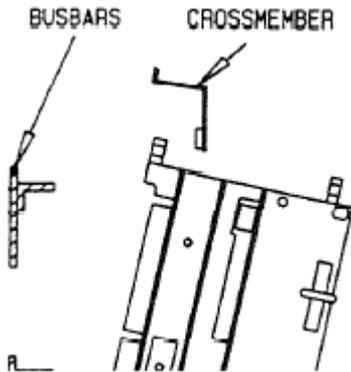
Section 6 - Fitting instructions for SAIF Fuseway

6.1 - Preparing the fuseway

Ensure that the SAIF fuse carriers are removed from the fuseway as described in the instructions with the equipment.

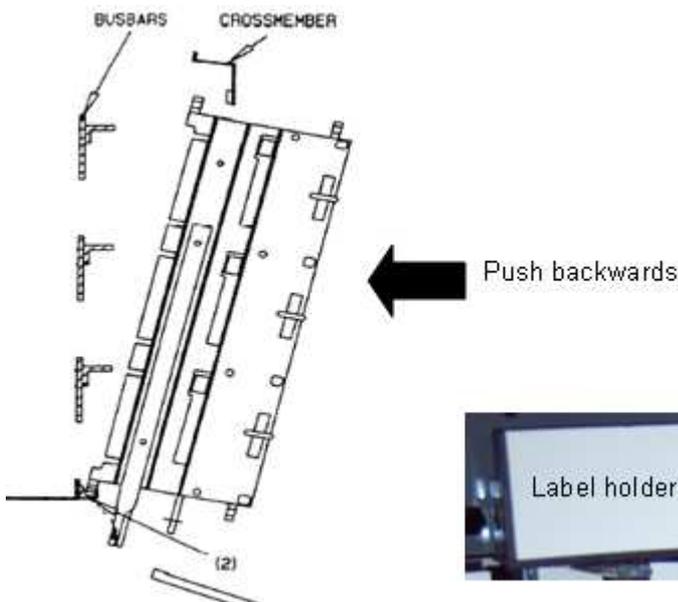


6.2 - Fitting the fuseway



1. Lift up the fuseway, and with the top leaning forward toward the front of the cabinet. Place its top rear fixing lugs behind the top cross member.

2. Rest the bottom SAIF support into the support bracket (2).



3. Push the upper end backwards, engaging the fuseway with the busbars. Some minor upward movement may be required during this operation to align and fully engage the busbars.

4. Remove the label holder off the label-fixing bracket (3).

5. Enter the top fixing M8 screws through the label fixing bracket and the fuseway upper fixing lugs. Tighten the fixing M8 screws.



6.3 - Re-fitting the fuse carriers



Lift the carriers back into position in the fuseway.

Note: Fuse carriers are supplied with dummy links fitted as standard, but may have factory fitted fuse links. Consult contract documents.

To put the unit into service the dummy links will need to be replaced with fuse links.

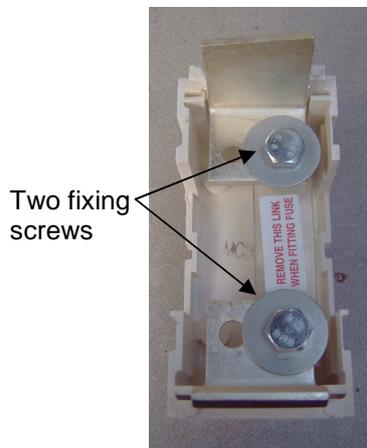
6.4 - Fuse replacement (SAIF)

Remove the fuse carrier from the fuseway as described in the instructions with the equipment.

6.5 - Removing the dummy link or blown fuse



1. Lay the fuse carrier on a level surface with the contacts upwards.

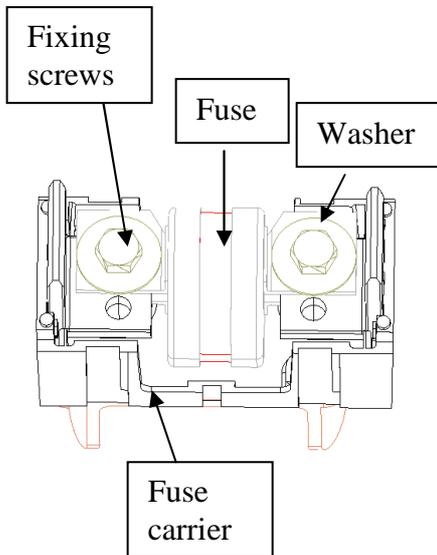


2. Using a 19mm ring spanner or socket for the 630 BS type – 17mm ring spanner or socket for the 400 BS type; unfasten and remove the two fixing screws and their washers.



3. Lift out the contacts (with the fuse if fitted) discard the dummy fuse link or blown fuse.

6.6 - Fitting a fuse



The 400A BS SAIF fuse carrier accepts 'J' type fuses (82mm centres) to IEC 60269-2-1 or BS 88-5, ratings up to 400A. The 630A and 800A BS SAIF fuse carriers accept 'J' type fuses (92mm centres) to IEC 60269-2-1 or BS 88-5, ratings up to 630A and 800A respectively.

Note: The rating of the fuse carrier is detailed on the label positioned on the front face of the fuse carrier.

1. Place the contacts between the fuse tags of the fuse to be fitted and place the assembly in the fuse carrier. Note that the contacts fit into the recesses in the top and bottom of the fuse carrier moulding. With the 630 BS type note also that, with the fuse barrel in the centre of the carrier, the fuse tags must lie to the side of the carrier adjacent to the tapped fixing bosses.
2. Refit the two fixing screws, along with their Belleville washers, and tighten to a torque of 40Nm for the 630 BS type and 24Nm for the 400 BS type or until the Belleville washers are flattened and increased resistance is felt.

Section 7 - Fitting instructions for fuseway blanking screens

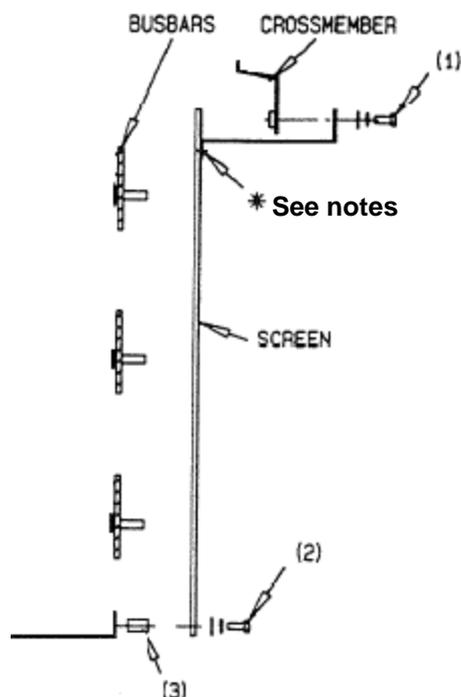
7.1 - Shielded fuseway blanking screens

The screens are the same width and have the same fixing points as the 400/630A shielded fuseways. Use one screen for each fuseway position being blanked off.

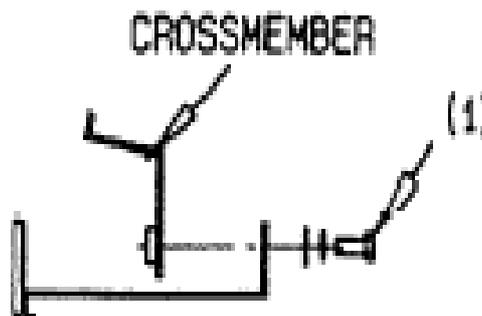
Note: Two screens are required to blank off an 800A shielded fuseway as these are twice the width of 400A or 630A fuseways.

Rating (Amps)	Fuse links		
	400A	630A	800A
20A	Y	Y	Y
	Y	Y	Y
	Y	Y	Y
	Y	Y	Y
	Y	Y	Y
	Y	Y	Y
400A	Y	Y	Y
630A	N	Y	Y
800A	N	N	Y

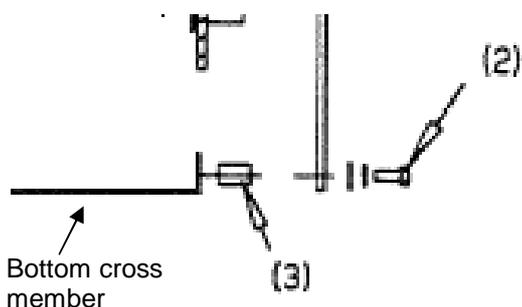
7.2 - Fitting the shielded fuseway blanking screen



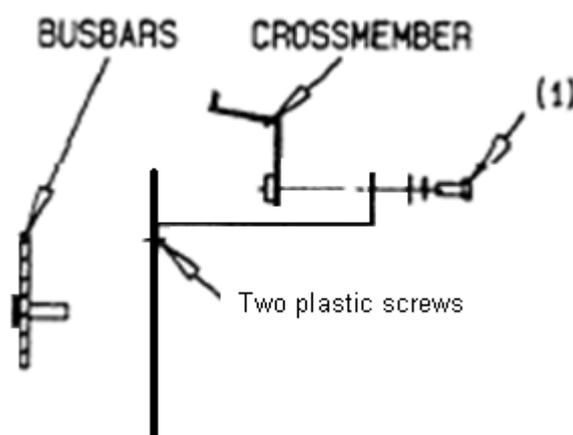
1. Offer up the blanking screen to the area being covered with the insulated top extension behind the top cross member.



2. Engage the fixing M8 screws (1), along with the flat washer and the spring washer, but do not tighten.



3. Hold the bush (3) between the lower cross member and the blanking screen whilst engaging the lower fixing M8 screw (2), along with the flat washer and spring washer.

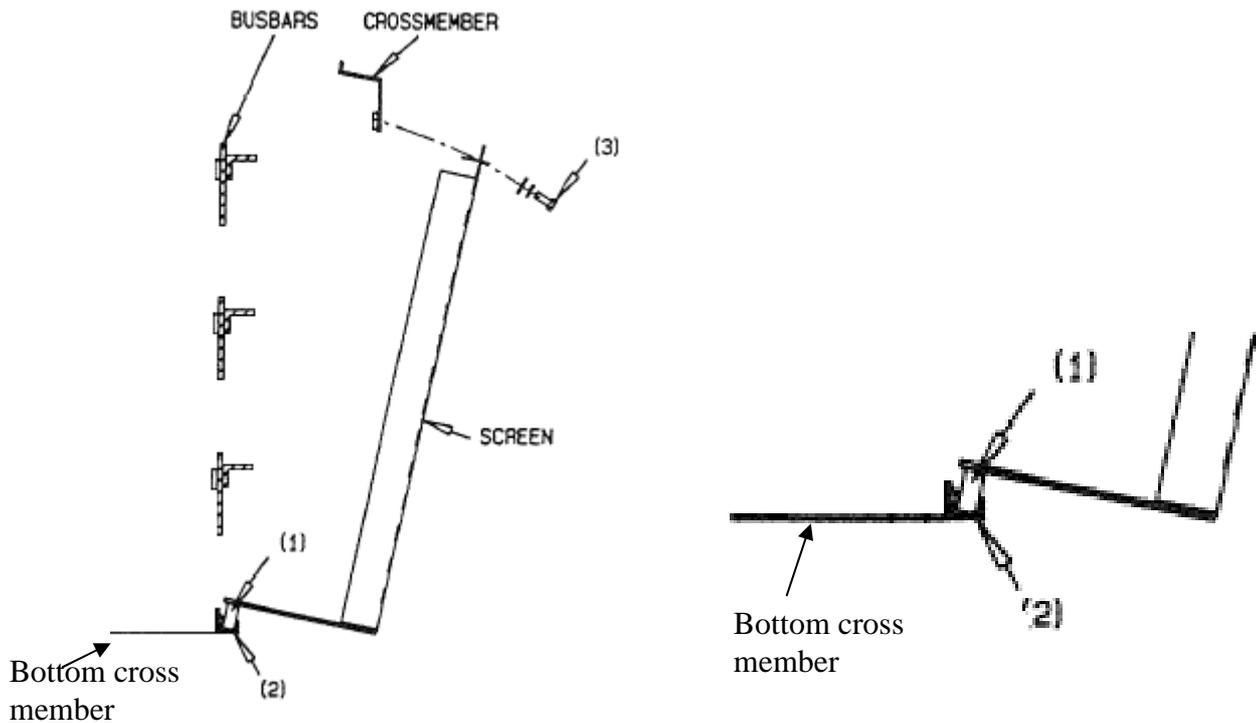


4. Tighten up the two fixing M8 screws.
Note: Do not remove the two plastic screws.

7.3 - SAIF fuseway blanking screen

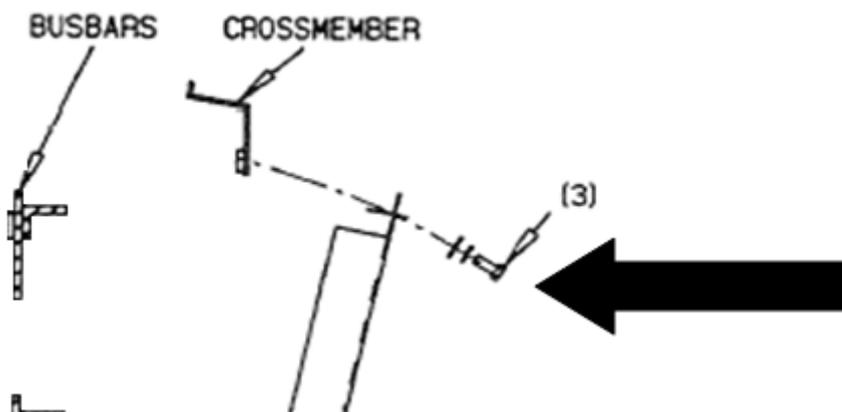
The screens are the same width and have the same fixing points as the 400A/630A SAIF fuseways. Use one blanking screen for each fuseway position being blanked off.

