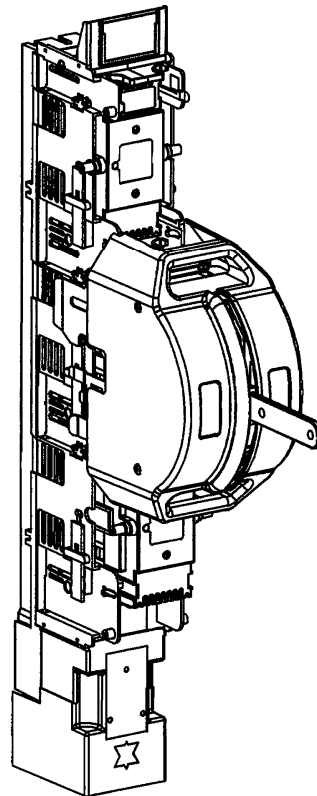


**MERLIN GERIN**  
**PUBLIC DISTRIBUTION PRODUCTS**  
SCARBOROUGH YO11 3DA ENGLAND

THE **'OPUS'** RANGE



**OPERATING AND MAINTENANCE MANUAL FOR  
OPUS EXCEL HRC STRIP TYPE FUSE SWITCH  
DISCONNECTORS**

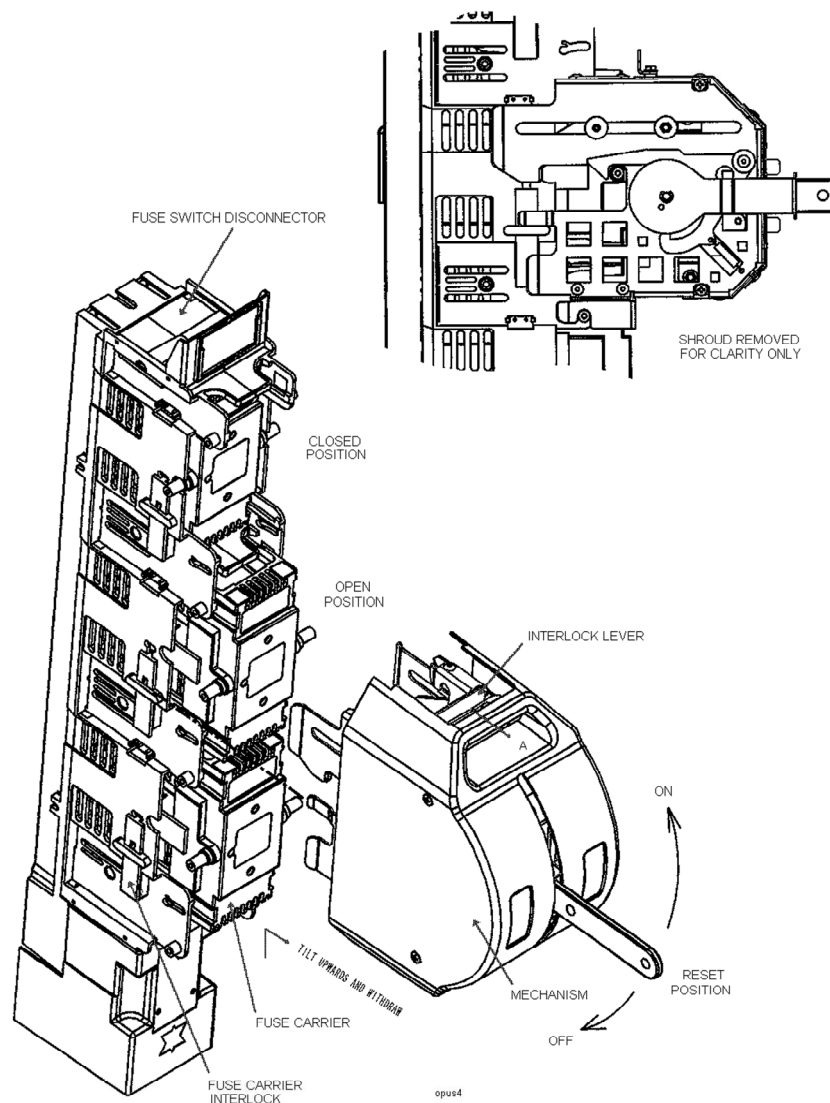
**FOR USE BY COMPETENT PERSONNEL**

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 ASSMBLIES) 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.