7.4 - Fitting the SAIF blanking screen



1. Offer up the screen to the area being covered.

2. Locate the two dowels (1) into the bracket (2) on the bottom cross member.



3. Engage the two M8 screws (3), together with the flat washer and spring washer on the top cross member.

4. Tighten the M8 screws (3).

Section 8 - Cabling instructions on cable glanding areas

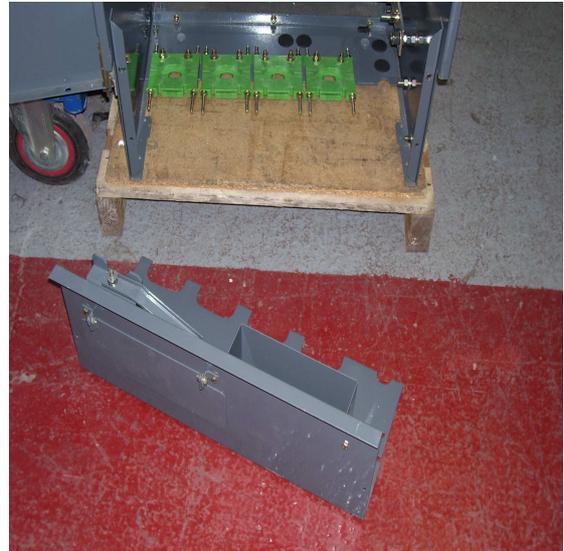


Caution: Ensure that the power to the cabinet is OFF before cabling up!

8.1 - Removing the front cross member



1. Release the screws at the front of the cross member and M8 screws at the inside bottom edges.



2. Holding the gland support bracket, front bottom plate, slide the front cross member forwards. Do not release the row of M8 screws or the brackets.

8.2 - Gland plates



Supplied when all cables within a unit are made off into type glands. An individual gland plate is fitted for each circuit. It rests on the gland plate support bracket and maybe removed by releasing the fixing M8 screws. Unless supplied as pre-drilled, drill the gland plate to suit the size of the gland being used in line with the centre of the cable core terminations.

8.3 - Split wooden cleats



Supplied when all cables within a unit are made off into split wooden cleats. The split wooden cleat is attached to the rear half of the split bottom plates. Unless supplied pre-drilled and split, drill a hole to suit the cable being fitted at the centre of cleat. Cut the cleat along its centre line parallel to the clamp plate. Always split after drilling.

8.4 - Mixture of gland plates and split wooden cleats

Supplied when the cables within a unit have a mixture of compression type glands and split wooden cleats or a combination of single core and multi-core cabled circuits. Plates for compression type glands are exactly as described for gland plates above. Split wooden cleats are the same as those supplied for split wooden cleats as above, but in this instance are supported by a modified gland plate. They have an oversized hole to allow the cables to pass clearly through the split wooden cleat.

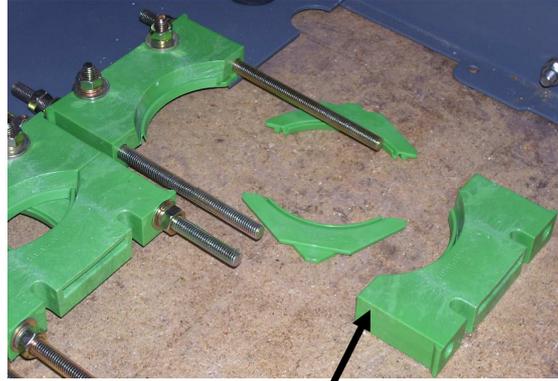
8.5 - Adjustable cable cleats



Adjustable cable cleat accommodates cable in range 3c x 70 sq. mm to 4c x 300 sq. mm. Cable cleats close cable access aperture around cable. Individual cable cleat is fitted for each circuit. Removable bottom front cross member and split bottom plate enable cables to be 'laid' in place.



1. Loosen off the two M8 nuts securing both halves of the cable cleat together.



2. Slide off the outer half of the cable cleat.
3. Insert cable.
4. Re-attach outer half of cable cleat.
5. Place on washer, spring washer and nut. Tighten up.

Section 9 - Cabling Instructions for shielded fuseways

9.1 - Preparing the cable glanding area

Cable glanding areas are in section 8.

9.2 - Removing the fuse handles



Caution: Busbar contacts will be exposed when the fuse handles are removed.

Fuse handles are normally supplied as loose items, boxed and without fuse links.

If the fuse handles have been fitted for any reason they should be removed by slackening the thumbscrews and pulling out with rapid movement in accordance with standard instructions for operators.

The YW4 fuse handles accepts 'J' type fuses (82mm centres) to IEC 60269-2-1 or BS 88-5 to 400A rating.

The YW6 fuse handles accepts 'J' type fuses (92mm centres) to IEC 60269-2-1 or BS 88-5 to 630A rating.

Installation

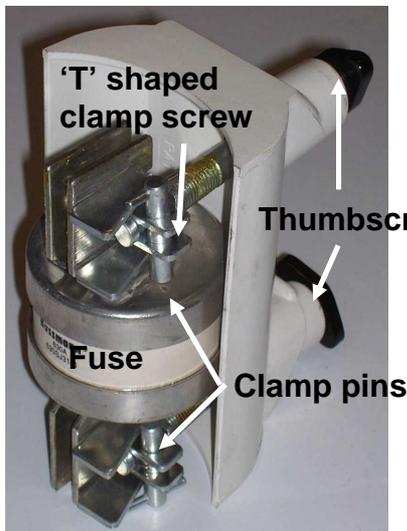


1. Loosen the top and the bottom thumbscrews on the fuse carrier.



2. Take hold of the fuse handle and pull off.

9.3 - Changing the fuse link in the fuse handle



1. Remove the fuse handle from the fuseway (see section 9.2).
2. Remove the two push in 'T' shaped clamp pins going through the clamp screw and washer.
3. Remove the two clamp screws and washers and remove the fuse.
4. Place the clamp pins through the slots of the fuse tags of the new fuse.
5. Position the fuse and clamp pins into the fuse handle. Push the 'T' shaped clamps through the holes in clamp pins until the retaining ball is between the prongs of the clamp pins.

9.4 - Fitting the contact shields



Contact shield



Caution: busbar contacts will be exposed when shields are not fitted.

Fit the contact shields to the busbar contacts and push firmly. Shields are normally fitted to the busbar contacts of circuits which have fuse handles removed.

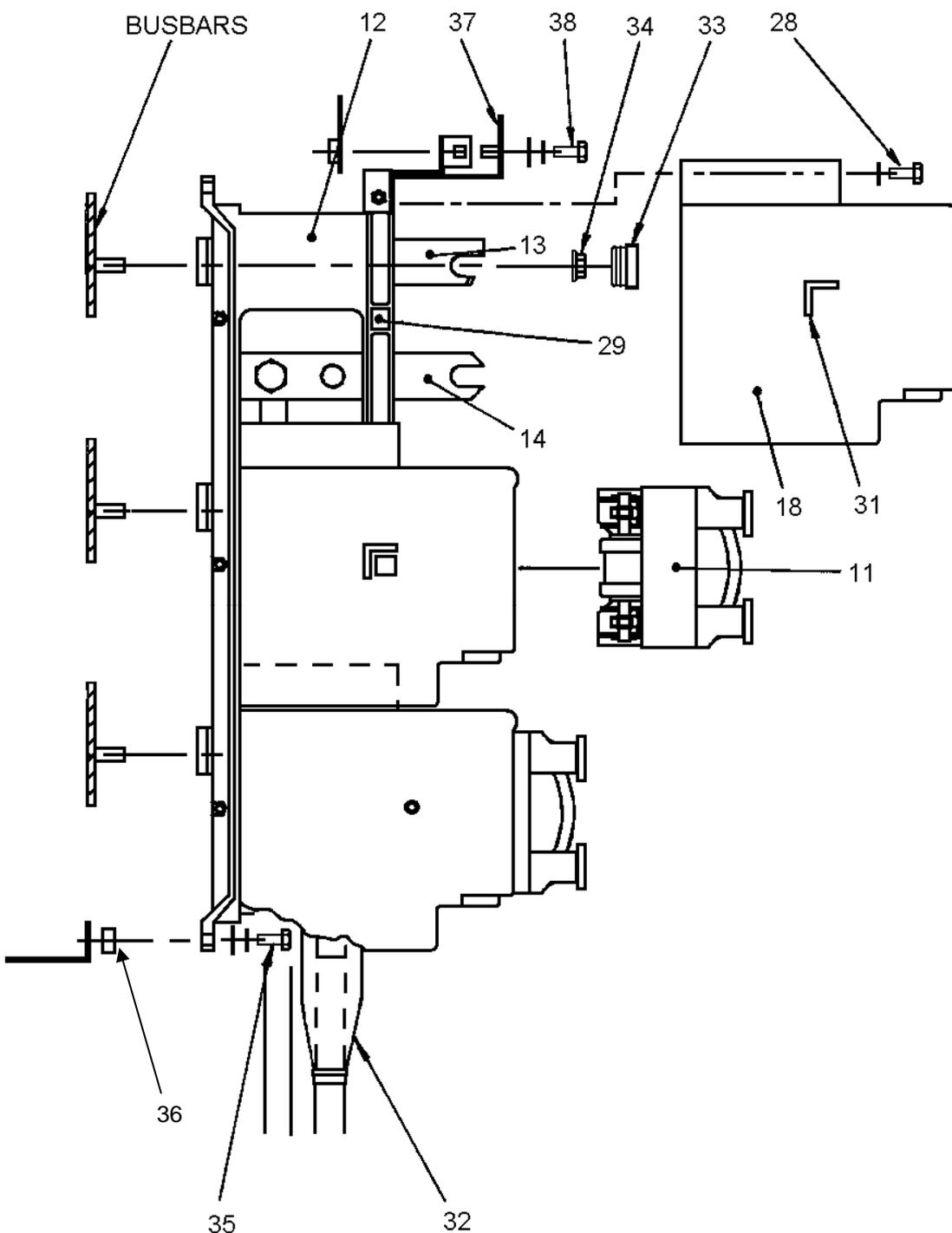
9.5 - Removing the contact shrouds

Details for the removal of contact shrouds are described in section 4.2 'Removing the contact shrouds' for 400/630A fuseways and in section 5.2 for 800A fuseways.

9.6 - Terminating the cables

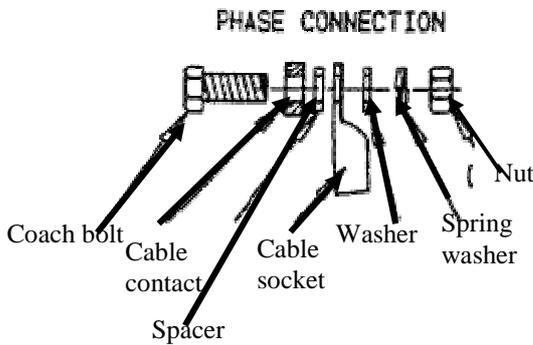
Gland the cables and terminate the cores in accordance with the instructions for the type of cable and termination method selected and the following.

Note: Cut the tapered end off of the terminal shroud so that it is a secure fit over the L3 phase cable core and fit the narrow end first over the cable core before making off the cable end socket. **Isolation:** Fuse handles must be removed and contact shields fitted.



- 11 – Fuse handles
- 12 – fuseway
- 13 – Upper contacts
- 14 – Lower contacts
- 18 – Shroud
- 28 – Fixing screws
- 29 – Interlocking peg
- 31 – Interlocking lip
- 32 – Insulating boot
- 33 – Square grommets
- 34 – Combi nuts
- 35 – Lower fixing screws
- 36 – Bush
- 37 – Circuit label
- 38 – Upper fixing screws

9.7 - Phase cores



1. Remove the screws and refit in either direction into the cable contact to suit the position of the cable core as it rises from the cable crotch, there is no need to cross the cable cores.
2. Cut one of the wings off of the terminal shroud to suit the position of the cable core onto the cable contact.
3. Refit the spacers, washers and nut then tighten.

Note: Ensure that the spacer is adjacent to the cable contact to allow the cable core to clear the shrouding of the phase below.

4. Slide the terminal shroud back up the core and around the cable contact.
5. Push the plastic clip through the top flange of the terminal shroud and secure the bottom with a plastic cable tie.

9.8 - Neutral cores

Make off the neutral core directly onto the neutral busbar. The neutral busbar comprises of one length of copper with square holes punched in to it, which should provide sufficient locations to provide a suitable terminations.

Fit the coach bolt from the rear, at any point on the neutral busbar, together with the washers, nuts as shown and tighten from the front.

9.9 - Refitting the contact shrouds

Details for the refitting of contact shrouds are described in section 4.2 'Removing the contact shrouds' for 400/630A fuseways and in section 5.2 for 800A fuseways.

9.10 - Restoring the cable glanding area

Refit all of the items that were removed during the preparation of the glanding area. For more information see section 8

Section 10 - Cabling instructions for SAIF fuseways

10.1 - Preparing the glanding area

Cable glanding areas are described in section 8.

10.2 - Removing the terminal shrouds



Caution: Cabling should only be carried out when the fuse carriers are in the 'OFF' position.

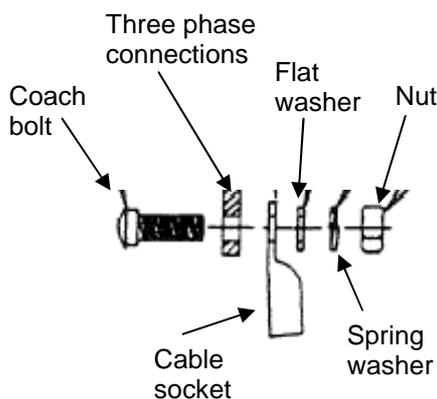
Terminal shrouds are normally supplied as loose items. If the terminal shrouds have been fitted for any reason, they should be removed. Only remove the terminal shrouds from the units that are to be cabled.

10.3 - Terminating the cables

Gland the cables and terminate the cores in accordance with the instructions for the type of cable and termination method selected and the following.

Note: Cut the tapered end off the terminal shroud so that it is secure fit over the cable cores before making off the cable end socket.

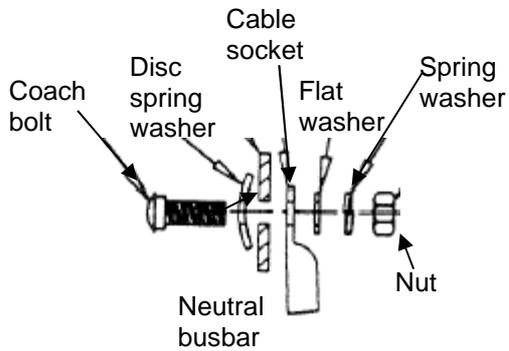
10.4 - Phase cores



The coach bolt must be fitted from the rear of the termination. It fits into a rectangular hole which takes up any small errors in length of the core when fitting the cable end socket.

1. Assemble the socket, washers and nut as shown in the diagram and tighten.
2. Slide the terminal shroud back up the cable cores and over the complete terminations. Ensure that the terminal shrouds fit up to the base of the mouldings.
3. Secure with plastic cable ties.

10.5 - Neutral cores



1. Make off the neutral cable lug directly onto the neutral busbar. The neutral busbar comprises of one length of copper with square holes punched into it to provide sufficient locations for a suitable termination
2. Fit the coach bolt from the rear, at any selected point on the neutral busbar, together with the washers, nuts and spacer.
3. Tighten from the front.

Side view



Front view



10.6 - Restoring the cable glanding area

Refit the front cross member if it was removed. For more information see section 8.1.

10.7 - Fuse links



Type 630BS
92mm centres



Type 400BS
82mm centres

The 630A and 800A BS fuse carriers accept 'J' type fuse links (92mm centres) to IEC 60269-2-1 or BS 88-5, ratings up to 630A and 800A.

The 400A BS fuse carrier accepts 'J' type fuse links (82mm centres) to IEC 60269-2-1 or BS 88-5, ratings up to 400A. For details on installing fuse links, see section 6.4.

Section 11 - Cabling instructions for mechanical cable connectors



UT4/I



UT4/B

1. Fit the mechanical cable connectors to the cable contacts in the positions suited to the height of the cable cores, but only to finger tightness.
 2. Set the conductor to the required position, cut to length and strip the insulation equal to the length of the connector plus 5mm. thoroughly abrade the exposed conductor.
 3. Remove the connectors from the cable contacts and assemble around the conductor. Tighten the screws sufficiently to secure the conductor but **DO NOT** shear the screw at this stage.
 4. Clean the cable contact area corresponding to the position of the mechanical connector.
 5. Assemble the connectors to the cable contacts, adjusting the position of the connector, **USING THE OUTER HEAD**, until the outer head shears.
 6. Carefully tighten the double headed shear screws holding the connector, **USING THE OUTER HEAD ONLY**, until the outer head shears off.
- N.B.:** A circlip is fitted at the point of shear between the two hexagon heads of the double-headed shear screw and its sole purpose is an aid to ensure that the socket or ring spanner does not engage with the lower hexagon head.

Ensure that all sheared heads and circlips are removed from the fusegears enclosure.

Notes:

- The connector is designed for use with cable contacts having a thickness of 8mm. When fitted to copper work of less thickness, suitable spacer washers must be fitted under the double-headed shear screw to achieve a normal thickness of 8mm.
- Should it be necessary to disconnect the fitting from the cables and/or cable contact, it should only be refitted using genuine replacement double-headed shear screws.
- Mechanical cable connectors are suitable for terminating phase cores only.

Section 12 - Using auxiliary devices

12.1 - Shielded fuseway locking off device



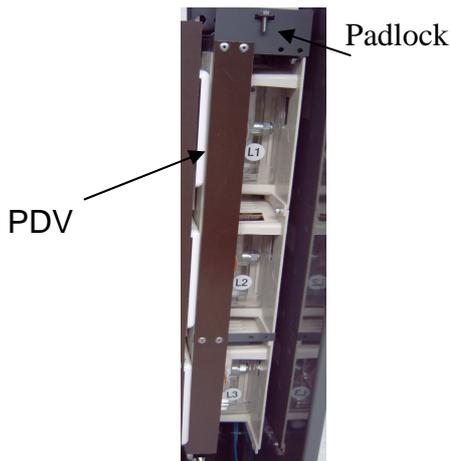
For padlocking fuseways with the fuse handles removed. The device prevents the insertion of fuse handles. The device consists of a wide insulated strip with a hole at one end and a spacer-retaining strip on one side.

1. Remove all fuse handles from the fuseway and fit the insulating contact shroud. Take the device with the end with the hole uppermost and the retaining strip towards the fuseway
2. Insert the retaining strip into the foremost ventilation slot on top of the lower shield.
3. The device towards the fuseway, the locking bar will pass through the hole at the top of the device.
4. Insert a padlock through the locking bar with the padlock device trapped behind, this now prevents insertion of any fuse handle.

12.2 - Disconnecter padlock device (PDV)

For padlocking vertically mounted disconnectors. Device can be fitted with the disconnector either open or closed. The device consists of a long narrow insulated bar with a steel bracket top and bottom.

1. Take the device with the flat bracket upper most and the insulated bar to the left.



2. Hook the lower bracket over the two nuts protruding from the insides of the disconnecting moulding just above the neutral section.
3. Hinge the device towards the disconnecting device, the locking bar pass through the slot in the top bracket.
4. Insert a padlock through the locking bar with the device trapped behind, the device now prevents insertion of the operating handle.

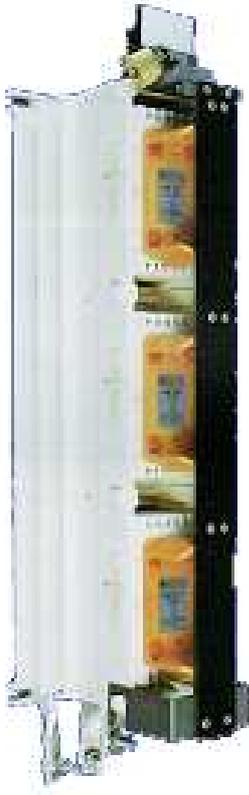
12.3 - SAIF fuseway padlocking device (PDO)



For padlocking fuseways with the fuse carriers removed. The device prevents insertion of the fuse carriers. The device consists of an insulated strip with a steel bracket at one end.

1. Remove all fuse carriers from the fuseway. Take the device with the steel bracket upper most, facing away from the fuseway.
2. Insert the lower end of the device into the slot in the floor of the fuseway.
3. Hinge the device towards the fuseway, the locking bar will pass through the hole in the steel bracket at the top of the device.
4. Insert a padlock through the locking bar with the device trapped behind, this now prevents insertion of any fuse carriers.

12.4 - SAIF fuseway padlocking device (PDI)



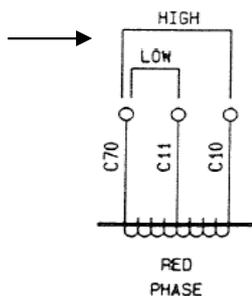
For padlocking fuseways with the carriers in the 'OFF' position. The device prevents the carriers being switched to the 'ON' position or removal of the carriers from the fuseway. The device consists of an insulated strip with a 'U' shaped steel bracket at the bottom, at steel bracket assembly at the top and three smaller steel brackets on one side of the insulated strip.

1. Ensure that all of the carriers are in the 'OFF' position, but not removed. Take the device with the 'U' shaped bracket lowermost, facing the fuseway.
2. Hook the 'U' shaped steel bracket over the lowermost set of locating bosses on the outside of the fuseway walls and the three small steel brackets locating on the top drive pins of the three fuse carriers.
3. Slide the moving portion of the top steel bracket assembly towards the fuseway, fitting around the locking bar.
4. Insert a padlock through the locking bar with the device trapped behind, this now prevents the removal or operation of the fuse carriers.

Section 13 - Incoming metering

13.1 - C.T ratio selection (when dual ratio C.T's are provided)

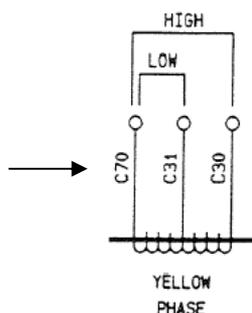
Ratio settings between wires



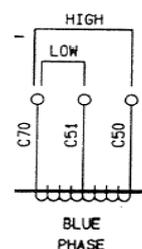
The incoming current transformers (C.T's) are located within the disconnecter housing and a label on then C.T's states the ratios available.

1. Use of alternative wiring: this method utilises wires located behind relevant meters. If the ratio needs to be changed, wires marked 10, 30 and 50 will be swapped with wires 11, 31 and 51. The wires marked 11, 31 and 51 are left 'floating' behind the relevant MDI inside a protective sleeve. When the two wires have been changed ensure that the 'floating wire' is placed back inside its protective sleeve.

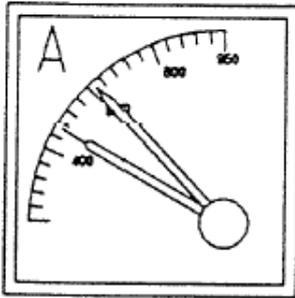
Metering wire numbers



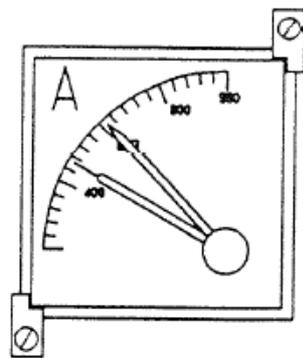
Current transformers typical dual ratio's
1600/800/5A or
800/400/5A



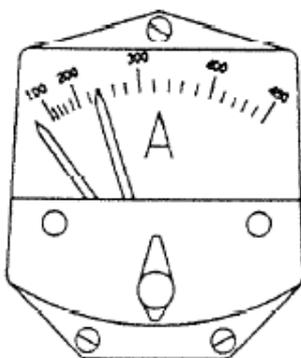
13.2 - Removing the meters



FLUSH MOUNTED METER
(SECURED AT REAR OF PANEL)



FLUSH MOUNTED METER
(SECURED AT FRONT OF PANEL)



SURFACE MOUNTED METER

Either of two types of meter may be fitted, flush mounted or surface mounted. Flush mounted meters may be secured to the panel by either of two methods, by retainers at the rear of the panel or by corner clips at the front of the panel.

1. Flush mounted (secured at the rear of the panel): To remove this type of meter it will be necessary to remove the roof and ventilation mesh, as described in sections 3.1 and 3.2, to gain access to the rear of the instrumental panel. The wiring may be changed with the meters in-situ or the meters can be removed by releasing the retainers.
2. Flush mounted (secured at the front of the panel): To remove this type of the meter, remove the two fixing screws holding the corner clips and withdraw the meter from the panel.
3. Surface mounted meters: To remove this type of meter, remove the three fixing screws at the front of the meter.
4. PM700/700P/710 (secured at the back of the panel): To remove this type of meter, it will be necessary to remove the roof and ventilation mesh, as described in sections 3.1 and 3.2, to gain access to the rear of the instrument panel. To remove the meter, remove the two spring-loaded catches on the upper right and lower left of the meter respectively.

PM710 front
view



PM710 back
view



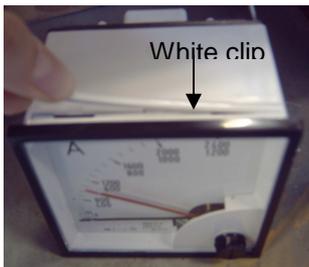
13.3 - Changing the meter scales

Unless dual scales are fitted, the meter scales will need changing to suit the C.T ratios.

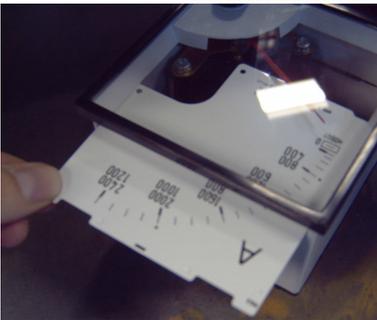


Caution: The C.T's wiring **MUST NOT** be left as an open circuit for any long duration of time if the equipment is energised as dangerous voltages may occur across the meter wire ends. To avoid this wire must be short-circuited.

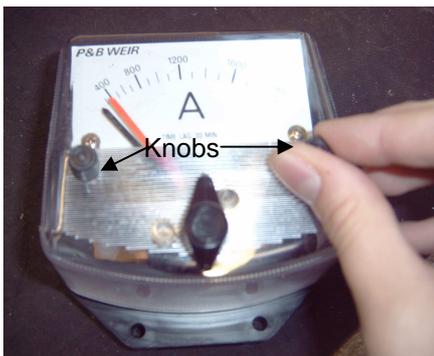
13.4 - Flush mounted meters



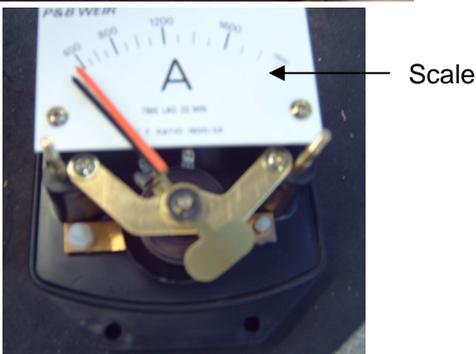
1. The white clip on top of the MDI.
2. Turn the MDI upside down so that the scale inside falls out.
3. Place the required scale inside the MDI so that the notch is situated in the bottom right hand corner.
4. Replace the white bung back inside the gap and press down until its clicks into place. Refit the meter to panel.



13.5 - Surface mounted meters

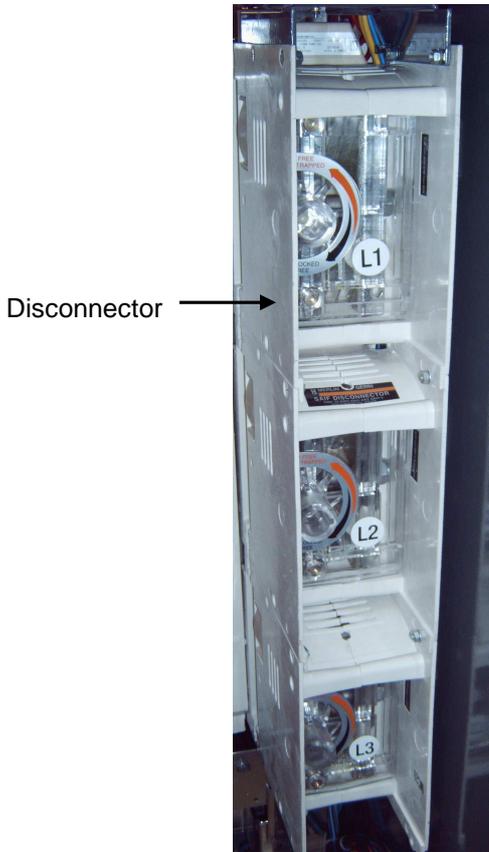


1. Unscrew the two knobs on the front of the meter.
2. The clear plastic cover. Unscrew the two screws securing the scale.
3. Turn the scale over. Refit the two screws to secure the scale.
4. Replace the plastic cover.