## OPERATION OF PORTABLE SPRING ASSISTED SWITCHING MECHANISM

- 1 Hold the mechanism top and bottom and squeeze the interlock lever in the direction of the arrow 'A' as shown in the diagram. The operating handle at the front of the mechanism **must** be in the reset position to enable this to be done.
- 2 Offer the mechanisms to the fuse switch disconnecter, moving forward and down on the appropriate locating dowels. The drive arms will automatically engage with the fuse carrier. As the mechanism is positioned the fuse carrier location interlocks will be released and the drive arms will assume responsibility for the fuse carrier position.
- 3 Release the interlock lever to secure the mechanism in place and free the operating lever at the front of the mechanism.
- 4 To close a circuit, move the operating lever at the front of the mechanism upwards. To open a circuit, move the operating lever at the front of the mechanism downwards. When the switching operation is complete the operating lever at the front of the mechanism **must** be returned to the reset position to disable the interlock and allow the mechanism to be removed. Removing the mechanism is the reverse procedure to fitting.

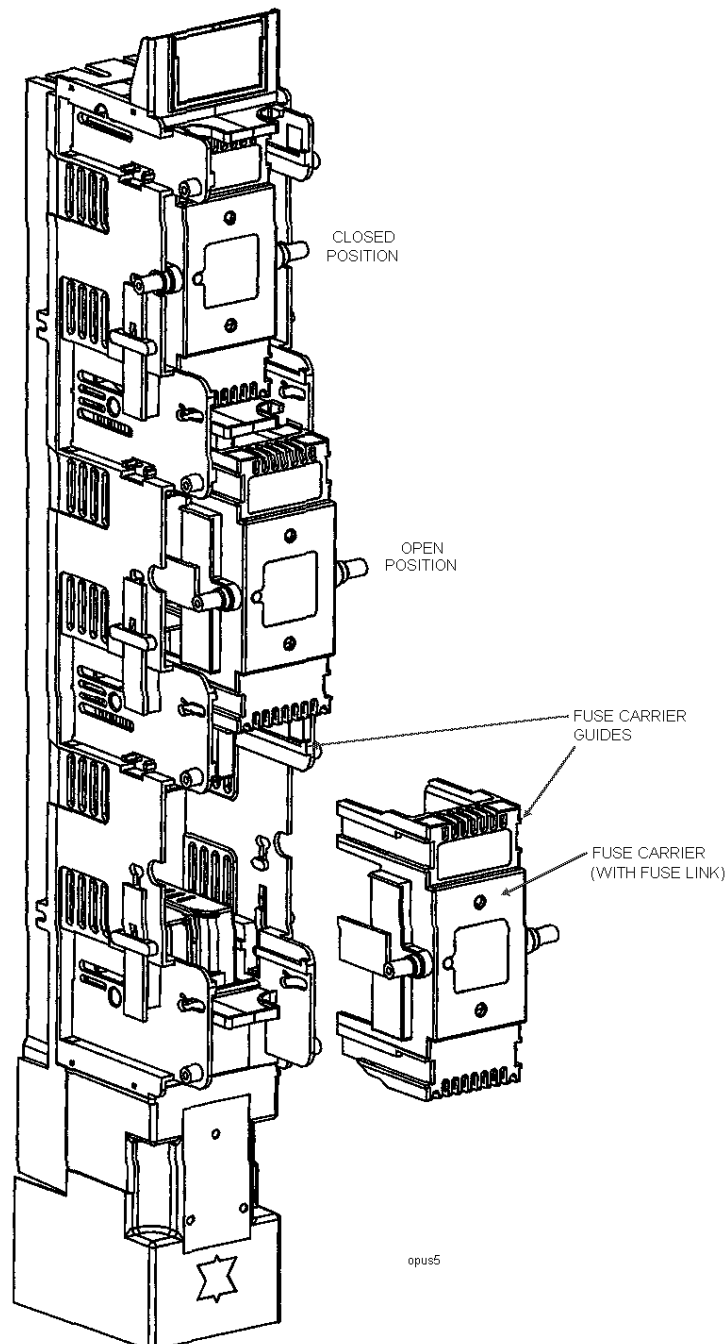
**NB:** The fuse carriers are interlocked to prevent switching without the mechanism.