Section 14 - Operation of SAIF disconnecter

14.1 - The disconnecter



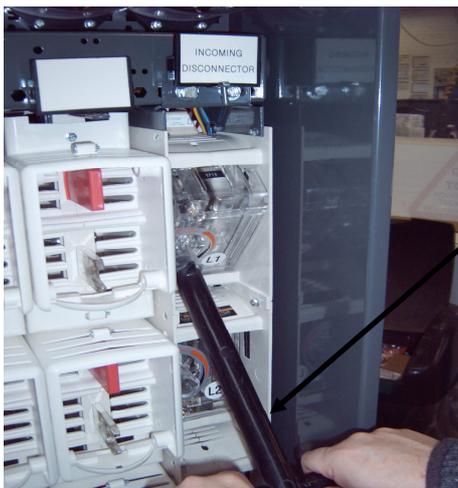
Essentially a hinged link off load isolator of an insulated and interlocked design, the SAIF disconnecter comprises three single phase units and a bolted neutral link, in identical moulded supports. They can be arranged in an integrated vertical format or in a horizontal format.

Operation is by means of a special insulated operating handle, with interlocks to ensure that it can only be removed when the disconnecter is properly closed and full contact pressure applied, or when the disconnecter is fully and positively locked open. At any intermediate position, the tool is into disconnecter and cannot be rotated.

Initial contact pressure is provided by springs, replaced in the closed position by clamping forces from a mechanical cam arrangement.

In addition to the open and closed positions the disconnecter has an inspection position for examination and serving only, which gives access to its contacts. This should not be undertaken with the equipment live and involves an outage of the whole equipment.

14.2 - Closing a disconnecter off-load



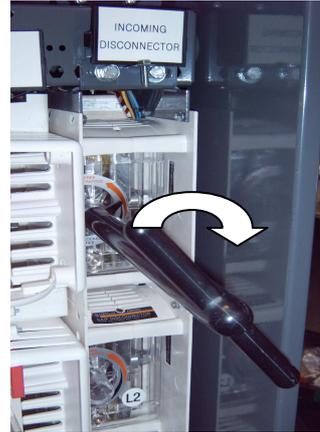
Insert the operating handle into the socket in the disconnecter transparent cover. Interlock pins and cut-outs will ensure that the handle cannot be inserted in the wrong position.



Rotate the handle anti-clockwise through 180° to free the disconnecter and trap the handle.



Push up on the handle to pivot the front cover back and up, closing the contacts to connect one phase to the transformer.



Rotate the handle clockwise through 180° to lock the disconnector closed and release the handle.

14.3 - Opening a disconnector off-load



Insert the operating handle into the socket in the disconnectors transparent cover.



Rotate the handle anti-clockwise through 180° to release the contact pressure.



Pull down on the handle to pivot the front cover forward and down, opening the contacts to isolate one phase from the transformer.



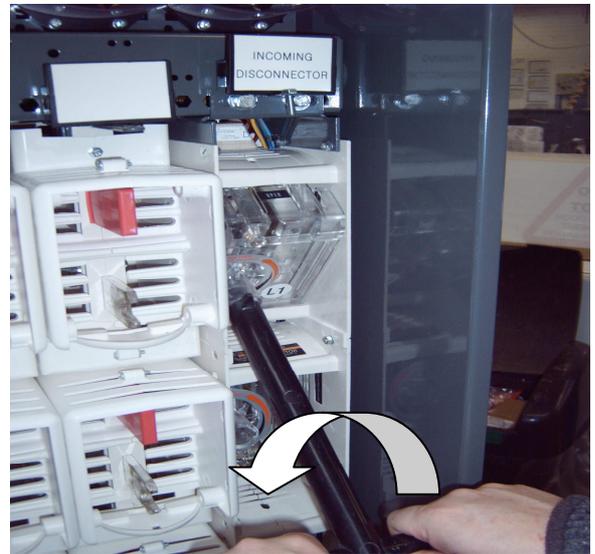
Rotate the handle clockwise through 180° to lock the disconnector open and release the handle.

14.4 - Disconnecter inspection position

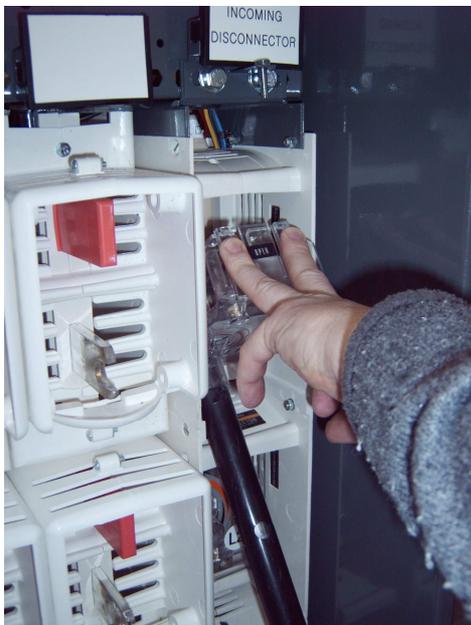
Make the transformer dead from the primary side. Ensure there are no supplies from any interconnectors and that the equipment is completely dead.



With the disconnector in the open position, insert the operating handle into the socket in the disconnectors transparent cover.



Rotate the handle anti-clockwise through 180° to free the disconnector cam and trap the handle.

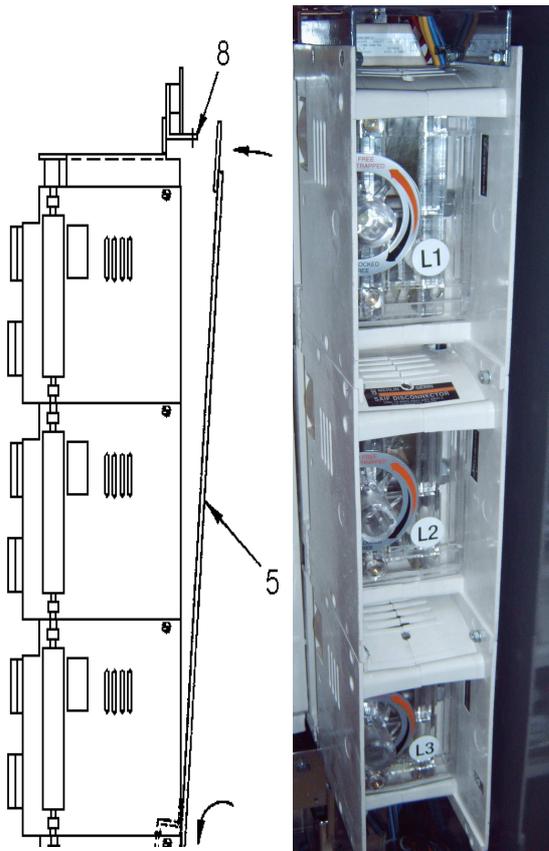


Maintain gentle pressure pulling down while with your other hand press down on the top of the disconnector transparent cover. This will release the safety catches allowing the disconnector to open fully.



Turn the handle 180° clockwise to tighten cam, lock the disconnector in the inspection position and release the handle. Reverse the previous action to return the disconnector to the OFF position.

14.5 - Disconnecter locking-off facilities



Two types of locking-off device enable SAIF disconnecters in vertical formats to be locked off, whether OPEN or CLOSED, so that it is impossible to insert the operating handle.

On vertically arranged disconnecters, hook the lower end of the device (5) behind the nuts on the sidewall at the bottom of the blue phase module, which secure it to the neutral module. Fit the metal upper end of the device over the padlock eye beneath the circuit label. Fit to the padlock eye (8).

14.6 - Disconnecter routine test access

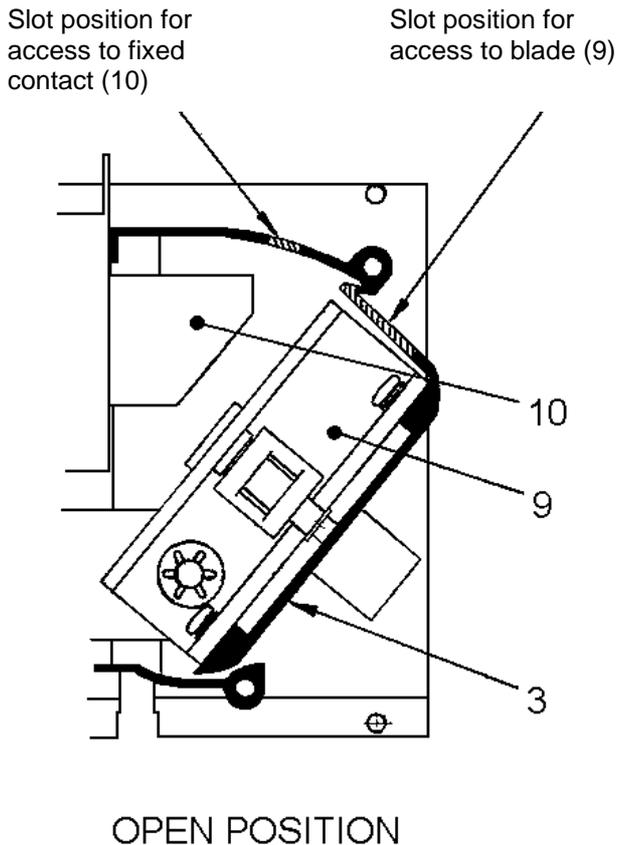


Whilst fully complying with the requirements of IPXXB protection to BS EN 60529, the design of SAIF disconnecters permits a wide variety of routine monitoring tests to be carried out, using standard lamps or voltmeter probes.

With a disconnecter in the OPEN but not the inspection position, access to the blade ends (9) through slots in the top of the disconnecter cover (3) permit phase to phase tests on the incoming supply. Access to the fixed contact (10) is through a small slot in the disconnecter moulding above the fixed contact (10).

Testing on the busbar side (10) of an OPEN disconnecter is possible through slots in the top of the fixed moulding or more readily, by using the topside of a fuseway, as discussed in section 15.3 'routine access'.

Note: With the horizontal configuration of disconnecter the busbars may not be connected to the bottom terminals that is, blade ends (9) of the disconnecter.



Section 15 - Operation of shielded fuseways

15.1 - The shielded fuseway

The shielded fuseway is a three phase vertical assembly consisting of three pairs of contacts, the upper contact of each phase is connected to the main busbar while the lower contact provides the cable termination point. The contacts are bridged by fuse links to BS 88-5 or IEC 60269-2-1 mounted within insulated carriers.

When a shielded fuseway has all screens and fuse handles in position a level of protection to IPXXB is achieved.

Switching of circuits is carried out by the manual insertion and removal of the fuse handles in accordance with standard instructions for operators.

Switching a circuit is exactly as the traditional open design (level of protection IPXX) and therefore an operator requires the same level of skill, diligence and protection, since he is exposed to the live conductors and arcing associated with switching a load by this means.

15.2 - Insertion of a fuse handle



Caution: Switching of circuits (removal or replacement of fuse handles) with the equipment live involves exposure to live conductors and possibly switching arcs. It is therefore strongly recommended the removal and replacement of fuse handles is carried out with the equipment totally de-energised. Where this is unreasonable, the requirements of the Electricity at Works Act must be fully met and in particular, regulation 14.



Hinge to close

Switching of circuits with the equipment live must be carried out by competent personnel trained and skilled in this operation. They must wear appropriate protective clothing and work in accordance with a safe working procedure established by the Duty Holder.

15.3 - Routine test access

Whilst fully complying with the requirements of IPXXB protection to BE EN 60529, the design of shielded fuseways allows a wide variety of routine monitoring tests to be carried, using standard lamps or voltmeter probes.

When a fuse handle is in place, the busbar contacts are accessible through one of the ventilation slots in the top of the shroud; the cable contacts are accessible through a rectangular hole in the bottom of the shroud. This permits checks to see if the fuse has ruptured.

Using the cable contacts and the neutral busbar at the bottom allows phase to neutral testing of the outgoing circuit.

Using the contacts on different phases allows phase to phase testing of outgoing circuits.



Test lamp probes

Section 16 - Operation of SAIF fuseways

16.1 - The SAIF fuseway and Mechanism

The 'SAIF' switchable and insulated fuseway is switched by means of a portable, independent manual spring mechanism. This gives it a single-phase on or off-load switching capability to category AC22B of BS EN 60947-3. Fuse carriers can only be switched between the ON and OFF positions by means of the mechanism interlocks prevent manual operation.

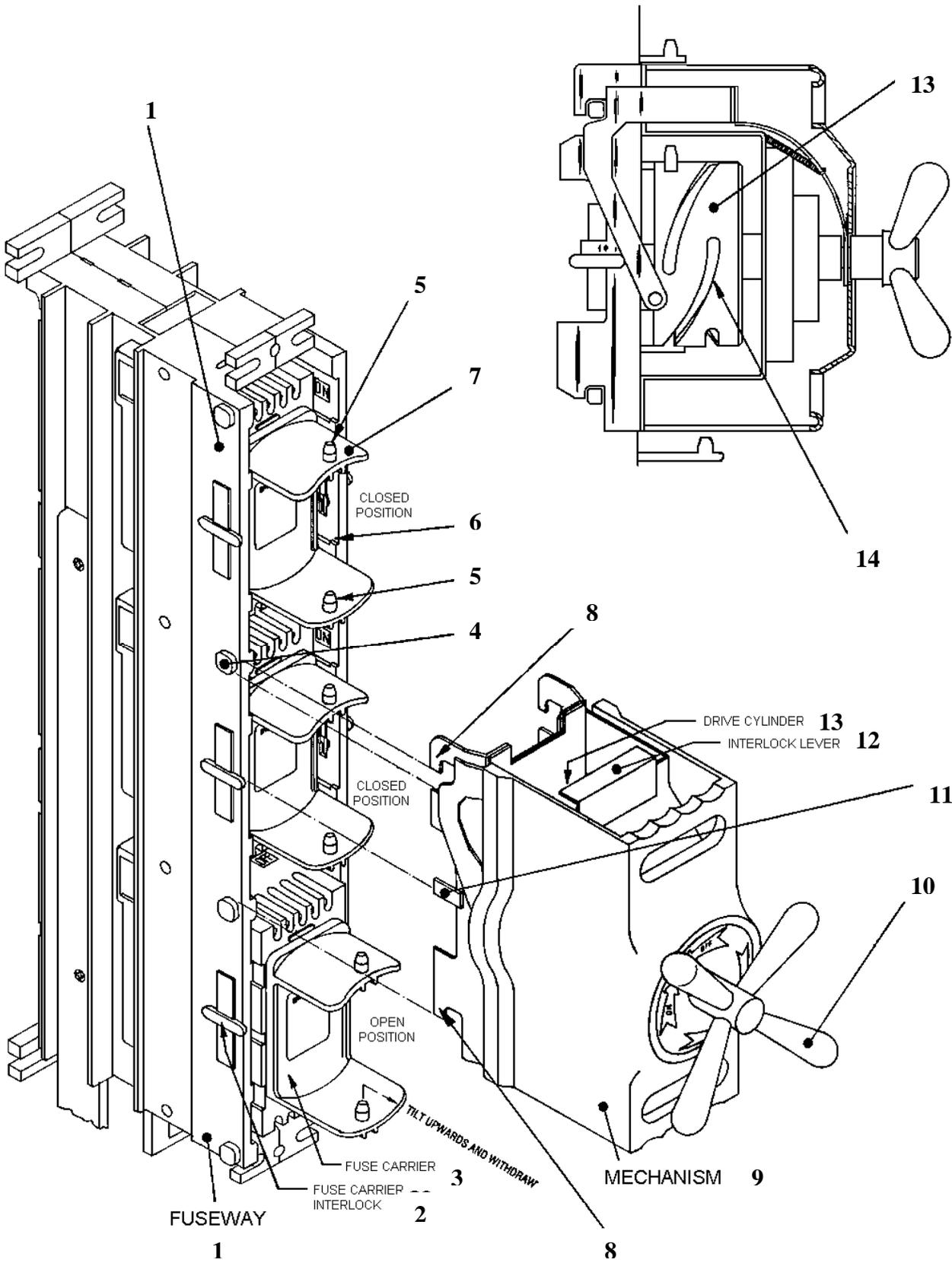
The mechanism operates in a rotary fashion, each opening (anti-clockwise) or closing (clockwise) operation taking it through a quarter of a circle. The mechanism never needs to be reset and can be operated any number of times in succession in either direction.

Fuse carriers must NOT be switched ON unless they have a fuse or dummy link (fitted for delivery) fastened between their contacts. Attempting to operate them empty can lead to incomplete contact engagement and jam the mechanism and carrier in an inoperable condition.

Items in fig 1. are:

1. Fuseway
2. Fuse carrier interlock
3. Fuse carrier
4. Locating bosses
5. Drive dowels
6. Securing lips
7. Front drive arm
8. Locating hooks
9. Mechanism
10. Capstan handle
11. Interlock lugs
12. Interlock lever
13. Drive cylinder
14. Drive slots

Fig 1.



Operation

16.2 - Switching ON and OFF

OFF label



Note the position of the fuse carrier in the fuseway. If it is OFF, a green label reading OFF will be visible on top of the fuse carrier. If it is ON, a red label reading ON will be visible on the fuseway sidewall.



Hold the mechanism by its top and bottom handles, so that the interlock lever is at the top. Pull back the interlock lever with the fingers of your upper hand.

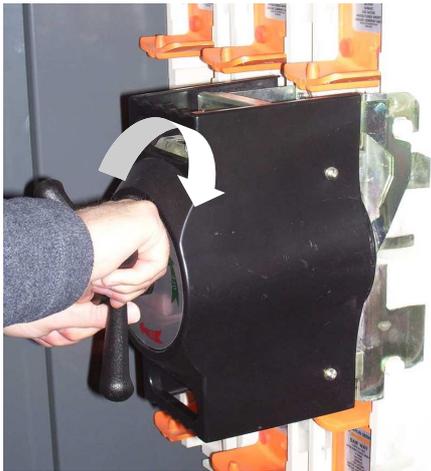


Move the mechanism forward and down onto the fuseway so that the locating hooks engage the locating bosses. At the same time, the drive slots in the drive cylinder will engage the drive dowels on the fuse carrier.

Locating bosses



As the mechanism settles onto the locating bosses, interlock lugs will depress the fuse carrier interlocks on the fuseway sidewall. The position of the carrier is now determined by the position of the drive cylinder.



Release the interlock lever. As it springs away from you, it will lock the mechanism onto the locating bosses, and release the mechanism drive. Rotate the mechanism capstan handle, either clockwise to drive a fuse carrier into the ON position, or anti-clockwise to pull it into the OFF position. Either operation involves a 90° turn.



If you do operate it strongly and far enough, the mechanism will pass its spring charged/de-latch position and the springs will take over to drive or pull the fuse carrier with sufficient force to make a fault current or break a load current. with the switching operation complete, pull back the interlock lever and lift the mechanism clear .

16.3 - Removing and replacing fuse carriers



A SAIF fuse carrier can only be removed from the fuseway if it is in the OFF position, as indicated by a green label reading OFF being visible on top of the carrier. If its is ON as indicated by a red label reading ON being visible on the sidewall, the fuse carrier must be switched to OFF using the mechanism as described in section 16.2 'Switching ON and OFF'.



With the fuse carrier OFF, tilt the orange-coloured front drive arms upwards by approximately 6mm and lift and gently pull the carrier away the fuseway, to remove it.

Operation



To replace a fuse carrier in the fuseway, hold the carrier by its upper orange front drive arm, slightly above its final position and push it gently into the fuseway. It should slide along, and drop by 3mm behind, the securing lips on the sidewall.

OFF label



When a fuse carrier is replaced in the fuseway it is automatically in the OFF position and cannot be switched to the ON position Except by use of the operating mechanism.

16.4 - Routine test access



Whilst fully complying with the requirements of IPXXB protection to BS EN 60529, the design of SAIF fuseways allows a wide variety of routine monitoring tests to be carried out, using standard test lamps or voltmeter probes.

When a fuse carrier is removed, the fixed busbar and feeder contacts are accessible through their respective slots in the back of the relevant compartment in the fuseway.

When a fuse carrier is in place and switched to ON, two circular openings in the front face of the carrier body contain contacts connected to the two ends of the fuse, for checks to see if the fuse has ruptured.

Using the lower contact and the neutral busbar at the bottom allows phase to neutral testing of the outgoing circuit.

Using the contacts on different phases allows phase to phase testing of the outgoing circuits.

Section 17 - Operation of Masterpact ACB equipment

17.1 - Test equipment required

- 30V DC voltage supply set.
- 0 to 240V AC variable supply set.
- Current injection set
- 1000V megger
- 'ME' test set for ACB protection units



Caution: Ensure all equipment is de-energised before commencing with these instructions.

17.2 - Manual operation

Check the manual close and tripping of the ACB by using the spring charge handle and the OFF and ON push buttons. When completed leave ACB open and the spring mechanism discharged.

17.3 - Procedure



To charge the springs pump the spring charge handle in a down wards motion 7 times until a 'CLAC' is heard, this indicates charged. the position indicator will confirm this.



To close the ACB press the OFF button. The position indicator will confirm this. To open the ACB press the OFF button. The position indicator will confirm this.

17.4 - Remote close & tripping

First remove the 32A size CAMASTER fuse carrier from its base, this will ensure no back feed onto the main conductors. Using the 0 to 240V test set connect test wires to terminal 5 (live) and terminal K3 (neutral).

17.5 - Motor spring charge mechanism (M & CH)

Switch on test set, apply 240V, the spring charge motor will commence to charge the ACB spring close mechanism ready for ACB close signal.

The spring charge mechanism will automatically recharge after every closing operation of the ACB.

This can be checked by manually closing the ACB upon pressing the ON and OFF push buttons.

Switch off test upon completion of checks.

17.6 - ACB close release (XF)

To check the ACB close release, proceed as follows. Using a 30V DC supply test set, connect the test wires to grey coloured wiring, terminals K5 (pin 6 on the multi-socket) and terminal K7 (on terminal board).

Switch on the 240V AC supply to allow the ACB spring charge mechanism to operate. Switch off 240V supply on completion of charging cycle. Momentarily, switch on the 30V DC supply, which will energise the ACB closing release, and close the ACB. To open the ACB press manual OFF button.

17.7 - ACB shunt trip coil (MX)

This unit requires to operate down to 30V AC. To check this, connect a normally open test push button across terminal K3 and terminal K1.

Switch on the 240V AC supply. This will again allow the spring charge mechanism to recharge. On completion of charge cycle reduce volts from 240V to 30V AC.

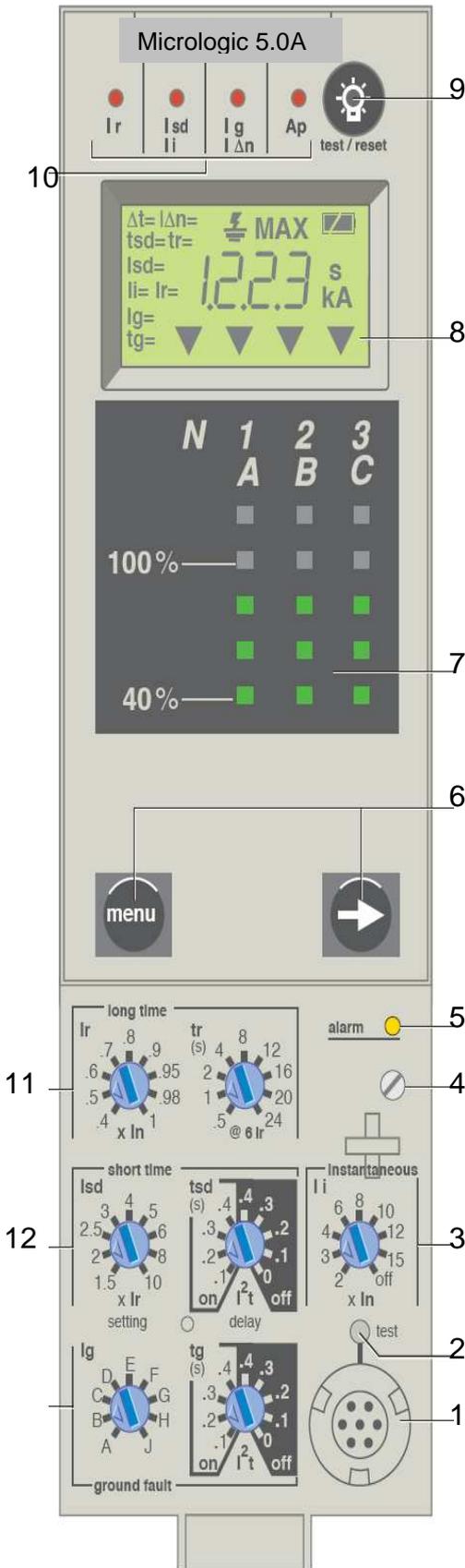
Momentarily switch on the 30V DC supply which will close the ACB. Press the test button, which will energise the ACB shunt trip coil and open/trip the ACB. Upon satisfactory completion of these checks ensure ACB is left in the open position and the spring mechanism discharged. All supplies switched off. Replace the 32A size CAMASTER fuse carrier back in its base.

17.8 - Protection

As the protection trip has been previously tested at the settings required, only one test using the type mini test kit is required to ensure correct operation.

Procedure: Connect the mini test kit to the Micrologic 5a protection unit using the test cable provided with the mini test kit. To commence the test, first manually close the ACB then press the short time test button on the mini tester. The red light on the mini tester will flash on and off to indicate testing. The circuit breaker will trip. Disconnect the mini tester from the Micrologic 5a.

Note: The fault trip indicator reset button situated at the top left of the circuit breaker is for resetting the internal SDE fault trip contact only, it does NOT prevent closing of the ACB after fault trip.

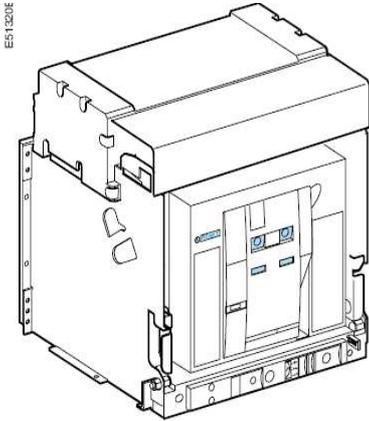


1. Test connector
2. Test indicator
3. Instantaneous pick-up. Set to 15
4. Long time rating plug screw
5. Overload signal (LED)
6. Navigation buttons
7. Three-phase bargraph and ammeter
8. Digital display
9. Lamp test, reset and battery test
10. Indication of tripping cause

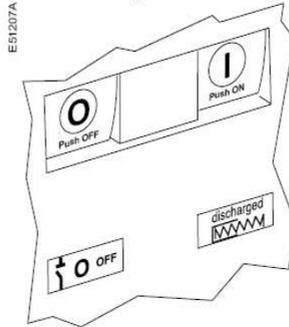
11. Long time current setting and tripping delay. On NW16 set I_r to 1. Set t_r to 12. On NW20 set I_r to 0.8. Set t_r to 4.

12. Short time pick up and tripping delay. On NW16 set I_{sd} to 6. On NW20 set I_{sd} to 4. Set t_{sd} to 0.1 with I^2t on.

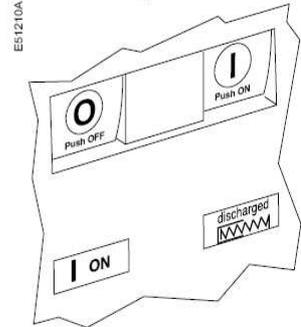
17.9 - Understanding the controls and indications on Masterpact



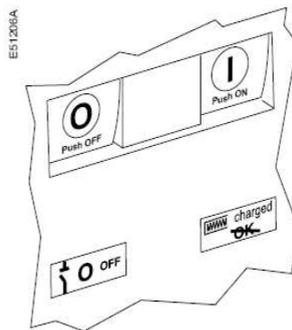
Circuit breaker open and discharged



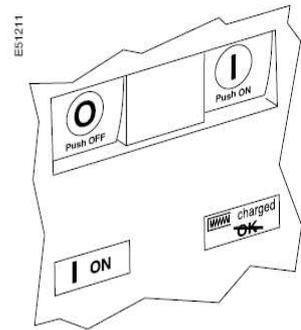
Circuit breaker closed and discharged



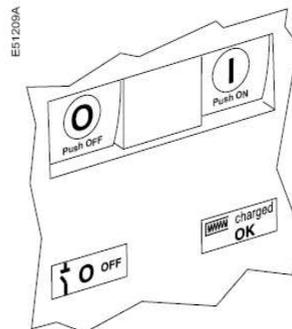
Circuit breaker open, charged and not "ready to close"



Circuit breaker closed, charged and not "ready to close"



Circuit breaker open, charged and "ready to close"



Section 18 - Operation of a RCD protected socket outlet

The SRCD is an easily fitted socket which incorporates a residual current device. RCD's give much greater safety in the use of electrical appliances wherever or whenever there is a risk of electrocution.