## FUSE CARRIER FITTING AND REMOVAL

- 1 To remove a fuse carrier, ensure the carrier is in the 'Disconnected' position ('OFF' labels visible on the top of the carrier). Switching from the 'ON' state to the 'OFF' state with the mechanism if necessary as described. Tilt the fuse carrier to allow the carrier to clear the stops on the ends of the runners, which are situated on the inside walls of the fuse switch disconnecter moulding, withdraw the fuse carrier.
- 2 To fit a fuse carrier, reverse the above procedure ensuring the carrier is behind the stops on the runners before switching.

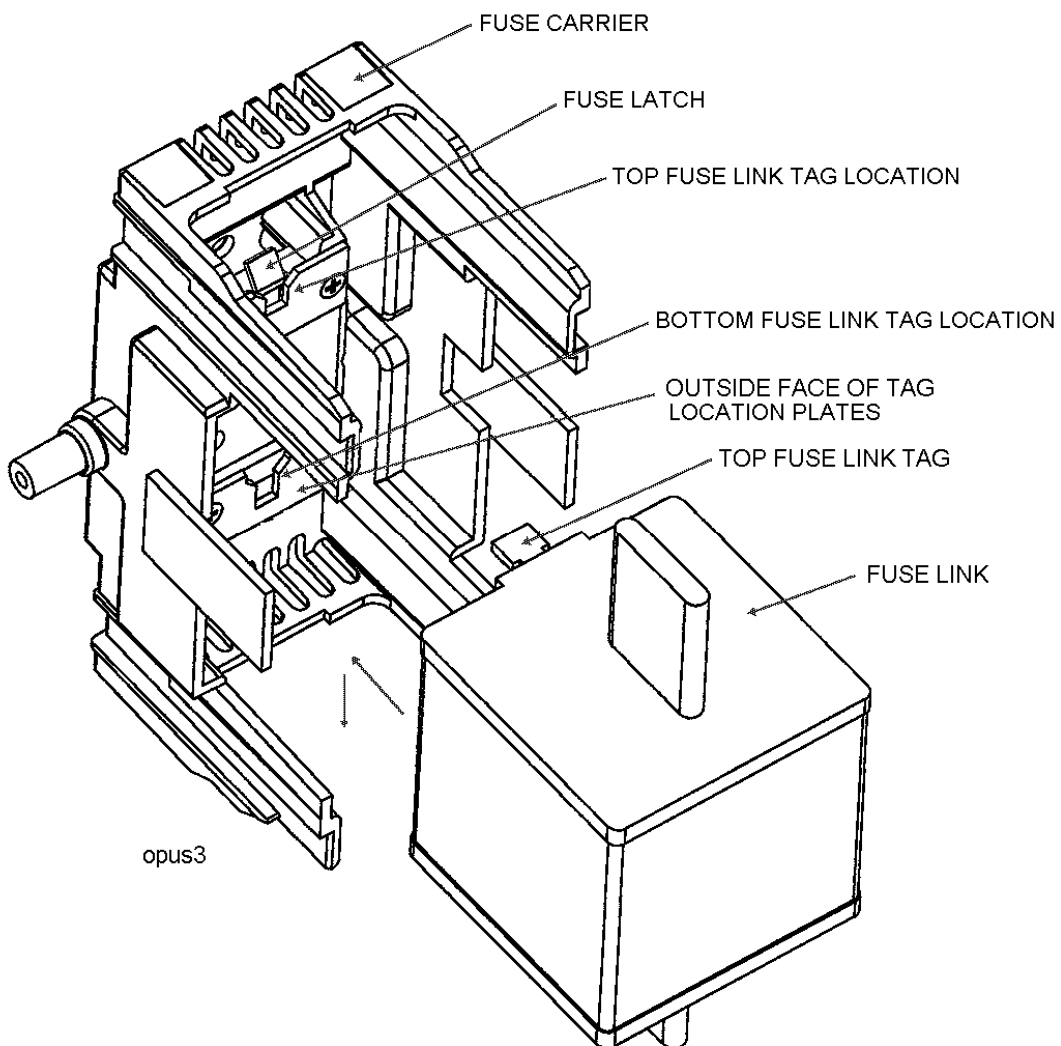
**NB:** When the carriers are in the 'Connected' position 'ON' labels are visible on the inside walls of the fuse switch disconnecter moulding opposite the appropriate carriers.