18.1 - Wiring instructions



Caution: Before starting any electrical work always switch off at the mains.

The SRCD has been designed for easy wiring and can be fitted to any standard 2 gang box with a minimum depth of 25mm and fixing centres to BS4662. The SRCD should be fitted and wired in accordance with current IEE regulations. Terminals are clearly marked L, N and E on the SRCD which should be wired in the same way as an ordinary socket.

SRCD specification: Rated voltage 240V, 50Hz. Rated current 13 amps. Rated trip current 30mA. Typical trip time 30mS.

Cleaning: Clean with a dry duster only. DO NOT use water, solvents or any kind of liquid cleaner.

Note: If a second RCD is fitted in the same circuit, it may not be possible to predict which will trip first in the event of an earth leakage fault or a loss of neutral input. A slight warming of the RCD during use is normal.

18.2 - Instructions for use

Carry out the following test procedure prior to each use.

- Press reset button and ensure indicator flag shows RED.
- Press test button and ensure indicator flag shows BLACK.
- Press the reset button.

If either of these tests does not produce the results stated DO NOT use the SRCD. Contact the manufacturer or seek expert advice.

If the SRCD trips consistently without the test button being pressed, one of the following faults is indicated:

- i. Earth leakage from a fault or accident on the output side.
- ii. Loss of supply.

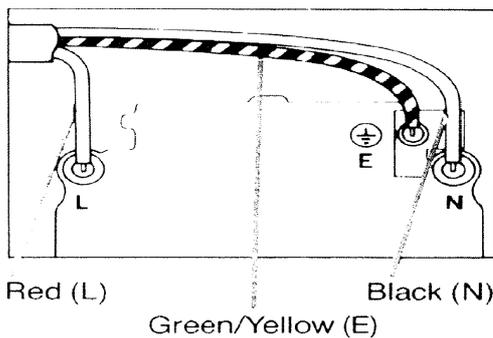
In this event, unplug the appliance(s) and seek help from a professional who should examine the appliance(s), cable lead(s) and input circuitry.

Warning: DO NOT use outside service conditions: i.e. an ambient temperature of -5°C to +40°C, an altitude not exceeding 2000 metres, an atmosphere not subject to abnormal pollution by smoke, chemical or flammable fumes, salt laden spray, prolonged periods of high humidity or other abnormal conditions. Use only with BS1363 plugs fitted with a BS1362 fuse. The use of an SRCD should be regarded as a substitute for basic electricity safety precautions.

Section 19 - Operation of a Powerbreaker safety RCD

Electricity is dangerous and an RCD must not be used as a substitute for normal precautionary measures. Always unplug from mains supply before any inspection or repair to equipment. To fit this Powerbreaker safety RCD single socket to replace an existing socket – Switch off the power supply at the mains in order to isolate the existing socket. Remove old socket, then simply connect using the easy to follow wiring diagram. If you are in any doubt about connecting this product consult a qualified electrician. Complete this simple test procedure before each use.

1. Press green reset  button.
 2. Window indicator will turn red
 3. Press white test button (T).
 4. Window indicator will turn white this means the RCD has tripped successfully.
 5. To reset press reset  button and use as a normal socket.
- If indicator fails do not use and return to Powerbreaker with proof of purchase.



RCD Socket



Section 20 - Operation of powerlock

20.1 - How to connect the Powerlock line drain to the Powerlock panel source



Panel Source
400A, Earth Green

The Powerlock line drain connectors should be placed through the 'cat flap' at the bottom of the cabinet.

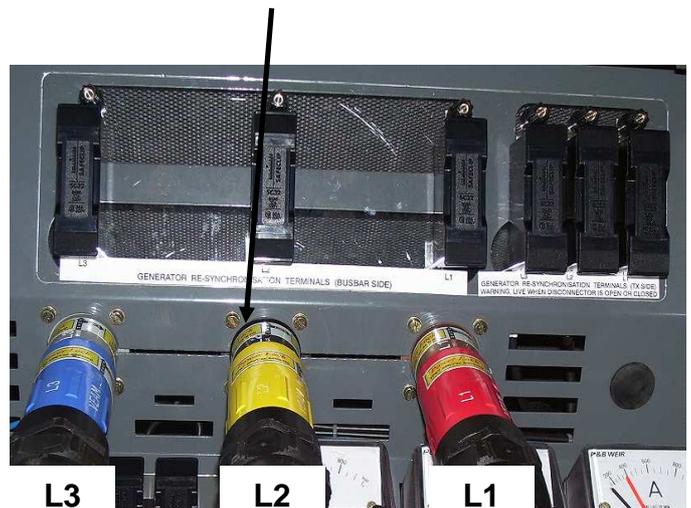
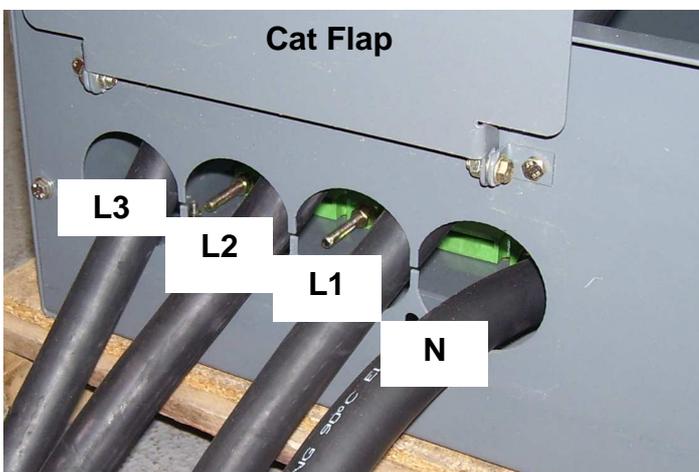
1. Push the Powerlock line drain firmly onto the Powerlock panel source, so that the front edge of the line drain is touching the panel source.
2. Twist the line drain in a clockwise direction until the interlocking peg on the line peg clicks into the groove on the line source.

The small section is just a guide on how to connect the Powerlock line drain into the Litton panel source, for more information you should refer to the manual for the generator set.

Max current rating: 660A
Max rated voltage to earth: 2kVac/3kVdc
Min flashover: 9.5kVdc or ac peak
Operating temp range: -30°C to +125°C
Insulation resistance: >5Mohms @ 500Vdc
Ingress protection (mated): IP67
Protection against electric shock: IP2X
Flammability: UL94-V0

The colours of the Powerlock connections on the new cabinets are in line with the new colour schemes adopted throughout Europe. Brown replacing Red (L1)
Black replacing Yellow (L2)
Grey replacing Blue (L3)
Blue replacing Black (Neutral)

Powerlock panel source



20.2 - Voltage source plugs

Voltage source plugs are used to connect external voltage source unit to ensure that the voltage supplied by the generator is in phase with the voltage supplied from the supply. The phase connections are situated on the panel and the neutral connections are situated on the neutral busbar. There are two neutral connections to allow monitoring of both the generator neutral and the transformer neutral.

The cat flap allows orderly access for the generator line source connections. Using the cat flap means that it is possible to connect the generator up to the cabinet whilst still being able to close and lock the door.

Phase generator connections



Section 21 - Shielded fuseway Inspection and Maintenance

21.1 - General maintenance policy

This document is to be used as guide to the maintenance of shielded type low voltage assemblies. It should read in conjunction with BS6423:1983, the current British standard code of practice for the maintenance of electrical switchgear and control gear for voltages up to and including 1KV, which sets out recommendations for safe conditions during maintenance work and guidelines for maintenance procedures.

It is assumed throughout that the precautions necessary to render the apparatus safe to work on, including the isolation of normally live parts as required, have been taken. However, reminders are included where this is felt appropriate.

21.2 - Frequency of maintenance

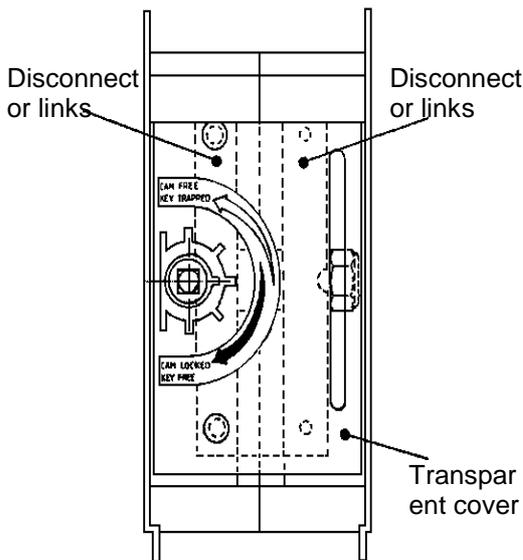
Different environments, loadings, types of load and frequency of operation will affect the maintenance requirements of low voltage fuses, isolators, and boards, so that the following recommendations are for guidance only and are based on: **Outdoor equipment:** installed outdoors where the atmospheric conditions of the site are reasonably clean and the equipment is not subject to excessive pollution's such as occurs in some industrial or costal areas, and employed on normal distribution duties.

It is recommended that the following intervals are considered but may be reduced to cater for any adverse conditions. Operational experience will determine how much more or less attention particular installations require. In the case of units supplying bulk consumers, it may be possible to schedule substation outages with the customers own maintenance programmes. Where a number and variety of consumers are served by an installation, however, an escalating programme as follows is suggested.

21.3 - Routine inspection

Essentially visual and involving no operations or system outages should be undertaken as frequently as possible and in any case at least once every 12 months.

On entering the substation or opening the enclosure doors, listen for any sizzling noise due to electrical discharge or rattling of loose components; sniff for any unusual smell which may indicate an electrical discharge or overheating; have a general look round.



DISCONNECTOR

Examination and service

As far as is reasonable practicable, look for signs of corrosion, damaged external insulation, loose earth connections and any other visible signs of abnormality.

Check as applicable, that any operating handle, locking off devices, spare fuses, spare fuse carriers or other equipment which should be there are present, accessible and in good conditions.

Look at the closed disconnector links through their transparent covers for signs of overheating or damaged insulation. If any is found, a disconnector replacement will be necessary. See section 21.9 'disconnector replacement'.

Should be undertaken at least every five years, during which:

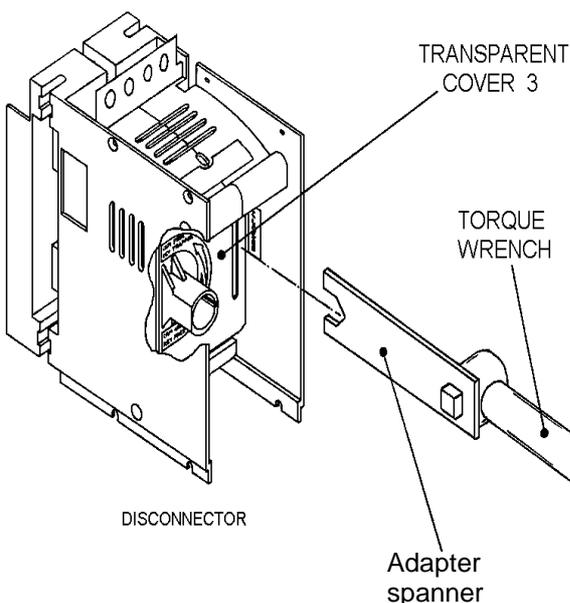
21.4 - Examination and service of disconnector

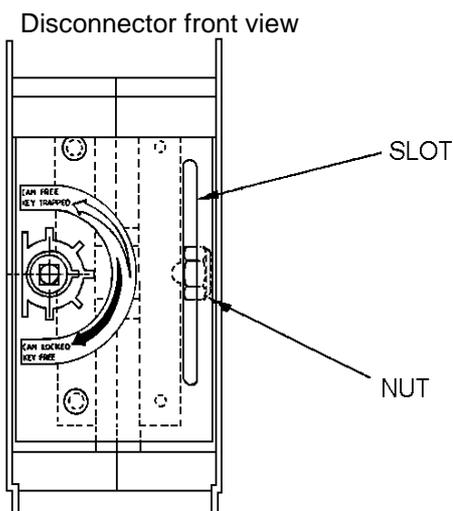
Disconnectors are opened for examination and lubrication. This involves an outage of the whole equipment.

Make the transformer dead from the primary side. Remove the fuse handles (see section 9.2 'Removing the fuse handles') from any interconnector. Operate the disconnectors to the OPEN and then the INSPECTION position, as described in sections 14.3 'opening a disconnector off load' and 14.4 'disconnector inspection position'.

Clean any hardened or discoloured grease from the disconnector contacts using a suitable solvent, such as one based on electronics grade trichloroethane. Silver plating on the contacts may be tarnished black. This is not serious, but may be cleaned up using silver polish.

A small amount of pitting is not significant, but if there are signs of serious damage due to overheating the complete single phase disconnector should be replaced as described in section 21.9 'disconnector replacement'.





Regrease the contacts with Electrolube Ltd's 'EMPL' grease before returning the disconnector to the OPEN and then CLOSED position, as described in sections 14.2 'Closing a disconnector off-load' and 14.3 'Opening a disconnector off-load'.

Check the contact pressure of the closed disconnector by slipping the special adapter spanner (Part No. 20590000C01, supplied separately upon request) through the slot in the transparent cover, fitting a torque wrench set to 12Nm and tighten (if possible). This is equivalent to a torque of 16Nm applied directly to the nut.

Note: this must not be done with the supply live. Repeat for all phases of the disconnector. Make the transformer, and thus the whole equipment, live again.

21.5 - Examination and service of fuseways



OPEN disconnector position

Fuseways have their fuse handles removed for examination and lubrication of the contacts, and so an examination of the fuses. This involves an outage of the whole equipment. Isolate the transformer primary/incoming supply, operate the disconnectors to the OPEN position as described in section 14.3 'Opening a disconnector off-load'. Isolate any L.V interconnecting supplies.

Remove each fuse handle in turn as described in section 9.2 'Removing the fuse handles'. Clean the fuseway contacts and of any hardened or discoloured grease and polish if required, as described above for the disconnector contacts.

Again, serious signs of overheating, severe pitting or large beads or ridges on the surface indicate that the fuse carrier should be replaced by another.

Check the condition of the fuse and replace if it shows signs of overheating. If severe fuseway contact damage is found, an urgent fuseway replacement (see section 21.7 'shielded fuseway replacement') is necessary.

Examine the moulded insulation for deterioration, cracks or breakage's. If there are any, scrap the affected fuseway or fuse handle and replace it with another, recovering the fuse if it is in good condition.



Snatch to remove

Regrease the contact surfaces with Electrolube Ltd's 'EMPL' grease. Replace the fuse handles onto the fuseway as described in section 15.2 'Insertion of fuse handle'.

Check fuse continuity at every fuse handle as described in section 15.3 'Routine test access'. Repeat for all other fuseways. Reclose the incoming disconnect re-energising the incoming supply.

21.6 - Examination and service of enclosures

Enclosures, exterior and accessible interior parts are cleaned. This does not involve an outage of the whole equipment. Where interrupting the supply could cause major problems, the period between services may be extended, but we would recommend extreme caution and very careful inspection between services.

Clean any loose dirt from the equipment exterior and accessible parts of the interior. DO NOT use cotton waste or cleaning cloths having loose fibres, loose particles or metallic threads. DO NOT use brushes or blower nozzles contaminated with metallic material. DO NOT let tools, loose parts, metal filings, dust or dirt fall into the compartment. DO NOT use cleaning fluids other than those specified in section 21.5 'Examination and service of fuseways'.

21.7 - Shielded Fuseway replacement



Which may be indicated by the findings of an examination and service, involves making the whole low voltage assembly dead.

Make the busbars dead by isolating all incoming supplies. Operate the disconnectors to the OPEN position as described in section 14.3 'Opening a disconnector off-load'.

In the event that fuseway contact damage is found, or fuseway cracking observed, during a servicing operation, it is recommended that the fuseway concerned be removed and scrapped. Then replaced as described below.

Any outgoing shielded fuseway can be removed as a complete, triple pole, units as follows.

Remove the fuse handles (11) as described in section 15.2 'Insertion of a fuse handle'.

Remove the shrouds (18) as described in section 4.2 'removing the contact shrouds'.

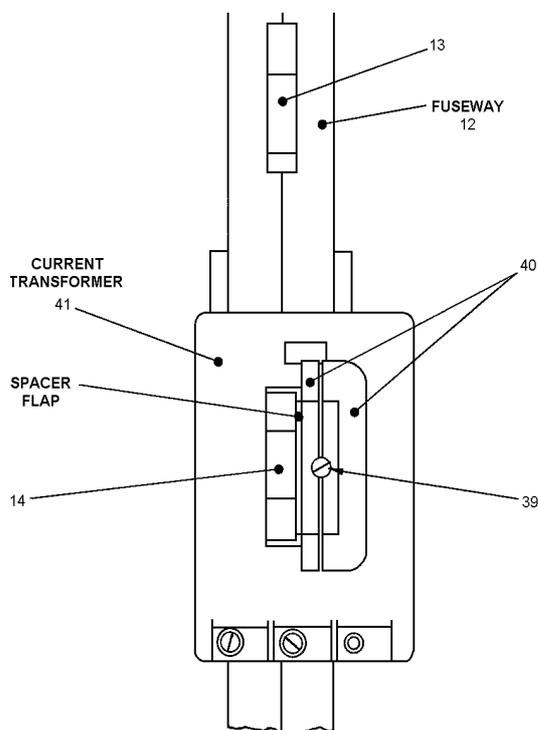
Unclip and slide the insulating boot (32) down the blue phase cable to reveal the cable termination.

Unfasten the screws that secure the cable end sockets or shear head connectors to the three phase contacts (14). Bend the cable tails clear of the fuseway (12).

To remove the fuseway reverse the procedure as described in section 4.4 'fitting the fuseways' and follow the procedure to fit the new fuseway.

21.8 - Shielded Fuseway C.T changes (De-energised only)

The current transformer (CT's) on the cable (lower) contacts (14) may be changed as follows.



VIEW ON FRONT OF FUSEWAY SHOWING ONE PHASE ONLY

Remove the fuse handle(s) from the relevant fuseway as described in section 9.2 'Removing the fuse handles'. Then fit the contact shield(s) to the busbar upper contact(s) (13). Remove the shroud(s) as described in section 4.2 'removing contact shrouds'.

Disconnect the tails from the relevant CT or CT's.

Unfasten and remove the brass screw (39) from between the two CT wedges (40). Take out the wedges. Slide off the old CT (41) from the cable contact (14).

Place the new CT (41) in the same position as the old one. Replace the wedges (40) with the spacer flap on the back wedge trapped between the wedge and contact, replace and tighten the brass screw (39). Reconnect the CT tails.

Reconnect the cable end socket or re-make the cable connection using a new shear head connector as applicable. Replace the shroud(s) and fuse handle(s).

21.9 - Disconnecter replacement



Involves making the whole low voltage assembly dead, and can usefully be combined with transformer and/or medium voltage switchgear maintenance.

Isolate all incoming supplies. Remove the disconnecter as follows.

Vertical configurations: disconnecters must be removed as complete three phase assemblies.

Depending on the particular arrangement, remove the screens over the incoming cable terminals and/or sufficient shielded fuseways each side of the disconnecter to gain access to the disconnecter terminals. Removal of the shielded fuseways is described in section 21.7 'shielded fuseway replacement'.

To remove the clear incoming cable screens, remove the M8 screws at the top and M8 nuts at the bottom of the screens, and then lift the screens off.

Remove the M10 fixings that secure the disconnecters to the transformer and busbar connections. Disconnect the current wiring from the terminal block.

Working from the front, remove the pairs of M8 fixings at the top and the bottom of the disconnecters assembly. Withdraw the complete assembly from the front.

The individual phases can now be separated by removing the screws through the sidewalls. With the faulty phase or phases replaced, refit the assembly in the reverse of the above procedure.

With the disconnecter replaced, check the contact pressure as detailed in section 21.4 'Examination and service of disconnectors'. Then make the incoming supply live again.

21.10 - General overhaul

Involves making the whole low voltage assembly dead and partially dismantling it to give access to the busbar and riser supports and other normally inaccessible component. Such an overhaul need only be undertaken when indicated by inspection, servicing or testing, or every fifteen years, whichever is the sooner.

Make the transformer dead from the primary side. Carry out all the inspection, servicing and overhaul procedures as described in sections 21.3 'Routine inspection' and 21.4 'Examination & service of disconnectors'. Carry out the procedures in sections 21.5 'Examination & service of fuseways' and 21.6 'Examination & service of enclosures' as required.

Unfasten and remove any front covers/screens as described in the instructions supplied with the equipment, as necessary for access.

Clean and inspect all insulation, looking for burning, cracks or other defects. Replace as necessary.

Clean all busbars, risers, droppers and other copper work. Check their fastenings for tightness. Examine the busbars and other copper work supports. Check all main and secondary earth connections for continuity and tightness of fastenings.

Inspect the cable tails for overheating of connections or discolouration. Clean and clear any dirt or rubbish, especially if metallic.

Check that external ventilation grilles are clear and if fitted with expamet filter elements these should be treated with filtafoil adhesive as instructed on the container.

With all fuse handles removed and any outgoing disconnectors open, close the incoming disconnectors to connect the busbars and connections to the low voltage windings of the (still unenergised) transformer. Remove the neutral earth link between the earth bar and neutral busbar. Test the resistance between phases and phase to earth. Values will vary between different equipment depending upon the content and site location. Values in excess of 20Mohms can be expected, but values above 1Mohm are acceptable.

Comparison of recorded insulation values, where available, will indicate any deterioration in the insulation. Refit all covers and make alive.

21.11 - Shielded post fault maintenance

If a fuse ruptures due to an overload or a fault, replace the fuse as described in section 9.3 'Changing the fuse links' and examine the contacts and body of the fuse handle for signs of damage. If the contacts are damaged, then the fuseway should be replaced as described in section 21.7 'shielded fuseway replacement'.

If possible, check the cable terminations for signs of loosened contacts or damaged insulation. Repair or replace as necessary.

Any fault occurring in the equipment will require a thorough overhaul or replacement of the complete assembly, special attention being paid to the effects of arcing, heat or smoke damage.

Section 22 - SAIF fuseway Inspection and Maintenance

22.1 - General maintenance policy

This document is to be used as a guide to the maintenance of SAIF type low voltage assemblies. It should be read in conjunction with BS6423: 1983, the current British Standard code of practice for the maintenance of electrical switchgear and control gear for voltages up to and including 1KV, which sets out recommendations for safe conditions during maintenance work and guidelines for maintenance procedures.

It is assumed throughout that the precautions necessary to render the apparatus safe to work on, including the isolation of normally live parts as required, have been taken. However, reminders are included where this is felt appropriate.

22.2 - Frequency of maintenance

Different environments, loadings, types of load and frequency of operation will all affect the maintenance requirements of low voltage fuses, isolators, on-load switching devices and boards, so that the following recommendations are for guidance only. Almost a decade of in-service experience has shown the SAIF range of equipment to suffer very little contact burning on either the on-load switched fuseway/fuse carrier contacts or the off-load switched disconnecter contacts. In the case of fuseways and fuse carriers, this is because the use of an independent manual switching mechanism and spring-loaded fixed contacts prevents any hesitation in operation or loose connections in service.

In the case of disconnectors, the impossibility of removing the operating handle until the cam mechanism has firmly locked the blades closed or open also prevents arcing or overheating in service.

Outdoor Equipment: installed outdoors where the atmospheric conditions of the site are reasonably clean and the equipment is not subject to excessive pollutions, such as occurs in some industrial or coastal areas, and employed on normal distribution duties.

It is recommended that the following intervals are considered but may be reduced to cater for any adverse conditions. Operational experience will determine how much more or less attention particular installations require.

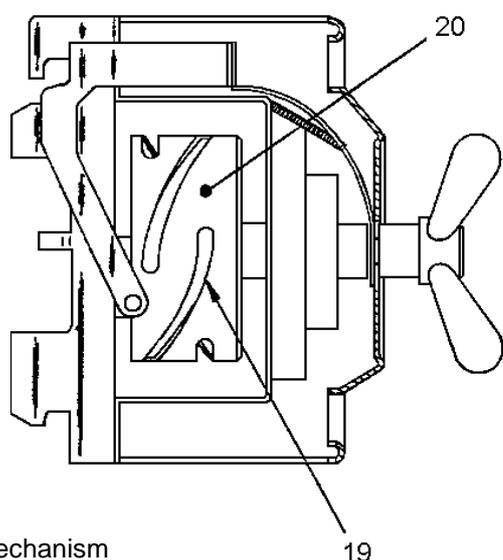
Due to the unique operational features of SAIF distribution equipment and the desirability of minimising interruptions to the public electricity supply, conventional definitions of:-

- inspection and operation check,
- servicing and
- examination and overhaul

are not precisely applicable. In the case of units supplying bulk consumers, it may be possible to schedule substation outages with the customers' own maintenance programmes. Where a number and variety of consumers are served by an installation, however, an escalating programme as follows is suggested.

22.3 - Routine inspection

Essentially visual and involving no operations or system outages should be undertaken as frequently as possible and in any case at least once every 12 months. For specific details see section 21.3 'Routine inspection'. clean and inspect the operating mechanism and lightly grease the slots (19) in the drive cylinder (20).



Examination and Service

Should be undertaken at least every five years, during which:

22.4 - Examination and service of disconnector

Disconnectors are opened for examination and lubrication. This involves an outage of the whole equipment. For specific details see section 21.4 'Examination & service of disconnector'.

22.5 - Examination and service of fuseways

Fuseways have their fuse carriers removed for examination and lubrication of the contacts, and also an examination of the fuses. This involves an outage of the particular feeder circuits.

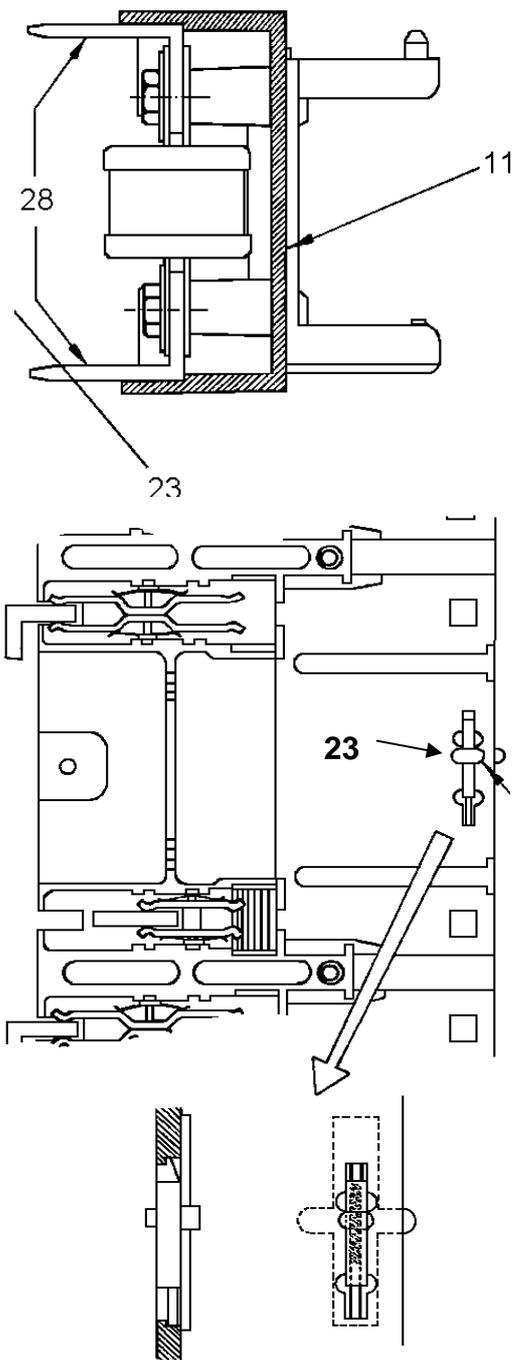
Open and remove each fuse carrier (11) in turn as described in section 16.2 'Switching ON and OFF' and 16.3 'Removing and replacing fuse carriers'. Clean the carrier contacts (28) of any hardened or discoloured grease and polish if required, as described above for the disconnector contacts.