## INSTALLING AND REPLACING HRC FUSE LINKS

- 1 To remove a fuse link, push the fuse latch forwards until it allows the fuse link to be lifted out.
- 2 To fit a fuse link, push the fuse forward towards the front of the carrier, when the fuse link touches the outside faces of the top and bottom tag location plates the fuse link can be moved downwards until it clips in to place. The fuse latch will spring forward automatically holding the fuse link in place.
- 3 The 400A OPUS fuse carrier accepts IEC/DIN blade type fuse links size 2, ratings up to 400A.  
The 630A OPUS fuse carrier accepts IEC/DIN blade type fuse links size 3, ratings up to 630A.

**NB:** The rating of the fuse carrier is shown on the label on the front face of the carrier.

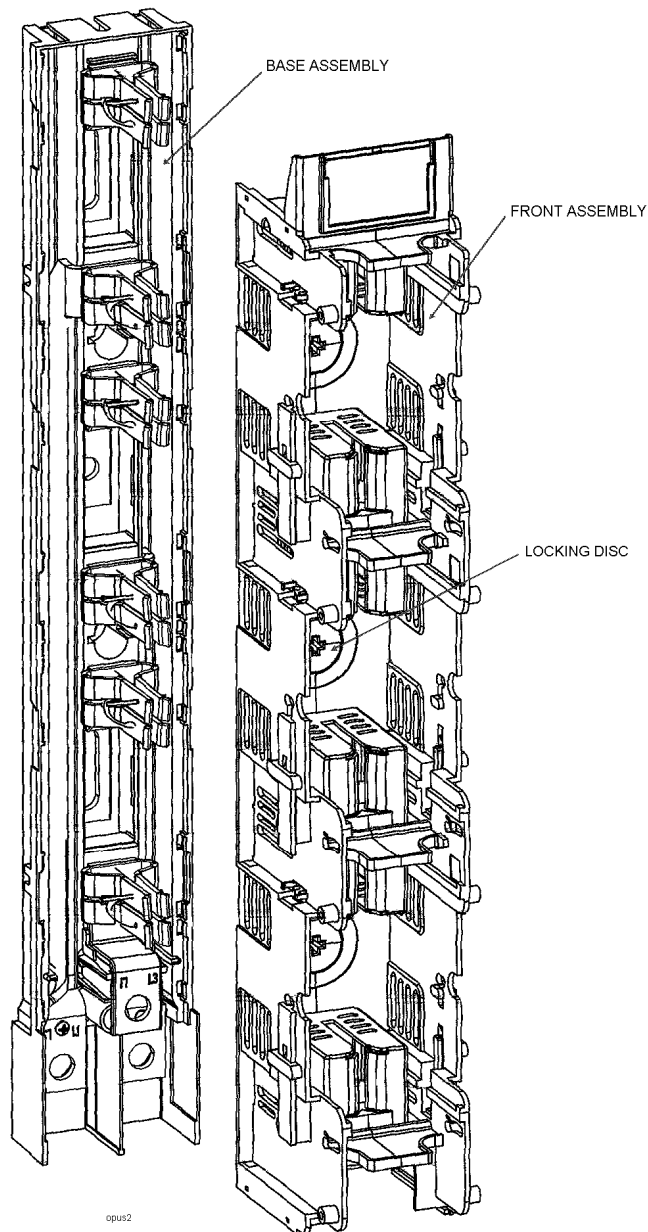


## FUSE SWITCH DISCONNECTOR MOUNTING (DOWNWARD DIRECT CABLES)

- 1 To prepare the fuse switch disconnecter, remove the three fuse carriers.
- 2 To remove the front section turn the three locking discs clockwise  $\frac{1}{4}$  turn and lift the front section away from the base assembly.
- 3 To mount the base assembly, offer the base assembly up to the busbar system and secure to the busbars, fastening the M12 fixings to 80Nm. Secure the base assembly to the horizontal supports of the busbar assembly using the two mounting positions between the phases on the base assembly.

**Note:** The electrical clearances to the busbar and cable terminals should as a minimum be in accordance with IEC 60439-1.

- 4 To refit the front assembly, lift the front section back on to the base assembly and turn the three locking discs anti-clockwise  $\frac{1}{4}$  turn.

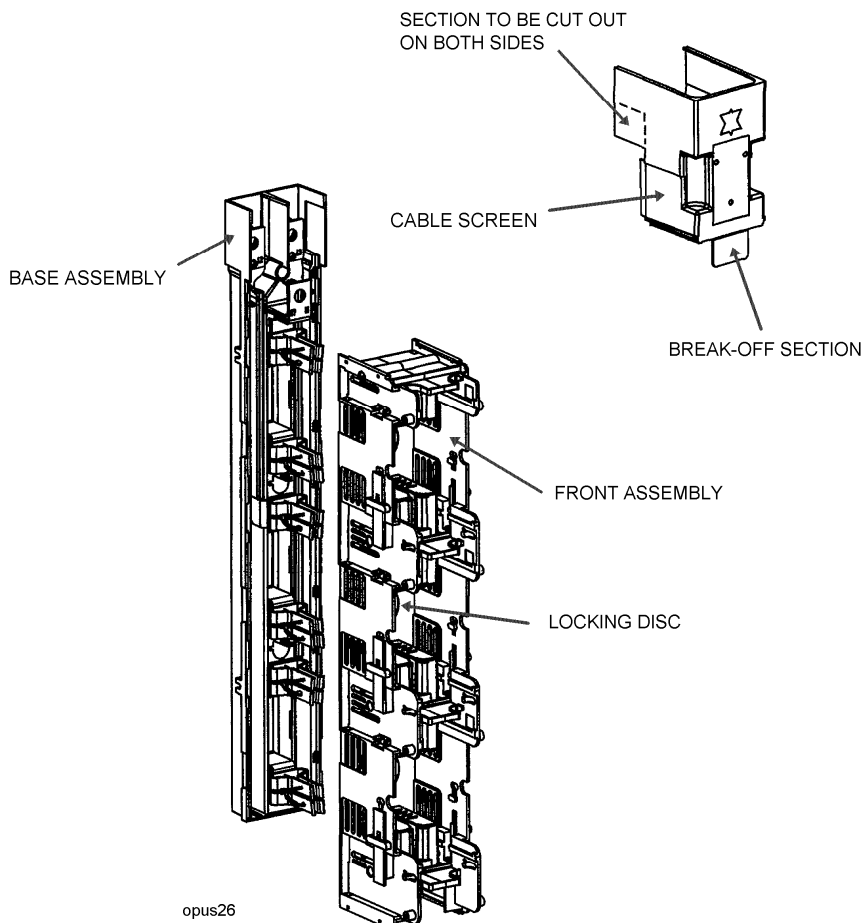


## FUSE SWITCH DISCONNECTOR MOUNTING (UPWARD DIRECT CABLES)

- 1 To prepare the fuse switch disconnecter, remove the three fuse carriers.
- 2 To remove the front section turn the three locking discs clockwise  $\frac{1}{4}$  turn and lift the front section away from the base assembly.
- 3 To mount the base assembly, invert the base assembly so that the cable connections point upwards, offer the base assembly up to the busbar system and secure to the busbars, fastening the M12 fixings to 80Nm. Secure the base assembly to the horizontal supports of the busbar assembly using the two mounting positions between the phases on the base assembly.

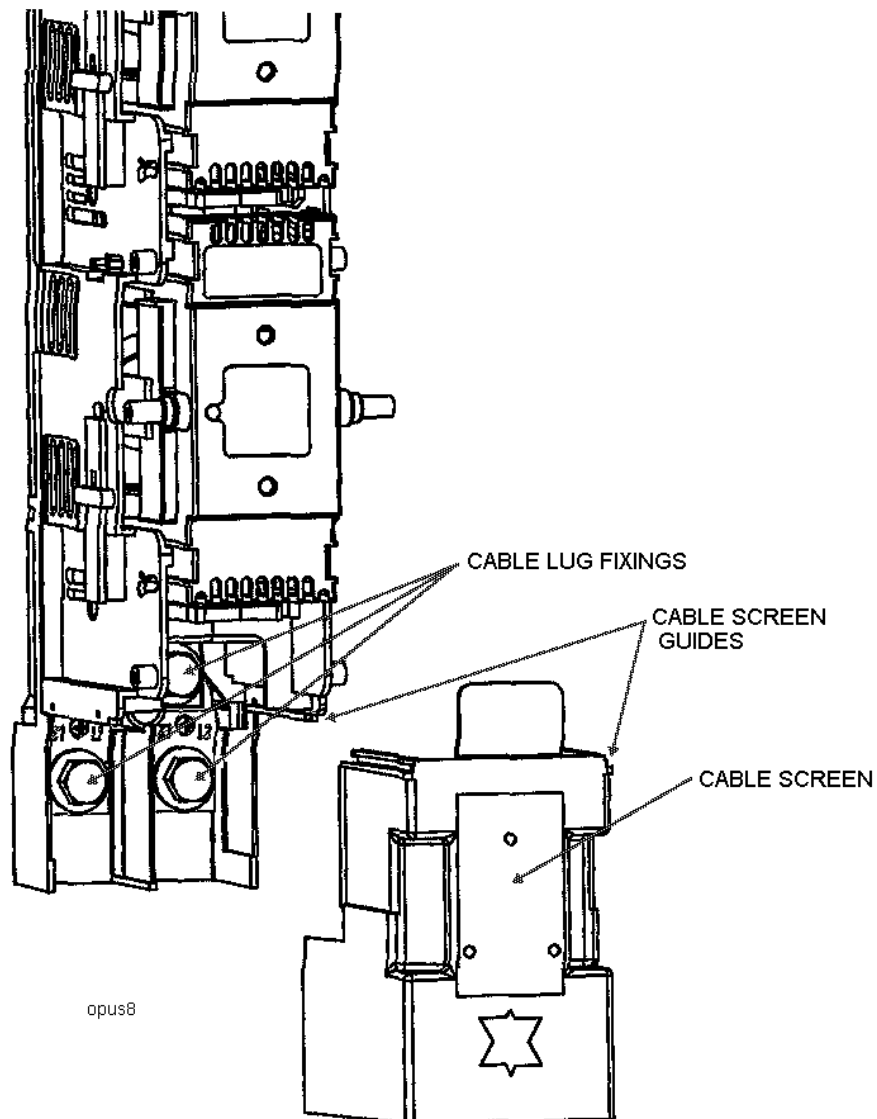
**Note:** The electrical clearances to the busbar and cable terminals should as a minimum be in accordance with IEC 60439-1.