Again, serious signs of overheating, severe pitting or large beads or ridges on the contact surface indicate that the fuse carrier should be replaced by another. However, the damaged contacts can be replaced, either on site or later in the workshop.

The procedure for replacing the contacts is exactly the same as for fuse replacement (see section 6.4 'Fuse replacement'), except that the contacts rather than the fuse are replaced. If severe fuse carrier contact is found, an urgent fuseway replacement (see section 22.7 'SAIF fuse replacement') is probably necessary.

Examine the moulded insulation for deterioration, cracks or breakage's. If there are any, scrap the fuse carrier and replace it with another, recovering the fuse and contacts if they are in good condition. Check the condition of the fuse and replace if it shows signs of deterioration. Re-grease the contact surfaces with Electrolube Ltd's 'EMPL' grease.

Check the fuse carrier interlocks (23) in the fuseway sidewalls for free vertical movement and spring return. If any is unsatisfactory, force its top out of the slot in the sidewall. Push a replacement interlock assembly (part No. 40E00074S0100) into the slot, with the spring plunger downwards, and force it home, taking care that the plunger and spring do not fall out.



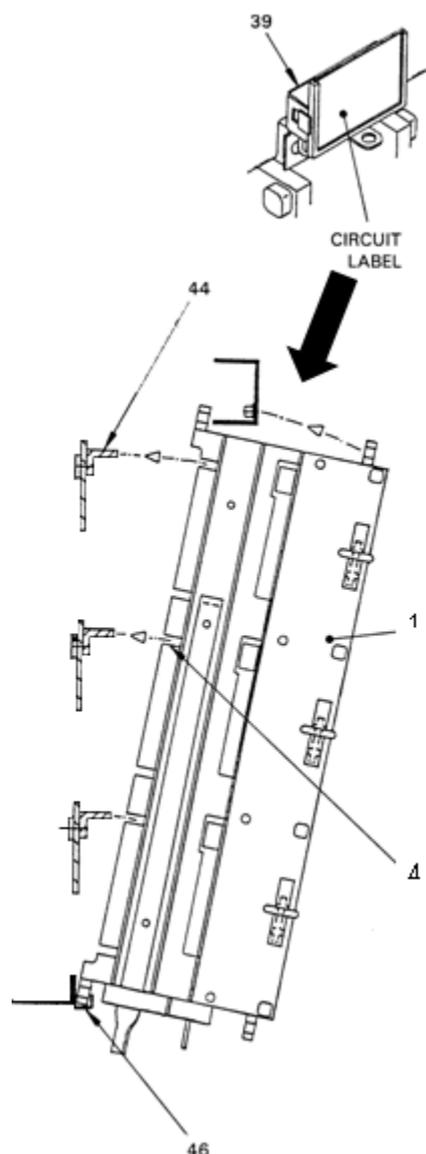
Check the visible condition of the fuseway for cracks or damage. If any are found, a fuseway replacement (see section 22.7 'SAIF fuseway replacement') is required.

22.6 - Examination and service of enclosures

Enclosures, exterior and accessible interior parts are cleaned. This does not involve any outage of the equipment. For specific details see section 21.6 'Examination & service of enclosures'.

Where interrupting the supply could cause major problems, the period between services may be extended, but we would recommend extreme caution and very careful inspection between services.

22.7 - SAIF Fuseway replacement



Which may be indicated by the findings of an examination and service, this preferably involves making the whole low voltage assembly dead. Where it is essential a fuseway may be replaced with the busbars and adjacent fuseways live. In the event that fuse carrier contact damage is found, or fuseway cracking observed, during a servicing operation, it is recommended that the fuseway concerned be removed and scrapped. Then replaced as described below. Any outgoing SAIF fuseway can be removed as a complete, triple pole, unit as follows.

Note: As busbars will be exposed, preferably fuseways should only be replaced with the equipment dead, where it is essential fuseways are replaced with busbars and adjacent fuseways live, the responsible person must ensure the work is carried out in strict compliance with 'The Electricity at Work Regulations', applicable safety procedure and that individuals carrying out the work are suitably trained and skilled.

Switch OFF and remove the fuse carriers (11) as described in section 16.2 'Switching ON and OFF' and 16.3 'Removing and Replacing fuse carriers'. Slide the insulating boots (38) down the cable tails to reveal the cable end sockets or shear head connectors. Unfasten the screws which secure the cable end sockets or shear head connectors to the three phase droppers.

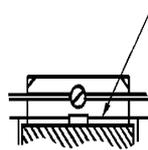
Remove the two M8 screws and washers at the top of the fuseway and keep them. Lift off the label bracket (39). Pull the top of the fuseway forward by about 80mm; this should unplug the way from the busbars. Lift the way out of its support bracket, pull the bottom end forward and lower the whole way

to clear the top support. Tilt the top forward, lift the way clear of the cable tails and remove it.

Lift up the replacement fuseway and with the top end leaning forward towards you; position its top rear fixing lugs behind the top support channel. Rest the lower end in the support bracket (46). Push the upper end of the fuseway backwards, to overcome the spring pressure on the busbar isolating contacts (45), which must open to engage the busbars (44). Some minor movement of the complete fuseway upward may be required during this operation in order to align and engage the busbar isolating contacts with the busbars.

22.8 - SAIF Fuseway CT changes

SPACER FLAP



The current transformers (CT's) on the outgoing cable cores may be changed as follows.

Remove the fuse carriers from the relevant way as described in section 16.3 'Removing and replacing fuse carriers'. Disconnect the tails from the relevant CT or CT's.

To change the blue phase CT only, disconnect the cable end socket or shear head connector.

Unfasten and remove the brass screw (40) from between the two CT wedges (41). Take out the wedges. Slide off the old CT (42).

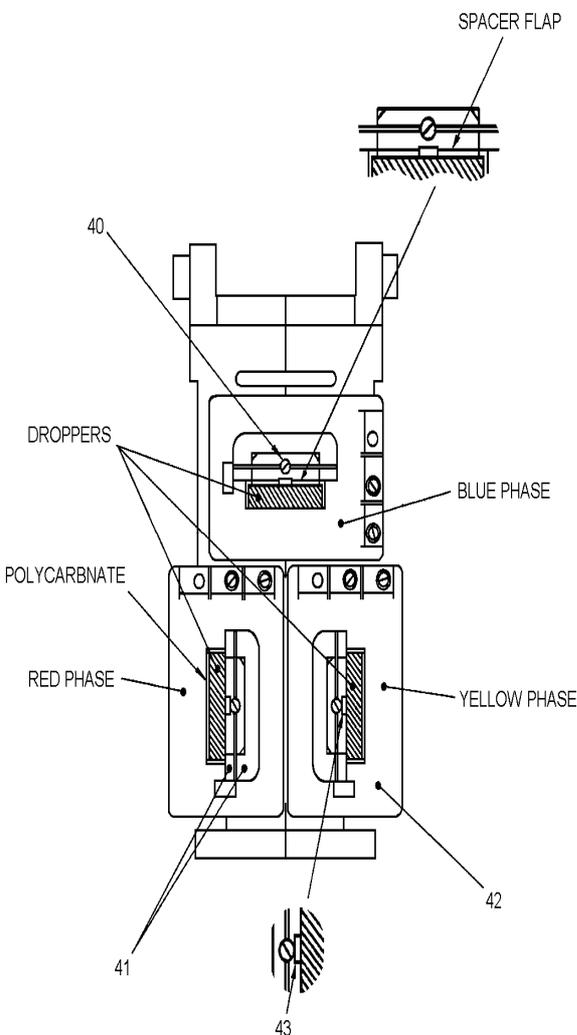
Place the new CT in the same position as the old one. Replace the wedges with the spacer flap on the back wedge trapped between the wedge and the dropper. A protrusion (43) on the dropper stops the whole assembly sliding down.

Replace and tighten the brass screw (40). Reconnect the cable end socket or remake the cable connection using a new shear head connector as applicable.

To change the red or yellow phase CT, remove the fuseway as described in section 22.7 'SAIF fuseway replacement'.

Unfasten and remove the relevant cable end sockets or shear head connector as applicable. Unfasten and remove the brass screw (40) from between the two CT wedges (41). Take out the wedges. Slide off the old CT.

Place the new CT in the same position as the old one. Replace the wedges. Note that the back wedge on red or yellow phase has the spacer flap snapped off, to compensate an intervening thickness of polycarbonate.



View on base of fuseway

A protrusion (43) on the dropper stops the whole assembly sliding down. Replace and tighten the brass screws (40). Replace the fuseway as described in section 22.7 'SAIF fuseway replacement'.

Reconnect the cable end socket to the droppers or remake the cable connections using new shear head connectors as applicable.

22.9 - Disconnecter replacement

Involves making the whole low voltage assembly dead, and can usefully be combined with transformer and/or medium voltage switchgear maintenance. For specific details see section 21.9 'Disconnecter replacement'.

22.10 - General overhaul

Involves making the whole low voltage assembly dead and partially dismantling it to give access to busbar and riser supports and other normally inaccessible components. Such an overhaul need only be undertaken when indicated by inspection, servicing or testing, or every fifteen years, whichever is the sooner.

Replace the fuse carrier in the fuseway as described in section 16.3 'Removing and replacing fuse handles' and, if required, close it to ON as described in section 16.2 'Switching ON and OFF'.

Check fuse continuity at every fuse carrier as described in section 22.3 'Routine inspection'.

Replace the screws and washers, taking care to locate the circuit label fixing bracket (39) between the washers and the fuseway rating. Reconnect the cable end sockets to the three phase droppers or remake the cable connections using new shear head connectors as applicable.

22.11 - SAIF post fault maintenance

If a fuse ruptures due to an overload or a fault, replace the fuse as described in section 6.4 'Fuse replacement' and examine the contacts and body of the carrier for signs of damage. If the moving contacts are damaged, then corresponding damage of the fixed contacts within the fuseway is also likely and the fuseway should be replaced as described in section 22.7 'SAIF fuseway replacement'.

If possible, check the cable terminations for signs of loosened contacts or damaged insulation. Repair or replace as necessary.

Any fault occurring in the equipment will require a thorough overhaul or replacement of the complete assembly, with special attention being paid to the effects of arcing, heat or smoke damage

Section 23 - Spares

The following list of spare parts does not list every individual small component, but only those assemblies which are supplied separately on request. This policy is based on years of service experience with the Shielded range and the SAIF range and on a recognition of the fact that transport, administration, loss of supply and on-site installation costs will often make the substitution of complete assemblies more cost effective than the replacement of individual components.

SAIF disconnectors will normally only be supplied as complete single phase units:

SAIF disconnector, type 3001S	5504A00200
SAIF disconnector, type 3001T	5504A00200
SAIF disconnector neutral, type 1500	5504N01300
SAIF disconnector, type 2001S	5504800100
SAIF disconnector, type 2001T	5504700100
SAIF disconnector neutral, type 1000	5504N00200
SAIF disconnector, type 1001S	5504600100
SAIF disconnector, type 1001T	5504500200
SAIF disconnector, type 500	5504N00100

Shielded fuseways will normally only be supplied as complete three phase units:

Shielded 800A fuseway	5724201600
Shielded 600A fuseway	5724200000
Shielded 400A fuseway	5724202000

Shielded fuse handles will normally only be supplied in packs containing three fuse handles (excluding fuse links):

YW6 fuse handles (92mm centre)	5680100100
YW4 fuse handles (82mm centre)	5680200100

Maintenance

SAIF fuseways will normally only be supplied as complete, three phase units including fuse carriers (excluding fuse links):

SAIF fuseway, type 800 BS MKII	5504400000
SAIF fuseway, type 630 BS MKII	5504301400
SAIF fuseway, type 400 BS MKII	5504200700

SAIF fuse carriers will normally only be supplied in packs containing three carriers (excluding fuse links):

SAIF fuse carrier, type 800 BS	5580007400
SAIF fuse carrier, type 630 BS	5580000500
SAIF fuse carrier, type 400 BS	5580000400

SAIF fuse carriers moving contacts (blades) will normally only be supplied in packs containing one pair of blades:

SAIF fuse carrier blades, type 800 & 630 BS	20543003C01*W
SAIF fuse carrier blades, type 400 BS	20542003C01*W

SAIF and Shielded accessories:

Insulated disconnect handle	40E0081S01*0
Vertical disconnect locking-off device	55800000800
Horizontal disconnect locking-off device	55800001000
Shielded fuseway padlocking device	5780000100
Disconnect torque setting spanner	20590000C01*R
SAIF fuseway switching mechanism MKII	5580000400
SAIF fuseway padlocking device, type PDO	5580000600
SAIF fuseway padlocking device, type PDI	5580000700

Section 24 - Lexicon

SCDB – Substation Cable Distribution Board

TMO – Outdoor Transformer Mounted

Fuseway – An outgoing distributor unit in which each pole (phase) consists of a fuse link that can be removed without the aid of additional tools

SAIF – Switched and Insulated Fusegear

Fuse handle – A through grip shrouded fuse carrier, of porcelain or other suitable insulating material, which provides a secure connection to the fuse link by means of wedge connections and insulated contact tightening thumbscrews

Fuse carrier – The movable part of a fuse way designed to carry a fuse link

TFX – Transformer Mounted Fuse boxes. Suitable for outdoor installation and fixing to the LV Flange of a distribution transformer

CNE – Combined Neutral and Earth

SNE – Separate Neutral and Earth

RCD – Residual Current Device – A mechanical switching device or association of devices intended to cause the opening of the contacts when the residual current attains a given value under specific conditions

Residual Current – Algebraic sum of the currents in the live conductors of a circuit at a point in the electrical installation

Residual Operating Current – Residual current which causes the RCD to operate under specified conditions

Circuit Breaker – A device capable of making, carrying and breaking normal load currents and also making and automatically breaking, under pre-determined conditions, abnormal currents such as short-circuit currents.

Short circuit currents – A over current resulting from a fault of negligible impedance between live conductors having a difference in potential under normal operating conditions

Over current – A current exceeding the rated value. For conductors the rated value is the current carrying capacity

Skilled Person – A person with technical knowledge or sufficient experience to enable him/her to avoid dangers which electricity may create

Disconnecter – A mechanical switching device which, in the open position, complies with the requirements specified for isolation.

Isolation – A function intended to cut off for reasons of safety the supply from the transformer to the unit to allow safe coupling of cables etc.

Details of revision		
<i>Version</i>	<i>Comment</i>	<i>Date</i>
1.0	First Draft Issue	December