- 4 To refit the front assembly, lift the front section back on to the base assembly as shown in the diagram and turn the three locking discs anti-clockwise  $\frac{1}{4}$  turn.
- 5 The label holder should be removed from the top of the fuse switch disconnecter, inverted and fitted at the bottom.
- 6 The cable screen will require the break-off section at the top to be removed and the two rectangular sections on either side to be cut out. The cable screen fits in a similar manner as when positioned at the bottom.



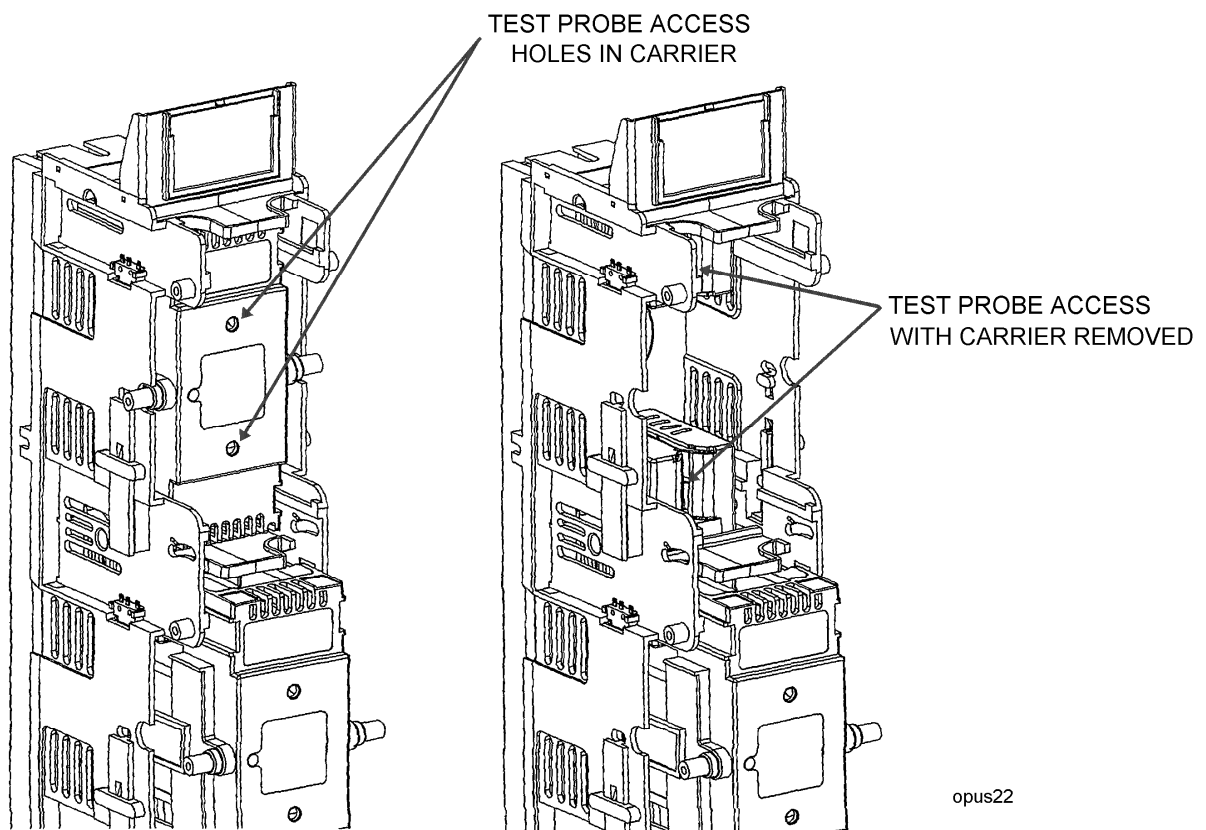
## FUSE SWITCH DISCONNECTOR CABLING INSTRUCTIONS

- 1 To remove the cable screen, slide the cable screen away from the fuse switch disconnecter until clear of the guides.  
**CAUTION:** Cable connections will be connected to the busbars when the carriers are in the 'ON' position.
- 2 To terminate the cables, attach the cable end sockets to the correct phase connections using the fixings provided, tighten the fixings to 35Nm for the 400A unit or 50Nm for the 630A unit..
- 3 To replace the cable screen, locate the cable screen into the guides and slide back into position.



## ROUTINE TEST ACCESS

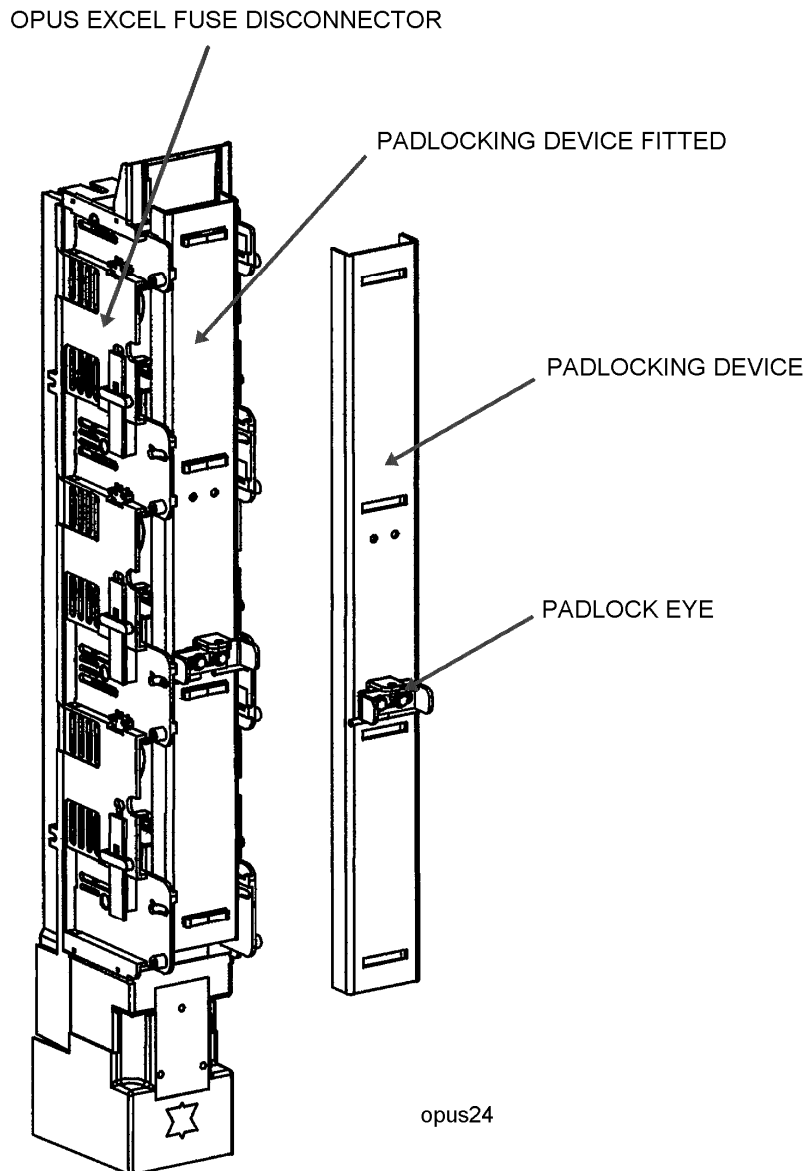
- 1 Whilst fully complying with the requirements of IP2X to IEC 529, the design of OPUS Excel fuse disconnectors allow a wide variety of routine monitoring tests to be carried out, using standard lamps or voltmeter probes.
- 2 When a carrier is in place and the circuit closed, the busbar (top) are accessible through the top hole in the fuse carrier front face. The cable (bottom) contacts are accessible through the bottom hole in the fuse carrier front face. This permits checks to see if a fuse link has ruptured.
- 3 Using the cable (bottom) contact accesses and the neutral busbar of the busbar system allows phase to neutral testing of the outgoing circuit.
- 4 Using the busbar (top) contact accesses on different phases allows phase to phase testing of outgoing circuits.
- 5 The busbar (top) contacts and cable (bottom) contacts are accessible with the carriers removed by using the slots in the contact shields.





## FUSE DISCONNECTOR LOCKING OFF FACILITY

- 1 The locking off device enables fuse switch disconnectors to be locked off when the fuse carriers are removed, this prevents insertion of any fuse carrier into the fuse switch disconnector.
- 2 To lock a fuse switch disconnector off, remove the fuse carriers from the fuse switch disconnector.
- 3 Take the locking off device and close the sliding metal clasps inwards to allow the device to be installed.
- 4 Locate the four slots over the protruding sections of the fuse switch disconnectors moulding and slide the metal clasps outwards to engage in the slots in the side of the fuse switch disconnectors side mouldings. This will align the central holes of the clasps enabling a padlock to be fitted; this prevents the device from being removed and any fuse carriers to be fitted.



## INSPECTION AND MAINTENANCE

### General Maintenance Policy

This document is to be used as a guide to the maintenance of the OPUS Excel range of fuse switch disconnectors.

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

### Frequency of Maintenance

Different environments, loadings, types of load and frequency of operation will affect the maintenance requirements of OPUS Excel fuse switch disconnectors, so that the following recommendations are for guidance only and are based on:

- (i) **Indoor Equipment** installed indoors in dry, well ventilated substations or switchrooms, with atmospheres which are not unduly corrosive, and employed on normal distribution duties.
- (ii) **Outdoor Equipment** installed outdoors where the atmosphere conditions of the site are reasonably clean and the equipment is not subjected to excessive pollution's, such as occur 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 adverse conditions. Operational experience will determine how much more or less attention particular installations require.

In the case of units supplying bulk customers, it may be possible to schedule substation outages with the customers own maintenance programmes. Where a number and variety of customers are served by an installation, however, an escalating programme as follows is suggested.

**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.

**Examination and Service**, should be undertaken at least every five years, during which OPUS Excel fuse switch disconnectors have their fuse carriers removed for examination and lubrication of the fuse switch disconnector contacts, and also an examination of the fuse links. This involves 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.

**Fuse switch disconnector replacement**, which may be indicated by the findings of an examination and service, involves making the whole low voltage assembly dead.

**General overhaul** involves making the whole low voltage assembly dead and partially dismantling it to give access to the busbars and other normally inaccessible components. Such an overhaul should be undertaken as and when recommended by the manufacturer of the busbar system.

## **ROUTINE INSPECTION**

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.

Check that the room is clean, dry and well ventilated and that external grilles are clear. Clear any rubbish, provided that this does not involve interfering with the equipment.

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

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

### **Examination and Service of Fuse switch disconnectors**

ISOLATE THE TRANSFORMER PRIMARY/INCOMING SUPPLY, operate any isolator to the OPEN position. Isolate any L.V interconnecting supplies.

Remove each fuse carrier in turn from the fuse switch disconnector as described. Check the condition of the fuse link and replace if it shows signs of overheating.

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

Remove the front mouldings from the fuse switch disconnector. Clean any hardened or discoloured grease from the contacts using a suitable solvent, such as one based on electronics grade trichloroethane. Silver plating on 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 fuse switch disconnector should be replaced.

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

Regrease the contacts with Electrolube LTD's 'EMPL' grease.

Replace the fuse carriers onto the fuse switch disconnector.

Repeat for all fuse switch disconnectors.

RECLOSE THE INCOMING ISOLATOR RE-ENERGISING THE INCOMING SUPPLY.